Orange County
Mobility Hubs Strategy

Final Report, September, 2022

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1 Framing the Opportunity

Chapter 1 introduces the purpose and structure of this Strategy and explains how to navigate and use the document.

This chapter sets the scene for the following chapters by defining mobility hubs and why they are important, including their key objectives, benefits and enabling factors.

The relevance of this Strategy to different audiences of practitioners and organizations involved in creating communities served by efficient, convenient, and accessible mobility services throughout Orange County is also addressed.

Chapter Structure

1.1 Strategy Overview

1.1.1 Strategy Purpose

The Orange County Mobility Hubs Strategy (OC Mobility Hubs Strategy or Strategy) establishes principles and guidelines for mobility hub planning in Orange County.

The Strategy identifies areas of high potential for a future county-wide mobility hubs network based on their mode shift and vehicle miles travelled (VMT) impacts. It then provides a planning and implementation framework to guide future planning and implementation efforts by the Orange County Transportation Authority (OCTA) and stakeholders, aligned with wider strategic transportation initiatives.

The effective design and implementation of mobility hubs can provide access to a broad range of flexible travel options and extend the reach and connectivity of transit services in Orange County.

1.1.2 The Role of Orange County Transportation Authority

Orange County Transportation Authority (OCTA)'s mission is to develop and deliver transportation solutions to enhance the quality of life and keep Orange County moving.

By developing this Strategy, OCTA is establishing a framework to identify areas of high potential for a future, county-wide mobility hub network. The Strategy also identifies planning and implementation considerations and provides sketch plans for five mobility hubs categories representing various locations type across the county as well as virtual hub locations.

The OC Mobility Hubs Strategy is situated within a broader body of planning work supporting a vision for transportation and mobility in Orange County. It was developed concurrent with the 2022 Long Range Transportation Plan (LRTP) and is designed to help practitioners and organizations plan and design facilities for communities that support active transportation and enhance connectivity between existing local and regional mobility options.

1.1.3 Audience

The Orange County Mobility Hubs Strategy is intended for the broad range of practitioners and organizations involved in creating communities served by efficient, convenient, and accessible mobility services throughout Orange County.

The Strategy is designed to help practitioners create communities that support active transportation and enhance connectivity between existing local and regional mobility options.

1.1.4 Strategy Structure

The Strategy is organized into four chapters and an Executive Summary:

Executive Summary

Provides an overview of the purpose, goals and approach of the OC Mobility Hub Strategy. It also includes key takeaways and recommendations.

1. Framing the Opportunity

Introduces the concept and objectives of Mobility Hubs, establishes OCTA's role in their development, explains their benefits.

2. A New Way Forward

Sets the policy context for mobility hubs in Orange County considering local context and selection of candidate Mobility Hub locations.

3. Planning Mobility Hubs

Establishes Mobility Hub planning and design considerations, starting with strategy development and funneling down to design considerations with reference to various hub and location types.

4. Delivery Considerations

Describes responsibilities, operational matters, funding pathways and customer information considerations for future implementation.

1.2 What is a Mobility Hub?

1.2.1 Definition of a Mobility Hub

Mobility hubs are places where multiple transport modes and services meet to encourage multimodal journeys. To inform the development of this Strategy, **OCTA defined mobility hubs as:**

Mobility Hub Definition
"Identifiable places that facilitate more seamless, sustainable, and inclusive travel experiences by co-locating regional and local travel modes and amenities at a facility designed for the local context." OCTA, June 2022

This definition is descriptive and is not intended to be limiting. Mobility hubs can, and do offer more, and this definition could be revisited in the future.

Mobility hubs need to adapt to their setting both in terms of the type of components and their scale. Most commonly, mobility hub components are grouped by those with a mobility related function such as transit (e.g., bus, passenger rail, shared modes), and those with a non-mobility related function such as Wi-Fi, food outlets, seating, or wayfinding.

A mobility hub is usually integrated with at least one anchor mobility service (e.g., transportation center, passenger rail station) and a complementary mobility service (e.g., any type of shared mode).

For this Strategy, a tailored set of components has been developed for each mobility hub category. Further detail is provided in Chapter 3. Please note, the list of components is not exhaustive, and more components can be added. For example, future developments such as connected and autonomous vehicles may influence the design of hubs and could require new components or remove some existing one.

1.2.2 Mobility Hub Components

Shared Mobility Context

Over the past decade, peoples' travel habits, preferences and patterns have changed, with this transformation expected to continue over the coming decade accelerated by advances in technology that have potential to improve multimodality, reduce costs, and transform business models (also referred to as shared mobility services). Mobility hubs form part of this evolving landscape and are an emerging concept with some of the first examples developed by the City of Bremen, Germany, and later spread to other European and North American cities.

There is no universal definition of a mobility hub, however, many agencies, private mobility providers and experts have developed their own definitions based on a variety of factors, catering to the agency/private operation's specific objectives, goals, and vision for their communities or users.

Some common themes and concepts are emerging, recognizing a mobility hub as a link between sustainable and shared mobility services supplemented by additional facilities and features which benefit and attract users.

Shared Mobility Services

Shared mobility refers to transportation services shared amongst users. It includes shared vehicle services such as bike share and carshare, and shared rides such as rideshare or on demand transport such as microtransit. Shared mobility services offer a range of flexible, on-demand services that complement existing public transit and taxis and include:

Shared Micromobility: shared micromobility is broadly defined as shared access to bikes/e-bikes, scooters, e-scooters or other light/low-speed modes. It is anticipated that a variety of new vehicle types and designs will emerge in the future. In their shared form, shared micromobility programs have brought flexibility, choice and more sustainable travel options to people in many cities, but not without challenges regarding use of public space, engagement with local authorities, transit agencies and concerns regarding safety.

Bikesharing: provides users with on-demand access to bicycles at a variety of pick-up and drop-off locations for one-way (point-to-point) or roundtrip travel. Bikesharing fleets are commonly deployed in a network within a metropolitan region, city, neighborhood, employment center, and/or university campus.

Carsharing: offers members access to vehicles by joining an organization that provides and maintains a fleet of cars and/or light trucks. These vehicles may be located within neighborhoods, at public transit stations, employment centers, universities, etc. The carsharing organization typically provides insurance, gasoline/electric vehicle charging, parking, and maintenance. Members who join a carsharing organization typically pay a fee each time they use a vehicle.

Curbside Management: relates to management of vehicles stopping adjacent to the curb, such as for parking or loading purposes. It also relates to vehicular access between the roadway and adjacent areas, via driveways. These elements require careful consideration as places where vehicles slow down and stop, and therefore where there is potential for conflict with other moving vehicles, as well as pedestrians and bicyclists. Curbside management is typically implemented in areas with high demand for use of the curb such as outside urban train stations or in downtown commercial zones.

Microtransit: a privately or publicly operated, technology-enabled transit service that typically uses multi-passenger/pooled shuttles or vans to provide on-demand or fixed-schedule services with either dynamic or fixed routing.

Ridesharing: is defined as the formal or informal sharing of rides between drivers and passengers with similar origin-destination pairings. Ridesharing includes carpooling, involving 2 or more persons, and vanpooling, involving up to 15 persons share costs and operating expenses and may share driving responsibility. Services are typically provided on a non-profit basis.

Ridesourcing: on-demand transportation services in which drivers and passengers connect via digital platforms. Digital applications are typically used for booking, electronic payment, and ratings. Drivers are paid for services provided with tariffs typically set by the platform operator. TNCs include companies such as UBER/Lyft.

Mobility Technologies

Mobility technologies are constantly evolving, and this document represents the latest development as of September 2022

1.3 Why Consider Mobility Hubs?

1.3.1 Mobility Hub Objectives

The Mobility Hubs Vision Statement (Figure 1.1) was developed collaboratively by staff from a broad cross-section of OCTA departments and takes account of early results of public engagement (described in Chapter 2), as well as findings from key countywide plans and policies.

The Strategy is situated within a broader body of planning work supporting a vision for transportation and mobility in Orange County.

By aligning with these other regional long-range plans- mobility, environmental, equity, public safety, technology, housing, and complete streets – the mobility hub strategy can become a useful tool to help decision-making.

Appendix E – Orange County Local Context Analysis provides an analysis of how this Strategy relates to and is supported by other relevant policy and plans that apply across the County

Figure 1.1: Orange County Mobility Hubs Vision Statement

Improve access and connectivity to transit stations

by providing safe, convenient, and affordable mobility options that bridge the gap between local and regional transit services.

Enhance the active transportation and on-demand services experience

by providing safe and equitable first and last mile services for local people and businesses.

Serve local needs and create a sense of place

for the surrounding communities by providing for broader needs beyond mobility.

Create a more attractive public transit experience for all passengers

by facilitating seamless and reliable trips through responsive services tailored to local needs and context

Reduce congestion and automobile dependency

by encouraging sustainable transportation modes to improve air quality and reduce greenhouse gas emissions.
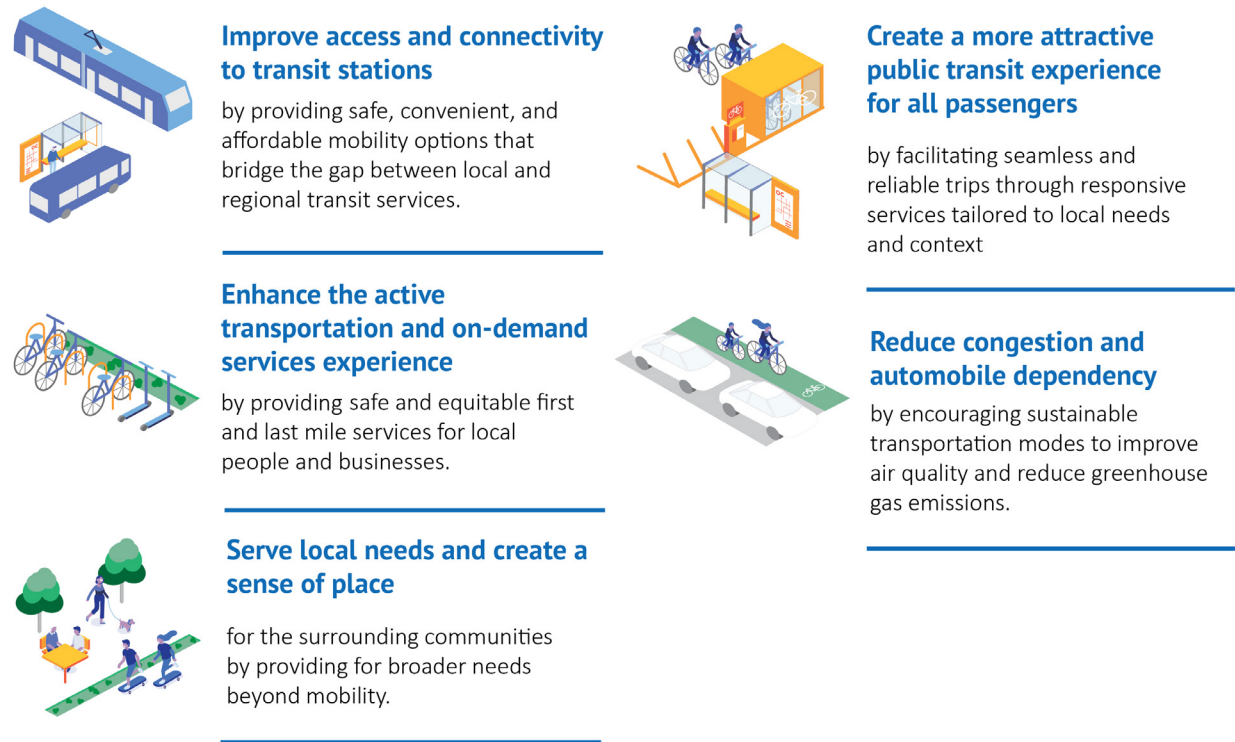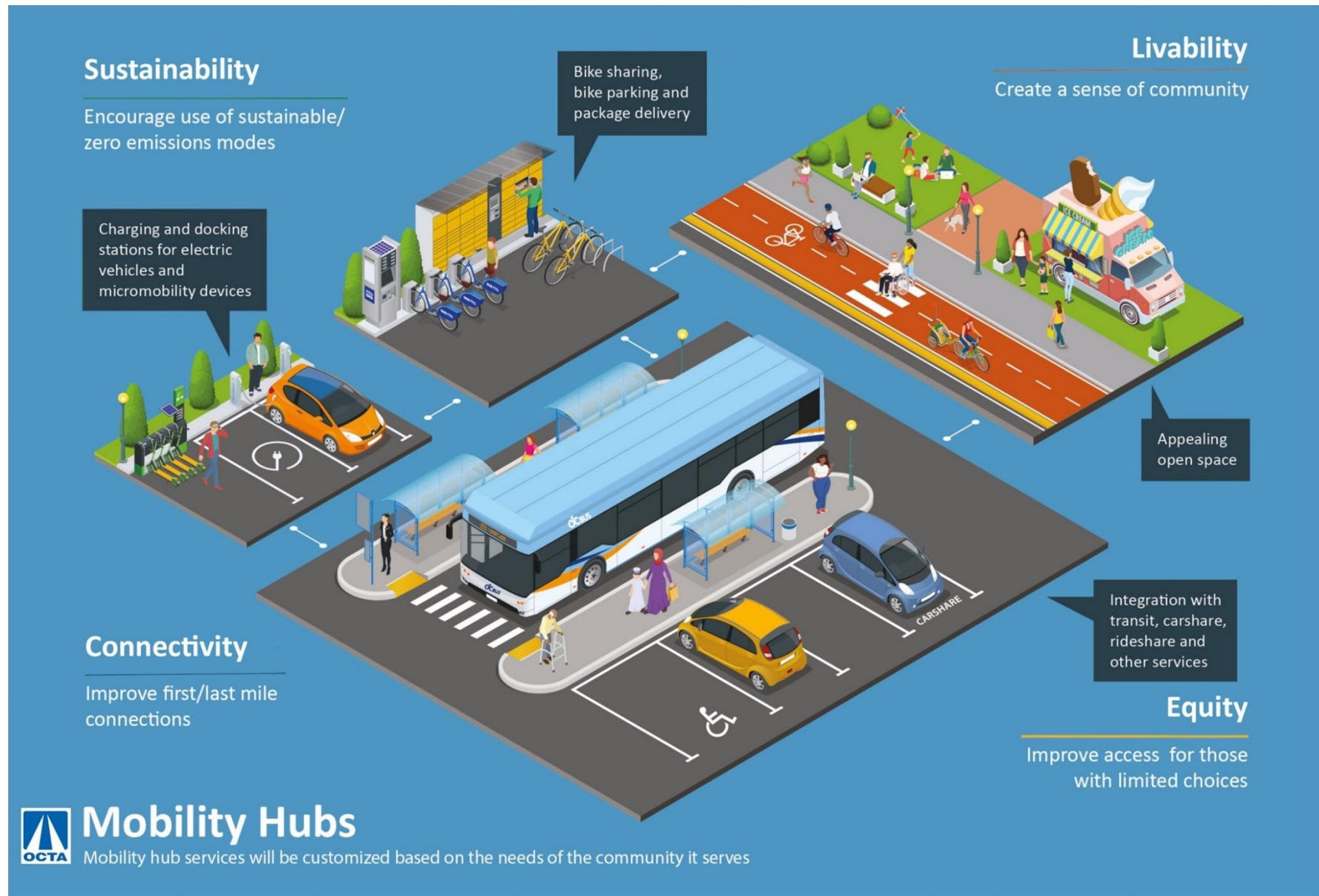
Figure 1.2: Illustration of OC Mobility Hubs Components and Objectives

1.3.2 Potential Benefits

Mobility hubs can emerge through a variety of strategies, from short-term pilot programs to a comprehensive regional network plan. A wider range of benefits identified through a review of mobility hub best practices is summarized in **Table 1.1**.

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Appendix C - provides a detailed comparative analysis of national and international case studies of mobility hubs (both proposed and existing).

Table 1.1: Benefits from Mobility Hub Use Case Analysis

Main Benefits	How Mobility Hubs Can Help
Expand Coverage of Services	• Increase options for the first/last mile connections at transit stops by increasing multimodal options
Congestion Relief	• Reduce reliance on personal cars for shorter neighborhood trips • Make travel choices easier and more reliable • Mitigate growing congestion on corridors through the state or at the city level • Mitigate growing car parking challenges in city centers • Help manage the growing and competing demand for curbside access and use
Improved Sustainability	• Reduce the number of vehicle miles traveled (VMT) • Increase prevalence of lower carbon and shared modes to reduce air pollution • Offer a range of shared electric mobility options at a local level • Supply charging stations (when relevant) to help improve air quality
Livability	• Foster an improved urban environment with safe and enjoyable places to walk, cycle and spend time outdoors for people of all ages and abilities • Reclaim street space for people • Contribute to the creation of great places
Promote Equity	• Provide flexible, affordable, adaptable and accessible services in response to local needs • Create centralized and convenient locations for equity program access • Augment existing transit services at off-peak times through tech enabled on-demand mobility options
Manage Private Mobility Services	• Dynamically allocate curb space to manage private mobility services more efficiently through curbside management strategies and technologies • Support a thriving local economy

CASE STUDY: Berlin's Jelbi Stations

Jelbi stations are mobility hubs implemented across various locations in in the city of Berlin, Germany. Jelbi stations bring several services together including car share, bike share, moped share, e-scooter share, EV charging and stops for taxis and on-demand shuttles.

The vehicles can all be booked through the Jebi App, implemented in Berlin by BVG (the city transport authority).

The objective of Jelbi stations is to use technology to promote the use of shared mobility and transit options instead of the private car, to mitigate increasing traffic congestion.

Berlin now has 12 Jelbi stations that host a wide variety of shared services, and 24 Jelbi points dedicated to micromobility options such as bikes and e-scooters.

1.3.3 Enabling Factors

Planning and design of a mobility hub should consider the following enabling factors:

Table 1.2: Enabling Factors

Characteristics	Considerations
Location	• The success or otherwise of a mobility hub is closely related to its location • Mobility hubs can be a tool to prioritize and increase access to transportation options for transit-dependent individuals and families • Mobility hubs should connect with local and regional transit
Components	• Mobility hubs may vary in size, components, and service mix: each hub should be tailored to the needs of the users in the area and the hub's objectives • All mobility hubs are formed of at least one anchor service and one complementary service • The type of vehicles and mobility options should serve identified local needs
Engaging with Local Communities and Stakeholders	• Stakeholder engagement is essential to secure buy-in from local communities leading to successful implementation and up-take • Mobility hub planning should include feedback from transport operators and other service providers, such as EV charging and technology suppliers • Local community/residents should be engaged during the initial stage of any mobility hub planning effort to validate local needs, evaluate the demand and inform the viability of the service
Planning and Implementation	• Implementation costs will vary considerably relative to the local context, hub scale, and related land development opportunities • Establishing new mobility hubs can take time and requires careful planning- working with multiple partners on a complex development may not happen fast or easily • Initial planning should include the development and execution of a long-term, self-sustaining model with revenue-generating ventures to expand the network of hubs
Marketing	• A mobility hub should have coherent branding and visual identity – consistent signage and publicity containing a recognizable Mobility Hub logo to increase visibility and user awareness
Monitoring & Evaluation	• The impact of mobility hubs on travel behavior, usage, and wider transport objectives such as accessibility, carbon emissions and congestion should be monitored to build an evidence base for planning the future expansion/ continuation of service provision

CASE STUDY: San Francisco Caltrain Mobility Hub

Located at Caltrain's busiest train hub, SF Caltrain BikeHub historically parked over 200 bikes daily during peak months. The pandemic placed Caltrain's secure valet bike parking program in dire straits. Operating costs are partially paid by Caltrain's Joint Powers Board, offset by operating revenues from bike repairs and sales. However, with Caltrain's ridership levels declining by over 90% in 2020, the hub operator, Tranzito proposed a pilot program to rebrand Caltrain BikeHub into Caltrain Mobility Hub. The Peninsula Corridor JPB approved a measure allowing the program to gain management authority over exterior real estate, which could then be converted into an area for e-scooter charging docks.

Tranzito partnered with Spin to provide real estate for e-scooter docks, customer service, and daily sweeps in the train station and public rights-of-way to ensure e-scooters are properly parked. Tranzito also partnered with FlixBus, offering customer service and ticket sales for bus users. These changes increased revenues by 18%, allowing it to adapt and remain a viable service even through a challenging time.

2 A New Way Forward

Chapter 2 establishes a four-step framework to identify locations with **a high propensity of success for a mobility hub network** in Orange County and the **hub hierarchy** associated with it.

This framework supports and informs the Strategy. Subsequent planning and engagement efforts should be undertaken to inform the final list of preferred locations when moving to the implementation phase.

Chapter Structure

2.1 Orange County Context

2.1 Candidate Locations for Orange County Mobility Hubs

Candidate hubs were identified to support the development of the Orange County Mobility Hubs Strategy. The candidate hubs are not intended to be an exhaustive list of locations that could benefit from mobility hubs; rather, they are intended to support the development of the strategy by providing a more limited number of locations that:

- Show high suitability for a mobility hub
- Include a mix of hub types and sizes located across a representative mix of Orange County place types
- Demonstrate the importance of implementing Mobility Hubs within a broader network rather than in isolation through a clustering of hubs in close proximity

Candidate hubs have been used to situate the Strategy within the Orange County Context. For this purpose, having a more targeted number of candidate hubs rather than an exhaustive list could more effectively support strategy development. As a result, not all potential hubs identified through the suitability analysis in Step 1 are included on the candidate list. Their exclusion does not diminish their suitability for a mobility hub, and they should remain in consideration as the strategy moves to more detailed planning stages.

The approach to identify candidate hubs is summarized in Figure 2.1, signposted to the specific needs of the study.

Step 1 – Identify Preliminary Hub Locations

This initial step uses several weighted metrics including land use, destinations, population and job density, ease of mobility, existing transit, equity and others to identify locations within Orange County with the highest suitability for mobility hubs. The geographic overlay of suitability scores was reviewed to identify locations or areas flagged for high suitability. The resulting 42 locations are recommended for further investigation as the strategy moves to implementation.

Step 2 – Categorize Candidate Locations by Place Type

In the second step, identified hubs were validated through public webinars and pop-up events to identify any additional locations where hubs could help address local mobility challenges, and to inform place classifications. Place relates directly to characteristics such as function, demand, potential user characteristics, trip purpose, etc. This review confirmed that a representative variety of different place classifications across Orange County were under consideration.

Step 3 – Prioritize, Cluster, and Reduce Number of Preliminary Hubs

Community and regional stakeholders contributed to hub prioritization. Stakeholders were asked to prioritize hubs relative to their alignment with the five mobility hub objectives described in Section 1.3. Hubs were then grouped into "mobility hub clusters" to extend network reach and service area coverage recognizing that mobility hubs function as an extension of the wider transit network. Initial clusters were validated with OCTA staff to confirm that they included a representative mix of hub and place classifications. Clusters that didn't meet these requirements were removed from the strategy benefits evaluation.

Step 4 – Evaluated Potential Impacts of Candidate Hubs

In the final step, the Orange County Transportation Analysis Model (OCTAM), was used to produce an off-model analysis to estimate how improved access in the mobility hub cluster areas may influence the number of trips using mobility hub services and/or transit.

Figure 2.1: Approach Overview

Step 1. Identify preliminary hub locations

Step 2. Categorize candidate locations by type

Step 3. Prioritize cluster, and reduce the number of preliminary hubs

Step 4. Evaluate potential impacts of candidate hubs

Development of the OC Mobility Hub Suitability Mapping Tool to support the identification of the initial list of hubs

Validation and refinement of the preliminary hubs informed by stakeholder contributions

Expanded preliminary list to create baseline hub network

Place classification assigned and informed by stakeholder outreach

Prioritization exercise to reduce the long-list of potential hubs informed by OCTA staff and stakeholder outreach

Clustering exercise prepared to extend the network and reach and service area coverage

An off-model analysis using OCTAM trip table outputs used to estimate impacts on the short-list

41 suitable locations identified with relative high-scores*

Classifications determine which mobility hub category is most appropriate for each location

25 short listed-cluster service area are identified

The analysis indicates potential mode shift and VMT reduction when mobility hubs are implemented as a full network

*The full baseline network candidate hub locations (56) should be retained for future evaluation as the strategy moves to implementation

Step 1 – Identify Preliminary Hub Locations

The OC Mobility Hub Suitability Tool (see Figure 2.2) was developed to support the identification of a preliminary list of candidate mobility hub locations based on spatial analysis of both quantitative metrics and qualitative inputs.

The suitability tool serves as a companion to this Strategy to support future site-specific planning and implementation efforts and includes existing and planned transit connections, major trip generators, and areas of mobility need, especially low-income and disadvantaged communities.

Table 2.1 lists the market suitability factors included in the preliminary analysis and their relative weightings. The factors were selected based on a review of current practices.

Results

Step 1 identified 41 locations with relatively high scores as potentially suitable for a mobility hub network in Orange County. Table 2.2 lists the recommended locations. Figure 2.3 maps these preliminary areas of opportunity across the county.

Steps 2-4 then refined this initial list to support the detailed strategy development and benefits evaluation.

Figure 2.2: Mobility Hub Suitability Tool
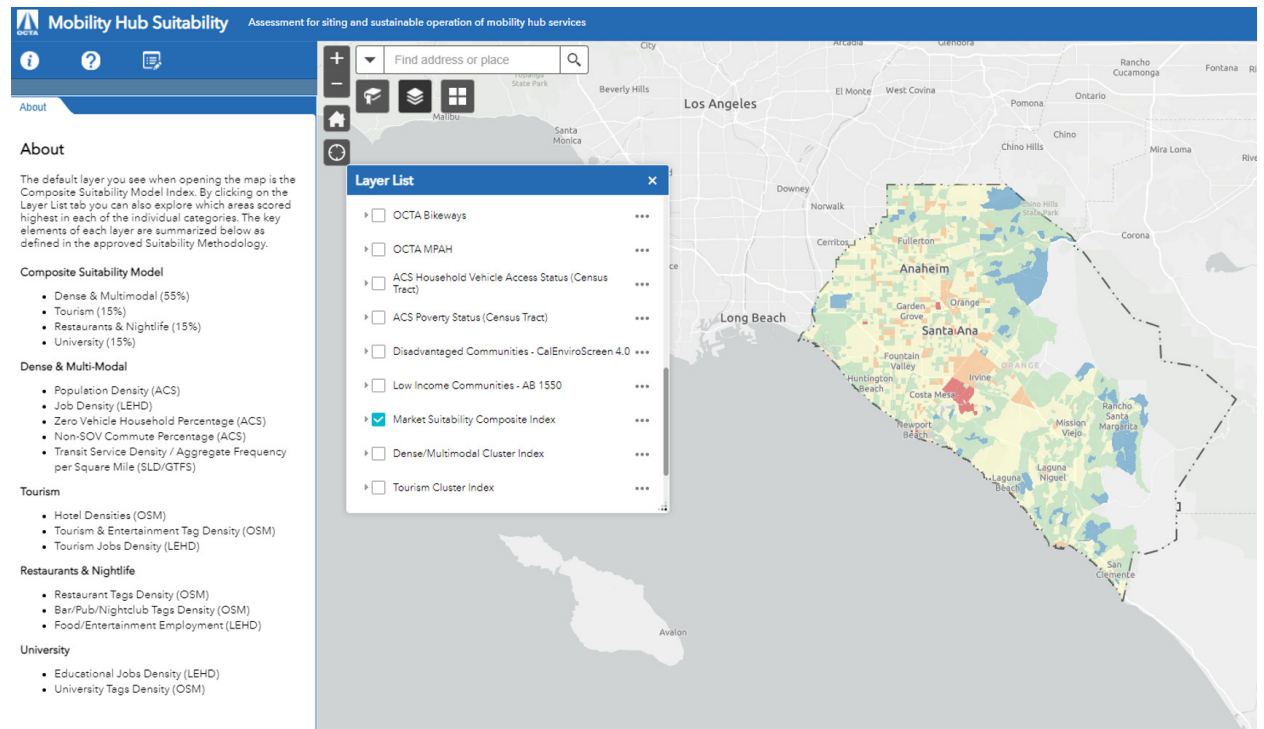
Table 2.1: Market Suitability Factors

Category	Weighting	Criteria	Suitability
Density & Multi-Modality	55%	• Population Density • Job Density • Zero Vehicle Household Percentage • Non-SOV Commute Percentage • Transit Service Density • Transit Job Accessibility • Location of transit stations, bus stop • Location of parks and other public facilities	• Compliments existing services, connects people to where they needs to go, higher number of trips beginning/ ending
Tourism	15%	• Hotel Densities • Tourism & Entertainment Tag Density • Tourism Jobs Density	• Provide options for OC visitors
Restaurants & Nightlife	15%	• Restaurant Tags Density • Bar/Pub/Nightclub Tags Density • Food/Entertainment Employment	• Connect people to where they want to go, more likely to try new mode with infrequent trip
University	15%	• Location of Colleges and Universities • Location of Libraries • Educational Job Density • University Tag Density • College Enrollment Percentage	• Students are early adopters, may not have access to own vehicle, destination for many trips supports existing TDM
Equity		• Communities of Concern • Low Income Communities AB 1550[2]	• Provide services to those who can benefit the most

2. Our mapping exercise used the AB 1550 definition of low income households as currently used by the California Air Resources Board: "Low-income households" are those with household incomes at or below 80 percent of the statewide median income or with household incomes at or below the threshold designated as low income by the Department of Housing and Community Development's list of state income limits adopted pursuant to Section 50093. Link

Table 2.2: Preliminary Candidate Hub Locations

#	Locations
1	Downtown Santa Ana
2	John Wayne Airport/UCI North Campus/ Irvine Business Complex
3	Newport Village/Balboa Boulevard
4	Outlets at Orange
5	University Town Center (UCI adjacent)
6	Westminster Center
7	Anaheim Center City
8	San Clemente Pier Metrolink/Amtrak Station
9	San Clemente (North) Metrolink Station
10	Laguna Beach Mountain Road/PCH
11	Downtown Huntington Beach
12	Lake Forest Plaza El Toro
13	University of California Irvine
14	Irvine Woodbridge Village
15	Westminster Little Saigon
16	Westminster Boulevard (Hoover to Newland)
17	Garden Grove Blvd (Gilbert to Euclid)
18	Main Place Mall/West Orange
19	Buena Park City Hall
20	CSU Fullerton

#	Locations
21	Downtown Brea
22	Huntington Beach Liberty Park
23	The Anaheim Resort
24	Santa Ana Triangle
25	Laguna Beach Downtown
26	Irvine Spectrum
27	Newport Beach Marina Park
28	Huntington Beach Old World Village/ Bella Terra
29	Santa Ana Downtown
30	Brea Mall
31	Downtown Fullerton
32	Fullerton College
33	Downtown Orange
34	Platinum Triangle/ARTIC
35	Sunset Beach
36	Knott's Berry Farm/California Marketplace
37	The District at Tustin Legacy
38	Dana Point Harbor
39	Aliso Viejo Town Center
40	Costa Mesa Triangle Square
41	UCI/University Research Park

Figure 2.3: Preliminary Candidate Hub Locations

Step 2 – Categorize Candidate Locations by Place Type

Place Classification

The preliminary mobility hub list was reviewed through stakeholder outreach, public webinars and pop-up events (see Section 2.3: A Community-informed Approach) to address local mobility challenges including:

• Lack of transportation service

• Long travel times

• Infrequent or unreliable transit

• Safety and security

• Limited or no shared mobility services

• Lack of transit information

Additional hubs identified through the review were added to the inital candidates from Step 1 to define a baseline hub network (Figure 2.4).

These locations are not intended to represent final mobility hub locations. Rather, they are recommended as candidates for further investigation as the strategy moves to implementation.

Figure 2.4: Baseline Hub Network
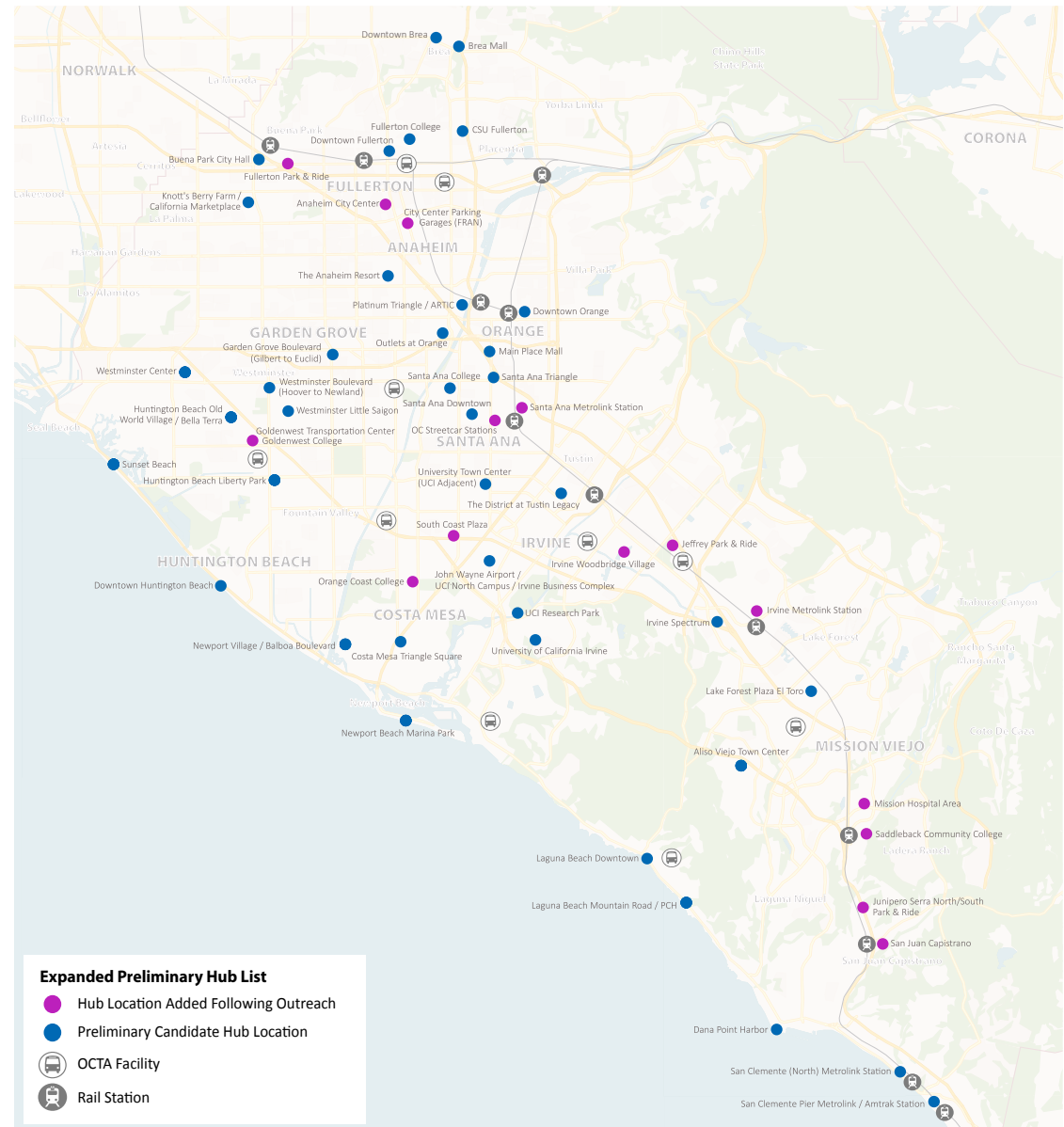
Place Classification

Hubs were then assigned to one of seven place classifications informed by stakeholder outreach (Table 2.3).

Classifications relate directly to local characteristics such as demand, potential user characteristics, trip purpose and physical constraints.

The place classifications help to determine which Mobility hub category could be most appropriate for each location. Mobility hub Categories and the role of place classifications in the planning process are further detailed Section 2.2 and Chapter 3.

