Public EV Infrastructure Siting Report

City of Southfield

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Sustainable Southfield
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I. Executive summary

As outlined in Southfield's Master Plan, the City is interested in developing infrastructure for electric vehicles (EVs) and advancing their broader mobility and sustainability goals. To support these efforts, this report identifies suitable City-owned locations for future public EV charging infrastructure and provides recommendations to guide the City's charging network expansion. Public EV charging plays an important role in the charging network. While private home charging serves as the foundation of the charging network, public charging serves as an essential complement by improving access, convenience, and visibility. A visible and reliable public charging network can also help build consumer confidence and encourage residents to consider transitioning to EVs.

A GIS-based site suitability analysis was used to process, analyze, and visualize spatial data related to EV charging siting. The selected criteria were based on technical, environmental, and local planning considerations and were organized into three broad categories: transportation, accessibility, and environment. A second suitability analysis was also conducted to incorporate equity considerations using two MiEJScreen indicators: environmental exposure and socioeconomic factors. Together, these analyses helped identify high-suitability City-owned sites for public EV infrastructure. These sites include the Southfield Department of Public Works Facility, Southfield Public Library, The Burgh Historical Park, Mary Thompson Farm, and several fire stations across the City. High-suitability areas generally follow and surround major transportation corridors, including I-696, Telegraph Road, and Northwestern Highway. A collaboration with the National Laboratory of the Rockies (NLR) produced estimates of Southfield's future charging needs. Based on the City's vehicle electrification goals, an estimated 205 to 416 public charging ports may be needed by 2035. These estimates provide a useful benchmark for long-term infrastructure planning and can help the City measure their progress.

The maps and data produced in this report serve as a useful first step for Southfield's future EV infrastructure planning. Recommended next steps include conducting site-specific feasibility studies in high-suitability areas, community engagement, conducting a municipal fleet electrification analysis, implementing local EV policies, and incorporating specific EV infrastructure goals into the City's sustainability planning.

II. Introduction

Growth of EV adoption

Transportation is now the largest source of direct CO_2 emissions in the United States (Climate Watch, 2026), and vehicle electrification represents an important opportunity to reduce these emissions. Despite recent policy shifts that have created uncertainty in the U.S. market, electric vehicle (EV) sales have remained relatively stable at just below 10% of new car sales, while hybrid vehicle sales have continued to increase (IEA, 2026). This suggests that American consumers remain interested in electrified vehicle options. Globally, EVs represented approximately 25% of new car sales in 2025, indicating a broader shift toward vehicle electrification in the long-term (IEA, 2026). Additionally, overall market trends predict that EVs will continue to increase their share in the American market. In response, state and local governments are leading efforts to support vehicle electrification. Governor Whitmer's administration has strongly supported vehicle electrification, with the MI Future Mobility Plan setting a goal of having 2 million EVs on the road by 2030. At the local level, cities across the state have also been adopting policies and ordinances that encourage EV adoption and the development of charging infrastructure.

Vehicle electrification offers several environmental, social, public health, and economic benefits. EVs can help reduce local air pollution by reducing emissions of pollutants associated with gasoline and diesel-powered vehicles, including nitrogen oxides, particulate matter, and volatile organic compounds (Pan, 2023). Research has also found that large-scale EV adoption can improve air quality, even when electricity generation is included (EPA 2026). These benefits are likely to increase as the electric grid becomes cleaner, especially as renewable energy now generates more than 20% of U.S. electricity (EIA, 2026). In addition to environmental and public health benefits, EVs can also provide more mobility options to consumers. EVs are often more economical over the lifetime of the vehicle because they have lower fueling costs and fewer moving parts, which can reduce maintenance expenses (EPA, 2026). Battery technology has also continued to improve, and battery replacements due to failures are uncommon (EPA, 2026). Public EV charging stations can further support local economic activity when they are located near business corridors, public amenities, and areas of interest. By encouraging drivers to spend time near shops, restaurants, and public facilities while charging, strategically placed chargers can support both transportation access and local economic activity (Zheng et al, 2024).

Role of public charging

To support the widespread adoption of EVs, a reliable charging network must be developed at both national and local levels. Range anxiety is one of the main barriers that deters consumers from adopting EVs. A reliable public charging network can help reduce this concern by showing drivers that charging options are available outside their home (Wood et al., 2023). Public charging is the most visible part of the charging network and locations are often along highways, commercial corridors, and public facilities such as parks, libraries, and municipal buildings. While private home charging will remain the foundation of the charging network, public charging serves as an important complement by improving convenience and building consumer confidence (Wood et al., 2023). Ensuring that this infrastructure is reliable and accessible will be essential for accelerating EV adoption.

Cities should therefore plan charging networks proactively. Research suggests that charging infrastructure should lead EV adoption, since many drivers will need to see charging availability along locations they frequent before they feel confident purchasing an EV (Muratori et al, 2021). However, cities must also avoid installing too much infrastructure ahead of demand, which can lead to low utilization. A balanced approach is necessary, where supply and demand of charging stations should be analyzed at the local level. Additionally, cities can enable efficient deployment of charging infrastructure by streamlining permitting, adopting local EV policies, and coordinating with utilities (Wood et al., 2023).

EV charging is generally categorized into three levels based on voltage, charging speed, and charging duration. Level 1 chargers are the slowest option and can add around 40 miles of range over an eight-hour charging period. Level 2 chargers are commonly used for both home charging and in public areas, and they can add 100 miles of range in the same amount of time. Level 3 chargers, also known as direct current fast chargers (DCFC), can restore up to 80% of a battery's capacity in 30 minutes or less. Although DCFCs reduce charging time, they are also the most expensive to install and may contribute to accelerated battery degradation when used too frequently (Ghamami, 2025). In contrast, Level 2 are generally more affordable and less demanding on the battery. Given these differences, EV infrastructure planning should consider location, costs and grid capacity when determining which charger type is most appropriate for a public charging site.

Charger type	**Primary use**	**Charging power**	**Charger cost**	**Charging time**
Level 1	residential	1.2-1.9 kW	$200-$1,500	8-16 hours
Level 2	residential and public	2.6-19.2 kW	$500-$5,000	4-8 hours
Level 3 DCFC	public	50-350 kW	$28,000-$140,000	20-30 minutes (80% charge)

Table 1. Charging infrastructure specifications (Ghamami, 2025)

Southfield

The City of Southfield is a first-ring suburb of Detroit located in Oakland County, Michigan. Southfield has an estimated population of 76, 572 (SEMCOG, 2025). The City's median household income is $55,705, although income levels vary across census tracts. Southfield residents come from a wide range of racial, cultural, ethnic and religious backgrounds. It is a Black-majority city, with approximately 64% of the population identifying as African American. Significant Armenian, Chaldean, Jewish, and Russian communities also contribute to Southfield's diversity.

Southfield is primarily a residential community. Approximately 88.5% of the city's land use is made up of single-family and multifamily residential parcels. In 2024, rental housing accounted for approximately 42% of Southfield's occupied housing units. Multi-unit residences represented the largest share of residential housing, making up about 52% of the housing stock in 2024 (SEMCOG, 2026b). These housing characteristics should be considered in EV infrastructure planning as renters and residents of multifamily housing may face additional barriers to installing or accessing home charging.

Although Southfield's residential population is around 76,572, its daytime business population increases to about 175,000, reflecting a significant influx of commuters who travel to the City for work. This highlights Southfield's role as a major business center, with approximately 27 million square feet of office space and more than 7 million square feet of retail and industrial space. As a result, public EV charging in Southfield must also account for commuters and visitors who may need charging access while traveling to or spending time in the city.

The City of Southfield has demonstrated a commitment to advancing sustainability in its communities. The City's Sustainable Southfield Master Plan outlines broad goals and initiatives to guide both short and long-term efforts. One of these goals is to increase mobility options for residents, commuters, and visitors. Within these broader mobility goals is the expansion of EV infrastructure.

Southfield has approximately 27 EV charging stations, with four additional stations planned. However, nearly half of the existing stations are privately owned or have limited public access (AFDC, 2026; PlugShare, 2026). There are also noticeable gaps in the charging network. Public charging stations are primarily concentrated along major roads and highways, while areas in the eastern portion of the City appear to be underserved.

The municipal fleet presents an opportunity for infrastructure expansion. Currently, only four out of the City's 326 municipal fleet vehicles are electric, indicating there is still significant progress to be made in fleet electrification. Expanding EV infrastructure could support both residents and the City's fleet transition while also serving as a visible signal of Southfield's commitment to electrification. In leading by example, the City can help build public confidence and encourage residents to consider transitioning to EVs.

