Regional Electric Vehicle Infrastructure Implementation Strategy

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Prepared for:

National Capital Region Transportation Planning Board

Metropolitan Washington Council of Governments

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Acknowledgements

The Regional Electric Vehicle Infrastructure Implementation (REVII) Strategy was developed as a follow-up to the National Capital Region Transportation Planning Board's (TPB) Climate Change Mitigation Study of 2021 (CCMS). The REVII Strategy was prepared by ICF for the TPB and the Metropolitan Washington Council of Governments with funding provided by the TPB. The TPB and COG provided regional perspective and partnered on project management and data collection. Additional assistance and insight were provided by the TPB and COG member jurisdictions on the Regional Electric Vehicle Deployment (REVD) Working Group, Dominion Energy, Pepco, Baltimore Gas & Electric, and Southern Maryland Electric Cooperative. Special thanks to all who provided guidance and feedback for this project.

Acronyms

AC	Alternating Current
ACCII	Advanced Clean Cars II
AFC	Alternative Fuel Corridor
AFDC	Alternative Fuels Data Center, from the U.S. Department of Energy
BEV	Battery Electric Vehicle
CBG	Census Block Group
CEAP	Climate and Energy Action Plan
CEEPC	Climate Energy & Environment Policy Committee
CFI	Charging and Fueling Infrastructure
COG	Metropolitan Washington Council of Governments
DAC	Disadvantaged Community
DOE	U.S. Department of Energy
DCFC	Direct Current Fast Charger
EEA	Equity Emphasis Area
EV	Electric Vehicle
EVI-Pro Lite	Electric Vehicle Infrastructure Projection Tool
FHWA	Federal Highway Administration
GHG	Greenhouse Gas
HEV	Hybrid Electric Vehicle
ICE	Internal Combustion Engine
kW	Kilowatt
kWh	Kilowatt-hour
LDV	Light-Duty Vehicle
MAEP	Mid-Atlantic Electrification Partnership
MFH	Multi-family Housing
NEVI	National Electric Vehicle Infrastructure Program
NFPA	National Fire Protection Association
NREL	National Renewable Energy Laboratory
OCPI	Open Charge Point Interface
PHEV	Plug-in Hybrid Electric Vehicle
REVD	Regional Electric Vehicle Deployment
REVII	Regional Electric Vehicle Infrastructure Implementation
TPB	Transportation Planning Board
V2G	Vehicle-to-Grid
V	Volt
ZEV	Zero Emission Vehicle

1 Executive Summary

Climate change poses a threat to health, safety, the environment, and the economy in the National Capital Region. The intensity of climate impacts in the region will depend on the extent of greenhouse gas (GHG) reductions in the next few years, both globally and locally. Transportation is one of the leading contributors to GHG emissions across the nation and region. According to the U.S. Environmental Protection Agency, 29% of GHG emissions is attributable to the transportation sector in the United States, with light-duty vehicles (LDVs) making up 58% of those emissions.[1] That number is even higher in metropolitan Washington, with 38% of GHG emissions coming from the transportation sector, and 31% of total GHG emissions coming from on-road vehicles.[2]

The National Capital Region Transportation Planning Board's (TPB) Climate Change Mitigation Study of 2021 showed that vehicle technology strategies, including vehicle electrification, are critical to achieving significant reductions in GHG emissions from transportation sources. Both the TPB and the Metropolitan Washington Council of Governments (COG) are committed to reducing GHG emissions in the region. The COG Board established economy-wide goals for the region to reduce GHG emissions 50% below 2005 levels by 2030 and 80% below 2005 levels by 2050. As of 2020, the region achieved a 24% reduction in GHG emissions compared to 2005 levels.[3] Reaching the 50% goal by 2030 will require a cross-sectoral approach to emissions reduction, including the transportation sector. In June 2022, the TPB adopted GHG reduction goals for the region's on-road transportation sector commensurate with COG's economy-wide goals.

To help achieve the region's GHG reduction goals, the TPB and COG support the adoption of electric vehicles (EVs) and the deployment of EV chargers. The Regional Electric Vehicle Infrastructure Implementation (REVII) Strategy was developed as a follow-up to the CCMS to be a guide to help state and local jurisdictions across the region plan for developing their EV charging infrastructure to support the transition of LDVs to electric power.

[1] U.S. Environmental Protection Agency. 2021. Fast Facts on Transportation GHG Emissions. Retrieved from: https://www.epa.gov/greenvehicles/fast-facts-transportation-greenhouse-gas-emissions.
[2] COG. Metropolitan Washington Community-wide GHG Emissions Inventory Summary. Retrieved from: https://www.mwcog.org/documents/2022/12/27/community-wide-greenhouse-gas-emissions-inventory-summaries-featured-publications-greenhouse-gas/
[3] COG. 2022. "Region surpasses 2020 climate goal." Retrieved from: https://www.mwcog.org/newsroom/2022/10/12/region-surpasses-2020-climate-goal/

The REVII Strategy builds on regional planning goals and includes three key objectives.

REVII Strategy Objectives

Identify locations for publicly accessible Level 2 and direct current fast charging facilities to support increased EV adoption throughout the metropolitan Washington region.

Support reliable access to publicly accessible EV charging infrastructure, particularly in areas with limited at-home charging, including multi-family housing (MFH) developments and disadvantaged communities (DACs).

Help ensure that all populations in the metropolitan Washington region, including DACs and individuals living within equity emphasis areas (EEAs), are able to access and benefit from the financial and environmental benefits of EVs.

To meet these objectives, the REVII Strategy includes an assessment of charging infrastructure needs based on anticipated EV demand, and identifies priority locations for deploying chargers, based on considerations such as accessibility and convenience for drivers, support for MFH residents, and equitable access for individuals living and working in EEAs. The results of the REVII Strategy may serve as the region's blueprint to develop a robust regional network of EV chargers as a major element of the region's commitment to reducing GHG emissions from motor vehicles. This strategy should support state and local governments as they prioritize locations for EV charger deployment and apply for funding from federal programs such as the Charging and Fueling Infrastructure (CFI) Discretionary Grant Program.[4]

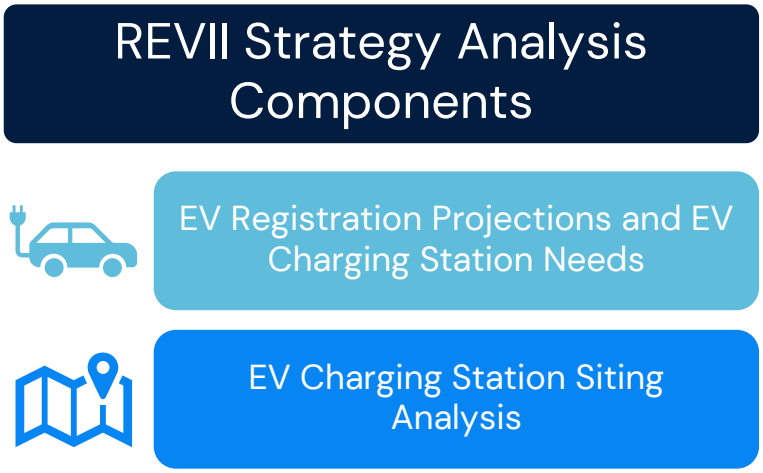
Encompassing the metropolitan Washington region, the REVII Strategy is a guide for local governments to consult and utilize as they develop and implement their EV charging station deployment processes. The strategy includes an EV charging station siting analysis, which makes general assumptions across jurisdictions to support prioritization of charging locations, but is not intended to be prescriptive. Local governments and private sector suppliers should use the analysis in conjunction with local knowledge to determine the best path forward for deploying EV charging stations in their jurisdictions.

[4] More information on the CFI Grant Program may be found here: https://www.fhwa.dot.gov/environment/cfi/

This strategy begins with an overview of the current state of EVs and associated infrastructure at the national and regional level to establish a snapshot of the existing market's transition from internal combustion engine (ICE) vehicles to EVs. Currently, the EV market is segmented into two technology platforms: battery electric vehicles (BEVs) and plug-in hybrid electric vehicles (PHEVs). The TPB anticipates an increase in EV adoption over the next 20 years due to growing consumer interest, EV model availability and affordability, and technological improvements. The REVII Strategy aims to more rapidly advance consumer adoption of EVs and increase the overall share of EVs in the household vehicle fleet. To support growth in the market, this strategy will help COG member jurisdictions plan for a regional EV infrastructure network that will provide drivers with reliable, accessible, and equitable EV charging opportunities.

Need for Infrastructure Development

To meet the region's goals for reducing GHGs and increasing the number of light-duty EVs on the road, there is a need for more publicly accessible charging infrastructure. Light-duty EVs are primarily comprised of passenger vehicles with a maximum gross vehicle weight rating below 8,500 pounds. The types of EVs included in this analysis are light-duty BEVs and PHEVs. While hybrid electric vehicles (HEVs) generate lower GHG emissions than conventional motor vehicles, they are not part of this REVII Strategy since they do not use EV chargers.



Increasing regional EV adoption to support climate goals will require a substantial increase in publicly accessible charging infrastructure. The creation of a regional charging network will, in turn, support the adoption of EVs by increasing charging access and availability, a major barrier to adoption for consumers. The REVII Strategy aims to identify solutions that can address and fill gaps in charging infrastructure around the region by informing member jurisdictions of possible scenarios for EV market growth and their associated infrastructure demands and by offering recommendations for deployment locations.

EV Registration Projections and EV Charger Needs

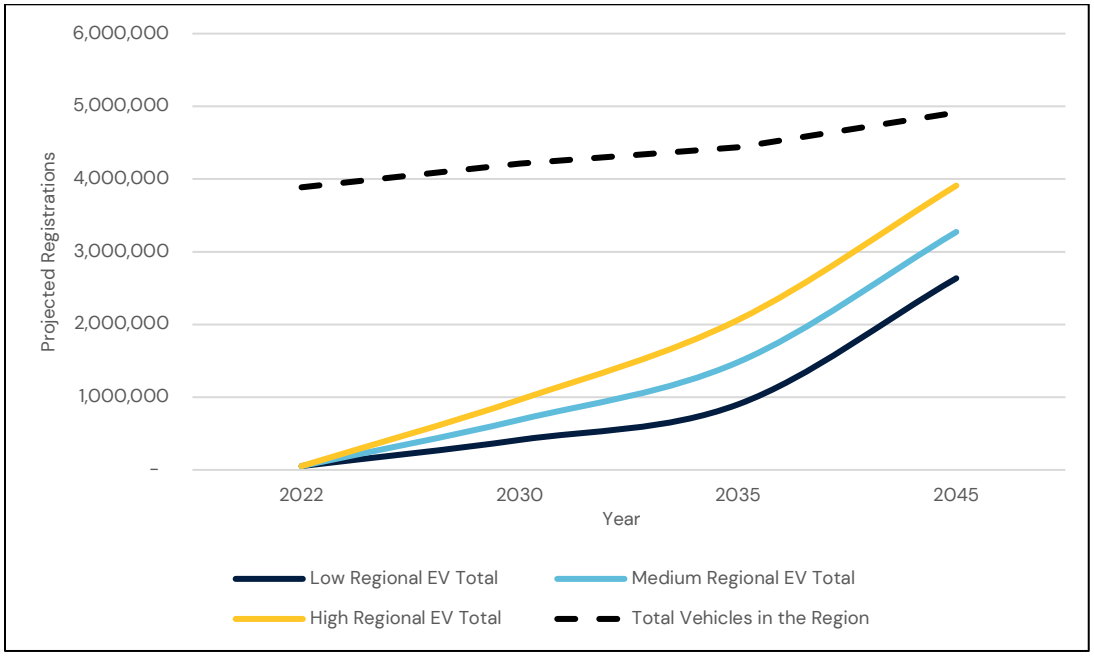
A primary component of the REVII Strategy is to forecast future light-duty EV registrations in the region under various policy scenarios and to use those projections to estimate the approximate number of EV chargers needed to support the growing EV population. Light-duty EV registration projections were calculated for three scenarios (low, medium, and high adoption) at three planning benchmark years (2030, 2035, and 2045) at both the regional and jurisdictional level.

Regional EV Registration Projections

After analyzing EV registration data, evaluating market trends, considering implications of state and federal policy, and assessing the future of market barriers and opportunities, the REVII Strategy estimates that by 2045 EVs may account for anywhere between 57% and 80% of all LDVs in the region. To meet TPB and COG

GHG emission reductions goals for 2050, the region will need to be on a pathway to achieve the high adoption scenario. Registration projections for low-, medium-, and high-adoption scenarios in the region at each planning year are shown in Figure 1.

Figure 1. Light-Duty EV Registration Projections in the Region



Anticipated Regional EV Charging Port Needs

The light-duty EV projections in Figure 1 are used to calculate the approximate number of EV charger ports needed to support future EV adoption across the region.[5] The estimated number of EV charger ports needed to support the projected future light-duty EV population in the region is available in Table 1 for both Level 2 chargers and direct-current fast charging (DCFC) stations.

Table 1. Projected Publicly-Accessible Regional EV Charging Needs

Scenario		Charger Type	2030	2035	2045
Low	EV Charging Port Needs	Level 2	13,848	30,647	72,013
		DCFC	485	1,103	2,447
	EVs[6]		*464,246*	*987,682*	*2,777,657*
Medium	EV Charging Port Needs	Level 2	21,840	44,333	86,936
		DCFC	785	1,538	2,955
	EVs		*705,096*	*1,515,557*	*3,340,186*
High	EV Charging Port Needs	Level 2	29,339	58,822	98,704
		DCFC	1,052	2,024	3,320
	EVs		*945,945*	*2,043,433*	*3,902,714*

[5] EV charging port estimates are calculated using the U.S. Department of Energy (DOE) EVI-Pro Lite tool. This tool estimates charging infrastructure needs and associated electric demands based on EV adoption scenarios.
[6] EV estimates represent the total number of anticipated EV registrations. EVI-Pro Lite accounts for drivers with home charging access. Assumptions and inputs for the EVI-Pro Lite analysis can be found in Appendix 1.B.

At the time of this assessment, there were approximately 1,586 publicly accessible EV chargers in the region with 3,898 Level 2 EV charging ports and 378 DCFC ports available.[7] The existing charging ports represent 29% of the Level 2 charging ports and 79% of the DCFCs projected to be needed by 2030 under the low adoption scenario, and 14% of the Level 2 and 37% of the DCFCs projected under the high adoption scenario.

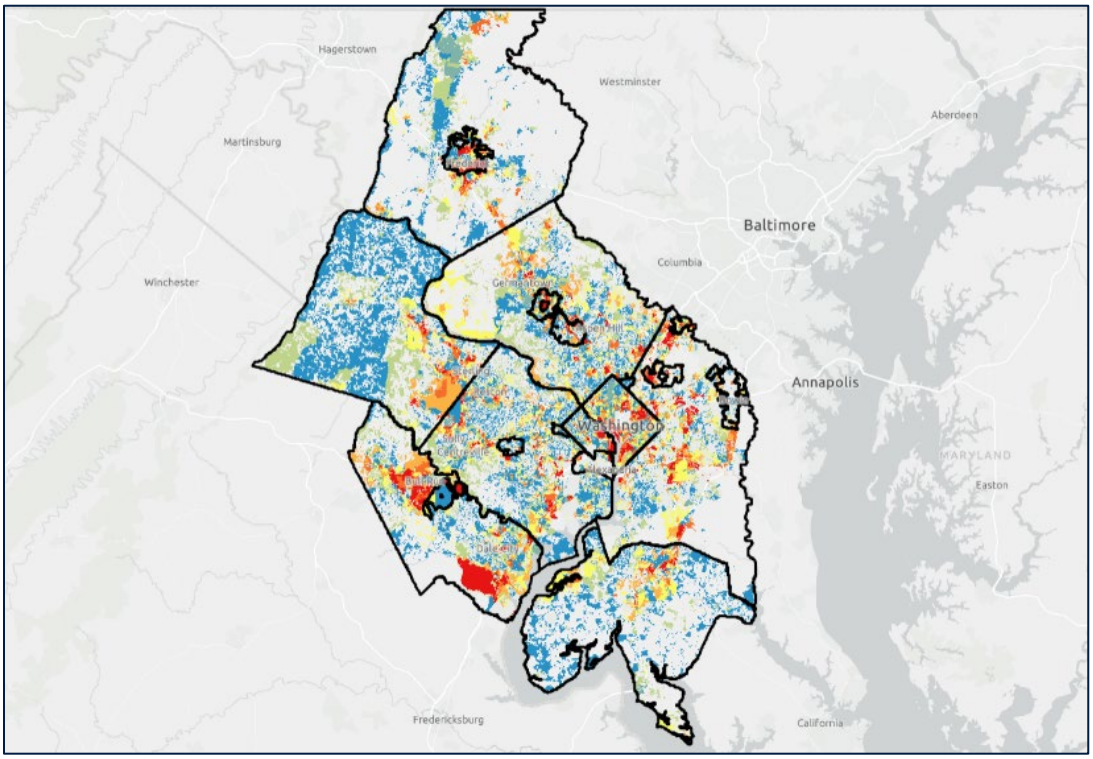
EV Charger Siting Analysis

The first portion of the REVII Strategy looks at the vehicles and infrastructure, also known as EV chargers, needed in the region in coming years. The second portion of the REVII Strategy, the EV charger siting priority map, identifies priority locations for deploying the chargers listed in Table 1. Three different scenarios are available for use by member jurisdictions, depending on their individual preferences: prioritizing DCFC with high utilization, prioritizing Level 2 chargers with an equity focus, and prioritizing DCFC with a MFH focus.

The mapping tool highlights parcels of land that are scored based on their suitability for light-duty EV chargers. Since the REVII Strategy focuses on publicly accessible light-duty EV charging, certain types of parcels are considered generally unsuitable for publicly accessible charger development and excluded from the analysis (e.g., parcels zoned for single-family residences, as many single-family homes will have access to their own charging infrastructure). Parcels are assessed on a scale of less suitable to more suitable for immediate charging infrastructure deployment. A screenshot of the results is shown in Figure 2; red indicates high priority deployment locations and blue indicates low priority locations. Local governments may use the mapping tool to explore the most promising locations for adding EV charger ports under any of the three scenarios based on their prioritization preferences.

[7] This count only includes publicly available EV charging stations. Because Tesla chargers are exclusive for Tesla owners, they were excluded from this count and the analysis. This data was retrieved from the AFDC Station Locator on December 5, 2023. This data is updated frequently, and more recent counts can be found at: https://afdc.energy.gov/stations.

Figure 2. EV Charging Station Analysis Results



While EV charger deployment location recommendations are generally consistent across the three scenarios examined, certain locations prove to be more suitable than others, depending on local priorities. TPB and COG member governments may use the EV projections, charger estimates, and mapping tool to develop a better understanding of their community charger needs and select optimal deployment locations for building out charging infrastructure.

The charger priority map will help member jurisdictions identify locations to deploy the estimated number of needed charging ports. Jurisdictions may choose to deploy charging stations on government property but they are not responsible for deploying charging stations on any private property recommended in this strategy. Rather, jurisdictions may engage and support local business and site owners of private property in high priority areas.

The recommendations contained within this strategy are designed to serve as a guide for local jurisdictions in their EV charger infrastructure deployment planning process. They are not meant to be prescriptive but should provide guidance in the deployment process. The recommendations may be applied in the following ways:

Jurisdictions can use the strategy at any stage of their planning process, for example:

- Identifying priority locations to help focus planning efforts.
- Crosschecking against locations jurisdictions have already flagged as high interest areas for charging station deployments.
- Selecting high priority parcels for in-depth charging station siting assessments (i.e., checking electrical conduit and infrastructure that exists or needs to be installed)
- Engaging with private property and non-government site owners to encourage and support the deployment of EV charging stations on their property.

- Jurisdictions may identify local government-owned properties to help site and prioritize the deployment of publicly accessible chargers. EV charging infrastructure should be deployed equitably, considering factors such as lower market demand and network gaps in EEAs and underserved communities. Planners should engage with community members and organizations to ensure EV infrastructure is desired in these communities.
- Local jurisdictions are encouraged to engage private EV charger suppliers and other property owners in high priority mapped areas to encourage them to install publicly accessible EV chargers. Local jurisdictions should widely share information on EV charging benefits, and incentives and subsidy programs to support EV charger deployment.

The parcels identified as high priority for deployment through the REVII Strategy should not be considered requirements for local government EV charger deployments; rather they should serve as a guide for jurisdictions in their planning processes. The REVII Strategy aims to give jurisdictions the materials they need to plan for future infrastructure deployments, while allowing them the flexibility to choose the number of chargers to deploy and the locations that best suit their individual needs.

Note that the REVII Strategy analyses are a snapshot in time. Planned and future EV charger deployment and land use changes are not factored into this analysis. The map and selected geospatial datasets are available for download by jurisdictions on the REVII Strategy EV siting parcel review website.

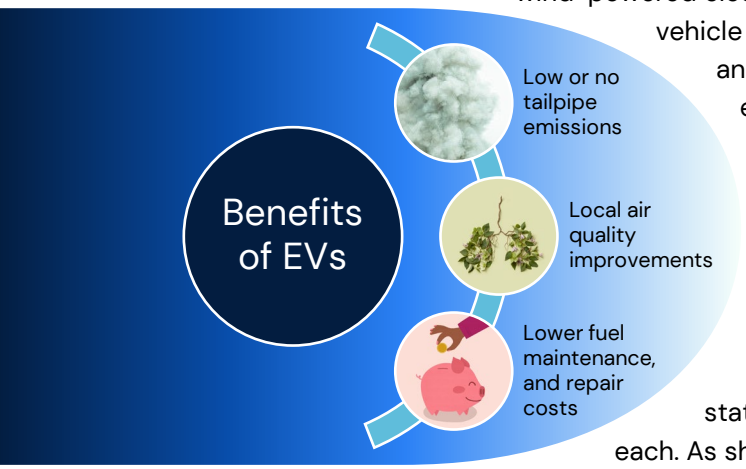
2 State of the Market

2.1 Electric Vehicles

There are two types of plug-in EVs: PHEVs, which are powered by both gasoline and electricity, and all-electric vehicles, which are powered solely by electricity and are sometimes referred to as BEVs.[8] Both vehicle types can be plugged into EV chargers. HEVs, however, are equipped with conventional gasoline engines with electric motors and cannot plug into a charger.

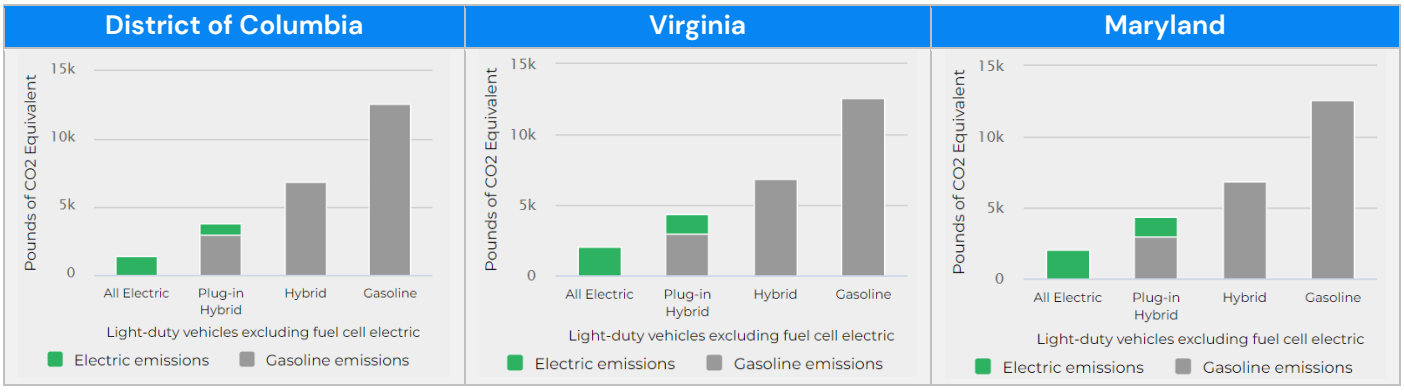
Figure 3. Energy Sources for Different Types of EVs

By running partially or entirely on electricity, EVs have much lower emission levels than ICE vehicles. Exact emissions reductions depend on electricity sources (e.g., coal-powered electricity versus wind-powered electricity). At the national level, EVs can reduce average total vehicle lifecycle GHG emissions by 78% compared to ICE vehicles, and PHEVs can reduce average total vehicle lifecycle GHG emissions by 62%.[9] At the state level, based on Maryland, Virginia, and the District of Columbia's electricity sources, EVs and PHEVs can reduce GHG emissions compared to ICE vehicles by up to 89% for EVs and 69% for PHEVs.



Emissions calculations are based on the average ICE, PHEV, and BEV, and represent state averages, not just the metropolitan Washington region. Figure 4 displays the annual CO_2e vehicle emissions per vehicle type in each state, based on gasoline emissions and the energy grid mix of each. As shown, BEVs and PHEVs produce well under half the GHG emissions as gasoline vehicles. The extent of actual emissions reductions depends on a number of factors, including vehicle model, electrical grid generation mix, and driving and charging patterns.[10]

Figure 4. Annual Emissions by Vehicle Type



[8] HEVs are sometimes included in the definition of EVs. However, these vehicles do not plug into charging stations. Therefore, HEVs are excluded from the REVII Strategy analysis.
[9] Alternative Fuels Data Center (AFDC). 2023. Emissions from EVs. Retrieved from: https://afdc.energy.gov/vehicles/electric_emissions.html
[10] Figure 4 shows comparative lifecycle GHG emissions of BEVs, PHEVs, HEVs, and ICE vehicles based on electricity sources.

In addition to GHG emissions reductions, EVs also reduce other pollutants that can have harmful effects on lung and heart health, such as nitrogen oxides and volatile organic compounds that contribute to ground-level ozone, fine particle pollution, sulfur dioxide, and carbon monoxide. Unlike GHGs, which have a global impact on the Earth's climate, these pollutants cause localized poor air quality, associated with asthma and other respiratory issues, which disproportionately impact low-income and underserved communities. The American Lung Association estimates the impacts of a national shift to 100% sales of passenger zero emission vehicles (ZEVs) by 2035, and medium- and heavy-duty trucks by 2040, could reduce health costs by more than $59.2 billion annually.[11]

While new EVs still typically have a higher purchase price than comparable gas-powered vehicles, the maintenance and fuel costs are typically lower. Lower maintenance and repair costs are attributable to EV design; with fewer moving parts than ICE vehicles, EVs break down and need repairs and replacements less frequently. The U.S. Department of Energy's (DOE) Argonne National Laboratory estimates that EV maintenance costs average approximately $0.061 per mile, while a similar conventional ICE vehicle has an average maintenance cost of $0.101 per mile.[12] Actual maintenance and repair costs vary by vehicle use and driver behavior. In terms of fuel costs, EV drivers spend approximately 60% less on fuel costs than the average vehicle in the same class.[13] Fuel costs depend on factors such as efficiency of the EV, regional electricity costs, and driving and charging patterns.

While new EVs are typically more expensive than new ICE vehicles, used EV prices are comparable to, or lower than, used ICE vehicle prices.

Additionally, EVs can serve as a distributed energy resources and mobile electricity sources. EV batteries can store energy, which allows vehicles to serve as portable batteries for bidirectional charging, or energy flow from batteries back to the grid, also known as vehicle-to-grid (V2G). V2G can help manage peak energy loads for buildings, facilities, the electrical grid, and other assets, creating a smart network of interconnected assets.

Challenges to EV Adoption

While the sale of EVs has increased in the last decade, several barriers to EV adoption remain. One of these common concerns is range anxiety. Many drivers are concerned about their EV running out of battery, despite most BEVs having a range of 150 to 400 miles when fully charged. This concern is especially prevalent among drivers without access to charging at home. Range anxiety can be mitigated by increasing access to charging, especially at workplaces, and filling in gaps in regional charging networks.[14] Additionally, EVs lose range in cold and hot temperatures, as the EV battery thermal management system cools or warms the battery to maintain the optimum temperature range (55-75°F). EV drivers can work around these impacts by 'preconditioning' the vehicle before driving, e.g. heating or cooling the vehicle cabin while the EV is still plugged in to avoid using battery charge.[15]

[11] American Lung Association. 2022. Zeroing in on Healthy Air. Retrieved from: https://www.lung.org/getmedia/13248145-06f0-4e35-b79b-6dfacfd29a71/zeroing-in-on-healthy-air-report-2022
[12] DOE. 2021. Fact of the Week #1190. Retrieved from: https://www.energy.gov/eere/vehicles/articles/fotw-1190-june-14-2021-battery-electric-vehicles-have-lower-scheduled
[13] Consumer Reports. 2020. EV Ownership Costs: Today's EVs Offer Big Savings for Consumers. Retrieved from: https://advocacy.consumerreports.org/wp-content/uploads/2020/10/EV-Ownership-Cost-Final-Report-1.pdf
[14] Fuels Institute, 2020. Electric Vehicle Adoption: Focus on Charging. Available at https://www.transportationenergy.org/research/reports/electric-vehicle-adoption-focus-on-charging
[15] Union of Concerned Scientists, 2016. Do Electric Cars Work in Cold Weather? Available at Do Electric Cars Work in Cold Weather? Get the Facts... - Union of Concerned Scientists (ucsusa.org)

Another possible barrier to EV adoption is the gap in education and awareness. According to a report from the National Renewable Energy Laboratory (NREL), individuals with firsthand exposure to EVs are more likely to consider purchasing and leasing a vehicle.[16] To promote EV adoption in Columbus, Ohio, and the surrounding areas, Smart Columbus, which serves as an innovation lab, facilitated 110 different events prioritizing and focused on education and awareness.[17] According to a survey, Smart Columbus estimates that they assisted in influencing the purchase or lease of 950 EVs within a two-year period.

Expanding education and awareness of EVs has been a top priority of the Biden administration. Teaming with different public and private partners, the administration has promoted its partnerships with entities such as Generation180, Avanza EV, Climate Power, Sierra Club and others to help engage in providing education and awareness to people across the country and across different demographics, communities, and income groups.[18] Other suggestions to help bridge the gap in awareness and education range from having Governors and other politicians attend local ride-and-drive events, supporting an "EV Hotline" to offer 24/7 EV assistance, and collaboration with the tourism agency to develop "EV Road Trip" resources and suggestions.[19]

Concerns about EV battery fires also represent a challenge for adoption. However, studies indicate that battery-related fires are quite rare. An article from the National Fire Protection Association (NFPA) found that the failure rate for lithium-ion batteries ranges from 1 in 10 million on the high end to 1 in 40 million on the low end, depending on manufacturing quality.[20] To prepare first responders the NFPA and the National Alternative Fuels Training Consortium both offer different on-demand trainings for first responders.[21]

The adoption of new EV technologies could also prove to be a challenge due to rapid technological advances and innovations. Entities from both the public and private sector have expressed concern that the cost and time required to build EV infrastructure will be outpaced by future charging advancements. This uncertainty may lead to hesitation among stakeholders, particularly regarding the costs associated with designing and implementing EV infrastructure and constructing charging stations.

Charger availability and uptime remain barriers to EV adoption. EV drivers may arrive at a charger only to find that all the ports are in use, or some are out of order. EV drivers can use websites like the AFDC Station Locator, PlugShare, and other charging network platforms to find stations that are available and functional. These resources can also show users the power output of chargers and allow drivers to plan how long they will need to charge at a location.[22]

Finally, while EVs offer substantially lower or no tailpipe emissions, there are still sustainability concerns related to EVs from a vehicle life-cycle perspective, which may discourage some consumers from making the switch to electric. EV manufacturing requires extraction and processing of rare minerals needed for electric

[16] NREL. 2020. Plug-In Electric Vehicle Showcases: Consumer Experience and Acceptance. Retrieved from: https://afdc.energy.gov/files/u/publication/pev_showcases_consumer_experience_acceptance.pdf
[17] Smart Columbus. 2020. Ride & Drive Roadshow Practitioner's Guide. Retrieved from: https://d2rfd3nxvhnf29.cloudfront.net/2020-02/Ride n Drive Final Report _compressed.pdf
[18] White House. 2023. Fact Sheet: Biden-Harris Administration Announces New Private and Public Sector Investments for Affordable Electric Vehicles. Retrieved from: https://www.whitehouse.gov/briefing-room/statements-releases/2023/04/17/fact-sheet-biden-harris-administration-announces-new-private-and-public-sector-investments-for-affordable-electric-vehicles/
[19] NASEO. 2021. Electric Vehicle Charging Needs Assessment. Retrieved from: https://www.naseo.org/data/sites/1/documents/publications/EVWest_NeedsAssessment_Final.pdf
[20] NFPA. Retrieved from: https://www.nfpa.org/news-blogs-and-articles/nfpa-journal/2020/01/01/ev-stranded-energy/ess
[21] NFPA. Retrieved from: https://www.nfpa.org/for-professionals/training-for-me/alternative-fuel-vehicles-training/electric-vehicles
[22] Idaho National Laboratory. 2015. How Does Utilization of Non-Residential EVSE Compare Between those Installed in Oregon in Planned versus Unplanned Locations? Available at https://avt.inl.gov/sites/default/files/pdf/EVProj/UtilizationOfNonResEVSEInstallationVsPlan.pdf

batteries. Although EV manufacturing generate higher emissions than those manufacturing ICE vehicles, environmental life-cycle assessment indicates that over the vehicle lifetime, an EV is more sustainable than a gasoline-fueled vehicle due to substantial emissions reductions over the life of vehicle use.[23] Further, research and development of new methods to recycle batteries more efficiently and sustainably is increasing, along with applications for battery reuse after they are removed from an EV.[24][25]

2.2 EV Charging

Charging Infrastructure Terminology

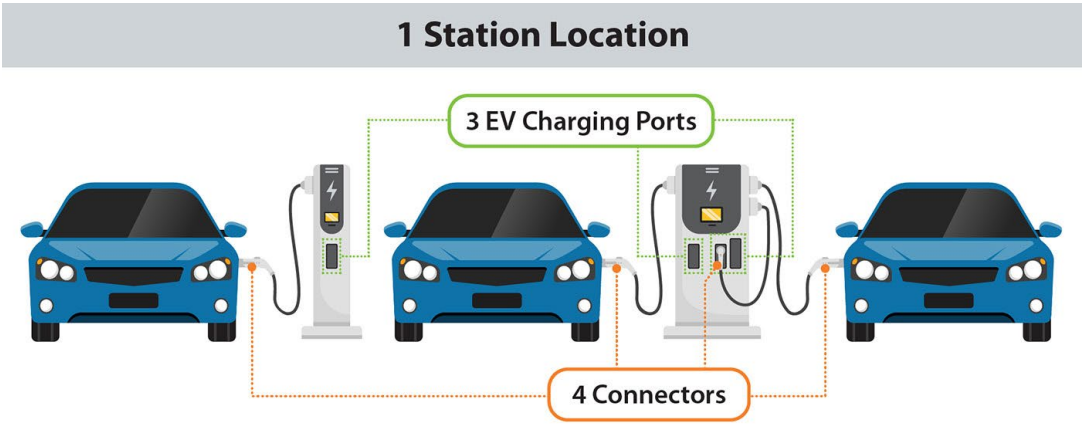
The charging infrastructure industry has aligned with a common standard called the Open Charge Point Interface (OCPI) protocol with the following hierarchy for chargers: location, EV charger port, and connector. The AFDC and the Station Locator use the following charger definitions:[26]

Station Location: A station location is the area in the immediate vicinity of a group of chargers. It includes the chargers, supporting equipment, parking spaces adjacent to the chargers, and lanes for vehicle ingress and egress. A charger could comprise only part of the property on which it is located. Examples include a parking garage or a mall parking lot.

EV Charger Port: An EV charger port is the system within a charger that charges one EV. A charging port may have multiple connectors, but it can provide power to charge only one EV through one connector at a time. The unit that houses EV charger ports is sometimes called a charging post, which can have one or more EV charger ports. An EV charger can have either single- or dual-port configuration.

Connector: A connector is the device that attaches an EV to a charging port to transfer electricity. Multiple connectors and connector types (such as CHAdeMO and Combined Charging System) can be available on one EV charger port, but only one vehicle will charge at a time. Connectors are sometimes called plugs.

Figure 5. Charger Terminology



[23] Kukreja, B., 2018. Life cycle analysis of electric vehicles. Available at https://sustain.ubc.ca/sites/default/files/2018-63%20Lifecycle%20Analysis%20of%20Electric%20Vehicles_Kukreja.pdf
[24] Argonne National Laboratory, 2019. DOE launches its first lithium ion battery recycling R&D center. Available at https://www.anl.gov/article/doe-launches-its-first-lithiumion-battery-recycling-rd-center-recell
[25] AFDC. 2020. Battery second life. Available at https://afdc.energy.gov/files/u/publication/battery_second_life_faq.pdf
[26] The image used in Figure 5 is retrieved from the AFDC: https://afdc.energy.gov/fuels/electricity-stations

Charging Equipment

EV chargers are characterized by the maximum amount of power they can deliver to an EV battery. There are three categories of EV chargers, as shown in Figure 6[27]:

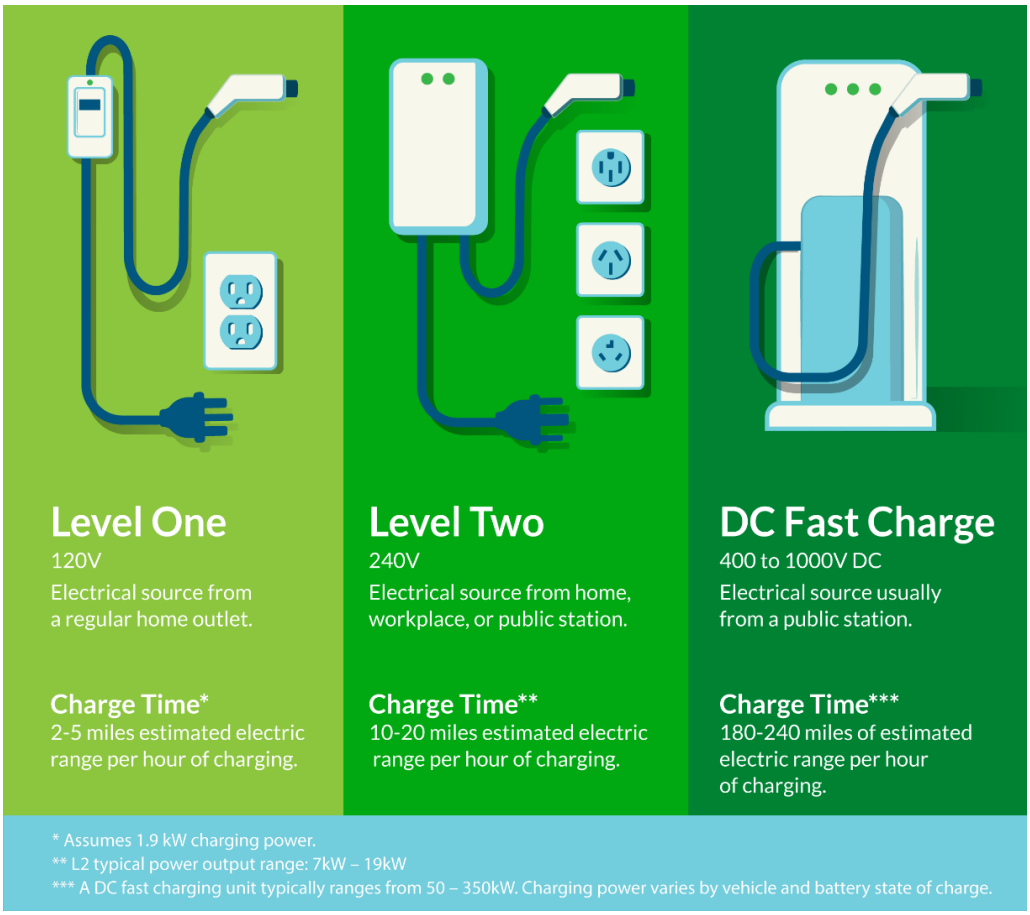
Level 1 chargers are standard 120-volt (V) wall outlets. These chargers give EVs two to five miles of range per hour of charging. Due to this relatively slow rate, Level 1 charging is most common in residential settings where regular overnight charging is possible.

Level 2 chargers operate on a circuit from 208V to 240V and transfer alternating-current (AC) electricity to a device in an EV that converts alternating current to direct current (DC) to recharge an EV battery. These chargers give EVs 10 to 20 miles of range per hour and are most suitable for residential and workplace locations where charging for at least 4 hours at a time is feasible.

Level 3, or **DCFCs**, enable rapid charging by delivering direct current electricity to an EV's battery. These chargers give 60 to 80 miles of range per 20 minutes of charging. DCFCs are useful in publicly accessible spaces where parking dwell times may be short.

When choosing the type of charger best suited for a particular fleet, use, or location, these equipment factors should be considered.

Figure 6. Types of Chargers



[27] Image retrieved from https://marylandev.org/charging/

Connector Types

There are multiple connector types available for drivers. Each connector type is compatible with different vehicle models and EV charger types. These are the most common connector types:

J1772: The J1772 connector can be used with AC Level 1 and Level 2 chargers. All commercially available EVs in the United States can charge using Level 1 and Level 2 charging equipment.

North American Charging Standard (NACS)/J3400: The NACS connector was developed by Tesla. Currently only Tesla vehicles can use the NACS connector. SAE International is standardizing the J3400 connector based on Tesla's design for the NACS connector, which works for all charging levels.

Combined Charging System (CCS): The CCS connector lets drivers use the same charge port with AC Level 1, Level 2, and DCFC chargers. The only difference is that the DCFC connector has two additional bottom pins. Most EV models on the market can charge using the CCS connector.

CHAdeMO: CHAdeMO is a common DCFC connector type among Japanese automakers.

Table 2 summarizes EV charger and connector types.

