Charge Pacific County

Pacific County Site Assessment for Electric Vehicle Charging Stations

Final Report

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Pacific County Site Assessment for Electric Vehicle Charging Stations

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Abbreviations & Terms

ABA	Architectural Barriers Act
ADA	Americans with Disabilities Act
AHJ	Authority Having Jurisdiction
DCFC	Direct Current Fast Charger
DOE	Department of Energy
EV	Electric Vehicle
EVSE	Electric Vehicle Supply Equipment
GIS	Geographic Information System
LCY	Livable City Year
PCEDC	Pacific County Economic Development Council
PUD	Public Utility District
UW	University of Washington

1. Introduction

Background

Livable City Year

The Livable City Year (LCY) program is a partnership initiative between the University of Washington (UW) and local governments or community organizations, aiming to connect students and faculty with real-world community challenges. This collaboration allows students to apply their academic knowledge and skills to tangible projects that benefit the community while gaining valuable experience. For the 2023-2024 academic year, the LCY program has partnered with the Pacific County Economic Development Council (PCEDC) to address the need for electric vehicle (EV) charging infrastructure in Pacific County.

Pacific County

Pacific County, located in the southwest corner of Washington State, experiences significant seasonal influxes of tourists due to festivals, fishing, and other recreational activities. The county's economic development strategy recognizes the growing importance of sustainable transportation and the need to support the increasing number of electric vehicles. The county's residents and visitors require reliable and accessible EV charging stations to meet their travel and commuting needs.

The primary goal of this project is to assess and recommend ideal locations for publicly accessible charging stations across Pacific County. These recommendations aim to enhance economic development, support sustainable tourism, and meet the future demand for EV infrastructure. Key stakeholders have expressed their support and provided valuable insights into the community's needs and potential challenges.

Team Approach

The project team, comprised of students from the Urban Planning Studio course (URBDP 506/507), adopted a multi-faceted approach to meet Pacific County's requirements. This approach included:

1. Case Studies: To inform their recommendations, the team examined case studies of EV infrastructure implementation in similar rural and tourism-heavy regions. These case studies provided best practices and innovative solutions that could be adapted to Pacific County's context.
2. Community Engagement: The team conducted interviews and engaged with local stakeholders to gather diverse perspectives and ensure that the proposed solutions align with community needs. Stakeholders such as city officials, port authorities, tribal representatives, and local businesses provided insights into current plans and future aspirations for EV infrastructure.
3. Location and Design Recommendations: The team utilized geographical information systems (GIS) and other analytical tools to identify optimal locations for EV charging stations. They examined best practices in EV charging station design to provide recommendations for new and existing locations.
4. Implementation Framework: The team developed a phased implementation plan, outlining a ten-year horizon for the construction and deployment of EV charging stations. This plan includes key milestones, cost estimations and potential funding opportunities.

By integrating community input, data-driven analysis, and best practices from other regions, the project team aimed to deliver comprehensive and actionable recommendations that would support Pacific County's transition to a sustainable transportation future.

This collaborative effort between the University of Washington's LCY program and the Pacific County Economic Development Council exemplifies the power of academic-community partnerships in addressing real-world challenges and fostering sustainable development.

Case Studies

Eagle County, Colorado

Eagle County, Colorado, is characterized by its sparse population and remote locations, heavily relying on tourism as a key economic driver. This makes it an ideal reference for Pacific County, which shares similar geographic and economic characteristics. Eagle County's innovative approach to EV infrastructure offers valuable insights into

addressing the challenges of supporting a significant influx of tourists while catering to the local population's needs.

Eagle County's EV infrastructure plan emphasizes the importance of strategic placement of EV charging stations. Additionally, the county's focus on integrating renewable energy sources with its EV charging network and its commitment to long-term sustainability goals provide a comprehensive model for Pacific County to emulate.

Eagle County's approach to integrating renewable energy sources with its EV charging network and its focus on expanding to underserved areas provide a model for long-term infrastructure development.

- **Renewable Integration:**
    - Solar Panels: Many of the EV charging stations are powered by solar panels, minimizing the environmental impact.
    - Sustainability Goals: This approach supports the county's broader sustainability goals.
- **Future Expansion**:
    - Data-Driven Decisions: Continuous monitoring and data analysis guide future expansion efforts.
    - Technology Updates: The county stays updated with the latest EV technologies and infrastructure improvements.

Monterey Bay, California

Monterey Bay, a renowned tourist destination, offers valuable insights into employing data-driven site selection and seasonal adjustments to manage EV infrastructure effectively. This approach is particularly relevant to Pacific County, which experiences significant seasonal variations in traffic due to tourism.

Monterey Bay's success in deploying EV infrastructure stems from its comprehensive use of data to identify optimal locations for charging stations and its innovative use of portable EV charging stations to manage seasonal charging demand. Portable EV charging stations are mobile units that can be deployed during peak tourist seasons and relocated as needed. This strategy ensures that the infrastructure remains efficient and adaptable to changing demand.

Monterey Bay effectively leverages Public Private Partnerships to expand its EV charging infrastructure, combining public oversight with private sector investment and expertise.

- **Collaborative Agreements:**
    - **Private Sector Involvement:** Partnerships are formed with private companies, such as EV charger manufacturers and operators, to share the costs and responsibilities of deploying and maintaining EV chargers.
    - **Revenue Sharing:** Revenue-sharing models are established where both the public and private partners benefit financially from the operation of the EV chargers.
- **Funding and Incentives:**
    - **Grants and Subsidies:** State and federal grants and subsidies are leveraged to reduce the financial burden on both public and private partners.
    - **Local Incentives:** Local incentives are provided to businesses that agree to host EV chargers, such as tax breaks and expedited permitting processes.
- **Operational Efficiency:**
    - **Management and Maintenance:** Private partners are responsible for the day-to-day management and maintenance of the EV charging stations, ensuring high levels of service and reliability.
    - **Technological Expertise:** The technological expertise of private partners is leveraged to ensure that the infrastructure is up-to-date and meets the latest standards.

Pierce County, Washington

Pierce County, Washington, is the second-most populous county in the state with approximately 905,000 residents.[1] It has a diverse mix of urban, suburban, and rural areas. Similar to Pacific County, economic development is a major goal.

Pierce County's EV infrastructure plan focuses on ensuring equitable access to EV charging stations, particularly in underserved communities. The plan includes strategic site selection, community engagement, and partnerships with local organizations.

- **Equity Analysis:**

[1]Pierce County Facts and Data: Link

    - **Data Collection:** Conducted a thorough equity analysis using data on income levels, racial demographics, and housing types.
    - **Prioritization:** Areas with higher percentages of low-income and non-white populations were prioritized for EV charger installation.
- **Community Engagement:**
    - **Outreach Programs:** Implemented outreach programs to educate residents about the benefits of EVs and the availability of charging infrastructure.
    - **Feedback Mechanisms:** Established regular community meetings and feedback mechanisms to ensure that the needs and preferences of all residents were considered.
- **Accessibility:**
    - **Focus:** Focused on residential areas, particularly those with high population densities and multi-family housing units.
    - **Strategic Locations:** EV chargers were installed in public amenities such as parks, community centers, and libraries, making them easily accessible to a broad range of residents.
    - **Universal Design:** Ensured that the charging stations were designed to be accessible to people with disabilities.

Pierce County employs a third-party ownership model to facilitate the deployment and management of EV infrastructure, making it accessible and affordable for all residents.

- **Ownership and Operation:** In this model, private companies own and operate the EV charging stations, while the county provides regulatory support and site selection assistance.
- **Revenue Sharing:** Revenue generated from the charging stations is shared between the private companies and the county. This arrangement reduces the financial burden on the county and ensures the infrastructure is well-maintained.
- **Investment and Risk:** Private companies bear the majority of the financial risk and investment costs, which can be offset through state and federal grants and local incentives provided by the county.

Snohomish County, Washington

Snohomish County is another leader in the EV space. The Snohomish County Public Utility District (PUD) has implemented an Electric Transportation Plan designed to promote the adoption of electric vehicles (EVs) and optimize the utility's grid to support transportation electrification. The plan revolves around three primary strategies: community engagement, grid optimization, and customer adoption.

- **Community Engagement:**
    - **Outreach and Education:** The PUD engages with the community through various outreach and educational programs, leveraging its position as a trusted energy advisor to promote the benefits of EVs and charging infrastructure.
    - **EV Community Building:** Establishing an EV community to facilitate information sharing and support for new and potential EV owners.
    - **Targeted Outreach:** Focused efforts on educating auto dealers, fleet managers, and charging site hosts about EV benefits and infrastructure requirements.
- **Grid Optimization:**
    - **Planning and Forecasting:** Integrating EV charging patterns into grid planning models to identify system constraints and opportunities for optimization.
    - **Managed Charging Initiatives:** Partnerships with companies like FleetCarma help the PUD gather data on EV usage patterns and develop incentives for off-peak charging, reducing strain on the grid during peak hours.
    - **Vehicle-to-Grid (V2G) Technology:** Testing V2G technology through projects like the Arlington microgrid to understand its impact on the grid and potential benefits.
- **Customer Adoption:**
    - **Incentives and Pilots:** Offering rebates and incentives for the installation of Level II ENERGY STAR® certified connected EV chargers to encourage residential adoption of EVs.
    - **Partnerships:** Collaborating with car dealerships, delivery fleets, and charging developers to facilitate the adoption of EVs and expansion of charging infrastructure.
    - **Grant Funding:** Leveraging grant opportunities to support the installation of EV charging infrastructure, particularly in underserved areas like multi-unit dwellings and public spaces.

2. Community Engagement

Stakeholder Interviews

During the development of the project, the primary source of local knowledge came from interviews with stakeholders from the county. These conversations informed site selection and identified potential constraints. The local perspective helped guide the project to meet the interests of Pacific County best. Our team engaged stakeholders from all parts of the county, including all the major cities. These included municipal officials and representatives from other entities that could offer insights on project development, including local utilities, community groups and private organizations. The key takeaways from these interviews are detailed below.

Please see the appendix for additional notes and context from our team's interviews. No individuals were directly quoted in the following sections, but rather, the conversations informed the research and site selection process

Constraints

Lack of funding is the main limiting factor for EV infrastructure in Pacific County. Representatives from several municipalities and organizations stated they have put off investing in charging stations due to installation and maintenance costs.

A major concern when evaluating charging station locations is power availability. This was brought up by a number of interview subjects. With this understanding, the site selection process was changed to incorporate the availability of three-phase power as a primary factor. The utility company representatives were clear that there is more than enough power available in Pacific County. The real challenge is the cost of an area's required hardware or infrastructure. Any sites in the early stages of the build-out are located in areas where no further improvements are necessary, making installation relatively cheap and implementable within a predictable time frame.

Stakeholders alerted our team to multiple potential time constraints. Time to design and plan out the projects, time from project approval and funding to implementation, and time to procure materials. It should take approximately two years from plan formation to a fully executed site based on rough estimates received from interviews. This could be delayed by supply chain issues in the county, specifically for transformers and other

essential components to complete the project. Given this timeline, best practice dictates that sites should be planned well before they are needed.

Opportunities

Every interview subject expressed excitement about the prospect of EV's and believed that developing EV charging infrastructure was a positive step. This motivation and optimism plays a crucial role in the project to expand EV infrastructure in Pacific County. It will facilitate the collaboration between site hosts, municipalities and other parties necessary to advance the project.

Several sites included in the location analysis were identified through stakeholder interviews. This provided a larger pool of potential sites, increasing the quality of station locations in the recommendations. Some of the most cost-effective and attractive locations were identified in interviews, as the subjects were able to lean on their local knowledge. This also informed the implementation plan, as multiple stakeholders highlighted the importance of exploring all funding options.

StoryMap

To engage the broader public in Pacific County, our team created an interactive, online webpage using ArcGIS StoryMaps. The StoryMap summarizes this report in an accessible format and serves as a quick guide to EV's and charging. The Pacific County Economic Development Council should direct residents toward the StoryMap to answer any basic questions about this project or EV's in general.

