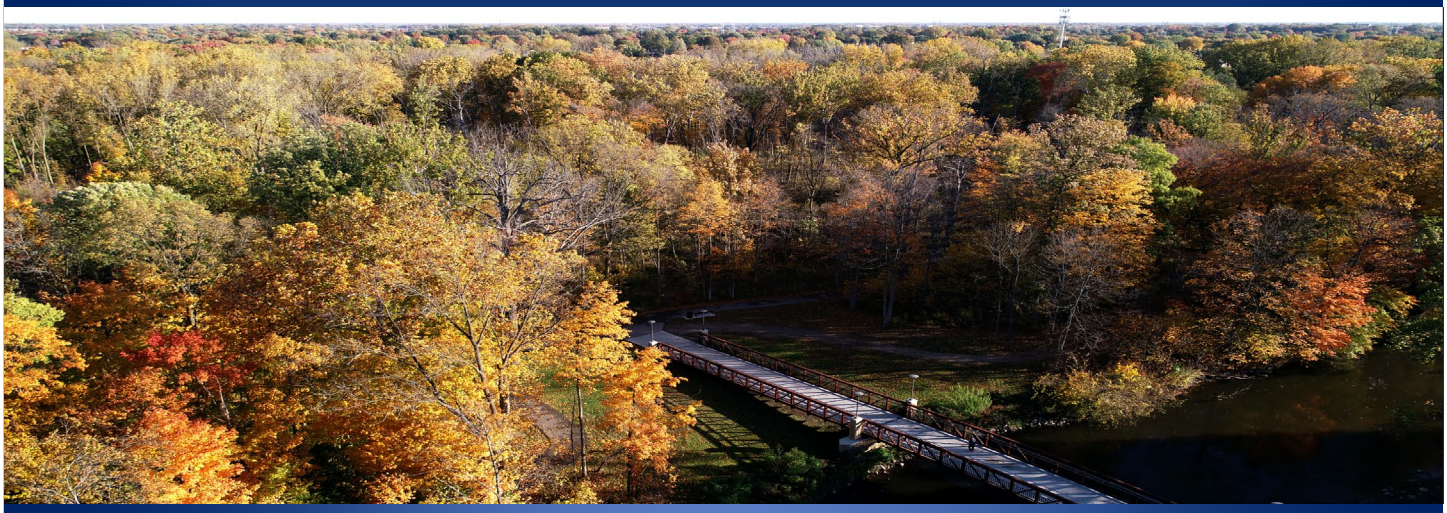
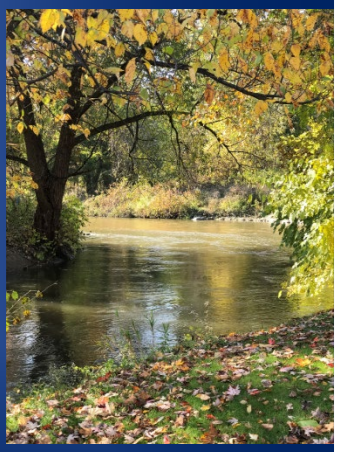




SUSTAINABILITY COMMISSION
Sustainability Plan
June 16, 2021

SUSTAINABILITY COMMISSION
June 16, 2021

SUSTAINABLE
CITY OF Sterling Heights

Table of Contents

Section I.
Executive Summary

Embedded within the official seal for the City of Sterling Heights are symbols of courage, quality, achievement, and peace. In the December 1968 adoption of the seal, while it is unlikely City Council had *sustainability* forefront in the discussions, the City founders were insightful enough to also include specific text "***To Strive on Behalf of All***." These foundational concepts helped foster growth of a farming community depending on the Clinton River for its livelihood to a major residential and commercial anchor of the Metro Detroit area. As undeveloped land becomes scarcer and new risks emerge, the City must balance growth with securing a healthy community now and decades into the future. **The only option is to embrace sustainability.** To strive on behalf of all entails consideration of the present and the generations to come. This will require every individual and City department to draw upon these foundations to examine how our decisions potentially affect not only our city limits but also our contributions to the livability of our planet as a whole.

Even in the midst of the 2008 financial crisis, the City prepared for a better, more successful future by embarking on its Visioning 2030 Strategic Plan. The foresight to recognize that Sterling Heights needed a well-defined strategy for a successful future has paid incredible dividends in the short term, with the City being recognized as a highly desirable place to live by a diverse group of independent sources. Fueled by significant community investment through initiatives such as the *Re*creating Recreation and Safe Streets initiatives, there is tangible positive energy within the City as residents are connecting with Sterling Heights in new and unique ways—the essence of positive placemaking.

On April 22, 2008, City Administration published a Strategy for a Sustainable Sterling Heights to coincide with Earth Day 2008.[1] This first-ever comprehensive sustainability strategy for the City is laudable for a commitment to creating a healthy environment, vigorous economy, and vibrant community. This strategy established specific goals for air, ecosystems, energy, land, materials, water supply, and water quality for Sterling Heights.

Unfortunately, the Great Recession (2009–2013) set in shortly after the creation of this document and forced the City to redirect its efforts. During this time immediately following the development of the 2008 plan, the City being able to both provide essential services and fund new initiatives was not viable. Committing to sustainability is not always easy. It takes a long-term commitment and meaningful, measurable actions, paired with a change in mindset, education, and financial commitment. Nurturing and realizing the long-term benefits are very difficult, as evidenced by the City's initial efforts in 2008, but there can be no greater legacy for City leadership than guaranteeing a better Sterling Heights to its future inhabitants. Sustainability is not a short-term undertaking. As noted by preeminent sustainable architect William McDonough:

"Sustainability takes forever. And that's the point."

Yet, like any successful organization, the City of Sterling Heights must be vigilant to ensure its success is sustainable. This fundamental duty of City leadership can be overlooked in times of prosperity. Complacency must be avoided. Sustainability has been globally recognized as a proven way to build a better community across a broad spectrum of topics, including economic prosperity, equity, social/cultural vitality, and environmental integrity.

I.A. How to Define Sustainability

Sustainability, under its traditional definition, simply means there is a focus on meeting "the needs of the present without compromising

[1] This report is on file with the Office of Planning and can be obtained by contacting the City Planner.

the ability of future generations to meet their own needs."[2] While this definition is straightforward, it fails to capture the activism and commitment necessary **today** to secure that future. The Sustainability Commission Ordinance provides its own definition of Sustainability, which further delineates the meaning of sustainability as it relates to the City.

(a) Sustainability means balancing environmental, economic, and social demands to adopt strategies and activities for the use of resources that meet the needs of the city and its stakeholders today while protecting, sustaining, and enhancing the human and natural resources that will be needed in the future. A sustainable community seeks to enhance the socio-environmental-economic well-being of the community while taking precautions not to compromise the quality of life of future generations. Toward that end, it reduces its use of nonrenewable natural resources and its production of wastes, while at the same time improving livability.

(B) As defined by the World Commission on Environment and Development (a/k/a the 1987 Brundtland Commission), sustainability means meeting the needs of the present generation without compromising the ability of future generations to meet their needs.

(C) Sustainability is an evolving concept and the definition will evolve over time. The Sustainability Commission may create and utilize a new definition from time to time in order to ensure its work remains modern and relevant.

"Sustainability is not a goal to be reached but a way of thinking, a way of being, a principle we must be guided by."

—Giulio Bonazzi
Chairman, Aquafil Group

[2] World Commission on Environment and Development, *Our Common Future* (New York: Oxford University Press, 1987), 43.

I.B. The Sustainability Plan Overview

The City of Sterling Heights is not alone in facing the challenges ahead in ensuring a sustainable future. Many local communities, larger cities across the nation, countries around the world, and major corporations already have a significant head start in adding sustainability planning as essential to mitigating future risks and fostering healthy communities.

For instance, in 2015, the United Nations established 17 Sustainable Development Goals (SDGs). The United Nations goals show how far-reaching into almost every aspect of life sustainability can go. These goals create a strong foundation and well-researched global standard for development of locally focused sustainability plan. This plan examines each SDG for its applicability to Sterling Heights and within the scope of the City's defined focus areas of sustainability.

Goals 1, 2, 4, 5, 14, and 16 are outside the scope of this plan

United Nations Sustainable Goals

There are abundant resources the City can tap for guidance in determining best practices in each of the key areas of this Sustainability Plan. The better aligned our own City's plans are with these foundational efforts, the more we will bring resilience and confidence to our direction by connecting our future to these global community efforts. It is important to recognize our City and its footprint do not exist in a silo, and our prosperity is intrinsically tied to the prosperity of our environment, our fiscal stability, and the health and well-being of our residents and businesses.

This report is intended to refocus attention upon the need to commit to sustainability and offer guidance as to the best ways to allow it to take root in the City. The following areas of focus in this report are not exclusive or exhaustive but serve a foundational purpose. The Sustainability Commission hereby recommends that City Government and Administration draw upon the concepts embedded in our City Seal to create *measurable and meaningful* actions to support the recommendations in each of these key areas.

Section II
Natural Assets

This section addresses the need for preservation and enhancement of the natural environment, including trees, waterways, wetlands, open space, and parks that have long defined the image of Sterling Heights as a destination for those seeking a high quality of life, green spaces, and recreation. The value of these natural assets goes far beyond the City's substantial investment in the Clinton River and the 31 parks throughout the City. Fostering residential connections to and appreciation of the city's natural assets, their protection and value is in the essence of placemaking.

Section III
Sustainable Mobility

People are moving about in a multitude of new ways, and this trend is going to continue to evolve both in the context of motorized and non-motorized means. The City's commitment to multi-modal transit development plays to a residential population seeking alternate ways to move in and around the City. The business community wants future-focused, supportive environments for its employees and an environment that brings more customers. This includes non-motorized means, such as increasing opportunities for walking, running, and riding a bike, along with motorized means, such as scooters, electric vehicles, ride-sharing, mass transit, etc. This section addresses the need to plan and implement multi-modal roads, sidewalks, paths, and overall infrastructure to prepare for the next generation of transportation needs.

Section IV
Sustainable Development and Land Use

As a maturing municipality that is largely built out, Sterling Heights is wise to focus on sustainable development and land use patterns. With an absence of large tracts of vacant land, Sterling Heights' future prosperity and ability to become more sustainable is dependent on the redevelopment of underutilized, obsolete, and environmentally challenged properties. When any development occurs, the City will need to consider the life cycle of that development.

Section V
Environmental Stewardship

Protection of the local environment and recognition of our impacts to the environment outside the city is a continuous improvement process that requires an "all-hands-on-deck" commitment. Unfortunately, there are significant challenges to achieving a high level of environmental stewardship. The effects of climate change are likely to pose increasing threats to the City's natural assets, developments, and residents. Although the City cannot tackle climate change on its own, the City must consider threats from anthropogenic climate change in its decision-making

processes. Climate change is not just an environmental issue but also one with financial, equity, and health risks to the community.

The City should also continue to take steps to reduce pollution and greenhouse gas emissions. In its efforts to reduce greenhouse gas emissions, the City should consider both public and private sources of greenhouse gases. Safeguarding both the storm and sanitary sewer infrastructure (in cooperation with County responsibilities) from illicit discharges is yet another duty that must be faithfully discharged by the City in order to protect the environment. The recycling industry is in the midst of a tumultuous period that is affecting municipal waste collection nationwide. Sterling Heights must carefully navigate this evolving market and ensure best practices are adhered to and aligned with state and national goals. Working toward Zero Waste principles aids in reducing the recycling and landfill burdens and moving toward a more sustainable culture throughout all city operations.

Section VI
Implementing a Sustainable Sterling Heights

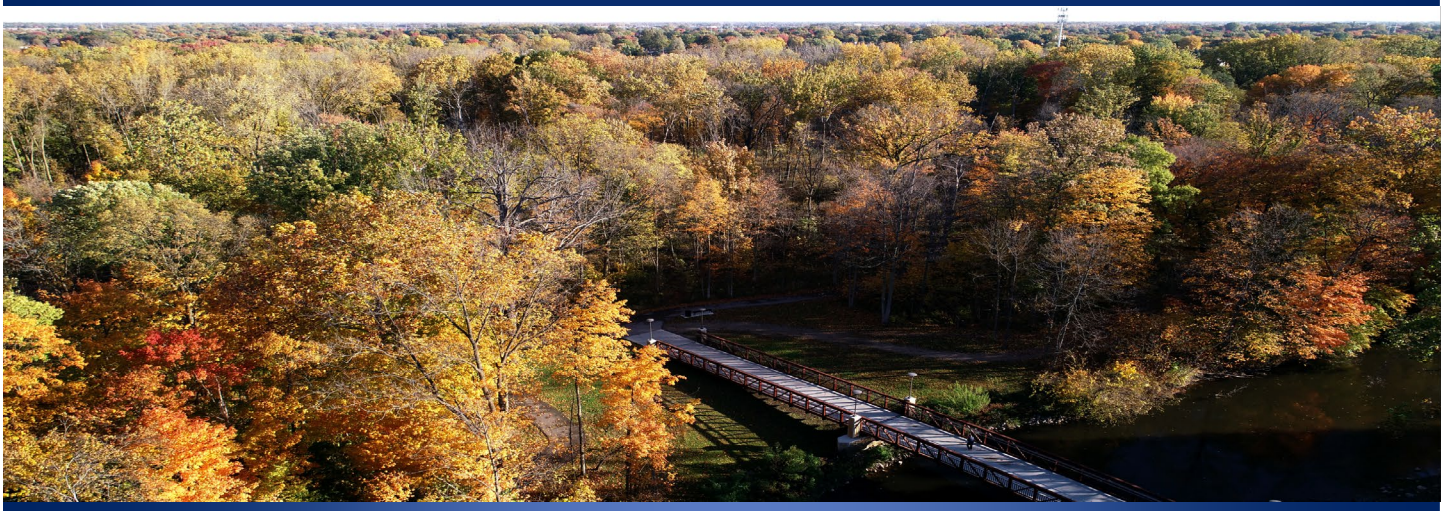
This section sets forth the timeline for undertaking this necessary effort.

Section VII
Concluding Remarks

This section offers some final thoughts and recommendations.

Section VIII
Document History

The Sustainability Commission recognizes that this plan will continue to be a work in progress that will require updates in the future. Future revisions to the plan will be noted at the end of the document.



SECTION II NATURAL ASSETS

Section II
Natural Assets

Sterling Heights is fortunate in having a significant number of natural assets. The Organisation for Economic Co-operation and Development provides the following definition of natural assets: "Natural assets are assets of the natural environment. These consist of biological assets (produced or wild), land and water areas with their ecosystems, subsoil assets and air."[3]

II.A LAND

Thirty-one major and neighborhood parks / green spaces offer a variety of active and passive recreational opportunities to residents. These largely green open spaces are dispersed throughout Sterling Heights, offering respite from the congestion, noise, and hardscape of subdivisions and major roadways. Parks are vital to community health and prosperity; a 2019 survey by the Southeast Michigan Council of Governments (SEMCOG) found that 95 percent of respondents agree that "Parks have a positive impact on the quality of life in my community" and that 80 percent of respondents participate in some form of outdoor recreational activities.[4]

The City of Sterling Heights has significant environmental assets for a fully developed City. A truly unique open space is the Plumbrook Nature Preserve, a 91-acre tract in the far northwest corner of the City that is untouched by development. A seven-mile stretch of the Clinton River traverses Sterling Heights. Through the help of a 2015 $4.5 million reclamation grant from the Environmental Protection Agency (EPA), the Clinton River now offers improved erosion control, wildlife habitat, family-friendly kayaking/canoeing, and fishing opportunities few communities in southeastern Michigan can match.

The City has significant treed areas as well, many of which are within the City's parks. With a Tree City USA designation for the past 36 years, the City has made a long-term commitment to its overall woodland canopy. Unfortunately, this was hindered by development over the last four decades along with natural impacts, such as the emerald ash borer infestation.[5] As of 2016, the City's tree canopy coverage was estimated at 19 percent.[6] As a part of its commitment to the increased tree canopy, the City has established a goal of increasing its tree canopy to approximately 30 percent, an increase of nearly 11 percent.[7]

Ensuring that the City's parks, open spaces, and natural assets are preserved and enhanced is a sustainability challenge. In addition to maintaining and protecting existing parks and the Plumbrook Nature Preserve, the City should remain open to purchasing vacant parcels for preservation and/or recreation.

The City should also consider that existing trees, as well as new plantings, are likely to see additional stresses from changes in regional climate conditions and invasive pests.

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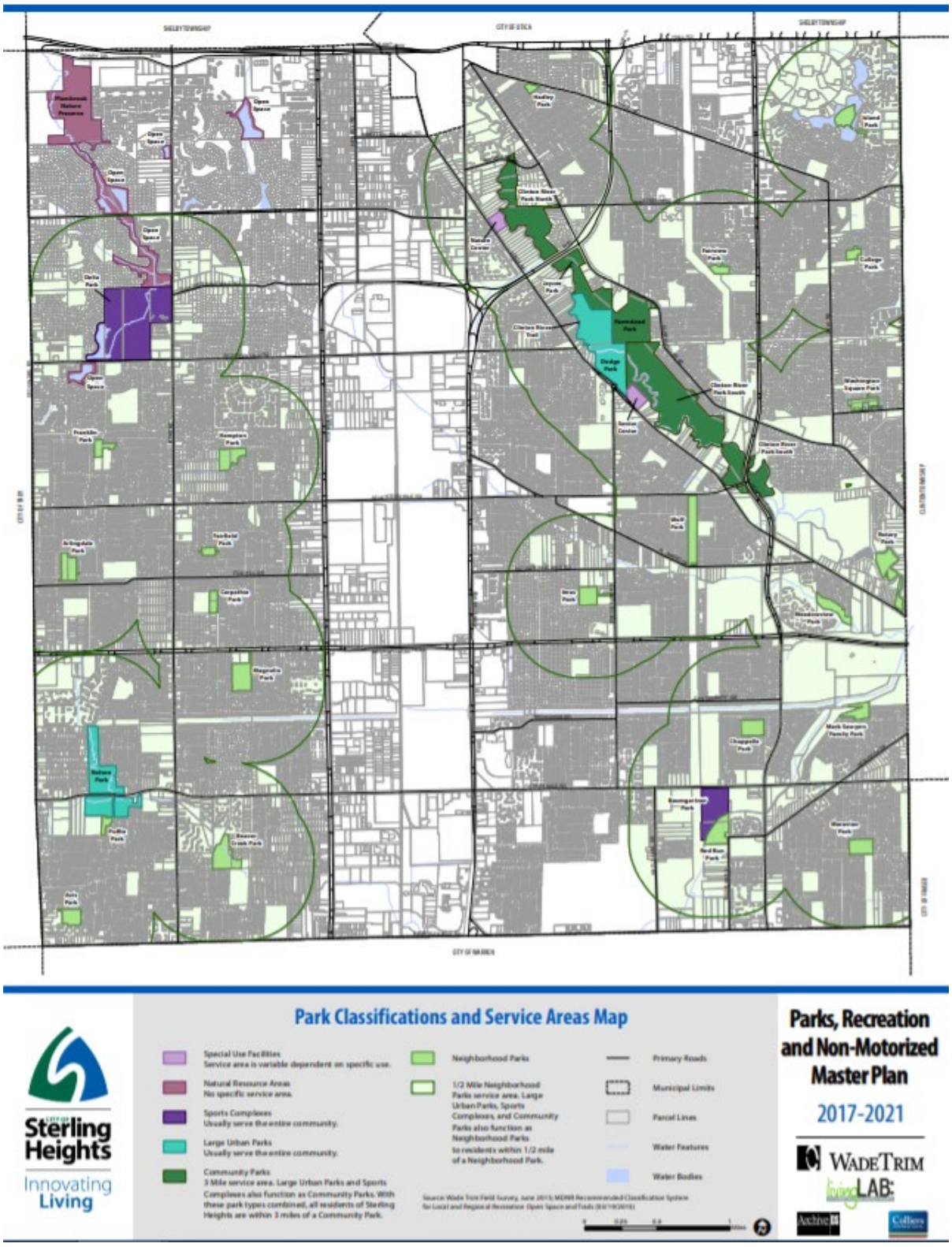
[3] "Natural Assets," Glossary of Statistical Terms, Organisation for Economic Co-operation and Development, updated December 2, 2005, https://stats.oecd.org/glossary/detail.asp?ID=1729.

[4] SEMCOG, *Parks and Recreation Plan for Southeast Michigan* (2019), 11, https://semcog.org/Portals/0/Documents/Plans-For-The-Region/Environment/Parks%20and%20Recreation/ParksAndRecreationPlanForSoutheastMichiganMay2019.pdf.

[5] "Michigan Information," Emerald Ash Borer Information Network, accessed June 14, 2021, http://www.emeraldashborer.info/state/michigan.php.

[6] Green Macomb, *Urban Forestry Partnership: Sterling Heights* (2016), https://green.macombgov.org/sites/default/files/content/government/green/pdfs/Sterling%20Heights%20Forestry%20Profile.pdf.

[7] Chris McLeod, "Making a Difference… The Case for Reforesting Sterling Heights" (PowerPoint presentation, Special City Council Meeting, Sterling Heights, MI, January 28, 2020), https://www.sterling-heights.net/AgendaCenter/ViewFile/Item/921?fileID=21694.



Source: City of Sterling Heights, *Parks Recreation and Non-Motorized Master Plan: 2017-2021* (2016), 45, https://www.sterling-heights.net/DocumentCenter/View/3697/Parks-Rec-Non-Motorized-Plan-PDF.

For neighborhood parks, the National Recreation and Park Association (NRPA) estimates a 0.25-to-0.5-mile service area (0.5 miles will be used for the purposes of this analysis). The 0.5-mile neighborhood service radius is shown on the Park Classifications and Service Areas Map. (Please note that community parks, large urban parks, and sports complexes are included in the radius calculation for neighborhood parks because they function as neighborhood parks to residents within 0.5 miles of the park.)

