

# Slow Speed Network Strategic Plan for The South Bay

SEPTEMBER 2017



Metro®

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# Project Overview

This Sustainable Transportation Demonstration Project tests and develops strategies of the Countywide Sustainability Planning Policy. The approach to sustainable mobility arrived at here can in the future be replicated elsewhere in the County, as can the methodology to test and evaluate recommended improvements and sustainability outcomes. The project's Evaluation Framework is key to replicability, allowing comparisons between case study areas.

Metro's Complete Streets policies provide direction on how to achieve safe access for all users of the roadway by placing a priority on non-car modes. Typically, these modes include pedestrians, bicycles and transit. The Slow Speed Network Strategy for the South Bay promotes Complete Streets goals of livability, safety, sustainability and mobility by focusing on a wider range of users of roads and sidewalks, anticipating a future in which modes such as Neighborhood Electric Vehicles, e-bikes, and other slow on-street mobility devices are widely used for transportation. These on-street slow modes have a strong symbiotic link to pedestrian activity - which is reinforced by a slow speed network strategy that considers the widest possible range of sidewalk modes, including wheelchairs, walkers, and mobility scooters.

The viability and safety of sidewalk modes needs to be supported and encouraged because, apart from providing mobility for all ages and abilities, they set a high standard for sidewalk design and maintenance crucial to successful pedestrian areas. Pedestrian areas, centered on medium to high density retail, office and other mixed uses, are fundamental to the livability of cities, and are key destinations for users of on-street slow modes. The presence of non-car slow modes on roads and in pedestrian areas, in turn, provides an all important buffer for pedestrians by disrupting the hegemony of the car.

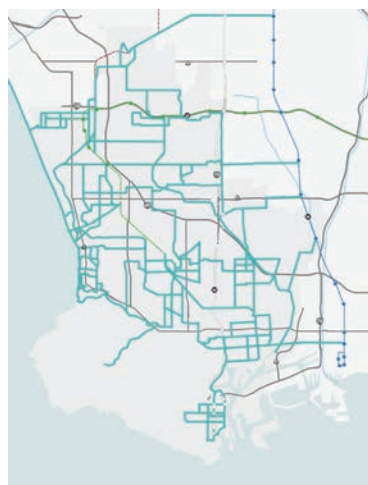
Expanding the concept of Complete Streets with a more fine-grained and high-resolution approach means providing infrastructure for the widest possible range of vehicles that travel at or less than 25 mph.

The Slow Speed Network Strategy achieves this through a system of **three interconnected networks**, each at a different scale, and each reinforced by physical and digital wayfinding, making neighborhood and sub-regional destinations accessible by slow non-car modes. Although developed for the South Bay, the approach is replicable, and lends itself to testing and evaluation Countywide.

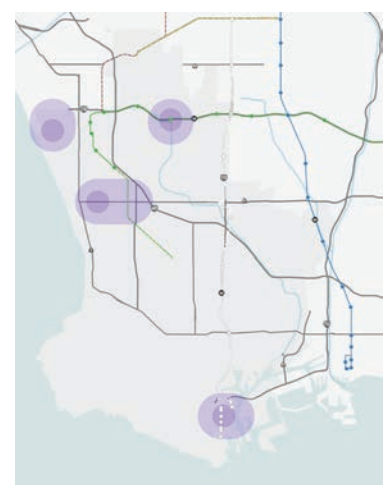
## THREE INTERCONNECTED NETWORKS



Slow Mode Thruways: Regional Network



Sub-regional Network



Slow Zones: Local Network



In its ultimate state, the entire network is seamlessly connected and consistently distinguished from its surroundings. The network design is expressed through elements such as distinct paving, signage, landscaping, lighting, broadband connectivity, and clear and consistent branding.

To take the first steps towards this vision, the network relies on the **adaptive re-use of the existing roadway network** to promote integrated multimodal transportation using primarily residential streets. The slow speed network strategy is made up of three interconnected sub-networks, as described below.

### Slow Mode Thruways: regional network

The largest scale of network uses dedicated ROWs for multi-use pathways that accommodate NEVs (Neighborhood Electric Vehicles) as well as bicycles, pedestrians and all other slow modes. These slow mode thruways on re-purposed ROWs should be imagined as a part of a future Countywide or regional multimodal transportation and recreation network made up of other similar ROWs. In the South Bay, candidates for such facilities include existing multi-use paths under electrical corridors, a segment of the Harbor Subdivision ROW that extends south of the Green Line, and the 16-mile length of the Dominguez Channel, which could provide trans-South Bay slow mode connectivity to jobs, education, housing and regional amenities.

### Sub-regional Network

The signed and branded routes for on-street slow modes link the Slow Zones and traverse the South Bay, forming a **Sub-regional Slow Mode Network**. The network is made up of existing residential streets wherever possible. Residential streets, with the addition of physical and digital wayfinding, present the lowest cost, both for implementation and maintenance, of a Slow Speed Network.

Further, our Network Strategy, which builds on the Countywide Active Transportation Strategic Plan (ATSP), relies on "low stress roadways". This means that shared use facilities -- where cars, bikes, pedestrians and other slow modes share the ROW with no separating barriers or striping -- are located on roads with simultaneously the slowest moving traffic and the lowest traffic volumes. In cases where residential streets are not feasible for accessing Slow Zone pedestrian centers or other important destinations, the network is located on the next slowest streets - e.g. 30 mph streets instead of 25 mph. In these cases, a striped lane, shared between bicycles, NEVs and other slow modes, is warranted.

Because NEVs are prohibited from roads with speed limits higher than 35 mph, under the California Vehicle Code, we do not use any such roads except in rare cases where there is no alternative. On roads over 35 mph, the network would need a physically separate lane shared by NEVs, bikes and other on-street slow modes. These facilities along the edges of roads would be analogous to non-car facilities on greenways or other multi-use paths.

### Slow Zones: local network

The smallest scale of roadway network is a series of signed and branded routes for slow modes on low speed-limit streets focused around selected pedestrian thoroughfares. These districts roughly encompassing a 1/2 mile to one mile area around pedestrian corridors are called **Slow Zones**. Twelve distinct Slow Zones have been identified in the sub-region. Four of the twelve areas are presented in-depth. These have mature pedestrian/retail cores and in some cases, business improvement districts. The other eight highlighted areas are referred to in our study as Lite Slow Zones. In the four in-depth case study areas the team carried out walk audits as the basis for recommendations for improvements to multimodal pedestrian infrastructure.

A very high-standard pedestrian environment, accessible to all, is the nucleus of the Slow Zone. Geared to the full range of slow modes, the zones feature wayfinding, signage, curbside drop-off and pick-up, and offer full speed electric and NEV charging facilities. The idea is that Slow Zones are a repeatable form, with established standards and conventions distinct from their surrounding areas that will be recognizable Countywide. In general, many areas of first/last mile travel to transit stations will make good candidates to become Slow Zones, although not all Slow Zones need to be centered on transit.

## Safety, technology and data considerations

The predominant street pattern of the South Bay is made up of grids roughly one-half by one mile, traversed by major roadways that are the basis for navigation and spatial orientation. The slow speed network creates new pathways as an alternative to the grid, negotiating ways around infrastructural barriers such as freeways and high speed roadways, on routes demarcated and reinforced by wayfinding, both physical and digital. The connectivity between network components; between the on-street Sub-regional Network to the slow mode thruways on the multi-use paths, and to the denser Slow Zone on-street and pedestrian networks, is key to the slow zone network strategy: a “more-complete” Complete Streets system.

Safety is an important consideration for the new, proposed use of roads. While we anticipate that the volume of slow mode traffic through the slow speed network will be modest, we are anticipating great safety benefits of new technology. Active Driver Assistance Safety (ADAS) will play an increasingly large role in preventing collisions between cars and other modes, and multimodal traffic control and signalization will be invaluable to the safety, and ultimately, the feasibility, of the network. ADAS promises to make better use of roads, not by smoothing traffic flow and otherwise improving the efficiency of automobile traffic, but by fully integrating modes.

Oncoming sensor and guidance technology has promise for the South Bay Network - not only for how it would operate, with improved multimodal safety and efficiency - but also for how the network can be improved on an ongoing basis through user generated data. If vehicles using the network all contribute data about their choice of routes and destinations to a database accessible to other users, the results could inform decision making, and inform the planning of network improvements. With more sensors of many kinds in our environment, including on roads, feedback loops will get smaller, and the information we have about the use of streets

will become increasingly fine grained.

The need for more complete and accurate data was abundantly apparent in the planning process of the Slow Mode Network, especially pedestrian modes. There is understandably no data for the new uses of roadways we propose; no data available for the multimodal use of sidewalks, or the actual physical condition of sidewalks. Despite best attempts, comprehensive speed limit and traffic volume data were unable to be found for study areas. All of these data are critical to planning for Complete Streets, for the Slow Speed Network, and by extension a progressive approach to the Sub-regional transportation system.



Low speed is key to serving a wider range of modes, and adding value to existing facilities by accommodating slow in shared lanes. However, projects geared towards active modes should generally favor designs that provide a safety buffer from vehicular traffic.

# Slow Modes

Slow modes fall into two categories, **sidewalk** (i.e. pedestrian) modes and **on-street rolling** modes. They cover a wide range of capabilities and requirements, and are sometimes in conflict when sharing the same right-of-way.

## Sidewalk modes, 0-12.5 mph

Sidewalks are the part of the street designated for use by pedestrians<sup>1</sup>, a category designated for people on foot but importantly also accommodates wheelchairs, push/pull-carts, skateboards, small-wheeled push walkers, as well as children on push-scooters, senior citizens using e-mobility scooters, and joggers and electric personal mobility assistive devices (EPAMDs)<sup>2</sup>.

The California Vehicle Code's definition of an EPAMD<sup>3</sup> coincides with a description of a Segway, and sets a speed limit for them at 12.5 mph. This sets the upper speed limit, in our study, for sidewalk modes. All rolling pedestrian modes must yield to pedestrians on foot<sup>4</sup>, and all can be regulated by cities<sup>5</sup>.

## On-street rolling modes, 12.5-25 mph

This category covers a range of roadway users that move faster than pedestrians and are vulnerable on roadways when mixed with cars. Bicyclists, specifically casual and commuting riders who move more slowly than sports cyclists, and drivers of neighborhood electric vehicles (NEVs) and e-bikes are the majority of this user group, although other human powered and electric mobility devices are also on-street modes.

Bikes and NEVs can mix with vehicular traffic when supported by specific design elements and speed limits. As with sidewalk modes, the state standards can be supplemented by local city regulations. On-street modes in this study move at speeds up to 25 mph, the upper limit of speed for NEVs, and faster than the 12.5 mph permitted for EPAMDs on sidewalks.



Urb-E electric scooter



## PEDESTRIAN AND SIDEWALK ROLLING MODES: 0-12.5 MPH



## ON-STREET ROLLING MODES: 12.5-25 MPH



<sup>1</sup> **CVC Division 1. 555.** "Sidewalk" is that portion of a highway, other than the roadway, set apart by curbs, barriers, markings or other delineation for pedestrian travel.

<sup>2</sup> **CVC Division 1. 467.** (a) A "pedestrian" is a person who is afoot or who is using any of the following:

- (1) A means of conveyance propelled by human power other than a bicycle.
- (2) An electric personal assistive mobility device.

(b) "Pedestrian" includes a person who is operating a self-propelled wheelchair, motorized tricycle, or motorized quadricycle and, by reason of physical disability, is otherwise unable to move about as a pedestrian, as specified in subdivision (a).

<sup>3</sup> **CVC Division 1. 313.** The term "electric personal assistive mobility device" or "EPAMD" means a self-balancing, non tandem two-wheeled device, that is not greater than 20 inches deep and 25 inches wide and can turn in place, designed to transport only one person, with an electric propulsion system averaging less than 750 watts (1 horsepower), the maximum speed of which, when powered solely by a propulsion system on a paved level surface, is no more than 12.5 miles per hour.

<sup>4</sup> **CVC ARTICLE 6. Electric Personal Assistive Mobility Devices [21280 - 21282] 21281.5.**

(a) A person shall not operate an EPAMD on a sidewalk, bike path, pathway, trail, bike lane, street, road, or highway at a speed greater than is reasonable and prudent having due regard for weather, visibility, pedestrians, and other conveyance traffic on, and the surface, width, and condition of, the sidewalk, bike path, pathway, trail, bike lane, street, road, or highway.

(b) A person shall not operate an EPAMD at a speed that endangers the safety of persons or property.

(c) A person shall not operate an EPAMD on a sidewalk, bike path, pathway, trail, bike lane, street, road, or highway with willful or wanton disregard for the safety of persons or property.

(d) A person operating an EPAMD on a sidewalk, bike path, pathway, trail, bike lane, street, road, or highway shall yield the right-of-way to all pedestrians on foot, including persons with disabilities using assistive devices and service animals that are close enough to constitute a hazard.

<sup>5</sup> **AB 470** "Existing law imposes safety specifications on EPAMDs, and authorizes a city, county, or city and county, to ensure the safety of pedestrians, to regulate the time, place, and manner of the operation of EPAMDs and their use as a pedestrian for purposes of the Vehicle Code".

## NEVs

Neighborhood Electric Vehicles present unique opportunities and challenges to policy and infrastructure since they are the most car-like of all slow modes, often sharing infrastructure with cars, and sometimes with bikes and other slow modes. NEVs, are a type of slow-speed, lightweight electric Local Use Vehicle (LUV). NEVs are limited to speeds up to 25 mph<sup>6</sup>, and, as per the California Vehicle Code, can drive only on streets of speed limits up to 35 mph<sup>7</sup>. NEVs can cross roads of speed limits greater than 35 mph, if the crossing, controlled or uncontrolled, begins and ends on a street with speed limits less than 35 mph<sup>8</sup>.

### Regulatory context - Federal

In 1998, NHTSA created the only Federal motor vehicle safety standard applicable to low speed vehicles such as NEVs<sup>9</sup>. This standard means they can only be driven at 25 mph, and are exempt from the safety equipment of a full speed vehicle. Because of their lack of safety features, the federal recommendation is that NEVs only be driven on roads up to 25 mph, although the California Vehicle Code does allow them on roads up to 35 mph.

California has been ahead of other states in expanding the use of low speed vehicles such as NEVs for use on roads. In 1998, the City of Palm Desert created a Golf Cart<sup>10</sup> Transportation Plan that established two types of dedicated lanes for golf carts: one for golf carts and bicycles, and another for golf carts and automobile traffic at speeds up to 25 mph. Based on the Golf Cart Plan, in 2005, the state enacted a law that allowed the City of Lincoln to create an NEV Plan under which NEVs could operate on specific roadways mixed with traffic.

The position of the Federal Department of Transportation is that NEVs mixing with full speed cars is a bad idea because of the weight differential between the types of vehicles, and the lack of safety equipment on NEVs<sup>11</sup>. However, the Federal position also specifies that where local communities have successfully prescribed the use of NEVs in designated lanes and on roads “appropriate for their use”, the safety performance of NEVs is good<sup>12</sup>.

### Regulatory context - State

(Please see California Vehicle Code Sections 21250-21266 in Appendix A

The California Vehicle Code defines NEVs as a type of Low Speed Vehicle (LSV). The driver of an NEV has to have a driver's license, be insured in the same way as a driver of a full speed vehicle, and the vehicle has to be registered with the DMV and have a VIN number.

Dealers of NEVs are required to warn buyers of the risks associated with driving a vehicle without safety features. NEVs need to conform to the safety standards set forth in the Federal Motor Vehicle Safety Standards governing the requirement for features such as seat belts and headlamps. If an NEV is modified to travel at a speed greater than 35 mph, then it is required to have all the safety equipment of a full speed vehicle.

Barring the few cases where a jurisdiction's NEV Plan is adopted as the result of an action by the State legislature, an NEV cannot travel on roads with speed limits above 35 mph. NEVs can cross roadways with a speed limit in excess of 35 miles per hour if the crossing begins and ends on a roadway with a speed limit of 35 miles per hour or less and occurs at an intersection of approximately 90 degrees. An NEV shall not traverse intersections without traffic controls (e.g. traffic lights, stop signs) with any state highway, unless that intersection has been approved and authorized by the agency having primary traffic enforcement responsibilities for that crossing.

A local police department with primary traffic enforcing responsibility, or the CHP, may prohibit the use of NEVs on any roads under their jurisdiction in the interest of public safety. Any such prohibition is made effective through signs upon the roadway.

<sup>6</sup> CVC Division 1 385.5. Low Speed Vehicles.

<sup>7</sup> CVC Division 11 212.60. Low Speed Vehicle Prohibitions...The operator of a low speed vehicle shall not operate the vehicle on any roadway with a speed limit in excess of 35 mph.

<sup>8</sup> CVC Division 11.212.66 b.

<sup>9</sup> Federal Motor Vehicle Safety Standards for low-speed vehicles. Section 571.500 of Title 49 of the Code of Federal Regulations.

<sup>10</sup> In California, golf carts can be driven at speeds up to 25 mph. They are not street legal and are intended for use primarily on golf courses. They have an occupancy of two people plus golf equipment. NHTSA defines them as having an upper speed limit of 15 mph.

<sup>11</sup> Page 38. Report to Congress: Operation of Neighborhood Electric Vehicles (NEVs) on Roadways with a Maximum Speed Limit of 40 mph (64 kph)

<sup>12</sup> Page 33. Report to Congress: Operation of Neighborhood Electric Vehicles (NEVs) on Roadways with a Maximum Speed Limit of 40 mph (64 kph)



Polaris GEM

## NEV plans

In order to promote and encourage the use of NEVs, an underutilized zero-emissions local transportation mode, some California jurisdictions have adopted NEV plans<sup>13</sup>.

The purpose of an NEV plan is to optimize the use of NEVs as a viable mode of transportation. Because of the slow speed of NEVs and lack of safety features, routes of travel for NEVs are identified or designated that will make access in NEVs convenient while protecting them from automobile traffic. Safe NEV routes can be established through a network of designated Class I, II or III slow speed paths, lanes and routes on streets with speed limits up to 35 mph. Consideration of safe crossings is key to ensuring connectivity of the network. Signage is necessary for ensuring mobility and safety for NEV routes so drivers of NEVs understand where they should and should not go, and other drivers are also aware of the presence of NEVs.

In some cases an NEV plan puts into place exceptions to the regulations in the California Vehicle Code governing NEVs. The exceptions are for a set length of time and in a specific geographic area -- they must specify context and rationale and ensure public safety.

The City of Lincoln, CA is the pioneer of NEV Plans. They created a network of striped Class II lanes to be shared by NEVs on specific roads of speed limits greater than 35 mph and as of this writing, have not experienced safety issues since the lanes were implemented<sup>14</sup>. If a jurisdiction is seeking to put into place these or other exceptions, they need to, with the support of Caltrans, seek authorization from the State legislature to adopt an NEV plan. Several Assembly Bills since 2006 authorize the adoption of these types of NEV Plans<sup>15</sup>.

## The market

Outside of retirement communities and controlled settings such as campuses, NEVs have not enjoyed market success. The market leader in NEVs is the GEM, now manufactured by Polaris. Despite efforts to promote them to individual consumers, they have not become a popular replacement for cars. This issue is discussed further in the Barriers to Implementation section of this report. However, within campuses and on private roads, they are used extensively for maintenance workers, by law enforcement and as shuttles. Their small size, ease of use and relatively low cost makes them popular vehicles for pathways where only pedestrians, cyclists and other non-car modes can travel. For these reasons, these vehicles could also succeed on multi-use paths typically used by bicycles and pedestrians. These paths are discussed in the Regional/ROW network section of this report.

## Planning for NEVs in the South Bay

According to LA Metro's 2015 Sub-regional Mobility Matrix study, about 65 percent of vehicle trips occur entirely within the South Bay Cities, and these trips averaged below seven minutes in duration<sup>16</sup>. Between 2014 and 2024, vehicle trips within the sub-region are expected to grow by about 3.4 percent (an additional 180,800 trips each weekday). The South Bay Cities Council of Governments vision is of fewer trips by car, with a large number short local trips carried out by NEV. The COG has led studies and pilots encouraging this mode shift. The work by the COG about NEVs, Neighborhood Oriented Development and other aspects of sustainable mobility such as electric vehicle charging are foundations of this study, and are listed in the bibliography for further reading and reference. The slow speed network builds on prior SBCCOGs efforts and supports the shift from full-speed cars to NEVs, and other on-street and sidewalk slow modes.

<sup>13</sup> Examples include WRCOG 4-City NEV Transportation Plan, 2010; Coachella Valley Association of Governments NEV Plan, 2016; City of Lincoln NEV Plan, 2006

<sup>14</sup> Lincoln-Rocklin Joint Report, 2011. p.3.

<sup>15</sup> Examples include AB 1781 for the City of Fresno, 2010; AB 2353 for Lincoln-Rocklin, 2009; and AB2963 Lincoln-Rocklin 2011, AB 61 County of Riverside 2011.

<sup>16</sup> LA Metro Sub-regional Mobility Matrix. South Bay Cities 2015.



# Facilities

The slow speed network relies on existing infrastructure to the extent possible, but also calls for strategic improvements coordinated with bike infrastructure on some network segments. The key principle is to adapt existing infrastructure for access by the widest range of slow modes in a manner that is safe and cost effective. Therefore, the majority of the network is on residential streets shared between cars, NEVs, bicycles and other slow on-street modes. Where residential streets are not feasible for achieving network connectivity, the strategy calls for improvements matched to specific challenges presented by, for example, high speed limits. In cases where the network uses roads with speeds over 35 mph, the strategy is to convert the curbside driving lane to a protected bicycle lane and lower the speed limit so the general lanes can be shared by cars as well as NEVs.

Investments in bicycle infrastructure along the slow speed network support slow modes - directly, in the case of wider-than-usual striped lanes shared by bikes and NEVs - and indirectly, where protected bike infrastructure benefits traffic calming and lower speed limits. Metro's Countywide Active Transportation Strategic Plan (ATSP), which consolidates the bicycle plans of municipalities across the South Bay, indicates where bicycle infrastructure exists and is planned. The slow speed strategy makes the most of this bicycle network, guided by the principle that what is good for cyclists benefits all slow modes.



Rendering of a Class III slow speed facility on a residential road



Beyond the recommended infrastructure changes, signage, wayfinding and multimodal traffic control are key to making the network **distinct from surrounding roads**, and ensuring the safety and efficiency of the network. While traversing multiple jurisdictions, the network will need to "read" consistently - and this presents a challenge for implementation, maintenance, as well as consistent enforcement of traffic rules. The best approach is to keep the network simple and uncomplicated. For the most part, this means maintaining current configurations to the extent possible and sharing them between a greater range of modes. It also means modifying and reinforcing bicycle infrastructure for use as a slow speed network component.

## Pedestrian facilities

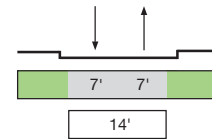
Pedestrians are the most vulnerable roadway users and the direct and indirect beneficiaries of diversifying the capacity of infrastructure to accommodate a wider range of modes. Systems for making sidewalk modes more functional are covered in the Slow Zones section of the report. Walk audits of Slow Zone pedestrian cores guide recommendations toward safe, accessible and continuous sidewalks, ramps and crossings for all pedestrian modes.

Everywhere in the sub-region, crossings should take pedestrians and other sidewalk users into account. Driveway curb cuts in sidewalks should be minimized and property owners and retail tenants should provide wheelchair ramps for access between the sidewalk and entrances of buildings.

## Class I slow speed path

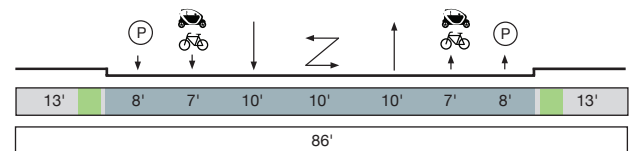
The project team proposes adapting the Streets and Highway Code definition of a Class I bikeway to allow sharing between all slow modes including NEVs, other slow modes, bikes and pedestrians. The Class I slow speed path could be the South Bay portion of a regional network of multimodal paths and greenways. The regional network components would include ROWs along water channels and rail infrastructure. For example the CV link in the Coachella Valley, the Greenway project in the San Gabriel Valley, and Metro's Rail to River multi-use path, along with other similar multi-use facilities, could ultimately become part of an expansive non-car multimodal network, with shared regulations and conventions

CLASS I SLOW SPEED PATH - OFF STREET MULTI-USE PATH, SHARED BY ALL SLOW MODES.



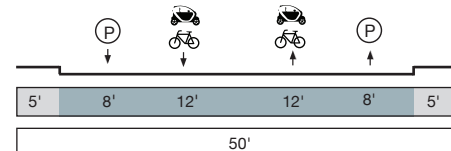
Adapted from City of Lincoln.

CLASS II SLOW SPEED LANE - STRIPED, DEDICATED ON-STREET LANE SHARED BY ON-STREET SLOW MODES.



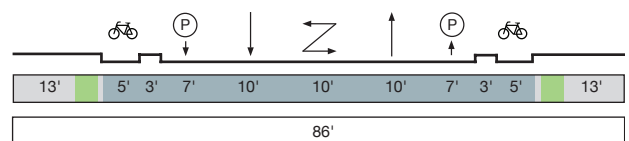
Adapted from LA Complete Streets Manual and City of Lincoln.

CLASS III SLOW SPEED ROUTE - SHARED BY ALL ON-STREET MODES.



Adapted from NACTO, LA Complete Streets Manual and City of Lincoln.

CLASS IV - PROTECTED LANE FOR BIKES AND NON-NEV ON-STREET SLOW MODES; 35 MPH ROADWAY SHARED BY CARS AND NEVs.



Adapted from LA Complete Streets Manual and City of Lincoln.

<sup>1</sup> SHC 890.4

for signage and design. The precedent of Lincoln for infrastructure shared between bikes and NEVs informs the design of the multi-use path cross section.

Jurisdictions and agencies, for example the LA County Flood Control District and cities on the Path would need to pursue policy changes in order to broaden the definition of multi-use path to include NEVs. This is discussed in more detail in the Regional Network: Slow Mode Thruways section of the report.

## Class II slow speed lane

On segments of the network where 25 mph roads are not present, the network travels on 30 mph or 35 mph roads. In these cases segments of the sub-regional network either repurpose existing Class II (striped, on-street) bicycle lanes, or use new striped lanes. If repurposing existing bike lanes, the roadway would need to be re-striped to widen existing lanes. Based on the precedent of Lincoln, where conflicts between NEVs and bicycles in shared lanes have not become an issue, striped lanes in the network should be at least 7' wide. **(Footnote p, 3 Lincoln-Rocklin Joint Report, 2011).**

Given the fact that there are currently many more bikes than NEVs in the South Bay, the extra-wide bike lanes would be a benefit primarily to cyclists until there is a critical mass of NEVs.

Cities would have to ensure that regulations would allow bike lanes to be repurposed and become shared bike/NEV lanes, including verifying compatibility with the original bike lanes' funding source. Making these types of changes across jurisdictional boundaries would present another layer of challenge since each city would have to adopt the regulatory change to include NEVs on bike lanes.

Ideally, the state legislature could define new statewide policies about shared slow mode facilities based on examples in NEV Plans statewide, the experience of Lincoln, and this strategic plan.

## Class III slow speed route

Roadway design in Lincoln, California, and the city's positive experience with shared facilities, are also the precedents for the slow speed network's Class III facilities on residential roads. With the availability of accurate speed limit and volume data, slow speed network segments would ideally run on roads with posted speed limits of 25 mph that also meet the ATSP definition of a low-stress roadway. This means having a daily vehicle volume of no more than 2,000 cars, and 85th percentile speeds at or below 25 mph. In other words, the network would use the slowest and least trafficked streets, shared by cars, bikes and on-street slow modes.

The key point is that Class III shared facilities, with all slow on-street modes and cars mixed together, only exist on 25 mph roads.

## Class IV

In any of the few cases of network segments on roads over 35 mph, by law the speed limit on that segments would need to be lowered to accommodate NEVs. Per the California Vehicle Code, NEVs cannot travel on roads with a speed limit of over 35 mph. A separated, protected Class IV bicycle lane added along the curb would slow traffic, and the speed limit to 35 mph, and result in general purpose lanes being able to include NEVs. Slow modes such as Segways, URB-Es and scooters that use the roadway could mix with bikes in the dedicated lane.

As in the case of Class II facilities, bikes would benefit from the slow mode strategy.

By preparing an NEV Plan, Lincoln and a handful of other cities and COGs have been granted exemptions from the California Vehicle Code rule that restricts NEVs to roads with speed limits of 35 mph and under. NEV Plans lay out the design and engineering for NEV networks - including striped lanes and crossings shared by NEVs on specific roads with speed limits higher than 35 mph. These planning and engineering proposals require buy-in from law enforcement and Caltrans, and then are submitted by cities and COGs to the state legislature so lawmakers can make the necessary additions to the CVC granting exemptions. The last steps are the local adoption of the NEV Plan, and, five years later, a report back to the legislature on the safety performance of the network.

The slow speed network strategy for the South Bay does not seek exemptions from the California Vehicle Code since it would be possible to achieve a safe and efficient network within the bounds of what is currently permissible by law and, to a large extent, what is already implemented or planned.

## Crossings

The viability of the slow speed network strategy relies on principles of safety and efficiency in the design of each crossing. NEVs crossing roadways with speed limits of 35 mph or more demand roads meeting at approximately 90-degree angles, preferably at controlled intersections. The network would benefit tremendously from multimodal traffic control at these intersections. Multimodal traffic control, discussed in the Barriers and Opportunities section of his report, utilizes cameras and other sensors to distinguish between cars and slow modes, giving priority and providing safety to non-car modes as the network traverses intersections. The network crosses major thoroughfares at controlled intersections and anticipates ways of overcoming major infrastructural barriers, some of which are presented as annotations to the sub-regional map.

Aside from what can be addressed through regulations or policy principles, there are numerous physical barriers presented by freeways, industrial areas, and the presence of wide roads with fast moving traffic. It's outside the scope of this plan to provide comprehensive design solutions to overcoming these specific barriers. **Next steps toward realizing the slow speed network strategy require examining each intersection in the network in detail, case by case. A toolkit of approaches would emerge from a network wide study of intersections.** The design of a standard kit of parts should be developed to solve the access points to the Dominguez Channel or Harbor Subdivision Slow Mode Thruways from streets, and from the sub-regional network. Guidelines should be developed for how slow modes would make left hand turns. These are just a few of many examples of the scope of a next level of study specifically addressing crossings.



Slow Speed Network Facility Types					
Shared between slow on-street modes: NEVs, bicycles, and all other rolling modes that travel < or = 25 mph					
Design Guidance/Standards	Off-Street	Striped Dedicated On-Street	Separated Dedicated On-Street	Shared On-Street	
Adapted from HDM***	Class I shared NEV/bike/ped	Class II shared NEV/bike	Class IV shared NEV/bike	Class III shared NEV/bike	
City of Lincoln 2011 Evaluation;	10' minimum	7'			
Adapted from HDM	12' recommended				
City of Lincoln 2011 Evaluation;	14' two way				
Adapted from NACTO Guidelines			7' and 1' buffer		
NACTO Guidelines				10' for each travel lane	
Eligible Under the Following Conditions					
Adapted from ATSP	Always	Preferred low-stress roadway§		Low stress roadway**	
Adapted from California Vehicle Code		< or = 35 mph speed limit	Always eligible but recommended for low stress roadways	< or = 25 mph speed limit	
Available Design Features					
Precedents/Best Practices: CV Link, City of Lincoln	Wayfinding and signage	Wayfinding and signage	Wayfinding and signage	Wayfinding and signage	
	Greenway park amenities, lighting, signage, safety call stations, controlled crossings.	Striped and/or painted lane, controlled crossings	Various separation methods including curbs, bollards, planters, parked cars or combinations of the above.	Various traffic calming methods to maintain low traffic speeds and volumes	
	Prioritized/protected access points	Prioritized/protected intersection	Prioritized/protected intersection	Prioritized/protected intersection	
Notes					
* For Class II shared NEV/bike/slow modes lanes, a low-stress roadway is defined as having an NEV/bike lane adjacent to the curb, rather than parked vehicles, and with no more than two general purpose travel lanes. Although this is preferred for the Slow Speed Network, and even if achieved on stretches of Class II (striped) facility within a city, it would be all the more difficult to implement consistently as the network traverses jurisdictions.					
** For Class III NEV/bike boulevards, a low-stress roadway is defined as having average daily vehicle volumes of no more than 2,000 and 85th percentile speeds at or below 20 mph. For this study, due to lack of accurate data on daily vehicle volumes and actual speeds, posted speeds limits of < or = 25MPH are used to designate the Class III NEV/Bike/Slow Modes network.					





Regional Active Transportation Network Eligible Facility Types (Table 4.1, p. 102, Metro ATSP)				
Regional ATN Design Guidance/Standards		Off Street	Dedicated On-Street	Shared On-Street
Highway Design Manual (HDM) Class. (1)		Class I	Class II and IV	Class III
HDM Class eligible under the following conditions: (2)		Always	A conventional Class II bicycle lane is only eligible on a low-stress roadway (3)	A Class III facility is only eligible on a low-stress roadway. (4)
Available Design Enhancements			Class II bikeways with buffers and Class IV protected bicycle lanes (with various barrier types) are always eligible.	
		Bicycle Freeway (5)	Various separation methods	Various traffic calming methods to maintain low traffic speeds and volumes
		Floating bicycle path (6)	Two-way or contraflow operation	Bicycle boulevards, bike-friendly streets, neighborhood greenways
		Sub-grade bicycle intersection (7)	Protected intersection	Advisory bicycle lanes
Notes				
1. California Department of Transportation, 2015. Highway Design Manual.				
2. Eligible facility types are those that are consistent with Regional Active Transportation Network design standards. Existing or planned facilities meeting these standards are not necessarily included in the Regional Active Transportation Network.				

