



Bicycle, Pedestrian, & Trails Active Transportation Plan

APPENDICES

JUNE 11, 2018

Prepared by Alta Planning + Design



This page intentionally blank.

TABLE OF CONTENTS

APPENDIX A PLAN & POLICY REVIEW.....	A-1	APPENDIX D HEALTH ANALYSIS.....	D-1
LOCAL PLANS AND POLICIES	A-1	PHYSICAL ACTIVITY	D-1
REGIONAL PLANS, GUIDELINES, AND		OBESITY.....	D-2
POLICIES.....	A-39	MENTAL HEALTH	D-3
STATEWIDE PLANS AND POLICIES	A-44	AIR POLLUTION.....	D-4
APPENDIX B PROGRAMS	B-1	ASTHMA	D-5
EDUCATION	B-2	VULNERABLE POPULATIONS.....	D-5
ENCOURAGEMENT	B-6	APPENDIX E SAFETY & COLLISION ANALYSIS	E-1
ENFORCEMENT	B-11	NUMBER, LOCATION, AND TRENDS.....	E-1
EVALUATION	B-13	AGE.....	E-5
APPENDIX C PUBLIC INPUT	C-1	TIME OF DAY	E-5
COMMUNITY WORKSHOPS	C-2	COLLISION FACTORS.....	E-7
USER SURVEY AND ONLINE INTERACTIVE		APPENDIX F DEMAND ANALYSIS.....	F-1
MAP	C-4	METHODOLOGY	F-1
POP UP EVENTS	C-9	DATA LIMITATIONS	F-2
BIKING AND WALKING TOURS	C-13	COMPOSITE DEMAND	F-11
ACTIVE TRANSPORTATION PLAN CITIZEN		APPENDIX G BICYCLE LEVEL OF TRAFFIC STRESS	
ADVISORY COMMITTEE	C-14	ANALYSIS.....	G-1
ACTIVE TRANSPORTATION PLAN TECHNICAL		GENERAL METHODOLOGY.....	G-2
ADVISORY COMMITTEE	C-14	STREET SEGMENT ANALYSIS	G-2
PLANNING COMMISSION & CITY COUNCIL ...	C-15	INTERSECTION AND CROSSING ANALYSIS...	G-4
		RESULTS.....	G-5

APPENDIX H PEDESTRIAN LEVEL OF SERVICE ANALYSIS H-1
 SIDEWALK GAP ANALYSISH-1
 PEDESTRIAN NETWORK SUITABILITYH-3
 PEDESTRIAN INTERSECTION SUITABILITYH-4
 RESULTS.....H-4

APPENDIX I DETAILED PROJECT LISTI-1
 EXPLANATION OF TABLE ELEMENTS I-1
 LIST OF ALL PROJECTS I-11

APPENDIX J TRAILSJ-1

APPENDIX K IMPLEMENTATION PLAN DETAIL K-1
 EVALUATION CRITERIA K-1
 REBALANCING K-4
 PROJECT COST ESTIMATES K-9
 MAINTENANCE COST ESTIMATES K-22

TABLE OF FIGURES

Figure A-1: Livermore Bikeways MapA-25
 Figure A-2: South Livermore Valley Specific Plan
 Proposed Trail System.....A-26
 Figure A-3: El Charro Specific Plan Proposed Circulation
 SystemA-29
 Figure A-4: Livermore Downtown Specific Plan Minimum
 New Street NetworkA-31
 Figure A-5: Livermore Downtown Specific Plan Proposed
 Typical Street NetworkA-32
 Figure A-6: Livermore Downtown Specific Plan First Street
 Design Concept.....A-33
 Figure A-7: Livermore Downtown Specific Plan Bikeways and
 Trails.....A-34
 Figure A-8: Iron Horse Trail Preferred AlignmentA-36

Figure C-1: Online Interactive MapC-4
 Figure C-2: Identified Barriers to Walking, Bicycling, and
 Trail Use in LivermoreC-5
 Figure C-3: Walking and Bicycling Experience in LivermoreC-5
 Figure C-4: Barriers to Walking in LivermoreC-6
 Figure C-5: Types of Bicyclists.....C-7
 Figure C-6: Barriers to Bicycling in LivermoreC-7
 Figure C-7: Barriers to Trail Use in LivermoreC-8

Figure D-1: Adults Who Walk 150+ Minutes Per Week.....	D-1	Figure G-1: Bicycle Level of Traffic Stress.....	G-6
Figure D-2: Students in Healthy Fitness Zone.....	D-2	Figure H-1: Sidewalk Gap Analysis.....	H-2
Figure D-3: Youth Overweight and Obesity.....	D-3	Figure H-2: Pedestrian Level of Service Results.....	H-6
Figure D-4: Adult Obesity.....	D-3		
Figure D-5: Adults Reporting Serious Psychological Distress.....	D-4	Figure I-1: Proposed Projects - Class IA Shared Use Paths.....	I-4
Figure D-6: Air Quality Indicators.....	D-4	Figure I-2: Proposed Projects - Class IIA Bicycle Lanes.....	I-5
Figure D-7: Asthma Prevalence.....	D-5	Figure I-3: Proposed Projects - Class IIB Buffered Bicycle Lanes...	I-6
Figure D-8: Child and Senior Population.....	D-6	Figure I-4: Proposed Projects - Class IIIA Bicycle Routes.....	I-7
Figure D-9: Families Living in Poverty.....	D-6	Figure I-5: Proposed Projects - Class IIIE Bicycle Boulevards.....	I-8
		Figure I-6: Proposed Projects - Class IV Separated Bikeways.....	I-9
Figure E-1: Pedestrian and Bicycle Collisions (2010-2014).....	E-2	Figure I-7: Proposed Projects - Sidewalk Gap Closures.....	I-10
Figure E-2: Severity of Bicycle Collisions.....	E-4		
Figure E-3: Severity of Pedestrian Collisions.....	E-4	Figure K-1: Implementation Strategy.....	K-4
Figure E-4: Age of Victim.....	E-5		
Figure E-5: Time of Bicycle Collisions.....	E-5		
Figure E-6: Age of Bicyclists Involved.....	E-6		
Figure E-7: Time of Pedestrian Collisions.....	E-6		
Figure E-8: Age of Pedestrians Involved.....	E-7		
Figure F-1: Demand Analysis – Where People Live.....	F-5		
Figure F-2: Demand Analysis – Where People Work.....	F-6		
Figure F-3: Demand Analysis – Where People Play.....	F-7		
Figure F-4: Demand Analysis – Where People Learn.....	F-8		
Figure F-5: Demand Analysis – Where People Shop.....	F-9		
Figure F-6: Demand Analysis – Where People Access Transit....	F-10		
Figure F-7: Demand Analysis – Composite Map with Existing Bikeway Network.....	F-12		

TABLE OF TABLES

Table A-1: Bicycle Parking Requirements (Table 4.7).....	A-14	Table K-1: Distance Criteria for Project Rankings	K-2
Table E-1: Collisions in Surrounding Jurisdictions.....	E-3	Table K-2: Project Readiness Criteria.....	K-3
Table E-2: Top Bicycle Collision Factors in Livermore	E-8	Table K-3: Unit Cost Assumption Breakdown.....	K-10
Table E-3: Top Pedestrian Collision Factors in Livermore	E-8	Table K-4: Maintenance Cost Estimate Breakdown	K-22
Table F-1: Source of Demand Model Inputs.....	F-3		
Table G-1: BLTS Scoring Criteria for Bike Lanes Alongside a Parking Lane	G-2		
Table G-2: BLTS Scoring Criteria for Bike Lanes Not Alongside a Parking Lane	G-3		
Table G-3: BLTS Scoring Criteria for Mixed Traffic	G-3		
Table G-4: LTS Criteria for Pocket Bike Lanes.....	G-4		
Table G-5: BLTS Criteria for Mixed Traffic in the Presence of a Right-Turn Lane	G-4		
Table G-6: BLTS Criteria for Unsignalized Crossings Without a Median Refuge	G-4		
Table G-7: BLTS Criteria for Unsignalized Crossings With a Median Refuge at Least Six Feet Wide	G-4		
Table G-8: BLTS Results – Summary Statistics	G-5		
Table H-1: Sidewalk Gap Analysis – Summary Statistics.....	H-3		
Table H-2: Pedestrian Network Suitability Scoring Matrix	H-4		
Table H-3: PLOS Results – Summary Statistics.....	H-5		
Table I-1: List of All Projects	I-11		

APPENDIX A PLAN & POLICY REVIEW

This Active Transportation Plan is built on and consistent with local and regional goals, policies, guidelines, and adopted plans. The following is a review of planning and policy documents that support or influence this Plan, with a strategic focus on the most relevant sections and specific policies. Please note, sections not directly related to this Plan have been omitted.

LOCAL PLANS AND POLICIES

LIVERMORE GENERAL PLAN (2004)

Livermore adopted its General Plan in 2004, with amendments in 2005, 2009, 2013, and 2014. This adopted General Plan guides development in the City through 2025.

Pursuant to California law, the General Plan must address seven mandatory elements. The most applicable of these to pedestrian, bicycle, and trail planning is the Circulation Element, which plans the movement of goods and people through the City. Additional elements with pertinent Goals, Objectives, Policies, and Actions include: Land Use, Community Character, Housing, Infrastructure and Public Services, Economic Development, and Climate Change.

The goals, objectives, policies, and actions most relevant to the Livermore Active Transportation Plan are listed below.

LAND USE

Goal LU-1: Protect the unique qualities of Livermore, which include a historic Downtown, a variety of residential neighborhoods, vineyards, ranches, natural habitats and open space

Objective LU-1.4 Encourage commercial development that will support and enhance a vibrant Downtown and serve existing neighborhoods.

Policy 1 The Downtown shall serve as the primary local commercial area and as the City's historic and pedestrian-oriented retail shopping area within the period of the General Plan.

Policy 12 All residential growth shall be consistent with the policy that a proposed development must be in the best interest of the community as a whole, considering that our goal is to achieve balance in our community, which shall be understood to mean:

(b) That the adverse impact of the residential growth on air quality be balanced by factors such as reduced vehicle miles traveled (VMT) because of shopping facility locations and local employment of the residents.

COMMUNITY CHARACTER

Goal CC-2: Maintain high standards of urban design in Livermore

Objective CC-2.1 Maintain and enhance Livermore’s urban design quality and encourage high quality design in all new development and redevelopment.

Policy 6 New residential, commercial, and mixed-use neighborhoods shall promote comfortable, safe, and human-scaled design, pedestrian-oriented design features, and connections to pedestrian, bikeway and site amenities shall be incorporated into these new neighborhoods.

Policy 7 In new residential developments, the use of traditional site design and architectural elements such as a grid street layout, narrower streets, street trees, detached sidewalks, traditional house designs, reduced setbacks, and garages to the rear or sides of properties, shall be encouraged where found consistent with the neighborhood character.

- Action 4: Periodically review and revise, as necessary, street width standards to address emergency vehicle access while also providing for the narrowest streets possible to enhance walkability and urban design character.
- Action 5: Continue to implement an attractive, coordinated system of “street furniture,” including fire hydrants, litter containers, newspaper vending machines, paving patterns,

planters, signposts, traffic signals, benches, and light standards.

Goal CC-4: Protect and enhance public views within and from established scenic routes, including views of arroyos

Objective CC-4.2 Provide a continuous, convenient system of scenic routes.

Policy 1 The scenic route system should be complete enough to be convenient to all persons in Livermore and to provide continuous pleasurable trails within and between major scenic areas and recreational and cultural centers in the Planning Area and adjacent areas.

Policy 3 The I-580 Scenic Corridor development shall include provision for cycling, hiking, and riding trails within or adjacent to street rights-of-way, where feasible.

Objective CC-4.13 Retain public easements for recreation trails.

Policy 1 All public trail easements should remain free and clear of any structures other than planting and trail improvements, except where they are required by public necessity or as a means of providing desired amenities (such as benches, tables, water fountains, public art, and restrooms) as specified by LARPD.

Objective CC-4.17 Coordinate scenic routes and recreation areas.

Policy 1 There should be maximum coordination in planning for scenic routes and adjacent public recreation areas such as parks, scenic outlooks, roadside rests, cycling, hiking and riding trails.

Policy 2 Recreation routes and trails should continue into adjacent communities to provide continuous networks for the enjoyment of the public. Scenic route recreation trails should be coordinated with existing and planned local, regional, and state trails.

CIRCULATION ELEMENT

The circulation element includes descriptions for roadway classes within the city, including major streets, collectors, and local streets. All three of these classes are described as typically including sidewalks on both sides of the street. Major streets may include bikeways, collectors typically include bikeways, and local streets are typically shared by drivers and bicyclists given their lower speeds.

The circulation element also describes and defines bicycle and pedestrian facilities in the City. This content is included in Chapter 3 of this Plan, along with a map of where bikeways currently exist.

Goal CIR-1: Provide safe, efficient, comfortable, and convenient mobility for all users

Objective CIR-1.1 Plan for Complete Streets that support all transportation systems throughout the City.

Policy 1 The City shall consider and balance the needs of all users when implementing Complete Streets, including pedestrians, bicyclists, persons with disabilities, motorists, movers of commercial goods, users and

operators of public transportation, emergency responders, seniors, children, youth, and families.

Policy 3 The City shall evaluate the most efficient, effective, and sustainable way of providing mobility for all users.

Objective CIR-1.3 Make Complete Streets practices a routine part of everyday operations.

Policy 1 The City shall incorporate Complete Streets into all planning, funding, design, approval, and implementation processes for any construction, reconstruction, retrofit, expansion, maintenance, operations, alteration, or repair of streets.

Policy 3 The City shall approach transportation projects, programs, and practices as opportunities to improve streets and the transportation network for all categories of users.

Policy 5 The City shall consider Complete Streets when adopting or amending the General Plan, Specific Plans, Zoning Ordinances, Master Plans, or the Capital Improvement Program.

- Action 1: Review transportation capital improvement projects and development projects during the planning/design phase to determine appropriate Complete Streets implementation.
- Action 2: Establish performance measures and perform evaluations of how well the street and transportation networks are serving various users.

Goal CIR-2: Promote multi-modal transportation

Objective CIR-2.1 Provide viable alternatives to single-occupant vehicle travel.

Objective CIR-2.2 Encourage vehicle trip reduction.

- Action 1: Work with employers to encourage ridesharing (carpools and vanpools), public transit, bicycling, walking, flexible working hours, and preferential parking.

Objective CIR-2.3 Provide a bicycle, pedestrian, and trails network.

Policy 1 Develop a comprehensive bikeway and trails system as a viable alternative to the automobile for all trip purposes in order to maximize the number of daily trips made by non-motorized means for residents of all abilities.

Policy 2 Consider bicycle, pedestrian, and equestrian access in all aspects of City Planning and coordinate with other agencies to improve non-motorized access within the City of Livermore and to surrounding regional areas and facilities.

Policy 3 Provide related facilities and services necessary to allow bicycle and pedestrian travel to assume a significant role as a local alternative mode of transportation.

Policy 4 Improve the safety of bicyclists and pedestrians by educating all Livermore residents about bicycle and pedestrian safety and by enforcing bicycle and motorist laws and regulations effecting bicycle and pedestrian safety. Increase bicycle and pedestrian mode share by increasing public awareness of benefits of bicycling and walking and of the available bike and trail facilities and programs.

Policy 5 Maintain all roadways and multi-use trails so that they provide safe and comfortable bicycling, walking, and equestrian conditions.

Policy 6 Implement a bikeway system with community input on the priorities and with a minimal impact on the environment.

- Action 1: Develop, periodically review, and update a master plan for a Citywide bicycle, pedestrian, and trails network.
- Action 2: Develop bicycle routes and multi-use trails in accordance with the City’s adopted master plan for a bikeway and trails network, as shown in Figure 5-4 (see Livermore General Plan, Circulation Element (Amended 2014), page 5-59).
- Action 3: Where other public works projects (roadways, buildings, or utilities) precede adopted trail development in an area, combine easement, property, or right-of-way acquisition, where feasible, to acquire necessary land for planned trails.

- Action 4: Special attention shall be made to make freeway interchanges, overpasses, and other grade separations safe for bicycles and pedestrians. (Reso. 2014-183)

Objective CIR-2.4 Provide a pedestrian network that encourages walking for transportation and recreation.

- Policy 1 The City shall ensure the safe and convenient movement of pedestrians throughout the City and within neighborhoods.
- Policy 2 The City’s design guidelines for public and private facilities shall aid and encourage pedestrian activity.
- Policy 3 The City shall require development to meet the requirements of the Americans with Disabilities Act to further facilitate the mobility of persons with accessibility needs.

Goal CIR-3: Identify and develop a circulation system consistent with the Land Use Element

Objective CIR-3.2 Minimize adverse impacts of regional cut-through traffic

- Policy 2 The City shall not base roadway system improvements solely on the local effects of regional cut-through traffic. Other issues including facility improvement costs and desirability shall be determinants to improving the intracity roadway network.

Objective CIR-3.3 Minimize local cut-through traffic in residential neighborhoods.

- Policy 1 The City shall provide adequate capacity to the extent possible on major and collector streets to prevent traffic diversion of local cut-through traffic onto neighborhood streets.
- Policy 2 The City shall consider using traffic calming methods to reduce local cut-through traffic, where appropriate.

Goal CIR-7: Develop a Downtown circulation system that is pedestrian-oriented and supports Downtown as a destination

Objective CIR-7.1 Design and maintain a safe and interconnected pedestrian-oriented Downtown circulation system.

- Policy 1 Promote pedestrian activity as the primary mode of travel on First Street in Downtown. (Reso. 2009-055)
- Policy 2 Provide a roadway system that is subordinate to the pedestrian environment, except for Livermore Avenue, L Street, Railroad Avenue, and Fourth Street, where pedestrian, bicycle, and vehicular traffic needs are balanced to ensure adequate access to the Downtown for all modes of travel. (Reso. 2009-055)
- Policy 5 Reduce the speed of roadway traffic moving through the Downtown Area to be more compatible with pedestrians.

- Action 2: Encourage alternatives modes of travel to and within the Downtown Area, including transit and bicycles.

Goal CIR-10: Provide adequate safe and convenient short- and long-term vehicle and bicycle parking for all land uses in the City

Objective CIR-10.3 Strive to expand bicycle parking facilities throughout the City.

Policy 1 On-and off-street bicycle parking facilities should be provided near destinations for all bicycle users, including commuters, residents, shoppers, students, and others.

Policy 2 Encourage businesses in the Downtown Area to provide valet bicycle parking.

- Action 1: Identify locations where more bike parking would be beneficial and install bicycle racks and bicycle storage facilities, as funding becomes available. (Reso. 2014-183)

HOUSING ELEMENT

Goal 1: Diversity of Housing Choice

Program 1.1.5: Mixed Use Development - The neighborhood mixed-use designations are intended to help improve pedestrian orientation in neighborhoods by providing neighborhood commercial services within walking distance of existing residences and integrating housing with commercial development on a single site.

INFRASTRUCTURE AND PUBLIC SERVICES ELEMENT

Goal INF-3: Collect, store and dispose of stormwater in ways that are safe, sanitary, environmentally acceptable and financially sound while maintaining the highest standards required to enhance the quality of life for existing and future residents.

Objective INF-3.3 Maintain creeks and arroyos in as natural a state as possible, while maintaining the health and safety of residents, providing flood control, preserving habitat and providing recreational use.

Policy 3 Recreational opportunities adjacent to the arroyos and creeks shall be incorporated where possible. Primarily bikeways and trails shall be located adjacent to the arroyo and creek corridors as outlined in a master plan prepared for bikeways and trails.

Goal INF-7: Provide education facilities sufficient to meet the demands of existing and new development.

Objective INF-7.3 Work with the Livermore Joint Unified School District to identify appropriate locations for schools and means of school expansion in order to prevent negative impacts on the health, safety and welfare of students.

Policy 3 Wherever possible, school sites should be integrated with recreation parks and community recreation/non-motorized transit corridors to permit recreational experiences as part of the educational process and to allow pedestrian and bicycle access.

Policy 4 Intermediate and high schools should be located centrally to the student populations they will serve. Sites shall have access to collector or major streets to permit access by pedestrians, bicycles and public transit with a minimal impact on surrounding residential areas.

ECONOMIC DEVELOPMENT AND FISCAL ELEMENT

Goal ED-3: Develop and maintain a stable fiscal base that is not overly dependent on any land use, major taxpayer, or revenue type.

Objective ED-3.2 Ensure that development pays its fair share of public services, equipment, and facilities necessary to serve the development.

Policy 3 New development will contribute its fair financial share to develop and maintain an adequate level of public services in the following areas:

- e) Street, highway, pedestrian, bicycle, and related transportation facilities.

CLIMATE CHANGE ELEMENT

Goal CLI-1: By 2020, the City of Livermore shall seek to reduce greenhouse gas emissions under the control of the City to a level 15% less than 2008 levels in order to support State implementation of the Global Warming Solution Act of 2006 (AB 32).

Objective CLI-1.1 Adopt a Climate Action Plan by 2010 that will help the City address climate change.

Policy 1 The City will prepare and adopt a Climate Action Plan (CAP) by 2011. The CAP shall include an inventory of the 2008 level of GHG emissions within the City. The CAP shall set out specific policies and actions to be undertaken by the City to reduce GHG emissions under the control of the City to a level 15% less than 2008 conditions in order to support State implementation of AB 32. The policies and actions will include incentives, actions, and requirements to reduce the City’s GHG emissions, the GHG emissions of the private sector, and actions that the City will take in concert with public agencies, the private sector, and other stakeholders to reduce GHG emissions. Development of the CAP will include a public and stakeholder process.

Objective CLI-1.3 Support measures that encourage alternative modes of transportation and alternative fuels in order to reduce emissions associated with vehicle travel.

Policy 4 Evaluate the feasibility of a VMT reduction target in concert with other Alameda County municipalities. Evaluate the feasibility of a VMT target for new development below “business as usual” VMT levels. If determined feasible, adopt a VMT reduction target in conjunction with adoption of the Climate Action Plan. Part of the evaluation of a VMT reduction target would require an analysis of the City’s existing multi-modal circulation infrastructure such as pedestrian routes, bicycle lanes, and transit services and operations. Monitor VMT every two years to evaluate the

effectiveness of VMT reducing strategies in this element.

- Policy 6 Evaluate and consider free bicycles for public use and/or charge a nominal fee for their use.

- Policy 15 The city shall evaluate the feasibility of implementing a voluntary trip reduction ordinance that promotes the preparation and implementation of a trip reduction plan (TRP) for large employers (100 employees or more) in the City. The TRP should include, at a minimum, performance of annual employee commute surveys, marketing of commute alternatives, ride matching assistance, telecommuting, and transit information. The suggested performance target for the TRPs is a reduction of the vehicle trips per employee by 15% in five years and 25% in ten years.

LIVERMORE MUNICIPAL CODE

TITLE 10 VEHICLES AND TRAFFIC

Section 10.20.290 Bicycle parking spaces.

- A. The traffic engineer is authorized to designate and establish bicycle parking spaces for use at such places and during such times as he may deem suitable and necessary. The traffic engineer may also authorize the placing of bicycle parking racks in the spaces so designated.

- B. When official signs or markings restricting parking to bicycles only are in place, bicycles shall be parked only in such places, and it is unlawful for any person to park or stand any vehicle other than a bicycle or other nonmotorized two-wheeled

vehicle in such space. (Ord. 1787 § 1, 2006; 1960 code § 13.66)

Section 10.28.010 Vehicles not to block intersections or crosswalks.

It is unlawful for the operator of any vehicle to enter an intersection or a marked crosswalk unless there is sufficient space on the side of the intersection or crosswalk to accommodate the vehicle he is operating without obstructing the passage of other vehicles or pedestrians. (Ord. 1787 § 1, 2006; 1960 code § 13.83)

Section 10.28.070 Driving on sidewalks, pedestrian/bike trails, parks and arroyos prohibited – Exceptions.

No motor vehicle, motorized bicycle, motorized skateboard, or motorized scooter shall be driven within sidewalk areas, trails, public parks, parkways, or paths, channels or arroyos, unless such vehicle or device is within an area specifically authorized for such use, or is operated by an authorized person employed by the public agency maintaining or controlling such property. (Ord. 1787 § 1, 2006; 1960 code § 13.85)

Section 10.32.010 Crosswalks – Established by traffic engineer.

- A. The traffic engineer is authorized to mark and maintain crosswalks, and to designate them by appropriate signs and/or markings upon the surface of the roadway.

- B. The traffic engineer may place signs at or adjacent to an intersection in respect to any un-marked crosswalk, directing that pedestrians shall not cross at that location. (Ord. 1787 § 1, 2006; 1960 code § 13.88)

Section 10.32.030 Standing in roadways prohibited – Exceptions.

No person shall stand in any roadway other than in a crosswalk if such action interferes with the lawful movement of traffic. This provision shall not apply to any public officer or employee, or employee of a public utility when necessarily upon a street in line of duty. (Ord. 1787 § 1, 2006; 1960 code § 13.91)

Section 10.36.010 Persons on rollerskates or toy vehicles – Prohibited when.

No person upon rollerskates or a skateboard or riding in or by means of any coaster or motorized toy vehicle or similar device shall go upon any roadway. (Ord. 1787 § 1, 2006; Ord. 1304 § 1, 1989; 1960 code § 13.18)

Section 10.36.020 Persons on rollerskates or toy vehicles – Business district restrictions.

No person shall skate with rollerskates or a skateboard or propel any coaster-brake or motorized wagons or toy vehicles upon and along any street, sidewalk, or other public place, or on or in a place open to the public within any business district. (Ord. 1787 § 1, 2006; Ord. 1599 § 1, 2000; Ord. 1304 § 2, 1989; 1960 code § 13.17)

Section 10.36.030 Persons on skateboards.

Any person riding a skateboard at any skateboard facility shall wear a helmet, elbow pads, and knee pads. (Ord. 1787 § 1, 2006; Ord. 1599 § 2, 2000)

Section 10.44.030 License – Required.

It is unlawful for any person to operate or use a bicycle unlicensed by either the city of Livermore or the state of California upon any of the streets, alleys or public highways of the city. (Ord. 1787 § 1, 2006)

Section 10.44.040 License – Application – Attachment to bicycle.

- A. Upon written application, any bicycle may be licensed and registered, as provided in this chapter. The city shall provide all necessary materials for licensing and registration, and provide registration opportunities at times and places convenient to the public.
- B. The license shall be attached to the bicycle, and shall remain attached as long as the license is in force. (Ord. 1787 § 1, 2006)

Section 10.44.090 Bicycle lanes – Establishment.

The traffic engineer is authorized to erect or place signs upon any street or adjacent to any street in the city indicating the existence of a bicycle lane or path, and otherwise regulating the operation and use of vehicles and bicycles with respect thereto as the same are consistent with the state law. The bicycle lane shall be designated on the roadway by appropriate painting, reflectorized buttons, or in such manner as the city engineer shall determine will provide sufficient notice of the existence of such bicycle lane. When such signs are in place, no person shall disobey the same. (Ord. 1787 § 1, 2006; 1960 code § 5A.30)

Section 10.44.100 Bicycle lanes – Cyclist to ride at right side.

While proceeding in a bicycle lane or path, a bicyclist must ride in the furthestmost right-hand portion of the lane or path, when possible. (Ord. 1787 § 1, 2006; 1960 code § 5A.33)

Section 10.44.120 Bicycle lanes – Stopping restrictions for riders.

A bicyclist may stop in a bicycle lane or path after giving the appropriate signal in the manner provided in Chapter [6](#) (commencing with Section [22100](#)) of the Vehicle Code; providing, that he has not blocked the path or lane, such that at least one moving bicyclist may pass by him and still be in the path or lane. (Ord. 1787 § 1, 2006; 1960 code § 5A.32)

Section 10.44.130 Riding on sidewalks and playgrounds – Restrictions.

- A. No person shall ride a bicycle upon a sidewalk except in residential areas, or where such riding is permitted.
- B. Whenever any person is riding a bicycle upon a sidewalk, such person shall yield the right-of-way to any pedestrian, and shall give audible signal before overtaking and passing such pedestrian.
- C. No person shall ride or operate a bicycle upon any playground, park or school ground where children are playing under supervision in an organized activity, without the permission of the person having supervision of the playground, park or school ground. (Ord. 1787 § 1, 2006; 1960 code § 5A.6)

TITLE 12 STREETS, SIDEWALKS AND PUBLIC PLACES**Section 12.04.010 Unimproved curbs, gutters and sidewalks – Findings.**

The existence of unimproved curbs, gutters, sidewalks and streets adjoining dwellings and buildings within the city is found and declared to be prejudicial to the public health, safety and welfare of the inhabitants of the city. (1960 code § 6.29)

Section 12.04.020 Construction – Location and specifications.

Any person who constructs or causes to be constructed any building or dwelling in the city shall construct curbs, gutters, sidewalks and streets in accordance with the city specifications along all street frontages adjoining the property upon which such building or dwelling is constructed, unless adequate curbs, gutters, sidewalks or streets already exist; provided, however, that in areas not subdivided or parceled into lots of one-half acre or less, such curbs, gutters, sidewalks and streets need not extend a greater distance than the side yards or the side and rear yards in the case of corner lots. Whether or not adequate curbs, gutters, sidewalks and streets already exist shall be determined in each instance by the city engineer, and an endorsement to that effect shall be made upon each building permit at the time it is issued. (1960 code § 6.30)

Section 12.04.030 Sidewalk width.

No cement sidewalk, or any walk of permanent character constructed after December 5, 1927, shall be less than five feet in width. (1960 code § 19.1)

Section 12.04.050 Exception – Rural residential subdivisions with lots over 10 acres.

In order to meet the intent of the South Livermore Valley Plan and at the same time maintain the rural character of the South Livermore Valley, Chapter 12.04 LMC relating to curbs, gutters, and sidewalks shall not apply to lots zoned residential which are over 10 acres in size. In lieu of Chapter 12.04 LMC, the city council shall establish regulations regarding curbs, gutters, and sidewalks in specific conditions of approval in conjunction with its approval of each parcel map or tentative tract map.

In imposing any alternative condition of approval regarding curbs, gutters, and sidewalks, the city council shall consider whether: (1) the alternative condition of approval will aid in maintaining the rural character of the South Livermore Valley, (2) the alternative condition of approval is consistent with policies intended to protect the health, safety and general welfare of the city, (3) the alternative condition of approval is appropriate for lots of 10 acres or more, and (4) the alternative condition of approval is at least the equivalent of the regulations set forth in Chapter 12.04 LMC. (Ord. 1478 § 1, 1996)

Section 12.32.020 Downtown revitalization fee – Findings.

A. Purpose of Fee. The policy of the city of Livermore is that new development will not burden existing development with the cost of street, park or infrastructure improvements required to accommodate growth. The purpose of the downtown revitalization fee is to implement this policy by providing a funding source from new development for downtown improvements. These new improvements are necessary for the downtown to become a defined and dynamic center to the

city that can support residential, office, and retail activity. These improvements include additional landscaping, street and intersection improvements that allow for a pedestrian-friendly environment; and public amenities like parks and plazas that attract people to live, work and shop in the downtown. The fee advances a legitimate interest of the city by enabling the city to provide municipal services to new development.

Section 12.55.10 Trails – Intent and Purpose.

Objective ED-3.2 of the Economic Development and Fiscal Element of the 2003-2025 General Plan is to “ensure that development pays its fair share of public services, equipment, and facilities necessary to serve that development.” This includes developing and maintaining an adequate level of public services in pedestrian, bicycle and related transportation facilities as well as in parks, recreational and cultural facilities. This part of the general plan provides that the city should recover the direct and indirect costs of providing services and facilities supporting development through a combination of fees, exactions and dedications.

Objectives CIR-3.3 and -3.4 of the Circulation Element of the 2003-2025 General Plan provide that the city should “provide a bicycle and trails network” and “provide a pedestrian network that encourages walking for transportation and recreation.” The circulation element is based in part upon the city’s Bikeways and Trails Master Plan adopted by city council in December of 2001. The master plan and the implementing Bikeways and Trails Design Guidelines and Best Practices provide a recommended network of multi-use trails throughout the city and spell out the

size and type of improvements required for these trails to be constructed.

The Downtown Specific Plan provides that “all new developments located on parcels backing onto the South Pacific right-of-way shall be required to provide a 20-foot dedication south of the existing right-of-way to be reserved for the Iron Horse Multi-Use Trail. Developments shall be required to provide improvements to the trail.”

The South Livermore Valley Specific Plan provides for a multi-use trail system. (See Section 5.6.2.)

The purpose of this chapter is to meet the council’s policies found in the 2003-2025 General Plan, the Downtown Specific Plan, the South Livermore Valley Specific Plan, the Bikeways and Trails Master Plan and the Bikeways and Trails Design Guidelines and Best Practices, regarding trail facilities in the city. It is the city’s policy, expressed in these documents, that new development contribute its fair share of trail land and improvements needed to accommodate that development.

In adopting this chapter, the city council has considered the impacts on trail facilities from new residential and nonresidential development in the city. Trail facilities provided by the dedications will provide a citywide network of services accessible to the additional residents and employees associated with new development. Thus, there is a reasonable relationship between the use of trail facilities dedicated and the residential and nonresidential types of new development that would dedicate them. (Ord. 1745 § 1, 2004)

Section 12.55.030 Dedication requirement –Improvements.

- A. Dedication. Where a trail facility is designated in the 2003-2025 General Plan, Downtown Specific Plan, South Livermore Valley Specific Plan, or Bikeways and Trails Master Plan to be located in whole or part within a proposed development, the developer is required to dedicate the land for a multi-use trail. The land shall include the right-of-way required in the city’s Bikeways and Trails Design Guidelines and Best Practices Manual, or other applicable plan.

All trail land shall be dedicated free and clear of all liens and encumbrances to the city of Livermore or Livermore Area Recreation and Park District (LARPD), as determined by the city engineer.

- B. Improvements. The developer shall provide complete multi-use trail improvements as designated in the city’s Bikeways and Trails Design Guidelines and Best Practices or LARPD’s Standard Specifications (July, 2003) and Standard Details (July, 2003). Such improvements may include, but are not limited to, landscaping, irrigation, fences, bollards, gates, asphalt paving pathways, decomposed granite pathways and fencing along the property line of the property contiguous to the dedicated land. (Ord. 1745 § 1, 2004)

Section 12.60.020 Findings.

- B. Use of Fee Revenue. The park facilities fee will fund expanded park facilities in the city to serve new development. These facilities include land for public parks plus all associated capital improvements necessary to provide park and recreation services including:

1. Adjacent street improvements, including utility connections, curbs, gutters, street paving, traffic control devices, street trees, sidewalks and fencing adjacent to the property line
4. Land for public multi-use trails plus all associated capital improvements per the city’s Bikeways and Trails Master Plan and Design Guidelines (December 2001) and the LARPD Trails Master Plan

LIVERMORE DEVELOPMENT CODE

CHAPTER 2.01 SITE PLANNING AND GENERAL SUBDIVISION STANDARDS

Section 2.01.020 Site Planning and Subdivision Design Standards for All Zones

H. Additional Standards

1. Pedestrian walkways away from street frontages.
 - a. As part of subdivision approval, the City may require dedicated and improved pedestrian walkways in locations away from street frontages where necessary to provide safe and convenient pedestrian access to a public facility or to otherwise provide convenient connections between existing pedestrian routes.
 - b. Where walkways are required, the City Engineer shall specify the standards for their design and construction.
4. *Private streets.* Within the residential zoning districts lots for dwelling units without frontage on a public street, private streets may be permitted subject to approval of a

conditional use permit and in conformance with the following requirements:

- d. Sidewalks and pedestrian pathways. Sidewalks and pedestrian pathways shall conform to the following requirements:
 - (1) They shall be constructed along both sides of the private street within the building setback area;
 - (2) They shall provide access to all building entrances, parking, and open space areas;
 - (3) These sidewalks and pathways shall have a minimum unobstructed width of five feet.
5. Miscellaneous
 - b. LARPD standards may be used, as appropriate, for the development and design of trails and parks of any size, including those less than 5 acres, in the City.

CHAPTER 2.02 TRADITIONAL NEIGHBORHOOD DEVELOPMENT AND TRANSIT-ORIENTED DEVELOPMENT SITE PLANNING STANDARDS

Section 2.02.020 Site Planning Standards for Walkable Urban Neighborhoods

A. General neighborhood layout.

1. Any site over ten acres must be planned with a pedestrian shed, generally described as a quarter mile radius, to determine its focal point.
2. Any site over 160 acres must be planned with one or more pedestrian sheds to determine neighborhood centers.

- 3. Pedestrian shed types include Linear, Long, and Network.
- 4. No more than 15% of land should fall outside of a pedestrian shed unless it is being designated as T1-Natural or civic space.

C. Neighborhood centers/main streets.

- 1. For each pedestrian shed, no less than 400 linear feet of frontage should be designated for T4 Main Street or T4 Main Street-Open measured from the edge of lots.
- 4. The main street must be proximate to the center of a pedestrian shed.

CHAPTER 4.04 PARKING STANDARDS

Section 4.04.030 Bicycle Parking

Table A-1: Bicycle Parking Requirements (Table 4.7)

USE	REQUIRED STALLS	LOCATION
Commercial, Services, Recreation, Education, and Public Assembly	4 stalls or 20% of required off-street automobile parking stalls, whichever is greater (up to a maximum of 30 bicycle stalls)	Adjacent to bicycle paths and pedestrian walks no further than 50 ft from the public entrance
Residential dwelling, multi-family	1 per 4 bedrooms	Must be secure
Industry, Manufacturing, and Processing	10% of required off-street automobile or truck parking stalls (up to a maximum of 30 bicycle stalls)	Adjacent to bicycle paths and pedestrian walks no further than 50 ft from the entrance

A. For each 10 bicycle parking stalls provided, there shall be permitted a reduction of one required automobile parking stall to a maximum of 15 percent of the required automobile parking stalls, at the discretion of the City Engineer or Planning Commission (depending on who is the Review Authority).

B. Bicycle Stalls. Bicycle stalls shall be improved in accordance with the following requirements:

1. Provided with a device to be approved by the City and capable of supporting a bicycle in an upright or hanging position and having a means that will enable a user to lock his bicycle to such a device.

2. Areas containing stalls shall be surfaced with hardscape or paving.

3. When located within a parking area, spaces shall be protected by curbs, fences, planter areas, bumpers, or similar barriers for the mutual protection of bikes, automobiles and pedestrians, unless deemed by the City to be unnecessary.

Section 4.04.070 Parking Lot Layout and Configuration

B. *Pedestrian walkways and bicycle paths.* So as to assure public safety and convenience within developments and/or parking lots, pedestrian walkways and bicycle paths shall meet the following criteria:

1. Allow the shortest possible safe route between the public entrance(s) to any building or use and adjacent public rights-of-way at points where the major pedestrian and bicycle traffic flows are expected, as determined by the City.

2. Facilitate access between the public entrance(s) to any building or use and areas within a parking lot.
3. Be continuous through a project and provide a direct route to individual uses/building throughout the entire site. Public sidewalks can provide this access if they exist.
4. Be paved and for purposes of providing safety for pedestrians, cyclists, and automobiles shall be distinguished, separated or protected through provision of curbs, fences, planter areas, bumpers, elevation change, or other methods as determined by the City.
5. Comply with Americans with Disabilities Act requirements.
6. When use is restricted to pedestrians or bicycles, a two-square-foot sign stating the words “Bicycle (or Pedestrians) Only,” must be located at all points of access
7. In any case where a row of parking is parallel to the side of a building or use through which public entry is provided, pedestrian walkways shall be provided at intervals of not greater than 75 feet.
8. Bicycle paths and pedestrian walkways shall not be required in the case of private parking lots in industrial, warehouse, and manufacturing uses, when deemed by the City to be unnecessary, and for other developments requiring the provision of less than 10 off-street parking spaces.
9. Automobile drives or aisles shall not be permitted to intersect a bicycle path at intervals of less than 80 feet.

10. Cars should be required to stop at locations where bicycle and pedestrian paths intersect drives or parking lots.

11. Minimum dimensions:

- a. Pedestrian walkways width: 5 feet min.
- b. Bicycle lanes: 5 feet min.
- c. Combined pedestrian walkways and bicycle: 10' min.
- d. Minimum curve radius for turns: 15 feet.

PART 7: THOROUGHFARE TYPES

Thoroughfare Types Overview

The thoroughfares of a city are one of the most important elements in defining community character. This role must be considered along with the movement of cars, bicycles, and transit.

All of the elements of the thoroughfare are context-based. Elements of the thoroughfares include pedestrian and bicycle oriented principles. The elements included in these standards start with the classification of movement type and design speed for each thoroughfare. Next, applicable Transect zones are listed, followed by overall width and pavement width, the number of lanes, and the lanes' specific maximum sizes. Last are the edges, which include drainage collection type, planter type, lighting type (street lighting per City standard), and walkway type and curb radii at intersections. Bulb-outs are encouraged to facilitate a pedestrian friendly environment. The following thoroughfare types are appropriate for the City.

A. Thoroughfares for new streets

1. Neighborhood Street Tree Wells, see 7.01.040 (Neighborhood Street Tree Wells) for standards.

2. Neighborhood Street Planter Strip, see 7.01.050 (Neighborhood Street Planter Strip) for standards.
 3. Neighborhood Main Street, see 7.01.060 (Neighborhood Main Street) for standards.
 4. Rear Alley Mixed Use, see 7.01.070 (Rear Alley Mixed Use) for standards.
 5. Rear Alley Residential, see 7.01.080 (Rear Alley Residential) for standards.
- B. Thoroughfares for retrofitting existing streets
3. Retrofit: Wide Planter Strip, see 7.01.110 (Retrofit: Wide Planter Strip) for standards.
 4. Retrofit: Bicycle Lanes, see 7.01.120 (Retrofit: Bicycle Lanes) for standards.
 5. Retrofit: Diagonal Parking, see 7.01.130 (Retrofit: Diagonal Parking) for standards.

CHAPTER 10.06 DEDICATIONS, RESERVATIONS, AND EXACTIONS

Section 10.06.060 Bicycle Paths – Transit Facilities

A. *Bicycle paths.* If a subdivision contains 200 or more parcels, the subdivider may be required to dedicate land to provide bicycle paths for the use and safety of the residents of the subdivision (Section 66475.1).

B. *Transit facilities.*

1. The City may require a subdivider to dedicate land within the subdivision for local transit facilities (e.g., bus benches, shelters, turnouts, landing pads, and similar items) that directly benefit the residents of the subdivision.

DESIGN STANDARDS AND GUIDELINES

CHAPTER 2: GOALS

Goal D Strengthen the Pedestrian Realm

1. Encourage landscape and building elements, such as enhanced paving materials, accent lighting, streetscape furniture and adequate sidewalk space that will contribute to pedestrian environments that are attractive and physically safe.
2. In commercial areas, develop pedestrian amenities that contribute to active and economically vibrant environments.

Goal G Facilitate Multiple Modes of Circulation

1. Enhance the non-vehicular environment by developing streets at a scale that is conducive to pedestrian and bicycle use.
2. Establish and maintain attractive and functional sidewalks to maximize pedestrian access to development projects.

Goal K Encourage Green Building Design

1. Encourage alternative modes of transportation through site planning and building orientation that emphasize connections to sidewalks, bike paths and trail networks. Also, encourage attractive pedestrian amenities on-site and comfortable, convenient pedestrian connections between sites and to transit stops to facilitate alternatives to the automobile.

CHAPTER 3: BASIC PRINCIPLES

E. Relationship to the Human Form

Building façades that are visible from public streets shall incorporate design features and architectural elements that relate to the scale of the pedestrian. Buildings that utilize smaller-scale elements and useable outdoor spaces, such as plazas or seating areas, will appear less massive, fit more appropriately on their sites and appear more inviting to visitors and residents or building users.

F. Pedestrian Orientation

Site planning, building design and landscaping of projects should implement design solutions that provide amenities, maximize access and optimize the use of new development by pedestrians.

CHAPTER 4: INDUSTRIAL AND OFFICE

3. Parking

3.1 Location

Guidelines

- 3.1.2 All outdoor parking areas should be divided into smaller units to decrease visual impacts associated with large expanses of pavement and vehicles, and to facilitate safe and efficient pedestrian movement between parking and structures. Methods for dividing parking areas into smaller components include the incorporation of landscaped medians between parking bays when the number of bays exceeds two. These landscaped medians can include pedestrian paths.

3.5 Internal Circulation

Standard

- 3.5.1 Parking areas shall include designated pedestrian access to building entrances.

Guidelines

- 3.5.2 On-site pathways which are separated from vehicular traffic should be provided for pedestrians and bicyclists and should provide connections between building entries and public sidewalks.
- 3.5.3 Large commercial development should include at least one separated pedestrian pathway through the parking area to the main entrance.
- 3.5.4 Pedestrian walkways and spaces should include elements such as special paving materials, raised curbs, trellis structures, landscaping, pedestrian-scaled lighting, seating and trash receptacles.
- 3.5.5 Paths with durable, all-weather surfaces should be located on medians and other landscaped areas to provide convenient pedestrian routes and reduce wear on landscaped areas.
- 3.5.6 Primary circulation paths should avoid excessive steps or level changes in order to reduce potential tripping hazards and facilitate circulation for all potential users, including strollers and wheelchairs.
- 3.5.7 Secure bicycle parking should be provided adjacent to building entrances. The design and materials should be coordinated with the site and building design. Whenever possible, bicycle areas should be covered and located in

areas which are clearly visible to site users in order to avoid security problems.

- 3.5.8 Trellises and shade structures are encouraged to enhance the aesthetic design of the parking lot and to create a more comfortable pedestrian environment.

CHAPTER 5: COMMERCIAL

1. Building Siting and Orientation

1.1 Location and Orientation

Standards

- 1.1.1 Buildings shall be sited to reinforce the public street network by incorporating active façades, with windows, doors and other architectural elements giving interest to the building wall along the sidewalk and providing views into and out of the building.
- 1.1.3 Buildings should be located as close as possible to the front setback line or immediately behind a public or semi-private space, such as an outdoor seating area for a restaurant.
- 1.1.4 Building entrances should be located facing the street.
- 1.1.5 Façades with entrance doors and windows fronting upon the primary street are encouraged.

3. Pedestrian Orientation

3.1 Pedestrian Spaces

Standards

- 3.1.1 All commercial areas shall emphasize pedestrian orientation by creating attractive pedestrian spaces which utilize such features as plazas, interior walkways,

ornamental gates, trellises, lighting, plant materials, seating and fountains.

- 3.1.2 Outdoor pedestrian spaces shall be landscaped and include appropriate street furniture and other elements to facilitate pedestrian activity.

3.2 Pedestrian Connections

Standards

- 3.2.1 Attractive well marked pedestrian links between parking and buildings shall be provided. The connections shall be clearly marked to provide safe access across traffic lanes and landscaped areas. Such walkways shall utilize decorative paving at key locations.
- 3.2.2 All commercial buildings shall be publicly accessible via a path or walkway from a public sidewalk.
- 3.2.3 Parking area design shall include provisions for pedestrian access from parking areas to building entrances.

Guidelines

- 3.2.4 Where walkways cross on-site driveways, special design features should be used to increase safety for the pedestrian. Potential design features include elevated crosswalks (raised to the level of the sidewalk), textured pavement, curb extension to narrow the travel lane or low-level lighting, such as a bollard light.
- 3.2.5 Pedestrian connections should also be provided between buildings and adjoining commercial sites.
- 3.2.6 Walkways should be shaded and landscaped.

- 3.2.7 Trellises are encouraged in parking areas to provide an attractive design element, which identifies the pedestrian walkway and provides additional shade.
- 3.2.8 Large commercial development should include at least one separated pedestrian pathway through the parking area to the main entrance. Pathway should be landscaped and provide elements such as shade trees, trellises, or other shade structures.
- 3.2.9 Paths with durable, all-weather surfaces should be located across medians and other landscaped areas, as necessary to provide convenient pedestrian routes and reduce wear on landscaped areas.
- 3.2.10 Primary circulation paths should avoid excessive steps or level changes in order to reduce potential tripping hazards and facilitate circulation for all potential users.

4. Parking

4.1 Location

Guidelines

- Site plans should provide bicycle racks that are located close to the buildings and do not impede pedestrian or auto circulation. Whenever possible, bicycle areas should be covered and located in areas which are clearly visible to site users in order to avoid security problems.

4.5 Internal Circulation

Guidelines

- 4.5.1 On-site pathways which are separated from vehicular traffic should be provided for pedestrians and bicyclists and should provide connections between building entries and public sidewalks.

- 4.5.2 Large commercial development should include at least one separated pedestrian pathway through the parking area to the main entrance.
- 4.5.3 Pedestrian walkways and spaces should include elements such as special paving materials, raised curbs, trellis structures, landscaping, pedestrian-scaled lighting, seating and trash receptacles.
- 4.5.4 Paths with durable, all-weather surfaces should be located on medians and other landscaped areas to provide convenient pedestrian routes and reduce wear on landscaped areas.
- 4.5.5 Primary circulation paths should avoid excessive steps or level changes in order to reduce potential tripping hazards and facilitate circulation for all potential users, including strollers and wheelchairs.
- 4.5.6 Parking areas should provide bicycle racks that are located close to the buildings and do not impede pedestrian or auto circulation. Whenever possible, bicycle areas should be covered and located in areas which are clearly visible to site users in order to avoid security problems.

4.2 Pedestrian Elements

Guideline

- 4.2.1 Design elements that create pedestrian interest, such as doors, windows, trellises, benches or other similar elements, should be included at least every 40 to 60 feet along a building façade.

5. Plazas and Open Space

5.1 Plazas and Protected Seating Areas

Standards

- 5.1.1 Publicly-accessible plazas and open spaces are encouraged to be provided as part of commercial projects.
- 5.1.3 Outdoor pedestrian spaces shall include appropriate outdoor furniture, such as seating, walls, trash receptacles, bike racks and other elements.

Guidelines

- 5.1.4 Pedestrian amenities, such as plazas, courtyards and other open spaces should be provided for spaces between buildings.

F. Lighting

1. Lighting Design and Illumination

1.1 Design

Standards

- 1.1.3 Illumination levels shall be provided to address security concerns, especially for parking lots, pedestrian paths, outdoor gathering spaces, at building entries and any other pedestrian accessible areas.

1.3 Area of Illumination

Guidelines

- 1.3.5 Lighting for pedestrian safety should illuminate changes in grade, path intersections and other areas along paths which, if left unlit, would cause the user to feel insecure. Recommended minimum levels of illumination along pedestrian paths between destinations is 0.5 foot-candles. At pedestrian destination points such as

entryways, plazas and courtyards, lighting levels should typically achieve illumination of 1 foot-candle.

- 1.3.6 The placement of light standards, whether for street lights or garden lights, should not interfere with pedestrian movement.

CHAPTER 6: RESIDENTIAL

2. Neighborhood Identity

2.2 Sidewalk Design

Guideline

- 2.2.1 Planting strips between the sidewalk and the back of the curb are strongly encouraged. They should be a minimum of 5 feet in width.

3. Open Space

3.1 General Open Space Guidelines

Guidelines

- 3.1.3 Neighborhood open space should also tie into citywide open space systems including public parks, the arroyos, bicycle, pedestrian and equestrian pathways.
- 3.1.4 Open space areas should be used to visually unify a development, link development clusters and provide enhanced pedestrian circulation within the development.

CHAPTER 7: MIXED-USE

3. Pedestrian Orientation

3.1 Pedestrian Spaces

Standards

- 3.1.1 Mixed-use areas shall emphasize pedestrian orientation by utilizing features such as plazas, interior walkways, ornamental gates, trellises, lighting, plant materials, seating, fountains and other similar elements.
- 3.1.2 Outdoor pedestrian spaces shall be landscaped and include appropriate street furniture and other elements to facilitate pedestrian activity.

3.2 Pedestrian Connections

Standards

- 3.2.1 Attractive well-marked pedestrian links between parking and buildings shall be provided. The connections shall be designed as safe, clearly marked and attractive pedestrian walkways across traffic lanes, landscaped areas and parking lots.
- 3.2.2 All mixed-use buildings shall be publicly accessible via a path or walkway from a public sidewalk.
- 3.2.3 Where pedestrian paths or walkways cross parking areas or driveways, the paths shall utilize decorative paving to define the pedestrian space.

Guidelines

- 3.2.4 Where walkways cross traffic lanes, special design features should be used to increase safety for the pedestrian. Potential design features include: raised or textured pavement, curb extensions to narrow the travel lane or low-level lighting, such as a bollard light.

- 3.2.5 Pedestrian connections should also be provided between buildings and adjoining commercial and residential sites.
- 3.2.6 Walkways should be shaded and landscaped.
- 3.2.7 Pedestrian connections should include design cues to help demarcate the transition between public and private spaces. Design cues may include a change in colors, materials, landscaping or the dimensions of the space.
- 3.2.8 Illumination of walkways should be concentrated along the pedestrian paths leading to parking areas and in the specific areas where cars are parked.
- 3.2.9 Illumination should achieve a lighting level of 1 foot-candle on the parking lot surface.

4. Parking

4.1 Location

Guidelines

- 4.1.2 Building siting and parking design should maximize opportunities for pedestrian and vehicular circulation between adjacent sites, such as joint access easements and common driveways.
- 4.1.3 Parking areas should be located on the sides or rear of projects with pedestrian connections between the parking areas of the project.

4.5 Internal Circulation

Guidelines

- 4.5.2 On-site pathways which are separated from vehicular traffic should be provided for pedestrians and bicyclists and should provide connections between building entries and public sidewalks.
- 4.5.3 Large commercial development should include at least one separated pedestrian pathway through the parking area to the main entrance.
- 4.5.4 Pedestrian walkways and spaces should include elements such as special paving materials, raised curbs, trellis structures, landscaping, pedestrian-scaled lighting, seating and trash receptacles.
- 4.5.5 Paths with durable, all-weather surfaces should be located on medians and other landscaped areas to provide convenient pedestrian routes and reduce wear on landscaped areas.
- 4.5.6 Primary circulation paths should avoid excessive steps or level changes in order to reduce potential tripping hazards and facilitate circulation for all potential users, including strollers and wheelchairs.
- 4.5.6 Parking areas should provide bicycle racks that are located close to the buildings and do not impede pedestrian or auto circulation. Whenever possible, bicycle areas should be covered and located in areas which are clearly visible to site users in order to avoid security problems. The design and materials should be coordinated with the site and building design.

CHAPTER 9: STREETS

1. Street Widths

Guideline

- 1.1.1 Pavement widths on many existing streets adversely affect the visual and urban design character of the area being served. Wide streets are generally at odds with preserving the pedestrian scale and intimate character that contribute to successful residential neighborhoods and commercial centers. Therefore, design elements are encouraged to be used to reduce perceived street widths. These elements can include landscaping, street tree placement, medians and street furniture.

2. Medians

Guidelines

- 2.1.1 Landscaped medians should be implemented on wider, busier streets to create visual interest, a more intimate roadway scale, and a place for pedestrians to take refuge while crossing wide streets.

3. Planting Strips

Guidelines

- 3.1.3 To provide a landscape separation between street and sidewalk, planting strips should be installed between the back of the curb and the sidewalk.
- 3.1.6 The installation of planter strips is preferable in most cases to monolithic sidewalks.

6. Street Furniture

Guidelines

- 6.1.2 In order to encourage pedestrian circulation, appropriate street furniture and accessories, such as benches and trash receptacles, should be incorporated into the design of the street.

10. Curb Extension Bulbouts

Guideline

- 10.1.1 On streets that contain parking or shoulder lanes, curb extension bulbouts are encouraged at intersections, consistent with City Engineering and maintenance requirements. Bulbouts help to lessen the perceived width of the street and also facilitate shorter crossing distances for pedestrians.

CHAPTER 12: PARKS AND TRAILS

1. Trail Sites

Guidelines

- 1.1.1 Trails should be sited in a manner that allows visibility and open access from surrounding land uses.
- 1.1.2 Trails should be sited and designed to preserve public views of scenic vistas.
- 1.1.3 Where trails run through or alongside residential, commercial, industrial and other land uses, these uses should provide landscaped buffers, fences, and sufficient setbacks along the trail.
- 1.1.4 Sufficient setbacks and landscape buffers should be provided between trails and roadways.

2. Trail Access

Guidelines

- 2.1.1 Open visual access should be provided at all trailheads and at as many points as possible along the trail for surveillance purposes.
- 2.1.2 Where new development adjoins a trail, pedestrian connections should be made from the new development to the trail system.
- 2.1.3 Community resources, such as schools, shopping areas, transit stops, employment centers, residential communities, parks and open space areas should connect to the City's trail system or other multi-use pathways wherever possible.
- 2.1.4 Connections to trails should separate bicycle and equestrian access where feasible.

3. Landscaping

Guideline

- 2.1.9 Native plant species should be planted adjacent to trails wherever possible.

LIVERMORE STANDARD SPECIFICATIONS AND DETAILS

The City of Livermore generally follows engineering standards established by Caltrans and has specifications and details for sidewalk construction, traffic signals, signs, pedestrian lighting, and other elements applicable to pedestrian, bicycle, and trail facilities. The standard specifications and details are available on the City of Livermore's website at <http://www.cityoflivermore.net/citygov/cdd/eng/specs.htm>

BIKEWAYS AND TRAILS MASTER PLAN (2001)

The City of Livermore adopted the Bikeways and Trails Master Plan in 2001. Plan goals and policies are organized around six main categories:

- Network Connectivity and Design
- Planning and Interagency Coordination
- Support Facilities
- Safety, Education and Promotion
- Maintenance
- Implementation

The recommended Bikeway Network from the 2001 Bikeways and Trails Master Plan can be seen in Figure A-1.

The 2018 Bicycle, Pedestrian, and Trails Active Transportation Plan will replace the 2001 Bikeways and Trails Master Plan, while adding in a pedestrian component not considered in the previous plan.

ARROYO VISTA NEIGHBORHOOD PLAN (2007)

The Arroyo Vista Neighborhood Plan addresses the development of a 28 acre site in the City. Pedestrian, bicycle, and trail facilities outlined in the plan include:

- The Arroyo Seco Trail, as proposed in the Bikeways and Trails Master Plan
- Class II bike lanes on Las Positas Road
- Sidewalks on primary internal streets of the neighborhood

SOUTH LIVERMORE VALLEY SPECIFIC PLAN (1997)

The South Livermore Valley Specific Plan encompasses the South Livermore Valley in unincorporated Alameda County, south of the City. The plan incorporates rural road standards designed specifically to provide pedestrian-friendly, rural residential neighborhoods.

The Specific Plan establishes a network of trails that will connect the seven planning subareas to each other, to major destinations in the area such as parks and wineries, and to the City's existing and planned citywide trail system. The proposed trail system can be found in Figure A-2. Many of these trails have been constructed since the adoption of this plan in 1997. The circulation goals and policies of the specific plan relevant to pedestrians, bicycles, and trails are listed below.

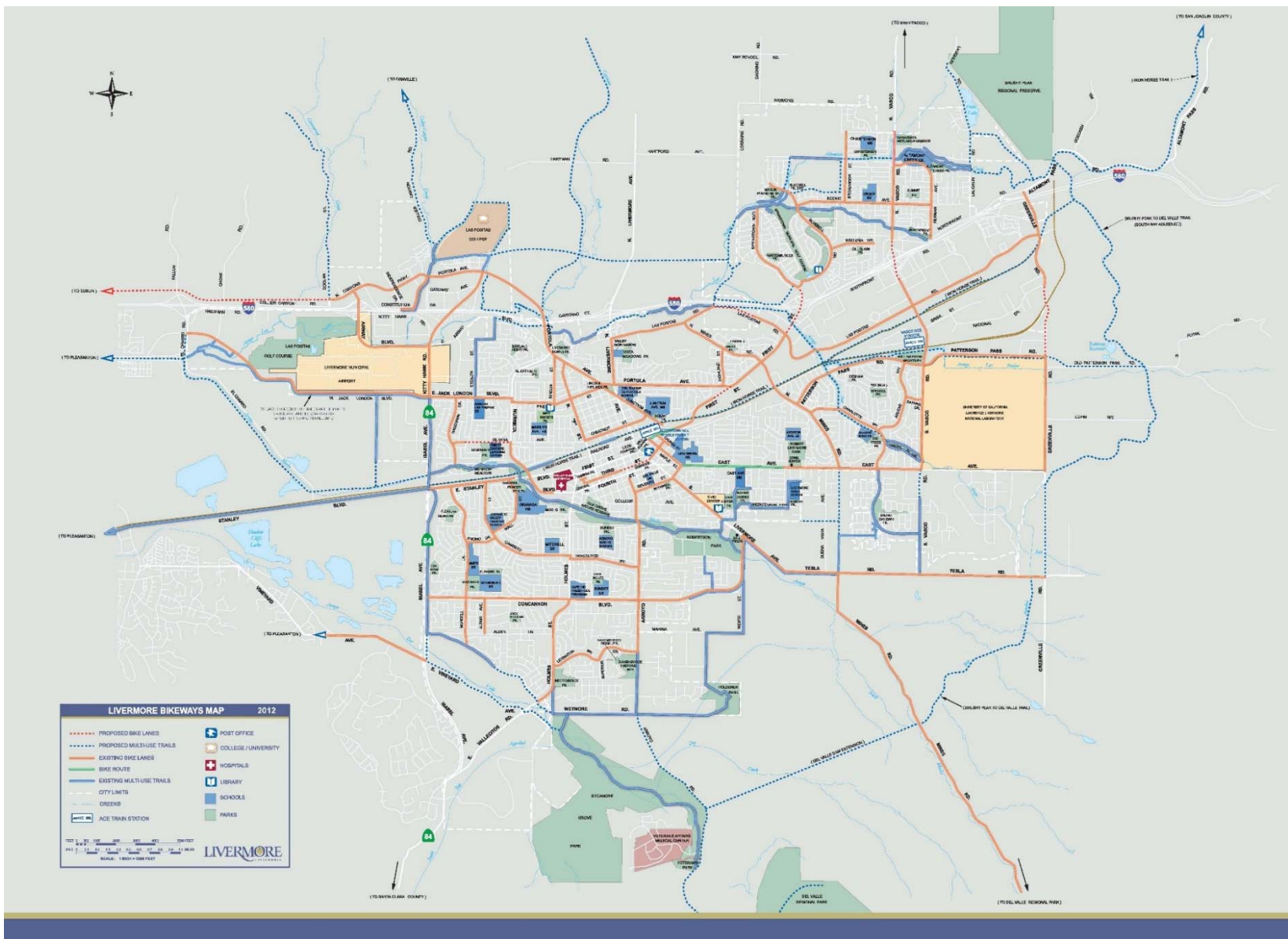


Figure A-1: Livermore Bikeways Map



Source: Livermore Bicycle/Pedestrian Plan Update and Equestrian Trails Study and Wallace Roberts & Todd



Figure A-2: South Livermore Valley Specific Plan Proposed Trail System

Goal: Develop a comprehensive and connected bikeway, pedestrian, and equestrian system which allows enjoyment of the scenic South Livermore Valley, connects the area's

parks and tourist destinations, and promotes use of alternatives to the automobile.

Policy 5-54: In order to enhance the value of the proposed regional trail for the entire Livermore community, the City/LARPD shall place a high priority on completing key linkages between the City's existing system and the proposed South Valley trail system (e.g., Holmes Street, South Livermore Avenue, etc.).

Policy 5-55: All trail corridor rights-of-way and improvements will be dedicated to LARPD for long-term ownership and maintenance.

Policy 5-58: A signage system should be designed for the regional trail system that identifies the trail corridor and the various destinations along the corridor, and provides safety warnings at key intersections. The signage system should be designed to be in scale with pedestrian, bicycle and equestrian uses, and in keeping with the rural, wine-country character of the area.

Policy 5-59: In order to encourage bicycle use by visitors to the South Livermore Valley, LARPD should identify locations for staging/parking areas, where people can leave their cars and bike through the Valley. Sycamore Grove Park and Robertson Park are existing possibilities, but another facility in the east end of the Valley would help to distribute visitor traffic and parking.

Policy 5-60: Provide paved, off-street pedestrian and bicycle facilities along all Specific Plan area streets.

Policy 5-61: Specific Plan developers shall ensure that subarea frontages with City and County roads have adequate paved

shoulders to accommodate Class II bicycle lanes per the City's General Plan Bikeway System.

Policy 5-62: Insure that local pedestrian and bicycle paths make convenient and frequent connections to the regional trail system.

Policy 5-63: Developers are encouraged to build pedestrian- and bicycle-only corridors within the development areas in order to provide shorter and more direct travel routes for pedestrians and bicyclists that are not associated with planning area streets

Policy 5-64: Trail crossings of public roadways shall be designed to the standards set forth in the City's General Plan Pedestrian/Bicycle Trails Element, and shall be reviewed and approved by the City and LARPD.

