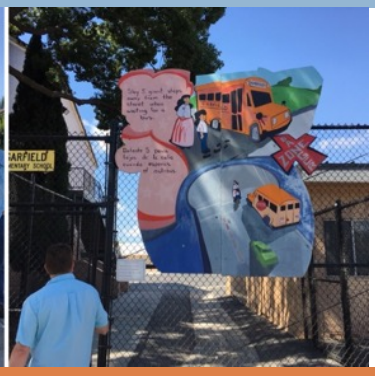
Recommendations to Improve Pedestrian & Bicycle Safety for the Community of West Long Beach

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California Walks
Stepping Up for Health, Equity, & Sustainability

Berkeley SafeTREC
SAFE TRANSPORTATION RESEARCH AND EDUCATION CENTER

Recommendations to Improve Pedestrian & Bicycle Safety for the Community of West Long Beach

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Introduction

At the invitation of Walk Long Beach, the University of California at Berkeley's Safe Transportation Research and Education Center (SafeTREC) and California Walks (Cal Walks) facilitated a community-driven pedestrian and bicycle safety action-planning workshop in West Long Beach to improve pedestrian safety, bicycle safety, walkability, and bikeability in West Long Beach.

Prior to the workshop, Cal Walks staff conducted an in-person site visit on Wednesday, August 23, 2017, to adapt the Community Pedestrian and Bicycle Safety Training program curriculum to meet the local communities' needs and to provide context-sensitive example strategies for the community's existing conditions. Cal Walks facilitated the workshop on Saturday, September 23, 2017, which consisted of: 1) an overview of multidisciplinary approaches to improve pedestrian and bicycle safety; 2) three walkability and bikeability assessments along three key routes; and 3) small group action-planning discussions to facilitate the development of community-prioritized recommendations to inform West Long Beach's active transportation and Safe Routes to School efforts. This report summarizes the workshop proceedings, as well as ideas identified during the process and recommendations for pedestrian and bicycle safety projects, policies, and programs.

Background

Community Pedestrian and Bicycle Safety Training Program

The Community Pedestrian and Bicycle Safety Training (CPBST) program is a joint project of UC Berkeley SafeTREC and Cal Walks. Funding for this program is provided by a grant from the California Office of Traffic Safety (OTS) through the National Highway Traffic Safety Administration (NHTSA). The purpose of the CPBST program is to train local neighborhood residents and safety advocates on how to improve pedestrian and bicycle safety and to strengthen their collaboration with local officials and agency staff to make communities safer and more pleasant to walk and bike. For each training, the program convenes a multi-sector, multi-disciplinary local planning committee to tailor and refine the training's curriculum and focus to meet the community's needs. Additionally, Cal Walks staff conduct pre-training site visits to collect on-the-ground observations of existing walking and biking conditions to inform the training's scope and focus.

The half-day training is designed to provide participants with both pedestrian and bicycle safety best practices and a range of proven strategies (the 6 E's: Empowerment & Equity, Evaluation, Engineering, Enforcement, Education, and Encouragement) to address and improve pedestrian and bicycle safety

conditions and concerns. Participants are then guided on a walkability and bikeability assessment of nearby streets before setting pedestrian and bicycle safety priorities and actionable next steps for their community.

For a summary of outcomes from past CPBST workshops, please visit: www.californiawalks.org/projects/cpbst and https://safetrec.berkeley.edu/programs/cpbst

Selected Pedestrian & Bicycle Safety Conditions in West Long Beach

High Speeds & Wide Streets

Santa Fe Avenue–located adjacent to Cabrillo High School and Admiral Kidd Park–is a major corridor signed for 35 miles per hour (MPH), but where residents report observing vehicles traveling at speeds greater than 35 MPH. Santa Fe Avenue is a wide road with two travel lanes on each side for vehicles and parallel parking on both sides of the streets. Research has demonstrated that wide streets and wide travel lanes are associated with higher vehicle speeds,[1] which affect safety for people walking and bicycling. Traffic calming measures, including the addition of separated curb extensions, pedestrian refuge islands, and on-street bicycle infrastructure, may improve the conditions along Santa Fe Avenue for all users. A speed survey along Santa Fe Avenue will also provide insight into the average speed of drivers and can help inform educational programs.

Santa Fe Avenue in the West Side neighborhood of Long Beach is a wide multi-lane road.

Santa Fe Avenue feeds into the Pacific Coast Highway (PCH) or State Route 1, owned and operated by the California Department of Transportation (Caltrans). PCH is a major thoroughfare for drivers, and in this area of Long Beach, for truck freight traffic as well. High volumes of freight traffic travel at high speeds and create challenging conditions for people walking, crossing PCH, or people biking. PCH is also signed as a bicycle corridor, though no marked facilities exist.

[1] *See* Kay Fitzpatrick, Paul Carlson, Marcus Brewer, and Mark Wooldridge, "Design Factors That Affect Driver Speed on Suburban Arterials": Transportation Research Record 1751 (2000):18–25.

Faded Street Markings and Lack of Crossing Enhancements

During Cal Walks' site visit, staff observed numerous locations along Santa Fe Avenue between Admiral Kidd Park and PCH that lacked pedestrian crossing signals, pedestrian refuge islands, bulb outs, and marked crosswalks that would assist people walking in the area, particularly students of Cabrillo High School.

Additionally, the intersection of Santa Fe Avenue and PCH has crosswalks in all four directions but they are severely faded, and in fact portions of the crosswalks are not even visible. This is especially concerning because during the site visit, staff observed multiple pedestrians crossing among very heavy freight traffic.

An extremely faded crosswalk on Pacific Coast Highway and Santa Fe Avenue.

No Ped Xing signage restricts crossing along one of the many intersections along on Santa Fe Avenue.

Conflicts between Vehicle Traffic, Truck Traffic, Pedestrians and Bicyclists

There are multiple potential conflicts along Santa Fe Avenue; it is both a designated bike route with no bike lanes and trucks are permitted on this street to conduct deliveries between the Port of Long Beach and businesses along Santa Fe Avenue and PCH. During the site visit, staff observed trucks parked on Santa Fe Avenue and trucks causing obstructions.

A semi-truck waiting to fuel blocks the sidewalk and travel lanes on Canal Avenue and PCH.

Along PCH, the 710 on ramp is particularly problematic due to a high volume of truck and vehicle traffic and potential conflict points with bicyclists. As trucks move toward the right lane onto the 710 on ramp, there are often bicyclists riding on the right side of traffic, creating potential conflicts when trucks turn right and bicyclists go straight.

Bike Route signage on Santa Fe Avenue,
which is also heavily used by delivery trucks.