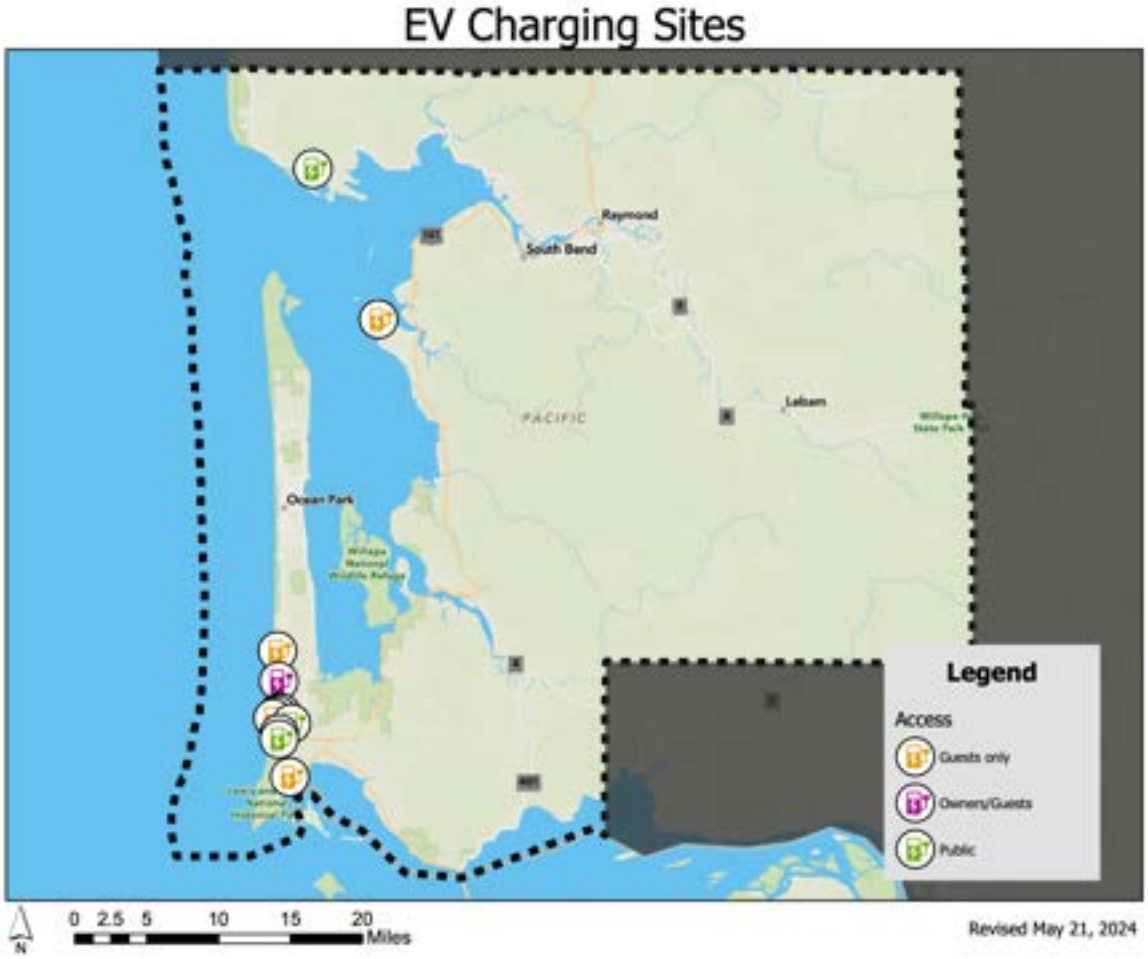
Access the StoryMap at: https://arcg.is/19bK1i1

3. Station Location

Current Situation

Pacific County currently contains 12 EV charging stations that are Level II or above.[2] Of these locations, ten are clustered in the Long Beach peninsula. Four of these stations are open to the public, with all others reserved for hotel guests and customers of local businesses. This amounts to only ten publicly available charging plugs across the county. The maps below show existing EV charging stations in Pacific County, differentiating between those that are publicly accessible, or accessible only to customers/guests of a respective business.

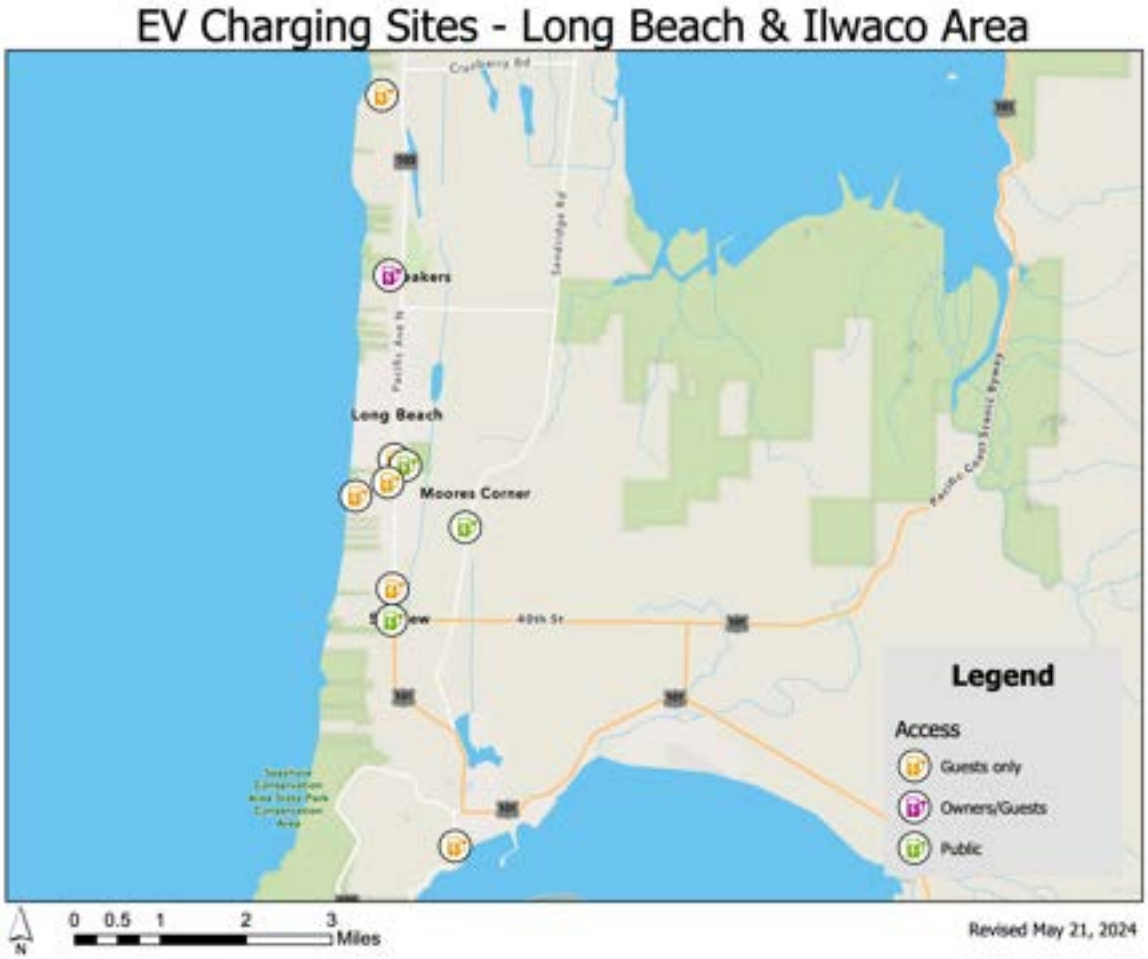
Figure 3.1. EV Charging Sites



Source: *Plugshare*

[2]PlugShare: Link

Figure 3.2. EV Charging Sites - Long Beach & Ilwaco Area

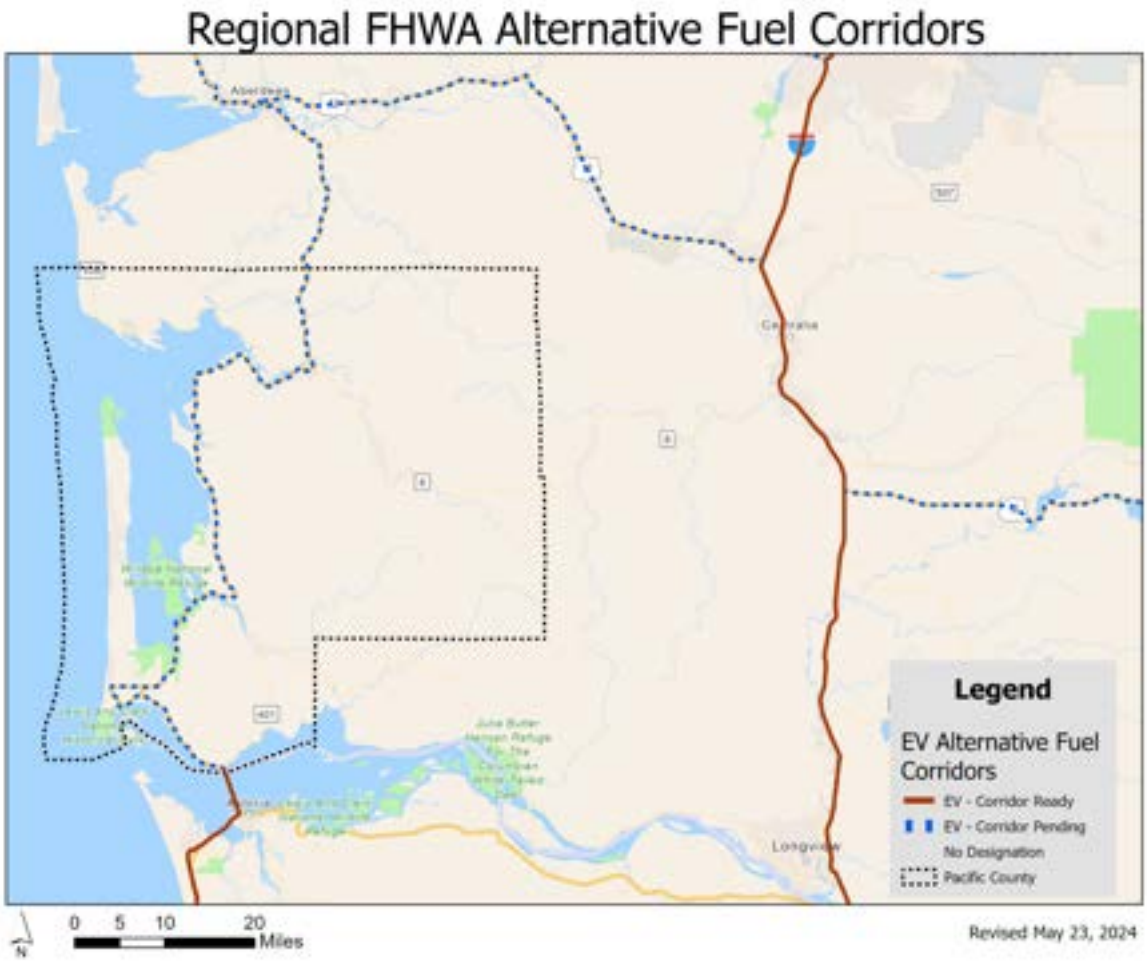


Source: *Plugshare*

Highway 101 has been identified as a potential Alternative Fuel Corridor (AFC) by the Federal Highway Administration.[3] This designation opens up funding through the Charging and Fueling Infrastructure (CFI) Discretionary Grant Program and National Electric Vehicle Infrastructure (NEVI) Formula Program to support the installation of EV infrastructure along the highway.

[3]Federal Highway Administration Alternative Fuel Corridors: Link

Figure 3.3. Regional FHWA Alternative Fuel Corridors



Source: *U.S Department of Energy*

Energy Northwest and vendor company EVCS received more than $14.6 million through the CFI Discretionary Grant Program to develop over 50 chargers across 12 charging locations along Highway 101 in western Washington and coastal Oregon.[4] These include two charging stations in Raymond and Ilwaco. Each station will contain six 150 KW DC fast charging ports.

The Southwest Regional Transportation Planning Organization (SWRTPO), which serves as the Regional Transportation Planning Organizations for Pacific County, created a map of recommended charging station site locations.[5] The map proposes 13 new level II charging stations across Pacific County. This would more than double the number of charging stations in the County and extend charging infrastructure over a broader area.

[4] Energy Northwest Announcement: Link
[5] SWRTPO Recommended Charging Station Site Locations: Link

Needs Assessment

EV Adoption

In order to calculate the annual growth in EV adoption, our team compared the current percentage of car sales that are EVs with the expected ratio by the end of the planning window. Both Washington and Oregon have a 100% EV's sales target by the year 2035. This allowed our team to create a linear function connecting the current EV sales rate to this goal and divide by the number of years to determine the expected increase in EV sales each year. The same process was applied to the U.S as a whole, which has an expected EV sales rate of 38.5% in 2035.[6] Current rates of EV ownership shown in Table 3.1 were obtained through ODOT, WSDOT, and USDOT registration data.

All calculations for this section are completed for the Seattle metropolitan area, Portland metropolitan area, and the rest of the United States separately. They are then combined using the visitor demographics provided by the DataFy Report.