The SLVSP calls for a Standard Trail Right-of-Way with the following:

- 25-foot right-of-way
- 10-foot wide paved path for shared pedestrian and bicycle use
- 2-foot wide compacted earth/aggregate shoulder on the outer edges of the paved bicycle path
- 3-foot wide planting strip between the two trails
- 8-foot wide compacted earth/aggregate equestrian path

The Optimal Trail Right-of-Way should include:

- 40-foot right-of-way
- 10-foot wide paved path for shared pedestrian and bicycle use

- 2-foot wide compacted earth/aggregate shoulder on the outer edges of the paved bicycle path
- 3-foot wide planting strip between the two trails
- 8-foot wide compacted earth/aggregate equestrian path
- 15 feet of landscaped buffer that can be located all on one side or divided between the two sides of the right-of-way

CLIMATE ACTION PLAN (2012)

The Climate Action Plan implements General Plan policy, adopted in 2009 via a Climate Change Element of the Plan, to reduce greenhouse gas (GHG) emissions to 15 percent below 2008 conditions by 2020. In Livermore, transportation represents the largest source of GHG emissions. The City expects to add 18.5 miles of off-street and on street facilities by 2020 to close gaps in the network and connect new development areas to the existing system. This is expected to decrease daily Vehicle Miles Traveled by approximately 7,736 miles.

EL CHARRO SPECIFIC PLAN

The El Charro Specific Plan calls for a regional retail destination along the I-580 corridor, at the western entrance to the City. The circulation goals and policies of the specific plan relevant to pedestrians, bicycles, and trails are listed below.

Goal 4.3: Newly constructed roadways should accommodate bicycle and pedestrian traffic in order to provide transportation alternatives to and within the Specific Plan Area

Policy 4.3.1 Construct a section of the regional multi-use trail along Arroyo Las Positas, which will eventually connect the City of Livermore's existing trail system to the east with the City of Pleasanton's multi-use trail system on the west side of El Charro Road.

Policy 4.3.2 Provide Class II bike lanes on City streets, where appropriate, throughout the Plan Area.

Policy 4.3.3 Provide convenient and safe pedestrian connections between development nodes and open space areas within the Plan Area to encourage walking and reduce internal vehicular trips.

The proposed circulation system for the El Charro Specific Plan area is shown in Figure A-3.

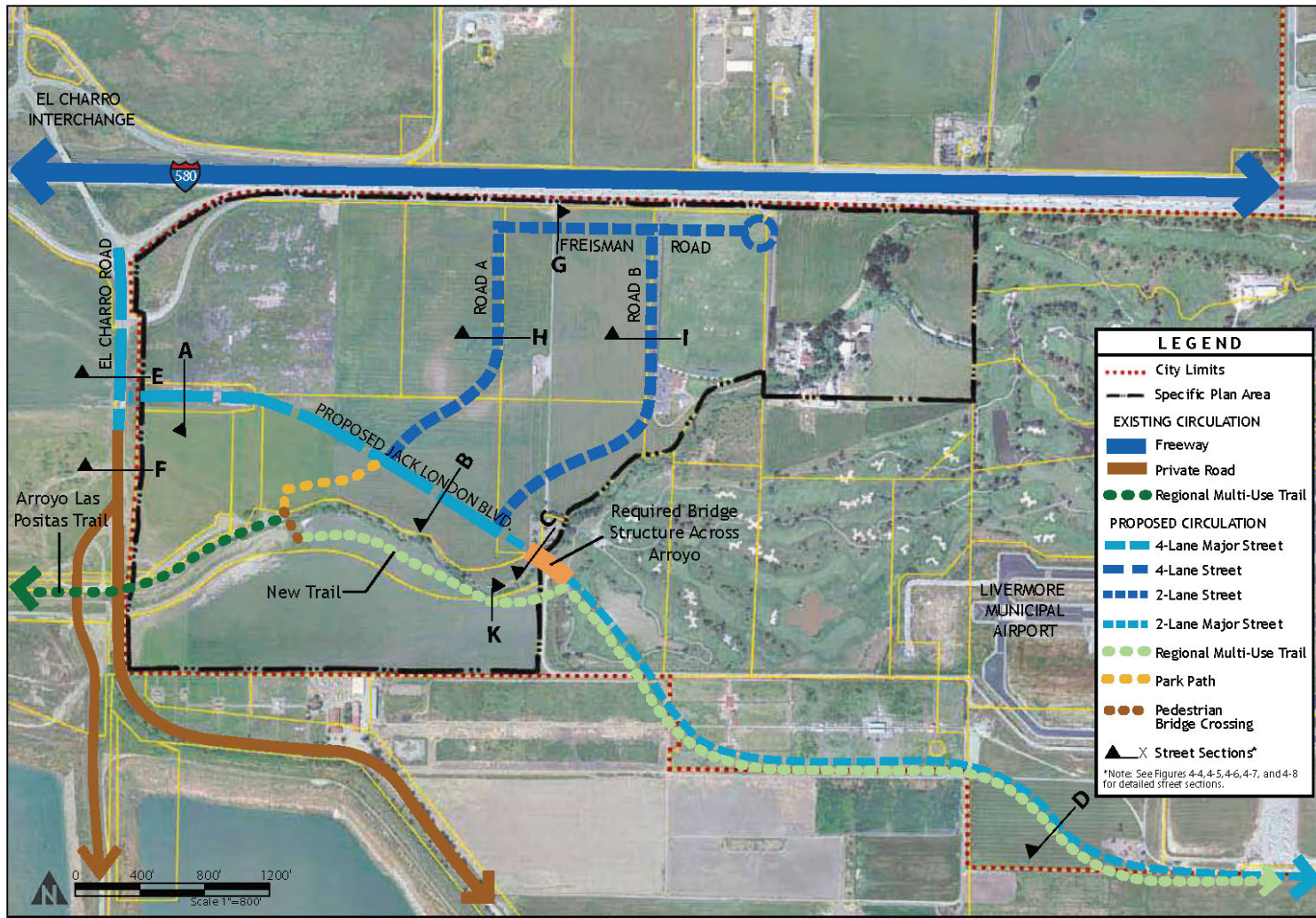


Figure 4-2 Proposed Circulation System:
CITY OF LIVERMORE EL CHARRO SPECIFIC PLAN

Revised July 2012

Note: This figure is conceptual in nature and subject to modifications based on subsequent development review.

Figure A-3: El Charro Specific Plan Proposed Circulation System

DOWNTOWN SPECIFIC PLAN (2004)

The Livermore Downtown Specific Plan focuses on downtown revitalization, with a vision of tree-lined streets and diverse uses. Proposed improvements to the existing network relevant to pedestrians, bicycles, and trails are listed below.

Pedestrians/Open Space

- Expand the pedestrian realm in the Downtown Core along First Street by creating a “flexible zone”
- Provide pedestrian connections minimum every 400 feet
- Maximize connections to and from major destinations such as the Livermore Valley Center, the Downtown retail core, and the Cineplex to Downtown transit facilities by providing clear pedestrian ways

Bikeway and Trail Network

- Extend Iron Horse Trail from Stanley Boulevard trail east along railroad right-of-way through Downtown Livermore
- Connect segments of bike lane on Third Street, provide bike lanes on P Street, and on Chestnut Street
- Provide bike routes on First Street from the west through Downtown to connect on the east end with existing bike lanes starting at Inman Street

The Specific Plan includes a Minimum New Street Network, shown in Figure A-4, and a Proposed Typical Street Network, shown in Figure A-5, to close gaps in the roadway network and prevent new development from creating new gaps. Within the Specific Plan area, recommended improvements include:

- First Street from S Street (west) to Inman Street (east) - Reorganize the street into three distinct segments along

this length - the Downtown Core from M to Maple Streets, the Downtown Boulevard Gateway west of M Street, and the Downtown Transit Gateway east of Maple Street. From P Street to Railroad/Maple Street, reduce the number of through lanes from four to two and provide left-turn lanes at the signalized intersections. At the Downtown Core, provide “flexible zones” on shoulders to accommodate diagonal or parallel parking, street side retail displays, or restaurant use. Throughout the study area, provide bulb-outs at key intersections to reduce pedestrian crossing distance.

- Railroad Avenue from East Stanley Boulevard/S Street to First Street- Improve roadway to provide four through traffic lanes. Existing parking may need to be eliminated to accommodate improvements. In the longer term, Railroad Avenue may be widened further to accommodate on-street parking.
- Railroad Avenue/First Street/Old First Street - Realign Railroad Avenue to intersect First Street at Old First Street in order to help promote pedestrian activity as the primary mode of travel on First Street within the Downtown, as well as improve traffic operations along Railroad Avenue in the Transit Gateway.
- Intersection of First Street/Livermore Avenue - Narrow both streets at intersection to provide one through lane in each direction and a left turn lane. On-street parking may be provided midblock as road width transition allows.

Proposed sections within the Downtown Core can be seen in Figure A-6 and proposed Bikeways and Trails can be seen in the following Figure A-7



Downtown Specific Plan – Chapter 7
Circulation and Transportation
Page 7 of 39

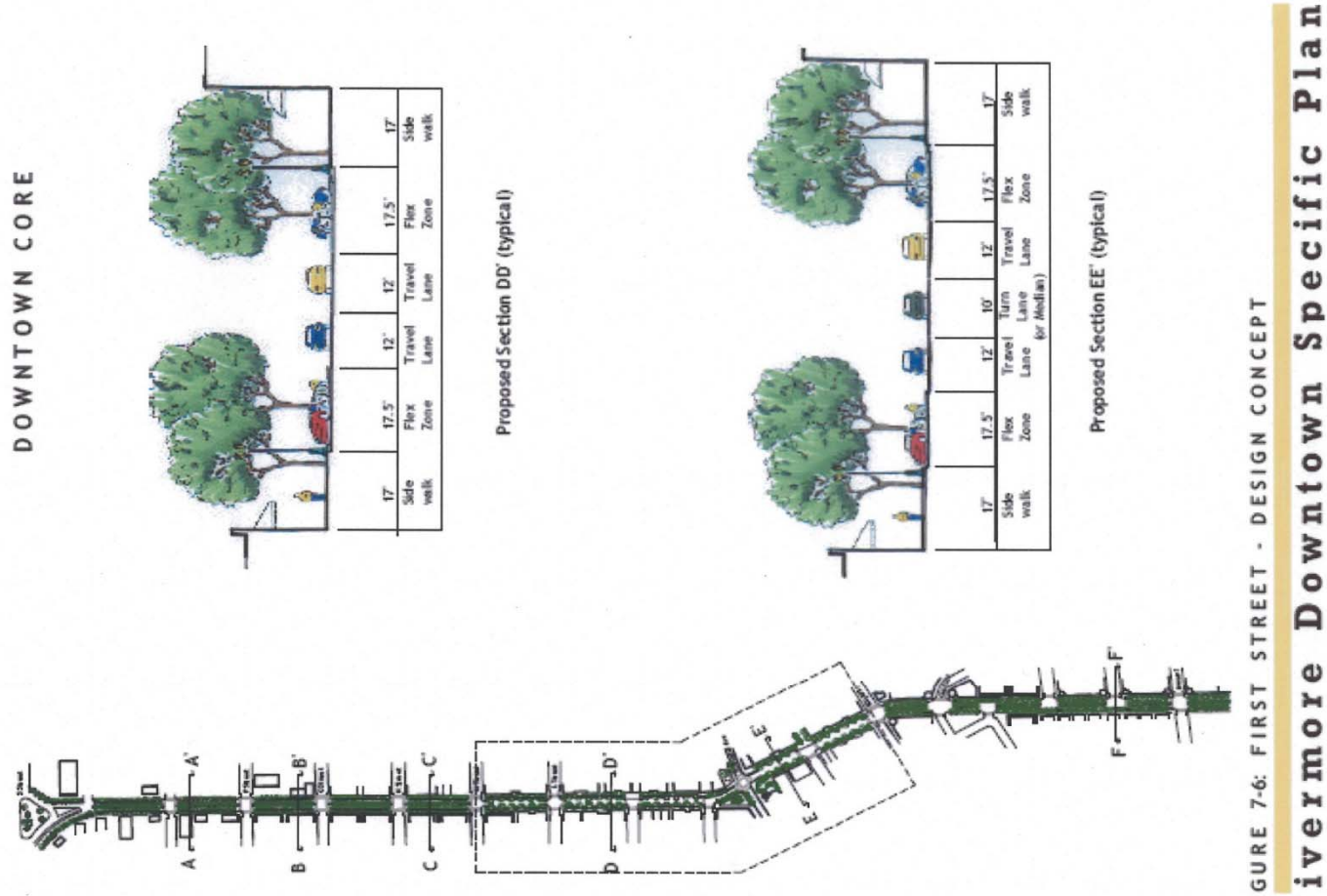
Figure A-4: Livermore Downtown Specific Plan Minimum New Street Network



FIGURE 7-4: PROPOSED TYPICAL STREET NETWORK

City of Livermore
Livermore Downtown Specific Plan

Figure A-5: Livermore Downtown Specific Plan Proposed Typical Street Network



Downtown Specific Plan – Chapter 7
 Circulation and Transportation
 Page 13 of 39

Figure A-6: Livermore Downtown Specific Plan First Street Design Concept

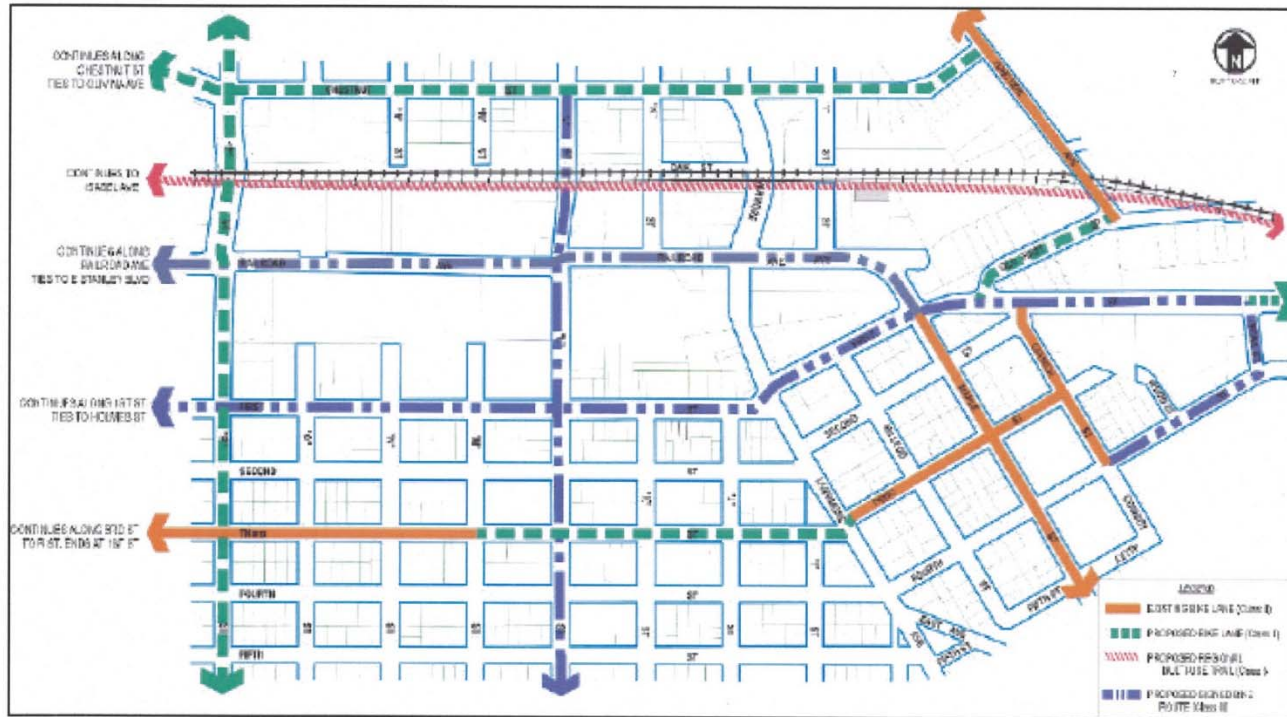


FIGURE 7-12: BIKEWAYS AND TRAILS

Livermore Downtown Specific Plan

Downtown Specific Plan – Chapter 7
 Circulation and Transportation
 Page 33 of 39

Figure A-7: Livermore Downtown Specific Plan Bikeways and Trails

IRON HORSE TRAIL FEASIBILITY STUDY

The Iron Horse Trail is a regional Class I multi-use trail, spanning almost 32 miles in Alameda and Contra Costa counties. The Iron Horse Trail Feasibility Study explores four potential segments of the trail in Livermore, along and adjacent to railroad right-of-way, and evaluates trail overcrossings at major intersections. The Livermore Iron Horse Trail will provide a universally accessible recreational route for trail users, providing for bicycle and pedestrian travel separated from vehicle traffic. The trail will be designed as an all-weather, multi-use pathway, in accordance with ADA requirements.

The preferred alignment, as identified in the study, is segment 1 Isabel Avenue to Murrieta Boulevard, following the realigned Arroyo Mocho channel, east past Greenville Road. Trail design will be consistent with existing plans and design guidelines, implementing best practices in trail design.

The preferred alignment can be seen in Figure A-8, with detailed sheets available in the Iron Horse Trail Feasibility Study document.

The feasibility study also outlines design standards for the trail to maintain a high quality experience for bicycling and walking and adhere to all relevant requirements. The trail must provide for two-way travel by people walking and bicycling, in addition to occasional access by patrol, maintenance, and emergency vehicles. Additional design information in the study includes:

- The trail width should conform to constructed portions of the trail in Downtown areas, with a 10-12 foot cross section and a two-foot shoulder on each side

- The trail will fully comply with Americans with Disabilities Act (ADA) requirements
- The trail should be surfaced with a durable material that meets universal access needs, generally asphalt
- The trail should be elevated slightly above existing grade with a cross slope of two percent to provide drainage and trail compaction
- Where the trail is located near or over an existing road, the trail should be separated by a vegetated strip or shoulder at least five feet wide

As the Iron Horse Trail intersects with streets, the study recommends bridges in some locations, passing under overpasses where they already exist, and some at-grade crossings, as outlined below:

- Bridges are proposed at Murrieta Boulevard, P Street, and Livermore Avenue
- Passing under existing roadway overpasses at Isabel Avenue, First Street, Mines Road, and Vasco Road
- At-grade crossings are recommended at Junction Avenue, North L Street, Patterson Pass Road, and Vasco Road

The feasibility study recommends upgrades for at-grade crossings of the Iron Horse Trail, including Pedestrian Hybrid Beacons, high visibility marked crosswalks, and medians to shorten crossing distance.

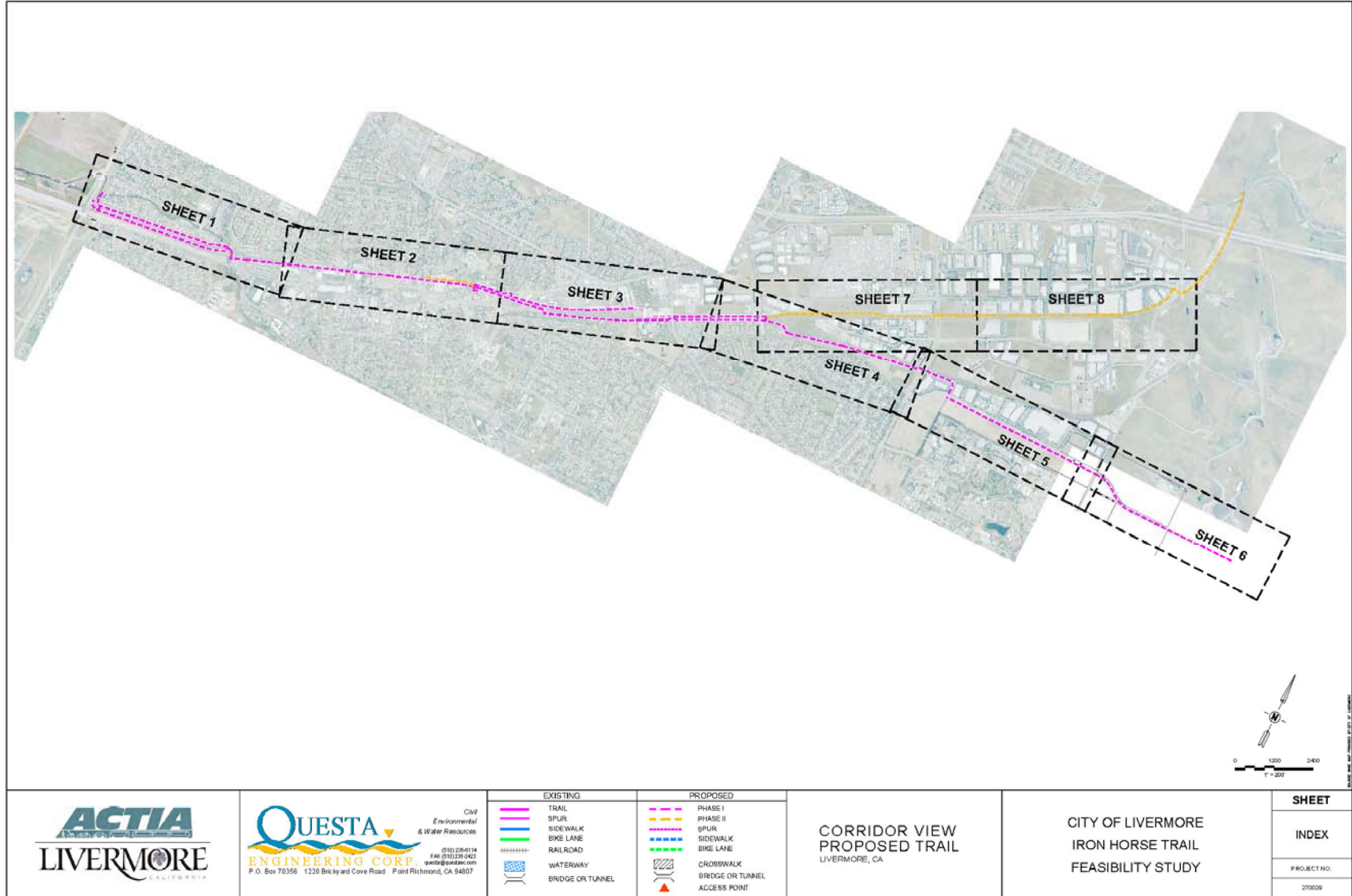


Figure A-8: Iron Horse Trail Preferred Alignment

LIVERMORE AREA RECREATION AND PARKS DISTRICT TRAILS MASTER PLAN

The Livermore Area Recreation and Parks District Trails Master Plan, last updated in 2016, recommends a trail system for the City and outlines a set of trail planning goals and policies. The goals and policies most relevant to this Plan are listed below.

Goal A.3: Plan and implement a comprehensive system of parks, trails, and open space areas in both the urban environment and rural open space areas within LARPD's jurisdiction.

Policy A.3.1 Periodically review the evaluation of location and distribution of existing LARPD facilities within this Master Plan to plan the District's efforts in meeting the needs of those areas identified as experiencing gaps, anticipating growth, or projecting changing needs

- Action 3.1.1: Identify undeveloped segments in the trail system and collaborate with the City of Livermore, EBRPD, TVC, and other agencies to plan, prioritize, and encourage completion of these segments to create major multi-use trail corridors and provide connectivity to important destinations, including schools, parks, open space areas, transportation centers, and major employment and commercial centers.
 - Encourage EBRPD and the City of Livermore to complete the Isabel Avenue Trail going under or over I-580 north toward Morgan Territory

- Encourage EBRPD and the City of Livermore to complete trail alignments and segments that will provide a safe, separated route from northeast Livermore south to the Downtown (Arroyo Las Positas Trail south over or under I-580 at Las Colinas Road to connect with the Arroyo Seco and Iron Horse Trails).
- Consider equestrian needs in the development of trails and the trail system and locations for potential staging areas in conjunction with EBRPD.

Goal A.5: Work cooperatively with local, state and federal agencies when planning trails that will connect with existing and future residential neighborhoods, major recreation areas, schools, and commercial, business, and employment centers.

Policy A.5.2 Coordinate mapping efforts and data sharing with other planning agencies for cost efficiency and to help maintain consistency and accuracy of information.

Goal B.2: Develop and periodically review facility design standards and guidelines that reflect existing conditions and updated practices, ADA accessibility requirements, evolving community needs, facility function, amenities, size, and location.

Policy B.2.1 Coordinate with the City of Livermore, EBRPD, Alameda County, and the California Department of

Transportation for consistency and adequacy in requirements for the various classifications of and standards for trail design.

Policy B.2.2 Periodically review park and trail facility development standards to ensure that they accurately reflect existing conditions, projected needs, and the most recent design and safety standards.

Goal B.3: Work with the City of Livermore and County of Alameda planning agencies to encourage new residential and commercial developments that include on-site, non-motorized circulation systems and connections to existing and planned trails with multi-use pathways and corridors.

Policy B.3.1 Through the development referral and review process for new development, encourage new urban development that addresses and provides convenient access to an existing or planned adjacent trail system.

REGIONAL PLANS, GUIDELINES, AND POLICIES

ALAMEDA COUNTY TRANSPORTATION COMMISSION (ACTC) BICYCLE MASTER PLAN GUIDELINES (2015)

In 2015, Alameda CTC approved guidelines for Bicycle Master Plans in the County in order to:

- Ensure plans throughout the county are comparable and facilitate countywide planning
- Ensure plans meet requirements for state grant funding (e.g. Active Transportation Program)
- Ensure plans incorporate best practices to the extent feasible

Bicycle Master Plans developed by Alameda County jurisdictions should include the following required core elements, or explain why the element is not applicable:

- Introduction
- Stakeholder engagement
- Policy Framework
- Existing Conditions
- Bikeway Network
- Programs
- Supportive Infrastructure and Intermodal Facilities
- Costs and funding
- Implementation

Alameda CTC has developed a detailed Bikeway Facility Classification System, which is used in the Livermore Active Transportation Plan. The classification system is as follows:

CALTRANS CLASS	DETAILED FACILITY CLASS
Class 1	1a. Paved Path
	1b. Unpaved Path
Class 2	2a. Standard bike lane
	2b. Upgraded bike lane (includes buffered bike lanes, green bike lanes, etc.)
	2c. Climbing bike lane (bike lane in uphill direction, route in downhill direction)
	2d. Contraflow bike lane
Class 3	3a. Signage-only route (e.g. bike route)
	3b. Wide curb lane or shoulder (may also include signage)
	3c. Route with standard sharrows or other pavement stenciling (may also include signage)
	3d. Route with green-backed sharrows or super sharrows
	3e. Bicycle Boulevard (routes that include signage and stenciling, traffic calming treatments, and intersection crossing treatments at major arterial streets).
Class 4	4a. One-way cycletrack/protected bikeway
	4b. Two-way cycletrack/protected bikeway

Livermore's Active Transportation Plan will be compliant with the Alameda CTC Bicycle Master Plan Guidelines.

TOOLKIT FOR IMPROVING WALKABILITY IN ALAMEDA COUNTY (2009)

The Toolkit for Improving Walkability in Alameda County includes information about planning and policies, pedestrian-oriented practices, design standards, education and encouragement programs, funding, and additional resources.

The Toolkit describes design standards for the following pedestrian elements:

- Sidewalks
- Street corners
- Street crossings
- Lighting
- Traffic calming
- Construction zones
- Disabled access
- Designing complete streets
- Crime reduction

The Toolkit also recommends Safe Routes to Schools (SR2S) programming as a means to improve walkability in the County. The City of Livermore actively participates in the growing countywide (SR2S) program. Livermore's Active Transportation Plan will be compliant with the Toolkit for Improving Walkability in Alameda County

ALAMEDA COUNTYWIDE BICYCLE PLAN (2012)

The Alameda County Transportation Commission's (Alameda CTC) Countywide Bicycle Plan was adopted in 2012. It summarizes existing bicycling conditions in the County, evaluates plans, policies, and practices, identifies goals for bicycling, and sets countywide priorities. The vision for 2040, set forth in the plan, is that:

Alameda County will be a community that inspires people of all ages and abilities to bicycle for everyday transportation, recreation and health, with an extensive network of safe, convenient and interconnected facilities linked to transit and other major destinations.

The vision network mileage for Livermore is 54 miles, with 34 miles built and 20 miles unbuilt at time of plan adoption. Several corridors through Livermore are identified as priorities in the plan, including:

- Bikeways and access to Central Business Districts, including Livermore
- Iron Horse Trail, from Dublin/Contra Costa County to Livermore's eastern city limit at Greenville Road
- Jack London/Arroyo Mocho Trail, connecting Livermore and Pleasanton

The 2012 plan is currently being updated, and Livermore will provide input into development of the plan by participating in a technical advisory committee.

ALAMEDA COUNTYWIDE PEDESTRIAN PLAN (2012)

The Alameda CTC's Pedestrian Plan aims to increase walking in the County through 2040 by identifying and prioritizing pedestrian projects, programs, and planning efforts. It organizes these goals into five thematic areas, with strategies and policies grouped under each:

- **Infrastructure and design:** Create and maintain a safe, convenient, well-designed and inter-connected pedestrian system, with an emphasis on routes that serve transit and other major activity centers and destinations.
- **Safety, education and enforcement:** Improve pedestrian safety and security through engineering, education and enforcement, with the aim of reducing the number of pedestrian injuries and fatalities, even as the number of people walking increases.
- **Encouragement and promotion:** Support programs that encourage people to walk for everyday transportation and health, including as a way to replace car trips, with the aim of raising the number and percentage of trips made by walking.
- **Planning:** Integrate pedestrian needs into transportation planning activities, and support local planning efforts to encourage and increase walking.
- **Funding and implementation:** Maximize the capacity for implementation of pedestrian projects, programs, and plans.

Several corridors through Livermore are identified as priorities in the plan, including:

- Pedestrian safety and access to Central Business Districts, including Livermore
- Iron Horse Trail, from Dublin/Contra Costa County to Livermore's eastern city limit at Greenville Road
- Jack London/Arroyo Mocho Trail, connecting Livermore and Pleasanton

The countywide pedestrian plan is currently in the process of being updated, and the City of Livermore has representation on the advisory committee.

ALAMEDA CTC'S COUNTYWIDE MULTIMODAL ARTERIAL PLAN (2016)

Alameda CTC developed this Countywide Multimodal Arterial Plan (MAP) to evaluate and address the needs of all modes of transportation on the county's arterial roadways. The MAP identified a typology and modal priority for each arterial in the county based on land use context; street type and access characteristics; and existing enhancements for transit, bicycling, walking, or freight. The resulting plan identifies a prioritized list of improvements and strategies for near-term and long-term implementation.

The MAP proposes the following general improvements:

- **Transit:** The BRT project currently under development is a good first step. This Plan proposes tripling the miles of dedicated transit ROW and knitting them together into a connected network serving major transit corridors and PDAs throughout Alameda County, in addition to proposing Rapid Bus improvements for nearly 100 miles of major arterials.

- **Pedestrian:** To maximize non-auto transit access and improved safety for pedestrians around activity centers, this Plan proposes focused pedestrian enhancements around BART stations and along major transit hubs and corridors.
- **Bicycle:** The MAP proposes nearly 150 miles of “high comfort” bikeways, which have the potential to dramatically expand bicycle usage.
- **Complementary strategies:** Other strategies proposed in the MAP include Transportation Demand Management (reducing auto travel by providing incentives for alternatives to single-occupant auto travel or disincentivizing driving alone) and on-street parking management.

The MAP also identifies macro-level improvements to be implemented on a broad scale. These include:

- Removing uncontrolled channelized right-turn lanes to require 90-degree turning angles at intersections to reduce automobile turning speed and improve pedestrian crossing safety
- Pedestrian-actuated signals with countdown timers
- Creating a dedicated pedestrian phase to protect people crossing the street from left-turning traffic

EAST BAY REGIONAL PARK DISTRICT MASTER PLAN (2013)

The East Bay Regional Park District Master Plan, adopted in 2013, sets the vision for parks and trails throughout the East Bay region. Several Livermore corridors are in the Park District Plan, including the Iron Horse Trail. The goals most relevant to this Plan are listed below.

- *RFA2:* The District will provide a diverse system of non-motorized trails to accommodate a variety of recreational users including hikers, joggers, people with dogs, bicyclists and equestrians. Both wide and narrow trails will be designed and designated to accommodate either single or multiple users based on location, recreational intensity, environmental and safety considerations. The District will focus on appropriate trail planning and design, signage and trail user education to promote safety and minimize conflicts between users.
- *PRPT17:* Where trail alignment is not predetermined by a relationship to established corridors such as roads, railroad rights-of-way, canals, utility corridors, or similar facilities, the District will prepare a study or a plan for the trail, taking into account any factors it deems relevant to alignment and feasibility. After determining a feasible trail alignment, the District will seek to acquire the necessary land tenure and develop the trail for public use. The District may acquire a wider corridor for a proposed trail to provide an enhanced environment for the trail before determining the final alignment for the trail.
- *PRPT18:* The District will coordinate with other agencies and organizations involved in planning for jointly managed

regional trails or trails that extend beyond the District's jurisdiction. When applicable, the District will use planning and environmental studies done by or in cooperation with other agencies for trail planning and development.

ALAMEDA COUNTY BICYCLE AND PEDESTRIAN MASTER PLAN FOR UNINCORPORATED AREAS

Alameda County is currently updating its Bicycle and Pedestrian Master Plan for Unincorporated Areas to improve bicycle and pedestrian safety, improve access to important destinations, and promote walking and bicycling in the unincorporated areas of the County.

The plan is expected to be completed in Summer of 2018.

CALTRANS DISTRICT 4 BICYCLE PLAN

Caltrans recently completed a bicycle plan for District 4, which includes Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, and Sonoma Counties. The plan focuses on opportunities and constraints for bicycling on and across the state highways, and identifies priority segments for improvement based on extensive community outreach.

The District 4 Plan, which was developed on a similar timeline and completed after the administrative draft of this Livermore Bicycle, Pedestrian, & Trails Active Transportation Plan was released, identifies the following improvements in Livermore.

I-580 IMPROVEMENTS

- New grade-separated crossing at Heritage Drive
- Interchange improvements at Airway Blvd: provide Class II bicycle lanes, conflict striping, and signage

- Interchange improvements at Livermore Ave: provide Class II bicycle lanes, conflict striping, and signage
- Interchange reconstruction at Vasco Road: reconstruct and square up ramps
- Interchange improvements at First Street: provide Class IIB buffered bicycle lanes

STATE ROUTE 84 IMPROVEMENTS

- Class I path adjacent to SR 84 between Airway Blvd and W Jack London Blvd
- Class I path from Arroyo Valle (existing path) to Vineyard Ave
- Class I path parallel to Airway Blvd from SR 84 to I-580

STATEWIDE PLANS AND POLICIES

CALTRANS COMPLETE STREETS POLICY AND DEPUTY DIRECTIVE 64 (2001)

In 2001, the California Department of Transportation (Caltrans) adopted Deputy Directive 64, Accommodating Non-motorized Travel, which established a routine accommodation policy for the department. A revised directive adopted in 2008, entitled Complete Streets—Integrating the Transportation System, significantly strengthened the policy beyond just “considering” the needs of pedestrians and bicyclists.

After adoption of this policy, it was noted that more guidance was needed on which roadway projects to review for impacts on bicyclists and pedestrians, how to review them, at what stage of project development and, most importantly, how to provide for bicyclists and pedestrians, especially if local or countywide plans do not identify non-motorized transportation priorities in the area.

In part to address these issues, Caltrans adopted the Complete Streets Implementation Action Plan in 2010. The plan sets forth actions under seven categories to be completed by various Caltrans districts and divisions within certain timelines to institutionalize complete streets concepts and considerations within the department. The action categories include updating departmental plans, policies, and manuals; raising awareness; increasing opportunities for training; conducting research projects; and actions related to funding and project selection. As one of its implementation activities, Caltrans updated the Highway Design Manual in large part to incorporate multi-modal design standards.

CALIFORNIA TRANSPORTATION PLAN 2025 (2006)

The California Transportation Plan 2025 seeks to provide for mobility and accessibility of people, goods, services, and information throughout California. It encourages consideration of bicycle and pedestrian facilities in capacity improvement projects, and promotes integration of active transportation into modeling and projection efforts.

The Plan also speaks to the public health benefits of active transportation, urging better education of youth on personal health and air quality impacts of making trips by bicycle or on foot.

TOWARD AN ACTIVE CALIFORNIA STATE BICYCLE AND PEDESTRIAN PLAN (2017)

California’s first statewide bicycle and pedestrian plan focuses on policy and program recommendations to support Caltrans’ goal of doubling bicycling trips and tripling walking trips in the state by 2020. Toward an Active California is intended to guide local and regional agencies as they prepare their own plans, offering guidance around four core areas: mobility, safety, preservation, and social equity. The objectives and strategies are listed below.

SAFETY

Reduce the number, rate, and severity of bicycle and pedestrian involved collisions

- S1: Safer Streets & Crossings. Address safety of vulnerable users in roadway design and operations.

- S2: Education. Provide consistent, accessible, and universal education about the rights and responsibilities of all roadway users.
- S3: Safety Data. Invest in the quality, completeness, timeliness, and availability of data on bicycle and pedestrian collisions.
- S4: Enforcement. Focus state and local enforcement of safety laws on highest risk behaviors by all road users.

MOBILITY

Increase walking and bicycling in California

- M1: Connected & Comfortable Networks. Develop local and regional networks of high-quality bicycle and pedestrian facilities for all ages and abilities.
- M2: Multimodal Access. Integrate bicycle and pedestrian needs in planning and design of multimodal transportation systems and services.
- M3: Efficient Land Use & Development. Support regional and state efforts to integrate land use and transportation planning to maximize the effectiveness of active transportation investments.
- M4: Network & Travel Data. Develop consistent, high-quality data on bicycle and pedestrian travel and facilities.
- M5: Statewide & Regional Trails. Support low-stress or physically separated pedestrian and bicycle trail routes of statewide or regional significance for tourism, recreation, and utilitarian transportation.

- M6: Encouragement. Promote bicycling and walking for everyday transportation, recreation, improved health, and active living.

PRESERVATION

Maintain a high quality active transportation system

- P1: Quality of Condition. Establish and meet an expected quality of condition for bicycle and pedestrian infrastructure.
- P2: Program Integration. Pursue internal and external partnerships to address bicycle and pedestrian needs in maintenance and preservation activities.

SOCIAL EQUITY

Invest resources in communities that are most dependent on active transportation and transit

- E1: Community Support. Strengthen engagement with disadvantaged communities by proactively seeking input on needs and providing technical guidance.
- E2: Equity Lens. Address social equity when implementing all strategies from this Plan.
- E3: Access to Funding. Provide disadvantaged communities with the opportunity to participate in active transportation funding programs.

AB 32 – GLOBAL WARMING SOLUTIONS ACT (2006) & SB 375 – SUSTAINABLE COMMUNITIES AND CLIMATE PROTECTION ACT (2009)

The past five years have seen an expansion of legislative and planning efforts in California to reduce emissions of greenhouse gases (GHGs) in order to mitigate climate change. Assembly Bill 32, the California Global Warming Solutions Act of 2006, aims to reduce the state’s GHG emissions to 1990 levels by 2020 and to 80 percent below 1990 levels by 2050. Meanwhile, Senate Bill 375, passed into law in 2008, is the first in the nation that will attempt to control GHG emissions by directly linking land use to transportation. The law required the state’s Air Resources Board to develop regional targets for reductions in GHG emissions from passenger vehicles for 2020 and 2035 as a way of supporting the targets in AB32.

AB 1358 – COMPLETE STREETS ACT (2008)

In future years, all jurisdictions will have to incorporate complete streets into their planning. Assembly Bill 1358 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, and can be expected to result in a new generation of circulation elements and a surge in complete streets policies around the state as general plans are updated over time.

SB 99 – ACTIVE TRANSPORTATION PROGRAM ACT (2013)

The Active Transportation Program was established by this legislation in 2013, and serves as the mechanism for distributing federal funds for local and regional efforts to promote walking and bicycling. It specifies goals that the funding will be disbursed to help meet, including increasing the mode shares of biking and walking trips, increasing safety for non-motorized users, and providing support to disadvantaged communities to promote transportation equity.

APPENDIX B PROGRAMS

This appendix provides additional detail on the new and existing programs identified in Chapter 3 and Chapter 5.

Program recommendations are organized into four E's: education, encouragement, enforcement, and evaluation.

Education programs are designed to increase safety by raising awareness and teaching pedestrian and bicycle skills to youth and adults.

Encouragement programs promote walking and bicycling through a variety of mechanisms, such as user friendly maps, incentives for walking or bicycling, and social gatherings.

Enforcement programs are designed to increase safety by increasing compliance with traffic laws by pedestrians, bicyclists, and motorists.

Evaluation programs help the City track progress toward achieving the goals outlined in this Plan and inform any necessary adjustments.

EDUCATION

YOUTH BICYCLE SAFETY

Existing Program

Livermore Police Officers provide bike safety presentations and bike rodeos to teach rules of the road to students ranging from Kindergarten to 8th grade. Bike safety presentations are typically assembly-style with several classes attending the presentation together during the school day. Presentations focus on how to fit a helmet, rules of the road, and interactive bike safety quizzes. Bike rodeos are held either during or after school, with a bike drills course set up on the blacktop. During a bike rodeo, students learn bike skills and have the opportunity to practice them in a safe setting away from vehicle traffic. The Livermore Police Department provides bike safety presentations and bike rodeos upon request, but typically only have capacity for few schools each year.

To supplement this local effort, the Alameda County Safe Routes to Schools (SR2S) program provides bike safety education for elementary school students through bike rodeos, and middle and high school students through the “Drive Your Bike” program. “Drive Your Bike” is a two-week class conducted during PE class for one to two grade levels, culminating in an on-street ride. These programs are available to schools enrolled in the countywide program, but are dependent on available resources. Each Alameda County planning area receives an allotment of bike rodeos and “Drive Your Bike” programs each school year, on a rotating basis.



RECOMMENDATION

This Plan recommends the police department continuing to provide bike rodeos to elementary school students, supplemented by bike safety education for elementary, middle and high school students provided by local partners. Elementary schools should receive bike rodeos for 3rd and 4th grade students every other year, on a rotating basis, so that every student participates by 4th grade. Middle and high schools should receive “Drive Your Bike” classes every three years, on a rotating basis, focusing on 9th and 10th grade students, so that every high school student receives this on-bike education. Implementation at this level would require partnerships between the city, countywide SR2S program, and other agencies, as existing resources are lacking.

Lead: City and Non-City – SR2S program and School District

BICYCLE SAFETY EDUCATION FOR ADULTS

Existing Program

Bike East Bay provides a series of instructional courses that teach adults rules of the road and how to safely ride a bicycle in a variety of scenarios.

RECOMMENDATION

This Plan recommends continuing to partner with the Alameda County Bicycle Safety Education program, administered by Alameda CTC through bicycle safety vendors. The countywide Bicycle Safety Education program provides education to adults through a variety of classes. Classes include 1-hour commuter workshops, Urban Cycling 101, and On-the-Road classes.

Lead: Non-City – Bike East Bay

PEDESTRIAN SAFETY EDUCATION

Existing Program

Alameda County SR2S offers educational courses for elementary students, including pedestrian safety rodeos, and other information for safely travelling as a pedestrian. Similar to bike rodeos, pedestrian rodeos teach students, during or after school, how to be a safe pedestrian and then provide them with the opportunity to practice what they learned in a safe environment away from vehicle traffic. Pedestrian rodeos are targeted toward Kindergarten through 2nd grade students, providing a foundation for safe and active travel.



RECOMMENDATION

This Plan recommends continuing to partner with the Alameda County Safe Routes to Schools program to provide pedestrian safety education to elementary school students.

Lead: Non-City – SR2S program and School District

WEBSITE

The current City website focused on active transportation was established for the development of this Plan, WalkBikeLivermore.net, and provides information about Livermore's Active Transportation Plan and ways to get involved in the planning process.

RECOMMENDATION

This Plan recommends transitioning the WalkBikeLivermore website onto the City's website and expand the content to include safety education, encouragement strategies, and progress reports focused on pedestrian, bicycle, and trail facilities, programs, policies, and events.

Lead: City

Example: City of Pleasanton

SHARE-THE-PATH/TRAIL CAMPAIGN

Share-the-Path campaigns educate the public on rules related to trails, also known as paths, to improve safety and access for all users.

RECOMMENDATION

This Plan recommends developing a Share-the-Path Campaign focused on educating users about trail safety.

Lead: City and Non-City – LARPD, Bike East Bay, other local partners

Example: Share-the-Path Marin, a partnership between Marin County, the Marin County Bicycle Coalition, and local law enforcement agencies, seeks to improve awareness, safety, access, and enjoyment for users on multiuse pathways. The campaign includes signage on paths, print materials, and a website that provides information about the rules of the path and how to stay safe.

NEW FACILITIES AND LOW STRESS ROUTE BIKE RIDES

New facilities are continuously being developed to improve bicyclist and pedestrian safety, ideally resulting in low-stress routes. If the public does not know new facilities are being built, or has no experience using them, increasing ridership can be difficult. Organizing rides to celebrate new facilities and provide tours of low-stress routes helps new users to feel more comfortable, therefore increasing ridership.

RECOMMENDATION

This Plan recommends the City work with local groups to organize rides when new facilities are installed.

Lead: City and Non-City – Bike East Bay and local bike shops within Livermore

Example: Southern California Association of Governments/Go Human SoCal

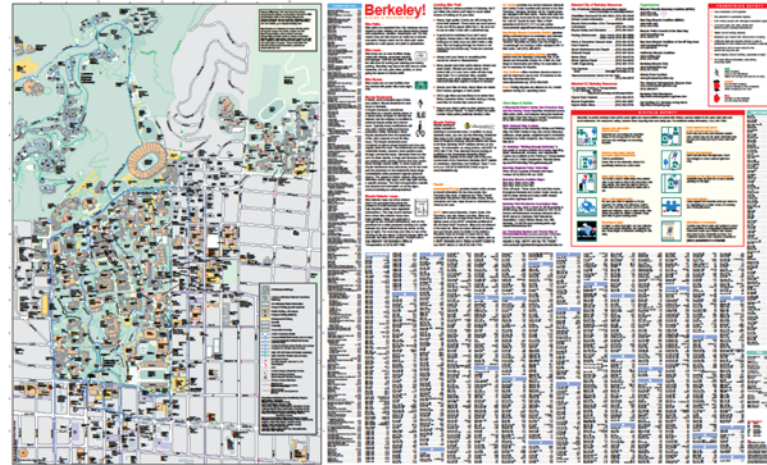
BICYCLING AND WALKING MAPS AND GUIDES

Maps and guides provide educational information to users about facilities for bicycling and walking, including routes through the City, trails, and key trail connections. Maps and guides provide users with information that they may not find elsewhere and help to plan walking trips. They can be used for recreational or utilitarian trips.

The City currently has a Bikeway and Trails map which provides information about the City’s existing bikeways and trails, so users can determine where there are comfortable facilities for biking. This map could be updated with information on walking to provide navigation guidance to more users.

RECOMMENDATION

This Plan recommends updating the Bikeway and Trails Map to include walking information for each quadrant of the City. The map should be updated annually as new facilities are constructed.



Lead: City and Non-City – Bike East Bay and local bike shops within Livermore

Example: City of Berkeley’s “Berkeley! Biking and Walking Map” provides information about facilities types, safety tips, and shows routes to key community destinations, as shown below.

ENCOURAGEMENT

SAFE ROUTES TO SCHOOL

Existing Program

Alameda County Safe Routes to School (SR2S) is a program of the County Transportation Commission that encourages students to walk or bicycle to school. The program funds and supports a variety of bicycle and pedestrian safety education activities, encouragement events, evaluation efforts, and school outreach and coordination.

Four schools have also received a school site assessment to identify necessary improvements. These include East Avenue Middle School, Granada High School, Jackson Avenue Elementary, and Marilyn Avenue Elementary.

Services are free for enrolled schools, and the program currently serves approximately 170 schools across Alameda County. In Livermore, 10 schools have participated in the program over the years, with participation varying each year.

Educational programs offered under the SR2S program are described in the previous section. Encouragement events include Walk & Roll to School Days, Bike to School Days, and contests that reward students for walking or bicycling to school. The County SR2S program also conducts parent surveys and student tallies at participating schools to evaluate success.

RECOMMENDATION

This Plan recommends continuing partnerships with the Alameda County SR2S program.

Lead: Non-City – SR2S program

BIKE TO WORK DAY

Existing Program

Livermore celebrates Bike to Work Day in conjunction with the Bay Area Bike to Work Day event, held each May for the past 22 years. This event encourages commuters to try bicycling to work by providing Energizer Stations along commute routes. Energizer stations, staffed by volunteers, provide free canvas bags stocked with giveaways that include educational information to those commuting by bike. These stations are typically located along popular bike routes and hosted by employers, local jurisdictions, or others and serve as an incentive for those commuting by bike. Bike East Bay, the local bicycle advocacy organization in Alameda County, works with the Metropolitan Transportation Commission (MTC) each year to organize Bike to Work Day events throughout the County.

RECOMMENDATION

This Plan recommends continuing to expand local involvement in annual Bike to Work Day activities. Expanded involvement may include providing financial support, hosting Energizer Stations, providing incentives to City employees who participate, and promoting the event through social media and the City's website.

Lead: City and Non-City – Metropolitan Transportation Commission/Bike East Bay, Local Bike Shops, Local Businesses

CITY BICYCLE AND PEDESTRIAN COORDINATOR

Bicycle and Pedestrian Coordinators at the city level play a vital role in representing walking and biking in all transportation projects and moving cities forward in the implementation of their pedestrian and bicycle-related planning efforts. A citywide coordinator may act as a technical expert and resource for other city staff when implementing projects and programs. The coordinator can also provide staff support for programs recommended within this plan.

RECOMMENDATION

Carried forward from the 2001 Bikeways and Trails Master Plan, this plan recommends the City of Livermore hire a Bicycle and Pedestrian Coordinator as a full-time position focusing on active transportation projects and programs within Livermore, and coordinating with other countywide and regional active transportation efforts.

Lead: City

Example: In the City of Pleasanton, the Economic Development Specialist position, within the Economic Development Department, is responsible for coordinating pedestrian and bicycle-related activities, including SR2S efforts. While this is not a dedicated Bicycle and Pedestrian Coordinator position, it is a flexible option to provide staffing for active transportation efforts.

The City of Berkeley has a full-time Pedestrian and Bicycle Programs Coordinator, housed in the City's Department of Public Works. Having a dedicated position focused on active transportation keeps it at the forefront of planning efforts.

EMPLOYER-BASED ENCOURAGEMENT CAMPAIGN

Employer-based campaigns focus on working with large, local employers to incentivize employees to walk, bike, ride transit, or carpool to work. Typically these programs involve a financial incentive for employees, but could also offer other rewards.

RECOMMENDATION

This Plan recommends working with the large employers in Livermore, such as the Lawrence Livermore National Laboratory, Sandia Laboratory, and Las Positas College, to encourage employees at these companies to try an alternative commute.

Lead: City and Non-City – Chamber of Commerce, Livermore Downtown Inc.

Example: San Jose State University allows employees to use pre-tax dollars from their wages for alternative commute costs, will email transit routes to students based on their addresses, and participates in the customized 511 RideMatch Service which helps users find carpool and bicycle riding partners.

BICYCLE-FRIENDLY BUSINESS PROGRAM

Bike-friendly Business Programs work with local retailers to provide incentives to customers to walk, bike, or take transit to their shops. This can include coupons for arriving by bicycle and other forms of encouragement.

RECOMMENDATION

This Plan recommends working with Livermore Downtown Inc. and Chamber of Commerce to establish a Bike-Friendly Business Program to incentivize those that live, work, and play in Livermore to arrive at local businesses by biking, walking, or using transit.

Lead: City and Non-City – Livermore Downtown Inc., Chamber of Commerce

Example: The Yerba Buena District in San Francisco has established a Bike-friendly Business District in the commercial district where merchants encourage people to bike to their businesses by providing coupons, such as 10% off purchases, bike parking in front of their business, or hosting bike events.

BICYCLE-FRIENDLY COMMUNITY DESIGNATION

A Bike-Friendly Community Designation is a League of American Bicyclists' designation for communities that encourage use of bicycles for recreation and transportation. Designations range from Bronze to Platinum, depending on the level of bike-friendly facilities and policies within the City.

RECOMMENDATION

This Plan recommends the City work toward a Bike-friendly Community Designation by implementing key components of this Plan and applying for designation in the next few years.

Lead: City

Example: The City of Pleasanton was recognized as a Bronze-level Bike-friendly Community in 2014, after City efforts to provide bicycle detection systems in traffic signals, expand new miles of bike lanes, and promote bicycle ridership throughout the City.

WALKING AND BIKING AMBASSADORS

Volunteers act as ambassadors of walking and biking, providing educational information and leading group walks or bike rides on local facilities and trails. Middle and high school ambassadors may also participate, encouraging fellow students to walk or bike to school.

Ambassadors can also act as an extra set of eyes on trails in Livermore to report maintenance needs, distribute educational materials, and provide a friendly presence on the network.

RECOMMENDATION

This Plan recommends the City work with local organizations to establish a Walking and Biking Ambassador Program utilizing local volunteers, including youth.

Lead: City and non-City – local organization

Example: The City of Roseville, outside of Sacramento, has volunteer Bike/Walk Ambassadors that teach students and parents about safety biking to school, educate trail users about safely using the trail system, and engage with the community at local events to promote biking and walking in the City of Roseville.

The Guadalupe River Park Conservancy in San Jose also operates a volunteer trail ambassador program. Ambassadors are asked to spend at least 45 minutes per week bicycling or walking along the trail. They wear green vests to identify them as volunteers, and in addition to reporting any maintenance or repair needs, ambassadors carry small kits with supplies for first aid, basic bicycle repairs, graffiti removal, and other tasks.

OPEN STREETS EVENTS

Open Streets events provide an opportunity to temporarily close a street to vehicle traffic and open it up to pedestrians, bicyclists, and other active forms of transportation, allowing people to safely enjoy a local street.

RECOMMENDATION

This Plan recommends partnering with organizations in the Tri-Valley to host an Open Streets event in Livermore.

Lead: City and Non-City – local organization

Example: Sunday Streets in San Francisco, Oaklavia in Oakland

BICYCLE TOURISM

Promoting bicycle tourism can include self-supported touring, organized rides, destination biking, and local events that draw visitors. There are many opportunities to promote bicycle tourism in Livermore, include partnerships with local wineries and downtown businesses.



RECOMMENDATION

This Plan recommends partnering with local businesses, such as wineries, to promote bicycle tourism in Livermore. This should include establishing a working group to plan local events and developing a map focused on biking to tourist destinations.

Lead: City and Non-City – Livermore Downtown Inc./Chamber of Commerce

Example: Napa Valley Bike Map – visitnapavalley.com

GROUP SOCIAL RIDES

Riding together socially in groups encourages cyclists to become comfortable riding in urban conditions and promotes a culture of bicycling within the city.

RECOMMENDATION

This Plan recommends local organizations, such as local bicycle shops, organize group social rides to promote bicycling in Livermore.

Lead: Non-City – local organization

Example: Alameda Bicycle, a local bike shop in the City of Alameda, hosts group social rides for varying skill levels. Events include Sunday morning rides, family rides, and other road rides.

ENFORCEMENT

TRAFFIC CITATION DIVERSION PROGRAMS

Existing Program

The Livermore Police Department provides diversion programs for youth under 18 who have been cited for a violation on a bicycle, such as running a stop sign. Youth and their parents attend a bike safety class in order to clear the citation.

RECOMMENDATION

This Plan recommends continuing and expanding the current traffic citation diversion program in Livermore.

Lead: City and Non-City – Bike East Bay

BICYCLE PATROL

Existing Program

The Livermore Police Department has officers trained to patrol the community on bicycles and volunteers that are trained to ride the trail system as an extra set of eyes.

RECOMMENDATION

This Plan recommends the City continue bicycle patrols of the city and trails, using both police officers and volunteers.

Lead: City

TARGETED ENFORCEMENT AND SPEED TRAILERS

Existing Program

The Police Department has a speed trailer that can be deployed to neighborhoods in Livermore that are experiencing issues with speeding. The Livermore Police Department can also do targeted enforcement at locations with reported speeding or compliance issues. Targeted enforcement is beneficial to bicyclists and pedestrians as it improves driver behavior, by citing driver who are speeding or do not yield to pedestrians in crosswalks. Reducing speeds and providing safe crossings are essential to encouraging more walking and biking.

RECOMMENDATION

This Plan recommends the City continue deploying speed trailers as needed and conduct targeted enforcement in an equitable manner.

Lead: City

CROSSING GUARD PROGRAM

Existing Program

The Livermore Police Department manages the City's Crossing Guard program, which provides trained, paid crossing guards at 12-14 locations near schools throughout the City. Crossing guards assist in stopping vehicle traffic to allow students to safely cross the street. Crossing guards are provided near schools based on the City of Livermore's Crossing Guard Policy. The policy outlines thresholds for providing an adult crossing guard at uncontrolled crossings, stop controlled crossings, and signalized crossings. Thresholds consider roadway speed limit, age of students crossing to get to school, vehicle volumes and pedestrian crossing volumes.

In 2015, crossing guards were provided at 14 locations in the City:

- East Avenue at Estates Street
- Livermore Avenue at Junction Avenue/Elm Street
- L Street at Pine Street
- El Caminita at Wagoner Drive
- Garaventa Ranch Road at Hawk Street
- Olivina Avenue at Albatross Avenue
- Jack London Boulevard at Arlington Road
- Concannon Boulevard at El Padro Drive
- Frankfurt Way at Warsaw Avenue
- Murdell Lane at mid-block crosswalk
- El Caminita at El Padro Drive
- Irene Way at Diane Lane
- Junction Avenue at North I Street/Linden Street
- Scenic Avenue at Mount Diablo Way
- Constitution Drive at North Canyons Road

RECOMMENDATION

This Plan recommends continuing the crossing guard program and expanding it as necessary to provide crossing guards at major intersections near elementary and middle schools in the City.

Lead: City

EVALUATION

COMMUNITY SURVEY

Community surveys are a good way to gather input about walking and biking in the city, including information about challenges and opportunities throughout the community. The survey used in developing this Plan provides a basis for future community surveys.

RECOMMENDATION

Building off of the survey developed for the ATP, this Plan recommends the City conduct a community survey about walking and biking in Livermore at least every other year to track attitudinal and behavior change as projects and programs are implemented. Alternatively, the City should consider adding an active transportation question to the Annual National Citizen's Survey.

Lead: City

EXPANDED BICYCLE AND PEDESTRIAN COUNT PROGRAM

Bicycle and pedestrian count programs document the number of bikes and pedestrians travelling along routes and key intersections to assess the existing demand and future opportunities to increase biking and walking.

RECOMMENDATION

This Plan recommends the City establish a regular and standardize bicycle and pedestrian data collection program. This program should include consideration of new automated counters in addition to manual counts. Year-to-year changes in counts can help the City evaluate ridership and safety impacts at specific locations where new infrastructure has been built.

Manual counts can track gender and helmet usage, metrics which can help gauge the impact of outreach activities and infrastructure improvements.

Lead: City

Example: The Alameda County Transportation Commission conducts manual counts at 63 locations throughout the county each September and October, using the National Bicycle and Pedestrian Documentation Project methodology. The agency also collects 24-hour county data using automated counters at select locations, primarily at trails. This provides valuable data about walking and bicycling levels and how they vary by time of day, day of the week, season, and over time.

EXPANDED COLLISION DATA REVIEW

Conducting an annual analysis of reported bicycle and pedestrian collisions can reveal potential sources of safety issues that can be addressed through education or infrastructure efforts, thereby improving safety in the city.

RECOMMENDATION

This Plan recommends city planners, engineers, and police officers conduct an annual review of reported bicycle and pedestrian collisions to determine if patterns exist and address local hot spots.

Lead: City

Example: The City of Concord is conducting an annual collision review as part of its recently adopted Bicycle, Pedestrian and Safe Routes to Transit Plan.

PRE/POST STUDIES OF NEW INFRASTRUCTURE

As new infrastructure is planned for Livermore, collecting data at key locations prior to installing new pedestrian or bicycle infrastructure, and again after installation, helps to determine its impact on users.

RECOMMENDATION

This Plan recommends the City conduct pre/post studies of new infrastructure in the City, along with more typical pre/post counts.

Lead: City

Example: The City of Fort Collins, Colorado conducts pre- and post-implementation studies for new bicycle infrastructure to determine the effectiveness of the facility.

ANNUAL REPORT CARD

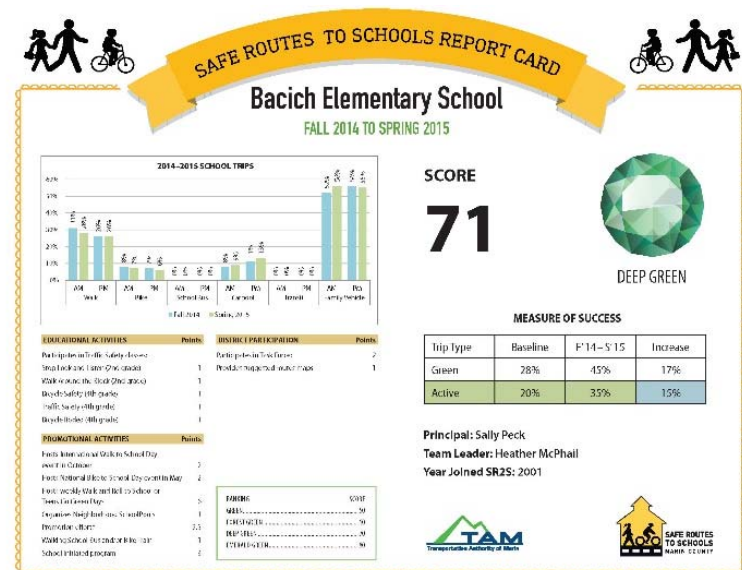
An Annual Report Card serves as an evaluation assessing the City’s progress toward goals outlined in this Plan and implementation of the recommended projects and programs. In addition to tracking progress and implementation, annual report cards can incorporate mode shift data and cost of programs to serve as an ongoing evaluation tool that determines overall effectiveness and benefits in relation to the cost.

RECOMMENDATION

This Plan recommends the City develop an Annual Report Card that tracks progress toward implementing the bicycle, pedestrian, and trail recommendations set forth in this Plan.

Lead: City

Example: Marin County SRTS Program



APPENDIX C PUBLIC INPUT

Community engagement has been a priority through the development of this Bicycle, Pedestrian, and Trails Active Transportation Plan (ATP). A variety of community engagement techniques were used to seek input from diverse audiences and to reach people in the community at existing events and by leveraging relationships with existing community groups and agencies. The outreach process also included extensive coordination with partner agencies and other City departments to ensure this Plan meets community needs, advances initiatives of local and regional agency partners, and includes projects and programs that can feasibly be implemented.

At each milestone during the planning process, additional outreach activities ensured a continuous feedback loop informed the final project list and Plan. Specific events included:

- Community workshops
- Online user survey and interactive map
- Pop-up events
- Walking and biking tours
- Citizens Advisory Committee
- Technical Advisory Committee
- Planning Commission and City Council Meetings

This appendix presents an overview of the format and objectives for these outreach events, along with broad themes of feedback received.

All comments, meeting minutes, sign in sheets, and surveys are included as an attachment to this Plan. Personal identifying information of attendees and participants has been redacted.

COMMUNITY WORKSHOPS

COMMUNITY WORKSHOP #1

The first public workshop was held on Monday, April 18, 2016 and had 76 participants. The workshop was open house style to encourage residents to attend at their convenience. Interpreters were available for Spanish translation at the workshop. Boards were set up around the room at the Robert Livermore Community Center and ranged from information about current demographics, mode share, and programs, to seeking input on goals and the existing pedestrian, bicycle, and trail networks. Large printed maps on tables allowed attendees to draw ideas and concerns about specific locations. City staff, along with the consultant team, spoke with participants at each board to gather input. User surveys were collected from attendees. This first workshop resulted in valuable input on the current barriers to walking and biking in Livermore and ideas for improving active transportation networks and education and encouragement programs in the City.

WHAT WE HEARD: IDEAS

Workshop participants shared their ideas about goals for the plan and potential programs. Ideas for goals included providing amenities like bike parking and water fountains, more support for maintenance, closing the network gaps, intersection safety, and providing facilities for active transportation to all neighborhoods. Suggestions for programs included bike share, an app for reporting maintenance concerns, bike safety messaging, and count programs.



COMMUNITY WORKSHOP #2

The second workshop was held on Thursday, January 26, 2017 from 4:00-7:00pm in the Robert E. Livermore Community Center. The workshop was open house style, with the public welcome to come at any time. The workshop was organized around ten stations:

- Welcome
- Existing Conditions and Feedback
- Facility Types
- Recommended Network
- Project Types: School Access, Downtown Access, Crosstown Routes, Trail Connections, I-580
- Crossings

- Recommended Programs
- Setting Priorities
- Next Steps
- Additional Comments
- Kids Activity Table

There were 110 people in attendance, with Spanish and Vietnamese translation available. Participants were invited to learn about the recommended network, spot and citywide improvements, and recommended programs. Once participants reviewed the information, they were asked to provide their input through comments on maps and votes for programs. Participants were also asked to provide their input on how the City will prioritize projects by ranking a set of seven criteria. Comment cards were available for any additional input participants would like to give.

