APPENDIX 3.2-C: TRAFFIC MITIGATION MEASURES SCREENING

1 INTRODUCTION

On February 5, 2021, the California High-Speed Rail Authority (Authority) finalized "Decision-making Guidance for the Adoption of Traffic Mitigation Measures" (Authority 2021). This memorandum describes Senate Bill (SB) 743 and its effect on the California Environmental Quality Act (CEQA) transportation analysis, describes National Environmental Policy Act (NEPA) requirements concerning the analysis of traffic effects and consideration of mitigation, and provides criteria for screening and selection of traffic mitigation. Five screening criteria were identified:

- The mitigation measure does not cause an increase in vehicle miles traveled (VMT).
- The measure would not contradict the objectives of SB 743.
- The measure is not more disruptive to the community than the traffic effect itself.
- The measure does not result in unmitigable secondary environmental effects.
- The Authority has determined the measure is practicable.

This appendix describes screening of traffic mitigation measures under consideration by the Authority as mitigation for traffic delays/congestion. Most of the measures would apply to both Alternative A and Alternative B but some of the measures are different in the San Jose Diridon Station Approach Subsection. Measures under consideration would not meet one or more of the screening criteria above at 75 locations leaving 19 remaining measures for Alternatives A and B and these measures are included in Section 3.2, Transportation.

2 SCREENING METHODOLOGY

The application and interpretation of the screening criteria are described below.

Increase in Vehicle Miles Traveled

The Office of Planning and Research (OPR) (OPR 2018) has issued guidance in the evaluation of VMT, given its role in SB 743 implementation. This section provides a description of project types that OPR indicates would generally lead to a measurable and substantial increase in vehicle travel/VMT.

- Addition of through lanes on existing or new highways, including general purpose lanes, high-occupancy vehicle (HOV) lanes, peak period lanes, auxiliary lanes, or lanes through grade-separated interchanges

OPR identifies a list of road projects, the most potentially relevant of which are provided in the following list, that would not likely lead to a substantial or measurable increase in vehicle travel and therefore generally would not require an induced travel analysis.

- Addition of an auxiliary lane of less than 1 mile in length designed to improve roadway safety
- Addition of roadway capacity on local or collector streets provided the project also substantially improves conditions for pedestrians, cyclists, and, if applicable, transit
- Installation, removal, or reconfiguration of traffic control devices, including Transit Signal Priority features
- Timing of signals to optimize vehicle, bicycle, or pedestrian flow
- Installation of traffic metering systems, detection systems, cameras, changeable message signs and other electronics designed to optimize vehicle, bicycle, or pedestrian flow
- Grade separation to separate vehicles from rail, transit, pedestrians, or bicycles or to replace a lane to separate preferential vehicles (e.g., HOV, HOT, trucks) from general vehicles
- Installation of roundabouts or traffic circles
- Installation or reconfiguration of traffic calming devices
- Addition of new or enhanced bike or pedestrian facilities on existing streets/highways or within existing public rights-of-way

- Addition of Class I bike paths, trails, multi-use paths, or other off-road facilities that serve nonmotorized travel
- Rehabilitation, maintenance, replacement, safety, and repair projects designed to improve the condition of existing transportation assets

The National Center for Sustainable Transportation (NCST) (NCST n.d.) provides an induced travel calculator that estimates the VMT induced annually because of adding vehicle travel lanes in any of California's urbanized counties. The annual induced VMT is calculated based on the facility type (freeway vs arterial), county location, and number of lane miles added.

In summary, the current mainstream view, articulated by OPR, is that mitigation measures that include signal timing modifications, installation of new traffic control devices, and/or turn lanes at intersections would not likely lead to a measurable increase in vehicle travel and VMT. Mitigation measures that add through lanes, either on freeway or arterial facilities, are likely to result in induced travel effects, particularly if the added travel lanes are through lanes of a mile or more in length.

While there are some differing opinions on this matter, the Authority has decided to rely on the written OPR guidance and follow the guidance of the state agency at the forefront of the consideration of VMT at this time.

Contradict the Objectives of SB 743

The objectives of SB 743 are as follows:

- To promote the state's goals of reducing greenhouse gas (GHG) emissions and traffic-related air pollution
- To promote the development of a multimodal transportation system
- To provide clean, efficient access to destinations
- To address the environmental impacts of traffic, such as noise, air pollution, and safety
- To balance congestion management with statewide goals related to infill development (diversity of land uses), promotion of public health through active transportation.

This screening evaluation considered a mitigation measure to not pass screening for the SB 743 criterion if it contradicted a SB 743 objective, as in it would make it more difficult to achieve the objectives due to some physical or operational hindrance.