Lack of Visibility and Lighting

There is a general lack of visibility for pedestrians and bicyclists due to a lack of lighting and overgrown vegetation. Street lighting is targeted to increase visibility for vehicles and is directed onto the roadway, while pedestrians and bicyclists must rely on light spilling over from street lights or nearby businesses.

There is a lack of pedestrian-scale lighting around Admiral Kidd Park and Hudson Park, especially along Hill Street and Webster Avenue. The south side of Hill Street is particularly dark due to a lack of pedestrian-scale lighting, overgrown vegetation blocking street lights, and a line of large RVs and campers. Walking paths within Hudson Park are lined with pedestrian-scale lighting, but the external sidewalks rely on street lights that are often obstructed by overgrown trees. Overgrown vegetation also blocks the few of the sidewalk and roadway, and therefore of pedestrians and bicyclists, from nearby apartments and single family homes.

A lack of pedestrian-scale lighting along Santa Fe Avenue.

Pedestrian & Bicycle Collision History

Between 2011-2015,[2] there were 12 pedestrian collisions within a ½-mile radius of Cabrillo High School, with collisions concentrated along the Pacific Coast Highway and Santa Fe Ave. When examining the Primary Collision Factors (PCF), 42% of these collisions in West Long Beach were due to a driver violation, 33% were due to a pedestrian violation, and 25% were due to a violation not associated with either a pedestrian or driver. Of the pedestrian violations, nearly half of the violations involved a pedestrian failing to yield to a driver who was already in a crosswalk, while about 25% resulted from a pedestrian crossing outside of a crosswalk between two signalized intersections.[3] Driver violations consisted entirely of pedestrian right-of-way violations.[4]

Between 2011-2015 there were 13 bicycle collisions within a ½-mile radius of Cabrillo High School, with collisions concentrated along the Pacific Coast Highway and Santa Fe Ave. When examining the Primary Collision Factors (PCF), nearly 8% involved a bicyclist riding on the wrong side of the road.

A full discussion of the pedestrian and bicyclist collision data prepared by UC Berkeley SafeTREC can be found Appendix A.

September 23, 2017 Workshop

Walk Long Beach requested a workshop to 1) provide City staff, community organizations, and residents with a toolkit for promoting pedestrian and bicycle safety to inform future active transportation projects including safe routes to school; 2) strengthen working relationships between Walk Long Beach, City Fabrick, Bikeable Communities, Long Beach Public Health Department, Walk Bike Long Beach, the City of Long Beach, and other stakeholders to ensure the best outcomes for the residents of West Long Beach; and 3) develop consensus regarding pedestrian and bicycle safety priority and actionable next steps.

The workshop was hosted from 9:00 am to 1:00 pm. Lunch and simultaneous interpretation from English to Spanish, and from English to Tagalog were provided to maximize community participation. Additionally, the Long Beach Department of Public Health provided healthy snacks and hydration stations. Twenty (20) individuals attended the workshop, including representatives from Walk Bike Long Beach, City Fabrick, Healthy Active Long Beach/City of Long Beach, Bikeable Communities, Pedal Movement, Walk Long Beach, Filipino Migrant Center, Black Girls Ride, and Cabrillo High School students.

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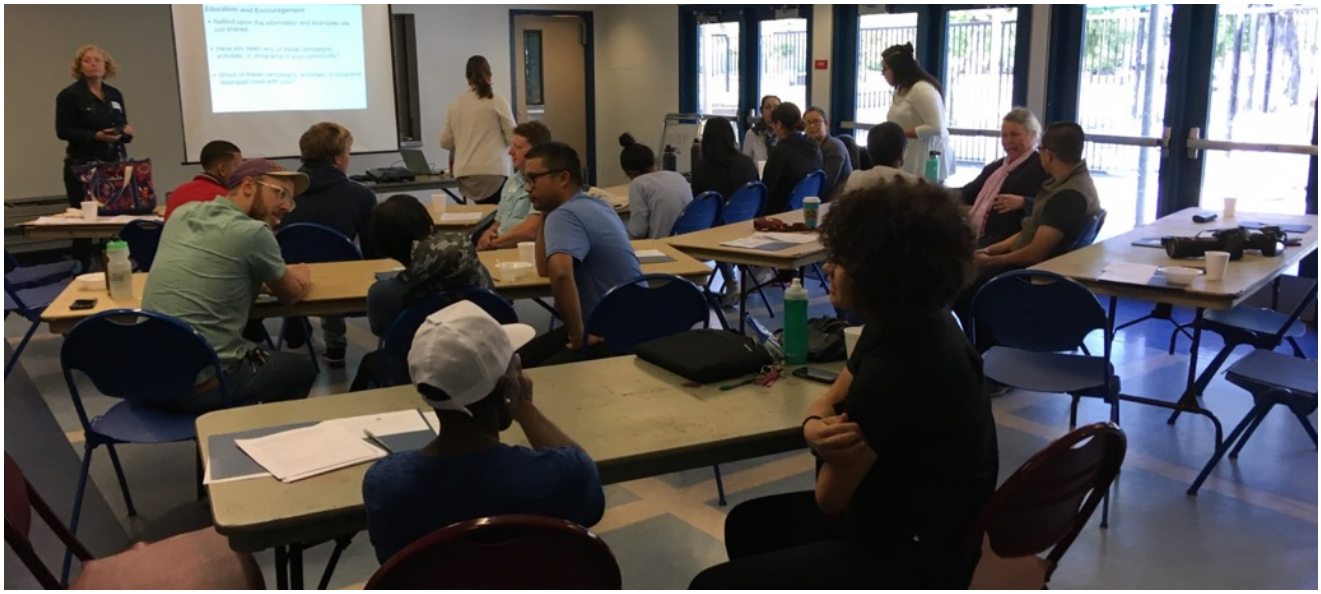
[2] Please note 2014 and 2015 data is provisional.

[3] Pedestrians have the right-of-way in marked and unmarked crossings, and drivers are legally required to yield to pedestrians in these instances. However, when pedestrians cross outside of marked or unmarked crossings, pedestrians must yield the right-of-way to drivers. This is not the same as the term "jaywalking," which refers to crossing outside of a marked or unmarked crossing between two signalized intersections. A pedestrian is legally able to cross outside of a marked or unmarked crossing between two intersections where one or none of the intersections is signalized but only if the pedestrian yields the right-of-way to oncoming drivers.

[4] Pedestrian Right-of-Way Violations are defined as instances where a driver fails to yield to a pedestrian in a marked or unmarked crosswalk when the pedestrian has the right of way (e.g., when the pedestrian has a "Walk" signal at a signalized intersection).



Participants learning and discussing the 6 E's approach to pedestrian and bicycle safety.

Reflections from Walkability & Bikeability Assessment

Workshop participants conducted walkability and bikeability assessments along 3 routes.