WHAT WE HEARD: PROJECT RECOMMENDATIONS

Project recommendations for the Active Transportation Plan are organized around five themes that were echoed throughout the development of the Plan: school access, downtown access, crosstown routes, trail connections, and I-580 crossings. Participants at the open house provided input on the proposed network as well as some potential concepts for streets such as North P Street, Murrieta Boulevard, East Avenue, and Holmes Street.

Feedback received during the open house was similar to other comments received throughout the Plan outreach process, with a few additions. Public comments were sorted into categories in order to assess feedback heard during the open house. These

categories include: access, bicycle facility improvement, crossing I-580, crossing improvement, maintenance, parking, pedestrian facility improvement, programs, safety, streetscape, trails, and traffic calming.

WHAT WE HEARD: PROGRAM RECOMMENDATIONS

Workshop participants learned about existing programs in Livermore and potential recommendations for new programs. Participants were asked to vote for three proposed programs, acting as an indicator of community support for new programs, many of which will require volunteers and involvement from local organizations. Comments were also taken for additional programs that participants would like to see in Livermore. Much of the discussion during the workshop was focused on education and enforcement efforts, not only geared toward bicyclists and pedestrians, but drivers as well.

Of the proposed programs, Open Streets Events received the most votes (27), followed by walking maps and guides (23) and bicycle tourism efforts (21).

New programs recommended by participants during the open house include:

- Campaigns focused on driver education regarding bicyclists and pedestrians
- Suggested walking and biking Routes to school maps
- Enforcement specifically at undercrossings
- Bicycle education expanded to community events
- Local bike share

USER SURVEY AND ONLINE INTERACTIVE MAP

A community survey was developed to gather input on walking and bicycling challenges and opportunities throughout Livermore. The survey was made available online from March 28, 2016 through May 30, 2016, and was also available in hardcopy at workshops and community events. The survey was advertised online through the project website and online bulletins, in local newspapers, and on informational flyers. The survey was available in English and Spanish on both online and paper versions. Five hundred responses to the survey were received. In addition, community members identified walking and bicycling routes that they currently use, routes that could be improved, and shared other feedback through an online interactive map. Figure C-1 shows the 226 lines, points, or comments that were collected through the online interactive map.

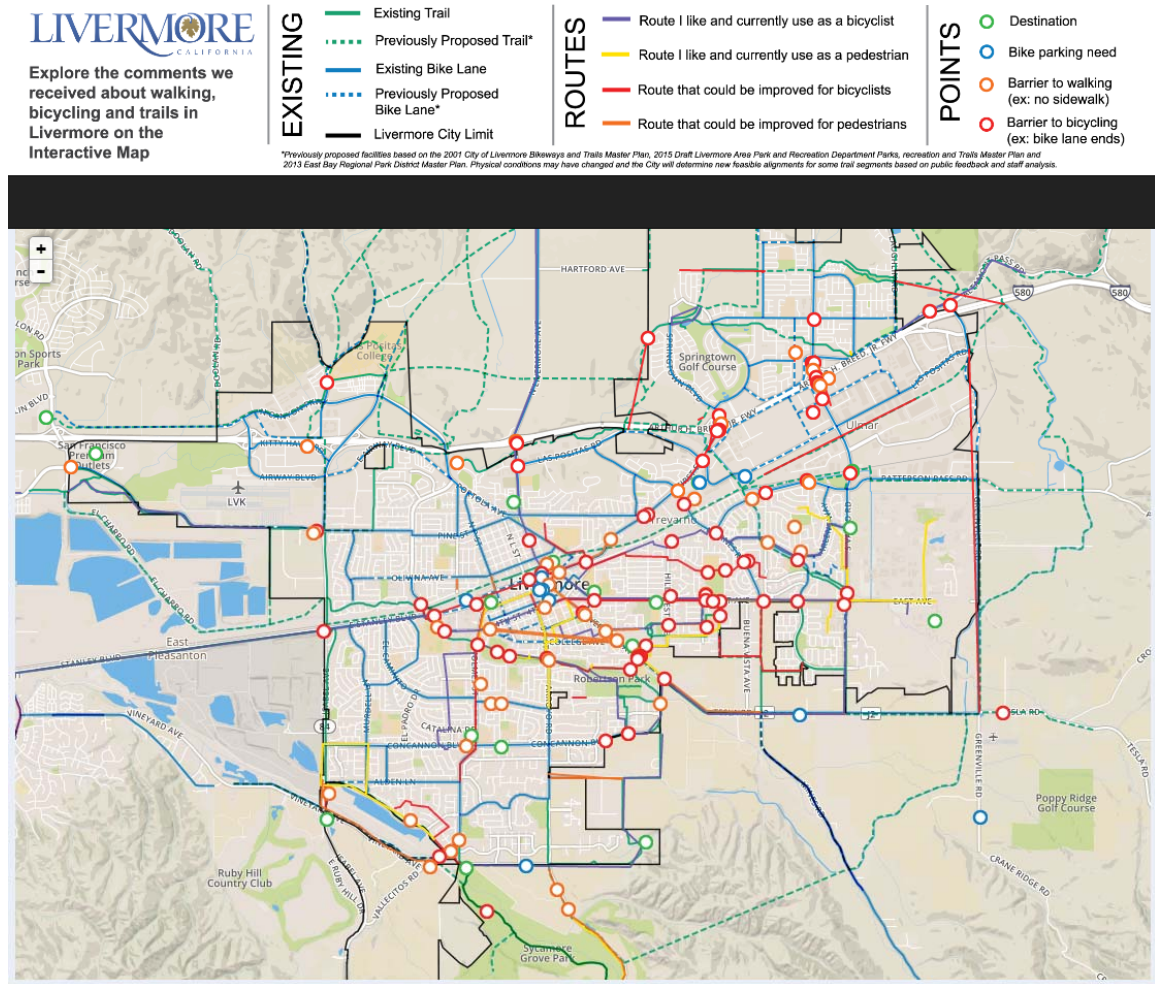


Figure C-1: Online Interactive Map

DEMOGRAPHICS

The largest age group represented was 55-64 years old, 21.4% of the survey respondents. Five respondents were 24 years old or younger, 50 were 25-34 years old, 147 were 35-54 years old, and 142 were 55 years old or older. 156 respondents did not indicate their age. Gender was split equally.

KEY THEMES

Respondents walk and bicycle most frequently for recreational purposes. Most respondents do not walk or bicycle for their commute to work or school. The majority of respondents would like to walk (76%) or bicycle (81%) more for their daily commute, errands, and other activities than they currently do.

As shown in Figure C-2, respondents identified infrastructure related issues as the most common barriers that prevent them from walking, bicycling, or using trails more often. The categories of barriers for each mode are discussed in the following sections.

The majority of respondents feel it is convenient to walk or bicycle where they want. While over half feel safe from cars while walking, less than one quarter feel safe from cars while bicycling. Figure C-3 shows respondents' feeling of safety and convenience towards walking and bicycling.

Respondents expressed appreciation for existing walking and biking paths and trails in Livermore and interest in a more connected network and improved safety for walking and bicycling to school. Respondents noted freeway crossings feel unsafe for walking and bicycling.

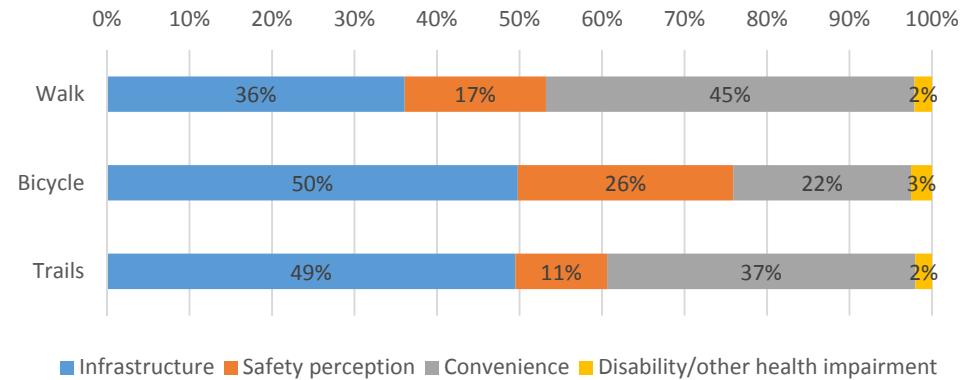


Figure C-2: Identified Barriers to Walking, Bicycling, and Trail Use in Livermore

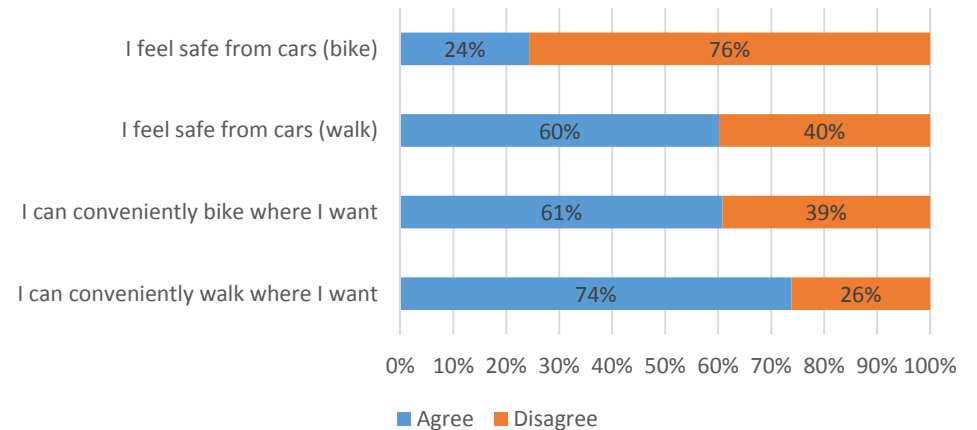


Figure C-3: Walking and Bicycling Experience in Livermore

WALKING

The most common barriers that respondents identified were a lack of time and distance to destinations. Figure C-4 shows the distribution of barriers that prevent survey respondents from walking more often. Respondents of the survey and online interactive map also commented about sidewalk gaps, poorly lit streets, vehicles speeding through intersections, the need for improved crossings, ADA accessible curb ramps, and road diets. Road diets are a way to rebalance the street to accommodate all modes. A road diet typically involves removing one travel lane or center turn lane to provide adequate space for bicycle facilities, with the added benefit of improving traffic flow and lowering speeds to improve safety. The safety and infrastructure concerns identified in the online interactive map were located in the downtown area, along Livermore Avenue and around the Vasco Road/I-580 crossing.

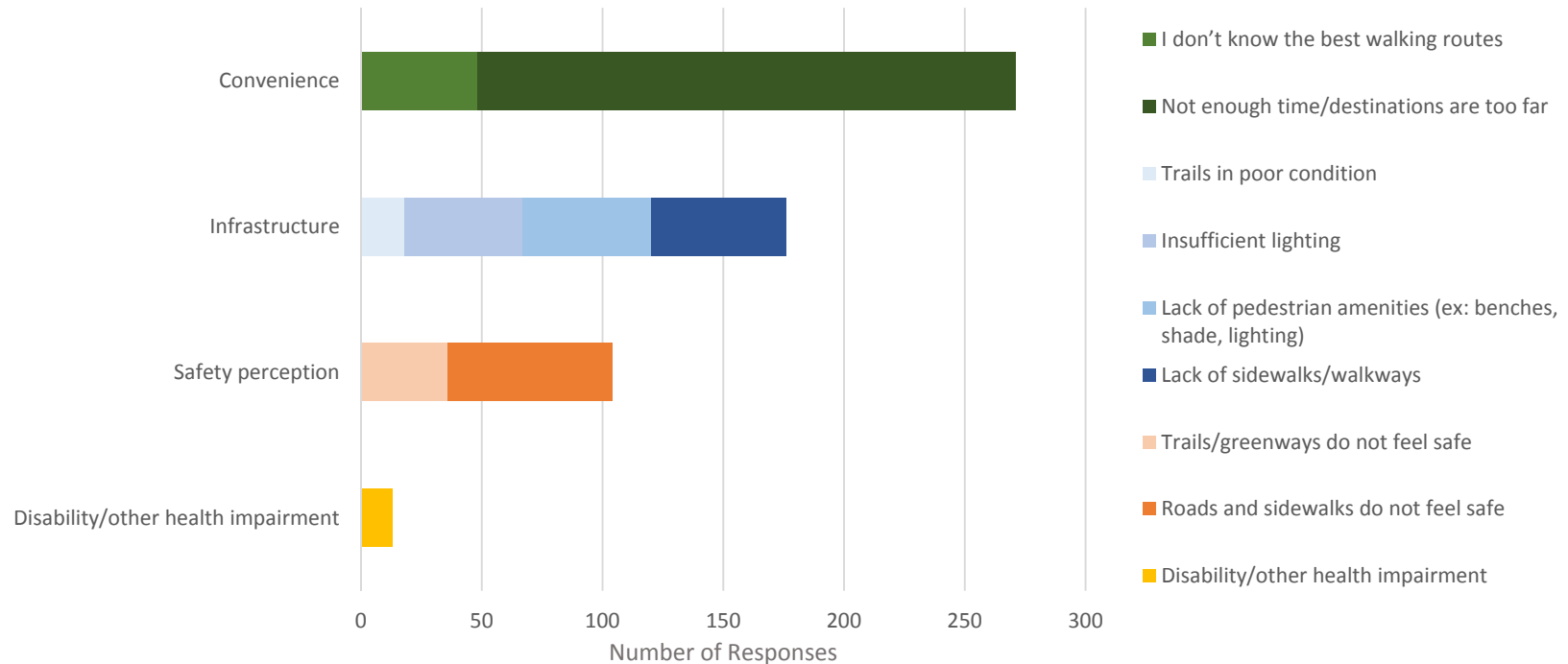


Figure C-4: Barriers to Walking in Livermore

BICYCLING

Figure C-5 shows the comfort level of respondents when bicycling alone. The majority of respondents are confident cyclists, identifying as “strong and fearless” or “enthusiastic and confident.” The 34% that identify as “interest but concerned” represent an opportunity for mode shift and behavior change in bicycling.

As shown in Figure C-6, distance and time are not as much of a barrier for bicycling as it is for walking; however, road safety and lack of dedicated space for bicycles are the most common barriers that prevent survey respondents from bicycling more. Similarly respondents of the online interactive map identified concerns about unsafe crossings, lack of bicycle lanes, and the need for more curb ramps and wider gate posts to allow enough width for bicycles with trailers. Respondents most commonly identified barriers and suggested improvements on Arroyo Mocho Trail, East Avenue, and the Vasco Rd/I-580 crossing.

Common suggested locations for additional bicycle parking include First Street and the downtown area, parks, grocery stores, and other destinations such as theaters and shops.

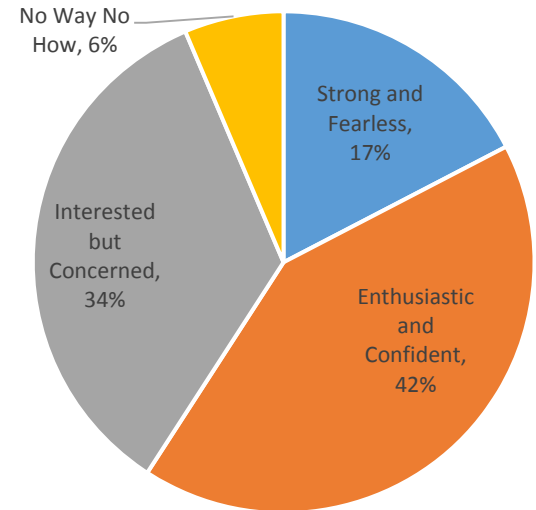


Figure C-5: Types of Bicyclists

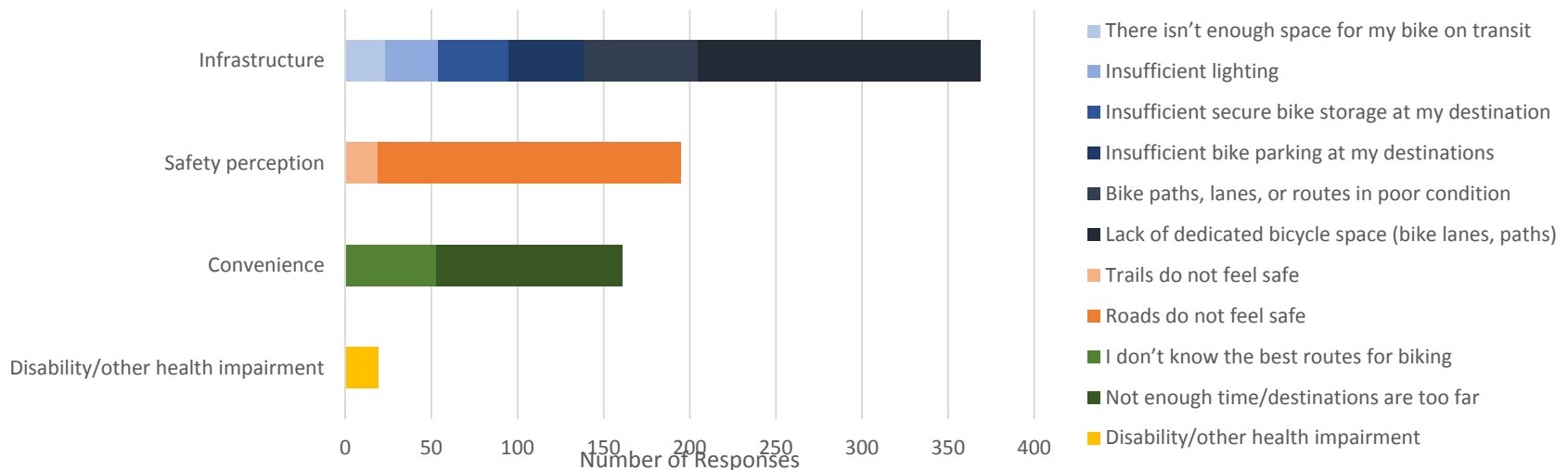


Figure C-6: Barriers to Bicycling in Livermore

TRAILS

The most common barrier to trail usage as identified by respondents is connectivity, shown in Figure C-7. Connectivity, when discussing transportation networks, generally refers to two things: first, it refers to facilities that close gaps in the network and connect to each other; second, it refers to providing bicycling or walking facilities that connect to meaningful destinations.

Respondents commented that they enjoy using the trails because it allows them to be separated from vehicular traffic, and they consider the trails to be an asset to the City. Respondents also expressed concerns about personal safety on the trails and a desire for a more connected trail system.

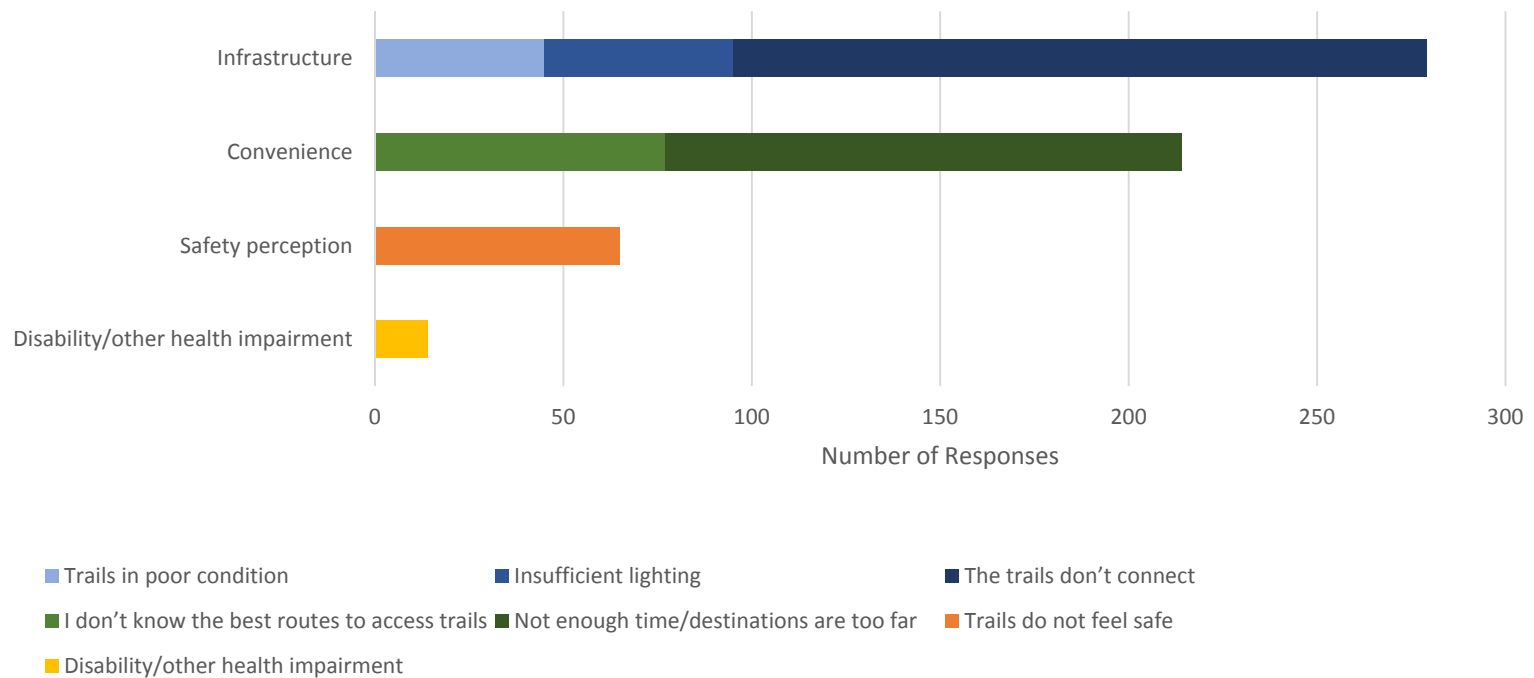


Figure C-7: Barriers to Trail Use in Livermore

POP UP EVENTS

In order to reach more people and include input from a broad set of perspectives during development of the network and programs, the City of Livermore planned and facilitated 14 pop up events for a diverse set of groups in Livermore. These events provided opportunities to educate the public on the planning process and active transportation, as well as collect feedback about access and circulation challenges and needs in the City. Pop up events included:

- Parent Club Information Council – April 26, 2016
- Senior Services – Living with Purpose – May 2, 2016
- Youth Advisory Commission – May 2, 2016
- Las Positas Junior College – May 4, 2016
- Livermore Farmer’s Market – May 19, 2016
- WHEELS Disabled Advisory Committee – January 4, 2017
- Marylin Elementary – English Learner Advisory Committee – March 29, 2017
- Livermore Wine Country Downtown Street Fest – May 2016 and May 2017
- Bike to Work Day Energizer Stations at Sandia and Lawrence Livermore Labs and at My Buddy’s Bike Shop – May 2016 and May 2017
- Hook and Ladder Run – June 4, 2017
- Equestrian Focus Group – June 25, 2017
- Livermore Trailblazers Focus Group – July 10, 2017

PARENT CLUB INFORMATION COUNCIL

April 26, 2016

City of Livermore staff presented information on the project to the School District’s Parent Club Information Council, an organization that includes the presidents of all parent-teacher organizations/associations (PTO/PTA). Attendees were encouraged to visit the project website, complete the online survey and interactive mapping exercise, subscribe to project updates, and promote the project within their schools.

SENIOR SERVICES – LIVING WITH PURPOSE

May 2, 2016 – 6 attendees

Alta Planning + Design and City of Livermore staff presented on the overall project and asked about priorities. The seniors identified maintenance of sidewalks as the highest priority, more than new facilities. Attendees also filled out surveys, pointed out specific locations with issues, and took home flyers to spread the word.

YOUTH ADVISORY COMMISSION

May 2, 2016 – 14 attendees

Alta Planning + Design and City of Livermore staff presented on the overall project and asked about priorities. Youth had specific locations in mind and were directed to the interactive online map. Youth Advisory Commission members were also provided with flyers to take to their schools. Student input was primarily focused on their walk to school.

LAS POSITAS JUNIOR COLLEGE

May 4, 2016

City of Livermore staff hosted a booth at Las Positas Junior College to encourage students and employees to participate in development of the active transportation plan. Students provided feedback on maps indicating areas of concern and locations or routes where improved facilities would encourage them to walk or bicycle. Participants were also encouraged to complete the online survey and interactive mapping exercise, and subscribe to updates to stay engaged with the project.

LIVERMORE FARMER'S MARKET

May 12, 2016

City of Livermore staff hosted a booth at the Farmer's Market and discussed the Plan with Livermore residents and members of the community. Participants provided comments and suggestions on a map to indicate where they would like to see bicycling and walking improvements throughout the city. Staff answered questions about the project and encouraged people to subscribe to updates and visit the project webpage for additional information and input opportunities.

WHEELS ACCESSIBLE ADVISORY COMMITTEE

January 4, 2017, 21 attendees

Alta Planning + Design and City of Livermore staff presented to the WHEELS Accessible Advisory Committee (WAAC) during their regular meeting on January 4, 2017. The intent of the presentation was to obtain feedback from WAAC committee members about accessibility to make sure the City's Active Transportation Plan (ATP) addresses the needs of all users. Feedback provided by the WAAC for the Active Transportation Plan includes the following:

- Sidewalks – the sidewalk gap map was very informative, but existence of sidewalk is only one aspect. Sidewalk conditions and presence/absence of curb ramps are very important to making sidewalks accessible. Data collected through the ATP includes presence of sidewalks, but does not include information on their condition or presence/absence of curb ramps.
- Curb ramps – the City does not have a comprehensive list of locations with missing curb ramps, but they are constructed as street improvements are made, or if funding is available. The neighboring communities of Dublin and Pleasanton have collected data about missing curb ramps throughout the City, with the help of staff or volunteers. This could potentially be part of the asset management assessment going on in Livermore now, City staff will follow up to determine if curb ramps will be included.
- Trails – would be helpful if trails had charging stations for electric wheelchairs
- Transit access – bus stops should be assessed for amenities and accessibility
- Alameda CTC Multimodal Study – WAAC member is working with City to provide information to Alameda CTC for their multimodal study.

MARYLIN ELEMENTARY - ENGLISH LEARNER ADVISORY COMMITTEE

March 29, 2017 - 14 surveys collected

Alta Planning + Design and City of Livermore staff attended an English Learner Advisory Committee Meeting with the principal and parents at Marilyn Elementary School. The goals included educating the group about the current planning efforts and better understanding what forms of transportation they use in daily activities. The majority of surveys submitted indicate a car is used for most activities, with some walking.

LIVERMORE WINE COUNTRY DOWNTOWN STREET FEST

May 2016

Festival attendees and City of Livermore staff discussed the purpose and intent of an active transportation plan, ways to get involved and provide input, as well as the project website and mapping tool. Attendees were encouraged to share where they currently walk and bicycle, and where they would like to walk or bicycle if facilities were improved.

May 6, 2017

City of Livermore staff interacted with wine festival attendees to discuss the Plan, explain the different types of walking and bicycling facilities, and review maps of proposed trails, bikeways, crossings, and pedestrian facilities. Participants were encouraged to provide feedback on the map of recommendations and get involved in the next steps of the planning process including project prioritization and programs.

BIKE TO WORK DAY AT SANDIA AND LAWRENCE LIVERMORE LABS AND MY BUDDY'S BIKE SHOP

May 11, 2017 – Bike to Work Day

Alta Planning + Design and City of Livermore staff participated in Bike to Work Day at the Sandia and Livermore Labs Energizer Station and My Buddy's Bike Shop Energizer Station. The team presented information about the plan and specifically the design concept ideas for East Avenue and Vasco Road adjacent to their property. The goal was to solicit ideas and feedback about the trade-offs for Vasco and East Avenue design concepts. Employees were asked to fill out a survey to identify their preferred design concept for each corridor.

HOOK AND LADDER RUN

June 4, 2017 - 14 Sign Ups for the Email List

Alta Planning + Design and City of Livermore staffed a booth at the event to educate attendees and runners about the ATP process, discuss favorite runs in the City, and answer any questions.

CALIFORNIA STATE HORSEMEN'S ASSOCIATION

June 15, 2017: Equestrian Needs Discussion with Carolyn Hendrickson (CSHA Region 5) and Marie Grisham

Alta Planning + Design and City of Livermore staff presented on the process for the ATP and asked about priorities for equestrians:

- **DESIGN:** Prefer trails separated from traffic, Separation from bicycles is important, they can speed along and disturb horses, Space for safe passage, line of sight important; vertical clearance (10' min)
- **WAYFINDING:** Important to have good signage regarding trails, connections and the end of facilities, also directions about what is allowed
- **LIVERMORE LOCATIONS:** Sycamore Grove Park is an equestrian destination, can ride summer and winter; Iron Horse next to an active rail line is not ideal for horses
- **BEST PRACTICES:** Point Pinole has great staging/parking/shade
- **RIDING:** Average ride is about 2-3 hours (3 miles/hour)
- **STAGING:** Water troughs, places to tie up, shade, seating, manure bin
- **PROGRAMS:** Reach out to Livermore Stables, Tri-Valley Trailblazers; liability issues to plan and run rides or lessons; Mounted patrol run by EBRPD with certification and training; Maps at stables

LIVERMORE TRAILBLAZERS

July 10, 2017 - 6 attendees

Alta Planning + Design and City of Livermore staff met with members of the Livermore Trailblazers, presented on the process for the ATP and asked about priorities for equestrians. The conversation started with general conversation about the Trailblazers, who have 72 members, and also covered the following:

- **EXISTING EVENTS:** Trailblazers Monthly club rides, Trailblazers Summertime camp outs, Robertson Park Community Center – expert and clinician events, Gymkhana, Diamond Hills Equestrian Center –shows and clinics, Trailblazers Monthly meetings at Farmers Bureau, Wine Ride, Spring Stampede, Rodeo (California State Horsemen Association)
- **RIDES:** Sycamore Grove is the most usable park, equestrians like the varied terrain and the rolling hills, Sunol is the next best park, Mount Diablo is nice, but has too much traffic to get there, Redwood Regional and Lake Chabot also have too much traffic to get there, Could ride in more parks but needs somewhere to park large trailers, Sycamore Grove comments: Would like to have access to Dry Creek Trail so that have a loop for riding, horses pick up the pace when they know they are heading home. Also, the Cattail Pond Loop Trail., loop trails are best, usually stage in Sycamore Grove Wetmore Road driveway, Del Valle Dam side parking lot difficult to bring trailer into
- **DESIRED AMENITIES:** Mounting block or boulders, Equestrian parking with gravel, Manure bins, Signage – would like trail names (good at Sycamore) and

interpretive, as well as rules of the trails, Water source (not trough)

- TRAILHEADS: Robertson Park (Robertson Park Rd), Sycamore Grove Park (Wetmore Rd access from Sycamore Grove Park Parking Lot), Del Valle Regional Park (Arroyo Rd Del Valle Arroyo Rd Staging Area (EBRPD)), Shadow Cliffs (Along Levee Trail, not sure exact location), Brushy Peak (Laughlin Rd – Laughlin Ranch Staging Area)
- FEED STORES: Western Saddlery in Pleasanton, Livermore Feed and Farm (Concord Feed), Concord Feed in Dublin, EJ Cattle and Feed on Carneal in Livermore, Bay Area Feed on Greenville, Walmart has limited feed and equine supplies
- STABLES: Cerro Vista on Tesla, Livermore Livery on Tesla, Cayetano Ridge on Dagnino, Reinstein Ranch on Highland, Diamond Hills Equestrian Center, Rocking Z on Morgan Territory, Additional ones on Collier Canyon, Private stables all over Livermore (Marina Ave, N. Livermore Ave, Mines Rd)

BIKING AND WALKING TOURS

Biking and walking tours were held on March 11, 2017 with 9 participants from the technical and citizens advisory committees to review initial recommendations in the field and get feedback on design ideas. Participants joined Alta Planning + Design and City of Livermore staff biking or walking on a planned route that crossed several of the project types being recommended in the plan. At each stop, the group reviewed the options for the project location and discussed challenges and opportunities. This provided a chance for the attendees to think about the improvements opportunities with the consultant team in the field, point out ideas and concerns and help to show the range of project types for the plan.

ACTIVE TRANSPORTATION PLAN CITIZEN ADVISORY COMMITTEE

The Active Transportation Plan Citizen Advisory Committee (Citizen Advisory Committee) provided input and feedback to City staff throughout the plan development process regarding the existing active transportation conditions and needs, proposed ATP goals and objectives, and recommendations to City Council. The Citizen Advisory Committee meetings were advertised and open to the public to learn about the process and provide comments. The group convened seven times over the planning period to provide their input:

- Meeting 1: Draft Procedures – December 17, 2015
- Meeting 2: Initiate the Citizens Advisory Group – January 21, 2016
- Meeting 3: Review Existing Conditions, Needs Analysis, and Goals & Objectives (WP 1-3) – August 25, 2016
- Meeting 4: Isabel Neighborhood Plan – October 27, 2016
- Meeting 5: Review Project and Program Recommendations (WP 4) – May 16, 2017
- Meeting 6: Review Prioritization Methodology and Initial Priorities – October 19, 2017
- Meeting 7: Review Draft Active Transportation Plan – April 26, 2018

ACTIVE TRANSPORTATION PLAN TECHNICAL ADVISORY COMMITTEE

The Technical Advisory Committee (TAC) provided technical expertise, analysis and recommendations related to active transportation planning, programming and funding. Specifically, this included identifying opportunities for collaboration, sharing local and best practices, and supporting regional coordination. The group convened four times over the planning period to provide their input:

- Meeting 1: Initiate the Technical Advisory Committee – February 9, 2016
- Meeting 2: Review Existing Conditions, Needs Analysis, and Goals & Objectives (WP 1-3) – August 25, 2016
- Meeting 3: Review Project and Program Recommendations (WP 4) – May 16, 2017
- Meeting 4: Review Draft Active Transportation Plan – April 26, 2018

PLANNING COMMISSION/CITY COUNCIL

The team presented progress to the Livermore Planning Commission and Livermore City Council in Fall/Winter of 2016 and will present the Draft Plan for approval in Spring 2018. The first round of public meetings allowed Planning Commissioners and City Council members to share their ideas and goals for the active transportation network. The concerns about the network expressed in these meetings helped direct the team in developing a strategy for recommendations of projects and programs. The second round of meetings will be the opportunity for the Planning Commissioners and City Council to review the draft plan and make any comments before adoption.

FIRST ROUND: EXISTING CONDITIONS, NEEDS ANALYSIS AND GOALS & OBJECTIVES

- Planning Commission: September 6, 2016
- City Council: November 14, 2016

SECOND ROUND: DRAFT ACTIVE TRANSPORTATION PLAN

- Planning Commission: May 15, 2018
- City Council: June 11, 2018

This page intentionally left blank.

APPENDIX D HEALTH ANALYSIS

A growing number of studies show that the designs of our communities and transportation systems have a profound impact on health and quality of life issues. Fostering conditions where bicycling and walking are accepted and encouraged increases a city's health and livability from a number of different perspectives, including physical activity, clean air, social activity, disease prevention, and safety. The following analysis presents indicators of Livermore residents' health related to transportation and the built environment.

PHYSICAL ACTIVITY

The Centers for Disease Control and Prevention (CDC) recommends 60 minutes of physical activity per day for children and adolescents and 150 minutes of physical activity per week for adults. The rates for adult and youth activity in Livermore are consistent with regional and State levels, but still have room for improvement. In Livermore, 35.5% of adults (age 18+) walk for at least 150 minutes per week, meeting the CDC's recommended amount of physical activity through walking alone. As shown in Figure D-1, this is consistent with activity rates for adults in Alameda County and the State of California, where 37.1% and 33.3% of adults, respectively, meet the physical activity recommendation through walking¹.

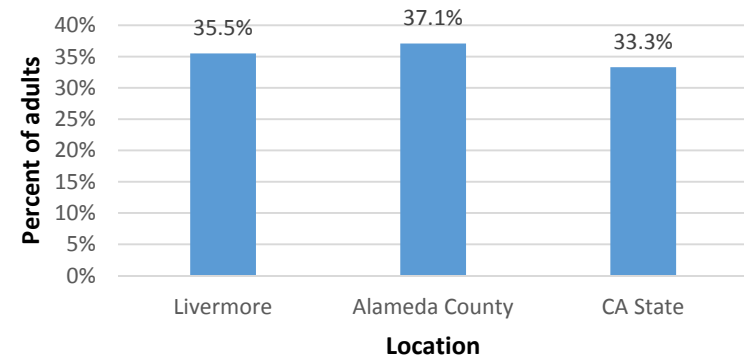


Figure D-1: Adults Who Walk 150+ Minutes Per Week

According to the Department of Education, approximately three-quarters of students in the Livermore Valley Joint Unified School District are in the Healthy Fitness Zone for aerobic capacity. This standard is established by The Cooper Institute representing levels of fitness that offer some degree of protection against diseases that can result from sedentary living. Figure D-2 compares the percentage of 5th, 7th, and 9th grade students in the Livermore Valley Joint Unified School District, Alameda County, and California State meet the Healthy Fitness Zone standards for aerobic capacity².

¹ California Health Interview Survey Neighborhood Edition (CHIS NE) - supported by Kaiser and The California Wellness Foundation – provides data for zip code (not used), City, County, and State. www.askchisne.ucla.edu

² California Department of Education, Physical Fitness Report. The performance goal for all test areas is the Healthy Fitness Zone which represents a level of fitness that offers protection against the diseases that result from sedentary living. <http://data1.cde.ca.gov/dataquest>

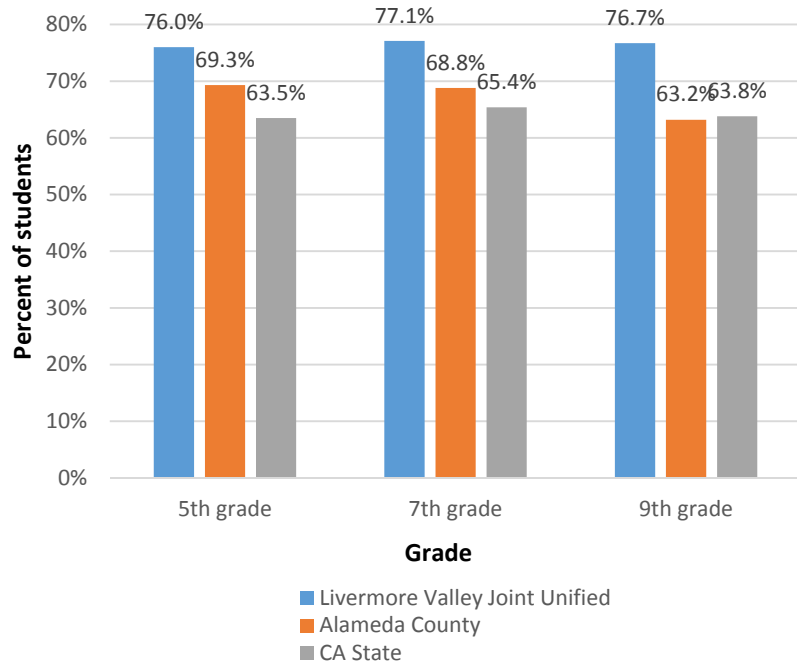


Figure D-2: Students in Healthy Fitness Zone

For both adult and youth activity levels, there is an opportunity to increase physical activity by improving the built environment. The CDC has determined that creating places to be active and making existing places more inviting or easily accessible could result in a 25% increase in the number of people who exercise at least three times a week³. This is significant considering that for people who are inactive, even small increases in physical

³ U.S. Department of Health and Human Services, Centers for Disease Control and Prevention. (2002). Guide to Community Preventive Services
⁴ Centers for Disease Control and Prevention and the President’s Council on Physical Fitness and Sports, Healthy People 2010, Conference Edition (2000), Section 22—Physical Activity and Fitness.

activity can bring measurable health benefits⁴. The establishment of a safe and reliable transportation network that offers opportunities for walking and bicycling will have a positive impact on the health of nearby residents.

OBESITY

In the United States, over one-third (34.9%) of adults are obese and 17% of youth ages 2-19 years old are obese, with no significant change in obesity levels between 2003-2004 and 2011-2012⁵. Healthy eating and active living can help to prevent and reverse the obesity trend, and the built environment can influence healthy behaviors. In particular, being able to take short walking and biking trips to the places where people live, work, learn, and play allows them to incorporate more physical activity into their daily routines.

Youth in Livermore have a slightly lower rate of being overweight or obese than their peers in Alameda County and the state⁶. However, 23% of adults in Livermore are obese, while 21.1% of adults in Alameda County are obese⁷. Research suggests that physically active adults have lower rates of all-cause mortality, coronary heart disease, high blood pressure, stroke, type 2 diabetes, metabolic syndrome, colon cancer, breast cancer, and depression than their physically inactive

⁵ Ogden CL, Carroll MD, Kit BK, Flegal KM. Prevalence of Childhood and Adult Obesity in the United States, 2011-2012. *JAMA*.2014;311(8):806-814.
⁶ As cited on kidsdata.org, California Dept. of Education, Physical Fitness Testing Research Files (Dec. 2015)
⁷ California Health Interview Survey

peers⁸. Figure D-3 compares rates of overweight and obese 5th, 7th, and 9th grade students in the Livermore Valley Joint Unified School District, Alameda County, and California State. Figure D-4 compares rates of obesity for adults in Livermore, Alameda County, and California State⁹.

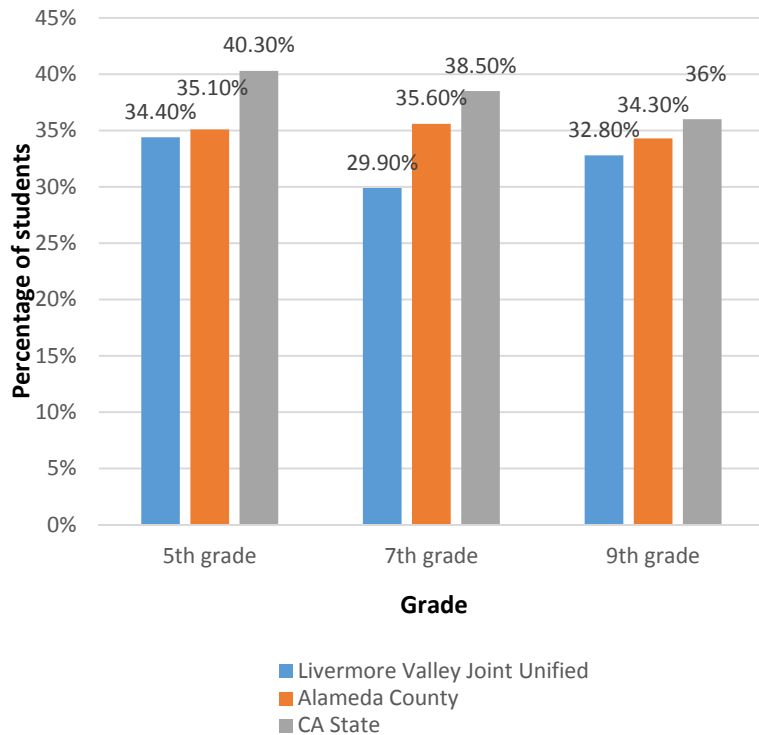


Figure D-3: Youth Overweight and Obesity

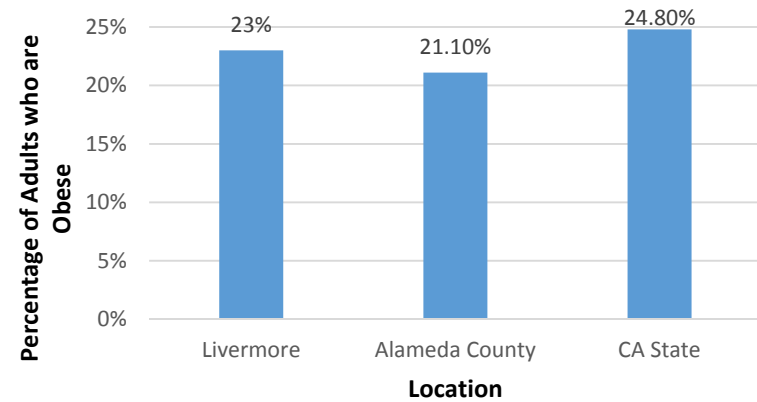


Figure D-4: Adult Obesity

MENTAL HEALTH

The design, land use patterns, and transportation systems that comprise the built environment have an impact on mental health, as well. Studies have found that people living in communities with built environments that promote bicycling and walking tend to be more socially active, civically engaged, and are more likely to know their neighbors^{10 11}. These social benefits can serve as preventative and coping mechanisms for stress and depression. In Livermore, 8.2% of adults reported having serious psychological distress in the past 12 months, a higher rate than both Alameda County (7.7%) and the state (7.9%)¹², as shown in Figure D-5.

⁸ U.S. Department of Health and Human Services, 1996. <https://www.transportation.gov/mission/health/physical-activity-transportation>
⁹ California Health Interview Survey Neighborhood Edition
¹⁰ Frumkin, H. 2002. Urban Sprawl and Public Health. Public Health Reports 117: 201–17.

¹¹ Leyden, K. 2003. “Social Capital and the Built Environment: The Importance of Walkable Neighborhoods.” American Journal of Public Health 93: 1546–51.
¹² California Health Interview Survey Neighborhood Edition. Definition of psychological distress is based on the standardized Kessler 6 scale.

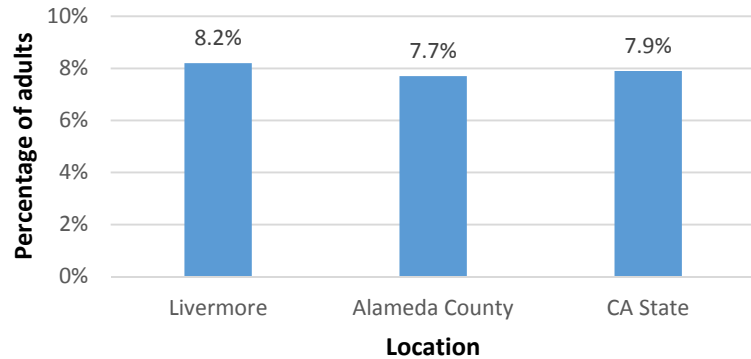


Figure D-5: Adults Reporting Serious Psychological Distress

AIR POLLUTION

Walking and bicycling reduces motor-vehicle miles traveled and subsequent traffic-related pollution such as fine particulate matter (PM 2.5) and diesel. CalEnviroScreen 2.0 is a tool developed by the Office of Environmental Health Hazard Assessment to measure pollution and population factors and rank census tracts in California by a percentile score, where a higher percentile indicates a higher relative burden, showing where risks and potential adverse health effects are disproportionately distributed. While the potential health effects of pollution exposure are well understood, individuals may be more sensitive or tolerant to exposures and may react differently.

According to CalEnviroScreen 2.0, Livermore residents experience a greater overall pollution burden than Alameda County. On average, census tracts in Livermore rank in the 51st percentile of having the greatest exposure to pollutants, while as a whole, Alameda county census tracts average at the 34th percentile. The pollution burden reflects the average percentiles of all pollution indicators measured in the tool, showing a more comprehensive assessment of a census tract’s exposure.

With regards to traffic related pollution, Livermore census tracts rank in the 36th percentile on average for exposure to PM 2.5 and in the 45th percentile for diesel emissions. Exposure to traffic pollution can have adverse health effects, such as asthma, respiratory issues, and heart and lung disease¹³. Cumulative exposure over time can have long-term health implications. Figure D-6 compares the average percentile rankings for air pollution in Livermore to Alameda County.

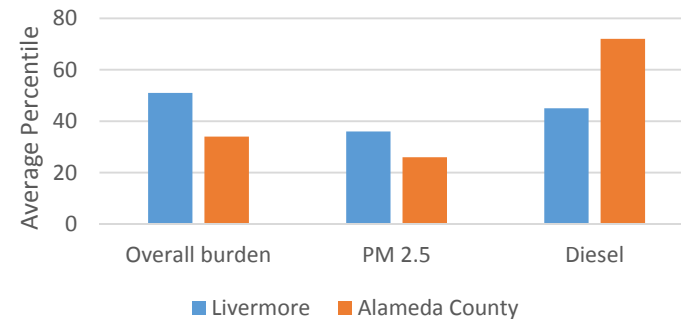


Figure D-6: Air Quality Indicators

¹³ National Heart, Lung, and Blood Institute National Asthma Education and Prevention Program, 2007; Health Effects Institute, 2010.” <https://www.transportation.gov/mission/health/proximity-major-roadways>

ASTHMA

Livermore residents also disproportionately suffer from asthma compared to the rest of the State, which may be correlated to air pollution exposure in the City. As shown in Figure D-7, 18% of youth age 1-17 years old and 18.1% of adults have been diagnosed with asthma (compared to 15.4% of youth and 13.7% of adults state-wide)¹⁴. This is compounded by the fact that children and seniors are more sensitive to the effects of air pollution, due to developing or weakened immune systems, but are also more likely to walk or bike outdoors rather than drive to meet their transportation needs, putting them at greater exposure to risks.

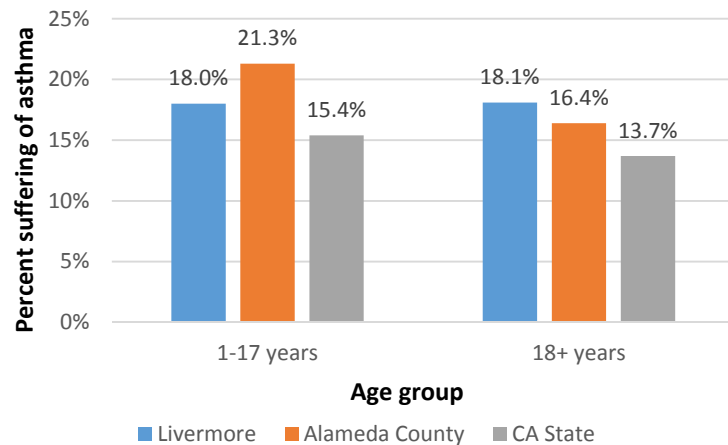


Figure D-7: Asthma Prevalence

¹⁴ California Health Interview Survey Neighborhood Edition

¹⁵ *Vulnerable Populations: Who Are They?* (Vol. 12, No. 13, Rep.). (2006). American Journal of Managed Care

VULNERABLE POPULATIONS

Vulnerable populations are groups that are economically, socially, or physically disadvantaged, and may have a compromised ability to anticipate, cope with, resist, and recover from hardships, emergencies, and environmental hazards. The vulnerability of individuals may be influenced by factors including race, ethnicity, age, sex, income, insurance coverage, education, and housing status¹⁵. When designing transportation systems, it is important to accommodate the needs of vulnerable populations to ensure that they benefit and do not endure unintentional harm. Everyone benefits when the most vulnerable members of the community are accounted for.

Children and seniors are particularly sensitive to hazards and risks in the environment. In Livermore, 13.2% of residents are under 10 years old and 11.4% are 65 years old or over, similar to the age distribution for Alameda County and California¹⁶, shown in Figure D-8.

¹⁶ 2014 ACS 5-Year Estimates

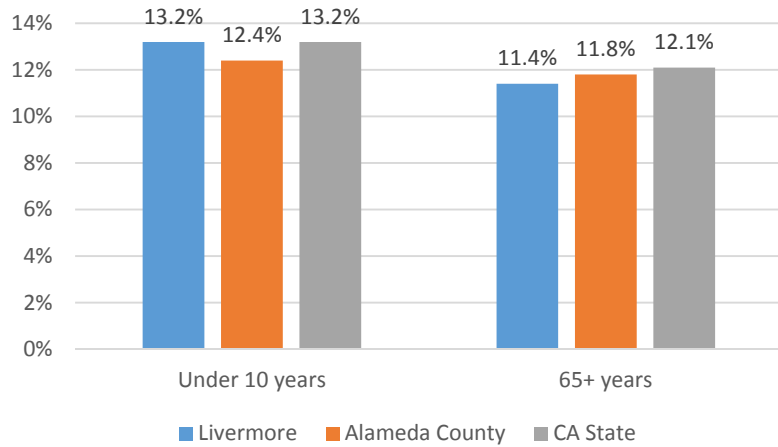


Figure D-8: Child and Senior Population

Socioeconomic status is also a social determinant of health because it influences one’s living conditions, nutrition, occupation, and access to health care and other health-promoting resources. Transportation plays a significant role in facilitating access to these resources. Walking or biking to destinations or to transit are low-cost alternatives to driving for people of all income levels, and leaves more disposable income that could be used for health promoting activities and behaviors.

In Livermore, about 3% of families in Livermore are living below the federal poverty level¹⁷. While thresholds vary by family size and composition, the federal poverty level was \$23,850 for a four-person household in 2014. While the poverty rate is lower than the County and State (Figure D-9), all transportation systems should be inclusive of diverse socioeconomic backgrounds.

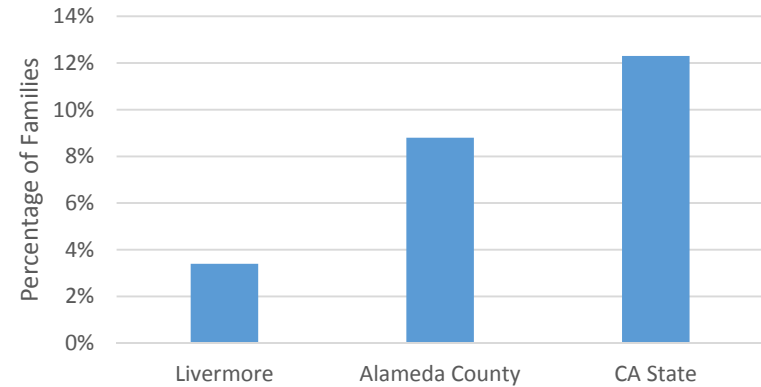


Figure D-9: Families Living in Poverty

¹⁷ 2014 ACS 5-Year Estimates

APPENDIX E SAFETY & COLLISION ANALYSIS

This appendix presents more detailed collision data for Livermore. The analysis of reported bicycle and pedestrian related collisions reveals patterns and potential sources of safety issues, both design and behavior-related. These findings provide the City of Livermore with a basis for infrastructure and program improvements to enhance bicycle and pedestrian safety.

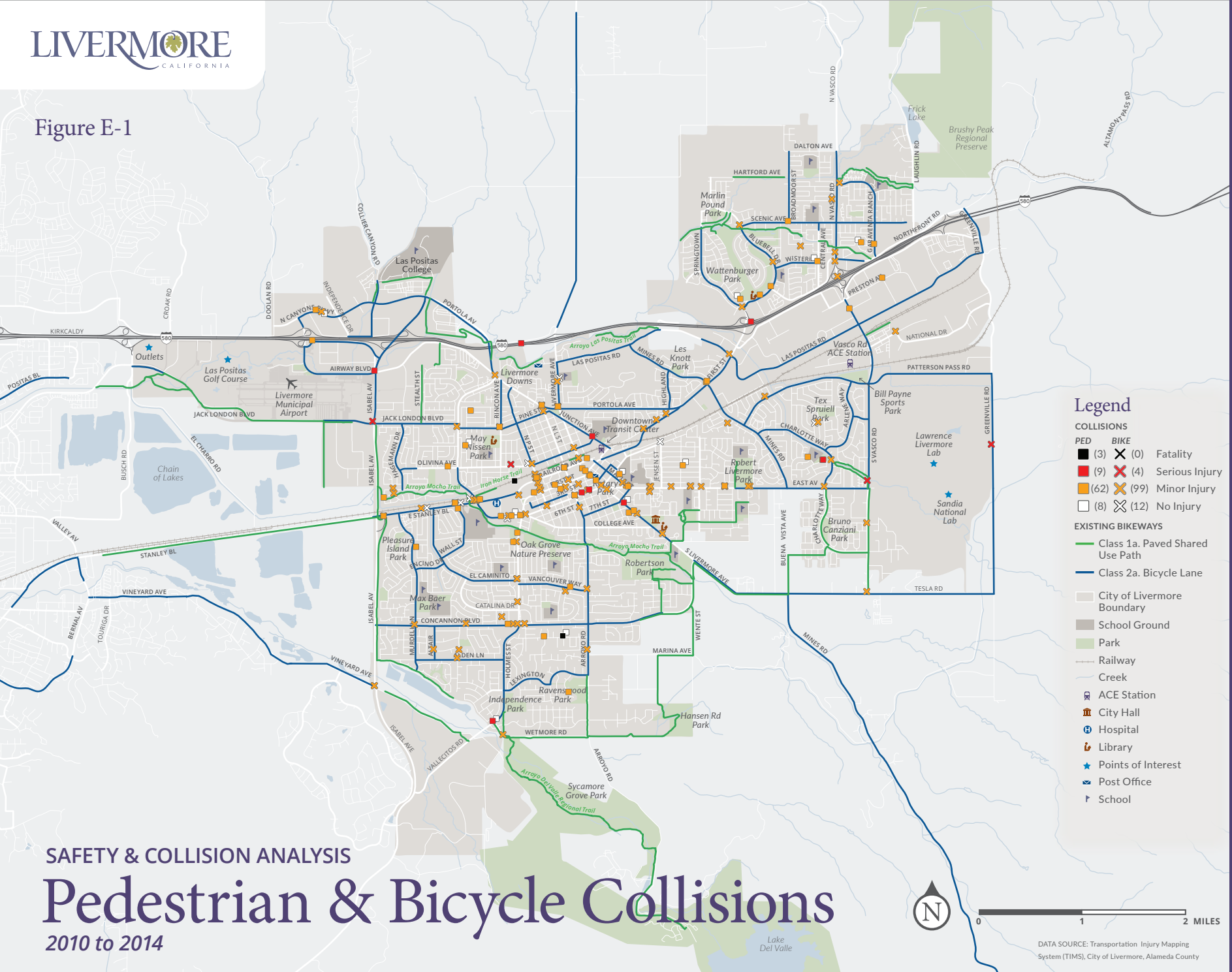
Collision data for this report was generated from the California Statewide Integrated Traffic Report System (SWITRS). Because SWITRS combines records from all state and local police departments, data varies due to differences in reporting methods. It is important to note that the number of collisions reported to SWITRS is likely an underestimate of the actual number of collisions that take place because some parties do not report minor collisions to law enforcement, particularly collisions not resulting in injury or property damage. Although under-reporting and omissions of “near-misses” are limitations, analyzing the crash data lets us look for trends both spatially and in behaviors (motorist, cyclist, and pedestrian) or design factors that may contribute to collisions in Livermore.

NUMBER, LOCATION, AND TRENDS

Bicycle and pedestrian related collisions and collision locations in Livermore were analyzed over the most recent five-year period of available data, 2010-2014. At the time of the analysis, 2014 provisional data was used to reflect the most up-to-date safety conditions as possible. A bicycle-related collision describes a collision involving a bicycle with a second party (e.g. motor vehicle, bicycle, pedestrian, stationary object) or without a second party (e.g. the collision occurred due to slippery road conditions). Similarly, a pedestrian-related collision describes a collision involving a pedestrian with a second party or without a second party. The term “collision location” describes a geographic location where at least one collision was recorded over the five-year period. Figure E-1 shows where pedestrian and bicycle collisions occurred.

Between 2010 and 2014, there were 5,220 total reported collisions in Livermore across all modes. Of those collisions, 122 (2.3%) were bicycle-related and 72 (1.4%) were pedestrian-related, resulting in zero bicyclist fatalities and three pedestrian fatalities. In these collisions, four bicyclists and nine pedestrians suffered severe injuries, comprising 28 percent.

Figure E-1



Legend

- COLLISIONS**
- | | | |
|------------|-------------|----------------|
| PED | BIKE | |
| ■ (3) | ⊗ (0) | Fatality |
| ■ (9) | ⊗ (4) | Serious Injury |
| ■ (62) | ⊗ (99) | Minor Injury |
| □ (8) | ⊗ (12) | No Injury |
- EXISTING BIKEWAYS**
- Class 1a. Paved Shared Use Path
 - Class 2a. Bicycle Lane
- Other Symbols:**
- ▭ City of Livermore Boundary
 - ▭ School Ground
 - ▭ Park
 - Railway
 - Creek
 - Ⓜ ACE Station
 - 🏛 City Hall
 - 🏥 Hospital
 - 📖 Library
 - ★ Points of Interest
 - ✉ Post Office
 - 🎓 School

SAFETY & COLLISION ANALYSIS

Pedestrian & Bicycle Collisions

2010 to 2014



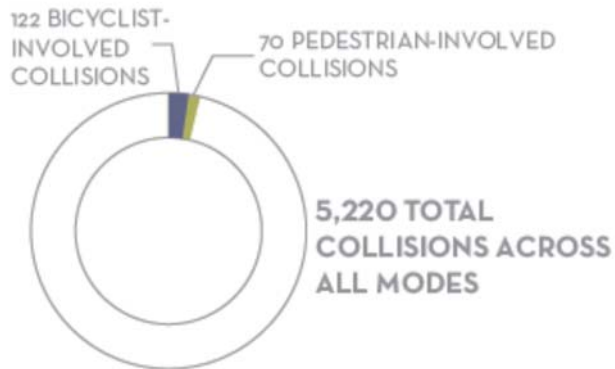
0 1 2 MILES

DATA SOURCE: Transportation Injury Mapping System (TIMS), City of Livermore, Alameda County

Table E-1: Collisions in Surrounding Jurisdictions

	TOTAL COLLISIONS	# OF BICYCLE COLLISIONS	% OF TOTAL COLLISIONS	# OF PEDESTRIAN COLLISIONS	% OF TOTAL COLLISIONS
Livermore	5,220	122	2.3%	72	1.4%
Pleasanton	1,996	155	7.8%	63	3.2%
Dublin	467	35	7.5%	35	7.5%
Alameda County	32,652	3,305	10.1%	3,283	10.1%

TOTAL COLLISIONS IN LIVERMORE, 2010-2014



SERIOUS INJURIES + FATALITIES IN LIVERMORE, 2010-2014

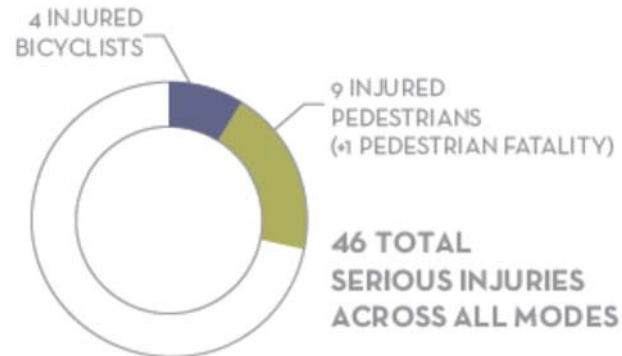


Figure E-2 shows the degree of injury sustained by the bicyclist in bicycle-involved collisions. After a spike in 2011, the frequency of bicycle collisions decreased between 2012 and 2014. Additionally, when bicycle collisions did occur, the resulting injury was less severe, with a higher percentage of collisions being classified in the “complaint of pain” category over the years.

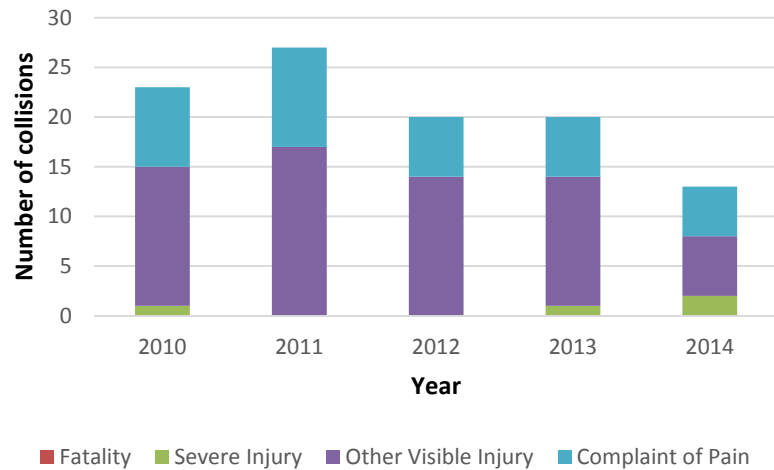


Figure E-2: Severity of Bicycle Collisions

Figure E-3 shows the degree of injury sustained by the pedestrian in pedestrian-involved collisions. Between 2010 and 2014, the number of pedestrian severe injuries decreased. The majority of injuries sustained by pedestrians were minor.