- *GHG emissions and air pollution*: SB 743 identifies that reducing VMT will result in reducing GHG emissions and air pollution. Thus, a mitigation measure will be considered to contradict SB 743 if it substantially increases VMT. Since all the traffic mitigation measures will reduce traffic delay at intersections, if they do not substantially increase VMT, they would lower localized emissions (such as carbon monoxide) at congested intersections.
- *Multimodal transportation system*: Traffic mitigation measures, by definition, are addressing on-road vehicle congestion/delay, and on-road travel is dominated by private passenger vehicles. Thus, the primary beneficiary of traffic mitigation measures are private passenger vehicles, but bus transit will also benefit where transit crosses an intersection addressed by mitigation. None of the traffic mitigation measures under consideration would block or impede bus, rail, pedestrian, or bicycle modes of travel; they can all be designed to accommodate existing bike lanes, sidewalks, or bus stops. As such, they will not hinder the operation of a multimodal system or block the completion of future multimodal investments. As such, none of the measures currently under consideration are considered to contradict this objective.
- *Clean, efficient access to destinations*: The San Francisco to San Jose Project Section varies substantially in terms of the existence of transit, bicycle, and pedestrian services and facilities and the mode share of alternatives to vehicles varies accordingly. In San Francisco, in some downtown areas (like Redwood City, Palo Alto, and San Jose) and in proximity to intermodal stations (including Caltrain and Bay Area Rapid Transit stations), use of transit, bicycle, and pedestrian modes of travel

is higher than in other areas where personal vehicles dominate modes of travel in the project corridor. As a result, passenger vehicles are the most efficient mode of travel at present in some portions of the Caltrain corridor. As to the "clean" criterion, transit modes are much cleaner on a passenger mile basis than personal vehicles, on average. However, none of the traffic mitigation measures under consideration would block or impede bus, rail, pedestrian, or bicycle modes of travel; as such, they will not hinder the operation of clean, efficient transit at present or block the development of such modes in the future. As such, none of the measures currently under consideration are considered to contradict this objective.

- *Noise, air pollution, and safety*: Air pollution was addressed in the first subcriteria above. SB 743 does not state that one of its purposes is to reduce noise or improve safety. Instead, it states that switching from level of service to VMT does not relieve a lead agency from still addressing noise or safety associated with increases in traffic. As such, noise and safety have not been used as a SB 743 consistency criteria for this evaluation.
- *Infill development*: Traffic mitigation supports all development but is not targeted at infill particularly. It is possible that traffic mitigation measures may help residents in infill areas along the project corridor, when they drive, to get in and out of their infill developments better. None of the traffic mitigation measures under consideration would block or otherwise impede infill development. As such, none of the measures currently under consideration are considered to contradict this objective.
- *Promotion of public health through active transportation:* Traffic mitigation measures do not promote active transportation such as biking or walking. However, all the traffic mitigation measures under consideration can be designed to accommodate existing bike lanes and sidewalks. As such, none of the measures currently under consideration are considered to contradict this objective.

More Disruptive than the Traffic Effect Itself

Evaluation under this criterion requires comparison of the effects of implementing a mitigation measure, which may include residential or business displacement, conversion of prime farmland or other effects, against the benefits of reducing traffic congestion/delay. This requires a comparison of different types of effects, which is not readily reduced to an objective quantitative comparison. As a result, there is inevitably some level of subjective judgement in completing screening against this criterion. Nevertheless, the evaluation of the mitigation measures regarding this criterion was conducted as follows:

- The traffic benefits of the measures were identified by either identifying the highest traffic delay reduction during a peak period provided by the measure for the quantified measures or by identifying the traffic delay impact during a peak period for the unquantified measures.
- The secondary effects were identified by identifying first whether the measure could be completed in the existing road right-of-way or not. If it could not, then the effects of acquisition of right-of-way were evaluated by reviewing whether biological habitat, built environment historic sites, residences, business structures, important farmland, or publicly owned parks, recreational areas, or wildlife refuges were present. Operational effects considered included generation of VMT (which is also used as a proxy for operational air pollution, GHG emissions, and energy) and noise.
- Temporary effects during construction were not considered to be more disruptive than permanent traffic delays that are more than the adverse criteria used in the EIR/EIS.
- Permanent effects that could be resolved by mitigation were not considered to be more disruptive than permanent traffic delays that are more than the adverse criteria used in the EIR/EIS.

Unmitigable Secondary Environmental Effects

"Unmitigable" effects are defined in two different ways for this evaluation: (1) if the measure would result in a significant unavoidable impact under CEQA; and/or (2) if the measure would result in adverse effects that cannot be avoided under NEPA that would be considered adverse even after the adoption of other measures to reduce the secondary effects.

The focus in this evaluation is on permanent effects, not temporary effects that may occur during the construction of site-specific traffic measures.

Practicable

Practicability was defined in terms of technical, logistical, and financial feasibility. Logistical feasibility includes whether the measure is within the defined responsibilities and mission of the Authority. Logistical feasibility also includes the view of local governments. Since traffic mitigation measures would occur within local streets under the jurisdiction of local cities, the Authority conducted outreach to those cities with potential traffic mitigation measures. If the local city opposed a mitigation measure, it was considered logistically infeasible since local jurisdictions must concur with changes to the roadways under their control.