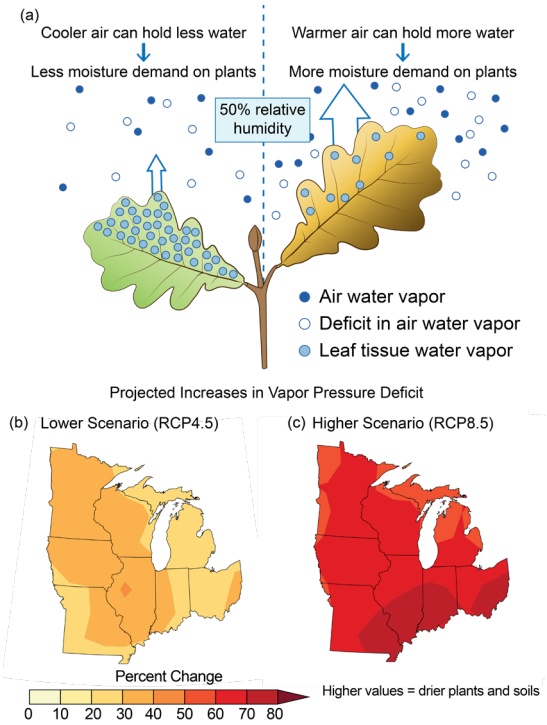
As can be seen, much of the City falls within 0.5 miles of a neighborhood park. Neighborhood park gaps presently exist in the northwestern portion of the City (between 19 Mile Road and M-59), northeastern portion of the City (in the area bounded by M-59, Schoenherr Road, 19 Mile Road, and M-53), and in the southeastern portion of the City (generally east of M-53 and west of Maple Lane / Dodge Park Road). The industrial corridor in the central portion of the City is also generally outside of the neighborhood park service radius, but few residents live within this area.

For community parks, the NRPA stipulates a 0.5-to-3-mile service area (3 miles was used for the purposes of this analysis). Given the number and location of existing community parks within the City, all residents of the City of Sterling Heights are within 3 miles of a community park. (Please note that large urban parks and sports complexes are included in the radius calculation for community parks because they function as community parks to residents within 3 miles of the park.)

Large urban parks and sports complexes, according to the NRPA, usually serve the entire community. Because the City operates two large urban parks (Dodge Park and Nelson Park) and two sports complexes (Baumgartner Park and Delia Park), all residents of the City are located within the service radius of a large urban park and sports complex.

Note: For mini-parks, the NRPA standard is a 0.25-mile service area. No mini-parks are operated by the City; therefore, the mini-park service radius is not shown on the map.

Additionally, the 2018 US National Climate Assessment warns, "As growing-season temperatures rise, reduced tree growth or widespread tree mortality is expected as the frequency of drought stress increases from drier air (as a result of increases in vapor pressure deficit [VPD] and changing patterns of precipitation."[8] This highlights how natural asset protection is directly linked to our practices in sustainable land use and environmental stewardship.



The tree canopy within Sterling Heights provides so many benefits while requiring our valuation and protection. Not only does the canopy provide habitat and food sources for wildlife, but it also has an aesthetic value that

[8] US Global Change Research Program, *Fourth National Climate Assessment*, vol. 2, *Impacts, Risks, and Adaptation in the United States* (2021), 884, https://nca2018.globalchange.gov/downloads/NCA4_2018_FullReport.pdf (alteration in original).

directly correlates to an increase in property values, potentially up to 15 percent for those homes directly abutting treed, open spaces.[9] Other benefits include a reduction in residential heating costs where windbreaks are created by treed areas,[10] while shading and evaporative cooling from trees can cut residential air-conditioning costs 15–50 percent.[11]

Trees are also essential for improving air quality by absorbing toxins and carbon dioxide, lowering the level of greenhouse gases in the atmosphere. A tree is a natural air conditioner; the evaporation from a single tree can produce the cooling effect of ten room-size, residential air conditioners operating 20 hours per day![12] Trees are excellent for water filtration and retention by capturing rainwater and recharging groundwater.

Despite the obvious benefits, the City has not fared well in growing its tree canopy over the last decade. Green Macomb has identified Sterling Heights as a municipality deficient in funding the growth of its tree canopy and building community support for trees.[13] There is also a need for public education on the benefits of a robust tree canopy, preserving landmark trees, and how planting trees on individual properties is the key to increasing the City's overall tree canopy.

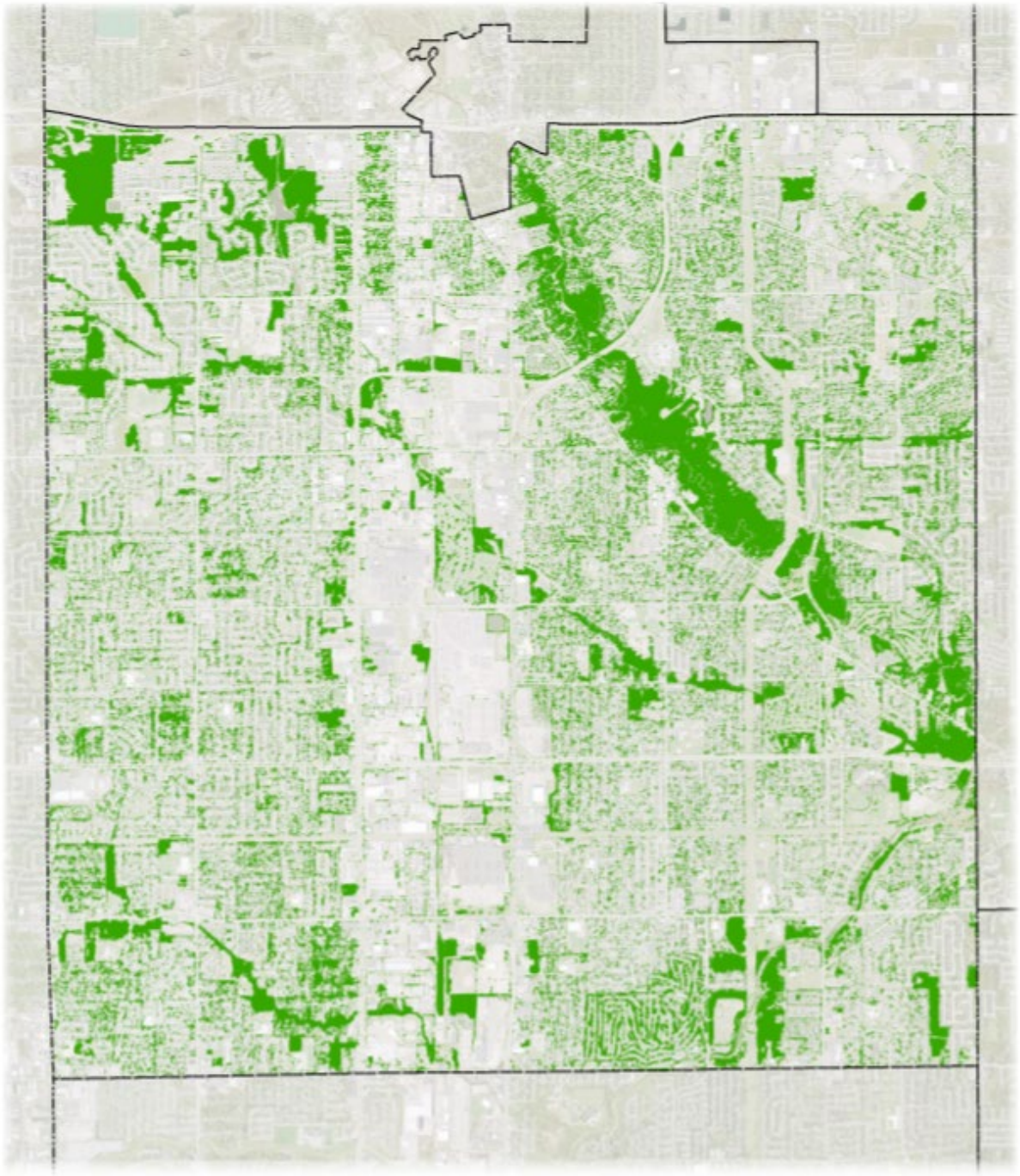
Currently, within the City, there are far too many residences with no street trees. With this in mind, the City must commit to developing sustainable strategies for improving the tree canopy. This is a feasible objective with environmental, health, and fiscal benefits to the community of Sterling Heights.

Preserving landmark trees (also known as Heritage, Hub, or Mother Trees) is critically significant in maintaining tree canopy and supporting surrounding natural assets. The vital contributions of these mature trees are not easily replaced by new plantings. Recognition of their significant contributions to the surrounding ecosystems deserves corresponding special weighting toward preservation in the City's Tree Preservation Ordinance. The City's 2021 amendments to the ordinance strengthen these preservation efforts. The City has discouraged the removal of these trees by increasing the replacement ratios for these trees over other regulated trees.

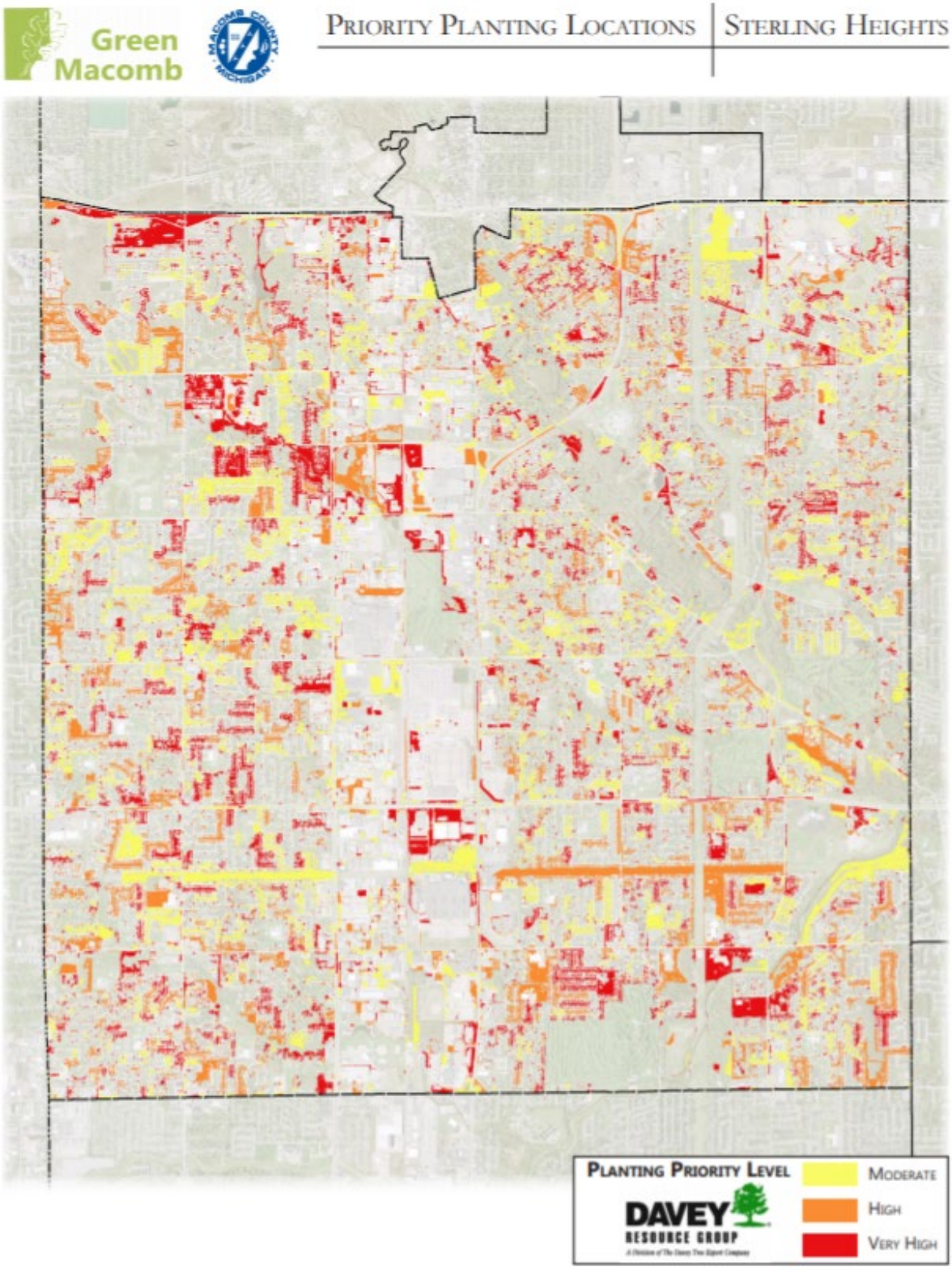
[9] Kathleen L. Wolf, "City Trees and Property Values," *Arborist News* 16, no. 4 (August 2007): 35.
[10] "Landscape Windbreaks and Efficiency," US Department of Energy, accessed June 14, 2021, https://www.energy.gov/energysaver/design/landscaping-energy-efficient-homes/landscape-windbreaks-and-efficiency.
[11] "Energy Saver 101 Infographic: Landscaping," US Department of Energy, April 3, 2014, https://www.energy.gov/articles/energy-saver-101-infographic-landscaping.
[12] "International Day of Forests," US Department of Agriculture, Forest Service, accessed June 14, 2021, https://www.fs.usda.gov/detail/r9/home/?cid=stelprd3832558.
[13] Green Macomb, *Urban Forestry Partnership*.

Green Macomb

TREE CANOPY | STERLING HEIGHTS



Map data from 2016. Source: "Sterling Heights Maps," Green Macomb, accessed June 14, 2021, https://green.macombgov.org/sites/default/files/content/government/green/pdfs/SterlingHeights_Maps.pdf.



Map data from 2016. Source: "Sterling Heights Maps," Green Macomb.

II.B WATER ASSETS

The need to protect the Clinton River and the supporting watershed is paramount. The City's seven-mile stretch of the Clinton River has once again become a family-friendly amenity and a true jewel of not only the City but also the region. SEMCOG reports that communities most attractive to potential residents are those with strong water resources.[14] As such, this resource requires particular focus to protect, preserve, and grow its use for recreation as well as serve as a strong environmental health indicator for the region.

The Clinton River is a key component of the Macomb County Blue Economy initiative. The Initiative is designed to protect and enhance Macomb County assets Lake St. Clair and the Clinton River Watershed. Its objectives are to increase public access and cultivate investment while maintaining high standards for environmental stewardship. The success of any initiative to develop a blue economy is wholly dependent on protecting the Clinton River and its watershed. Yet, there is still a lot of work to do.

The EPA still lists many aspects of the Clinton River as impaired. As a multi-county, multi-city state waterway, the City must continue vigilant efforts to work with its neighbors in bringing the river back to full health. The following table represents a 2020 assessment of the river by the EPA:

What is this water used for?	
Agriculture	Good
Fish Consumption	Impaired
Industrial Water Supply	Good
Navigation	Good
Other Indigenous Aquatic Life and Wildlife	Impaired
Partial Body Contact Recreation	Impaired
Total Body Contact	Impaired
Warm Water Fishery	Impaired

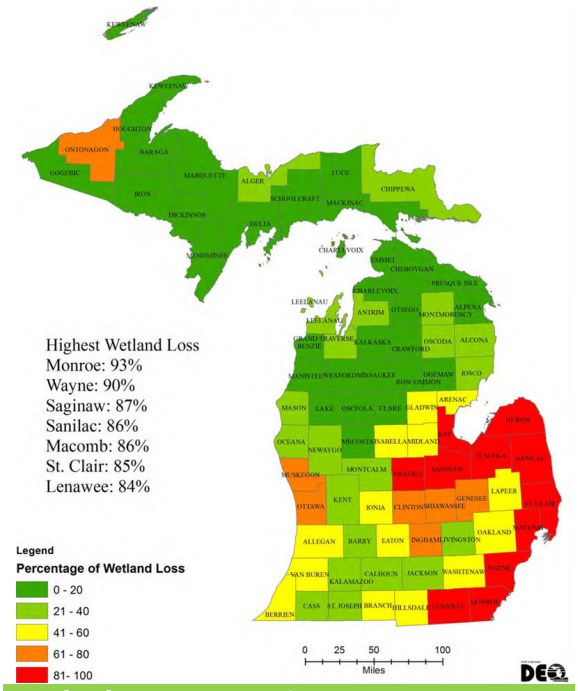
Source: "How's My Waterway?" US Environmental Protection Agency, accessed June 14, 2021, https://mywaterway.epa.gov/waterbody-report/21MICH/MI040900030402-03/2020.

In addition to the specific watercourse of the Clinton River, the Clinton River Watershed is a 760-square-mile area comprising thousands of lakes, ponds, wetlands, marshes, and bogs—as well as cold-water tributaries, brooks, and streams. These streams and rivers all drain into one common body of water: Lake St. Clair. Although many of these areas are not specifically located in the City and do not directly provide the same recreational opportunities that the Clinton River itself provides, they are nonetheless vital to both the economy and environment of Sterling Heights and surrounding communities.

These environmental assets play important roles in both pollution control and stormwater management for the City and region as a whole. The City should continue to ensure the watercourses, wetlands, marshes, bogs, etc., are properly maintained and pollutants are not intentionally or unintentionally making their way into the drains.

[14] SEMCOG, *Water Resources Plan for Southeast Michigan* (2018), 20, https://semcog.org/desktopmodules/SEMCOG.Publications/GetFile.ashx?filename=WaterResourcesPlanForSoutheastMichiganMarch2018.pdf.

As noted above, the City's wetlands are another integral part of the Clinton River Watershed. Wetlands provide numerous benefits to the community, including flood control, pollution treatment, and erosion control; they also provide a habitat and nutrients for wildlife.[15] As heavy rain events become increasingly more common in Michigan due to climate change,[16] enacting a long-term plan to ensure the preservation of the city's wetlands will likely play an important role in flood prevention and mitigation.



Wetland Loss 1800-2005

The city should conduct a study into the feasibility and propriety of joining a number of other Metro Detroit municipalities that have enacted a local wetland ordinance. If the City determines a wetland ordinance is ultimately appropriate, an inventory of wetlands within the City must be created. This inventory will locate the wetlands remaining within the City and determine the type and quality of those wetlands. An ordinance and inventory would then be used as a tool as development is proposed to ensure wetlands are properly protected. Currently, during the development review process, the City requires state review of potential wetland areas as required by state law in the absence of a local ordinance.[17]

Similarly, vernal pools (ponds) are found throughout Sterling Heights, in particular in the forested floodplain areas of Clinton River Park and the Sterling Heights Nature Preserve. Vernal pools are small, isolated wetlands that undergo cycles of filling and drying out, which makes them not as obvious as larger, more prominent wetlands areas. Sterling Heights currently has two verified vernal pools (the only two mapped in Macomb County to date) that have become part of the Michigan Vernal Pools Partnership Project at Michigan State University.[18] These often-overlooked assets are crucial habitats for amphibian populations, freshwater invertebrates, mollusks, birds, and other wildlife, which significantly contribute to the biodiversity of Sterling Heights.

UN SDG 6 (Water and Sanitation) and SDG 15 (Life on Land) both set a number of targets for protecting water and terrestrial ecosystems, each providing a number of proposed indicators to help a city like Sterling Heights in measuring progress.

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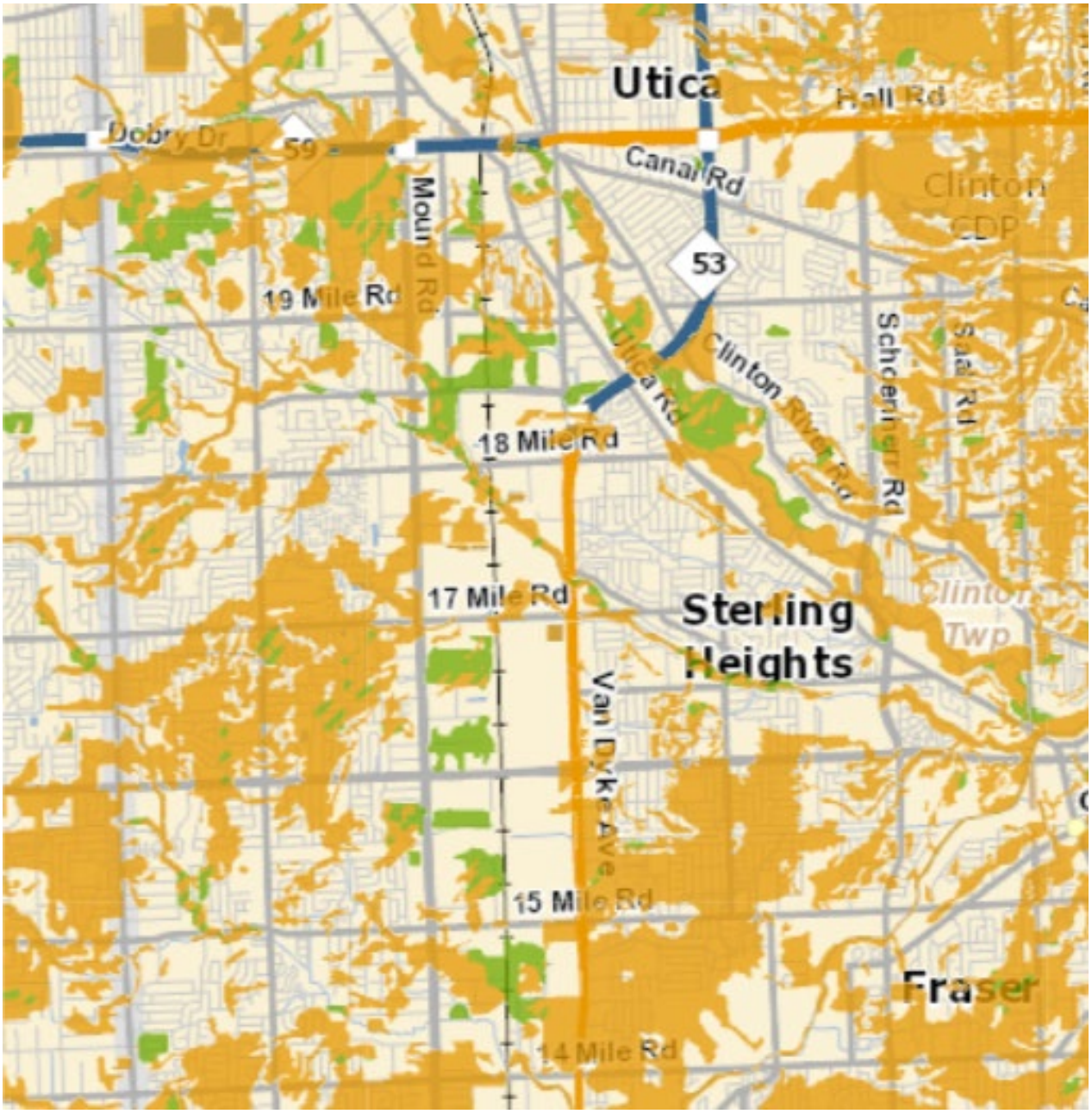
[15] "What Are Wetlands and Why Are They Important?" Michigan Department of Environment, Great Lakes, and Energy, accessed June 14, 2021, https://www.michigan.gov/egle/0,9429,7-135-3313_3687-141296--,00.html.
[16] "What Climate Change Means for Michigan," US Environmental Protection Agency, August 2016, https://19january2017snapshot.epa.gov/sites/production/files/2016-09/documents/climate-change-mi.pdf.
[17] MCL 324.30301 *et seq.*
[18] "View Map," Michigan Vernal Pools Partnership, accessed June 14, 2021, http://vppartnership.iescentral.com/menus/view-map.html.