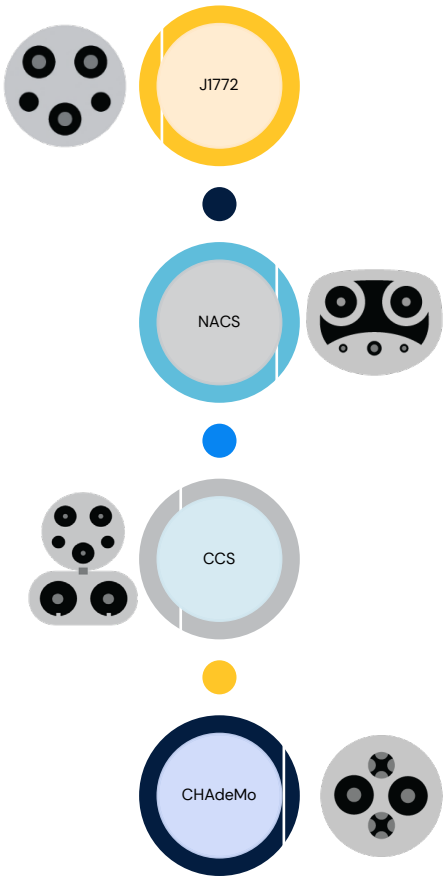


Table 2. EV Charger Type and Connector Information[28]

	Level 1	Level 2	DCFC
Description	120V AC port, single phase service 12-16 amp (A)	208/240V AC port, single phase service 12-80A	208/480/1,000V AC circuit, three-phase service connection 50-500A
Connector Type(s)	J1772 Standard Wall Outlet	J1772	CCS CHAdeMO NACS/J3400
Typical Use Cases	Residential, workplace	Residential, workplace, publicly accessible charging, fleets	Publicly accessible charging, fleets
Typical Charge Time[29]	PHEVs: 2-7 hours BEVs: 14-20+ hours	PHEVs: 1-3 hours BEVs: 4-8 hours	BEVs: 30-60 minutes

[28] DOE. Developing Infrastructure to Charge Plug-In Electric Vehicles, https://afdc.energy.gov/fuels/electricity_infrastructure.html
[29] For light-duty EVs. Actual time varies based on battery size.

Charging Infrastructure Costs

Prior to installation, site hosts need to coordinate with local utilities to ensure there is sufficient grid capacity to support new EV charging stations. Site evaluations are critical planning steps to determine whether grid upgrades are needed and what the utility rates are. If a site is located in an area with high electricity demand charges, then operating costs will be higher. Depending on charging patterns, utilities may need to spend between $1,700 and $5,800 on grid upgrades per EV.[30] Once energy supply assessments and site evaluations have been completed, site owners must determine the level of EV charging equipment suitable to their needs.

The installation costs of EV chargers vary based on the type and strength of the charging equipment. Many utilities and states offer incentives for the purchase or installation of EV charging stations, which can offset costs. Average cost ranges for each type of charger are shown in Table 3 below.

Table 3. Average Range of Site-Level EV Charging Equipment Costs[31][32][33]

Item	Minimum Cost Estimate	Maximum Cost Estimate
Level 2 Charger, per port	$400 (Residential), $2,500 (Commercial)	$6,500
DCFC - 50 kilowatt (kW)	$20,000	$35,800
DCFC - 150 kW	$75,600	$100,000
DCFC - 350 kW	$128,000	$150,000

Once EV charging stations are installed, site owners still incur operations and maintenance costs. Generally, the average annual cost of maintenance for a single EV charger is $400 but varies based on the charger level and whether the station is networked. Site owners may opt to pay for a warranty, which can cost over $800 per charger per year for DC fast chargers. Once warranty terms end, site owners are responsible for all repair and maintenance costs. Additionally, site owners are responsible for the cost of the electricity used to operate the site's EV chargers. This cost can vary greatly between sites as electricity rates vary depending on the state, utility providing the service, time of use, whether the site host is enrolled in any utility pilot programs that reduce electricity costs, and demand charges.[34]

Due to the costs incurred by operating EV charging infrastructure, site hosts may elect to generate revenue or charge a fee to use their chargers. Common pricing structures include charging by kilowatt-hour (kWh), length

[30] Boston Consulting Group. The Costs of Revving Up the Grid for Electric Vehicles, Retrieved from: https://www.bcg.com/publications/2019/costs-revving-up-the-grid-for-electric-vehicles#:~:text=We%20found%20that%20the%20representative%20utility%2C%20depending%20on,grid%20upgrades%20per%20electric%20vehicle%20%28EV%29%20through%202030.

[31] ICF. 2019. Comparison of Medium- and Heavy-Duty Technologies in California. California Electric Transportation Coalition, https://www.caletc.com/assets/files/ICF-Truck-Report_Final_December-2019.pdf

[32] DOE. 2015. Costs Associated with Non-Residential Electric Vehicle Supply Equipment, Retrieved from: https://afdc.energy.gov/files/u/publication/evse_cost_report_2015.pdf

[33] Nelder, C. & Rogers, E. 2019. Reducing EV Charging Infrastructure Costs. Rocky Mountain Institute, https://rmi.org/wp-content/uploads/2020/01/RMI-EV-Charging-Infrastructure-Costs.pdf

[34] DOE. Operation and Maintenance for Electric Vehicle Charging Infrastructure, Retrieved from: https://afdc.energy.gov/fuels/electricity-infrastructure-maintenance-and-operation#:~:text=While%20actual%20maintenance%20costs%20vary%20based%20on%20the,a%20maintenance%20plan%20for%20an%20additional%20annual%20fee

of time, session, or by subscription. In 2020, the average cost to charge an EV was $0.15 per kWh, but costs varied from $0.08 per kWh to $0.27 per kWh.[35]

Challenges to EV Charger Deployment

Grid capacity can be a significant barrier to EV charger deployment. Local jurisdictions and other site owners looking to deploy EV chargers should work with local utilities to evaluate electrical supply needs of any planned stations. If there is not an existing capacity to support these stations, then utilities may need to upgrade their grid distribution infrastructure, which often involves upgrading transformers and conductors at EV charger sites. When grid upgrades are requested as part of a specific customer project, the customer is typically responsible for the associated cost.

Local jurisdictions often require a minimum amount of parking spaces at real estate properties like MFH and office buildings. In some cases, EV charging spaces are not counted as parking spaces, so property owners are discouraged from installing EV chargers in order stay compliant with parking requirements. This concern can be mitigated by working with municipalities to recognize EV charging spaces as parking spaces, so property owners can install EV chargers without needing to build more parking spaces.

Similarly, permit applications need to be reviewed prior to EV charger installation to ensure stations are compliant with building, electrical, accessibility, and fire safety regulations. Failure of an application to satisfy a local jurisdiction's compliance standards will likely result in an application being returned to the submitter with a request for revisions. This process of submission, review, and revision can continue until the application meets all required standards. While permits are designed to ensure the safety and reliability of EV chargers, a lengthy permitting cycle can discourage those wishing to install EV chargers. Implementing a streamlined permitting process can greatly reduce the project time and costs associated with installation.

Ensuring EV Charger Reliability

Reliability standards help ensure EV charger deployments and networks are consistent, dependable, and user-friendly. Reliability standards include uptime requirements, consistent standards, data and reporting, and considerations for interoperability. Jurisdictions may consider adopting all or a combination of reliability standards to support the establishment of a consistent and accessible charging network.

Uptime Requirements: This is the percentage of time that an EV charger must be operational and able to deliver power. Currently, the only national standard that exists applies to EV chargers deployed through the National Electric Vehicle Infrastructure (NEVI) Program, which set an uptime requirement of 97%. Jurisdictions may consider setting their own uptime requirements for EV chargers, using the NEVI requirement as a best practice.

Consistent Standards: These ensure consistency in infrastructure across a charging network. These standards apply to plug types, power levels, number of ports, and station design. Jurisdictions may consider setting infrastructure standards to ensure all deployments in their territory are uniform to ensure ease of use and access for drivers.

Data and Reporting: EV charger operators may also collect data and report on EV charger performance. Jurisdictions may request EV charger operators report information related to pricing, charger availability, pricing, accessibility, and maintenance statistics to generate a clearer picture of how well a charging network

[35] NREL. News Release: Research Determines Financial Benefit from Driving Electric Vehicles, Retrieved from: https://www.nrel.gov/news/press/2020/research-determines-financial-benefit-from-driving-electric-vehicles.html. This calculation assumes 81% of charging is done at home and 14% of charging is done at workplaces or publicly accessible stations.

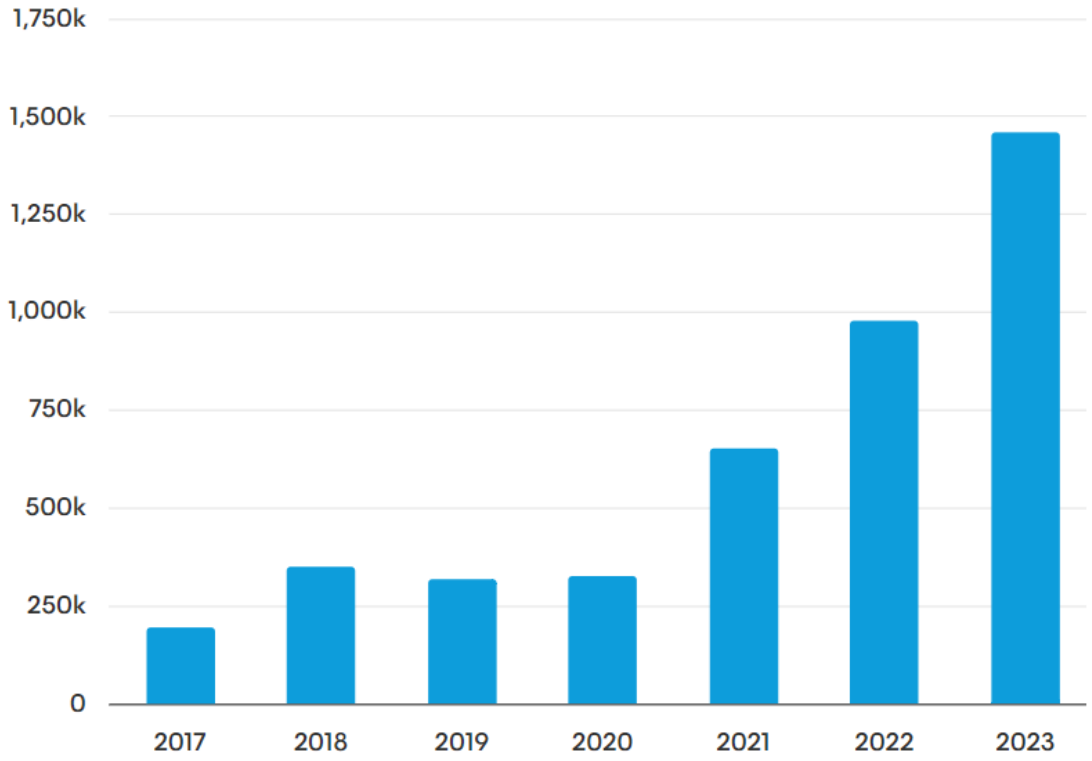
is functioning. Requiring data collection and performance reporting can help ensure chargers are functioning correctly and that station operators are maintaining the infrastructure to the jurisdiction's standards.

Interoperability: This standard focuses on ensuring chargers are compatible with various EV models and, potentially, future technologies. Setting interoperability standards helps ensure all drivers that visit an EV charger are able to use it.

2.3 Current EV Market

EVs make up a small but quickly growing share of vehicle sales in the United States. From 2017 through 2020, EV sales growth in the United States remained steady before increasing dramatically in 2021, 2022, and 2023. In 2023, EV sales grew to almost 1.5 million vehicles (Figure 7).[36] This equates to nearly 10% of vehicles sold in 2023 being electric.[37] This continued increase in sales has been supported by growing consumer interest, larger number of EV models available,[38] infrastructure expansion, and the federal Clean Vehicle Tax Credit.[39] In 2024, EV sales are expected to increase by 20% compared to 2022, which will result in almost 500,000 more EV sales in 2024 than 2023.[40]

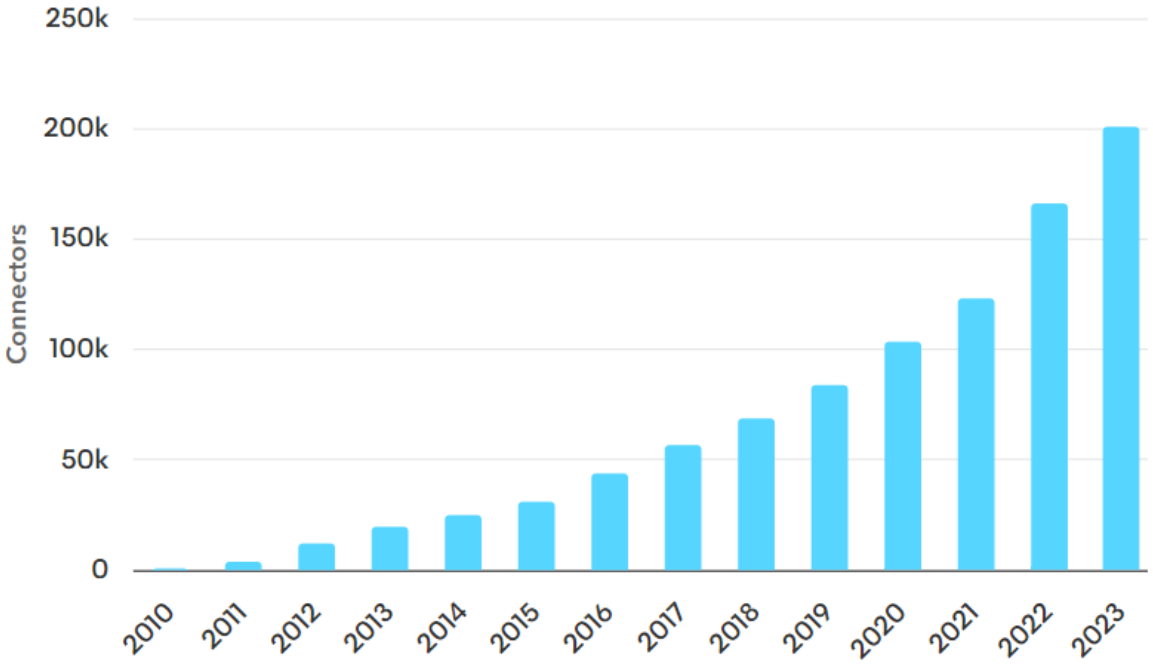
Figure 7. Passenger EV Sales in the United States



[36] Bloomberg. 2024. NEF EV Outlook 2024. Retrieved from: https://about.bnef.com/electric-vehicle-outlook/ (also source of Figure 7)
[37] IEA. 2024. Global EV Outlook 2024 Trends in Electric Cars. Retrieved from: https://www.iea.org/reports/global-ev-outlook-2024/trends-in-electric-cars
[38] For available EV makes and models, see the AFDC Alternative Fuel and Advanced Vehicle Search: www.afdc.energy.gov/vehicles/search
[39] More information on the Clean Vehicle Tax Credit can be found here: https://afdc.energy.gov/laws/409
[40] IEA. 2024. Global EV Outlook 2024 Trends in Electric Cars. Retrieved from: https://www.iea.org/reports/global-ev-outlook-2024/trends-in-electric-cars

To support a growing EV population, EV charging infrastructure has also continued to grow. In addition to private, state, and local charger deployments, the Biden Administration announced a goal to build 500,000 EV chargers across the country by 2030.[41] As of June 2024, there are currently over 76,000 publicly-available chargers and over 205,000 publicly-available EV charging connectors available in the United States (Figure 8).[42][43]

Figure 8. EV Charger Connectors in the United States



Federal Actions

Two recent landmark federal programs support the nation's shift to EVs. Through the Bipartisan Infrastructure Law, the federal government has made $7.5 billion available for EV charging infrastructure; $5 billion of that is formula funding that is allocated to states through programs such as the NEVI Formula Grant Program and the CFI Discretionary Grant Program. The Inflation Reduction Act of 2022 offers credits up to $7,500 for the purchase of a new EV. Combined, these programs actively support the buildout of EV infrastructure and will encourage EV adoption.

The tax credits have helped to increase nationwide sales of EVs. In the first quarter of 2024, BEV sales were 15% higher and PHEV sales were 50% higher than 2023 first quarter sales. Federal tax credits, in addition to EV price cuts, have made EVs more accessible to drivers.[44]

The Federal Highway Administration (FHWA) NEVI Program is expanded public access to EV chargers, allaying range anxiety concerns. As of May 2024, over 205,000 publicly accessible charging ports were available nationwide. The NEVI Formula Program seeks to advance the Biden Administration goal of 500,000 publicly

[41] DOE. 5 Clean Energy Moments From President Biden's State of the Union Address. Retrieved from: https://www.energy.gov/articles/5-clean-energy-moments-president-bidens-state-union-address
[42] AFDC Station Locator, pulled 6/22/2024
[43] Bloomberg. 2024. NEF EV Outlook 2024. Retrieved from: https://about.bnef.com/electric-vehicle-outlook/ (also source of Figure 8)
[44] IEA. 2024. Global EV Outlook 2024. Retrieved from: https://www.iea.org/reports/global-ev-outlook-2024/trends-in-electric-cars

accessible ports available by 2030 by providing funding to states to install DCFC within 50 miles of each other along FHWA-designated Alternative Fuel Corridors (AFCs).[45] Additional federal funding is available for the planning and deployment of EV chargers along community roadways, which will further reduce range anxiety and encourage EV adoption in the US.[46]

State Actions

Mid-Atlantic Electrification Partnership (MAEP): The District, Maryland, and Virginia joined MAEP with West Virginia to support the deployment of EVs and a regional network of EV chargers. The regional charging network will make it possible to seamlessly drive and charge light-, medium-, and heavy-duty EVs across transportation corridors and underserved communities.

Advanced Clean Cars II (ACCII): The District of Columbia, Maryland, and Virginia adopted the California motor vehicle emissions standards and compliance requirements specified in Title 13 of the California Code of Regulations. Beginning with model year 2026, ACCII requires an increasing percentage of new vehicle sales to be ZEV and PHEV. Maryland, Virginia, and the District will begin the ACCII requirements with model year 2027, making 100% of new passenger vehicle sales electric by model year 2035.[47]

EV Registration Goals: The District of Columbia and Maryland have both adopted ambitious EV registration goals. Maryland's goal is 600,000 EV registrations by 2030, and the District of Columbia's goal is 25% of vehicle registrations are electric by 2030.

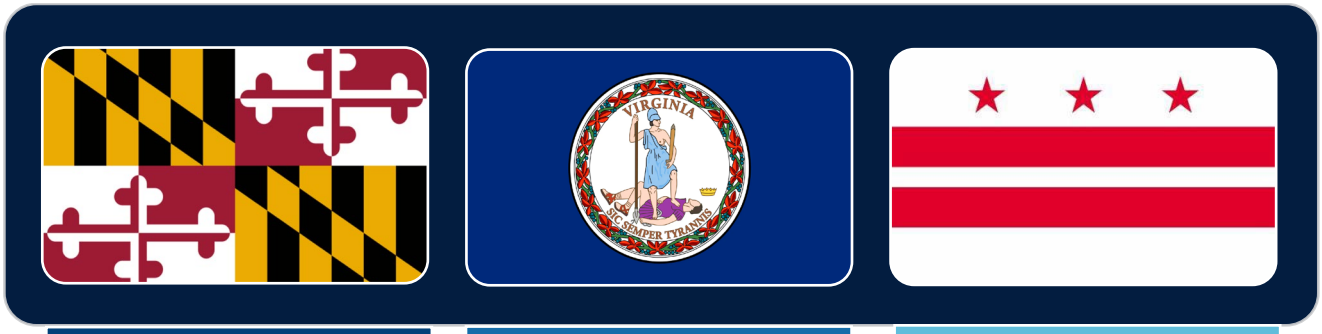
Financial Incentive Programs: The District of Columbia, Maryland, and Virginia offer a variety financial incentives for EVs or EV chargers to incentivize adoption and infrastructure expansion. These incentives include tax credits, rebates, fee reductions, and grants.[48]

Supportive Legislation and Policies: The District of Columbia, Maryland, and Virginia have all enacted policies that support EV drivers and the deployment of EV chargers. Types of enacted policies include right-to-charge laws, new construction and renovation prewiring requirements to support EV chargers, fleet acquisition requirements, and parking space regulations.[49] Descriptions of each policy type are listed below:

- **EV charger prewiring requirements:** Mandates that new buildings or renovations must include electrical wiring and infrastructure necessary to support the future installation of EV chargers
- **Right-to-charge laws:** Regulations protecting the right to install an EV chargers at homeowner's associations, condominium owner's associations, and rental properties
- **Aquisition regiuirements:** Mandates that government fleets purchase alternative fuel vehicles;
- **EV parking space regulations:** Requires a minumum number of parking spaces to be EV-ready
- **Reduced registration fee for EVs:** A type of financial incentive that reduces the annual registration fee for EV owners
- **Excise tax exemption:** A type of financial incentive for EV owners that exempt them from the excise tax imposed on an original certificate of title of their EV

[45] Joint Office of Energy and Transportation. Q2 2024 NEVI Quarterly Update. Retrieved from: https://driveelectric.gov/news/q2-2024-quarterly-nevi-update
[46] AFDC. Community Electric Vehicle Charging Grants. Retrieved from: https://afdc.energy.gov/laws/13443
[47] The status of Virginia's ACCII rule adoption should continue to be monitored. Virginia's Governor Younkin announced in June 2024 that the Commonwealth will abandon the ACCII emissions rules at the end of the year when the state's current regulations expire.
[48] More information on specific financial incentives offered by each government can be found at the AFDC Laws and Incentives Database: https://afdc.energy.gov/laws
[49] Ibid.

Figure 9. EV and ZEV Legislation by State



MARYLAND

- New Construction EV Charger Prewiring Requirements
- Right-to-charge laws
- Fleet and schools EV acquisition requirements
- EV parking space regulations
- Maryland Energy Administration's EV Charging Station Rebate Program
- State-level EV tax credit
- Zero Emission Electric Vehicle Infrastructure Council

VIRGINIA

- New construction and building renovation prewiring requirements
- EV parking space regulation
- Right-to-charge laws
- EV Charging Assistance Program Grant

DC

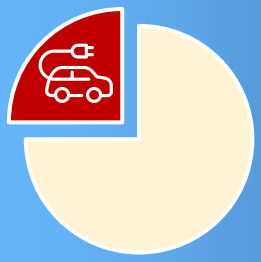
- New construction and building renovation prewiring requirements
- Alternative fuel vehicle and infrastructure tax credit
- Reduced registration fee for EVs
- EV title excise tax exemption
- ZEV acquisition requirements

Maryland Statewide EV Registration Goal

300,000 by 2025

600,000 by 2030

District of Columbia EV Registration Goal



25% of vehicles are electric by **2030**

3 State of the Region

3.1 Significance of the EV Transition in the Metropolitan Washington Region

The REVII Strategy is part of a larger effort to reduce GHG emissions and support a more sustainable future within local jurisdictions. In 2020, the COG Board adopted an economy-wide goal to reduce GHGs by 50% below 2005 levels by 2030 to help the region work towards its existing long-term goal of reducing GHG emissions 80% below 2005 levels by 2050. As part of these efforts, COG published a Climate and Energy Action Plan (CEAP) in November 2020 detailing specific actions COG and member governments can take to meet these climate goals. Within the CEAP, COG is aiming to transition approximately 34% of LDVs, or 1.4 million vehicles, in the region to EVs by 2030.[50]

The TPB's Climate Change Mitigation Study of 2021 (CCMS) found that ZEV adoption is a critical component of achieving significant GHG reductions from on-road transportation sources, and that rapid increases in ZEVs, such as EVs, in the LDV fleet are necessary to significantly reduce GHG emissions. While the study analysis found that none of the GHG reduction scenarios would reduce on-road transportation GHG emissions by 50% by 2030 from 2005 levels, the study indicated that a transition to a clean electrical grid combined with achieving high-levels of EV adoption in the region could potentially allow the region's on-road transportation sector to achieve an 80% reduction in GHG emissions by 2050.[51] In 2022, TPB subsequently adopted Resolution R18-2022 on the Adoption of On-Road Transportation GHG Reduction Goals and Strategies. This resolution included regional, voluntary on-road transportation GHG reduction goals of 50% below 2005 levels by 2030 and 80% below 2005 levels by 2050, which are commensurate with COG's economy-wide goals for the region. The resolution also included the adoption of seven GHG reduction strategies, one of which is to "deploy a region-wide robust EV charting network (or refueling stations for alternative fuels)." The REVII Strategy was developed to support implementation of this goal.

In 2022, the COG Board also identified EV deployment as a regional priority and adopted Resolution R40-2022, which established the REVD Working Group and called for the development of an EV Deployment Clearinghouse.[52] The REVD Working Group serves as a forum for members to collaborate and coordinate actions related to EVs and EV infrastructure deployment, and they provided feedback on the REVII Strategy throughout its development.

Deploying EV charging infrastructure is a COG Board of Directors priority, and the REVII Strategy builds on the foundation established by multiple COG plans, initiatives, and working groups. These include:

- **Region Forward and Region United:** COG's Region Forward vision was adopted in 2010, and focuses on creating a more prosperous, accessible, livable, and sustainable metropolitan Washington. In partnership with the region's local governments, which endorsed the vision and incorporated it into their planning efforts, Region Forward maps out ambitious goals and targets to guide future planning decisions and measure progress. In 2020, COG adopted resolution R26-2020 affirming racial equity as a fundamental COG value and that equity will be woven into COG's Region Forward Vision to ensure

[50] COG. 2020. Metropolitan Washington 2030 Climate and Energy Action Plan. Retrieved from: https://www.mwcog.org/documents/2020/11/18/metropolitan-washington-2030-climate-and-energy-action-plan/
[51] TPB. 2022. TPB Climate Change Mitigation Study of 2021. Retrieved from: https://www.mwcog.org/tpb-climate-change-mitigation-study-of-2021/
[52] COG Resolution R40-2022. Retrieved from: https://www.mwcog.org/documents/2022/09/14/certified-resolution-r40-2022---endorsing-efforts-to-support-electric-vehicle-deployment/

an equitable future for all area residents. COG adopted Region United in 2022, which establishes a planning framework for 2030 and identifies the following four priorities: EEAs, High-Capacity Transit Station Areas, 2030 Regional Housing Targets, and the 2030 Climate Mitigation Goal.[53]

- **REVD Working Group:** Established by the COG Board in 2022 with members from TPB and COG member jurisdictions, the REVD Working Group serves as a forum for members to collaborate and coordinate actions related to deploying EVs and EV infrastructure, positioning the region and its local government members for EV and EV charger funding opportunities. REVD guided the development of COG's EV Clearinghouse, Local Jurisdiction EV Ready Checklist, and the REVII Strategy.[54]
- **Metropolitan Washington 2030 CEAP:** Adopted in 2020, the CEAP builds on previous regional action plans and establishes priority collaborative actions for area governments and partners to work on to help move the region towards meeting its' 2030 climate mitigation and resiliency goals, including accelerating deployment of EVs and building out the region's EV charging network.[55]
- **Regional EV Readiness Strategy:** Published in 2012, this report, EVs in metropolitan Washington, was developed with a cross-sectoral group of regional stakeholders – local and state agencies, Clean Cities Coalition, industry, utilities, regional authorities, fleet managers, think tanks, high education, interest groups, and more - to provide a framework for the deployment of EVs in metropolitan Washington. COG has supported implementation of this strategy for more than 10 years through initiatives such as local government fleet assessments, coordinating development of local government EV plans for government operations and community-wide, supporting cooperative procurement initiatives, supporting EVs and engagement at the annual Washington Auto Show as well as via trainings, ride and drives, demonstrations, and tours, etc.[56]
- **Climate, Energy and Environment Policy Committee (CEEPC):** Established by the COG Board in 2009, CEEPC is responsible for developing and implementing regional climate change plans to meet the regional GHG reduction goals adopted by the board. CEEPC includes representatives from COG's member governments, state environmental, energy, and transportation agencies, state legislatures, the Air and Climate Public Advisory Committee, federal and regional agencies, electric and gas utilities, environmental organizations, business organizations, and members of the academic community.[57]

[53] COG. Region Forward. Retrieved from: https://www.mwcog.org/regionforward/
[54] COG. Regional Electric Vehicle Deployment Working Group. Retrieved from: https://www.mwcog.org/committees/regional-electric-vehicle-deployment-working-group/
[55] COG. 2020. Metropolitan Washington 2030 Climate and Energy Action Plan. Retrieved from: https://www.mwcog.org/documents/2020/11/18/metropolitan-washington-2030-climate-and-energy-action-plan/
[56] COG. 2012. Electric Vehicles in Metropolitan Washington. Retrieved from: https://www.mwcog.org/documents/2012/10/17/electric-vehicles-in-metropolitan-washington-clean-fuel-vehicles-electric-vehicles/
[5757] COG. CEEPC. Retrieved from: https://www.mwcog.org/committees/climate-energy-and-environment-policy-committee/

3.2 REVII Strategy Overview

Objectives

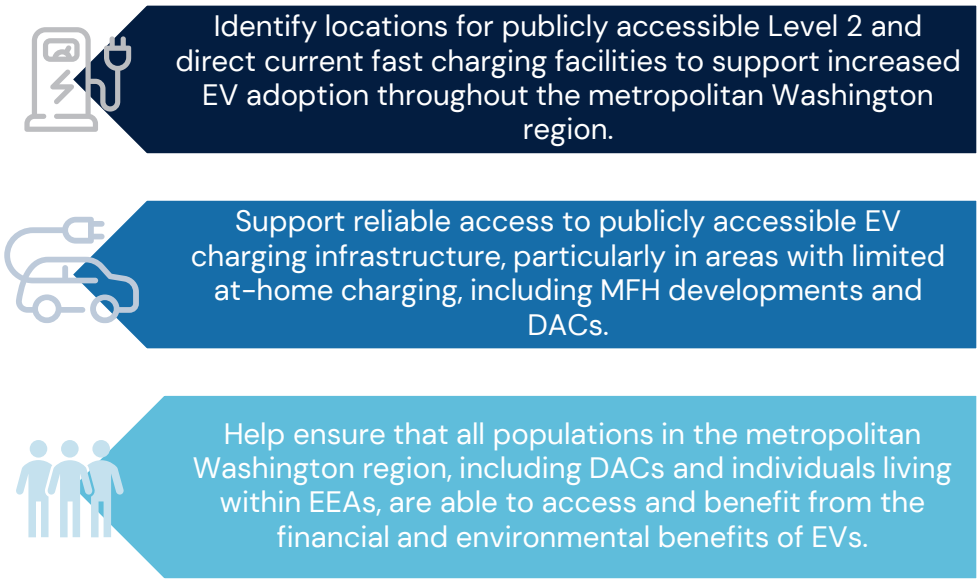
The REVII Strategy builds on the TPB and COG's regional GHG reduction goals and is a vital component of the region's overall GHG reduction strategy. It also supports the region's broader transportation planning goals and is a key component of the region's transportation strategy.

The REVII Strategy aims to support the TPB and COG's GHG emission reduction goals, and goals outlined in Region Forward and the TPB's transportation policy documents.

To guide the development of the region's long-range transportation plan, *Visualize 2050*, the TPB has established eight goals that describe what the TPB aims to accomplish. These goals include Safety, Maintenance, Reliability, Affordable & Convenient, Efficient System Operations, Environmental Protection, Resilient Region, and Livable & Prosperous Communities. This REVII Strategy supports the Environmental Protection Goal to "Provide, facilitate, and incentivize methods that build, operate and maintain the transportation system in a manner that provides for healthy air, water, other environmental factors, and mitigates the climate change crisis." It also supports other goals, such as ensuring that travel options (which include the use of EVs) are reliable, affordable, and convenient, and supports livable and prosperous communities that provide a high quality of life for all people. This strategy is also designed to support COG and TPB's commitment to equity and efforts to prioritize and invest in communities having high concentrations of low-income individuals and communities of color.

Building on these climate and transportation goals, the REVII Strategy includes three key objectives, outlined in Figure 10.

Figure 10. REVII Strategy Objectives



Supporting Implementation of the Strategy

The REVII Strategy includes an assessment of publicly accessible EV charging infrastructure needs and identification of priority areas for infrastructure investment across metropolitan Washington to support the

LDV transition from ICE to electricity. This analysis is designed to serve as a blueprint to develop a robust regional network of EV chargers to accommodate the anticipated needs of the region's residents, workers, and visitors using EVs as a major element of the region's GHG reduction strategy. The results of this analysis should support state and local governments as they pursue EV registration goals, prioritize locations for EV charger deployment, and apply for funding from federal programs such as future funding opportunities from the CFI Discretionary Grant Program.

The REVII Strategy analysis provides guidance on EV and publicly accessible EV charger deployment planning for TPB and COG member jurisdictions primarily at the county level, including the District of Columbia, Montgomery County, Prince George's County, Frederick County, Charles County, Arlington County, City of Alexandria, Fairfax County, Loudoun County, and Prince William County.

This strategy only considers LDVs. Medium- and heavy-duty vehicles and associated infrastructure are not included in this analysis. These vehicles are typically part of public and private fleets, which primarily utilize behind-the-fence charging solutions. Fleet vehicle and charging needs, while important for achieving GHG reductions, require a different form of analysis and often have varying requirements and needs that require a more unique approach to electrification planning.

Objective

The REVII Strategy includes two primary components: projecting EV registrations and charging needs and developing a mapping tool to identify priority locations for EV chargers. Table 4 outlines these components in more detail.

Table 4. REVII Strategy Components and Purpose

REVII Strategy Component	Description	Purpose
EV Registration Projections and EV Charger Needs	Project future light-duty EV registrations in the region and jurisdictions across low-, medium-, and high-adoption scenarios for planning years 2030, 2035, and 2045, and the approximate number of EV ports needed to support the projected light-duty EV population	Approximate the number of EVs in the region and within each jurisdiction to plan for future charging demand and estimate the number of charging ports needed to support the future EV population
EV Charger Priority Deployment Locations Map	Develop a light-duty EV charger deployment recommendations map that highlights certain parcels of land as optimal, or "high priority", locations for EV chargers to support the development of a regional charging network. This portion of the analysis looks at different attributes of land areas to determine their priority level for deploying charging infrastructure	Help member jurisdictions identify and prioritize parcels of land for deploying the number of light-duty EV charger installations identified in the first element. Jurisdictions may use the results to select government property for deployments or help them identify potential site hosts to engage with on deploying stations on private property

The EV projection scenarios were analyzed with the following assumptions:

- **Low Growth Scenario:** Growth rate informed by historical vehicle registration data serves as a conservative estimate.

- **Medium Growth Scenario**: Average of low and high scenarios.
- **High Growth Scenario**: Growth based on ACCII adoption and the assumption that the electrical grid can only support a maximum market share of approximately 80% electric LDVs in 2045. This scenario serves as the maximum potential for EV adoption and the scenario that will best help COG and TPB reach GHG emission reduction goals.

Light-duty EV projections are used to calculate the approximate number of EV charging ports needed to support future EV adoption in the region using EVI-Pro Lite. Assumptions and inputs used in the EVI-Pro Lite analysis can be found in Appendix 1.B. The charger priority map will help identify locations to deploy the estimated number of needed chargers. The map has three scenarios that jurisdictions can toggle between and use to identify priority deployment sites:

Scenario	Goal
Scenario A: Prioritizing DCFC with High Utilization	Accelerating deployment of DCFC to serve a larger number of vehicles quickly
Scenario B: Prioritizing Level 2 Charging with Equity Focus	Accelerating deployment of Level 2 chargers in EEAs to support equity goals
Scenario C: Prioritizing DCFC with MFH Focus	Accelerating deployment of DCFC in areas near MFH developments to support individuals without access to at-home charging

REVII Strategy Outputs

EV Registration Projections

- EV registration projections for low-, medium-, and high-adoption scenarios for each member jurisdiction and at the regional level for 2030, 2035, and 2045.

Estimated Charging Port Needs *Informed by EV registration projections*

- Estimated number of EV charging ports, both Level 2 and DCFC, needed to support the growing EV population for each member jurisdiction and at the regional level for low-, medium-, and high-adoption scenarios for 2030, 2035, and 2045.

EV Charging Station Siting Map

- A mapping tool with downloadable shapefiles and data that COG and member jurisdictions can use to identify priority locations for EV charging station deployments. Three scenarios are available for use by jurisdictions to help support planning efforts to reflect local priorities.

How to Use the Analysis

The EV registration projections give member jurisdictions an idea of what their respective EV populations may look like in 2030, 2035, and 2045 under different levels of EV adoption. This information can be useful for understanding how the LDV mix and vehicle market are changing as well as planning larger scale EV infrastructure deployments. The estimated number of charging ports needed to support the projected EV

registrations will give member jurisdictions an understanding of how much infrastructure is needed in the coming years.

The EV charger siting map can be used at any stage of their planning process, for example:

- The beginning of the planning process by using the map to generally identify priority locations to help focus planning efforts.
- Crosschecking against locations jurisdictions have already flagged as high interest areas for charger deployments.
- Selecting high priority parcels for in-depth charger siting assessments (i.e., checking electrical conduit and infrastructure that exists or needs installed)

The projections are not incorporated into the map. Rather, jurisdictions are given the estimated number of EV charging ports in conjunction with the map and the freedom to consider and implement the results as is useful in their planning efforts. The number of charging ports to be deployed and at which locations is up to the jurisdiction and site owners; these products of the REVII Strategy analysis serve as useful resources for deployment planning for achieving the region's GHG reduction goals and supporting policy objectives related to supporting convenient access, particularly in relation to MFH units and equity populations. The methodology for all analyses can be found in Appendix 1 and Appendix 2.

Individual jurisdiction results summaries can be found in Section 6. The mapping tool and associated shapefiles are available for viewing and download at the REVII Strategy EV siting parcel review website.

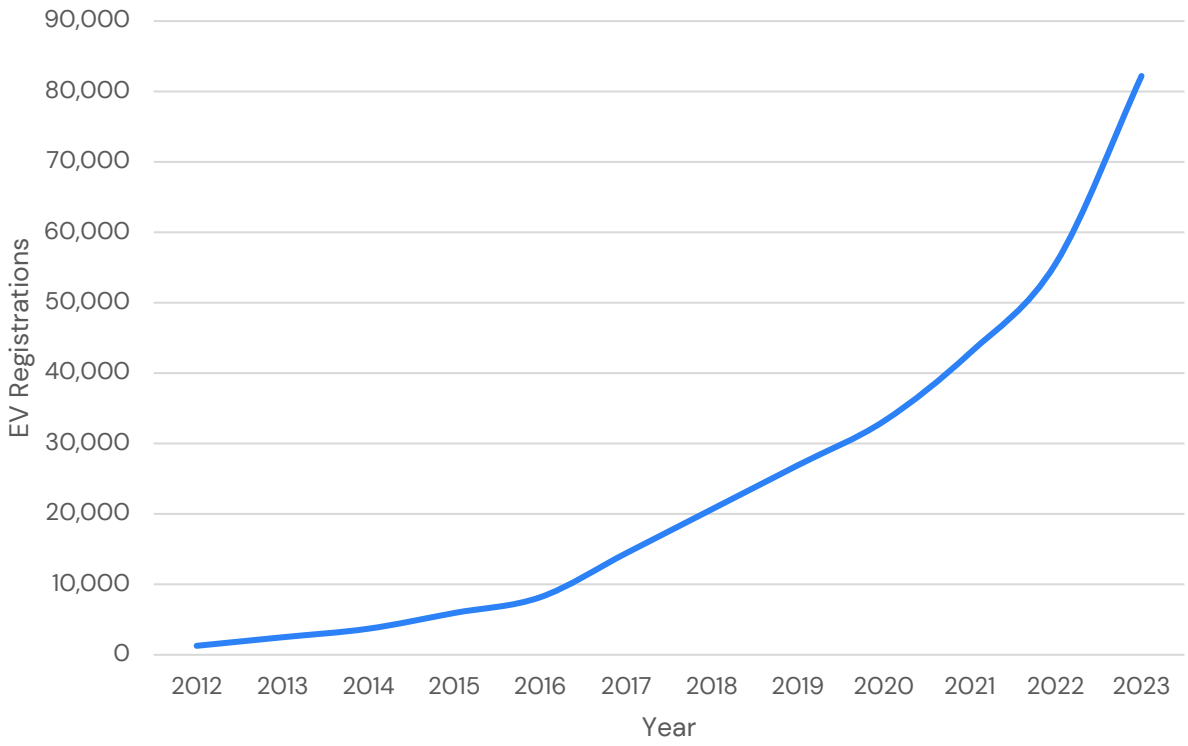
3.3 Historic EV Adoption in the Region

The region has seen substantial growth in EV adoption between 2011 and 2023. The number of EV registrations, including both BEVs and PHEVs, increased from 62 EVs in 2011 to over 82,000 in 2023, with the rate of adoption steadily increasing over the last decade.[58] Figure 11 shows historic regional EV registration growth.

The REVII Strategy is meant to serve as a guide for local jurisdictions in their EV charging station infrastructure deployment planning process. It is not meant to be prescriptive. To complete the REVII Strategy assessments, region-wide assumptions were made which may not capture some unique local considerations. Decisions related to the number of charging stations deployed and at which locations are up to each local jurisdiction. Jurisdictions should use this analysis in conjunction with local knowledge to determine the best path forward for deploying EV charging stations.

[58] Historic EV registration data include both BEVs and PHEVs. HEVs are excluded from the historic data since they are unable to use EV charging stations. Only vehicles that can utilize charging infrastructure are relevant for this strategy. This is VIN data for 2011, 2014, 2016, and 2020 by vehicle fuel types. This data comes from COG's registration datasets. Data from 2021 and 2022 comes from Atlas Public Policy and state departments of transportation.