3 OUTREACH TO LOCAL JURISDICTIONS

Authority staff and consultants conducted outreach to the six cities with candidate mitigation measures that passed the screening evaluation: San Francisco, San Bruno, Burlingame, Millbrae, Menlo Park, and San Jose. Because of the overlap between the San Jose to Merced (JM) project section with the FJ project section, San Jose outreach was done previously as part of JM outreach.

Authority staff and the EEC provided a description of the traffic mitigation candidates identified for each of the six cities in advance of meetings with each city. The measures were discussed with city representatives. In addition, five of the cities (San Francisco, San Bruno, Millbrae, Redwood City, Menlo Park) provided additional written input concerning the mitigation measures.

The Authority evaluated the city comments provided in the meetings and/or in writing. The review of that input and the actions taken in response to that input is summarized by jurisdiction below:

- San Francisco
  - TR-MM#1b: Second Street/Townsend Street—Add Protected Signal Phase and Optimize Signal Timing
    - Revise mitigation language to be more flexible around signal optimization.
  - TR-MM#1c: Harney Way/Thomas Mellon Circle Mid-Term Harney Way Improvements
    - Revise mitigation language to clarify improvement title.
  - TR-MM#2: Install Transit Priority Treatments
    - Revise language to be more flexible (delete reference to intersection treatments or signal priority as they may involve segments or different treatments).
- San Bruno
  - No changes. City supported both candidate mitigation measures
    - TR-MM#1a.1 Scott Street/San Mateo Avenue—Install Traffic Signal
    - TR-MM#1d: Scott Street/Herman Street—Install Traffic Signal, Extend Sidewalk, and Add Northbound and Southbound Right Turn Lanes
- Burlingame
  - Oak Grove/Carolan Avenue
    - The city suggested adding a traffic signal as a mitigation measure at this intersection. Subsequent review indicated that the Caltrain Peninsula Corridor Electrification Project (PCEP) already has a mitigation for that project to signalize this intersection and thus the PCEP mitigation is already presumed in the 2040 No Project and 2040 Project conditions. No additional measure added to the EIR/EIS.
  - City concurred with the following measures:
    - TR-MM#1a.2: North Lane/California Drive—Install Traffic Signal
    - TR-MM#1a.3: North Lane/Carolan Avenue—Install Traffic Signal

    - TR-MM#1a.4: Peninsula Avenue/Arundel Road—Install Traffic Signal

- Millbrae
  - El Camino Real (SR 82)/Hillcrest Boulevard—Reconfigure Westbound Approach to Add Left Turn Lane
    - The mitigation involved restriping the two-lane westbound approach to add a left turn pocket to mirror the opposite 3-lane eastbound approach. Staff does not support. Delete mitigation and indicating no feasible measure exists.
  - TR-MM#1e: El Camino Real (SR 82)/Murchison Drive—Reconfigure Westbound Approach to Add Left and Right Turn Lanes; Add Overlap Signal Phase; Install New Traffic Signal at California Drive/Murchison Drive
    - Retain mitigation measure but provide additional text to describe/clarify the proposed improvements.
  - TR-MM#1f: Millbrae Avenue/Rollins Road—Reconfigure Eastbound and Northbound Approaches; Add Overlap Signal Phase and Optimize Signal Timing
    - Eliminate the mitigation measure's lane reconfigurations due to City concerns and instead have the mitigation address signal phasing/timing enhancements (low-cost improvement).
  - TR-MM#1g: Millbrae Avenue/US 101 Northbound Ramps—Widen Off-Ramp to Extend Northbound Left Turn Lane Storage
    - City concurred with measure. Keep measure.
- Redwood City
  - TR-MM#1a.5: Brewster Avenue/Perry Street—Install Traffic Signal
    - Revise general signal mitigation language to add emergency vehicle signal preemption to the list of potential signal-related improvements.
  - Broadway/Perry Street—Install Traffic Signal
    - Subsequent evaluation indicated tradeoffs of improvement in one peak period and worsening of conditions in the other peak period. Delete mitigation and indicating no feasible measure exists.
  - TR-MM#1h: Whipple Avenue/El Camino Real—Add Overlap Signal Phase and Optimize Signal Timing
    - Add text: (1) note that improvement requires Caltrans approval and (2) clarify that interconnect reference in mitigation measure applies to adjacent intersections.
  - TR-MM#1i: Whipple Avenue/Arguello Street—and Optimize Signal Timing
    - Recommend adding text: (1) clarify that interconnect reference in mitigation measure applies to adjacent intersections.
  - TR-MM#1a.6: Main Street/Beech Street
    - Based on review of "South Main Mixed-Use Project" redevelopment plans, add traffic signal as new mitigation measure. Measure would meet all HSR screening criteria.
- Menlo Park
  - Oak Grove Avenue/Alma Street—Install Traffic Signal
    - City does not support this mitigation. Delete this mitigation and note City opposition.
  - Add two new mitigation measures identified from the City's Transportation master Plan

- El Camino/Ravenswood Avenue (TMP 89) – remove median and add northbound right turn lane. Evaluation of this measure indicated that it would not mitigate project impacts
- Laurel Street/Ravenswood Avenue (TMP 74) - widen eastbound Ravenswood to provide shared through-left and right turn lane. Measures would meet all HSR screening criteria. However, subsequent analysis found that this measure would not be effective at improving traffic conditions, so it is not included as mitigation for the project.