# Wayfinding Strategy



WalkNYC wayfinding system on Citi Bike kiosk

Metro has developed a graphic language throughout LA County that serves its passengers with an identifiable, clear information system. Building on the strategy for Metro's First/Last Mile program and regional active transportation network (Active Transportation Strategic Plan), the South Bay slow speed network strategy extends wayfinding to nearby environments, including those not well served by transit.

The South Bay Slow Speed Network will support entire journeys with a **consistent brand and information architecture, reinforcing slow mode pathways and providing critical information and context** about a user's location within the overall regional, sub-regional and local systems. Throughout the network, and within Slow Zones, wayfinding messaging should remain constant. However limited custom elements, like logos and colors, can help express the unique identity of a city or neighborhood.

## Overview

Wayfinding refers to graphic communication of location and proximity to destinations, aiding navigation and connecting people to their environments. A successful public wayfinding system is designed to foster quick associations and increase people's awareness and confidence to explore their local surroundings. The many potential benefits of wayfinding, in coordination with other street improvements, include increased economic activity, higher real estate values and improved public safety and health<sup>1,2</sup>.

<sup>1</sup> The Economic Benefits of Sustainable Streets. New York City Department of Transportation, December 2013.

<sup>2</sup> Legible London - a wayfinding study. Central London Partnership, April 2013.

## SLOW SPEED NETWORK WAYFINDING: MULTI-SCALE AND MULTIMODAL



Regional



Sub-regional (on-street)



Local

### Slow Mode Thruways: regional network

The regional level of wayfinding will establish a recognizable brand for the slow mode thruways and overall slow mode system. Analogous to signage found on regional greenways, information will be targeted at the full range of slow mode users (traveling 0-25 mph). The regional system will consist of a strong branding element, confirming location and building confidence in the system, as well as multimodal directions and average travel times to regional points of interest such as beaches, colleges, parks, major transit stops, shopping centers and Slow Zones. Major decision points include exit/entrance locations where the Slow Mode Thruway connects to a Metro rail station or intersects the Sub-regional Network.

### Sub-regional Network

A complementary, largely on-street, system will be established for the Sub-regional Network, emphasizing a continuous relationship with signage found at the slow mode thruway and Slow Zone levels. Information at this scale is primarily targeted at users traveling 12.5-25 mph, and the content will be more focused on traveling to/from and around Slow Zones and regional destinations. Gateway signage on the Sub-regional Network will indicate when the user is entering a Slow Zone. Example information at the sub-regional level includes directions and travel times to Slow Zone pedestrian cores, parking facilities, electric charging stations and significant destinations like parks, civic centers and shopping streets.

On-street signage should be coordinated with other neighborhood safety signage (e.g. school safety signs). Additional public outreach may be needed to address concerns over new signage on residential streets.

### Slow Zone pedestrian core

At the pedestrian core level, information will be targeted at modes traveling between 0-12.5 mph. The general form and content of this system should have a direct relationship with the sub-regional and regional networks, although certain graphic elements can be modified to accommodate the local brand of each Slow Zone. Information can be displayed in schematic or map mediums at this level, as pedestrians on foot are more likely to stop and absorb detailed content about their surroundings. Example information at the local level includes directions and travel times to shops, parks, schools, transit and slow mode connections.



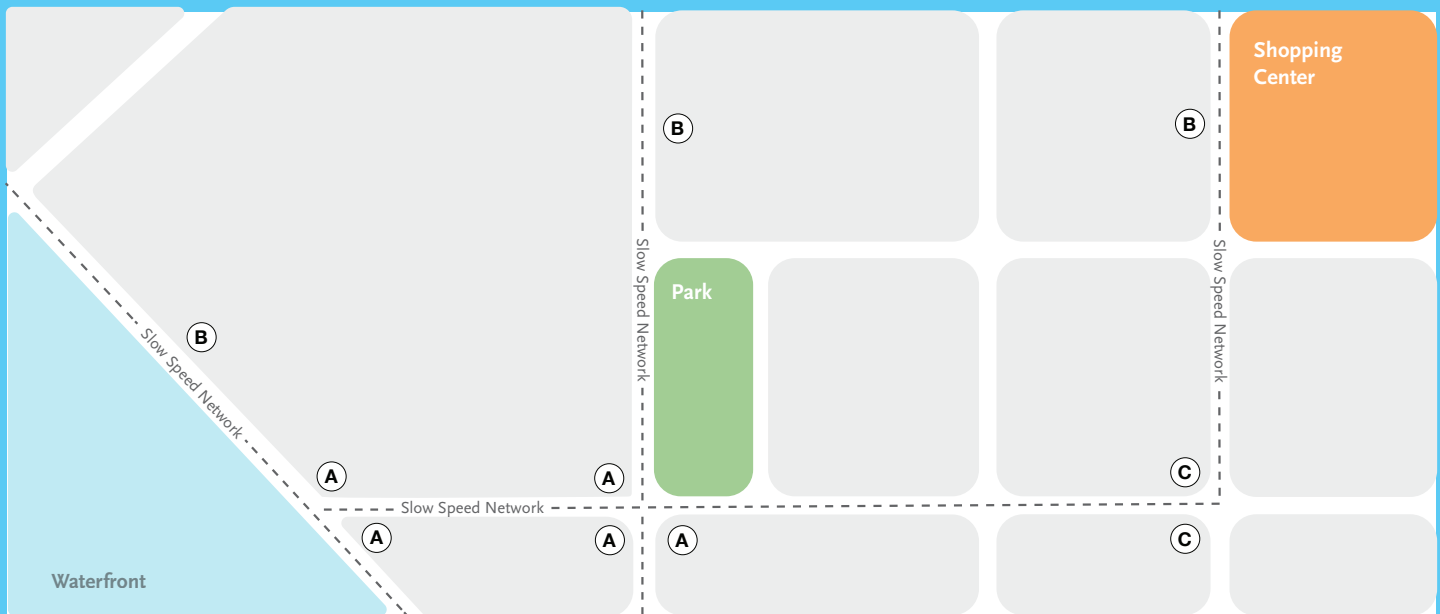
Legible London bike path signage

## Example on-street sign types

Although no standards currently exist within the MUTCD or CA-MUTCD specific to NEVs or other slow modes, Chapter 9 of the MUTCD and CA-MUTCD contains standards for bicycle signage and markings. These guidelines should be adapted to inform a comprehensive and effective on-street wayfinding system that works in tandem with existing pedestrian

and bicycle signage. The system should include decision, confirmation and turning signs as shown below.

Since no federally approved pictorial standard for NEVs currently exists, a graphic symbol should be developed to increase awareness of NEVs on the slow speed network. The City of Lincoln, CA offers precedent.



Guidelines adapted from NACTO Urban Bikeway Design Guide. United States: Island Press, 2013.

### A Decision Sign



Decision signs mark the junction of two or more slow speed routes to facilitate decision-making. It is recommended to include arrows and distance or time to selected destinations

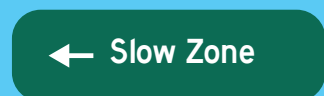
### B Confirmation Sign



Confirmation signs work together with pavement markings to indicate to users that they are on a designated slow speed route. These signs also serve to remind people in cars and on bicycles to share the road with NEVs and other slow speed modes.

These signs can include destinations and distance or time, but should not include arrows.

### C Turning Sign



Turning signs mark where a slow speed route turns from one street onto another street. They should also be coordinated with use of pavement markings.

These signs should include destinations and arrows, and may include distance or time.



## Digital vs static wayfinding

Most public wayfinding systems consist primarily of static physical signage. The physical permanence of signs establishes authority, builds brand identity and reinforces fixed routes. However, advances in open data and real time technologies present new opportunities to integrate digital features and/or reinforce physical systems with personalized digital systems.

Many cities and transit agencies already display real-time travel information and collect data on network travel patterns. Data collected on travel speeds, popular destinations and preferred routes can be looped back into the slow speed network, signaling the need for permanent route changes or temporary detours depending on factors such as the time of day, weather patterns, or special events. However, an important consideration with digital signs are the significantly increased costs due to electrical power supply, industrial designs for outdoor resilience and overall maintenance.

Digital smart-phone navigations apps will guide slow mode users along variable trajectories, for example from their homes or places of work, to the fixed slow speed network. Widely used navigation apps (Google and Apple Maps) as well as targeted multimodal travel apps (e.g. Moovit, Transit, Citymapper, GoLA), could potentially be adapted to specific slow modes, offering personalized routing information and suggested destinations based on user preferences and mode choice. This added layer of digital information should be coordinated with physical signage, matching the appropriate form and content at each respective scale within the overall slow speed network.

## Opportunities and next steps

The First/Last Mile Strategic Plan and ATSP recommend measures to extend the reach of transit throughout LA County through a variety of interventions to improve pedestrian and biking infrastructure. These efforts require Metro to collaborate and coordinate with cities and agencies such as the SBCCOG.

Metro graphic and signage guidelines can be adapted to accommodate local branding, signage network planning and system maintenance for the South Bay slow speed network. For example, the model adopted in London for roll out of its system is a collaboration between Transport for London (TfL) and local boroughs, where TfL maintains the core elements of the system, including the mapping information. The local borough works together with TfL, and sometimes design or planning consultants, to fine tune location of the signage and some of the information content for best implementation.

The reach of Metro services across LA County means the vast majority of residents, particularly transit users, already use Metro signage to assist them on their journeys. Coordination with Metro on signage and wayfinding guidelines for the South Bay slow speed network will save money on design development and implementation. Other transit providers in the South Bay should also be included in the discussion, as coordinated passenger information is in the best interests of customers.

Several pilots can be initiated with ties to First/Last Mile and ATSP regional network projects to develop the system — proving the concepts and testing Metro collaboration models with local jurisdictions. The direction forward should be established in a strategic plan describing a regional inter-modal wayfinding system supporting trip chains and complete journeys in non-car modes.

# Electric Slow Mode Charging



Currently the South Bay has around 600, 000 full speed fossil-fueled vehicles . Electric vehicle supply equipment (EVSE) strategies are key to converting the full speed fleet to electric. These strategies should include charging for electric slow modes such as NEVs, e-bikes and others. If people saw that slow mode charging was convenient, affordable and accessible, with charging stations predictably and widely distributed, they might be more inclined to choose NEVs or other electric slow modes for short trips.

The EVSE infrastructure needs of electric slow mode vehicles are simple. NEVs can be charged in 6-8 hours from a standard 120V wall outlet. The battery can also be topped off wherever the driver can find an opportunity to plug it in. Polaris, the manufacturer of the GEM, also makes an NEV battery that can be charged using a Level 2 charger, the 240V plug most common for full speed electric vehicles. Electric bikes can travel between 15 and 30 miles on a charge from a standard wall outlet, and charging to full capacity takes between 2 and 6 hours. Other smaller slow modes, consumer electronic devices such as e-scooters and URB-E's, take less time to charge and again, from a standard household outlet.

Slow modes can be conveniently charged at home overnight without modifying electrical equipment, but to provide NEVs and other electric slow mode vehicles a more prominent role in the public realm, charging should be available on shopping streets in Slow Zones, in public parking lots associated with transit, at employment centers, malls and all other regional destinations. Cities and the COG could also encourage building owners and employers to offer slow mode charging anywhere people stay for several consecutive hours, such as at work<sup>1</sup>.

Public agencies, building owners and cities could co-locate charging for slow modes with charging for full speed cars. The hubs for shared NEVs, in Slow Zones, near transit, employment centers, and regional destinations, may sometimes also be the best location for EVSE for full speed cars. This is especially relevant for shared NEVs that use Level 2 (full speed EV) chargers.

## Electric charging and slow speed network identity

Public charging facilities could form an important part of the identity of the slow speed network, providing a key programmatic element and design feature to Slow Zone centers and hubs. Wayfinding and signage along the slow speed network would tell users where charging is available. In Slow Zone centers and at NEV sharing hubs, charging for slow modes would take place at designated parking spots, including overnight while the vehicles are not in use. At Metro stations, slow mode charging could help make NEVs a viable part of the trip chain, useful to commuters. NEVs parked by commuters at a transit station hub during the day could even be shared for short trips.

## Charging and private development

There are also good opportunities for privately owned charging stations. The Luskin Center's 2013 South Bay Cities Plug-in Electric Vehicle (PEV) Deployment Plan focused on private sector EVSE for full speed vehicles, but as such, provides a systematic way of considering locations where slow mode EVSE can be co-located.

The Luskin study provides inventories of land uses at the sub-regional and municipal level to prioritize EVSE at three types of locations: multi-unit dwellings (MUDs), workplaces, and commercial/retail centers. It evaluates the suitability of hundreds of individual parcels to host PEV charging using criteria that represent supply of parking spaces, the relative cost of installing chargers, and parcel-level demand for charging. It also includes maps of PEV registrations and travel patterns to daytime destinations within all South Bay cities. The study recommends making specific employers and owners of existing commercial centers aware of the benefits of EVSE, and providing them assistance in installing chargers.

The report recommends cities require EVSE in new construction - of multi-unit dwellings, commercial centers and employer-owned parking - as well as in new and shared public facilities. Retrofitting slow speed charging in existing buildings is easy since podium and underground parking structures will already have 110V outlets. It might be feasible for employers to widely offer Level 1 charging for both full-speed PEVs, and Local Use Vehicles since "4 to 8 hours of 110v charging will get most drivers home"

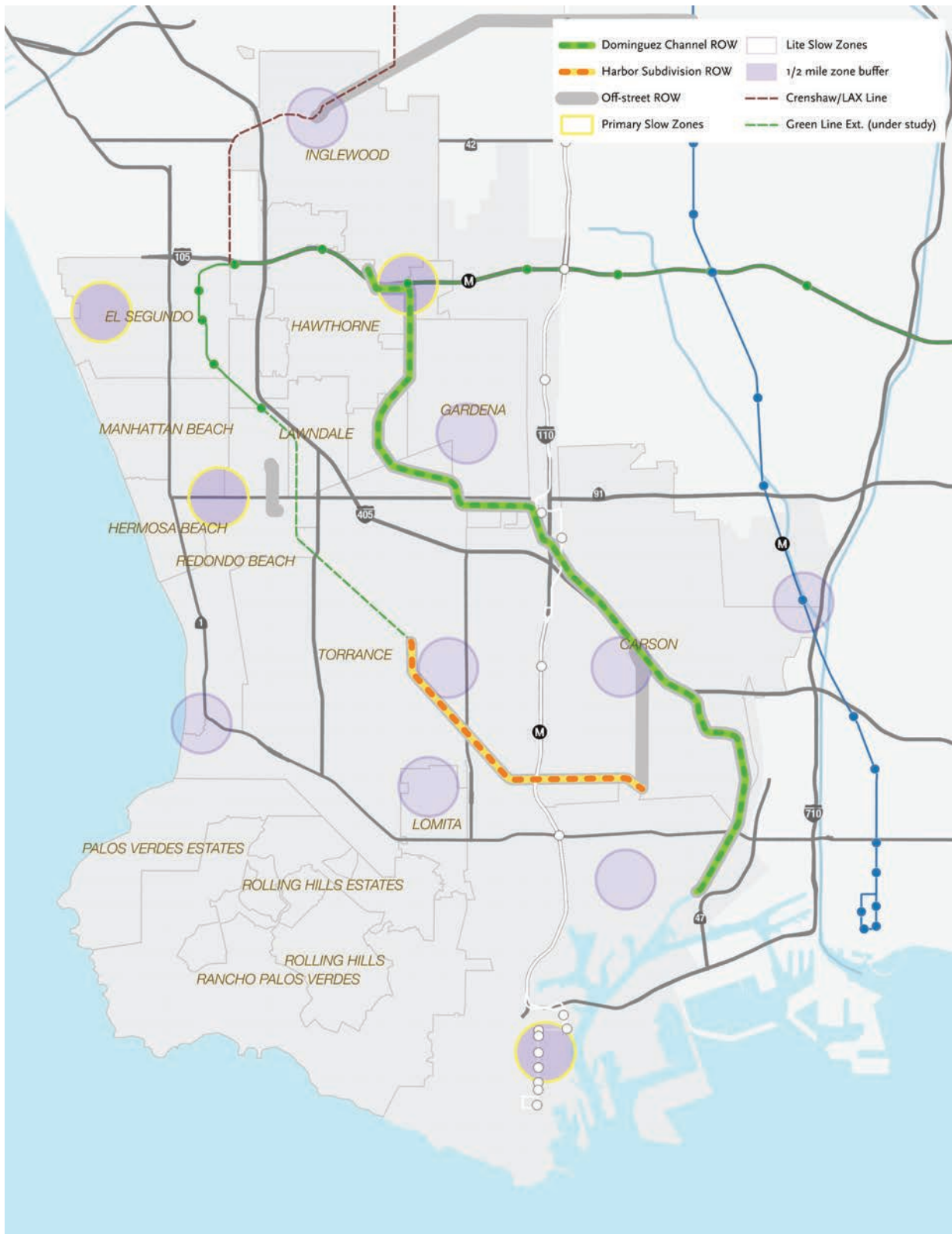
## Planning framework for slow mode charging

Cities investing in slow mode charging, including providing guidance and information, would most likely be building on an entire planning framework that supports sustainability and livability. Land use policies would support mixed-use development, denser housing, and shortening the distance between employment and housing. Transportation policies would encourage the use of active transportation, slow modes and EVs, maintaining focus on these forms of mobility even as technology and market conditions change. At a more detailed level, Specific Plans and Zoning Ordinances would provide direction on an entire range of slow mode issues, including facilities, access, and charging stations for new construction. Cities would provide information on the costs and benefits of Level 1 charging, as well as smoothing the path to Level 2 EVSE installation by eliminating fees and streamlining permitting and inspection.

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<sup>1</sup> South Bay Cities Plug-in Electric Vehicles (PEV) Deployment Plan. Luskin Center 2013.

# Slow Mode Thruways: Regional Network





## Dominguez Channel

The Dominguez Channel extends diagonally across the South Bay. Currently, a few segments along the channel are either planned or implemented bikeways. Turning the channel into a zero-emissions active and slow mode transportation corridor would dramatically expand mobility options in the sub-region. The Dominguez Channel links residential neighborhoods to places of employment, commerce and educational institutions including a number of schools, and El Camino College. The Los Angeles County Flood Control Districts would need to approve NEVs as permissible vehicles on the multi-use path. The patchwork of jurisdiction over the channel's easements would need to be consolidated. Some portions are currently under the direct control of the Flood Control District while other portions are leased out to cities and other entities. Entrances and exits from the channel, as well as roadway crossings, would need to safely accommodate the range of slow modes.

For flood control reasons, the channel capacity will be increased over the course of the next ten years, offering an opportunity to bundle new slow speed transportation infrastructure with the new waterway initiative.

## Harbor Subdivision

The Harbor Subdivision is a Metro-owned railroad right-of-way (ROW) in southwestern Los Angeles County, running approximately 26 miles south of downtown Los Angeles to the Carson/Wilmington border. The Crenshaw/LAX transit corridor, South Bay Green line extension, and Rail to River projects all utilize sections of the Harbor Subdivision ROW.

Metro completed an Alternatives Analysis (AA) in 2009 for the entire Harbor Subdivision Transit Corridor. The study compared alternative use cases and included consideration of amenities needed to facilitate all modes of access to and from stations, including pedestrian and bicycle infrastructure.

As a result of the Alternatives Analysis, Metro is currently conducting an environmental review of the South Bay Green Line extension from Redondo Beach to a proposed transit center in Torrance. The extension, as well as the additional Metro-owned ROW south to the Carson/Wilmington border, was considered as part of the Slow Mode Thruway analysis. By virtue of its inclusion in this study, it should not be assumed that the Harbor Subdivision is available to accommodate slow modes. Any further implementation action for the slow speed network considering this ROW would need to be coordinated with the transit corridor planning process currently underway.

## Regional network comparison

	<b>Harbor Subdivision (11 miles)</b>	<b>Dominguez Channel (16 miles)</b>
<b>People</b>	204,700	210,400
<b>Workers</b>	87,300	95,000
<b>Students</b>	39,500	52,500
<b>Park area (sq. miles)</b>	256	113
<b>Hospitals</b>	2	4
<b>Bus stops</b>	265	629
<b>Retail area (sq. miles)</b>	396	936

### Notes:

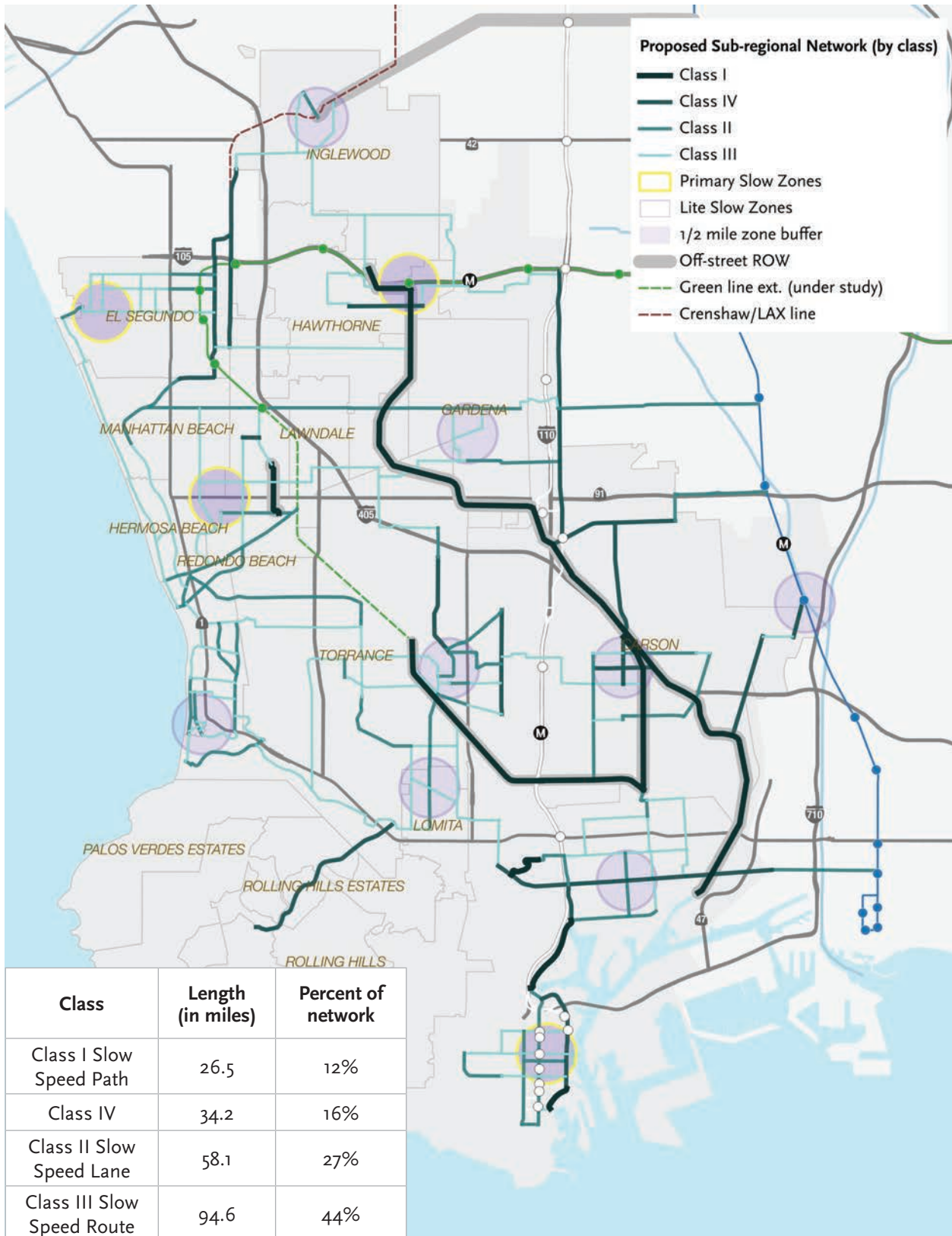
- Data includes areas one mile on either side of ROW.
- For purposes of comparison, Harbor Subdivision calculations include ROW south of the existing Green line service (currently under study by Metro) to the Carson/Wilmington terminus.
- Population, worker and student data courtesy of RTI International<sup>1</sup>.

<sup>1</sup> Wheaton, W.D. (May, 2014) 2010 U.S. Synthetic Population Ver. 1. RTI International. Retrieved from <https://www.epimodels.org/midas/Rpubsytndata1.do>.

# Sub-regional Network



# Sub-regional Network by Class



# Slow Zones: Local Network

## Selection of Slow Zones

Selection of the following Slow Zone centers and corridors included the analysis of relevant demographic, economic and mobility metrics, evaluation of future development areas and trends, and local organizational capacity and interest. Area selection also took into consideration the range of demographic patterns and land use types in the South Bay.

### San Pedro

San Pedro's past, present and future are tied to the Port of Los Angeles, which is partly in San Pedro. The area's appealing old port-city quality is preserved thanks to the twenty-five miles separating it from downtown Los Angeles, and to its relative isolation from other cities. The historic downtown benefits from wide sidewalks, alleys, and pedestrian lighting. Housing, shops and restaurants in pre-WWII era buildings feature historic ornaments and finishes rare in the Los Angeles region. New offices and housing in the blocks surrounding the historic core indicate the area will only grow as a commercial destination. The San Pedro Public Market, the new development planned for the site of the current Ports O' Call, promises to be a regional attraction, expanding and evolving in phases.

San Pedro's bike infrastructure, residential streets, sidewalks and alleys lend themselves very well to non-car modes. The 2016 Mobility Plan by the City of Los Angeles picks up on this, suggesting street enhancements that encourage active modes. Building on this planning, the Slow Zone strategy fosters local connectivity and local business, and strengthens access from downtown to the San Pedro Public Market.

### North Redondo

Artesia Boulevard, the pedestrian heart of the Slow Zone, is a mile and half boulevard of restaurants, small businesses and some auto-serving uses. Surrounding it are small blocks of attractive single and multi-family housing on very narrow streets. The neighborhood has a dense, close-knit quality that lends itself comfortably to walking and biking. There is senior housing, a small park and a range of retail amenities at the Aviation Blvd. end of the area, and the South Bay Galleria on the other end. In between, the Edison corridor ROW active transportation path intersects Artesia. A new Metro Green Line

station will eventually be built on the site of a transit center planned just southwest of the Galleria. The Galleria itself will soon undergo renovation.

The pedestrian core of the North Redondo Slow Zone would be distinguished through improved sidewalks and new decorative crossings, signage and wayfinding. The on-street network, with slow mode infrastructure, signage and wayfinding, provides access to the Artesia Boulevard corridor by on-street slow modes, and connection to the Galleria and the Metro Green Line station. The Slow Zone concept is in keeping with the extensive analysis, projects, programs and outreach carried out in the area by the Beach Cities Health District, local advocates of community health and sustainability. It also supports the efforts of the North Redondo Beach Business Association to promote small businesses on Artesia.

### El Segundo

The large commercial and employment districts on the eastern side of El Segundo, which are also the site of three Metro Green Line stations, are notably separate and entirely different in use and character from the quadrant on the city's western edge with the City's only housing, schools, civic functions, and main street with busy restaurants and shops. On the southern edge of this residential quadrant is a small stretch of a few blocks of undulating hills, centered on Franklin, with an intriguing mix of housing and light industrial facilities and offices popular with small businesses. The area is genuinely mixed use and less corporate than the rest of the city. With relatively modest effort, it could be a real standout in the region, functionally and aesthetically, if distinguished as a Slow Zone.

The slow speed strategy provides policy and planning direction for establishing the Slow Zone and linking it, with NEVs, e-bikes, bikes and other on-street modes, from the Main Street/Franklin mixed-use area to the employment districts and Green Line.



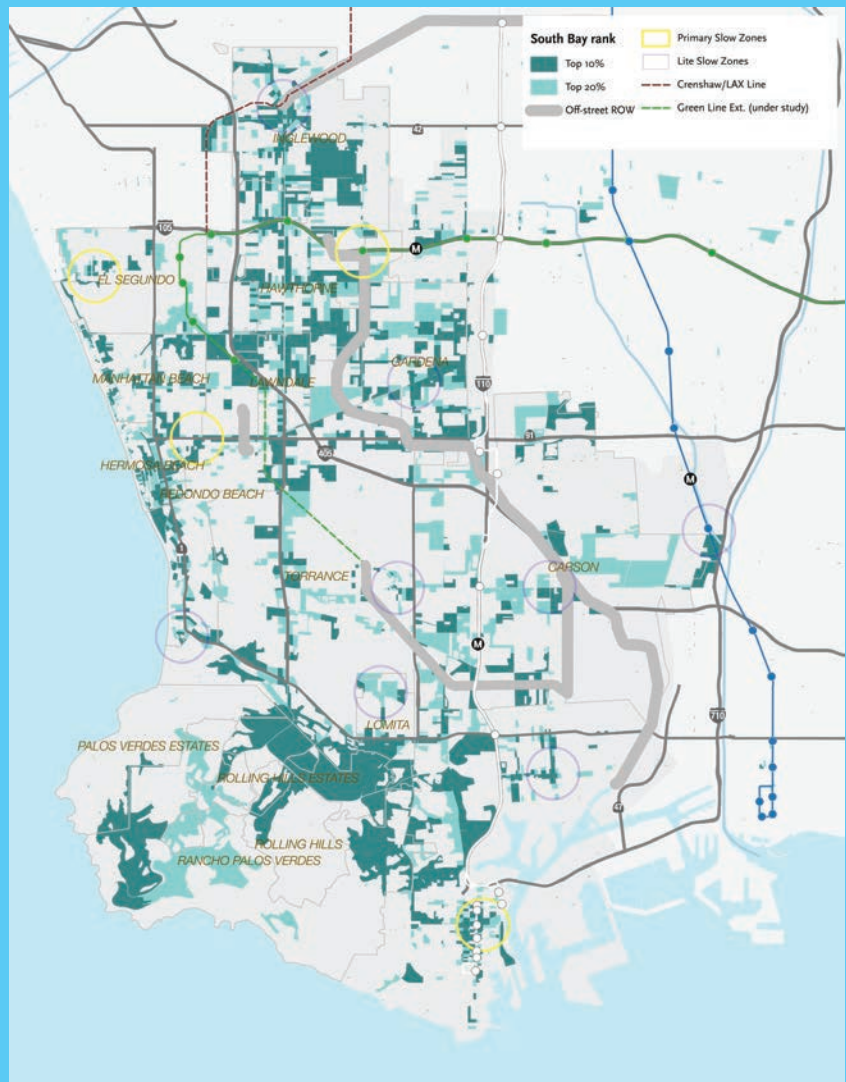
## Selection of Slow Zones: data-driven approach

The project team provides a data-driven method to objectively identify and prioritize areas using demographic and land use data that indicate conditions throughout the South Bay sub-region that could support Slow Zone development. A rigorous method breaks down data from larger geographic units (e.g. census blocks, traffic analysis zones) to the individual city block level.

All data inputs are then aggregated at the block level and assigned a composite ranking, allowing for a more accurate, and scale-appropriate, comparison across locations.

The composite ranking is comprised of a calculation of the following variables by block:

- > Residents
- > Workers
- > Students
- > Neighborhood Mobility Area score - composite score developed by SCAG. (see appendix B for more details)
- > Transit ridership volume (average on/off boardings by stop per station)
- > Retail area (land use)
- > Park area (land use)
- > Safety (derived from land use) - Industrial and vacant is scored as less safe while high concentrations of retail and residential are scored as safer.
- > Street/Intersection density (based on size of blocks) - Higher density of streets and intersections are more amenable to development as Slow Zones.



The top 20% scoring blocks, as well as selected primary and lite Slow Zone areas, are shown on the map above.

Resident, worker, student data:

Wheaton, W.D. (May, 2014) 2010 U.S. Synthetic Population Ver. 1. RTI International. Retrieved from <https://www.epimodels.org/midas/Rpubsyntdata1.do>.

## Hawthorne

The streetscape in the area around the Crenshaw Metro Green Line Station is in dire and immediate need of major upgrades, just as it was two years ago when a plan was produced for the City for pedestrian, active transportation and NEV infrastructure<sup>1</sup>. The elevated Metro station straddles Crenshaw Blvd, with entrances under the 105 freeway accessed by crossing either 120th street, from the South, or freeway on-ramps from the north. Both 120th street and Crenshaw Blvd. are dominated by fast moving traffic, including trucks. The strip mall just south of the station, which features a Starbucks, is accessed from the sidewalk on Crenshaw by a provisional staircase made of railroad ties set unevenly in a steep earth berm.

This was a complaint in public meetings in 2014, during the outreach phase for a previous report. The Metro station itself, although under the freeway, is clean and well lit, with colorful mosaic tiles lining the concrete. The adjoining Metro owned parking lot is well utilized and accessible to the station. South of the station across 120th is Hawthorne's small airport, and Space-X, among the largest employers in the South Bay. Just south of there is Lithographics, another fairly large employer. Extending southward into Hawthorne alongside Space-X's tall parking structure, the Dominguez Channel has a wide asphalt pathway that bikes and pedestrians could use, but with no shade, and no consideration to design. The pedestrian environment in the station area is unsafe, loud and full of fumes from fast-moving cars and trucks. The adjoining residential neighborhoods of single and multi-family housing need safer and better access.