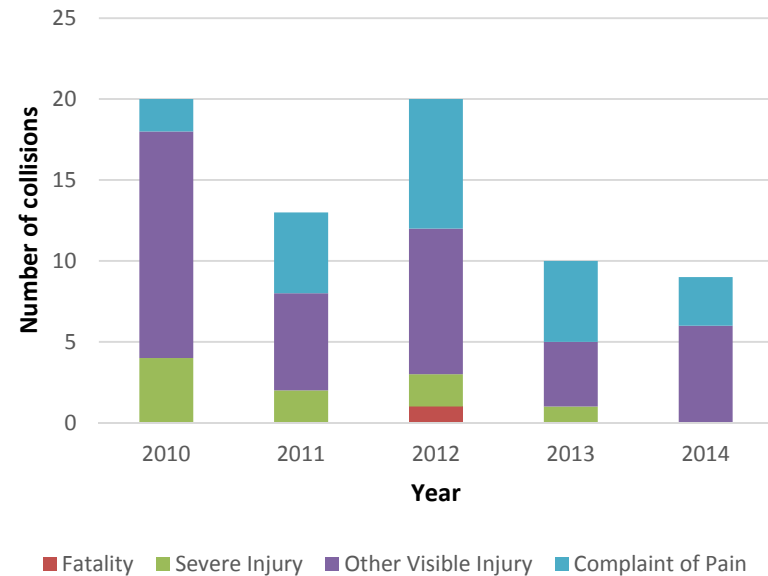


Figure E-3: Severity of Pedestrian Collisions

The two most common locations where bicycle collisions occurred were at Murrieta Blvd & East Stanley Blvd and North P St & Railroad Ave. Between 2010 and 2014, five bicycle collisions occurred at these intersections. Pedestrian collisions were less concentrated at particular intersections, but were more prevalent along segments on Murrieta Blvd, E Stanley Blvd, S Livermore Ave, and 4th St.

AGE

About a quarter of bicyclists and pedestrians involved in a collision were aged 10-19. Figure E-4 shows the age distribution bicyclists and pedestrians involved in collisions. The high percentage of youth involved in bicycle and pedestrian collisions indicates an opportunity to target safety education in schools to prevent future collisions.

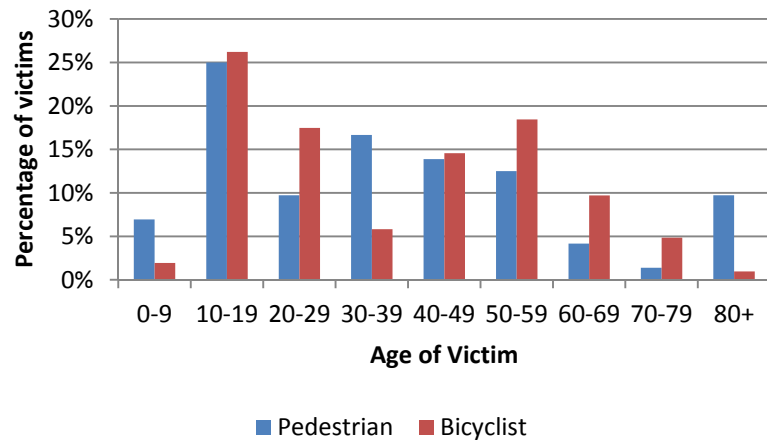


Figure E-4: Age of Victim

TIME OF DAY

Most bicycle collisions occurred between 7am-11am and 3pm-8pm, when most people are traveling to or from work, school, and after school activities. Figure E-5 shows the distribution of bicycle-related collisions throughout the day.

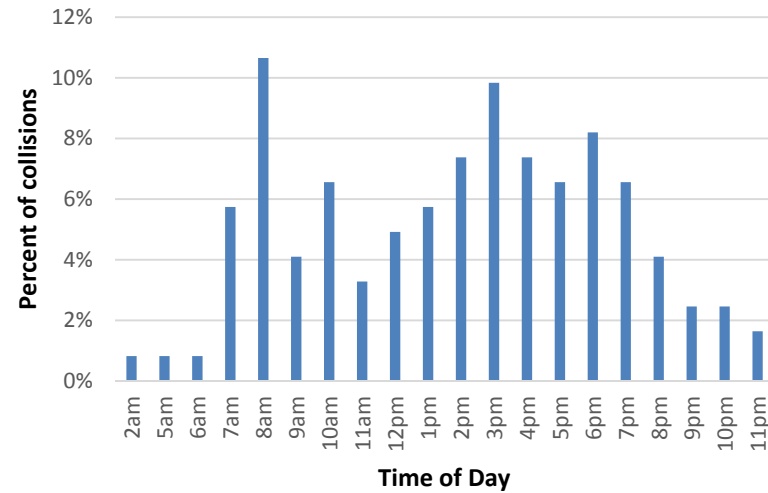


Figure E-5: Time of Bicycle Collisions

Many peak morning collisions included children, teenagers, and young adults. Between 7am-9am, at least half of the bicycle collisions involved cyclists 10-19 years old. From 7am-8am, one third of the bicycle collisions involved cyclists 20-29 years old.

Bicycle collisions also peaked between 3pm-7pm, which coincides with typical school dismissal and evening work commute times. Between 3pm-4pm, which coincides with typical school dismissal time, 20% of bicycle collisions involved cyclists 19 years old or younger. Between 3pm-7pm, typical work

commute times, the proportion of bicycle collisions involving cyclists 20-29 years old increases by the hour, reaching 50% of bicycle collisions between 6pm-7pm. Figure E-6 shows the age distribution of cyclists involved during morning and afternoon/evening peak times.

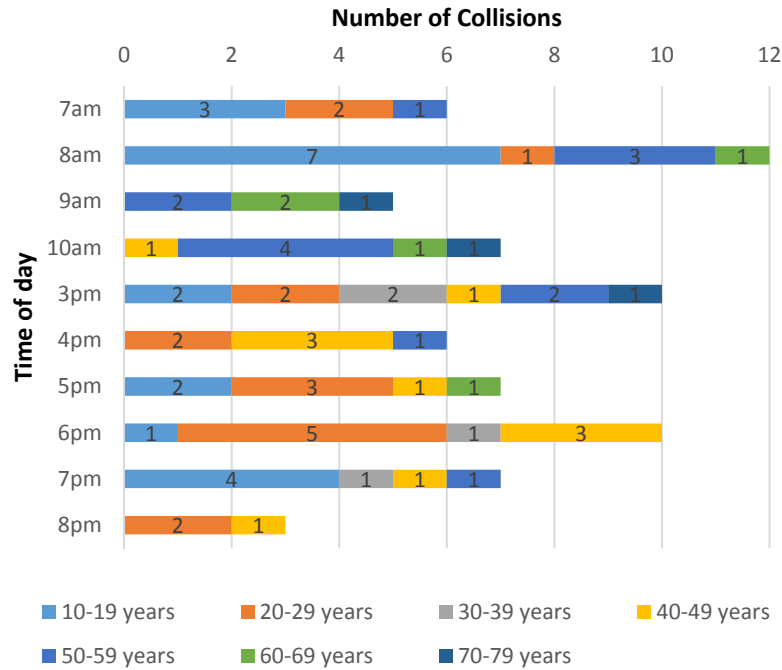


Figure E-6: Age of Bicyclists Involved

Similar to bicycle collisions, the peak hours for pedestrian collisions occurred between 7am-11am and 3pm-8pm. Figure E-7 shows the distribution of pedestrian-related collisions throughout the day.

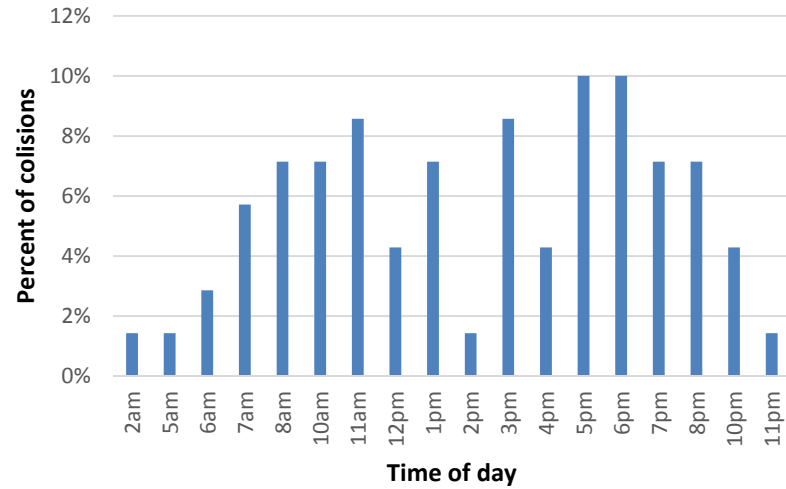


Figure E-7: Time of Pedestrian Collisions

The majority of pedestrians involved in a collision between 7am-8am and 3pm-5pm were age 10-19 years old. These time periods align with typical school start and dismissal times. In the evening, pedestrian collisions were more equally distributed across age groups. The majority of these collisions occurred in the downtown Livermore area and near schools. Figure E-8 shows the age distribution of pedestrians involved during morning and afternoon/evening peak times.

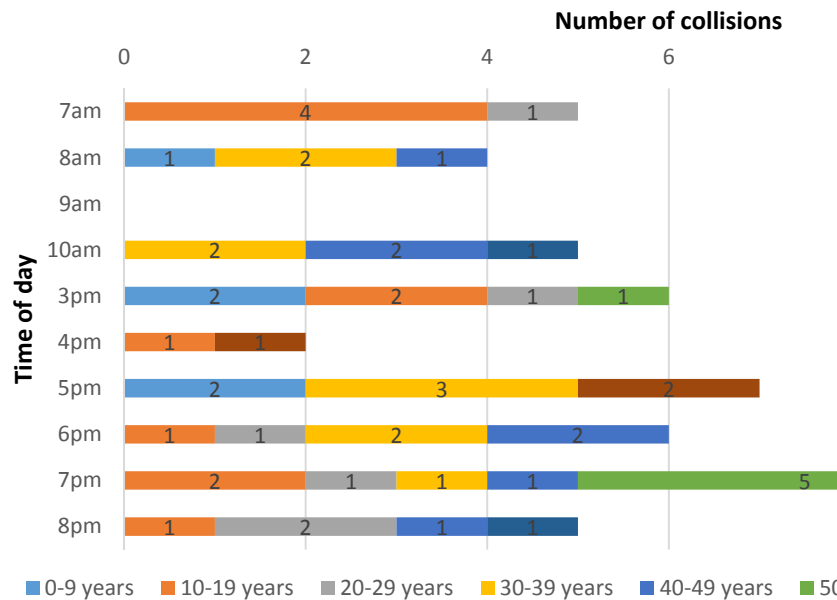


Figure E-8: Age of Pedestrians Involved

COLLISION FACTORS

In general, collisions are the result of traffic violations, lack of sufficient infrastructure, or unsafe conditions. Table E-2 and Table E-3 list the five most common primary collision factors attributed to bicycle collisions and pedestrian collisions, respectively. The collision factors can provide insight into people’s behavior or roadway feature(s) that may account for the collision.

The most common causes for bicycle-related collisions in Livermore were bicyclists traveling on the wrong side of the road. Some of these violations occurred along roadways that lack bicycle infrastructure, which suggests that the roadway configuration in these areas may not be conducive to riding directly to the bicyclist’s destination. Several of these collisions occurred at an intersection, and half of them were broadside collisions, in which the driver and bicyclist collided at a perpendicular angle. The bicyclist was at fault in almost all of the collisions that involved traveling on the wrong side of the road.

For pedestrian-related collisions, violation of the pedestrian right of way and violations made by pedestrians were equal. In the majority of pedestrian right of way violations, the pedestrian was crossing in a crosswalk at an intersection. Collisions involving pedestrian violations were evenly split into three types of occurrence, including when the pedestrian was crossing in a crosswalk at an intersection, the pedestrian was crossing outside of a crosswalk, or the pedestrian was in the road. Overall, the majority of pedestrian collisions occurred while the pedestrian was crossing, suggesting that safer crossing environments or education for drivers and pedestrians may be needed.

Table E-2: Top Bicycle Collision Factors in Livermore

VIOLATION CATEGORY	EXAMPLE	NUMBER OF COLLISIONS	BICYCLIST AT FAULT	% OF TOTAL COLLISIONS
Wrong side of road	Driver or a person on a bicycle is traveling on wrong side of road (against the flow of traffic)	32	30	26.2%
Improper turning	Driver or a person on a bicycle makes a U-turn at an intersection without a four way stop and collides with a bicyclist or vehicle	19	8	15.6%
Automobile right of way	Driver or person on a bicycle fails to yield to and then collides with a vehicle, pedestrian or bicyclist already in an intersection	19	5	15.6%
Traffic signals and signs	Driver or a person on a bicycle fails to stop at a stop sign and collides with a vehicle or person on a bicycle	12	5	9.8%
Unsafe speed	Driver or a person on a bicycle travels above the posted speed limit or at an unsafe speed for the existing roadway conditions	8	7	6.6%

Table E-3: Top Pedestrian Collision Factors in Livermore

VIOLATION CATEGORY	EXAMPLE	NUMBER OF COLLISIONS	PEDESTRIAN AT FAULT	% OF TOTAL COLLISIONS
Pedestrian right of way	Driver did not yield the right-of-way to a pedestrian crossing the roadway within any marked crosswalk or within any unmarked crosswalk at an intersection; or prior to driving over or upon any sidewalk, driver did not yield right-of-way to a pedestrian approaching	20	0	28.6%
Pedestrian violation	Pedestrian on a roadway at any point other than within a marked crosswalk or within an unmarked crosswalk at an intersection did not yield the right-of-way to all vehicles on the roadway	20	20	28.6%
Unsafe starting or backing	Driver started a vehicle stopped, standing, or parked on a highway, or backed a vehicle on a highway when movement could not be made with reasonable safety	5	0	7.1%
Automobile right of way	Driver or person on a bicycle fails to yield to and then collides with a vehicle or person on a bicycle	4	0	5.7%
Not stated		4	0	5.7%

APPENDIX F DEMAND ANALYSIS

This appendix provides detailed information on the Bicycle and Pedestrian Composite Demand Model discussed in Chapter 4.

The Composite Demand Model is an objective, data-driven process to identify areas of higher existing and potential pedestrian and bicycle activities in Livermore. The number of people walking or biking on a street depends on a number of factors, including street typology, destinations, vehicle speeds and volumes, and land uses. Counting the number of people walking and biking on every street in Livermore is unrealistic. Instead, we can estimate the cumulative demand representative of where people live, work, learn, play, shop, and access transit. Livermore's specific land use and transportation factors are considered in conjunction with demographic data that correlate with bicycle and pedestrian trip generation.

By estimating where there is high demand for walking and biking trips, projects can be prioritized for locations that will have the biggest impact on the community. It's important to note that this demand analysis does not necessarily reflect the current level of walking and biking activity; rather it captures the latent demand, or the potential for walking and biking trips. The demand analysis is one of several tools that informed this Plan's project and program recommendations. Other tools include the Bicycle Level of Traffic Stress, Pedestrian Level of Service, and Network Connectivity Analyses.

METHODOLOGY

Spatial analysis of the proximity and density of trip generators (where people live) and trip attractors (where people work, shop, play, access public transit, and go to school) helps identify areas with high potential demand for bicycle and pedestrian activity in Livermore. The list of data inputs is shown in Table F-1. The demand analysis displays expected pedestrian and bicyclist demand in Livermore; the darker the color, the more potential demand there is for walking and biking trips. This method is based on the *Low-Stress Bicycling and Network Connectivity* report released by the Mineta Transportation Institute (2012).

The following maps display the walking and bicycling demand analysis results for each of the six categories. The final product is a composite map, where each category is combined into one map, to show the overall demand for walking and biking trips throughout the City.

The demand model's scoring method is a function of density and proximity. Areas that have more features and features that are closer together will have higher scores. For example, a census block that contains three schools will receive a higher score than a census block with only one school. Low feature density areas and areas where features are over one-quarter mile away will receive lower scores. Composite demand is calculated by summing the six categories: Live, Work, Play, Shop, Learn, and Access to Transit. All categories are given the same weight.

The figures in the following sections illustrate and describe how the demand model categories support a holistic profile of high-demand areas in the Livermore.

DATA LIMITATIONS

This model approximates expected pedestrian and bicyclist activity along the street network using census blocks as the unit of analysis. While census blocks closely mimic the street network, they also vary in size. The data for each model input is tied to the census block and divided evenly throughout the block in a point grid system regardless of the spatial location of the input data. The number of jobs in each census block is attributed to the whole census block regardless of where those jobs are located. Thus, demand may be more spread out or concentrated along the street network than is actually shown. The demand model still provides a high-level analysis of pedestrian and bicyclist demand. Closer inspection of certain hot spots may be needed due to inherent limitations of the model.

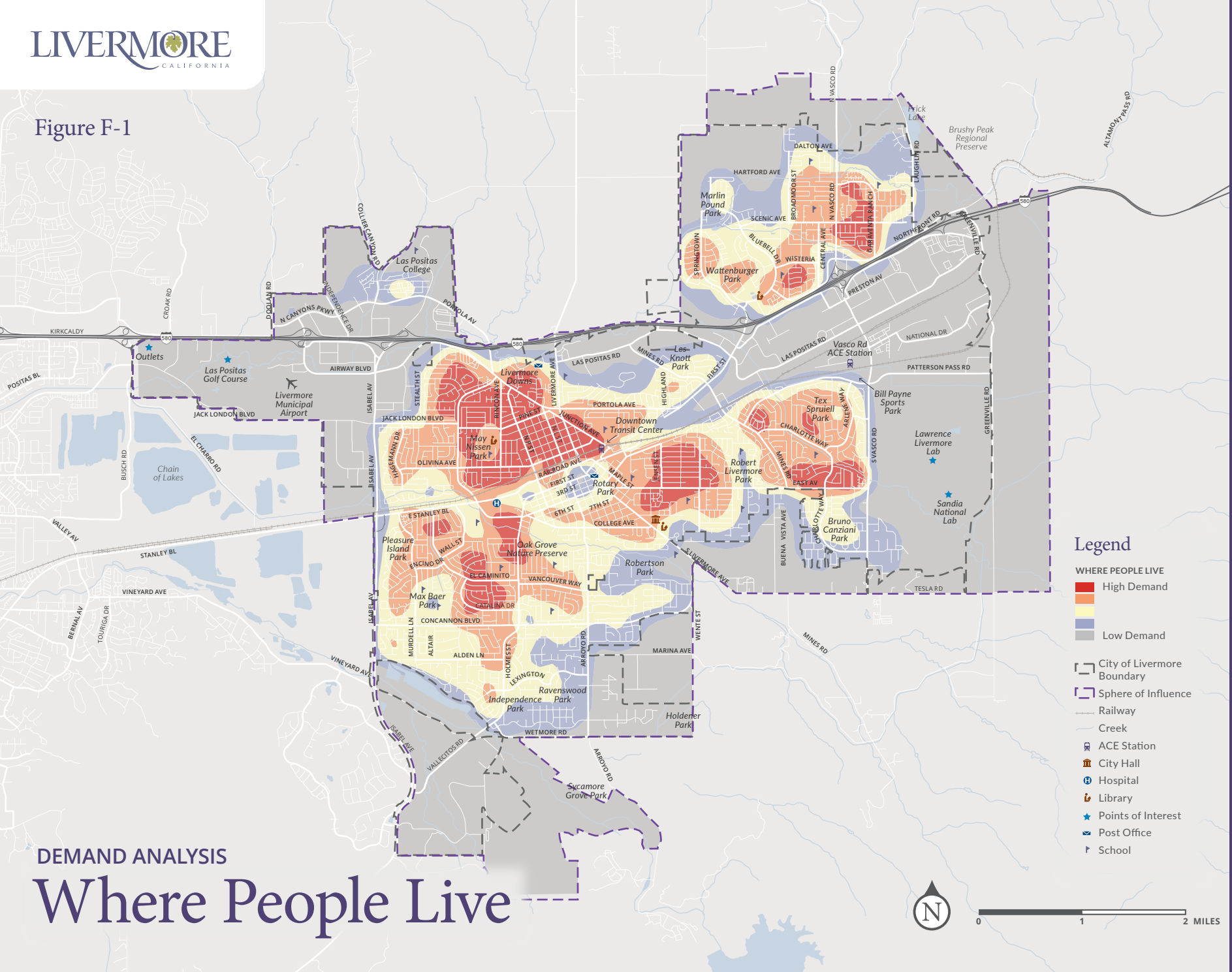
Table F-1: Source of Demand Model Inputs

CATEGORY	MODEL INPUT	SOURCE	NOTES
LIVE Figure F-1	Total Population	2010 U.S. Census	This category is defined by population density at the census block level. Census block population data is from the 2010 U.S. Census. Census blocks areas represent potential trip origin locations, or places where a person would begin a walking or biking trip.
WORK Figure F-2	Total Employment	2013 U.S. Census Longitudinal Employer-Household Dynamics (LEHD) City of Livermore Community and Economic Development Department	This category represents trip endpoints (regardless of place of residence) for people working in Livermore and adjacent areas. The demand is based on the number of jobs at the census block level. Depending on the employment type, places where people work can act as trip attractors (such as retail stores and restaurants), trip generators (such as office buildings) or both. Areas of high demand for pedestrian and bicyclist activity represent high density trip destinations and one-quarter mile surrounding them; Some residential areas are shown as having medium demand for jobs due to nearby employment areas, which can produce pedestrian and bicyclist activity along the streets that provide access to these jobs. LEHD: Summarized by census block and only provides the number of jobs within the census block by job industry. City of Livermore: Used employment numbers provided by the city for major employers
LEISURE (PLAY) Figure F-3	Parks	City of Livermore parcel data	The Play category includes a combination of major recreational and leisure destinations: parks, community centers, wineries, and libraries. This list is not exhaustive, but provides a snapshot of where residents and visitors will recreate. Where people play in Livermore is based on the existence of the inputs in each census block. Census blocks with more parks or more wineries will receive higher scores. Using a one-quarter mile search radius, areas with a high density of categories resulting in “play” are determined
	Libraries	City of Livermore parcel data	
	Wineries	Livermore Valley Winegrowers Association	
	Community centers	City of Livermore	

CATEGORY	MODEL INPUT	SOURCE	NOTES
LEARN Figure F-4	Elementary schools, middle schools, high schools, and colleges Daycare centers, preschools, and private schools	City of Livermore	Walking and biking demand is based on the existence of a school. The more schools clustered in a census block, the higher the demand. The exception to this methodology is Las Positas College. It is assumed that college students spend approximately as much time on campus as workers do at a full-time job. Therefore, the demand for Las Positas College was based on the number of enrolled students at Las Positas College and the acreage of the campus.
SHOP Figure F-5	Retail and commercial destinations	2013 U.S. Census Longitudinal Employer-Household Dynamics (LEHD)	Retail and commercial areas were identified using data on service sector jobs: Arts, Entertainment, and Recreation; Accommodation and Food Services; and Other Services (except Public Administration). These three employment sectors are important drivers of retail demand since they account for the various retail and service industries. Unlike the “Where People Work” analysis, which examined total employment numbers throughout the city, the “Where People Shop” analysis is more narrow in an attempt to estimate retail demand.
TRANSIT Figure F-6	Bus ridership ACE ridership	LAVTA bus stop data specific to Wheels Bus, including stop locations and ridership ACE station locations	Density of pedestrian demand is measured using a quarter-mile search radius of transit access points. Demand for walking and biking to and from Wheels Bus stops was determined by LAVTA on/off boarding data from 2015 to reflect the number of transit riders at each stop. On/off boarding data was not available for the two Livermore ACE stations. The demand for walking and biking activity to and from ACE stations was determined by average ridership data from a 2014 ACE report ¹ , which estimated 300 to 590 ACE riders reside in Livermore. The average of these two values (445) was used to estimate approximate boardings at each ACE station, and does not account for the number of ACE riders disembarking at each ACE station. The areas of high demand reflect the highest likelihood for pedestrians and/or bicyclists to use the street network to access Wheels bus stops and ACE stations.

¹ Mortensen, Stacey (2014). “What is ACE?” [Powerpoint slides] Retrieved from: <http://www.acerail.com/About/Public-Projects/ACEforward/ACEforward-Informational-Materials/Oct30ACE1-WhatisACEpresentation.pdf>

Figure F-1



Legend

- WHERE PEOPLE LIVE
- High Demand
 - Medium Demand
 - Low Demand

- City of Livermore Boundary
- Sphere of Influence
- Railway
- Creek
- ACE Station
- City Hall
- Hospital
- Library
- Points of Interest
- Post Office
- School

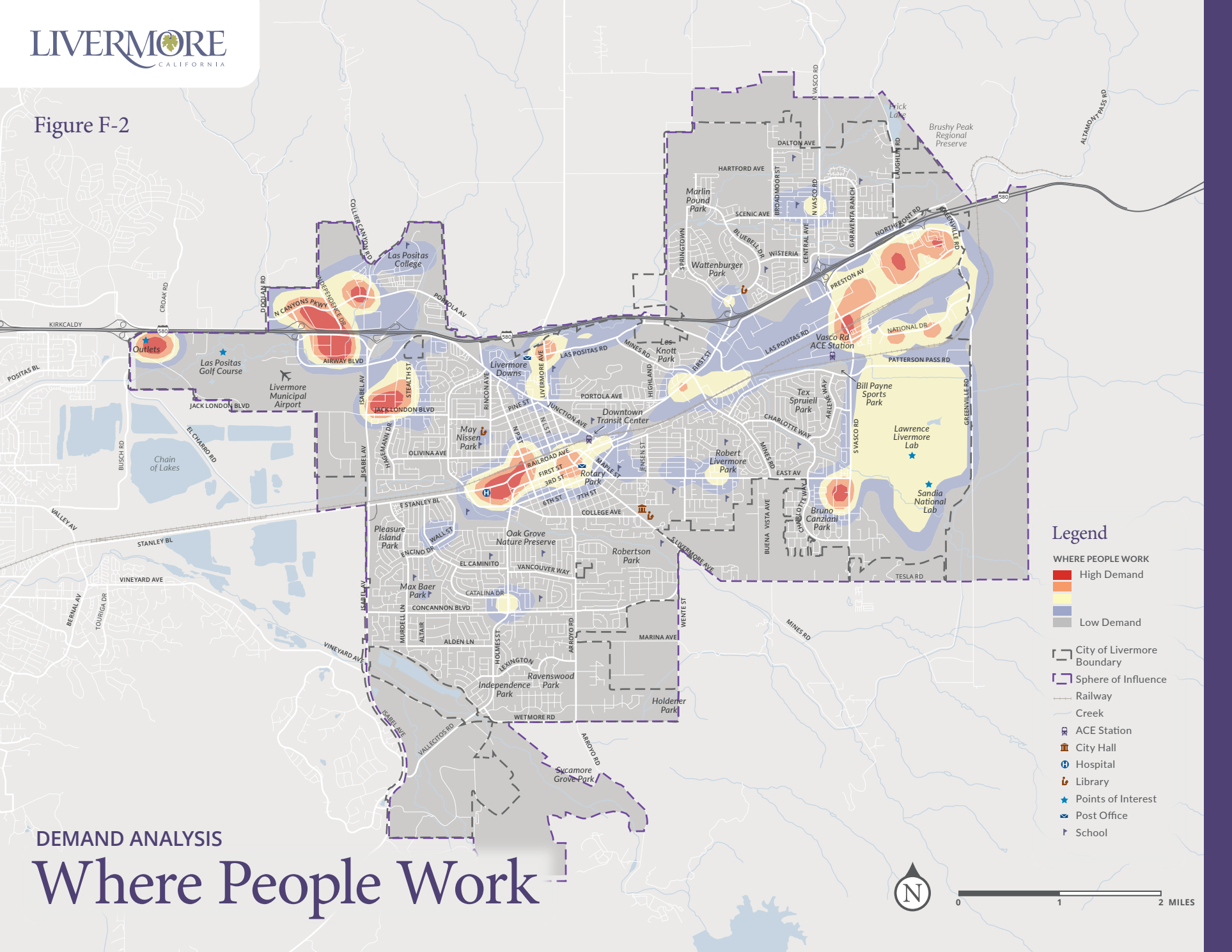
DEMAND ANALYSIS

Where People Live



0 1 2 MILES

Figure F-2



Legend

- WHERE PEOPLE WORK
- High Demand
- Low Demand

- City of Livermore Boundary
- Sphere of Influence
- Railway
- Creek
- ACE Station
- City Hall
- Hospital
- Library
- Points of Interest
- Post Office
- School

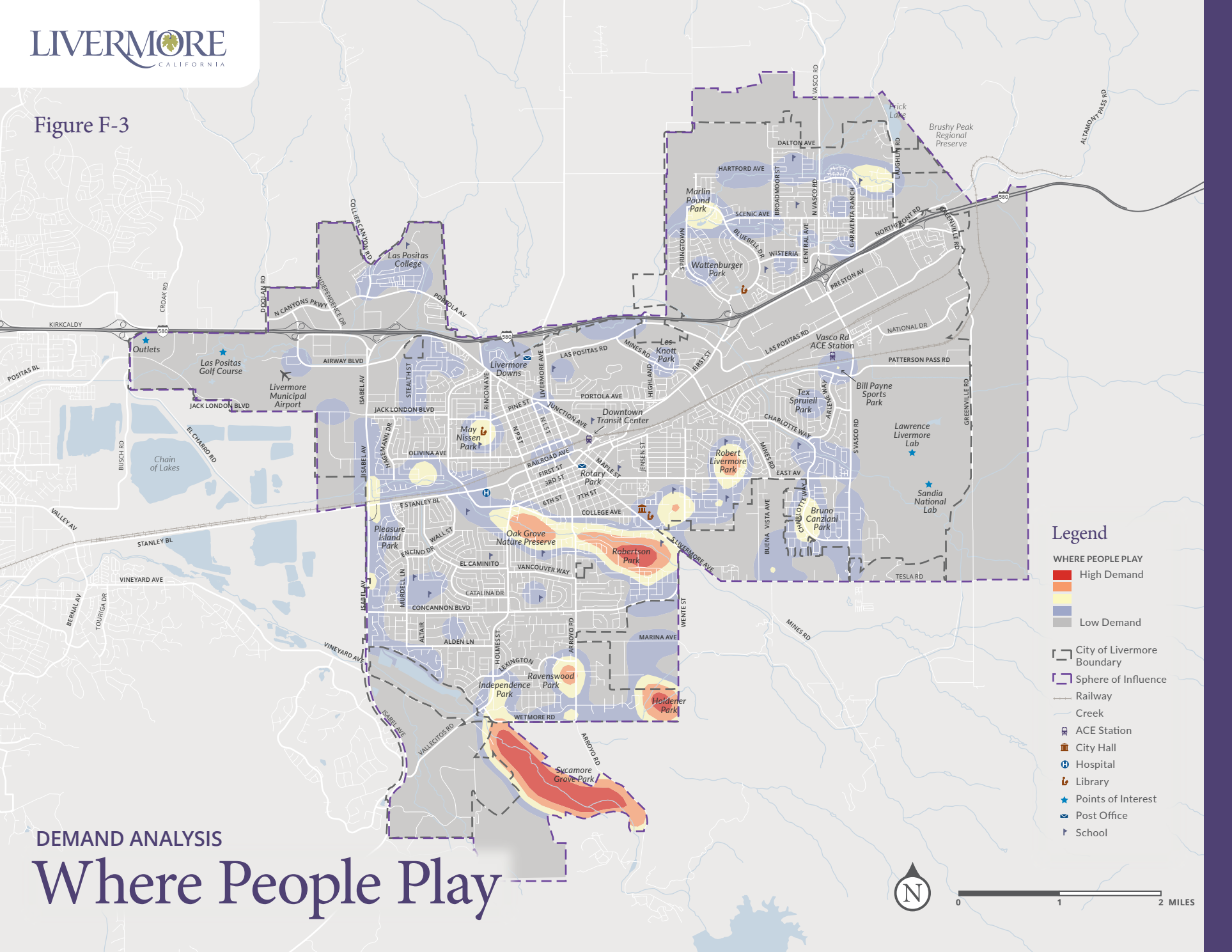
DEMAND ANALYSIS

Where People Work



0 1 2 MILES

Figure F-3



Legend

- WHERE PEOPLE PLAY
- High Demand
 - Medium Demand
 - Low Demand

- City of Livermore Boundary
- Sphere of Influence
- Railway
- Creek
- ACE Station
- City Hall
- Hospital
- Library
- Points of Interest
- Post Office
- School

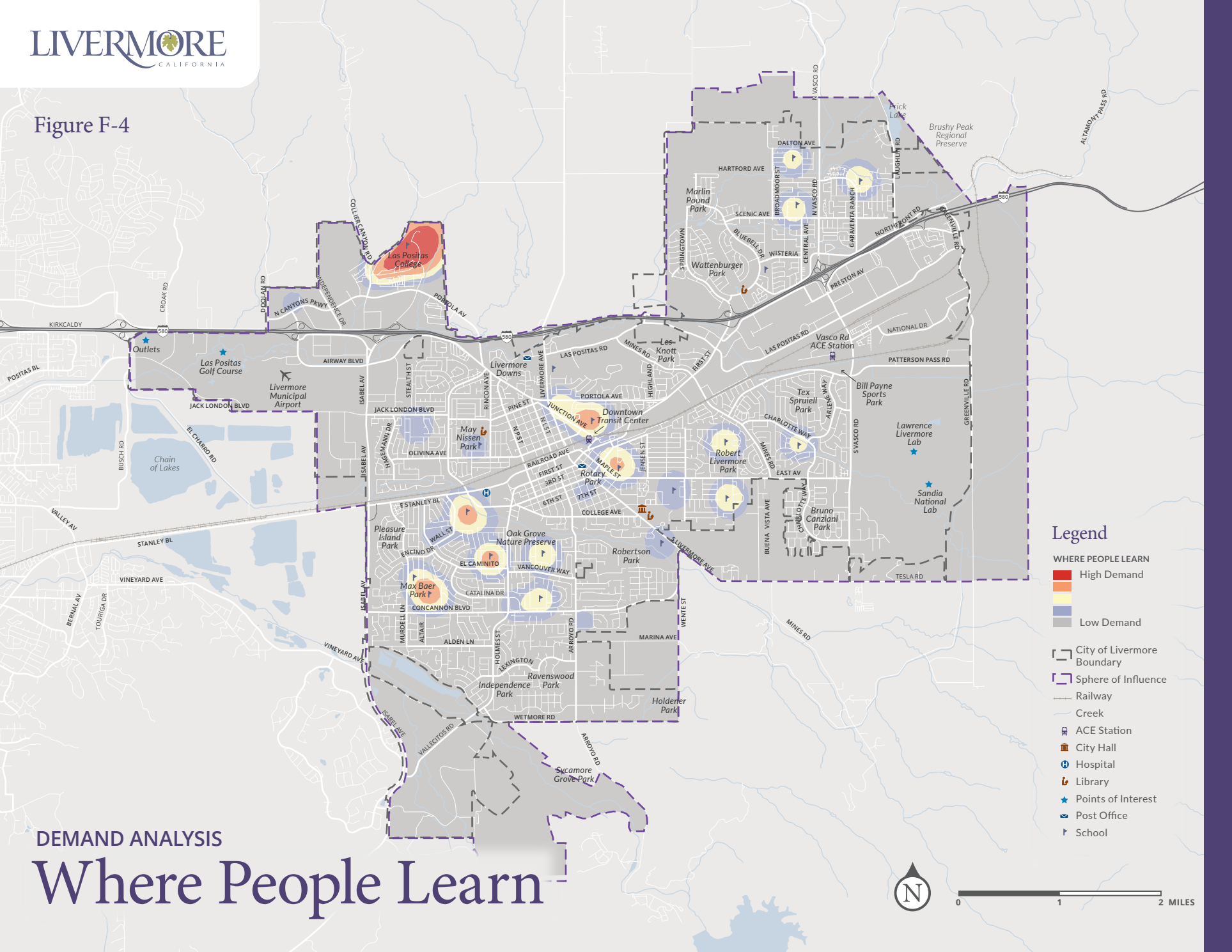
DEMAND ANALYSIS

Where People Play



0 1 2 MILES

Figure F-4



Legend

- WHERE PEOPLE LEARN
- High Demand
- Low Demand

- City of Livermore Boundary
- Sphere of Influence
- Railway
- Creek
- ACE Station
- City Hall
- Hospital
- Library
- Points of Interest
- Post Office
- School

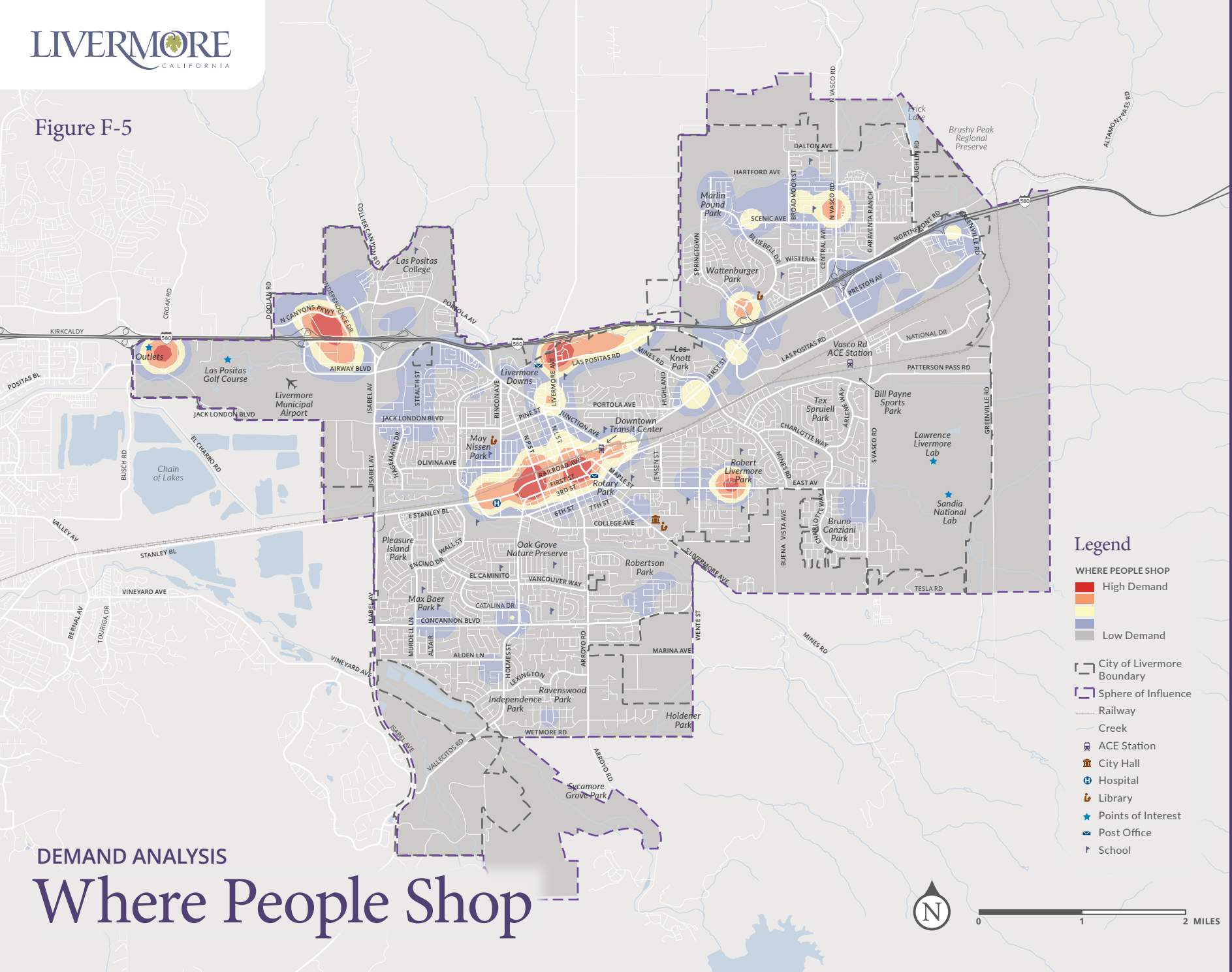
DEMAND ANALYSIS

Where People Learn



0 1 2 MILES

Figure F-5



Legend

- WHERE PEOPLE SHOP
- High Demand
- Low Demand
- City of Livermore Boundary
- Sphere of Influence
- Railway
- Creek
- ACE Station
- City Hall
- Hospital
- Library
- Points of Interest
- Post Office
- School

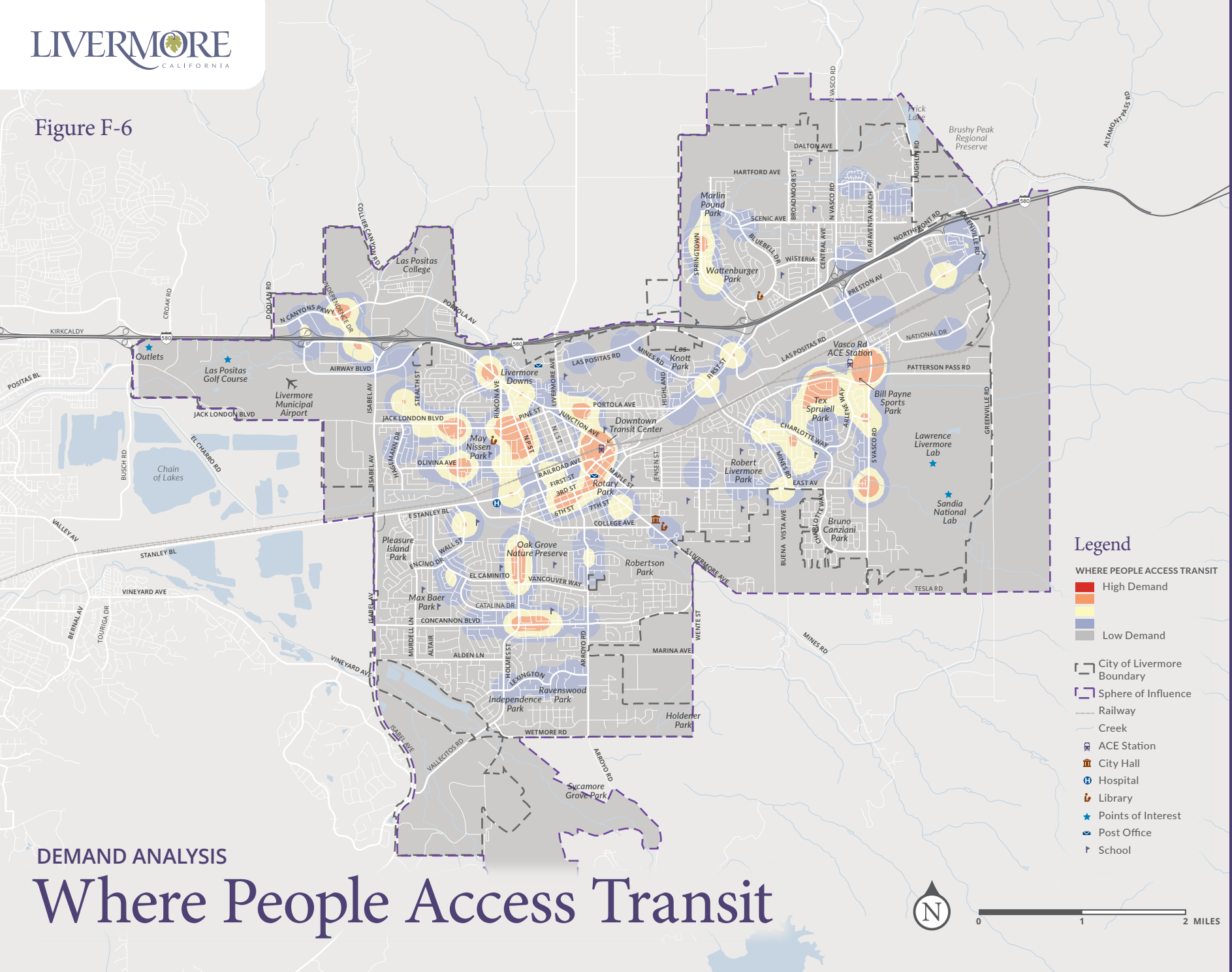
DEMAND ANALYSIS

Where People Shop



0 1 2 MILES

Figure F-6



DEMAND ANALYSIS

Where People Access Transit



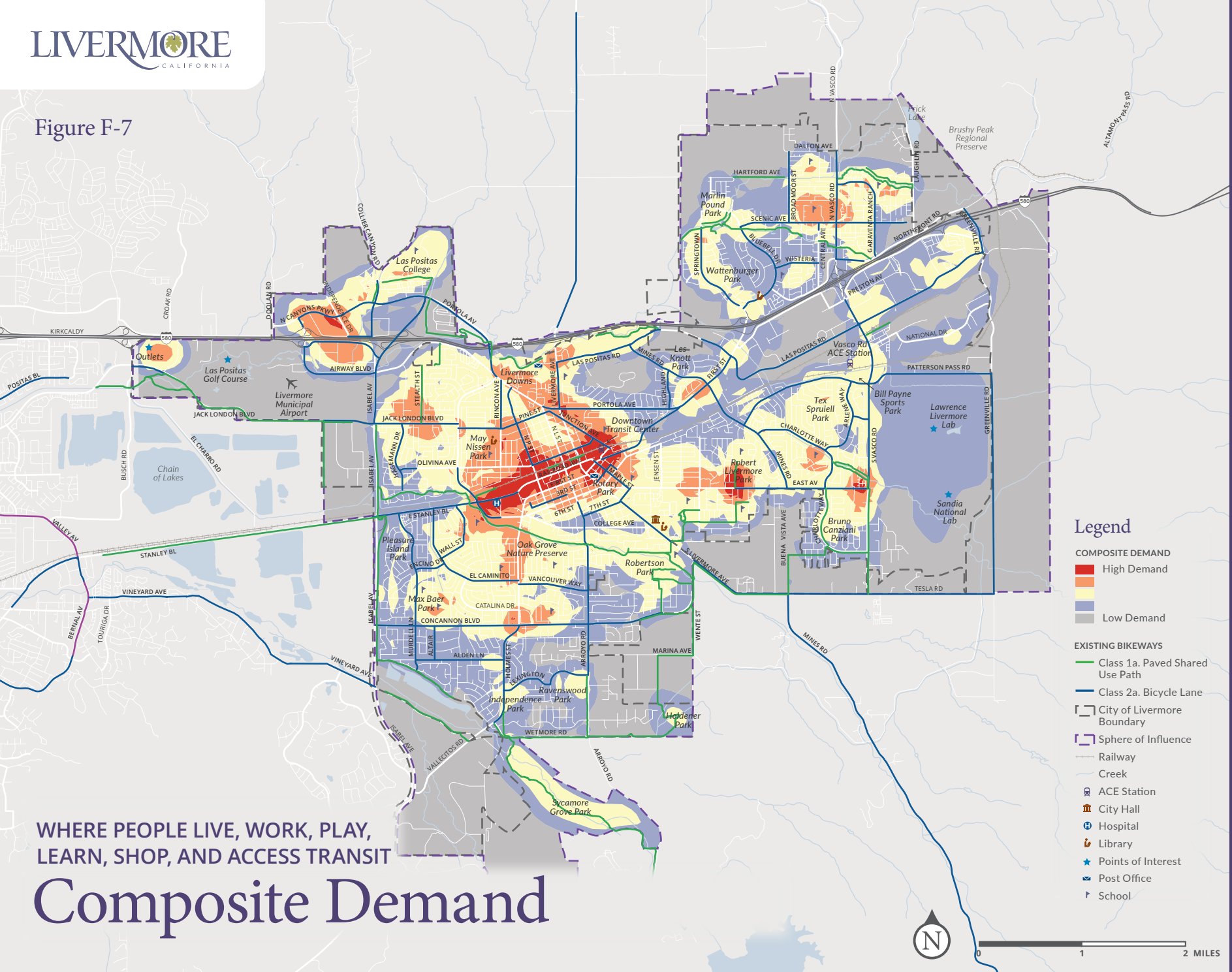
0 1 2 MILES

COMPOSITE DEMAND

Spatial analysis of the proximity and density of trip generators (where people live) and trip attractors (where people work, shop, play, access public transit, and go to school) can help identify areas with high potential demand for pedestrian and bicycle activity in Livermore. Figure F-7 overlays trips generators and trip attractors into a single composite sketch of pedestrian and bicycle demand in Livermore: the darker the color, the higher the demand for walking and bicycling. Areas of high demand are in parts of Livermore where there are schools, particularly Mendenhall Middle School and Livermore High School, as well as parks. Las Positas College in the northwest part of Livermore has high potential demand for walking and bicycling. Other areas of high demand include Downtown Livermore and the Downtown Livermore Transit Station, where people dine, shop, and access transit. The composite map illustrates that there are high areas of demand that can be found throughout Livermore, indicating that there are a variety of attractors and generators of pedestrian and bicycle activity.

The current bicycle, trails, and sidewalk network is overlaid on the composite demand map to illustrate how well existing facilities provide coverage and connectivity to high demand areas. The results can be used to identify bikeway network gaps and to prioritize bicycle projects in areas of high trip demand. Existing bikeways and sidewalks provide access to much of the high demand areas of Livermore. However, coverage is not universal; gaps exist in the current bicycle and pedestrian networks, including on East Avenue, Olivina Avenue, and Holmes Street. There is poor connectivity for active transportation between the Northeast and Northwest neighborhoods (north of I-580) and the rest of the city.

Figure F-7



Legend

- COMPOSITE DEMAND
 - High Demand
 - Medium Demand
 - Low Demand
 - Very Low Demand
- EXISTING BIKEWAYS
 - Class 1a. Paved Shared Use Path
 - Class 2a. Bicycle Lane
- City of Livermore Boundary
- Sphere of Influence
- Railway
- Creek
- ACE Station
- City Hall
- Hospital
- Library
- Points of Interest
- Post Office
- School

WHERE PEOPLE LIVE, WORK, PLAY,
LEARN, SHOP, AND ACCESS TRANSIT

Composite Demand

APPENDIX G BICYCLE LEVEL OF TRAFFIC STRESS ANALYSIS

This appendix describes in further detail the Bicycle Level of Traffic Stress (BLTS) analysis discussed in Chapter 4.

Traffic stress is the perceived sense of danger associated with bicycling in, or adjacent to, vehicle traffic. A BLTS analysis is an objective, data-driven evaluation which classifies road segments and intersections into four levels of traffic stress from LTS 1 (least stressful) to LTS 4 (most stressful):

- **LTS 1:** Presenting little traffic stress and demanding little attention from bicyclists, and attractive enough for a relaxing bike ride. Suitable for almost all bicyclists, including children trained to safely cross intersections. On links, bicyclists are either physically separated from traffic, or are in an exclusive bicycling zone next to a slow traffic stream with no more than one lane per direction, or are on a shared road where they interact with only occasional motor vehicles (as opposed to a stream of traffic) with a low speed differential. Where bicyclists ride alongside a parking lane, they have ample operating space outside the zone into which car doors are opened. Intersections are easy to approach and cross.
- **LTS 2:** Presenting little traffic stress and therefore suitable for most adult bicyclists but demanding more attention than might be expected from children. On links, bicyclists are either physically separated from traffic, or are in an exclusive bicycling zone next to a well-confined traffic stream with adequate clearance from a parking lane, or are on a shared road where they interact with only occasional motor vehicles (as opposed to a stream of traffic) with a low

speed differential. Where a bike lane lies between a through lane and a right-turn lane, it is configured to give bicyclists unambiguous priority where cars cross the bike lane and to keep car speed in the right-turn lane comparable to bicycling speeds. Crossings are not difficult for most adults.

- **LTS 3:** More traffic stress than LTS 2, yet markedly less than the stress of integrating with multilane traffic, and therefore tolerable to many people currently riding bikes in American cities. Offering bicyclists either an exclusive riding zone (lane) next to moderate-speed traffic or shared lanes on streets that are not multilane and have moderately low speed. Crossings may be longer or across higher-speed roads than allowed by LTS 2, but are still considered acceptably safe to most adults.
- **LTS 4:** A level of stress beyond LTS 3.

For a bicycle network to attract the broadest segment of the population, it must provide a continuous and connected low-stress experience for users. Continuous and connected low-stress bicycle networks allow for citizens of all ages and abilities to better consider bicycling as a viable and safe form of transportation. Disconnected low-stress bicycle facilities constrain users who wish to travel across the city.

The BLTS analysis is divided into two parts:

- **Street Segment Analysis** – scores street segments based on the perceived level of stress for bicyclists along a roadway at the block level

- **Intersection & Crossing Analysis** – scores intersections and crossings based on the perceived level of stress for bicyclists passing through an intersection

GENERAL METHODOLOGY

The methods used for the BLTS analysis were adapted from the 2012 Mineta Transportation Institute (MTI) *Report 11-19: Low-Stress Bicycling and Network Connectivity*. The approach outlined in the MTI report uses roadway network data, including posted speed limit, the number of travel lanes, and the presence and character of bicycle lanes, as a proxy for bicyclist comfort level.

A comprehensive city-wide inventory of all roadways in the City of Livermore was conducted using high-quality fly-over imagery and an on-site field survey. This inventory included collecting detailed attribute information about the presence of on-street bike facilities, parking lanes, turn lanes, medians, and signalized intersections.

STREET SEGMENT ANALYSIS

The BLTS street segment scoring methodology varies depending on a variety of factors that influence a bicyclist’s perceived level of stress along a roadway and are outlined in Table G-1, Table G-2, and Table G-3.

Table G-1: BLTS Scoring Criteria for Bike Lanes Alongside a Parking Lane¹

	LTS ≥ 1	LTS ≥ 2	LTS ≥ 3	LTS ≥ 4
Street width (through lanes per direction)	1	(no effect)	2+	(no effect)
Sum of bike lane and parking lane width (including marked buffer and paved gutter)	≥15 ft	14 – 14.5 ft*	≤13.5 ft	(no effect)
Speed limit or prevailing speed	≤25 mph	30 mph	35 mph	≥40 mph
Bike lane blockage (typically applies in commercial areas)	Rare	(no effect)	Frequent	(no effect)

Notes: (no effect) means the factor does not trigger an increase to this level of traffic stress

**If speed limit is <25 mph or street class is residential then any width is acceptable for LTS 2*

¹ Ibid.

Table G-2: BLTS Scoring Criteria for Bike Lanes Not Alongside a Parking Lane²

	LTS ≥ 1	LTS ≥ 2	LTS ≥ 3	LTS ≥ 4
Street width (through lanes per direction)	1	2, if directions are separated by a raised median	2+, or 2 without a separating median	(no effect)
Sum of bike lane and parking lane width (including marked buffer and paved gutter)	≥6 ft	≤5.5 ft	(no effect)	(no effect)
Speed limit or prevailing speed	≤30 mph	(no effect)	35 mph	≥40 mph
Bike lane blockage (typically applies in commercial areas)	Rare	(no effect)	Frequent	(no effect)

At its core, as the BLTS scoring increases, cycling comfort decreases (1 is the highest comfort level and 4 is the lowest comfort level). Additionally, the number of factors that influence the overall segment BLTS score decreases as speed limit increases. This is in line with research that indicates vehicle speed is the largest influence on a bicyclist’s perceived level of comfort. This is an important point because it speaks to the need for the city to consider improving bicycle facilities both on low-stress streets with lower vehicle speeds and on high speed arterial and collector roadways.

Table G-3: BLTS Scoring Criteria for Mixed Traffic³

SPEED LIMIT	STREET WIDTH		
	2-3 LANES	4-5 LANES	6+ LANES
Up to 25 mph	LTS 1* or 2*	LTS 3	LTS 4
30 mph	LTS 2* or 3*	LTS 4	LTS 4
35+ mph	LTS 4	LTS 4	LTS 4

**Use lower value for streets without marked centerlines or classified as residential and with fewer than 3 lanes. Otherwise use higher value.*

² Ibid.

³ Ibid.

INTERSECTION AND CROSSING ANALYSIS

The intersection and crossings component of the BLTS analysis is equally important to assessing street network comfort. Most of Livermore’s bicycle collisions occurred at intersections. Improving the safety of these high-stress intersections can greatly reduce the stress felt by bicyclists as they approach and pass through an intersection or crossing.

Unsignalized crossings increase stress for cyclists along otherwise low-stress routes. An intersection level of service analysis was completed to identify challenging or uncomfortable crossings. Crossing comfort decreases as the number of lanes and posted speed increase. The BLTS intersection and crossing scoring methodology varies depending on a variety of factors that influence a bicyclist’s perceived level of stress while biking through an intersection, as outlined in Table G-4, Table G-5, Table G-6, and Table G-7.

Table G-4: LTS Criteria for Pocket Bike Lanes⁴

CONFIGURATION	LTS
Single right-turn lane up to 150 ft long, starting abruptly while the bike lane continues straight, and having an intersection angle and curb radius such that turning speed is ≤15 mph	≥2
Single right-turn lane longer than 150 ft starting abruptly while the bike lane continues straight, and having an intersection angle and curb radius such that turning speed is ≤20 mph	≥3
Single right-turn lane in which the bike lane shifts to the left but the intersection angle and curb radius are such that turning speed is ≤15 mph	≥3
Single right-turn lane with any other configuration; dual right-turn lanes; or right-turn lane along with an option (through-right) lane	4

⁴ Ibid.

⁵ Ibid.

Table G-5: BLTS Criteria for Mixed Traffic in the Presence of a Right-Turn Lane⁵

CONFIGURATION	LTS
Single right-turn lane with length ≤75 ft and intersection angle and curb radius that limit turning speed to 15 mph	(no effect)
Single right-turn lane with length between 75 and 150 ft, and intersection angle and curb radius that limit turning speed to 15 mph	≥3
Otherwise	4

Table G-6: BLTS Criteria for Unsignalized Crossings Without a Median Refuge⁶

SPEED LIMIT	STREET WIDTH		
	UP TO 3 LANES	4-5 LANES	6+ LANES
Up to 25 mph	LTS 1	LTS 2	LTS 4
30 mph	LTS 1	LTS 2	LTS 4
35 mph	LTS 2	LTS 3	LTS 4
40+ mph	LTS 3	LTS 4	LTS 4

Table G-7: BLTS Criteria for Unsignalized Crossings With a Median Refuge at Least Six Feet Wide⁷

SPEED LIMIT	STREET WIDTH		
	UP TO 3 LANES	4-5 LANES	6+ LANES
Up to 25 mph	LTS 1	LTS 1	LTS 2
30 mph	LTS 1	LTS 2	LTS 3
35 mph	LTS 2	LTS 3	LTS 4
40+ mph	LTS 3	LTS 4	LTS 4

⁶ Ibid.

⁷ Ibid.

RESULTS

The results of the BLTS analysis can be seen in Figure G-1. Roadways and intersections with the highest level of bicycle comfort are shown in dark green. These roadways and intersections include a majority of neighborhood residential streets due to their low vehicle speeds and two-lane roadways. Bright green and yellow-green roadway segments and intersections indicate slightly higher stress conditions than the dark green segments, but are still generally comfortable for bicyclists. Moderate to high stress segments and intersections for bicyclists are shown in yellow, orange, and red. Higher stress segments and intersections include corridors where there is no dedicated space for bicycling and high traffic speeds, or where conventional bike lanes do not provide sufficient comfort given the context of multiple lanes and higher traffic speeds.

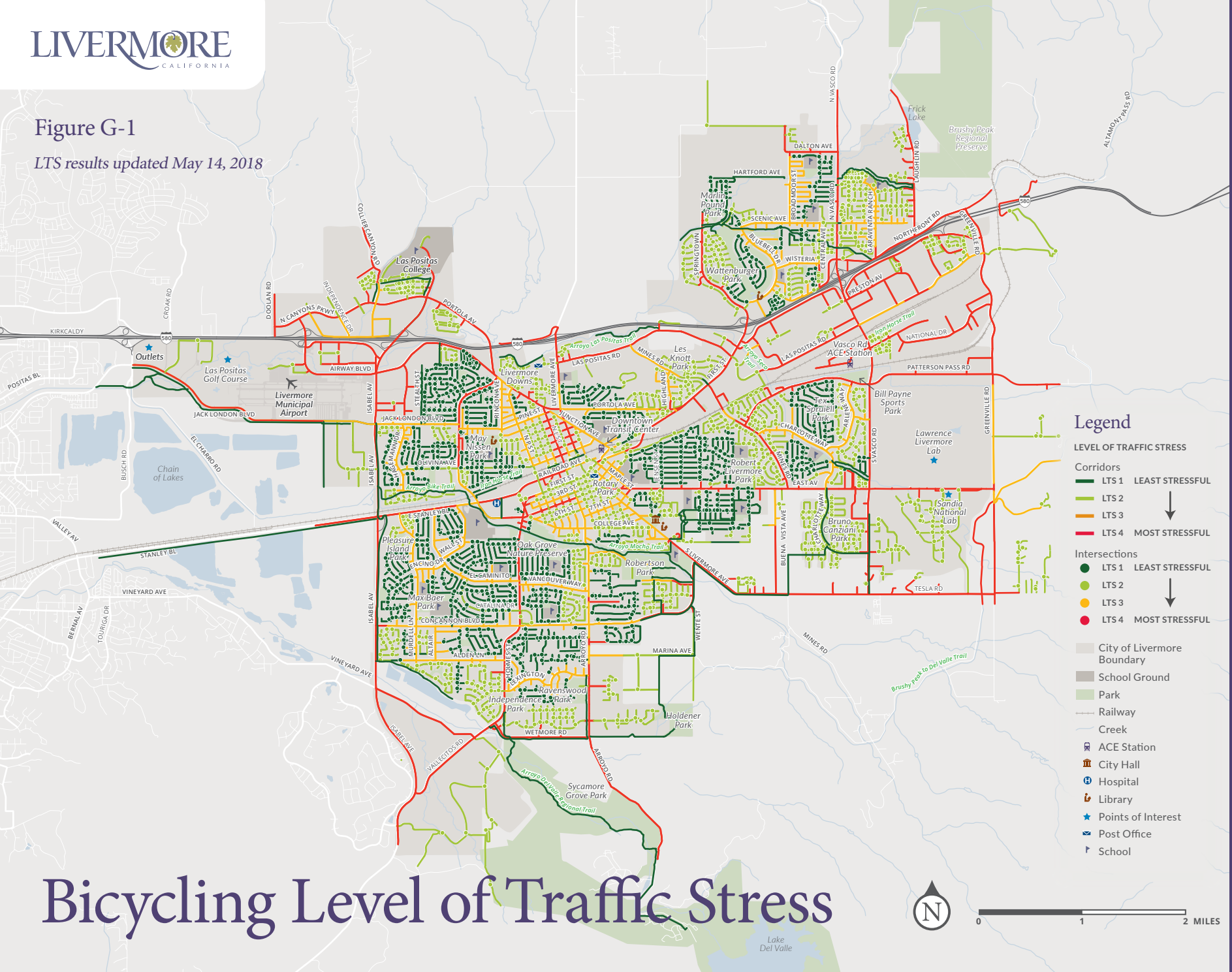
Table G-8 outlines the total mileage and percentage of the City of Livermore's roadway and trail network by BLTS segment score. All paved off-street paths (trails) are assigned an LTS segment score of 1.

Table G-8: BLTS Results – Summary Statistics

SEGMENT SCORE	TOTAL MILEAGE	% OF TOTAL ROADWAY AND TRAIL NETWORK
LTS 1	104	25.81%
LTS 2	148	36.72%
LTS 3	62	15.38%
LTS 4	89	22.08%

Figure G-1

LTS results updated May 14, 2018



Legend

LEVEL OF TRAFFIC STRESS

- Corridors**
- █ LTS 1 LEAST STRESSFUL
 - █ LTS 2
 - █ LTS 3
 - █ LTS 4 MOST STRESSFUL
- Intersections**
- LTS 1 LEAST STRESSFUL
 - LTS 2
 - LTS 3
 - LTS 4 MOST STRESSFUL

- ▭ City of Livermore Boundary
- ▭ School Ground
- ▭ Park
- Railway
- Creek
- 🚊 ACE Station
- 🏛️ City Hall
- 🏥 Hospital
- 📖 Library
- ★ Points of Interest
- ✉️ Post Office
- 🎓 School

Bicycling Level of Traffic Stress



0 1 2 MILES

APPENDIX H PEDESTRIAN LEVEL OF SERVICE ANALYSIS

Analysis of the existing pedestrian environment is important as the basis for making recommendations to improve or enhance the pedestrian network. The purpose of the Pedestrian Level of Service (PLOS) analysis is to determine if and where improvement projects may be most needed given the existing conditions as compared to expected demand. This analysis is an essential component to better understanding the existing conditions of the built environment in Livermore as it relates to pedestrians. Safe and comfortable pedestrian facilities are necessary in order to foster a community where walking is desirable. The PLOS analysis is based in part on research identifying pedestrian collision counter-measures.