Expanding the public charging network would help encourage widespread adoption of EVs, provide more accessible charging options, and support the City's long-term sustainability and mobility goals. Although vehicle cost remains a barrier to EV adoption, EV affordability is expected to improve over time as battery costs decline, market competition increases, and more lower-cost models become available. As vehicle electrification continues to grow, proactive planning will allow the City to prepare for future transportation needs of its residents, commuters, and visitors. This report aims to identify suitable City-owned locations for public EV charging infrastructure and provide recommendations to guide future expansion as EV adoption increases.

III. Methodology

The City of Southfield is a 26.6 square mile city located in Oakland County, Michigan. The City shares borders with Detroit, Oak Park, Royal Oak, Berkley, Redford Township, Beverly Hills, Franklin, Bingham Farms, and Farmington Hills. Southfield is also intersected by several major transportation corridors, which include I-696, M-10, and Telegraph Road.

Mapping current chargers

Current EV charging station data was obtained from the City of Southfield, the U.S. Department of Energy's Alternative Fuels Data Center (AFDC), and PlugShare. ArcGIS Pro was the mapping software used to create the Southfield EV Charging Stations Map and the Southfield EV Public Charging Stations Density Map. For the density map, the Kernel Density tool in ArcGIS Pro was used to identify areas with higher and lower concentrations of public charging ports.

Site suitability analysis

Site suitability analysis is a common GIS-based approach used to identify the most appropriate locations for a specific use, such as EV charging stations. To determine the suitability of sites, spatial data layers are standardized, scored, and assigned weights before being combined to identify areas with higher or lower suitability. The decision-making framework used in this analysis was based on a literature review of prior EV infrastructure siting studies. The final methodology was informed primarily on the approaches used by Gu et al (2025) and Guler et al (2020), with modifications to reflect Southfield's context and this report's scope. Seven evaluation criteria were initially selected and grouped into three broader categories: environmental, transportation, accessibility. Grid capacity was ultimately excluded from the analysis because publicly accessible EV hosting capacity data was not available by the local utility company. This report focused on identifying suitable locations for public charging stations on City-owned property. However, City-owned parcels were included as a weighted criterion rather than as a final constraint. This approach prioritizes publicly owned sites while still producing results that may be useful to other stakeholders interested in establishing public charging stations across Southfield. After the criteria were defined, each evaluation criterion was scored using a standardized scale from 0 to 5, where 5 represents the highest degree of suitability.

A fourth category, environmental justice, was included in a second site suitability analysis to incorporate equity considerations into the EV infrastructure siting and planning process. This category includes two MIEJScreen indicator scores: environmental exposure and socioeconomic factors. The environmental exposure score focuses on air quality measures and includes indicators for NATA air toxics cancer risk, NATA diesel particulate matter, particulate matter ($PM_{2.5}$), ozone, and traffic density (Kruse et al., 2022). The socioeconomic factors score focuses on conditions that can influence how community health is affected by environmental conditions. These indicators include low-income population, Black, Indigenous, People of Color population, educational attainment, linguistic isolation, population under age 5, population over age 64, unemployment, and housing burden (Kruse et al., 2022). Suitability scores were assigned to the environmental justice criteria and incorporated into the GIS-based suitability analysis. Southfield-specific indicator scores for environmental exposure and socioeconomic factors by census tract were obtained from Sehgal's Southfield Vulnerability Assessment report (2025).

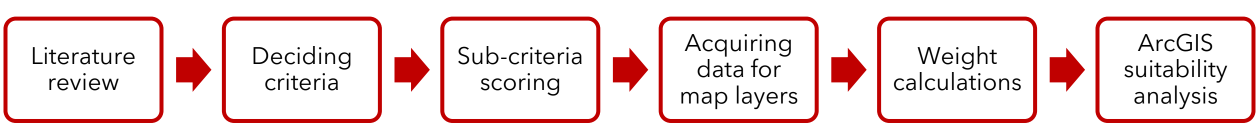


Figure 1. Workflow of the study

Category	Criteria	Subcriteria	Score
Environment	Distance from forest (m)	<100	1
		100-200	2
		200-300	3
		300-400	4
		>400	5
	Flood risk	Identified risk	1
		No risk	5
Transport	Distance from existing public chargers (mi)	0-1	3
		>1	5
	Distance from roads (m)	>1000	1
		1000-500	2
		500-250	3
		250-100	4
		0-100	5
	Traffic density (AADT/km^2)	0-5.8	1
		5.8-11.6	2
		11.6-17.4	3
		17.4-23.2	4
		>23.2	5
Accessibility	City-owned building	Not city-owned	1
		City-owned	5
	Population density (km^2)	<1890	1
		1890-2872	2
		2872-3854	3
		3854-5817	4
		>5817	5

Table 1. Suitability scoring for each criterion used in the GIS-based site suitability analysis

Category	Criteria	Subcriteria	Score
Environmental Justice	Environmental exposure (indicator score)	0-50	1
		50-75	2
		75-80	3
		80-90	4
		90-100	5
	Socioeconomic factors (indicator score)	0-50	1
		50-75	2
		75-80	3
		80-90	4
		90-100	5

Table 2. Suitability scoring for the environmental justice criteria

AHP Method

The Analytical Hierarchy Process (AHP) was used to structure and analyze the multi-criteria decision-making process. AHP, developed by Saaty (1990) is a method used to evaluate problems that include multiple criteria. The method is based on ranking criteria and subcriteria, using pairwise comparison matrices to determine the relative importance of one criterion compared with another. These comparisons are then transformed into a numerical scale used to calculate criterion weights.

For this report, the AHP hierarchy was organized into three main categories: environment, transport and accessibility, each with their own subcriteria. The pairwise comparison matrices were developed based on existing literature (see Appendix A). The normalized weights for each criterion and subcriterion were then calculated from these matrices and used as inputs in the Weighted Sum tool in ArcGIS Pro to produce the final suitability map.

Criteria	Weight
C1.1 Distance from forest	0.053
C1.2 Flood risk	0.106
C2.1 Existing charging ports	0.041
C2.2 Distance to main road	0.075
C2.3 Traffic density	0.136
C3.1 City-owned property	0.147
C3.2 Population density	0.442

Table 3. Final weights for site suitability analysis

Criteria	Weight
C1.1 Distance from forest	0.035
C1.2 Flood risk	0.071
C2.1 Existing charging ports	0.026
C2.2 Distance to main road	0.048
C2.3 Traffic density	0.087
C3.1 City-owned property	0.120
C3.2 Population density	0.359
C4.1 Environmental exposure	0.085
C4.2 Socioeconomic factors	0.169

Table 4. Final weights for site suitability analysis with the addition of the environmental justice category

The GIS-based analysis was conducted in ArcGIS Pro to process, manage and visualize the spatial data used. Layers representing each of the seven evaluation criteria were compiled from multiple data sources, as specified on Table 5. Each layer was standardized to the same projection and coordinate system to ensure consistency across the analysis. ModelBuilder was used to organize the workflow, and a representation of the workflow is included in Appendix A.

Polygon layers were transformed to raster format and reclassified according to the suitability score designated in Table 1. Distance-based criteria, such as proximity to forests, distance to main roads, and distance from existing chargers were calculated using the Euclidean Distance tool. Traffic density was calculated using the Kernel Density tool. Finally, the reclassified criteria layers were combined using the Weighted Sum tool, with weights calculated using AHP, to generate the final EV charging site suitability map.