There is an opportunity, in the Slow Zone, to do even more than save lives and improve access to local retail, or incentivize use of transit. A thorough redesign of pedestrian crossing facilities, including signalization systems that protect pedestrians and non-car modes, would be a key priority for connecting residents and employees to transit. Another crucial ingredient would be to design the Dominguez Channel path as a multimodal non-car greenway. It would serve as a park, and offer zero-emissions connectivity at the same time. Of utmost importance would be to consider the greenway as a conduit not just to the Metro station but as part of a larger mobility system that extends to downtown Inglewood and the residential and commercial areas in between.

The Slow Zone would not only offer a high standard of safety to pedestrians, it could achieve a uniquely appealing physical environment, building upon the exceptional range of uses, massing, and multimodal movement through the Zone.

The Hawthorne station area provides challenges, but the challenges are also what give it the potential to be exceptional. With creative, state-of-the art design of linkages, streetscapes and treatments, this Slow Zone could be a regional attractor, rather than a detriment to local health.

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<sup>1</sup> SCAG, City of Hawthorne. 2015. Crenshaw Station Active Transportation Plan, Neighborhood Electric and Electric Vehicle Strategies, and Overlay Zone.

## Walk audit

Due to lack of available data, our team created a standardized approach for evaluating infrastructure for slow modes that collects data on sidewalks and street edges within Slow Zones.

This approach blends inputs from the First/Last Mile Strategic Plan audits with additional measures regarding the quantity and quality of physical infrastructure. While the former audit method captures additional subjective measures (e.g. safety, aesthetics) and focuses on the overall condition of station area, the walk audit aims to create a more objective, block-by-block approach to data collection.

Information on the following infrastructure elements are currently collected:

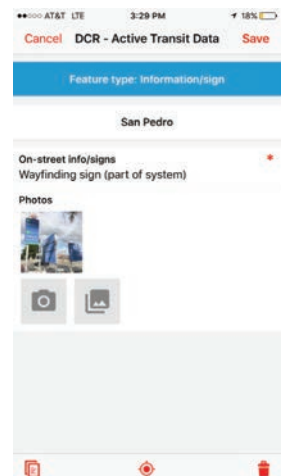
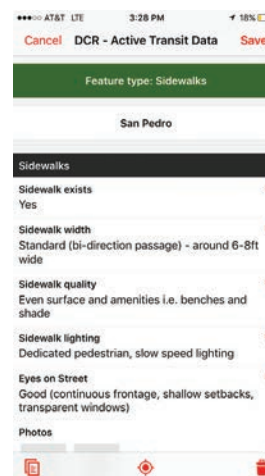
- > Sidewalks
- > Street Edges
- > Corners
- > Crossings
- > Information/Signage
- > Physical barriers (geo-tagged photos)

Slow mode walk audit data results are actionable - meaning that data can be used for planning, pricing and measuring potential outcomes such as increased mobility, access and safety. Audit results can be used and presented differently for a variety of audiences including statewide and regional funding and planning agencies, local planning and public works departments and community organizations.

Our team initially tested methodology with paper-based maps and surveys. However, in an effort to streamline the data collection and subsequent analysis process, a digital tool was created using an “off-the-shelf” platform shown in the screenshots below. The approach presented here should be considered and adapted for future Metro First/Last Mile planning studies.

Data collection for the entire 1/2 to one mile Slow Zone was beyond the scope of this work -- current analysis results shown on the following pages only cover the extents of the approximately 1/4 mile pedestrian core areas within Slow Zones.

## WALK AUDIT - EXAMPLE DATA



## Sidewalk and Street Edge Audits for Slow Speed Zones

Block Level Inputs		Block Level Ratings	Definition
Streets	Speed limits	0	More than 25 mph
		1	Less than or equal to 25 mph
	Moving Lanes	0-5	0 to 5+ lanes
	Bike Lanes	0	None
		1	Sharrows
		2	Painted lane
		3	Protected lane
		4	Separated Path
Sidewalks	Sidewalk exists?	0	No
		1	Yes
	Sidewalk width	0	Too narrow (single direction passage)
		1	Standard (bi-direction passage)
		2	Even wider, supporting wheelchairs, walkers and strollers
	Sidewalk quality	0	Uneven or poor surface
		1	Good, even surface
		2	Even surface and amenities, i.e. benches and shade
		3	Dedicated pedestrian and rolling slow speed lanes/mall
	Sidewalk lighting	0	Doesn't exist
		1	Street lighting or ambient light
		2	Dedicated pedestrian, slow speed lighting
	Eyes on street	0	Poor (vacant lots, parking lots, large setbacks)
		1	Average
		2	Good (continuous frontage, shallow setbacks, transparent windows)
	Crossing type	1	Standard crossing
		2	Mid-block crossing
		3	Wide crossing (more than 2 lanes in each direction)
		4	Crossing w/refuge island
		0	No stop signs/signals



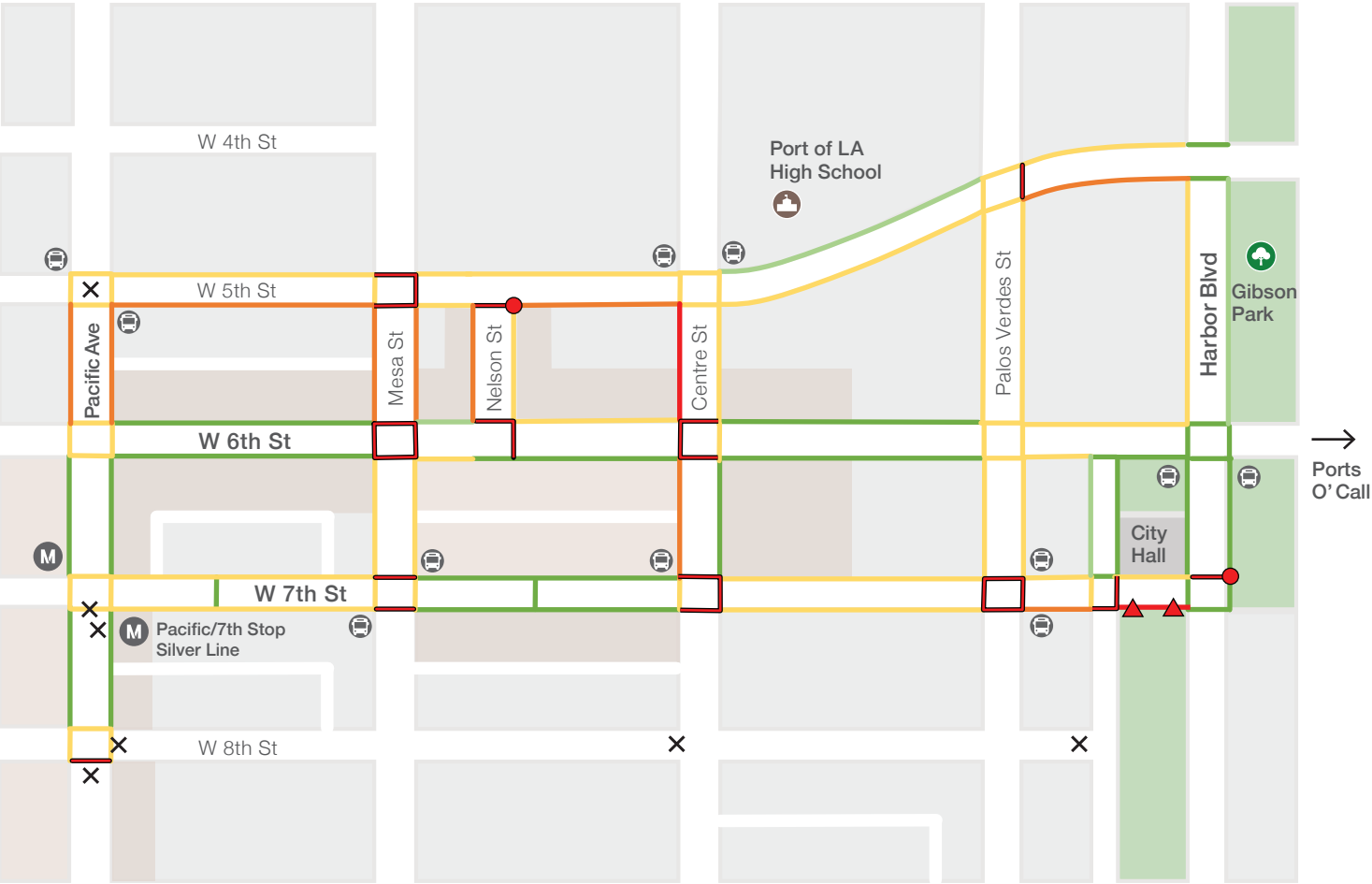
Crossings	Traffic control	1	Stop signs
		2	Stop lights
		3	Yield signs
	Crosswalks	0	No crosswalks
		1	Standard crosswalks
		2	Striped/zebra crosswalks
		3	Decorative
		4	Diagonal/scramble
	Slow speed controls (select all that apply)	1	Standard walk signal
		2	Countdown signal
		3	Countdown with voice
4		Flashing beacons	
5		Bike controls	
Corner	ADA compliance	0	No ADA ramps
		1	ADA ramps
		2	Tactile ADA ramps
	Visibility	0	Obstructed
		1	Standard
		2	Enhanced
On-Street Info/Signs		1	Street sign missing
		2	Place branding
		3	Wayfinding sign (part of system)
		4	Ped/bike safety
		5	Ped/bike route sign
		6	Clutter
Other/Barriers		None	Geo-tagged photos, notes

The walk audit results for each Slow Zone pedestrian core are displayed in maps on the following pages. This evaluation system was developed to enable scoring for each feature (sidewalk, crossing or corner) - a higher score indicates better support for pedestrian and rolling modes.

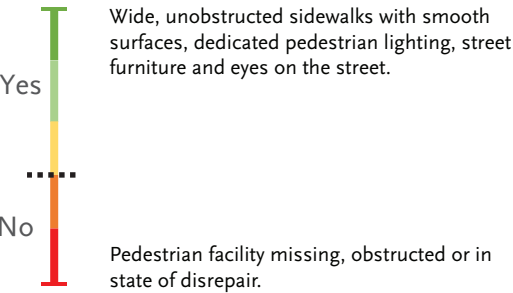
The mapping of this information emphasizes connectivity, safety and other major areas to target infrastructure improvements.

Data captured digitally and verified in the field was post-processed in GIS to facilitate this analysis. Ranges were developed for categorizing data, and are represented on a red to green color scale. Further development of the audit tool requires data collection in other study areas to add refinement and precision to the analysis process.

San Pedro Slow Zone pedestrian core walk audit results



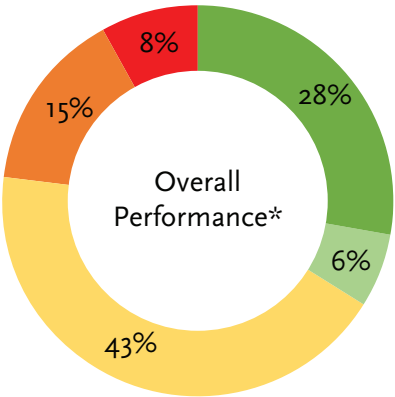
Supports pedestrian modes?



- No ADA ramp
- No crosswalk
- ▲ Obstruction (e.g. tree, utility pole, etc.)
- × Fatal crash location (ped/bike vs car)  
2005-2014 SWITRS data

5 min. walk

The deficiencies shown above, coded in red and orange, need to be addressed to bring the San Pedro Slow Zone pedestrian core to a state of good repair.



\* percent of total road miles in each category

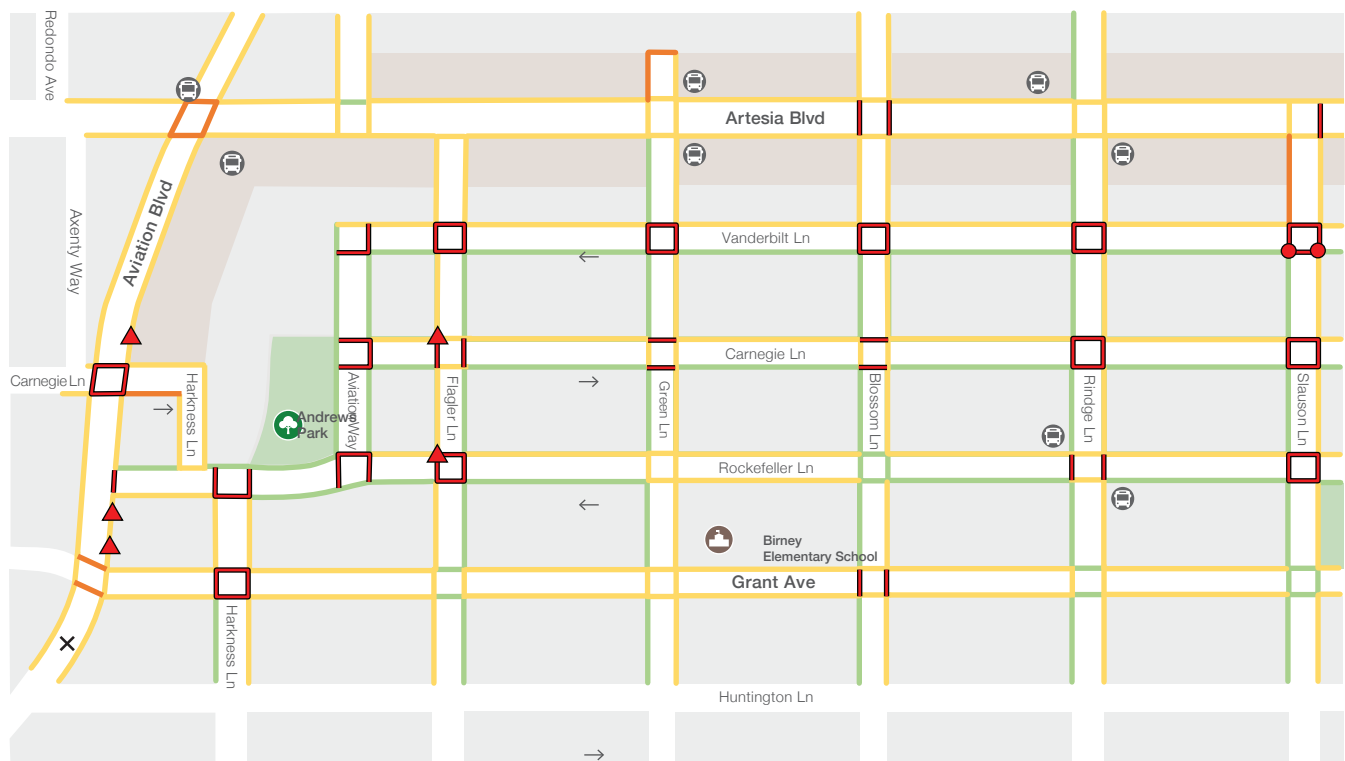
San Pedro Slow Zone pedestrian core recommendations



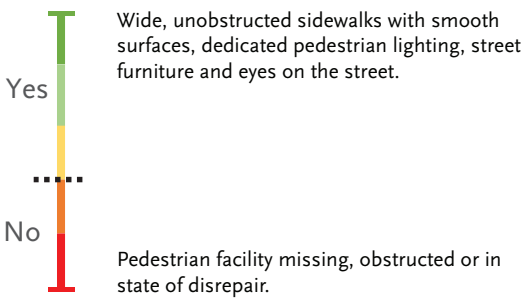
Sub-regional Network in the San Pedro Slow Zone



North Redondo (West) Slow Zone pedestrian core walk audit results



Supports pedestrian modes?

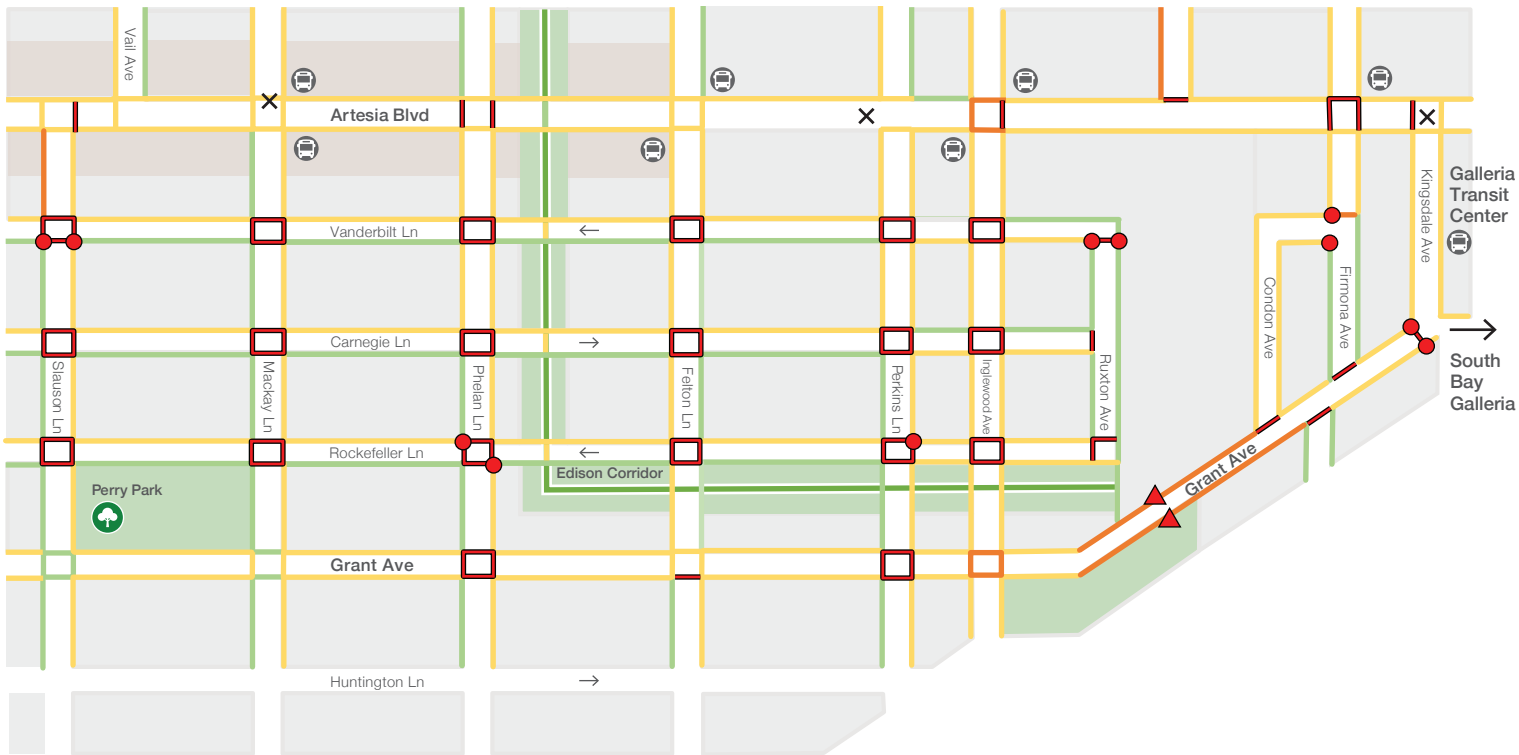


- No ADA ramp
- No crosswalk
- ▲ Obstruction (e.g. tree, utility pole, etc.)
- ✕ Fatal crash location (ped/bike vs car)  
2005-2014 SWITRS data

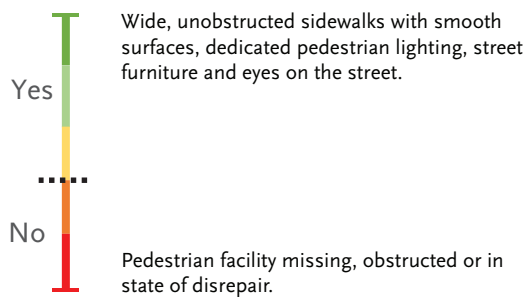




North Redondo (East) Slow Zone pedestrian core walk audit results



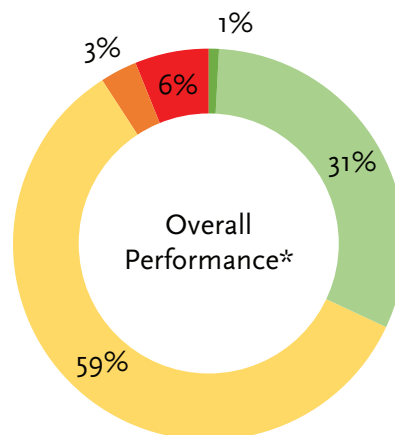
Supports pedestrian modes?



- No ADA ramp
- No crosswalk
- ▲ Obstruction (e.g. tree, utility pole, etc.)
- × Fatal crash location (ped/bike vs car)  
2005-2014 SWITRS data

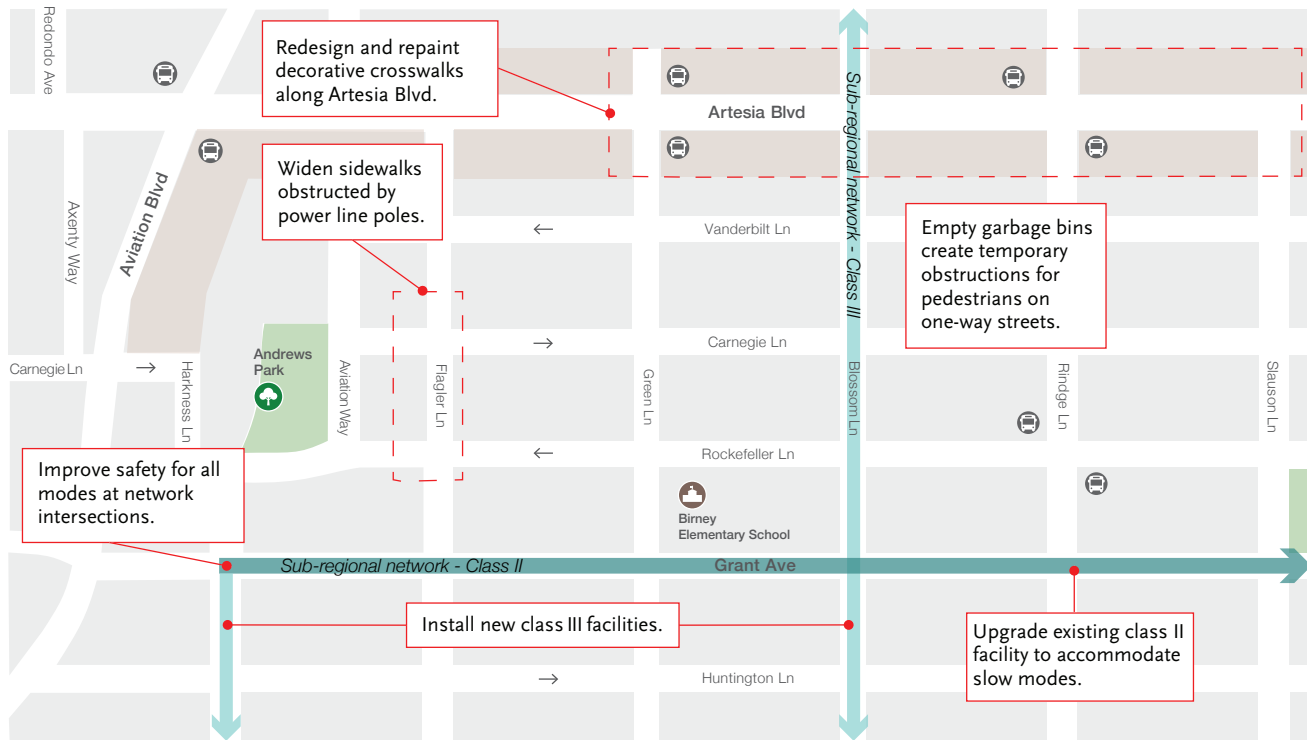
5 min. walk

The deficiencies shown above, coded in red and orange, need to be addressed to bring the North Redondo Slow Zone pedestrian core to a state of good repair.

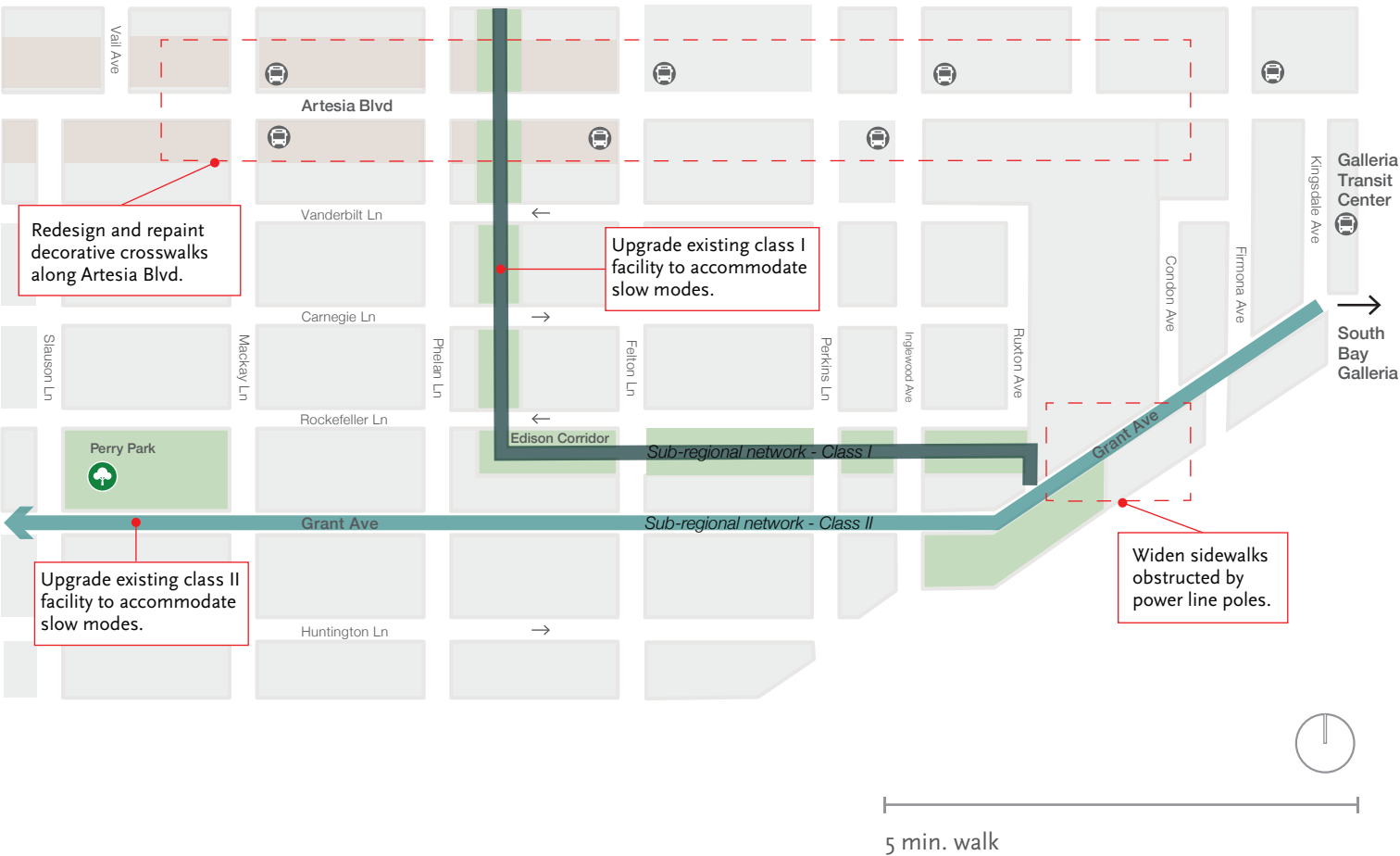


\* percent of total road miles in each category

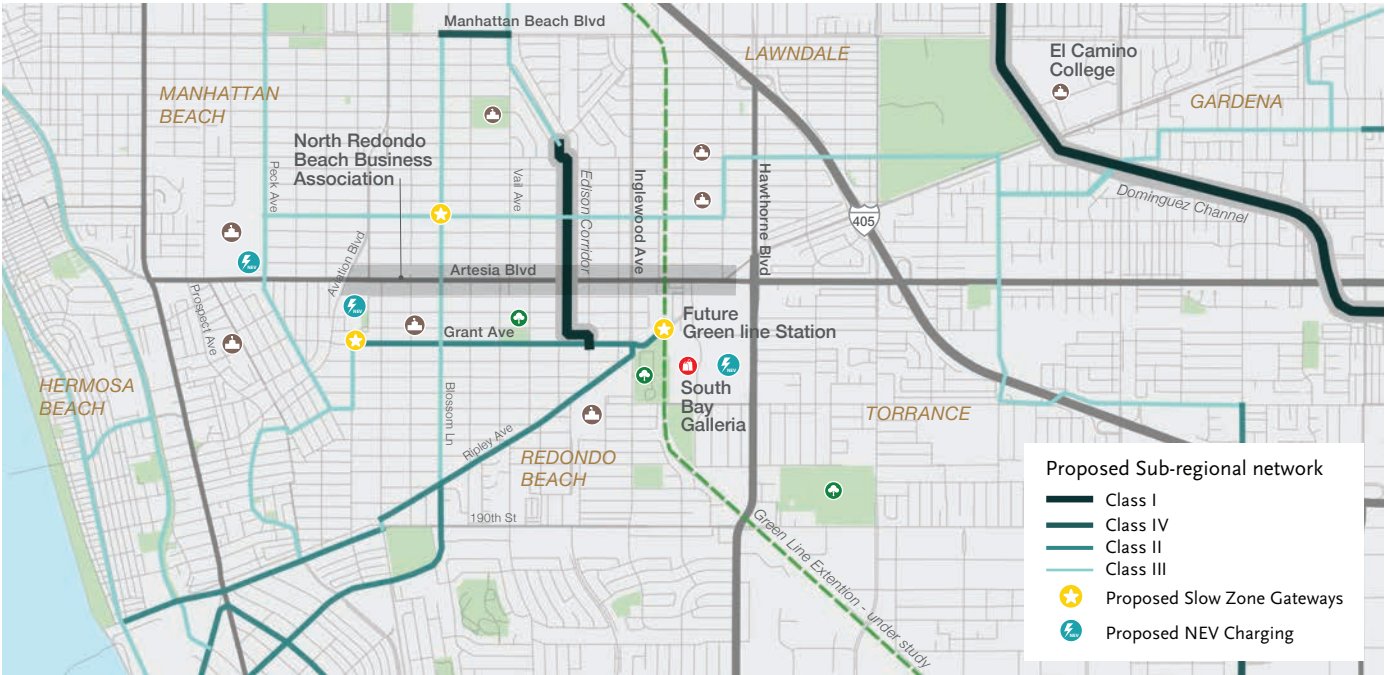
## North Redondo (West) Slow Zone pedestrian core recommendations



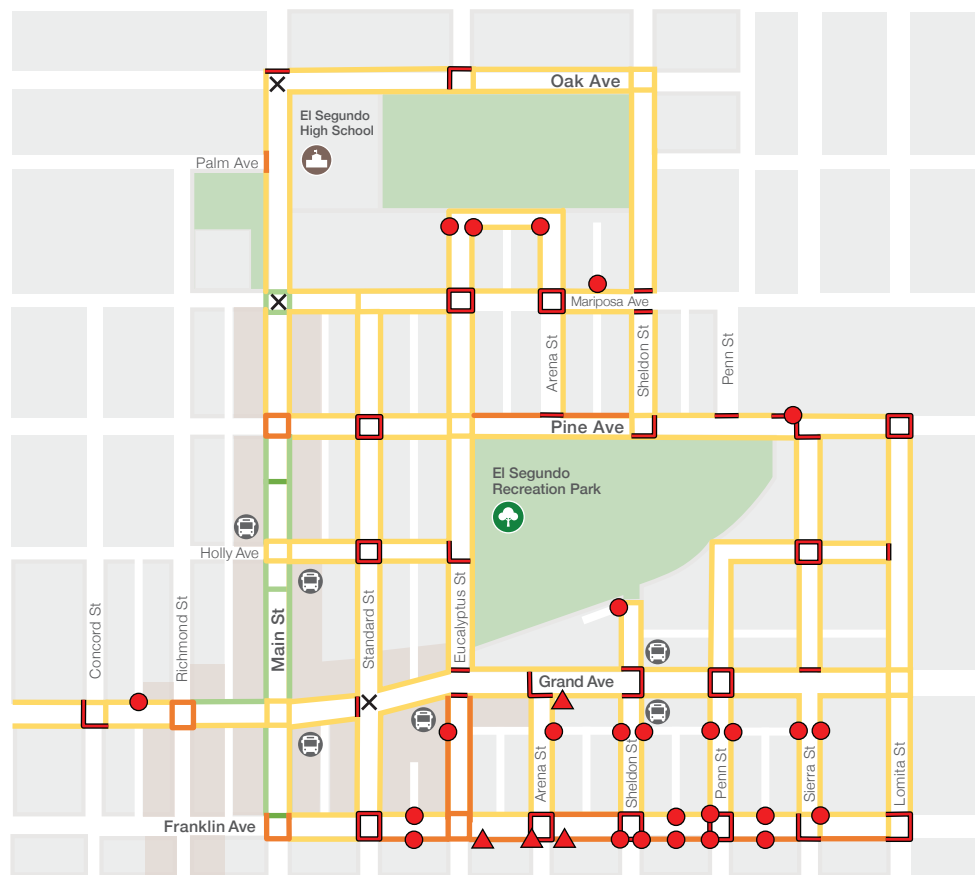
North Redondo (East) Slow Zone pedestrian core recommendations



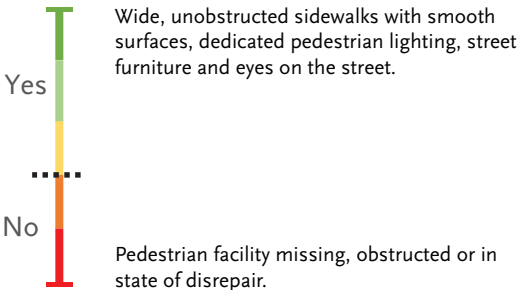
Sub-regional Network in the North Redondo Slow Zone



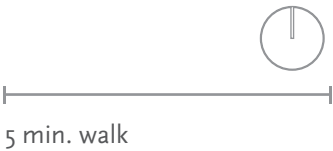
El Segundo Slow Zone pedestrian core walk audit results



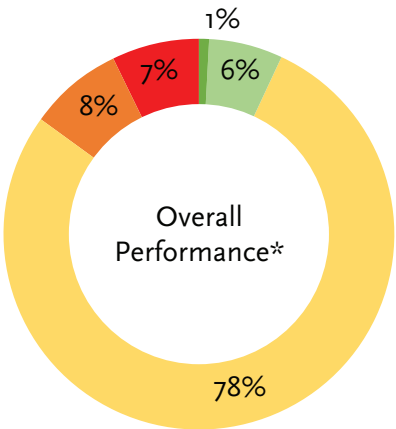
Supports pedestrian modes?