The PLOS analysis scores street segments and intersections based on roadway and sidewalk characteristics that are perceived to have an impact on pedestrian safety, comfort, and ease of movement. The PLOS analysis is divided into three parts:

- **Sidewalk Gap Analysis** – Identification of gaps along the existing sidewalk network
- **Pedestrian Network Suitability** – Suitability of a roadway for pedestrian travel along that roadway
- **Intersection Suitability** – Suitability of an intersection for a pedestrian crossing

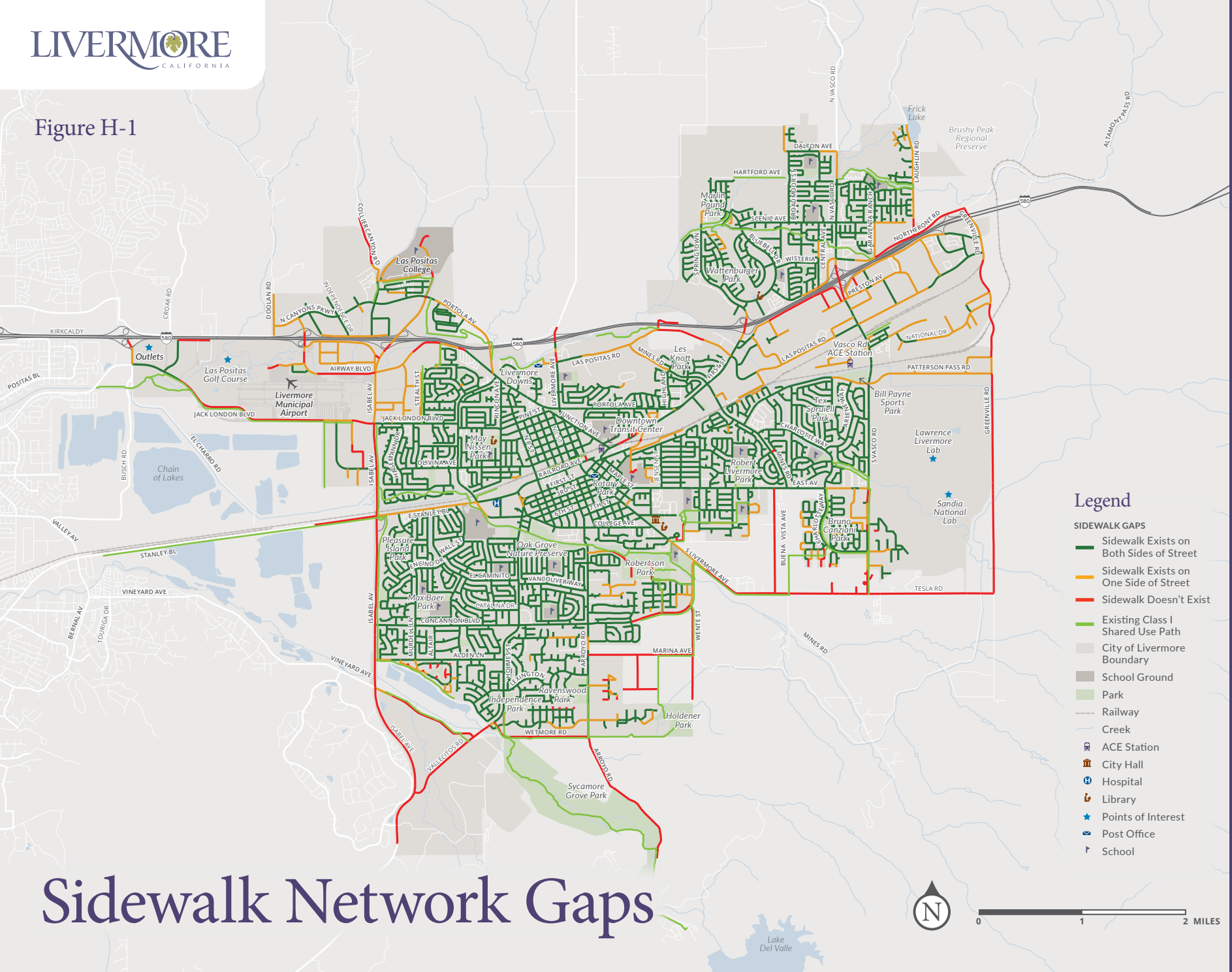
SIDEWALK GAP ANALYSIS

The sidewalk gap analysis is the result of an extensive inventory process to identify gaps in the existing sidewalk network. These gaps were identified via fly-over imagery and field survey collection. The pedestrian gap analysis is an important and necessary input for the PLOS analysis. By itself, the gap analysis may serve as a useful tool for visualizing gaps in the network at a large scale.

It is important to note that Livermore already has a strong pedestrian network that is complemented by off-street trails and paths. These trails are the safest facilities for pedestrians since they remove pedestrians from the risks of vehicle collisions. Many of Livermore's high speed streets including Isabel Ave, West Jack London Blvd, and Wetmore Rd are not suitable for pedestrians but are complemented by neighboring off-street trails. Additionally, many street segments on the rural fringe only have sidewalks on one side of the street since there is often no need for pedestrians to access the opposite side of the street. Additionally, some neighborhoods were intentionally built with only one sidewalk (such as in the South Livermore Valley Specific Plan Area) to maintain a rural feel.

The results of the sidewalk gap analysis are shown in Figure H-1. Street segments with existing sidewalk on both sides of the roadway are shown in dark green. Street segments with existing sidewalk only on one side of the roadway are shown in orange. Street segments without existing sidewalk on either side of the roadway are shown in red. Summary results of the sidewalk gap analysis are shown in Table H-1.

Figure H-1



Sidewalk Network Gaps



0 1 2 MILES

Table H-1: Sidewalk Gap Analysis – Summary Statistics

SIDEWALK PRESENCE	CENTERLINE MILEAGE	% OF TOTAL ROADWAY NETWORK
Sidewalk exists on both sides of street	262	66%
Sidewalk exists on one side of street	51	13%
No sidewalk	82	21%

PEDESTRIAN NETWORK SUITABILITY

Pedestrian network suitability is based on characteristics of the roadway and the vehicular traffic it carries, the space provided for pedestrians (pedestrian buffers like landscaping or parking lanes), as well as the presence of sidewalks along the roadway. The roadway network is scored by block and all parameters are summarized at the block level.

The PLOS model is rooted in the concept that a doubling of travel speed results in a four-fold increase in vehicular stopping time and resulting crash severity. According to one study, vehicle speed has the following impact on pedestrian fatalities¹:

- At 25 mph the probability of pedestrian fatality is 11%
- At 35 mph the probability of pedestrian fatality is 42%
- At 45 mph the probability of pedestrian fatality is 65%

¹ Tefft, B. C. Impact speed and a pedestrian's risk of severe injury or death. *Accident Analysis & Prevention* 50 (2013)

While other studies have found some variation, the relationship between vehicle impact speed and rates of pedestrian survival have been reported consistently across academic and professional literature.

The segment-based PLOS analysis measures pedestrian safety using four factors:

- Posted speed limit
- Roadway width (number of travel lanes)
- Pedestrian buffer (bicycle lanes, parking lanes, and/or landscaping)
- Presence of sidewalks

Table H-2 outlines the scoring methodology of the PLOS analysis. The analysis follows a six-point scale, with 1 representing the highest comfort level for pedestrians. Generally, more pedestrian space on a lower speed roadway segment correlates to a higher comfort level. Bicycle lanes or parking lanes act as buffers between pedestrians and motor vehicle traffic, increasing comfort. However, where sidewalks are only provided on one side of the roadway, pedestrian comfort is degraded since pedestrians are forced to cross traffic to access the sidewalk.

Table H-2: Pedestrian Network Suitability Scoring Matrix

PEDESTRIAN SPACE ALONG ROADWAY	≤ 25 MPH		30 - 35 MPH		≥ 40 MPH	
	2	> 2	2	> 2	2	> 2
	LANES	LANES	LANES	LANES	LANES	LANES
Complete sidewalk or multi-use path on both sides next to bike lane or parking lane	1	1	1	1	2	3
Complete sidewalk or multi-use path on both sides	1	1	2	3	3	4
Complete sidewalk or multi-use path on one side next to bike lane or parking lane	2	2	2	3	3	4
Complete sidewalk or multi-use path on one side	2	2	3	4	4	5
No sidewalk next to bike lane or parking lane	3	3	3	4	5	6
No sidewalk	3	3	4	5	6	6

PEDESTRIAN INTERSECTION SUITABILITY

The intersection and crossing component of the PLOS analysis is equally important to assessing comfort along the street network. Many pedestrian collisions occur at intersections; improving the safety of these high-stress crossings can reduce pedestrian stress and improve comfort.

Unsignalized crossings increase stress for people walking along otherwise low-stress routes. An intersection level of service analysis was completed to identify challenging or uncomfortable pedestrian crossings. In general, pedestrian crossing comfort decreases as the number of traffic lanes and the posted speed limit increase.

RESULTS

The results of the Pedestrian Network Suitability analysis in combination with the sidewalk gap analysis create the final PLOS results as seen in Figure H-2. Roadways with the highest level of pedestrian comfort are shown in dark green. These roadway segments feature sidewalks on both sides of the street and are either along low-speed streets or are paired with bike lanes, parking lanes, and/or landscaping as a buffer from vehicles moving up to 35 mph.

Bright green and yellow-green roadway segments indicate slightly lower comfort conditions than the dark green segments, but are still generally comfortable for pedestrians. These segments exhibit a range of conditions that include sidewalks along one or both sides of the roadway without a buffer or no dedicated space for pedestrians along two-lane streets with posted speeds up to 30 mph.

Moderate to low comfort segments for pedestrians are shown in yellow, orange, and red. These segments are characterized by either 1) sidewalks along only one side of high speed, multi-lane roadways 2) no dedicated space for pedestrians but where bike lanes or parking lanes are present along multi-lane or higher speed streets; or 3) no dedicated space for pedestrians combined with no buffer along high speed roads.

Table H-3 outlines the total mileage and percentage of the City of Livermore’s roadway and trail network by PLOS score. All paved off-street paths (trails) are assigned a score of PLOS 1.

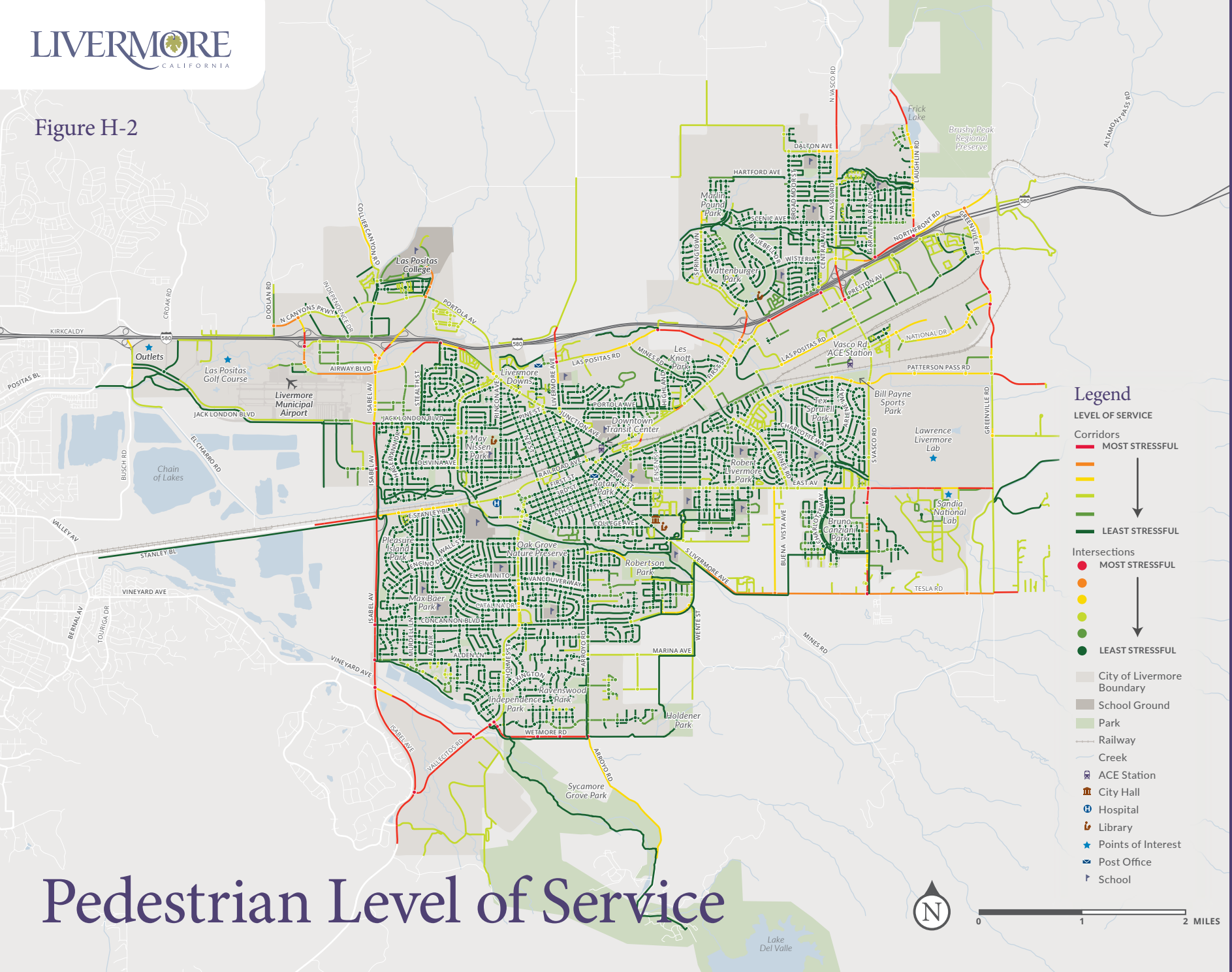
Table H-3: PLOS Results – Summary Statistics

SEGMENT SCORE	TOTAL MILEAGE	% OF TOTAL ROADWAY AND TRAIL NETWORK
PLOS 1	240	71.46%
PLOS 2	28	8.35%
PLOS 3	35	10.53%
PLOS 4	16	4.74%
PLOS 5	5	1.38%
PLOS 6	12	3.54%

Key themes from the PLOS analysis include:

- The highest levels of pedestrian comfort (roadway segments with scores of 1, 2, or 3) account for roughly 90% of roadways in Livermore and are found on low-speed residential neighborhood roadways as well as roadways in the downtown core.
- The lowest levels of pedestrian comfort (roadway segments with scores of 4, 5, or 6) account for roughly 10% of roadways in Livermore and are found on high-speed arterials, collectors, and state routes since these segments often lack sidewalks.
- Although high comfort pedestrian roadways account for an overwhelming majority of city streets in Livermore, these safe walking environments are often separated from one another by low comfort links. Improving these links are essential to increasing the demand for pedestrian transit so that citizens feel they can safely travel throughout the city. This is especially evident on roadways surrounding Interstate 580 as well as key crossings into and out of the downtown area.

Figure H-2



Pedestrian Level of Service



0 1 2 MILES

APPENDIX I DETAILED PROJECT LIST

This appendix presents detailed information on the network and crossing projects summarized in Chapter 5. A comprehensive list of projects is provided in Table I-1, listed alphabetically by location. Projects are mapped by facility type in Figure I-1 through Figure I-7. The table of all projects begins on page I-11.

The following section explains the information listed in each column of the project table. Because this table is intended to be used as a reference by location, network and crossing projects have been combined into a single table. Therefore some columns may not apply to all projects.

EXPLANATION OF TABLE ELEMENTS

PROJECT ID

Each project has an ID number used as a reference between the tables and maps of projects in this plan. Project IDs are composed of one or two letters that correspond to a facility type (i.e. BB for bicycle boulevards, L for bicycle lanes, BL for buffered bicycle lanes). Project IDs with an asterisk indicate the 50 highest benefit network and intersection projects, which include short term projects, projects determined by the Advisory Committee to have significant importance, and those evaluated by the City for overall connectivity and improvement to the existing system.

SEGMENT (SEG)

Some projects are broken into multiple segments based on logistics of implementation. These segments are identified in the “Seg” column, for applicable projects. For other projects, this column will be left blank.

PROJECT GROUP

Projects in this plan are organized into six project groups, described in Chapter 5. These include the five focus areas—school access, downtown access, crosstown routes, trail connections, and I-580 crossings—as well as sidewalk gap closures, which are broken out as a sixth project group due to their process for implementation.

FACILITY TYPE

Facility type describes the bikeway class or crossing intensity of the project. Bikeway classes are defined and described by Caltrans and the Alameda County Transportation Commission, and discussed in detail in Chapter 3. Crossing facilities for both bicyclists and pedestrians are discussed in the following section, before the list of projects.

LOCATION

Location is the name of the street or trail a project is on or adjacent to. Projects in this appendix are listed alphabetically by location. Numbered streets are listed first, regardless of whether they are numerals or spelled out (1st Street vs First Street).

CROSS STREET A

This column lists the starting cross street for network projects, or the street or facility intersection for crossing projects.

CROSS STREET B

This column lists the ending cross street for network projects. For crossing projects, this column will be left blank.

USER

Some intersections are identified for bicycle-only improvements or pedestrian-only improvements, while others are recommended for both. This is based on the existing conditions of the intersection, which may already have adequate facilities for pedestrians, such as marked crosswalks, medians, and pedestrian countdown signals, or are low volume roadways that bicyclists can comfortably navigate.

For crossing projects, this column identifies whether improvements were developed for people walking, bicycling, or both. For network projects, this column will be left blank.

SOURCE

This column lists the provenance of a project using three abbreviated codes:

- **PP** indicates a previously proposed project carried forward from an existing document, including the 2001 Bike Plan
- **AP** indicates a project from the 2001 plan that was adapted in this update, including changes to project extents or facility type
- **NEW** indicates a project identified for the first time in this Plan through community input or project team discussions

SCHOOL

For School Access projects, this column lists the school or schools the project is located near or intended to serve. School levels are abbreviated: ES for elementary school, MS for middle school, K8 for Kindergarten through 8th grade schools, and HS for high school. Almond School is listed simply as “Almond,” as it is no longer an active elementary school but the campus continues to house other school-related activities.

REBALANCING (REBAL)

Many network projects are able to be accommodated within existing roadway widths, with minimal rebalancing required. Other projects on constrained roadways will require further study and/or significant rebalancing to create necessary width for the bikeway. Rebalancing efforts might include eliminating a travel lane, removing on-street parking, or relocating curbs and hardscaping to widen a roadway. These efforts will require additional community outreach and study to identify the solution that best fits the specific context and community need.

Projects that require this increased level of rebalancing are indicated with an X in the “Rebal” column. For crossing projects and projects that do not require significant rebalancing, this column will be left blank.

LENGTH

Network projects include length in miles. This is used to calculate planning-level construction and maintenance cost estimates based on unit cost assumptions described in Chapter 6. For crossing projects, this column will be left blank.

COST ESTIMATE

Planning-level cost estimates for construction and maintenance of each project are provided. All cost estimates are 2017 dollars rounded to the nearest \$100 and do not include cost escalation.

Two costs are provided for each project: an estimated construction cost (CONST) and an estimated annual maintenance cost (MAINT). Both are based on unit costs developed for each facility type and multiplied by the length of the project (if applicable). The cost estimating process is discussed in further detail in Chapter 6 and Appendix K.

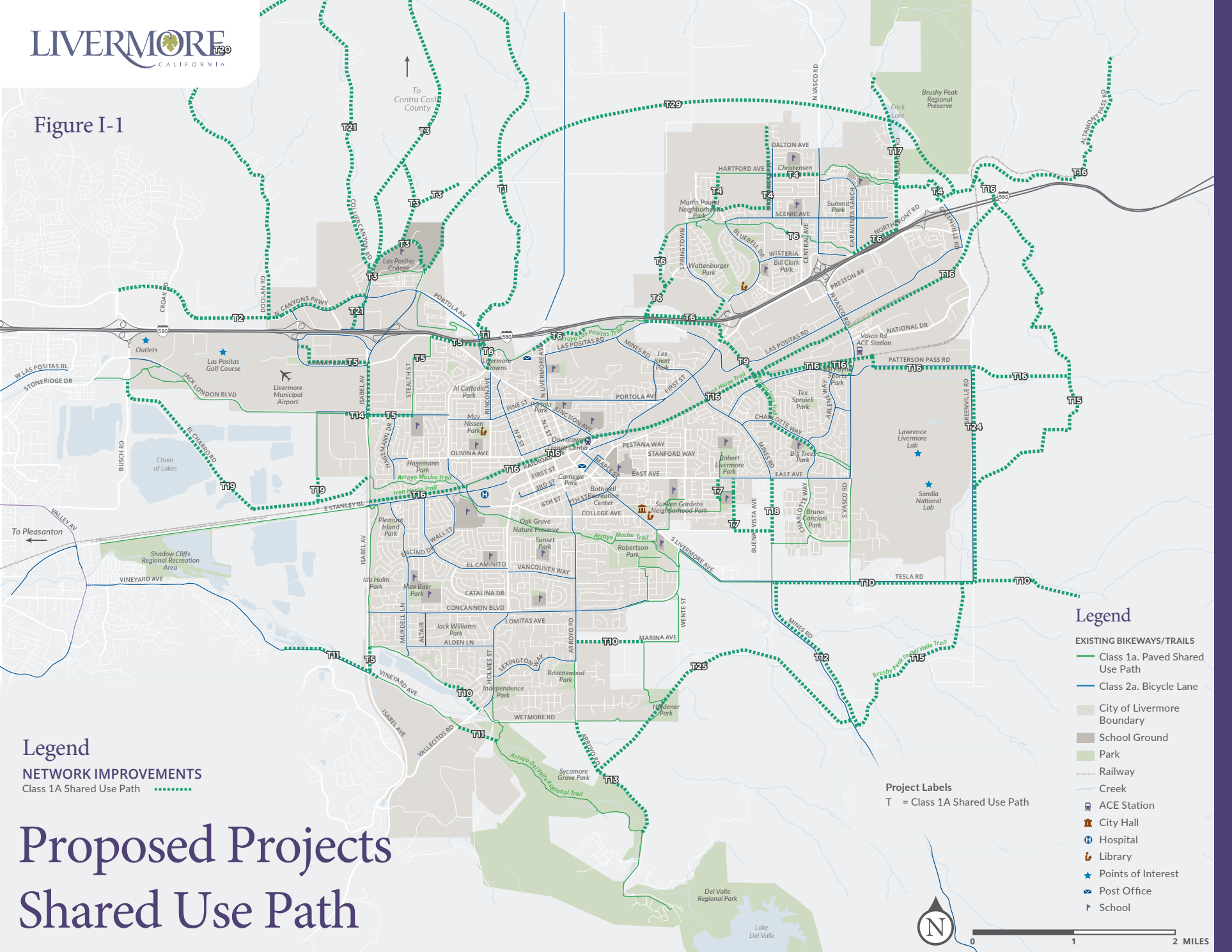
Cost estimates were not developed for the ten I-580 crossing projects, as these are likely to be completed through coordination with Caltrans as opportunities arise rather than pursued as standalone projects.

IMPLEMENTATION (IMPL) STRATEGY

Based on the benefit and feasibility evaluation described in Chapter 6, projects were grouped into four implementation strategies:

- **Short Term** improvements are high functioning and easy to implement projects for short term development
- **Long Term** improvements are projects for further study and evaluation, which may require grant funding to advance
- **Opportunity** improvements are lower benefit projects that may become opportunities if funding or partnerships arise
- **Future** improvements are challenging projects that may be pursued long term, but are not a high benefit at this time

Figure I-1



Legend
NETWORK IMPROVEMENTS
 Class 1A Shared Use Path

Legend

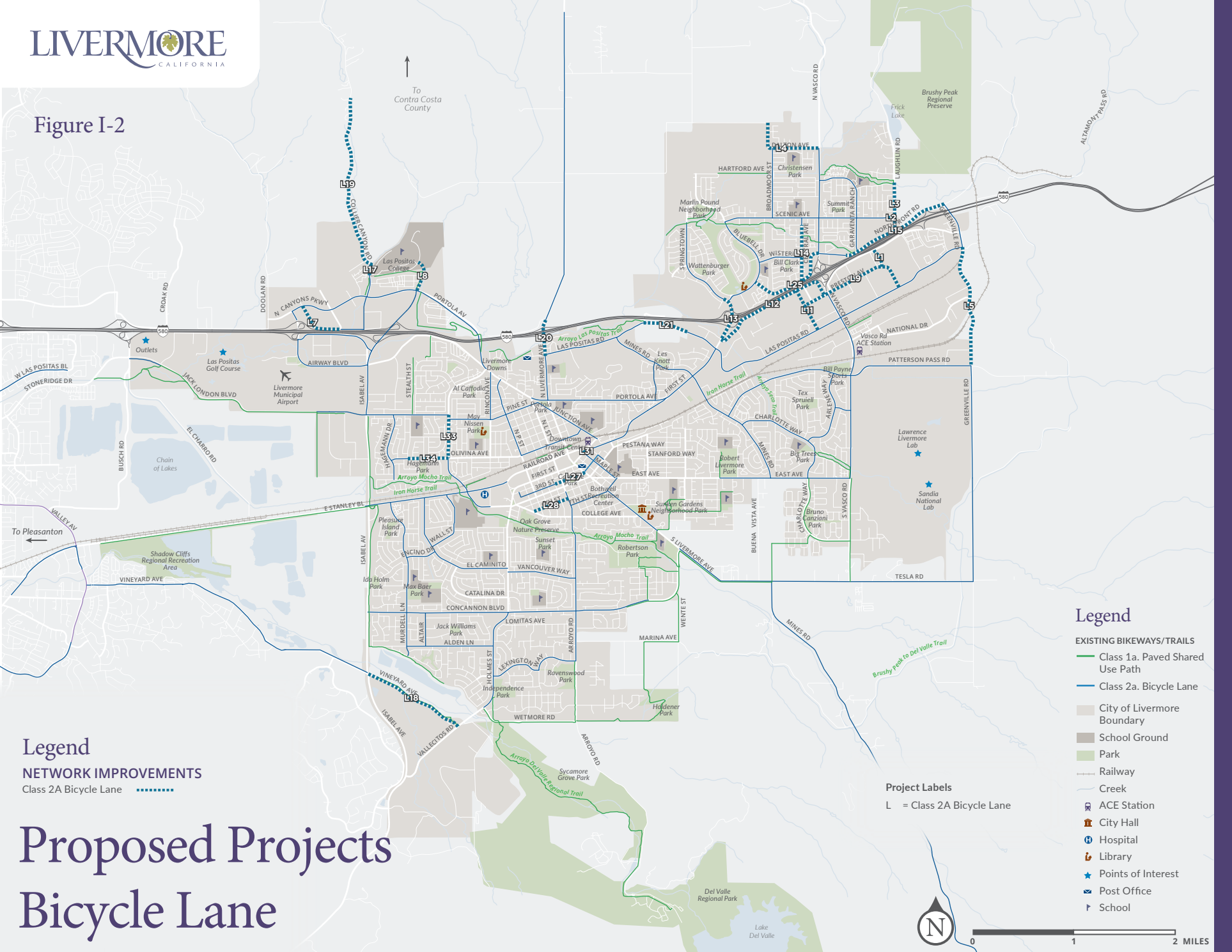
- EXISTING BIKEWAYS/TRAILS
- Class 1a. Paved Shared Use Path
- Class 2a. Bicycle Lane
- City of Livermore Boundary
- School Ground
- Park
- Railway
- Creek
- ACE Station
- City Hall
- Hospital
- Library
- Points of Interest
- Post Office
- School

Project Labels
 T = Class 1A Shared Use Path

Proposed Projects

Shared Use Path

Figure I-2



Legend
NETWORK IMPROVEMENTS
 Class 2A Bicycle Lane

Legend

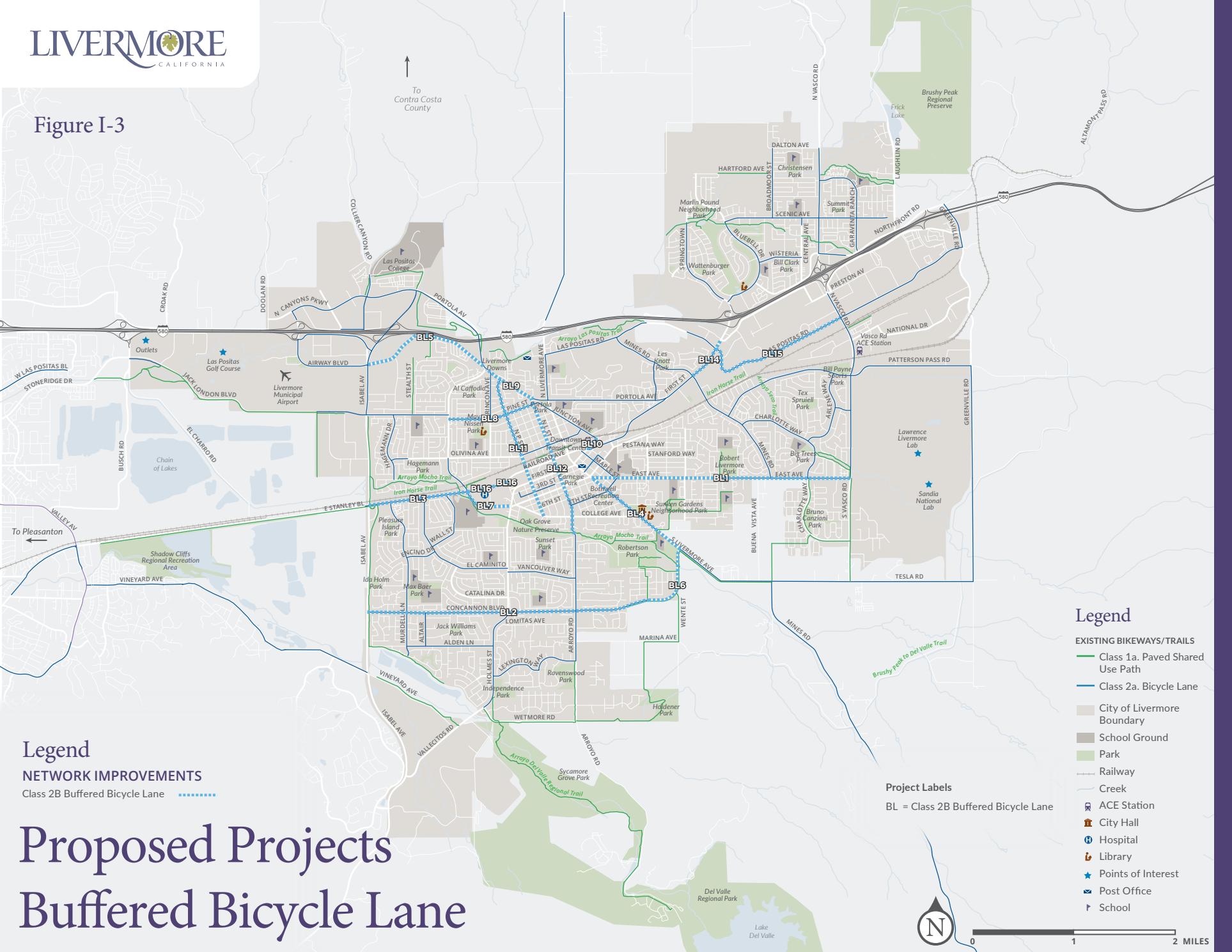
- Class 1a. Paved Shared Use Path
- Class 2a. Bicycle Lane
- City of Livermore Boundary
- School Ground
- Park
- Railway
- Creek
- ACE Station
- City Hall
- Hospital
- Library
- ★ Points of Interest
- Post Office
- School

Project Labels
 L = Class 2A Bicycle Lane

Proposed Projects

Bicycle Lane

Figure I-3



To Contra Costa County

To Pleasanton

Legend
NETWORK IMPROVEMENTS
 Class 2B Buffered Bicycle Lane

Legend

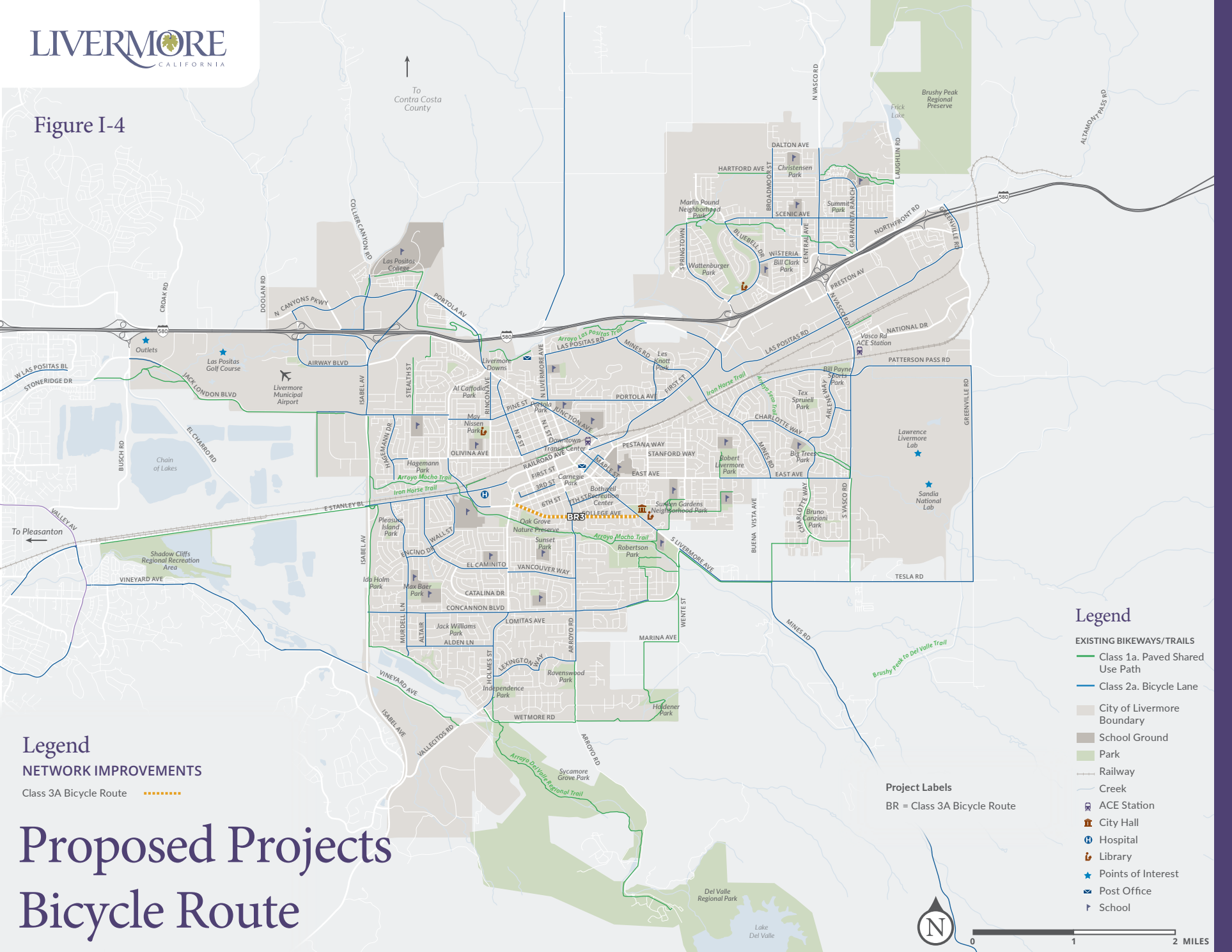
- Class 1a. Paved Shared Use Path
- Class 2a. Bicycle Lane
- City of Livermore Boundary
- School Ground
- Park
- Railway
- Creek
- ACE Station
- City Hall
- Hospital
- Library
- Points of Interest
- Post Office
- School

Project Labels
 BL = Class 2B Buffered Bicycle Lane

Proposed Projects

Buffered Bicycle Lane

Figure I-4



To Contra Costa County

Legend
NETWORK IMPROVEMENTS
 Class 3A Bicycle Route

Legend

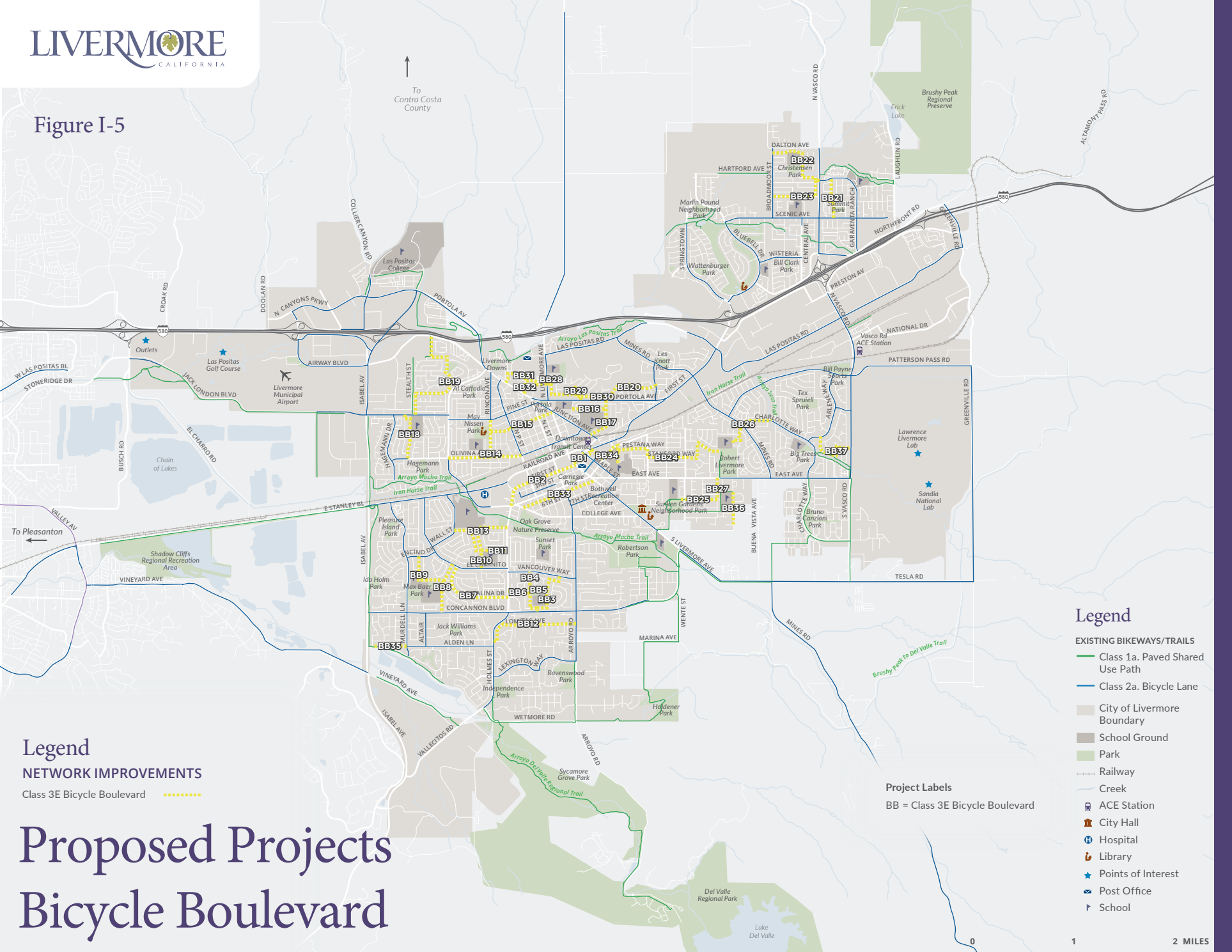
- EXISTING BIKEWAYS/TRAILS
 - Class 1a. Paved Shared Use Path
 - Class 2a. Bicycle Lane
- City of Livermore Boundary
- School Ground
- Park
- Railway
- Creek
- ACE Station
- City Hall
- Hospital
- Library
- Points of Interest
- Post Office
- School

Project Labels
 BR = Class 3A Bicycle Route

Proposed Projects

Bicycle Route

Figure I-5



To Contra Costa County

Legend
NETWORK IMPROVEMENTS
 Class 3E Bicycle Boulevard

Legend

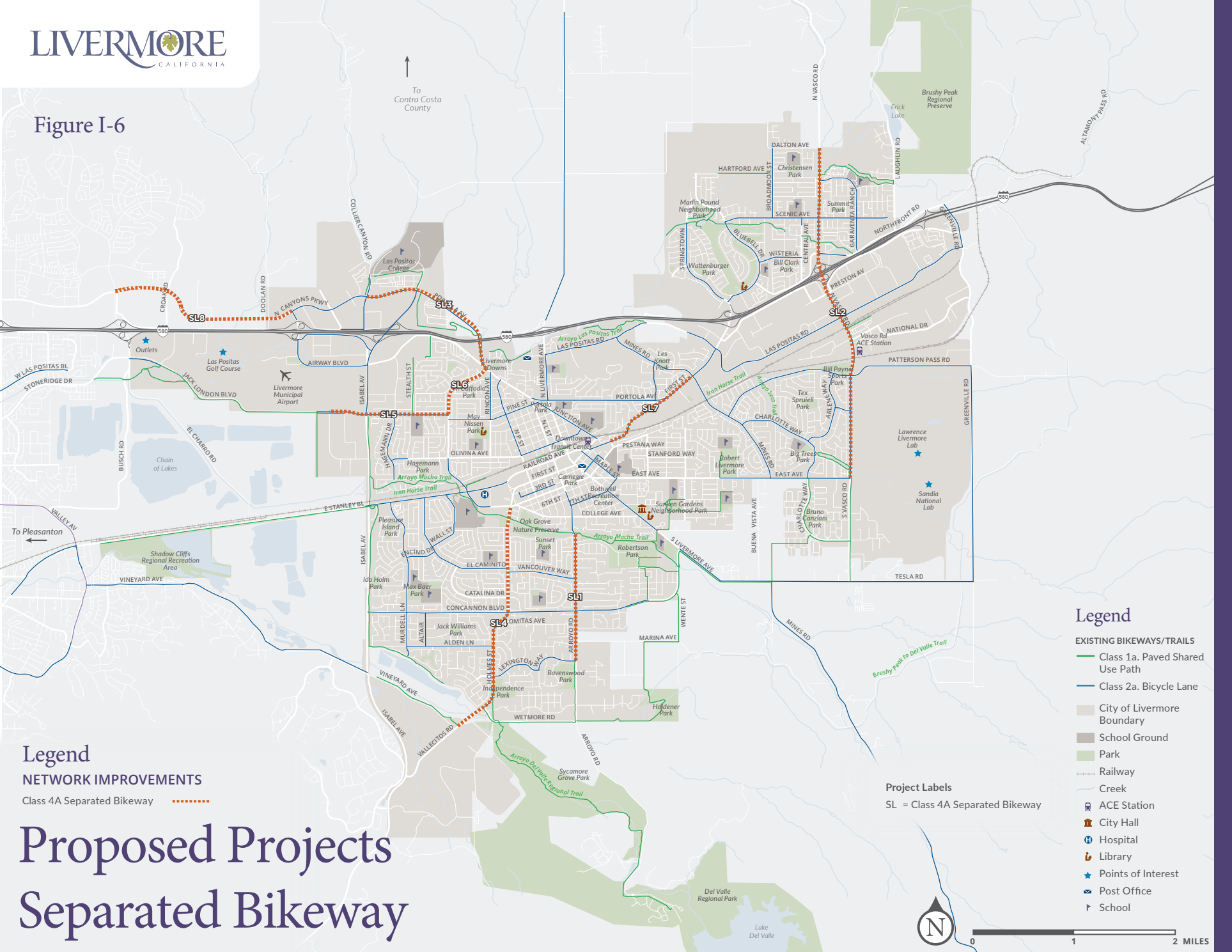
- Class 1a. Paved Shared Use Path
- Class 2a. Bicycle Lane
- City of Livermore Boundary
- School Ground
- Park
- Railway
- Creek
- ACE Station
- City Hall
- Hospital
- Library
- Points of Interest
- Post Office
- School

Project Labels
 BB = Class 3E Bicycle Boulevard

Proposed Projects

Bicycle Boulevard

Figure I-6



To Contra Costa County

To Pleasanton

Legend
NETWORK IMPROVEMENTS
 Class 4A Separated Bikeway

Legend

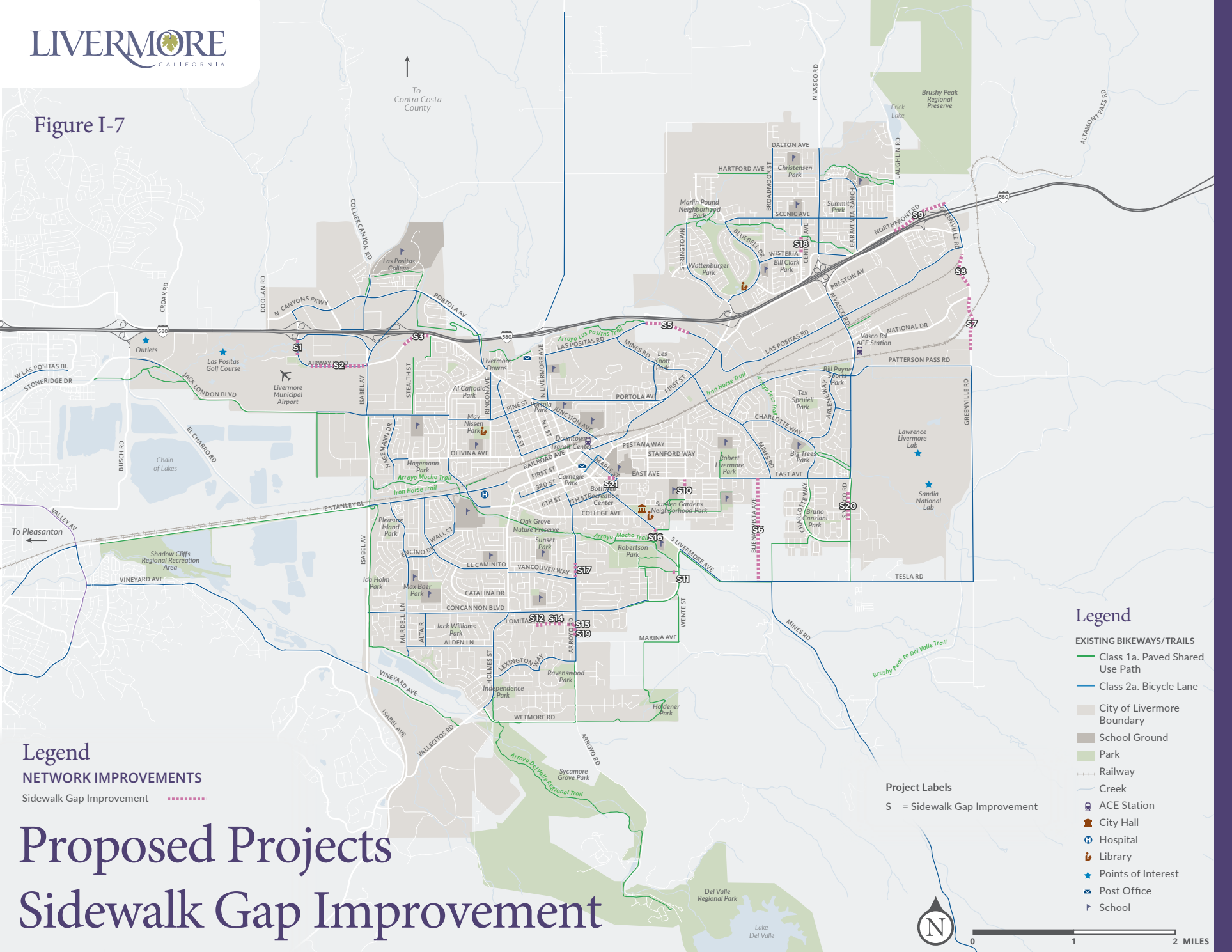
- Class 1a. Paved Shared Use Path
- Class 2a. Bicycle Lane
- City of Livermore Boundary
- School Ground
- Park
- Railway
- Creek
- ACE Station
- City Hall
- Hospital
- Library
- ★ Points of Interest
- Post Office
- School

Project Labels
 SL = Class 4A Separated Bikeway

Proposed Projects

Separated Bikeway

Figure I-7



To Contra Costa County

Legend
NETWORK IMPROVEMENTS
 Sidewalk Gap Improvement

Proposed Projects

Sidewalk Gap Improvement

Legend

- EXISTING BIKEWAYS/TRAILS
 - Class 1a. Paved Shared Use Path
 - Class 2a. Bicycle Lane
- City of Livermore Boundary
- School Ground
- Park
- Railway
- Creek
- ACE Station
- City Hall
- Hospital
- Library
- Points of Interest
- Post Office
- School

Project Labels
 S = Sidewalk Gap Improvement

LIST OF ALL PROJECTS

Table I-1: List of All Projects

ID	SEG	PROJECT GROUP	FACILITY TYPE	LOCATION	CROSS ST A	CROSS ST B	USER	SOURCE	SCHOOL	REBAL	LENGTH (MI)	COST ESTIMATES		IMPL STRATEGY
												CONST	MAINT	
P12		I-580 Crossings	High Intensity - High Cost Crossing	First St	I-580			New						Long Term
SL7*		Crosstown Routes	Class IVA Separated Bikeway	First St	Inman St	Mines Rd		PP			1.06	\$1,584,900	\$22,050	Short Term
BL14*		Crosstown Routes	Class IIB Buffered Bicycle Lane	First St	Mines Rd	Southfront Rd		PP		X	0.46	\$63,500	\$1,670	Short Term
L31		Downtown Access	Class IIA Bicycle Lane	First St	Railroad Ave	Old First St		PP		X	0.06	\$4,700	\$170	Long Term
P82*		Crosstown Routes	High Intensity - Low Cost Crossing	First St	Scott St		Both	PP				\$312,300	\$7,620	Opportunity
L13		Crosstown Routes	Class IIA Bicycle Lane	First St	Southfront Rd	Lassen Rd		New		X	0.46	\$34,400	\$1,240	Long Term
BB2*		Downtown Access	Class IIIE Bicycle Boulevard	First St	Murrieta Blvd	S Livermore Ave		New			0.82	\$441,000	\$2,390	Short Term
BB1*		Downtown Access	Class IIIE Bicycle Boulevard	First St	S Livermore Ave	Maple St		New			0.14	\$77,100	\$420	Short Term
L27		Downtown Access	Class IIA Bicycle Lane	Third St	S M St	S Livermore Ave		New		X	0.32	\$24,300	\$850	Long Term
P76		Crosstown Routes	High Intensity - High Cost Crossing	4th St	College Ave		Both	New				\$447,800	\$10,330	Long Term
BB33*		School Access	Class IIIE Bicycle Boulevard	5th St	College Ave	S Livermore Ave		New	Livermore HS, Granada HS		0.76	\$408,600	\$2,210	Short Term
L28*		Downtown Access	Class IIA Bicycle Lane	Sixth St	College Ave	S L St		AP			0.37	\$27,800	\$1,010	Opportunity
S2		Sidewalk Gap	Sidewalk	Airway Blvd	3,000 ft East of Isabel Ave	Isabel Ave		PP			0.56	\$442,500	\$4,500	Short Term
S3		Sidewalk Gap	Sidewalk	E Airway Blvd	800ft North of Rutan Dr	100 ft East of Sutter St		PP			0.28	\$222,800	\$2,270	Opportunity
S1		Sidewalk Gap	Sidewalk	Airway Blvd	Clubhouse Dr	Kitty Hawk Rd		PP			0.15	\$117,900	\$1,200	Opportunity
BL5		Crosstown Routes	Class IIB Buffered Bicycle Lane	E Airway Blvd	Isabel Ave	Portola Ave		PP			1.33	\$183,600	\$4,830	Long Term
P51*		School Access	Medium Intensity Crossing	E Airway Blvd	Sutter St		Bike	New	Marylin Ave ES			\$172,300	\$3,950	Short Term
P9		I-580 Crossings	High Intensity - High Cost Crossing	Airway Blvd	I-580			New						Long Term
BB35		School Access	Class IIIE Bicycle Boulevard	Alden Ln	Vetta Dr	Murdell Ln		AP			0.34	\$182,400	\$990	Opportunity
BB10		School Access	Class IIIE Bicycle Boulevard	Alexander St, Camelia Dr, Elaine Ave, Wagoner Dr	Wall St	El Caminito		New	Granada HS, Michell K-8		0.61	\$331,400	\$1,790	Opportunity
BB36		School Access	Class IIIE Bicycle Boulevard	Almond Ave	Country Ln	150 ft North of N Almond Cir		New			0.32	\$175,200	\$950	Opportunity
T4	B	Trail Connections	Class IA Shared Use Path	Altamont Creek Trail				PP			1.72	\$2,722,100	\$45,450	Future
T4	C	Trail Connections	Class IA Shared Use Path	Altamont Creek Trail				PP			0.50	\$784,500	\$13,100	Long Term
T4	F	Trail Connections	Class IA Shared Use Path	Altamont Creek Trail				PP			1.11	\$1,753,600	\$29,280	Future
L4		Crosstown Routes	Class IIA Bicycle Lane	Ames St, Dalton Ave	Raymond Rd	N Vasco Rd		PP			0.74	\$55,800	\$2,020	Opportunity
BB19		School Access	Class IIIE Bicycle Boulevard	Arlington Rd, Hanover St, Cortland Way, Alameda Dr, Mendocino Rd, Stetson Way, Sutter St	E Jack London Blvd	Airway Blvd		New	Marylin Ave ES		1.29	\$695,000	\$3,760	Opportunity
T6	A	Trail Connections	Class IA Shared Use Path	Arroyo Las Positas Trail				PP			0.27	\$432,000	\$7,210	Long Term
T6	AB	Trail Connections	Class IA Shared Use Path	Arroyo Las Positas Trail				PP			1.17	\$1,855,400	\$30,980	Long Term
T6	B	Trail Connections	Class IA Shared Use Path	Arroyo Las Positas Trail				PP			0.58	\$916,500	\$15,300	Long Term
T6	C	Trail Connections	Class IA Shared Use Path	Arroyo Las Positas Trail				PP			0.10	\$151,500	\$2,530	Long Term

For an explanation of table columns and abbreviations, see pages I-1 to I-3 of Appendix I

ID	SEG	PROJECT GROUP	FACILITY TYPE	LOCATION	CROSS ST A	CROSS ST B	USER	SOURCE	SCHOOL	REBAL	LENGTH (MI)	COST ESTIMATES		IMPL STRATEGY
												CONST	MAINT	
T6*	D	Trail Connections	Class IA Shared Use Path	Arroyo Las Positas Trail				PP			0.07	\$102,900	\$1,720	Long Term
T6*	E1	Trail Connections	Class IA Shared Use Path	Arroyo Las Positas Trail				PP			1.00	\$1,578,200	\$26,350	Long Term
T6	E2	Trail Connections	Class IA Shared Use Path	Arroyo Las Positas Trail				PP			0.88	\$1,394,100	\$23,280	Long Term
T6	F1	Trail Connections	Class IA Shared Use Path	Arroyo Las Positas Trail				PP			0.17	\$275,500	\$4,600	Long Term
T6	I	Trail Connections	Class IA Shared Use Path	Arroyo Las Positas Trail				PP			0.48	\$755,800	\$12,620	Future
T19	A	Trail Connections	Class IA Shared Use Path	Arroyo Mocho/El Charro Road Trail				PP			0.20	\$322,200	\$5,380	Future
T19	B	Trail Connections	Class IA Shared Use Path	Arroyo Mocho/El Charro Road Trail				PP			1.67	\$2,638,900	\$44,060	Future
T19	C1	Trail Connections	Class IA Shared Use Path	Arroyo Mocho/El Charro Road Trail				PP			1.21	\$1,903,600	\$31,780	Future
T19	C2	Trail Connections	Class IA Shared Use Path	Arroyo Mocho/El Charro Road Trail				PP			0.24	\$379,700	\$6,340	Future
P29		School Access	Medium Intensity Crossing	Arroyo Rd	Lomitas Ave		Ped	New	Sunset ES			\$172,300	\$3,950	Opportunity
S19		Sidewalk Gap	Sidewalk	Arroyo Rd	Lomitas Ave	200 ft North of Marina Ave		PP			0.12	\$98,400	\$1,000	Opportunity
SL1*		Crosstown Routes	Class IVA Separated Bikeway	Arroyo Rd	The Arroyo	Superior Dr		PP			1.26	\$1,881,900	\$26,180	Opportunity
P64		Crosstown Routes	Medium Intensity Crossing	Arroyo Rd	Vancouver Way		Ped	New				\$172,300	\$3,950	Opportunity
S17		Sidewalk Gap	Sidewalk	Arroyo Rd	Vancouver Way	800ft North of Vancouver Way		PP			0.14	\$111,900	\$1,140	Opportunity
T13*	B	Trail Connections	Class IA Shared Use Path	Arroyo Road Trail				PP			1.37	\$2,160,700	\$36,080	Long Term
T9	A	Trail Connections	Class IA Shared Use Path	Arroyo Seco Trail				PP			0.91	\$1,444,700	\$24,120	Future
T9	B	Trail Connections	Class IA Shared Use Path	Arroyo Seco Trail				PP			0.13	\$210,700	\$3,520	Future
T9	C	Trail Connections	Class IA Shared Use Path	Arroyo Seco Trail				PP			0.20	\$311,100	\$5,190	Future
T9	D	Trail Connections	Class IA Shared Use Path	Arroyo Seco Trail				PP			0.27	\$423,800	\$7,080	Future
T9	E	Trail Connections	Class IA Shared Use Path	Arroyo Seco Trail				PP			0.39	\$612,300	\$10,220	Future
T9	F	Trail Connections	Class IA Shared Use Path	Arroyo Seco Trail				PP			0.54	\$858,300	\$14,330	Future
S6		Sidewalk Gap	Sidewalk Both Sides	Buena Vista Ave	East Ave	Tesla Rd		PP			1.01	\$1,610,700	\$16,390	Future
L8		Crosstown Routes	Class IIA Bicycle Lane	Campus Hill Dr	Portola Ave	North of Las Positas College		PP		X	0.31	\$23,500	\$850	Future
L11		Crosstown Routes	Class IIA Bicycle Lane	Capitol St	Las Positas Rd	Southfront Rd		New		X	0.44	\$33,000	\$1,200	Future
BB7		School Access	Class IIIE Bicycle Boulevard	Catalina Dr	El Caminito	Holmes St		New	Sunset ES		0.80	\$430,500	\$2,330	Opportunity
T1		Trail Connections	Class IA Shared Use Path	Cayetano Creek Trail				PP			3.68	\$5,812,900	\$97,060	Future
L14		Crosstown Routes	Class IIA Bicycle Lane	Central Ave	Woodrose Way	Northfront Rd		New		X	0.55	\$41,500	\$1,500	Long Term
S18		Sidewalk Gap	Sidewalk	Central Ave	Lobelia Way	Cherry Way		PP			0.16	\$127,600	\$1,300	Opportunity
T7	C1	Trail Connections	Class IA Shared Use Path	Civic Center Trail				PP			0.24	\$381,600	\$6,370	Long Term
T7	C1	Trail Connections	Class IA Shared Use Path	Civic Center Trail				PP			0.13	\$213,000	\$3,560	Future
T7	D	Trail Connections	Class IA Shared Use Path	Civic Center Trail				PP			0.38	\$600,000	\$10,020	Future
T7	E	Trail Connections	Class IA Shared Use Path	Civic Center Trail				PP			0.38	\$593,900	\$9,920	Future
BR3*		Downtown Access	Class IIIA Bicycle Route	College Ave	Fourth St	S Livermore Ave		New			1.23	\$66,400	\$1,620	Short Term
T3	A2	Trail Connections	Class IA Shared Use Path	College Trail				PP			0.94	\$1,482,900	\$24,760	Future
T3	B	Trail Connections	Class IA Shared Use Path	College Trail				PP			2.91	\$4,599,300	\$76,800	Future
T3	C	Trail Connections	Class IA Shared Use Path	College Trail				PP			0.86	\$1,355,500	\$22,630	Future

For an explanation of table columns and abbreviations, see pages I-1 to I-3 of Appendix I

ID	SEG	PROJECT GROUP	FACILITY TYPE	LOCATION	CROSS ST A	CROSS ST B	USER	SOURCE	SCHOOL	REBAL	LENGTH (MI)	COST ESTIMATES		IMPL STRATEGY
												CONST	MAINT	
T3	C	Trail Connections	Class IA Shared Use Path	College Trail				PP			0.49	\$774,000	\$12,920	Future
L19		Crosstown Routes	Class IIA Bicycle Lane	Collier Canyon Rd	Campus Loop	North of Las Positas College		New		X	1.74	\$130,400	\$4,720	Future
P22*		Trail Connections	Medium Intensity Crossing	Collier Canyon Rd	Stone Peak Ct		Both	New				\$172,300	\$3,950	Short Term
L17		Crosstown Routes	Class IIA Bicycle Lane	Collier Canyon Rd, Campus Loop	Stone Peak Ct	North of Las Positas College		New		X	0.11	\$8,500	\$310	Future
T21	A	Trail Connections	Class IA Shared Use Path	Collier Canyon Trail				PP			0.38	\$602,600	\$10,060	Long Term
T21	B	Trail Connections	Class IA Shared Use Path	Collier Canyon Trail				PP			3.13	\$4,944,900	\$82,570	Future
L1		Crosstown Routes	Class IIA Bicycle Lane	Commerce Way	Southfront Rd	Preston Ave		New		X	0.19	\$14,500	\$520	Future
P24		School Access	High Intensity - Low Cost Crossing	Concannon Blvd	El Prado Dr		Bike	New	Smith ES, Mendenhall MS			\$312,300	\$7,620	Future
P26*		School Access	Medium Intensity Crossing	Concannon Blvd	Epson St		Bike	New	Sunset ES			\$172,300	\$3,950	Short Term
BL2*		Crosstown Routes	Class IIB Buffered Bicycle Lane	Concannon Blvd	Isabel Ave	San Vicente Dr		PP			2.79	\$383,900	\$10,100	Short Term
BL6		Crosstown Routes	Class IIB Buffered Bicycle Lane	Concannon Blvd	San Vicente Dr	S Livermore Ave		PP		X	0.73	\$100,200	\$2,640	Future
P5		Trail Connections	Medium Intensity Crossing	Concannon Blvd	San Vicente Dr		Both	New				\$172,300	\$3,950	Opportunity
P83*		Crosstown Routes	Medium Intensity Crossing	Concannon Blvd	Robertson Park Rd		Both	New				\$172,300	\$3,950	Opportunity
L7		Crosstown Routes	Class IIA Bicycle Lane	Constitution Dr	North Canyons Pkwy	Independence Dr		PP			0.50	\$37,700	\$1,360	Opportunity
BB23		School Access	Class IIIIE Bicycle Boulevard	Crestmont Ave, Del Monte St	Broadmoor St	Overlake Ave		New	Croce ES, Altamont Creek ES		0.58	\$314,100	\$1,700	Opportunity
BB29		School Access	Class IIIIE Bicycle Boulevard	Cromwell St, Harewood Dr, Wellingham Dr, Briarwood Dr, Royal Rd	Cromwell Way	Portola Ave		AP	Junction Ave K-8, Lawrence ES		0.57	\$308,400	\$1,670	Opportunity
BB28		School Access	Class IIIIE Bicycle Boulevard	Cromwell Way, Cromwell St	N Livermore Ave	North end of Cromwell St		AP	Junction Ave K-8		0.12	\$66,400	\$360	Opportunity
T20		Trail Connections	Class IA Shared Use Path	Doolan Canyon Trail				PP			6.27	\$9,909,600	\$165,460	Future
BB25		School Access	Class IIIIE Bicycle Boulevard	Drake Way	300 ft West of Hillcrest Ave	Madison Ave		New	East Ave MS, Almond		0.38	\$204,300	\$1,110	Opportunity
T25		Trail Connections	Class IA Shared Use Path	Dry Creek Trail				PP			3.29	\$5,198,100	\$86,790	Future
T18	C2	Trail Connections	Class IA Shared Use Path	Dunsmuir Trail				PP			0.64	\$1,016,300	\$16,970	Future
P40*		Crosstown Routes	Medium Intensity Crossing	East Ave	Estates St		Ped	New	East Ave MS, Almond			\$172,300	\$3,950	Short Term
P41*		School Access	Medium Intensity Crossing	East Ave	Robert E Livermore Park		Bike	New	East Ave MS, Almond			\$172,300	\$3,950	Short Term
P3		Crosstown Routes	High Intensity - Low Cost Crossing	East Ave	S Livermore Ave		Bike	New				\$312,300	\$7,620	Long Term
BL1*		Crosstown Routes	Class IIB Buffered Bicycle Lane	East Ave	S Livermore Ave	S Vasco Rd		AP		X	2.55	\$351,200	\$9,240	Long Term
BB20		School Access	Class IIIIE Bicycle Boulevard	Edinburgh Dr	Portola Ave	Highland St		New	Junction Ave K-8		0.54	\$292,600	\$1,580	Opportunity
P32		School Access	Low Intensity Crossing	El Caminito	Catalina Dr		Ped	New	Sunset ES			\$35,500	\$460	Opportunity
P33		School Access	Low Intensity Crossing	El Caminito	El Prado Dr		Ped	New	Smith ES, Mendenhall MS			\$35,500	\$460	Opportunity
P35		School Access	Medium Intensity Crossing	El Caminito	Wagoner Dr		Bike	New	Granada HS, Michell K-8			\$172,300	\$3,950	Opportunity
BB8		School Access	Class IIIIE Bicycle Boulevard	El Prado Dr	Concannon Blvd	El Caminito		New	Smith ES, Mendenhall MS		0.51	\$272,700	\$1,480	Opportunity

For an explanation of table columns and abbreviations, see pages I-1 to I-3 of Appendix I

