Lamorinda Program Management Committee
Technical Advisory Committee (TAC)

IMPORTANT NOTICE REGARDING THIS MEETING: To protect our residents, officials, and staff, and in alignment with the Governor's recent Executive Order N 25-20 and provisions of AB 361 in which certain teleconference requirements of the Brown Act have been suspended, including the requirement to provide a physical location for members of the public to participate in the meeting, this meeting will be held by Teleconference.

BY **TELECONFERENCE** VIA ZOOM WEBINAR	Attending by PC: MEETING URL https://us02web.zoom.us/j/83275046021?pwd=J_kr0i4rMcZbnxyC68pBr67p_8-cds.1 MEETING ID: 832 7504 6021 PASSCODE: 863679 Attending by Telephone: +1 (669) 900-6833 MEETING ID: 832 7504 6021

LAMORINDA PROGRAM MANAGEMENT COMMITTEE TECHNICAL ADVISORY COMMITTEE (LPMC TAC) MEETING AGENDA

Wednesday, July 6, 2022, 1:00 PM

City of Lafayette

How to follow or participate in the meeting:

1. Members of the public may observe and participate in the meeting at the teleconference location highlighted above. (*Please note that due to the remote nature of the meeting, the City of Lafayette cannot guarantee that the network or its site will not experience technical interruptions. To ensure that the LPMC TAC receives your comments, we* ***strongly encourage you to submit your comments in writing in advance*** *of the meeting by following instructions in below.)*

2. Send your e-mail to MMoran@lovelafayette.org by 8 am on the day of the meeting. Those e-mails will be forwarded to the LPMC TAC. They will also be made a part of the public record and be available to view by 10 am on the day of the meeting by following this link: https://swatcommittee.org

3. Comments may also be submitted by e-mail during the meeting up until the closure of public comment period on the relevant agenda item. These will be read into the record by staff at their normal cadence and will be limited to a maximum of 3 minutes. To be read into the record, e-mail must contain in the subject line "Public Comment – Not on the Agenda" or "Public Comment – Agenda Item #" with the relevant agenda item indicated.

Lamorinda Program Management Committee
Technical Advisory Committee (TAC)

4. During the meeting, the Chair will call for public comment. If you wish to address the LPMC TAC, please so indicate by using the "raise your hand" function at that time and the Chair will add you to the speaker list and call your name when it is your turn.
    a) App/Browser Attendees: Those who are joining us using the Zoom app or via internet browser, can click on the "raise your hand" icon found in the control panel. Generally, the control panel is located at the bottom of your screen; however, this may vary depending on the type of device and/or the method by which you're joining the meeting.
    b) Telephone Attendees: Those who are joining us by telephone—only, please press " ***9** " This lets the moderator know that you wish to make a comment.

1. **Call to Order the LPMC TAC**
2. **Roll Call**
3. **Adoption of the LPMC TAC Agenda**
4. **Public Comment**
5. **New Business**
6. **Old Business**
    a. **Lamorinda Action Plan Update: Presentation by Placeworks and Discussion of Report**
    Recommendation: Receive presentation, and discuss next steps to develop the Lamorinda Action Plan
7. **Adjourn.**

I, Therese Kain, declare under penalty of perjury under the laws of the State of California that this regular meeting agenda has been posted at least 72 hours in advance at the City of Lafayette, 3675 Mt Diablo Blvd, Suite 210, Lafayette, CA and on the LPMC website at https://swatcommittee.org

Therese Kain, Engineering Assistant

Location of Agendas and Agenda Packets: Agendas and packets are available for review by the public by following this link: https://swatcommittee.org and during regular business hours at the City of Lafayette, 3675 Mt Diablo Blvd, Suite 210, Lafayette, CA 94549. Agendas and packets shall be made available at least 72 hours in advance of regular meetings and 24 hours in advance of special meetings.

Any writings or documents pertaining to an open session item provided to a majority of the Lamorinda Program Management Committee TAC less than 72 hours prior to the meeting, shall be made available for public inspection at this link: https://swatcommittee.org and at the City of Lafayette, 3675 Mt Diablo Blvd, Suite 210, Lafayette, CA 94549.

Item 6A:

Attachment 1 - Corridor Map Memo

MEMORANDUM

DATE June 27, 2022

TO RTPC TAC members

FROM John Hoang and Matt Kelly, CCTA
David Early and Torina Wilson, PlaceWorks

SUBJECT Mapping of Routes of Regional Significance

An ongoing component of the Action Plan updates is revising the existing Routes of Regional Significance (RRS) to create new maps that show multi-modal RRS in Contra Costa County and the Alameda County portion of the Tri-Valley area.

RRS's are transportation facilities that meet certain qualifying criteria and were nominated by local staff. The maps will help CCTA itself, local jurisdictions, and the general public know which roadway, transit, and active transportation facilities are important to the region, and will serve as the basis for monitoring and maintenance by CCTA and the Regional Transportation Planning Committees (RTPCs).

After extensive discussions with RTPC Technical Advisory Committees (TACs) and various community stakeholders, CCTA and the PlaceWorks team have created a series of maps that will show Routes of Regional Significance both as a multimodal network of travel corridors, and for individual modes. These maps are described below.

Overall Corridor Maps

PlaceWorks has created multimodal RRS "Corridor Maps" that show five different transportation modes (bus, rail, bike, freeway, and surface roadway) on a single map. The maps are intended to illustrate the multimodal nature of the transportation network, and to also show that multiple facilities exist in any given generalized transportation corridor.

There are six Corridor Maps included in this memorandum: one countywide and one for each RTPC subregion. These maps show the location, generalized routing, and modes of each corridor. They are not intended to be exact, but rather to show travel corridors of the multimodal transportation network, as dictated by our hilly geography and Bay coastline. There are several critical notes to these Corridor Maps:

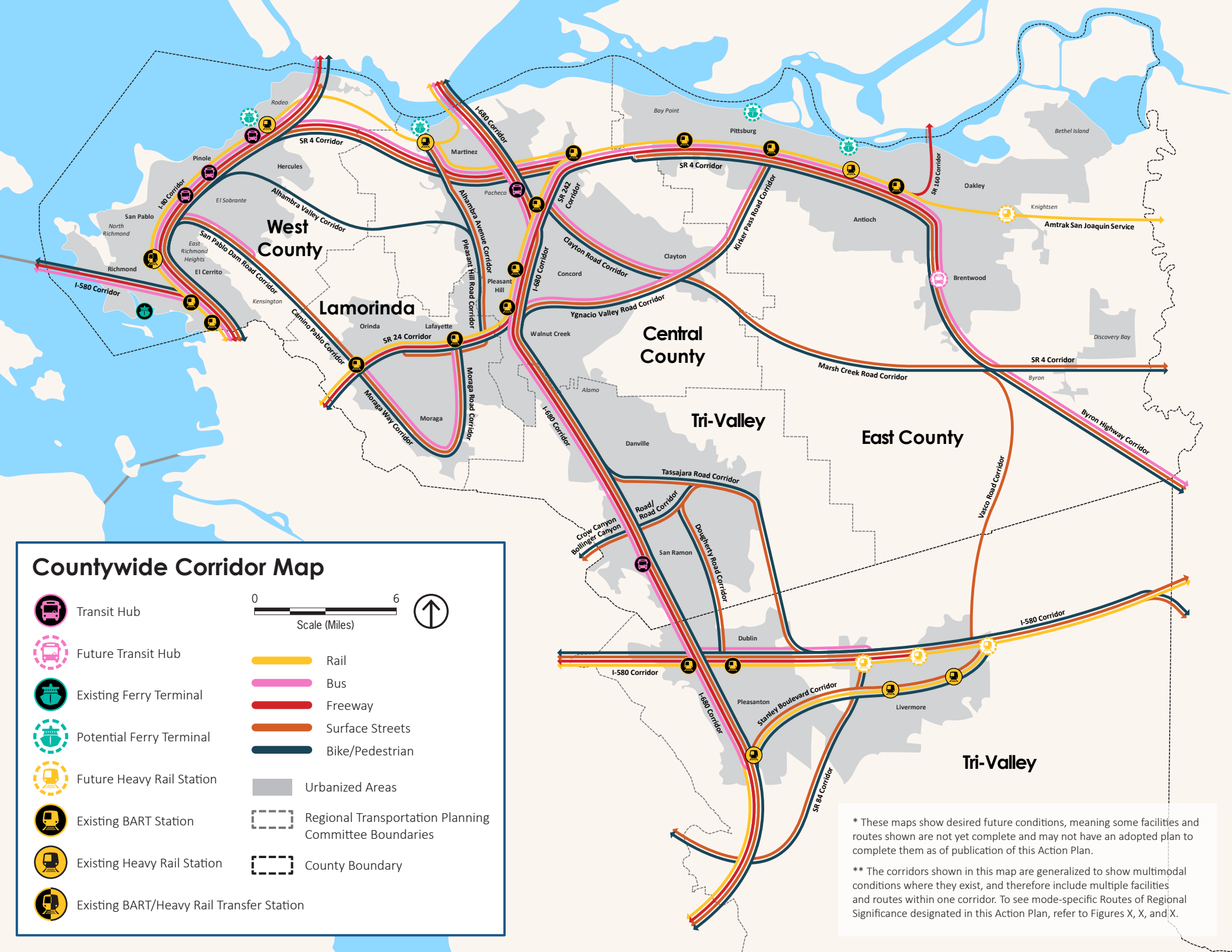
- The Corridor Maps show desired future conditions, meaning some facilities and routes shown are planned but not yet constructed.
- The corridors shown on the maps are highly generalized to show multimodal conditions where they exist or may someday exist, and therefore include multiple facilities and routes within one corridor.

The draft Corridor Maps are attached to this memo. CCTA welcomes comment on them at future meetings, via email, or when the Action Plans themselves are published for review and adoption.

Mode Specific Maps

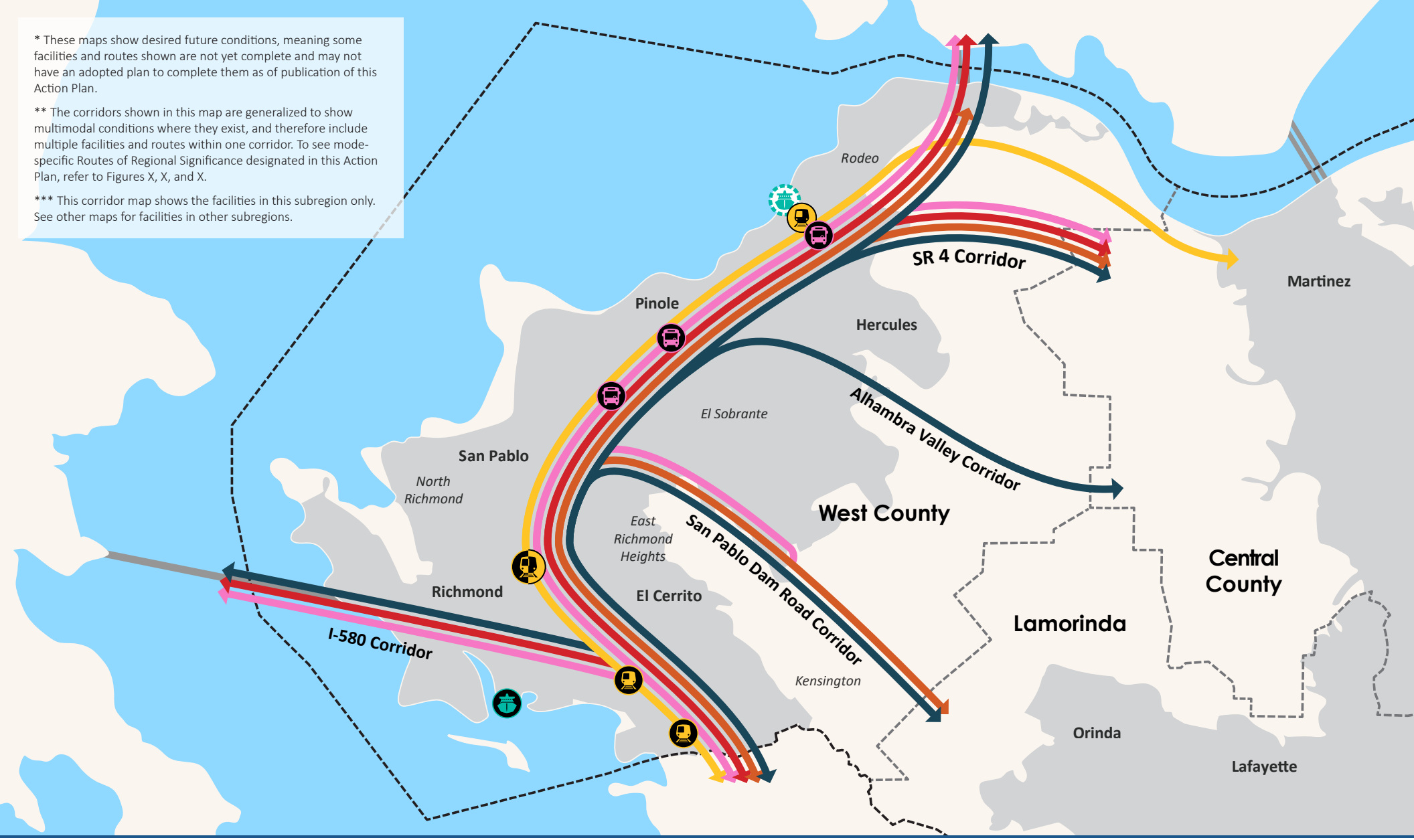
In addition to the Corridor Maps, each Action Plan will also include three mode-specific maps that will be tied to specific Regional Transportation Objectives (RTOs). Readers will be able to refer to these maps for a detailed depiction of existing and desired facilities:

- **Vehicular Routes.** One or more maps in each Action Plan will show locations of key freeway and roadway segments and intersections that are to be monitored and maintained as part of the Action Plan process.
- **Low Stress Bike Network.** The Action Plans will contain one or more RTOs to move towards completion of CCTA's already-designated Low Stress Bike Network (LSBN) described in the 2018 Countywide Bicycle and Pedestrian Plan. Therefore, the Action Plans will include a map showing completed and yet-to-be-completed facilities on the LSBN.
- **Key Existing Transit Facilities.** Each Action Plan will include a map showing key transit routes that has been developed in conjunction with the TACs and local transit providers.



* These maps show desired future conditions, meaning some facilities and routes shown are not yet complete and may not have an adopted plan to complete them as of publication of this Action Plan.

** The corridors shown in this map are generalized to show multimodal conditions where they exist, and therefore include multiple facilities and routes within one corridor. To see mode-specific Routes of Regional Significance designated in this Action Plan, refer to Figures X, X, and X.



West Contra Costa County Corridor Map

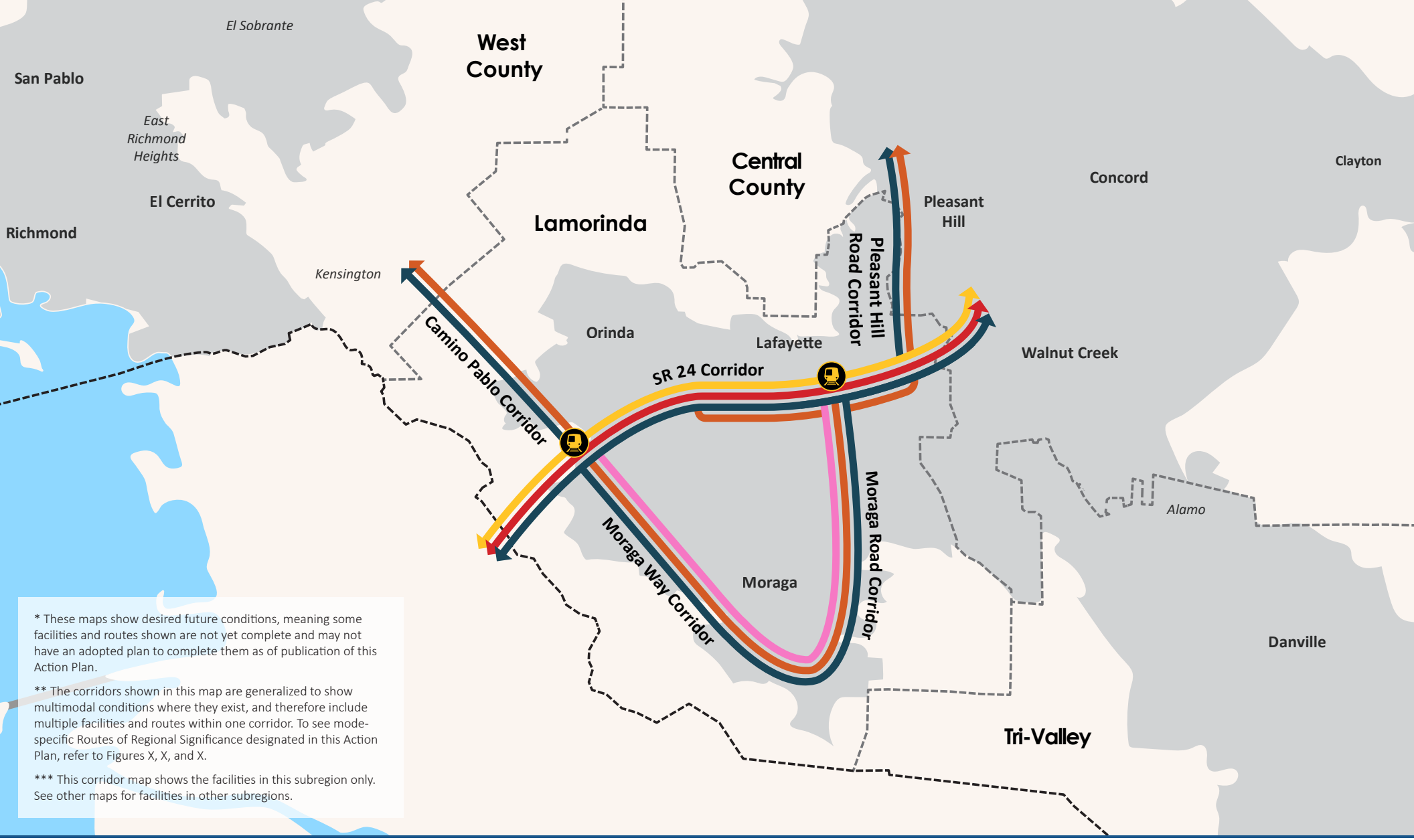
- Rail
- Bus
- Freeway
- Surface Streets
- Bike/Pedestrian

- Existing Ferry Terminal
- Potential Ferry Terminal
- Transit Hub

- Existing BART Station
- Existing Heavy Rail Station
- Existing BART/Heavy Rail Transfer Station

- Urbanized Areas
- Regional Transportation Planning Committee Boundaries
- County Boundary

0 3
Scale (Miles)

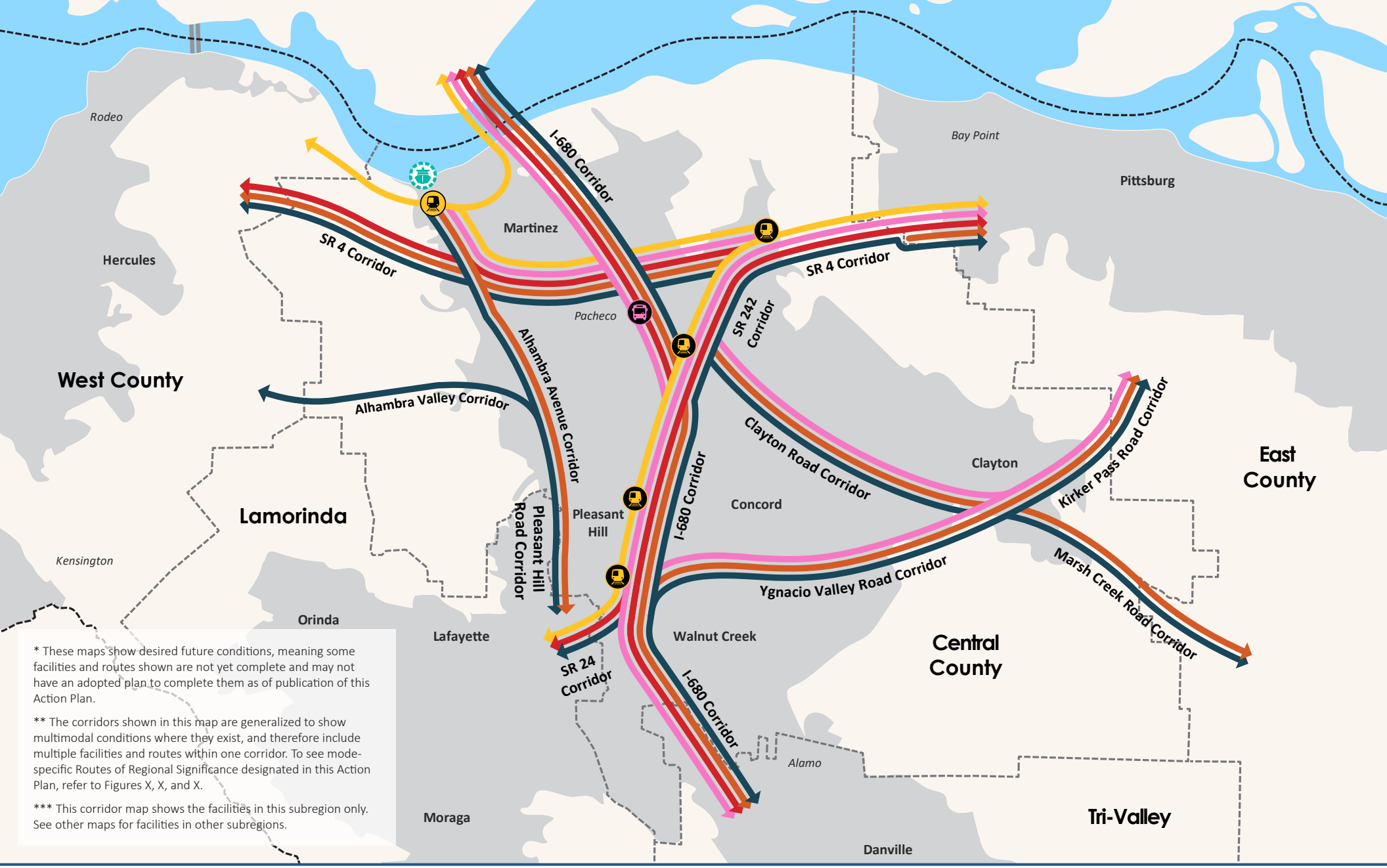


Lamorinda Area Corridor Map

- Rail
- Bus
- Freeway
- Surface Streets
- Bike/Pedestrian
- Existing BART Station

0 3
Scale (Miles)

- Urbanized Areas
- Regional Transportation Planning Committee Boundaries
- County Boundary



* These maps show desired future conditions, meaning some facilities and routes shown are not yet complete and may not have an adopted plan to complete them as of publication of this Action Plan.