- No ADA ramp
- No crosswalk
- Obstruction (e.g. tree, utility pole, etc.)
- Fatal crash location (ped/bike vs car)  
2005-2014 SWITRS data



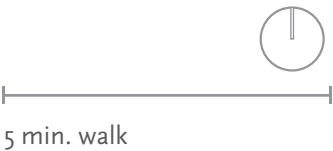
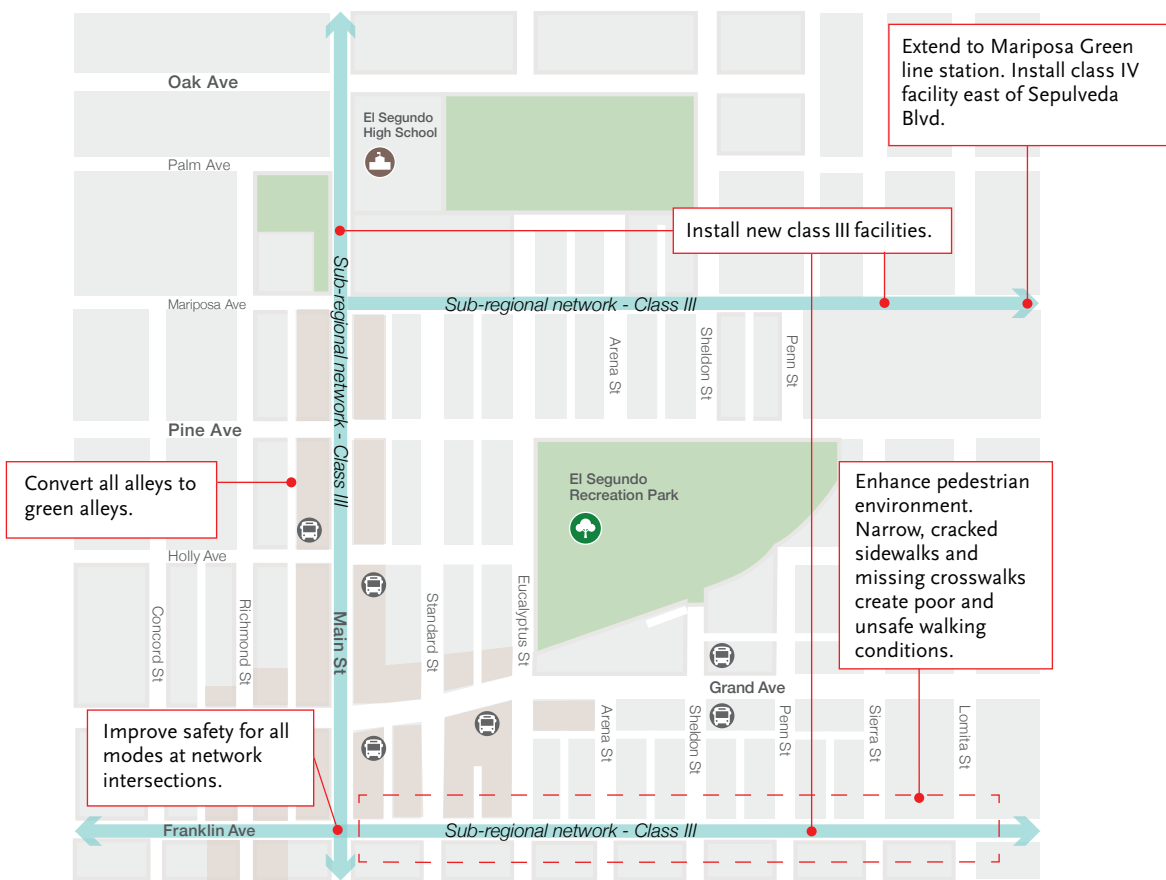
The deficiencies shown above, coded in red and orange, need to be addressed to bring the El Segundo pedestrian core to a state of good repair.



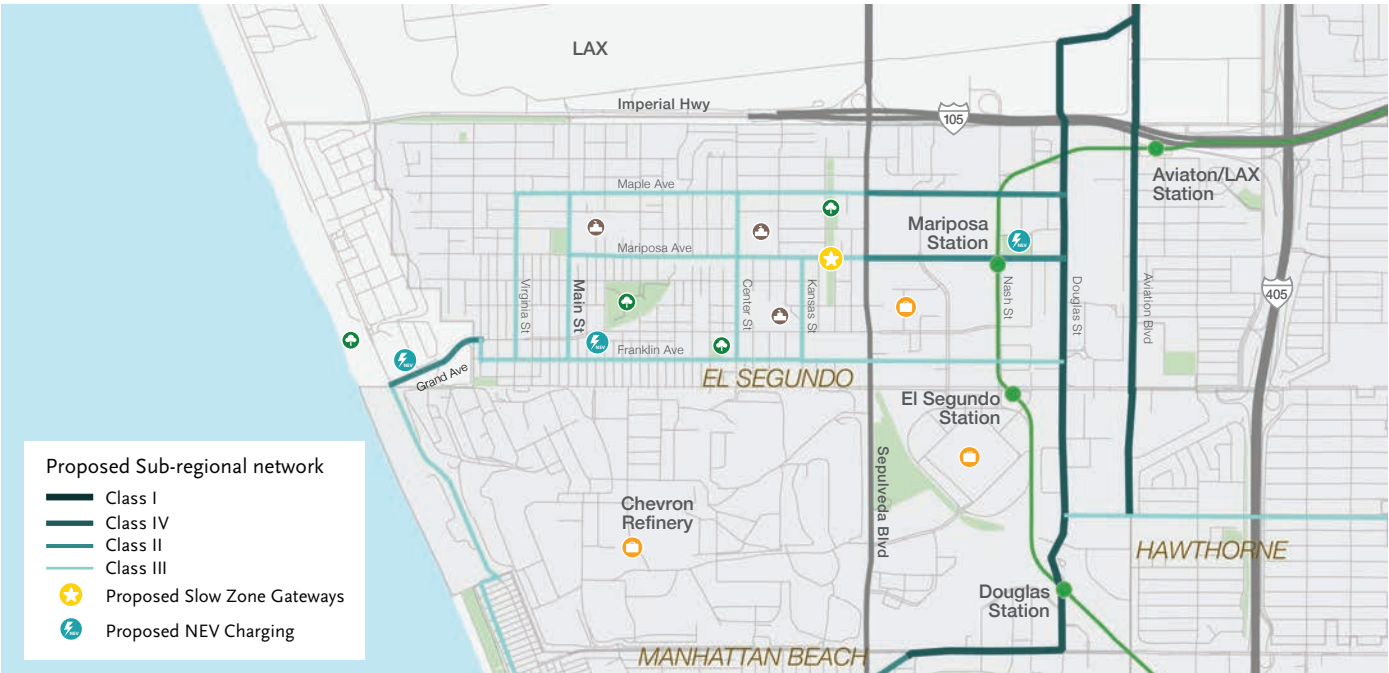
\* percent of total road miles in each category



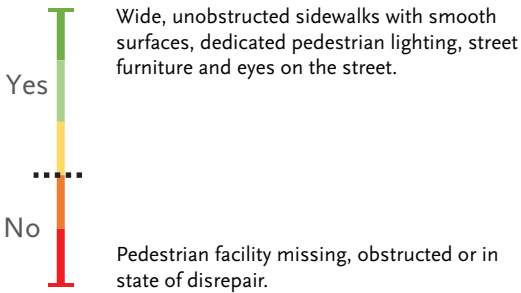
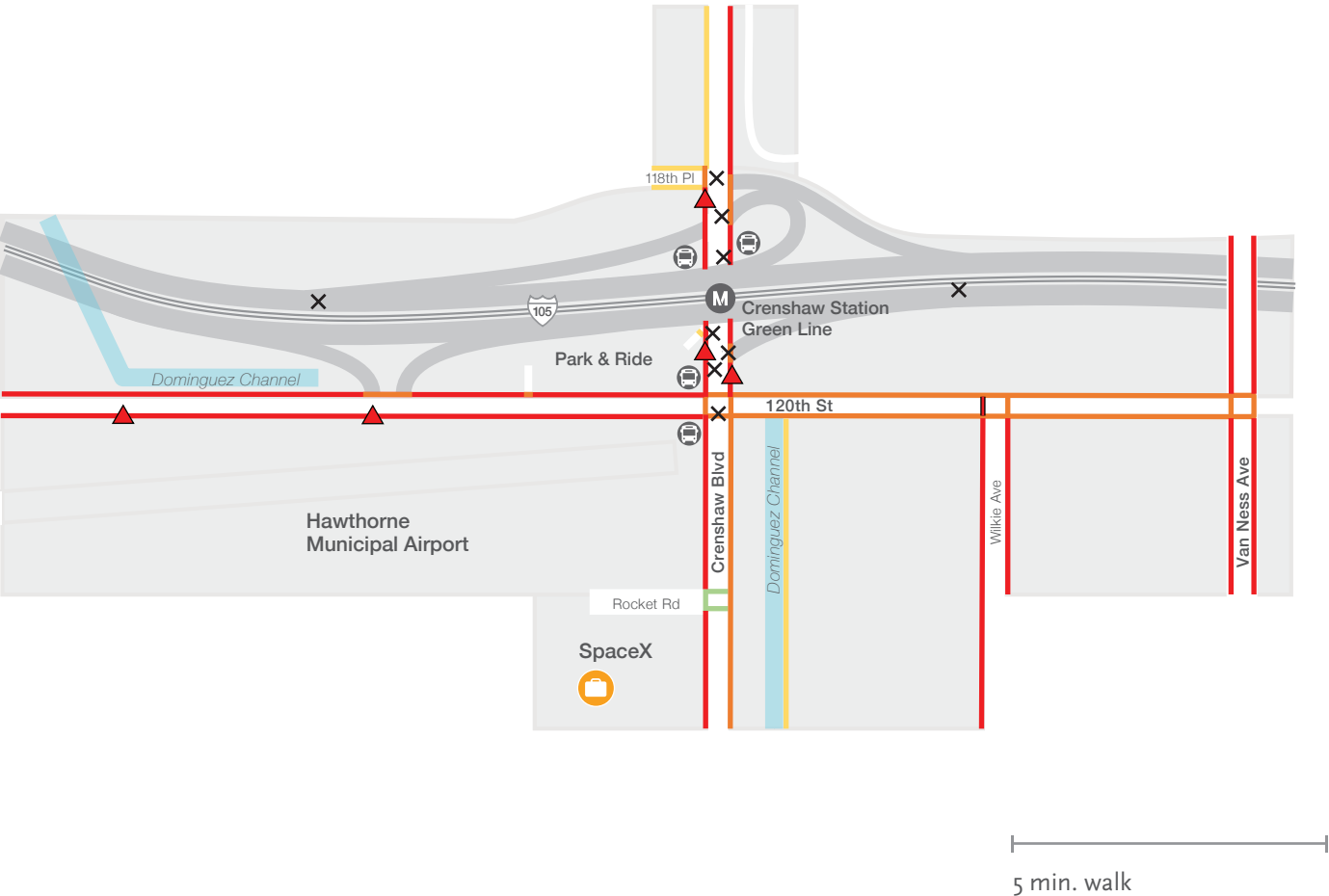
El Segundo Slow Zone pedestrian core recommendations



Sub-regional Network in the El Segundo Slow Zone

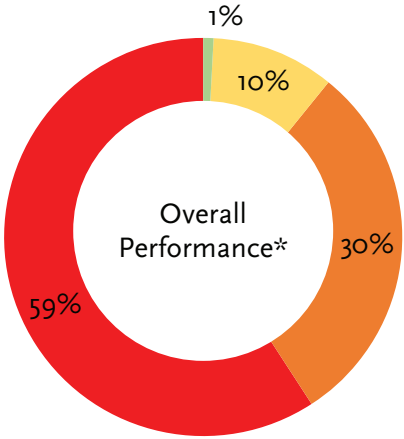


Hawthorne Slow Zone pedestrian core walk audit results



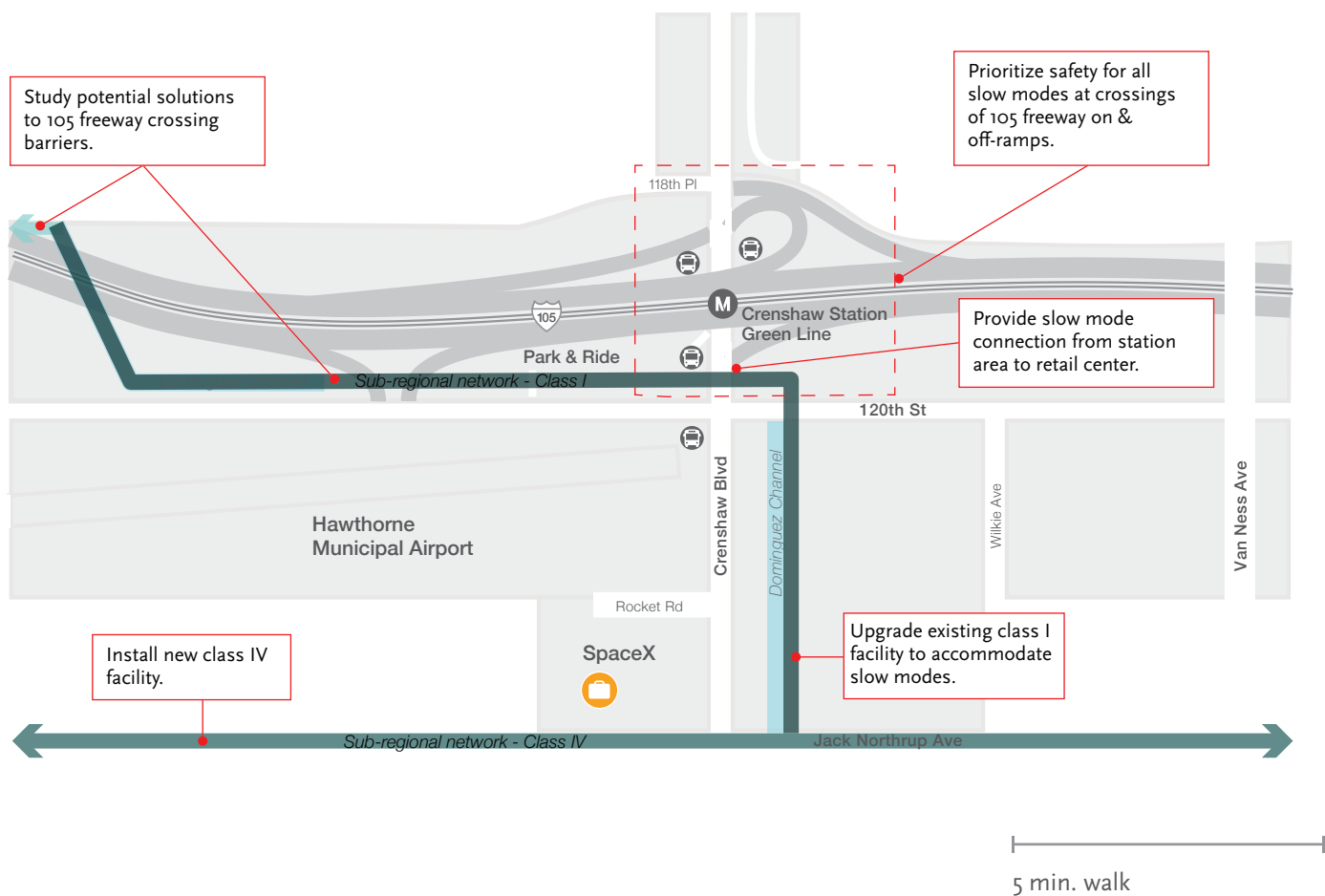
- No ADA ramp
- No crosswalk
- ▲ Obstruction (e.g. tree, utility pole, etc.)
- × Fatal crash location (ped/bike vs car)  
2005-2014 SWITRS data

The deficiencies shown above, coded in red and orange, need to be addressed to bring the Hawthorne pedestrian core to a state of good repair.



\* percent of total road miles in each category

Hawthorne Slow Zone pedestrian core recommendations



Sub-regional Network in the Hawthorne Slow Zone







# Opportunities and Barriers

TO SLOW SPEED NETWORK STRATEGY IMPLEMENTATION



# Policy and Safety

## Slow modes sharing roadways, lanes and paths

Los Angeles County and cities have to balance the need and cost of providing separate lanes, protected or not, for slow modes using travel lanes including bicycles. In designing a network that is safe and crosses jurisdictional boundaries, the slow speed network strategy for the South Bay relies, to the extent possible, on slow, low-stress roadways that have a low volume of traffic on which all modes, including cars, share the same roadway. In planning for a future with a large variety of modes, this seems more practical than imagining each mode having its own separate lane.

There are stretches of the slow speed network on which on-street slow modes share existing or planned striped Class II Slow Speed Lanes, or, in rare cases, slow on-street modes except for NEVs share new physically separated (Class IV) lanes. This is on segments of the network where it was impossible to avoid roadways with speed limits over 35 mph. The new bike lanes would reduce the speed of the roadway to 35 mph, accommodating NEVs mixed with regular traffic. This is necessary to creating a complete network as shown and analyzed in this study, but is of course subject to local decision-making and trade-offs.

All other on-street (non-NEV) slow modes could mix with bicycles on the protected, physically separated lane. On multi-use paths and greenways (Class I Slow Speed Paths) all slow modes are mixed, but in the absence of cars.

### > Opportunity

#### Public awareness and education

Education of drivers and of the rest of the public, as much as regulations or law enforcement, will be crucial to the acceptance of multiple modes sharing roadways and lanes. The public sector, through cities and public agencies, non-profits, and the private sector, through employers, and manufacturers of slow mode vehicles and technology, has to use state of the art, sophisticated, public messaging to make consumers aware of the many reasons why slow modes, and a slow speed network, is viable and beneficial. Public messaging, over a long enough time, coupled with regulations and data are a powerful tool for change. But it would take a focused, concerted effort to make people realize that they themselves are the traffic, and contributors to global warming - and moreover, that there are efficient and cost effective alternatives to our current system. The status quo has a lot of staying power, and it will likely take a combination of numerous incentives, technological advancements and new products and services to achieve a gradual, but ultimately significant, shift away from full speed cars to slow speed modes.

## > Opportunity

### Regulating interaction between modes

The presence of more slow modes may benefit from specific regulations to govern their interaction in shared lanes, roadways and multi-use paths.

For now, the slow speed network needs to rely on existing regulations which for the most part are geared to the safety of vehicles, bicycles and pedestrians. Everyone on the road has a general duty to use reasonable care to avoid collisions. Examples of some general "common sense" regulations in the California Vehicle Code (CVC) include: a vehicle passing another vehicle "in the same direction shall pass to the left at a safe distance without interfering with the safe operation of the overtaken vehicle."<sup>1</sup> The "3-foot" rule puts a finer point on this principle with regards to the interaction between cars and bicycles. Cars need to leave a 3-foot margin while passing a cyclist.<sup>2</sup> And pedestrians, who for very good reason have specific protections, are also required to use "due care" for their safety.<sup>3</sup>

If the slow speed network were built out, new policies, and the state, city and agency level, may be helpful in assuring safety and promoting the viability of slow modes.

### Bicycles sharing facilities with NEVs

On designated streets with striped Class II lanes in the cities of Lincoln and Rocklin, California, NEVs and bikes successfully share a 7' wide lane<sup>1</sup>. If cities determine that this design guideline serves as good model, then any striped bicycle lanes in the slow speed network, existing or planned that are narrower than 7' will have to be re-striped or redesigned to be 7' wide. In the City of Los Angeles, for example, bike lane guidelines call for a minimum width of 5', although 7' is preferred.

Cities would have to review the rules surrounding the conditions for original funding sources for the planned or existing bike lanes and obtain any necessary buy-in and approvals in order to convert them to a lane shared between bikes, NEVs and other slow modes.

<sup>1</sup> CVC 21750, 2017.

<sup>2</sup> CVC 21760, 2017

<sup>3</sup> CVC 21950, 2017

<sup>4</sup> Lincoln and Rocklin Joint Report, 2011.

From the Lincoln-Rocklin NEV Report:

"There have been a few minor conflicts between NEVs and bicyclists that have been reported. These conflicts are in the form of complaints by bicyclists due to the NEVs operating at slightly higher speeds than bicycles and the quiet operation of NEVs. Bicyclists may become startled by an NEV that suddenly appears along side, without much warning.

These conflicts can be reduced by NEV users extending courtesy to bicyclists when passing. These courtesies include providing sufficient room when passing, and providing an auditory signal in advance of passing the bicyclist. This solution is similar to what should be done when a bicyclist is passing another bicyclist".<sup>4</sup>

### Bicycles sharing facilities with e-bikes

The law treats e-bikes and bicycles the same way since the adoption of AB 1096, 2016 legislation governing E-bikes. Like human powered bicycles, E-bikes are not subject to insurance, registration or licensing requirements. The new law designates three different classes of e-bikes, with the lowest class reaching a speed of 20 mph, and the highest reaching 28 mph. The lower class of e-bike is allowed on bike paths and lanes, whereas the highest speed is not. However, local jurisdictions do have flexibility to regulate where the various categories e-bikes can go.

### NEVs sharing multi-use paths

Along the Dominguez Channel, and indeed along any Greenway or Right Of Way forming part of the Regional Slow Mode Thruway network, permission would have to be granted by the LA County Flood Control district or other relevant governing entities to allow NEVs to share the multi-use path along with all other on-street and pedestrian slow modes. Because there would be a very small number of NEVs initially using these paths, the concept could be demonstrated along a stretch of where entrance and exiting the path are already determined to be safe and viable for all slow modes including NEVs. A demonstration would have to be supported by a temporary signage program.

In principle, efficiently bundling together infrastructure such as flood control, recreation, and safe zero emissions modes of transportation, could be of great public benefit.

## Size and weight differential between cars and slow modes

The interaction of vehicles of different weights, sizes and speeds on shared facilities presents considerable safety issues. The Insurance Institute for Highway Safety and NHTSA has demonstrated how badly NEVs perform in crash tests with even Smart cars. The Smart Fortwo is the smallest passenger car on US roads equipped with airbags and a safety cage and crash tests show how a side impact crash of a Smart Fortwo into a GEM NEV, which does not have safety cages or airbags, would be fatal to the driver of the GEM. Pedestrians, bicycles and other slow modes don't have safety cages or airbags either -- however, a key difference is that the closer a slow speed vehicle is to a full speed car in terms of form and use, the more interaction it is likely to have with them.

Safety, real and perceived, is a huge factor in consumer choice of vehicles. From a systems perspective, all things being equal, safety would be maximized if our cars were all one size, weight and shape -- and the bulk of cars do fit within a narrow range. This only reinforces traffic, environmental and safety (for other modes) consequences of the dominance of our roadways by cars, and encourages the market demand for ever-larger passenger vehicles.

Active safety features on vehicles, such as sensor systems integrated with vehicles controls, promise to make safer the coexistence between the entire spectrum of vehicles, motorized and not, as well as pedestrians. Multimodal traffic controls that guide vehicles, cyclists and pedestrians offer promise for enhanced decision-making, keeping modes separated and thereby increasing the safety of these environments.

### > Opportunity

#### Advanced Driver Assistance Systems

Advanced Driver Assistance Systems (ADAS) are automotive safety features that respond to the driving environment to avoid collisions. These include collision avoidance and warning systems, electronic stability control and speed and distance adaptation/regulation. The inputs that vehicles receive come from many different data sources, including LIDAR, and other sensors and imaging, and the number of sources and the granularity of data is continually increasing. Aftermarket advanced video systems already exist for bicycles -- scanners will emit a warning if they detect an obstacle within close proximity. It's easy to imagine these types of systems becoming more widespread in use and more deeply integrated into the controls of any and all vehicles, including wheelchairs and senior mobility scooters. If ubiquitous in both car and non-car modes, ADAS concepts have the potential to mitigate the safety issues of mixing modes.

#### Multimodal traffic control

Cities such as Los Angeles are using separate bicycle signal heads for guiding crossings for bike lanes in some locations. They are used in combination with conventional traffic signals, or hybrid traffic signals. This type of approach for bicycles could be used for all slow modes to increase safety and system performance.

Even in cases where there isn't a separate slow speed lane, a signalization system for on-street slow-modes (NEVs, Bicycles and smaller devices) could provide slow modes an advanced green to give them a head start, or signals could be timed to allow the slow mode vehicles enough time to clear the intersection. A slow mode signal could indicate an all slow-mode phase, or allow them to cross with pedestrians and separately from cars.

As technology develops and becomes less expensive, crossings equipped with cameras and other sensors that detect the presence of slow modes and actuate accordingly could become common. For our network, this type of technology would be invaluable wherever the multi-use paths cross roadways, or at gateways and entry points to multi-use paths. Like ADAS (preventive active safety) on vehicles, multimodal traffic control could help offset the dangers presented by cars to smaller and lighter modes.



## Speed limits in Slow Zones

Slow Zones are a new urban feature, and a key element in the slow speed network strategy. Centered on select mixed-use corridors or transit stations, these commercial districts already have a concentration of pedestrians. These locations have the potential to foster a critical mass of pedestrian and non-car modes, and encourage slow mode access throughout the network. A key premise well supported by policy at all levels is that shoppers on foot and using slow modes are good for local business, as well for the vitality, health and safety of nearby residential areas. Slow Zones are built from a toolkit of closely focused infrastructural improvements.

Analogous to school zones, the idea is that Slow Zones will be standard and similar enough to each other as to be recognizable by the public as special pedestrian and non-car zones. They will also communicate distinct neighborhood identity. The toolkit of Slow Zone urban design elements includes signage and wayfinding, pedestrian lighting, decorative crosswalks, as well as state-of-the-art safety and access features for pedestrians, wheelchair users and other slow rolling modes. Other ingredients include multimodal traffic control, electric vehicle charging for both full speed vehicles and NEVs, and slow-mode parking. Since low speeds are key to increased safety, comfort and ease of travel for the range of pedestrian and on-street slow modes, it would be important to have a mechanism to lower speeds on stretches of roadway within Slow Zones if cities deem it necessary.

## > Opportunity

### Lowering speed limits

Pedestrian crossing activity and the presence of slow rolling modes in Slow Zones could provide the rationale to cities for lowering speed limits on stretches of road in designated areas to 25 mph, analogous to lowering speed limits around schools and senior centers. It's worth considering strategies cities could employ for establishing and maintaining these consistently safer, low posted limits within Slow Zones instead of using Caltrans' standard process for setting enforceable speed limits at the 85th percentile of an Engineering and Traffic Survey (E&TS).

Speed limits are 25 mph by default on any road other than a state road, and are increased by local jurisdictions, through an E&TS, to levels that are enforceable. According to current regulations, only speed limits established through an E&TS are enforceable by radar, and any posted speed limit that is lower constitutes a speed trap.

The new Caltrans document "Toward an Active California State Bicycle and Pedestrian Plan", still in draft form, advocates the following:

"...policy changes that would allow municipalities to establish reduced maximum speeds on certain roadways (such as bike boulevards and pedestrian-oriented streets) and to enforce these limits without conducting engineering and traffic studies. This action will be led by the Division of Research, Innovation and System Information with support from the Division of Traffic Operations and the Division of Transportation Planning."

Caltrans argues that encouraging active transportation safety, and achieving the goal of reducing fatalities by 10% a year relies on a combination of education, technology, enforcement, infrastructure design and better data to inform policy. In order to support this, the agency is "Exploring alternate methods to the 85th percentile approach to setting and enforcing speed limits."

A prior document, the Caltrans California Manual for Setting Speed Limits already refers to lower speeds in pedestrian and bicycle zones:

“The frequency of pedestrian (crossings) is... an important factor, particularly at intersections with limited sight distance and in areas with crosswalks with no intersection traffic controls. The presence of bicycle traffic and the width of available shoulder or designated bicycle lanes is also an important factor. In areas with high bicycle and pedestrian use, drivers should adjust their speeds to anticipate both expected and unexpected movements into moving traffic. These speeds should be reflected in the measured speeds during a spot speed survey.”

Ideally, a convention should be established to maintain 25 mph speed limits as needed in Slow Zones. Cities and Caltrans could set into motion legislative action - analogous to NEV Plans - to create new, enforceable, traffic standards for Slow Zones as in school zones.

## Vision Zero

Vision Zero policies and programs are in sync with the safety objectives of the slow speed network. Vision Zero is an international initiative that originated in the 90's in Sweden aimed at reducing traffic fatalities and serious injuries to zero. Such a simple goal can only be achieved through a complex and collective effort on the part of policymakers, infrastructure owners, private industry and the public.

In the SCAG region, roadway safety is part of the regional "complete communities" vision of integrating jobs, housing, safety and health. In support of this broad vision, the City of Los Angeles is committed to eliminating all traffic deaths by 2025. The LADOT uses a map of a High Injury Network (HIN) to direct investments in road safety. Two-thirds of all deaths and severe injuries involving people walking occur on the HIN, which makes up only six percent of city streets. The city will focus resources from a range of departments on protecting vulnerable groups such as children, older adults and people walking and bicycling.

Other non-car modes beyond bicycles and pedestrians should be part of the “complete streets” picture put forward by Vision Zero programs and included in the definition of vulnerable road users.

ITS, collision avoidance (ADAS), analytics, and traffic management all have a role to play in drastically improving safety, including protections for a new mix of modes. As a corollary to this, Vision Zero could provide an excellent marketing platform for telecoms, OEMs and their suppliers to offer new products, and conduct research and development. Safety sells. The combination of fine tuned regulation, public awareness, and private sector innovation could potentially result in better physical infrastructure, as well as lower speeds on roadways.

Los Angeles and other cities pursuing Vision Zero goals require a consistent revenue stream beyond competitive grants in order to maintain and develop projects and programs. In a future mobility system that runs on, and relies on, data more than fossil fuels, perhaps data transactions, and data infrastructure, could yield a new long term, safe physical infrastructure funding source.<sup>1</sup>

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<sup>1</sup>Kati Rubinyi. "Who will pay for Vision Zero?" TU-Automotive. June, 2015

# Slow Mode Market

## Market challenges of mode shift

The greatest barrier to the adoption of non-car modes, and the greatest barrier to diversification of vehicles is the success (and ubiquity) of cars for personal mobility. The market challenges the premise that 20% of short trips in the South Bay will be by slow mode in 2025. The fifty-dollar a day cost of owning and operating a vehicle in Los Angeles is conveniently spread out and hidden in other costs, of gas, of the purchase or lease price, of repairs. The ubiquity of cars, and the fact that all cars can be driven on the same freeways and residential streets makes them extraordinarily versatile, and even with ever worsening traffic, they are the quickest way of getting from Point A to B, when and where we want. In Los Angeles, cars provide the quickest access to the largest number of jobs. This dependence on cars is supported and maintained, indirectly, by the fact that every car-producing nation subsidizes its auto industry - an industry based on thin margins and fierce global competition. The methods by which cars are made remain extremely expensive, even though new manufacturing trends do support quicker retooling to produce new lines. Producing an entirely new platform, even maintaining an existing engine type with a new body system costs automakers 1 billion dollars. This is a number worth keeping in mind as it ultimately represents the investment we have indirectly but collectively, made in the status quo of what is on our roads.

Moreover, despite public relations experiments by car companies that suggest the contrary (for example in ride-hailing), it's imprudent to assume that automakers will soon find viable revenue models to replace selling units. The slow speed network strategy is based on a hypothetical assumption that by 2025, 20% of trips in the South Bay currently made by car will be made by zero emissions cars and slow modes, allowing households to own one or two, instead of two or three cars. If this goal were achieved, the auto industry, for the sake of necessary expansion, would need to add more than the number of replaced cars elsewhere in the world.

Autonomous vehicle technology is also likely to drive the expansion of the auto market globally, as well as in the South Bay, especially given the pressure exerted by the already enormous investment in autonomous technology on the part of manufacturers and suppliers.