Table 3.1. EV Sales Rate Growth

Region	Current Sales Rate	Expected Sales Rate in 2035	Sales Increase Per Year
Seattle	17.2%	100%	7.69%
Portland	18%	100%	7.45%
Rest of the U.S	6.5%	38.5%	3.1%

Source: *ODOT*, *WSDOT*, *USDOT*, *Edison Electric Institute*

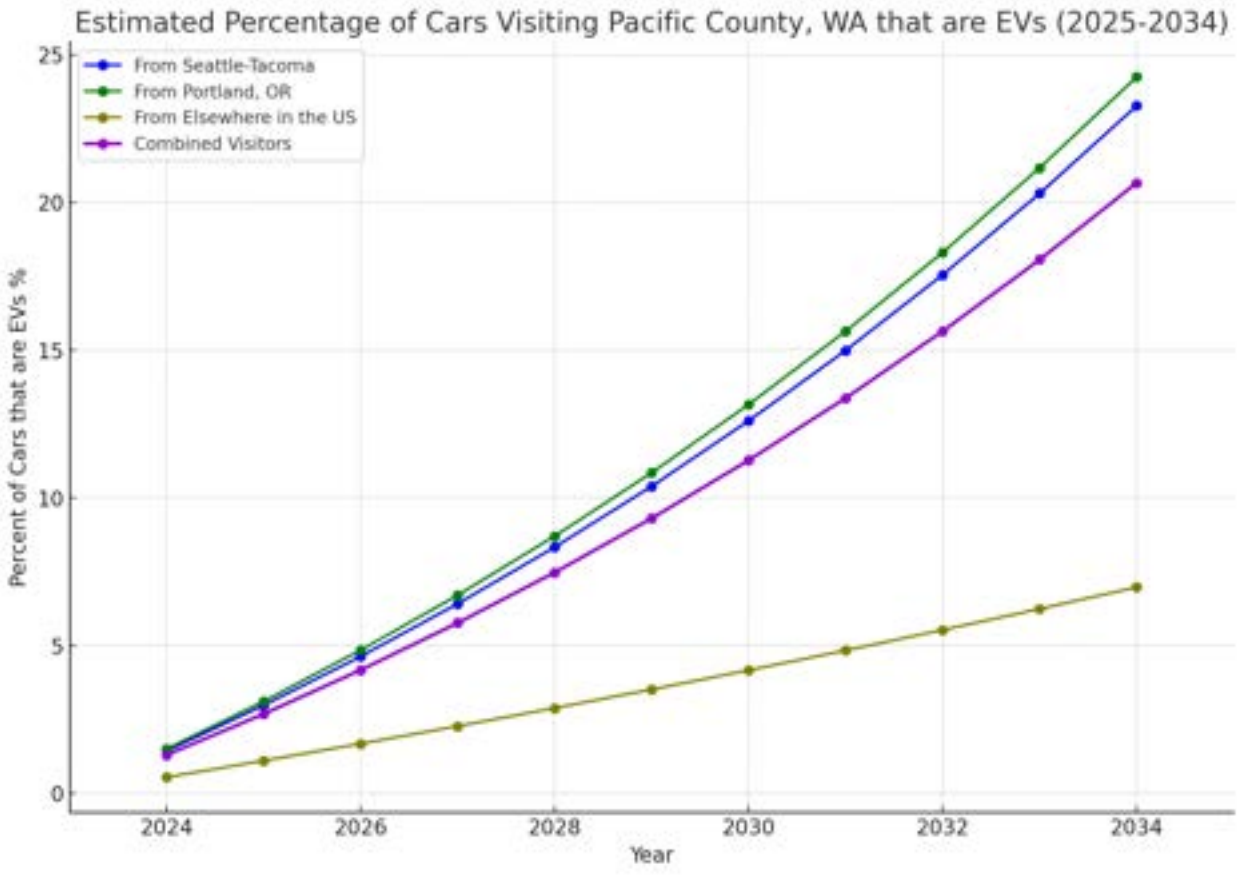
Table 3.2. Current EV Share

Region	Share of Vehicles that are EVs (2024)	Share of Visitors to Pacific County
Seattle	3.7%	46.35%
Portland	4.1%	35.52%
U.S	1%	18.13%

Source: *ODOT*, *WSDOT*, *USDOT*, *DataFy*

[6] Edison Electric Institute: Link

Figure 3.4. Estimated Percentage of Cars Visiting Pacific County, WA



The following formula was used to calculate the percentage of vehicles that are EVs for each year of the study in each of the study regions and then combined with the current share of visitors to Pacific County from each region. Table 3.3 shows the results of the formula.

$$EV(t) = (\sum_{K=0}^{11} \quad p(t-k) \times \frac{1}{12}) + a$$

t = years from 2024
p = Current percentage of new car sales that are EVs table 2
K = Number of years from t that the ev was bought
a = existing share of vehicles that are EV's

Table 3.3. Visitor EV Share Over Time

Year	Seattle Area Visitor EV Share (%)	Portland Area Visitor EV Share (%)	Rest of the U.S Visitor EV Share (%)	Weighted Visitor EV Share (%)
2024	1.4	1.5	0.5	1.3
2025	3.0	3.1	1.1	2.7
2026	4.6	4.8	1.7	4.2
2027	6.4	6.7	2.3	5.8
2028	8.3	8.7	2.9	7.5
2029	10.4	10.9	3.5	9.3
2030	12.6	13.2	4.2	11.3
2031	15.0	15.6	4.8	13.4
2032	17.6	18.3	5.5	15.6
2033	20.3	21.2	6.2	18.1
2034	23.3	24.2	7.0	20.7

Traffic Volume

To determine the number of vehicles traveling through Pacific County, our team used the Annualized Average Daily Traffic (AADT) volumes on State Routes collected by WSDOT. These traffic volumes were added to their respective road segments in ArcGIS and combined with the region each road section was in to map traffic flow.

Table 3.4. Traffic Volume of State Routes in Pacific County

State Route	Vicinity	AADT(2019)
SR 4	After SR 101	2,500
SR 4	Before SR 401	2,500
SR 4	After SR 402	2,800
SR 4	County Line	1,800
SR 6	After SR 101	5,400
SR 100	After 2nd Ave. SW	1,100
SR 101	Oregon State Line	9,300
SR 101	At Alt. SR 101	7,400
SR 101	Before SR 103	5,500

SR 101	After SR 103	3,000
SR 101	Before SR 6 Roundabout	11,000
SR 101	After SR 6 Roundabout	12,000
SR 101	Before Smith Creek Road	4,900
SR 103	After SR 101	8,100
SR 103	Before 10th Street	8,300
SR 103	Before Vernon/Bay Aves.	4,600
SR 103	After Joe Johns Road	1,100
SR 105	Before Tokeland Road	1,100
SR 401	After SR 101	2,900
SR 401	After So. Valley Road	3,000
SR 401	Before SR 4	3,200

Source: *WSDOT*

Annual visitor data to the main cities of Pacific County was included in the DataFy report and event attendance data provided by the Economic Development Council. The number of visitors was converted into a vehicle count by assuming an average occupancy of 2.5, based on data from the National Household Travel Survey.[7] The number of visitor vehicles was then removed from the AADT of roads in the area of each city, separating the volume of visitors stopping in the county from those passing through. Traffic volume on peak travel days was calculated by dividing maximum event attendance by average vehicle occupancy.

Table 3.5. Traffic Volume of Pacific County Cities

City	AADT	Passing Vehicles	Maximum Event Attendance	Maximum Event Vehicles
Ilwaco	5500	5120	9000	3600
Long Beach	8300	7145	12360	4944
South Bend	11000	10800	680	272
Raymond	11500	11435	2000	800

Source: *DataFy*, *Pacific County EDC*

Charging Demand

Demand capacity was separated by charger type due to the disparity in charging time. The average time to charge a vehicle is 20 minutes at a DCFC and up to six hours at a

[7] U.S. Department of Transportation NHTS BRIEF: Link

Level II charger.[8] The demand analysis used an 18 hour service span of 4 AM to 12:00 AM as over 95% of trips happen in this period.[9] Based on this information, the maximum capacity of a single charging port is 54 vehicles per day for a DCFC and three vehicles per day for a Level II charger.

The next step was to determine actual charger demand. This was divided between corridor (fast/DCFC) and destination (slow/Level II) charging due to the differences in how demand is generated. For corridor charging, our team began by estimating the percentage of passing vehicles that would stop at each station. Based on previous studies and the distribution of existing chargers, this was set at 59%. The demand pool was then narrowed to only include personal vehicles (49.2%) as public and commercial EVs usually charge at fleet facilities rather than public charging stations.

Destination charging demand was calculated through a separate methodology. Visitor volume was restricted to the 45.2% of trips to Pacific County that are less than one day, according to the DataFy report. Visitors staying overnight will likely use private chargers at hotels or campgrounds and avoid public charging stations. Based on these calculations, our team determined the amount of vehicles needing public Level II and DCFC charging in year 10 of the analysis. This was translated into the amount of chargers needed in each location.

Table 3.6. Charging Demand by City (Year 10)

City	Level II (vehicles per day)	Level II Chargers to Build	DCFC (vehicles per day)	DCFC Chargers to Build
Ilwaco	337	50	308	6
Long Beach	463	60	429	10
South Bend	25	10	649	0
Raymond	75	18	687	12

Site Selection

Location Scoring

The first step in site selection was to create a list of potential sites. Through a mix of suggestions from stakeholders, community members, government organizations and

[8] U.S. Department of Transportation Charger Types and Speeds: Link
[9] Washington State Department of Transportation: Link

officials and site visits our team identified 35 potential locations for public chargers in the county. To narrow down this list, our team created a scoring criteria modified from Monterey Bay's EV charging master plan. Each site was scored on a scale of 0 to 3 by three team members and then averaged to calculate a final score.

Figure 3.5. Sites Under Consideration

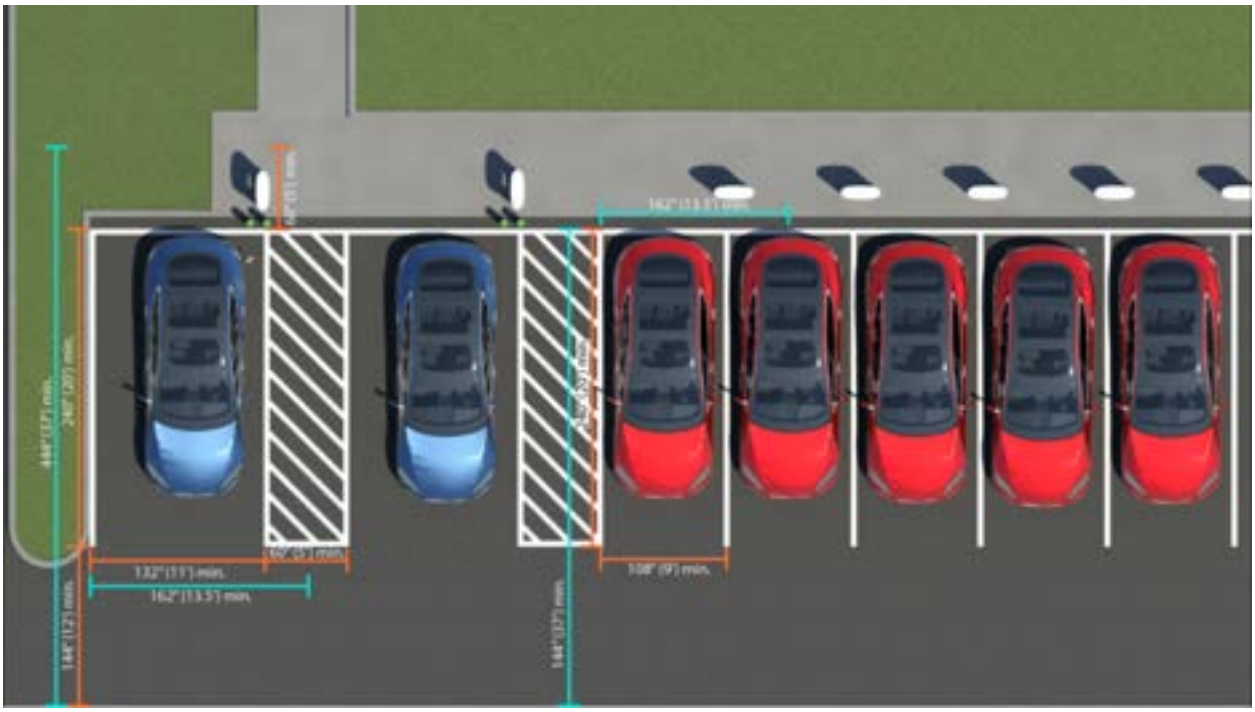
Table 3.7. Site Scoring Criteria

Score	Length of Stay	Attractiveness	Nearby Businesses	Visitor Attractions	Lot Layout	Restroom Access
0	Less than 0.5 hours	Not attractive	None	None	Not conducive to charging	None
1	0.5 to 2 hours	Somewhat attractive	1-3	1	Can accommodate charging	Customer access
2	More than	Very attractive	4+	2+	Great for	Public

	2 hours				charging	access

With the scoring provided these locations were geocoded and mapped in ArcGIS. The surface of the lot (paved or unpaved) was added to each site using LandSat Data.[10] Then the total capacity for chargers was calculated by dividing the total lot size by the average size of an EV charging spot, as provided in Figure 3.6.

Figure 3.6. Parking Dimensions



Source: *U.S Access Board*

The next step number of the process was to allocate the needed number of Level II and DCFC chargers to each site. For Level II, chargers were assigned to the highest scoring sites first while not exceeding 35% of total lot coverage. Once 35% of the lot was occupied by EV charging spots, chargers were added to the next best scoring lot, and so on until all chargers were assigned locations. Long Beach and Ilwaco had some capacity constraints over a lack of parking expressed by stakeholders. This led our team to recommend building an additional DCFC in these cities in place of roughly 20 Level II chargers to address these concerns.

