

SANDAG

Regional EV Charger Management Strategy

Roadmap for Public Agencies

FINAL | MARCH 2023





Introduction and Purpose

The San Diego Association of Governments (SANDAG) and local partners were awarded a California Department of Transportation (Caltrans) Sustainable Communities Planning Grant to develop a regional strategy to assist public agencies with providing readily and consistently available public electric vehicle (EV) chargers. The *Regional EV Charger Management Strategy* focuses on developing a structure of steps and considerations for installing charging private passenger vehicles and publicly accessible parking areas, such as parking lots for public buildings, park & rides, transit stations, rest areas, parks, libraries, recreation centers, and other publicly owned lots. The Public EV Charging Roadmap provides an action plan for public agencies in the San Diego region to use a guide to deploy and manage charging assets in public lots.

The authors of the present strategy document compiled key components from other reports prepared for this effort:

- *Peer Agency Research and Analysis Summary Report* (November 2021)
- *Regional and Local Charger Management Practices Summary Report* (December 2021)
- *Asset Management Considerations Summary Report* (March 2022)
- *Regional Public Charger Operations and Management Strategy* (September 2022)



Public Agency Implementation Roadmap

Policy Check

1. Check that internal policies call for the inclusion of charging infrastructure within capital projects. The table below provides recommendations on which types of projects to include full EV charging deployment versus make-ready infrastructure for future deployment.

Recommended EV Charging Improvements



FULL EV CHARGING DEPLOYMENT

Type of Capital Project

- New construction.
- Significant site redevelopment.
- Parking lot construction.
- Major electrical improvements, such as upgraded transformers, an upsized electrical panel, or improvements that would trigger the need for new trenching or excavation.



MAKE-READY INFRASTRUCTURE

Type of Capital Project

- Parking lot resurfacing (required for covering trenching).
 - » May consider permeable resurfacing at the same time if conduit is appropriately shielded and condensation prevention measures are implemented.
- Minor electrical improvements.
- Utility service upgrades.
- Other maintenance projects affecting areas of the site where future EV chargers are planned.

2. Check that internal policies identify how many chargers to install at existing site modifications.

The **San Francisco Bay Area Rapid Transit District (BART)** has set a goal of installing Level 2 EV charging stations at 3% of BART parking spaces. An additional 6% of spaces will be prepared with charger make-ready infrastructure. BART is developing EV charger design requirements to be added to their Facilities Standards.



3. Check if local design documents include jurisdictionally-specific guidance for charging infrastructure. These specific guidelines and requirements will build on the “General Design Guidance” section later in this document.

- » Local municipal code.
- » Local design requirements and standard drawings.

Planning

1. Identify and prioritize sites for charging infrastructure deployment projects.

- » See Appendix A for examples of prioritization criteria and some available tools to help analyze.
- » See Appendix E for an example of how to identify publicly-owned sites in underserved communities and charging deserts for future prioritization.

2. Examine the common ownership structures offered by EV Service Providers (EVSPs) and determine what model is most ideal for the site.

- » See Appendix B for a decision tree to guide the process to select an ownership structure.

3. Engage relevant stakeholders in the planning and permitting process.

- » See Appendix C for a general timeline of the process and the associated stakeholders.

4. Explore available funding sources.

- » See Appendix D for a non-exhaustive summary table of possible funding sources.

General Design Guidelines

1. Identify the quantity of chargers needed at the site.

- » [California Green Building Standards Code \(CALGreen\)](#) requires newly constructed publicly owned or commercial sites to host a certain number of charging spaces based on the total number of parking spaces in the lot. Design staff should refer to the most recent version of CALGreen as standards are periodically revised.

2. Select the type of charger that aligns with site usage patterns and parking turnover. The table at right indicates generally appropriate power levels for different driver residence times (turnover) and utilization rates – high turnover typically requires higher power levels to dispense an adequate amount of charge in a short time, while high utilization rates may require a greater number of charging ports. Additional information about charger selection can be found in the [Asset Management Considerations Summary Report \(March 2022\)](#).