Figure 11 . Historic Light-Duty EV Registrations in the Region



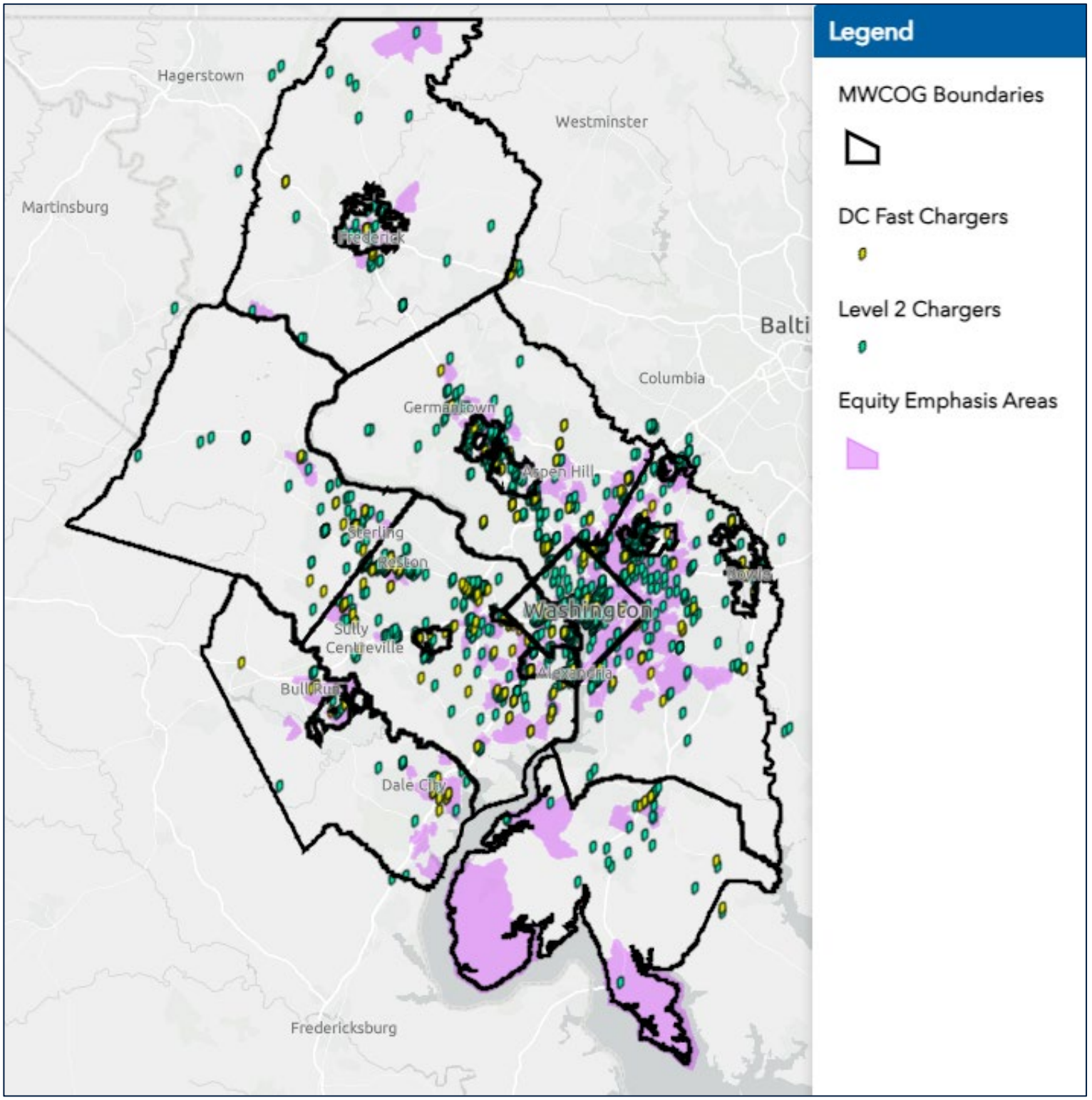
The rapidly growing EV population requires innovative infrastructure and policy solutions to ensure drivers are supported in all areas within the MWOCG region. This includes the development of a regional charging network to support residents, commuters, and tourists that drive light-duty EVs in and through the region.

3.4 Existing Conditions for EV Charging in the Region

At the time of this assessment, there were approximately 1,586 publicly accessible EV chargers in the region with 3,898 Level 2 EV charging ports and 378 DCFC ports available.[59] These data were incorporated in the EV charger siting map analysis to identify areas that already have at least one publicly accessible charger deployed. Knowing where existing infrastructure is located will help REVII Strategy users understand the charging landscape in their jurisdiction so that they can quickly identify areas that lack infrastructure and those that have charging opportunities already available. Additional details on how existing chargers were included in the charger siting map analysis can be found in Appendix 2. A map of chargers that are already operational at the time of this analysis are shown in Figure 12.

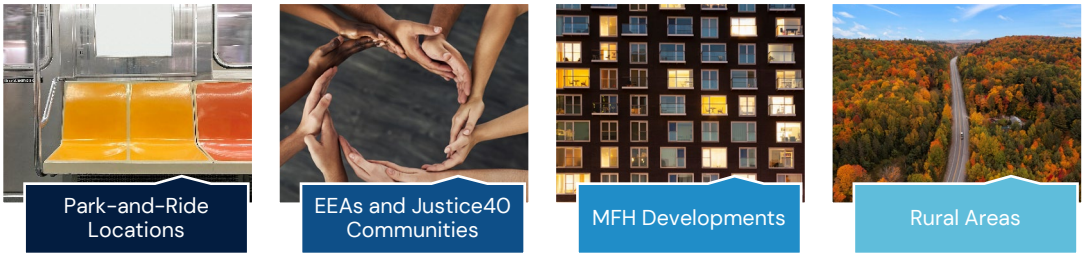
[59] This count only includes publicly available EV charging stations. Because Tesla chargers are exclusive for Tesla owners, they were excluded from this count and the analysis. This data was retrieved from the U.S. Department of Energy's Alternative Fuel Data Center (AFDC) Station Locator on December 5, 2023. This data is updated frequently, and more recent counts can be found at: https://afdc.energy.gov/stations.

Figure 12. Existing Publicly Accessible EV Charging Infrastructure in the Region



The region has made notable progress over the past decade establishing the current EV charging network. In 2012, the region had 112 publicly accessible EV chargers, with 113 level 1 ports, 174 level 2 ports, and no DCFC ports.[60] However, there are many areas that lack the charging infrastructure necessary to support current and encourage future EV registrations in the region. This strategy can help local jurisdictions identify areas lacking infrastructure that present a high demand for charging both in volume of traffic and in terms of regional priorities. Notable types of areas that generally still lack infrastructure include park-and-ride locations for multimodal commuters, EEAs and Justice40 Communities, areas with high density of MFH and minimal mixed-use zoning, and rural areas that may not receive high traffic but are essential areas for local communities and have access points to highway ramps. While some of these gaps can be addressed by this strategy, others such as rural areas, may not be prioritized due to the lower traffic volume.

Figure 13. Gaps in Existing EV Charger Network



[60] COG. 2012. Electric Vehicles in Metropolitan Washington. Retrieved from: https://www.mwcog.org/documents/2012/10/17/electric-vehicles-in-metropolitan-washington-clean-fuel-vehicles-electric-vehicles/

4 Using the EV Charger Siting Analysis

4.1 Using the REVII Strategy

Jurisdictions can use the strategy at any stage of their planning process. In the early stages of deployment planning, jurisdictions can use the strategy to identify priority locations to help focus planning efforts. For jurisdictions that have already independently identified potential locations for charger deployment, they can use the strategy to crosscheck against locations that are already flagged as high interest areas to confirm site suitability. Similarly, if jurisdictions are ready to begin on-the-ground site assessments, they can use the strategy to select high priority parcels for in-depth charger siting assessments (i.e., checking electrical conduit and infrastructure that exists or needs installed).

To use the strategy most effectively, jurisdictions should follow steps one through six outlined below.

1. Locate jurisdiction profile
2. Review EV projections for all scenarios and planning years
3. Determine which scenario you would like to plan for--low, medium, or high adoption. Consider local knowledge of driver and consumer attitudes, current local EV adoption and planning, and local priorities. High adoption is the scenario that will best support the region's GHG goals.
4. Look at the number of estimated charging station plugs you will need in your jurisdiction at each planning year (2030, 2035, and 2045) and the number of charging stations you currently have to understand the amount that you will need to deploy in the coming years.
5. Use the map to identify potential locations for charging station deployments. You may use the map as your primary tool for selecting locations or you may use it as an additional crosscheck in your existing efforts.
6. Start engaging the community, stakeholders, potential site hosts, relevant utilities, and charging station companies.

4.2 EV Charging Station Siting Map Technical Approach

The technical approach for developing the EV charger station siting map was designed to address the three objectives of the REVII Strategy:

1. Identify locations for publicly accessible Level 2 and DCFC facilities to support increased EV adoption throughout the metropolitan Washington region.
2. Support reliable access to publicly accessible EV charging infrastructure, particularly in areas with limited at-home charging, including MFH developments and DACs.
3. Help ensure that all populations in the metropolitan Washington region, including DACs and individuals living within EEAs, are able to access and benefit from the financial and environmental benefits of EVs

The EV charging station siting analysis uses data from several sources to determine locations with anticipated high demand for EV charging stations, as well as EV charging deserts within EEAs. This approach is heavily driven by trip data from Replica, which contains attributes of travel data that help determine areas within the region that experience high traffic (i.e., areas where there is currently a higher expected demand for charging). The analysis then uses data including locations of existing chargers, MFH developments, EEAs, highway on- and off-ramps, and park-and-ride locations to recommend priority sites for EV charger installation. The final product is a GIS map with parcels of land ranked by priority for locating EV charging stations. This assessment was conducted at the regional level but produced detailed results within member jurisdictions. The assessment also includes elements that allow users to be conscientious about equity when reviewing priority locations and developing an EV charging network.

The method employed to create the EV charging station siting map utilized a three-step analysis:

Step 1: Census Tract Level Screening	Step 2: High Priority Parcel Analysis	Step 3: Site Selection

• Screening analysis of all census block groups (CBGs) in the region
• Driven primarily by Replica data of observed trips
• Data sources: income, dwelling type, the travel demand forecasting model, trip length, vehicle dwell times, EEAs, and more
	• Narrowing in, potential parcels were scored according to the following criteria:
	  • Step 1 CBG score
	  • Distance to existing charging stations
	  • Distance to MFH
	  • Distance to highway on-ramp or off-ramp
	  • Location in or near an EEA
	  • Distance to park-and-ride location
		• Parcels were alloted priority scores of 1-10 based on Step 2 criteria, then mapped. Different scenarios were applied to emphasize different scoring priorities that can be filtered on the map.
		• The top 10% of parcels for each scenario were reviewed to determine suitability for a publicly accessible EV charging station, and to remove incompatible sites

Step One relied exclusively on Replica data at the CBG level. Replica an activity-based model, calibrated locally with ground truth data from a diverse set of third-party data such as cellular phone location data, consumer marketing data, geographic and land use data, credit card transactions, built environment, and economic activity. This analysis utilized Replica data through Fall 2022 with detailed and disaggregated outputs down to the network link level. The trip data provided by Replica platform includes information such as origin, destination, land use, trip purpose, and socio-demographic of the trip taker (e.g., income, race,

household size, etc.). Replica incorporates detailed travel patterns and behaviors to identify historic traffic patterns; it does not forecast future changes in activity.

Step One used this data to identify CBGs within the region that receive the highest and lowest number of trips in the study area (i.e., where individuals are traveling to and from the most), which indicate the general areas that will likely have a higher demand for charging. CBGs within the study area were then given a score, one through six, that indicates whether it experiences a lower or higher traffic volume.

Step Two moves to a more granular level, focusing on individual parcels within CBGs. Step Two identified and ranked actual parcels of land that are ideal for EV charging station deployment. Individual parcels throughout the region were scored based on a variety of factors including their Step One and proximity score modifiers, or characteristics of a parcel that make it more or less ideal for a new charger deployment. These proximity modifiers include distance to existing charging stations, distance to MFH, distance to highway on- and off-ramps, whether the parcel is located in an EEA, and the parcel's distance to a park-and-ride location.

Parcel scores were calculated by combining their Step One score of 1-6, with their proximity modifier score which could raise or lower their parcel score, to get their final suitability score of 1-10:

Parcel Score = [Step 1 CBG Score] + [Step 2 Proximity Score Modifier Total]

Parcel scores are highly dependent on Step One, meaning the historic trip pattern data is a driving force in determining if a parcel is recommended for deployment. The proximity score modifiers indicated which parcels within a CBG might be better for charging stations than others. Results should be viewed with the knowledge that trip data is the primary driver of the results, with site characteristics further influencing priority. Because this assessment has been completed for a region, yet analyzes individual parcels, users must be sure to also review and consider the parcels adjacent to high priority parcels. A lower scoring parcel may only have a lower score because it is part of a CBG that has less traffic than the parcel in an adjacent CBG. A lower scoring parcel immediately adjacent to a high scoring parcel may be equally or better suited to host an EV charging station.

Step Three reviewed high scoring parcels for general suitability and removes parcels where charging station deployments are not possible.

A more detailed explanation of the technical approach for the EV charging station siting map can be found in Appendix 2.

4.3 Analysis Limitations and Additional Considerations

The REVII Strategy is designed to support decision-making and investments to develop a publicly accessible regional EV charging network to support the transition of LDVs to EVs. The EV charging station siting analysis uses data from several sources to determine locations with anticipated high demand or need for EV charging stations, as well as EV charging deserts within EEAs. These data sources include attributes related to travel data, existing chargers, MFH developments, EEAs, highway on- and off-ramps, and park-and-ride locations. These attributes define key characteristics that highlight certain areas as more favorable for charging infrastructure deployment.

Building a regional charging network requires identifying areas that both serve the largest number of drivers and those who do not have existing infrastructure. This means the REVII Strategy may at times recommend locations that are not as high traffic but will serve a moderate or large number of drivers in areas with characteristics of importance (i.e., prioritizing locations near EEAs or MFH that may not otherwise be the focus of charging deployment). Additionally, while rural areas represent a gap in EV charging, they also have less

traffic and some scored lower overall for the purposes of this evaluation to prioritize public charging deployment in high demand areas–it does not mean that they are not a candidate for charging deployment.

Unique considerations for individual jurisdictions or subareas may not be accounted for in the modeling, but jurisdictions can use local knowledge and goals to determine if a parcel should actually be included or excluded as a priority location. The REVII Strategy is a regional study that covers a large area, and region-wide assumptions were made for various land uses. These assumptions include determining which types of zoning and land use types to include and exclude from the analysis. Certain land use types, such as agricultural areas, were wholly excluded due to the assumption that these parcels of land would not be high priority for publicly accessible, light-duty EV chargers at this time. Other areas, such as single-family homes, were excluded because the REVII Strategy assumes owners of EVs there will be charged at home and do not need publicly accessible chargers in close proximity. Similarly, the focus of the REVII Strategy is on accelerating deployment of high-use chargers in publicly accessible locations. Single-family residential areas, especially those that do not have access to off-street or garage parking, could be the focus of a future analysis.[61]

The recommendations contained within this strategy are a guide for local jurisdictions in their EV charging deployment planning. These recommendations are not meant to be prescriptive, and may be applied in the following ways:

- Jurisdictions may identify local government-owned properties to help site and prioritize the deployment of publicly accessible chargers. EV charging infrastructure should be deployed equitably, considering factors such as lower market demand and network gaps in EEAs and underserved communities. It is recommended that local jurisdictions engage community members and organizations to ensure charging infrastructure is desired in these communities.
- Local jurisdictions are encouraged to engage private EV charger suppliers and other property owners in high priority mapped areas to encourage them to install publicly accessible EV chargers. Local jurisdictions should widely share information on EV charging benefits, and incentives and subsidy programs to support EV charger deployment.
- This charger siting analysis is designed to identify priority parcels of land for EV charger deployment which will allow jurisdictions to move forward to the next step of planning and complete targeted site assessments. The siting analysis results rank parcels of land in terms of suitability for EV chargers, but it is up to member jurisdictions to determine which high priority parcels to select for detailed siting assessments, as well as the number of chargers to deploy. This analysis does not include a recommended number of chargers for each parcel.

Jurisdictions should use this study in conjunction with local knowledge to determine the best path forward for deploying EV chargers.

[61] A full list of excluded parcel and land use types can be found in Appendix 2.

5 Regional Results

To support a rapidly growing EV population, an increasing amount of publicly accessible EV chargers—both Level 2 and DCFC—are needed to keep up with driver demand and create a cohesive charging network, allowing EV owners to confidently drive in the region. Narrowing down locations for charger deployment can be challenging, as there are many factors that contribute to site selection and many sites that may seem appropriate for infrastructure development. A barrier many local and state governments face with deployments is figuring out where to start with charger deployment and which sites to prioritize.

EV registration projections were developed based on historic EV registration through 2023 and by utilizing aggressive EV adoption goals. Three EV registration growth scenarios were modeled for this strategy:[62]

- **Low Growth Scenario:** Growth rate informed by historical vehicle registration data serves as a conservative estimate.
- **Medium Growth Scenario**: Average of low and high scenarios.
- **High Growth Scenario**: Growth based on ACCII adoption and the assumption that the electrical grid can only support a maximum market share of approximately 80% electric LDVs in 2045. This scenario serves as the maximum potential for EV adoption and the scenario that will best help COG and TPB reach GHG emission reduction goals.

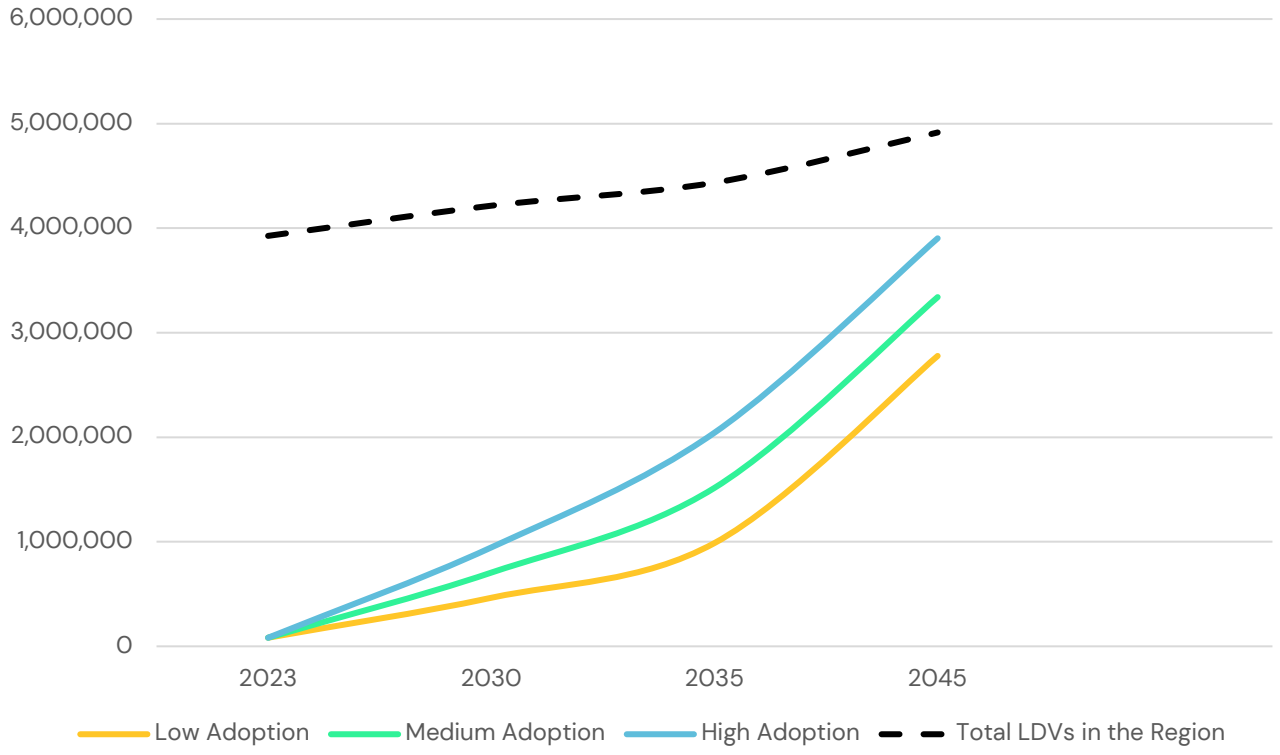
Actual EV registration values may vary from year to year, depending on market forces. Regional projection results can be seen in Table 5 and Figure 14 below. The table shows the number of EVs expected in each benchmark year ("# EVs") and the approximate share of EVs in the LDV population ("% EVs") for each adoption scenario.

Table5. LDV EV Registration Projections for the Region by Growth Scenario

EV Registration Projection Scenario	2023		2030		2035		2045	
	# EVs	% EVs	# EVs	% EVs	# EVs	% EVs	# EVs	% EVs
Low	82,197	2%	464,246	11%	987,682	22%	2,777,657	57%
Medium	82,197	2%	705,096	17%	1,515,557	34%	3,340,186	68%
High	82,197	2%	945,945	22%	2,043,433	46%	3,902,714	80%
	2023		2030		2035		2045	
Total LDVs in the Region	3,926,030		4,214,678		4,435,148		4,915,102	

[62] Additional details on the projection methodology may be found in Appendix 1.

Figure 14 . LDV EV Registration Projections for the Region by Scenario



At the jurisdiction level, EV registration projections vary based on a variety of factors including a jurisdiction's historic EV adoption rates; state, commonwealth, or district goals; and general market trends in their respective areas. In the Low Scenario, there is larger variation in projected EV adoption since this scenario is anchored in historic adoption. The High Scenario sees more similar EV market share percentages due to the assumption that all jurisdictions can achieve ACCII goals and a maximum EV market saturation of approximately 80% by 2045. Details on each jurisdiction's EV registration projections by scenario and planning year can be seen in Section 6.

Substantial growth of light-duty EV registrations is expected in the next two decades, with EVs representing 57% to 80% of the LDV market share in the COG region by 2045, depending on which adoption scenario is achieved. With over half of LDVs expected to electrify over the next 20 years, it is essential to build an adequate, accessible, and equitable publicly accessible charging network to support the region's drivers, commuters, and tourists. As of December 2023, there are 3,898 Level 2 EV chargers and 378 DCFC stations in the COG region. However, to support the number of projected light-duty EV registrations in the region by 2030, the region will collectively need to add approximately 13,800 Level 2 EV charging ports and 485 DCFC ports.

DOE's Electric Vehicle Infrastructure Projection Tool (EVI-Pro Lite)[63] was used to forecast the amount of anticipated publicly accessible charging needed to support the number of EVs expected to be registered in the region in 2030, 2035, and 2045 under each scenario. EVI-Pro Lite uses a set of variables to determine the amount of EV chargers needed to support EVs registered in metropolitan areas. These variables include

[63] EVI-Pro Lite can be accessed here: https://afdc.energy.gov/evi-x-toolbox#/evi-pro-ports

number of EVs that need to be supported (which comes from the EV registration projection analysis), vehicle mix, PHEV support (gasoline versus charging needs), and percentage of drivers with home charging access.[64] Charging infrastructure needs are evaluated by Level 2 and DCFC. See Appendix 1.B for more details on assumptions and inputs used in the EVI-Pro Lite analysis.

EV charging assessment results for the region are shown in Table 6 below. Charging needs are provided in terms of number of ports by charger type, EV growth scenario, and benchmark year.

Table6. Projected Regional EV Charging Needs

Growth Scenario		Charger Type	2030	2035	2045
Low	EV Charging Port Needs	Public Level 2	13,848	30,647	72,013
		Public DCFC	485	1,103	2,447
	EVs		*464,246*	*987,682*	*2,777,657*
Medium	EV Charging Port Needs	Public Level 2	21,840	44,333	86,936
		Public DCFC	785	1,538	2,955
	EVs		*705,096*	*1,515,557*	*3,340,186*
High	EV Charging Port Needs	Public Level 2	29,339	58,822	98,704
		Public DCFC	1,052	2,024	3,320
	EVs		*945,945*	*2,043,433*	*3,902,714*

The existing charging ports represent 29% of the Level 2 charging ports and 79% of the DCFCs projected to be needed by 2030 under the low adoption scenario and 14% of the Level 2 and 37% of the DCFCs projected under the high adoption scenario.

[64] This analysis assumes 97% of drivers have access to home charging.

6 Overview of Jurisdictional EV Needs

Profiles for each County member jurisdiction, the District of Columbia, and the City of Alexandria are provided below. Results from the EV projection analysis and EV charger needs analysis are available in tables and sample screenshots of the jurisdiction's charger priority location map, showing Scenario A (emphasizing DCFC with high utilization), which is available for viewing and download on the REVII Strategy EV siting parcel review website, is available for reference.

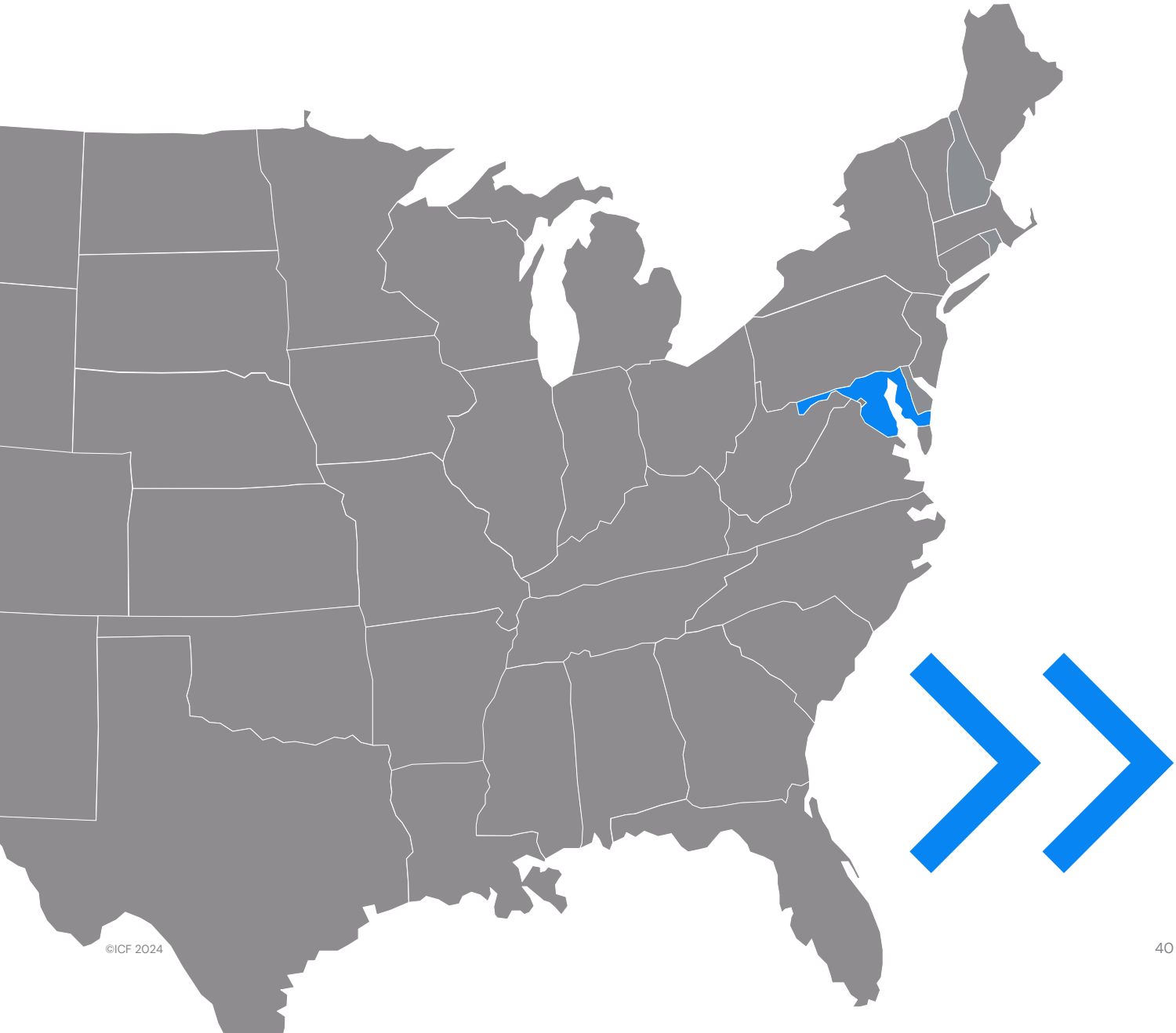
The sites identified below are examples of locations where jurisdictions may choose to deploy or engage and support the private sector in deploying EV chargers. The images of each site are provided at the CBG level, which includes the recommended site as well as the surrounding area. These sites are recommendations, not requirements, and are highlighted due to their high scores in EV charger GIS siting analysis. However, jurisdictions may have different priorities or location preferences than the ones highlighted below. Jurisdictions may consider and move forward with these locations for deployments but should rely on local knowledge, expertise, and priorities when sitting EV chargers. See the interactive map to view all priority locations, EEAs, and transportation infrastructure.

For the most detail, jurisdictions should use the GIS platform and shapefiles to review all priority locations.

6.1 Maryland

Maryland member jurisdiction results are following, as well as hyperlinked below:

- Charles County
- Frederick County
- Montgomery County
- Prince George's County



Total EV Registrations*

1,812

EV % of Total LDVs

1%

Current EV Charging Ports

31 Level 2

5 DCFC

County Progress

Charles County developed a Climate Resilience Plan in 2020

**As of April 2024*

Charles County

Maryland

EV and Charging Infrastructure Deployment Progress

Over the past few years, Charles County has taken the following actions to reduce GHG emissions and support EV adoption:

- In 2020, the county created a Climate Resilience Action Strategy which is aimed to help them prepare for, adapt to, and recover from the impacts of climate change. The County is currently working to expand this work through the development of a Climate Action Plan for Resilience and Mitigation that will address both government operations and the broader community.
- Established the Resilience Authority of Charles County, a nonprofit organization that, as a government instrumentality, is operated for the public purpose of responding to the impacts of climate change in communities across Charles County and the State.
- Opened their first EV chargers in 2012 at the Welcome Center, P.D. Brown Library, and Potomac Branch Library as part of the county's climate change initiative.
- Partnered with SMECO to install 15 additional EV chargers at various locations across the county on public property.

EV Registration Projections

At the end of April 2024, Charles County had approximately 1,800 registered EVs, accounting for 1% of total LDVs in the county. Table 7, below, shows the number of EVs and percentage of EVs in the LDV population for low-, medium-, and high-adoption scenarios at benchmark years 2030, 2035, and 2045.[65]

Table 7. Charles County EV Registration Projections

Growth Scenario	2030		2035		2045	
	# EVs	% EVs	# EVs	% EVs	# EVs	% EVs
Low	7,850	5%	16,261	10%	44,958	25%
Medium	20,735	14%	44,903	28%	93,716	52%
High	33,620	22%	73,544	46%	142,473	79%

Trends in EV Adoption

Over the last five years, Charles County has made marked progress in launching GHG and EV initiatives. From 2020 to 2024 alone, the number of EVs on the road grew by almost 1,200 vehicles, a 298% increase in EV registrations. Similarly, after deploying their first charger in 2012, the county now has 36 charging ports available.

[65] See Appendix 1.A in the REVII Strategy document for technical methodology of EV market growth projections.

Despite Charles County being a predominately rural area, this growth is expected to continue in the county as barriers to adoption are lowered, even in the low adoption scenario. In terms of infrastructure, EV chargers are currently concentrated in more densely populated areas along the US-301 corridor, with few chargers located within EEAs or in rural portions of the county. To ensure equitable access to EV charging infrastructure for anticipated EV adoption and to support higher EV adoption rates, continued efforts are needed to deploy chargers in high-traffic populous areas, including considerations for EEAs and rural portions of the county.

Projected EV Charging Infrastructure Needs

To support the projected EV registrations above, Charles County would need to deploy the following estimated numbers of EV chargers for each scenario and planning year. See Appendix 1.B for technical methodology on calculating EV charging port needs.

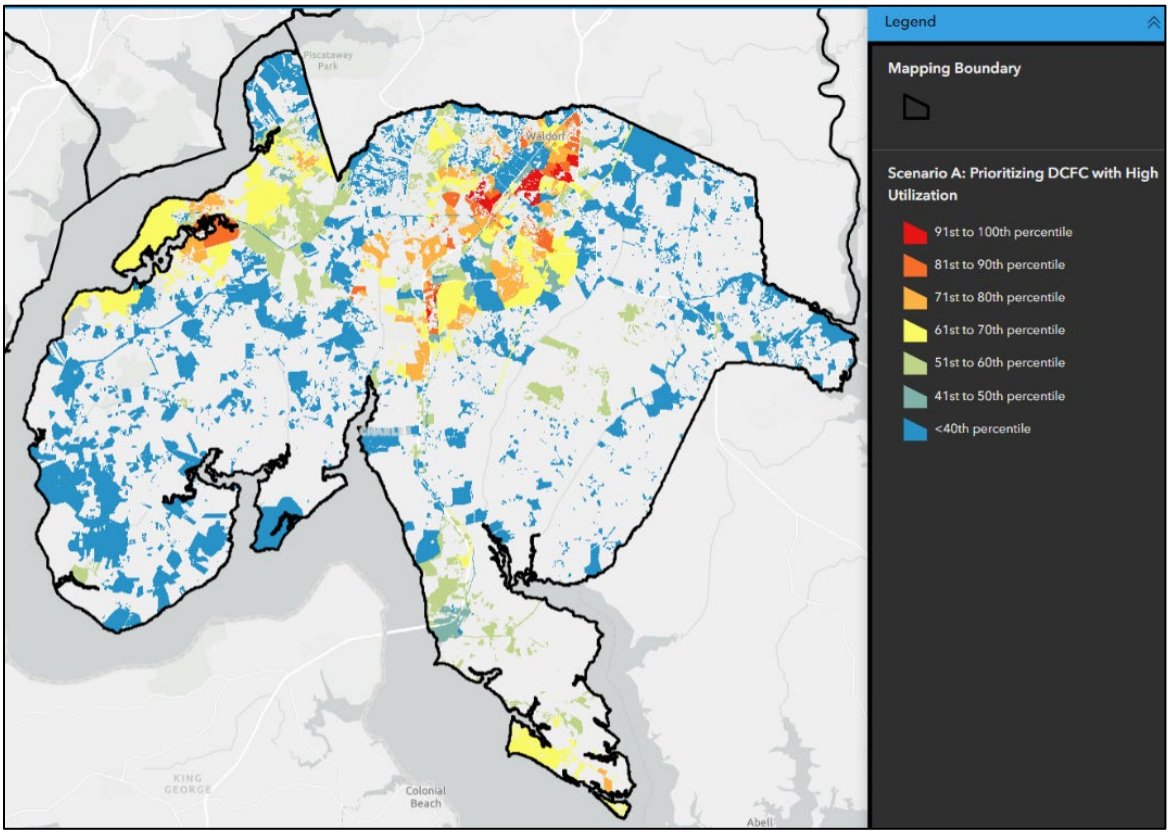
Table 8. Charles County Estimated EV Charging Port Needs

Growth Scenario		Charger Type	2030	2035	2045
Low	EV Charging Port Needs	Public Level 2	258	490	1,181
		Public DCFC	10	17	39
	EVs		*7,850*	*16,261*	*44,958*
Medium	EV Charging Port Needs	Public Level 2	625	1,180	3,079
		Public DCFC	22	39	119
	EVs		*20,735*	*44,903*	*93,716*
High	EV Charging Port Needs	Public Level 2	1,014	2,413	4,294
		Public DCFC	35	91	150
	EVs to Support		*33,620*	*73,544*	*142,473*

Figure 15 summarizes the charger siting analysis results for Charles County. The charger siting analysis identifies and ranks parcels of land based on their suitability for deploying public EV chargers. Three scenarios were tested. This map shows Scenario A, Prioritizing DCFC with High Utilization. The online map can be used to display all three scenarios. Red parcels are high priority, and blue parcels are low priority. Charles County may use this map and these estimated charging port needs to support and participate in the development of a regional charging network.[66]

[66] The COG REVII Strategy EV Siting Parcel Review map and associated shapefiles available for download may be found here: https://mwcog.org/REVIIStrategyMap

Figure 15. Charles County EV Charging Siting Analysis Results



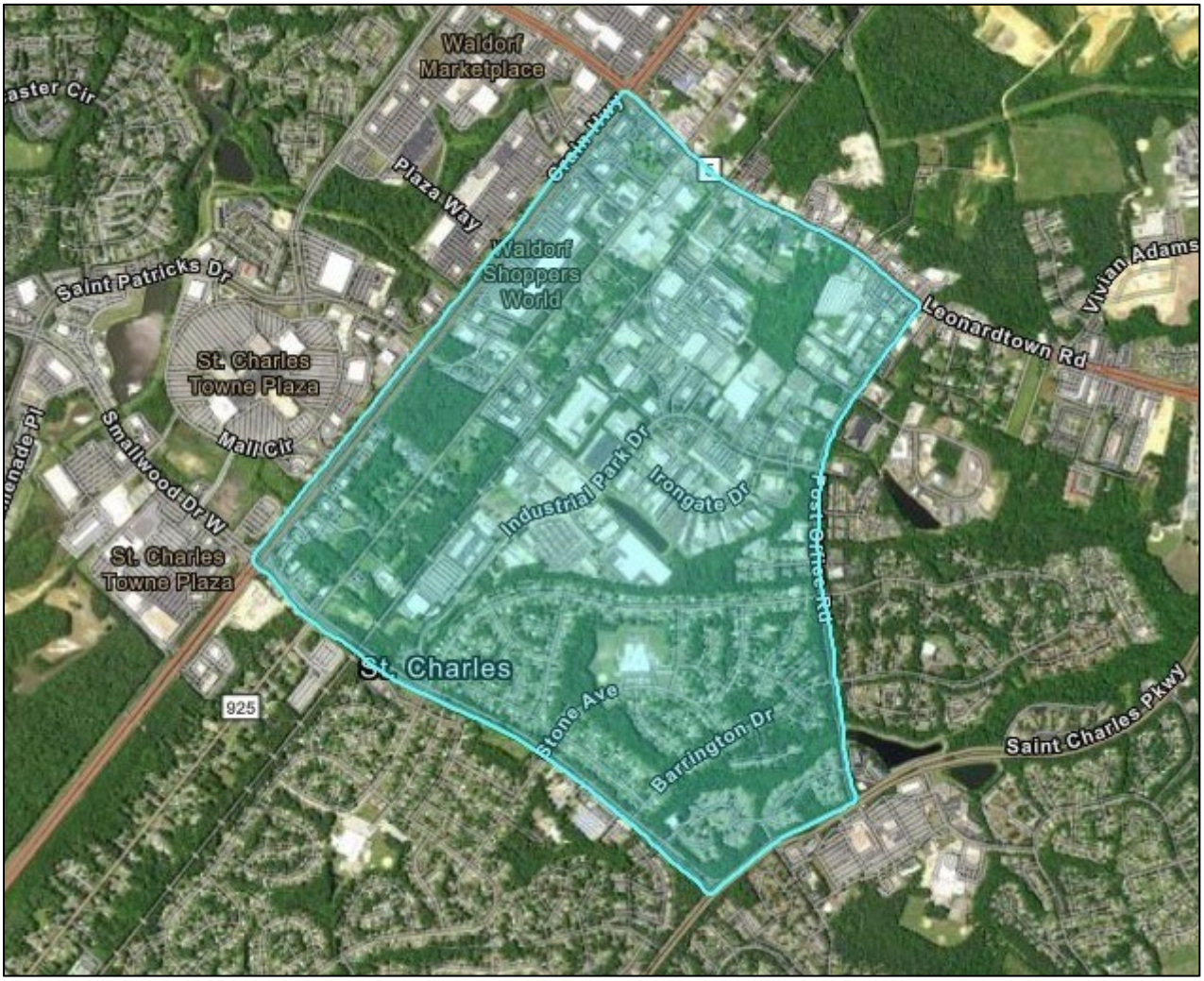
EV Charger Deployment Site Recommendations

The sites identified below are examples of locations where Charles County may choose to deploy or engage and support the private sector in deploying EV chargers. The images of each site are provided at the CBG level, which includes the recommended site and the surrounding area. These sites are recommendations, not requirements, and are highlighted due to their high scores in EV charger GIS siting analysis. However, Charles County may have different priorities or location preferences than the ones highlighted below. As such, additional priority options are available for use and consideration in the online interactive map. Charles County may consider and move forward with these locations for deployments but should rely on local knowledge, expertise, and priorities when sitting EV chargers. See the interactive map to view all priority locations, EEAs, and transportation infrastructure within the county.

Waldorf Senior Center and Recreational Center

The Waldorf Senior Center and Recreation Center in Waldorf is close to a large residential area, government facilities and local businesses. The recreational center is less than a mile from a major road, MD-5, and within two miles of US- 301 making it an attractive location for residential and community traffic. This area is also within an EEA and includes MFH. Level 2 chargers are ideal for community residents and DCFC may be useful for a wider range of users visiting the various social and governmental services close by.

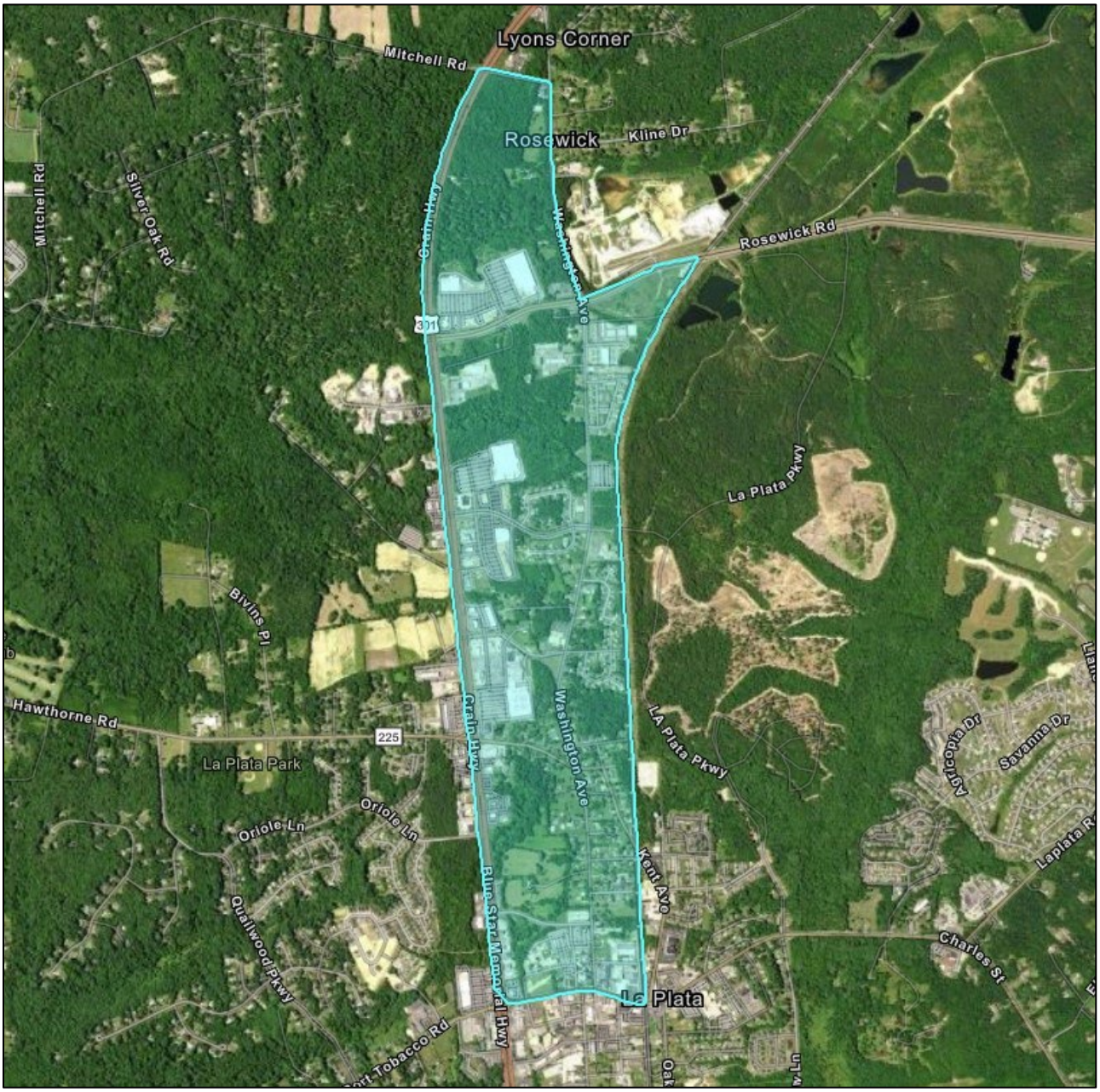
Figure 16 . Waldorf Senior Center and Recreational Center



La Plata Plaza

The La Plata Plaza in La Plata is close to major retailers, local businesses, and restaurants. The site is along U.S Route 301, and close to another major road making it an attractive location for local shopping traffic. This area also encompasses MFH. Level 2 chargers would be ideal for shoppers in the mall using this parking lot.

