West Sacramento Mobility Action Plan

Mobility Hubs Supporting Analysis and Documentation

February 2021

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This chapter provides an overview of the Mobility Hub strategy as part of the West Sacrmaneto Mobility Action Plan (MAP). It starts by defining what mobility hubs are, followed by how they achieve the goals set forth in the Mayors' Commission on Climate Change report. The chapter summarizes the methodology for siting of the mobility hubs, key considerations for mobility hub designs, a mobility hub toolkit and its potential application with locations in the city.

Introduction

What are Mobility Hubs?

Mobility hubs are places that offer people a variety of choices to get around, along with other services, technology, and information they need to do so. Whether it is walking, biking, riding transit, finding a carshare or EV charging station, the primary intent of mobility hubs is to reduce dependency on privately owned vehicles, and to equitably provide access to opportunity by way of convenient and sustainable travel options.

The West Sacramento Mobility Action Plan (MAP) defines opportunity as access to employment, education, open space, social connections, healthy food, recreation, and other vital services that contribute to a high quality of life. Mobility hubs in West Sacramento are meant to **improve access to opportunity** by prioritizing variety of mobility choices to support short trips and by **serving as first mile – last mile connection** to wider a transportation network. Additionally, they focus on **user experience** by designing for seamless trips, **integrating services** and amenities that fulfill un-served needs in certain areas, such as healthcare, fresh produce, childcare, social gathering space, etc.; and **placemaking strategies** such as landscape improvements, street furniture, signage, public art elements and temporary programming.

Mobility Hubs are not a one-size-fits-all solution. They are tailored to meet the needs of each neighborhood or district they serve. Availability of diverse transportation options, supportive infrastructure, and land use considerations determine the design and programming at each mobility hub to ensure compatibiity with adjacent context.

How do Mobility Hubs achieve Carbon Zero goals?

In West Sacramento, mobility hubs are a tool for implementing the goals set forth in the **Mayors' Commission on Climate Change**, developed in partnership with City of Sacramento and regional stakeholders. The Commission set forth bold goals to achieve **Carbon Zero by 2045** through a focus on the following sector-based strategies;

A. Built environment,
B. Mobility, and
C. Community health and resiliency.

Equity was a key priority and the commission recommended equity measures to address historical and current disparities, which serve as a guide for implementation of the above sector-based strategies. Equity analysis is required to be applied to all strategies across the three sectors, prior to adoption and implementation to ensure strategies are informed by, and benefit marginalized and underserved populations while avoiding unintended consequences.

Implementation tactics outlined in the Commission report, for the mobility sector, aim to significantly shift away from single-occupancy vehicles and the need for private automobile ownership, and highlight the need for a comprehensive approach to enable clean transportation solutions by improving accessibility, connectivity, and safety. The implementation tactics establish a hierarchy that first prioritizes **active transportation**, followed by **transit and shared mobility**, and finally **vehicle electrification** to achieve equitable outcomes and provide multiple benefits to the communities.

Active transportation: Expand and enhance accessibility to low-stress, connected infrastructure for walking and rolling, prioritizing improvements that address specific community and neighborhood concerns and needs, so that 30% of all trips are by active transportation by 2030 and 45% by 2045.

Transit and shared mobility: Expand and improve transit and shared mobility services to be more accessible, affordable, timely and attractive than single occupancy vehicle use so that 30% of all trips are by transit and shared mobility by 2030, and 50% by 2045.

Vehicle Electrification: Develop a comprehensive package of incentives, disincentives, and policies to encourage the adoption of zero-emission vehicles (ZEVs) so that 70% of new vehicle registrations will be for ZEVs by 2030, and all public, private and shared fleets fully electrified by 2045.

The implementation tactics described above, for the mobility sector provide the critical ingredients necessary for creating mobility hubs that work for community members and help address climate change; and serve as a guiding framework for the MAP. In addition to these, implementation tactics for the built environment sector and Community Health and Resilience sector that are relevant to the design of mobility hubs in West Sacramento are:

- **Sustainable land use patterns**: Supporting infill growth, consistent with the regional Sustainable Communities Strategy to ensure that 90% of the cities' growth is in the established and center/corridor communities and is 90% small-lot and attached homes by 2040.

- **Urban Greening and Forestry:** To expand green infrastructure (baseline canopy of 25% by 2030) and access to parks and open space within ¼ mile, particularly in neighborhoods that historically have been marginalized.
- **Sustainable food systems:** To increase food security and access to healthy, affordable food for all communities, while supporting a regenerative food system.

Learning from Other Communities

The first step in developing mobility hub recommendations for West Sacramento included a review of best practices and industry standards to build from. The following section summarizes select case studies related to mobility hub, sustainable transportation, and other and relevant planning efforts that were considered in the development of a West Sacramento-specific Mobility Hub strategy, including:

1) Los Angeles Metro First/Last Mile Strategic Plan
2) El Camino Real Grand Boulevard Initiative
3) SANDAG Regional Mobility Hub Implementation Strategy
4) City of Oakland Mobility Hub Suitability Analysis Technical Report
5) Toronto Metrolinx Mobility Hub Guidelines
6) BART and VTA TOD Guidelines
7) Curitiba and Bogota Metropolitan Transportation Plans
8) Amsterdam Smart Mobility Plan
9) Copenhagen Action Plan for Green Mobility

Each case study focuses on possible applications and key takeaways for West Sacramento, including considerations across the following categories:

Mobility Hub Site Selection

- **Hub Concepts Vary Depending on Land Use –** The scale, location, and types of transportation options and amenities comprising a hub varies based upon development patterns, providing tailored solutions in a suburban setting that may look different from a highly urban hub.
- **Focus on Existing Communities and Areas Where Growth is Expected –** Putting mobility hubs in place where development happened, is happening or will happen, rather than relying on the hub to generate development, can increase the success of the hub.
- **Involve the Community in the Mobility Hubs Planning Process –**Involving the community early in identifying the location of the hub and their transportation and community needs will help create a hub that is inclusive and respond to the community's need. Defining clear metrics in collaboration with the community is key to monitor successes of the hubs.

Implementation of Mobility Hubs

- **Tactical Urbanism** – Tactical urbanism is a great way to test new concept at a small scale, carefully monitor the results and lessons and scale up successful concepts for a larger area. It also creates the opportunity to adjust the concept based on what works and doesn't as it is low cost and temporary structures.
- **Importance of Placemaking**– Creating a destination, as opposed to just passing through, is important in the success of mobility hubs. Mobility hubs should integrate the transportation and placemaking functions.
- **Mobility Hubs are Places of Seamless Connection –** In parallel of offering multiple transportation options at the hubs (e.g. transit stops, bike and scooter share), users should be aware of the service offered to them through wayfindings, interactive information system or phone application. Also, the design of the hubs should include physical path and visual line of sights between transportation services.
- **Developing Safe Access to Mobility Hubs in Conjunction with the Mobility Hubs Implementation –** Suburban areas (e.g. long blocks, freeways, large streets) can create barriers for active transportation. Developing safe path to the hubs and implementing supportive infrastructure (e.g. sidewalk, bike lanes) in conjunction of implementing the hubs will enhance user experience and allow for more usage of the hub.
- **Developing Public-Private Partnerships** – Partnerships with local stakeholders and businesses, employers, new mobility companies and developers plays a vital role in the success of mobility hubs. Possible partnerships include pilot projects, data-sharing agreements with new mobility company, infrastructure improvements in existing and new developments.

Los Angeles Metro First/Last Mile Strategic Plan

Los Angeles, California

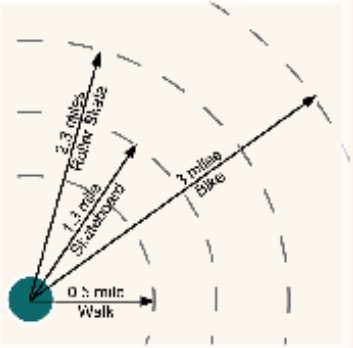
Keywords:

Transit Access, First/Last Mile, Active Transportation

Possible Applications for West Sacramento:

- Use the toolkit interventions to improve the overall experience of people biking and walking in West Sacramento.
- Identify pathways to mobility hubs.
- Modify access shed to include e-bike, scooter and e-scooters.

Access Sheds per Mode



Context:

Los Angeles County's streets have traditionally offered little accessibility to transit stations for people walking and biking, making public transit seem less accessible for daily trips. This plan focuses on strategies to improve active transportation access to and from rail and BRT stations.

Summary:

- Identifies six barriers that most impact transit access: long blocks, freeways, maintenance of surfaces, safety, wayfinding, and right-of-way allocation and design.
- Introduces the idea of pathways connecting different transit stations.
- Identified access sheds where improvements for each mode of transportation should be located. The sheds vary from ½ mile to 3 miles depending on transportation mode (figure below).

Key technical takeaways:

The plan includes a toolkit to address barriers along identified proposed pathways:

Trip Duration Reduction Improvements:

- Cut-throughs and shortcuts
- Freeway underpass and overpass enhancements
- Signal modifications
- Car share
- Neighborhood Electric Vehicles (NEVs)
- Van pool and feeder bus
- Bike share and bike station
- Micro Park-and-ride

Safety Improvements:

- Enhance existing crosswalks
- Mid-block and additional intersections crossings
- Raised crossings
- Curb extension at intersections
- Scramble crossings
- Lighting
- Traffic calming
- Reduced lane width
- Sidewalk widening
- Rolling lanes
- High-visibility bicycle parking

Overall Rider Experience Improvements:

- Metro signage and maps
- Medallion signage
- Time-to-station signage
- Real-time signage adjacent to stations
- Smart technologies
- Street Furniture
- Landscaping and shade
- Enhanced bus waiting areas
- Sidewalk paving and surface enhancements
- Enhanced bike facilities
- Bus enhancements
- The green zone
- Electronic bicycle and pedestrian counters
- Kiss and ride

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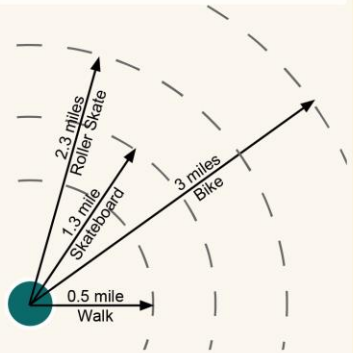

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Grand Boulevard Initiative

El Camino Real Corridor, San Francisco Peninsula, California

Keywords:

Corridor vision, place of destination, placemaking, multijurisdictional collaboration

Possible Applications for West Sacramento:

- Transform a vehicular oriented street to a place of destination.
- Reimagine long roadways in West Sacramento such as Jefferson Boulevard, Sacramento Avenue or Capitol Avenue.

Context:

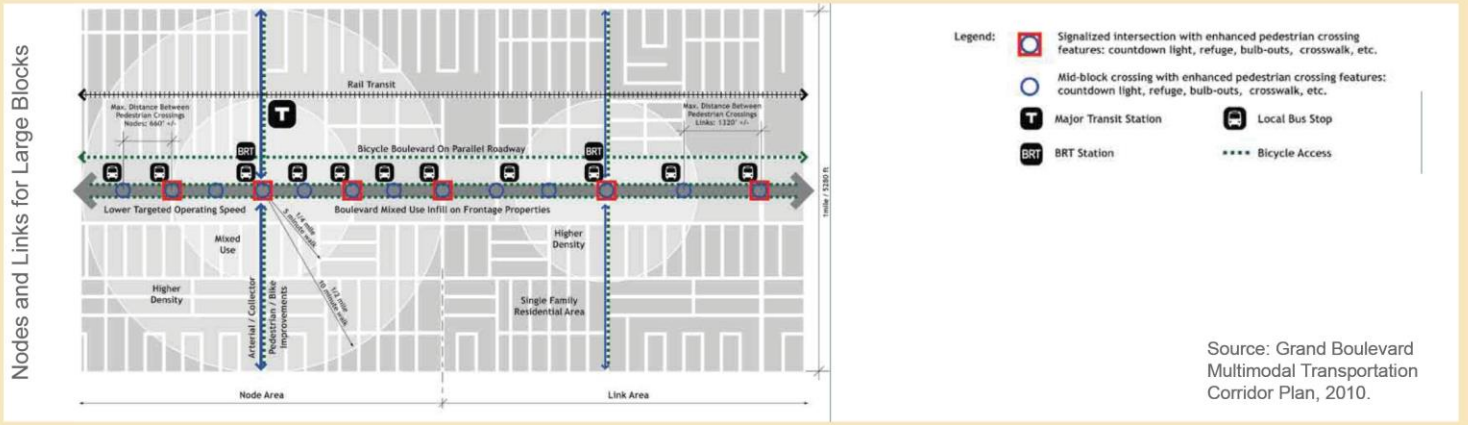
El Camino Real has historically been one of the major arterial roadways along the San Francisco Peninsula, linking downtown areas and transit center, but struggling to tie into the community due to its vehicular focus.

Summary:

- Initiated in 2006 with the objective of developing a shared vision of the corridor and creating a place of destination linking transportation and land use.
- Prompted a shift to increased density and more mixed-use zoning and land use plans along the corridor, a focus on creating destinations and activation of groundfloor retail, and an emphasis on safe, multimodal streetscape designs.
- Separated the vision into nodes (e.g. transit centers, downtown areas, universities) and links (connections between nodes).

Key technical takeaways:

- Concepts for nodes include: pedestrian-scale grid of small block and high frequency of pedestrian crossing (max. 660 feet), lower targeted operating speeds with synchronized traffic signals, continuous network of pedestrian facilities within ½-mile radius of node area, and concentration of transit-oriented developments.
- Concepts for links include: Greater distance between signalized crossings (max. 1,320 feet), accommodate bicycle facilities on the corridor where feasible, supplement with alternative facilities on parallel streets, allocate transit-oriented development along the street frontage.



Source: Grand Boulevard Multimodal Transportation Corridor Plan, 2010.

SANDAG Regional Mobility Hub Implementation Strategy

San Diego, California

Keywords:

Mobility Hubs, Transit Hubs, Public- Private Partnership, New Mobility

Possible Applications for West Sacramento:

- Comprehensive available amenities and services at mobility hubs to encourage non-auto transportation use.
- Develop public-private partnerships at mobility hubs.
- Employ strategies for delivery and curbside management for efficient people and goods movement.

Access Sheds per Mode

Context:

The strategy was developed as part of San Diego Forward to assist SANDAG in demonstrating how transportation services, amenities, and supporting technologies can work together to make it easier for communities to access transit and other shared mobility choices.

Summary:

- Identifies mobility hubs as places with seamless connections between public transit and other travel modes. Mobility hubs should be developed in existing communities or areas with transitoriented developments where public transit is most active.
- Highlights the importance of public-private partnerships in implementing transit hubs.
- Potential partners include developers, property managers, employers, transportation service providers and technology service providers.
- Encourages emerging privately-operated transportation services to explore possibilities to solve real-world mobility challenges.
- Data integration from multiple sources (public or private transportation services) is necessary for a successful transit hub.

Key technical takeaways:

Identifies 5 types of services and amenities needed in transit hubs and their distance to the hub based on the transportation speed:

- Transit Amenities (in the transit station area): enhanced transit waiting areas, real-time transit information, and passenger loading zones.
- Pedestrian Amenities (within a 5 minute walk from the station): safe and convenient walkways and crossings.
- Bike Amenities (within a 5 minute bike ride from the station): network of bikeways, safe bicycle parking, and bike share services.
- Motorized Service Amenities (within a 5 minute drive from the station): exclusive bus lanes, on-demand motorized shared services and infrastructure improvements that support their efficient operation, EV charging, smart parking, and flexible curb space.
- Support Services & Amenities (within the access zone): wayfinding, mobile retail services, package delivery areas, and integrated trip planning and payment options.

City of Oakland Mobility Hub Suitability Analysis Technical Report

Oakland, California

Keywords:
Mobility Hubs, Transit Hubs, New Mobility, methodology for selection of Mobility Hubs.

Possible Applications for West Sacramento:

- Technical approach to siting the mobility hubs
- Equity Considerations
- Phasing of Implementation

Context:
The study looks at mobility options that can supplement existing road and transportation infrastructure - like TNCs and shared micromobility - and proposes mobility hubs as an opportunity to improve mobility and direct their growth in an efficient and equitable way.

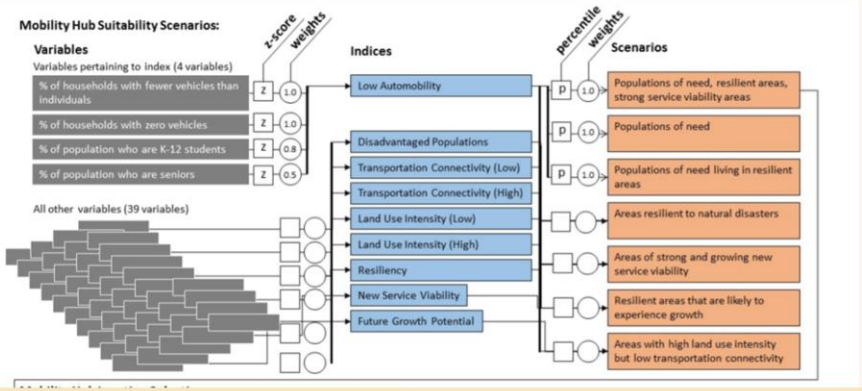
Summary:

- The study found that there are major gaps in Oakland's transportation system, including first and last mile transportation and long transportation times. It proposes mobility hubs as a viable solution to these problems.
- Introduce subsidy programs for users in low-income areas
- 77 mobility hubs spaced ½ to 1 mile apart in order to capture the ½ mile walking catchment area

Key technical takeaways:

- The study uses a four-step Analytical Hierarchy Process to classify various attributes and aggregate them across multiple indices in order to define the site of the mobility hubs. The four steps are:
  - Data processing and variable construction.
  - Index construction;
  - Scenario development; and
  - Location and mode suitability analysis.

- The model includes 7 indices and same number of scenarios



Example: In the model, the authors took variables such as "the proportion of households in each block group with fewer vehicles than household members" and "the proportion of households in each block group with zero vehicles", weighted them based on importance, and used them to construct a "Low Automobility" index. The authors did this for multiple indices per block group. The indices were weighted based on their importance per scenario like "Population of Need" vs. "Resiliency" vs. "Growth". The mobility hubs were then sited based on these scenarios and a quantitative location and mode suitability analysis.

Toronto Metrolinx Mobility Hub Guidelines

Toronto, Canada

Keywords:
Mobility Hubs, Transit Hubs, Placemaking, New Mobility, Regional Planification, implementation strategies

Possible Applications for West Sacramento:

- Typology of mobility hub
- Placemaking at transit station.
- General mobility hub implementation guidance and strategies.

Context:
The Metrolinx Mobility Hub Guidelines looks at identified mobility hubs along high-quality transit lines in the greater Toronto and Hamilton area. Guideline to inform planning and development of hubs

Summary:

- Provides guidelines on how to best develop and improve transit hubs focusing on the two main functions: transportation and placemaking.
- Defines mobility hubs as:
  - Major transit stations and their surrounding area serving a critical function in the regional transportation system as the origin, destination, or transfer point for a significant portion of trips.
  - A place of seamless connectivity between different modes of transportation and have intense concentration of working, living, shopping and playing spaces.
- Siting methodology for a successful mobility hub includes: multimodal transportation, residential and employment density, high levels of pedestrian priority, embedded technology, development potential and economic anchors and strong sense of place.

Key technical takeaways:
Divides mobility hubs into the following typology categories:

- Based on Urban Context:
  - Central Toronto: Regional center, multiple destinations, and high density, limited developable land, walkable street network.
  - Urban Transit Nodes: Major and local centers with mix of uses, moderate to high density, some developable land availability.
  - Emerging Urban Growth Centers: Significant developable land availability, existing development forms, generally auto-oriented areas.
  - Historic Suburban Town Centers: Town centers, low-medium density, mix of uses, walkable streets.
  - Suburban Transit Nodes: Auto-oriented urban form, good land availability for development, good market for mix-used developments.
  - Unique Destinations: Universities, Colleges, airports.
- Based on Transportation Function:
  - Entry
  - Transfer
  - Destination

Guidelines are separated into three categories:

- Seamless Mobility
  - Seamless integration of modes at the rapid transit station
  - Safe and efficient movement of people with a high level of pedestrian priority
  - A well-designed transit station for a high-quality user experience
  - Strategic parking management
- Placemaking
  - A vibrant mixed-use environment with higher land use intensity
  - An attractive public realm
  - A minimized ecological footprint
- Successful implementation
  - Flexible planning to accommodate growth and change
  - Effective partnerships and incentives for increased public and private investments

BART and VTA TOD Guidelines

San Francisco Bay Area, California

Keywords:
TOD Development, Agency Owned Land, Equity

Possible Applications for West Sacramento:

- Possible tactics to develop TOD Guidelines.
- Guidance on creating comprehensive policies to encourage new parking and development standards.
- Emphasize development potential surrounding an improved transit and transportation network.

Context:
BART and VTA are taking an active approach to developing agency owned properties through public-private and public-public partnerships to help support the use of modes of transportation other than single-occupancy vehicles to access their stations.

Summary:
These plans look at how they can implement transit supportive land use and other development measure and tactics in areas served by high-capacity transit, with the goal of increasing rider experience and ridership.

Key technical takeaways:

- Set a minimum threshold for affordable housing on developments happening on or near a station.
- Use of local workforce in the local developments.
- Set maximum parking standards depending on the connectivity of the nearby station.
- Set minimum expected density for development on or near the station depending on the connectivity of each station.
- Develop a checklist to evaluate transit supportive developments on or near stations.
- Focus on equity and complete communities.