	HIGH UTILIZATION	LOW UTILIZATION
HIGH TURNOVER	DC Fast Charge or High Power Level 2	High Power Level 2
LOW TURNOVER	Load-Managed Level 2	Level 1

3. Assess the site’s power and communications needs.

- » Contact utility provider and an electrician to assess existing power capacity and necessary improvements to support charging demand.
- » Consider implementing load management systems for sites with a mismatch between parking turnover and charging demand.
- » Assess necessary communications improvements to support vendor software platform/user interface.
- » Consider planning for future expansion, onsite generation, or energy storage by purposely oversizing infrastructure such as panels and transformers, and by installing additional conduit and stub-outs.



4. Require the electrical meter for EV charging be separate from the primary site meter to enable a third party to manage energy fees related to EV charging and facilitate site utilization tracking.
5. Check that the proposed charging equipment adheres to federal and state procurement guidelines, (such as [Buy America](#)) if funded by public dollars.
6. Specify that equipment and network (if applicable) must be compliant with the newest version of [OCPP](#).
7. Optimize charger placement within the site.
 - » Each site must provide accessible spaces in conformance with the latest California Building Code, the Americans with Disabilities Act, and local laws.
 - » Design layouts to allow each port to reach at least 2 spaces.
 - » Place chargers near the site's transformer to minimize costs associated with trenching, conductors, and conduit, to the extent practicable.
 - » Promote a sense of personal security by placing chargers in well-lit locations near main building entrances and thoroughfares, to the extent practicable.
8. Reference the [California Manual for Uniform Traffic Control Devices \(CA MUTCD\)](#) for applicable wayfinding signage, regulatory signage, and pavement markings to help users find charging stations and to communicate parking restrictions.

Operations and Maintenance

Internal Policies

1. Implement a parking policy that aligns with the site usage patterns and parking turnover.
2. Establish a codified 3-5 year maintenance plan with EVSP at the time of initial installation agreement. For guidance and discussion on how to approach the maintenance of stations after this time period, please see the “End of Service Life Considerations” later in this document.
3. Update local O&M guidelines and requirements.
4. Determine pricing of user fees.
 - » The charger operating model that the agency selects for a site will determine whether the site host or the EVSP is responsible for setting user fees. If fees are charged to the consumer, rates should be generally commensurate with the local region's pricing, and should be cheaper, on a per-mile basis, than fossil fuels. If stations offer dynamic rate-setting functionality, this may be used to control parking and charging duration and/or prioritize off-peak charging habits.

Contract Requirements for Vendors and Service Providers

1. Include contract language that states clear roles and responsibilities for asset ownership, maintenance, meter fees, performance data collection and analysis.
2. Include contract language that prioritizes hiring a local workforce to perform installation and maintenance.
3. Include vendor performance requirements to maintain state of good repair to establish expectations for station monitoring and maintenance response times.
4. Include vendor performance requirements for anonymized data collection, data sharing, and reporting, such as:
 - » Cybersecurity and consumer data privacy.
 - » Charging session initiation and end times.
 - » Total energy dispensed (kilowatt-hours, kWh).
 - » Maximum, average, and/or 15-minute session powers (kilowatts, kW).
 - » Fault codes triggered per session.
 - » Service outage durations and station uptime.
 - » Number of daily sessions.
 - » Clear data showing cost to agency (energy cost, maintenance cost) versus agency share of revenue.



End of Service Life Considerations

1. Include contract language that states if the vendor will leave the hardware in place at the end of the contract, remove it, prepare the site for another vendor, or leave the transition option open for decision at the end of the contract.
 - a. If a decision is made to remove the chargers, chargers may either be resold as full units into the consumer sector, or an electronics recycler may be utilized to break down and reintroduce materials into the consumer stream. Homeboy Industries in Los Angeles has partnered with a major EVSP to recycle entire stations, while the San Diego Urban Corps may be able to recycle the core components.
2. Begin planning for the end of service life with enough lead time to avoid service disruptions at contract expiration. Local needs will vary, but beginning the process up to one year in advance may be advisable to allow enough time for the planning and usage analysis activities above, lead times on involvement of local officials and executives, and procurement of a new vendor, if needed.
3. Assess site performance, future demand, and equity gaps to determine whether to continue existing service, expand, or decommission the site.
4. Determine whether to extend the contract, renew, modify the terms, or select a new provider.
5. Consider whether new functionalities or technologies should be integrated into new contracts.