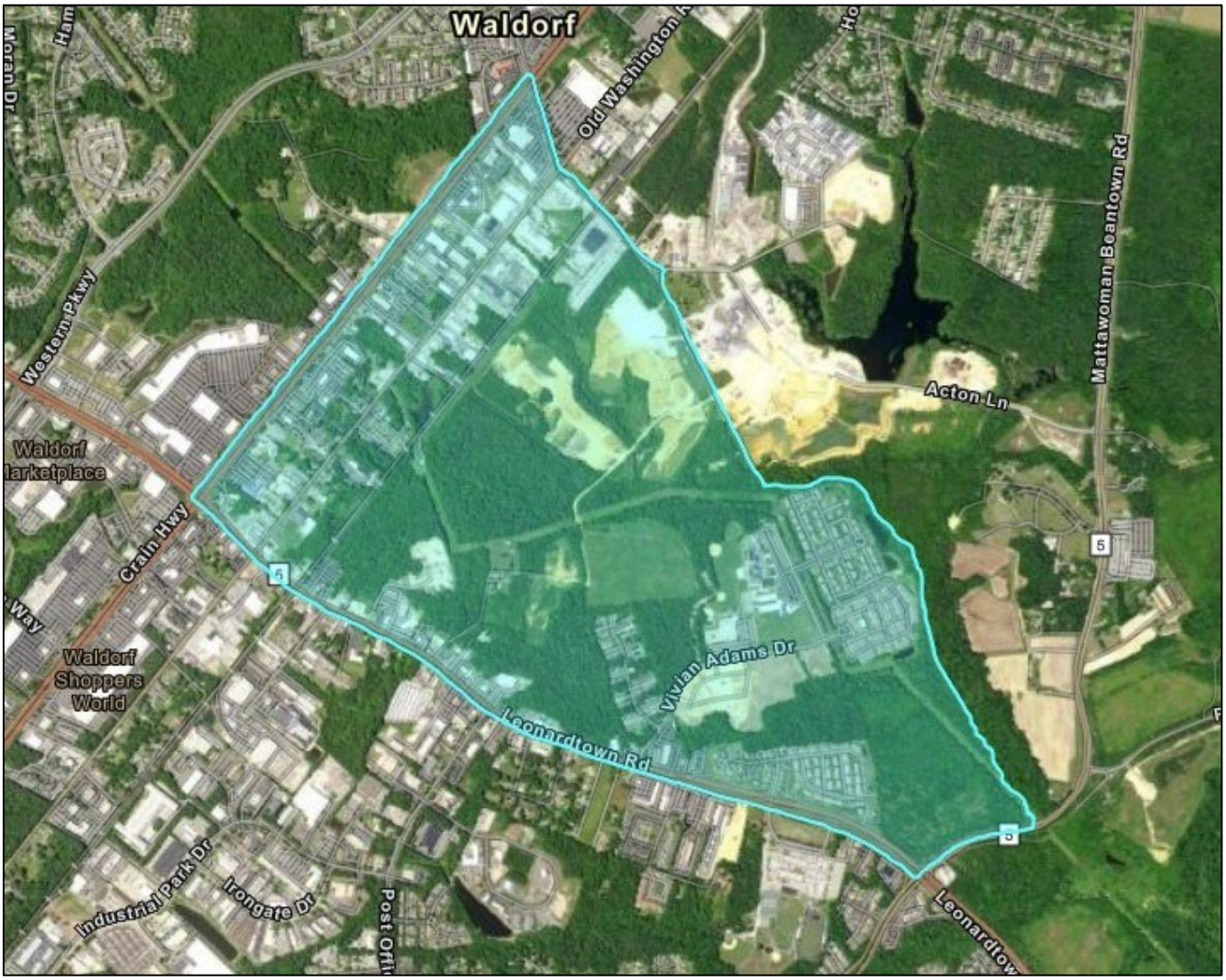
Figure 17 . La Plata Plaza



Hanson Community Center

The Hanson Community Center in Waldorf is located close to a large apartment complex, middle and elementary school, local businesses, and restaurants. The site is two miles from US-301 and along MD-5, making it an attractive location for residential traffic and other residents using the community center. This area also encompasses MFH whose residents may need to utilize publicly accessible charging. Level 2 chargers are ideal for the community center, and DCFC may potentially be useful for drivers along MD-5.

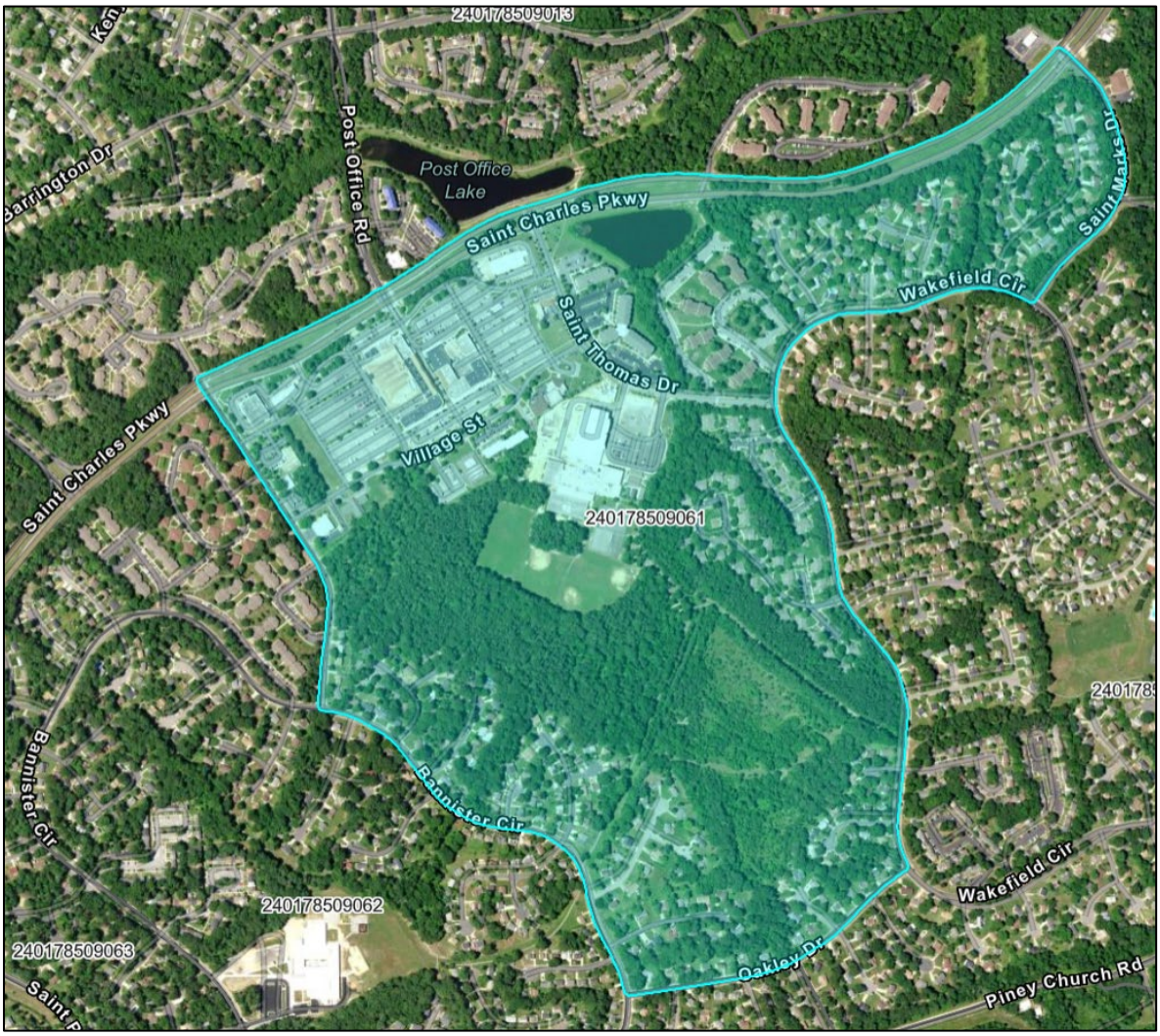
Figure 18. Hanson Community Center



Smallwood Village Shopping Center

The Smallwood Village Shopping Center is located along St. Charles Parkway in Charles County. The shopping center is home to multiple chain stores, small restaurants, banks, and a pharmacy. Currently, there are two ChargePoint EV chargers behind the shopping center. Expanding the number of EV charging stations could benefit shoppers, drivers on St. Charles Parkway, and nearby residents, as several apartment complexes are located within walking distance of the mall. Level 2 charges would be most convenient for mall workers and nearby residents, while DC fast chargers would be optimal for drivers along the Parkway.

Figure 19. Smallwood Village Shopping Center



Pinefield Center

The Pinefield Center in Waldorf is a shopping location close to apartment complexes, major retailers, hotels, local businesses, and restaurants. The site is along US-301 and Mattawoman Beantown Road, making it an attractive location for local shopping traffic. Level 2 chargers are ideal for shoppers in the shopping center.

Figure 20 . Pinefield Center

Total EV Registrations*

5,513

EV % of Total LDVs

2%

Current EV Charging Ports

101 Level 2

10 DCFC

County Progress

Frederick County prioritized healthy communities by establishing an EV Readiness Plan to curb GHG emissions.

**As of April 2024*

Frederick County

Maryland

EV and Charging Infrastructure Deployment Progress

Over the lats four years, the number of EVs on the road in Frederick County has grown by more than 4,000 vehicles. At the end of 2020, Frederick County had approximately 1,500 registered EVs. Between 2021 and 2023, the number of new EV registrations has grown each year, from 601 new EV registrations in 2021, to 1,140 new EV registrations in 2022, and 1,687 new EV registrations in 2023. Frederick County has embarked on various plans and policies to promote EV adoption and deploy associated charging infrastructure within the jurisdiction. Frederick County's actions include:

- The Frederick County Electric Vehicle Readiness Plan which supports the county's community wide goals to reduce GHG emissions 50% by 2030 and 100% by 2050.
- Frederick County completed a Fleet Electrification Transition Plan in 2023.
- Planning to replace retiring ICE vehicles in the county fleet with EVs where feasible based on total cost of ownership and use case compatibility.
- Frederick County passed an EV charging station new construction requirement in 2022, requiring newly built single-family detached homes, duplexes, and townhomes with on-lot parking to include at least one EV-capable space.

EV Registration Projections

At the end of April 2024, Frederick County had approximately 5,500 registered EVs, accounting for 2% of total LDVs in the county. Table 9, below, shows the number of EVs and percentage of EVs in the LDV population for low-, medium-, and high-adoption scenarios at benchmark years 2030, 2035, and 2045.[67]

Table9. Frederick CountyEV Registration Projections

Growth Scenario	2030		2035		2045	
	# EVs	% EVs	# EVs	% EVs	# EVs	% EVs
Low	23,459	10%	48,659	19%	134,744	47%
Medium	38,802	16%	83,243	32%	181,148	63%
High	54,146	22%	117,827	46%	227,551	79%

Trends in EV Adoption

Over the last four years, the number of EVs on the road in Frederick County grew by almost 4,000 vehicles. Between 2020 and 2023,

[67] See Appendix 1.A in the REVII Strategy document for technical methodology of EV market growth projections.

the number of new EV registrations has grown. Early registration numbers in 2024 indicate that this growth will continue through this year. Despite Frederick County being a rural area, this growth is expected to continue in the county, even in the low adoption scenario.

The county currently has 111 charging ports available for public use. DCFCs are concentrated in the South Frederick Corridors; the economic center along Urbana Pike and Buckeystown Pike. Level 2 chargers are concentrated in the City of Frederick but are also located in some in rural areas and EEAs. However, there are currently no DCFC ports located within Frederick County EEAs.

Projected EV Charging Infrastructure Needs

To support the projected EV registrations above, Frederick County would need to deploy the following estimated numbers of EV chargers for each scenario and planning year. See Appendix 1.B for technical methodology on calculating EV charging port needs.

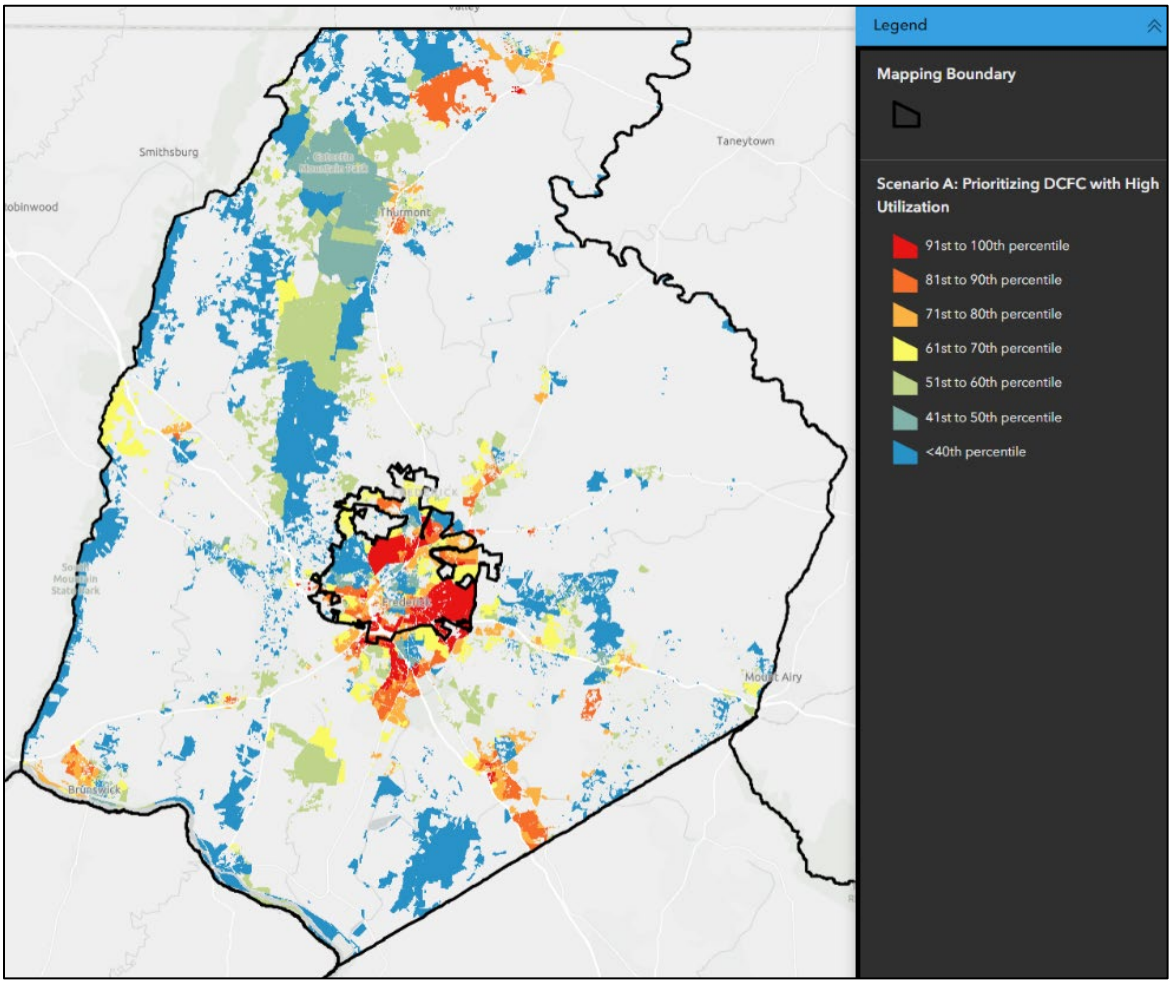
Table 10. Frederick County Estimated EV Charging Port Needs

Growth Scenario		Charger Type	2030	2035	2045
Low	EV Charging Port Needs	Public Level 2	707	1,596	4,065
		Public DCFC	25	62	141
	EVs		*23,459*	*48,659*	*134,744*
Medium	EV Charging Port Needs	Public Level 2	1,020	2,735	5,462
		Public DCFC	34	104	190
	EVs		*38,802*	*83,243*	*181,148*
High	EV Charging Port Needs	Public Level 2	1,773	3,552	6,860
		Public DCFC	69	122	236
	EVs		*54,146*	*117,827*	*227,551*

Figure 21 summarizes the charger siting analysis results for Frederick County. The charger siting analysis identifies and ranks parcels of land based on their suitability for deploying public EV chargers. Three scenarios were evaluated. This map shows Scenario A, Prioritizing DCFC with High Utilization. The online map can be used to display all three scenarios. Red parcels are high priority, and blue parcels are low priority. Frederick County may use this map and these estimated charger needs to support and participate in the development of a regional charging network.[68]

[68] The COG REVII Strategy EV Siting Parcel Review map and associated shapefiles available for download may be found here: https://mwcog.org/REVIIStrategyMap

Figure 21 . Frederick County EV Charging Siting Analysis Results



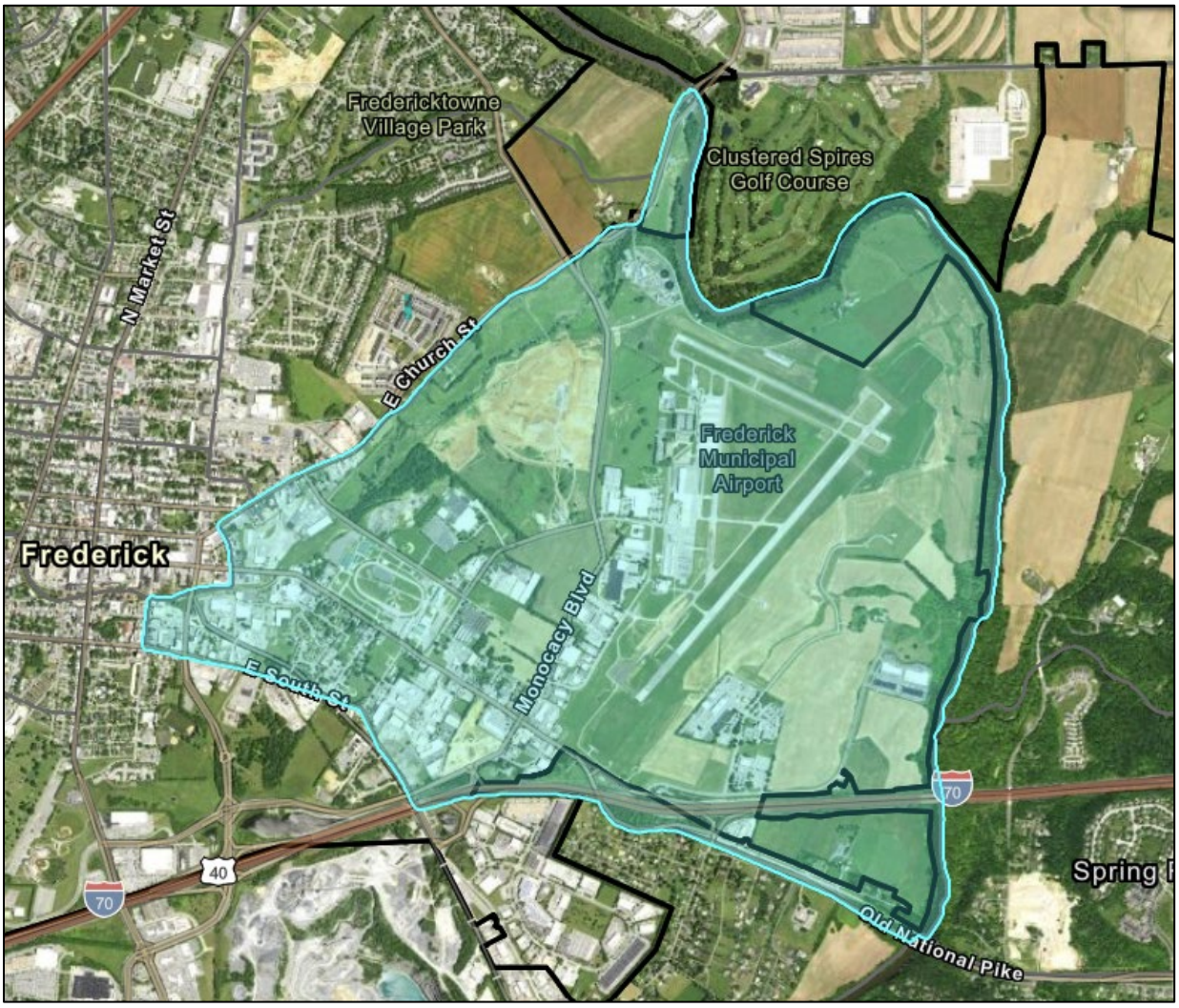
EV Charger Deployment Site Recommendations

The sites identified below are examples of locations where Frederick County may choose to deploy or engage and support the private sector in deploying EV chargers. The images of each site are provided at the CBG level, which includes the recommended site and the surrounding area. These sites are recommendations, not requirements, and are highlighted due to their high scores in EV charger GIS siting analysis. However, Frederick County may have different priorities or location preferences than the ones highlighted below. As such, additional priority options are available for use and consideration in the online interactive map. Frederick County may consider and move forward with these locations for deployments but should rely on local knowledge, expertise, and priorities when siting EV chargers. Disclaimer: The following site maps have recommended deployment sites there are located within the GIS produced parcel barriers. See the interactive map to view all priority locations, EEAs, and transportation infrastructure within the county.

Frederick Fairgrounds

The Frederick Fairgrounds provides an opportunity to install EV charging equipment for fair visitors and commuters. Its location along I-70 provides for an easily accessible charger that can be used year-round by event attendees. Level 2 chargers would be most optimal here for use by event attendees.

Figure 22. Frederick Fairgrounds



Clemson Corner

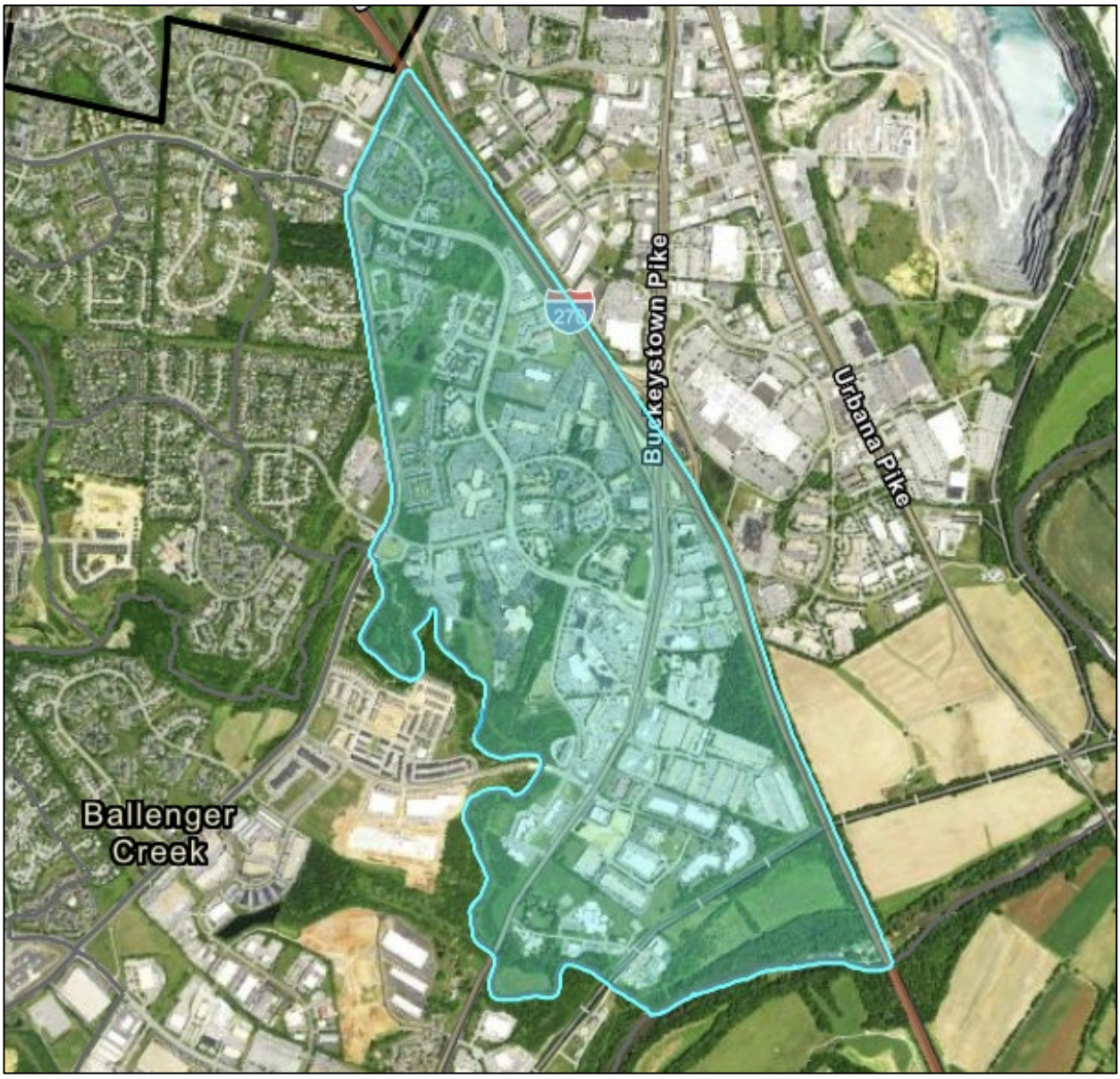
Clemson Corner hosts multiple department stores, fast food restaurants, and banks. This deployment site can host Level 2 chargers for shoppers while also hosting DCFC for commuters along Catoctin Mountain Parkway. This site is also near MFH.

Figure 23 . Clemson Corner

Westview Promenade

The Westview Promenade Shopping Center is home to multiple shopping outlets and restaurants. It is also located off I-270 and Buckeystown Pike, just south of I-70, making it accessible and convenient for shopping center visitors and drivers along these Interstates. This deployment site can host Level 2 chargers for shoppers while also hosting DCFC for commuters looking for a charge.

Figure 24 . Westview Promenade



Prospect Plaza Shopping Center

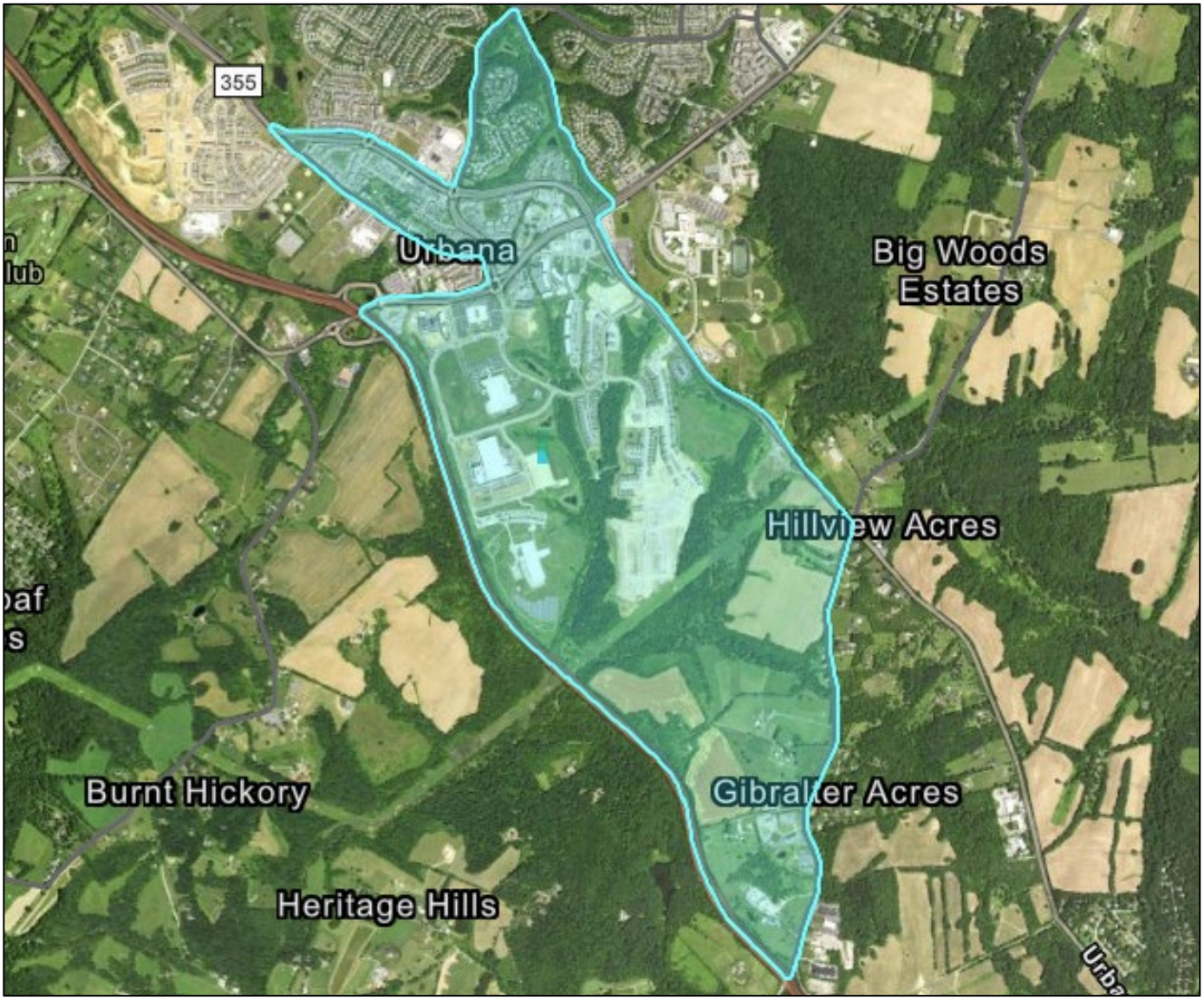
The Prospect Plaza Shopping Center is located off US-40 and is near MFH in the area as well, making it convenient for both residents of the nearby area, commuters, and shopping center visitors. Level 2 chargers would be deployable for residents and shopping center visitors, while DCFC would be most optimal for drivers along US-40 going into Downtown Frederick.

Figure 25. Prospect Plaza Shopping Center

Urbana Park and Ride

The Urbana Park and Ride in Ijamsville hosts a bus stop along with a nearby shopping center and restaurants. It is also located along both Route 80 and I-270. Making this location convenient for both commuters, shopping center visitors, and those looking to park their vehicles and take the bus elsewhere. Level 2 chargers would be optimal for shopping center visitors and others looking to take the bus elsewhere. DCFC would be most optimal for drivers looking to charge along Route 355 and I-270.

Figure 26 . Urbana Park and Ride



Total EV Registrations*

32,347

EV % of Total LDVs

3%

Current EV Charging Ports

525 Level 2

52 DCFC

County Progress

Plans to eliminate carbon emissions completely by 2035, implementing several EV initiatives to achieve their goal.

**As of April 2024*

Montgomery County

Maryland

EV and Charging Infrastructure Deployment Progress

Montgomery County recognizes that ZEVs play a critical role in achieving its Climate Action Plan goal to eliminate carbon emissions by 2035.[69] The county has taken actionable steps[70] to deploy EV charging infrastructure and encourage EV adoption to support its GHG goal, including:

- Designing and implementing the EV Infrastructure Overview Plan;
- Installing 64 public-purpose EV chargers at parking facilities;
- Creating downloadable maps showing the locations of EV chargers in the county and information detailing how to use the EV chargers;
- Launching an EV Purchasing Cooperative (EVPC) with an online education and resource hub to support the transition to EVs;
- Providing educational resources on ZEVs, EV charging basics and best practices, and installing residential and workplace EV chargers; and,
- Leading by example by having the largest deployment of electric school buses in the US.

EV Registration Projections

At the end of April 2024, Montgomery County had approximately 32,350 registered EVs, accounting for 3% of total LDVs in the county. Table 11, below, shows the number of EVs and percentage of EVs in the LDV population for low-, medium-, and high-adoption scenarios at benchmark years 2030, 2035, and 2045.[71]

Table 11. Montgomery County EV Registration Projections

Growth Scenario	2030		2035		2045	
	# EVs	% EVs	# EVs	% EVs	# EVs	% EVs
Low	132,743	17%	272,571	33%	710,804	80%
Medium	159,608	20%	330,257	40%	715,037	81%
High	186,473	24%	387,943	47%	719,270	81%

Trends in EV Adoption

Montgomery County is already making progress towards its ZEV adoption goals and has quickly become an example of what aggressive dedication to EV adoption can accomplish. From January 2022 to September 2023, the Montgomery County EVPC received

[69] Montgomery County. Climate Action Portal. Retrieved from: https://www.montgomerycountymd.gov/climate/index.html
[70] MCDOT Division of Parking Management. Electric Vehicle Infrastructure Overview Plan. Retrieved from: https://www.montgomerycountymd.gov/DOT-Parking/Resources/Files/EV_OverviewPlan_Public%20Update%202021.pdf
[71] See Appendix 1.A in the REVII Strategy document for technical methodology of EV market growth projections.

over 1,100 pledges from residents to make their next vehicle an EV. Additionally, by the end of 2023, nearly a third of Maryland's EV registrations came from Montgomery County.[72] EV registrations in Montgomery County totaled just over 10,000 at the end of 2020 and tripled by April 2024. As of January 2024, over 30,000 EVs have been registered in Montgomery County and this number is projected to increase to over 270,000 vehicles, at a minimum, by 2035. This projected increase is possible due to Montgomery County's commitment to deploying EV chargers and making EVs as affordable as possible through the EVPC and its promotion of dealership, government, and utility incentives.

Projected EV Charging Infrastructure Needs

To support the projected EV registrations above, Montgomery County would need to deploy the following estimated numbers of EV chargers for each scenario and planning year. See Appendix 1.B for technical methodology on calculating EV charging port needs.

Table 12. Montgomery County Estimated EV Charging Port Needs

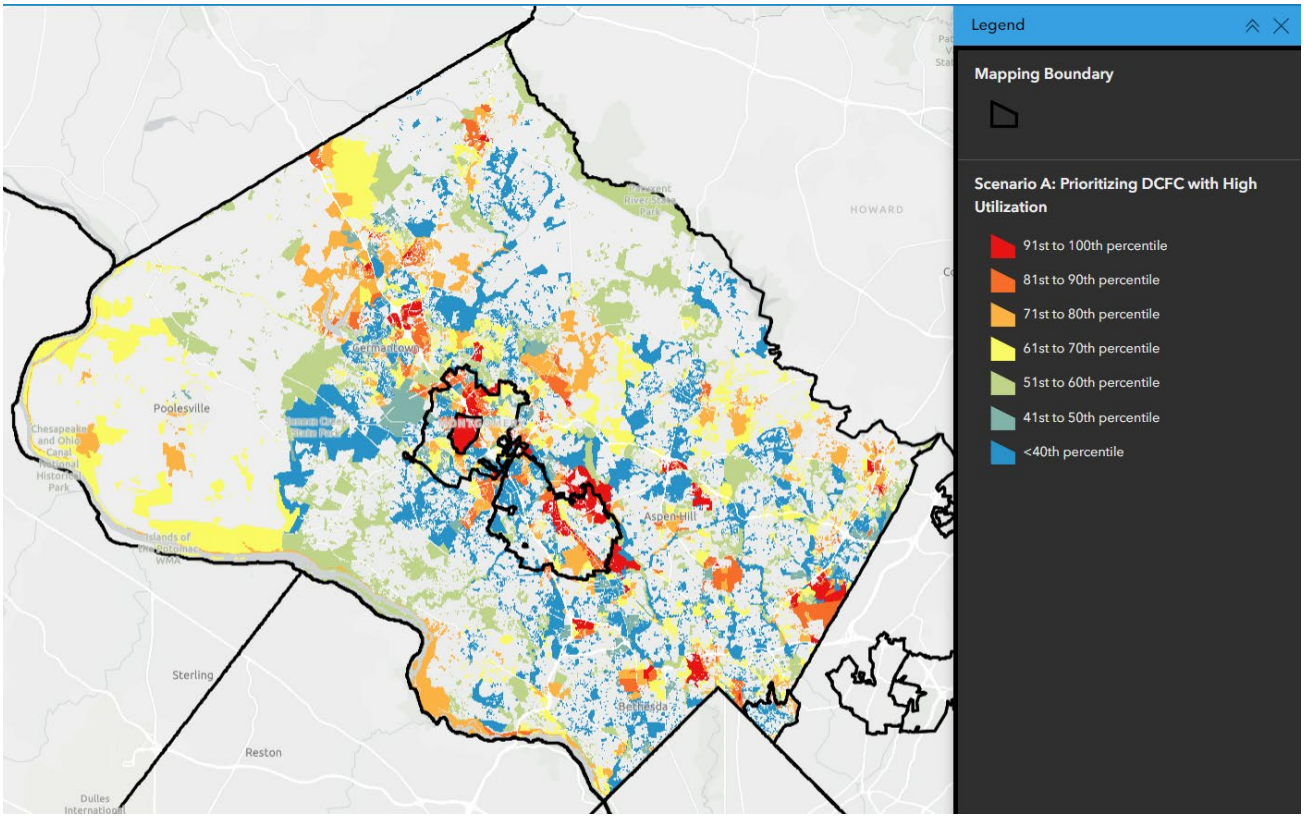
Growth Scenario		Charger Type	2030	2035	2045
Low	EV Charging Port Needs	Public Level 2	4,000	8,221	16,135
		Public DCFC	138	284	535
	EVs		*132,743*	*272,571*	*710,804*
Medium	EV Charging Port Needs	Public Level 2	4,813	9,956	16,231
		Public DCFC	165	347	539
	EVs		*159,608*	*330,257*	*715,037*
High	EV Charging Port Needs	Public Level 2	5,623	10,194	16,326
		Public DCFC	194	337	542
	EVs		*186,473*	*387,943*	*719,270*

Figure 27 summarizes the charger siting analysis results for Montgomery County. The charger siting analysis identifies and ranks parcels of land based on their suitability for deploying public EV chargers. Three scenarios were tested. This map shows Scenario A, Prioritizing DCFC with High Utilization. The online map can be used to display all three scenarios. Red parcels are high priority, and blue parcels are low priority. Montgomery County may use this map and these estimated charger needs to support and participate in the development of a regional charging network.[73]

[72] MDOT MVA Electric and Plug-In Hybrid Vehicle Registrations by County: https://opendata.maryland.gov/Transportation/MDOT-MVA-Electric-and-Plug-in-Hybrid-Vehicle-Regis/qtcv-n3tc

[73] The COG REVII Strategy EV Siting Parcel Review map and associated shapefiles available for download may be found here: https://mwcog.org/REVIIStrategyMap

Figure 27 . Montgomery County EV Charging Siting Analysis Results



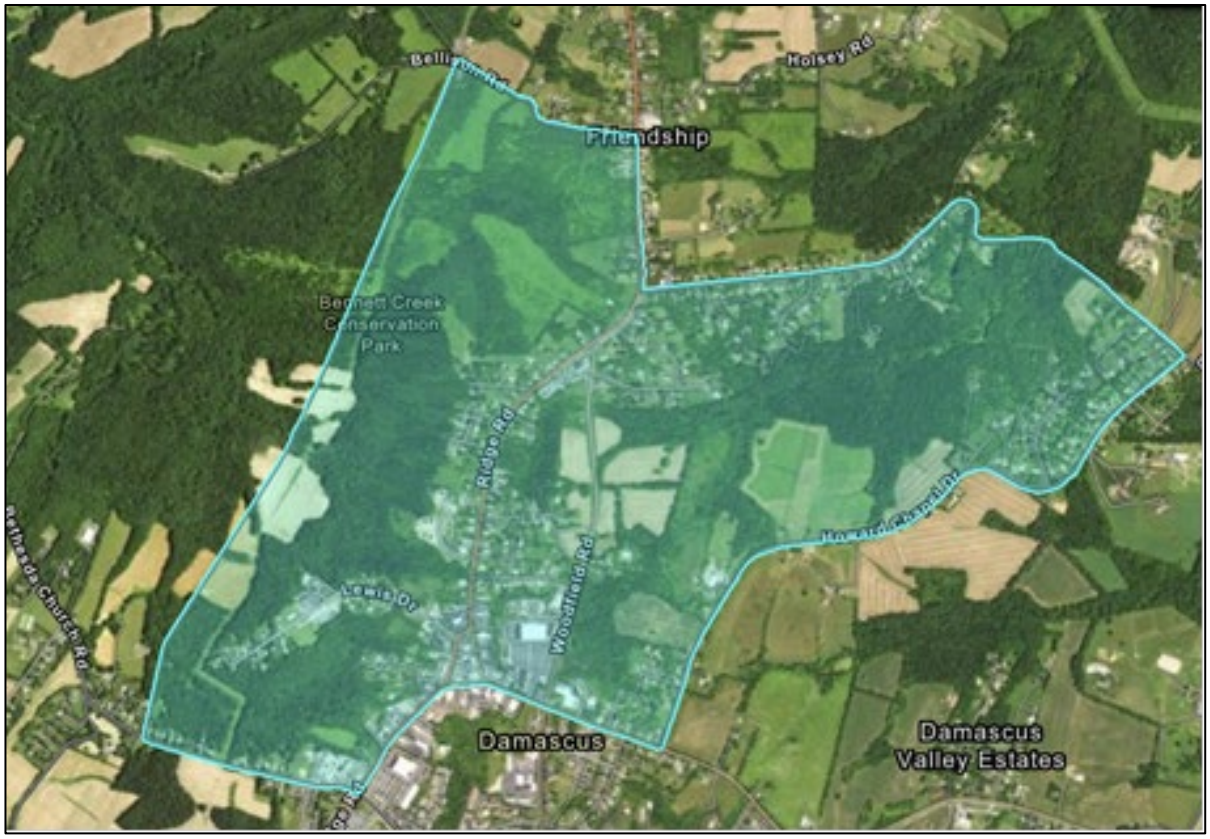
EV Charger Deployment Site Recommendations

The sites identified below are examples of locations where Montgomery County may choose to deploy or engage and support the private sector in deploying EV chargers. The images of each site are provided at the CBG level, which includes the recommended site and the surrounding area. These sites are recommendations, not requirements, and are highlighted due to their high scores in EV charger GIS siting analysis. As such, additional priority options are available for use and consideration in the online interactive map. However, Montgomery County may have different priorities or location preferences than the ones highlighted below. Montgomery County may consider and move forward with these locations for deployments but should rely on local knowledge, expertise, and priorities when siting EV chargers. See the interactive map to view all priority locations, EEAs, and transportation infrastructure within the county.