** The corridors shown in this map are generalized to show multimodal conditions where they exist, and therefore include multiple facilities and routes within one corridor. To see mode-specific Routes of Regional Significance designated in this Action Plan, refer to Figures X, X, and X.

*** This corridor map shows the facilities in this subregion only. See other maps for facilities in other subregions.

Central Contra Costa County Corridor Map

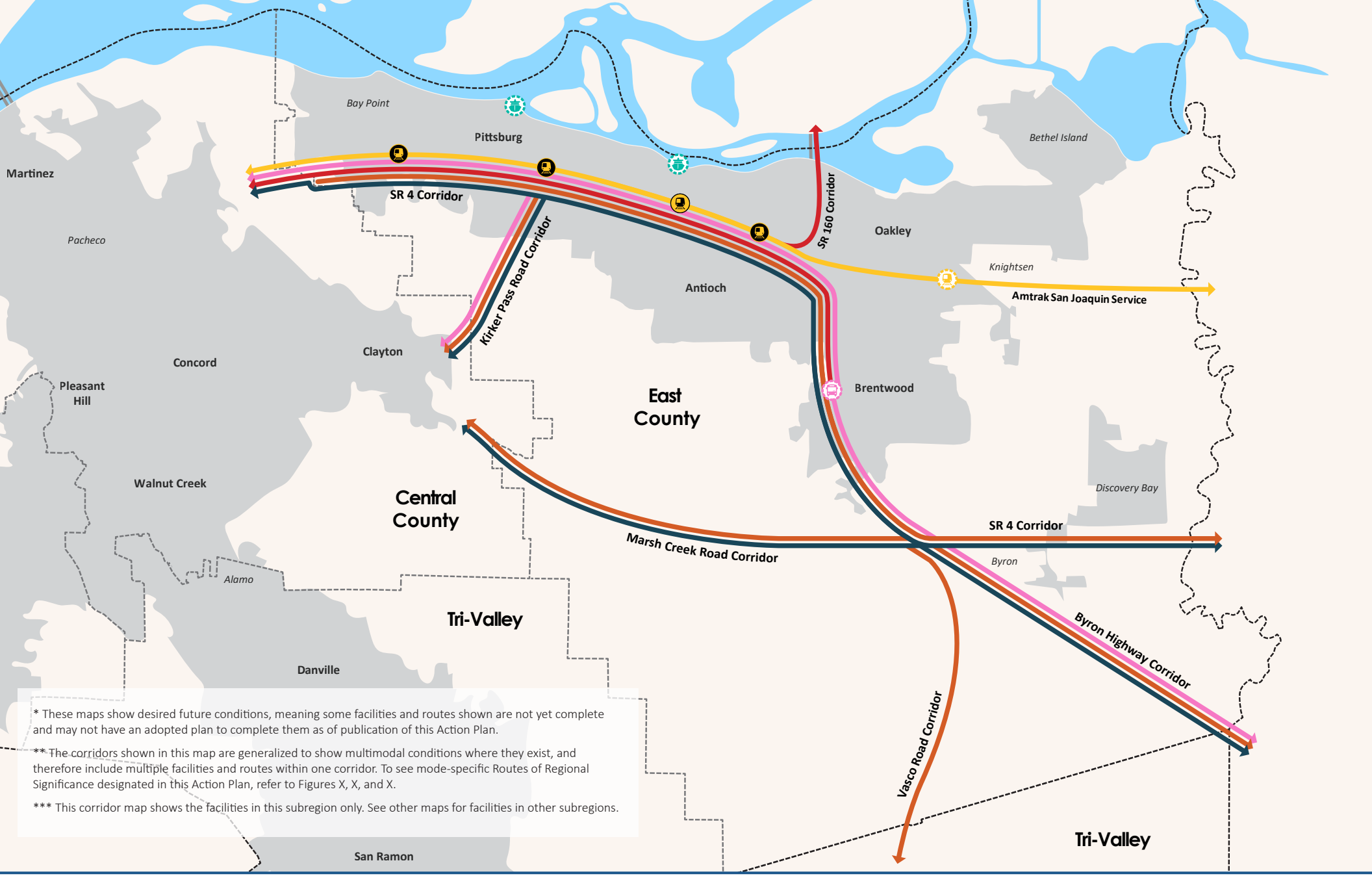
Rail
Bus
Freeway
Surface Streets
Bike/Pedestrian

Potential Ferry Terminal
Transit Hub

Existing BART Station
Existing Heavy Rail Station

Urbanized Areas
Regional Transportation Planning Committee Boundaries
County Boundary

0 3
Scale (Miles)



* These maps show desired future conditions, meaning some facilities and routes shown are not yet complete and may not have an adopted plan to complete them as of publication of this Action Plan.

** The corridors shown in this map are generalized to show multimodal conditions where they exist, and therefore include multiple facilities and routes within one corridor. To see mode-specific Routes of Regional Significance designated in this Action Plan, refer to Figures X, X, and X.

*** This corridor map shows the facilities in this subregion only. See other maps for facilities in other subregions.

East Contra Costa County Corridor Map

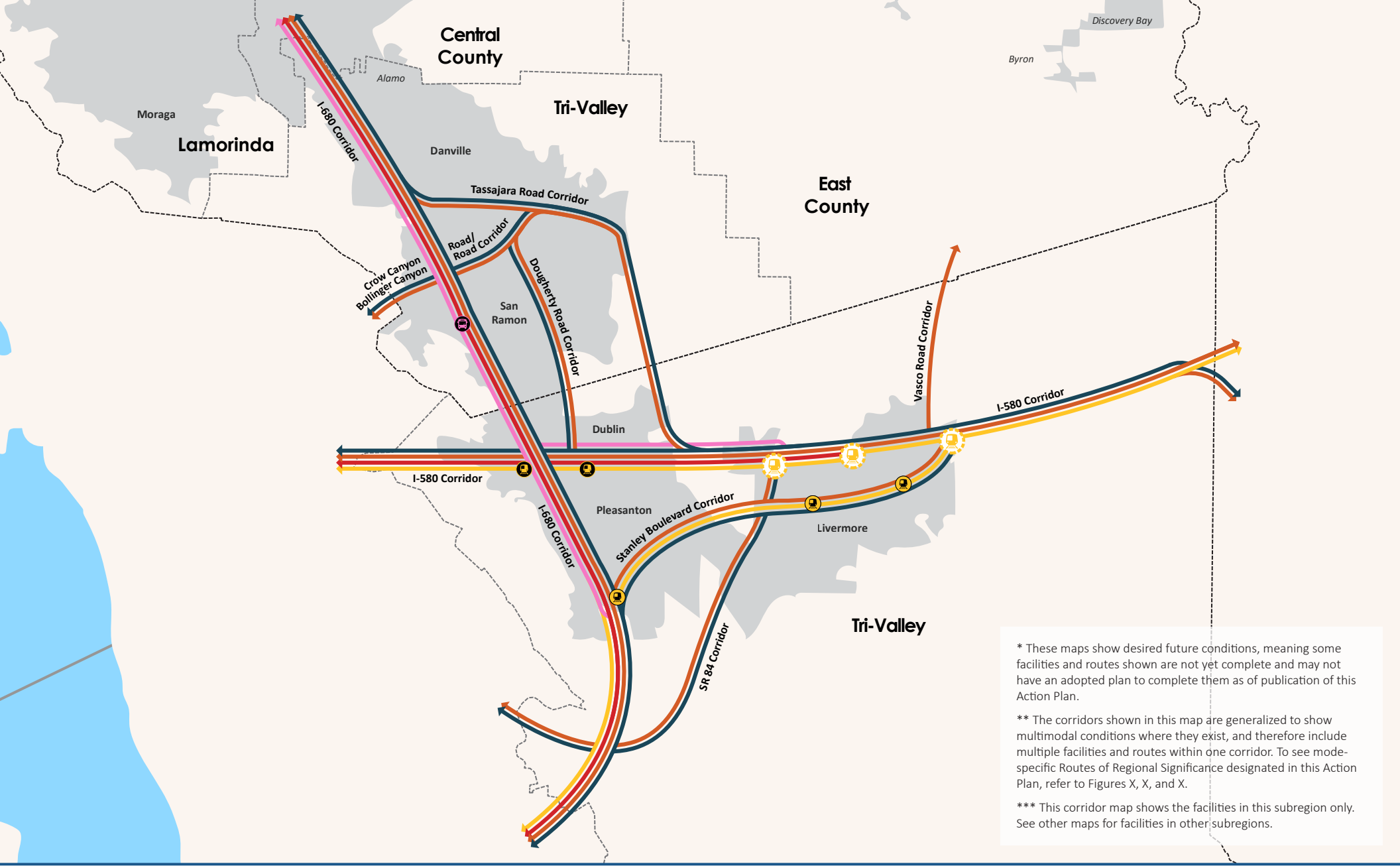
- Rail
- Bus
- Freeway
- Surface Streets
- Bike/Pedestrian

- Existing BART Station
- Existing Heavy Rail Station
- Future Heavy Rail Station
- Potential Ferry Terminal
- Future Transit Hub

- Urbanized Areas
- Regional Transportation Planning Committee Boundaries
- County Boundary

0 6

Scale (Miles)



* These maps show desired future conditions, meaning some facilities and routes shown are not yet complete and may not have an adopted plan to complete them as of publication of this Action Plan.

** The corridors shown in this map are generalized to show multimodal conditions where they exist, and therefore include multiple facilities and routes within one corridor. To see mode-specific Routes of Regional Significance designated in this Action Plan, refer to Figures X, X, and X.

*** This corridor map shows the facilities in this subregion only. See other maps for facilities in other subregions.

Tri Valley Area Corridor Map

- Rail
- Bus
- Freeway
- Surface Streets
- Bike/Pedestrian

- Existing BART Station
- Existing Heavy Rail Station
- Future Heavy Rail Station
- Transit Hub

- Urbanized Areas
- Regional Transportation Planning Committee Boundaries
- County Boundary

0 6
Scale (Miles)

Item 6A:

Attachment 2 – RTO Methodology Memo

MEMORANDUM

DATE June 27, 2022

TO John Hoang and Matt Kelly, CCTA

FROM David Early and Torina Wilson, PlaceWorks
Erin Vaca, DKS Associates
Julie Morgan and Terence Zhao, Fehr & Peers

SUBJECT Regional Transportation Objectives (RTOs) Methodology Memorandum

This Memorandum outlines the preliminary RTOs, and the methodology behind them, that PlaceWorks and its Technical Consultants (DKS and Fehr & Peers) plan to model in preparation of the CCTA Action Plan Updates. These RTOs cover all seven Action Plan and CTP topics and will be used to evaluate success in achieving the goals of each Action Plan. These RTOs could also be carried forward into the Countywide Transportation Plan (CTP) to define the outcomes of that plan.

Historically, each RTPC has had latitude to select a set of Multimodal Transportation Service Objectives (MTSOs) of its own choosing, and the various Action Plans have had differing MTSOs. In this round of Action Plan preparation, each RTPC continues to have the authority to craft its own RTOs. However, PlaceWorks is working with CCTA and the RTPCs to ensure that the new RTOs are as consistent as possible across the Action Plans, to ensure they are largely internally consistent and to ultimately be combined and consolidated into the future CTP. At this time, PlaceWorks anticipates only minor variations among the RTOs adopted by each RTPC.

The preliminary list of RTOs, and their relevant chapter topics, are:

- Freeway RTOs
  - Peak hour delay index on select freeway segments.
  - Buffer index on select freeway segments.
- Surface Roadway RTOs
  - Peak hour Level of Service (LOS) at selected intersections in urban areas.
  - Peak hour segment LOS on selected two-lane roadways outside of urban areas.
- Transit RTOs
  - Mode share of transit trips.
  - Ratio of travel time for transit as compared to automobile travel time for select trips.
- Bicycle and Pedestrian RTOs
  - Mode share of bicycling and walking.
  - Proportion of the countywide low stress bike network that has been completed.
  - Number of locations where the low stress bike network makes an unprotected crossing over a heavily traveled vehicle route.
- Safety RTOs

    - Number of Killed or Seriously Injured (KSI) collisions.
    - Number of bike- or pedestrian-involved collisions.
    - Number of bike- or pedestrian-involved collisions within 500 feet of a school.
- Equity RTOs
    - Proportion of KSI and bike- or pedestrian-involved collisions that occur in Equity Priority Communities (EPCs), compared to the county as a whole.
    - Share of county jobs that can be reached by EPC residents within a 30-minute drive, as compared to county residents as a whole.
    - Share of county jobs that can be reached by EPC residents within a 45-minute transit trip, as compared to county residents as a whole.
    - Number of people in EPCs who are not within a quarter-mile distance of a transit stop served by high quality transit.
- Climate Change RTOs
    - Single occupant vehicle mode share.
    - Vehicle Miles Traveled (VMT) per capita.
    - Transportation greenhouse gas (GHG) emissions per capita.
    - Zero-emission vehicle ownership in the subregion.
- Technology RTOs
    - Level of signal interconnection.

This memo ends with a discussion of several potential RTOs that were explored but are not recommended to move forward. They are:

- Wait time for paratransit.
- Speed reduction
- Use of shared (pooled) Transportation Network Companies (TNCs)
- Number of shared scooters, shared bicycles, and public autonomous shared vehicles that are deployed.
- Pavement condition on the countywide low stress bike network.
- Average commute time for low-income residents as compared to county residents as a whole.
- Miles of Routes of Regional Significance (RRS) estimated to be vulnerable to sea level rise.
- Percentage of vulnerable RRS for which remediation plans or a mitigation approach have been created.

The remainder of this memo explains the methodologies that the PlaceWorks team will use to measure each of the above RTOs. These same methodologies will be documented in a revision to CCTA's Technical Procedures and will be available for on-going assessment of attainment of the RTOs. An explanation of RTOs that were considered and not recommended to move forward are also included.

The modelling work described in this memo will be completed by DKS using the CCTA Countywide Travel Demand Model. This four-step, trip-based model was most recently revalidated to a 2018 base year. The standard CCTA travel demand model incorporates land use (population and employment) forecasts for 2020, 2030, and 2040 and can interpolate these inputs for interim years. Because the standard

model cannot produce scenarios beyond 2040, a special version of the model script will be developed for the Action Plan analyses. In addition to accommodating a year 2050 horizon, the revised version will incorporate enhanced traffic assignment procedures for express lanes.

For the Action Plan updates, land use inputs for the horizon year of 2050 will be developed based on the MTC Plan Bay Area 2050 projections for Contra Costa County. The transportation network assumed for the Baseline 2050 scenario will be derived from the CCTA Transportation Expenditure Plan (TEP) No Build scenario, to reflect only already programmed improvements. In addition to the TEP projects, some additional express lanes will be assumed on I-680 and the extension of BART to Livermore will be removed.

For existing conditions, the project team will use 2018 data to reflect pre-pandemic conditions, as it is not possible to predict how traffic conditions might stabilize as the post-pandemic "new normal" continues to evolve.

Freeways RTOs

PEAK HOUR DELAY INDEX ON SELECT FREEWAY SEGMENTS

The delay index is a measure of delay experienced by motorists on a roadway segment during a peak commute hour in a single direction. The delay index is calculated by measuring the time it takes to travel a segment of road during average peak-period congested conditions and comparing it to the time it takes to travel the same segment during uncongested, free-flow conditions. A delay index may also be calculated as the ratio of congested speed to uncongested speed, given that the distance is fixed on any given corridor.

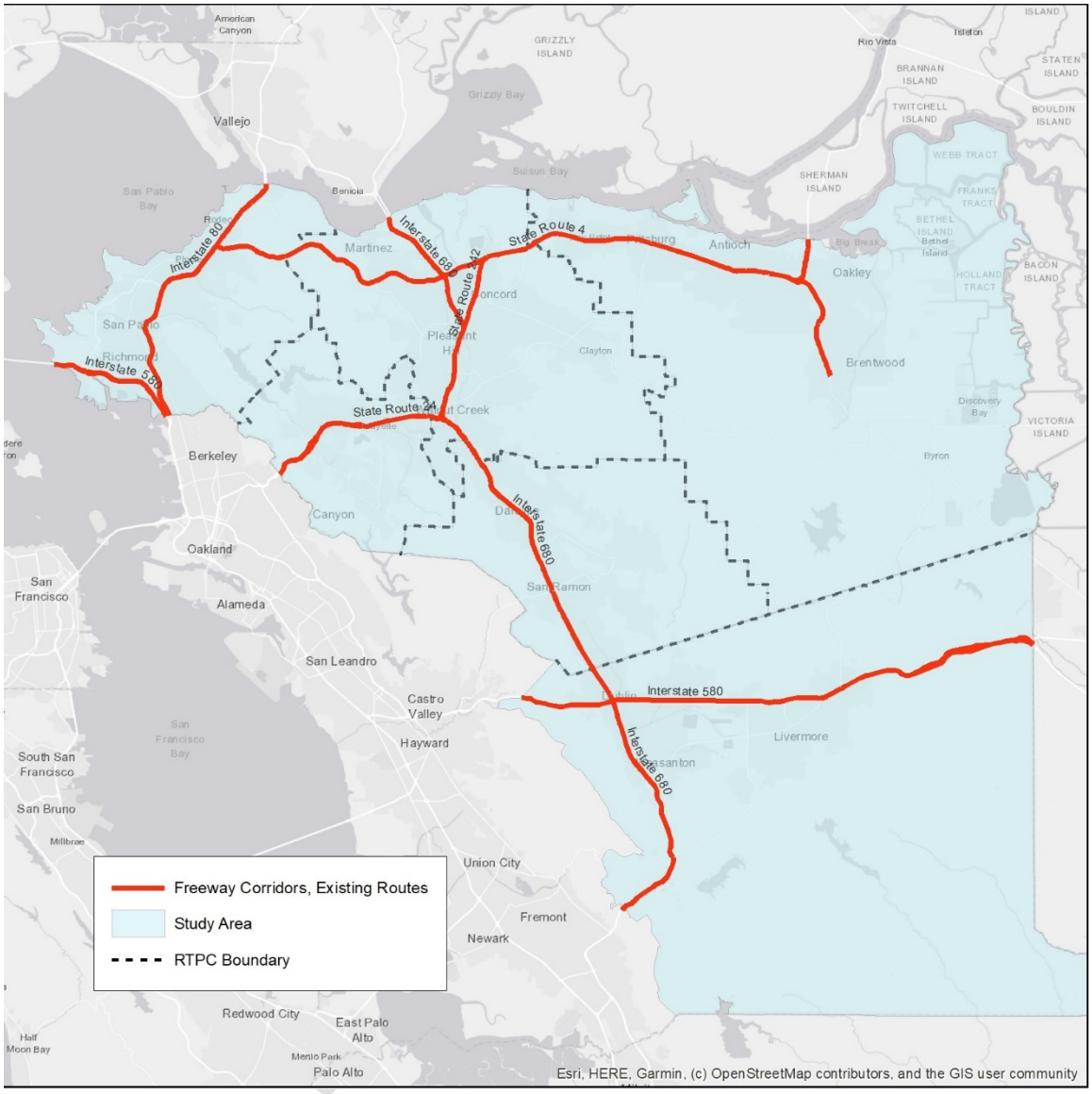
All previous CCTA Action Plans used delay index as MTSOs for freeway facilities. Table 1 lists the specific facilities to be evaluated with this metric for the current Action Plan updates; these segments are mapped in Figure 1. The performance targets used in the previous round of Action Plans are provided for reference, although these will be revisited as part of the current planning process.

TABLE 1 FREEWAY FACILITIES AND PREVIOUS PERFORMANCE TARGETS

RTPC	Facility	From	To	Previous Performance Target
WCCTAC (West County)	Interstate 80	Carquinez Bridge	Solano County Line	DI≤3.0
	Interstate 580	I-80	Marin County Line	DI≤2.5
	State Route 4	I-80	Cummings Skyway	DI≤2.0
TRANSPAC (Central County)	Interstate 680	Benicia Martinez Bridge	I-680/SR-24 Interchange	DI≤ 4.0 (I-680)
	Interstate 680	I-680/SR-24 Interchange	Livorna Road	DI≤ 4.0 (I-680)
	State Route 242	SR-4/WO Port Chicago Highway	I-680/SO Willow Pass Road	DI≤ 3.0 (SR-242)
	State Route 4	Cummings Skyway	Willow Pass Road/Evora Road	DI≤ 5.0 (SR-4)
TRANSPLAN (East County)	State Route 4	Willow Pass Grade	Balfour Road	DI≤2.5
	State Route 160	SR-4	Sacramento County Line	DI≤2.5
Lamorinda (Southwest County)	State Route 24	Caldecott Tunnel	I-680	DI≤2.0
Tri-Valley (Southwest County)	Interstate 680	Livorna Road	I-580	DI≤2.0
	Interstate 680	I-580	SR-80	DI≤2.0
	Interstate 580	Eden Canyon Road	I-680	DI≤2.0
	Interstate 580	I-680	N Midway Road	DI≤2.0

Source: RTPC Action Plans.