ID	SEG	PROJECT GROUP	FACILITY TYPE	LOCATION	CROSS ST A	CROSS ST B	USER	SOURCE	SCHOOL	REBAL	LENGTH (MI)	COST ESTIMATES		IMPL STRATEGY
												CONST	MAINT	
BB11		School Access	Class IIIE Bicycle Boulevard	Elaine Ave	Wagoner Dr	Holmes St		New	Granada HS, Michell K-8		0.26	\$139,900	\$760	Opportunity
BB15		School Access	Class IIIE Bicycle Boulevard	Elm St	Rincon Ave	N Livermore Ave		New	Junction Ave K-8, Lawrence ES		0.65	\$349,500	\$1,890	Opportunity
L22*		Crosstown Routes	Class IIA Bicycle Lane	Emily Way, Cheryl Dr	S Vasco Rd	Arlene Way		New			0.54	\$40,500	\$1,470	Future
P34		School Access	Low Intensity Crossing	Encino Dr	Ontario Dr		Ped	New	Smith ES, Mendenhall MS			\$35,500	\$460	Opportunity
BB3		School Access	Class IIIE Bicycle Boulevard	Epson St, Heidelberg Dr, Frankfurt Way, Helsinki Way, Jaffa Rd	Concannon Blvd	Vancouver Way		New	Sunset ES		0.56	\$301,000	\$1,630	Opportunity
BB21		School Access	Class IIIE Bicycle Boulevard	Fallen Leaf Dr, Sunnybrook Way, Altamar Way	Scenic Ave	Garaventa Ranch Rd		New	Croce ES, Altamont Creek ES		0.41	\$222,700	\$1,200	Opportunity
P62		School Access	High Intensity - High Cost Crossing	Garaventa Ranch Rd	Altamar Way		Both	New	Croce ES, Altamont Creek ES			\$447,800	\$10,330	Future
P66		I-580 Crossings	High Intensity - High Cost Crossing	N Greenville Rd	I-580			New						Long Term
S7		Sidewalk Gap	Sidewalk	Greenville Rd	National Dr	Marathon Dr		PP			0.53	\$423,400	\$4,310	Opportunity
L5*		Crosstown Routes	Class IIA Bicycle Lane	Greenville Rd	Patterson Pass Rd	Las Positas Rd		New		X	1.21	\$90,900	\$3,290	Long Term
S8		Sidewalk Gap	Sidewalk	Greenville Rd	Rail ROW	Hawthorne Ave		PP			0.34	\$272,300	\$2,770	Opportunity
S9		Sidewalk Gap	Sidewalk	N Greenville Rd, Northfront Rd	EB I-580	Laughlin Rd		PP			0.57	\$453,000	\$4,610	Opportunity
T24		Trail Connections	Class IA Shared Use Path	Greenville Road Trail				PP			1.19	\$1,874,500	\$31,300	Future
BB22		School Access	Class IIIE Bicycle Boulevard	Haggin Oaks Ave, Pasatiempo St, Del Monte St, Overlake Ave	Broadmoor St	N Vasco Rd		New	Croce ES, Altamont Creek ES		0.73	\$396,000	\$2,140	Opportunity
BB12		School Access	Class IIIE Bicycle Boulevard	Hampton Rd, Lomas Ave	Holmes St	Arroyo Rd		New	Sunset ES		0.95	\$511,600	\$2,770	Short Term
BB4		School Access	Class IIIE Bicycle Boulevard	Heidelberg Dr, Darwin Ave	Epson St	Vancouver Way		AP	Sunset ES		0.43	\$231,300	\$1,250	Opportunity
P56		School Access	Low Intensity Crossing	Highland St	Edinburgh Dr		Ped	New	Junction Ave K-8			\$35,500	\$460	Opportunity
S10*		Sidewalk Gap	Sidewalk	Hillcrest Ave	East Ave	Hillcrest Ct		PP			0.09	\$68,900	\$700	Short Term
P71		Crosstown Routes	High Intensity - Low Cost Crossing	Holmes St	Arroyo Mocho Trail		Bike	New				\$312,300	\$7,620	Long Term
P27		School Access	High Intensity - Low Cost Crossing	Holmes St	Catalina Dr		Bike	New	Sunset ES			\$312,300	\$7,620	Long Term
SL4*		Crosstown Routes	Class IVA Separated Bikeway	Holmes St	E Vineyard Ave	Fourth St		PP	Michell K-8	X	2.39	\$3,582,500	\$49,830	Long Term
P17		School Access	High Intensity - High Cost Crossing	Holmes St	Elaine Ave		Both	New	Granada HS, Michell K-8			\$447,800	\$10,330	Long Term
P25*		School Access	Medium Intensity Crossing	Holmes St	Hampton Rd		Bike	New	Sunset ES			\$172,300	\$3,950	Short Term
P18		School Access	High Intensity - Low Cost Crossing	Holmes St	Mocho St		Bike	New	Granada HS, Michell K-8			\$312,300	\$7,620	Long Term
P28*		School Access	Medium Intensity Crossing	Holmes St	Paris Way		Bike	New	Sunset ES			\$172,300	\$3,950	Short Term
T16*	Phase 1	Trail Connections	Class IA Shared Use Path	Iron Horse Trail	Mines Rd	Arroyo Las Positas		PP			0.52	\$818,400	\$13,660	Long Term
T16*	Phase 1	Trail Connections	Class IA Shared Use Path	Iron Horse Trail				PP			3.76	\$5,936,900	\$99,130	Long Term
T16*	Phase 1	Trail Connections	Class IA Shared Use Path	Iron Horse Trail				PP			0.98	\$1,545,500	\$25,810	Long Term

For an explanation of table columns and abbreviations, see pages I-1 to I-3 of Appendix I

ID	SEG	PROJECT GROUP	FACILITY TYPE	LOCATION	CROSS ST A	CROSS ST B	USER	SOURCE	SCHOOL	REBAL	LENGTH (MI)	COST ESTIMATES		IMPL STRATEGY
												CONST	MAINT	
T16	Phase 1	Trail Connections	Class IA Shared Use Path	Iron Horse Trail				PP			0.11	\$179,200	\$2,990	Long Term
T16	Phase 1	Trail Connections	Class IA Shared Use Path	Iron Horse Trail				PP			0.54	\$851,500	\$14,220	Long Term
T16	Phase 1	Trail Connections	Class IA Shared Use Path	Iron Horse Trail				PP			1.42	\$2,238,300	\$37,370	Long Term
T16	Phase 2	Trail Connections	Class IA Shared Use Path	Iron Horse Trail				PP			2.06	\$3,250,100	\$54,270	Long Term
T16	Phase 2	Trail Connections	Class IA Shared Use Path	Iron Horse Trail				PP			1.03	\$1,627,300	\$27,170	Long Term
T16		Trail Connections	Class IA Shared Use Path	Iron Horse Trail				PP			2.56	\$4,048,300	\$67,600	Future
P68		I-580 Crossings	High Intensity - High Cost Crossing	Isabel Ave	I-580			New						Long Term
P19		Trail Connections	High Intensity - Low Cost Crossing	Isabel Ave	Jack London Blvd		Bike	New				\$312,300	\$7,620	Long Term
T5	D	Trail Connections	Class IA Shared Use Path	Isabel Trail				PP			0.52	\$825,600	\$13,780	Long Term
T5	E	Trail Connections	Class IA Shared Use Path	Isabel Trail				PP			0.12	\$193,800	\$3,240	Future
T5	G	Trail Connections	Class IA Shared Use Path	Isabel Trail				PP			0.44	\$695,900	\$11,620	Long Term
T5	I	Trail Connections	Class IA Shared Use Path	Isabel Trail				PP			0.25	\$393,500	\$6,570	Long Term
T5		Trail Connections	Class IA Shared Use Path	Isabel Trail				PP			1.35	\$2,137,800	\$35,700	Long Term
P70		I-580 Crossings	High Intensity - High Cost Crossing	Isabel Trail/Portola Ave	I-580			New						Long Term
P46		School Access	High Intensity - Low Cost Crossing	E Jack London Blvd	Arlington Rd		Both	New	Marylin Ave ES			\$312,300	\$7,620	Future
SL5*		Crosstown Routes	Class IVA Separated Bikeway	Jack London Blvd	Discovery Dr	N Murrieta Blvd		PP			1.18	\$1,765,100	\$24,550	Short Term
L26		Crosstown Routes	Class IIA Bicycle Lane	W Jack London Blvd	Discovery Dr	4,100 ft West of Discovery Dr		New		X	0.78	\$58,700	\$2,130	Future
P81		Crosstown Routes	High Intensity - Low Cost Crossing	W Jack London Blvd	Voyager St		Bike	New				\$312,300	\$7,620	Future
T14		Trail Connections	Class IA Shared Use Path	Jack London Trail				PP			0.24	\$376,900	\$6,290	Future
P57*		School Access	Medium Intensity Crossing	Junction Ave	Ladd Ave		Ped	New	Junction Ave K-8			\$172,300	\$3,950	Short Term
P84*		Downtown Access	Medium Intensity Crossing	Junction Ave	Railroad		Both	New				\$172,300	\$3,950	Short Term
BB16		School Access	Class IIIIE Bicycle Boulevard	Kelly St	Enos Way	Lee Ave		New	Junction Ave K-8, Lawrence ES		0.33	\$179,900	\$970	Opportunity
BB5		School Access	Class IIIIE Bicycle Boulevard	Kingsport Ave	Darwin Ave	Frankfurt Way		AP	Sunset ES		0.17	\$91,700	\$500	Opportunity
P77		Crosstown Routes	Medium Intensity Crossing	S L St	Arroyo Bike Path		Bike	New				\$172,300	\$3,950	Opportunity
P80		Downtown Access	Medium Intensity Crossing	N L St	Chestnut St		Ped	New				\$172,300	\$3,950	Opportunity
P85*		Downtown Access	High Intensity - Low Cost Crossing	N L St	Railroad		Bike	New				\$312,300	\$7,620	Short Term
P74		Downtown Access	High Intensity - Low Cost Crossing	N L St	Railroad Ave		Bike	New				\$312,300	\$7,620	Long Term
BL12*		Downtown Access	Class IIB Buffered Bicycle Lane	L St	The Arroyo	Pine St		PP		X	1.35	\$186,300	\$4,900	Long Term
BB17*		School Access	Class IIIIE Bicycle Boulevard	Ladd Ave, Lee Ave	Old First St	Portola Ave		AP	Junction Ave K-8		0.43	\$233,800	\$1,270	Short Term
P11		I-580 Crossings	High Intensity - High Cost Crossing	Las Colinas Rd	I-580			New						Long Term
BL15		Crosstown Routes	Class IIB Buffered Bicycle Lane	Las Positas Rd	First St	S Vasco Rd		PP			1.52	\$209,900	\$5,520	Opportunity
L21*		Crosstown Routes	Class IIA Bicycle Lane	Las Positas Rd	Las Colinas Rd	East Livermore Boundary		AP			0.45	\$33,400	\$1,210	Opportunity
S5		Sidewalk Gap	Sidewalk	Las Positas Rd	Las Colinas Rd	2,400 ft East of Las Colinas Rd		PP			0.46	\$365,700	\$3,720	Opportunity

For an explanation of table columns and abbreviations, see pages I-1 to I-3 of Appendix I

ID	SEG	PROJECT GROUP	FACILITY TYPE	LOCATION	CROSS ST A	CROSS ST B	USER	SOURCE	SCHOOL	REBAL	LENGTH (MI)	COST ESTIMATES		IMPL STRATEGY
												CONST	MAINT	
L3		Crosstown Routes	Class IIA Bicycle Lane	Laughlin Rd	Northfront Rd	Altamont Creek Dr		AP			0.48	\$35,700	\$1,290	Opportunity
T17	A	Trail Connections	Class IA Shared Use Path	Laughlin Road Trail				PP			0.45	\$717,700	\$11,980	Future
T17	B	Trail Connections	Class IA Shared Use Path	Laughlin Road Trail				PP			0.02	\$32,800	\$550	Future
T17	C	Trail Connections	Class IA Shared Use Path	Laughlin Road Trail				PP			1.09	\$1,724,500	\$28,790	Future
BB26*		School Access	Class III E Bicycle Boulevard	Leeann Ct, Loyola Way, Jeannie Way, Audry St, Mines Rd, Charlotte Way	Amy Ct	Joyce St		New	Jackson ES		0.68	\$364,700	\$1,970	Opportunity
S16		Sidewalk Gap	Sidewalk	S Livermore Ave	Chateau Way	150 ft South of Chateau Way		PP			0.03	\$21,500	\$220	Opportunity
BL4*	B	Crosstown Routes	Class IIB Buffered Bicycle Lane	S Livermore Ave	Concannon Blvd	Palm Ave		New		X	0.74	\$102,100	\$2,690	Short Term
P20		School Access	High Intensity - Low Cost Crossing	N Livermore Ave	Cromwell Way		Bike	New	Junction Ave K-8			\$312,300	\$7,620	Future
P48		School Access	High Intensity - High Cost Crossing	N Livermore Ave	Elm St		Bike	New	Junction Ave K-8			\$447,800	\$10,330	Long Term
P63		Downtown Access	High Intensity - Low Cost Crossing	S Livermore Ave	First St		Bike	New				\$312,300	\$7,620	Long Term
P87		I-580 Crossings	High Intensity - High Cost Crossing	N Livermore Ave	I-580			New						Long Term
BL4	A	Crosstown Routes	Class IIB Buffered Bicycle Lane	S Livermore Ave	Palm Ave	East Ave		PP		X	0.38	\$52,400	\$1,380	Long Term
P86		Downtown Access	High Intensity - Low Cost Crossing	N Livermore Ave	Portola Ave		Both	New				\$312,300	\$7,620	Long Term
P4*		Trail Connections	Medium Intensity Crossing	S Livermore Ave	175 ft South of Chateau Way		Both	New				\$172,300	\$3,950	Short Term
L20		Crosstown Routes	Class IIA Bicycle Lane	N Livermore Ave	Cayetano Ct	Las Positas Rd		AP		X	0.36	\$27,000	\$980	Long Term
S14		Sidewalk Gap	Sidewalk	Lomas Ave	120 ft East of Kara Pl	Jeffrey St		PP			0.09	\$72,600	\$740	Opportunity
S13		Sidewalk Gap	Sidewalk	Lomas Ave	Bella Vista Pl	Kara Pl		PP			0.06	\$47,900	\$490	Opportunity
S15		Sidewalk Gap	Sidewalk	Lomas Ave	McLean Pl	Arroyo Rd		PP			0.07	\$59,000	\$600	Opportunity
S12		Sidewalk Gap	Sidewalk	Lomas Ave	San Remo Ct	Sorrento Pl		PP			0.06	\$48,600	\$490	Opportunity
BB27		School Access	Class III E Bicycle Boulevard	Madison Ave	Drake Way	East Ave		New	East Ave MS, Almond		0.21	\$115,500	\$630	Opportunity
T10		Trail Connections	Class IA Shared Use Path	Marina Ave				PP			0.67	\$1,053,100	\$17,580	Future
P60		School Access	High Intensity - Low Cost Crossing	Mines Rd	Audry St		Bike	PP	Jackson ES			\$312,300	\$7,620	Future
P59		School Access	High Intensity - Low Cost Crossing	Mines Rd	Charlotte Way		Bike	AP	Jackson ES			\$312,300	\$7,620	Future
L16		Crosstown Routes	Class IIA Bicycle Lane	Mines Rd	Tesla Rd	1,700 ft South of Tesla Rd		New			0.33	\$24,800	\$900	Future
T12		Trail Connections	Class IA Shared Use Path	Mines Road Trail				PP			1.71	\$2,693,900	\$44,980	Future
P8		Trail Connections	High Intensity - High Cost Crossing	Murrieta Blvd	650 ft West of Fenton St		Bike	New				\$447,800	\$10,330	Long Term
P23		Downtown Access	High Intensity - High Cost Crossing	N Murrieta Blvd	E Jack London Blvd/Pine St		Bike	New				\$447,800	\$10,330	Future
BL7		Crosstown Routes	Class IIB Buffered Bicycle Lane	Murrieta Blvd	East Stanley Blvd	Holmes St		PP			0.51	\$69,600	\$1,830	Long Term
L33		Downtown Access	Class IIA Bicycle Lane	N Murrieta Blvd	Jack London Blvd	Olivina Ave		PP		X	0.43	\$32,100	\$1,160	Long Term
SL6*		Downtown Access	Class IVA Separated Bikeway	N Murrieta Blvd	Jack London Blvd	Portola Ave		PP		X	0.66	\$985,000	\$13,700	Long Term

For an explanation of table columns and abbreviations, see pages I-1 to I-3 of Appendix I

ID	SEG	PROJECT GROUP	FACILITY TYPE	LOCATION	CROSS ST A	CROSS ST B	USER	SOURCE	SCHOOL	REBAL	LENGTH (MI)	COST ESTIMATES		IMPL STRATEGY
												CONST	MAINT	
T3		Trail Connections	Class IA Shared Use Path	New Proposed Trail Connection				New			0.07	\$104,800	\$1,750	Future
T2	A	Trail Connections	Class IA Shared Use Path	North Canyons Parkway Trail				PP			2.66	\$4,204,600	\$70,210	Future
SL8		Crosstown Routes	Class IVA Separated Bikeway	North Canyons Pkwy	Airway Blvd	Fallon Rd		PP			1.91	\$2,868,000	\$39,900	Future
T29		Trail Connections	Class IA Shared Use Path	North Livermore Connector Trail				PP			6.24	\$9,860,700	\$164,650	Future
L15*		Crosstown Routes	Class IIA Bicycle Lane	Northfront Rd	600 ft West of Herman Ave	N Greenville Rd		New		X	1.11	\$83,000	\$3,000	Future
BL10		Downtown Access	Class IIB Buffered Bicycle Lane	Old First St	First St	Junction Ave		PP			0.15	\$20,100	\$530	Short Term
BB34		School Access	Class IIIE Bicycle Boulevard	Old First St, 2nd St, Church St, 4th St, Madera Way, School St	First St	Pestana Way		AP	Livermore HS, Jackson ES		0.45	\$245,100	\$1,330	Opportunity
P43		School Access	High Intensity - Low Cost Crossing	Olivina Ave	N Murrieta Blvd		Bike	New	Marilyn Ave ES			\$312,300	\$7,620	Long Term
L34		Downtown Access	Class IIA Bicycle Lane	Olivina Ave	Tanager Rd	Murrieta Blvd		PP			0.40	\$29,900	\$1,080	Opportunity
P44		School Access	Low Intensity Crossing	Olivina Ave	Tanager Rd		Ped	New	Marilyn Ave ES			\$35,500	\$460	Opportunity
BB14*		School Access	Class IIIE Bicycle Boulevard	Olivina Ave	Murrieta Blvd	N P St		AP	Marilyn Ave ES		0.72	\$391,000	\$2,120	Short Term
BB9		School Access	Class IIIE Bicycle Boulevard	Ontario Dr	El Prado Dr	Encino Dr		AP	Smith ES, Mendenhall MS		0.48	\$258,900	\$1,400	Opportunity
P79		Downtown Access	High Intensity - Low Cost Crossing	N P St	Chestnut St		Bike	New				\$312,300	\$7,620	Future
BL11		Downtown Access	Class IIB Buffered Bicycle Lane	P St	College Ave	Portola Ave		PP		X	1.43	\$197,600	\$5,200	Future
BB6		School Access	Class IIIE Bicycle Boulevard	Paris Way	Holmes St	Darwin Ave		AP	Sunset ES		0.22	\$118,000	\$640	Opportunity
BB31		School Access	Class IIIE Bicycle Boulevard	Paseo Laguna Seco, Calle Del Rey, Portola Meadows Rd, Calle Del Sueno, Reserve Ct, Cromwell Way	Portola Ave	N Livermore Ave		New	Junction Ave K-8		0.56	\$304,400	\$1,650	Opportunity
BL8		Crosstown Routes	Class IIB Buffered Bicycle Lane	Pine St	Murrieta Blvd	N L St		New		X	0.86	\$118,600	\$3,120	Long Term
P55		School Access	High Intensity - High Cost Crossing	Portola Ave	Edinburgh Dr		Both	PP	Junction Ave K-8			\$447,800	\$10,330	Future
P10		I-580 Crossings	High Intensity - High Cost Crossing	Portola Ave	I-580			New						Long Term
P54		School Access	High Intensity - High Cost Crossing	Portola Ave	Lee Ave		Both	PP	Junction Ave K-8			\$447,800	\$10,330	Future
P50		School Access	High Intensity - Low Cost Crossing	Portola Ave	Paseo Laguna Secco		Bike	PP	Junction Ave K-8			\$312,300	\$7,620	Long Term
P49		School Access	High Intensity - High Cost Crossing	Portola Ave	Portola Meadows Rd		Bike	PP	Junction Ave K-8			\$447,800	\$10,330	Long Term
P52		School Access	Medium Intensity Crossing	Portola Ave	Royal Rd		Ped	PP	Junction Ave K-8			\$172,300	\$3,950	Opportunity
P53		School Access	Medium Intensity Crossing	Portola Ave	Yorkshire Dr		Bike	PP	Junction Ave K-8			\$172,300	\$3,950	Opportunity
SL3		Crosstown Routes	Class IVA Separated Bikeway	Portola Ave	Collier Canyon Rd	Murrieta Blvd		PP		X	1.62	\$2,424,000	\$33,720	Long Term
BL9*		Crosstown Routes	Class IIB Buffered Bicycle Lane	Portola Ave, N L St	Murrieta Blvd	Pine St		New			0.60	\$82,400	\$2,170	Short Term
BB32		School Access	Class IIIE Bicycle Boulevard	Portola Meadows Rd	Portola Ave	Rapallo Ct		New	Junction Ave K-8		0.13	\$68,400	\$370	Opportunity
L9		Crosstown Routes	Class IIA Bicycle Lane	Preston Ave	Las Positas Rd	West end of Preston Ave		PP			1.14	\$85,400	\$3,090	Opportunity

For an explanation of table columns and abbreviations, see pages I-1 to I-3 of Appendix I

ID	SEG	PROJECT GROUP	FACILITY TYPE	LOCATION	CROSS ST A	CROSS ST B	USER	SOURCE	SCHOOL	REBAL	LENGTH (MI)	COST ESTIMATES		IMPL STRATEGY
												CONST	MAINT	
P78*		Downtown Access	High Intensity - Low Cost Crossing	Railroad Ave	S P St		Bike	New				\$312,300	\$7,620	Long Term
P42		School Access	Medium Intensity Crossing	Rincon Ave	Elm St		Ped	PP	Marylin Ave ES			\$172,300	\$3,950	Opportunity
P47		School Access	High Intensity - High Cost Crossing	Rincon Ave	Pine St		Both	New	Marylin Ave ES			\$447,800	\$10,330	Long Term
BB14*		School Access	Class III E Bicycle Boulevard	Rincon Ave	Olivina Ave	Pine St		AP	Marylin Ave ES		0.37	\$200,200	\$1,080	Short Term
S11		Sidewalk Gap	Sidewalk	Robertson Park Rd	Francesco Ct	Concannon Blvd		PP			0.04	\$32,500	\$330	Opportunity
P61		School Access	Medium Intensity Crossing	Scenic Ave	Ridgestone Rd		Ped	PP	Croce ES, Altamont Creek ES			\$172,300	\$3,950	Opportunity
L2		Crosstown Routes	Class IIA Bicycle Lane	Scenic Ave	Saddleview Ct	Laughlin Rd		AP		X	0.07	\$5,300	\$190	Future
BB24*		School Access	Class III E Bicycle Boulevard	School St, Pestana Way, Jensen St, Stanford Way, Lincoln Ave, Pomona Way	Patricia Ln	Jackson Ave		New	Livermore HS, Jackson ES		1.38	\$742,900	\$4,020	Opportunity
T11	A	Trail Connections	Class IA Shared Use Path	Shadow Cliffs to Arroyo del Valle Regional Trail				PP			1.40	\$2,205,800	\$36,830	Long Term
T15	A	Trail Connections	Class IA Shared Use Path	South Bay Aqueduct Trail				PP			4.05	\$6,401,500	\$106,890	Future
T15	B	Trail Connections	Class IA Shared Use Path	South Bay Aqueduct Trail				PP			0.91	\$1,431,100	\$23,900	Future
T15	C	Trail Connections	Class IA Shared Use Path	South Bay Aqueduct Trail				PP			2.03	\$3,208,400	\$53,570	Future
T10*	B	Trail Connections	Class IA Shared Use Path	South Livermore Valley Trail				PP			0.47	\$739,600	\$12,350	Future
T10	G	Trail Connections	Class IA Shared Use Path	South Livermore Valley Trail				New			1.86	\$2,945,000	\$49,170	Future
T10	H	Trail Connections	Class IA Shared Use Path	South Livermore Valley Trail				PP			1.20	\$1,899,300	\$31,710	Future
L12		Crosstown Routes	Class IIA Bicycle Lane	Southfront Rd	First St	Preston Ave		New		X	1.29	\$96,500	\$3,490	Future
P58		School Access	Low Intensity Crossing	Stanford Way	Jensen St		Ped	PP	Livermore HS, Jackson ES			\$35,500	\$460	Opportunity
P7		Trail Connections	High Intensity - Low Cost Crossing	E Stanley Blvd	400 ft East of Isabel Ave		Bike	New				\$312,300	\$7,620	Future
BL3*		Crosstown Routes	Class IIB Buffered Bicycle Lane	E Stanley Blvd	Isabel Ave	Murrieta Blvd		New			0.98	\$134,900	\$3,550	Short Term
BL16		Downtown Access	Class IIB Buffered Bicycle Lane	E Stanley Blvd	Murrieta Blvd	Railroad Ave		PP			0.44	\$33,400	\$1,210	Long Term
P75*		Crosstown Routes	High Intensity - Low Cost Crossing	E Stanley Blvd	Murrieta Blvd		Bike	New				\$312,300	\$7,620	Long Term
L25		Crosstown Routes	Class IIA Bicycle Lane	Sunflower Ct, Northfront Rd	Bluebell Dr	N Vasco Rd		AP		X	0.89	\$66,800	\$2,420	Long Term
P69		I-580 Crossings	High Intensity - High Cost Crossing	Sutter St/Airway Blvd	I-580			New						Future
BB18		School Access	Class III E Bicycle Boulevard	Tanager Rd, Tanager Way, Curlew Rd	Olivina Ave	E Jack London Blvd		New	Marylin Ave ES		0.49	\$261,900	\$1,420	Opportunity
P14		Trail Connections	Medium Intensity Crossing	Tesla Rd	Mines Rd		Bike	PP				\$172,300	\$3,950	Future
P31*		School Access	Medium Intensity Crossing	Vancouver Way	Darwin Ave		Ped	PP	Sunset ES			\$172,300	\$3,950	Short Term
P30		School Access	Medium Intensity Crossing	Vancouver Way	Jaffa Rd		Ped	PP	Sunset ES			\$172,300	\$3,950	Opportunity

For an explanation of table columns and abbreviations, see pages I-1 to I-3 of Appendix I

ID	SEG	PROJECT GROUP	FACILITY TYPE	LOCATION	CROSS ST A	CROSS ST B	USER	SOURCE	SCHOOL	REBAL	LENGTH (MI)	COST ESTIMATES		IMPL STRATEGY
												CONST	MAINT	
P2		School Access	High Intensity - High Cost Crossing	N Vasco Rd	Crestmont Ave		Both	AP	Croce ES, Altamont Creek ES			\$447,800	\$10,330	Long Term
SL2*	A	Crosstown Routes	Class IVA Separated Bikeway	Vasco Rd	East Ave	Dalton Ave		PP			1.88	\$2,817,600	\$39,190	Short Term
SL2*	B	Crosstown Routes	Class IVA Separated Bikeway	Vasco Rd	East Ave	Dalton Ave		PP			0.41	\$611,700	\$8,510	Long Term
SL2	C	Crosstown Routes	Class IVA Separated Bikeway	Vasco Rd	East Ave	Dalton Ave		PP			1.04	\$1,554,300	\$21,620	Long Term
P1		School Access	High Intensity - Low Cost Crossing	N Vasco Rd	Garaventa Ranch Rd		Bike	New	Croce ES, Altamont Creek ES			\$312,300	\$7,620	Long Term
S20		Sidewalk Gap	Sidewalk	Vasco Rd	Grahm Ct	Welch Ln		PP			0.27	\$215,100	\$2,190	Opportunity
P13		I-580 Crossings	High Intensity - High Cost Crossing	N Vasco Rd	I-580			New						Long Term
P65		Crosstown Routes	High Intensity - Low Cost Crossing	N Vasco Rd	Scenic Ave		Bike	New				\$312,300	\$7,620	Long Term
L18		Crosstown Routes	Class IIA Bicycle Lane	E Vineyard Ave, Vallecitos Rd	Isabel Ave	Wetmore Rd		New			1.04	\$78,400	\$2,840	Opportunity
BB13		School Access	Class IIIIE Bicycle Boulevard	Wagoner Dr, Mocho St	Elaine Ave	Holmes St		AP	Granada HS, Michell K-8		0.53	\$284,000	\$1,540	Opportunity
P36		School Access	Medium Intensity Crossing	Wall St	Alexander St		Ped	PP	Granada HS, Michell K-8			\$172,300	\$3,950	Opportunity
BB30		School Access	Class IIIIE Bicycle Boulevard	Yorkshire Dr, Briarwood Dr	Portola Ave	Royal Rd		New	Junction Ave K-8, Lawrence ES		0.25	\$133,200	\$720	Opportunity

For an explanation of table columns and abbreviations, see pages I-1 to I-3 of Appendix I

This page intentionally left blank.

APPENDIX J TRAILS

This appendix describes the proposed shared use path projects including alignments, intent, and context for each of the recommended Class IA facilities identified in this Bicycle, Pedestrian, & Trails Active Transportation Plan. This appendix uses the term “trail” synonymously with shared use path for consistency with the Livermore community and City partners such as Livermore Area Recreation and Park District and East Bay Regional Park District.

Trails are described and mapped on the following pages, including the project ID number used in Chapter 5 and Appendix I.

The alignments and costs are calculated at a planning level. Additional site analysis and evaluation will be required when implementing the individual projects. The project costs include plan level construction estimates and annual maintenance estimates based on an aggregate cost per mile. The construction cost assumptions do not include acquisition of right-of-way or other significant infrastructure needs including bridges or at-grade traffic signals. The estimated annual maintenance costs do not include the current maintenance costs for the existing segments, they are associated with the new facilities.

Finally, the estimated costs are based on the paved shared use path paved classification. However, several segments could be implemented as an unpaved or natural surface trail depending on site context and desired user experience. If trail projects are implemented as an unpaved project, these trails could conceivably be less expensive to construct and/or maintain.

Similarly, some of these trails may include a separated equestrian component based on site context and feasibility.

T1 CAYETANO CREEK TRAIL

Status: Proposed trail

Location: In northwest Livermore, north of I-580 and west of North Livermore Avenue, it generally follows a north-south direction parallel to Cayetano Creek.

Length: 3.68 miles

Construction Cost Estimate: \$ 5,812,900

Annual Maintenance Cost Estimate: \$ 97,100

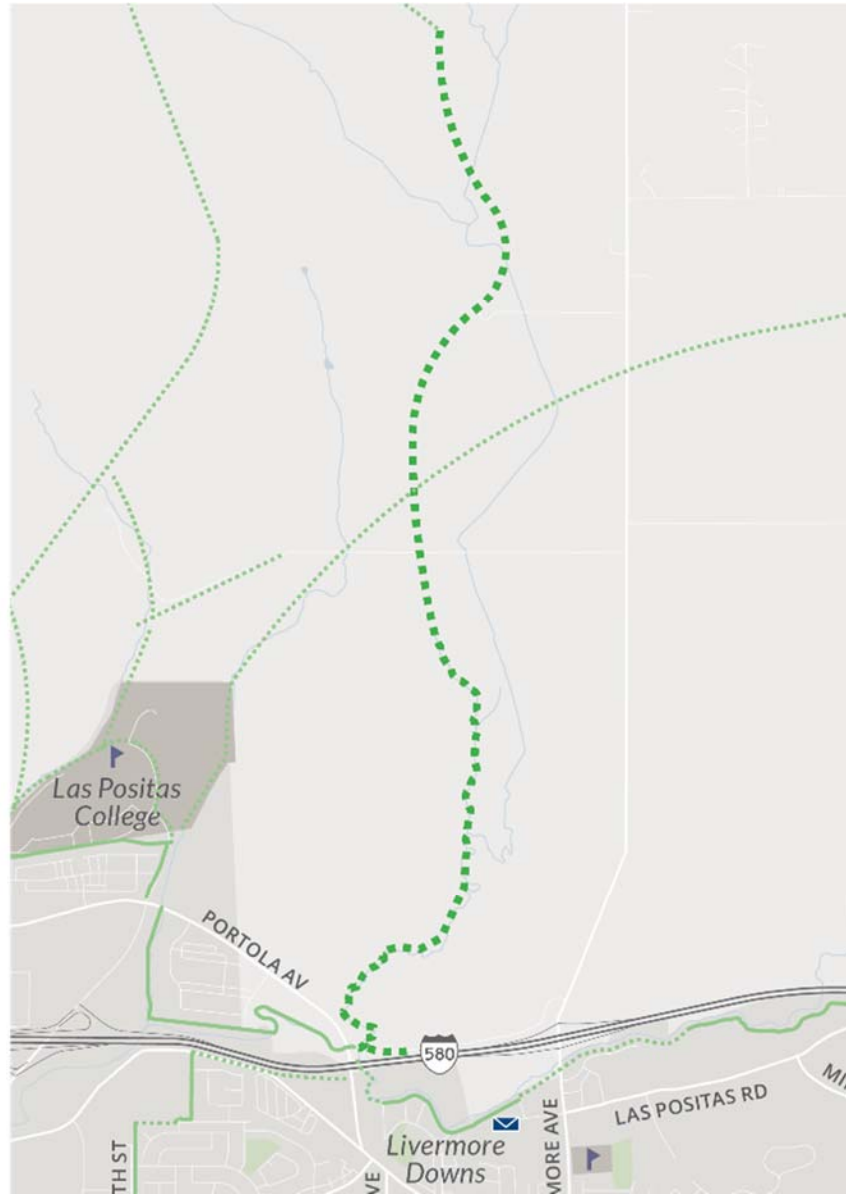
Trail Connections: Arroyo Las Positas Trail (T6), Isabel Trail (T5)

Purpose/Significance: This trail provides scenic value and recreation opportunities through North Livermore in Alameda County; and provides a connection into Contra Costa County to Morgan Territory.

Trail Alignment: The proposed trail would begin just north of I-580 where the Arroyo Road Trail (T6) veers south and crosses under I-580. The trail would run primarily in a north/south direction adjacent to Cayetano Creek. Another possible alignment would be along North Livermore Avenue. The trail is proposed to continue into Contra Costa County and eventually to Morgan Territory. The trail also includes a spur that connects to Cayetano Court. A bridge connecting to Trail T6 may also be necessary depending on the precise alignment of T1.

Additional Information: The majority of this proposed trail is located in Alameda County outside the Livermore city limit line, and urban growth boundary. The trail traverses multiple privately owned parcels with agriculture zoning designations. Because of this, communication/negotiation with multiple property owners will be necessary for successful implementation. Coordination with East Bay Regional Park District and Zone 7 is essential.

T1 CAYETANO CREEK TRAIL



T2 NORTH CANYONS PARKWAY TRAIL

Status: Proposed trail

Location: In northwest Livermore, it generally follows parallel to North Canyons Parkway.

Length: 1.6 miles

Construction Cost Estimate: \$4,204,600

Annual Maintenance Cost Estimate: \$70,200

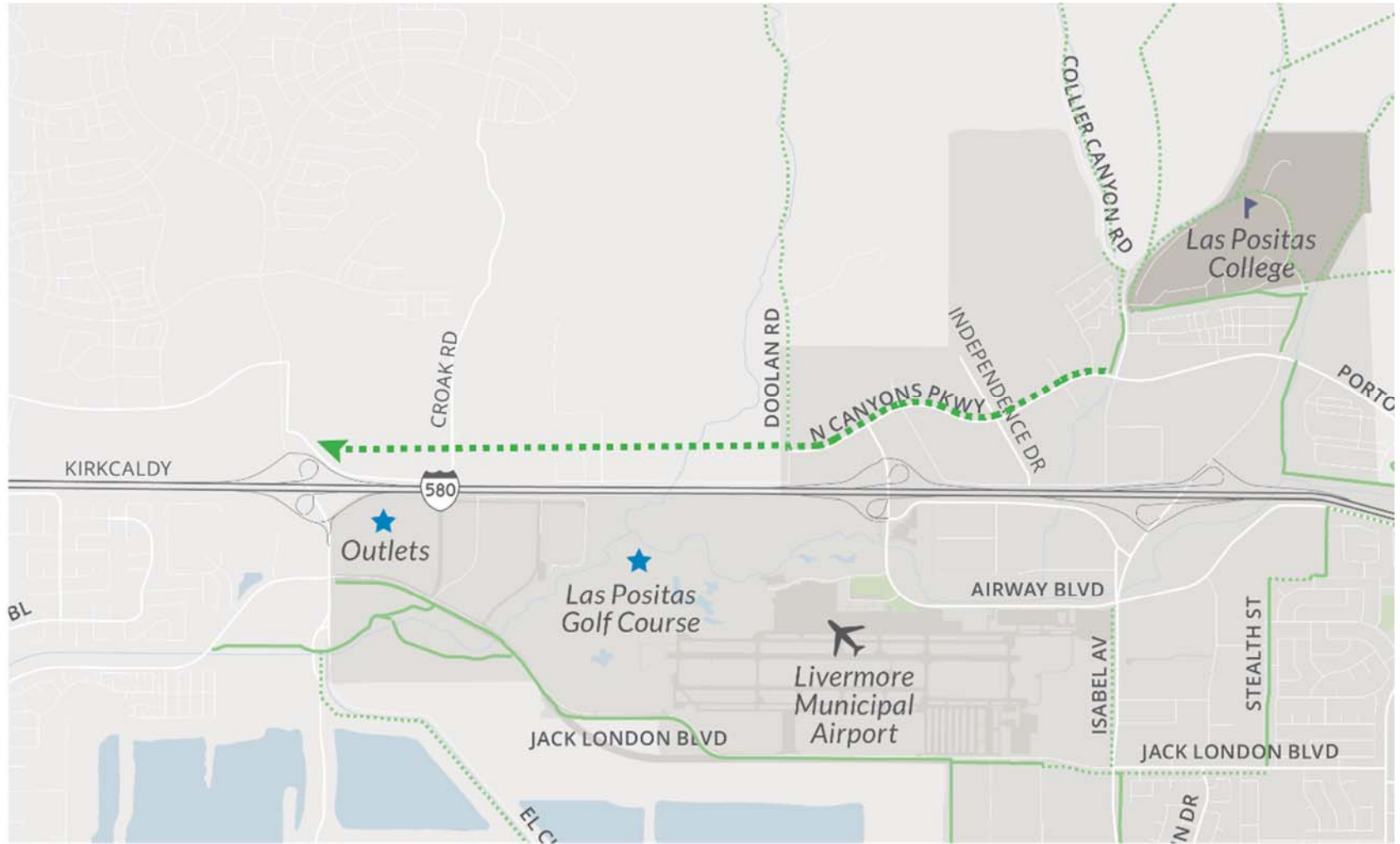
Trail Connections: Doolan Canyon Trail (T20), Collier Canyon Trail (T21), Arroyo Las Positas (T6)

Purpose/Significance: This trail runs in an east-west direction and provides a connection between the cities of Dublin and Livermore.

Trail Alignment: The proposed trail would begin near the future Dublin Boulevard Extension and extend parallel to and on the north side of North Canyons Parkway. There is an existing wide sidewalk along North Canyons Parkway between Constitution Drive and Collier Canyon Road. This sidewalk could be improved to shared-use trail standards.

Additional Information: Coordination with the City of Dublin and Alameda County is necessary. In 2017, the Cities of Dublin and Livermore initiated a feasibility study for the Dublin Boulevard / North Canyons Boulevard Extension.

T2 NORTH CANYONS PARKWAY TRAIL



Proposed Trail

Existing Trail

T3 COLLEGE TRAIL

Status: Existing trail with extensions proposed

Location: In northwest Livermore, it loops around Las Positas College with segments to the north.

Length: 5.3 miles

Construction Cost Estimate: \$ 8,316,600

Annual Maintenance Cost Estimate: \$138,900

Trail Connections: Isabel Trail (T5), Doolan Canyon Trail (T20), Collier Canyon Trail (T21)

Purpose/Significance: This trail provides off-street circulation around Las Positas Junior College, and extends north from to provide recreation opportunities and scenic vistas along ridgelines in Northern Alameda County.

Trail Alignment:

A1 – Existing trail along the southern edge of Las Positas College. A short section of trail will be needed to cross Collier Canyon Creek, connect with the existing portion of Collier Canyon Creek Trail (T21).

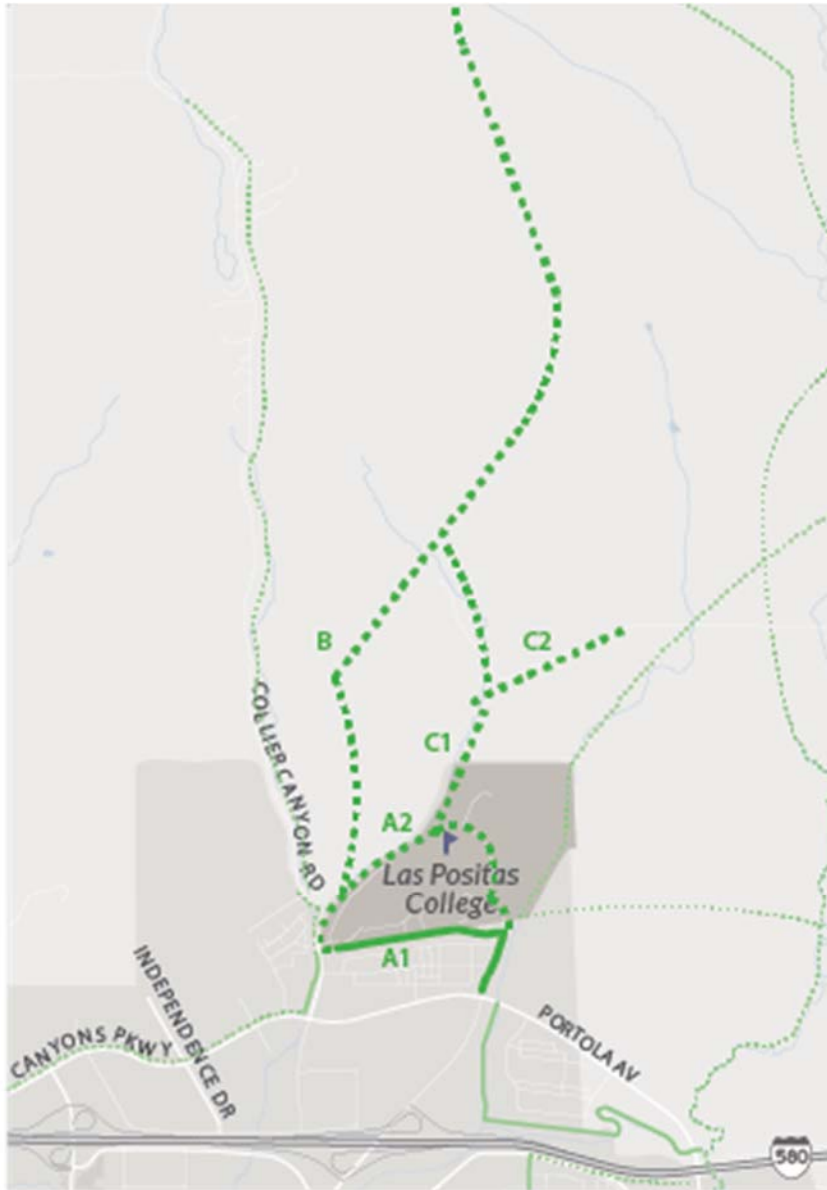
A2 – Proposed extension around Las Positas College adjacent to Perimeter Road and complete the loop around the college.

B – Proposed segment extends from Perimeter Road (near Collier Canyon Road) along a series of ridges to Doolan Canyon Trail (T20).

C – Proposed connector trail heads north from the northern portion of Perimeter Road to form a loop with segment B. Possible spur trail could be built to Hartman Road, providing a possible connection to other proposed North Livermore trails.

Additional Information: Consultation and planning with Las Positas College is necessary for the loop trail proposed adjacent to Perimeter Road. Segments B and C north of the college most likely will be single track due to terrain. The northern portion of the proposed trail is located in Alameda County outside the Livermore city limit line and urban growth boundary. This trail traverses multiple privately owned parcels with agriculture zoning designations. Because of this, communication/negotiation with multiple property owners will be necessary for successful implementation.

T3 COLLEGE TRAIL



T4 ALTAMONT CREEK TRAIL

Status: Existing trail with gap closures and extensions proposed

Location: In northeast Livermore, it generally follows an east-west direction parallel to Altamont Creek from the Iron Horse Trail west to the Arroyo Las Positas Trail.

Length: 5.93 miles

Construction Cost Estimate: \$ 5,260,100

Annual Maintenance Cost Estimate: \$87,800

Trail Connections: Arroyo Las Positas Trail (T6), Iron Horse Trail (T16), Laughlin Road Trail (T17)

Purpose/Significance: This trail provides connectivity through the residential areas in northeast Livermore to schools and LARPD facilities including Christensen Park, Altamont Creek Park, and Marlin A. Pound Park.

Trail Alignment:

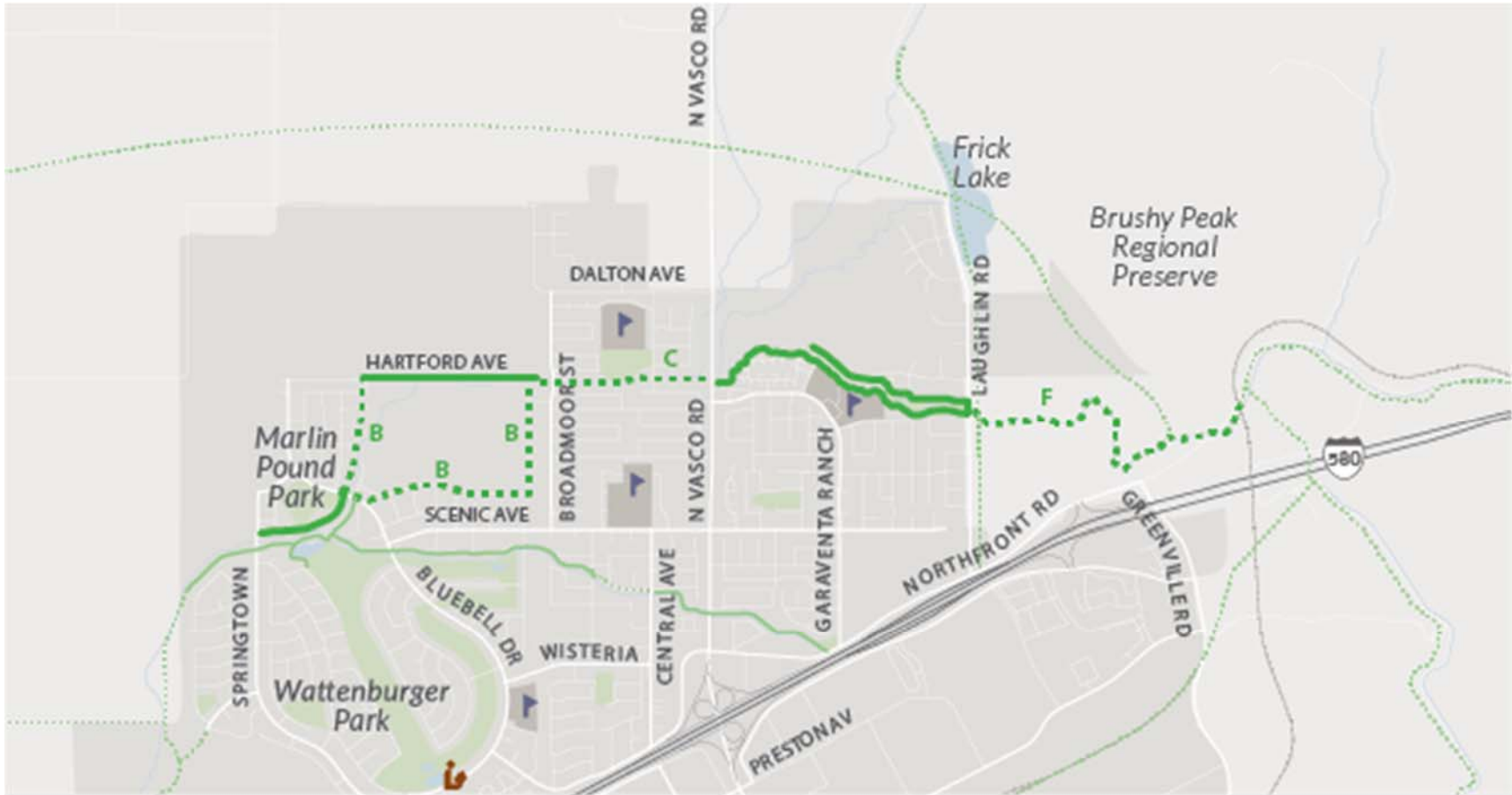
B – This potential trail alignment would continue east from Bluebell Drive following the northern border of existing residences and then northward along the western border of the existing residential development to connect to Broadmoor Street. The proposed trail could also continue north from Bluebell on the eastern side of the residential development on Buckskin Road and connect to the existing trail, along Altamont Creek, and ultimately connect with Broadmoor Street.

C – From Broadmoor, the proposed trail would continue east by converting the existing concrete channel into a culvert and creating a greenway with a shared-use trail. This trail would connect to the Christenson Middle School and Christensen Neighborhood Park. From the park, the trail would continue along an existing Zone 7 access road to Vasco Road.

Alternatively, this trail could utilize existing street right of way and park property as an interim alignment. The trail would veer north on Broadmoor Street approximately 100 feet, turn east and cross Broadmoor at the existing striped crossing at Bridgeport Circle. From here, the trail would continue east along the exiting street to Christensen Neighborhood Park where the trail would align approximately 800 feet along on the southern portion of property, and finally connect to the existing Zone 7 access road along the channel at Pasatiempo Street and would continue to Vasco Road.

F – East of Laughlin Road, the trail is proposed to continue east along Altamont Creek to connect with the proposed Iron Horse Trail.

T4 ALTAMONT CREEK TRAIL



T5 ISABEL TRAIL

Status: Existing trail with extensions proposed

Location: In west Livermore, it generally follows a north-south direction parallel to Isabel Avenue.

Length: 6.13 miles

Cost Estimate: \$4,246,600

Annual Maintenance Cost Estimate: \$70,900

Trail Connections: Cayetano Creek Trail (T1), College Trail (T3), Arroyo Las Positas Trail (T6), South Livermore Valley Trail (T10), Shadow Cliffs to Arroyo del Valle Regional Trail (T11), Iron Horse Trail (T16), Arroyo Mocho Trail (T19).

Purpose/Significance: This trail provides regional connectivity from residential areas and park facilities in South Livermore to Las Positas College and employment centers in the North Canyons Parkway area. The trail will provide a safe and separated undercrossing at I-580 allowing access between the areas north and south of I-580.

Trail Alignment:

D – Beginning at Portola and T-6 to Arroyo Las Positas Trail, the proposed trail would align west adjacent to I-580 along Airway Blvd. It will then continue along the north side of Airway Blvd. At a point to be determined in the future, it will cross Airway Blvd to connect to Sutter Street.

E-F – The trail exists along Sutter Street through existing residential development. There is an existing unpaved gap at the end of Sutter Street located behind the homes fronting Colusa Street. The existing paved trail parallels Stealth Street and aligns south to Jack London Blvd.

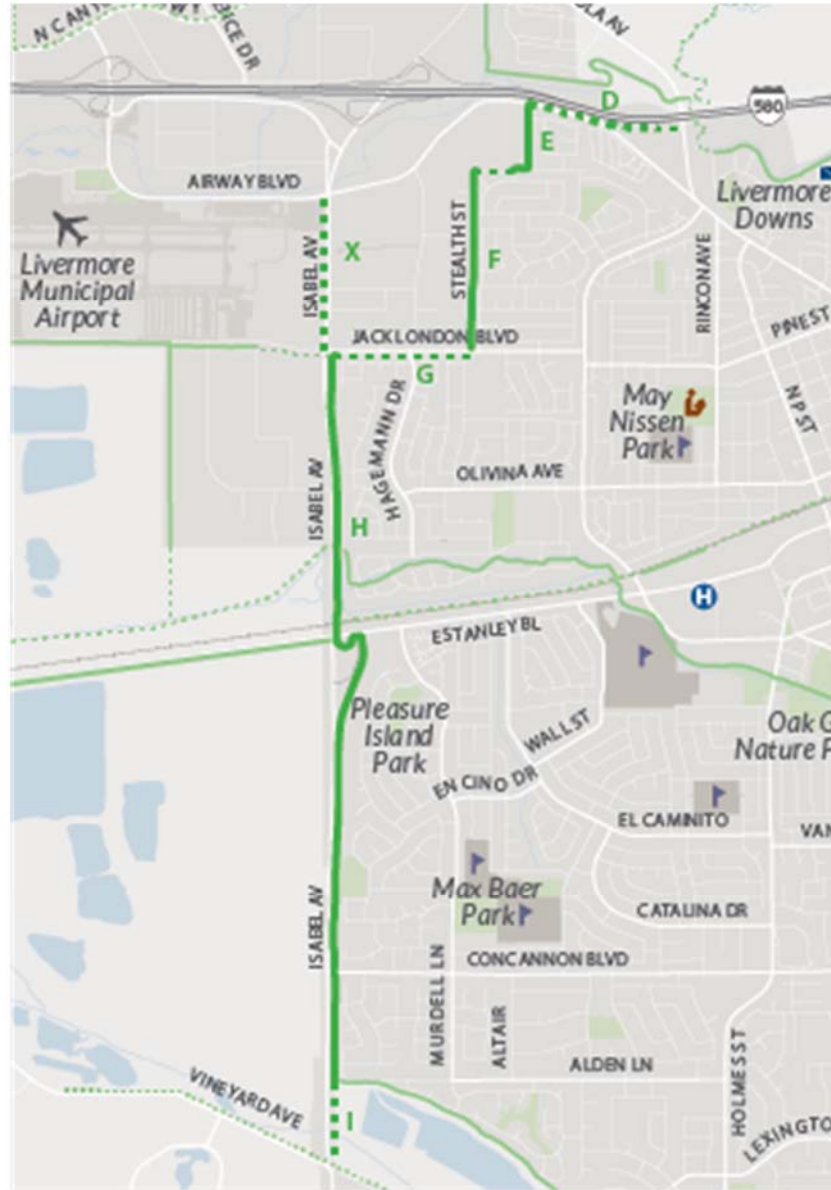
G – At Jack London Blvd, the proposed trail continues west along Jack London Blvd to Isabel Avenue as part of an upgraded sidewalk and other on street bike facilities (separated or buffered bike lane).

H – Existing portion of the trail continues south from the southeast corner of Jack London Blvd and Isabel Avenue along the east side of Isabel Avenue. The trail connects to Arroyo Mocho Trail (T19) and Iron Horse Trail (T16) near the Stanley Blvd overcrossing. The trail continues south to Alden Lane where it connects to the Livermore Valley Wine Trail (T10).

I – The Isabel Trail is proposed to continue south from Alden Lane to Vineyard Avenue where it will connect with the Shadow Cliffs to Arroyo del Valle Regional Trail (T11). Caltrans and the City are constructing this trail segment as part of SR84 widening project including the bicycle/pedestrian Isabel Avenue Bridge over the Arroyo del Valle.

X – From the corner of Jack London Blvd and Isabel Avenue, the proposed trail would also continue north along Isabel Avenue following an upgraded sidewalk and new trail segments to the intersection at Airway Blvd.

T5 ISABEL TRAIL



T6 ARROYO LAS POSITAS TRAIL

Status: Existing trail with gap closures and extensions proposed

Location: In northern Livermore, it generally follows an east-west direction parallel to Arroyo Las Positas.

Length: 6.36 miles

Cost Estimate: \$4,246,600

Annual Maintenance Cost Estimate: \$93,600

Trail Connections: North Canyons Trail (T2), Altamont Creek Trail (T4), Isabel Trail (T5), Arroyo Seco Trail (T9), Laughlin Road Trail (T17)

Purpose/Significance: This trail provides connectivity through the residential areas in northeast Livermore and grade-separated crossings to the north and south sides of I-580 with connections to Las Positas College and to recreation trail facilities in north and south Livermore.

Trail Alignment:

A – The existing Arroyo Las Positas Trail begins at the intersection of Campus Hill Drive/Isabel Avenue and Portola Avenue/North Canyons Parkway and continues south parallel to Isabel Avenue along a seasonal drainage. The existing trail turns east, roughly following the Las Positas creek, and continues east under the Portola Avenue/I-580 overcrossing. On the south side of I-580, the trail aligns slightly to the west and connects to Portola Avenue sidewalk.

B – A short gap exists between the Portola Avenue/I-580 overcrossing and the existing portion of the trail at the rear of the apartment complex on Paseo Laguna Seco. This existing

segment continues east on the south side of the Arroyo where it terminates about 1,000 feet west of North Livermore Avenue.

C – This segment would continue east along the Arroyo Las Positas to the signalized intersection of North Livermore Avenue at the Arroyo Plaza. The City owns right of way for this trail between North Livermore Ave and the Walmart property parallel to the arroyo. A bridge is required to cross a small seasonal tributary to the arroyo. The existing trail begins near the Walmart Property and continues on the south side of the arroyo to Las Colinas Road.

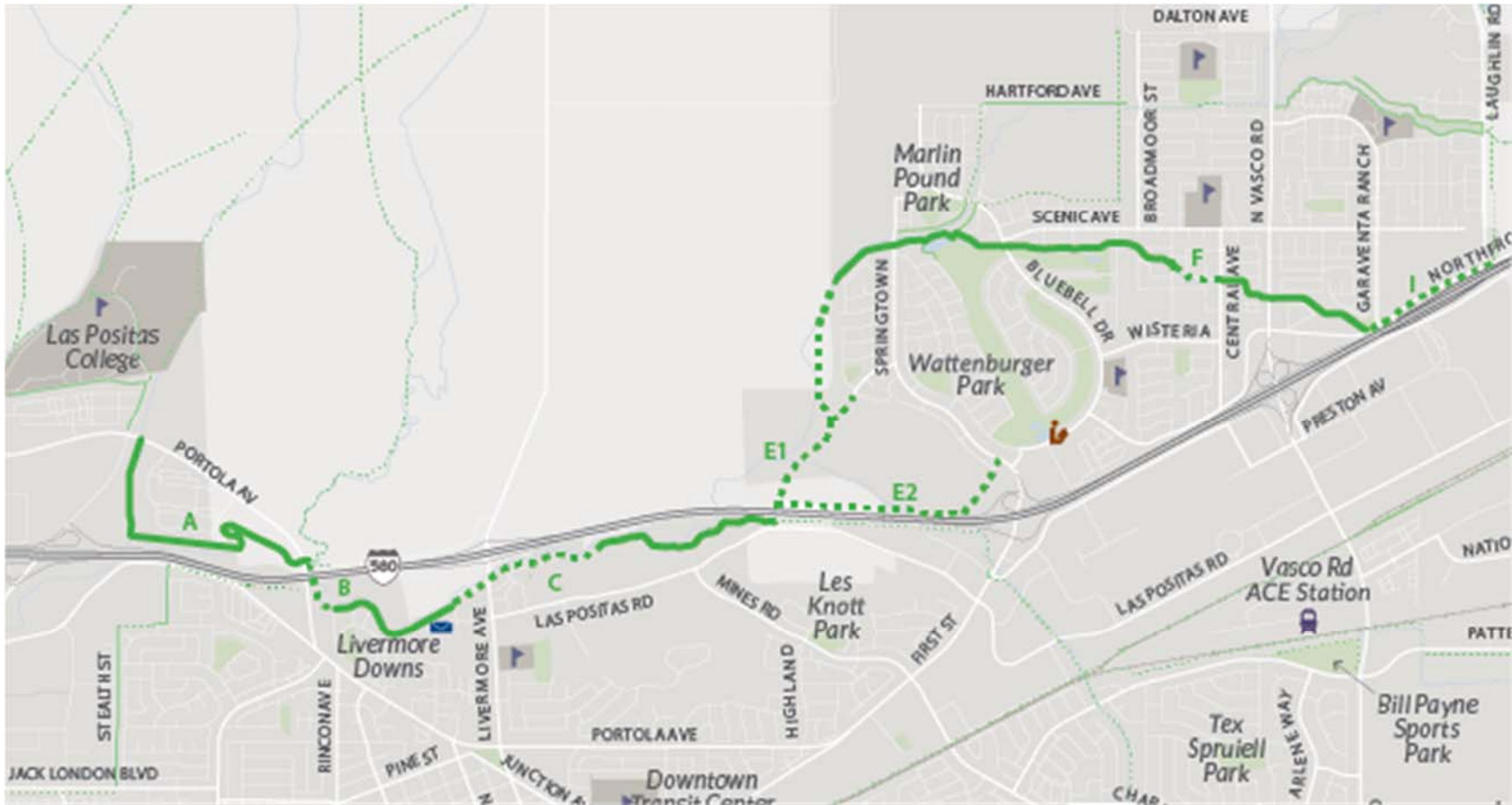
E1 – The trail would utilize the existing Las Colinas Road/I-580 Overpass. The proposed trail would continue north and connect to the existing trail at the north-west edge of the existing residential development.

E2 – A spur trail is proposed parallel to I-580 from the Las Colinas/I-580 overcrossing east to Lassen Road.

F – The existing trail follows the south side of the arroyo from approximately the City boundary to the Springtown Open Space where it crosses the arroyo and follows along the north side of the arroyo and through the existing residential development until Arrowhead Way. On the north side of the arroyo, the trail exists as an approximately 240-linear foot trail segment and transitions to existing sidewalk along Lobelia Way to Central where the trail exists on the north side of the arroyo. On the south side of the arroyo the trail exists, but is unpaved from Arrowhead Way to Cherry Way.

I – After crossing Vasco the existing trail ends at Northfront Road. The proposed trail would continue east along Northfront Road to the intersection of Laughlin Road and Northfront Road where it would connect with the Laughlin Road Trail.

T6 ARROYO LAS POSITAS TRAIL



- Proposed Trail
- Existing Trail

T7 CIVIC CENTER TRAIL

Status: Existing trail with extensions proposed

Location: In central Livermore, it generally follows an east-west direction near the Livermore Civic Center.

Length: 1.0 miles

Cost Estimate: \$1,220,100

Annual Maintenance Cost Estimate: \$29,900

Trail Connections: Dunsmuir Trail (T18), Arroyo Mocho Trail (T19)

Purpose/Significance: This trail provides connectivity from the Robert Livermore Community Center and Park, to Almond Avenue Park, Sunken Gardens Park, East Avenue Middle School, and the Livermore Civic Center which contains the Police Department, City Hall, and the Main Library. This trail also ultimately connects to the Arroyo Mocho Trail and recreation opportunities in Robertson Park.

Trail Alignment:

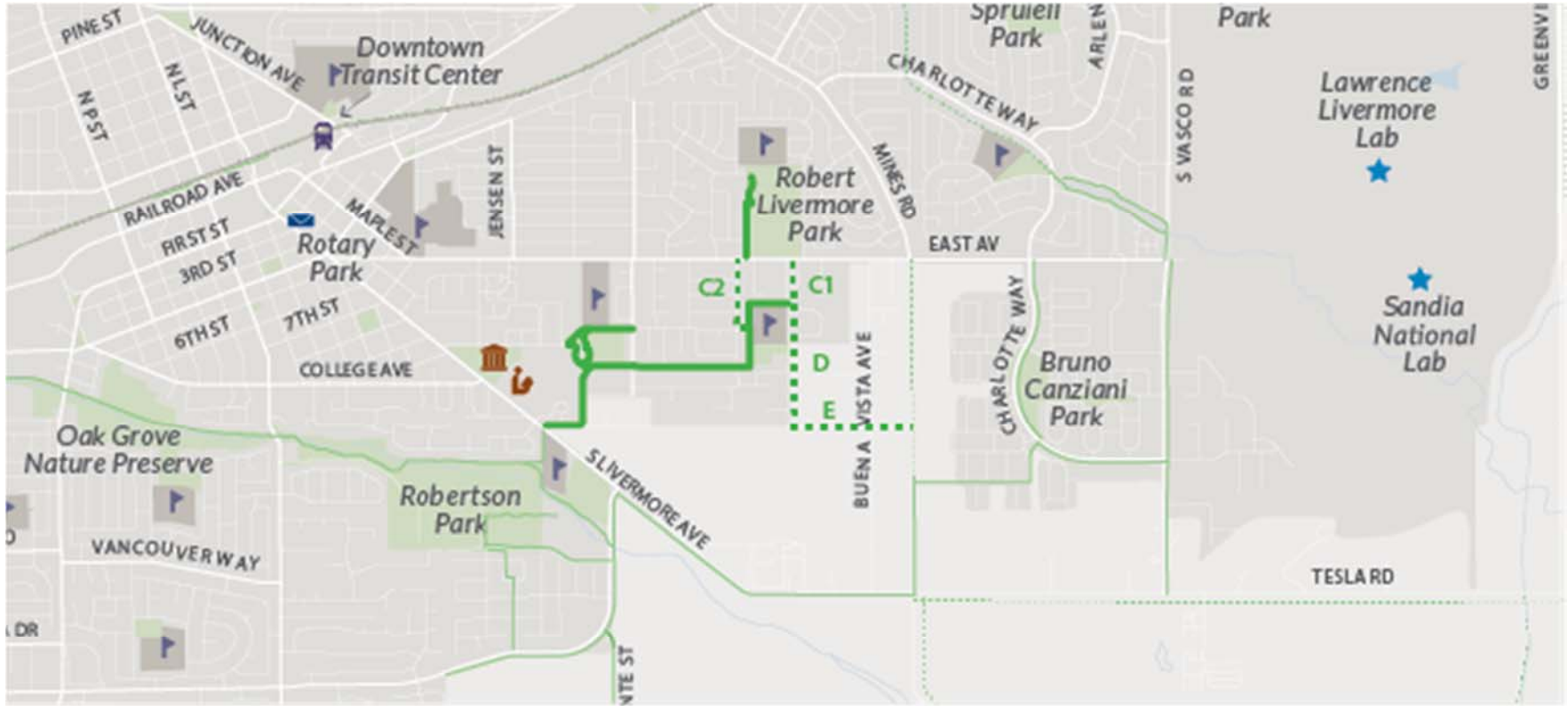
A1 – The existing trail begins where the Arroyo Mocho Trail ends at S. Livermore Avenue south of the Civic Center. The trail initially heads east and then veers north to the Sunken Gardens Park and then east again to Hillcrest Avenue.