Damascus Library

The Damascus Library is located near a shopping center, park-and-ride, and MFH, making it an ideal location for charging station deployments. The site has no existing EV chargers nearby and would provide charging access to residents in an area that currently does not offer any publicly accessible charging. Libraries often host community events, making them well-suited for Level 2 charging as visitors will dwell for longer periods of time.

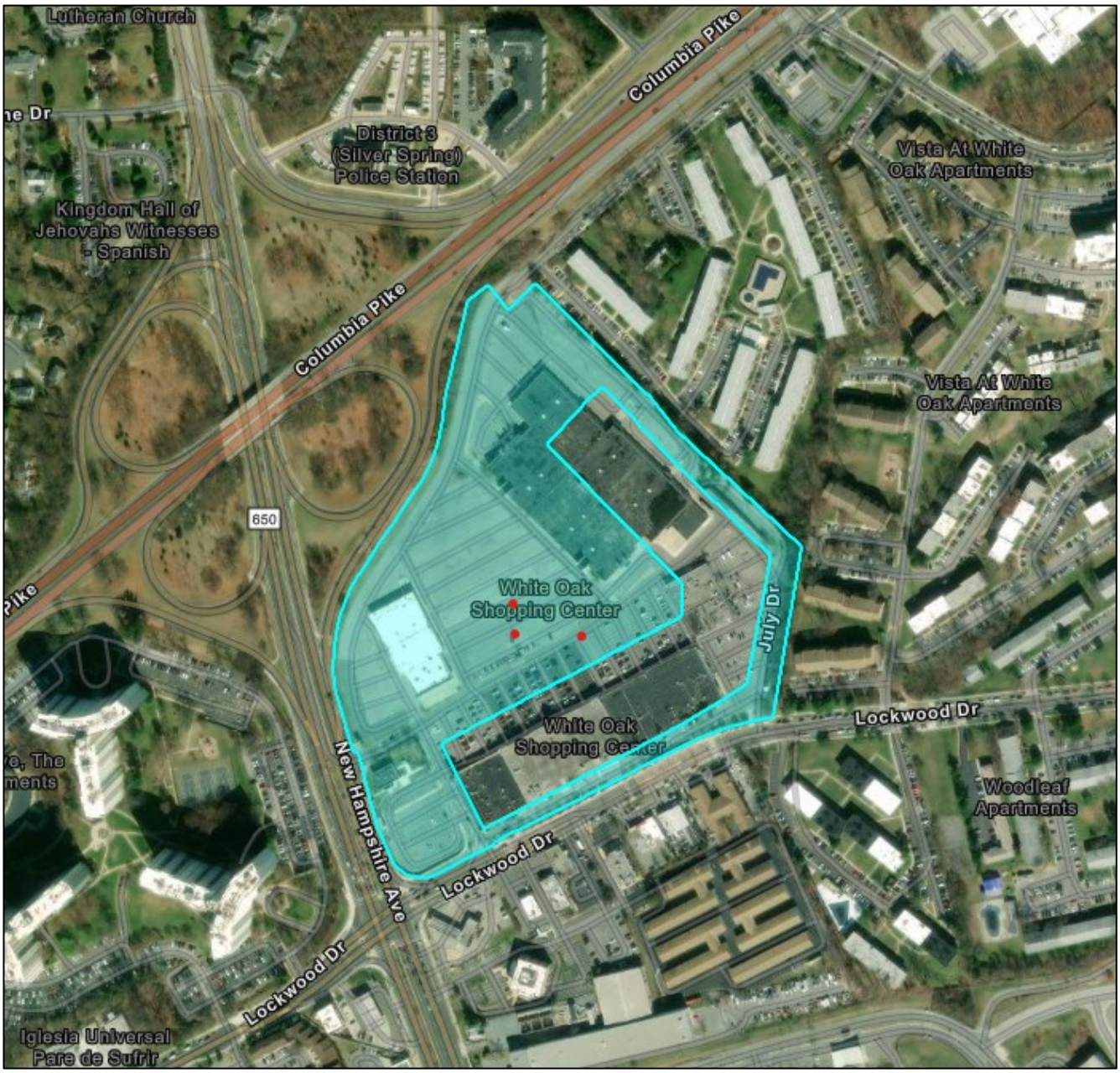
Figure 28 . Damascus Library



White Oak Shopping Center

The White Oak Shopping Center is located within an EEA and is accessible from US-29 (Columbia Pike) and New Hampshire Avenue. The headquarters of the US Food and Drug Administration, one of Montgomery County's largest employers, is a half-mile south of the White Oak Shopping Center. The Enclave Silver Spring, a high-density apartment complex, is west of the site, and multiple medium-density apartment complexes are located east of the site. Due to the high utilization this site experiences, a DCFC is recommended so drivers can quickly charge their vehicles while they shop.

Figure 29. White Oak Shopping Center



Americana Centre

The Americana Centre is a MFH development in downtown Rockville, west of Rockville Pike. Americana Centre is within an EEA and is located near Rockville City Hall and multiple government offices, including the Montgomery County Judicial Building, the Montgomery County Executive Office, and the Montgomery County District Court. The site is located near the Rockville Metro station, which also serves Amtrak and MARC Train. Due to the site's location and residential density, it is ideal for Level 2 chargers.

Figure 30 . Americana Centre

Pathways Baptist Church

The Pathways Baptist Church in Gaithersburg is located within an EEA. and is suitable for Level 2 EV charger deployment. The site is accessible from I-270 and Rockville Pike and is adjacent to low-density commercial and industrial businesses along Perry Parkway. Pathways Baptist Church is located a half-mile south of the Montgomery County Fair grounds site discussed above. For sites like this, Montgomery County would need to engage and support the site owner on ensuring EV charging station deployments are available to the public, not just church members or during church services and activities.

Figure 31 . First Baptist Church of Gaithersburg

Clarksburg Elementary School

Clarksburg Elementary School is located between I-270 and Rockville Pike, near MFH, is just north of an EEA, meeting conditions for EV chargers to be highly utilized. There are no existing EV chargers near this site, increasing the need for deployment. Siting EV chargers at schools serves multiple purposes, as they can be used by school staff during the workday and visitors for after-hours events. Additionally, this site is located off an I-270 ramp.

Figure 32. Clarksburg Elementary School

Total EV Registrations*

9,518

EV % of Total LDVs

1%

Current EV Charging Ports

532 Level 2

52 DCFC

County Progress

Implementing an EV and Charging Infrastructure plan to incentivize countywide EV adoption.

**As of April 2024*

Prince George's County

Maryland

EV and Charging Infrastructure Deployment Progress

Over the past several years, Prince George's County has embarked on various plans and policies to promote EV adoption and deploy associated charging infrastructure within its jurisdiction. Prince George's County's actions include:

- Creating and implementing of the Government Operations EV and Charging Infrastructure Action Plan;[74]
- Developing the Green Fleet Policy, which outlines a 25% reduction in GHG emissions by 2025 supported by a goal to make 50% of all county vehicle purchases to be ZEV or partial ZEV by 2025;[75]
- Installing 140 public EV chargers on government properties;
- Creating an interactive map showing the locations where new EV chargers or ports have been installed across the county;[76] and,
- Highlighting utilities in the county with rebates related to EVs.

EV Registration Projections

At the end of April 2024, Prince George's County had approximately 9,500 registered EVs, accounting for 1% of total LDVs in the county. Table 13, below, shows the number of EVs and percentage of EVs in the LDV population for low-, medium-, and high-adoption scenarios at benchmark years 2030, 2035, and 2045.[77]

Table 13. Prince George's County EV Registration Projections

Growth Scenario	2030		2035		2045	
	# EVs	% EVs	# EVs	% EVs	# EVs	% EVs
Low	37,618	6%	75,016	11%	192,605	28%
Medium	89,781	14%	191,196	29%	381,084	55%
High	141,944	22%	307,376	47%	569,562	82%

Trends in EV Adoption

The County has seen considerable growth in EV adoption over the last few years. From 2020 to 2021, EV registrations increased by 48%

[74] Prince George's County. 2021. Prince George's County Government Operations: EV & Charging Infrastructure Action Plan. Retrieved from: https://www.mwcog.org/assets/1/6/Prince_Georges_Operational_EV_Plan_2021_Final_April.pdf

[75] Prince George's County. Retrieved from: https://www.princegeorgescountymd.gov/departments-offices/environment/sustainability/sustainable-energy/electric-vehicles

[76] Prince George's County. 2024. EV Charging Station Program. Retrieved from: https://princegeorges.maps.arcgis.com/apps/webappviewer/index.html?id=fb70e07405474af5afa595b02e60a360

[77] See Appendix 1.A in the REVII Strategy document for technical methodology of EV market growth projections.

and, from 2021 to 2022, EV registrations increased by 55%. Total EV registrations in the County climbed from 1,998 to 4,548 between 2020 and 2022, despite the COVID-19 pandemic's impact on the economy. This growth is expected to continue in the county as barriers to adoption are lowered with falling EV purchase prices and the increasing availability of accessible public EV chargers.

Prince George's County has already made substantial progress with deploying EV chargers, particularly in the areas surrounding the District of Columbia, which includes many EEAs. As EV registrations continue to climb, the County will need to plan and invest in EV charging infrastructure to support the development of a charging network and support local and regional drivers. The County is already working to install over 100 EV chargers on government property in the coming years and has partnered with electric utilities to install chargers at parks, recreational facilities, libraries, government office buildings, and park-and-ride locations.

Projected EV Charging Infrastructure Needs

To support the projected EV registrations above, Prince George's County would need to deploy the following estimated numbers of EV chargers for each scenario and planning year. See Appendix 1.B for technical methodology on calculating EV charging port needs.

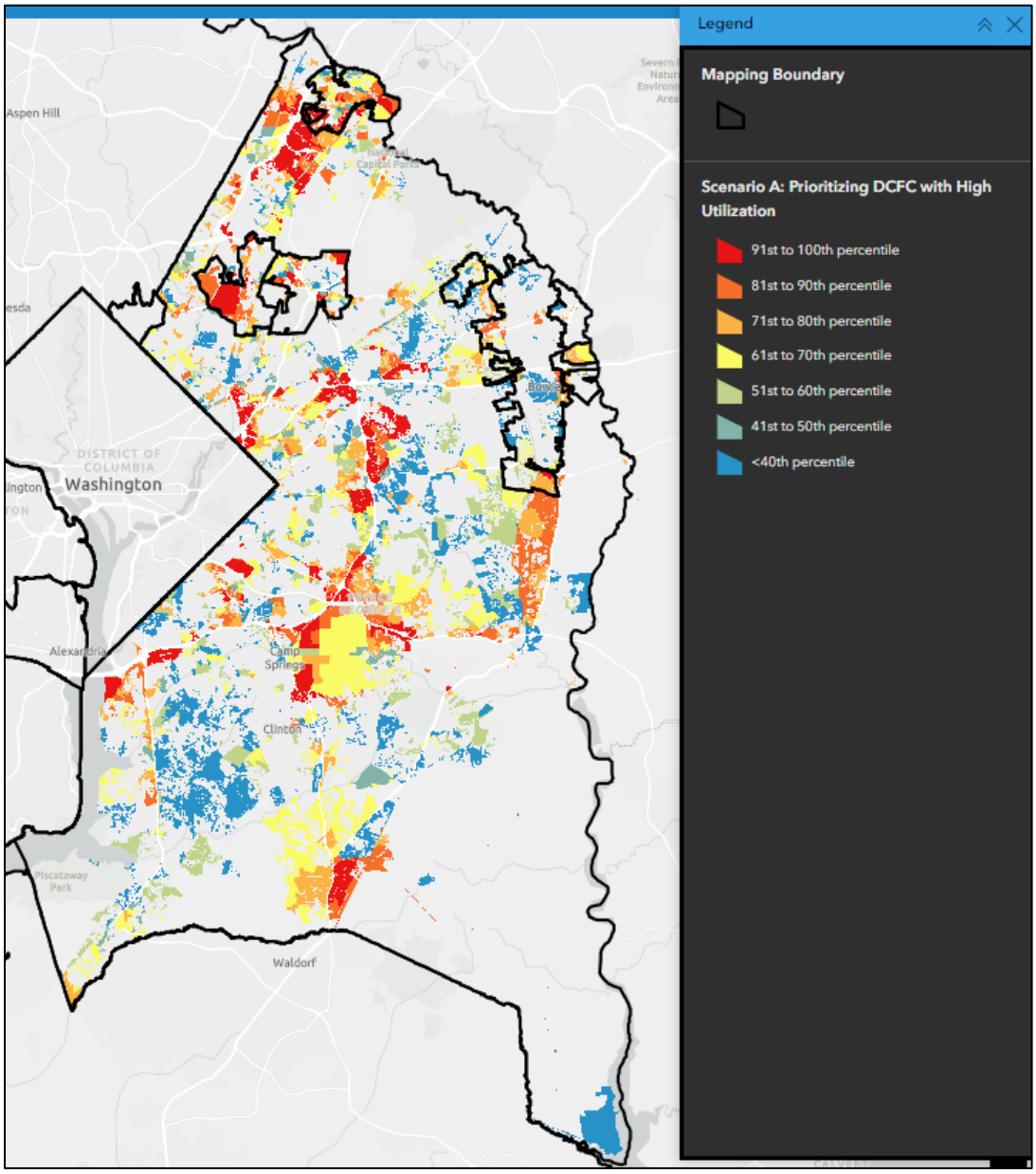
Table 14. Prince George's County Estimated EV Charging Port Needs

Growth Scenario		Charger Type	2030	2035	2045
Low	EV Charging Port Needs	Public Level 2	989	2,461	5,809
		Public DCFC	33	93	202
	EVs		*37,618*	*75,016*	*192,605*
Medium	EV Charging Port Needs	Public Level 2	2,946	5,768	10,014
		Public DCFC	113	201	330
	EVs		*89,781*	*191,196*	*381,084*
High	EV Charging Port Needs	Public Level 2	4,278	9,266	12,933
		Public DCFC	148	320	428
	EVs		*141,944*	*307,376*	*569,562*

Figure 33 summarizes the charger siting analysis results for Prince George's County. The charger siting analysis identifies and ranks parcels of land based on their suitability for deploying publicly accessible EV chargers. Three scenarios were tested. This map shows Scenario A, Prioritizing DCFC with High Utilization. The online map can be used to display all three scenarios. Red parcels are high priority, and blue parcels are low priority. Prince George's County may use this map and these estimated charging port needs to support and participate in the development of a regional charging network.[78]

[78] The COG REVII Strategy EV Siting Parcel Review map and associated shapefiles available for download may be found here: https://mwcog.org/REVIIStrategyMap

Figure 33. Prince George's County EV Charging Siting Analysis Results



EV Charger Deployment Site Recommendations

The sites identified below are examples of locations where Prince George's County may choose to deploy or engage and support the private sector in deploying EV chargers. The images of each site are provided at the CBG level, which includes the recommended site and the surrounding area. These sites are recommendations not requirements and are highlighted due to their high scores in EV charger GIS siting analysis. However, Prince George's County may have different priorities or location preferences than the ones highlighted below. As such, additional priority options are available for use and consideration in the online interactive map. Prince George's County may consider and move forward with these locations for deployments but should rely on local knowledge, expertise, and priorities when siting EV chargers. See the interactive map to view all priority locations, EEAs, and transportation infrastructure within the county.

Rivertowne Commons Marketplace

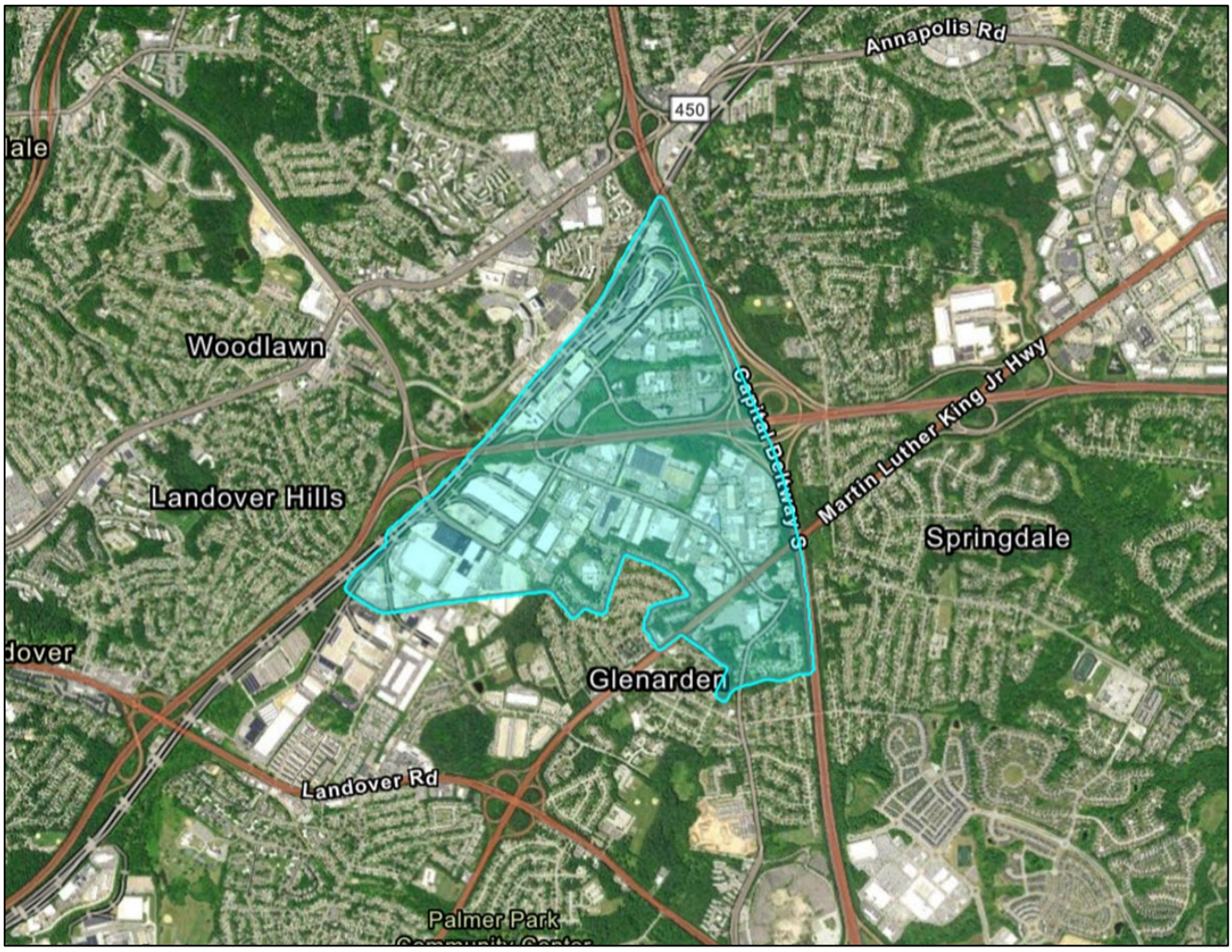
This site includes the Rivertowne Commons Marketplace parking lot in Oxon Hill. This site is close to multiple retail stores, fast food restaurant chains, a movie theater, and a sports entertainment complex. This location is also directly adjacent to I-95, making the location attractive to both EV drivers visiting marketplace and those traveling along I-95. Level 2 chargers are ideal for drivers shopping or dining at this complex, whereas DCFC would generally be better suited for drivers traveling along I-95.

Figure 34 . Rivertowne Commons Marketplace

New Carrolton Train Station

This site covers an area of New Carrolton that includes the New Carrolton train station, corporate buildings, a hotel, and a college affiliated building. This site is also near I-495 and US-50, making it an attractive charging location for both drivers commuting or traveling via the highway and those commuting from the New Carrolton area using the train system. Level 2 chargers are generally ideal for park-and-ride applications, whereas DCFC in this area would better serve drivers traveling along US-50 and I-495.

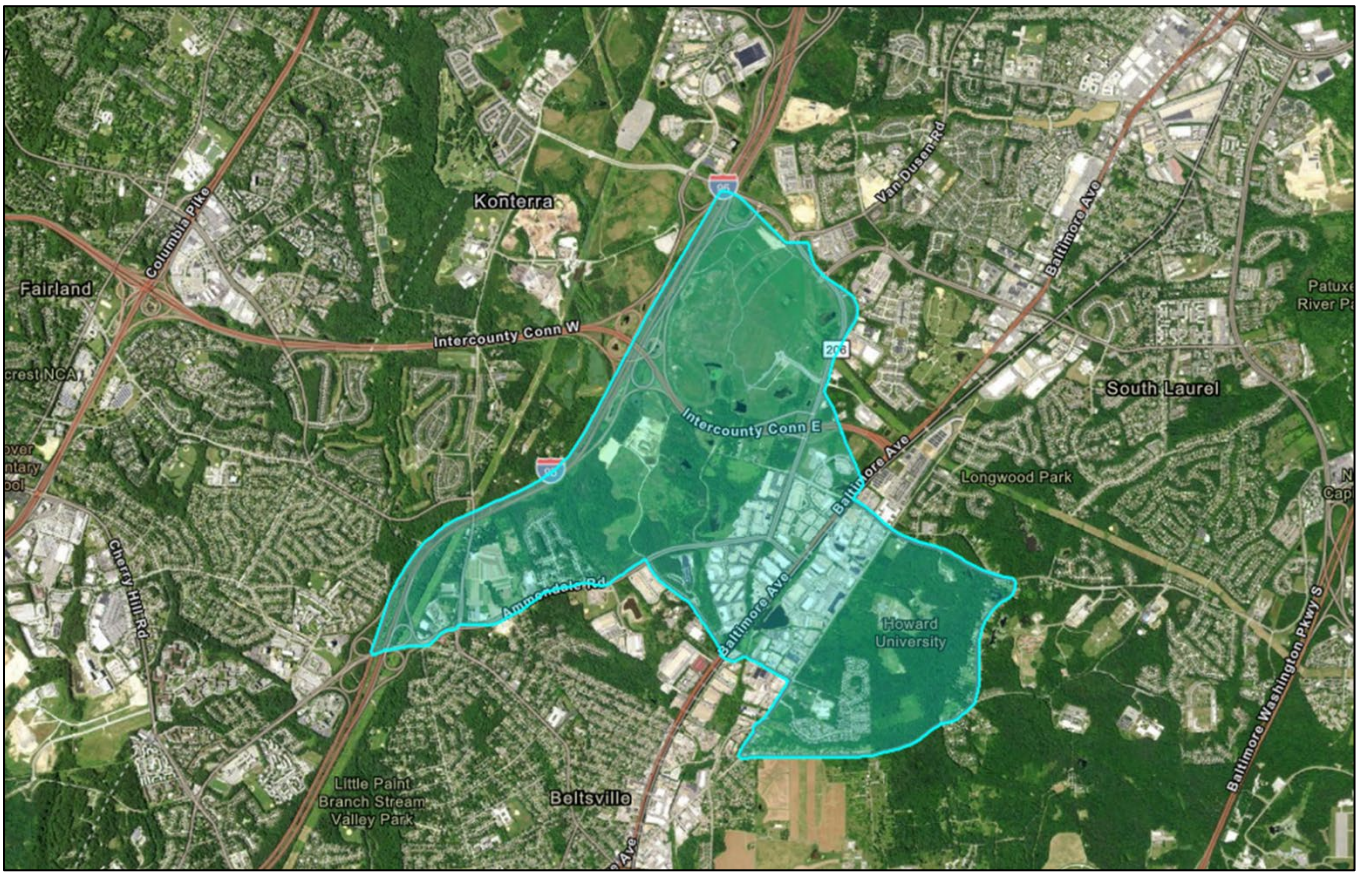
Figure 35 . New Carrolton Train Station



Technology Park or Vansville Recreation Center

Deployment site recommendation 3 is in the Annandale area of the county at one of the business parks or at the Vansville Recreation Center, depending on county priorities. The proposed deployment site is near I-95, multiple residential housing areas, Howard University Beltsville Campus, shopping areas, business parks, an elementary school, and outdoor recreation area making it attractive to residents, students, commuters, interstate travelers, and shopping customers. Level 2 chargers are likely best suited for this location.

Figure 36. Technology Park or Vansville Recreation Center

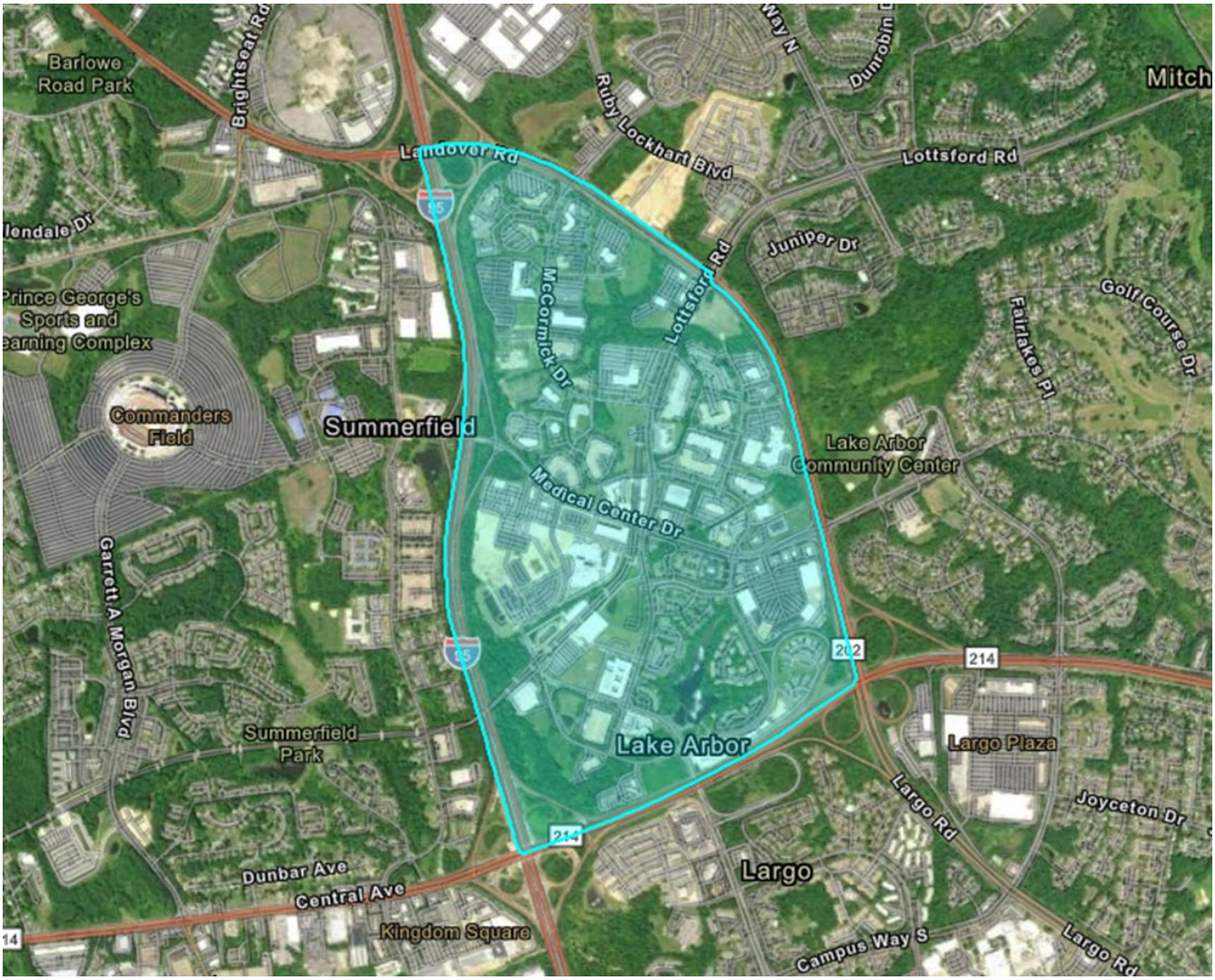


Downtown Largo Train Station

The Largo Train Station in Landover is also located right off I-495 with multiple restaurants, fast food chains, and hotels in the immediate area. Level 2 chargers would be best suited for deployment at a train station, as most drivers park their cars there for the day and return in the evening. The Level 2 chargers would also be serviceable to drivers visiting nearby restaurants and fast-food chains.

This site recommendation is also located near the Commanders Field, which is ranked as a lower priority deployment location. Commanders Field has limited charging already, although they are meant for visitors to the stadium, not for regular use by the surrounding community.

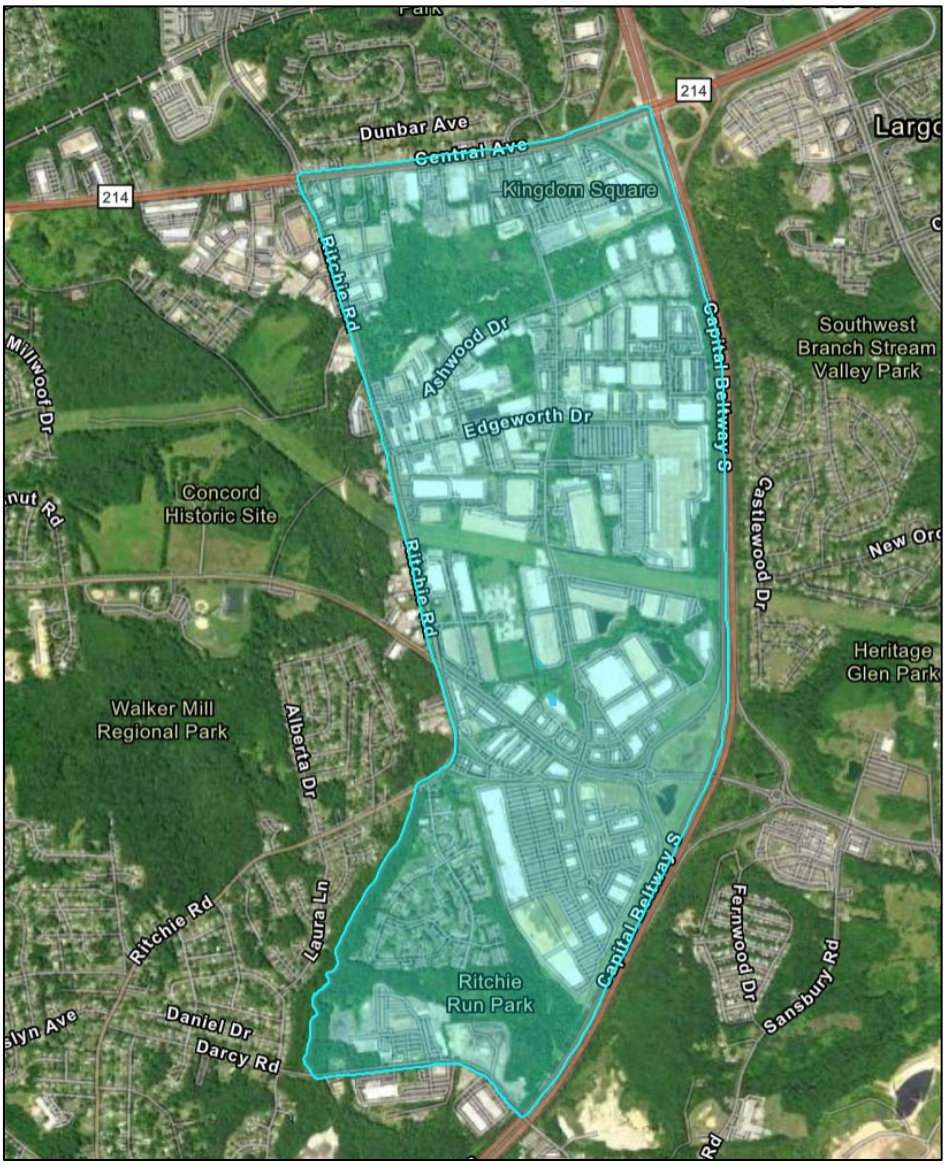
Figure 37 . Downtown Largo Train Station



Hampton Mall Shopping Center

The Hampton Mall Shopping Center in Capitol Heights area is centered around the redeveloped Hampton Park project and contains department stores, hotels, a religious center, and other venues that make it an attractive area for EV charger installations. The proposed site is also situated off I-495 and Central Avenue, both of which see sizeable vehicle traffic throughout the day making this area serviceable to EV drivers both commuting along these routes and those shopping in the area. This site has also been designated a Qualified Opportunity Zone[79] by the Federal government. Level 2 chargers would be most optimal for drivers shopping or visiting Hampton Park. While DCFC would be more convenient for drivers needing to charge their vehicles while traveling on I-495 or Central Avenue.

Figure 38 . Hampton Mall Shopping Center

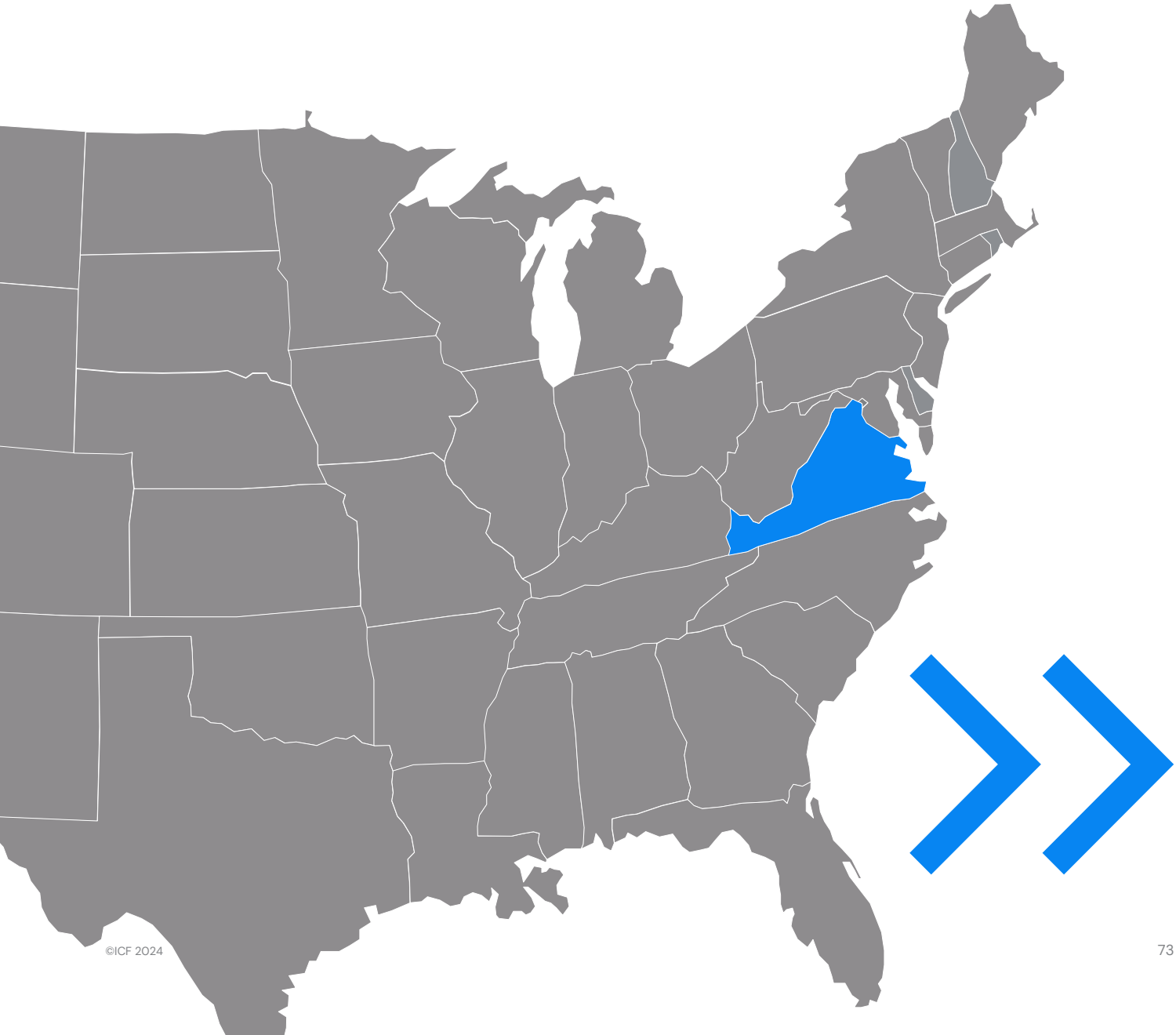


[79] See the U.S. Internal Revenue Service for more information about Qualified Opportunity Zones to spur economic growth and job creation in low-income communities while providing tax benefits to investors: https://www.irs.gov/credits-deductions/businesses/opportunity-zones

6.2 Virginia

Virginia results include the following COG member jurisdictions:

- Arlington County
- City of Alexandria
- Fairfax County
- Loudoun County
- Prince William County



ARLINGTON
VIRGINIA

Total EV Registrations*
3,585

EV % of Total Vehicles
2%

Current EV Charging Ports
146 Level 2
12 DCFC

County Progress
Arlington County has set out to electrify its municipal fleet of vehicles by 2050, building countywide EV infrastructure to support its goal.

**As of December 2023*

Arlington County

Virginia

EV and Charging Infrastructure Deployment Progress

Arlington is utilizing strategies to promote the adoption of EVs across the county as part of the Arlington County Community Energy Plan (CEP), in which EVs are central. Arlington County is adopting the following policies to accelerate EV adoption:

- Electrifying the County vehicle fleet by 2050;
- Accelerating EV adoption in the private and commercial sectors; and,
- Supporting a network of convenient chargers throughout Arlington.

EV Registration Projections

At the end of 2023, Arlington had approximately 3,500 registered EVs, accounting for 2% of total LDVs in the county. Table 15, below, shows the number of EVs and percentage of EVs in the LDV population for low-, medium-, and high-adoption scenarios at benchmark years 2030, 2035, and 2045.[80]

Table 15. Arlington County EV Registration Projections

Growth Scenario	2030		2035		2045	
	# EVs	% EVs	# EVs	% EVs	# EVs	% EVs
Low	18,439	13%	40,024	27%	112,881	73%
Medium	25,428	18%	54,374	37%	119,633	78%
High	32,418	23%	68,723	47%	126,385	82%

Trends in EV Adoption

EV adoption in Arlington has grown exponentially in the last decade, with 1,855 new EV registrations in 2021 alone. While PHEVs initially represented the largest growth area in the county, BEVs have outpaced PHEV registrations since 2019, with two thirds of new registrations being BEVs.

Projected EV Charging Infrastructure Needs

To support the projected EV registrations above, Arlington would need to deploy the following estimated numbers of EV chargers for each scenario and planning year (Table 16). See Appendix 1.B for technical methodology on calculating EV charging port needs.

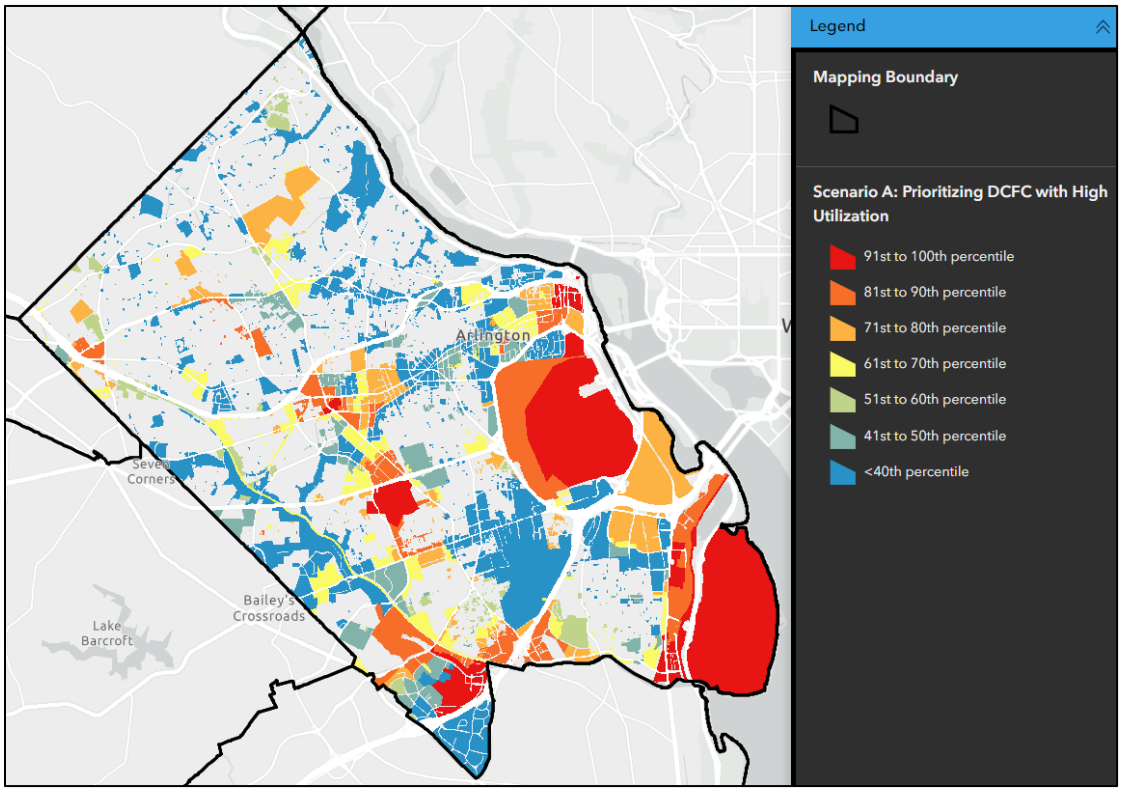
[80] See Appendix 1.A in the REVII Strategy document for technical methodology of EV market growth projections.