Figure 1: Freeway Facilities



The delay index (and the related average speed) will be calculated for both the 2019 Base Year and 2050 Baseline scenarios, pivoting from observed data. The source of observed data for this RTO will be speed

data from INRIX Roadway Analytics, which was also used in the 2017 MTSO monitoring[1] and 2021 CMP monitoring[2]. DKS will first calculate observed 2019 speed with INRIX data using April 2019 as a baseline. DKS will pull one-minute interval data that includes travel time, use a Python program to excerpt defined study areas from Table 1 and Figure 1, and ultimately filter holidays, defined peak hours, defined days of the week, and data points affected by construction and special events, or with low INRIX quality scores. Delay indices will be calculated by estimating the additional congested travel time that is expected to occur on the link using the CCTA Countywide Travel Demand Model during peak hours. Components of this work include:

- Average congested speed for 2019 will be speed data derived from INRIX Roadway Analytics, which was also used in the 2017 MTSO monitoring and 2021 CMP monitoring.
- For 2050, DKS will take average congested speed data from the model.
- Free flow speed will be the posted speed limit.
- The delay indices will be calculated by dividing the free flow speed by the observed or modeled average congested speed.

These calculations will yield existing and future delay index ratings for the segments of freeways listed in Table 1. Existing delay index ratings will be compared to adopted MTSO delay index thresholds and the project team will suggest any revisions to the existing delay index thresholds for consideration by the RTPCs.

BUFFER INDEX ON SELECT FREEWAY SEGMENTS

RTPC TAC members expressed interest in tracking the reliability of freeway segments. The project team recommends moving forward with the "buffer index" to measure reliability because it will rely on the same data pulled for the delay index RTO. The buffer index represents the extra buffer time (or time cushion) that most travelers add to their average travel time when planning trips to ensure on-time arrival. This extra time is added to account for any unexpected delay. The buffer index is expressed as a percentage and its value increases as reliability gets worse. For example, a buffer index of 40 percent means that, for a 20-minute average travel time, a traveler should budget an additional 8 minutes (20 minutes × 40 percent = 8 minutes) to ensure on-time arrival most of the time. In this example, the 8 extra minutes is called the buffer time. The buffer index is computed as the difference between the 95th percentile travel time over a corridor and average travel time, divided by the average travel time.

The CCTA Countywide Travel Demand Model can output only average congested speeds and not 95th percentile speeds, so the buffer index will be a monitoring metric, compiled for existing and observed

[1] Contra Costa Sub-regional Action Plans for the Routes of Regional Significance Multimodal Traffic Service Objectives (MTSO) Draft 2017 Monitoring Report (March 2018).

[2] 2021 Update of the Contra Costa Congestion Management Program (Draft Final Report).

conditions but not forecasted. The buffer index for each freeway corridor listed in Table 1 will be calculated from the same INRIX data used to calculate the delay index.

Surface Roadway RTOs

PEAK HOUR LEVEL OF SERVICE (LOS) AT SELECTED INTERSECTIONS IN URBAN AREAS

Peak hour intersection LOS will be calculated for specified signalized intersections along the defined RRS in urban areas. Signalized LOS is a delay-based qualitative measure of traffic conditions. LOS is expressed in ratings from "A" through "F", with "A" meaning that all traffic clears the intersection in every cycle and "F" meaning that drivers must wait through multiple cycles to clear the intersection.

Signalized intersection LOS is determined based on intersection turning movement counts (also called turning/traffic volumes), intersection geometry, and signal timing data. The CCTA Technical Procedures specify that methods documented in the latest edition of the Highway Capacity Manual be used to measure signalized intersection LOS[3]. The relationship between average delay and LOS is shown in Table 2.

TABLE 2 INTERSECTION LOS DEFINITIONS

Delay (Second/Vehicle)	Level of Service
≤10	A
> 10-20	B
> 20-35	C
> 35-55	D
> 55-80	E
> 80	F

Source: Highway Capacity Manual, 6th Edition, Exhibit 19-8.

The facilities evaluated using signalized intersection LOS or other intersection operational metrics in the previous round of Action Plans are listed in Table 3. The performance of these Action Plan intersections and some additional locations was monitored in 2017. In addition, a subset of these intersections is regularly monitored as part of the Congestion Management Program, which was most recently conducted in 2021. For all previously monitored intersections, intersection operational models have been built, and peak hour turning movement counts were collected to represent 2013, 2017, or 2021 conditions. Table 4 summarizes the available data for intersection analysis.

[3] The Highway Capacity Manual 6th Edition was published by the Transportation Research Board in January 2022.

Since the previous rounds of Action Plans and monitoring, some previously rural highway segments have been developed into signalized arterial corridors and some roadways have been newly designated as RRS, potentially adding numerous additional signalized intersection locations to be analyzed. A small number of previously monitored intersections appear to fall on roadway facilities that are no longer proposed as RRS for this round of Action Plan updates.

For this analysis of 2019 and 2050 baseline conditions, the project team proposes to report on only key locations, such as at the intersections of two RRS facilities, freeway ramp terminals, and intersections of local concern, as depicted in Figure 2 through Figure 6. In total, 355 intersections will be analyzed for 2019 and 2050.

TABLE 3 SIGNALIZED INTERSECTION LEVEL OF SERVICE – PREVIOUS ACTION PLANS

RTPC	Arterial Facility	Previously Used Performance Target and Number of Intersections
WCCTAC (West County)	• Appian Way • Carlson Boulevard • Central Avenue • Cummings Skyway • Interstate 580 (I-580) • Richmond Parkway • San Pablo Avenue • San Pablo Dam Road • State Route 4 (SR-4) • 23rd Street	LOS D on all intersections except for San Pablo Avenue and San Pablo Dam Road where LOS E is acceptable.
TRANSPAC (Central County)	• Alhambra Avenue • Bailey Road • Clayton Road • Contra Costa Boulevard • Geary Road • North Main Street • Pacheco Boulevard • Pleasant Hill Road • Taylor Boulevard • Treat Boulevard • Ygnacio Valley Road/Kirker Pass Road	LOS F on all intersections[a]
TRANSPLAN (East County)	• Auto Center Drive • Bailey Road • Balfour Road • Brentwood Boulevard/Main Street • Buchanan Road • Deer Valley Road (improved portion) • East 10th Street/Harbor Street (in Pittsburg) • East 18th Street • Fairview Avenue • Hillcrest Avenue	LOS D on all intersections except for Bailey Road where LOS E is acceptable.

TABLE 3 SIGNALIZED INTERSECTION LEVEL OF SERVICE – PREVIOUS ACTION PLANS

RTPC	Arterial Facility	Previously Used Performance Target and Number of Intersections
	• James Donlon Boulevard (including future extension) • Laurel Road • Leland Road (both West and East)/Delta Fair Boulevard • Lone Tree Way/A Street • Oak Street/Walnut Boulevard (within Brentwood) • Ninth Street/Tenth Street (in Antioch) • Pittsburg-Antioch Highway • Railroad Avenue/Kirker Pass Road • Sand Creek Road/Dallas Ranch Road • Somersville Road • Wilbur Avenue • Willow Pass Road	
Lamorinda (LPMC and Southwest County)	• Camino Pablo/San Pablo Dam Road • Pleasant Hill Road	Side Street Delay, no LOS rating.
Tri-Valley (TVTC and Southwest County)	• Alcosta Boulevard • Bernal Avenue • Bollinger Canyon Road • Camino Tassajara • Danville Boulevard • Dougherty Road • Dublin Boulevard • Fallon Road • First Street/Railroad Avenue • Hopyard Road • Iron Horse Trail • Jack London Boulevard • San Ramon Road • San Ramon Valley Boulevard • Santa Rita Road • Stanley Boulevard • Stoneridge Drive • Sunol Boulevard • Sycamore Valley Road • Tassajara Road • Vasco Road	LOS E on all intersections except no standard for intersections in downtown areas and those exempt by General Plans.

Source: RTPC Action Plans

a. Other TRANSPAC intersection performance targets are defined by V/C ratios or the number of cycles.

TABLE 4 SIGNALIZED INTERSECTIONS AND AVAILABLE INTERSECTION DATA

Region	Previous Action Plans	2017 Monitoring	2021 CMP	Total Signalized Intersections on RRS	Total Proposed for Existing and Baseline Scenarios
West	55	30	29	174	84
Central	41	41	9	233	83
East	13	12	1	47	12
Lamorinda	151	29		301	93
Tri-Valley	39	51	22	163	83
Total	**299**	**163**	**61**	**918**	**355**

Figure 2: Arterial Intersections and Roadway RRS (West County)

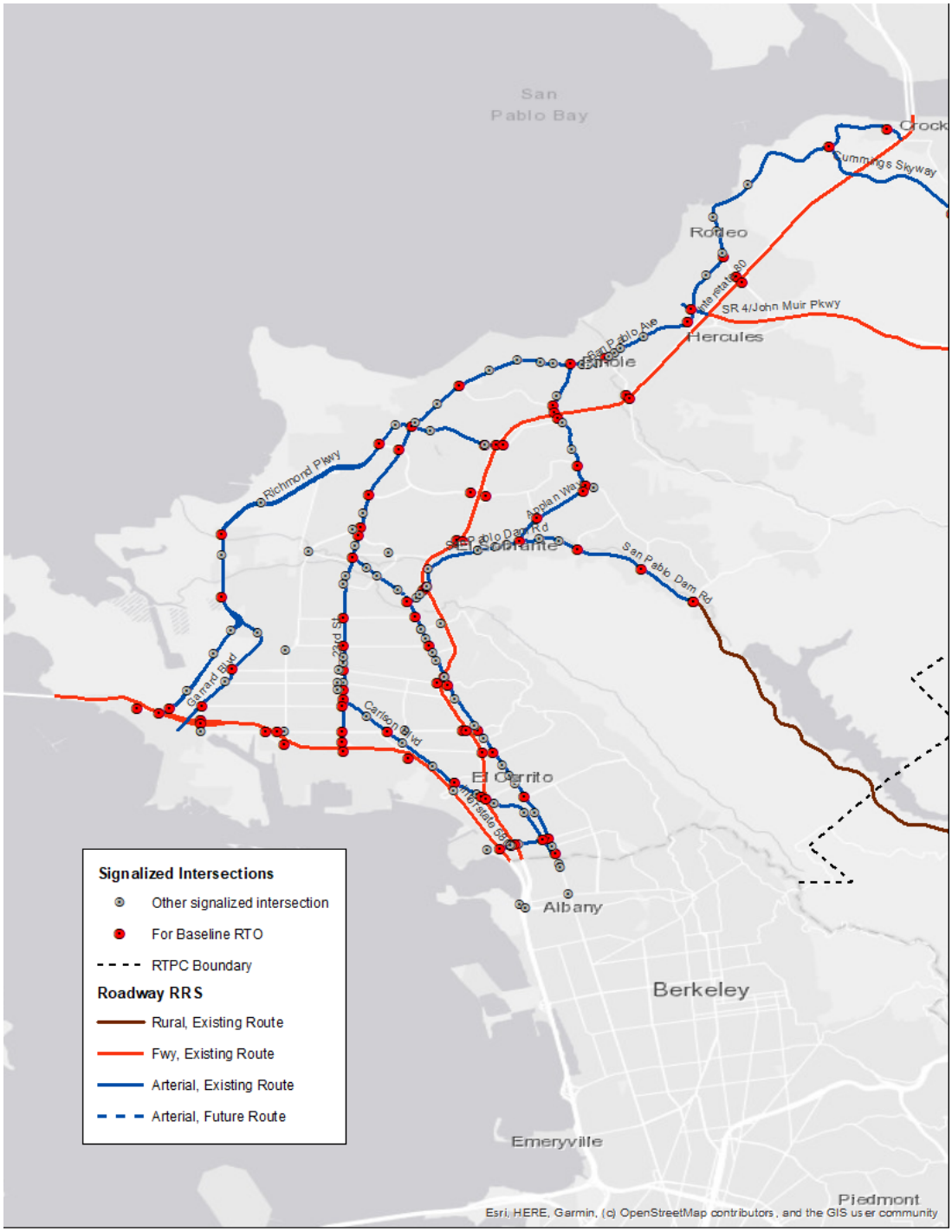


Figure 3: Arterial Intersections and Roadway RRS (Central County)

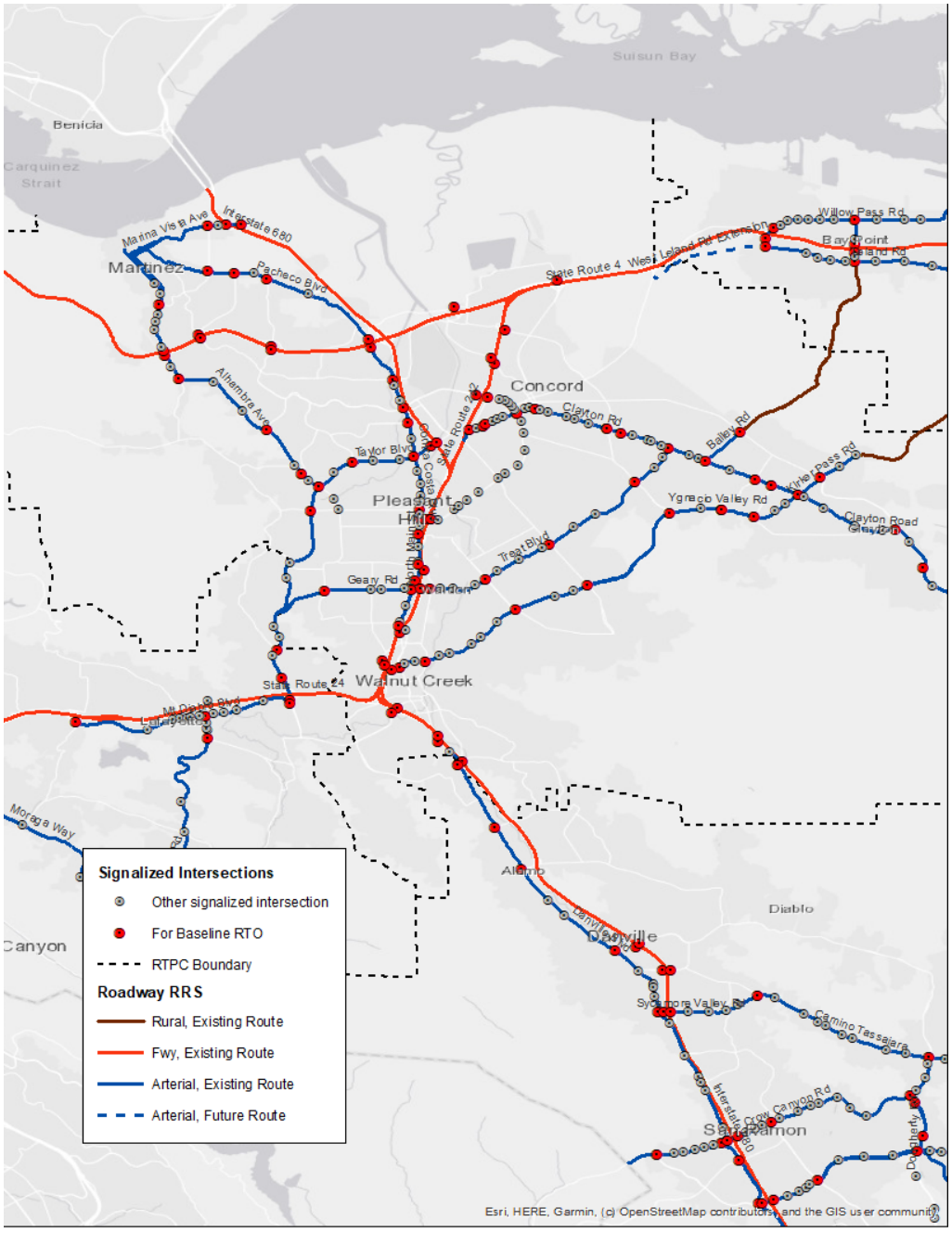


Figure 4: Arterial Intersections and Roadway RRS (East County)

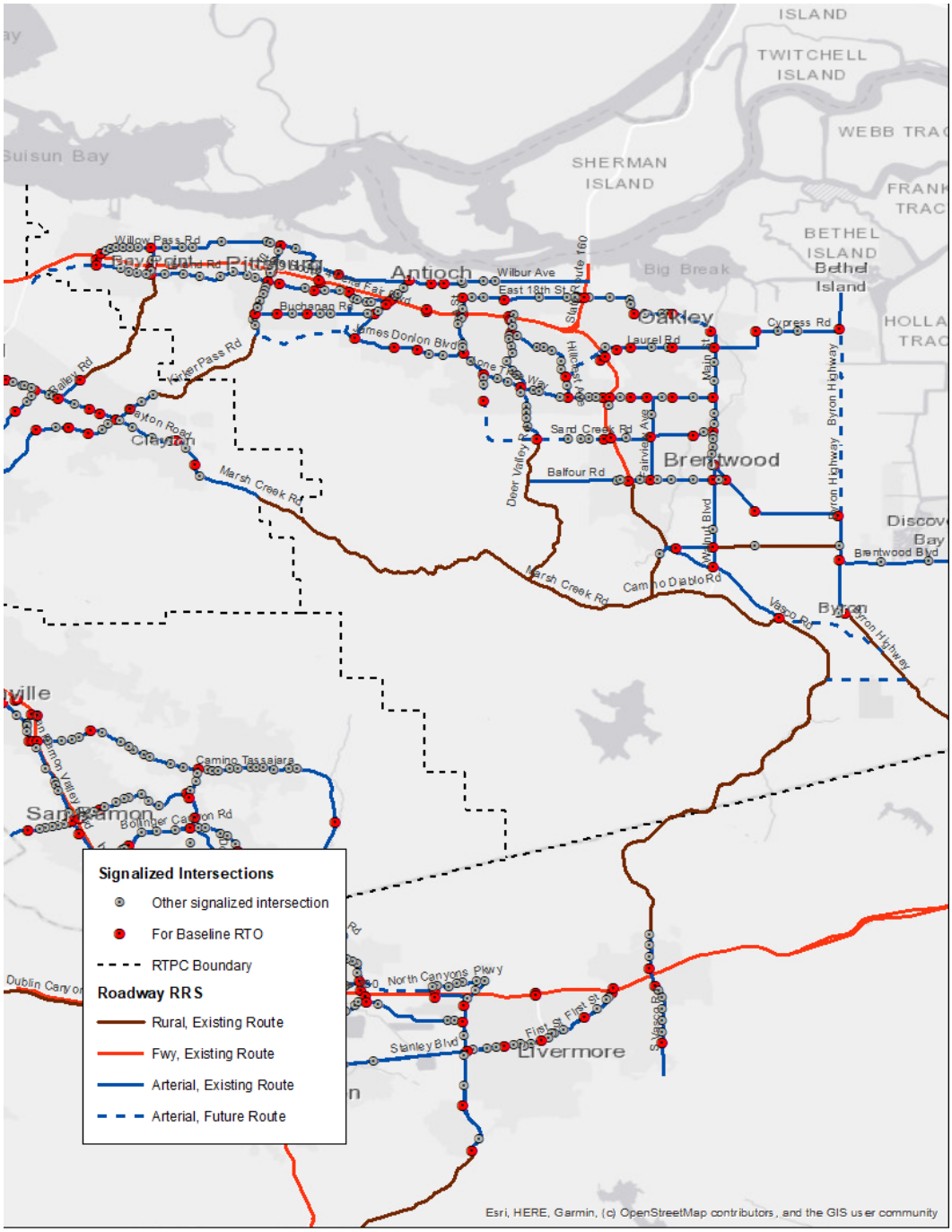


Figure 5: Arterial Intersections and Roadway RRS (Southwest County – Lamorinda)