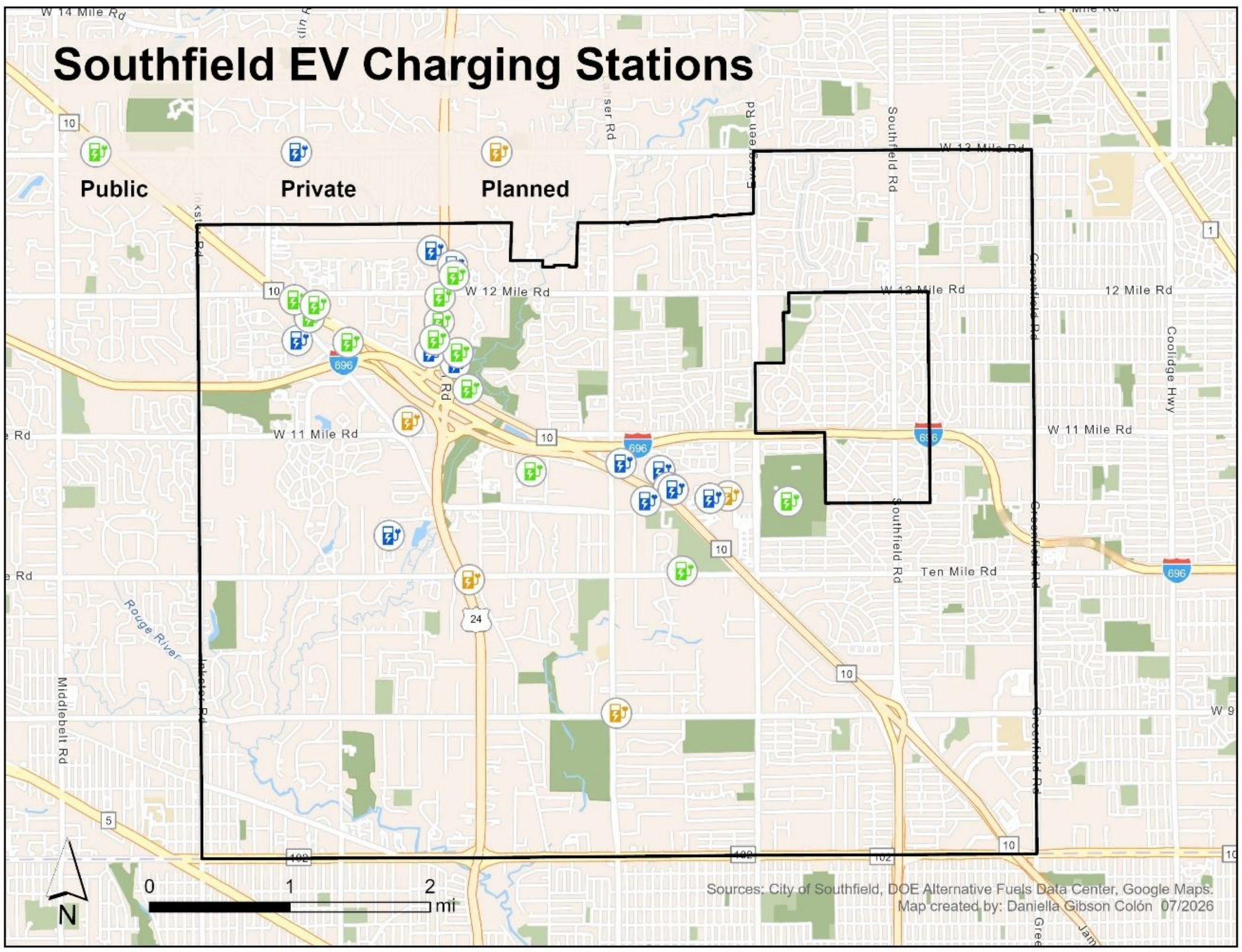
Criteria	Data source
C1.1 Distance from forest	Modified Copernicus Sentinel-2 Level-1C imagery (June 7, 2026)
C1.2 Flood risk	FEMA (2024)
C2.1 Existing charging ports	City of Southfield, AFDC (2026), PlugShare (2026)
C2.2 Distance to main road	MDOT (2025a)
C2.3 Traffic density	MDOT (2025b)
C3.1 City-owned property	City of Southfield
C3.2 Population density	U.S. Census Bureau (n.d.)
C4.1 Environmental exposure	Southfield Vulnerability Assessment report (2025)
C4.2 Socioeconomic factors	Southfield Vulnerability Assessment report (2025)

Table 5. Source list for each layer used in GIS-based analysis

IV. Results and discussion

Existing charging stations

There are currently approximately 27 EV charging stations in the City of Southfield, with four additional stations planned (Map 1). Of the existing stations, only 15 of these are public chargers, providing approximately 62 charging ports. Expanding Southfield's public charging network will be necessary to meet the needs of residents interested in electrifying their vehicles, support the potential electrification of the municipal fleet, and serve commuters who travel to the city.



Map 1. Current EV charging stations in Southfield

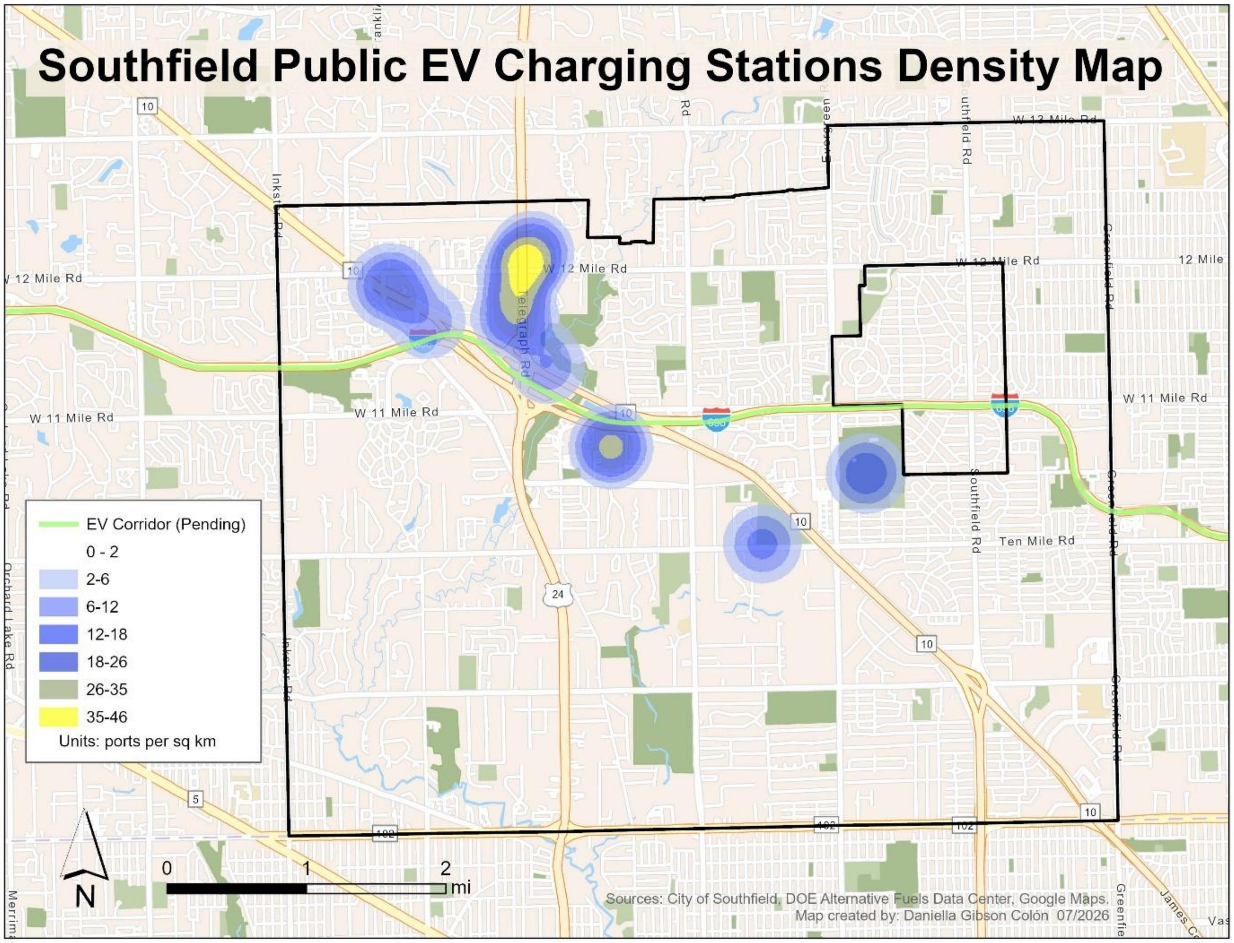
	Location	Address	Ports	Access
1	Southfield Municipal Campus	26000 Evergreen Rd	2	public
2	Lawrence Technological University	21000 W 10 Mile Rd	1	public
3	Lawrence Technological University Lot D	21000 W 10 Mile Rd	2	public
4	Lawrence Technological University Lot C	21000 W 10 Mile Rd	2	public
5	Verizon	1 Towne Square	2	private
6	1-800-LAW-FIRM	26700 Lahser Rd	4	private
7	Staybridge Suites	26060 Northwestern Hwy	4	private
8	Hampton Inn by Hilton	26080 Northwestern Hwy	4	private
9	Eaton Corporation	26201 Northwestern Hwy	4	private
10	Corewell Health Southfield Center	26901 Northwestern Hwy	10	public
11	Tiger Market	27522 Northwestern Hwy	4	public
12	One Northwestern Plaza	28411 Northwestern Hwy	4	public
13	Mobil	28681 Northwestern Hwy	2	public
14	Go Green Gas Station & Market	28830 Northwestern Hwy	1	public
15	ReNew Franklin Hills	28509 Franklin Rd	10	private
16	Denso International America, Inc.	24777 Denso Dr	10	private
17	Glassman Hyundai Kia	28000 Telegraph Rd	4	private
18	Fox Chrysler Dodge Jeep RAM	28100 Telegraph Rd	1	public
19	Serra Chevrolet	28111 Telegraph Rd	4	private
20	Marvel Technologies Inc	28275 Telegraph Rd	8	public
21	Tamaroff Honda	28585 Telegraph Rd	1	public
22	Cloverleaf Plaza bp	28995 Telegraph Rd	8	public
23	Avis Ford	29200 Telegraph Rd	10	public
24	Matick Buick GMC	29300 Telegraph Rd	2	private
25	The Onyx Building	29777 Telegraph Rd	2	private

