CITY OF BELLEVUE

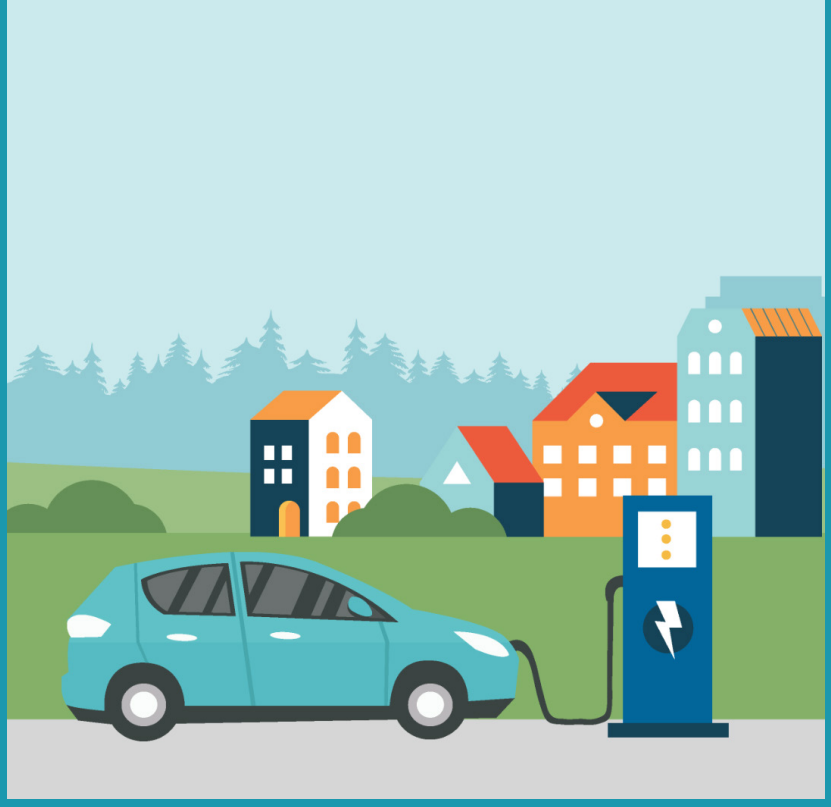
Electric Vehicle Roadmap

Accelerating EV Adoption in Bellevue

October 2024

ACKNOWLEDGEMENTS

and thank yous



CITY OF BELLEVUE

Core Team

Colin Munson
Community Development

Daniel Lai
Transportation

Jennifer Ewing
Community Development

Patrick Babbitt
Community Development

Ana Hagerup
Finance & Asset Management

Darcy Akers
Transportation

Allison Lammerts
Finance & Asset Management

Subject Matter Experts

Edward Butterfield
Community Development

Franz Loewenherz
Transportation

Kevin McDonald
Transportation

Ryan Walker
Parks & Community Services

Tom Purcell
Parks & Community Services

Oversight Team

Chris Long
Transportation

Emil King
Community Development

Paula Stevens
Transportation

Thara Johnson
Community Development

Prepared for:

CIty of Bellevue

Prepared by:

HDR Inc.

GLOSSARY of terms

Alternating Current (AC)	An electric current that reverses direction multiple times per second. Current flowing in power lines and normal household electricity from a wall outlet is alternating current.
Battery Electric Vehicle (BEV)	An electric vehicle that exclusively uses electricity to charge batteries, which then discharge to electric motors to propel the vehicle.
Disadvantaged Community (DAC)	A group of people with environmental justice concerns (most impacted from a combination of economic, health and environmental burdens) and those with predominantly low-income persons and/or communities of color. Also commonly referred to as underserved communities.
Direct Current (DC)	An electric current flowing in one direction only, used in high-power charging applications.
DC Fast Charging (DCFC)	Chargers which convert AC power to DC power that flows directly into the vehicle's battery to provide faster and higher-power charging. Commonly referred to as "fast charging."
Electric Vehicle	A vehicle propelled by one or more electric motors using energy stored in rechargeable batteries.
Electric Vehicle Supply Equipment (EVSE)	The equipment that takes power from the grid and supplies it to an electric vehicle. Commonly referred to as a charger.
Greenhouse Gas (GHG)	A gas (such as carbon dioxide) that traps heat near Earth's surface, thus raising temperature through the greenhouse effect.
Heavy-Duty Vehicle (HDV)	Any vehicle exceeding 26,001 pounds in gross weight.
Hybrid Electric Vehicle (HEV)	A vehicle powered by an internal combustion engine in combination with a battery pack that may be used to power an electric motor for propulsion.
Internal Combustion Engine (ICE)	An engine that generates power by burning gasoline, oil, or other traditional fuels.
Justice40 Initiative	U.S. initiative directing 40 percent of the benefits of federal investments to disadvantaged communities for environmental justice and social equity.

GLOSSARY of terms

Kilowatt (kW)

The rate at which specific work is done or which energy is transmitted. EVSE power is defined in kilowatts. An EVSE delivering 10kW of power into a battery over an hour will have provided 10kWh of energy to the battery.

Kilowatt-Hour (kWh)

A measure of energy (defined as the capacity to do work) equal to one thousand watt-hours. A kilowatt-hour is the amount of energy delivered by one kilowatt of power for one hour. EV battery capacity is typically measured in kilowatt-hours.

Light-Duty Vehicle (LDV)

Any vehicle with a gross weight of 10,000 pounds or less.

Level 1 Charging

A charger utilizing a 120-volt power to charge an EV at up to 1.9kW, typically providing 2-5 miles of range per hour of charging.

Level 2 Charging

A charger utilizing 240-volt AC power to charge an EV, typically providing 10-20 miles of range per hour of charging.

Medium-Duty Vehicle (MDV)

A vehicle with a gross weight between 10,001 pounds and 26,000 pounds.

Plug-In Hybrid Electric Vehicle (PHEV)

A vehicle that is propelled from both batteries and an internal combustion engine, with the batteries typically providing 20-50 miles of all-electric range.

Port

The ability for a charger to charge one EV. A charger will typically have one or two ports. A single port may offer several different connector types.

Transportation Network Company (TNC)

A company offering prearranged rides or car rentals for a fee using an online-enabled platform, such as a smartphone application, like Uber and Lyft.

United States Department of Energy (DOE)

The Federal department working to address the United States' national energy policy production, conservation, and energy-related research.

United States Department of Transportation (DOT)

The Federal department that works to fund, coordinate, and deliver the United States' transportation network.

Washington State Department of Commerce

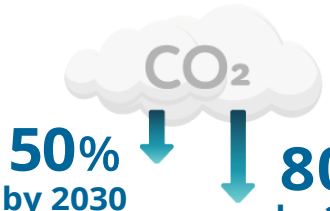
The state government agency working to serve Washington residents through community and economic development.

City Of Bellevue | EV Roadmap

Executive Summary

The City of Bellevue has developed this Electric Vehicle Roadmap to guide the deployment of new EV charging infrastructure, potential incentives, and programming within the city to support the transition to electric vehicles in Bellevue. This roadmap aligns with the 2021-2025 Sustainable Bellevue Environmental Stewardship Plan and aims to support the city's goals for a 50 percent reduction in greenhouse gas emissions by 2030 and an 80 percent reduction by 2050.[1]

Goals for reduced emissions



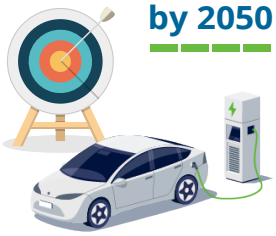
50% by 2030

80% by 2050

Goals for registered cars that are EVs

100% by 2050

25% by 2030



The city is positioning itself to be ready for EVs to account for 25 percent of all registered vehicles on its roads by 2030 and for all vehicles to be EV by 2050. Bellevue's current EV adoption is three times the statewide rate; it is estimated EV adoption in Bellevue will continue to outpace that of the state.[2]

[1] City of Bellevue (2020): *https://bellevuewa.gov*
[2] Washington State Legislature Clean Vehicles Program (2022)

Executive SUMMARY

This EV Roadmap forecasts a path toward transportation electrification in Bellevue and identifies a series of strategies the city can implement to align Bellevue's resources with its goals for a rapid pace of EV adoption. The EV and EV charging infrastructure markets are rapidly evolving, and what could be a stand-alone market-based transition is reinforced by the Washington State mandate for new vehicle sales.[3] Support and management from entities outside the city, including those in the private sector, will be needed to complete the work to support electrification and ensure all of Bellevue's community members are provided equitable benefits of a large shift in the transportation system.

Bellevue is in the early stages of the transition to electric mobility, and the rate of EV adoption is expected to greatly accelerate in the coming years. The transition to electrified mobility is intended to complement existing efforts that support alternative modes of transportation such as public transit and bicycling. While the adoption of EVs over ICE vehicles is not the sole solution, it is a significant component in the broader strategy to reduce GHG emissions within the city. The strategies outlined in this EV Roadmap aim to prepare for and manage this transition, delivering needed services in a timely manner as well as distributing the benefits of transportation electrification like reduced emissions, better air quality, and improved public health, to everyone in the Bellevue community.

Overall, this EV Roadmap provides a comprehensive strategy for the city to lead a widespread transition to EVs while providing an equitable distribution of benefits to all. Through strategic investments, collaboration with private partners, policy updates, and community engagement, this plan charts a path for the city to reduce emissions, expand charging access, and establish itself as a model for electrified mobility solutions.

100% of new car sales in WA will be zero-emission models by 2035[3]

NEEDS ASSESSMENT

Bellevue currently has an EV population of about 8,100 vehicles, supported by a charging network with just under 600 publicly accessible charging ports. This plan projects the city will see almost 200,000 EVs on its roads come 2050, necessitating a charging network of more than 10,000 publicly accessible charging ports by 2050, about 90 percent of which would be Level 2 chargers. More than 2,900 of these charging ports will need to be installed by 2030 to support an estimated 56,000 EVs.

Not all the community's charging needs will need to be met through direct financial investment from the city however, as private sector investments are likely to meet much of this demand. The city can leverage funding from federal, state and utility programs to maximize city investments.

[3] Washington State Legislature RCW 70.A.30.010 (2020): *https://app.leg.wa.gov/70A.30.010*

EQUITY CONSIDERATIONS

Ensuring equitable access to EVs and their supporting charging infrastructure is a major focus of the EV Roadmap. The plan assumes that the market will drive EV charging infrastructure investment in higher income areas and low-income neighborhoods may require more targeted investments. This pattern is evidenced based on the current distribution of publicly available chargers in Bellevue. This plan evaluates EV charging solutions and service levels based on the distribution of affordable housing, health disparities, income, air quality concerns, racially disparate impacts, and displacement risks to identify communities that should be prioritized in the city's investments and programming. Travel patterns are also examined to optimize charging locations to serve Justice40 communities, with opportunities identified to equitably expand EV charging in underserved areas. The analysis seeks to estimate where the private sector may invest in charging infrastructure and where it may leave gaps that public investments could be used to address. Combining the methodologies offered in this section, a shortlist of candidate sites was developed that the city can use as an example of how an equity-focused siting process can help to identify where EV charging will have the largest benefits for underserved community members.

CITY INVESTMENT GUIDE

This plan explores the role of both the public and private sectors in building a comprehensive and equitable network of publicly accessible chargers across the city. Ongoing growth in private sector investments has been fast-paced, but these investments often focus on areas with high existing EV adoption rates and leave gaps in disadvantaged communities that have historically borne the brunt of impacts related to transportation-related emissions. Public sector investments will be needed to fill these gaps and ensure all members of the Bellevue community will have convenient access to charge their EV in the future. It is recommended in this report that the City of Bellevue set an aspirational target of adding 194 publicly accessible charging ports by 2030, many of which would be in underserved communities. Not all this charging will need to be directly owned, operated, constructed, or funded by the city. Rather, the city can utilize a combination of direct investment in key areas and support for private site hosts looking to install publicly accessible charging on their property.

IMPLEMENTATION STRATEGIES

The strategies offered in this EV Roadmap can be used to prioritize actions and coordinate between city departments and the community as the city continues to take action to promote and support a widespread shift to electrified mobility.

The five major strategy categories for this plan are:

1. Focus Outreach & Education
2. Refine Planning, Policy & Regulations
3. Advance Equitable Access
4. Leverage Strategic Partnerships
5. Lead by Example

The city's near-term actions will primarily focus on assessing potential new EV charging sites in identified priority areas that have been designated as candidate sites through an infrastructure siting process described in this plan. Other key actions for the city to take will include establishing funding and incentives for multifamily buildings and other properties; maximizing partner programs; expanding knowledge of, and access to, used EVs; and working with the private sector to encourage greater investment in publicly accessible charging infrastructure. Funding is available from many federal and state sources and includes tax credits, grants, and incentive programs. This funding can be leveraged to install EV charging infrastructure that prioritizes investments in underserved communities.

EV CHARGING FRAMEWORK

Finally, this plan provides a comprehensive framework for the expansion of charging infrastructure in Bellevue. The charging framework identifies five categories of charging: residential, community, destination, distance, and depot. Bellevue's focus is on community and destination charging, which aim to expand public charging access, particularly in areas with high densities of multifamily housing with residents who have limited access to charging at home. The EV Roadmap's charging framework provides detailed information on these different charging types, including use cases, potential local applications, and cost estimates for installation.

Table of CONTENTS

« CONTINUED

Table of CONTENTS

CONTINUED »

FIGURES

TABLES

01 Introduction

What you will find in this chapter

- Why we've created this EV Roadmap
- Goals that align with other city plans
- Planning both for growth, and bringing EV infrastructure to underserved communities

In accordance with the goals and actions found in the city's 2021-2025 Environmental Stewardship Plan, the City of Bellevue has developed this Electric Vehicle Roadmap, or EV Roadmap, to guide the deployment of EV charging infrastructure, incentives, and programming across the city and help to achieve its goals for a 50 percent reduction in greenhouse gas emissions by 2030 and an 80 percent reductions by 2050.[4] Bellevue also aims for EVs to account for 25 percent of all registered vehicles on its roads by 2030, and for all registered vehicles to be EVs by 2050. Washington State adopted California's ambitious vehicle emission standards for new vehicle sales in December 2022 and has enacted a new rule requiring 100 percent of new passenger car, light-duty truck, and medium-duty vehicle sales to be of zero-emission models starting in 2035.[5,6]

With over 280 million vehicles on U.S. roads, light-duty passenger vehicles — including passenger cars, SUVs, and pick-up trucks — are the dominant mode of passenger travel in the country. These vehicles account for more than 50 percent of total transportation energy consumption and emissions, as shown in **Figure 1**.[7] The widespread adoption of EVs presents a key solution for decarbonizing the U.S. light-duty vehicle sector and achieving emission reduction goals, offering opportunities to decrease the emissions from legacy Internal Combustion Engine (ICE) vehicles still on the road in 2050 and beyond. The integration of EVs as an alternative to ICE vehicles is a valuable tool in the toolbox for carbon reduction within the City of Bellevue and is intended to complement the advancement of alternative transportation mode-related efforts, not diminish them.

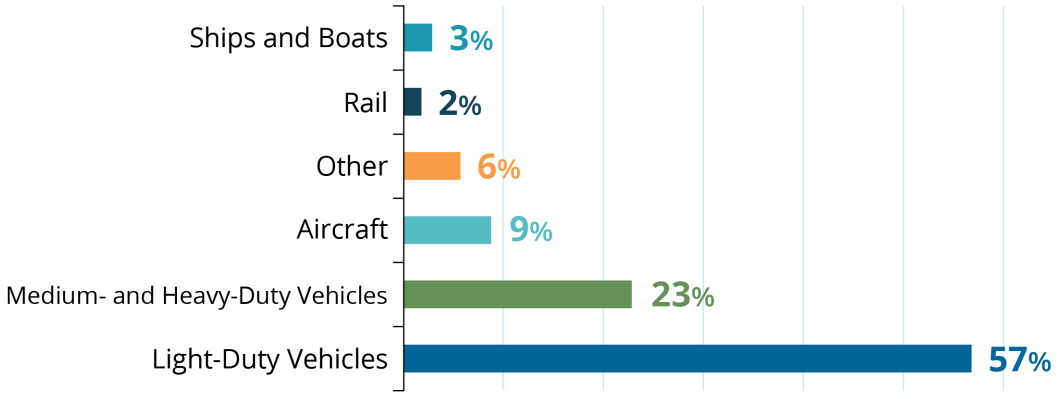


Figure 1. Share of U.S. Transportation Sector GHG Emissions by Source, 2022

[4] City of Bellevue (2020): *https://bellevuewa.gov*
[5] Washington State Legislature RCW 70.A.30.010 (2020)
[6] Washington State Legislature Clean Vehicles Program (2022)`
[7] United States Environmental Protection Agency Green Vehicle Guide (2024): *https://epa.gov/greenvehicles/us-national-blueprint-transportation-decarbonization*

The Comprehensive Plan, the city's foundational document which guides growth over the next twenty years, includes policies that direct the City to reduce greenhouse gas emissions, improve air quality, reduce vehicle miles traveled, electrify the city's fleet and provide excellent and equitable access to city facilities. Bellevue is planning for growth consistent with the Council-ratified growth targets of 70,000 new jobs and 35,000 new housing units by 2044. The planning for EV adoption in the EV Roadmap aligns with these targets and the policies to address the causes of climate change. The recent update to the policies in the Comprehensive Plan were informed by the Air Quality and Land Use Report, the Climate Vulnerability Assessment, and the Environmental Impact Statement for the 2044 Comprehensive Plan. These documents also informed the development of the EV Roadmap and align with the 2044 Comprehensive Plan policies and the Environmental Stewardship Plan.

The future of mobility in Bellevue includes EVs as part of the puzzle and is being incorporated in the documents previously mentioned and many more city planning efforts such as the Mobility Implementation Plan, Curb Management Plan, Transit Master Plan, Transportation Demand Management Plan, and active transportation planning. The city is prioritizing sustainable and equitable transportation in all forms, not exclusively electric vehicles. While the EV Roadmap is guiding city planning and investment in EVs, EV charging, and other electrified mobility, the Roadmap is part of a holistic vision of the future of transportation in Bellevue.

Bellevue is planning for growth of 70,000 new jobs and 35,000 new housing units by 2044.

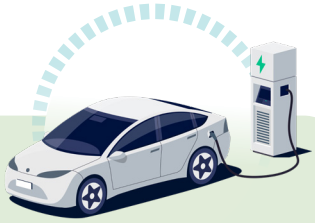
This EV Roadmap forecasts a path toward transportation electrification in Bellevue, then identifies a series of strategies the city can implement that align Bellevue's goals with those of the state. A major focus is ensuring all members of the Bellevue community will have access to, and benefit from, the transition to electrified mobility. Although Bellevue's high share of workers in the technology sector and college-educated residents has led to a relatively rapid pace of EV adoption to date, it can often be more difficult for those in historically disadvantaged and underserved communities to overcome cost and access barriers such that owning an EV becomes feasible. The strategies outlined in this EV Roadmap aim to distribute the many benefits of electrified mobility, like reduced emissions, better air quality, and improved public health, to everyone in the Bellevue community.

02 Plan Vision, Mission & Goals

What you will find in this chapter

- Our mission and vision for EV adoption
- 9 EV Roadmap goals, grouped into 4 areas:
  - Sustainability
  - Equity
  - Partnerships
  - Leadership

The opportunities to overcome barriers to EV adoption and expand transportation electrification in Bellevue outlined throughout this EV Roadmap have been built upon a vision and mission reflecting the needs and desires of the city and its many stakeholders. A series of goals for electrified mobility in Bellevue have also been developed to measure progress and success as the city works to facilitate a widespread transition to EVs across the entire community. The plan's vision, mission, and goals are important in creating an EV Roadmap that is locally applicable and actionable.



VISION

The vision statement describes the unique future the city hopes to create and how it will serve the public by supporting electrified transportation in Bellevue and reinforcing the city's commitment to environmental sustainability.

Position the City of Bellevue as a national model in transportation electrification through equitable solutions driven by innovation and collaboration.

MISSION

The mission statement defines the purpose of the plan and describes what is being done, for whom, and why.

Support a city where residents, workers, and visitors benefit from an accessible, efficient, and clean transportation ecosystem by guiding the deployment of charging infrastructure, incentives, and other sustainable modes of transportation to advance the Bellevue's mobility and equity goals.

GOALS

Goals are qualitative statements of what should be achieved by the plan. These goals were developed while keeping existing city goals from the Comprehensive Plan in mind. The nine goals developed for this plan are grouped into four areas that align with the city's goals for a better, cleaner future.

Sustainability

1. **Environmental Stewardship:** Reduce tailpipe GHG emissions and promote sustainability, fostering a citywide commitment to electrified transportation.
2. **Policy Action:** Leverage city resources to promote municipal and community actions that support sustainable transportation in regional, state, and federal planning initiatives; policy; and law.

Equity

3. **Charging Access:** Collaborate to create and accelerate development of a publicly accessible charging network that provides all residents, workers, and visitors in Bellevue with equitable and convenient access to EV charging.
4. **Mobility Diversity:** Expand electrified transportation choices for Bellevue's residents, workers, and visitors by exploring robust, shared-use mobility options, including e-bikes, electrified ride-share, and other e-mobility alternatives.

Partnerships

5. **Smart Funding:** Leverage private and public sector partnerships to advance implementation of EV and shared-use mobility strategies.
6. **Transit Electrification:** Support regional transit partners in the electrification of transit fleets within Bellevue to help achieve the city's goals for EV adoption and GHG emissions reductions.
7. **Coordination & Collaboration:** Within the city government, work across departments and teams to align EV planning with other efforts and meet citywide needs; with strategic partners, leverage coordination for key initiatives outside of the city's direct control.

Leadership

8. **National Leadership:** Establish Bellevue as a nationally recognized leader in advanced transportation technologies, including electrified mobility.
9. **Leading by Example:** Reinforce the city's commitment to reducing greenhouse gas emissions from all possible sources, including municipal operations, by transitioning city fleet vehicles as appropriate and available.

03 Needs Assessment

What you will find in this chapter

- EV adoption forecasting and trends
- EV driver profiles and adoption rates
- Charging needs analysis and assumptions
- Future charging demand

EV ADOPTION FORECASTING

To understand the anticipated need for light-duty EV charging in Bellevue, adoption forecasts were created by projecting current growth trends through the year 2050. Forecasting growth of vehicles in Bellevue is inherently tied to the city's growth targets and status as a job center for the Eastside, and one of only two in King County. Bellevue anticipates adding 35,000 housing units and 70,000 jobs by 2044 through the Comprehensive Plan.[8] These projections were used to determine where city investment in new EV charging could be most impactful.

When analyzing EV adoption, there are two main metrics to track:

1. **EV adoption:** The percentage of **all** registered vehicles that are EVs.
2. **EV market share:** The percentage of **new** vehicle registrations that are EVs.

The starting point for the forecast was established by analyzing existing data for the metrics outlined above. As part of the Washington Transportation Electrification Strategy effort, the Washington State Department of Commerce completed a statewide adoption forecast.[9] This forecast provides insights into EV adoption only at the state and county levels and does not extend beyond 2035. To address these limitations, an adoption forecast specific to Bellevue was developed. This forecast focuses on reaching the city's market share and adoption goals through 2050.

The goals of this effort were to:

- **Determine what level of growth is needed** to reach the city's goals for 25 percent EV adoption in 2030 and 100 percent EV adoption in 2050.
- **Identify EV adoption forecasts** for different EV driver profiles based on housing types, including both current and future owned or leased EVs.
- **Inform the charging needs analysis** by estimating the number of registered EVs that will need to be supported over time.

Recent EV Adoption Trends

About 24 percent of Bellevue's new vehicle registrations in 2023 were EVs (including battery electric vehicles and plug-in hybrid electric vehicles), compared to 19 percent in Washington and 10 percent nationwide.[10] Based on this market share, it is estimated there were roughly 8,145 registered EVs in Bellevue at the end of 2023, equating to just under 7.9 percent of the 103,000 vehicles registered in the city. In addition, it is estimated another 2,865 EVs enter the city each day to work or visit. Based on this, there are roughly 11,000 EVs traversing Bellevue's roadways on a typical day in 2023.

Figure 2 summarizes existing EV adoption trends at the city, county, state, and national levels from 2020 to 2023. Bellevue continues to outpace the other jurisdictions, with EVs having a market share of nearly 25 percent in 2023.

[8] City of Bellevue (2024): *https://bellevuewa.gov/city-government/departments/community-development/planning-initiatives/comprehensive-plan*
[9] Washington Transportation Electrification Strategy (2024): *https://public.tableau.com*
[10] Alliance for Automotive Innovation (2023): *https://www.autosinnovate.org/posts/papers-reports*

In comparison, EV market shares in Seattle and Portland were about 17 and 18 percent, respectively, in 2023. The share of EVs that are battery electric vehicles increased each year during that period, accounting for four out of five registered EVs in 2023. It is anticipated that this trend will continue as battery technologies continue to improve, leading to these vehicles being the dominant EV type for the city to consider in its planning efforts.

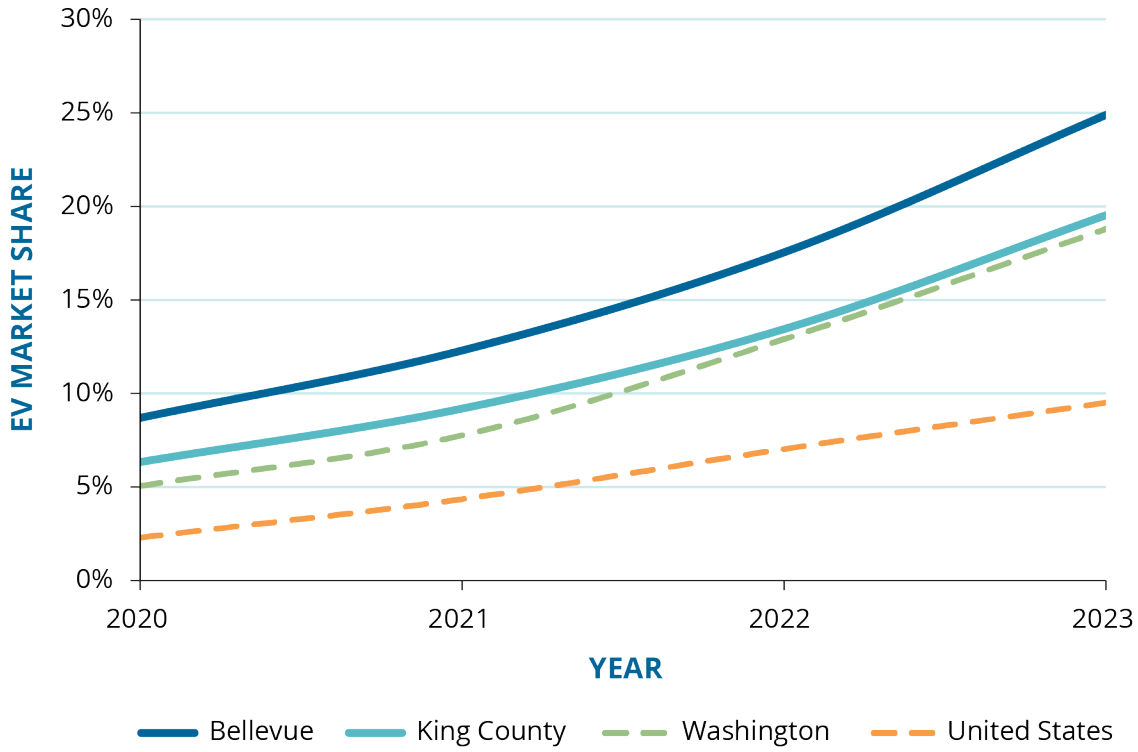


Figure 2. Comparison of Recent EV Market Share Trends
Source: *Washington State Open Data Portal (WA)[11] and Alliance for Automotive Innovation (U.S.)[12]*

[11] Washington State Open Data Portal (2023): *https://data.wa.gov/Transportation/Vehicle-Registration-Transactions-by-Department-of/brw6-jymh/about_data*
[12] Alliance for Automotive Innovation (2023): *https://www.autosinnovate.org/GetConnected*

Forecasting Assumptions

A Bellevue-specific EV adoption forecast was developed using an S-curve approach that reflects the non-linear nature of how societies typically adopt new technologies: Adoption is slow at first, then rapidly increases as the technology improves before slowing again as market saturation is reached. This trend has been seen around the world, as shown in **Figure 3**.[13]

Due to the uncertainties that come with deploying new technologies and the magnitude of infrastructure that is needed to support EVs, market share projections are a constantly moving target.

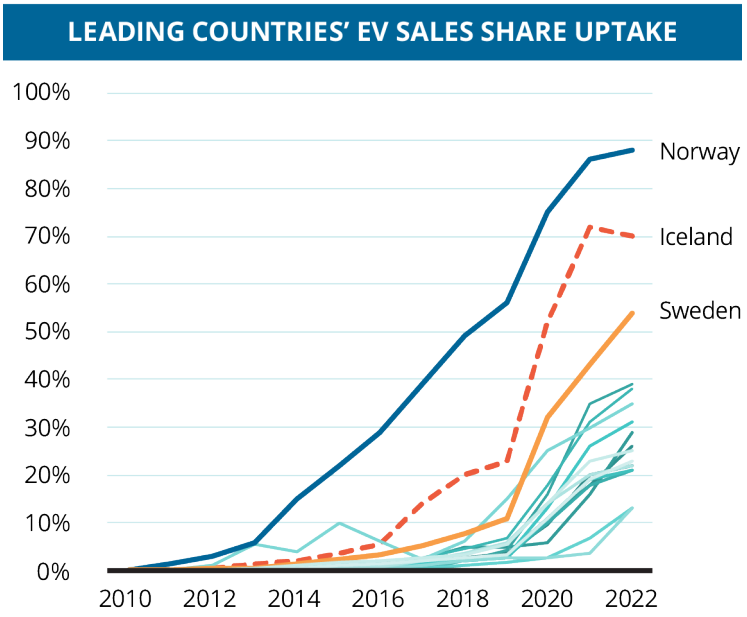


Figure 3. Observed EV Market Growth

The EV adoption forecasting process follows three main steps:

1. Use existing vehicle registration data to determine current EV market shares.
2. Project EV market shares through 2050, when all registered vehicles should be EVs.
3. Apply new vehicle sales projections to estimate EV adoption in 2050 and intermediate years.

Factors that will continue to change and affect subsequent EV market share and EV adoption forecasts include:

- EV purchase prices compared to those of gas- or diesel-powered vehicles.
- EV driving ranges compared to those of gas- or diesel-powered vehicles.
- Electricity costs compared to those of traditional fuels that are higher and more dynamic.
- Charger availability and charging speeds.
- State and federal policy action.
- Availability of financial incentives.
- Raw material availability for battery production.

[13] Rocky Mountain Institute (2023): *https://rmi.org/the-ev-revolution-in-five-charts-and-not-too-many-numbers*

It is recognized that EV adoption will be highly dependent on drivers' access to charging infrastructure, with home charging typically accounting for a majority of charging needs. To account for this, EV adoption forecasts were developed for four unique EV driver profiles according to housing type.

Housing types used for EV forecasting include:

1. **Single-Family Residents:** Single-family homes, which in this analysis refers only to detached single-family residences, account for more than half of all existing housing units in Bellevue. These drivers are historically more likely to own an EV because of their access to charging at home: In California, 80 percent of all EVs are owned by residents of a single-family home.[14] Washington State recently adopted a requirement that each new unit of this type must be equipped with at least one EV-Ready parking space.[15] This analysis estimates there are about 6,500 EVs in single-family homes today in Bellevue, and there will be around 74,600 EVs in these homes by 2050. Note that very few detached single-family housing units are planned to be added in Bellevue moving forward.

2. **Existing Multifamily Housing:** The number of vehicles in existing multifamily housing was estimated as the difference between total persons and vehicles in Bellevue and the estimates developed for the Single-Family Residents EV driver profile. Based on this, there are roughly 1,600 EVs in these developments today. Because this EV driver profile only considers existing housing units, total vehicle registrations and sales were held constant in all projections. Upon reaching 100 percent EV adoption in 2050, it is estimated this EV driver profile will account for about 30,500 EVs.

3. **New Multifamily Development:** Washington State recently adopted a requirement that 45 percent of parking spaces in new multifamily developments must be either equipped with EV charging stations, be made EV Ready, or be made EV Capable.[16] This requirement is expected to increase EV adoption in new developments more rapidly than in existing buildings where EV charging is less likely to exist and can be more difficult to install, but EV adoption rates in this profile will likely be slower than those for the Single-Family Residents profile. Based on a starting EV adoption value of 14 percent, it is estimated there will initially be about 1,750 EVs in these units. By 2050, this EV driver profile is expected to account for roughly 45,100 EVs.