- Route 1 traveled south on Santa Fe Avenue towards Pacific Coast Highway and north along Santa Fe Avenue to Admiral Kidd Park and focused on crossing conditions along Santa Fe Avenue and at the intersection of Santa Fe Avenue and PCH.
- Route 2 traveled through Admiral Kidd Park to Hill Street and Webster Avenue around Hudson Park and on the north side of Hill Street to Santa Fe Avenue to Admiral Kidd Park and focused on walking and crossing conditions near the parks.
- Route 3 traveled north on Santa Fe Avenue, east on 23rd Street, south on Caspian Avenue, west on 21st Street crossing conditions along Santa Fe Avenue and walking and biking conditions around Admiral Kidd Park and James A. Garfield Elementary School.

Participants sharing reflections from walkability and bikeability assessment..

Participants were asked to 1) observe infrastructure conditions and the behavior of all road users; 2) apply strategies learned from the 6 E's presentation that could help overcome infrastructure concerns and unsafe driver, pedestrian, and bicyclist behavior; and 3) identify positive community assets and strategies which can be built upon.

Following the walkability and bikeability assessment, participants shared the following reflections:

- **Crossing Challenges Due to Lack of Infrastructure:** Participants noted several crossing challenges due to faded marked crosswalks and other road markings, and a lack of pedestrian crossing signage on all three routes.

An unmarked crossing across on Santa Fe Avenue.

- **Lack of School Zone Markings, Signage, and Placement:** Participants noted faded crosswalk markings, a lack of school zone signage near schools, and awkward signage placement, including signage that was either too high or too too low for pedestrian visibility. Near Elizabeth Hudson Elementary School, the school zone signage is located on Webster Avenue just past the 23rd Street marked crosswalk. Drivers are notified of a school zone only when they have already entered it and are parallel to the school's only drop-off/pick-up zone.

School zone signage for Elizabeth Hudson Elementary School is located after the marked crosswalk and parallel to the school drop-off/pick-up zone.

- **Lack of Pedestrian-Scale Lighting:** Participants highlighted that the area lacked pedestrian-scale lighting, especially along Hill Street near Admiral Kidd Park and Hudson Park, and street lights were often obscured by overgrown trees.

Overgrown trees darken the sidewalk and street and block street lighting.

An uplifted sidewalk due to expanding tree roots.

- **Sidewalk Challenges:** A variety of sidewalk conditions were also observed. Participants noted that some sidewalks are uneven or cracked and vary in width from one side of a street to the other and sometimes within the same side. For example, sidewalk width and conditions varied along Hill Street between Santa Fe Avenue and Webster Avenue depending on the width and presence of a tree filled landscape buffer.

- **Sidewalk Opportunities:** Alongside difficult sidewalk conditions, participants also noted some positive conditions they would like to see replicated throughout the community. Sidewalks with landscape buffers filled with large shade trees, for example, along portions of Webster Avenue near Hudson Park were admired; participants expressed a desire to fill empty tree wells and select tree species that shade the sidewalk. Participants on Route 2 also noted the presence of trash cans and bicycle parking along Santa Fe Avenue.
- **Lack of Bicycle Facilities:** Participants noted a lack of bicycle lanes in the community, especially along Santa Fe Avenue and expressed a strong preference for Class IV separated or protected bike lanes.
- **Opportunity for an Open Streets Event in West Long Beach:** Participants identified the City of Long Beach's Beach Streets open streets event as an opportunity to bring the community together in West Long Beach. Participants noted the lack of activities and programming focused on the West Long Beach area and highlighted the opportunity to frame a Beach Streets event around a "connecting the City" concept.

A bicyclist rides on the sidewalk on Santa Fe Avenue.

Community Resident Recommendations

Following the walkability and bikeability assessment, Cal Walks facilitated small-group action planning discussions. Workshop participants discussed two sets of questions:

- The first set of questions focused on identifying non-infrastructure (education and encouragement) programs that would be most effective for the community, as well as strategies for engaging and sustaining parent and school community leadership.
- The second set of questions focused on identifying specific infrastructure projects for West Long Beach and where those infrastructure projects are most needed.

Participants engaged in small group action planning discussions.

Workshop participants provided the following recommendations for overall pedestrian and bicyclist safety improvements:

Non-Infrastructure Priorities & Recommendations

- **Speed Limit Reduction and Education:** Participants expressed interest in pursuing speed limit reductions along major corridors in West Long Beach, including on Santa Fe Avenue, Willow Street, PCH, and Anaheim Street. To accompany speed limit reductions, participants would like to work with the City and Police Department to establish educational, non-punitive enforcement programs ranging from informational handouts to diversion programs in lieu of tickets.
- **West Long Beach-focused Open Streets Event:** Participants identified both near- and long-term possibilities for open streets and smaller play streets events in West Long Beach. In the near-term, participants were excited by the prospect of organizing play streets event on West Willard Street between Admiral Kidd Park and the Cabrillo High School campus during the winter break to benefit the students and their families. Activities would include food giveaways or food trucks to combat chronic hunger challenges among the student population; peer mentoring; and walk and bike education and encouragement activities geared toward Cabrillo youth who are homeless and in transition. In the longer term, participants would like to work with the City of Long Beach to bring the City's Beach Street open streets event to the area along Santa Fe Avenue that also incorporates Willow and/or Anaheim Streets to connect East and West Long Beach. This event could be billed as a "Connecting the City" event.
- **Walking School Bus and Walk to School Day Events:** Participants suggested working with both Elizabeth Hudson Elementary and James A. Garfield Elementary to establish regular walk-to-school activities, including walking school buses. Youth participants in the workshop expressed interest in helping to lead or build leadership among their peers to help lead the walking school buses.