26	Chase Bank	28660 Northwestern Hwy	6	public
27	Blue Care Network	20500 Civic Center Dr	4	private
28	Sunoco Southfield	21990 W 9 Mile Rd	4	planned
29	Marathon Gas	24960 Telegraph Rd	4	planned
30	Arbor Lofts	20300 Civic Center Dr	8	planned
31	Regal Towers	27300 Franklin Rd	4	planned

Table 6. Current EV charging stations in Southfield

Density mapping

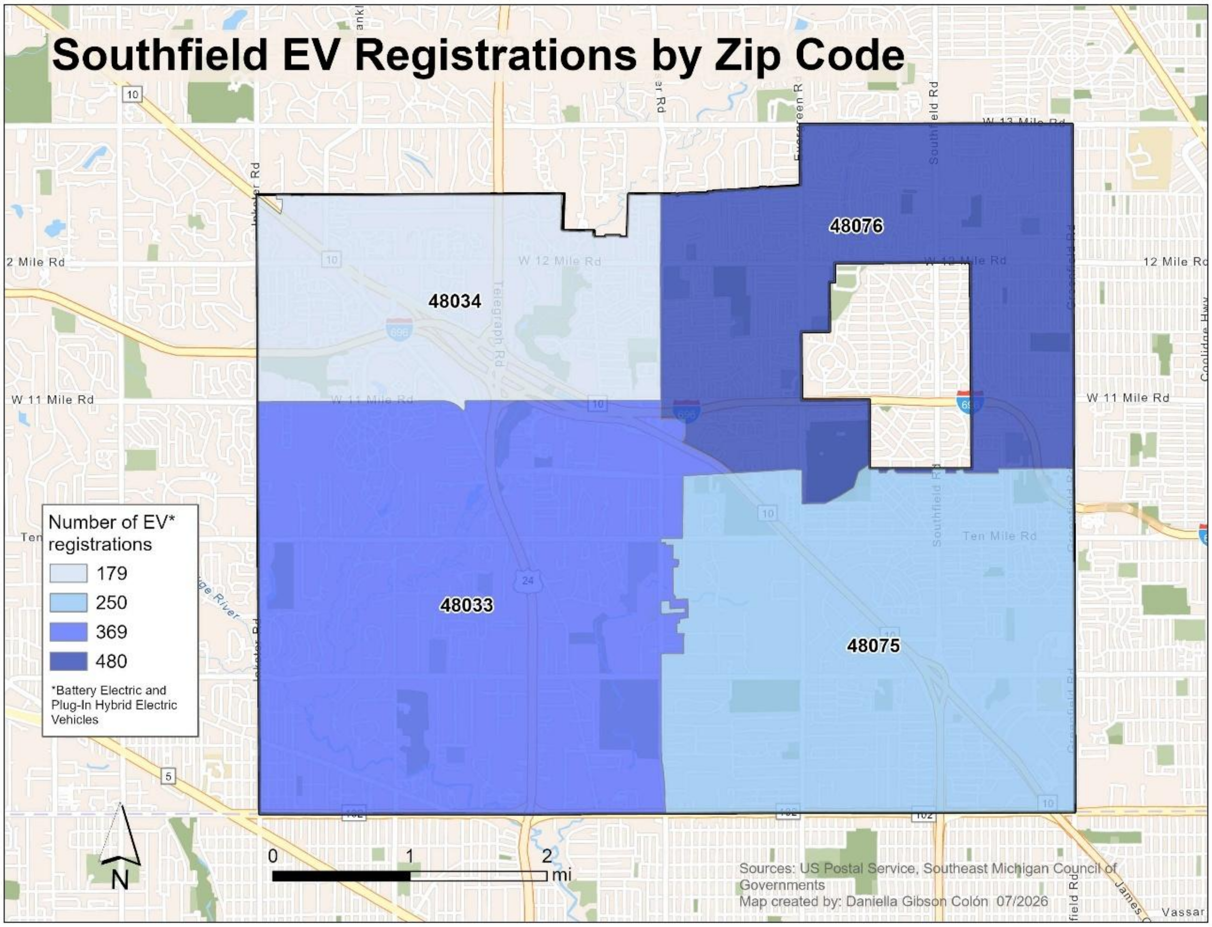
The Southfield EV Public Charging Stations Density Map used kernel density analysis to show the concentration of existing public EV charging points across the City. The map indicates that public chargers are most concentrated near the intersection of major highways and roads, including Northwestern Highway, I-696, and Telegraph Road. In contrast, the southeast and northeast areas of Southfield show low or no public charging density, possibly due in part to lower traffic density in these areas. The map also highlights a pending EV corridor along I-696. EV corridor designations are issued by the U.S. Department of Transportation and the U.S. Department of Energy to highways that support long-distance EV travel. “Ready” EV corridors are highways that have DCFC stations no more than 50 miles apart, located within 1 mile of the corridor. The pending EV corridor designation for I-696 may help explain the higher density of chargers along the highway. Additionally, the pattern could also be influenced by the high traffic volumes along I-696 segments that run through Southfield, which have an annual average daily traffic (AADT) of approximately 100,000 vehicles per day.



Map 2. Kernel density map of public charging stations

EV registrations

SEMCOG data on EV registrations by zip code indicate that, as of July 2026, Southfield had a total of 1,278 registered EVs. To visualize the distribution of current EV owners across the City, Map 3 shows the number of EV registrations by zip code. The northwest portion of the City (zip code 48034) has the fewest EV registrations. However, Map 2 shows that the area has the highest density of public charging ports among Southfield's four zip codes. This distribution may be explained by the presence of the Telegraph Road commercial and business corridor, where charging demand is likely influenced by employees, visitors, and commercial activity rather than by nearby residential ownership. In contrast, zip code 48076 has the highest number of registered EVs, but only contains one public EV charging station, located at the City's Civic Center. Because this area is predominantly residential, EV owners may rely primarily on home charging rather than public charging infrastructure.