4. **Daytime Influx Population:** An important aspect of this forecasting effort is the implications of regional transportation electrification for those who do not live in Bellevue but come to the city to work, shop, or play and will need to charge their EV. This influx of drivers increases the city's daytime population by about 70,140 persons, or an additional 34 percent. This must be considered when projecting future charging demand. Based on existing EV market share (20 percent) and EV adoption rates (5 percent) in King County, there are about 2,865 EVs entering Bellevue during the day. When 100 percent EV adoption is reached in 2050, it is estimated this group will account for 49,020 EVs.

Many assumptions, including access to home charging and the share of EVs in each category, were also made to distribute registration data by housing type as it is not available at this granularity. The assumptions are based on updates to the Bellevue Comprehensive Plan and work completed by the city to project future housing developments and vehicle registrations. Detailed information on these assumptions by EV driver profile is provided in **Attachment A: Needs Assessment Supplement.**

[14] California Energy Commission (2024): *https://www.energy.ca.gov/data-reports/surveys/california-vehicle-survey/housing-type-pev-ownership*
[15] Washington State (2024): *https://app.leg.wa.gov/WAC/default.aspx?cite=51-50-0429*
[16] Washington State Legislature (2023): *https://apps.leg.wa.gov/wac/default.aspx*

EV Adoption Timeline

PROJECTING FUTURE EV MARKET SHARE

Across all four EV driver profiles, Bellevue should anticipate that the Bellevue community is about to enter a period of very rapid EV adoption based on observed market trends reinforced by the state mandate and various incentives. Charging strategies will need to prepare for these rapid changes, which have only just begun when compared to observed growth in EV adoption in other markets across the U.S. and internationally. As mentioned earlier, an S-curve approach was used to develop EV market share forecasts specific to Bellevue.

These EV adoption tiers were maintained in the forecasting effort until all four S-curves converge in 2035, at which point all new vehicle sales in Washington will be EVs. **Figure 4** shows the EV market share curves for each EV driver profile through 2035, reflecting rapid growth in adoption in single-family and new multifamily housing and slower growth in the existing multifamily population. More information regarding the market share projections for the daytime influx population is provided in **Attachment A: Needs Assessment Supplement.**

EV market share analysis assumes a different growth rate for each profile:

1. **Single-Family Residents:** These drivers will adopt EVs at the **fastest rate** because of their convenient access to home charging in a dedicated parking space or garage.
2. **New Multifamily Development:** These drivers will see **relatively rapid growth** in adoption rates, largely due to the state's EV readiness requirements for new construction.
3. **Daytime Influx Population:** These drivers will adopt EVs at a **medium rate**, as this profile includes a mix of single-family and multifamily housing residents.
4. **Existing Multifamily Housing:** These drivers will have the **slowest rate** of EV adoption due to their lack of existing home charging access and the difficulty of retrofitting these properties to add charging. While charging infrastructure can be introduced to these properties, this may be unattractive to property owners because it can incur significant costs.

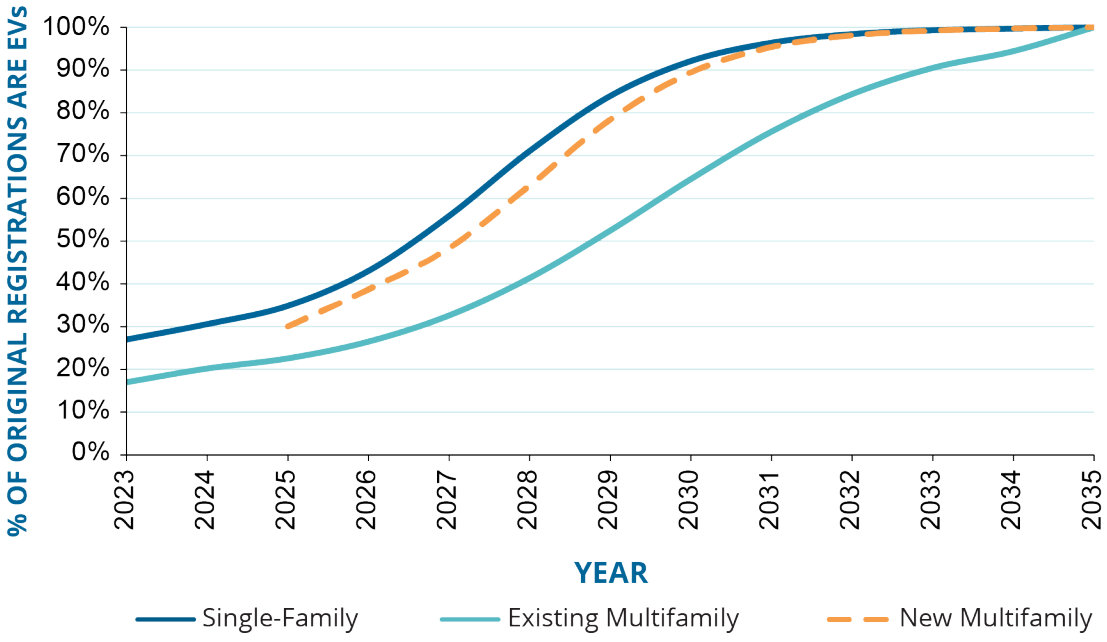


Figure 4. Projected EV Market Share by Driver Profile

TRANSLATING MARKET SHARE TO EV ADOPTION

To create an overall EV adoption forecast, EV market share projections were used with annual sales, annual growth in total registrations, and annual vehicle retirements to estimate how many EVs can be expected on Bellevue's roadways from now through 2050. **Table 1** and **Figure 5** show anticipated growth in EV adoption by EV driver profile within Bellevue. Market share projections for the daytime influx population are provided separately in **Attachment A: Needs Assessment Supplement.**

Table 1. Projections for Registered EVs by Driver Profile

Year	BELLEVUE RESIDENTS				
	Single-Family (# of EVs)	Existing Multifamily (# of EVs)	New Multifamily (# of EVs)	Resident Total (# of EVs)	Resident Adoption
2030	29,595	7,465	2,800	**39,860**	**35%**
2035	49,145	16,355	9,095	**74,595**	**60%**
2040	60,390	22,620	18,510	**101,520**	**76%**
2045	69,965	28,135	31,625	**129,725**	**92%**
2050	74,575	30,515	45,075	**150,165**	**100%**

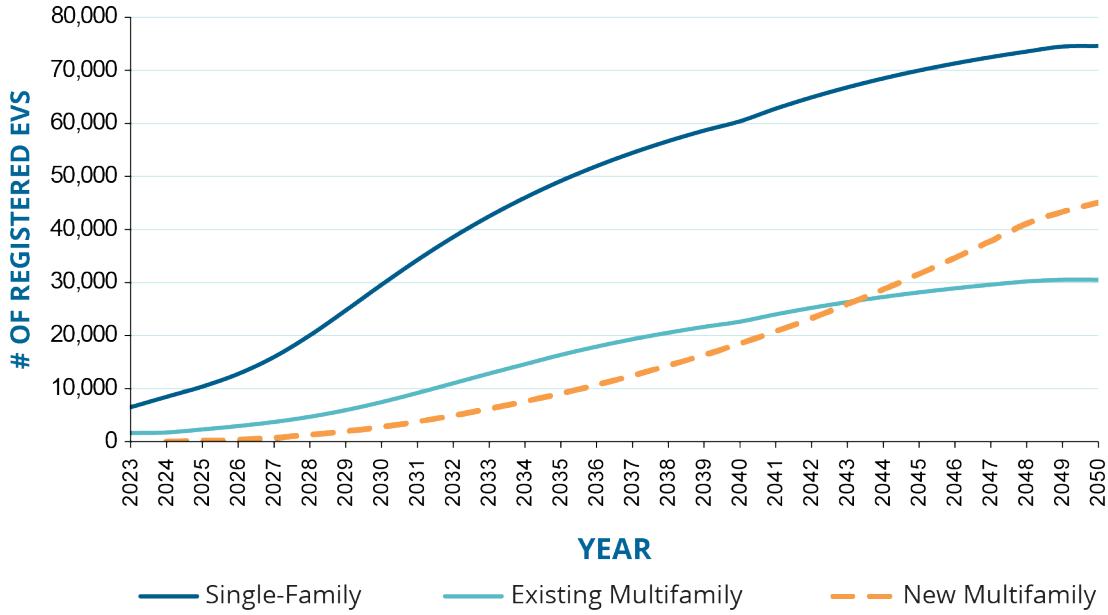


Figure 5. Projected Registered EVs by Driver Profile for Bellevue Residents

The fastest growing category is expected to be new multifamily development. This profile has the highest growth in total vehicle registrations because it is expected to represent the vast majority of housing units—and therefore virtually all residents and vehicles—being added to Bellevue beginning in 2025. Based on these projections, the number of registered EVs in Bellevue is expected to surpass that of internal combustion engine vehicles in 2033 (**Figure 6**).

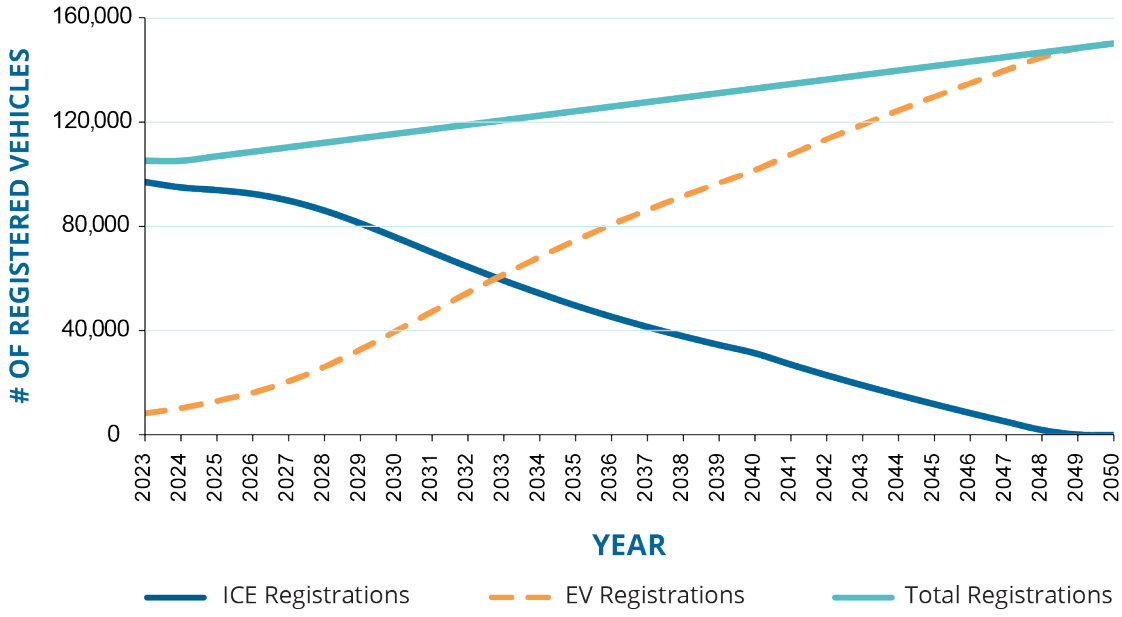


Figure 6. Projected Changes in Registered Vehicle Mix for Bellevue Residents

CHARGING NEEDS ANALYSIS

The U.S. Department of Energy's EVI-Pro Lite tool was used to quantify future charging needs across Bellevue. To best reflect the varying degrees of difficulty associated with installing infrastructure and adopting EVs in different housing types, future charging needs were divided into the same EV driver profiles as applied in the forecasting effort: single-family residents, existing multifamily housing, new multifamily development, and the daytime influx population. Different housing types will generate different charging demand based on travel patterns and access to at-home charging.[17]

Needs Analysis Assumptions

A series of assumptions was developed for each EV driver profile, including the number and types of EVs being considered, the level of support provided to plug-in hybrid electric vehicles (PHEV) and the share of drivers with access to home charging.[18] For all groups, this analysis uses the default vehicle mix assumed by EVI-Pro Lite for the Seattle-Tacoma-Bellevue metropolitan area. More detail on the assumptions made to determine charging needs by EV driver profile is provided in **Attachment A: Needs Assessment Supplement.**

EV driver assumptions include:

1 Single-Family Residents:

6,500 EVs today → **74,600 EVs** (2050)
95% of these EV drivers have home charging

There are about 6,500 EVs in this group today, increasing to around 74,600 EVs in 2050. There are 0.8 vehicles per person, compared to a ratio of 0.62 for the city overall. In this profile, 95 percent of EV drivers have access to home charging, enabling these users to switch to EVs more rapidly than others.

2 Existing Multifamily Housing:

6,500 EVs today → **74,600 EVs** (2050)
5% of these EV drivers currently have home charging, will increase to **45%** in 2050

There are roughly 1,600 EVs in this group today, increasing to about 30,500 EVs in 2050. There are 0.5 vehicles per person. Access to home charging begins at 5 percent today and slowly increases until reaching 45 percent in 2050, reflecting future investments by private property owners. This will likely require significant policy action and incentivization.

3 New Multifamily Development:

1,750 EVs today → **74,600 EVs** (2050)
45% of these EV drivers have home charging

Initially there is estimated to be roughly 1,750 EVs in this category, increasing to about 45,100 EVs in 2050. There are 0.5 vehicles per person, and 45 percent of drivers will have access to home charging based on the state's EV readiness requirements, which require 45 percent of parking spaces be either equipped with EV charging infrastructure, be made EV Ready, or be made EV Capable.

4 Daytime Influx Population:

2,850 EVs today → **49,000 EVs** (2050)
55% of these EV drivers have home charging

There are about 2,850 EVs in this category today, increasing to around 49,000 EVs in 2050. There are 0.62 vehicles per person, equal to the citywide average in Bellevue. In this group, 55 percent of drivers have access to home charging based on the share of single-family homes to all housing units. This value slowly increases until hitting 75 percent in 2050.

[17] **Note that this subsection refers to 'public charging' as that which is accessible to all members of the public, not necessarily that which the city directly invests in.**
[18] U.S. Department of Energy (2024): *https://afdc.energy.gov/evi-pro-lite*

The EVI-Pro Lite tool was used to estimate future charging needs based on four distinct categories, each with its own relevant charging types and locations.

The four categories and their most typical use cases are as follows:

1. **Single-Family Residents:** Level 1 and Level 2 home chargers. **Level 1 + Level 2**
2. **Shared Private Charging:** Multifamily Level 1 and Level 2 chargers, private workplace Level 1 and Level 2 chargers. **Level 1 + Level 2**
3. **Publicly Accessible Level 2 Charging:** Curbside neighborhood Level 2 chargers and Level 2 chargers at offices, retail, recreation facilities, healthcare facilities, education campuses, and community centers, among other land uses. **Level 2**
4. **Publicly Accessible DC Fast Charging:** DC Fast Chargers supporting members of the public and transportation network company drivers; power outputs range from 150 kW to 350 kW. **DC Fast Chargers**

Note that all adoption forecasts include both currently registered EVs and those registered moving forward. Only the city's overall needs are outlined here; more detail and breakdowns by EV driver profile are provided in **Attachment A: Needs Assessment Supplement.**

Future Charging Demand

Citywide charging needs, reflecting the sum of the charging needs estimated for each housing type, are summarized in **Table 2**. Forecasted EV adoption across all four populations, equating to about 57,000 EVs in 2030 and 199,200 EVs in 2050, would incur respective demands for roughly 2,900 and 10,150 publicly accessible charging ports. This would account for about 6.5 percent of total charging needs within the city limits.

Table 2. Citywide Charging Needs Summary

Year	Adoption Forecast (# of EVs)	CHARGING NEEDS BY TYPE (# OF PORTS)				Total Ports (# Publicly Accessible)
		Single-Family	Shared Private	Public Level 2	Public DCFC	
2030	**57,005**	26,580	4,640	2,610	295	**34,125** (2,905)
2035	**109,555**	44,135	12,315	5,145	570	**62,165** (5,715)
2040	**146,020**	54,235	21,040	6,460	700	**82,435** (7,160)
2050	**199,185**	66,975	41,740	9,145	1,005	**118,865** (10,150)

Note: Single-family charging needs for the daytime influx population are not included in this table. Single-family charging does not include any multifamily buildings.

There were 596 publicly accessible charging ports within the city limits as of early 2024, of which 574 were Level 2 and 22 were at DC Fast Chargers. This analysis indicates a need to target installation of just over 2,300 new publicly accessible charging ports by 2030, including more than 2,000 at Level 2 chargers and 275 at DC Fast Chargers. Then, about 8,575 new Level 2 charging ports and almost 1,000 new DC Fast Charging ports would be targeted for installation by 2050 to support an overall population of roughly 199,200 EVs. More information, breakdowns by driver profile, and detailed summary tables reflecting specific charger types and locations are provided in **Attachment A: Needs Assessment Supplement.**

All EV owners in Bellevue will incur some need for publicly accessible charging, though the type and amount vary. Even those in single-family homes who are likely to have access to home charging will sometimes need charging at their destination, largely to overcome low charge speeds at home that may not fully recharge their EV in the time they have available. Large investments in new chargers, particularly Level 2 chargers, will be needed from both the public and private sectors to meet the city's goals and encourage EV adoption in Bellevue and the surrounding communities. Focus areas for the city's investments, like expanded access to public Level 2 charging, are discussed in the **City Investment Guide** section.

04 Equity Considerations

What you will find in this chapter

- Equitable planning for e-mobility in Bellevue
- Outreach & Engagement efforts
- Demographic criteria, insight into existing conditions across the city
- Justice40 considerations and candidate sites

EQUITY IN BELLEVUE

To ensure that equity is a cornerstone of Bellevue's EV transition, the EV Roadmap must consider the perspectives of diverse communities, work to address and provide solutions for public charging and mobility access in underserved areas, and be conscious of existing socioeconomic disparities. Using this approach, the city aims to better serve communities that may be left behind in the EV transition and mitigate adverse impacts on communities disproportionately vulnerable to the health and quality of life impacts from non-electric mobility.

This section describes outreach and engagement efforts, demographic criteria for equity planning, and the application of the Justice40 Initiative to identify priority locations for EV charging infrastructure that were used to inform the cities transition to e-mobility. To accomplish this goal, the EV Roadmap included extensive outreach and engagement across the city, analyzes charging and mobility equity across eight criteria, and uses the federal government's Justice40 initiative to identify priority locations to invest in EV charging infrastructure. This section of the EV Roadmap describes each of these components in detail and how they inform the city's future work to ensure an equitable transition to e-mobility in Bellevue.

Figure 7 highlights the three Justice40 census tracts in Bellevue as well as the city's publicly accessible charging stations. The Justice40 census tracts reach into the Woodridge, Lake Hills, West Lake Sammamish, and Crossroads neighborhoods. As of 2024, there are 596 publicly accessible charging ports within the city limits, including 574 Level 2 ports and 22 ports at DC Fast Chargers. Just 1 percent of these ports were within a Justice40 census tract. Most charging stations are concentrated in Downtown Bellevue, with other hubs in Eastgate and Factoria. There is minimal overlap between existing charging station locations and Justice40 census tracts, highlighting a disparity in charging access.[19]

[19] Alternative Fuels Data Center (2024): *https://afdc.energy.gov/states/wa*

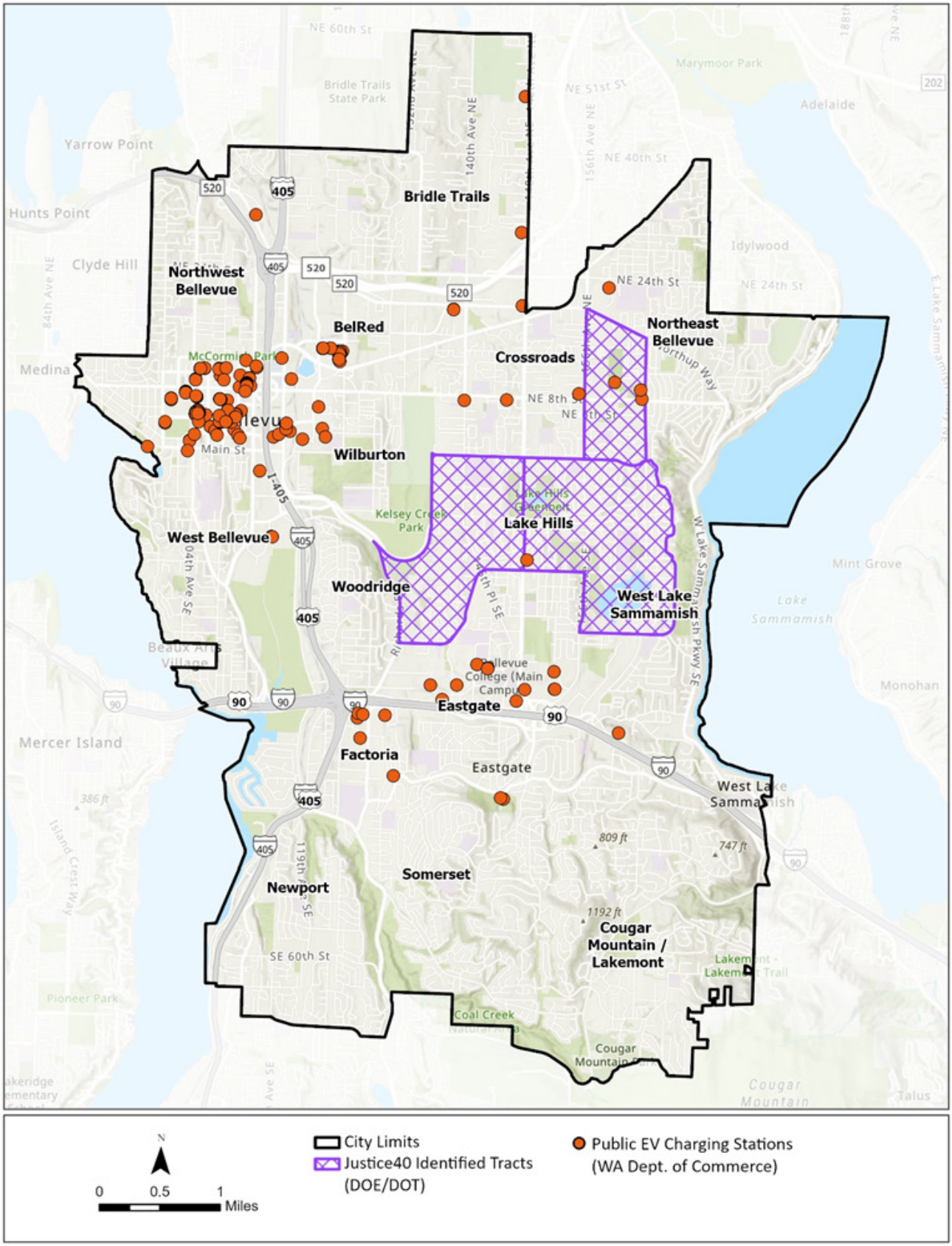


Figure 7. Justice40 Census Tracts & Publicly Accessible EV Charging Stations

OUTREACH & ENGAGEMENT

The EV Roadmap team conducted Phase I Outreach from December 2023 to April 2024. During this period, 620 connections were made with community members through online tools and in-person events. The project team employed a variety of techniques to reach a diverse cross section of the public, making an intentional effort to hear voices that reflect the makeup of the broader Bellevue community. The main goals of this first phase of outreach were to introduce the project, understand the community's needs, and identify barriers to EV charging access or EV adoption in general. A full description of city engagement can be found in **Attachment B: Phase I Engagement Report.**

Based on the feedback received during this outreach period, barriers to EV adoption were identified as existing socioeconomic factors, limited vehicle and charging access, the prioritization of charging infrastructure access over general mobility access improvements, and other areas of concern. The city aims to ensure EV charging is deployed in a way that prioritizes disadvantaged communities by applying equity-focused siting methodologies, prioritizing the mobility needs of existing residents, and carefully considering local conditions when implementing electrification initiatives.

The project team also identified other common themes related to barriers to local EV adoption, including:

- **Access to EV Charging in Multifamily Buildings:** Community members expressed a need for charging available to renters and owners in multifamily buildings.
- **Public Charging:** Community members expressed a desire for publicly accessible charging stations in central and frequently visited public locations like shopping malls and libraries.
- **EV Barriers:** Community members identified the cost of EVs and a lack of reliable access to EV charging as the main barriers to purchasing an EV.
- **Charging Behavior:** For residents who already owned an EV, 89 percent of Community EV Adoption Survey respondents and 100 percent of EV owner interview respondents charged their vehicles most often at home, citing the convenience of home charging as their reason.
- **Interest in Other Forms of Mobility:** 52 percent of survey respondents and many intercept interview respondents expressed interest in other forms of electrified mobility, including EV carshare, e-bikes, and e-scooters. Intercept interview participants in specific neighborhoods identified the high cost of EVs and lack of access to EV charging as insurmountable barriers to EV adoption and expressed an interest in the city offering accessible, affordable mobility and e-mobility programs to low-income residents.
- **Grid Limitations:** Among property managers and condo board members who participated in engagement activities, limitations of the electric grid and power access were identified as key barriers to installing EV charging for resident use at multifamily buildings.

These key takeaways were used to inform the strategies in the **Implementation Strategies** section. In addition to the input above, the project team also collected suggestions for where EV charging would be most beneficial to both current and future EV drivers in Bellevue. These data are used to better understand demand for charging and to compliment the siting analyses done in the subsequent sections. The most commonly requested areas for more publicly available charging include Downtown, Factoria, and Crossroads. In addition to these areas, the project team heard a clear desire for more charging available in multifamily buildings and workplaces. The full analysis of this input can be found in **Attachment B: Phase I Engagement Report.**

DEMOGRAPHIC CRITERIA

Overview of Existing Conditions

Demographic data used as equity criteria for EV planning and infrastructure planning include many socioeconomic and environmental factors. These criteria are employed to ensure that the benefits of electrified mobility are accessible and equitable for all communities, particularly those that are historically disadvantaged or underserved. This section explores the following demographic equity criteria applied to Bellevue to develop a profile of the city and offer insight into existing conditions that are important to consider when planning to support citywide EV adoption efforts. The criteria listed here were also applied to a charger siting analysis, described later in this section, to identify areas that may require targeted investments toward providing equitable access to EVs and charging infrastructure. By incorporating these factors into EV planning, Bellevue can develop more inclusive and balanced strategies that address the unique needs of all residents.

The criteria recommended for use can include any combination of the following:

- **Affordable Housing:** Assessed current housing conditions to align with electrification efforts, including considering different housing typologies in the planning process.
- **Health Disparities:** Identified areas with heightened needs for reductions in emissions, addressing disproportionate health impacts on vulnerable communities from air pollution.
- **Low-Income Populations:** Examined tracts with high rates of low-income households to guide targeted investments in communities facing socioeconomic challenges.
- **Air Quality - Ozone:** Identified communities with higher levels of air quality concerns and emphasized the need to prioritize electrification efforts in areas with them.
- **Air Quality – $PM_{2.5}$:** Identified the distribution of air pollution levels for equitable electrification planning to mitigate adverse health impacts in areas with higher $PM_{2.5}$ concentrations.
- **Displacement Risk:** Recognized displacement risk to avoid having electrification initiatives inadvertently contribute to the displacement of vulnerable communities, emphasizing the importance of inclusive planning and policy measures.
- **Racially Disparate Impacts:** Identified racially disparate impacts to address existing injustices and promote the equitable distribution of electrification's many benefits.
- **Traffic Proximity:** Considered traffic proximity for equitable electrification planning, prioritizing areas with high traffic proximity to best mitigate environmental burdens.

A detailed equity analysis is described in **Attachment C: Equity Considerations Supplement.** The analysis reveals a moderate correlation between Justice40 tracts and other demographic layers, including ozone and $PM_{2.5}$, indicating some disproportionate impacts of poor air quality and pollution-related health risks on communities in these areas. Elevated displacement risks in areas with limited affordable housing underscore the need for careful planning. Strategic and equitable investments in charging infrastructure and electric mobility will support a better future for Bellevue.

JUSTICE40 TRIP CRITERIA

Justice40 is a federal initiative for addressing environmental and climate justice concerns with a focus on underserved communities who have historically faced disproportionate burdens of transportation-related pollution and environmental hazards. The goal of the Justice40 initiative is to ensure at least 40 percent of the overall benefits from federal investments in climate and clean energy initiatives are directed toward these communities. This includes not only EVs, but solutions such as electrified micromobility and zero-emission transit services.[20]

To gain insight into the travel patterns of populations living in underserved communities both within and outside of Bellevue, Justice40 census tracts were identified in Bellevue and trip data was used to map trips made to Bellevue. This data shows where drivers from Justice40 communities, from both within and outside Bellevue, travel and therefore where EV charging would provide the most benefit to disadvantaged communities. The trip data analyzed outside of Bellevue was collected from Justice40 census tracts in King County, serving as the geographic barrier for external trip made (**Figure 8**). This process is used to illuminate commuting behaviors and destination preferences for various populations and can serve to inform infrastructure planning.

Based on this analysis conducted of trips from Justice40 communities, the Lake Hills, Crossroads, Woodridge, and West Lake Sammamish neighborhoods exhibit a higher concentration of trips originating in a Justice40 community, suggesting that these areas are highly frequented destinations for underserved community members. Additionally, the Northwest and South Bellevue neighborhoods, where many shopping centers and commercial hubs are located, reflect high travel demand from these populations living both within and outside of Bellevue. Focusing on areas with a high share of trips originating in Justice40 tracts will help the city select sites that prioritize distributing the benefits of electrified mobility to underserved communities.

[20] U.S. White House (2021): *https://www.whitehouse.gov/wp-content/uploads*

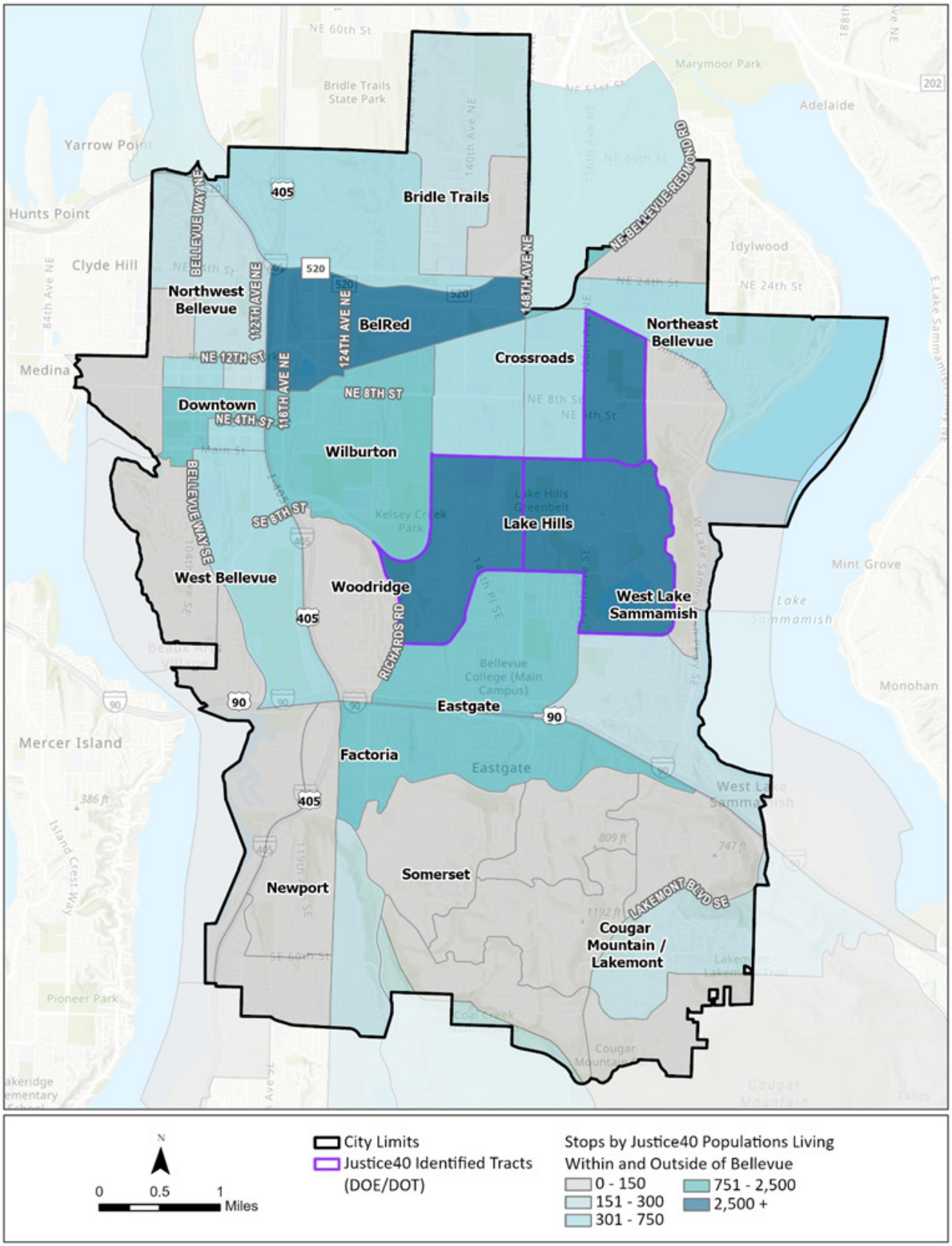


Figure 8. Replica Trip Destinations for Justice40 Populations

Applications in Infrastructure Siting

When planning for electrified mobility, the takeaways of this section are imperative to ensuring fair access to electrification benefits for all. Guided by criteria like affordable housing distribution, health disparities, demographics, and existing tools such as the Justice40 initiative, this analysis, underscores the necessity for a comprehensive approach beyond charging infrastructure deployment. Strategic investments in EV charging, especially in areas vulnerable to adverse socioeconomic and environmental factors and Justice40 tracts, are vital for fostering an inclusive EV transition. Analyzing travel patterns offers insights for optimizing charger locations, with strategic implementation opportunities throughout Bellevue neighborhoods.