Table 2.3: Identified Place Classification

Classification	Consideration
Downtown Area	• City core areas • Land use constraints for mobility hubs – higher value of land and limited undeveloped space, sufficient parking is important to existing businesses so constraints for identifying areas for mobility hubs • Connections to high-frequency transit • Concentration of bars, restaurants, nightlife • Used by employees, visitors, residents • Increased revenue potential for downtown businesses through improved customer access
University	• High population density, important trip attractor but also high density living at some universities • For universities with smaller residential populations, important trip attractor • Students have different mobility needs – less access to a vehicle, non-regular trips, more open to alternative modes, early technology adopters, cost conscious • High number of faculty and staff, expensive to supply sufficient parking
Multimodal Transportation Center	• OCTA-owned transportation centers • Metrolink/Amtrak stations/passenger rail or bus station with bike infrastructure. • Used as first/last mile to/from station • Multimodal interchange and transfer hubs • Larger scale, higher demand, larger range of services

Table 2.3: Identified Place Classification

Classification	Consideration
Entertainment Center	• Major attractor/destination. Occasional visitors, information will need to be accessible for first time users • Event centers need to accommodate high demand at specific times • Similarities/overlaps with university or transit center • Beach communities (especially during summer, and key events)
Park & Ride	• Important for first/last mile • Modal interchange with public transit • Potentially good to pilot in South Orange County
Residential Neighborhood	• People's homes are their trip origin • May be beginning longer commute trip, or more local trip to neighborhood centers • Fewer space constraints but more dispersed development patterns can lead to lower demand that is localized – demand is more spatially distributed. Identify neighborhoods with higher density of population • Location of these hubs should be identified with local-representatives and be connected to larger hubs
Neighborhood Center	• Local Core, Grocery stores, medical centers, parks, schools, gyms, schools/daycares • Should be identified with local-representatives and be connected to larger hubs

Step 3 – Prioritize, Cluster, and Reduce Number of Preliminary Hubs

Step 3 aimed to reduce the long list of potential hubs, including those identified through Step 2, to a targeted short-list with involvement of OCTA staff and regional stakeholders.

Stakeholders were first asked to prioritize hubs relative to their alignment with the five mobility hub objectives described in Section 1.3, giving each a ranking from 1 (lowest) to 3 (highest) priority. Composite scores were assigned to each hub based on this feedback.

Hubs were then grouped into "mobility hub clusters" to extend network reach and service area coverage- recognizing that mobility hubs do not exist in isolation and need to function as an extension of the wider transit network.

Clustering acknowledges the role of jurisdictions in the future implementation of mobility hubs and builds on existing boundary definitions. Clusters were to include:

• Anchor hubs with either regional transit connectivity or serving a major trip generator/destination

• Hubs in close proximity and in the same jurisdiction to extend network reach and service area coverage

Initial clusters were reviewed by OCTA staff to confirm that they met the above requirements and included a representative mix of hub and place classifications. Hubs that didn't meet the requirements were set aside, or hubs were consolidated where more than one anchor hub was identified in close proximity and in the same jurisdiction.

Service areas for Step 4 benefits evaluation were then defined for each mobility hub cluster and reviewed by OCTA staff to confirm that the assigned cluster service areas matched their real-world understanding of those areas. Following industry practice, the service areas represent a selection of transportation analysis zones (TAZs) within approximately 3 miles of each location[3].

Results

The clustering exercise produced 25 candidate mobility hub cluster service areas, as illustrated in Figure 2.5 and listed in Table 2.4.

Specific locations for neighborhood centers, residential neighborhood hubs or virtual hubs should be identified during future planning phases, with the participation of local stakeholders.

3. A 3 mile buffer was applied to each location and the cluster represent the addition of the buffers when they intersected

Figure 2.5: Cluster Locations and Service Areas
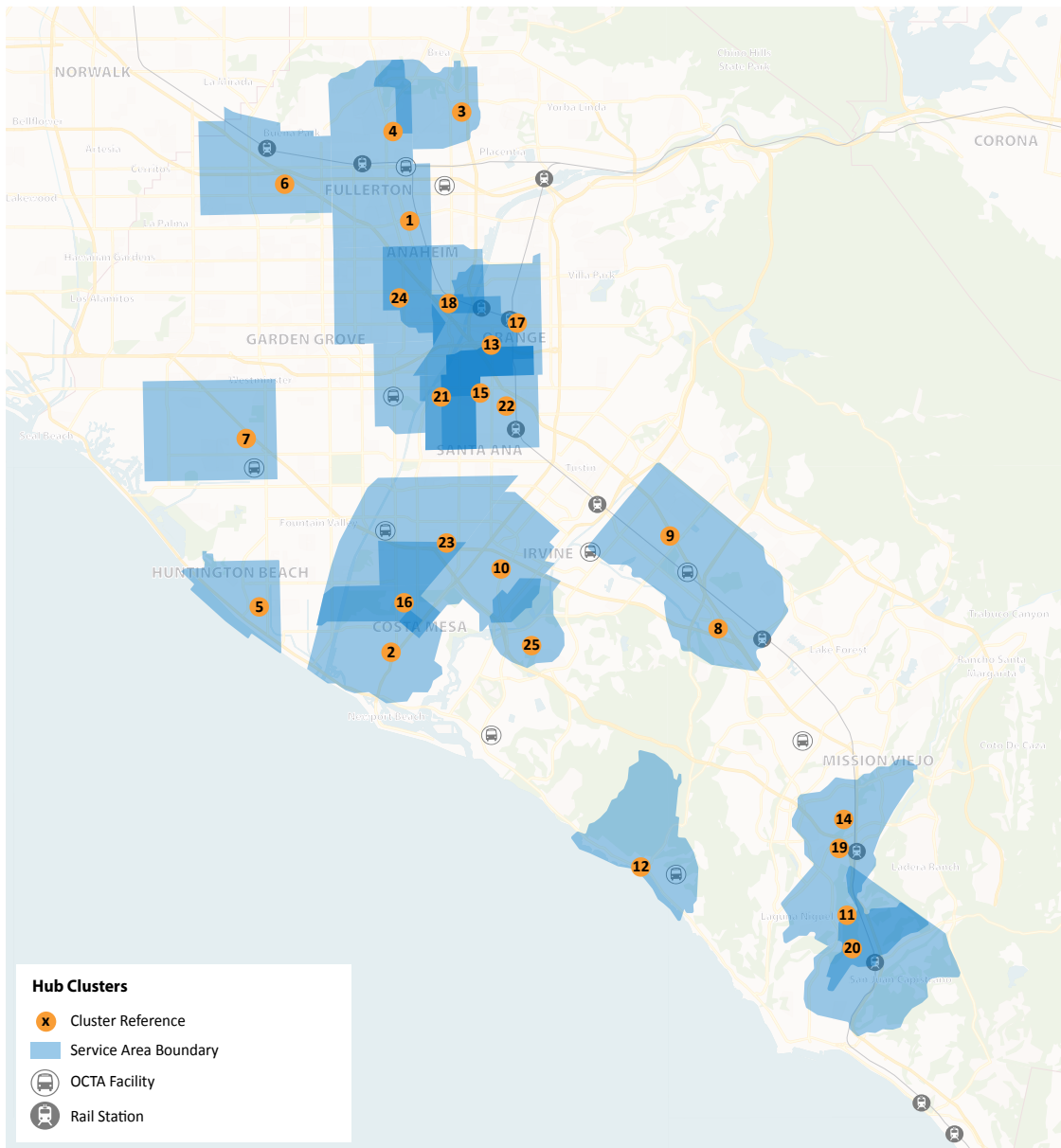
Table 2.4: Clustered Locations

#	Candidate Hub Locations Service Area
1	City Center Parking Garages (FRAN)
2	Costa Mesa Triangle Square
3	CSU Fullerton
4	Downtown Fullerton and Fullerton College
5	Downtown Huntington Beach
6	Fullerton Park-and-Ride
7	Goldenwest College and Transportation Center
8	Irvine Spectrum/Irvine Metrolink Station
9	Jeffrey Park-and-Ride
10	John Wayne Airport / UCI North Campus / Irvine Bus
11	Junipero Serra North/South Park-and-Ride
12	Laguna Beach Downtown
13	Main Place Mall / West Orange
14	Mission Hospital Area
15	OC Streetcar Stations
16	Orange Coast College
17	Orange Downtown
18	Platinum Triangle / ARTIC
19	Saddleback Community College/Mission Viejo Area
20	San Juan Capistrano
21	Santa Ana College
22	Santa Ana Metrolink Station
23	South Coast Plaza
24	The Anaheim Resort
25	University of California Irvine

Step 4– Evaluate Potential Impacts of Candidate Hubs

An off-model analysis using OCTA's travel demand model (OCTAM) trip table outputs data was used to estimate how improved access in the mobility hub cluster areas may influence the number of trips using mobility hub services and/or transit. The OCTAM future year (2045) conditions was used for this analysis, with a base year of 2016.

This analysis focused primarily on estimating mode shift away from single occupancy vehicle trips, and VMT reduction, based on a time-cost comparison of a suite of mobility hub services including: micromobility, microtransit, and single or shared rideshare or ridehailing trips.

The time-cost analysis was applied to the 25-candidate mobility hub service areas identified in Step 3. The analysis addresses any overlaps of the mobility hub cluster areas by presenting mode shift results for all TAZs without double counting. The overall results of the mode shift analysis express the potential benefits that could result from implementation of the complete regional mobility hub network.

For these reasons, outputs need to be read as high-level estimates, reflecting trips that could be shifted away from drive alone trips, and the orders of magnitude of this potential between different hub locations.

Modal shift impacts should be reviewed as priority locations are agreed and a final implementation plan is developed, taking account of implementation timings alongside planned investment in new transit and shared mobility services.

Mode shift estimates provided as part of Step 4 were generated for preliminary planning purposes and are not intended to be used in mobility hub revenue forecasting.

Table 2.5 provides the total estimated number of shifted trips within the combined Mobility Hub service areas as well as for the County as a whole and the region as defined by the OCTAM.

The initial network of candidate Mobility Hub service areas covers an area that comprises approximately 59% of trips in Orange County and 12% of trips in the region, indicating that alternatives could be present in areas that produce a high proportion of countywide trips.

An off-model analysis using OCTAM was used to estimate number of trips using new Mobility Hub services and increased use of transit because of improved access in the Mobility Hub areas. The tool re-estimates mode share of each mode, with the addition of the new modes, and re-adjusts the trips based on the new mode shares.

Table 2.5: Overall Reallocated Trip and Total Trips by Time Period and Geography

Time Period	Trip Shift Away from Drive Alone (After Mobility Hubs)								Total Drive Alone Trips (Before Mobility Hubs)		
	Micromobility to Transit[4]	Micromobility	Microtransit to Transit	Microtransit	TNC Shared to Transit	TNC Shared	TNC Single to Transit	TNC Single	Qualified Trips[5] within Mobility Hub Service Areas	Orange County Drive Alone Trips	Region-wide Drive Alone Trips
AM	97,755	38,726	97,439	36,706	96,970	9,223	96,957	732	1,385,528	2,341,577	11,152,004
MD	52,619	68,228	52,371	48,852	52,188	9,186	52,184	868	1,981,107	3,359,655	17,445,845
PM	149,551	75,109	148,955	70,398	148,167	17,685	148,146	1,387	2,092,662	3,533,855	17,619,427
NT	29,140	28,424	29,027	20,662	28,894	4,605	28,891	410	1,179,489	2,025,219	10,193,819
Daily	329,066	210,487	327,792	176,618	326,220	40,699	326,177	3,398	6,638,786	11,260,306	56,411,095

4. "To Transit" reflects DA trips shifted to transit because mobility hub services have been used as a first/last mile connection

5. A Qualified Trip is a Drive Alone (DA) trip where either one or both ends of the trip is within a mobility hub service area per the agreed upon assumptions.

Table 2.6 reports the estimated potential mode shift for qualified trips within the area comprised of all mobility hub service area boundaries, and the estimated impact of those shifted trips on mode share at the countywide and regional levels. The results of this table correlate directly with Table 2.3 as the mode shift reduction is the result of the total shifted trips divided by the total qualified trips in geographic area.

The Total Auto Drive-Alone (DA) Reduction estimates should be considered the maximum potential mode shift achievable if all mobility hub service areas are built out with the proposed services and under the conditions described in the Time/Cost Methodology Assumptions (see Appendix D). Based on the mode shift results for each time-of-day category, the more congested AM and PM periods provide more favorable conditions for mode shift from a time/cost perspective.

Table 2.6: Overall Potential Mode Shift

Time Period (Daily)	Total Auto DA Mode Share[5] Reduction	Mode Share after Mode Shift								
		Auto Drive-alone	Micro-mobility to Transit	Micro-mobility	Micro-transit to Transit	Micro-transit	TNC Shared to Transit	TNC Shared	TNC Single to Transit	TNC Single
Mode Share Shift for Qualified Trips within Service Areas[6]	**26.2%**	73.8%	5.0%	3.2%	4.9%	2.7%	4.9%	0.6%	4.9%	0.1%
Mode Share Shift for OC[7]	**15.5%**	84.5%	2.9%	1.9%	2.9%	1.6%	2.9%	0.4%	2.9%	0.0%
Mode Share Shift Regionwide[8]	**3.1%**	96.9%	0.6%	0.4%	0.6%	0.3%	0.6%	0.1%	0.6%	0.0%

5. A Qualified Trip is a Drive Alone (DA) trip where either one or both ends of the trip is within a mobility hub service area per the agreed upon assumptions.

6. Within identified mobility hub service areas

7. Countywide (not just within MH service areas).

8. As a percentage of all trips in the OCTA region.

Table 2.7 reports the estimated potential reduction in VMT within the area comprised of all mobility hub service area boundaries, and estimates the impact on overall VMT at the countywide and regional levels. As with the mode shift estimates, these results should be considered the maximum potential VMT reduction achievable if all mobility hub service areas are built out with the proposed services and under the conditions described in the Time/Cost Methodology Assumptions (see Appendix D).

The time-cost model, which was used to generate estimates, does not take account of detailed factors, such as presence of supporting infrastructure to support safe use of micromobility; any limitations associated with the provision of mobility services (number of available vehicles); or the propensity of population to shift from drive alone to an alternative mode for reasons beyond the time and cost factors considered. The estimates are also generated with the assumption that all candidate mobility hubs would be implemented as a network and does not account for hubs implemented in a piecemeal manner.

Potential VMT reduction percentages are lower than potential mode shift percentages because, on average, the analysis shows that shorter trips are more likely to shift away from Drive Alone in areas where mobility hub services are provided.

6. Within identified mobility hub service areas

7. Countywide (not just within MH service areas).

8. As a percentage of all trips in the OCTA region.

Table 2.7: Overall Potential VMT Reduction

Time Period (Daily)	Total VMT Reduction	Mode Share after Mode Shift							
		Micro-mobility to Transit	Micro-mobility	Micro-transit to Transit	Micro-transit	TNC Shared to Transit	TNC Shared	TNC Single to Transit	TNC Single
VMT Reduction within Service Area[6]	**11.3%**	2.6%	0.3%	2.6%	0.3%	2.6%	0.1%	2.6%	0.0%
VMT Reduction within OC[7]	**6.3%**	1.5%	0.2%	1.5%	0.2%	1.5%	0.1%	1.5%	0.0%
VMT Reduction Regionwide[8]	**1.3%**	0.3%	0.0%	0.3%	0.0%	0.3%	0.0%	0.3%	0.0%

Table 2.8 provides the total potential number of shifted trips for each mobility hub service area, broken down into inter-hub and intra hub trips. Achieving the shifted inter-hub trips is dependent on development of the complete network of mobility hub service areas, while shifting the intra-hub trips could be achieved with implementation of individual mobility hub service areas.

Table 2.8: Potential Drive Alone Trips Shifted by Mobility Hub[9] - DAILY PERIOD

	Mobility Hub Service Area	Inter Hub Trips[10]	Intra-Hub Trips[11]	Total
1	City Center Parking Garages (FRAN)	113,517	57,234	170,751
2	Costa Mesa Triangle Square	37,147	43,908	81,055
3	CSU Fullerton	33,962	21,966	55,928
4	Downtown Fullerton and Fullerton College	51,689	27,774	79,464
5	Downtown Huntington Beach	11,787	13,298	25,085
6	Fullerton Park-and-Ride	57,023	35,562	92,585
7	Goldenwest College and Transportation Center	40,857	34,085	74,942
8	Irvine Spectrum/Irvine Metrolink Station	29,267	25,392	54,660
9	Jeffrey Park-and-Ride	19,712	13,105	32,817
10	John Wayne Airport / UCI North Campus / Irvine Bus	119,148	62,540	181,689
11	Junipero Serra North/South Park-and-Ride	5,847	4,204	10,050
12	Laguna Beach Downtown	1,174	1,652	2,827
13	Main Place Mall / West Orange	199,478	59,354	258,832
14	Mission Hospital Area	156	144	300
15	OC Streetcar Stations	250,499	149,554	400,053
16	Orange Coast College	55,204	36,622	91,826
17	Orange Downtown	124,622	39,097	163,720
18	Platinum Triangle / ARTIC	163,253	70,715	233,968
19	Saddleback Community College/Mission Viejo Area	9,178	12,847	22,025
20	San Juan Capistrano	3,567	8,675	12,243
21	Santa Ana College	248,385	83,148	331,533
22	Santa Ana Metrolink Station	233,597	133,490	367,087
23	South Coast Plaza	122,725	66,602	189,327
24	The Anaheim Resort	186,757	135,458	322,216
25	University of California Irvine	27,642	35,798	63,441

9. Due to significant overlap between mobility hub service areas, and single shifted trip may be reflected in multiple mobility hubs.

10. Inter-Hub Trips are trips where one trip end is falls within the corresponding mobility hub service area.

11. Intra-Hub Trips are trips where both trip ends fall within the corresponding mobility hub service area.

Table 2.9 reports the estimated potential mode shift and VMT reduction within each individual mobility hub service area. The results have been reported for inter-hub and intra-hub trips to provide a better understanding of the interdependencies between individual mobility hubs and the potential benefits of a countywide network of hubs. Results show that inter-hub trips are less likely to be shifted from the drive alone (DA) mode, than intra-hub trips. This is consistent with the finding that shorter trips are more likely to be shifted from DA than longer ones.

The results suggest that achieving the potential inter-hub mode shift and VMT reductions would require build-out of the complete network of mobility hubs, while the intra-hub mode shift and VMT reduction could theoretically be achieved with the build-out of the corresponding mobility hub service area only.

12. Due to significant overlap between mobility hub service areas, and single shifted trip may be reflected in multiple mobility hubs.

13. Inter-Hub Trips are trips where one trip end is falls within the corresponding mobility hub service area.

14. Intra-Hub Trips are trips where both trip ends fall within the corresponding mobility hub service area.

Table 2.9: Potential Mode Shift and VMT Reduction by Mobility Hub Locations[12]-DAILY PERIOD

	Mobility Hub Service Area	Auto DA Mode Share Reduction		VMT % Reduction	
		Inter Hub Trips[13]	Intra-Hub Trips[14]	Inter Hub Trips	Intra-Hub Trips
1	City Center Parking Garages (FRAN)	33.1%	52.3%	17.5%	50.5%
2	Costa Mesa Triangle Square	17.5%	33.3%	6.7%	33.4%
3	CSU Fullerton	15.5%	30.0%	8.5%	31.2%
4	Downtown Fullerton and Fullerton College	19.9%	32.0%	11.9%	33.1%
5	Downtown Huntington Beach	12.3%	25.6%	5.2%	27.8%
6	Fullerton Park-and-Ride	17.7%	32.8%	10.5%	34.2%
7	Goldenwest College and Transportation Center	14.4%	26.6%	6.7%	25.0%
8	Irvine Spectrum/Irvine Metrolink Station	9.5%	22.1%	7.8%	17.4%
9	Jeffrey Park-and-Ride	8.4%	19.9%	5.4%	18.4%
10	John Wayne Airport / UCI North Campus / Irvine Bus	16.9%	32.7%	8.5%	33.7%
11	Junipero Serra North/South Park-and-Ride	6.1%	15.9%	2.7%	12.3%
12	Laguna Beach Downtown	3.9%	11.7%	1.9%	10.6%
13	Main Place Mall / West Orange	33.9%	44.6%	19.7%	45.9%
14	Mission Hospital Area	1.5%	14.1%	0.8%	13.8%
15	OC Streetcar Stations	41.2%	60.9%	25.7%	61.9%
16	Orange Coast College	18.9%	33.3%	7.8%	32.3%
17	Orange Downtown	25.2%	32.0%	14.5%	31.9%
18	Platinum Triangle / ARTIC	24.6%	32.6%	13.1%	34.3%
19	Saddleback Community College/Mission Viejo Area	8.1%	20.7%	7.7%	19.2%
20	San Juan Capistrano	6.2%	16.8%	3.3%	14.0%
21	Santa Ana College	39.8%	55.2%	24.4%	53.7%
22	Santa Ana Metrolink Station	42.4%	61.8%	26.3%	62.7%
23	South Coast Plaza	21.2%	32.4%	10.7%	30.9%
24	The Anaheim Resort	31.0%	48.7%	16.3%	50.6%
25	University of California Irvine	26.5%	55.8%	9.7%	55.9%

2.2 Orange County Mobility Hub Categories

2.2.1 Mobility Hub Categories

The four-step approach outputs were used to define five mobility hub categories for Orange County described below. High potential locations for each category are included, informed by the mode-shift analysis. Potential mobility service mix and amenities expected to be present at each hub category are presented in Chapter 3 alongside conceptual design arrangements.

Downtown Anaheim

California State University, Fullerton

Hub Locations
Example candidate hub locations presented in this strategy are used to illustrate places with high potential and serve as a starting point to be revisited among relevant stakeholders. They are not intended to represent final Mobility Hub locations.

Gateways and Regional Activity Centers: these hubs offer regional rapid transit connectivity and have a wide sphere of influence. They offer shared mobility services alongside a wide range of amenities including secure bike hubs, Wi-Fi, parcel lockers and retail.

Example locations

- Downtown Santa Ana
- Downtown Fullerton
- Downtown Anaheim
- Dana Point/San Juan Capistrano
- Laguna Hills/Aliso Viejo
- Newport Beach/Newport Center

Large Trip Generator/Destination: these hubs offer car share, managed loading and servicing, bus stops, and information pillar alongside supporting amenities such as secure bike hubs, Wi-Fi, parcel lockers and retail.

Example locations

- Irvine – Spectrum
- Anaheim Disney Resort
- John Wayne Airport/Irvine Business Complex
- California State University, Fullerton and College
- University of California Irvine
- Santa Ana College

Orange Downtown

Local Transit Connection (Emerging Urban District): this hub type is found in areas of lower population density. They operate as local community and economic activity centers and offer services and amenities essential to local transit connectivity.

Example locations

- Huntington Beach Downtown
- Mission Viejo/Hospital Urban Area
- Brea Downtown
- Orange Downtown
- Costa Mesa Urban Area

Laguna Beach

Neighborhood Center/Community Access: this hub type is attached to smaller ancillary station areas located in suburbs or more rural areas.

Example locations

- Irvine Woodbridge Village
- Laguna Beach
- Lido Marine Village

Example of a Virtual Hub

Virtual Hubs: this typology is designed to address local connectivity needs. Their form depends on services available. They typically only require geofencing and light touch infrastructure, e.g., car share bays or marked pavement boxes for micromobility parking.

2.3 Orange County Mobility Hub Analysis Conclusions

The prioritized network of 27 high-potential hubs (from 25 clusters) cover an area comprising approximately 59% of trips in Orange County. The high proportion of trips captured in certain hub service areas indicates a high potential to shift Single Occupancy Vehicle (SOV) trips to other modes. This assessment highlighted **clusters in Santa Ana, Anaheim, Irvine and Orange with a greater potential to shift more drive alone trips and reduce VMT** than others, representing initial opportunity areas for a future, county-wide mobility hubs network.

The analysis indicates potential mode shift and VMT reduction when mobility hubs are implemented as a full network. However, it is anticipated that mobility hubs may be implemented incrementally over time, requiring buy-in and implementation support from different jurisdictions. Modal shift impacts should therefore be reviewed as priority locations are agreed and a final implementation plan is developed, taking account of timings alongside planned investment in new transit and shared mobility services.

Table 2.10: Baseline Network Hub Locations

#	Locations
1	Downtown Santa Ana
2	John Wayne Airport/UCI North Campus/Irvine Business Complex
3	Newport Village/Balboa Boulevard
4	Outlets at Orange
5	University Town Center (UCI adjacent)
6	Westminster Center
7	Anaheim Center City
8	San Clemente Pier Metrolink/Amtrak Station
9	San Clemente (North) Metrolink Station
10	Laguna Beach Mountain Road/PCH
11	Downtown Huntington Beach
12	Lake Forest Plaza El Toro
13	University of California Irvine
14	Irvine Woodbridge Village
15	Westminster Little Saigon
16	Westminster Boulevard (Hoover to Newland)
17	Garden Grove Blvd (Gilbert to Euclid)
18	Main Place Mall/West Orange
19	Buena Park City Hall
20	CSU Fullerton
21	Downtown Brea
22	Huntington Beach Liberty Park
23	The Anaheim Resort
24	Santa Ana Triangle
25	Laguna Beach Downtown
26	Irvine Spectrum
27	Newport Beach Marina Park
28	Huntington Beach Old World Village/Bella Terra

#	Locations
29	Santa Ana Downtown
30	Brea Mall
31	Downtown Fullerton
32	Fullerton College
33	Downtown Orange
34	Platinum Triangle/ARTIC
35	Sunset Beach
36	Knott's Berry Farm/California Marketplace
37	The District at Tustin Legacy
38	Dana Point Harbor
39	Aliso Viejo Town Center
40	Costa Mesa Triangle Square
41	UCI/University Research Park
42	City Center Parking Garages (FRAN)
43	Costa Mesa Triangle Square
44	Fullerton Park-and-Ride
45	Goldenwest College & Transportation Center
46	Irvine Metrolink Station
47	Jeffrey Park-and-Ride
48	Junipero Serra North/South Park-and-Ride
49	Mission Hospital Area
50	OC Streetcar Stations
51	Orange Coast College
52	Saddleback Community College/Mission Viejo Area
53	San Juan Capistrano
54	Santa Ana College
55	Santa Ana Metrolink Station
56	South Coast Plaza

Baseline Mobilty Hub Network

Figure 2.6 assigns categorizations to the prioritized high-potential hubs and maps them as part of the Orange County baseline mobility hub network established in Step 2.

These locations (see Table 2.10 and Figure 2.6) should be used as a starting point to inform future planning and engagement efforts and investment priorities as the strategy moves to implementation.

Figure 2.6: Baseline Mobility Hub Network for Orange County

Candidate and Prioritized Hubs

🔴 Gateways and Regional Activity Centres

🟠 Large Trip Generator/Destination

🟢 Local Transit Connection (Emerging Urban District)

🟣 Neighborhood Center/Community Acess

🔵 Preliminary Hub Location

⊘ OCTA Facility

⊘ Rail Station

2.4 A Community-Informed Approach

The Orange County Mobility Hubs Strategy is underpinned with **a community-informed approach** to build community trust and engagement in the process.

Stakeholder and community engagement included the following activities:

- A Stakeholder Advisory Group to provide feedback and support decision-making representing Metrolink, Caltrans and SCAG; OCCOG; LRTP/Diverse Community Leaders Committee (DLC); Citizen Advisory Committee (CAC); Accessible Transit Advisory Committee (ATAC) and Greater Irvine CBOs (as part of a localized engagement exercise)
- Public webinars with community members
- Survey (as part of the LRTP Survey)
- Pop-up events (Figures 2.8 and 2.9)

Stakeholder and community engagement through Fall and Winter 2021 had the following key objectives:

- Understand awareness and interest for mobility hubs
- Identify major transportation challenges and opportunities
- Identify preferred locations for mobility hubs within the County
- Explore what services and amenities people expected to find at mobility hubs

2.3.1 Overview of Engagement for the Orange County Mobility Hub Strategy

General Approach

The study's community outreach campaign aimed to engage the public, build general awareness, and facilitate community input on the evolving strategy. A public notification plan was developed to engage the community through various methods, including print and digital media (Figure 2.7), to promote the virtual community meeting. Virtual engagement was conducted with consideration for public safety and COVID-19 health protocols.

Figure 2.7 Facebook Campaign Ad

A project identity was applied to all outreach materials, including the study website, collateral and display materials and notifications.

Figure 2.8: Tustin Metrolink Pop-Up

Figure 2.9: Fullerton Farmers Market Pop-Up

Diversity Outreach

Outreach tactics were designed to engage with the County's diverse and hard-to-reach communities and encourage meaningful participation with all people regardless of ethnicity or socioeconomic background.

Spanish and Vietnamese language fact sheets were available for non-English speakers during the outreach campaign (Figure 2.10).

English-Spanish interpretation was also provided during the virtual community meeting to facilitate greater participation and understanding. Spanish and Vietnamese advertisements were placed in print newspaper ads as well as online Facebook ads. A text message campaign with translated graphics was used to promote the virtual meeting.

A bilingual (English and Spanish), electronic communication toolkit was distributed to all 34 Orange County cities, key stakeholders and OCTA's CAC, ATAC and DCL groups.

Lastly, Community Leader Roundtables and Key Stakeholder Roundtables were assembled, comprised of a diverse range of stakeholders representing various agencies, transportation interests, community organizations, business and residential interests, and others from around Orange County to help ensure representative participation in the development of the Strategy.

Figure 2.10: Fact Sheets in Spanish and Vietnamese

Survey Key Findings

As part of the LRTP survey, four questions were included to capture community preferences and insights for the potential future development of mobility hubs (Table 2.10).

Table 2.10: Mobility hub questions as part of the LRTP survey

Survey Question	#1 Choice	#2 Choice
Which two services would you like offered at mobility hubs?	On-demand shuttle services (OCFlex) **65%**	Rideshare (Uber/ Lyft) **40%**
Where should mobility hubs be placed in Orange County? (Select Top Two)	At major visitor destinations (amusement parks, shopping malls, beaches, etc.) **48%**	At rail stations/ stops **37%**
How important are the following amenities/ services for you at Mobility Hubs? (5 is very important)	Security features (cameras, lighting, etc.) **4.7 rank**	Bathrooms **4.5 rank**
What would encourage you to use mobility hubs? Is there anything else you would like to share about Mobility Hubs?	Common Themes (in order of frequency)	#1. Accessibility #2. Safety #3. Bus #4. Location within the community #5. Amenities

Virtual Community Meeting

One community meeting was organized and held during this initial study (Figure 2.11). The live public webinar was held on the evening of Thursday, October 7, 2021. This one-hour meeting included a PowerPoint presentation, interactive polling to spark participant interest and input, and a question-and-answer session, led by the OCTA study team.

Figure 2.11: OCMH Virtual Meeting
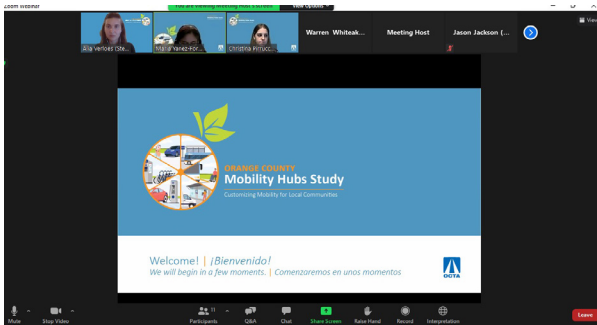
The goals of the virtual community meeting were to:

- Build awareness for the potential application of mobility hubs in the County
- Define the dynamic structure and adaptability of the mobility hub concept and services
- Provide background and overview of the study goals and objectives

- Engage with local stakeholders and interested parties for future local mobility hub initiatives
- Provide an opportunity for public feedback to inform the evolving strategy

Community and stakeholder polling also informed the place classification for Orange County. The standout types are listed below.

Citizens Advisory Committee (CAC)

Major Visitor Destinations
Neighborhood Centers
Bus stations/stops

Accessible Transit Advisory Committee's (A-TAC)

Bus stops/stations
Residential areas

Webinar October 7th

Rail stations/stops
Employment centers

While these have been identified as priorities for Orange County implementation planning should consider them as part of a mobility hub network comprising a wide range of hub types.

2.3.2 Pilot Engagement with the Irvine Community

Orange County mobility hubs should be centered on the communities in which they are located, whether it is a densely populated neighborhood or a school campus or regional train station. There are common themes that are applicable to all communities, such as local transport networks, infrastructure, technology, social considerations, and heritage.

To support the development of the Mobility Hubs Strategy, a localized engagement pilot was undertaken in the City of Irvine[15].

Community stakeholders commented about the challenges and opportunities, organized by the following context themes:

Local Transport Network

Challenge: Stakeholders commented that the most common challenges for the local transportation network are connections and frequency issues including access to bus amenities, as mentioned by Dayle McIntosh Center, "Bus stops are too far and perceived as not safe."

Opportunity: The opportunity is to provide better coverage through a network of transit services with Metrolink, OC Flex and iShuttle. Micromobility and other modes are also under consideration by OCTA and local transit providers.

15. Irvine was selected as a representative example of the range of classifications the strategy was looking to illustrate

Infrastructure

Challenge: Car culture and a largely auto-centric planning: as expressed by City of Irvine "Irvine was a master planned community that provisioned huge roads to get a large number of cars through, but now we're approaching capacity."

Opportunity: Mobility hubs are an opportunity for improved infrastructure, "Enhancing safety infrastructure, traffic calming, bulb outs and crosswalks … and mobility hubs should be adjacent to Class 1 bike paths" noted by Santa Ana Active Streets. Dayle McIntosh Center emphasized the importance of "All ADA accommodations for braille, low vision, hearing impairments – ramps, wide sidewalks, signals."

Technology

Challenge: Technology needs to be balanced with grass roots solutions to support equitable access for a wide range of communities and user groups.

Opportunity: The use of technology is a key consideration for mobility hubs, and its use and application may vary at different locations. Dayle McIntosh Center noted "(Disabled younger consumers) are familiar with technology and apps …". UC Irvine was "part of an OCTA pilot program for driverless vehicles".

Social Considerations

Challenge: The socioeconomics of transportation riders in Orange County ranges from commuters to captive riders. Spectramotion's "priorities are commuter rail (Metrolink) with first/last mile shuttles, on-demand Lyft or Uber, plus carpool or carshare". Meanwhile, Santa Ana Active Streets commented "Most people who use transit are captive riders or underserved populations who use it to get to work, day care, stores, etc."

Opportunity: Stakeholders often referred to mobility hubs as community gathering spaces with access for all to different modes of transportation. On a similar theme, Providence Health/St Jude Medical Center observed "Multimodal transportation is important; train and bus transit connections with riding bikes, walking and skating at the mobility hubs."

Heritage

Challenge: Mobility hub amenities should be culturally sensitive to local community characteristics, which may include a mix of ethnic, economic, age or disability considerations.

Opportunity: Santa Ana Active Streets shared an example of cultural sensitivity "A flexible space for farmers market, street vendors and swap meet … and retail ethnic grocery stores, bike repair, etc." This type of neighborhood mobility hub may be conducive to community heritage.

Next Steps

For jurisdictions who want to move forward with implementation of mobility hubs, next steps have been identified as part of Chapter 4.

3 Planning Mobility Hubs

Chapter 3 describes the recommended approach to mobility hub planning and design.

It sets out overarching design principles including the need for adaptability, integration, connectivity, and equity. It describes the need for a digital framework to underpin delivery, operation, and evaluation and the relationship of mobility hubs to wider planning guidance including complete streets and transit supportive design.

A range of customer personas are proposed to inform thinking around the types of services and amenities that may be required to support different customer needs.

Mobility hub components, including anchor services, complementary services, and non-mobility related amenities, are presented by hub category, and illustrated with schematic diagrams to show conceptually how they could be combined to suit Orange County's mobility hub classifications in support of subsequent detailed planning and design efforts.

Chapter Structure

Figure 3.1: Hamburg Mobility Hub

3.1 Strategy and Program

3.1.1 Design Principles

Mobility hubs are planned and designed to respond to the varied needs of different place types. They range from small hubs in local neighborhood centers to large muti-modal gateways. All hubs contain two or more mobility components that can be combined with public realm interventions to create a place that is responsive and customized to each location.

At a minimum, each hub location is expected to include:

- Access to two or more mobility services
- Walk and cycle infrastructure
- A sense of place and user-centered design
- Context sensitive programming and non-mobility amenities
- Fair and equitable access
- Adherence to universal design principles
- Flexibility to adapt to changing needs

The following design principles should be considered when planning a new mobility hub.

1. Adaptability and Function

Mobility hubs are not static in place, time or scale. Mobility hub services, amenities, and site design features may evolve as new services become available or expand in reach and location. They use a component mix intended to be adaptable to spatial constraints and context specific mobility requirements. Additional services can be plugged-in to complement the core functions. Flexibility will enable mobility hubs to remain attractive and maximize their ability to respond to new funding streams, changes in policy and emerging trends, as well as allowing the delivery of new services through future partnerships.

2. Identity and Integration

Mobility hubs bring together multiple modes and services in one place. This requires a distinct brand and visual identity to build visibility and user understanding of all the options they have. Identity can be achieved through selection of material, product, color, visual identity and context sensitive user-centered design. Consistent co-location of services helps contribute to a cohesive place and establish user expectations about the services and amenities to be found at each hub type.