## > Opportunity

### Market acceptance of new vehicle types

The success of ride-hailing indicates the public is open to new concepts in transportation if products and services can save people time. There is also some evidence to show that people are more willing these days to invest in new types of vehicles. One case in point is the Razor, by Polaris, the manufacturer of the market-leading NEV, the GEM. The Razor is making a large dent in the off-road market, even though it's a new and different type of vehicle. As Polaris' top selling vehicle (the GEM is at the bottom), the Razor is full-speed, but weighs half of what a car does, is made with plastic panels, and has a safety cage but lacks airbags. It's primarily an off-road vehicle, but is being used on streets or shoulders, and primarily in rural areas - in states where it's legal (... not in California).

On the other end of the spectrum of speed is the URB-E, a portable folding scooter designed for first/last mile travel. The URB-E is made of carbon fiber and aluminum and weighs about 30 pounds. It folds to a compact shape to be carried on transit, and unfolded for riding to final destinations. It's battery range is 16 miles. The URB-E uses the edge of the road and travels at a top speed of 14 to 18 mph depending on the model. The majority of owners of URB-E's are male and young.

There are currently around 2000 URB-Es in Los Angeles County, whereas in 2013 there were none. Perhaps the phenomenon of ride-hailing has at least alerted people to the fact that there are alternatives to driving their own cars, and opened their minds to new concepts.



URBE-E Sport GT

## Shared use and new opportunities for specialized vehicles

Convenient and inexpensive access to slow speed vehicles for short times, for use over short distances and for specific purposes could be a counterpoint to the versatility of the car. Shared use allows room for more specificity of a vehicle's form and function. If shared slow modes were convenient and on-demand, at least some of the market for the vehicles would not be based on personal ownership, but ownership of fleets by entities like cities, transit agencies, community groups, rental companies or employers.

Pedestrian modes that travel short distances and could be available where the infrastructure best supports them. On the other end of the spectrum, a network of NEV-sharing hubs and charging facilities could extend throughout Southern California, in conjunction with the regional Slow Mode Thruway network.

NEVs and other slow speed modes could be available for short term rentals at hubs along the lines of Metro's bike-share hubs. An NEV could be driven from one hub to another where it could be refueled, and another fully charged NEV would be available for immediate use. Hubs would be co-located with important origins and destinations, including transit stations.

In addition to shared fleets, privately owned NEVs will become easier to share between neighbors or members of clubs or communities. The security, insurance, verification, scheduling and other transactional issues surrounding sharing are becoming more streamlined over time. There are still hurdles to overcome, but sharing promises to provide affordable and easy access to "the right tool for the job", opening up new markets for NEVs and other specialized vehicles.

The manufacturers of NEVs could create a community of owners that share each other vehicles (Ford is working on a similar program for its cars). And any vehicle, including a NEV, can be used for ride-hailing, increasing the use of owned NEVs and replacing some full speed car trips.

Innovations in sharing technology and business models could prove especially beneficial in the South Bay where the high level of residential density and large number of short trips would be exceptionally well served by systems of NEV-sharing.



Toyota Ha:mio ride sharing station in Toyoda City, Japan in 2012. The vehicles, comparable to NEVs, are "ultra compact single-occupant electric vehicles" or COMS.





# Data Limitations

Determining the suitability of a region for potential slow speed modes requires detailed datasets regarding travel demand, infrastructure, behavior, and demographics coupled with forecasts and projections for future years. Because the use of slow modes for transportation represents a shift away from how infrastructure is currently used, there is a lack of real world experience and testing that would have produced data.

Available data currently originates from a combination of census, development, land-use, traffic, transit, and planning datasets sourced from local, regional, and state agencies. The available data is compiled into a geographic framework to promote comparison of relevant attributes and characteristics beneficial for detailed transportation network analysis.

The analysis at hand focuses on utilizing existing data sources to determine the suitability of the roadway and pedestrian facilities for pedestrians and slow speed rolling modes. Pedestrian rolling modes under 12.5 mph are expected to utilize the pedestrian facilities and therefore data representing: sidewalks, crosswalks, controlled intersections, ramps, pedestrian safety, signage, lighting, width, continuity, and surface quality become especially important. Rolling modes exceeding 12.5 mph are anticipated to share the roadway with vehicular traffic and therefore datasets representing: speed, volume, lane quantity, lane width, parking configuration, lane marking, signage, vehicle mix, controlled intersections, and lighting are required to determine suitability for a shared on-road network with slow speed rolling modes.

The data listed above are typically not available for a regional analysis and are lacking for the South Bay region. While some datasets may be available, they are often not well organized in a geographical database. The greatest deficiencies have been in the data representing pedestrian facilities. Additionally the road information is sparse and accuracy often insufficient (e.g. speed). Relative to the South Bay region, the team has utilized targeted pedestrian and slow mode audits to capture detailed infrastructure information. This audit method fills in a portion of the infrastructure information, but still lacks in capturing demand, demographic, and behavior details. Additional efforts must be made to create a comprehensive geographical represented dataset suitable for evaluating the potential of slow speed rolling mode integration.

# 2025 Future State Scenario

## The Slow Speed Network in 2025

In 2025, the slow speed network and wayfinding system is built out. Most vehicles on the road have some automated features, and some have advanced semi-autonomous capabilities. Traffic flow and safety for full speed vehicles in the South Bay is improved by **new traffic control equipment** at key intersections and at freeway on-ramps. **Multimodal traffic control** on the slow speed network supports the flow of slow mode vehicles including bikes and pedestrians, giving them priority over cars. A **network of public EVSE** (electric vehicle supply equipment) for both full speed and slow modes provides convenient and ubiquitous access to charging. Strategically placed **Hubs** for shared NEVs and other slow modes, in Slow Zones and at other destinations, incorporate public charging stations and allow for on-demand use of the slow speed network. In the future, the slow speed network, including wayfinding, charging, multimodal traffic control, and NEV-sharing hubs, will extend beyond the subregion. There is a more detailed discussion of sharing slow mode vehicles in The Market section of Opportunities and Barriers.

## The South Bay in 2025

Conditions in the South Bay in 2025 are contingent on political, economic, social and technological developments that will play out locally, nationally and internationally. The health of the overall economy and political stability necessary for sustaining jobs and specific economic sectors such as housing, retail and the automobile market are of prime relevance to the South Bay's future, and to the slow speed network.

The rapidly changing landscape for retail commerce -- predicting the decline of local shopping centers, the transformation of main street retail and the shortage of housing in the region -- points to shifts away from commercial land uses and toward new housing. In Slow Zones, which feature many businesses such as restaurants, cafes, and other service industry retail, slow speed modes would support the combination of placemaking and local economy. In 2025, new and evolved types of service industry retail that bring people together - such as gyms, clinics and learning centers - would be a draw to Slow Zones.

## Regional destinations

However, the success of Slow Zones, especially as they connect to the Sub-regional Slow Speed Network, relies on the synergy between Slow Zone retail streets and adjacent

regional destinations. In at least two of the Slow Zones, San Pedro and North Redondo, it remains to be seen if economic conditions will or will not justify building large scale planned developments by 2025. One case in point is an ambitious plan for the redevelopment of Ports O' Call as a lively mixed use center called the San Pedro Public Market. The project, which includes some office space along with retail, food and entertainment, would attract workers from the South Bay and beyond, local shoppers from San Pedro, as well as tourists, and weekend visitors from across Southern California. The project has numerous phases, and it's impossible to predict what stage of completion the economy will support by 2025, and therefore, how the San Pedro Public Market development would impact the use of the slow speed network.

Another important example is the renovation of the South Bay Galleria. In the north eastern corner of the North Redondo Slow Zone, the developer Forest City is planning extensive changes to the shopping center and adding a block of multi-family housing. Before proceeding with the project, there has to be some assurance that it will pay off given predicted trends in retail and the market demand for housing. The decision-making context includes the discomfort, on the part of local residents, with mid-rise multi-family housing. If political and economic conditions do justify moving ahead in the near term, a successful renovation of the South Bay Galleria would provide a boost to the Slow Zone, especially when the Metro Green Line is extended, as planned, to a site southwest of the Galleria.

## Access to the curb

As part of local Complete Street policy and implementation, jurisdictions should specifically consider demand for curb space necessitated by emerging transportation options including shared ride services. The combination of an increase in the use of ride hailing and the advent of autonomous vehicles will create even more demand for curbside access. This trend will be accelerated because policy is shifting toward lessening requirements on property owners to provide parking. Curbside space for pickup and drop off will be in especially high demand in front of the commercial destinations at the heart of Slow Zones.

This is in clear conflict with the need for slow mode lanes to be located adjacent to the curb in order to qualify as "low-stress". In the case of slow speed lanes adjacent to the sidewalk, and physically separated from the roadway by a curb, pedestrians would be crossing the slow speed lane to get to their rides - which may be double parked next to the parking lane on the

edge of the second curb. While not ideal, it's much preferred to cars cutting into the slow speed lanes, as would be the case with striped, unseparated facilities. Pedestrian and on-street slow mode interaction could be mitigated by designing safe crossings for pedestrians.

Access points from the road to privately owned pickup and drop-off locations will present design challenges. The issue of passengers getting from roads to buildings promises to eventually supplant parking as an issue, with the curbside being a precious commodity to be bought, sold and fought over by citizens, communities and developers. The design and planning of curb space needs to anticipate many new demands, not the least of which is a greater range of modes on the edge of roads and sidewalks.

## Autonomous technology and slow modes

If the South Bay is in step with the rest of the industrialized world in 2025, 12 to 13 percent of vehicle sales in the South Bay will be of cars with advanced autonomous features. Globally, those features will have a market value of \$42 billion<sup>1</sup>, which will be a significant force driving automotive marketing, whether for vehicles owned by individuals, or by car-sharing or even ride-hailing companies. The manufacturers of the equipment -- the multiple types of sensors and controls and software -- don't care if their cars are used privately or shared, just as long as their products find their way to market. This means they, and their funders, will continue (as they already do) to sponsor car-sharing and ride-hailing ventures.

By about 2035, 10 percent of the vehicles in the South Bay will likely be fully autonomous, and another 15 percent partially autonomous. This trajectory bodes well for increasing the number and variety of slow modes for several reasons: The first is because autonomous features largely mean Active Driver Assistance Systems (discussed in the Barriers and Opportunities section of this report), which will make the commingling of cars and slow and pedestrian modes safer and make people feel better about using slow modes. A safer mobility environment may also result from the good influence of the partially autonomous cars on the rest of the vehicle fleet. They would be traveling at the speed limit, avoiding collisions, and obeying traffic laws.

The autonomous technology industry is looking for opportunities to use their equipment on any and all devices beyond cars - including wheelchairs, NEVs and senior mobility scooters. These slow modes, if autonomous, would have obvious social benefits of an entirely different order than, for

example, driverless ride-hailing. Easier and more convenient mobility, freedom, and access for seniors and others would be a clear win, not for the technology industry, but for public benefit and even the economy at large (since more people would be able to participate in it). Another reason why autonomous technology could encourage slow modes is that some of the first fully autonomous vehicles available for public use are NEVs, including NEV shuttles for up to 12 passengers. The shuttles are currently available for planning pilots. If successful, the fully autonomous shuttles might realistically be in commercial use by 2025, transporting employees at lunchtime from, for example, employment centers of El Segundo to Main Street.

<sup>1</sup> "Revolution in the Driver's seat." Boston Consulting Group, 2015.

## The market for slow modes

A discussion of current market challenges to the shift away from cars to slow modes can be found in the Barriers and Opportunities section of the report.

A future study should explore the market potential for slow modes in 2025 by taking into account demographic, technological and consumer trends.

### Examples of sidewalk modes:

- baby strollers
- wheelchairs
- skateboards
- Segways
- motorized mobility scooters
- senior push walkers
- autonomous wheelchairs
- autonomous logistics carts

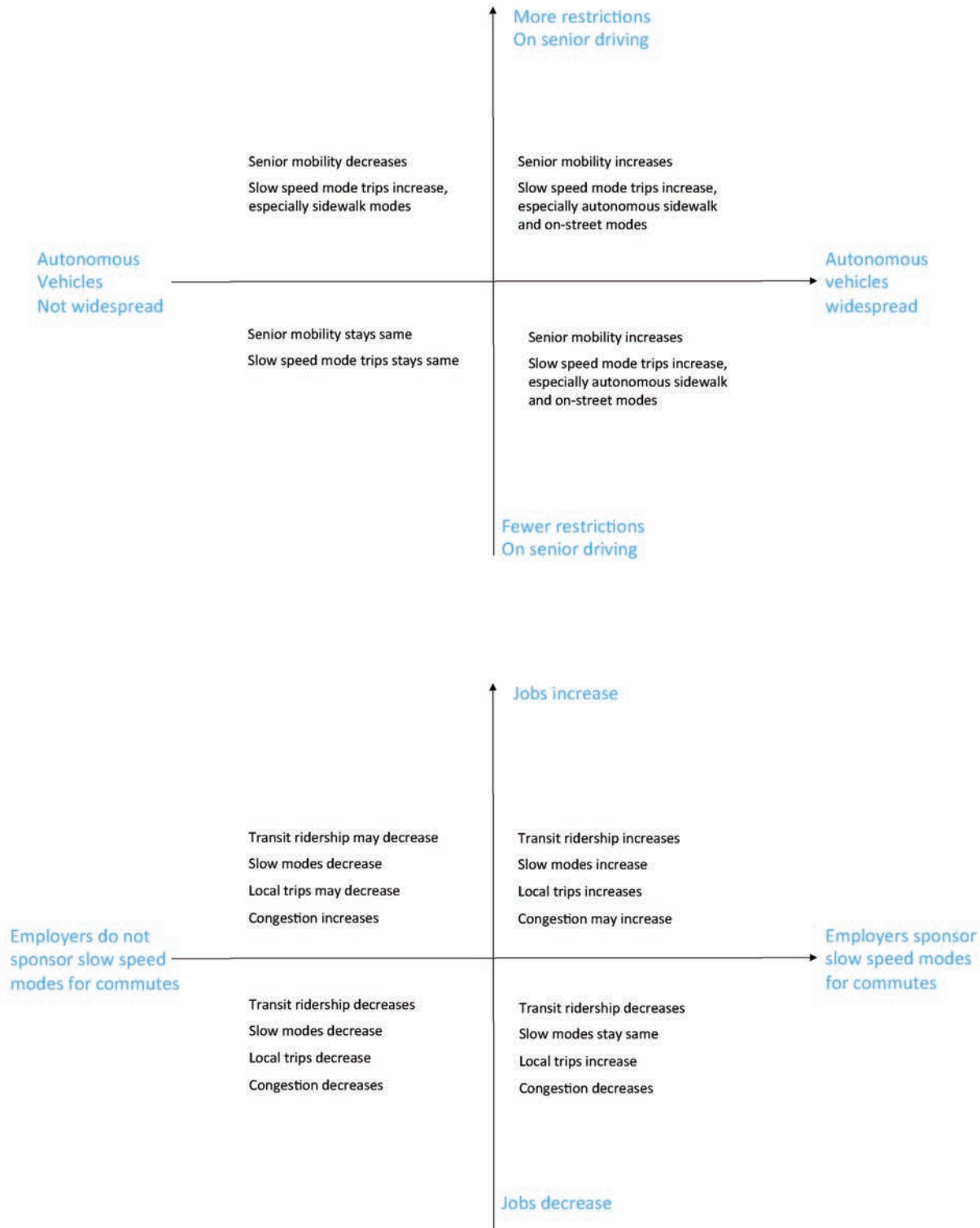
### Examples of on-street modes:

- Segways
- motorized mobility scooters
- motorized skateboards
- URB-E's
- bikes
- e-bikes
- Neighborhood Electric Vehicles (NEVs) for personal use
- NEV shuttles for 2-4-6-8 passengers for transportation

## Political, economic, social, technological context

To the right is a very small sampling of the wide range of issues would interact to influence the adoption of slow modes. car-sharing and ride-hailing ventures. Whether or not consumers take to these in any form other than what is offered by Uber or Lyft remains to be seen.







# Evaluation Framework

OF SLOW SPEED NETWORK STRATEGY



# Overview

The Evaluation Framework assumes the slow speed network is built out in 2025, and there has been a 20% shift in the South Bay from short trips (less than 3 miles) made by cars with internal combustion engine to trips by zero emissions modes. This includes an assumption that some portion of the zero emissions trips are by slow speed modes, and that this mode shift has been encouraged and enabled by the slow speed network. Besides presenting the results of the 20% mode shift, the Evaluation Framework also provides a methodology for comparing Slow Zones to each other in terms of pedestrian and slow mode infrastructure improvements needed, demographics and land use. The purpose is to create a framework for evaluating the cost and value of investment in parts of the slow speed network.

## Slow Zone analysis and comparison

The methodology to analyze Slow Zones can easily be adapted to select and compare additional Slow Zone pilot centers and corridors throughout the South Bay region and LA County. The boundaries of the designated four Slow Speed Zones in the South Bay are shown on the following page. Inputs for the Slow Zone analysis include census demographics, SCAG Neighborhood Mobility Area metrics, land use, points of interest, schools, workplaces, transit, and other data relevant

to active transportation and slow mode planning.

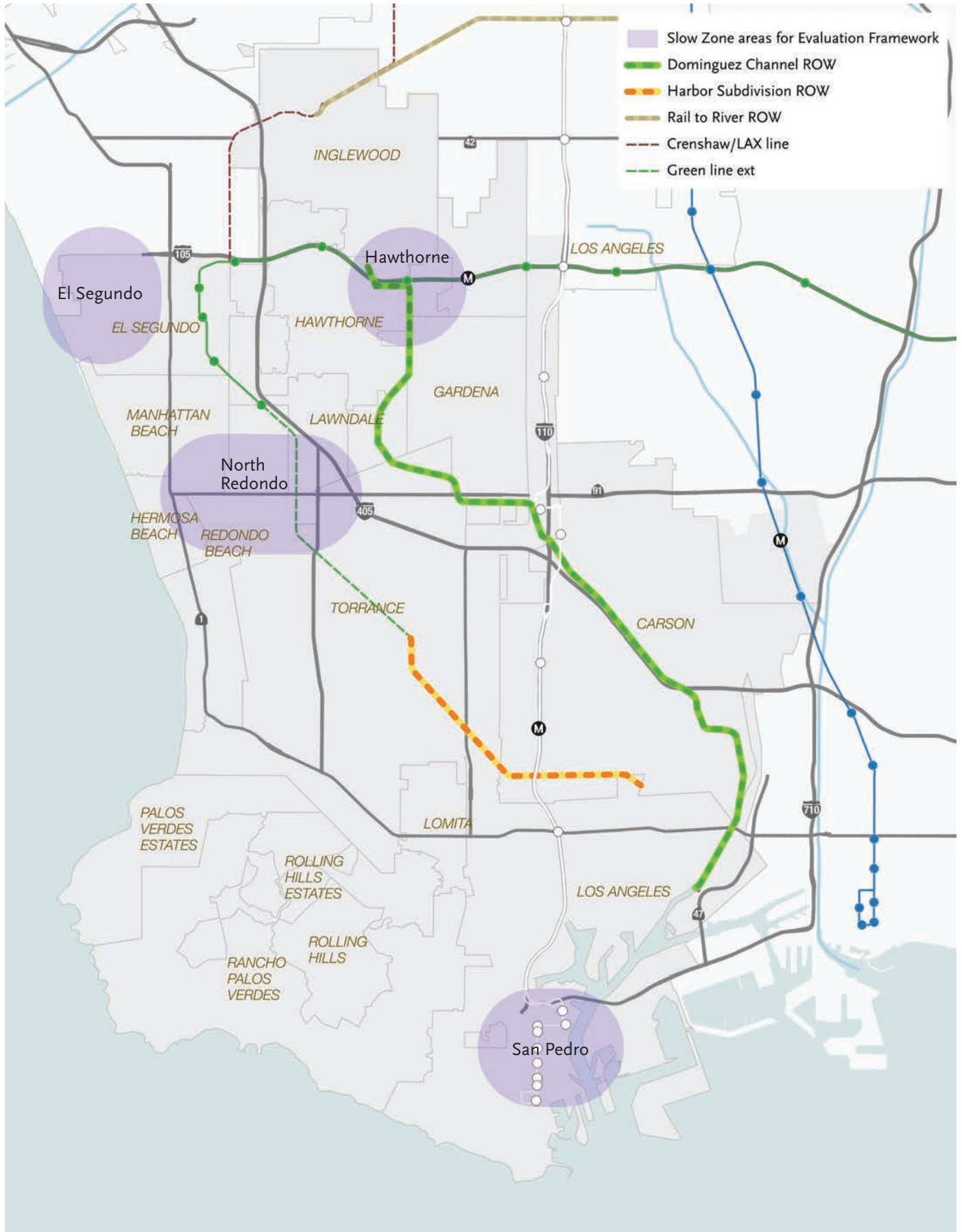
The team broke down data from larger geographic units such as census blocks and traffic analysis zones, to the individual city block level. All data inputs were then aggregated at the block level and assigned a composite ranking, allowing for a more accurate, and scale-appropriate, comparison across study locations. The results of this process, completed with GIS, are shown on page 29.

## The 20% shift to zero emissions modes

It is assumed that in year 2025, 20% of short trips (under three miles) will be made with zero emissions vehicles, and that slow modes are a large contributor to this mode shift. The current future projected year 2025, extracted from the California emission model EMFAC2014, provides the aggregated VMT and emissions by light duty automobiles and light duty trucks are as shown in the Evaluation Framework table.

TABLE 1: AGGREGATED VMT AND EMISSIONS BY LIGHT DUTY AUTO AND TRUCKS (LA COUNTY)

Vehicle Population	VMT (miles/day)	Fuel Consumption (1000 gallons/day)	NOx (tons/day)	CO (tons/day)	CO2 (tons/day)	PM10 (tons/day)	PM2.5 (tons/day)
5705005	1.88E+08	6669.1	13.5	177.8	62408.9	9.9	4.2





## SCAG short trip data

The short trips are defined as trips in 2016 under three miles made by internal combustion engine vehicles. The short trips data are provided by SCAG, and the data format is illustrated in Table 1. The short trips are modeled based on Traffic Analysis Zones (TAZ) as geographical units. The SCAG model includes more than one hundred parameters regarding socioeconomic status, demographics, and policy applied as inputs for trip prediction. A validation report explaining regional trip generation can be found here: <http://www.scag.ca.gov/DataAndTools/Pages/Documents.aspx>.

The total number of short trips per Slow Zone was calculated by adding the number of trips originating and/or ending in Slow Zones TAZs.

**TABLE 2: EXAMPLE OF SHORT TRIP DATA**

Origin TAZ ID	Destination TAZ ID	# Single occupancy vehicles	# Vehicles w/ 2 persons	# Vehicles w/ 3+ persons	# of trucks	Distance
20211000	20211000	28	5	4	0	1.37
20211000	60192000	5	1	1	0	2.72
20212000	20211000	209	41	34	0	0.47
20212000	20213000	57	9	7	1	2.42
20212000	20214000	65	28	32	1	2.49

Metro Slow Speed Network Strategic Plan: Slow Zone Evaluation Metrics									
Absolute Values	See "source" column for details on origin of data								
Estimated Values	Where absolute values are not available, estimated values are provided based on assumptions or sample data (see "explanation of measures" column for details). These values should be used as placeholders until more complete data is collected.								
Normalized Values	Standardized values to allow for comparison - i.e. because each zone differs in area (measured in sq. miles), some metrics have been divided by area to provide a standardized comparison.								
	Slow Zones			South Bay			Explanation of Measures		
Measures Relevant to All Modes	El Segundo	San Pedro	North Redondo	Hawthorne		Source			
# Area of zone in sq. miles	3.6	3.5	5.9	3.1	148.6	SBCCOG parcel data	Shape of zones on map in Fig. #		
# Miles of roadway less than 54 mph	42.22	79.02	146.48	51.28	#REF!	Navteq data	Estimated based on estimated travel speeds.		
# (Miles of roadway less than 54 mph)/(sq. Miles)	11.7	22.9	24.7	16.3	#REF!	See above	See above		
# Miles of sidewalk	76.0	142.2	263.7	92.3	#REF!	No existing data source (detailed survey needed)	90% of (Miles of roadway x 2). Based on sample audit data.		
# Miles of sidewalk/sq. mile	21.1	41.2	44.4	29.4	#REF!	See above	See above		
# Intersections	242	377	755	286	2269.0	Navteq data	Intersections are defined as locations where opposing traffic lanes intersect. Most intersections have four crossings, though mid-block intersections generally have just one.		
# Intersections/sq. mile (Street Density)	67	109	127	91	153	Navteq data			
# Potential Crossings	968.0	1508.0	3020.0	1144.0	90760.0	No existing data source (detailed survey needed);	Potential crossings are defined as paths across opposing travel lanes. Most 4-way intersections have 4 potential crossings. Mid-block intersections generally have just one. Assume that each intersection has 4 potential crossings.		
# Crosswalks	387	603	1208	458	36304	No existing data source (detailed survey needed)	Crosswalks are defined as designated, marked paths (e.g. striped, zebra, decorative) for pedestrians and other slow modes crossing from one side of street to the other. Assume that 40% of crossings have crosswalks, based on sample audit data		
# Crosswalks/sq. mile	108	175	203	146	244	See above	See above		
# Ridership on Bus and Metro	198	7456	6,556	15,256	216,480	Metro ATSP, 2015	The number of people getting on and off at each transit stop or station within the study area. Source: Metro, Culver City Bus, Foothill Transit, City of Los Angeles Department of Transportation (LADOT), Gardena Transit, Long Beach Transit, Montebello Bus, Santa Clarita Transit, Santa Monica Big Blue Bus. Numbers were normalized to reflect average daily boardings and alightings per stop		
# Ridership on Bus and Metro in 2025									
# Wayfinding signs	0	0	0	0	0				

# Wayfinding signs in 2025	tbd	tbd	tbd	tbd	tbd	tbd	tbd	tbd
# Miles existing bike lanes on roads less than 25MPH	35.6	40.0	5.4	4.6	189.0	Metro Countywide ATSP		
# Miles proposed bike lanes on roads less than 25MPH	16.5	21.9	82.0	9.8	440.8	Metro Countywide ATSP		
# Short trips (under three miles) 2016 per day	9,499	34,107	78,573	36,979	1,386,310	SCAG Model		Short trips (under three miles) per day. Summarized at TAZ level per slow zone.
# Short trips (under three miles) 2025 per day	18,870	42,032	79,993	35,553	1,460,404	SCAG Model		Projected Short trips (under three miles) per day. Summarized at TAZ level per slow zone.
# Slow Speed short trips (under three miles) in 2025 per day	374	8406	15819	7111	292,081			Assume 20% of short trips in 2025 are made in slow speed mode
# CO2 emissions in 2016 (tons/day)	12.2	43.7	100.7	47.4	1776.0	California Emission Model EMFAC 2014		
# CO2 emissions in 2025 (tons/day)	18.8	41.8	78.6	35.3	1451.2	California Emission Model EMFAC 2014		
# CO2 emissions reduction in 2025 (tons/day)	3.8	8.4	15.7	7.1	290.2	California Emission Model EMFAC 2014		Assume 20% of short trips in 2025 are made in slow speed mode
# PM2.5 (fine particle) emissions in 2016 (grams/day)	647.9	2326.2	5359.0	2522.1	94551.4	California Emission Model EMFAC 2014		
# PM2.5 (fine particle) emissions in 2025 (grams/day)	1264.8	2817.1	5301.2	2382.9	97882.1	California Emission Model EMFAC 2014		
# PM2.5 (fine particle) emission reduction in 2025 (grams/day)	253.0	563.4	1060.2	476.6	19576.4	California Emission Model EMFAC 2014		Assume 20% of short trips in 2025 are made in slow speed mode
Relevant to Sidewalk Modes (0-12.5 MPH)	El Segundo	San Pedro	North Redondo	Hawthorne	South Bay	Source	Explanation of Measures	
# Corners	968.00	1508.00	3020.00	1144.00	90760.00	No existing data source (detailed survey needed)	Assume each intersection has four corners. Each corner should ideally have two curb cut ramps leading into crosswalks.	
# Curb cuts (curb ramps, ADA ramps)	1162	1810	3624	1373	108912	No existing data source (detailed survey needed)	Curb cuts are defined as downgrades from sidewalks to adjoining streets. These are also referred to as curb or ADA ramp and are generally located on sidewalk corners. Assume that 60% of corners have curb cuts, based on sample audit data	
# Curb cuts (curb ramps, ADA ramps)/sq. mile	323	525	610	437	733	See above		
# Pedestrian Collisions from 2008-2012	28	134	79	39	1845	SWITRS data	Collisions from year 2008-2012. The collisions were reported by California Highway Patrol and compiled by Statewide Integrated Traffic Records System.	
# Pedestrian Collisions in 2025	0	0	0	0	0	SWITRS data	Result of Vision Zero policies	

Relevant to Slow On-street Modes (12.5-25 MPH)	El Segundo	San Pedro	North Redondo	Hawthorne	South Bay	Source	Explanation of Measures
# Miles of roads with speed limit < or = 20 mph	2.4	13.6	8.0	1.6	403.4	Navreq data	
# Miles of roads with speed limit > 20 mph and < or = 30 mph	33.5	50.9	106.7	37.0	1768.8	Navreq data	
# Miles of roads with speed limit between 31 and 54 mph	6.3	14.5	31.9	12.7	614.9	Navreq data	
# Bike collisions from year 2008-2012	21	59	98	21	1414	SWITRS data	Collisions from year 2008-2012. The collisions were reported by California Highway Patrol and compiled by Statewide Integrated Traffic Records System.
# Bike collisions in 2025	0	0	0	0	0	SWITRS data	Results of Vision Zero policies

# Implementation and Next Steps

Four pilot scenarios - the first spanning a part of Inglewood and Hawthorne, the second centered on El Camino College linking Carson to the North Redondo Transit Center, the third in San Pedro, and a fourth in El Segundo linking the old downtown to the Green Line - lend themselves to being developed into transportation projects that demonstrate the network strategy.

The pilot scenarios are fragments of the overall network, linking key destinations on the Sub-regional Network, connecting Slow Zones and Slow Mode Thruways.

To become transportation projects the four pilots scenarios would need to be developed through these steps:

- > Feasibility,
- > Design alternatives, and
- > Engineering and environmental review

Each of these steps will require identification of funding sources, such as Measure M dollars, that the SBCCOG and its member cities can access to fund the pilot projects.

## Pilot Scenario 1: Inglewood to Hawthorne

The terminus of the Rail to River Active Transportation Corridor, although not part of the slow speed network, would provide a link from outside the project area to the network. The western terminus of Rail to River extends towards the Sub-regional, on-street network crossing downtown Inglewood - a Slow Zone centered around a future light rail stop. From here, the on-street network extends southward into Hawthorne, and links to the northernmost portion of the Dominguez Channel slow mode thruway, offering access to the Crenshaw Green Line Station. In a compact area, the project features all three types of slow speed network. If built, such a demonstration project would provide seamless connectivity for active modes coming from the Rail to River Corridor, and connectivity for all slow modes including NEVs through downtown Inglewood, and access to two light rail stations.

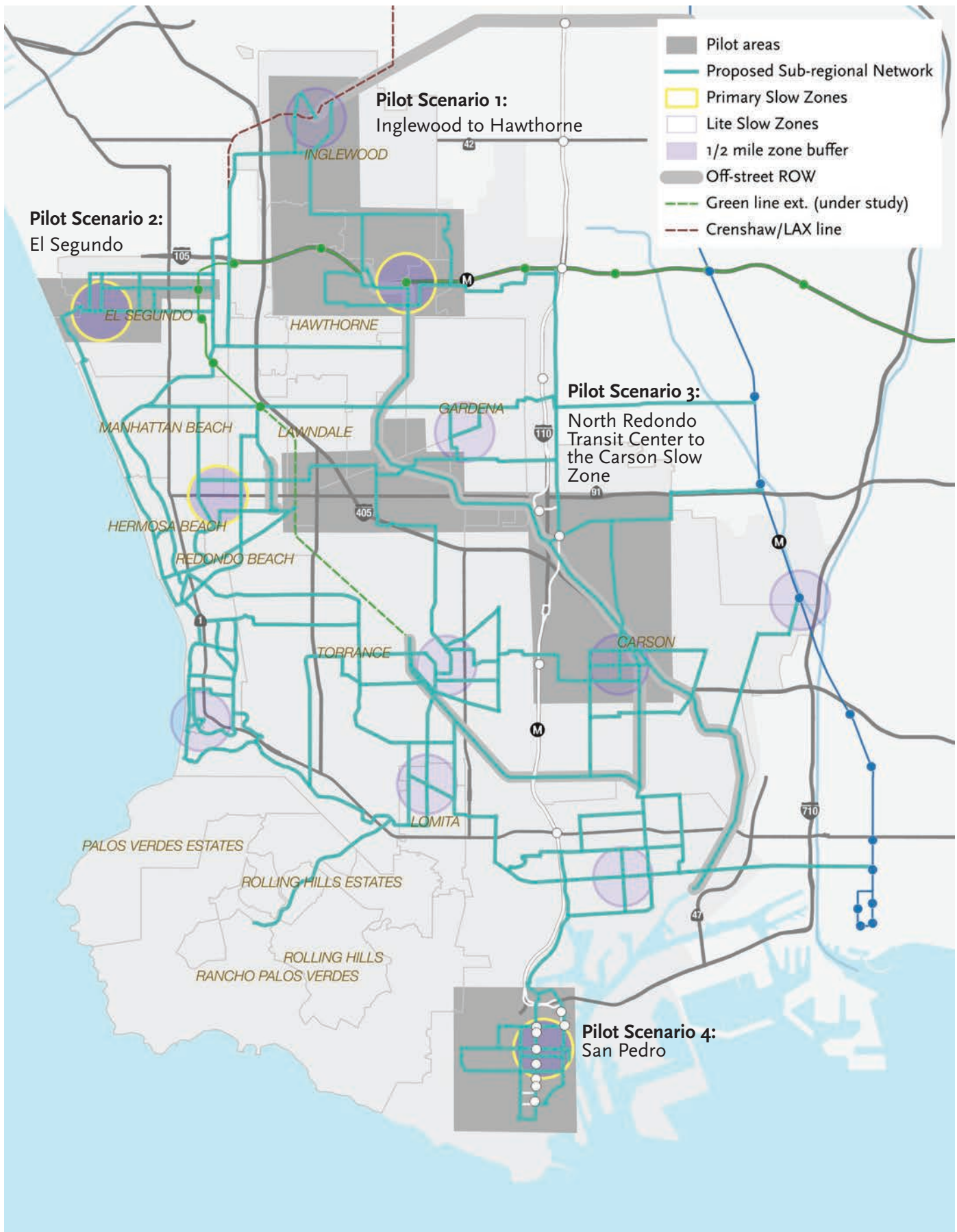
### About Rail to River on Metro's website:

"The Active Transportation Rail to River Corridor Project will convert an existing, underutilized railroad right-of-way (ROW) into a multi-purpose transportation corridor from the City of Inglewood in the western end from the City of Inglewood in the western end to the Los Angeles River in the eastern end, spanning up to 10.6 miles (depending upon the alternative path selected). Upon completion, the Active Transportation Rail to River Corridor Project will link neighborhoods, schools, and other key destinations through the heart of South Los Angeles."