To employ the demographic criteria in a siting analysis that addresses these equity considerations, a scoring methodology can be used to score census tracts sites in Bellevue based on key demographics such as the ones above and other metrics such as the trips from Justice40 populations. (An example of this analysis being conducted for this plan is discussed in the following subsection, **Candidate Sites**) A relative score can be calculated using scoring and weighting criteria to quantify results and identify tracts with the highest relative scores. These scores can then be used to identify potential areas where new EV charging stations can serve those communities that have historically borne the brunt of impacts associated with transportation-related emissions. Once a relative score has been calculated, parcel-level dwell time data from the Washington State Department of Commerce can be added to identify where drivers are stopping for an ideal length of time that could support either Level 2 charging or DC Fast Charging.[21] Further, trip data, such as that discussed above in Justice40 Trip Criteria, obtained using Replica (or a similar source) can be overlaid to show where new EV chargers would serve drivers originating in a Justice40 or underserved community. Replica is a tool that provides data visualizing a comprehensive record of all trips made by persons driving private vehicles on an average day. The data are simulated from passively collected location data, publicly available ground-truth sources, and survey data products. Sites can then be identified by cross-referencing this stop data with parcel-level dwell times while considering gaps in the existing charging network. Example candidate sites are provided and discussed below.

CANDIDATE SITES

Combining the two methodologies discussed above, a shortlist of candidate sites was developed for the city to use as an example of how this siting process helps to identify where EV charging will have the largest benefits for underserved community members. Seven sites were selected through the equity analysis conducted for the EV Roadmap; these sites and the reasons each might be a good candidate for new charging infrastructure are described below.

Level 2 Charging

- **Lake Hills Community Park:** This site in the Lake Hills neighborhood is a Parks and Community Services facility, with the land being publicly owned. Dwell times (time spent in the same area/position) average around 75 minutes, making this location a good candidate for Level 2 charging that would support brief top-offs by visitors. The city will need to closely coordinate with Parks to plan and install charging infrastructure on this property while considering impacts to existing parking availability.

[21] Washington State Department of Commerce (2024): *https://wacommerce.maps.arcgis.com/apps/webappviewer/index.html*

- **Highland Park:** This site in the Bel-Red neighborhood is another example of a Parks and Community Services site that is publicly owned and has good charging potential. Dwell times at this location are generally around 3 hours; depending on the charger's power output, which can range from 6.6 kW to 19.2 kW, an EV driver could add anywhere between 60 and 180 miles to their driving range in this time. Again, close coordination with Parks and Community Services will be needed to add chargers here.
- **Bel-Red Station:** This new transit facility in the Bel-Red neighborhood has very high charging potential due to its long dwell times, which average 8.5 hours. This site is owned by the city, which can make planning and installation easier as less coordination is required. It should be noted, however, that this site is planned for redevelopment into a mixed-use community. As this redevelopment is planned, the city should work to include charging in the design.
- **Bellevue Crossroads Par 3 Golf:** This site in the Crossroads area has relatively high charging potential based on its average dwell times of about 2.5 hours. In this timeframe, an EV driver could add between 50 and 150 miles to their driving range. Parks and Community Services controls this site, so close coordination will be needed to plan for, and install, new charging infrastructure.

DC Fast Charging

- **Kelsey Creek Center:** This shopping center includes multiple destinations that are shown in the state's online mapping tool to have very high DC Fast Charging potential due to the short dwell times they incur, which range from 30 to 45 minutes. The parcel is privately owned; the city will need to work closely with the site host to gauge interest in, and plan, new chargers.
- **Lake Hills Village:** This site is also home to multiple destinations with good DC Fast Charging potential according to the state. Dwell times range from 45 to 60 minutes. A library branch is one of the destinations here; the city could partner with King County Library System to plan new chargers and apply for funding. Close coordination with the site host will also be needed.
- **Crossroads Bellevue:** This shopping mall has also been identified by the state as having very high potential for DC Fast Charging, as dwell times here are typically under 1 hour. The King County Library System also maintains a library branch at this location, but the parking area is privately owned. This will necessitate collaboration with the site host to gauge interest in, and plan, new publicly accessible charging infrastructure.

05 City Investment Guide

What you will find in this chapter

- Private sector investments; closing equity gaps
- Public sector investments and assumptions
- Addressing needs for census tract groups
- Infrastructure goals & annual need forecasts

PRIVATE SECTOR INVESTMENTS

Over the last decade, a blend of government and utility funding has helped to build a foundation for private investment in EV charging infrastructure. This funding has led private companies to explore and pursue viable business models for installing and operating publicly accessible charging stations, expanding the public charging networks in many regions of the United States. Private investment in charging infrastructure increased greatly following the passing of the Inflation Reduction Act in 2022, hitting nearly $13 billion in total by March 2023.[22] In the last two years alone, private companies have committed to installing more than 100,000 publicly accessible EV chargers in communities and along highway corridors throughout the United States.[23]

Even with sufficient funding for installing new charging infrastructure, some private companies have had difficulty in maintaining viable business models for operating the chargers because there have not always been enough EVs on the road to utilize them. Private companies must be able to recoup the costs associated with installing charging infrastructure and, as such, their investments are often focused in areas where early adopters live and where utilization is likely to be highest. This approach can create unnecessary redundancy in some areas while leaving large gaps in others that have lower existing EV adoption rates, such as low- and moderate-income neighborhoods and other historically disadvantaged communities. Financial barriers to purchasing an EV can hinder near-term adoption in these areas, while the lack of access to the public charging network makes EV ownership difficult even for those able to switch.

Some private companies have begun to work toward addressing the equity gap in today's publicly accessible EV charging networks, particularly for residents of multifamily buildings that are unlikely to have access to home charging. However, should property owners marketing EV charging as an amenity increase rental rates as a result, low- and moderate-income and historically disadvantaged communities may continue to be priced out of electrified mobility. Public sector investment will still be needed to fully close gaps in the charging network such that EV ownership becomes accessible to all.

[22] Atlas Public Policy (2023): *https://atlaspolicy.com*
[23] U.S. Joint Office of Energy and Transportation (2023): *https://driveelectric.gov*

PUBLIC SECTOR INVESTMENTS

In a 2023 publication, researchers from the National Renewable Energy Laboratory identified the need for a cumulative investment of $31 to $55 billion to meet nationwide public charging demand by 2030. In addition to 26.8 million Level 1 and Level 2 home charging ports, a nationwide charging network of 1 million publicly accessible Level 2 charging ports and 182,000 publicly accessible DC Fast Charging ports will need to be created.[24] The Washington State Transportation Electrification Strategy also identifies the need for home or neighborhood charging for multifamily residents to provide both cost savings and equity benefits.[25] This section focuses on how the City of Bellevue can work to fill gaps left by the private sector and equitably increase access to EV charging as regional EV adoption accelerates. Not all the charging needs identified in this section will be met through direct financial investment from the city. Rather, the city can directly invest in key areas while supporting private landowners looking to install publicly accessible charging on their property.

Investment Assumptions

Based on the analysis detailed in the previous **Needs Assessment** section, a charging network in Bellevue of 2,905 publicly accessible charging ports will be needed to support roughly 57,000 EVs in 2030. With an existing charging network consisting of 596 publicly accessible charging ports, this indicates the need to see about 2,300 public charging ports added within Bellevue over the next five years. Many of these needs are likely to be met by private companies where their investments will have the most promising returns, but public investments, programs, and policies will be needed to fill gaps left by the private market.

To identify the magnitude of charging investments and resources the City of Bellevue should aim for through year 2030, census tracts across the city were split into three groups based on the analysis in the **Equity Considerations** section (subsection 4.4): Justice40 Communities, Higher Density of Justice40 Trips, and Lower Density of Justice40 Trips. 'City share goals,' shown in **Table 3** and **Figure 9**, were assigned based on the share of all trips to each census tract originating in a Justice40 community. The goals represent a mix of directly investing public funds and facilitating private sector investment in publicly accessible charging.

Table 3. City Share Goals

Census Tract Group	# of Census Tracts	ANALYSIS ASSUMPTIONS			
		# of Trips from Justice40 Tracts	Total # of Trips	Share of Trips from Justice40 Tracts	City Share Goal
J40 Communities	3	15,850	33,662	47.1%	**47.5%**
Higher Density of J40 Trips	9	10,010	155,316	6.4%	**6.5%**
Lower Density of J40 Trips	28	8,503	225,128	3.8%	**4.0%**

[24] National Renewable Energy Laboratory (2023): *https://www.nrel.gov*
[25] Washington State Department of Commerce (2024): *https://www.commerce.wa.gov*

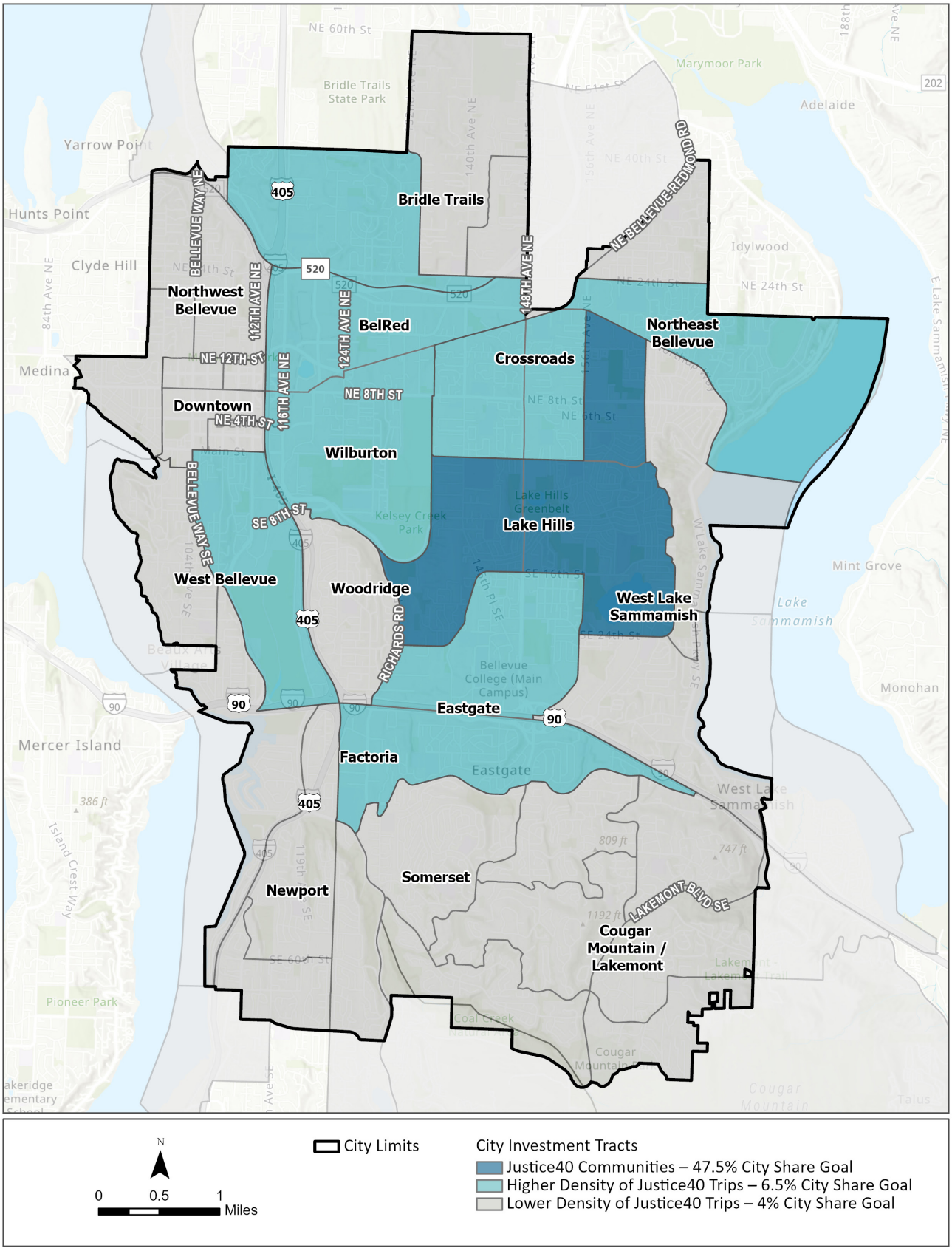


Figure 9. City Investment Analysis Census Tract Groups

City Investment & Facilitation

In addition to the recommended city share goals, each census tract group will incur its own share of the total need for publicly accessible charging infrastructure. These shares were calculated based on the proportion of all trips ending in their respective census tracts. The citywide charging need for about 2,300 additional charging ports was distributed to each group, and city investment goals were determined by applying the city shares shown previously. As noted, this will be achieved through a mix of direct financial investment and facilitation of new publicly accessible EV chargers on private land through programs, policies, or other city actions. Potential approaches, like assisting private groups in applying for and obtaining available grant funding and streamlining permitting for EV charging are outlined in the **Implementation Strategies** section.

Table 4 compares the overall public charging need in each census tract group to the share the City of Bellevue can aim for to help support roughly 57,000 EVs in 2030. Public sector investments can be directed toward installing, or facilitating the installation of, just under 200 new publicly accessible charging ports, half of which would be installed in Bellevue's Justice40 communities or in areas serving those community members' trip destinations. A larger focus can be placed on Level 2 charging ports, which accounts for about 88 percent of the overall city investment goals. These investments would satisfy about 8.5 percent of the citywide need for new publicly accessible charging over the next five years and expand charging access in areas of Bellevue less likely for private sector investment.

Table 4. City Investment Goals by Census Tract Group (2024-2030)

Census Tract Group	Share of Public Charging Need	PUBLIC CHARGING NEED			CITY INVESTMENT GOAL		
		Level 2 (# of Ports)	DCFC (# of Ports)	Total (# of Ports)	Level 2 (# of Ports)	DCFC (# of Ports)	Total (# of Ports)
J40 Communities	8.0%	163	22	**185**	77	10	**87**
Higher Density of J40 Trips	37.5%	764	102	**866**	50	7	**57**
Lower Density of J40 Trips	54.5%	1,110	149	**1,259**	44	6	**50**
All Census Tracts		2,037	273	**2,310**	171	23	**194**

The magnitude of public investments needed moving forward will be directly influenced by the level of support provided by the private sector. The city investment goals identified in this analysis can be met through a combination of direct financial investment and support for private entities looking to install publicly accessible charging stations. Applying the set of approaches in the **Implementation Strategies** section will help direct public funds to where they are most needed and avoid over-expending those funds where other strategies may be employed to meet public needs.

Table 5 summarizes the annual distribution of public charging needs and suggested goals for Bellevue to install, or more often facilitate the installation of, new EV charging infrastructure through 2030. The City of Bellevue would support the installation of 16 new charging ports next year (2025), then investments would slowly increase each year until reaching 55 new ports in 2030. These efforts must be complemented by significant private sector support for publicly accessible charging to meet an aspirational goal of roughly 2,900 charging ports in 2030.

Table 5. Annual Charging Need and City Investment Goals (2024-2030)

Year	Adoption Forecast (# of EVs)	PUBLIC CHARGING NEED			CITY INVESTMENT GOAL		
		Level 2 (# of Ports)	DCFC (# of Ports)	Total (# of Ports)	Level 2 (# of Ports)	DCFC (# of Ports)	Total (# of Ports)
2024	**13,905**	574	22	**596** 23.3 EVs/port	–	–	–
2025	**17,740**	702	79	**781** 22.7 EVs/port	11	5	16
2026	**22,185**	897	101	**998** 22.2 EVs/port	16	2	18
2027	**28,130**	1,188	134	**1,322** 21.3 EVs/port	24	3	27
2028	**35,820**	1,577	178	**1,755** 20.4 EVs/port	33	4	37
2029	**45,070**	2,025	229	**2,254** 20 EVs/port	38	4	42
2030	**55,495**	2,610	295	**2,905** 19.1 EVs/port	49	6	55

Compared to Bellevue's current ratio of 23.3 EVs per publicly accessible charging port, following this guide will provide a slightly lower ratio of 19.1 EVs per publicly accessible charging port. This ratio is recommended by EVI-Pro Lite as sufficient to support about 199,200 EVs in 2050 based on its assumptions specific to the Seattle-Tacoma-Bellevue metropolitan area. In comparison, the International Energy Agency's *Global EV Outlook 2023* reports a nationwide ratio of 24 EVs per publicly accessible charging port in the U.S. and a worldwide average of 10 EVs per port. The recommended ratio of 19.2 EVs per port would put Bellevue in line with countries such as Canada (19 EVs per port) and Spain, Norway, and the United Kingdom (20 EVs per port). The same report reiterates the importance of publicly accessible charging to support EV owners without private home or workplace charging options.[26] It is further recommended that the City of Bellevue monitor growth in more developed EV markets with respect to these ratios moving forward.

[26] International Energy Agency (2023): *https://www.iea.org/reports/global-ev-outlook-2023/trends-in-charging-infrastructure*

06 Implementation Strategies

What you will find in this chapter

- Implementation strategies and actions, organized into 5 major categories
- An actions matrix that outlines the details of each strategy and action
- Evaluation criteria for measuring performance

Building upon the EV Roadmap vision, mission, and goals; community engagement; and outcomes from the data analysis and forecasting efforts, strategies have been identified to advance the plan's goals across five major categories. The strategies can be used to prioritize and coordinate between city departments and the community as the city continues to take action to advance electrification priorities, catalyze increased EV adoption, and spur EV charging and overall EV acceptance across Bellevue.

The five major strategy categories for this plan are:

Focus Outreach & Education

Refine Planning, Policy & Regulations

Advance Equitable Access

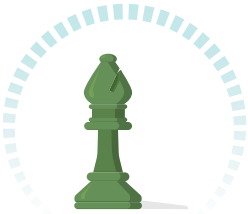
Leverage Strategic Partnerships

Lead by Example

The strategies presented here include specific actions that can be taken to promote and support a widespread shift to electrified mobility in Bellevue. Some strategies may apply to, or advance, more than one goal area, but are listed under the most directly relevant category. A combined matrix (**Table 7**) at the end of this section outlines each strategy and action, along with their specific implementation, relative priorities, estimated levels of effort, timelines, and magnitude costs.

FOCUS OUTREACH & EDUCATION

The strategies for the Focus Outreach and Education goal focus on improving public awareness of the many benefits of owning or leasing an EV and the resources available for those considering an EV, with a focus on expanding outreach and engagement activities to underserved communities in Bellevue.



Grow Public Awareness

1-A Monitor & Measure Awareness & Adoption

Regularly conduct market research to understand and capture trends and changes in the marketplace. Measure changing views on EVs over time with targeted engagement, surveys, and outreach efforts that build upon feedback received from community members, business owners and visitors. Measure changes in adoption rates and access to charging. Update planning, mapping, and data collection annually to reflect best available data, charging infrastructure and development progress.

1-B Enhance EV Information Access & Resources

Expand the city's existing website to provide comprehensive and detailed information on EVs, including: educational materials, instructional guides, charging station locations, progress updates on EV adoption rates and other relevant materials. Model the site after successful examples like the City of San Jose's Electric Mobility Landing Page. Target specific audiences crucial to growing EV adoption, such as multifamily housing property owners illustrating how to enable EV charging access, and single-family homeowners seeking guidance on installing home chargers. Collaborate with county or state-level initiatives, such as SwitchIsOn for home electrification, to leverage their resources and expertise. This partnership can help create a more comprehensive and regional clearinghouse for EV information, while the city website focuses on providing detailed, locally relevant information.

1-C Communicate the Benefits of E-Mobility

Communicate the benefits of regional electrification to residents and visitors. As regional transit fleets electrify and e-mobility options continue to expand, improvements to air quality and reductions in noise are just a few of the benefits to communities along bus routes and corridors that extend beyond just the transit rider. Businesses, residents and other travelers along transportation corridors benefit from EVs' cleaner transportation investments and reduced tailpipe emissions. Consider holding "Clean Transportation Campaigns" to encourage the use of e-mobility modes and educate businesses, residents, and travelers on the benefits of alternative transportation solutions. Target campaigns to residents who are less familiar with the benefits of e-Mobility and associated financial incentives.

Grow Public Awareness (cont.)

1-D Share Developments in Transportation Electrification

Continually update the community on regional transit electrification efforts, including the deployment of new EVs in King County Metro and Sound Transit's fleets and the ability to access existing resources, like Bellhop, the on-demand electric shuttle. Leveraging various communication channels to spread this information, from social media to community newsletters, helps to keep residents informed on transit initiatives and benefits in their area.

1-E Increase Awareness of Financial Incentives

Communicate the range of financial savings available for reductions in purchases of both new and used EVs, and the full life cycle cost savings of ownership compared to ICE cars. Add cost savings summaries of EV ownership and available rebates for residents and businesses to existing channels of agency communications. As part of these summaries, include new purchase lifecycle cost savings, and the growing secondary used EV market, and federal tax credits. Dedicated programs, partnerships and resources focused on making used EVs more visible, affordable and accessible can support accelerating adoption in these areas. For example, the Washington Department of Commerce's EV Instant Rebate Program, targeted toward low-to-moderate Income residents of Washington, helps to increase EV access and offers solutions to adoption barriers.

1-F Increase Charging Awareness & Technical Assistance for Private Owners

Provide comprehensive awareness materials and technical assistance to private operators, including multifamily property owners and workplaces, to facilitate the installation and operation of EV charging infrastructure. Consider creating guides and personalized assistance for available incentives, tax credits, Washington's Clean Fuel Standard and other benefits for private operators.

1-G Expand Knowledge of Used EV Market

Investigate ways to leverage a growing secondary market of EVs at lower purchase prices as model availability continues to expand and more used EVs are entering the market. Promote used EV shopping tools and resources like the Department of Energy's vehicle cost calculator to help buyers understand total ownership costs, and the new federal tax credits for used EVs. Implement a group buy program for EVs, similar to the Northern Colorado Clean Cities EV Group Buy Program, which allowed Colorado residents to lease a new EV at a significant discount. This program can be modeled by partnering with local dealerships and outreach partners to deliver affordable EV options and accelerate EV adoption in the city.

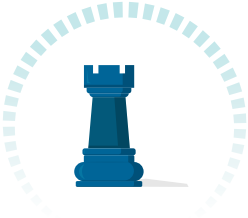
Tailor Equity-Focused Outreach

1-H **Expand Disadvantaged Community Engagement**

In addition to broad outreach and engagement, specifically focus engagement efforts on community members residing in disadvantaged communities. Develop a Mobility Equity Resource Guide that specifically focuses on barriers, opportunities, and resources for increasing equitable EV access and adoption in underserved communities. This guide would begin by listening first and engaging directly with disadvantaged community groups to ask what would be most helpful. Utilize expertise from community leaders, residents in underserved areas and environmental justice organizations to guide the development of inclusive content that promotes equitable EV access. Establish a principle to listen first to best understand what is working, and what is not, and identify national best practices or emerging technologies that can be recommended to advance electrification efforts in disadvantaged communities. For example, the City of Portland has conducted extensive community engagement in disadvantaged communities as part of their Electric Mobility Strategy, including workshops, surveys, and focus groups. Recognize that privately owned EVs and related infrastructure do not provide a comprehensive solution to all equity and sustainable transportation challenges and needs.

REFINE PLANNING, POLICY & REGULATIONS

The strategies for goal provide insight into planning, policy, and regulations to support widespread EV adoption, ensuring the city's infrastructure and policies are positioned for success.



Plan, Design & Prioritize

2-A **Prioritize EV Funding & Incentives**

Prioritize city funding and resources within financial plans to advance EV adoption progress across all plan goal areas. Focus on grant applications that leverage the greatest amounts of federal or state funding and with small or no match required from the city to maximize city funds. Investigate creative funding mechanisms to promote EV investments with dedicated revenue streams, such as a revolving green fund to finance and advance projects that incorporate reduced emissions, i.e., increasing EV adoption. Partner with Bellevue property owners to apply for grants and support local organizations in accessing external funding for EV charging infrastructure.

Plan, Design & Prioritize (cont.)

2-B Create Financial Incentives

Within the city, create incentives to help residents and businesses make the transition to EVs and install additional charging infrastructure. Mirror and support applicable state, federal, or utility incentives: For example, consider creating an incentive program specifically for existing multifamily properties to make upgrades for EV charging to accelerate charging access for those in existing properties constructed prior to recent building code updates. Explore strategies for discounted low-income EV charging rates, to help offset public charging costs for disadvantaged communities.

2-C Enhance User Experience at EV Charging Stations

Ensure that EV charging stations are operational and available for use, minimizing downtime and ensuring a seamless charging experience. Provide clear and concise signage and instructions at charging stations, making it easy for users to understand the charging process and navigate the station. Ensure there is proper lighting and safety measures implemented to maximize a secure environment for users.

Policy Action, Codes & Regulations

2-D Define EV Policy Actions & Integrate E-Mobility in Planning Efforts

Define a set of adoptable policy priorities for EV Readiness to show city commitment to prioritize funding for projects that promote EV expansion and growing adoption like the transportation policies in the Comprehensive Plan addressing GHGs and the use of emerging technologies (TR-38, TR-140, and TR-143). This includes integrating e-mobility into relevant city plans and policies to ensure a cohesive approach to EV infrastructure development. Utilize coordination and policies to leverage match funding for grant applications and requests. Consider a closer tie between the recently created Curb Management Plan and the EV Roadmap where appropriate; follow recommendations related to locating curbside charging for on-street parking.

2-E Remove Code Barriers

Update all applicable codes and regulations to ensure EV charging infrastructure installations are permittable uses in all zoning designations. Most often, Level 1 and Level 2 charging is allowed in all zones, but DCFC is restricted to specific zoning districts. Within the East Main TOD Land Use District, the land use code has been updated to state that EV infrastructure, excluding battery exchange stations, is ancillary to motor vehicle parking and highways and rights-of-way, and is permitted through the applicable review process as a component of that use. Some jurisdictions, like Des Moines, Washington, have amended their municipal code to permit any type of EVSE in any zoning district. Removing these barriers can help to streamline the permitting process and make it easier for site hosts to install the type of charger that is appropriate and/or desired.

Policy Action, Codes & Regulations

2-F **Develop an EV Charging Station Permitting Guide**

Help businesses, existing and new multifamily property owners, and others better understand how to efficiently navigate permitting with a proactive packaging of requirements for sharing publicly. Clearly outline the permitting process for EV chargers, including anticipated charging demand, process steps needed, expected timelines, how many permits are required per space or per charger, whether to bundle installations, and details regarding inspection processes. Draw inspiration from other cities that are supporting property owners navigate the permitting process. For example, the City of Oakland has recently published a detailed EV Charging Station Installation Guide. Additionally, offer guidance to appropriate transportation organizations or mobility groups on how to properly permit and install EV chargers, ensuring a streamlined and efficient process.

2-G **Develop EV Readiness Requirements**

Update building code requirements for EV charging infrastructure to meet the forecasted future needs of drivers in Bellevue. Continue to monitor trends of EV adoption and charging needs and adjust the codes appropriately. To maximize EV charging infrastructure, consider incentives such as parking reductions to reach higher levels of EV readiness in new construction.

2-H **Streamline Permitting Process for EV Charging Infrastructure**

Across all appropriate city departments, look for opportunities for efficiency in permitting relating to EV charging infrastructure. Consider updates, including refined online permitting, expedited processing, waiving applicable requirements for pre-appointment or pre-approval, standardized reviews, reduce document processing delays and other appropriate efficiencies. Commit to timely processing and approvals for this growing market among staff and inspectors. The City of Vancouver has streamlined permitting by allowing online submissions, simplifying requirements, and providing staff training.[29]

2-I **Amplify Private Sector Charging**

Encourage the private sector to increase their investment in publicly available charging to provide better support for the city's charging needs. Encourage private sector champions to invest in workplace charging and public charging at key land uses such as retail locations, fueling stations, and publicly owned facilities. Sponsor charging infrastructure in disadvantaged communities to support those who need it the most. To support this, the city may share information on funding from utility programs, state incentives, tax credits, and additional funding resources.

2-J **Consider EV Charging for Middle Housing**

Consider EV charging needs for middle housing to align with the HB 1110 ordinance. As the zoning is developed for this new type of housing, which will primarily occur in single family neighborhoods, consider how to accommodate future EV charging needs when updating code. The city can expect new housing without designated parking or off-street parking required when middle housing is located within one-half mile walking distance of a major transit stop. Monitor and include provisions for EV charging when making code updates, similar to what the cities of Portland and Seattle have implemented.[30,31]

[29] *Electric Vehicles | City of Vancouver* (2024)
[30] *Portland.gov* [31] *Seattle.gov*

ADVANCE EQUITABLE ACCESS

The strategies for the goal to Advance Equitable Access focus on ensuring that all members of the community have access to EVs and their supporting chargers, prioritizing equity in the siting of new publicly accessible charging infrastructure, and catalyzing e-mobility hubs.

Prioritize, Measure & Site Infrastructure

3-A Prioritize Equity in Siting New Publicly Accessible Charging Infrastructure

Utilize EV Roadmap equity-focused siting methodologies for site selection that follows the priorities and goals outlined in this plan. Site EVSE and related investments in areas that serve to benefit those who need it most, supported by both quantitative and qualitative measures.

3-B Develop a Repository of Candidate Charging Sites

Use the methodologies developed for this EV Roadmap to create a repository of candidate sites for EV chargers, including both public and private property. This repository will support the addition of charging infrastructure at these sites and prioritize locations serving members of Justice40 and disadvantaged communities. Evaluate the level of difficulty associated with each site, identifying sites with near-term feasibility. This assessment will help streamline the implementation process when the city or its private partners are ready to install charging stations. Regularly update the repository to reflect changes in site feasibility, new site additions, and the implementation status of charging infrastructure.

3-C Measure Access to EV Charging Across Populations

Measure the annual growth in access to EV charging to identify the remaining gaps in EV charging infrastructure across diverse populations. For example, add EV specific questions to commuter surveys in coordination with other Transportation Demand Management partners to provide an additional data collection point, or work with the state to gather demographic data with EV registration reporting. Additionally, track and analyze metrics such as the availability of financial incentives, including rebates and tax credits like the Washington State Department of Commerce's EV Instant Rebate Program, to understand how these incentives impact access to EVs and charging infrastructure for low-income and disadvantaged communities. This will help identify areas where targeted interventions are needed to ensure equitable access to EVs and charging infrastructure.

3-D Build Upon Existing Contracting Requirements to Encourage Equitable Participation

Follow the examples like the City of Los Angeles to utilize a range of contracting opportunities and public-private partnerships to encourage equitable participation. While the city must minimize risk when exploring contracting opportunities, there may also be ways to consider encouraging equitable participation through the type of contracting selected, and opportunities to package and bid the work. Consider direct outreach to potential equity partners for interest from certified businesses who can perform the work in line with city objectives and needs. This will be closely tied to the Diversity Plan Update, ensuring the city's contracting practices continue to promote equity and inclusion.