- **VideoVoice and PhotoVoice Projects for High School Seniors:** Youth participants expressed interest in exploring the possibility of incorporating VideoVoice and PhotoVoice into their required senior projects. While the students will need to work with Cabrillo High School for permission to pursue the project, Bikeable Communities committed to support the project with technical assistance if it moves forward.
- **Integrating Walkability & Bikeability into Promotoras/Promotores Programs**: Participants agreed that education and encouragement activities must come from inside the community. To that end, they suggested establishing a promotoras/promotores program, where community members are active leaders in the decision-making and empowerment of their community. Often, a community-based organization will be the "home base" for the promotoras/promotores, and the leaders are often parents in the community.[5]

Infrastructure Priorities & Recommendations

- **Separated and Protected Bike Lanes on Santa Fe Avenue:** Participants identified as a priority the addition of separated, protected bike lanes on Santa Fe Avenue, as it is the only contiguous north-south corridor in West Long Beach.
- **Increased Crossing Times at Key Intersections:** Participants noted the need for increased crossing times at many of the major intersections, including Santa Fe Ave and Willow Street, Santa Fe Avenue and 23rd Street, Santa Fe Avenue and PCH, and Santa Fe Avenue and Anaheim Street.
- **Bulb-Outs and Refuge Islands at Key Intersections:** Participants also noted the desire for traffic calming measures, such as, bulb-outs and, where possible, pedestrian refuge islands at key intersections, including at Santa Fe Avenue and Willow Street and Santa Fe Avenue and PCH.
- **Data-Driven Engineering and Vision Zero Analysis:** Participants strongly felt that most infrastructure improvements in West Long Beach are currently prioritized by a complaint-based system, which exacerbates existing infrastructure disparities in the community. Instead, they would like to see the City perform a deep analysis into the collision and engineering data to help develop a more systematic and equitable prioritization process for traffic safety improvements. From an initial look at five-year collision data as well as the workshop walk assessment, participants suggested first taking a closer look at both the Santa Fe Avenue and PCH corridors.
- **Leverage Local Funding for Improvements:** Participants identified both Freeway 710 mitigation funding and Measure M local return dollars as key opportunities for the City to secure funding for air quality improvements at the schools in West Long Beach and to fund planning and implementation of traffic safety projects in the community.

California Walks/SafeTREC Recommendations

California Walks and SafeTREC also submit the following recommendations for consideration by the City of Long Beach and Caltrans:

- **Improve Crossing Opportunities and Enhance Existing Crossings along Santa Fe Avenue**: Along Santa Fe Avenue, there are many community facilities, including Cabrillo High School, Admiral Kidd Park, the Boys and Girls Club, and a Job Corps site. All these facilities are located on one side of Santa Fe Avenue, while the other side is residential. This speaks to the need for additional, more frequent, and enhanced crossings for residents in the area to be able to cross safely to access

[5] For one example of a Promotores Program, see Somos Mayfair: http://somosmayfair.org/?page_id=167.

community resources. Currently, the City prohibits crossing at a majority of unmarked crossings; therefore, residents have to walk to Santa Fe Avenue and Cabrillo High School or Santa Fe Avenue and PCH to get to a marked crossing. The distance between these crosswalks is 0.3 miles, meaning that some residents would have to walk 0.6 miles or more simply to cross the street and access local business and transit stops. We **recommend that the City work with the high school and other community facilities along Santa Fe Avenue to identify the most appropriate locations for more frequent crossing opportunities**.

Additionally, we **recommend the City evaluate pedestrian signal timing at the existing marked and signalized crossings along Santa Fe Avenue**. During the walk assessment, participants commented that the provided crossing times felt short and based on their experiences, the time provided is not sufficient for the large groups of students walking to/from school. Participants also commented that the marked crossing at the school entrance was not sufficiently wide for the numbers of students who cross on a daily basis–students frequently spill outside the marked crossing during arrival and dismissal hours.

- **Establish a "PCH Partners–South" Task Force to Coordinate Safety improvements on PCH**: We recommend that Walk Long Beach and other community partners work with the City of Long Beach and Caltrans to establish a "PCH Partners-South" Task Force to serve as a primary stakeholder body for disseminating information and updates, and for collecting input related to the planned and upcoming Caltrans projects on PCH. We have seen this model work successfully for other communities concerned with pedestrian and bicycle safety on PCH.[6] California Walks has previously evaluated pedestrian safety conditions along the PCH corridor from Santa Monica to the Ventura County Line on behalf of the PCH Partners and provided community-driven, best practice recommendations to improve pedestrian safety along the corridor.[7] Since that recommendations report, numerous non-infrastructure pedestrian safety projects have been implemented, as well as the installation of a pedestrian hybrid beacon at PCH and Palisade Bowl, as requested by the Palisade Bowl residents.

- **Explore Gateway Treatments for the West Long Beach Community**: We recommend that the City explore installing gateway treatments at Santa Fe Avenue/Pacific Coast Highway, the Pacific Coast Highway/I-710 overpass bridge, and the Anaheim Street/I-710 overpass bridge as a traffic calming measure. Gateway treatments can be used as a visual cue to drivers that they are entering a different environment that will require them to drive more slowly. Additionally, gateways are often used to convey a sense of neighborhood identity and sense of place. We believe gateway treatments would be especially effective at communicating to freight operators that residents live in the immediate area and to be considerate to residents in the area.

  Generally, gateway treatments alone cannot discourage speeding traffic without additional traffic calming measures. Therefore, if the City pursues this strategy, we recommend that they pair it with other traffic calming measures, such as road diets, bulb outs, high visibility signage and markings, and pedestrian safety islands. Gateway treatments can vary from simple monument signs to more

[6] See PCH Partners, http://pchpartners.org/
[7] See PCH Pedestrian Safety Project Recommendations Report here http://pchpartners.org/factsheets/PCH%20_Final%20Recommendations%20Report_FINAL_10.09.2015.pdf

elaborate street spanning arches. Potential funding sources include future cycles of the Highway Safety Improvement Program (HSIP) and the state Active Transportation Program (ATP).

Acknowledgments

We would like to thank Steve Gerhardt of Walk Long Beach for inviting us to the West Long Beach community and for hosting the Community Pedestrian and Bicycle Safety Training.

We would like to acknowledge the many community members and agencies present at the workshop and their dedication to pedestrian and bicycle safety. Their collective participation meaningfully informed and strengthened the workshop's outcomes.

Funding for this program was provided by a grant from the California Office of Traffic Safety through the National Highway Traffic Safety Administration.

Appendix A

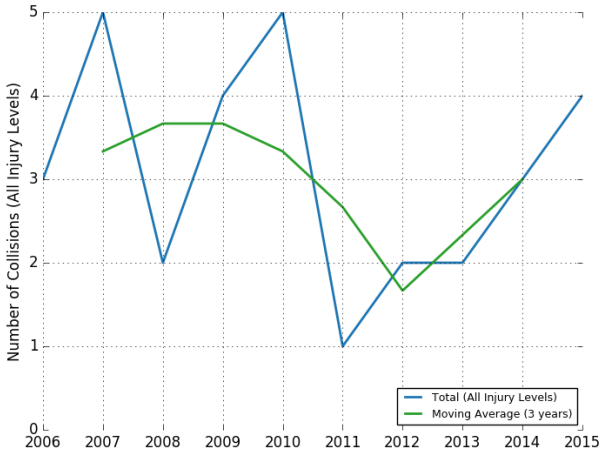
Pedestrian and Bicycle Collision Data Analysis

Cabrillo High School – Long Beach, CA

Pedestrian and Bicycle Collision Analyses, 2006-15*

PEDESTRIANS

Number of Collisions Involving Pedestrians, 2006-15



The blue line shows the number of pedestrian collisions where a fatality and/or injury occurred. There were 34 people injured or killed in 31 pedestrian collisions over the last 10 years.