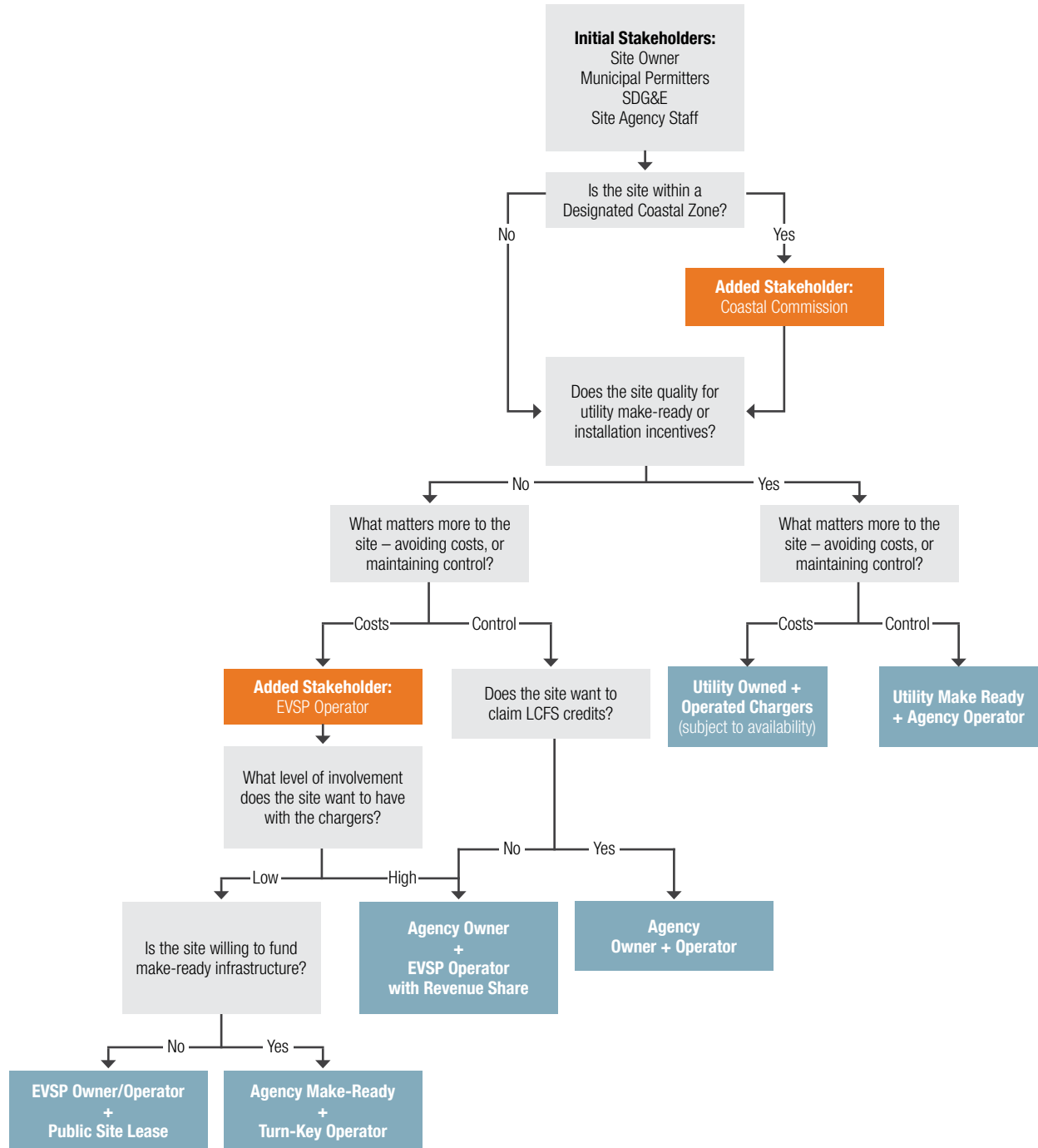
Appendix

A. Table of prioritization criteria and tools

SITE ASSESSMENT FACTORS	RECOMMENDED PRIORITIZATION CRITERIA	AVAILABLE TOOLS
New construction considerations	<p>New construction should consider...</p> <ul style="list-style-type: none"> » Utility service infrastructure availability and/or readiness. » Driver requirements (power, range). » Lot space. » Cost considerations. 	<ul style="list-style-type: none"> » Partner with utility provider for site-specific assessments. » Determine site host or SANDAG's appetite for costs and infrastructure upgrades.
Existing access to charger infrastructure	<ul style="list-style-type: none"> » Sites located in regions with fewer existing EV charging sites should be prioritized over sites with significant existing access. 	<ul style="list-style-type: none"> » PlugShare » Plug-in San Diego EV Charging Stations Map » DOE Alternative Fueling Station Locator » EVI-Pro Lite
Projected commuting patterns into and away from low-income communities (LICs) and disadvantaged communities (DACs)	<ul style="list-style-type: none"> » Sites located in DAC/LICs, CalEnviroScreen Priority Populations, and EJScreen communities should be prioritized. » Sites located in zones with more "Potential EV Work Trip Ends in DAC/LICs" should be prioritized. » Sites located in designated Mobility Hubs should be prioritized. 	<ul style="list-style-type: none"> » Plug-in San Diego EV Charging Stations Map » California Climate Investments Priority Populations 2022 CES 4.0 » A Transformative Transportation Vision (arcgis.com)