For DCFC, the goal was to provide the capacity in quality locations with as little capital cost as possible. Therefore, sites in Ilwaco and Raymond that will already be receiving

[10] Ecopia High-precision 3D vector map of the entire United States: Link

DCFC through Energy NW were prioritized for further expansion to save on costs. In Long Beach, an additional DCFC charger was added at a site to take advantage of easily accessible three phase power and provide additional capacity for the region. Table 3.8 shows the final list of selected sites and the type and number of chargers allocated to each one.

Table 3.8. Selected Sites

Location	Type	Score	Lot Surface	Level II	DCFC
Port of Ilwaco East	Corridor	11	Paved	20	6
Port of Ilwaco West	Destination	11	Paved	20	0
The Doupe Building	Destination	8	Paved	5	0
Ilwaco City Hall	Destination	6	Unpaved	5	0
Bolstad Avenue	Destination	11	Paved	20	0
Long Beach Public Parking	Destination	11	Unpaved	20	0
406 Oregon Ave Public Parking	Destination	10	Paved	20	10
Bay Ave Approach	Destination	9	Paved	4	0
Ocean Park Library	Destination	8	Paved	4	0
Courthouse Annex	Corridor	10	Paved	6	0
Robert Bush Park	Corridor	7	Paved	4	0
New Raymond City Hall	Destination	11	Paved	5	0
Raymond Library	Destination	10	Paved	5	0
Carriage Museum	Corridor	9	Paved	6	12
Willapa Thriftway	Corridor	8	Paved	2	0
Port of Chinook	Corridor	6	Unpaved	2	0
Naselle Bank Building	Corridor	4	Paved	2	0
Port of Willapa Harbor	Destination	7	Paved	2	0

*Planned or Existing Charging Stations

Figure 3.7. Recommended Sites for Charging Stations

Figure 3.8. Recommended Sites - Long Beach & Ilwaco

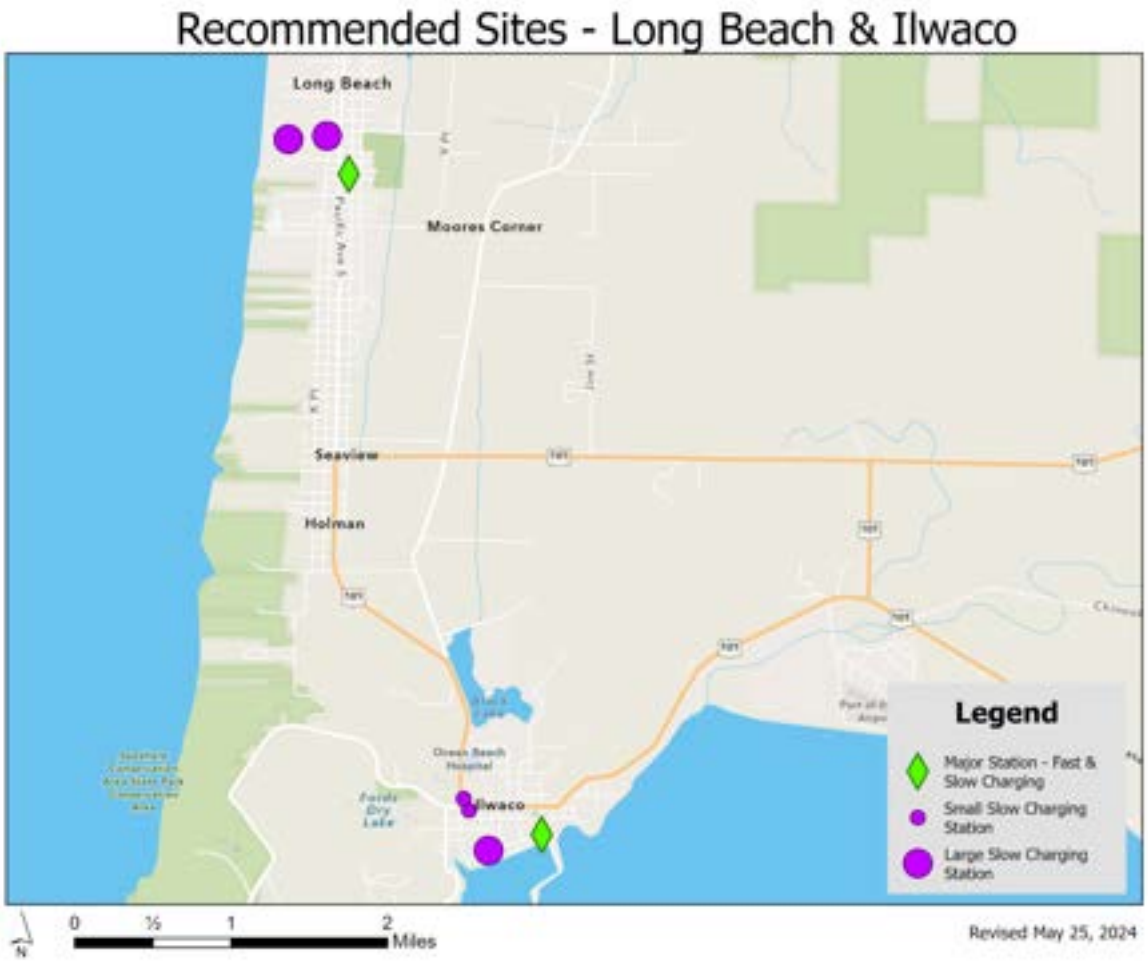


Figure 3.9. Recommended Sites - Ocean Park

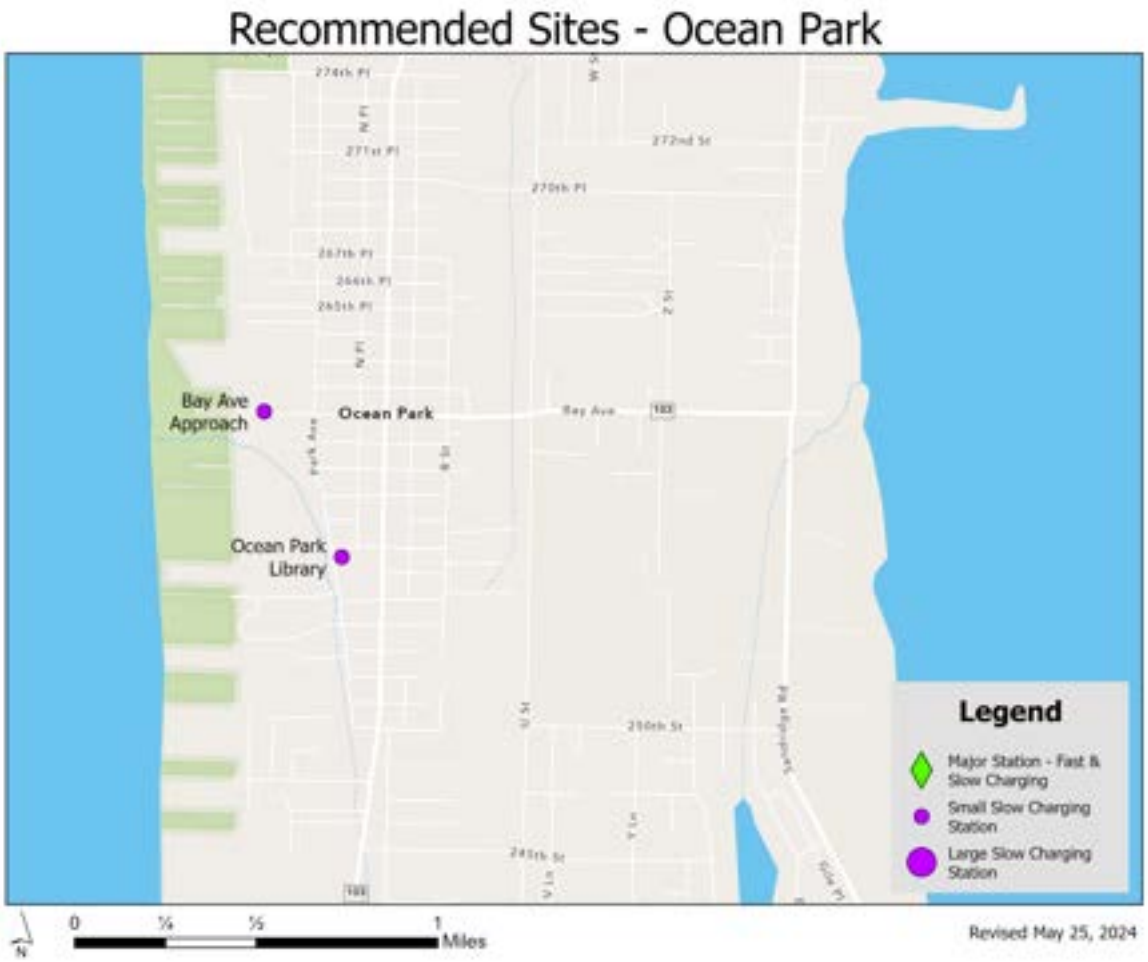


Figure 3.10. Recommended Sites - South Bend & Raymond

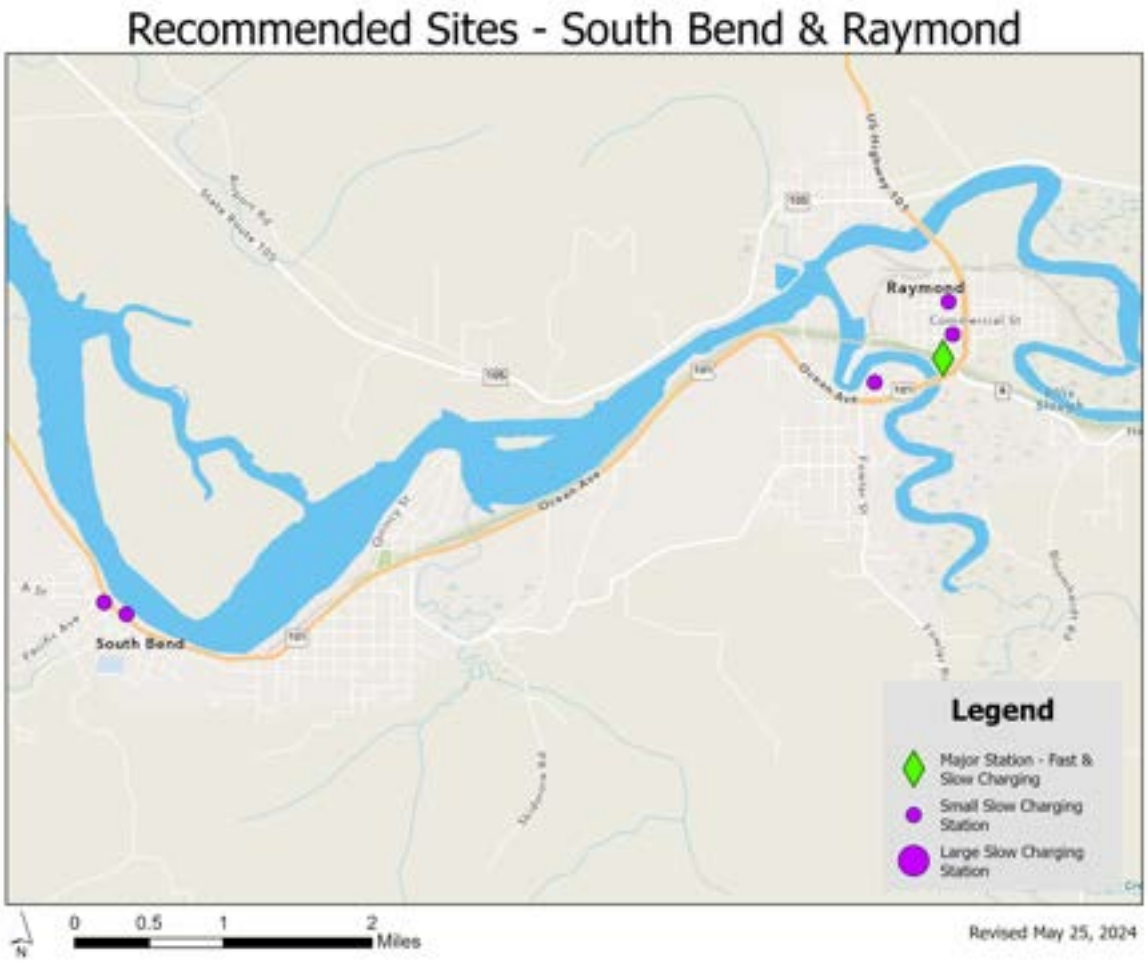


Figure 3.11. Recommended Site - Tokeland

Limitations and Assumptions

This analysis is based on a few key assumptions. These include relatively slow growth in the number of visitors to the County over the next ten years, consistent EV adoption rates and states meeting their sales targets and minimal adoption of non-electric zero emissions vehicles. Private entities are assumed to continue providing charging for their fleets and customers. Power availability is not factored into the analysis. Finally there is a relatively stable rate of car ownership in the United States. These limitations and assumptions are the foundation of the analysis and allow the research to be grounded in current data collection and research.