## Pilot Scenario 2: El Segundo

As in San Pedro, El Segundo's slow speed network is linked to other cities, but through network segment links that are several miles long. For this and other reasons, it makes sense to contain a pilot project within El Segundo. A pilot project here would provide non-car access from the lively mix of uses in the area of Main Street in downtown El Segundo to the Green Line station on Mariposa and Nash streets. Employees working around the Mariposa station would be able to get to Main street in slow modes. As a non-car link for residents, visitors, employees and commuters, the project would support planning and design efforts towards a more pedestrian friendly and mixed use environment in the areas of the city now zoned exclusively as commercial.





### **Pilot Scenario 3: North Redondo Transit Center to the Carson Slow Zone**

This project would develop an important segment of the Dominguez Channel multi-use thruway near El Camino College and connect it to a Slow Zone in Carson, and to the Transit Center in North Redondo. It would be proof of concept for the network strategy, providing useful non-car transportation infrastructure for commuters, and foster local community within Slow Zones. The North Redondo Slow Zone would be linked, through the on-street network, to the Dominguez Channel, and from here to Carson. It would require the development of a Slow Zone in Carson.

The Dominguez Channel slow mode thruway benefits the whole South Bay and fits with other ROW projects Metro and the County are engaged in such as the LA River Greenway, the San Gabriel Valley Greenway and the Rail to Rail and Rial to River projects.

### **Pilot Scenario 4: San Pedro**

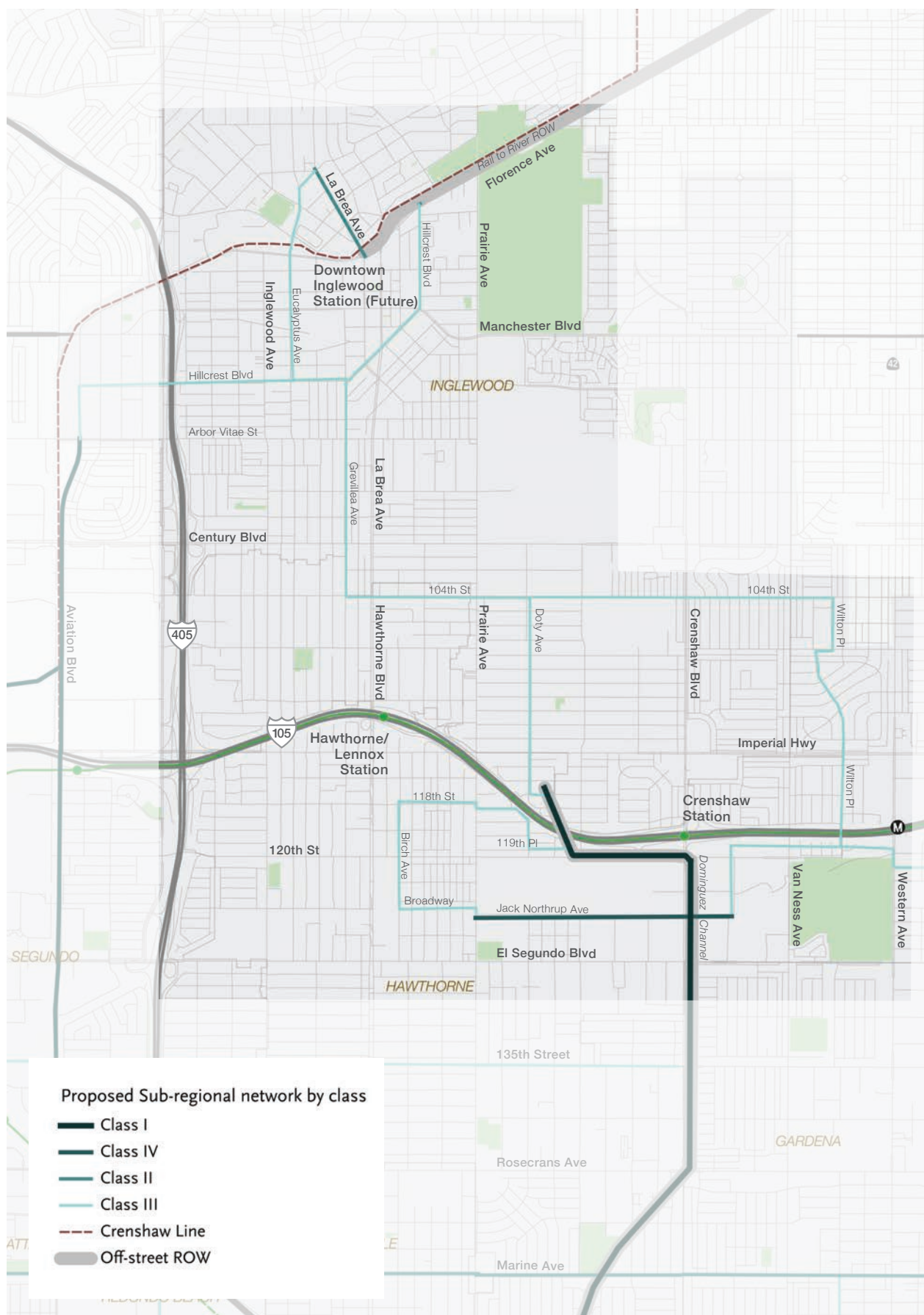
The Dominguez Channel slow mode thruway ends in neighboring Wilmington, five miles from San Pedro, and from here an on-street slow mode route connects to San Pedro's downtown. Because of this long distance between San Pedro and the rest of the network, a less expensive (but still effective) demonstration project could be contained within the city. Resources would be focused on the on-street Slow Zone network and pedestrian corridor, and on connecting the old downtown to the future San Pedro Public Market on the waterfront along the city's eastern edge.

This pilot project would build on previous planning efforts by the City of LA to create a more robust active transportation network in downtown San Pedro. A pilot project here would demonstrate the value for the slow speed network strategy, of connecting Slow Zones to adjacent regional destinations.

### **Legislative process**

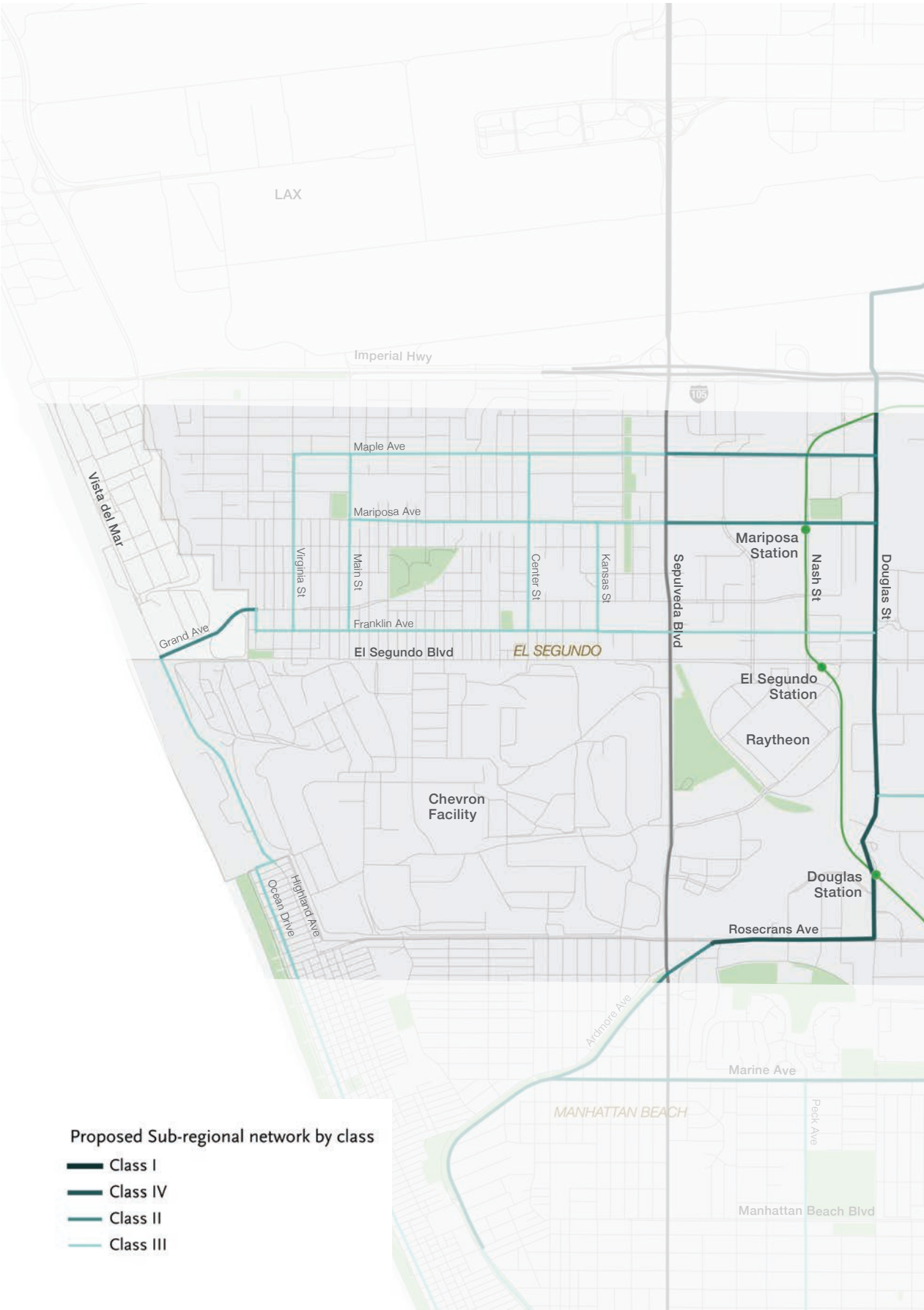
Any pilot will need to determine the most efficient regulatory course of action for including NEVs on non-car multi-use pathways, and in widened striped Class II slow speed lanes. The legislative steps for obtaining exemptions from the CVC for NEVs is by now a tried and true process. It remains to be seen if adapting the rules surrounding multi-use paths and striped lanes will require the same or a similar process. There is a possibility the change could be made directly by individual cities or agencies, with buy-in from local law enforcements and/or Caltrans. As discussed elsewhere in the report, the LA County Flood Control District would need to agree to include NEVs on multi-use pathways along any of their waterways.

## Pilot Scenario 1: Inglewood to Hawthorne

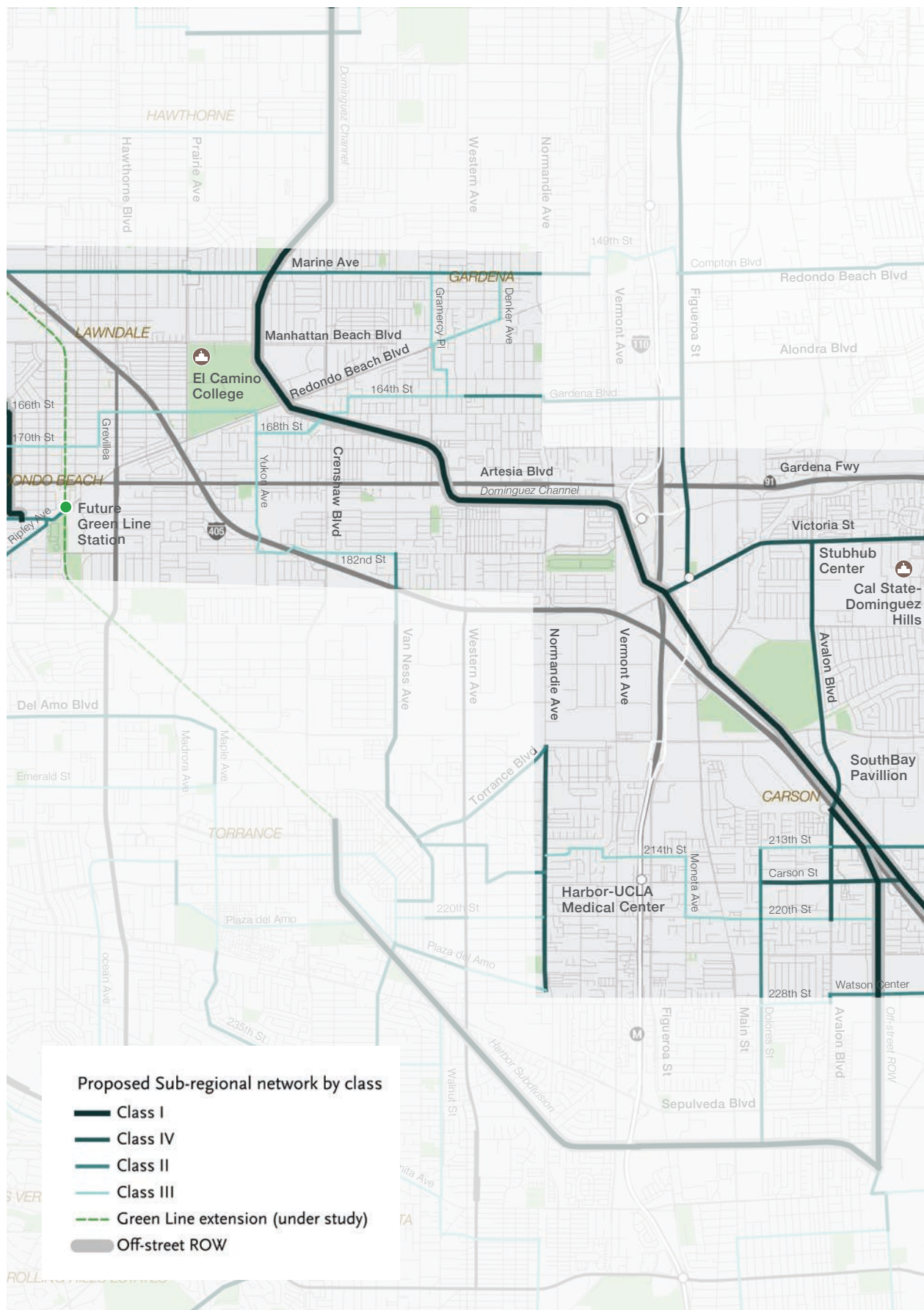




Pilot Scenario 2: El Segundo

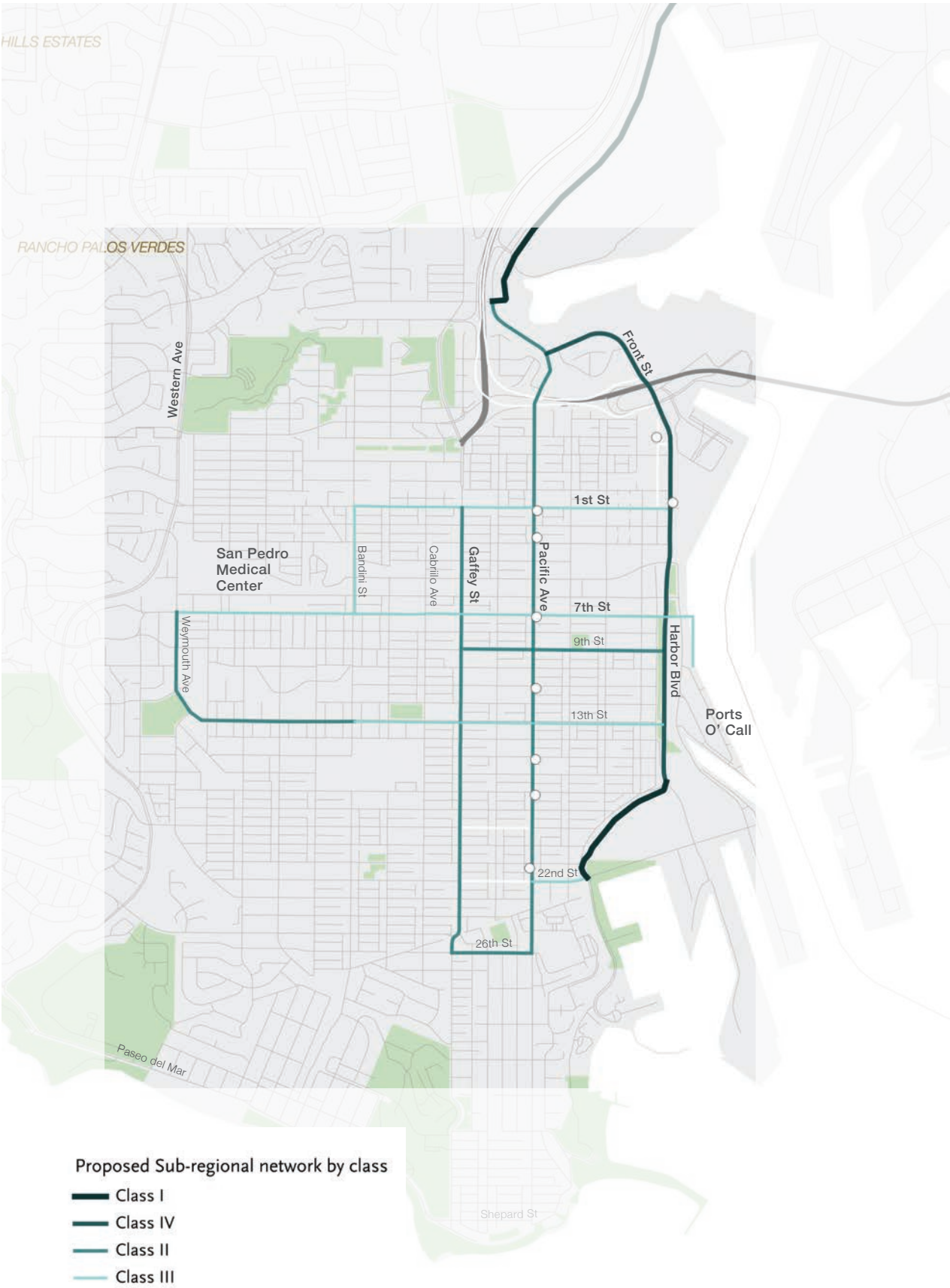


### Pilot Scenario 3: North Redondo Transit Center to the Carson Slow Zone





Pilot Scenario 4: San Pedro



## Feasibility, design alternatives, engineering and environmental review for pilot projects

The first step toward implementation for any of the pilot projects will be to identify infrastructure owners and determine who will lead pilot projects. Moving forward will require the participation of multiple agencies, and in some cases, adjoining cities. Project leads will need to establish funding sources for planning, design, funding of implementation capital, operations and maintenance.

Because continuity is essential to the network concept, maintaining consistency and continuity between jurisdictions, including as the network expands over time, will be an unavoidable challenge. The network strategy calls for a unified route for slow speeds, and will not succeed as disconnected segments.

### 1. Feasibility

Feasibility studies for any of the pilots will entail refinement of route planning, study of intersections and signalization, estimating costs and conducting outreach.

#### 1a. Route planning

- > Field-verify routes.
- > Confirm speed limits: conduct speed surveys and volume counts
- > Verify recommended facility classes.
- > Determine planned changes, street blockages or directional closures.
- > Determine phasing and the sequence of segments.
- > Locations for wayfinding and other signage
- > Location for parking and charging of slow modes.

#### 1b. Intersections

- > Field verify intersection geometry and performance for crossings and turning.

#### 1c. Signalization

Work with cities and agencies to understand advantages of taking on the scope of more advanced signalization.

Analyze existing and required timing changes to accommodate non-car modes, including determining concept of operations for multimodal signalization throughout the pilot project area. A camera-based sensor system, acting in concert with other sensors and types of activation, would best track the effectiveness of the pilot.

- > Determine which signals would be owned and maintained by County and which by cities.
- > Coordinate with agencies and local jurisdictions.
- > Determine what agreements are needed to cover cost and liability.

#### 1d. Outreach

- > Determine project constituents.
- > Discuss project with agencies, cities, institutional and local stakeholders, including in the immediate project area.

#### 1e. Cost and funding

- > Calculate costs and determining funding sources for design, engineering, environmental, as well as implementations, operations and maintenance.

## 2. Design alternatives

Studying network alternatives will require a new layer of analysis and refinements of these steps:

- > **Route Planning**
- > **Intersections**
- > **Signalization**
- > **Outreach**
- > **Cost and Funding**

## 3. Engineering and environmental review

Intersection improvements, streetscapes and signalization would be developed through the construction document phase and precisely coordinated with existing conditions. Some facility classes of the slow speed network would require CEQA documentation and some would not. Class III facilities will not require it, whereas Class II slow speed lanes would have to justify an exemption, for example, if no travel lanes will be eliminated. Class IV lanes require full CEQA documentation, whereas for Class I slow speed paths, the specific facility may be exempt upon study.

The following are specific feasibility, design alternatives, engineering and environmental review considerations for the four pilot scenarios.

### **Pilot scenario: Inglewood to Hawthorne**

- > Confirm the end points of the pilot project area as the termination of the Rail to River active transportation corridor, and a specified a point along the Dominguez Channel south of SpaceX.
- > Focus on edges of project area to ensure connectivity to streets outside pilot project boundaries.
- > Consider connectivity to Hollywood park redevelopment, planned rail stations and Market street.
- > Pay special attention to Hillcrest, Manchester, LaBrea “Y” intersection at Hillcrest and Gravelia.
- > Study connection to Jack Northrup Class IV facility.

### **Pilot scenario: El Segundo**

- > Study crossings of Sepulveda at both Maple and Mariposa.
- > Consider redesigning station area at Mariposa for all modes.
- > Verify route on Vista del Mar at Highland.
- > Study route in light of planned changes for Raytheon site, and other planned improvements around light rail stations in the eastern half of the City.

### **Pilot scenario: North Redondo Transit Center to the Carson Slow Zone**

- > Study intersections including 182nd street at the 405.
- > Ensure the continuity of Dominguez Channel infrastructure, especially between El Camino college and the Metro Transit Plaza/Green Line station.
- > Study connection to El Camino College to Dominguez Channel.
- > Study grade separations at intersections with the Dominguez Channel.
- > Study all access points to the channel, including traffic control.
- > Verify the width of Dominguez Channel ROW and engage all issues related to designing the network on the channel.
- > Consider coordination for channel maintenance, and closure in storms.
- > Anticipate environmental permitting for Dominguez Channel path.
- > Study including spurs to Dominguez Hills and Harbor UCLA.
- > Link pilot network to the Metro Silver Line.

### **Pilot scenario: San Pedro**

- > Coordinate with local Chamber of Commerce and other local initiatives.
- > Coordinate with current City of LA planning and implementation, making the most of synergies with bike share.
- > Ensure viable slow mode connectivity to Port o’ Call/San Pedro Public Market, requiring safe and convenient access from the level of Old Town San Pedro down to the lower level.



# Potential Funding Sources

Following are descriptions of the various funding mechanisms at the federal, state, regional and local levels that should be explored for funding the improvements outlined in the Slow Speed Network Strategic Plan. The cities in the South Bay COG and/or partner agencies can use this information as a starting point. Note that the inclusion of a discussion of any of these funding sources or approaches does not imply eligibility of any specific funding source for any individual project. This section will focus on capital funding sources with some secondary information on funding that can be used to support operations and maintenance costs.

## Federal funding sources

At the time, this plan was being prepared the federal government was operating with uncertainty in its budgeting process and funding levels subject to sequestration. The availability of funding discussed from these sources is likely to change.

### FAST-Act

This program has discretionary funds that are available through a grant process administered by the federal government through 2015 federal legislation. Federal and state statutes require the preparation of a Transportation Improvement Program (TIP) for Los Angeles County. The TIP process funding is allocated to all surface transportation modes based on requirements specified in the FAST-Act program and state requirements mandated by the California Transportation Commission.

The FAST-Act converts the long-standing Surface Transportation Program into the Surface Transportation Block Grant Program (STBG), acknowledging that this program has the most flexible eligibilities among all Federal-aid highway programs and aligning the program's name with how FHWA has historically administered it. The FAST-Act provides an estimated annual average of \$11.7 billion nationally for STBG, which States and localities may use for projects to preserve or improve conditions and performance on any Federal-aid highway, bridge projects on any public road, facilities for non-motorized transportation, transit capital projects, and public bus terminals and facilities. The program also provides financial support for surface transportation projects that enhance mobility or encourage quality of life in and around transportation facilities. These projects include pedestrian- and bicycle-oriented projects and landscaping. FAST-Act could be a source of funding for street improvements including the Slow Mode Thruways dedicated lane system along the Dominguez Channel and the Harbor Subdivision identified in the Slow Speed Network Strategic Plan. The Federal Transportation Administration (FTA) administers this financial assistance according to authorization under FAST-Act, which authorizes

specific dollar amounts for each program. Each year Congress provides an annual appropriation which funds the programs specified in the act.

More information on FAST-Act can be found at <https://www.fhwa.dot.gov/fastact/>

### Surface Transportation Block Grant Program

Under the Surface Transportation Block Grant Program (STBGP) program, California receives approximately \$60 million per year from the federal government to fund projects and activities that enhance the surface transportation system. The program funds projects under 12 eligible categories, including the provision of bicycling lanes, trails, bicycle parking, and other bicycling facilities; landscaping, and streetscaping projects. In California, 75 percent of TE funding is distributed by the regional transportation planning agencies. For the Los Angeles County, the Metropolitan Transportation Authority (Metro) manages the disbursement of funds. The remaining 25 percent of the state budget is allocated by Caltrans at the district level.

More information can be found at <https://www.fhwa.dot.gov/fastact/factsheets/transportationalternativesfs.cfm>

### Community Development Block Grant

Most of the cities in the South Bay are participants in the Community Development Block Grant Program (CDBG) from the US Department of Housing and Urban Development (HUD) to support community investment. Projects in the Slow Speed Network Strategic Plan may be eligible to receive funds through this program. The key uses for this funding include the acquisition, rehabilitation, construction of and improvements to public facilities. Utility upgrades and street improvements are eligible to utilize CDBG funds.

More information about the CDBG program can be found at: <https://www.hudexchange.info/resources/documents/About-the-CDBG-Program.pdf>

### Federal Economic Development Administration Grants

The Federal Economic Development Administration (EDA) is another potential source of grant money for plan elements. Funds from the EDA can be used to finance construction and rehabilitation of infrastructure and facilities that are necessary to achieve long-term growth and dynamic local economies. These competitive grants could potentially support utility upgrades and street improvements that have been specified in the pilot area designs.

Additional information about EDA grants can be found at: <https://www.eda.gov/funding-opportunities/>



## Recreational Trails Program

The Recreational Trails Program (RTP) provides funds to states to develop and maintain recreational trails and trail related facilities for both non-motorized and motorized recreational trail uses. The RTP is an assistance program of the Department of Transportation's Federal Highway Administration (FHWA). The RTP funds come from the Federal Highway Trust Fund, and represent a portion of the motor fuel excise tax collected from non-highway recreational fuel use. FAST-Act reauthorized the RTP as a set-aside of funds from the TA set-aside covered within the STBGP program. RTP funds may be used for maintenance and restoration of existing trails, purchase and lease of equipment to construct or maintain trails, administrative costs associated with the program, or operation of educational programs to promote safety and environmental protection related to trails. Dominguez Channel multimodal path and portions of some of the other regional network improvements identified in the plan may be able to access this funding source.

More information on the RTP is available at: [https://www.fhwa.dot.gov/environment/recreational\\_trails/](https://www.fhwa.dot.gov/environment/recreational_trails/)

## Safe Routes to School

Funding for this program is allocated as a sub-program of the transportation alternatives allocations within the STBGP, federal Safe Routes to School (SRTS) funds are available via the State's grant allocation. SRTS is competitive grant program to provide construction of pedestrian and bicycle facilities near schools. A small percentage of funds can be used for programmatic improvements. As communities consider SRTS grants, opportunities will exist to tie into on-street and sidewalk facilities identified by this plan.

Information on this program's funding and operations can be found under the transportation alternatives section of the Federal Highway Administration's web site at: [https://www.fhwa.dot.gov/environment/transportation\\_alternatives/](https://www.fhwa.dot.gov/environment/transportation_alternatives/)

## State funding sources

California Infrastructure and Economic Development Bank – Infrastructure Revolving Fund Program

This loan program provides low-cost financing to public agencies for a variety of infrastructure programs, including streets, bridges and recreational facilities. This type of loan could be used to fund the infrastructure upgrades and improvements proposed within the Slow Speed Network Strategic Plan. Funding assistance ranges from \$250,000 to \$10,000,000. There must be a dedicated source for debt service of the loan and the term of the loan can be as long as 20 years.

Information on the California Infrastructure revolving loan program can be found at: <http://www.ibank.ca.gov/>

## Statewide Community Infrastructure Program

The Statewide Community Infrastructure Program (SCIP) is a program of the California Statewide Communities Development Authority (CSCDA) that makes use of a local government's ability to create land-secured financing districts. The Program "pools" debt obligations to gain a comparatively lower interest rate and issuance costs (particularly if the total amount to be financed is less than \$5 million). Municipal governments located within the South Bay can benefit from SCIP eligible project types included in this plan are roads, street lights, landscaping. CSCDA is a Joint Powers Authority sponsored by the League of California Cities and the California State Association of Counties. SCIP financing is available for development projects situated within cities or counties (local agencies) which have elected to become SCIP participants

Information on SCIP can be found at [http://cscda.org/Infrastructure-Finance-Programs/Statewide-Community-Infrastructure-Program-\(SCIP\)](http://cscda.org/Infrastructure-Finance-Programs/Statewide-Community-Infrastructure-Program-(SCIP))

## Gasoline Taxes/Operations and Maintenance

Each city in California receives state gasoline taxes that may be used for operating and maintenance expenditures related to streets and roads. While these funds are limited, a city's annual budgeting process may designate a portion of these revenues for specific facilities specified in the Slow Speed Network Strategic Plan, subject to annual budgeting priorities. Interventions on the street itself, including striping and reservation of space for NEV and ATP activities could be funded from this source. This funding would be available via the state but is distributed at the local agency level.

## Regional funding sources

### Metro Measure M

In November of 2016 Los Angeles county voters approved a measure that added an additional 0.5% to the sales tax to fund transportation improvements in the county. Measure M also extended existing sales tax increases that had been used to fund transportation projects in the county. Communities in the South Bay will have access to two sub-regional programs funded by Measure M:

> South Bay Highway Operational Improvements

> Transportation System and Mobility Improvement Program #1 and #2

## Utility rebates for EV charging stations

The electric utilities that serve the communities in the plan area, the Los Angeles Department of Water and Power (LADWP) and Southern California Edison have incentives in place for private property owners to install electric vehicle charging facilities. These programs can be accessed in order to support increased infrastructure capacity for NEVs as presented in the plan.

### Southern California Edison

Southern California Edison's Charge Ready program is a newly authorized pilot program that has a goal of adding as many as 1,500 electric vehicle charging stations to the utility's service area. Funded initially at \$22-million the Charge Ready pilot aims to get more electric vehicle charging stations installed at locations where cars are parked for extended periods — for example, at workplaces, apartment and condo complexes, fleet vehicle parking lots, campuses and recreational areas. Participants will own, operate and maintain electric vehicle charging stations, and SCE will install and maintain the supporting electrical infrastructure at no cost to participants. As an additional incentive to participate, SCE will offer rebates to offset some or all of the cost of the charging stations and their installation, depending on the location and type of establishment. The program also calls for at least 10 percent of the charging stations to be installed in disadvantaged communities. This program can be used to support the development of NEV infrastructure in a few cities within the plan area served by SCE.

### LADWP

Rebates are available to compensate commercial LADWP customers for costs incurred on the purchase of the EV chargers. Eligible customers will receive up to \$4,000 for each hardwired EV charger. One Level 2 (240-volt) EV charger rebate will be available to commercial customers who have a minimum of three parking spaces available to employees, customers, visitors or tenants. One additional Level 2 charger rebate will be available for every 10 additional parking spaces at the same location, business, or property. A maximum of 20 EV charger rebates will be available per business location or multi-residential property. These funds can be used to support NEV infrastructure.