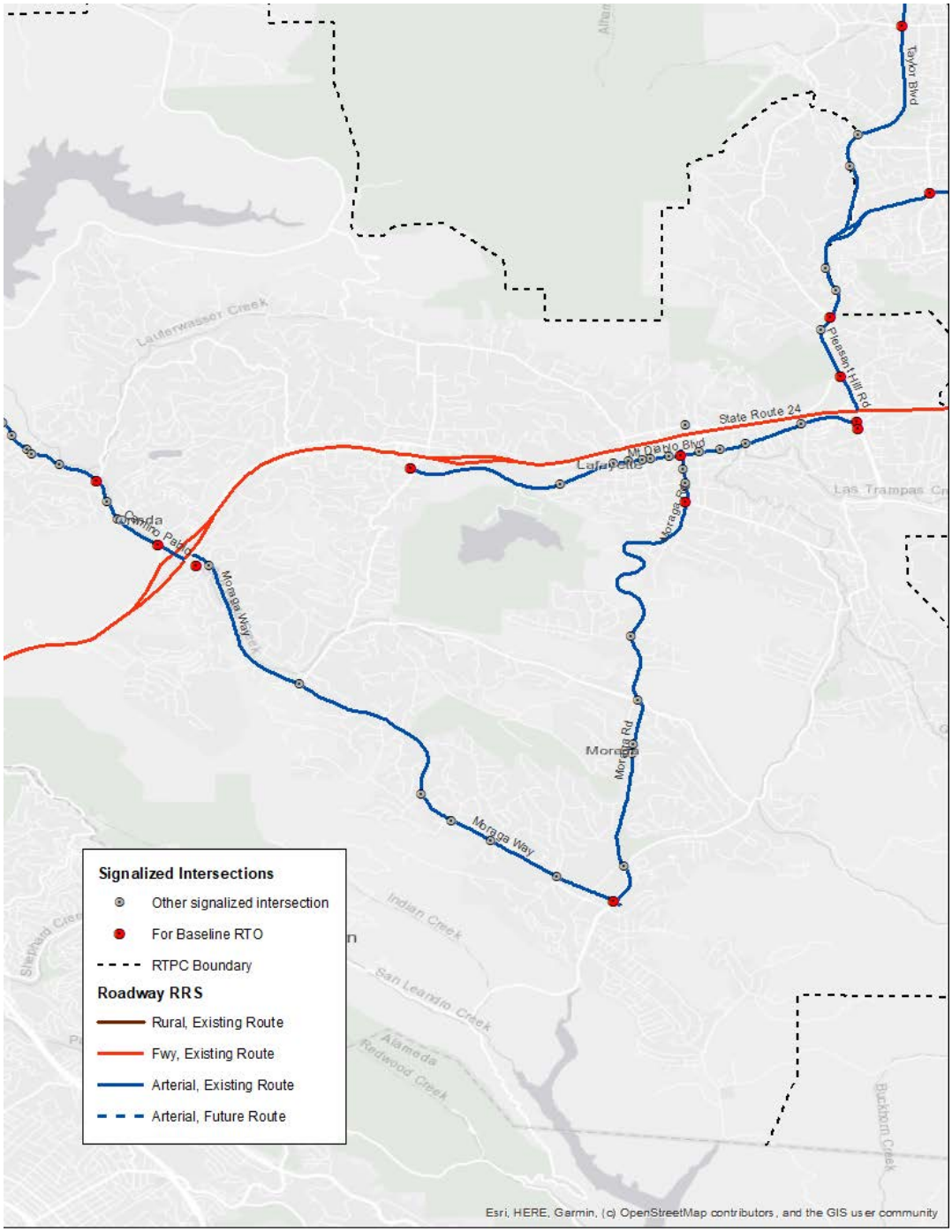
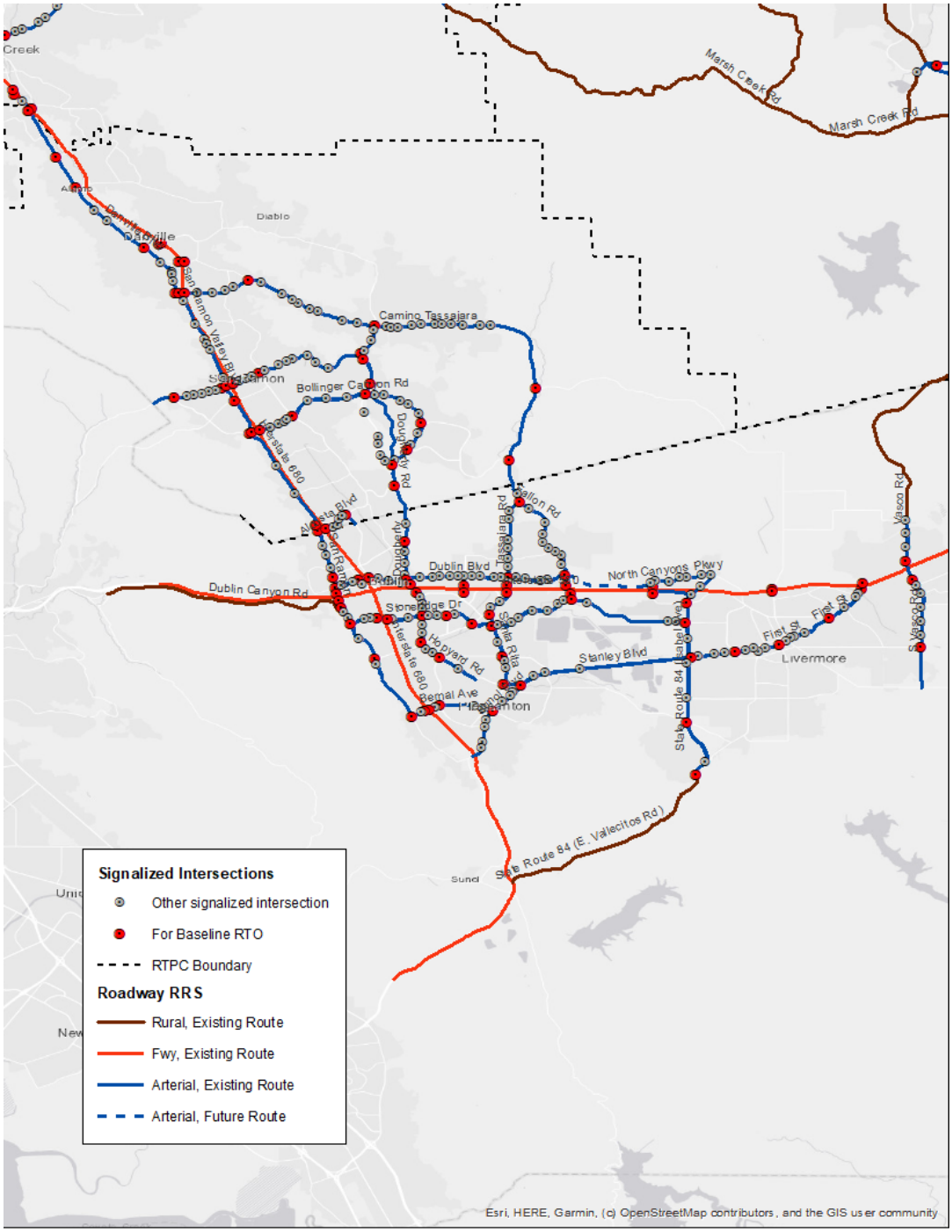


Figure 6: Arterial Intersections and Roadway RRS (Southwest County – Tri-Valley)



The methodology for calculating signalized intersection LOS will follow standard practice.

Observed counts will largely be obtained from those collected for the 2017 MTSO monitoring and the 2021 CMP monitoring. For any additional intersections added to the list for this round of Action Plans, historical turning volume estimates will be obtained from the Streetlight data subscription maintained by CCTA.

Peak hour traffic volumes for the base year and future year will be estimated using the Furness process specified in the CCTA Technical Procedures and summarized below. This process develops intersection turning movement forecasts using observed counts and model outputs, as follows:

- Calculate the Model Correction Volume for each network link (i.e., the difference between the projected peak hour volume for the validation (base year) run and actual peak hour traffic volumes).
- Determine the forecast peak hour approach and departure volumes for each study intersection by adding the Model Correction Volume to the model output.
- Develop intersection turning movement volumes that are consistent with the approach and departure volumes by balancing projected intersection turning movements with actual turning movement volumes using an iterative process.
- Check reasonableness by comparing adjusted intersection turning movement volumes with both the existing count data and the raw model output.
- Review volume adjustments that do not appear reasonable and, if appropriate, revise adjustments.

Prior to modeling the level of service that will result from the calculated volumes, DKS will doublecheck intersection geometry using Google Earth to ensure that the modeling reflects current intersection configurations. DKS will reach out to the local jurisdictions to request timing plans for any newly added intersection locations. In the absence of local timing plans, optimized timing settings will be applied.

Once the estimated 2019 Base Year and 2050 Baseline turning volumes, intersection geometries, and signal timings are in place, signalized intersection LOS will be assessed by implementing the latest HCM methods in the Trafficware Synchro ("Synchro") software package. The latest HCM 7th Edition was released in February 2022 and is not yet implemented in Synchro, so Synchro reports signalized intersection delay and LOS based on the HCM 6th Edition (there is no significant difference for the analysis of signalized intersections).

The outcome of this modeling will yield a list of all intersections and their baseline 2019 and projected 2050 LOS rating. These ratings will be compared to the existing Action Plan MTSOs, if applicable, and DKS will assist the RTPCs in revising the MTSOs to create new RTOs as appropriate.

There may be a data gap for turning movement counts for newly identified intersections in Alameda County. Since the CCTA Streetlight subscription will not provide data for these locations, local jurisdictions will be contacted to provide any available recent counts. In some cases, it may be necessary

to use turning volumes directly from the CCTA Countywide Travel Demand Model outputs to estimate existing conditions operational performance.

PEAK HOUR SEGMENT LOS ON SELECTED TWO-LANE HIGHWAYS OUTSIDE OF URBAN AREAS

LOS will be analyzed for specific segments on rural roadways. Roadway segment LOS is a measure of traffic efficiency and smoothness of flow along roadway segments that are not constrained by a nearby traffic signal. This has previously been calculated for the East County in accordance with the methods specified in the 2010 HCM using average speed for Class I highways, which are two-lane facilities in largely rural areas that motorists expect to traverse at relatively high speed.

DKS will run LOS analysis for the roadway segments as listed in Table 5 and shown above in Figures 2 through 6.

TABLE 5 RURAL ROADWAY CORRIDORS

Subarea	Facility	From	To
West County	San Pablo Dam Rd	Castro Ranch Rd	RTPC Boundary
		RTPC Boundary	Wildcat Canyon
Central County	Bailey Rd	Concord Blvd	RTPC Boundary
	Kirker Pass Rd	RTPC Boundary	James Donlon Blvd
	Kirker Pass Rd	Clearbrook Dr	RTPC Boundary
East County	Byron Highway	State Route 4	Alameda County
	Camino Diablo Rd	Marsh Creek Rd	Vasco Rd
	Marsh Creek Rd	Deer Valley Rd	Vineyard Pkwy
	Vasco Rd	Walnut Blvd	Alameda County
	Vasco Rd	Alameda County	Dalton Avenue
	Bailey Rd	Leland Ave	RTPC Boundary
	State Route 4 Bypass	Balfour Rd	Marsh Creek Rd
	Deer Valley Rd	Sand Creek Rd	Marsh Creek Rd
	Marsh Creek Rd	RTPC Boundary	Deer Valley Rd
Lamorinda	San Pablo Dam Rd	RTPC Boundary	Wildcat Canyon
Tri-Valley	State Route 84 (E. Vallecitos Rd)	I-680	Ruby Hill Dr
	Dublin Canyon Rd	Palo Verde Rd	Foothill Rd

The latest Edition of HCM (HCM 7th Edition) specifies a new version for calculating segment LOS, which requires substantially more data than the previous HCM 6th edition/2010 approach. The new approach requires information on passing constraint condition (none, passing lane, or passing constrained), flow rate (vehicles per hour), percent heavy vehicles, vertical slope (five classifications based on segment length and slope), and horizontal curvature (five classifications based on curve radius and superelevation). This data is not available for the segments to be studied, the Action Plan updates will retain this HCM 6th Edition approach, which simply relates LOS to average speed, as shown in Table 6. For this analysis, DKS will use the model to predict average speed for all segments to be analyzed.

TABLE 6 LOS FOR TWO-LANE RURAL ROADWAYS

Level of Service	Average Speed (MPH)
A	>55
B	>50-55
C	>45-50
D	>40-45
E	≤40

Source: Highway Capacity Manual, 2010, Exhibit 15-3.

Transit RTOs

MODE SHARE OF TRANSIT TRIPS

Mode share will be estimated for the Action Plan updates, both for transit (which is the focus of this section) and for the bike/pedestrian and climate change topics (as explained in later sections of this memo).

For the Action Plan analysis, mode share in each subregion will be estimated using data collected by the American Community Survey (ACS), as published by the Census Bureau, and model results.

For current conditions, the PlaceWorks team will use ACS data, which gives data for work commute trips for workers 16 years of age and over. The current data release includes one-year estimates for 2019, which will be used for the Action Plan analysis. Mode share for all trips and all modes will be modeled using outputs from the CCTA Countywide Travel Demand Model. Specifically, the person trip tables from the mode choice step of the model will be aggregated to calculate mode share by geographic subarea. The trip tables are in "production-attraction" format, meaning that trips are tabulated based on the zone of production (location of residence for all home-based trip purposes) and zone of attraction (work or other location) rather than representing directional trips.

The CCTA Countywide Travel Demand Model produces person trip matrices by mode by TAZ for each trip purpose and income quartile. DKS will develop scripts to summarize this data by RTPC and mode.

Most mode share RTOs will be summarized by the geographic area of production, but some metrics based on the attraction zone may be of interest as well. Thus, mode share can be reported based on the zone of residence ("X% of work trips made by East County residents are by auto") or the attraction zone ("Y% of work trips for jobs located in Central County are by transit").

Mode shares will be calculated for the 2019 base year and 2050 Baseline scenarios. The mode alternatives specified in CCTA Countywide Travel Demand Model include:

- Drive Alone
- Shared Ride 2 Occupants
- Shared Ride 3+ occupants
- Transit with Walk Access
- Transit with Drive Access
- Bicycle
- Walk

The summary tables and charts for these modes will report mode share for the subregion of production (all trips), for commute mode share by subregion of production (home-based work trips only), and for commute mode share by subregion of attraction or job location (home-based work trips only).

RATIO OF TRAVEL TIME FOR TRANSIT AS COMPARED TO AUTOMOBILE TRAVEL TIME FOR SELECT TRIPS

This RTO is intended to measure the difference in travel time for a motorist as compared to a transit user. The origin destination pairs shown in Table 7 are proposed for this metric. Travel times will be developed for each mode based on both the peak commute and reverse commute directions of travel for the morning and afternoon peak periods.

TABLE 7 CORRIDORS FOR TRANSIT-AUTO TRAVEL TIME COMPARISON

Subarea	Origin-Destination Pairs
West County	North Richmond BART and Contra Costa Center (Pleasant Hill BART station) Hercules Transit Center and Salesforce Transit Center in San Francisco
Central County	Walnut Creek BART station and Montgomery Street BART station Orinda BART station and 12th Street (Oakland) BART station
East County	Antioch BART station and 12th Street (Oakland) BART station
Lamorinda	Orinda BART station and Montgomery Street (San Francisco) BART station
Tri-Valley	Vasco Station (Altamont Corridor Express) and San Jose Diridon station Dublin-Pleasanton BART station and Montgomery Street (San Francisco) BART station

Transit travel times along key routes will be based on published transit schedules. Bus schedules are assumed to account for expected roadway congestion that would impact bus routes. Driving travel times will be derived from INRIX roadway analytics for weekdays (Tuesday – Thursday) for April 2019.

Baseline 2050 conditions will be modeled using the CCTA Countywide Travel Demand Model. The model outputs used for this purpose will be the peak period transportation "skim" matrices, representing transit wait time, transit in-vehicle travel time, and drive-alone automobile travel time between all TAZs.

Bike/Pedestrian RTOs

Bicycle and Pedestrian RTOs will be based on the countywide Low Stress Bike Network (LSBN) adopted in the 2018 CCTA Countywide Bike and Pedestrian Plan. This network consists of existing and planned Class 1 bike paths and Class 4 cycle tracks throughout Contra Costa County.

MODE SHARE OF BICYCLING AND WALKING

The methodology for this RTO will be identical to the methodology for the "Mode Share of Transit Trips" RTO. See the above section for more details.

PROPORTION OF THE COUNTYWIDE LOW STRESS BIKE NETWORK THAT HAS BEEN COMPLETED

The Low Stress Bike Network (LSBN) is a component of the CCTA Countywide Bicycle and Pedestrian Plan (CBPP) adopted in 2018. The CBPP introduced a new way of evaluating a facility's "Level of Traffic Stress", in which roadways are evaluated on several factors, including, but not limited to the speed and number of vehicles and presence and width of bicycle facilities. Facilities are given a rating from one (least stressful) to four (most stressful) to evaluate the stress a bike rider will experience. The goal of the 2018 CBPP is to ensure the countywide bicycle network is complete and rated either Level of Traffic Stress 1 (most children can feel safe riding on these facilities) or Level of Traffic Stress 2 (The "interested but concerned" adult population will feel safe riding on these facilities). Ultimately, construction of the entire LSBN would result in an increase in bicycle mode share and a reduction in KSI collisions.

For this RTO, the project team will update the LSBN to reflect any portions that have been constructed since the 2018 CBPP and map adoption. Once the LSBN is updated, the number of total miles in the network upon buildout will be calculated and compared with the total miles already completed.

NUMBER OF LOCATIONS WHERE THE LOW STRESS BIKE NETWORK MAKES AN UNPROTECTED CROSSING OVER A HEAVILY TRAVELED VEHICLE ROUTE

PlaceWorks will create an ArcGIS point data set to identify each location where the LSBN crosses a vehicle roadway. Then, we will rank the crossing by how protected it is using Google Maps. Ranking will occur as follows:

- Fully protected by grade separation or a signalized intersection with cyclist protections.
- Semi-protected at an at-grade crossing with a beacon system, or with a signal but without cyclist protections.
- Unprotected at an at-grade crossing which includes none of the improvements listed above.

This exercise will be conducted for low-stress bikeway crossings of all arterials and major collectors in each subarea. The types of roadways included in this exercise are interstates, freeways, expressways, other principal arterials, minor arterials, and major collectors. The only roadways not included in this exercise are minor collectors and local routes.

Safety RTOs

NUMBER OF KILLED OR SERIOUSLY INJURED (KSI) COLLISIONS

DKS will obtain KSI collisions data for Contra Costa County from the Transportation Injury Mapping System (TIMS) and will then geocode and clean the data to form the basis for the RTO. The number of KSI collisions will be tabulated and mapped by subregion.

NUMBER OF BIKE- OR PEDESTRIAN-INVOLVED COLLISIONS

This RTO will be developed using the same TIMS data set described above. The number of bicycle- or pedestrian-involved KSI collisions will be tabulated and mapped by subregion.

NUMBER OF BIKE- OR PEDESTRIAN-INVOLVED COLLISIONS WITHIN 500 FEET OF A SCHOOL

This RTO will be developed using the same TIMS data set described above. The project team will use GIS school site polygon data to create a 500-foot buffer around school sites and determine which of the geocoded collisions occurred within these school site buffers. The resulting data will be tabulated and mapped by subregion. The number of crash records is expected to be low, so the records identified through GIS analysis will be individually reviewed to confirm that the crashes involve student bicyclists or pedestrians.

Equity RTOs

PROPORTION OF KSI AND BIKE- OR PEDESTRIAN-INVOLVED COLLISIONS THAT OCCUR IN EQUITY PRIORITY COMMUNITIES (EPCs)

This RTO will be developed using the same TIMS data set described above for the Safety RTOs. Using GIS, this analysis will map the boundaries of identified EPCs. For each subregion and the County as a whole, the proportion of collisions occurring in EPCs will be reported and mapped. This RTO would not be tracked in Action Plans that do not contain EPCs, including Tri-Valley and Lamorinda.

SHARE OF COUNTY JOBS THAT CAN BE REACHED BY EPC RESIDENTS WITH A 30-MINUTE DRIVE, AS COMPARED TO COUNTY RESIDENTS AS A WHOLE

DKS will compare the model's map of TAZs to identified EPCs in Contra Costa and identify each TAZ as either "EPC" on "non-EPC." DKS will then calculate which TAZs can be reached with a 30-minute drive

from each TAZ in the study area and will sum the number of jobs within those TAZs. The average number of jobs per TAZ that are reachable within 30 minutes will be calculated for EPC and non-EPC TAZs, and the results will be compared to each other. Since this analysis has not been completed, it is unknown if there is any correlation in the data. If there is no correlation, the RTO will be recommended to move forward. This RTO would not be tracked in Action Plans that do not contain EPCs, including Tri-Valley and Lamorinda.

SHARE OF COUNTY JOBS THAT CAN BE REACHED BY EPC RESIDENTS WITH A 45-MINUTE TRANSIT TRIP, AS COMPARED TO COUNTY RESIDENTS AS A WHOLE

DKS will use the TAZs identified as "EPC" and "non-EPC" in the previous RTO to calculate which TAZs can be reached within a 45-minute transit trip from each TAZ in the study area. DKS will then sum the number of jobs within those TAZs. The average number of jobs per TAZ that are reachable by a 45-minute transit trip will be calculated for EPC and non-EPC TAZs, and the results will be compared to each other. Since this analysis has not been completed, it is unknown if there is any correlation in the data. If there is no correlation, the RTO will be recommended to move forward. This RTO would not be tracked in Action Plans that do not contain EPCs, including Tri-Valley and Lamorinda.

NUMBER OF PEOPLE IN EPCs WHO ARE NOT WITHIN A QUARTER-MILE DISTANCE OF A TRANSIT STOP SERVED BY HIGH QUALITY TRANSIT

GIS data will be used to map the EPC boundaries and all high-quality transit stops in the CCTA area. A buffer of a quarter mile will be created around the high-quality transit stops to determine if there are any portions of EPCs that are not within this buffer. Census data can then be used to determine how many people live in an EPC that is not within a quarter mile of a high-quality transit stop. This RTO would not be tracked in Action Plans that do not contain EPCs, including Tri-Valley and Lamorinda.

Climate Change RTOs

SINGLE OCCUPANT VEHICLE MODE SHAARE

The methodology for this RTO will be identical to the methodology for the "Mode Share of Transit Trips" RTO, except that the metric associated with this RTO will track a decrease in overall SOV Mode share, not an increase as desired for transit and bicycle/pedestrian mode share. See the above section for more details.

VEHICLE MILES TRAVELLED (VMT) PER CAPITA

VMT per capita will be modeled for the 2019 Base Year and Baseline 2050 condition using outputs from the CCTA Countywide Travel Demand Model. Scripts tabulating VMT per capita at the residential location and VMT per employee at the work site for each TAZ have already been developed as part of CCTA's Technical Procedures update. Final processing will be done in a spreadsheet, and results will be tabulated by subregion.

TRANSPORTATION GREENHOUSE GAS (GHG) EMISSIONS PER CAPITA

This RTO will be based on the VMT data developed above. DKS will divide the VMT by speed bin and time period to create inputs for the most recent Emission Factor (EMFAC) mobile source emissions model maintained by the California Air Resources Board. Subregional scenarios will be created for the 2019 Base Year and 2050 Baseline conditions. Total tons of GHG emissions will be divided by the subregional population assumed in the CCTA Countywide Travel Demand Model to arrive at average daily GHG emissions per capita (in tons).

ZERO-EMISSION VEHICLE OWNERSHIP IN THE SUBREGION

The California Energy Commission tracks zero-emission vehicle (ZEV) ownership in partnership with the Department of Motor Vehicles. Data are updated annually in April and are published on the Zero Emission Vehicle and Infrastructure Statistics web page.

Vehicle population is also updated annually in April, to reflect the number of vehicles on the road during the previous calendar year. The vehicle population number includes vehicles whose registration is either current or less than 35 days expired.

PlaceWorks will assemble this data and disaggregate it by subregion. Total registrations by vehicle type are available by county and zip code, so a rough approximation of ownership by subregion is possible.

Technology RTOs

LEVEL OF ETHERNET-BASED SIGNAL INTERCONNECTION

Interconnected signal systems are those which communicate with other signals or systems. Signal interconnect helps in establishing a connection between the traffic signals and the central system, which enables remote access to the signals from the local agency locations or the Traffic Management or Operations Center. This will allow signal timings to be adjusted remotely, during regular day-to-day operations, during major incidents, and during special events. Interconnection enables cross-jurisdiction communications, coordination, and data exchange to respond to varying traffic conditions.