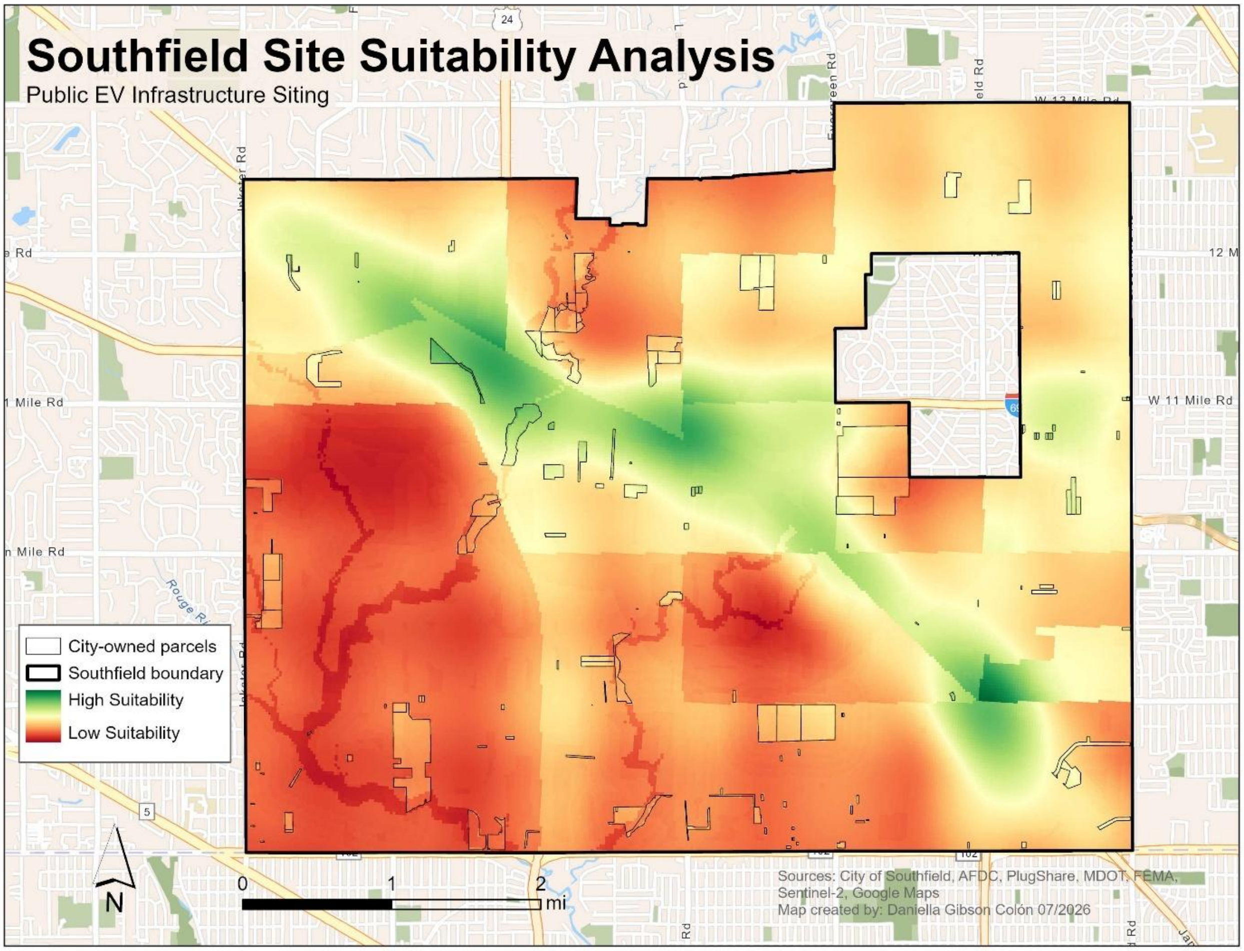


Map 3. EV registrations in Southfield by zip code

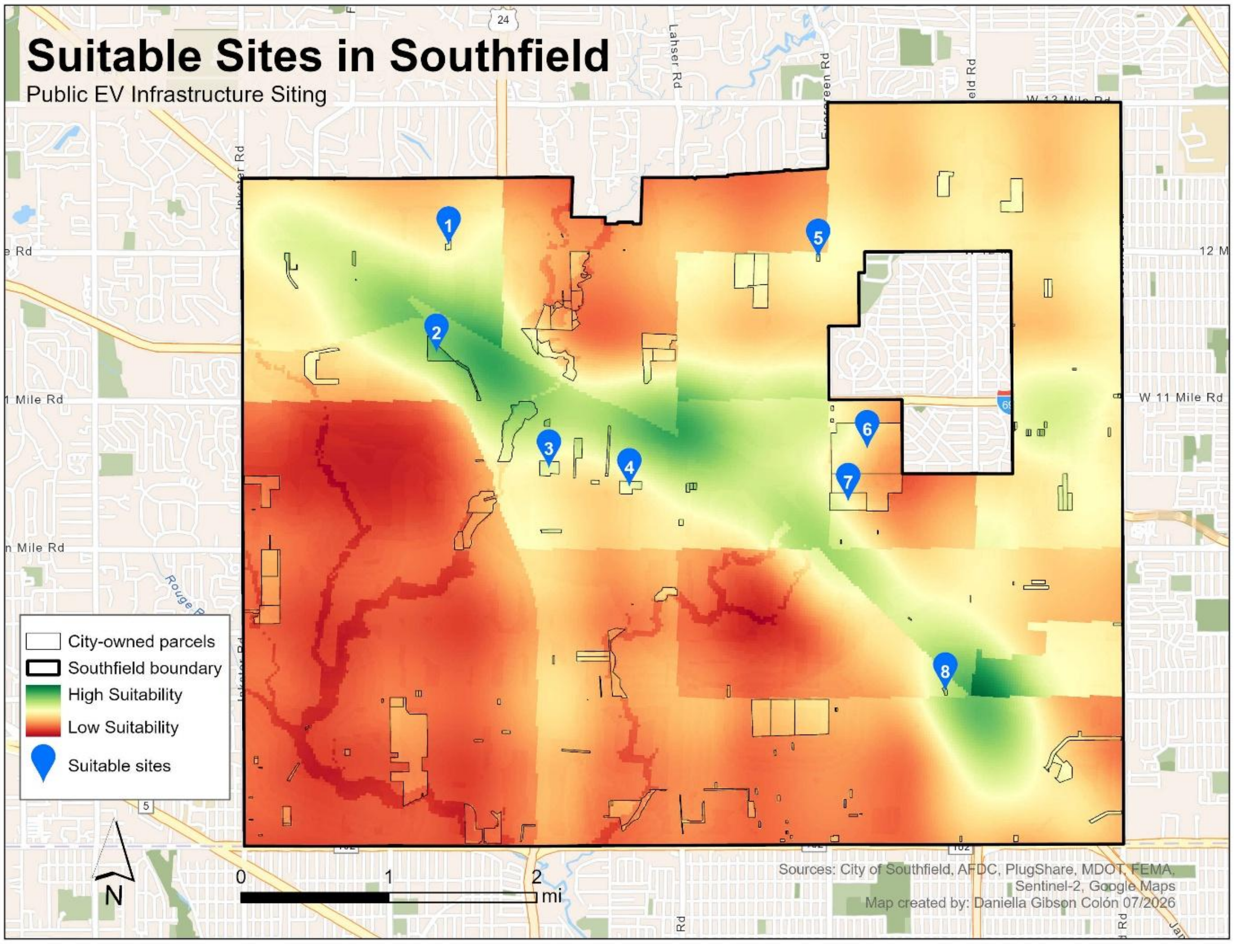
Suitability mapping

Map 4 shows the final suitability map produced through the ArcGIS ModelBuilder workflow described in the methodology section. Areas shown in green represent the highest suitability for public EV charging infrastructure, while areas shown in red represent lower suitability. The resulting map shows that the highest suitability areas generally follow major transportation corridors, particularly I-696, due to its high traffic volume. It is important to note that areas shown in orange or light red should not be interpreted as unsuitable for EV charging altogether. These areas should instead be considered as lower priority based on the criteria and weights used in this analysis. The exception to this would be the deep red areas located along the river, where flood risk creates a constraint. On the other hand, the more vibrant green areas represent the most suitable areas for future public EV charging stations and should be prioritized during infrastructure siting and planning.

Map 4 also includes an overlay of city-owned parcels, which aids in identifying which public properties fall within high-suitability areas. Among the highest-suitability locations are the Southfield Department of Public Works Facility, Southfield Public Library, and a few fire stations. Map 5 and the accompanying Table 7 identify the city-owned parcels located within the green regions of the suitability map and should be considered high-priority candidates for future public EV charging stations. The Southfield Civic Center, although it already has two charging stations may benefit from additional public chargers, particularly closer to Evergreen Road where public accessibility is stronger. Other points of interest, such as Carpenter Lake, may also require additional site-level evaluation seeing as residents spend time there using park and trail facilities. These types of destinations could provide convenient charging opportunities for residents and visitors. Although the sites listed in Table 7 are identified as highly suitable based on the GIS criteria used in this analysis, further site-level evaluation is still necessary. Future review should consider factors not included in this map, such as parking availability, electrical capacity, ADA accessibility, and installation cost.



Map 4. Results from the GIS-based site suitability analysis



Map 5. City-owned property labeled as suitable sites for public EV infrastructure