<p>Potential for dual-use charging, for example:</p> <ul style="list-style-type: none"> • the site can charge employee/visitor vehicles during the day and fleet vehicles overnight • the site can charge employee and visitor vehicles during the day and allow residential charging after business hours 	<ul style="list-style-type: none"> » Sites located within ¼ mile of "Multiple Family" or "Mixed Use" Planned Land Use areas should be prioritized. » If a site can serve as a dual-use location, it may be a higher priority candidate than single-use locations. Note, feasibility of dual-use operations ultimately depends on the site owner's willingness to serve multiple use cases or allow site access after-hours. 	<ul style="list-style-type: none"> » Interactive Map SanGIS Website (arcgis.com)
Existing electrical infrastructure readiness	<ul style="list-style-type: none"> » Sites with sufficient electrical capacity to add chargers should be prioritized as "low-hanging fruit" over sites that would need significant infrastructure improvements. 	<ul style="list-style-type: none"> » Partner with utility provider for site-specific assessments.
Projected charging demand and usage patterns (utilization and parking space turnover rates)	<ul style="list-style-type: none"> » Sites with higher projected utilization should be prioritized. » Sites located in areas with lower ratios of existing chargers to the anticipated number of EVs should be prioritized. 	<ul style="list-style-type: none"> » EVI-Pro Lite
Climate and environmental hazards or considerations	<ul style="list-style-type: none"> » Assess a site's exposure to environmental wear, such as saltwater corrosion, or hazards, such as wildfires and flooding, and take appropriate mitigation measures. 	<ul style="list-style-type: none"> » FEMA Flood Maps » Port of SD Sea Level Rise Report » CAL FIRE Fire Hazard Severity Zone Map