Information will be collected from cities regarding signal systems to identify percentage of signals that are currently interconnected through ethernet-based communications. The assembled data will determine the level of signal interconnection as compared to the total number of signals with the jurisdiction and countywide as a whole.

RTOs Considered but Not Recommended

WAIT TIME FOR PARATRANSIT

Several RTPC TAC members expressed interest in an RTO relating to wait time for paratransit services. The project team met with CCTA staff and consultant Nelson Nygaard to discuss their work with paratransit services and other accessible transit in the county. This group prepared CCTA's *Accessible Transportation Strategic Plan* in 2021, which provides a detailed catalog of existing accessible transportation facilities in the county, needed improvements, and goals and strategies to address gaps in service. Upon recommendation from this group, the Action Plans and Countywide Transportation Plan will include language and actions that refer to the *Accessible Transportation Strategic Plan* but will not include an RTO related to such service.

SPEED REDUCTION

Several RTPC TAC members stated that reducing typical travel speeds on surface streets around Contra Costa, especially in areas where prevailing speeds exceed designated speed limits, may improve overall safety. Reducing vehicular speeds is critical to improve safety outcomes and make streets more comfortable for active users such as bicyclists and pedestrians.

CCTA's Vision Zero effort includes speed reduction as a defined goal. The CCTA Vision Zero Implementation Guide for Local Jurisdictions points to encouraging safe speeds as a key priority, and notes that "[managing] speeds is critical to achieving zero fatalities because the kinetic transfer of energy from vehicles traveling at high speeds is much greater than at lower speeds, and results in more fatalities and more injuries, increasing in severity as speeds increase." It additionally suggests that local jurisdictions "[identify] high-speed corridors based on speed surveys and Safety Priority Locations Maps. The concentration of locations on high-speed arterials reveals a relationship between speed and traffic collisions resulting in fatal or severe injuries."

Mobile device data can be used to measure existing prevailing speeds on specific roadways, so an RTO could be defined that monitors prevailing speeds along specific corridors and sets a goal to reduce those prevailing speeds over time. However, this mobile device data can be difficult to gather, especially within a large geographic area, so use of this data is not practical for this RTO. However, the CCTA countywide travel model also produces estimates of vehicular speed along each road segment, and that data could hypothetically be used to forecast changes in travel speeds under various future scenarios. Thus, gathering data for this RTO is possible.

Regardless, a potential RTO relating to speed reduction is not as relevant to land use as the RTOs described above. Therefore, the project team does not propose to move forward with this RTO.

USE OF SHARED (POOLED) TRANSPORTATION NETWORK COMPANIES (TNCs)

Data assembled before the pandemic showed that the emerging presence of Transportation Network Companies (TNCs) such as Lyft and Uber were leading to increases in VMT and congestion, but that

shared TNC rides (also referred to as pooled rides), in which several unrelated riders share a vehicle for a trip, could result in reductions in VMT and congestion. For this reason, many experts suggested that shared TNC rides should be considered, and several RTPC TAC members thought it would be useful to track the proportion of TNC rides that are shared.

However, the pandemic has led to the cancellation of shared services by both Lyft and Uber in the greater Bay Area market, so it is impossible to track such rides today. Moreover, data from Lyft and Uber is not readily available and is difficult to obtain. For these reasons, no RTO regarding shared TNC rides is recommended at this time, but one could be added if shared services are reinstated, and data can be collected from TNCs.

NUMBER OF SHARED SCOOTERS, SHARED BICYCLES, AND PUBLIC AUTONOMOUS VEHICLES THAT ARE DEPLOYED

Several RTPC TAC members indicated that they'd like to track micromobility programs through the Action Plans. Potential metrics included the number of shared devices deployed, miles of rides completed, and number of operators, among others. However, there is only one subarea with an active micromobility program and only one other subarea currently pursuing deployment of their own. To determine feasibility of this RTO, the project team met with these jurisdictions and government relations staff at micromobility operator Lime. Lime and local jurisdiction staff expressed support for increasing the number of micromobility programs. However, it was agreed that the most efficient use of time and funding is to first support CCTA in taking a regional leadership role similar in the way that the Transportation Authority of Marin and the Sonoma County Transportation Authority have done. This role could include working with operators and jurisdictions to create a draft ordinance and/or Request for Proposals or a set of model standards for the local jurisdictions to adopt locally. Therefore, the project team proposes that micromobility programs be addressed in the Action Plans as actions and not as an RTO. The action will consider a micromobility RTO in the next iteration of Action Plans.

PAVEMENT CONDITION ON THE COUNTYWIDE LOW STRESS BIKE NETWORK

Several RTPC TAC members indicated that condition of pavement along bicycle and pedestrian routes could potentially encourage or deter their use. The project team explored how and where pavement condition on these facilities is measured to determine if this RTO would be feasible. The project team found that there are no programs that track pavement condition on the entirety of the countywide Low Stress Bike Network. Pavement condition is currently tracked in a few areas of the county:

- Some portions of the Low Stress Bike Network are located on arterial roadways which, in some cases, do have a tracking system for pavement condition. However, pavement condition data for these arterial roadways is limited to the portion utilized by vehicles and does not include shoulder bicycle or pedestrian facilities.
- The East Bay Regional Parks District (EBRPD) measures Pavement Condition Index (PCI) on their off-street bicycle facilities. This data is used by the EBRPD to determine where pavement needs to be enhanced or replaced on their facilities. However, the project team discussed this potential RTO with EBRPD staff and heard that the PCI is not considered a truly accurate

measurement of overall pavement condition. EBRPD staff noted that the tool is tailored for vehicle roadways and does not account for varying pavement conditions resulting from tree uprooting, settling, or damage.

Given that no comprehensive data regarding pavement conditions on bikeways currently exists, no RTO regarding this topic is recommended at this time.

AVERAGE COMMUTE TIME FOR LOW-INCOME RESIDENTS VERSUS HIGHER-INCOME RESIDENTS

Various RTPC TAC members were interested to know if there is a correlation between the time that commuters spend traveling to and from work and their income. Specifically, RTPC TAC members were curious to know if low-income commuters spend a disproportionately longer amount of time traveling to work than higher-income commuters. They wanted to determine:

- Is there a correlation between household income and **total** commute time?
- Is there a correlation between household income and **transit** commute time?
- Is there a correlation between household income and **driving (solo)** commute time?

Commute time and income can be estimated through data collected by the ACS, as published by the Census Bureau. The ACS estimates only cover work commute trips for workers 16 years of age and over. The current data release includes one-year estimates for 2019. The project team pulled this ACS data and calculated the average travel time in each census tract by dividing the aggregate travel time by the number of workers over 16 that commute to work. The finding from this exercise was that the correlation value was 0.3, indicating a weak correlation between all three commute types and household income. Due to this lack of correlation, the project team moved forward to check related questions, including:

- Is there any correlation between income and the percentage of commuters at 19 minutes or less (total of three commute time groups)?
- Is there any correlation between income and the percentage of commuters at 60 minutes or more?
- Is there any higher commute time for tracts inside of EPCs vs those outside EPCs?

A detailed examination revealed that none of these questions resulted in a strong correlation. Therefore, the project team could not make a conclusion that household income is directly related to the amount of time that commuters spend traveling to and from work. For these reasons, the project team does not propose moving forward with this RTO.

MILES OF ROUTES OF REGIONAL SIGNIFICANCE (RRS) ESTIMATED TO BE VULNERABLE TO SEA LEVEL RISE

RTPC TAC members and the project team indicated interest in how rising sea levels would potentially impact RRS. PlaceWorks identified all key facilities subject to inundation through sea level rise, which were limited to bay shore areas in West, Central, and East County. These facilities subject to inundation were determined using RRS maps, which the project team then overlaid with sea level rise projections. The sea level rise projections are also used in Contra Costa County's ongoing Climate Action Plan and 2019 Vulnerability Assessment, congruent with best practices. Through this exercise, the project team determined that the majority of RRS or other infrastructure are in areas where private property owners and entities, such as Union Pacific Railroad, will likely work with local agencies to protect their infrastructure, thereby reducing the need for local intervention. In cases where local intervention or action would need to occur, sea level rise adaptation planning will occur incrementally over time and is likely already being considered, such as through the current update to the Contra Costa County General Plan and Climate Action Plan and regional work through agencies such as the Association of Bay Area Governments and State working groups. Furthermore, it is difficult to know the true extent of infrastructure impacted by sea level rise due to elevation of existing roadways (that may not be at sea level, such as the Carquinez Bridge) and unknowns related to vital infrastructure along these routes that may not be identified, such as bus storage lots or utility boxes. For these reasons, the project team does not propose moving forward with this RTO.

PERCENTAGE OF VULNERABLE RRS FOR WHICH REMEDIATION PLANS OR A MITIGATION APPROACH HAVE BEEN CREATED

Much like the above RTO, the RTPCs and project staff wanted to know if there were existing or proposed remediation plans or mitigation approaches to address the RRS that are vulnerable to sea level rise inundation. Since the project team does not propose moving forward with the above RTO, we recommend not moving forward with this subsequent RTO.

Item 6A:

Attachment 3 – RTO Analysis Memo

MEMORANDUM

DATE June 29, 2022

TO John Hoang and Matt Kelly, CCTA

FROM David Early and Torina Wilson, PlaceWorks
Erin Vaca, DKS Associates

SUBJECT Regional Transportation Objectives (RTOs) Analysis Memorandum

The Action Plan planning process will incorporate performance metrics known as Regional Transportation Objectives (RTOs) that address transportation modes such as driving, transit, and bicycle and pedestrian travel, along with nonmodal topics of safety, equity, climate change, and technology. This memorandum presents the initial results of modeling and data collection for each of these RTOs for the Lamorinda subregion, and it presents performance targets for each RTO based on the modeling and data collection results.

This memorandum was compiled and authored by PlaceWorks. DKS conducted the modeling and wrote most of the text regarding the roadway, mode share, collision, and climate change RTOs. PlaceWorks prepared the content for the remaining RTOs.

The RTOs and proposed performance targets are summarized in Table 1.

Information about the methods used to calculate this data is contained in the RTO Methodology Memorandum dated June 27, 2022.

Table 1. Regional Transportation Objectives for Lamorinda Subregion

Facility Type or Planning Focus	Metric	Definition	Existing Target	Proposed 2027 Target	Proposed 2050 Target
Roadways	Freeway Delay Index	Travel time ratio for congestion vs. free-flow conditions	DI≤2.0	2.0	2.0
	Freeway Buffer Index	Proportion of added travel time between the 95th percentile and the average	None	0.50	0.50
	Intersection Level of Service (LOS)	Average control delay during peak hours	Side street delay, no intersection LOS	LOS D (35 to 55 seconds per vehicle)	LOS D (35 to 55 seconds per vehicle)
	Rural Roadway Segment LOS	Average speed during peak hours	None	LOS D (40 to 45 mph)	LOS D (40 to 45 mph)
Transit	Transit Mode Share	Proportion of daily person trips using transit	None	20% commute trips	40% of commute trips
	Travel Time Ratio	Ratio of peak commute period travel time on transit to drive alone auto travel time for key corridors	None	Transit time < = auto travel time	Transit time < = auto travel time
Active Transportation	Bicycle Mode Share	Proportion of daily person trips made by bicycle	None	5% all trips 2.5% commute trips	10% all trips 5% for commute trips,
	Low Stress Bike Network (LSBN)	Proportion of the LSBN that is complete	None	29%	100%
	LSBN Crossings	Number of locations the LSBN crosses a roadway and is considered to be unprotected	None	None	None
Safety	KSI Collisions	Number of crashes resulting in fatality or injury	None	Zero fatality and severe injury crashes	
	Bike-Ped Collisions	Number of KSI crashes involving a bicyclist of pedestrian	None		
	Bike-Ped Collisions near Schools	Number of bicycle or pedestrian involved KSI collisions occurring within 500 feet of schools	None		
Climate Change	SOV Mode Share	Proportion of daily person trips made by single occupant vehicle	None	50%	40%
	GHG Emissions per Capita	Tons of CO_2 emissions	None	TBD	TBD
	EV Ownership	Number of battery electric vehicles owned by subregion residents	None	50% market penetration	100% market penetration
	VMT per capita	Home-based vehicle miles traveled per capita	None	TBD	TBD
Technology	Level of Signal Interconnection	Number of connected signals	None	18	None

Mode Share RTOs

Mode share is considered in RTOs regarding the transit, bike/pedestrian, and climate change topics. Since mode share is relevant to three separate topics, information on it is presented in this section. Specific RTOs for each mode are contained in the sections below.

REPORTED CURRENT COMMUTE MODE SHARE

The American Community Survey (ACS) estimates published by the Census Bureau reports the number of work trips by mode. An estimated mode share based on this data is shown in Table 2 shows the commute mode share for Contra Costa County and the Lamorinda subregion. As shown, about 78 percent of the work trips in Contra Costa County are made by automobile while 66 percent are made by automobile in the Lamorinda subregion.

Table 2. Means of Transportation to Work in Contra Costa County and the Lamorinda Subregion

	Contra Costa County			Lamorinda Subregion		
Mode	Estimate	Margin of Error	Percent Mode Share	Estimate	Margin of Error	Percent Mode Share
Total:	**559,646**	**±7,121**		25,898	1,064	
Car, truck, or van - drove alone	380,290	±7,760	68%	15,416	829	60%
Car, truck, or van - carpooled	56,092	±4,997	10%	1,504	285	6%
Public transportation (excluding taxicab)	63,846	±4,543	11%	4,574	472	18%
Taxicab, motorcycle, bicycle, walked, or other means	20,444	±3,970	4%	1,092	269	4%
Worked from home	38,974	±3,917	7%	2,190	699	8%

Source: American Community Survey 1-Year Supplemental Estimates, Table K200801.

MODELED COMMUTE MODE SHARE

Mode shares for the home-based work trip purpose have been calculated based on the residence location (Table 3) or the work location (Table 4). These tables report mode shares for both Lamorinda and Contra Costa County as a whole. The modeling results show that most work trips by Lamorinda residents are made by automobile, specifically driving alone. Lamorinda's transit mode share for work trips is higher than the County's, reflecting the availability of BART service. Bicycling and walking account for a very small portion of commute trips made by Lamorinda residents (note that the bicycle mode share only reflects those trips made by bicycle from beginning to end and does not count access trips to and from transit stops).

Commuters to jobs located within Lamorinda predominantly use the automobile modes to get to work, specifically driving alone. Transit, bicycling, and walking account for very small shares of this market. Commute mode shares are predicted to remain much the same by 2050, with only a small increase in the transit mode share.

Table 3. Modeled Home-Based Journey-to-Work Mode Share – Lamorinda Residents

	Planning Area		Lamorinda	
	2019	2050 Baseline	2019	2050 Baseline
Drive Alone Auto	73%	73%	65%	65%
Carpool	14%	13%	13%	13%
Transit	11%	12%	20%	21%
Bike	0.4%	0.5%	0.1%	0.1%
Walk	1.3%	1.4%	0.9%	0.7%

Source: CCTA travel demand model and DKS Associates.

Note: Mode shares calculated with home-based work person trip ends at the production (home location) zone. Totals may not add due to rounding.

Table 4. Modeled Home-Based Journey-to-Work Mode Share –Jobs Located in Lamorinda

	Planning Area		Lamorinda	
	2019	2050 Baseline	2019	2050 Baseline
Drive Alone Auto	83%	81%	87%	86%
Carpool	12%	12%	10%	9%
Transit	2%	3%	1%	2%
Bike	0.6%	0.7%	0.3%	0.5%
Walk	2%	2%	2%	2%

Source: CCTA travel demand model and DKS Associates.

Note: Mode shares calculated with home-based work person trip ends at the attraction (work location) zone. Totals may not add due to rounding.

MODE SHARE FOR ALL TRIP PURPOSES

Table 5 reports the mode share calculated for all trip purposes included in the CCTA travel demand model – home-based work, home-based shopping, home-based social/recreation, non-home-based, home-based grade school, home-based high school, and home-based college. The modeling results show that most trips are currently made by automobile, with transit and active transportation modes accounting for less than ten percent of all trips, respectively.

By 2050, the mode shares are expected to remain like existing conditions, with only a modest increase in the transit mode share.

Table 5. Mode Share for all Trips– Lamorinda Subregion Residents

	Planning Area		Lamorinda	
	2019	2050 Baseline	2019	2050 Baseline
Drive Alone Auto	63%	62%	64%	62%
Carpool	27%	27%	26%	26%
Transit	3%	4%	6%	7%
Bike	1%	1%	0.3%	0.3%
Walk	6%	6%	5%	5%

Source: CCTA travel demand model and DKS Associates.

Note: Totals may not add due to rounding.

Freeway RTOs

The one freeway Route of Regional Significance (RRS) in the Lamorinda subregion is State Route 24 (SR-24) from the Caldecott Tunnel to Interstate 680 (I-680).

PEAK HOUR DELAY INDEX ON SELECT FREEWAY SEGMENTS

The delay index is a measure of delay experienced by motorists on a roadway segment during a peak commute hour in a single direction. The delay index is calculated by measuring the time it takes to travel a segment of road during peak-period congested conditions and comparing it to the time it takes to travel the same segment during uncongested, free-flow conditions. The delay index may also be calculated as the ratio of congested speed to uncongested speed, given that the distance is fixed on any given corridor.

Baseline observed and modeled results for freeway delay index on SR-24 are shown in Table 6. As expected, the observed delay index for existing conditions is fairly high in the a.m. westbound direction and p.m. eastbound direction, with a delay index of 1.71 and 2.16, respectively. The modeled condition for 2050 shows a decrease in delay index of 0.11 and 0.16, respectively.

The previous Action Plan for Lamorinda set a delay index standard for SR-24 of 2.0 or better during the peak period/peak direction. The current delay index is slightly above this target in the p.m. eastbound direction, so it is recommended to be continued.

BUFFER INDEX ON SELECT FREEWAY SEGMENTS

The buffer index represents the extra buffer time (or time cushion) that most travelers add to their average travel time when planning trips to ensure on-time arrival. This extra time is added to account for any unexpected delay. The buffer index is expressed as a percentage and its value increases as reliability gets worse. For example, a buffer index of 40 percent means that, for a 20-minute average travel time, a traveler should budget an additional 8 minutes (20 minutes × 40 percent = 8 minutes) to ensure on-time arrival most of the time. In this example, the 8 extra minutes is called the buffer time. The buffer index is computed as the difference between the 95th percentile travel time and average travel time, divided by the average travel time.

Baseline observed and modeled results are shown in Table 6. The observed buffer index for existing conditions and peak direction of travel ranges from 0.5 to 0.73, reflecting a high degree of travel time variability, especially in the morning westbound direction.

The existing Lamorinda Action Plan does not have a buffer index performance target set for any RRS. The proposed performance target for the buffer index is 0.50, which means that the extra travel time that must be considered for travelers would be no more than half of the average travel time over the corridor.

Table 6. Freeway RTOs

Route of Regional Significance	2019 Observed			2050 Baseline Modeled	
State Route 24	Avg Speed [a]	Delay Index	Buffer Index	Avg Speed [a]	Delay Index
A.M. Eastbound	67.6	0.96	0.08	68	1.0
A.M. Westbound	38.1	1.71	0.73	41.8	1.6
P.M. Eastbound	30.1	2.16	0.50	32.9	2.0
P.M. Westbound	66.4	0.98	0.08	67.5	1.0

Notes: a) Average speed over corridor as a whole.

Surface Roadway RTOs

PEAK HOUR LOS AT SELECTED INTERSECTIONS IN URBAN AREAS

This RTO will be applied to signalized intersections along the defined arterial RRS. Signalized Intersection LOS is a delay-based qualitative measure of traffic conditions at a signalized intersection. LOS is expressed in ratings from "A" through "F", with "A" meaning that all traffic clears the intersection in every cycle and "F" meaning that drivers must wait through multiple cycles to clear the intersection. Signalized intersection LOS is determined based on intersection turning movement counts (also called turning/traffic volumes), intersection geometry, and signal timing data. The CCTA Technical Procedures specify that methods documented in the latest edition of the *Highway Capacity Manual* be used to measure signalized intersection LOS[1]. The relationship between average control delay and LOS is shown in Table 7. The key arterial intersections that are analyzed for LOS are listed in Table 8 and shown in Figure 1. The observed arterial intersection LOS for existing conditions and modeled for 2050 is shown in Table 8.

The existing Lamorinda Action Plan does not have an adopted LOS threshold for any arterial intersections. Rather, the Lamorinda Action Plan includes side street delay performance measures for motorists accessing RRS. As shown in the data below, Level of Service at Lamorinda intersections is expected to decline somewhat over time through 2050, with the poorest performance in downtown areas and at freeway ramps. Congestion in downtown areas often results from economically- and socially-positive increased activity, so it is considered acceptable. Congestion at freeway ramps is often unavoidable since large numbers of trips are concentrated in areas where motorists get onto freeways. Therefore, the proposed performance targets for signalized intersection LOS for the Lamorinda subregion is as follows:

- LOS D in all areas except downtowns and freeway on-ramps.
- LOS E at freeway on-ramps.
- No LOS standard for downtowns.

[1] The *Highway Capacity Manual* 7th Edition was published by the Transportation Research Board in January 2022.