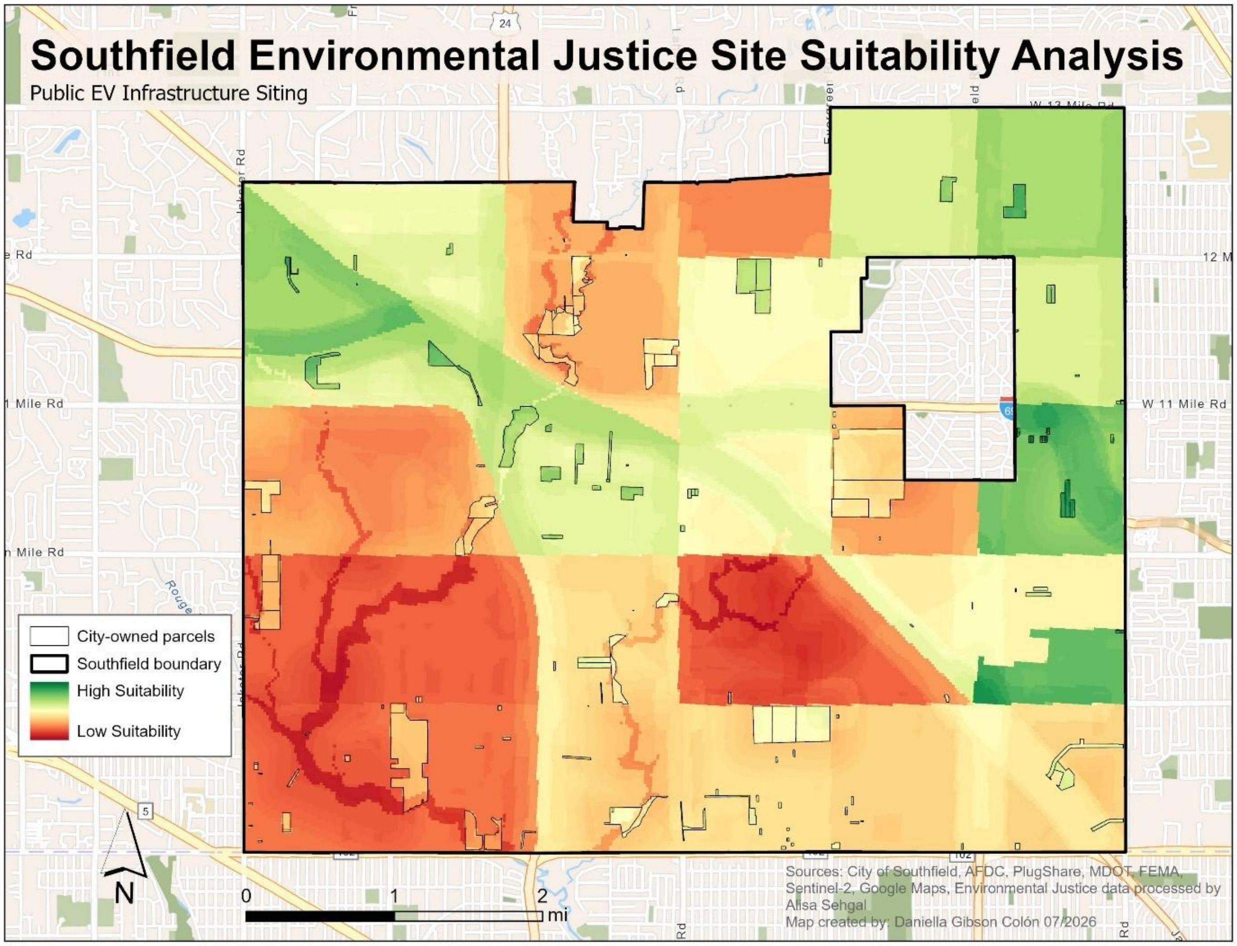
Label	Location	Address
1	Southfield Fire Station 4	25120 W 12 Mile Rd
2	Southfield Department of Public Works Facility	25501 Clara Lane
3	The Burgh Historical Park	23660 Civic Center Dr
4	22635 Civic Center Dr	22635 Civic Center Dr
5	Southfield Fire Station 3	20135 W 12 Mile Rd
6	Southfield Public Library	26300 Evergreen Rd
7	Mary Thompson Farm	25630 Evergreen Rd
8	Southfield Fire Station 1	18400 W Nine Mile Rd

Table 7. City-owned parcels with high suitability for public EV charging infrastructure

Equity in public EV charging

Equitable access to public EV charging stations is essential for supporting a just transition to lower-emissions transportation. Research by Yu et al (2025) found that disadvantaged communities have 64% fewer public EV charging stations per capita than non-disadvantaged communities. This disparity increases to 73% when multifamily renters are considered. These findings are important because disadvantaged communities often have a greater need for public charging infrastructure due to higher shares of renters and residents living in multi-family housing, where access to home charging may be limited. EV infrastructure planning should therefore consider how the benefits of vehicle electrification can be extended to communities with lower incomes and higher exposure to environmental pollutants. Planning should not only support current EV owners but also serve the needs of future EV owners as adoption expands. With this in mind, a second suitability map was created that incorporated two additional criteria: environmental exposure and socioeconomic factors.

The resulting raster in Map 6 appears more block-like than the previous suitability map because several criteria in this analysis are based on census tract data, including population density, environmental exposure, and socioeconomic factors. As a result, census tract boundaries are more visible, and the map shows a less continuous gradient than Map 4. Map 6 shows higher suitability in the northwest, northeast and eastern portions of Southfield. Several census tracts that appeared light yellow or orange in Map 4 are shown as brighter green in Map 6 because they have higher environmental exposure and socioeconomic factor scores. The suitable City-owned properties identified in Table 7 also fall within high-suitability areas in this map, along with additional vacant commercial and residential City-owned parcels.



Map 6. Results from GIS-based site suitability analysis with environmental justice considerations incorporated

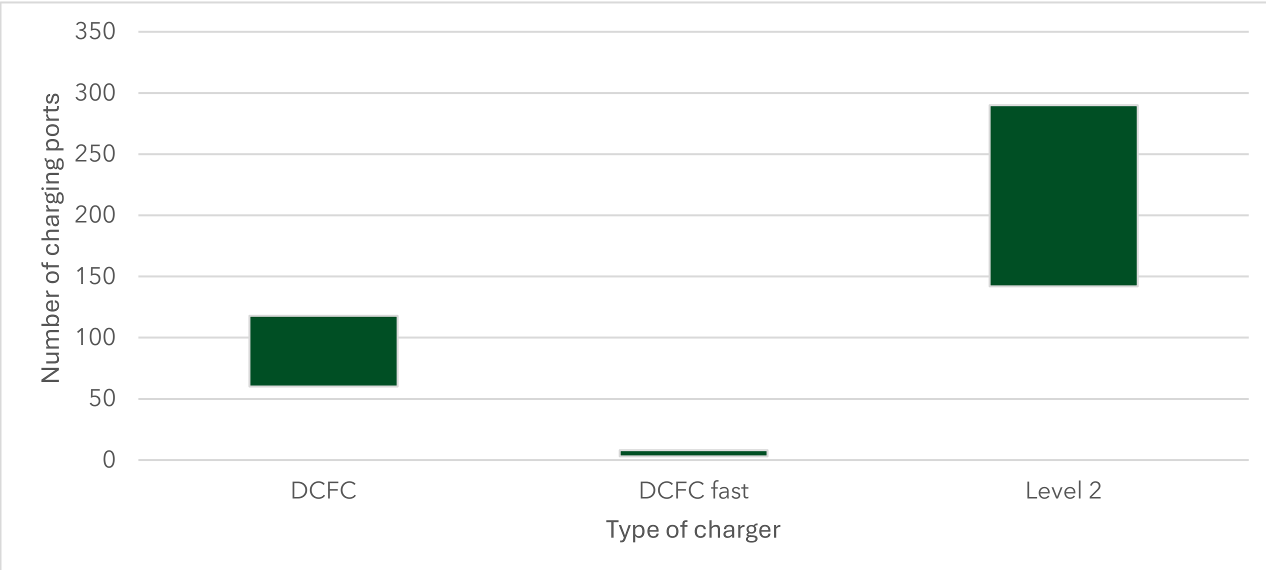
Number of charging ports

As mentioned previously, Southfield currently has 1,278 registered EVs as of 2026. To advance the city's mobility and electrification goals, Southfield's goal is to quadruple this number to 6,410 EVs by 2035. In addition to identifying suitable locations, estimating the number of charging ports needed is an important part of the EV infrastructure planning process. This information can help with long-term planning, guide site-specific feasibility studies and inform the type and number of chargers that should be installed at different locations.