- San Jose
  - The city had no objections to the five mitigation measures identified in the overlap area between FJ and JM:
    - TR-MM#1a.7: Cahill Street/Stover-Crandall Street—Install Traffic Signal
    - TR-MM#1a.8: Montgomery Street/Stover-Crandall Street—Install Traffic Signal
    - TR-MM#1a.9: Cahill Street/West San Fernando Street Intersections—Install Traffic Signal
    - TR-MM#1j: The Alameda (SR 82)/Taylor Street–Naglee Avenue—Restripe Northbound Approach
    - TR-MM#1k: Optimize Signal Coordination on West Santa Clara Street from Stockton Street to Autumn Street in San Jose

4 SCREENING RESULTS BY CRITERION

The site-specific traffic mitigation measures under consideration are shown in Table 1, including identification of the location of impacts addressed, a description of the measure, identification of which alternatives the mitigation applies to, the PM peak intersection traffic volumes, the traffic delay effects of the different alternatives, and the traffic benefits of the mitigation in terms of reduced delay.

The screening evaluation and results are summarized below. Table 2 presents the details of the evaluation including description of the secondary effects, whether additional right-of-way is required, whether the additional right-of-way acquisition would likely result in displacement of residences or businesses, whether the measure has an additional effect on top of the project alternatives. Table 2 also identifies whether the measure would increase VMT, contradict the objectives of SB 743, have an unmitigable secondary effect, be more disruptive than the traffic effect, and whether it would pass the four screening criteria.

Increase in Vehicle Miles Traveled

Following OPR guidance, traffic measures improvements that do not include widening of roadways between crossing streets are not considered to result in a substantial increase in VMT. No measures were considered to result in a substantial increase in VMT.

Contradict the Objectives of SB 743

None of the measures are considered to contradict SB 743 objectives for the reasons discussed above in the discussion of methodology.

More Disruptive to the Community than the Traffic Effect Itself

Intersection improvements at several locations were identified as resulting in secondary effects that are more disruptive to the community than the traffic effect itself and thus would not meet this criterion. The secondary effects that outweighed the traffic benefits of the measures were primarily the displacement of residences or businesses.

Unmitigable Secondary Environmental Effects

Intersection improvements at several locations were identified as resulting in unmitigable secondary effects. These unmitigable effects primarily concern displacement of residential and/or commercial businesses.

Practicability

Many of the measures are standard local intersection improvements. However, they were considered impracticable to implement if they would result in substantial property acquisitions and displacement. Due to the substantial cost and high level of disruption and right-of-way needs, grade separations are not considered financially or institutionally practicable for implementation by the Authority given its defined responsibilities and mission.

5 OVERALL RESULTS AND RECOMMENDATIONS

The following measures passed the screening criteria:

Alternatives A and B:

- TR-MM#1a.1 Scott Street/San Mateo Avenue—Install Traffic Signal
- TR-MM#1a.2: North Lane/California Drive—Install Traffic Signal
- TR-MM#1a.3: North Lane/Carolan Avenue—Install Traffic Signal
- TR-MM#1a.4: Peninsula Avenue/Arundel Road—Install Traffic Signal
- TR-MM#1a.5: Brewster Avenue/Perry Street—Install Traffic Signal
- TR-MM#1a.6: Main Street/Beech Street Street—Install Traffic Signal
- TR-MM#1a.7: Cahill Street/Stover-Crandall Street—Install Traffic Signal
- TR-MM#1a.9: Cahill Street/West San Fernando Street Intersections—Install Traffic Signal
- TR-MM#1b: Second Street/Townsend Street—Add Protected Signal Phase and Optimize Signal Timing
- TR-MM#1c: Harney Way/Thomas Mellon Circle—Near-Term Harney Way Improvements
- TR-MM#1d: Scott Street/Herman Street—Install Traffic Signal, Extend Sidewalk, and Add Northbound and Southbound Right Turn Lanes
- TR-MM#1e: El Camino Real (SR 82)/Murchison Drive—Reconfigure Westbound Approach to Add Left and Right Turn Lanes; Add Overlap Signal Phase; Install New Traffic Signal at California Drive/Murchison Drive
- TR-MM#1f: Millbrae Avenue/Rollins Road—R Optimize Signal Timing and Coordination
- TR-MM#1g: Millbrae Avenue/US 101 Northbound Ramps—Widen Off-Ramp to Extend Northbound Left Turn Lane Storage
- TR-MM#1h: Whipple Avenue/El Camino Real—Add Overlap Signal Phase and Optimize Signal Timing
- TR-MM#1i: Whipple Avenue/Arguello Street—Optimize Signal Timing
- TR-MM#1k: Optimize Signal Coordination on West Santa Clara Street from Stockton Street to Autumn Street in San Jose