Table 7. Intersection LOS definitions

Control Delay (Seconds/Vehicle)	LOS
≤10	A
>10-20	B
>20-35	C
>35-55	D
>55-80	E
>80	F

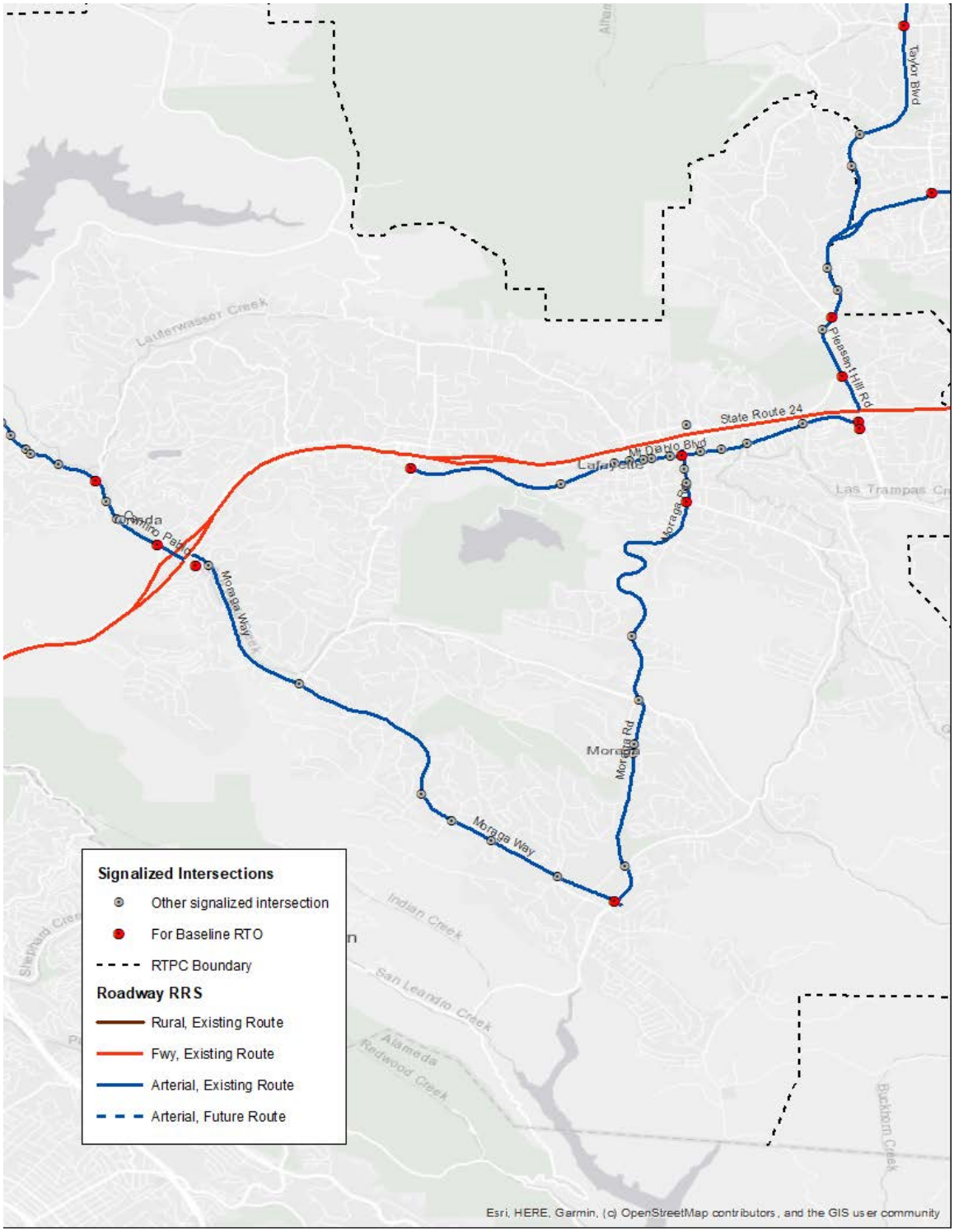
Source: *Highway Capacity Manual*, 6th Edition, Exhibit 19-8

Table 8. Signalized Intersection Peak Hour LOS

Intersection	2019 A.M.		2019 P.M.		2050 A.M.		2050 P.M.	
	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay
SR-24 EB OFF & BROOKWOOD RD & CAMINO PABLO	**F**	**>80**	**F**	**>80**	**F**	**>80**	**F**	**>80**
PLEASANT HILL RD & MT DIABLO BLVD	C	32	D	40	C	32	D	39
PLEASANT HILL RD & SR-24 OFF EB/OLD TUNNEL RD	A	10	C	24	A	10	C	23
CANYON RD/MORAGA RD & MORAGA WAY	C	28	D	42	C	26	D	40
MORAGA RD & MT DIABLO BLVD	B	20	**E**	**70**	B	19	**E**	**60**
SAN PABLO DAM RD & WILDCAT CANYON RD/BEAR CREEK RD	B	12	C	26	A	9	C	26
PLEASANT HILL ROAD & RELIEZ VALLEY ROAD	**E**	**57**	A	7	D	44	C	27
PLEASANT HILL ROAD & DEER HILL ROAD/STANLEY BOULEVARD	**F**	**>80**	**F**	**>80**	**F**	**>80**	**F**	**>80**
SR-24 ON RAMP/SANTA MARIA WAY & CAMINO PABLO	B	17	B	16	B	12	B	15
ACALANES RD & SR-24 EB RAMPS/MT DIABLO BLVD	B	14	B	17	B	13	B	16
CAMINO PABLO & MINER ROAD	C	29	C	23	C	24	B	18
MORAGA RD & ST MARYS RD	B	14	C	25	C	14	C	25

Notes: Delay is average control delay reported in seconds. Cells that are bolded indicate performance below target.

Figure 1. Signalized Intersections and Roadway RRS - Lamorinda



PEAK HOUR SEGMENT LOS ON SELECTED TWO-LANE ROADWAYS OUTSIDE OF URBAN AREAS

Roadway segment LOS is a measure of traffic efficiency and smoothness of flow along roadway segments that are not constrained by a nearby traffic signal. This has been calculated in accordance with the methods specified in the 2010 *Highway Capacity Manual* using average speed for Class I highways (Class I highways are two-lane facilities in largely rural areas that motorists expect to traverse at relatively high speed).

For the Lamorinda subregion, this metric is applied only to San Pablo Dam Road from the West County RTPC Boundary to Wildcat Canyon.

The segment LOS is related to average speed, as shown in Table 9. Table 10 lists the rural roadway corridors analyzed for the Lamorinda subregion and reports the existing and forecasted LOS. The observed average speed for existing conditions varies between 25.4 and 46.7 eastbound in the A.M. and P.M. and between 47.0 and 45.9 westbound in the A.M. and P.M. These speeds equate to LOS E and C, respectively. The only occurrence of LOS E is on the morning eastbound commute. The modeled average speed for 2050 varies between 25.4 and 46.8, almost identical to observed 2019 average speed.

The existing Lamorinda Action Plan does not have an adopted LOS threshold for any two-lane rural roadways. The recommended performance target for this metric is LOS D on San Pablo Dam Road, which appears to be achievable through 2050, which corresponds to an average speed across the corridor of 40-45 mph.

Table 9. LOS For Two-Lane Roadways

LOS	Average Speed (mph)
A	>55
B	>50-55
C	>45-50
D	>40-45
E	≤40

Source: *Highway Capacity Manual* 2010, Exhibit 15-3.

Table 10. Rural Roadway Corridor LOS

Route of Regional Significance	Time of Day	Direction	2019		2050	
			Avg Speed	LOS	Avg Speed	LOS
San Pablo Dam Rd	A.M.	EB	25.4	E	25.4	E
San Pablo Dam Rd	A.M.	WB	47.0	C	47	C
San Pablo Dam Rd	P.M.	EB	46.7	C	46.8	C
San Pablo Dam Rd	P.M.	WB	45.9	C	46.4	C

Source: Inrix Roadway Analytics, CCTA Travel Demand Model

Transit RTOs

MODE SHARE OF TRANSIT TRIPS

As shown in Table 3 in the first section of this memo ("Mode Share"), 20 percent of Lamorinda residents commute to work using transit, compared to 12 percent of total Contra Costa County residents. Table 3 and Table 4 illustrate that the model output predicts that this number will increase to 21 percent of home-based work mode share based on residence location and decrease to 2 percent based on job location. Meanwhile, the model predicts that 7 percent of all trips (not strictly commute trips) will be taken by transit by 2050.

The existing Lamorinda Action Plan does not have an adopted transit mode share target. Covid has greatly reduced transit trips, so the proposed performance target for transit mode share in the Lamorinda subregion is to return to pre-pandemic levels of 20 percent of home-based work trips by 2027. We also propose a target is to double the level of home-based work transit trips to 40 percent by 2050. This is an ambitious goal, but one that will be needed to meet goals to minimize VMT, transportation-related GHG emissions and congestion.

RATIO OF TRAVEL TIME FOR TRANSIT AS COMPARED TO AUTOMOBILE TRAVEL TIME FOR SELECT TRIPS

This metric compares the peak period transit travel time on select corridors to the equivalent single occupant vehicle travel time in the peak commute direction. The key corridor(s) monitored for the Lamorinda subregion along with the comparative travel times are shown in Table 11.

The proposed performance target is that transit travel time should be less than or equal to auto time, when measured from transit station to transit station. As shown in Table 11, travel by BART is quicker than driving between the Orinda and Montgomery Street stations in the morning westbound and afternoon eastbound directions. In 2050, the congested travel times predicted by the travel demand model will give transit an even greater advantage in this corridor (assuming BART service remains constant).

Table 11. Travel Time Ratio for Autos vs Transit on Key Corridors Between Orinda BART Station and Montgomery Street (San Francisco) BART Station

	Median Drive Time (min:sec) [a]	Scheduled Transit Time [b]	2050 Drive Alone [c]
Morning – Westbound*	35:24	27	82:53
Morning – Eastbound	18:14	26	17:58
Afternoon- Westbound	22:37	27	22:19
Afternoon- Eastbound*	32:20	26	90:5

Notes:

a) Range of average driving time for Tuesdays – Thursdays for April 2019 from Inrix Roadway Analytics;

b) From published schedules

c) CCTA travel demand model congested time skim;

Bike/Pedestrian RTOs

MODE SHARE OF BICYCLING AND WALKING

As shown in Table 3 in the first section of this memo ("Mode Share"), about one percent of Lamorinda residents commute to work through active transportation such as biking or walking. Table 3 and Table 4 illustrate that these shares will remain roughly constant at one percent of home-based work trips based on residence location and six percent based on job location. As shown in Table 5, the model predicts that about 5 percent of all trips (not strictly commute trips) were taken by walking or biking in 2019 and 2050.

The existing Lamorinda Action Plan does not have an adopted biking or walking mode share target. The proposed performance target for biking and walking mode share in the Lamorinda subregion is to double the combined mode share for all trips for bikes and walking to 10 percent by 2050. Because biking and walking modes are important to CCTA and their member jurisdictions, the proposed performance target for 2027 is half of the 2050 target, at 5 percent. Further, the project team proposes the Lamorinda Action Plan include biking and walking mode share performance targets for commute trips in addition to all trips. The proposed biking and walking performance targets for commute trips are 2.5 percent by 2027 and 5 percent by 2050. These are ambitious goals but will be needed to meet goals to minimize VMT, transportation-related GHG emissions and congestion.

PROPORTION OF THE COUNTYWIDE LOW STRESS BIKE NETWORK THAT HAS BEEN COMPLETED

The Low Stress Bike Network (LSBN) is a component of the CCTA Countywide Bicycle and Pedestrian Plan (CBPP) adopted in 2018. The CBPP introduced a new way of evaluating a facility's Level of Traffic Stress, in which roadways are evaluated on several factors, including, but not limited to the speed and number of vehicles and presence and width of bicycle facilities. Facilities are given a rating from one (least stressful) to four (most stressful) to evaluate the stress a bike rider will experience. The goal of the 2018 CBPP is to ensure the LSBN is complete and rated either Level of Traffic Stress 1 (most children can feel safe riding on these facilities) or Level of Traffic Stress 2 (The "interested but concerned" adult population will feel safe riding on these facilities). Ultimately, construction of the entire LSBN would result in an increase in bike/pedestrian mode share and a reduction in KSI collisions.

The status of the entire Lamorinda portion of the LSBN is shown in Figure 2. If the entire LSBN in the Lamorinda subregion were completed, it would result in 53.4 miles of Class I and Class IV facilities.

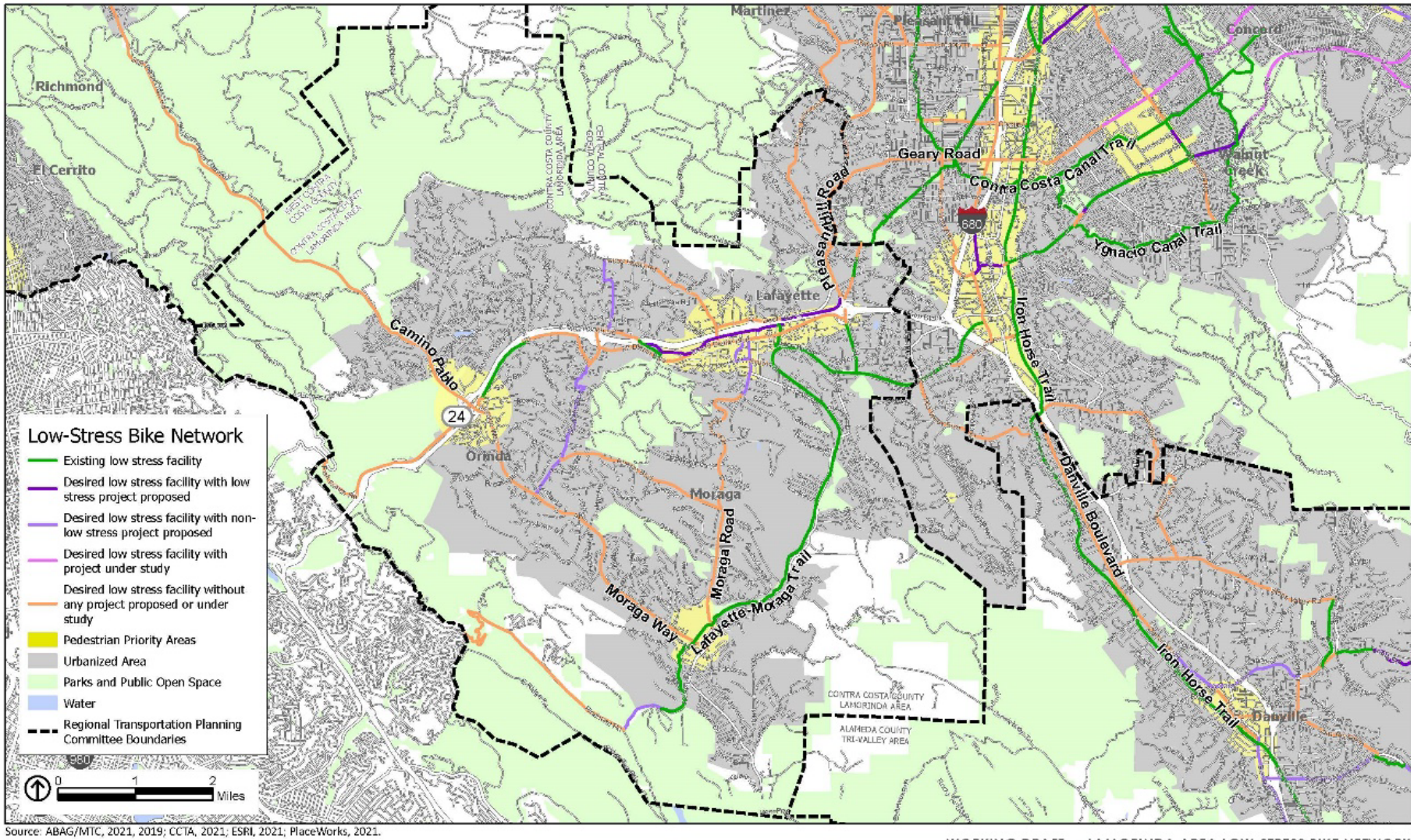
Table 12 shows that 21 percent of Lamorinda's LSBN is already completed. A further 5 percent of low stress facilities are incomplete yet have an adopted plan to complete the facility. There are projects proposing improvements that would not result in low-stress facilities on an additional 9 percent of the LSBN. A total of 65 percent of the total LSBN miles are incomplete and do not have a plan to complete them.

We suggest that the region should aim to achieve 100% completion of the LSBN by 2050. We also propose an interim target of 29% (15.5 miles) completion by 2027. This is the sum of existing completed facilities (21%) and 150% of the already proposed additions to the network (5% x 150% = approximately 8%). This would require completion of the low-stress projects that already have an adopted plan, and completion of additional projects on 33 percent (11.6 miles) of the proposed LSBN. This could include segments on which non-low-stress facilities are currently proposed if those projects are revised to become low-stress projects.

Table 12. Proportion of the Lamorinda Subregion LSBN that is Complete

Status of Facility	Miles	Percent
Existing Low Stress Facility	11.1	21%
Desired Low Stress Facility with Low Stress Project Proposed	2.8	5%
Desired Low Stress Facility with Non-Low Stress Project Proposed	4.9	9%
Desired Low Stress Facility without any Project Proposed or Under Study	34.6	65%

Figure 2. Status of the Lamorinda LSBN



Source: ABAG/MTC, 2021, 2019; CCTA, 2021; ESRI, 2021; PlaceWorks, 2021.

WORKING DRAFT — LAMORINDA AREA LOW-STRESS BIKE NETWORK

NUMBER OF LOCATIONS WHERE THE LOW STRESS BIKE NETWORK MAKES AN UNPROTECTED CROSSING OF A HEAVILY TRAVELED VEHICLE ROUTE

For this RTO, PlaceWorks created an ArcGIS point data set, shown in Figure 3, that identifies each location where the existing LSBN crosses a heavily-traveled vehicle route and is considered:

- Fully protected by grade separation or a signalized intersection with cyclist protections.
- Semi-protected at an at-grade crossing with a beacon system, or with a signal but without cyclist protections.
- Unprotected at an at-grade crossing which includes none of the improvements listed above.

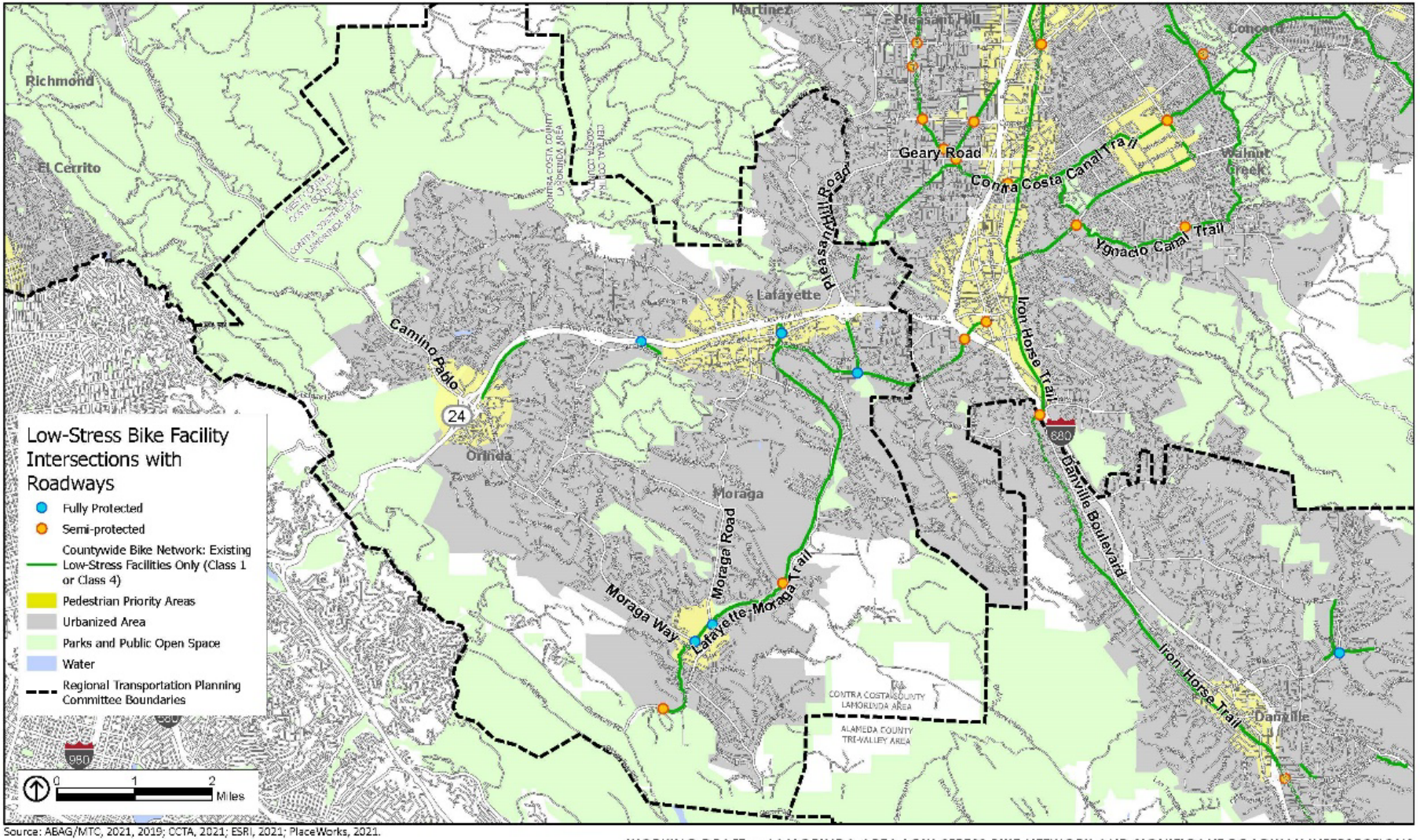
As illustrated in Figure 3, there are no study intersections in the Lamorinda subregion that are currently unprotected. There are four existing intersections that are already fully protected and two which are semi-protected. The semi-protected intersections are:

- St. Mary's Road and Rheem Boulevard where the intersection improvements are limited to a painted crosswalk and stop sign along Rheem Boulevard.
- Lafayette-Moraga Regional Trail crossing at Canyon Road where the intersection improvements are limited to a painted crosswalk.

We propose that the Action Plan set a target to modify these two semi-protected intersections to become fully protected by 2027.

As the LSBN is completed over time, new locations where the LSBN crosses a heavily traveled vehicle route will be added. Local jurisdictions should install full intersection protections for cyclists and pedestrians at these locations.