### Motor Vehicle Subvention Program

The funds are available through the South Coast Air Quality Management District (SCAQMD). Local jurisdictions receive 40 percent of the first \$4 of each vehicle registration fee to implement projects that reduce mobile source emissions. The SCAQMD distributes these funds quarterly to cities and counties within its jurisdiction based upon their prorated share

of population. In 2004, an additional \$2 surcharge was added as a source of funding its Air Quality Standards Attainment program. This additional funding is used to support early introduction of clean air technology such as cleaner vehicle engines, a Lower-Emission School Bus Program, and accelerated vehicle retirement and repair programs. These funds may be accessed to support NEV supportive improvements identified in the plan.

## Mobile Source Emission Reduction Credits

The SCAQMD also administers a tax credit program aimed at the reduction of mobile source emissions. The MSERC program covers credits for clean on and off-road vehicles. These programs can be used to support the conversion of the use of vehicles with conventional emissions to clean modes of transportation. Applications for the tax credits are available to entities with tax liabilities who are seeking off set credits.

Application materials can be found at: <http://www.aqmd.gov/home/programs/business/business-detail?title=mobile-source-credits>

## Municipal funding sources

### City General Fund

This is the most accessible and flexible funding source available to local agencies. Local revenues collected include property tax, sales tax and transient occupancy and utility user taxes and are expended on projects and programs as defined in the City's adopted budget. Projects and programs that may be funded by this source of money generally include those items which cannot be paid for by other funding sources and which provide a direct community-wide benefit for the residences or businesses in the city. General fund expenditures could be used for most of the improvements identified in the Slow Speed Network Strategic Plan. However, since this funding source is a city's primary source of operating funds and for capital projects, there are many demands on these funds and the priorities for funding are highly competitive. General fund revenues should be looked at as a secondary source to fund most projects.

### Development impact fees

While most of the plan area is built out, some of the planned improvements could be necessary because of the pressures from either new development or recent growth in the surrounding area. Therefore, it could be possible to attach an appropriate portion of the financial responsibility of these improvements to new development. A mechanism commonly utilized for funding various streetscape improvements is development impact fees. Impact fees collected through this mechanism are based on the proportion of impact relative to

the improvements necessary, providing a clear connection or "nexus" between development and a particular improvement. Since most of the proposed improvements are expected to occur in built out areas, development impact fees will not likely be one of the primary mechanisms for paying for improvements but could be considered for utility upgrades and relocations as well as some specific roadway and streetscape improvements that are impacted by new development. This approach may be relevant in San Pedro and North Redondo

### Rule 20A Utility Set-asides

Utility companies that serve the cities in the plan area set aside funds each year that accumulate to finance local utility undergrounding projects. Utility undergrounding can be a very long-term project if using this rule as the primary dedicated source of funds for district utility improvements. This could be used to improve pedestrian access in areas effected by utility lines.

### Assessment districts

Assessment districts are most commonly established to finance the construction of public capital improvements. They are authorized to operate and maintain costs of certain public facilities. Assessment districts are formed in two different ways: 1) Property owners petition the appropriate public agency to form a district and provide a needed public improvement, or 2) a public agency foresees the need for an improvement and approaches the affected property owners with an assessment district proposal. While there are several types of assessment districts, not all of them could be used for facilities specified in the Slow Speed Network Strategic Plan. The most relevant assessment district types are covered below:

### Community Facilities Districts

Community Facilities Districts (CFDs), also known as Mello-Roos districts, can fund the planning, design, purchase, construction, expansion, improvement, or rehabilitation of capital facilities that are defined as having a useful life of five or more years. These districts levy a special tax instead of a special assessment. This tax may be applied to the value of each property, rather than assessed based on the level of special benefit received. However, because it is a special tax on real property, a two-thirds majority vote is required to approve the levy of the special tax. If the district has twelve or more registered voters, the election polls voters with each having an equal vote. If there are fewer than twelve registered voters, the election polls property owners with each vote weighted by acreage owned within the district boundary. Properties within the district need not necessarily be contiguous. Finally, establishing a CFD requires only a general description of the

facilities, services, and costs associated with the district, not the detailed engineer's report required for many other types of assessment districts. Community Facilities Districts may fund the construction of the following types of facilities found in the Slow Speed Network Strategic Plan:

- > Recreational facilities (dedicated off street network)
- > Medians
- > Open Space
- > Improvements to storm water facilities
- > Other governmental facilities the legislative body creating the district is authorized by law to contribute revenue to construct, own or operate

Community Facilities Districts may also fund limited operations and maintenance services

In order to simplify the process of establishing a CFD, the City may choose to establish the district for a portion of a pedestrian retail area and define the district area to include fewer than twelve registered voters. The City could also choose to establish a CFD for all or a portion of a pedestrian retail area and define the district area to include more than twelve registered voters if the City believes that resident registered voters might be more likely to approve the CFD than property owners. Alternatively, the City could also establish multiple CFDs across the area to accommodate phased growth.

An additional approach that is beginning to be used in established urban areas involves creating a small district tied to specific projects. As additional properties are developed, the CFD boundaries can be amended to incorporate these properties. Because such a CFD would only contain property owners who wish to join, it avoids the need for a larger election with many property owners and the potential rejection of the district. This approach can work for site-specific improvements to the public realm.

## Local Return

In addition to Measure M funded programs, jurisdictions will receive Local Return allocations annually from the combined Los Angeles County funding sources that were put in place by previous initiatives including Prop A, Prop C, Measure R and Measure M. The forecasted funding levels for FY 2017-2018 are shown below. Local return is broadly flexible and can be used in variety of project/expenditure types with a transportation nexus.

### SOUTH BAY CITIES LOCAL RETURN FUNDING FY 2017-2018

City	Prop A (25%)	Prop C (20%)	Measure R (15%)	Measure M (17%)	Total
Carson	1,876,917	1,556,853	1,167,640	1,323,325	5,924,735
El Segundo	342,547	284,134	213,100	241,514	1,081,295
Gardena	1,217,332	1,009,745	757,309	858,283	3,842,669
Hawthorne	1,766,274	1,465,078	1,098,808	1,245,316	5,575,476
Hermosa Beach	398,403	330,464	247,848	280,895	1,257,610
Inglewood	2,263,492	1,877,507	1,408,130	1,595,881	7,145,010
LA County UA*	1,174,916	974,562	730,921	828,377	3,708,776
Lawndale	673,065	558,290	418,717	474,546	2,124,618
Lomita	417,767	346,526	259,895	294,547	1,318,735
Los Angeles City**	8,172,810	6,779,131	5,084,348	5,762,261	25,798,550
Manhattan Beach	720,619	597,734	448,301	508,074	2,274,728
Palos Verdes Estates	276,657	229,480	172,110	195,058	873,305
Rancho Palos Verdes	857,658	711,404	533,553	604,694	2,707,309
Redondo Beach	1,372,103	1,138,123	853,593	967,405	4,331,224
Rolling Hills	38,365	31,823	23,867	27,050	121,105
Rolling Hills Estates	165,692	137,437	103,078	116,822	523,029
Torrance	2,990,780	2,480,773	1,860,580	2,108,657	9,440,790
South Bay Total	24,725,397	20,509,064	15,381,798	17,432,705	78,048,964
* LA Countywide Total					
** LA Citywide Total					

Source: South Bay Cities Council of Governments

## Landscape and lighting districts

Each of the cities within the plan area can establish landscape and lighting districts to maintain landscape and lighting in sub-areas of each city that could support the establishment of Slow Zones. These districts allow for the maintenance cost to be paid for by assessments on property owners within each sub-area or district. These districts are based on land use type and are used to supplement maintenance costs. The Landscaping and Lighting Act of 1972 (Streets and Highway Code Section 22500) enables assessments to be imposed in order to finance:

- > Acquisition of land for parks, recreation and open space
- > Installation or construction of planting and landscaping, street lighting facilities, ornamental structures, and park and recreational improvements
- > Maintenance and servicing any of the above

## Property and Business Improvement Districts

A Property and Business Improvement District (PBID) is an established benefit assessment district that can be formed based on the provisions of AB 3754. These districts are geographically defined business areas in which private property owners unite to realize a common goal, such as to gain legal standing, or generate sufficient revenue to improve area services and facilities. All types of businesses can be included within a PBID, including commercial, professional office, finance institutions and high-density residential. The PBID can perform a number of activities designed to supplement existing City services, such as marketing district businesses and activities, promoting public events, cleaning streets and sidewalks, removing graffiti, promoting tourism, providing sanitation, and retaining and recruiting retail. Physical improvements – such as plazas, planting areas, restrooms, pedestrian shelters, benches, kiosks, trash receptacles, signs, lighting and fountains – are also often funded through a PBID. There are several legal forms of PBIDs authorized by California law. The most common are districts formed under the Parking and Business Improvement Act of 1989. Business Improvement Areas (BIAs) formed under the 1989 law impose a fee on the business licenses of the businesses (rather than the property owners) operating in the area. The collected funds are used to pay for the improvements and activities specified in the formation documents. A similar assessment procedure was authorized by the Property and Business Improvement District (PBID) Law of 1994. The distinction is that the PBID makes the assessment on the real property and not on the business itself.

Generally speaking, the BIA format works well for marketing and other programmatic activities that serve to directly benefit area businesses (i.e. tenants), whereas a PBID may be more appropriate for permanent physical improvements that stand to improve property values in the area. A PBID could be used to make some of the identified improvements in the pilot projects in commercial areas. Candidates would include construction and maintenance of landscaped medians in commercial districts, implementation of pedestrian improvements, signage and wayfinding.

## Enhanced Infrastructure Financing District

Enhanced Infrastructure Financing District (EIFD) is a relatively new mechanism that allows the use of tax increment funds to help pay for infrastructure, the most likely candidate for use of this tool for the items recommended in the plan would be the development of the Dominguez Channel multimodal path. The EIFD increases the funds available for infrastructure without additional burden on individual property owners but at the expense of the general fund. It may have limited potential, as each agency sharing in the property tax revenues may veto the use of its portion of the tax increment. Even motivated agencies would be taking what would otherwise be general fund revenues and spending them on infrastructure.

An EIFD can be used to finance the construction or rehabilitation of a wide variety of public infrastructure and private facilities. An EIFD may fund these facilities and development with the property tax increment of consenting taxing agencies (cities, counties and special districts, but not schools). EIFDs are also authorized to combine tax increment funding with other permitted funding sources, including:

- > Property tax revenue distributed to a city, county or special district after payment of a successor agency's debts
- > Revenues dedicated by a city or county to the EIFD from property tax corresponding to the increase in assessed valuation of taxable property attributed to those property tax shares received by the City In lieu of Vehicle License Fee (VLF)

Facilities financed by an EIFD that could be included in the Slow Speed Network Strategic Plan include:



**Public Infrastructure and Facilities:**

- > Ramps and bridges, arterial streets, parking and transit facilities
- > Flood control retention basins, drainage canals, and levees and dams
- > Recreational facilities

**Private Facilities:**

- > Transit priority projects as defined under Section 21155 of the Public Resources Code
- > Projects which implement a sustainable communities strategy
- > Reimbursement of a developer located within the boundaries of a district for permit and other expenses incurred when constructing affordable housing pursuant to the Transit Priority Project Program

Eligibility for EIFD by geography can be accessed via SCAG's EIFD eligibility tool which is currently being developed by the agency.

**Community Revitalization and Investment Authority**

The Community Revitalization and Investment Authority Law (AB 2) allows cities (and other property-taxing entities, except school districts) to establish a Community Revitalization and Investment Authority (CRIA) in disadvantaged communities (defined by the legislation). The CRIA area may adopt a resolution to allocate its share of property tax increment to the CRIA for funding of affordable housing and other redevelopment-related costs (e.g., infrastructure, environmental remediation, property). CRIA powers are similar to the authority of former Redevelopment agencies, including eminent domain. A CRIA is formed by City resolution or through entering into a joint powers agreement. The actions of the CRIA are governed by a community revitalization plan. To adopt an AB2 community revitalization plan, the CRIA must hold hearings. If there is a majority protest, the CRIA must terminate proceedings.

CRIs create a new opportunity to redirect property taxes otherwise accruing to the city General Fund to pay for specified improvements. However, similar to EIFDs, the CRIA only may utilize local government's share of property tax (along with other agencies who agree to forego their share of tax increment). Furthermore, the CRIA area must include at least 80 percent of land that has an annual household income

that is less than 80 percent of the statewide annual median income, as well as three out of the four additional criteria defined in the statute (high unemployment, high crime rates, deteriorated or inadequate infrastructure, deteriorated commercial or residential structures, including a former military base).

The use of a CRIA may be possible as a multi-jurisdictional tool that can contribute to the development of portions of the Dominguez Channel multimodal path however, these districts have yet to be successfully implemented.

**Parcel taxes**

Citywide parcel taxes can be imposed with voter approval to fund municipal services and infrastructure. In practice, they typically are used to provide a broad-based source of funding for citywide-serving services. Due to the voter approval requirements and similar to general obligation bonds, jurisdiction-wide parcel taxes or special taxes typically are only successful if they fund highly-desirable public services and improvements, such as improved public safety services. Parcel taxes differ from general obligation bonds in that they can be used for maintenance and operations and, they typically have a flat rate structure applied to individual parcels. They could be used on a City-wide basis to fund ATP and slow speed network improvements across any of the cities that are covered by the plan in conjunction with a wider plan for public improvements.

**Development agreements**

An individual jurisdiction may require a development agreement for development projects proposed within their area of land use authority. A development agreement can stipulate how the proposed project will pay its fair share of the capital improvements called for in the Slow Speed Network Strategic Plan and ensure that the proposed project will be served by adequate public infrastructure and services. Examples of public improvements proposed in the plan area that could become part of a development agreement include improvement to pedestrian facilities and accessible street frontage associated with new development.

In some cases, the development of one or more parcels may require the construction of off-site infrastructure improvements, the size of which may be larger than what is needed to serve the proposed development. In such cases the property owner or developer may, through a development agreement, consent to pay for the full cost of the off-site infrastructure improvement and to be repaid as additional development occurs. The development agreement would stipulate the terms of such repayment. In these circumstances items such as traffic signals and improvements to the roadway itself may be considered as part of a development agreement.



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A: When speed limits are lowered without an E&TS, with some exceptions, speeding violations issued to drivers may be thrown out in court. Exceptions include speed limits that are near schools, senior centers, or in business districts.”

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"As low-speed vehicles, these 20 to 25 mile-per-hour vehicles are subject to a new Federal Motor Vehicle Safety Standard No. 500 (49 CFR 571.500) established by this final rule. The agency notes that the growing on-road use of golf cars has already resulted in some deaths and serious injuries, and believes that the new standard is needed to address the effects in crashes of the higher speed of low-speed vehicles. The standard requires low-speed vehicles to be equipped with headlamps, stop lamps, turn signal lamps, tail lamps, reflex reflectors, parking brakes, rearview mirrors, windshields, seat belts, and vehicle identification numbers. The agency believes that these requirements appropriately address the safety of low-speed vehicle occupants and other roadway users, given the sub-25 mph speed capability of these vehicles and the controlled environments in which they operate." (NHTSA Federal DOT 1998)





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Civil Engineer  
Watershed Management Division  
Los Angeles County Public Works

Armand Ghazarian  
Senior Civil Engineer  
Watershed Management Division  
County of Los Angeles Public Works

## North Redondo

Jacqueline Sun  
Community Policy Analyst  
Beach Cities Health District

Lauren Nakano  
Blue Zones Project Director  
Beach Cities Health District

Donald Szerlip  
North Redondo Beach Business Association

John Gran  
North Redondo Beach Business Association

Ted Semaan  
Public Works Director  
City of Redondo Beach

Jin Kim  
Public Works Department  
Redondo Beach

Kenneth Lee  
VP, Real Estate Services  
Forest City (South Bay Galleria)

Amy Errett  
E3 Neighborhood Electric Vehicles  
Redondo Beach

## San Pedro

Nathan Holmes  
Planning Deputy  
Joe Busciano  
Councilmember, 15th District  
City of Los Angeles

Jacob Haik  
Deputy Chief of Staff  
Joe Busciano  
Councilmember, 15th District  
City of Los Angeles

David Roberts  
Economic Development and Planning Director  
Joe Busciano  
Councilmember, 15th District  
City of Los Angeles

Peter Hudnut  
Development Manager  
Ratkovitch Company (San Pedro Public Market)

Lorena Parker  
Executive Director  
San Pedro Property Business Improvement District

## El Segundo

Gregg McClain  
Planning Manager  
City of El Segundo

Sam Lee  
Director of Planning and Building  
City of El Segundo

## ITS and signalization

Alan Cleland  
Senior VP  
Transportation Systems  
Iteris

John Lower  
Associate VP  
Iteris

## Vehicles

Grant Delgatty  
Co-Founder, Chief Creative Officer  
URB-E

Peter Lee  
CEO  
URB-E

John Stockman  
Polaris

Rob Keenan  
Polaris

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Kimberly Clark  
Urban Planner/Regional Data and GIS Specialist

Marco Anderson  
Senior Regional Planner

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Bruins Policy Solutions

Aaron Baum  
Environmental Services Analyst and Electric Vehicle Programs  
South Bay Cities Council of Governments

Bill Wheaton  
RTI International

Lance Glover  
Manager, Signage and Environmental Graphic Design  
LA Metro

Katie Lemmon  
Manager, Transportation Planning  
LA Metro

Marina Henderson  
Administrative Intern  
LA Metro

## Project team

### Project management LA Metro

Jacob Lieb  
Senior Director, First/Last Mile Planning  
Countywide Planning and Development

### South Bay Cities Council of Governments

Jacki Bacharach  
Executive Director

Stephen Lantz  
Transportation Director

Walter Siembab  
Research Director

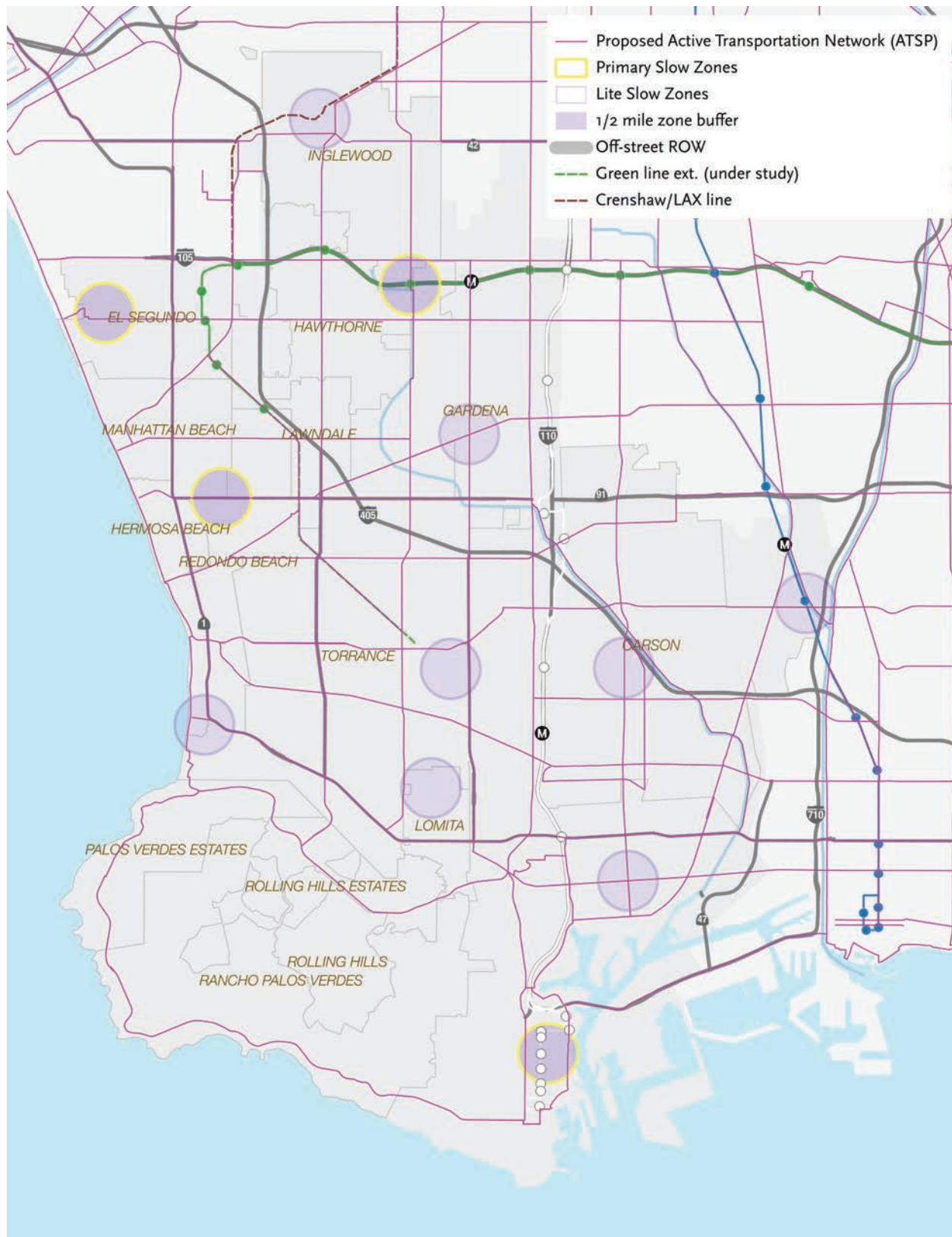
### Consultant team

Civic Projects, DCR Design, UCR CE-CERT,  
Metropolitan Research + Economics

# Appendix A

## SLOW SPEED NETWORK DESIGN METHODOLOGY

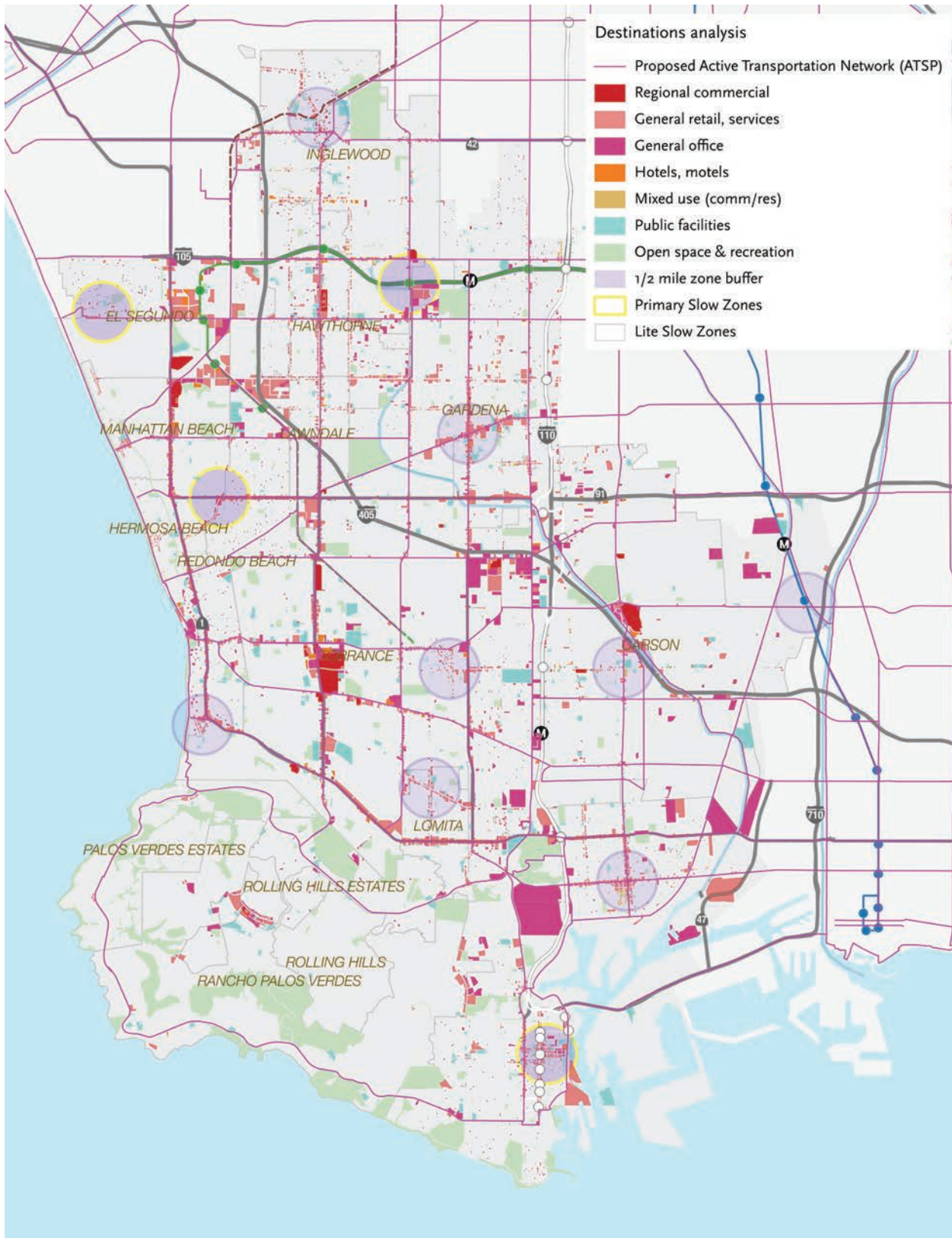
## Proposed Active Transportation Network (ATN) - Metro Active Transportation Strategic Plan



1) The design of the slow speed network built upon principles and strategies from Metro's Proposed Active Transportation Network (in the Active Transportation Strategic Plan). The ATN as proposed in the South Bay sub-region is shown above.

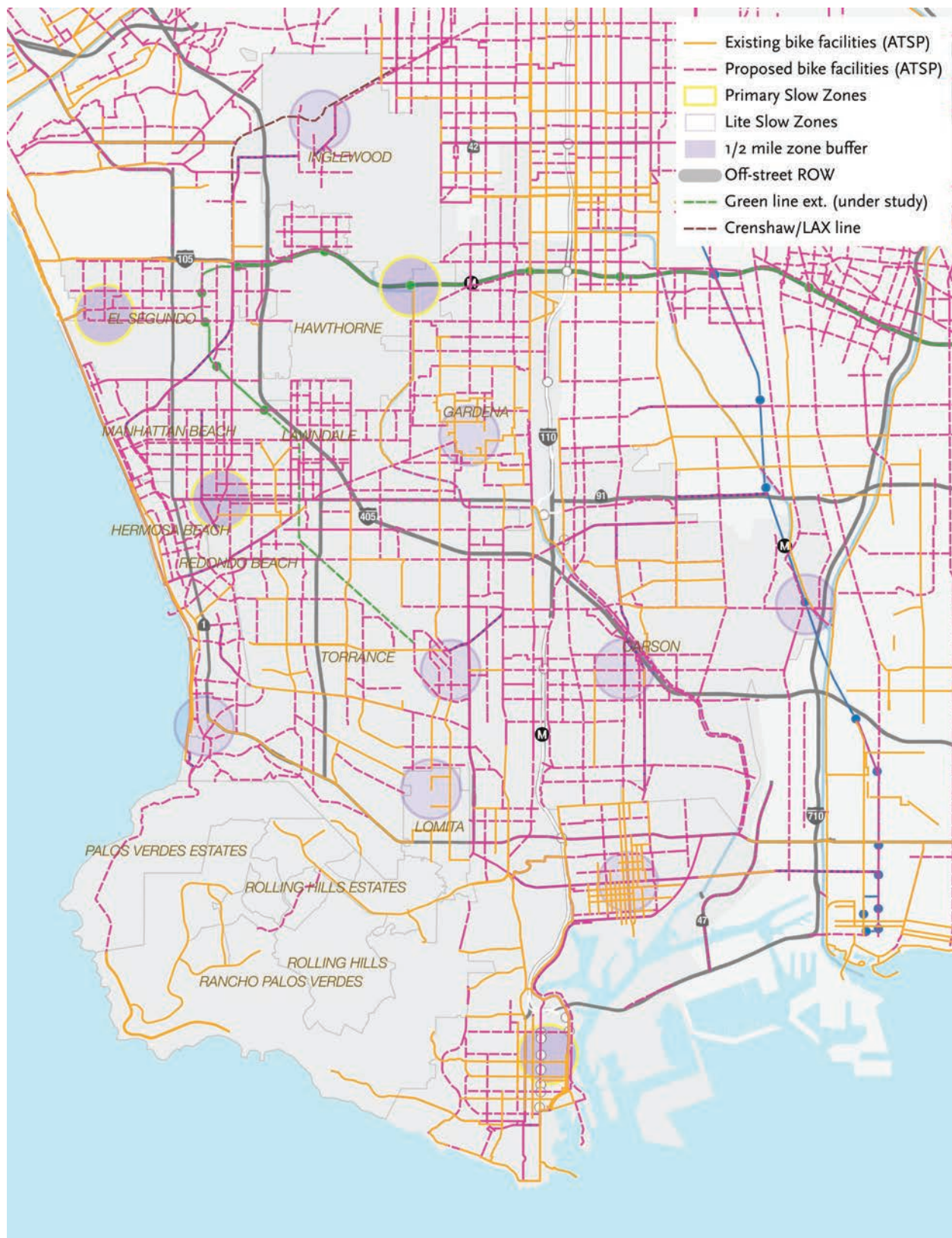


## Active Transportation Network, destinations analysis



2) The ATN was overlaid on destinations in the South Bay (derived from land use) to assess how well the network served trips to public, retail, office and recreational destinations as well as the proposed Slow Zones.

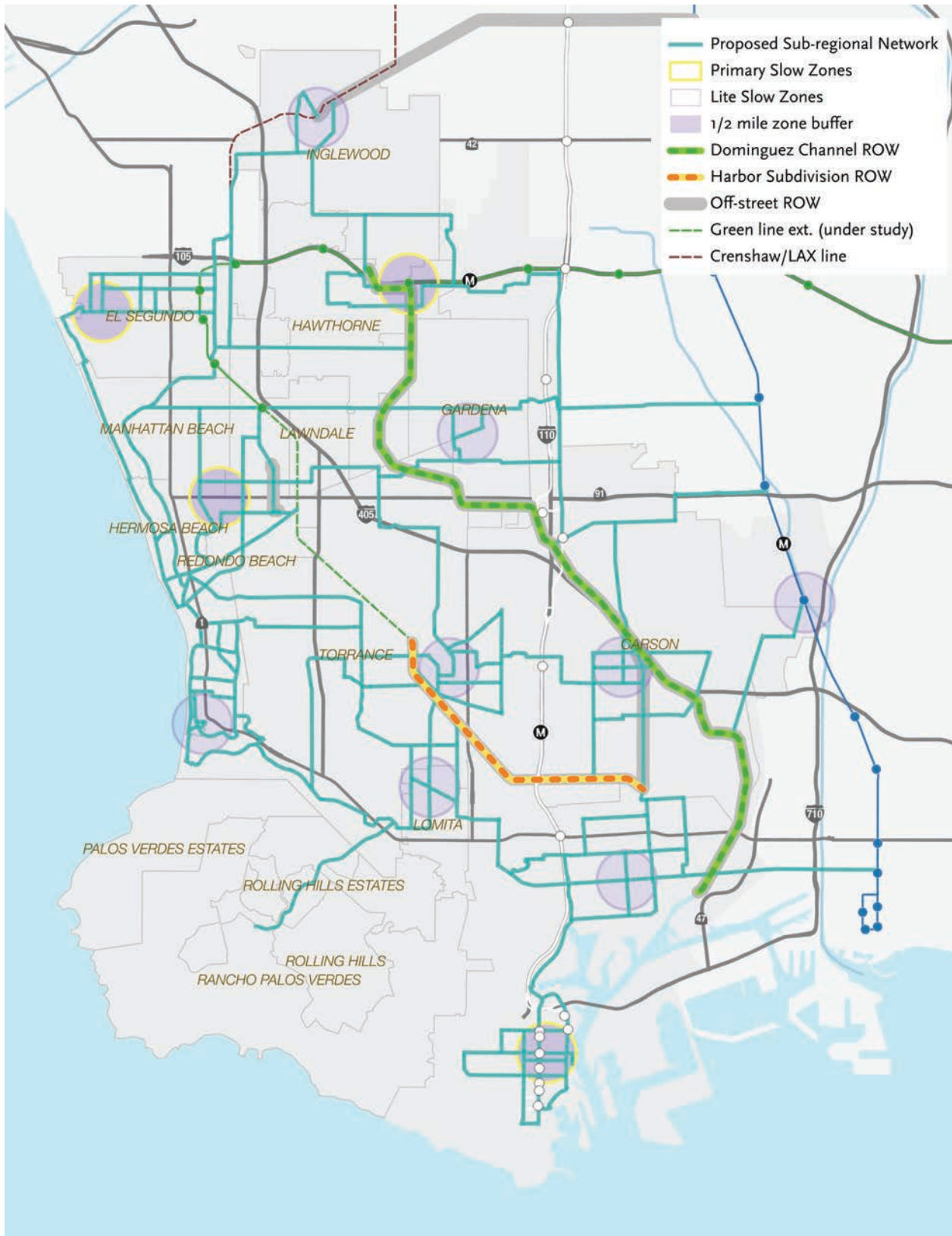
## Existing and proposed bike facilities - ATSP



3) Additional links were selected based on existing and proposed bike facilities (from the South Bay Bicycle Master Plan and relevant City plans as shown in the ATSP) to fill gaps serving key destinations, including Slow Zones. Slow speed, low traffic volume routes with flat topography that could accommodate the full range of slow modes were given priority.