Curitiba and Bogota Metropolitan Transp. Plans

Curitiba, Brazil and Bogota, Colombia

Keywords:
High Capacity Transit Corridor, Regional Transportation Planning, Land Use and Transportation

Possible Applications for West Sacramento:

- Applicable tactics when looking at the possibility of creating high capacity transit corridor to better connect the different areas of the city and the region.

Context:
The Cities of Curitiba and Bogota took similar approaches for their metropolitan public transit system. The transit systems were modified from radial services connecting neighborhoods to the central area to a system of transit corridors and feeder services.

Summary:
Both cities looked at current and future developments to:

- Locate high-capacity and high-frequency lines in areas with high expected growth.
- Allocate separate right-of-way for transit and enhance the station areas to make these more efficient.

Key technical takeaways:

- The high-capacity lines are located in transit exclusive corridors or have allocated right-of-way.
- All stations along the corridors are enhanced stations, with weather protection and early payment, to improve rider experience and facilitate transfers.
- Universal fare system with free transfers: the success of the system depends on transfers along the route.
- Routes with lower ridership are served by smaller vehicles to keep higher frequency.

Amsterdam Smart Mobility Plan

Amsterdan, Netherlands

Keywords:
Public-Private Partnership, Smart Mobility, Tactical Urbanism

Possible Applications for West Sacramento:

- Partnerships with local stakeholders and businesses in developing smart mobility pilot projects.
- Focus on smart mobility to increase access and ease of use.

Context:
The City of Amsterdam has been at the forefront of urban biking but also of smart mobility for many years. It is mainly due to a combination of factors:

- Relatively small area and high density of population make carsharing, transit, biking and Mobility as a Service (MaaS) a viable option for most trips.
- Forward-thinking city government promoting new initiatives.
- Creative and enterprising local population developing businesses around smart mobility which led to the creation of Amsterdam Smart City Public-Private Partnership.

Summary
The objective is to offer alternatives to the present forms of mobility, to create more space in the city by sharing and to use this extra space to improve liveability. This includes shared electric transport, from cars to bikes, in 'Neighbourhood eHubs' (eBuurthubs) established in cooperation with local residents. The residents put together their own eBuurtthub using a mix of different modes of transportation.

Key technical takeaways:

- From Small-Scale to Scaling-Up: Test new concept at a small scale, carefully monitor the results and lessons and scale up successful concepts for the whole city.
- Strengthen partnerships at the local level (neighborhood) regional level and national level to create successful pilot project.
- 'Learn by Doing' Feedback Loop: allows flexibility and adjust mobility hubs based on what is working or not.
- Smart Phone Applications: Provides information on transportation modes, departure times and distances to ferries and offer advices on where to park.

Copenhagen Action Plan for Green Mobility

Copenhagen, Denmark

Keywords:
Climate, Zero-Carbon, Green Mobility, Active Transportation

Possible Applications for West Sacramento:

- Policies and projects to incentivize a mode shift to greener transportation choices.
- Improve experience for active transportation users.

Context:
As part of the Climate Plan and to achieve the goal of becoming Carbon Zero by 2025, the City of Copenhagen developed the Action Plan for Green Mobility which is a package of 25 specific initiatives covering five themes:

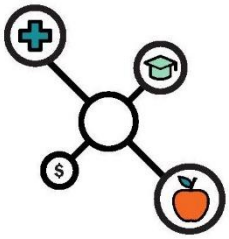
- Urban development: Develop and design the city in a way that makes green transportation the first choice (ex.: neighborhood plans, parking policy).
- Green means of transportation: Extend green transportation network (ex.: shortcuts for bikers, EV charging stations, pedestrian network, bus priority).
- Transportation system: Adapt the road network for a smooth traffic flow (ex.: optimized transportation system, traffic management).
- Incentive: Make green transportation modes more attractive with incentives for choosing them (ex.: local collaborations, cooperation with school).
- Innovation: Develop new concepts of transportation technology.

Initiatives were selected through rounds of public meetings with local stakeholders and prioritize from existing local plans. The Action Plan supplements previous extensive work and investments in infrastructure in active transportation and transit that are already underway.

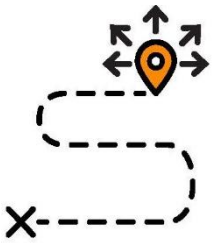
Mobility Hub Strategy for West Sacramento

A key takeaway from the best practices review was the importance of integrating transportation, land use and placemaking strategies for the mobility hubs to successfully function, while leveraging existing assets and infrastructure investments. The design of mobility hubs should allow flexibility and scaleability to successfully respond to future growth, and evolving needs, mobility preferences and technology.

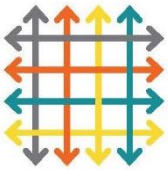
In developing a mobility hub concept specific to West Sacramento, the priority is not only to expand mobility choices to provide access to opportunities, but also to bring opportunities closer to people by co-locating them with transportation; and minimizing trips. The following goals serve both, as a guide for hub design, and as metrics for assessing the success of mobility hubs.



ACCESS TO OPPORTUNITY



PROVIDE BOTH A FIRST MILE LAST MILE CONNECTION *AND* A DESTINATION



A DENSE NETWORK OF SUSTAINABLE TRANSPORTATION OPTIONS

1. Ensure access to opportunity – beyond simply employment to include heathcare, education, fresh food, social connections, and other key services.

2. Provide both, a first mile connection and a destination – Mobility hubs will provide a connection to wider transportation networks and also become a destination in its own right. Integrating uses such as clinics, food options, grocery, daycare and other community amenities, will create an activity node at the mobility hub.

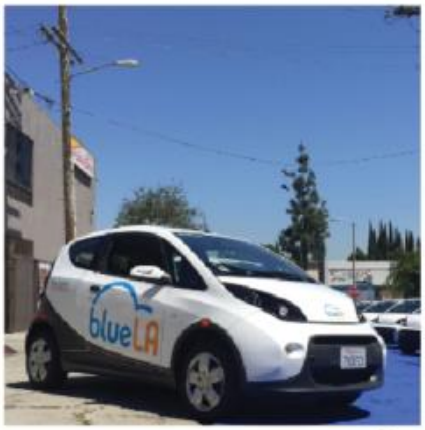
3. Create a dense network of sustainable transportation options for them to be useful and effective.

AUGMENT EXISTING SUSTAINABLE TRANSPORTATION NETWORKS

4. Augment existing sustainable transport options such as bike share, rideshare, scooter share, bicycle network and bus lines.

These goals inform the basic structure of a mobility hub to include three key components, irrespective of the location of the hub.

1. Core transportation infrastructure,
2. Activating and supporting uses, and
3. Cultural context.



CORE TRANSPORTATION INFRASTRUCTURE

ACTIVATING AND SUPPORTING USES

CULTURAL CONTEXT

Core Transportation Infrastructure

Integral to the function of a mobility hub is its transportation function, indentifying the infrastructure that will enable the most trips via sustainable modes. The menu of services provided at each mobility hub can be some combination of, but not limited to, the following:

- Public Transit
- Bicycle infrastructure
- Bike-share
- Electric scooters
- Car-share
- EV Charging
- Flexible curb space

- Automated Vehicles and Connected Vehicles
- Waterborne Transit
- Microtransit

Activating and Supporting Uses

The directly adjacent land uses are just as important as the transportation infrastructure that is within a mobility hub. The existing adjacent land uses can be thought of as supporting uses. However, there is also an opportunity to add to existing services either within the hub itself or very closely adjacent.These are considered as activating uses that bring people to the mobility hub for reasons beyond just transit trips, and create an environment that supports active social life and local economy. Activating uses can be permanent with a brick and mortar presence, or flexible in the form of mobile truck or temporary kiosks. But more importantly they serve site-specific needs. Examples of activating uses are:

- Community hubs
- Mobile and/or brick and mortar retail
- Designated delivery lockers
- Access to healthy food
- Small open spaces/parklets
- Daycare/preschool
- Senior facilities
- Health clinics
- Maker-spaces/co-working spaces
- Libraries
- Bike/scooter maintenance

Cultural Context

Finally, integral to the success and use of the mobility hubs is cultural sensitivity. Integrating cultural elements with the design of a mobility hub is important to ensure that all members of the community are served equitably. It also creates a sense of community by providing opportunities for cultural expression. Some examples of cultural considerations are:

- Language/way finding
- Design considerations for seniors
- Place-making opportunities
- Smart phone usage
- Public art

Where Should Mobility Hubs be Located in West Sacramento?

Once the priorities and basic structure of mobility hub were determined, the next step was to identify locations of mobility hubs in West Sacramento. This was done by conducting a **Suitability Analysis** at three scales.

1. **Citywide scale:** At the citywide scale, the suitability analysis looks at a number of metrics to determine where the greatest need is and where there will be the greatest impact. Metrics assessed fall under four broad categories:

- Connectivity
- Land use characteristics
- Demographics
- Infrastructure and resilience

2. **Neighborhood Scale:** Zooming at the parcel level, areas deemed highly suitable at citywide scale, were further assesed to take into consideration current and proposed investments in infrastructure for active transportation, service coverage for transit, and current and proposed land use development.
3. **Site Scale**: The final stage in the suitability analysis included proposing potential sites and their respective typologies that would create a cohesive and robust mobility network across West Sacramento.

The **Suitability Analysis** provides a sound framework for determining locations of mobility hubs and their type, by identifying gaps in exisiting services, infrastructure and amenities at citywide scale and eventually focusing on site-specific needs.

Suitability Analysis and Outcomes

The methodology illustrated above outlines the various layering of metrics to create the suitability heat maps for 2020 and 2035.

Citywide scale

At the citywide scale metrics in the four areas listed below, were applied to create suitability heat maps for 2020 and 2035.

1) Connectivity
2) Land use characteristics
3) Demographics
4) Infrastructure and resilience

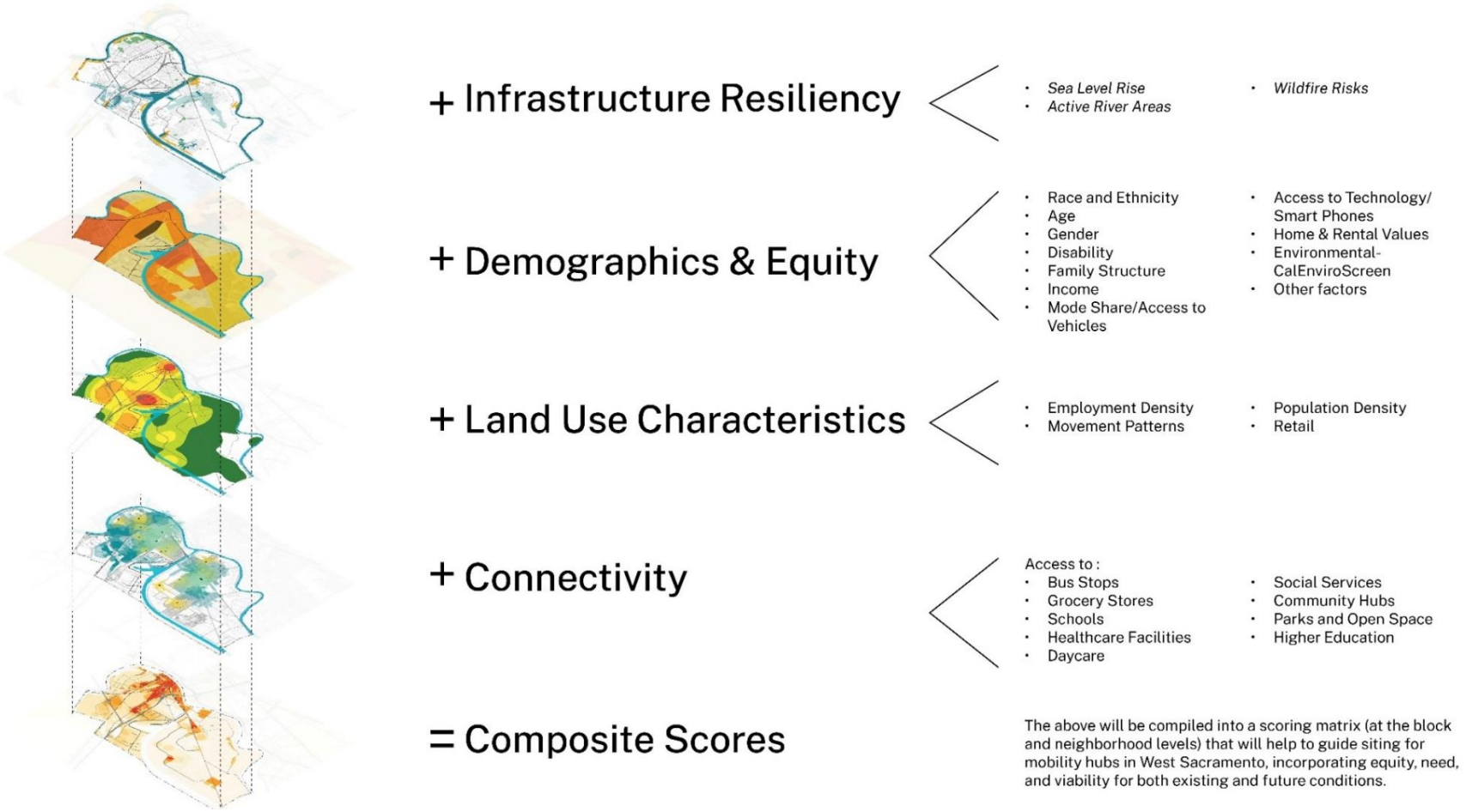
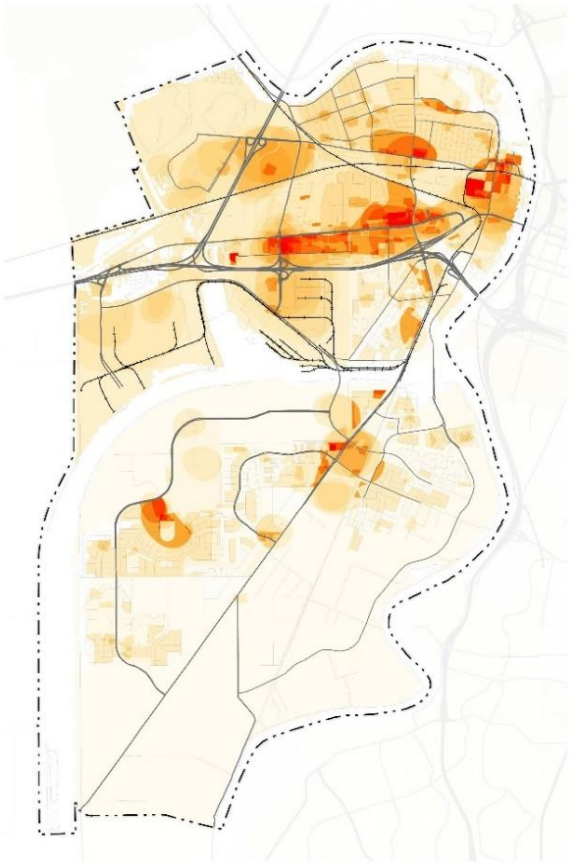
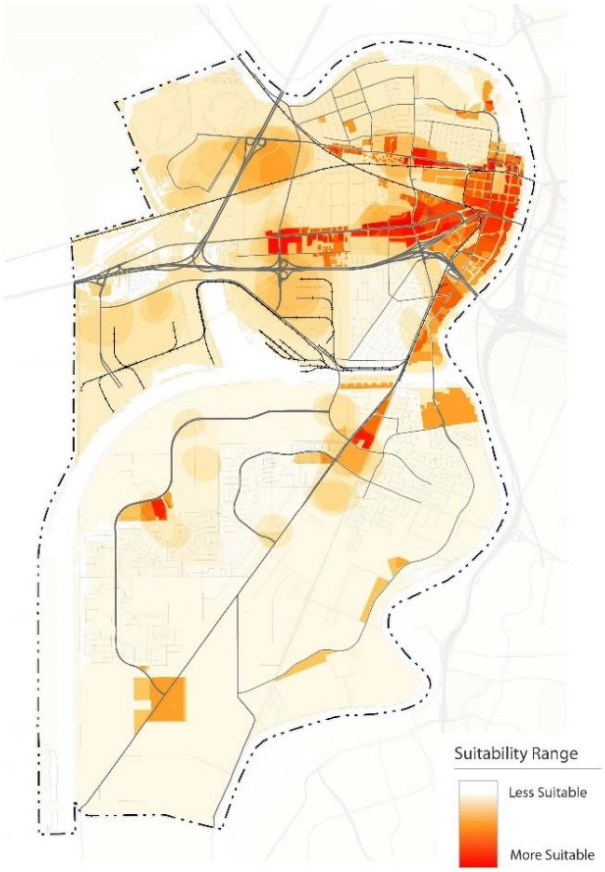


Figure 1: Methodology for Suitability Analysis at the Citywide Scale

SUITABILITY- 2020



SUITABILITY- 2035



Suitability of a location varies by the metric measured. For example, a metric in infrastructure resiliency is flooding risk for 2035 and on, which may deem a location as a less desirable than others. Contrary to this, the same location may deemed highly suitable in the context of the equity metric, due to a concentration of population with low income or high technological needs. Therefore, the suitabilty analysis, layers these metrics to arrive at a composite scoring for each location.

The citywide suitability analysis considers two time horizons, with the suitability for 2020 representing current conditions and the suitability for 2030 adding additional layers of proposed employment and population densities. The darker an area, the more suitable it is for a mobility hub based on the aforementioned metrics.

West Capitol Avenue represents a strong area for investment currently in mobility hubs and continuing into the Washington District. Fewer hot spots are located in the south, which reflects both the equity metrics and the population density.

When considering future conditions the development proposed near the Sacramento River in the Bridge District and Pioneer Bluff become very suitable for investment in mobility hubs. However, these areas at the moment are not as prime for investment. The Washington District only intensifies in need for investment on a 2035 timeline.

Connectivity

The connectivity category focuses on access to bus-stops, grocery stores, schools, healthcare facilities, daycare, social services, community hubs, parks and open space, higher education.

Bus-Stops

While on the surface, it appears that the existing network provides bus service to much of West Sacramento, the low frequency of buses makes it less effective and less attractive. While this is expected to change with the new bus network, for the purpose of this analysis the new bus network has been used to identify gaps. The new network reduces the catchments across much of the city but may result in improved quality of service in the remaining routes. *Map below show the current access to bus stops.*

Figure 2: Access to Bus Stops

Educational Access

Access to education across the life span of residents represents a substantial trip generator. Students, in particular, tend to be under the driving age therefore requiring other forms of mobility. Lack of mobility options and thus access to education, creates inequity. *Maps below show the current access to various level of education.*

Figure 3: Access to Daycare

While not explicitly educational, daycare facilities are in similar categories because they represent a stop for trip chaining behavior. Providing mobility options nearby these areas can be hugely impactful for residents that are taking care of small children while working

Figure 4: Access to Elementary School

Access to elementary schools can have implication on attendance and safety. By investing in active transportation modes, children who are at the age to bike or walk to school on their own can. This can mitigate effects of traffic during school hours.

Figure 5: Access to High School

High schools are prime areas for locating mobility hubs as this population have limitations on their mobility choices. By installing behavior during this time, sustainable transportation can continue to be a preferred option later in life.

Figure 6: Access to Higher Educational Facilities

Often, higher educational facilities are limited in their ability to cater to parking, meaning transportation demand management processes must be put in place. Mobility hubs can help to offset this pressure. The catchment for these facilities are inherently larger and can extend into Sacramento

Key Services Access

Much like educational institutions, access to key services such as health care and healthy foods are key trip generators and often not included in transportation analysis. Yet again, lack of access to key services results in disparity and inequity causing long-lasting social issues. *Maps included show the current catchments for grocery stores, health care facilities, community hubs, and parks.*

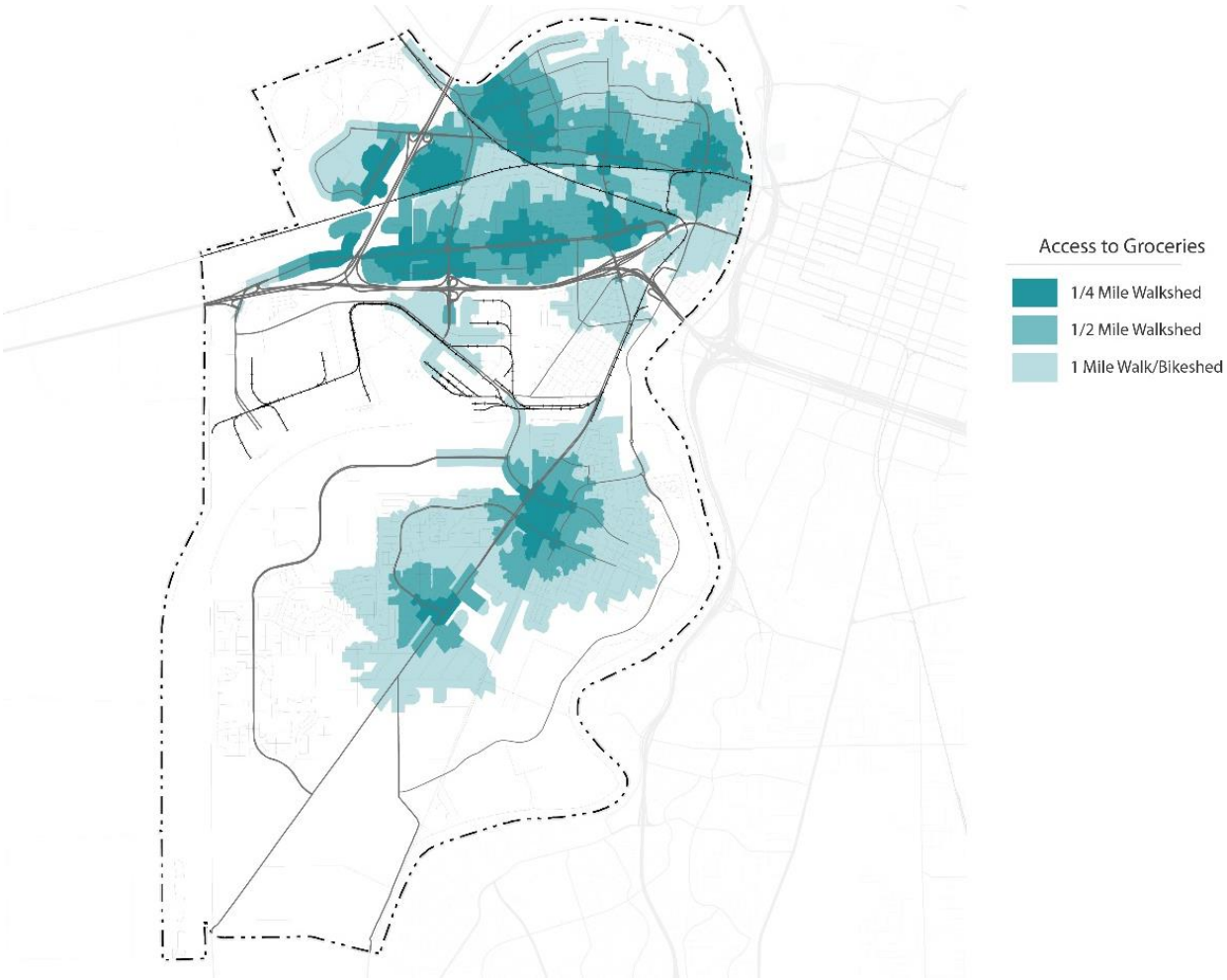


Figure 7: Access to Grocery Stores

Access to healthy food at a walking distance is unavailable for many residents in the southern area of the city. Mobility hubs in these areas should provide additional food options to help reduce car trips.