Full Data Tables

The location analysis produced complex data tables calculated for every year in the study to inform implementation of the report. They are located in the Pacific County

Shared Project Files folder.

4. Station Design

Accessibility and Site Planning

ADA and ABA Applicability

EV charging stations fall under several categories relevant to the Americans with Disabilities Act (ADA), such as communications, transportation, and public accommodations. Charging stations often are sited and planned through taking advantage of state and federal funding, which often require adherence to ADA standards.

Some specific examples of where ADA/ABA (Architectural Barriers Act) would apply to EV charging stations in Pacific County would be:

- Public parks
- Government offices and lots
- On-street parking within the public right-of-way
- Privately hosted sites that are open to public use

Figure 4.1. Accessible charging station within the public right of way.

Source: *Joint Office of Energy and Transportation*

Figure 4.2. Curbs locations are permitted if there are nearby ADA curb ramps.

Source: *U.S Access Board*

EV charging stations are more efficient and convenient for all if they are designed and maintained from their onset with everyone's needs and interests in mind.

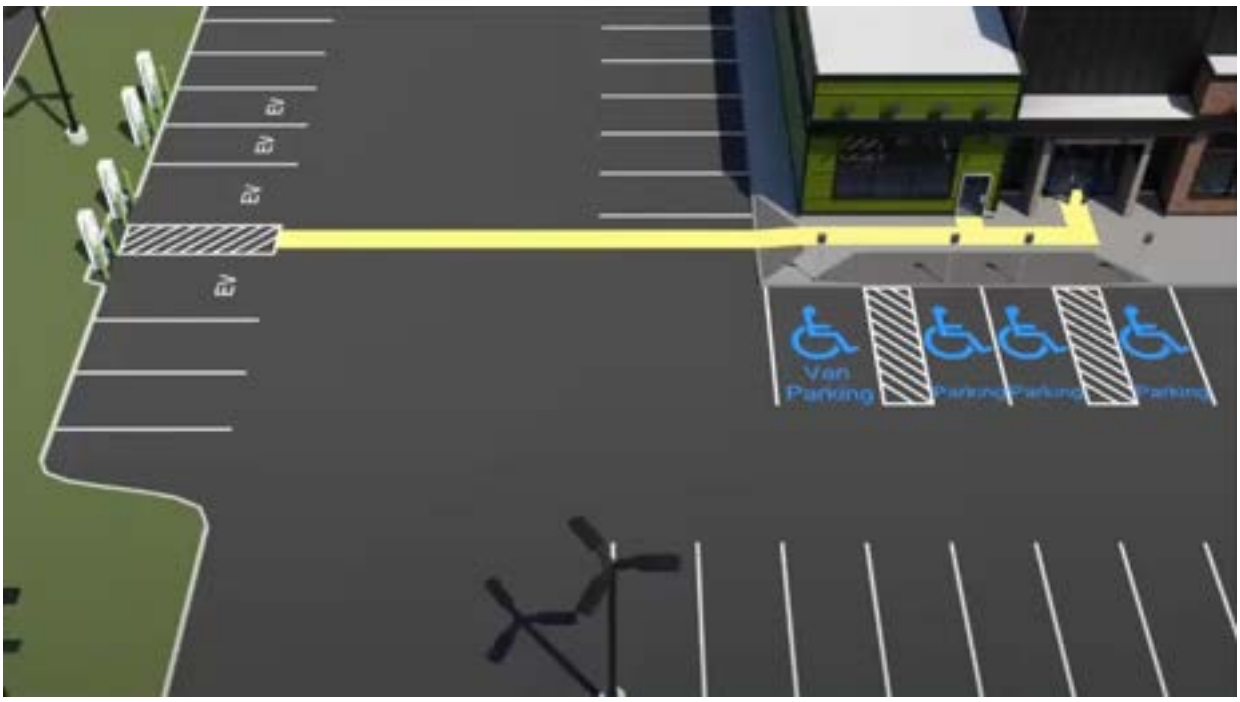
ADA and ABA Standards

Below is a summarizing list of technical aspects relevant to how ADA and ABA accessibility standards apply to EV charging stations according to the Joint Office of Energy and Transportation:

- Accessible routes (§402) and wayfinding/signs (§703)
- Reach ranges (§308) and operable parts (§309)
- Ground surfaces (§302), clear floors §305, and parking spaces (§502)
- Information/electronic communications (§508 of Rehabilitation Act) and Fare machines (§707)

EV charging stations should have accessible mobility features that allow people who use mobility devices to traverse around the vehicle, charging station, and nearby amenities. This should ideally connect with other ADA accessible networks like sidewalks. There should also be as direct of a route as possible with only accessible grade-changes (if applicable) from the charging station to nearby facilities and amenities.

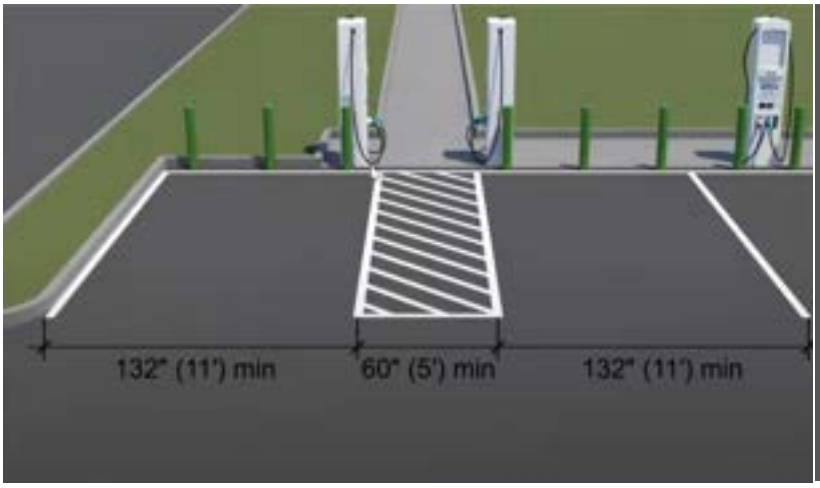
Figure 4.3. A direct and accessible route from the charging station to nearby amenities.



Source: *Joint Office of Energy and Transportation*

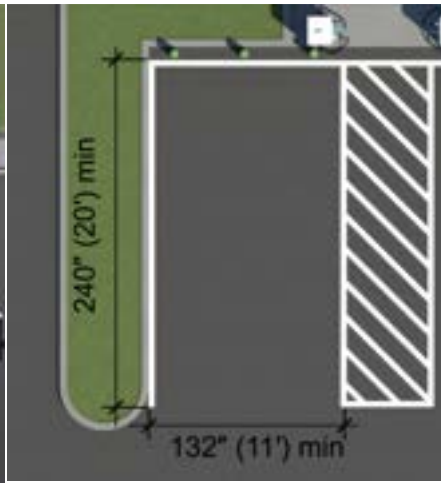
These accessibility features determine the size of the vehicle charging space, access aisles, charger situation and grading on the site in relation to the car, and the physical operability of the charger.

Figure 4.4. Wider parking stalls, access aisles, and flush surfaces allowing for accessible movement.



Source: *Joint Office of Energy and Transportation*

Figure 4.5. Width and depth of ADA accessible parking stalls.



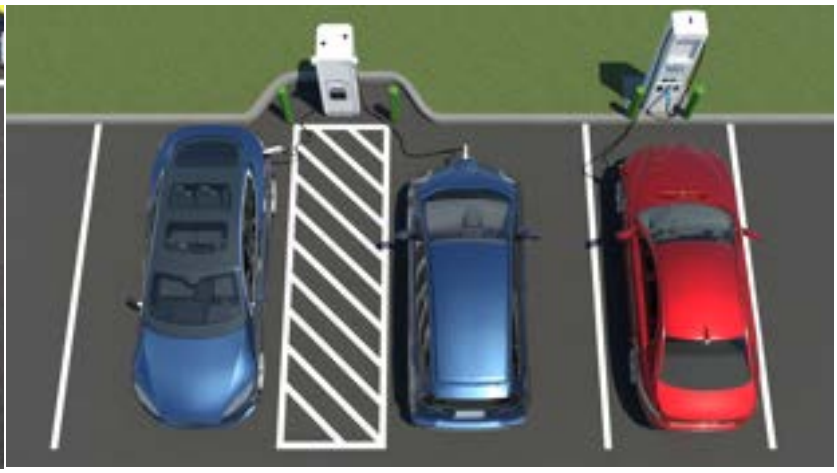
Source: *U.S Access Board*

Charging stations must accommodate the location of charging ports varying from car to car. This is especially important in instances where charging cables not only need to be long enough but also need to provide as little resistance as possible to allow for ADA use.. Charging cables for particularly fast-charging stations can be heavy and difficult to maneuver. There should be enough space in stalls for people using mobility devices to easily navigate within and around the stall and their vehicle, as well as situated their vehicle at angles or in different directions.

Figure 4.6. Parking stalls should accommodate vehicles with charging ports in various spots.

Source: *Joint Office of Energy and Transportation*

Figure 4.7. An example of an ADA accessible charging stall (left) next to a non-ADA accessible charging stall (right).



Source: *U.S Access Board*

Additionally, the charging station's electronic interface should be able to accommodate seeing and/or hearing disabilities with possible speech outputs and other sensory indicators that instruct how to use the station and provide updates to the visitor on status. This factor can also be assisted by the many EV charging mobile applications that are already prevalent, creating opportunities for both greater accessibility and convenient wayfinding and advertising of the site in relation to nearby amenities.

Since there are currently no requirements for the number of required ADA accessible charging stalls at a given location,[11] it is recommended that the general ADA parking stall requirements are followed (see below).

Table 4.1. ADA Parking Stall Ratio

Total Number of Parking Spaces Provided in Parking Facility	Minimum Number of Required Accessible Parking Spaces
1 to 25	1
26 to 50	2

[11] U.S. Access Board Design Recommendations: Link

51 to 75	3
76 to 100	4
101 to 150	5
151 to 200	6
201 to 300	7
301 to 400	8
401 to 500	9
501 to 1000	2 percent of total

Source: *U.S Access Board*

Given that compared to the number of normal stalls in parking lots, EV charging stalls are already a minority, the "Use Last" approach is often used to allow people without disability placards to use ADA accessible charging stalls.[12]

[12] U.S. Access Board Design Recommendations: Link

Figure 4.8. Examples of “Use Last” signage that could be posted at ADA accessible charging stalls that prioritize accessibility.

Source: *U.S Access Board*

Design Guidelines

Figure 4.9. There are three levels of charging speed. Charging speed should be paired with the amount of time visitors would want to spend at an amenity.

▶ *National Household Travel Survey, 2017.*

Representative Operational Characteristics of EV Chargers for Light-Duty Vehicles

Charger Type	Primary Use	Typical Power Output	Estimated EV Charge Time from Empty (~60 kWh battery)
Level 1	Residential Charging	1 – 1.5 kW	40 - 50 hours
Level 2	Residential and Public Charging	7 - 19 kW	4 - 10 hours
Older Level 3 DC Fast Charge	Public Charging	50 kW	< 1 hour [to 80% charge]*
State-of-the-Art DC Fast Charge	Public Charging	150 kW +	20 minutes [to 80% charge]*

▶ *U.S. Department of Transportation Volpe Center, U.S. Department of Energy, March 2021; Alternative Fuels Data Center, https://afdc.energy.gov/fuels/electricity_infrastructure.html, U.S. Department of Energy, www. fueleconomy.gov, March 2021.*