Catalyze E-Mobility & Mobility Hubs

3-E Measure Access to Available E-Mobility Options

For all shared e-mobility options available within the city, identify gaps in e-mobility availability by measuring access for residents of disadvantaged community census tracts to monitor awareness, usage, and potential opportunities to improve access to shared e-modes. Potential measurements could come from geospatial based quantity of e-mobility modal options within disadvantaged communities, as identified using American Community Survey data, including e-bikes, e-scooters and e-car share; quantity of chargers within disadvantaged communities; distance of publicly available chargers from specific disadvantaged communities; quantity of publicly available chargers per capita; and survey based responses including awareness and usage of available e-mobility options by specific demographic response categories.

3-F Catalyze E-Mobility Hubs

Pursue a strategy to advance dynamic and electrified mobility hubs to link together a full suite of electrified mobility modes, building from recent and local models such as the Eastgate Mobility Hub Vision. Include real-time transit arrival information, interactive information kiosks, public Wi Fi, real-time parking availability signage, payment kiosks, micromobility parking and charging, EV charging and bus charging to bring together complementary users and modes of transportation at key nodes of shared infrastructure. Plan for hubs and programs in underserved communities to provide increased access to all forms of electrified mobility options. Include scope elements for EV infrastructure when funding active transportation plans.

3-G Incentivize Zones for Electrified Delivery Priority

Create electrified delivery zones in downtown or other key areas to test regulatory- and incentive-based promotion of sustainable freight delivery modes and promote safer streets with smaller cargo delivery vehicles, compared to large delivery trucks. Explore the use of data and technology to better understand how people and different types of vehicles use commercial loading zones and city streets. Increase micro-delivery hub operations and expand the use of electric-cargo trikes as a delivery solution. Create micro-delivery hubs in central locations to store goods to create easier delivery within smaller service areas. Consider lessons learned from the Seattle Department of Transportation's Zero Emissions Last-Mile Delivery Hub pilot program and complement the Curb Management Plan.

Catalyze E-Mobility & Mobility Hubs (cont.)

3-H Explore Electric Micromobility and Microtransit Fleets

Reexamine the potential role that electrified micromobility and microtransit can play in complementing mobility options. Encourage the growth of e-bikes and e-scooters, with contracted parties or privately owned, to provide additional low-cost access to e-mobility modes to more areas and more residents. Consider opportunities to expand e-bike access through shared programs or incentives. Continue supporting the BellHop 100 percent electric, on-demand shuttle service in partnership with Visit Bellevue and explore expansion opportunities as appropriate.

3-I Encourage EV Carshare Programs

Encourage the continued expansion of EVs available in car-share fleets, such as the Zipcar fleet and other programs geared towards targeted communities, such as ZEV Co-op. Car share is a great way for users to experience EVs without having to own a car themselves and become familiar with driving and charging an EV before purchasing and owning an EV. Explore car share opportunities with contracted parties to provide additional low-cost access to EVs for more areas and residents like the Crossroads Senior Living Facility EV car share program. Offering similar EV car share options to residents of other buildings in Bellevue and establishing EV car share partnerships will advance EV access.

3-J Encourage TNC Fleet Electrification

Encourage the use of EVs within Transportation Network Company fleets, which help to reduce tailpipe emissions for TNC trips. Incentivize faster incorporation of EVs into the fleets of Lyft and Uber, supporting or accelerating their existing program goals with local levers where possible for cleaner rides within the city.

3-K Support Heavy-Duty Vehicle Electrification

Identify the current and projected demand for heavy-duty EV charging infrastructure in the city, engaging with private fleets and stakeholders to understand their specific needs and challenges. Explore EV charging needs of heavy-duty vehicles and how the city can support medium and heavy-duty vehicle electrification as medium and heavy-duty vehicle technology advances.

LEVERAGE STRATEGIC PARTNERSHIPS

The strategies in this goal aim to leverage partnerships with utilities, transit agencies, the private sector, and other applicable outside organizations to support the city's EV adoption goals, aligning and collaborating to maximize resources and expertise.

Align & Collaborate

4-A Establish a Citywide EV Working Group

Beyond the roadmap, establish a citywide EV working group to coordinate EV-related policies, programs and initiatives across departments. Leverage staffing and funding opportunities across departments to make efficient progress on charging infrastructure and maintenance. Continue to seek efficiencies between departments through regular updates of the EV Roadmap to best identify opportunities and coordinate on local, state and federally funded projects of all sizes that can promote electrification. The EV working group should include representatives from key departments, serving as a central hub for internal information sharing, collaborative problem-solving and ensuring consistent implementation of Bellevue's EV strategies and priorities citywide.

4-B Collaborate with Utility Partners

Continue close collaboration with utility partners to plan for publicly accessible EV charging priority locations, building from existing relationships with Puget Sound Energy. Early and frequent coordination is crucial to ongoing partnership, grant applications, development permits, and other opportunities to advance EV charging installations and usage. Support electric utility grid stability through active and meaningful utility partner collaboration and thoughtful, cooperative planning to anticipate and support EV growth.

Create a methodology with utility partners for continued cooperation over time to prepare for growth in charging infrastructure locations into the future and consider opportunities to fast-track permits and other support for substations, transformers, and circuitry upgrade needs. Help utility partners to manage grid demand and capacity with improved charging behaviors during peak periods to promote efficient energy use. See the City of San Diego's utility partnership model with San Diego Gas & Electric that emphasizes a shared responsibility approach. This model leverages the benefits of private companies' data and expertise while still maintaining utility ownership and control to manage grid impacts.

Assess the potential to partner with utilities and EVSE installation companies to test different power storage and charging types (e.g., V2G, microgrids, battery storage, and other clean-energy sources).

Align & Collaborate (cont.)

4-C **Share Access to City-Owned Charging**

Explore sharing access to chargers by transit providers, school buses, or other fleets to assist with on-route plug-in charging within the city or at centralized locations. Consider opportunities at transit layover locations, park and rides or complementary properties for aligning charging investments and utility infrastructure upgrades. Access and upgrades can be considered for transit buses, as well as supportive fleet vehicles for smaller paratransit vehicles or supervisor monitoring, employee parking and relief vehicles.

4-D **Lead Grant Applications with Partner Organizations**

Lead grant writing efforts on behalf of partner organizations that do not have capacity to promote increased partner support of EVs and growing adoption rates.

Develop Local Partnerships

4-E **Maximize Partner Programs**

Partner with and promote the PSE Up & Go Electric charging stations that are currently available and growing. Identify and form partnerships with EV charging companies to streamline publicly accessible charging installation within Bellevue. Additionally, leverage state incentive programs such as the Washington State Department of Commerce's EV Instant Rebate Program to increase EV adoption among Bellevue residents and businesses. Continue to partner with PSE, state agencies and other agencies to investigate potential charging station locations within Bellevue as well as explore any modifications or complementary programs that can help advance the city's EV goals. Actively cross-promote all partner incentives, rebates and charging infrastructure programs through city channels to raise awareness and increase access. This could include solar canopy or rooftop solar, battery storage, or other green energy initiatives.

4-F **Consider Funding Contributions for Transit Vehicles**

Consider funding contributions for initial pilot projects or purchases of zero emission transit vehicles as a portion of local match funding for transit partners serving Bellevue, including King County Metro and Sound Transit. For example, the City of Seattle provided funding to support King County Metro's procurement of electric buses as part of the Proposition 1 Transit Measure. The increased cost of switching from diesel buses to electric buses is substantial, and transit partners need to find creative solutions to fill funding gaps in vehicle costs and associated infrastructure.

Develop Local Partnerships (cont.)

4-G **Support Clean Grid Inputs**

Support continued investments of clean energy into the power grid and generation to provide a reduced pathway of clean energy powering clean transportation such as EVs, along the road to 100 percent clean energy. To advance local EV adoption rates and charger investments, key statewide initiatives must be met with planning and design that implements grid capacity enhancements. This requires staying informed on electrification infrastructure applications. Coordinate with PSE to ensure electric infrastructure upgrades have the necessary electrical capacity to support higher rates of EV adoption and infrastructure. Additionally, stay up to date with Washington State demand response and time-variable pricing programs.[32] For example, PSE's Up & Go Electric for Fleet program offers a time-of-use rate structure for EV charging stations, incentivizing charger installation, and charging during off-peak hours.[33]

4-H **Streamline Installation of Publicly Accessible EV Charging**

Work closely with EV charging equipment providers to install chargers. Develop a long-term partnership(s) following installation to streamline the public charging installation and maintenance process. Consider utilizing the partnership to collaborate on grants, support investment in priority investment areas, and closely monitor new advancements in charging technology, such as cable management solutions, to provide future-proofing and flexibility for the city.

[32] *Energy.gov* [33] *PSE.com*

LEAD BY EXAMPLE

The strategies in for the goal to Lead by Example focus on the city's internal efforts and how we can lead by example. This can be achieved through actions such as electrifying the municipal fleet, supporting employee EV adoption, and strengthening workforce development in the EV sector.

Track Peer Cities

5-A **Track Peer City Best Practices**

Monitor progress with peer cities in appropriate markets to advance EV adoption rates and glean from best practices in other markets. City peers could include the cities of Seattle, San Jose, California, Denver, Vancouver and Boston, and other areas where EV adoption is growing at faster rates. Continue regular standing calls to share best practices and lessons learned among peers through the Urban Sustainability Directors Network and similar groups. Seek out and participate in industry groups nationwide that can support and advance local efforts.

Track Peer Cities (cont.)

5-B **Seek International EV Leadership Inspiration**

As appropriate, seek out peer cities from outside the U.S. to benchmark and share lessons learned in EV adoption, including leading European peers and other markets with high EV adoption and similar characteristics to Bellevue, and also including employment and residential growth and unique land development interests.

Further City Efforts

5-C **Transition the Municipal Fleet**

Coordinate with the city's Green Fleet Strategy and EV Master Plan efforts to accelerate municipal EV purchases across all appropriate vehicle types within the fleet, including light-duty, medium and heavy-duty and specialty equipment as the market allows. Prioritize vehicle replacements based on total cost of ownership, vehicle duty cycles and availability of EV models to meet operational needs. Share best practices and lessons learned with specialty equipment with peers, including King County cities and Eastside Climate Partnership cities, for municipal specialty equipment. Facilitate close coordination between the public charging infrastructure planning and the charging needs identified for the municipal fleet through the Green Fleet Strategy and EV Master Plan processes to ensure consistent policies, investments, and initiatives.

5-D **Support Employee EV Adoption**

Support EV adoption among city employees by improving internal awareness of the benefits and performance of EVs and investing in EV charging infrastructure in employee parking areas, especially for employees where transit, carpooling, biking and walking are not ideal commute options.

5-E **Strengthen Workforce Development**

Further position the city's workforce to expand career path opportunities and support prosperous workers for coming generations, directed by Facilities & Asset Management. Collaborate with employers and industry experts to understand the knowledge and skills needed to support jobs in the EV sector, and train staff as appropriate for the operations and maintenance of EVs and EVSE through opportunities such as the Electric Vehicle Infrastructure Training Program. Leverage and partner with community colleges and existing training programs aimed at supporting the growing EV industry locally and leverage economic investments in EV related industries and economic competitiveness. Collaborate with employers and industry experts to understand the knowledge and skills needed to support jobs in the EV sector. Additionally, work closely with the City of Bellevue's Chamber of Commerce and Community Economic Development team to develop a program that integrates workforce development with local economic growth, ensuring a strong and skilled workforce to support the city's EV infrastructure and industry. This program will facilitate the creation of targeted training initiatives, job placement programs, local economic incentives, and other workforce retention efforts.

Table 6. Implementation Strategies Action Matrix

Goal	ID	Strategy	Priority	Effort	Impact	Start	Duration
Focus Outreach & Education	1-A	Monitor & Measure Awareness & Adoption	High	Low	Low	6-12 mo.	Ongoing
	1-B	Enhance EV Information Access & Resources	Medium	Low	Low	6-12 mo.	Ongoing
	1-C	Communicate the Benefits of E-Mobility	Medium	Low	Low	6-12 mo.	Ongoing
	1-D	Share Developments in Transportation Electrification	Low	Low	Low	6-12 mo.	Ongoing
	1-E	Increase Awareness of Financial Incentives	Medium	Low	Medium	Now	Ongoing
	1-F	Increase Charging Awareness & Technical Assistance for Private Owners	Medium	Medium	Medium	1-2 yr.	6-12 mo.
	1-G	Expand Knowledge of Used EV Market	Low	Low	Medium	Now	Ongoing
	1-H	Expand Disadvantaged Community Engagement	High	Medium	Medium	6-12 mo.	Ongoing
Refine Planning, Policy & Regulations	2-A	Prioritize EV Funding & Incentives	High	Low	High	Now	Ongoing
	2-B	Create Financial Incentives	Medium	High	High	2-5 yr.	1-2 yr.
	2-C	Enhance User Experience at EV Charging Stations	Low	Medium	Medium	1-2 yr.	Ongoing
	2-D	Define EV Policy Actions & Integrate E-Mobility in Planning Efforts	Low	Medium	Low	6-12 mo.	Ongoing
	2-E	Remove Code Barriers	High	Medium	Low	Now	1-2 yr.
	2-F	Develop an EV Charging Station Permitting Guide	Medium	Low	High	6-12 mo.	6-12 mo.
	2-G	Develop EV Readiness Requirements	Medium	Medium	High	Now	6-12 mo.
	2-H	Streamline Permitting Process for EV Charging Infrastructure	High	Medium	High	Now	1-2 yr.
	2-I	Amplify Private Sector Charging	High	Low	High	Now	Ongoing
	2-J	Consider EV Charging for Middle Housing	High	Medium	Medium	1-2 yr.	Ongoing
Advance Equitable Access	3-A	Prioritize Equity in Siting New Publicly Accessible Charging Infrastructure	High	Medium	High	Now	Ongoing
	3-B	Develop a Repository of Candidate Charging Sites	High	Medium	High	Now	1-2 yr.
	3-C	Measure Access to EV Charging Across Populations	Medium	Low	Low	Now	Ongoing
	3-D	Build Upon Existing Contracting Requirements to Encourage Equitable Participation	Low	Medium	Low	1-2 yr.	Ongoing
	3-E	Measure Access to Available E-Mobility Options	Low	Low	Low	1-2 yr.	6-12 mo.
	3-F	Catalyze E-Mobility Hubs	Medium	High	Medium	1-2 yr.	>5 yr.
	3-G	Incentivize Zones for Electrified Delivery Priority	Low	High	Medium	2-5 yr.	2-5 yr.
	3-H	Explore Electric Micromobility and Microtransit Fleets	Low	High	Medium	2-5 yr.	2-5 yr.
	3-I	Encourage EV Carshare Programs	Medium	High	Medium	2-5 yr.	2-5 yr.
	3-J	Encourage TNC Fleet Electrification	Medium	High	Medium	2-5 yr.	>5 yr.
	3-K	Support Heavy-Duty Vehicle Electrification	Low	High	Medium	>5 yr.	>5 yr.
Leverage Strategic Partnerships	4-A	Establish a Citywide EV Working Group	Medium	Low	Low	6-12 mo.	Ongoing
	4-B	Collaborate with Utility Partners	High	Low	Low	Now	Ongoing
	4-C	Share Access to City-Owned Charging	Low	Medium	Medium	2-5 yr.	1-2 yr.
	4-D	Lead Grant Applications with Partner Organizations	High	High	High	1-2 yr.	Ongoing
	4-E	Maximize Partner Programs	High	Low	High	Now	Ongoing
	4-F	Consider Funding Contributions for Transit Vehicles	Low	Medium	Low	>5 yr.	Ongoing
	4-G	Support Clean Grid Inputs	Low	Low	Low	Now	Ongoing
	4-H	Streamline Installation of Publicly Accessible EV Charging	High	Medium	High	1-2 yr.	2-5 yr.
Lead by Example	5-A	Track Peer City Best Practices	Medium	Low	Low	Now	Ongoing
	5-B	Seek International EV Leadership Inspiration	Low	Low	Low	Now	Ongoing
	5-C	Transition the Municipal Fleet	Medium	High	Medium	2-5 yr.	>5 yr.
	5-D	Support Employee EV Adoption	Low	High	Low	1-2 yr.	Ongoing
	5-E	Strengthen Workforce Development	Low	High	Low	2-5 yr.	Ongoing

PERFORMANCE METRICS

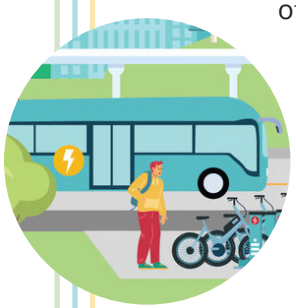
To measure progress towards the goals and strategies in the EV Roadmap, the city will develop evaluation criteria. These metrics will not apply to all goals or strategies and should be viewed as broad holistic criteria.

These metrics include:

EV Adoption Rate

Definition: The percentage of electric vehicles registered in Bellevue

Source: Washington State Department of Licensing



Publicly Available EV Charging Ports

Definition: The number of public charging ports in Bellevue

Source: US DOE Alternative Fuels Data Center

Public Charging Ports per EV

Definition: The ratio of publicly available EV charging ports to the number of EVs registered in Bellevue

Source: Alternative Fuels Data Center; Washington State Department of Licensing

City Installed or Facilitated Public Chargers

Definition: The number of publicly accessible chargers installed directly or facilitated by the city.

Source: Internal tracking

City Installed or Facilitated Private Chargers

Definition: The number of privately accessible charger installations (multifamily buildings, workplaces, etc.) facilitated by the city.

Source: Internal tracking

Expanded Access to EVs

Definition: The number of used EVs registered in Bellevue or number of vehicles registered in priority census tracts, as defined in the EV Roadmap.

Source: Washington State Department of Licensing

Reduced On-Road GHG Emissions

Definition: amount of GHG emissions attributed to on-road sources in Bellevue

Source: City of Bellevue GHG Inventory

07

Bellevue's EV Charging Framework

What you will find in this chapter

- Charging Scenarios
- Community charging options
- Destination charging considerations
- Infrastructure guidelines with conceptual layout scenarios and associated costs

While conventional gasoline- and diesel-powered vehicles are refueled at stations often placed near interstate exits and along commercial corridors, the expansion of land uses associated with charging EVs has significant implications for regional and city policymakers. EV charging infrastructure exists at many different land uses, presenting many new challenges to local governments, businesses, and consumers. This section of the Electric Vehicle Roadmap outlines a transect between charging types and their real-world applications as they relate to the city's goals for widespread EV adoption across the Bellevue community.

THE EV CHARGING TRANSECT

Different EV users will create different charging use cases; for example, a driver with access to home charging may prefer to charge at home overnight, while a driver on a long-haul trip will most likely want to charge at a DC Fast Charger near the highway. The regional charging framework discussed in this section is intended to provide an overview of different charging types in relation to land use, cost, use case, power availability, and physical space.

Five categories of charging were identified to develop a charging transect specific to Bellevue:

Residential Charging

Community Charging

+

Destination Charging

CITY FOCUS

Distance Charging

Depot Charging

Table 7 outlines the general elements of the charging transect for each type of charging. The pages following the matrix discuss each type in detail, including use cases and potential local applications. The city should focus on community and destination charging as these are most aimed at expanding public charging access but should remain aware of the other charging types and how they relate to the changing needs of its residents as EV adoption continues to grow. The rest of this section details these two types of charging, while more information on the others is provided in **Attachment D: EV Charging Framework Supplement.**

Table 7. Bellevue's EV Charging Transect

		CITY FOCUS			
	Residential Charging	**Community Charging**	**Destination Charging**	**Distance Charging**	**Depot Charging**
					
Primary Land Uses	Primarily single-family homes, can include shared private charging in multifamily buildings	Public streets with on-street parking, prioritizing locations near existing or planned multifamily development	Retail, shopping, schools, transit stops, restaurants, grocery stores, workplaces; prioritizing Justice40 trip destinations	Highway exits and rest stops	Centralized depot facilities
Primary Vehicle Types	Privately owned vehicles charging at home	Privately owned vehicles without home charging access	Privately owned vehicles charging at destinations	Publicly and privately owned vehicles needing a rapid charge	Public transit and other fleets
Typical Charging Configuration	Level 1 or Level 2	Utility pole drop-down or pedestals in sidewalk or furnishing zone, prioritizing locations with excess grid capacity	Clusters of Level 2 chargers in parking lots and select DCFCs where dwell times are short	Clusters of DCFCs enabling long-distance travel, likely paired with services like a typical fueling station	Clusters of Level 2 chargers and/or DCFCs depending on operating needs
Typical Dwell Time	Up to 16 hours overnight	2-12 hours	Varies from <1 hour up to 8-10 hours	Short en-route stops of 20-30 minutes	Varies but typically >12 hours overnight
Access Type	Private	Public	Public	Public	Private
Power Requirement	Low	Low	Medium	High	High
Level of Financial Investment	$1,500-5,000 per Level 2 port; Level 1 charging equipment typically included with EV purchase	$5,000-$15,000 per port	$3,000-$15,000 per Level 2 port (6.6-19.2 kW) or $1,250-1,750 per kW (typically 50-350 kW per port)	$1,250-1,750 per kW (typically 50 to 350 kW)	$5,000-$20,000 per Level 2 port (6.68-19.2 kW) or $1,500-2,000 per kW (typically 50-350kW per port)

Community Charging

The publicly accessible charging network will need to rapidly expand to support future EV adoption in Bellevue. In this transect, 'community charging' refers to publicly accessible charging stations that are sited such that they aim to serve the nearby community, focusing on areas with a high density of multifamily residents who may have limited access to charging at home. The city holds influence in how the charging network builds out and can support community-focused siting through both direct investment and coordination with private entities looking to invest in new charging infrastructure.

Unlike at-home charging, the user cost for publicly accessible charging is generally determined by the site operator, who is likely to have influence over the cost of energy, the cost of parking and idling fees for fully charged vehicles. On average, users will pay between $0.20 and $0.30 per kWh at a Level 2 charger or between $0.40 and $0.60 per kWh at a DCFC, but prices can vary based on local electricity costs and the direction of the property owner and charger operator. In Bellevue, users can expect to pay closer to $0.50 per kWh on average when using a publicly accessible DCFC.

Two applications of community charging have been identified: charging in existing parking areas and charging along the curbside, though this may not be applicable in all parts of Bellevue. A focus is placed on charging within the public right-of-way or on city-owned parcels as this can significantly reduce the difficulty and cost of installing new chargers. These community chargers can serve as vital neighborhood amenities, providing residents without access to home charging with the opportunity to own and charge an EV as part of their daily routine.

To assess whether a specific site is a good candidate, the city can utilize tools produced by the state of Washington that indicate a location's dwell time and 'charging potential.' Dwell time is how long travelers typically stay in one location and can be used to determine if a site is a better fit for Level 2 charging or DC Fast Charging.

Charging potential is a metric developed by the Washington State Department of Commerce to generally assess how appropriate each type of charging may be at a given location.

CHARGING IN EXISTING PARKING AREAS

Charging stations installed in parking lots are most commonly bollard-mounted or pylon-style Level 2 chargers. If a small number of Level 2 ports are installed, the circuit is generally tapped into the host building's electrical panel, which may require additional conductors to be brought to the parking area. Based on the specific site and application, a planning-level estimate for a small charging station can range from $10,000 to $20,000 per port.

Should the city choose to invest in publicly accessible chargers in existing parking areas, a focus can be put on those near existing multifamily developments or serving trips made by members of Justice40 and other underserved communities. Sites should also be evaluated for power availability during the planning stages; those where spare power is available may be more desirable for early action as they would not require costly electrical upgrades. During the siting process, a focus can also be placed on parcels owned by the city to streamline the installation process. Bellevue Parks and Community Services sites, for example, typically have ideal dwell times for Level 2 charging as users tend to stay at the park for multiple hours. The city should consider adding charging as an amenity for parks users, especially those sites offering larger parking lots that can accommodate publicly accessible chargers.

EXAMPLE:

Bellevue Crossroads Par 3 Golf

The Bellevue Crossroads Par 3 Golf Course is near many multifamily communities just east of Crossroads Mall. It is a city-owned parcel and has average dwell times of about 2.5 hours. The state has noted its high charging potential in its online planning tool.

CURBSIDE CHARGING IN THE PUBLIC RIGHT-OF-WAY

Curbside charging can offer a solution for siting new infrastructure in urbanized areas without the need for a dedicated off-street parking lot. As with other installations, these chargers can take many forms depending on the specific constraints of the selected site. Companies have begun installing curbside charging that is fed from the adjacent building's electrical panel, which may reduce the cost to bring power to the curb. To solve the challenge of cable management, some chargers require the driver to provide a charging cable, so no cable needs to be stored when the charger is not in use. Chargers may also be mounted to a utility pole, tapping into an existing pole-mounted transformer to obtain power. These chargers can be mounted at waist-level, or higher up to avoid vandalism and keep charging cables organized. Higher-mounted chargers typically use a drop-down charging cable that retracts when the charge is complete. By leveraging excess power available from the grid, utility upgrade costs can be reduced because no underground conduit, trenching or site work is needed. Some key elements of ground-level and pole-mounted curbside charging are compared in **Table 8**.

Table 8. Curbside Community Charging Comparison

	Ground-Level Curbside Charging	Pole-Mounted Curbside Charging
		
Context	Areas where on-street parking, power and drivers with a need for charging all exist	Areas where on-street parking, utility poles, power and drivers with a need for charging all exist
Charger	Level 2 charging, typically at 7.2 kW but ranging up to 19.2 kW	Level 2 charging, below 10 kW and varying based on power availability
Power	Can draw from surplus capacity or new feed; may require upgrades	Draws from surplus capacity already available; unlikely to require upgrades
Cost	Highly dependent upon several site- and application-specific factors	Estimated at about $5,000-$15,000 per port, including equipment and installation

While curbside charging is more commonly seen in European countries, it is starting to be applied in metropolitan areas across the United States. This approach can help to quickly expand the publicly accessible charging network without adding demand to the grid where there is not already spare power to accommodate, benefiting those without access to home charging. As stated previously, the city will place a focus on equity as it deploys and supports the deployment of new chargers.

A siting effort prioritizing trip destinations with high shares of trips made by Justice40 community members may mean predominately siting curbside chargers in Downtown, where on-street parking is more prevalent. In other areas, it can be difficult to find on-street opportunities for new chargers. Note that on-street parking would need to be established to support charging at this location, but public right-of-way exists to accommodate this. Installing new chargers here, and in other locations like it, would improve charging access for those living in nearby multifamily communities.

Destination Charging

To facilitate a large-scale switch to EVs, charging opportunities must be made available where they are most needed. For this transect, 'destination charging' refers to charging that is sited at popular trip destinations such that drivers can recharge their EV while they are completing a nearby activity, like shopping, eating, or recreating. Destination charging can include Level 2 chargers and DC Fast Chargers depending on dwell times at the host site or adjacent land uses. Chargers are most often installed in existing parking areas, which may require close coordination with the site host where the land is not owned by the city.

LEVEL 2 DESTINATION CHARGING

Level 2 destination charging can be added to publicly and privately owned parking areas and is ideal for sites with dwell times of 2 to 6 hours. Suitable land uses include public buildings, schools, transit facilities, restaurants, and workplaces. To continue to reinforce the city's commitment to equity in electrification, a focus can be placed on destinations with a high share of trips made by members of Justice40 and underserved communities. These drivers are generally less likely to be able to access charging at or near their residence; making charging available at their destination will be crucial in promoting citywide EV adoption. Note that destination charging can double as community charging if it is close to existing developments whose residents can use the charger. This charging is also ideal for workplaces, where drivers will typically stay for 6 to 8 hours. **Figure 10** provides an example of Level 2 destination charging.

Figure 10. Example of Level 2 Destination Charging

Destination charging using Level 2 chargers is most often rated for 7.2 kW, but power outputs can range up to 19.2 kW. The exact charging speed will be determined based on power availability and the site's specific dwell times, which indicate how long EV owners will be plugged in. Higher-speed chargers will be preferred by EV drivers because they can replenish more charge over the same timeframe, letting them travel further without another recharge. Slower rates can still be sufficient for sites with long dwell times.

Electrical system upgrades may be needed to install larger banks of new Level 2 chargers depending on existing power availability and the number and rating of the chargers being installed. Close coordination with Puget Sound Energy will be needed to determine site-specific power needs during the planning phase. In general, a Level 2 charger can cost between $3,000 and $15,000 per charging port, but the final price will vary greatly based on site design, charger ratings, and the magnitude of electrical upgrades needed, if any, to support the new infrastructure.

EXAMPLE:

Bel-Red Station

Bel-Red station is a new rail stop close to many planned developments in the Bel-Red neighborhood. It is publicly owned and has average dwell times of about 8.5 hours. EV charging could be considered as part of the proposed redevelopment of this site.

DC FAST DESTINATION CHARGING

Destination charging is most often Level 2, but it can also use DC Fast Chargers to enable more rapid charging. This is most appropriate at locations with dwell times of up to an hour, such as grocery stores, shopping centers, and convenience stores. Fast charging can give residents without access to home charging a more convenient option than relying on Level 2 chargers, as they only need to wait 15 to 45 minutes for their EV to reach a sufficient state of charge instead of many hours. **Figure 11** shows an example of destination charging using a set of DC Fast Chargers.

Though DC Fast Chargers can reach power ratings of 350 kW or more, a destination-focused installation will most commonly be sized at 50 to 100 kW to allow for rapid charging without further increasing costs for the owner. A typical charging station of this type can cost $1,250 to $1,750 per kilowatt, including equipment and installation, and it is likely that power upgrades will be needed to support the new infrastructure. Financial incentives are available to help reduce charger costs, but a DC Fast Charger will draw significant power and can greatly increase utility costs. Charging fees for chargers of this kind are typically set by the site host and can help offset the high costs associated with them. Users in Bellevue pay up to $0.30 more per kWh when using a DC Fast Charger compared to using a Level 2 charger.

Figure 11. Example of DC Fast Destination Charging

As with Level 2 destination charging, promoting equity in the city's siting efforts and investments will mean prioritizing trips made by members of Justice40 and other underserved communities both in and near Bellevue. By combining trip data and the dwell time information catalogued in the state's resources, ideal sites for equity-focused DC Fast Chargers can be identified. Crossroads Bellevue, for example, shows great potential for chargers that would serve historically underserved or otherwise DAC members. A high share of trips destined for this shopping mall originate in Justice40 communities, and dwell times are typically between 30 and 60 minutes. The city might consider partnering with the King County Library System, which has a branch at this location. Note, however, that they do not control the parking area at this location, so installing any new EV chargers here will require close coordination with the site host.

INFRASTRUCTURE GUIDE

To provide the city with a template to better understand how and where it can install new publicly accessibly charging infrastructure, conceptual layouts and associated costs were developed for a standard installation of three types of charging identified as focus areas for the city.

The three types are:

1. **Level 2 Community Charging:**
   (2) 7.2-kW Level 2 dual-port chargers (no utility upgrades)
2. **Level 2 Destination Charging:**
   (12) 7.2-kW Level 2 dual-port chargers (utility upgrades)
3. **DC Fast Destination Charging:**
   (4) 150-kW single-port DC Fast Chargers (utility upgrades)

Three elements are shown on the following pages for each type of charging listed above (**Figure 12**, **Figure 13**, and **Figure 14**). Together, the elements listed below can help the city create a plan for the expansion of EV charging infrastructure in Bellevue. Note that this guide considers only the electrical and civil site work directly related to charging, such as geometric design and running new conduit.