3. A Connected Network

Mobility hubs should operate as a connected network from urban centers, through suburban neighborhoods to the urban fringe. Different hub categories and scales act as a framework to accommodate a variety of journey types that start and finish in a range of locations. A connected network optimizes the provision of transportation options, emphasizing existing transit corridors while opening new routes along walk and bike desire lines. This approach not only accommodates local journeys but also extends the reach of mobility hubs in their role as collectors for higher capacity transit.

4. Equitable Access and Universal Design

The Orange County mobility hub network will encompass the entire county, and so should be guided by the county's collective vision. By aligning with long-range plans – mobility, environmental, equity, public safety, technology, housing – mobility hubs become a useful tool to help planners achieve their agency's stated aims for equity and universal access based on its accessibility and affordability to disadvantaged communities, low-income riders as well as neurodiverse, physically, or visually impaired.

3.2 A Digital Framework

3.2.1 Mobility Hub Digital Framework

Thanks to digital technology advances, many transit riders now start and end their journey using a personal mobile device – providing context specific trip planning as well as real time updates on disruption or incidents that may affect their travel.

This intelligent connection between data, processes, and people is a key enabler for mobility hubs and is shaping the future of transportation – improving the passenger experience, optimizing transportation services, and creating new opportunities for economic growth.

A mobility hub digital framework helps to puts the user at the center of the decision-making process, considering not only their ride on transit or other connected services but the entire door-to-door experience. It also provides agencies and operators with user and operational insights to adapt and refine the service offer available at mobility hubs to better meet actual usage and demand.

3.2.2 Data Requirements

Successful operation of mobility hubs requires transportation agencies and providers to share data on their assets and services in as close to real-time as possible. This requires coordination and standardization of the digital formats to access the data in a uniform way.

A digital framework, illustrated in Figure 3.2, establishes the data inputs/outputs necessary for effective operation and use of the hubs.

Data inputs typically include:

Transport Data

Data on availability of the mobility service, real-time data via secured API's.

Infrastructure Data

For example, availability of EV charging points, parking spaces, road conditions and congestion levels.

Access/Ticketing Data

Data to resell the access to the mobility service, mobile ticketing, online booking through secured API's, ticket verification services.

Customer Data

Personal data on customers may be required to enable access to shared mobility services, e.g., driving license for car share, customer registrations, payment methods.

These data inputs are combined to deliver user information and operationalize the services.

3.2.2 Data Requirements

Establishing timely data and information sharing between all groups involved in delivery of mobility hubs will improve messaging, create fewer interruptions, and provide more seamless operation of services.

The Mobility Data Specification (MDS) is an open data platform based on a set of APIs (Application Programing Interfaces), developed as a data integrator to help cities manage the use of shared mobility services in the public right of way. MDS organizes the collection and dissemination of data across transportation agencies, cities, mobility hub operators and service providers to improve management of services, coordinate the public right-of-way and provide access to customers.

Further information on data management is provided in Section 4.7.

Figure 3.2: Mobility Hub Data Flow

CUSTOMER APP

CITY/AGENCY

OUTPUTS

Real time useage and demand

Historic useage

REQUIREMENTS

Policy requirements

Operational requirements

MOBILITY HUB

MDS/ data integrator

Trip planning

Booking & payments

Availabiliity

Incidenst / updates

Feedback

Personalized preferences

Registration

TNCs | Taxis | Micromobility | Car Share | Curbside | Transit | Smart Parking | EV Charge Points | Network/ congestion

REAL TIME DATA FEEDS

3.3 Complete Streets

3.3.1 Place and Movement Considerations

Orange County's primary road classification is set out in the Orange County Master Plan of Arterial Highways (MPAH). Special designations may be requested by local agencies where mobility hubs are planned on streets covered by the MPAH.

The layered network approach set out in Orange County's Complete Streets Handbook can be an important tool to inform decisions on the integration of mobility hub design elements in relation to the MPAH, sensitive to their surrounding context.

The handbook considers complete streets as multi-functional places, serving as key routes and spaces for movement through them, as well as destinations for local or regional travelers. Because of this duality in their purpose and how they are used, complete streets are classified by their significance for movement or place.

Mobility hubs are expected to be situated at locations where the balance between place and movement is important, however they will also be connected to each other through street networks that may emphasize movement, providing different levels of service and comfort for each mode.

Figure 3.2 presents the nine Orange County street typologies established in the handbook, relative to the balance of their local and strategic movement/place characteristics summarised in Table 3.1.

To help balance these differing priorities, the Complete Streets Handbook should be considered in the planning and design of mobility hubs to aid prioritization of transportation modes and user needs in response to movement and place and to inform any requests for special designations to the MPAH classification that may be required where components are proposed for streets covered by the MPAH.

Movement-Place

The Orange County Complete Streets Design Guidelines has a set of considerations for each of the Movement-Place Typologies (Figure 3.3). As well as vision for how these types of streets can be improved for all users.

Figure 3.3: Complete Streets Movement-Place Matrix
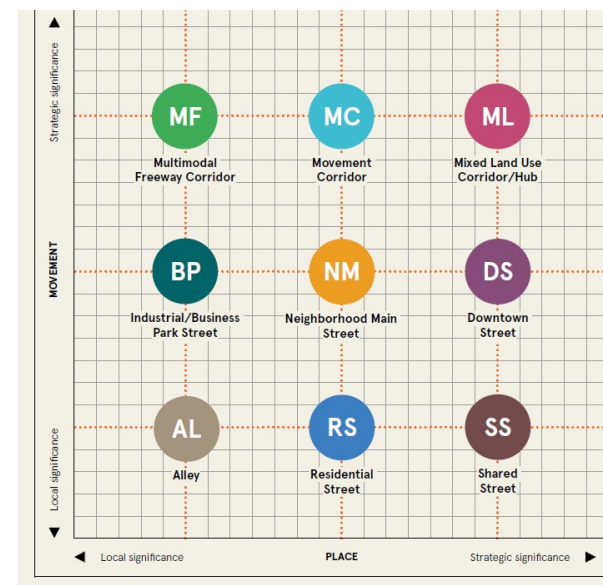
Table 3.1: Movement-Place Matrix Typology

	Movement	Place
Local Significance	• Low volumes of traffic • Traffic more likely to have a specific start or end point on the street	• Minimal activity generated by adjacent land uses • Performs specific function rather than offering a mix of uses
Strategic Significance	• High volumes of traffic • Large part of traffic is likely to be passing through the area	• Attracts a lot of activity due to its mix of land uses and/or strong identity as a destination • People come for work, leisure, shopping,etc

3.3.2 Relationship to Context

Existing conditions analyses and community engagement are great tools to build an understanding of place and movement.

Key considerations for mobility hubs planning are described in Table 3.2. These considerations are not exhaustive and may not apply to every location, and so should be reviewed and developed in response to context for each mobility hub.

OCCOG Complete Streets Initiative Design

The Orange County Council of Governments Complete Streets Initiative Design Handbook is designed to outline flexible policies and design guidance to meet the unique character use and capacity of all streets throughout Orange County.

The Handbook provides technical guidance with supporting illustrative street arrangements (Figure 3.4) on redesigning street elements for pedestrians, bicyclists and transit users and outlines a range of traffic calming interventions such as the introduction of bicycle lanes to enhance the bicycle network and refuge islands for midblock crossings to improve pedestrian safety.

Table 3.2: Place and Movement Considerations

	Consideration	Applicability
Place	What is the land use of the surrounding area – is it residential, are there large employers or significant trip generators such as theme parks or sports venues, are there many businesses or major destinations?	What times of day will people use the mobility hub the most? What type of demand could be expected? How might that demand vary by day/time of year? Will user types vary at different times/ days?
	Who lives nearby?	How do people want to use the mobility hub? What barriers might exist and how can they be addressed?
	What type of businesses are nearby to the Mobility Hub?	How can they benefit from mobility hubs? How can they engage with/participate in a mobility hub
	Who works or studies nearby?	How could people working, studying nearby benefit from mobility hubs? How could visitors to the area benefit form mobility hubs?
	What is the heritage or defining features of the surrounding area?	How can the design or character of a mobility hub design honor the nearby area?
Movement	What type of supporting infrastructure is available in proximity to the mobility hub?	How safe will it be for pedestrians and micromobility users? Can wayfinding be used to encourage use of certain routes?
	What other transportation services are nearby?	How can the mobility hub integrate with these existing services?
	Is the area surrounding a mobility hub permeable and support walking/ biking?	What improvements are required to provide safe, convenient and direct walk/bike access to a mobility hub?

Figure 3.4: OCCOG Complete Streets Handbook, Example Downtown Complete Street

3.4 Customer Journeys / Touch Points

3.4.1 Understanding User Personas

User personas are a tool to help OCTA and partners assess mobility hubs from the perspective of a range of user types of varied abilities and needs, and who may choose to use mobility hubs within Orange County. Application of user personas at the planning stage helps identify the needs and choices of potential mobility hub users and can inform conversations around how to respond to their needs.

Personas are not meant to be exhaustive of every type of person or even every mobility hub user in Orange County. For these personas, we are most interested in trying to understand the main trade-offs the different personas may need to make to choose to use a mobility hub in place of their current trip choice or how those needs may change in relation to journey purpose or personal circumstance.

Personas combine quantitative and qualitative behavioral analysis to describe various traveler types and their unique characteristics. The defining attributes of each persona typically align with characteristics known to influence trip making decisions such as employment or occupation but are ultimately highly context-specific and will also include differences by geography across Orange County.

A sample set of personas has been developed for the Orange County Mobility Hubs Strategy to illustrate their application as a mobility hub planning tool. These provide a base set of different user perspectives to help explain some of the principal considerations and decisions that need to be made in relationship to different hub categories.

There are three ways we anticipate these could be used in relation Orange County mobility hubs:

Initial Mobility Hub Planning

User personas can be used to confirm that a broad range of Orange County user needs are being met. They can be cross-referenced with geospatial datasets, to help identify the types of people who may use the hubs. This analysis can inform initial planning, customer journey mapping, prioritization, and service mix required to meet with the specific needs of different personas.

Stakeholder Engagement

During the engagement process, and prior to the creation of a mobility hub, user personas can be applied as co-creation engagement activity for community participants. Community members can be asked to think about different people they know in their city or neighborhood and describe the specific needs they may have as mobility hub users, or how they might use mobility hubs. This provides a great opportunity to tap into local expertise and help make mobility hubs more responsive to the specific needs of a local community. It can

also be an opportunity to integrate community participation directly into a process and inform outputs. Thinking about the needs of others in the community can help participants think about the trade-offs required and create a shared understanding and community agreement around providing for the needs of different groups.

Implementation

Community co-created personas can inform the service and amenity mix offered at a particular mobility hub. They can make the hub more locally responsive. These personas can be used as an input to the design of marketing materials and incentives to help communities in surrounding areas learn about a new mobility hub and encourage new users to try them.

Personas can also be used when planning transportation demand management and communication strategies to accompany mobility hub deployment.

3.4.2 Proposed Personas

An initial list of proposed personas differentiates **who** these users are, **why** they might use mobility hubs, and **what** their needs/sensitivities may be.

Pages 46 and 47 summarize an initial list of personas, providing a brief description on each.

> ! When considering these personas, it's important to acknowledge that they are not fixed, and that motivation can change depending physical, social, economic, temporal, cultural contexts. The co-creation process which is a crucial component of the community engagement and implementation phases should include a community visioning process to inform the final persona set for mobility hub specific planning activities.

Transit Reliant or Low Income

- May use transit daily to get to work, lack access (or primary access) to a car and prioritize affordability
- This group may also include those with lengthy commutes from areas with limited transit options
- Safety is a key concern as they may use the services during the hours of darkness and have limited alternative options to fall back on if they have a bad experience with the service
- This group may not all have a bank account or payment card, so alternative payment methods are important to allow them to access the services
- For those from this group who are in transit for longer periods of time, amenities such as vending of food/beverage or access to a restroom is particularly important
- An integrated solution that provides improved first/last mile connectivity and off-peak trip options will be important to those of this group that commute during off-peak hours or who trip-chain throughout the day. Options that reduce the transportation cost burden could support an improved quality of life

Automobile Priority

- Likely to use car as their main mode of transportation
- May try transit or new mobility options on an occasional basis to attend events, see friends or visit clients if the convenience of first/last mile options are similar or better than driving
- Limited parking at destinations is a primary motivator for this group to experiment with new travel modes
- Trying a different mode for the first time is a big barrier, but if they have a good experience, they will use it again
- They expect a safe, simple, seamless and reliable journey with real time updates on delays or incidents and prioritize convenience, time and comfort over cost

Tourists & Visitors

- This group is based outside of Orange County and includes leisure travelers, vacationers, and people on business
- They are frequently unfamiliar with the area and may wish to visit the range of attractions and places of interest offered across the region
- The majority are domestic visitors, who may use their own vehicles, fly, or arrive by train
- If they traveled to OC by train, they may require convenient last mile travel options to connect to hotels (with baggage) or to other destinations
- They may be looking for flexible travel options to explore the region
- If traveling as a family group, they may be open to explore new experiences and may view mobility hubs as a flexible, fun alternative to the private car for local trips
- Their experience needs to be convenient, safe, entertaining, comfortable, and seamless to their destination(s), with easily understandable information at all stages of their trip

Person with Reduced Mobility

- This group may include retired individuals and older adults as well as neurodiverse, physically, or visually impaired individuals
- Transportation can be challenging for these individuals, and they may currently rely on existing access services or friends/family
- They are more likely to find their current travel pattern stressful especially in places with poor infrastructure, areas that are crowded or when traveling to places they are less familiar with
- Mobility Hubs need to offer ADA access and accessible information and provide services that specifically support users with reduced mobility
- These users place a priority on accessible environments, accessibility features and need accessible and responsive wayfinding and information
- Individuals in this group may use mobility hubs to access essential destinations like groceries, childcare, or healthcare
- Safety and reliability are of paramount importance

Caregiver

- This group could include parent(s) or caregivers travelling with one or more children of varying ages or with adult dependents
- Travelling for these users typically requires more planning, coordination, and gear
- They may need to make multiple short trips and may be more cost conscious and sensitive to logistical barriers (such as multiple transfers or places to leave bags)
- Caregivers may have more to carry, may also be pushing a stroller or wheelchair and/or supplies for multiple travelers
- Families with younger children (under age 8, for example requiring car or bike seats) may have unique challenges and needs
- Priorities include safety and reliability, ADA accessibility, kid-friendly amenities, family/ADA accessible bathrooms, car seats for carshare or bike seats for kids, real-time information to facilitate access/egress and allow for changes to travel plans enroute if required

3.5 Planning Mobility Hubs

3.5.1 Planning Considerations

The form, function, and amenities at a mobility hub need to relate to existing transit services and frequency, land use, and access characteristics acknowledging that services, amenities, and site design features may evolve over time, particularly as new services become available or expand in reach and location.

Mobility hubs vary in size and components, with each hub tailored to local needs and mobility objectives. For example, a major train station hub may include physical space for local and regional transit, and on-demand services, whereas a hub in a local neighborhood center may provide for fewer service types but support access to more flexible, local travel options such as micromobility.

3.5.2 Key Steps in Process

Mobility hubs are not intended to serve all transportation system user needs. Mobility hubs are not a replacement for transit stops, train stations or other existing transit facilities. Rather, mobility hubs extend the reach of these existing services by providing an environment that allows for the combination of a wider range of transportation modes applied strategically in prioritized areas where gaps or barriers to seamless transportation are identified.

When planning mobility hubs, the following aspects should be considered:

Mobility Hub Components: Mobility hub components should be selected based on the local context, mobility needs and challenges.

Spatial Context: Mobility hubs should be spatially organized to encourage visibility and access to available services with easy transfer between modes and connections to surrounding destinations.

Visibility and Accessibility: Mobility hubs should be visible and easily accessible by all user types.

Flexibility and Scalability: Mobility hubs should be modular to accommodate future growth and new services/components embracing and encouraging innovation.

Safety: Mobility hubs should become a safe place for everybody encouraging the use of available services and facilities.

Community Appeal: Mobility hub design should contribute to an improved sense of place and a quality public realm.

Branding and Signage: Mobility hubs should have clear branding and provide information for ease of use.

3.5.3 Stakeholder Engagement

The success of a mobility hub or network of mobility hubs requires significant involvement of key stakeholders at all phases, from planning through to implementation and evaluation, primarily in helping to identify suitable locations and to confirm that services are customized to the needs of users (Figure 3.5). This is necessary to balance the areas of greatest demand (to have the greatest potential for commercial success) with those areas with the greatest need (where public subsidy is likely to be necessary.

Further infomation on stakeholder engagement is presented across Chapters 2, 3 and 4.

Figure 3.5: Mobility Hub Senior Resources Fair Engagement

3.6 Mobility Hub Components

3.6.1 Mobility Hub Components

The type of a mobility hub implemented in any given environment, should consider the type of place, local geographic and demographic factors, current and future demand for hub services and exiting facilities/transit modes in the area.

These considerations inform the mix of components that should be combined to implement and scale hubs relative to local context and need.

Assignment of Components by Mobility Hub Category

Each hub category has been assigned essential anchor transit services alongside a range of complementary mobility and non-mobility related components and amenities.

Anchor Services include transit stops, rail or frequent transit services.

Complementary Services could include any of micro-transit, car share, bike share, or other community mobility models depending on location.

Customer Amenities include Wi-Fi, seating, pocket parks, food services, parcel lockers and other amenities relevant to the local context.

Implementation considerations are described in Table 3.3 and application of components and amenities by hub category is illustrated in Figure 3.6: Mobility Services, and 3.7: Facilities and Amenities to inform the definition of services and amenities that may be available at each of Orange County's mobility hub categories.

These examples are illustrative and are expected to evolve over time as new services emerge and hub requirements are clarified informed by lessons learned from implemented hubs.

Table 3.3: Mobility Hubs Components- Overview of Implementation Considerations

Categories	Description	General Considerations
Anchor Services	• Rail • Bus • Light rail (e.g., OC Streetcar) • P&R • BRT	• Park-and-ride parking slots can be adapted to accommodate car share, carpool, and on-demand pick-up/drop-off zones • Cluster hub services at or close by the anchor service stop/station • Facilities should follow universal design principles
Complementary Services	• Car share • Micromobility (both bike share and shared e-scooters services) • Microtransit Carpooling/ Vanpooling • Rideshare / taxis	• Designated parking slots allocated for carshare, and micromobility services – modal mix and level of provision based on the local context • Designated passenger or vehicles pickup/ drop off zones (for rideshare, microtransit or pooling services) • Areas should be visible and easily accessible with clear signage • An opportunity to use flexible curb space management for loading/servicing • Taxi ranks may be required in certain locations • Consider use of flexible curb space management to manage multiple demands for curb space (deliveries/ TNCs etc)
Related Mobility Amenities	• Secured bike storage • Unsecured bike parking • Bike equipment • Wayfinding • Information pillar/ticketing • EV Charging	• Secured and unsecured bike storage appropriate scaled to local demand, with lockers, bike pumps and repair stands • Linked to local pedestrian/bicyclist wayfinding signage – a hub pillar should provide information on how to use/access shared transport modes and other facilities available at the hub powered by solar panels or other renewable source • Payment kiosks to book services – including payment options for non-credit card holders- universal transportation account and integrated ticketing would be beneficial • Hub signifier totem, waiting areas, service information and clear signage to hub services • Wayfinding and information pillar/kiosk with Wi-Fi connectivity to provide hub information and ticket/booking • EV charging for car share and public use consistent with local policy/strategy

Table 3.3: Mobility Hubs Components- Overview of Implementation Considerations

Categories	Description	General Considerations
Customer Amenities	• Seating • Food services • Lighting/ Cameras • Parcel Lockers • WC provision • Retail • Wi-Fi • Public Space	• Waiting area design should be safe, comfortable, and welcoming in response to community needs including (as appropriate) covered weather shelters; shade; landscaping; accessible seating; and artwork to improve the quality of space • Lighting should be designed according to a hub's local context, with light levels compliant with local lighting standards for safety, security, productivity, enjoyment and commerce while not impacting negatively on neighboring communities • CCTV should be considered to increase safety of pedestrian movements in hours of darkness • Opportunities for community co-design of the hub to reflect community values, vision and history • Opportunities to integrate green features and renewable energy technologies should be considered • Parcel lockers, where available, should be safe and secure- they have potential to encourage first and last mile deliveries in the area • Opportunities at larger hubs to convert underutilized parking space to micro-consolidation hubs for first/last mile deliveries
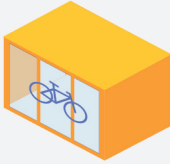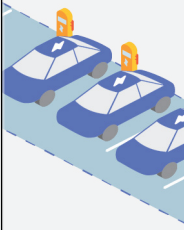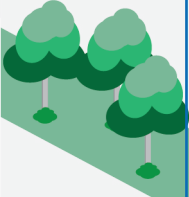
Figure 3.6: Mobility Hub Mobility Services

Mobility Hub	Anchor Services					Complementary Services			
OC MH	Train Station	Bus Interchange	Bus Stop	OC Street Car	Park and Ride	Car Share	On-demand Pick-Up/Drop-Off	Bike Share	e-scooters
1. Gateways and Regional Activity Centers	🟠	🟠	🟠	🚫	🟡	🟠	🟠	🟠	🟡
2. Large Trip Generators/ Destinations	🟡	🟠	🟠	🚫	🟡	🟠	🟠	🟡	🟡
3. Local Transit Connection	🚫	🚫	🟠	🚫	🚫	🟡	🟠	🟡	🟡
4. Neighborhood Center/ Community Access	-	🚫	🟠	🚫	🚫	🟡	🟡	🟡	🚫

Legend:

🟠 Expected

🟡 Recommended

🚫 If Available

- N/A

Figure 3.7: Mobility Hub Facilities and Amenities

Mobility Hub	Mobility-Related Facilities					Customer Amenities			
	Bike Parking	Bike Repair	Interactive Hub Signage	Ticketing	EV Charging	Seating	Parcel Lockers	Cafe/Retail	Public Space
OC MH									
1. Gateways and Regional Activity Centers	● Expected	⊘ If Available	● Expected	● Expected	● Expected	● Expected	● Expected	○ Recommended	○ Recommended
2. Large Trip Generators/ Destinations	● Expected	○ Recommended	● Expected	● Expected	● Expected	● Expected	● Expected	○ Recommended	○ Recommended
3. Local Transit Connection	● Expected	○ Recommended	● Expected	● Expected	○ Recommended	○ Recommended	⊘ If Available	⊘ If Available	⊘ If Available
4. Neighborhood Center/ Community Access	● Expected	⊘ If Available	● Expected	● Expected	○ Recommended	○ Recommended	⊘ If Available	⊘ If Available	⊘ If Available

Legend:

● Expected

○ Recommended

⊘ If Available

- N/A

3.7 Conceptual Arrangements

3.7.1 Mobility Hub Conceptual Arrangements

The mobility hub classification, described in Section 2.3, was developed to help guide investment, planning and design efforts.

Each hub category is detailed on the following pages, with supporting schematic diagrams to show conceptually how the different components could be combined to suit Orange County's mobility hub classifications.

These diagrams should not be read as resolved designs, but more as illustrations to explore scalability, adaptability, and potential service and amenity mix. For example, a local hub may initially only include micromobility parking to provide improved connectivity to local residential areas, but over time could add other components such as car share, or microtransit services such as OC Flex.

The design and service offer for each classification depends on hub location, user needs and characteristics, existing infrastructure, and other variables.

Ultimately the component mix available at a hub needs to be efficient, comfortable, pleasant, easy to understand, and relevant to the local context - supported by a range of mobility options that can offer a compelling and attractive customer proposition.

Design Integration

Detailed design and integration of mobility hubs on Orange County streets should reference the OCTA Transit Supportive Design Guide, 2021.

Category 1: Gateways and Regional Activity Centers

Gateways and regional activity center hubs are located in urban districts at the center of economic and social activities, serving the dense residential and employment centers of a district. These hubs are easily accessible for all types of transport users and provide mixed-mode access, including large transit such as train stations and bus exchanges for high frequency transport use, which connect users to local and regional travel destinations.

Category 1: Features and Anchor Services

- Access to high-capacity transit via the train station and high frequency bus services, offering local routes and regional services

- If available in the area, access to an OC Street Car Station

- Access to car sharing, alongside opportunities to use shared micromobility modes including bike share, e-scooter share, and ride sharing, with some park and ride services, carpool/vanpool, OCFlex, I-shuttle

- Opportunities for EV charging, alongside secure bike storage/parking, bike equipment

- Hub information pillar/ticketing and wayfinding

- Presence of lighting and security cameras, parcel lockers, Wi-Fi connectivity and seating if not already available

- Close proximity to public space, retail, cafes, restaurants, and food services

On-demand pick-up/drop-off

Managed delivery/servicing bay

Wayfinding

Hub signifier / micromobility parking / secure bike parking hub/ parcel locker

Car share bays (with EV charging)

EV charging bays
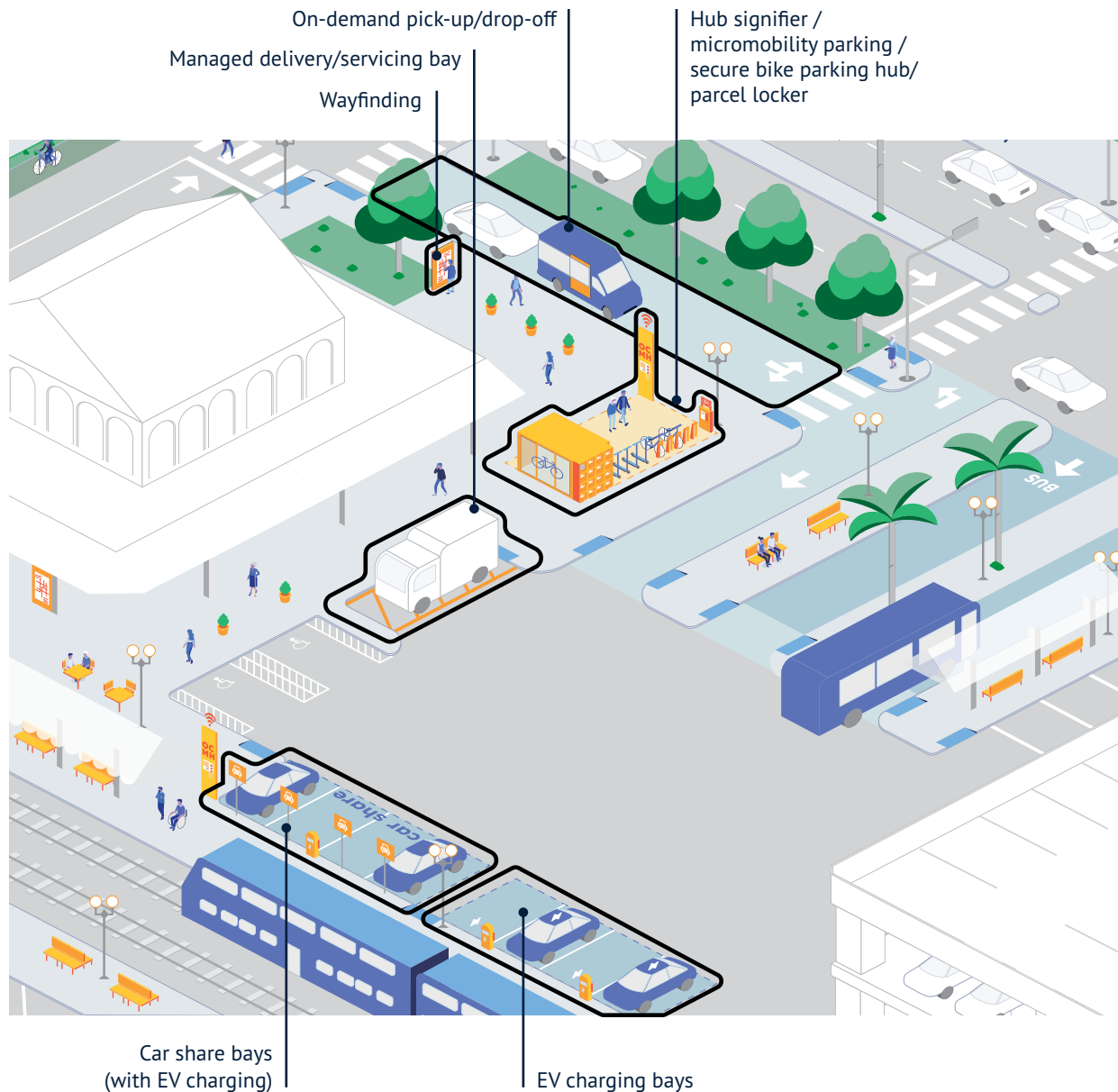
Category 1: Gateways and Regional Activity Centers

Category 2: Large Trip Generator/Destination

Large trip generator/destination hubs are located in moderate to high density residential and employment centers.

Category 2 hubs often have bus rapid transit or a train station, alongside high frequency and local bus services. Carshare and rideshare services operate from these hubs. Complementary opportunities include EV charge points, cafes, restaurants and food services in the immediate surroundings.

Category 2: Features and Anchor Services

- High frequency bus services with a bus exchange/ bus stops, and may also include access to bus rapid transit, OC Street Car and/or a train station for mass transit
- Shared mobility options, mostly provided by carshare, rideshare and moderate access to bike share, e-scooter share and carpool where available
- Opportunities for EV charge points
- Access to secure bike storage and parking
- Hub information pillar/ticketing and wayfinding
- Availability of public space, cafes, seating, restaurants and food services, Wi-Fi connectivity, WC and parcel lockers

Refreshment kiosk

Parcel Lockers

Customer seating

Geofenced micromobility parking

Mobility Hub signifier

Customer seating

On demand pick-up/ drop-off

Customer seating

Managed delivery/ servicing bay

Car share bays (with EV charging)

On demand pick-up/drop-off

Secure bike hub and unsecured bike stands
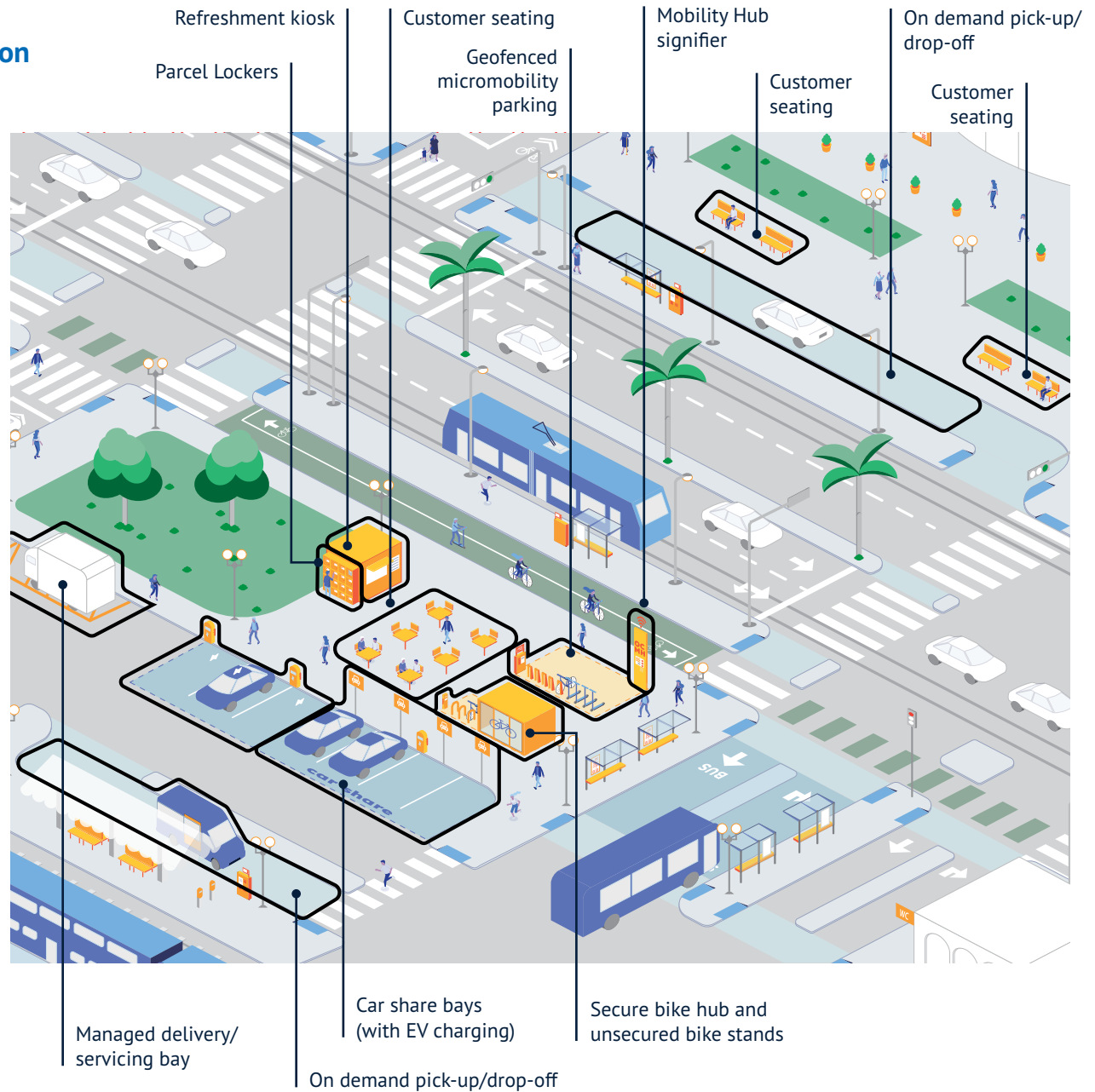
Category 2: Large Trip Generator/Destination

Category 3: Local Transit Connection (Emerging Urban District)

Emerging urban district hubs are areas of lower residential and employment densities.

Category 3 hubs are typically served by bus transit services, which operate as local community and economic activity centers. These hubs are located close to established employment centers, local services and shopping to provide local first/last mile travel connections.

Category 3: Features and Anchor Services

- Access to high-capacity high frequency bus services

- Moderate availability of shared transit services, mostly provided by rideshare, OC Flex, I-Shuttle, and vanpool/carpool

- Access to bike share, e-scooter share, and car share is recommended

- Limited non-mobility related components, typically including lighting, security cameras Wi-Fi connectivity, WC, retail and public space appropriate to context

- Availability of information pillar/ticketing and wayfinding

- Seating, cafes, restaurants, food services and parcel lockers are recommended

- Access to unsecured (short stay) bike parking. Although, secure bike storage/parking is also recommended, as well as access to bike maintenance equipment

Parcel Lockers & seating

Geofenced micromobility parking

Mobility Hub signifier

Car share bays (with EV charging)

Wayfinding

Managed delivery/ servicing bay

Pocket park & micromobility parking (using car bays)
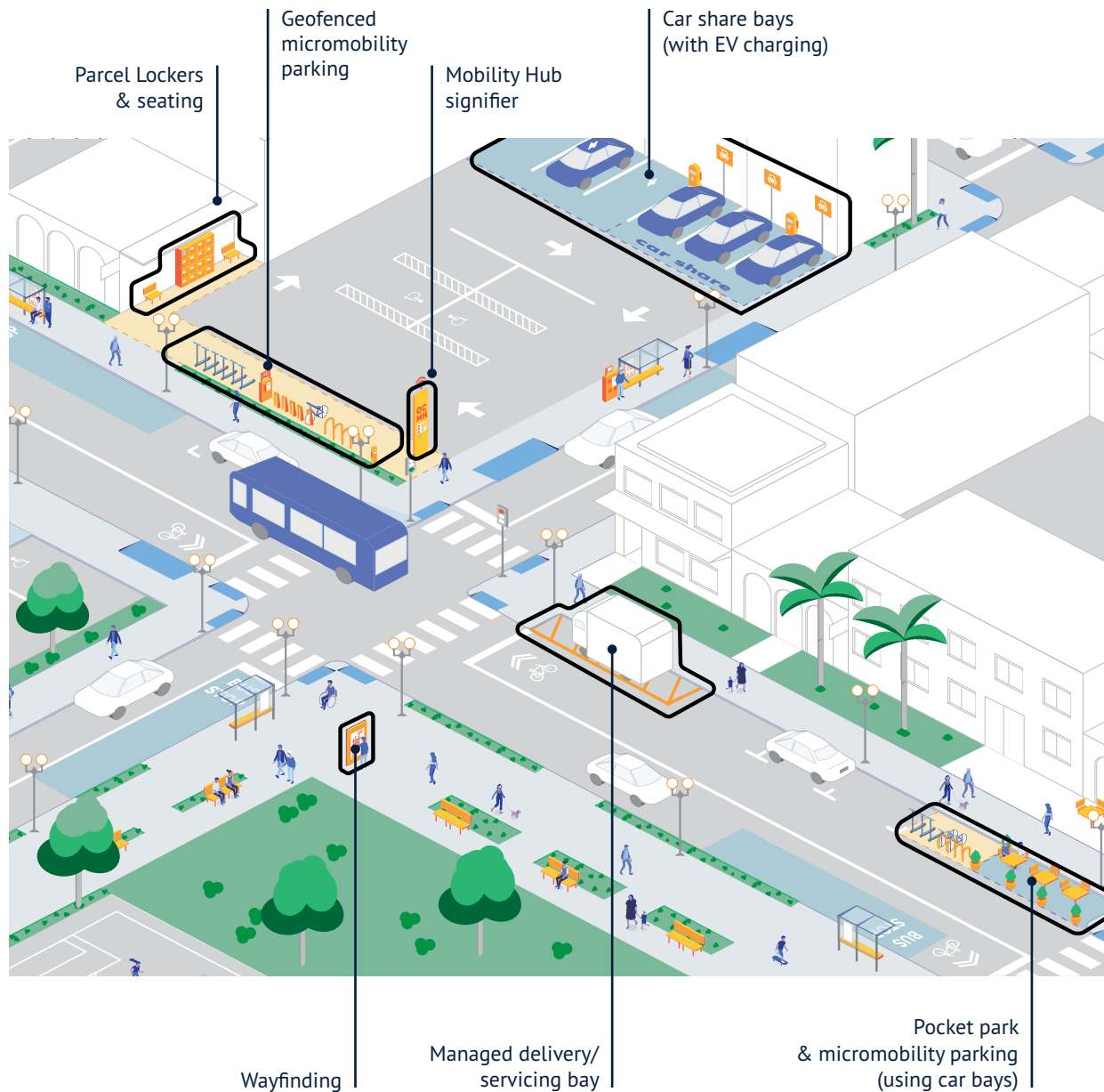
Category 3: Local Transit Connection (Emerging Urban District)

Category 4: Neighborhood Center/ Community Access

Category 4 hubs are located in small neighborhood areas, these hubs provide local transit connections to regional transit options which may include a bus exchange, OC Street Car Station, or carpool/vanpool service. Users of category 4 hubs typically access hubs via bus stops or park and ride zones.