Figure 1. Types of Crossings at Intersections of the LSBN and a Heavily-Traveled Roadway



Source: ABAG/MTC, 2021, 2019; CCTA, 2021; ESRI, 2021; PlaceWorks, 2021.

WORKING DRAFT — LAMORINDA AREA LOW-STRESS BIKE NETWORK AND SIGNIFICANT ROADWAY INTERSECTIONS

Safety RTOs

The RTOs presented in this section are based on the injury and fatality crashes reported by the Transportation Injury Mapping System (TIMS)[2]. TIMS crash records represent cleaned and geocoded data compiled by the Statewide Integrated Traffic Records System (SWITRS) maintained by the California Highway Patrol. The statistics reflect the most recent five years available data (January 1, 2016 through December 31, 2020).

CCTA has published the *Vison Zero & Systemic Transportation Safety "How To" Policy and Implementation Guide* and encourages local jurisdictions to adopt and implement Vison Zero Action plans. In addition, an objective found in the Contra Costa Countywide Bicycle and Pedestrian Plan is to, "Reduce the rate of pedestrian and bicycle fatalities and injuries per capita."

In alignment with the Vision Zero philosophy, the proposed performance target is zero fatalities and severe injuries for each of the below safety RTOs.

NUMBER OF KILLED OR SERIOUSLY INJURED (KSI) COLLISIONS

This RTO tracks the number of bicycle or pedestrian involved KSI crashes from the TIMS data set. The crash locations are depicted in Figure 4. Table 13 summarizes the crashes by type and Table 14 summarizes the crashes by severity.

As shown, most of the crashes occurred along the SR-24 corridor, although clusters also occur along Moraga Way, Moraga Road, and other facilities. The most common type of crash was rear-end, followed by vehicles hitting objects and sideswipe collisions. During this timeframe, there were 14 fatal crashes and 78 severe injury crashes, accounting for about two percent and nine percent of all crashes, respectively.

NUMBER OF BIKE- OR PEDESTRIAN-INVOLVED COLLISIONS

The crash locations for the Lamorinda subregion are depicted in Figure 5 and summarized by severity in Table 14. During this timeframe, there were 66 bicycle or pedestrian involved crashes, accounting for about eight percent of all crashes. Three of the bicycle or pedestrian crashes resulted in fatalities and 18 resulted in severe injury.

NUMBER OF BIKE- OR PEDESTRIAN-INVOLVED COLLISIONS WITHIN 500 FEET OF A SCHOOL

This RTO tracks the number of bicycle or pedestrian involved KSI crashes that occur within 500 feet of school campuses. These crash locations are also depicted in Figure 5. A total of eleven crashes occurred near school campuses, five of which involved collision with a pedestrian and six with a bicyclist, including one fatality.

[2] Transportation Injury Mapping System (TIMS), Safe Transportation Research and Education Center, University of California, Berkeley. 2022

Figure 4. Fatality and Injury Collisions (2016-2020)

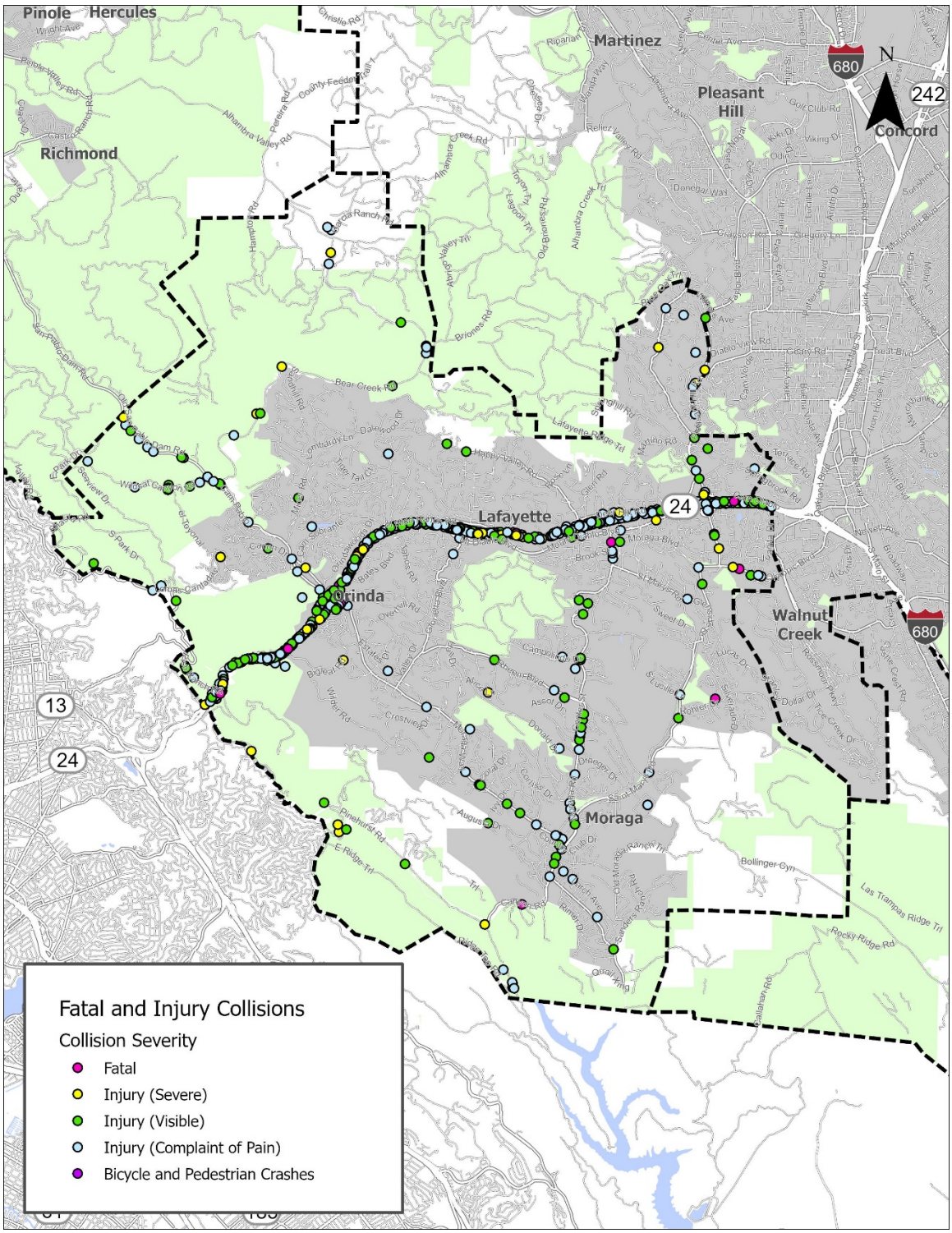


Table 2. Injury and Fatality Collision by Crash Type - Lamorinda Subregion from January 1, 2016, through December 31, 2020

Crash Type	Number of Crashes
Not Stated	4
Head-on	29
Sideswipe	127
Rear End	342
Broadside	57
Hit Object	234
Overturned	56
Vehicle/Pedestrian	25
Other	6
Total	**880**

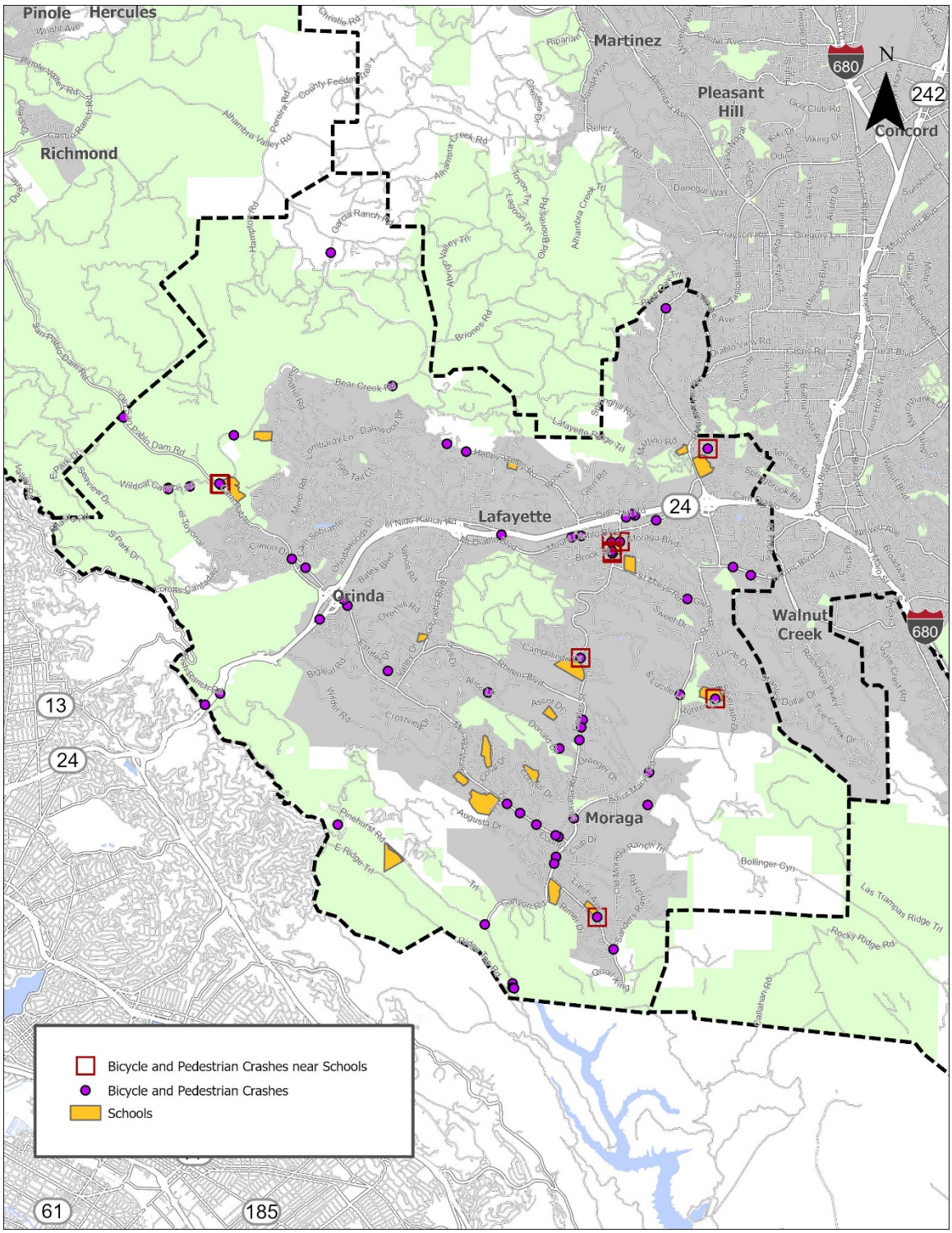
Source: Transportation Injury Mapping System and DKS Associates

Table 3. Number of Crashes by Severity - Lamorinda Subregion from January 1, 2016 through December 31, 2020

Severity	Number of Total Crashes	Bike and Ped Crashes
Fatal	14	3
Injury (Severe)	78	18
Injury (Other Visible)	237	23
Injury (Complaint of Pain)	551	22
Total	880	66

Source: Transportation Injury Mapping System and DKS Associates

Figure 5. Bicycle and Pedestrian Involved Crashes Including within 500 Feet of Schools



Climate Change RTOs

SINGLE OCCUPANT VEHICLE MODE SHARE

As shown in Table 2 in the first section of this memo ("Mode Share"), 60 percent of total Lamorinda work trips were taken by driving alone, compared to 68 percent of total Contra Costa County residents. Table 3 and Table 4 illustrate that the model output predicts that this number will increase to 65 percent of home base work mode share based on residence location and decrease to 86 percent based on job location. Meanwhile, the model predicts that 62 percent of all trips made by Lamorinda residents (not strictly commute trips) will be taken by driving alone by 2050.

The proposed performance target for single-occupant vehicle work commute mode share in the Lamorinda subregion is 50 percent for home-based work trips, in 2027 and 40 percent in 2050. These numbers have been derived by reducing future single-occupant vehicle mode share by the targeted increases in transit, bike and walk trip mode share, and by also assuming an increase in carpooling (multiple-occupant vehicle) mode share to 15 percent.

VEHICLE MILES TRAVELED (VMT) PER CAPITA

The Action Plans will consider total VMT for County and subregion residents.

The 2020 VMT study conducted for CCTA by Fehr & Peers found that 2018 VMT per capita in the Lamorinda subregion was 32.0 VMT per capita, and that the same number for Contra Costa County was 30.3 VMT per capita.

The California Air Resources Board's document entitled *2017 Scoping Plan-Identified VMT Reductions and Relationship to State Climate Goals* published in January 2019[3] states that the state needs to reduce daily per capita total VMT to 21 to achieve carbon-neutrality, which is the State's goal for 2045.

Based on this finding, we propose that the Action Plan contain a goal for 2050 to reduce VMT per capita to 21 in the Lamorinda area. Using a straight-line projection for reductions from 2018 until 2045, this would mean a reduction to 30 VMT per capita by 2027.

More information on the current and modeled future VMT per capita will be forthcoming.

TRANSPORTATION GREENHOUSE GAS (GHG) EMISSIONS PER CAPITA

This metric reflects the total daily VMT occurring on roadways within the planning area, including commercial vehicle trips and through traffic. DKS will use the EMFAC model to translate this total daily roadway VMT into GHG emissions.

More information on the current and modeled future GHG emissions will be forthcoming.

ZERO-EMISSION VEHICLE OWNERSHIP IN THE SUBREGION

This RTO tracks the number of battery electric vehicles "on the road," with the goal of increasing total EV penetration. Data as of April 2021, which is the most recent report date, are shown in Table 15 for Lamorinda as well as all of Contra Costa County for comparison. Lamorinda currently has xx percent EV ownership, as compared to xx percent in the County overall.

[3] Available at https://ww2.arb.ca.gov/sites/default/files/2019-01/2017_sp_vmt_reductions_jan19.pdf

Under a rule proposed by CARB, 35 percent of new passenger vehicles sold in the state must be powered by batteries or hydrogen by 2026, and 100 percent 2035[4]. Currently, 12.4 percent of new vehicles sold in California are ZEV and ZEVs make up about 4 percent of the light duty vehicle fleet in Contra Costa County.

By executive order, California has set a target of one million ZEVs on the road by 2025 and five million ZEVs by 2030[5]. Since Lamorinda accounts for less than one percent of the state's population, this suggests that the subregion should have 1,573 EVs by 2025 and 7,867 EVs by 2030. A straight-line extrapolation of this number through 2050 suggests about 39,000 EVs in Lamorinda by 2050. Lamorinda is more affluent than the State as a whole, which suggests that even more EVs should be deployed in the subregion.

With all the above factors in mind, we propose a target 100 percent of the fleet, contrasted to the estimated existing EV fleet penetration of about 6 percent. The estimated number of light duty vehicles currently based in Lamorinda is about 46,800.

Table 4. Electric Vehicles in the Subregion as of April 2021

Area	Battery Electric Vehicles
Central	4,879
East	2,926
Lamorinda	3,141
Tri-Valley	15,262
West	4,258
Total Subregion	30,466
Contra Costa County	21,609

Source: California Energy Commission (2022). California Energy Commission Zero Emission Vehicle and Infrastructure Statistics. Data last updated April 2022. Retrieved June 29, 2022 from http://www.energy.ca.gov/zevstats.

Note: Correspondence of zip codes to RTPC boundaries is approximate.

Technology RTO

LEVEL OF SIGNAL INTERCONNECTION

Interconnected signal systems are those which communicate with other signals or systems. Signal interconnection helps in establishing a connection between the traffic signals and the central system, which enables remote access to the signals from the local agency locations or the Traffic Management or Operations Center. These interconnections allow signal timings to be adjusted remotely, during regular day-to-day operations, during major incidents, and during special events. Interconnection also enables cross-jurisdiction communications, coordination, and data exchange to respond to varying traffic conditions.

CCTA is currently working with Lamorinda's jurisdictions to interconnect a total of 18 signals in Lafayette, Moraga, and Orinda, using funding to come primarily from MTC's OBAG3 program. Since this effort is already underway, the target for this RTO is the completion of all 18 signal improvements by 2027. There is no additional target for 2050, since there are no plans for a further interconnection program.

[4] California Air Resources Board. Advanced Clean Cars II.

[5] Executive Order B-16-2012 and Executive order B-48-18.

Item 6A:

Attachment 4 -Lamorinda Subregion Actions Memo

MEMORANDUM

DATE June 29, 2022

TO John Hoang and Matt Kelly, CCTA

FROM David Early and Torina Wilson, PlaceWorks
Erin Vaca, DKS Associates
Julie Morgan and Terence Zhao, Fehr & Peers

SUBJECT Lamorinda Subregion Actions Memorandum

This Memorandum lists the existing Lamorinda Action Plan actions and proposes revisions to those actions as part of the Action Plan update. These actions will reinforce the Regional Transportation Objectives (RTOs) set, and described in further detail, in the RTO Methodology and RTO Analysis Memorandums submitted as part of the Round 4 TAC meeting materials and dated June 27, 2022 and June 29, 2022, respectively.

The revisions proposed in Table 1 reflect consolidation and/or wordsmithing of existing actions, removing of actions which are now complete, and the introduction of new actions. Proposed new actions come from several sources, including:

- Actions recommended by the project team based on best management practices or similar projects, that are necessary to achieving the performance targets established under the RTOs.
- Actions to introduce topics that would have been RTOs but the project team decided not to pursue. These RTOs considered but not recommended are discussed in detail at the end of the RTO Methodology Memorandum dated June 27, 2022.
- Actions to address topics requested by Lamorinda TAC members or through other subregional TAC members that are also applicable to the Lamorinda subregion.

The middle column of Table 1 lists the existing Lamorinda Action Plan text and includes strikethrough and underline edits to show revisions proposed by the project team. Column B includes notes on why the edit has been made while the first column assigns each revised action with an action number that will be used in the Draft Action Plan. TAC members can make comments on these revisions at the Round 4 TAC meeting or through email before or after the meeting.

TABLE 1 RECOMMENDED REVISIONS TO THE LAMORINDA ACTION PLAN ACTIONS

New Action Number	Proposed Action Language Revisions	Notes
Freeways		
Freeways-1	~~Add a right-turn lane to the eastbound SR-24 off-ramp for southbound Moraga Way. (Action 4.25)~~ Complete necessary operational improvements (i.e. protected turn lanes, synchronized signal timing, and auxiliary lanes, among others) at select intersections or roadway segments, while ensuring that the improvements are balanced against the objectives and actions set forth elsewhere in this Action Plan.	Removed the specific action and instead created a general action that promotes operational improvement as may be identified throughout the life of the Action Plan
	~~Seek funding for an auxiliary lane on eastbound SR-24 Gateway on-ramp to Brookwood and continue completion of improvements to eastbound Brookwood off-ramp subject to specific design criteria. (Action 4.06)~~	Removed because it is an operational improvement that would occur under the general above action
Freeways-2	~~Explore opportunities to work with TRANSPAC to develop a traffic management program to discourage use of westbound/southbound traffic using Pleasant Hill Road north of SR-24 to bypass the I-680 SR-24 interchange. (Action 4.05)~~ Work with TRANSPAC, WCCTAC, and local jurisdictions to discourage diversion from freeways and cut through travel on surface roadways by developing traffic management programs, increasing trip capacity on freeways, completing freeway operational improvements, implementing traffic calming measures on surface roadways, implementing restrictive signal timing and metering, and exploring surface roadway redesign to support active and public transportation modes.	Revised this action to be more general and to include other modes of transportation
	~~Support added person trip capacity on regional freeways that could divert traffic from Pleasant Hill Road. (Action 4.04)~~	Consolidated with general diversion action above
	~~Support WCCTAC's efforts to reduce diversion from I-80 to alternative routes in Lamorinda through operational improvements that increase throughput on I-80. (Action 4.09)~~	Consolidated with general diversion action above
	~~Explore ways to redesign roadway (Mount Diablo Boulevard) to discourage diversion from SR-24 but without reducing capacity. (Action 4.10)~~	Consolidated with general diversion action above
	~~Protect adjacent residential streets from diverted cut-through traffic through the installation of traffic calming measures. (Action 4.16)~~	Consolidated with general diversion action above
Freeways-3	~~Study need for, feasibility, and cost of installing additional park-and-ride lots and/or HOV bypass lanes at critical congestion points in the corridors leading into Lamorinda Routes of Regional Significance from other subareas. (Action 2.08)~~ Improve the operational efficiency of freeways and arterial streets through effective corridor management strategies, such as ramp metering, traffic operations systems, Intelligent Transportation Systems	Replaced this action with a more general and holistic action drafted for all action plans