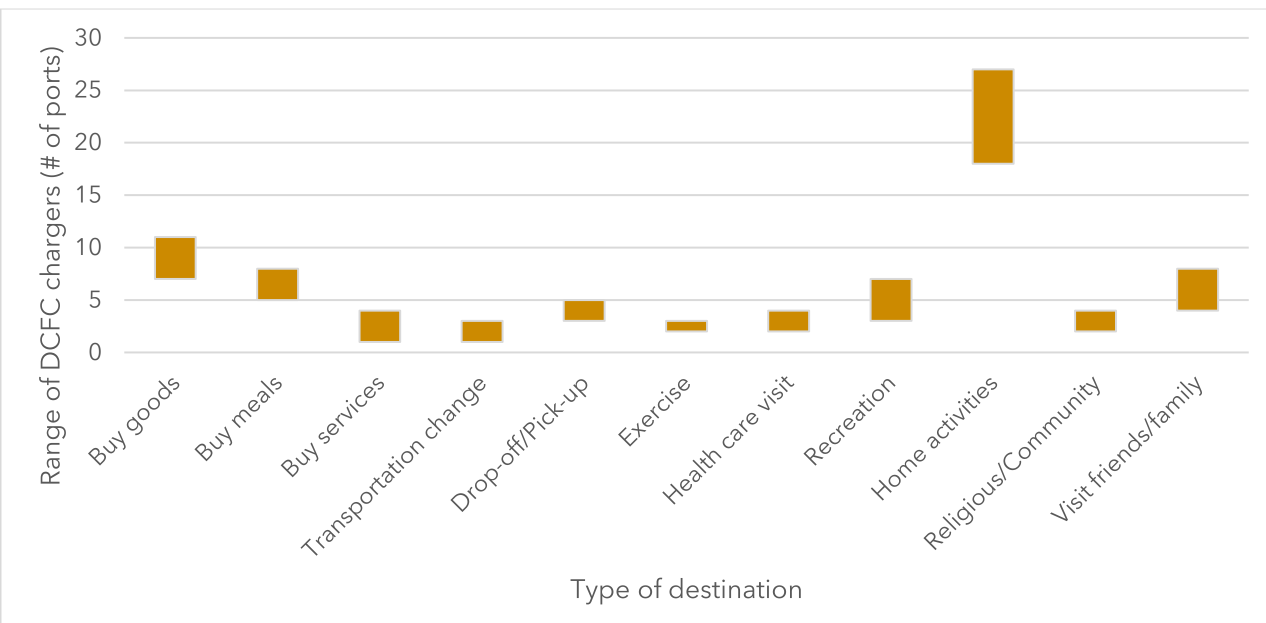
To estimate the number of charging ports needed to support the City's target number of EVs, the City collaborated with the National Laboratory of the Rockies (NLR). Using available Southfield data, the collaborators at NLR ran the lab's EVI-Pro: Electric Vehicle Infrastructure Projection Tool, which estimates the charging infrastructure needed based on typical daily travel patterns, including the quantity and type of chargers needed to meet a given demand. Because the results are estimates and the model relies in part on assumptions based on national travel patterns, the findings should be used as a planning benchmark rather than a final target. Coordination with the City's local utility will be necessary before large-scale EV charger installations are implemented across Southfield.

For Southfield's context and 2035 electrification goals, EVI-Pro estimated that approximately 205-416 public charging ports will be needed to support 6,410 EVs on the road. Most of these ports are expected to be Level 2 chargers. More specifically, Southfield is expected to need 60-118 DCFC ports, 3-8 DCFC fast ports, and 142-290 Level 2 ports to meet its electrification target (see Graph 1). Graphs 2 and 3 show a list of destination types and the associated number of charging infrastructure needed based on the dwell times these destinations typically produce.

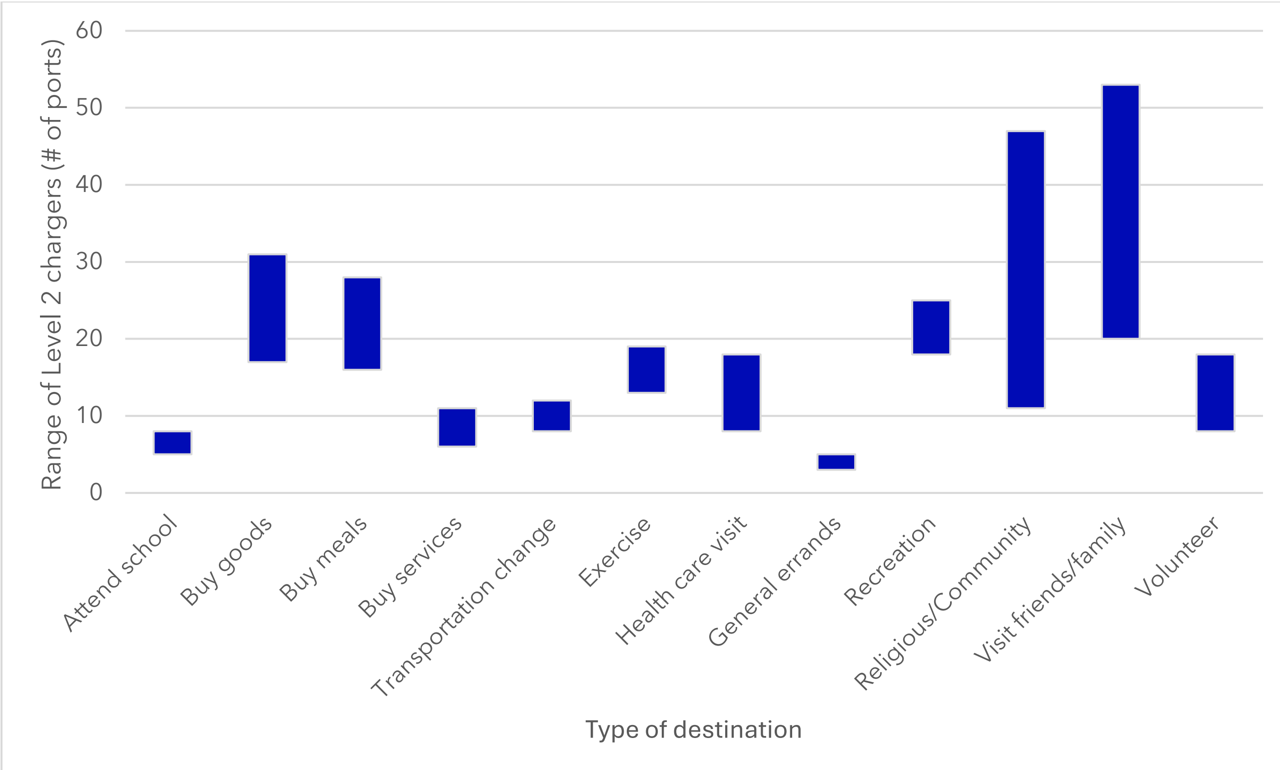
One notable result from the analysis is that the highest number of DCFC public charging ports is assigned to regular home activities. This reinforces the importance of the public charging network as an essential complement to private home charging. Approximately 18-27 DCFC ports are estimated to be needed to support regular home activities. Few DCFC fast chargers are estimated to be needed overall, and those that are needed are associated with destinations such as buying goods, regular home activities, and visiting friends or family. For Level 2 chargers, the activities associated with the greatest need for public charging include commercial activities, such as buying goods and eating meals, as well as recreational, community, and family activities. Buying goods is estimated to require 17-31 Level 2 charging ports, while buying meals is estimated to require 16-28 ports. Recreational activities are estimated to require 18-25 ports, religious or other community activities are estimated to require 11-47 ports, and visiting friends or family is estimated to require 20-53 charging ports.



Graph 1. Number of charging ports needed by charger type in Southfield, as estimated by the National Laboratory of the Rockies



Graph 2. Estimated range of DCFC charging ports Southfield needs, divided by destination



Graph 3. Estimated range of Level 2 charging ports Southfield needs, divided by destination

Some of the previously identified suitable sites, such as the Southfield Public Library, Mary Thompson Farm, and The Burgh Historical Park, align with these recreational and community activities. This reinforces their suitability as potential public EV charging stations, particularly for Level 2 charging. Other suitable sites, such as fire stations and the Department of Public Works Facility, may be more appropriate for supporting future municipal fleet electrification.

V. Next steps

1. Conduct site-specific feasibility studies in high-suitability areas

The suitability analysis presented in this report should serve as a starting point for identifying priority locations for future public EV infrastructure. As a next step, the City should conduct site-specific feasibility studies for the City-owned property in Table 7. These studies would provide more detailed information on the feasibility of installing EV charging stations at each location, including installation costs, energy demand, electrical capacity, utility connection, and the most appropriate charger type.

2. Incorporate community engagement into EV infrastructure planning

Southfield should incorporate early and meaningful community engagement into the EV infrastructure siting process to ensure that future charging stations reflect the needs and priorities of residents, workers, and visitors. Incorporating community feedback can help build public support, improve charger accessibility, and ensure that EV infrastructure investments respond to community needs. Massachusetts's Electric Vehicle Infrastructure Coordinating Council provides a useful guide outlining best practices for equitable EV infrastructure siting.

3. Conduct a municipal fleet electrification analysis

Southfield should conduct a municipal fleet electrification analysis to evaluate the costs, benefits, and feasibility of transitioning portions of the City's light-duty fleet to EVs. This analysis would help identify which vehicles are best suited for electrification and support the siting process for future EV charging stations serving the municipal fleet. As other cities across Michigan work to electrify their fleets and meet sustainability goals, Southfield can use this process to determine which EV models, charging infrastructure, and implementation strategies would work best for the city's operational needs.