Category 3: Features and Anchor Services

- Access to a range of local bus services and a bus exchange/OC Street Car Station if available
- Limited shared mobility services
- OC Flex, I-Shuttle and vanpool/carpool are suitable if available
- Unsecured (short stay) bike parking
- Secure bike parking/storage and EV charging are recommended
- Availability of information pillar/ticketing and wayfinding
- Wi-Fi connectivity
- Seating is recommended, cafes, restaurants, food services, parcel lockers, WC provision, retail, public space appropriate to context

Managed delivery/ servicing bay

Parcel Lockers & seating

Micromobility parking

Car share bays (with EV charging)

Mobility Hub signifier

Micromobility parking

Pocket park
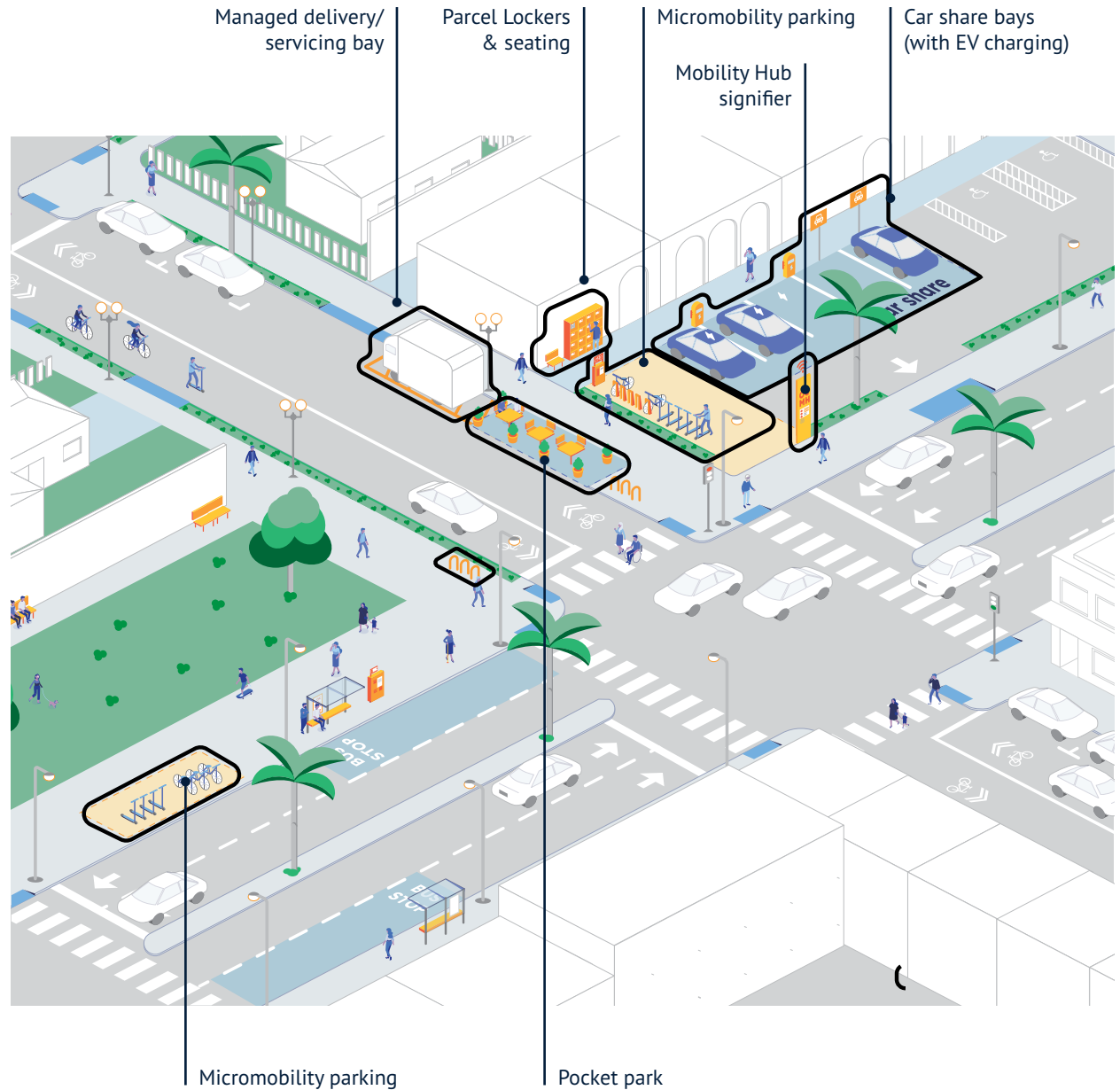
Category 4: Neighborhood Center/Community Access

4 Delivery Considerations

Chapter 4 describes delivery considerations for the financing, implementation, management and operation of mobility hubs.

This Chapter also describes the requirements for effective governance and definition of responsibilities between the different stakeholders. It provides an implementation framework considering the key next steps for successful delivery, from pre-planning to pilot program, testing and refinement.

Chapter 4 sets out a recommended approach to business case development and then goes on to describe some key operations and maintenance considerations and the main aspects of monitoring and evaluation.

Chapter Structure

4.1 Defining Responsibilities

4.1.1 Planning Phase Overview

The planning framework considers the key steps for successful delivery from pre-planning to pilot program implementation to test and refine.

Key steps to progress this strategy to implementation are set out in the table below.

Stage 1. Planning
• Planning Phase Overview
• Governance
• Stakeholder consultation
• Vision Statement

Stage 2. Initiation
• Implementation Plan
• Site Selection Assessment
• Design development
• Business Case
• Funding Pathways
• Procurement and permitting

Stage 3. Implementation
• Piloting
• Construction and installation works
• Branding and marketing

Stage 4. Operations
• Operations and Maintenance
• Monitoring and evaluation

4.1.2 Governance

Defining the Area of Governance

The emerging mobility ecosystem brings with it complex public policy implications, often placing traditional mechanisms for government decision-making at odds with the disruptive landscape that policymakers must look to shape. Public agencies will need to work collaboratively in order to implement and govern a regional mobility hub network. And as the proliferation of private mobility options continues, public agencies will also need to consider how far their management of private mobility operators should extend.

At their core, mobility hubs facilitate use of and transition between different mobility options.

Determining a regional Mobility Hubs Governance structure to facilitate a consistent approach to implementation aligned to the OC Strategy Vision is key to enable successful delivery.

Different scenarios can be considered with medium to limited level of control and involvement. OCTA is expected to take the lead on conversations to establish how developing mobility hubs may work. This can take place along city curbs, by an OCTA bus stop, outside Metrolink stations, or within P&R lots. This is where the passenger meets the vehicle, or where the package moves from carrier/courier to customer.

However, identifying these locations is only part of the story. Unlike a school, park, or library, a standalone bus stop or passenger train station cannot function on its own but operate as part of a network. **Mobility hubs also need to be considered as a network including trip origins and destinations.** This complexity grows exponentially, not just with singular origin/destination locations, but with a wide range of options between trip origins and trip destinations, and even mid-trip transfers, and that's just the **physical** component.

The advent of new mobility options- selected via a menu of options from trip planning apps or hailed by smartphone- blurs the lines between **physical and digital** environments. But unlike other app-based interactions which are frequently left to the private sector to define, mobility occurs on public right-of-way. This means **public policy** will need to be considered as well.

This three-pronged framework should be considered simultaneously when building a countywide mobility hub network to codify a coherent implementation.

Note: Core approved physical components and branding can be recommended in a mobility hub component set, similar to the recent emergence of parklet and outdoor dining standards

- Digital components include established and/ or endorsed data standards, e.g., Mobility Data Specification (MDS) and City Data Specification (CDS), data streams, e.g., General Transit Feed Specification Real-Time (GTFS Realtime), digital wallet compatibility (e.g., ApplePay, Masabi, TAP wallet), and sensors supported
- Policy components may include standardizing parking enforcement, funding strategies, Americans with Disabilities standards (ADA), and governance

Defining Who's Involved in Governance

In Orange County, governance for Mobility Hubs will involve five major stakeholder groups:

- **Landowners:** Cities, public institutions (John Wayne Airport, Anaheim Convention Center, UC Irvine, Cal State Fullerton, etc.), private developers (Irvine Company, Walt Disney Company, etc.)
- **Public transit operators:** OCTA, Metrolink, and Metro
- **Regional policy and funding agencies:** OCCOG and SCAG
- **Major utilities providers:** Power authorities (Southern California Edison, Orange County Power Authority), terrestrial data providers, water districts[16]
- **Local community-based organizations:** bicycle advocacy coalitions; student groups; health and disability

These stakeholders, along with key private partners, must work collaboratively to design and operate an Orange County mobility hub network. These stakeholder categories are large and heterogenous, each dealing with its own departmental coordination challenges. Finding and retaining support for the program will need to consider the intra-agency as well as standard inter-agency challenges.

Mobility hubs touch virtually all departments within transit agencies, and good coordination and shared incentives are key. Without these efforts, the planning between organizational representatives cannot trickle down to each organization itself.

There are several models where inter-agency coordination can thrive, each with its own pros and cons. The following framing questions help establish an appropriate structure for Orange County:

? What are the primary objectives of a Mobility Hub coalition?

Answering this can help identify the structure that best aligns with primary objectives. If maximizing state and federal funding is of paramount importance, then a regionally led Joint Powers Authority (JPA) that can combine multiple communities of concern may offer the greatest opportunity.

Likewise, if the main objective is to further define a regional vision and rally broad strategic alignment, or to establish regional cohesion and consistency, then utilizing an existing organization such as OCTA offers quick onboarding.

Conversely, if public-private partnerships are the primary aim, then a loose coalition of Transportation Management Authorities (TMAs) may offer a more agile solution. Or if local objectives- such as ensuring local stakeholder participation or maximizing local equity and strategic aims- are top of mind, then informal city-led Mobility Hub initiatives may be the most practical.

? Who can realistically provide the resources to lead the effort?

The initial funds will require bootstrapping from existing staff and funds. This entails duties such as: leading meetings, leading funding / grant applications, hiring and managing contractors, responding to correspondence, setting up a public communications strategy and records management.

16. Consult the information here

? **What historic precedents and relationships are there?**

Successful project execution is based on many criteria such as proper planning and ample resources, but none are as important as strong relationships between stakeholders throughout the project lifetime.

These are large-scale coordination projects- with disparate stakeholders creating and operating the hubs. Consider which structures and organizations have a proven track record of successful implementation, and of collaborating successfully with others.

4.1.3 Potential Governance Structures

When applying the framing questions, there are four options decision makers should consider in their journey to plan and implement mobility hubs in Orange County. Each of these imply differing levels of control, involvement and funding support summarized in Table 4.1.

Each option is described in greater detail over the following pages:

Scenario 1. Form an intra-agency mobility hubs office

Scenario 2. Co-found a mobility hubs JPA

Scenario 3. Participate in a mobility hubs TMA

Scenario 4. Participate in a regional mobility hub working group

Table 4.1: Governance Scenarios

Governance Option	OCTA Level of Control	OCTA Level of Involvement	OCTA Level of Funding	Level of harmonization across the region
OCTA MH Office	●●●	●●●	●●●	●●
OCMH JPA	●●	●●	●●	●●●
OCMH TMA	—	●	—	●●
OCMH WG	●	●	—	●

Legend

●●● High

●● Medium

● Low

— None

Scenario 1: OCTA Mobility Hubs Office

Governance Option	OCTA Level of Control	OCTA Level of Involvement	OCTA Level of Funding	Regional harmonization
OCTA MH Office	●●●	●●●	●●●	●●

Description: form a special office within OCTA with responsibility for intra-agency coordination and collaboration.

This office either reports directly to the department head or CEO's office to secure broad institutional support or operates in a quasi-independent manner to encourage informal arrangements, foster creativity, innovation, and respond with agility.

This office should aim to support the entire agency to advance emerging concepts and accelerate innovations that may typically be seen as too risky to incorporate into existing operations. While still important, standard transit agency metrics such as ridership and farebox recovery should be consider less important in the initial stages than learning and innovation metrics.

Broad institutional support throughout OCTA for the mobility hubs office is essential since all departments will play a role in its development. The office should have direct lines of communication with all departments and broad responsibility to arrange meetings with staff at all levels.

Mobility hubs are not separate components of OCTA's mobility offering, but a connecting fabric and extension of existing ones. This nuance will mean that some projects initially developed by the mobility hubs office, may end up being owned by other departments to refine, implement, and operate. The office's role would then shift to a more indirect strategic advisor role.

The office would also be the external representative for OCTA in mobility hub discussions. The mobility hubs office should meet with and work alongside private industry to keep abreast of new innovations and potential partners. The office would also lead efforts in interagency coordination and strategic visioning, press relations and public outreach, and as a representative to panels and conventions

Case Study: Los Angeles Metro Office of Extraordinary Innovation
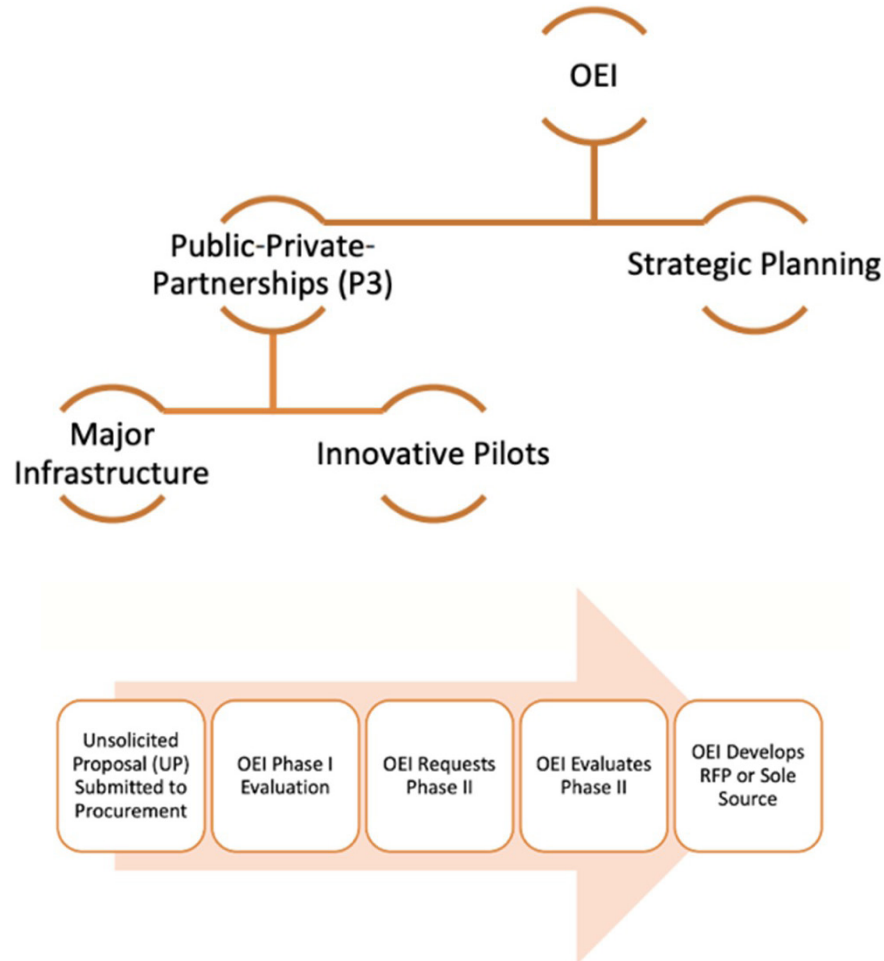
The Metro Office of Extraordinary Innovation (OEI) was created in 2015 by then-CEO Phillip Washington and reports directly to the CEO's office. OEI works along intra-agency lines and acts as "part SWAT team, part cheerleader" to usher in innovative strategic planning and public-private partnerships.

Rather than taking on the full burden of initiating innovations and pilots, OEI solicits ideas both internally within Metro's almost 10,000 employees and from private industry. Its "unsolicited proposals process" is an intentionally informal process that actively encourages innovation, even taking on "projects that are set to fail" for the insights they will provide into other possible projects.

Once a program is formally launched, it can find a permanent place in one of Metro's established departments for further development. Projects have included a wide range of innovations: microtransit, bus lane enforcement, urban greening, even an aerial gondola. After long-term evaluation, these innovations can become permanent fixtures within Metro.

Scenario 2: Orange County Mobility Hubs JPA

Governance Option	OCTA Level of Control	OCTA Level of Involvement	OCTA Level of Funding	Regional harmonization
OCTA JPA	●●	●●	●●	●●●

Description: form a new mobility hubs joint powers authority (JPA) with direct oversight of the formation and ongoing development of a regional network.

Cities and other property owners would grant oversight of land to the JPA. OCTA could become a charter member, alongside other regional agencies such as Metrolink, OCCOG, SCAG, Southern California Edison, and Orange County Power Authority.

Orange County has several JPAs including Metrolink, LOSSAN, OCCOG and SCAG. A JPA would allow for a mobility hubs strategy to be implemented across the entire region, to the benefit of all. Transit agencies routinely struggle with their lack of land rights at the stops and stations used by their vehicles, and the wide range of regulations and contacts across cities, stakeholders, and landowners. The JPA would set universal regulation and operation standards for mobility hubs on a regional basis. Some early actions may include: codifying land-use guidelines and enforcement; formal adoption of digital standards; and, developing a formal mobility hubs kit of parts and/or playbook.

The JPA may even directly manage the Mobility Hubs network, rather than having property owners manage mobility hubs located on their property. This may include hiring a third-party property manager, providing ongoing services such as removal of trash and hydration stations, and overseeing construction efforts.

The JPA would initially start with seed funding from charter members, after which it would be expected to be self-sustaining.

As a separate entity with a broad regional service area, the JPA could become an ideal candidate for various federal, state, and regional funding opportunities. Other revenue sources could include: new curb revenues such as automated micropayments for pickups and drop-offs; power distribution fees; selling vendor permits; offering co-leasing space for private use; and. advertising and sponsorship opportunities.

Scenario 3: Orange County Mobility Hubs TMA

Governance Option	OCTA Level of Control	OCTA Level of Involvement	OCTA Level of Funding	Regional harmonization
OCTA TMA	—	●	—	● ●

Description: form a regional transportation management association (TMA) managing mobility hubs and coordinating mobility options on behalf of its members.

TMAs are member-controlled, and typically include major employers and local businesses with joint mobility goals such as providing transit options, harmonizing stop locations, consolidating parking spots, and achieving broad policy objectives (such as reducing traffic, reducing carbon emissions, or other measurable strategic goals).

An Orange County mobility hubs TMA would involve property owners and businesses as primary members. In Orange County, this would primarily be cities, institutions, and large private landowners such as The Irvine Company, Walt Disney, and Orange County Government.

Members would then set guidelines for certain land-use allocations — and potentially, responsibilities such as ongoing maintenance and management- and agree to a self-funding mechanism amongst members. Many property owners are also major employers in Orange County, and these members may realize financial savings by consolidating existing private transit services and management of commute trip-reduction programs, ultimately reducing the number of costly employee parking spaces.

OCTA, Metrolink, and other public and private mobility operators would play an important advisory role to create harmony with their services. OCTA would likely take on an initial leadership role facilitating meetings and educating prospective members on the benefits of mobility hubs. It would then help establish key transit stops and services that would become part of the mobility hub network.

CASE STUDY: Irvine Spectrum TMA

In 1985 the Irvine Company, a private real estate development company, and the City of Irvine created a public/private partnership (PPP) to address traffic management and monitoring for the Irvine Spectrum business and entertainment park. The PPP resulted in establishing the Irvine Spectrum Transportation Management Association (TMA) to monitor local area traffic and develop solutions and incentives to reduce traffic. To financially support the TMA and its operations the PPP utilized deed Covenants, Conditions, and Restrictions (CC&R), similar to homeowner's association dues. Under the CC&R, all Irvine Spectrum business park property owners are required to financially support the TMA through their property assessments. With funding secured through the CC&R, the TMA was renamed Spectrumotion.

Spectrumotion is a non-profit rideshare association that provides free services to commuters, residents, students, employers and property managers. Spectrumotion supports transportation services that are environmental, cost-effective, reduce traffic, and reduce single-occupancy vehicle trips.

Scenario 4: Orange County Mobility Hubs Working Group

Governance Option	OCTA Level of Control	OCTA Level of Involvement	OCTA Level of Funding	Regional harmonization
OCTA WG	●	●	—	● ●

Description: establish a permanent working group to set strategic guidelines and facilitate regional coordination of mobility hubs.

This working group could be a subgroup of an existing regional organization, such as OCCOG, and be composed of regional public mobility operators OCTA, Metro, and Metrolink. The working group would help set recommendations on policy, locations and network reach, and services offered.

The working group would be aided by having its own budget to facilitate strengthened strategic planning of mobility hubs. This budget could be procured via grant proposal and be used to hire a consultant team or contract employee to lead the strategic planning process. A formal mobility hub kit of parts and regulation guidelines would supplement broad strategic planning efforts.

Working groups would meet regularly to confirm adherence to the strategic plan. They would set assignments for members and generate regular progress reports and policy recommendations to the parent organization. These recommendations would be disseminated to member cities, who would each be responsible for implementation and ongoing operations.
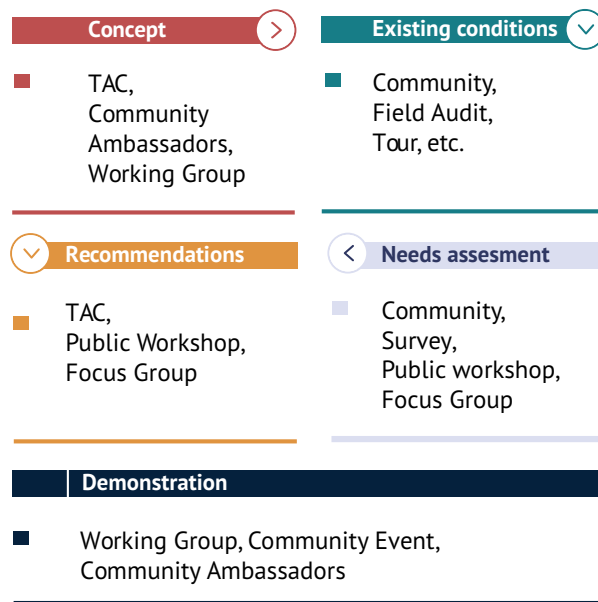
4.1.4 Stakeholder Engagement

Community outreach and stakeholder engagement is an integral part of a mobility hub planning and design process. Engagement components are typically described in a **Public Participation Plan** developed as part of the stakeholder planning process planning**.** The main priority for a Public Participation Plan is implementation of an equitable process founded in community-based planning or a bottom-up approach. An ideal process involves the community and key stakeholders at all project phases (Figure 4.1). These usually include engagement strategies, community partners/stakeholders, timeline, and budget.

Each phase may include public engagement strategies not limited to: Technical Advisory Committees; Working Groups; Community Ambassadors; Community Field Audits/Tours; Community Survey; Public Workshops, Focus Groups; and Community Events.

Public participation is an important part of the funding process. Most funding applications require community outreach and stakeholder engagement as a grant qualification requirement. Government grants often ask for community outreach and stakeholder engagement, with an emphasis on equity, as part of the application.

Guidelines for applications commonly emphasize terms such as "community capacity, special needs populations, or vulnerable communities" to confirm that the planning and design process is inclusive.

Figure 4.1: Public Participation Plan Phasing

Concept >	Existing conditions ⌄
TAC, Community Ambassadors, Working Group	Community, Field Audit, Tour, etc.

⌄ Recommendations	< Needs assesment
TAC, Public Workshop, Focus Group	Community, Survey, Public workshop, Focus Group

Demonstration
Working Group, Community Event, Community Ambassadors

Grant Funding Resources

Examples of public participation requirements by Caltrans and Cap/Trade Grant Programs, are described below:

Caltrans Sustainable Transportation Planning Grant Program FY 2021-22 Grant Application Guide, page 14 requires, "Evidence of additional public outreach measures that promote access to decision-making and program implementation for all segments of the community, including special needs populations, disadvantaged communities,

and a variety of socio-economic groups (e.g. households across the income and employment spectrum, ethnically and racially diverse households."

As part of the project planning, the "Caltrans Sustainable Communities Competitive Grant applications must include an explanation of how local residents and community-based organizations will be meaningfully engaged in developing the final product, especially those from disadvantaged and low-income communities, and how the final product will address community-identified needs."

Caltrans Sustainable Transportation Planning Grant Program FY 2022-2023 Grant Application Guide, Community Engagement Best Practices, p 50.

Transformative Climate Communities Program, FY 2018-2019 TCC Final Program Guidelines pages 13-14, states" Ensure Community Engagement. Applicants must involve residents from the Project Area and key stakeholders in all phases of TCC Proposal development and implementation. TCC Proposals should be designed to meet needs that have been and will be further identified by Project Area residents through a documented outreach and engagement process. Additionally, Applicants must establish multi-stakeholder partnerships organized into a Collaborative Stakeholder Structure that will oversee TCC Proposal development and implementation."

California Climate Investment (Cap/Trade), California Strategic Growth Council and California Conservation guidelines p. 13-14.

Case Study: The South Los Angeles Universal Basic Mobility Pilot Program

Project Funding: 17.8 Million Dollars and over $ $13 million grant funding from the State of California Climate Investment Program and $4,000,000 City of Los Angeles.

"The Universal Basic Mobility (UBM) project includes a mobility wallet and transportation subsidy pilot; an e-bike lending library; a year-long, on-demand electric shuttle pilot; an expansion of the BlueLA electric carshare program into South LA; new public charging infrastructure; CicLAvia events in South LA; stakeholder outreach and engagement activities led by SLATE-Z; quick-build active transportation demonstration projects; and bike and pedestrian improvements on a future Rail-to-Rail active transportation corridor".

California Air Resources Board (CARB) Sustainable Transportation Equity Project (STEP) Implementation Grant Website.

Project Public Participation: "The vision for the UBM Pilot Program was directly shaped by key stakeholders in South LA. Over 4,500 residents participated in a year-long Transformative Climate Communities planning process.... And engaged over 40 community-based organizations and other groups that represented thousands of member residents in an iterative online process of two community meetings and a focus group".

Report of the South LA Climate Commons Collaborative March 2021.

Los Angeles Department of Transportation
STEP IMPLEMENTATION GRANT
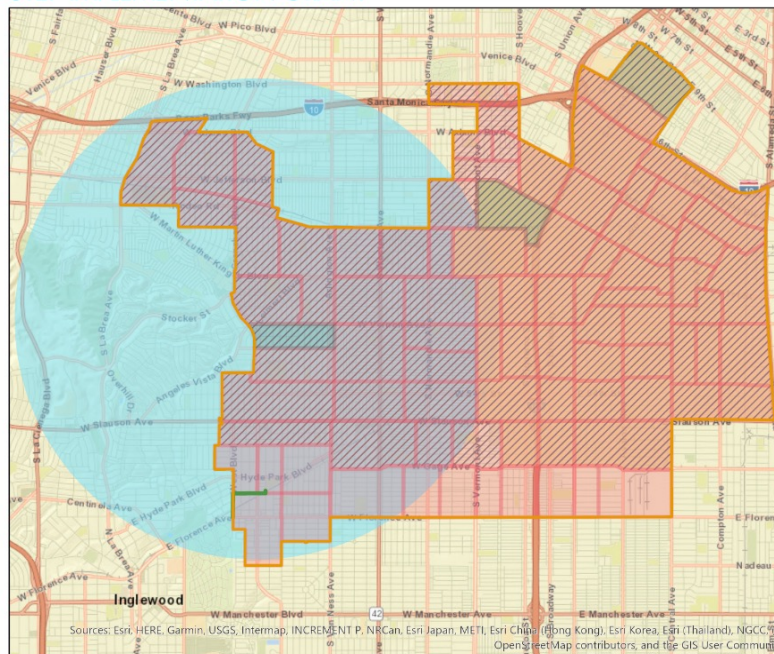
Legend
- STEP Community Boundary
- SB 535 Disadvantaged Communities
- Other Tracts in STEP Community
- Electric Mobility Electric Vehicle Car Share Expansion
- Electric Mobility On Demand Community Shuttle
- Zero Emission Delivery Solutions
- Rail to Rail First/Last Mile

0   1.5   3   6 Miles

Project Outreach & Engagement Strategies: surveys, town hall events, focus groups, steering committee meetings, community ambassador programs, instructional collateral material (flyers, pamphlets, and posters), demonstrations/mini pilots, including CicLAvia events.

Visit Project Website

4.2 Pathways to Implementation

4.2.1 Identify the Opportunity

Greenfield projects are the exception- most mobility hub projects will be built as extensions to existing buildings, transit facilities or parking lots, complicating the land-use question. While the long-term goal is for an expansive network, often the land-use reality requires a piecemeal approach to specific plots of land and/or mobility hub components.

A pragmatic approach involves looking for easy wins along the way — which may include exploiting opportunity plots, e.g., planned developments, that may not have emerged as the highest priority - so long as they fit into the larger vision for the mobility hub network.

Develop an Implementation Plan

The objective is to build a flexible framework that allows for iteration (Figure 4.2 and Table 4.2). An **Implementation Plan** should provide structure but remain focused on a flexible vision that can allow new components, use-cases, and mobility options to work within it. Agile design principles- common in the inherently fast pace of software design- offer a useful guide for mobility hub planning (See Chapter 3 for more details on design principals). Design should begin with longer-term visioning and a "minimal viable product"[17] (MVP) mindset with specifics subject to change based on community response. Ultimately, enabling mobility hubs to evolve and expand over time.

Figure 4.2: Implementation Plan Considerations
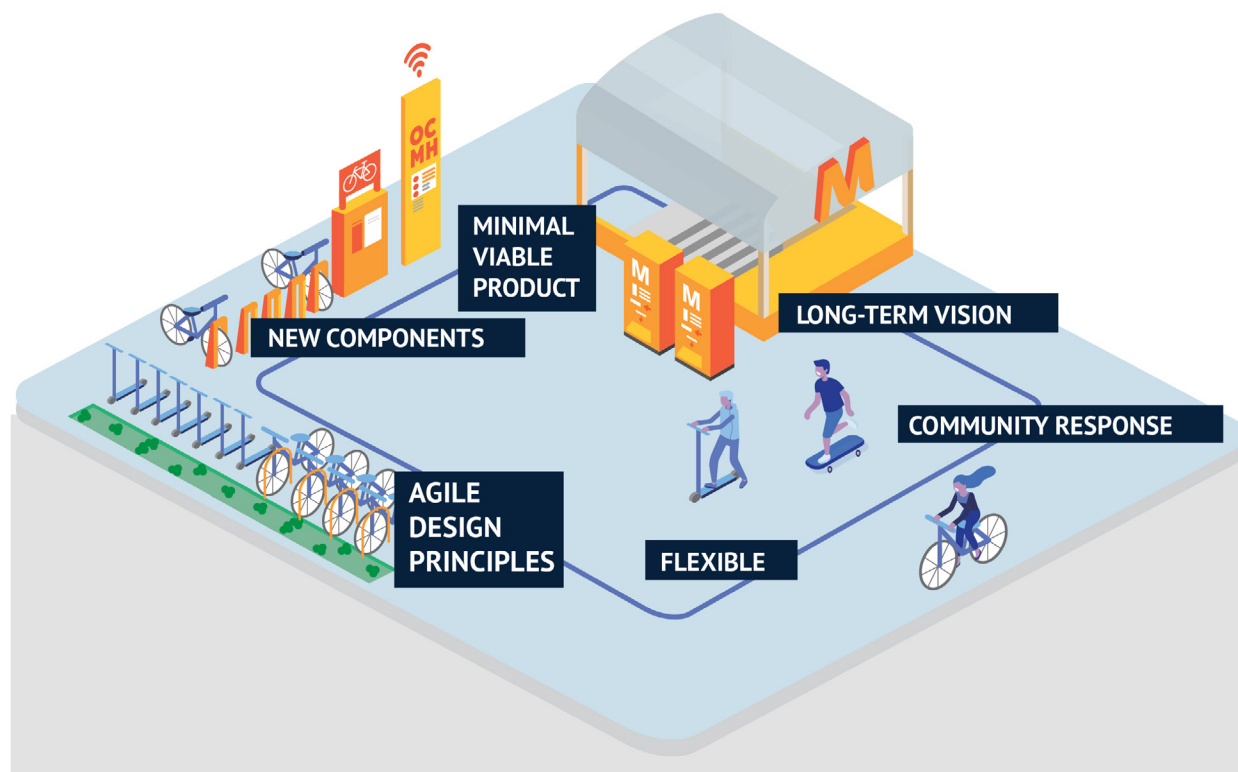
17. A minimum viable product, or MVP, is a product with enough features to attract early-adopter customers and validate a product idea early in the product development cycle

This framework should encourage opportunism - landing early 'nodes' in an emerging network and setting attainable and testable goals for the smaller-scale beginnings. Early successes can be reproduced elsewhere in the system and projects that fail to gain traction can be shelved or even scrapped.

At this stage, it will be important to monitor and evaluate this early success as, if the network is too sparse or the amenities too limited, there could be a danger that the program fails before it has the change to demonstrate its potential value.

An Implementation Plan for each candidate location should include Table 4.2 key tasks:

Table 4.2: Implementation Plan- Overview

Characteristics	Considerations
Existing Conditions Analysis	• Review of relevant background material and a Vision and Framework for Mobility to confirm the vision and objectives of a hub
Stakeholder Engagement Plan	• Develop a detailed engagement strategy to respond to the purpose and objectives of the hub. Stakeholder engagement and a communication plan should be developed and followed throughout the hub implementation process at different stages and for different audiences • Stakeholder involvement will be different, depending on each Mobility Hub's objectives, operational model, governance, features, and locations.
Public Participation Plan	• Develop a detailed engagement strategy and public participation plan
Site Selection Assessment	• Assess the local land use plan, land ownership and potential for the hub to be developed. Including site visits to assess visibility of the area, safety and vandalism concerns, and available space
Technical Assessment	• Prepare a multimodal transport analysis (including parking) leading to the confirmation of key components for each location • Develop a spatial planning and design analysis • Assess environmental impacts
Governance	• Assess partnerships required
Business Case	• Economic and financial analysis including capital and operational costs and opportunities for revenue generation to determine long term sustainability
Operation and Maintenance	• Assess the agreement and contracts required for operation and maintenance of the hub. This evaluation will influence the necessary procurement routes
Evaluation	• Identify metrics to be used for post-implementation monitoring and evaluation of the hub

CASE STUDY: LADOT's Strategic Implementation Plan

LADOT's Strategic Implementation Plan (SIP) began in spring 2018, just before shared scooters hit the streets of Los Angeles. The timing was perfect and resulted in the creation of the Mobility Data Specification (MDS). LADOT's SIP articulated how to usher in Transportation 2.0: The underlying principle to construct Transportation 2.0 is to have authority over how autonomous surface and air vehicles route through the network.