Table 16. Arlington County Estimated EV Charging Port Needs

Growth Scenario		Charger Type	2030	2035	2045
Low	EV Charging Port Needs	Public Level 2	556	1,052	3,704
		Public DCFC	19	25	142
	EVs		*18,439*	*40,024*	*112,881*
Medium	EV Charging Port Needs	Public Level 2	766	1,781	3,604
		Public DCFC	27	70	123
	EVs		*25,428*	*54,374*	*119,633*
High	EV Charging Port Needs	Public Level 2	977	2,257	3,810
		Public DCFC	34	85	132
	EVs		*32,418*	*68,723*	*126,385*

Figure 39 summarizes the charger siting analysis results for Arlington County. The charger siting analysis identifies and ranks parcels of land based on their suitability for deploying public EV chargers. Three scenarios were tested. This map shows Scenario A, Prioritizing DCFC with High Utilization. The online map can be used to display all three scenarios. Red parcels are high priority, and blue parcels are low priority. Arlington County may use this map and these estimated charger needs to support and participate in the development of a regional charging network.[81]

Figure 39. Arlington County EV Charging Siting Analysis Results



[81] The COG REVII Strategy EV Siting Parcel Review map and associated shapefiles available for download may be found here: https://mwcog.org/REVIIStrategyMap

EV Charger Deployment Site Recommendations

The sites identified below are examples of locations where Arlington County may choose to deploy or engage and support the private sector in deploying EV chargers. The images of each site are provided at the CBG level, which includes the recommended site and the surrounding area. These sites are recommendations not requirements and are highlighted due to their high scores in the EV charger GIS siting analysis. However, Arlington County may have different priorities or location preferences than the ones highlighted below. As such, additional priority options are available for use and consideration in the online interactive map. Arlington County may consider and move forward with these locations for deployments but should rely on local knowledge, expertise, and priorities when siting EV chargers. See the interactive map to view all priority locations, EEAs, and transportation infrastructure within the county.

St. Thomas More Cathedral School

This area of Arlington includes two schools, a church, and MFH, as well as being directly adjacent to Arlington Boulevard. This parcel would be an attractive EV charging location for residents of MFH, parents, students, and staff of the adjacent schools, and travelers along Arlington Boulevard. DCFC would be ideal to serve drivers along Arlington Boulevard, while parents, students, and school staff would benefit best from Level 2 chargers.

Figure 40. Thomas More Cathedral School

Wilson Boulevard and Glebe Road

This location covers a dense area of Ballston including hotel space, apartment buildings, office buildings, a shopping center, a restaurant, and a school. This site is also directly adjacent to a busy section of Glebe Road. While there are existing charging stations in the area, this area experiences high enough trip volume and has several site characteristics that may warrant additional charging. EV chargers in the area would attract drivers, diners, school parents and staff, hotel guests, and office and retail workers. Level 2 chargers would best apply to this parcel.

Figure 41. Wilson Boulevard and Glebe Road

Columbia Pike and George Mason Drive

This location covers a multiuse apartment building and shopping center that includes a grocery store, veterinary office, restaurants, and a nearby park. The site is directly located off Columbia Pike. This site would attract both residents of the apartment complex, drivers, shoppers and commuters. A DCFC would best serve the needs of shoppers running quick errands, as well as the commuters going to the nearby Foreign Services Institute, which is not recommended as a charging site in this study. There are several existing Level 2 chargers within a few miles, but for commuters, the closest DCFC is over 2 miles away at the Crossroads Center at Bailey's Crossroads.

Figure 42. Columbia Pike and S George Mason Drive

East Falls Church Metro Station

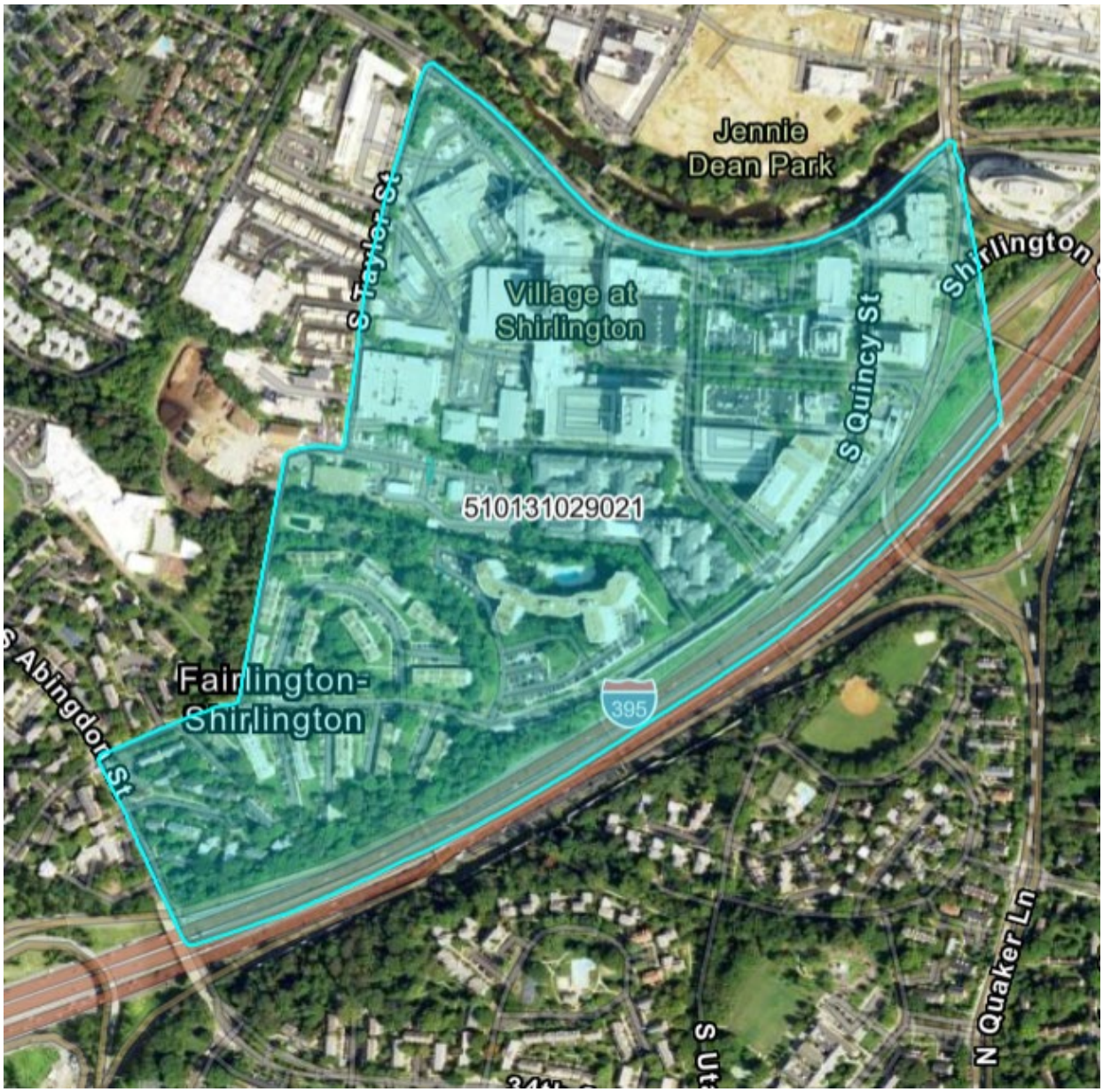
This location is adjacent to the East Falls Church Metro Station, directly adjacent to I-66, and close to MFH. EV chargers at this site would be appealing to Metro commuters who would be able to fuel their EVs while taking advantage of Metro connection to the District and beyond. Multiple Level 2 chargers could be installed directly in the Metro Park & Ride daily parking lot, but the County would need to partner with WMATA to establish charging time limits and etiquette as well as address accessibility options for accessing the parking lot. Alternatively, the County and WMATA could explore deploying DCFC within or directly adjacent to the Kiss & Ride parking, to support commuters and local residents.

Figure 43. East Falls Church Metro Station

Shirlington

This location encompasses the Village at Shirlington, which is an urban village with a dense mix of apartments, restaurants, shopping, a cinema, and a grocery store along a pedestrian friendly promenade. The site contains community-focused locations including a branch of the Arlington County Library, a performing arts theater, and the Shirlington Bus Station. The site is also adjacent to a recreational complex and sports facility. EV chargers would appeal to shoppers and entertainment goers, as well as drivers coming off I-395 due to its proximity to the highway. A mix of Level 2 and DCFC would be ideal. While there are some charging stations at the Shirlington Tower Garage and the Village at Shirlington, the high trip volume and parcel characteristics indicate that this area may require additional charging.

Figure 44 . Shirlington



City of Alexandria

Virginia

Total EV Registrations*

2,475

EV % of Total Vehicles

2%

Current EV Charging Ports

110 Level 2

6 DCFC

City Progress

Citywide goal for 50% of new vehicle sales be electric by 2030, and 100% of new vehicle sales be electric by 2050.

**As of December 2023*

EV and Charging Infrastructure Deployment Progress

The City of Alexandria is creating a sustainable EV ecosystem where everyone can benefit from transportation electrification. In its Energy and Climate Change Action Plan, the City has set a goal of 50% of new vehicle sales be electric by 2030, and 100% of new vehicle sales be electric by 2050.[82] Alexandria's transportation electrification actions have already allowed for EV adoption and EV charger deployment. The City of Alexandria's actions include:

- Creating and implementing the EV Charging Infrastructure Readiness Strategy (EVRS), a roadmap of 31 recommendations for how the City can promote EV adoption in the community and meet current and future EV charging needs;
- Promoting federal and utility EV and EV charger programs and incentives;
- Approving the Alternative Fuels Policy and setting a goal of achieving a 100% zero-emission fleet by FY 2040.[83] Alexandria's transit agency, DASH, has set a more aggressive goal than what is included in the City's plans for their bus fleet to 100% zero-emission by 2037; and
- Conducting public outreach activities, such as EV showcases and EV ride and drives, where the public can test drive vehicles, E-bikes, and scooters.

EV Registration Projections

At the end of 2023, Alexandria had approximately 2,500 registered EVs, accounting for 2% of total LDVs in the county. Table 17, below, shows the number of EVs and percentage of EVs in the LDV population for low-, medium-, and high-adoption scenarios at benchmark years 2030, 2035, and 2045.[84]

Table 17. City of Alexandria EV Registration Projections

Growth Scenario	2030		2035		2045	
	# EVs	% EVs	# EVs	% EVs	# EVs	% EVs
Low	12,420	10%	26,593	21%	75,528	53%
Medium	19,552	16%	42,451	33%	93,259	66%
High	26,685	22%	58,310	46%	111,800	79%

[82] City of Alexandria. Energy and Climate Change Action Plan. Retrieved from: https://www.alexandriava.gov/energy/energy-and-climate-change-action-plan

[83] City of Alexandria. 2023. Environmental Action Plan 2040. Retrieved from: https://www.alexandriava.gov/eco-city-alexandria/environmental-action-plan-2040

[84] See Appendix 1.A in the REVII Strategy document for technical methodology of EV market growth projections.

Trends in EV Adoption

Alexandria created the EVRS to reduce transportation emissions, which made up 34% of Alexandria's total GHG emissions in 2019.[85] Even so, 5% of new passenger vehicles in Alexandria were purchased as EVs in 2019 when the national average was 1% to 2% EVs.[86] Based on the actions outlined in the EVRS, this number is projected to grow to nearly 40% by 2030. In 2021, an estimated 1% of all vehicles in Alexandria were already EVs.[87] The City EVRS roadmap helps ensure that Alexandria will be prepared to support widespread passenger vehicle electrification.

Projected EV Charging Infrastructure Needs

To support the projected EV registrations above, Alexandria would need to deploy the following estimated numbers of EV chargers for each scenario and planning year. See Appendix 1.B for technical methodology on calculating EV charging port needs.

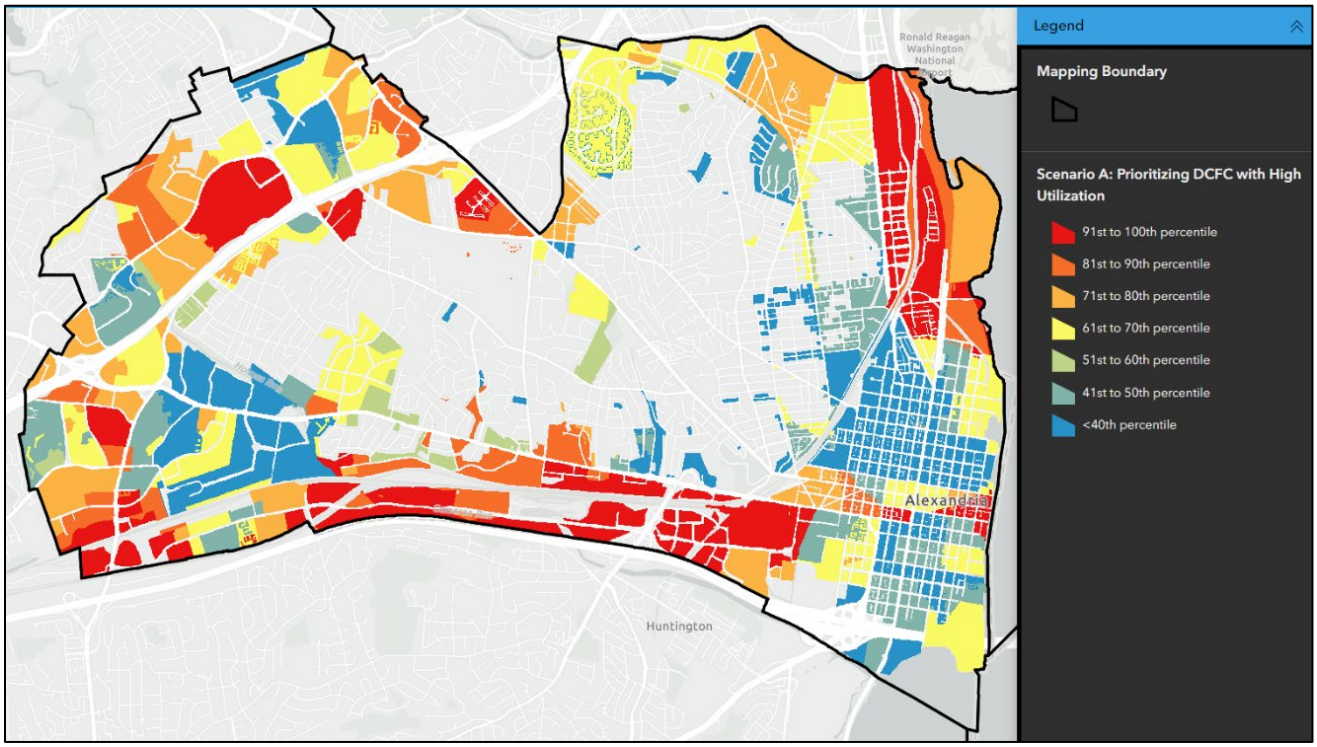
Table 18. City of Alexandria Estimated EV Charging Port Needs

Growth Scenario		Charger Type	2030	2035	2045
Low	EV Charging Port Needs	Public Level 2	375	802	2,470
		Public DCFC	13	28	94
	EVs		*12,420*	*26,593*	*75,528*
Medium	EV Charging Port Needs	Public Level 2	589	1,116	3,068
		Public DCFC	21	37	119
	EVs		*19,552*	*42,45`*	*93,529*
High	EV Charging Port Needs	Public Level 2	805	1,916	3,670
		Public DCFC	28	73	141
	EVs		*26,685*	*58,310*	*111,800*

Figure 45 summarizes the charger siting analysis results for the Alexandria. The analysis identifies and ranks parcels of land based on their suitability for deploying public EV chargers. Three scenarios were tested. This map shows Scenario A, Prioritizing DCFC with High Utilization. The online map can be used to display all three scenarios. Red parcels are high priority, and blue parcels are low priority. Alexandria may use this map and these estimated charger needs to support and participate in the development of a regional charging network.[88]

[85] City of Alexandria. 2021. Electric Vehicle Charging Infrastructure Readiness Strategy. Retrieved from: https://www.alexandriava.gov/sites/default/files/2024-06/alexandria_evrs_final.pdf
[86] Eco-City Alexandria. FACTSHEET: Alexandria Electric Vehicle Charging Infrastructure Readiness Strategy (EVRS). Retrieved from: https://media.alexandriava.gov/docs-archives/tes/eco-city/info/alexandria=evrs=factsheet=final.pdf
[87] City of Alexandira. FY 23 Budget Q&A. Retrieved from: https://www.alexandriava.gov/budget-memos/fy-23-budget-qa-047-i-would-like-additional-detail-on-how-many-personal-car-owners-do
[88] The COG REVII Strategy EV Siting Parcel Review map and associated shapefiles available for download may be found here: https://mwcog.org/REVIIStrategyMap

Figure 45. City of Alexandria EV Charging Siting Analysis Results



EV Charger Deployment Site Recommendations

The sites identified below are examples of locations where the City of Alexandria may choose to deploy or engage and support the private sector in deploying EV chargers. The images of each site are provided at the CBG level, which includes the recommended site and the surrounding area. These sites are recommendations not requirements and are highlighted due to their high scores in EV charger GIS siting analysis. However, the City of Alexandria may have different priorities or location preferences than the ones highlighted below. As such, additional priority options are available for use and consideration in the online interactive map. The City of Alexandria may consider and move forward with these locations for deployments but should rely on local knowledge, expertise, and priorities when siting EV chargers. See the interactive map to view all priority locations, EEAs, and transportation infrastructure within the county.

Van Dorn Street Metro Station

One site recommendation is the Van Dorn Street Metro Station. Despite having a paid Park & Ride parking, this site has no existing EV chargers nearby. The Metro station is near a ramp for I-95 and already has 46 metered parking spaces with options for all day parking. This would be an ideal site to deploy Level 2 chargers for commuters and visitors. The site is near sports facilities and businesses along Eisenhower Avenue, attracting more drivers that may need to recharge their vehicles. The Van Dorn Street Metro Station is also near MFH and an EEA, which often lacks access to EV chargers. If this location is a priority for Alexandria, the City would need to partner with WMATA to establish Level 2 charging time limits and etiquette as well as address accessibility options for accessing the parking lot. Alternatively, the County and WMATA could explore deploying DCFC within or directly adjacent to the Kiss & Ride parking, to support commuters and local residents.

Figure 46. Van Dorn Street Metro Station

North Potomac Yard

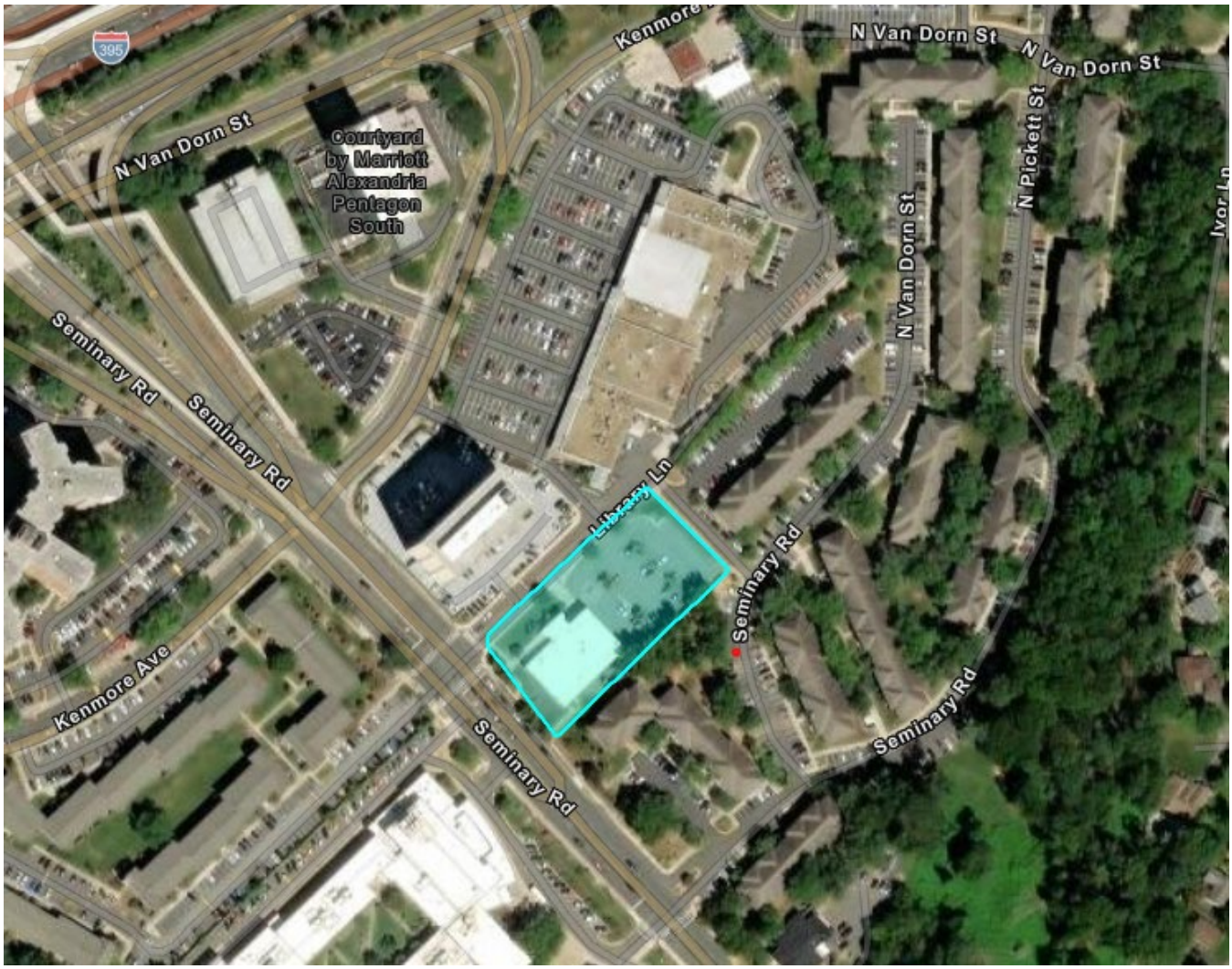
Another site recommendation is North Potomac Yard. While this site already has 22 Level 2 chargers nearby, it experiences high utilization and is along Route 1 (Richmond Highway) corridor, which is a major commuter and local artery for traffic. The site includes a large shopping center, so charging would be convenient for customers. It is also near an EEA and MFH. This site that experiences such heavy traffic may benefit from additional DCFC. This site includes the new Potomac Yard Metro Station, however there is no parking specifically available for the Metro. However, commuters may park in nearby communities to walk to the Metro.

Figure 47 . North Potomac Yard

Ellen Coolidge Burke Branch Library

The Ellen Coolidge Burke Branch Library is located near an I-395 ramp and a shopping center, making it apt for high utilization. The site has no existing EV chargers nearby but is close to an EEA and MFH and would provide crucial EV charging access to residents. Libraries often host community events, making them well-suited for Level 2 charging as visitors will dwell for longer periods of time.

Figure 48. Ellen Coolidge Burke Branch Library



Alexandria Commons

The Alexandria Commons shopping center is not near any existing Level 2 or DCFC. While Alexandria Commons is not near any major highways or park and rides, it is close to MFH and an EEA. Additionally, shopping centers are convenient places for drivers to charge their EVs Level 2 stations since they are already parking for extended periods of time.

Figure 49. Alexandria Commons

Shops of Foxchase

Similar to Alexandria Commons, the Shops of Foxchase are not near any existing DCFC or Level 2 chargers. The shopping center contains a grocery store, as well as restaurants and shops, and is located near MFH and an EEA. It is also located right off of Duke Street, a busy arterial roadway in Alexandria, which is not far from I-395. This means that Level 2 charging at this site would be both convenient to commuters and other drivers and would increase access to EV chargers for local residents in an area where drivers already dwell for longer periods of time.

Figure 50 . Shops of Foxchase

Total EV Registrations*

21,337

EV % of Total Vehicles

2%

Current EV Charging Ports

848 Level 2

153 DCFC

County Progress

Using EV adoption as a performance metric on its Climate Action Dashboard.

**As of December 2023*

Fairfax County

Virginia

EV and Charging Infrastructure Deployment Progress

Fairfax County's dedication to building sustainable communities is reinforced by county plans and policies, including the Fairfax Countywide Strategic Plan. The Plan highlights Environment and Energy as one of ten Community Outcome Areas and utilizes EV adoption selected as performance metric[89]. In addition to the Fairfax Countywide Strategic Plan, the County has supported EV adoption and charging infrastructure deployment within its jurisdiction through a variety of plans and initiatives. The initiatives Fairfax County is taking include:

- The Fairfax County Community-Wide Energy and Climate Action Plan identifies specific EV targets and resources, including increasing EV adoption to at least 15% of LDV registrations by 2030.
- The County's Operational Energy Strategy sets a target to achieve 100 percent fleet electrification by 2035.
- Charge Up Fairfax is a program that financially and technically supports residential community associations (ex. homeowner's associations) with charging infrastructure installation.
- The County's Climate Action Dashboard tracks EV adoption.
- The County's education and awareness efforts have included web content, resource materials, videos and webinars to support EV adoption.
- The Fairfax County Board of Supervisors decided to waive all electrical and building permit fees for EV chargers.

EV Registration Projections

At the end of 2023, Fairfax County had approximately 21,300 registered EVs, accounting for 2% of total LDVs in the county. Table 19, below, shows the number of EVs and percentage of EVs in the LDV population for low-, medium-, and high-adoption scenarios at benchmark years 2030, 2035, and 2045.[90]

Table 19. Fairfax County EV Registration Projections

Growth Scenario	2030		2035		2045	
	# EVs	% EVs	# EVs	% EVs	# EVs	% EVs
Low	113,360	12%	248,669	24%	730,329	63%
Medium	165,096	17%	361,136	35%	823,974	71%
High	216,831	22%	473,602	46%	917,619	79%

[89] Countywide Strategic Plan.pdf (fairfaxcounty.gov)

[90] See Appendix 1.A in the REVII Strategy document for technical methodology of EV market growth projections.

Trends in EV Adoption

EV adoption in Fairfax County has significantly increased in the last five years but remains below target rates. BEV and PHEV adoption grew from less than 0.3% in 2016, to 1.1% in 2020, and approximately 2% in 2023. The County is targeting 15% EV adoption by 2030, or roughly 125,000 vehicles. The County has set a goal to be carbon neutral by 2050, which would require 42% of LDV registrations to be EVs. Fairfax County aims to transition the county fleet fully to EVs or ZEVs by 2035.

Projected EV Charging Infrastructure Needs

To support the projected EV registrations above, Fairfax County would need to deploy the following estimated numbers of EV chargers for each scenario and planning year. See Appendix 1.B for technical methodology on calculating EV charging port needs.

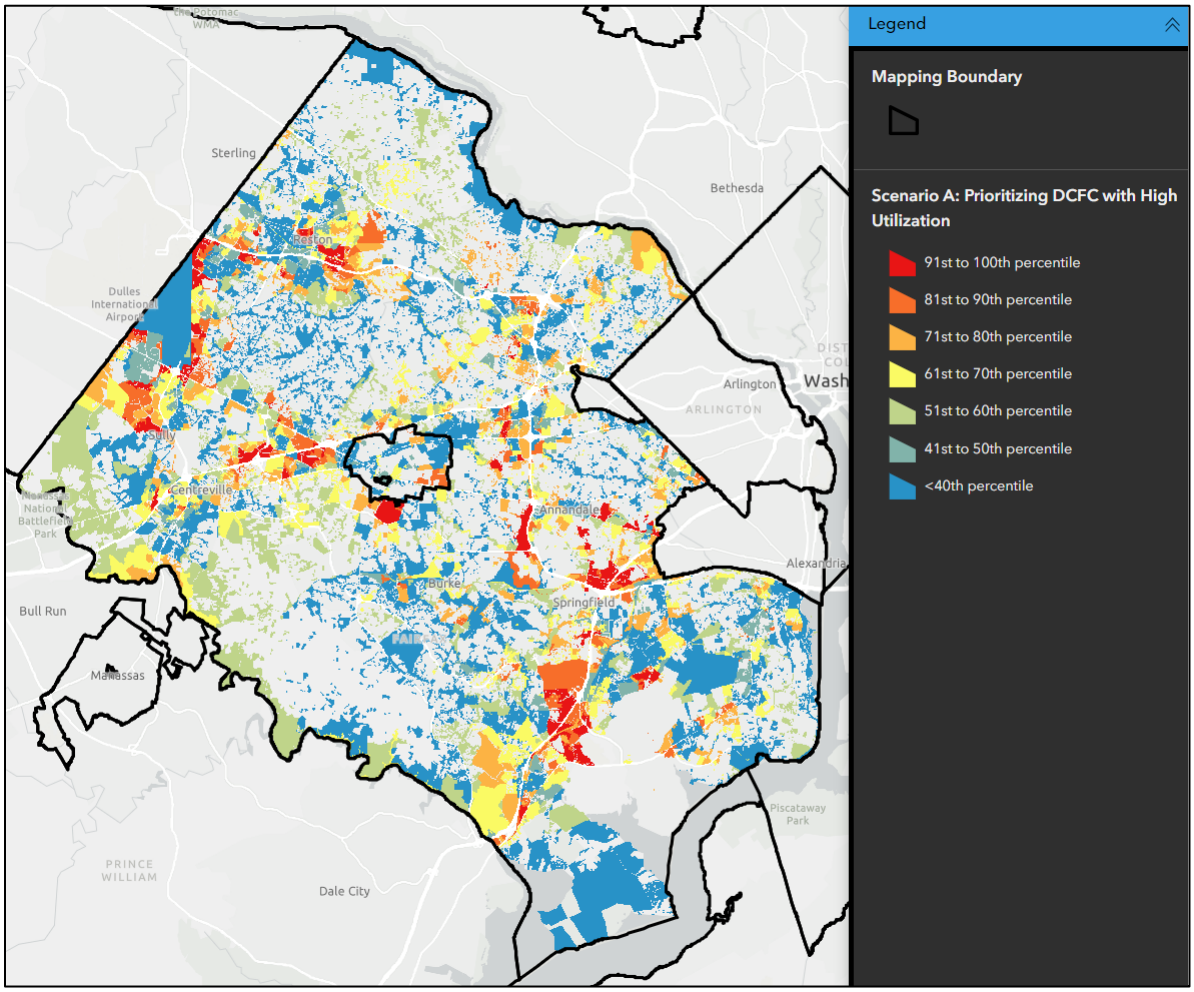
Table20 . Fairfax CountyEstimated EV ChargingPort Needs

Growth Scenario		Charger Type	2030	2035	2045
Low	EV Charging Port Needs	Public Level 2	3,419	7,489	16,578
		Public DCFC	120	259	548
	EVs		*113,360*	*248,669*	*730,329*
Medium	EV Charging Port Needs	Public Level 2	4,980	9,496	18,705
		Public DCFC	170	314	620
	EVs		*165,096*	*361,136*	*823,974*
High	EV Charging Port Needs	Public Level 2	6,542	12,449	21,077
		Public DCFC	225	414	691
	EVs		*216,831*	*473,602*	*917,619*

Figure 51 summarizes the charger siting analysis results for Fairfax. The charger siting analysis identifies and ranks parcels of land based on their suitability for deploying public EV chargers. Three scenarios were tested. This map shows Scenario A, Prioritizing DCFC with High Utilization. The online map can be used to display all three scenarios. Red parcels are high priority, and blue parcels are low priority. Fairfax County may use this map and these estimated charger needs to support and participate in the development of a regional charging network.[91]

[91] The COG REVII Strategy EV Siting Parcel Review map and associated shapefiles available for download may be found here: https://mwcog.org/REVIIStrategyMap

Figure 51 . Fairfax CountyEV Charging Siting Analysis Results



EV Charger Deployment Site Recommendations

The sites identified below are examples of locations where Fairfax County may choose to deploy or engage and support the private sector in deploying EV chargers. The images of each site are provided at the CBG level, which includes the recommended site and the surrounding area. These sites are recommendations not requirements and are highlighted due to their high scores in EV charger GIS siting analysis. However, COG recognizes that Fairfax County may have different priorities or location preferences than the ones highlighted below. As such, additional priority options are available for use and consideration in the online interactive map. Fairfax County may consider and move forward with these locations for deployments but should rely on local knowledge, expertise, and priorities when siting EV chargers. See the interactive map to view all priority locations, EEAs, and transportation infrastructure within the county.

Backlick Plaza Shopping Center

The Backlick Plaza Shopping Center parking lot in Springfield is attractive to shoppers, drivers, and VRE commuters. The shopping center is directly adjacent to the I-495, I-95, and I-395 intersection as well as the VRE Backlick Road Rail Station. There are currently no DCFC nearby. The site is also near an EEA and MFH.

Figure 52. Backlick Plaza Shopping Center

George Mason University

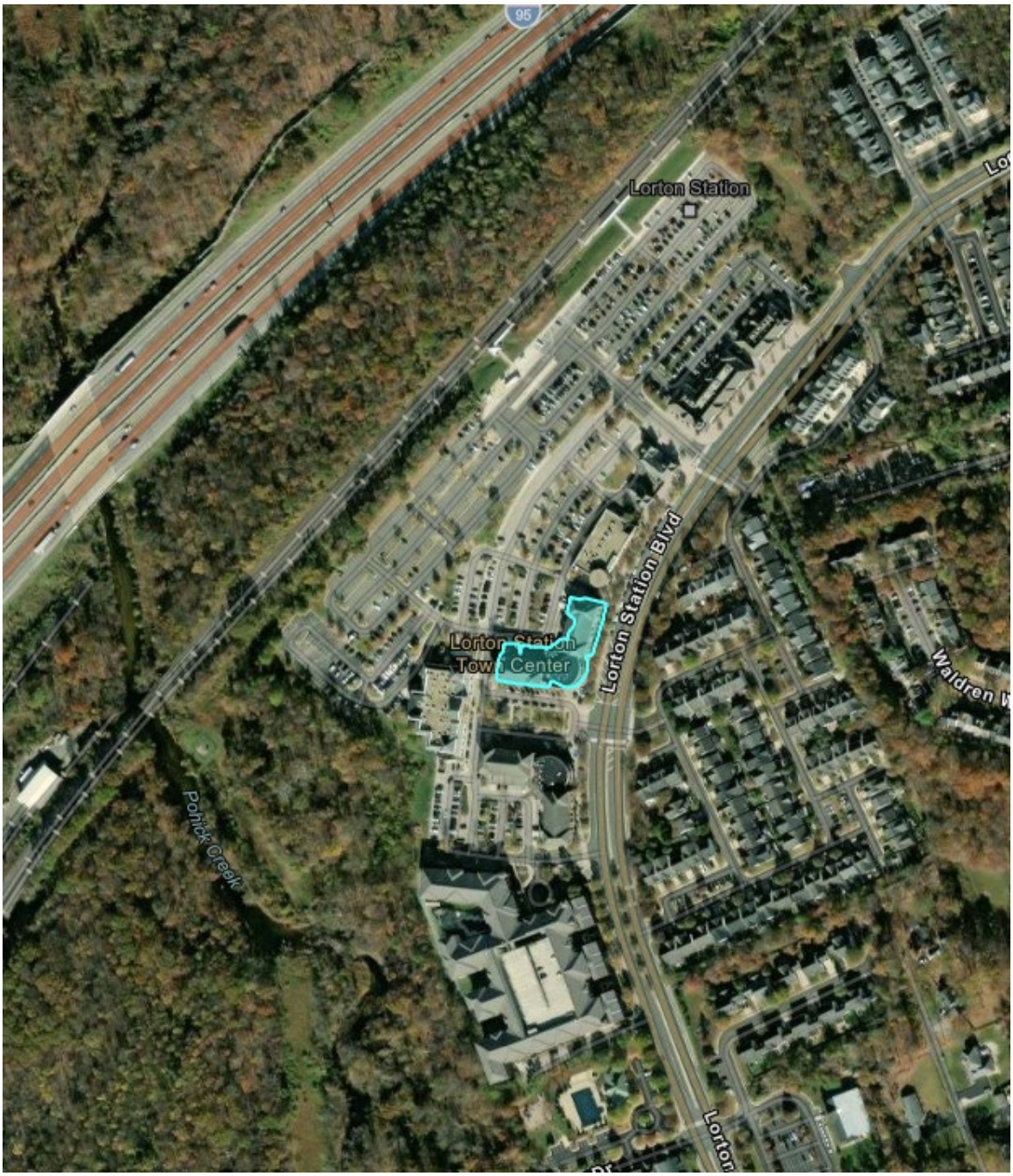
This is an activity center with over 40,000 students and 2,000 faculty members (not including support staff). The campus includes the EagleBank Arena, which is a major venue for sporting and other events that also attract non-university-affiliated individuals. The University is also within an EEA. While this site has 12 Level 2 charging ports already, this site is an ideal location for numerous Level 2 chargers publicly-available for the campus community and visitors. George Mason is also located directly adjacent to Braddock Road and Ox Road/Chain Bridge Road, which are already major arterials with high volumes of traffic, yet the nearest DCFC is a few miles from campus. While technically outside of this CBG, the University Mall shopping center across Braddock Road would be an ideal location to deploy DCFC.

Figure 53. George Mason University

Lorton Station Town Center

Lorton Station Town Center is a mixed-use development with retail space and 32 condominiums. It is also an attractive site for drivers and travelers as it is directly adjacent to the Amtrak and VRE Lorton stations, as well as I-95. It is within an EEA and there are currently no nearby chargers, so Level 2 chargers would benefit this site.

Figure 54. Lorton Station Town Center



Fair Lakes Shopping Center

Fair Lakes Shopping Center in Fairfax is a large and busy shopping center containing big box retailers (Walmart, Target), as well as a variety of other shops and restaurants. Located right off of I-66 and the Fairfax County Parkway, the shopping center is an attractive site for either DCFC or Level 2 chargers. Level 2 chargers would be well utilized by shoppers from the surrounding residential neighborhoods. Drivers along I-66 and the Fairfax County Parkway could recharge at DCFC or Level 2 chargers, allowing them to rest and potentially shop at the center. The location is within an EEA, and nearby neighborhoods include many MFH developments.

Figure 55. Fair Lakes Shopping Center

Cub Run Recreation Center

The Cub Run Recreation Center in Chantilly is run by the Fairfax County Park Authority in an EEA. The recreation center offers pool, indoor gym, and court facilities as well as drop-in childcare, classes, and camps. The site is a good location for Level 2 chargers for the community to use while accessing the recreation center. Directly adjacent to Cub Run is Westfield High School. A cooperating agreement between the Park Authority and Westfield High could also allow a selection of teachers, staff, students, and/or school visitors to also utilize the chargers. If this is permitted, then a DCFC that enforces short-term parking restrictions may be a more suitable charger.

Figure 56 . Cub Run Recreation Center

Total EV Registrations*

10,737

EV % of Total Vehicles

3%

Current EV Charging Ports

144 Level 2

29 DCFC

County Progress

Loudon County is taking a holistic view of its municipal fleet electrification by setting specific goals for different vehicle types.

**As of December 2023*

Loudoun County

Virginia

EV and Charging Infrastructure Deployment Progress

Over the past several years, Loudoun County has embarked on various plans and policies to promote EV adoption and deploy associated charging infrastructure within its jurisdiction. These actions include:

- The adoption of a plan to replace more than a fifth of the county's gasoline powered fleet with either ZEVs or PHEVs.
- The greenlighting of a plan to electrify sedans and small sport utility vehicles which currently represent 23% of the county fleet.
- Implementation procurement focused on low or zero emission transit buses.
- The installation of EV chargers at County buildings for County and employee vehicles.

EV Registration Projections

At the end of 2023, Loudon County had approximately 10,700 registered EVs, accounting for 3% of total LDVs in the county. Table 21, below, shows the number of EVs and percentage of EVs in the LDV population for low-, medium-, and high-adoption scenarios at benchmark years 2030, 2035, and 2045.[92]

Table21 . Loudon County EVRegistration Projections

Growth Scenario	2030		2035		2045	
	# EVs	% EVs	# EVs	% EVs	# EVs	% EVs
Low	47,381	13%	108,837	28%	343,209	77%
Medium	64,651	18%	143,011	37%	344,685	77%
High	81,921	23%	177,186	46%	346,162	78%

Trends in EV Adoption

Loudon County has one of the highest percentages of EV deployment for the region. Over the last decade, Loudoun County has seen tremendous growth in light-duty EV adoption. While EV growth slowed between 2021 and 2022, 2023 saw the addition of almost 4,000 new EVs on the road. This growth is expected to continue over the next 20 years, with EVs reaching almost 80% of the market share in 2045. The county does not expect consumers to make these changes alone and has engaged in efforts to electrify 20% of their fleet vehicles and procuring low- or zero-emission transit buses.

[92] See Appendix 1.A in the REVII Strategy document for technical methodology of EV market growth projections.

Projected EV Charging Infrastructure Needs

To support the projected EV registrations above, Loudon County would need to deploy the following estimated numbers of EV chargers for each scenario and planning year. See Appendix 1.B for technical methodology on calculating EV charging port needs.