Figure 8: Access to Health Care

Healthcare access is almost exclusively via car trips for residents in West Sacramento with the entire souther part of the city with no access to hospitals. The above include clinics and hospitals. Additional pop-up clinics can be strategically placed at mobility hubs.

Figure 9: Access to Community Hubs

Community hubs such as churches and clubs provide areas of gathering. These social connections create livable communities. In part because of the history of the northern communities, there is far more access to these social clubs in the north.

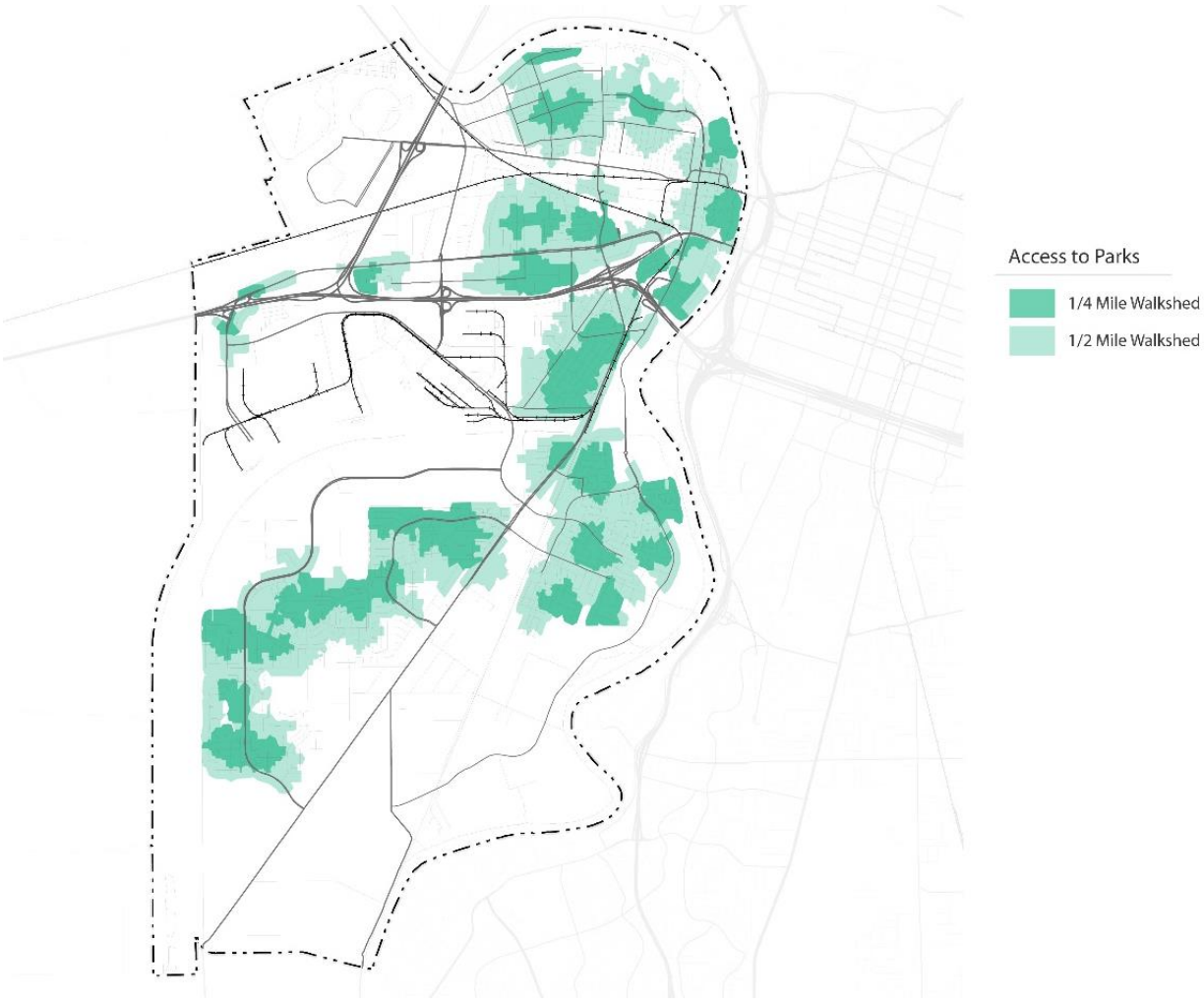


Figure 10: Access to Park

Access to open space and parks provide public health benefits by not only promoting physical activity but also greening the city. Interestingly, some of the areas with the least amount of parkland have the highest pollution. Those areas should prioritize parklets or landscaped areas to create some degree of access to vegetation.

Outcomes

The primary function of mobility hubs is to reduce dependency on privately-owned vehicles by expanding mobility choices available for people for equitable access to opportunities. The gaps identified under the connectivity category directly inform the menu of mobility options needed at specific locations for short trips, and connections to regional transportation network for longer trips. Mobility hubs can also fill gaps in access to key services by incorporating temporary programs such as a mobile market, mobile clinic, produce stands, mobile libraries, parklets, etc.

Land Use Characteristics

Land use and transportation are inextricably linked, as landuse patterns determine the nature and frequency of transportation trips. Understanding current and future patterns of land use

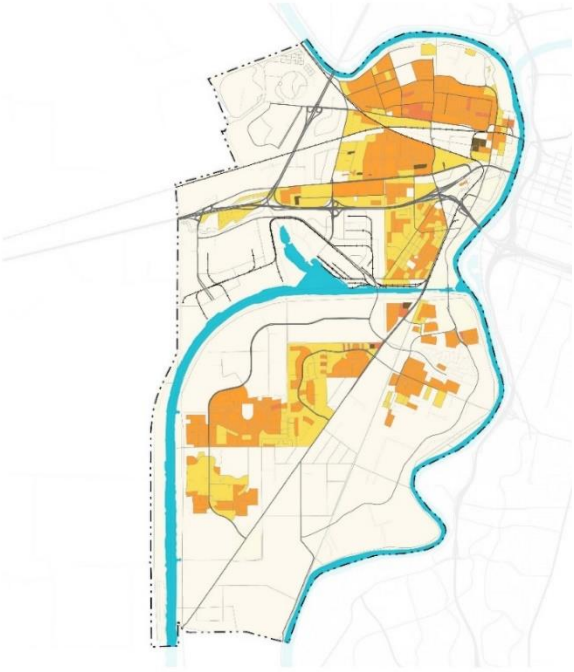
help determine whether are not those land uses are adequately served by multi-modal transportation options, and how mobility hubs can fulfil those needs.

The metrics used for this analysis are:

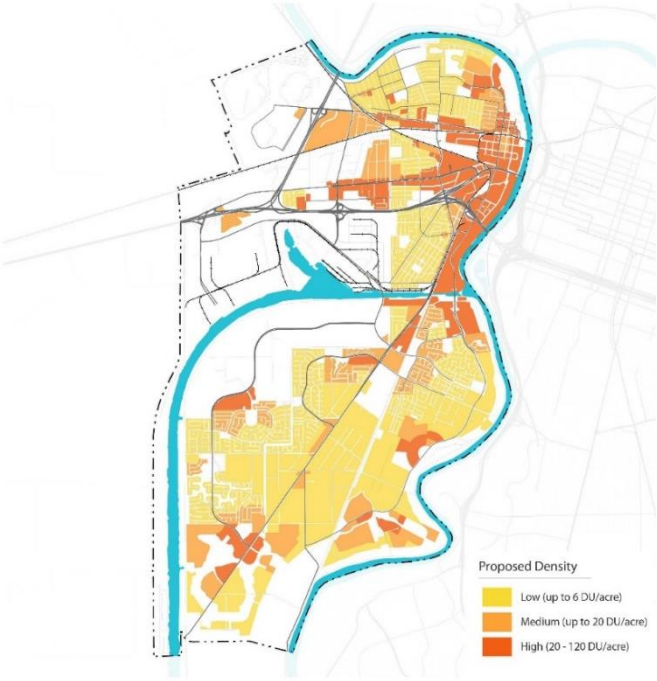
- Current and projected population density
- Current and projected employment density
- Current retail
- Current transportation activity for all modes

Mapping population and employment density illustrates most frequent trip origins and destinations. Therefore both current (2020) and projected (2035) densities have been used to generate suitability heat maps in this category.

POPULATION DENSITY- CURRENT



POPULATION DENSITY- 2035



Outcomes

Most of the transportation activity is located in areas that are most densely populated, are employment centers, and at retail centers. This will be an important consideration in siting of mobility hubs.

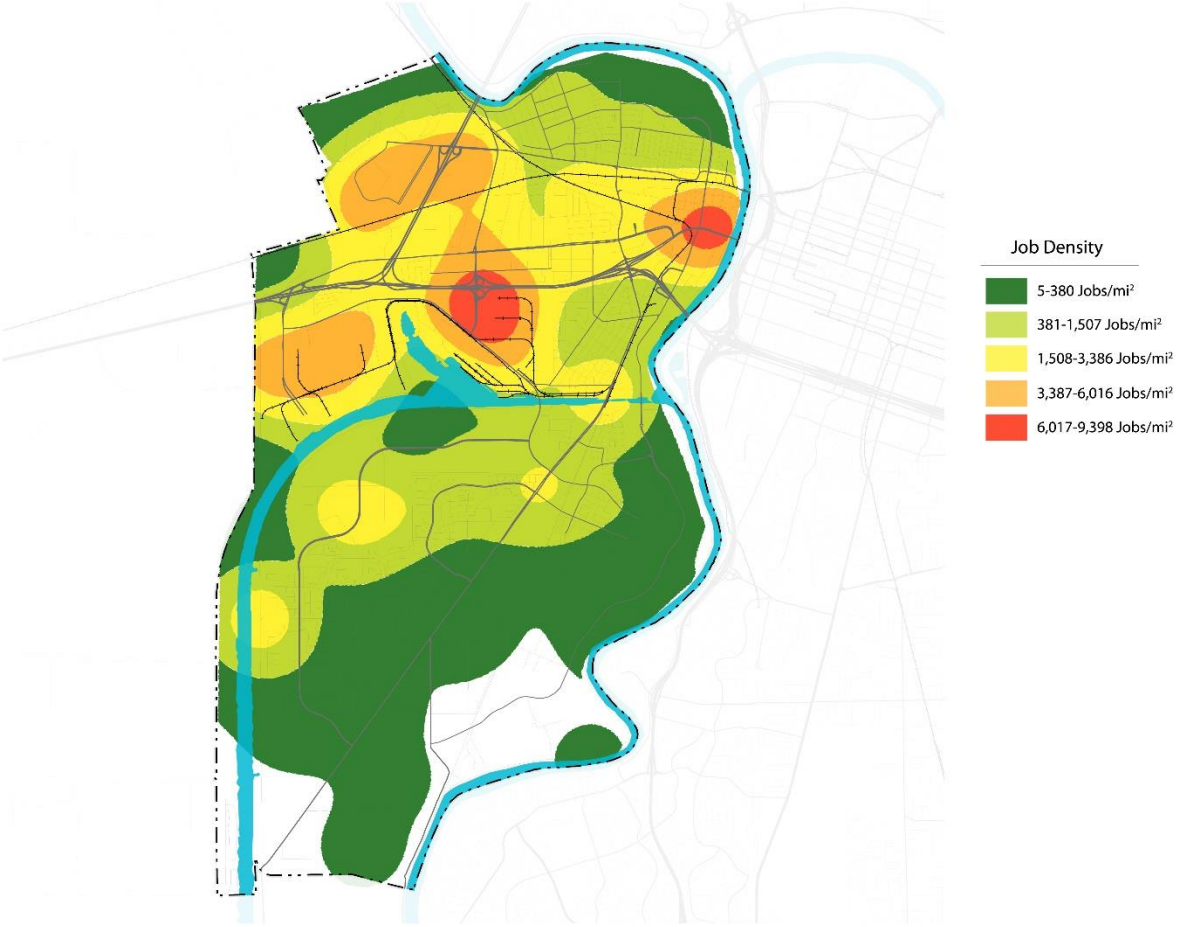


Figure 11: Employment Density - Current Conditions

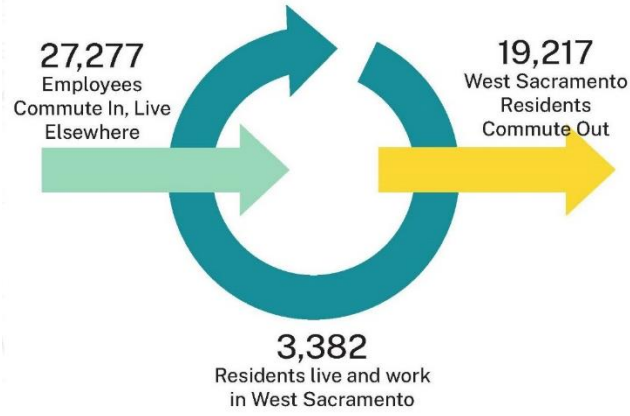


Figure 12: Commuting Patterns

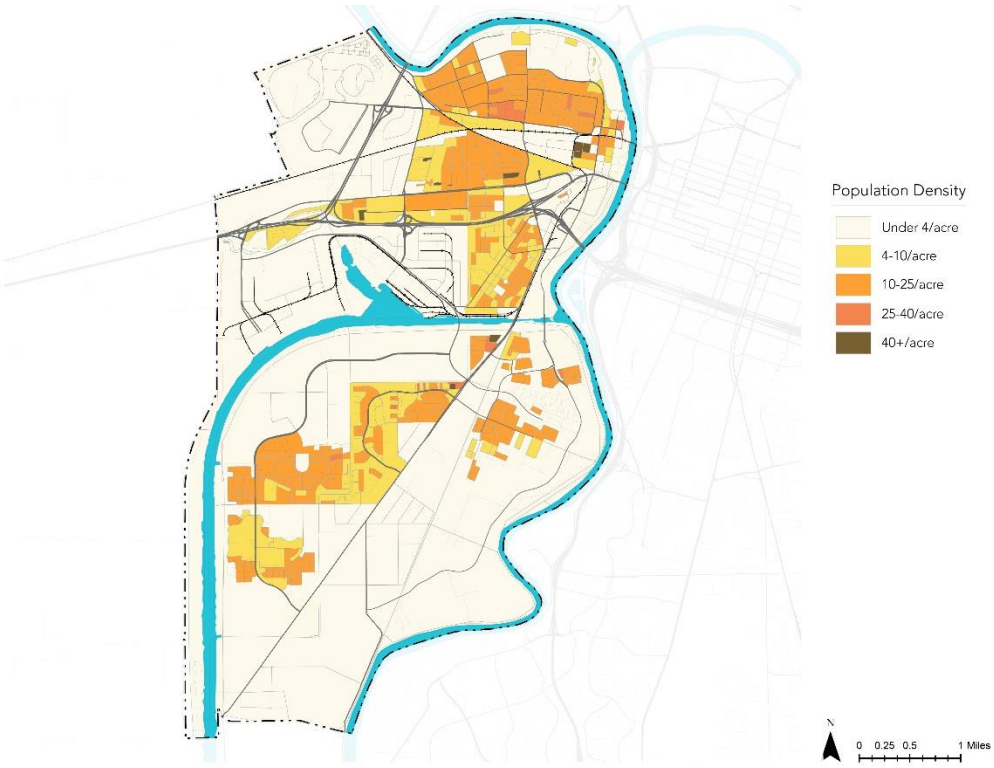


Figure 13: Population Density - Current Conditions

Figure 14: Population Density - 2035

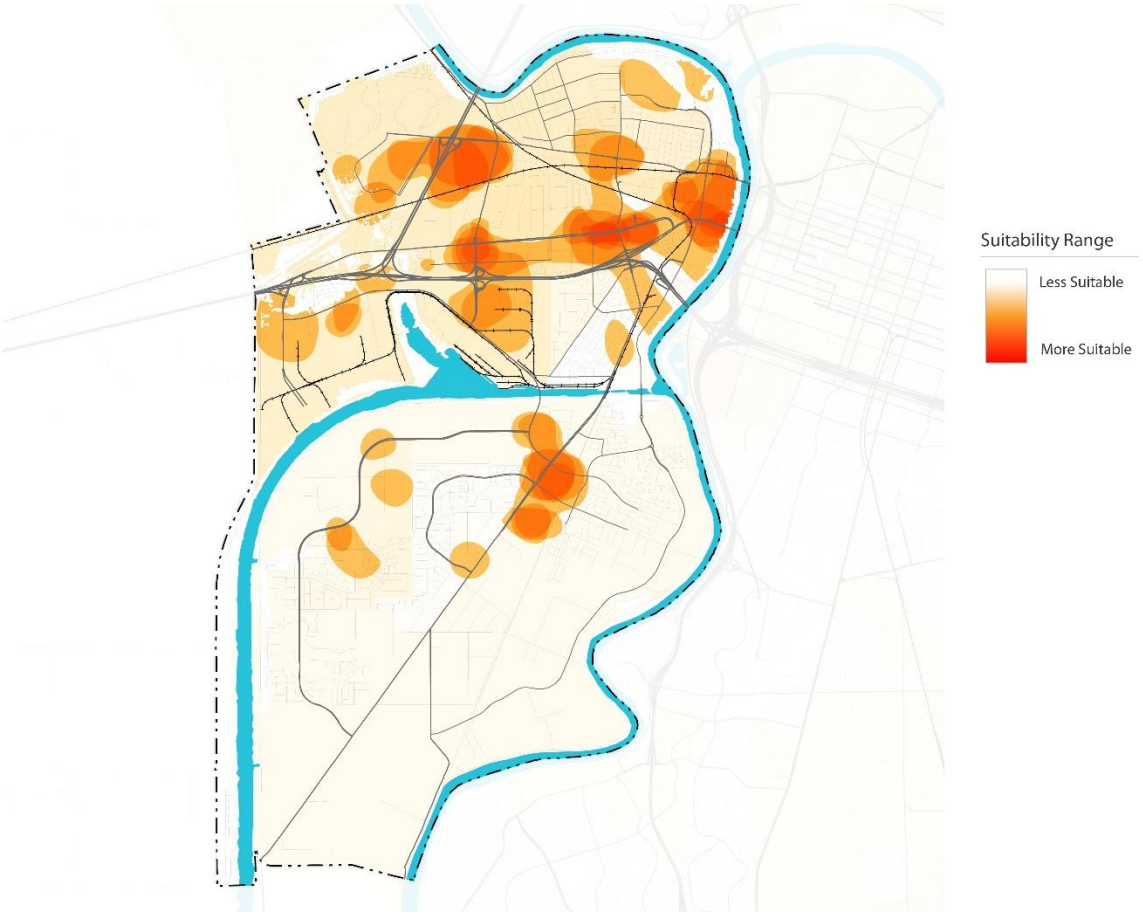


Figure 15: Transportation Activities for All Modes - Current Conditions

Demographics & Equity

The Mayors' Commission on Climate Change has established equity as a priority when developing strategies to address climate change. Mapping of demographic information such as age, gender, race and ethnicity, income, language barrier, disabilities, etc. illustrate geographic concentration or distribution of these characteristics, in relation to current access to opportunities; and highlight inequities.

At onset of the project, a preliminary equity analysis was conducted to understand existing equity issues across West Sacramento at the Census Block level. This analysis then was replicated for the mobility siting criteria to create a better understanding of un-served needs. The metrics of analysis are listed below

- Age
- Gender
- Race and Ethnicity
- Access to a Private Vehicle
- English Proficiency

- CalEnviroScreen
- Healthy Places Index
- Tenure
- Income
- Disability
- Family Structure
- Educational Attainment
- Smart Phone Usage

Overcoming current inequities requires an approach that prioritizes resource allocation to serve the needs of disadvantaged communities, with the goal to correct historically established patterns that have led to limited or lack of access to opportunities for these communities. Therefore this is an important consideration in siting of mobility hubs.

Outcomes

The northern areas of the city are more diverse, have a lower median household income, and have more environmental concerns. Pollution is particularly severe near the port and in the northwest of the city, with a pollution burden percentile of 92 and 85. This is likely a result of the I-80 and freight activities related to the port.