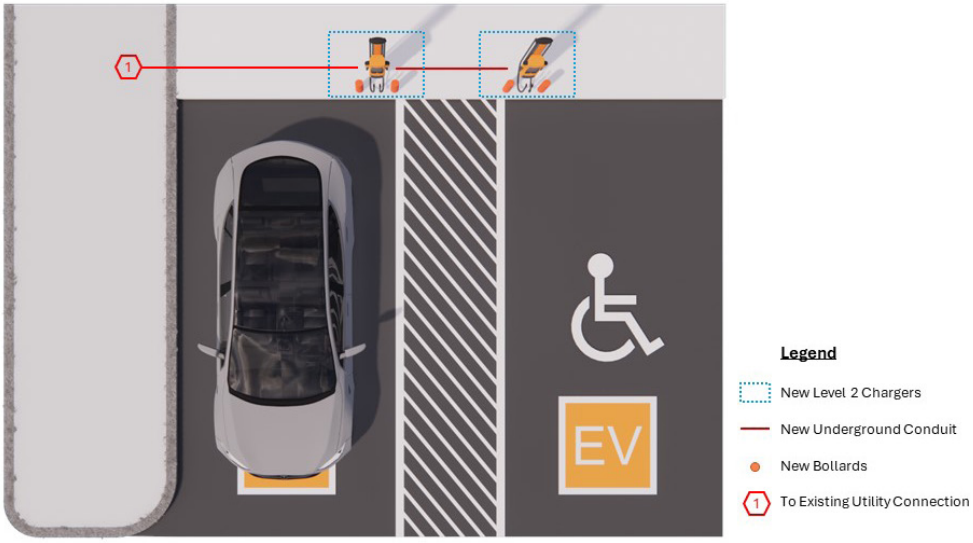
The figures convey:

- A conceptual layout showing the charger and its supporting infrastructure, which includes conduit, bollards, interconnects, and new transformers, as needed. Note that the high-level concepts that do not represent any specific site; they are intended to show the key elements that are applicable to any charger installation.
- A high-level cost estimate showing potential costs associated with installing each type of charging. DC Fast Chargers are significantly more expensive than Level 2 chargers, and they can necessitate utility upgrades that can significantly increase costs. Upgrades are reflected in the destination charging estimates, but it is assumed that small-scale community charging will not require any enhancements to electrical infrastructure.
- A zoning map showing where chargers of each type may be most successful based on the site's context. Community charging is largely focused on multifamily and workplace zoning, while destination charging is more appropriate in commercial areas. These maps begin to provide a framework for implementing land use and zoning controls that support new EV charging infrastructure.

Design for EV charging parking spots should follow industry best practices, including the U.S. Access Board's Design Recommendations for Accessible EV Charging Stations. Washington State's building code dictates requirements for including accessible charging spaces: 10 percent of accessible spaces shall be equipped with charging stations. and an additional 10 percent of accessible parking spaces shall be EV Ready. Note that EV charging infrastructure may also serve adjacent parking spaces not designated as accessible parking. In this case, appropriate signage is needed to inform EV drivers that they should use these chargers last to avoid blocking accessible parking spaces, where possible.

In addition to meeting existing ADA and ABA accessibility standards, charging stations must consider accessible mobility and communication features. Accessible mobility features include the size of the charging space and its access aisle and the provision of clear floor space and an unobstructed side reach. Accessible communication features include aspects such as display screens, input controls, and pay systems. Applying these elements to EV charger designs in Bellevue will ensure that those living with disabilities, people with vision impairments, and people who are deaf or hard of hearing are accommodated in Bellevue's transition to electrified mobility.

EXAMPLE 1: LEVEL 2 COMMUNITY CHARGING



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2 X 72KW DUAL PORT CHARGER WITH EXISTING TRANSFORMER				
Description	Units	Quantity	Unit Cost (incl. labor)	Unit Cost (incl. labor)
ELECTRICAL				
7.2kW Electric Vehicle Charger (2-Port)	ea.	2	$20,000	$40,000
Disconnect with Integral Metering	ea.	1	$7,000	$7,000
50A Branch Circuit 4W+G - Chargers (incl. conduit)	LF	50	$17	$850
Ethernet, CAT 6	LF	50	$1	$50
CIVIL				
Asphalt	SF	200	$5	$1,000
Bollard	ea.	4	$700	$2,800
Trenching & Backfill for Conduit	SF	50	$45	$2,250
Painting Lines	LF	40	$2	$80
Painting Symbols	ea.	4	$75	$300
ADJUSTMENTS				
		Contingency	15%	$8,100
		Site Sensitivity	8%	$4,300
		Area Cost	12%	$6,500
TOTAL				
				Total Approximate Cost $73,500

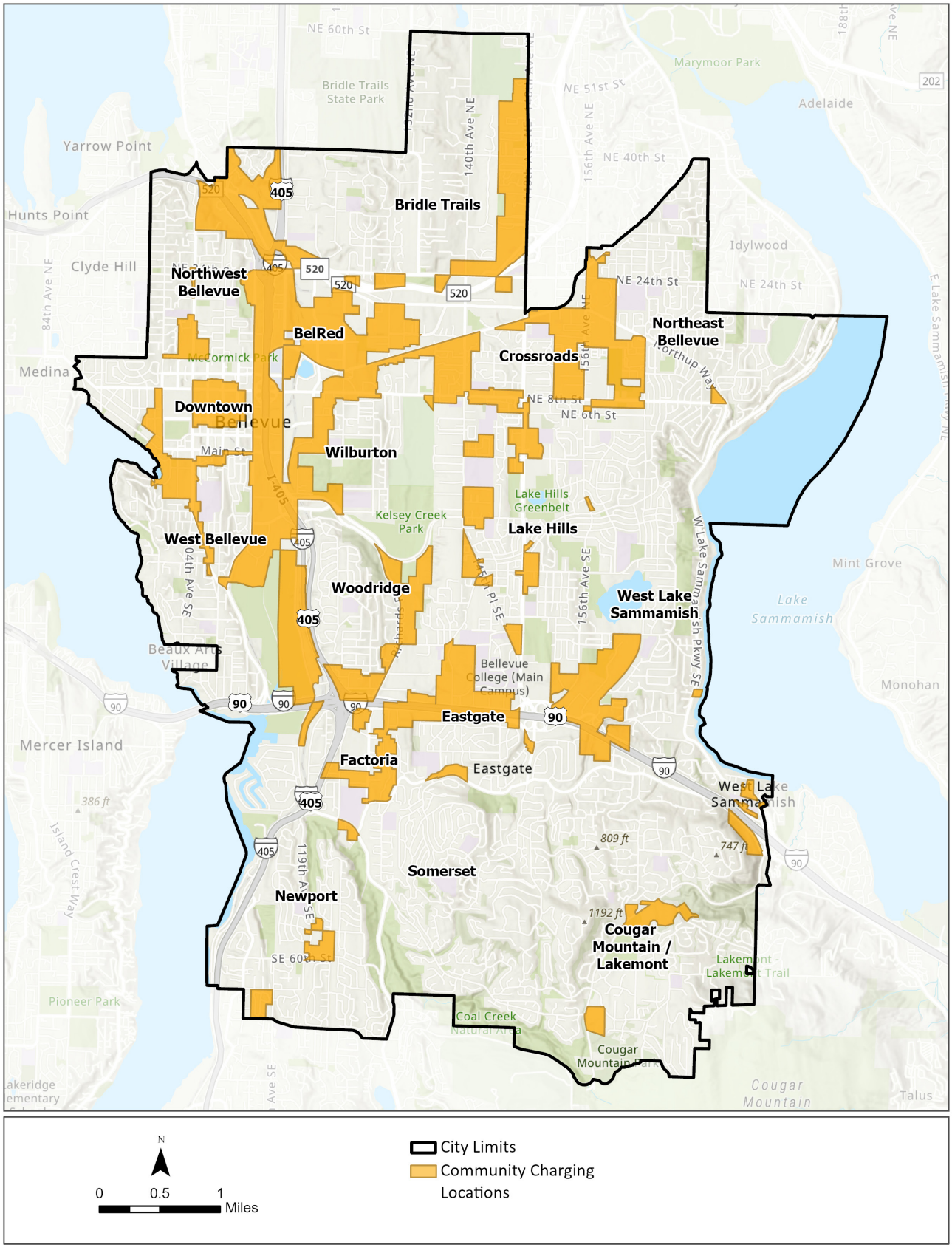
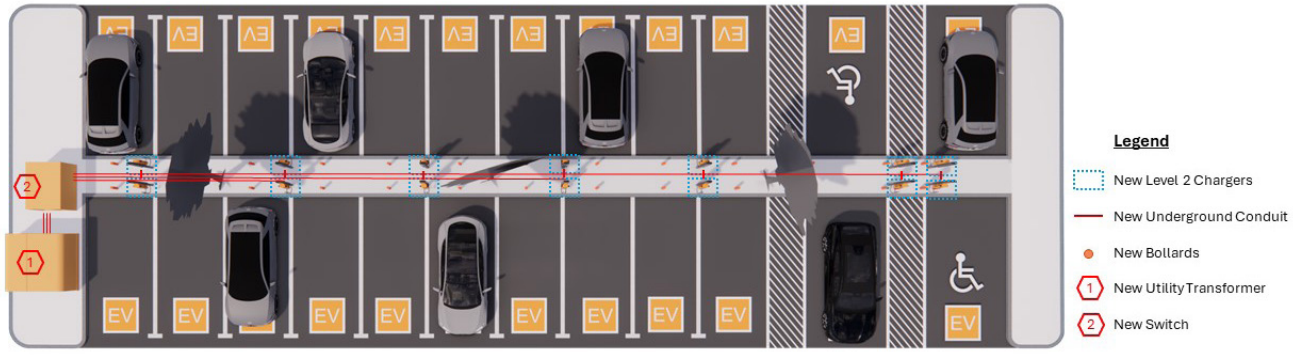


Figure 12. Context Map for Level 2 Community Charging

EXAMPLE 2: LEVEL 2 DESTINATION CHARGING



Not to scale

12 X 7.2KW DUAL-PORT CHARGERS WITH UTILITY UPGRADES				
Description	Units	Quantity	Unit Cost (incl. labor)	Unit Cost (incl. labor)
ELECTRICAL				
7.2kW Electric Vehicle Charger (2-Port)	ea.	12	$20,000	$240,000
Circuit Breakers	ea.	24	$525	$12,600
1,200A panelboard	ea.	1	$90,000	$90,000
Utility Transformer	ea.	1	$75,000	$75,000
50A Branch Circuit 4W+G - Chargers (incl. conduit)	LF	1,200	$17	$20,400
Ethernet, CAT 6	LF	1,200	$1	$1,200
Utility Upgrades - Overhead Cable & Poles	LF	50	$50	$2,500
Utility Upgrades - Trenching	LF	50	$45	$2,250
CIVIL				
Asphalt	SF	1,200	$5	$6,000
Bollard	ea.	24	$700	$16,800
Trenching & Backfill for Conduit	SF	100	$45	$4,500
Painting Lines	LF	360	$2	$720
Painting Symbols	ea.	24	$75	$1,800
ADJUSTMENTS				
		Contingency	15%	$71,100
		Site Sensitivity	8%	$37,900
		Area Cost	12%	$56,900
TOTAL				
				Total Approximate Cost $640,000

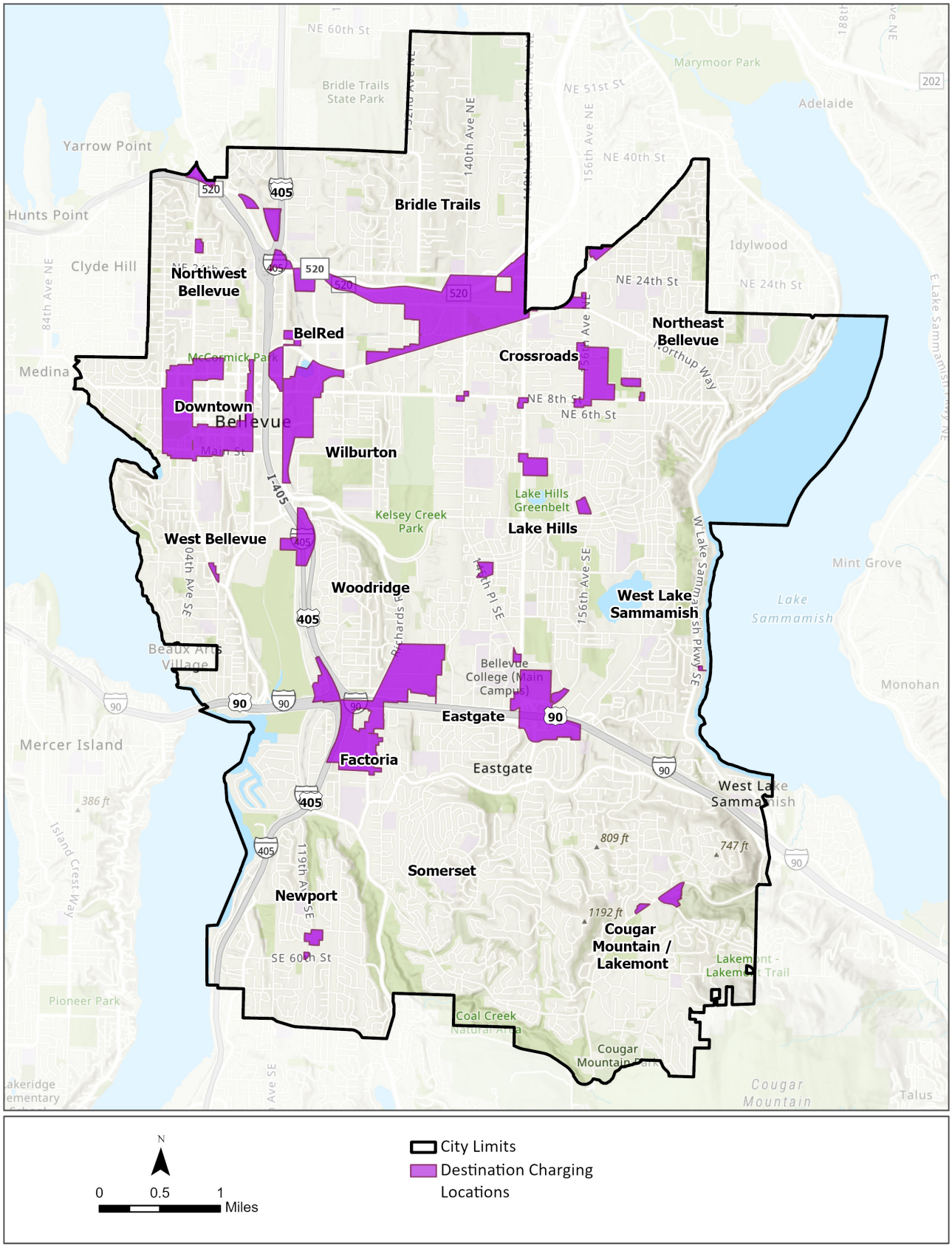
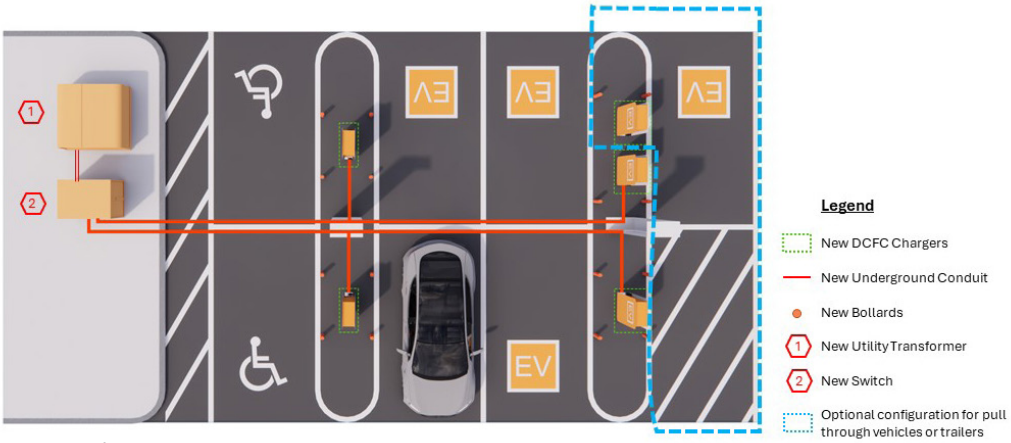


Figure 13. Context Map for Level 2 Destination Charging

EXAMPLE 3: DC FAST DESTINATION CHARGING



Not to scale

4 X 150KW SINGLE-PORT CHARGERS WITH UTILITY UPGRADES (NEVI-COMPLIANT)				
Description	**Units**	**Quantity**	**Unit Cost** (incl. labor)	**Unit Cost** (incl. labor)
ELECTRICAL				
150kW Electric Vehicle Charger (1-Port)	ea.	4	$75,000	$300,000
Light Pole 20', 270 W LED, 277V	ea.	2	$5,500	$11,000
Security Cameras	ea.	2	$6,000	$12,000
Security Camera Hub	ea.	1	$6,000	$6,000
Wireless Communication Devices	ea.	1	$4,000	$4,000
Circuit Breakers	ea.	4	$7,000	$28,000
Switchboard	ea.	1	$90,000	$90,000
Utility Transformer	ea.	1	$75,000	$75,000
20A Branch Circuit 2W+G - Light Pole (incl. conduit)	LF	200	$17	$3,400
250A Branch Circuit 4W+G - Chargers (incl. conduit)	LF	200	$110	$22,000
Incoming Switchboard Feeder	ea.	2	$1,500	$3,000
Ethernet, CAT 6	LF	200	$1	$200
Utility Upgrades - Overhead Cable & Poles	LF	100	$50	$5,000
Utility Upgrades - Trenching	LF	100	$45	$4,500
CIVIL				
Concrete, 12" with 4" Reveal	SF	150	$17	$2,550
Asphalt	SF	200	$4	$800
Bollard	ea.	16	$700	$11,200
Trenching & Backfill for Conduit	SF	200	$45	$9,000
Painting Lines	LF	120	$2	$240
Painting Symbols	ea.	8	$75	$600
ADJUSTMENTS				
		Contingency	15%	$88,300
		Site Sensitivity	8%	$47,100
		Area Cost	12%	$70,600
TOTAL				
			Total Approximate Cost	**$795,000**

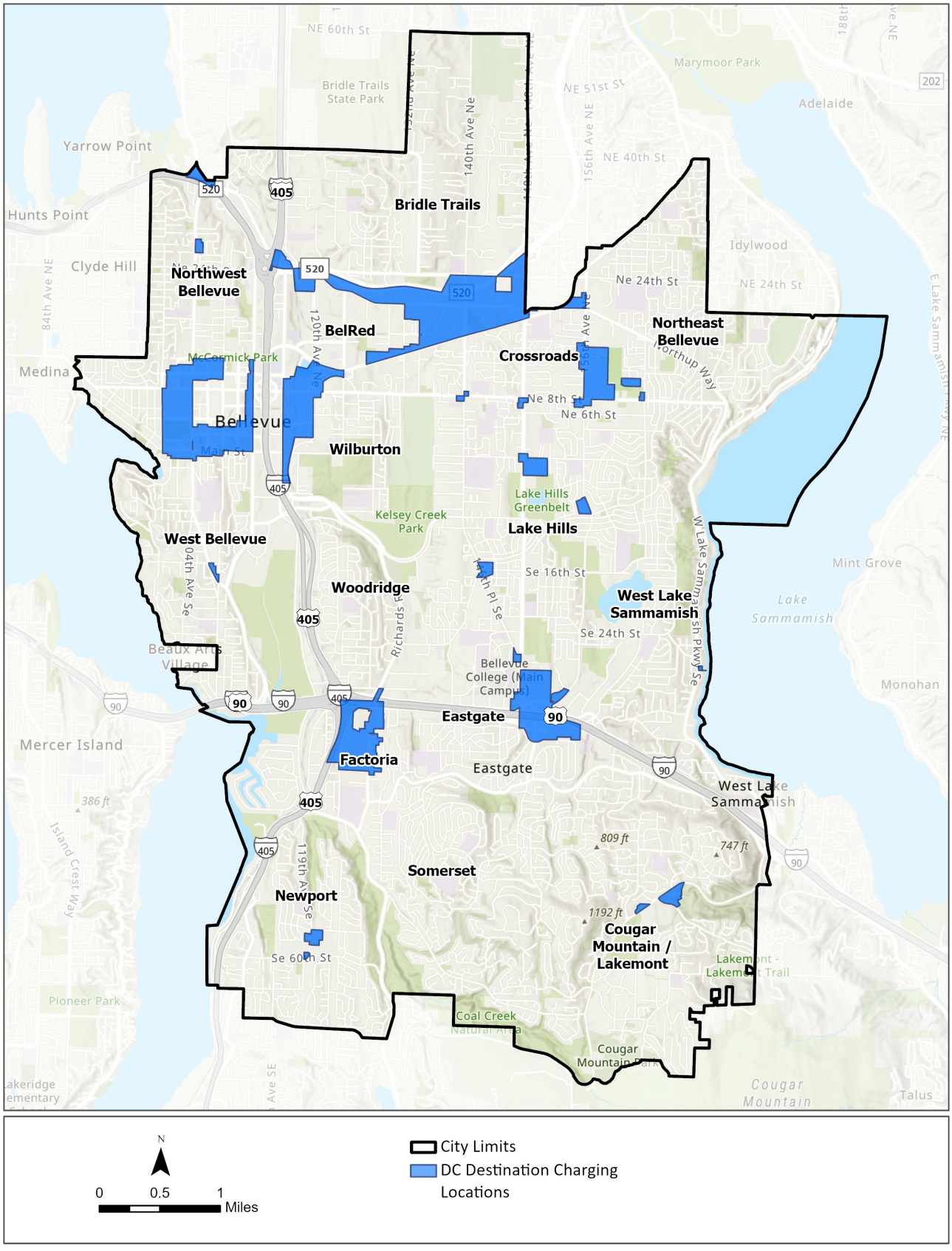


Figure 14. Context Map for DC Fast Destination Charging

08 Summary

What you will find in this summary

- Bellevue's near term actions
- Funding resources
- Charging infrastructure needs
- Site selection and methodology

Based on the City of Bellevue's goals for EV adoption and the analysis presented throughout this EV Roadmap, the city's near-term actions will primarily focus on assessing new charging sites through an equity lens. Other key actions for the city to take will include establishing funding and incentives for multifamily buildings and other property owners to boost EV charger installations; maximizing partner programs; expanding knowledge of, and access to, used EVs; and working with the private sector to encourage greater investment in publicly accessible charging infrastructure. Funding is available from federal and state sources, including tax credits, grants, and incentive programs, to install EV charging infrastructure that prioritizes investments in underserved communities.

Large investments in new EV charging infrastructure, particularly Level 2 chargers, will be needed from both the public and private sectors to achieve the city's goals and encourage 100 percent EV adoption across the Bellevue community. To support an estimated 57,005 EVs in 2030, the city and its partners will need to installation of 2,310 new publicly accessible charging ports by 2030, most of which will be at Level 2 chargers. By 2050, about 8,570 new Level 2 charging ports and 985 new DC Fast Charging ports will be needed to support a total of 199,185 EVs. The scale of public resources needed moving forward will be directly influenced by the level of support provided by the private sector. The city can directly invest in key areas while supporting private landowners considering the installation of publicly accessible charging on their property.

Two charging infrastructure siting methodologies are discussed in this plan. A combination of both was used to identify a shortlist of candidate sites that the city can use as an example of where new charging can have the largest benefits for underserved community members. Six sites were selected through the equity analysis conducted for the EV Roadmap, but many other sites exist that will help to ensure equity is at the forefront of the city's electrification efforts.

Overall, this EV Roadmap provides a comprehensive strategy for city to lead a widespread transition to EVs while providing an equitable distribution of benefits to all in its community. Through strategic investments, collaboration with private partners, policy updates, and community engagement, this plan charts a path for the city to reduce emissions, expand charging access, and establish itself as a model for inclusive electrified mobility solutions.

CITY OF BELLEVUE » Electric Vehicle Roadmap

Attachment A:

Needs Assessment Supplement

October 2024

Table of Contents

Tables

A Needs Assessment Supplement

A.1 EV Adoption Forecasting

As described in the EV Roadmap, EV adoption will be highly dependent on drivers' access to home charging. To account for this, the forecasting effort considered four unique EV driver profiles based on housing type: single-family residents, existing multifamily housing, new multifamily development, and the city's daytime influx population. This attachment supplements the Needs Assessment in the EV Roadmap, providing descriptions of these assumptions by EV driver profile.

A.1.1 Single-Family Residents

Single-family homes, which in this analysis refers only to detached single-family residences, account for more than half of all existing housing units in Bellevue. These drivers are historically more likely to own an EV because of their access to charging at home: In California, 80 percent of all EVs are owned by residents of a single-family home.[1] The following assumptions were made to estimate existing EV adoption levels and market share for this EV driver profile:

- Based on a total existing residential population of 154,600 persons and a 55-percent market share for single family homes to all residential units in Bellevue, there are **93,220 residents in Bellevue's single-family homes**.
- Based on a citywide ratio of 0.62 vehicles to persons and there typically being more vehicles in single-family homes than in multifamily developments, there are **0.8 vehicles per person in Bellevue's single-family homes**.
- Based on an existing (2023) citywide EV population of 8,145 EVs and data showing 80 percent of EVs are in single-family homes, **Bellevue's single-family homes account for 6,515 EVs**.
- Based on 100 percent adoption being reached in 2050 and the above assumptions, there will eventually be **74,575 EVs in Bellevue's single-family homes**.

Combining these data and assumptions with the 2023 citywide market share (24 percent) led to an estimate of about 27 percent for the existing EV market share among single-family residents. No new detached single-family housing is planned to be added within Bellevue, so total registrations and vehicle sales were held constant in all projections. Note that future development in Bellevue is likely to include housing units, single-family or otherwise, with less parking than currently provided.

A.1.2 Existing Multifamily Housing

Existing multifamily housing vehicles were estimated using the difference between total persons and vehicles and the population estimates developed for the single-family housing EV driver profile. The following assumptions were made to develop adoption and market share projections for this group:

[1]California Energy Commission (2024): *https://www.energy.ca.gov/data-reports/surveys/california-vehicle-survey/housing-type-pev-ownership*

- Based on a total existing residential population of 154,600 persons and a 45-percent market share for multifamily units to all residential units in Bellevue, there are **61,380 residents in Bellevue's existing multifamily housing**.
- Based on a citywide ratio of 0.62 vehicles to persons and there typically being fewer vehicles in multifamily developments than in single-family homes, there are **0.5 vehicles per person in Bellevue's existing multifamily housing**.
- Based on an existing citywide EV population of 8,145 EVs and an estimate of 6,515 EVs being in single-family homes, **Bellevue's existing multifamily housing accounts for 1,630 EVs**.
- Based on 100 percent adoption being reached in 2050 and the above assumptions, there will eventually be **30,515 EVs in Bellevue's existing multifamily housing**.

These assumptions led to an estimated existing EV market share of 17 percent. This category only considers existing housing units, so total registrations and sales were held constant in all forecasts.

A.1.3 New Multifamily Development

Multifamily housing was divided into existing and future properties because of the recently adopted statewide requirement that 45 percent of parking spaces in new multifamily developments be either equipped with EV charging stations, be made EV Capable or EV Ready.[2] This requirement is anticipated to increase EV adoption in new developments more rapidly than in existing buildings where EV charging is less likely to exist and can be more difficult to install. However, the rate of EV adoption for this driver profile is likely to remain lower than that of single-family residents.

As this driver profile focuses on future developments for which existing data is not available, it was assumed the initial (2025) EV market share among these residents would be 30 percent. This value was selected as it falls between the projected 2025 EV market shares among single-family residents and existing multifamily housing. Initial EV adoption was assumed to be 14 percent, matching that of single-family residents. Additional assumptions made for this EV driver profile include:

- Based on a projected 2050 citywide population of 242,200 persons and all new development (i.e., all new residents) being multifamily, there will be **87,600 residents in new multifamily developments**.
- Based on the assumptions made for existing multifamily housing, there will be **0.5 vehicles per person in new multifamily developments**.
- Based on a projected 2050 EV population of 150,165 EVs (100 percent adoption) and all new development (i.e., all new vehicles) being multifamily, **new multifamily developments will eventually account for 45,075 EVs**.

Because the vast majority of future residential development is expected to be multifamily housing and middle housing, these projections were used to forecast annual growth in EV registrations. This shows that on average there will be roughly 1,735 new EVs registered each year through 2050.

[2]Washington State Legislature (2023): *https://apps.leg.wa.gov/wac/default.aspx?cite=51-50-0429*

A.1.4 Daytime Influx Population

An important aspect of the Bellevue forecasting effort is the implications for commuters who do not live in Bellevue but come to the city to work, shop, or play and will need to charge their EV. This increase in population—roughly 34 percent—was considered when projecting future charging needs. King County's existing EV market share and EV adoption rates of 20 percent and 5 percent were used as a baseline, then the following assumptions were made to forecast future EV adoption and market share for this driver profile:

- Based on an existing daytime influx of 53,025 vehicles and an existing vehicle-to-person ratio of 0.67, there are currently **79,140 additional persons entering Bellevue during the day**.
- Based on existing vehicle registration data and an EV adoption rate of about 5 percent, there are currently **2,865 additional EVs entering Bellevue during the day**.
- Based on the city's forecasts showing a decreasing daytime influx population over time and 100 percent adoption being reached in 2050, there will eventually be **49,020 additional EVs entering Bellevue during the day**.

A.2 Charging Needs Analysis

The U.S. Department of Energy's EVI-Pro Lite tool was used to quantify future charging needs across Bellevue. To best reflect the varying degrees of difficulty associated with installing infrastructure and adopting EVs in different housing types, future charging needs were divided into the same EV driver profiles as applied in the forecasting effort. A series of assumptions was developed for each profile, described below.[3] For all groups, this analysis uses the default vehicle mix assumed by EVI-Pro Lite for the Seattle-Tacoma-Bellevue area.[4]

A.2.1 Needs Analysis Assumptions

SINGLE-FAMILY RESIDENTS

Single-family homes are the most feasible for near-term EV adoption, as these drivers are likely to have access to Level 1 or Level 2 home charging. The assumptions made to estimate the charging needs of these Bellevue residents are summarized below.

1. **Number of Vehicles:** 80 percent of EVs are owned by single-family housing occupants, based on survey data from the State of California.[5] Bellevue begins at about 6,515 EVs in 2024 and increases to 74,575 EVs in 2050 based on the S-curve model described in the previous section, reflecting estimated current adoption and 100 percent adoption, respectively.
2. **Vehicle-to-Person Ratio:** 0.8 vehicles to persons in single-family homes, compared to a ratio of 0.62 vehicles to persons for Bellevue as a whole.

[3]U.S. Department of Energy (2024): *https://afdc.energy.gov/evi-pro-lite*
[4]**Note that this subsection refers to 'public charging' as that which is accessible to all members of the public, not necessarily that which the city directly invests in.**
[5]California Energy Commission (2021): *https://www.energy.ca.gov/data-reports/surveys/california-vehicle-survey/housing-type-pev-ownership*

3. **Access to Home Charging:** 95 percent of drivers in single-family homes have access to home charging, based on the assumption that most units of this type include either a private garage or dedicated parking space where charging activities can occur.

EXISTING MULTIFAMILY HOUSING

Existing multifamily housing is expected to be the most difficult to electrify based on the limited access to home charging. While charging infrastructure can be introduced to these structures, this can be unattractive to property owners because it can necessitate large modifications at significant costs. The assumptions made to determine future charging needs for this group are outlined below.

1. **Number of Vehicles:** Overall vehicle population does not change. The number of vehicles begins at about 1,630 EVs in 2024 and increases to 30,515 EVs in 2050, based on the S-curve model described in the previous section, reflecting estimated adoption today and 100 percent adoption, respectively.
2. **Vehicle-to-Person Ratio:** There are 0.5 vehicles to persons in existing multifamily housing, compared to a citywide ratio of 0.62 vehicles to persons.
3. **Access to Home Charging:** This begins at 5 percent in 2024 (to reflect an existing lack of charging infrastructure at these structures) then increases by 1 to 2 percent per year until reaching 45 percent in 2050 (to reflect future investments by property owners). Increasing home charging access for these residents will likely require significant policy action.

NEW MULTIFAMILY DEVELOPMENT

New multifamily development will need to electrify per the Washington Administrative Code, which has been amended to require a combined 45 percent of parking spaces be either equipped with EV charging stations, be made EV Ready, or be made EV Capable.[6] The assumptions made to estimate the charging needs of these Bellevue residents are summarized below.

1. **Number of Vehicles:** All growth in multifamily housing is assigned to this category, beginning in 2024. The number begins at zero EVs in 2024 and increases to about 45,075 EVs in 2050 based on the S-curve model described in the previous section, reflecting estimated current adoption and 100 percent adoption, respectively.
2. **Vehicle-to-Person Ratio:** There are 0.5 vehicles to persons in new multifamily development, compared to a citywide ratio of 0.62 vehicles to persons.
3. **Access to Home Charging:** 45 percent of drivers in new multifamily developments have access to home charging, based on the requirements outlined in the Washington Administrative Code.

DAYTIME INFLUX POPULATION

Bellevue's large daytime influx population, which accounts for about 34 percent of all vehicles within the city limits on a given day, will also incur some level of charging need. The assumptions made to determine future charging needs for this population subset are outlined below.