** Note: To prolong battery life, charging slows after an 80% charge level is reached.*

Source: *Federal Highway Administration*

Table 4.2. Station and Site Plan Design Elements

VERY ATTRACTIVE - FUTURE-WORTHY	ADEQUATE	UNATTRACTIVE - POTENTIALLY HARMFUL
★ **Adequate number of ADA stalls plus an environment conducive to safe active mobility** ★ **Located where things are happening**; stations are on arterials, in business districts, or other significant sites and **with effective wayfinding** ★ **Obvious access to a public bathroom** at or very visibly near the charging site with clear wayfinding ★ **Perfect match between charging speed and amenity length of stay**: a bank of Level II charging stations is located within walking distance of an abundance of long-term amenities and/or a level 3 charging station has both short and long term services and amenities within walking distance ★ **Additional charging stations**: the number of stations is sufficient at meeting BOTH daily and exceptional demand during holidays, special events, and/or summer/seasonal traffic increases) ★ **Pull-thru charging stations**: charging stations enable vehicles of diverse sizes, flexibility of stall size in the	+ **Adequate number of ADA stalls** + **Next to at least a one business with a usable bathroom** (bathroom wayfinding should be visible) + **Located where it will be seen**; some wayfinding present + **Charging speed somewhat matches amenity length of stay**: *some* longer-term activities are available for slower Level II charging and *some* both short- and long-term activities are available for fast-charging DCFC visitors + **A near-sufficient number of charging stations for typical daily traffic** (not needed to meet holiday, special event, or summer/seasonal traffic increases) + **Room and board is within walking distance of at least Level II chargers** + **Adequate lighting and public visibility** (i.e., there is some lighting present but it may not be solely dedicated to the station and there some sense of comfort from eyes on the street) + **At least one unique entertainment/cultural opportunity is**	- **ADA failures**: i.g., the charging station is at a difficult grade or different plane (on a curb with no ADA ramp) and cables are out of arm's-reach or too stiff or resistant—not wheelchair accessible, etc. - **Difficulty getting the charging cable to reach** a charging port on any given side of a reasonably sized and parked car - **Little to no wayfinding** - **Mismatch of charging speed and amenity length of stay:** Stuck at a Level II charger (longer charging) with little to no amenities or services - **No obviously present bathrooms**, no wayfinding to the few bathrooms within nearby private businesses - **A lack of things to do within walking distance** of the charging station - **Poorly maintained/unprotected site**: no litter management; stations appear in poor condition; stormwater pools around charging cars - **Seemingly unfrequented location with poor lighting** (i.e., design that does not

future, and allow vehicles with trailers to efficiently navigate and easily charge ★ **Protection from the elements**: a roof over the station and/or station siting behind a building, vegetation, or plants that shield from the corrosive and uncomfortable impacts of prevailing winds, sand, and rain o Aesthetically pleasing and functional on-site infiltration and stormwater management ★ **Other facilities common at gas stations**: squeegees, tire pumps, trash receptacles ★ **Ample lighting** at the station that meshes with surrounding amenities; a sense of eyes on the street ★ **Abundance of diverse recreational activities within walking distance, both active and less-active**: e.g., beach walking, dog walking, kids activities, cafes, grocery and tourism shopping, etc. ★ **Room and board within walking distance of all charging levels** ★ **At least one place to connect to the internet in the vicinity** ★ **Unique entertainment/cultural opportunities**: e.g., live music, local art at the station or within walking distance, museums, campsites,	**within walking distance** + **Charging site may or may not be protected from the elements** (at the very least, stormwater does not pool in charging stalls)	instill a sense of safety) - **Charging station is located at a busy road/intersection that has no pedestrian infrastructure** - **Charging station was/is visibly destructive** of crucial habitat and/or indigenous culturally significant spaces

interpretive signage		

***Note:** Many factors in the quality of charging stations are entangled with their planning, construction, and maintenance by different parties at different project phases. The above table aims to primarily capture site design factors and much less considers the downsides of insufficient resources to maintain attractive amenities and services, or likewise, the faults of particular proprietary charging equipment designs.

The best charging stations offer as many services and amenities as possible within walking distance to users. Level II chargers typically take several hours to charge most vehicles and should thus be paired with activities that can occupy a user for roughly the same amount of time. Stations should also be designed to provide protection from the elements and contribute positively to their local environment by managing runoff and including trash receptacles to prevent littering.

Ultimately, however, station elements will have to be weighed to reconcile budgets. Thus, the minimum standard should be ADA accessibility and at least one nearby amenity that corresponds to the charging duration.

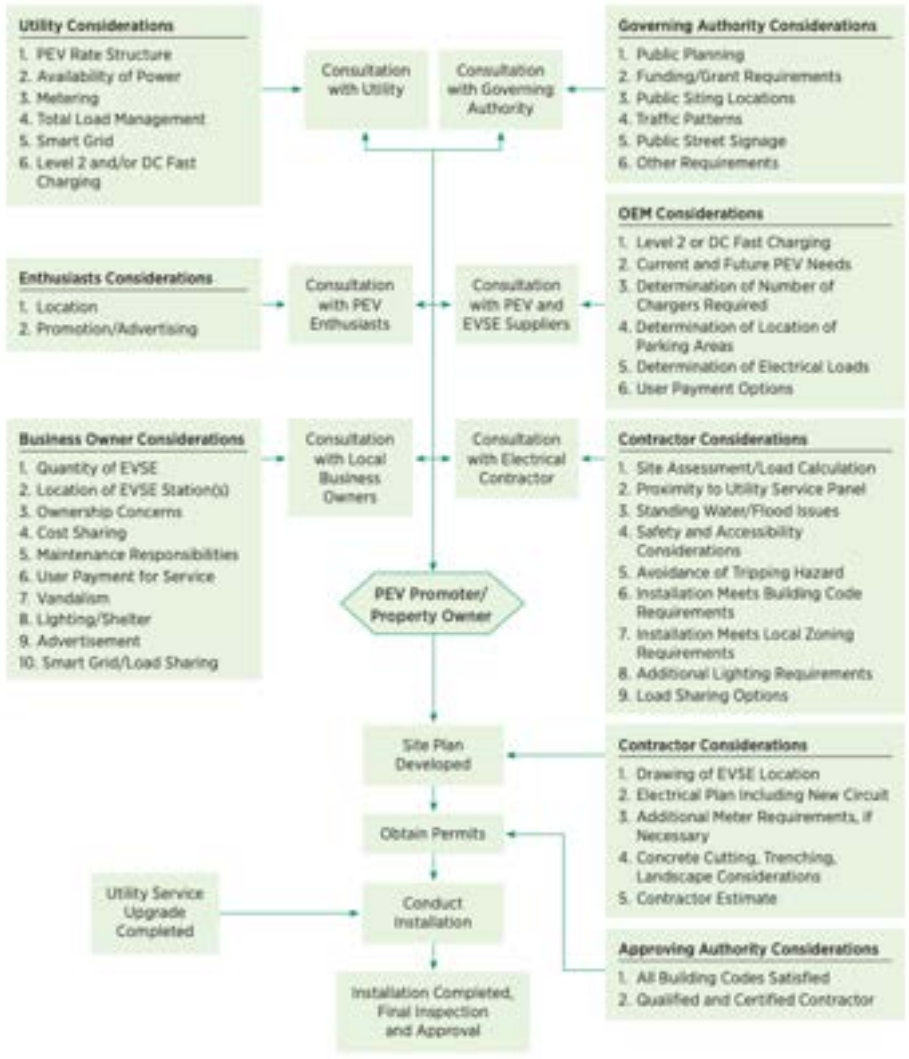
Station Design Precedents and Station Visualizations

See the Station Design Precedent section of the appendix for pictures of existing local and national charging stations that informed the report's design guidelines. See the Station Visualization section of the appendix to see detailed visualizations and descriptions of a proposed DC fast charging station in Long Beach. *Detailed standalone tabloids of each station design visualization are included in the "Pacific County Shared Project Files" folder provided with this report.*

5. Implementation

Key Milestones

Figure 5.1: General Process for Installing EVSE



Source: *U.S. Department of Energy*

The average construction time - from site assessment to final installation and operation- for one EV charging station is two or more years. The chart above was created by the U.S Department of Energy and provides key steps and considerations when implementing an EV charging station. These steps will be referred to in phase 0 of the rollout plan.

In addition, while the average time to implement an EV charging station is more than two years there are unpredictable factors that can impact construction timelines. Particularly, the supply chain delays that many industries are still experiencing from the COVID-19 pandemic. As noted by PUD#2 it is averaged to take up to 18 months or more to get a transformer. However, there are other opportunities to save time and costs. According to our team's interview with Energy Northwest, using the same site design and building multiple stations on the same site at the same time can result in significant time and cost savings.

Project Phasing

Phase 0

The first step of the implementation plan, termed Phase 0, focuses on incorporating EV charging station development into long-term planning processes. This phase is an opportunity to address regulatory barriers to installing charging stations and develop best practice guides for municipal regulations. This is also the best time to introduce electric vehicle charging readiness requirements for existing and new commercial buildings. Standard regulations to advance charging station deployment include streamlining the permitting process and updating parking and zoning ordinances to encourage EV charging station installation.

Permitting Process

Permitting can be a potential barrier to electric vehicle infrastructure deployment. Best practices to streamline the permitting process for EV charging station installation include creating a standardized and transparent permit review process, simplifying the review and approval process, and adopting an online permitting platform. The Northeast State for Coordinated Air Use Management (NESCAUM) developed a factsheet, Improving Permitting and Zoning for EV Fast Charging Stations, for strategies local and state governments can use to streamline EV charging station approvals.[13] This can include creating a checklist of requirements that can be found on the county website and limiting the permit approval to health and safety review requirements.

Furthermore, pre-application meetings and having a single point of contact between charging station developers, utilities, and the local authority having jurisdictions (AHJs) can expedite the project process. Pre-application meetings can also help utilities conduct efficient screening reviews for proposed locations which would save

[13] Improving Permitting and Zoning for EV Fast Charging Stations: Link

time and money on full reviews.[14]

Zoning Regulations

Revising local ordinances to explicitly count EV charging spaces toward minimum parking requirements can encourage the deployment of charging stations. As an example, the city of Walla Walla added a section to their municipal code that allows EV charging stations to be included in the minimum number of required parking spaces.[15]

The County should consider revising the zoning code to designate charging stations as a permissible accessory use to explicitly authorize its development, even if they are not the primary purpose of the property.

EV Charging Requirements

Washington state has EV charging station requirements for new buildings.[16] The law requires new construction projects with on-site parking to dedicate 10% of the total parking lot spaces to EV Charging Stations. As of July 2023, 10% of accessible parking spaces need to provide electric vehicle charging stations, and an additional 10% of accessible spaces must be EV-ready.

While many of the recommended sites are targeted towards sites with existing building structures, Pacific County can consider adopting a minimum parking requirement, particularly for new commercial or public projects, specifically in areas with high levels of visitors. In addition, the County can consider encouraging or requiring developers to incorporate the installation of conduits in new parking lots or structures.

Site Planning

Introducing and educating developers about EV charging stations during site planning can encourage its deployment. The County should consider requiring the installation of conduits in new parking lots or structures to later reduce the cost of EV charging station projects.

Grid Capacity and Utility Upgrades

The local utility plays a key role in assessing and informing the council on grid capacity for each location. It's important the council work with the utility to evaluate electrical supply needs to support EV charging infrastructure at the recommended site locations to ensure utilities and power grids are prepared for an increase in EV charging. The

[14] Electric Vehicles Roadmap Initiative: Link
[15] Chapter 20.156 ELECTRIC VEHICLE INFRASTRUCTURE: Link
[16] WAC 51-50-0429: Link

utility can advise the county on needed utility and infrastructure upgrades as well as their associated costs. Local upgrades to local distribution infrastructure may be needed to support the installation of DC fast charging stations. Utility upgrades can vary between eight months to five years depending on the size and anticipated load demand therefore it is imperative to determine if new charging infrastructure requires a utility service upgrade during the early project design phase. The county should work with the utility to develop accurate energy load and capital requirement forecasts to meet increasing EV charging demand.

EVSE Data Collection and Sharing

Grants generally require recipients to collect and report utilization and reliability data of EVSE stations. Pacific County can adopt California's strategy of including data collection and reporting requirements into agreements with station developers in order to receive public funding. The recommended list of data to collect and protocols to implement include;

- Charging station usage by location and corridor
- Information about each charging session
- Ensure location and station information is publicly available
- Collect data to support reliability and usage analysis

The California Energy Commission (CEC) publishes biennial assessment of charging infrastructure needs. This is to help monitor and report progress on the EV network and continually identify opportunities for improvements. The County is encouraged to adopt a program evaluation protocol to monitor the EV network progress. This can provide valuable evidence and data for future grant and funding applications.

Working Groups

The County should consider creating working groups (particularly for high-tourist locations) to identify, rank and address potential EV readiness barriers for each region. The Department of Transportation in Upstate New York is working to develop a comprehensive network of EV charging stations to support EV adoption and meet EV driver needs.[17] To inform this work the department created working groups to evaluate each region's EV readiness, identify areas that lack EV infrastructure and make recommendations of areas that would benefit from additional EV charging stations. Working groups included key stakeholders such as municipal leaders and business owners. Conversations with the working group included discussing potential locations for DC Fast charging stations in the region,

[17] Charging station implementation plans for the Upstate New York I-90 corridor final report: Link

creating a list of potential barriers towards EV adoption and gathering feedback from the working group after a draft plan was created. Pacific County can adopt a similar strategy of creating working groups of key stakeholders to advise the maintenance and operation of existing charging stations as well as identify barriers and opportunities for additional EV charging stations.

Phase I

As noted in the Station Location section, potential sites were ranked based on visitor demand and charging need. These sites were then organized into three phases with priority being given to sites with existing paving and locations that don't have any existing or planned charging stations. In addition, another consideration is that implementing charging stations in bulk reduces costs and DCFCs should be prioritized in high destination locations. Funding resources and local capacity is also considered in these recommendations. The values in table 5.2, 5.3 and 5.4 do not include existing or already planned charging stations, please refer to Table 5.1 for current existing or planned charging stations.