A2 – An existing spur trail extends from the northern boundary of the Sunken Gardens Park east to Hillcrest Avenue.

B – This existing trail segment extends east from Hillcrest Avenue along the Quezaltenango Parkway parallel to Findlay Way. After crossing Madison Avenue, the trail continues north within Almond Park. At the northern limit of the Almond Avenue School property, the trail veers east and ends at Almond Avenue.

Additional Information: The future alignment of segment E is contingent on future development in Alameda County along Buena Vista Road. In the event that the existing development pattern in this area remains the same, coordination with existing property owners and Alameda County would be necessary to establish a connection from Almond Avenue to the Dunsmuir trail.

T7 CIVIC CENTER TRAIL



- Proposed Trail
- Existing Trail

T9 ARROYO SECO TRAIL

Status: Existing trail with gap closures and extensions proposed

Location: In east Livermore, it generally follows a north-south direction from I-580 to Tesla Road.

Length: 4.24 miles

Cost Estimate: \$3,861,000

Annual Maintenance Cost Estimate: \$64,500

Trail Connections: Las Positas Trail (T6), South Livermore Valley Trail (T10), Iron Horse Trail (T16), Dunsmuir Trail (T18)

Purpose/Significance: This trail provides north/south as well as east/west connectivity between residential areas in southeast Livermore to the Lawrence Livermore Lab, and commercial areas near I-580.

Trail Alignment:

A – The proposed trail would begin at Las Colinas Road on the south side of I-580 and continue east, roughly parallel to I-580, to the Arroyo Seco channel. At this point, the trail would cross over the Arroyo Seco channel and continue southeast along an existing Zone 7 service road to First Street. At First Street, trail users should be directed to cross at the signalized intersection of First Street and Southfront Road.

B – Once across First Street, trail users would need to utilize Southfront Road until they reach the Arroyo Seco channel where the trail would continue south on the Zone 7 service road.

C – The proposed trail would cross Arroyo Vista Road at a mid-block location, where an enhanced pedestrian crossing would be provided. The trail would continue along the arroyo and cross Las Positas Road at a future signalized intersection.

D – The proposed trail would continue south on the Zone 7 service road and connect to the future Iron Horse Trail, north of the railroad tracks. The trail could utilize a bridge which is being proposed for the future Iron Horse Trail in order to cross east over the arroyo. In order to continue south to Patterson Pass Road the trail would need to cross over or under the railroad tracks.

E – The proposed trail would cross Patterson Pass road at an at-grade improved pedestrian crosswalk and continue south along the Zone 7 access road on the west side of the arroyo to Charlotte Way near Ursula Street.

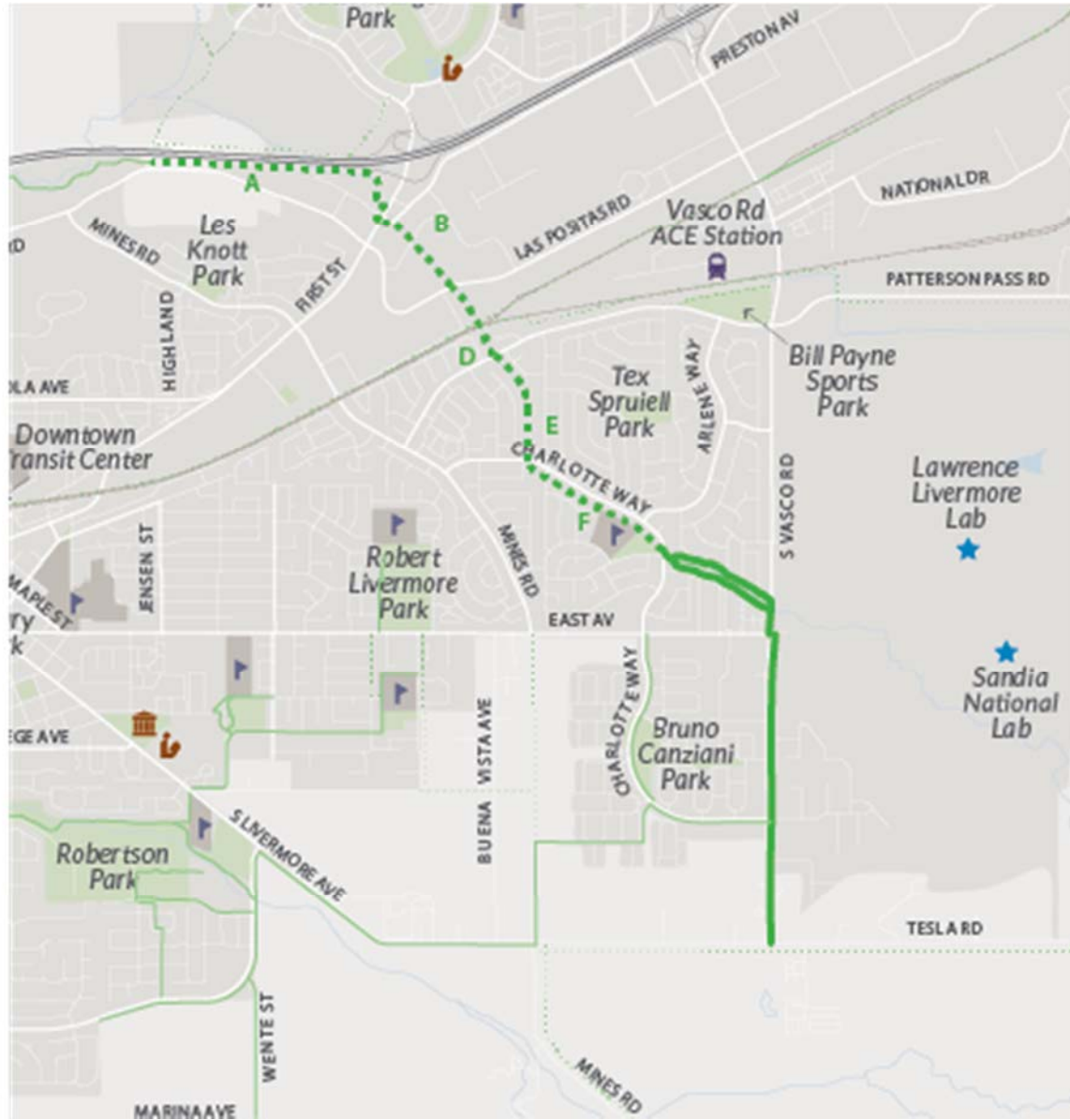
F – The rear residential property lines are immediately adjacent to the Arroyo Seco and leave no service road on either side between the northern arroyo crossing of Charlotte Way near Ursula Street and the southern arroyo crossing of Charlotte Way near Kathy. A proposed trail can be built by modifying the arroyo channel or building a cantilevered trail. Alternatively, the existing bike lanes and sidewalk on Charlotte Way could be used to create a connection between the two trail extents.

G – There is an existing trail on both sides of the arroyo between Charlotte Way and Vasco Road.

H – The existing trail continues south along the west side of Vasco Road as part of a sidewalk. From the intersection of Vasco Road and East Avenue the trail exists on the east side of Vasco Road to Tesla Road. (In the South Livermore Valley Specific Plan this trail segment is identified as A.)

Additional Information: Coordination with Zone 7 and Union Pacific Railroad is necessary.

T9 ARROYO SECO TRAIL



T10 SOUTH LIVERMORE VALLEY TRAIL

Status: Existing trail with gap closures and extensions proposed

Location: At the southern edge of Livermore, it follows an east-west direction from Isabel Avenue to Greenville Road.

Length: 10.65 miles

Cost Estimate: \$6,637,000

Annual Maintenance Cost Estimate: \$110,800

Trail Connections: Isabel Trail (T5), Arroyo Seco Trail (T9), Shadow Cliffs to del Valle Regional Trail (T11), Mines Road Trail (T12), Arroyo Road Trail (T13), South Bay Aqueduct Trail (T15), Dunsmuir Trail (T18), Arroyo Mocho Trail (T19), Sycamore Grove Oak internal trail system

Purpose/Significance: This trail provides connectivity between the residential areas and vineyards in South Livermore to important recreation opportunities such as Sycamore Grove Park.

Trail Alignment:

A – The existing trail begins at Isabel Avenue and Alden Lane and continues east on the south side of the existing residential neighborhood and on the north side of the Arroyo del Valle (commonly known as the Oaks Trail).

B – There is a gap in the existing trail along an undeveloped parcel south of Wood Hollow Drive. This gap should be constructed with the reclamation of Lake “A”. From here, the trail continues east and crosses Vallecitos Road at the signalized intersection at Wetmore Road.

C – The existing trail continues east along Wetmore Road to Arroyo Road. (In the South Livermore Valley Specific Plan this trail segment is identified as L.)

D – The existing trail crosses Arroyo Road at the three-way stop controlled intersection and continues east into Holdener Park. The trail then veers northeast through the park and then north to connect to Marina Avenue. (In the South Livermore Valley Specific Plan this trail segment is identified as I and H.)

E – This existing segment continues east along the south side of Marina Avenue to Wente Street and then veers north along the east side of Wente Street to Concannon Blvd. (In the South Livermore Valley Specific Plan this trail segment is identified as H and F.)

E2 – A segment of the proposed trail would also align westward along Marina Avenue towards Arroyo Road to improve connectivity with residential neighborhoods and provide recreational loop opportunities. Coordination with Marina Avenue residents would be required.

F – The existing trail runs along Concannon Blvd to South Livermore Avenue where it turns south and continues on the west side of South Livermore Avenue. (In the South Livermore Valley Specific Plan this trail segment is identified as E.)

G – The existing trail continues along the west side of South Livermore Avenue as the road travels southeast and then on the south side of Tesla Road east to Mines Road. The proposed trail would continue along Tesla Road from Mines Road to Greenville Road. (In the South Livermore Valley Specific Plan this trail segment is identified as E.)

H – A long-term proposal is to continue the proposed trail along Tesla Road to the east of Greenville Road.

I – This is an existing spur trail from Wetmore Road opposite the driveway entrance for Sycamore Grove Park north to Independence Park (in the South Livermore Valley Specific Plan this trail segment is identified as K.)

J1 – This is an existing spur trail from Concannon Blvd at Wente Street west to just before Normandy Street. (In the South Livermore Valley Specific Plan this trail segment is identified as G.)

J2 – This is an existing spur trail at Concannon Blvd and San Vicente Road north to Robertson Park.

Additional Information: Coordination with Livermore Area Recreation and Park District, Zone 7 Water Agency, and Alameda County would be required to determine construction and maintenance responsibilities.

This page intentionally left blank.

T11 SHADOW CLIFFS TO DEL VALLE REGIONAL TRAIL

Status: Existing trail with gap closure and extensions proposed

Location: At the southwestern edge of Livermore, it generally follows an east-west direction from Shadow Cliffs Regional Recreation Area (EBRPD) to Del Valle Regional Park (EBRPD).

Length: 4.70 miles

Construction Cost Estimate: \$2,205,800

Annual Maintenance Cost Estimate: \$36,800

Trail Connections: Isabel Trail (T5), South Livermore Trail (T10), Arroyo Road Trail (T13), and Sycamore Grove Regional Park (LARPD), Del Valle Regional Park (EBRPD), and Shadow Cliffs Regional Recreation Area (EBRPD) internal trail systems

Purpose/Significance: This trail provides connectivity between the Shadow Cliffs Regional Recreation Area in Pleasanton through significant open space areas in Livermore including Sycamore Grove Regional Park to the Del Valle Regional Park.

Trail Alignment:

A – In Pleasanton, the proposed trail will begin at Shadow Cliffs Regional Recreation Area and align in a south east direction south of the Arroyo del Valle and north of Vineyard Avenue toward Isabel Avenue. It is envisioned the trail would be constructed as part of reclamation of Lake B.

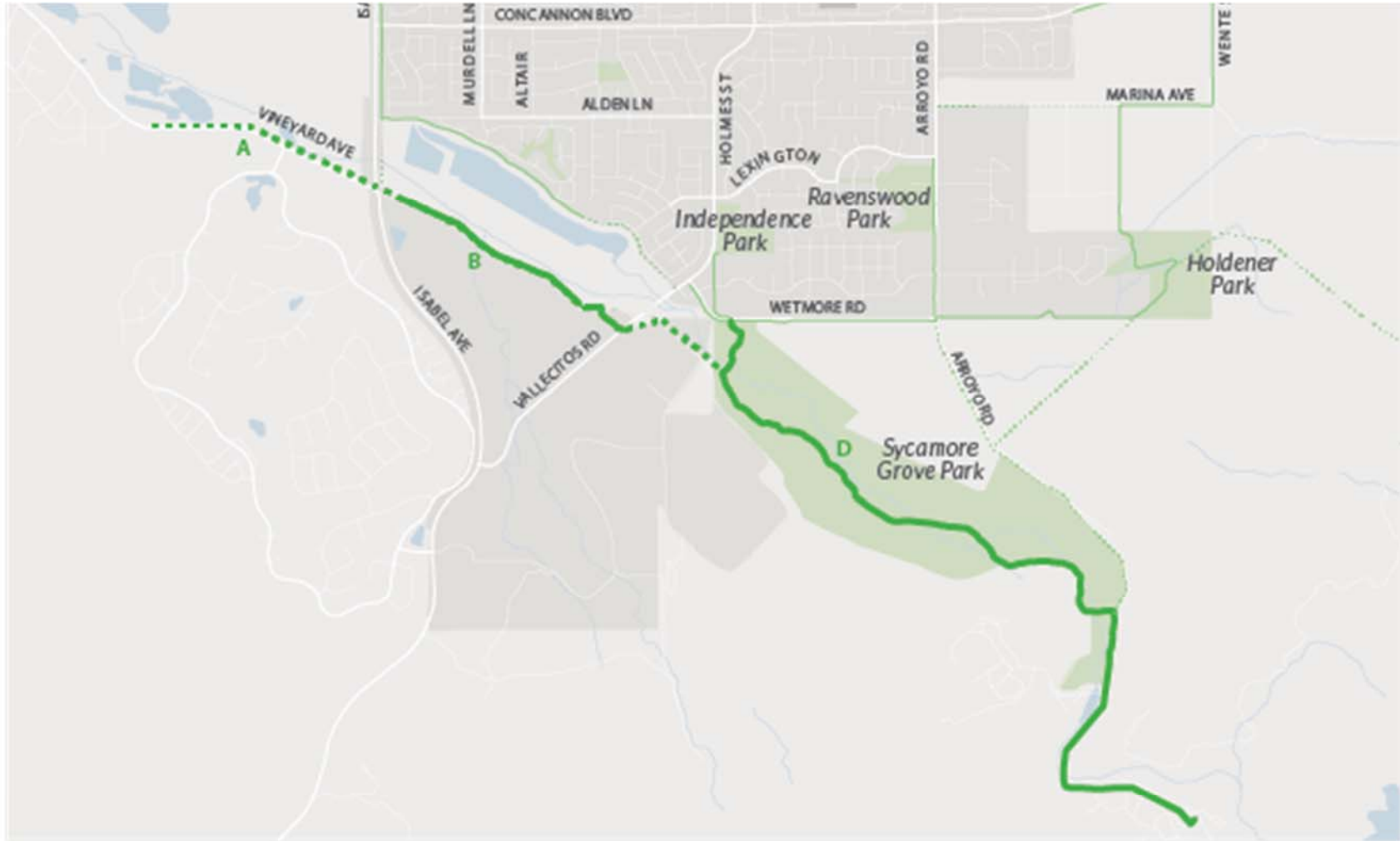
B – In Livermore, the existing trail begins at the east side of Isabel Avenue at Vineyard Avenue and parallels the north side of Vineyard Avenue, south of Arroyo del Valle to the signalized intersection at Vineyard Avenue and Vallecitos Road.

C – From the Vineyard Avenue and Vallecitos Road intersection, the proposed trail follows Vineyard Avenue across Vallecitos Road generally following the Arroyo del Valle, and continues southeast to Sycamore Grove Park where it will connect with the existing trail.

D – The existing paved trail passes through Sycamore Grove Regional Park following the arroyo with various connections to the internal park trail system. At the southern edge of the Park, the existing paved trail transitions to a natural surface trail that crosses the arroyo and aligns south to the eastern edge of Camp Arroyo and into the Del Valle Regional Park where it connects with the internal trail network. (LARPD to construct a permanent bridge to provide year-round access across the arroyo).

Additional Information: Coordination with East Bay Regional Park District, Livermore Area Recreation and Park District, Zone 7 Water Agency, Alameda County, and City of Pleasanton is essential.

T11 SHADOW CLIFFS TO DEL VALLE REGIONAL TRAIL



Proposed Trail

Existing Trail

T12 MINES ROAD TRAIL

Status: Proposed trail

Location: In southeast Livermore, it generally follows a north-south direction along Mines Road from Tesla Road to the Del Valle State Recreation Area.

Length: 2 miles

Construction Cost Estimate: \$2,693,900

Annual Maintenance Cost Estimate: \$45,000

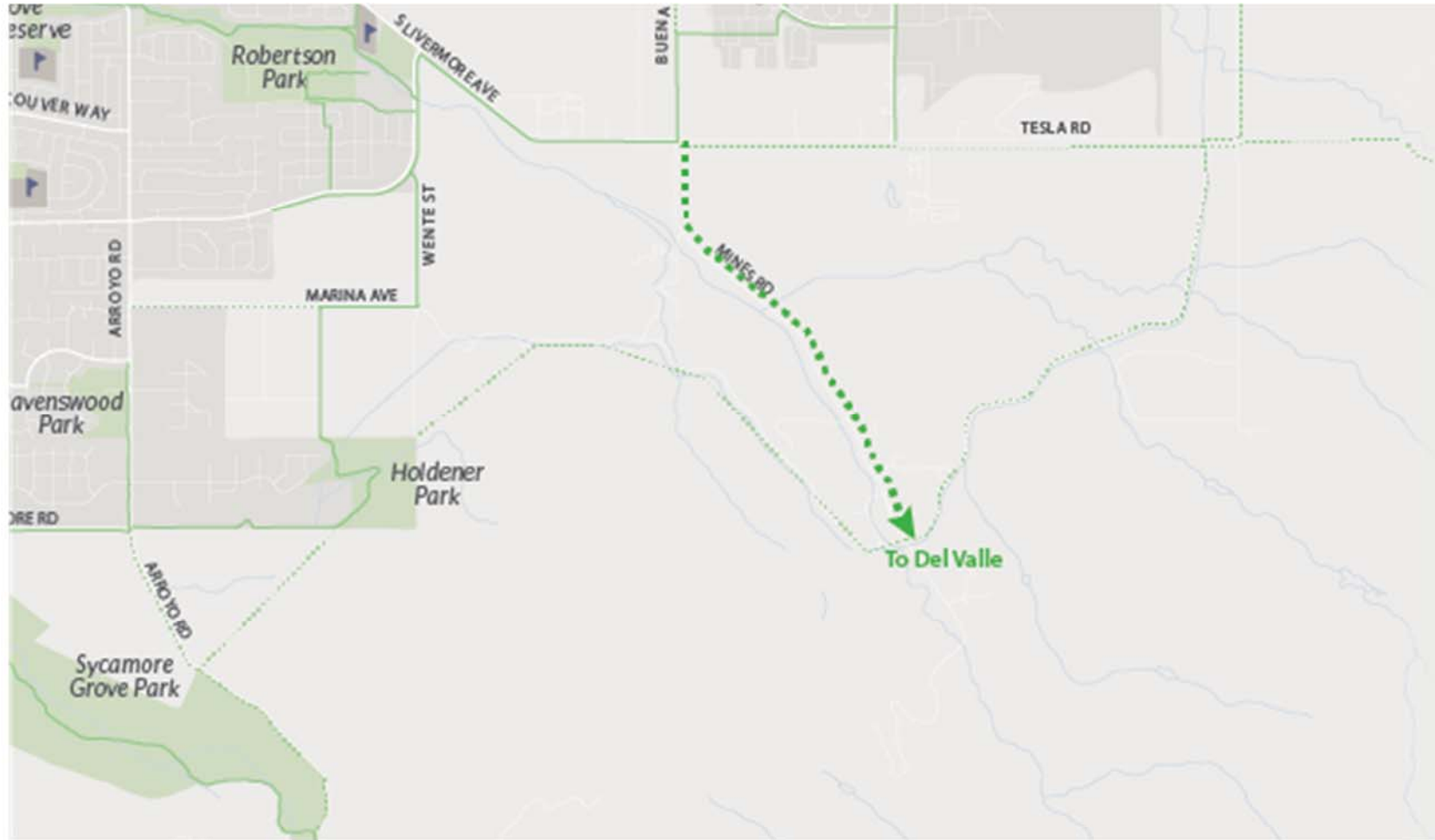
Trail Connections: South Livermore Valley Trail (T10), South Bay Aqueduct Trail (T15), Dunsmuir Trail (T18), Del Valle Regional Park internal trail system

Purpose/Significance: This trail provides an important link to the south end of Del Valle Regional Park (EBRPD), and provides potential to connect to the proposed South Bay Aqueduct Trail (T15); this trail could also provide a link between two major recreation areas – Brushy Peak and Del Valle.

Trail Alignment: The proposed trail would start at the intersection of Tesla Road and Mines Road and continue south, adjacent to Mines Road and Del Valle Road, terminating at the South Bay Aqueduct, with ultimate connection to Del Valle Regional Park.

Additional Information: The entire trail is located in Alameda County outside the Livermore city limit line and urban growth boundary. A desirable alignment for this trail is along Mines Road; however, there is limited road right-of-way. Therefore, communication/negotiation with private property owners may be necessary for successful implementation. Additionally, coordination with East Bay Regional Park District, Livermore Area Recreation and Park District, Zone 7 Water Agency, and Alameda County, and Mines Road residents is needed.

T12 MINES ROAD TRAIL



Proposed Trail

Existing Trail

T13 ARROYO ROAD TRAIL

Status: Existing trail with extension proposed

Location: In south central Livermore, it generally follows a north-south direction parallel to Arroyo Road.

Length: 1.91 miles

Construction Cost Estimate: \$2,160,700

Annual Maintenance Cost Estimate: \$36,100

Trail Connections: South Livermore Valley Trail (T10), Shadow Cliffs to Del Valle Regional Trail (T11), Dry Creek Trail (T25), and Sycamore Grove Regional Park internal trail system

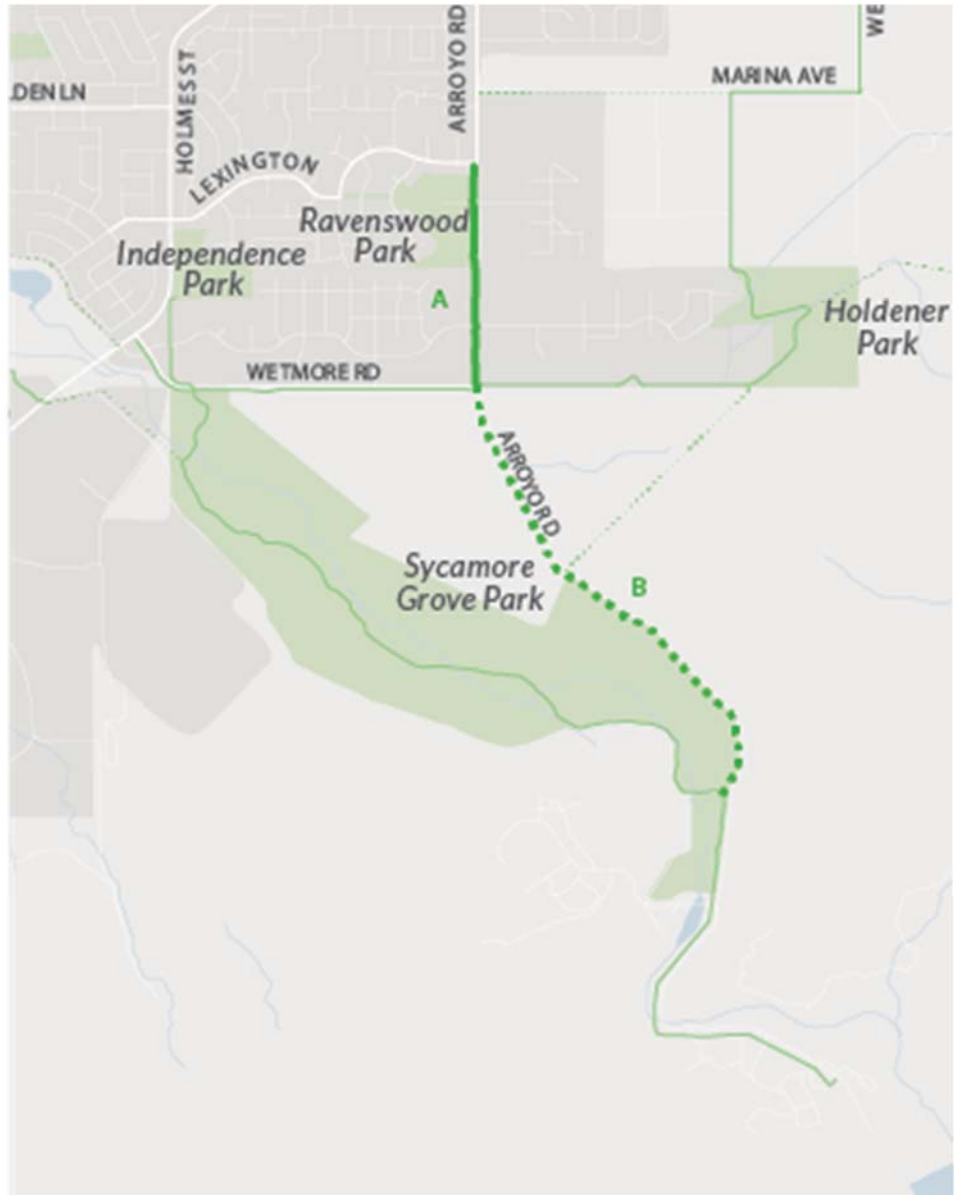
Purpose/Significance: This trail provides connectivity between the Ravenswood Historic Site, the surrounding neighborhoods, the South Livermore Valley Trail and open space areas such as Sycamore Grove and Del Valle Regional Parks. A wide sidewalk from Superior Drive to Ravenswood Historic Site provides connectivity for the residential neighborhood to the north.

Trail Alignment:

A – The existing paved trail begins at Ravenswood Historic Site on the west side of Arroyo Road. It continues south to Wetmore Road. (In the South Livermore Valley Specific Plan this trail segment is identified as J.)

B – The proposed trail would continue south on the west side of Arroyo Road and connect to the existing natural surface trail system in Sycamore Grove Regional Park near Dry Creek and ultimately with T11 to the Arroyo Road entrance. (In the South Livermore Valley Specific Plan this trail segment is identified as M.) Alternatively, the trail could align through private property on the east side of Arroyo Road and would require an at-grade crossing of Arroyo Road to connect into Sycamore Grove Park.

T13 ARROYO ROAD TRAIL



T14 JACK LONDON TRAIL

Status: Existing trail with small extension segment

Location: At the western edge of Livermore from the boundary of Pleasanton near El Charro Road to the intersection of Jack London Boulevard and Isabel Avenue, it generally follows an east-west direction adjacent to the Arroyo Las Positas.

Length: 2.91 miles

Construction Cost Estimate: \$376,900

Annual Maintenance Cost Estimate: \$6,300

Trail Connections: Isabel Trail (T5), Arroyo Mocho Trail (T19)

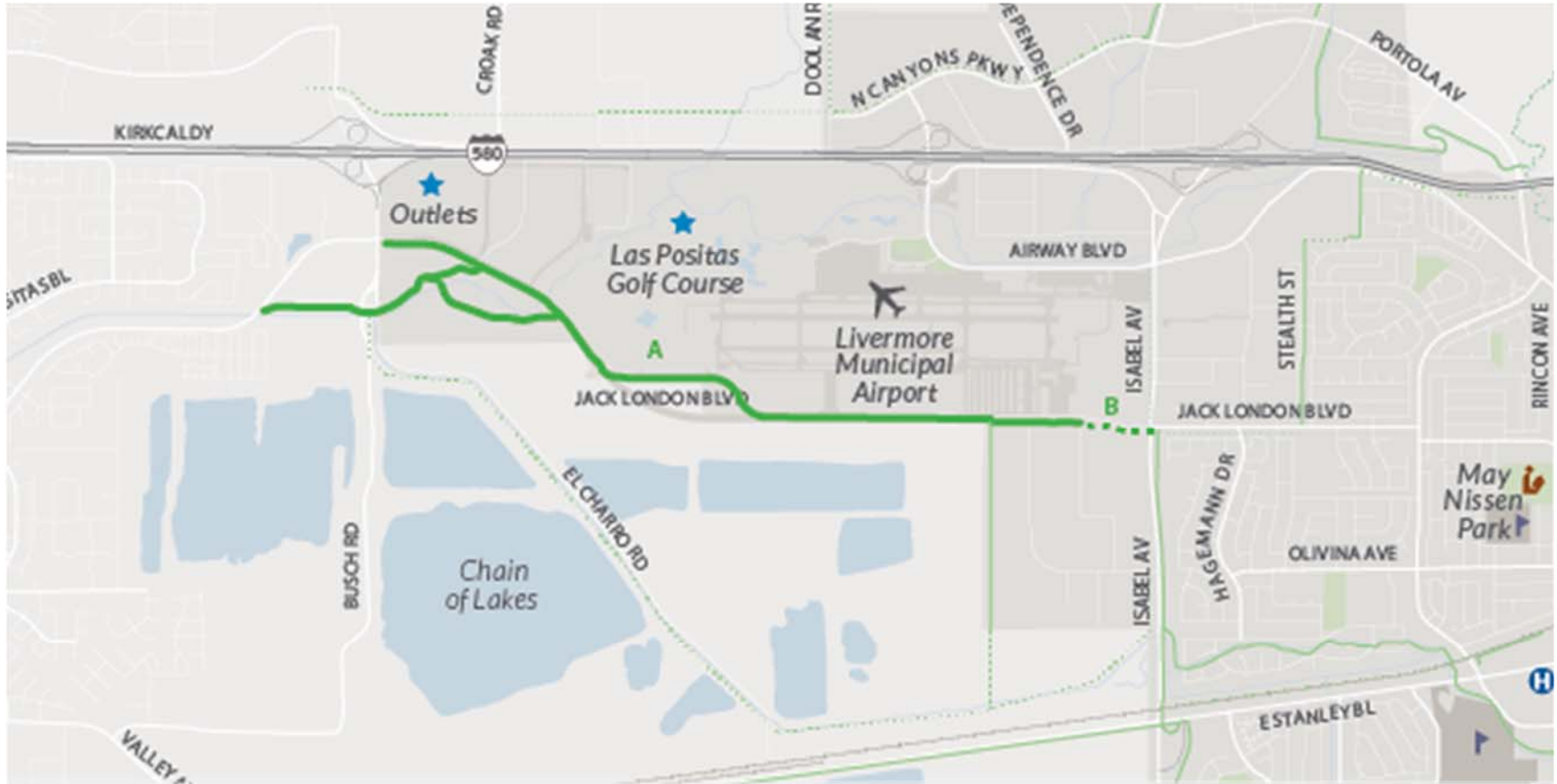
Purpose/Significance: This trail provides a separated, shared use path connection to the City of Pleasanton, regional amenities and the broader Tri-Valley trail network.

Trail Alignment:

A – The existing trail extends from El Charro east along the south side of Jack London Boulevard with several spur connections to the Outlet Mall and regional commercial centers.

B – A small gap exists along Jack London Boulevard between Voyager Street and Isabel Avenue.

T14 JACK LONDON TRAIL



Proposed Trail

Existing Trail

T15 SOUTH BAY AQUEDUCT TRAIL

Status: Proposed trail

Location: At the eastern edge of Livermore, it generally follows a north-south direction along the South Bay Aqueduct.

Length: 7.15 miles

Construction Cost Estimate: \$11,041,000

Annual Maintenance Cost Estimate: (N/A)

Trail Connections: South Livermore Valley Trail (T10), Mines Road Trail (T12), Iron Horse Trail (T16), Greenville Road Trail (T24), Dry Creek Trail (T25)

Purpose/Significance: This proposed trail will provide a critical link between South Livermore and North Livermore recreation trails. Additionally, this trail would provide a continuous trail opportunity from Brushy Peak to Del Valle State Recreation Area, via the Iron Horse, South Bay Aqueduct, and Mines Road trail connections. South of I-580 this trail would also serve as a segment of the De Anza National Historic Trail.

Trail Alignment:

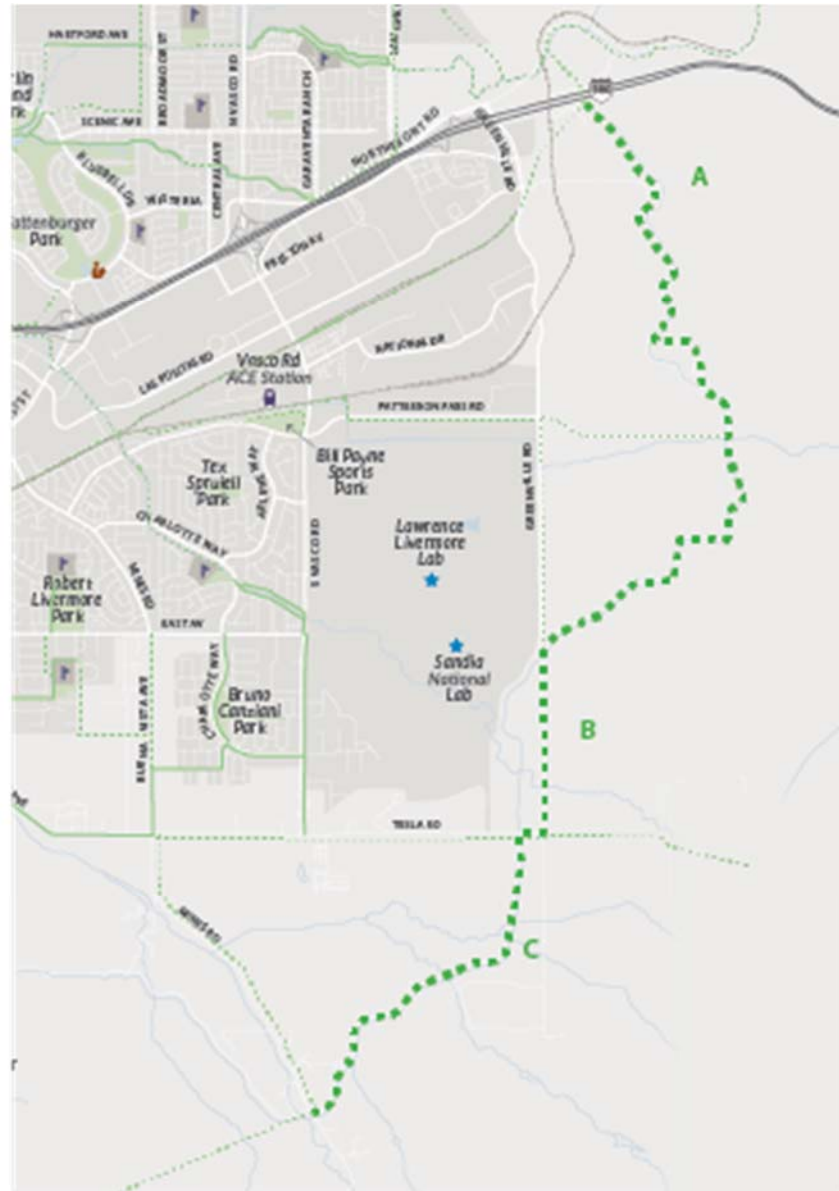
A – The proposed trail would begin where the Iron Horse Trail connects to the South Bay Aqueduct, south of I-580 and east of Greenville Road. The trail would continue south on an existing California Department of Water Resources service road along the aqueduct.

B – When the aqueduct enters the Sandia National Laboratory Property, the proposed trail would exit from the aqueduct service road and follow Greenville Road south to Tesla Road. At the intersection of Greenville Road and Tesla Road the trail will veer to the west along Tesla Road until it reconnects with the aqueduct.

C – At the intersection of the aqueduct and Tesla Road, the proposed trail would rejoin the aqueduct service road and continue along the aqueduct to Mines Road.

Additional Information: The majority of this trail is located in Alameda County outside the City of Livermore and the urban growth boundary. A major segment of the trail is proposed along the South Bay Aqueduct, which is operated by the California Department of Water Resources (DWR). A feasibility study that addresses DWR's operational issues is necessary in order to develop a regional trail, which shares the aqueduct's service roads. Coordination with DWR, Zone 7 Water Agency, Livermore Area Recreation and Park District, East Bay Regional Park District, and Alameda County is essential.

T15 SOUTH BAY AQUEDUCT TRAIL



T16 IRON HORSE TRAIL

Status: Existing trail with extensions and gap closures proposed

Location: Located in the center of Livermore, it runs in an east-west direction roughly following the Union Pacific Railway, Arroyo Mocho and Arroyo Las Positas Channel.

Length: 18.75 miles

Construction Cost Estimate: \$20,498,400

Annual Maintenance Cost Estimate: \$342,200

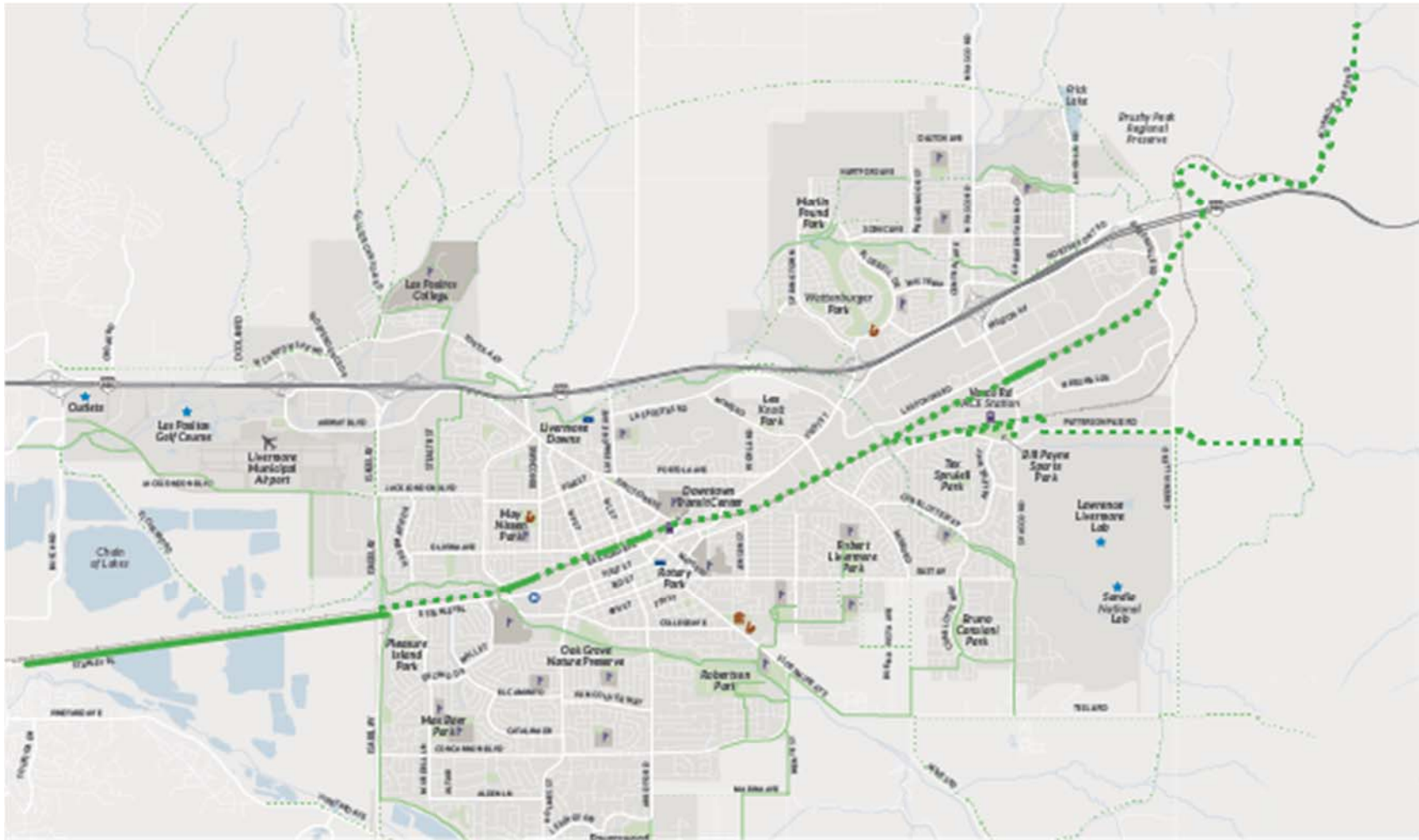
Trail Connections: Arroyo Seco Trail (T9), South Bay Aqueduct Trail (T15), Greenville Road Trail (T24), Altamont Creek Trail (T4), Isabel Trail (T5), Arroyo Mocho Trail (T19),

Purpose/Significance: The Iron Horse Regional Trail would provide a continuous recreation and transportation corridor through the entirety of Alameda County. For residents of Livermore, the Iron Horse Trail will provide a direct connection to the Downtown Livermore, Vasco and Downtown ACE stations, local parks and community facilities, Pleasanton, the Dublin/Pleasanton BART station, regional parks, and to other cities connected by the Iron Horse Trail. The existing Iron Horse Trail aligns through the communities of Concord, Pleasant Hill, Walnut Creek, Alamo, Danville, San Ramon, Dublin and areas of Pleasanton, and is one of the most widely used trails in the East Bay. A portion of the proposed trail, near Greenville Road and Altamont Pass Road, would also serve as a segment of the De Anza National Historic Trail.

Trail Alignment: In 2008, the City adopted a Feasibility and Alignment Study and related environmental documents, in coordination with LARPD and EBRPD, determined the preferred alignment of the Iron Horse Trail from the existing terminus at the intersection of Stanley Blvd and Isabel Avenue east to Greenville Road however future developments will determine the final route.

Additional Information: The Feasibility Study includes the Patterson Pass Trail (T8, identified in the LARPD Master Plan) as an alignment for the eastern portion of the Iron Horse Trail. Coordination with Union Pacific Railroad is necessary to secure rights-of-way and to determine railway crossings (via either bridge or tunnel). Coordination with Livermore Area Recreation and Park District, and East Bay Regional Park District is also necessary to determine funding and maintenance obligations. Coordination with Zone 7 is essential to implement Iron Horse Trail along the Arroyo Mocho and Las Positas. Coordination with the Lawrence Livermore Lab may also be necessary due to proximity of the trail along Patterson Pass Road.

T16 IRON HORSE TRAIL



Proposed Trail

Existing Trail

T17 LAUGHLIN ROAD TRAIL

Status: Proposed trail

Location: In northeast Livermore, it generally follows a north-south direction parallel to Laughlin Road.

Length: 2.32 miles

Construction Cost Estimate: \$2,475,000

Annual Maintenance Cost Estimate: \$41,300

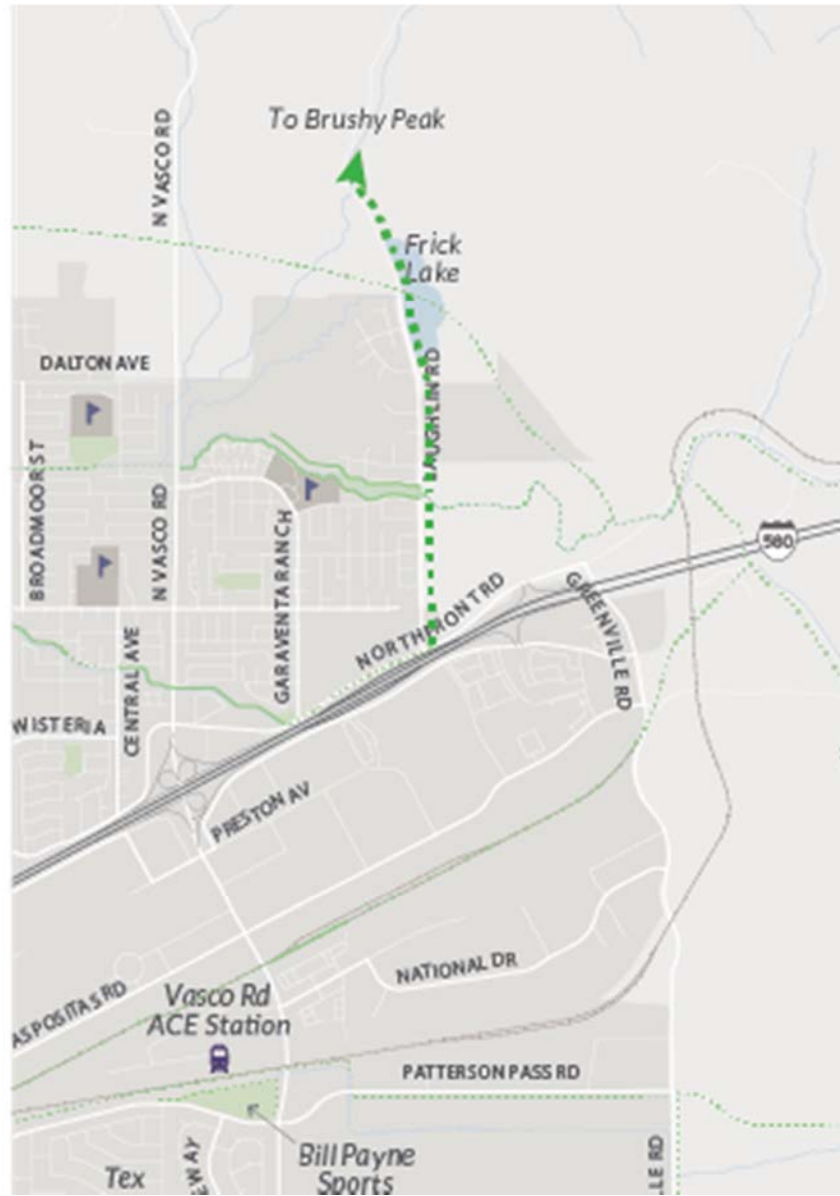
Trail Connections: Altamont Creek Trail (T4), Arroyo Las Positas Trail (T6), Brushy Peak internal trail system.

Purpose/Significance: This trail provides connectivity for the Northeast Livermore residential area to the Altamont Creek Trail and the Brushy Peak Regional Preserve.

Trail Alignment: The proposed trail begins at Northfront Road and continues north along the east side of Laughlin Road. The proposed trail would continue north parallel to Laughlin Road to connect to the Brushy Peak trail system. This exact alignment is not yet determined.

Additional Information: Portions of the trail are proposed outside the Livermore city limit line and urban growth boundary. Therefore, communication/negotiation with private property owners, Livermore Area Recreation and Park District, and East Bay Regional Park District may be necessary for successful implementation.

T17 LAUGHLIN ROAD TRAIL



T18 DUNSMUIR TRAIL

Status: Existing trail with extensions proposed

Location: In southern Livermore, from East Avenue to Tesla Road and between Buena Vista Avenue and Vasco Road.

Length: 1 mile

Construction Cost Estimate: \$1,016,300

Annual Maintenance Cost Estimate: \$17,000

Trail Connections: Civic Center Trail (T7), Arroyo Seco Trail (T9), South Livermore Valley Trail (T10), Mines Road Trail (T12)

Purpose/Significance: This trail connects the adjacent residential neighborhoods to South Livermore Valley recreation opportunities.

Trail Alignment:

A – The existing trail begins at the intersection of East Avenue and Charlotte Way and aligns south along Charlotte Way to Stockton Loop. (In the South Livermore Valley Specific Plan this segment is identified as B.) The existing trail continues along Charlotte Way to Vasco Road. (In the South Livermore Valley Specific Plan this trail segment is identified as C.)

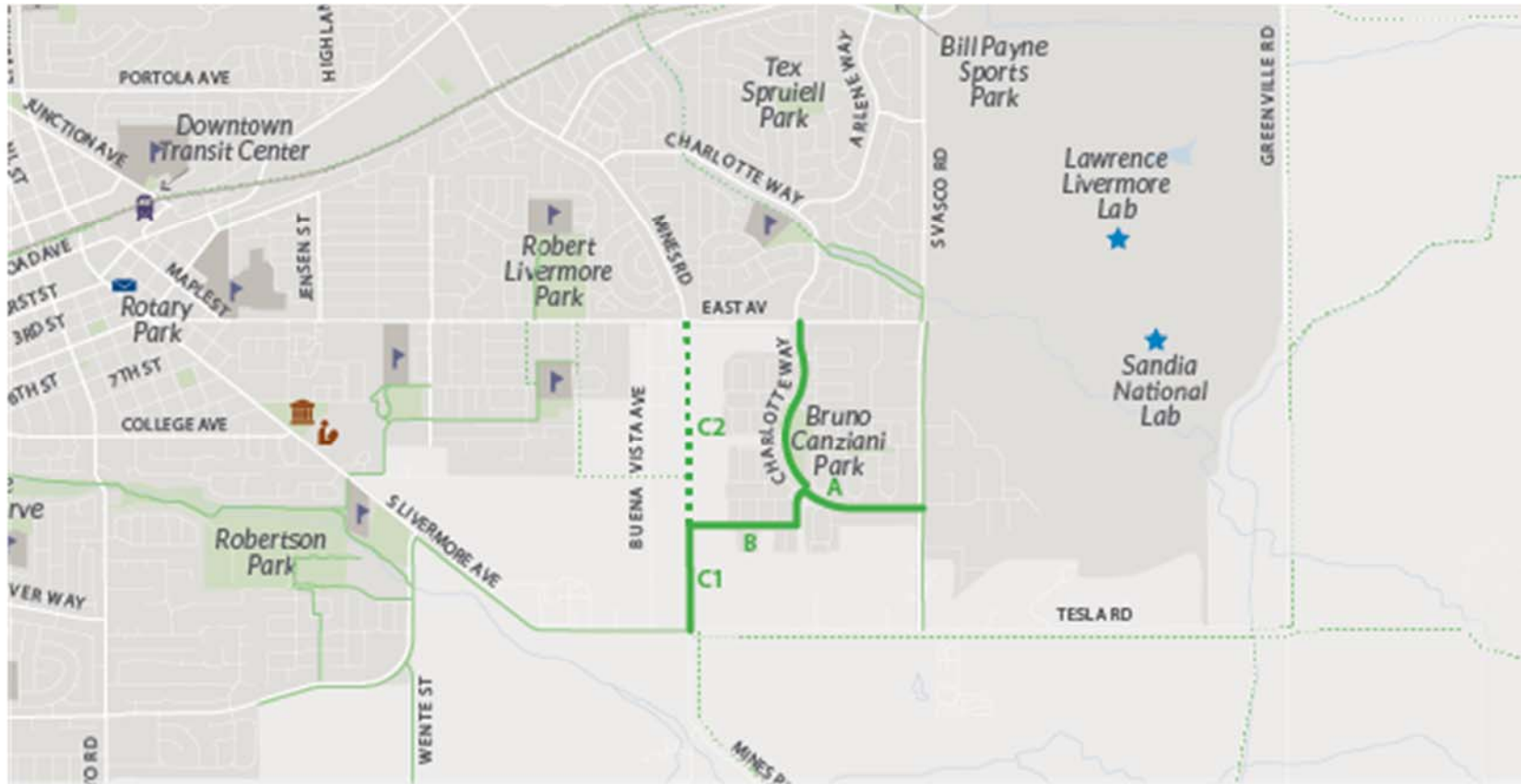
B – This segment runs from Charlotte way south along White Crane Circle and then continuing west to connect with segment C at the PG&E easement. (In the South Livermore Valley Specific Plan this trial segment is identified as C.)

C1 – The existing trail continues south along an existing 75-foot wide PG&E to Tesla Road. (In the South Livermore Valley Specific Plan this trail segment is identified as D.)

C2 – This segment is proposed along an existing 75-foot wide PG&E easement between East Avenue and the intersection with existing trail.

Additional Information: Segment C2 is outside the City of Livermore within an easement, requiring coordination with PG&E. Negotiations with property owners would be required before moving forward with design and construction of this alignment.

T18 DUNSMUIR TRAIL



- Proposed Trail
- Existing Trail

T19 ARROYO MOCHO TRAIL

Status: Existing trail with extension proposed

Location: Located generally in the center of Livermore following an east-west direction parallel to the Arroyo Mocho.

Length: 6.39 miles

Construction Cost Estimate: \$5,244,300

Annual Maintenance Cost Estimate: \$87,600

Trail Connections: Isabel Trail (T5), Civic Center Trail (T7), South Livermore Valley Trail (T10), Jack London Trail (T14), Iron Horse Trail (T16)

Purpose/Significance: The existing Arroyo Mocho trail aligns from the Civic Center through Robertson Park to Isabel Avenue and provides transportation and recreation opportunities. When complete, the trail will provide regional connectivity to Pleasanton near El Charro Road.

Trail Alignment:

A – The proposed trail begins at El Charro Road just south of the Arroyo Las Positas.

B – The proposed trail continues south along El Charro Road into Alameda County. The specific alignment from El Charro Road to Isabel Avenue will generally follow the Arroyo Mocho but the exact alignment would be determined and implemented as part of reclamation activities.

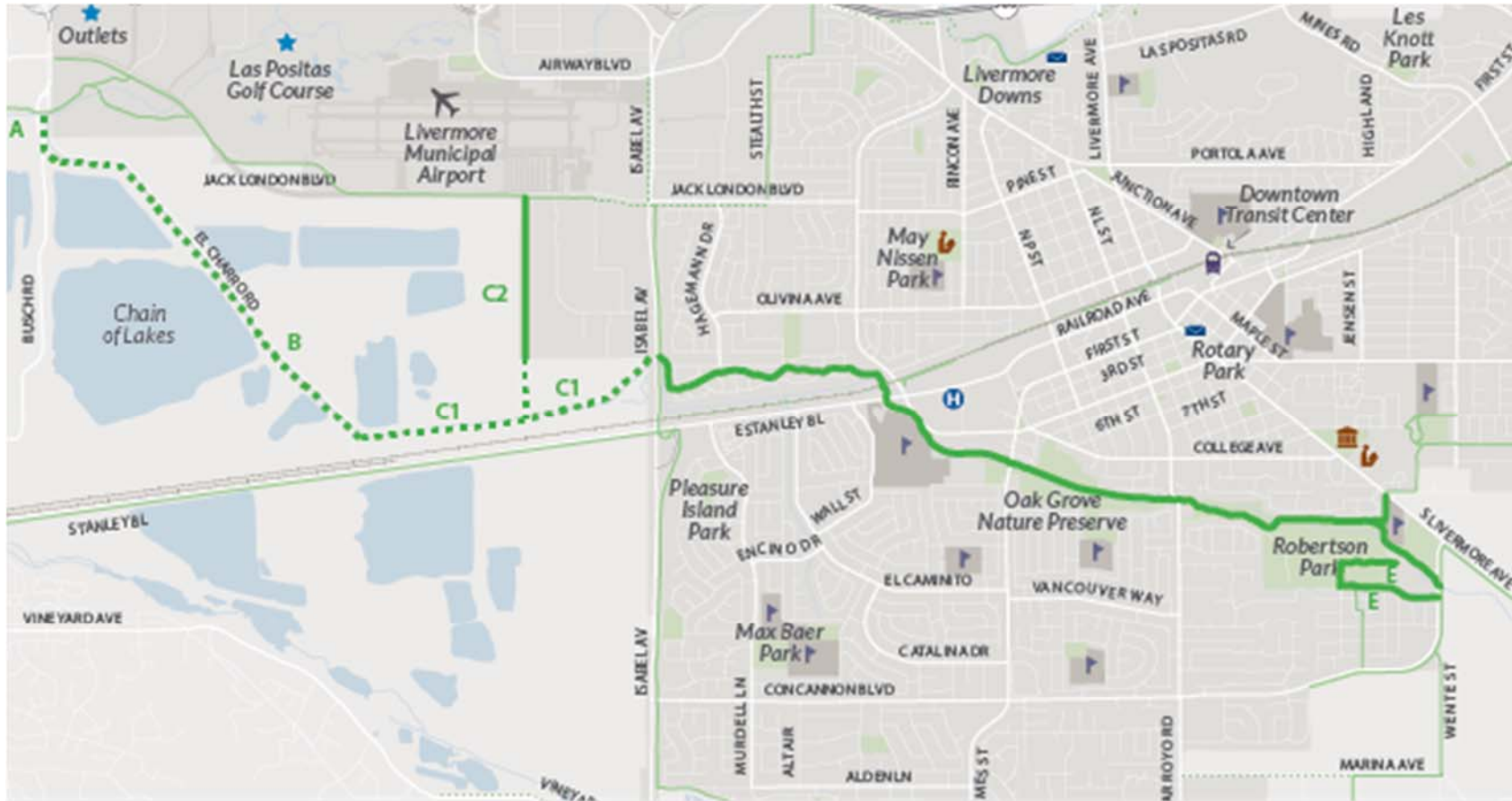
C1 – The proposed trail generally continues east parallel to and north of Stanley Boulevard to Isabel Avenue. The trail is proposed to cross Isabel Avenue (under following the Arroyo, or a bridge over). Alternatively, the trail could align north on the west side of Isabel Avenue and cross at the signalized intersection at Discovery Drive.

C2 – A spur connects from the proposed Arroyo Mocho trail north to the exiting trail along the western edge of the Oaks Business Park.

D/E – East of Isabel Avenue the existing trail parallels the Arroyo Mocho through Robertson Park to South Livermore Avenue and the existing Civic Center Trail. A southern spur exists through Robertson Park and under Concannon Blvd and connects to the South Livermore Valley Trail at Concannon Blvd.

Additional Information: Coordination between Alameda County and Zone 7 is needed to determine the future alignment of the trail from El Charro Road south to Isabel Avenue.

T19 ARROYO MOCHO TRAIL



Proposed Trail

Existing Trail

T20 DOOLAN CANYON TRAIL

Status: Proposed trail

Location: In northwest Livermore, it generally follows a north-south direction parallel to Cottonwood Creek.

Length: 5.92 miles

Construction Cost Estimate: \$9,909,600

Annual Maintenance Cost Estimate: \$165,500

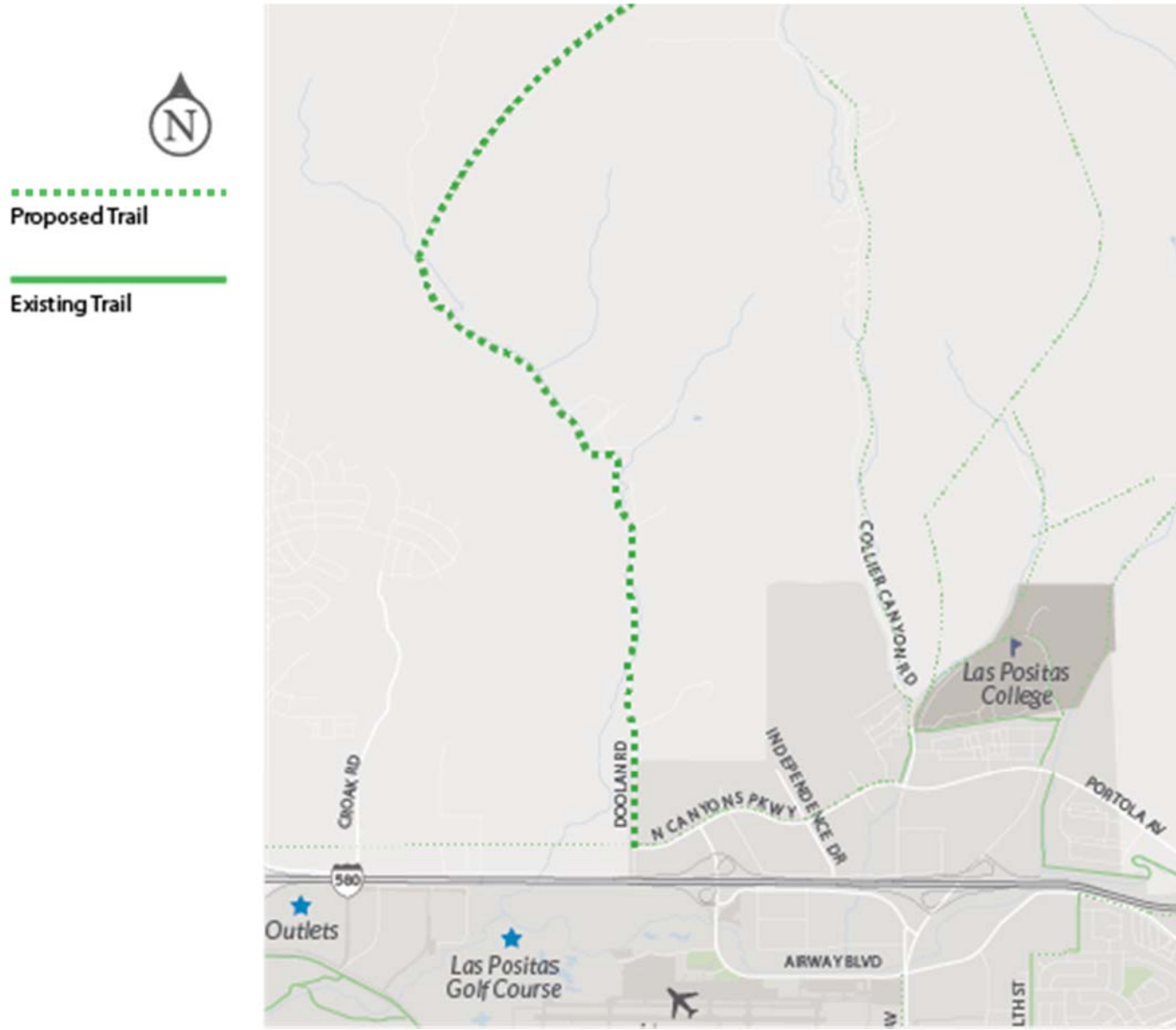
Trail Connections: North Canyons Parkway Trail (T2), College Trail (T3), Collier Canyon Trail (T21)

Purpose/Significance: This trail provides recreation opportunities through rolling hills and open space in northern Alameda County.

Trail Alignment: This proposed trail would begin on the north side of North Canyons Parkway and would continue north parallel to Doolan Road until it ends and connects to the future Doolan Regional Preserve internal trail system. A loop trail is recommended that would connect to the Collier Canyon Trail (T21) and the proposed Collier Canyon – Doolan Preserve staging area, and perhaps eventually the College Trail (T3) the Cayetano Creek Trail (T1) near Hartman Road.

Additional Information: This proposed trail is located in Alameda County outside the Livermore city limit line and urban growth boundary. Coordination with East Bay Regional Park District, Livermore Area Recreation and Park District, Alameda County and multiple property owners would be necessary for successful implementation.

T20 DOOLAN CANYON TRAIL



T21 COLLIER CANYON TRAIL

Status: Existing trail with extension proposed

Location: In northwest Livermore, it generally follows a north-south direction parallel to Collier Canyon Creek.

Length: 3.92 miles

Construction Cost Estimate: \$5,547,500

Annual Maintenance Cost Estimate: \$92,600

Trail Connections: North Canyons Parkway Trail (T2), College Trail (T3), Doolan Canyon Trail (T20)

Purpose/Significance: This trail provides recreation opportunities in northern Alameda County.

