City of Newark

Bicycle & Pedestrian Master Plan

February 2017

FEHR & PEERS

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1. INTRODUCTION

The City of Newark is excited about the development of its first Pedestrian and Bicycle Master Plan (Plan). The Plan is a long-range planning document that provides a basis for future pedestrian and bicycle improvement projects and programs. These projects provide access to the San Francisco Bay waterfront, parks, trails, and open space areas for recreational purposes. However, these facilities also serve the ever-expanding numbers of people walking and cycling for their health, while also reducing traffic congestion and benefiting the environment. As such, this Plan identifies gaps to fill in the pedestrian and bicycling networks and presents upgrades and repairs to existing facilities in order to make them more accessible and inviting to walkers and cyclists of varying levels of experience and abilities.

VISION

The vision sets the tone, emphasizes the City's priorities and focuses the Plan to best meet the needs of the City's residents and employees. The vision statement comprises of an overarching statement on walking and biking and series of supporting statement. The community's vision for the future of walking and biking in Newark is:

The purpose of this Pedestrian and Bicycle Master Plan *is to make the City of Newark as walking and bicycling friendly as possible to encourage people of all ages, abilities, and means to walk and bike.*

Newark will be a community that provides its residents, employees, and visitors with viable walking and biking facilities. These facilities will meet the community's travel needs, to improve health and recreation opportunities, and to provide economic benefit to those traveling via cost savings and to local businesses through the creation of vibrant, walkable neighborhoods. The City will have a complete, well-integrated system of bicycle and pedestrian networks and support facilities that encourage walking and biking as active transportation modes.

PLAN DEVELOPMENT AND PUBLIC INVOLVEMENT

The goals, policies, recommendations, and action items in this *Plan* are the outcome of a substantial public outreach effort by the City. The planning process included development of an ad-hoc Bicycle and Pedestrian Advisory Committee (BPAC) formed at the outset of the Plan development. The BPAC has comprises a group of citizens appointed to provide valuable input during the development of the City's Plan.

Between August 2010 and December 2010, the City and its consultant team solicited public input to the Plan at six public events. Additionally, a public website (www.newarkbikepedplan.fehrandpeers.net) broadcast the latest news related to the Plan, and provided a forum for public dialogue about the Plan. City staff and project team members discussed the Plan at the following public events:

Bicycle and Pedestrian Advisory Committee Meeting #1, held September 16, 2010 at the Silliman Activity Center, was the first public forum held relating to the Plan. At the meeting, the project team reviewed the proposed scope of the Plan with the BPAC, identified key barriers and concerns to walking and biking in Newark, and solicited feedback on the draft vision statement and Plan goals.

Community Workshop #1 was held at the Silliman Recreation Center on October 21, 2010. The purpose of this workshop was to gather feedback from Newark residents and employees on existing barriers to walking and bicycling, desired facilities, and preferred support programs. Attendees recorded their comments on City maps, including a 20- by-20-foot aerial "carpet," as well as several multiple-choice poster boards. City staff and BPAC members interacted with attendees.

Walking Audits were held at each of the 10 public schools within the Newark Unified School District in November and December 2010. Audits were held at each of the City's eight elementary schools, in addition to Newark Junior High School and Newark Memorial High School. Parents, family members, and local residents were invited to participate. The audits included a field review of the on-site and off-site infrastructure, and recommendations for improvements were developed. City staff and representatives from each school discussed efforts to increase the number of students walking and biking to school;

traffic safety, access, and circulation issues; and programs schools do or could operate to encourage more walking and bicycling. The results of each audit are summarized in **Chapter 5: Safe Routes to School**.

BPAC Meeting/Community Workshop #2 was held on December 16, 2010 at the Silliman Recreation Center. Similar to the first Public Workshop, Newark residents gave feedback on desired walking and biking facilities. Specifically, attendees reviewed the goals and policies, as well as a draft preferred bicycle network, and potential education, encouragement, and enforcement programs.

BPAC Meeting/Community Workshop #3 was held on June 13, 2016. This meeting represented a refocusing on the PBMP update following the City and BPAC review of the Plan in 2011. During this meeting, the BPAC and the project ream reviewed the work completed to date, including the public outreach described above, bicycle and pedestrian field work, the prioritization checklist, proposed project lists, and the draft plan/implementation process. The project team reviewed the existing conditions for walking and biking in Newark and presented an updated list of recommended projects. This workshop occurred after the Plan was on hiatus as a result of recession and limited staffing levels at the City.

GOALS AND POLICIES

This section contains the goals and policies of the City of Newark's Pedestrian and Bicycle Master Plan. The goals provide the foundation for the community's long-term vision for developing a citywide bicycle and pedestrian network that is safe and accessible for all users. Goals are broad statements of purpose and policies provide the course of action to achieve the goals. The City's BPAC and the community vetted and refined the goals and policies listed below, as described in the previous section.

The Plan has five goals:

1. Create a connected bicycle and pedestrian network
2. Increase the number of people walking and bicycling
3. Improve safety for pedestrians and bicyclists
4. Develop a comprehensive *Safe Routes to School* program and supporting infrastructure plan
5. Establish citywide design guidelines for bicycle and pedestrian facilities

The following section outlines each goal in more detail, and provides supporting policies for each.

Goal 1: Create a citywide pedestrian and bicycle network that provides safe access to destinations within the city, connects to an integrated regional network, and is accessible to users of all, ages, and abilities and means (General Plan Goal T-2).

Policy 1-1: Complete the Pedestrian Network:

Work to close gaps in the pedestrian network and improve sidewalk connectivity between residential and commercial areas. Develop curbs, gutters, sidewalk on all remaining Newark streets not yet fully improved to encourage safe, convenient pedestrian travel. Where appropriate, include marked crosswalks at intersections and install pedestrian countdowns at traffic signal to facilitate safe pedestrian movement across City streets, as recommended in this Plan. (General Plan Policy T-2.1)

Policy 1-2: Complete the Bicycle Network:

Maintain and expand an interconnected network of bicycle routes, paths, and trails, serving the City's neighborhoods, shopping districts, workplaces, and park and open space areas. The existing bicycle network should be expanded to provide connections to developing areas, including the Dumbarton TOD, the Southwest Residential and Recreational Project, Old Town Newark, and the NewPark Mall vicinity. (General Plan Policy T-2.2)

Policy 1-2: Funding:

Develop dedicated funding streams and apply for grant funding to implement the Pedestrian and Bicycle Master Plan, inclusive of staff time.

Policy 1-3: Maintenance:

Continue ongoing maintenance and upgrades of the City's sidewalk and wheelchair accessible ramp infrastructure and bikeway system. Develop a maintenance program for the City's planned off-street trail networks (consistent with General Plan Action T-2.F).

Policy 1-4: Continuity:

Develop facilities that are continuous across city boundaries and integrate with the regional system, particularly Fremont's on-street bicycle network and the regional trails networks.

Policy 1-5: Intermodal Connections:

Provide bicycle and pedestrian connections to public transportation systems in the City and region.

Policy 1-6: Bicycle Parking:

Provide secure, adequate, and easily accessible bicycle parking at key destinations, including municipal facilities, schools, and new development. The style and design of bike racks should contribute to overall neighborhood and architectural aesthetics. Develop a citywide ordinance for the provision of bicycle parking. (General Plan Policy T-2.11)

Policy 1-7: Pedestrian and Bicycle Provisions within New Development:

Ensure safe and convenient pedestrian and bicycle access to and through new public and private developments. The City will use the development review process to ensure—and where appropriate to require—provisions for pedestrians and bicycles in new development areas. (General Plan Policy T-2.6)

Policy 1-8: Pedestrian and Bicycle Provisions within New Development:

Develop and maintain trails in parks and open space areas, and between Newark neighborhoods and the City's open spaces.. (General Plan Policy T-2.9)

Policy 1-9: Trails Along Railroads and Utilities:

Consider the use of railroad, flood control, and utility rights of way for jogging, biking, and walking trails, provided that safety and operational issues can be fully addressed.

Such trails may be considered where the right-of-way is sufficiently wide to address safety considerations, and where a trail project would not interfere with railroad, flood control, or utility operations (General Plan Policy T-2.12)

Policy 1-10: Bicycle and Pedestrian Improvements at Signalized Intersections:

Upgrade existing and design future traffic signals to have adequate bicycle and pedestrian detection, including signage and/or pavement markings to indicate how the detection works; pedestrian countdown signals timed for 3.5 feet/second or lower in front of schools and senior centers; accessible push buttons; directional curb ramps wherever feasible; and corner curb radii that allow truck access while prioritizing pedestrian safety. (Consistent with General Plan Action T-2.I)

Policy 1-11: Citywide Uncontrolled Crosswalk Policy:

Consult the Citywide Uncontrolled Crosswalk Policy, located in ***Appendix C****, whenever installing, enhancing, or removing crosswalks in Newark.*

Goal 2: Increase the number of people of all ages, abilities, and means who bicycle and walk for transportation, recreation, and health.

Policy 2-1: Infrastructure:
Create and maintain a safe, convenient, and effective bicycle and pedestrian system.

Policy 2-2: Promote Bicycling and Walking:
Promote bicycling and walking as viable modes of transportation for everyday trips as well as for

recreation to increase the number of people of all ages, abilities, and means who bicycle and walk. (General Plan Policy T-2.1)

Policy 2-3: Health Benefits:
Promote a healthy community through expansion of active transportation modes.

Policy 2-4: Bicycle Events:
Support special bicycle events and activities which showcase Newark's bike trails and amenities, especially facilities providing access to shoreline trails and open spaces (General Plan Policy T-2.13)

Goal 3: Develop a safe system for walking and bicycling.

Policy 3-1: Improve Pedestrian and Bicycle Safety::
Improve actual and perceived pedestrian and bicycle safety. Make use of the latest technologies available to provide increased safety measures. Special attention should be given to facilitating the safety of children walking or bicycling to school. (General Plan Policy T-2.7)

Policy 3-2: Collision Reduction:
Work to reduce the rate of bicycle and pedestrian crashes, injuries and fatalities.

Policy 3-3: Education & Outreach:
Establish educational and encouragement opportunities for all bicyclists and walkers and promote safer behavior by drivers.

Policy 3-4: Railroad Crossings:
Ensure that any future grade separated railroad crossings include sidewalks and designated lanes for bicycles. (General Plan Policy T-2.10)

Goal 4: Enhance, promote, and expand the countywide *Safe Routes to School* programs in Newark and implement biking and walking infrastructural improvements near schools.

Policy 4-1: Mode Share:
Increase the number and percentage of children walking and bicycling to school.

Policy 4-2: Safety:
Improve actual and perceived safety of children en route to school.

Policy 4-3: Safety Awareness and Health Benefits:
Encourage bicycle and pedestrian safety training in schools and through City recreation programs. Such programs should aim to reduce the rate of bicycle and pedestrian collisions while increasing

awareness of available facilities and the health benefits of bicycling and walking. (General Plan Policy T-2.8)

Goal 5: Establish design guidelines and priorities for the comprehensive and consistent design of trail and bikeway improvements.

Policy 5-1: Adhere to national best practices and the Plan's design guidelines in the design and implementation of biking and walking facilities in Newark.

REQUIRED BICYCLE MASTER PLAN ELEMENTS

Federal and regional funds are distributed in Alameda County through the Alameda County Transportation Commission (Alameda CTC). Alameda CTC is therefore an important funder for biking and walking projects in Newark. Alameda CTC has a series of requirements for bicycle master plans adopted in Alameda County, which the City of Newark has addressed in order to maintain funding eligibility and to provide a planning document consistent with best practices. The Alameda CTC Guidelines are similar the Caltrans Active Transportation Program (ATP) guidelines. This Plan satisfies both the Alameda CTC and Caltrans guidelines, as outlined in **Table 1-1**.

Table 1-1.
Alameda CTC Bicycle Master Plan Guidelines/Caltrans ATP Guidelines Addressed in this Plan

Source	Requirement	Chapter
Alameda CTC	Introduction which summarizes plan's purpose or vision and goals.	Chapter 1
Alameda CTC	A description of how the plan has been coordinated with the Countywide Transportation Plan and its component modal plans.	Chapter 2
Alameda CTC	Designate and map an "all ages and abilities" bikeway network.	Chapter 3
Alameda CTC	A map and description of major barrier/gap closure projects (bridges, freeway crossings, major arterial crossings, etc.).	Chapter 3
Alameda CTC	A description of which design guidelines the jurisdiction uses for bikeway geometry, striping, and traffic control devices.	Appendix D
Alameda CTC	A description of which design guidelines the jurisdiction uses for the development of bicycle parking and wayfinding.	Appendix D
Alameda CTC	Infrastructure cost estimates developed for individual projects or network segments (planning-level cost estimates acceptable).	Chapter 8
Alameda CTC	Estimates of maintenance (including repaving of bikeway and trail network) and staffing costs over life of plan.	Chapter 8
Alameda	Description of ongoing data collection plans such as counts, facility inventory, etc.	Chapter 8

Source	Requirement	Chapter
CTC		
Both	The estimated number of existing bicycle trips and pedestrian trips in the plan area, both in absolute numbers and as a percentage of all trips, and the estimated increase in the number of bicycle trips and pedestrian trips resulting from implementation of the plan.	Chapter 3
Both	The number and location of collisions, serious injuries, and fatalities suffered by bicyclists and pedestrians in the plan area, both in absolute numbers and as a percentage of all collisions and injuries, and a goal for collision, serious injury, and fatality reduction after implementation of the plan.	Appendix E: Collision Analysis
Both	A map and description of existing and proposed land use and settlement patterns which must include, but not be limited to, locations of residential neighborhoods, schools, shopping centers, public buildings, major employment centers, and other destinations.	Chapter 3, Figure 3-2
Both	A map and description of existing and proposed bicycle transportation facilities.	Chapter 3, Figures 3-1, 3-3
Both	A map and description of existing and proposed end-of-trip bicycle parking facilities.	Chapter 3, Figure 3-7
Both	A description of existing and proposed policies related to bicycle parking in public locations, private parking garages and parking lots and in new commercial and residential developments.	Chapter 3
Both	A map and description of existing and proposed bicycle transport and parking facilities for connections with and use of other transportation modes. These must include, but not be limited to, parking facilities at transit stops, rail and transit terminals, ferry docks and landings, park and ride lots, and provisions for transporting bicyclists and bicycles on transit or rail vehicles or ferry vessels.	Chapter 3, Figure 3-7
Both	A description of proposed signage providing wayfinding along bicycle and pedestrian networks to designated destinations.	Chapter 3, Chapter 4
Both	A description of the policies and procedures for maintaining existing and proposed bicycle and pedestrian facilities, including, but not limited to, the maintenance of smooth pavement, freedom from encroaching vegetation, street sweeping, maintenance of traffic control devices including striping and other pavement markings, and lighting.	Chapter 8
Both	A description of bicycle and pedestrian safety, education, and encouragement programs conducted in the area included within the plan, efforts by the law enforcement agency having primary traffic law enforcement responsibility in the area to enforce provisions of the law impacting bicycle and pedestrian safety, and the resulting effect on accidents involving bicyclists and pedestrians.	Chapter 6
Both	A description of the extent of community involvement in development of the plan, including disadvantaged and underserved communities.	Chapter 1
Both	A description of how the active transportation plan has been coordinated with neighboring jurisdictions, including school districts within the plan area, and is consistent with other local or regional transportation, air quality, or energy conservation plans, including, but not limited to, general plans and a Sustainable Community Strategy in a Regional Transportation Plan.	Chapter 2
Both	A description of the projects and programs proposed in the plan and a listing of	Chapter 8

Source	Requirement	Chapter
	their priorities for implementation, including the methodology for project prioritization and a proposed timeline for implementation.	
Both	A description of past expenditures for bicycle and pedestrian facilities and programs, and future financial needs for projects and programs that improve safety and convenience for bicyclists and pedestrians in the plan area. Include anticipated revenue sources and potential grant funding for bicycle and pedestrian uses.	Chapter 8
Both	A description of steps necessary to implement the plan and the reporting process that will be used to keep the adopting agency and community informed of the progress being made in implementing the plan.	Chapters 8
Caltrans	A map and description of existing and proposed pedestrian facilities at major transit hubs. These must include, but are not limited to, rail and transit terminals, and ferry docks and landings.	Chapter 4, Figures 4-1 and 4-2
Caltrans	A resolution showing adoption of the plan by the city, county or district. If the active transportation plan was prepared by a county transportation commission, regional transportation planning agency, MPO, school district or transit district, the plan should indicate the support via resolution of the city(s) or county(s) in which the proposed facilities would be located.	

2. POLICY CONTEXT

This chapter summarizes the policies in existing planning documents related to non-motorized active transportation. Existing plans have been grouped into citywide plans, other cities' and county plans, regional plans, state plans and federal initiatives. **Table 2-1** lists the existing planning and policy documents that this chapter addresses.

Table 2-1.
Summary of Relevant Existing Plans and Policies

Citywide Plans	Other Cities' and County's Plans	Regional Plans	State Plans	Federal Initiatives
General Plan (particularly Chapter 4 – Transportation and Chapter 10 – Health and Wellness)	Alameda County Bicycle Plan	San Francisco Bay Trail	Caltrans' Complete Streets Policy	US DOT Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations
Municipal Code	Alameda County Countywide Bicycle and Pedestrian Plans	Regional Bicycle Plan for the San Francisco Bay Area	California Complete Streets Act of 2008	Americans with Disabilities Act
Complete Streets Policy	Fremont Bicycle Master Plan	East Bay Regional Park District Master Plan	Assembly Bill 32 & Senate Bill 375	
	Union City Bicycle Plan	MTC Complete Streets & Routine Accommodation Policy	Assembly Bill 1581 & Caltrans' Policy Directive 09-06	
	Alameda Countywide Multimodal Arterials Plan	Newark-Fremont Bay Trail Feasibility Study		

CITYWIDE PLANS

GENERAL PLAN: TRANSPORTATION ELEMENT

One of the City of Newark's *General Plan* (2013) goals is to create a citywide pedestrian and bicycle network that provides safe access to destinations within the city, connects to an integrated regional network, and is accessible to users of all ages, abilities, and means. In order to accomplish this goal, the plan lists 13 policies which support the development of a multimodal travel network.

Specifically, the 2013 General Plan includes the following new and revised transportation policies:

Policy T-2.1 Promoting Bicycling and Walking: Promote bicycling and walking as viable modes of transportation for everyday trips as well as for recreation to increase the number of people of all ages, abilities, and means who bicycle and walk.

Policy T-2.2 Pedestrian Facilities: Work to close gaps in the pedestrian network and improve sidewalk connectivity between residential and commercial areas. Develop curbs, gutters, sidewalks on all remaining Newark streets not yet fully improved to encourage safe, convenient pedestrian travel. Where appropriate, include marked crosswalks at intersections and install pedestrian countdowns at traffic signals to facilitate safe pedestrian movement across City streets.

Policy T-2.3 Bicycle Network: Maintain and expand an interconnected network of bicycle routes, paths and trails, serving the City's neighborhoods, shopping districts, workplaces, and park and open space areas. The existing bicycle network should be expanded to provide connections to developing areas, including the Dumbarton TOD, the Southwest Residential and Recreational Project, Old Town Newark, and the NewPark Mall vicinity.

Policy T-2.4 Bicycle and Pedestrian Project Funding: Apply for grants and other funding sources to implement pedestrian and bicycle improvements.

Policy T-2.5 Connecting to the Region: Develop bicycle and pedestrian facilities that connect across City boundaries, integrate with larger regional systems, and improve intermodal connections to local and regional public transportation systems.

Policy T-2.6 Pedestrian and Bicycle Provisions within New Development: Ensure safe and convenient pedestrian and bicycle access to and through new public and private developments. The City will use the development review process to ensure—and where appropriate to require—provisions for pedestrians and bicycles in new development areas.

Policy T-2.7 Pedestrian and Bicycle Safety: Improve actual and perceived pedestrian and bicycle safety. Make use of the latest technologies available to provide increased safety measures. Special attention should be given to facilitating the safety of children walking or bicycling to school.

Policy T-2.8 Safety Awareness and Health Benefits: Encourage bicycle and pedestrian safety training in schools and through City recreation programs. Such programs should aim to reduce the rate of bicycle and pedestrian accidents while increasing awareness of available facilities and the health benefits of bicycling and walking.

Policy T-2.9 Recreational Trails: Develop and maintain trails in parks and open space areas, and between Newark neighborhoods and the City's open spaces.

Policy T-2.10 Railroad Crossings: Ensure that any future grade separated railroad crossings include sidewalks and designated lanes for bicycles.

Policy T-2.11 Bicycle Parking: Provide secure, adequate, and easily accessible bicycle parking at key destinations throughout the city, including municipal facilities, schools, and new development. The style and design of bike racks should contribute to overall neighborhood and architectural aesthetics.

Policy T-2.12 Trails along Railroads and Utilities: Consider the use of railroad, flood control, and utility rights of way for jogging, biking, and walking trails, provided that safety and operational issues can be fully addressed. Such trails may be considered where the right-of-way is sufficiently wide to address safety considerations, and where a trail project would not interfere with railroad, flood control, or utility operations.

Policy T-2.13 Bicycle Events: Support special bicycle events and activities which showcase Newark's bike trails and amenities, especially facilities providing access to shoreline trails and open spaces.

MUNICIPAL CODE

The City of Newark's Municipal Code includes ordinances that address how development should occur within the City. The City does not currently have a bicycle parking ordinance. In addition to defining standards for future development, the Code includes ordinances for the installation and maintenance of crosswalks and the operation of bicycles, as described below:

10.20.020: Crosswalks

a. The city traffic engineer shall establish, designate and maintain crosswalks at intersections and other places by appropriate devices, marks or lines upon the surface of the roadway as follows: crosswalks shall be established and maintained at all intersections where the city traffic engineer determines that there is particular hazard to pedestrians crossing the roadway subject to the limitation contained in subsection B of this section.

b. Other than crosswalks at intersections, no cross-walk shall be established in any block which is less than four hundred feet in length. Elsewhere not more than one crosswalk shall be established in any one block and such crosswalk shall be located as nearly as practicable at mid-block.

c. The city traffic engineer may place signs at or adjacent to an intersection in respect to any crossing directing that pedestrians shall not cross in the direction so indicated.

10.44.000: Bicycles Rules of Operation

- 10.44.140: Operation. It is unlawful for any person to ride or operate a bicycle in the city of Newark in violation of any of the rules of the road contained in the State Vehicle Code and this title. *(Ord. 160 Art. III § 1, 1979)*
- 10.44.150 – Parking: No person shall park any bicycle against windows or parking meters or on the main traveled portion of the sidewalk, nor in such a manner as to constitute a hazard to pedestrians, traffic or property. *(Ord. 160 Art. III § 2, 1979)*
- 10.44.160 - Parks, playgrounds and schools. No person shall ride or operate a bicycle upon any park, playground or schoolground, where children are playing, without permission of the person having supervision thereof. *(Ord. 160 Art. III § 3, 1979)*
- 10.44.170 - Riding in groups. Persons riding or operating bicycles in the city shall not ride more than two abreast, except on paths or bicycle lanes set aside for the exclusive use of bicycles; provided further, that persons riding bicycles on the sidewalk shall do so in single file.

NEWARK COMPLETE STREETS POLICY

The City of Newark City Council adopted a Complete Streets Policy on March 14, 2013. The Policy has three main components: Complete Streets Principles, Implementation, and Exceptions. Complete Streets Principles outlines the need to serve different modes, to be sensitive to the particular contexts in which changes are being made, and to integrate complete streets efforts into all relevant city departments and processes. Implementation addresses design rules and guidelines that should be used, and includes network connectivity as a goal. The Exceptions component describes how exceptions can be made to the policy on a case-by-case basiswith certain findings, and includes a list of specified exception scenarios.

OTHER CITY AND COUNTY PLANS

This section describes the plans and policies related to bicycling and pedestrian activity in adjacent jurisdictions and within Alameda County. As required by the Alameda County Transportation Commission (Alameda CTC), this plan has been coordinated with the Countywide Transportation Plan and its component modal plans, including the Pedestrian Master Plan, the Bicycle Plan, and the Multimodal Arterial Plan. A description of each of these plans follows.

ALAMEDA COUNTYWIDE PEDESTRIAN MASTER PLAN

The Alameda CTC adopted the Countywide Pedestrian Master Plan in October 2012. The plan intends to improve walking conditions throughout the County's 14 cities and unincorporated areas. The *Pedestrian Master Plan* highlights regional efforts and funding opportunities to implement pedestrian facilities throughout the County. The *Plan* includes a goal to maximize the capacity for implementation of pedestrian project, programs, and plans, including securing maximum funding for pedestrian enhancements from countywide, regional, state, and federal grants, as well as private and non-traditional sources.

Other goals in the plan relate to creating and maintaining a safe and convenient pedestrian system; improving pedestrian safety through engineering, education, and enforcement; developing support programs that encourage people to walk; and integrating pedestrian needs into transportation planning activities.

The Plan includes the County's priority programs, highlighting numerous opportunities for the County and its constituent jurisdictions to improve the walking environment.

ALAMEDA COUNTYWIDE BICYCLE PLAN

The Alameda CTC adopted the Countywide Bicycle Master Plan in October 2012. This Plan coordinates with the Countywide Pedestrian Master Plan whenever possible since the efforts of both plans coincide in several areas.

Among the updates included in this plan, the vision for total bicycle facilities is increased by 40% to 762 miles of bikeways; of this, about half is already built. The increased mileage comes from new priorities to link bikeways with transit and to increase access in 'communities of concern'. The cost to implement the plan is also updated to $945M higher than in 2006 due to the larger network, updated cost estimates, and

increased number of programs. The funding shortfall identified amounts to $325M. Overall, the 2012 Plan refines and supplements the goals and strategies identified in earlier 2006 plan.

This vision network includes 7 miles of unbuilt facilities in the City of Newark. Specifically, the Plan's envisioned network includes four proposed enhancements in the City of Newark:

- A proposed Class II bike lane on Thornton Avenue from Marshlands Road to Cherry Street
- A proposed Class II bike lane on Willow Street from Thornton Avenue to Central Avenue
- A proposed Class II bike lane on Central Avenue from Willow Street to Sycamore Street
- A segment of the countywide Bay Trail

The plans also lists several Priority Development Areas (PDAs), or areas within existing communities that have been identified by local jurisdictions and identified as the most appropriate for infill development. The objective of PDAs is to create more housing, jobs, retail and services in pedestrian-friendly environments served by transit. PDAs could result in a significant increase in the number of walking trips in Alameda County, to the extent that compact, transit-and-pedestrian-friendly developments are favored also by cyclists. Designated PDAs in Newark include the Dumbarton Transit Area, Old Town, Cedar Boulevard Transit, and Civic Center Re-Use Transit.

ALAMEDA COUNTYWIDE MULTIMODAL ARTERIAL PLAN

The Countywide Multimodal Arterial Plan was adopted in 2016. The Alameda CTC led the development of the Countywide Multimodal Arterial Plan (MAP) to provide a basis for the integrated management of major arterial corridors in Alameda County. The county road network consists of 3,600 centerline miles of roadways, and the majority of them are arterials and local roads. As part of this study, the Alameda CTC identified a priority list of short- and long-term improvements and strategies. Because arterials support and connect to alternative transportation modes such as transit hubs, rail stations, transit routes, bikeways and pedestrian paths, this study is relevant to any and all bicycle and pedestrian plans in the County. The bicycle facility recommendations included Chapter 3 of this document align with the recommendations included in the MAP.

CITY OF FREMONT BICYCLE MASTER PLAN

The City of Fremont completed its *Bicycle Master Plan* in January 2012, and is currently in the process of updating the plan. The plan update will identify ways to enhance and expand the city's existing bikeway network and also use community input to identify needs and challenging areas in order to upgrade or construct new, safe, and efficient bicycle facilities, and to encourage and increase bicycle ridership for people of all ages and abilities. The plan update continues Fremont's efforts to improve conditions for cyclists traveling within and through the city. The 2012 plan identified over six miles of bike paths, twenty-five miles of bike lanes, and thirty-one miles of bike routes that had been improved or newly created in the preceding seven years.

Existing bicycle facilities that connect Fremont and Newark are identified in the plan as: Boyce Road, Central Avenue, Ardenwood Boulevard, Paseo Padre Parkway, Thornton Avenue (all Class II bicycle lanes), and a Class III bicycle route through the Ardenwood Historic Farm. There is a gap in the bicycle lane along

Thornton Avenue north of the interchange with I-880. Proposed bicycle facilities that would connect Fremont and Newark are identified in the plan as: Stevenson Boulevard and Mowry Avenue (both Class II bicycle lane). At the adoption of this Plan, Fremont is updating its Bicycle Master Plan to include a strong emphasis on separated bikeway and low traffic stress bikeways.

CITY OF UNION CITY PEDESTRIAN AND BICYCLE MASTER PLAN

Union City updated its *Pedestrian and Bicycle Master Plan* in January 2012. The city's original plan was prepared in 2006. Between 2006 and 2012, the city spent approximately $7.5 million on pedestrian and bicycle projects and constructed approximately 21 percent of the high-priority pedestrian and bicycle network identified in the 2006 plan. The plan was updated to reflect new pedestrian and bicycle facilities that have been constructed since 2006, new analysis regarding Safe Routes to School projects and feedback received throughout the implementation process. The Pedestrian and Bicycle Master Plan provides for a citywide system of pedestrian and bicycle facilities and a variety of programs to allow for safe, efficient, and convenient walking and bicycling within the city.

The plan calls for the integration of Newark's bikeway network with Union City's bicycle facilities in order to provide continuous connections from the Union City BART station to the Dumbarton Bridge bicycle facilities. The proposed route between these destinations links Union City with Newark at the eastern end of Jarvis Avenue and SR-84. The Plan also includes proposed facilities on regional connections between Newark and Union City, including Ardenwood Boulevard and Decoto Road.

REGIONAL PLANS

The plans summarized in this section affect jurisdictions throughout the nine county Bay Area region, including the City of Newark.

SAN FRANCISCO BAY TRAIL

The Bay Trail is a planned continuous multi-use trail that, when complete, will encircle San Francisco and San Pablo bays. Approximately 500 miles long, the trail's planned alignment connects the bay shoreline of all nine Bay Area counties, links 47 cities, and crosses all the toll bridges in the region. The alignment includes a continuous "spine" along or near the shoreline and many short "spurs" to the waterfront itself. The nonprofit San Francisco Bay Trail Project coordinates planning for the Bay Trail Project, a project of the Association of Bay Area Governments.

To date region-wide, approximately 290 miles of the Bay Trail alignment have been developed as either off-street paths or on-street bicycle lanes or routes. Beginning in 2010, the City of Newark undertook the Newark Fremont Bay Trail Realignment Feasibility Study with the City of Fremont to identify the best alignment for the proposed Bay Trail between the Dumbarton Bridge (SR 84) bike path, through Newark and Fremont. The study, completed in 2013 and accepted by the City Council in 2014, proposes a preferred trail alignment for a bay-oriented shoreline trail accessible by many modes and abilities.

At the time of writing of this Plan, the San Francisco Bay Trail Design Guidelines are in draft form, which provide detailed guidance on the preferred design of the Bay Trail, including trail crossings.

NEWARK-FREMONT BAY TRAIL FEASIBILITY STUDY

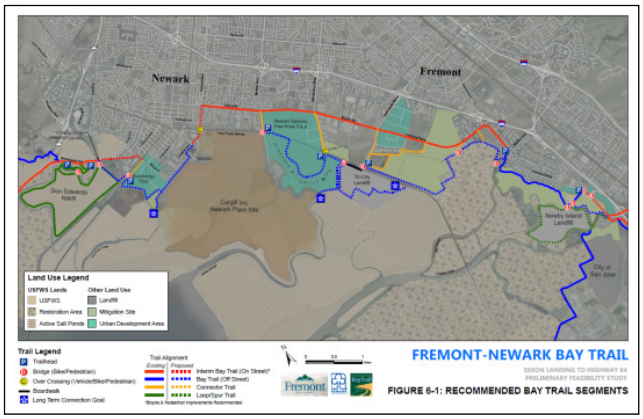


FIGURE 6-1: RECOMMENDED BAY TRAIL SEGMENTS

This 2012 study evaluates potential alignments for the Bay Trail along the 15 miles of shoreline in Fremont and Newark that would ultimately be a part of the 500-mile trail encircling the Bay (described above). The Feasibility Study points out that there are no existing off-street Bay Trail segments in Newark, and there are three existing segments (totaling five miles) in Fremont. One goal of the study is to shift the current planned alignment from city streets and the Union Pacific Railroad Corridor to an alignment nearer to the shoreline. It reviews local and regional studies, incorporates public feedback and stakeholder involvement, and identifies environmental constraints and issues in order to evaluate and compare different alignment options. Despite potential wetland habitat and right of way issues, alignment options closer to the shoreline overall ranked higher than those along the rail corridor or on-street, urban alignments. Thus, the study concludes with a recommended preferred alignment, a phasing plan, design guidelines, funding options, and other strategies. This Plan incorporated the recommendations made in that study.

REGIONAL BICYCLE PLAN FOR THE SAN FRANCISCO BAY AREA

In 2009, the Metropolitan Transportation Commission (MTC) updated its *Regional Bicycle Plan* for the San Francisco Bay Area. The new *Plan* updates the designated regional bikeway network, one of the purposes of which is to focus MTC's spending on high-priority facilities that serve regional trips. The regional bikeway network extends approximately 2,140 miles and the estimated cost to complete it is just over $1.4 billion, approximately half of which is for toll bridges that currently lack bicycle access.

The MTC Plan details the length and completion cost of the regional bikeway network by county, though not by city. The network includes 343 miles in Alameda County, of which 156 miles (almost 45 percent) have been built or are fully funded and awaiting development. The plan estimates the cost to complete the bikeway network within Alameda County, excluding the toll bridges, at almost $165 million. A map of the Alameda portion of the regional bikeway network is shown on page 40 of the MTC plan. In and near Newark, the existing and proposed network encompasses much of the San Francisco Bay Trail (see above) along the western edge of the City, as well as Thornton Avenue, Newark Boulevard, Brittany Avenue Cherry Street, and Central Avenue.

EAST BAY REGIONAL PARK DISTRICT MASTER PLAN

The East Bay Regional Park District (EBRPD) serves as a regional park agency for Contra Costa and Alameda counties, acquiring, developing, managing and maintaining parkland. It encompasses

approximately 113,000 acres, with 65 parks and over 1, 200 miles of mostly unpaved trails. The trails are designed to connect parks and communities and use publicly owned rights-of-way in cooperation with other agencies, with the goal of developing a regional trail network that provides non-motorized transportation and recreational opportunities.

EBRPD's most recent master plan was adopted in 2013. Trails-related priorities in the plan include completing the missing sections of the San Francisco Bay Trail (see above) and Bay Area Ridge Trail, and developing key trail segments in eastern Alameda and Contra Costa counties. In the meantime, it updated the Plan map showing all existing and potential parklands and trails in its system. In and near Newark, EBPRD's network of existing and potential trails encompasses much of the San Francisco Bay Trail (see above) along the Bay waterfront and a regional trail connecting Coyote Hills to Santa Clara County proposed to run on the western edge of developed area of the City.

MTC'S COMPLETE STREETS/ROUTINE ACCOMMODATION POLICY

"Routine accommodation" refers to the practice of considering the needs of pedestrians and bicyclists habitually in the planning, design, funding and construction of transportation projects. "Complete streets" is a related concept that describes roadways designed and operated for safe and convenient access by all users, including bicyclists, pedestrians and transit riders.

In June 2006, the Metropolitan Transportation Commission—the regional transportation planning agency for the Bay Area—adopted a complete streets/routine accommodation policy for the region. The policy states that projects funded all or in part with regional funds "shall consider the accommodation of bicycle and pedestrian facilities, as described in Caltrans Deputy Directive 64" (see below) in the full project cost. The policy requires that sponsors of transportation projects—which could include the City of Newark—complete a project checklist for any project submitted for funding to MTC that has the potential to impact bicycle or pedestrian use. The checklist is meant to ensure that project sponsors evaluate the need for bicycle and pedestrian facilities as part of project planning—ideally at the earliest stage—and accommodate such facilities in the design and budget of their projects.

STATE PLANS

Caltrans is responsible for building and maintaining state-funded transportation infrastructure. Although Caltrans does not have jurisdiction over transportation facilities within the City of Newark, the City is bounded on its northern and eastern sides by Interstate 880 and State Route 84. Most entry points into the City require crossing these facilities. In conjunction with Caltrans, the State has also passed legislation that affects all streets in Newark.

CALTRANS' COMPLETE STREETS POLICY

In 2001, the California Department of Transportation (Caltrans) adopted a routine accommodation policy for the state in the form of Deputy Directive 64, "Accommodating Non-motorized Travel." The directive

was updated in 2008 as "Complete Streets—Integrating the Transportation System." The directive was renewed in October 2014. According to the policy:

The Department views all transportation improvements as opportunities to improve safety, access, and mobility for all travelers in California and recognizes bicycle, pedestrian, and transit modes as integral elements of the transportation system.

The Department develops integrated multimodal projects in balance with community goals, plans, and values. Addressing the safety and mobility needs of bicyclists, pedestrians, and transit users in all projects, regardless of funding, is implicit in these objectives. Bicycle, pedestrian and transit travel is facilitated by creating "complete streets" beginning early in system planning and continuing through project delivery and maintenance and operations….

The directive establishes Caltrans' own responsibilities under this policy. Among the responsibilities that Caltrans assigns to various staff positions under the policy are:

- Ensure bicycle, pedestrian, and transit interests are appropriately represented on interdisciplinary planning and project delivery development teams.
- Ensure bicycle, pedestrian, and transit user needs are addressed and deficiencies identified during system and corridor planning, project initiation, scoping, and programming.
- Ensure incorporation of bicycle, pedestrian, and transit travel elements in all Department transportation plans and studies.
- Promote land uses that encourage bicycle, pedestrian, and transit travel.
- Research, develop, and implement multimodal performance measures.

In February 2010, Caltrans released a Complete Streets Implementation Action Plan to define how Deputy Directive 64 be implemented within all Caltrans' projects. The Action Plan is available here: http://www.dot.ca.gov/hq/tpp/offices/ocp/complete_streets_files/CompleteStreets_IP03-10-10.pdf.

CALIFORNIA COMPLETE STREETS ACT

Assembly Bill 1358, the "California Complete Streets Act of 2008," requires "that the legislative body of a city or county, upon any substantive revision of the circulation element of the general plan, modify the circulation element to plan for a balanced, multimodal transportation network that meets the needs of all users [including] motorists, pedestrians, bicyclists, children, persons with disabilities, seniors, movers of commercial goods, and users of public transportation…." This provision of the law went into effect on January 1, 2011. The law also directed the Governor's Office of Planning and Research to amend its guidelines for the development of circulation elements so as to assist cities and counties in meeting the above requirement. The latest guidelines were released in December 2010, and are available at the following website: http://www.opr.ca.gov/planning/docs/Update_GP_Guidelines_Complete_Streets.pdf.

ASSEMBLY BILL 32 AND STATE BILL 375

Senate Bill (SB) 375 is the implementation legislation for Assembly Bill (AB) 32. AB 32 requires the reduction of greenhouse gases (GHG) by 28 percent by the year 2020 and by 50 percent by the year 2050.

GHGs are emissions – carbon dioxide chief among them – that accumulate in the atmosphere and trap solar energy in a way that can affect global climate patterns. The largest source of these emissions related to human activity is generated by combustion-powered machinery, internal combustion vehicle engines, and equipment used to generate power and heat. SB 375 tasks metropolitan and regional planning agencies with achieving GHG reductions through their Regional or Metropolitan Transportation Plans. The reduction of the use of automobile for trip making is one method for reducing GHG emissions. This can be achieved through the use of modes other than the automobile, such as walking, bicycling, or using transit.

ASSEMBLY BILL 1581 AND CALTRANS POLICY DIRECTIVE 09-06

Assembly Bill (AB) 1581 provides direction that new actuated traffic signal construction and modifications to existing traffic signals include the ability to detect bicycles and motorcycles. It also calls for the timing of actuated traffic signals to account for bicycles. In response to AB 1581, Caltrans has issues Traffic Operations Policy Directive 09-06, which has proposed modifications to Table 4D-105(D) of the California Manual on Uniform Traffic Control Devices. The California Traffic Control Devices Committee is considering the proposed modifications.

FEDERAL INITIATIVES

The United States Department of Transportation has issued the following statement on pedestrian and bicycle activity and planning.

BICYCLE AND PEDESTRIAN FACILITY DESIGN FLEXIBILITY

In August of 2013, the Federal Highway Administration released a memorandum expressing FHWA's support for flexibility with bicycle and pedestrian design. The memorandum acknowledges the new best practice documentation available to practitioners as important design manuals for helping cities to build safe and convenient bicycle and pedestrian facilities. The National Association of City Transportation Officials (NACTO) Urban Bikeway Guide and Institute of Transportation Engineers (ITE) Designing Urban Walkable Thoroughfares are both mentioned specifically.

THE UNITED STATES DEPARTMENT OF TRANSPORTATION STATEMENT ON BICYCLE AND PEDESTRIAN ACCOMMODATIONS, REGULATIONS AND RECOMMENDATIONS

On March 5, 2010, the United States' Department of Transportation (DOT) announced a policy directive to demonstrate the DOT's support of fully integrated active transportation networks by incorporating walking and bicycling facilities into transportation projects. The statement encourages transportation agencies to go beyond minimum standards in the provision of the facilities. The DOT further encourages agencies to adopt policy statements that would affect bicycling and walking, such as:

- Considering walking and bicycling as equals with other

transportation modes

- Ensuring availability of transportation choices for people of all ages and abilities
- Going beyond minimum design standards
- Integrating bicycle and pedestrian accommodations on new, rehabilitated, and limited access bridges
- Collecting data on walking and biking trips
- Setting mode share for walking and bicycling and tracking them over time
- Removing snow from sidewalks and shared use paths
- Improving non-motorizes facilities during maintenance project

3. BIKEWAY ELEMENT

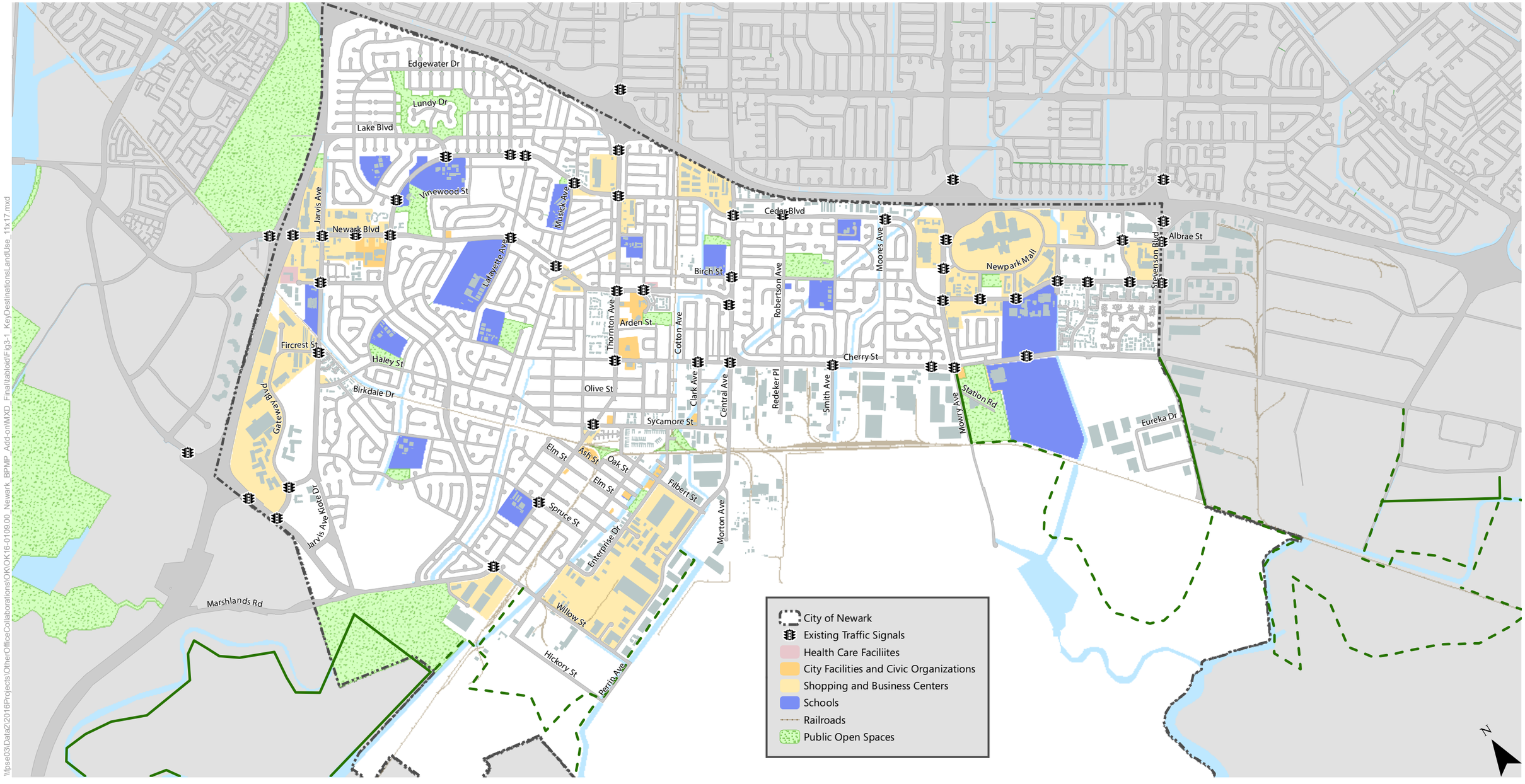
This chapter sets forth a blueprint for a system of proposed bikeways and support facilities within the City of Newark. The bicycle element of the Plan builds upon existing on-street and off-street bicycle facilities throughout the City, focusing on access to major destinations in Newark, including schools, employment areas, retail areas, parks, trails and open space areas. This Plan also includes criteria for choosing different types of bicycle facilities, a project list, design standards, and education and safety programs. Design guidelines for bikeways are presented in **Appendix D**.

EXISTING LAND USE AND SETTLEMENT PATTERNS

Newark is primarily a City of residential neighborhoods. Traditional neighborhood developments have been built up around the original core of Newark at Thornton Avenue and Sycamore Street, reaching north to the City boundary at SR 84 and east to I-880. These neighborhoods are characterized by landscaped medians and sidewalks, internal street networks that connect to the City's arterial network, and access to local parks and schools. See **Figure 3-1** for a map of key destinations and land uses in Newark.

The City also boasts significant commercial uses, with industrial and employment uses concentrated near the Bay in the southwest area of the City and the main retail service centers in the north-central area. The NewPark Mall is another main retail center, located in the southeastern corner of the City. City Hall is located in central Newark.

Community destinations, including schools, parks and community centers are also identified on Figure 3-1. Newark Unified School District includes eight elementary schools, one junior high school and one high school within the City. Several private schools are also located in Newark, including Challenger School. Newark's elementary schools are neighborhood-oriented, with boundaries drawn so that schoolchildren do not have to cross major arterial roadways to get to school. This represents a significant step towards encouraging students to walk and bike to school, and is discussed further in Chapter 5: Safe Routes to Schools. Public facilities include the George M. Silliman Activity and Family Aquatics Center, Community Center on Cedar Boulevard, and Newark Library on Civic Terrace Avenue.



\\pse03\Data2\2016Projects\OtherOfficeCollaborations\OK\OK16-0109.00_Newark_BPMP_Add-on\MXD_Final\tabloid\Fig3-1_KeyDestinationsLandUse_11x17.mxd

Figure 3-1

Key Destinations and Land Uses

NEEDS ANALYSIS

Newark has a great deal of potential for growing its bicycle network and safely and comfortably attracting new bicycle trips with its temperate climate, flat terrain, growing on-street facilities, system of low volume streets ideal for casual cyclists, and access to trails and recreation areas. However, bicycling today can be difficult in Newark despite the growing interest and number of bicyclists. Heavy traffic, high traffic stress bikeways, and a lack of continuous bicycle facilities on Newark's major arterials, particularly on north-south routes, remain significant challenges for attracting new riders.

In addition to busy streets and incomplete facilities, other constraints are I-880 and SR 84 located on the eastern and northern edges of Newark. Interchanges within the City do not provide safe access for bicyclists and pedestrians, making it difficult to reach destinations including Ardenwood Park, Fremont BART, and other regional destinations. Additionally, many neighborhoods in Newark developed with cul-de-sac street patterns with limited connectivity for walking and bicycling. Short pathways and connectors were provided in many of these areas in the past, but, in the last 20 years, many of the pathways have been abandoned by the City or returned to adjacent property owners due to lack of visibility and safety considerations. Improving these connections throughout the City will greatly improve the bicycling experience.

BICYCLIST TYPES

Bicycle riders vary in experience, skill, ability, and confidence. As a result, a city's bikeway system and the type, location, and characteristics of the bicycle facilities must respond to the needs of a broad range of cyclists in order to adequately serve people of all ages and abilities. Roger Geller, Bicycle Coordinator for the Portland Office of Transportation, developed the "Four Types of Cyclists" (2009) descriptions to help understand existing and potential bicyclists. Creating comfortable bicycle facilities that people of all ages and abilities feel comfortable using can help to increase bicycle mode share, particularly for the segment of the population that identifies as "interested but concerned." **Figure 3-2** presents a description of the four types of cyclists.

Given the barriers to bicycling in Newark today, those who ride as typically "strong and fearless" or "enthused and confident". In order to accommodate those who want to be biking but do not currently feel safe or comfortable doing so, Newark will need to design its bikeway system with the "interested but concerned" in mind through the creation of low traffic stress bikeways throughout the city.

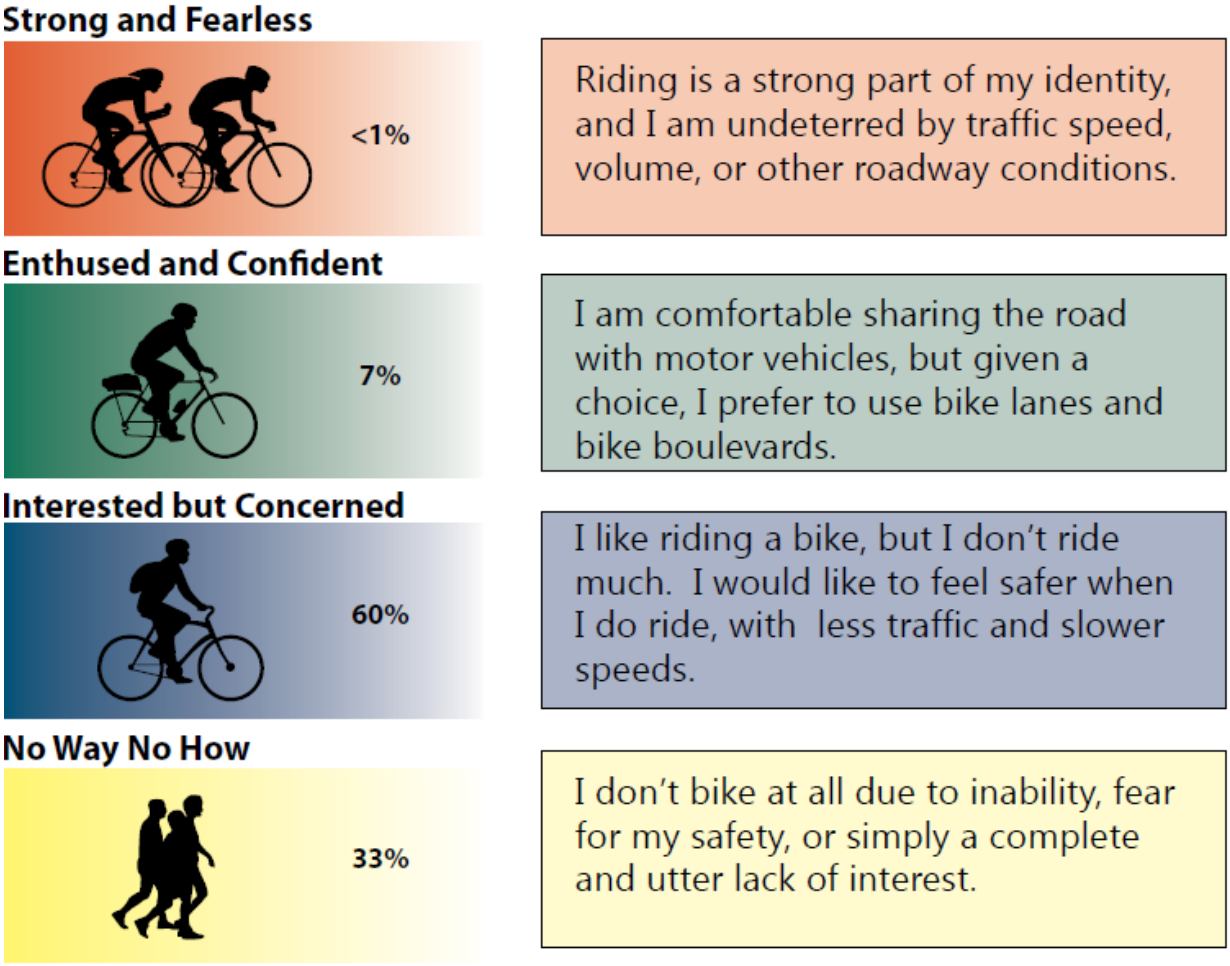


Figure 3-2: Roger Geller's "Four Types of Cyclists" (2009)

BICYCLE TRIPS

A common term used in describing demand for bicycle facilities is "mode share." Mode share refers to the proportion of people choosing a given travel mode, such as walking, bicycling, public transit, or driving, for their trip. Mode share is often used in evaluating return on investment of biking facilities and allow for measuring increases in the number of bicycle trips over time, as the objective is to increase the percentage of people selecting an alternative means of transportation to the single-occupant (or drive-alone) automobile. **Table 3-1** presents the estimated number of bicycling trips in Newark today, both in absolute numbers and as a percentage of all trips.