Table 5.1. Existing and Currently Planned Chargers

City	Location	Level II	DCFC
Ilwaco	Port of Ilwaco East		6
Long Beach/ Seaview	406 Oregon Ave Public Parking	2	
	Seaview Mobil	1	
	Snow Peak Campfield	5	
Raymond	Carriage Museum		6
Tokeland	Shoalwater Bay Casino	2	

Table 5.2. Phase I Chargers

City	Location	Level II	DCFC
Ilwaco	The Doupe Building	5	
	Port of Ilwaco West	10	
Long Beach/ Ocean Park	406 Oregon Ave Public Parking	10	5
	Bolstad Avenue	15	
	Bay Ave Approach	4	
Raymond	New Raymond City Hall	5	
Naselle	Naselle Bank Building	2	

Phase II

Table 5.3. Phase II Chargers

City	Location	Level II	DCFC
Ilwaco	Ilwaco City Hall*	5	
	Port of Ilwaco East	10	2
Long Beach/ Ocean Park	Bolstad Avenue	5	
	Long Beach Public Parking*	10	

	Ocean Park Library	4	
South Bend	Robert Bush Park	4	
Raymond	Raymond Library	5	
	Willapa Thriftway	2	

*requires additional paving

Phase III

Table 5.4: Phase III Chargers

City	Location	Level II	DCFC
Ilwaco	Port of Ilwaco West	10	
	Port of Ilwaco East	8	
Long Beach	406 Oregon Ave Public Parking	8	5
	Long Beach Public Parking*	10	
South Bend	Courthouse Annex	6	
Raymond	Carriage Museum	4	8
Chinook	Port of Chinook	6	
Tokeland	Port of Willapa Harbor	2	

*requires additional paving

Cost Estimates

The most significant costs associated with EV infrastructure are equipment and installation. Cost correlates with power rating, making it an important determination when choosing between Level II and DCFCs. DCFCs may need to be equipped with liquid-cooled cables to prevent overheating, increasing their cost. Other configuration characteristics such as the number and types of communication system (Wi-Fi, Ethernet), and the number and length of charging cables on a dispenser can add costs.

Installation is the most variable cost and may include permitting and inspection contractor labor and materials for connecting EVSE to the electrical service, new electrical service or upgrades (e.g. transformers), meeting ADA requirements and engineering review and drawings. For Level II chargers, installation costs can depend on whether it's a wall or pedestal installation. The basic wall charger costs around $5,000 to install while a pedestal charger can cost up to $15,000. This discrepancy is due to increased costs associated with trenching, wiring and labor for pedestal chargers. The main cost drivers for DCFC are the level of power upgrades needed to accommodate the larger amp units.

Table 5.5. Cost Estimates

Type	**Equipment (per plug)**	**Installation**	**Maintenance (per year)**
Level II	$2,500 - $5,000	$15,000 - $26,000	$275 - $500
50 kW	$27,000 - $40,000	$25,000 - $46,000	$2000
150 kW	$72,000 - $110,000	$50,000 - $90,000	$3000
350 kW	$140,000	$80,000 - $120,000	-

Sources: *ICCT*, *NREL*, *RMI*, *OpConnect*

Table 5.6: Total Costs for **four 150kW/hr DCFC**

Equipment	$650,000
Installation	$465,000

Source: *Energy Northwest*

Table 5.7: Installation Costs for **four 150kW/hr DCFC**

Project Management	$15,000
Engineering	$35,000
Utility Line Extension/Transformer	$70,000
Construction	$300,000
Misc. (signage, outreach)	$45,000

Source: *Energy Northwest*

Funding Opportunities

Grants and Tax Credits

Grants offer a prime opportunity for funding charging infrastructure. Grant opportunities take two main forms. The first are large, infrastructure-focused grants from Federal and State agencies. The second are smaller scale, public or private grants that are centered around economic development. Federal infrastructure grants are highly competitive and are usually won by large entities like States. State grants are also competitive but are usually more realistic options for counties, tribes, or municipalities to apply for. The Washington State Departments of Commerce, Ecology, and Transportation all run EV infrastructure grant programs but differ in focus, eligibility and scoring criteria. Economic development grants are often catered to smaller applicants but may not be directly focused on EV charging infrastructure.

Regardless of the specific criteria, the materials in this report are useful for any application. Presenting a comprehensive plan and implementation strategy is key to showing the county's commitment to EV. The county can also highlight its lack of existing infrastructure and status as an underserved rural community to secure grant funding. It is helpful to constantly check agency websites and grant databases for new updates and opportunities. Both the Federal and State government offer tax credits to offset the costs of installing and maintaining EV infrastructure.

Utility Programs

As EV adoption grows, an increasing number of electric utilities are offering funding for commercial properties interested in deploying charging stations on-site. The most common funding programs are rebates and incentives to cover the capital costs of charging infrastructure. For operating costs, many utilities offer a special rate structure that charges the customer a lower cost per kilowatt-hour or demand charge on their electrical bills. If the site requires additional power and equipment upgrades, some utilities will discount or waive these costs for the site owner. Additionally, some utilities pay for the installation and procurement of public charging stations, but not for continued maintenance and operation. Utility funding is not always guaranteed and can come with special conditions attached like the host providing monitoring data for a period of time. Utilities programs can play a key role in expanding EV infrastructure, like in the case of Snohomish County.

As of May 2024, the major utilities in Pacific County do not offer any public EV charging funding programs. However, it is important to connect with utility representatives early in the planning stage to ensure that any funding opportunities that do arise are communicated. Be aware that utility programs can change due to budget and cost effectiveness. They may have an end date or limit on the number of participants, so apply early and read the terms and conditions closely.

Private Partnerships

It is a common practice for local governments to partner with private companies to build and operate EV charging stations. Public-private partnerships have been effective in expanding EV charging infrastructure in the case of cities like Los Angeles. Some grant opportunities also require joint application with a private vendor. There are several companies that operate EV charging stations in and around Pacific County that could serve as potential partners. However, there may be regulatory or cost barriers to pursuing this approach

Resource List

Our team created a list of available funding opportunities for EV charging infrastructure in Pacific County. It provides key information and links to numerous grants, tax credits, local utilities and private partnerships. There is a collection of additional resources that provide information on grant applications, EV policy and other relevant topics. The full list is available in the Pacific County Shared Project Files folder.

6. Appendix

Interview Summaries

Name of interviewee: Allison Colman
Position: Energy Service Specialist
Organization: Energy Northwest

This interview was a follow up from last quarter, when a group of students met with Allison to better understand Energy NW's role in the charging space. With a clearer understanding of our responsibilities, we focused on asking direct questions to gain the specific information we needed. We were able to glean important takeaways for our project by asking about Energy NW's ongoing effort to install charging stations in Pacific County.

Firstly, we learned more about Energy NW's ongoing charging project. They partnered with the vendor EVCS to install two charging stations in Raymond and Ilwaco. Each station will each have four DCFCs and two level 2 stalls. This mix of chargers is based on the desire to provide charging access for as many different models of EVs as possible and meeting certain grant requirements. Sites were located based on grant requirements, as they focused on filling gaps in existing corridors and expanding access to disadvantaged areas. Allison offered several good suggestions for design elements at stations, including providing additional outlets for scooter and electric wheelchair charging. She also gave us the specific location of the proposed Ilwaco station and a clearer timeline for project implementation.

Name of interviewee: Boyang Sa
Position: Senior Data Scientist
Organization: Center for Sustainable Energy (CSE)

The Center for Sustainable Energy (CSE) is a national nonprofit that accelerates the adoption of clean transportation and distributed energy through effective and equitable program design and administration. Governments, utilities, and the private sector trust CSE for its data-driven and software-enabled approach, deep domain expertise, and customer-focused team. In talking with Boyang, we gained a greater understanding of the process they use to evaluate sites and receive feedback on our approach and project. Though there were similarities in how we both developed our site selection criteria, our approach has integrated a larger aspect of the human touch and subjectivity in comparison with the Center for Sustainable Energies' data-driven approach.

Our approach utilized and integrated the opinions and recommendations of local stakeholders to help guide and influence our choices for sites, leading to recommendations that make more sense in the community context. The CS, on the other hand, uses a data-driven approach, honing in on the best locations from the parcels that fit given criteria guided by an algorithm. Both approaches are suitable for the task at hand, but there is value in each approach.

Name of interviewee: Cheryl Heywood
Position: Executive director
Organization: Timberland Regional Library

Libraries are great for chargers as they allow access to free public amenities while you wait for your car to charge. In our conversation, we discussed the successful improvements made to the Sulcom library that can serve as a model for rural libraries and the potential for Libraries to be a stopping point for EV charging.

Given that the main visitors to libraries are residents of the area, with some visitors, libraries are likely to be a good sport for charging and can model for amenities but may not be the priority when it comes to servicing vehicles that are passing through or visiting the area. Additionally, the challenge that 18/29 Timberland libraries are city-owned poses a challenge for the development of chargers without full coordination.

Name of interviewee: Dee Roberts
Position: Mayor
Organization: City of Raymond

Dee Roberts was able to give us greater context on the city of Raymond's plans for EV changes. They are very receptive to the Idea, as they need more people to stop in town, and providing EV charging is a way to do that.

Ev Charging presents a huge opportunity for economic development. Energy Northwest is developing chargers at the Northwest Carriage Museum (funding was not fully in place for the project at the time of the interview). This will allow for greater mobility for EV drivers around the area and close the gap of charging along the corridor.

Further charging infrastructure presents an opportunity to influence where people stop and draw people to existing attractions. This presents an opportunity for food vendors to locate near new charging projects. Dee was also able to give us a few sites to incorporate into our site evaluation.

Name of interviewees: David Glasson and Sue Svendsen
Position: City Administrator and Mayor
Organization: City of Long Beach

In an interview with David Glasson, the City Administrator for Long Beach, he highlighted the increasing presence of electric vehicles (EVs) in the community and the consequent need for expanded charging infrastructure. Glasson emphasized that as demand for EV charging stations grows, the city plans to accommodate it progressively. He discussed the integration of tourism and sustainable growth, noting that tourism has been a core part of Long Beach’s identity even before it was officially a town. The focus on sustainable tourism is supported by data from sources like the Dean Runion report, which tracks tourist demographics and patterns.

Moreover, Glasson identified a significant need for additional charging facilities, especially during peak tourist seasons when the population can surge to 20,000. Current charging stations, like the one on Main Beach approach, which serves about 30 visitors a month, are insufficient. Plans are underway to construct more stations in strategic locations such as camping sites and near key highways like Nasell Highway 4, leveraging funding from various grants. He also mentioned that any new developments, including EV stations, would need to consider community aesthetics and local zoning ordinances to ensure they integrate seamlessly with Long Beach's scenic and community values.

Name of interviewee: Tanya
Position: Project Manager
Organization: Energy Northwest

From the interview with Tanya, Project Manager at Energy Northwest, several key takeaways inform our master plan. Firstly, Energy Northwest is currently not planning additional charging stations in Pacific County beyond the two locations already funded, with each set to have six DC Fast Chargers (DCFCs). Additional awarded funding from the Washington Department of Commerce allows for the expansion of the two initial sites from four to six chargers. More broadly, Energy Northwest is a joint operating district supporting its 29 public utility districts (PUD) and municipal members, with projects in various locations initiated largely based on member requests.

EV charging deployment has been a major focus for the agency, and Tanya described that many of the member districts requested more chargers. However, cost overruns and funding challenges are substantial barriers to adoption. For example, a planned site in Randall, WA, had to be abandoned mid-engineering due to its location in a flood zone, with substantial wastage.

Regarding project timelines and costs, Energy Northwest anticipates entering into a contract by the end of summer, with construction starting in the fall and a completion target set for Fall 2026 for the Pacific County chargers. One of the main challenges faced in these projects is the high equipment and construction costs. To mitigate this, the organization plans to bid out multiple construction sites simultaneously and purchase EV charging equipment in bulk. They aim for standardization with 'cookie cutter' sites to simplify the process, using similar layouts, sizes, and electrical setups to reduce complexity and costs. Understanding utility rate schedules and demand charges is also critical, especially for sites lacking three-phase power, which significantly complicates and increases project costs.

Name of interviewee: Evan Roberts
Position: Area Manager
Organization: Cape Disappointment

Cape Disappointment currently has no public-facing charging and only one staff only charger for their 1 Park EV and 4 utility carts. They are one of the busiest state parks, with 5 million visitors to the area every year. They currently struggle to accommodate current visitor capacity and already have limited parking.

In their major construction project, they were planning on adding four more chargers, two public-facing and 2 for staff use. They ran into issues regarding price, and there was a significant delay if they wanted to pursue the required infrastructure improvements regarding substations and, specifically, transformers,

which they were quoted would take 18 months to get. Another major concern was dedicating already limited parking to EV charging stations, given the limited supply and normal quick turnover of parking at their visitor center where the potential 2 new public-facing chargers would be.

They have decided to limit their expansion regarding EV charging to one additional charging station for staff use only and have hired consultant DK associates to help them plan for future EV charging needs. They are supportive of the need for EV chargers but it is not a major concern of the park given their major visitor numbers that they already struggle to accommodate.

Name of interviewee: Schuyler Burkhart
Position: General Manager
Organization: Grays Harbor PUD

In our conversation with Schuyler Burkhart, the executive director of the Grays Harbor PUD, we gained greater insight into the northern area of Pacific County that falls within their service area, learned about the energy landscape of Tokland, and gained greater context on the successful EV charging project in Aberdeen.