April 30, 2021

Part 303 Final Wetlands Inventory

Wetlands as identified on NWI and MIRIS maps

Soil areas which include wetland soils

Wetlands as identified on NWI and MIRIS maps and soil areas which include wetland soils

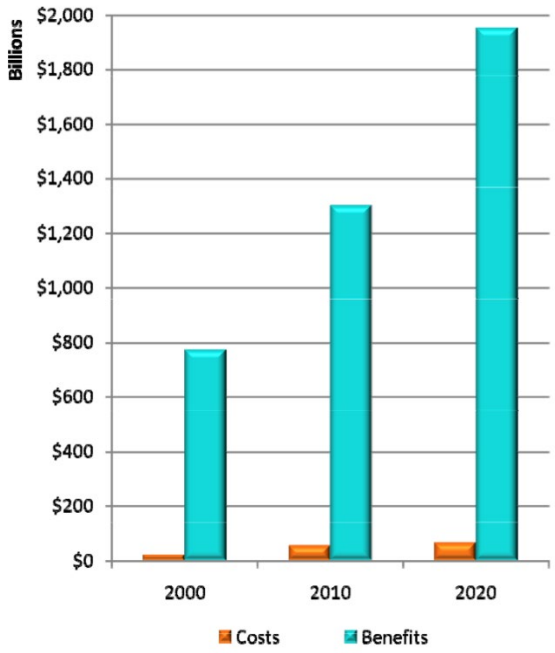
Map Taken from EGLE for Wetland Inventory Mapping

II.C WILDLIFE

Sterling Heights is home to over 365 species of animals.[19] As a growing suburb, it is important that future development plans take into account the animals living in Sterling Heights and promote coexistence between humans and wildlife. Animals that some consider nuisances, such as coyotes and skunks, serve valuable purposes in maintaining a healthy ecosystem. The Plumbrook Nature Preserve plays a special role in ensuring the continued biodiversity and wellbeing of wildlife, and the City should continue its commitment to protecting this area from human intrusion. The City of Sterling Heights can leverage the resources of the Sterling Heights Nature Center to engage the community in learning more about our resident wildlife populations.

II.D CLEAN AIR

Finally, clean air, both indoors and outdoors, is a key natural asset for the City and its residents that we often take for granted. Our local environment benefits greatly from state and federal regulations in place, in particular the Clean Air Act (CAA). While the City is limited in its ability to regulate air pollution, it should do what it can to ensure that pollutants are appropriately contained and mitigate future threats to this asset. The City should also take steps to reduce its carbon emissions and other pollutants and encourage residents and businesses to do the same.



Direct costs and benefits of the CAA. Source: US Environmental Protection Agency, *The Benefits and Costs of the Clean Air Act from 1990 to 2020: Summary Report* (2011), 2, https://www.epa.gov/sites/production/files/2015-07/documents/summaryreport.pdf.

Health Effect Reductions (PM2.5 & Ozone Only)	Pollutant(s)	Year 2010	Year 2020
PM2.5 Adult Mortality	PM	160,000	230,000
PM2.5 Infant Mortality	PM	230	280
Ozone Mortality	Ozone	4,300	7,100
Chronic Bronchitis	PM	54,000	75,000
Acute Bronchitis	PM	130,000	180,000
Acute Myocardial Infarction	PM	130,000	200,000
Asthma Exacerbation	PM	1,700,000	2,400,000
Hospital Admissions	PM, Ozone	86,000	135,000
Emergency Room Visits	PM, Ozone	86,000	120,000
Restricted Activity Days	PM, Ozone	84,000,000	110,000,000
School Loss Days	Ozone	3,200,000	5,400,000
Lost Work Days	PM	13,000,000	17,000,000

Reductions in risk of air pollution-related health effects due to the 1990 amendments to the CAA. Source: US Environmental Protection Agency, *The Benefits and Costs of the Clean Air Act*, 14.

[19] "Observation," iNaturalist, accessed June 14, 2021, https://tinyurl.com/3js8fvbf.

Advancing 2030 Visioning Strategic Plan

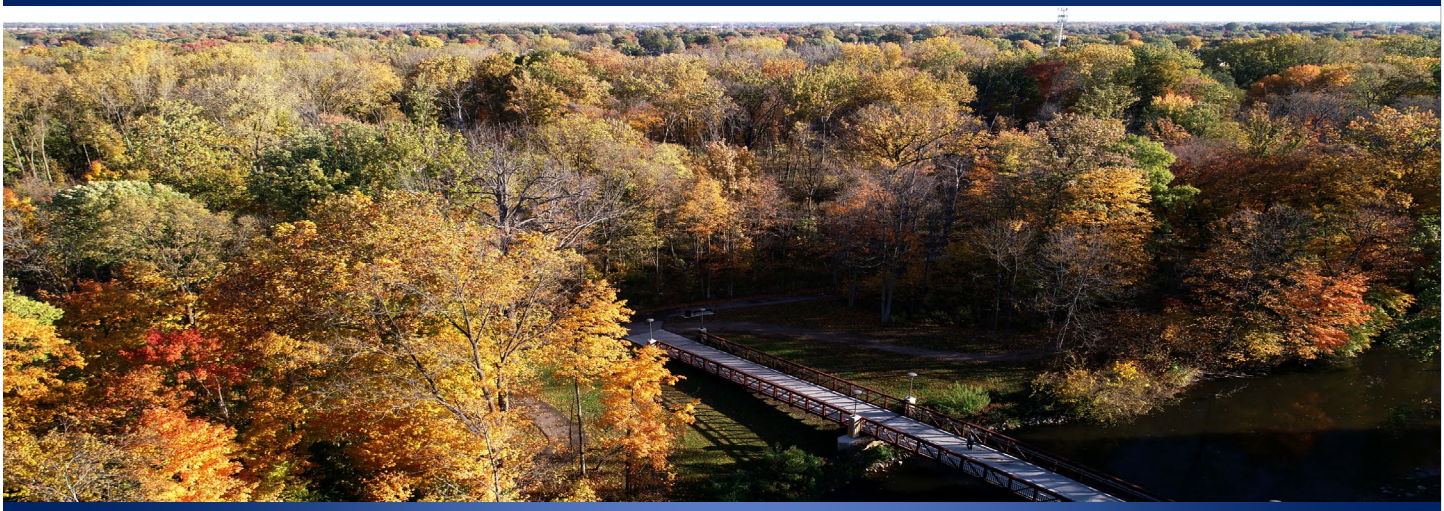
Sustaining the City's natural assets is well aligned with the City's 2030 Vision Statement and Guiding Principles as follows:

Vision Statement	Natural Assets
A vibrant, inclusive community for residents and businesses that is safe, active, progressive and distinctive	Yes
Guiding Principles	**Natural Assets**
Safe, well maintained, and desirable neighborhoods enhanced by great schools	Yes
Plentiful leisure and recreation opportunities featuring fully utilized parks	Yes
Abundant pathways for biking and walking	Yes
Focal points that are both public and private to serve as destinations for residents and visitors	Yes
Well maintained and aesthetically pleasing roads and green spaces	Yes

Suggested Action	**Responsible Parties**
1. Continue to adhere to best practices for earning Tree City USA recognition that includes adhering to four standards.	City Council Sustainability Commission Department of Public Works Office of planning
2. Explore updating the City's ordinances to ensure best practices with tree preservation, including tree canopy guidelines, promoting native species, and to ensure enforcement of tree ordinances.	City Council Sustainability Commission Office of Planning Office of Engineering
3. Introduce new strategies for reforesting residential areas.	City Council Sustainability Commission Office of Planning Department of Public Works
4. Increase tree-planting requirements for new development (Zoning Ordinance).	City Council Sustainability Commission Office of Planning Department of Public Works Planning Commission

5. Promote public investment in urban forestry initiatives.	City Council Sustainability Commission Office of Planning Department of Public Works
6. Focus on reforestation of City parks.	City Council Parks and Recreation Sustainability Commission
7. Implement public education programs on the benefits of trees.	Sustainability Commission Office of Planning Community Relations
8. Collaborate with other Clinton River municipalities to establish programs for residents that would maximize the economic and recreational benefits of the waterway.	Parks and Recreation Sustainability Commission Community Relations Community Development Department Macomb County Clinton River Watershed Council
9. Seek opportunities to acquire vacant parcels for open space for active or passive recreation / natural conservation areas.	City Council Parks and Recreation Sustainability Commission
10. Maintain and enhance park improvements made through *Re*creating Recreation.	City Council Parks and Recreation
11. Explore enacting a wetland ordinance.	City Council Sustainability Commission Office of Planning
12. Inventory city watercourses, drains, wetlands, vernal ponds, woodlands, trees, and other environmentally sensitive areas to develop a natural features map.	City Council Sustainability Commission Department of Public Works Office of Planning Office of Engineering
13. Promote coexistence and education on wildlife; promote Nature Center presentations.	Parks and Recreation Sustainability Commission Community Relations
14. Promote and extend partnerships and City engagement with a variety of environmental stewardship organizations, such as Clinton River Watershed Council, Green Macomb Urban Forestry Partnership, Michigan Natural Features Inventory, etc.	Sustainability Commission Office of Planning Community Relations
15. Prioritize the eradication of invasive species throughout the City and explore various funding options for accomplishing such.	City Council Parks and Recreation Sustainability Commission Department of Public Works

16. Promote existing environmental days, such as Arbor Day, Earth Day, Sterling Heights Clean-Up Days, Clinton River Water Shed Clean-Up, etc.	City Council Sustainability Commission Department of Public Works Community Relations
17. Provide education and promote policy on appropriate tree plantings with "The Right Tree for the Right Place."	Sustainability Commission Office of planning Department of Public Works Community Relations
18. Continue the City policy of maintaining landscaping consistent with approved site plans in City ordinances, and bring sites with new development into compliance with City standards.	Sustainability Commission Office of Planning Code Enforcement



SECTION III SUSTAINABLE MOBILITY

SUSTAINABLE
CITY OF Sterling Heights

Section III.
Sustainable Mobility

Promoting and facilitating citizen mobility in non-motorized variants is crucial to creating a healthier and sustainable community. As mentioned in SDG 11 (Cities), sustainable transport achieves better integration of the economy while respecting the environment, improving social equity, health, resilience of cities, urban–rural linkages and productivity of rural areas.[20]

Sole reliance on automobiles for transportation is not only poor for the environment; it has also been linked to increased health risks. One study found a correlation between time spent in a car and an increased likelihood of increased body mass index.[21] Multiple studies have found that people who have to commute at least 10 miles per day by automobile are shown to have higher levels of blood pressure, anxiety, and cholesterol and are more likely to experience depression.[22] To promote improved public health, Sterling Heights should look to provide opportunities for non-motorized transportation and recreational movement via walking, running, bicycling, and other forms.

What Is Sustainable Mobility?

- *Has equitable access*
- *Is Secure & Safe*
- *Is Efficient*
- *Is Pollution and Climate Responsive*

III.A Non-Motorized Transport

Sterling Heights has over 17 miles of shared use paths, including the Clinton River Park Trail, situated throughout the city that offer citizens excellent recreational and fitness opportunities only a few other communities in the state can replicate. SEMCOG's 2019 survey identifies the importance of pedestrian trails, reporting:

- 81 percent of Southeast Michigan residents visit parks for walking, hiking, or running trails[23]
- 73 percent of survey respondents expressed a strong desire for more hiking or biking trails in parks[24]
- 73 percent of survey respondents report wanting parks that are connected by trails[25]

These non-motorized trails not only increase property values and the livability of a city, but they also provide the opportunity to experience natural assets around the city—a significant placemaking opportunity. Sterling Heights has developed the incredible Clinton River Park Trail System, which follows the route of the scenic Clinton River and links Dodge Park to the Macomb Orchard Trail via the city of Utica and Charter Township of Shelby. This shared use path totals approximately 8.1 miles within the City itself.

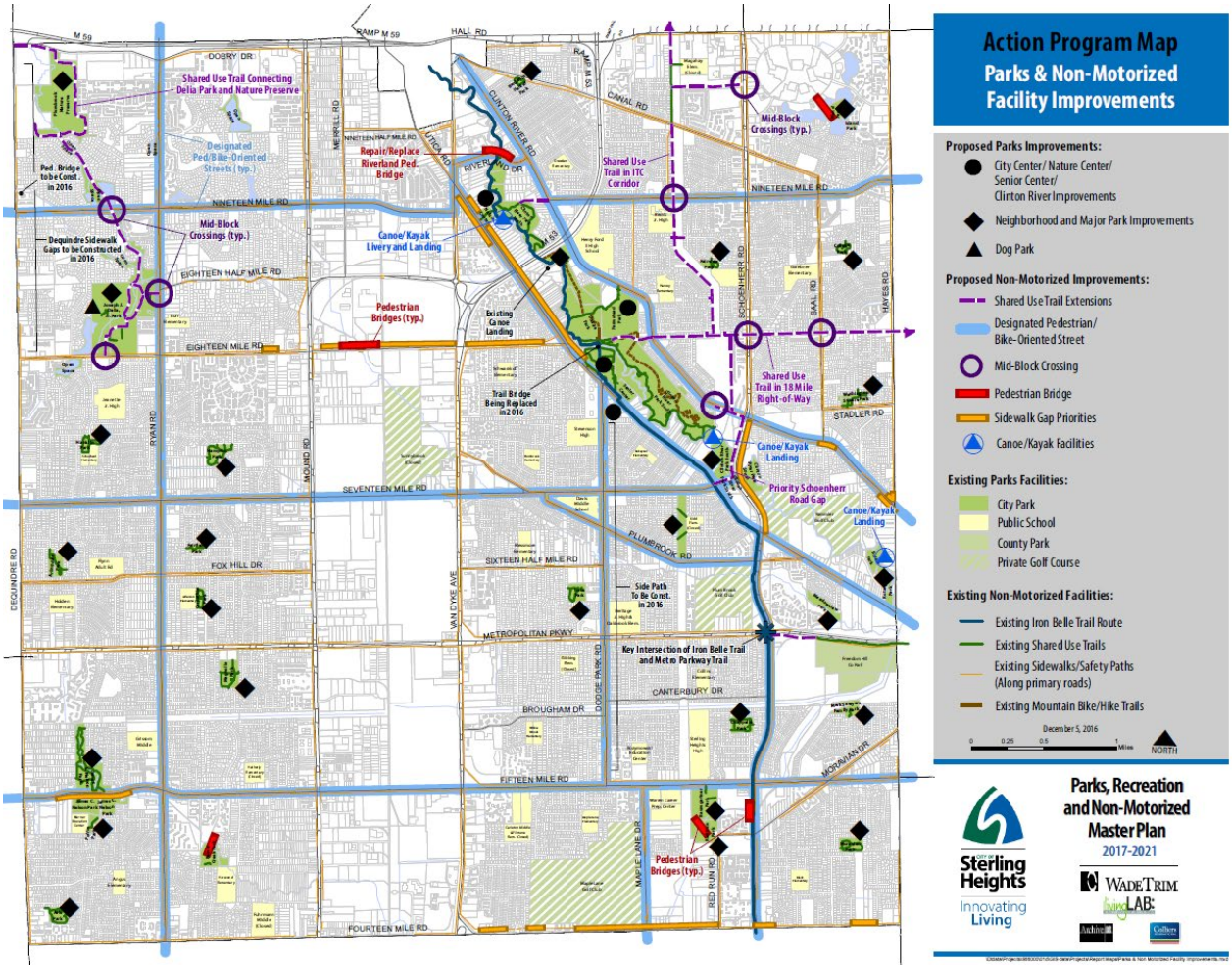
The City has also incorporated a shared use path along the west side of Mound Road as a part of the Innovate Mound Road redevelopment project. The road project will install a 10-foot-wide shared use path and designated crosswalks at major intersections with pedestrian materials, pedestrian scale

[20] "Goal 11," United Nations, Department of Economic and Social Affairs, accessed June 14, 2021, https://sdgs.un.org/goals/goal11.
[21] Lawrence D. Frank, Martin A. Andresen, and Thomas L. Schmid, "Obesity Relationships with Community Design, Physical Activity, and Time Spent in Cars," *American Journal of Preventative Medicine* 27, no. 2 (August 2004): 87–96, https://doi.org/10.1016/j.amepre.2004.04.011.
[22] Carolyn Kylstra, "10 Things Your Commute Does to Your Body," *Time*, February 26, 2014, https://time.com/9912/10-things-your-commute-does-to-your-body/.
[23] SEMCOG, *Parks and Recreation Plan*, 12.
[24] SEMCOG, *Parks and Recreation Plan*, 12.
[25] SEMCOG, *Parks and Recreation Plan*, 12.

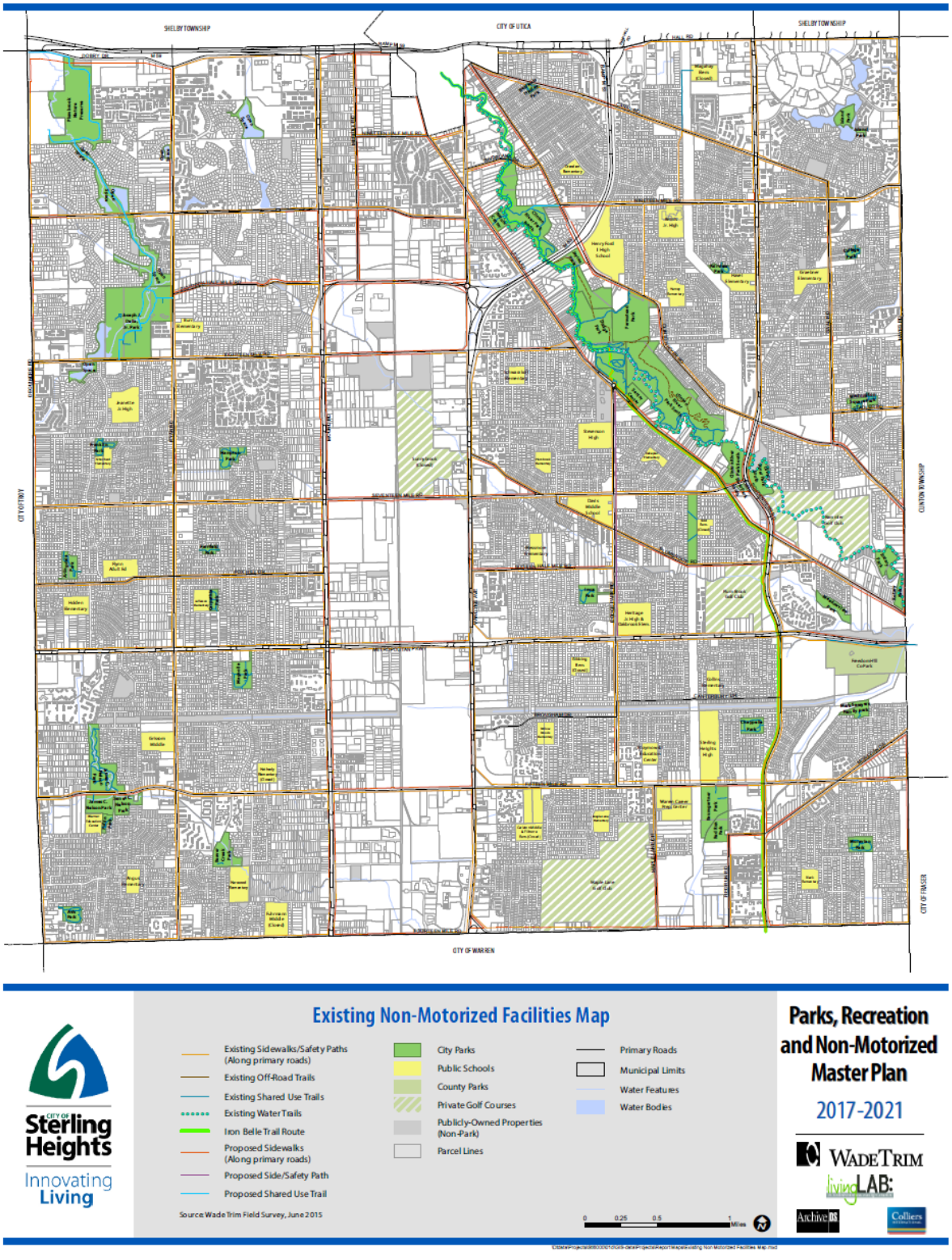
lighting, extensive landscaping, and pedestrian signalization.