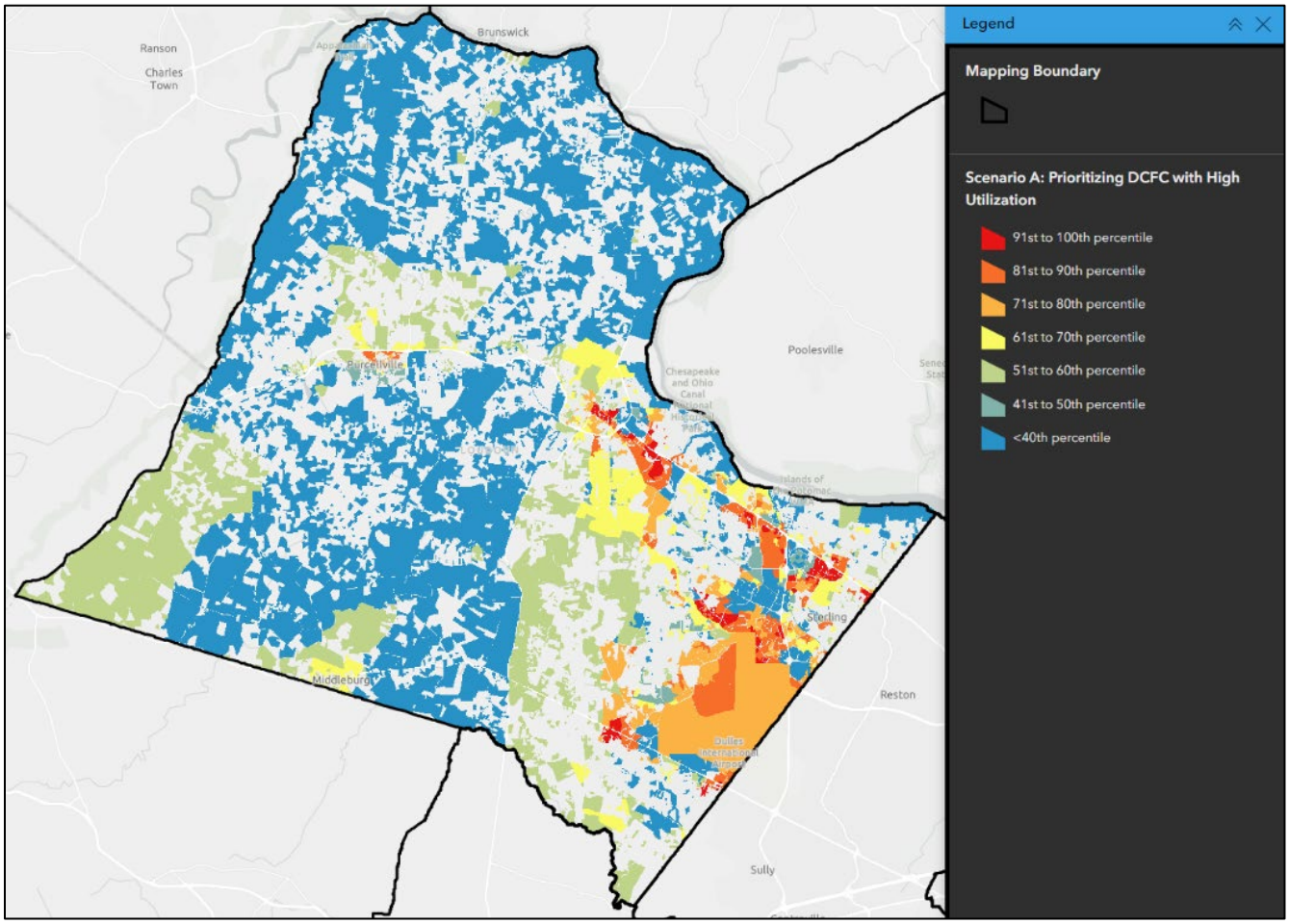
Table 22. Loudon County Estimated EV Charging Port Needs

Growth Scenario		Charger Type	2030	2035	2045
Low	EV Charging Port Needs	Public Level 2	1,558	3,568	9,023
		Public DCFC	60	138	298
	EVs		*47,381*	*108,837*	*343,209*
Medium	EV Charging Port Needs	Public Level 2	2,118	4,314	9,061
		Public DCFC	80	151	300
	EVs		*64,651*	*143,011*	*344,685*
High	EV Charging Port Needs	Public Level 2	2,689	5,346	9,099
		Public DCFC	102	186	303
	EVs		*81,921*	*177,186*	*346,162*

Figure 57 summarizes the charger siting analysis results for Loudoun County. The charger siting analysis identifies and ranks parcels of land based on their suitability for deploying public EV chargers. Three scenarios were tested. This map shows Scenario A, Prioritizing DCFC with High Utilization. The online map can be used to display all three scenarios. Red parcels are high priority, and blue parcels are low priority. Loudoun County may use this map and these estimated charger needs to support and participate in the development of a regional charging network.[93]

[93] The COG REVII Strategy EV Siting Parcel Review map and associated shapefiles available for download may be found here: https://mwcog.org/REVIIStrategyMap

Figure 57. Loudon County EV Charging Siting Analysis Results



EV Charger Deployment Site Recommendations

The sites identified below are examples of locations where Loudoun County may choose to deploy or engage and support the private sector in deploying EV chargers. The images of each site are provided at the CBG level, which includes the recommended site and the surrounding area. These sites are recommendations not requirements and are highlighted due to their high scores in EV charger GIS siting analysis. However, Loudoun County may have different priorities or location preferences than the ones highlighted below. As such, additional priority options are available for use and consideration in the online interactive map. Loudoun County may consider and move forward with these locations for deployments but should rely on local knowledge, expertise, and priorities when siting EV chargers. See the interactive map in Appendix 2.C to view all priority locations, EEAs, and transportation infrastructure within the county.

Pleasant Valley Road and Little River Turnpike

Route 50 (Little River Turnpike) in the South Riding area of Loudoun County sees steady amounts of traffic from commuters and residents for shopping and other purposes each day. The area around the intersection of Pleasant Valley Road and Route 50 on either side of the roadway would be good locations for chargers, as there is a 7-11 on one side and a Popeyes and Silver Diner on the other. DCFC would be most optimal for deployment here as its most frequent users will probably be commuters along Route 50.

Figure 58. Pleasant Valley Road and Little River Turnpike

Village at Leesburg Parking Lot

This mixed-use development is home to higher-density MFH units and various retail stores, restaurants, and entertainment facilities. This includes a Wegman's grocery store, Bowlero and a CMI Cinema movie theater complex. The site is also directly off Leesburg Pike, a major commuter route in the northern Virigina area. The deployment site would be suitable for Level 2 chargers for those visiting the stores, attractions, or MFH residents in the area, while DCFC would be most optimal for commuters on Leesburg Pike looking to charge their vehicles.

Figure 59 . Village at Leesburg Parking Lot

Potomac Run Plaza Parking Lot

The Potomac Run Plaza in Sterling is a busy shopping area with retail stores, restaurants, and personal services such as banks and medical services. The Potomac Run Plaza is also right off Leesburg Pike which makes it an attractive place for commuters to stop and charge. This deployment site can host Level 2 chargers for shoppers and Plaza visitors while also hosting DCFC for commuters along Leesburg Pike, and in the sprawling garden-style office park in this CBG between the Potomac Run Plaza and the Dulles Town Center mall to the northwest, looking to charge their vehicles before heading back on the road.

Figure 60 . Potomac Run Plaza Parking Lot

Loudon Station Parking Lot

Loudon Station located in Ashburn is home to a variety of retail stores, banks, a gas station, and restaurants, situated near MFH and Quantum Park offices. This makes this site optimal for deployment of both Level 2 chargers for shopping visitors and DCFC for commuters and residents. It's located off the Dulles Toll Road and Ashburn Village Boulevard and adjacent to the Ashburn Metro station on the Silver Line. While there are numerous Level 2 chargers in Ashburn Metro South Parking Garage, they are only intended for Metro commuters.

Within this CBG to the southeast, past Loudon Metro Station and closer to the airport, are a series of warehouses and office parks which are also contributing to trips to this area along Sully Road/Darrell Green Boulevard. There are already a few Levels 2 charging ports available in this corner of the CBG, but more are needed. Multiple Level 2 charging stations spread out throughout this industrial area would be ideal, as most employees won't walk across multiple office complexes to park their vehicles daily.

Figure 61 . Loudon Station

One Loudoun Park and Ride

One Loudoun is a large-scale mixed-use new urban destination in eastern Loudoun County featuring popular restaurants, entertainment options, shopping, and recreation activities in a walkable environment. It includes the One Loudoun Park and Ride, which is recommended as an optimal location for Level 2 charging as it can service residents who live in the new MFH units, visitors to One Loudoun, and those who are using the park and ride to reach other destinations.

Figure 62. One Loudoun Park and Ride

Total EV Registrations*

5,321

EV % of Total Vehicles

1%

Current EV Charging Ports

64 Level 2

26 DCFC

County Progress

Prince William County is supporting countywide EV adoption through innovative policy and financing mechanisms

**As of December 2023*

Prince William County

Virginia

EV and Charging Infrastructure Deployment Progress

In recent years, Prince William County has actively promoted EV adoption and deployed associated charging infrastructure within its jurisdiction. EV adoption is a key action item in their 2023 Community Energy and Sustainability Master Plan, supporting the county's 2030 GHG reduction strategy. The specific action items listed in the Master Plan include:

- Encouraging the development of and cost-reduction programs for residents and businesses to purchase ZEVs or install chargers such as streamlined permitting and "group-buy" programs for EV chargers, or EV purchasing co-ops.
- Expanding public EV chargers especially along main routes and in popular destinations, by developing an EV Infrastructure Plan to guide community deployment and considerations for electric bike charging.
- Transitioning the county fleet to ZEVs and ensuring the supporting infrastructure is open to other fleets.

As of 2022, Prince William County added their first BEV to their fleet and expects to have an all BEV, PHEV, or HEV fleet by 2024, with accompanying chargers.

EV Registration Projections

At the end of 2023, Prince William County had approximately 5,300 registered EVs, accounting for 1% of total LDVs in the county. Table 23, below, shows the number of EVs and percentage of EVs in the LDV population for low-, medium-, and high-adoption scenarios at benchmark years 2030, 2035, and 2045.[94]

Table23 . Prince William County EV Registration Projections

Growth Scenario	2030		2035		2045	
	# EVs	% EVs	# EVs	% EVs	# EVs	% EVs
Low	31,310	7%	68,878	14%	205,163	35%
Medium	65,406	14%	146,633	29%	326,979	56%
High	99,503	21%	224,388	45%	448,796	77%

Trends in EV Adoption

The County has seen growth in EV deployment over the past two years, especially with more EV model options. They have installed a number of chargers and have been promoting residents to use them. The county has also been adding more ZEVs to their county fleet.

[94] See Appendix 1.A in the REVII Strategy document for technical methodology of EV market growth projections.

Projected EV Charging Infrastructure Needs

To support the projected EV registrations above, Prince William County would need to deploy the following estimated numbers of EV chargers for each scenario and planning year. See Appendix 1.B for technical methodology on calculating EV charging port needs.

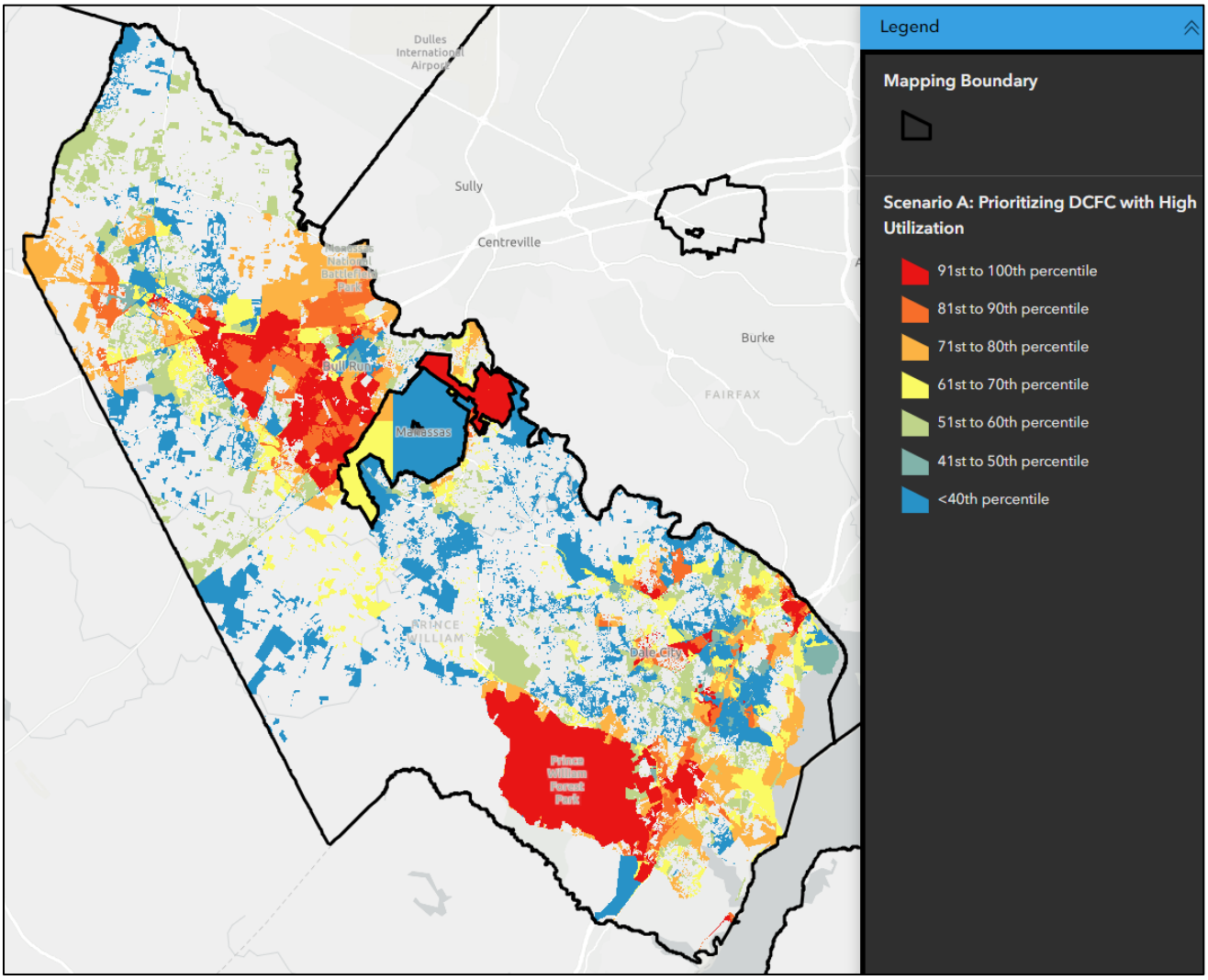
Table24 . Prince William CountyEstimated EV ChargingPort Needs

Growth Scenario		Charger Type	2030	2035	2045
Low	EV Charging Port Needs	Public Level 2	944	2,261	6,186
		Public DCFC	33	85	212
	EVs		31,310	68,878	205,163
Medium	EV Charging Port Needs	Public Level 2	2,146	4,421	9,861
		Public DCFC	82	152	343
	EVs		65,406	146,633	326,979
High	EV Charging Port Needs	Public Level 2	3,265	6,767	11,798
		Public DCFC	127	233	391
	EVs		99,503	224,388	448,796

Figure 63 summarizes the charger siting analysis results for Prince William County. The charger siting analysis identifies and ranks parcels of land based on their suitability for deploying public EV chargers. Three scenarios were tested. This map shows Scenario A, Prioritizing DCFC with High Utilization. The online map can be used to display all three scenarios. Red parcels are high priority, and blue parcels are low priority. Prince William County may use this map and these estimated charger needs to support and participate in the development of a regional charging network.[95]

[95] The COG REVII Strategy EV Siting Parcel Review map and associated shapefiles available for download may be found here: https://mwcog.org/REVIIStrategyMap

Figure 63. Prince William County EV Charging Siting Analysis Results



EV Charger Deployment Site Recommendations

The sites identified below are examples of locations where Prince William County may choose to deploy or engage and support the private sector in deploying EV chargers. The images of each site are provided at the CBG level, which includes the recommended site and the surrounding area. These sites are recommendations not requirements and are highlighted due to their high scores in EV charger GIS siting analysis. However, Prince William County may have different priorities or location preferences than the ones highlighted below. As such, additional priority options are available for use and consideration in the online interactive map. Prince William County may consider and move forward with these locations for deployments but should rely on local knowledge, expertise, and priorities when siting EV chargers. See the interactive map to view all priority locations, EEAs, and transportation infrastructure within the county.

Dumfries Road Commuter Lot

This site recommendation includes the Dumfries Road Commuter Lot (US 1/VA 234) in Southbridge. This site is close to the Southbridge Plaza, apartment complexes, and local businesses. This location is less than a mile from I-95 and directly on U.S. Route 1 making it an attractive location for local commuters and throughway traffic using these two major roads. The site is within an EEA, includes MFH, and is close to a middle and high school. Level 2 chargers are ideal for commuters using this parking lot and DCFC are best suited for drivers traveling along I-95 or U.S Route 1.

Figure 64 . Dumfries Road Commuter Lot

Potomac Mills Mall

The Potomac Mill Mall in Woodbridge is close to apartment complexes, major retailers, hotels, local businesses, and restaurants. The site is less than a mile from I-95 and in between major roads making it an attractive location for local shopping traffic and I-95 throughway traffic. The Potomac Mills Mall is also within an EEA and includes MFH. Level 2 chargers are ideal for shoppers in the mall using this parking lot and DCFC are best suited for drivers traveling along I-95.

Figure 65 . Potomac Mills Mall

Bull Run Plaza

The Bull Run Plaza in Manassas is close to apartment complexes, major retailers, local businesses, and restaurants. The site is about 1 mile from I-66 and along a major road making it an attractive location for local shopping traffic and I-66 throughway traffic. The Bull Run Plaza is located within an EEA and includes MFH. Level 2 chargers are ideal for shoppers in the mall using this parking lot and DCFC are best suited for drivers traveling along I-66.

Figure 66 . Bull RunPlaza

Virginia Gateway

The Virginia Gateway is a shopping center in Gainesville and is close to major retailers, local businesses, restaurants, and MFH. The site is about 1 mile from I-66 and along U.S Route 29 making it an attractive location for local shopping traffic and I-66 throughway traffic. Level 2 chargers are ideal for shoppers in the mall using this parking lot and DCFC are best suited for drivers traveling along I-66.

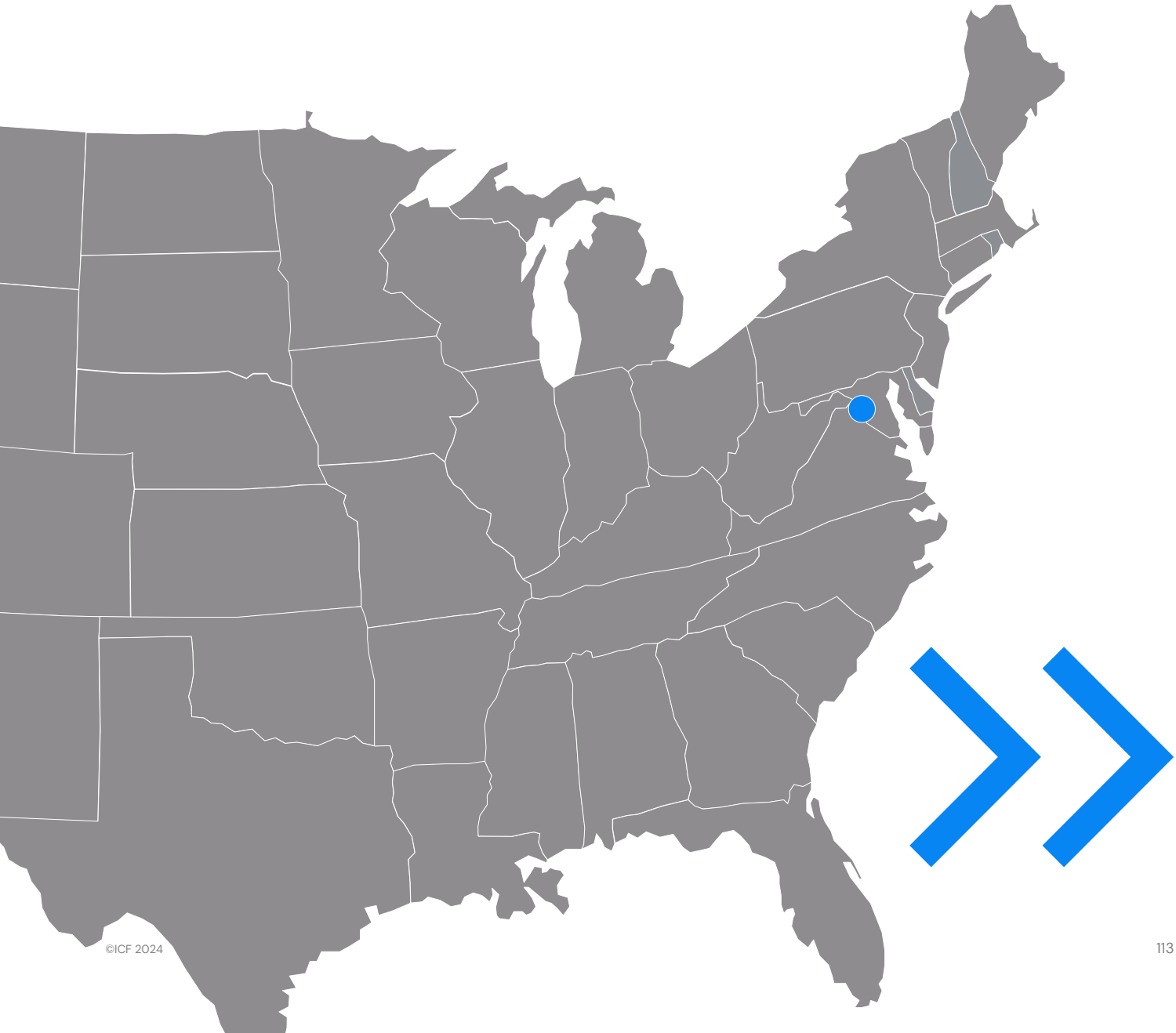
Figure 67 . Virginia Gateway

Manassas Mall

Manassas Mall in Manassas is close to apartment complexes, major retailers, local businesses, and restaurants. The site is close to I-66 and along a major road making it an attractive location for local shopping traffic and I-66 throughway traffic. The Manassas Mall is located within an EEA and includes MFH. Level 2 chargers are ideal for shoppers in the mall using this parking lot and DCFC are best suited for drivers traveling along I-66.

Figure 68 . Manassas Mall

6.3 District of Columbia



Total EV Registrations*

8,032

EV % of Total Vehicles

3%

Current EV Charging Ports

930 Level 2

21 DCFC

District Progress

The District of Columbia plans to cut transportation emissions by over half by 2032 and is applying for funding and enacting pro-EV mandates to support its goal.

**As of December 2023*

District of Columbia

EV and Charging Infrastructure Deployment Progress

Over the past several years the District of Columbia has embarked on various plans and policies to promote EV adoption and deploy associated charging infrastructure within its jurisdiction., The initiatives the District of Columbia has in place include:

- The District Department of Transportation's solicitation of applications for the NEVI (National Electric Vehicle Infrastructure Formula) funding.
- The District's moveDC program calls for the reduction of GHG from transportation by 60% by 2032 and Strategy 34 which calls for supporting EV use with more charging facilities.
- The Transportation Electrification Roadmap.[96]
- The CleanEnergy DC Omnibus Amendment Act of 2018 codified into law the mandate that at least 25 percent of private vehicles registered in the District must be ZEVs by 2030.
- The EV Public Infrastructure Expansion Amendment Act of 2018 mandates DDOT to install at least 15 EV chargers that are publicly accessible, including at least one EV charger in each Ward.
- The District also offers a tax exemption for EV's and other high efficiency vehicles.

EV Registration Projections

At the end of 2023, the District of Columbia had approximately 8,000 registered EVs, accounting for 3% of total LDVs in the county. Table 25, below, shows the number of EVs and percentage of EVs in the LDV population for low-, medium-, and high-adoption scenarios at benchmark years 2030, 2035, and 2045.[97]

Table25 . District of Columbia EVRegistration Projections

Growth Scenario	2030		2035		2045	
	# EVs	% EVs	# EVs	% EVs	# EVs	% EVs
Low	39,667	13%	82,173	25%	227,705	62%
Medium	56,036	18%	118,354	36%	260,400	71%
High	72,406	23%	154,535	47%	293,095	80%

Trends in EV Adoption

The District of Columbia faces a unique circumstance as the nation's capital and a highly dense urban area that supports residents, commuters from surrounding jurisdictions, and high levels of tourism. Just considering vehicles registered within the

[96] Available at: https://electrificationcoalition.org/resource/district-of-columbia-transportation-electrification-roadmap/

[97] See Appendix 1.A in the REVII Strategy document for technical methodology of EV market growth projections.

jurisdiction, the District of Columbia has seen consistent growth in EV registrations. The District of Columbia is continuing to support EV adoptions with efforts to reduce GHG emissions from the transportation sector, the development of the Transportation Electrification Roadmap, a tax exemption for residents who purchase an EV, and charging infrastructure deployment mandates.

Projected EV Charging Infrastructure Needs

To support the projected EV registrations above, the District of Columbia would need to deploy the following estimated numbers of EV chargers for each scenario and planning year. See Appendix 1.B for technical methodology on calculating EV charging port needs.

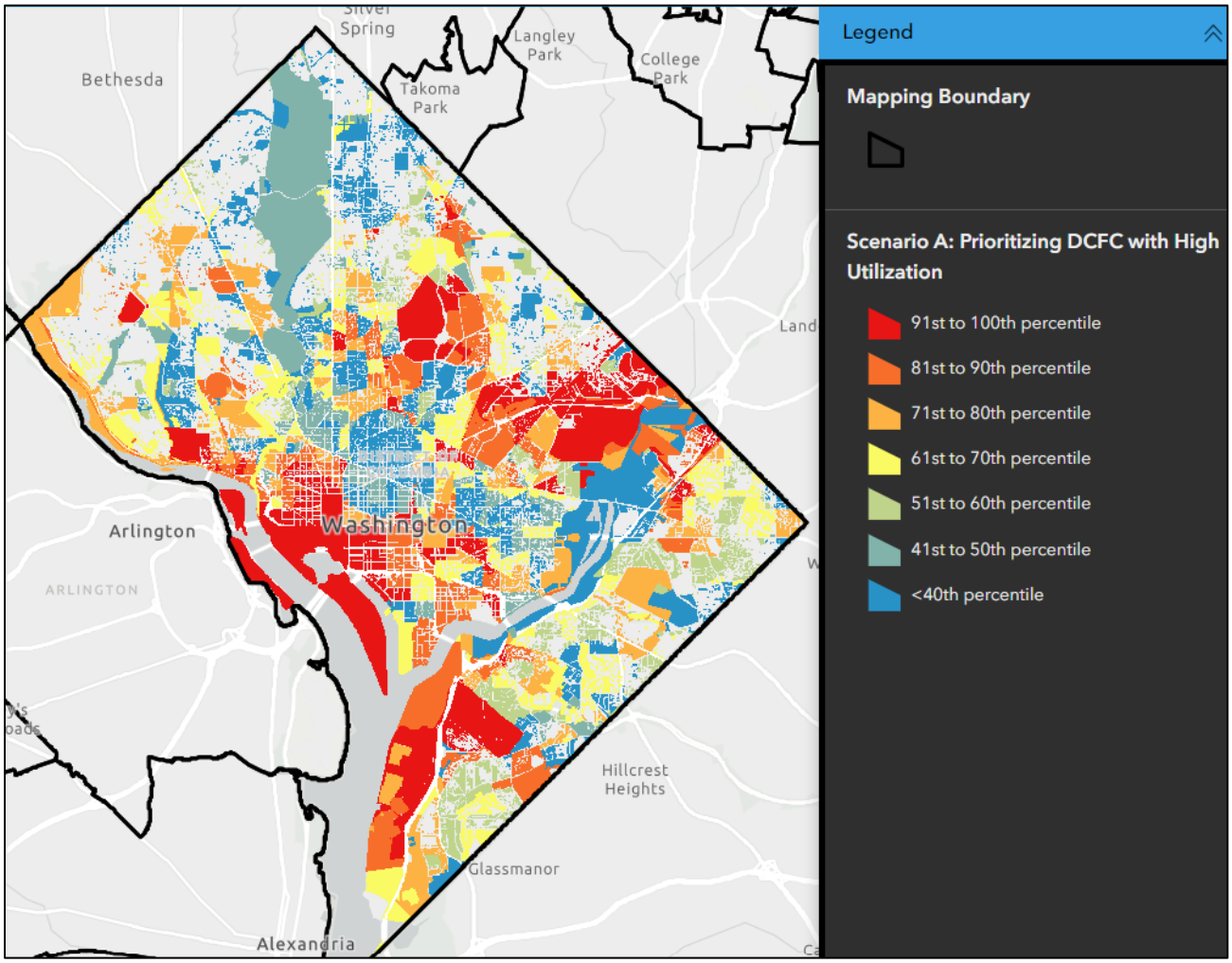
Table 26. District of Columbia Estimated EV Charging Port Needs

Growth Scenario		Charger Type	2030	2035	2045
Low	EV Charging Port Needs	Public Level 2	1,042	2,698	6,862
		Public DCFC	34	102	236
	EVs		*39,667*	*82,173*	*227,705*
Medium	EV Charging Port Needs	Public Level 2	1,837	3,566	7,851
		Public DCFC	71	123	272
	EVs		*56,036*	*118,354*	*260,400*
High	EV Charging Port Needs	Public Level 2	2,373	4,662	8,837
		Public DCFC	90	163	306
	EVs		*72,406*	*154,535*	*293,095*

Figure 69 summarizes the charger siting analysis results for the District of Columbia. The charger siting analysis identifies and ranks parcels of land based on their suitability for deploying public EV chargers. Three scenarios were tested. This map shows Scenario A, Prioritizing DCFC with High Utilization. The online map can be used to display all three scenarios. Red parcels are high priority, and blue parcels are low priority. The District of Columbia may use this map and these estimated charger needs to support and participate in the development of a regional charging network.[98]

[98] The COG REVII Strategy EV Siting Parcel Review map and associated shapefiles available for download may be found here: https://mwcog.org/REVIIStrategyMap

Figure 69. District of Columbia EV Charging Siting Analysis Results



EV Charger Deployment Site Recommendations

The sites identified below are examples of locations where the District of Columbia may choose to deploy or engage and support the private sector in deploying EV chargers. The images of each site are provided at the CBG level, which includes the recommended site and the surrounding area. These sites are recommendations not requirements and are highlighted due to their high scores in EV charger GIS siting analysis. However, the District of Columbia may have different priorities or location preferences than the ones highlighted below. As such, additional priority options are available for use and consideration in the online interactive map. The District of Columbia may consider installing chargers at these locations, but should rely on local knowledge, expertise, and priorities when siting EV chargers. See the interactive map to view all priority locations, EEAs, and transportation infrastructure within the county.

Georgetown University

Georgetown University's main campus and the Georgetown University Hospital are in northwest D.C. and are adjacent to low-density residential neighborhoods. The University does currently host 10 EV chargers at two different locations across the campus. However, this proposed deployment site allows for EV charging accessibility to students, faculty, hospital patients, and other visitors. Deployment of Level 2 EV chargers are optimal for this site, as their users will most likely be on campus or at the hospital for longer periods.

Figure 70 . Georgetown University

East Potomac Park

This CBG encompasses the National Mall, the United States Capitol, and multiple memorial sites, including the Washington Memorial, Lincoln Memorial, and the Jefferson Memorial. The proposed location for the EV charging is in East Potomac Park, adjacent to I-395. The proposed site will provide charging for visitors to the National Mall, visitors to East Potomac Park (including the East Potomac Golf Course), and Department of the Interior employees. Level 2 chargers are recommended for this site as most visitors are projected to spend longer periods parked in this area.

Figure 71 . East Potomac Park

MedStar Washington Hospital Center

MedStar Washington Hospital Center is the largest private hospital in D.C., Children's National Hospital and the Washington Veteran Affairs Medical Center are located within the hospital center complex. The CBG also includes the Armed Forces Retirement Home, which is owned by the U.S. Federal Government and is not publicly accessible or a recommended site. Level 2 chargers are recommended for this site as most hospital staff and visitors will likely be visiting for longer amounts of time.

Figure 72. Medstar Washington Hospital Center

American University

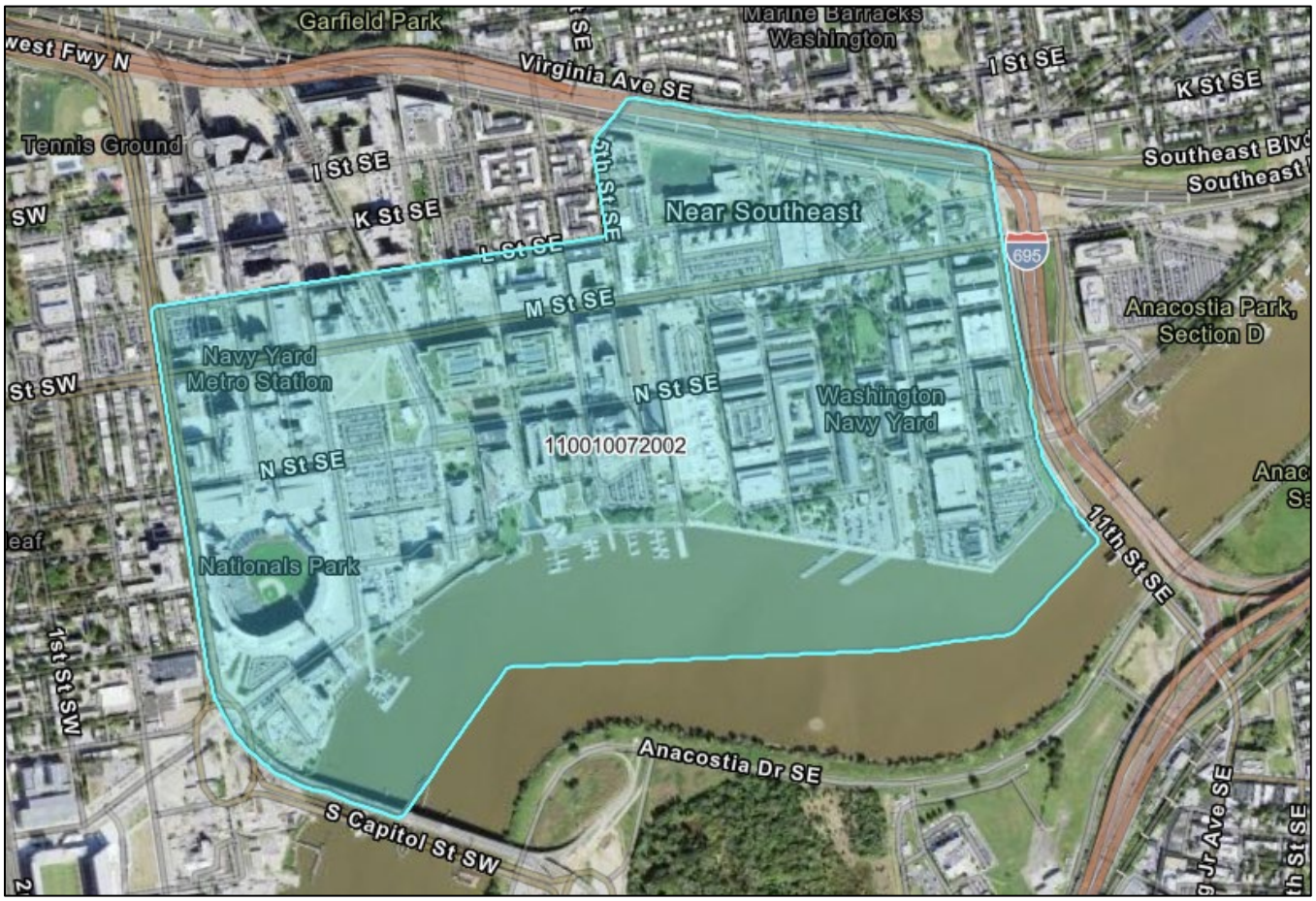
The proposed deployment site at American University will primarily serve commuting students and faculty. The CBG includes low-density residential neighborhoods north and west of American University. EV charging stations are currently located in SIS garage and the Katzen garage. Level 2 chargers are recommended for this site, as most students, faculty, and visitors are expected to be on campus for longer periods. time.

Figure 73 . American University

Virginia Avenue Park

Virginia Avenue Park is in Navy Yard, just south of I-695. The site is a convenient charging location for drivers traveling through D.C. on I-695, people visiting Nationals Park or other destinations in Navy Yard, and residents of the many MFH developments in this neighborhood. There are some charging stations throughout the neighborhood, but additional stations near the Virginia Avenue Park may help build out this high-traffic area. Level 2 chargers are optimal to serve residents or local visitors, while DCFC will better serve long-distance drivers traveling on I-695.

Figure 74 . Virginia Avenue Near I-695



7 Recommendations and Next Steps

The REVII Strategy is intended as a tool to help jurisdiction assess EV infrastructure needs, identify areas that lack access to EV charging, and identify priority locations for siting EV chargers. To best serve the region, this network should deploy stations equitably, which may require EV charger deployment by local governments in addition to the private sector.

The REVII Strategy is meant to serve as a guide for local jurisdictions in their EV charging station infrastructure deployment planning process. It is not meant to be prescriptive. Jurisdictions should use this analysis in conjunction with local knowledge to determine the best path forward for deploying EV charging stations.

Additional initiatives that local jurisdictions can take to support EV deployment include:

- **Review the Local Jurisdiction EV Ready Checklist**, available in the EV Deployment Clearinghouse. This checklist provides a detailed list of recommended actions local governments can take to facilitate EV charger deployments. It also provides additional resources for review.
- Engage in **community planning** efforts, which may include: making a public commitment to EV readiness, identifying community priorities for deployments, engaging with historically underserved residents, engaging with local property owners and stakeholders about site hosting, evaluating the use of EV chargers on public property for public use, and leveraging funding opportunities that can facilitate deployment.
- **Review zoning rules and siting criteria** related to EV charger construction and deployment. If not yet created, prepare requirements for parking lots, signage, accessibility, and general site design to ensure consistency and ease of use across locations. Similarly, if there are existing zoning laws, clearly communicating requirements.
- Develop a clear, streamlined, and expedited **permitting and inspection** process for EV chargers and provide inspectors with a standardized review checklist. Consider minimizing or removing permitting fees for EV chargers to reduce barriers to adoption.
- **Lead by example** and adopt EVs in your government fleet.
- **Focus on constructing Level 2 EV chargers**. Level 2 EV chargers are easier to rapidly deploy, as they require fewer infrastructure upgrades and are more affordable. Long-term, greater number of Level 2 chargers are needed across the region.
- **Review all local and state plans and policies** relating to EV infrastructure, including leveraging funding opportunities at the state and federal levels (available in the EV Deployment Clearinghouse).
- **Coordinate with local planning agencies** to integrate EV planning into long-range planning processes, review permitting policies to streamline and accelerate the EV charger installation process, and consider the need for new EV chargers during the development review process. Relatedly, jurisdictions should review and update building codes (if needed) to encourage EV charger adoption and installation for new construction and renovations. Building code considerations include pre-wiring requirements and parking requirements and policies. Creating standardized site design and accessibility requirements for EV charger installations can expedite the deployment of EV chargers at the local level.

- Conduct **public outreach and education** to ensure residents receive accurate information on EVs and chargers, which can reduce barriers to adoption by helping residents understand EV prices, how to charge vehicles, environmental and community health benefits, and vehicle range and performance.
- Seek **partnerships with community organizations and local businesses** to leverage relationships during pubic outreach and site identification.
- Identify and engage **workforce development** organizations to ensure the local workforce is prepared for and involved in the transition to EVs.
- Coordinate with utility providers as potential charging locations are identified to ensure **grid capacity** is available and to discuss required supporting infrastructure.
- Explore **ownership models** for EV chargers and **partnerships** with private-sector charging companies.
- Actively **monitor EV registrations**, along with the location of new **EV chargers**, to ensure the network will support the growing EV population and is fully functional for users.

Appendices

Appendix 1: EV Market Growth Projection

1.A Methodology for EV Registration Projections

This section describes the methodology for the EV market growth scenarios. Three different vehicle growth scenarios were forecast as part of this study for the following jurisdictions: the District of Columbia, Montgomery County, Prince George's County, Frederick County, Charles County, Arlington County, City of Alexandria, Fairfax County, Loudoun County, and Prince William County. The projections consider three growth scenarios for three benchmark years: 2030, 2035, and 2045. These projection scenarios only consider light-duty on-road BEVs and PHEVs; HEVs are excluded from these projections since they are unable to use EV chargers.

The three scenarios considered in this assessment are:

- **Low Growth:** The historic EV registration growth in each jurisdiction was used to project future EV deployment as a function of projected vehicle population growth.
    - The historic EV growth rate in each member jurisdiction is used to project future EV deployment as a function of projected LDV population growth. Using the preceding decade, beginning with 2011, through 2023 as a baseline, the ratio of LDVs to EVs is calculated. Projected EV growth is then calculated using the observed average change and increase in the ratio of EVs to LDVs. This calculation is then applied from 2024 through 2045. That forecast is used to extrapolate a baseline light-duty EV forecast through 2045, based on the EV growth to date.
- **Medium Growth:** An average of the "business as usual" and high growth projections.
- **High Growth:** This scenario assumes that Virginia, Maryland, and the District of Columbia will meet their most aggressive EV registration and sales goals, which is ACCII. ACCII requires an increasing percentage of new vehicle sales to be EVs each year beginning with model year 2026 in all jurisdictions. These sales requirements begin with 35% of new vehicle sales being electric in 2025 before reaching 100% of new vehicle sales being electric in 2034. This scenario assumes the maximum capacity the electrical grid can handle is approximately 80% market saturation, or 80% of LDVs being EVs by 2045.

Projections were completed using a combination of COG's LDV and EV vehicle registration and population data summaries and state vehicle data for the District of Columbia, Montgomery County, Prince George's County, Frederick County, Charles County, Arlington County, City of Alexandria, Fairfax County, Loudoun County, and Prince William County. COG historic vehicle registration data is used for years 2011 through 2020. To account for registration in more recent years, growth rates for observed EV registrations from the Maryland Department of Transportation and Atlas Public Policy are used for 2021, 2022, and 2023.