This information is based the Alameda CTC *Bicycle and Pedestrian Mode Share Tools* methodologies, which incorporate demographic factors and mile of bikeways in the network to estimate existing and future bicycling demand

Table 3-1.
Estimated Current and Future Number of Daily Bicycle Trips in Newark

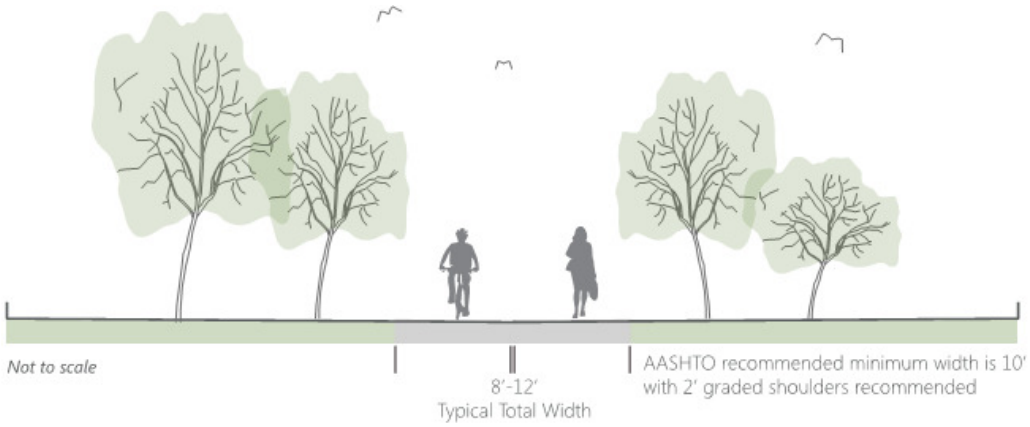
Number of Trips	Today (2014)	Future with the Plan (2040)
Bicycle Trips	1,180 (0.3%)	3,700 (0.7%)

Source: 2010 U.S. Census, 2014 American Community Survey, Alameda CTC ATP Mode Share Forecast Tool

TYPES OF BIKEWAY FACILITIES

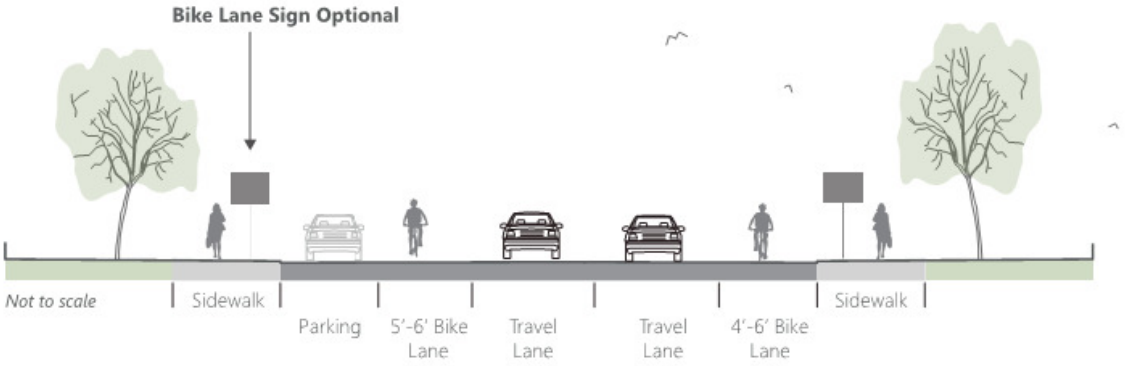
The Plan proposes the use of the following types of bicycle facilities:

- ***Class I Bicycle Paths or Multi-Use Paths*** provide a completely separate right-of-way and is designated for the exclusive use of bicyclists and pedestrians with minimal vehicle and pedestrian cross-flow. Bike paths are for non-motorized use only. It should be noted that Class I paths adjacent to roadways (also known as "sidepaths") with intersecting driveways and roadways have a high collision potential for cyclists, because drivers who are exiting driveways or intersecting roads and looking for oncoming traffic do not expect cyclists to approach from the opposite direction.[1] For these reasons, the City should minimize driveways and cross-flow traffic when it reviews plans for development adjacent to proposed Class I facilities. When driveways cross Class I paths, the City should consider warning signs and pavement markings (such as "Bike XING" or STOP bars) for both drivers and bicyclists, as appropriate. These safety issues do not apply to regional multi-use paths, which generally have few intersections.

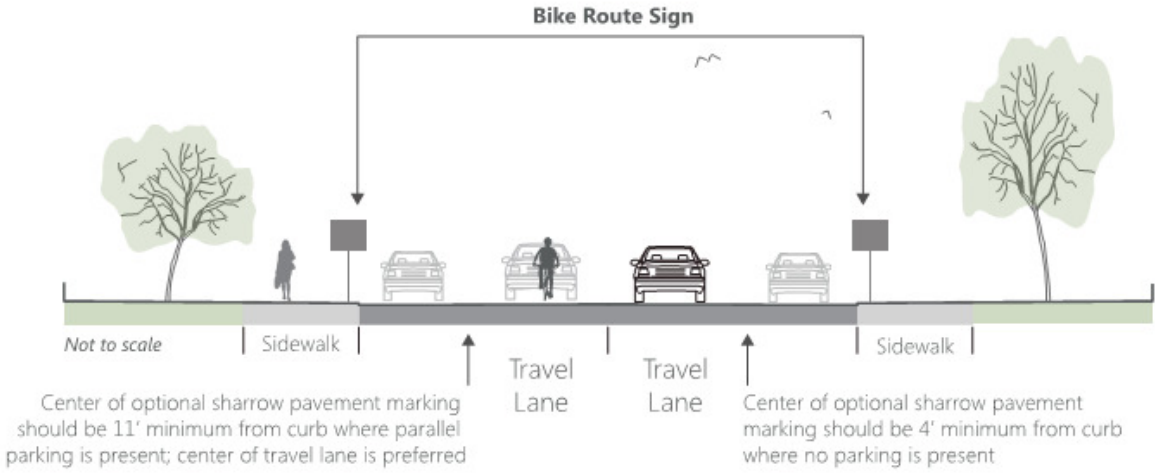


- ***Class II Bicycle Lanes*** provide a restricted right-of-way and is designated for the use of bicycles with a striped lane on a street or highway. Bicycle lanes are generally at least five feet wide. Vehicle parking and vehicle/pedestrian cross-flow are permitted. Class II lanes are preferred to Class I paths on roadways with multiple intersections and/or driveways, for the reasons described above. Class II bicycle lanes are generally indicated on streets with speeds higher than 30 miles per hour.

[1] Wachtel, Alan and Diana Lewiston, *Risk Factors for Bicycle-Motor Vehicle Collisions at Intersections*, Institute of Transportation Engineers Journal, September 1994. pp. 30-35

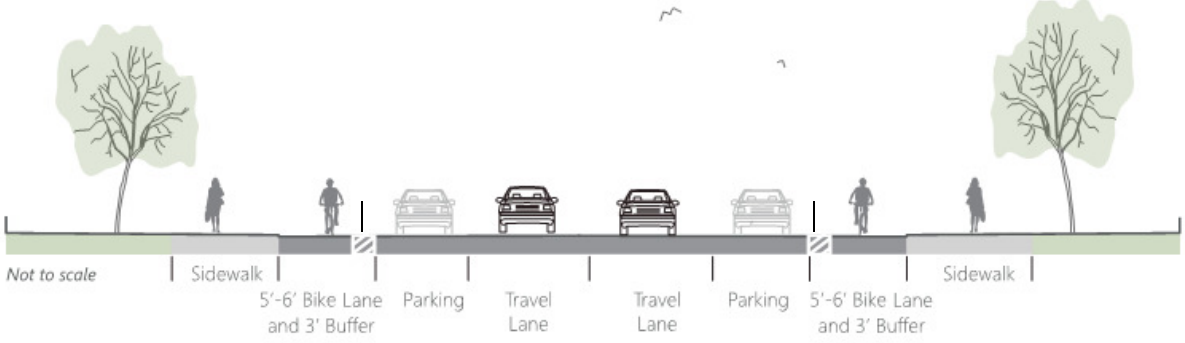


- ***Class III Bicycle Routes*** provide a right-of-way designated for shared use with pedestrians or motor vehicles by signs or pavement markings. A Shared-Use Arrow (or "Sharrow") can be marked in the outside lane on a Class III route to show the suggested path of travel for bicyclists. This is often done when the route has on-street parking, in order to encourage cyclists to ride a safe distance away from the parked vehicles' "door zone." The sharrow can also be used at intersections with multiple turn lanes to show bicyclists the recommended lane for through travel. Sharrows indicate to drivers that cyclists should be expected on the street and given sufficient room. A sign stating "Bicycles Allowed Full Use of Lane" citing the California Vehicle Code is often included. Shared lanes are often used for short stretches of Class II bicycle lanes where there is not sufficient room for a separated lane or along streets with speeds of 25 miles per hour or slower.



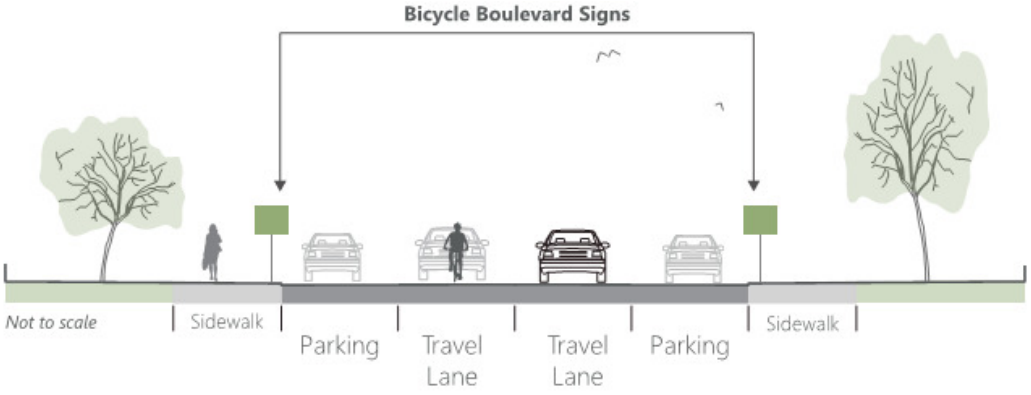
In addition to those three bikeways currently in use in Newark, this Plan proposes two additional bicycle facility types, which have more detailed information in **Appendix D: Design Guidelines**.

- ***Class IV Separated Bikeways*** are a new type of bikeway for Newark. Separated bikeways



maximize protection for bicyclists in providing a physical separation between the bikeway and vehicular traffic. The separation may include, but is not limited to grade separation, inflexible physical barriers, or on-street parking. Separated bikeways, or cycle tracks, typically operate as one-way bikeway facilities in the same direction as vehicular traffic on the same side of the roadway.

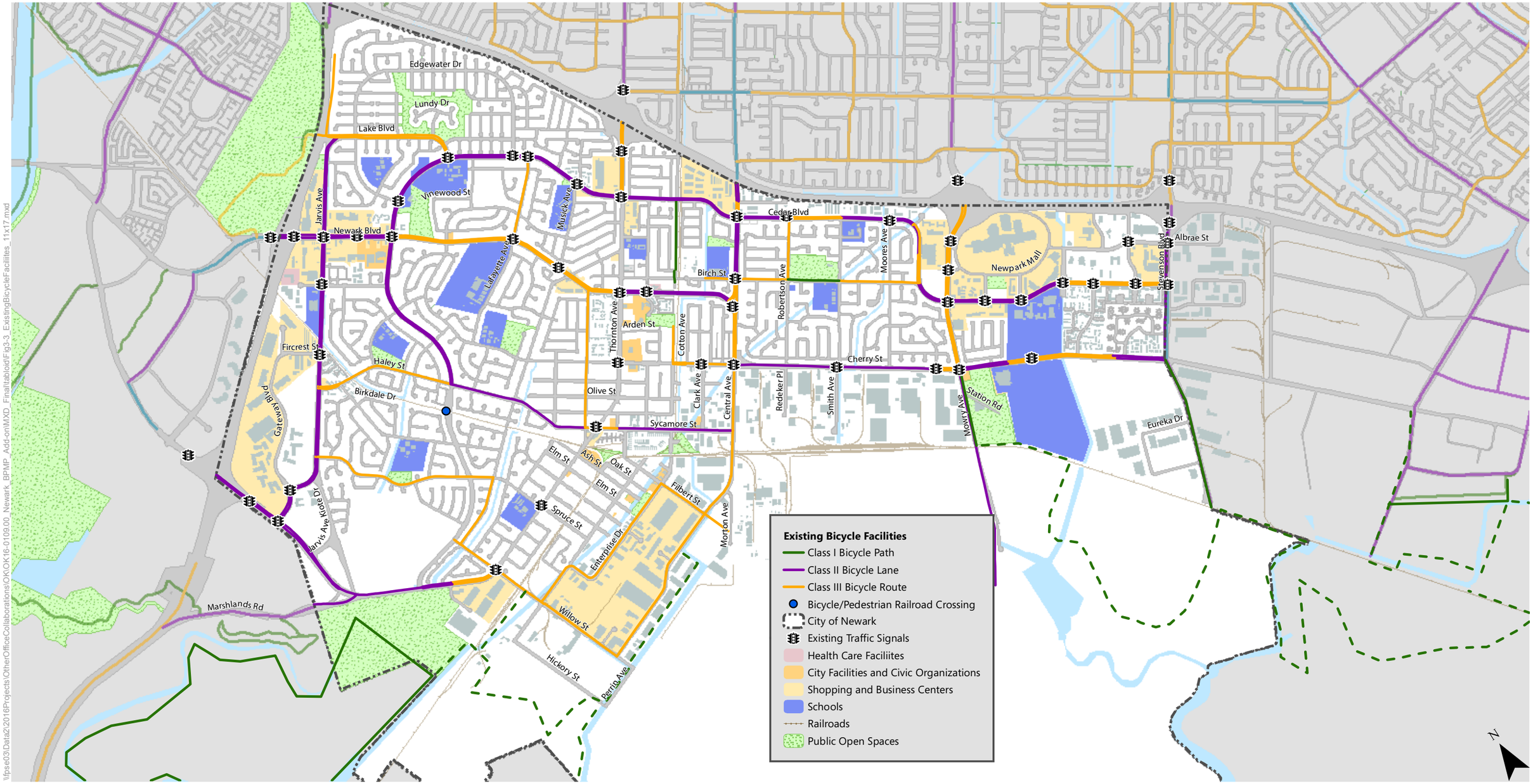
- ***Class III Bicycle Boulevards*** are a new type of bikeway for Newark. Bicycle boulevards are facilities that are designated for shared bicycle use with motor vehicles, similar to bicycle routes. However, the key differentiator is that they are lower volume and lower speed roadways and typically include traffic calming. They are low volume (usually fewer than 1,500 vehicles per day), low speed residential streets in order to allow beginner cyclists to feel comfortable riding on these quiet streets. They also provide key connections to and within neighborhoods and to many of Newark's neighborhood-oriented elementary schools. These routes provide an alternative to arterial streets and often include other "green streets" or traffic calming measures to improve the aesthetics and experience of traveling along a particular street. Cities refer to these facilities by a variety of other names, including neighborhood greenways, bicycle priority streets, and neighborhood connectors.



EXISTING CONDITIONS

Fehr & Peers conducted an inventory of existing multi-use paths, trails, and on-street bikeway facilities in Newark based on the City of Newark's existing bikeways map and GIS data files, additional information from the Bicycle and Pedestrian Advisory Committee and extensive field visits.

Figure 3-3 Existing Bikeway Network shows locations for all existing bikeways.



Additional Citywide Improvements:
> Additional bike parking
> Improved wayfinding signage
> Upgrade signals to incorporate bike detection with bike clearance at intersections

Figure 3-3
Existing Bicycle Facilities

KEY CORRIDORS

The City of Newark has several main arterials and major streets that provide excellent routes across town and regionally, to connect with Fremont and other destinations. Bicycle facilities along these routes include a combination of Class II and III facilities; however there are significant gaps in the existing network. Most notably, Cedar Boulevard and Cherry Street are key north-south arterials with high auto vehicle speeds, multiple travel lanes but no protected space for bicyclists. Interstate 880 and State Route 84 freeway interchanges across north-south and east-west routes are also challenging areas for bicyclists and pedestrians to cross safely. Each of the facilities described below is also summarized in in **Appendix A: Bicycle Prioritized Project List**.

ON-STREET NORTH-SOUTH ROUTES:

- **Cedar Boulevard** is an arterial roadway that circulates through much of the City. Cedar Boulevard begins at Haley Street as a two-lane roadway that fronts residential neighborhoods with a wide center median, Class II bicycle lanes, and on-street parking. Just north/east of Newark Boulevard, Cedar Boulevard widens to four travel lanes (two in each direction) and becomes a Class III bicycle route. This configuration continues south to Thornton Avenue, where the median becomes a center two-way left-turn lane. A median is again provided south of Moores Avenue. Class II bicycle lanes are provided at intermittent locations between Newark Boulevard and Stevenson Road, where Cedar Boulevard ends. The speed limit is 40-45 miles per hour along Cedar Boulevard, with the exception of the segment between Haley Street and Lido Boulevard, which is 30 miles per hour. The City is considering applying a road diet to segments of Cedar Boulevard, which would help reduce vehicle speed differentials and improve safety by removing travel lanes.

  While Cedar Boulevard currently terminates at Haley Street, the City has preserved right-of-way for a future extension of Cedar to Thornton Avenue (a small stretch of which exists between Bridgepointe Drive and Mahogany Place). This extension offers the possibility of a linear parkway and Class I bicycle path for dedicated pedestrian and bicycle travel. During the public workshop in June 2016, citizens advocated for transforming the Cedar Boulevard extension into a linear park/greenway project.

- **Newark Boulevard** is a four-lane arterial that connects the main retail area in the northern section of the City (i.e., the Lido Faire Shopping Center) with central Newark before merging with Central Avenue. North of SR 84, Newark Boulevard is designated Ardenwood Boulevard. Newark Boulevard has Class II bicycle lanes north/west of Cedar Boulevard, and south/east of Thornton Avenue. Between Cedar Boulevard and Thornton Avenue, Newark Boulevard is designated a Class III bicycle route. The posted speed limit is 45 miles per hour on Newark Boulevard. According to the Fremont Bicycle Master Plan Update Project, several community members indicated that Newark Boulevard should be made safer for bikes, and that its bicycle infrastructure should be made more continuous. The City is considering applying a road diet to segments of Newark Boulevard, which would help reduce vehicle speed differentials and improve safety by removing travel lanes.

- **Cherry Street** west of Thornton Avenue is a two-lane collector with residential frontage. This section of Cherry Street is traffic calmed with speed humps, with a posted speed limit of 25 miles per hour. At Mirabeau Street, Cherry Street becomes Brittany Avenue, and at Newark Boulevard,

Brittany Avenue becomes Ruschin Drive. Ruschin Drive continues south to its terminus at Thornton Avenue, paralleling Cedar Boulevard. This section of Cherry Street serves as an alternative to Cedar Boulevard for cyclists who may be less experienced or confident riding on busier streets.

East of Thornton Avenue, Cherry Street is a four-lane arterial with a landscaped median or center two-way left-turn lane and turn pockets. Class II bicycle lanes are provided on portions of this section south of Central Avenue, although they drop at several constraint points and at the Mowry Avenue/Cherry Street intersection. Cherry Street provides connections to Fremont, as it becomes Boyce Road south/east of the Newark City limit. Within Newark, it also provides access to the Silliman Activity and Family Aquatics Center and Ohlone College Newark Campus. The posted speed limit increases to 45 miles per hour on this section, creating undesirable conditions for a Class III bicycle route which is more appropriate for streets with speeds slower than 25 miles per hour.

Because Cherry Street provides access to the City of Fremont, it received several comments during the Fremont Bicycle Master Plan Update Project. One community member suggested adding more signage along Cherry Street reminding drivers to share the road with cyclists. Another respondent suggested that the existing bicycle lanes along Cherry Street be further protected by buffer or barrier due to the high vehicle speeds on the road. Another respondent noted that there are several locations along Cherry Street where tree branches have grown over bicycle lanes, making the lanes unusable. In response to these comments, Cherry Street has been recommended for an upgrade to a Class IV Separated Bikeway from Central Avenue to Stevenson Boulevard.

- **Haley Street and Sycamore Street** are two lane collectors with residential uses fronting north of the railroad tracks, and industrial land uses fronting south of the tracks. South of Cedar Boulevard, Class II bicycle lanes are provided on Haley Street, and continue on Sycamore Street to its southern/eastern terminus at Central Avenue, except for a short section where Sycamore crosses the railroad tracks. On-street parking is provided along the entire lengths of Haley and Sycamore Streets. The posted speed limit along Haley Street and Sycamore Street is 30-35 miles per hour.

ON-STREET EAST-WEST ROUTES:

- **Thornton Avenue** is a two- to four-lane arterial roadway that traverses the City from SR 84 to I-880 and is one of the busiest roadways in Newark. West of the railroad tracks, Thornton Avenue is a two-lane roadway, with a center two-way left-turn lane and on-street parking. It provides the only access to/from the Don Edwards National Wildlife Refuge and Bay Trail trailhead in the City. The City's long-term vision for this section of Thornton Avenue (between the railroad tracks and Willow Street) is to improve the two-way left-turn lane to a raised center median with turn pockets. Class II bicycle lanes are provided on Thornton Avenue west of Hickory Street. Two other short sections of the street are designated a Class III bicycle route (between Hickory Street and Willow Street, and between Cedar Boulevard and I-880). The speed limit is 45 miles per hour, creating undesirable conditions for a Class III bicycle route which is more appropriate for streets with speeds of 25 miles per hour. The City's Arterial Beautification Program, affirmed in the 2013 General Plan, calls for gateway features along Thornton Avenue in the Old Town area, and other beautification improvements to on Thornton between Willow Street and Old Town.

These beautification measures will make Thornton Avenue a more enjoyable thoroughfare for pedestrians.

Because Thornton Avenue provides regional access to the Dumbarton Bridge, it received several comments during the Fremont Bicycle Master Plan Update Project, particularly on the segment west of Willow Street. Several community members suggested that Thornton Avenue be made safer for biking in general, particularly between Gateway Boulevard and Marshlands Road, where traffic regularly travels up to 50 miles per hour. East of Marshlands Road, community members called for a protected bicycle route along Thornton Avenue to help resolve conflicts with school parking (near Schilling Elementary School) and fast-moving traffic. In response to these comments, the section of Thornton Avenue from Gateway to Peachtree Avenue is recommended for a Class IV Separated Bikeway upgrade. Additionally, the intersection of Thornton Avenue and Marshlands Road was identified as a dangerous crossing, particularly for cyclists turning left onto Marshlands Road to access the bridge. This intersection has been identified for intersection improvements. Marshlands Road itself was also identified as a problematic street for cycling due to the roughness of pavement and repaving is recommended. These changes should improve connectivity between Thornton, Willow Street, and the Bay Path could be improved.

- **Jarvis Avenue** is the westernmost arterial that provides access across the City, as well as access to much of the retail area in the north area of the City. Jarvis Avenue is a four-lane road with a landscaped median with turn pockets. The posted speed limit is 45 miles per hour. Class II bicycle lanes are provided along Jarvis Avenue.

- **Mayhews Landing Road** is a two-lane east-west collector that serves residential areas. A short section of Mayhews Landing Road is designated a Class III bicycle route to connect between Spruce Street and Willow Street. On-street parking is provided along the entire length of the roadway. East of Cherry Street, the street has been traffic calmed with speed humps. The speed limit along Mayhews Landing Road is 25 miles per hour.

- **Central Avenue** is an arterial roadway that provides access to and from the industrial area in the western portion of the City. It is the only roadway providing access to the City of Fremont on the northern side that does not cross a freeway interchange; thus, it is an important bicycle connection. From I-880 to Newark Boulevard, Central Avenue has four lanes with on street parking and Class II bicycle lanes. This section has a posted speed limit of 45 miles per hour. West/south of Newark Boulevard, Central Avenue is designated a Class III bicycle route. The posted speed limit is between 40-45 miles per hour, which is inappropriate for a Class III route. Central Avenue narrows to two-lanes with a wide center median and turn pockets west of Filbert Street, before connecting with Willow Street at the western edge of the developed area of the City.

- **Mowry Avenue** is a six-lane arterial between Cedar Boulevard and I-880, providing the main point of access to NewPark Mall. West of Cedar Boulevard, to Cherry Street, Mowry Avenue narrows to four lanes. Mowry Avenue has a posted speed limit of 45 miles per hour and is designated a Class III bicycle route, creating undesirable conditions for a Class III bicycle route which is more appropriate for streets with slower speeds. Near the NewPark Mall, one community member referred to Mowry Avenue as "suicidal" due to traffic trying to access I-880. South of Cherry Street, Mowry Avenue has Class II bicycle lanes. It provides access to the Silliman Activity and Family Aquatics Center, the main source of recreation in Newark. Like Thornton Avenue,

Mowry Avenue has been identified for improvements under the City's Arterial Beautification Program.

- **Stevenson Boulevard** is the easternmost north-south connector in Newark, and forms much of the city's border with the City of Fremont. Stevenson Boulevard is a four-lane road with landscaped median with a speed limit of 40 miles per hour. Class II bicycle lanes are provided along the entire length of Stevenson Boulevard, except in the eastbound direction between Cherry Street and Balentine Drive. During the Fremont Bicycle Master Plan Update project, community members identified the Stevenson/I-880 interchange, in the northeast corner of Newark, as a dangerous barrier for cyclists. One community member suggested that bike lanes be added on the uphill, northbound side of Stevenson Boulevard. This entire segment is recommended for an upgrade to a Class IV separated bikeway.

KEY ISSUES OF THE BIKEWAY NETWORK

Several challenges with the bicycle network have been identified through public meetings, information from City staff and field work. The following section discusses the key issues to be addressed in the Proposed Facilities section later in this chapter and Design Guidelines in **Appendix D**.

PROTECTED AND DEDICATED VERSUS DESIGNATED FACILITIES

Today, Class III bicycle routes are used on several arterials within Newark, including Mowry Avenue, Cedar Boulevard, Newark Boulevard, and Central Avenue. Each of these roadways carries high vehicular traffic volumes and have high posted speed limits. Bicyclists and drivers sharing the road in such conditions is a major deterrent to riding, even if only for short distances. The need in Newark is for more dedicated bikeways, such as a bicycle lanes and separated bikeways, which provide full protection from auto traffic. Shared lanes in Newark are typically appropriate only on lower volume streets, such as the proposed bicycle boulevards, or for gaps in the bicycle network where there is no way to provide a dedicated bikeway.

BIKE DETECTION

Traffic signals are generally programmed according to the speed, weight, and operational characteristics of motorized vehicles. Bicycles present a unique set of challenges to signals, particularly with regard to vehicle detection. Bicycles are small in size and profile and contain minimal ferromagnetic components, making detection by traditional means difficult. In certain extreme cases, a bicyclist may need to wait indefinitely at an intersection for the light to change, potentially incentivizing the cyclist to risk proceeding through the intersection against the light.

Bicycle detection has been identified as a key issue in the City of Newark. According to comments received, some locations where it is difficult for bicycles to activate the left-turn signal include Thornton Avenue and Gateway Boulevard; Thornton Avenue and Marshlands Road; Newark Boulevard and Central Avenue; and Stevenson Boulevard and Cherry/Boyce Street.

Several options exist for traffic signals to detect the presence of bicycles. Many control systems for traffic signals detect small vehicles by relying on a type of in-roadway sensor known as inductive loop detectors.

However, many loop detectors for actuating signal changes do not register the presence of bicyclists at intersections. To be effective these detectors require cyclist to ride within the loop's detection zone. Appropriate signage can help ensure that cyclists know where to stop and wait for the signal to turn green.

Bicycle-sensitive detectors should be installed at major intersections along the bike network during signal upgrades or the installation of new signals, and stencils should be used to inform bicyclists where to position their bikes in order to actuate the signal. Specifications are provided in the *Design Guidelines* section.

GREEN CLEARANCE TIME

According to data from the National Highway Traffic Safety Administration, cyclists are overrepresented in intersection fatalities nationwide. In fact, intersections are the site of more than one-third of all cyclist fatalities. One potential cause of this phenomenon is the programming of traffic signals, which often provide insufficient time for cyclists to clear the intersection, particularly for cyclists on minor streets crossing signalized intersections. Designing traffic signals with consideration for bicycles can account for the fact that a bicycle requires a minimum crossing time of roughly 10 seconds, in comparison to 3 seconds for a motor vehicle. At these locations, minimum green times should be extended to allow adequate time for bicyclists.

BIKEWAYS THROUGH INTERSECTIONS AND CONFLICT ZONES

At most locations in Newark, Class II bicycle lanes end in advance of intersections to avoid conflicts with turning motorists crossing the lane. While this is an acceptable practice according to the Highway Design Manual (Caltrans), it does not reflect best practices in bicycle design as it discontinues bike lanes at the point where bikes encounter the most conflicts with vehicles. Improvements should focus on extending bike lanes all the way to intersections through appropriate design. The goal of this practice is to manage expectations for both drivers and cyclists and to guide them through the highest conflict zones. Green paint is frequently used in such situations to highlight the presence of bicyclist to drivers, and to show bicyclists how to maneuver through the intersection.

PEDESTRIAN/BICYCLE CONFLICTS

While Class I pathways are shared-use facilities, these pathways can be the site of conflicts between pedestrians and bicyclists. The same type of conflict may occur where bicyclists ride on sidewalks intended for pedestrians only. Citizens participating in the June 2016 workshop commented that these conflicts are a problem in the City of Newark. To resolve this problem, Newark may educate cyclists about sidewalk riding and enforce laws where it is unlawful to ride bicycle according to the Municipal Code. Additionally, improvements to the size and comfort of Newark's bicycle network will make bicyclists more likely to use streets rather than sidewalks, thus reducing conflict between bicyclists and pedestrians.

NORTH-SOUTH BIKEWAYS

Newark Boulevard, Cedar Boulevard, and Cherry Street are key bikeways that serve both regional and local destinations. Current conditions on these roads include fast moving vehicular traffic, high traffic stress for bicyclists, insufficient signs for bicyclists, and wide intersections with multiple turning lanes and right-turn

pockets that are difficult to navigate by bicycle. While several sections of these roads are designated Class III routes, there are many opportunities to improve the safety, comfort and access for bicyclists on these roads.

FREEWAY INTERCHANGES

Newark's proximity to I-880 and SR 84 necessitates multiple arterial-freeway interchanges on the north and east sides of the City. Characterized by fast moving vehicular traffic, wide travel lanes and multiple turning lanes, these interchanges could be improved to provide a safer passage for bicyclists through protected and dedicated bikeways.

ACCESS TO THE FREMONT AND UNION CITY BART STATIONS

The closest BART stations for Newark residents and employees are located in neighboring Fremont and nearby Union City (approximately 4 and 4.5 miles away, respectively). Many challenges exist to improving the connection to these stations. Currently, there is only one route into and out of Newark, Central Avenue, which does not require cyclists to navigate a freeway interchange.

SIGNAGE AND WAYFINDING

Newark's bikeway routes have basic signs indicating where bike lanes and routes are present, and where they begin and end. In several areas signs are missing or obscured by trees and other barriers. In some areas, such as Cedar Boulevard, the City currently has new wayfinding systems that indicate destinations, distances and directions.

However, Newark's wayfinding and sign system should be enhanced to help make the bicycle network more visible and easy to navigate. In February 2016, In accordance with the Dumbarton Bridge Newark Wayfinding Sign Plan, the City of Newark issued a permit for the installation of bike route signs for several locations along the preferred bicycle route from the Fremont BART Station to the Dumbarton Bridge. In the City of Newark, these locations include:

- Central Avenue and Cedar Boulevard (Westbound), using existing "No Parking" post
- Central Avenue and Cedar Boulevard (Eastbound), using existing electrolier
- Central Avenue Split (Westbound), using new post
- Central Avenue Split (Eastbound), using existing post in split area
- Central Avenue and Cherry Street (Westbound), using median post
- Central Avenue and Cherry Street (Eastbound), using new post
- Central Avenue and Filbert Street (Westbound), using existing electrolier
- Central Avenue and Filbert Street (Eastbound), using existing electrolier
- Willow Street and Thornton Avenue (Willow Northbound), using existing electrolier
- Willow Street and Thornton Avenue (Thornton Eastbound), using existing electrolier

- Thornton Avenue and Marshlands Road (Thornton Ave Northbound), using new post, directing riders to the Dumbarton Bridge
- Left Arrow Dumbarton Bridge) see photo
- Thornton Avenue and Marshlands Road (Marshlands Eastbound), using new post, directing riders to beginning of route to BART Fremont

Thornton Avenue and Marshlands Road are important recreational and commute corridors for access to the Bay Trail, recreation areas, and the Dumbarton Bridge; however, these areas have rough pavement conditions and drivers must deal with fast moving traffic. Enhanced wayfinding and signage, improved pavement quality, and support for bicyclists turning onto and off of these roadways is needed.

The signs described above will be placed primarily at the site of existing posts, which will be replaced in accordance with City standards.

MULTI-MODAL CONNECTIONS

Alameda-Contra Costa County Transit District (AC Transit) operates fixed-route bus service within Newark and throughout Alameda and Contra Costa Counties. All AC Transit buses are equipped with a front-mounted bicycle rack that can hold two bicycles. On select Dumbarton Bridge crossing lines, additional

bike storage is provided in the cargo bay and on custom-made undercarriage racks. Several lines serve the City of Newark, including the routes described in **Table 3-2**.

Table 3-2. AC Transit Weekday Routes Serving The City of Newark

Route Number	Description	Type of Line
212	Fremont BART to NewPark Mall via Mowry Ave., Fremont Blvd., Pacific Commons, Christy St., and Cedar Blvd	Local
200	Union City BART to Fremont BART via Decoto Road, Newark Blvd., Thornton Ave., Filbert St., Central Ave., Cedar Blvd., NewPark Mall, Mowry Ave., and Civic Center Dr.	Local
216	Union City BART to Ohlone College Newark Campus (weekends, Silliman Center) via Alvarado-Niles Rd., Niles Blvd., Mowry Ave., Fremont BART, Stevenson Blvd., Cedar Blvd., and NewPark Mal	Local
232	Fremont BART to New Park Mall via Walnut Ave., Mission Blvd., Union City BART, Paseo Padre Pkwy., Ardenwood Blvd., Lido Faire Shopping Center and Cedar Blvd.	Local
251	Fremont BART to Ohlone College, Newark Campus (weekends: Silliman Center) via Walnut Ave., Paseo Padre Pkwy., Thornton Ave., Newark Blvd., Central Ave., and Cherry St.	Local
275	Union City BART to Four Corners shopping area via Decoto Rd., Fremont Blvd., Thornton Ave., Willow St., Enterprise Dr., Filbert St., Sycamore St., Haley St., and Jarvis Ave.	Local
620	Cedar Blvd. & Stevenson Blvd., Newark, to Newark Jr. High via Cedar Blvd., Central Ave., Sycamore St. and Thornton Ave.	Supplementary
626	Lido Faire Shopping Center to Newark Memorial High School via Newark Blvd. and Cedar Blvd.	Supplementary
628	Lido Faire Shopping Center to Newark Memorial High School via Cedar Blvd.	Supplementary
629	Lido Faire Shopping Center to Newark Memorial High School via Jarvis Ave., Haley St., Sycamore St. and Cherry St.	Supplementary
SB	Cedar Blvd. & Stevenson Blvd., Newark, to San Francisco via Cedar Blvd., Newark Blvd, Union City Blvd. and Hesperian Blvd.	Transbay

Source: AC Transit Average Daily Ridership (from Automatic Passenger Counters, September and October 2010).

Note: Many of the routes listed also serve the Cities of Fremont and/or Union City. Ridership numbers represent weekday average daily activity on the entire route.

QAlameda Contra Costa Transit (AC Transit) operates the Dumbarton Express, which offers fixed route bus service between the Union City BART station, Ardebn Wood Park and Ride, and Palo Alto. Thirty trips are made in each direction each weekday, with service starting at 5:20 AM and ending at 8:48 PM. All Dumbarton Express buses are equipped with bicycle racks.

Bay Area Rapid Transit (BART), the regional commuter rail transit system, provides service at the Fremont and Union City Stations on the Millbrae-Fremont and Richmond-Fremont lines. Both stations are approximately 4-4.5 miles from the center of Newark by bicycle. Bicycles are allowed on BART trains on all times of the day. At the Union City Station there are 48 shared use electronic bicycle lockers and 20 keyed

bicycle lockers (application form required for bicycle lockers).The Fremont Station features 76 shared use electronic lockers.

BIKE SHARE CONNECTIONS

A bike share is a bicycle transportation system that provides bicycles for short trips placed at strategic locations throughout a city. Bike shares reduce barriers to urban cycling by eliminating the need to store and maintain a bicycle. Unlike traditional bike rentals, bike share is not meant for long trips, but rather for short trips between one and three miles. It can complement public transit use by improving linkages to stations that may be beyond a comfortable walking distance.

The Bay Area is home to the Bay Area Bike Share system, run by the private operator Motivate. The region's bike sharing system features 70 stations, with locations in San Francisco, Mountain View, Palo Alto, and San Jose. Bike Share is expanding to the East Bay, in Berkeley, Oakland and Emeryville. As of 2016, there are no plans to expand the Bay Area Bike Share into Newark. As a private enterprise, successful bike share systems require a high-density of potential riders in order to justify the installation of bike share stations.

Due to population density and existing mode share, a full-fledged bike share system may not be a short-term possibility in Newark. However, the City may consider conducting a feasibility study to investigate the possibilities of a bike share system after achieving other milestones in this plan. Building key infrastructure and improving the safety of streets for cyclists can improve the feasibility the bike sharing in Newark. It may be the case that the City is interested in pursuing a smaller-scale bike share system, such as those provided by the companies Zagster or B-Cycle.

PROPOSED BIKEWAY NETWORK

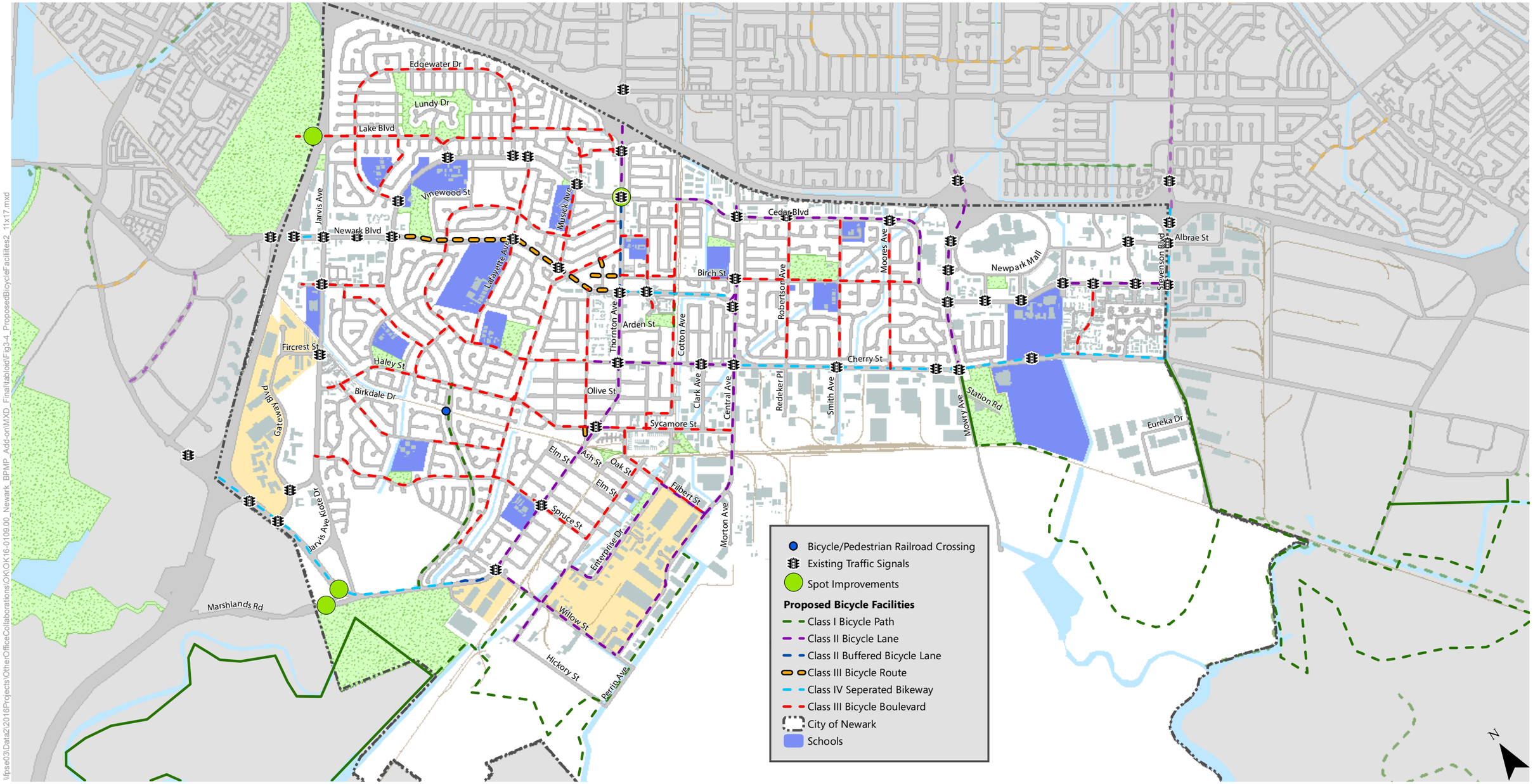
Once complete, the proposed network will provide safer and more direct routes for a majority of those bicycling within the City. A bikeway network consists of routes that are designed to be the primary system for bicyclists. By law, unless explicitly prohibited (as they are on I-880 and SR 84), bicyclists are allowed on all streets and roads regardless of whether the streets and roads are a part of the bikeway network. The bikeway network is a tool that allows the City to focus and prioritize implementation efforts where they will provide the greatest community benefit. Streets or corridors selected for inclusion in the network are targeted for specific improvements, such as the installation of bicycle lanes, off-street paths, or signs. **Figure 3-4 Proposed Bicycle Network** maps the proposed projects.

The proposed system was developed according to the following planning criteria:

- **Coverage**: The system should provide equitable, reasonable access from all areas of the city to both commute and recreation routes. Ideally, the system should provide a bicycle path, lane, or route within one-half mile of any residential street.
- **Purpose**: Each link in the system should serve one or a combination of these purposes: recreation, connection, and commuting. On-street facilities should be continuous and direct, and off-street facilities should have a minimal number of arterial crossings and uncontrolled intersections.

- **Connection to Employment/Retail Centers**: Businesses, major retail, and other employment centers should be accessible from all neighborhoods by a reasonably direct system.
- **Connection to Schools and other Community Facilities**: Schools and community facilities such as community centers, the library, and City Hall should be accessible by bikeways. While not serving every residential street, the bikeway system should provide access routes with special treatments at busy intersections, such as bicycle loop detectors or signs.
- **Connection to Parks and Open Space**: Parks and open space should be accessible by bikeways so that residents are able to bicycle from home to both local and regional recreation destinations.
- **Connection to Regional Bikeways**: The bikeway system should provide access to regional bikeway routes, regional trails, and routes in adjacent communities.
- **Comfort**: The proposed bicycle network aims to provide continuous bicycle facilities with the greatest degree of comfort possible. The goal is to create a system of bicycle facilities that people of all ages and abilities feel comfortable using. The comfort of the existing network is limited by fast moving vehicular traffic, insufficient signs for bicyclists, and wide intersections with multiple turning lanes.
- **Safety**: The proposed bicycle system aims to provide safer routes the City's cyclists through the installation of bicycle lanes, bicycle boulevards, signs, etc. Facilities such as Class IV Separated Bikeways enhance perceived and actual safety by providing a layer of protection between cyclists and fast moving traffic. The degree of separation from traffic is determined primarily by the type of road, with higher order streets requiring higher orders of protection to be safe.

The table in **Appendix A: Bicycle Prioritized Project List** provides detailed definition of the comprehensive proposed bicycle network.



Additional Citywide Improvements:
> Additional bike parking
> Improved wayfinding signage
> Upgrade signals to incorporate bike detection with bike clearance at intersections

Figure 3-4
Proposed Bicycle Facilities

ON-STREET FACILITIES

The purpose of the on-street bicycle network is to provide continuous on-street bicycle facilities with the greatest degree of bicycle comfort possible. Each on-street project is described briefly below.

Description of Proposed On-street Projects

- **Newark Boulevard**: Class III bicycle routes are recommended for Newark Boulevard from Cedar Boulevard to Thornton Avenue, where street width prevents the installation of Class II bicycle lanes (without the removal of parking or travel lanes). The Class III route will feature improved wayfinding and signage for bicycles. Class IV separated bikeways are recommended for Newark Boulevard from SR 84 to Cedar Boulevard and from Thornton Avenue to Central Avenue, in keeping with the Alameda CTC's Multimodal Arterial Plan. Special design and engineering improvements for the SR 84 interchange are detailed in the *Master Plan Design Guidelines*.

- **Spruce Street**: Extending/upgrading the existing Class III facility on Spruce Street from Jarvis Avenue to Wells Avenue is recommended, especially with development of the Dumbarton Station Area Plan (Area 2).

- **Bettencourt Street**: A Class III bicycle boulevard is recommended along Bettencourt Street between Haley Street and Mayhews Landing Road. This route would provide direct access to Lincoln Elementary School and facilitate a connection to the proposed Cedar Boulevard off-street facility discussed below.

- **Cedar Boulevard**: Class II bicycle lanes are recommended for Cedar Boulevard between Newark Boulevard and Robertson Avenue, Cedar Court and Birch Street, and Balentine Drive and Stevenson Boulevard. These lanes will connect existing segments of bicycle lanes along Cedar Boulevard. In the long term, Class II bicycle lanes are recommended along the entire length of Cedar Boulevard.

- **Cherry Street-Brittany Avenue-Ruschin Drive**: An extensive Class IV facility is recommended on Cherry Street from Stevenson Avenue in the east to Central Avenue in the west. This Class IV facility will connect with a Class II facility from Central Avenue to Baine Avenue. The facility will continue as a Class III bicycle route from Baine to Dairy, then as a Class III bicycle boulevard along Brittany Avenue and Ruschin Drive back to Thornton Avenue. There are no existing facilities on the Brittany Avenue/Ruschin Drive part of this corridor, which passes by three elementary schools.

- **Mayhews Landing Road**: A Class III bicycle boulevard is recommended for Mayhews Landing Road. This route serves as an important east-west route, and parallel facility to Thornton Avenue and Cedar Boulevard. Its lower traffic speeds and two-lane configuration allow it to function as a Class III facility, with Sharrows to remind bicyclists to maintain adequate distance from the cars parked on the street and to remind drivers of a bicyclist's presence.

- **Thornton Avenue**: Class II bicycle lanes are recommended on the length of Thornton Avenue from Peachtree Avenue to Fremont city line at I-880, with upgrades to Class IV separated bikeway wherever feasible. These lanes will connect with the existing bicycle lanes from SR 84 to Peachtree Avenue and also provide an improved connection between Don Edwards National Wildlife Refuge, the Bay Trail trailhead, and the central City. These existing bicycle lanes have substandard widths in some areas, such as just east of Gateway, which should be addressed in the near term.

The City is planning to enhance this section of Thornton Avenue with a raised median and turn pockets. Even with these improvements, adequate right-of-way exists for bike lanes in this corridor. East of the railroad tracks, Thornton Avenue widens to four lanes, and adequate right-of-way does not currently exist for bicycle lanes with on-street parking. Class IV separated bikeways are recommended for inclusion in the City's proposed roadway widening project. In the interim, it is recommended to provide signs to guide bicyclists north on Spruce Street or Sycamore Street to parallel facilities such as Dairy Avenue.

- **Willow Street**: Class II bicycle lanes are recommended along Willow Street, from Thornton Avenue to Central Avenue. This arterial is a critical connection for bicyclists to access the Bay Trail and the Dumbarton Bridge, and also serves as a key recreational cycling route. Roadway improvements are currently under construction that will include Class II bicycle lanes and traffic calming roundabouts between Enterprise Drive and Central Avenue within the Dumbarton Transit Oriented Development Area.

- **Enterprise Drive:** The City has obtained funding for a pavement overlay and road diet on Enterprise Drive between Filbert Street and the Dumbarton Transit Oriented Development Area just west of Aleppo Drive. As part of this project, Enterprise Drive will be reduced from four travel lanes to two travel lanes with a two-way left-turn lane. Class II bike lanes will be added to the entire length of this street.

- **Central Avenue**: Between Willow Street and Filbert Street, adequate right-of-way exists to stripe Class II bicycle lanes on Central Avenue. Between Filbert Street and Newark Boulevard, an interim Class III bicycle route is proposed, with long-term Class II bicycle lanes planned for the corridor. Central Avenue is a key bicycle route in Newark, as it is the only roadway that provides access to the City on the eastern side that does not cross a freeway interchange. A grade separation structure is planned at the railroad crossing that will include Class II bicycle facilities.

- **Birch Street**: Birch Street is an ideal north-south connection for less experienced and confident bicyclists, as it provides a parallel facility to Newark and Cedar Boulevards and provides access to several schools, including the Milani and Bunker campuses of Birch Grove Elementary. The long-term vision is for Birch Street to provide a continuous north-south Class III bicycle boulevard, as well as an enhanced off-street Class I bicycle path along the southern edge of Birch Grove Park. Safely accommodating bicyclists requires creative design and engineering applications throughout this route. Many of the sections can be upgraded without much complexity; however, long-term improvements are needed at several intersections and crossings to make a viable continuous route, including intersection improvements at Thornton Avenue to facilitate safe crossings, a grade-separated bicycle/pedestrian bridge at the railroad tracks, and an enhanced pathway along Bunker School to Smith Avenue. With these improvements, Birch Street may become a critical link in north-south bicycle travel.

- **Stevenson Boulevard**: Stevenson Boulevard is a major north/south street connecting to I-880 in the north, and passing through the city's northeastern shopping center area. A Class IV separated bikeway is recommended from I-880 to the proposed Cherry Street separated bikeway.