Source: Innovate Mound (website), accessed June 14, 2021, https://innovatemound.org/.

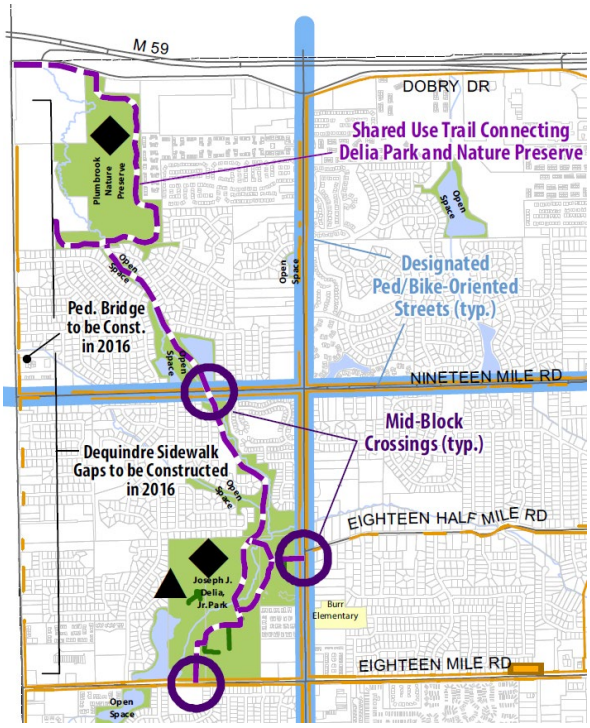
The City has recently completed a connective nature trail between Joseph J. Delia, Jr. Park (133.4 acres) and the Sterling Heights Nature Preserve (91 acres). This trail affords residents and visitors with an opportunity to traverse through woods and over streams and have exposure to over 224 acres of open and park space.



Source: City of Sterling Heights, *Parks Recreation and Non-Motorized Master Plan*, 68.



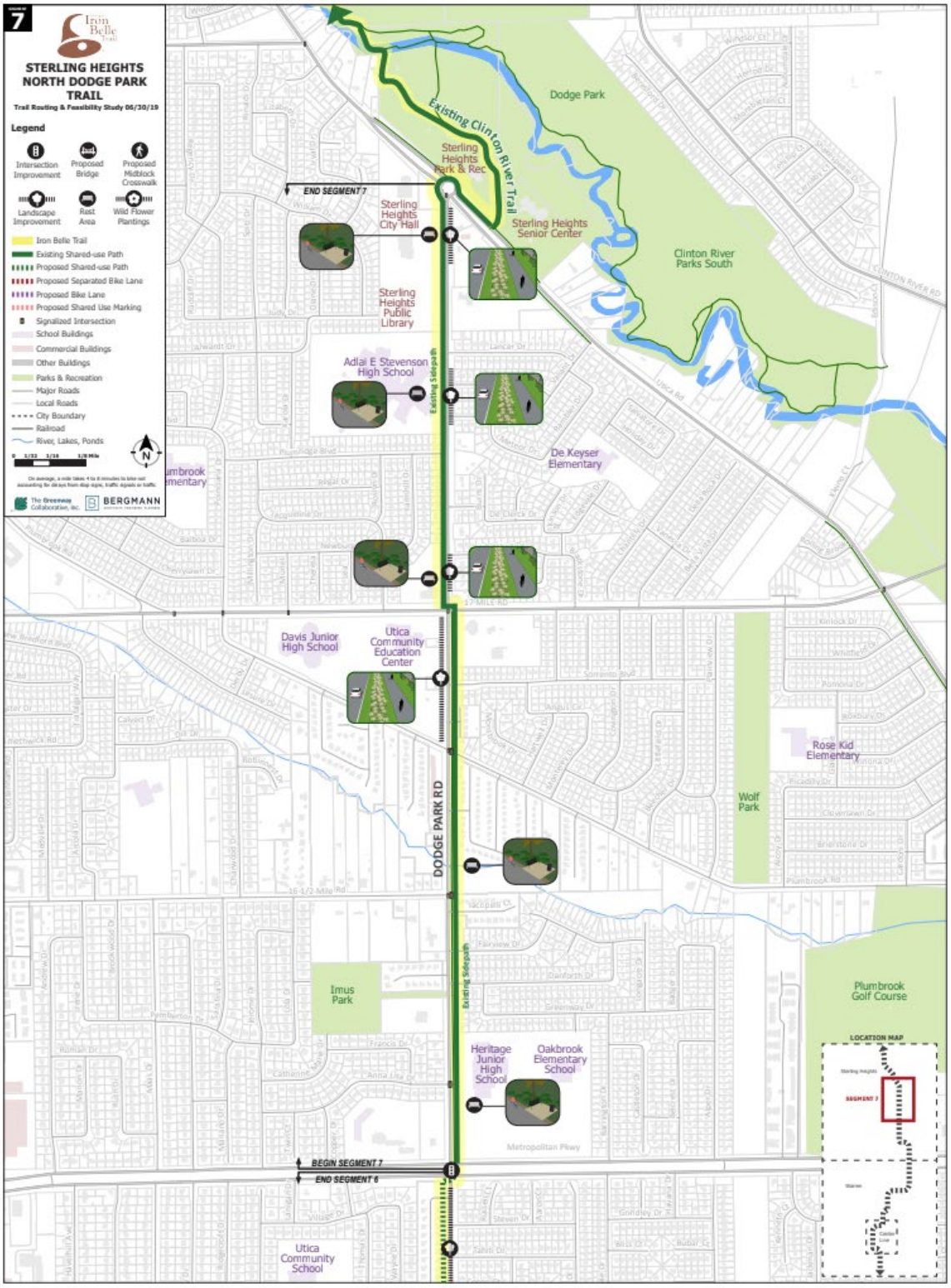
Source: City of Sterling Heights, *Parks Recreation and Non-Motorized Master Plan*, 34.



Source: City of Sterling Heights, *Parks Recreation and Non-Motorized Master Plan*, 68.

The Iron Belle Trail linking Belle Isle in Detroit with Ironwood in Michigan's Upper Peninsula will traverse through Sterling Heights and provide an opportunity for the City to tap the burgeoning economy of non-motorized mobility. The following master plan maps are a part of the Iron Belle Trail Route and Feasibility Study that was conducted by the County as a part of the overall Iron Bell Trail Development.[26] The City participated in the development of this plan in 2019. The intended route for the Iron Belle Trail within the City is along the ITC Corridor at the south end of the City, east of Maple Lane, heading north; the trail ultimately goes through Baumgartner Park to 15 Mile Road, then west to Dodge Park. The trail then heads directly north along Dodge Park Road to Dodge Park itself and into the City's existing trail system up to the City of Utica. It is anticipated that the Iron Belle Trail will be completed within the City by the year 2025 dependent on grant and other funding.

[26] "Iron Belle Trail Route and Feasibility Study," The Greenway Collaborative, Inc. (2019), https://drive.google.com/file/d/1aHSss24sXa-iJolC1YeXNRL5HFJh7hw9/view.



Source: "Iron Belle Trail Route and Feasibility Study."

Source: "Iron Belle Trail Route and Feasibility Study."

Source: "Iron Belle Trail Route and Feasibility Study."

The City is also developing a strategic plan to close the remaining gaps in the City's sidewalk system along major roads to further facilitate safe non-motorized travel throughout the City. Per the City's Office of Engineering, which is responsible for the City's sidewalk gap program, there are a total of approximately 628 miles of completed sidewalk, and there remain a total of approximately 126 miles of sidewalk gaps within the City.

With this amount of sidewalk gaps remaining, it provides an excellent opportunity to expand our approach to the traditional concrete slab walkway that becomes a win-win effort in the approach to sustainability. With permeable surfaces, it is possible for the City to reduce concrete use (a greenhouse gas contributor), improve stormwater management, reduce the need for salt, and expand non-motorized access.

For a variety of reasons, Sterling Heights has not traditionally been user friendly when it comes to providing infrastructure for non-motorized mobility. The City's significant industrial corridor creates an east–west division with infrastructure necessary to handle heavy truck traffic. In addition, the City's vast population and development increased traffic volumes throughout the community.

Currently, Sterling Heights lacks bicycle lanes. Its road designs do not consider future development of these key modes of non-motorized transportation. Nonetheless, a commitment to bicycle lanes, or other suitable multi-modal transportation infrastructure, can help demonstrate Sterling Heights' commitment to sustainable mobility by providing alternatives to traditional vehicle trips. These alternatives will reduce congestion and per capita environmental footprints. Though modest, a well-considered system of bicycle lanes has potential to reduce traffic congestion and associated greenhouse gases produced by automobiles, while providing additional means of equitable access. The adopted 2017 Parks, Recreation and Non-motorized Plan calls for designation pedestrian/bike-oriented streets to cross the industrial district at 15 Mile Road, 17 Mile Road, and 19 Mile Road. It also calls for designated pedestrian / bike-oriented streets on Clinton River Road, Ryan Road, Dodge Park, Maple Lane, Plumbrook, Utica Road, and Riverland Drive. Finally, the Non-Motorized Transportation Plan provides for filling sidewalk gaps on the remaining mile road connections within the industrial corridor.

Although the public sidewalk system provides an alternate means, most municipalities with a commitment to sustainability are more advanced in both planning for and implementing a system of bike lanes, shared roadways and other infrastructure for multi-modal transportation. This deficiency, as recognized in the City's Non-Motorized Transportation Plan, should be addressed through the appropriate means of policy change, education, design revisions, etc.

Traditional motorized transportation that originally helped drive the City's growth and development in the past is evolving rapidly. Sterling Heights must plan for and implement strategies to adapt to new and desired alternative transportation technologies. For instance, the negative environmental impacts associated with the burning of fossil fuels by vehicles with combustion engines is now well documented, and electric vehicles are becoming much more popular.

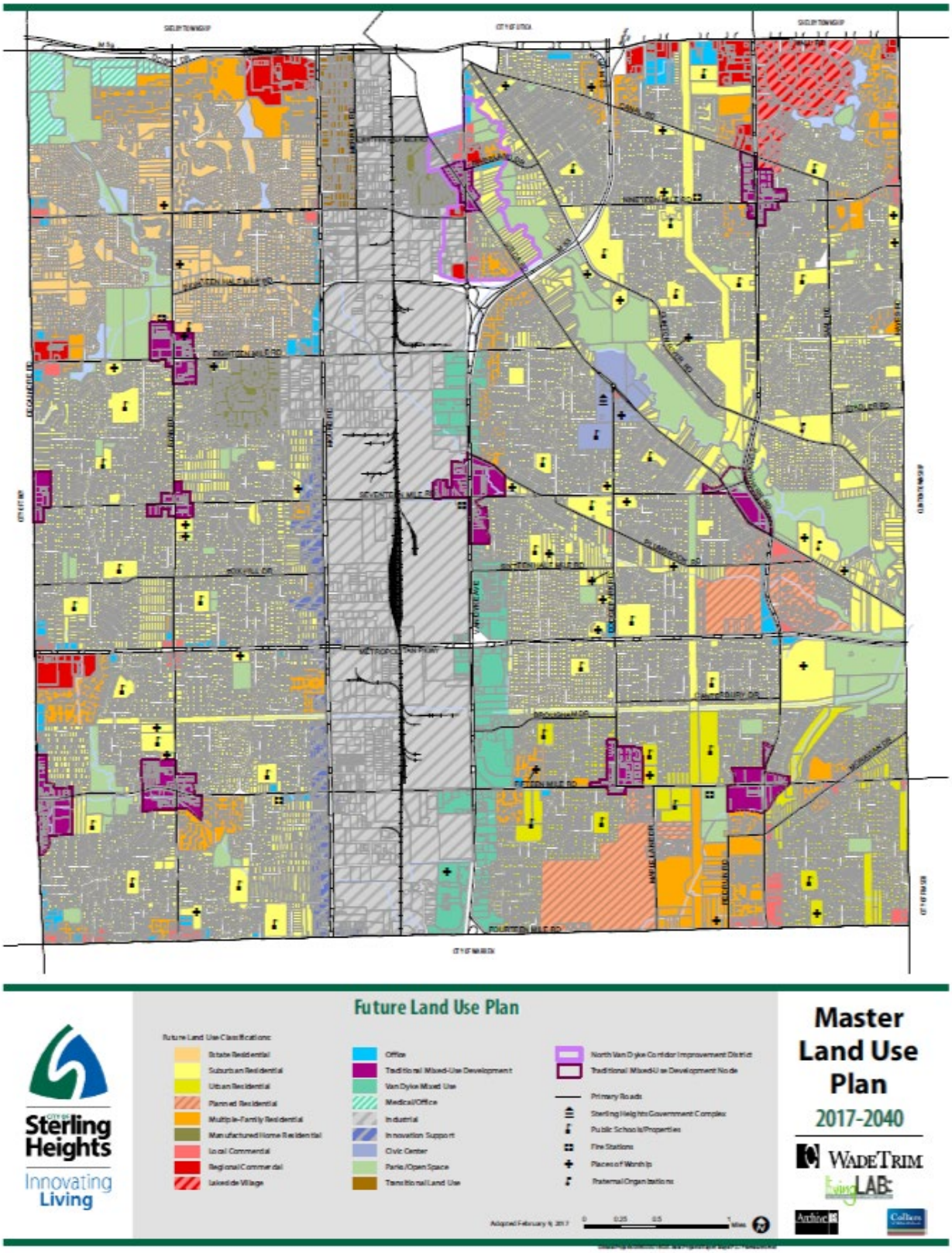
In addition, varying methods of transportation, such as ride-sharing, on-demand, scooters, etc., are becoming more popular, potentially reducing the need for vehicle lanes. A reduction in vehicle lanes could potentially help mitigate increasing costs associated with constructing, maintaining, and repairing the City's road system and have significant impacts on the City's budget.

Sustainability requires a new vision for both motorized and non-motorized transportation from both financial and environmental standpoints. With 504 miles of public roads within city boundaries carrying thousands of

gasoline-powered vehicles each day, addressing fossil fuel consumption and pollution via new transportation models is critical.

In part, this can be accomplished through land use planning by creating more densely developed areas that are a mixture of uses. This type of development will allow residents the ability to live in an area that also has employment opportunities along with shopping, eating, and entertainment opportunities within walking distance, reducing separate trips to the store, restaurant, or movie theater.

The City recently adopted Zoning Ordinance Overlay Districts to create 11 Traditional Mixed Use Development Nodes at intersections throughout the city. This was done to help implement the vision and goals of the adopted 2017 Master Land Use Plan. These Overlay Districts can be seen as a step toward decreasing reliance on motorized vehicles and making the city more attractive for pedestrians and other means of multi-modal transportation. Although realizing the full benefit of these nodes will take time, as the intersections transform into larger mixed use development areas, residents living in and near these nodes will be able to quickly and easily walk to their work and places to shop and eat. Over time, the need for residents living in and near these nodes to rely on motorized vehicles will decrease.



City Master Land Use Plan adopted in 2017 shows the intended future plan of the city, and the various nodes and corridors.

III.B Motorized Transport

Sterling Heights must recognize that future motorized transportation will be increasingly electric, from personal vehicles to mass transit. This requires strategic planning in both private and public infrastructure investments that can accommodate a rapidly changing transportation sector with resilience to adapt. Charging stations at city facilities and parks, as well as educational resources for residents charging at home, should become part of planning and investment discussions.

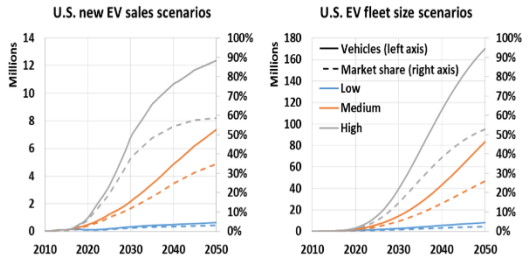


Figure 1 EPRI low, medium, and high PEV market penetration scenarios, shown both as annual sales (at left) and total PEV fleet size (i.e., cumulative vehicles in service, at right). Solid lines correspond to number of vehicles (left axes) and dotted lines correspond to sales shares (right axes).

Source: US Department of Energy, *Summary Report on EVs at Scale and the U.S. Electric Power System* (2019), 2, https://www.energy.gov/sites/prod/files/2019/12/f69/GITT%20ISATT%20EVs%20at%20Scale%20Grid%20Summary%20Report%20FINAL%20Nov2019.pdf.

The City's fleet of vehicles consumed over 250,000 gallons of fuel last year, expected to increase to 280,000 gallons over the coming year.[27] This is the opposite direction we need to be moving in terms of sustainability. Electric vehicles would lower this consumption and have lower maintenance costs. Investment analysis, factoring in sustainability initiatives, should be a requirement for all future vehicle purchases. In an ideal future, the city would be budgeting for kilowatt hours instead of gallons.

Motorized transport may be the only option for many individuals. Sterling Heights is fortunate to have many automotive manufacturers and suppliers as community partners. As such, the City needs to consider how it can best support this exponential growth in electric vehicles. New vehicles equipped with an increasing amount of connected technology will play a large role in making massive infrastructure projects like Innovate Mound a success. These new technologies will also bring exponential growth in accident avoidance, making our community much safer for pedestrian traffic and growth of our non-motorized infrastructure. While some electric replacements for larger vehicles (e.g., fire trucks, construction equipment) have current cost or technological limitations, each vehicle in the city fleet should be analyzed for electrification potential.

Mass-transit availability continues to be a developing area in Metro Detroit, and the City should continue to develop partnerships with County and regional authorities in moving toward options to reduce emissions while improving accessibility.

[27] City of Sterling Heights, *Annual Budget: 2021-2022* (2021), 202, https://www.sterling-heights.net/DocumentCenter/View/9913/2021-2022-Annual-Proposed-Budget-Book.

Advancing 2030 Visioning Strategic Plan

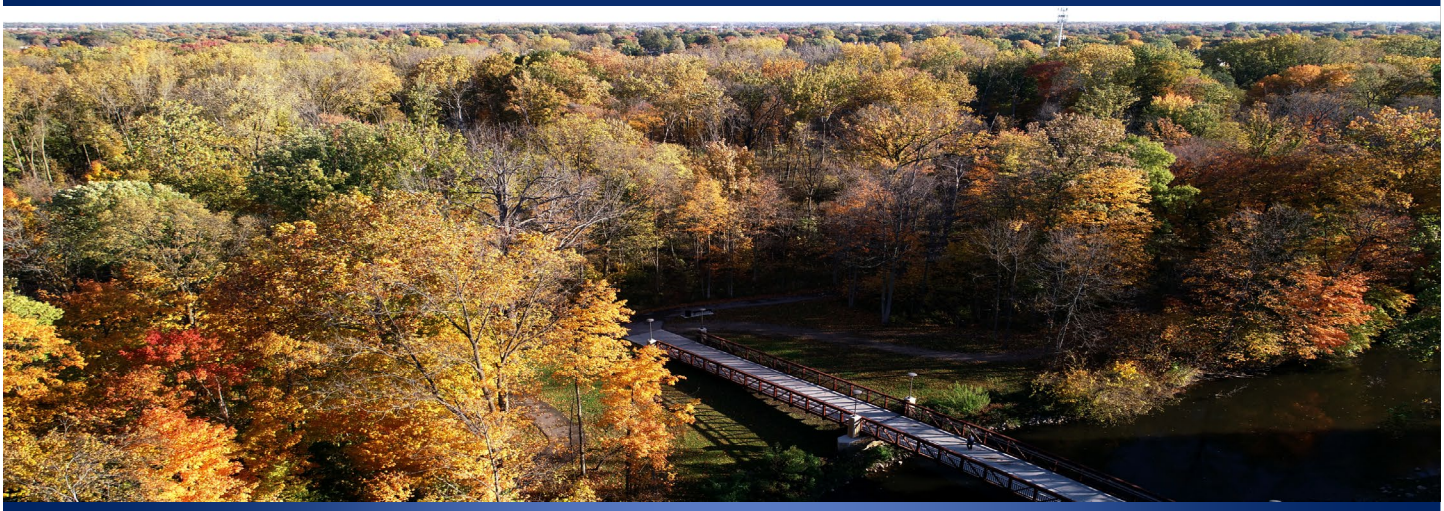
Citizen mobility is a sustainability goal that will positively affect the City's 2030 Vision Statement and Guiding Principles as follows:

Vision Statement	Sustainable Mobility
A vibrant, inclusive community for residents and businesses that is safe, active, progressive, and distinctive	Yes
Guiding Principles	**Sustainable Mobility**
Safe, well maintained, and desirable neighborhoods enhanced by great schools	Yes
Plentiful leisure and recreation opportunities featuring fully utilized parks	Yes
Abundant pathways for biking and walking	Yes
Focal points that are both public and private to serve as destinations for residents and visitors	Yes
Well maintained and aesthetically pleasing roads and green spaces	Yes

Suggested Action	Responsible Parties
1. Refine and standardize trail markings and use technology (apps, GIS, web-based dashboard) to enhance the user experience on the City's recreational trails and sidewalks.	Parks and Recreation Office of Engineering IT Department
2. Enhance connectivity of all trails and public sidewalks to make non-motorized travel accessible and easy.	City Council Office of Engineering Macomb County
3. Collaborate with SEMCOG, SMART, and other key agencies on regional transportation initiatives, including mass transit, that focus and incorporate sustainability.	City Council City Administration Office of planning SEMCOG Macomb County
4. Encourage and facilitate bicycle usage by providing bicycle-friendly infrastructure, including design and construction of bike lanes, on appropriate road projects.	City Council Parks and Recreation Office of Planning Office of Engineering

5. Identify opportunities to expand the recreational trail system.	City Council Parks and Recreation Sustainability Commission Office of Planning Planning Commission
6. Incorporate non-motorized pedestrian shared spaces into walkable node concepts within the Master Plan.	City Council Sustainability Commission Office of Planning Planning Commission
7. Pursue grant-funding and public–private partnerships to assist in financing the creation and maintenance of public trails.	City Council Parks and Recreation Sustainability Commission Office of Planning Office of Engineering
8. Research industry trends and assess future infrastructure needs to maximize the benefits of new modes of transportation.	City Council Sustainability Commission Office of Planning Office of Engineering
9. Prepare the City for the next generation of motorized transportation by updating City ordinances, regulations, and policies (e.g., Engineering Standards, Zoning Ordinance, Non-Motorized Master Plan).	City Council Sustainability Commission Office of Planning Office of Engineering
10. Ensure City owned and operated facilities include electric charging stations conveniently located to all buildings for public use.	City Council Parks and Recreation Sustainability Commission Purchasing Department Department of Public Works Fire Department Police Department
11. Explore partnerships for ride-sharing providers within the City.	City Council Sustainability Commission Community Relations
12. Explore potential sponsorship or alternative funding sources for building electric vehicle charging stations for public use.	City Council Sustainability Commission Community Relations
13. Implement city bike-ride events to take advantage of existing trail systems. Promote or implement recreational events to promote bike riding and utilization of trails. Implement city-coordinated “walk with your neighbor” events to hike City trails. Examine creating a walker leaderboard on the city website with annual awards/recognition.	City Council Parks and Recreation Community Relations

14. Examine a bike-share program within existing parks (e.g., Dodge Park) and other parks in the southern half of the city to create more accessibility.	City Council Parks and Recreation
15. Develop regulations to prohibit the use of coal tar sealant for any road, trail, parking lot, driveway, reconstruction, or repair.	City Council Sustainability Commission Office of Engineering
16. Explore creating a permeable sidewalk and pavement pilot program.	City Council Parks and Recreation Sustainability Commission Office of Planning Office of Engineering



SECTION IV SUSTAINABLE DEVELOPMENT AND LAND USE

SUSTAINABLE
CITY OF Sterling Heights

Section IV.
Sustainable Development and Land Use

The City of Sterling Heights has become almost fully developed over the last 50 years. The City's Master Land Use Plan estimates that less than seven percent of the City remains undeveloped (as of 2015). This number is likely less, based on the significant amount of development the City has seen over the last six years. The lack of undeveloped, "greenfield" sites dictates the type of development (redevelopment) the City must consider to continue to prosper and, therefore, the type of sustainability measures that work best for redevelopment rather than for new, greenfield development. The City will need to consider much denser, vertical developments rather than the sprawling developments that flourished in the previous 50 years.