The green line shows the three-year moving average of the number of pedestrian collisions where a fatality and/or injury occurred. The moving average is useful for tracking trend change over time, especially when the number of collisions is subject to variability. Data points are the midpoint of the three years of data specified.

The following analyses are based on the most current five years, 2011 to 2015, of data for collisions within a half-mile radius of Cabrillo H.S. in Long Beach, CA. There were 13 people killed or injured in 12 pedestrian collisions.

Top Violation Types for Collisions Involving Pedestrians

Type of Violation	Collisions N(%)
Driver must yield to pedestrian right of way in a crosswalk.	3 (25%)
Other	3 (25%)
'Walk' pedestrian failure to yield right-of-way to vehicles already in crosswalk.	2 (16.67%)
Hit-run, injury or death, immediate report of fatal.	1 (8.33%)
Jaywalking, between signal controlled intersections.	1 (8.33%)
Traffic control sign, failure to obey regulatory provisions.	1 (8.33%)
Pedestrian yield, upon roadway outside crosswalk.	1 (8.33%)
Total	**12 (100.0%)**

Pedestrian Actions in Collisions Involving Pedestrians

Pedestrian Action	Collisions N(%)
Crossing in Crosswalk at Intersection	6 (50%)
Crossing Not in Crosswalk	2 (16.67%)
Crossing in Crosswalk Not at Intersection	1 (8.33%)
In Road, Including Shoulder	1 (8.33%)
Approaching/Leaving School Bus	1 (8.33%)
- - Not Stated	1 (8.33%)
Total	**12 (100.0%)**

* Data Source: California Statewide Integrated Traffic Records System (SWITRS). Collision data for 2014 and 2015 are provisional at this time.

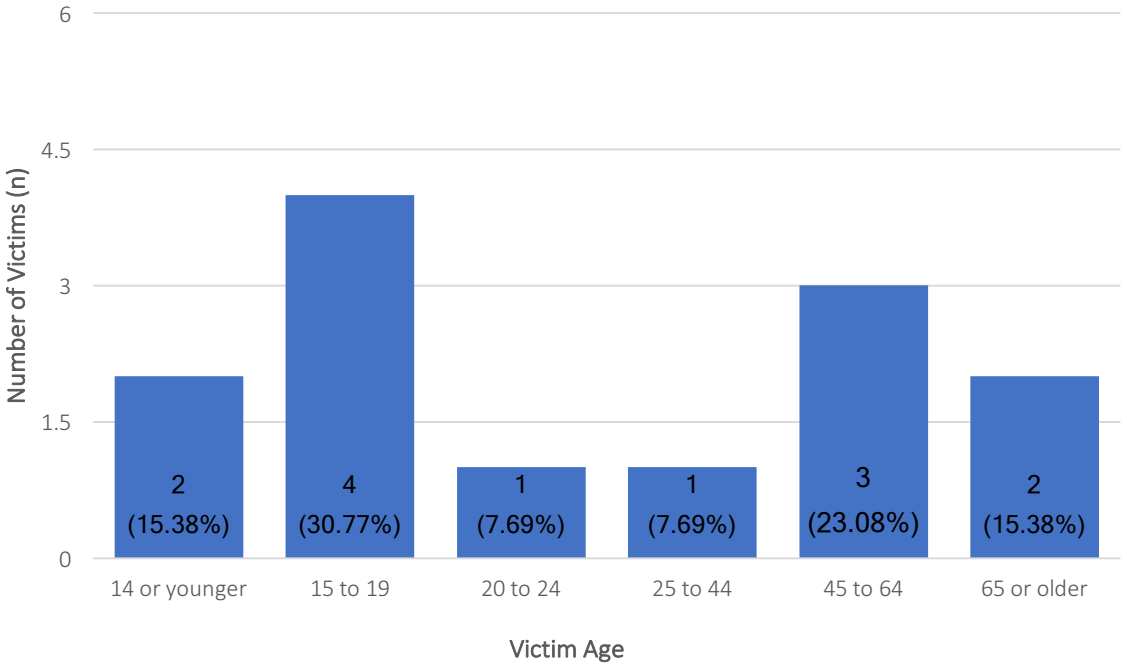
Funding for this project was provided by a grant from the California Office of Traffic Safety through the National Highway Traffic Safety Administration.

Cabrillo High School – Long Beach, CA

Pedestrian and Bicycle Collision Analyses, 2006-15*

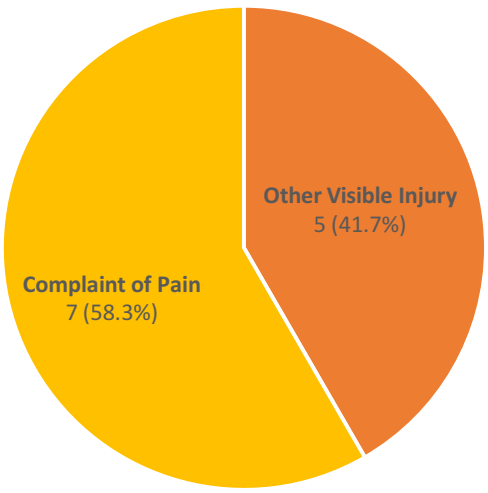
Pedestrian Victim Demographics

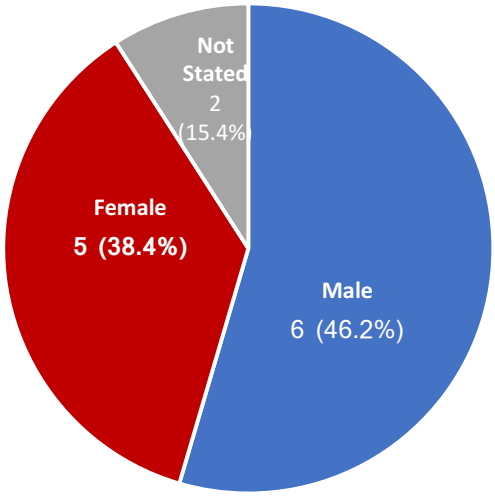
The age of pedestrian victims ranged considerably across all age groups, with youth age 19 or younger accounting for 46.2 percent of all victims. Victims were primarily male.



Victim Injury Severity, 2011-15

Most collisions resulted in minor injuries.