- **Bicycle Boulevards**: Class III bicycle boulevards are proposed for multiple streets other streets in Newark streets with low motorized traffic volumes and speeds. These include segments of the following streets: Baine Avenue, Blackburn Drive, Chapman Drive, Civic Terrace Avenue, Darvon Street, Dumbarton Court, Dupont Avenue, Edgewater Drive, Filbert Street, Graham Avenue, Haley

Street, Joaquin Murrietta Avenue, Lafayette Avenue, Lake Boulevard, Lakewood Drive, Lido Boulevard, Magnolia Street, Moores Avenue, Orleans Drive, Parkshore Drive, Robertson Avenue, Smith Avenue, St. Edwards Street, and Wells Avenue)

OFF-STREET FACILITIES

The projects listed below include four proposed off-street facilities, organized from west to east, and north to south. These include Class I routes, trail crossing/intersection improvements, trails access points, new and upgraded bike/pedestrian bridges, and special study corridors. These projects represent a total of four key corridors for off-street bicycle travel:

1. San Francisco Bay Trail
2. Cedar Boulevard
3. Birch Street
4. Baine Avenue "Mid-town" Connection

The off-street paths provide connections to parks and open space and are recreational amenities in themselves. Additionally these routes provide connections to schools, community and civic institutions and facilitate bicycling for everyday transportation and commuting.

Class I pathways are recommended on the majority of these routes. These facilities should have a minimum 10-foot wide paved surface for two-way bicycle travel, as well as a stabilized soil or decomposed granite side path for pedestrian, runner, and equestrian use. The City should endeavor to complete the listed projects to the maximum extent possible to avoid discontinuous segments. Where needed, trail crossings/intersections with roadways should be improved to minimize conflict between trail users and motorized traffic.

These off-street pathways will provide access across Newark, from north to south and east to west, and to major destinations within the city. Where appropriate, City staff should coordinate the planning of these facilities with staff from Fremont, Alameda County, Caltrans, and the East Bay Regional Parks District to ensure continuity across city boundaries, jurisdictions, and ownership. Brief project descriptions follow:

Description of Proposed Off-street Projects

- **San Francisco Bay Trail**: Beginning in 2010, the City of Newark undertook the Newark Fremont Bay Trail Realignment Feasibility Study with the City of Fremont to identify the best alignment for the proposed Bay Trail between the Dumbarton Bridge (SR 84) bike path, through Newark and Fremont. The study, completed in 2013 and accepted by the City Council in 2014, proposes a preferred trail alignment for a bay-oriented shoreline trail accessible by many modes and abilities. This preferred route has also been incorporated into Newark's General Plans. The preferred route is a multi-use path that extends east from the existing Bay Trail alignment on Marshlands Road (See Figure 3 6). A pedestrian/bike bridge from the Wildlife refuge trail to the TOD is necessary. From there the off-street path will pass through the northeastern edge of the Don Edwards National Wildlife Refuge, then the southwestern edge of the proposed Dumbarton TOD (with an alternate on-street segment along Thornton Avenue. From the TOD, the off-street path will

continue in northeastern direction before joining Central Avenue for an on-street segment to Cherry Street, where it will connect with the proposed separated bikeway that continues to the city line. Upon completion, the trail will turn off of Cherry Street at Mowry Avenue and use the existing connector trail there to link with a new off-street path through a proposed mitigation area to the northeast of the Cargill Inc. plant site.

- **Cedar Boulevard Extension Linear Park**: Cedar Boulevard currently terminates at Haley Street, although the City has preserved right-of-way for a future extension of Cedar to Thornton Avenue (a small stretch of which exists between Bridgepointe Drive and Mahogany Place). This section represents a prime candidate for a linear parkway and Class I bicycle path for dedicated pedestrian and bicycle travel. The main obstacle to fully developing this pathway is the existing railroad tracks, which would require a grade separated crossing. As an interim improvement, the trail may be constructed between Thornton Avenue to Bettencourt Street, with bicyclists and pedestrians channeled to Bettencourt Street until the connection to Haley Street is completed. The connection to Haley Street can be considered a second phase of the project, while the connection to Bettencourt should be a top priority. The existing railroad crossing closest to Bettencourt Street is on Mayhews Landing Road.
    - Additionally, from the Cedar Boulevard terminus at Thornton Avenue, an off-street trail connection through the Don Edwards Wildlife Refuge may be explored to provide improved bicycle access to the Refuge and proposed Bay Trail alignment.
- **Birch Street**: As described in the Off-Street Facilities section above, Birch Street is an ideal north-south connection for casual bicyclists. Full development of this facility would require an enhanced Class I bicycle path along Bunker School and Birch Grove Park to connect at Smith Avenue, as well as a grade-separated bicycle/pedestrian connection across the railroad tracks.
- **Baine Avenue "Mid-town" Connection**: An existing informal pathway is provided from Baine Avenue, along the north side of the railroad tracks, to Cedar Boulevard. Two recommendations would develop this pathway into an alternative facility to a Class I bicycle path: (1) widen the facility to provide a standard Class I facility; (2) extend the pathway to Sycamore Street.

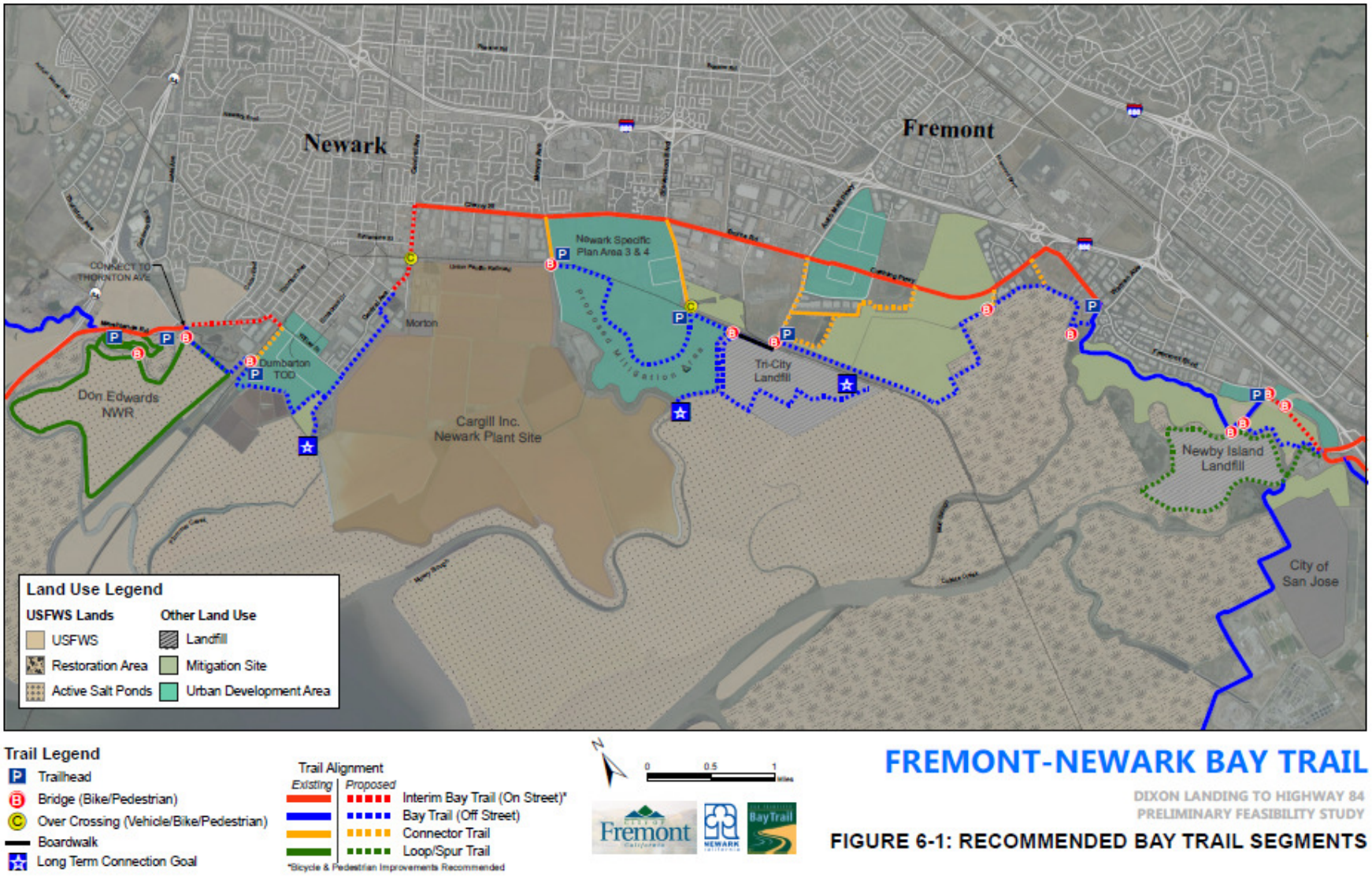


Figure 3-5: Newark-Fremont Bay Trail Feasibility Study Proposed Bay Trail Alignment

SUPPORT FACILITIES

Every bicycle trip has two components: 1) the route selected by the bicyclist and 2) the "end-of-trip" facilities at the destinations. End-of-trip facilities can include short and long-term bicycle parking, showers, lockers, restrooms, good lighting, and even public phones. The lack of secure bicycle facilities at the destination can be one of the largest deterrents to cycling for many riders.

TYPES OF BICYCLE PARKING AND SUPPORT FACILITIES

There are different types of support facilities just as there are different levels of bikeway facilities. Support facilities fall into one of four main categories:

- Short-term Bicycle Parking: Bicycle racks are low-cost devices that secure a bicycle. Ideally, bicyclists can lock their frame in two places and wheels. The bicycle rack should be in a highly visible location secured to the ground, preferably within 50 feet of a main entrance to a building or facility. Short-term bicycle parking is commonly used for short trips, when cyclists are planning to leave their bicycles for up to a few hours. A group of bicycle racks that take the place of an on-street parking spot and provide 8 or more bicycle parking spaces is known as a bicycle corral.
- Long-term Bicycle Parking: Bicycle lockers are covered storage units that can be locked individually, providing secure parking for one bicycle as well as panniers and helmets. Lockers can be either mechanical or electronic. Bicycle cages are secure areas with limited-access doors. Occasionally, they are attended. Each of these is designed to provide bicyclists with a high level of security so that they feel comfortable leaving their bicycles for long periods of time. They are appropriate for employee parking and at transit stations. There are electronic and keyed bicycle lockers currently available at the Union City and Fremont BART Stations.
- Shower and Locker Facilities: Lockers provide a secure place for bicyclists to store their helmets or other riding gear. Showers are important for bicycle commuters with a rigorous commute and/or formal office attire.
- Trailheads and Staging Areas: Trailheads and Staging Areas provide access to and support facilities along trails. These may include bicycle racks, public telephones, restrooms, drinking fountains, and maps and signs.
- Bicycle Cooperatives: Bicycle cooperatives, also known as bike kitchens, bicycle collectives, or community bike shops, are volunteer-run repair facilities where volunteers assist individuals in need of bike repair and maintenance. Community-focused cooperatives can help make cycling more accessible and affordable for new or inexperienced riders.

EXISTING FACILITIES

Bicycle racks are provided at all schools within the Newark Unified School District. Racks are also located in many parks and recreation areas, including Civic Center Park, Ash Street Park, and at the Silliman Activity and Family Aquatics Center. Bicycle racks have been installed at other public facilities, including in front of the public library, at City Hall, and the Community Center.

Showers and clothes storage facilities are provided at the Silliman Activity and Family Aquatics Center. These facilities are also available at health/fitness clubs for members. **Figure 3-6** illustrates the existing support facilities.

KEY RECOMMENDATIONS

The following improvements and programs are recommended to increase the provision of end-of-trip facilities for bicyclists:

- Amend the Zoning Ordinance to require bicycle parking as part of new development projects according to established ratios.
- Evaluate the needs of the community for bicycle parking and amend the City of Newark Zoning Code: Off-Street Parking Facilities (Chapter 18.88) to address these needs. Specify bicycle parking minimums, design and location standards for a variety of land uses. Refer to the Design Guidelines for recommendations. Amend the code per the bicycle parking guidelines and design guidelines outlined in the Association of Bicycle and Pedestrian Professionals' (APBP's) Bicycle Parking, 2nd edition, as shown in **Table 3-3**.
- Make a map of locations of bike racks and lockers available to the public.
- Determine the adequacy of bicycle parking currently provided. Pursue grant funds or other funding to supplement insufficient bicycle parking.
- Engage local employers to discuss the benefits of end-of-trip facilities, such as a healthier workforce, higher productivity, reduced car parking costs, and improved image for the company.
- Use regulations or incentive programs, to encourage or mandate the facilities discussed above in all new office buildings.
- Pilot the installation of a public bicycle repair station at a high-traffic area for cyclists.
- Modify the City's Municipal Code to Remove the following outdated references:
    - 10.44.160 - Parks, playgrounds and schools. No person shall ride or operate a bicycle upon any park, playground or schoolground, where children are playing, without permission of the person having supervision thereof. *(Ord. 160 Art. III § 3, 1979)*

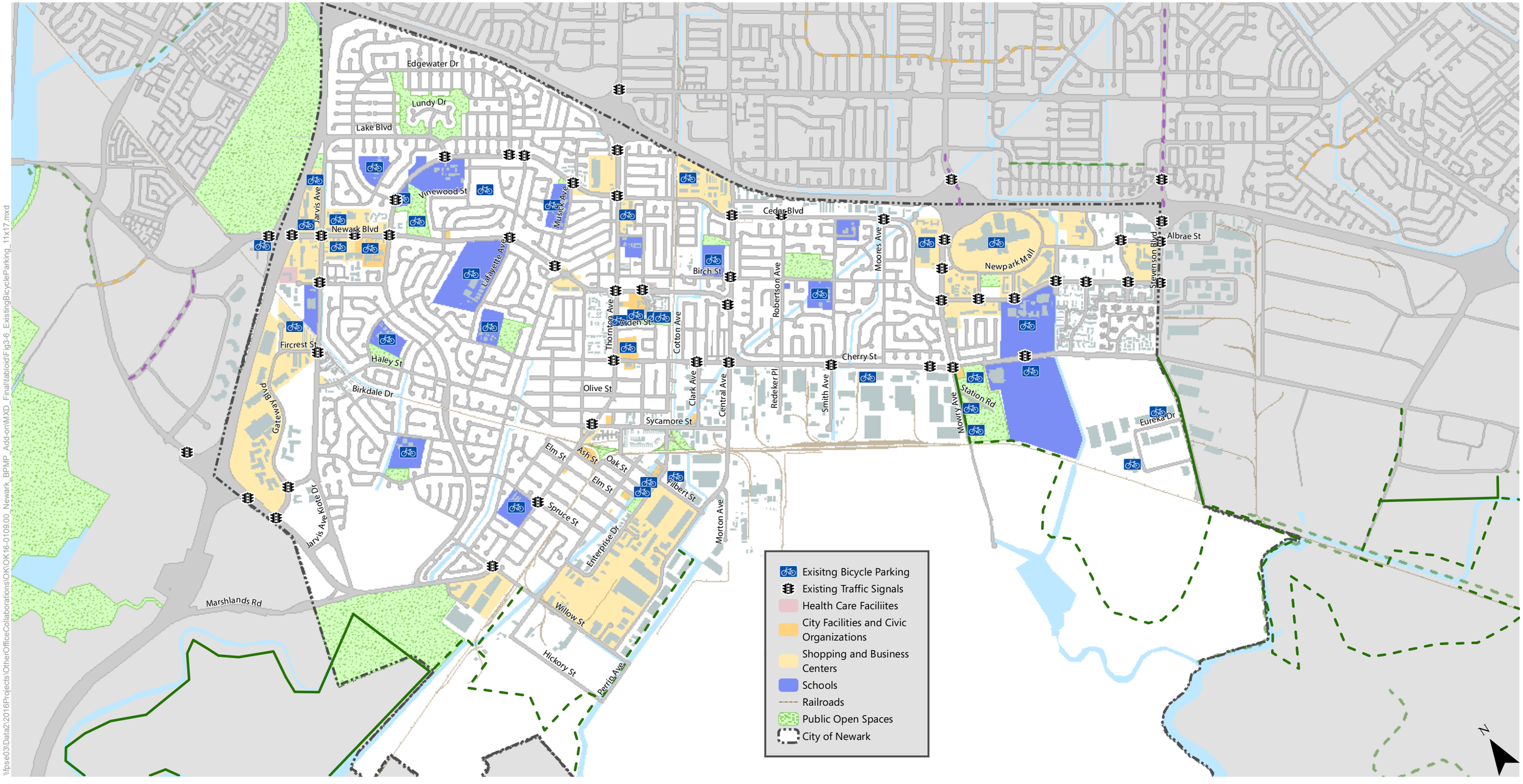
Table 3-3. Proposed Bicycle Parking Requirements

Type of Activity	Long-Term Bicycle Parking Requirement	Shor-Term Bicycle Parking Requirement
Residential		
Single Family Dwelling	-	-
Multi-family Dwelling – with private garage for each unit	-	0.05 spaces for each bedroom. Minimum is 2 spaces.
Multi-family Dwelling – without private garage for each unit	0.5 spaces for each bedroom. Minimum is 2 spaces.	0.05 spaces for each bedroom. Minimum is 2 spaces.

Type of Activity	Long-Term Bicycle Parking Requirement	Shor-Term Bicycle Parking Requirement
Multi-family Dwelling – senior housing	0.5 spaces for each bedroom. Minimum is 2 spaces.	0.05 spaces for each bedroom. Minimum is 2 spaces.
Civic: Cultural/Recreational		
Non-assembly, cultural (library, government buildings, etc)	1 space for each 10 employees. Minimum is 2 spaces.	1 space for each 10,000 sf of floor area. Minimum is 2 spaces.
Assembly (church, theaters, parks, etc)	1 space for each 20 employees. Minimum is 2 spaces.	Spaces for 2% of maximum expected daily attendance
Health care/hospitals	1 space for each 20 employees or one space for each 70,000 sf of floor area, whichever is greater. Minimum is 2 spaces.	1 space for each 20,000 sf of floor area. Minimum is 2 spaces.
Education – public, parochial, and private day care for 15 or more children	1 space for each 20 employees. Minimum is 2 spaces.	1 space for each 20 students of planned capacity. Minimum is 2 spaces.
Education – public, parochial, and private nursery schools, kindergartens, and elementary schools (1-3)	1 space for each 10 employees. Minimum is 2 spaces.	1 space for each 20 students of planned capacity. Minimum is 2 spaces.
Education – public, parochial, and elementary (4-6), junior high, and high schools	1 space for each 10 employees plus 1 space for each 20 students of planned capacity. Minimum is 2 spaces.	1 space for each 20 students of planned capacity. Minimum is 2 spaces.
Education – colleges and universities	1 space for each 10 employees plus 1 space for each 10 students of planned capacity or 1 space for each 20,000 sf of floor area, whichever is greater.	1 space for each 10 students of planned capacity. Minimum is 2 spaces.
Rail/bus terminal and stations/airports	Spaces for 5% of projected AM peak period daily ridership	Spaces for 1.5% of AM peak period daily ridership
Commercial		
Retail – General food sales or groceries	1 space for each 12,000 sf of floor area. Minimum is 2 spaces.	1 space for each 2,000 sf of floor area. Minimum is 2 spaces.
Retail - General retail	1 space for each 12,000 sf of floor area. Minimum is 2 spaces.	1 space for each 5,000 sf of floor area. Minimum is 2 spaces.
Office	1 space for each 10,000 sf of floor area. Minimum is 2 spaces.	1 space for each 20,000 sf of floor area. Minimum is 2 spaces.
Auto Related – automotive sales, rental, and delivery; automotive servicing; automotive repair and cleaning	1 space for each 12,000 sf of floor area. Minimum is 2 spaces.	1 space for each 20,000 sf of floor area. Minimum is 2 spaces.
Auto Related – off-street parking lots and garages available to the general public either without or without charge	1 space for each 20 automobile spaces. Minimum is 2 spaces. Unattended surface parking lots excepted.	Minimum of 6 spaces or 1 per 20 auto spaces. Unattended surface parking lots excepted.

Type of Activity	Long-Term Bicycle Parking Requirement	Shor-Term Bicycle Parking Requirement
Industrial		
Manufacturing and production	1 space for each 15,000 sf of floor area. Minimum is 2 spaces.	Number of spaces to be determined by the City. Consider minimum of 2 spaces at each public building entrance.

Source: Association of Bicycle and Pedestrian Professionals Bicycle Parking Guidelines, 2nd edition.



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Additional Citywide Improvements:
> Additional bike parking
> Improved wayfinding signage
> Upgrade signals to incorporate bike detection with bike clearance at intersections

Figure 3-6
Existing Bicycle Parking Locations

4. PEDESTRIAN ELEMENT

Walking as a form of transportation is enjoyable, energizing, environmentally friendly, and free. The ability to walk from one place to another is a key element of vibrant, livable places, and it is an important factor in the overall transportation system. Walking contributes to creating vibrant communities by reducing the number of automobiles on the road, which has air quality benefits and helps reduce greenhouse gas emissions. Because it is a form of active transportation, it also contributes to improving public health by reducing obesity rates.

Unlike bicyclists and drivers, who use streets to travel between cities throughout the region, pedestrians do not typically travel long distances. Walking does not rely on a regional network of facilities but instead is concentrated in small, local, accessible areas and facilitated by short, direct access routes. Pedestrians, however, are able to expand their access range greatly by walking to transit. While the number of people in Newark for whom walking is the main form of transportation is currently small, we are all pedestrians for at least part of all trips – whether that is walking through a parking lot, to a bus stop or strolling in a park.

This chapter of the *Plan* includes an inventory of existing pedestrian conditions throughout the City, focusing on access to major destinations in Newark, including schools, employment areas, retail areas, parks, trails and open space areas. This Plan also includes a project list, design standards, a crosswalk policy and education and safety programs.

PEDESTRIAN NEEDS

Depending on age and level of mobility, the needs of various types of pedestrians differ. However, all pedestrians have several needs in common, including safety, connectivity, and accessibility to destinations. Pedestrian infrastructure should also consider those with special needs, including children, seniors, and people with mobility impairments. The Americans with Disabilities Act (ADA) mandates that reasonable accommodation for access be provided for those who may need such assistance.

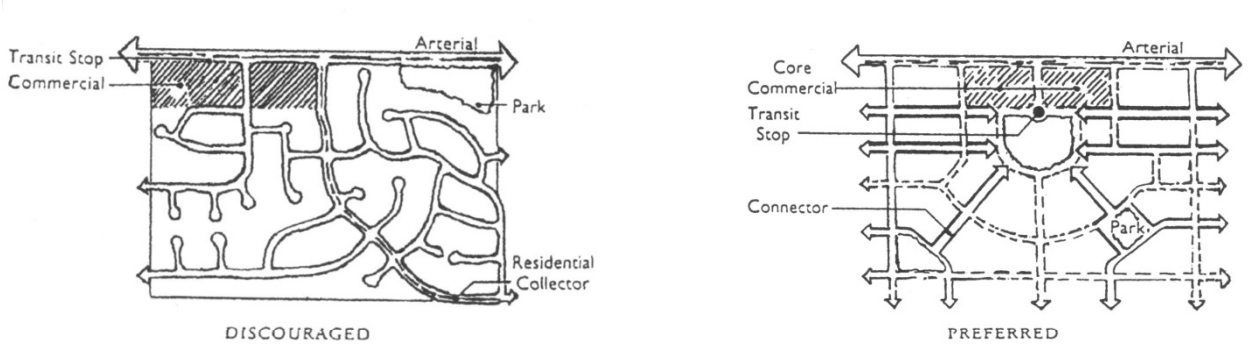
The most important needs of pedestrians include:

- Direct connections. Pedestrians must sometimes walk long distances to access adjacent destinations when the street network is developed in a non-grid street pattern with cul-de-sacs and limited collector streets that connect to the arterial network. Pedestrian cut-through paths between cul-de-sacs and neighborhood trails that create direct connections reduce walking distances and make walking a more viable option for transportation.

- Appropriate crossings. Proper placement and adequate visibility both contribute to an appropriate crossing location. Crosswalks should be placed in locations that best serve pedestrian desire lines (i.e., where pedestrians want to cross) and meet required visibility and sight distance requirements. Two major types of crosswalks are “controlled” (i.e., vehicle traffic controlled by a traffic signal or stop sign) and “uncontrolled” (i.e., motorists do not stop when pedestrians are not present). In this plan, special attention is paid to enhancing high-risk uncontrolled crosswalks on multilane roadways. This chapter lists enhancements to crossing facilities, including crosswalk

striping, signage, and other enhancements that alert both motorists and pedestrians to the presence of the facility.

- Continuous facilities. Sidewalk gaps, missing sidewalks and worn crosswalks are all barriers to safe pedestrian travel. Continuous facilities allow pedestrians to choose the safest and most efficient path to and from their destination, encouraging them to choose walking as their mode of transportation.
- Well-designed walkways. Narrow sidewalks, sidewalks that are directly adjacent to heavy-volume roadways without vegetation or parking buffer, and sidewalks with utility boxes or lighting poles in the walkway detract from the walking environment and can make it difficult or impossible for the mobility-impaired to use the sidewalk.
- Reduced traffic speeds. The likelihood of a pedestrian injury or death in a collision increases dramatically as motor vehicle speeds increase. Reducing traffic speeds substantially increases pedestrian safety.
- Mixed and diverse land uses. Segregated land uses generally increase the distance between different destinations, and make it difficult for residents to walk to employment, shopping, schools and recreational facilities from their homes. Mixed land uses make it easier to build housing, employment, shopping, schools, and recreational amenities within walking distance of each other.



Source: Creating Livable Streets, Portland Metro and Fehr & Peers

WALKING TRIPS

A common term used in describing demand for walking facilities is "mode share." Mode share refers to proportion of people using a given travel mode for their trip, such as walking, bicycling, public transit, or driving. Mode split is often used in evaluating return of walking investments and measuring increases in walking trips over time, as key objective is to increase the percentage of people selecting an alternative means of transportation to the single-occupant (or drive-alone) automobile. **Table 4-1** presents the estimated number of walking trips in Newark today, both in absolute numbers and as a percentage of all trips.

This information is based the Alameda CTC *Bicycle and Pedestrian Mode Share Tools* methodology, which incorporate demographic factors and residential and employment densities in Newark to estimate existing and future walking demand

Table 4-1.
Estimated Current and Future Number of Daily Walking Trips in Newark

Number of Trips	Today (2014)	Future with the Plan (2040)
Walking Trips	50,500 (12.0%)	80,900 (13.7%)

Source: 2010 U.S. Census, 2014 American Community Survey, Alameda CTC ATP Mode Share Forecast Tool

SPECIAL PEDESTRIAN NEEDS

Complete streets practices improve the pedestrian realm because they are designed with well-connected and comfortable sidewalks, traffic calming measures to manage vehicle speeds and enhanced pedestrian crossings. Incomplete streets can be a barrier in any community by preventing people to walk, particularly for specific types of pedestrians such as the disabled, older adults, and children.

To improve transportation conditions in Newark, development of complete streets is essential to moving towards an integrated pedestrian street network. Complete streets offer a significant opportunity to give children and seniors better mobility. With a growing population of seniors and children in the City, providing appropriate pedestrian accommodations is even more critical. Streets that prioritize the automobile (including those with wide lanes, multi-lane approaches, long crossing distances, frequent driveways, and narrow or poorly-maintained sidewalks) are difficult for pedestrians to navigate. The needs of pedestrians should be incorporated in every transportation investment, with a primary goal to have all roads work for children, seniors, and those with disabilities.

SCHOOL CHILDREN

Children have special needs in the pedestrian realm and should thus have unique considerations. This becomes apparent in school zones where a safe pedestrian environment is vital. Young children are often too small to be in the line of sight of drivers, so without proper designs, streets surrounding schools may not be adequate for these young pedestrians. In addition, children have a slower walking speed than adults and may not yet have an understanding for the amount of time needed to cross an intersection. When streets surrounding schools have inadequate pedestrian facilities, parents may be reluctant to allow their children to walk to school, encouraging driving children to school even if they are within walking distance.

Accommodating vulnerable populations, including children, requires special provisions to remove barriers to pedestrian travel. These special provisions include measures such as slowing vehicle speeds and enhancing street crossings around schools. Reduced speed zones near schools, striping patterns and colors, and traffic calming measures can communicate to drivers that they are within a school zone and facilitate slower vehicle speeds. Reducing crossing lengths through bulb-outs, special crosswalk striping,

and median refuges provides shorter crossings for children. Technical assistance and funding to implement these enhancements can be acquired through Safe Routes to School programs. Adequate sidewalk facilities and crosswalks are particularly important around school neighborhoods to separate children who are walking and riding their bicycles from traffic.

SENIORS

Poor sidewalk and crossing conditions may foster isolation for seniors with limited opportunities for mobility. They need travel options other than driving, whether it be walking or taking transit. Many seniors have slower walking speeds and reaction times, and may often have a variety of other impairments to their mobility, vision, and hearing. As a result, sidewalks and street crossings need to be sensitive to these barriers and how they affect the aging population. Treatments like pedestrian refuge islands are particularly important to help seniors cross a street since they tend to walk at slower speeds; if they are unable to make the crossing during the available signal time, a refuge provides a separated place to wait.

Opportunities to orient streets to provide senior mobility include:

- Making street crossings shorter through installation of median refuges or sidewalk bulb-outs and adequate curb ramps
- Sidewalk furniture to make walking more comfortable by providing places to rest
- Adjusting signal timing to account for slower walking speeds
- Removing sidewalk barriers and obstructions that make it difficult for pedestrians using wheelchairs, walkers, or other aids

AMERICANS WITH DISABILITIES ACT

The American with Disabilities Act of 1990 (ADA) protects the rights of disabled individuals, requiring public entities to create transition plans to bring existing public facilities up to ADA standards. A key component to adequate ADA provision includes plans to improve curb ramps and walkways. It sets guidelines for disabled individuals to access public accommodations and commercial facilities. Disconnected sidewalks and unpaved surfaces prove frustrating to disabled pedestrians. Additionally, pedestrian signals successfully communicate pedestrian right-of-way, but without audible or vibro-tactile enhancements, signals may not support the needs of those with poor vision. Creating a comfortable and well-connected pedestrian network is important for complete streets, as well as focusing on the needs of disabled users.

Complete streets strategies will help focus intersection designs to expand access for all users. There are many best practices, including improving curb ramps, providing adequate pedestrian clearance intervals, ensuring pedestrian network gaps, and upgrading sidewalk conditions, which cover many aspects of ADA requirements. Direct curb ramps (i.e., two ramps per corner) are preferred whenever possible, so that pedestrians are directed into a crosswalk instead of into the intersection. Accessible pedestrian signals can communicate information about crossings to visually impaired pedestrians through audible tones or vibrating systems. The location of these accessible pedestrian signals should be placed based on guidance from the California Commission on Disability Access. Obstacles on sidewalks, such as cracks or misplaced sidewalk amenities, are a primary barrier to visually impaired pedestrians. Truncated domes provide a

tactile signal to the visually impaired as they transition between walking paths or sidewalks and conflict areas such as intersections. Special attention is also warranted at bus stops, so that they are located at the far side of an intersection. This encourages pedestrians to cross behind rather than in front of the vehicle.

TYPES OF PEDESTRIAN FACILITIES

The quality of the pedestrian realm has two components: safety and comfort. Newark seeks to maximize both elements for all users through appropriate facilities and design characteristics within the Sidewalk Zones, Pedestrian Amenities, and Crossings. This section provides an overview of what each pedestrian facility includes and how it fosters walkability.

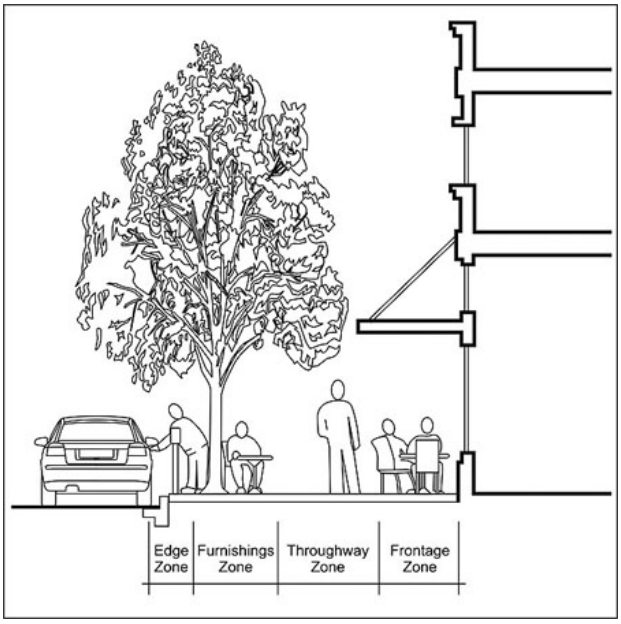
SIDEWALKS

Sidewalks provide pedestrians a separated travel path from vehicles on the road. Within an urban area, sidewalks should be provided everywhere but especially around schools, transit stops, parks, and along mixed-use and commercial corridors. In the case of schools, safety considerations are a primary concern when parents and children make the decision whether children should walk (or be driven) to school (see Chapter 5: Safe Routes to School). Transit stops are also locations of high pedestrian activity, as every transit rider is a pedestrian for some time both before and after taking a trip by transit. Commercial areas not only accommodate pedestrian travel but also serve as gathering places for pedestrians.

The construction of adequate sidewalks to schools, transit, and pedestrian commercial areas will result in an increase in walking as a mode of transportation and a corresponding decrease in vehicular trips. In commercial areas, sidewalks can also provide economic benefits to local businesses. Providing sidewalks will increase the safety and convenience of pedestrian travel for all users, as well as furthering the federal mandate to improve air quality. Sidewalk improvements should accommodate all users, especially children, seniors and people with disabilities.

Sidewalk zones, summarized below, represent the key elements provided within a sidewalk:

- *Edge/Curb Zone:* At a minimum, such as in areas with lower pedestrian activity, there should be a six-inch wide curb. Other areas, such as downtowns, should have at least an extra foot to accommodate car doors to not conflict with the sidewalk.
- *Furnishing Zone:* This area acts as a buffer between the curb and throughway zone. This is the area for benches and landscaping. Any sidewalk amenities should be located within this area and should not interfere with the throughway zone. Streets with higher speeds should have larger furnishing zones to provide a better buffer



from traffic.

- *Throughway Zone:* The minimum width of this zone should be four feet if there are low pedestrian volumes. However, in order to accommodate people walking side by side in higher volume areas and shy distance from building fronts, widths of at least seven feet are appropriate.
- *Frontage Zone:* This area borders the building façade or fence. The primary purpose of this zone is to create a buffer between pedestrians walking in the throughway zone from people coming in and out of buildings. It provides opportunities for shops to place signs, planters, or chairs that do not encroach into the throughway zone.

PEDESTRIAN AMENITIES

- *Wayfinding and Signing:* Wayfinding signing should cater to both vehicles and pedestrians, particularly in districts where there are high levels of walking activity. Signs and routes that direct pedestrians to specific destinations are key to providing adequate way finding for pedestrians.
- *Street Furniture:* Street furniture is normally placed on a sidewalk in the Frontage Zone to provide additional comfort for pedestrians and enhance place making within the pedestrian realm. Street furniture makes pedestrians feel welcome, but it is important that they do not conflict with the pedestrian travel path. Street furniture can include benches, specially designed newspaper racks, fountains, special garbage/recycling containers, etc.
- *Street Trees:* Street trees enhance the pedestrian environment by providing shade and a buffer from vehicles. Street trees may also enhance property values, especially in residential neighborhoods, and the frequency of their placement can affect traffic speeds. However, street trees, when improperly selected, planted, or maintained, may cause damage to adjacent public utilities and sidewalks.
- *Lighting:* Pedestrian scale lighting provides a better-lit environment for pedestrians while improving visibility for motorists. Sidewalks with frequent nighttime pedestrian activity should have pedestrian lighting. Pedestrians tend to observe more details of the street environment since they travel at a slower pace than vehicles, and thus pedestrian scale lighting should have shorter light poles and shorter spacing between posts. A height of 12 to 20 feet is common for pedestrian lighting. The level of lighting should reflect the level of pedestrian activity and location.
- *Parklets and Public Space:* Parklets are small sidewalk-scale open spaces that repurpose the curbside parking lane. Parklets provide public space as well as amenities such as seating, planting, bicycle parking, and public art. Parklets provide an excellent opportunity for citizens to enjoy their city and participate in civic life on the street, particularly in areas with narrow sidewalks. Additionally, parklets can expand access to public space to residents of areas that are far from existing parks and playgrounds.

CROSSWALKS

Crosswalks and opportunities to safely cross the street are particularly important near schools, transit stops, parks, and other destinations where there are many pedestrians. Pedestrians tend to walk in the path of the shortest distance. Thus, if intersection crossings are too far apart, mid-block crossings may be necessary to accommodate these paths, or 'desire lines'. Crosswalks may either marked (i.e. with striping

indicating their location on the pavement) or unmarked (i.e. crossings that are legal but are not marked on the ground.

Crosswalks are typically understood in terms of the type of traffic control. There are three basic types of crosswalks:

- Uncontrolled crosswalks, at which drivers must yield to pedestrians crossing the street
- Stop-controlled crosswalks, where drivers must come to be a complete stop before proceeding
- Signalized crosswalks, where drivers and pedestrians each have their own signal phases.

More information about crosswalks is found in **Appendix C Crosswalk Policy**. Each has special considerations around its installation and enhancement.

EXISTING CONDITIONS AND ISSUES

This section provides a snapshot of existing citywide pedestrian conditions in Newark. It describes the existing infrastructure including gaps in the sidewalk network, sidewalk obstructions and bus stop amenities in key pedestrian areas. The City compiled an inventory of existing pedestrian conditions in Newark, including sidewalks, marked crosswalks, and curb ramps based on prior inventories, additional information from the Bicycle and Pedestrian Advisory Committee and extensive field visits and walking audits.

The data collected was mapped and analyzed to determine issues and opportunities with the existing conditions.

SIDEWALKS

Newark generally has a comprehensive sidewalk network in commercial areas and in residential neighborhoods, and the majority of Newark's sidewalks are in good condition, paved and five feet or wider. However, several streets in industrial areas, the Dumbarton Transit Oriented Development Specific Plan redevelopment area, and around the NewPark Mall are missing sidewalks on one or both sides of the street, as shown on **Figure 4-1**. Overall, 30 sidewalk gaps were identified through fieldwork.

SIDEWALK OBSTRUCTIONS & DEFICIENCIES

Prevalent sidewalk obstructions include street trees, landscaping, utility poles and fire hydrants. Less frequent obstructions include utility vaults and traffic signal controller cabinets. **Figure 4-1** also documents where obstructions in sidewalks were noted along observed corridors.

Additional obstructions in the pedestrian environment include damaged sidewalk and uneven pavement surfaces at intersections. Sidewalk damage is most commonly caused by street trees located in an adjoining parkway strip. Although sidewalk maintenance is technically the responsibility of the adjoining property owner under both the California Streets and Highways Code and the Newark Municipal Code (Chapter 12.28.090), the City has implemented a curb, gutter and sidewalk repair program continuously for many years to address damaged locations. Repairs can range from concrete grinding to remove

sidewalk off-sets at control joints to complete removal and replacement. At intersection, disabled persons confined to wheelchairs can experience difficulty with uneven asphalt concrete pavement surfaces near gutter lips where there has been a build-up of pavement surface materials over time. With implementation of the Complete Streets Policy, these issues are reviewed and addressed on all streets included in the City's annual pavement maintenance program. The City will continue to focus on repairs to sidewalk and street crossing locations.

TRANSIT ACCESS

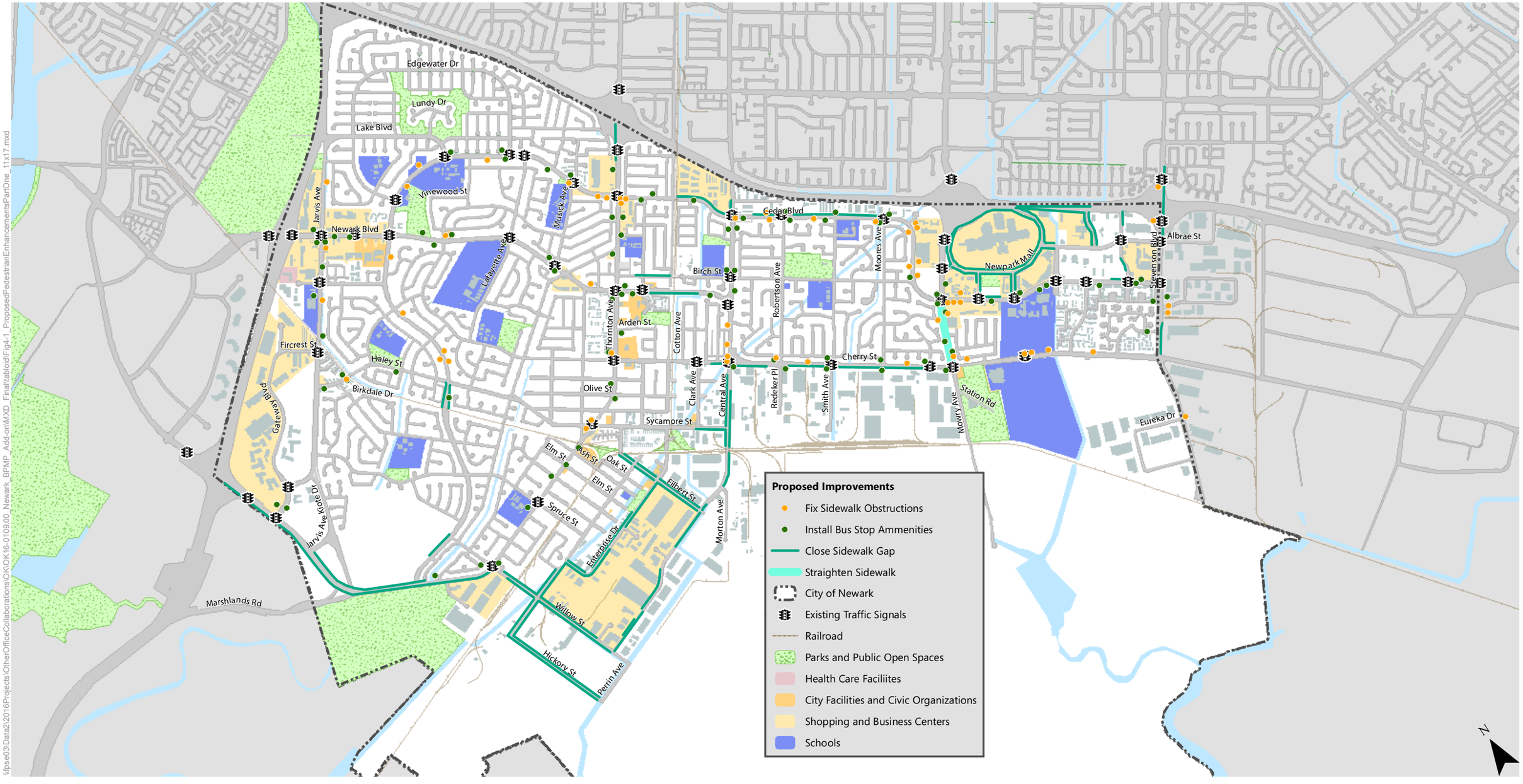
Bus stop amenities are an important resource for pedestrians, particularly for people who rely on transit as their primary means of transportation. Sufficient seating and shelter from weather are two key factors for comfort, while amenities such as signing, accessible sidewalks and secure bicycle parking also encourage multimodal trips and transit use. Real time transit information displays are critical in low service frequency areas like Newark.

Bus stop near the intersection of Thornton Avenue and Locust Street without bench, shelter, or other amenities

Common at surveyed bus stops was a lack of amenities, such as benches or shelters. More recently developed bus shelters appear more likely to contain amenities; however, not all locations have adequate sidewalk widths for the installation of bus stop amenities. **Figure 4-1** below shows where surveyed bus stops have or are lacking seats and shelter.

CURB RAMPS

Newark has made significant progress on installing curb ramps throughout the City. The City of Newark has installed several new curb ramps and made many existing curb ramps ADA-accessible by installing directional curb ramps of standard grade and width, and installing tactile warning surfaces (i.e., truncated domes). Upgrades to curb ramps to date have focused at major intersections and in the northern neighborhoods in the City. The City will continue to focus efforts on areas where new curb ramps are needed or where existing curb ramps should be improved.



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Additional City-wide Improvements:
> Change to 3.5 feet/second for the pedestrian crossing phase
> Addition of countdown signals at all signalized intersections
> ADA curb ramp upgrade program

Figure 4-1
Proposed Pedestrian Enhancements Part One

CROSSINGS

An inventory of uncontrolled and stop-sign controlled marked pedestrian crossings is shown in **Figure 4-2**. Several lower volume residential collector streets, such as Haley Street, Cherry Street north of Thornton Avenue, and Edgewater Drive, and many elementary schools feature uncontrolled crossings. Additionally, uncontrolled crosswalks are provided across several high volume and speed roadways.

Crosswalk frequency is also important for pedestrian safety and creating continuous pedestrian networks. Several areas in the City were observed where pedestrians cross at unmarked mid-block locations, typically where there are long distances between controlled crosswalks. In many instances, a sidewalk or trail terminates at a road without provision of a marked crosswalk. Although many of these are legal crossing locations (where drivers are required to yield to pedestrians), the lack of a marked crosswalk creates ambiguity for pedestrians and drivers about who has the right-of-way. In fact, at many locations with marked crosswalks but uncontrolled intersections, observations revealed that drivers failed to yield to pedestrians. This was most common on Cedar and Newark Boulevards.

This chapter recommends that the City enhance 32 uncontrolled single-lane crossings with high visibility striping. Fourteen unsignalized multi-lane crossings are recommended for more long-term involved enhancements, including Rapid Rectangular Flashing Beacon (RRFB) or Pedestrian Hybrid beacon (PHB), and geometric improvements of median refuge and/or curb extension where feasible and whre applicable warrants as satisfied. Finally nine signalized crossings are recommended for enhancements such as the removal of bends in crosswalks, the removal of channelized right-turns, and shortened crossing distances. **Chapter 5: Safe Routes to School** and the **Appendix C Crosswalk Policy** section of this chapter discuss enhancements to uncontrolled crossings in more detail.

LACK OF PEDESTRIAN-ORIENTED DESIGN

Many buildings in Newark are not oriented towards pedestrians. These places appear uninviting towards pedestrians and are closed off from the activity on the street. Additionally, some sidewalks and pedestrian facilities, while well-intentioned, are not conducive to easy and comfortable pedestrian access. Narrow meandering sidewalks substantially increase pedestrian travel distances, which unduly impacts pedestrians with mobility impairments and seniors, ad they are difficult to navigate for pedestrians with low vision or other visual impairments.

WIDE, HIGH-SPEED ARTERIAL ROADWAYS

In addition to freeways and rail tracks, a major barrier to pedestrian travel is wide, high-speed arterial roadways. Many roadways have been built particularly wide to accommodate peak traffic levels. However, during non-peak hours, these wide roadways can encourage high speed travel above posted speed limits. High vehicle speeds are problematic for pedestrians by limiting the time that pedestrians can safely cross the street and making them vulnerable to more severe collisions. Creating a walkable environment means addressing ways to manage speeds including such measures as landscaping, synchronized signal timing to slow traffic, and lane reconfiguration to narrow overly wide roadways.

MAINTENANCE AND FUNDING

Maintenance of existing walkways and funding of new improvements each bear special attention. Recognizing the need to develop a process for the distribution of scarce resources, this Plan establishes a prioritization process in Chapter 8: *Funding and Implementation*.

OFF-STREET TRAILS

Shared-use pathways, such as the existing pathway along Mowry Avenue south of Cherry Street, may serve pedestrians for recreation and exercise, or to connect key destinations such as schools, parks, and civic and community centers. For additional details on the existing and proposed off-street trail system, see Chapter 3: *Bikeway Network*.

PEDESTRIAN IMPROVEMENT RECOMMENDATIONS

Figures 4-1 and **4-2** identify recommend pedestrian improvements throughout the city. These include identification of gaps in the sidewalk network as well as crosswalk enhancements. Crosswalk enhancements may be a more cost effective way for the city to immediately improve the safety and comfort for pedestrians. These recommendations are summarized below and in **Appendix B Pedestrian Prioritized Project List**.

In addition to the site specific recommendations, Newark can also improve the safety and comfort of pedestrians through other roadway or signal related projects and routine maintenance, such as:

- Adjusting pedestrian walk time to 3.5 feet/second at crossings citywide and adjusting to 2.5 feet/second adjacent to elementary schools and senior centers or housing.
- Adding countdown signals at signalized intersections where they are missing.
- Continuing to upgrade curb ramps citywide in line with the latest ADA best practices, including providing directional curb ramps, two per corner where feasible.

  Continuing to repair damaged sidewalk and other pedestrian obstructions on the roadway surface.

- Installing and enhancing crosswalks in line with the **Appendix C Crosswalk Policy**.

In addition to the citywide recommendations listed above, this chapter also identifies unique, site-specific projects that represent high priorities in developing the city's pedestrian network.

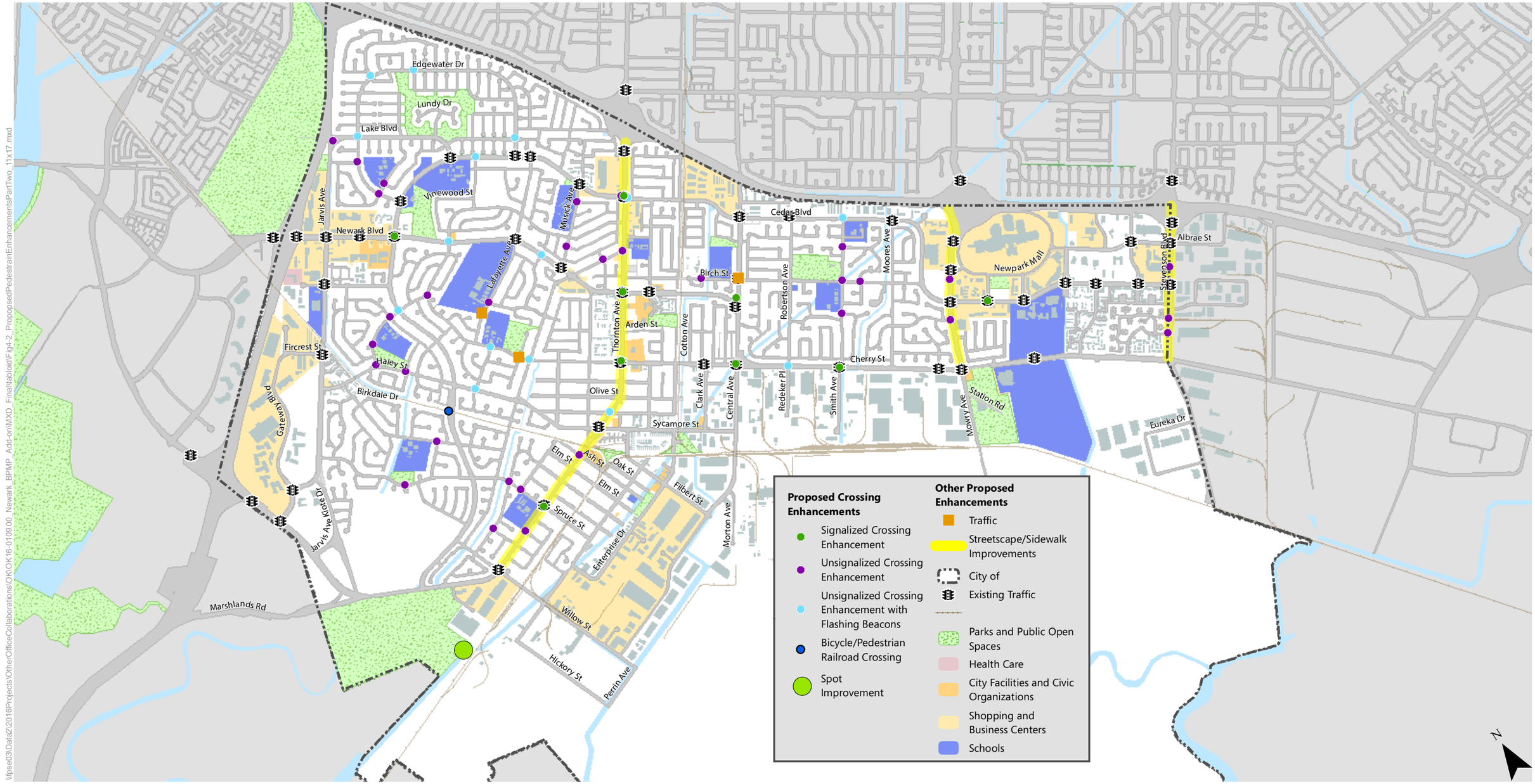

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Figure 4-2

Proposed Pedestrian Enhancements Part Two

5. SAFE ROUTES TO SCHOOL

Safe Routes to School (SRTS) is a concept that aims to improve walking and bicycling conditions for students traveling to and from school. Compared to the early 20th century, most communities have seen a decrease in the number of children who use active transportation as a means of getting to and from school. However, the value of these activities in the daily lives of children has been under estimated. In California, the Caltrans Active Transportation Program (ATP) provides competitive funding to enhance engineering, encouragement, enforcement, education, and evaluation programs for schools throughout the state. The Alameda County Safe Routes to School program administers SRTS education and encouragement activities in participating schools within Newark.