Alternative A only:

- TR-MM#1a.8: Montgomery Street/Stover-Crandall Street—Install Traffic Signal

Alternative B only:

- TR-MM#1j: The Alameda (SR 82)/Taylor Street–Naglee Avenue—Restripe Northbound Approach

The overall results of the screening are as follows (the remaining measures are shown in Table 2):

- Alternative A:
  - Measures excluded at 70 locations

  - 18 measures remaining

- Alternative B:
  - Measures excluded at 75 locations
  - 18 measures remaining

6 REFERENCES

California High-Speed Rail Authority (Authority). 2021. *Decision-making Guidance for the Adoption of Traffic Mitigation Measures*. Memorandum from Serge Stanich, Director of Environmental Services, to Mike McCormick, Gary Kennerley, Rick Simon, and Mark Chang, Strategic Delivery. February 5, 2021.

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Table 1 Traffic Mitigation Measures Screening Evaluation, Part One

Mitigation Measure or Intersection Location	Intersection(s)	Community	Detail	Alt. A	Alt. B	Traffic Delay	MM Benefit
TR-MM#1a.1: Scott Street/San Mateo Avenue—Install Traffic Signal	GX43	San Bruno	Signalize intersection	X	X	8.6	-53.9
TR-MM#1a.2: North Lane/California Drive—Install Traffic Signal	GX17	Burlingame	Signalize intersection	X	X	N/A	-103
TR-MM#1a.3: North Lane/Carolan Avenue—Install Traffic Signal	GX18	Burlingame	Signalize intersection	X	X	N/A	-121
TR-MM#1a.4: Peninsula Avenue/Arundel Road—Install Traffic Signal	GX26	Burlingame	Signalize intersection	X	X	N/A	N/A
TR-MM#1a.5: Brewster Avenue/Perry Street—Install Traffic Signal	GX58	Redwood City	Signalize intersection	X	X	N/A	-147
TR-MM#1a.6: Main Street/Beech Street—Install Traffic Signal	GX65	Redwood City	Signalize intersection	X	X	N/A	N/A
TR-MM#1a.7: Cahill Street/Stover-Crandall Street—Install Traffic Signal	D21	San Jose	Signalize intersection	X	X	89.4	-167
TR-MM#1a.8: Montgomery Street/Stover-Crandall Street—Install Traffic Signal	D22	San Jose	Signalize intersection	X		103.9	-167.1
TR-MM#1a.9: Cahill Street/West San Fernando Street Intersections—Install Traffic Signal	D23	San Jose	Signalize intersection	X	X	60.5	-38.2
TR-MM#1b: Second Street/Townsend Street—Add Protected Signal Phase and Optimize Signal Timing	SF17	San Francisco	Install signal equipment at the Second Street/Townsend Street intersection to optimize timing to serve demand.	X	X	7.2	-2.5
TR-MM#1c: Harney Way/Thomas Mellon Circle—Near-Term Harney Way Improvements	MF10	San Francisco	Construction of SFMTA Near-Term Harney Way – 101 Transit Crossing Improvements if the City and County of San Francisco or other entities have not yet implemented this project. Realignment of Thomas Mellon Circle to intersect Harney Way at a new intersection approximately 100 feet north of Alana Way, installation of a traffic signal at the newly configured Harney Way/Thomas Mellon Circle intersection.	X	X	8.1	-20.6
TR-MM#1d: Scott Street/Herman Street—Install Traffic Signal, Extend Sidewalk, and Add Northbound and Southbound Right Turn Lanes	GX8	San Bruno	Install traffic signal equipment at the Scott Street/Herman Street intersection; reconfigure lanes to provide exclusive northbound and southbound right turn lanes on Herman Street; and, install approximately 120 lineal feet of sidewalk, curb, and gutter on the north side of Scott Street to provide continuous pedestrian facilities on the north side of Scott Street between Montgomery Avenue and Herman Street including pedestrian safety features at the at-grade rail crossing as required by Caltrain.	X	X	N/A	-150.9
TR-MM#1e: El Camino Real (SR 82)/Murchison Drive—Reconfigure Westbound Approach to Add Left and Right Turn Lanes; Add Overlap Signal Phase; Install New Traffic Signal at California Drive/ Murchison Drive	MB6	Millbrae	Reconfigure the westbound Murchison Drive approach to the El Camino Real (SR 82)/Murchison Drive intersection to add exclusive left and right turn lanes with an overlap signal phase for the westbound right turn and southbound left turn. This improvement would require modifying the northernmost of two eastbound lanes on Murchison Drive to provide left turn pockets of approximately 150 feet in each direction between El Camino Real and California Drive and removing parking on the south side of Murchison Drive between El Camino Real and California Drive, and replacing the parking with a protected eastbound bike facility as designated in the Burlingame Pedestrian and Bicycle Plan, and modifying the traffic signal. Would also include new traffic signal at the California Drive/Murchison Drive intersection to minimize eastbound queue spillback along eastbound Murchison Drive into El Camino Real and traffic signal interconnect equipment with the El Camino Real/Murchison Drive intersection to the extent necessary for coordinating signal phases and vehicle movements between both the El Camino Real/Murchison Drive and California Drive/ Murchison Drive intersection controllers.	X	X	24.3	-38.7
TR-MM#1f: Millbrae Avenue/Rollins Road—Optimize Signal Timing and Coordination	MB8	Millbrae	Furnish and install signal equipment at the Millbrae Avenue/Rollins Road intersection to optimize timing to serve demand at the intersection and coordinate signal timing along the Millbrae Avenue corridor between El Camino Real and the US 101 Northbound Ramps. Along the Millbrae Avenue corridor, the City of Millbrae plans to convert the northernmost westbound lane on Millbrae Avenue at El Camino Real from a westbound through lane to a westbound through/right turn lane for improved operations.	X	X	6.4	-11.8