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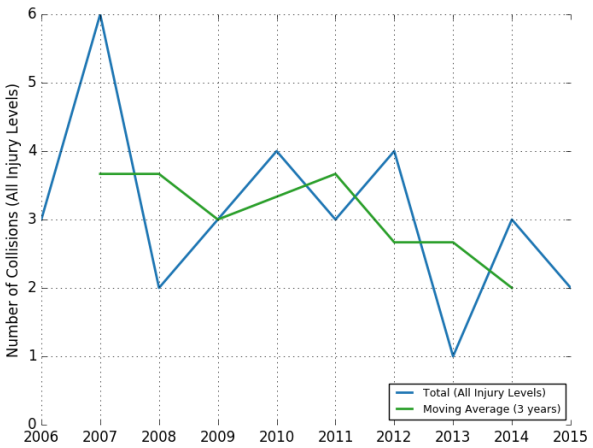
Cabrillo High School – Long Beach, CA

Pedestrian and Bicycle Collision Analyses, 2006-15*

BICYCLISTS

Number of Collisions Involving Bicyclists, 2006-2015



The blue line shows the number of bicycle collisions where a fatality and/or injury occurred. There were 31 people injured in 31 bicycle collisions over the last 10 years.

The green line shows the three-year moving average of the number of bicycle collisions where a fatality and/or injury occurred. The moving average is useful for tracking trend change over time, especially when the number of collisions is subject to variability. Data points are the midpoint of the three years of data specified.

The following analyses are based on the most current five years, 2011 to 2015, of data for data for collisions within a half-mile radius of Cabrillo H.S. in Long Beach, CA. There were 13 people injured in 13 bicycle collisions.

Top Violation Types for Collisions Involving Bicycles

Type of Violation	Collisions N(%)
Automobile Right of Way	4 (30.77%)
--Not Stated	2 (15.38%)
Traffic Signals and Signs	2 (15.38%)
Unknown	2 (15.38%)
Other Improper Driving	1 (7.69%)
Other Hazardous Violation	1 (7.69%)
Wrong Side of Road	1 (7.69%)
Total	**13 (100.0%)**

* Data Source: California Statewide Integrated Traffic Records System (SWITRS). Collision data for 2014 and 2015 are provisional at this time.

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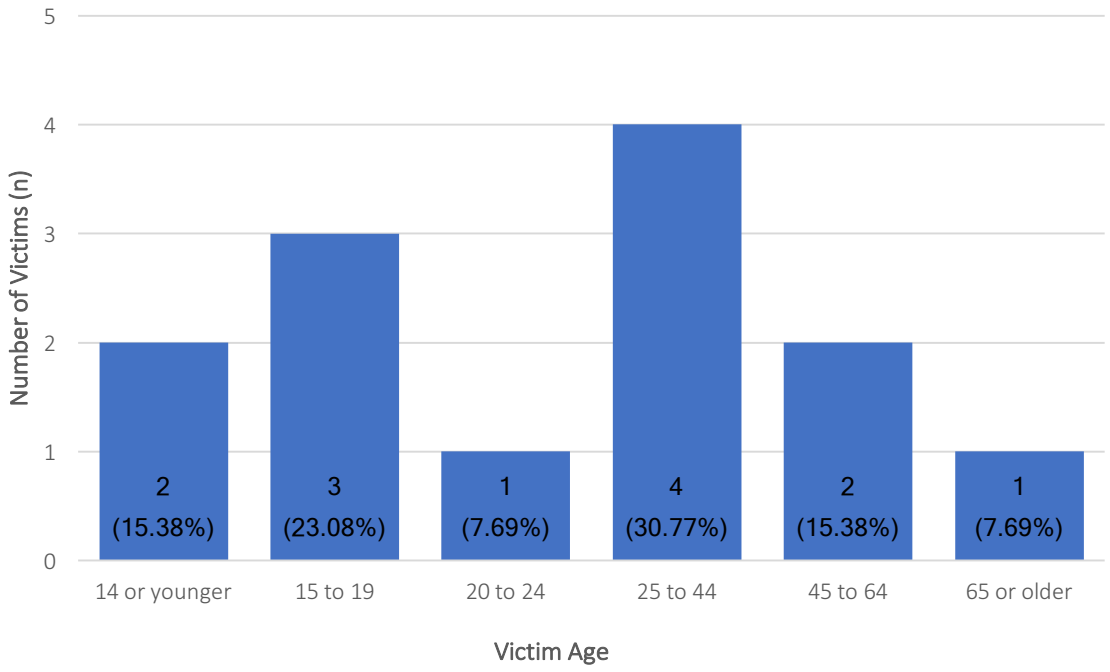
Cabrillo High School – Long Beach, CA

Pedestrian and Bicycle Collision Analyses, 2006-15*

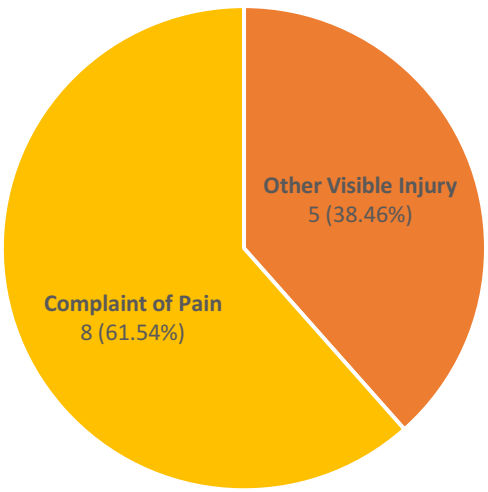
Bicycling Victims Demographics

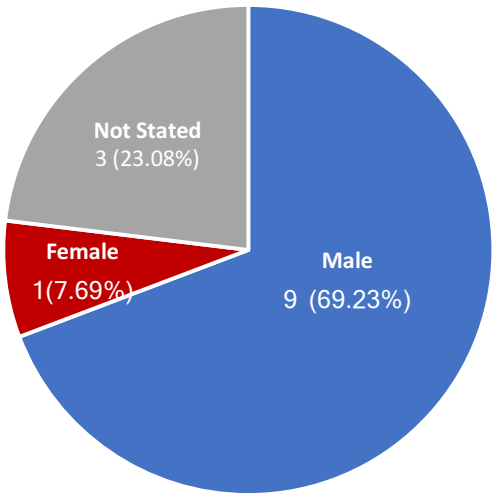
The age of bicycling collision victims varied across all age groups, with youth age 19 or younger accounting for 38.5 percent of victims. The majority of victims were male.



Victim Injury Severity, 2011-15

Most collisions resulted in minor injuries.