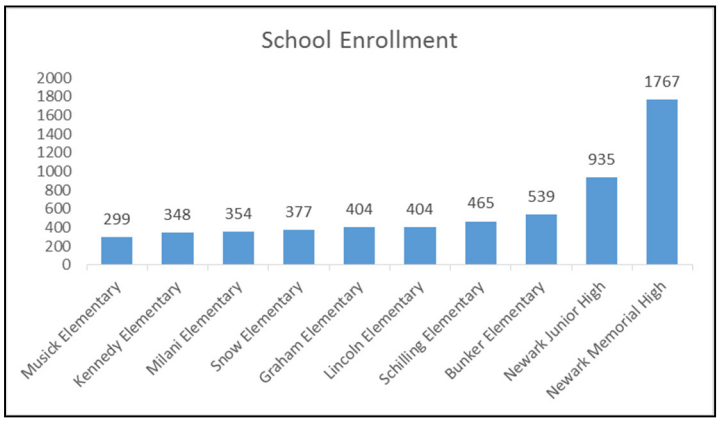
The following chapter presents information on Newark's schools and presents the results of a comprehensive walking of each of the city's schools. The audits support the Plan's goal of developing increasing safety for school-aged bicyclists and pedestrians and increasing the number of children walking and biking to school. **Appendix C** presents the City's Crosswalk Policy, which provides guidance on where to install crosswalk, including at school sites, and when to enhance crosswalks. **Chapter 6** provides additional information on the Alameda County Safe Routes to School program.

NEWARK SCHOOLS

The City of Newark's boundaries coincide with the Newark Unified School District (NUSD) boundary. NUSD has created a great network of local, neighborhood-centered elementary schools, where many of the boundaries are drawn so that schoolchildren do not have to cross major arterial roadways to access their school. Having smaller schools spread throughout the city rather than larger schools on the periphery or concentrated in only a few neighborhoods allows each neighborhood to be in close proximity to an elementary school. This helps reduce the conflicts that school-age bicyclists and pedestrians may face in their commute to school, and increases the viability of children walking or biking to school.

There is an opportunity to reach over 5,800 children through safe routes to school activities and improvements in the (ten) USD-operated public schools, including seven elementary schools, a junior high school, and a high school:

1. Birch GroveElementary School (Milani K-2 & Bunker 3-6 Campuses)
2. Graham Elementary School
3. Kennedy Elementary School
4. Lincoln Elementary School
5. Musick Elementary School
6. Schilling Elementary School



7. Snow Elementary School
8. Newark Junior High School
9. Newark Memorial High School
10. MagGregor Campus: Alternative School and Adult School

Almost all schools in Newark schools operate on a similar bell schedule. The elementary schools typically start at 8:10 AM and dismiss at 2:32PM. Many elementary schools in Newark offer school breakfast programs that allow participating students to enter the campus as early as 7:30 AM, and many sites offer after-school programs as well. The Junior High starts at 8:10 AM and dismisses at 2:45 PM most days, except for Fridays. The high school begins at 6:50 AM and dismisses at 3:00 PM on Monday, Tuesday and Friday, and dismisses at 1:57 PM on Wednesday and Thursday. As a result, particularly in the morning, trips to school overlap substantially with people commuting to work, which is an important consideration for improving school safety and also shifting more trips to walk and biking to help alleviate congestion in Newark.

WALKING AUDITS AT NEWARK SCHOOLS

Walking audits help identify pedestrian issues pertinent to specific communities. This section presents the observations and suggestions made during the walking audits conducted in at each of Newark's public schools in November and December 2010. The suggestions are based on best practices and discussions with the participant group regarding local needs and feasibility. These walking audits included City staff, parents and family members of school children, and school administrators. The walking audits were approximately two hours in length and generally included a discussion with school staff (teachers and/or principals), followed by a walking audit around the school drop-off/pick-up area and primary routes on streets surrounding each school.

These walking audits serve as an initial step to improve the pedestrian and/or bicycling environment within each school area. Many individuals participated in these walking audits: community residents, stakeholders, and affiliated individuals. During each walking audit, positive practices were observed and issues and opportunity areas are noted. Observations focused on how drivers behave around pedestrians and pedestrian behavior, particularly at intersections. For each opportunity area, the group discussed possible suggestions to address pedestrian safety concerns. These walking audits were highly interactive, with many observations explored during the walk as a means to observing and learning how to "see through the eyes of the pedestrian."

The observations and recommendations from these walking audits can assist the City in improving safety and prioritizing infrastructural improvements in the vicinity of Newark's schools. In fact many of the off-site recommendations from the walking audits are included in **Chapter 4** and in **Appendix B: Pedestrian Prioritized Project List**. The following discussion provides an assessment of the existing conditions as well as both on-site and off-site recommendations for each of the ten schools.

BIRCH GROVE PRIMARY ELEMENTARY (BUNKER CAMPUS)

EXISTING CONDITIONS

Bunker Elementary is located at the corner of Birch Street and Smith Avenue. It has the largest school enrollment of all the elementary schools within the district at 539 students. Its school boundary draws a large area of the surrounding neighborhood, bounded by Cherry Avenue to the southwest and Cedar Boulevard and Highway 880 to the northeast and northwest. Bunker's southeastern boundary coincides with the City boundary at Stevenson Boulevard. Bunker Elementary is located in a residential neighborhood in at the northern end of the boundary. Birch Grove Park is adjacent to the school to the north.

In the 2016-2017 academic year, Bunker Elementary is merging with Milani Elementary. Bunker will be renamed Birch Grove Primary and will serve students from Kindergarten to second grade, while Milani will be renamed Birch Grove Intermediate and will serve students between the third and sixth grades. This merger was designed in part due to anticipated population growth in areas served by these two schools.

The school site fronts Smith Avenue, a two-lane residential collector street with on-street parking on both sides. The school's parking lot is located on the southwestern corner of the property, with approximately 60 vehicle parking spaces. The parking lot serves as a primary drop-off and pick-up area, although many parents drop off students along Smith Avenue or park in the neighborhood nearby and walk their children into school. The City of Newark assisted Bunker Elementary in the 2009-2010 school year to improve circulation through the parking lot. Currently, two driveways function as in-only and out-only access and egress, respectively. When parents enter the lot, the first 60 feet of curb are painted red to prevent drop-off/pick-up near the entry and better facilitate circulation through

the drop off area and lot. The next 150 feet are designated a drop-off/pick-up area with yellow curb. Both a drop-off lane and circulation aisle are provided along the school frontage. Vehicles then circulate through the lot and exit on to Smith Avenue; to reduce congestion within the parking lot, only right-turns are permitted from the exit driveway during drop-off and pick-up times.

Three marked school crosswalks are provided across Smith Avenue to access the school – one at Birch Street (stop-controlled), one at Jacaranda Drive (uncontrolled), and one at Escallonia Drive (uncontrolled). Observations made during the walking audit show that all three crosswalks are well-utilized.

ON-SITE OBSERVATIONS

- Parents drop off many students along the school curb on Smith Avenue, causing street congestion and increasing exposure of pedestrians to vehicles.
- Positive practice: The school's bicycle rack is prominently placed in a visible location to school entry. Staff noted approximately four to ten students bicycle on a typical dry day.
- Positive practice: Rear gate entry on Birch Street is open during pick-up and drop-off times to facilitate a more direct connection to the school from the north.

The available curb area for vehicle drop-offs/pick-ups in the parking lot is limited causing queuing on Smith Avenue. Conflicts with pedestrian traffic contribute to delays for exiting vehicles.

- **OFF-SITE OBSERVATIONS**A crossing guard is present at the Smith Avenue and Jacaranda Drive intersection
- Parked vehicles on Birch Street at Jacaranda Drive restrict site distance
- Disorganized vehicle drop-off/pick-up at Birch Street near Birch Grove Park
- Site distance issues on bicycle path on Cherry Street
- Opportunities for more visible crossings on Smith Avenue and Birch Street

ON-SITE RECOMMENDATIONS

- Evaluate relocating the entrance for the kindergarten as close as possible to the stop-controlled intersection at Smith Avenue and Birch Street.
- Consider the addition of a perimeter walkway around the parking lot so that westbound pedestrians do not need to cross the parking lot driveways, This may require some landscaping removal with significant parking lot restriping.
- Evaluate opportunities for parking lot modifications to create an additional drop-off/pick-up lane while providing crosswalks and appropriate signage to direct students to designated crosswalks.

OFF-SITE RECOMMENDATIONS

- Enhance existing crosswalks on Smith Avenue near school with high visibility striping and signage.
- Add a crosswalk, enhance curb ramps with tactile warning surfaces, and add curb extension across of Jacaranda Drive where it intersects Birch Street.
- Add a crosswalk across Smith Avenue at Birch Street on the northern leg.
- Improve the connection for the path along northern edge of Bunker Elementary between cul-de-sac dead end of Birch Street and Smith Avenue intersection.
- Add sidewalks in the existing industrial area west of Cherry Street as the area redevelops.
- Improve traffic signals on Cherry Street to provide pedestrian signals and crosswalks as the industrial area redevelops.

  Widen the bicycle lane on Cherry Street to maintain a straight path of travel for bicyclists.

GRAHAM ELEMENTARY

EXISTING CONDITIONS

Graham Elementary is located on Cherry Street in north-central Newark, just south of Newark Junior High School and adjacent to Mayhews Landing Park. Graham's boundary area includes the neighborhood generally bounded by Newark Boulevard, Rochelle Avenue, Hayley-Sycamore Streets, and Thornton Avenue. There have been several reported bicycle and pedestrian collisions and injuries in the Graham Elementary School vicinity. For additional information, see **Appendix C: Collision Data**.

Graham Elementary fronts onto Cherry Street, with a parking area in the southwestern corner that fits approximately 75 vehicles. Vehicles enter the lot at the southern property edge, via an entry-only access driveway. Parents may park and walk their children into school, or circulate through the lot to the main drop off area along the curb parallel to Cherry Street. Both a drop-off lane and circulation aisle are provided along the school frontage through the designated drop off area. To exit, vehicles continue through the parking lot, then exit the northern, right-turn only driveway. The exit driveway is offset approximately 80 feet from the Fountaine Avenue/Cherry Street intersection.

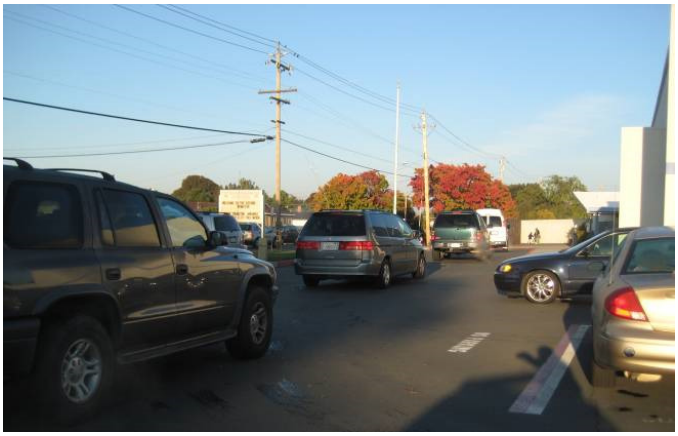
One marked school crosswalk is provided across Cherry Street near Graham Elementary, at the Fountaine Avenue intersection. Direct access to the school is not provided from this crosswalk; students and parents who cross at this location cross the exit driveway to enter the school.

ON-SITE OBSERVATIONS

- Congestion and queuing occur during drop off and pick up due to limited queuingspace.
- Parking spaces are full during drop off and pick up.

Entrance only and exit only driveways exist with a 'No Left Turn' sign at exit.

- Positive practice: The school's bicycle rack is prominently placed in a visible location to school entry. Two students were observed bicycling to school during the walking audit.
- No direct access for pedestrians between the street crossing and main entrance.



Lack of available staff during drop off and pick up times.

Cafeteria opens early; some early arrivals noted.

- No side school access from the pedestrian path in Mayhews Landing Park due to a closed and locked gate.

OFF-SITE OBSERVATIONS

- Positive practice: School crossing guard is present at the Cherry Street and Fountaine Avenue intersection.
- Lack of marked crosswalks to channelize pedestrian flows into school.
- High vehicle speeds on Cherry Street in front of the school.
- Lack of bicycle access and facilities near the school.
- Lack of signs around the school to indicate the school's presence and likely pedestrian activity.

ON-SITE RECOMMENDATIONS

- Consider opening the side gate to Mayhews Landing Park during pick-up and drop-off to provide access from the pedestrian path.
- Consider marking a direct pedestrian route into school from Cherry Street.
- Look for opportunities to reconfigure the parking lot to provide more space for vehicles dropping off and picking up students. One possibility is to angle the row of perpendicular (90-degree) parking spaces facing Cherry Street, which allows for a reduced parking stall depth and drive aisle.
- Consider realignment of the exit driveway with the street intersection to reduce congestion and improve pedestrian accessibility.
- Assign school staff to help direct traffic.

OFF-SITE RECOMMENDATIONS

- Consider adding school zone signs and reducing speed limit in front of school on Cherry Street.
- Consider moving the crosswalk in front of the school across Cherry Street and adding a pedestrian path through the grass in front of the school. This will provide a more direct pedestrian entrance to school and reduce the number of students crossing the driveway to enter the site, thus reducing vehicle delays out of the school driveway.

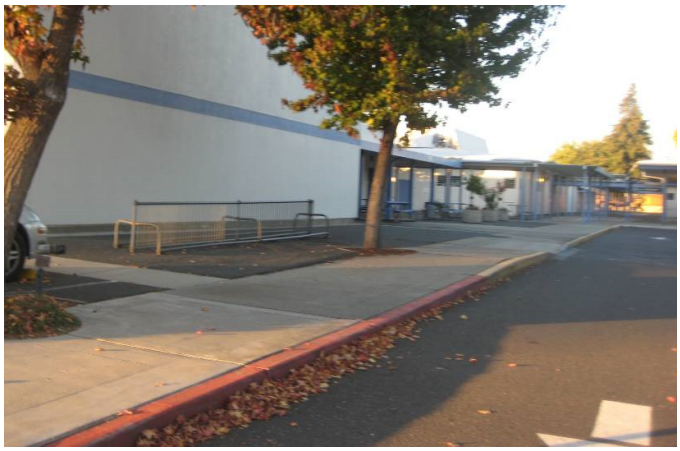
- Add advance stop bars at Fountaine Avenue and Cherry Street in front of the school.
- Update school signs including the pavement legend on Fountaine Avenue and the school zone sign on Cherry Street.
- Consider adding sharrows on Cherry

Street.

- Consider a traffic circle with yield control at Montcalm Avenue and Cherry Street, or side stops, alternatively.
- Provide continuous marked crosswalks along Cherry Street and Christine Street.
- Consider curb extensions to reduce crossing distances and straightening the crosswalk at Mayhews Landing Road and Cherry Street.
- Add bulb outs and mark crosswalk at Mayhews Landing Road and Christine Street.

KENNEDY ELEMENTARY

EXISTING CONDITIONS



Located near the northern border of Newark near SR 84, Kennedy Elementary School is located off of Blackburn Drive near Chapman Drive. There are currently 348 students enrolled. Although the school is located in a predominantly residential area, it is in close proximity to several major shopping destinations within the City, including Rosemont Square, Lido Faire, Newark Marketplace, and Raley's shopping centers. Additionally, Kennedy Elementary is within a half mile of Newark Community Park and Lakeshore Park. There have been no reported bicycle or pedestrian collisions or injuries in the immediate vicinity of Kennedy Elementary; however, there have been pedestrian and bicycle collisions along the nearby larger streets: Newark Boulevard and Cedar Boulevard. However, it was noted during the walking audit that the intersection of Lake Boulevard and Blackburn Drive to the east of the school has had several near misses, as vehicles often fail to stop at the intersection. During the walk audit, the school reported approximately 10 to 12 students arriving by bicycle daily, and a significant number walking. The Alameda County Safe Routes to School performed a site assessment in March 2016. Some of the recommendations herein were generated from that assessment. Kennedy Elementary sponsored an educational helmet safety program a few years ago through the Newark Police Department.

Kennedy Elementary's catchment area is roughly formed by Newark Boulevard and Lafayette Avenue to the north and the City boundaries to the north. The school site fronts Blackburn Drive, a two-lane residential collector street with on-street parking on each side. The school restriped the parking areas to improve vehicle access and circulation. Two driveways function as in-only and out-only access and egress, respectively. Two small parking lots are provided on site, with the main pick-up and drop-off area located in the eastern lot. The area is triangular shaped, with approximately 20 parking spaces, and 350 feet of

curb for drop-off. Both a drop-off lane and circulation aisle are provided along the school frontage. Vehicles then circulate through the lot and exit on to Blackburn Drive.

Another small parking lot with approximately 30 parking spaces is provided on the western side of the school property. To access the secondary lot, drivers cross the sidewalk which channels students arriving from the west into the school. No secondary access points are provided on the school property, as the houses surround the school on each side.

ON-SITE OBSERVATIONS

- The angled parking area creates a long curb area for pick-up and drop-off.
- The school parking lot is equipped with separate driveways for entrance-only and exit-only.
- Not all school parents observe on-site circulation rules, particularly for access to the extra parking area to the southwest.
- Full staff parking area adjacent to the street limits availability for parents to use park and walk-in option.
- Attempted left-turn movements out of parking lot are difficult due to queuing on Blackburn Drive for entry driveway.

OFF-SITE OBSERVATIONS

- Vehicular access to school driveway results in queuing onto Blackburn Drive.
- Many parents park on nearby streets and escort students to school entrance.
- Limited number of pedestrian crossings at Chapman Drive and Blackburn Drive. All school-age pedestrians were escorted by an adult.
- Need to paint crosswalks around the school to provide clearly marked opportunities for pedestrian crossings.
- High vehicle speeds and long pedestrian crossings at stop-controlled Blackburn Drive and Lake Boulevard intersection.
- Opportunities for the use of advance stop bars, median refuges, and curb extensions at various locations around the school site to moderate vehicle speeds and provide more a clearly identified pedestrian realm

ON-SITE RECOMMENDATIONS

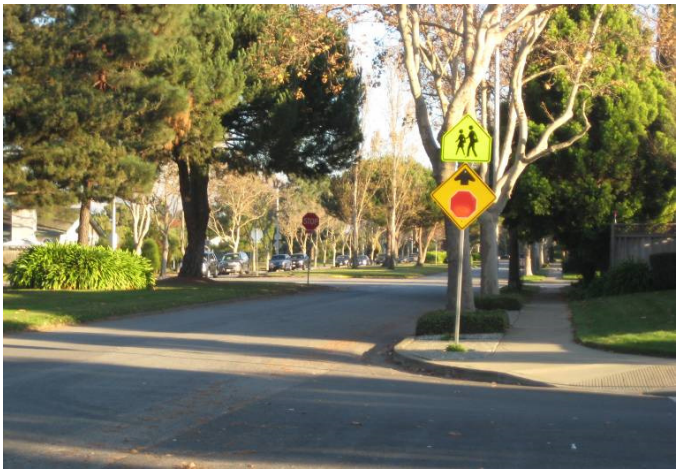
- Add high visibility crosswalks at driveways on school property.
- Consider painting the curb red near the school front driveways to improve visibility and reduce delays in the parking lot.
- Evaluate use of the northeastern segment of the drive aisle as a part of the loading zone.

Consider prohibiting left-turn movements out of school parking lot during drop-off and pick-up.

- Consider relocating staff parking to the southwest parking area and convert front parking area to a short-term parent parking and loading zone to platoon students across drive aisle.

OFF-SITE RECOMMENDATIONS

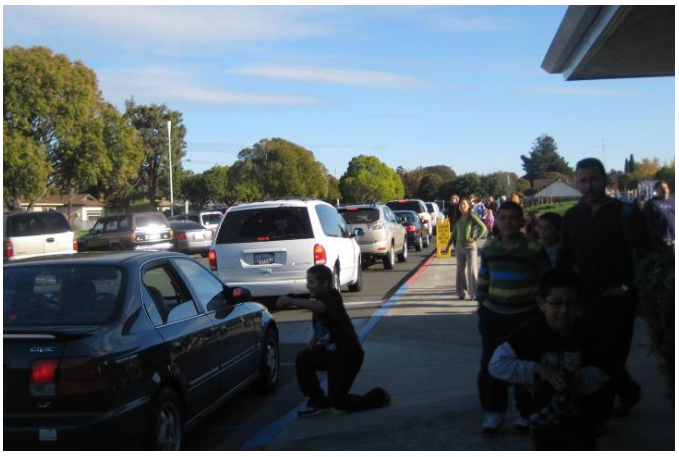
- Consider construction of flashing beacons, a median refuge, curb extensions, and advance stop bars at Lake Boulevard and Blackburn Drive.
- Add sharrows on Lake Boulevard and a Class III Bicycle Route on Blackburn Drive with sharrows.
- Consider adding crosswalks along Chapman Drive, specifically at Cardiff Street and Donegal Court.
- Consider extending the pork chop median at Chapman Drive and Lake Boulevard to move the crosswalk back through the median to create a more direct pedestrian crossing.
- Add a stop-bar on Reymouth Drive at the intersection with Blackburn Drive.
- Add a crosswalk across Blackburn Drive when it intersects Chapman Drive on the eastern leg.
- Move the pedestrian crosswalk warning sign closer to the crosswalk at Blackburn Drive and Reymouth Drive.
- Realign crosswalk and add a curb extension at Chapman Drive and Blackburn Drive.
- Consider a loading zone on Blackburn Drive between the school driveways.
- Add advance yield line and signage at uncontrolled crossings at Blackburn Drive/Chapman Drive and Blackburn Drive/Reymouth Drive intersections.



LINCOLN ELEMENTARY

EXISTING CONDITIONS

Lincoln Elementary school is located on Bettencourt Street near Crestmont Avenue and Shorehaven Avenue. Bridgepointe Park is located directly behind the school to the west, with direct access to the school through a gate in the park. Lincoln's boundaries are formed generally by the railroad tracks, Mayhews Landing Road, and the City boundaries to the west. There are 404 students that attend Lincoln Elementary.



Lincoln Elementary fronts Bettencourt Street, a two-lane residential collector with on-street parking on each side. The site has three driveways, one entry-only at the north end of the site, one exit-only at the middle, and one full-access driveway at the southern end of the site. A single row of 15 angled parking spaces with two lanes for drop-off and circulation is provided along the main school frontage. During arrival and dismissal times, staff places temporary yellow signs along the recommended area for pick-up and drop-off. Currently, the drop-off area is designated as the 150 feet of curb south of the crosswalk and ramps. South of the drop-off zone, double loaded perpendicular parking is provided along a two-way drive aisle. Nearly 50 parking spaces are located in the southern lot. A large dumpster separates the northern one-way and the southern two-way lots, which causes the drive aisles to be slightly offset and inhibits extending the drop-off area.

Two uncontrolled school crossings are provided near Lincoln Elementary across Bettencourt Street, one at Indian Wells Drive and the other at Shorehaven Avenue. Spruce Street, just southwest of the school, is currently a designated Class III bicycle route.

ON-SITE OBSERVATIONS

- Congested drop off and pick up area in front of school.
- Channelization of pedestrian access on the sidewalk near the driveway in front of the school.
- Rear pedestrian access to the school via an asphalt pathway on school grounds with connectivity to a gate at the Bridgepoint Park boundary.
- Two staff members help direct drop off and pick up traffic through the school parking lot.

- Bicycle racks are located in a prominent location.
- Left-turn movements out of the middle driveway are prohibited with a sign.

OFF-SITE OBSERVATIONS

- Positive practice: A crossing guard is stationed at the intersection of Bettencourt Street and Indian Wells Drive. Guard helps cross pedestrians at the school driveway as well.
- Significant vehicle queuing on Bettencourt Street in both directions in advance of school parking lot. Crossing guard directing through traffic around the queue.
- The street curb adjacent to the school was largely unused during drop off and pick up times.
- Limited crossing opportunities at the rear of school on Spruce Street.
- Poor site distance and high vehicle speeds on Spruce Street.

ON-SITE RECOMMENDATIONS

- Create a paved pedestrian path on the southern parking lot corner in front of the school fronting Bettencourt Street.
- Consider moving the dumpster in the front parking lot to provide a larger drop off/ pick up area.
- Evaluate the feasibility of realigning the northern driveway with Indian Wells Drive in order to eliminate the need for pedestrians to cross the school driveway after crossing Bettencourt Street.
- Consider adding speed humps or raised crosswalks within the parking lot to reduce speeds and improve visibility

OFF-SITE RECOMMENDATIONS

- Widen the sidewalk in front of the school to provide a Class I off-street bike path.
- Enhance the existing crosswalks on Indian Wells Drive and Shorehaven Avenue at Bettencourt Street with high visibility striping, advance yield lines, and signs.
- Install pedestrian warning signs (temporary or permanent) on Bettencourt Street before and after the crosswalk at Indian Wells Drive.

BIRCH GROVE INTERMEDIATE ELEMENTARY (MILANI CAMPUS)

EXISTING CONDITIONS

Milani Elementary School is located in central Newark near the major intersection of Newark Boulevard and Central Avenue. The current enrollment is 354 students, a relatively small school compared to the rest in the district. In the 2016-2017 academic year, Bunker Elementary is merging with Milani Elementary. Bunker will be renamed Birch Grove Primary and will serve students from Kindergarten to second grade, while Milani will be renamed Birch Grove Intermediate and will serve students between the third and sixth grades. This merger was designed in part due to anticipated population growth in southern part of the city, which is served by these two schools. While the two attendance areas are merging, the schools will remain separate campuses.

Milani is one of the southernmost schools in Newark, about a mile away from the City's Civic Center Park, library, and community center building. Access to Milani is severely constrained by the railroad tracks and canal to the north, and major arterials of Newark Boulevard, Central Avenue, and Cedar Boulevard located to the west, south, and east. No secondary access points are provided to the school through adjacent residential units or the park on Byington Drive. The school's boundaries are formed roughly by Thornton Avenue to the north and Robertson Avenue to the south; therefore, a significant portion of the students attending Milani must cross one or more of the barriers noted.

Milani Elementary fronts Birch Street, a two-lane residential collector with on-street parking on each side. The site has a very constrained loading area, with a long, single-loaded aisle of angled parking (approximately 30 spaces) that parallels Birch Street. One-way circulation is provided, with an entry-only driveway at the southern end of the site, and an exit-only driveway at the northern end. Both a drop-off lane and circulation aisle are provided along the school frontage. Vehicles circulate through the lot and exit on to Birch Street; to reduce congestion within the parking lot, only right-turns are permitted from the exit driveway during drop-off and pick-up times. Vehicles travel north on Birch Street and turn around at the cul-de-sac at the end.

One uncontrolled marked school crossing is provided across Birch Street at Ezra Drive north of the school. A traffic signal controls the intersection of Central Avenue and Birch Street, which has crosswalks and pedestrian signals across all four legs. A crossing guard is provided by the City at this intersection. Recent adjustments to the signal timing allow for longer pedestrian intervals and improved traffic flow through the intersection at peak traffic times.

ON-SITE OBSERVATIONS

- Limited driveway access with high levels of congestion during drop off and pick up times
- Location of the ADA parking spot along school drop off lane
- Underused bicycle parking

OFF-SITE OBSERVATIONS

- Hectic pick up near the school
- Significant queuing on Central Avenue signal as vehicles wait to turn onto Birch Street
- Current placement of the crosswalk outside of Milani
- Missing curb ramps
- Pedestrian and bicycle disconnect at the dead end on Birch Street due to the railroad tracks
- High speeds on Birch Street south of the Central Avenue intersection

- Confusing and expansive intersection of Newark Boulevard and Central Avenue

ON-SITE RECOMMENDATIONS

- Consider other portions of the site for staff parking.
- Add a pedestrian path in front of the school into the parking lot to reduce conflicts with vehicles entering and exiting the parking lot.
- Replace the ADA parking space in parking lot.
- Paint the curb white or designate as loading zone during bell times instead of red in front of school.
- Study the feasibility of changing the parking lot to include double drop-off/pick-up lanes with a single high-visibility crosswalk where students could move in platoons as directed by school staff.

OFF-SITE RECOMMENDATIONS

- Widen the bicycle lanes on Newark Boulevard to enhance facilities for bicyclists against high vehicle speeds near the overpass.
- Straighten the crosswalk at Newark Boulevard and Central Avenue and add advance stop bars to provide a buffer between vehicles and pedestrians.
- Add traffic calming measures on Central Avenue frontage road to slow vehicle speeds.
- Consider traffic calming Birch Street south of Central Avenue signal to reduce vehicle speeds and add sharrows to encourage neighborhood bicycle network.
- Provide a curb ramp for the crosswalk at Ezra Drive and Birch Street.

MUSICK ELEMENTARY

EXISTING CONDITIONS

With 299 students enrolled, Musick Elementary School is the smallest elementary school within the Newark Unified School District. School staff noted during the walking audit that enrollment numbers have been continually dropping over the past several years. The school's boundaries are generally formed by Layfayette Avenue to the north, Newark Boulevard to the west, and Thornton Avenue/Cedar Boulevard to the south. The school is adjacent to Musick Park and the NUSD offices, located east and west of the school, respectively. Musick Elementary is situated within a predominantly residential neighborhood, but it also is within ½-mile of several shopping destinations along Thornton Avenue and Newark Boulevard. In addition to economic challenges, school staff noted awareness and time to be two major barriers in increasing bicycling and walking to and from school.

The school is located on Musick Avenue between Cedar Boulevard and Newark Boulevard, major arterials that serve as key routes for cross-town City traffic. Musick Avenue is a two-lane residential collector street with on-street parking on both sides. The school has a total of four driveways along Musick Avenue, providing access to the two parking lots on site. The easternmost lot provides one-way circulation through a single-loaded angled-parking aisle with two travel lanes. Both a drop-off lane and circulation aisle are provided along the school frontage. Vehicles then circulate through the lot and exit on to Musick Avenue; separate right-turn and left-turn lanes are provided to reduce congestion within the parking lot.

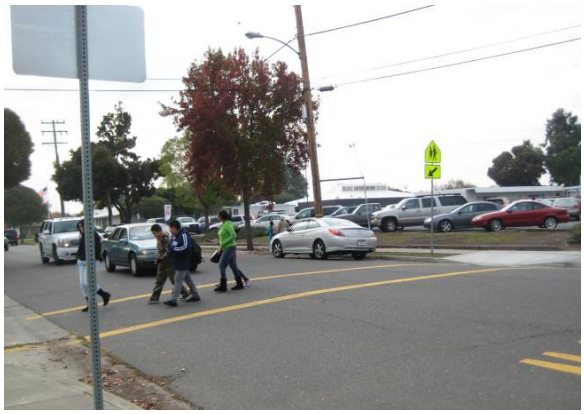
In the second western lot, circulation is configured in a one-way pattern with separate entrance-only and exit-only driveways. Approximately 35 parking spaces are provided. No curb frontage is provided for drop-off/pick-up, but parents may park in this lot to walk their children into school.

Three uncontrolled, marked school crosswalks are provided across Musick Avenue near the school, at Burdick Street, Dugan Court, and Bishop Street. Observations made during the walking audit show that all three crosswalks are well-used. The Alameda County Safe Routes to School performed a site assessment in March 2016. Some of the recommendations herein were generated from that assessment.

ON-SITE OBSERVATIONS

- The parking lot driveway ramp is misaligned and too small to accommodate larger vehicles.
- Bike rack placement is somewhat secluded and not heavily used.

Older and newer pavement markings in parking lot clash.



OFF-SITE OBSERVATIONS

- A crossing guard is posted at the intersection of Musick Avenue and Dugan Court.
- Musick Avenue is a small street that serves many access points and can get congested during both pick up and drop off, but the morning commute is reported as being particularly challenging
- Need for the addition of marked crosswalks along Musick Avenue in front of school
- Questionable crosswalk placement and signs, increasing vehicle and pedestrian conflicts

ON-SITE RECOMMENDATIONS

- Retrofit the driveway to accommodate larger vehicles accessing parking lot.

OFF-SITE RECOMMENDATIONS

- Mark crosswalks on minor streets along Musick Avenue at Munyan Street, Burdick Street, and Dugan Court.
- Consider the installation of stop signs and advance stop bars with the crosswalks to improve visibility at the Bishop Street, Burdick Street and Dugan Court intersections with Musick Avenue.
- Consider the installation curb extensions to shorten the crossing distances at Burdick Street and Dugan Court.

Install high visibility crosswalks, yield lines, and signage to improve visibility at the Burdick Street, Dugan Court, and Bishop Street intersections with Musick Avenue.

- Consider moving the crosswalk across Musick Avenue in front of the school at Dugan Court in between two driveways to avoid direct conflicts with driveway entrance.
- Prohibit parking between the two school driveways.
- Consider widening the sidewalk along the entire school frontage.
- Install high visibility crosswalks at the parking lot entrances to improve pedestrian visibility.

Install an additional school warning sign on Musick Avenue.

- Enhance the dead end cul-de-sac on Souza Avenue to provide a better bicycle and pedestrian connection from Cedar Boulevard.

SCHILLING ELEMENTARY

EXISTING CONDITIONS

With 540 students, Schilling Elementary School is the second largest elementary school in Newark's school district. The school located at the intersection of Thornton Avenue and Sycamore Street, in the southwest corner of the City near the edge of the developed area. Schilling is in a predominantly residential neighborhood, although much of the City's industrial lands are located at the southern and western edges of its boundaries, generally defined by Mayhews Landing Road and Sycamore Street, and marshlands and the City's boundary to the west. Several significant barriers are within the Schilling catchment area, including railroad tracks, canals, and Thornton Avenue. Thornton Avenue is a major arterial, providing access to I-880 and SR 84, as well as a large portion of the City's commercial uses.

Schilling Elementary fronts on Spruce Street, a two-lane collector street with on-street parking on each side. North of Thornton Avenue, Spruce Street is traffic calmed with speed humps to reduce vehicular travel speeds. It is designated a Class III bicycle route. The school's parking lot is located on the southeastern corner of the property, with three access driveways along Spruce Street. The northern two driveways serve the drop-off area and a single-loaded angled parking aisle. Parents enter the northernmost driveway and head south along the school frontage to drop off students. The second driveway is exit-only. The southernmost driveway is full-access and mainly serves the approximately 50 spaces at the southern end of the parking lot. An existing sidewalk extends along most of the school fence line through the parking lot. However, the sidewalk ends before connecting to Thornton Avenue.

Spruce Street provides two crossing opportunities near Schilling: (1) an uncontrolled marked school crosswalk at Sunset Avenue, and (2) a signalized crossing at Thornton Avenue.

ON-SITE OBSERVATIONS

- Positive practice: A rear access gate is located off of Peachtree Avenuefor students to access the Schilling Elementary campus during pick-up and drop-off times

Positive practice: School sstaff directs drop-off/pick-up traffic in the parking lot

Bicycle racks are located in a prominent location, but has relatively little use

OFF-SITE OBSERVATIONS

- Positive Practice: A crossing guard is stationed at the Thornton Avenue and Spruce Street signalized intersection where more than 200 school-age pedestrian cross daily
- During peak drop-off/pick-up times,

northbound Spruce Street traffic is heavily congested due to the queuing for the left-turn movement into the school site

- High vehicle speeds and volumes on Thornton Avenue present a barrier for students coming to school on foot or by bicycle
- High pedestrian and vehicle activity on Thornton Avenue and Spruce Street increases conflicts
- Limited pedestrian crossing opportunities on Thornton Avenue

ON-SITE RECOMMENDATIONS

- Enhance the pedestrian path accessing the gate on Peachtree Avenue and ensure the gate is open daily
- Extend the pedestrian path in front of the school near parking lot to Thornton Avenue to provide a direct pedestrian path

Consider prohibiting left turns out of the parking lot at peak times to improve parking lot circulation

OFF-SITE RECOMMENDATIONS

- Add a median refuge on Thornton Avenue to facilitate shorter crossing distances for pedestrians.
- Stripe side-street crosswalks on Thornton Avenue.
- Enhance current crosswalk at Maple and Thornton Avenues.
- At the intersection of Thornton and Spruce, add curb extensions on all corners to help slow down vehicle right turns and reduce crossing distances. Additionally, consider a leading pedestrian interval and protected left- turn phasing.
- Consider adding a stop sign on Sunset Avenue at Spruce Street if warrants are met.
- Enhance the crosswalk along Spruce Street at Sunset Avenue with high visibility treatments such as advance yield lines.
- Add curb extensions to Peachtree Avenue and Spruce Street to shorten the crossing distance.
- Add a crosswalk at the intersection of Laurel Street and Peachtree Avenue to facilitate a clear crossing location for children accessing the rear gate of the school.
- Adding bicycle facilities on Thornton Avenue.

SNOW ELEMENTARY

EXISTING CONDITIONS

Snow Elementary School is located in the north-central area of the City near the intersection of Haley Street and Mirabeau Drive, adjacent to Mirabeau Park. Snow Elementary has 377 students currently enrolled and is within a predominantly residential neighborhood. Railroad tracks to the southwest and Rochelle Avenue, Cherry Street, and Lafayette Avenue to the southeast form its boundaries. Snow Elementary is within a mile of several of the City's shopping centers off of SR 84 and north of the railroad tracks. According to school staff, Snow Elementary has an active volunteer group which includes seniors and a parent club. While the school reported during the walk audit that a few children ride their bicycle to school, many do not wear a helmet and might benefit from an outreach educational program.

The school site fronts Mirabeau Drive, a two-lane residential collector street with on-street parking on both sides. Snow Elementary has a parking lot on the northern edge of the property, with one-way circulation. The eastern half of the parking lot is used for drop-off/pick-up, in addition to providing 20 parking spaces. Drop-off areas are designated along the building frontage. Adequate width is provided through the aisle to provide both a lane for vehicle circulation and a lane for pick-up/drop-off activity. Vehicles then circulate through the lot and exit on to Mirabeau Drive. To reduce congestion within the parking lot, only right-turns are permitted from the exit driveway during drop-off and pick-up times. The western parking lot serves mainly as staff parking with twenty-three spaces.

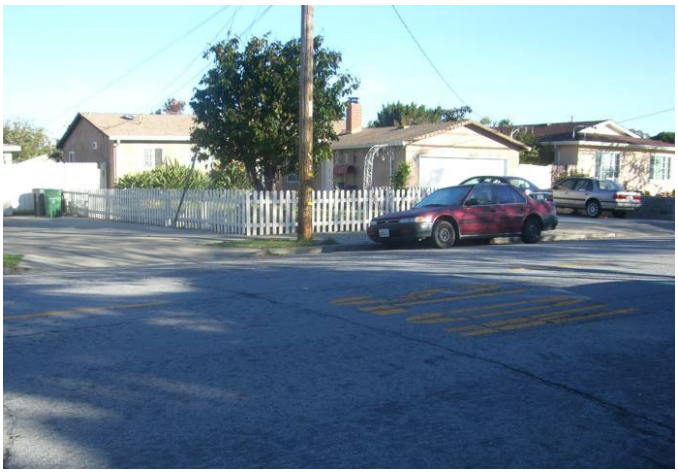
Mirabeau Drive provides two marked school crosswalks near Snow Elementary, including an uncontrolled crosswalk at Curie Court and a controlled crosswalk at Orleans Drive. A rear access gate between Snow and Mirabeau Park remains closed and locked to restrict access to the school.

ON-SITE OBSERVATIONS

- Need for more drop-off and pick-up space in the front parking lot

There is heavy pedestrian activity to and from Cedar Boulevard and through the staff parking lot towards Haley Street

The bicycle rack is in a prominent location



OFF-SITE OBSERVATIONS

- A crossing guard is stationed at Cedar Boulevard and Mirabeau Drive
- Need for additional crosswalks along Mirabeau Drive in front of the school to increase pedestrian access
- High speeds along Mirabeau Drive
- Need for high visibility treatments along Mirabeau Drive, specifically at Orleans Drive and Cedar Boulevard
- Need for continuous marked crosswalks along Rochelle Avenue
- Need to update school zone signs along Haley Street
- Complicated street geometry at Mirabeau Street and Haley Street creates a barrier for bicyclists and pedestrians

ON-SITE RECOMMENDATIONS

- Replace red painted curb with white or designate as loading zone during bell times to increase space for drop off and pick up.
- Provide rear site access through thepark, and open the existing access gate during school pick up and drop off.
- Provide a path connection to the sidewalk and add an on-site path through the back of the school.

Investigate the feasibility of turning the visitor parking lot into a staff parking lot and changing the existing loading area/staff parking into a double drop-off/pick-up lane with high visibility crosswalk and stop controls.

OFF-SITE RECOMMENDATIONS

- Ensure pavement legends are near designated crosswalks and update school crossing signs.
- Add advance yield line at the crosswalk on Haley Street by Cabernet Avenue.
- Add minor street crosswalks along Haley Street.

- Consider adding a signed neighborhood bicycle route on Orleans Drive.
- Shift the crosswalk back in order to shorten pedestrian crossing and provide directional curb ramps at Mirabeau Drive and Cedar Boulevard and add advance stop bars.
    - Another alternative for this intersection is to remove the left turn pockets and extend the median to create a pedestrian refuge.
- Add advance stop bars on Orleans Drive and advance yield lines on Mirabeau Drive at this intersection.
- Reduce the speed limit to 15 miles per hour in front of the school on Mirabeau Drive.
- Enhance existing crosswalks on Mirabeau Drive with high visibility striping and consider adding an additional crosswalk across Mirabeau Drive.
- Alternatives for the Mirabeau Drive and Haley Street intersection.
    - Option 1: Enhance with high visibility striping, signs, and flashing beacons.
    - Option 2: Remove the right turn slip lane and pork chop, add high visibility crosswalks, and add crosswalks across Mirabeau Drive with an advance stop bar.
    - Option 3: Install a roundabout with median refuges at each of the three legs with marked crosswalks.

NEWARK JUNIOR HIGH SCHOOL

EXISTING CONDITIONS

Newark Junior High School, which sits on the former high school site, is located on Lafayette Avenue near the intersection of Newark Boulevard. The school is situated in the north-central area of the City and in close proximity to several other elementary schools within the district. The Junior High has an enrollment of 935 students. Newark Boulevard, which extends along the northeastern edge of the school, is a major arterial roadway within the

City. The Newark Boulevard/Layfayette Avenue intersection is the closest signalized intersection to the Junior High School. Lafayette Avenue is the site of several bicycle and pedestrian collisions.

The Junior High fronts Lafayette Avenue, a two-lane residential collector with on-street parking on both sides. A large parking lot is provided on the eastern side of the parking lot. Since this site formerly housed the City's High School, the parking lot can accommodate nearly 175 vehicles, many spaces more than currently needed. The drop-off area around the periphery of the parking lot provides a long queue area for vehicle circulation. Two lanes are provided through the drop-off loop, one for drop-off and one for vehicle circulation. The entire northern edge of the parking lot is reserved for drop-off with a clear walking path protected from traffic by bollards. Exiting the parking lot, there are two lanes for left- and right-turns onto Lafayette Avenue.

A portion of the school frontage along Lafayette Avenue is designated for student drop-off and pick-up, although the majority is signed as a "No Stopping" zone from 7 AM to 4 PM. A sidewalk approximately 50 feet wide, with mature street trees planted every 50 feet, is provided along the frontage.

A large bicycle cage is provided at the northwestern corner of the school, with more than ten 'wheel-bender' style racks, which do not adequately support the bicycle frame when parking. During the walking audit, over 12 bikes were observed in the cage.

Two marked school crosswalks are provided across Lafayette Avenue near the Junior High – one at Christine Street (stop-controlled) and one at Bernard Street (uncontrolled). A traffic signal with crosswalks and pedestrian signals on all four legs is provided at Lafayette Avenue/Newark Boulevard.

ON-SITE OBSERVATIONS

- Staff acts as crossing guard for students in the parking lot area
- Outdated bicycle parking on the school grounds

- Expansive and underused parking lot with congestions in front of school during drop off and pick up

OFF-SITE OBSERVATIONS

- Traffic signals do not detect bicycles
- Need for enhanced crossing opportunities and bicycle facilities along busy Newark Boulevard corridor
- Existing parking along school-front on Lafayette Boulevard is inefficiently used
- Need to stripe crosswalks along the major paths around neighborhood

The stop-controlled intersection of Lafayette Avenue and Christine Street is congested with pedestrian and vehicular traffic. There is currently no crossing guard at this location.

ON-SITE RECOMMENDATIONS

- Enhance the on-site bicycle parking storage area

Study the feasibility of changing the inner loop to a double drop-off/pick-up lane with high visibility crosswalks, stop controls, and fencing to direct students to crosswalks.

OFF-SITE RECOMMENDATIONS

- Install tactile warning surfaces on curb ramps at the crosswalk on Lafayette Avenue in front of the school near Christine Street.
- Stripe crosswalks along Christine Street at intersecting residential minor streets.
- Consider removing no stopping restrictions from 7am to 4pm on Lafayette Avenue in front of the school.
- Add tactile warning surfaces on curb ramps at the crosswalk across Bellhaven Avenue at Newark Boulevard.
- Consider adding bulb-outs and altering the cycle length at Lafayette and Newark Boulevard.
- Consider enhancing the existing crosswalks at the intersection of Newark Boulevard and Brittany Avenue.
- Consider the addition of Sharrows on Newark Boulevard to close gaps in the bike facility until longer-term improvements are implemented.

- Reduce the curb turning radii at the Cedar Boulevard and Newark Boulevard intersection.
- Consider extending median nose ("thumbnail island") to provide a pedestrian refuge at the Cedar Boulevard and Newark Boulevard intersection.

Consider traffic control officers at the intersection of Lafayette Boulevard and Christine Street.

NEWARK MEMORIAL HIGH SCHOOL

EXISTING CONDITIONS

Newark Memorial High School currently has 1767 students enrolled. The school is located in the southern tip of the City, just west of Cedar Boulevard near Balentine Drive. Newark Memorial High School is near many major City destinations, including the George M. Sullivan Recreation Complex a mile to the south and NewPark Mall ¼-mile to the north. Cedar Boulevard, Newark Boulevard, Mowry Avenue, and Stevenson Boulevard are major cross-town vehicle routes that provide access to State Route 84 and I-880. Additionally, several existing bicycle facilities serve the High School, including both Class II bicycle lanes on Cherry Street and Cedar Boulevard, and sections of Mowry Avenue and Stevenson Boulevard.

The High School fronts Cedar Boulevard, which has two vehicle travel lanes in each direction near the school, with a landscaped center median and bicycle lanes. On-street parking is prohibited along Cedar Boulevard in this area. The High School provides several large parking lots, including the student lot for at the northern edge of the property, and the staff lot at the southeastern corner of the site. The student parking lot was recently realigned to improve circulation. The drop-off area is within the student lot: drivers enter the main driveway at the traffic signal opposite S. Magazine Street and make an immediate right-turn to circulate through the parking lot. Drop-off occurs along the Events Center frontage, and then drivers circulate back to the main driveway and can exit the site.

Marked, controlled crosswalks are provided near the High School at the traffic signals at Cedar Boulevard and S. Magazine Street and Balentine Drive. Each of these signals have crosswalks and pedestrian signals on all four legs. "No Stopping" signage was recently added on the Cedar Boulevard frontage to limit drop-offs.

A 'wheel-bender' style bicycle rack is provided near Cedar Boulevard in the student parking lot. Approximately eight bicycles were observed in the rack during the walking audit.

ON-SITE OBSERVATIONS

- Vehicular drop-off functions adequately in the student parking lot. A moving queue on Cedar Boulevard, which extended back from S. Magazine Street nearly to Mowry Avenue, developed as students and parents entered the parking lot.
- Drop-off also occurred on the cul-de-sac at Balentine Drive, where there is a staff monitor.
- An informal path borders the maintenance channel along the southern edge of the school property, with gated access from Cherry Street. The gate is open during drop-off and pick-up times. Otherwise it is locked.
- Students pay an annual parking permit fee of approximately $15.

The staff parking lot and student lot had open parking spaces during arrival and dismissal times

OFF-SITE OBSERVATIONS

- Positive practice: Landscaped median and landscape buffer and/or street trees are provided on Cedar Boulevard
- Positive practice: Sidewalk driveway crossings maintain flat crossing area. Driveway apron occurs in landscape buffer zone.
- Positive practice: Many intersections have been retrofitted with curb ramps with tactile warning surfaces
- Positive practice: Countdown pedestrian signals are provided near the school
- The pedestrian push button at Cedar Boulevard/N. Magazine Street is inoperable.

- Pedestrians cross outside of marked crosswalk on Cedar Boulevard between Mowry Avenue and N. Magazine Street.
- Missing Sidewalk between S. Magazine Street and N. Magazine Street on the east side of Cedar Boulevard, and along S. and N. Magazine Streets
- Bike push buttons are provided at Cherry Street/Mowry Avenue
- At several intersections, pedestrian push buttons for various directions are located on a single pole
- Crosswalks near the NewPark Mall are treated with stamped, colored pavement
- Some sections of sidewalk experienced significant upheaval from street tree roots
- Sprinklers at Chase Suites Hotel on Cedar Boulevard spray the sidewalk with water

ON-SITE RECOMMENDATIONS

- Formalize the pathway along the maintenance channel to improve access from Cherry Street.
- Add high-visibility crosswalks from the school pathways to the bust stops.

Utilize staff or a traffic control agent to direct traffic through the front parking lot.

OFF-SITE RECOMMENDATIONS

- Modify drains in bicycle lanes so that bicycle tires cross perpendicular to grates.
- Extend median noses through crosswalks to provide a full pedestrian refuge.
- Consider reducing right-turn radii at large intersections to slow vehicle speeds.
- Consider providing two curb ramps per corner at intersections and crossings to channelize disabled pedestrians into the appropriate crosswalk and in the correct direction.
- Straighten the sidewalk on north side of Mowry Avenue to provide a direct pedestrian travel path that accommodates those in wheelchairs.
- Enhance the stamped, colored crosswalks near NewPark Mall with two parallel lines (white, or yellow if in school zone) to improve visibility to sight-impaired pedestrians and comply with ADA.

6. SUPPORT PROGRAMS

Support programs use education, encouragement, and enforcement strategies to increase the safety, utility and viability of infrastructure projects to provide comprehensive citywide recommendations for improving walking and biking. Municipalities nationwide provide support to, and even administer, a broad range of programs and activities related to bicycling safety, education, promotion and law enforcement as a way to complement their project-building efforts. This chapter reviews existing support programs in Newark and provides suggestions for education, encouragement, and enforcement programs for bicycling and walking. The suggestions are based on national best practices for programs and activities that have proven effective in other jurisdictions and may well work in the City of Newark. The toolbox of education, encouragement and enforcement programs is adaptable to the unique needs of Newark and also flexible to budget opportunities and constraints.

EXISTING ENCOURAGEMENT PROGRAMS

SAFE ROUTES TO SCHOOL

SRTS programs improve the health of young children by encouraging students to safely walk or bicycle to school. Through coordinated efforts from parents, schools, community leaders and public officials, SRTS programs examine conditions around schools and identify projects and activities that make bicycling and walking to school safer and more appealing. In addition to increasing physical activity and reducing childhood obesity, SRTS programs also reduce morning traffic associated with school drop-off as much as 30%. SRTS projects draw upon a range of programs, including encouragement, education, engineering, and enforcement.

As described in Chapter 5, the Alameda County SRTS began operating in 2006 using funding from a Caltrans grant and, later, funding from authorized funding from the County's Measure B transportation sales tax and a mix of other local, regional, and federal sources. The program has grown from four schools to over 100 schools in Alameda County, including Newark's John F. Kennedy and Musick Elementary Schools. The SRTS program is administered by the Alameda County Transportation Commission (Alameda CTC).

The County SRTS program offers a wide range of programs, events, and technical assistance activities for participating schools, such as walk audits, walking school buses/bike trains, and bike skills drills. All schools in the County are invited to apply to the SRTS program and to participate in countywide events for elementary, middle and high schools. These events include International Walk and Roll to School Day each October, the "Golden Sneaker Contest," and the Bike Mobile, which provides mobile bicycle repair services to students.