We heard previously that the Tokland area was prone to power outages. In asking The PUD about this issue, they discussed how this is caused by their above-ground power, which can be damaged and disturbed in storms. Improving power security in this region is difficult due to concerns about rising sea levels and its position at the end of the line for the PUD. There has been a proposed project to connect the end of the Grays Harbor PUD service area to PUD#2, which serves most of Pacific County, but that project is not a priority for either PUD. This project would allow each to act as a backup, better covering the northwest Pacific County and Tokland area.

Additionally, we discussed a successful charging project in Aberdeen that was fairly simple to get up and running due to its location in town, allowing for level 3 chargers with little disruption or required improvements to service the load. This can serve as a model for how we think about building out chargers. Overall, as long as we stay within the main city areas with our recommendations, installing chargers should be feasible.

Name of interviewee: Holly Beller
Position: City Administrator
Organization: City of Ilwaco

Overall, there has been little communication between the City of Ilwaco Pacific County PUD, and Energy Northwest. The City wants to partner with the PUD to expand charging capacity and would like more communication with Energy NW about the level 3 charging station they intend to install. The biggest planning constraints are a lack of parking and the need for landscaping per the municipal code. The commercial core has the largest parking need, which may limit new charging station locations. Partnering with local downtown organizations and businesses could be helpful in exploring options in this part of town. There are some parking lots, the biggest being at the port, which would be a more readily available location. City Hall is also planning on installing chargers; they just need money to repair the parking lot.

Main charging destinations in Ilwaco include city hall, the port parking lot, the commercial core, and the museum, which have all been identified as having a need for chargers. The biggest events include the summer market (Holly will follow up with average attendance), the Fourth of July fireworks show, and slow drive weekends. These events can be used to understand local crush load needs. Overall, they seem very perceptive to adding chargers as some members of the council have EVs but not a lot of experience with public charging stations, as they currently do not have any in the city.

Name of interviewee: Jesse Downs
Position: Regional Account Coordinator
Organization: Shoalwater Bay Tribal Member

Jesse Downs provided important local context and highlighted key challenges to consider for infrastructure development. She identified land use regulations and sea level rise as key concerns around EV charging development in Pacific County. The area is subject to rising sea levels, so their preference is to develop green infrastructure in highland areas. The area is also prone to power outages and power surges. Tokeland receives electricity from Grays Harbor County and often sees coastal flooding damaging their above-ground infrastructure. These are factors to highlight for the Council as it evaluates each region's EV readiness and continues to identify challenges. Another key consideration is the lack of space to set up multiple chargers. It's a small area, and most places can only carry a limited number of chargers, if any.

According to Jesse, desirable EV charging station locations include the Tokeland Marina, Tokeland gas station and the Tokeland Hotel.

Name of interviewee: Tiffany Turner
Position: CEO
Organization: Adrift Hotel

From the interview with Tiffany Turner, CEO of Adrift Hotels, several important insights emerged that could inform the development of our plan. As a leader of a Certified B Corporation, Turner's focus on sustainability was apparent and is deeply ingrained in the company's operations and ethos. Adrift Hotel targets tourists primarily from Seattle and Portland. They have already integrated Level 2 charging stations at each of its properties, with ongoing expansions, highlighting a proactive approach to accommodating EVs. This initiative helps meet the current demand, as evidenced by the frequent full usage of these chargers. However, future demands may not be met.

Turner noted the growing trend of tourists who prioritize sustainability, estimating that 50-75% of their guests are influenced by such considerations. This shift in consumer preferences may underscore the importance of building EV infrastructure to cater to those visitors. The hotel's choice of level 2 chargers was driven by cost considerations, with hopes that the community would eventually support the installation of faster Level 3 chargers. Moreover, Turner expressed a willingness to expand their charging facilities based on demand if that infrastructure does not pan out.

Collaboration with county and city government officials in Pacific County appears to be positive, with minimal bureaucratic hurdles. Turner indicated that their company would be willing to participate in any

future community or planning meetings. The meeting ended with a note that underscores the importance of the work: "if tourists are gone, our jobs are gone".

Name of interviewee: Tracy Lofstrom
Position: Port manager
Organization: Port of Ilwaco/Chinook

Tracy Lofstrom is the Port Manager of Ilwaco and Chinook. As a port manager, she provided some valuable insights about people's habits in and around the port areas. Tracy agrees that tourism is a major contributing factor to Pacific County's economy.

Tracy believes that we should implement a mix of both level 2 and DCFC. The reasoning behind this is that the ports are popular fishing spots. Fishing trips can last anywhere from 4-10 hours, meaning they are usually a full day activity. This would lead one to think that the area would only need slower level 2 charging, but Tracy argued that drivers may need a fast charger to top up before or after their trip. They can't leave their car plugged in depending on their length of stay and charging speed, as it may incur an additional idle fee.

Tracy expressed that people generally stop and walk around towns, but acknowledged that they definitely need personal vehicles to travel between towns. In terms of tourism drive, she said that Long Beach is the most popular spot, followed by Ilwaco, then Ocean Park and Seaview. People generally base their trip out of one location and travel between destinations.

Tracy also mentioned a few locations that she thinks are prime for EV charging. She specifically mentioned the port parking lot and the building currently being renovated by Abigail Mack in downtown Ilwaco. She did not really mention Chinook, as it is a much smaller port and a lower concern in terms of EV charging expansion.

Name of interviewee: Marc Wilson
Position: General manager
Organization: PUD#2

PUD#2 is the primary utility provider for Pacific County. In our discussion with them, we learned greater detail about the two energy northwest changing stations that are about two years out as they have recently secured funding. These projects should have four 150kw chargers at each location.

Some major concerns related to building chargers are cost and increased lead time since the pandemic, which can delay projects if they require infrastructure improvements. There is more than enough energy available at the moment, with the biggest constraint to any charging stations being cost. Level 2 chargers may provide a more cost-effective way of servicing our targeted group as we aim to serve people that already intend on spending time in PC and would be substantially cheaper than level three chargers.

Station Design Precedents

Figure 6.1. A charging station in Walla Walla with a single 100kW DCFC and Level II charger. It has stalls with accessibility aisles, a same-plane interface (also promoting accessibility), and a solar panel roof acting as rain protection.

Source: *Keathley Pinney-Brown*

Figure 6.2. An Electrify America bank of DCFCs in Baker, CA. Note the effective and attractive night lighting.

Source: *The Watt Car - An EV Blog*

Figure 6.3. An Electrify America bank of DCFCs in Baker, CA. Note that the charging stations appear mobility device-accessible, the station allows for pull-thru charging, and visitors are sheltered from the sun and rain.

Source: *Google Street View*

Figure 6.4. A Tesla Supercharger bank of DCFCs in Baker, CA. Note that the charging stations appear mobility device-accessible, the station allows for pull-thru charging, and visitors are sheltered from the sun and rain. Also note that larger DCFC charging banks require significant utility space.

Source: *Google Street View*

Figure 6.5 : An Electrify America bank of DCFCs in Warrenton, OR. Note its proximity to bathrooms and things to do like shopping at Joann's and the nearby strip malls. Also note that the outer charging stations, while the appear not to be labeled as ADA stalls, intentionally provide more space for varied parking configurations conducive to accessibility and vehicles that have charging ports in varied locations.

Source: *PlugShare*

Figure 6.6. A level 3 Rivian pull-thru charging station. Note how the cross-hatched aisle on one side and the charging station's location immediately off the curb improve accessibility and parking flexibility. Nonetheless, accessibility could perhaps be improved by having the charging station flush with the parking lot pavement and on consistently surface terrain.

Source: *RANtracker*

Figure 6.7: A bank of size (4 in foreground, 2 behind) 350kW Electrify American charging stations in Kennewick, WA. Note the charging station placement in existing parking stalls and under existing parking lot lighting. Likewise, the station could easily be made pull-thru by relocating the EV-charging-only signs.

Source: *Google Street View*

Station Visualization

These representations are shown to scale to the extent possible using remote data collection methods. The dimensions for parking stalls and corresponding charging components were derived using the ADA dimensional standards provided by the U.S Access Board and by remotely measuring the dimensions of the site's current elements using tools such as Google Earth Pro, Google Street View, and Pacific County's MapSifter.

The parking lots along the west side of Oregon Ave S from 7th St SE in the south to 3rd St SE in the north contain a Level II charger with two plugs. The existing level 2 charging station is already attractive due to its proximity to businesses in the CBD, nearby beach access, visible wayfinding and unique artwork nearby, public restrooms and a sense of security from overhead lighting and overall activity of the area (see the existing parking lot under "Current Alignment" on the next page).

Following the description of the existing parking lot, there are design visualizations meant to show how the existing level 2 station can be expanded and enhanced to accommodate 6 DC fast chargers. Three different alignments are shown to highlight the versatility and potential of this site.

Current Alignment

Alignment 1

Six DC fast chargers would be located in the existing lot with the level 2 station. Three of those fast chargers would be conventionally-widthed stalls, another would be fashioned as a pull-thru station within the parking portion of the Oregon Ave S ROW, and finally two would be ADA accessible stalls on the south end of the lot. The ADA charging stalls would have their charging stations at-grade with the parking lot to promote ease of access. The existing conventional (not EV) ADA stalls on the south end of the lot were displaced by the new ADA accessible EV stalls. Now the conventional ADA stalls lie on the west side of the lot closer to the CBD and are provided an additional ADA aisle space.

The pull-thru charging stall would contribute a uniquely beneficial utility because many tourists and residents may be towing trailers consisting of anything from summer watercraft to travel trailers and would otherwise have to spend time detaching the trailer in order to charge, or worse, leave the trailer in a disruptive or hazardous location while charging their EV. Nonetheless, the pull-thru charging stall takes up four ordinary stalls on the west side of Oregon Ave S. Another four conventional parking stalls are lost to the new DCFC utility hub as well as another two stalls are lost to accommodate additional space required for both the ADA charging stalls and the relocated existing conventional ADA stalls that will be provided an additional accessibility aisle (see the southeast lot corner).


(Becomes ped. ROW to CBD)
4th St SE
Existing parking stall lines (yellow)
Existing utility hub
Existing recently rennovated curbing
Existing level 2 charging station
New DCFC (level 3) stations
New pull-thru DCFC station
New DCFC utility hub
Curbing becomes at-grade with lot for ADA access
ADA charging stalls and aisles
Existing ADA stalls relocated closer to Long Beach CBD
ADA charging stall signage:
ACCESSIBLE
EV CHARGING
EV
USE LAST
PULL - THRU CHARGING
Oregon Ave S
5th St SE
0 ft.
25 ft.
50 ft.

Alignment 2

Six DC fast chargers would be located in the existing lot with the level 2 station. Three of those fast chargers would be conventionally-widthed stalls, another would be fashioned as a pull-thru station parallel with the parking lot's circulation routes, and finally two would be ADA accessible stalls on the north end of the lot. The ADA charging stalls would have their charging stations at-grade with the parking lot to promote ease of access.

In this layout, the pull-thru charging stall does not delete any one parking stall so much as it shortens eight extra-length parking stalls running up the central spine of the parking lot to conventional lengths. However, three conventional parking stalls are still lost to the new DCFC utility hub as well as two more stalls are lost to accommodate the extra space required for the ADA charging stalls.


Existing parking stall lines (yellow)
New DCFC utility hub
Existing utility hub
Existing recently rennovated curbing
ADA charging stalls and aisle
ADA charging stall signage:
ACCESSIBLE
EV CHARGING
EV
USE LAST
New DCFC (level 3) stations
New pull-thru DCFC station
At-grade paving covering underground cables
Existing level 2 charging station
(Becomes ped. ROW to CBD)
4th St SE
PULL-THRU CHARGING
Oregon Ave S
5th St SE
0 ft.
25 ft.
50 ft.

Alignment 3

Six DC fast chargers would be located in the existing lot with the level 2 station (see below). Four of those fast chargers would be conventionally-widthed stalls, and two would be ADA accessible stalls. The ADA charging stalls would have their charging stations at-grade with the parking lot to promote ease of access.

While this layout does not allow for a pull-thru charging station, it potentially reduces costs through only requiring the additional DCFC utility hub and it leaves room for future additional charging stations if desired. Likewise, since there is no pull-thru station, only 3 three parking stalls are lost to the placement of the DCFC utility hub and just two stalls are lost to the additional stall and aisle area required for the ADA charging stalls. Since the existing parking stalls lying down the central spine of the parking lot can already function as pull-thru stalls or stalls for larger vehicles (given they are 30 ft long vs the conventional 17-20 ft length), this could make up for a lack of a dedicated pull-thru charging station because visitors could safely detach their trailers in these larger stalls before plugging their vehicle in at the separate charging stall.


(Becomes ped. ROW to CBD)
4th St SE
Existing parking stall lines (yellow)
Existing utility hub
New DCFC utility hub
Existing recently rennovated curbing
New DCFC (level 3) stations
ADA charging stalls and aisles
ADA charging stall signage:
ACCESSIBLE
EV CHARGING
EV
USE LAST
At-grade paving covering underground cables
Existing level 2 charging station
Oneida Ave S
5th St SE
0 ft.
25 ft.
50 ft.