Mitigation Measure or Intersection Location	Intersection(s)	Community	Detail	Alt. A	Alt. B	Traffic Delay	MM Benefit
TR-MM#1g: Millbrae Avenue/US 101 Northbound Ramps-Widen Off-Ramp to Extend Northbound Left Turn Lane Storage	MB11	Millbrae	Widen the northbound US 101 off-ramp to Millbrae Avenue to extend the left turn pocket to a length of approximately 600 feet. This improvement would require modifications to ramp lighting, barriers, signing, drainage, and landscaping.	X	X	31.4	-61.1
TR-MM#1h: Whipple Avenue/El Camino Real—Add Overlap Signal Phase and Optimize Signal Timing	GX55	Redwood City	Add an overlap signal phase to the northbound right turn and westbound left turn movements, optimize signal timing at the Whipple Avenue/Arguello Street intersection, and coordinate timing changes with adjacent coordinated signals on Whipple Ave. This improvement would require traffic signal modifications.	X	X	8.6	-24.4
TR-MM#1i: Whipple Avenue/Arguello—Optimize Signal Timing	GX56	Redwood City	Optimize signal timing including optimizing cycle length and splits at the Whipple Avenue/Arguello Street intersection and signal timing at adjacent intersections that are interconnected along Whipple Avenue. This improvement would require traffic signal modifications.	X	X	8.4	-35.3
TR-MM#1j: The Alameda (SR 82)/Taylor Street–Naglee Avenue—Restripe Northbound Approach	D4	San Jose	Approach would be reconfigured to provide a left turn lane, two through lanes, and an exclusive right turn lane		X	9.6	-6.6
TR-MM#1k: Optimize Signal Coordination on West Santa Clara Street from Stockton Street to Autumn Street in San Jose	D13, D14, D15	San Jose	Modify the signal and optimize the signal timings and coordination for the traffic signals on West Santa Clara Street from Stockton Street to Autumn Street. This improvement includes the intersections of West Santa Clara Street with Stockton Street, Cahill Street Montgomery Street, and Autumn Street	X	X	23.5	-16.5
Fourth Street/Townsend Street	SF1	San Francisco	The Central Subway rail is in 4th Street median and Townsend Corridor Improvement Project completed in 2020 added bike lanes. Any intersection improvement would require building acquisitions on 4 corners and potential removal of bike lanes which is considered unacceptable. *No feasible intersection capacity mitigations identified.*	X	X	20.1	N/A
Fourth Street/King Street	SF2	San Francisco	The Central Subway rail in 4th Street median and the T Third Rail is in King Street median and thus intersection improvement would require building acquisitions on 3 corners, which is considered unacceptable. *No feasible intersection capacity mitigations identified.*	X	X	7.4	N/A
Fifth Street/King Street/I-280 ramps	SF3	San Francisco	The elevated I-280 ramps are located on the southern approach so that ramp expansion would require building acquisitions on 3 corners, which is considered unacceptable. *No feasible intersection capacity mitigations identified.*	X	X	N/A	N/A
Fourth Street/Brannan Street	SF4	San Francisco	The Central Subway rail is in 4th Street median, and thus intersection improvement would require building acquisitions on 4 corners which is considered unacceptable. *No feasible intersection capacity mitigations identified.*	X	X	5.7	N/A
Fourth Street/Bluxome Street	SF8	San Francisco	The Central Subway rail is in 4th Street median, and thus intersection improvement would require building acquisitions on 4 corners. *No feasible intersection capacity mitigations identified.*	X	X	N/A	N/A
Fifth Street/Bryant Street	SF10	San Francisco	Recent complete street changes that installed separated bikeways and protected northbound right turn signal phases to separate through bicycle movements from conflicting vehicle turning movements. Removal of complete street improvements are considered unacceptable. *No feasible intersection capacity mitigations identified.*	X	X	7.6	N/A
Sixth Street/Brannan Street/I-280 ramps	SF15	San Francisco	There are elevated I-280 ramps on south approach, so intersection improvements would require building acquisitions on 3 corners, which is considered unacceptable. *No feasible intersection capacity mitigations identified.*	X	X	13.1	N/A
Seventh Street/Townsend Street	SF18	San Francisco	The 4th and King railyards are located on the southeast corner and any intersection improvement would require displacing a portion of the railyards or building acquisitions on 3 corners and displacing recently added bike lanes, any of which is considered unacceptable. *No feasible intersection capacity mitigations identified.*	X	X	8.0	N/A