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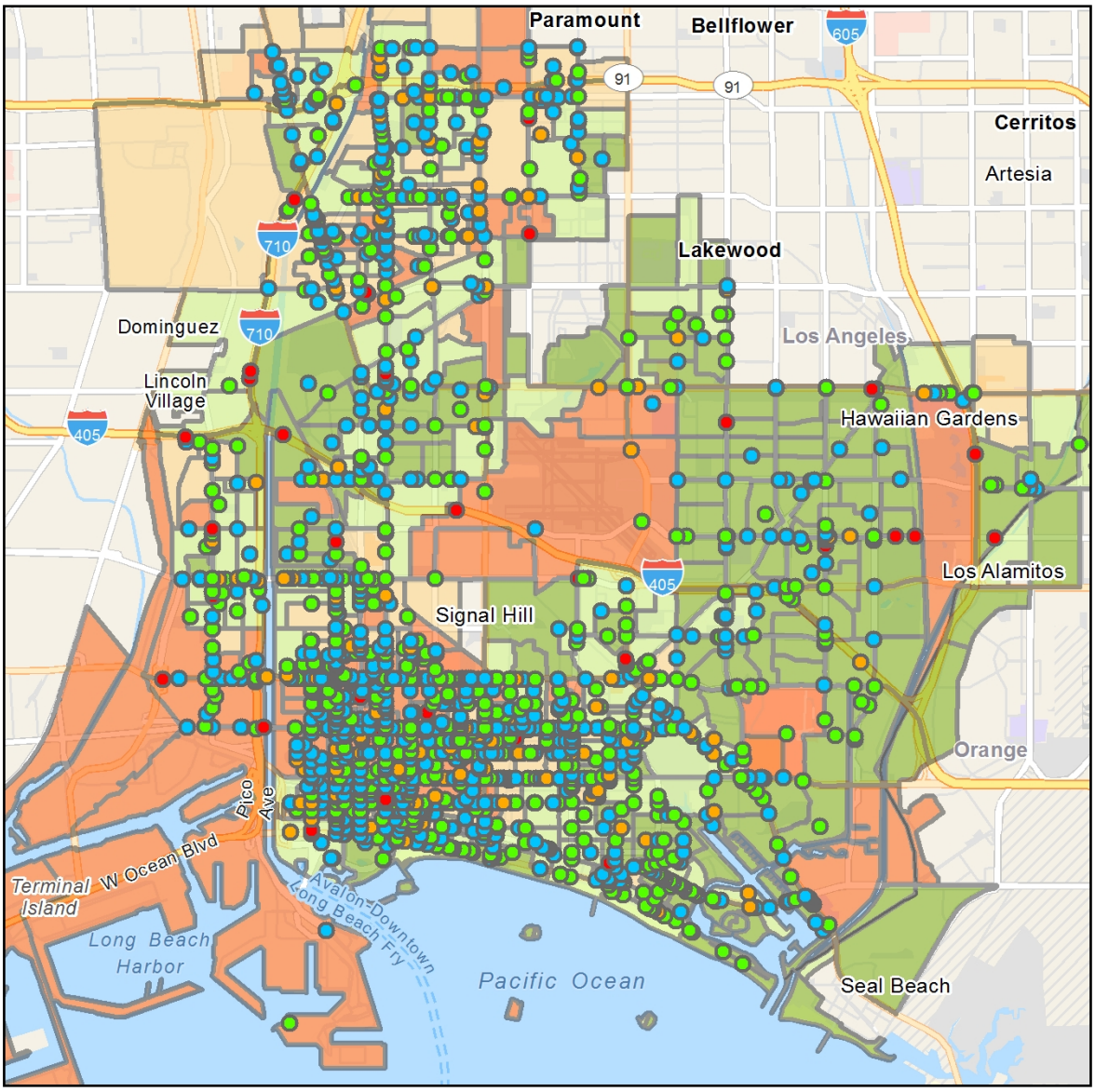
Long Beach Bicycle/Pedestrian Collision Map (2011 - 2015)



Collision Severity (2011-2015)

- Fatal (49)
- Injury (Severe) (194)
- Injury (Other Visible) (868)
- Injury (Complaint of Pain) (1,038)