In addition to the County SRTS program, the City may consider developing a comprehensive Citywide Safe Routes to School Plan that further encourages walking and biking to school and highlights preferred walking and biking routes. Such a program may involve schools, advocates, parents, City staff, community health representatives and other stakeholders. A coalition may be developed for the program, with committees for mapping/data collection, outreach, education and encouragement, enforcement and engineering, and traffic safety. School-specific committees may also be considered. Consider scheduling regular, ongoing meetings to maintain stakeholder involvement.

Funding for Safe-Routes-to-School programs and projects is available competitively through the Caltrans Active Transportation Program (ATP) (http://www.dot.ca.gov/hq/LocalPrograms/atp/). Additional information on best practices is available at www.saferoutestoschools.org.

EXISTING ENFORCEMENT AND EDUCATION PROGRAMS

PEDESTRIAN STING OPERATIONS

Pedestrian sting operations target motorists who violate the right-of-way of pedestrians crossing the street, especially motorists who do not stop for the pedestrian when the cars in the adjacent lane have stopped. Such operations can target pedestrians who make unsafe crossings. Stings are most effective on roadways and intersections with high pedestrian volumes, such as near Newark Memorial High School and NewPark Mall.

The City of Newark's Police Department conducted a pedestrian sting campaign in 2008. Pedestrian stings increase drivers' awareness of pedestrians at intersections, however as the program is not an ongoing operation; changes in motorist behavior can be short-term. Implementing the program on a recurring basis may be pursued through possible grant funds; the Bend, Oregon Police Department received a $3,200 "mini-grant" of federal funds that paid police officer overtime for six weeks.

PHOTO RED LIGHT ENFORCEMENT PROGRAMS

Photo Red Light Enforcement Programs help improve the safety of pedestrians at controlled crosswalks. Activated by loops in the pavement, red light cameras photograph the license plate and sometimes the driver of any vehicle entering an intersection after the light has turned red. Warnings or citations can be sent to offenders. Speeding and double-parking can be discouraged with similar measures.

Red light cameras are appropriate for locations with speeding or red-light-running issues. Fines from citations help pay for the red-light camera system. While the threat of a ticket prevents deliberate traffic violations; the program is repeatedly tested in court.

One technical challenge is that the digital cameras have been known to have more problems than the standard wet-film models. Malfunctions ranged from computer failures, failure of the system's telephone line to download information, and image clarity problems to overheating on hot days.

The City of Newark has installed photo red light enforcement programs at several traffic signals in the City, including Cherry Street/Mowry Avenue and Cedar Boulevard/Mowry Avenue.

BIKE NOW

The Newark Parks Foundation is a nonprofit organization unaffiliated with the City of Newark that promotes parks as a way to build active lifestyles and neighborhood connections in the City of Newark. In addition to supporting new and existing parks, the Foundation also runs the Bike NOW (Newark on Wheels) program to provide support and advocacy to the Newark community. The program hosts community bike rides, organizes bike mechanic training for parents and children, publishes a newsletter, and solicits public feedback on bicycle and pedestrian issues.

RECOMMENDED PROGRAMS

This section presents recommended support programs for Newark. **Table 6-1** summarizes each of the suggested programs outlined in this section and presents information on the cost and effort required to implement each program, as well as examples of other cities around the nation that have implemented similar programs. The target population and responsible agencies vary for each program, which means that an effective safety program takes a multi-pronged approach to reaching various populations and taking advantage of the many stakeholders invested in improving bicycle and pedestrian safety in Newark. Section 6.3.1. presents the high priority support program recommendations.

PRIORITY SUPPORT PROGRAMS

While there are variety of programs that may work well in Newark, funding and administration constraints mean that Newark must prioritize the biking and walking support programs that work best. Expanding the County Safe Routes to School Program and working with the City's Police Department to provide officer training on walking and biking issues are the highest priorities for Newark.

Officer Training Programs

Many officers have little background in pedestrian and bicycle safety laws and are not prepared to enforce laws and educate the public on proper safe behaviors. Developing a training program to raise awareness around pedestrian and bicycle safety enforcement principles can improve officers' understanding of the law, including ongoing changes as they are developed, and their ability to enforce it. Training should include information on what, when, where and how law enforcement should occur to maximize behavior change and to reduce the number of crashes involving pedestrians and cyclists.

Other cities around the nation provide examples of effective training activities for law enforcement officers. The Madison, Wisconsin Department of Transportation has developed a DVD in collaboration with the Madison Police Department to train traffic officers in pedestrian and bicycle issues (for more information see *http://www.walkinginfo.org/library/details.cfm?id=2865*). The Bicycle Transportation Alliance in Portland, Oregon offers Pedestrian Safety Enforcement Training (for more information on this five-hour course see: *http://www.bta4bikes.org/at_work/pedestriangrants.php*).

Expand the Safe Routes to School Program and Participation

The Alameda County SRTS program offers organizes safe routes to school programming that is open to any school in Alameda County. Currently, only two schools in Newark participate in the county's program.

By expanding participation in Alameda County SRTS to additional schools, more Newark students could learn about walking and biking safely and the City of Newark could receive additional assistance in improving road infrastructure. Whether or not additional schools join the Alameda County SRTS, the program offers resources that could be valuable to parents, educators, and other safety champions.

In addition or in coordination with that, the City could lead a Safe Routes to School Plan to identify safe walking and biking routes to each school and conduct community outreach with each school community.

ENFORCEMENT PROGRAMS

Enforcement of pedestrian and bicycle right-of-way laws and speed limits is an important complement to engineering treatments and education/encouragement programs. Enforcement programs reinforce legal and respectful walking, bicycling, and driving behaviors. Partnerships with law enforcement officials are particularly effective in improving traffic safety around schools.

Enforcement tools, such as Newark's existing photo red light enforcement program, have proven very effective in improving safety for road users. However, some programs can require a significant investment from local agencies. As a result the prioritization of enforcement activities is essential for implementing the most effective programs for improving bicycle and pedestrian safety in the City of Newark.

Coordination with Safe Routes to School

Involvement in SRTS activities can benefit schools, students, parents, and law enforcement agencies alike. Participating in Safe Routes to School activities can draw positive attention to the Newark Police Department, while also engaging the public on critical safety issues. Potential roles for the police department include identifying schools unsafe or unlawful behavior is a problem, conducting speed studies near schools to help inform engineering measures, and conducting targeted enforcement activities in a buffer zone around schools. The police department could also focus on crosswalk enforcement near schools by ticketing drivers who fail to yield to pedestrians. There is also a possibility for the Newark Police Department to raise awareness for safety issues by participating in countywide SRTS activities, such as a Walk to School Day event or public meetings regarding about bicycle and pedestrian safety. Many cities around the country, including Missoula, MT and Santa Barbara, CA, have developed special non-fine ticket-writing campaigns for youth that aim to encourage safe bicycling behavior at an early age.

Community Engagement and Neighborhood Enforcement

Effective enforcement, especially for SRTS programs, requires law enforcement officers to work closely with community members to promote safe walking, bicycling and driving. Because most traffic around schools is made up of neighborhood residents, parents, and faculty/staff, an effective enforcement program will seek to notify all groups that about law enforcement activities.

One low-cost option for expanding the enforcement of safe walking and biking procedures is to enlist representatives of communities and schools (including older students) to become safety patrol members or crossing guards. Community members can also help enforce safe driving through neighborhood speed watch programs, which provide opportunities educating drivers about speed while also communicating that the neighborhood is concerned about safety. Finally, all adults in a community should set good examples for their children and others by crossing streets in crosswalks and following other traffic rules.

Increased Fines

An increase in traffic fines discourages driver violations against pedestrians in crosswalks. For example, Salt Lake City, Utah increased fines from $34 to $70 for driver violations against pedestrians in crosswalks. The Police Department also lowered jaywalking fines from $70 to $10. Variations on this approach include double fines in school zones and construction zones. Increasing fines would be a low-cost option for improving the effectiveness of law enforcement in and around Newark's schools.

All the components of a good law enforcement program—creating awareness, alerting the public and the actual enforcement event—benefit from media coverage. The goal is to garner substantial media attention, not give numerous tickets. If 10 motorists receive tickets and 100,000 people hear about it, the enforcement effort will have a bigger impact than if officers issue 100 tickets, and only the recipients know what happened. The key to a successful campaign is to provide information before the enforcement event occurs to encourage community support and facilitate positive coverage. Without such prior notification, motorists may claim to be caught by surprise, which can lead to negative publicity.

Engaging the Media

Involving the media in law enforcement activities can help the Newark Police Department amplify the effectiveness of safety programs. Holding pedestrian safety press conferences and providing the press with information about walking and safety statistics prior to beginning new enforcement activities can facilitate positive coverage. Raising awareness of law enforcement may cause some drivers to alter their unsafe actions.

Tattletale Lights/Rat Box

Tattletale lights are similar to the photo red light enforcement technology, but serve to aid rather than replace law enforcement officers. To officers catch red-light runners safely and more effectively, a "rat box" is wired into the backside of a traffic signal controller and allows enforcement officers stationed downstream to identify, pursue, and cite red-light runners. Warning signs m ay be set up along with the box to warn drivers about the fine for red-light violations. While "rat boxes" are a low-cost initiative (approximately $100 to install the box), they do require police officers for enforcement. Similarly, newer enforcement tools like radar "wagons" can minimize the amount of staff time required of local law enforcement agencies.

EDUCATION AND ENCOURAGEMENT PROGRAMS

In addition to enforcement and engineering, education and encouragement are critical elements for a complete and balanced approach to improving both bicycling and pedestrian safety in Newark. Education campaigns include residents of all ages, especially emphasizing education of school children where safe bicycling and crossing habits may be instilled as lifelong lessons.

Many education efforts involve an element of community participation, as they are volunteer-based. As a result, education programs are among the most inexpensive tools to improve the walking and bicycling environment. Education programs can also be a collaborative effort between the City and local public health organizations. The following is a prioritized list of possible low-cost education and encouragement programs that the City of Newark could consider.

Billboards and Electronic Message Boards

Billboards and electronic message boards promote pedestrian safety in the community, inform the public about pedestrian safety programs, and provide feedback on the program's effects.

Example: Street Smarts is one example of a public education campaign targeted toward changing driver, pedestrian, and bicyclist behavior to improve safety on our streets.

Street Smarts is a safety program initiated by the city of San José, California. Under this program, electronic message boards were used to display safety messages at various pedestrian hot spots. Messages were changed regularly and the boards were moved repeatedly to maximize their impact. The Street Smarts campaign launched in November 2002 and has received positive feedback from the public.

Street Smarts was designed as both a media and a community relations campaign. It uses education to raise awareness of certain problem behaviors that contribute to traffic crashes and aims to change those behaviors over time. Current behaviors being addressed by the campaign are: red-light running, speeding, stop sign violations, school zone violations and crosswalk violations. In addition to a media campaign, it is critical that a community relations campaign is conducted, working with schools, neighborhood associations, businesses and community organizations to create a public forum to address this growing community issue. Although the Street Smarts campaign requires staff resources, the overall cost is low to implement.

Bicycle Training and Repair

Bicycle training and repair classes are an excellent tool to increase community knowledge of bicycle maintenance issues and street riding skills. Local bike shops, bicycle clubs or community groups can offer a series of bicycle repair and training classes for youth and adults. Youth training classes can include a "build-a-bike" program, in which youth learn how to rebuild a used bicycle that they may keep at the end of the program. Such classes are most helpful for beginner to intermediate bicyclists who would like to improve their understanding of bicycle maintenance and street riding skills.

Cycles of Change, a bicycle education program founded in July 1998 as part a community-based partnership in Oakland, formerly operated a cycling club at Newark Junior High School – 'NJHS Cycling!' While this program is no longer active, it was an effective tool for teaching bicycle mechanics and proper riding techniques through group outings. The program's mission was to promote cycling as a primary means of safe, enjoyable, accessible, inexpensive, healthy, and sustainable transportation for as many Bay Area residents as possible.

Brochures and Pamphlets

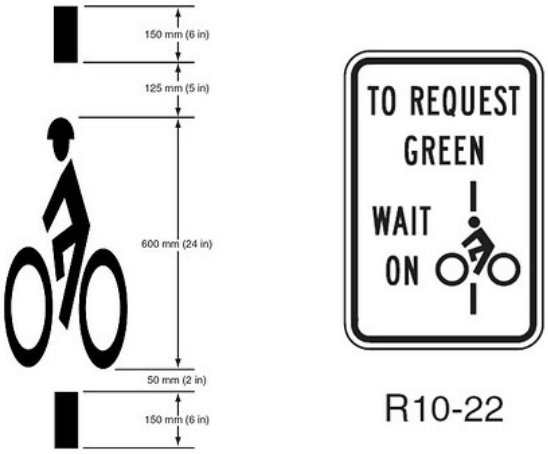
Brochures and pamphlets are helpful to educate pedestrians and bicyclists on safe riding and crossing behaviors. They can be distributed at locations with high volumes of pedestrians and bicyclists and on the City's website, as part of a general education campaign.

A bicycle brochure may also describe the types of traffic signal detection used at intersections: video detection and inductive loop detection. It explains how the detectors work and shows the best places to position a bicycle to be detected at a signalized intersection.

One advantage of this approach is that materials can be distributed at existing bicycle and pedestrian-oriented events. Once the materials are developed, distributing them requires minimal staff time.

Example: Santa Clara County's *Bicycle and Pedestrian Safety for Parents and Youth* pamphlet emphasizes the importance of children learning the correct bicycling rules at an early age. When children adopt safe techniques early, they are more likely to practice them as they grow older.

Figure 9C-7. Example of Bicycle Detector Pavement Marking



Public Service Announcements

Public service announcements (PSA) can provide accurate and current information to the public. PSAs are valuable as they are versatile and can reach a large audience on pedestrian and bicycle issues, education, and announcements. One challenge is that PSAs can be costly and may not reach the intended audience. A low-cost approach may not be as effective as using a public relations firm and purchasing advertising time targeted to a specific audience.

Educational Signs for Bicycle Detectors

A major point of emphasis for those who bicycle in Newark today is incorporating bicycle sginal detection and green and yellow clearance intervals appropriate for the speed of the average bicyclist. While this is a requirement of new signals and modified signals in California, bicyclists somsestimes may not understand how to use the detection. Providing pavement legends and signs can help educate bicyclists on where to queue in order to be detected. This is important both with loop and video detection. Pavement legends and signs, suchas those shown at right, installed along bicycle routes approaching signalized intersections instruct bicyclists to look for the bicycle detector symbol and stop their bicycle on it in order to actuate the signal. Signs can improve the understanding of bicycle detections and encourage bicyclist compliance to signals. This would supplement brochures available on the City's website and at City Hall or Community Centers. Signs can be posted along bicycle lanes, routes, and boulevards at actuated signals.

Educational signs can be installed above pedestrian push buttons to improve understanding of pedestrian signal indications. Signs improve public understanding of pedestrian signal indications and thus

encourage pedestrian compliance. Signs should be considered at locations with ten or more pedestrian crossings per hour.

Bike and Pedestrian Safety Website

One effective tool for educating and encouraging the public is a city-run website dedicated to bicycle and pedestrian safety in Newark. Website allow cities to communicate with the community and also for the community to communicate with the city. Such a website could provide a forum for advice, feedback, news and events, safety tips, and useful information. A website could support a broader safety campaign focused on education by providing training materials for the all age groups.

Media Programs

A great way to educate the public on pedestrian and bicycle issues is through media. For example, the monthly television series Perils for Pedestrians promotes awareness of issues affecting the safety of people who walk and bicycle. Many cities in California including Berkeley and Davis are already taking part through cable stations and webcasts. The series discusses important issues affecting alternative modes of travel such as: pedestrian hazards, infrastructure, bicycles, transit, and more.

Pedestrian Mascot

Pedestrian Mascots can also raise awareness of bicycle and pedestrian safety. Bellevue, Washington launched a pedestrian mascot campaign at their elementary school in conjunction with roadway improvements. The mascot, called PedBee, is on school safety signs and makes personal appearances at school safety days. Safety days involve local city staff from the City's Transportation and Police Departments. Children are taught bicycle, pedestrian, and traffic safety basics, such as crossing the street safety. Children are also given traffic safety workbooks that provide guidance hands-on activities such as coloring and safety procedure quizzes.

Walk Wise, Drive Smart

The number of senior pedestrians is growing. The US Census estimates approximately ten percent of Newark's population is over age 62. Walk Wise, Drive Smart is a program aimed to improve the pedestrian environment not only for older adults, but for all residents and visitors. It is a community program that holds educational workshops, walking audits, and feedback surveys. Activities provide exercise for older adults at a pace and location comfortable to the participants, but are open to all.

SmartTrips Program

Single occupancy vehicle trips in the primary mode of transportation for most Newark residents. SmartTrips is a program to encourage walking, bicycling, carpooling and transit through hand-delivered information packets and social marketing strategies. Social marketing describes an approach to changing behavior that draws on traditional advertising techniques. Key components of the SmartTrips packet

include: biking and walking maps, organized activities that get people out in their neighborhoods or places of employment to shop, work, and discover how many trips they can easily, conveniently, and safely make without using a car. Newark could measure the success of this program through surveys of mode share and travel behavior.

Pedestrian Flag Program

The purpose of a pedestrian flag program is to make pedestrians more visible as they cross the street. Hand-held flags are located in containers at both sides of the crosswalk and can be carried by pedestrians as they cross the street. The brightly colored flags can make pedestrians more visible to drivers and alert drivers to the presence of pedestrians. Depending on the number of intersections involved, the start-up costs for this type of program would be relatively low for Newark.

Table 6-1.
Recommended Education, Encouragement and Enforcement Programs

Program	Target Population					Responsible Agency				Cost	Cities Using Program	Studies
	Motorists	All Bicyclists	All Pedestrians	Young Pedestrians	Elderly Pedestrians	Police Department	Public Works	Planning Department	Parks & Recreation			
Expansion of Safe Routes to School Program	X			X		X	X	X	X	Medium to high: costs may be covered with competitive grant funding from Caltrans	Newark and Alameda County	
Training Programs	X	X	X							Medium: Staff time plus course registration and possible travel fees. Portland's PSE Training for 2011 is $30 for course plus $100 for lodging.	Madison, Wisconsin; Portland, Oregon	Madison, Wisconsin results can be found at the following website: http://www.walkinginfo.org/library/details.cfm?id=2865
Increase in Fines	X		X			X	X			Low-cost initiative and increased fine revenue	Salt Lake City, UT	
Tattletale Lights/ Rat Box	X					X	X			Low: the cost is about $100 to construct the box	City of Sunnyvale, CA; Santa Clara County, CA	Stop Red Light Running program, Sunnyvale CA
Street Smarts (Message Program)	X	X	X			X	X			Low: costs $3,500 to insert a new agency name on campaign artwork. Program set-up is an additional cost.	City of St. Petersburg, FL; City of San Jose, CA. Over 20 other cities in California have adopted the San Jose program materials	Center for Urban Transportation Research, University of South Florida
Bike Training and Repair		X							X	Low	Newark Junior High School previously had a similar program	
Additional Brochures and		X	X	X	X		X		X	Low	City of Santa Cruz, CA; Salt Lake City, UT	

Program	Target Population					Responsible Agency				Cost	Cities Using Program	Studies
	Motorists	All Bicyclists	All Pedestrians	Young Pedestrians	Elderly Pedestrians	Police Department	Public Works	Planning Department	Parks & Recreation			
Pamphlets												
Public Service Announcements	X	X	X			X	X	X		Low to high		
Educational Signs for Bike Detectors		X					X			Low: $250 per installation, including labor		
Educational Signs for Pedestrian Signals			X	X	X		X			Low: $250 per installation, including labor	City of Boston, MA; City of Philadelphia, Pennsylvania	Lalani, N., and W. Baranowski. "Reducing Public Confusion about the Use of Pedestrian Signals." ITE Journal, January 1993; ITE, Pedestrian Information Plaques: An Informational Report, Prepared by Traffic Engineering Council Committee TENC-4S-02, October 1997.
Safety Website	X	X	X	X	X			X		Low	Boston: https://www.cityofboston.gov/bikes/bikesafety/	
Media Program (Perils for Peds)										Free	Contact: John Z Wetmore (301) 654-5305 john@pedestrians.org www.pedestrians.org	
Pedestrian/ Bicycle Mascot				X			X	X		Low	Bellevue, WA	
Walk Wise,	X		X		X		X			Low to Medium: $250K over	Henderson, NC; New York, NY; Marin	

Program	Target Population					Responsible Agency				Cost	Cities Using Program	Studies
	Motorists	All Bicyclists	All Pedestrians	Young Pedestrians	Elderly Pedestrians	Police Department	Public Works	Planning Department	Parks & Recreation			
Drive Smart										three years. Includes staff time and programmatic activities. Grants may be available from federal and state agencies.	County (Safe Routes for Seniors Program)	
SmartTrips Program	X	X	X	X			X	X		Medium to High: The program costs $10 per person in the SmartTrips area. A typical 20,000-household program costs $570,000. This cost includes 4.35 FT staff and most materials and services. Staff overhead is included in this number, but computer and general overhead and printing bicycle maps and transit schedules are not.	Portland, OR Sausalito, CA Alameda County, CA	Program results can be found on the www.walkinginfo.org website: http://www.walkinginfo.org/library/details.cfm?id=3961

7. PRIORITIZATION

The proposed bicycle and pedestrian networks, when fully implemented, will provide a comprehensive, comfortable, and safe active transportation network for Newark. In order to provide a sense of relative priority of each project, the proposed improvements are organized and ranked. The intent of prioritization is to identify generally which bicycle and pedestrian facilities are the highest priority for the City and should be constructed first based on the establish criteria. The prioritization rankings may change over time because of changing travel patterns, land use patterns, understanding of user needs, community priorities, and implementation constraints and opportunities like roadway repaving. City staff, in conjunction with the Bicycle and Pedestrian Advisory Committee (BPAC) and the greater community should review the project list regularly to ensure it reflects the most current priorities, needs, and opportunities for implementing the bicycle and pedestrian networks in a logical and efficient manner. The prioritized list is not intended to be a binding or fixed ranking system; instead, it provides a general road map of the community's priorities for implementing biking and walking projects citywide.

The following sections detail the proposed prioritization criteria for bicycle and pedestrian projects, respectively, as well as the general prioritization process proposed for use in the Plan. The prioritization criteria and weighting incorporate extensive community feedback received at public workshops and BPAC meetings in addition to input from the City of Newark.

BICYCLE NETWORK PRIORITIZATION CRITERIA

Five criteria were analyzed to prioritize potential bicycle projects:

- Anticipated use
- Connectivity
- Regional access
- Safety
- Relative ability to implement

ANTICIPATED USE (FOUR POINTS)

This criterion prioritized projects with the highest potential to serve existing bicyclists as well as potential future bicyclists. Key to this criterion is the comfort and safety that the bicycle facility type provides. Low traffic stress bikeways that are highly comfortable for people of a wide range of ages and abilities are given top scores.

Projects that:

- Provide a separated bikeway receive four points.
- Provide a path or low traffic stress bicycle lane receive three points.

- Provide a bicycle boulevard receive two points.
- Provide a bicycle route receive one point.

CONNECTIVITY (FIVE POINTS)

This criterion evaluates access to major streets, connections between activity centers, and links to neighborhoods. Projects that:

- Close a major gap receive one point.
- Provide opportunity for coordination with nearby, on-going project receive one point.
- Completes street by adding a facility where one does not currently exist receive one point.
- Connect to an existing or planned transit stop receive one point.
- Are part of a cross-city route receive one point.

REGIONAL ACCESS (TWO POINTS)

The criterion assesses a project's contribution to regional access is based on whether the project provides access. Projects that:

- Across a freeway or rail crossing receive one point.
- To a regional trail or bikeway receive ½ point.
- To a bikeway in an adjacent city receive ½ point.

SAFETY (THREE POINTS)

The method for assessing the safety of on-street facilities measures the number of bicycle collisions on the roadway over the past ten years within a half-mile:

- Projects that provide a bikeway on a roadway within a half mile of a location with more than 5 collisions over the past ten years receive three points.
- Projects that provide a bikeway on a roadway within a half mile of a location with 3 to 5 collisions over the past ten years receive two points.
- Projects that provide a bikeway on a roadway within a half mile of a location with fewer than 3 collisions over the past ten years receive one point.

For off-street facilities, the facility is assessed based on the potential for conflicts with motor vehicles:

- Intersection improvement projects and grade separation projects receive three points.
- Trail and path projects that cross roads and driveways less than one time per mile receive three points.

- Trail and path projects that cross roads and driveways fewer than two times per mile receive two points.
- Trails and path projects that cross roads and driveways fewer than three times per mile receive one point.

RELATIVE ABILITY TO IMPLEMENT (FOUR POINTS)

The relative ease of project implementation was determined through a review of existing plans, field review of the study area, and level of construction required for implementation. Each potential bicycle project was assigned an ease of implementation category of high, moderate, or low:

- *High implementation ability:* Projects that do not require repaving, re-striping, modification of existing street layout, right-of-way acquisition and projects that converge with the City's overall planning priorities receive four points
- *Moderate implementation ability:* Projects that require repaving, re-striping, and minor modifications to the existing layout receive three points
- *Low implementation ability:* Projects that require major construction, right-of-way acquisition, or inter-jurisdictional coordination receive one point

PEDESTRIAN NETWORK PRIORITIZATION CRITERIA

Pedestrian projects are prioritized based on their:

- Proximity to pedestrian priority areas
- Community connectivity
- Safety
- Relative ease of implementation.

The criteria for prioritizing pedestrian projects differ slightly from that for bicycle projects. This is largely due to the large quantity of pedestrian projects and the different grant requirements for bicycle and pedestrian projects.

PROXIMITY TO PEDESTRIAN PRIORITY AREAS (FIVE POINTS)

The Pedestrian Element will identify Pedestrian Priority Areas in Newark where the City anticipates its highest pedestrian demand and need for improvements. Pedestrian demand is also relatively higher in areas located within walking distance of amenities including but not limited to commercial areas, schools, parks, and trails. The highest priority is given to key pedestrian amenities like schools and large parks.

Projects are prioritized based on their proximity to a Priority Area, specifically the number of amenities located within ¼ mile walking distance, based on aerial straight line distance. This criterion will be assessed on a scale of 1 to 5 (with 5 representing the highest priority). Unlike bicycle projects' anticipated

use criteria, this proximity to priority areas criterion is defined by the raw count of nearby amenities rather than the facility or roadway type.

Projects that:

- Are within ¼ mile walking distance of 5 or more of the destinations listed above, or at least 3 high priority amenities, receive five points.
- Are within ¼ mile walking distance of 4 or more of the destinations listed above, or 2 high priority destinations, receive four points.
- Are within ¼ mile walking distance of 3 or more of the destinations listed above, or 1 high priority destinations, receive three points.
- Are within ¼ mile walking distance of 2 or more of the destinations listed above receive two points.
- Are within ¼ mile walking distance of 0-1 of the destinations listed above receive one point.

COMMUNITY CONNECTIVITY (FOUR POINTS)

This criterion evaluates the ability of a pedestrian project to provide access across major streets, to provide safe connections between activity centers, and to link neighborhoods and/or overcome physical barriers between them. Projects that

- Improve access on or across a barrier, such as a major arterial, freeway interchange or railroad tracks receive three points.
- Improve access along a bus route receive one point.

SAFETY (FIVE POINTS)

The proposed method for assessing the safety of pedestrian projects measures the number of pedestrian collisions on the roadway over the past ten years:

- Projects that provide a pedestrian facility or improvement within a half mile of a location with more than 5 collisions over the past ten years receive five points.
- Projects that provide a pedestrian facility or improvement on a roadway within a half mile of a location with 3 to 5 collisions over the past ten years receive four points.
- Projects that provide a pedestrian facility or improvement on a roadway within a half mile of a location with fewer than 3 collisions over the past ten years receive two points.

RELATIVE ABILITY TO IMPLEMENT (THREE POINTS)

The relative ease of project implementation was determined through a review of existing plans, field review of the study area, and level of construction required for implementation. Each potential bicycle project was assigned an ease of implementation category of high, moderate, or low:

- *High implementation ability*: Projects that do not require repaving, re-striping, modification of existing street layout, right-of-way acquisition or projects that converge with the City's overall planning priorities receive three points.
- *Moderate implementation ability*: Projects that require repaving, re-striping, and minor modifications to the existing layout receive two points.
- *Low implementation ability*: Projects that require major construction, right-of-way acquisition, or inter-jurisdictional coordination receive one point.

NETWORK PRIORITIZATION PROCESS AND RESULTS

Bicycle and pedestrian projects were evaluated and prioritized separately based on the criteria described in the previous sections. The proposed bicycle and pedestrian projects were assigned a score for each criterion described above. Projects are assigned a total score (out of a possible 18 for bicycle projects or 17 for pedestrian projects) and group into either high, medium, or low priority groups. While these are general priority rankings that may shift as the community changes and as implementation opportunities arise, the highest priority projects are generally understood to be implemented in the short-term (one to five years). Moderate priority projects are generally designated for mid-term implementation (six to nine years); and lowest priority projects are designated for long-term implementation (ten to twenty years). Again, these lists identify the highest current priority needs, but changing travel patterns, land use patterns, and user needs may result in modifications to actual implementation over time.

Appendix A: Bicycle Prioritized Project List summarizes the prioritization results for bicycle projects; **Appendix B: Pedestrian Prioritized Project List** summarizes the results for pedestrian projects. The top five projects for each mode are summarized below.

TOP FIVE BICYCLE PROJECTS

1. Thornton Avenue between Willow Street and SR 84: Install Buffered Class II Bicycle Lanes Between Willow and Perachtree and Class IV Separated Bikeway between Peachtree and Gateway and Class II Bike Lane between Gateway and SR 84 (15 points)
2. Newark Boulevard, between SR 84 and Jarvis Avenue: Install Class IV Separated Bikeway (15 points)
3. Thornton Avenue, between I-880 and Mayhews Landing Road: Install Class II Bicycle Lanes with buffer (15 points)
4. Thornton Avenue, between Willow Street and Mayhews Landing Road: Install Class II Bicycle Lanes (14 points)
5. Cherry Street between Central Avenue and Stevenson Boulevard: Install Class IV Separated Bikeway (14 points)

In addition to that, the Dumbarton Transit-Oriented Development (TOD) to Refuge connection is a high priority project and received 14 points. The Newark-Fremont Bay Trail Feasibility Study and the Dumbarton TOD Specific Plan detail the alignment, issues, and opportunities through this section. While

development will assist in building portions of the trail, there is $3 million needed for grade-separated railroad crossing and a crossing of the Slough.

TOP FIVE PEDESTRIAN PROJECTS

1. Newark Junior High School Safe Routes to School improvements (15 points)
2. Thornton Avenue between Willow Street and I-880 streetscape improvements (15 points)
3. Cedar Boulevard at Milani Avenue, uncontrolled multi-lane crosswalk enhancements (16 points)
4. Milani Campus of the Birch Grove Elementary School Safe Routes to School improvements (14 points)
5. Thornton Avenue at Ash Street, crosswalk marking (14 points)

Detailed project descriptions are provided on the following pages.

BIKE-1. Thornton Avenue between Willow Street and SR 84

This segment of Thornton Avenue is a key connection to major open space and trail destinations as well as a key commute route for those traveling to the Peninsula on the Dumbarton Bridge. Thornton Avenue transitions from a four-lane arterial with a raised median between Peachtree Avenue and Willow Street to a two-lane roadway between Peachtree Avenue and SR 84. North of Peachtree Avenue, speeds are 45MPH and existing wide shoulders provides bicycle access. However, pavement quality and debris are consistent issues on that segment. South of Peachtree Avenue, there is approximately 32 feet of pavement on either side of the raised median. Marshlands Road is an important connection to the Dumbarton Bridge and the Don Edwards San Francisco Bay National Wildlife Refuge and its trail system, including the Bay Trail. Currently, bicycle turning movements onto and off of Marshlands Road are difficult given the high speed differential between bicyclists and autos and the lack of bicycle infrastructure to support turning movements. The proposed project will close a critical gap connecting the Newark on-street network with key regional resources in the Bay Trail, open space paths, and the Dumbarton Bridge connection. A bike/pedestrian connection between the TOD and the Don Edwards Wildlife Refuge trails would provide a auto conflict free connection to Coyote Hills regional Park and the Dumbarton Bridge bikeway.

Detail of Proposed Improvements

- Install striped Class IV separated bikeway with "armadillos" or similar raised elements between SR 84 and Peachtree Avenue, as defined in **Appendix D: Design Guidelines**.
- Install raised elements to allow for typical street sweeping of the separated bikeway with Newark's existing street sweeping equipment. Maintain separated bikeway routinely and clear separated bikeway of debris.
- In the long-term, design the WB SR 84 On-Ramp to bring the on-ramp to the existing signal at the EB SR 84 Ramps/Thornton Avenue. In the near-term, stripe green conflict zone striping through the EB SR 84 On-Ramp.
- At the Marshlands Road intersection, provide support for bicyclists making left-turns onto and off of Thornton Avenue. Stripe a "cross bike" for bicyclists making the WB left-turn and the NB left-turn with a two-way raised median refuge for bicyclists.
- At the intersection with Gateway Boulevard, install bicycle detection at all approaches, including left-turn pockets. Move existing bicycle lane to the appropriate location between the left- and right-turn lanes. Use green to define the conflict zone between right-turning vehicles and bicyclists transitioning from the curbside bicycle lanes to the bicycle lane between the left- and right-lanes.
- Stripe buffered Class II bicycle lanes between Peachtree Avenue and Willow Street, assuming 11′ inside, 12′ outside lane, and 3′ striped buffer with 6′ bicycle lane.
- Install bicycle detection, adjust green and yellow clearance intervals for the average bicyclist at all existing signals, and stripe green-skip striping through conflict zones where turn pockets add at signalized intersections.

Cost

$426,400 for Class II bicycle lanes between Mayhews Landing Road and Willow Street

$87,200 for Class II buffered bicycle lanes between Willow Street and Peachtree Avenue

$524,500 for Class IV separated bikeway between Peachtree Avenue and SR 84. Note that this should be integrated into the proposed roadway widening of Thornton Avenue through this area, in addition to the proposed pedestrian improvements on Thornton Avenue.

$150,000 for Marshland Road Intersection Improvements

$41,000 for Gateway Boulevard Intersection Improvements

$4,000,000 for Route 84 /Thornton Interchange Improvements

BIKE-2. Newark Boulevard, between SR 84 and Central Avenue

This segment of Newark Boulevard has an important commercial function with many popular retail locations. It also provides regional auto access to SR 84. Residential neighborhoods are located close by, approximately a half block to the east and west of the corridor. The roadway has a six to eight lane cross-section with no parking on either of the street and a 35MPH posted speed limit.

The level of traffic stress is very high for bicyclists. As a result, full protection of the bicycle lane is needed.

Detail of Proposed Improvements

- Install Class IV separated bikeway through narrowing of travel lanes to 11-12 feet. Stripe four foot buffer with "armadillos" for protection and eight foot bicycle lanes.
- Install raised elements to allow for typical street sweeping of the separated bikeway with Newark's existing street sweeping equipment. Maintain separated bikeway routinely and clear separated bikeway of debris.
- Install bicycle detection, adjust green and yellow clearance intervals for the average bicyclist at all existing signals, and stripe green-skip striping through conflict zones where turn pockets add at signalized intersections.

Cost

$905,000

BIKE-3. Thornton Avenue, between I-880 and Mayhews Landing Road

This portion of Thornton Avenue typically has a three-lane cross-section with a two-way center left-turn lane. The street has a 64 feet curb to curb dimension, which allows for Parking is allowed on both sides of the street and many of the fronting uses are residential transitioning to commercial nearer to I-880. This segment has an important safe routes to school function and provides walking and biking access to Schilling Elementary School

Detail of Proposed Improvements	• Near-Term: Stripe buffered bicycle lanes in each direction through reducing travel lanes to 11 feet inside and 12 outside. Stripe seven foot bicycle lane with three foot buffer. • Long-Term: Install "armadillos" or raised concrete median islands to transition the buffered bicycle lanes to fully-protected Class IV separated bikeways • Near-Term: Stripe skip-striped green conflict zones through I-880 On- and Off-Ramps • Long-Term: Realign I-880 On- and Off-Ramps to bring ramps into existing signal to improve bicycle and pedestrian safety. • Near-Term: Install bicycle detection, adjust green and yellow clearance intervals for the average bicyclist at all existing signals, and stripe green-skip striping through conflict zones where turn pockets add at signalized intersections.
Cost	$180,000

BIKE-4. Thornton Avenue, Willow Street and Mayhews Landing Road

This segment of Thornton Avenue covers a diverse section of the city with fronting residential uses on the west end, an important retail node at Sycamore Street, and commercial uses further east toward I-880. The western portion of Thornton Avenue typically has a three-lane cross-section with a two-way center left-turn lane through to the railroad tracks between Ash Avenue and Sycamore Street. East of the railroad tracks, a second eastbound travel lane is added and the roadway transition to a four lane cross-section with parking on both sides. Between Willow and Cherry Street, the roadway has a consistent 62 foot cross-section. This segment has an important safe routes to school function and provides walking and biking access to Schilling Elementary School. Between Cherry Street and Mayhew Landing Road, the roadway widens again to a five lane cross-section with raised median and parking on both sides, with approximately 33 feet between the median and face of curb. Parking is prohibited between Newark Boulevard and Mayhews Landing Road on the north side of the street.

There are significant near-term constraint with second westbound travel lane between Sycamore Street and Cherry Street and 32 foot curb-to-curb dimension with two travel lanes and on-street parking between Cherry Street and Mayhews Landing Road.

Detail of Proposed Improvements

- Near-Term: Stripe buffered bicycle lanes between Willow Street and Sycamore Street in both direction with 12 foot center left turn lane, 11 foot travel lanes, 8 parking areas, and 2 foot buffers with five foot bicycle lanes. Remove second westbound lane between Ash and Sycamore Streets.
- Near-Term: Conduct feasibility study to remove second westbound travel lane in order to provide bicycle lanes in both directions between Sycamore and Cherry Streets.
- Near-Term: Stripe Class III bicycle route with sharrows between Sycamore Street and Newark Boulevard.
- Near-Term: Stripe buffered Class II bicycle lanes in both directions between Newark Avenue and Mayhews Landing Road. Allow parking between 7PM and 7AM on the south side of the street to accommodate single-family residences
- Long-Term: Stripe Class II bicycle lanes between Sycamore Street and Mayhews Landing Road through lane reduction or parking removal.
- Near-Term: Install bicycle detection, adjust green and yellow clearance intervals for the average bicyclist at all existing signals, and stripe green-skip striping through conflict zones where turn pockets add at signalized intersections.

Cost $420,000 plus studies

BIKE-5. Cherry Street between Central Avenue and Stevenson Boulevard

Cherry Street is a wide arterial with existing bicycle lanes. The high posted speed limit of 45MPH makes standard bicycle lanes not a suitable treatment for making this a key corridor in the bicycle network. Providing fully protected bicycle lanes will substantially improve comfort and safety for bicyclists and make this a key north-south link in the bicycle network.

Issues and Opportunities	• The curb-side travel lane in each direction is 25 feet wide. Even with on-street parking provided, this is sufficient width to accommodate a bicycle lane. • Much of the City's walkable neighborhood commercial uses are provided near the Thornton Avenue/Sycamore Street intersection. • An at-grade rail crossing is located just west of Sycamore Street.
Detail of Proposed Improvements	• Reduce travel lane widths to 11 foot inside lanes and 12 foot outside lanes • Install Class IV separated bikeway with four foot striped buffers with armadillos and six to eight foot bicycle lanes • Maintain bicycle lane frequently using City's existing street sweeping equipment to remove debris • Install bicycle detection, adjust green and yellow clearance intervals for the average bicyclist at all existing signals, and stripe green-skip striping through conflict zones where turn pockets add at signalized intersections • Remove slip lanes at Central Avenue • Remove slip lanes or enhance signage at Smith Avenue, Mowry Avenue, and Stevenson Boulevard.
Cost	$1,100,000

PED-1. Newark Junior High School Safe Routes to School Improvements

Newark Junior High School is located on Lafayette Avenue near the intersection with Newark Boulevard. Improvements near the Junior High will also benefit several elementary schools in the vicinity, including Snow and Graham Elementary Schools. A detailed discussion of issues, opportunities, and proposed improvements is presented in Section 5.11.1.

Detail of Proposed Improvements	Cost
• Intersection improvements at Lafayette Avenue/Newark Boulevard • Improve curb ramps at Bellhaven Avenue/Newark Boulevard and Lafayette Avenue near Christine Street • Remove No Stopping restrictions in front of the school • Enhance crosswalks at Newark Boulevard/Brittany Avenue • Reduce curb radii at Cedar Boulevard/Newark Boulevard intersection and provide median refuges • Stripe crosswalk along Christine Street at the intersecting side-streets	$ 53,000

PED-2. Thornton Avenue between Willow Street and I-880

This segment of Thornton Avenue is an important pedestrian area with Newark. Retail and commercial nodes are located throughout the corridor. Pedestrian demand is particular high key activity centers, such as the retail around Sycamore Street and Cedar Boulevard An existing unimproved at-grade railroad crossing is located between Ash and Sycamore Streets. On the east end of the corridor, pedestrian access is only provided on the south side of the street through the I-880 interchange into Fremont. To enhance the economic activity and to improve these high pedestrian demand areas, pedestrian-scale lighting, sidewalk repair, bus stop enhancements, and other improvements are proposed to enhance the safety, security, and character of the area. This may include sidewalk widening in some locations and improvements to sidewalk quality and driveway modifications.

In addition to the streetscape projects defined above, intersection improvements at Magnolia Street, Cherry Street, Central Avenue, Cedar Boulevard, and Newark Boulevard are proposed.

Detail of Proposed Improvements	**Cost**
• Install pedestrian-scale lighting • Remove existing ADA obstructions • Repair sidewalk • Install bus shelters and bus stop amenities • Close existing sidewalk gaps • Install railroad gate	$ 6,800,000

PED-3. Milani Campus of the Birch Grove Elementary School Safe Routes to School Improvements

The Milani Campus of the Birch Grove Elementary School is located on Birch Street, near Newark Boulevard and Central Avenue. A detailed discussion of issues, opportunities, and proposed improvements is presented in Section 5.7.1.

Detail of Proposed Improvements	Cost
• Straight crosswalk at Newark Boulevard/Central Avenue • Convert slip lane at Newark Boulevard/Central Avenue to a local-access only street or install traffic calming with ladder striping at existing crosswalk • Consider traffic calming on Birch Street south of Central Avenue • Close sidewalk gap on west side of Newark Boulevard between Civic Terrace Avenue and Central Avenue • Restripe existing bicycle lanes on Newark Boulevard as buffered bicycle lane through reduction on travel lane widths to 11 feet	$ 95,400

PED-4. Schilling Elementary School Safe Routes to School Improvements

Schilling Elementary School is located on Thornton Avenue, near Spruce Street. A detailed discussion of issues, opportunities, and proposed improvements is presented in Section 5.9.1.

Detail of Proposed Improvements	Cost
• Install median refuges at school crosswalks on Thornton Avenue. • Stripe side-street crosswalks along Thornton Avenue through the school zone. • Restripe existing crosswalk at Maple/Thornton Avenues with yellow ladder striping to improve visibility and add median refuge. • Add curb extensions on all corners at Thornton Avenue/Spruce Street. Consider a leading pedestrian interval and protected left-turn phasing.	$ 298,000

PED-5. Thornton Avenue/Mayhews Landing Road Pedestrian Improvements

This signalized intersection provides a safe routes to school route for students attending St. Edward School and also serves the various commercial uses on Thornton Avenue. The northwest corner of the intersection has a curb radius, which allows high speed auto turns through the intersection. Crossing distances for pedestrian are long, which is further increased through angled crosswalks. The south crosswalk is not marked.

Detail of Proposed Improvements	Cost
• Reduce curb radii on northwest corner and install directional curb ramps • Straighten north crosswalk • Add south crosswalk	$ 72,000

8. FUNDING AND IMPLEMENTATION

Implementation of the proposed bicycle and pedestrian system will require funding from local, state, and federal sources and coordination with multiple agencies. To facilitate funding efforts, this section presents conceptual construction cost estimates for the proposed system along with a brief description of past expenditures for bicycle and pedestrian facilities. The conclusion of this section provides a brief overview of overall funding and implementation strategies.

CURRENT AND PAST EXPENDITURES

Over the past ten years, the City of Newark has spent approximately $1,595,000 on bicycle facilities. Annual expenditures were as follows:

Table 8-1.
Current and Past Bicycle and Pedestrian Expenditures

Fiscal Year	Bicycle Projects	Pedestrian Projects	Combined Projects	*Total*
2006-2007	$5,000	$250,000	$0	*$255,000*
2007-2008	$5,000	$250,000	$0	*$255,000*
2008-2009	$20,000	$260,000	$0	*$280,000*
2009-2010	$25,000	$265,000	$230,000	*$520,000*
2010-2011	$40,000	$267,000	$0	*$307,000*
2011-2012	$87,000	$233,000	$0	*$320,000*
2012-2013	$173,000	$326,000	$31,000	*$530,000*
2013-2014	$185,000	$277,000	468,000	*$930,000*
2014-2015	$109,000	$451,000	$0	*$560,000*
2015-2016	$106,000	$321,000	$0	*$427,000*
Total	*$755,000*	*$2,900,000*	*$729,000*	*$4,384,000*

Understanding the City's investment in the existing bikeway and pedestrian system and what is required to complete the system is important in developing a funding strategy. With an approximate length of 43 miles, the existing bikeway system represents a substantial investment.

FUNDING STRATEGY

With this understanding, the following options should be considered by the City for fulfilling the funding commitment necessary to complete the proposed systems:

- For multi-agency bikeway projects, prepare joint applications with other local and regional agencies, such as the City of Fremont, Alameda County, and the East Bay Regional Park District for competitive funding programs at the State and Federal levels. Joint applications often increase

the competitiveness of projects for funding; however, coordination amongst the participating jurisdictions is often challenging. The City should act as the lead agency, with a strong emphasis on coordination between participating jurisdictions and agencies (including AC Transit and Public Health organizations) on important projects to ensure they are implemented as quickly as possible.

- Use existing funding sources as matching funds for State and Federal funding.
- Include bikeway and pedestrian projects in local traffic impact fee programs and assessment districts.
- Require construction of bicycle and pedestrian facilities as part of new development.
- Continue to include proposed bikeways and pedestrian improvements as part of roadway projects involving widening, overlays, or other improvements.

The City should also take advantage of private contributions, if appropriate, in developing the proposed system. This could include a variety of resources, such as volunteer labor during construction, right-of-way donations, or monetary donations towards specific improvements.

FUNDING SOURCES

There are numerous funding sources at the federal, state, regional, county and local levels that are potentially available to the City of Newark to implement the projects and programs in the *Pedestrian and Bicycle Master Plan*. Below is a description of the most promising funding programs available for the proposed projects. Most of these sources are highly competitive and require the preparation of extensive applications.

FEDERAL FUNDING SOURCES

Fixing America's Surface Transportation Act (FAST Act)

The FAST Act provides funding for roads, transit, safety, and environmental enhancements. The FAST Act, signed into law in December 2015, supplanted the Moving Ahead for Progress in the 21st Century Act (MAP-21). Relative to MAP-21, the FAST Act makes more federal-aid highway funding available to locally-owned transportation infrastructure and also increases overall spending for the Surface Transportation Block Grant (STBG) program. This legislation also preserved the Safe Routes to School program, with funding for projects that improve pedestrian and bicycle access and safety around primary and middle schools.

Cities, counties, and transit operators can apply for FAST Act funds, although a local match is required for these funds. There are several bicycle-related programs funded through the FAST Act. These include the following:

- *Surface Transportation Block Grant (STBG) Program* – The STBG, formerly known as the Surface Transportation Program, provides block grant funds that are used for roads, bridges, transit capital, and bicycle projects. Eligible bicycle projects include bicycle transportation facilities, bike-

parking facilities, equipment for transporting bicycles on mass transit facilities, bike activated traffic control devices, preservation of abandoned railway corridors for bicycle trails, and improvements for highways and bridges. Cities, counties, metropolitan planning organizations (MPO), and transit operators can apply for STBG funds. An 11.5 percent local match is required for these funds when used for bicycle projects.

- *Transportation Alternatives Program (TAP)* – MAP-21 bundled three funding programs – Transportation Enhancements program, the Safe Routes to School program, and the Recreational Trails Program – into one Transportation Alternatives Program. The FAST Act preserved TAP, slightly increased its annual funding through 2019 (up to $850 million/year) and made it a set-aside program within the STBG program. TAP is the most prominent funding source for biking and walking infrastructure projects. However, up to half of TAP grants can be diverted to other purposes by state and local governments. Within TAP, funding for the Recreational Trails Program is preserved at the 2009 level and is effectively a set-aside of the TAP.

- *Congestion Mitigation and Air Quality Improvement Program (CMAQ)* – CMAQ funds are available for projects that will help attain National Ambient Air Quality Standards (NAAQS) identified in the 1990 Federal Clean Air Act Amendments. Projects must be located within jurisdictions in non-attainment areas. Eligible projects include bicycle facilities intended for transportation purposes, bicycle route maps, bike-activated traffic control devices, bicycle safety and education programs, and bicycle promotional programs. Cities, counties, MPO, state, and transit operators can apply for CMAQ funds. A 20 percent local or state match is required for these funds.

- *Highway Safety Improvement Program (HSIP)* – HSIP was created by MAP-21 and preserved in the FAST Act. While walking and cycling projects are eligible activities for HSIP funding, the FAST Act does prohibit using HSIP funding for non-construction activities, such as education and enforcement. The Caltrans Division of Local Assistance (DLA) manages California's local agency share of HSIP funds. Local HSIP projects must be identified on the basis of crash experience, crash potential, crash rate, or other data-supported means.

- *Section 405 National Priority Safety Programs* – The National Highway Traffic Safety Administration (NHTSA) administers a new non-motorized safety funding program. Of the $280 million allocated to the program, approximately $14 million will be awarded to States on an annual basis to decrease bike and pedestrian crashes with motor vehicles. Eligible states must have bicycle and pedestrian fatalities that constitute more than 15 percent of all fatal crashes, including California. Unlike HSIP, funding may be used for training law enforcement officials, organizing enforcement campaigns, or increasing awareness of bicycle and pedestrian laws.

- *National Highway Performance Program (NHPP)* – NHPP funding provides support for the condition and performance of the National Highway System (NHS), for the construction of new facilities on the NHS, and to ensure that investments of Federal-aid funds in highway construction are directed to support progress toward the achievement of performance targets established in a State's asset management plan for the NHS. A 20 percent local or state match is required for these funds. States may transfer up to 50% of NHPP funding to the STBG program, TAP, CMAQ, or other programs each year.

- *Transportation Infrastructure Finance and Innovation Act (TIFIA)* – The TIFIA program allows Congress to provide credit assistance to large-scale surface transportation projects. Under MAP-21, most projects needed to meet a minimum cost of $50 million to be eligible for credit

assistance. Under the FAST Act, this threshold is reduced to $10 million for projects involving local governments. This change may allow active transportation projects to more easily take advantage of these credit and innovative financing mechanisms.

- *Highway Research and Development (HRD) Program* – The HRD program funding, continued under the FAST Act, funds strategic investment in research activities that address current and emerging highway transportation needs. As such, HRD funding can be used to improve bicycle safety through education, police enforcement, and traffic engineering. Cities, counties, and state agencies can apply for these funds. A 20 percent state or local local match is required for these funds.

Land and Water Conservation Fund (LWCF)

The Land and Water Conservation Fund (LWCF) uses offshore drilling royalties paid by energy companies to provide matching grants for state and local parks and recreation projects, among other uses. The LWCF state assistance program provides matching grants to help states and local communities protect parks and recreation resources, including off-street bicycle paths.

- California Department of Parks and Recreation LWCF application webpage: http://www.parks.ca.gov/?page_id=21360

STATEWIDE FUNDING SOURCES

California Active Transportation Program (ATP), including Safe Routes to School

California's Active Transportation Program (ATP) was created in 2013 by Senate Bill 99 and Assembly Bill 101. Its purpose is to encourage increased use of active modes of transportation, including biking and walking. The ATP consolidated previously-existing funding programs, including the federal Transportation Alternatives Program (TAP), state Bicycle Transportation Account (BTA), and the federal and state Safe Routes to School programs. Program funding is divided into three components. Half of ATP funding is awarded through a statewide competitive program. Ten percent of funding is awarded through the small urban and rural area competitive program. Forty percent of funding is awarded to Metropolitan Planning Organizations, such as MTC, through the large urbanized area competitive program. The ATP Cycle 3 call-for-projects closed in June 2016.