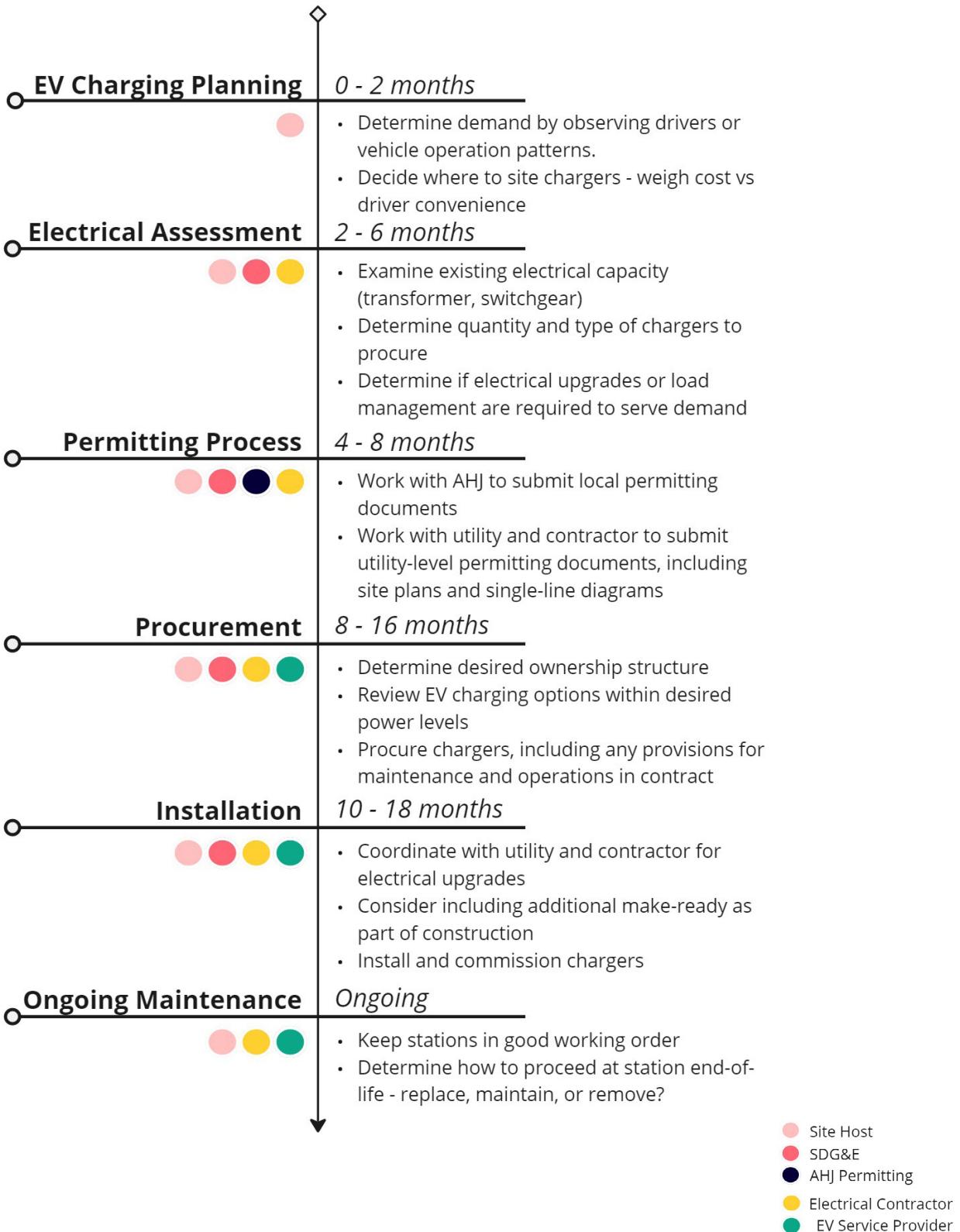


B. Operating model decision tree.





C. EV charger deployment timeline.





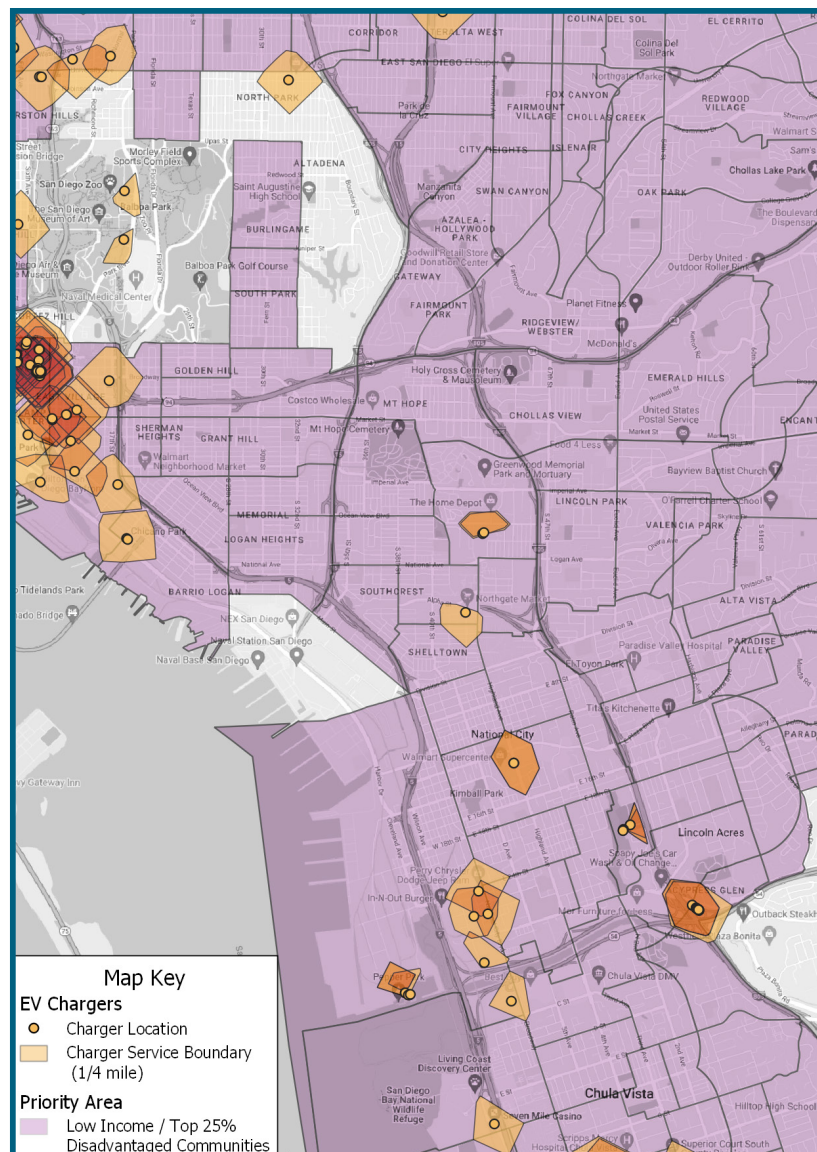
D. Example funding sources.

PROGRAM	SCOPE	DETAILS
Power Your Drive 2.0	Local	<ul style="list-style-type: none"> » Administered by SDG&E. » Workplace and MUD charging. » Covers construction costs up to, and in some cases including, the Level 2 charging station, as well as station design and operation.
Municipal Capital Projects	Local	<ul style="list-style-type: none"> » Administered by local municipality. » Details vary by municipality.
Communities in Charge	State	<ul style="list-style-type: none"> » Administered by CALSTART. » Prioritizes “Ready-to-Go” Level 2 projects and Disadvantaged or Low-Income Communities. » Covers charging infrastructure and offers technical assistance.
Discretionary Grant Program for Charging and Fueling Infrastructure	National	<ul style="list-style-type: none"> » Allows communities to propose EV chargers along designated EV charging corridors. » Specific implementation rules pending. » 50% of CA funding must be for community grants for projects within underserved communities (rural, low/moderate-income communities, communities with low ratios of private parking spaces : cars).
National Electric Vehicle Infrastructure Program	National	<ul style="list-style-type: none"> » Administered by the Federal Highway Administration and Caltrans. » Covers DC Fast Chargers along designated EV charging corridors.
Alternative Fuel Vehicle Refueling Property Tax Credit	National	<ul style="list-style-type: none"> » Tax credit covers 30% of the total cost of commercial charger purchase and installation, to a maximum of \$100,000. » Site must be located in census tracts where poverty rate is at least 20%, or where median family income is less than 80% of state median. » Residential fueling equipment is eligible for a tax credit of up to \$1,000.