With the age of the City's developments, another factor must be considered, and that is the need to begin to demolish or otherwise retrofit existing sites to become more economically viable as well as sustainable, including becoming more energy efficient, land efficient, walkable, less reliant on transportation, etc. In addition, these higher density areas, with mixed use, open spaces, and desirable amenities, are highly sought after by new homebuyers, renters, and retailers.

According to the Niche report, Sterling Heights is ranked #2 of best places to live in Macomb County as of 2021.[28] Looking at the current state of Sterling Heights, there are opportunities to grow and strengthen our community to ensure that the City remains one of the best places to live, raise a family, work, and receive a quality education. To ensure the long-term maintenance of these quality-of-life traits at the highest levels, long-term planning and action is necessary. This includes providing innovative incentives to encourage infill developments that will reenergize underutilized and functionally obsolete properties that are ripe for implementing more sustainable development and land use patterns.

IV.A Sustainable Development

Sustainable development can be defined as development that meets the needs of the present without compromising the ability of future generations to meet their own needs.

UN SDG 11 (Cities) sets a broad range of targets, from providing safe, inclusive green spaces to reducing per capita impacts to creating sustainable and resilient buildings using localized materials. A multi-faceted approach works toward addressing the disproportional footprint of cities while making them to be more inclusive, healthy environments.

IV.B Brownfield Projects

One way to help incentivize redevelopment of functionally obsolete properties is through tax incentives for new development. One of the main tax incentives that is available to the City of Sterling Heights to incentivize development is for brownfields. The EPA defines "brownfield sites" as properties whose "expansion, redevelopment, or reuse [could] be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant."[29] The City has established its own Brownfield Redevelopment Authority and the required brownfield planning documents. Since its inception, the City has established three brownfield redevelopment projects that qualified under the City's standards and mitigated contamination on each of those sites, redeveloped the underutilized properties, and significantly increased the long-term taxable value of each of the properties. In certain brownfield projects, truly transformational impacts have resulted. For example, BAE

[28] "Sterling Heights, MI," Niche, accessed June 14, 2021, https://www.niche.com/places-to-live/sterling-heights-macomb-mi/.

[29] "Overview of EPA's Brownfields Program," US Environmental Protection Agency, accessed June 14, 2021, https://www.epa.gov/brownfields/overview-epas-brownfields-program.

Systems, located at 34201 Van Dyke Avenue, is an example of a brownfield development project that has had truly transformational properties for the Van Dyke Corridor in terms of architecture, design, economic investment, and job opportunities.

As the City continues to age and sites become more viable for redevelopment, qualifying brownfield sites will continue to be attractive from a sustainability standpoint due to the benefits derived from environmental cleanup, redevelopment, and reuse that generates property taxes and increased employment and avoids the consumption of greenfields and associated urban sprawl by encouraging infill development.

The City's Brownfield Redevelopment Authority has designated the entire city as a brownfield redevelopment zone. However, this does not indicate that every property within the City qualifies as a brownfield site and requires each property owner/buyer to determine whether the site qualifies based on environmental factors.

As of April 2021, the following brownfield sites have been approved within the City:

- BAE Systems
- Casadei Steel
- Liberty Commerce Center (former Liberty Park
- Faurecia

IV.C Sustainable Land Use Patterns

The City would also benefit from positive changes in land use patterns that reflect a more efficient and long-term viable development pattern. This includes allowing for land use patterns that promote higher-density land uses in residential areas, a mixture of uses (residential, office, and commercial), and concentration of densities near major transportation nodes where public transit can be easily utilized. By allowing more people to live together in a smaller area, suburban sprawl on a regional scale can be better managed by directing population growth in those areas where infrastructure already exists while preserving remaining open space in those areas outside of developed areas.

These higher-density and mixed use residential developments and their inhabitants that are properly located typically have smaller carbon footprints, as they occupy less physical land area, require fewer physical extensions of roadways and infrastructure, and allow the inhabitants to be more centrally located near job centers, resources, and amenities, compared to conventional single-family housing that is less dense, land consumptive, and isolated from existing core areas. In addition, higher-density development also allows for more efficient delivery of public services since the amount of infrastructure required is typically less and the cost for that infrastructure is spread over a greater number of living units. There are less roads and less sewers serving more residents.[30]

If properly implemented, Sterling Heights can, through sustainable development and land use policies, increase efficiency of land use, reduce wasteful impervious surfaces, increase the ability to utilize public transit, and lower the need for individual vehicle travel, among other things. For example, by incorporating more mixed use developments or increased density into specific nodes as highlighted in the City's Master Land Use Plan, there is the potential to reduce the amount of trips taken by automobiles for traveling to work, shopping, and going to entertainment venues. The reduction in vehicular traffic and increased use of ride-sharing and other sustainable methods can reduce gas consumption, reduce emissions, reduce wear and tear on roadways and parking areas, support walkability and fitness, etc.

[30] "APA Policy Guide on Smart Growth," American Planning Association, updated April 14, 2012, https://www.planning.org/policy/guides/adopted/smartgrowth.htm.

IV.C.1 Sustainable Housing Mix

Currently, the City of Sterling Heights has approximately 134,000 residents. City residents live within a wide variety of housing types. The City's housing stock ranges from large lot (100 plus feet in width and at least 14,000 square feet in area) single family residential, to higher-density single family residential lots, to high-density multiple family residential, dedicated senior housing towers, or dedicated low–moderate income housing developments. Residents within the City have a variety of housing types to choose from.

One of the housing markets that was identified as being underserved in the City's current Master Land Use Plan is the "missing middle." What this means is housing that is market rate, multiple family housing. As a part of a sustainable community, housing of all kinds and price ranges must be provided. Within the City, there are limited open, greenfield sites that are available for new housing developments. Most of the housing developments that will likely be brought forward include redevelopment of identified potential mixed use areas. Developments on properties of this nature will likely be multiple family housing and should help satisfy the identified missing middle housing needs.

IV.C.2 Community Green Space

One important aspect of sustainability as it relates to land use is the provision of viable open green spaces. These open spaces can take a number of forms and shapes, including community gardens, natural open spaces, formal urban gardens or plazas, etc. While the form of these spaces may vary greatly, their overall benefits are largely the same.

From an environmental standpoint, these open spaces reduce imperviousness, while typically allowing for additional green space and vegetation. The reduction in imperviousness can help with stormwater management by allowing collection, infiltration, and leveling out heavy rain events. Green spaces contribute to growth of tree canopy and improve water and air quality.

As for social sustainability, spaces such as community gardens and parks can provide not only opportunities to recreate but also to socialize and even generate food sources for the residents. By strategically and equitably planning these spaces throughout the City, convenient accessibility is provided to all.

Green spaces have clinically proven health benefits to their users in reducing stress levels and contributing to improved physical and mental health simply through the exposure to increased natural habitats. A 2019 study quantified this exposure time to be a minimum of 120 minutes per week to see benefits.[31] By investing in such community green spaces throughout the City, Sterling Heights is investing in the health and well-being of its residents.

As the City continues to plan for more densely populated and development areas, such as the planned Traditional Mixed Use Development Nodes, Lakeside Mall Redevelopment, and the newly planned Van Dyke Master Land Use Plan, the importance of community green spaces becomes all the more important for all of the reasons noted above.

IV.D Green Building

Green building sets standards for new developments and continuously looks for opportunities to improve existing infrastructure. It recognizes that economic development in a city does not need to be in conflict with protection of natural assets but

[31] Mathew P. White, "Spending at Least 120 Minutes a Week in Nature Is Associated with Good Health and Wellbeing," *Scientific Reports* 9 (June 2019): 7730, https://doi.org/10.1038/s41598-019-44097-3; Lydia Denworth, "How Much Time in Nature Is Needed to See Benefits?" *Brain Waves* (blog), *Psychology Today*, June 13, 2019, https://www.psychologytoday.com/us/blog/brain-waves/201906/how-much-time-in-nature-is-needed-see-benefits.

work as a mutually beneficial partnership. It recognizes the need to reduce our carbon footprint as a community and foster a healthy, prosperous environment for existing and future residents. Cement production accounts for eight percent of global emissions, with reductions of at least 16 percent required by 2030 to fall in line with the 2015 Paris Agreement.[32]

While the City of Sterling Heights cannot directly amend the Michigan Building Code, the City could address via zoning (or other) incentives for new developments to obtain building certification through two of the most recognized green building certification programs: the US Green Building Council's Leadership in Energy and Environmental Design (LEED) and the EPA's ENERGY STAR Homes programs. Different incentives could be provided for each level of certification obtained under the LEED program, for example. Incentives would likely tie directly to increasing buildable area or an overall increase in development area in return for a certain level of LEED certification. LEED Certification levels include Certified, Silver, Gold and Platinum.

While to the developer LEED Certification or Energy Star Certification can result in higher densities and, therefore, larger profits, these certifications can result in a more highly desirable building product that sells for a higher price. This benefits not only the developer initially but also the homeowners when they go to sell their home. Further, these types of green practices yield long-term savings to the residents and businesses of Sterling Heights by lowering heating and cooling costs, reducing water consumption, etc. This is especially important in housing that is geared toward low-to-moderate-income families where energy use can be 19–26 percent of a household's income.[33]

IV.E Green Energy

In addition to actual physical green building practices for homes or buildings, green infrastructure also includes those structures that generate green, clean energy, such as wind turbines, solar arrays (stand alone or roof mounted), geothermal, and hydroelectric. As costs decrease, these types of technologies continue to become much more viable on a small-scale basis, while their reliability and efficiency continue to increase.

Currently, within the City there are no specific regulations within the City's Zoning Ordinance that regulate or provide guidance on whether these structures are permissible and what conditions would be applicable to them if allowed. The City would benefit from amending its Zoning Ordinance to specifically permit these green energy structures within all zoning districts under the proper conditions. Care would need to be taken in locating these structures due to their potential size, height, and safety concerns.

IV.F Green Infrastructure

While the main function of streets within the City has traditionally been to provide the ability to travel throughout the City, our streets can also be designed to provide an array of sustainable attributes/amenities and become green streets.

Green streets can incorporate a variety of elements, including rain gardens, sidewalk planters, tree boxes, landscaped medians, and permeable paving. These elements are also part of a larger group of sustainable design elements known as green infrastructure. The plants and soils used in gardens, medians, and

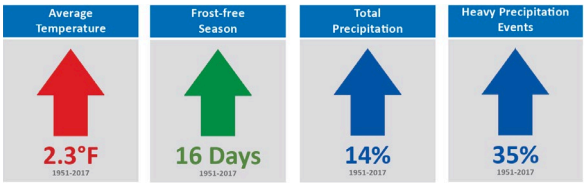
[32] "Making Concrete Change: Innovation in Low-Carbon Cement and Concrete," Chatham House, June 13, 2018, https://www.chathamhouse.org/2018/06/making-concrete-change-innovation-low-carbon-cement-and-concrete.

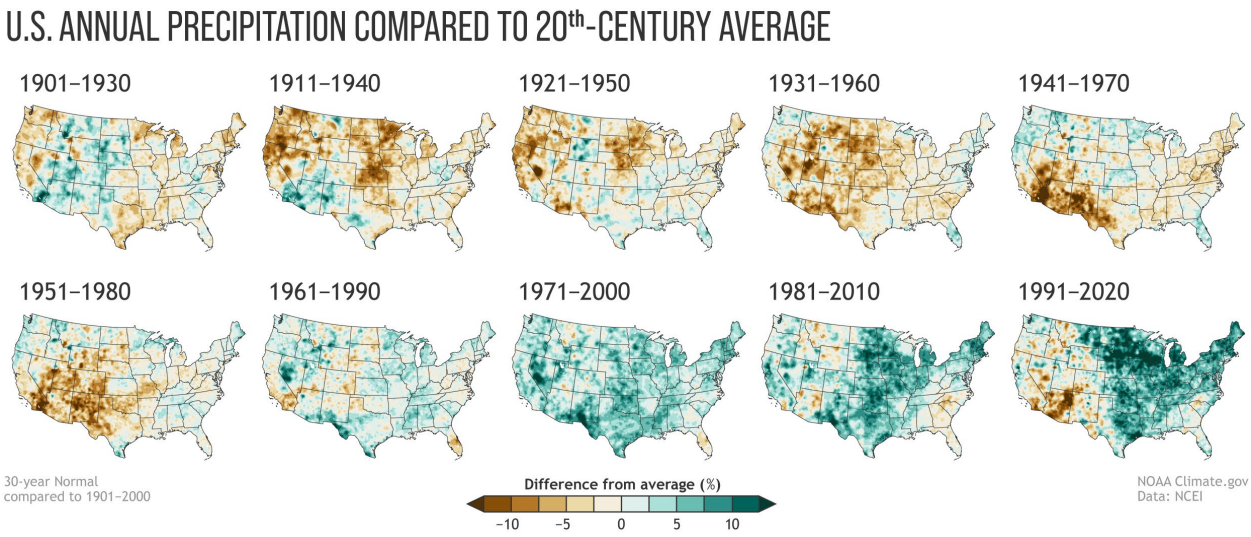
[33] US Department of Housing and Urban Development, Office of Policy Development and Research, *Energy Desk Book for HUD Programs*, accessed June 14, 2021, 3, https://www.huduser.gov/publications/pdf/energybook.pdf.

planters help to filter and break down pollutants. Trees catch and absorb rainfall and help water to evaporate. Green street designs sometimes reduce the amount of hard surface by narrowing the street. Porous materials, such as permeable pavement, can also replace portions of streets and sidewalks typically covered by impervious concrete and asphalt.

Green streets improve air quality by intercepting small particles of air pollutants and reducing "heat islands" that occur when concrete and asphalt are heated during hot weather.[34] They can beautify neighborhoods and calm traffic, making walking and biking safer and more enjoyable. Green streets can also reduce the risk of localized flooding and the need for more costly traditional "grey" infrastructure—such as expanded sewer systems and water treatment facilities—to handle runoff.

About the need to address stormwater as it relates to our roadways, the following can be said: as our climate warms, annual precipitation and precipitation during extreme weather events for the Great Lakes region continues to increase. The amount of precipitation falling in the heaviest 1 percent of storms increased by 35 percent in the Great Lakes region from 1951 through 2017. Since 1951, total annual precipitation has increased by 14 percent in the region.[35]





Source: Rebecca Lindsey, "Climate Change and the 1991-2020 U.S. Climate Normals," National Oceanic and Atmospheric Administration, https://www.climate.gov/news-features/understanding-climate/climate-change-and-1991-2020-us-climate-normals.

[34] "Heat Island Effect," US Environmental Protection Agency, accessed June 14, 2021, https://www.epa.gov/heatislands.

[35] "Summary Climate Information," Great Lakes Integrated Sciences and Assessments, accessed June 14, 2021, https://glisa.umich.edu/summary-climate-information/.

Stormwater runoff is a primary source of water pollution in Michigan.[36] Such pollution occurs indirectly by overwhelming capacities of sewage systems and directly by flowing through storm drains. Water rushing over pavement picks up brake dust, tar, oil, grease, fertilizers, and other contaminants that move untreated into our lakes, rivers, and streams. A green street uses natural landscaping to collect, filter, and cleanse polluted runoff by mimicking natural processes where rainfall evaporates, is taken up by plants, or drains into the soil. Almost any type of street can be greened, including main arterial roads, residential streets, and alleys.

The City's current approach to stormwater management is likely unsustainable, especially if heavy rain events continue to increase in frequency and severity. However, addressing the issue from only the perspective of City-owned infrastructure is insufficient to remedy the problem. How private properties are developed plays a significant role in how and how much stormwater enters the system. In addition to incentivizing developers to incorporate better stormwater management practices in developments, amendments to the City's ordinances and codes may be appropriate. The City should explore adopting a comprehensive Green Stormwater Infrastructure Plan that addresses both the public and private aspects of stormwater management.

In order to better align funding for stormwater infrastructure with use of such infrastructure, the City should explore creating a stormwater utility, which would fund the City's stormwater management system through fees paid by users of the system.[37] A stormwater utility would ensure that there is dedicated funding for the City's stormwater infrastructure. Calculating a landowner's portion of stormwater use based on the amount of impervious surface on a property more accurately reflects actual use of the system than funding this infrastructure through property taxes. A stormwater utility would also allocate costs of the stormwater system to owners of nontaxable properties, who currently benefit from the infrastructure in place without having to pay for it. Stormwater utilities created in other municipalities have faced legal challenges, and the City may wish to wait for more clarity in this area of the law before considering creating a stormwater utility.[38]

IV.F.1 "Fix-It-First" Infrastructure Strategy

This strategy recognizes the value of repair and maintenance of existing infrastructure versus constructing new infrastructure in undeveloped places. Within roadways, sidewalks, and pathways, where appropriate, the City should explore the ability to utilize permeable pavements and other innovative construction materials/methods that are environmentally sensitive to reduce the amount of imperviousness, reduce energy consumption, and limit potential chemical contamination within City rights of way. A policy of this nature signals a commitment to not only sustainability but also to the existing neighborhoods that can benefit from reinvestment, whether public or private, and can attract private sector investment and jobs. Existing infrastructure throughout Sterling Heights should be examined for upgrades in energy efficiency improvements, such as LED streetlights, mitigation of future flooding risks by reducing impervious surface levels, and creating more sustainable green space in municipal projects.

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[36] Michigan Department of Natural Resources and Environment, Water Bureau, *Wet Weather Pollution in Michigan* (2010), 103, https://www.michigan.gov/documents/deq/wb-spotlight-wetweather_323733_7.pdf.

[37] Jerry Zhirong Zhao, Camila Fonseca, and Raihana Zeerak, "Stormwater Utility Fees and Credits: A Funding Strategy for Sustainability," *Sustainability* 11, no. 7 (March 2019): 1913, http://dx.doi.org/10.3390/su11071913.

[38] Avi Brisman, "Considerations in Establishing a Stormwater Utility," *Southern Illinois University Law Journal* 26, no. 3 (Spring 2002): 518–24.