[6]Washington State Legislature (2023): *https://apps.leg.wa.gov/wac/default.aspx?cite=51-50-0429*

1. **Number of Vehicles:** Housing mix and existing adoption rates in King County are similar to those of existing Bellevue residents. The number begins at about 2,865 EVs in 2024 and increases to 49,020 EVs in 2050 based on the S-curve model described in the previous section, reflecting estimated adoption today and 100 percent adoption, respectively.
2. **Vehicle-to-Person Ratio:** There are 0.62 vehicles to persons, aligning with the overall ratio for Bellevue residents described previously.
3. **Access to Home Charging:** 55 percent of daytime influx drivers have access to home charging today, based on the existing share of single-family homes to all housing units. This increases by 0.6 to 1.2 percent per year until reaching 75 percent in 2050, assuming similar development trends (i.e., a focus on multifamily units) to those within Bellevue.

A.2.2 Future Charging Demand

SINGLE-FAMILY RESIDENTS

Single-family resident charging needs are summarized by category in **Table 1** in terms of ports, or individual plugs that can support one EV each. Out of the ports needed to support EV adoption in each future year, about 30 percent would be publicly accessible.

Table 1. Single-Family Resident Charging Needs

Year	Adoption Forecast (# of EVs)	Charging Needs by Type (# of Ports)				Total Ports (Publicly Accessible)
		Single-Family	Shared Private	Public Level 2	Public DCFC	
2030	**29,595**	26,580	975	785	60	**28,400** **845**
2035	**49,145**	44,135	1,615	1,310	95	**47,155** **1,405**
2040	**60,390**	54,235	1,990	1,615	115	**57,955** **1,730**
2050	**74,575**	66,975	2,455	1,990	145	**71,565** **2,135**

Most ports for this housing group would be at single-family homes, because it was assumed that 95 percent of EV drivers will have home charging access. In total, forecasted EV adoption levels for Bellevue residents in single-family housing would demand a total of nearly 845 publicly accessible charging ports in 2030 and 2,135 publicly accessible charging ports in 2050.

EXISTING MULTIFAMILY HOUSING

Existing multifamily housing charging needs are summarized by category in **Table 2**. The share of publicly accessible charging that would be needed is estimated to decrease over time as existing multifamily structures are electrified.

Table 2. Existing Multifamily Housing Charging Needs

Year	Adoption Forecast (# of EVs)	Charging Needs by Type (# of Ports)				Total Ports (Publicly Accessible)
		Single-Family	Shared Private	Public Level 2	Public DCFC	
2030	**7,465**	-n/a-	1,320	670	90	**2,080** **760**
2035	**16,355**	-n/a-	4,350	1,355	180	**5,885** **1,535**
2040	**22,620**	-n/a-	8,030	1,720	215	**9,965** **1,935**
2050	**30,515**	-n/a-	14,945	2,030	255	**17,230** **2,285**

About 37 percent of these residents' charging demand would need to be publicly accessible in 2030, but just 13 percent would need to be publicly accessible in 2050 based on assumed improvements in access to home charging. In total, forecasted EV adoption for this housing type would demand 760 publicly accessible charging ports in 2030 and 2,285 publicly accessible charging ports in 2050. Of the charging ports, roughly 89 percent would be Level 2 and 11 percent would be at DCFCs.

NEW MULTIFAMILY DEVELOPMENT

Charging needs in Bellevue's new multifamily developments are summarized by category in **Table 3**. For this group, the home charging needs identified using EVI-Pro Lite were considered as part of the shared private charging category, which includes multifamily Level 1 and Level 2 charging.

Table 3. New Multifamily Development Charging Needs

Year	Adoption Forecast (# of EVs)	Charging Needs by Type (# of Ports)				Total Ports (Publicly Accessible)
		Single-Family	Shared Private	Public Level 2	Public DCFC	
2030	**2,800**	-n/a-	1,370	185	25	**1,580** **210**
2035	**9,095**	-n/a-	4,455	605	80	**5,140** **685**
2040	**18,510**	-n/a-	9,065	1,235	155	**10,455** **1,390**
2050	**45,075**	-n/a-	22,075	3,000	375	**25,450** **3,375**

Projected EV adoption for Bellevue residents in new multifamily developments would demand 210 publicly accessible charging ports in 2030 and 3,375 publicly accessible charging ports in 2050. Out of the total ports needed to support EV adoption in each year, about 13 percent would need to be publicly accessible. As in the existing multifamily housing group, about 89 percent of these ports would be Level 2 and 11 percent would be at DCFCs.

DAYTIME INFLUX POPULATION

Charging needs for Bellevue's daytime influx population are summarized by category in **Table 4**. The share of needed charging that would be publicly accessible is estimated to decrease over time as the market shifts toward new multifamily construction, which is subject to the new code requirements. Note that single-family residents outside of Bellevue will need some level of charging when they are in the city, but most of their charging is likely to occur at home.

Table 4. Daytime Influx Population Charging Needs

Year	Adoption Forecast (# of EVs)	Charging Needs by Type (# of Ports)				Total Ports (Publicly Accessible)
		Single-Family	Shared Private	Public Level 2	Public DCFC	
2030	**17,145**	-n/a-	975	970	120	**2,065** **1,090**
2035	**34,960**	-n/a-	1,895	1,875	215	**3,985** **2,090**
2040	**44,500**	-n/a-	1,955	1,890	215	**4,060** **2,105**
2050	**49,020**	-n/a-	2,265	2,125	230	**4,620** **2,355**

Note that the charging needs shown here do not include home charging for daytime influx drivers, as this is outside the city's influence. In total, forecasted EV adoption for this group would demand a total of 1,090 publicly accessible charging ports in 2030 and 2,355 publicly accessible charging ports in 2050. Of these ports, roughly 90 percent would be at Level 2 chargers.

CITYWIDE CHARGING NEEDS

The tables on the following pages provide detailed breakdowns of estimated citywide charging needs through 2050 by driver profile and charging type. **Table 5, Table 6,** and **Table 7** summarize these needs for intermediate years. **Table 8** summarizes charging needs in 2050, at which time every vehicle on the road in Bellevue should be an EV based on the state's EV adoption goals. This incurs the need for about 67,000 single-family home charging ports, 41,750 shared private charging ports, 9,150 publicly accessible Level 2 charging ports, and 1,000 publicly accessible DCFC ports.

Table 5. Citywide Year 2030 Charging Needs

Housing Group	Adoption Forecast (# of EVs)	Charging Needs by Type (# of Ports)												Total Ports (Public)
		SINGLE-FAMILY		SHARED PRIVATE			PUBLIC LEVEL 2				PUBLIC DCFC			
		Home Charging	**Total**	Multi-Family	Private Workplace	**Total**	Curbside	Office	General[1]	**Total**	150 kW	250 kW	**Total**	
Single-Family	**29,595**	26,580	**26,580**	690	285	**975**	450	115	220	**785**	50	10	**60**	**28,400** **845**
Existing MF	**7,465**	-n/a-	**-n/a-**	725	595	**1,320**	10	240	420	**670**	80	10	**90**	**2,080** **760**
New MF	**2,800**	-n/a-	**-n/a-**	1,220	150	**1,370**	20	60	105	**185**	20	5	**25**	**1,580** **210**
Daytime Influx	**17,145**	-n/a-	**-n/a-**	245	730	**975**	160	290	520	**970**	105	15	**120**	**2,065** **1,090**
TOTAL	**57,005**	26,580	**26,580**	2,880	1,760	**4,640**	640	705	1,265	**2,610**	255	40	**295**	**34,125** **2,905**

[1]General land uses include retail, recreation, healthcare, education, community centers, and transportation facilities.

Table 6. Citywide Year 2035 Charging Needs

Housing Group	Adoption Forecast (# of EVs)	Charging Needs by Type (# of Ports)												Total Ports (Public)
		SINGLE-FAMILY		SHARED PRIVATE			PUBLIC LEVEL 2				PUBLIC DCFC			
		Home Charging	**Total**	Multi-Family	Private Workplace	**Total**	Curbside	Office	General[1]	**Total**	150 kW	250 kW	**Total**	
Single-Family	**49,145**	44,135	**44,135**	1,145	470	**1,615**	750	190	370	**1,310**	80	15	**95**	**47,155** **1,405**
Existing MF	**16,355**	-n/a-	**-n/a-**	3,175	1,175	**4,350**	55	470	830	**1,355**	160	20	**180**	**5,885** **1,535**
New MF	**9,095**	-n/a-	**-n/a-**	3,970	485	**4,455**	65	195	345	**605**	70	10	**80**	**5,140** **685**
Daytime Influx	**34,960**	-n/a-	**-n/a-**	535	1,360	**1,895**	350	545	980	**1,875**	195	20	**215**	**3,985** **2,090**
TOTAL	**109,555**	44,135	**44,135**	8,825	3,490	**12,315**	1,220	1,400	2,525	**5,145**	505	65	**570**	**62,165** **5,715**

[1]General land uses include retail, recreation, healthcare, education, community centers, and transportation facilities.

Table 7. Citywide Year 2040 Charging Needs

Housing Group	Adoption Forecast (# of EVs)	Charging Needs by Type (# of Ports)												Total Ports (Public)
		SINGLE-FAMILY		SHARED PRIVATE			PUBLIC LEVEL 2				PUBLIC DCFC			
		Home Charging	**Total**	Multi-Family	Private Workplace	**Total**	Curbside	Office	General[1]	**Total**	150 kW	250 kW	**Total**	
Single-Family	**60,390**	54,235	**54,235**	1,410	580	**1,990**	925	235	455	**1,615**	100	15	**115**	**57,955** **1,730**
Existing MF	**22,620**	-n/a-	**-n/a-**	6,580	1,450	**8,030**	110	580	1,030	**1,720**	195	20	**215**	**9,965** **1,935**
New MF	**18,510**	-n/a-	**-n/a-**	8,080	985	**9,065**	135	395	705	**1,235**	140	15	**155**	**10,455** **1,390**
Daytime Influx	**44,500**	-n/a-	**-n/a-**	650	1,305	**1,955**	425	520	945	**1,890**	190	25	**215**	**4,060** **2,105**
TOTAL	**146,020**	54,235	**54,235**	16,720	4,320	**21,040**	1,595	1,730	3,135	**6,460**	625	75	**700**	**82,435** **7,160**

[1]General land uses include retail, recreation, healthcare, education, community centers, and transportation facilities.

Table 8. Citywide Year 2050 Charging Needs

Housing Group	Adoption Forecast (# of EVs)	Charging Needs by Type (# of Ports)												Total Ports (Public)
		SINGLE-FAMILY		SHARED PRIVATE			PUBLIC LEVEL 2				PUBLIC DCFC			
		Home Charging	**Total**	Multi-Family	Private Workplace	**Total**	Curbside	Office	General[1]	**Total**	150 kW	250 kW	**Total**	
Single-Family	**74,575**	66,975	**66,975**	1,740	715	**2,455**	1,140	290	560	**1,990**	125	20	**145**	**71,565** **2,135**
Existing MF	**30,515**	-n/a-	**-n/a-**	13,320	1,625	**14,945**	220	650	1,160	**2,030**	230	25	**255**	**17,230** **2,285**
New MF	**45,075**	-n/a-	**-n/a-**	19,675	2,400	**22,075**	325	960	1,715	**3,000**	335	40	**375**	**25,450** **3,375**
Daytime Influx	**49,020**	-n/a-	**-n/a-**	905	1,360	**2,265**	595	545	985	**2,125**	205	25	**230**	**4,620** **2,355**
TOTAL	**199,185**	66,975	**66,975**	35,640	6,100	**41,740**	2,280	2,445	4,420	**9,145**	895	110	**1,005**	**118,865** **10,150**

nd uses include retail, recreation, healthcare, education, community centers, and transportation facilities.

CITY OF BELLEVUE » Electric Vehicle Roadmap

Attachment B:

Engagement Report

October 2024

Table of Contents

B Engagement Report

B.1 Introduction

The City of Bellevue is developing an Electric Vehicle to guide the deployment of EV charging infrastructure, incentives, and programming across the city, in accordance with the 2021-2025 Sustainable Bellevue Environmental Stewardship Plan, which sets goals for 50 percent greenhouse gas emissions reductions by 2030 and 80 percent GHG emissions reductions by 2050.F Bellevue aims for EVs to account for 25 percent of registered vehicles on its roads by 2030, and for all registered vehicles to be EVs by 2050. This EV Roadmap forecasts a path toward transportation electrification in Bellevue, then identifies a series of actions and strategies the city can implement to align Bellevue's goals with those of Washington State. A major focus is ensuring all members of the Bellevue community will have access to, and benefit from, the transition to electrified mobility.

Outreach was conducted in two phases. Phase I covered the development of the draft Roadmap and strategies from the launch of the project in December of 2023 to April 2024. Phase II covered the release of the draft strategies and draft roadmap to the public from July to September 2024.

B.2 Overview of Phase I Outreach

The Electric Vehicle Roadmap team conducted Phase I Outreach from December 2023 to April 2024. The EV Roadmap team contacted thousands of community members through online tools and in-person events and used a variety of techniques to reach different cross sections of the public.

The goals of Phase I Outreach were to:

- Introduce the EV Roadmap project to the public
- Understand EV charging needs in the community, and, in particular, identify areas of the city where there is a high need for access to EV charging that is not currently being met by the market
- Understand barriers to EV adoption across different cross-sections of the community
- Understand community attitudes towards EVs and EV charging
- Identify other community mobility needs

B.3 Phase I Outreach Activities

The EV Roadmap Outreach Phase I consisted of four main components: a Community EV Adoption Survey, EV Charging Map, intercept interviews with community members, and a focus group for property managers.

B.3.1 Community EV Adoption Survey

240 community members completed the Community EV Adoption Survey, which was available in Traditional Chinese, Simplified Chinese, English, Japanese, Korean, Russian, and Vietnamese on

Engaging Bellevue from December 20, 2023 to March 11, 2024. 238 English surveys were completed; as well as one survey in Simplified Chinese and one survey in Spanish. The Community EV Adoption survey asked community members questions to better understand current attitudes towards EVs in Bellevue; current levels of access to EV charging based on housing type in Bellevue; barriers to EV adoption for residents; and community behavior around EVs. There were two versions of the survey; one for current EV owners, and one for those who do not currently own an EV.

B.3.2 EV Charging Map

Community members had the opportunity to share suggestions for future EV charging stations at public places, multifamily buildings, or workplaces around Bellevue. 158 suggestions were submitted to the virtual map, while 175 suggestions were gathered on a physical map taken to various community events and tabling opportunities. The virtual map was launched on December 20, 2023 and closed on May 1, 2024. The physical map was presented at the following locations and events:

- CHIME Lunar New Year Festival at Overlake Christian Church on Saturday, January 27, 2024 from 12:00pm-5:00pm
- Bellevue Downtown Library on Saturday, March 9, 2024 from 12:00pm-3:00pm
- H Mart on Saturday, March 16, 2024 from 11:30am-2:30pm
- Bellevue Downtown Library on Tuesday, March 26, 2024 from 2:00pm-5:00pm
- EarthFest 2024 at the Bellevue Botanical Garden on Saturday, April 20, 2024 from 11:00am-3:00pm

B.3.3 Intercept Interviews

EV Roadmap staff and Cultural Outreach Assistants conducted intercept interviews at locations around Bellevue for the month of March 2024. Intercept Interviews consisted of City of Bellevue staff asking library patrons, shoppers, and other community members to answer a few brief questions about the electric vehicle transition in Bellevue, including: current access to EV charging; current thoughts on EV adoption; barriers to EV adoption; and EV benefits. Community members could also offer further feedback on other EV-related topics. In addition, residents who participated in the intercept interviews were invited to place a pin on the online or physical EV charging maps. Intercept interviews were conducted at the following locations:

- Bellevue Downtown Library on Saturday, March 9, 2024 from 12:00pm-3:00pm
- H Mart on Saturday, March 16, 2024 from 11:30am-2:30pm*
- Junta de Mamas weekly Zoom meeting on Tuesday, March 19, 2024 from 9:15-10:00am**
- Bellevue Downtown Library on Tuesday, March 26, 2024 from 2:00pm-5:00pm

Conducted primarily in Mandarin
****Conducted in Spanish only***

B.3.4 Property Management Focus Group

Property managers and condo board members around Bellevue were recruited for a focus group via digital and in-person advertising. The focus group took place at Bellevue City Hall on March 27, from 6:00pm-7:30pm, and was attended by 3 property managers and 1 condo association board member. Participants were compensated with a $50 Visa gift card, and dinner was provided.

B.4 Overview of Participation

During the 4.5-month Phase I Outreach period, the EV Roadmap made over 620 connections with community members. Overall participation varied by activity, and some people may have participated in more than one activity.

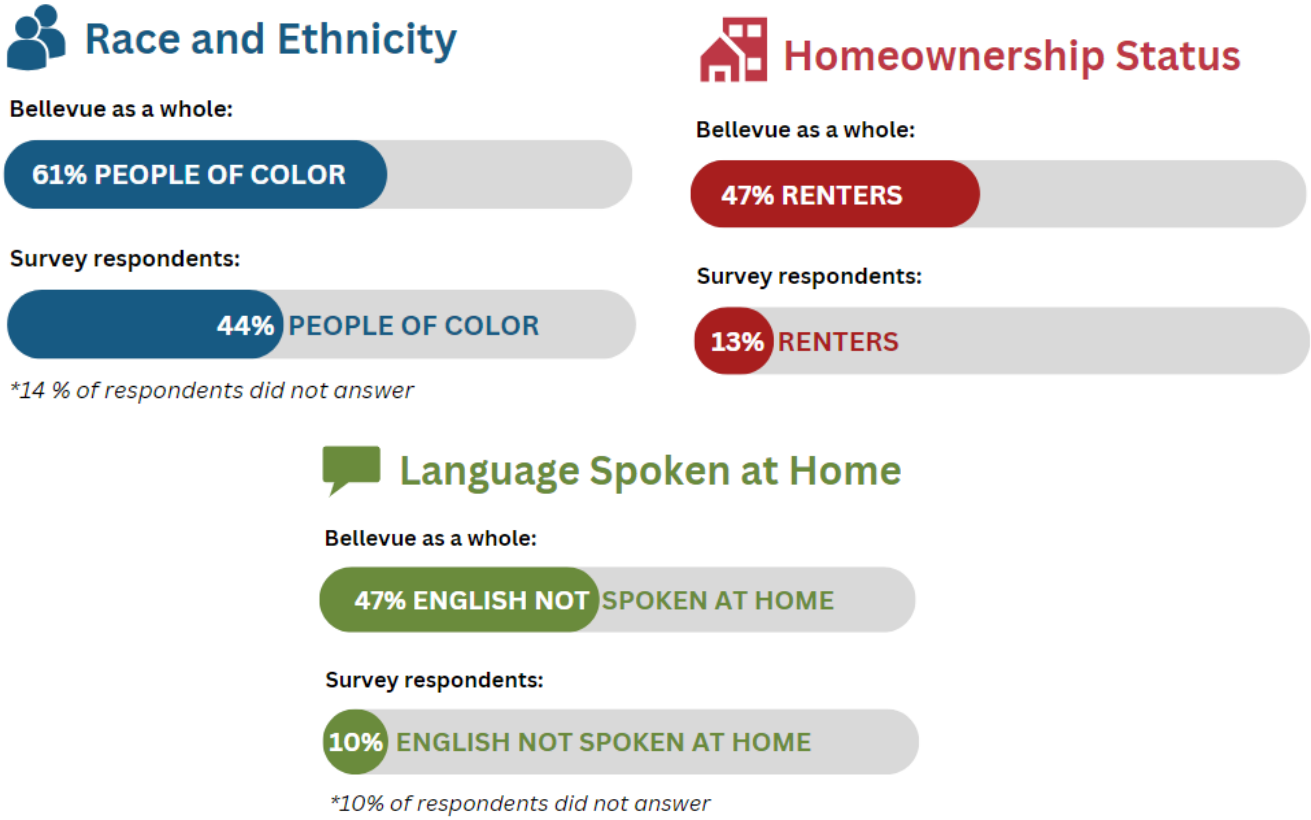
- 240 people submitted an online Community EV Adoption Survey
- 158 pins were submitted on the online EV Charging Map
- 168 pins were entered on the physical EV Charging Map
- 50 people offered feedback during intercept interviews
- 4 people participated in a focus group

B.4.1 Supporting Diverse Participation

Throughout the Phase I Outreach period, the EV Roadmap team made intentional effort to hear from diverse voices that reflect the makeup of our broader community. In particular, the intercept interviews, which included conversations in Spanish and Mandarin conducted informally at public locations and organizational meetings in Bellevue, and in-person tabling with the EV Charging Map were designed to reach community members not typically included in public participation.

Reporting on demographic information of participants in some outreach activities can be challenging. The format for some in-person, drop-in outreach activities, including the EV charging map tabling and intercept interviews, does not allow for easy data collection. Additionally, participants are never required to provide demographic information, either for in-person or online outreach activities.

Demographic information was not collected during intercept interviews or during in person tabling with the EV Charging Map. The online Community EV Adoption Survey provided the most structured opportunity to collect demographic data, which allows staff to understand how participation in this activity compares to citywide demographics. In general, participants in the Community EV Adoption Survey were older, whiter, and more likely to be homeowners than Bellevue as a whole.



B.5 Summary of Input

Because the different outreach activities had different content and different main focuses, this report evaluates input from each activity individually. However, it is possible to identify some common themes from across the outreach activities. These include:

- **Access to EV Charging in Multifamily Buildings:** Community members expressed a need charging available to renters and residents in multifamily buildings.
- **Public Charging:** In intercept interviews and on the online and physical EV Charging maps, community members expressed a desire for publicly available EV charging stations in central and frequently visited public locations, including shopping malls and libraries.
- **EV Barriers:** In the Community EV Adoption survey and in intercept interviews, community members identified cost of EVs and lack of reliable access to EV charging as main barriers to purchasing an EV.
- **Charging Behavior:** For residents who already owned an EV, 89% of Community EV Adoption Survey respondents and 100% of EV-owner intercept interview respondents charged their vehicles most often at home, citing convenience of home charging as the reason.

- **Interest in Other Forms of Mobility:** 52% of Community EV Survey respondents and many intercept interview respondents expressed interest in other forms of e-mobility, including an EV car share, e-bikes, and e-scooters. Intercept interview participants in the Junta de Mamas meeting in particular identified high cost of EVs and lack of access to charging as insurmountable barriers to EV adoption and expressed an interest in the city offering accessible, affordable mobility and e-mobility programs to low-income residents.
- **Grid Limitations:** Among property managers and condo board members who participated in the focus group, and some intercept interview participants, limitations of the grid and access to power were identified as important barriers to installing EV charging for resident use at multifamily buildings.

B.5.1 Community EV Adoption Survey

As highlighted in the Overview of Participation section of this report, the Community EV Adoption Survey respondents are not fully reflective of the makeup of our community as a whole. In general, the respondents of the survey were much more likely to be homeowners, current EV owners, and speakers of English at home than Bellevue as a whole. Additionally, survey respondents were less likely to be people of color than Bellevue as a whole. Although the survey was available in five languages, only two surveys were completed in languages other than English.

Full results of the Community EV Adoption Survey, including demographic information, are available in Engagement Appendix A. This report highlights key findings:

- **Housing Situation (All respondents):**
  80% of respondents live in single-family homes or townhouses. 18% of respondents own or rent multifamily housing, including condos. Overall, only 13% of survey respondents were renters of any type of housing.

- **Knowledge of Plug-in EVs (All respondents):**
  Most respondents (87%) said they were familiar with plug-in EVs. 13% indicated a limited knowledge or awareness.

- **Ability to Charge EV at Home (All respondents):**
  Roughly half of respondents (51%) can charge an EV at home, while the rest do not, are unsure, or have other or partial access to home charging, such as occasional access to shared chargers at multifamily buildings, or access to a less-than desired level of charging at home. Among respondents who rent or own multifamily housing, condos, or townhouses, 63% did not have the ability to charge an EV at home.

- **Awareness of Incentives (All respondents):**
  Most respondents (84%) are aware of state and federal incentives aimed at reducing the cost of purchasing EVs or charging equipment.

- **Interest in Other Electric Mobility (All respondents):**
  A significant portion of respondents (59%) expressed interest in alternative electric mobility options such as EV car share, e-bikes, and e-scooters.

- **Ownership of BEV/PHEV (All respondents):**
  Nearly half (48%) of respondents already own or lease either a Battery Electric Vehicle (BEV) or Plug-in Hybrid Electric Vehicle (PHEV).

- **Charging Behaviors (Current EV owners):**
  87% of respondents charged most frequently at home. Of the respondents who charged most frequently at home, 85% said they preferred this location because of convenience.

- **Charging Preferences (Current EV owners):**
  80% of respondents said that if they had access to charging at home, at their workplace, and in public places, they would prefer to charge at home.

- **Factors in Purchasing an EV (Current EV owners):**
  Environmental concerns (61%) and cost savings (13%) were identified as primary factors influencing the decision to purchase an EV.

- **Consideration of Purchasing an EV (Non-EV owners):**
  Many respondents are considering purchasing or leasing an EV in the future (59%), with environmental impact (38%) and cost savings (20%) selected as important factors considered for potential purchase. However, a significant portion of respondents (41%) are not considering purchasing or leasing an EV in the future.

- **Barriers to Purchasing an EV (Non-EV owners):**
  Access to reliable charging infrastructure (22%), affordability (17%), and range concerns (19%) were identified as the most significant barriers to EV adoption. Additional barriers selected were time required to charge an EV (15%), as well as not needing a new vehicle at this time (14%). Among survey respondents who rent or own multifamily housing and condos, lack of reliable access to charging was the most commonly chosen barrier to purchasing an EV (80%), followed by concerns about EV range (40%).

- **EV Ownership Considering Barriers (Non-EV owners):**
  Despite the consideration of barriers, a majority (64%) of respondents expressed willingness to own an EV if these obstacles were addressed.

B.5.2 EV Charging Map

On both the physical and online EV Charging Maps, community members identified frequently visited public spaces and shopping centers as desired locations for EV charging. These locations included the Crossroads and Downtown malls, as well as public libraries. Certain Bellevue neighborhoods were particularly requested for EV charging on the online and physical EV Charging Maps. Downtown, Crossroads, Factoria, and Eastgate were the most frequently cited locations for EV Charging on the online map.

On the physical map, frequently requested neighborhoods were: Downtown, Crossroads, Factoria, and Eastgate. As the physical map was taken to locations around the community, it is possible responses on the physical map may be more biased towards locations and neighborhoods where the tabling took place, including Downtown, Wilburton, and Overlake.

B.5.3 Intercept Interviews

Intercept interviews took place over the month of March 2024, and 50 residents offered feedback in total. Intercept Interviews at Bellevue Downtown Library were conducted in English only, while those at H Mart were conducted primarily in Mandarin. Interviews at the Junta de Mamas meeting were conducted in Spanish only.

Demographic information was not formally collected during the intercept interviews. However, residents were asked whether they currently owned EVs, and why or why not. They were also asked if they lived in single-family or multifamily housing in Bellevue.

Feedback from community members who participated in the Intercept interviews can be grouped into 4 key themes (Engagement Report Appendix B: Intercept Interview Summary Results):

- **Public charging:**

  Respondents expressed a desire for more publicly accessible charging, particularly at central and frequently-visited locations, such as the Bellevue Downtown Library. Respondents also described a desire for charging that was accessible for use by patrons at shopping centers, and for affordable charging for low-income residents. In particular, respondents identified a desire for free charging for low-income residents. Public charging was the most common theme that occurred across the intercept interviews.

- **EV access and equity:**

  The second-most frequent theme in the intercept interview responses was EV access and equity. Respondents identified access to charging at home for multifamily renters and prohibitive costs of EVs as major barriers to EV adoption, particularly for low-income residents. Respondents also expressed concerns that even if EV charging was made more accessible in public locations, they would be mainly used by middle- and higher-income residents who could afford to purchase an EV. Respondents expressed a desire for more

affordable mobility and e-mobility options accessible to lower-income residents, including EV carshare programs that could be of low cost or free to low-income residents or seniors. Residents expressed concerns that focusing on access to EV charging alone would do little to address the most pressing mobility needs for the city's low-income residents.

- **Access to reliable charging for multifamily buildings and condos:**

  Intercept interview respondents expressed a desire for increased access to reliable charging for residents of multifamily buildings and condos. Respondents who were current multifamily building residents identified lack of access to charging at home as a common barrier to EV adoption. Though respondents indicated that better public charging access would help, access to charging at home was preferable.

- **EV hesitancy, reliability of technology and the grid, safety of use:**

  Some respondents also expressed hesitancy towards EVs, including concerns about reliability of EV range and technology, and batter performance in cold temperatures. Some respondents expressed concerns about capacity of the electrical grid to meet EV charging needs in the community. A few respondents also expressed concerns about whether EV charging would be safe and secure for residents to use, and whether fires or performance in wet conditions were a concern for EV batteries.

B.5.4 Property Management Focus Group

Three property managers and one condo association board member participated in the focus group. All property managers managed buildings occupied by 100% renters. The condo board member identified his association as mostly made up of condo owners, with 8 of 64 units occupied by renters.

Feedback from community members who participated in the focus can be grouped into 8 key themes (Engagement Report Appendix C: Focus Group Summary Notes):

- Grid capacity issues and concerns
- Lack of information about how to begin and complete the charging process
- Incentives and rebates
- Concerns about security, convenience, or other attributes of EV charging
- Difficulty navigating the charging installation process
- EV/EV charging benefits
- Cost of charging and/or maintenance

In particular, the EV Roadmap team was interested in the major barriers to installing EV charging for residents at multifamily buildings and condo associations. The feedback on these barriers and possible strategies for reducing barriers from the focus group is summarized here:

MAJOR BARRIERS

The major barrier for property managers who had begun the installation process was navigating power availability and grid capacity. The property managers who had begun the process did not feel they had enough grid capacity to install the level of charging they would ideally prefer. They also felt that once they had started the process, there was a great deal of confusion about how to navigate it. When they faced roadblocks, they were unsure of what resources might help them understand how to deal with them, or where they could go for help. Additionally, property managers who had begun the process also identified cost of installing and maintaining charging at multifamily buildings as a major barrier.

The major barrier for property managers who had not begun the installation process was not knowing how to begin or what the process would look like for them. These property managers were concerned about how to understand their property's charging needs, grid capacity, and potential incentives available.

Additionally, all the property managers expressed some uncertainty over what level of charging is most appropriate for their buildings and resident needs. None of the property managers were very familiar with existing state or federal incentives for installing charging.

BARRIER REDUCTION

The property managers who had begun the installation process identified more electricity/grid capacity and more incentives and rebates as the main things that could reduce barriers. They also identified resources that would help property managers navigate the process as important to barrier reduction.

Property managers who had not begun the process identified resources for property managers on beginning and navigating the process from start to finish as the main thing that could reduce barriers.

B.6 Phase II and Next Steps

The EV Roadmap team used the feedback received during Phase I Outreach to inform the strategy and siting recommendations for the EV Roadmap. Input from the Phase I Engagement Summary was incorporated into the Draft EV Roadmap. The draft strategies and Draft EV Roadmap document were released for further public input during Phase II engagement activities.

B.6.1 Phase II Outreach

Phase II outreach took place from July to September of 2024, and consisted of two key activities, a draft strategy Open House and a Draft Roadmap Public Review period. Phase II engagement was centered around the draft strategies and draft Roadmap document, developed with input from Phase I engagement. In total, connections were made with over 100 community members throughout Phase II engagement.

B.6.2 Open House

On July 22, the EV Roadmap team held an open house in Crossroads Park from 4:30pm-7:30pm. Participants were encouraged to read boards describing the EV Roadmap project and summarizing the policies for each focus area. Participants were given four dots to place next to policies they wanted to see prioritized for implementation, and post it notes for open-ended feedback. Additionally, participants had the opportunity to discuss the benefits and drawbacks of EVs with drivers with their vehicles located by the public EV charging in the Crossroads Parking lot. The event was open to the public and received drop-in traffic from Crossroads Park as well as pre-registered attendees. In total, around 100 people attended the Open House.

In general, policies to prioritize EV funding and incentives, enhance user experience at EV charging stations, and create financial incentives received the most support from participants in dot voting. In open ended feedback, participants expressed a desire for increased access to EV charging, such as increasing charging available at multifamily buildings; reducing costs for public charger use; improving charger reliability; and improving user experience at public chargers. Some participants also expressed general EV hesitancy, including concerns about the environmental impact of used batteries, grid capacity, and impacts on road maintenance.