E. Example maps to identify infrastructure equity gaps.

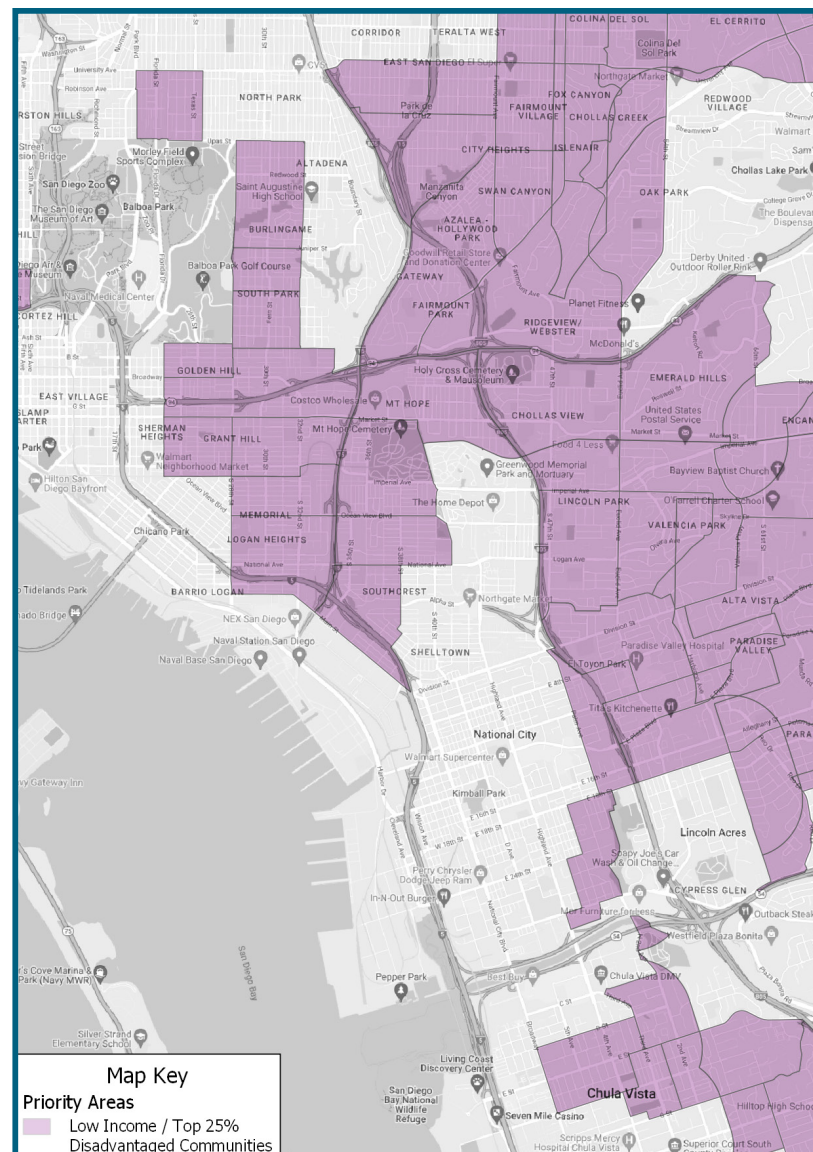
The following maps are intended to illustrate the process of how agencies can use GIS to identify and prioritize possible sites for public charging deployments. This process can be applied to any geographic region and many types of prioritization criteria, such as disadvantaged communities, low income communities, proximity to multi-family dwellings, commercial land use, transit-oriented development, or others as identified by the local agency.