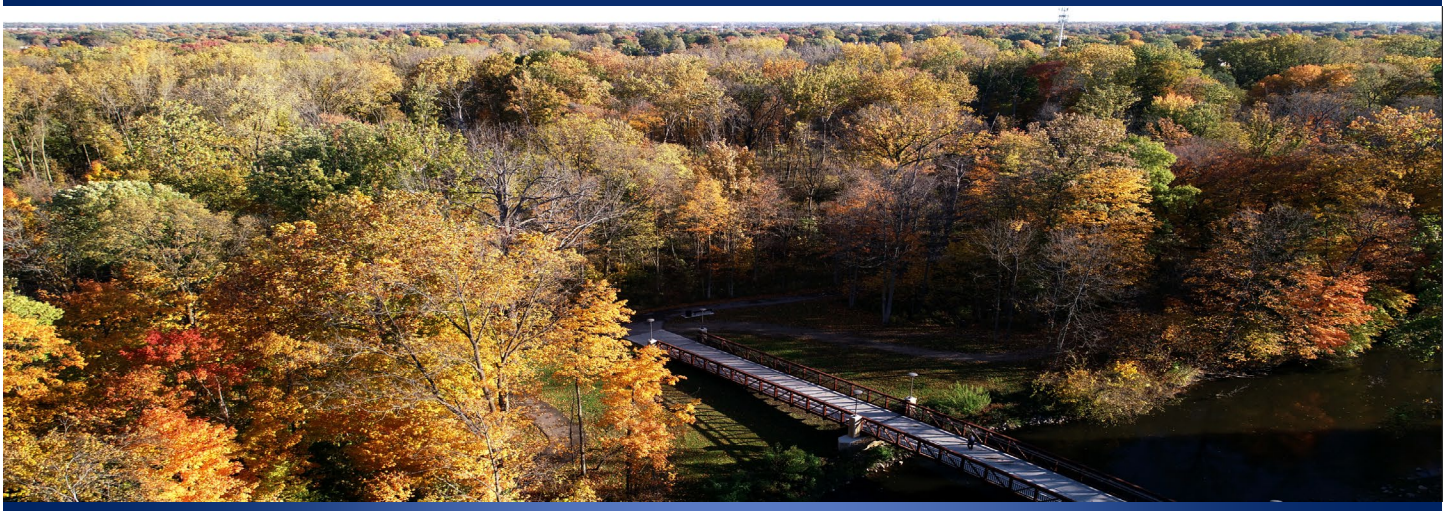
Advancing 2030 Visioning Strategic Plan

Sustainable development and land use is a key sustainability goal that is aligned with the City's 2030 Vision Statement and Guiding Principles as follows:

Vision Statement	Sustainable Development
A vibrant, inclusive community for residents and businesses that is safe, active, progressive, and distinctive	Yes
Guiding Principles	**Sustainable Development**
Safe, well maintained, and desirable neighborhoods enhanced by great schools	Yes
Successful, vibrant, and attractive commercial centers with unique offerings	Yes
Destination for high-tech and emerging industries and entrepreneurs	Yes

Suggested Action	Responsible Parties
1. Continue to market and incentivize brownfield redevelopment sites involving contaminated, functionally obsolete, and underutilized properties.	Economic Development Office of Planning Planning Commission
2. Incorporate sustainability principles, including green infrastructure practices, sustainable landscaping requirements, etc., into the Master Plan, Zoning Ordinance requirements, Engineering Standards, and other codes.	City Council Sustainability Commission Office of Planning Office of Engineering Planning Commission
3. Encourage higher-density residential units or mixed use developments where appropriate.	City Council Office of Planning Planning Commission
4. Research and implement potential incentives for development consistent with sustainability.	Sustainability Commission Office of Planning Office of Engineering Building Department

5. Promote use of green infrastructure (e.g., green/living roofs, rain gardens, bioswales) and sustainable landscaping in City development and planning approvals of new construction and modernization of existing business and manufacturing facilities.	City Council Parks and Recreation Sustainability Commission Office of Planning Office of Engineering Planning Commission Building Department
6. Explore the adoption of a Green Stormwater Infrastructure Plan, with the goal of amending relevant ordinances to comprehensively address green stormwater infrastructure.	City Council Sustainability Commission Office of Planning Planning Commission Office of Engineering
7. Explore the creation of a stormwater utility.	City Council Sustainability Commission Office of Engineering Macomb County Public Works Office
8. Explore amending the Zoning Ordinance to include provisions specifically addressing alternative energy sources.	City Council Sustainability Commission Office of Planning Planning Commission



SECTION V ENVIRONMENTAL STEWARDSHIP

SUSTAINABLE
CITY OF Sterling Heights

Section V.
Environmental Stewardship

Environmental stewardship encompasses the goals most traditionally associated with sustainability. Protection of the Earth's natural resources is the foundation of sustainability, as quality of life begins and ends with clean water and air, productive and nutrient-rich soil, and land conservation. Sterling Heights has been engaged in environmental stewardship since its inception as a city in 1968. The population growth of the City over the course of its first 50 years necessitated planning and installation of stormwater and sanitary sewer systems and potable water supply systems, proper disposal of consumer and yard waste, and management of preexisting, unregulated landfills.

While the City has excelled in these previous endeavors, it has not kept pace with the evolution of the sustainability movement. The City's deficiencies are largely attributable to the fact that the City has not approached sustainability on a **holistic basis** until the creation of the Sustainability Commission and the directive that the Sustainability Commission develop this Sustainability Plan. It is also without question that the challenges of environmental stewardship are bigger than ever, not only within the City but also at the regional, state, national, and global levels.

V.A. Definition

"The responsible use and protection of the natural environment through conservation and sustainable practices to enhance ecosystem resilience and human well-being."[39]

Stewardship contains components of action and measurement.

Action represents the activities of individuals, groups, or communities used to manage, preserve, or protect common-trust resources.

Measurement represents quantifiable benefits to the environment as a result of a stewardship action.

V.B. Climate Change

The Earth's climate is now changing faster than at any point in the history of modern civilization, primarily because of human activities. Global anthropogenic climate change has already resulted in a wide range of impacts across every region of our country along with many sectors of the economy that are expected to grow in the coming decades.[40] It is a pervasive threat throughout all of the UN SDGs.

Climate change and its effects on the natural and built environment are examples of the monumental challenge that obviously Sterling Heights cannot meet alone. But it is a challenge that can start to be addressed by incremental changes implemented at the local level, including those changes made within the City.

The International Panel on Climate Change SR1.5 Special Report states quite plainly:

"Without increased and urgent mitigation ambition in the coming years, leading to a sharp decline in greenhouse gas emissions by 2030, global warming will surpass 1.5°C in the following decades, leading to irreversible loss of the most fragile ecosystems, and crisis after crisis for the most vulnerable people and societies."[41]

The report rates the probability of warming to 1.5°C as *likely*, and it will not be without consequence, further detailing the confidence levels of various outcomes between 1.5–2°C. As such, matters of adaptation and resilience

[39] "Stewardship Definitions," National Oceanic and Atmospheric Administration, updated June 17, 2019, https://www.noaa.gov/resource-collections/common-measures-definitions/stewardship-definitions.
[40] "Understand: Climate Change," US Global Change Research Program, accessed June 14, 2021, https://www.globalchange.gov/climate-change.
[41] Intergovernmental Panel on Climate Change, *Global Warming of 1.5°C* (2019), vi https://www.ipcc.ch/site/assets/uploads/sites/2/2019/06/SR15_Full_Report_High_Res.pdf.

become important topics for risk mitigation and planning. The *Summary for Policymakers* is a necessary educational starting point for officials.

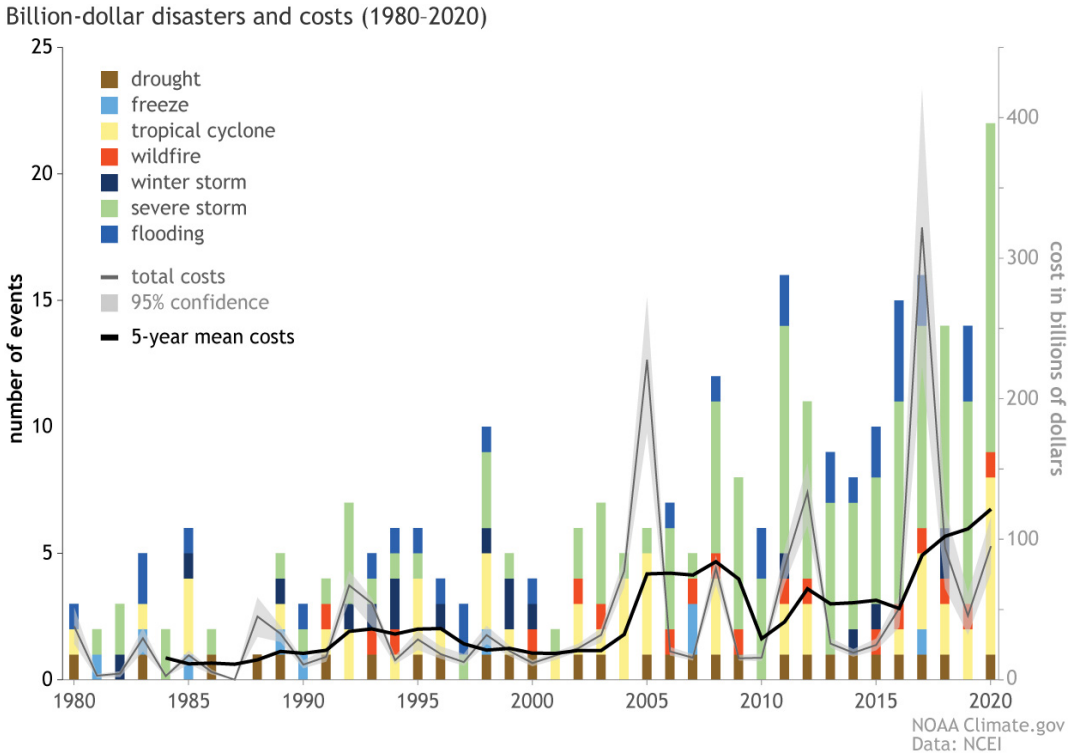
In determining the level of quality of life within the City, and alignment with the globally recognized UN SDGs, the City should consider elements such as the provision of clean water, clean air, and housing for all economic demographics, accessibility, quality education, etc.

It is critical for the City to recognize the threat-multiplier effects of climate change. Any current issue the city may be dealing with, from localized flooding, to increased severe storm events, to tree preservation, to increases in ticks and mosquitoes, are exacerbated by the threat-multiplying effects of our changing climate.[42] As the increases in natural disasters across the country have shown, city financials as well as the financial and livelihood burden on businesses and residents could be severely impacted by just a single severe weather event.

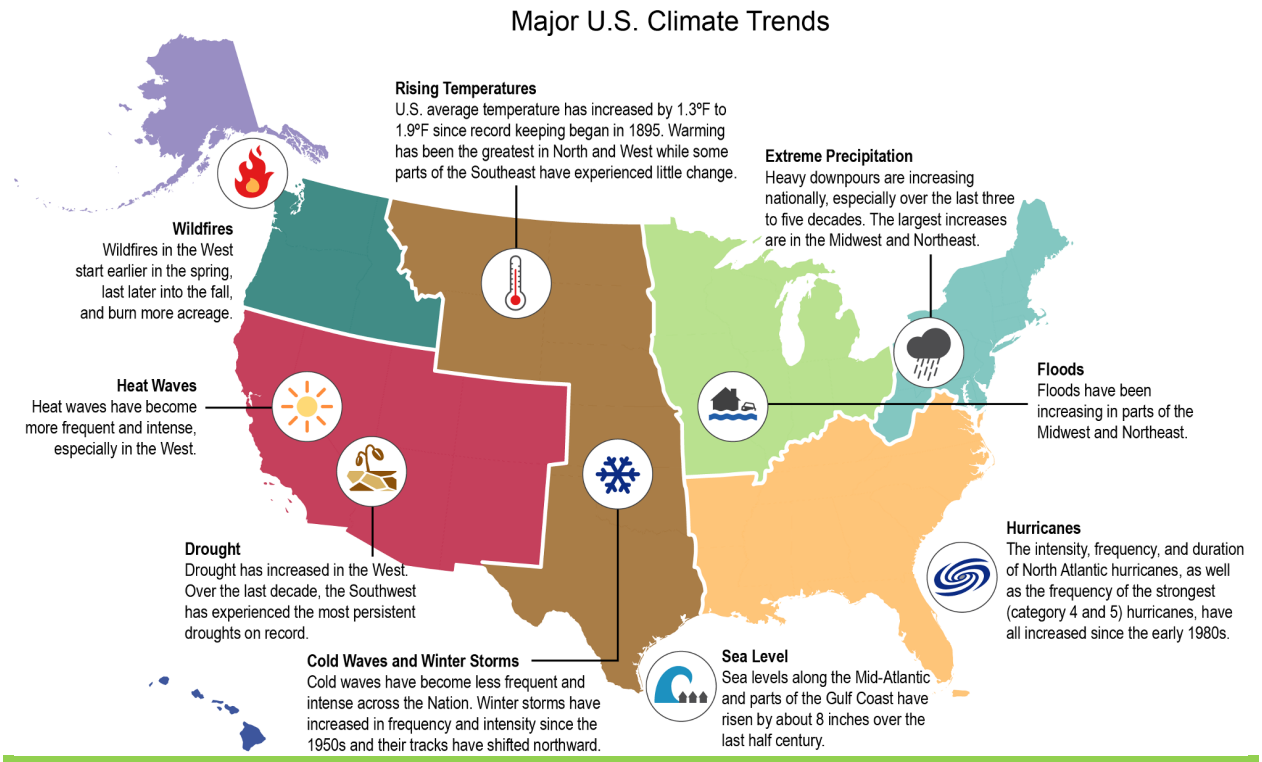
A city's leadership and the success of its community and businesses are judged by how well it responds to crises, how prepared and forward thinking it is in mitigating foreseen risks. Each of these impact areas face known risks of varying degrees from the mounting changes in our climate: community health, environmental equity, city infrastructure, commercial and residential property, financial stability, and adaptive resilience.

The oath of office for elected and appointed officials in the City establishes the responsibilities that those officials have, including the City's commitment to being sustainable, inclusive of the guiding principles of the 2030 Visioning Plan.

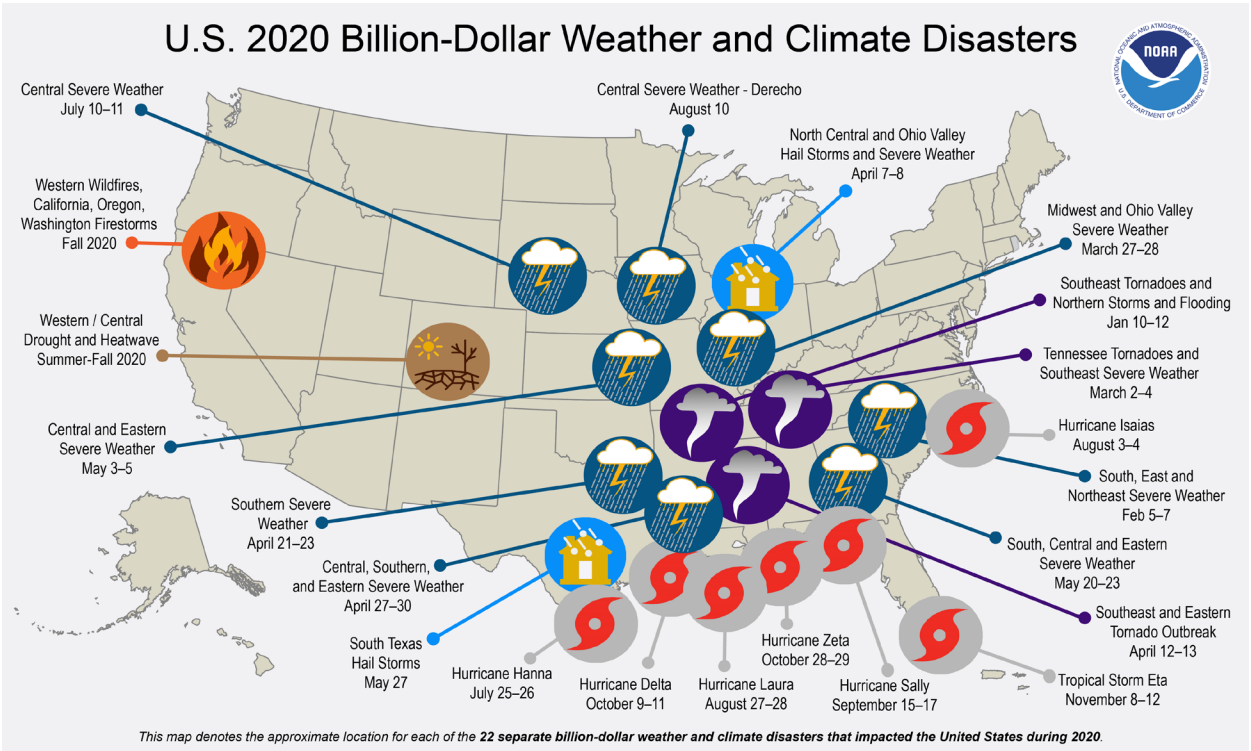
The City of Sterling Heights must thoroughly consider climate change in each of its applicable responsibilities, the regular and evolving threat assessments for our region, and our collective contribution to the greater global problem.



[42] US Global Change Research Program, *Impacts, Risks, and Adaptation in the United States*, 44.



Source: US Global Change Research Program, *The Impacts of Climate Change on Human Health in the United States: A Scientific Assessment* (2016), 27, https://health2016.globalchange.gov/high/ClimateHealth2016_FullReport.pdf.

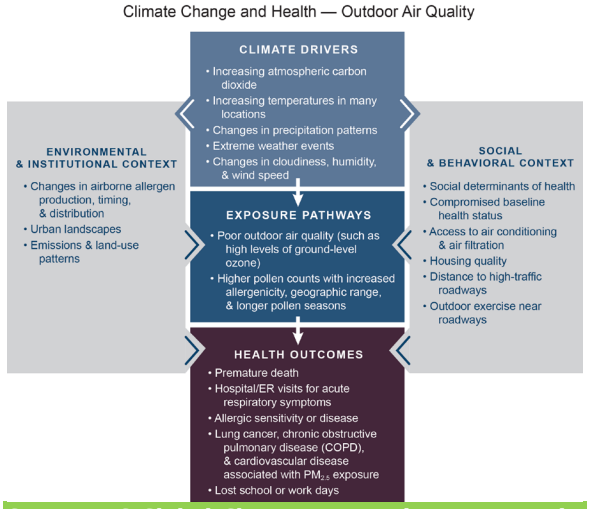


V.B.1 Social Cost of Carbon

With the very broad impacts of climate change and the various risks it creates, one method of accounting for the influence of city policies and decisions on future budgets and generations is using a Social Cost of Carbon ($SC\text{-}CO_2$). "Under Executive Orders regarding regulatory impact analysis and as required by a court ruling, the U.S. government has since 2008 used estimates of the $SC\text{-}CO_2$ in federal rulemakings to value the costs and benefits associated with changes in CO_2 emissions."[43] As the City of Sterling Heights evolves its accounting of its carbon footprint, applying $SC\text{-}CO_2$ to appropriate policy decisions will help in better planning for future risk analysis to city financials.

V.C. Air

Addressing air quality and global warming are significant undertakings. Vehicular transportation is the source of approximately 29 percent of all greenhouse gas emissions.[44] Minimizing the amount of fuel consumed among fleet vehicles within the City has the ability to greatly reduce operating costs for the City while also decreasing carbon emissions from the burning of conventional fossil fuels. The City's fleet of vehicles, including those for fire, police, public works, code, building, etc., are all powered by fossil fuels. Researching and transitioning to vehicles that are powered by alternative energy sources (batteries or natural gas) may be justified when factoring in the benefits to the environment, while taking into account all necessary infrastructure improvements and fueling methods that would be necessary for such a transition.



Source: US Global Change Research Program, *The Impacts of Climate Change*, x.

Allergy season is growing in length and intensity. In a February 2021 paper, researchers concluded pollen seasons start earlier and are 20 days longer, comparing data from 1990 to 2018, due to our changing climate. The greatest increases were seen in the Midwest and Texas.[45] The US Global Change Research program states, "Changes in climate, specifically rising temperatures, altered precipitation patterns, and increasing concentrations of atmospheric carbon dioxide, are expected to contribute to increasing levels of some airborne allergens and associated increases in asthma episodes and other allergic illnesses."[46]

Indoor air quality is also affected by numerous outdoor and indoor elements that can affect the health and well-being of the Sterling Heights community.[47] Increases in humidity and precipitation from climate change can exacerbate indoor air quality issues, including

[43] National Academies of Sciences, Engineering, and Medicine, *Valuing Climate Damages: Updating Estimation of the Social Cost of Carbon Dioxide* (Washington, DC: The National Academies Press, 2017), 1, https://doi.org/10.17226/24651.

[44] "Sources of Greenhouse Gas Emissions," US Environmental Protection Agency, accessed June 14, 2021, https://www.epa.gov/ghgemissions/sources-greenhouse-gas-emissions.

[45] William R. L. Anderegg et al., "Anthropogenic Climate Change Is Worsening North American Pollen Season," *Proceedings of the National Academy of Sciences of the United States of America* 118, no. 7 (February 2021): e2013284118, https://doi.org/10.1073/pnas.2013284118.

[46] US Global Change Research Program, *The Impacts of Climate Change*, 9.

[47] "Indoor Air Quality," US Environmental Protection Agency, accessed June 14, 2021, https://www.epa.gov/report-environment/indoor-air-quality; "The Inside Story: A Guide to Indoor Air Quality," US Consumer Product Safety

increased mold growth and bacteria.[48] The City should make efforts to educate members of the community on methods to improve indoor air quality conditions, potentially mitigating some aspects of our changing climate. The City should also evaluate its own facilities for indoor air quality improvements and the related hazard mitigation.