Mitigation Measure or Intersection Location	Intersection(s)	Community	Detail	Alt. A	Alt. B	Traffic Delay	MM Benefit
Mission Bay Drive/Seventh Street	GX1	San Francisco	There are rail tracks on east side and thus intersection improvements at surface would require building acquisition on west side which is considered unacceptable. The Pennsylvania Tunnel Extension (estimated at $2 billion additional cost to DTX) in San Francisco, would address impact, but is considered infeasible due to cost. *No feasible intersection capacity mitigations identified.*	X	X	5.0	N/A
Mission Bay Drive/Berry Street	GX2	San Francisco	There are rail tracks on the west side and I-280 and Mission Creek on east side so an improvement at surface is not feasible. The Pennsylvania Tunnel Extension (estimated at $2 billion additional cost to DTX) in San Francisco, would address impact, but is considered infeasible due to cost. *No feasible intersection capacity mitigations identified.*	X	X	6.9	N/A
16th Street/Seventh Street/Mississippi Street	GX3	San Francisco	I-280 is on the east side, which would mean that any surface intersection improvement would require building acquisition on west side, which is considered unacceptable. The Pennsylvania Tunnel Extension (estimated at $2 billion additional cost to DTX) in San Francisco, would address impact, but is considered infeasible due to cost. *No feasible intersection capacity mitigations identified.*	X	X	56.7	N/A
16th Street/Third Street	GX7	San Francisco	The T Third rail is in the median of Third Street, so a surface intersection improvement would require building acquisition on 4 corners including Benioff's Children's Hospital, Chase Center office, which is considered unacceptable. The Pennsylvania Tunnel Extension (estimated at $2 billion additional cost to DTX) in San Francisco, would address impact, but is considered infeasible due to cost. *No feasible intersection capacity mitigations identified.*	X	X	32.0	N/A
Geneva Extension/US 101 Northbound Ramps	MF16	San Francisco	The interchange northbound ramp cannot feasibly be expanded given proximity to San Francisco Bay without resulting in new fill in the Bay, which is considered unacceptable. *No feasible intersection capacity mitigations identified.*	X	X	4.6	N/A
Linden Avenue/Dollar Avenue	GX5	South San Francisco	There are rail tracks on east side which would mean that any intersection improvement would require building acquisition on the west side, which is considered unacceptable. The City of South San Francisco and City of San Bruno are jointly conducting the South Linden Avenue and Scott Street Grade Separation Planning Study. A preferred alternative has yet to be identified for the South Linden Avenue and Scott Street at-grade crossing areas. A grade separation to address this traffic delay effect is considered infeasible due to cost. *No feasible intersection capacity mitigations identified.*	X	X	22.0	N/A
Linden Avenue/San Mateo Avenue	GX6	South San Francisco	Due to existing right-of-way constraints, any intersection improvement would require building acquisition on 3 corners, which is considered unacceptable. *No feasible intersection capacity mitigations identified.*	X	X	17.1	N/A
El Camino Real/Victoria Avenue	MB2	Millbrae	The City of Millbrae has approved, as part of a land development project, a street right-of-way narrower than would be needed for intersection improvement to address the traffic delay project effect at this location. As such, intersection improvement would be infeasible due to right-of-way constraints. *No feasible intersection capacity mitigations identified.*	X	X	36.0	N/A
El Camino Real/Linden Avenue (relocated)	MB4	Millbrae	The City of Millbrae has approved, as part of a land development project, a street right-of-way narrower than would be needed for intersection improvement to address the traffic delay project effect at this location. As such, intersection improvement would be infeasible due to right-of-way constraints. *No feasible intersection capacity mitigations identified.*	X	X	46.1	N/A
El Camino Real/Millbrae Avenue	MB5	Millbrae	The eastern leg of the intersection is an elevated bridge over the rail corridor and thus intersection improvement would require building acquisition on 3 corners which is considered unacceptable. *No feasible intersection capacity mitigations identified.*	X	X	6.8	N/A