Coining the phrase "code is the new concrete", the SIP argued that control of movement data was the key to managing private mobility operators that rely on LA streets to conduct business. Possessing this information would allow city planners to more effectively manage the streets, plan and provision for future use patterns, and prepare the city for Transportation 2.0. LADOT made MDS compliance a pre-condition for operating shared scooters in LA. MDS is an open-source software that gathers data on scooter starting point, end point, and trip route taken. Unlimited data queries based on vendor, location, time of day, etc. are available on-demand.

This simple solution allows cities the ability to monitor scooters on a systemwide basis, and data from scooter trips will aid in future planning decisions. The MDS framework also works with all vehicle types - such as ride-hail vehicles, delivery vehicles, and automated drones- which places cities in a much stronger position to manage the future of urban mobility in a digital age. MDS is now implemented in over 50 cities and is managed by the Open
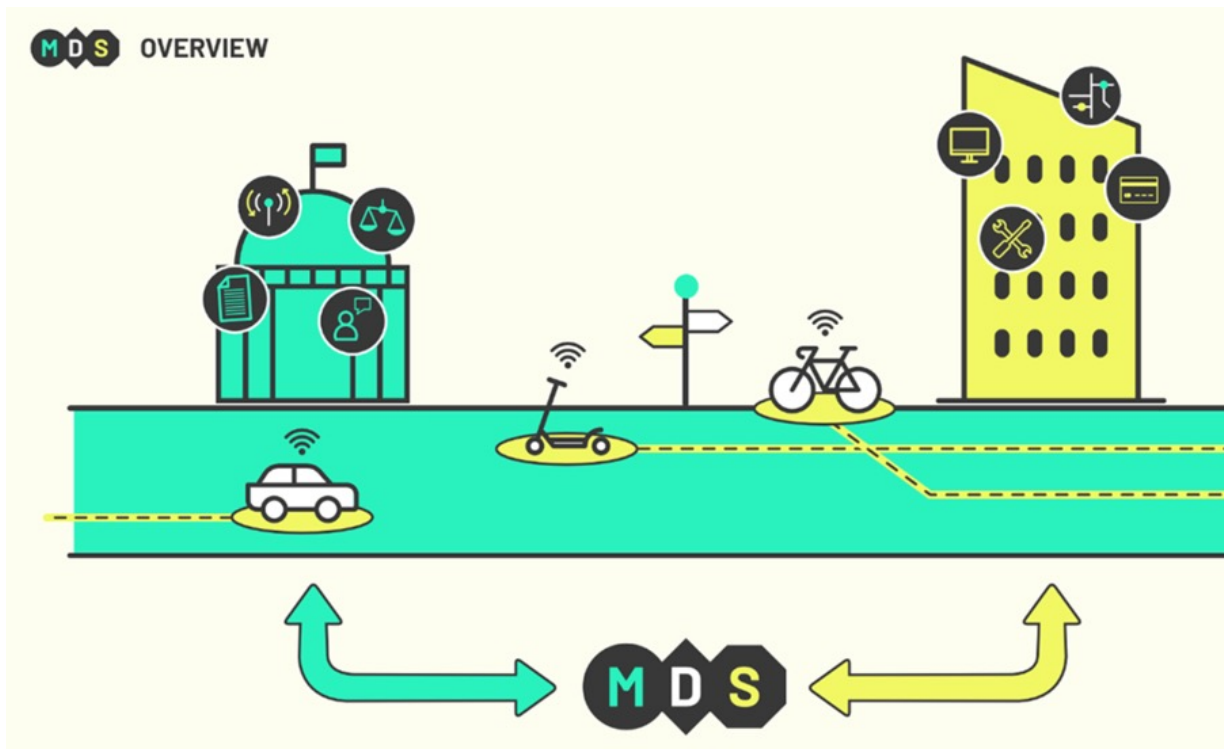
Mobility Foundation, whose mission is "to transform the way cities manage transportation infrastructure in the modern era using well-designed, open-source technology." Its next project, Curb Data Specification (CDS), "provides a mechanism for measuring activity at the curb and developing policies that create more accessible, useful curbs."

4.2.2 Decision Point

Depending on the outcome and recommendations of the Implementation Plan and feedback from the stakeholder engagement, a decision should be made on which features each targeted location should have. Funding for the implementation phase should be secured, if this has not already happened (see Chapter 4.5 Funding Pathway for more details).

During these early project phases, a formal "pilot of pilots" or the review of quick win tactics as presented in Table 4.3 can be considered to encourage experimentation and signal approval for projects that otherwise may struggle to find support within the traditional structure of public agency procedure (See Section 4.5 Piloting).

Table 4.3: Implementation Plan- Direct Action Considerations

Quick Wins Approach	Considerations
Tactical Urbanism	Quick, temporary projects that rapidly change land use in small and reversible ways. These projects can minimize friction, because of their reversibility- but establish real world examples to help gain community support for wider adoption.
Transit Stops	Unused curb space or other portions of public ROW next to transit stops can be outfitted with micromobility infrastructure. Solar + battery-operated scooter charging docks and smart bike racks can be installed quickly without permanent infrastructure.
Municipal/Public Buildings	Identify municipal buildings with ample curb or plaza real estate. These are commonly located near or even at bus stops- providing ideal candidates for enhanced mobility hub amenities. Evaluate for micromobility infrastructure, package delivery lockers, and additional shelter elements.
Surface Parking Lots	The shift to agile working has resulted in reduced demand for parking. Finding underutilized lots in highly appealing urban areas could provide ideal locations for temporary conversion of parking space into new uses such as micro fulfillment delivery depots, micromobility operations zones, and food trucks/carts.

CASE STUDY: Oakland Slow Streets

In April 2020, Oakland, CA announced an ambitious plan to close up to 10% of its roadway (74 miles) to through-traffic, prioritizing safe active transportation and outdoor recreation.[18] While implementation fell short of the original ambition, the resulting 21 miles of bike and pedestrian space demonstrated a reproducible vision for rapid transformation of the public roadway. The primary phase was entirely launched with inexpensive and removable infrastructure; cones, barricades, posters, and decals - enabling a dramatic and rapid shift of roadway priorities.

The pilot program came to an end in 2022 and resulted in tangible next steps, establishing a long-term program to effect more permanent changes in street design. The next phase improves on the pilot by identifying places for new speed-reduction signs, stop signs, speed bumps, and traffic circles. The City of Oakland also plans to improve several of the most dangerous intersections for pedestrians in areas with high concentrations of lower-income residents. It's also looking to alter special permit laws to allow residents to apply for "pop-up" Slow Streets, to encourage greater neighborhood cohesion and a culture of slower and more thoughtful driving through residential neighborhoods.

Telegraph Avenue, Oakland

18. Consult the Report here

CASE STUDY: Translink - Transitioning into New Mobility, Future Curb Space Design

TransLink, Metro Vancouver's transit agency, commissioned TIPS Lab, an interdisciplinary research group based out of the University of British Columbia, to explore how today's curbs can respond to the changing needs of an increasingly digital future

This research imagines a comprehensive approach to the design of physical and digital curb space infrastructure. The approach fully integrates the advantages of the digital into the organization and use of the curb space itself. To do this, a 'digital twin' is proposed – a virtual twin of the physical infrastructure which exists and connects to the virtual. The 'Virtual Curb Space' is seen as the building block to scale to a city- wide network of Mobility Hubs, which is explored and broken down into urban typologies and components.

The TransLink paper argued for public agencies to set policy and regulations to manage its streets and curbs through their digital twins. For example, virtual zoning sets rules and regulations for people and vehicles to interact with curb space. Through the inventory and classification of digital curb space, the digital realm- and by extension, the physical one - can be properly allocated, managed and it's use dynamically charged for or to interested parties.

Those interested parties can manage or reserve space on a pre-planned or on-demand basis, and the physical space, for example with dynamic signs, can respond to digital instructions to establish a digital-to-physical match. Virtual zoning can occur on a location-specific, zone-specific, or system wide basis.
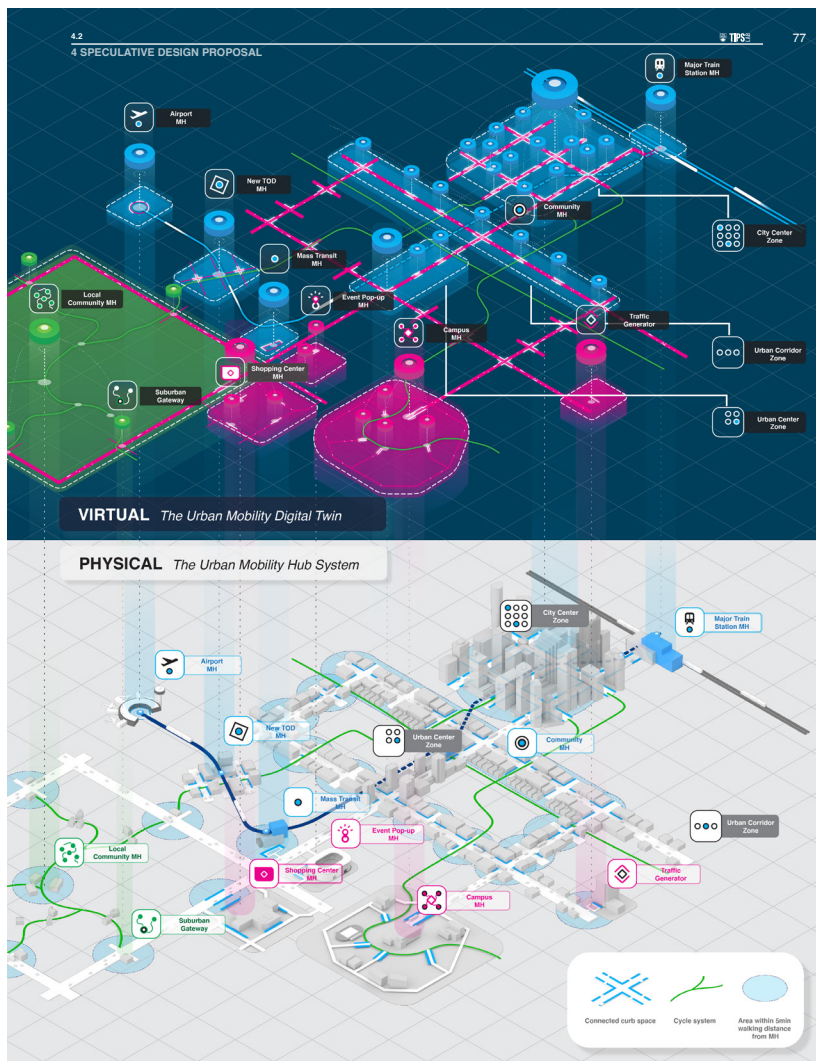
Consult the Report here

4.3 Funding Pathways

4.3.1 Developing a Business Case

Developing a business case requires a comprehensive collection of data-driven evidence that provides the rationale for why an investment should be considered. A comprehensive business case for mobility hubs would aim to provide transparent evidence to OCTA, stakeholder, business partners and local communities on the expected benefits of mobility hubs including to users, the economy, society, and the environment.

A business case should seek to answer the following key questions:

- What is the investment about? Why is it being considered? How will it be realized and evaluated?
- What source of funding will be considered? What are the financial pros/cons?
- How will the investment fits with the Vision Statement and current financial considerations?
- How much value will it realize in terms of economic, environmental, and social impacts?
- What's the deliverability of the investment?

A business case can be structured around four cases: two setting out the rationale for pursuing an investment (Strategic case and Economic case) and two providing inputs on how to implement an investment (Financial case and Operations & Maintenance case).

Case Study: Metrolinx's Business Case Guidance

Metrolinx is the regional transportation authority for the Greater Toronto and Hamilton Area (GTHA). The Metrolinx Business Case Guidance was developed by the agency to underpin a robust approach to assessing the benefits, costs, and impacts of a range of potential transportation investments, provide further detail on how to build a strategic business case taking account of social, economic, financial and operational considerations.

<u>More info</u>

Strategic Case

An innovative vision for integrating mobility hub services with existing infrastructure, transportation, and community culture will be critical for a successful project.

The strategic case summarizes the performance of mobility hubs against agreed strategic objectives to assess its success. A strategic case can vary depending on the nature of the mobility hub within its network but should set out a strategic narrative over the projected project lifecycle.

The strategic case should include:

- A detailed existing condition analysis
- An overview of the expected outcome provided by the new hub
- A performance review of each outcome of the hub against expected benefit which need to align with local and regional policy and plans

Economic Case

While the strategic case evaluates options based on the project vision, local context, policy and plans, the economic case intends to assess how an investment – here to develop mobility hubs – realizes benefits to society and the resource costs required to do so. With the economic case, OCTA will seek to answer the following questions:

- What is the overall impact to society, as indicated by the Benefit Cost Ratio (BCR) and Net Present Value (NPV) of the investment option(s)?
- What are the benefits and resource costs associated with Mobility Hubs investment in real terms?
- Will the investment have an impact upon productivity, well-being, environmental and economic performance?

By performing an economic appraisal, OCTA will be able to confirm the economic value of developing a mobility hubs network within Orange County.

Table 4.4 outlines other important facets of mobility hub components – equity, traffic, GHG, and ridership impacts.

- The **equity impact** of the mobility hub denotes how large a benefit it will provide, based on its accessibility and affordability, to disadvantaged communities and low-income riders

- The **traffic impact** relates to mode shift and reduction of VMT and congestion

- The **GHG impact** measures reductions in CO_2 emissions, which support Orange County's objective to reduce GHG emissions through mobility hub amenities and services

- The **ridership** impact will measure changes in alighting's and boardings as well as overall transit ridership, which will support OCTA's objective to increase ridership on transportation

Financial Case

The Financial case consists of assessing the overall financial impact of developing mobility hubs. While the strategic and economic cases focus on how investing in mobility hubs will achieve organizational goals and social value, the financial case focuses on the requirements to successfully deliver the investment and the cash flow impact for the mobility hub operator.

The financial case should usually include:

- Capital Costs
- Operating and Maintenance Costs
- Revenue Impacts
- Labor Force Requirement

Capital costs to develop mobility hubs are based on peer research and input from the project objectives outlined in the OCTA RFP. These preliminary costs are planning level only. Equipment, development, and implementation costs for each mobility hub service (e.g., lockers, rideshare, bikeshare, hub signage, trip planning, and kiosks) are also discussed in Figure 4.2.

Table 4.4: Examples of Funding Mobility Hub Amenities

Components			Potential Impacts				Funding	
			Equity	Traffic	GHG	Ridership	CAPEX	OPEX
Real-time departure kiosks	GTFS Real-time feeds	Vehicle real-time tracking	High	N/A	N/A	Mid	$$	$
Multimodal Trip Planning	"Official partner" app	Digital twin / Digital ID	Mid	Mid	Low	Mid	$	$
Universal payments & registration	Wallet integrations, e.g. ApplePay	Digital IDs tied to low-income verification	High	Mid	Mid	Mid	$$	$
"Smart" loading zones	"Official partner" app	Camera-based enforcement	Low	High	High	N/A	$$	$$
Delivery lockers	Exclusive partner	Universal lockers	Mid	High	High	Low	$	$$
Shared micro docks	Exclusive partner	Universal docks	Low	Low	Low	Mid	$$$	$
Personal micro parking	Standard racks	Park & Charge docks	Mid	Mid	Mid	Mid	$$	$

Specific costs and locations of services will be refined by contractor proposals. The project components that require the highest amount of capital investment are related to technology and physical equipment.

Operations and Maintenance Case

The operations and maintenance case assesses the technical and commercial feasibility of the mobility hubs network.

With the operations and maintenance case, OCTA will seek to answer the following questions:

- Has a procurement strategy been developed?
- What formal role will each stakeholder play?
- What are the arrangements for project governance and decision making? What risk do these arrangements introduce or mitigate?
- What project and program dependencies exist?
- What contractual strategies are being considered?
- What approvals and reporting processes apply will apply?
- What is the delivery approach?

The operations case will take account of the Operating Procedures (SOPs), which will be drawn from industry best practices. It will need to adjust and adapt to the information gathered through the public outreach sessions and user surveys. As the mobility hubs network grows over time, the complexities of operations, logistics, customer service, and communications will increase with real world data fed back into the business case analysis to inform an increasingly robust analysis of future project cost benefits.

Sections 4.4 and 4.6 of this chapter discuss the procurement and permitting process, and operations and maintenance considerations in more detail.

4.3.2 Potential Funding Resources

Funding mobility hub projects requires differentiation of costs associated with planning, installing, and operating the hubs. Mobility hubs require capital investment for equipment, permitting, land use, construction, and installation. Additionally, they require ongoing funding for operations and maintenance. Funding for mobility hubs can come from a variety of sources- from government grants (e.g., local and federal), or cooperative funding through public-private partnerships. This section outlines various funding options and considerations for securing funding and building partnerships.

Most funding sources, particularly grant funding, can only be used for specific mobility hub elements, such as procuring pilot studies, capital investment, infrastructure, equipment, operations and maintenance, planning and design, or community engagement. Furthermore, build out of mobility hubs is typically phased, with hubs reaching different stages of completion and operation on different timelines. With changing technology and user preferences, the process for the development of each mobility hub will likely change over time. Given the specificity of the funding sources and phased development, the creation of a system of mobility hubs will rely on a combination of project revenues and incremental funding sources.

Revenues

Revenue can be generated from several different streams, from tax collection to the sale of goods, services, or the use of public resources. There are additional methods for acquiring funds that support the development of mobility hubs (Table 4.5):

Smart loading zones and smart commercial loading zones, as discussed in more detail in the Curb management Case Study.

Enforcement Revenues: fare evasion impacts transit farebox revenue, ridership, and customer perceptions of the services as paying passengers. Enhanced and more accurate fare evasion measurement can improve ridership data, inform policy decisions, and prioritize resources for fare enforcement. Fare evasion can be examined and calculated for improved fare evasion deterrents. Collecting fines and fees from individuals who are caught evading fares can provide a regular revenue stream for transit and mobility hubs.

Financial Intermediary Funds (FIFs): are financial arrangements that leverage public and private resources in support of specific projects or initiatives, enabling the international community to coordinate and invest in projects worldwide. Intermediary funds have been invested in projects such as: urban parking management linked to business improvement districts that support improved pedestrian/bicycle infrastructure, public bike systems linked to advertising, and intermodal public transport terminal construction linked to commercial center development and housing development.

Advertising and Sponsorship: can generate revenue from companies that buy and display advertisements on media on Mobility Hub facilities and amenities, as well as support ongoing operations and maintenance. Out-of-home (OOH) advertising, also called outdoor advertising, outdoor media, and out-of-home media, is advertising experienced outside of the home. This includes billboards, wallscapes, street furniture, bus stops, kiosks, bicycles, and posters seen while "on the go". Appendix G provides further detailed description of pertinent local, regional, state, federal, and private funding options.

Table 4.5: Potential Funding and Revenue Resources

Funding Mechanisms	Pilot & Feasibility Studies	Capital Investment	Infrastructure	Vehicles & Equipment[19]	Operations & Maintenance	Planning & Engagement
Local	●	●	—	●	●	●
Regional	—	—	●	●	—	—
State	—	●	●	●	●	●
Federal	●	●	●	●	●	●
Private Funding & PPP	●	●	●	—	●	—

19. In the case of car share/e-scooters this is likely to be private funding.

4.4 Procurement and Permitting

Following the decision point to progress to implementation, a procurement process should start. Procurement can include both RFI/RFP for service providers (e.g., a micromobility operator or EV charging infrastructure) and construction. The need to start a bid procurement with service providers will depend on whether or not there is an agreement in place to operate in the area. For example, if a carsharing or microtransit service is already operating in the candidate hub service zone, then there may be no need to re-procure this type of service.

After procurement is completed, construction of the hub starts followed by operations and maintenance, and monitoring and evaluation phases.

Permitting processes can also be used to provide dedicated space or right of way access for new mobility services at a hub. Existing permit types can include: shared mobility permits, parklets, street furniture permits, and EV charging installation permits

4.4.1 Process Considerations

The OC mobility hub network will encompass the entire county, so it should be guided by the county's collective vision. By aligning with long-range plans- mobility, environmental, equity, public safety, technology, housing- mobility hubs become a useful tool to help planners achieve their agency's stated aims. Plans from major institutions, major employers, and property owners should also inform priorities and decision making.

Mobility Hub Supplier Bench

Establishing a mobility hub Supplier Bench speeds up the procurement process by creating a roster of pre-vetted partners and replacing the Requests for Proposal (RFP) or Invitation for Bid (IFB) process with a Task Order Submission (TOS) process. A TOS is more flexible than an RFP, as the stated aim is to fulfill a task rather than a set quantity of items or deliverables. A successful TOS focuses on **what** is to be achieved over **how** to achieve it. This results

in submission of a far greater range of possible solutions, which only benefits the project.

Subcontractors and vendors that can respond to task order solicitations. Partners are likely to belong to three main categories, hardware, software, and staffing. Some providers such as car share operators or micromobility providers might be part of the three categories at the same time:

Relying on a TOS process can dramatically speed up procurement and vendor selection. The TOS can be ideal for limited scope (pilots) and/or easily deployed projects. It's critical to pre-vet the bench members to confirm their ability to carry out their proposals, especially as proposals may be different enough as to not be easily comparable. While the bench development phase may add time at the start of the process, that will be recaptured thanks to more rapid future procurements using the TOS. Consideration can also be given to accept unsolicited TOS requests from bench members.

Hardware	Software	Staffing
Vehicles, vehicle components, sensors, vehicle and people counters, devices, screens, kiosks, shelter, seating	MaaS apps, trip planners, curbside management, fleet management, data analytics, dashboard services, AR/VR software, camera-based AI systems	Operators, program managers, maintenance services, traffic planners, data analysts

CASE STUDY: LADOT Code the Curb

Cities constantly need to adapt operational services of their streets for emergencies, public demonstrations, and construction, as well as pricing the curb to regulate parking and deliveries. As part of its 2019 Technology Action Plan, LADOT introduced Code the Curb. Code the Curb is a digital inventory project intended to electronically inventory and compile data on all the city's curbs and parking assets in the public right-of-way.

The result will provide the city with an online inventory database of all signed traffic and parking regulations. With this online inventory the city can convert its fixed curb designations into a more dynamic digital program that can alter curb designations to meet changes in traffic demand. The city can adjust curb spaces for parking needs, deliveries, ADA accessibility, and transit.

The managed digital twin of this real estate enables the navigation apps connecting users to transit, vehicles, and deliveries to available curb space. When completed, Code the Curb will have inventoried over 1 million signs, 37,000 parking meters, and curb paint and regulatory tools along 7,500 centerline miles of streets.

The digital inventory will allow Los Angeles to develop more dynamic pricing and regulations for the curb.

Consult the Project here

4.4.2 Private Partnerships

Long-term partnerships are only possible when they benefit all parties involved. While it may be tempting to strike deals with as many private companies as are willing, this approach is typically short-sighted.

For example, some cities took this approach with shared e-scooter companies when they first emerged and witnessed a plethora of problems: an overabundance of scooters in key urban areas to the point of compromising pedestrian safety, low levels of coverage in other areas, and sudden departures of e-scooter companies if or when they proved unprofitable.

Recently, a leading e-scooter operator decided to limit their activities to limited vendor markets -- jurisdictions that used permits to restrict the number of mobility operators. This decision was made to maximize unit economics and focus on markets where the operator experiences "double the revenue per vehicle". This focused approach allows the operator to continue working in a collaborative manner with city planners to maximize coverage throughout a city, offer equity and safety programs, and support advocacy and increased infrastructure efforts.

Several cities and transportation agencies use the open-source Mobility Data Specification (MDS) to improve coordination of information and operations among transportation operators. MDS enables cities and transportation operators to communicate and exchange data digitally. Use of a digital platform allows for the transmission of more accurate and up-to-the-minute information and coordination of transportation services in real time. In order to encourage new transportation operators to coordinate their services, cities and transportation agencies can require data sharing as part of the permitting process, with MDS as an established framework for that data. New micromobility operators or other multimodal services would be required to comply with MDS data sharing to operate. Permits that require MDS also assist relevant agencies in allocating space for other services at mobility hubs.

Orange County decision-makers could consider exclusive partnerships or permitted engagements, either on a countywide or a city-by-city basis. While pockets of the county may offer the opportunity for multiple competitive operators to function profitably, most of the county does not. By establishing policy to offer exclusive or "official" status, cities and/or the county may gain leverage to enforce broad policy objectives such as: offering discounts to low-income patrons; offering fare transfer discounts; ensuring coverage in areas that are less or not profitable; offering service at non-peak times; and compliance with local regulations. Implementing innovative configurations of the mobility hub space could allow for permitted food carts, farmers market stands, or other vendors to offer additional amenities at mobility hubs.

CASE STUDY: Lyft becomes official rideshare partner of Disneyland

In 2019 Lyft became the official rideshare partner of Disneyland and Disneyworld resorts. While Ubers and taxis can still drop off and pick up at the resorts, Lyft is afforded more convenient and exclusive pick-up and drop-off zones and signage to direct passengers to their services.

Lyft also enhanced its app experience at Walt Disney World resort to provide a frictionless experience. This builds upon Lyft's "Disney's Minnie Van Service"- a branded rideshare experience offering accessible vehicles and seating up to 6 passengers- which began in 2017.

CASE STUDY: Permitting Approach Through Curbside Management

Curbside management involves taking a comprehensive view of how passenger vehicles, delivery trucks, transportation services, pedestrians, bicycles, and other forms of multimodal transportation all vie for access and use of the curb. Reviewing the demand for curb usage can better inform solutions and methods for improving curb and loading zone access.

Smart loading zone micropayments allow cities to charge for use of loading zones, either through a reservation system or by directly invoicing vehicle owners via license plate recognition. Cities are recognizing that curbspace is becoming more important in dense urban areas with limited space and increasing demand for access, particularly for deliveries. Delivery van or on-demand service drivers double-parked, pulled over in a bike or bus lane, or stopped in the street can impact traffic patterns and cause hazards. They block traffic and can force cyclists, scooter riders, and pedestrians into oncoming traffic to get around them.

Smart commercial loading zones, or "smart zones," allow drivers to coordinate usage through mobile apps/payments, providing incentives for drivers to load in designated locations where it is safe, efficient, and legal — all while collecting important data on curbside usage patterns. Cities can then create tools to manage the curb, to right-size their loading space and incentivize use of the curb at certain times, which could open up the space for a variety of other uses. Collecting data on curb usage

and smart zones provide a regular stream of data on who is loading, for how long, and at what times. It also makes it possible for cities to monetize the curb and its usage, charging drivers and delivery services fees for using the curb.

The City of Pittsburgh is utilizing grant funding to pilot a smart loading zones project. Pittsburgh began to notice an increase in delivery vehicles from commercial, retail, and food vendors, causing an increase in congestion, emissions, and safety hazards on its streets. As a result, Pittsburgh partnered with private company Automotus to install 20 smart loading zones throughout the city. The smart loading zones will analyze actual curbside activity, process payments for curb usage, and provide real-time parking availability data via open APIs.

Parking enforcement is critical to making smart loading zones a reality, several cities and states are taking different approaches to address a wide range of traffic and congestion issues.

Consult the Report here

4.5 Piloting

4.5.1 Why Pilot?

Pilot programs allow an agency to test innovations, and make adjustments before rolling out a wider implementation and making larger-scale investments. Given the fluid nature of changes in mobility, pilots provide proof of concept quickly and efficiently with a lower level of investment. The goal is to be flexible and replicable, while still building an awareness and understanding of a specific service or component.

Orange County is extremely diverse, so figuring out which model(s) will work best at each individual location is paramount to success. This needs to take account of local differences in the built environment, existing employment opportunities, institutions, and resident populations. Some combinations of mobility hub elements will be successful at a particular location or type of location, and not elsewhere. Piloting these elements at different locations will establish patterns that can become formalized in a mobility hub playbook.

A network-wide approach to pilots can introduce services, amenities, and infrastructure that can be applied system-wide. This may also allow the entire network to qualify for grant opportunities that are targeted to communities of concern via air quality and equity initiatives.

The network of mobility hubs itself should be considered a **pilot of pilots**, allowing public and private parties to test out new concepts and product offerings. Partner agencies should be encouraged to cite the mobility hubs network as part of their grant and pilot applications, which simultaneously provides an easier path to implementation for them while increasing public engagement around the mobility hubs and mobility options for users.

4.5.2 Objectives, Benefits and Downsides

The objective of a pilot program is to test new innovations and products. Pilots help spur product and service improvements; they also help identify unsuitable options before widespread deployment.

It is vital to set aside traditional metrics of success during the pilot phase and focus on the big picture. The success of a pilot isn't necessarily the direct impact, e.g., more ridership, but the data and experiences that can be used to inform future projects. "Success" could even be determining the pilot's assumptions invalid and not going forward with a larger project. A "failed" pilot can save agencies significant money by keeping failures small and out of large-scale program budgets. Embrace "mistakes" and encourage an iterative mindset.

In mobility hub deployment, and especially in the case of pilot projects, an agile design approach is vital. Agile design intentionally releases products or services that are a work-in-progress to encourage real-world application where more rigorous and specific feedback can be given. Analysis and planning continue with this feedback, and an improved product or service gets re-released quickly. This cycle should be iterative.

Agile design is the opposite of waterfall design, which is the traditional method deployed at public agencies. Waterfall design passes through various stages of development prior to moving downstream, with robust planning at all stages for a thorough product/service development prior to public interaction.

It is important to recognize the difference between agile and waterfall design and understand the natural tendency of public agencies to subject pilots to the same rigorous planning process as other projects. When this occurs, the main benefits of pilot programs-- their iterative design, ease, and speed of delivery-- are hindered. Given this reality, it's important to be thoughtful about the pilot's procurement process.

The most common process, the Request for Proposals, is generally a multi-year process. As a result, the final execution of a project could be years after the scope of services is written. Thoughtful statement of goals is therefore required with flexibility around methods. Or an RFP could be replaced entirely with more flexible procurement option such as a Task Order Submission.

Having established the expectations for success and failure in pilot programs, the downsides should be noted. Most significantly- a pilot is only as useful **as the awareness of the pilot itself.**

A piggyback approach is recommended in both physical and digital environments. For example, co-locate pilots with existing bus stops and rail stations, and supplement locations with temporary signage using QR codes to direct riders to program information. Work with existing transportation program operators to publicize the pilot with their user base, adding sweeteners like free or discounted passes for members. Consider augmenting existing programs (such as OC Flex, OC Access, etc.) rather than developing one-off new programs and branding.

4.5.3 Scaling Approach

Even pilots that result in positive outcomes across all the traditional metrics of success- high usage and demand- may create real challenges if the pilot expires without developing into a permanent program. Pilots typically attempt to address urgent needs of the most transit-dependent mobility users.

When those needs are met with a pilot program, this can quickly result in structural life changes for users- such as selling a car or changing jobs- which cannot be quickly reversed.

Performance-driven programs and flexibility also allows for hubs to be scaled — in size or mix of elements — as demand increases or as hub contexts evolve. A Virtual Hub may transition to a Neighborhood Center/Community Access as the community needs increases with new development.

Using KPIs and metrics to assess the success of a mobility hubs will be key for scaling decision-making (See section 4.7 Monitoring and Evaluation).

4.5.4 Process Considerations

For the private sector, there are many reasons to join a pilot: to gain a foothold in a region, to introduce a new product or innovation, to increase brand awareness, to generate buzz for fundraising purposes. Consider each potential private partner carefully- and try to understand their motivation for joining the pilot, as it may not align with the program goals. For example, if a startup is in major fundraising mode, project execution may take a lower priority to the buzz generated from the initial press release. Document a clear understanding of the pilot's intentions, and architect the project to minimize such misalignments.

Developing an MoU

A memorandum of understanding (MoU) is a practical tool to clarify commitments for all parties involved. MoUs clearly outline specific points of an agreement. The MoU should list the parties involved, broadly describe the project, objectives, and scope, and may detail each party's roles and responsibilities, including KPIs and other metrics.

Unlike a formal contract, MoUs are rarely enforceable- but this isn't a downside. Execute an MoU quickly to build and maintain momentum as a pilot materializes. The MoU can include latitude to deepen scope, and even change course if necessary. A well-executed MoU focuses more on the intentions and goals, with specific bullet points of importance. In fact, the more concise and readable it is, the more effective it remains as an ongoing tool to fall back on. The primary purpose isn't to be a document that is called upon for punitive damages, but a guiding document to give all parties a common understanding of the agreement and a clear idea of what is expected from each party. Even without teeth, this formal alignment can be critical to remind private companies- especially tech-related companies and young startups- of their commitments if they begin to stray off course.

Developing the MVP

A minimum viable product (MVP)- combined with A/B testing[20]- should be established at the outset to allow the project to stand up quickly. An MVP is intentionally a work-in-progress; it is formed with just enough features to attract early adopters and encourage testing and feedback. For pilot projects with public agencies, where defined scope and length of operations are codified, a typical MVP approach may not be practical or possible. Before establishing an MVP framework, keep the fundamental goals in mind. The main purpose of a pilot is the learning that results from real-world application. Part of the learning process is the iteration of the original design. Establishing an MVP allows the product or service to be released as soon as it is minimally viable (and safe), so that ongoing testing and feedback can be gathered. The ongoing iteration based upon that feedback allows that product or service to be improved quickly and inexpensively.

Developing the Communications Network

Pilot duration and funding are limited; it's therefore vital to establish a strong communications network across the entire chain of command. Pilots are frequently assigned to junior planners to supervise, seen as small scope and low risk. While this is not necessarily a bad thing, a successful pilot will be iterative, meaning change orders should be an expected feature- not a bug - and it should be overseen by a team empowered to navigate these changes.

Senior decision makers need to be available to approve changes. This will frequently include the department that owns the pilot, as well as other departments including procurement and legal. Consider ways to empower the direct project manager with a set of activities they have decision-making authority on, and a clear set of protocols for the change order process. A "point person" should be assigned to all relevant departments ahead of time, and available at project commencement.

Plan for regular meetings of all relevant stakeholders, or at the very least a communications

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20. A/B testing is a way to compare two versions of a single variable, typically by testing a subject's response to variant A against variant B, and determining which of the two variants is more effective.

CASE STUDY: Pittsburgh Move Pgh

Move PGH is a coordinated public/private partnership between public agencies and private mobility operators dubbed the Pittsburgh Mobility Collective. Move PGH aims to co-locate and digitally integrate various private mobility offerings with public transportation to make it easier to get around without owning a private vehicle.

These co-located vehicles- within scooter parking zones, bike share docks, and carshare spaces- are designated as mobility hubs, with an aim to be located near Port Authority's bus and rail stops to act as a "one-stop" mobility solution. Current and planned digital integrations include multimodal trip planning, fare integration, and real-time departure info.

The two-year pilot program has generated good traction due to its strong support from local public and private partners. The City of Pittsburgh Department of Mobility and Infrastructure (DOMI) leads the public initiative, with assistance from the Port Authority and Pittsburgh Parking Authority. Current private industry partners include Spin, Transit App, Waze Carpool, Healthy Ride, Zipcar, and Masabi. The reason for its rapid private adoption was the city's offering partners in the Pittsburgh Mobility Collective exclusive two-year access to public right-of-way and/or digital integrations. This exclusivity provides a non-monetary yet very tangible benefit to private partners. Meanwhile, their participation allows the mobility hubs to be functional from day one; a strong strategy to roll out a mobility hub network MVP into the marketplace

Consult the Program here

4.5.5   Developing the Budget Model

Pilot project budgets need to be flexible. As the pilot continues, expect growth in some portion of the program and be ready to see other areas cut. Because increasing a budget may be tedious or even impossible, try to establish flexibility within that not-to-exceed budget in expectation of unforeseen expenses.

When possible, arrange the budget so that capital and operational costs can be fluid. When the funding parameters are rigid, consider ways to re-introduce flexibility into your project. For example, some operational costs can be recategorized as capitalized expenses, such as bulk purchase of an annual license or a block of service hours and capitalized. So too can enhanced service contracts, which allow ongoing maintenance, replacement products, even planned upgrades, to be covered at project commencement. In addition to adding flexibility to your program budget, and stability to your program operations, these up-front purchases can often secure a significant discount below 'pay-as-you-go' pricing for the same service.

Grant applications will require granular knowledge of your expected expenses- but rarely need that granular information in the grant itself. Consider abstracting that information in the grant application to make sure funds don't get restricted by the grant process itself. In practice, this means you'll want to get line-by-line quotes to confirm costs are fair and comprehensively understood - but your next step should be to transform those detailed quotes into standardized categories for the funding process. This may provide latitude for changes in-project. Consider adding an extra 20% "innovation" contingency for iteration and feature upgrades.