Data Used in Analysis	Source
Historic EV Registration Data 2011 through 2020	COG Decoded VIN Data
Historic EV Registration Data 2021 through 2023	MDOT MVA Electric and Plug-In Hybrid Vehicle Registrations by County as of each month end from July 2020 to April 2024 Atlas Public Policy State EV Registration Data
LDV Projections	COG: MOVES2014b's Activity Outputs based on TPB's 2022 Update to Visualize 2045
Jurisdiction Population Data Historic	U.S. Census
Jurisdiction Population Projections	COG (Final Round 10.0 Cooperative Forecasts)

1.B EVI-Pro Lite Methodology for Estimating Future EV Charging Port Needs

DOE's EVI-Pro Lite was used to project the amount of anticipated publicly accessible charging needed to support the number of EVs expected to be registered in the Region in 2030, 2035, and 2045. EVI-Pro Lite uses a set of variables to determine the amount of EV chargers needed to support EVs registered in metropolitan areas. These variables include number of EVs that need support, vehicle mix, PHEV support (gasoline versus charging needs), and percentage of drivers with home charging access. Charging infrastructure needs are evaluated by Level 2 and DCFC. Charging needs are provided in terms of number of ports by charger type, EV growth scenario, and benchmark year.

EVI-Pro Lite inputs used in the REVII Strategy analysis:

Step	Inputs
Step 1: Select Statewide or Metropolitan Area for assessment.	Virginia and DC: Metropolitan Area (Washington-Arlington-Alexandria) Maryland: Statewide 
Step 2: Select a Metropolitan Area	Washington-Arlington-Alexandria
Step 3: Add the number of EVs registered in your jurisdiction	Input EV registration at whichever year or scenario you are interested in learning about
Step 4: Vehicle Mix	Sedans: 44% Sport Utility Vehicles: 40% Pickups: 10% Vans: 6% PHEV Share of EVs: 30%
Step 5: PHEV Support	Partial Support
Step 6: Home Charging Access	97%
Step 7: Ride-Hail Support	Conservative Electrification
Step 8: View Results	

Appendix 2: EV Charger Siting Assessment Map

2.A Methodology

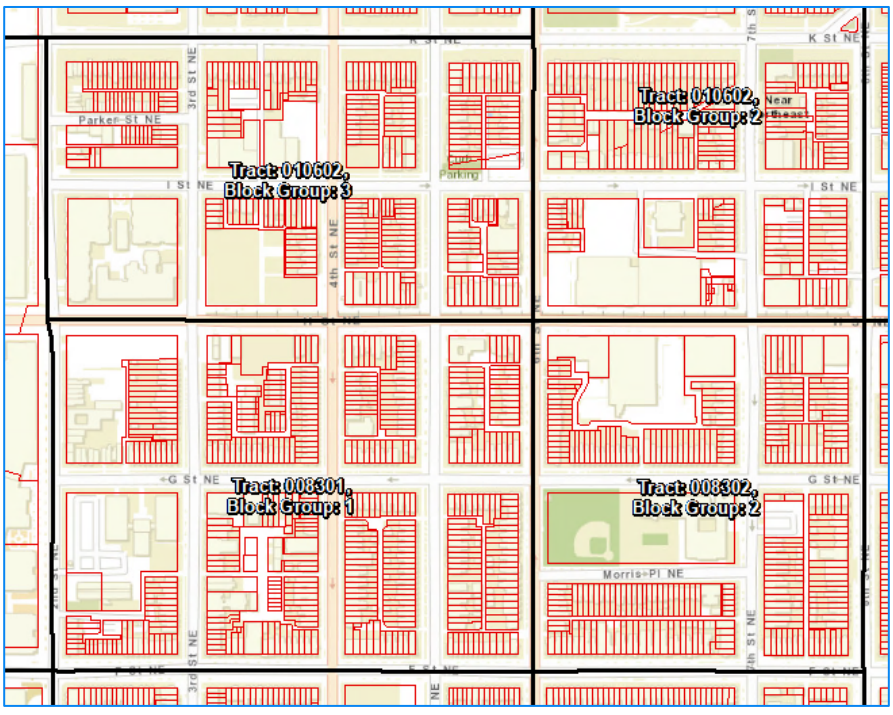
The technical approach for developing the EV charger station siting map was designed to address the three objectives of the REVII Strategy:

1. Identify locations for publicly accessible Level 2 and DCFC facilities to support increased EV adoption throughout the metropolitan Washington region.
2. Support reliable access to publicly accessible EV charging infrastructure, particularly in areas with limited at-home charging, including MFH developments and DACs.
3. Help ensure that all populations in the metropolitan Washington region, including DACs and individuals living within EEAs, are able to access and benefit from the financial and environmental benefits of EVs

The EV charging station siting analysis uses data from several sources to determine locations with anticipated high demand for EV charging stations, as well as EV charging deserts within EEAs. This approach is heavily driven by trip data from Replica, which contains attributes of travel data that help determine areas within the region that experience high traffic (i.e., areas where there is currently a higher expected demand for charging). The analysis then uses data including locations of existing chargers, MFH developments, EEAs, highway on- and off-ramps, and park-and-ride locations to recommend priority sites for EV charger installation. The final product is a GIS map with parcels of land ranked by priority for locating EV charging stations. This assessment was conducted at the regional level but produced detailed results within member jurisdictions. The assessment also includes elements that allow users to be conscientious about equity when reviewing priority locations and developing an EV charging network.

The siting analysis is intended to identify sites with a high probability for charging demand. The analysis consists of three stages:

1. A CBG level screening based on predominate travel patterns and priority trip characteristics.
2. A priority parcel analysis that ranks parcels based on characteristics that identify higher or lower needs for EV charging.
3. A site selection analysis to determine suitability of recommended parcels.



This image shows the difference between CBGs and parcels. CBGs are at a larger scale and cover more area than parcels. Multiple parcels exist within a CBG. CBGs are outlined in black, and individual parcels are outlined in red.

Step 1: Census Tract Level Screening	Step 2: High Priority Parcel Analysis	Step 3: Site Selection
• Screening analysis of all CBGs in the region • Driven primarily by Replica trip data • Data sources: income, dwelling type, the travel demand forecasting model, trip length, vehicle dwell times, Equity Emphasis Areas, and more	• Potential parcels were scored according to the following criteria: • Step 1 CBG score • Distance to existing charging stations • Distance to MFH • Distance to highway on-ramp or off-ramp • Location in or near an EEA • Distance to park-and-ride location	• Review of high scoring parcels to determine suitability for a publicly accessible EV charging station

An overview of the siting analysis methodology is below.

Data

Step One of this analysis primarily relies on travel data acquired through Replica.[99] Replica an activity-based model, calibrated locally with ground truth data from a diverse set of third-party source data such as mobile location data, consumer marketing data, geographic and land use data, credit card transaction data, built environment, and economic activity. This analysis utilizes Replica data through Fall 2022 with detailed and disaggregated outputs down to the network link level. The trip data provided by Replica platform includes information such as origin, destination, land use, trip purpose, and socio-demographic of the trip taker (e.g., income, race, household size, etc.). Replica allows this analysis to incorporate detailed travel patterns and behaviors to help identify high traffic areas. This dataset only provides historic traffic patterns; it does not forecast future changes in activity.

Step Two of this analysis relies on a variety of parcel-level data from member jurisdictions, COG, and DOE charger data. This data includes existing chargers[100], EEAs, AFCs, transit stations, MFH, EV Charging Justice40 Map, and COG Regional Activity Centers (RACs).

Step One

Step One relies primarily on travel data at the CBG level. CBGs are scored based on trip characteristics that end within that group. Trip characteristics considered in Step One include:

- **Trip purpose:** The number of non-home based trips, which includes work commutes and shopping trips.
- **Trip length:** Number of long-distance trips at least 20 miles long.
- **Dwelling time:** How long drivers dwell at a location. Three dwell time scenarios were considered in this trip characteristic: 30 to 60 minutes, 60 to 120 minutes, and greater than 120 minutes.

[99] For more information on Replica data, see: https://replicahq.com/solutions/
[100] A snapshot of the existing charging stations in each jurisdiction was downloaded from the AFDC's Station Locator: https://afdc.energy.gov/stations/

- **Income**: This characteristic considers the income of the trip taker, both for drivers above and below medium income levels.
- **Trips originating from MFH:** These are trips that begin at MFH developments.
- **Trips originating from EEAs:** These are trips that begin with an EEA.

Three different trip characteristic scenarios were completed in Step One, outlined in Table 27 below.

Table27 . Step 1 CBGScenarios

Scenario	Reason
Scenario A: Prioritizing DCFCs with High Utilization	This scenario weighs longer trips with shorter dwell times more heavily. This will identify trips where DCFC would be preferrable to Level 2 chargers. Scoring adjustments in Step two provide a check against recommending overbuilding DCFC in wealthier areas with existing ample access to charging.
Scenario B: Prioritizing Level 2 Chargers with Equity Focus	DCFCs require higher upfront costs for equipment, installation, and potential utility upgrades that may be needed to accommodate higher powered charging infrastructure. The electricity cost at the point of purchase is also higher, which can cause some service EV charger providers to cite economic infeasibility when deciding whether to cite DCFCs in communities with less EVs and lower utilization. Most Level 2 charging infrastructure will not require grid or electrical service upgrades, and the projects will have lower costs across other factors (e.g., equipment costs, electricity pricing for customers). Prioritizing Level 2 charging will mean there are fewer barriers to entry for a jurisdiction or project team looking to install EV chargers in EEAs.
Scenario C: Prioritizing DCFCs for Multi-Family Housing	For individuals living in MFH without a dedicated parking spot or home charging, DCFC opportunity charging or workplace charging are two priority charging options. MFH residents are more likely to use DCFC stations. Establishing DCFC charging hubs near higher concentrations of MFH developments could provide an attractive and highly utilized alternative to on-site charging for buildings where it is challenging to install and maintain charging infrastructure.

Each CBG is scored based on the percentage of regional trips it receives meeting the criteria. The final Step 1 analysis assigns each CBG in the study area a score of 1 to 6. The higher the CBG score, the more traffic a CBG experiences. For example, if a CBG with a score of 1 has a low number of trips starting or ending there, whereas a CBG with a score of 6 has a very high number of trips starting or ending there.

Step Two

Once the CBGs have been scored, individual parcels for all three scenarios within high-scoring CBGs are evaluated based on characteristics that make that parcel more or less desirable for charging infrastructure. Those characteristics, called proximity score modifiers, include a parcel's distance to existing chargers, distance to MFH, distance to highway on- and off-ramps, proximity to EEAs, and distance to park-and-ride locations. These proximity score modifiers have been selected for the following reasons:

- **Distance to existing chargers**. Locations that are close to existing publicly accessible chargers and may have less demand.
- **Distance to MFH**. Residents of MFH typically lack access to home charging and will rely on publicly accessible infrastructure to meet charging needs.

- **Distance to highway on-ramp or off-ramp**. Sites located near highway ramps are likely to attract EV drivers who are making longer trips, typically needing DCFC.
- **Location in or near an EEA**. Ensuring the benefits of EVs are spread equitably in the region is a priority. Providing access to charging infrastructure in or near EEAs can help remove barriers to EV adoption.[101]
- **Distance to park-and-ride locations**. The distance from potential sites to the nearest public transportation stop with park-and-ride lots is calculated to determine which sites are most useful in enabling more sustainable first and last miles of multimodal trips. Charging locations near transit stops could benefit EV ride-sharing companies or commuters that use a combination of personal vehicles and mass transit.

Each proximity score modifier can increase or decrease a parcel's overall score. If a parcel is not located near any proximity score modifier, their final score will not be influenced by these characteristics. Proximity score modifiers and their associated point values are as follows:

Table28 . Proximity Score Modifier Details

Proximity Score Modifier	Score Influence
Within ¼ mile of a Park-and-Ride Location	Parcel score increases by 1
Within ¼ mile of MFH	Parcel score increases by 1
Within ¼ mile of an EEA	Parcel score increases by 1
Within ¼ mile of a highway ramp	Parcel score increases by 1
Within ½ mile of Existing Level 2 Chargers	Parcel score decreases by up to 2 points
Within ½ mile of Existing DCFC Stations	Parcel score decreases by up to 4 points

These factors are assessed with GIS software and compiled to modify the parcel's charging demand score, or how suitable a particular parcel of land is for an EV charger deployment.

All parcels in each of the three scenarios from Step 1 have proximity score modifiers added in Step 2, resulting in three unique maps.

Step 2 does not consider all parcel types in the region. Certain parcels were excluded from the analysis because they are not ideal for publicly accessible EV charger installations. For this analysis, parcels zoned as single-family residences, railways, utility-owned, agricultural land, and certain industrial sites were removed from analysis.[102] That means that these parcels do not have a suitability score assigned to them and are not recommended at any priority level for EV charger deployments. Single-family residences were removed from this analysis due to this study's underlying assumption that there is less of a need to prioritize installing

[101] EEAs are a regional planning concept adopted in 2021 by the MWCOG Board of Directors to elevate equity and inform future growth and investment decisions. EEAs they have high concentrations of low-income individuals and/or traditionally disadvantaged racial and ethnic population groups. For more information, see: https://www.mwcog.org/maps/map-listing/equity-emphasis-areas-eeas/

[102] Parcels zoned as federal land were kept in this analysis due to the high density and importance of federal property in the MWCOG region. Jurisdictions are not required to work with the federal government to deploy charging stations on this land type. Rather, because many drivers travel to and from federal land destinations and not all federal land is private or inaccessible, these parcels were kept in the analysis.

publicly accessible charging in areas with single-family homes and that owners of those homes are able to charge their vehicles at home. Similarly, the focus of this strategy is on accelerating deployment of high-use publicly accessible chargers that serve a large number of drivers. Once a larger publicly accessible charging network is established, areas with single-family homes—particularly in areas where these homes have no off-street parking available—could be the focus of further infrastructure deployments.

2.B Pulling the Methodology Together

The charger siting analysis map shows parcels of land that are assigned scores between 1 to 10, indicating that parcel's suitability for EV charger deployments. Parcels that are better suited for charging will score higher than parcels less suitable for charging. A parcel's final score is calculated by the following formula:

Parcel Score = [Step 1 CBG Score] + [Step 2 Proximity Score Modifier Total]

For example, a parcel that has high traffic and is located in an EEA and near a highway ramp would receive a high score:

Parcel Score	=	*Step 1 CBG*	+	*Step 2 Proximity Score Modifier Total*
8	=	*6 (high traffic)*	+	*[1 (near EEA) + 1 (near highway ramp)]*

Alternatively, even if a parcel has high traffic, if there are already EV chargers at that location, it might score much lower than expected:[103]

Parcel Score	=	*Step 1 CBG Score*	+	*Step 2 Proximity Score Modifier Total*
3	=	*6 (high traffic)*	+	*[-3 (near existing DCFC stations) + -1 (near existing Level 2 stations) + 1 (near EEA)]*

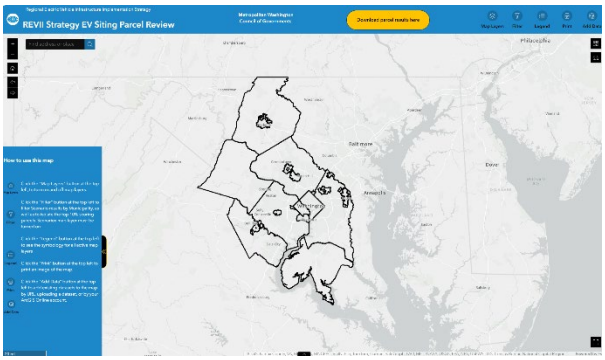
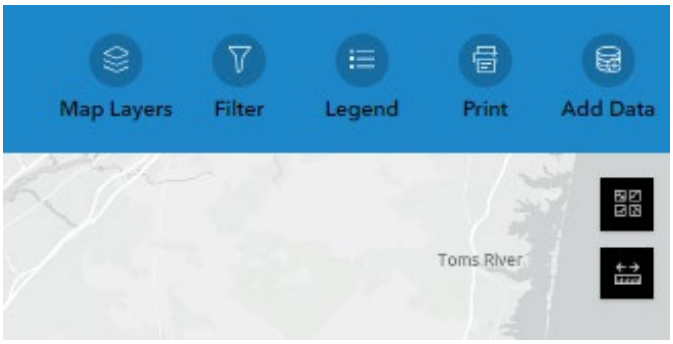
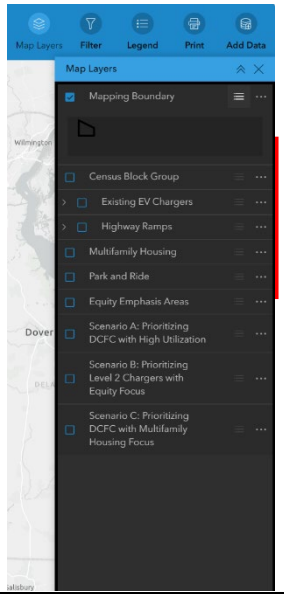
Another scenario might recommend a parcel with lower traffic as high priority for EV charger deployments due to certain characteristics making it ideal for certain communities:

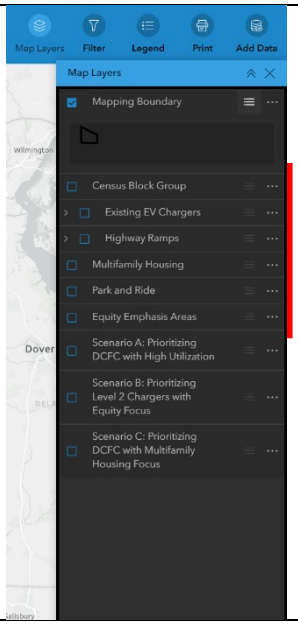
Parcel Score	=	*Step 1 CBG Score*	+	*Step 2 Proximity Score Modifier Total*
7	=	*4 (moderate traffic)*	+	*[1 (near EEA) + 1 (near MFH) + 1 (near highway ramp)]*

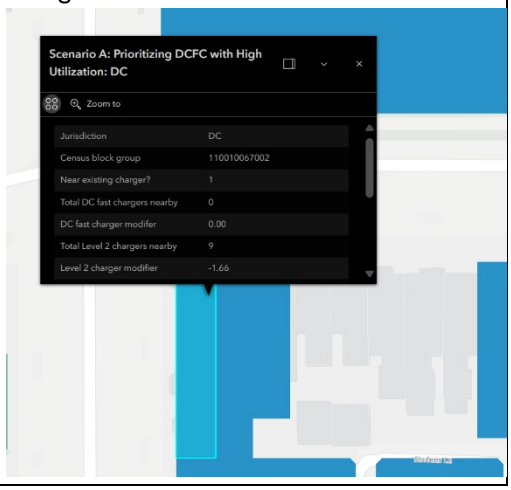
When reviewing parcel scores, it is important to consider all aspects of the scoring criteria. Depending on parcel characteristics, certain parcels might score higher or lower than expected.

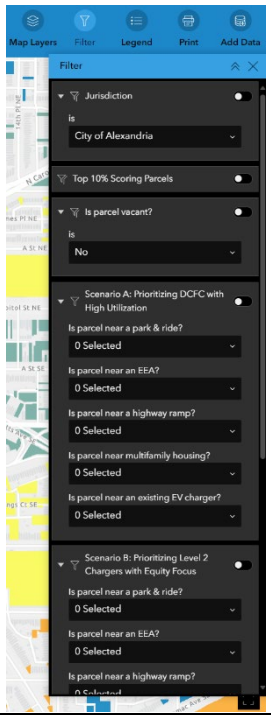
[103] In circumstances like this, jurisdictions should use their discretion to determine if they want to continue prioritizing EV chargers at locations or parcels of land that are already served by nearby existing EV charging stations. Even if this analysis ranks a parcel as low priority, if a jurisdiction's individual priority is to install EV chargers at shopping plazas first (regardless of existing infrastructure status), they may continue pursuing existing priorities.

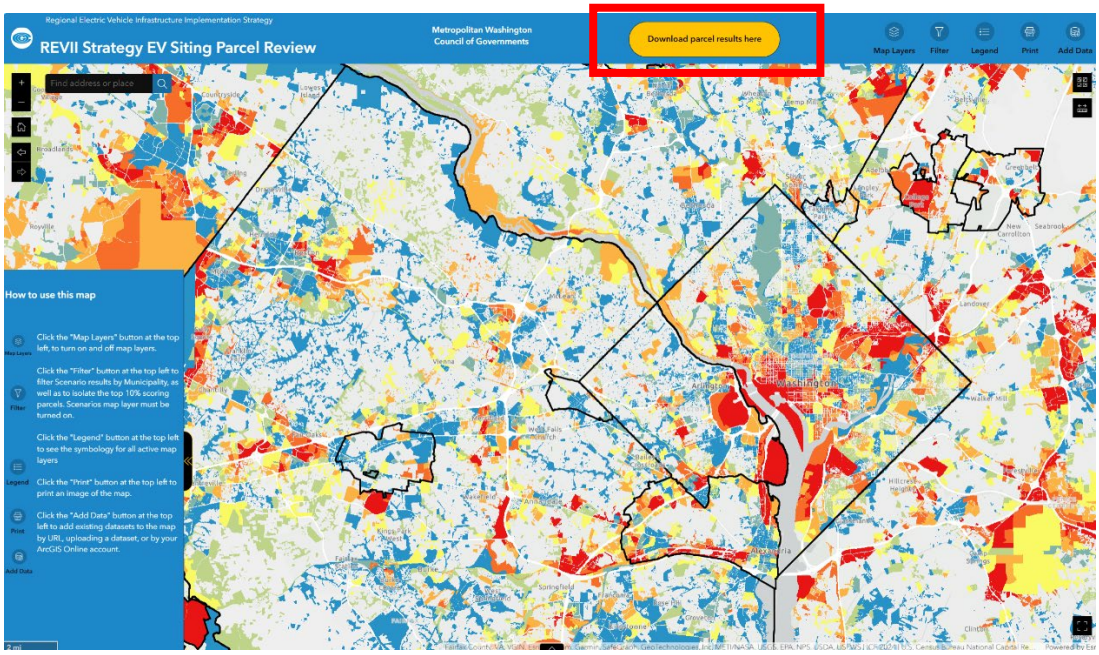
2.C How to Use the EV Charger Siting Assessment Map

Step 1: Access the Map	Open the GIS map viewer at: https://mwcog.org/REVIIStrategyMap 
Step 2: Map Basics	To add layers, change the base map (for example, change it from this simple grey scale to a satellite image), view the legend, print the map view, or make measurements, use the buttons in the top right corner. 
Step 3: View Scenario Results	For viewing the different scenario results, click the "Map Layers" button in the top right corner of the map and list layers will appear that you can select from.  of the B" Within this list you'll find a variety of layers you can add to map, but the analyzed scenarios that will display scored parcels are at the bottom, labeled "Scenario A" "Scenario and "Scenario C". As you're viewing scenario results, the map will populate. Please be patient with the map. It can take several moments for it to fully load as there is a lot of data to display. Please only select one scenario at a time. Results from multiple scenarios are not meant to be overlayed.

Step 4: Add Additional Layers	In addition to viewing the different scenario results, you can also add other layers to the map see different datasets that are relevant to EV charger siting. These are also in the Layer list, located above the scenarios. If you select any of these, they will display on the map over the scenario results. So, for example, if you wanted to see where existing chargers are at in relation to the Scenario A results, you can select "DCFC" and "Level 2 Chargers" to see where all existing chargers are in the area. 

Step 5: View Parcel Details	While viewing the results of a general area is useful, users may also view individual parcels and their suitability score. To do that, zoom in to a particular area/parcel of interest and select it. Once you click on it, the parcel description will pop up, which tells you how a parcels score is added up.
	
	In the parcel description box, you will see the following fields:
	
	• CBG Number
	• Step 1 score ("Replica rank")
	• Step 2 score ("final score")
	• Scores for each parcel score modifier:
	  ○ Existing DCFCs
	  ○ Existing Level 2 Chargers
	  ○ Equity Emphasis Area
	  ○ Multifamily Housing
	  ○ Highway ramps
	  ○ Park-and-Ride
	  ○ Number of nearby chargers (within ½ mile)
	
	 

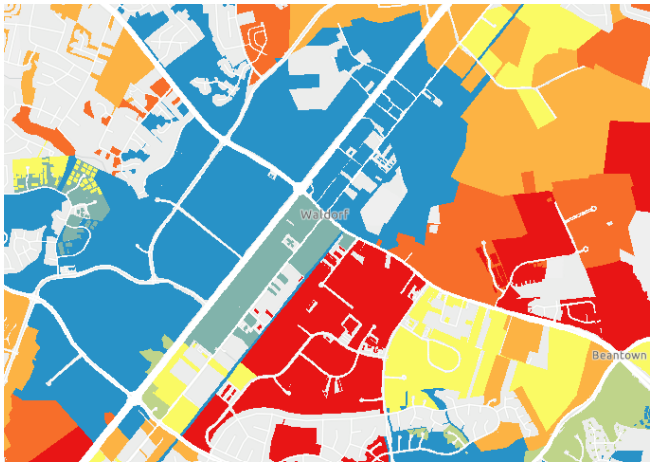
Step 6: Filter for Specific Results	Users may also filter the map for parcels that meet certain requirements. Filters are available for finding:
	• Individual jurisdiction results by scenario
	• Parcels with certain characteristics based on proximity score modifiers:
	  ○ Near park-and-ride locations
	  ○ Near multifamily housing
	  ○ Near highway ramps
	  ○ Near equity emphasis area
	  ○ Near or not near existing chargers
	• Top 10% highest scoring parcels for each scenario
	• Whether the parcel is "vacant"
	This analysis is limited to available data. Not all parcels that are designated "high priority" are suitable locations for EV chargers. Jurisdictions should consult directly with planning agencies and utility companies when considering the siting of EV chargers and related infrastructure.
	 

Step 7: Download Shapefiles	To download parcel results, select the "Download parcel results here" icon at the top of the web map. 

2.D How to Interpret the Map Results

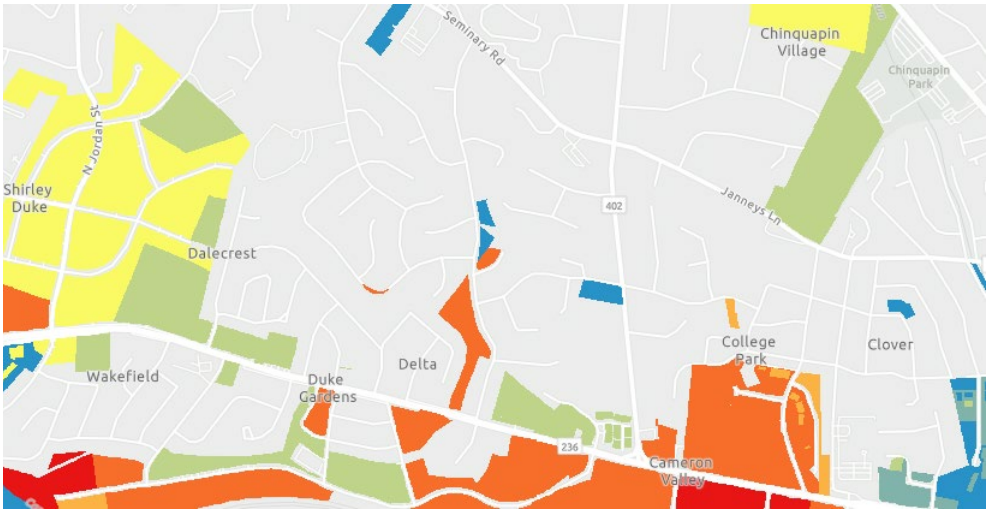
The REVII Strategy charger siting analysis produced three parcel-level maps. Within the maps, parcels are scored based on Step 1 (CBG trip data) and Step 2 (proximity score modifiers) to get their charger suitability score. The results of the analysis for all three scenarios, outlined in Step 1 of the 2.A Methodology, are displayed by priority and percentile scores. High priority parcels for deployment are red, and low priority parcels for deployment are blue. Because this assessment has been completed for a region, but analyzes individual parcels, be sure to also review and consider the parcels adjacent to high priority parcels. A lower scoring parcel may only have a lower score because it is part of a CBG that experiences lower traffic than the parcel in an adjacent CBG. A lower scoring parcel immediately adjacent to a high scoring parcel may be equally or better suited to host an EV charging station.

Figure 75. Screenshot of Results Showing a Combination of Parcel Priority Levels



Parcel scores may not change dramatically between scenarios; certain parcels score high or low no matter what based on the data. For example, some high scoring parcels will remain high scoring across scenarios because they receive the majority of trips and are located near proximity modifiers. Grey areas indicate areas that were excluded from the analysis. These areas are not recommended at any priority level for EV charger deployments at this time.

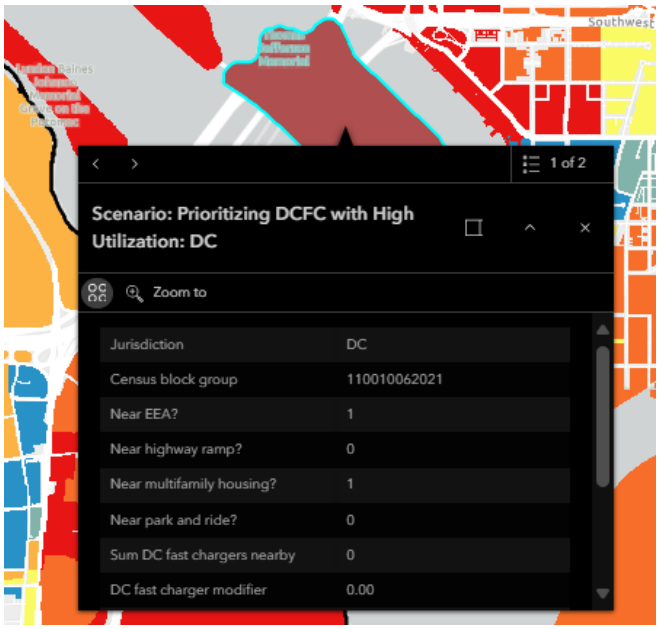
Figure 76 . Screenshot of Resultsthat Shows Included and Excluded Parcels



Within the EV charger priority locations map, users may select different parcels and view their suitability scores. Each parcel will have a variety of fields that show users different pieces of information related to the parcel and its score. These fields provide general information about the parcel the user has selected:

- **Census block group:** the CBG to which that parcel belongs
- **Location:** the jurisdiction in which the parcel is located
- **Sum DCFC nearby:** the number of DCFC within half a mile of the parcel
- **Sum Level 2 chargers:** the number of Level 2 chargers within half a mile of the parcel

Figure 77 . Image of Parcel Description Box



Each parcel description will display its Step 1 score (the amount of traffic the CBG it is located in experiences):

- **Scenario # rank:** parcels will have scores ranging between 1 and 6. Low traffic parcels will have a score of 1, and high traffic parcels will have a score of 6.

The parcel description will also have the following proximity score modifier fields:

- **DCFC modifier:** If there are existing DCFCs within ½ mile of the parcel, this proximity score modifier is negative, decreasing the parcel's suitability score since it is already located near existing infrastructure. If there is no nearby infrastructure, the parcel will score 0.
- **Near EEA?:** If the parcel is located in or within ¼ mile of an EEA, it will receive a score of 1. If it is not located in or near an EEA, it will score 0.

- **Level 2 charger score:** If there are existing Level 2 chargers within ½ mile of the parcel, this proximity score modifier is negative, decreasing the parcel's suitability score since it is already located near existing infrastructure. If there is no nearby infrastructure, the parcel will score 0.
- **Near MFH?:** If the parcel is located in or within ¼ mile of MFH, it will receive a score of 1. If it is not located in or near MFH, it will score 0.
- **Near highway ramp?:** If the parcel is located in or within ¼ mile of a highway ramp, it will receive a score of 1. If it is not located in or near a highway ramp, it will score 0.
- **Near park and ride?:** If the parcel is located in or within ¼ mile of a park-and-ride, it will receive a score of 1. If it is not located in or near a park-and-ride, it will score 0.

Note: A proximity score of 0 is not a bad thing. This just means the parcel does not have that characteristic that may make it more or less ideal for EV charger deployments at this time.

The parcel description will also indicate the parcel's final score, or the score that determines how suitable a particular parcel is for EV charger deployments. This is the score that is visually displayed on the map. It can be found in the following field:

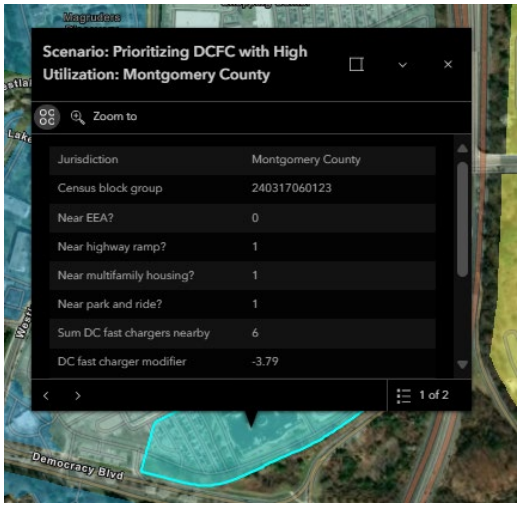
- **Scenario # final score:** parcels will have scores ranging between 1 and 10. Low priority parcels will have a score of 1, and high priority parcels can have a maximum score of 10. Most parcels will fall somewhere in between.

2.E Example Results and Interpretations

Example 1: High Traffic Mall with Low Priority Score

This parcel located in Montgomery County contains a shopping mall that experiences high traffic. Intuitively, a user might expect this area to be a high priority for EV charger deployments. However, it has a low suitability score. The parcel's scores in the "prioritizing DCFC with high utilization" scenario are as follows:

Figure 78. Example 1 Map Results



- **Scenario rank: 5.** This is the Step 1 CBG traffic score. A score of 5 means this parcel experiences high traffic.
- **DCFC score: -3.79.** This proximity score indicates there are already DCFC stations within ½ mile of the mall, so its score decreases. The **Sum DCFC** field indicates there are 6 stations nearby.
- **Near EEA?: 0.** This means the parcel is not located in or near an EEA, so its score does not increase.
- **Level 2 charger score: -1.47.** This proximity score indicates there are already Level 2 chargers within ½ mile of the mall, so its score decreases. The **Sum Level 2 fast chargers** field indicates there are 17 stations nearby.
- **Near MFH?: 1.** This means the parcel is located near MFH, so its score increases.
- **Near highway ramp?**: 1. This means the parcel is located near a highway ramp, so its score increases.

- **Near park and ride?**: 1. This means the parcel is located near a park-and-ride location, so its score increases.

This parcel's final score is 2.74, making it low priority for EV charger deployments. Using the above scores as inputs to the priority formula, the parcel's score is calculated as follows:

Parcel Score	=	*Step 1 CBG Score*	+	*Step 2 Proximity Score Modifier Total*
2.74	=	*5 (high traffic)*	+	*-3.79 (near existing DCFC)* *+ 0 (not near EEA)* *-1.47 (near existing Level 2 chargers)* *+ 1 (near MFH)* *+ 1 (near highway ramp)* *+ 1 (near a park-and-ride)*

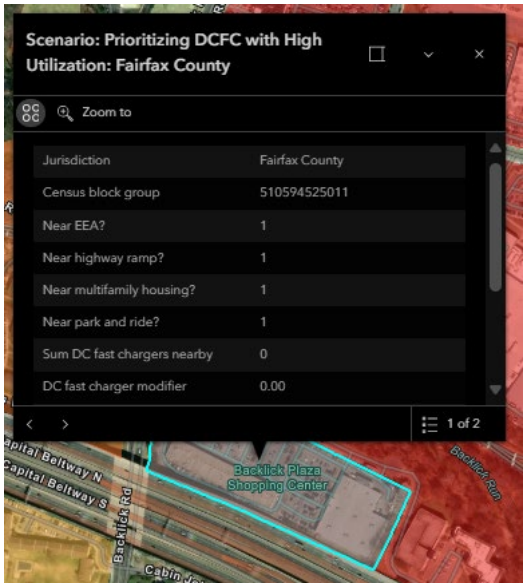
In this case, while Example 1 is in a high traffic area located near MFH and a highway ramp, the existing charging infrastructure indicates the area already has publicly accessible EV chargers. This reduces the parcel's priority because the focus of the REVII Strategy is to identify areas that lack any publicly accessible charging infrastructure in order to establish a well-distributed charging network. However, the results of Example 1 are not prescriptive. A jurisdiction may continue to build chargers on this parcel if that is a priority for the locality. Local knowledge and discretion should be used with all deployments.

Example 2: High Traffic Mall with High Priority Score

This parcel is located in Fairfax County and contains a shopping mall that experiences high traffic. Intuitively, a user may expect this area to be a high priority for EV charger deployments, which this analysis confirms. The parcel's scores in the "DCFC with High Utilization" Scenario are as follows:

- **Scenario rank: 6.** This is the Step 1 CBG traffic score. A score of 6 means this parcel experiences high traffic.
- **DCFC score: 0.** This proximity score indicates there no existing DCFC stations within ½ mile of the mall, so the parcel's suitability score is not impacted by existing infrastructure. The **Sum DCFC** field indicates there are 0 stations nearby.
- **Near EEA?: 1.** This means the parcel is located in or near an EEA, so its suitability score increases.
- **Level 2 charger score: 0.** This proximity score indicates there are no existing Level 2 chargers within ½ mile of the mall, so the parcel's suitability score is not impacted by existing infrastructure. The **Sum Level 2 fast chargers** field indicates there are 0 stations nearby.

Figure 79. Example 2 Map Results



- **Near MFH?: 1.** This means the parcel is located near MFH, so its score increases.
- **Near highway ramp?**: 1. This means the parcel is located near a highway ramp, so its score increases.

- **Near park and ride?**: 0. This means the parcel is not located near a park-and-ride location, so its score does not increase.

This parcel's final score is 10, making it a high priority location for EV charger deployments. Using the above scores as inputs to the priority formula, the parcel's score is calculated as follows:

Parcel Score	=	*Step 1 CBG Score*	+	*Step 2 Proximity Score Modifier Total*
10	=	*6 (high traffic)*	+	*0 (not near existing DCFC)* *+ 1 (near EEA)* *0 (not near existing Level 2 chargers)* *+ 1 (near MFH)* *+ 1 (near highway ramp)* *+ 1 (near a park-and-ride)*

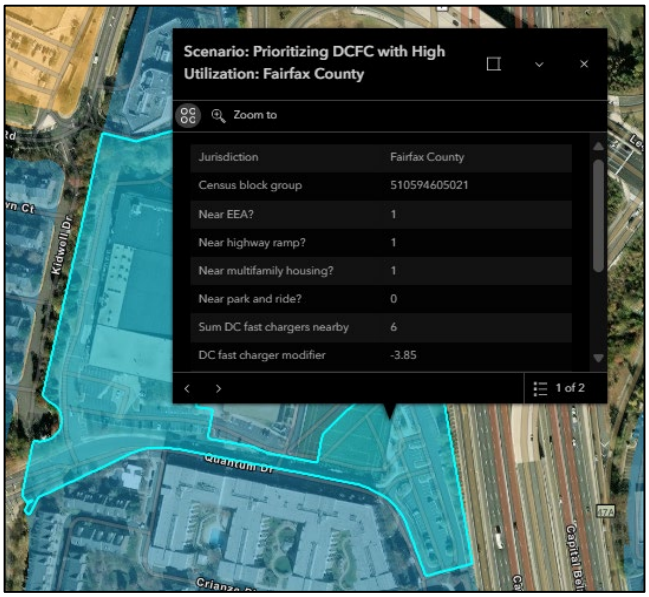
In this case, Example 2 is in a high traffic area located near MFH, an EEA, a highway ramp, and a park-and-ride location with no existing EV chargers within half a mile. This combination of parcel characteristics makes the mall a high priority location for deploying EV chargers because it is in a charging desert and will serve a large number of drivers, including those that come from EEAs, are commuting, or live in nearby MFH. However, the results of Example 2 are not prescriptive. Local knowledge and discretion should be used with all deployments, knowing many will be private deployments.

Example 3: Sports Field with Low Priority Score

This parcel located in Fairfax County contains playing fields that experience moderate traffic. Intuitively, a user might expect this area to be a high priority for EV charger deployments. However, it has a low suitability score. The parcel's scores are as follows:

- **Scenario rank: 3.** This is the Step 1 CBG traffic score. A score of 3 means this parcel experiences moderate traffic.
- **DCFC score: -3.85.** This proximity score indicates there are already DCFC stations within ½ mile of the mall, so its score decreases. The **Sum DCFC** field indicates there are six chargers nearby.
- **Near EEA?: 1.** This means the parcel is located in or near an EEA, so its suitability score increases.
- **Level 2 charger score: -1.68.** This proximity score indicates there are already Level 2 chargers within ½ mile of the mall, so its score decreases. The **Sum Level 2 fast chargers** field indicates there are 7 stations nearby.

Figure 80. Example 3 Map Results



- **Near MFH?: 1.** This means the parcel is located near MFH, so its score increases.
- **Near highway ramp?**: 1. This means the parcel is located near a highway ramp, so its score increases.

- **Near park and ride?**: 0. This means the parcel is not located near a park-and-ride location, so its score does not increase.

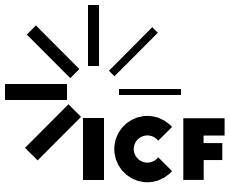
This parcel's final score is 0.47, making it low priority for EV charger deployments. Using the above scores as inputs to the priority formula, the parcel's score is calculated as follows:

Parcel Score	=	*Step 1 CBG Score*	+	*Step 2 Proximity Score Modifier Total*
0.47	=	*3 (moderate traffic)*	+	*-3.85 (near existing DCFC)* *+ 1 (near EEA)* *-1.68 (near existing Level 2 chargers)* *+ 1 (near MFH)* *+ 1 (near highway ramp)* *+ 0 (not near a park-and-ride)*

In this case, while Example 3 is in a moderate traffic area located near MFH, a highway ramp, and an EEA, there is existing charging infrastructure in the area. This reduces the parcel's priority, as the focus of the REVII Strategy is to identify areas that do not have charging infrastructure available in order to establish an equitable and well-distributed charging network. However, these results are not proscriptive, and local knowledge and discretion should be used with all deployments.

Appendix 3: List of High Priority EV Charging Sites by Jurisdiction

Available as a separate excel file attachment.

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