TABLE 1 RECOMMENDED REVISIONS TO THE LAMORINDA ACTION PLAN ACTIONS

New Action Number	Proposed Action Language Revisions	Notes
	(ITS) improvements, HOV/HOT lane and bypass lanes, among others, to support a cohesive transportation system for all modes.	
Freeways-4	~~Supporting~~ Work with CCTA, TRANSPAC, WCCTAC and local jurisdictions to implement HOV/HOT and transit improvements ~~in the I-680, SR24 and I-80~~ along freeway corridors to reduce single occupant automobile use and increase carpooling~~ on SR-2~~. ~~(Action 4.08)~~	Revised to be more general for all freeways
	~~Explore actions to improve SR-24 flow in PM and use of BART consistent with the Gateway Constraint Policy. (Action 1.13)~~	Removed because this is a goal/policy and not an action
Freeways-5	~~Seek funding to utilize existing parking for park-and-ride for Lamorinda residents. (Action 2.07)~~ Implement park and ride facilities at appropriate locations, including shared-use agreements at activity centers with underutilized parking spaces.	Added using language drafted for all action plans
Freeways-6	Work with CCTA and local jurisdictions to study the feasibility of bus on shoulder pilot and long-term programs on SR-24.	Added using language drafted for all action plans
Freeways-7	Conduct a study to develop a seamless HOV/HOT/Express Lane on SR-24.	Added using language drafted for all action plans
Freeways-8	Work with CCTA to complete a Countywide Goods Movement Plan that promotes greater use of technology for communications and scheduling, funding for equipment upgrades for air quality improvements with cleaner technology, and an advocacy platform for goods movement and guidance for local jurisdictions.	Added using language drafted for all action plans
Freeways-9	Work with CCTA, Caltrans, and other applicable agencies to conduct Integrated Corridor Management (ICM) studies for the SR-24 corridor to improve multimodal function of countywide facilities.	Added using language drafted for all action plans
Surface Roadways		
Surface Roadways-1	~~Explore opportunities to conduct studies to identify options for connecting regional traffic to~~ Complete needed projects on SR-24 to maintain targeted delay and buffer index goals, without increasing traffic in ~~negatively affecting Lafayette and Orinda~~ downtowns or residential neighborhoods: - ~~Including option for~~Conduct studies to identify alternatives for~~,~~ ~~including options for~~ bypass corridors. - Seek and secure funding ~~for~~and implement~~ation of~~ the Lafayette Downtown Congestion Study ~~for~~to get~~ting~~ Lamorinda trips to and from SR-24. ~~as a project of significant regional benefit (Action 4.03)~~	Revised to have stronger language and include other actions
	~~Seek and secure funding for implementation of the future Lafayette Downtown Congestion Study for getting Lamorinda trips to and from SR-24 as a project of significant regional benefit. (Action 4.03)~~	Consolidated with action above
	~~Investigate appropriate mechanisms, including maintaining existing roadway lanes and widths and restrictive signal timing and metering, to discourage use of arterial roads as a substitute for freeway travel. (Action 4.01)~~	Consolidated with general diversion action above

TABLE 1 RECOMMENDED REVISIONS TO THE LAMORINDA ACTION PLAN ACTIONS

New Action Number	Proposed Action Language Revisions	Notes
Surface Roadways-2	Seek to coordinate and improve procedures of Lamorinda agencies for detecting, reporting, announcing and documenting lane or road closures. ~~(Action 4.19)~~	Kept as is
Surface Roadways-3	~~Explore opportunities to~~ Improve coordination~~e~~ of Lamorinda procedures/practices for traffic management during lane or road closure. ~~(Action 4.20)~~	Revised to be more actionable
Surface Roadways-4	Replace or reconstruct ~~piping, drainage or~~ undergroundin~~g of~~ utilities~~y~~, and maintain vegetation and drainage facilities~~infrastructure~~ to reduce the incidence of lane or road closure. ~~(Action 4.21)~~	Revised to include drainage action below
	~~Maintain vegetation and drainage to reduce incidence of lane or road closure. (Action 4.22)~~	Combined with utilities action above
Surface Roadways-5	Develop subregional corridor management plans for Moraga Road, Moraga Way, San Pablo Dam Road, and Pleasant Hill Road, to provide adequate roadway capacity for local and subregional travel while also including both public and active transportation modes and nonmodal transportation issues such as equity, climate change, safety, and technology.	Added using language drafted for all action plans
Transit		
Transit-1	~~Support~~ Continue the augmentation and expansion of, and seek funding for, subscription bus service (flex van) to BART stations and high-volume ridership locations such as St. Mary's College.~~, to provide additional transit opportunities (Action 1.01)~~	Slightly revised
Transit-2	~~Support expansion of~~ Complete the following projects to improve BART service: ~~seat capacity through the corridor,~~ - Expand BART parking capacity east of Lamorinda when needed.~~, and~~ - Reduce BART headways~~ reduction~~ as ridership may require. - Provide public transit service in the Pleasant Hill Road/Taylor Boulevard Corridor that connects to BART and to CCCTA services in Lafayette. - Reduce bus headways on routes providing service to the Bay Point/Colma BART line. ~~(Action 1.02)~~	Combined all BART-related improvements into one general action
	~~Support BART and CCCTA strategies that enhance transit ridership and reduce single-occupant vehicle trips and encourage casual carpools for one-way BART ridership. (Action 1.06)~~	Combined with the general BART improvement action above
Transit-3	~~Support~~ Work with CCTA, local jurisdictions, and local public transit operators to: -Develop a Lamorinda Transit Plan to identify future community transit needs and set a shared vision for viable, sustainable public transit service for all. - Link transit service in the entire subregion, including ~~that links Lamorinda bus service~~ more directly to communities to the north and east of Lafayette and Orinda, between BART stations, between adjacent Central County communities, to Bishop Ranch and the Tri-Valley area,	Revised to combine several transit improvement and collaboration actions together

TABLE 1 RECOMMENDED REVISIONS TO THE LAMORINDA ACTION PLAN ACTIONS

New Action Number	Proposed Action Language Revisions	Notes
	and through the Caldecott Tunnel. - Standardize operations, regional mapping, and wayfinding. - Implement traffic signal management and bus prioritization technology on regionally significant transit routes to improve bus speed and reliability. ~~(Action 1.09)~~	
	~~Support the provision of public transit service in the Pleasant Hill Road / Taylor Boulevard Corridor with connections to BART and other CCCTA services in Lafayette.(Action 1.10)~~	Combined with the general BART improvement action above
	~~Seek funds to build and operate park and ride lots and associated BART shuttles in Lamorinda to encourage carpooling and transit ridership while reducing single occupant vehicle commute loads.(Action 1.08)~~ ~~Support bus headway reductions on routes providing service to the Bay Point/Colma BART line and reinstatement of direct service to important employment centers such as Pleasanton and Bishop Ranch.(Action 1.04)~~	Combined with the general BART improvement action above Combined with the general BART improvement action above
	~~Support and seek additional funding for expanding transit service, including service between Lamorinda BART stations and adjacent communities in Central County, service on Pleasant Hill Road north of SR 24, service to Bishop Ranch and the Tri-Valley area, and service through the Caldecott Tunnel.(Action 1.05)~~	Combined with the general BART improvement action above
Transit-4	Work with WCCTAC, local jurisdictions and all applicable transit agencies ~~AC Transit, BART, County Connection, WestCAT, and MTC~~ to explore the feasibility of service re-organization along the~~in~~ San Pablo Dam Road/Camino Pablo corridor~~, and develop recommendations~~ to increase bus frequency, and to resolve transit stop access and amenity needs in the corridor. ~~and connectivity of bus service for people traveling between City of Richmond, San Pablo, El Sobrante and Orinda (Action 1.12)~~	Revised to be more actionable
	~~Local jurisdictions to work with the transit agencies to resolve transit stop access and amenity needs on San Pablo Dam Road and Camino Pablo as identified by the transit agencies. (Action 5.06)~~	Combined with general San Pablo action above
Transit-5	Support and seek funding for augmentation and, expansion, and continued operation of school bus service in Lamorinda. ~~(Action 1.07)~~	Revised to be more general/inclusive
	~~Maintain Lamorinda school bus program service to Wagner Ranch School.(Action 1.11)~~	Removed because of the generic school bus action above
Transit-6	~~Monitor and explore ways to improve paratransit productivity when possible.(Action 1.13)~~ Implement the recommendations of the Contra Costa Accessible Transportation Strategic Plan, including the establishment of a new	Added using language drafted for all action plans

TABLE 1 RECOMMENDED REVISIONS TO THE LAMORINDA ACTION PLAN ACTIONS

New Action Number	Proposed Action Language Revisions	Notes
	Coordinating Entity and establishing a new, ongoing, dedicated funding stream.	
	~~Develop a Lamorinda Transit Plan to identify future community transit needs and to address the changing needs of the senior population.(Action 1.03)~~	Combined with general transit operations/connectivity action above
Transit-7	~~Support a c~~Collaborat~~ive effort~~ with the Acalanes Union High School District to reduce auto trips and to promote and increase ridesharing and use of transit for travel to and from the high schools in Lamorinda. ~~(Action 2.01)~~	Revised to be more actionable
	~~If the CCCTA cannot increase service to Acalanes High and Campolindo Schools, evaluate the feasibility of augmenting the existing school bus program to add the high school as funding permits. (Action 5.05)~~	Removed
Transit-8	Work with CCTA and local transit operators to explore financial incentives and reduced fares for public transportation, including a feasibility study to explore a subregional or countywide Universal Basic Mobility program.	Added using language drafted for all action plans
Transit-9	Provide educational awareness of public transportation options through outreach, education, and advertising, particularly in local schools.	Added using language drafted for all action plans
Transit-10	Work with CCTA and MTC to promote Safe Routes to Transit projects and programs, and submit applications for funding for construction of local Safe Routes To Transit projects and programs.	Added using language drafted for all action plans
Transit-11	Work with local jurisdictions to develop intermodal transportation facilities ("Mobility Hubs") that serve major activity centers and connect transit, pedestrian, bicycle facilities, and car/ride share in their planning documents, and site park and ride facilities, where appropriate.	Added using language drafted for all action plans
Transit-12	Complete a study to explore the feasibility of a regional Express Bus Program and expansion and enhancement of Bus Rapid Transit along SR-24 and other key roadways.	Added using language drafted for all action plans
Transit-13	Evaluate systemwide bus stop improvements, including making it safer and easier for people to access transit stations and ensuring that transit is safe and attractive.	Added using language drafted for all action plans
Bike/Ped		
	~~Improve pedestrian connectivity to multi-use trails. (Action 3.09)~~	Removed, as it is covered in other actions
Bike/Ped-1	~~Improve and/or add sidewalks and/or pedestrian pathways. (Action 3.01)~~ Work with local jurisdictions to adopt and update their bicycle and pedestrian plans to expand and/or improve their facilities to ensure a seamless active transportation network that provides a positive user experience.	Revised using language drafted for all action plans

TABLE 1 RECOMMENDED REVISIONS TO THE LAMORINDA ACTION PLAN ACTIONS

New Action Number	Proposed Action Language Revisions	Notes
	~~Support pedestrian and bicycle improvements including BART access, to encourage alternative transportation modes, increase transit ridership, and reduce auto demand. (Action 3.02)~~	Removed because this topic is addressed in other bike/ped and transit actions
	~~Design pedestrian and bicycle facilities to connect with the planned EBMUD pathway identified in Lafayette's Bikeways Master Plan. (Action 3.05)~~	Combined with the gap closure action below because this path is part of the Low Stress Bike Network
Bike/Ped-2	Explore the feasibility of widening existing pedestrian/bike facilities where needed and feasible to accommodate demand and improve safety. ~~and where technically and financially feasible. Improve north-south bicycling by providing a continuous bikeway facility to address the gap created by the Pleasant Hill Rd/Taylor Blvd split. (Action 3.10)~~	Moved second portion of action to be part of gap closure action because this path is part of the Low Stress Bike Network
	~~Support the development of regional bicycle facilities. (Action 3.06)~~	Removed because this will be incrementally completed with the buildout of the low stress bike network.
Bike/Ped-3	Seek funding to provide bicycle parking infrastructure at employment sites and activity centers throughout Lamorinda. ~~(Action 3.07)~~	Kept as is
Bike/Ped-4	Install~~, where appropriate,~~ bicycle lanes as part of any future roadway improvements where they are needed and feasible ~~to the corridor~~. ~~(Action 3.08)~~	Revised to be more general
Bike/Ped-5	Make the following ~~I~~improvements to the Lafayette-Moraga Regional Trail: - ~~c~~Crossings ~~and striping~~ improvements at high traffic volume crossings. -Work with East Bay Municipal Utilities District (EBMUD) and East Bay Regional Parks District (EPRPD) to reopen the trail near August Drive between School Street Bridge and Canyon Road Bridge. ~~(Action 3.11)~~	Consolidated to include all actions related to LMRT.
	~~Encourage commute use of the Lafayette-Moraga Regional Trail and other trails systems as they are developed. (Action 3.12)~~	Combined with general Lafayette-Moraga Regional Trail action above
	~~Work with East Bay Municipal Utilities District (EBMUD) and East Bay Regional Parks District (EPRPD) to reopen the Lafayette-Moraga Regional Trail near August Drive between School Street Bridge and Canyon Road Bridge to restore the pedestrian and bicycle link. (Action 3.14)~~	Combined with general Lafayette-Moraga Regional Trail action above
	~~Evaluate and seek opportunities to improve and/or build pedestrian and bicycle facilities between the Lamorinda BART stations and adjacent land uses and communities. (Action 3.01)~~	Merged with bike/ped connectivity action above
Bike/Ped-6	Work with CCTA, Contra Costa Health Services, and Street Smarts Diablo Region to facilitate a countywide coordinated approach to Safe Routes	Added using language drafted for all action plans

TABLE 1 RECOMMENDED REVISIONS TO THE LAMORINDA ACTION PLAN ACTIONS

New Action Number	Proposed Action Language Revisions	Notes
	to Schools programs, and to identify continual funding streams to encourage students, employees, and residents at K-12 schools, technical schools, and college sites to use non-vehicle modes to get to school.	
Bike/Ped-7	Develop a program to provide educational awareness of active transportation options and safety through outreach, education, and advertising.	Added using language drafted for all action plans
Bike/Ped-8	Complete the following gaps in the Countywide Low Stress Bike Network: - Segment of Pleasant Hill Road between Rancho View Drive and Withers Avenue. - Address the gap created by the Pleasant Hill Rd/Taylor Blvd split. - Complete the EBMUD pathway identified in Lafayette's Bikeways Master Plan. - [Placeholder for more as identified in Round 4 meeting]	Added using language drafted for all action plans and listed gap closure related actions; gaps to be closed will be determined at the round 4 TAC discussion
Bike/Ped-9	Provide a bicycle and pedestrian trail from Wilder Road to Moraga Way ~~to provide a safer path of travel for bicyclist currently riding on the SR-24 shoulder~~.	Revised
Bike/Ped-10	Continue the program to reduce the cost of bicycles, pedal-assist bicycles, and electric bicycles for Contra Costa residents.	Added using language drafted for all action plans
Bike/Ped-11	Work with CCTA and other regional agencies to develop a method of tracking the Pavement Condition Index (PCI) of bicycle facilities on the low-stress bike network, and implement rehabilitation improvements where needed.	Added using language drafted for all action plans
Bike/Ped-12	Complete bicycle and pedestrian crossing improvements at the following intersections: - St. Mary's Road and Rheem Boulevard where the intersection improvements are limited to a painted crosswalk and stop sign along Rheem Boulevard. - Lafayette-Moraga Regional Trail crossing at Canyon Road where the intersection improvements are limited to a painted crosswalk.	Added using language drafted for all action plans and added semi-protected intersections that the RTO Analysis Memo suggests are to be improved by 2027
Bike/Ped-13	Work with CCTA, micromobility operators, and local jurisdictions to create a subregional model ordinance and model RFP to deploy micromobility systems, built off industry best management practices.	Added using language drafted for all action plans
Safety		
Safety-1	~~Support pedestrian and bicycle safety improvements around schools, trailheads, and at intersections and along the bikeway network.(Action 3.01)~~ Work with regional and local agencies to increase the level of public education about bicycle safety and to reduce injuries due to pedestrian or bicycle collisions.	Revised with language drafted for all action plans
Safety-2	~~Support multi-modal safety actions that encourage safe speeds with particular emphasis on access to schools.(Action 4.11)~~	Revised to combine all speed related actions

TABLE 1 RECOMMENDED REVISIONS TO THE LAMORINDA ACTION PLAN ACTIONS

New Action Number	Proposed Action Language Revisions	Notes
	Implement the following to monitor traffic speeds in Lamorinda: - Monitor and evaluate traffic speed and other safety issues, particularly around schools, on an annual basis. - Seek to reduce the speed limit on Taylor Blvd to improve safety around the elementary and high schools and at the southbound approach to Pleasant Hill Road. - Install permanent speed feedback signs to slow vehicle speeds and reduce the severity of collisions. - Install speed cameras in areas where enhanced speed enforcement is needed.	
	~~Seek to monitor and evaluate traffic speed and other safety issues on an annual basis. (Action 4.12)~~	Combined with the safety action above
	~~Seek to reduce the speed limit on southbound Taylor Blvd at approach to Pleasant Hill Road to improve safety at the merge. (Action 4.13)~~	Combined with the safety action above
	~~Pursue opportunities to install permanent, speed feedback signs to slow vehicle speeds and reduce the severity of collisions. (Action 4.14)~~	Combined with the safety action above
	~~Seek funding to provide increased enforcement of the existing speed limits. (Action 4.15)~~	Combined with the safety action above
	~~Minimize number of new street and driveway access points to the extent that is feasible. (Action 4.18)~~	Removed
Safety-3	Develop a program to coordinate the collection and analysis of safety data, identify areas of concern, and propose safety-related improvements and user awareness so as to support state and federal safety programs and performance measures.	Added using language drafted for all action plans
Safety-4	Work with CCTA to implement the Countywide Vision Zero Framework.	Added using language drafted for all action plans
Safety-5	Work with Caltrans to prepare an incident management plan for the SR-24.	Added using language drafted for all action plans
Safety-6	Conduct a study to identify all safety-related transportation improvements needed within 500 feet of schools.	Added using language drafted for all action plans
Safety-7	Work with CCTA, MTC, and East Bay Regional Parks to study and avoid the impacts safety of electric bicycles on local trails and streets, so as to eventually allow electric bicycles on all local trail facilities.	Added using language drafted for all action plans
Equity		
Equity-1	Conduct a study to identify strategies to increase low-income resident access to transit hubs, jobs, and areas with goods and services (for	Added using language drafted for all action plans

TABLE 1 RECOMMENDED REVISIONS TO THE LAMORINDA ACTION PLAN ACTIONS

New Action Number	Proposed Action Language Revisions	Notes
	example, in Lamorinda the study could explore enhancing existing transit hubs, constructing new transit hubs, and first/last mile solutions).	
Equity-2	Increase express bus service to regional job centers, particularly those with low-income workers, inside and outside of the subregion.	Added using language drafted for all action plans
Equity-3	Increase access to car sharing services for low-income residents and support financial incentives for using them.	Added using language drafted for all action plans
Climate Change		
Climate Change-1	Encourage "green" ~~commuting~~ travel including ZEV and NEV vehicles, clean fuel infrastructure and car sharing. ~~(Action 2.05)~~	Revised to include all types of travel, not just commute travel
Climate Change-2	Continue to implement a program to support deployment of high-quality, fast and diverse electrical vehicle chargers in the subregion.	Added using language drafted for all action plans
Climate Change-3	Continue to promote electric vehicle ownership by offering financial incentives and providing educational programs and demonstrations. Work with regional agencies, local employers and schools to increase tele-work, compress work weeks, alternative work location, and flex schedules, and provide pre-tax employer transportation benefit programs.	Added using language drafted for all action plans Added using language drafted for all action plans
Climate Change-4	Work with 511 Contra Costa and local jurisdiction Transportation Demand Management Advisory Councils to expand Transportation Demand Management (TDM) programs, adopt local TDM plans, and conduct regular monitoring and reporting for program effectiveness.	Added using language drafted for all action plans
Technology		
Technology-1	~~Evaluate opportunities for adaptive signal timing. (Action 4.23)~~ Upgrade the signal system along certain Routes of Regional Significance, including the 18 signals identified for interconnection.	Revised using language drafted for all action plans
Technology-2	Conduct a study of the feasibility of a pilot Dynamic Personal Micro Transit systems somewhere in the Lamorinda area.	Added using language drafted for all action plans
Technology-3	Work with local transit agencies, regional policymakers, and private entities to promote pooled regional ridesharing services.	Added using language drafted for all action plans
Technology-4	Coordinate with CCTA and local jurisdictions to identify solutions to the Intelligent Transportation System (ITS) communications needs during the development and implementation of a Regional ITS Communications Plan and/or regional communications infrastructure, including expanding fiber to link all traffic signals and bolster communications for signals, etc.	Added using language drafted for all action plans

TABLE 1 RECOMMENDED REVISIONS TO THE LAMORINDA ACTION PLAN ACTIONS

New Action Number	Proposed Action Language Revisions	Notes
Funding		
Funding-1	Continue to ~~P~~participate in and periodically update the Lamorinda Transportation Impact Fee (LTIF) structure to ensure it will produce sufficient funds in light of current and anticipated growth rates and construction costs. ~~(Action 5.01)~~	Revised to be more specific
	~~Seek funding to implement options selected by local jurisdictions, such as inclusion of projects in the expenditure plan(s) of future regional funding plans and measures. (Action 4.02)~~	Removed
	~~Support continuation and expansion of Measures J return-to-source funds for road maintenance. (Action 5.02)~~	Removed
Misc.		
	~~Support school start times on Pleasant Hill Road that reduce peak commute loads on the roadway. (Action 2.03)~~	Combined with alternative schedules action below and to be subarea-wide
	~~Support Transportation Demand Management (TDM) programs at St. Mary's College and the high schools, middle schools and elementary schools that encourage students to take alternative modes of transportation to school to reduce demand on the roadway and increase vehicle occupancy rates. (Action 2.06)~~	Removed in place of the more general action above
	~~In cooperation with Lamorinda jurisdictions, develop TDM plans and provide consultations to improve mobility and decreased parking demand for new development and redevelopment while not reducing parking supply. (Action 2.10)~~	Removed because this topic is now implied with the revised action above
	~~Seek Measure J funding of HOV facility needs for San Pablo Dam Road and Camino Pablo. (Action 4.17)~~	Removed, covered under general HOV/HOT/Express lane actions under freeway section
Misc.-1	Assist local juridictions in ~~R~~reviewing and considering options for improving curb management and bus and truck loading on public streets regulations and actions. ~~(Action 4.24)~~	Revised
	~~Seek to establish reciprocity agreements with jurisdictions outside of Lamorinda to mitigate the downstream impacts of proposed new development projects or General Plan Amendments that could adversely affect ability to achieve the MTSOs. (Action 5.03)~~	Removed
Multimodal		
Multimodal-1	~~Prepare letters of support to Caltrans, ACTC, CCTA, and MTC for continued improvement of high occupancy vehicle and transit capacity in the I-80 corridor to reduce traffic pressure on San Pablo Dam Road and Camino Pablo. Request annual reports from transit operators to WCCTAC and SWAT on their activities related to this action. Seek additional funds for public transit. (Action 5.07)~~	Removed because the updated West County Action Plan will include many improvements to the I-80 corridor.