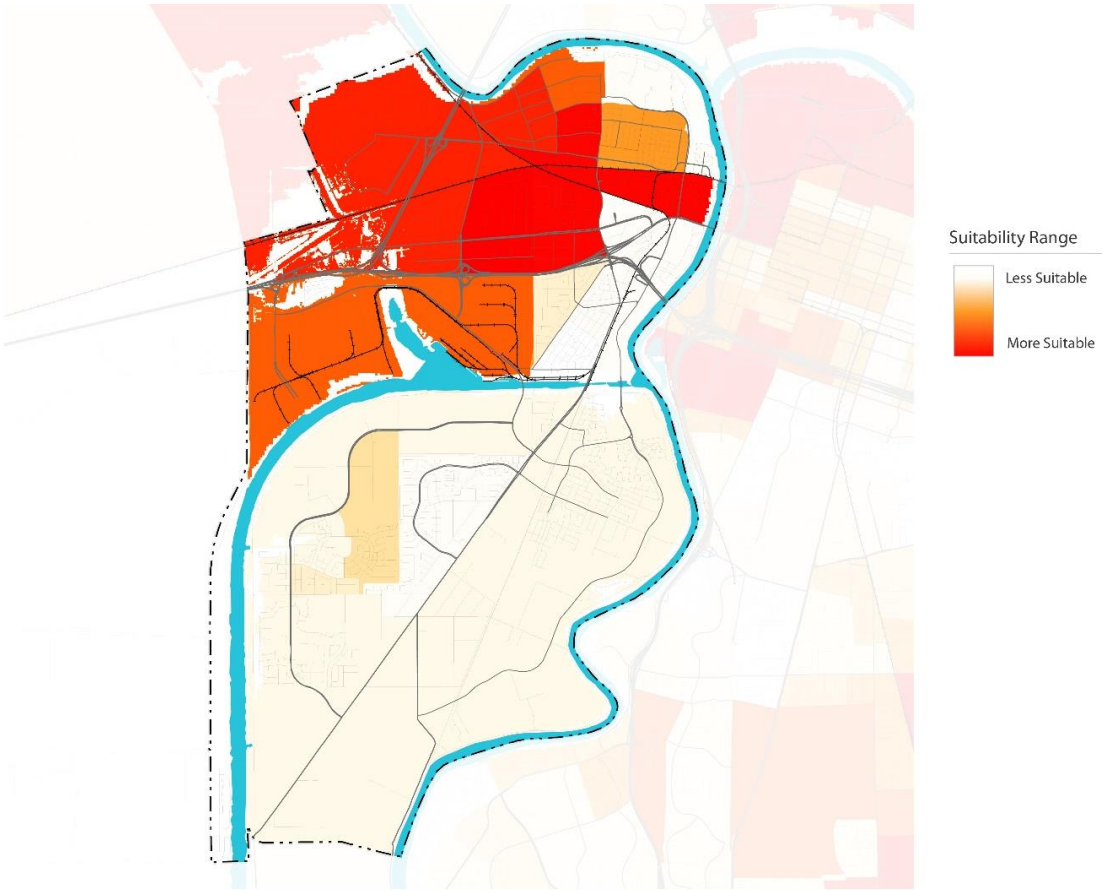


Figure 16: Equity Metric Suitability Analysis

Infrastructure Resiliency

Infrastructure resiliency is not only important for understanding the risks of investing in certain areas of the city, but is also outlined in the Mayor's Climate Commission as a tactic. This analysis sought to understand the greatest risks for infrastructure investment, using the following metrics.

- **Active River Areas** include both the channels and the riparian lands necessary to accomodate the physical and ecological processes associated with the river system. They account for the areas that form, change and maintain a wide array of habitat types. Their location does not preclude a mobility hub location, but extra consideration should be given to ecological implications.
- **Wildfire** moderate risk, no areas in West Sacramento are considered high risk
- **Sea level rise:** The Sacramento River has been analyzed for sea level rise risk. This is based on a potential inundation of 1.41m or 4.5'

Outcomes

Much of the city will be unaffected by sea level rise with some exceptions near I-80, nor by wildfire risks, leaving large areas of the city open for development of mobility hubs.

Figure 17: Resiliency Analysis

Neighborhood Scale

The next step in the process was to zoom into each neighborhood or area that emerged as highly suitable for locating mobility hubs in the citywide analysis, and analyze them further taking into consideration current and proposed investments in infrastructure for active transportation, service coverage for transit, and current and proposed land use development.

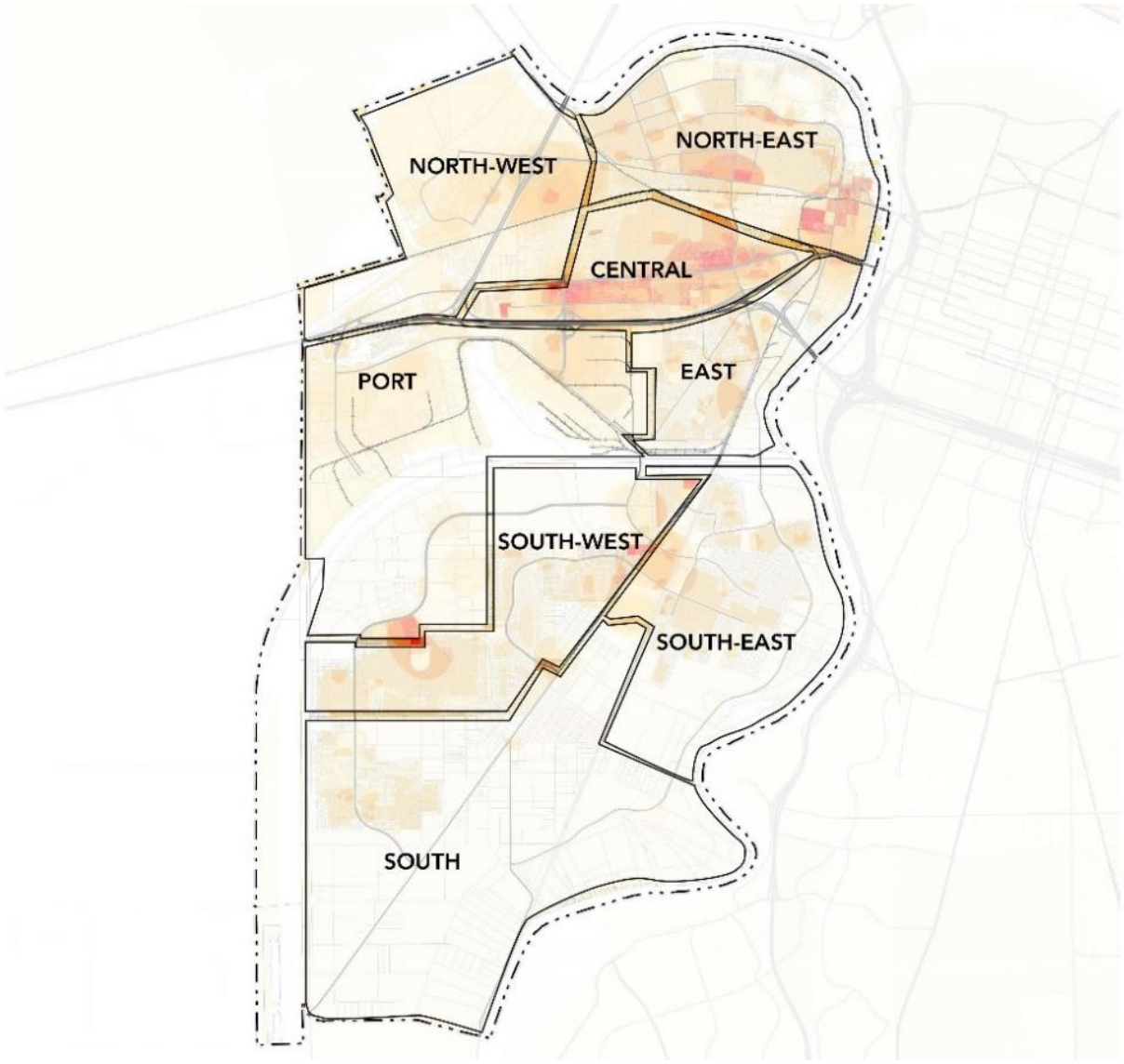
The project team developed eight neighborhood groups, based off the boundaries used in the City's General Plan and revised slightly to ensure clear representation of data outputs. Naming conventions used are simply to assist in identifying these neighborhoods geographically for the purposes of this study.

The areas with the greatest need are largely in the central, north-east, and eastern areas. These areas also have existing active transportation infrastructure that enable good connections to the rest of the mobility network.

The southern neighborhoods have a lower density of uses and will require fewer mobility hubs. Therefore, while much of the South Neighborhood has relatively low suitability, there will still need to be some degree of coverage.

Selection Criteria included:

- High Suitability Analysis Score at citywide scale
- Proximity to Bus/Transit Connection
- Population Density
- Existing/Proposed Bicycle Facilities
- Distribution across the city



Site Scale

The final step in the suitability analysis was to identify potential sites in the high-suitable areas. The site selection process took into account various factors such as:

- **On-the-ground conditions** such as existing transportation infrastructure, availability of space in terms of right-of-way width, adjacent parking lot or vacant land, that will provide an opportunity to accommodate supporting and activating uses.
- **Land ownership** - City-owned vs. privately owned.
- **Immediate context** such as land uses that will benefit from proximity to a mobility hub.
- **Future plans** for infrastructure improvement.
- **Phasing** for implementation of the hubs, with sites identified for near-term implementation and long-term implementation.

Mobility Hub Design Considerations

Following the identification of specific sites for mobility hubs, the next step is to define a design approach that responds to unique needs for the West Sacramento community. This section outlines key considerations for design of mobility hubs.

1. **Site Context:** Different contexts require different kinds of mobility hubs, with measurable differences in the design. The MAP identifies three different site contexts in West Sacramento and specific considerations related to each. The context directly influences the menu of transportation functions and activating uses offered at each mobility hub.

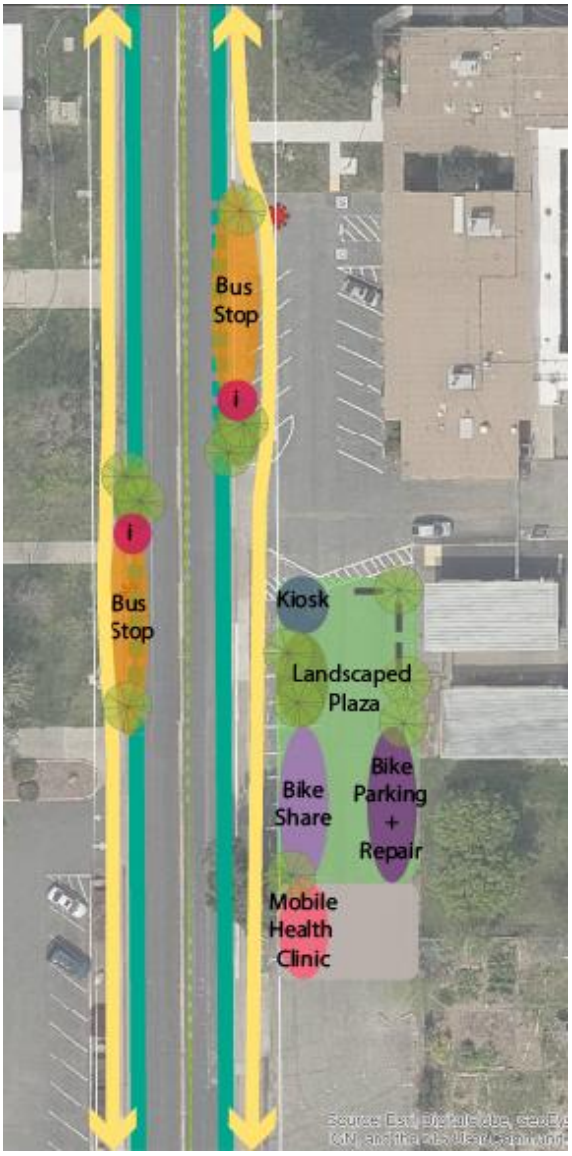
    - **Employment Centers:** Employment centers by their very nature are places of destinations. They will mostly be accessed during peak commute period and therefore should link to larger transportation networks. Mobility hubs in this context should be designed to handle larger volumes of foot-traffic and ridership during peak periods, provide adequate amenities
    - **Residential Neighborhoods:** These are often going to be origin mobility hubs and may have varying degrees of activating uses. The activating uses will be dependent on both the need of the neighborhood and also the willingness for the neighborhood to expand the land uses.
    - **Educational Center:** Finally, educational centers should be oriented to facilitate caregivers escorting children to school, students, and faculty alike. Because the demographics may lend themselve well to those that are not yet driving age, investment in active transportation will be well-suited at mobility hubs near educational facilities.

2. **Spatial organization:** The sites were assessed to see whether there was adequate right-of-way space to accommodate all components of the mobility hub necessary for that site; or if vacant/underutilized parcels were available adjacent to the right-of-way which could allow co-location of supporting functions.

    - **Right-of-way only:** At locations where mobility hubs only had the right-of-way space to work with, the priority woud be create a safe environment and ease of access to mobility functions such as safe and improved sidewalks for pedestrians, protected bike lanes, transit stops, bike parking, micromobility and shared mobility infrastructure. Additional features such as street planting, parklets and mobile/flexible programs should be incorporated in the hub design.
    - **Right-of-way plus:** Many of the identified mobility hubs fall under this category, which provides opportunity for supporting functions and activating uses to be accommodated on adjacent parcels that are either vacant, underutilized, or have ground floors of buildings available for programming.

Right-of-way Only

Right-of-way Plus

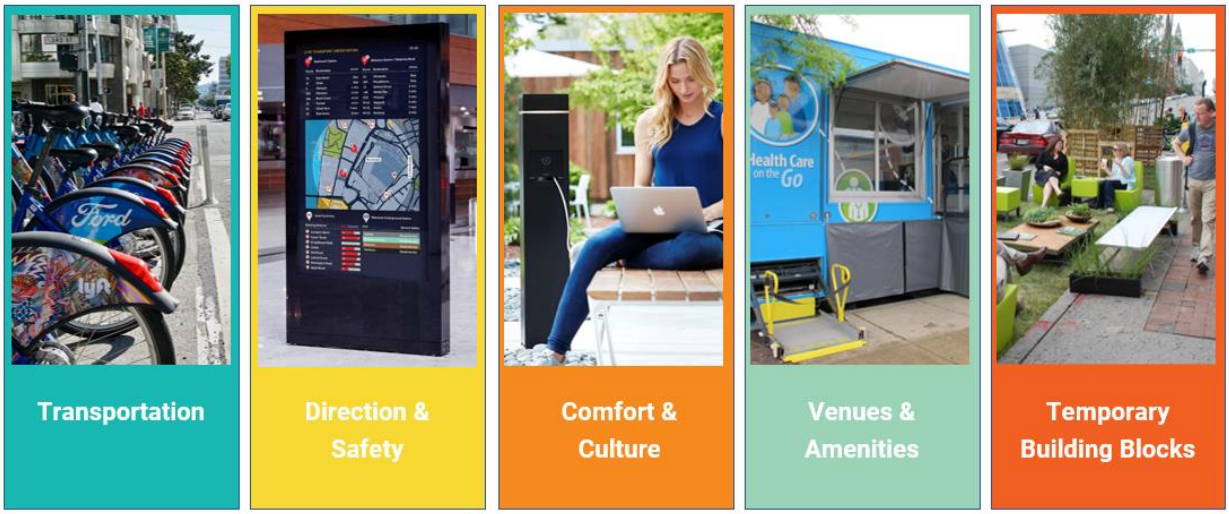


Mobility Hub Toolkit

Along side the above considerations, a toolkit was developed to identify key components and amenities that should be considered in the design of a mobility hub. Considerations include transportation and mobility focused amenities, as well as supporting amenities that can improve the functionality of a mobility hub and respond to specific contextual needs. Further, a typology of mobility hubs was developed based on the hub components included, the function they serve, and the service area in which they would be located

Mobility Hub Amenities

While site context and spatial organization directly determine what can or should be provided in a mobility hub, there are some set building blocks that make up a mobility hub. Provided in different combinations, the following can help to achieve successful mobility hub designs.



- **Transportation** will always be the backbone of the mobility hub, providing the primary service that is needed. Each hub will have some combination of these elements such as transit stops, bicycle lanes, crosswalks, bike parking, cargo bike-share, scooter areas, ride-shares pick-up and drop off areas, and car-share facilities. West Sacramento is well suited for accomodating many of these mobility options because of the ample space available at many locations.
- **Direction and safety amenities** increase the utility of the mobility hub and provide confidence in them as public spaces. Wayfinding, lighting, and accessibility are all additional elements that are transportation adjacent but make investment useable and accessible to everyone.
- **Comfort and culture** features create a sense of place, and make mobility hubs pleasant places to linger. These elements include seating, shade, planting, wifi/charging stations, art, etc..
- **Venues and amenities** provide activating uses that give the mobility hubs utility and make them destinations in their own right. These features should respond to site-specific needs to make them relevant and functional.
- Finally, **temporary building blocks** or tactical urbanism features allow for flexible spaces that can be built quickly and cheaply, influenced by the needs of the people using the space. They can range from blocking off the right of way for taking over street space, to temporary pods for providing additional temporary land uses.

Mobility Hub Typologies

The MAP differentiates mobility hubs in four typologies based on their scale, location, the function they serve, and transportation infrastructure they support.

1. Regional Hub
2. Local Hub
3. Neighborhood Hub
4. Micromobility Hub

Each hub type will have the core component of transportation infrastructure, albeit in varying degrees from minimal to expanded. Similarly each typology will have an increasing degree and diversity of activating land uses.

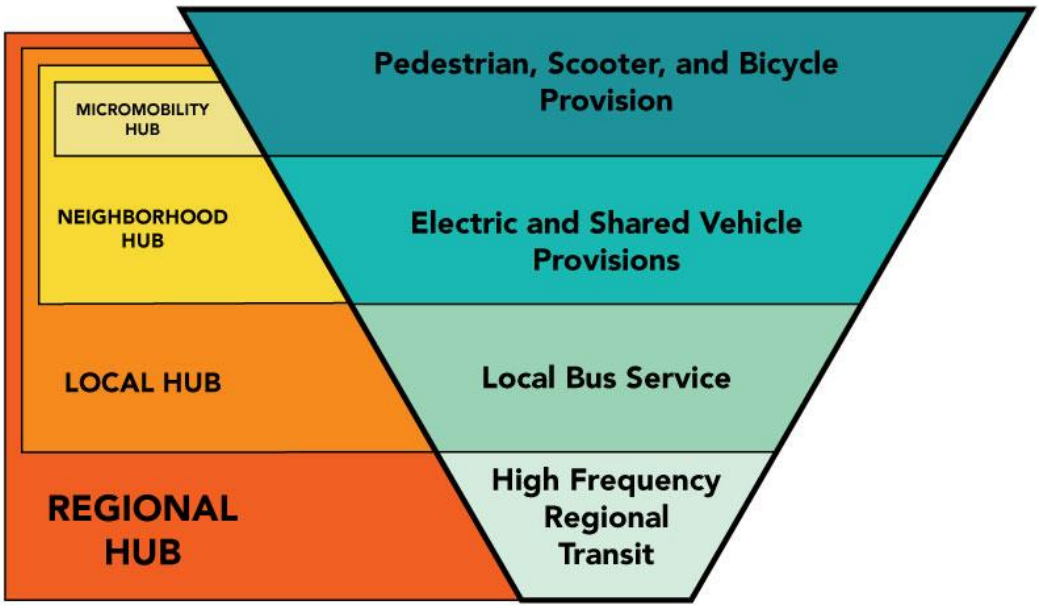


Figure 18: Mobility Hub Typologies

Regional Hubs

The Regional Hub is the largest in scale with the largest footprint of all mobility hubs requiring space beyond just the right-of-way. They offer extensive transit service serving local and regional destinations, and a wide range of other mobility options (pedestrian, scooter, bicycle, vehicle, and information) and amenities. It will always be co-located with a diversity of activating land uses ranging from retail, community services, educational facilities to make the most of the frequency of transportation trips; making it a destination.

Local Hubs

The Local Hubs are smaller in scale than the regional hubs. They provide local bus-service that connect to `or are along a major active transportation route. The opportunity for activating and supporting uses is greater, due to their location along major transportation routes and higher ridership and foot traffic. The supporting uses may be located within the right-of-way, or on adjacent parcels.

Neighborhood Hubs

Neighborhood Hubs are smaller than the neighborhood hubs and mostly not on a major transit route. But they offer robust bike, pedestrian and scooter facilities and also access rideshare or

carshare facilities. There is an opportunity to co-locate some degree of activating and supporting uses, but the footprint is minimal.

Micromobility Hubs

Micromobility hubs have the most basic of amenities to promote sustainable, non-motorized transportation options such as pedestrian, scooter, and bicyclefacilities. This provision includes: sidewalks, low-stress bicycle facilities, bicycle racks, wayfinding, and dedicated areas for scooters. The identified micromobility hubs in the MAP, have often been taken from existing bicycle racks located strategically around West Sacramento. While not a full fledged mobility hub, micromobility hubs serve as a key first mile and last mile solution to connect to the larger hub network. All locations of micromobility hubs that do not currently exist are subject to change based on community input. However, their distribution should consider coverage across the entire city. There are no activiating uses associated with micromobility nodes.

Mobility Hub Amenity Matrix

The mobility hub amenity matrix summarizes the requirements for putting the design elements together by hub type. The matrix focuses on the core transportation functions of the site as the activating uses and cultural components will respond to site-specific needs. Primary hubs require the most amount of transportation investment, with varying degrees of investment provided for the other typologies. Amenities are described as vital, recommended, optional and not applicable, based on their applicability and relevance at each hub type.