V.D. Energy

Environmental stewardship for energy is a combination of conservation and protection from emerging threats. The 2018 US National Climate Assessment delivers this stark key message:

> *"The Nation's energy system is already affected by extreme weather events, and due to climate change, it is projected to be increasingly threatened by more frequent and longer-lasting power outages affecting critical energy infrastructure and creating fuel availability and demand imbalances. The reliability, security, and resilience of the energy system underpin virtually every sector of the U.S. economy. Cascading impacts on other critical sectors could affect economic and national security."*

At a global level, the UN pushes goals related to clean and affordable energy in UN SDG 7 (Energy), specifically citing energy as the dominant contributor to climate change, accounting for 60 percent of total greenhouse gas emissions. Carbon emissions from electricity generation are a significant source of air pollution. According to EPA estimates, generating electricity accounts for 25 percent of all greenhouse gas emissions in the United States.[49]

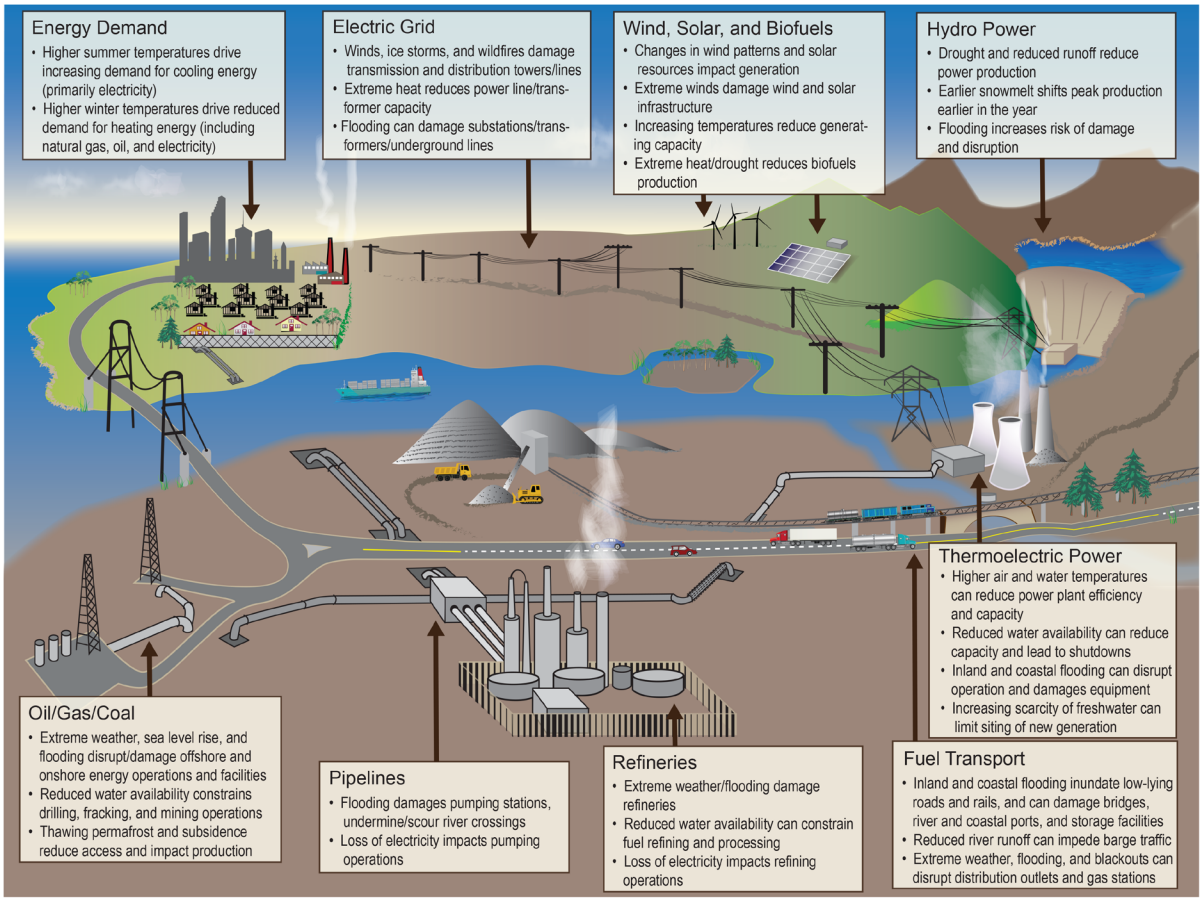
Leading governments and corporations have all indicated the need to reduce carbon footprints and greenhouse gas emissions to varying degrees, acknowledging the consequences of inaction. The City first needs to document its own greenhouse gas emissions to establish a baseline. Then, to be in compliance with (if not lead) state and national targets, the City needs to establish a plan of action for reductions throughout each city department.

In addition, the City should be promoting energy efficient products, promoting renewable energy, and/or incentivizing building owners to obtain LEED certifications to play their own part in reducing the City's collective energy demand and ultimately carbon footprint and greenhouse gas generation.

Commission, accessed June 14, 2021, https://www.cpsc.gov/Safety-Education/Safety-Guides/Home/The-Inside-Story-A-Guide-to-Indoor-Air-Quality.

[48] Nick Bradford, "Healthy Indoor Air Quality in a Changing Climate," National Environmental Education Foundation, accessed June 15, 2021, https://www.neefusa.org/weather-and-climate/climate-change/healthy-indoor-air-quality-changing-climate.

[49] "Sources of Greenhouse Gas Emissions."



Extreme weather and climate change can potentially affect all components of the Nation's energy system, from fuel (petroleum, coal, and natural gas production and demand).[50]

Within the residential sector, energy efficiency gains are obtainable with ENERGY STAR compliant appliances, low wattage luminaires in light fixtures, water faucet / shower head aerators, low-flush toilets, new insulation methods, solar panels/orientation, etc. Aging apartment buildings and single-family residences tend to be more energy inefficient due to outdated appliances, inefficient heating units, inadequate insulation, drafty windows, etc.

It is also important to recognize the interdependence of energy and water. Generating energy requires water, and treating wastewater requires energy. A projected 40 percent increase in US energy demand by 2030 with current systems will require an additional 165 percent in freshwater to support it.[51]

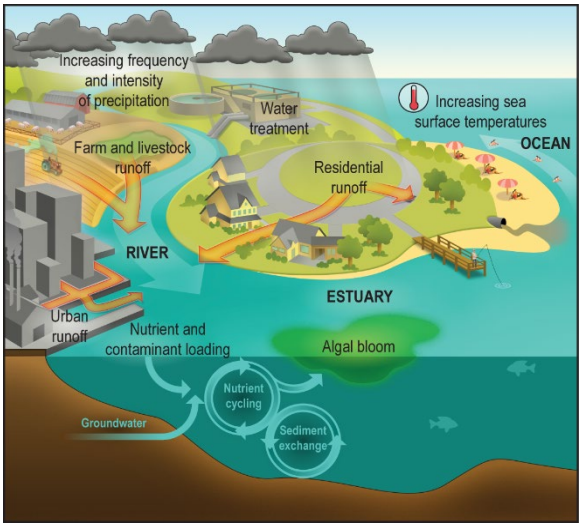
Conservation will ultimately result in lower utility bills for those embracing energy efficiency. Lowering our greenhouse gases, however, shows our dedication toward creating a healthier community and planet.

V.E. Water

Access to affordable potable water is a fundamental need that is often taken for granted within the United States, especially for those in the Great Lakes region. Globally, with

[50] US Global Change Research Program, *Impacts, Risks, and Adaptation in the United States*, 180.
[51] Dominic Waughray, "Why Worry about Water? A Quick Global Overview," 2030 Water Resources Group, November 10, 2010, https://www.2030wrg.org/why-worry-about-water-a-quick-global-overview/.

only one percent of Earth's freshwater sources being readily available in the form of rivers, lakes, and streams, freshwater is a limited commodity.[52] When combined with increasing populations worldwide and aspects of climate change, ensuring that this essential resource is available requires sound stewardship practices. Commitments to best conservation practices and public education are important first steps toward sustainability.



Source: US Global Change Research Program, *The Impacts of Climate Change*, 14.

Fortunately, Sterling Heights is not currently threatened with having a water shortage, unlike many areas of the world. Affordability remains the principal concern, as the costs to deliver safe, dependable clean water rise. This affordability is impacted by the fact that the City's water costs are largely fixed and distributed over users proportioned by volume of use. Costs associated with maintaining an aging infrastructure as well as addressing emerging water quality threats are built into these fixed costs by the regional authorities.

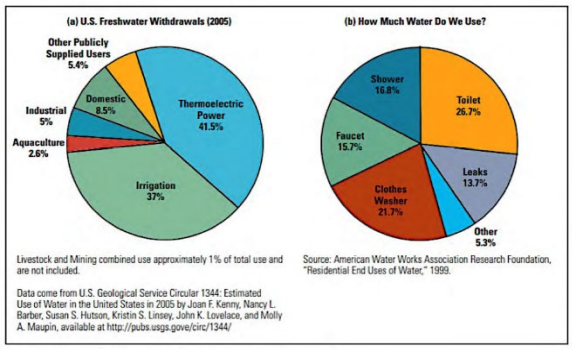


Figure 1. (a) National freshwater usage by category, with the average personal domestic use (b).

Even though general trends are moving toward a decline in per user water usage with more water efficient appliances, the fixed costs still need to be paid for, resulting in higher bills. Higher bills may naturally drive more conservation, but we need educational programs for residents on all factors affecting the cost of this safe, dependable supply.

This may involve going beyond basic water conservation practices that reduce usage volume. It is still important for residents to be aware of ENERGY STAR appliances, low-flow fixtures, and checking for leaks. This should be standard equipment in any City facility specification. However, as recent history shows, even with lower use, costs can still rise due to the fixed portion assigned by the Great Lakes Water Authority (GLWA).

A significant factor is with community storage. This should be examined at a city level (e.g., water tower investment) if it will result in an overall lower fixed-cost burden for the community.

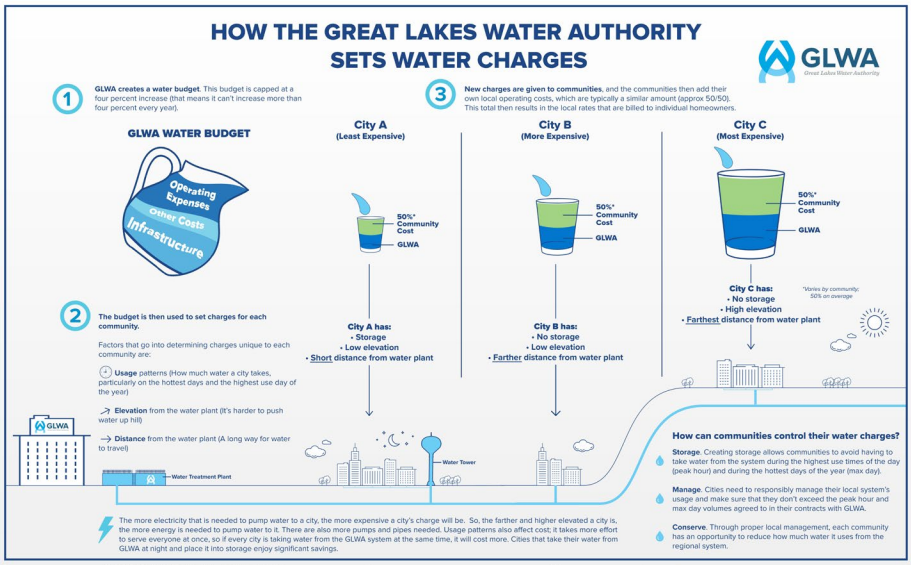
Irrigation is a significant water consumption factor. Currently, the City does not offer many educational resources when it comes to reducing the need for irrigation. The American lawn has become part of the suburban culture, the most grown crop in the United States.[53] Yet

[52] "Freshwater Crisis," National Geographic, accessed June 14, 2021, https://www.nationalgeographic.com/environment/article/freshwater-crisis.

[53] Lara Brenner, Claire McFadden, and Hannah Joy Wirshing, "The American Lawn: Examining Our Cultural Commitment to an Energy-Intensive Institution," (Environmental Studies Comprehensive Project, Carleton College, 2013), https://d31kydh6n6r5j5.cloudfront.net/uploads/sites/75/2019/05/BrennerMcFaddenWirshing.pdf; Annie

it is not one anyone can eat and requires substantial resources to maintain. It is a crop largely driven by aesthetics, often to the detriment of water quality and conservation. Green turf does contribute to cooling permeable surfaces throughout our parks and neighborhoods, but the root depth is much shallower than native plants. Deeper roots help stabilize soil and absorb more stormwater. An increase in the use of native plants, use of home water storage solutions (e.g., rain barrels), and an examination of ordinances that may limit a homeowner's ability to create a more sustainable landscape can all help conserve our water resources directed at irrigation.

The following graphic supplied by the GLWA offers comparisons of the factors affecting each community's charges.



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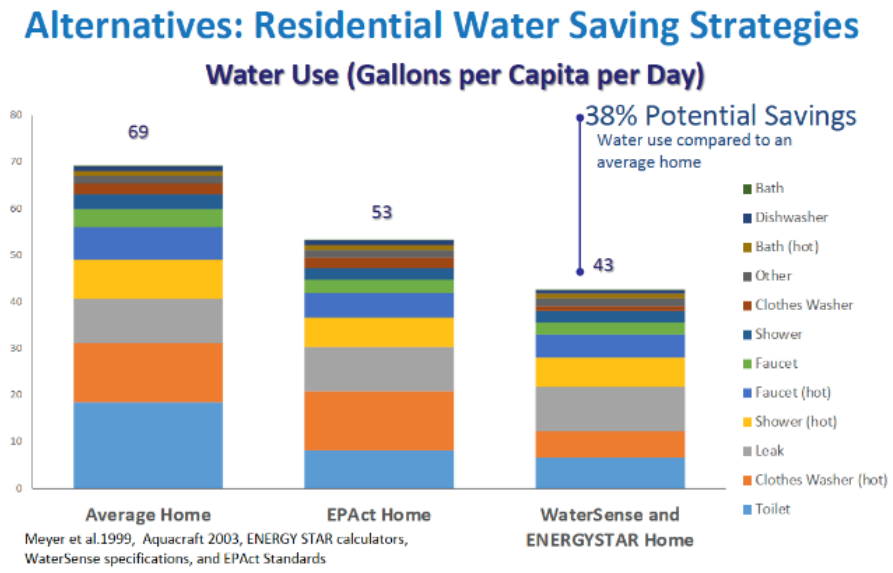

Rauwerda, "A Greener Lawn," University of Michigan College of Literature, Science, and the Arts, accessed June 14, 2021, https://lsa.umich.edu/sustainable-living/sle-podcast/lawn-care-in-the-u-s-.html.

V.F. Waste

As a populous municipality, generation of consumer and yard waste is significant, and such waste is an environmental burden even when properly disposed. The City Refuse Service contributes on average nearly 45,000 tons to landfills each year.[54] Yet, how much do we avoid? The waste stream from Sterling Heights has largely remained constant. Avoidance can be difficult to measure unless we make a trackable metric related to it. UN SDG 12 (Consumption and Production) also looks at this problem from the aspect of *sustainable consumption and production*. By 2030, it sets a target to substantially reduce waste generation through prevention, reduction, recycling, and reuse, including halving per capita food waste.

The City would be well served by any initiative, like Zero Waste principles, including general education of business owners and residents that reduces the volume of waste being generated, recycling volume, and ultimately placed in a landfill. As has been the case in many other areas, the City will need to be strategic and forward-thinking with how to address this significant issue, since the management of waste is complicated, fluid, and subject to many influences, such as waste haulers, waste economics, resident education, city investment costs, etc.[55]

Zero Waste has many basic definitions and strategies. One local government defines "Zero Waste" as "a way of life that promotes the goal of reducing the amount of material we throw away and instead reincorporating by-products of one system for use for another system. *There is no such thing as 'waste' in Nature.* In nature, the by-product of one system is feedstock for another system."[56]

Source: "Zero Waste Hierarchy."

Zero Waste promotes a hierarchy of priorities to add depth to the principle of the well-known 3 Rs of Reduce, Reuse, and Recycle. UN SDG 12 (Consumption and Production) highlights the global material footprint—an indicator of the pressure put on the environment to support economic growth and to satisfy the material needs of people—grew by 17.4 per cent to 85.9 billion metric tons in 2017 as compared to 2010.[57] Electronic waste grew by 38 percent, but less than 20 percent is recycled. In the United States, 61 percent of calories from food produced for human consumption is lost or wasted.

Incorporating Zero Waste principles throughout city operations, and encouraging residents and businesses to do the same, will help Sterling Heights in reaching its sustainability goals.

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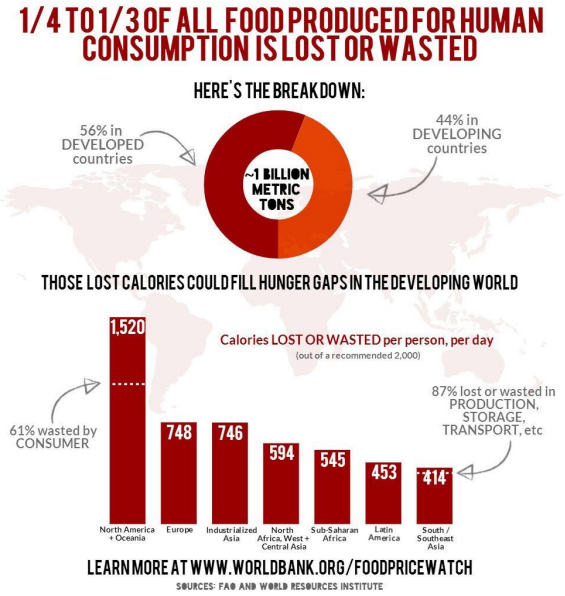
[54] City of Sterling Heights, *Annual Budget*, 207.

[55] "Zero Waste Hierarchy of Highest and Best Use," Zero Waste International Alliance, accessed June 14, 2021, https://zwia.org/zwh/; "How Communities Have Defined Zero Waste," US Environmental Protection Agency, accessed June 14, 2021, https://www.epa.gov/transforming-waste-tool/how-communities-have-defined-zero-waste.

[56] "How Communities Have Defined Zero Waste" (emphasis added).

[57] "Goal 12: Ensure sustainable consumption and production patterns," United Nations, accessed June 14, 2021, https://www.un.org/sustainabledevelopment/sustainable-consumption-production/.



Curbside recycling in some form has real potential for reducing the volume of landfilled waste being generated by the residents and businesses within the City. Recent volatile market conditions have greatly reduced the demand for some recyclable plastics and therefore increased costs of providing this service. Cities and recovery facilities across the United States are navigating difficulties with their recycling programs and to a large degree remain at the mercy of market conditions. This signals the need for more innovation and novel approaches when it comes to recycling and effective waste management versus increasing dumping at landfills.

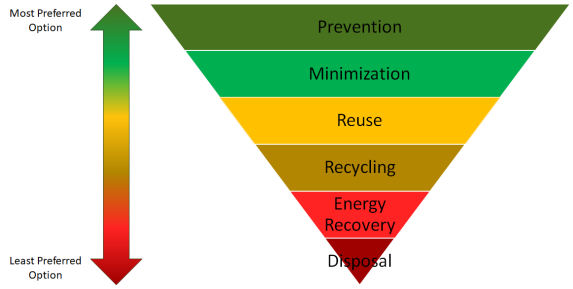
"Should the global population reach 9.6 billion by 2050; the equivalent of almost three planets could be required to provide the natural resources needed to sustain current lifestyles."

Thinking and planning in a sustainable manner, thinking Zero Waste, and a long-range focus will prepare Sterling Heights for this type of volatility and will help ensure that recycling efforts remain viable and the desire to recycle does not diminish.

V.G. Reduce, Reuse, Recycle

Within the State of Michigan, the amount of waste material that is generated on an annual basis is staggering. For instance, over 7,000,000 tons of construction and demolition waste alone are landfilled in the state annually.[58] The current paradigm of disposing of building waste rather than recycling or reusing it is unsustainable and places additional pressure on the dwindling capacity of landfills within the State.

Promoting deconstruction over demolition presents higher up-front costs but is profitable via the salvage, reuse, and sale of reclaimed building materials. Additionally, one study found that up to 90 percent of a building's structural material can be recycled and reused.[59] An increase in the deconstruction of buildings over the simple demolition of them also carries the capacity to increase jobs in the deconstruction/salvage industry within Sterling Heights.



Waste Hierarchy

Other estimates indicate that an estimated 10,000 metric tons (22 million pounds) of plastic

[58] Michigan Department of Environment, Great Lakes, and Energy, *Report of Solid Waste Landfilled in Michigan: October 1, 2019 - September 30, 2020* (2021), 6, https://www.michigan.gov/documents/egle/Solid-Waste-Landfilled-Report-FY2020_720245_7.pdf.

[59] Ilenia Farina, "LCA of Concrete with Construction and Demolition Waste," in *Advances in Construction and Demolition Waste Recycling*, ed. Fernando Pacheco-Torga et al. (Woodhead Publishing, 2020), 501–13, https://doi.org/10.1016/B978-0-12-819055-5.00024-3.

enter the Great Lakes every year.[60] Every single year, cleanup efforts pull bulk plastic waste out of the Clinton River, its tributaries and drains, and across the landscape of our watershed. However, these efforts largely miss microplastics. One study found 97 percent of 330 fish from Lake Ontario had microfibers in their digestive tracts.[61] In a 2016 US Geological Survey study of 29 Great Lakes tributaries, the Clinton River ranked fourth highest for microplastic concentrations, with a concentration of 21 particles/m^3, well above the median of 1.9 particles/m^3.[62] Ingested microplastics can cause digestive and reproductive problems, as well as death, in fish, birds, and other animals. These tiny materials tend to accumulate in the environment, can contain many toxins, and often pass through waste treatment plants.

A decrease in plastic consumption or a more widely utilized recycling program would help minimize waste being generated and waste potentially not being disposed of (recycled) appropriately.

Education, as with many aspects of sustainability, is key. Residents need to understand the complexities of the journey of an object beyond their recycling bins and how they can help (or hinder) that process. Contamination issues, number symbols on plastics, and mixed material items all contribute to the complexities of how residents interface with recycling programs. It can result in an item going to a landfill versus the expectation of it being recycled just because it was placed in a green bin. Perhaps most notably, plastic (and the toxins it encountered) on the side of the road may ultimately end up in the fish we eat.

The City will need to significantly increase educational opportunities available to its residents, emphasizing that while reusing and recycling are important, reducing (the first R) is the most sustainable option. In addition to educating its residents and business owners, the City can track its own usage of consumables and identify where reducing is possible.