2016 Median Household Income

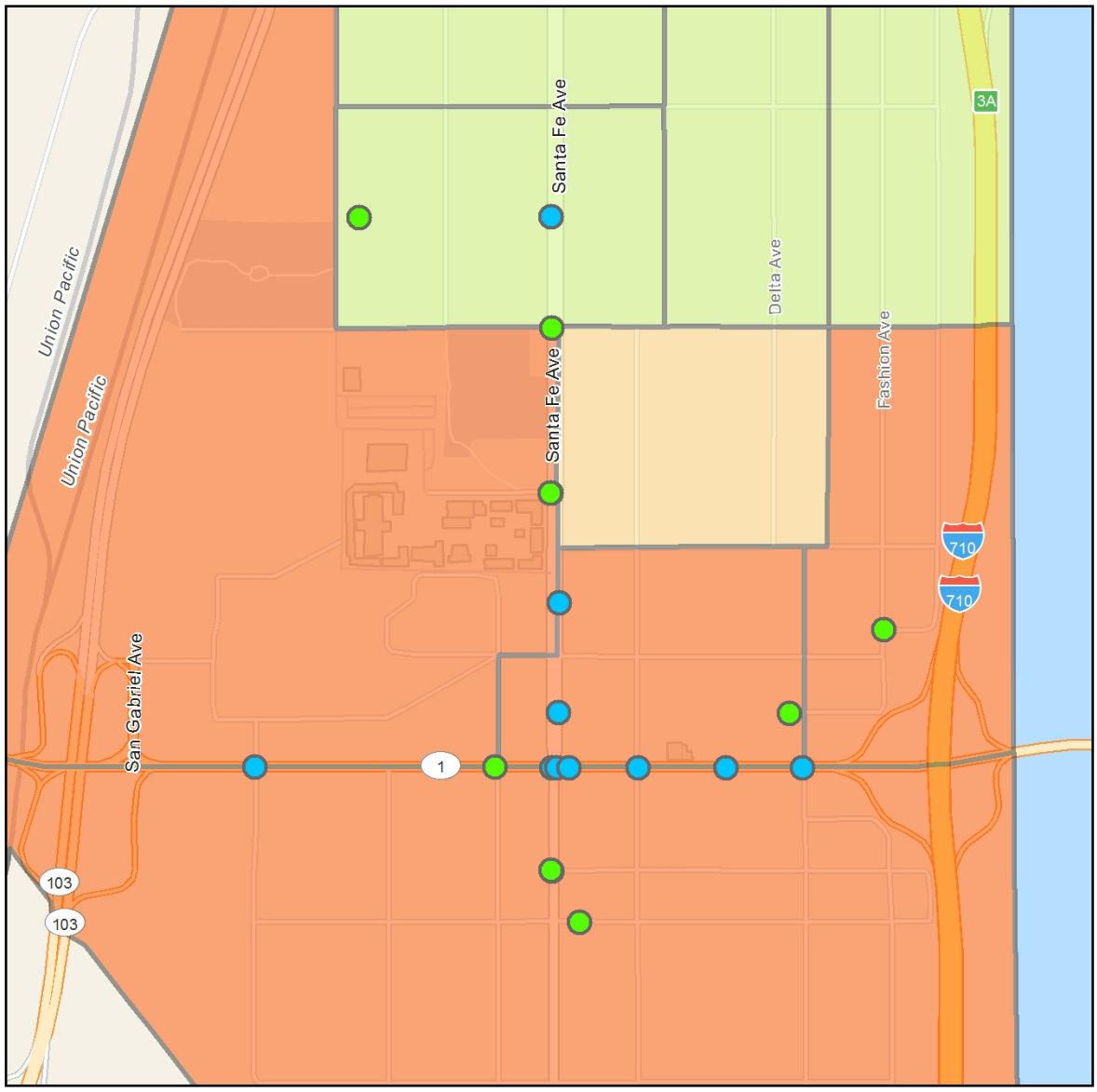
- < 35K
- 35K - 50K
- 50K - 75K
- > 75K

Berkeley SafeTREC

Data Source: Collision - SWITRS 2011 - 2015 (2014 - 2015 data is provisional)
Demographics - Esri, US Census Bureau, and ACS
Date: 8/16/2017

This map shows where all the pedestrian/bicycle injury collisions occurred and may not extend to the city's boundaries.

Cabrillo_High Bicycle/Pedestrian Collision Map (2011 - 2015)



Collision Severity (2011-2015)

- Injury (Other Visible) (11)
- Injury (Complaint of Pain) (15)

2016 Median Household Income

- < 35K
- 35K - 50K
- 50K - 75K

Berkeley SafeTREC

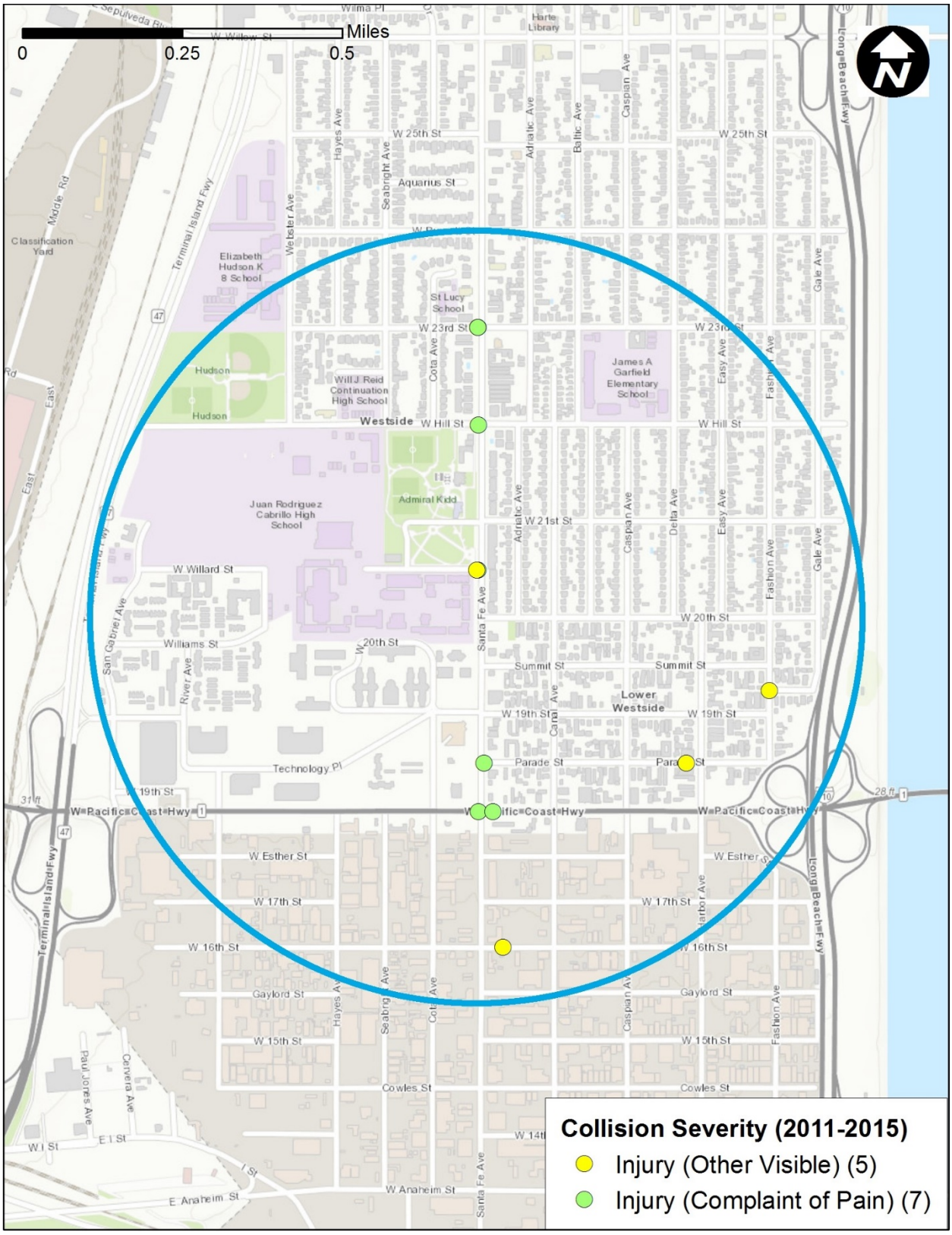
Data Source: Collision - SWITRS 2011 - 2015 (2014 - 2015 data is provisional)
Demographics - Esri, US Census Bureau, and ACS
Date: 8/16/2017

This map shows where all the pedestrian/bicycle injury collisions occurred and may not extend to the city's boundaries.

Cabrillo High School – Long Beach, CA

Pedestrian and Bicycle Collision Analyses, 2006-15*

Pedestrian Collision Locations, 2011-15



* Data Source: California Statewide Integrated Traffic Records System (SWITRS). Collision data for 2014 and 2015 are provisional at this time.

Funding for this project was provided by a grant from the California Office of Traffic Safety through the National Highway Traffic Safety Administration.

Cabrillo High School – Long Beach, CA

Pedestrian and Bicycle Collision Analyses, 2006-15*

Bicyclists Collision Locations, 2011-15

* Data Source: California Statewide Integrated Traffic Records System (SWITRS). Collision data for 2014 and 2015 are provisional at this time.

Funding for this project was provided by a grant from the California Office of Traffic Safety through the National Highway Traffic Safety Administration.