- California ATP Webpage: http://www.catc.ca.gov/programs/ATP.htm

Transportation Development Act (TDA), Article 3

TDA Article 3 is perhaps the most readily available source of local funding for bicycle projects. TDA funds are derived from a statewide quarter-cent retail sales tax. This tax is returned to the county of origin and distributed to the cities and county on a population basis. Under TDA Article 3, two percent of each entity's TDA allocation is set aside for pedestrian and bicycle projects; this generates approximately $3 million in the Bay Area annually. Eligible projects include the design and construction of walkways, bike paths and bike lanes, and safety education programs. According to MTC Resolution 875, these projects must be included in an adopted general plan or bicycle plan and must have been reviewed by the relevant city or county bicycle advisory committee.

- MTC's Procedures for the TDA Article 3 program: http://mtc.ca.gov/our-work/fund-invest/investment-strategies-commitments/transit-21st-century/funding-sales-tax-and-0

Caltrans Sustainable Transportation Planning Grant Program

The Caltrans Division of Transportation Planning offers Sustainable Transportation Planning Grants to provide funding to support transportation planning (not construction or environmental review). The grants are intended to strengthen the economy, promote equity, and protect the environment. Eligible projects include safe routes to school plans, streetscape plans, complete street plans, and safety enhancement plans. The program requires a 20% local match. Grants are available in amounts from $100,000 to $500,000.

- Caltrans Sustainable Transportation Planning Grant Program: http://www.dot.ca.gov/hq/tpp/grants.html

California State Parks Recreational Trails Program (RTP)

The Recreational Trails Program (RTP) provides funds for recreational trails and trails-related projects, including Class I Bicycle Paths. The program is administered at the state level by the California Department of Parks and Recreation (DPR) and the Caltrans Active Transportation Program (ATP). While DPR does not anticipate conducting another cycle before 2018, the agency does intend to create a new application guide in 2017 to incorporate updated information based on the FAST Act. Applicant, including cities and towns, are responsible for obtaining a match amount that is at least 12% of the total project cost.

- PR RTP application site: http://www.parks.ca.gov/?page_id=24324

California Cap-and-Trade Funding

The Global Warming Solutions Act of 2006 (AB 32) directed the California Air Resources Board (ARB) to institute programs to reduce greenhouse gas (GHG) emissions. The Cap-and-Trade Program, a key element of the ARB's plan to reduce emissions, funds several programs that support the goals of AB 32. Several of these programs relate to transportation and mode shift. The Affordable Housing and Sustainable Communities Program (AHSC), for one, provides funding to support active transportation and complete streets initiatives, among other project types. Applications for FY 2015-2016 AHSC funding were due in June 2016.

- Cap-and-trade auction proceed-funded programs, including AHSC: http://www.arb.ca.gov/cc/capandtrade/auctionproceeds/ggrfprogrampage.htm#Transportation

REGIONAL FUNDING SOURCES

Transportation for Livable Communities

MTC created the Transportation for Livable Communities (TLC) program in 1998. MTC uses this program to finance pedestrian, bicycle and streetscape improvements near public transit in cities around the Bay Area. The purpose of TLC is to support community-based transportation projects that bring new vibrancy to downtown areas, commercial cores, neighborhoods and transit corridors, making them places where

people want to live, work and visit. Pedestrian- and transit-friendly developments are hallmarks of the program. MTC awarded the most recent round of TLC capital grants in July 2010.

- MTC's TLC program: http://mtc.ca.gov/whats-happening/news/mtc-awards-44-million-new-grants-promote-livable-communities

Bay Trail Grants

The San Francisco Bay Trail Project—a non-profit organization administered by the Association of Bay Area Governments—provides grants to plan, design, and construct segments of the Bay Trail. The amount, and even availability, of Bay Trail grants vary from year to year, depending on whether the Bay Trail Project has identified a source of funds for the program. As of 2016, the Bay Trail Project is not currently offering grants, but may in the future.

One Bay Area Grants (OBAG)

Currently in its second funding round, OBAG uses federal funds to maintain MTC's commitments to regional transportation priorities while also advancing the Bay Area's land-use and housing goals. Cities and counties can use these OBAG funds to invest in bicycle and pedestrian improvements and Safe Routes to School projects, among other uses. MTC distributes OBAG funds to county Congestion Management Agencies in each Bay Area county. The CMAs are then responsible for selecting eligible projects within each county.

- MTC's OBAG program: http://mtc.ca.gov/our-work/invest-protect/focused-growth/one-bay-area-grants

Transportation Fund for Clean Air (TFCA)

TFCA is a grant program administered by the Bay Area Air Quality Management District (BAAQMD) and funded through a surcharge on motor vehicles registered in the Bay Area. The Air District offers funding to public agencies for trip reduction, bike parking and bikeway, and clean air vehicle projects. A sub-program of the TFCA is the Bikeways, Roads, Lanes and Paths program, which offers funding for bicycle parking and bikeway projects (Class I-IV). Funding will be offered on a first-come, first-served basis until the funds (total: $3.84) are spent.

Funding for bicycle projects is also available through the TFCA's County Program Manager Fund. Under that sub-program, 40 percent of TFCA revenues collected in each Bay Area county is returned to that county's congestion management agency (CMA) for allocation (the Alameda County CMA in Alameda County's case). Applications are made directly to the CMAs, but must also be approved by the BAAQMD.

- TFCA Bikeways, Roads, Lanes and Paths: http://www.baaqmd.gov/grant-funding/public-agencies/bikeways-roads-lanes-paths
- TFCA County Program Manager Fund: http://www.baaqmd.gov/grant-funding/public-agencies/county-program-manager-fund

COUNTYWIDE FUNDING SOURCES

Measure WW

In 2008, Contra Costa and Alameda County voters approved EBRPD's Measure WW, the "Regional Open Space, Wildlife, Shoreline and Parks Bond." This extension of a similar 1988 bond measure allocates $33 million specifically to trail projects in the county. In addition, the measure will provide $48 million directly to cities, the county and special park and recreation districts for their park and recreation needs, including trails and other non-motorized transportation projects.

- Measure WW: http://www.ebparks.org/about/planning/ww

Alameda County Measure BB Bicycle and Pedestrian Program

Measure BB is a special sales tax that was passed with 70 percent approval in 2014, building on the original Measure B half-cent tax passed in 1986. Measure BB provides $8 billion in funding (from 2015 to 2045) to support the 2014 Transportation Expenditure Plan of the Alameda County Transportation Commission. Among other goals, the 2014 plan aims to provide clean transportation by expanding bike and pedestrian paths. As part of the 2014 plan, local agencies and transit jurisdictions receive Measure BB direct local distributions to support local transportation investments.

Eight percent of net revenues from Measure BB are set aside for bicycle and pedestrian improvements through the Alameda CTC Bicycle and Pedestrian Program. Three percent of overall revenues are set aside for regional trail gap closure projects (including the Bay Trail), three percent of net revenues are allocated to local jurisdictions as direct local funding, and two percent of net revenues are allocated to the Measure BB Bicycle and Pedestrian Countywide Discretionary Fund (CDF), which supports planning, projects and programs, including a competitive grant program. The CDF has funded 41 projects, totaling $9.5 million to date, and Alameda CTC has completed four funding cycles.

- Alameda County Measure BB: http://www.alamedactc.org/app_pages/view/17260
- Alameda County Bicycle and Pedestrian Program: http://www.alamedactc.org/app_pages/view/3429

LOCAL FUNDING SOURCES

A variety of local sources may be available for funding bikeway improvements; however, their use is often dependent on political support.

Roadway Construction and New Development

As development and roadway projects occur, changes to walking and biking facilities should always be considered. This may include closing sidewalk gaps, providing enhanced streetscape, and installing bicycle facilities. To ensure that development projects and roadway construction projects include the recommendations in this Plan, it is important that the review process includes a designated bicycle and pedestrian coordinator or City staff familiar with walking and biking issues. Planned roadway improvements in Newark should always consult this Plan to assist in building out the biking and walking network in the City.

Impact Fees

Cities across the country charge developer impact fees, typically tied to trip generation and traffic impacts as a result of proposed projects. The City of Newark's Building Inspection Division charges transportation impact fees for new construction projects. According to the City's 2015 permit and plan review fees documentation, developers pay transportation impact fees at a rate of $801 per single-family dwelling unit, $460 per multi-family dwelling unit, $1.38 per square foot of commercial space, and $0.68 per square foot of industrial space. The intent of this funding is to reduce trip generation and/or pay for necessary traffic improvements resulting from the new construction.

Assessment Districts

Different types of assessment districts can be used to fund the construction and maintenance of bikeway facilities. Examples include Mello-Roos Community Facility Districts, Infrastructure Financing Districts (SB 308), Open Space Districts, or Lighting and Landscape Districts. These types of districts have specific requirements relating to the establishment and use of funds.

Open Space District

Local Open Space Districts may float bonds that go to acquiring land or open space easements, which may also provide for some improvements to the local trail and bikeway system.

Capital Improvement Plan

The Capital Improvement Plan synthesizes the information for the entire network: cost estimates, funding sources, and rankings, into a plan for the next 10 years. The Capital Improvement Program is a planning document that the City may use to formulate its budget, but it does not preclude "opportunistic projects." Opportunistic projects are unanticipated projects where the City may incorporate bicycle and pedestrian facilities, even if the projects occur out of sequence. Examples include street resurfacing to include bicycle lanes, signal upgrades for pedestrians, or install a new pedestrian hybrid beacon and crosswalk.

Other Funding Sources

Local sales taxes, developer or public agency land dedications, private donations, and fund-raising events are other local options to generate funding for bikeway projects. Creation of these potential sources usually requires substantial local support.

COST OF NEW BICYCLE FACILITIES

Table 8-2 provides a unit cost summary for the construction of bikeway facilities in Newark. These costs are construction cost only, and do not include other contingencies and "soft costs," such as traffic control, construction management, mobilization, design, environmental review, and utility/drainage contingencies. These estimates are based on costs experienced in Newark and other communities throughout the State. The City will develop more detailed estimates following the preliminary engineering stage as individual projects advance towards implementation.

For purposes of this Plan, conceptual construction costs for the proposed system were based on the following assumptions:

- New Class I facilities would be constructed on generally flat right-of-way with no grade separation and minimal grading needed given the existing topography within the City; cost of right-of-way acquisition is not included.
- Most new Class II bikeways would require minimal or no roadway improvements
- New Class III bikeways would require signing only (with optional stencils).
- New Class IV separated bikeways vary in cost, due to the wide variety of treatment types and materials used. FHWA estimates that costs can range from $50,000 to $500,000 per mile. Permanent build-outs with raised curbs and/or dedicated bicycle signalization require more labor and material costs separated bikeways that consist only of flexible delineator posts and moderate amounts of paint and signage.

Table 8-2. Planning-Level Unit Cost Estimates for Bikeway Facilities

Facility Type	Description	Improvement	Estimated Cost Per Mile
Class I	Bike Path	Construct Path with Minimal Grading Needed	*$1.2 Million*
Class I w/ Greenway	Bike Path and Linear Park	Construct Path, including crossings and park improvements	*$2.8 Million*
Class II	Bike Lane	Signing and Striping with Signal Detection	*$260,000*
	Bike Lane w/ Buffer	Signing and Striping with and Signal Detection (Two Bike Boxes, Four Green Conflict Zones, etc.)	*$270,000*
Class III	Bike Route	Signing and Sharrows Only	*$65,000*
	Bicycle Boulevard	Signing and Sharrows with Additional Wayfinding, Signage, and Low-Cost Traffic Calming	*$250,000*
Class IV	Separated Bikeway	Striped Buffer with "armadillos", Wayfinding, and Signal Detection	*$423,000*

Costs are in 2016 dollars, excluding right-of-way costs.

Table 8-3 summarizes the total costs of the entire proposed network. Note that some cost estimates for facility types are higher or lower than a direct multiplication of the unit cost and mileage. Some of the proposed facilities include other design elements that change the cost from a direct multiplication of unit cost and mileage.

Table 8-3. Citywide Conceptual Cost Estimates Summary for Bikeway Facilities

Facility Type	Description	Length of Proposed Segments	Estimated Cost (2016 $)[1]
Class I	Bike Path	0.8 miles	*$1,000,000*
	Bay Trail	5.7 miles	*$6,900,000*
	Cedar Boulevard Linear Park/Path	2.1 miles	*$6,400,000*

Facility Type	Description	Length of Proposed Segments	Estimated Cost (2016 $)[1]
Class II	Bike Lane	9.8 miles	*$2,600,000*
	Bike Lane w/ Buffer	0.9 miles	*$300,000*
Class III	Bike Route	2.2 miles	*$200,000*
	Bicycle Boulevard	17.5 miles	*$4,400,000*
Class IV	Separated Bikeway	6.4 miles	*$6,600,000*[2]
		Total Construction Costs	*$28,400,000*

1. Costs are in 2016 dollars, excluding right-of-way costs. Unit costs are assumed to be the highest option in Table 8-2.
2. Includes 0.3 miles of separated bikeway that would reconfigure the Thornton Avenue/Route 84 Interchange.

Construction of the Class I, II, III, and IV system would require approximately $28,400,000 in 2016 dollars, which equates to an investment of approximately $3.8 million per year over 20 years (including compounding at a 12% interest rate). A significant portion of the proposed system would be constructed as part of new development or as re-development occurs.

MAINTENANCE COSTS

Multi-use path maintenance includes cleaning, resurfacing, and re-striping an asphalt path, repairing bridges and other structures, cleaning drainage systems, removing trash, and landscaping. While this maintenance effort may not be incrementally major, it does have the potential to develop heavy expenses if it is not done periodically.

The estimated annual maintenance expenses for Class I bike paths is approximately $13,000 per mile for landscaping work, including monthly trash collection, biannual weeding and asphalt cleaning, and annual tree pruning. This annual estimate is in addition to slurry seal treatments, which should occur roughly once every ten years, and costs approximately $28,000 per mile (based on $4 per square yard and a 12 foot wide trail, including restriping). If slurry seal is applied every 10 years, more expensive trail rehabilitation (i.e., pavement overlay and reconstruction) may not be necessary. If all of the proposed bike paths were implemented, there would be a total of nearly 7 miles of Class I facilities, including the Bay Trail. Thus the annual maintenance cost for Class I facilities is estimated at about $90,000.

For Class II bike lanes, the cost consists of maintaining pavement markings and striping. The estimated annual cost is $13,500 for a full build-out of nearly 30 miles of Class II facilities, based on an annual cost of $455 per mile in restriping (including the cost to restripe bike lanes and refresh stencils). This annual expense is in addition to sign replacement costs of about $2000 per sign. Signs need to be replaced roughly once every ten years.

Class III facilities will require maintenance of bike signs located along the bike route every ten years.

The cost for maintaining Class IV facilities depends on the type of bikeway constructed. For grade-separated bikeways, maintenance costs are similar to sidewalk maintenance costs, of approximately $132,000 per mile every ten years. For bikeways separated by planter, cement, or bollard, the maintenance costs are similar to those of bike lanes ($13,500/year).

Table 8-4.
Citywide Conceptual Annual Maintenance Costs

Facility Type	Description	Length of Existing Plus Proposed Segments	Estimated Cost (2016 $)
Class I	Bike Path	17.4 miles	*$215,000*
Class II	Bike Lane	19.0 miles	*$10,000*
Class III	Bike Route/Boulevard	32.0 miles	*Sign Replacement (Every 10 Years)*
Class IV	Separated Bikeway	6.4 miles	*$83,000*
		Total Annual Maintenance Costs	*$320,000*

Costs are in 2016 dollars, excluding right-of-way costs. Cost do not include sign replacement and other maintenance that does not occur annually.

COST OF NEW PEDESTRIAN FACILITIES

CONSTRUCTION COSTS

Table 8-5 provides a unit cost summary for the construction of sidewalk and pedestrian-related facilities in Newark. As with the bicycle estimates, these costs are construction cost only, and do not include other contingencies and "soft costs," such as traffic control, construction management, mobilization, design, environmental review, and utility/drainage contingencies. The City will develop more detailed estimates following the preliminary engineering stage as individual projects advance towards implementation.

For purposes of this *Bicycle and Pedestrian Master Plan*, conceptual construction costs for the proposed improvements were based on the following assumptions:

- Sidewalk paving does not include demolition costs
- Sidewalk paving does not include curb and gutter work
- Relocation of utility poles and fire hydrants does not include design and engineering costs

Table 8-5.
Conceptual Unit Cost Estimates for Pedestrian Improvement Projects

Improvement	Estimated Cost Per Location
Relocate utility pole	*$6,500*
Relocate street sign	*$250*
Relocate/remove tree	*$800*
Relocate fire hydrant	*$1500*

Improvement	Estimated Cost Per Location
Bus stop shelter and installation	*$20,000*
Bus stop bench and installation	*$1,500*
Sidewalk paving	*$15/square foot*
Curb/gutter	*$40/linear foot*
Curb cut and truncated dome installation	*$3,500*
Customized wayfinding signs on steel post	*$1,200*
High-Visibility Ladder Crosswalk	*$3,500/Crosswalk*
Rectangular Rapid Flashing Beacon	*$25,000*
Pedestrian Hybrid Beacon	*$80,000*
Pedestrian Signal	*$450,000*
Signal Modifications at Existing Signal	*$75,000*
Remove Slip Lane	*$25,000*
Tighten Curb Radii	*$175/LF*
Curb Extension	*$130/LF*[1]
Pedestrian-scale Lighting	*$315/LF*
Traffic Calming (Low)	*$24,000/Intersection*
Traffic Calming (High)	*$225,000/Intersection*
At-Grade Rail Road Crossing Improvements	*$400,000/Crossing*

Costs are planning-level and in 2016 dollars, excluding right-of-way costs.

[1] Cost includes removal of existing curb, new curb, new sidewalk, and new bollards. Cost does not include curb ramps.

Construction of the proposed pedestrian improvements would require approximately $46,726,000 in 2016 dollars, which equates to an investment of approximately $6,000,000 per year over 20 years (including compounding). A significant portion of the proposed system could be constructed as part of new development or as redevelopment occurs. **Appendix B** includes the costs associated with the proposed pedestrian network.

FUNDING FOR PEDESTRIAN IMPROVEMENT PROJECTS

To fund pedestrian projects, the City has an annual budget as part of the CIP or Capital Improvement Program. In the annual City's Capital Improvement Program (CIP), the City programs approximately $250,000 toward pedestrian-related improvements and maintenance. This included funds for sidewalk and intersection ramp installations and annual sidewalk maintenance. This funding generally consists of TDA Article 3 funds.

Typically, new development projects are required to install sidewalks or bus pullouts. Additional projects may be funded with grant funding when available.

IMPLEMENTATION PLAN

As the historic level of investment in bicycle and pedestrian infrastructure indicates, the City has already accomplished a great deal to encourage bicycling in Newark. The City already enjoys nearly 15 miles of bike lanes and 13 miles of designated bicycle routes. Newark is also strategically located between the Dumbarton Bridge and two BART stations. As such, the City has the potential to become a leader in active transportation while also providing its residents with healthy lifestyles and accessible modes of transportation. However, this distinction depends on the successful implementation of this plan. The following section presents the broad plan and timeline for implementing the items in this plan.

STAKEHOLDER INVOLVEMENT AND LEADERSHIP

Fully achieving the vision set forth in this Plan requires close coordination among City agencies, neighboring (including Fremont and Union City), and the community-at-large. The volunteer Newark Bicycle/Pedestrian Advisory Committee (BPAC) will play a central role in stewarding the implementation of this Plan through regular meetings and oversight. The BPAC will provide valuable input during the implementation of the Plan, as it has during its development. The BPAC may be expected to coordinate the activities of other key stakeholders essential to the implementation of the plan, including the Planning Division, Public Works Department (Engineering Division, Maintenance Division), Police Department, AC Transit, and Alameda County Safe Routes to Schools. Table 8 7 summarizes the role of the various stakeholders in each required task.

REPORTING PLAN

The Alameda CTC and the Caltrans ATP require bicycle and pedestrian plans to describe the steps necessary to report on the implementation of the of ongoing efforts. This reporting process is intended to keep the adopting agency and the community informed of the progress being made in the implementation of the plan.

On an annual basis, the City of Newark should identify the status of the items listed in Table 8-7 according to a three-part scale: green ("meeting all expected benchmarks"), yellow ("may meet all expected benchmarks"), or red ("will likely not meet all expected benchmarks"). When assigning each score, the City should take into account the intended timeframe of each item; short-term items are intended to be complete in less than 5 years, while other action items require 6-10 years for completion, or greater than 10 years. Assessing the progress of various items is a subjective process, but should take into account current planning and construction efforts, as well as the political status and updated feasibility of a given project.

The City should compile these updated statuses into a report that summarizes the overall status of the implementation plan. If the City finds that it is falling behind on its implementation timeline, it should offer an explanation for the delay and identify steps to expedite the remaining implementation efforts. This report should be delivered to the Mayor and City Council for their review and approval. The report should also be made publically available on the Engineering Division's website to ensure accountability and transparency. (http://www.newark.org/departments/public-works/engineering-division/pedestrian-bicycle-master-plan/)

DATA COLLECTION

In accordance with Alameda CTC requirements, this Plan includes a description of ongoing evaluation and data collection plans, including bicycle and pedestrian counts and facility inventories. Newark does not currently have a data collection program.

While manual bicycle and pedestrian counts can be expensive and labor-intensive, the City of Newark has several opportunities to conduct counts in a streamlined, low-cost manner. The City should collect data on bicycle and pedestrians whenever traffic counts are conducted. Additionally, the City should take advantage of existing counts undertaken by other entities that may be able to provide useful baseline data.

One example of an existing count program for the City of Newark to the Alameda CTC's Bicycle and Pedestrian Count Program, established in 2010. Each year this program provides manual count data at 63 high-priority sites in the County, including two in Newark: Jarvis Avenue/Newark Boulevard and Thornton Avenue/Willow Street. By working with Alameda CTC, Newark may be able to expand the number of locations and routes that are targeted for data collection. The 2014 count data for these sites is listed in the table below. The goals of the Alameda CTC Countywide Bicycle and Pedestrian Count Program are to track trends in levels of bicycling and walking, to gain insights into variations in levels of biking and walking over time and in different areas of the county, and to help quantify the demand for biking and walking to make the case for investment in bicycle/pedestrian projects and programs.

In addition to these manual counts, Alameda CTC also collects data using automated counters which gather 24-hour, 7-day information at selected locations throughout the county. These data are collected using automated counting equipment installed in the field. Automated counters are primarily placed in trail locations and provide valuable insights into variation in levels of bicycling and walking by time of day, day of the week, season and over time. This data may be of use to the City of Newark in the future.

Table 8-6.
Existing Bicycle and Pedestrian Count Data (2014)

Time Period	Location	Pedestrian Count	Bicycle Count
4:00 p.m. – 6:00 p.m.	Jarvis Avenue/Newark Boulevard	37-89	23-34
4:00 p.m. – 6:00 p.m.	Thornton Avenue/Willow Street	3-36	14-22
2:00 p.m. – 4:00 p.m.	Jarvis Avenue/Newark Boulevard	N/A	12-21
2:00 p.m. – 4:00 p.m.	Thornton Avenue/Willow Street	3-8	8-9
12:00 p.m. – 2:00 p.m.	Jarvis Avenue/Newark Boulevard	1-23	N/A

Beyond bicycle and pedestrian counts, the City of Newark should continue to update the GIS database developed for this plan with current facility inventory as new infrastructure is constructed. Finally, other datasets that could help the City of Newark evaluate the success of its bicycle and pedestrian program include:

- Number of collisions involving cyclists and pedestrians
- Average Daily Traffic (ADT) on designated Class II and Class III bicycle lanes/routes.

- Perceived safety for pedestrians and cyclists collected by survey
- Enforcement data
- Travel time along key bicycle corridors
- Pedestrian ADA access
- Support program availability
- Percentage of proposed network constructed
- Facility miles
- Gap closure
- Distance between marked crossings
- Bicycle Level of Traffic Stress (LTS)

IMPLEMENTATION TIMELINE

Table 8-7 presents the items, responsible parties, approximate cost, and general timeframe for implementing the major components of the Plan. Upon adoption, the City should craft a detailed five-year work plan based on this Plan.

Table 8-7. Implementation Plan Summary

Focus Area	Task	Lead Agency/Partner	Timeline	Relative Cost	Relative Priority
Priority Bicycle and Pedestrian Projects	Install loop detection, signage, countdown signals, and other detection upgrades at signals as described in Chapter 3 of this plan	Public Works	Near-Term	$$$	High
Priority Bicycle and Pedestrian Projects	Secure funding and implement the five priority projects for bicyclists and pedestrians outlined in Chapter 7 of this Plan.	Public Works	5 Years	$$$$	High
Citywide Pedestrian Projects	Fund, design, and execute all citywide pedestrian projects, including bus stop amenity installation, crosswalk improvements, and ADA obstruction removal	Planning and Public Works	5 Years	$$	High
Facility Maintenance	As part of standard roadway maintenance procedures, develop a bicycle and pedestrian maintenance plan; perform continuing maintenance on bicycle and pedestrian facilities in accordance with the details presented in Chapter 8 of this plan	Public Works	Ongoing	$$-$$$	High

Focus Area	Task	Lead Agency/Partner	Timeline	Relative Cost	Relative Priority
Support Program (Enforcement)	Work with the Newark Police Department to provide officer training on biking and walking issues and safety	Planning, Police Department.	Near-Term	$$	High
Support Program (Safe Routes to School)	Work with NUSD and the Alameda County SRTS Program to expand the number of schools participating in the SRTS Program in Newark. Work with NUSD to develop walk and roll to school maps and other Newark-specific programming.	NUSD; Alameda County SR2S; Planning	Ongoing/ 5 Years	$$	High
Medium-term Bicycle Projects	Ensure that medium-term bicycle projects are considered as new funding sources, redevelopment or other opportunities arise	Engineering Div.	6-10 Years	$-$$$$	Medium
Long-term Bicycle Projects	Ensure that long-term bicycle projects are considered as new funding sources, redevelopment or other opportunities arise in order to implement those projects opportunistically.	Engineering Div.	Ongoing	$-$$$$	Low
Bicycle Parking	Revise the Municipal Ordinance to remove outdated references to add a citywide bicycle parking ordinance based on the APBP Bicycle Parking Guidelines, 2nd Edition best practices	Planning	Near-Term	$	Medium
BPAC	Reform a standing Bicycle and Pedestrian Advisory Committee to provide regular input on walking and biking issues	Planning/Public Works	Near-Term	$	Medium
Reporting	Provide annual reports on the state of biking and walking in Newark. Coordinate efforts with BPAC meetings.	Planning/Public Works	Near-Term	$	Medium
Count Program	Work with Alameda CTC, the BPAC, Bike East Bay, and other potential partners to consider monitoring bicycle and pedestrian volumes in the City on an annual basis. Work with Traffic Engineering to require bicycle and pedestrian counts routinely with all data collected in the City.	Planning/Public Works	Ongoing	$$	Low
E-Bikes	Update the City's Municipal Code to incorporate definition of electric-assist bikes (e-bikes) and define maximum operating speeds and where e-bikes can operate.	Planning/Public Works	Near-Term	$	Medium

APPENDIX A. PROPOSED BICYCLE IMPROVEMENT PROJECTS

The table below presents the full list of prioritized bicycle projects. Appendix A presents the full list of prioritized pedestrian projects. The criteria for the selection of these projects, as well as a further explanation of several key corridors, is presented in Chapter 3: Bikeway Element.

Table A-1 City of Newark Proposed Bicycle Improvements Projects

ID	Location	Location Detail	Proposed Project	Description	Cost	Anticipated Use (3)	Connectivity (5)	Access (2)	Safety (3)	Implementation (4)	Total Score
1	Citywide	All commercial areas, schools, park, and other key destinations, including the NewPark Mall	Install bicycle racks and lockers	Enhance and add bicycle racks and lockers at key destinations in the City, including the NewPark Mall	$250 per rack, $2,500 per locker	N/A	N/A	N/A	N/A	N/A	N/A
2	Citywide	All signalized intersections, including high-priority locations such as Jarvis Avenue and Newark Boulevard; Lake Boulevard and Cedar Boulevard; Mayhews Landing Road and Newark Boulevard; and Thornton Avenue and Gateway Boulevard	Bicycle Detection and Bicycle Signal Timings	Upgrade all signals to incorporate bicycle detection and bicycle detection pavement legends. Update green clearance intervals to allow bicyclists to clear the intersection. Where conditions are hilly or where there may be older or younger bicyclists, assume slower bicyclists and extend yellow time to accommodate bicyclists of all abilities	$30,000 per intersection	N/A	N/A	N/A	N/A	N/A	N/A
3	Citywide	All bikeways	Improve wayfinding signage	Incorporate a signed route system indicating destinations, distances and directions to make the bicycle network easier to navigate; refer to the Design guidelines in the Plan Appendix and the Dumbarton Bridge Newark Wayfinding Sign Plan (see Chapter 3)	$1,200 per customized wayfinding sign	N/A	N/A	N/A	N/A	N/A	N/A
5	Baine Avenue	Between Civic Center Park and Newark Boulevard cul-de-sac	Class I Bicycle Path	Formalize desire line with paved separated path including wayfinding	$216,000	3	2	0	3	4	12
6	Baine Avenue	Between Magnolia Street and Civic Center Park	Class III Bicycle Boulevard	Add sharrows, wayfinding signage, and enhanced facilities at crossings of major arterials; consider traffic calming	$105,000	2	3	0	3	4	12
7	Baine Avenue	Between St. Paul Drive and Cedar Boulevard	Class I Bicycle Path	Formalize desire line with paved separated path including wayfinding	$396,000	3	3	0	3	1	10

Table A-1 City of Newark Proposed Bicycle Improvements Projects											
ID	**Location**	**Location Detail**	**Proposed Project**	**Description**	**Cost**	**Anticipated Use (3)**	**Connectivity (5)**	**Access (2)**	**Safety (3)**	**Implementation (4)**	**Total Score**
8	Baine Avenue	Between Newark Boulevard cul-de-sac and St. Paul Drive	Class III Bicycle Boulevard	Add sharrows, wayfinding signage, and enhanced facilities at crossings of major arterials; consider traffic calming	$20,000	2	3	0	3	1	9
9	Bay Trail	Between Marshlands Road and Southern City Limit	Class I Bicycle Path and Grade-Separated Crossings	Install railroad and Slough crossings between the Don Edwards Wildlife Refuge and the Dumbarton Transit-Oriented Development area. Add paved off-street path with wayfinding signage through development projects. Work with Cargill to consider easement and allow access at existing locked gate.	$6,816,000 ($3,000,000 for two crossings)	3	5	2	3	1	14
10	Bettencourt Street	Between Haley Street and Mayhews Landing Road	Class III Bicycle Boulevard	Add sharrows, wayfinding signage, and enhanced facilities at crossings of major arterials; consider traffic calming	$212,500	2	1	0	3	4	10
11	Bettencourt Street	Between Shorehaven Avenue and Crestmont Avenue	Class I Bicycle Path	Widen sidewalk to provide Class I off-street bike path	$264,000	3	1	0	1	3	8
12	Birch Street	Between Birch Grove Park and Smith Avenue	Class I Bicycle Path	Enhance existing trail with improved wayfinding and remove obstructions	$84,000	3	1	0	3	4	11
13	Birch Street	Between Smith Avenue and Cedar Boulevard	Class III Bicycle Boulevard	Add sharrows, wayfinding signage, and enhanced facilities at crossings of major arterials; consider traffic calming	$90,000	2	1	0	3	4	10
14	Birch Street	Between Thorton Avenue and Birch Grove Park	Class III Bicycle Boulevard	Add sharrows, wayfinding signage, and enhanced facilities at crossings of major arterials; consider traffic calming	$230,000	2	2	1	3	4	12
15	Birch Street	Between Cul-de-sac north of Fair Avenue and Thornton Avenue	Class III Bicycle Route	Sign as Class III Bicycle Route and stripe sharrows	$5,850	1	2	0	3	4	10
16	Blackburn Drive	Between Chapman Drive and Lake Boulevard	Class III Bicycle Boulevard	Add sharrows, wayfinding signage, and enhanced facilities at crossings of major arterials; consider traffic calming	$77,500	2	1	0	3	4	10

Table A-1 City of Newark Proposed Bicycle Improvements Projects											
ID	**Location**	**Location Detail**	**Proposed Project**	**Description**	**Cost**	**Anticipated Use (3)**	**Connectivity (5)**	**Access (2)**	**Safety (3)**	**Implementation (4)**	**Total Score**
17	Brittany Avenue	Between Newark Boulevard and Mirabeau Drive	Class III Bicycle Boulevard	Add sharrows, wayfinding signage, and enhanced facilities at crossings of major arterials; consider traffic calming	$67,500	2	2	1	3	4	12
18	Cedar Boulevard	Between Balentine Drive and Stevenson Boulevard	Class II Bicycle Lane	Add bicycle lane at least 5' in width	$120,939	3	3	0	2	4	12
19	Cedar Boulevard	Between Cedar Court and Birch Street	Class II Bicycle Lane	Add bicycle lane at least 5' in width	$65,985	3	2	0	3	4	12
20	Cedar Boulevard	Between Newark Boulevard and Robertson Avenue	Class II Bicycle Lane	Add bicycle lane at least 5' in width	$548,600	3	2	0	2	4	11
21	Cedar Boulevard	RR Crossing	Bike/Ped RR Crossing	Enhanced Bicycle and Pedestrian crossing of Railroad as part of potential extension of Cedar as greenway/linear park	$461,000	3	4	1	1	1	10
22	Cedar Boulevard	Between Haley Street and Thornton Avenue	Class I Bicycle Path with Greenway/Linear Park	Consider extension of Cedar Boulevard on city-owned right-of-way, including Class I Bicycle Path, greenway/linear park, RR crossing, and intersection improvements at Cedar and Thornton	$5,900,000	3	3	0.5	2	1	9.5
23	Central Avenue	Between Birch Street and Filbert Street	Class II Bicycle Lane	Class III in short term, Class II in long term	$291,200	3	2	1.5	3	3	12.5
24	Chapman Drive	Between Lake Boulevard and Cedar Boulevard	Class III Bicycle Boulevard	Add sharrows, wayfinding signage, and enhanced facilities at crossings of major arterials; consider traffic calming	$102,500	2	1	0	3	4	10
25	Cherry Street	Between Baine Ave and Central Avenue	Class II Bicycle Lane	Add bicycle lane at least 5' in width	$73,667	3	3	1	3	1	11
26	Cherry Street	Between Dairy Avenue and Baine Avenue	Class III Bicycle Route	Sign as Class III Bicycle Route and stripe sharrows	$25,938	1	3	1	3	4	12

Table A-1 City of Newark Proposed Bicycle Improvements Projects											
ID	**Location**	**Location Detail**	**Proposed Project**	**Description**	**Cost**	**Anticipated Use (3)**	**Connectivity (5)**	**Access (2)**	**Safety (3)**	**Implementation (4)**	**Total Score**
27	Cherry Street	Between Central Avenue and Stevenson Boulevard	Class IV Protected Bikeway	Adequate road width exists for Class IV bikeway, with slight reconfiguration at some locations and intersections	$837,540	4	4	2	1	3	14
28	Cherry Street	Between Mirabeau Drive and Dairy Avenue	Class III Bicycle Boulevard	Add sharrows, wayfinding signage, and enhanced facilities at crossings of major arterials; consider traffic calming	$214,015	2	2	0	2	4	10
29	Civic Terrace Avenue	Between Newark Boulevard and St. Edwards Street	Class III Bicycle Boulevard	Add sharrows, wayfinding signage, and enhanced facilities at crossings of major arterials; consider traffic calming	$65,000	2	2	0	2	4	10
30	Dairy Avenue	Between Sycamore Street and Newark Boulevard	Class III Bicycle Boulevard	Add sharrows, wayfinding signage, and enhanced facilities at crossings of major arterials; consider traffic calming	$35,000	3	0	0	3	4	10
31	Darvon Street	Between Edgewater Drive and Port Tidewood Street	Class III Bicycle Boulevard	Add sharrows, wayfinding signage, and enhanced facilities at crossings of major arterials; consider traffic calming	$137,500	2	1	0	3	4	10
32	Dumbarton Court	Between cul-de-sac and Jarvis Avenue	Class III Bicycle Boulevard	Add sharrows, wayfinding signage, and enhanced facilities at crossings of major arterials; consider traffic calming	$25,000	2	1	0	3	4	10
33	Dupont Avenue	Between Lakewood Drive and Darvon Street	Class III Bicycle Boulevard	Add sharrows, wayfinding signage, and enhanced facilities at crossings of major arterials; consider traffic calming	$12,500	2	1	0	3	4	10
34	Edgewater Drive	Between Lake Boulevard and Parkshore Drive	Class III Bicycle Boulevard	Add sharrows, wayfinding signage, and enhanced facilities at crossings of major arterials; consider traffic calming	$325,000	2	1	0	2	4	9
35	Enterprise Drive	Between Willow Street and Filbert Street	Class II Bicycle Lane (w/ Road Diet)	Use road diet to add center turn lane, remove two travel lanes, and make space for Class II bicycle lanes at least 5' in width.	$223,758	3	4	1	1	3	12
36	Fair Avenue	Between Mayhews Landing Road and Birch	Class III Bicycle Route	Sign as Class III Bicycle Route and stripe sharrows	$4,550	1	2	0	3	4	10

Table A-1 City of Newark Proposed Bicycle Improvements Projects											
ID	**Location**	**Location Detail**	**Proposed Project**	**Description**	**Cost**	**Anticipated Use (3)**	**Connectivity (5)**	**Access (2)**	**Safety (3)**	**Implementation (4)**	**Total Score**
		Street									
37	Filbert Street	Between Enterprise Drive and Central Avenue	Class II Bicycle Lane	Add bicycle lane at least 5' in width	$62,400	3	1	0	1	4	9
38	Filbert Street/Carter Street	Between Wells Avenue and Sycamore Street	Class III Bicycle Boulevard	Add sharrows, wayfinding signage, and enhanced facilities at crossings of major arterials; consider traffic calming	$80,000	2	4	0	1	4	11
39	Graham Avenue	Between Sycamore Street and Magnolia Street	Class III Bicycle Boulevard	Add sharrows, wayfinding signage, and enhanced facilities at crossings of major arterials; consider traffic calming	$17,500	2	3	0	3	4	12
40	Haley Street	Between Jarvis Avenue and Cedar Boulevard	Class III Bicycle Boulevard	Add sharrows, wayfinding signage, and enhanced facilities at crossings of major arterials; consider traffic calming	$159,896	2	1	0	3	4	10
41	Joaquin Murrietta Avenue	Between Cherry Street and Cedar Boulevard	Class III Bicycle Boulevard	Add sharrows, wayfinding signage, and enhanced facilities at crossings of major arterials; consider traffic calming	$85,000	2	1	0	2	4	9
42	Lafayette Avenue	Between Cherry Street and Cedar Boulevard	Class III Bicycle Boulevard	Add sharrows, wayfinding signage, and enhanced facilities at crossings of major arterials; consider traffic calming	$225,000	2	1	0	3	4	10
43	Lake Boulevard	Between SR 84 and Cedar Boulevard	Class III Bicycle Boulevard	SB forced turn to Jarvis	$127,500	2	0	0.5	3	4	9.5
44	Lake Boulevard	Entrance to Ardenwood Historic Farm Park	Improve Access	Work with EBRPD and City of Fremont to provide access to Ardenwood path at all times of day	-	2	2	1	1	4	10
45	Lakewood	Between Port Sailwood Drive and Dupont	Class III Bicycle Boulevard	Add sharrows, wayfinding signage, and enhanced facilities at	$15,000	2	1	0	3	4	10

Table A-1 City of Newark Proposed Bicycle Improvements Projects											
ID	**Location**	**Location Detail**	**Proposed Project**	**Description**	**Cost**	**Anticipated Use (3)**	**Connectivity (5)**	**Access (2)**	**Safety (3)**	**Implementation (4)**	**Total Score**
	Drive	Avenue		crossings of major arterials; consider traffic calming							
46	Lido Boulevard	Between Jarvis Avenue and Cedar Boulevard	Class III Bicycle Boulevard	Add sharrows, wayfinding signage, and enhanced facilities at crossings of major arterials; consider traffic calming	$77,500	2	1	0	3	4	10
47	Magnolia Street	Between Graham Avenue and Baine Avenue	Class III Bicycle Boulevard	Add sharrows, wayfinding signage, and enhanced facilities at crossings of major arterials; consider traffic calming	$30,000	2	3	0	3	4	12
48	Marshlands Road	Between Thornton Avenue and City Line	Pavement Improvements	Repave and maintain Marshlands Road, including the existing bicycle lanes; complete pave spot improvement in near-term	$109,636	3	1	1	3	1	9
49	Mayhews Landing Road	Between Willow Street and Thornton Avenue	Class III Bicycle Boulevard	Add sharrows, wayfinding signage, and enhanced facilities at crossings of major arterials; consider traffic calming	$405,000	2	2	0	3	4	11
50	Moores Avenue	Between Cherry Street and Cedar Boulevard	Class III Bicycle Boulevard	Add sharrows, wayfinding signage, and enhanced facilities at crossings of major arterials; consider traffic calming	$190,000	2	1	0	3	4	10
51	Mowry Avenue	Between I-880 and Cherry Street	Class II Bicycle Lane	Add bicycle lane at least 5' in width	$148,200	3	3	0.5	3	3	12.5
52	Musick Avenue	Between Newark Boulevard and Cedar Boulevard	Class III Bicycle Route	Sign as Class III Bicycle Route and stripe sharrows	$26,000	1	1	0	3	4	9
53	Newark Boulevard	Between SR 84 and Central Avenue	Class IV Protected Bikeway	Install Class IV separated bikeway	$905,220	4	3	2	3	3	15
54	Newark Boulevard	Between Cedar Boulevard and Bellhaven Avenue	Class III Bicycle Route	Sign as Class III Bicycle Route and stripe sharrows	$44,404	1	3	0.5	3	4	11.5

Table A-1 City of Newark Proposed Bicycle Improvements Projects											
ID	**Location**	**Location Detail**	**Proposed Project**	**Description**	**Cost**	**Anticipated Use (3)**	**Connectivity (5)**	**Access (2)**	**Safety (3)**	**Implementation (4)**	**Total Score**
55	Orleans Drive	Between Normandy Drive and Rochelle Avenue	Class III Bicycle Boulevard	Add sharrows, wayfinding signage, and enhanced facilities at crossings of major arterials; consider traffic calming	$114,631	2	1	0	1	4	8
56	Parkshore Drive	Between Lake Boulevard and Edgewater Drive	Class III Bicycle Boulevard	Add sharrows, wayfinding signage, and enhanced facilities at crossings of major arterials; consider traffic calming	$81,455	2	1	0	3	4	10
57	Port Sailwood Drive	Between Cedar Boulevard and Port Tidewood Street	Class III Bicycle Route	Sign as Class III Bicycle Route and stripe sharrows	$22,100	1	1	0	3	4	9
58	Port Tidewood Street	Between Port Sailwood Drive and Darvon Street	Class III Bicycle Route	Sign as Class III Bicycle Route and stripe sharrows	$11,050	1	1	0	3	4	9
59	Robertson Avenue	Between Cherry Street and Cedar Boulevard	Class III Bicycle Boulevard	Add sharrows, wayfinding signage, and enhanced facilities at crossings of major arterials; consider traffic calming	$170,000	2	0	0	3	4	9
60	Ruschin Drive	Between Thornton Avenue and Newark Boulevard	Class III Bicycle Boulevard	Add sharrows, wayfinding signage, and enhanced facilities at crossings of major arterials; consider traffic calming	$247,500	2	2	0	3	4	11
61	Smith Avenue	Between Cherry Street and Cedar Boulevard	Class III Bicycle Boulevard	Add sharrows, wayfinding signage, and enhanced facilities at crossings of major arterials; consider traffic calming	$172,500	2	1	0	3	4	10
62	Spruce Street	Between Jarvis Avenue and Wells Avenue	Class III Bicycle Boulevard	Add sharrows, wayfinding signage, and enhanced facilities at crossings of major arterials; consider traffic calming	$345,000	2	2	0	2	4	10
63	St. Edwards Street	Between Civic Terrace Avenue and Thornton Avenue	Class III Bicycle Boulevard	Add sharrows, wayfinding signage, and enhanced facilities at crossings of major arterials; consider traffic calming	$30,000	2	1	0	2	4	9
64	Stevenson	Between I-880 and Cherry Street	Class IV Protected Bikeway	Adjust striping at intersections; requires narrowing of lanes and	$299,064	4	2	1.5	1	3	11.5

Table A-1 City of Newark Proposed Bicycle Improvements Projects											
ID	**Location**	**Location Detail**	**Proposed Project**	**Description**	**Cost**	**Anticipated Use (3)**	**Connectivity (5)**	**Access (2)**	**Safety (3)**	**Implementation (4)**	**Total Score**
	Boulevard			median in some sections; requires moving turn lane							
65	Sycamore Street	Thornton Avenue	Class II Bicycle Lane	Extend bike lane all the way to Thorton intersection	$13,610	3	2	1	3	4	13
66	Sycamore Street	Between Thornton Avenue and Carter Street	Class II Bicycle Lane	Extend bike lanes all way to Thorton Ave intersection and add NB bike lane	$34,093	3	2	0	3	4	12
67	Sycamore Street	Central Avenue	Class II Bicycle Lane	Extend bike lanes SB all way to Central Ave intersection	$128,881	3	2	0	3	3	11
68	Thornton Avenue	Between I-880 and Mayhews Landing Road	Class II Bicycle Lane w/ buffer	Add bicycle lane at least 5' in width with 3' painted buffer.	$87,188	3	4	2	3	3	15
69	Thornton Avenue	Between Mayhews Landing Road and Willow Street	Class II Bicycle Lane	Add bicycle lane at least 5' in width with 3' painted buffer	$161,847	3	4	1	3	3	14
70	Thornton Avenue	Between Willow Street and Peachtree Avenue	Class II Bicycle Lane w/ buffer	Add bicycle lane at least 5' in width	$426,400	3	4	2	3	3	15
71	Thornton Avenue	Between Peachtree Avenue and SR 84	Class IV Protected Bikeway	Adjust striping at intersections; requires narrowing of lanes and median in some sections; requires moving turn lane, including reconfiguration of clover-leaf ramps to enhance bicycle and pedestrian safety.	$4,524,520	4	3	2	2	4	15
72	Thornton Avenue	Intersection with Marshlands Road	Intersection Improvements	Conduct safety study for improvements for bicyclists turning onto and off of Marshlands Road, including solutions such as a median refuge, bicycle left-turn pocket, jughandle turn/two-	$150,000-$450,000 depending on preferred	2	1	2	2	1	8

Table A-1 City of Newark Proposed Bicycle Improvements Projects											
ID	**Location**	**Location Detail**	**Proposed Project**	**Description**	**Cost**	**Anticipated Use (3)**	**Connectivity (5)**	**Access (2)**	**Safety (3)**	**Implementation (4)**	**Total Score**
				stage turn, and/or a traffic signal	alternative						
73	Thornton Avenue	Intersection with Gateway Boulveard	Intersection Improvements	Add bicycle left-turn pocket between right-turn lanes and left lane on WB Gateway	$40,660	2	1	2	2	1	8
74	Wells Avenue	Between Filbert Street and Spruce Street	Class III Bicycle Boulevard	Add sharrows, wayfinding signage, and enhanced facilities at crossings of major arterials; consider traffic calming	$102,500	2	2	0	3	4	11
75	Willow Street	Between Mayhews Landing Road and Morton Avenue	Class II Bicycle Lane	Enhance and add bicycle parking based on policies and recommendations in Plan	$182,000	3	0	0	2	4	9

APPENDIX B. PROPOSED PEDESTRIAN IMPROVEMENT PROJECTS

The table below presents the full list of prioritized pedestrian projects. Appendix X presents the full list of prioritized bicycle projects. The criteria for the selection of these projects, as well as a further explanation of several key projects, is presented in Chapter 4: Pedestrian Element.