B.6.3 Public Review Period

After incorporating feedback from the Open House, the EV Roadmap Team released the Draft EV Roadmap for public review on Monday, September 9. The public review period was open for two weeks until Monday, September 23 and promoted via city channels, including a news release, social media, and various mailing lists.

Members of the community were invited to read the Draft Roadmap in its entirety and by individual section on Engaging Bellevue. In total, 17 community members left comments during the two-week period.

Key themes in the comments included general support for EVs and the Draft EV Roadmap strategies, hesitancy or skepticism towards EVs and the draft strategies, support for public and multifamily building charging, and support for diverse mobility options in addition to EVs that would reduce overall car dependency in Bellevue.

Key Quotes:

The EV Roadmap team selected key quotes for inclusion in this report that represented the main themes present in the comments overall. Quotes may have been condensed or edited for clarity. All comments, unedited and in their entirety, are available in Engagement Report Appendix D: EV Roadmap Public Comments.

“Charging stations should NOT be built with taxpayer money.”

“It is well known that tire particles shed by heavy cars pollute the streams in winter and are floating in the air near the roads in summer. It is nice that you at least mention air quality in your roadmap,

but you aren't paying it nearly enough attention. The city's electrification plans should focus not on car charges but on better transit…and on better non-car options, like e-bikes and e-scooters, things that residents are [explicitly] asking for."

"Beyond having a growing number of chargers, there needs to be a plan in place for ensuring the chargers actually work and maintaining them when they don't."

"This is wonderful, I hope we can use this as an opportunity to reduce our carbon emissions in Bellevue and also create an infrastructure for greener alternatives to gas powered cars."

"I'm excited by the city's progress on this plan. I hope that the city's chargers will be located where our neighbors currently spend time—parks, grocery stores and shopping centers, etc. This will enable people to charge while attending to other business or activities."

"One thing to take into account…is that most people who have EVs are likely to have charging at home, otherwise they wouldn't have gotten the car. While it would be nice to have charging stations around, I don't think it's completely necessary."

"This roadmap is extensive, which is promising. It also highlights the need for available EV charging in existing multifamily sites without current access…Questions for which solutions need to be developed include: How do you implement it now, with the capacity to grow as adoption increases?"

"I believe it is important…not only to promote EV adoption, but also [to] work towards the city's goals for 50% reduction in greenhouse gas emissions."

"Require all rental Unit buildings (townhomes, single family, apartments) to have electrical capacity to support EV charging and plan to retrofit existing units"

B.6.4 Next Steps

After publication of the final EV Roadmap, staff anticipate ongoing periodic engagement as the city moves into implementing aspects of the EV Roadmap. Additionally, there will be further opportunities for public engagement on EVs, e-mobility, and mobility options as the city updates its Sustainable Bellevue Environmental Stewardship plan for 2026-2030.

CITY OF BELLEVUE » Electric Vehicle Roadmap

Attachment C:

Equity Considerations Supplement

October 2024

Table of Contents

Figures

C Equity Considerations Supplement

This attachment supplements the Equity Considerations chapter in the EV Roadmap to more deeply explore the demographic and trip-based criteria applicable to Bellevue and develop a profile of the city that offers insight into existing equity conditions. By understanding the elements included here, the city will be able to conduct siting analyses while ensuring all community members are provided the many benefits of—and shielded from the burdens of—transportation electrification.

C.1 Demographic Equity Criteria

Throughout this section, data is utilized from the U.S. Environmental Protection Agency's Environmental Justice Screening and Mapping tool.[1] The EPA's EJScreen tool employs various environmental and socioeconomic indicators to provide nationally consistent datasets. The raw data values provided by EJScreen are represented by percentiles and can be compared to an entire state, EPA region, or nation. State percentiles provide perspective on how a selected area compares to the entire state (the City of Bellevue compared to Washington state, for this plan). For example, if a given location is at the 95th percentile, this means that only 5 percent of the population within the area has a higher value than the average person in the location being analyzed.[2] A percentile is a relative term and is meant to indicate how environmental and socioeconomic indicators compare across given locations.

C.1.1 Affordable Housing

Figure 1 displays data on affordable housing units as identified by the U.S. Department of Housing and Urban Development based on low-income housing tax credit properties.[3] The intersection of these properties with the Justice40 tracts in the region suggests an overlap between disadvantaged communities and areas facing limited resources. The highest concentration of low-income units is found in the southeastern part of the Bridle Trails neighborhood. Additionally, there is a moderate number of low-income units intersecting with the Justice40 census tracts identified in the Crossroads and Lake Hills neighborhoods. A successful plan for electrified mobility in Bellevue must extend beyond EV charging infrastructure and consider affordability, education, engagement, and environmental impacts to ensure an equitable and sustainable transition for all. Affordable housing data can be utilized as an equity criterion for scoring potential charging sites, as discussed in the EV Roadmap.

C.1.2 Health Disparities

Differences in exposure to environmental health hazards by racial and/or ethnic groups are shown in **Figure 2** based on data obtained from the Washington State Department of Health.[4] Though the map does not indicate a prominent overlap between health disparity areas and Justice40 tracts, the

[1]U.S. Environmental Protection Agency (2024): *https://ejscreen.epa.gov/mapper*
2 U.S. Environmental Protection Agency (2024: *https://www.epa.gov/ejscreen/interpret-ejscreen-data*
[3]U.S. Department of Housing and Urban Development (2024): *https://www.huduser.gov/portal/datasets/lihtc/property.html*
[4]Washington State Department of Health (2022): *https://fortress.wa.gov/doh/wtnibl/WTNIBL*

proximity of the Wilburton area, which has a health disparity score of 9 or higher, to the Justice40 census tracts in East Bellevue raises concerns about indirect impacts. Communities facing health disparities often share characteristics with underserved neighborhoods, even if they are not in a designated Justice40 census tract. Health disparities often correlate with factors such as income, transportation access, and limited English proficiency. Additionally, health disparities can be linked to working in one area and living in a different one, where there may be varying levels of exposure to environmental health hazards. While environmental burdens need to be carefully addressed, EVs do offer the potential for improved air quality and reduced noise pollution, which can both benefit communities facing health burdens. As outlined in the EV Roadmap, environmental health disparity data can be used as an equity criterion for scoring potential charging sites.

C.1.3 Low-Income Populations

Figure 3 illustrates the state percentiles of low-income census tracts based on data collected from the UEPA's EJScreen tool.[5] EJScreen employs various socioeconomic indicators for analysis, including elements such as low-income percentiles which consider the percentage of individuals living below two times the federal poverty level. The household income to poverty level ratio compares a household's income to the poverty threshold set by the federal government based on household size and composition. Identifying low-income areas can inform targeted investments in communities facing socioeconomic challenges. For example, the Newport neighborhood, situated east of I-405, includes a mix of high- and low-income populations, while the Crossroads and Lake Hills neighborhoods, which intersect with the city's Justice40 census tracts, have the highest percentage of low-income levels. The Wilburton, Factoria, and Eastgate neighborhoods also have moderately high percentages of low-income individuals. Low-income percentile data can also be utilized as a criterion for scoring new EV charging sites through an equity lens.

In the city's outreach and engagement activities for the EV Roadmap, including a Community EV Adoption Survey and intercept interviews, Bellevue residents expressed a need for other forms of mobility access beyond EV charging. In particular, residents identified concerns that EV infrastructure would primarily benefit the city's middle- and higher- income residents who could afford to own or lease electric vehicles. In addition, residents urged the city to balance EV charging infrastructure access with other mobility access improvements, such as frequent transit or micromobility options.

The city aims to ensure EV charging infrastructure is deployed in a way that prioritizes all residents by applying the equity-focused siting methodologies discussed in the EV Roadmap and prioritizing the mobility needs of existing residents by carefully considering local conditions when implementing electrification initiatives.

[5]U.S. Environmental Protection Agency (2024): *https://ejscreen.epa.gov/mapper*

C.1.4 Air Quality - Ozone

Ground-level ozone is a major air pollutant, commonly emitted from gasoline- and diesel-powered vehicles, that can adversely impact health and exacerbate respiratory illnesses. Air quality data from the EPA's Office of Air and Radiation was identified using the EPA's Environmental Justice Screening and Mapping Tool and is presented in **Figure 4**.[6] The data reflects an average of the top 10 highest eight-hour air concentrations, in parts per billion, over one year. The highest concentration of ozone locally is recorded in Bellevue's southeast neighborhoods like Cougar Mountain and Lakemont. Most of the east side of Bellevue is shown to have moderate levels of ozone recorded, with some overlap between higher levels of ozone and the Justice40 census tracts within the city limits. This data can be used to evaluate new charging sites with a focus on equity and addressing concerns for those communities that are disproportionately impacted by transportation-related emissions.

C.1.5 Air Quality - $PM_{2.5}$

Particulate matter 2.5 ($PM_{2.5}$) are fine inhalable pollutant particles that can create significant adverse health impacts by deeply penetrating lungs. Levels of $PM_{2.5}$ in the air are measured in micrograms per cubic meter on an annual basis. Vehicle emissions are a large contributor to $PM_{2.5}$ levels, making the reduction of these emissions a crucial step in mitigating the adverse impacts of air pollution on health and quality of life. Bellevue's $PM_{2.5}$ levels are shown in **Figure 5** based on data from the EPA's EJScreen tool.[7] The map highlights higher concentrations of $PM_{2.5}$ in the Northwest Bellevue area and in neighborhoods such as Bridle Trails, Wilburton, BelRed, and parts of West Bellevue. The three Justice40 census tracts within the city limits have low to moderate levels of $PM_{2.5}$. Like with ozone levels, this data can be used to score potential charging sites in an equitable manner.

C.1.6 Displacement Risk

Recognizing displacement risk is crucial to mitigating inadvertent adverse impacts of electrification, which could displace vulnerable communities. Visualizing displacement risk can help to emphasize the importance of inclusive planning and policy measures to ensure citywide EV adoption efforts do not amplify social inequities**. Figure 6** reveals several areas with a higher risk of displacement in the Bellevue based on data from the Puget Sound Regional Council.[8] The map indicates the Crossroads neighborhood, which is in a Justice40 census tract, faces the highest risk of displacement. There is also a high displacement risk in the Justice40 census tract along I-405. A large number of other neighborhoods are identified as moderately at risk. Notably, many at-risk neighborhoods feature more multifamily housing—which can be comprised low-income and underserved renters—than those with lower risk, making them particularly vulnerable. Lower displacement risk areas are found in North and East Bellevue; these areas tend to have higher household incomes and a lower share of renters, making them less susceptible to displacement pressures. Careful planning and mitigation

[6]U.S. Environmental Protection Agency (2024): *https://ejscreen.epa.gov/mapper*
[7]U.S. Environmental Protection Agency (2024): *https://ejscreen.epa.gov/mapper*
[8]Puget Sound Regional Council (2023): *https://www.psrc.org/our-work/displacement-risk-mapping*

strategies will be needed to ensure deploying new EV charging infrastructure in high-risk areas does not inadvertently exacerbate existing disparities.

C.1.7 Racially Disparate Impacts

Racially disparate impacts refer to practices or policies that have a disproportionate adverse effect on one racial group compared to another. Identifying racially disparate impacts is crucial to ensuring the equitable distribution of the benefits of electrified mobility. By addressing differences in access to EV charging infrastructure, cost concerns, user experience, and awareness, the specific needs of diverse racial groups can be addressed. Through tailored initiatives, adverse impacts that may come from citywide electrification efforts can be mitigated.

An analysis of racially disparate impacts employs an array of data and methodologies recognized by the Washington State Department of Commerce to evaluate housing patterns and determine the presence of racially disparate impacts, displacement risk, and exclusion in the housing sector.[9] **Figure 7** showcases three neighborhoods (Crossroads, Eastgate and Factoria) identified as facing such impacts. The eastern part of the Crossroads neighborhood partially overlaps with a Justice40 census tract on the east side of Bellevue. Racially disparate impact data can be used as an equity criterion for scoring potential charging sites, as discussed in the EV Roadmap.

C.1.8 Traffic Proximity

Figure 8 shows traffic proximity in Bellevue's census tracts based on state percentiles in the EPA's EJScreen tool.[10] This information reflects traffic volume in terms of the average number of vehicles per day on major roads divided by the roads' distance, in meters, from nearby sites. These figures are taken from the U.S. Department of Transportation's National Transportation Atlas Database Highway Performance Monitoring System. In Bellevue, the regions with the highest traffic volumes are Downtown, Northwest Bellevue, West Bellevue, Newport, and Factoria. These patterns seem to align with commuter travel, as traffic proximity is higher in areas closer to I-405, I-90, and highway ramps. Traffic proximity data can also be applied as an equity criterion for scoring potential new EV charging sites.

C.2 Justice40 Trip Criteria

C.2.1 Bellevue Resident Trips

The information presented in **Figure 9** offers valuable insights into the travel patterns of those living within the three Justice40 census tracts in Bellevue, including trips from within the city for work, recreation, shopping, and other activities.[11] The density of stops in specific areas indicates the frequency of travel of these populations and illuminates preferred destinations. The highest density of trips originating in these census tracts end in Woodridge, Lake Hills, Crossroads, and West Lake

[9]City of Bellevue (2023): https://bellevue.legistar.com
[10]U.S. Environmental Protection Agency (2024): *https://ejscreen.epa.gov/mapper*
[11]**Note:** Replica HQ data represents a Thursday in Spring 2023 using the Places Model, Author's Calculations (2024)

Sammamish. Following suit are the Northwest and South Bellevue neighborhoods, where shopping centers and commercial hubs are located. This data can help inform where charging infrastructure may support the lifestyle patterns of the city's residents.

C.2.2 Daytime Influx Trips

The information presented in **Figure 10** offers additional trip insights, but for those originating in a Justice40 census tract outside of Bellevue and travelling into the city during the day.[12] The density of stops in specific areas indicates the frequency of travel to these destinations. Bel-Red, Downtown, Factoria, Wilburton, and Eastgate exhibit a higher concentration of these trips, suggesting that they are popular among daytime influx travelers. This data can be helpful in evaluating sites for charging infrastructure that may support the lifestyle patterns of these populations, particularly in areas with high retail and commercial activity like Factoria and Crossroads. Industrial and retail zones in areas like Bel-Red also harbor opportunity for charging infrastructure to be well utilized by these travelers. Bellevue's strong service sector, which accounts for more than 30 percent of its workforce, may also influence travel patterns and the need for electrified mobility solutions.[13]

C.2.3 Combined Trips

Figure 11 shows a combination of the resident and daytime influx trip data, encompassing all stops from Justice40 census tracts in King County.[14] These stops are reflective of both internal trips that do not leave the city limits and outside commuters who are traveling into the city to work, recreate, shop, or do other activities. The density of stops in specific areas indicates the frequency of travel to these destinations, with Lake Hills, Crossroads, Woodridge, and West Lake Sammamish exhibiting a higher concentration of stops. This suggests that these areas are highly frequented destinations for these populations. The Northwest and South Bellevue neighborhoods, where shopping centers and commercial hubs are located, also reflect high rates of travel originating in Justice40-identified tracts. This data can be used to inform where charging infrastructure may support the lifestyle patterns of King County's underserved residents as they apply to Bellevue.

[12]**Note:** Replica HQ data represents a Thursday in Spring 2023 using the Places Model, Author's Calculations (2024)
[13]U.S. Census Bureau (2022): *https://data.census.gov/table/ACSDT5Y2022.C24050*
[14]**Note:** Replica HQ data represents a Thursday in Spring 2023 using the Places Model, Author's Calculations (2024)

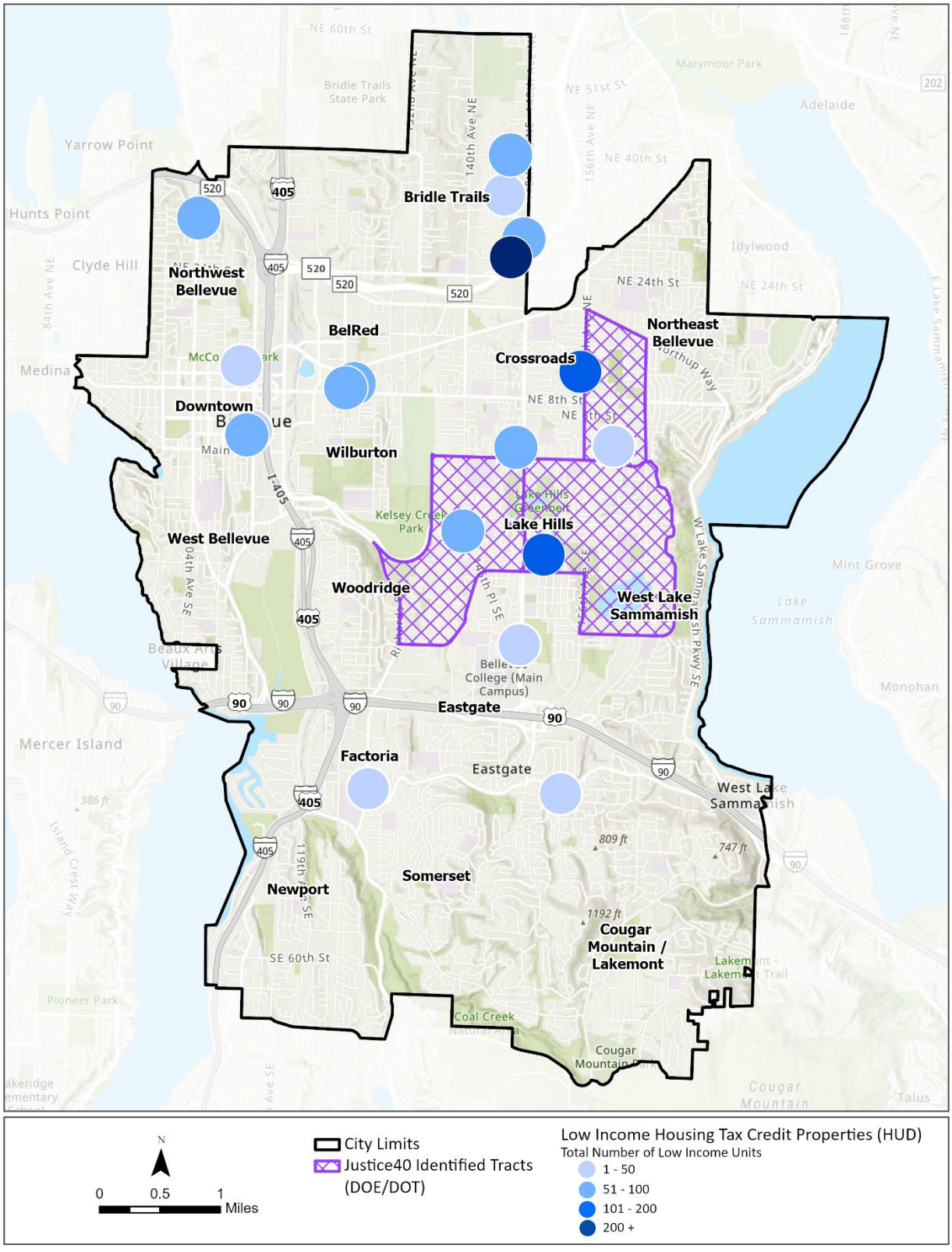


Figure 1. Affordable Housing in Bellevue (2024)

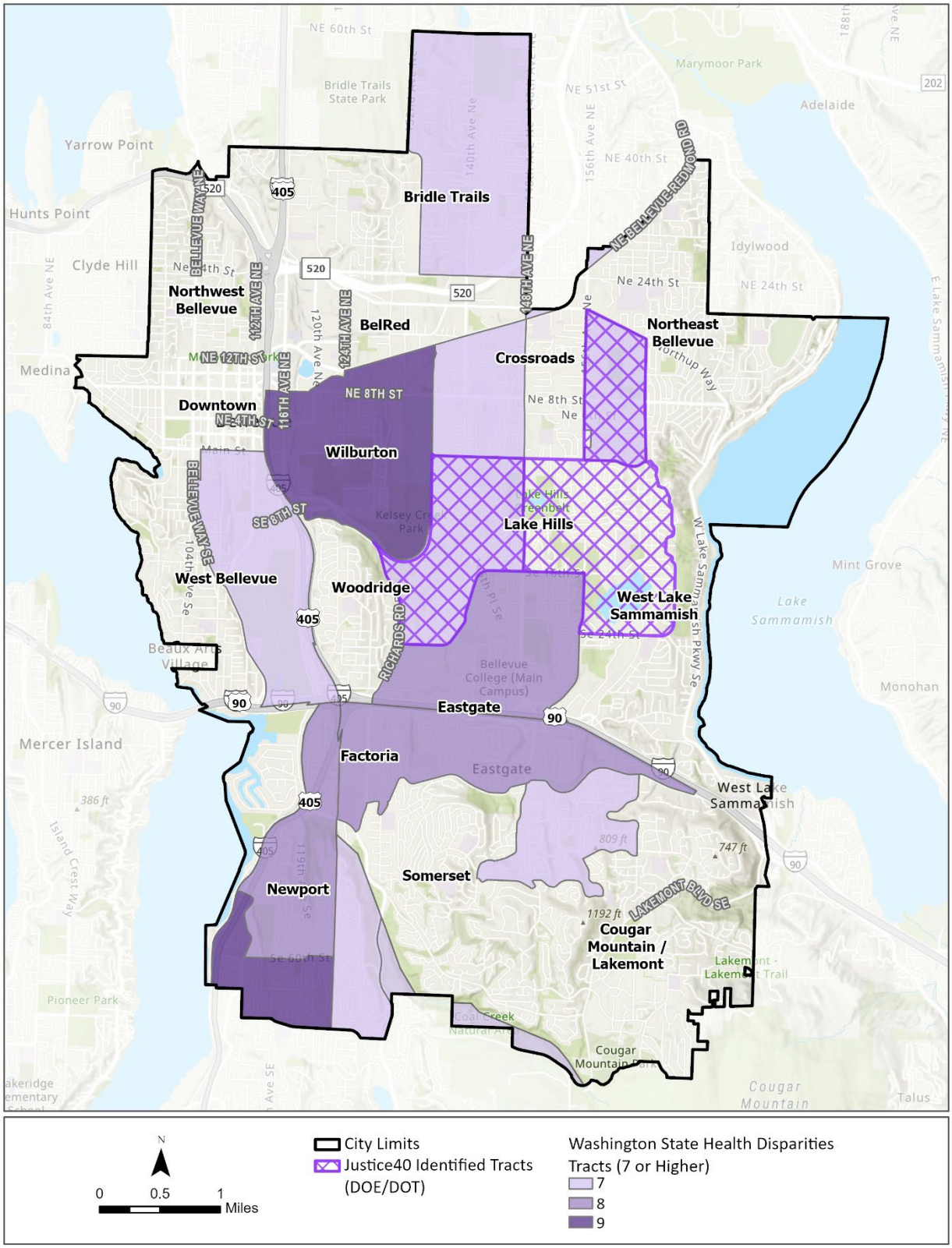


Figure 2. Health Disparities in Bellevue (2022)

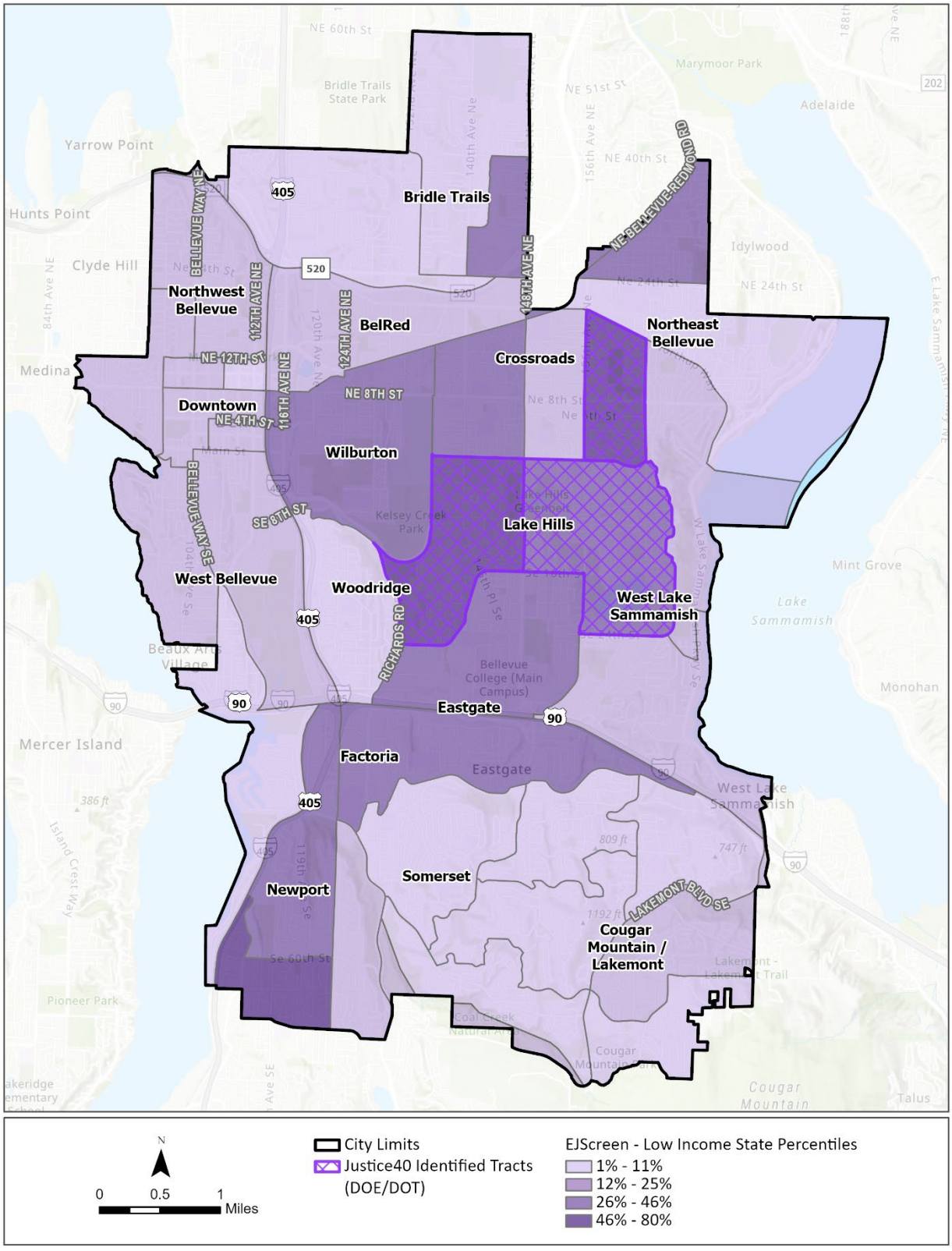


Figure 3. Low-Income Populations in Bellevue (2024)

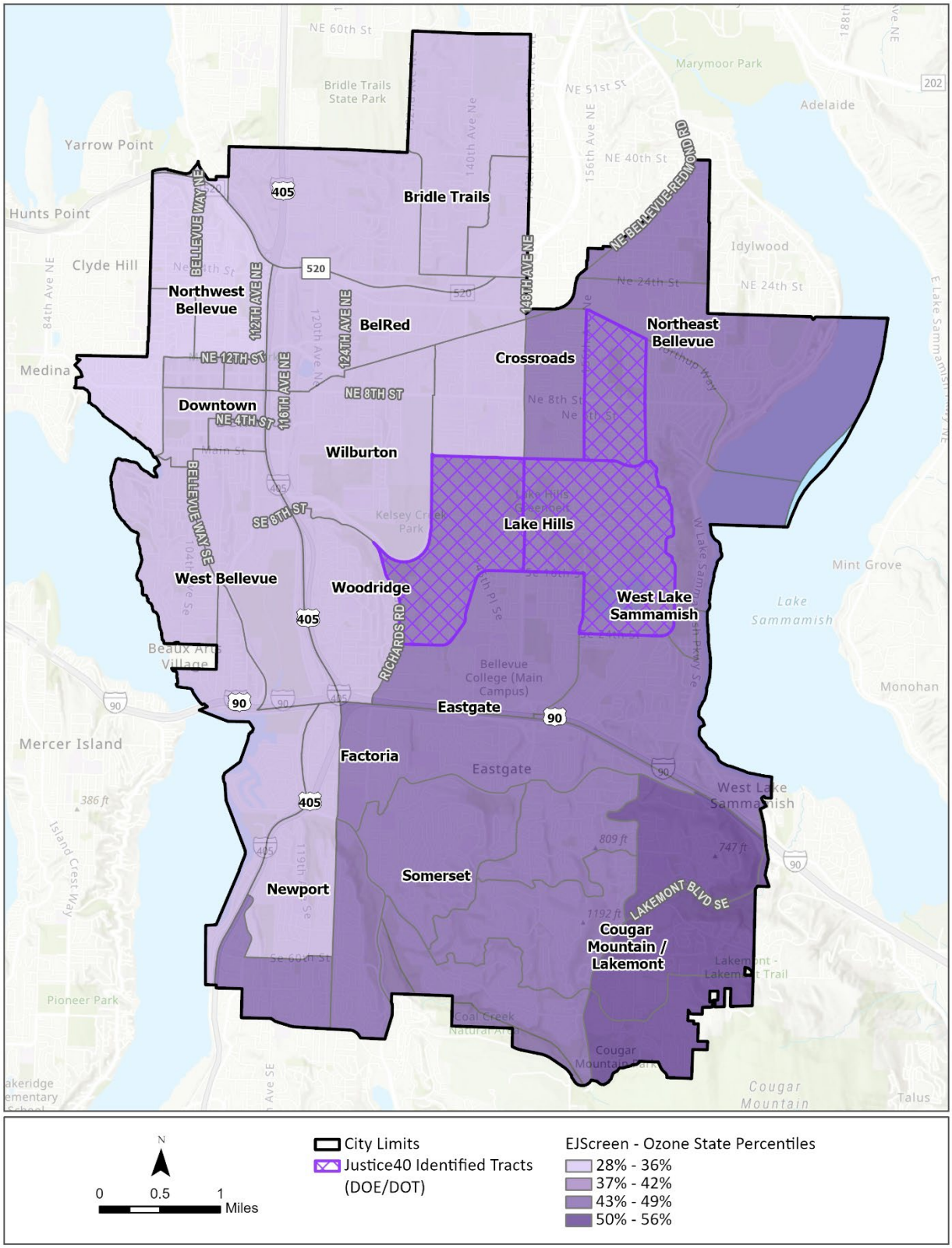


Figure 4. Ozone State Percentiles (2024)

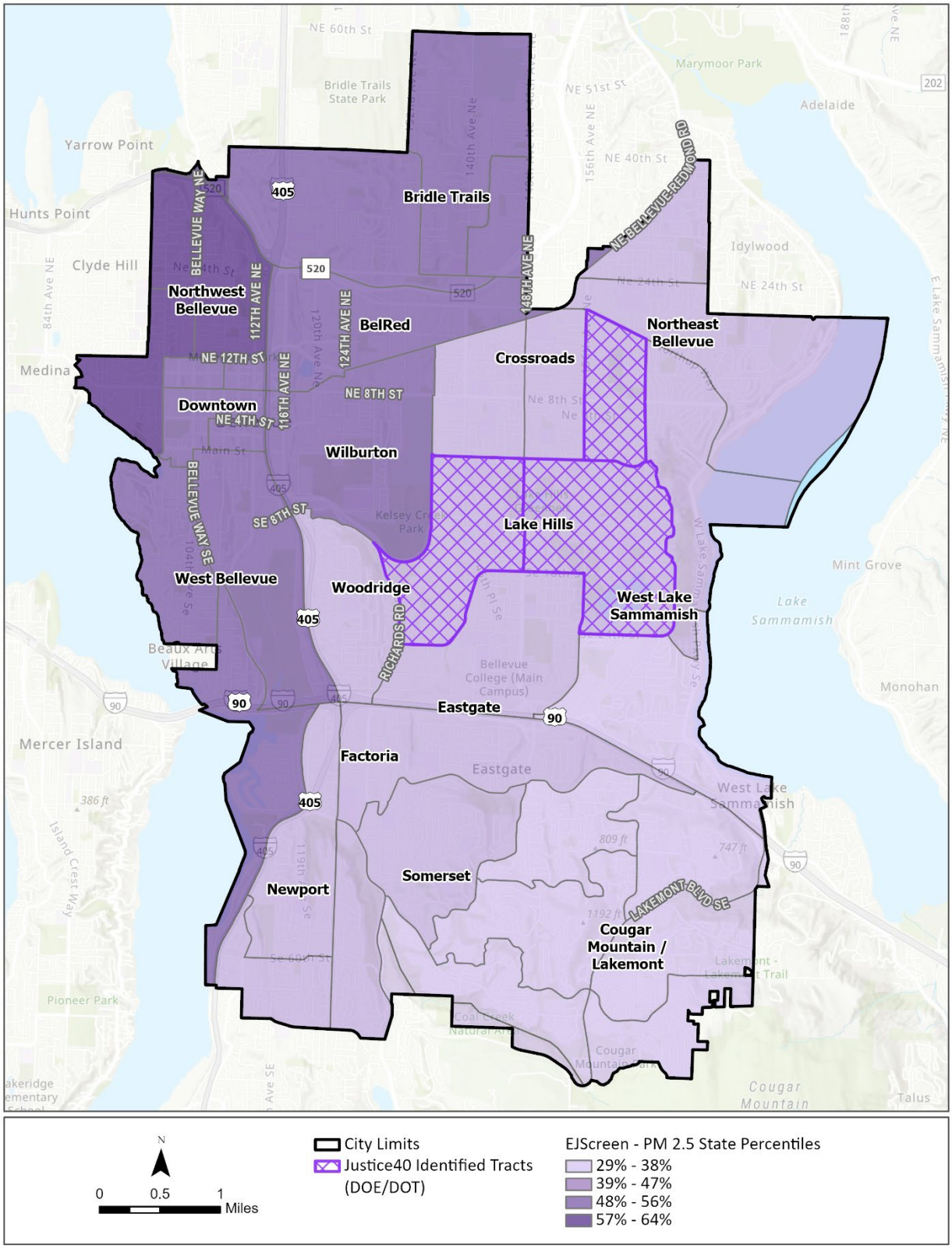


Figure 5. $PM_{2.5}$ State Percentiles (2024)