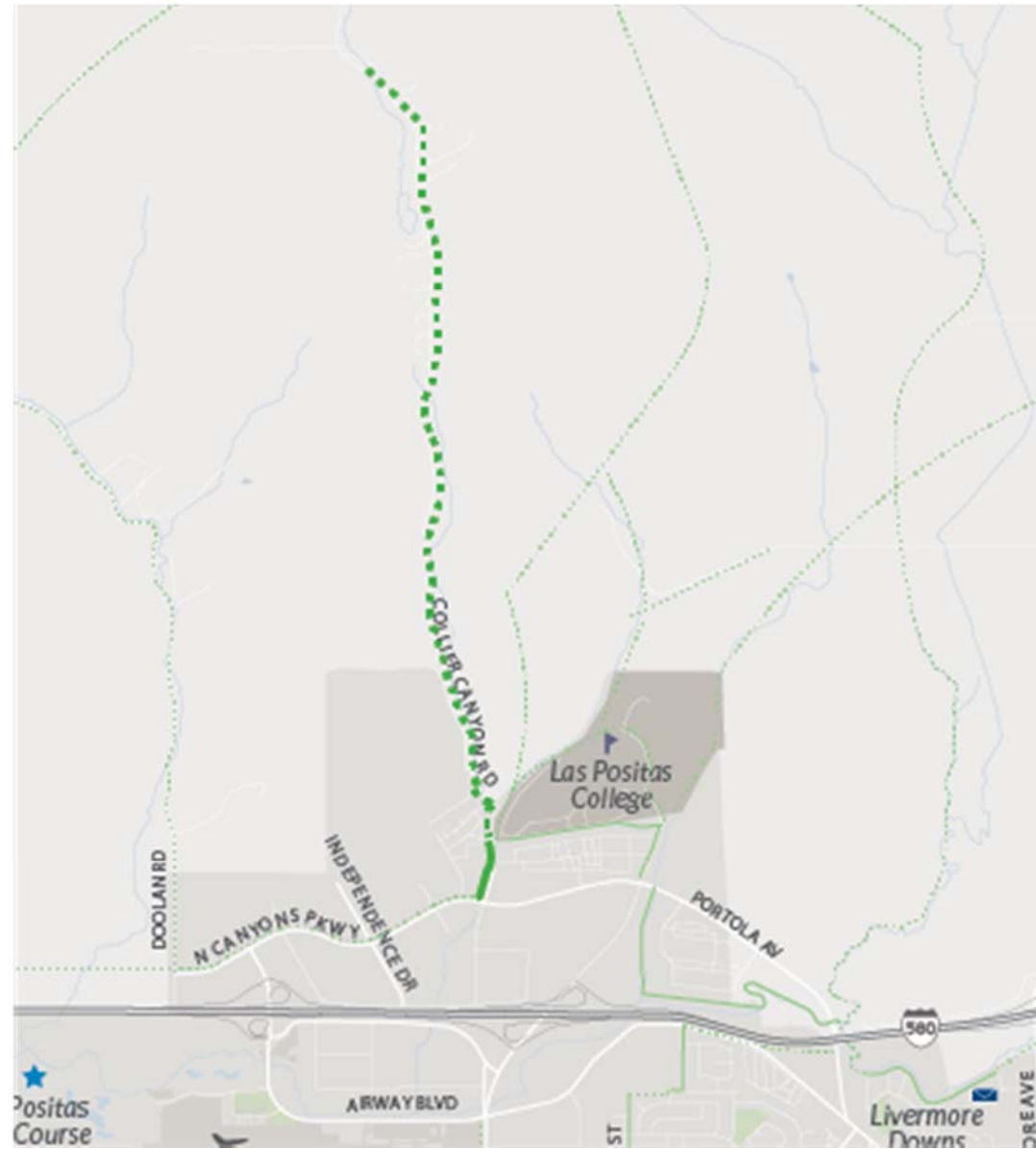
Trail Alignment:

A – From Constitution Drive along Collier Canyon Creek to North Canyons the trail is proposed along an existing service road that needs to be upgraded to comply with standards. The trail then exist north along the creek to Las Positas College.

B – From the northern edge of Las Positas College, the proposed trail would continue north along Collier Canyon Road, ultimately connecting to the Doolan Canyon Trail (T20) and possibly extending into Contra Costa County. The exact alignment has not yet determined and should be evaluated in the future.

Additional Information: The majority of this trail would be located in Alameda County outside the Livermore city limit line and urban growth boundary. The trail traverses privately owned parcels with agriculture zoning designations; therefore, communication/negotiation with multiple property owners will be necessary for successful implementation.

T21 COLLIER CANYON TRAIL



T24 GREENVILLE ROAD TRAIL

Status: Proposed trail

Location: In east Livermore, it generally follows a north-south direction parallel to Greenville Road and adjacent to the Lawrence Livermore Lab.

Length: 1.23 miles

Construction Cost Estimate: \$1,520,000

Annual Maintenance Cost Estimate: \$92,600

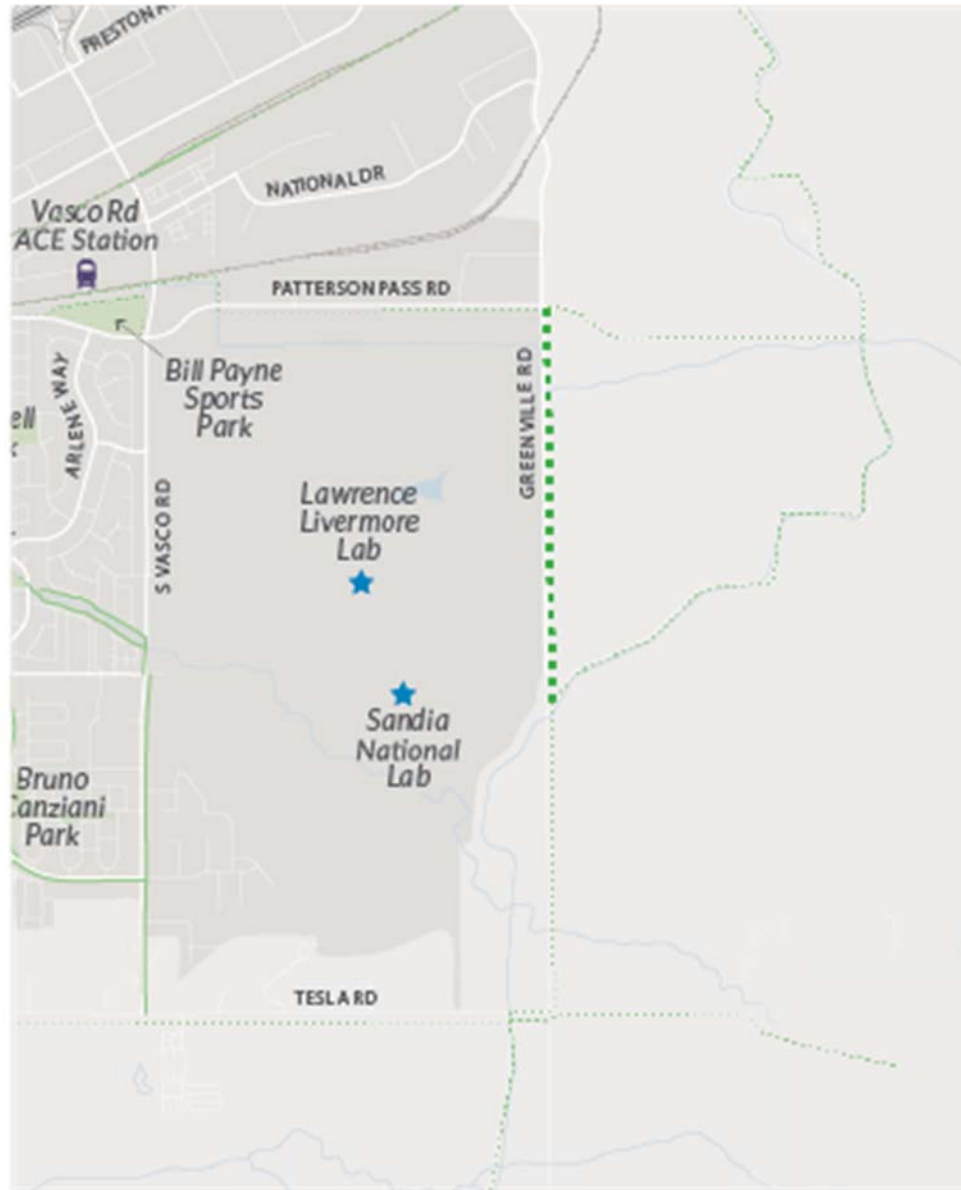
Trail Connections: Iron Horse Trail (T16), South Bay Aqueduct Trail (T15)

Purpose/Significance: Serves as a connector between two shared-use trails and provides an off-road alternative for bicycle commuters and recreation users on the east side of the Lawrence Livermore Lab.

Trail Alignment: The proposed trail would parallel Greenville Road, connecting the Iron Horse Trail with the South Bay Aqueduct Trail.

Additional Information: Coordination with adjacent property owners and Lawrence Livermore National Lab would be required to implement this trail.

T24 GREENVILLE ROAD TRAIL



T25 DRY CREEK TRAIL

Status: Proposed trail

Location: In southeast Livermore, it generally follows an east-west direction along Dry Creek.

Length: 3.23 miles

Construction Cost Estimate: \$5,198,100

Annual Maintenance Cost Estimate: \$86,800

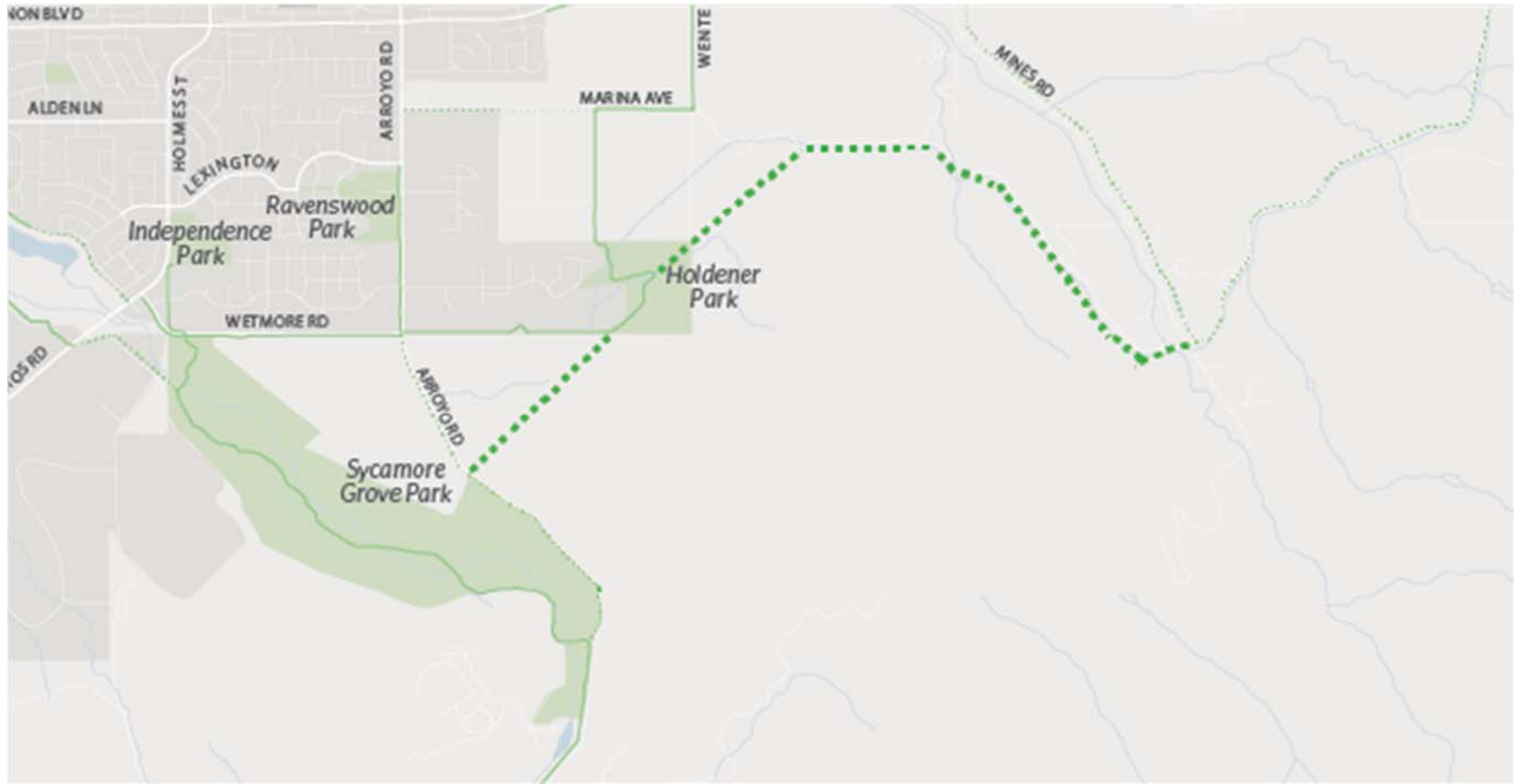
Trail Connections: Arroyo Road Trail (T13), South Bay Aqueduct Trail (T15), Mines Road Trail (T12), and Holdener Park, Del Valle Regional Park internal trail System

Purpose/Significance: Provides a connection from Arroyo Road to Holdener Park and the east side of the Del Valle Regional Park to Mines Road.

Trail Alignment: The proposed trail extends from Arroyo Road, generally following Dry Creek. At an unknown location, a spur trail will provide a connection to Holdener Park. The Trail would connect to Mines Road and the South Bay Aqueduct Trail and a spur could provide possible connectivity to Del Valle Regional Park.

Additional Information: The proposed trail is located in Alameda County outside the Livermore city limit line and urban growth boundary. This trail traverses privately owned parcels with agriculture zoning designations. Because of this, communication/negotiation with property owners will be necessary for successful implementation. Coordination with Livermore Area Recreation and Park District and East Bay Regional Park District is essential.

T25 DRY CREEK TRAIL



- Proposed Trail
- Existing Trail

T29 NORTH LIVERMORE TRAIL

Status: Proposed trail

Location: In north Livermore, it generally follows an east-west direction from Vasco Road to northwest Livermore.

Length: 2.55 miles

Construction Cost Estimate: \$9,860,700

Annual Maintenance Cost Estimate: \$164,600

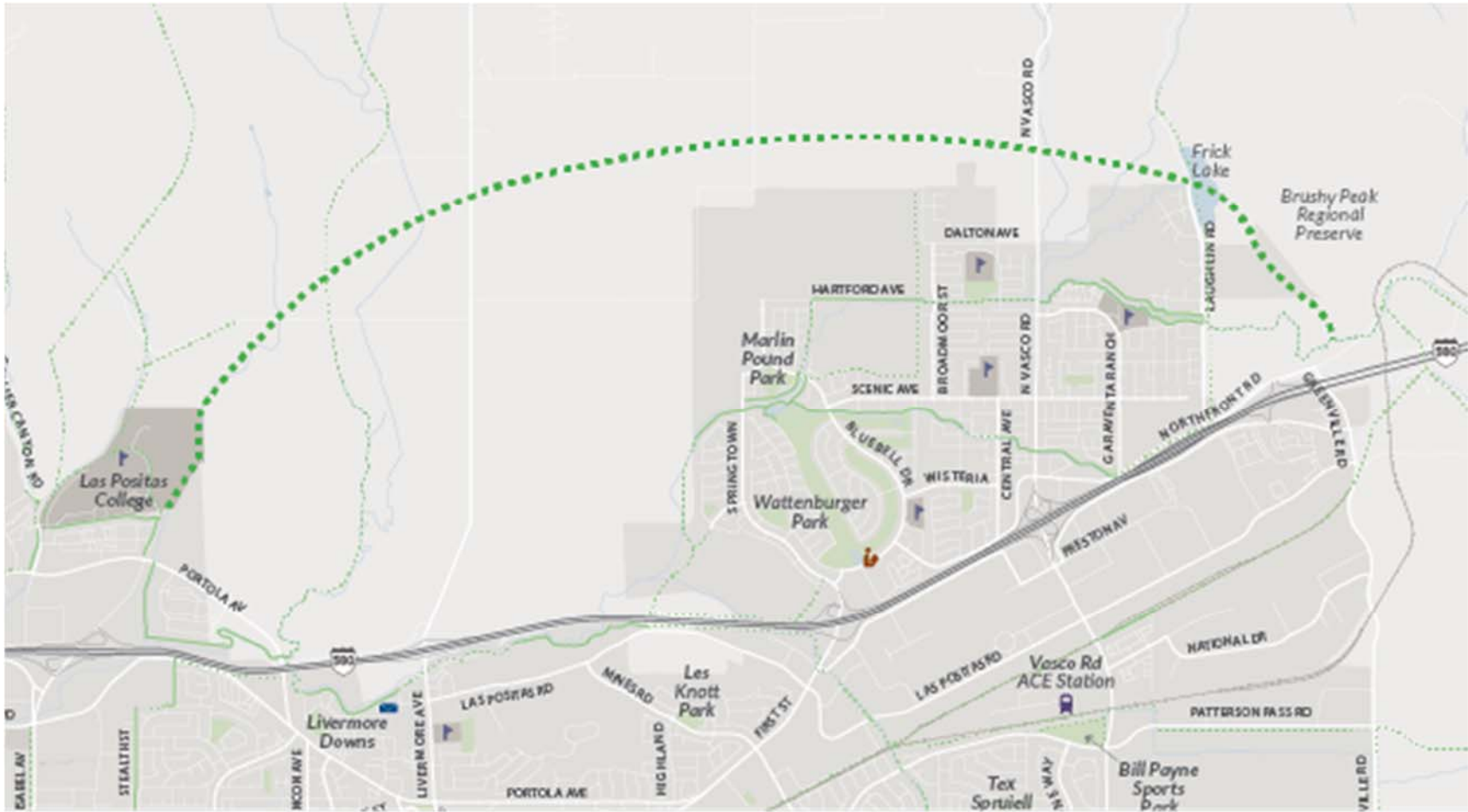
Trail Connections: Cayetano Creek Trail (T1), College Trail (T3) Altamont Creek (T4)

Purpose/Significance: This trail would provide connectivity from the residences in Northeast Livermore to businesses, neighborhoods, and Las Positas College in Northwest Livermore.

Trail Alignment: The proposed trail extends from an unknown location at or near Vasco Road and extends to an undetermined location in northwest Livermore, possibly along North Livermore Avenue.

Additional Information: The majority of the proposed trail is located in Alameda County outside the Livermore city limit line and urban growth boundary. This trail traverses privately owned parcels with agriculture zoning designations. Additionally, many parcels within North Livermore contain critically sensitive habitat and natural areas.

T29 NORTH LIVERMORE TRAIL



- Proposed Trail
- Existing Trail

This page intentionally left blank.

APPENDIX K IMPLEMENTATION PLAN DETAIL

This appendix provides additional background on evaluation processes and unit cost development for projects, discussed in Chapter 6.

EVALUATION CRITERIA

Network projects provided in the Plan address community needs and are consistent with the Plan's goals and policies to improving comfort and safety. The recommendations include a variety of facility types including bike boulevards, and standard, buffered, and separated bike lanes, crossing improvements, and programs intended to educate, enforce, and encourage walking and biking.

The proposed network and intersection improvements are intended to increase and enhance connections to transit facilities, major employers, commercial centers, and public facilities. The Plan evaluated each recommendation by its proximity to these criteria. Additionally, the Plan evaluated each recommendation further based on additional criteria including safety, gap closure, community identified projects, and increased comfort. The evaluation process weighted the criteria evenly and assigned a high or low benefit designation based on the cumulative total and the natural grouping. Based on natural break classes analyzed in the GIS model based on natural groupings inherent in the data, the proposed improvements were grouped into high or low categories.

Distance criteria for project rankings are summarized in Table K-1.

In addition to the distance criteria, the Plan investigated the readiness of improvement implementation by defining the construction complexity. Based on two factors, each recommendation received either a high or a low designation for readiness. The Plan evaluated feasibility based on right-of-way ownership, the facility type, and the significance of any roadway modifications. For example, significant modifications to the roadway such as removal of parking or traffic lanes received a low readiness. Similarly, trail segments that require right-of-way acquisition received a low readiness. Less significant alterations, such as reduction of travel lanes within acceptable standards received high feasibility. The Plan also considered travel speeds and average daily trips in the feasibility evaluations. Because all intersections (except for the I-580 Crossings) are located within the City right-of-way, the Implementation Strategy primarily ranked them by their intensity.

Project readiness criteria used to evaluate feasibility and implementation complexity are summarized in Table K-2.

Table K-1: Distance Criteria for Project Rankings

CRITERIA	DESCRIPTION
Access to Transit	<p>Project improves walking or bicycling access to transit</p> <ul style="list-style-type: none"> ▪ <i>Projects within ¼ mile of a regional transit facility (Downtown Transit, BART, ACE) are high priority</i> ▪ <i>Projects not within ¼ mile of a regional transit facility are low priority</i>
Access to Major Employers	<p>Project improves walking or bicycling access to a major employer</p> <ul style="list-style-type: none"> ▪ <i>Projects within ¼ mile of a major employer, such as Lawrence Livermore Lab are high priority</i> ▪ <i>Projects not within ¼ mile of a major employer are low priority</i>
Access to Retail or Commercial Center	<p>Project improves walking or bicycling access to a retail or commercial area</p> <ul style="list-style-type: none"> ▪ <i>Projects within ¼ mile of an existing or planned retail or commercial zone (Safeway shopping center on First Street or the Target shopping center on Las Positas Road) are high priority</i> ▪ <i>Projects not within ¼ mile of an existing or planned retail or commercial zone are low priority</i>
Access to a Public Facility	<p>Project improves walking or bicycling access to a public facility such as library, park, or civic building</p> <ul style="list-style-type: none"> ▪ <i>Projects within ¼ mile of a public facility are high priority</i> ▪ <i>Projects not within ¼ mile of a public facility are low priority</i>
Access to Schools	<p>Project improves walking and bicycling access to schools in Livermore</p> <ul style="list-style-type: none"> ▪ <i>Projects within ¼ mile of a school are high priority</i> ▪ <i>Bicycle boulevard projects are high priority</i> ▪ <i>Projects not within ¼ mile of a school that are not bicycle boulevards are low priority</i>
Safety	<p>Project addresses a location with a reported bicycle or pedestrian related collision, based on 2010-2014 data</p> <ul style="list-style-type: none"> ▪ <i>Projects within 150 feet of more than one minor injury collision OR any major injury collision are high priority</i> ▪ <i>Projects located within 150 feet of one minor injury collision are medium priority</i> ▪ <i>All other projects are low priority</i>
Gap Closures	<p>Project closes a gap in the existing walking or bicycling network</p> <ul style="list-style-type: none"> ▪ <i>Projects that close a gap are high priority</i> ▪ <i>Projects that do not close a gap are low priority</i>

CRITERIA	DESCRIPTION
Community Identified Project Location	<p>Project opportunity or challenge was identified by the public through workshops, online wikimap, or the project survey</p> <ul style="list-style-type: none"> Projects at a community identified location will receive high priority Projects not at a community identified location will receive low priority
Expands or Improves Comfort Network	<p>Based on results from the Level of Traffic Stress (LTS) and Pedestrian Level of Service (PLOS) analyses</p> <ul style="list-style-type: none"> Bicycle projects along streets with average LTS scores of 3 or 4 OR pedestrian projects along streets with average PLOS scores of 5 or 6 are high priority Bicycle projects along streets with average LTS scores of 2 OR pedestrian projects along streets with average PLOS scores of 4 are medium priority Bicycle projects along streets with average LTS scores of 1 OR pedestrian projects along streets with average PLOS scores of 3 or lower are low priority
Previous Plans	<p>Project was included in a previous planning document</p> <ul style="list-style-type: none"> Projects at locations where an improvement was previously identified are high priority Projects not at locations previously identified for improvements are low priority

Table K-2: Project Readiness Criteria

CRITERIA	DESCRIPTION
Feasibility/Readiness	<p>Based on the complexity of the project</p> <p>Segments:</p> <ul style="list-style-type: none"> Pavement markings only (bicycle lanes, bicycle routes, some separated bikeways) score high project readiness Roadway rebalancing projects (parking removal, traffic lane removal, narrowing traffic lane below City accepted standard), separated bikeways, traffic calming (bicycle boulevards), trails, and facilities with right-of-way needs will score low project readiness <p>Intersections:</p> <ul style="list-style-type: none"> Low intensity crossings score high project readiness Medium intensity crossings score medium project readiness High intensity crossings score low project readiness
City Jurisdiction	<p>Based on project location and City property</p> <ul style="list-style-type: none"> Projects that do not require acquisition of right of way or easement will score high project readiness Projects that may require acquisition of right of way will score low project readiness

The Implementation Strategy combines the benefit ranking and readiness to group each project by implementation potential as shown in Figure K-1 below:

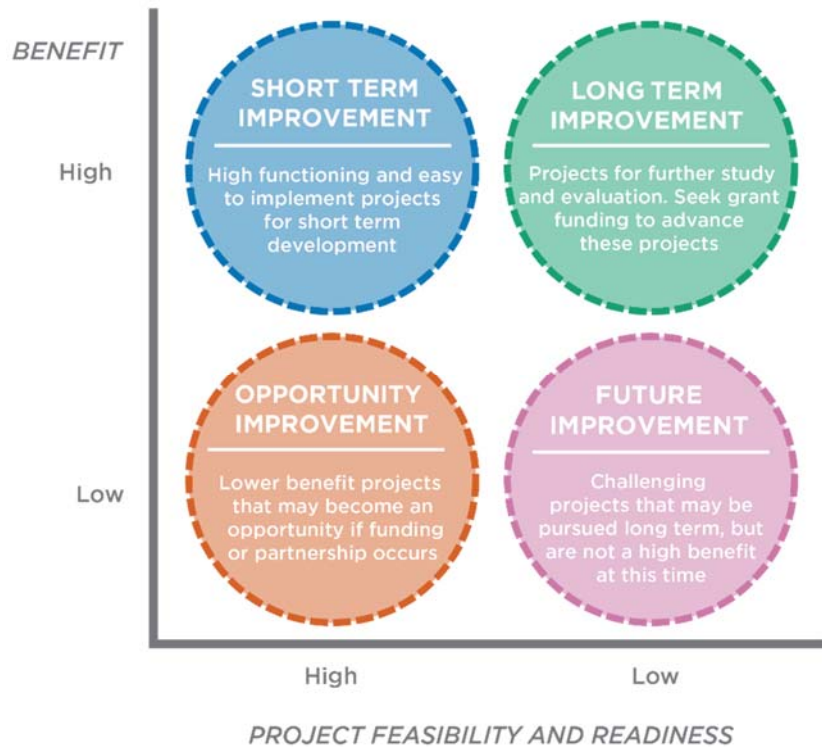


Figure K-1: Implementation Strategy

The Implementation Strategy ranks each project using data. Improvements that receive a high benefit and high readiness ranking are those that the City could choose to implement in the near term. In addition to these viable improvements, there are several longer term improvements that the Plan recommends pursuing either as a project phase to provide some level of enhancement, a corridor or feasibility study to identify and

resolve any potential issues, or a temporary pilot to sample the facility type and gain further public input.

REBALANCING

The City, in conjunction with the community, will need to consider the trade-offs when determining how to rebalance existing roadways to incorporate new bicycling and walking facilities. Rebalancing options can include adjusting lane widths, removing or reconfiguring travel lanes, or removing on-street parking—though the community expressed a strong preference for accommodating on-street bikeways through lane narrowing or removal rather than on-street parking removal.

The following cross-sections provide illustrative examples of how rebalancing can create space for bicycle facilities by considering different options for distributing the existing roadway width. These figures are intended to show how rebalancing might be considered on various Livermore roadways, and are not intended to represent recommended designs. More detailed traffic engineering analysis and public outreach will be required to determine the rebalancing designs for specific projects in this Plan.

P STREET

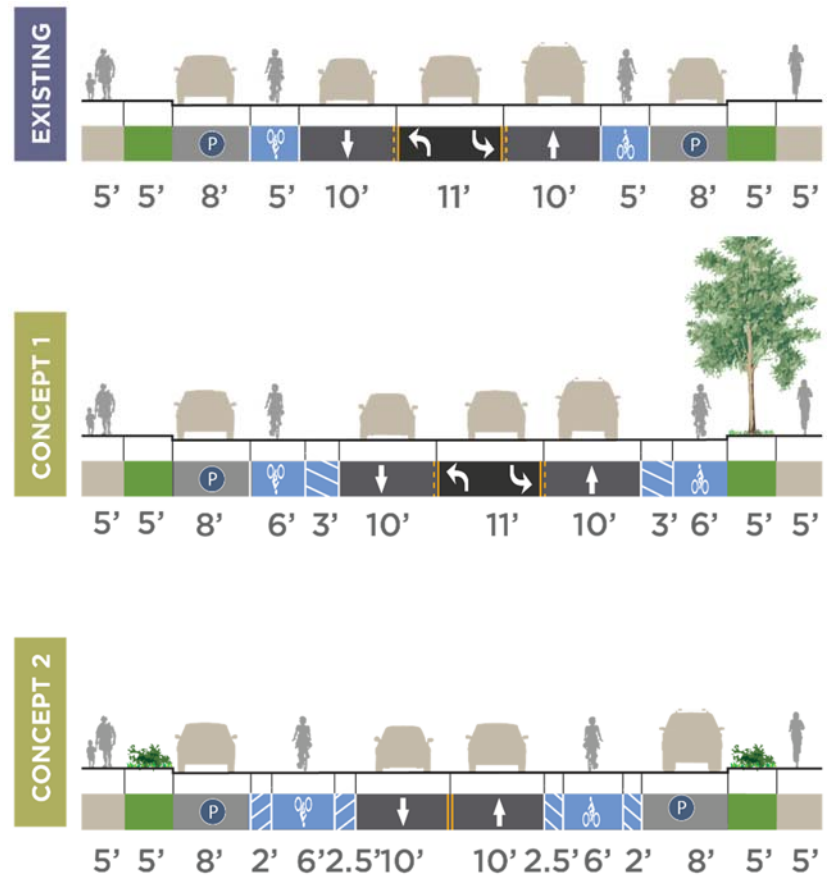


N. P STREET

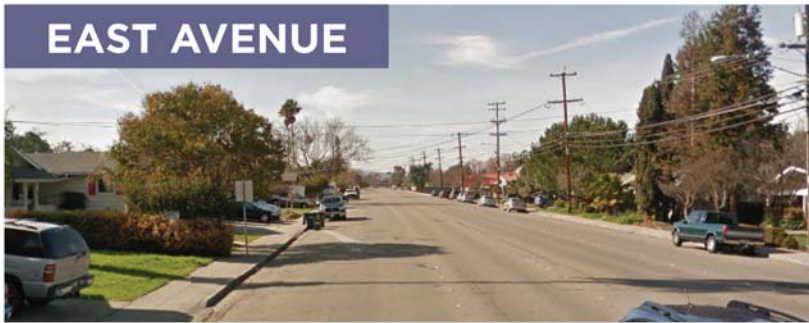
PINE ST TO LOCUST ST
(Looking North)

Concept 1 shows buffered bicycle lanes accommodated by removing one lane of on-street parking.

Concept 2 shows buffered bicycle lanes accommodated by removing the center turn lane.



EAST AVENUE

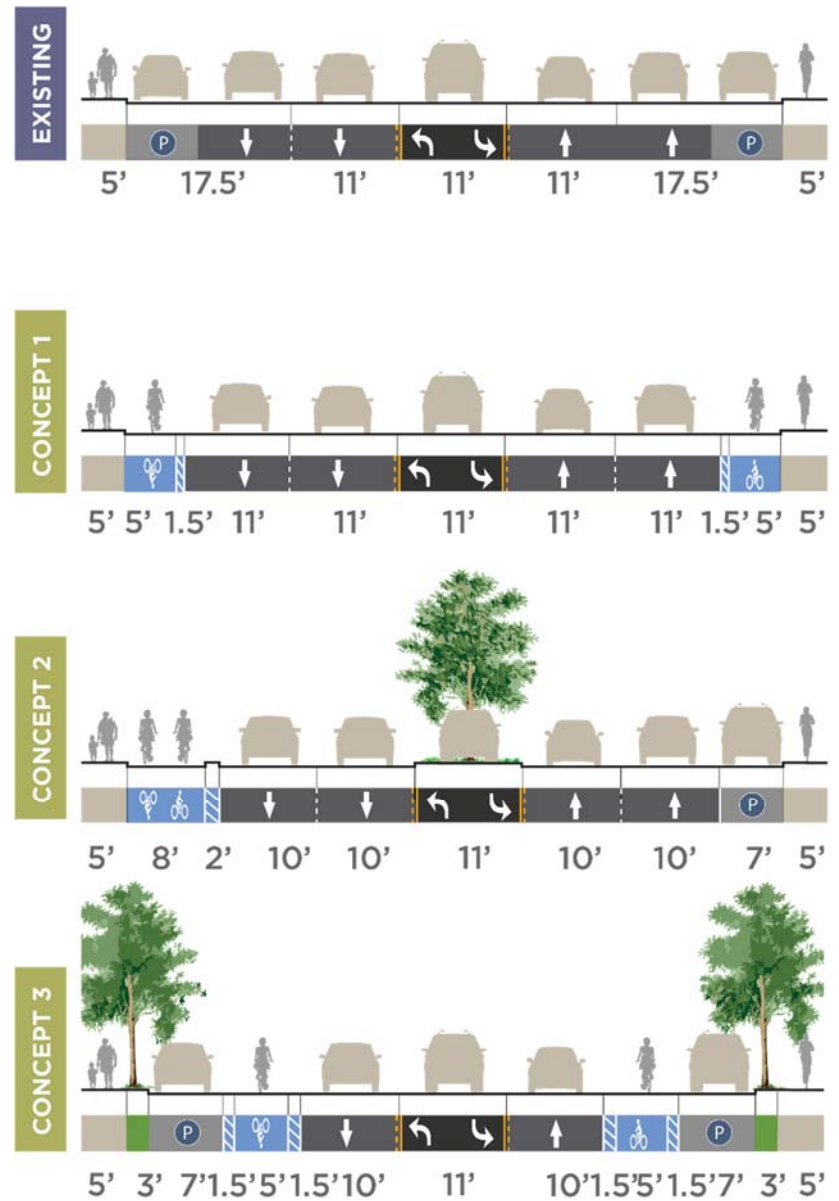


7TH ST TO DOLORES AVE
(Looking West)

Concept 1 shows buffered bicycle lanes accommodated by removing on-street parking.

Concept 2 shows a two-way separated bikeway accommodated by removing on-street parking on one side and narrowing the existing travel lanes.

Concept 3 shows buffered bicycle lanes accommodated by removing two travel lanes.



HOLMES STREET

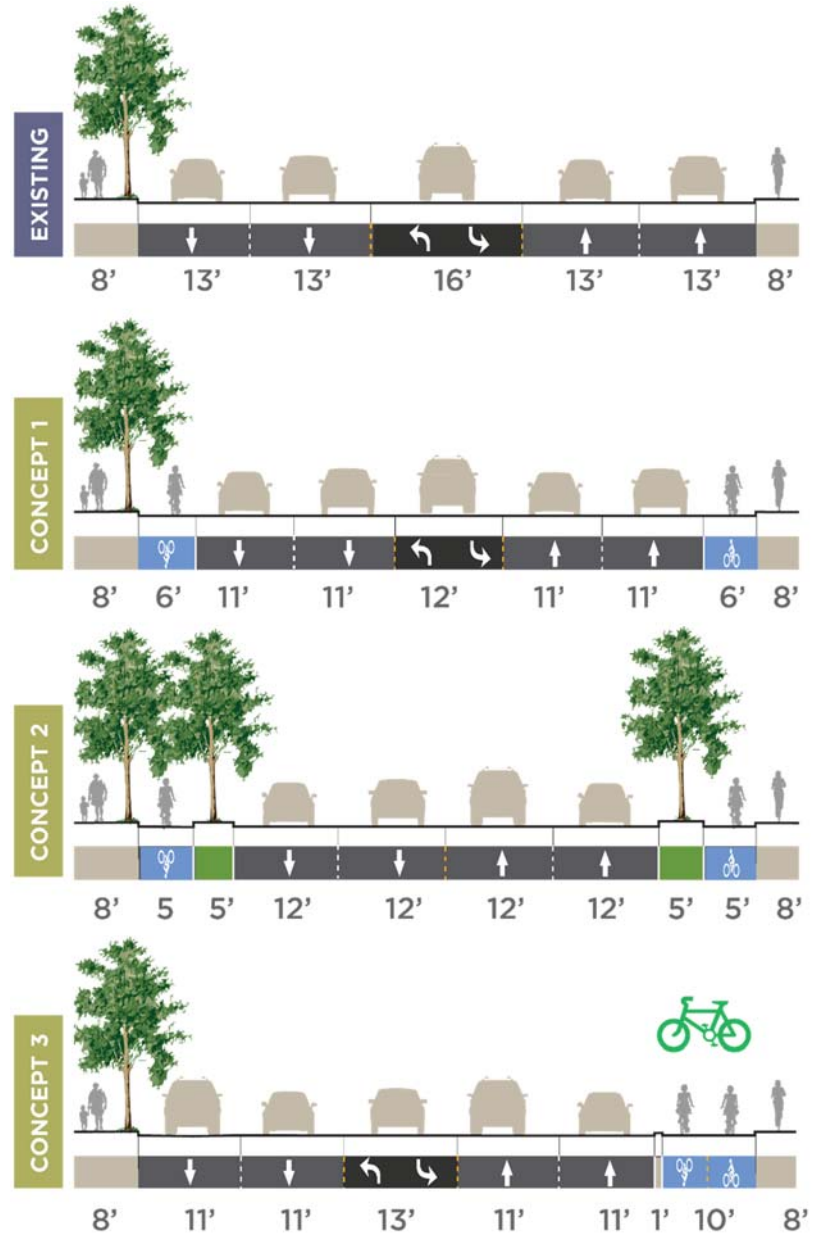


VANCOUVER WAY TO CATALINA DR
(Looking North)

Concept 1 shows bicycle lanes accommodated by narrowing the existing travel lanes.

Concept 2 shows separated bikeways accommodated by removing the center turn lane and narrowing the existing travel lanes.

Concept 3 shows a two-way separated bikeway accommodated by narrowing the existing travel lanes.



VASCO ROAD

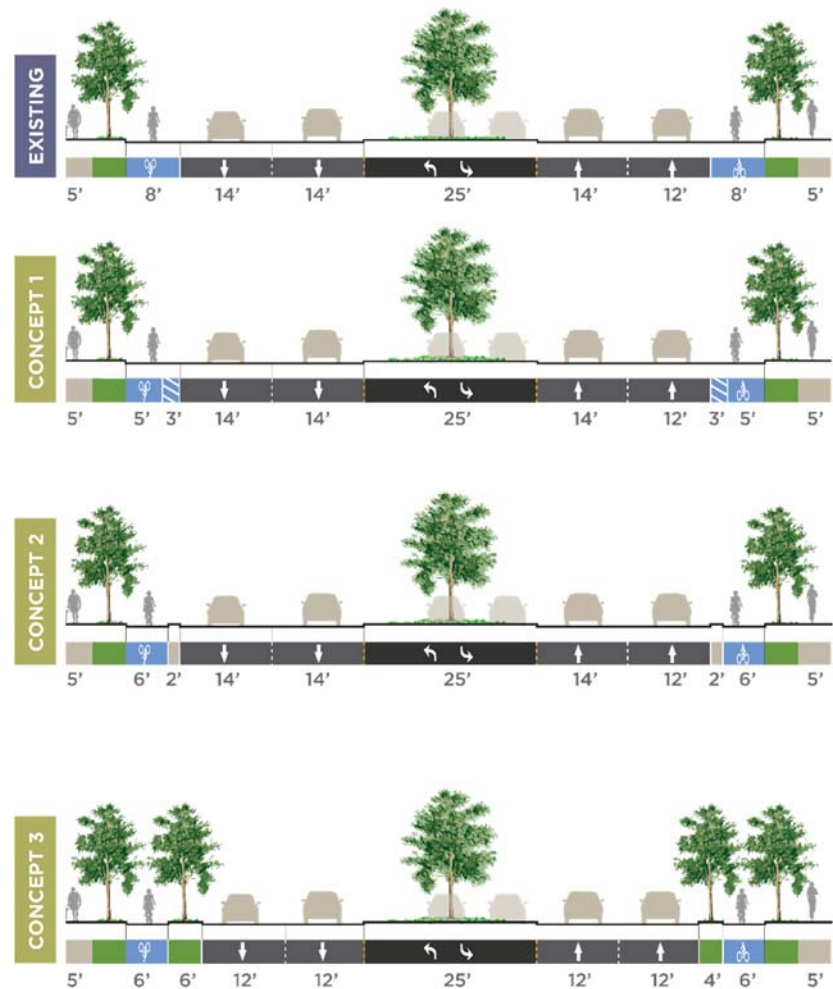


MESQUITE WAY TO W GATE DR (Looking North)

Concept 1 shows a buffer for existing bicycle lanes accommodated within the bicycle lane width.

Concept 2 shows separated bikeways with curb barriers accommodated within the existing bicycle lane width.

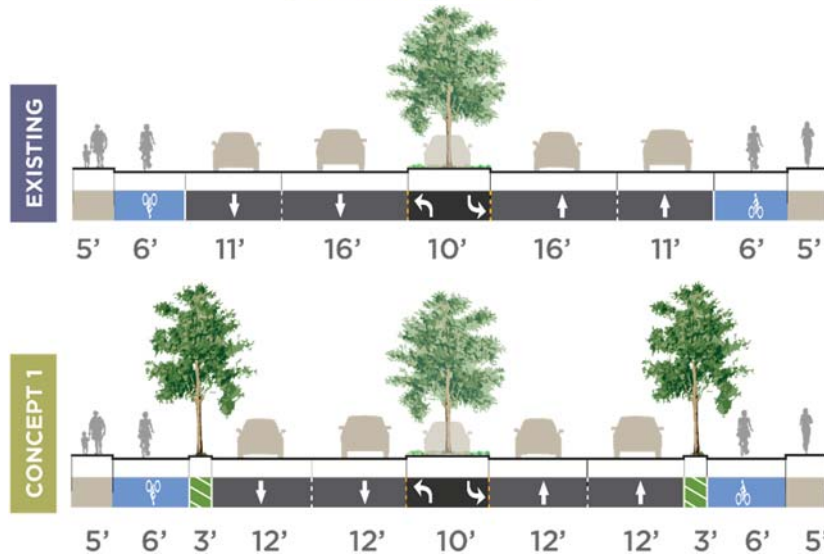
Concept 3 shows separated bikeways with landscaped median barriers accommodated by narrowing the travel lanes and existing bicycle lanes.



JACK LONDON BLVD



ISABEL AVE TO CURLEW RD
(Looking East)



Concept 1 shows an added buffer for the existing bicycle lanes created by narrowing existing travel lanes.

PROJECT COST ESTIMATES

Project costs for this Plan were developed by multiplying unit cost assumptions for each facility type by the length of the project. Unit costs for each facility type are listed in Chapter 6. This section provides a breakdown of the unit cost for each facility in Table K-3, including all assumptions.

All unit costs are 2017 dollars rounded up to the nearest \$100. Units include linear mile (MI), linear feet (LF), square feet (SF), cubic yards (CY), ton (TON), and lump-sum costs (LS, or EA for “each”). When multiplied by the length of a project to develop an estimated project cost, costs are rounded to the nearest \$100 (up or down).

Cost estimates include assumed costs for mobilization, traffic control, earthwork, utility coordination, and grading. In addition, project cost estimates reflect the following soft cost percentages:

- 15 percent for contingency
- 10 percent for engineering design
- 10 percent for administration
- 10 percent for construction management

At the planning level, cost estimates do not include acquisition of right-of-way, significant grading or slope management, or relocation of utilities. For some projects, actual costs may differ significantly from the planning level estimates.

Table K-3: Unit Cost Assumption Breakdown

FACILITY AND DESCRIPTION	QTY	UNIT	UNIT COST	EST. COST
Class 1A Shared Use Path (Paved) <i>14' wide HMA path with a pavement section of 4" HMA with 6" AB. Minimal grading, 1' vertical difference between FG and EG at hinge point, and 4:1 daylight slopes. Landscaping – 6' width, native plants and irrigation. No lighting.</i>			MI	\$1,579,500
Mobilization (15%)	1	LS	\$190,000.00	\$190,000.00
Traffic Control (5%)	1	LS	\$90,000.00	\$90,000.00
Clear and Grub (2%)	1	LS	\$45,000.00	\$45,000.00
Surveying and Construction Staking (2%)	1	LS	\$45,000.00	\$45,000.00
Water Pollution Control (2%)	1	LS	\$45,000.00	\$45,000.00
Utility Coordination (2%)	1	LS	\$45,000.00	\$45,000.00
Grading (5%)	1	LS	\$90,000.00	\$90,000.00
Signing	18	EA	\$500.00	\$9,000.00
Striping	5,280	LF	\$1.00	\$5,280.00
4" HMA	1,320	TON	\$150.00	\$198,000.00
6" AB	978	CY	\$100.00	\$97,800.00
Fencing	2,640	LF	\$30.00	\$79,200.00
6' width of native plantings and associated irrig	1	MI	\$150,000.00	\$850,000.00
<i>Subtotal</i>				\$1,089,280.00
Contingency			15%	\$163,392.00
Engineering Design			10%	\$108,928.00
Administration			10%	\$108,928.00
Construction Management			10%	\$108,928.00

FACILITY AND DESCRIPTION	QTY	UNIT	UNIT COST	EST. COST
Class 1A Shared Use Path (Unpaved) <i>14' wide HMA path with a pavement section of 4" HMA with 6" AB. Minimal grading, 1' vertical difference between FG and EG at hinge point, and 4:1 daylight slopes. Landscaping – 6' width, native plants and irrigation. No lighting.</i>			MI	\$1,133,400
Mobilization (15%)	1	LS	\$175,000.00	\$175,000.00
Traffic Control (5%)	1	LS	\$55,000.00	\$55,000.00
Clear and Grub (2%)	1	LS	\$25,000.00	\$25,000.00
Surveying and Construction Staking (2%)	1	LS	\$25,000.00	\$25,000.00
Water Pollution Control (2%)	1	LS	\$25,000.00	\$25,000.00
Utility Coordination (2%)	1	LS	\$25,000.00	\$25,000.00
Grading (5%)	1	LS	\$55,000.00	\$55,000.00
Signing	18	EA	\$500.00	\$9,000.00
Compacted Gravel	52,800	SF	\$3.00	\$158,400.00
Fencing	2,640	LF	\$30.00	\$79,200.00
6' width of native plantings and associated irrig	1	MI	\$150,000.00	\$150,000.00
<i>Subtotal</i>				<i>\$781,600.00</i>
Contingency			15%	\$117,240.00
Engineering Design			10%	\$78,160.00
Administration			10%	\$78,160.00
Construction Management			10%	\$78,160.00

FACILITY AND DESCRIPTION	QTY	UNIT	UNIT COST	EST. COST
Class 2A Bicycle Lane <i>Restripe the entire roadway section to the new lane configuration. Minor civil work, such as sidewalk/curb reconstruction at isolated locations (driveways, intersections, etc). Pavement legends for bicycles every 500'.</i>			MI	\$75,100
Mobilization (15%)	1	LS	\$9,000.00	\$9,000.00
Traffic Control (5%)	1	LS	\$3,000.00	\$3,000.00
Clear and Grub (2%)	1	LS	\$1,500.00	\$1,500.00
Surveying and Construction Staking (2%)	1	LS	\$1,500.00	\$1,500.00
Water Pollution Control (2%)	1	LS	\$1,500.00	\$1,500.00
Utility Coordination (2%)	1	LS	\$1,500.00	\$1,500.00
Grading (5%)	1	LS	\$1,500.00	\$1,500.00
Signing	18	EA	\$500.00	\$9,000.00
Pavement Marking	950	SF	\$5.00	\$4,750.00
Striping	18,500	LF	\$1.00	\$18,500.00
<i>Subtotal</i>				\$51,750.00
Contingency			15%	\$7,762.50
Engineering Design			10%	\$5,175.00
Administration			10%	\$5,175.00
Construction Management			10%	\$5,175.00

FACILITY AND DESCRIPTION	QTY	UNIT	UNIT COST	EST. COST
Class 2B Buffered Bicycle Lane <i>Restripe the entire roadway section to the new lane configuration. No roadway widening or curb work. Pavement legends for bicycles every 500'.</i>			MI	\$137,800
Mobilization (15%)	1	LS	\$15,000.00	\$15,000.00
Traffic Control (5%)	1	LS	\$5,000.00	\$5,000.00
Clear and Grub (2%)	1	LS	\$2,500.00	\$2,500.00
Surveying and Construction Staking (2%)	1	LS	\$2,500.00	\$2,500.00
Water Pollution Control (2%)	1	LS	\$2,500.00	\$2,500.00
Utility Coordination (2%)	1	LS	\$2,500.00	\$2,500.00
Signing	16	EA	\$500.00	\$8,000.00
Pavement Marking	1,900	SF	\$5.00	\$9,500.00
Striping	47,500	LF	\$1.00	\$47,500.00
<i>Subtotal</i>				<i>\$95,000.00</i>
Contingency			15%	\$14,250.00
Engineering Design			10%	\$9,500.00
Administration			10%	\$9,500.00
Construction Management			10%	\$9,500.00

FACILITY AND DESCRIPTION	QTY	UNIT	UNIT COST	EST. COST
Class 3A Bicycle Route <i>Pavement legends and signage for bicycles every 500'.</i>			MI	\$54,100
Mobilization (15%)	1	LS	\$7,500.00	\$7,500.00
Traffic Control (5%)	1	LS	\$2,500.00	\$2,500.00
Clear and Grub (2%)	1	LS	\$1,250.00	\$1,250.00
Surveying and Construction Staking (2%)	1	LS	\$1,250.00	\$1,250.00
Water Pollution Control (2%)	1	LS	\$1,250.00	\$1,250.00
Utility Coordination (2%)	1	LS	\$1,250.00	\$1,250.00
Signing	36	EA	\$500.00	\$18,000.00
Pavement Marking	850	SF	\$5.00	\$4,250.00
<i>Subtotal</i>				<i>\$37,250.00</i>
Contingency			15%	\$5,587.50
Engineering Design			10%	\$3,725.00
Administration			10%	\$3,725.00
Construction Management			10%	\$3,725.00

FACILITY AND DESCRIPTION	QTY	UNIT	UNIT COST	EST. COST
Class 3E Bicycle Boulevard <i>Restripe the entire roadway section. Pavement legends and signage for bicycles every 500'. Curb extensions located every 2 blocks (750') to limit vehicular through movements.</i>			MI	\$539,700
Mobilization (15%)	1	LS	\$88,000.00	\$88,000.00
Traffic Control (5%)	1	LS	\$30,000.00	\$30,000.00
Clear and Grub (2%)	1	LS	\$10,000.00	\$10,000.00
Surveying and Construction Staking (2%)	1	LS	\$10,000.00	\$10,000.00
Water Pollution Control (2%)	1	LS	\$10,000.00	\$10,000.00
Utility Coordination (2%)	1	LS	\$10,000.00	\$10,000.00
Grading (5%)	1	LS	\$30,000.00	\$30,000.00
Signing	36	EA	\$500.00	\$9,000.00
Pavement Marking	1,300	SF	\$5.00	\$6,500.00
Striping	5,000	LF	\$1.00	\$5,000.00
Relocate Fire Hydrant	2	EA	\$7,000.00	\$14,000.00
Relocate Utility Pole	2	EA	\$8,000.00	\$16,000.00
Curb Inlet	8	EA	\$5,000.00	\$40,000.00
4" HMA	65	TON	\$150.00	\$9,750.00
6" AB	45	CY	\$100.00	\$4,500.00
Curb and Gutter (All Types)	620	LF	\$20.00	\$12,400.00
4" PCC Sidewalk	1,500	SF	\$12.00	\$18,000.00
Curb Ramp	8	EA	\$5,000.00	\$40,000.00
<i>Subtotal</i>				<i>\$372,150.00</i>
Contingency			15%	\$55,822.50
Engineering Design			10%	\$37,215.00
Administration			10%	\$37,215.00
Construction Management			10%	\$37,215.00

FACILITY AND DESCRIPTION	QTY	UNIT	UNIT COST	EST. COST
Class 4A Separated Bikeway <i>Restripe the entire roadway section. Minor civil work, such as sidewalk/curb reconstruction at isolated locations (driveways, intersections, etc.). Construct vertical curb as a part of the buffer. Landscaping – 6’ width, native plants and irrigation, one quarter of the length. Requires rebalancing corridor study/traffic study, not included in cost estimate.</i>			MI	\$1,497,900
Mobilization (15%)	1	LS	\$170,000.00	\$170,000.00
Traffic Control (5%)	1	LS	\$55,000.00	\$55,000.00
Clear and Grub (2%)	1	LS	\$25,000.00	\$25,000.00
Surveying and Construction Staking (2%)	1	LS	\$25,000.00	\$25,000.00
Water Pollution Control (2%)	1	LS	\$25,000.00	\$25,000.00
Utility Coordination (2%)	1	LS	\$25,000.00	\$25,000.00
Grading (5%)	1	LS	\$25,000.00	\$25,000.00
Signing	18	EA	\$500.00	\$9,000.00
Pavement Marking	100	SF	\$5.00	\$500.00
Striping	19,000	LF	\$1.00	\$19,000.00
Curb Inlet	8	EA	\$5,000.00	\$40,000.00
4" HMA	1,030	TON	\$150.00	\$154,500.00
6" AB	165	CY	\$100.00	\$16,500.00
Curb and Gutter (All Types)	20,300	LF	\$20.00	\$406,000.00
6’ width of native plantings and associated irrig	0.25	MI	\$150,000	\$37,500.00
<i>Subtotal</i>				<i>\$1,033,000.00</i>
Contingency			15%	\$154,950.00
Engineering Design			10%	\$103,300.00
Administration			10%	\$103,300.00
Construction Management			10%	\$103,300.00

LIVERMORE BICYCLE, PEDESTRIAN, & TRAILS ACTIVE TRANSPORTATION PLAN

FACILITY AND DESCRIPTION	QTY	UNIT	UNIT COST	EST. COST
Sidewalk (one side of street) <i>5' sidewalk, one side. Curb and gutter.</i>			MI	\$794,100
Mobilization (15%)	1	LS	\$45,000.00	\$45,000.00
Traffic Control (5%)	1	LS	\$15,000.00	\$15,000.00
Clear and Grub (2%)	1	LS	\$5,000.00	\$5,000.00
Surveying and Construction Staking (2%)	1	LS	\$5,000.00	\$5,000.00
Water Pollution Control (2%)	1	LS	\$5,000.00	\$5,000.00
Utility Coordination (2%)	1	LS	\$5,000.00	\$5,000.00
Grading (2%)	1	LS	\$15,000.00	\$15,000.00
4" HMA	135	TON	\$150.00	\$20,250.00
6" AB	100	CY	\$100.00	\$10,000.00
Curb and Gutter (All Types)	5280	LF	\$20.00	\$105,600.00
4" PCC Sidewalk	2,6400	SF	\$12.00	\$316,800.00
<i>Subtotal</i>				<i>\$547,650.00</i>
Contingency			15%	\$82,147.50
Engineering Design			10%	\$54,765.00
Administration			10%	\$54,765.00
Construction Management			10%	\$54,765.00

FACILITY AND DESCRIPTION	QTY	UNIT	UNIT COST	EST. COST
Low-Intensity Intersection Crossing <i>Includes minor civil improvements (ramp replacement and/or minor sidewalk ADA work), new signage (including advanced warning signage), and/or new striping.</i>			EA	\$35,600
Mobilization (15%)	1	LS	\$3,000.00	\$3,000.00
Traffic Control (5%)	1	LS	\$1,000.00	\$1,000.00
Clear and Grub (2%)	1	LS	\$500.00	\$500.00
Surveying and Construction Staking (2%)	1	LS	\$500.00	\$500.00
Water Pollution Control (2%)	1	LS	\$500.00	\$500.00
Utility Coordination (2%)	1	LS	\$500.00	\$500.00
Grading (2%)	1	LS	\$500.00	\$500.00
Striping	500	LF	\$1.00	\$500.00
Signing	6	EA	\$500.00	\$3,000.00
Curb and Gutter (All Types)	100	LF	\$40.00	\$4,000.00
4" PCC Sidewalk	800	SF	\$12.00	\$9,600.00
4" HMA	4	TON	\$150.00	\$600.00
6" AB	3	CY	\$100.00	\$300.00
<i>Subtotal</i>				\$24,500.00
Contingency			15%	\$3,675.00
Engineering Design			10%	\$2,450.00
Administration			10%	\$2,450.00
Construction Management			10%	\$2,450.00

FACILITY AND DESCRIPTION	QTY	UNIT	UNIT COST	EST. COST
Medium-Intensity Intersection Crossing <i>Includes moderate civil improvements (curb extensions or new refuge islands in addition to ramp and ADA work), new signage (including advanced warning signage), new striping, and/or RRFBs.</i>			EA	\$172,300
Mobilization (15%)	1	LS	\$15,000.00	\$15,000.00
Traffic Control (5%)	1	LS	\$5,000.00	\$5,000.00
Clear and Grub (2%)	1	LS	\$2,000.00	\$2,000.00
Surveying and Construction Staking (2%)	1	LS	\$2,000.00	\$2,000.00
Water Pollution Control (2%)	1	LS	\$2,000.00	\$2,000.00
Utility Coordination (2%)	1	LS	\$2,000.00	\$2,000.00
Grading (2%)	1	LS	\$2,000.00	\$2,000.00
Striping	500	LF	\$1.00	\$500.00
Signing	8	EA	\$500.00	\$4,000.00
RRFB	1	EA	\$20,000.00	\$20,000.00
Curb and Gutter (All Types)	500	LF	\$40.00	\$20,000.00
4" PCC Sidewalk	3,500	SF	\$12.00	\$42,000.00
4" HMA	10	TON	\$150.00	\$1,500.00
6" AB	8	CY	\$100.00	\$800.00
<i>Subtotal</i>				<i>\$118,800.00</i>
Contingency			15%	\$17,820.00
Engineering Design			10%	\$11,880.00
Administration			10%	\$11,880.00
Construction Management			10%	\$11,880.00

FACILITY AND DESCRIPTION	QTY	UNIT	UNIT COST	EST. COST
High-Intensity Intersection Crossing (Low) <i>Includes moderate civil improvements (adjustments to curb lines or modifications to existing islands to account for new signal configurations in addition to ramp and ADA work), new signage, new striping, and/or minor signal improvements (new push buttons, modifications to signal heads, minimal pole relocations).</i>			EA	\$312,300
Mobilization (15%)	1	LS	\$30,000.00	\$30,000.00
Traffic Control (5%)	1	LS	\$10,000.00	\$10,000.00
Clear and Grub (2%)	1	LS	\$5,000.00	\$5,000.00
Surveying and Construction Staking (2%)	1	LS	\$5,000.00	\$5,000.00
Water Pollution Control (2%)	1	LS	\$5,000.00	\$5,000.00
Utility Coordination (2%)	1	LS	\$5,000.00	\$5,000.00
Grading (2%)	1	LS	\$5,000.00	\$5,000.00
Striping	1,000	LF	\$1.00	\$1,000.00
Signing	12	EA	\$500.00	\$6,000.00
PPB Post	4	EA	\$1,500.00	\$6,000.00
Signal Head	4	EA	\$1,000.00	\$4,000.00
Detectors	4	EA	\$10,000.00	\$40,000.00
Conductors	1	LS	\$10,000.00	\$10,000.00
Curb and Gutter (All Types)	500	LF	\$40.00	\$20,000.00
4" PCC Sidewalk	5,000	SF	\$12.00	\$60,000.00
4" HMA	15	TON	\$150.00	\$2,250.00
6" AB	11	CY	\$100.00	\$1,100.00
<i>Subtotal</i>				<i>\$215,350.00</i>
Contingency			15%	\$32,302.50
Engineering Design			10%	\$21,535.00
Administration			10%	\$21,535.00
Construction Management			10%	\$21,535.00

FACILITY AND DESCRIPTION	QTY	UNIT	UNIT COST	EST. COST
High-Intensity Intersection Crossing (High) <i>Includes moderate civil improvements (adjustments to curb lines or modifications to existing islands to account for new signal configurations in addition to ramp and ADA work), new signage, new striping, and/or moderate signal improvements (new poles and major changes to signal heads, and/or significant pole relocations).</i>			EA	\$447,900
Mobilization (15%)	1	LS	\$45,000.00	\$45,000.00
Traffic Control (5%)	1	LS	\$15,000.00	\$15,000.00
Clear and Grub (2%)	1	LS	\$7,500.00	\$7,500.00
Surveying and Construction Staking (2%)	1	LS	\$7,500.00	\$7,500.00
Water Pollution Control (2%)	1	LS	\$7,500.00	\$7,500.00
Utility Coordination (2%)	1	LS	\$7,500.00	\$7,500.00
Grading (2%)	1	LS	\$7,500.00	\$7,500.00
Striping	1,000	LF	\$1.00	\$1,000.00
Signing	12	EA	\$500.00	\$6,000.00
PPB Post	4	EA	\$1,500.00	\$6,000.00
Signal Head	10	EA	\$1,000.00	\$10,000.00
Signal Pole	2	EA	\$25,000.00	\$50,000.00
Detectors	4	EA	\$10,000.00	\$40,000.00
Conductors	1	LS	\$15,000.00	\$15,000.00
Curb and Gutter (All Types)	500	LF	\$40.00	\$20,000.00
4" PCC Sidewalk	5,000	SF	\$12.00	\$60,000.00
4" HMA	15	TON	\$150.00	\$2,250.00
6" AB	11	CY	\$100.00	\$1,100.00
<i>Subtotal</i>				<i>\$308,850.00</i>
Contingency			15%	\$46,327.50
Engineering Design			10%	\$30,885.00
Administration			10%	\$30,885.00
Construction Management			10%	\$30,885.00

MAINTENANCE COST ESTIMATES

Table K-4 summarizes the maintenance activities and estimated annual costs for each facility type. Total annual costs for each facility are 2017 dollars rounded to the nearest \$10.

Table K-4: Maintenance Cost Estimate Breakdown

FACILITY AND ACTIVITY	UNIT	ANNUAL COST
Class 1A Shared Use Path (Paved)	MI	\$26,400
Sweeping, Weeding, Litter Removal, Crack Sealing and Repair	MI	\$4,250
Sign Replacement every 10 years (18)	MI	\$540
Fence Maintenance (paint touch up and spot repair, 2 visits)	MI	\$500
Landscape Maintenance	MI	\$2,400
Irrigation Controller Replacement (20 years)	EA	\$1,355
Plant Replacement (3% per year) ~900SF	SF	\$4,500
Repaving Annual Allowance	MI	\$12,557
Class 1A Shared Use Path (Unpaved)	MI	\$12,720
Sweeping, Weeding, Litter Removal, Crack Sealing and Repair	MI	\$4,200
Sign Replacement every 10 years (18)	MI	\$540
Fence Maintenance (paint touch up and spot repair, 2 visits)	MI	\$500
Landscape Maintenance	MI	\$1,400
Plant Replacement (3% per year) ~900SF	SF	\$4,500
Regrading and Gravel Overlay Annual Allowance	MI	\$1,580

FACILITY AND ACTIVITY	UNIT	ANNUAL COST
Class 2A Bicycle Lane	MI	\$2,720
Restriping every 6 years	MI	\$2,180
Sign replacement every 10 years (18)	MI	\$540
Class 2B Buffered Bicycle Lane	MI	\$3,620
Restriping every 6 years	MI	\$3,140
Sign replacement every 10 years (16)	MI	\$480
Class 3A Bicycle Route	MI	\$1,320
Restriping every 6 years	MI	\$240
Sign replacement every 10 years (36)	MI	\$1,080
Class 3E Bicycle Boulevard	MI	\$2,920
Restriping every 6 years	MI	\$240
Sign replacement every 10 years (36)	MI	\$1,080
Allowance for pavement repair (curb extension damage 40 LF)	MI	\$1,600 ¹
Class 4A Separated Bicycle Lane	MI	\$20,840
Restriping every 6 years	MI	\$2,180
Sign Replacement every 10 years (18)	MI	\$540
Allowance for pavement repair (Barrier damage - 100LF)	MI	\$2,000
Landscape Maintenance	MI	\$2,400
Sweeping, Special Equipment	MI	\$200
Irrigation Controller Replacement (20 years)	EA	\$1,355
Plant Replacement (3% per year) ~900SF	SF	\$1,125
Repaving Allowance	MI	\$9,500

¹ *Varies based on features implemented*

FACILITY AND ACTIVITY	UNIT	ANNUAL COST
Sidewalk	MI	\$8,080
Annual operations & maintenance	EA	\$140
Annual replacement	EA	\$7,940
Low Intensity Crossing Improvement	EA	\$460
Annual operations & maintenance	EA	\$105
Annual replacement	EA	\$355
Medium Intensity Crossing Improvement	EA	\$3,950
Annual operations & maintenance	EA	\$530
Annual replacement	EA	\$3,420
High Intensity Low Cost Crossing Improvement	EA	\$7,620
Annual operations & maintenance	EA	\$1,010
Annual replacement	EA	\$6,610
High Intensity High Cost Crossing Improvement	EA	\$10,330
Annual operations & maintenance	EA	\$1,010
Annual replacement	EA	\$9,320