This particular example walks through how to use visual data to answer the question: Which public lots could help fill EV charging infrastructure gaps in low income and disadvantaged communities?



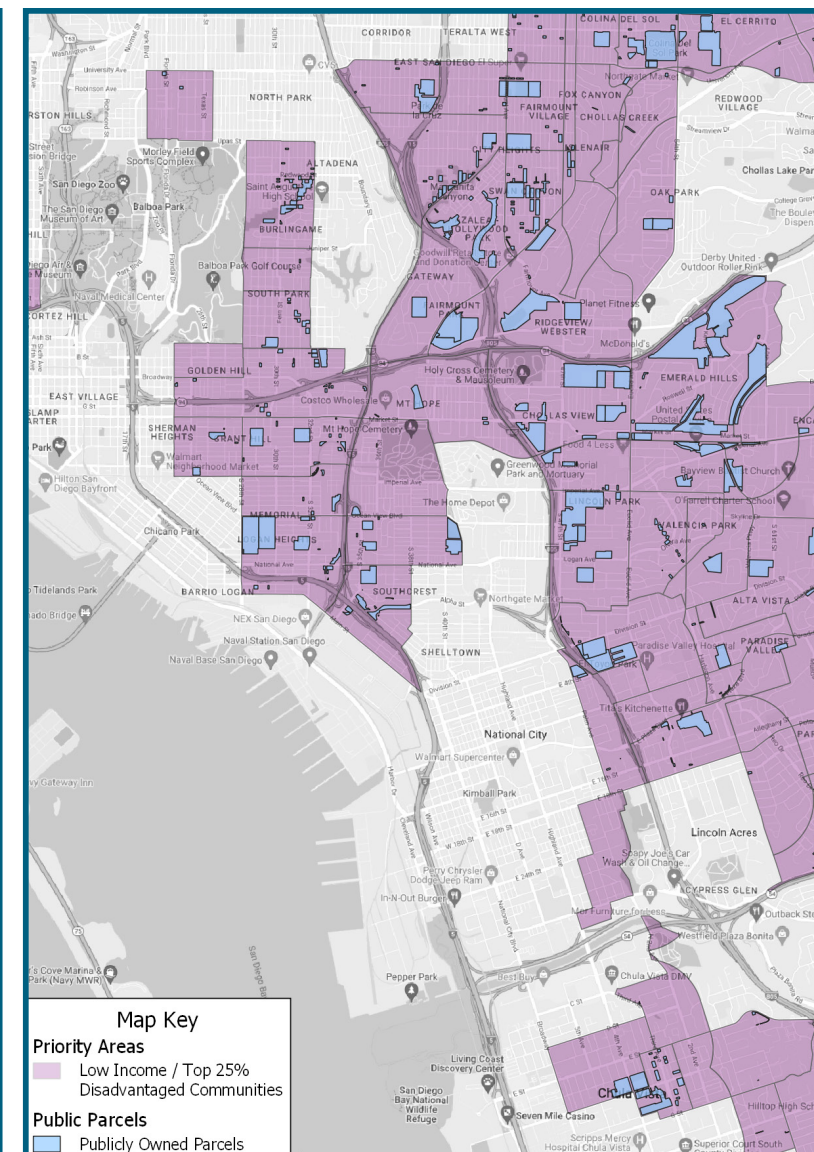
STEP 1

- Display the location of existing chargers within the agency jurisdiction and their assumed service boundary.
- Display the boundaries of the DACs and LICs.



STEP 2

- Display the areas within the DACs and LICs that are NOT covered by an existing charger service boundary, assumed to be a 1/4 mile radius. This represents the infrastructure gaps.



STEP 3

- Display public lots within the DAC and LIC areas that are NOT covered by an existing charger service boundary.
- The identified public lots can serve as a starting point for consideration of EV charging deployment to fill infrastructure gaps in DACs and LICs. Agencies can then analyze the site specifics (upcoming capital improvements, site usage patterns, parking turnover, existing infrastructure, etc.) to determine which of these lots are most appropriate for EV charging deployments.