Unexpected delays to public procurement contracts are common and should be expected. Incorporate inflation increases into line items, including capital expenses. This may keep your program on track in the event of delays and inflation, and if inflation is less than predicted, you'll have an extra discretionary budget for changes.

4.6 Operations and Maintenance

4.6.1 Operations and Maintenance Components

The word "operations" is a general term used to describe a wide range of services. Operating a mobility hub network across a wide service area requires an understanding of both macro planning elements and physical boots-on-the-ground realities. Whether these are implemented and managed by a public agency, a private operator, or a strategic partnership, the same operational components require consideration. This section should serve as an operational lens for budget analysis.

For simplicity, operational components are presented in three broad categories: administration, field operations, and remote support. All these subcategories need to be considered, though they may be filled by public agency staff and/or existing subcontractors. A further section details "other direct costs", to gain better insight into full operational expenses.

Regardless, successful programs still require ongoing support from the agency itself, preferably with a single point of contact that can funnel agency-wide communication in both directions.

Administration

Program Management: Strategic guidance, project management (scheduling), maintain records & assemble reports, manage field and remote support staff.

External Communications: Liaison with lead agency, lead and/or attend meetings, communicate with subcontractors and partners, public outreach and marketing support, public and press relations.

Professional Services: Legal, compliance, accounting and payroll support.

Logistics: Vendor/supplier selection; procurement of capital infrastructure; facilitate delivery, setup, storage, installation; setup office / warehouse tools, supplies, equipment; facilitate utilities, construction, permits.

Field Operations

Supervision: Direct liaison between executive management and field operations staff.

Dispatch: Person(s) and/or automated tools to offer dispatch services (be mindful if multilingual support is required); customized dispatch software.

Field Staff: Person(s) dedicated for ongoing maintenance, installations/transfers, and as-needed service calls (Figure 4.2). Depending on required support levels, provisions for Paid Time Off (PTO) and unexpected absences should be considered.

Asset Management: Hub components will require a staging location pre-launch, as well as a robust assortment of replacement parts to be warehoused during operations. General consumable supplies.

Figure 4.2: Mobility Hub Maintenance

Figure 4.3: Mobility Hub Service Fleet

Figure 4.4: Mobility Hub Customer Service

Figure 4.5: Energy Resources

Service Fleet: Vehicles to access locations for servicing, vehicle modifications and field tools, warehouse tools and equipment (Figure 4.3).

Service Management: Person(s) and/or software tools to schedule, track, and triage routine and non-routine maintenance and field repairs, tracking swappable assets at the individual level as they are removed, repaired, or refurbished, and redeployed throughout the network. Asset management and service management may be fulfilled with a single software suite.

Remote Support

Call Center: Customer support software for non-emergency end-user communication (Figure 4.4). Unified multi-platform support ticketing to manage phone, email, chat, and text is necessary. Multilingual support and 24/7 response should be considered.

Emergency Response: Person(s) to provide response to urgent issues such as access (e.g., remote unlock of doors), and resources such as providing information to file a police report.

On-premises Monitoring: Surveillance cameras and sensors, on-premises support options (such as service phone), remote hardware resets.

System Integration: Create and/or integrate with digital tools that deploy and track the system, data, and usage; confirm that new tech deployments are context aware and built for future integration.

Other Direct Costs

Warehouse/Office: Lease, utilities, repairs, furniture and equipment, security, tools, and fixtures.

Network and Communications: Phone, internet, software, data retention (either on-premises or cloud).

Energy Costs: Grid electricity, solar panels, battery life cycle analysis and replacement (Figure 4.5).

Insurance/Bonding: Standard insurance includes property, worker's compensation, cyber, terrorism, and professional. Standard bonding includes construction and performance. Insurance/bonding costs and acquisition can be a huge barrier for smaller companies, especially small and local firms which can create challenges when recruiting DBE/ SLBE/DVE firms. Given that most federally funded grants require participation of these disadvantaged

firms, consider ways to create carve-outs to apply these requirements in a targeted way, rather than an umbrella that captures each sub-contracting entity.

Discretionary: Transportation costs, business meals, meeting expenses, standard food/beverage, team building/celebratory expenses.

Contingency: A minimum 10% contingency of all non-employee operating costs is highly recommended.

4.6.2 Operational Models

A mobility hub network can be managed through different business models, each affording their own advantages and disadvantages:

Concessionaire Model

Concessionaire assumes control over the mobility infrastructure in exchange for a monetization opportunity such as Out-of-Home (OOH) advertising, or a featured business. These models are often no-cost or revenue-split models, whereby the concessionaire provides a share of revenues back to the public agency. Because of the expectation of the concessionaire to provide capital investments, these contracts are often very long-term, i.e., 10-year with 10-year renewal options.

Contractor Model

Contractor is under operations contract to deliver a specific set of services. These are often cost-plus contracts, with defined profit percentages generally as a markup to staffing expenses. Because these contracts generally require new hires and large investments in time for onboarding, these contracts are generally mid-term, i.e., 3-to-5-year contracts, often with a number of extensions, either optioned, or due to program needs.

Property Manager Model

Property managers generally have a less-defined set of deliverables but are more domain-specific. These sorts of contracts are more collaborative and open and are often arranged as a revenue-sharing model whereby property managers get a set fee plus commission on sales and/or achieving KPI goals. These contracts can have a short, guaranteed term with indefinite end dates, i.e., minimum 1–2-year terms.

CASE STUDY: Minneapolis Mobility Hub Pilot

In Minneapolis, a mobility hub pilot helped grow transit ridership, as well as ridership across other modes. The city developed its first pilot in 2019 and increased its number of hubs from four to roughly 25 locations in 2020. The project has required partnering with both other public and private entities, considering that the various right of ways could be owned by the city, the county, or the state while working with Lyft and Nice Ride has meant partnering with private companies. Looking to the future, the project is planning to collaborate with HourCar, a St. Paul-based non-profit carshare that is launching a one-way electric project next year.

Table 4.6: Operations Model Options

	Description	Pros	Cons	Insights
Concessionaire	• Defined responsibilities, time-period, and revenues	• More hands off from agencies- making it easier to find and engage partners • Easy to find representative examples and copy their successes	• Agencies lose control of their land, creating delays for planning initiatives to be accomplished • Private cooperation is based upon profitability mindset • KPIs and deliverables should be well defined and may create rigidity preventing program evolution	• Shifting priorities (as new technologies emerge, policies or priorities change) prior concessions may become limiting, holding cities/ agencies back from achieving their goals
Contractor	• Operations contractor, implementing a set SOW, generally through RFP process	• Agencies get the most control of the project	• Defined scope may limit flexibility, especially if federal funds are involved • Private cooperation is limited (generally) to named subcontractors • KPIs and deliverables should be well defined and may create rigidity preventing program evolution	• Particularly for long-range projects, program success depends on agency planning to anticipate the future. Contractor is disincentivized to accommodate changes in priority
Property Manager	• Property manager works under the direction of JPA board and can have a varying range of responsibilities based upon JPA discretion • Lead or facilitate JPA meetings- handle reports, administration, financing, data collection, outreach • Lead advisory boards or simply facilitate them • Select deck partners, make recommendations, or just vet them	• Works at the behest of its public entities – they can be hired and fired • Can be a lot quicker and agile compared to agencies • Financial incentives can be structured to align managers' interests with the public agency landowner	• Fewer examples within this industry to copy their successes and avoid their mistakes	• Can do a lot of the daily management, similar to a commercial real-estate property manager • Property manager can be hired in an RFP format OR via JPA decree

4.7 Evaluation and Monitoring

Monitoring and evaluation will build an evidence base of the benefits that can feed into future funding applications for wider implementation.

Creating a comprehensive performance measurement system will be key to monitor and evaluate the mobility hub network.

4.7.1 Performance Measures

Performance measures will help to track how the hubs perform against the Vision Statement and related goals. It will help OCTA gauge under which conditions mobility hubs are successful which will help stakeholder refine how to design, operate, and maintain their own Mobility Hubs. Regular monitoring is a key step in refining the hub network.

KPIs and Metrics

Develop a limited set of true key performance indicators (KPIs) and metrics to manage and monitor progress- to keep projects on track, deliver critical lessons, and improve the project as it operates. KPIs should be understood before your program launches to establish a baseline and be measured at various intervals to monitor progress. The metrics will measure the individual performance of each mobility hub as well as allow for comparison between hubs. This will allow adjustments to be made in the implementation and issues with a specific hub to be addressed.

The developed KPIs will document progress toward an intended result and are intended to focus on the strategic and operational management of each mobility hub. The methods for collecting the data and measurements for determining progress on the KPIs could be intercept surveys, manual counts, census / assessor data, and online surveys, among others. This data may be available from public sources or may need to be collected on-site at hub locations.

Frameworks for KPIs and metrics needed to manage and monitor mobility hubs are categorized below, and presented in further details as part of Appendix F:

1. Mobility Performance or Usage

2. Climate Benefit

3. Equity and Inclusion

4. Optimal Experience

5. Community Value and Accessibility

6. Health and Safety

Reporting

The evaluation of the mobility hubs can be performed with both quantitative (e.g., via travel surveys, data from private partners) and qualitative (e.g., via community or stakeholder engagement) data. Ridership and volume data can also be collected through passive data platforms, e.g., Streetlight.

KPIs and other metrics should be collected and analyzed though a data platform /dashboard on a quarterly basis at a minimum, monthly for more responsiveness and iteration. Using a similar platform over time will also allow decision-makers analyze long term patterns.

At any moment, decision points can be set for when a hub location need to be reevaluated or redesign, e.g., transforming a virtual hub into a neighborhood hub.

4.7.2 Branding and Marketing

The plan for marketing and public outreach is guided by a user-based approach-- understanding the transportation demands and schedule of mobility hub customers. Outreach content will be tailored to the target audiences' sensibilities and familiarity first. The marketing and outreach plan can be broken down into three phases: information, implementation, and evaluation.

The information phase will involve outreach to introduce the locations, services, and benefits of the mobility hubs to potential users, demonstrating how they can have more flexibility in their transportation services.

During the implementation phase the team will also be gathering information and data from mobility hub users on their transportation needs – what mobility hub services they use most frequently and what services need to be improved.

The evaluation phase will analyze the information to make logistical, technological, and geographical adjustments and improvements to the mobility hubs. Guiding the implementation and evaluation of hubs with this user-based approach will verify that the hubs are designed and operating to best meet the transportation needs of the community. The transportation needs of users may vary according to the different mobility hub locations and evaluations should be conducted both at the project level and at specific hub locations

4.7.3 Data Management

Agency Data Feeds

The successful management of a mobility hub program requires the monitoring and management of information and data from transportation agencies, cities, and communities. Transportation data rely on information collected from navigation GPS systems in buses and railcars, and from applications installed on mobile devices – Location-Based Services (LBS). Data and information shared from transportation agencies and cities may include but are not limited to: real-time transportation travel data for buses, shuttles and other services; road closures for construction, events or demonstrations; and any other alterations or changes to the public right-of-way, either temporary or permanent.

Typically, this information is provided to the public via notifications or alerts, however the dissemination of this information is not always reliable or distributed early enough for the mobility hub to adapt or adjust its services. As a result, there is a need for coordination and information sharing between the transportation agencies, cities, and the mobility hub operators. Coordination between these groups will help to improve the mobility hub user interface (UI) and the user experience (UX) and improve long-term maintenance and operations planning.

Providing accurate, real-time transit and travel information at the hub and when using the transit system is an important aspect of a user's overall experience. Establishing timely data and information sharing between these groups will improve messaging, create fewer interruptions, and provide more seamless operation of transportation services.

User Information

In addition to real-time transportation and traffic data, mobility hubs also need user information and ridership data. Relevant information includes individual transportation user accounts, registrations, discount registrations, payment methods (including cash and contactless and flexible payments), and ticket verification services/locations.

The data when a transit rider boards a transit service and validates their fare payment is important for understanding transit demand. In addition to installing permanent ticket validating systems at transit stations and on buses, vendors are offering handheld validators to support mobile multi-modal transportation services.

User account information and ticket validation is usually collected and managed electronically by private sole-source vendors, that develop and maintain the online account system, ticket vending and validator machines. The data and information are then provided to the transportation agencies upon request or as part of a contract requirement.

Private vendors are not required and nor are they inclined, to share information with additional transportation operators, like mobility hubs. Private vendors are less inclined to share information with outside vendors and operators due to personal data security issues. Yet, it is in the best interest of the transit agency and the private vendor to share this information and data to improve service coordination. To avoid these issues and simplify the data sharing process it is necessary to establish staff points of contact, data sharing infrastructure and policy.

Location Digitization

Mobility hubs and local transportation agencies working together can provide seamless travel using multimodal transit services and in the mid-term a Mobility as a Service platform. In order for MaaS between service providers to be successful, transportation agencies need to be able to share their transport services and availability of their assets and services digitally in as close to real-time as possible. This requires coordination and standardization of the digital formats to access the data in a uniform way.

The Mobility Data Specification (MDS) is an open-source set of APIs, focused on shared mobility services such as dockless bikeshare, e-scooters, and carsharing. MDS acts as a data integrator to organize the collection and dissemination of data among transportation agencies, cities, and mobility hub operators to improve the management of transportation services and coordination of the public right-of-way.

Curb Data Specification (CDS) is another digital tool that helps cities and transit agencies map and manage dynamic curbs. CDS enables cities, transportation agencies, and mobility hub operators to better manage the use of limited curb space for loading, rideshare, and mobility services to optimize uses and accessibility of curb space.

4.8 Next steps

4.8.1 Implementation Plan Considerations

This Strategy outlines relevant planning and design principles and guidelines, and an analysis of locations with high potential for auto mode shift by better connecting people to regional transit and offering a wider range of first/last mile travel options. Delivery of the strategy is expected to enhance equitable mobility choice, reduce transportation emissions, and strengthen community engagement.

A flexible approach is proposed to mobility hub implementation that allows for iteration and evolution focused on a vision that allows new components, use-cases, and mobility options to work within it. Agile design principles- common in the inherently fast pace of software design- offer a useful guide for mobility hub planning and implementation with lessons learned and practical experiences leveraged to guide future planning and implementation efforts aligned to wider strategic transportation initiatives contained withing the LRTP.

An approach to develop an Implementation framework is described in Table 4.5.

Table 4.7: Implementation Framework Overview

Steps	Actions	Considerations for Land Fully Owned by OCTA	Considerations for Land Involving Third Parties
Conditions Analysis	Review relevant background material and a Vision and Framework for Mobility to confirm the vision and objectives of a hub.	Strategic alignment with OCTA's Transit Vision, LRTP goals and objectives as well as site specific ongoing and future development.	Strategic alignment with the site location plans and policies and specific local land use requirements as well as site specific ongoing and future development.
Stakeholder Engagement Plan	Develop a detailed engagement strategy to respond to the purpose and objectives of the hub. Stakeholder engagement and a communication plan should be developed and followed throughout the design and implementation process at different stages and for different audiences.	Stakeholder involvement will vary, depending on each Mobility Hub's objectives, operational model, governance, features, and location.	
Public Participation Plan	Develop a detailed engagement strategy and public participation plan. Community engagement is essential to secure buy-in from local communities leading to successful implementation and up-take.	Stakeholder and community engagement is led by OCTA Outreach tea. Also include marketing effort.	Stakeholder and community engagement is supported by OCTA staff, but might be led by third parties. Also include marketing effort.
Site Selection Assessment	Assess the local land use plan, land ownership and potential for the hub to be developed. Includes review of related local planning efforts, site visits to assess visibility of the area, safety and vandalism concerns, available space, and equity considerations.	Site selection and feasibility studies are led by OCTA.	Limited involvement from OCTA in the site selection process. OCTA may support and orient, but final decision is made by third parties.
Technical Assessment	Prepare a multimodal transport analysis (including parking) leading to the confirmation of key components for each location Develop a spatial planning and design analysis.Assess environmental impacts (air quality, noise, place and landscape, flood/ wildfire risks and heritage).	OCTA leads the preparation of the site selection technical assessment and design brief. Development design is led by OCTA.	Third parties oversee preparation of feasibility studies informed by the Orange County Mobility Hubs Strategy. OCTA participates as a stakeholder. Design development process is led by third parties.

Steps	Actions	Considerations for Land Fully Owned by OCTA	Considerations for Land Involving Third Parties
Governance	Determine a regional Mobility Hubs Governance structure to facilitate a consistent approach to implementation aligned to the Strategy Vision. Different scenarios might be considered with medium to limited level of control and involvement. OCTA is expected to take the lead on conversations to establish how developing mobility hubs may work for OCTA's owned land and how OCTA would like them to work for land owned by third parties. The project sponsor is expected to procure contractors to manage the installation of the hub's components. Different options are possible: • Separate bids for planning / design / build / operate • Separate bids for planning and design / build and operate • Single planning, design, build and operate contract	High level of control and involvement. OCTA form a special office with own staff with responsibility for intra-agency coordination and stakeholder collaboration. Delivery and operational requirements are determined on a site basis. OCTA is responsible for procurement and funding decision.	Based on the site selection, assess which of the four options for governance structure presented within the Strategy align best with the site situation. Depending on the selected governance option, responsibilities for procurement and funding are shared between the parties.
Business Case	Economic and financial analysis including capital and operational costs and opportunities for revenue generation to determine long term sustainability.	CAPEX is assumed by OCTA. Financial risks are assumed by OCTA.	CAPEX is assumed by third parties. Financial risks are mostly assumed by third parties.
Operation & Maintenance	Assess the agreement and contracts required for operation and maintenance of the hub. This evaluation will influence the necessary procurement routes. O&M tasks include, cleaning and maintenance of hub components; gardening contract; data sharing agreements; digital information checks; and maintenance as well as promotion.	OCTA is responsible for the construction and installation of hubs components. OPEX is assumed by OCTA.	OPEX is mostly assumed by third parties.
Evaluation	Identify metrics to be used for post-implementation monitoring and evaluation of the hub. Prepare evaluation report based on surveys and trip data analysis.	OCTA is responsible for monitoring and evaluation of the hub's performance.	OCTA works with third party partners to monitor and evaluate the hub performance.

Successful implementation requires a thoughtful, phased approach that allows for iteration. Stakeholder engagement is essential to secure buy-in from local communities leading to successful implementation and up-take. As part of this process, the enabling factors described in Chapter 1 should be considered alongside the strategic objectives defined in the LRTP to help identify sites for a series of mobility hub pilots:

Key factors are:

- Location
- Components
- Engaging with local communities and stakeholders
- Planning and implementation
- Marketing
- Monitoring & Evaluation

Confirmation of land availability, partnering opportunities and funding should also be reviewed to identify quick win opportunities

Monitoring and evaluation of the pilots will provide a more robust local evidence base of the benefits that can feed into future funding applications for wider implementation of mobility hubs.

Creating a comprehensive performance measurement system will be key to monitor how the network of mobility hubs perform against the Vision Statement and related goals. Regular monitoring is key to refining the mobility hub network. This helps gauge the conditions in which

mobility hubs are successful which will help refine how to design, operate and maintain the mobility hubs over time.

Using KPIs and metrics to assess the success of a mobility hub will also be key for scaling decision-making and deciding if pilots may scale up into permanent programs.

4.8.2 Suggested Next Steps

Suggested next steps for implementation and launch of mobility hubs in Orange County:

Enabling factors

- Decision on governance structure
- Decision on priority hub locations
- Preliminary steps
- Preliminary definition of location specific mobility requirements
- Site selection and feasibility assessment
- Funding considerations based on site selection and feasibility studies

Preliminary Design Process and Funding

- Design brief
- Agreement on level of funding available and investment strategy
- Agreement on site location components (based on capital cost breakdown)

Delivery Team

- Identification of a project lead and key parties required for decision making
- Preparation and agreement on KPIs and evaluation support

Engagement and Design Process

- Preparation of stakeholder and community engagement and co-design activities
- Concept and detailed design

Procurement Considerations

- Discussion and agreement on procurement options and procurement lead
- Discussion and agreement with existing service providers on changes/expansion of services
- Discussion and agreement on responsibilities and costs for ongoing maintenance of new elements/services
- Development of procurement specification for new elements/services (pilot)
- Procurement of new elements/services

Pilot Set Up

- Development of marketing and communications plan for the mobility hub(s)
- Installation of new elements/services. Launch of the mobility hub(s) pilot

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Author

steer

Project Team

OCTA

steer

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- Autodelen
- City of Bremen
- San Diego Association of Governments
- Translink

A Glossary of Terms

Glossary of Key Terms

ADA: American with Disabilities Act

API: Application Programming Interface

BID: Business Improvement District, a defined area subject to an additional tax that funds projects within the district's boundaries. BIDs may also take over certain city obligations within their boundaries, such as parking allocations, and receive a share of city tax revenues derived from within their boundaries.

Bikesharing: Provides users with on-demand access to bicycles at a variety of pick-up and drop-off locations for one-way (point-to-point) or roundtrip travel. Bikesharing fleets are commonly deployed in a network within a metropolitan region, city, neighborhood, employment center, and/or university campus

BRT: Bus Rapid Transit

Business model: Methods of commercial transactions used, such as services directly to consumers (SAE International)

Carsharing: Offers members access to vehicles by joining an organization that provides and maintains a fleet of cars and/or light trucks. These vehicles may be located within neighborhoods, at public transit stations, employment centers, universities, etc. The carsharing organization typically provides insurance, gasoline/electric vehicle charging, parking, and maintenance. Members who join a carsharing organization typically pay a fee each time they use a vehicle

CDS: Curb Data Specification, which creates universal standards for digitizing the curb, in order to set regulations, measure activity, and develop policies. An offshoot of Mobility Data Specification (MDS), both are managed by OMF.

CMF: Open Mobility Foundation, a city-governed, public-private partnership for open-source, vendor-neutral, privacy-forward and sustainable urban mobility data tools. Open-source tools like MDS and CDS are governed by OMF.

Curbside management: Curbside management relates to management of vehicles stopping adjacent to the curb, such as for parking or loading purposes. Curbside management is typically implemented in areas with high demand for use of the curb such as outside urban train stations or in downtown commercial zones.

EV: Electric Vehicle

GHG: Greenhouse Gas

GTFS: General Transit Feed Specification

JPB: Joint Power Board

LADOT: Los Angeles Department of Transportation

LRTP: Long-Range Transportation Plan

LEV: Lightweight electric vehicle, loosely defined as a motorized electric vehicle ranging from scooter-sized to anything less than a standard passenger vehicle.

MaaS: Mobility-as-a-Service

Microtransit: Is a privately or publicly operated, technology-enabled transit service that typically uses multi-passenger/pooled shuttles or vans to provide on-demand or fixed-schedule services with either dynamic or fixed routing.

MOU: Memorandum of Understanding, a document describing the broad outlines of an agreement that two or more parties have reached. Generally non-binding documents.

MDS: Mobility Data Specification, which aims to create universal data standards for private and public commercial vehicles to help cities better manage their public right-of-way. Started by LADOT and handed over to OMF.

MPO: Metropolitan Planning Organization, a federally-mandated and federally-funded policy group made up of local cities and transit authorities.

MVP: Minimum Viable Product, a product with enough features to attract early-adopter customers in order to validate the concept.

MPAH: Master Plan of Arterial Highway

OC: Orange County

OCCOG: Orange County Council of Governments

OCTA: Orange County Transportation Authority

OCTAM: Orange County Transportation Analysis Model

OMF: The Open Mobility Foundation, an open-source foundation that creates a governance structure around open-source mobility tools, beginning with a focus on the Mobility Data Specification (MDS).

Operational Models: Models that describe the limitations of a vehicle or equipment pick-up and drop-off locations (SAE International)

Overlay Zone: Overlay zoning districts, applied where special circumstances justify the modification of base zoning regulations to achieve special land use and/or design objectives.

P&R: Park and Ride

PTO: Paid Time Off

PUDO: Pick-Up / Drop-Off, an app-based ride-hailing service, i.e. Uber and Lyft

RFI: Requests for Information

RFP: Requests for Proposal

Ridesharing: (Also known as carpooling and vanpooling) is defined as the formal or informal sharing of rides between drivers and passengers with similar origin-destination pairings.

Ridesourcing: (Also known as ridehailing or TNC) prearranged and on-demand transportation services in which drivers and passengers connect via digital platforms. Drivers are paid for services with tariffs typically set by the platform operator, examples inlcude Lyft and UBER.

ROW: Right-of-Way, a legal right to pass along a specific route (such as sidewalk or street) unhindered. Public ROW includes both public and privately owned land.

SANDAG: San Diego's Regional Planning Agency

SCAG: Southern California Association of Governments

SIP: Strategic Implementation Plan, a document that defines and details a project strategy. SIPs can list resources, roles, requirements, assumptions, outcomes, and budget.

Shared Mobility: Shared mobility includes shared vehicle services such as bike share and car share, and shared rides such as rideshare or on demand transport such as microtransit. Shared mobility services offer a range of flexible, on-demand services that complement existing public transit and taxis.

Shared streets: Streets that are purposefully designed to prioritize pedestrian and non-motorized traffic, such as bicycles.

Shared Micromobility: Shared micromobility is broadly defined as shared access to bikes/e-bikes, scooters, e-scooters or other light/low-speed modes. It is anticipated that a variety of new vehicle types and designs will emerge in the future. In their shared form, shared micromobility programs have brought flexibility, choice and more sustainable travel options to people in many cities, but not without challenges regarding use of public space, engagement with local authorities, transit agencies and concerns regarding safety.

SOV: Single occupancy vehicle, a privately operated vehicle (generally car or truck) whose only occupant is the driver.

TAZ: Transportation Analysis Zones

TDM: Transportation / Traffic / Travel Demand Management, application of strategies and policies to reduce travel demand and/or disperse travel across a broader swath of land.

TMA: Transportation Management Association

TNC: Transportation Network Company, entity that offer prearranged rides or rentals for a fee, generally utilizing an app and a disbursed network of drivers and/or vehicles.

TOS: Task Order Submission, which eventually leads to a task order contract, which allows public agencies greater flexibility in final deliverables such as quantities and pricing.

Transportation system: Refers to both infrastructure that support movement of people and goods as well as services that operate within it.

Vision Zero: An international road traffic safety initiative aimed at eliminating fatalities and serious injuries on roads, with an emphasis on reducing vehicle-to-pedestrian collisions.

VMT: Vehicle miles traveled (VMT)

B References and Photo Credits

Overview

This appendix provides reference and links for studies, key documents, or case study projects referenced in the report.

Background Review

- OC Transit Vision
- Transit-Supportive Design Guidelines
- Complete Streets Initiative Design Handbook
- Active Transportation Plan
- Transit Centers: Modernization and Parking Management Study
- Master Plan of Arterial Highways (MPAH)
- Orange County 2022 Long-Term Transportation Plan

Planning Mobility Hubs

- The Mobility Data Specification (MDS) [1] [2]
- OC Complete Streets Handbook
- OCTA Transit Supportive Design Guidelines

Delivery Considerations

- Caltrans Sustainable Transportation Planning Grant Program FY 2021-22
- Transformative Climate Communities Program, FY 2018-2019
- Metrolinx's Business Case Guidance

Report Case Studies

- Berlin's Jelbi Stations
- Rural/Semi-Rural Mobility Hubs in West Lothian, Scotland
- San Francisco Caltrain Mobility Hub
- Los Angeles Metro Office of Extraordinary Innovation
- Orange County Power Authority JPA
- Irvine Spectrum TMA
- The South Los Angeles Universal Basic Mobility Pilot Program
- LADOT Strategic Implementation Plan
- Oakland Slow Streets
- TransLink- Transitioning Into NEew Mobility, Future Curb Design
- LADOT Code the Curb
- Lyft becomes official rideshare partner of Disneyland
- Permitting approach through curbside management
- Pittsburgh Move PGH
- Minneapolis Mobility Hub Pilot

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C Case Studies

Overview

This appendix presents a summary of the literature review undertaken to:

- Develop understanding of the challenges and opportunities associated with Mobility Hubs;
- Identify parameters to support development of the siting criteria; and
- Explore operational and financial perspective as well as Mobility Hubs stakeholder ecosystem.

Steer and Tranzito reviewed the work undertaken around Mobility Hubs in 8 selected cities in North America and Europe including the following case studies:

Table 1 Selection of Use Cases

North American Case Studies

- Caltrain SF Mobility Hub, USA LADOT Mobility Hub @Wilshire Grand, USA
- SANDAG MH, USA
- Denver Mobility Hubs, USA
- Portland Mobility Hubs, USA
- TransLink transit-oriented communities, Canada

North American Case Studies

- Interreg North West Europe eHubs project
- A network of Mobility Hubs in Bremen, Germany
- Jelbi stations in Berlin, Germany

North American Case Studies

The review of the North American case studies includes the following locations:

- Caltrain SF Mobility Hub, USA
- LADOT Mobility Hub @Wilshire Grand, USA
- SANDAG MH, USA
- Portland Mobility Hubs
- Denver Mobility Hubs, USA
- TranLlink transit-oriented communities, Canada

Caltrain SF Mobility Hub

Figure 1. San Francisco Hub

Context and Problem Statement

Caltrain is a commuter rail line along the San Francisco Peninsula and Santa Clara Valley, connecting San Francisco, Palo Alto and San Jose. Caltrain SF Bike Station is a standalone building adjacent to the main San Francisco Station entryway. It has been in operation since 2008 and provides secure valet bike parking for privately owned bicycles. Construction of the building was funded through federal and local funds, with operating expenses funded through a combination of the city and local funds and offset by the revenues generated by a third-party operator Tranzito (operating as BikeHub) from bike repairs and retail.

With the growth of ridesharing and micromobility, the Bike Station has seen a decline in the daily number of bikes parked from its peak in 2015, resulting in under-utilized capacity in the exterior parking area and reduced revenues from bike repairs and retail. In short, its funding model was under pressure- and the program needed to find additional sources of revenue, either from increased public contribution, or external. Tranzito's efforts to expand from "Bike Station" to "Mobility Hub" provided opportunities for additional revenues that ran harmoniously with its established mission to increase Caltrain ridership, while mitigating the first/last mile impact.

Tranzito has operated the Caltrain SF Bike Station since 2013, originally as a bike parking station only, with an operations model that was envisioned to grow towards operational self-sufficiency. Rescoping the Caltrain SF Mobility Hub was a response to the explosion of micromobility- both private and shared – accessing the Caltrain SF Station. Bike Station staff filled the customer service gaps of bikeshare, shared scooters, e-moped, and even MegaBus – initially, on an informal basis. Tranzito's move to establish the Mobility Hub as an axis of intermodality was presented to Caltrain and SFMTA as a way to improve the user experience while providing alternative revenue potential to support its operating costs.

The staff also provide valet bike parking, customer service, marketing/outreach, and administrative functions such as janitorial and record-keeping as, while they are extremely busy during key commute hours of 7:00am- 10am and 4pm- 7:00pm, there is considerably lower foot-traffic at other times.

Implementation

Caltrain board approval was required to amend the Caltrain Bike Station contract to include management and rights to an exterior plot of land, recently decommissioned for use as a sidewalk in the Townsend Street renovation project. Caltrain then authorized Tranzito to pilot a micromobility valet and/or park & charge pilot program. The goal is to help SFMTA and Caltrain address new micromobility challenges such as clutter, asymmetric demand, and operations access to the station premises, while also providing additional sources of revenue for Caltrain Mobility Hub.

A successful pilot program is expected to demonstrate how a mobility hub can improve passenger access to the Caltrain Station while bringing additional operations revenue to the Caltrain Mobility Hub program. Shared Mobility operators were encouraged to propose revenue models based on price per square foot, cost-per-vehicle/day or month, or a combination of the two. If successful, this pilot program may be incorporated into a permanent aspect of a future management contract and demonstrate a model to be applied to other key transit hubs. While it is presently an 'opt-in' pilot with limited operator participants, the pilot could also demonstrate a model for the application of shared-mobility permit funds to remediate the inconveniences caused by shared mobility systems. Applying these permit fees to Mobility Hub operations would create a level playing field, ensuring smooth new-mobility access to high impact destinations, allocating equal access – and proportional expense – among mobility operators.

Starting November 2019, Tranzito directly solicited the four existing San Francisco permitted shared-mobility operators, and in February 2020, released a Solicitation for Proposals asking how operators would use the space/services available at the Mobility Hub. The proposal yielded two responses and the selection of Spin e-scooters. The proposal was to present an opportunity to operators and use the pilot project time as an evaluation period- and if the program could demonstrate public value – the idea would then be to explore ways to institutionalize these services. Spin proposed installing a Swiftmile scooter dock alongside the exterior wall of the Bike Station accessible to the public and contracting with Tranzito for staff support. Tranzito staff sweeps the station property for damaged or mis-parked scooters a few times a day, and provides a layer of direct, in-person customer service to e-scooter patrons. Staff tasks include re-parking improperly parked scooters, collecting low-battery scooters to charge stations, and alerting Spin to inoperable vehicles. The winning proposal included three distinct revenue stream models-- lease, operations support, and advertising fees.

- **Lease fees** cover e-scooter charging energy usage and leasing of exterior real-estate.
- **Operations fees** cover staff time, management time and coordination.
- **Advertising fees** are based upon a revenue-split from digital advertising panels on the exterior e-scooter docking station. This hasn't been implemented yet due to challenges with OOH advertising limitations but is proposed for the future

Tranzito also formed a secondary partnership with FlixBus, a private bus shuttle service operating on Townsend St, to provide customer service and act as a cash ticket vendor for FlixBus' regional bus service. These two partnerships, combined with existing bike parking services, form the basis of the Caltrain SF Mobility Hub pilot.

Impact

Caltrain SF Mobility Hub officially opened on July 6, 2020, which also marked the re-opening of the facility since its temporary closure due to the COVID-19 pandemic in March 2020.

- Traffic Impacts are still pending, given the slow recovery of both San Francisco pedestrian counts and Caltrain ridership counts (both are currently at 20%-30% of normal)

- Full Pedestrian Safety Impacts are also still pending, but sidewalk clutter is noticeably decreased due to the presence of docks and daily sweeps of mis-placed and inoperable Spin scooters

- Revenue Impacts have been positive from the beginning; Spin paid for all capital and start-up expenses, and monthly payments to Tranzito have helped offset the revenue decline that resulted from the COVID-19 pandemic. Flixbus ticket sales have been low, but ridership in 2020 - 2021 isn't a viable baseline. Further evaluation is necessary

Next Steps

- Pending more complete results to Traffic Impacts, Pedestrian Safety Impacts, Revenue Impacts, and Ridership Impacts within six months after resumption to normality.

- Will consider digital advertising as an additional pilot feature

LADOT Mobility Hub @Wilshire Grand

Figure 2. LADOT Hub

Context and Problem Statement

The Los Angeles Department of Transportation, (LADOT) oversees transportation planning, design, construction, maintenance, and operations of various assets including the second largest fleet of buses and microtransit vehicles operating in the city.

LADOT, via federal funds, will begin a 3-year pilot program of a network of 97 mobility hubs anticipated to commence in early 2022. This pilot program aims to help low-income residents connect with new mobility, ushering in a new multimodal vision for Los Angeles County. It is sponsored by LADOT, in partnership with LA Metro and the cities of Los Angeles and Long Beach[1].

The key elements of the pilot program include:

- Placemaking and wayfinding
- A mobility app and payment layer
- Secure parking for micromobility
- Microtransit service, offering on-demand service between hub locations

Supportive elements are to be evaluated during the pilot and may include:

- Interactive kiosks
- Charging docks for shared fleets
- Self-repair stations
- Shared Use Mobility (SUM) Zones, designating curb space for ridesharing, on-demand delivery, and package delivery vehicles
- Shared electric vehicles such as cargo e-bikes, scooters, or even carshare
- Staff support

To gain further insights before initiating the pilot program, LADOT built the first location: a "Primary Hub" at Wilshire Grand Center as a pre-pilot. WGC, at 1,100 feet is the tallest building west of the Mississippi, positioned at the heart of Downtown LA, and just footsteps away from Metro Rail's busiest station[2], 7th / Metro Center.

LADOT Mobility Hub @Wilshire is expected to be the first of 13 Primary Hubs adjacent to 13 Metro Rail stations located in Downtown LA, Hollywood, and the City of Long Beach. 85 Satellite Hubs will be sited within a one-mile radius of a Primary Hub.