Table 1: Mobility Hub Amenity Matrix by Type

Hub Amenities	Existing
Vital	●
Recommended	●
Optional	■
Not Applicable	◊

	Pedestrian Connections			Bicycle & Scooter Connections			Vehicle Connections			Bus Infrastructure			Information/Signage			
Hub Type	Sidewalks to the Hub	Connections within the Hub	ADA Ramps	Low-Stress Bicycle Facilities	Bike share/Scooter share	Bike Parking	Ride Share/Pick Up-Drop off	Car Share	EV Charging Stations	Bus Shelters	Bus Stop/Transit Connection	Fare Kiosk	Wayfinding	Real-time information	Wi-fi/Smart Phone Connectivit	Device Charging Station
Regional	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Local	●	●	●	●	●	●	●	●	●	●	●	■	●	●	●	●
Neighborhood	●	●	●	●	●	●	●	■	■	◊	◊	◊	●	■	●	●
Micromobility	●	◊	●	●	●	●	■	◊	◊	◊	◊	◊	●	◊	◊	◊

Sidewalks to the Hubs

Getting to the mobility hub is integral to their success and the most basic provisions for a mobility hub are sidewalks. A well connected and robust sidewalk network must surround any mobility hub for at least a ¼ mile.

Connections within the Hub

For hubs that encompass a larger footprint, ensuring adequate pedestrian provision within the hub allows for maximizing investment. Connections to destinations within the hub (bus shelters, activating uses, bike parking) provides a seamless experience.

ADA Ramps

ADA compliant ramps provide a basic amount of accessibility through the site when grade changes occur. They benefit anyone on wheels, including caregivers of young children, people on bicycles, and small frieght deliveries.

Scooter Parking

While scooters can be parked anywhere, it is helpful from a legibility perspective to congregate them in predetermined areas. These can constructure with temporary materials (as seen above) or can be more formalized.

Low-Stress Bicycle Facilities

Just as sidewalks are vitally important connections to the hub, low-stress bicycle facilities are imperative to making the mobility hubs attractive facilities to all ages and abilities. Without the safe infrastructure to and from the mobility hub, the mobility hub's functionality decreases, especially for groups that tend to be more risk averse including women, children, and the elderly.

Bikeshare

Not only does bike share normalize cycling as a way of moving throughout a city, they also are extremely helpful for bicycle access and one way bicycle trips. Like scooters, bike share can be dockless however having dedicated areas for congregating assist with rebalancing the fleet as well as instilling confidence in the reliability of bike share as a mode to the public.

Bicycle Parking

Bicycle parking can be either short term or long term. In larger hubs, longer term bicycle parking should be provided since it is integrating with a more regional transportation system. Long term bicycle parking adds additional security. Short term bicycle parking can be as simple as a rack, but should enable two points of contact for locking up as well as some areas that can accommodate larger bicycles such as cargo bikes.

Ride Share/ Pick-up Drop-off Zones

Also known as flexibile curb side space, this is a dedicated area of the mobility that can accommodate ride hailing services and also kiss and ride.

Carshare

Mobility hubs can also be an area to access services like car share. Car share can be an important.

EV Charging Stations

To support electrification of the vehicle fleet, many mobility hubs will provide EV charging stations. Not all mobility hubs will be able to have this capability as it must align with utilities, but where possible, EV charging stations have been included.

Bus Shelters

Adequate bus shelters can sheild transit riders from the elements, whether it is heat or rain. While ideally wait times are minimal, bus service without dedicated bus lanes is subject to a variety of factors including traffic and dwell times. Bus shelters make transit trips more attractive by minimizing the perception of waiting.

Bus Layover Zones

Bus layover zones, while not applicable at all mobility hubs, are a necessary part of any bus network. By colocating them at mobility hubs, bus routes can minimize the amount of time spent driving to a bus layover zone. Mobility hubs, especially more regionally focused hubs are natural locations for a bus layover zone.

Fare Kiosk

Fare kiosks enable passangers to purchase tickets or add value to a ConnectCard prior to getting on the bus, thereby reducing dwell time.

Wayfinding

Wayfinding and signage are important techniques in alerting the public either explicitly or through design about the layout of a city. Signage can explicitly give directions, with distances or time estimates to encourage biking and walking. Strategically placing trees, planting, or designs in pavers can direct people to significant services or nearby destinations that would otherwise be missed. It is an essential part of the mobility hub network, as it informs the public on how hubs interconnect.

Real-time Information

Real-time information signs can provide timetables and necessary updates to communities. Like a live bulletin board, it can help users of the mobility hub system make informed decisions. For instance, because mobility hubs provide mobility choices, a bus rider can instead choose bike share if a real-time information indicated that their bus is running late.

Wifi & Smart Phone Connectivity

As we move more into mobility as a service or MaaS, access to smart phones can be directly tied to mobility function. However, not everyone may have access to the internet or even smart phones. Many neighborhoods in the north of the city have relatively low smart phone ownership and therefore other options must be given. Even if people may have access to a smart phone, they may not have enough data to access the mobility services on offer. Mobility hubs offer a place to provide equitable access to these features.

Charging Stations

Just as important as having Wifi connectivity, mobile devices must be charged to be used as a service.

Mobility Hub Network Recommendations

44 sites were selected as potential mobility hub sites, based on suitability analysis across scales and with input from City staff. The site selection process also takes into account phasing for implementation of the hubs, with sites identified for near-term implementation and long-term implementation.

The above typologies were assigned to the mobility hub network that resulted from the Suitability Analysis.

The placement of the hubs followed an iterative process.Tthe neighborhood and micormobility hubs have indicative placement on the map, since these two categories are subject to change based on community input.

Each mobility hub type will have different catchments, due to the amenities offered at each. Regional hubs will have the largest catchment, with high frequency transit and the most amenities. Whereas, micromobility hubs will only serve the neighborhood that is in its immediate vicinity.

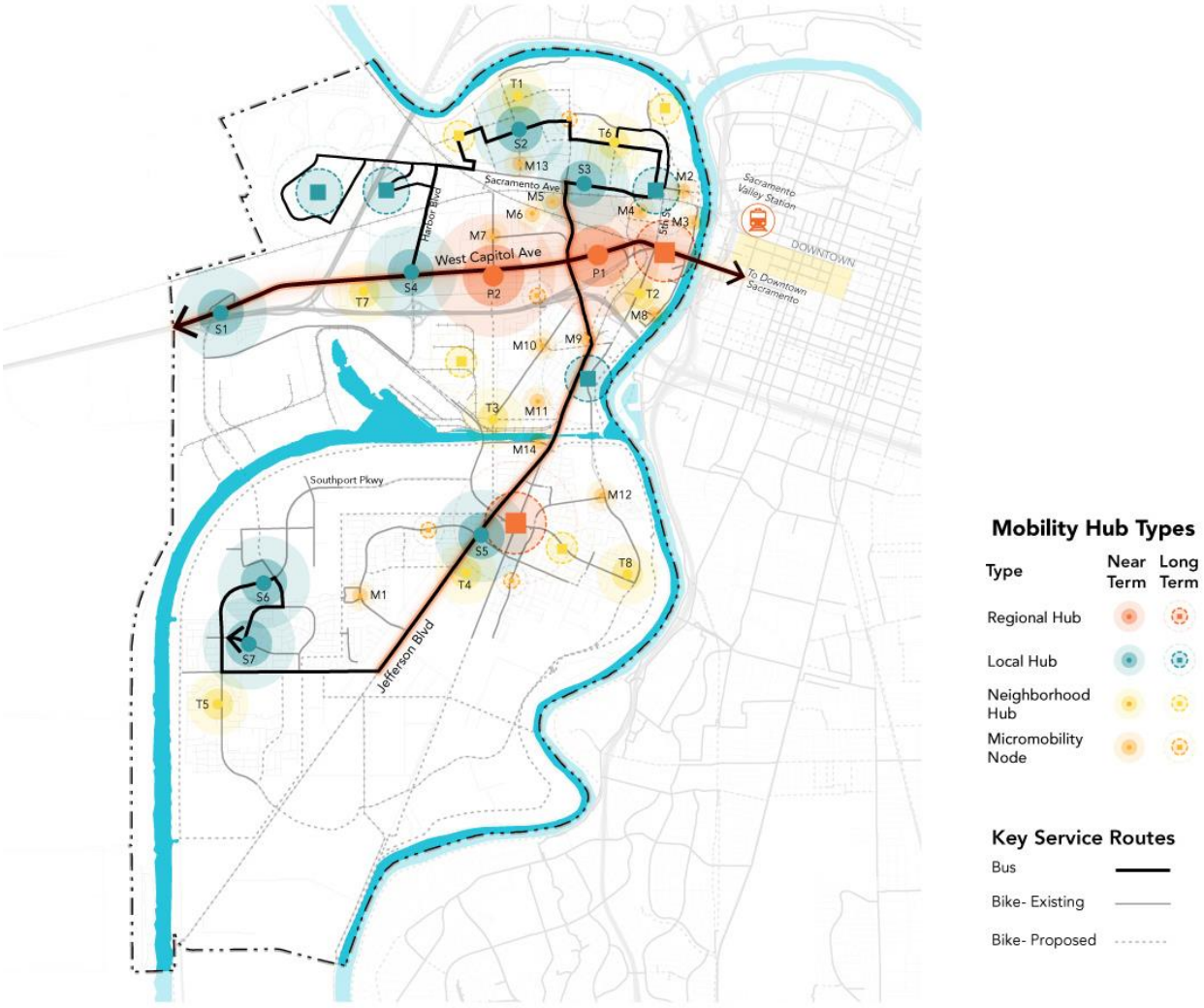


Figure 19: Mobility Hub Network Recommendations

Near Term

31 of the 44 hubs have been identified as near term, to be executed in the next approximately 5 years or so. These are based on existing land use and development patterns.

The near-term hub recommendations are those that naturally lend themselves to being developed as a mobility hub due the presence of existing assets, such as transit stops, location on a key service corridor or low-stress bicycle facility, good pedestrian connectivity, or adjacent land use and development patterns. Each of the near-term sites are designated as either regional, local, neighborhood or a micromobility hub. The matrix below shows near-term site locations by type and summarizes the mobility-focused amenities that currently exist, and those that will need to be considered in the future.

Table 2: Near-term Hub Recommendations

		Pedestrian Connections			Bicycle & Scooter Connections			Vehicle Connections			Bus Infrastructure			Information/Signage			
	Site Locations by Hub Type	Sidewalks to the Hub	Connections within the Hub	ADA Ramps	Low-Stress Bicycle Facilities	Bike share/Scooter share	Bike Parking	Ride Share/Pick Up-Drop off	Car Share	EV Charging Stations	Bus Shelters	Bus Stop/Transit Connection	Fare Kiosk	Wayfinding	Real-time information	Wi-fi/Smart Phone Connectivity	Device Charging Station
Location Code	**Regional Hub Needs**	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
P1	West Sacramento Community Center	●	●	●	●	●	●	●	●	○	●	●	○	○	●	○	○
P2	Joey Lopes Park	●	●	●	●	●	●	●	●	○	●	●	○	○	○	○	○
	Local Hub Needs	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
S1	Enterprise North Park n Ride (P)	●	○	○	○	○	○	●	○	○	●	●	□	○	○	○	○
S2	Alyce Norman Playfields	●	●	●	●	○	○	●	○	○	●	●	□	○	○	○	○
S3	Arteaga's Supermarket (Jefferson Blvd/Sacramento	○	○	○	○	○	○	●	○	○	○	○	□	○	○	○	○
S4	West Capitol Ave./Harbor Blvd.	○	○	○	○	○	○	●	○	◊	○	○	□	○	□	□	□
S5	Southport Town Center Plaza	●	●	●	●	○	●	●	○	○	○	○	□	○	○	○	○
S6	Savannah Apartments	●	●	●	○	○	●	●	○	○	●	●	□	○	□	□	□
S7	Sunset Vista Park	●	●	●	●	○	●	●	○	◊	○	○	□	○	□	□	□
S8	5th & C Street Senator Garage	●	●	●	○	○	○	●	◊	◊	○	○	□	○	○	○	○
	Neighborhood Hub Needs	●	●	●	●	●	●	●	■	■	■	■	■	●	■	●	●
T1	Bryte Park	●	●	●	●	●	●	●	□	□	□	□	□	○	□	○	○
T2	Bridge Street Parking Lot	●	●	●	○	●	●	●	■	■	□	■	□	●	□	○	○
T3	Sycamore Trail Phase 3/4	●	●	●	○	○	○	●	□	□	□	□	□	○	□	○	○
T4	RCHS/Recreation Center	●	●	●	●	○	●	●	□	□	■	■	□	○	□	○	○
T5	Bridgeway Lakes Community Park	●	●	●	●	○	●	●	□	□	□	□	□	○	□	○	○
T6	Elkhorn Elementary	●	●	●	●	○	●	●	□	□	□	□	□	○	□	○	○
T7	Courtyard & Westside Village Village Apts	●	●	●	○	○	●	●	□	□	□	□	□	○	□	○	○
T8	Heritage Oaks Park	●	●	●	○	○	●	●	□	■	□	□	□	○	□	○	○
	Micromobility Hub needs	●	◊	●	●	●	●	■	◊	◊	◊	◊	◊	●	◊	◊	◊
M1	Summerfield/Patwin Park Area	●	◊	●	●	○	●	■	◊	◊	◊	◊	◊	○	◊	◊	◊
M2	3rd & C St	●	◊	●	○	●	●	■	■	◊	□	□	□	○	◊	◊	◊
M3	CalSTRS	●	◊	●	●	●	●	■	◊	◊	◊	◊	◊	○	◊	◊	◊
M4	Washington Courtyard	●	◊	●	●	●	●	■	◊	◊	◊	◊	◊	○	◊	◊	◊
M5	HHSA/Social Services	●	◊	●	○	●	●	■	◊	◊	◊	◊	◊	○	◊	◊	◊
M6	Meadowbrook Apts	●	◊	●	○	●	●	■	◊	◊	◊	◊	◊	○	◊	◊	◊
M7	Michigan Blvd/Sycamore Trail	●	◊	●	●	●	●	■	◊	◊	◊	◊	◊	○	◊	◊	◊
M8	The Barn	●	◊	●	●	●	●	■	◊	◊	◊	◊	◊	○	◊	◊	◊
M9	Whitey's Jolly Kone	●	◊	●	●	●	●	■	◊	◊	◊	◊	◊	○	◊	◊	◊
M10	Park Blvd at Westacre Rd	●	◊	●	●	●	●	■	◊	◊	◊	◊	◊	○	◊	◊	◊
M11	Memorial Park	●	◊	●	●	●	●	■	◊	◊	◊	◊	◊	○	◊	◊	◊
M12	Stonegate/Village Pkwy	●	◊	●	●	○	○	■	◊	◊	◊	◊	◊	○	◊	◊	◊
M13	Eagle Point Park	●	◊	●	●	○	○	■	◊	◊	◊	◊	◊	○	◊	◊	◊

Long Term

The long-term hubs have been identified taking into consideration future development, transportation investments and areas zoned for higher density development. Implementation of

mobility hubs at these locations tend to be more reliant upon future plans or projects being realized, or may require additional input from the community to determine specific locations and desired amenities. Below is the list of long-term sites by hub types.

Table 3: Long-term Mobility Hub Recommendations

LONG-TERM SITES	Contingencies
Regional Hubs	
Sutter Health Park/Streetcar Stop	Implementation of light rail extension; Community input and coordination with micromobility operators
Southport Town Center/Future LR Station	Rail study to extend light rail to Southport; Community input and coordination with micromobility operators
Local Hubs	
Future Native American Heritage Center	Provision of multi-modal options by developer & partnership with YCTD; Community input and coordination with micromobility operators
5th & C St.	Future tenant preferences for mobility; Community input and coordination with micromobility operators options & re-routing plans for bus routes 40/41
Lighthouse Charter Area	Community input
Riverpoint Plaza	Detailed planning and coordination on siting of hub elements; Community input and coordination with micromobility operators
Jefferson/State Streets/Pioneer Bluff	Future corridor planning and possible rail study; Community input and coordination with micromobility operators
Stillwater Road	Stakeholder outreach with employers
Neighborhood Hubs	
Monticello at Southport (Jefferson/Devon)	Implementation of future multi-family development and future program needs; Community input and coordination with micromobility operators
Emile "Whitey" Boisclair Park	Future class 1 bike connection; Community input and coordination with micromobility operators
Micromobility Hubs	
Broderick (Kegle Dr/ Anna St. area)	Community input and coordination with micromobility operators
Westacre Park	Community input and coordination with micromobility operators
Stonegate/Muscovy	Community input and coordination with micromobility operators

Mobility Hub Design Prototypes

Three example sites were selected to develop a prototypical model for regional, local and neighborhood mobility hubs respectively. The protoypical models demonstrate how various design elements from the mobility toolkit can be assembled together to tailor mobility hubs to their immediate context.

The following factors were considered when selecting the example sites.

- Opportunity for modal shift
- Equity issues
- Diversity of location around the city
- Feasibility of construction
- Heirarchy of hub examples

Regional Mobility Hub Prototype: West Sacramento Community Center (W Capitol Ave)

The West Sacramento Community Center on West Capitol Avenue, serves as a regional mobility hub. This location is on a major bus route connecting key locations in West Sacramento and Sacramento. It is a destination due to the cluster of civic and community amenities such as the City Hall, Community Center, Library and the Community College.

Figure 20: Community Center Library Complex - Existing Conditions

Core Transportation Infrastructure

This mobility hub leverages existing assets at the site and recommends placemaking strategies to enhance functionality of the hub; and create a cohesive, safe environment for all users. The existing mobility infrastructure at this location includes:

- Transit stops,
- Bike lanes
- Bike racks for short-term parking

- Real-time information system
- A shared parking lot (serving the community center, library and city college)

These facilities are augmented additional mobility functions such as:

- Fare kiosk
- Improved real-time information system
- Bike lockers for long-term bike parking
- Bike-share station
- Scooter-share docking station
- Ride-share pick-up/drop-off zones
- Car-share facility
- EV charging stations
- Way-finding signage
- WiFi connectivity
- Shaded waiting areas

Activating Uses at the Mobility Hub:

The advantage to this location is the adjacency of community serving uses such as the Community Center, Library, Community College, and the City Hall. While these community and civic uses are co-located they currently are not well connected with each other to form a cohesive environment that can support active social life and provide an inviting and comfortable environment to linger.

The mobility hub desing prototype recommends interventions and improvements to public realm that are small-scale, less expensive, yet transformational in the way they will serve the community. The recommended interventions include:

- Improving connectivity between buildings by establishing clear and safe pedestrian circulation paths that are marked by distinctively paved or painted surface.
- Marking building entrances clearly to define points of origin and destination along pedestrian paths.
- Improving existing outdoor spaces and plazas for outdooe social gatherings by adding shade, comfortable seating, landscape enhancements, green infrastructure such as rain gardens, swales, etc.
- Introducing temporary programing in the parking lot, to activate the public spaces and create a draw to this destination. Temporary programs could either complement existing programs offered by the community center, library, community college and City Hall; or fulfil needs that are not served by them. For example: Outdoor seating with shade
    - Mobile retail
    - Mobile clinic
    - Mobile maker space
    - Food and beverage kiosks
    - Weekly farmers market
    - Annual festivals

- Bike repair

Supporting Land Uses Around Mobility Hub

In thinking about mobility hubs, it is important to consider land uses within ¼ to ½ mile radius of the hub that will not only benefit from proximity to a mobility hub but will also support the goal of equitable access to opportunities. Some such uses include multi-family housing, retail, co-working spaces, daycare, etc.

Cultural Context

Due to its citywide draw, the Community Center/Library complex offers a unique opportunity to showcase cultural diversity of West Sacramento. It also offers ample space for accommodating permanent and temporary programs that celebrate local culture. Programing ideas include:

- Multi-lingual wayfinding and information signage
- Public-art, murals, etc.
- Venue for cultural festivals

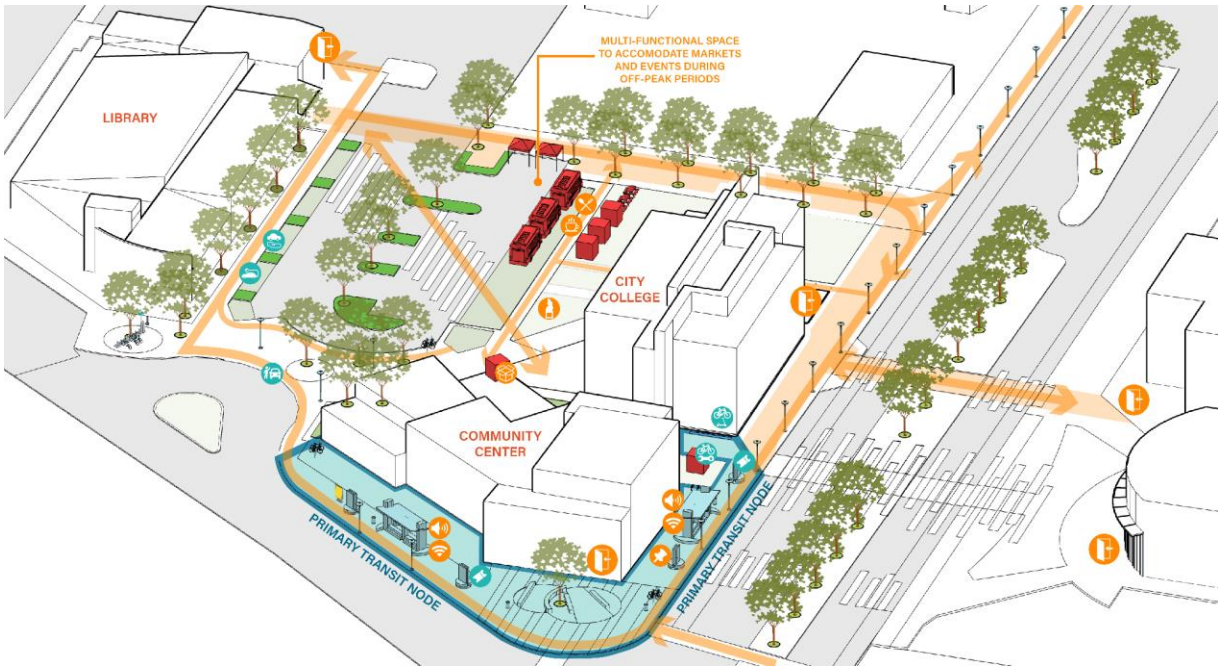


Figure 21: Regional Mobility Hub Prototype: Community Center (Proposed)

Cost Estimation

These are planning stage level of cost estimation. A more detailed cost estimation can be find in the appendices of this document.