V.H. Collaboration and Advocacy

While the state and federal governments play important major roles in enacting and enforcing environmental laws and regulations, the role of local governments should not be overlooked. At times, it may be appropriate for local governments to have the ability to provide greater protections for the environment and natural resources than provided at the state or federal level. The City should engage in advocacy with the Legislature to advocate against legislation removing issues that local governments are currently permitted to regulate. The City already collaborates with the Michigan Municipal League (MML) for advocacy on local government issues, and there may be opportunities for collaboration on issues related to sustainability in the future.

V.I. Challenges

The formation of the Sustainability Commission is an indicator of renewed commitment to sustainability on the part of the City. However, the level of environmental stewardship outlined in this plan is likely to face challenges. The following are some of the most likely challenges and suggestion on how the City can address them:

Poor monitoring or evaluation systems: This plan recommends actions that need to be meaningful and measurable. The City must carefully evaluate and commit to robust monitoring and measuring programs. Providing

[60] Matthew J. Hoffman and Eric Hittinger, "Inventory and Transport of Plastic Debris in the Laurentian Great Lakes," *Marine Pollution Bulletin* 115, no. 1 (December 2016): 273–81, https://doi.org/10.1016/j.marpolbul.2016.11.061.
[61] Andrew Blok, "Microplastics and Algae Tangle in the Great Lakes," Environmental Health News, March 17, 2021, https://www.ehn.org/great-lakes-plastic-algae-2651097829.html.
[62] "Widespread Plastic Pollution Found in Great Lakes Tributaries," US Geological Survey, September 14, 2016, https://www.usgs.gov/news/widespread-plastic-pollution-found-great-lakes-tributaries.

public visibility for such efforts helps with transparency.

Financial and Economic Factors: While sustainability aims to achieve a more resilient and risk-tolerant budget, certain events may result in restrictions on capital or other spending. It is important to recognize the long-term benefits, both environmental and financial, of investing in sustainable infrastructure, avoiding shortsighted mindsets.

Political Will: It is important that sustainability become ingrained in the City's operational culture, not subject to any changes in the political leadership from the local to national levels.

Resource Constraints: While sustainability initiatives require integration into each departmental function, it is important to have resources dedicated to follow up and reporting progress, ideally summarized at a senior management level. Additional resources may also be required for public education. A volunteer-based commission can only go so far.

Empowerment: While many aspects of this plan touch on areas that are subject to county, state, or national authorities, it is important that the City show leadership and perseverance in leaning forward on these initiatives. The City should also examine any ordinance restrictions that may hinder a resident or business from taking initiative.

Advancing 2030 Visioning Strategic Plan

Environmental stewardship is fundamental to the City's 2030 Vision Statement and Guiding Principles as follows:

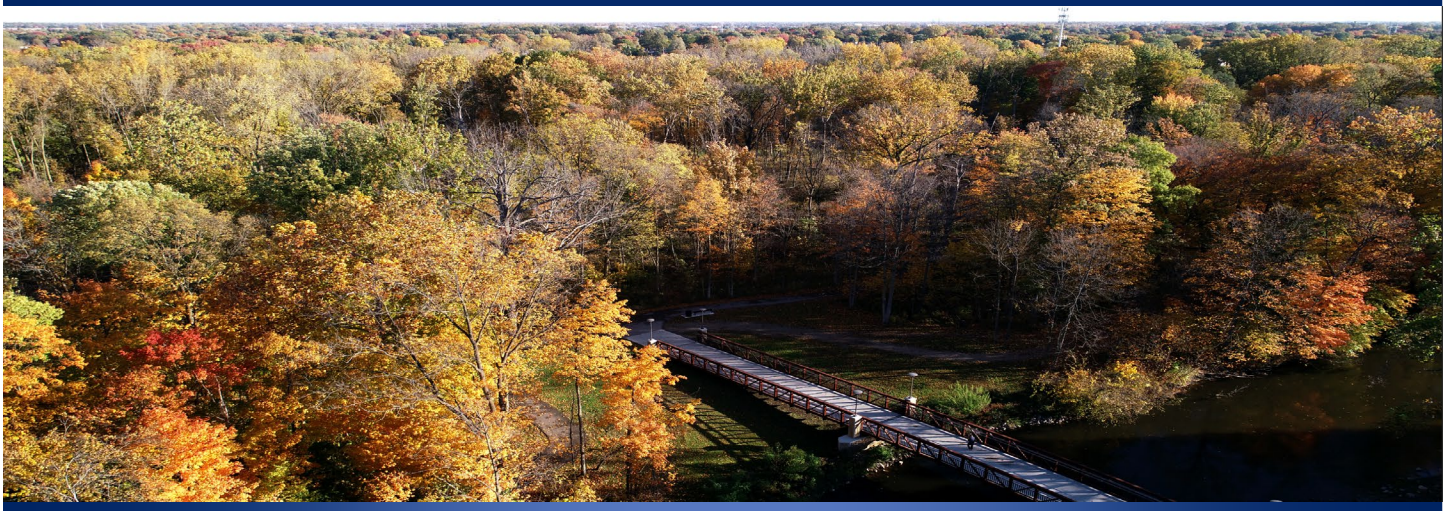
Vision Statement	**Environmental Stewardship**
A vibrant, inclusive community for residents and businesses that is safe, active, progressive, and distinctive	Yes
Guiding Principles	**Environmental Stewardship**
Safe, well maintained, and desirable neighborhoods enhanced by great schools	Yes

Suggested Action	Responsible Parties
1. Develop and aggressively market public education on all aspects of conservation of natural resources and responsible land stewardship.	City Council Sustainability Commission Community Relations Office of Planning
2. Consider alternative energy sources to power the City's extensive fleet of vehicles.	City Council Parks and Recreation Sustainability Commission Purchasing Department Facilities Maintenance Department of Public Works Office of Planning Office of Engineering Building Department Police Department Fire Department

3. Establish procedures for collecting data on and publishing public fuel consumption statistics on the City's vehicle fleet (e.g., police, fire, and pool vehicles).	City Council Parks and Recreation Sustainability Commission Purchasing Department Department of Public Works Office of Engineering Building Department Community Development Department Fire Department Police Department
4. Research and provide education materials regarding best practices for diverting construction and demolition materials from landfills.	City Council Parks and Recreation Sustainability Commission Purchasing Department Facilities Maintenance Department of Public Works Building Department Office of Planning Police Department Fire Department
5. Continue to work with DTE to retrofit existing public lighting with the most energy efficient technology available.	City Council Sustainability Commission Purchasing Department Community Development Department
6. Establish internal standards for all heating and cooling systems within City facilities to ensure energy efficiency of these units is commensurate with industry standards.	City Council Parks and Recreation Sustainability Commission Purchasing Department Facilities Maintenance Department of Public Works Office of Engineering Building Department Community Development Department Police Department Fire Department
7. Encourage composting and other alternate waste reduction practices.	City Council Sustainability Commission Office of Planning Community Relations

8. Reduce the use of plastics at all City facilities and events.	City Council Parks and Recreation Sustainability Commission Purchasing Department Facilities Maintenance
9. Eliminate the practice of allowing residents to deposit consumer waste outside of approved waste disposal containers.	City Council Sustainability Commission Purchasing Department Department of Public Works Office of Planning
10. Consider development of a City composting site for yard waste.	City Council Sustainability Commission Purchasing Department Facilities Maintenance Department of Public Works Office of Planning
11. Consider increasing funding for community education on environmental stewardship (e.g., The Nature Education Center).	City Council Parks and Recreation Sustainability Commission Purchasing Department Facilities Maintenance Department of Public Works Office of Engineering Building Department Community Development Department Police Department Fire Department
12. Implement mobile recycling containers for all City-sponsored events.	City Council Parks and Recreation Sustainability Commission Purchasing Department Facilities Maintenance Department of Public Works Office of Planning
13. Consider creating a full-time position to be responsible for coordinating sustainability action plans through all departments.	City Council Sustainability Commission Human Relations Department Office of Planning
14. Implement processes for measuring the City's carbon footprint / total energy use—baseline and regular public reporting.	City Council Sustainability Commission Facilities Maintenance Office of Planning

15. Consider use of Social Cost of Carbon in future budget risk planning.	City Council Sustainability Commission Purchasing Department City Administration
16. Adopt a resolution affirming the City's commitment and recognition of the need for the objectives of the 2015 Paris Climate Agreement.	City Council Sustainability Commission
17. Adopt city risk assessment procedures aligned with the National Risk Index and the US Climate Resilience Toolkit.	City Council Sustainability Commission City Administration Office of Planning
18. Implement Zero Waste principles aligned with the United States Conference of Mayors.	City Council Parks and Recreation Sustainability Commission Purchasing Department Facilities Maintenance Department of Public Works Community Development Department
19. Expand special collection days for proper disposal of potentially hazardous substances generated by residents.	City Council Sustainability Commission Purchasing Department Facilities Maintenance Department of Public Works Office of Planning
20. Implement universal curbside recycling as a City service.	City Council Sustainability Commission Purchasing Department Department of Public Works Office of Planning Community Relations Department
21. Promote programs such as Property Assessed Clean Energy (PACE).	City Council Sustainability Commission Building Department Community Development Department Community Relations Department
22. Engage in open dialogue and advocacy with the Legislature on issues related to sustainability and partner with relevant organizations, such as the MML.	City Council Sustainability Commission City Attorney Office of Planning



SECTION VI IMPLEMENTING A SUSTAINABLE STERLING HEIGHTS

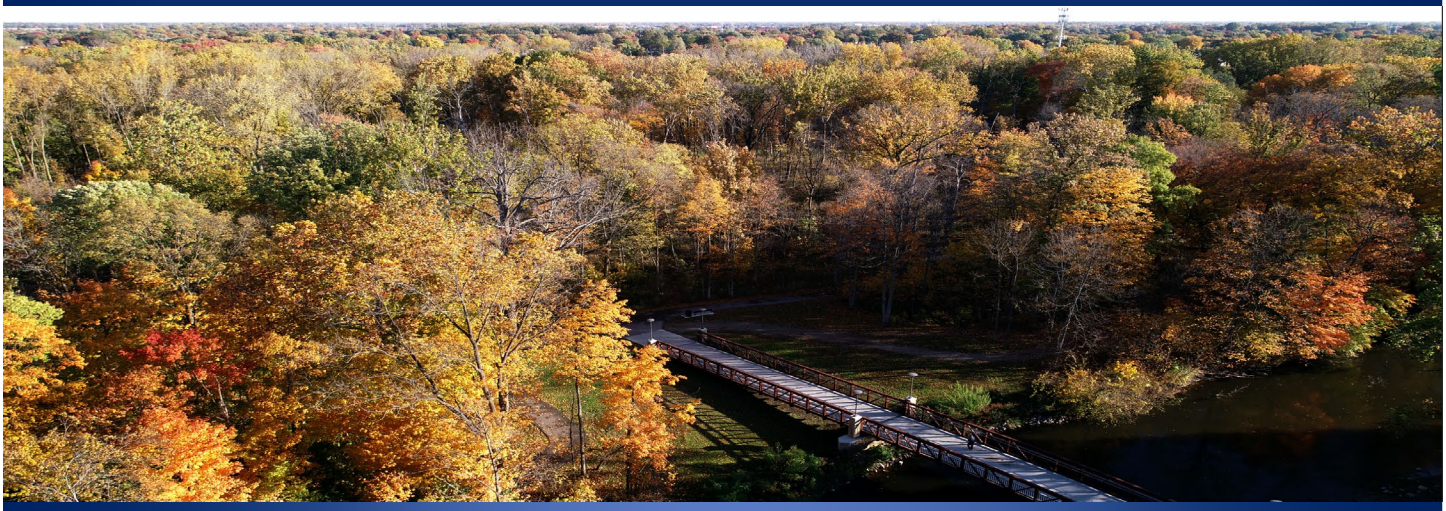
SUSTAINABLE

CITY OF Sterling Heights

Section VI.
Implementing a Sustainable Sterling Heights

The following timeline is for the creation of the Sustainability Commission and Sustainability Plan for the City of Sterling Heights:

Distribution of Creating a Sustainable Sterling Heights Report	January 2020
Strategic Planning Presentation: Creating a Sustainable Sterling Heights	January 2020
Adoption of Ordinance Creating City of Sterling Heights Sustainability Commission	March 2020
City Council Appointments to Sustainability Commission	July 2020
Drafting of Sustainability Plan	September 2020–May 2021
Adoption of Sustainability Plan	June 2021



SECTION VII CONCLUSION

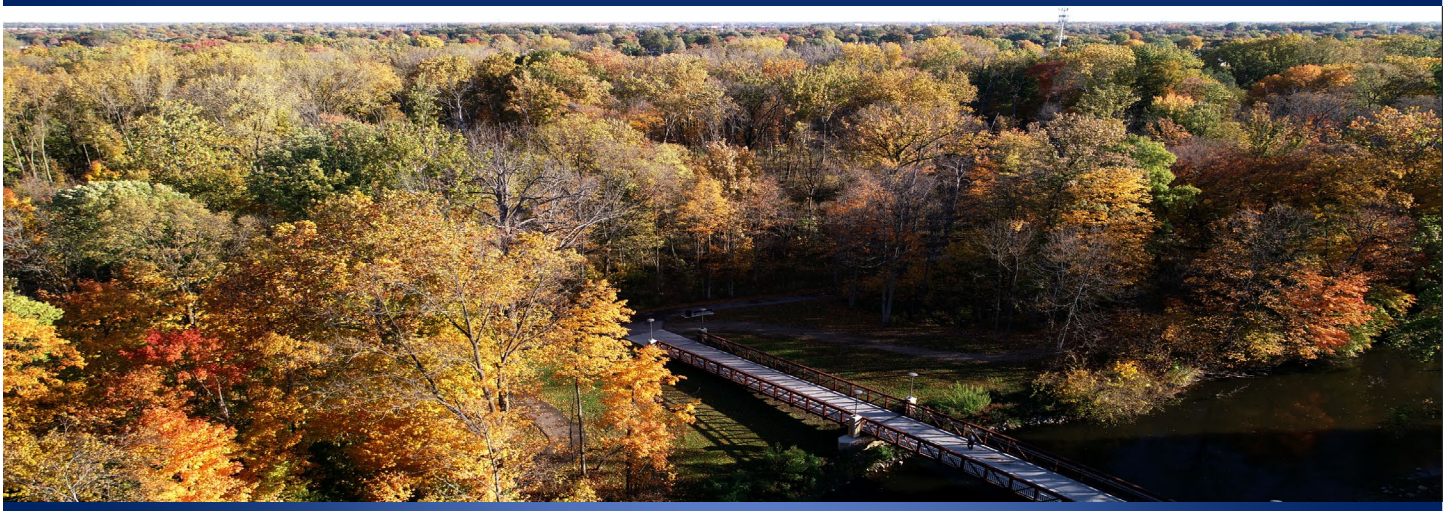
SUSTAINABLE
CITY OF Sterling Heights

Section VII.
Conclusion: A Sustainable Sustainability Plan

To ensure that the goals and objectives of this plan are being implemented and that new sustainability objectives that are pertinent to the City are identified, this Plan should be reviewed on an annual basis to review current goals, objectives, and priorities and reevaluate those as necessary. In addition, an annual review would also allow for new or modified sustainability objectives, new information on the UN SDGs, and priorities to be identified and entered into the plan.

The many recommendations in this plan will require a substantial and dedicated commitment from the administration and government of Sterling Heights to create meaningful and measurable actions. Some may be easy to accomplish in a short time frame, others will require establishing baselines, and some may take years to develop. Recommendations may be replaced by better, bolder ideas. Many of these challenges clearly cannot be solved by Sterling Heights alone, requiring the City to be a strategic partner at the county, state, national, and even global levels.

It is clear from the concepts embedded within our City Seal that Sterling Heights embraces challenges. We have more than 50 years of proof in putting action behind words. Sustainability simply must become integral to our decision processes such that *striving on behalf of all* isn't limited to the scope of our time, our species, or our city limits.



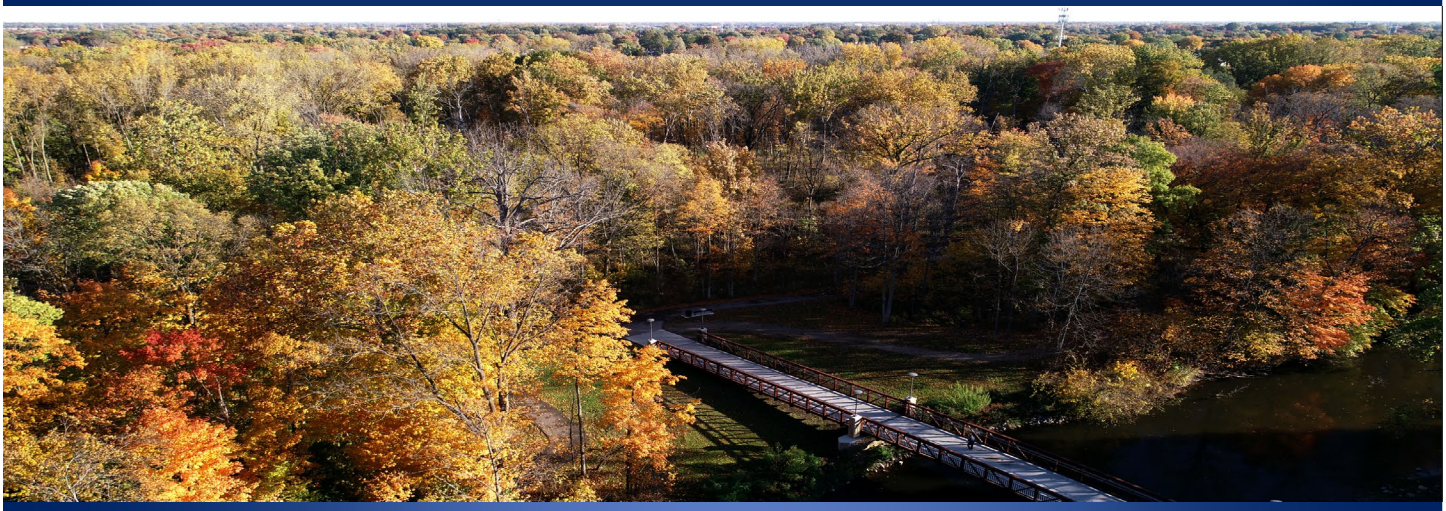
SECTION VIII DOCUMENT RELEASE AND REVISION HISTORY

SUSTAINABLE
CITY OF Sterling Heights

Section VIII.
Document Release and Revision History

The Sterling Heights Sustainability Commission recognizes this Plan is a living document and must evolve based on new data and information. As such, the following revision history has been provided as a reference:

Version	Date	Notable Revisions
00	September 16, 2020	Draft as presented to the Sustainability Commission
01	June 16, 2021	Adoption by the Sustainability Commission



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CITY OF Sterling Heights

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This report is the product of many hours of hard work by the following group of dedicated people:

Administration:

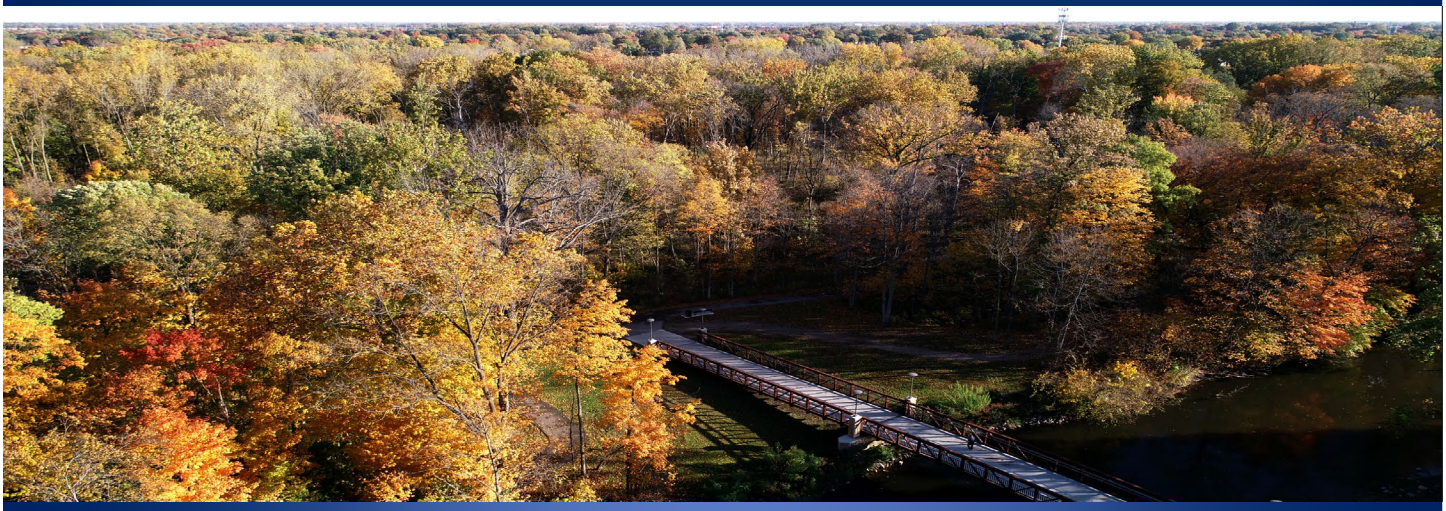
Chris McLeod, AICP, Contributor, City Planner
Allison Bittner, Contributor, Planning Coordinator
Jeffrey Bahorski, Contributor, Assistant City Manager
Mark Vanderpool, Contributor, City Manager

Sustainability Commission:

Nathan Inks, Chairman
Mark Graf, Vice Chair
Mobashira Farooqi
Jonathan Matthews
Raelanda Robinson

Ashley Frank, Past Member

A special thank you to Alexander Bahorski, Michigan State University Intern, for his contributions to the beginning stages of this document that helped guide the Sustainability Commission and City Administration to create and enhance this document.



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“Whether we and our politicians know it or not, Nature is party to all our deals and decisions, and she has more votes, a longer memory, and a sterner sense of justice than we do.”

—Wendell Berry