Table B-1 City of Newark Proposed Pedestrian Improvements Projects

ID	Location	Location Detail	Proposed Project	Description	Cost	Priority Areas (5)	Access (3)	Bus Route (1)	Connectivity (4)	Safety (5)	Ease of Imp. (3)	Total Score
1	Citywide	All Existing Locations with Obstructions	Remove/relocate obstructions in sidewalk to improve accessibility	-	$91,800	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2	Citywide	All Existing Bus Stops	Install bus stop amenities, such as bus shelters	-	$234,900	N/A	N/A	N/A	N/A	N/A	N/A	N/A
3	Citywide	All Existing Sidewalk Gap Locations	Add sidewalk where currently missing	-	$17,847,000	N/A	N/A	N/A	N/A	N/A	N/A	N/A
4	Citywide	All Signalized Intersections	Adjust pedestrian walk time to 3.5 feet/second	-	$5,000 per intersection	N/A	N/A	N/A	N/A	N/A	N/A	N/A
5	Citywide	All Signalized Intersections	Add countdown signals at signalized intersections where missing	-	$30,000 per intersection	N/A	N/A	N/A	N/A	N/A	N/A	N/A
6	Citywide	All Existing and/or Missing Curb Ramps	Citywide ADA curb ramp upgrades	Many curbs ramps throughout the city have been upgraded to include directional curb ramps of standard grade and width with truncated domes; efforts may continue	$3,000 per new ramp	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Table B-1 City of Newark Proposed Pedestrian Improvements Projects												
ID	**Location**	**Location Detail**	**Proposed Project**	**Description**	**Cost**	**Priority Areas (5)**	**Access (3)**	**Bus Route (1)**	**Connectivity (4)**	**Safety (5)**	**Ease of Imp. (3)**	**Total Score**
7	August Schilling Elementary School	Souza Avenue and Cedar Boulevard; Spruce Street and Sunset Avenue/Peachtree Avenue/Thornton Avenue	Safe Routes to School - Improve crossings	Enhance cul-de-sac to provide better connection at Cedar Blvd and Souza; add stop sign at Spruce and Sunset; add curb extensions at Spruce and Peachtree; add median and curb extensions at Thornton and Spruce; add minor street crosswalks along Thornton; enhance crosswalk at Maple Street with advance yield lines and high-visibility striping	$297,900	4	3	1	4	4	2	14
8	Birch Street	Between Central Avenue and Robertson Avenue	Add traffic calming measures	Traffic calming measures may include speed bumps, roadway narrowings such as chicanes or chokers, or partial closures	$129,600	4	0	1	1	2	2	9
9	Bunker Elementary School	Cherry Street, Jacaranda Drive, Smith Avenue	Safe Routes to School - Improve sidewalk and crossings	Improve traffic signals to provide pedestrian signals and add crosswalks on Cherry between Smith and Robertson; Add crosswalk, enhance curb ramps, add curb extension at Jacaranda and Birch; Enhance crosswalks (existing) with high-visibility striping and signage, add crosswalk (at Birch, northern leg) at Birch and Smith; improve connection to path along northern edge of Bunker	$847,800	5	3	1	4	2	2	13
10	Cedar Boulevard	at McDonald Avenue	Enhance crossings with flashing beacons, signing, and striping	All uncontrolled multi-lane crosswalks to be enhanced with high visibility striping, Rapid Rectangular Flashing Beacon (RRFB) or Pedestrian Hybrid beacon (PHB, if applicable warrants are satisfied), and geometric improvements of median refuge and/or curb extension where feasible	$51,300	2	3	1	4	2	2	N/A

Table B-1 City of Newark Proposed Pedestrian Improvements Projects												
ID	**Location**	**Location Detail**	**Proposed Project**	**Description**	**Cost**	**Priority Areas (5)**	**Access (3)**	**Bus Route (1)**	**Connectivity (4)**	**Safety (5)**	**Ease of Imp. (3)**	**Total Score**
11	Cedar Boulevard	at Milani Avenue	Enhance crossings with flashing beacons, signing, and striping	All uncontrolled multi-lane crosswalks to be enhanced with high visibility striping, Rapid Rectangular Flashing Beacon (RRFB) or Pedestrian Hybrid beacon (PHB), and geometric improvements of median refuge and/or curb extension where feasible. Consider removing if pedestrian demand is low, consistent with the Citywide Crosswalk Policy.	$51,300	5	3	1	4	5	2	16
12	Cedar Boulevard	at Smith Street	Enhance crossings with flashing beacons, signing, and striping	All uncontrolled multi-lane crosswalks to be enhanced with high visibility striping, Rapid Rectangular Flashing Beacon (RRFB) or Pedestrian Hybrid beacon (PHB), and geometric improvements of median refuge and/or curb extension where feasible	$51,300	4	3	1	4	2	2	N/A
13	Cedar Boulevard	at N. Magazine Street	Signalized crossing enhancement	Enhance crossings through removal of bends in crosswalks, removal of channelized right-turns, and/or narrowing of crossing distances	$45,000	4	3	1	4	4	1	13
14	Cedar Boulevard	Intersection with RR Crossing	Improve Bike/Ped RR Crossing, possibly with grade separation	-	$720,000	3	3	1	4	5	1	N/A
15	Central Avenue Frontage	Between Birch and Starflower Street	Add traffic calming measures	Traffic calming measures may include speed bumps, roadway narrowings such as chicanes or chokers, or partial closures	$86,400	3	0	1	1	2	3	9
16	Chapman Drive	at Lake Boulevard	Enhance crossings with flashing beacons, signing, and striping	All uncontrolled multi-lane crosswalks to be enhanced with high visibility striping, Rapid Rectangular Flashing Beacon (RRFB) or Pedestrian Hybrid beacon (PHB), and geometric	$51,300	1	3	0	3	2	2	8

Table B-1 City of Newark Proposed Pedestrian Improvements Projects												
ID	**Location**	**Location Detail**	**Proposed Project**	**Description**	**Cost**	**Priority Areas (5)**	**Access (3)**	**Bus Route (1)**	**Connectivity (4)**	**Safety (5)**	**Ease of Imp. (3)**	**Total Score**
				improvements of median refuge and/or curb extension where feasible								
17	Cherry Street	at Fountaine Avenue	Enhance crossings with flashing beacons, signing, and striping	All uncontrolled multi-lane crosswalks to be enhanced with high visibility striping, Rapid Rectangular Flashing Beacon (RRFB) or Pedestrian Hybrid beacon (PHB), and geometric improvements of median refuge and/or curb extension where feasible	$51,300	3	0	0	0	5	2	10
	Cherry Street	at Robertson Avenue	Enhance existing crosswalk with flashing beacons, signing, and striping	Existing uncontrolled multi-lane crosswalks to be enhanced with high visibility striping, Rapid Rectangular Flashing Beacon (RRFB) or Pedestrian Hybrid beacon (PHB), and geometric improvements of median refuge and/or curb extension where feasible	$51,300	0	3	1	4	2	2	12
18	Cherry Street	at Smith Avenue	Signalized crossing enhancement	Enhance crossings through removal of bends in crosswalks, removal of channelized right-turns, and/or narrowing of crossing distances	$45,000	0	3	1	4	2	1	7
19	Cherry Street	at Central Avenue	Signalized crossing enhancement	Enhance crossings through removal of bends in crosswalks, removal of channelized right-turns, and/or narrowing of crossing distances	$45,000	1	3	1	4	4	1	10
20	Cherry Street	at Montcalm Avenue	Consider a traffic circle	-	$27,000	3	0	1	1	5	1	10
21	Cherry Street/Christ	at Mayhews Landing	Enhance crossings with flashing beacons, signing, and striping	All uncontrolled multi-lane crosswalks to be enhanced with high visibility striping, Rapid Rectangular Flashing Beacon (RRFB) or	$51,300	3	0	0	0	5	2	10

Table B-1 City of Newark Proposed Pedestrian Improvements Projects												
ID	**Location**	**Location Detail**	**Proposed Project**	**Description**	**Cost**	**Priority Areas (5)**	**Access (3)**	**Bus Route (1)**	**Connectivity (4)**	**Safety (5)**	**Ease of Imp. (3)**	**Total Score**
	ine Street			Pedestrian Hybrid beacon (PHB), and geometric improvements of median refuge and/or curb extension where feasible								
22	E.L. Musick Elementary School	Birch Street and Ezra Drive; Musick Avenue and Munyan Street/Bishop Street	Safe Routes to School - Improve crossings	Mark crosswalks on minor cross streets along Musick Avenue; move crosswalk in front of school to avoid conflicts with school driveway; add high-visibility crosswalk treatment and stop signs at Musick and Bishop	$18,900	5	0	0	0	4	3	12
23	Edgewater Drive	at Scarborough Drive	Enhance crossings with flashing beacons, signing, and striping	All uncontrolled multi-lane crosswalks to be enhanced with high visibility striping, Rapid Rectangular Flashing Beacon (RRFB) or Pedestrian Hybrid beacon (PHB), and geometric improvements of median refuge and/or curb extension where feasible	$51,300	1	0	0	0	2	2	5
24	Edgewater Drive	at Farnham Drive	Enhance crossings with flashing beacons, signing, and striping	All uncontrolled multi-lane crosswalks to be enhanced with high visibility striping, Rapid Rectangular Flashing Beacon (RRFB) or Pedestrian Hybrid beacon (PHB), and geometric improvements of median refuge and/or curb extension where feasible	$51,300	1	0	0	0	2	2	5
25	Edgewater Drive	at Parkshore Drive	Enhance crossings with flashing beacons, signing, and striping	All uncontrolled multi-lane crosswalks to be enhanced with high visibility striping, Rapid Rectangular Flashing Beacon (RRFB) or Pedestrian Hybrid beacon (PHB), and geometric improvements of median refuge and/or curb extension where feasible	$51,300	2	0	0	0	2	2	6

Table B-1 City of Newark Proposed Pedestrian Improvements Projects												
ID	**Location**	**Location Detail**	**Proposed Project**	**Description**	**Cost**	**Priority Areas (5)**	**Access (3)**	**Bus Route (1)**	**Connectivity (4)**	**Safety (5)**	**Ease of Imp. (3)**	**Total Score**
26	Graham Elementary School	Cherry Street, Fountaine Avenue, Christine Street, Mayhews Landing Road	Safe Routes to School - Improve crossings	Consider a traffic circle with yield control, or side stops at Cherry and Montcalm; add direct pedestrian route to school at Cherry Street and Fountaine; provide continuous marked crosswalks and bulbouts at Cherry and Mayhews Landing	$33,300	5	0	1	1	5	2	13
27	Haley Street	at Fountaine Avenue	Enhance crossings with flashing beacons, signing, and striping	All uncontrolled multi-lane crosswalks to be enhanced with high visibility striping, Rapid Rectangular Flashing Beacon (RRFB) or Pedestrian Hybrid beacon (PHB), and geometric improvements of median refuge and/or curb extension where feasible	$51,300	2	3	1	4	5	2	13
28	Jarvis Avenue	at Lake Boulevard	Uncontrolled Single-Lane Crosswalks	Marked crosswalks with high visibility striping,	$12,600	2	0	0	0	2	3	7
29	John F. Kennedy Elementary School	Chapman Drive and Cardiff Street, Chapman Drive and Lake Boulevard, Reymouth Drive and Blackburn Drive	Safe Routes to School - Improve crossings	Add crosswalks at Chapman and Cardiff; Extend pork chop median and move crosswalk at Chapman and Lake; Add stop-bar and move crosswalk at Reymouth and Blackburn	$288,900	5	0	0	0	2	2	9
30	Lincoln Elementary School	Blackburn Drive and Chapman Drive	Safe Routes to School - Improve crossings	Add crosswalk; add in-street pedestrian warning sign or in-pavement flashers	$7,650	4	0	0	0	2	3	9
31	Louis Milani Elementary School	Central Avenue Frontage and Birch Street; Birch Street and Central Avenue; Bettencourt Street and Shorehaven Avenue; Newark Boulevard	Safe Routes to School - Taffic calming and improve crossings	Add traffic calming measures at Central Avenue Frontage and Birch and Birch and Central Avenue; Enhance existing crosswalks on Indian Wells Drive and Shorehaven Avenue with striping, advance yield lines, and signs; install	$95,400	4	3	1	4	4	2	14

Table B-1 City of Newark Proposed Pedestrian Improvements Projects												
ID	**Location**	**Location Detail**	**Proposed Project**	**Description**	**Cost**	**Priority Areas (5)**	**Access (3)**	**Bus Route (1)**	**Connectivity (4)**	**Safety (5)**	**Ease of Imp. (3)**	**Total Score**
		and Central Avenue		ped warning signs around Indian Wells crosswalk; Realign crosswalk and add advance stop bars at Newark and Central								
32	Mayhews Landing Road	at Fair Avenue	Uncontrolled Single-Lane Crosswalks	Marked crosswalks with high visibility striping,	$12,600	4	0	1	1	5	3	13
33	Mirabeau Drive	at Cedar Boulevard	Enhance crossings with flashing beacons, signing, and striping	All uncontrolled multi-lane crosswalks to be enhanced with high visibility striping, Rapid Rectangular Flashing Beacon (RRFB) or Pedestrian Hybrid beacon (PHB), and geometric improvements of median refuge and/or curb extension where feasible	$51,300	2	3	0	3	4	2	11
34	Mirabeau Drive	at Cherry Street	Uncontrolled Single-Lane Crosswalks	Marked crosswalks with high visibility striping,	$12,600	2	0	0	0	4	3	9
35	Mowry Avenue	at Rockrose Drive	Uncontrolled Single-Lane Crosswalks	Marked crosswalks with high visibility striping,	$12,600	3	3	1	4	2	3	12
36	Mowry Avenue	at Alpenrose Court	Uncontrolled Single-Lane Crosswalks	Marked crosswalks with high visibility striping,	$12,600	2	3	1	4	2	3	11
37	Mowry Avenue	Between Cherry Street and I-880	Pedestrian scale lighting	-	$2,268,000	4	3	1	4	2	2	12
38	Newark Boulevard	at Bellhaven Avenue	Enhance crossings with flashing beacons, signing, and striping	All uncontrolled multi-lane crosswalks to be enhanced with high visibility striping, Rapid Rectangular Flashing Beacon (RRFB) or	$51,300	3	3	1	4	4	2	13

Table B-1 City of Newark Proposed Pedestrian Improvements Projects												
ID	**Location**	**Location Detail**	**Proposed Project**	**Description**	**Cost**	**Priority Areas (5)**	**Access (3)**	**Bus Route (1)**	**Connectivity (4)**	**Safety (5)**	**Ease of Imp. (3)**	**Total Score**
				Pedestrian Hybrid beacon (PHB), and geometric improvements of median refuge and/or curb extension where feasible								
39	Newark Boulevard	at Brittany Avenue	Enhance crossings with flashing beacons, signing, and striping	All uncontrolled multi-lane crosswalks to be enhanced with high visibility striping, Rapid Rectangular Flashing Beacon (RRFB) or Pedestrian Hybrid beacon (PHB), and geometric improvements of median refuge and/or curb extension where feasible	$51,300	4	3	1	4	2	2	12
40	Newark Boulevard	at Central Avenue	Signalized crossing enhancement	Enhance crossings through removal of bends in crosswalks, removal of channelized right-turns, and/or narrowing of crossing distances	$45,000	2	3	1	4	2	1	9
41	Newark Boulevard	at Cedar Avenue	Signalized crossing enhancement	Enhance crossings through removal of bends in crosswalks, removal of channelized right-turns, and/or narrowing of crossing distances	$45,000	4	3	1	4	2	1	11
42	Newark Junior High School	Christine Street and Lafayette Avenue; Mirabeau Drive and Haley Street; Newark Boulevard and Bellhaven Avenue	Safe Routes to School -Improve crossings	Install tactile warning surfaces on curb ramps; stripe crosswalks at intersecting minor streets; add additional crosswalk across Mirabeau; consider alternatives for intersection (enhancements, advance stop bar, roundabout, etc.); add tactile warning surfaces on curb ramps at Bellhaven crossing; enhance crosswalks at Brittany Avenue; add sharrows along Newark Boulevard	$53,100	4	3	1	4	5	2	15
43	Newark Mem. HS	Cedar Avenue and N. Magazine Street/Newark	Safe Routes to School - Improve crossings	Fix pedestrian push button at N. Magazine; enhance colored crosswalks along Cedar	$839,070	5	3	1	4	2	2	13

Table B-1 City of Newark Proposed Pedestrian Improvements Projects												
ID	**Location**	**Location Detail**	**Proposed Project**	**Description**	**Cost**	**Priority Areas (5)**	**Access (3)**	**Bus Route (1)**	**Connectivity (4)**	**Safety (5)**	**Ease of Imp. (3)**	**Total Score**
		Boulevard		between N. Magazine and Balentine; extend median nose through crosswalk at existing crossings; reduce right-turn radii at large intersections; provide two curb ramps per corner								
44	Newpark Mall Road	Loop around NewPark Mall	Sidewalk Gap Closures; Crosswalk Enhancements	Through the NewPark Mall Specific Plan, work with stakeholders and parcel owner to close sidewalk gaps around the mall and identify and install preferred crosswalk location and appropriate enhancements	-	-	-	-	-	-	-	-
45	Smith Street	at Escallonia Drive	Uncontrolled Single-Lane Crosswalks	Marked crosswalks with high visibility striping,	$12,600	3	0	0	0	2	3	8
46	Snow Elementary School	Haley Street and Cabernet Avenue; Laurel Street and Peachtree Avenue; Mirabeau Drive and Cedar Boulevard/Orleans Drive	Safe Routes to School - Improve crossings	Add advance yield line at Haley and Cabernet; add minor street crosswalks along Haley; add crosswalk at Laurel and Peachtree; shorten ped crossing and add advance stop bars at Mirabeau and Cedar; reduce speed limit to 15 mph on Mirabeau in front of school; add advance stop bars at Mirabeau and Orleans	$828,900	4	0	0	0	4	3	11
47	Stevenson Boulevard	at Encyclopedia Street	Uncontrolled Single-Lane Crosswalks	Marked crosswalks with high visibility striping,	$12,600	2	3	1	4	2	3	11
48	Stevenson Boulevard	Between Cedar Boulevard and Balentine Drive	Uncontrolled Single-Lane Crosswalks	Marked crosswalks with high visibility striping,	$12,600	2	3	1	4	2	3	11
49	Stevenson Boulevard	at Parada Street	Uncontrolled Single-Lane Crosswalks	Marked crosswalks with high visibility striping,	$12,600	0	3	1	4	2	3	9

Table B-1 City of Newark Proposed Pedestrian Improvements Projects												
ID	**Location**	**Location Detail**	**Proposed Project**	**Description**	**Cost**	**Priority Areas (5)**	**Access (3)**	**Bus Route (1)**	**Connectivity (4)**	**Safety (5)**	**Ease of Imp. (3)**	**Total Score**
50	Stevenson Boulevard	Between Boyce Road and I-880	Streetscape improvements	Streetscape improvements may include additional pedestrian amenities such as street furniture, street trees, and building façade improvements	$2,736,000	2	3	1	4	2	2	10
51	Thornton Avenue	at Magnolia Street	Enhance crossings with flashing beacons, signing, and striping	All uncontrolled multi-lane crosswalks to be enhanced with high visibility striping, Rapid Rectangular Flashing Beacon (RRFB) or Pedestrian Hybrid beacon (PHB), and geometric improvements of median refuge and/or curb extension where feasible	$51,300	2	3	1	4	4	2	12
52	Thornton Avenue	at Mayhews Landing Road	Signalized crossing enhancement	Reduce curb radii on northwest corner, straighten north crosswalk, and add south crosswalk.	$72,000	4	3	1	4	5	1	14
53	Thornton Avenue	at Ash Street	Uncontrolled Single-Lane Crosswalks	Marked crosswalks with high visibility striping,	$12,600	2	3	1	4	5	3	14
54	Thornton Avenue	at Spruce Street	Signalized crossing enhancement	Enhance crossings through removal of bends in crosswalks, removal of channelized right-turns, and/or narrowing of crossing distances	$45,000	1	3	1	4	4	1	10
55	Thornton Avenue	at Cedar Boulevard	Signalized crossing enhancement	Enhance crossings through removal of bends in crosswalks, removal of channelized right-turns, and/or narrowing of crossing distances	$45,000	4	3	1	4	4	1	13
56	Thornton Avenue	at Newark Boulevard	Signalized crossing enhancement	Enhance crossings through removal of bends in crosswalks, removal of channelized right-turns,	$45,000	4	3	1	4	4	1	13

Table B-1 City of Newark Proposed Pedestrian Improvements Projects												
ID	**Location**	**Location Detail**	**Proposed Project**	**Description**	**Cost**	**Priority Areas (5)**	**Access (3)**	**Bus Route (1)**	**Connectivity (4)**	**Safety (5)**	**Ease of Imp. (3)**	**Total Score**
				and/or narrowing of crossing distances								
57	Thornton Avenue	at Cherry Street	Signalized crossing enhancement	Enhance crossings through removal of bends in crosswalks, removal of channelized right-turns, and/or narrowing of crossing distances	$45,000	3	3	1	4	4	1	12
58	Thornton Avenue	Between Willow Street and I - 880	Install pedestrian scale lighting and sidewalk enhancements	Sidewalk enhancements may include driveway modification, improve sidewalk quality, and sidewalk widening	$6,747,300	5	3	1	4	5	1	15

APPENDIX C. CITYWIDE UNCONTROLLED CROSSWALK POLICY

1. INTRODUCTION

The City of Newark initiated development of this Crosswalk Policy to prescribe a formal, transparent, and consistent process for new crosswalk implementation and improvement. A comprehensive pedestrian safety strategy contains a three-pronged approach including engineering, enforcement, and education programs. **Chapter 4: Pedestrian Element** introduces several physical elements, such as pedestrian crossing treatments and intersection design. **Chapter 6: Support Programs** details enforcement and education programs related to crosswalk safety. Finally, this appendix provides more detailed guidance on when to mark, enhance, or remove crosswalks and creates a clear, consistent, and citywide basis for making those decisions. The Crosswalk Policy includes a toolbox of elements to improve crosswalk visibility and safety. In addition to standard tools, the toolbox includes highly effective uncontrolled crosswalk enhancements, such as pedestrian hybrid beacons (PHBs) and rectangular rapid flashing beacons (RRFBs).

This Policy provides guidance about the type of treatments appropriate on different kinds of roadways and under various conditions. The toolbox uses simple inputs that can be derived from a field survey, such as number of lanes, posted speed, and average daily traffic, to provide a candidate crosswalk treatment at mid-block and uncontrolled locations. While these treatments represent best practice, engineering judgment should be exercised in all cases.

Development of a pedestrian safety strategy should guide the City in making decisions about all types of crosswalks and should be consulted each time a crosswalk is considered for installation, enhancement, or removal. These include basic crosswalks (i.e., two stripes); crosswalks with special treatments, such as high visibility crosswalks, flashing beacons, and other special features; and crosswalks that remain unmarked due to safety concerns resulting from volume, speed, or sight distance issues.

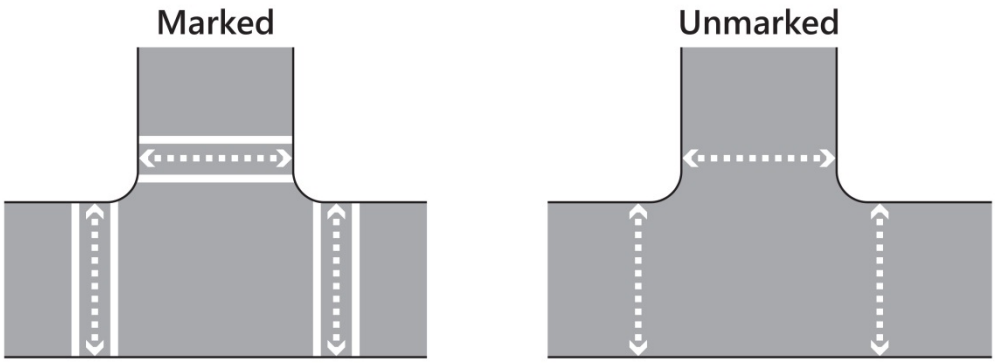
2. CROSSWALK FUNDAMENTALS

This section outlines the types of crosswalks, where crossing the street is legal in California per the California Vehicle Code, and the steps the City should take in identifying locations for marked crosswalks.

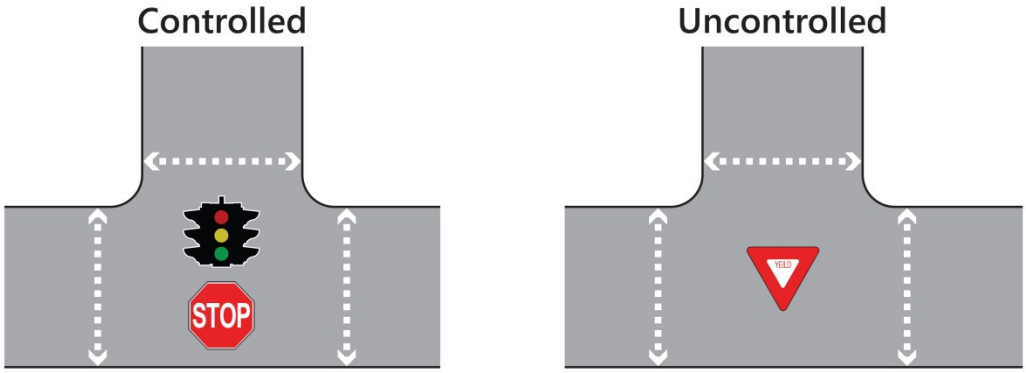
2.1.1. TYPES OF CROSSWALKS

Crosswalks are primarily classified by three characteristics:

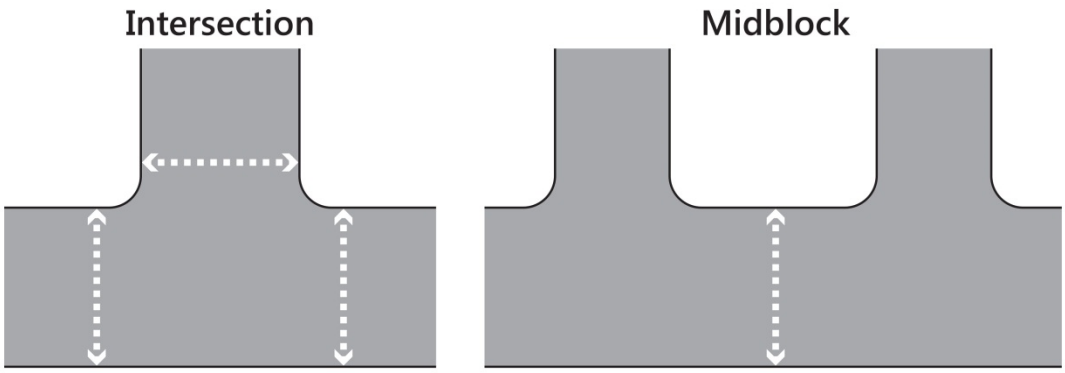
1) Whether they are marked (demarcated with striping on the street) or unmarked (no striping)



2) Whether they are controlled (by a traffic signal or stop-sign) or uncontrolled (with no intersection control)



3) Whether they are located at an intersection (where two streets meet) or mid-block (between intersections)



The following section outlines where crossing the street is legal in California. Based on pedestrian safety and crosswalk marking research, some types of crosswalks are safer than others. Generally speaking, marked, controlled crosswalks at an intersection have lower risk of pedestrian collisions than mid-block, uncontrolled crosswalks, for example.

2.1.2. LEGAL CROSSWALKS

In California, a legal crosswalk exists where a sidewalk meets a street, regardless of whether the crosswalk is marked (i.e., with or without striping to denote the crosswalk). Pedestrians may legally cross any street, except at unmarked locations between immediately adjacent signalized crossings, or where crossing is expressly prohibited. Marked crosswalks reinforce the location and legitimacy of a pedestrian crossing.

These legal statues are contained in the California Vehicle Code (CVC) as follows:

- Section 275 defines a legal crosswalk as:
    - That portion of a roadway included within the prolongation or connection of the boundary lines of sidewalks at intersections where the intersecting roadways meet at approximately right angles, except the prolongation of such lines from an alley across a street.
    - Any portion of a roadway distinctly indicated for pedestrian crossing by lines or other markings on the surface (such as a marked midblock crossing).
- Section 21950 describes right-of-way at a crosswalk:
    - The driver of a marked vehicle shall yield the right-of-way to a pedestrian crossing the roadway within any marked crosswalk or within any unmarked crosswalk at an intersection.
- Section 21955 describes where pedestrians may *not* cross a street:
    - Between adjacent intersections controlled by traffic control signal devices or by police officers, pedestrians shall not cross the roadway at any place except in a crosswalk.

2.1.3. ADVANTAGES OF MARKED CROSSWALKS

Sidewalks and crosswalks are essential links within a pedestrian network. Whether commuting, running an errand, exercising, or wandering, pedestrians will need safe and convenient crossing opportunities to reach their destinations. A marked crosswalk has three (3) primary functions:

1) To create reasonable expectations where pedestrians may cross a roadway
2) To improve predictability of pedestrian actions and movement
3) To channel pedestrians to designated crossing locations (often selected for their optimal sight distance)

Marked crosswalks offer the following advantages:

- They help pedestrians find their way across complex intersections
- They can designate the shortest path
- They can direct pedestrians to locations of best sight distance
- They assure pedestrians of their legal right to cross a roadway at an intersection or mid-block crossing

This last bullet point is important. The *California Vehicle Code* gives the right-of-way to pedestrians at any marked or unmarked crosswalk (as noted above), although the law is not always obeyed by road users, including both drivers and pedestrians. Drivers often fail to yield the right-of-way without the visual cue of a marked crosswalk. Pedestrians also do not always know the right-of-way law, and will either wait for a gap in traffic, or assert their right-of-way by stepping in to the roadway.

2.1.4. IDENTIFYING CANDIDATE LOCATIONS FOR CROSSWALK ENHANCEMENTS IN NEWARK

Identifying candidate locations for marked crosswalks involves two steps. The first step is to locate unmarked places where people would like to cross the street. In this plan, this step was achieved by reviewing aerial images of all uncontrolled single-lane crosswalks in the City. The Plan also recommends specific crosswalk installation and enhancement projects, as shown on **Figure 4-2** and in **Table B-1.** These potentially crosswalk locations should be consulted again this Policy for consistency and also incorporate engineering judgment to determine the final crosswalk design and level of enhancement. Where members of the public request crosswalks or City projects uncover possible crosswalk installations or enhancements, **Figure C-1** should be consulted to determine if marking a crosswalk is appropriate.

The second step is to identify where people can cross safely. The primary consideration in this step is adequate stopping sight distance. Of all road users, pedestrians have the highest risk of injury in a collision because they are the least protected. The crosswalk safety treatment toolboxes in presented in this appendix provide numerous options for enhancing pedestrian safety at uncontrolled crossings, with treatment selection based on the overall context of the crosswalk – including surrounding land uses, roadway characteristics, and user characteristics.

2.1.5 WHEN TO INSTALL MARKED CROSSWALKS

Once candidate locations are identified (either through the recommendations contained in this Plan, through studies, or through citizen requests), an engineering evaluation should be conducted to determine if a marked crosswalk should be installed at an uncontrolled or mid-block location, and if so, what visibility enhancements should be included in the design. Crossings should be marked where all of the following occur:

- Sufficient demand exists to justify the installation of a crosswalk
- Sufficient sight distance as measured by stopping sight distance calculations exists and/or sight distance will be improved prior to crosswalk marking
- Safety considerations do not preclude a crosswalk

Figures C-1 and **C-2** describe the overall procedures from the moment City staff receives a request for a new marked crosswalk (or considers removing an existing marked crosswalk) to the installation of the treatment. As described, the first steps to determine the appropriate location and treatment for the crosswalk include a staff field visit.

Figure C-1: Marked Crosswalk Placement Flowchart

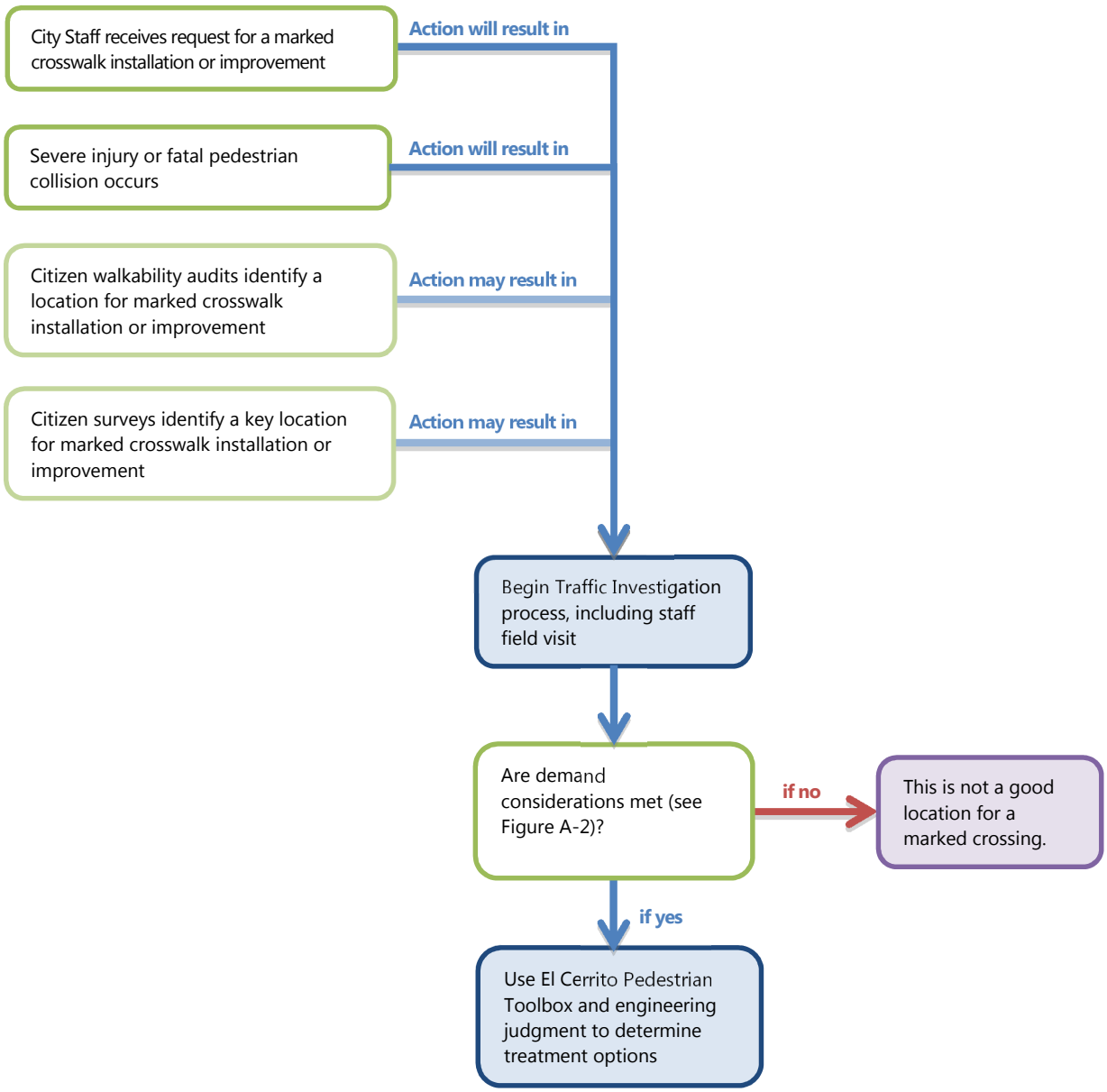
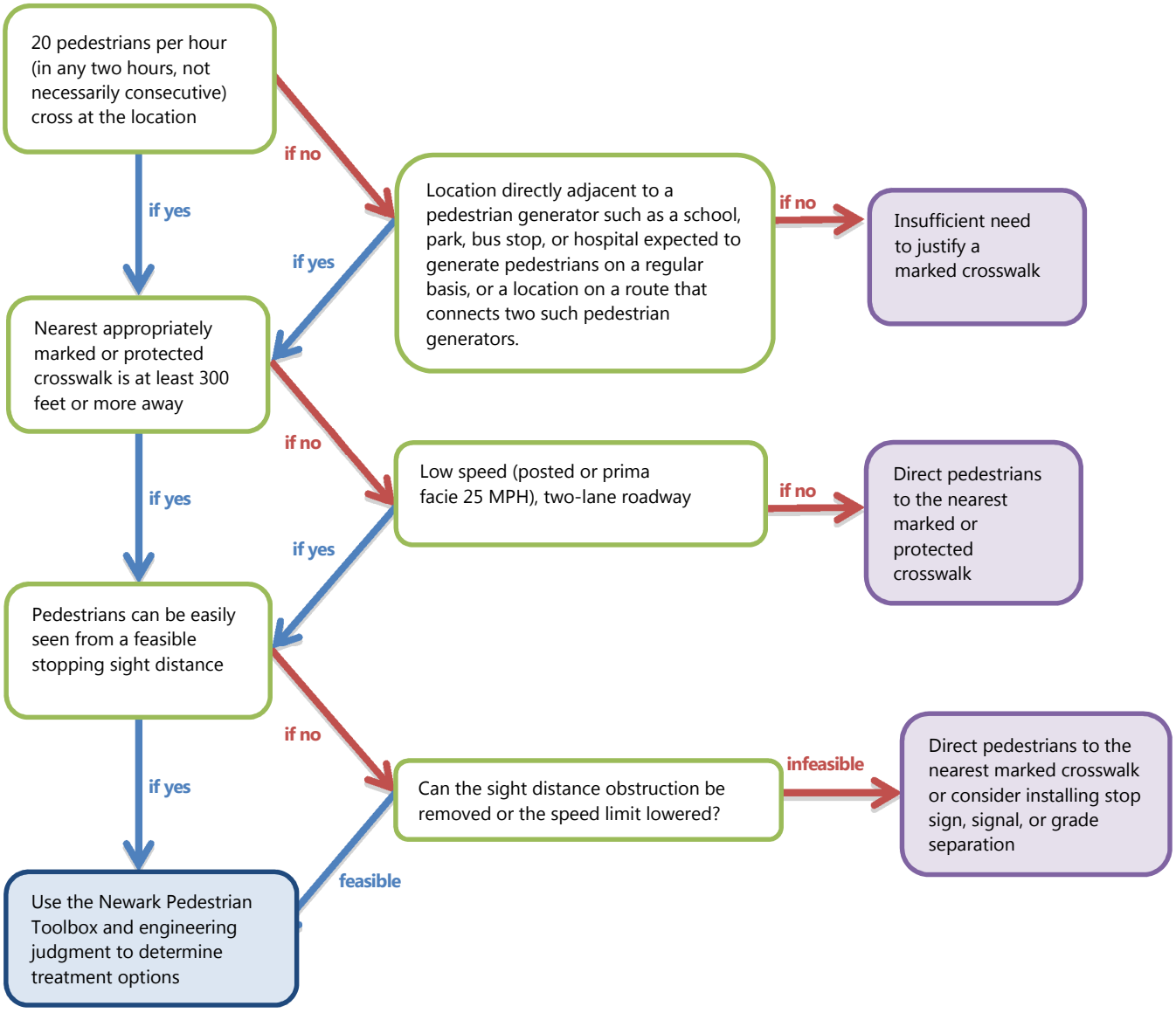


Figure C-2: Feasibility Analysis for Treatments at Uncontrolled Locations



Note: Where it is determined that a marked crosswalk is not necessary based on Figure C-2, other treatment options are available. These include traffic calming measures, such as speeds tables and speed humps; curb extensions and refuges to narrow the roadway, speed feedback signs, and similar treatments to help reducing crossing distances and slow speeds. These engineering treatments are described in the following pages. In addition to engineering treatments, education and enforcement programs should also be considered.

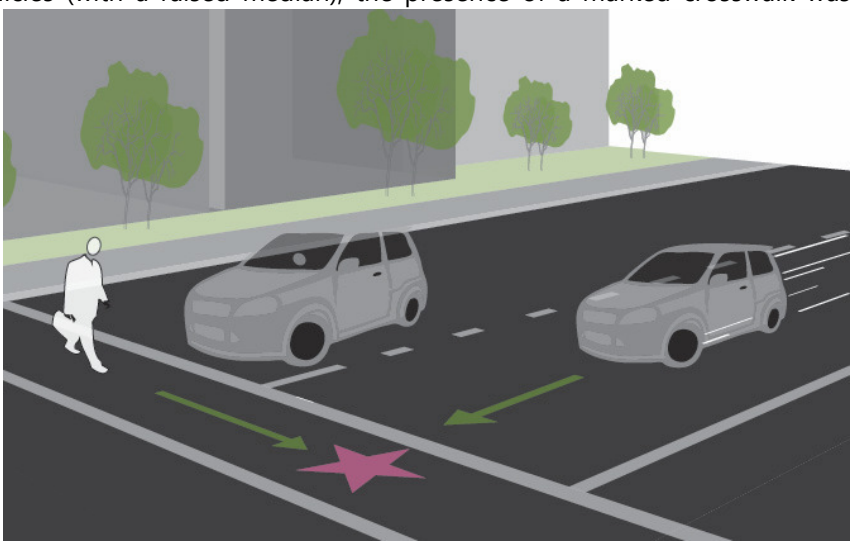
For locations without pedestrian counts, consider whether location is directly adjacent to a pedestrian generator such as a school, park, bus stop, or hospital and is expected to generate pedestrians on a regular basis, or is located on a route that connects two such pedestrian generators.

3. UNCONTROLLED CROSSING ENHANCEMENT TOOLBOX

This section presents best practices for the installation of marked crosswalks at uncontrolled intersections and mid-block locations. Uncontrolled crossings require additional consideration during planning and design since traffic signals and stop signs are not provided, meaning that motorists must be able to recognize the pedestrian and yield accordingly. Thus, providing appropriate enhancements to improve the visibility and safety of pedestrians crossing the street at an uncontrolled location is critical for pedestrian safety.

3.1.1. CROSSWALK SAFETY RESEARCH

Several studies of pedestrian safety at uncontrolled crossings have been completed, from which conflicting research had emerged in the past. Studies conducted in San Diego in the 1970s showed that pedestrian collision risk at marked, uncontrolled crosswalks was greater than at unmarked crossings. This led many cities to remove marked crosswalks, as they were suspected of providing a false sense of security that drivers would yield to pedestrians in the crosswalk. However, a more recent study[2] by the Federal Highway Administration (FHWA) comprehensively reviewed crossing safety at 1,000 marked and 1,000 unmarked crosswalks in 30 U.S. cities, controlling for site context factors. The study concluded that site factors related to pedestrian-involved collisions included pedestrian average daily traffic (ADT), vehicle ADT, number of lanes, median type, and the region of the U.S. At uncontrolled locations on two-lane roads and multi-lane roads with ADT below 12,000 vehicles, FHWA found that the presence of a marked crosswalk alone, compared with an unmarked crosswalk, made no statistically significant difference in the pedestrian crash rate. However, on multi-lane roads with an ADT of greater than 12,000 vehicles (without a raised median) and 15,000 vehicles (with a raised median), the presence of a marked crosswalk was associated with a statistically significant higher rate of pedestrian collisions compared to sites with an unmarked crosswalk.



Multiple threat conflicts on multi-lane roadways occur where a vehicle yielding to a pedestrian inhibits sight lines to another oncoming vehicle.

The results of the study should not encourage city officials to simply remove (or fail to install) marked crosswalks. Rather, the report suggested adding crosswalk enhancements to the marked crosswalks to balance mobility needs with safety needs. These improvements include high-visibility striping, advanced yield signs, raised medians, traffic and pedestrian signals

[2] Zeeger, C., J. Stewart, and H. Huang. *Safety Effects of Marked Versus Unmarked Crosswalks at Uncontrolled Locations*. Publication FHWA-RD-01-142, FHWA, U.S. Department of Transportation, 2001.

where warranted, curb extensions, adequate lighting, and tighter turn radii.

In the FHWA study, about 70 percent of the pedestrian crashes occurred at marked crosswalks on multi-lane roads. Of the pedestrian crashes at marked crosswalks, 17.6 percent were classified as multiple-threat collisions. Multiple-threat collisions occur as one car slows down to allow pedestrians to cross, but a second car approaching from behind in the adjacent lane may not see the pedestrian. The slowing vehicle blocks the sight line of both the pedestrian and the second motorist, leading to the pedestrian-vehicle collision. Multi-lane roadways are therefore not well-served by unmarked or marked crosswalks alone. At these sites, the study concluded, engineers should consider countermeasures that provide additional safety to pedestrians and alert motorists to upcoming crosswalks. These countermeasures include advanced yield lines with corresponding signs informing motorists where to yield. Other more substantial measures may also be considered, such as signalization, illumination, or raised medians.

These studies support the decisions presented in this plan, which proposes new marked crosswalks at single-lane crossings only. This plan also proposes appropriate additional treatments, including PHBs and RRFBs, at specific multi-lane crossings with higher levels of ADT.

3.1.2. TREATMENT SELECTION

At uncontrolled locations, a marked crosswalk with striping only may not provide adequate visibility to the pedestrian crossing, especially at high volume, high speed, or multi-lane crossings. As such, this plan only proposes new marked crosswalks at single-lane crossings, such as Mirabeau Drive at Cherry Street. Nonetheless, additional enhancements should be considered for installation to supplement crosswalk striping. Appropriate treatments should be identified based on:

- Site characteristics: presence of pedestrian desire lines, available sight distance and visibility, lighting
- Geometric configuration of the roadway: presence of curb extensions or median refuge islands
- Travel data: 85th percentile speeds, posted speed limits, and average daily traffic (ADT) volumes.

As previously mentioned, new marked crosswalks across uncontrolled roadways should include other measures designed to reduce traffic speeds, shorten crossing distances, enhance driver awareness of the crossing, and/or provide active warning of pedestrian presence, where the speed limit exceeds 40 MPH and either[3]:

- Four or more travel lanes without a raised median or pedestrian island and an average daily traffic volumes (ADT) greater than 12,000
- Four or more travel lanes with a raised median or pedestrian island and average daily traffic volumes (ADT) greater than 15,000

Locations with speeds and ADT volumes below these thresholds warrant marked crosswalks, while locations that exceed these thresholds may also warrant more advanced enhancements. The Uncontrolled

[3] California MUTCD, Section 3B. 18.

Treatment Toolbox outlines considerations for the use of enhancements in various contexts as summarized in the remainder of this section. This Toolbox may be used to identify potential treatments at a candidate uncontrolled crosswalk locations.

3.1.3. PEDESTRIAN LEVEL OF SERVICE AND TREATMENT SELECTION

A calculation of Pedestrian Level of Service forms the basis for the treatment identification. Pedestrian Level of Service is the average delay experienced by pedestrians as they are waiting to cross the street. Expected motorist compliance is another other key variable for treatment identification. Compliance is based on field observations and engineering judgment. Expected motorist compliance is meant to estimate typical motorist responses to pedestrians attempting to cross the street. If drivers are likely to stop for a pedestrian, the compliance is rated "high." If drivers rarely stop for pedestrians, compliance is "low." The compliance rate should be assumed to be low for all locations where the speed limit is greater than 30 MPH. **Table C-1** summarizes the appropriate treatments based on level of enhancement needed (with the most significant enhancement required with the worst LOS and compliance rates).

Table C-1.
Application of Enhanced Treatments for Uncontrolled Locations

Pedestrian Level of Service	Expected Motorist Compliance		
	Low (or Speed >30 mph)	**Moderate**	**High**
LOS A-D (average delay up to 30 seconds)	***LEVEL 3*** 2 lane road: RRFB, overhead flashing beacons Multi-lane road: RRFB *Plus LEVELS 1 and 2*	***LEVEL 2*** Curb Extensions, Bus Bulb, Reduced Curb Radii, Staggered Pedestrian Refuge *Plus LEVEL 1*	***LEVEL 1*** High Visibility Crosswalk Markings, Advanced Yield Lines, Advance Signage
LOS E-F (average delay greater than 30 seconds)	***LEVEL 4*** Pedestrian Hybrid Beacon, RRFB, or Direct Pedestrians to Nearest Safe Crossing *Plus LEVELS 1 and 2*	***LEVEL 3*** 2 lane road: RRFB, overhead flashing beacons Multi-lane road: RRFB *Plus LEVELS 1 and 2*	***LEVEL 2*** Curb Extensions, Reduced Curb Radii, Staggered Pedestrian Refuge *Plus LEVEL 1*

Notes: A pedestrian refuge island (median) is recommended for consideration in all scenarios with more than 2 lanes of traffic with suitable right-of-way.

Level 1 enhancements represent minor interventions, appropriate for situations with lower speeds and traffic volumes and high driver yielding rates. Higher levels represent more significant interventions, as may be needed on higher speed or volume roadways, wider roadways, and roadways where motorists are less likely to yield to pedestrians. Treatments may be combined with higher level treatments added to lower level treatments (i.e., flashing beacons with curb extensions). Failing to provide an enhanced crosswalk and/or removing a marked crosswalk should be an option of last resort.

3.1.4. TREATMENT OPTIONS

The following tables provide additional information on the preferred pedestrian safety treatments listed in **Table C-1**. These treatments are grouped into three categories, as follows:

- **Table C-2**: Geometric Treatments
- **Table C-3**: Striping and Signage
- **Table C-4**: Signal Hardware and Operational Measures

Within each table, treatments are categorized into three levels based on the level of safety concern they are meant to address: Level 1 (all cases), Level 2 (enhancements), and Level 3 (advanced enhancements). Categories of improvements are cumulative; for example, a Level 2 device should also include appropriate Level 1 devices. Not all of these treatments are recommended for application at the locations identified in this document.

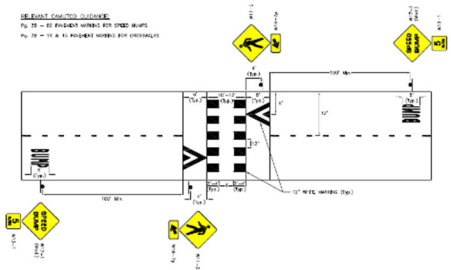
Table C-2.
Uncontrolled Crossings – Geometric Treatments

Treatment	Description	Level	Estimated Cost
2-1. Road Diet (i.e., fewer lanes)  *Image Source: Fehr & Peers*	Fewer travel lanes decrease roadway width and crosswalk length, reduce speeds, reduce left-turn and rear-end collisions, and often eliminate the multiple-threat collision. It takes an average pedestrian almost four seconds to cross each additional travel lane. Therefore, reducing the number of travel lanes minimizes the amount of time that pedestrians are in the crosswalk. More travel lanes than necessary can also increase vehicle travel speeds; research has shown that the severity of pedestrian collisions increases with vehicle travel speed. Where fewer travel lanes are not possible, travel lanes can be narrowed to as little as nine feet, especially left- and right-turn pockets.	**Level 1**	$20/LF[4]
2-2. Removal of Sight-Distance Obstructions	If objects impede sight-distance, this may result in an unsafe condition where motorists and pedestrians are unable to see each other. Items such as parked cars, signage, landscaping, fencing, and street furniture should be placed in a location that will not obstruct sight distance.	**Level 1**	Varies[5]

[4] Cost includes removal of existing pavement markings and repainting.
[5] Items may be as low as $250 (relocating a street sign) or as high as $800 (relocating a tree).

Treatment	Description	Level	Estimated Cost
 *Image Source: Fehr & Peers*			
2-3. Pedestrian Refuge Island  *Image Source: Fehr & Peers*	Raised islands are placed in the center of the roadway separating opposing lanes of traffic with cutouts or ramps for accessibility along the pedestrian path. Median refuge islands are recommended where right-of-way allows and conditions warrant. Studies show medians are one of the most important safety enhancements available for crosswalks. They simplify complicated multi-lane crossings by breaking the crossings/conflicts into two stages.	**Level 1**	$130/LF[6]
2-4. Curb Extensions  *Image Source: Fehr & Peers*	Curb extensions extend the curb and sidewalks further into the roadway, shortening the length of the crosswalk. They act as a traffic calming device by narrowing the effective width of the roadway and slowing turning speeds. Because they extend into the roadway, often past parallel-parked vehicles, they improve visibility for pedestrians. The also provide space for street furniture, landscaping, bicycle parking, and signs and signal poles. Curb extensions can be constructed with reduced curb radii and to accommodate ADA improvements, such as directional curb ramps.	**Level 1**	$140/LF[7]
2-5. Split Pedestrian Crossover (SPXO)	This measure is similar to traditional	**Level 1**	$130/LF

[6] Cost includes new curb and concrete barrier. Assumes a 6 foot median.
[7] Cost includes removal of existing curb, new curb, new sidewalk, and new bollards. Cost does not include curb ramps.

Treatment	Description	Level	Estimated Cost
 *Image Source: Fehr & Peers*	median refuge islands; the difference is that the crosswalks in the roadway are staggered such that a pedestrian crosses half of the street and then walks toward traffic to reach the second half of the crosswalk. This measure must be designed for accessibility by including rails and truncated domes to direct sight-impaired pedestrians along the path of travel.		
2-6. Raised Crosswalk  *Image Source: Fehr & Peers*	Raised crosswalks are speed tables (flat-topped speed humps) outfitted with crosswalk markings and signage, providing pedestrians with a level street crossing. By raising the level of the crossing, vehicles drive more slowly through the crosswalk and pedestrians are more visible to approaching motorists.	**Level 2**	$4,000/EA
2-7. Pedestrian Overpass/Underpass  *Image Source: Fehr & Peers*	This measure consists of a pedestrian or pedestrian/bicycle overpass or underpass of a roadway. It provides complete separation from motor vehicle traffic, normally where no other pedestrian facility is available, and connects off-road trails and paths across major barriers. Overpasses and underpasses should be used as a measure of last resort because of their cost and barriers to their effective/efficient use, with topographical and desire line considerations influencing their design. Personal security concerns must also be addressed in the design of these facilities.	**Level 3**	$150/SF

Source: Fehr & Peers, 2016.

Table C-3.
Uncontrolled Crossings – Striping and Signage

Treatment	Description	Level	Estimated Cost
3-1. High Visibility Markings  *Image Source: Fehr & Peers*	All uncontrolled marked crosswalks should feature high-visibility markings. Various striping patterns are available, including white and fluorescent yellow green continental style markings. Triple four striping, as shown in the photo to the left, is recommended for use in future installations.	**Level 1**	$3500/Xwalk
3-2. Advanced Yield Line  *Image Source: Fehr & Peers*	Advanced yield lines, often referred to as "sharks teeth", should be striped at all marked, uncontrolled crosswalks on multi-lane roadways. They should be placed 20-30 feet in front of the crosswalk. Their intention is to identify where vehicles should stop when yielding to a pedestrian to maintain adequate sight lines.	**Level 1**	$100/EA
3-3. Advanced Warning Signs  *Image Source: Fehr & Peers*	High-visibility yellow or fluorescent-yellow-green (FYG) signs are posted at crossings to increase the visibility of a pedestrian crossing.	**Level 1**	$1,000/EA

Treatment	Description	Level	Estimated Cost
3-4. In-Street Pedestrian Crossing Sign  *Image Source: FHWA*	This measure involves posting regulatory pedestrian signage on lane edge lines and/or road centerlines. The in-street pedestrian crossing sign may be used to remind road users of laws regarding right-of-way at an uncontrolled pedestrian crossing. They can be installed on medians and may also be temporary signs, placed by school crossing guards during school hours.	**Level 1**	$400/EA

Source: Fehr & Peers, 2016.

Table C-4.
Uncontrolled Crossings – Beacon, Lighting, And Signal Treatments

Treatment	Description	Level	Estimated Cost
4-1. Pedestrian-Scale Lighting  *Image source: www.ci.mil.wi.us*	Pedestrian-scale lighting improves visibility along a pedestrian's path and across driveways. It also improves visibility at pedestrian/vehicle conflict points in crosswalks.	**Level 1**	$315/LF
4-2. Rectangular Rapid Flashing Beacon (RRFB)  *Image Source: Fehr & Peers*	The RRFB is an enhancement of the older flashing beacon that replaced the traditional slow flashing incandescent lamps with rapid flashing LED lamps. The RRFB may be push-button activated or activated with passive detection. This treatment was approved for use in California via Interim Approval IA-7-83 in 2011. Any installations should be reported to Caltrans for documentation, but do not require pre-approval for experimentation.	**Level 2**	$25,000/EA
4-3. Pedestrian Hybrid Beacon (PHB)	The PHB is a pedestrian-activated beacon that is a combination of a beacon flasher and a traffic control signal.	**Level 3**	$80,000/EA

Treatment	Description	Level	Estimated Cost
 *Image Source: FHWA*	When actuated, the PHB displays a yellow (warning) indication followed by a solid red indication. During the pedestrian clearance interval, the driver sees a flashing red "wig-wag" pattern until the clearance interval has ended and the beacon goes dark. The device is included in the 2012 California MUTCD for use at midblock locations.[8]		
4-4. Pedestrian Signal  *Image Source: Fehr & Peers*	A pedestrian signal is a conventional traffic control device with warrants for use based on the MUTCD. The pedestrian warrants were revised with the 2009 Federal and 2012 California MUTCD.	**Level 4**	$450,000/EA

Source: Fehr & Peers, 2016.