Table 4: Cost Estimation for West Sacramento Community Center Mobility Hub

West Sacramento Community Center (W Capitol Ave)	Cost	Notes
On-Site Temporary Tactical Urbanism Strategies	$ 90,000.00	
On-Site Permanent Infrastructures	$ 270,000.00	
Public Art & Public WiFi	Variable	[1] [2]
EV Charging Infrastructures - DC Fast Chargers	$ 50,000 - 150,000	[3]
Total	$ 360,000.00	

[1] WiFi depend on level of coverage and the program the City want to take over.
[2] Public Art program largely varies in cost and depend on grants.
[3] Range including equipment, design, permitting, install, networking, maintenance & warranty costs. Higher end is primarily accounting for sites that may require new or upgraded panels or other electrical service to the site.

Local Mobility Hub Prototype: Arteaga's Supermarket (Jefferson Blvd and Sacramento Ave)

The local hub mainly serves as a point of origin or a transfer point in a trip. The site selected for the local mobility hub at Artegas Supermarket, on Sacramento Avenue, needs significant improvements to create a safe and inviting environment at the mobility hub.

Currently, this intersection is marked by a large parking lot at the north-east corner serving the supermarket, a vacant lot across the street from the parking lot and under utilized parcels at the remaining two corners. While there aren't many existing assets to build on here, there is ample space to add new elements and create a sense of place incrementally.

Core Transportation Infrastructure:

The first addition will be transit stops along the proposed transit route. The design recommends proposed bike lanes to be protected bike lanes to encourage biking over driving. Improved pedestrian crosswalks at the intersection and improved sidewalks are warranted. With active transportation in the form of bike and ped covered, along with transit, mobility choices can be expanded to include scooters and ride-share.

Components recommended at this mobility hub are as below:

- Transit stops (new)
- Bus-shelters
- Real-time information (new)
- Protected bike lanes (new)
- Bike racks (new)
- Bike-share station
- Scooter docking station
- Ride-share pick-up/drop-off
- Car share facility

- EV charging stations
- Way-finding signage
- WiFi connectivity

Supporting and Activating Uses

The location of this mobility hub is immediately adjacent to a parking lot that serves the supermarket and other businesses. This offers an opportunity to expand the footprint of the hub beyond the right-of-way into the adjacent parking lot to incorporate landscape enhancements, create an outdoor plaza and have flexible programming. These improvements will not only serve the users of the mobility hub but will also be beneficial to the businesses adjacent to the mobility hub.

While the grocery strore and other businnesses occupy one corner of the intersection, the other three corners are either vacant or underutilized. As the City plans for future development, land uses around this intersection should leverge proximity to the mobility hub. Multi-family housing that includes affordable housing or ground floor retail, community services, health clinic and other community serving uses will increase ridership, reduce auto trips and create an activity node at this location. Some recommendations for improvements and flexible programming are listed below:

- Landscape enhancements with shade giving trees and planting
- Outdoor plaza
- Green infrastructure and storm-water management
- Mobile library
- Mobile bike repair
- Mobile clinic
- Mobile maker space
- Food and beverage kiosk
- Multi-family housing, retail, co-working spaces, daycare, etc.
- Other transit supporting land uses within 1/2mile radius of the mobility hub.

Cultural Context:

- Multi-lingual wayfinding and information signage
- Public-art

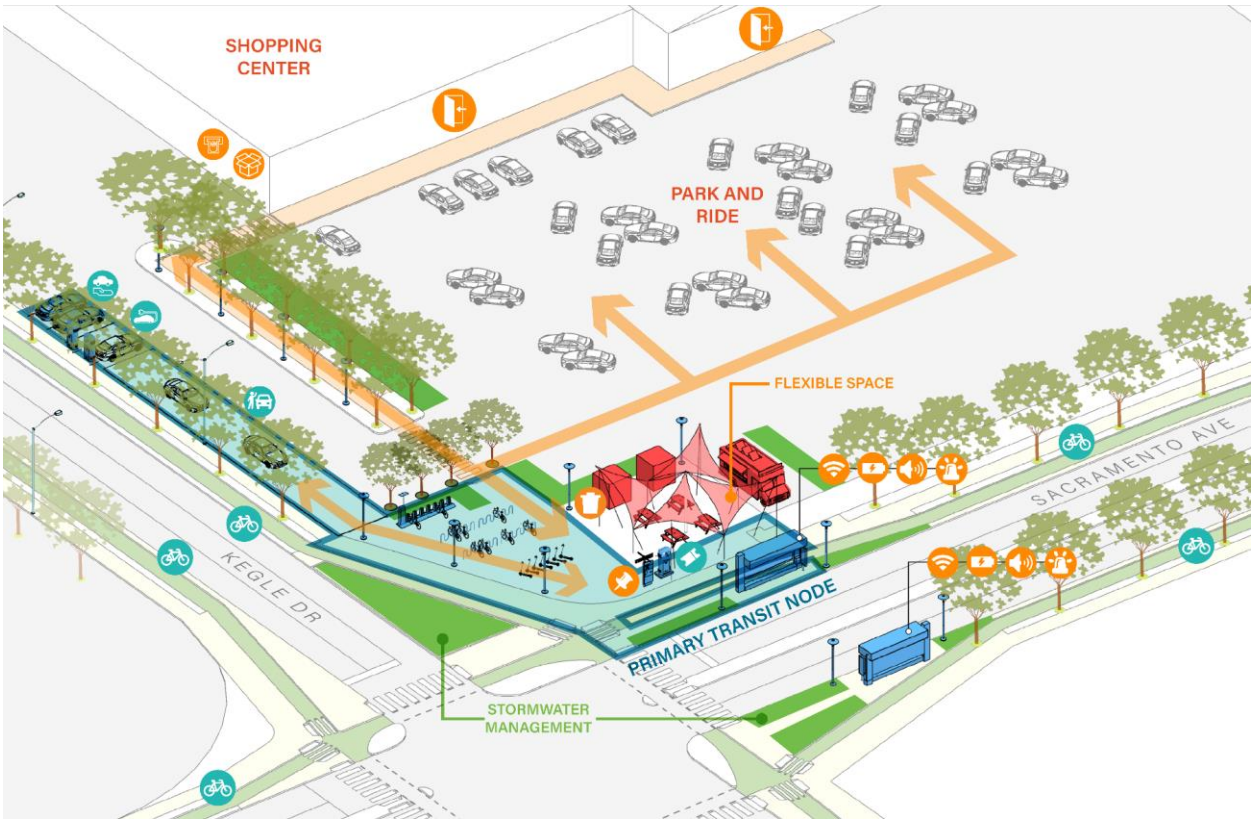


Figure 22: Local Hub Prototype (Proposed Improvements)

Cost Estimation

These are planning stage level of cost estimation. A more detailed cost estimation can be find in the appendices of this document.

Table 5: Cost Estimation for Arteaga's Supermarket Mobility Hub

Arteaga's Supermarket (Jefferson Blvd and Sacramento Ave)	**Cost**	**Notes**
On-Site Temporary Tactical Urbanism Strategies	$ 95,000.00	
On-Site Permanent Infrastructures	$ 407,000.00	
Off-Site Permanent Infrastructures	$ 1,650,000.00	[1]
Public WiFi	Variable	[2]
Total	$ 2,152,000.00	

[1] Include 1/4 mile radius around the site of protected bike lane intersection improvements
[2] WiFi depends on level and type of coverage the City wants.

Neighborhood Mobility Hub Prototype: Heritage Oaks Park

The neighborhood mobility hub at the ropes course park location is in a neighborhood which is predominantly residential. This hub is the most basic type with micromobility choices for first and last mile connectivity. At the ropes course park location, the design leverages planned

improvements such as the concession stand and the parking lot to locate both the transportation infrastructure and create a social gathering space. Components recommended at this location are:

Core Transportation Infrastructure:

- Bike lanes (new)
- Bike racks (new)
- Bike-share station
- Scooter docking station
- Ride-share pick-up/drop-off
- EV charging stations

Supporting and Activating Uses:

- Landscape enhancements with shade giving trees and planting
- Outdoor plaza

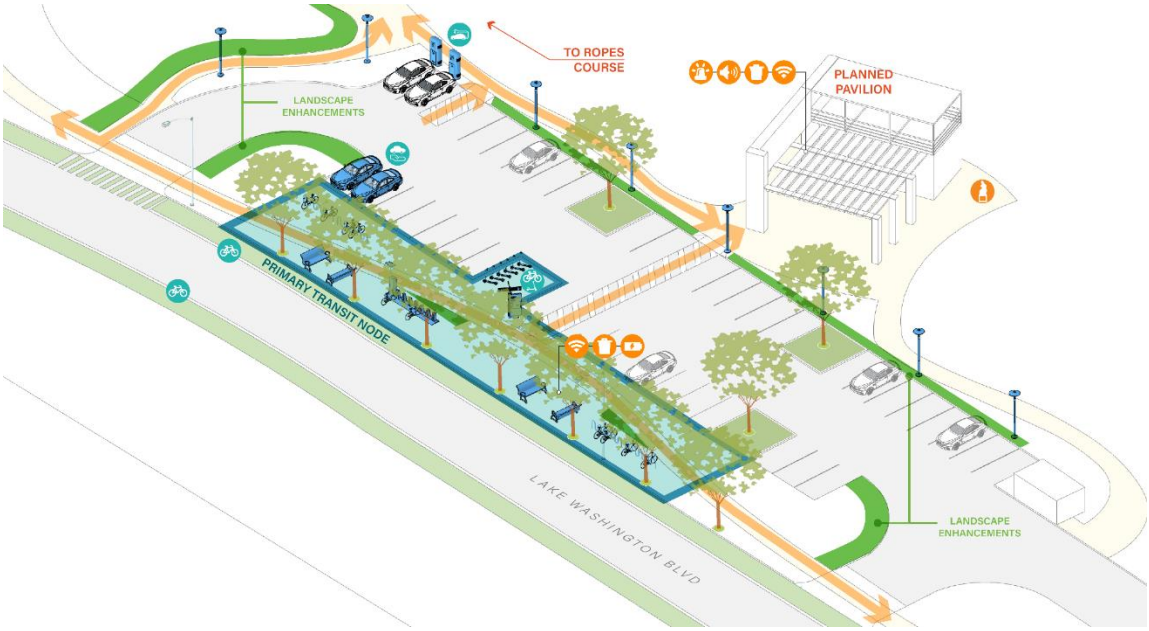


Figure 23: Neighborhood Hub Prototype (Proposed Improvements)

Cost Estimation

These are planning stage level of cost estimation. A more detailed cost estimation can be find in the appendices of this document.

Table 6: Cost Estimation for Heritage Oaks Park

Heritage Oaks Park (Lake Washington Blvd)	**Cost**	**Notes**
On-Site Permanent Infrastructures	$ 153,100.00	
Public Art & Public WiFi	Variable	[1] [2]

[1] Public Art program largely varies in cost and depends on grants.
[2] WiFi depends on level and type of coverage the City wants.

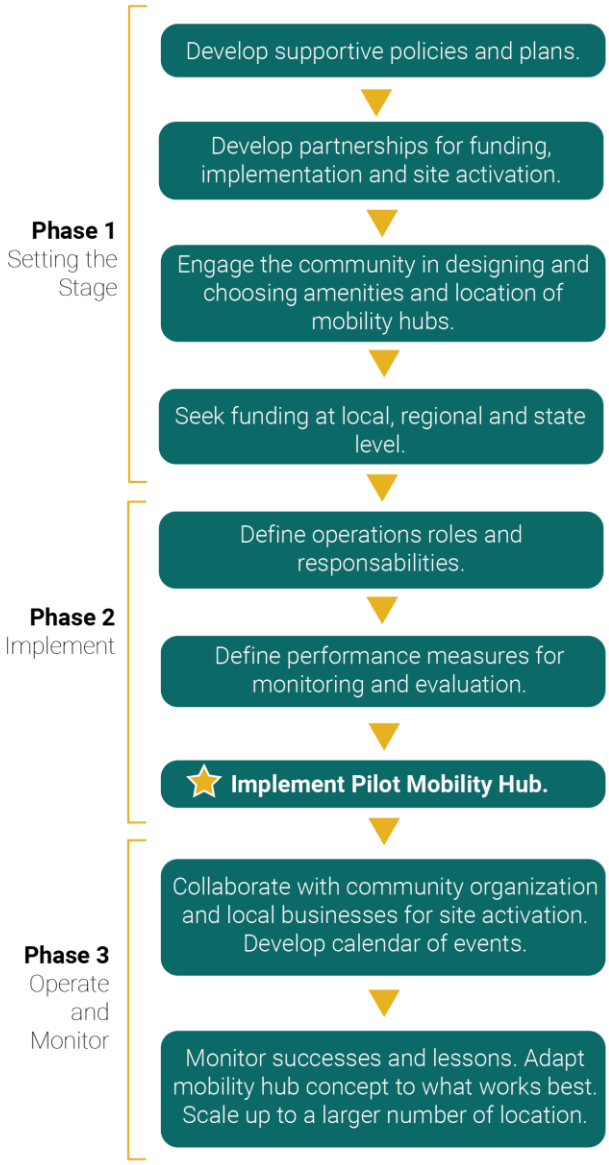
Implementation Strategies

Process For Pilot Project Implementation

The following flow chart illustrates the steps leading to the implementation of the mobility hubs. The first phase can be referenced as "setting the stage", where the City put in place the right pieces of the puzzle to develop the mobility hubs. It includes developing supportive policy and process, developing partnerships and seeking funding.

Phase 2 is the mobility hub pilot project implementation. In this phase, the community is invited to participate in putting together hubs in their community, including the type of transportation infrastructure and the hub location.

The last phase includes the operation and the monitoring of the hubs' success. The first step includes coordination with local organizations and businesses to develop site activation, such as farmer's market, food trucks, etc. The second step, the monitoring, uses the performance measurement defined in the second step to monitor the success of the hub.



Funding Strategies

Implementation of the mobility hubs and the adoption of the new plans and policies required to set the stage requires funding from differents agencies. The following section lists potential funding partners for the Cityand includes private partners and agencies at the regional, state, and federal level.

Private Partners

Public Private Partnerships: The City of West Sacramento has developed successful partnerships for unique projects such as the Clarksburg Trail Rest Area and Improvements. Building on this past success, there are opportunities to develop partnerships with the private sector to fund mobility hubs. Potential funding partners may include:

- Developers
- Educational Institutions
- Employment Centers

- Local Businesses

The Pacific Gas and Electric Company (PG&E) is the local electricity provider in West Sacramento and offers charging station funding for multifamily housing. The City should expand to partner with the PG&E for EV charging station program and incentives.

- *PG&E launched the EV Charge Network program to install 7,500 EV chargers at multi-unit dwellings and workplaces throughout its service territory. PG&E pays for the infrastructure to supply electricity to each EV parking space, and for a portion of the charging equipment. As of December 2020, the EV Charge Network Program is fully subscribe and not accepting any new participants but could re-open for another cycle*.

Regional Agencies

Sacramento Metropolitan Air Quality Management District (SMAQMD) offers a variety of incentive programs for public agencies to improve air quality in the Sacramento region[1]. The City and SMAQMD should identify future partnerhips opportunities for EV charging station program and incentives and for community carshare program:

- *Community CarShare Program* – The Community CarShare Program is a pilot car sharing program to benefit disadvantaged communities in the greater Sacramento area.
- *As of December 2020, most of the programs such as Infrastructure Incentives for EVs or Transit Stop Improvement grants are closed but could re-open for another cycle.*

Sacramento Area Council of Governments (SACOG) is in the metropolitan planning organization (MPO) for the six-county Sacramento region. SACOG is the regional transportation planning agency and serves as a funding mechanism by administering multiple grant programs for projects approved in the Metropolitan Transportation Improvement Program (MTIP). Currently, available transportation funding includes:

- *Regional flexible funding programs: the Maintenance & Modernization program support projects (less than $5 million) such as bicycle, pedestrian path and trail, complete streets and safety improvements*[2].

State Agencies

Caltrans: The California State Department of Transportation (Caltrans) is a major funding mechanism for agencies across the state, administering federal funding programs and its own statewide grant programs. Of particular interest for the City of West Sacramento are two major state programs, both of which have awarded funding to the City for various projects, including the development of the Mobility Action Plan.

- *Active Transportation Program (ATP):* The ATP is a competitive statewide program created to encourage increased use of active modes of transportation, such as biking and walking. ATP can support implementation of a comprehensive bike and pedestrian network to access mobility hubs. Eligible projects include:
    - *Infrastructure Projects*

[1] http://airquality.org/Businesses/Incentive-Programs
[2] https://www.sacog.org/post/2021-maintenance-modernization-category-application-materials

    - *Plans: including development of a community wide bicycle, pedestrian, safe route to school or active transportation plan*
    - *Non-infrastructure Projects: education, encouragement and enforcement activities*
    - *Quick Build Project Pilot Program: These projects require construction, and are built with durable, low to moderate cost materials but last from one year to five years*[3].
- *Sustainable Transportation Planning Grants:* This program includes two pathways for potential funding, including the Sustainable Communities Grants and Strategic Partnerships Grants. The Sustainable Communities Grants are intented to advance projects that align with established goals included in the Regional Transprotation Plan Guidelines, and can vary in focus from year to year. The Strategic Partnerships Grants are focused on statewide, interregional, or regional transportation deficiencies, and include a sub-focus on transit planning projects to address multimodal transportation deficiencies. Projects funded by these sources are generally limited to planning studies, and cannot include engineering design or capital infrastructure activities. The City was successful in securing funding from this program for the development of the Mobility Action Plan, and could seek future funding awards for follow-on projects as part of implementation.
- *Transportation Development Act (TDA) funds: As the Regional Transportaiton Planning Agency, SACOG administers TDA funding for public transit service. The funding is derived from two key sources: Local Transportation Funds (LTF), which can be used for street and roads projects and/or transit operations, and State Transit Assistance (STA) which is generated through sales tax on fuel.*

California Strategic Growth Council: Through a series of investment programs and initiatives, the Strategic Growth Council (SGC) supports community design that makes it easier for Californians to walk, bike and use transit. Grants program include:

- *Affordable Housing and Sustainable Communities:* The Affordable Housing and Sustainable Communities (AHSC) Program makes it easier for Californians to drive less by making sure housing, jobs, and key destinations are accessible by walking, biking, and transit. The City of West Sacramento was awarded this grant in 2014-2015 to help fund the West Gateway Place[4].
- *Transformative Climate Communities:* This program funds development and infrastructure projects that reduce greenhouse gas emissions and local air pollution, primarily in communities of concern. Funding is derived from the cap-and-trade dollars, and is part of the larger statewide initiative, California Climate Investments, and includes funding for planning grants and implementation grants. Round 3 awards occurred in 2020, and future rounds have yet to be announced.
- *California Climate Investments Technical Assistance Program*: While not a funding source itself, the program provides assistance to understaffed or strained public agencies with grant application assistance, implementation assistance, and capacity

[3] https://catc.ca.gov/-/media/ctc-media/documents/programs/atp/workshops/cycle-5/2020325-adopted-2021-atp-guidelines-a11y.pdf
[4] https://sgc.ca.gov/programs/ahsc/docs/20180612-Update-AHSC_CS_City_of_West_Sac.pdf

building services. This is not tied to a specific funding program, and can be utilized for multiple sources.

Federal Agencies

Federal Transit Administration (FTA): FTA provide grants to local public transit systems operation support and capital projects. FTA provides annual formula grants to transit agencies nationwide as well as discretionary funding in competitive processes. Grants that could be available for the City or their partner include:

- *Pilot Program for TOD Planning:* FTA provides funding to local communities to integrate land use and transportation planning with a new fixed guideway or core capacity transit capital investment. It is a competitive grant program aimed to improve access to public transportation. Comprehensive planning funded through the program must examine ways to improve economic development and ridership, foster multimodal connectivity and accessibility, improve transit access for pedestrian and bicycle traffic, engage the private sector, identify infrastructure needs, and enable mixed-use development near transit stations[5].
- *Integrated Mobility Innovation Program:* FTA funds projects that demonstrate innovative and effective practices, partnerships and technologies to enhance public transportation effectiveness, increase efficiency, expand quality, promote safety and improve the traveler experience[6]. This program blends three programs – Mobility on Demand Sandbox, Strategic Transit Automation Research (STAR), and Mobility Payment Integration. The objective of the program is to assist public transit agencies enhance transit industry preparedness for integrated mobility, assist in developing and integrating innovative mobility practices, and measure the impacts of integrated mobility innovation on travelers and transportation systems, among other objectives.
- *Mobility for All Pilot Program:* This funding opportunity seeks to improve mobility options through employing innovative coordination of transportation strategies and building partnerships to enhance mobility and access to vital community services for older adults, individuals with disabilities, and people of low income.
- *Mobility on Demand (MOD) Sandbox Demonstration Project:* Funds projects that promote innovative business models to deliver high quality, seamless and equitable mobility options for all travelers. The goal is to support better connections for travelers to the overall transportation network, explore new mobility on demand accessibility models, examine data sharing and data collection methods that lead to increased understanding of transportation impacts like economic, societal, and personal. These projects are intended to be centered with partnerships at the local level, and leverage technology that allows for a traveler-centric approach to improved mobility.