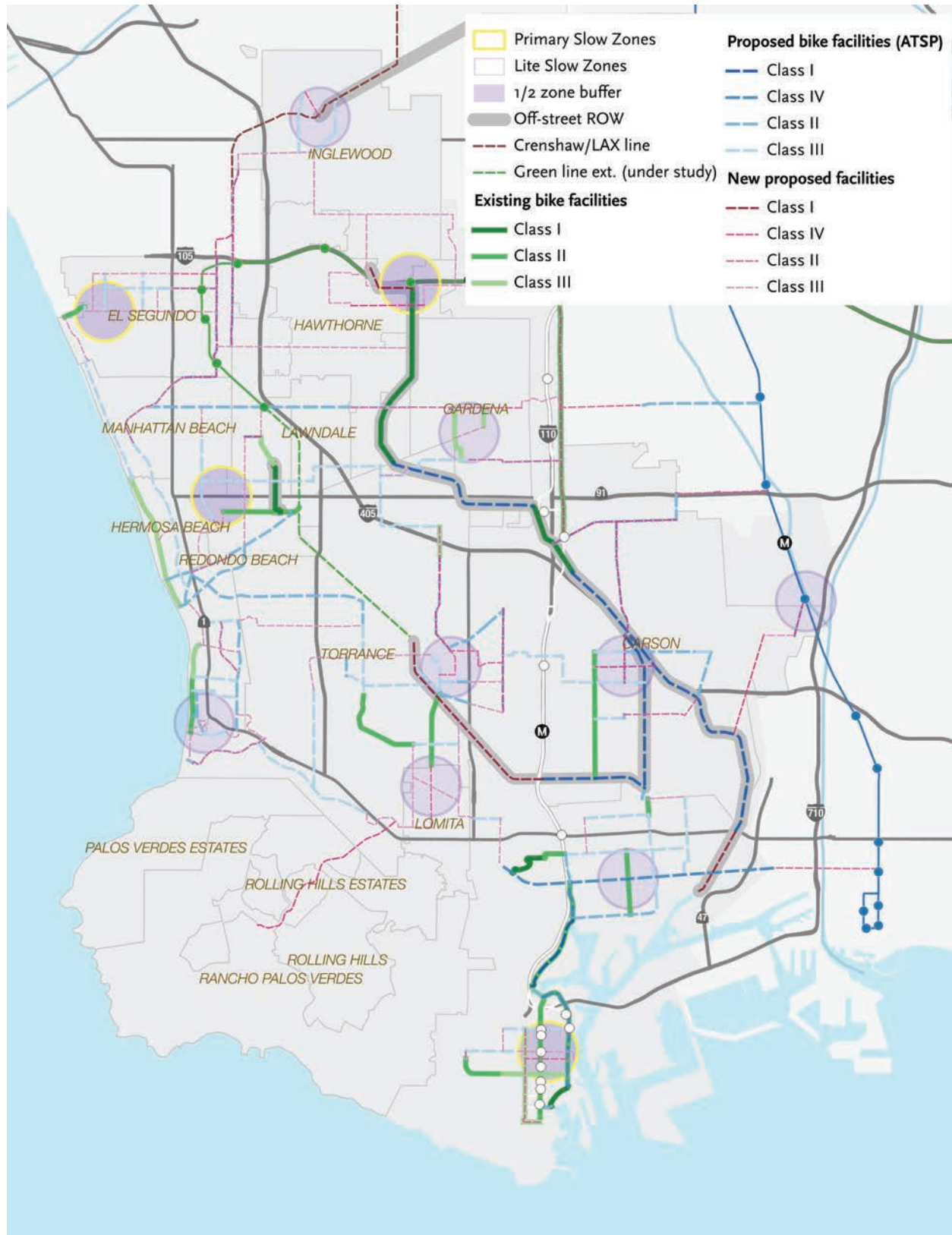


## Proposed Sub-regional Network



4) All inputs were refined based on field visits and stakeholder input to create the proposed Sub-regional Network as shown above.

## Proposed Sub-regional Network, existing conditions



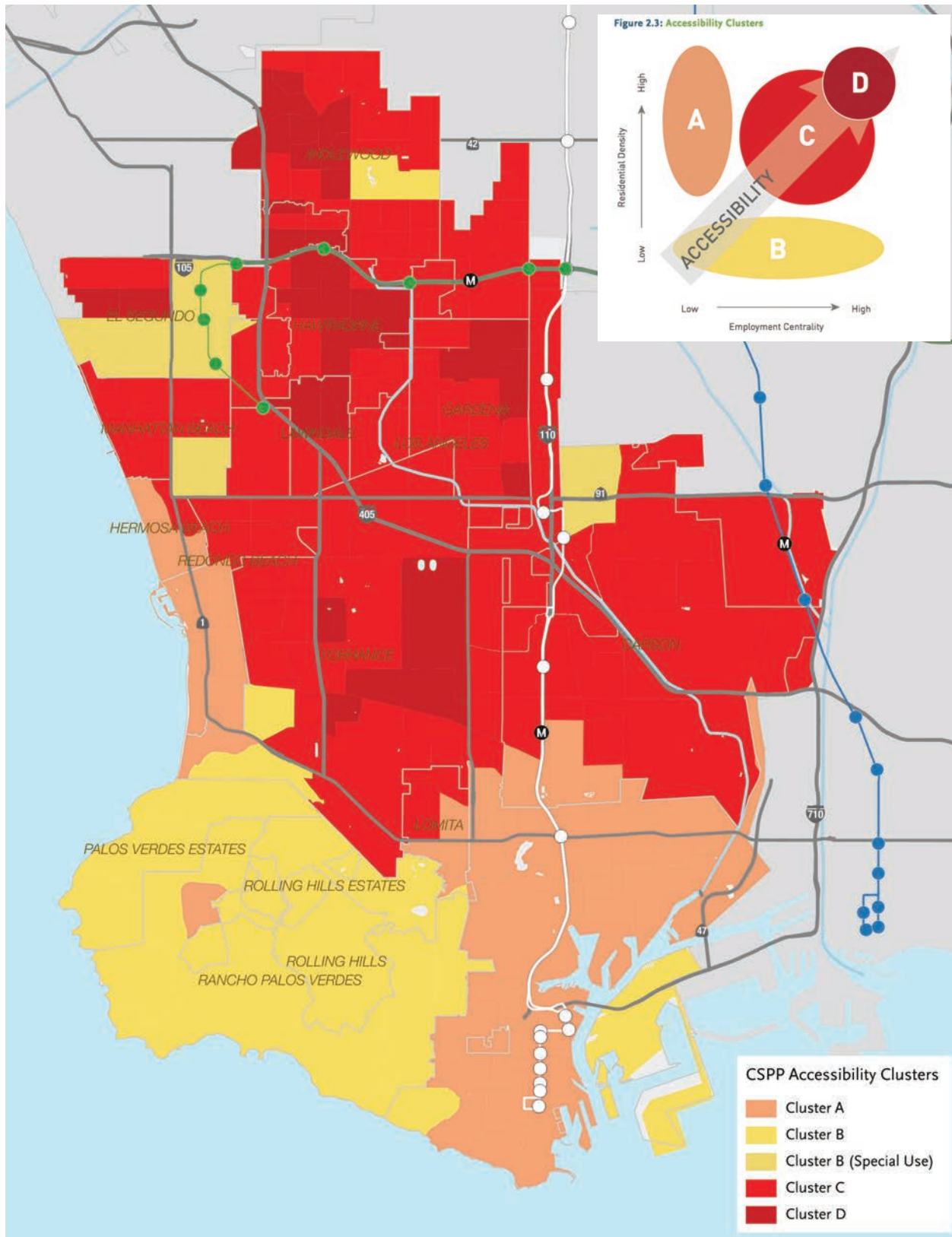
Existing conditions of the Sub-regional Network: Segments are categorized into existing bike facilities, proposed bike facilities, and new proposed slow mode facilities (from this study).

# Appendix B

## EXISTING CONDITIONS

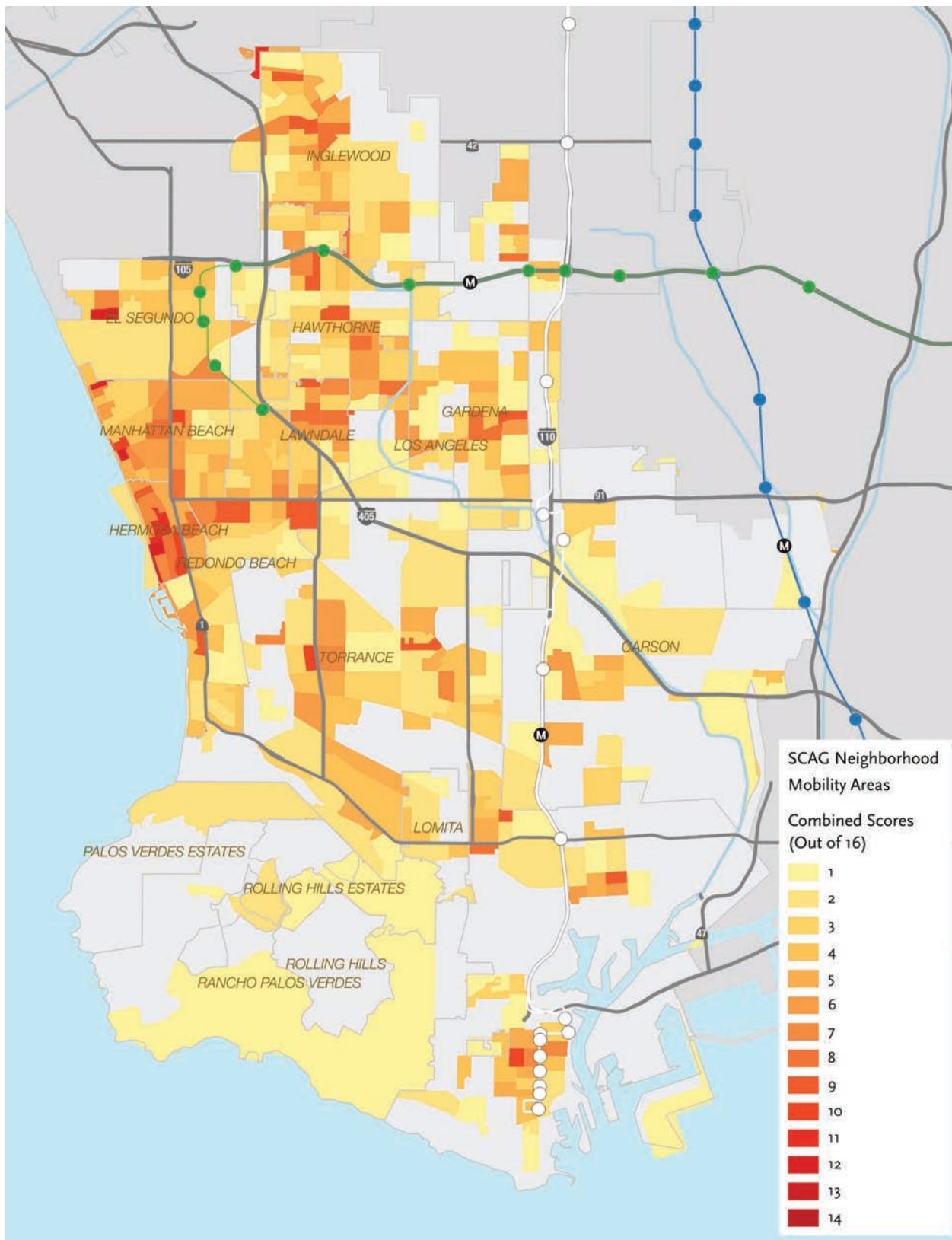


## Metro Countywide Sustainability Planning Policy & Implementation Plan - Accessibility Clusters



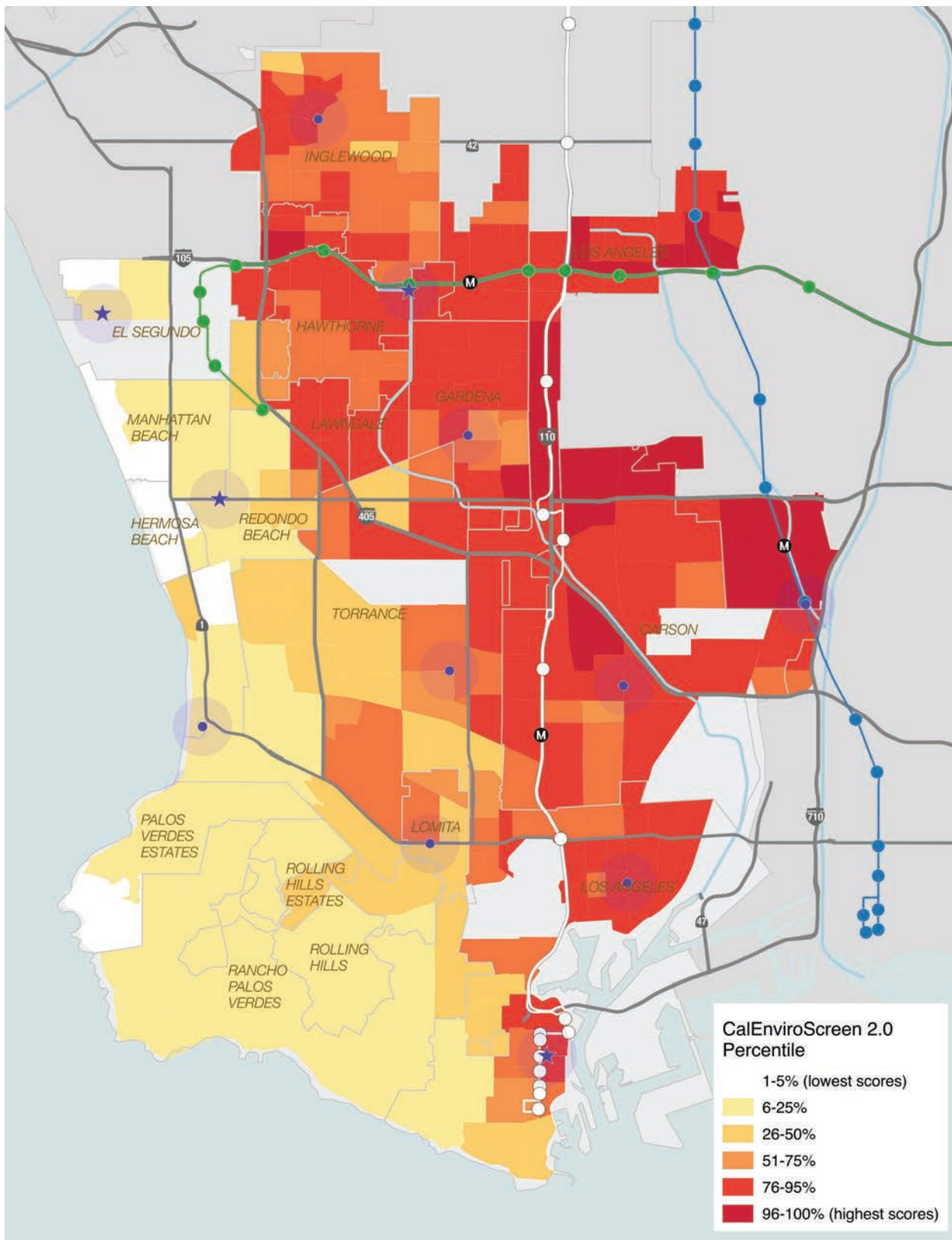
Accessibility clusters are defined by land-use conditions that were identified, through original local analysis, to have the greatest impact on travel behavior, as defined by vehicle miles traveled. These characteristics include net residential density (number of households per census tract) and job centrality (calculation based on the number of jobs and their distance from each tract). In general, the higher the residential density and job centrality for a given location, the less people drive to achieve their daily needs. Separately, the Palos Verdes Peninsula has topography that make Slow Speed Vehicles not useful in most places.

## Neighborhood Mobility Areas (combined scores) - Southern California Association of Governments



Displayed as Traffic Analysis Zones (TAZs) with the highest ranked active transportation variables within the SCAG region (higher scores = stronger relationship). The NMA combined score is comprised of walk accessibility, bicycle and pedestrian hazard (density of collisions/acre), NEV "friendliness" and density of short trips variables.

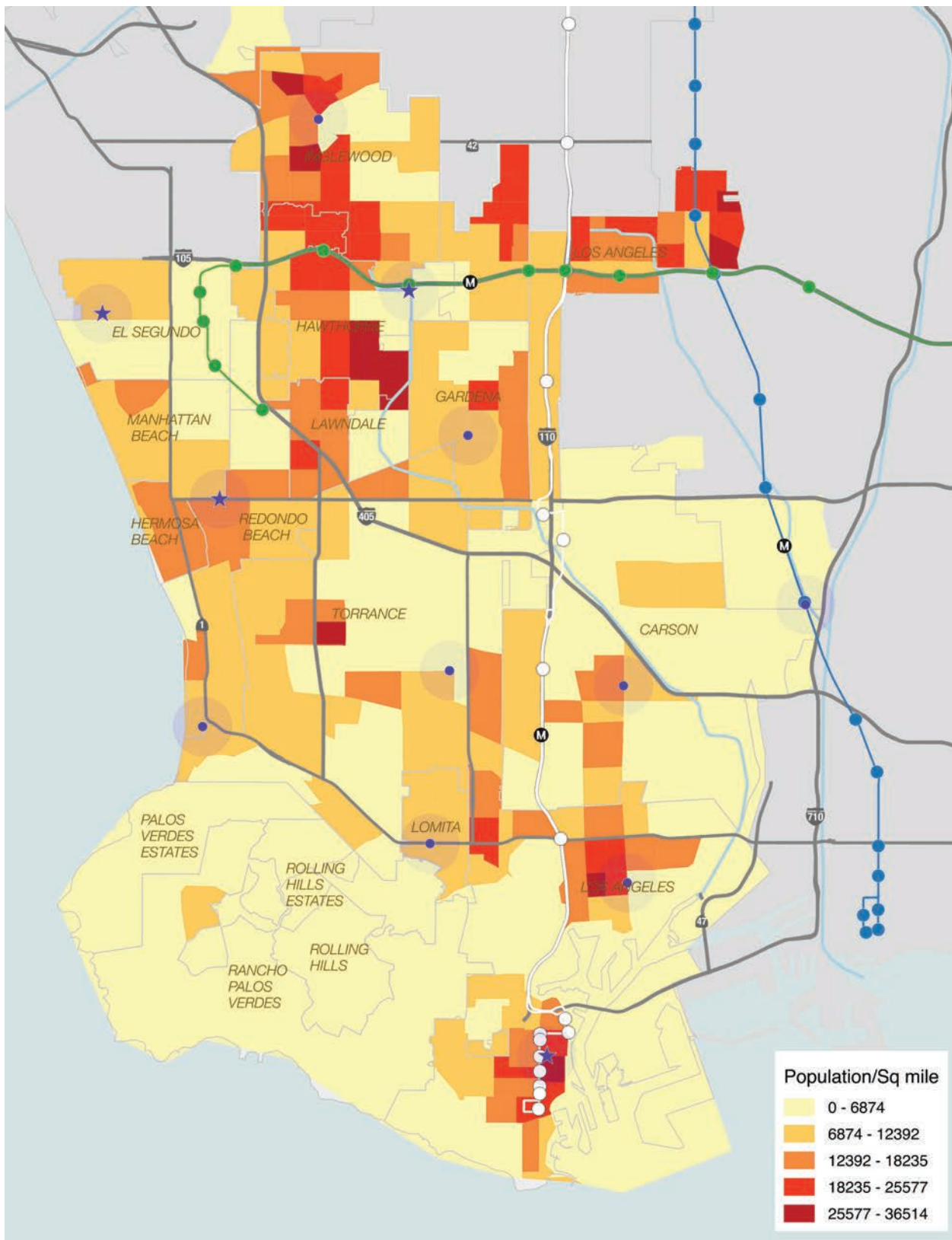
## CalEnviroScreen 2.0\* - California Environmental Protection Agency



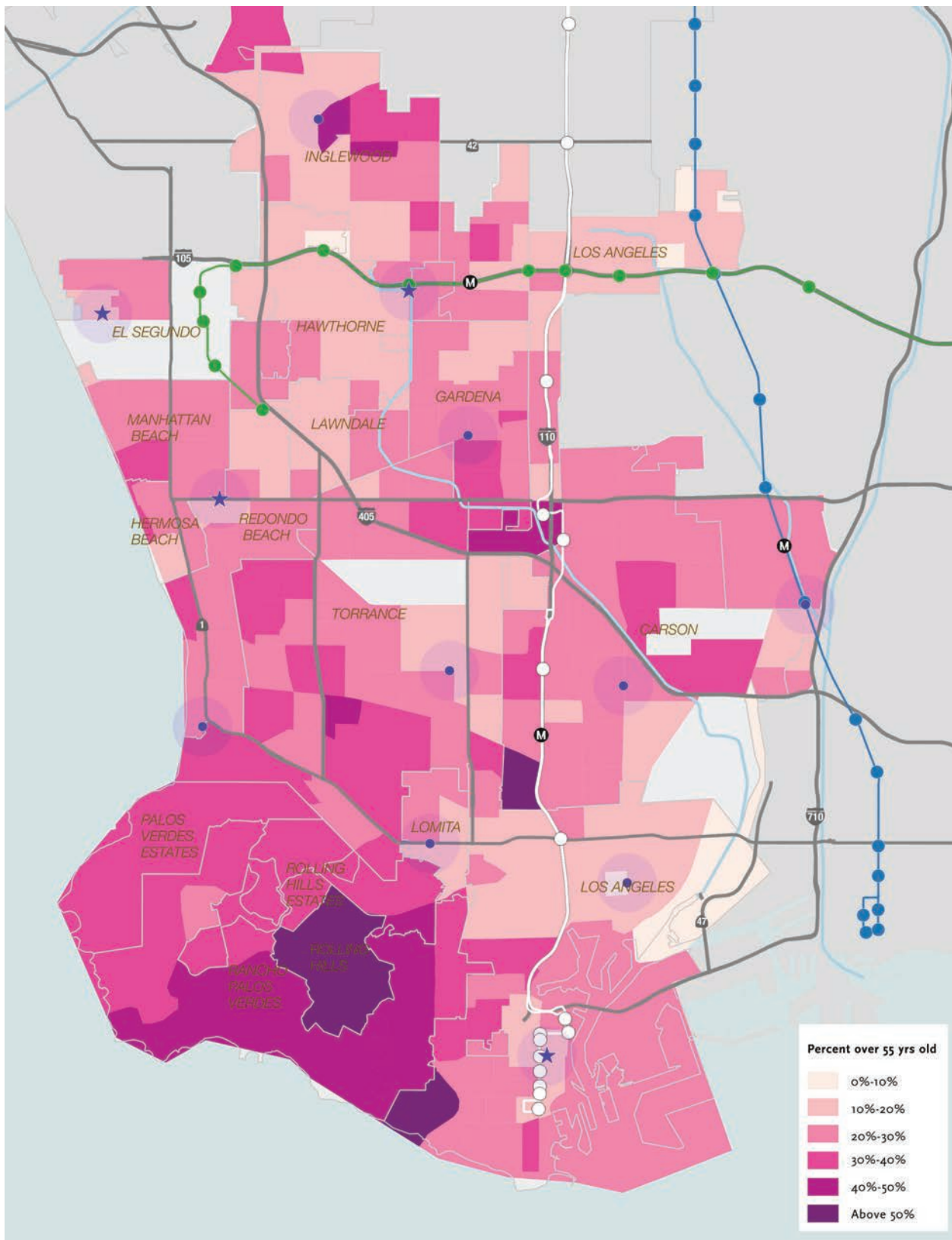
CalEnviroScreen is a screening methodology used to help identify California communities that are disproportionately burdened by multiple sources of pollution. CalEPA has used the tool to designate California communities as disadvantaged pursuant to Senate Bill 535. \*(The standard has been updated to CalEnviroScreen 3.0 as of April, 2017)



## Population density - U.S. Census 2010

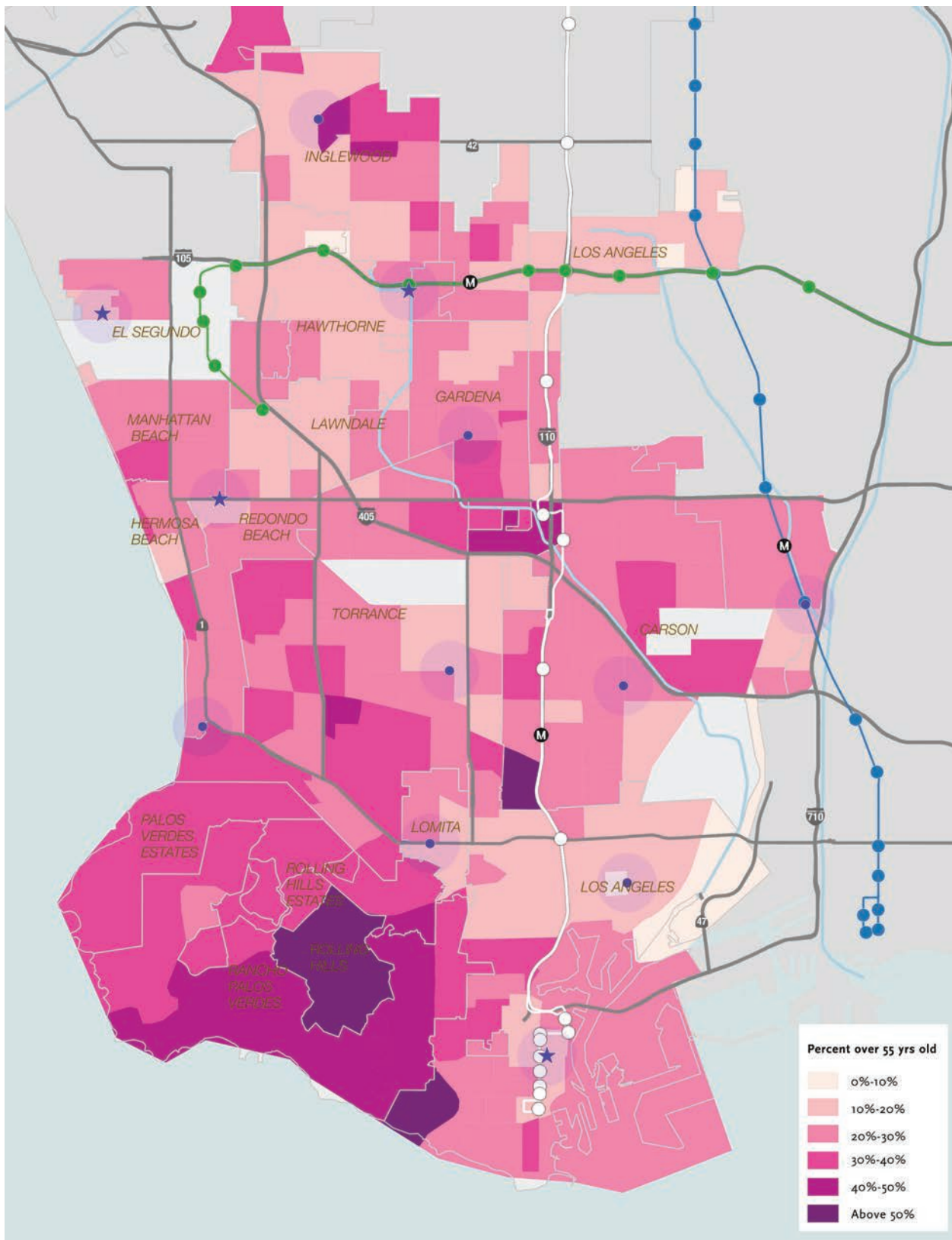


## Percent population under 18 years old - U.S. Census 2010





## Percent population over 55 - U.S. Census 2010





# Appendix C

## WAYFINDING GUIDELINES

## General wayfinding guidelines

Comprehensive research, public outreach and site analysis phases are key to the success of any wayfinding system. The best-known systems have developed their components, shapes, sizes and graphic and informational specifications through detailed design phases, with strong user and stakeholder outreach providing valuable, context-specific feedback.

The following rules of thumb, however, should be applied to the design of a multimodal slow speed network wayfinding system:

### Network planning

- > Locate signage on approach to major decision points, such as points of interest, public spaces and Metro stations and stops. Sign placement requires prioritization in a dense urban environment.
- > Maintain sufficient placement rhythm to support entire multimodal journeys. Regularly place confirmation signs as determined by the complexity of settings to instill user confidence.
- > Locate signs in areas where they will not impede the flow of traffic (e.g. traffic calming hubs, pullouts, etc.).

### Content

- > Keep messaging simple, with preferably no more than five destinations per sign; use a consistent, easy-to-follow hierarchy.
- > Sign and map content should be guided by simplicity and indicate major destinations based on a consistent, established hierarchy.

### Graphic design

- > Graphics should be sized to be easily legible from distances that are proportional to speed of traffic (typ. 1" in cap height for every 20' of static viewing distance); sight lines relative to potential obstructions must also be considered; field tests are highly recommended to account for speed of travel and other factors.
- > Design should enhance legibility via choice of typeface, letter spacing, contrast, color, finish, etc.; symbols should be simple, clear, and as universal as applicable.



Sample sign - LA Metro Station Wayfinding Guidelines, 2014

### Orientation/mapping

- > Maps along routes should be configured "heads-up", such that path of travel (rather than true north) is oriented toward the top of map.
- > Map content and nomenclature protocol must be coordinated with wayfinding directional signage.
- > Public spaces for walking and rolling should be clearly indicated to aid pathfinding and efficient movement. Green spaces, plazas, pedestrian malls and private public spaces are all part of the active transportation network.

### Sign construction

- > Materials should be durable, easy to maintain, and suited to the particular environment (e.g., near the coast, anti-corrosive materials are required; in full sun locations, light- and color-fastness is paramount; in areas of high vandalism, anti-graffiti measures should be employed).
- > Uniformity/replicability of construction methodology and detailing will significantly reduce installation and maintenance costs.
- > Potential changeability of messaging, if required, should be designed into the system.

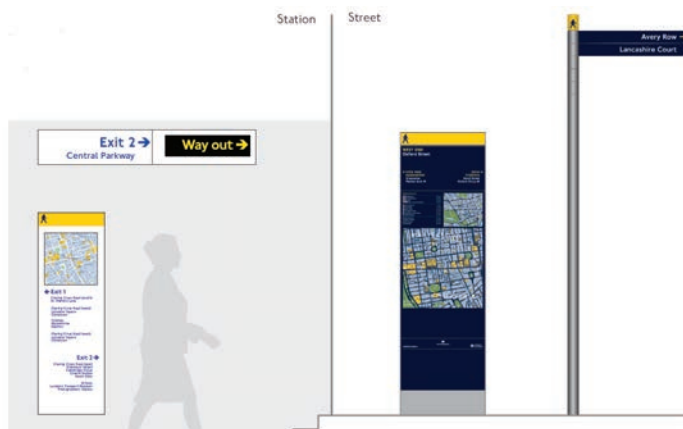
## Multimodal wayfinding best practices

### Legible London (Transport for London)

Legible London, a pedestrian wayfinding system formally established in 2007, is credited for a revolutionary change in walking habits and active mobility improvements in London. Often missing from the story of its development however, is that Transport for London had been designing and developing coordinated multimodal information for transit passengers since 2000, when all major transit modes in London were consolidated under their control.

The expanded focus on active transportation, brought into play with Legible London, created the impetus to coordinate all public and active transportation information under one set of signage and graphic information guidelines. The 34 uncoordinated, existing pedestrian wayfinding systems in central London (largely Borough or Business Improvement District projects) were pulled out of the ground and replaced by Legible London, providing virtually seamless, consistent wayfinding information for transit riders, pedestrians and cyclists, which included users of London's large bike share system.

Several design elements, which are now the standard in multimodal wayfinding, became part of the systems specifications, including: a family of sign products to fit specific situations, multiple map scales to display detailed local information (often a five minute walking area), a smaller overview scale suited for bike journeys and longer walking trips and "heads-up" map orientation facing the direction of viewing.



Legible London, coordinated station and on-street signage

### WalkNYC (New York City Department of Transportation)

WalkNYC, a city-wide pedestrian wayfinding program, was established in 2011 to make it easier for New York City's 8.5 million residents and 50 million yearly visitors to better navigate the city on foot, bicycle and public transit. The maps were developed in close collaboration with the city's local Business Improvement Districts (BIDs) and other community stakeholders. Similar to Legible London, the maps use an innovative "heads-up" orientation, situated towards the direction the user is facing. The information content, mapping and design were extensively user tested.

The graphic language of the maps was inspired by the iconic design of the New York City subway system to create a seamless, coordinated delivery of information above and below ground. The maps also feature New York landmarks, like the Empire State Building and One World Trade Center, rendered as evocative 2D line drawings.

Since the first phase of the program was installed in the summer of 2013, WalkNYC has been extended to MTA Select Bus Service (bus rapid transit) signs, printed tourist maps and MTA Subway stations throughout the city, creating a truly unified navigation system for New Yorkers and visitors alike.



WalkNYC, "heads-up" mapping in lower Manhattan.



Los Angeles County  
Metropolitan Transportation Authority

One Gateway Plaza  
Los Angeles, CA 90012-2952

213.922.9200 Tel  
213.922.5259 Fax  
[metro.net](http://metro.net)