1. LADOT- The Makings of a Mobility Hub- Tranzito

2. Consult the Data here

The 3-year pilot is intended to:

- **Define** mobility hubs in Los Angeles, establish siting criteria and list of elements, establish 97 viable locations

- Create **placemaking** for 97 mobility hubs through signage, digital integrations, and colocation of other mobility assets like bike parking, scooter docks, smart loading zones, etc

- **Maintain and operate** mobility hub locations and a related microtransit service, offering on-demand rides between mobility hubs during off-peak hours. This will launch as a free service, supported by a JARC grant targeting low-income access to jobs and education centers

- Build and manage a **digital application** built with Spare Microtransit, offering multimodal trip planning, booking of microtransit service, and a payments integration element with third-party mobility operators

- Develop and execute a long-term **self-sustaining model** with revenue-generating ventures to expand the network

Implementation

In 2018, LADOT leveraged their streamlined Task Order solicitation from pre-approved firms to build and operate the Wilshire Grand mobility hub for one year. LADOT selected Fehr & Peers, who retained administration and reports, subcontracting with Tranzito to construct and operate access-control kiosk, security monitoring, bike parking and repair infrastructure, public access membership and registration, outreach/promotions, customer service, and ongoing staffing.

LADOT assigned a Project Manager to directly work with the contract team through:

- Numerous start-up meetings to establish project details and project parameters

- Weekly check-in meetings to respond to updates and review tasks

- Shared tracking document to monitor task list, meeting summaries, project Gantt chart, and monthly invoices.

Setup of the location proved difficult, as the physical real-estate was delivered without any improvements. LADOT officially has a two-year no-payment lease of the ground-level and street-facing room, which it secured in exchange for granting the Wilshire Grand a construction variance. However, neither the lease agreement or variance agreement stipulated construction details of necessary elements, such as: power and data provisioned into the suite, door or latch wired for automated entry, and power and data connections to an external access control kiosk. The team overcame these challenges by reallocating staffing and operations budgets to fund construction and prepare the hub for secure public access including:

- Installing a submeter, bringing data and power from the building's main control room into a room-specific control panel

- Modifying existing door and installing a controllable mag-lock for automated entry

- Bringing power and data from the interior of the room to its exterior and installing an access kiosk

- Installing interior security monitoring and a charge station to support electric vehicle/micromobility charging

Since LADOT decided to postpone the opening, remaining marketing funds were also reallocated to produce two promotional videos optimized for both web content and social media.

Impact

The Mobility Hub @Wilshire Grand is now fully operational (opening date TBD). What began as a bare room is now equipped with the necessary improvements for a secure public-access room supporting bike parking, micromobility charging, self-help bike repairs, personal trip planning, and real-time transit departures.

Next Steps

LADOT has communicated that they intend to wait for more details on the Integrated Mobility Hubs pilot program before announcing the opening of the Wilshire Grand Mobility Hub.

Figure 3. Mobility hub

Figure 4. Mobility hub: before and after pictures

Before:

After:

Source: Tranzito

SANDAG Mobility Hubs

Context and Problem Statement

The approach for developing a mobility hubs strategy was first developed through the 5 Big Moves vision back in April 2019. At that time, the 5 Big Moves were high-level concepts to address congestion, meet SANDAG's regulatory requirements, and take advantage of new technology and mobility services. The vision provided a framework for the 2021 Regional Plan. The 2021 Regional Plan deployed the vision for Mobility hubs.

The objectives for the agency were for Mobility Hubs to help:

- Increase transit ridership by providing first/last mile connection at transit stop
- Neighborhood congestion relief: nearly half of all trips in the San Diego region are three miles or less. Mobility Hubs are key to reducing reliance on personal cars for these shorter neighborhood trips
- Thriving local economy: making it safer for people to walk, bike, or scoot to transit and other Mobility Hub destinations to help boost local retail sales
- Reduced air pollution thanks to electrifying shared vehicle fleets and supplying convenient charging stations can help improve air quality.
- Promote equity: automated vehicle fleets can help seniors and people with disabilities achieve mobility independence

The 2021 Regional Plan includes a network of "right-sized" Mobility Hubs near major residential, job, and activity centres. The proposed network identified 30 Mobility Hubs based on land use and employment characteristics, travel patterns, and demographics.

Implementation

SANDAG defines Mobility Hubs as "places of connectivity where different travel options – walking, biking, transit, and shared mobility – come together. They provide an integrated suite of mobility services, amenities, and supporting technologies to better connect high-frequency transit to an individual's origin of destination." A mobility hub can span one, two, or even a few miles to provide on-demand travel choice for short trips around a community.

A network of "right-sized" Mobility Hubs has been proposed, all in close proximity to major residential and job centres. The primary objective is to enhance connections to and from existing and new high-speed, high-frequency services. Alongside improved connectivity to multiple modes, Mobility Hubs are planned to offer several smart roadside features such as wireless electric vehicle charging, smart parking, and flexibly managed kerb space.

The Regional Mobility Hub Strategy has identified eight prototype sites within the San Diego region to show how mobility hub features should be tailored to different communities.

SANDAG is responsible of overseeing the vision, and subsequently creating partnerships with cities, developers and employers to support the development of the prototypes. They have also recently started working with communities and stakeholders to ensure the prototype will meet the need of the communities.

The expectation is for those prototypes to be partially funded by grants at the regional and federal levels, parking revenues at the city level and the agency is currently exploring new ways of funding (e.g. fare management, PPP, etc.). The process and path of deployment of those eight hubs remain flexible depending on the funding stream and willingness of the partners.

Impact

SANDAG is now starting the pilot phase and is focusing on collecting qualitative data to understand local needs (which was an emphasis of the planning process).

Next steps

SANDAG received funding from MTS to start the initial design of the 8th Street Trolley Station Mobility Hub. They have started the stakeholder and community outreach. The project aims at prioritizing equitable transportation at a station that boards nearly 12,000 daily passengers from the South residents and Mexico.

Colorado Department of Transportation Mobility Hubs Program

Context and Problem Statement

Colorado has experienced significant population growth over the past decade that has led to increased congestion along the state's major highways and a strain on the current transportation infrastructure system. In 2019, the Colorado Department of Transportation (CDOT)'s Division of Transit and Rail (DTR) made the policy decision to prioritize SB 17-267 funds for the development of mobility hubs across the state to relieve congestion and enhance multimodal connectivity in the region.[3] CDOT defines mobility hubs as "focal points in the transportation network that seamlessly integrates different types of modes of transportation, multimodal supportive infrastructure, and place-making strategies to create activity centers that maximize first- and last-mile connectivity."[4] The goals for these mobility hubs are as follows:

- Increase transit ridership and multimodal options

- Increase safety, travel time, reliability, economic vitality, and air quality

- Decrease the number of vehicle miles travelled by Colorado residents

- Decrease or mitigate air pollution across the state

- Decrease or mitigate growing congestion on corridors throughout the state

Projects that are funded through SB 17-267, including mobility hubs, are subjected to evaluation and approval by the Transportation Commission of Colorado. In its "Mobility Hub Handbook," DTR developed a two-step approach to identify locations and levels of investments for mobility hubs. The table below shows the location evaluation metrics used by DTR to determine location.

Once DTR determined locations, they developed typologies to determine the scale and level of investment for a mobility hub, as well as the amenities recommended for each type of mobility hub.

Table 2. Mobility Hub Location Evaluation Metrics

Criteria	Metric
Distance from Nearest Mobility Hub	Miles from the nearest mobility hub(s); Recommended 10 mile spacing
Transit Operations	Accommodate a center median transit stop Streamlined operations and routing Efficient transit travel times Ability to utilize managed lanes
Vision and Goals	Alignment with project vision and goals
Site Constraints	Site accessibility and right-of-way availability Topography and terrain Presence of other barriers Space availability
Travel Patterns	Average daily traffic volumes Existing transit ridership (boardings and alightings)
Connectivity	Miles of existing and planned sidewalk Miles of existing and planned bicycle facilities Miles of existing and planned trails Connections to local transit Front Range Passenger Rail
Community Support	Political support Stakeholder support
Development and Land Use Characteristics	Existing adjacent supporting land uses Compatible with local land use zoning Ability to promote and implement Transit Oriented Development Planned supporting development is underway

3. Consult the Handbook here

4. Consult the Mobility Hub Memorandum here

Table 3: Mobility Hub Characteristics, by Type

Type I: Larkspur

- Transit Activity: Low # of boardings and alightings
- Land Use Characteristics: Low residential/ employment density
- Population Demographics: Low percentage of seniors, households living below poverty level, and zero-vehicle households
- Level of Amenities: **Low**

Type II: Berthoud

- Transit Activity: Medium # of boardings and alightings
- Land Use Characteristics: Low to medium residential/employment density
- Population Demographics: Moderate percentage of seniors, households living below poverty level, and zero-vehicle households
- Level of Amenities: **Medium**

Type II: Centerra Loveland

- Transit Activity: High   # of boardings and alightings
- Land Use Characteristics: Medium to high residential/employment density
- Population Demographics: High percentage of seniors, households living below poverty level, and zero-vehicle households
- Level of Amenities: **High**

5. More information here

6. Consult the I-25 Resource here

The Handbook also has a section on mobility hub design guidelines, which are meant to be "advisory in nature." These include design guidelines for pedestrian features, bicycle features, traditional station amenities, multimodal connectivity, mixed use/TOD in cooperation with local government, ADA compliant infrastructure, as well as green energy/smart city technology/intelligent transportation systems.

Implementation

CDOT has leveraged many sources of funding to implement these mobility hubs. In addition to the SB 17-267 funds, CDOT was able to leverage 2016 TIGER (Transportation Investment Generating Economic Recovery) grant funding to fund roadway and mobility hub improvements for I-25 Express Lanes Project, Segments 7 and 8. Most recently, Colorado has received federal coronavirus stimulus money, which has gone to the construction of the $6 million Berthoud Mobility Hub.[5]

Figure 5: Illustration of the center-load Bustang stop in the middle of I-25, looking north

Impact

Currently, four mobility hubs already exist: Fort Collins Downtown Mobility Hub, Denver Union Station, Colorado Boulevard and Pueblo Downtown Transit Center. For example, the Fort Collins Downtown Mobility Hub has a full service customer service counter, restrooms, an indoor waiting area, bus shelters, bike racks, and a parking facility.

Next steps

Currently, other mobility hubs are under construction, going through the planning and design process, or have not yet started. Colorado is also expecting more funds to come from President Joe Biden's American Rescue Plan, which Congress passed in March. The Colorado Transportation Commission also recently approved $238 million in transportation funding, some of which will help complete the mobility hubs along the I-25 corridor.[6]

Figure 6: Downtown Transit Center, Fort Collins

Portland Mobility Hubs

Context and Problem Statement

Rapid changes in technology and travel choices as well as the growing population in Portland raised the profile of mobility hubs, suggesting that they may be an important tool for the future of transportation. The City commissioned developed a Toolkit for mobility hubs that will guide planning and implementation of mobility hub typologies.

The current trends analysed by PBOT suggest that mobility hubs could help the city achieve the following objectives:

- Making travel choices more reliable and easier for people
- Expanding coverage of transportation services, especially when transit service is not available
- Managing private mobility services by applying curb side management, attracting new mobility services to transit stations, creating centralized and convenient locations for accessing social equity programs of private mobility providers and offering lower carbon and shared modes to the passengers

The project included an assessment of typical contexts in the City of Portland as well as recommendations for design and programming elements.[7]

Implementation

The document suggests a five-step approach to siting, planning and eventually implementing the mobility hubs.

7. Consult the Report here

- A suitability analysis mapping the factors that influence transportation choice, including an Equity Analysis, to determine areas of the City most suited for clustering transportation choices
- A prioritization analysis establishing criteria to further narrow areas of suitability based on alignment with City goals
- A mobility hub typology that confirms context of prioritized areas and recommends mobility hub type and scale to serve the context
- A feasibility analysis evaluating feasibility of implementing mobility hubs within prioritized areas
- A site & design programming concept that fits within the selected site and reflects the appropriate mobility hub type

Impact

While no mobility hubs have yet been created, the Typology Study does point out that a mobility hub already exists. The South Waterfront Lower Tram Terminal, planned more than two decades ago and implemented in phases, is cited as a mobility hub that fits the modern definition of one. It has public transit as part of a suite of services (aerial tram, transit stops, biketown station, drop off zones), places to gather, a high density of employment and services, wide sidewalks, curb extensions, bike parking options, and curb protected bike facilities.

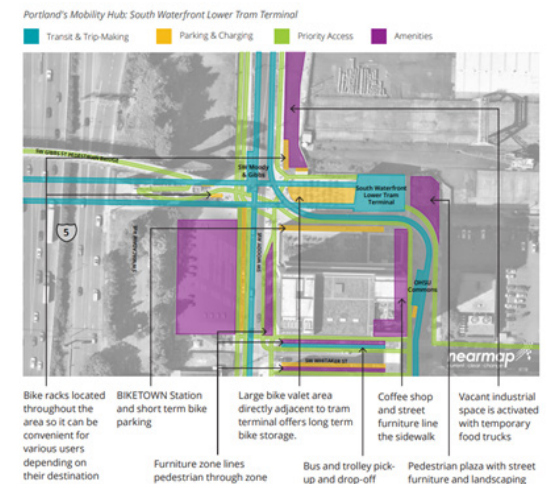## Next Steps

As this document was published in June 2020, at the height of the pandemic, it is unclear what next steps will be taken to materialize mobility hubs.

Figure 7: Mobility Hub Elements

Figure 8: South Waterfront Lower Tram Terminal

TransLink Transit-Oriented Communities

Context and Problem Statement

TransLink, as Greater Vancouver's regional transportation authority, operates an integrated regional network of transit services that includes automated rail rapid transit, commuter rail, passenger ferry, highway coach, bus, trolley bus, community shuttle and para-transit. Creating communities that are more "transit-oriented" is one of the key goals of most land use and transportation plans in Metro Vancouver and other communities around British Columbia. Other objectives are the following:

- **Increased livability:** Transit-oriented communities are intended to foster an improved urban environment and to be safe and enjoyable places to walk, cycle, and spend time outdoors for people of all ages and abilities

- **Improved sustainability:** primarily by supporting reduced energy consumption and fewer and shorter automobile trips. They also provide high quality transportation options for all community members, including those who cannot or do not drive, such as seniors, young people, and people with disabilities and/or low incomes.

- **Accessibility:** Transit-oriented communities help TransLink to provide high-quality transit services at a reasonable cost

- **Enhanced resiliency:** Transit-oriented communities are adaptable and retain their value as great places to live, work, and visit, even as the surrounding urban environment and the needs of resident's change

To support this, TransLink developed three comprehensive design guidelines that brought together all standards, findings and research alongside examples of best practices:

- The Transit Passenger Facility Guidelines (TPFDG) which is focused on transit facilities
- The Transit-Oriented Communities Guidelines (TOC) focused on connecting neighborhoods and communities with transit services
- Transit Service Guidelines (TSG) used to improve service quality for customers and evaluate proposed transit service improvements

The Guidelines are designed to share current thinking on how design of transit facilities and their surrounding context can best support walking, cycling, and transit.

Transit-Oriented Communities Design Guidelines (TOCDG)

The Transit-Oriented Communities Design Guidelines outline best practices and strategies for designing communities around frequent transit stops, stations, and exchanges that support walking, cycling, and transit. These guidelines serve as a resource for municipal planners, engineers, elected officials, developers, and others in achieving transit-oriented visions for their communities.

Transit-oriented communities are defined as "places that, by their design, allow people to drive less and walk, cycle, and take transit more"[8]. This means concentrating higher-density, mixed-use, pedestrian-friendly development within walking distance of frequent transit stops and stations, in tandem with measures to discourage unnecessary driving.

The six key attributes (the "6 Ds") were established that contribute to high levels of transit demand and productive transit service: destinations, distance, design, density, diversity, and demand management:

- Destinations: coordinate land use and transportation
- Distance: create a Well-Connected Street Network
- Design: create Places for People
- Diversity: concentrate and Intensify Activities Near Frequent Transit
- Diversity: encourage a Mix of Uses
- Demand Management: discourage Unnecessary Driving

It is recommended that all "6 Ds" are planned and implemented together at multiple levels of geography, including the regional, corridor, neighborhood and site scales.

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8. Transit-Oriented Communities | TransLink

Figure 9. The "6 Ds"
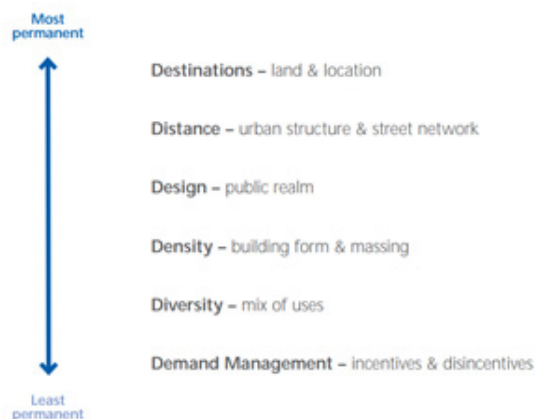
Source: Transit-Oriented Communities Design Guidelines

Transit Passenger Facility Design Guidelines

The Guideline is focused on transit passenger facilities and their immediate surroundings (i.e., within one block). It is acknowledged that the planning and design of transit facilities requires consideration of issues beyond the transit facility itself including community integration, land use, urban development and sense of place.

Transit passenger facilities are classified into three types:

- Stations
- Exchanges
- Stops

The unique characteristics of each facility should be considered through their design including the following elements:

- Transport modes
- Frequency of services
- Passenger demand
- Network role/urban context
- Specific location and site context

The guidelines provide direction for design in context and are presented as a structured, question-based thematic framework aimed to encourage creativity and innovation form planners and designers while ensuring consistent outcomes - enabling projects to be completed more consistently, quickly and cost-effectively.

The Design Framework Themes are: **Usability, Operations, Placemaking, Environment and Accountability** and the framework sits within a series of overarching design principles that include:

- **Design excellence and innovation:** 'High quality' planning and design should lead to outcomes which are both cost effective and affordable, where the cost of design is considered as part of the overall cost of a project and included in the whole life assessment of project cost-in-use.
- **Integration:** The most efficient planning and design results are achieved when the transit facility and its surrounding context are fully integrated, each adding value to the other

- **Inclusivity:** Development of transit facilities and places to provide for ease of access and use for all people
- **Modal balance:** Putting passengers and pedestrians first means prioritizing access and facilities based on the needs of different travel and access modes

Implementation

When the municipalities implement the frequent transit development areas (FTDAs), they use the guidelines to make sure the land uses are the highest and are transit oriented: "this is where 6 Ds are coming handy". For example, the TOCDG was used in Burke to back up and support the decision for area development. Another example is Coquitlam, where the city developed the city center area plan and the "6 Ds" were used within that plan to structure their land use plan and how it is related to the wider rapid transit investment. Coquitlam also developed its own transit oriented development strategy based of the TOCDG.

Both TransLink and Metro Vancouver are responsible for monitoring how the region is becoming more transit-oriented. An annual Transit Service Performance Review measures ridership, cost, utilization, and reliability of bus, SeaBus, SkyTrain, West Coast Express, and HandyDART. It informs how the regional transit network is managed.

Impact

The design guidelines have been an integral part of TransLink's facility planning. They have been used as a municipal liaison for how transit planning relates to community development and a resource for both internal and external stakeholders during facility upgrades, improvements and new construction.

The guidelines are also being used for the assessment of development proposals in relation to the land use supporting the transport facilities and review of planning applications. The 6 "ds" are being widely used and referenced. When area plans are updated the 6Ds are used, and these would also be applicable to mobility hub planning.

The Guideline currently suggests rapid transit stations and exchanges have an 800 m catchment area – there are plans to extend this to 1000m to reflect adoption of micromobility services.

The Transit-Oriented Communities Design Guidelines have also served as a valuable resource to local municipalities when conducting their own policy and development planning work.

European Case Studies

The review of the European case studies includes the following locations:

- Interreg North West Europe eHubs project (reviewed by Steer);
- A network of Mobility Hubs in Bremen, Germany (reviewed by Steer); and
- Jelbi stations in Berlin, Germany (reviewed by Steer).

Figure 10. eHub, Amsterdam

Source: Polis Network

9. Consult the Project here

Interreg North West Europe eHubs Project

Context and Problem Statement

Six European cities including Manchester, Arnhem-Nijmegen, Leuven and Amsterdam agreed to pilot electric Mobility Hubs[9] (eHubs) to facilitate transition to electric and shared mobility and reduce car automobile dependency between 2019 and 2022. The pilots are primarily funded by the European Union, with total estimated budget of €8.86m. eHUBS are defined as on-street locations that bring together e-bikes, e-cargo bikes, e-scooters and/or e-cars, offering users a wide range of options to experiment and use in various situations.

The project aims to create 92 eHubs over the period between 2019-2022 with more than 2,400 shared e-vehicles. Each hub may vary in size and components, and they might be located in major transport interchanges (such as stations) or residential areas. Different characteristics of the pilot cities will be evaluated such as population size and density; morphology; number of private cars per household and current modal split to identify the best locations for implementing the eHubs.

E-hubs will offer a range of shared electric mobility options such as e-bikes, e-scooters, e-cars, e-cargo bikes, etc. along with electric vehicle charging stations (with fast/rapid chargers), and parking/docking stations for e-micromobility vehicles. Three classification types have been proposed based on the function of a location within the local transportation network:

- **Interregional connections:** from these points there are a broad range of public transport connections (bus, tram, metro and/or local trains) for traveling between regions
- **Regional connections:** these locations include a mix of public transport connections (local trains and or different buses) to easily travel within a region
- **Local/neighborhood connections:** these locations include different types of shared mobility close to trip origins clusters (such as home locations), often referred to as first or last mile connections

Implementation

The 15-partner consortium, led by the City of Amsterdam, is composed of European cities, network organizations, shared e-mobility service providers, and universities[10]. The city of Amsterdam launched its first eHub in June 2019, with the aim to create up to 20 hubs by 2022, to discourage people from using private vehicles and make better use of on-street space (otherwise used for parking).

Every pilot city developed an operational plan for the implementation of eHubs in their urban contexts. These plans include number, size, location and type of electric shared mobility services that will be offered in cities.[11,12,13]

One of the main objectives of the program is to develop a methodology for the implementation of eHubs in cities, which will enable the creation of a blueprint to support other cities wishing to replicate the approach to eHubs development and implementation in the future. A general framework for the selection of locations for eHubs was developed supporting the planning of eHubs[14].

Impact

The summary report[15], January 2021, of the initial survey presents aggregate survey results of the questionnaire targeted at potential users of eHubs. Overall, respondents held positive attitudes towards eHubs and shared mobility, with the majority indicating that they would: enjoy trying out vehicles from an eHub (60%); be interested in using shared vehicles for work (44%) or non-work trips (60%); and that eHubs provide them with more flexibility (45%).

Amsterdam University is conducting evaluation and monitoring of the hubs and has published the pre-liminary findings report[16]. Based on the survey results the following recommendations were shared:

- Car owners are largely satisfied with their own car, so they automatically filter out messages about alternative travel modes (attentional bias) — as such, in communications, there is a need to address the attentional bias to reach car owners
- Finding: perceived usefulness is the most important determinant — as such, there is a need to emphasize in communications the benefits of (trying out) shared mobility and the hubs
- Increase the understanding of financial benefits of eHubs compared to a private car
- Emphasize practical advantages of long-term use of eHubs: unburdening of tasks related to car ownership, flexibility, vehicle that fits your needs
- Ensure that trying out shared mobility and hubs is a fun and pleasant experience

- Emphasize the green framing of eHubs to create positive associations
- Provide an environment that makes car use and car ownership less attractive, thereby changing cost-benefit analyses of eHubs vs own car

Further results from the survey in Amsterdam[17] revealed the following findings:

- Walk time from place of resident or destination is highly significant
- Travel time is not significant
- Travel cost is only significant for shared e-bike
- Public transport users are more likely to switch to eHubs compared to car users
- Parking search time and cost is highly significant
- Congestion-related variables (both frequency and duration) are non-significant

10. Smart Shared Green Mobility Hubs

11. Operational Plan Amstserdam

12. Operational Plan Leuven

13. Operational Plan Nijmegen

14. e-Hubs 21 Maps

15. Draft Report

16. e-Hubs Behaviour Change Perspective

17. Link to Survey

Rural Mobility Hubs in Bremen, Germany

Context and Problem Statement

The City of Bremen in Germany faced its congestion and parking problems head on in 2003, introducing a strategic transport policy to reduce car ownership and parking problems. At that time, many streets were used for parked cars, causing traffic congestion and access difficulties for service and emergency vehicles.

The City has been developing its Mobility Hub network since 2003 to support its transport policy and provide a toolbox to answers the more pressing challenges the city was facing. Mobility hubs are called mobil.punkts. The key objectives of the hubs are to provide an alternative to a private car, reduce car ownership, reclaim the street space for people and reduce emissions. For a place to be called a Mobility Hub in Bremen (mobil.punkt), it should include the following key elements:

- Car club;
- Safe places to lock the bikes;
- Accessibility and visibility to public;
- Safe environment; and
- Specific type of branding and marking on the streets.

Additional elements can include bays for taxis, recycling containers, etc.

There are various types of the Hubs developed in Bremen, which can be broadly classified in large and small hubs. A hub with four or more car club spaces is classed as a large hub with smaller hubs having one to three car club space.

In 2020 there were 10 large mobility hubs and 37 smaller mobility hubs, which are often located in residential areas.

10 Large Mobility Hubs

- At central locations
- 4-12 car sharing vehicles
- Some with roofs
- Nearby public transport stops
- Bicycle parking
- Taxis (at several locations)
- Bike sharing (currently free-floating model)
- Other services, e.g. recycling container

37 Smaller Mobility Hubs

- At decentralised locations
- 2-3 car sharing Bicycle parking

Source: Presentation at the Vianova Webinar #7- Managing Mobility Hubs, 05/06/2021

Figure 11. Branded Monolith Sign, Bremen

Sources: SHARE-North, UK Mobility Hub Guidance 2019/20, CoMoUK

Implementation

The Municipality of Bremen in Germany estimate that their program of developing mobility hubs across the city is currently taking 20% of one officer's time to manage the planning process. The whole process can take around 1-2 years.

The hubs are owned and operated by the public sector, which provides the funding for the hubs implementation. Commercial operators such as carsharing and bike share need to have a permit to use the hub, which can be obtained from the public sector. Currently, works are underway for a first hub which will be owned by a private sector company working in collaboration with the City of Bremen.

There is a contract with a local parking management agency, which maintains the hubs facilities. Normally users will contact the transport provider and then the provider will get in touch with the management agency if the problem has been reported. The transport provider is responsible for the quality/maintenance of vehicles etc. Carshare operators pay the monthly fee for the use of the hubs. The carshare operators are chosen through tendering process, in Bremen there is only one car club operator. Micromobility operators do not need to pay anything for the use of the hubs, as they already pay 50c per vehicle (both e-scooters and bike share) to the local authority through an umbrella agreement.

In terms of location selections, the following lessons learned[18] have been captured:

- Build around strong transit stops: "Transit is the cornerstone to creating a life where you don't need to depend on car ownership"
- Target areas with high parking pressure: "The willingness to give up private cars is higher when owning a car is a pain in the butt"
- Find areas with high level of cycling and walking where active transport choices are a reasonable alternative to a private car
- Get as close as possible to your users: "The hubs should be close to where people live, or to the buildings where they work."

The City engaged with the key stakeholders in Bremen and undertook public engagement with the following takeaways[19]:

- Open engagement showcasing the problem-solving approach: Bremen invited the local media to see the everyday issues caused by traffic and parking
- Clear communication of what is being delivered, why, were, when and how
- Focus on positive benefits of the hubs
- Importance of consistency in messages and communication
- Approach a wider range of stakeholders
- Use digital engagement platform alongside traditional ways of communication, use mock-ups and videos to show what a hub can be like
- Engage with the residents and businesses located nearby: Bremen sent letters explaining proposed hubs to every resident living in an affected neighborhood and residents were invited to discuss a proposed hub
- Approach various user groups and ages, including vulnerable and minority groups, older and younger people

Figure 12. Engagement with the local media to show access and parking challenges

Source: CoMoUK

The city understands the importance of branding and communication in encourage take up of the hubs, as such the following actions were undertaken:

- A clear brand with the logo was developed to be easy recognizable by the general public
- Locations of the hubs are carefully chosen to be highly visible
- A branded monolith sign is installed at each hub
- Public awareness is promoted by adverts on large roadside hoardings, street posters, adverts on public transport and at interchanges, in cinema video adverts and leaflets, featuring Udo – a character who shows the positive impact of shared mobility on lifestyle

18. Lessons on Mobility Hubs

19. Communications-Case-Study

This approach was successful and led to some neighborhoods even asking the council to install a hub in their area.

Impact

A study published in 2018 shows that on average each car club car in Bremen has replaced 16 private cars (seven vehicles no longer owned, and nine vehicles not purchased)[20]. The member surveys conducted revealed the following results:

- Car club cars at Mobility Hubs have contributed to people deciding not to purchase over 2,700 vehicles, in addition to the reduction of 2,300 privately owned cars. The kilometers travelled by car in a 'carsharing household' are more than 50% lower than the average household in Bremen

- Hubs often utilize space that would otherwise be needed for parking. This space is used for better access for people with disabilities, more pedestrian space and crossings and other visual enhancements

- The hubs have contributed to climate and air pollution targets by reducing the number of vehicles on roads, lowering car ownership rates among carsharing users, and supporting modal shift to environmentally friendly modes of transport

- Building mobility hubs in easy reach of homes has been attributed as a main factor in the success of the scheme: 60% of users cite this as a prime incentive to use the scheme. As a direct result of the impacts on car use and ownership, new housing developments are planned with fewer parking spaces than before 2003

Next Steps

The ultimate goal of the City Council is to have 100 mobility hubs and a hub at least every 300m, so if cars are booked out at the nearest hub, the next hub is an easy walk away. The City plans to introduce e-cargo bikes and implement designated parking spaces for micromobility.

20. UK Mobility Hub Guidance

Jelbi Stations in Berlin, Germany

Context

Jelbi stations have been implemented in Berlin, Germany across various locations in the city. Jelbi stations bring a number of services together including car sharing, bike sharing, moped sharing, e-scooter sharing, EV charging and stops for taxis and on-demand shuttles. The vehicles can be booked through the Jebi Ap, which is a MaaS platform and App implemented in Berlin by BVG (a local transport authority)[21].

The main objective of these stations is to use technology to promote the use of shared mobility and transit options- except the private car – to mitigate the increasing traffic congestion. By into one app the main modes of transportation accessible in the city (twelve different), the goal is also for the operator to recognize Berlin as the "world's largest mobility as a service city"[22].

There are two types of Jelbi: Jelbi stations (larger hubs) and Jelbi points (small hubs for all vehicles with just two wheels). There are 11 Jelbi stations and 11 Jelbi points operating in Berlin as of summer 2021.

The Jelbi development is supported by Berliner Verkehrsbetriebe (BVG), a main public transport company in Berlin, and is encouraged through the partnerships with shared mobility operators and other stakeholders.

Implementation

There are 11 Jelbi stations implemented across Berlin, all of the stations have similar identity with a branded information pillar and are painted in the same yellow and black colours.

Hub at Aral Station[23]

One of the hubs is implemented in partnership with Aral – a bp[24] brand which is Germany's fuel retail brand offering Aral service stations. This hub is an important step in bp's strategy to offer convenience and mobility solutions that support achievement of net zero by 2050. The hub is part of Aral's expansion of an ultra-fast charging network.

The hub is located in central Berlin and offers customers a comprehensive range of mobility options that go beyond those of a tractional fuel station comprising:

- A conventional Aral filling station with REWE To Go Shop
- A Swobbee battery changing outlet for e-bikes, cargo bikes and small vehicles
- Car sharing in partnership with Miles, Cambio and Greenwheels
- E-scooter sharing in partnership with Emmy
- Bike sharing in partnership with Nextbike
- Two Aral ultra-fast charging stations (EV charging)
- Connection to public transport (S-Bahn / U-Bahn / Bus)
- A DHL parcel connection facility

Figure 13. Jelbi station

Source: https://www.jelbi.de/en/jelbi-stations/
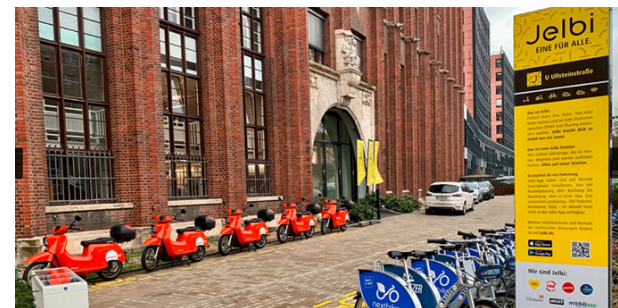
21. Jelbi – Stations

22. Berlin Mobility App

23 Aral Station

24 BP plc (official styling BP p.l.c., formerly The British Petroleum Company plc and BP Amoco plc) is a British multinational oil and gas company headquartered in London, England

Impact

The impact of the hubs is being assessed; no data is available to date.

Next Steps

The city of Berlin is planning to expand the network of the hubs depending on the success and uptake of already implemented hubs. An intention is to roll out Jelbi stations all over Berlin, from the city center to the suburbs, so that in the future customers can easily change to motor scooters, bicycles, e-scooters or shared cars at most S-Bahn and subway stations.

D Network Analysis Approach

Overview

This appendix outlines the approach and assumptions for the time-cost analysis done to estimate high-level potential mode shift and VMT reduction.

Approach

An off-model analysis using OCTAM was used to estimate number of trips using new mobility hub services and increased use of transit because of improved access in the mobility hub areas. The tool re-estimates mode share of each mode, with the addition of the new modes, and re-adjusts the trips based on the new mode shares. The tool applies the logit model to re-estimate mode share of each mode, with the addition of the new modes, and re-adjust the trips based on the new mode shares.