4. CONTROLLED CROSSWALK TREATMENT TOOLBOX

Controlled crosswalks are located at stop-controlled or signalized intersections. Generally, these crossings do not need enhancements beyond standard crosswalk markings (two parallel lines), as the traffic signal or stop-sign controls allocation of right-of-way. However, in special cases, such as skewed intersections or near schools, this plan recommends providing enhanced crossings to improve visibility and to create a

[8] Use of the device at side-street stop control locations currently requires separate permission from the CTCDC (though this is under review).

sense of place or improved aesthetics. This section presents preferred and enhanced measures for pedestrian treatments at controlled locations to:

- Improve the visibility of pedestrians to motorists and vice-versa
- Communicate to motorists and pedestrians who has the right-of-way
- Accommodate vulnerable populations such as the disabled, children, and the elderly
- Reduce conflicts between pedestrians and vehicles
- Reduce vehicular speeds at locations with potential pedestrian conflicts

All treatments identified in this chapter are required or allowed by the standards and specifications in the *California Manual on Uniform Traffic Control Devices* (CA MUTCD).

4.1.1. CITYWIDE CROSSING ENHANCEMENTS

As described in Chapter 4, this plan identifies several recommendations that the city can apply across Newark to improve the safety and comfort of pedestrians at controlled crosswalks. These recommendations include:

- Extending pedestrian walk time beyond 3.5 feet/second at signalized crossings citywide (particularly in key pedestrian locations near schools, parks and senior centers).
- Adding countdown signals at signalized intersections where they are missing.
- Continuing to make curb ramps through the city ADA-accessible by installing directional curb ramps of standard grade and width, with truncated domes.
- Additional treatments at signalized crossings (see below).

4.1.2. PREFERRED CROSSING TREATMENTS

Preferred crossing treatments are identified as the basic pedestrian crossing improvements that could be provided at all stop-controlled and signalized intersections in Newark. New controlled intersections should be designed with these treatments included as they are installed. Existing controlled intersections identified in this plan may require retrofits and may be prioritized according to the standards presented in chapter 7. These treatments are based on recommended best practices in pedestrian safety:[9]

- Mark crosswalks on all legs of the intersection that serve a key desire line
- Provide advanced stop bars in advance of each crosswalk
- Minimize the number of vehicle traffic lanes pedestrians must cross (i.e., "Road Diet")
- Provide median refuge islands and thumbnails, as width and path of turn maneuvers allow

[9] See America Walks *Signalized Intersection Enhancements that Benefit Pedestrians* http://americawalks.org/wp-content/upload/America-Walks-Signalized-Intersection-Enhancement-Report-Updated-8.16.2012.pdf (2012).

- Remove sight-distance obstructions
- Provide directional curb ramps for each crosswalk (e.g., two per corner)
- Eliminate free right-turn slip lanes, where feasible, and mitigate for pedestrian safety where they remain with a raised crosswalk or signalization
- Locate bus stops on the far-side of the intersection (or in front of mid-block crossings)
- Minimize cycle lengths
- Reduce prevalence or eliminate permitted signal phasing where pedestrian crossings exist

4.1.3. ENHANCED CROSSING TREATMENTS

This plan recommends additional crosswalk enhancements at the nine high-volume pedestrian crossing locations identified in **Table B-1** and in Chapter 4. These treatments improve drivers' awareness of pedestrians by slowing traffic through geometric changes, providing signal timing or phasing modifications, or enhancing striping or signing to improve visibility.

The following tables describe the preferred and optional enhanced pedestrian safety treatments that may be used at the City's discretion for controlled locations:

- **Table C-5**: Geometric Treatments
- **Table C-6**: Striping and Signage
- **Table C-7**: Signal Hardware and Operational Measures

Table C-5.
Controlled Intersections – Geometric Treatments

Treatment	Description	Level	Cost
5-1. Fewer Travel Lanes ("Road Diet")  *Image Source: Fehr & Peers*	Fewer travel lanes decrease roadway width and crosswalk length, reduce speeds, reduce left-turn and rear-end collisions, and often eliminate the multiple-threat collision. An average pedestrian takes almost four seconds to cross each additional travel lane. Therefore, reducing the number of travel lanes minimizes the amount of time that pedestrians are in the crosswalk. More travel lanes than necessary can also increase vehicle travel speeds; research has shown that the severity of pedestrian collisions increases with vehicle travel speed. Where fewer travel lanes are not possible, travel lanes can be narrowed to as little as nine feet, especially left- and right-turn pockets.	Preferred	$20/LF[10]
5-2. Pedestrian Refuge Island with "Thumbnail"  *Image Source: Fehr & Peers*	Median pedestrian islands provide a refuge for pedestrians to stand if they do not have sufficient time to cross a street. They can be enhanced with median pedestrian push buttons at signalized crossings. Median islands can be installed throughout a corridor or only at specific crosswalks.	Preferred	$130/LF[11]
5-3. Removal of Sight-Distance Obstructions	If objects impede sight-distance, an unsafe condition may arise where motorists and pedestrians are unable to see each other. Items such as parked cars, signage, landscaping, fencing, and street furniture should be	Preferred	Varies[12]

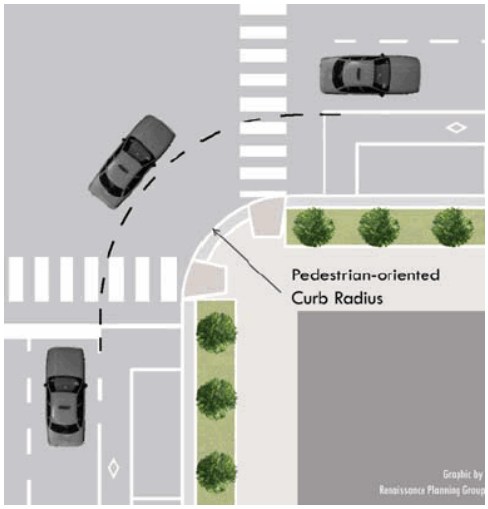
[10] Cost includes removal of existing pavement markings and repainting.
[11] Cost assumes 6 foot median and includes new curb and concrete barrier.
[12] Items may be as low as $250 (relocating a street sign) or as high as $800 (relocating a tree).

Treatment	Description	Level	Cost
 *Image Source: Fehr & Peers*	placed in a location that will not obstruct sight-distance.		
5-4. Directional Curb Ramps with Truncated Domes  *Image Source: Fehr & Peers*	Curb ramps offer wheelchair access to/from the sidewalk and crosswalk. Truncated domes, or tactile strips, warn blind pedestrians that they are about to enter a crosswalk. The best practice for curb ramps is to install two per corner so that each ramp points directly into the crosswalk and to the curb ramp at the other side of the street. Corner bulbouts can be used to increase the amount of space available for directional curb ramps.	Preferred	$4,000/ea
5-5. Right-Turn Lane Design  *Image Source: Fehr & Peers*	Free right-turns allow vehicles to turn right at high speeds. Since the vehicles are not typically controlled by the traffic signal in this circumstance, crosswalks across the turn lanes are usually uncontrolled crosswalks. Controlled right-turn movements are preferable for pedestrians because they require a vehicle to stop on red before turning right. Where "pork-chop" islands that channelize right-turns are necessary to provide acceptable turning radii, raised crosswalks are a pedestrian enhancement. Other options include signalizing the crossing (especially if it is multi-lane) and designing the "pork-chop" for slower speeds and	Preferred	$25,000/EA[13]

[13] Assuming no electrical costs

Treatment	Description	Level	Cost
	better visibility of pedestrians.		
5-6. Far-Side Bus Stops  *Image Source: Fehr & Peers*	Far-side bus stops allow pedestrians to cross behind the bus, improving pedestrian visibility. Far side bus stops also enhance transit operations by providing a guaranteed merging opportunity for buses. Exceptions for far-side bus stops include considerations for bus routing, sufficient sidewalk area, and conflicts with parking, land uses, or driveways.	Preferred	$1,000/EA[14]
5-7. Curb Extensions  *Image Source: Fehr & Peers*	Curb extensions extend the curb and sidewalks farther into the roadway, shortening the length of the crosswalk. They act as a traffic calming device by narrowing the effective width of the roadway and slowing turning speeds. Because they extend into the roadway, often past parallel-parked vehicles, they improve visibility for pedestrians. The also provide space for street furniture, landscaping, bicycle parking, and signs and signal poles. Curb extensions can be constructed to accommodate ADA improvements, such as directional curb ramps.	Enhanced	$140/LF[15]
5-8. Reduced Turn Radius	Vehicles travel faster through turns with a large radius. Reducing the radius of a corner is an effective way of reducing vehicle speeds (particularly on non-truck routes where there is less of a need for wide radii). In suburban environments, turn radii generally do not need to exceed 30 feet. In urban environments turn radii can be 10 feet or less, especially where the meeting of one-way streets prohibits turning movements. Where	Enhanced	$175/LF[16]

[14] Cost assumes no sidewalk or paving work
[15] Cost includes removal of existing curb, new bollards, curb, and sidewalk. Cost does not include curb ramps.
[16] Cost includes removal of existing curb, new bollards, curb, and sidewalk. Cost does not include curb ramps.

Treatment	Description	Level	Cost
 *Image Source: AARP*	on-street parking is permitted and/or bicycle lanes are present on one or both streets, consideration for further reductions of radii should occur, acknowledging that the effective radius is increased with on-street parking. Corner curb radii on multi-lane streets should acknowledge that trucks turning right can turn into two lanes.		

Source: Fehr & Peers, 2016

Table C-6.
Controlled Intersections – Striping and Signage

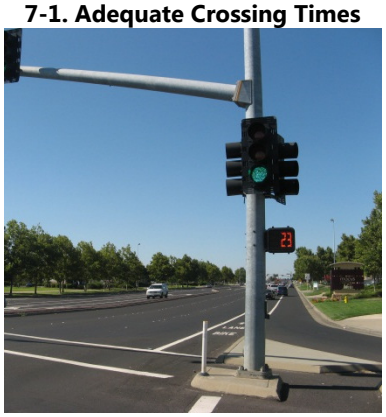
Treatment	Description	Level	Cost
6-1. Marked Crosswalks  *Image Source: Google Maps*	Signalized intersections do not necessarily have marked crosswalks. Marking a crosswalk across all approaches of an intersection improves pedestrian accessibility. At a four-way intersection, a closed crosswalk forces pedestrians to cross via three crosswalks instead of one. Crosswalks on all approaches can often be accommodated without a significant impact to traffic signal operations.	Preferred	$15/LF[17]
6-2. Advanced Stop Bar	Advanced stop bars are placed five to seven feet in front of crosswalks. They keep vehicles from	Preferred	$7.50/LF

[17] Cost includes both lines of crossing.

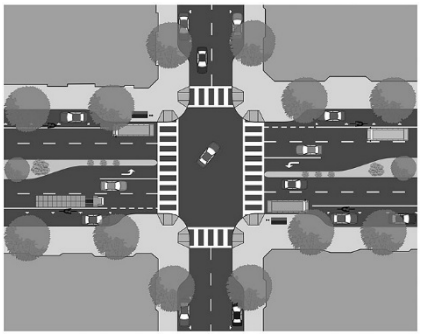
Treatment	Description	Level	Cost
 *Image Source: Fehr & Peers*	encroaching into the crosswalk when stopped at a red signal or stop sign.		
6-3. High Visibility Markings  *Image Source: Fehr & Peers*	High-visibility crosswalks at controlled locations are appropriate in areas with high pedestrian volumes, at crosswalks with skewed geometries, or near sensitive land uses (such as schools).	Enhanced	$3500/Xwalk
6-4. Textured Pavement or Colored Crosswalks  *Image Source: Fehr & Peers*	Textured pavement can be used in crosswalks or in intersections as an aesthetic enhancement. Because of its texture, it may also calm traffic by slowing vehicles before they cross an intersection. It can also make crosswalks more visible. Textured pavement can be made of brick or, alternatively, both concrete and asphalt can be stamped to look like brick or stone. At controlled locations, standard crosswalk striping should be provided in addition to the textured pavement. A smooth, non-slip surface is preferable.	Enhanced	$15/SF

Source: Fehr & Peers, 2016

Table C-7.
Controlled Intersections – Signal Hardware and Operational Measures

Treatment	Description	Level	Cost
7-1. Adequate Crossing Times  *Image Source: Fehr & Peers*	The 2012 California MUTCD requires a walking speed of 3.5 feet per second be assumed to determine crossing times as a default minimum (4.0 feet per second was previously the guidance). A speed slower than 3.5 feet per second can be used where slower pedestrians routinely use the crosswalk, such as locations near schools, parks, or senior centers.	Preferred	N/A[18]
7-2. Pedestrian Countdown Signal  *Image Source: Fehr & Peers*	Pedestrian countdown signals give pedestrians "Walk" and "Don't Walk" signals with a second-by-second countdown for each phase. Research suggests that pedestrians are more likely to obey the "Don't Walk" signal when delivered using a countdown signal. The device has been shown to enhance safety for all road users. The 2012 California MUTCD requires that all new pedestrian signals be countdown signals.	Preferred	$500/EA
7-3. Pedestrian Signals and Push Buttons 	Mounting push buttons for different crosswalks on one pole can be confusing for blind pedestrians. Push buttons should be separated by ten feet and placed within five feet of each curb ramp, one per crosswalk. At long crosswalks (≥60 feet) with a median refuge island, push buttons can be placed in the median for pedestrians who may not be able to	Preferred	$1,000/EA[19]

[18] No construction costs associated with measure. Only preparation and implementation costs
[19] Cost includes pole

Treatment	Description	Level	Cost
Image Source: Fehr & Peers	cross the entire crosswalk in one cycle length. In areas with high pedestrian volumes, eliminating pedestrian push buttons and providing a pedestrian phase in every cycle, can enhance walkability (and signal compliance).		
7-4. Short Cycle Lengths  *Image Source: Institute of Transportation Engineers*	Long cycle lengths at signalized intersections result in long pedestrian wait times to cross a street. By shortening an intersection's cycle length, pedestrians do not have to wait as long to cross after pushing the button to request a "Walk" signal.	Preferred	N/A[20]
7-5. Protected Left-Turns  *Image Source: Fehr & Peers*	Where permitted left-turns are allowed, denoted by a "Left Turn Yield on Green" sign, left-turning vehicles can conflict with pedestrians in the crosswalk. By making the left-turn protected, so that it is allowed only with a green arrow, the "Walk" signal at a crosswalk occurs at the same time that through- and right-turning vehicles in the same direction receive a green light. This reduces the risk of left-turning vehicle conflicts with the opposing crosswalk; since left-turns typically occur at a higher speed than right-turns, collisions of increased severity can be avoided by protecting left-turns.	Preferred	$20,000-50,000/EA[21]
7-6. Accessible Pedestrian Signals	Accessible pedestrian signals (APS) and detectors provide information, such as "Walk" indications and direction of crossing, in non-visual formats to improve accessibility for	Enhanced	$2,500/EA

[20] No construction costs associated with measure. Only preparation and implementation costs
[21] Assumes left turn lane is existing, so no roadway work is necessary. Only signal work.

Treatment	Description	Level	Cost
 *Image Source: Fehr & Peers*	blind pedestrians. Audible options for accessible pedestrian signals include audible tones and speech messages. Vibrotactile push-buttons are effective options that alleviate the impacts of noise created by audible pedestrian signals. They are also accessible to deaf pedestrians. APS should always be provided when two push buttons are located on one pole and where persons with disabilities are expected frequently at a crossing.		
7-7. Pedestrian Recall  *Image Source: Fehr & Peers*	Pedestrian recall gives pedestrians a "Walk" signal at every cycle. No push-button or detection is necessary since a "Walk" signal will always be given. Pedestrian recalls are useful in areas with high levels of pedestrian activity. They demonstrate that an intersection is meant to serve both vehicles and pedestrians. In general, pedestrian recall should be used if pedestrians actuate a "Walk" signal 75 percent of the time during three or more hours per day. Recall can be used 24-hours a day or during peak hours for pedestrians (in which case push buttons should continue to be provided).	Enhanced	N/A[22]
7-8. No Right Turn on Red  *Image Source: FHWA*	When attempting to turn right on red, motorists must look left to see if the road is clear; motorists often do not look right before turning and may not see pedestrians to their right. Restricting right turns on red can reduce conflicts between vehicles and pedestrians. "Blank out" turn restriction signs (see 7-9 below) are more effective than conventional "No	Enhanced	$1,500/EA[23]

[22] No construction costs associated with measure. Only preparation and implementation costs
[23] Cost includes 2 signs: one on mast arm and other on pole nearby

Treatment	Description	Level	Cost
	Right Turn on Red" signs. "No Right Turn on Red" signs that specify time-of-day restrictions or "When Pedestrians are Present" are confusing to motorists and are often disregarded.		
7-9. Blank-Out Turn Restriction LED Sign  *Image Source: Fehr & Peers*	The ubiquity of conventional turn restriction signs, usually for no right turn on red, contributes to their disregard by motorists. Blank out turn restriction signs activate only when the specified movement is prohibited. The LED sign is also very visible.	Enhanced	$2,000[24]
7-10. Animated Eyes  *Image Source: Fehr & Peers*	Animated eyes pedestrian signals feature eyes that move from side to side when a "Walk" signal is given. The signals remind pedestrians to look for turning vehicles before proceeding into the crosswalk. Research has indicated that animated eyes pedestrian signals reduce conflicts between vehicles and pedestrians. Source: http://www.cers-safety.com/pedestriansignals.pdf	Enhanced	$2,000[25]
7-11. Leading Pedestrian Interval (LPI)	A leading pedestrian interval (LPI) advances the "Walk" signal for a few seconds while through-vehicles continue to receive a red indication. By allowing pedestrians to get a head start into the crosswalk, it can reduce conflicts between pedestrians and turning vehicles. The 2012 California MUTCD recommends that LPIs be at least three seconds in duration. Right-turn on red restrictions may be	Enhanced	No construction costs only preparation and implementation costs

[24] Cost includes installation
[25] Cost includes installation

Treatment	Description	Level	Cost
 *Image Source: Fehr & Peers*	needed with LPIs are installed in locations with lower pedestrian volumes.		
7-12. Push Button for Extended Crossing Time  *Image Source: FHWA*	Some pedestrians may need extra time to safely cross a street. Traffic signals can be retrofitted to provide pedestrians with increased crossing time by extending the duration of a pushbutton press.	Enhanced	$1,000/EA[26]

Source: Fehr & Peers, 2016.

[26] Cost includes pole

APPENDIX D. NEWARK BICYCLE & PEDESTRIAN DESIGN GUIDELINES

New or enhanced bicycle and pedestrian facilities in Newark should follow the guidance outlines in the National Association of City Transportation Officials (NATCO) Urban Bikeway Guide, 2nd edition and the Urban Streets Design Guide and the Federal Highway Administration (FHWA) Separated Bike Lane Planning and Design Guide. All projects should follow the **Newark Citywide Crosswalk Policy** (**Appendix C**) included in this Plan to guide the installation, enhancement, and removal of crosswalks.

TRAVEL LANE WIDTHS

In addition to those resources, the City uses assumptions regarding travel lane widths and preferred bikeway dimensions and materials, as outlined in this chapter.

PATH (CLASS I) CROSSING DESIGN GUIDANCE

The AASHTO Guide for the Development of Bicyclists, 4th Edition and the Bay Trail Design Guidelines (draft, 2016) should be consulted when planning for and designing trails in Newark. The following section provide general information and focuses on trail crossing design guidance.

TYPICAL DESIGN

Class I Paths or Multi-Use Paths provide a completely separate right-of-way for bicyclists and pedestrians. In most cases, paths provide the most comfortable option for people walking and biking as paths are separated from the roadway and typically have few intersections with autos. Where paths intersect the roadway network, trail crossings are critical. An unsafe trail crossing can diminish the value to the trail itself and has the highest collision rate. For these reasons, it is important to minimize vehicle and pedestrian cross-flow at crossings to improve the safety of path users. Paths that intersect many driveways and roadways have a high collision potential for cyclists, because drivers exiting driveways or traveling on intersecting roads often do not look for cyclists approaching in the opposite direction of traffic. Thus the City should consider warning signs and pavement markings wherever driveways and side-streets must cross Class I Paths, such as the intersection of the Bay Trail and Morton Avenue. Where bicycle and pedestrian demand is high and/or where there users are expected to have a wide range of ages and abilities, wider path cross-sections or separated bicycle and pedestrian paths should be considered to minimize conflicts between bicyclists and pedestrians.

PREFERRED CROSSING DESIGN

Providing a consistent trail crossing design in Newark will provide a consistent message to drivers, pedestrians, and bicyclists alike. Trail crossing should always include high-visibility ladder striping or "triple-four" striping, which consists of three 4' segments, two dashed lines on the outside, with a clear space in the center to direct pedestrian traffic. A bicyclist and pedestrian pavement legend with arrows

may be placed within the triple-four striping to indicate to bicyclists and pedestrians that they must share the space and also indicate the preferred directional path of travel. Where the trail intersection the on-street roadway network, trail crossings should be provided, including wide curb ramps to allow for two-way bicycle and pedestrian traffic. Trail crossing enhancements should be considered in accordance with the Citywide Crosswalk Policy contained in **Appendix C**.

Trail Crossing Signage

Stop bars and high-visibility striping at trail crossing

Pedestrian hybrid beacon at trail crossing

Modified triple-four striping with bike legends

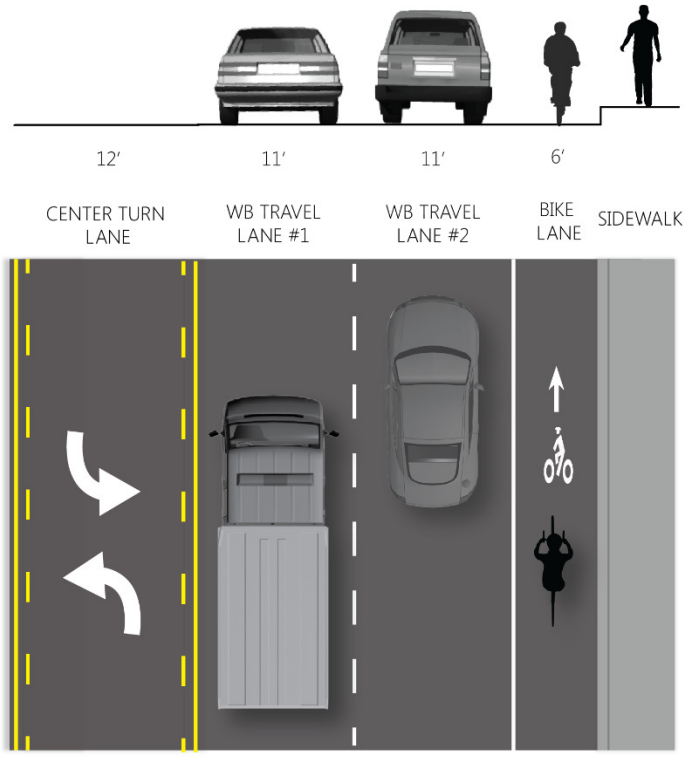
BICYCLE LANES AND BUFFERED BICYCLE LANES (CLASS II) DESIGN GUIDANCE

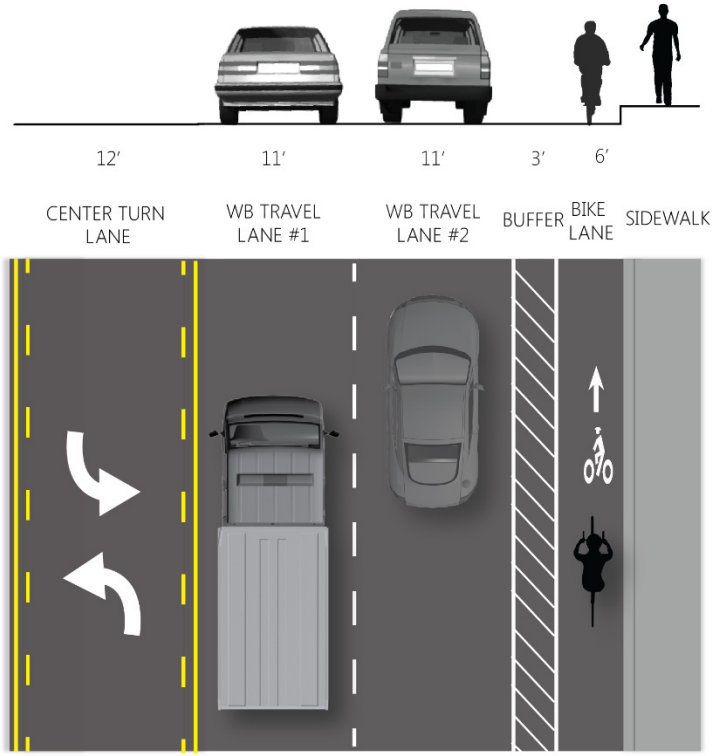
The NACTO Urban Bikeway Guide, 2nd Edition should be consulted whenever designing bicycle lanes or buffered bicycle lanes in Newark. The following section provides general guidance, definition of terms, and preferred dimensions and practices for Newark.

TYPICAL DESIGN

A Class II Bicycle Lane is typically a six foot dedicated area for bicyclists designated by striping, signage, and pavement markings for the use of bicyclists. Bike lanes improve bicyclist safety by reducing interactions between cyclists and traffic, and by facilitating predictable behavior. Unlike Class IV Separated Bikeways, bike lanes have no physical barrier between bicyclists and motorized traffic.

Buffered bicycle lanes are distinguished by a designated horizontal buffer space separating the bicycle lane from the adjacent motor vehicle travel lane and/or parking lane. Buffered bicycle lanes feature painted buffers of typically two feet or more in width, marked with two solid white lines and interior diagonal cross hatching. The buffers do not include a raised separation.





TYPICAL DESIGN ELEMENTS

Bicycle lanes may be marked with colored green striping, lane markings, wayfinding signage, and intersection treatments. The City should consider applying green "skip" striping at intersections, driveways, and any other locations where cars are likely to cross the bicycle lane. In particular, this should be used to transition bicycle lanes where turn pockets are added at large intersections. Where right-turn lanes or pockets are added, the bicycle lane should remain adjacent to the curb until approximately 150 feet or less before the intersection, at which point, the bicycle lane should transition with colorized green markings to between the through and right travel lanes. Bicycle lanes should always be striped up to the stop bar/crosswalk and should not drop to allow for turn pockets to be added.

Buffered bike lane with wayfinding signage

Green skip-striping at intersection where cars may merge across or into the bicycle lane

DESIGN ISSUES TO CONSIDER

The minimum width of a bike lane should be five feet against a curb or adjacent to a parking lane, with six feet as the preferred standard with. If the curb includes a 1-2′ gutter pan, this width should not count toward the minimum lane width because bicyclists are typically unable to use this space. Poor pavement quality and inconsistent striping or disappearing lanes are also design issues of concern for bicycle lanes and other on-street facilities.

Bike lane painted over gutter pan

Poor pavement quality ahead of a bike lane

BICYCLE BOULEVARD (CLASS III) DESIGN GUIDANCE

The NACTO Urban Bikeway Guide, 2nd Edition should be consulted whenever planning for or designing bicycle boulevards in Newark. This section provides general guidance on bicycle boulevards and discusses opportunities to enhance the City's existing Traffic Calming Program to accommodate bicycle boulevards.

TYPICAL DESIGN

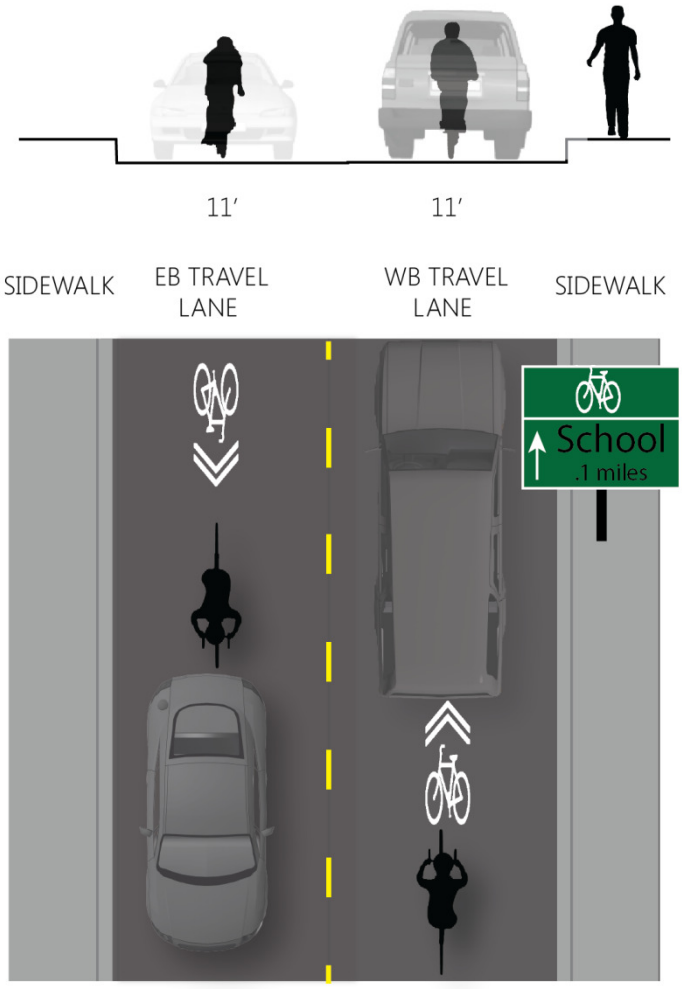
Bicycle boulevards are low-volume, low-speed streets that offer travel priority to bicycles. These facilities feature shared-use markings (i.e., "sharrows"), wayfinding signage, and enhanced facilities at crossings of major arterials, and may also include traffic calming measures where appropriate. Bicycle boulevards are intended for local/residential streets with low speeds and volumes, such as Baine Avenue or Wells Avenue in Newark.

Bicycle boulevard recommendation can be integrated into Newark's existing Traffic Calming Policy. Consider updating the Policy to lower speeds and introduce volume thresholds on roadways designated as Bicycle Boulevards.

STANDARD BICYCLE BOULEVARD ELEMENTS

Bicycle boulevard pavement markings vary widely in size from typical sharrow markings to oversized pavement markings that occupy nearly a full lane. MUTCD-approved shared lane markings/sharrows on bicycle boulevards are highly visible and have been proven to impact desired lane positioning by bicyclists, while also reinforcing the legitimacy of bicycle travel.

Wayfinding signs guide users through turns, help brand the City's bicycle network, and inform cyclists by identifying intersecting bikeways and travel times to nearby destinations. Since bicycle boulevards are typically local streets with few businesses or services, wayfinding signs inform riders of the direction and distance to key destinations, such as neighborhoods, commercial districts, transit hubs, schools, and connecting bikeways.



Large shared lane marking (sharrow)

Bike route wayfinding with destinations

Enhanced crossing of arterial via median refuge traffic diverter

POTENTIAL TRAFFIC CALMING ENHANCEMENTS

Bicycle boulevard streets can be enhanced with a range of design treatments, depending on existing conditions and desired outcomes. These treatments benefit bicyclists while also helping to create "quiet" streets for residents and other road users.

Speed hump

Chicane

Curb Extension

Traffic circle on residential street

RELATION TO EXISTING TRAFFIC CALMING PROGRAM

The City of Newark has an existing traffic calming program that applies to collectors and residential streets above a certain threshold of typical vehicle speeds. This program involves measures such as resident education, speed limit enforcement, street centerline striping, stop signs, chicanes, center islands, and speed bumps. In order to suit these measures to streets with new bicycle boulevards, the City should consider reviewing the steps of the existing calming program to determine how and when to apply traffic calming to bicycle boulevards. Specifically, the City could consider lowering speed thresholds for traffic calming on bicycle boulevards and introducing volume thresholds alongside speed thresholds.

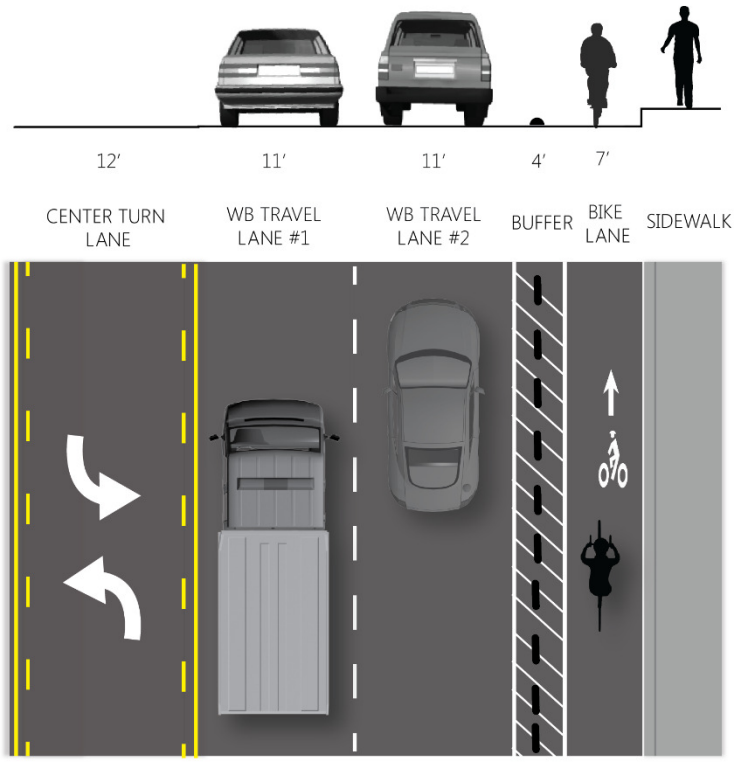
SEPARATED BIKEWAYS (CLASS IV) DESIGN GUIDANCE

In addition to a general discussion, this section defines the preferred cross-section and materials for separated bikeways in Newark. The NACTO Urban Bikeway Guide, 2nd Edition and the Federal Highway Administration Protected Bike Lane Planning and Design Guide should also be consulted when planning for and designing separated bikeways in Newark.

TYPICAL DESIGN

A Class IV Separated Bikeway is an on-street bicycle facility that is physically separated from automobile traffic and also distinct from the sidewalk. These facilities can offer a higher level of security and comfort than bicycle lanes. While all Class IV facilities separate bicyclists from motor vehicle travel lanes, there are many different designs for these facilities. They may be at street level ("in roadway"), sidewalk level, or intermediate level. They may be separated from the neighboring travel lane by "armadlilo" or "zebra" separators, raised concrete curbs, on-street parking, flexible bollards, or planters. Pavement paint, texture, or landscape may separate the facility from the sidewalk. They can also be one-way (directional on both sides of the roadway) or two-way. Generally two-way cycletracks are discouraged unless they parallel a trail or side path or have a critical gap closure function.

In Newark, the preferred design of the separated bikeway is typically a striped buffer with "armadillo" traffic separators. As grant funding or developer funding is available, raised concrete buffers with decorative stamped pavement can be phased in with available funding. The typical cross-section would consist of: 11' travel lanes, three to four feet striped buffer with diagonal cross-hatching, and a seven foot bicycle lane. It is critical that the separated bikeway remain wide to allow for traditional street sweepers to routinely maintain the area.



PREFERRED BARRIER SEPARATION: INTERIM DESIGN

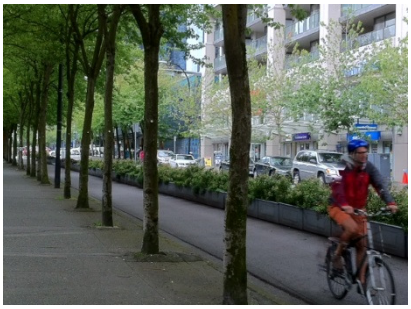
While there are many options for separating Class IV facilities from motor vehicles on an interim basis, two of the most inexpensive methods are installing simple traffic separators or rubber curbs.

"Armadillo" or "zebra" traffic separators

Rubber curb traffic separator

PREFERRED BARRIER SEPARATION: LONG-TERM OR GRANT-FUNDED DESIGN

Reconfiguring streetscapes to use raised medians, on-street parking, curbs, bollards, planters, or other features to separate the bikeway is more expensive and labor-intensive. As such, these design options are considered for long-term or grant-funded implementation.



Bikeway separated by trees and landscaping

Bikeway separated by curb/decorative pavement

BICYCLE PARKING

The Association of Bicycle and Pedestrian Professionals (APBP) Bicycle Parking Guidelines, 2nd edition should always be consulted when planning for, selecting, and designing bicycle parking in Newark. The document includes information on types of parking and design and layout considerations.

SIDEWALK, STREETSCAPE, & INTERSECTION IMPROVEMENTS

The NACTO Urban Street Guide should always be consulted when designing sidewalk, streetscape, and intersection improvements for pedestrians Newark.

APPENDIX E. COLLISION ANALYSIS

This section provides collisions analysis for the last five years of available reported bicycle-auto and pedestrian-auto collision data. This was used to inform project recommendations and the prioritization of projects. In doing so, this Plan treats Newark's collision history as a proxy for the level of safety for bicyclist on the road. While collision history only accounts for collisions that have been reported, they are nonetheless an important tool for analyzing the most frequent causes of bicycle- and pedestrian-related crashes and identifying hotspots for physical improvement.

1. NEWARK BICYCLE AND PEDESTRIAN SAFETY IN CONTEXT

Comparing the bicycle- and pedestrian-related collisions in Newark to cities of similar size can be a useful planning tool to understand safety for active modes in Newark and how it compares to similarly-sized cities. The California Office of Traffic Safety (OTS) produces collision statistics for cities grouped by size according to total population cohort.

Newark is in a population cohort of 92 cities with populations between 25,001 and 50,000; as a result, the denominator is 92 for all rankings. Newark's rankings for 2013, the most recent year available for OTS rankings, are summarized in **Table E-8**. This data represents collisions from 2013 only, and therefore the total numbers of pedestrian and bicycle collisions presented in this table differs from other data presented in this appendix.

Table E-8. Newark Collision Rankings among Similar Cities, 2013

Type of Collision	Victims Killed & Injured	Percentage of All Killed & Injury Collisions	OTS Ranking
Total Fatal and Injury[1]	127	100%	68/92
Bicyclists	12	9.4%	63/92
Bicyclists <15	4	3.1%	17/92
Pedestrians	4	3.1%	79/92
Pedestrians < 15	1	0.8%	55/92
Pedestrians 65+	1	0.8%	53/92

1. Total includes fatal and injury collisions for all travel modes, including auto-auto, auto-pedestrian, and auto-bicycle.

Source: California Office of Traffic Safety 2013 OTS Rankings

Key findings from the 2013 OTS rankings include:

- Bicycle and pedestrian collisions, taken together, account for approximately 10 percent of all fatal and injury collision that occur in Newark.

- Newark ranked favorably for bicycle and pedestrian safety overall, with fewer reported bicycle collisions than about 68 percent of cities of a similar sizes and fewer pedestrian collisions than about 86 percent of cities of a similar sizes
- For collisions involving bicyclists under 15 years of age, Newark ranked less favorably, falling in the top quintile of similarly-sized cities for this type of collision. However, this number represents a small total percentage of injury and fatality collisions and can vary significantly from year to year given the small sample size.

2. BICYCLE COLLISIONS

Between January 1, 2011 and December 31, 2015, 88 bicycle collisions resulting were reported per the California Highway Patrol's Statewide Integrated Traffic Records System (SWITRS).

2.1. HIGH INJURY CORRIDORS

In the study period, nearly 81 percent of all bicyclist collisions occurred on the following nine roadways: Cedar Boulevard (17 crashes); Mowry Avenue (8 crashes, 3 of which occurred at the I-880 interchange); Thornton Avenue (8 crashes); Jarvis Avenue (8 crashes); Newark Boulevard (8 crashes); Cherry Street (8 crashes); Birch Street (5 crashes); Central Avenue (6 crashes); and Sycamore Street (3 crashes). **Chart E-3** identifies the top locations for bicyclist crashes in Newark.

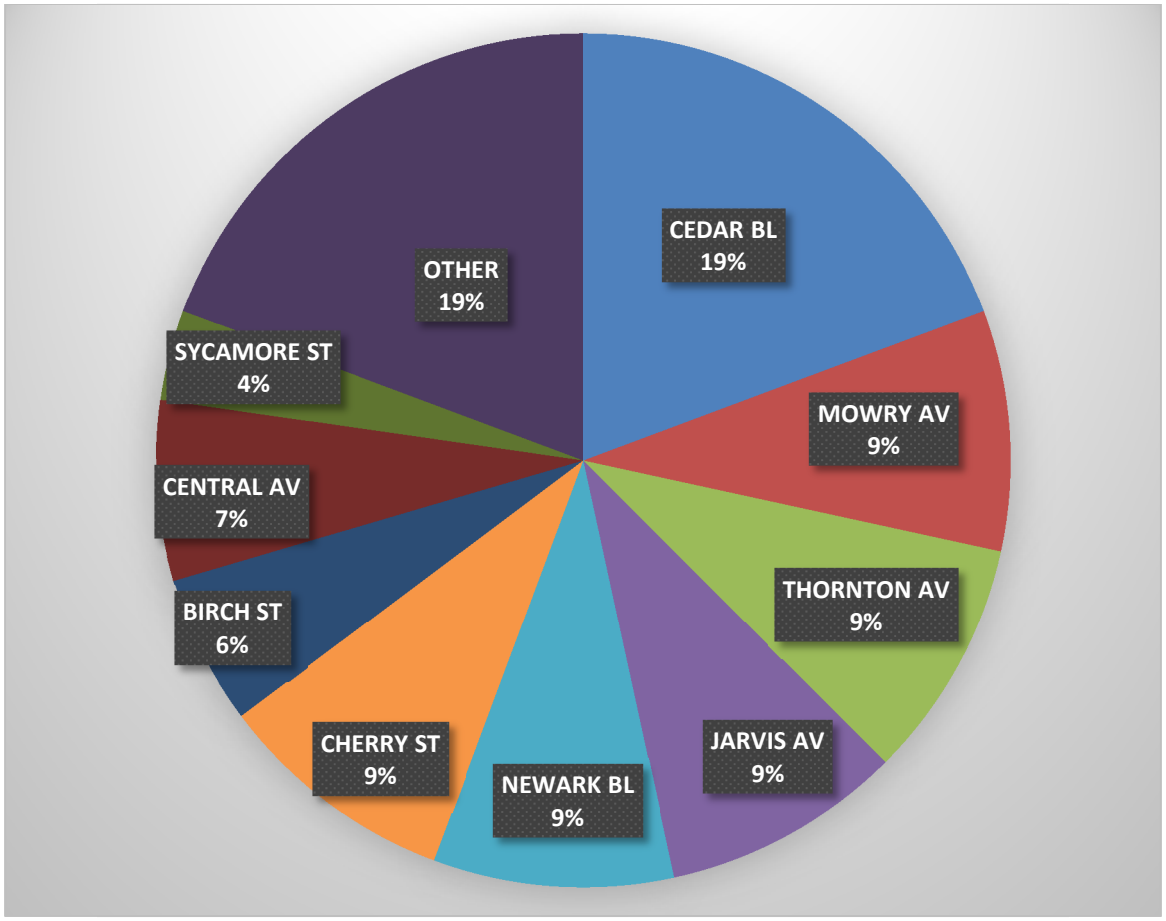


Chart E-3: High Injury Corridors for Bicyclists in Newark

2.2. CRASHES AT INTERSECTIONS

Intersections can be particularly unsafe locations for bicyclists. Drivers forced to make descisions and the frequency of lane changes at intersections make them particualrly unsafe for cyclists. In the study period, about half of all collisions - 42 of the 88 collisions - occurred in the intersection. An additional 22 collisions occurred within 150 feet of intersection, which is typically the distance at which drivers may be anticipating turning movements as well as typical turn-pocket length. Taken together, about 73 percent of collisions occurred in or at the intersection approach. Only four locations had more than one collision coded to it: I-880 and Mowry Avenue, which had three collisions; Cedar Boulevard and Forbes Drive,which had two collisions; Central Avenue and Birch Street, which had two collisions near the intersection; and Cherry Street and Broadway Avenue, which had two collisions.

2.3. CRASH CAUSES/CONTRIBUTING FACTORS

Table E-**E-2** details the reported violation causes during the study period for all bicycle collisions in the City. A large number of collisions, 25 percent, were due to wrong-way bicycle riding, which indicates that education and enforcement may be important issues to address citywide. Many other crashes were due to violation of the auto's right-of-way, improper turning, or unsafe speeds.

Table E-2.
Violation Category for Bicycle Crashes, 2011-2015

Violation Category (Primary Contributing Factor)	Number of Collisions	Percentage of Collisions
Wrong Side of Road	22	25%
Violation of the Automobile Right of Way	19	22%
Improper Turning	14	16%
Unsafe Speed	11	13%
Traffic Signals and Signs	6	7%
Other[1]	16	18%

Source: SWITRS query of 2011-2015 bicycle crashes in Newark, CA.

1. Other includes Unsafe Lane Change, Pedestrian Right of Way, Other Hazardous Violation, and Not Stated, which each had two collisions; and Improper Passing, Other than Driver (or Pedestrian), and Unknown, which each had one reported collision.

2.4. INJURY SEVERITY

During the study period, 89 percent of all bicycle collision resulted in an injury. However, the majority of bicyclist injuries in Newark were lower-order; other visible injury and complaint of pain accounted for nearly 90 percent of the collisions during the study period. Severe injuries accounted for ten percent of all collisions, and there were no reported fatalities. **Table E-3** summarizes the injury severity.

Table E-3.
Bicyclist Injury Severity, 2011-2015

Collision Severity	Number of Collisions	Percentage of Collisions
Fatal	0	0%
Injury (Severe)	8	9%
Injury (Other Visible)	30	34%
Injury (Complaint of Pain)	40	45%
Property Damage Only	10	11%
Total	88	100%

Source: SWITRS query of 2011-2015 bicycle crashes in Newark, CA.

1. Other includes Unsafe Lane Change, Pedestrian Right of Way, Other Hazardous Violation, and Not Stated, which each had two collisions; and Improper Passing, Other than Driver (or Pedestrian), and Unknown, which each had one reported collision.

3. PEDESTRIAN COLLISIONS

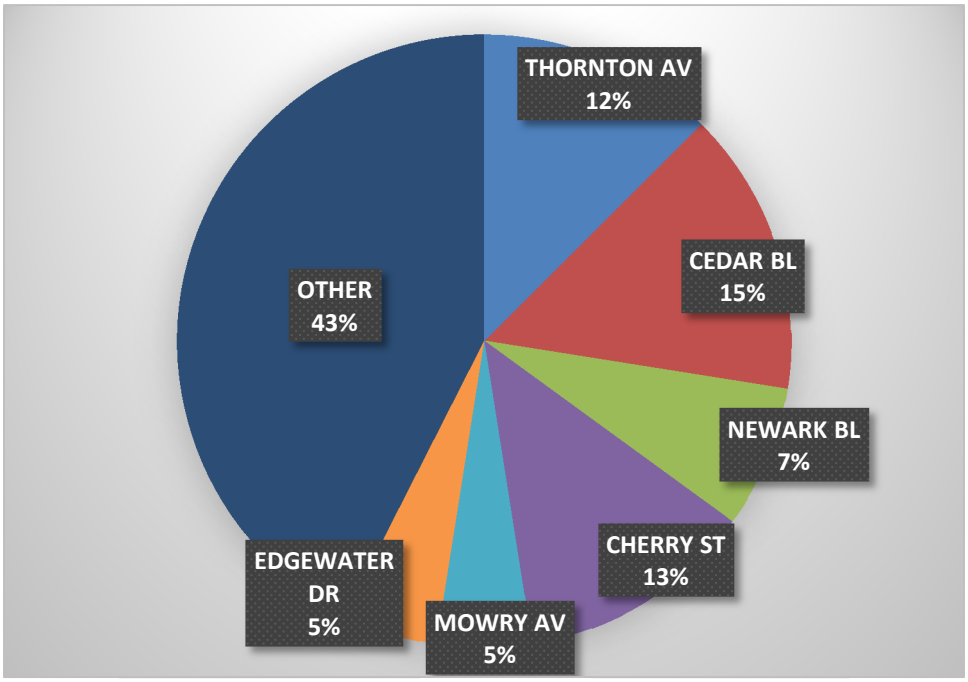
Between January 1, 2011 and December 31, 2015, 40 collisions involving pedestrians were reported per SWITRS.

3.1. CRASH LOCATIONS

In the study period, nearly 57 percent of all pedestrian collisions occurred on the following six roadways: Cedar Boulevard (6 crashes); Thornton Avenue (5 crashes); Cherry Street (5 crashes); Newark Boulevard (3 crashes); Mowry Avenue (2 crashes); and Edgewater Drive (2 crashes). **Chart E-2.**

High Injury Corridors for Bicyclists in Newark identifies the top locations for bicyclist crashes in Newark.

Chart E-2.
High Injury Corridors for Bicyclists in Newark



3.2. CRASHES AT INTERSECTIONS

Pedestrians crossing the street is typically the most common type of collision in urban areas. In Newark, 85 percent of all pedestrian collisions occurred while a pedestrian was crossing the street. The majority of pedestrian collisions – 51 percent – occurred while a pedestrian was crossing in the crosswalk, indicating that driver education and enforcement of driver behavior is important to address citywide. Approximately 35 percent of collision resulted from pedestrian crossing outside of a crosswalk, indicating that educating pedestrians is also important as is providing more frequent crossing opportunities. **Table E-4** summarizes the pedestrian action prior to the collision.

Table E-4.
Pedestrian Action Prior to the Collision, 2011-2015

Collision Severity	Number of Collisions	Percentage of Collisions
Pedestrian Crossing in Crosswalk at an Intersection	19	48%
Pedestrian Crossing in Crosswalk not at an Intersection	1	3%
Pedestrian Crossing Outside of a Crosswalk	14	35%
Pedestrian Was Walking in Roadway or Shoulder	4	10%
Pedestrian Was Not in Roadway	2	5%
Total	40	100%

Source: SWITRS query of 2011-2015 pedestrian crashes in Newark, CA.

3.3. CRASH CAUSES/CONTRIBUTING FACTORS

Table E-5 details the reported violation causes during the study period for all pedestrian-related collisions in the City. The plurality of collisions - 40 percent – resulted from automobiles violating the pedestrian's right of way. Twenty five percent of collisions resulted from pedestrians violating the automobile's right of way.

Table E-5.
Primary Collision Factor in Pedestrian-Auto Collisions, 2011-2015

Primary Collision Factor	Number of Collisions	Percentage of Collisions
10 – Violation of the Pedestrian Right of Way	16	40%
11 - Pedestrian Violating the Auto's Right of Way	10	25%
12 - Traffic Signals and Signs	4	10%
09 - Automobile Right of Way	2	5%
01 - Driving or Bicycling Under the	2	5%

Influence of Alcohol or Drug		
03 - Unsafe Speed	1	3%
06 - Improper Passing	1	3%
00 - Unknown	1	3%
18 - Other Than Driver (or Pedestrian)	1	3%
21 - Unsafe Starting or Backing	1	3%
13 - Hazardous Parking	1	3%

Source: SWITRS query of 2011-2015 pedestrian crashes in Newark, CA.

3.4. INJURY SEVERITY

While the data reported to SWITRS includes only collisions resulting in injury or fatality, 97 percent of all pedestrian collisions resulted in injury to the pedestrian, as shown on **Table E-6**. However, the majority of these injuries in Newark were lower-order; other visible injury and complaints of pain accounted for over 85 percent of the collisions during the study period. Severe injuries accounted for 13 percent of all collisions and there were no fatalities.

Table E-6.
Primary Collision Factor in Pedestrian-Auto Collisions, 2011-2015

Primary Collision Factor	Number of Collisions	Percentage of Collisions
Fatal	0	0%
Severe	5	13%
Other Visible	20	50%
Complaint of Pain	14	35%
Property Damage Only	1	3%
Total	40	100%

Source: SWITRS query of 2011-2015 pedestrian crashes in Newark, CA.