Environmental Protection Agency (EPA): EPA provides grants to state environmental programs, non-profits, educational institutions, and others to fund a wide variety of projects, from scientific studies to community cleanups.

[5] https://www.transit.dot.gov/TODPilot
[6] https://www.transit.dot.gov/IMI

- *Brownfields Grants and Funding: Existing facilities where redevelopment is complicated by real or perceived contamination.*

Appendix

Appendix A - Detailed Cost Estimation

The following cost estimation is a high level of magnitude planning cost. More detailed cost estimation should be performed when going to the design phase. These are based on the template in the following page and on a litterature review of similar projects, reports from the industry and vendor comparison.

References

City of Davis Dutch Intersection: https://www.cityofdavis.org/city-hall/public-works-engineering-and-transportation/transportation/current-projects/covell-boulevard-and-j-street-dutch-intersection/-PhotoID-324

TCRP Report 118 Bus Rapid Transit Practitioner's Guide: https://nacto.org/docs/usdg/tcrp118brt_practitioners_kittleson.pdf

NCHRP Report 552 Guidelines for Analysis of Investment in Bicycle Facilities: https://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_552.pdf

UNC Highway Safety Research Center Costs for Pedestrian and Bicyclist Infrastructure Improvements: https://vtrans.vermont.gov/sites/aot/files/highway/documents/ltf/UNCReportOnCosts.pdf

NACTO Urban bikeway design: https://nacto.org/publication/urban-bikeway-design-guide/intersection-treatments/bike-boxes/)

Vendor Comparable

Harbor Locker: https://harborlocker.com/products/harbor-smart-package-locker?gclid=Cj0KCQiA962BBhCzARIsAIpWEL0DcPy6qtjNEwezGV4mIBY5y1EWcNJw3LVokFwmjIdYTEpiS9choTsaAiHSEALw_wcB

Kwikboost: https://kwikboost.com/shop/brightbox-smart-locker/

School Outfitters: https://www.schooloutfitters.com/catalog

Samsung Display: https://pid.samsungdisplay.com/en/learning-center/blog/digital-signage-pricing

Cost Estimation Template

Table 7: Cost Estimation Template

	Categories	Unit	Unit Price	Notes	Reference
1.00	**Roadway Construction**				
1.10	Pavement				
1.11	Curb ramps	unit	$ 6,000.00		*City of Davis Dutch Intersection*
1.12	Sidewalk	linear foot	$ 300.00		*UNC Highway Safety Research Center Costs for Pedestrian and Bicyclist Infrastructure Improvements*
1.13	Curb Extension (bulb out)	unit	$ 16,000.00		*UNC Highway Safety Research Center Costs for Pedestrian and Bicyclist Infrastructure Improvements*
1.14	Median Curb	linear foot	$ 30.00		*City of Davis Dutch Intersection*
1.20	Pavements Markings				
1.21	Bicycle Box	square feet	$ 20.00		*NCHRP Report 552 Guidelines for Analysis of Investment in Bicycle Facilities, p.14 Sizes of the bicycle box are typically **10-16 feet deep and 15-18 feet wide** (NACTO)*
1.22	Lane Stripping (Class II)	linear foot	$ 3.00		*City of Davis Dutch Intersection*
1.23	Lane Painting (Class IV)	square feet	$ 6.00		*City of Davis Dutch Intersection*
1.25	Bicycle Marking	unit	$ 210.00		*UNC Highway Safety Research Center Costs for Pedestrian and Bicyclist Infrastructure Improvements*
1.26	Pedestrian Crossing	unit	$ 3,500.00	*Per crossing, only stripping*	*UNC Highway Safety Research Center Costs for Pedestrian and Bicyclist Infrastructure Improvements*
1.27	Pavement Marking	square feet	$ 3.00		*City of Davis Dutch Intersection*
1.30	Landscaping				

	Categories	Unit	Unit Price	Notes	Reference
1.31	Landscaping - Grass	square feet	$ 7.50		*City of Davis Dutch Intersection*
1.32	Landscaping - Trees	unit	$ 500.00		*City of Davis Dutch Intersection*
1.33	Landscaping - Trails	square feet	$ 5.00		*City of Davis Dutch Intersection*
1.34	Stormwater management	unit	$ 20,000.00		
	Subtotal 1.00				
2.00	**Equipment**				
2.10	Signs				
2.11	Wayfindings (Temporary)	program	$ 30,000.00	*Basic signage*	
	Wayfindings (Permanent)	program	$ 100,000.00	*Incorporate art as wayfindings and include utility boxes*	
2.12	Interactive Signage	unit	$ 30,000.00	*Include equipment, design, permitting, install, networking, maintenance & warranty costs.*	*Samsung Display*
2.20	Traffic Signals				
2.21	Pedestrian Signals	unit	$ 10,000.00		*NCHRP Report 552 Guidelines for Analysis of Investment in Bicycle Facilities, p.14*
2.22	Bicycle Signals	unit	$ 15,000.00		*NCHRP Report 552 Guidelines for Analysis of Investment in Bicycle Facilities, p.14*
2.30	Bike Parking				
2.31	Bicycle Rack (U Rack for 2 bikes)	unit	$ 1,000.00		*NCHRP Report 552 Guidelines for Analysis of Investment in Bicycle Facilities, p.14*
2.32	Bicycle Rack (Spirals for 6 bikes)	unit	$ 2,000.00		*NCHRP Report 552 Guidelines for Analysis of Investment in Bicycle Facilities, p.14*
2.33	Bike Repair Station	unit	$ 2,500.00		*https://www.theparkcatalog.com/bike-repair-stations*
2.40	Lighting				
2.41	Street Lighting	unit	$ 5,500.00		*NCHRP Report 552 Guidelines for Analysis of Investment in Bicycle Facilities, p.14*
2.50	Charging Infrastructures				

	Categories	Unit	Unit Price	Notes	Reference
2.51	Level 2 Dual-Port Chargers	unit	$ 20,000 - 50,000	*Range including equipment, design, permitting, install, networking, maintenance & warranty costs. Higher end is primarily accounting for sites that may require new or upgraded panels or other electrical service to the site*	
2.52	DC Fast Chargers	unit	$ 50,000 - 150,000	*Range including equipment, design, permitting, install, networking, maintenance & warranty costs. Higher end is primarily accounting for sites that may require new or upgraded panels or other electrical service to the site*	
2.60	*Security*				
2.61	*Emergency Call Boxes*	unit	$ 9,000.00		*NCHRP Report 552 Guidelines for Analysis of Investment in Bicycle Facilities, p.14*
2.62	*Announcement System*	unit	$ 9,000.00		*NCHRP Report 552 Guidelines for Analysis of Investment in Bicycle Facilities, p.15*
	Subtotal 2.00				
3.00	**Amenities**				
3.10	Sitting Area				
3.11	Benches	unit	$ 2,000.00		*City of Davis Dutch Intersection*
3.12	Parklets	unit	$ 20,000.00		*Litterature review (Seattle Department of Transportation Parklet Guide, Morgan Hill Parklet Pilot Program)*
3.13	Pop-up activities	unit	$ 10,000.00		
3.14	Picnic Table	unit	$ 2,000.00		*School Outfitters*
3.15	Trash Can	unit	$ 1,500.00		
3.16	Public Art	unit	Variable	*Could be a collaboration with local artists or a larger art program*	
3.20	Technology				

	Categories	Unit	Unit Price	Notes	Reference
3.21	Wifi	Forfait	Variable	*Depend on level of coverage of the WiFi and the program the City want to take over.*	
3.22	Device Charging Station	Unit	$ 10,000.00		*Kwik Boost*
3.23	Delivery Lockers	Unit	$ 10,000.00		*Harbor Lockers*
3.30	Bus Amenities				
3.31	Bus Shelter	unit	$ 28,000.00		*TCRP Report 118 Bus Rapid Transit Practitioner's Guide*
3.32	Bus benches	unit	$ 2,000.00		*City of Davis Dutch Intersection*
3.33	Fare Kiosk	unit	$ 15,000.00		
	Subtotal 3.00				
	Total 1.00+2.00+3.00				
	Administration		*6%*		
	Planning & Outreach		*5%*		
	Design and Engineering		*10%*		
	Field Inspection		*2%*		
	Total				
	Project Contingency		*30%*		
	Total with contingency				

Table 8: Temporary Infrastructure Cost Estimation for West Sacramento Community Center Mobility Hub

		Unit	Quantity	Unit Price	Total Cost
1.00	**Roadway Construction**				
1.10	Pavement				
1.11	Curb ramps	unit		$ 6,000.00	$ -
1.12	Sidewalk	linear foot		$ 300.00	$ -
1.13	Curb Extension (bulb out)	unit		$ 16,000.00	$ -
1.14	Median Curb	linear foot		$ 30.00	$ -
1.20	Pavements Markings				
1.21	Bicycle Box	square feet		$ 20.00	$ -
1.22	Lane Stripping (Class II)	linear foot		$ 3.00	$ -
1.23	Lane Painting (Class IV)	square feet		$ 6.00	$ -
1.25	Bicycle Marking	unit		$ 210.00	$ -
1.26	Pedestrian Crossing	unit		$ 3,500.00	$ -
1.27	Pavement Marking	square feet	**3000**	$ 3.00	$ 9,000.00
1.30	Landscaping				
1.31	Landscaping - Grass	square feet		$ 7.50	$ -
1.32	Landscaping - Trees	unit		$ 500.00	$ -
1.33	Landscaping - Trails	square feet		$ 5.00	$ -
1.34	Stormwater management	unit		$ 40,000.00	$ -
	Subtotal 1.00				***$ 9,000.00***
2.00	**Equipment**				
2.10	Signs				
2.11	Wayfindings (Temporary)	program		$ 30,000.00	$ -
	Wayfindings (Permanent)	program		$ 100,000.00	$ -
2.12	Interactive Signage	unit		$ 30,000.00	$ -
2.20	Traffic Signals				
2.21	Pedestrian Signals	unit		$ 10,000.00	$ -
2.22	Bicycle Signals	unit		$ 15,000.00	$ -
2.30	Bike Parking				
2.31	Bicycle Rack (U Rack for 2 bikes)	unit		$ 1,000.00	$ -
2.32	Bicycle Rack (Spirals for 6 bikes)	unit		$ 2,000.00	$ -
2.33	Bike Repair Station	unit	**1**	$ 2,500.00	$ 2,500.00
2.40	Lighting				$ -
2.41	Street Lighting	unit		$ 5,500.00	$ -
2.50	Charging Infrastructures				
2.51	Level 2 Dual-Port Chargers	unit		$ 20,000 - 50,000	
2.52	DC Fast Chargers	unit		$ 50,000 - 150,000	$ 50,000 - 150,000
2.60	*Security*				

		Unit	Quantity	Unit Price	Total Cost
2.61	*Emergency Call Boxes*	unit		$ 9,000.00	$ -
2.62	*Announcement System*	unit		$ 9,000.00	$ -
	Subtotal 2.00				***$ 2,500.00***
3.00	**Amenities**				
3.10	Sitting Area				
3.11	Benches	unit		$ 2,000.00	$ -
3.12	Parklets	unit		$ 20,000.00	$ -
3.13	Pop-up activities	unit	**3**	$ 10,000.00	$ 30,000.00
3.14	Picnic Table	unit	**2**	$ 2,000.00	$ 4,000.00
3.15	Trash Can	unit		$ 1,500.00	$ -
3.16	Public Art	unit		Variable	Variable
3.20	Technology				
3.21	Wifi	Forfait		Variable	Variable
3.22	Device Charging Station	Unit		$ 10,000.00	$ -
3.23	Delivery Lockers	Unit		$ 10,000.00	$ -
3.30	Bus Amenities				
3.31	Bus Shelter	unit		$ 28,000.00	$ -
3.32	Bus benches	unit		$ 2,000.00	$ -
3.33	Fare Kiosk	unit		$ 15,000.00	$ -
	Subtotal 3.00				***$ 34,000.00***
	Total 1.00+2.00+3.00				**$ 45,500.00**
	Administration			*6%*	$ 2,730.00
	Planning & Outreach			*5%*	$ 2,275.00
	Design and Engineering			*10%*	$ 4,550.00
	Field Inspection			*2%*	$ 910.00
	Total				**$ 55,965.00**
	Project Contingency			*30%*	$ 16,789.50
	Total with contingency				**$ 90,000.00**

Table 9: Permanent Infrastructure Cost Estimation for West Sacramento Community Center Mobility Hub

	Unit	Quantity	Unit Price	Total Cost
Roadway Construction				
Pavement				
Curb ramps	unit		$ 6,000.00	$ -
Sidewalk	linear foot		$ 300.00	$ -
Curb Extension (bulb out)	unit		$ 16,000.00	$ -
Median Curb	linear foot		$ 30.00	$ -
Pavements Markings				
Bicycle Box	square feet		$ 20.00	$ -
Lane Stripping (Class II)	linear foot		$ 3.00	$ -
Lane Painting (Class IV)	square feet		$ 6.00	$ -
Bicycle Marking	unit		$ 210.00	$ -
Pedestrian Crossing	unit		$ 3,500.00	$ -
Pavement Marking	square feet		$ 3.00	$ -
Landscaping				
Landscaping - Grass	square feet		$ 7.50	$ -
Landscaping - Trees	unit		$ 500.00	$ -
Landscaping - Trails	square feet		$ 5.00	$ -
Stormwater management	unit		$ 40,000.00	$ -
Subtotal 1.00				***$ -***
Equipment				
Signs				
Wayfindings (Temporary)	program		$ 30,000.00	$ -
Wayfindings (Permanent)	program	**1**	$ 100,000.00	$ 100,000.00
Interactive Signage	unit	**1**	$ 30,000.00	$ 30,000.00
Traffic Signals				
Pedestrian Signals	unit		$ 10,000.00	$ -
Bicycle Signals	unit		$ 15,000.00	$ -
Bike Parking				
Bicycle Rack (U Rack for 2 bikes)	unit		$ 1,000.00	$ -
Bicycle Rack (Spirals for 6 bikes)	unit		$ 2,000.00	$ -
Bike Repair Station	unit	**1**	$ 2,500.00	$ 2,500.00
Lighting				$ -
Street Lighting	unit		$ 5,500.00	$ -
Charging Infrastructures				
Level 2 Dual-Port Chargers	unit		$ 20,000 - 50,000	
DC Fast Chargers	unit	**1**	$ 50,000 - 150,000	$ 50,000 - 150,000
Security				
Emergency Call Boxes	unit		$ 9,000.00	$ -
Announcement System	unit	**1**	$ 9,000.00	$ 9,000.00
Subtotal 2.00				**$ 132,500.00**

	Unit	Quantity	Unit Price	Total Cost
Amenities				
Sitting Area				
Benches	unit		$ 2,000.00	$ -
Parklets	unit		$ 20,000.00	$ -
Pop-up activities	unit		$ 10,000.00	$ -
Picnic Table	unit		$ 2,000.00	$ -
Trash Can	unit		$ 1,500.00	$ -
Public Art	unit	**1**	Variable	Variable
Technology				
Wifi	Forfait	**1**	Variable	Variable
Device Charging Station	Unit	**1**	$ 10,000.00	$ 10,000.00
Delivery Lockers	Unit	**1**	$ 10,000.00	$ 10,000.00
Bus Amenities				
Bus Shelter	unit		$ 28,000.00	$ -
Bus benches	unit		$ 2,000.00	$ -
Fare Kiosk	unit	**2**	$ 15,000.00	$ 30,000.00
Subtotal 3.00				**$ 20,000.00**
Total 1.00+2.00+3.00				**$ 152,500.00**
Administration			*6%*	$ 9,150.00
Planning & Outreach			*5%*	$ 7,625.00
Design and Engineering			*10%*	$ 15,250.00
Field Inspection			*2%*	$ 3,050.00
Total				**$ 187,575.00**
Project Contingency			*30%*	$ 56,272.50
Total with contingency				**$ 270,000.00**

Table 10: Temporary Infrastructure Cost Estimation for Arteaga's Supermarket Mobility Hub

	Unit	Quantity	Unit Price	Total Cost
Roadway Construction				
Pavement				
Curb ramps	unit		$ 6,000.00	$ -
Sidewalk	linear foot		$ 300.00	$ -
Curb Extension (bulb out)	unit		$ 16,000.00	$ -
Median Curb	linear foot		$ 30.00	$ -
Pavements Markings				
Bicycle Box	square feet		$ 20.00	$ -
Lane Stripping (Class II)	linear foot		$ 3.00	$ -
Lane Painting (Class IV)	square feet		$ 6.00	$ -
Bicycle Marking	unit		$ 210.00	$ -
Pedestrian Crossing	unit		$ 3,500.00	$ -
Pavement Marking	square feet		$ 3.00	$ -
Landscaping				
Landscaping - Grass	square feet		$ 7.50	$ -
Landscaping - Trees	unit		$ 500.00	$ -
Landscaping - Trails	square feet		$ 5.00	$ -
Stormwater management	unit		$ 20,000.00	$ -
Subtotal 1.00				***$ -***
Equipment				
Signs				
Wayfindings (Temporary)	program		$ 30,000.00	$ -
Wayfindings (Permanent)	program		$ 100,000.00	$ -
Interactive Signage	unit		$ 30,000.00	$ -
Traffic Signals				
Pedestrian Signals	unit		$ 10,000.00	$ -
Bicycle Signals	unit		$ 15,000.00	$ -
Bike Parking				
Bicycle Rack (U Rack for 2 bikes)	unit		$ 1,000.00	$ -
Bicycle Rack (Spirals for 6 bikes)	unit	**2**	$ 2,000.00	$ 4,000.00
Bike Repair Station	unit		$ 2,500.00	$ -
Lighting				$ -
Street Lighting	unit		$ 5,500.00	$ -
Charging Infrastructures				
Level 2 Dual-Port Chargers	unit		$ 20,000 - 50,000	$ 20,000 - 50,000
DC Fast Chargers	unit		$ 50,000 - 150,000	$ 50,000 - 150,000
Security				
Emergency Call Boxes	unit		$ 9,000.00	$ -
Announcement System	unit		$ 9,000.00	$ -
Subtotal 2.00				**$ 4,000.00**

	Unit	Quantity	Unit Price	Total Cost
Amenities				
Sitting Area				
Benches	unit		$ 2,000.00	$ -
Parklets	unit	**1**	$ 20,000.00	$ 20,000.00
Pop-up activities	unit	**2**	$ 10,000.00	$ 20,000.00
Picnic Table	unit	**4**	$ 2,000.00	$ 8,000.00
Trash Can	unit	**1**	$ 1,500.00	$ 1,500.00
Public Art	unit		Variable	Variable
Technology				
Wifi	Forfait	**1**	Variable	Variable
Device Charging Station	Unit		$ 10,000.00	$ -
Delivery Lockers	Unit		$ 10,000.00	$ -
Bus Amenities				
Bus Shelter	unit		$ 28,000.00	$ -
Bus benches	unit		$ 2,000.00	$ -
Fare Kiosk	unit		$ 15,000.00	$ -
Subtotal 3.00				**$ 49,500.00**
Total 1.00+2.00+3.00				**$ 53,500.00**
Administration			*6%*	$ 3,210.00
Planning & Outreach			*5%*	$ 2,675.00
Design and Engineering			*10%*	$ 5,350.00
Field Inspection			*2%*	$ 1,070.00
Total				**$ 65,805.00**
Project Contingency			*30%*	$ 19,741.50
Total with contingency				**$ 95,000.00**

Table 11: On-Site Permanent Infrastructure Cost Estimation for Arteaga's Supermarket Mobility Hub

	Unit	Quantity	Unit Price	Total Cost
Roadway Construction				
Pavement				
Curb ramps	unit		$ 6,000.00	$ -
Sidewalk	linear foot		$ 300.00	$ -
Curb Extension (bulb out)	unit		$ 16,000.00	$ -
Median Curb	linear foot	**270**	$ 30.00	$ 8,100.00
Pavements Markings				
Bicycle Box	square feet		$ 20.00	$ -
Lane Stripping (Class II)	linear foot		$ 3.00	$ -
Lane Painting (Class IV)	square feet		$ 6.00	$ -
Bicycle Marking	unit		$ 210.00	$ -
Pedestrian Crossing	unit		$ 3,500.00	$ -
Pavement Marking	square feet	**300**	$ 3.00	$ 900.00
Landscaping				
Landscaping - Grass	square feet	**1290**	$ 7.50	$ 9,675.00
Landscaping - Trees	unit	**20**	$ 500.00	$ 10,000.00
Landscaping - Trails	square feet		$ 5.00	$ -
Stormwater management	unit		$ 20,000.00	$ -
Subtotal 1.00				***$ 28,675.00***
Equipment				
Signs				
Wayfindings (Temporary)	program		$ 30,000.00	$ -
Wayfindings (Permanent)	program		$ 100,000.00	$ -
Interactive Signage	unit	**1**	$ 30,000.00	$ 30,000.00
Traffic Signals				
Pedestrian Signals	unit		$ 10,000.00	$ -
Bicycle Signals	unit		$ 15,000.00	$ -
Bike Parking				
Bicycle Rack (U Rack for 2 bikes)	unit		$ 1,000.00	$ -
Bicycle Rack (Spirals for 6 bikes)	unit		$ 2,000.00	$ -
Bike Repair Station	unit		$ 2,500.00	$ -
Lighting				$ -
Street Lighting	unit	**12**	$ 5,500.00	$ 66,000.00
Charging Infrastructures				
Level 2 Dual-Port Chargers	unit	**2**	$ 20,000 - 50,000	$ 75,000.00
DC Fast Chargers	unit		$ 50,000 - 150,000	
Security				
Emergency Call Boxes	unit		$ 9,000.00	$ -
Announcement System	unit		$ 9,000.00	$ -
Subtotal 2.00				**$ 171,000.00**