4. Implement local EV policies

The City should consider adopting local policies that support the expansion of EV charging infrastructure. Cities across Michigan and nationwide have implemented EV-ready policies to make EV planning easier and more predictable. These policies include streamlined permitting, EV-ready requirements for new construction, parking standards, ensuring accessibility through ADA-compliance and effective signage, and requirements for multifamily or commercial buildings to include charging infrastructure or electrical capacity for future chargers. Examples of EV-ready policies from other cities are included in Appendix B. These examples can serve as models for Southfield and should be modified to meet local needs.

5. Incorporate specific EV infrastructure goals into the City's sustainability planning

Establishing clear targets for EV registrations, public charging ports, and municipal fleet electrification would demonstrate the City's commitment to vehicle electrification and provide a clearer path for implementation. The charging port targets provided by NLR could be used as a benchmark for future EV infrastructure planning and would help the City measure progress over time.

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Appendix A. Additional Tables and Graphics

Verbal scale	Numerical value
Equally important, likely, or preferred	1
Moderately more important, likely or preferred	3
Strongly more important, likely or preferred	5
Very strongly more important, likely or preferred	7
Extremely more important, likely or preferred	9
Intermediate values	2, 4, 6, 8

Table A1. Scale for pairwise comparisons in AHP (Guler et al, 2020)

By Category		C1	C2	C3	C4
	C1	1	1/2	1/3	1/3
	C2	2	1	1/3	1/2
	C3	3	3	1	3
	C4	3	2	1/3	1
Environment		C1.1	C1.2	–	–
	C1.1	1	1/2	–	–
	C1.2	2	1	–	–
Transport		C2.1	C2.2	C2.3	–
	C2.1	1	1/2	1/3	–
	C2.2	2	1	1/2	–
	C2.3	3	2	1	–
Accessibility		C3.1	C3.2	–	–
	C3.1	1	1/3	–	–
	C3.2	3	1	–	–
Environmental Justice		C4.1	C4.2	–	–
	C4.1	1	1/2	–	–
	C4.2	2	1	–	–

Table A2. Pairwise comparison matrices

Consistency index	Random index	Consistency ratio
0.05	0.89	0.05

Table A3. Consistency index, random index and consistency ratio calculated for pairwise comparison matrices

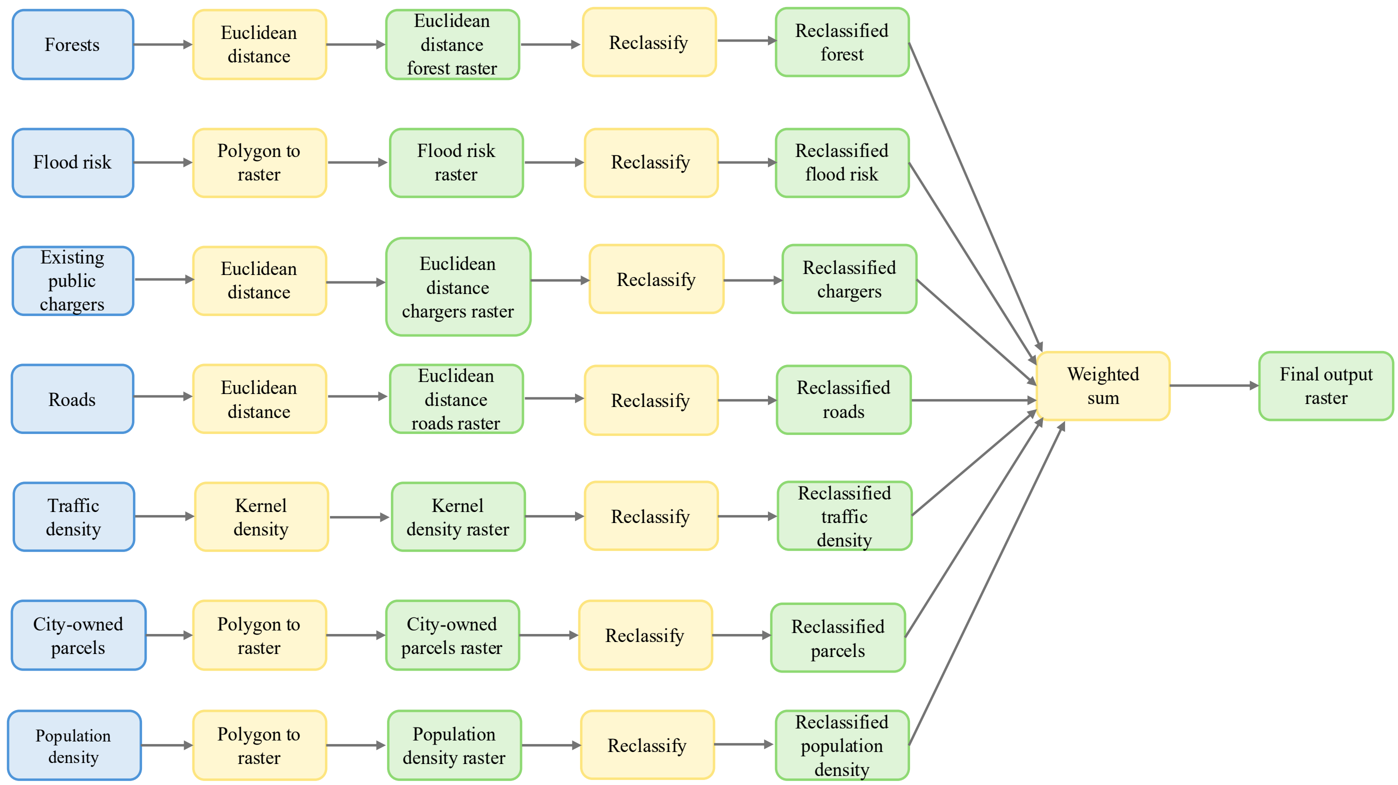

Figure A1. ModelBuilder workflow used in site suitability analysis. Blue boxes represent data inputs, yellow boxes represent geoprocessing tools, green boxes represent data results.

Appendix B. Local EV Policy Examples

What are other cities doing to advance EV adoption and expand their charging networks?

Electric municipal fleets

Ann Arbor: The city has used its Green Fleets policy to guide the transition of municipal fleet vehicles toward lower-emission alternatives. The city has also adjusted vehicle replacement and depreciation practices to support the replacement of eligible municipal vehicles with electric alternatives. Ann Arbor has electrified a significant portion of its light-duty fleet, including sedans, vans, SUVs, and e-bikes.

Marquette: The city participated in the MiNextCities pilot program in collaboration with NextEnergy to assess local mobility challenges and identify appropriate technologies to address them. As part of this program, the city added electric fleet equipment, including Ford E-Transit vans, an electric mower, and EV chargers. City staff began testing the electric vans and mower after the City Commission approved the purchases in 2023.

Grand Rapids: The city has worked to electrify its municipal fleet as part of its broader effort to reduce city emissions. The city has 27 EVs in service and 90 hybrid vehicles in service, supported by 60 city-owned charging stations. In 2025, Grand Rapids installed 36 EV charging stations at its new Public Service Center (PCS), which serves as the permanent garage for the city's full EV and hybrid fleet.

EV-ready building codes and parking requirements

Ferndale: In 2019, the city adopted an EV parking ordinance requiring certain new developments and significant redevelopments to include EV charging infrastructure. The ordinance applies to projects such as new buildings, off-street parking facilities, major additions that affect parking, and parking expansions that increase capacity by more than 50 percent. Ferndale’s requirements establish minimum percentages of parking spaces that must be equipped or prepared to support EV charging.

Grand Rapids: The City of Grand Rapids requires large parking lots and parking structures to provide at least one EV charging station for every 200 parking spaces.

Ypsilanti: The city provides a parking incentive for EV charging by allowing parking spaces reserved, signed, and enforced for EV charging stations to count as two regular parking spaces. This can reduce the total number of required off-street parking spaces for developments that include EV charging.

Incentives and funding

Ann Arbor: The city has offered limited-time EV rebates through its A2ZERO rebate program. The rebates will be available through September 2026 and will provide financial support that mirrors the federal EV rebates that are no longer available.

EV carsharing

Grand Rapids: The city's Mobile GR department operates DART GR (Drive Around Town Grand Rapids). DART GR is a membership-based EV carsharing program that allows residents and visitors to reserve EVs by the hour. The program is part of the broader MI Carshare network and is designed to provide lower-cost access to electric mobility options.

MI Carshare: Mobility Development Operations (MDO) supports community-based EV carsharing programs in several Michigan cities. In addition to Grand Rapids, MDO Carshare provides access to EV carsharing services in Detroit, Ann Arbor, and Kalamazoo.

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