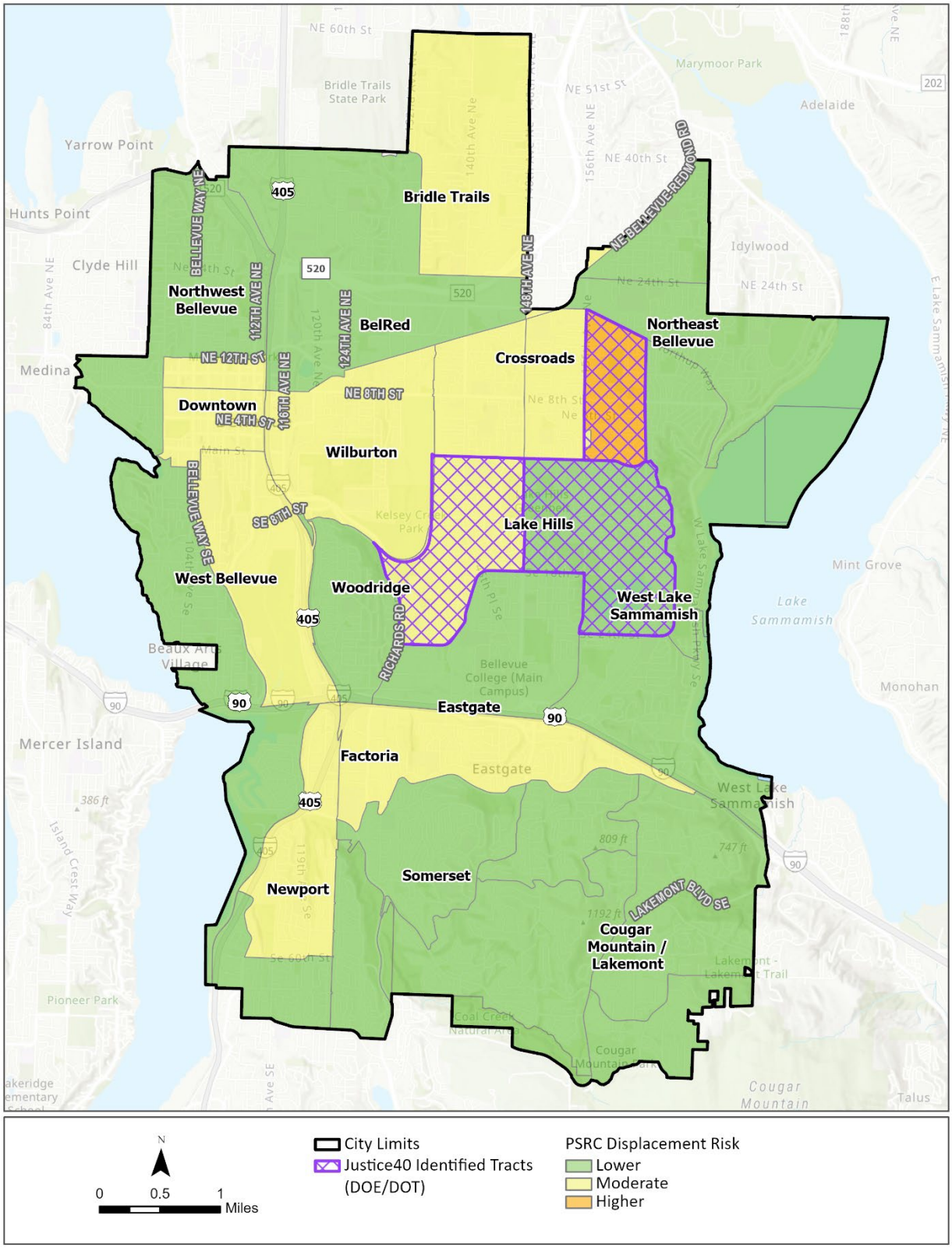


Figure 6. Puget Sound Regional Council Displacement Risk for King County (2023)

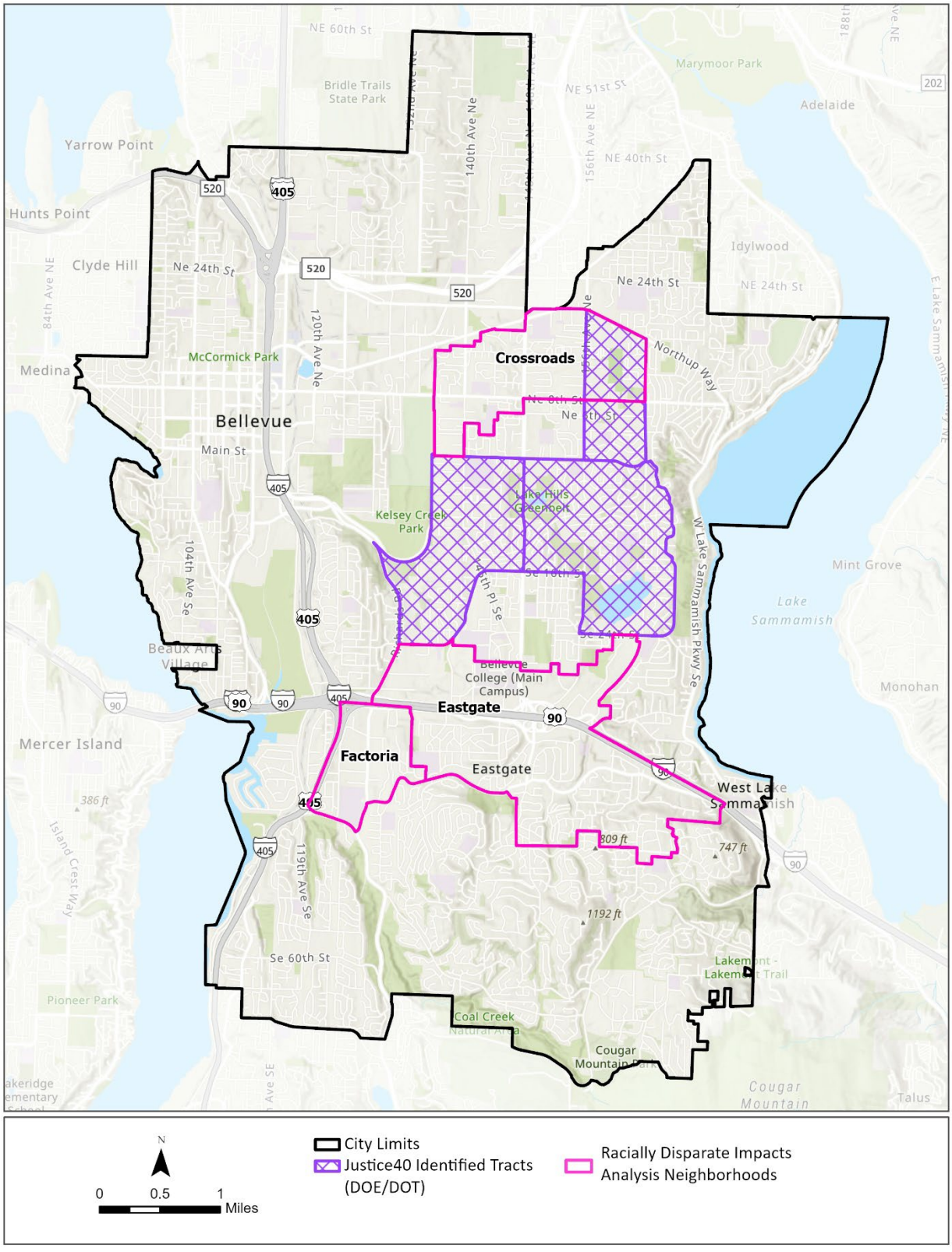


Figure 7. Racially Disparate Impacts by Neighborhood (2024)

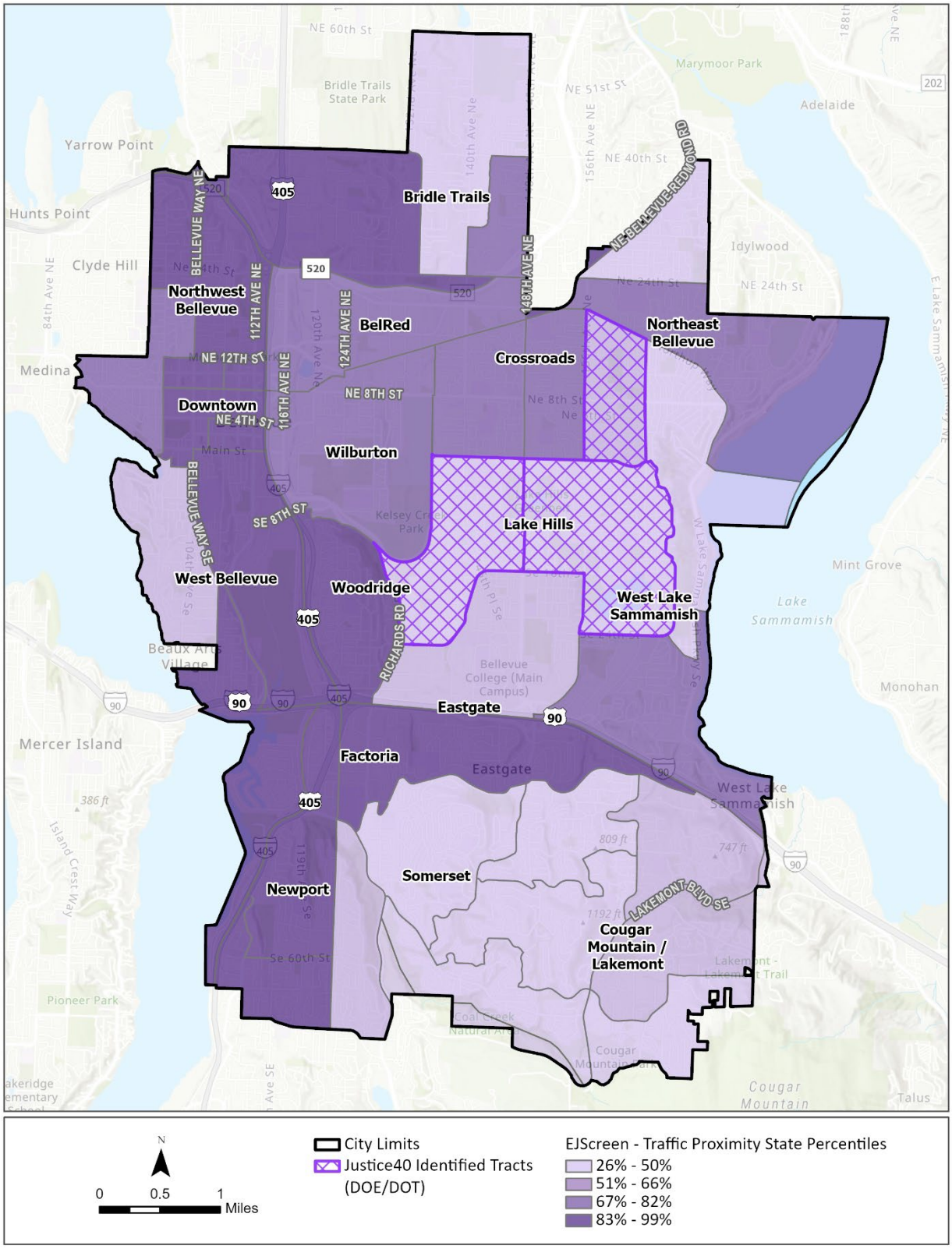


Figure 8. Traffic Proximity (2024)

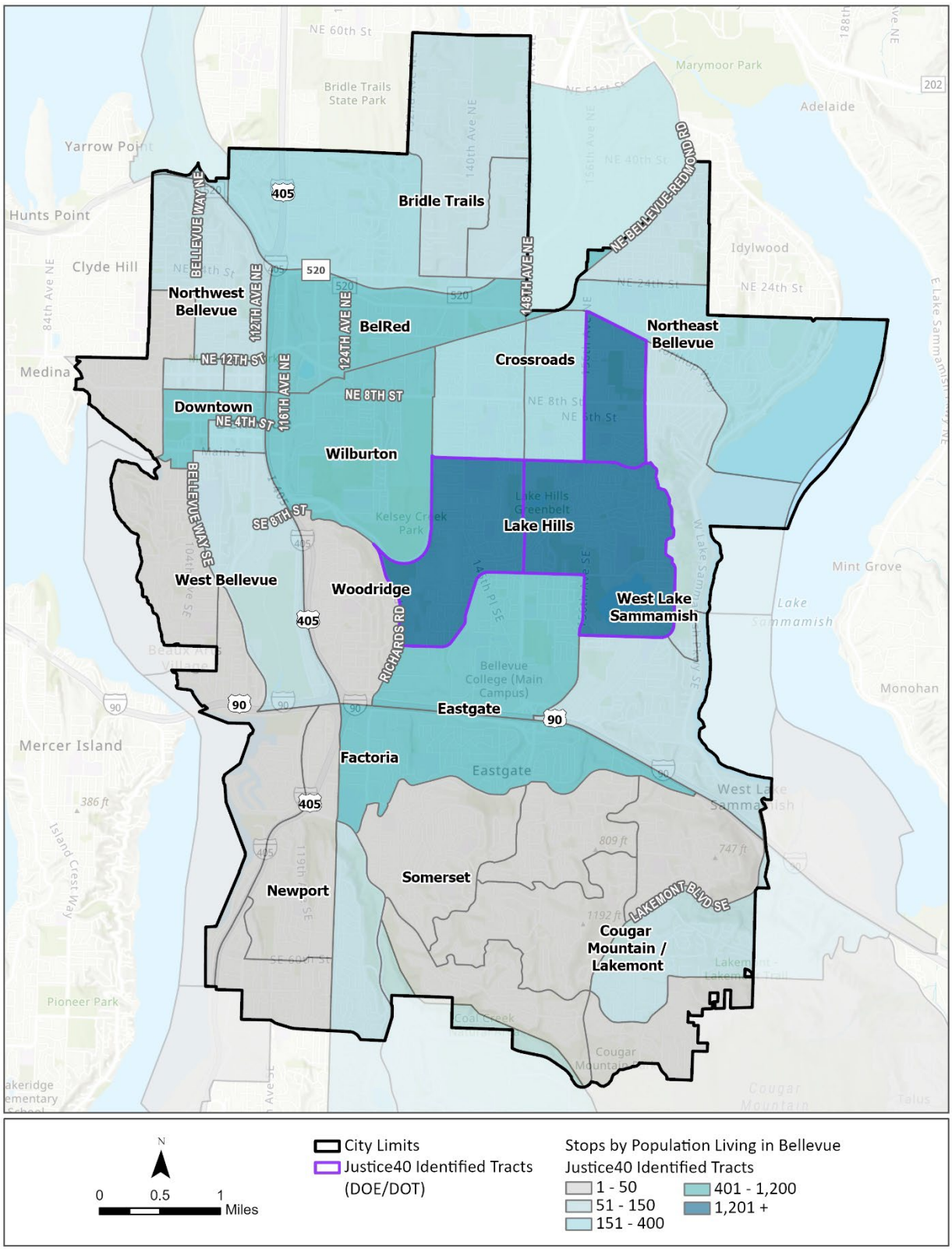


Figure 9. Stop Distribution by Justice40 Populations for Bellevue Residents (2024)

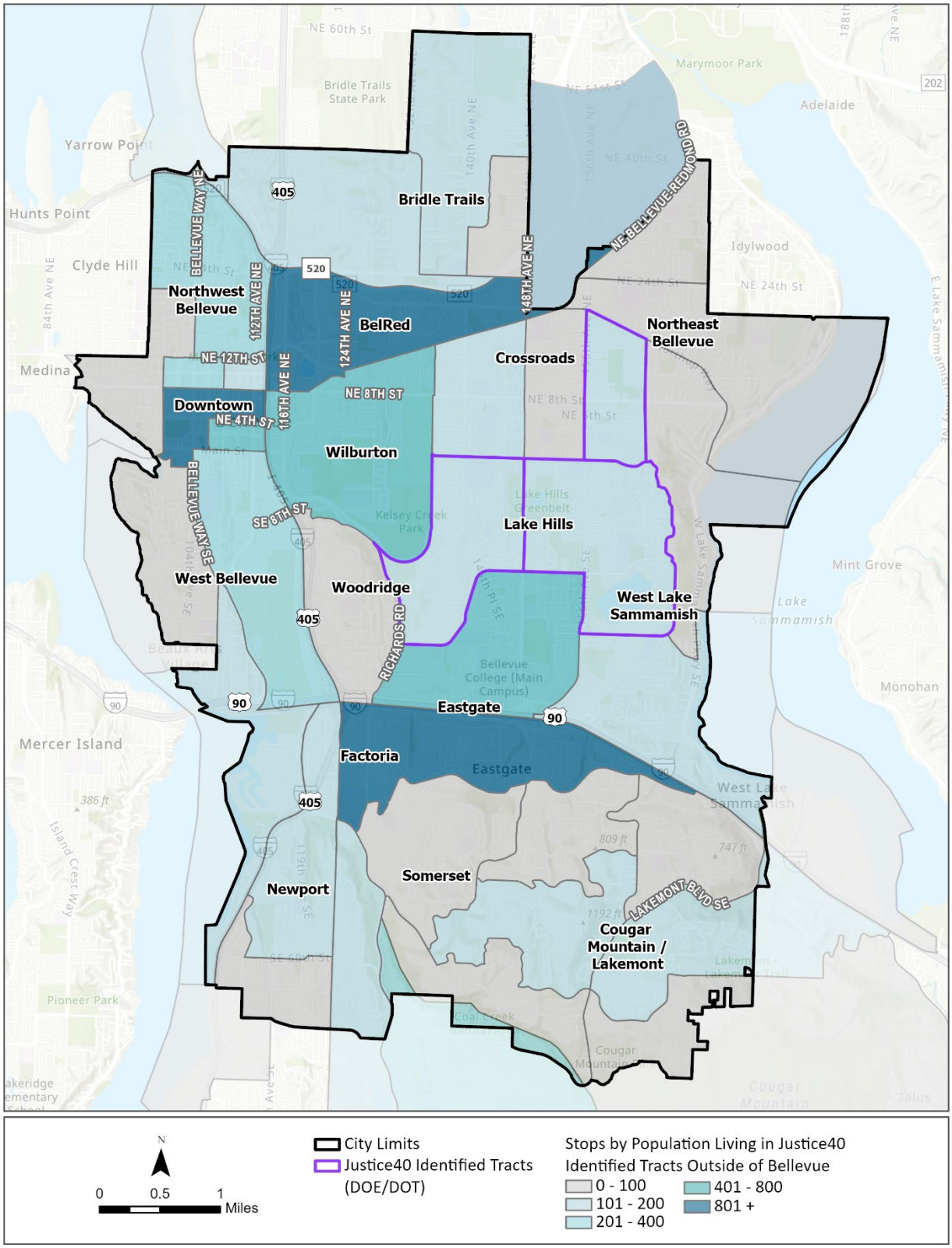


Figure 10. Stop Distribution by Justice40 Populations for Daytime Influx (2024)

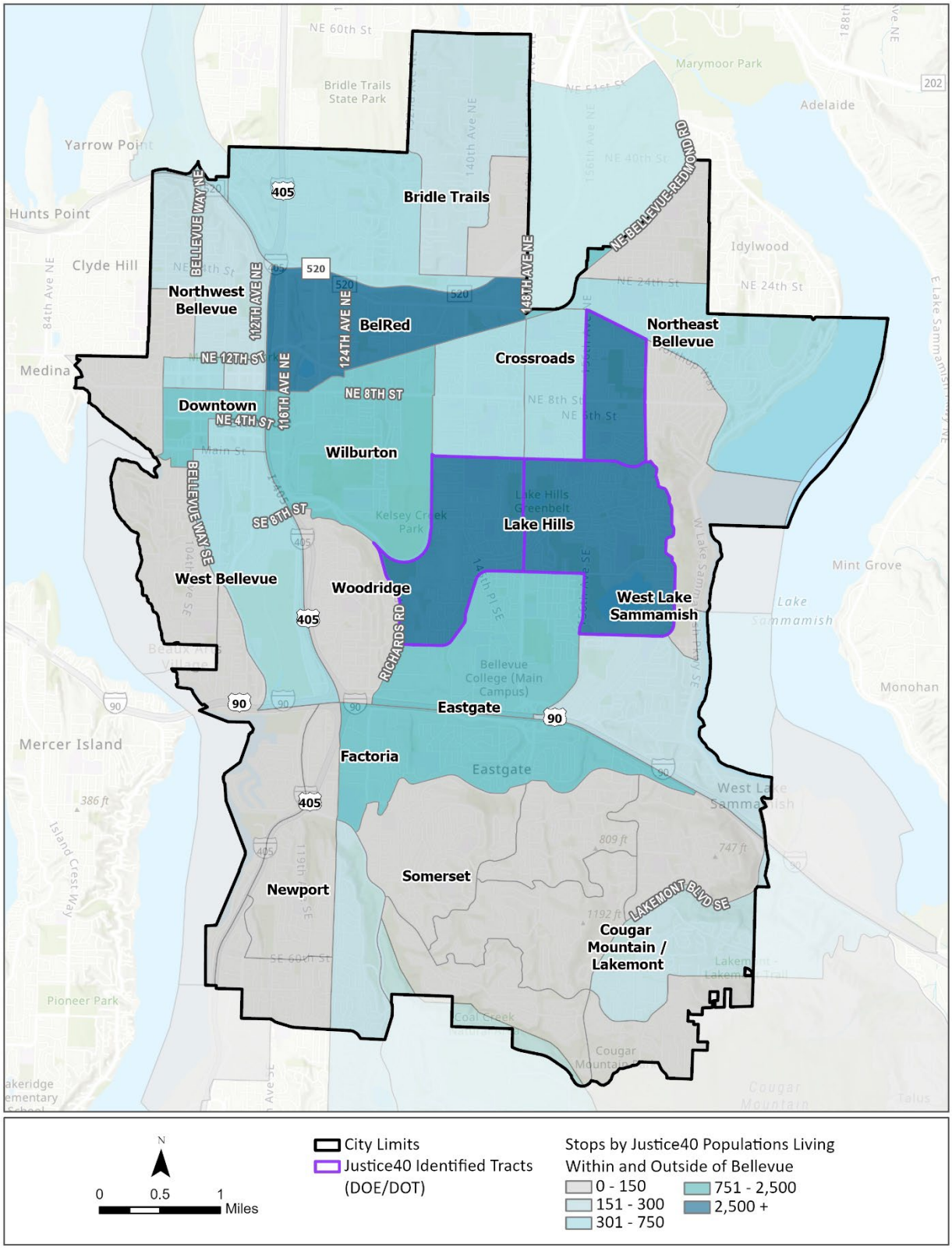


Figure 11. Stop Distribution by King County Justice40 Populations (2024)

CITY OF BELLEVUE » Electric Vehicle Roadmap

Attachment D:

EV Charging Framework Supplement

October 2024

Table of Contents

Figures

Tables

D EV Charging Framework Supplement

While conventional gasoline- and diesel-powered vehicles are refueled at stations often placed near interstate exits and along commercial corridors, the expansion of land uses associated with charging EVs has significant implications for regional and city policymakers. EV charging infrastructure exists at many different land uses, presenting many new challenges to local governments, businesses, and consumers. This attachment supplements the EV Charging Framework chapter of the Electric Vehicle Roadmap, providing more detail on the three types of EV charging in Bellevue's transect that are not directly within the city's direct control or influence.

D.1 The EV Charging Transect

D.1.1 Residential Charging

According to the National Renewable Energy Laboratory, about 80 percent of charging in the United States occurs at home. Reliance on home charging will differ from region to region, and even within different areas of the same region, depending on drivers' specific needs and the potential for them to access charging infrastructure at home. In the recent EV Community Adoption Survey, 85 percent of Bellevue residents indicated their preference for charging at home based on convenience. Three at-home charging locations have been identified in this transect: driveways and garages, dedicated parking spaces, and shared private installations. Residential charging will almost always be Level 1 or Level 2 and can be configured in various ways. A home charging installation can include portable chargers plugged into a wall or powered bollard, wall-mounted or post-mounted chargers, and/or freestanding pylon-style chargers. Chargers will most commonly be used during the overnight hours when the vehicle is parked for an extended period of time. This can also allow users to leverage less expensive off-peak electricity rates where fee structures based on time of use are available.

DEDICATED SPACES AT DETACHED RESIDENCES

Charging infrastructure installed in a private driveway or garage is typically intended for use by the occupant of the residence. The resident must have the ability to have the charger installed, which is often limited for renters. There must be space available for the charger, either in the garage or along the driveway, and sufficient electrical capacity. This infrastructure is limited to Level 1 or Level 2 charging, which are typically sufficient to meet residential charging needs. **Figure 1** shows an example at-home charging setup. **Table 1** compares the

Figure 1. Example of At-Home Charging

two types of charging, which are generally outside the purview of a municipal agency's influence on charging and EV adoption as they are installed for private use only.

Table 1. Detached Residence Charging Comparison

	Level 1 At-Home Charging	Level 2 At-Home Charging
Context	Residential dwellings with access to dedicated driveway or garage (primarily single-family homes)	Residential dwellings with access to dedicated driveway or garage (primarily single-family homes)
Charger	Typically included with EV purchase; rated at about 1 kW, adding about 2–3 miles of range per hour	Typically rated at 7.2 kW (30-amp charger), adding about 10–30 miles of range per hour
Power	Utilizes 120V circuits typically drawn from a home's panel; unlikely to require electrical upgrades	Utilizes 240V power on a 40- or 60-amp circuit; often requires running wiring for 240V power and could entail upgrades
Cost	Minimal, assuming charger was provided with EV purchase and a 120V outlet is available to use	Can range from $1,500 to $5,000 per port, and upgrades can add several thousand dollars; financial rebates are available

DEDICATED SPACES IN MULTIFAMILY BUILDINGS

Charging stations can also be added in dedicated parking spaces contained in multifamily buildings, by property managers or if residents are provided the permission to install their own charger. These chargers can take many different forms, including a Level 2 pylon or a simpler charging bollard that provides access to power for portable Level 1 and/or Level 2 chargers. A rating of 7.2 kW, which can add between 10 and 30 miles of range per hour depending on the EV's efficiency, is most common. Equipment costs generally range from $5,000 to $15,000, but additional site work and installation costs will vary greatly based on several factors.

SHARED SPACES IN MULTIFAMILY BUILDINGS

At-home charging access may also be offered as a shared option for those in multifamily buildings without a dedicated parking space (**Figure 2**). Though defined as at-home charging, the station may operate more similarly to the parking-based charging sites discussed later in this section. Access to shared chargers may be fully public or restricted to residents only, either through

Figure 2. Example of Shared Multifamily Charging

physical means or within the charger's software. These chargers can be wall-mounted or placed on pylons and may be incorporated in surface lots or parking structures. Costs are like those for new chargers installed in dedicated spaces, generally ranging from $5,000 to $15,000 for the equipment plus additional costs incurred during site work and installation, which can vary greatly.

Effective March 2024, the Washington State Building Code requires that a certain share of parking spaces in new multifamily developments are made EV Capable, EV Ready, or see charging stations installed during construction.[1] In total, 45 percent of all new spaces must have some level of EV infrastructure installed to support EV charging. It is important to note that the new regulations only apply to new construction and not existing developments, which will require significantly more work to electrify. The city may look to support these developers by offering incentives, serving as a pass-through for outside funding, or reevaluating its own administrative code for opportunities to require EV readiness in existing multifamily communities.

D.1.2 Distance Charging

The future publicly accessible EV charging network will not only need to meet community needs, but also the needs of through travelers on longer trips. Under the U.S. Federal Highway Administration's Alternative Fuel Corridors program, I-90 and I-405 are designated as ready for AFC signage where they pass through Bellevue, meaning that fast charging stations are available for public use within 50-mile increments on these highway segments. The full AFCs run from Seattle to Ellensburg on I-90 and from Lynnwood to Renton on I-405, so these chargers will help to accommodate regional travel. While this charging type is not necessarily within the city's purview for direct financial investment, it should remain aware of its own importance in supporting regional mobility and seek opportunities, where available, to promote private investment in these chargers.

Distance chargers most often come in the form of DCFCs to enable rapid top-offs for long-haul trips. These chargers are often rated for between 65 and 125 kW but can provide outputs of up to 350 kW if designed to support higher-power charging. It is most typical to install a small bank of up to four charging ports, though some installations can include six, eight or more if projected charging demand is high (**Figure 3**). Larger charging hubs like these are relatively uncommon in Bellevue, and recent engagement activities indicated that many drivers commonly travel out of their way to use existing ones in

Figure 3. Example of Large Distance Charging Hub

[1]Washington State Building Code Council (2021): *https://sbcc.wa.gov/state-codes-regulations-guidelines/state-building-code/building-code-amendments*

Kirkland and Issaquah. As EV adoption grows, more installations of this kind will be needed to help support rapid recharging for nearby residents, visitors, and workers.

Though a single fast charging port can cost $1,250-$1,750 per kW, there is a large amount of funding available for new DCFCs along designated AFCs. The National Electric Vehicle Infrastructure Formula Program provides funding to states to strategically deploy new EV charging stations and establish an interconnected network of publicly accessible chargers across the country. Funding is available to cover up to 80 percent of eligible project costs, which include the acquisition, installation, operation, and maintenance of the charger(s). About $855 million will be distributed annually through FY 2026, with more than $15 million per year being allocated to Washington State.[2]

D.1.3 Depot Charging

Across the country, fleet owners such as transit providers, municipal agencies, utility companies and non-profit organizations are planning or undertaking fleet transitions due to local regulations and/or current funding availability. Any fleet transition will be supported by the addition of new charging infrastructure, which is typically installed at a centralized facility to support overnight charging of the fleet. Based on the operating needs of the specific fleet, depot charging can come in the form of Level 2 chargers, DCFCs, or a combination of both. The power demand related to charging will vary greatly based on fleet type, size and usage profiles, but it is very likely that electrical upgrades will be needed to support an EV fleet. **Figure 4** shows an example depot charging configuration. Though this infrastructure is not usually accessible to the public, fleet owners could install shared-access chargers so long as the fleet's needs can still be met. These cases are typically the result of partnerships between fleet owners and municipal or transportation agencies.

Figure 4. Example of Depot Charging

Outside of efforts to transition the municipal fleet, the city's electrification efforts and investments generally will not include depot charging. However, the city can encourage other fleet operators to evaluate the feasibility of electrification and can serve as a pass-through for funding opportunities that support zero-emission fleet transitions. Examples include the Commercial Clean Vehicle Credit, the Alternative Fuel Vehicle Refueling Property Credit, the Low- or No-Emission Grant Program and the Grants for Buses and Bus Facilities Program.

[2]U.S. Federal Highway Administration (2024): *https://www.fhwa.dot.gov/bipartisan-infrastructure-law*