	Unit	Quantity	Unit Price	Total Cost
Amenities				
Sitting Area				
Benches	unit		$ 2,000.00	$ -
Parklets	unit		$ 20,000.00	$ -
Pop-up activities	unit		$ 10,000.00	$ -
Picnic Table	unit		$ 2,000.00	$ -
Trash Can	unit		$ 1,500.00	$ -
Public Art	unit		Variable	Variable
Technology				
Wifi	Forfait		Variable	Variable
Device Charging Station	Unit	**2**	$ 10,000.00	$ 20,000.00
Delivery Lockers	Unit	**1**	$ 10,000.00	$ 10,000.00
Bus Amenities				
Bus Shelter	unit		$ 28,000.00	$ -
Bus benches	unit		$ 2,000.00	$ -
Fare Kiosk	unit		$ 15,000.00	$ -
Subtotal 3.00				**$ 30,000.00**
Total 1.00+2.00+3.00				**$ 229,675.00**
Administration			*6%*	$ 13,780.50
Planning & Outreach			*5%*	$ 11,483.75
Design and Engineering			*10%*	$ 22,967.50
Field Inspection			*2%*	$ 4,593.50
Total				**$ 282,500.25**
Project Contingency			*30%*	$ 84,750.08
Total with contingency				**$ 407,000.00**

Table 12: Right-of-Way Permanent Infrastructure Cost Estimation for Arteaga's Supermarket Mobility Hub

	Unit	Quantity	Unit Price	Total Cost
Roadway Construction				
Pavement				
Curb ramps	unit	**8**	$ 6,000.00	$ 48,000.00
Sidewalk	linear foot	**135**	$ 300.00	$ 40,500.00
Curb Extension (bulb out)	unit	**4**	$ 16,000.00	$ 64,000.00
Median Curb	linear foot	**10560**	$ 30.00	$ 316,800.00
Pavements Markings				
Bicycle Box	square feet		$ 20.00	$ -
Lane Stripping (Class II)	linear foot	**10560**	$ 3.00	$ 31,680.00
Lane Painting (Class IV)	square feet	**26400**	$ 6.00	$ 158,400.00
Bicycle Marking	unit		$ 210.00	$ -
Pedestrian Crossing	unit	**4**	$ 3,500.00	$ 14,000.00
Pavement Marking	square feet		$ 3.00	$ -
Landscaping				
Landscaping - Grass	square feet		$ 7.50	$ -
Landscaping - Trees	unit		$ 500.00	$ -
Landscaping - Trails	square feet		$ 5.00	$ -
Stormwater management	unit	**5**	$ 40,000.00	$ 200,000.00
Subtotal 1.00				***$ 873,380.00***
Equipment				
Signs				
Wayfindings (Temporary)	program		$ 30,000.00	$ -
Wayfindings (Permanent)	program		$ 100,000.00	$ -
Interactive Signage	unit		$ 30,000.00	$ -
Traffic Signals				
Pedestrian Signals	unit		$ 10,000.00	$ -
Bicycle Signals	unit		$ 15,000.00	$ -
Bike Parking				
Bicycle Rack (U Rack for 2 bikes)	unit		$ 1,000.00	$ -
Bicycle Rack (Spirals for 6 bikes)	unit		$ 2,000.00	$ -
Bike Repair Station	unit		$ 2,500.00	$ -
Lighting				$ -
Street Lighting	unit		$ 5,500.00	$ -
Charging Infrastructures				
Level 2 Dual-Port Chargers	unit		$ 20,000 - 50,000	
DC Fast Chargers	unit		$ 50,000 - 150,000	
Security				
Emergency Call Boxes	unit		$ 9,000.00	$ -
Announcement System	unit		$ 9,000.00	$ -
Subtotal 2.00				**$ -**

	Unit	Quantity	Unit Price	Total Cost
Amenities				
Sitting Area				
Benches	unit		$ 2,000.00	$ -
Parklets	unit		$ 20,000.00	$ -
Pop-up activities	unit		$ 10,000.00	$ -
Picnic Table	unit		$ 2,000.00	$ -
Trash Can	unit		$ 1,500.00	$ -
Public Art	unit		Variable	Variable
Technology				
Wifi	Forfait		Variable	Variable
Device Charging Station	Unit		$ 10,000.00	$ -
Delivery Lockers	Unit		$ 10,000.00	$ -
Bus Amenities				
Bus Shelter	unit	**2**	$ 28,000.00	$ 56,000.00
Bus benches	unit		$ 2,000.00	$ -
Fare Kiosk	unit	**1**	$ 15,000.00	$ 15,000.00
Subtotal 3.00				**$ 56,000.00**
Total 1.00+2.00+3.00				**$ 929,380.00**
Administration			*6%*	$ 55,762.80
Planning & Outreach			*5%*	$ 46,469.00
Design and Engineering			*10%*	$ 92,938.00
Field Inspection			*2%*	$ 18,587.60
Total				**$ 1,143,137.40**
Project Contingency			*30%*	$ 342,941.22
Total with contingency				**$ 1,650,000.00**

Table 13: Permanent Infrastructure Cost Estimation for Heritage Oaks Park

		Unit	Quantity	Unit Price	Total Cost
1.00	**Roadway Construction**				
1.10	Pavement				
1.11	Curb ramps	unit		$ 6,000.00	$ -
1.12	Sidewalk	linear foot		$ 300.00	$ -
1.13	Curb Extension (bulb out)	unit		$ 16,000.00	$ -
1.14	Median Curb	linear foot		$ 30.00	$ -
1.20	Pavements Markings				
1.21	Bicycle Box	square feet		$ 20.00	$ -
1.22	Lane Stripping (Class II)	linear foot		$ 3.00	$ -
1.23	Lane Painting (Class IV)	square feet		$ 6.00	$ -
1.25	Bicycle Marking	unit		$ 210.00	$ -
1.26	Pedestrian Crossing	unit		$ 3,500.00	$ -
1.27	Pavement Marking	square feet		$ 3.00	$ -
1.30	Landscaping				
1.31	Landscaping - Grass	square feet	**3000**	$ 7.50	$ 22,500.00
1.32	Landscaping - Trees	unit		$ 500.00	$ -
1.33	Landscaping - Trails	square feet		$ 5.00	$ -
1.34	Stormwater management	unit		$ 20,000.00	$ -
	Subtotal 1.00				***$ 22,500.00***
2.00	**Equipment**				
2.10	Signs				
2.11	Wayfindings (Temporary)	program	**1**	$ 30,000.00	$ 30,000.00
	Wayfindings (Permanent)	program		$ 100,000.00	$ -
2.12	Interactive Signage	unit		$ 30,000.00	$ -
2.20	Traffic Signals				
2.21	Pedestrian Signals	unit		$ 10,000.00	$ -
2.22	Bicycle Signals	unit		$ 15,000.00	$ -
2.30	Bike Parking				
2.31	Bicycle Rack (U Rack for 2 bikes)	unit		$ 1,000.00	$ -
2.32	Bicycle Rack (Spirals for 6 bikes)	unit	**2**	$ 2,000.00	$ 4,000.00
2.33	Bike Repair Station	unit		$ 2,500.00	$ -
2.40	Lighting				$ -
2.41	Street Lighting	unit		$ 5,500.00	$ -
2.50	Charging Infrastructures				
2.51	Level 2 Dual-Port Chargers	unit		$ 20,000 - 50,000	
	DC Fast Chargers	unit		$ 50,000 - 150,000	
2.60	*Security*				
2.61	*Emergency Call Boxes*	unit	**1**	$ 9,000.00	$ 9,000.00
2.62	*Announcement System*	unit	**1**	$ 9,000.00	$ 9,000.00
	Subtotal 2.00				**$ 43,000.00**
3.00	**Amenities**				
3.10	Sitting Area				
3.11	Benches	unit	**4**	$ 2,000.00	$ 8,000.00
3.12	Parklets	unit		$ 20,000.00	$ -
3.13	Pop-up activities	unit		$ 10,000.00	$ -
3.14	Picnic Table	unit		$ 2,000.00	$ -
3.15	Trash Can	unit	**2**	$ 1,500.00	$ 3,000.00

		Unit	Quantity	Unit Price	Total Cost
3.16	Public Art	unit	**1**	Variable	Variable
3.20	Technology				
3.21	Wifi	Forfait	**2**	Variable	Variable
3.22	Device Charging Station	Unit	**1**	$ 10,000.00	$ 10,000.00
3.23	Delivery Lockers	Unit		$ 10,000.00	$ -
3.30	Bus Amenities				
3.31	Bus Shelter	unit		$ 28,000.00	$ -
3.32	Bus benches	unit		$ 2,000.00	$ -
3.33	Fare Kiosk	unit		$ 15,000.00	$ -
	Subtotal 3.00				**$ 21,000.00**
	Total 1.00+2.00+3.00				**$ 86,500.00**
	Administration			*6%*	$ 5,190.00
	Planning & Outreach			*5%*	$ 4,325.00
	Design and Engineering			*10%*	$ 8,650.00
	Field Inspection			*2%*	$ 1,730.00
	Total				**$ 106,395.00**
	Project Contingency			*30%*	$ 31,918.50
	Total with contingency				**$ 153,100.00**

Appendix B – Mobility Hub Building Bloc Elements

As part of the outreach effort done for the MAP, a series of virtual community workshops that invited residents to virtually design mobility hub prototypes. For more information, refer to the Outreach Summary. The following are the mobility hub building blocs elements per theme.

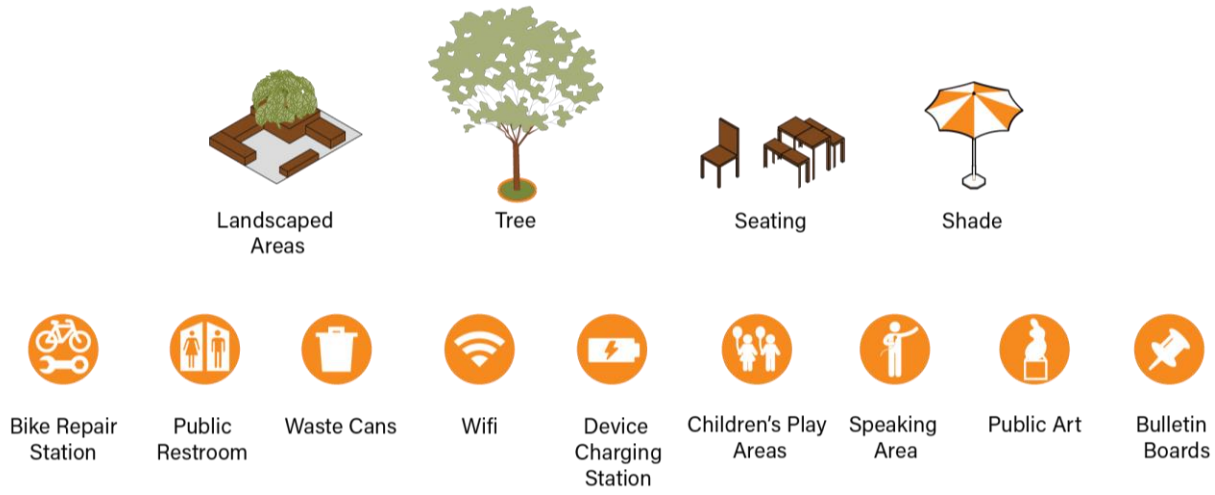


Figure 24: Comfort Building Bloc Elements

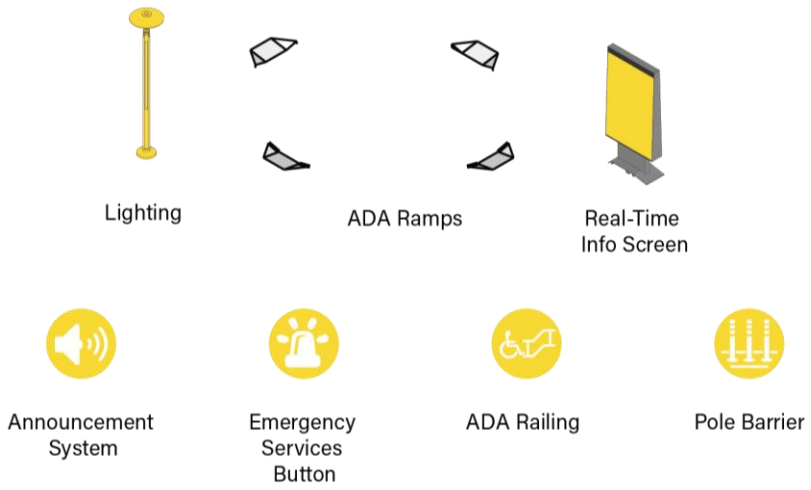


Figure 25: Safety, Lighting and Information Building Bloc Elements

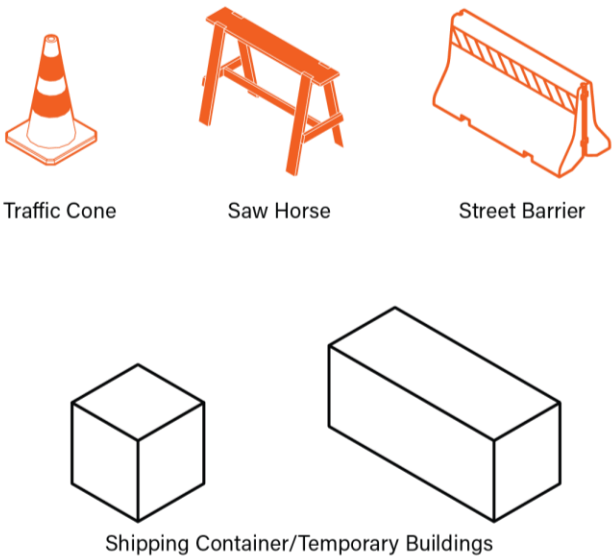


Figure 26: Temporary Infrastructure Building Bloc Elements

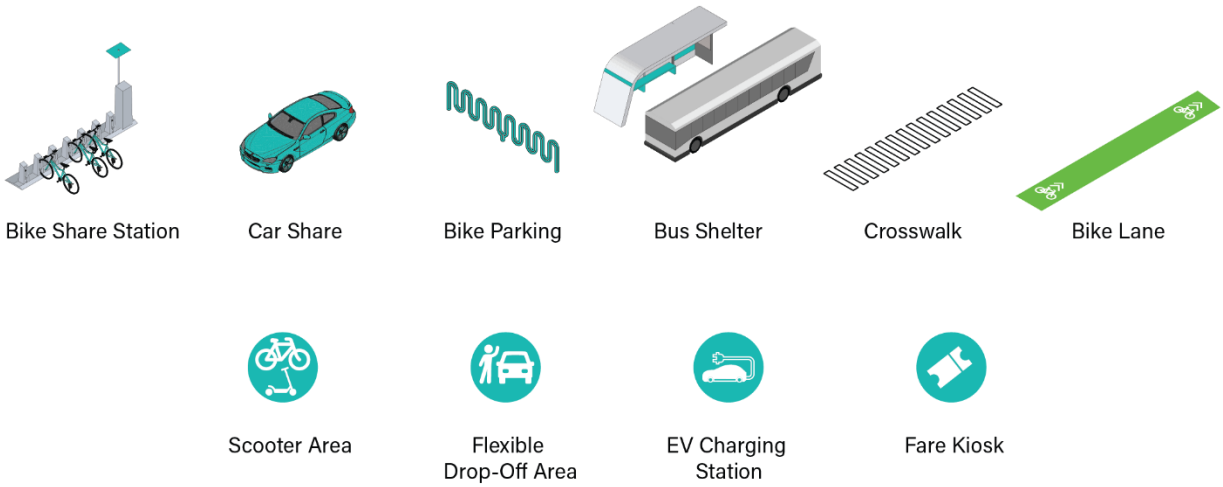


Figure 27: Transportation Infrastructure Building Bloc Elements

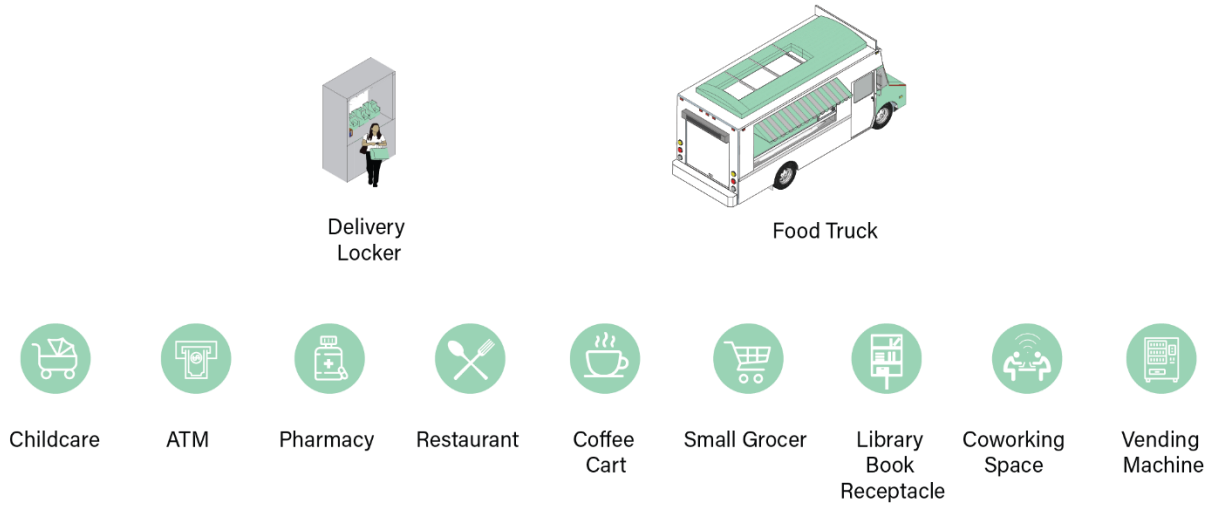
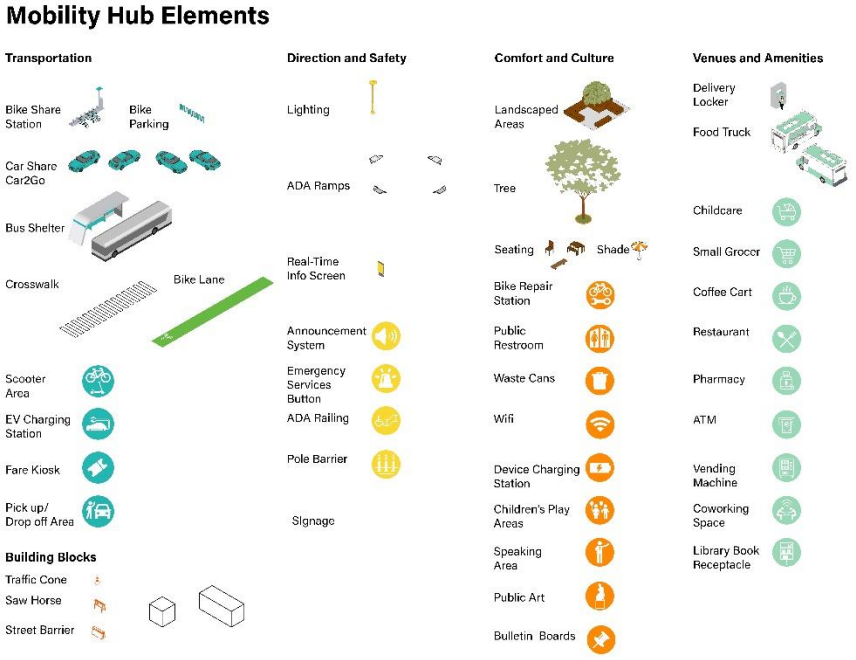


Figure 28: Activating Uses Building Bloc Elements



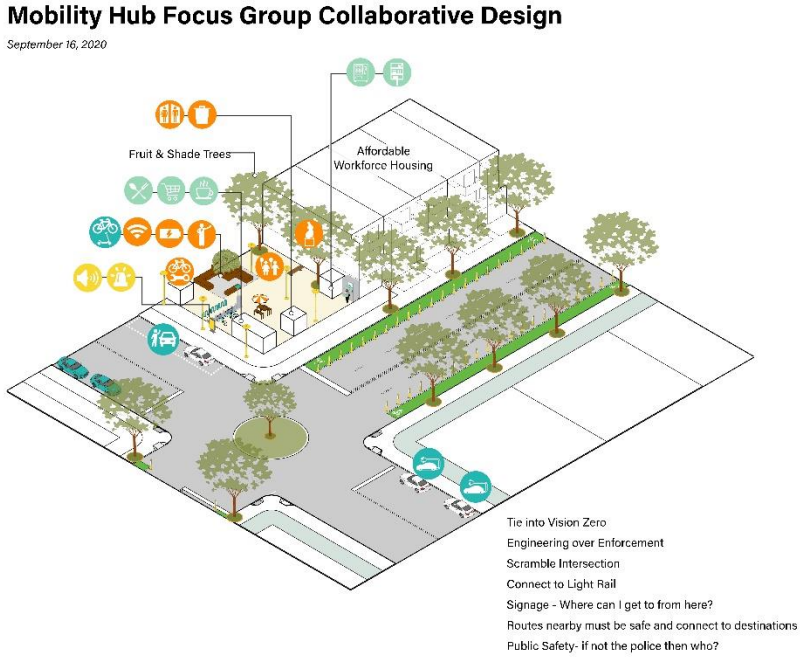


Figure 29: Mobility Hub Design from Focus Group