Figure 1. Analysis Flow

Table 1. Time/Cost Methodology Assumptions are outlined in the following table

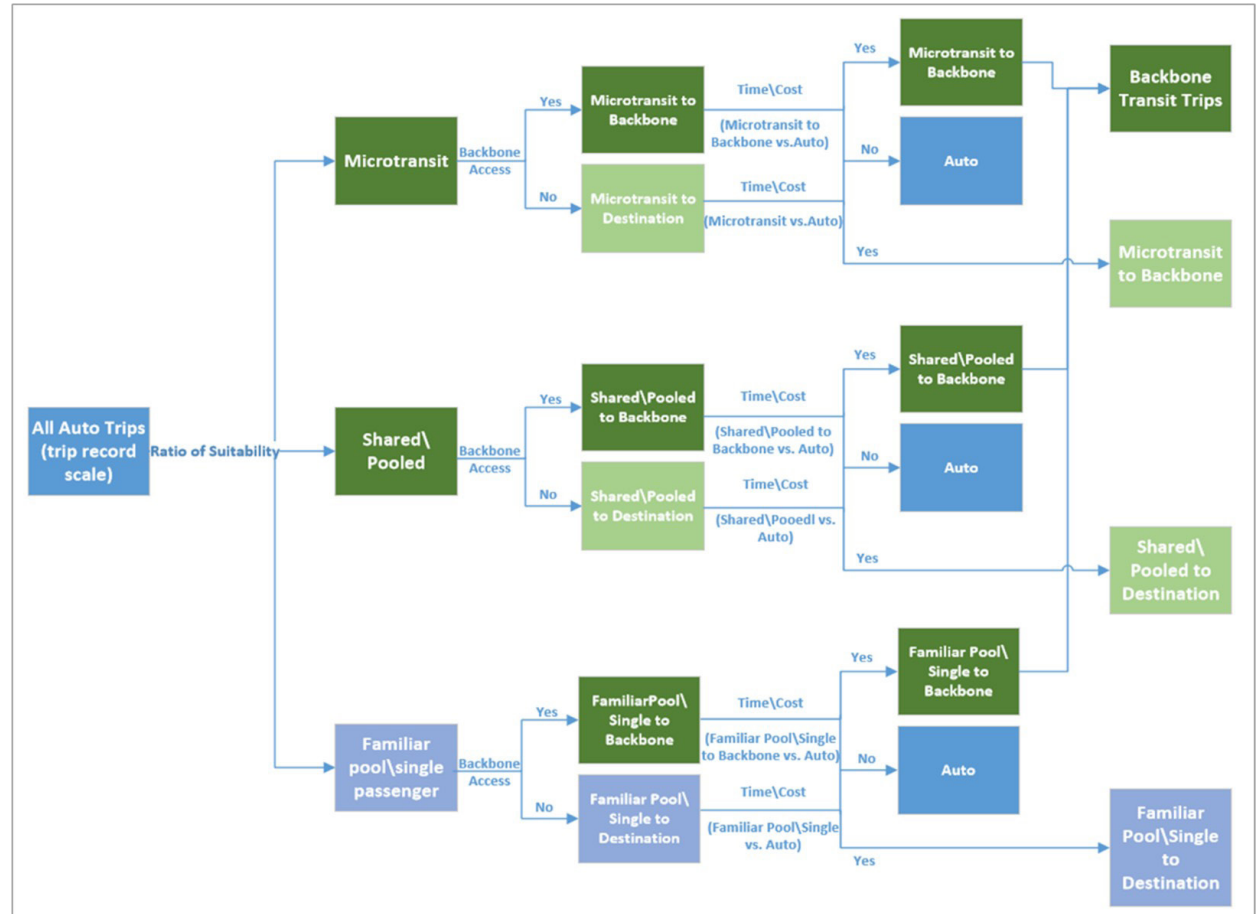| Mode	Cost Function	Variable	Data	Description	Unit
Auto	Uauto = cost + vot * time	cost	"TotalCost"	Cost of OD travel from OCTAM highway skim "TotalCost", including auto operating cost over distance, plus toll and parking cost if applies	$
		time	"[AB_PKTIME/ BA_PKTIME]"	Travel time of OD travel from OCTAM highway skim "[AB_PKTIME / BA_PKTIME]"	min
		vot	"AsnVOT"	Value of time- OCTAM parameter "Args.Table.ASN.AsnVOT.Value" = {{0.111, 0.33, 0.917, 0.222, 0.66, 1.833, 0.396, 1.175, 3.263}, {0.067,0.198,0.55 ,0.133,0.396,1.1,0.237,0.705,1.958}}	$/min
Micromobility: **both trip ends within the same service area**	1. As an independent Travel Mode: Umm = (fare_var_min * (dist/speed*60) + fare_fix) + vot * time_mult * (dist/ speed*60 + time_add) 2. As an Access/egress Mode: U = Umm + Utr dist/time: high skim data from/to TAZs that transit stops are located.	fare_var_ min	0.16	Variable cost- from SANDAG model	$/min
		fare_fix	0.81	Fixed cost- from SANDAG model	$
		speed	15	Speed- from SANDAG model	mph
		dist	"Length (Skim)"	Distance of OD travel from OCTAM highway skim "Length (Skim)"	mile
		time_mult	1	Multiplier of auto travel time (distance/speed*60)	
		time_add	1	rental time without any capacity constraint- from SANDAG model	min
		vot	0.203	Value of Time- from SANDAG model: $12.17/hr = $12.17/60/min) = $0.203/min	$/min
		max_dist	3	Maximum distance- from SANDAG model	mile
		max_dist_ acc	1	Maximum distance to access a transit stop- from SANDAG model	mile

Table 1. Time/Cost Methodology Assumptions are outlined in the following table

Mode	Cost Function	Variable	Data	Description	Unit
Microtransit: **both trip ends within the same service area**	1. As an independent Travel Mode: Umt = fare_fix + vot * time_mult * (dist/ speed*60 + time_add) 2. As an Access/egress Mode: U = Umt + Utr dist/time: high skim data from/to TAZs that transit stops are located.	fare_fix	1.01	Fixed cost- from SANDAG model ($0 variable cost)	$
		dist	"Length (Skim)"	Distance of OD travel from OCTAM highway skim "Length (Skim)"	mile
		speed	17	Speed- from SANDAG model	mph
		time_mult	1	Multiplier of travel time reference to auto distance (distance/speed*60)	
		time_add	4	Wait time- from SANDAG model (0 min access time)	min
		vot	"AsnVOT"	Value of time- OCTAM parameter "Args.Table.ASN.AsnVOT.Value" = {{0.111, 0.33, 0.917, 0.222, 0.66, 1.833, 0.396, 1.175, 3.263}, {0.067,0.198,0.55,0.133,0.396,1.1,0.237,0.705,1.958}}	$/min
		max_dist	3	Within the service area (Maximum distance- from SANDAG model)	miles
		max_dist_acc	3	Within the service area (Maximum distance to access a transit stop- from SANDAG model)	miles
TNC Shared: **at least one trip end within the pre-defined service area**	1. As an independent Travel Mode: Ushare = max(fare_var_mile * dist_mult * dist + fare_var_min * time_mult * time + fare_fix, fare_min) + vot * (time_mult * time + time_add) 2. As an Access/egress Mode: U = Ushare + Utr dist/time: high skim data from/to TAZs that transit stops are located.	fare_var_mile	0.36	Cost Per Mile- from SANDAG model	$/mile
		fare_var_min	0.06	Cost Per Minute- from SANDAG model	$/min
		fare_fix	2.31	Base Fare- from SANDAG model	$
		fare_min	2.43	Minimum cost- from SANDAG model	$
		dist	"Length (Skim)"	Distance of OD travel from OCTAM HOV2 highway skim "Length (Skim)"	mile
		dist_mult	1.1	Multiplier of 'dist'	
		time	"[AB_PKTIME/ BA_PKTIME]"	Travel time of OD travel from OCTAM HOV2 highway skim "[AB_PKTIME / BA_PKTIME]"	min
		time_mult	1.1	Multiplier of 'time'	
		time_add	7	Wait time- from SANDAG model	min
		vot	"AsnVOT"	Value of time- OCTAM parameter "Args.Table.ASN.AsnVOT.Value" = {{0.111, 0.33, 0.917, 0.222, 0.66, 1.833, 0.396, 1.175, 3.263}, {0.067,0.198,0.55,0.133,0.396,1.1,0.237,0.705,1.958}}	$/min

Table 1. Time/Cost Methodology Assumptions are outlined in the following table

Mode	Cost Function	Variable	Data	Description	Unit
TNC Single: **at least one trip end within the pre-defined service area**	1. As an independent Travel Mode: Usingle = max(fare_var_mile * dist + fare_var_min * time + fare_fix, fare_min) + vot * (time + time_add) 2. As an Access/egress Mode: U = Usingle + Utr dist/time: high skim data from/to TAZs that transit stops are located.	fare_var_mile	**1.08**	Cost Per Mile- from SANDAG model	$/mile
		fare_var_min	**0.19**	Cost Per Minute- from SANDAG model	$/min
		fare_fix	**2.8**	Base Fare- from SANDAG model	$
		fare_min	**5.84**	Minimum cost- from SANDAG model	$
		dist	**"Length (Skim)"**	Distance of OD travel from OCTAM HOV2 highway skim "Length (Skim)"	mile
		time	**"[AB_PKTIME/ BA_PKTIME]"**	Travel time of OD travel from OCTAM HOV2 highway skim "[AB_PKTIME / BA_PKTIME]"	min
		time_add	**5**	Wait time- from SANDAG model	min
		vot	**"AsnVOT"**	Value of time- OCTAM parameter "Args.Table.ASN.AsnVOT.Value" = {{0.111, 0.33, 0.917, 0.222, 0.66, 1.833, 0.396, 1.175, 3.263}, {0.067,0.198,0.55,0.133,0.396,1.1,0.237,0.705,1.958}}	$/min
Transit Submode	Utr = fare +vot * time	fare	**"Fare"**	Transit fare of OD travel from OCTAM transit skim "Fare"	$
		time	**IVTT + wait time + transfer time**	Travel time of OD travel from OCTAM transit skim IVTT, wait time, transfer penalty time	min
		vot	**"AsnVOT"**	Value of time- OCTAM parameter "Args.Table.ASN.AsnVOT.Value" = {{0.111, 0.33, 0.917, 0.222, 0.66, 1.833, 0.396, 1.175, 3.263}, {0.067,0.198,0.55,0.133,0.396,1.1,0.237,0.705,1.958}}	$/min

The time-cost analysis was applied to a series of 25 mobility hub services areas selected based on a spatial analysis of land use, demographic and mobility data as well as input from stakeholders and OCTA staff. Mobility hub service areas were selected based on a selection of transportation analysis zones (TAZs) within approximately 3 miles of the identified hub location. In many cases there is overlap between the service areas of each individual mobility hub. The analysis addresses this overlap by presenting overall results that present mode shift for all TAZs without double counting overlap. However, to better understand the potential benefits of individual mobility hubs, trips within a TAZ shared by two or more hubs will be reported for each associated hub. For this reason, aggregating the outputs for individual hubs would produce an overcount which is why the overall results should be used to express the potential benefits resulting from implementation of the complete regional mobility hub network.

E Mobility Components

Overview

This appendix outlines different mobility components, categorized into physical, digital and polity components. This section provides a long list of potential amenities that could be provided at Mobility Hubs in Orange County. Guidance on the selection of these components can be found in Chapter 3. These different components can also be used for soliciting community input on Mobility Hubs.

Table 1. Three pillars of Mobility Hubs throughs the components list

Components	Physical	Digital	Policy
Mobility Components- Existing			
Train station (Metrolink, Amtrak)	(all of the below)	(all of the below)	Land use, TOD policy, parking, ADA, regional interoperability, GHG, VMT targets
Bus exchange	Signage, shelters and other waiting amenities, curb marking, real-time-departure displays	Vehicle geolocation, GTFS sync, fare integration + digital wallet, transfer management	Parking, enforcement, outdoor advertising, ADA
Bus stop	Signage, shelters and other waiting amenities, curb marking	Vehicle geolocation, GTFS sync, fare integration + digital wallet, transfer management	Parking, enforcement, outdoor advertising, ADA
OC Street Car Station	Boarding island, signage, fare collection, traffic control devices, pedestrian safety improvements	Vehicle geolocation, GTFS sync, fare integration + digital wallet, transfer management, traffic control device integration	Private vehicle lane reduction, pedestrian safety / vision zero. intersection rights of way
BRT	Dedicated lanes, traffic light management, roadway marking, physical lane barriers	Vehicle geolocation, GTFS sync, fare integration + digital wallet, transfer management, traffic control device integration, bus lane enforcement	Private vehicle lane reduction, pedestrian safety / vision zero. intersection rights of way

Components	Physical	Digital	Policy
Mobility Components - Options			
Carsharing	Parking signs, electrical stub ups, charging kiosk if EV, parking bollard, in hi-density zones	Vehicle geolocation, app communication, registration and reservations, payments	Enforcement, regulations, permitting of vehicles and spaces, power distribution policies, power usage fees, maintenance and operations
OCFlex	Curb and roadway markings, street signs	Vehicle geolocation, GTFS sync, fare integration, digital wallet, transfer management	Land use, curb access, interagency transfer fare policy
I-Shuttle	Curb and roadway markings, street signs	Vehicle geolocation, GTFS sync, fare integration, digital wallet, transfer management	Land use, curb access, interagency transfer fare policy
Vanpool/Carpool	Pickup zone signage, parking zones	Incentive tracking, rider matching	Incentive programming, toll policy, HOV lanes
Park & Ride	Curb and roadway markings, street signs, wayfinding	Vehicle geolocation, app communication, registration and reservations, payments	Land use, parking enforcement
Rideshare/Pick-up Zone	Curb and roadway markings, street signs, wayfinding	CDS digital twin, vehicle sensing, API link to operators	TNC permitting, MDS/CDS, curb access and parking policy
Bikeshare/ Bike rental	Bike docks, parking zones	Vehicle geolocation, app communication, registration and reservations, payments	Enforcement, regulations, permitting of furniture, power distribution policies, power usage fees, maintenance and operations
E-scooter share	Scooter docks, parking zones	Vehicle geolocation, app communication, registration and reservations, payments	Enforcement, regulations, permitting of furniture, power distribution policies, power usage fees, maintenance and operations
Mobility-Related Components			
Secure bike storage/parking	Bike parking rooms & lockers, smart bike racks	ID verification, security monitoring, digital twin in CDS	Building/remodeling bike parking requirements, space allocation
Unsecured (short-stay) bike parking	Bike racks (various)	Digital twin in CDS	Building/remodeling bike parking requirements, space allocation
Bike equipment	Bike pumps, tools, repair stand	Digital twin in CDS	–
Wayfinding	Physical signs, digital signs, roadway markings, lighting design	Information feeds, customized information	–
Information pillar/ ticketing	Poles, screens, sensors	Information feeds, customized information	Accessibility and equity considerations, determining which agencies get access / priority, maintenance & operations
EV Charging	Electrical stub ups, charging kiosk, safety equipment	-	Construction incentives, cap & trade allocation

Components	Physical	Digital	Policy
Non-Mobility-Related Components			
Seating	Bus shelters, canopies, signage	Amenities, wayfinding elements	ADA regulations, safety & homeless encampment considerations, maintenance and operations
Cafes, restaurants, food services (additional)	Mobile carts, vending stands, food trucks	Cart geolocation, app communication	Enforcement, regulations, health inspections, food permits, territorial rights
Lighting/Security cameras	Lights, cameras, power and data connections, ambient light sensors	–	Lighting regulations, safety & homeless encampment considerations, maintenance and operations
Parcel lockers	Lockers, people sensors, transponders	User verification, digital twin in CDS, API connection to delivery operators, security monitoring	Incentive structures
WC provision	Ramps, wayfinding	–	ADA regulations
Retail	Various	Online orders / parcel locker pickup orders /	Zoning
Public Space	Seating, amenities (various)	Digital twin in CDS	Zoning
Wifi/Smartphone Connectivity	Fiber main, router, repeaters	Network security, privacy considerations	Digital divide, public internet equity policy

F Mobility Hubs KPIs

Overview

This appendix provides different Key Performance Indicators (KPIs) and metrics that can be used for assessing Mobility Hub performance. Evaluating performance is particularly important for the implementation of Mobility Hubs, as they are often implemented incrementally over time, and provide more flexibility to change if they are not performing well. Monitoring performance allows for adjusting approach as Mobility Hubs are incrementally implemented, in order to dynamically respond to performance.

Measurement	Purpose	KPI or Metric	Data Collection
Mobility Performance or Usage			
Number of daily transit boardings and alightings	Evaluating the performance usage of transit services and ridership capacity	KPI	Automated Passenger Counts (APC) or farebox recovery
Number of new transit transfers at hubs	Determine volume and connectivity to other transit systems	Metric	Automated passenger counters (APCs) , ticket transfers, or mobile transfers, survey
Average daily and peak transit or microtransit boardings and alightings	Calculate transit usage in connectivity to the mobility hub	Metric	MOU with microtransit provider, mobile app data, ticket validations, APCs
Number of mobility hub services used- bikeshare, scooter share, and carshare trip (average daily, monthly, and annual usage)	Evaluate usage of different hub services, determine fare pricing, and marketing strategies	KPI	Bikeshare usage data, carshare service bookings, parking data, and records of hub services
Number of subscriptions or memberships to mobility hubs	Evaluate membership and subscription types, pricing, and marketing opportunities to increase the number of memberships and subscriptions	KPI	Total annual fees collected from subscriptions or memberships to mobility hubs, surveys
Bikeshare, scooter share, and carshare average trip distance/trip duration for trips starting or ending at the mobility hub	Determine 1) reduction in trips and trip distances made by vehicles, 2) reduction of GHG emissions from trips, 3) if adjustment in hub locations or additional locations are needed	Metric	General Bikeshare Feed Specification and Mobility Data Specification
Number of additional bicycle parking spaces or lockers	Measure increase in availability of bicycle parking by hub in an area	Metric	Survey, manual counts
Average daily bike parking utilization rate	Evaluate usage rate of parking for improving hub services	KPI	Survey, manual counts

Measurement	Purpose	KPI or Metric	Data Collection
Climate Benefit			
Count and average transit modes to arrive and depart from hubs	Increase use of non-vehicle transportation	KPI	Intercept survey or travel diary
Average trip reduction- origins and destinations	Determine reduction in trips and trip distances made by vehicle and reduction of GHG emissions from vehicles	KPI	Intercept survey or travel diary
Average access distance (miles) of hub user to reach hubs	Determine distances traveled to achieve reductions	Metric	Intercept survey or travel diary
EV charger utilization (average daily vehicles charged) and charge time	Evaluate use of EV charging at mobility hubs, need for increase, or change in services	Metric	Charging network API or utilization data from private EV charging stations co-located
Equity and Inclusion			
Average household vehicle ownership in locations surrounding mobility hubs	Evaluate transit dependency of community to improve service and accessibility	KPI	Intercept survey or census data
Age-diversity of hub users and surrounding community	Determine average ages of hub users to increase youth and elderly usage / improve marketing and accessibility	Metric	Intercept or visual public life survey, Census data
Racial diversity of hub users and surrounding community (total number and %)	Increase number of BIPOC travelers and hub users	Metric	Intercept survey, Census data
Average income of hub users and surrounding community	Increase in low-income and hub users, determine fare pricing, and potential offer discount passes	Metric	Intercept survey, Census data
% of income spent on transportation	Decrease % of individual household income spent on transportation	KPI	Intercept survey, Census data
% of ESL speakers	Increase accessibility and visibility of mobility hub services with service instructions and payment information in multiple languages	KPI	Intercept survey, Census data
Number of social services, non-profit, community groups in close proximity to mobility hubs	Increase outreach and partnerships with local community organizations	KPI	City data, non-profit registry, and location data

Measurement	Purpose	KPI or Metric	Data Collection
Optimal Experience			
Peak hour of daily use/pedestrian counts	Monitor the number of individuals walking and using mobility hubs, potential to increase pedestrian access		Intercept survey data, visual inspections
Public life (see callout on page 94)	Increase		Public Life Data Protocol (full or modified method)
Legibility	Increase visibility and accessibility to hub service with improved signage and wayfinding		Intercept survey and visual inspections
Customer satisfaction score	Increase customer satisfaction and improve services		Intercept and employee survey
% of space dedicated to public realm, lingering, and non-mobility functions	Improve efficient use of space and offering of needed mobility hub services		Visual inspection and land use assessment
Community Value and Accessibility			
Average property values	Monitor for potential displacement impacts	Metric	County assessor data
Small business retail revenue at mobility hubs	Improve accessibility and capacity for retail at hub locations	Metric	Survey
Number of small businesses and BIPOC-owned businesses near mobility hubs	Increase connectivity between mobility hubs and local small businesses	Metric	County data, land use, survey
Private investment in public mobility	Increase revenue for mobility hubs	KPI	Survey
Value of amenities integrated into adjacent development/properties	Evaluate value of amenities and enhance services	Metric	Survey
Health and Safety			
Annual collisions, serious injuries, and deaths	Increase safety and decrease accidents	KPI	Police reports, OCTA transit data, other local reporting mechanisms
# conflicts between vehicles, pedestrians, and cyclists	Decrease number of incidents	Metric	Camera counts, security inspection, police reports
Comfort	Increase comfort and ease of use	Metric	Intercept survey
Safety and security	Evaluate lighting, security, and wayfinding	KPI	Intercept survey and visual inspection

G Funding Mechanisms

Overview

This appendix provides different potential funding sources for Mobility Hubs. It provides a long list of private and public sources, allowing flexibility to build a funding scheme based on specific Mobility Hub context.

Private Funding

Private funding can come from a variety of sources and can be more flexible in terms of availability, i.e., no need to wait for an annual application timeframe.

Public-private partnerships (PPP) for funding transportation involve a contractual arrangement between a public entity such as a city or state government and a private company. The public agencies are typically the owners of the transportation vehicles and infrastructure, while the private sector can invest capital or resources into the enhancement or expansion of transit infrastructure. Typically, PPPs fall into two categories: design-build-finance-operate-maintain (DBFOM) contracts and long-term leases.

U.S. Federal Transit Administration Private Investment Project Procedures (PIPP). PIPP establishes procedures by which FTA recipients contemplating public transportation capital projects may seek a waiver or modification of a mandatory FTA regulation, policy, procedure, or guidance document in order to address impediments to the use of PIPP or private investment in public transportation capital projects. PIPP are intended to encourage project sponsors to seek modifications of federal requirements such that the modification will accelerate the project development process, attract private investment and lead to increased project management flexibility, more innovation, improved efficiency, and/or new revenue streams.

Local and Regional Funding

Local funding is discretionary local resources which are used to fund projects that benefit public health and safety, including amounts from general and special revenue funds, but excluding amounts received from fees and licenses and other types of payments for service. Local funding or subsidies are a way that cities or county governments can fund the planning, installation, and operations of mobility hubs.

Developer in-lieu fees "In-lieu" fees give developers the option to pay fees in-lieu of meeting the specific requirements on-site (parking, land use, etc.) where meeting the requirements would be difficult or extremely expensive.

Orange County Impact Fees are charges assessed on new housing or commercial building development and used to fund public infrastructure. Impact fees are assessed and charged at the issuance of a project's building permit.[1]

Private businesses (financing or Alternative Project Delivery) can be facilitated in a number of ways. Design-build-operate-maintain (DBOM) model is an integrated procurement that combines the design and construction responsibilities of design-build procurements with O&M. These projects are typically private sector procurements within a single contract with financing independently secured by the public sector project sponsor. This project delivery approach is also referred to as "turnkey" procurement or build-operate-transfer (BOT).

Design-Build-Finance-Operate and/or Maintain (DBFOM)- private company finances the project entirely from design and build through O&M, recuperating their costs from concession services and other revenue streams.

Small-scale private partnership projects – enable private partners to invest in small or pilot projects to offer funding or test new technologies / services. Opportunity offers public agencies investment in specific mobility hubs or locations from private investors, while private companies are able to test new technologies and build branding.

Community Benefit Districts (CBDs)- CBDs are designed to support commercial districts and mixed-use residential/commercial neighborhoods through a partnership between the City or County and local communities. CBDs are also known as Business Improvement Districts (BIDs) are established through vote or special dispensation, where specific locations are given access to special funds designated for local improvement projects.

CBDs are unique tax districts that allow communities to raise money for local infrastructure investments and services. Funds are available for a wide variety of neighborhood improvement projects, from addressing graffiti / blight to tourism, and funds are administered or coordinated with the City or County government.

Tax Increment Financing (TIFs) and Enhanced Infrastructure Financing Districts (EIFDs) are post-redevelopment tools for funding infrastructure and economic development. Funding from TIFs can apply towards affordable housing, infrastructure, urban greening, transit-oriented development, and small business grants. EIFDs are a type of TIF district cities and counties could form to help fund economic development projects. EIFDs are intended to fund climate adaptation projects, such as addressing air quality and water conservation.

California Senate Bill 1145 (2018) allows EIFDs to use funds towards public infrastructure maintenance costs. EIFDs located within Orange County include: Santa Ana EIFD, Garden Grove EIFD, and Placentia EIFD.

Sample Sources of EIFD Funds

The Placentia EIFD used its status to fund transit-oriented infrastructure in areas surrounding the upcoming Placentia Metrolink Station. Specific improvements to transit and mobility include street upgrades, lighting infrastructure and pedestrian connectivity. These investments are estimated to cost around $8 million.

The City of Placentia / County of Orange EIFD was then established in September 2019 and became the first city/county EIFD partnership in California, when the District's Public Financing Authority (PFA) officially approved its Infrastructure Financing Plan.[2]

Orange County's Measure M or OC Go (rebranded in 2017) is a 30-year one-half-cent sales tax for transportation improvements in Orange County through 2041. Measure M was renewed in 2006 by voters to extend it past the 2011 expiration date.

OC Go is expected to generate approximately $13.2 billion through 2041. The "Next 10 Delivery Plan," adopted in 2017, is for the 2021 – 2030 timeframe, and covers funding for freeway programs, streets and roads, transit programs, and environmental clean-up. OCTA can utilize this source of funding for transit development and street improvements; this could include developing mobility hubs infrastructure.

2. Enhanced Infrastructure Financing District (EIFD)

California State Funding

Senate Bill 1, the Road Repair and Accountability Act of 2017, is the California legislative package which invests $54 billion over the next decade to fix roads, freeways and bridges in communities across California and put more dollars toward transit and safety. These funds will be split equally between state and local investments.

Implementing the funding is the California State Transportation Agency (CalSTA), which is striving to build a system that offers a safer, more accessible, lower emission, and more multimodal transportation system. An increasing number of these funding mechanisms are being used to fund multimodal transportation like mobility hubs.

Clean Mobility Options (CMO) is a pilot project that provides voucher-based funding for zero-emission carsharing, carpooling, vanpooling, bikeshare, scooter-share, and ride-on-demand transit services for California's historically underserved communities. CMO is funded by the California Climate Investments (CCI) state initiative that uses cap-and-trade funds towards transit development that reduces GHG emissions, improves public health, and supports local economies.

The program is administered by CALSTART, the Shared Use Mobility Center, and the Local Government Commission. In 2020 there were 21 communities throughout California that were awarded $1 million each by CMO to develop and launch zero-emission mobility projects, such as bikeshare and ride-on-demand services, aimed at overcoming transportation challenges faced by residents in their communities.

Transit and Intercity Rail Capital Program (TIRCP) was created to fund capital improvement projects that would modernize California intercity rail, bus, and vanpool services. The intent of TIRCP is to reduce statewide GHG emissions, expand and enhance transit to encourage ridership, and integrate rail services with the incoming high-speed rail system. Assembly Bill 398 (Chapter 135) extended the cap-and-trade program that supports the TIRCP from 2020 through 2030.

Carl Moyer Memorial Air Quality Standards Attainment Program provides over $60 million in grant funding each year to clean or remove older polluting engines throughout California. The program for 2022 focuses on the On-Road and Off-Road Heavy-Duty Vehicles Voucher Incentive Program (VIP), which aims to reduce emissions by replacing existing high-polluting vehicles with newer, lower-emission vehicles.

Sustainable Transportation Equity Project (STEP) is administered by the California Air Resources Board (CARB) and is a transportation equity pilot program working to address community residents' transportation needs while reducing GHG emissions. STEP funds planning, implementation, and support for developing clean transportation. The goal of STEP is to increase transportation equity in disadvantaged and low-income communities throughout California.

Planning and Capacity Building Grants are designed to identify community transportation needs and prepare to implement clean transportation projects. Eligible projects include: community transportation needs assessments, community engagement activities, land use and mobility plans. Eligible entities include community-based organizations, federally-recognized tribes, and local governments as lead applicants (representing a broader coalition of community, public agency, and private partners as sub-applicants). Previous awarded amount total was $1.75 million for 8 grantees' projects.

Figure 1. Anaheim, CA transit agency ATN was a recipient of 2021 STEP funding

Affordable Housing and Sustainable Communities (AHSC) Program is administered by the California Strategic Growth Council, and designed to make it easier for Californians to drive less by promoting housing, jobs, and key destinations that are more accessible by walking, biking, and transit. AHSC provides funding for affordable housing developments (new construction or renovation) and transportation infrastructure. Funding for sustainable transportation infrastructure includes transit vehicles, sidewalks, and bike lanes; transportation-related amenities, such as bus shelters, benches, or shade trees; and other programs. Eligible applicants include: local governments, transportation and transit agencies, nonprofit and for-profit housing developers, JPAs, K-12 school, college and university districts, federally recognized Indian tribes, and developers of affordable and mixed-income housing.

Figure 2. Legacy Square of Santa Ana, CA was a recipient of $25.4m in 2020 AHSC funding

Transformative Climate Communities (TCC) Program, a program through the California Strategic Growth Council (SGC), funds community development and infrastructure projects to support disadvantaged communities. TCC enables communities to develop and fund projects that best meet their needs. Since 2018, the SGC has awarded over $230 million in TCC implementation and planning grants to 26 communities in California.

Projects funded by TCC must prove that they reduce GHG emissions significantly over time as well as provide overall improvements to the health, environment, and economic wellbeing of the community. Approved projects include: affordable and sustainable housing developments, transit stations and facilities, electric bicycle and carshare programs, solar installation and energy efficiency, water-energy efficiency installations, urban greening and green infrastructure, bicycle and pedestrian facilities, recycling and waste management, health and well-being projects, among others.

Caltrans: Active Transportation Program (ATP) Grant. Funding request is $250,000 (non-infrastructure projects, Safe Routes to Schools projects, Recreational Trails projects, and Planning projects are exempt from this and may apply for smaller amounts). Eligible entities include: cities, counties, county transportation commissions, regional transportation planning agencies, metropolitan planning organizations (MPOs), school districts, and transit districts.

Funding is for infrastructure Projects /capital improvements, education, encouragement, and enforcement activities that further the goals of the ATP, planning the development of a community wide bicycle, pedestrian, safe routes to school, or active transportation plan that is located in a disadvantaged community. The goals of the Active Transportation Program are to increase the proportion of trips accomplished by biking and walking or increase the safety and mobility of non-motorized users.

Federal Funding

Federal sources of funding for infrastructure and transit have recently expanded, with more resources available to mobility hubs. However, federal grants are very competitive with several entities competing for large scale projects. Additionally, most federal grants require local matching funds and dedicated staff to manage grant administration and reporting requirements.

U.S. Department of Transportation: FY 2022 National Infrastructure Investments - Rebuilding American Infrastructure with Sustainability and Equity (RAISE) (April 2022). RAISE grants are a minimum of $5 million, except that for projects located in rural areas the minimum award size is $1 million. Grants may not be greater than $25 million. There is a matching fund requirement of 20% for urban areas or less for projects located in rural areas or disadvantaged communities. Eligible entities include cities, counties, port authorities, tribal governments, and MPOs. RAISE provides funding for multi-modal, multi-jurisdictional projects that are more difficult to support through traditional DOT programs.

U.S. Department of Transportation: Multimodal Project Discretionary Grant Opportunity (MPDG) (May 2022). Notice of Funding Opportunity (NOFO) eligibility includes state, MPO, local government, tribal governments. There are three funding opportunities: the National Infrastructure Project Assistance grants program (Mega), the Nationally Significant Multimodal Freight and Highways Projects grants program (INFRA), and the Rural Surface Transportation Grant program (Rural).

Projects focus on improving multimodal transportation systems that incorporate affordable transportation options such as public transit to improve mobility of people and goods, as well as decreasing transportation costs and providing reliable and timely access to employment centers and job opportunities.

Innovation grants or funding mechanisms are designed to provide funding for improving transit operations, enhance the travelers' experience, and generate innovative research to improve safety, mobility, and infrastructure. Each of these funding mechanisms focuses on different aspects of innovating and improving mobility with better infrastructure, equipment, and services.

- **U.S. FTA Integrated Mobility Innovation (IMI)** – the IMI program supports the transit authorities' ability to develop and integrate new mobility innovations with existing services, while evaluating the impact of innovations on agency's operations and riders' experience.

- **U.S. FTA Enhancing Mobility Innovation (EMI) program** – aims to provide safe, reliable, equitable, and accessible services that promote technology projects that center around ridership experience, such as integrated fare payment systems or on-demand-response public transportation.

- **U.S. FTA Accelerating Innovative Mobility (AIM)** promotes forward-thinking approaches to improve transit financing, planning, system design and service. The AIM Initiative also supports innovative approaches to advance strategies that promote accessibility, including equitable and equivalent accessibility for all travelers. Eligible applicants include public transit agencies, state/local government DOTs, and federally recognized Indian tribes.

U.S. FTA Pilot Program for Transit-Oriented Development (TOD) Planning – Section 20005(b)

Pilot Program for TOD Planning helps support

- FTA's mission of improving public transportation by providing funding to local communities to integrate land use and transportation planning with a new fixed guideway or core capacity transit capital investment.

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. In 2020, FTA awarded $11 million in grants to 20 projects in 12 states. The grants help organizations plan for transportation projects that connect communities and improve access to transit and affordable housing.

H Orange County
Local Contex Analysis

Orange County Context

County-Wide Context for Mobility Hubs

A review of key countywide documents was undertaken to contextualize the Strategy within a larger body of transportation planning work and visioning already established for Orange County. Relevant documents are summarized over the following pages.

By aligning with these long-range plans- mobility, environmental, equity, public safety, technology, housing- mobility hubs become a useful tool to help planners achieve their agency's stated aims. Plans from major institutions, major employers, and property owners should also inform priorities and decision making.

OC Transit Vision

A key regional document, the OC Transit Vision establishes a vision, goals and framework for future transit investment. The OC Transit Vision is a 20-year plan for enhancing and expanding public transit service in Orange County. This is the county's first transit-specific long-term plan of its kind.

The document identifies the most promising corridors for major future investment; issues transit-related recommendations; offers transit policy guidance to cities; and concludes with an action plan for next steps for OCTA.

The vision set out in the OC Transit Vision is to provide compelling and competitive transit services that expand transportation choices for current riders, attract new riders, and equitably support immediate and long-term mobility in Orange County.
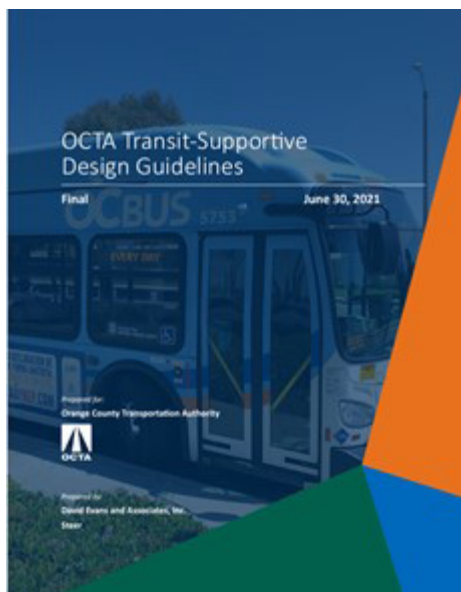
The goals are as follows:

- Make it more desirable to take transit
- Connect Orange County's people and places with effective transit
- Make transit easier to use and more convenient
- Make Orange County a more attractive place to live, work, and visit by providing transit service that supports community priorities
- Create a system that is resilient over the long term

This Mobility Hub Strategy resulted from the Transit Vision recommendations. Below are the five key elements from the OC Transit Vision long-range plan.

Figure 1 OC Transit Vision's long-range plan

Vision and Goals
The plan establishes a vision and goals and defines a framework for future transit investments.

Transit Corridors
The plan identifies the most promising corridors for major future investments in high-quality transit.

Strategies
The plan makes recommendations in areas ranging from existing fixed-route bus services to paratransit service and new types of service, such as on-demand "microtransit" service.

Policy Guidance
The plan offers transit policy guidance to cities, developers, and other partners who support transit service and are important stakeholders in creating an effective and efficient transit system.

Plan for Action
The plan concludes with an action plan laying out the next steps for OCTA, including recommended phasing of these recommendations

Transit-Supportive Design Guidelines

OCTA's Transit-Supportive Design Guidelines provides guidance on the design of transit stops in Orange County, and describes the context for mobility hubs:

Mobility hubs are places where multiple modes of transportation come together, providing seamless connections to the transit system and between modes.

The emerging best practice is to provide fully featured mobility hubs at transit centers including elements such as bike stations with secure bike parking, repair, and rental facilities (and extensive rider amenities, such as showers); bikeshare docks (if a local system exists); carshare vehicles; a staffed or unstaffed traveler information kiosk with integrated information on all modes serving the transit center; retail spaces such as a café; public restrooms; and placemaking features such as plazas, art, and landscaping.

Together with other access elements including stops for connecting transit, park-and-ride lots, and pedestrian and bicycle routes through the site, Mobility hubs can provide transit riders with access to a wide range of options for first/last mile connectivity, greatly increasing the range and utility of transit routes serving the transit center.

Complete Streets Initiative Design Handbook

The OCCOG Complete Streets Initiative Design Handbook provides high-level guidance on complete street planning and design in OC, including example policy statements, design goals and strategies, examples cross-sections, and design principles related to street elements. It includes a foundational matrix that categorizes nine types of streets and suggests design elements for each type.

It also includes design elements that relate to mobility hubs. Further details on the role of complete street design in relation to mobility hubs is provided in Chapter 3 of this Strategy.

OCActive

Orange County's Active Transportation Plan identifies geographic areas of high-need relative to active transportation, complete with evaluation criteria and maps of existing inventories. The plan provides a framework for bikeway and pedestrian planning across the county. This document has an inventory of existing facilities as well as regulations that dictate the placement of these facilities, which are important

Transit Centers: Modernization and Parking Management Study

The **Transit Centers: Modernization and Parking Management Study** provides an overview of existing conditions at Transit Centers in the OC area combined with recommendations for each site obtained from best practice research as well as an implementation plan. While this document does not directly address mobility hubs, transit centers are important candidate sites for mobility hubs that can help meet first/last mile needs.

Master Plan of Arterial Highways

The Master Plan of Arterial Highways (MPAH) was established in 1956 to ensure that a regional arterial highway network would be planned, developed, and preserved, in order to supplement the County's developing freeway system. This document is a mechanism to communicate MPAH policies and procedures to jurisdictions in the County and support their compliance with MPAH guidelines. Through the MPAH, special designations may be requested by local agencies: Landmark Streets, Multi-Modal Transportation Arterial, Smart Streets and Asymmetric Lanes which may be required for implementation when mobility hubs are planned on roads covered by the MPAH.

Orange County 2022 Long Range Transportation Plan:

The Orange County Transportation Authority is preparing for the long-term transportation future of Orange County.

The LRTP acts as local input for the Regional Transportation Plan and Sustainable Communities Strategy (RTP/SCS) developed by the Southern California Association of Governments (SCAG). To address future transportation needs the LRTP reflects current OCTA policies and commitments, transportation study findings, and input from local jurisdictions, business leaders, community leaders, county residents, and transportation planning professionals.

More information