Mitigation Measure or Intersection Location	Intersection(s)	Community	Detail	Alt. A	Alt. B	Traffic Delay	MM Benefit
El Camino Real/Trousdale Drive	MB7	Millbrae	Intersection improvement would require building acquisitions and significantly impact access and parking for adjacent businesses, which is considered unacceptable. *No feasible intersection capacity mitigations identified.*	X	X	38.0	N/A
Rollins Road/Adrian Road	MB9	Millbrae	This location consists of a narrow street with on-street parking, and planned Class II bike lanes. It is not considered feasible to add left turn lane/ provide 3-lane section and add planned bike lanes without significant street widening that would require property acquisition and substantially impact adjacent business operations. *No feasible intersection capacity mitigations identified.*	X	X	16.6	N/A
Millbrae Avenue/US 101 Southbound Ramps	MB10	Millbrae	Widening the westbound approach of the intersection would require widening of the bridge over US 101, which would in turn require a change in the horizontal alignment and vertical profile of the loop on-ramp from westbound Millbrae Avenue to southbound US 101 that would be infeasible within the existing constrained right-of-way and/or require substantial acquisition and displacement to acquire the additional right-of-way. *No feasible intersection capacity mitigations identified.*	X	X	18.8	N/A
Broadway/California Drive	GX10	Burlingame	The rail corridor is located on east leg, the Burlingame Caltrain station is on the southeast corner and thus any surface intersection improvement would require acquisition of businesses on west side, which is considered unacceptable. The Broadway Grade Separation project (estimated cost of $250 million) in Burlingame, which is currently not fully funded, would mitigate impacts at this location, but due to cost is considered as infeasible. *No feasible intersection capacity mitigations identified.*	X	X	8.9	N/A
Broadway/US 101 Southbound Ramps	GX13	Burlingame	Given the location of US 101 on the east side, ramp improvement would require acquisition of businesses on west side which is considered unacceptable. The Broadway Grade Separation project (estimated cost of $250 million) in Burlingame, which is currently not fully funded, would mitigate impacts at this location, but due to cost is considered as infeasible. *No feasible intersection capacity mitigations identified.*	X	X	N/A	N/A
Rollins Road/Cadillac Way	GX14	Burlingame	The US 101 pedestrian overpass landing is located on the east side, so intersection improvement would require building acquisition on west side, which is considered unacceptable. The Broadway Grade Separation project (estimated cost of $250 million) in Burlingame, which is currently not fully funded, would mitigate impacts at this location, but due to cost is considered as infeasible. *No feasible intersection capacity mitigations identified.*	X	X	15.6	N/A
Oak Grove Avenue/California Drive	GX15	Burlingame	There are rail tracks on the east side, so intersection improvements would require building acquisition on west side, which is considered unacceptable. The at-grade crossings in Burlingame at Oak Grove Avenue, Howard Avenue, Bayswater Avenue, and Peninsula Avenue are identified as candidates for grade separations in the San Mateo Measure A Grade Separation Program, but none of those projects are currently fully funded and due to cost, grade separation at this location is considered infeasible. *No feasible intersection capacity mitigations identified.*	X	X	N/A	N/A
Oak Grove Avenue/Carolan Avenue	GX16	Burlingame	There are rail tracks on the west side and a protected bike lane on Carolan Ave north of intersection, and thus any surface intersection improvement would require building acquisition on the east side and possibly elimination of the bike lane, which is considered unacceptable. The at-grade crossings in Burlingame at Oak Grove Avenue, Howard Avenue, Bayswater Avenue, and Peninsula Avenue are identified as candidates for grade separations in the San Mateo Measure A Grade Separation Program, but none of those projects are currently fully funded and due to cost, grade separation at this location is considered infeasible. Signalization of this intersection is included as mitigation for the Caltrain Peninsula Corridor Electrification Project (PCEP) and is presume in the 2040 No Project and 2040 Project conditions. *No further feasible intersection capacity mitigations identified.*	X	X	N/A	N/A
Howard Avenue/California Drive	GX19	Burlingame	Due to right-of-way constraints, a surface intersection improvement would require building acquisition on 4 corners, which is considered unacceptable. The at-grade crossings in Burlingame at Oak Grove Avenue, Howard Avenue, Bayswater Avenue, and Peninsula Avenue are identified as candidates for grade separations in the San Mateo Measure A Grade Separation Program, but none of those projects are currently fully funded and due to cost, grade separation at this location is considered infeasible. *No feasible intersection capacity mitigations identified.*	X	X	55.4	N/A

Mitigation Measure or Intersection Location	Intersection(s)	Community	Detail	Alt. A	Alt. B	Traffic Delay	MM Benefit
Howard Avenue/East Lane	GX21	Burlingame	There are rail tracks on the west side and the Caltrain station is on the north side, so surface intersection improvements would require building acquisition on the north side and on-street parking loss in a commercial district, which is not considered acceptable. The at-grade crossings in Burlingame at Oak Grove Avenue, Howard Avenue, Bayswater Avenue, and Peninsula Avenue are identified as candidates for grade separations in the San Mateo Measure A Grade Separation Program, but none of those projects are currently fully funded and due to cost, grade separation at this location is considered infeasible. *No feasible intersection capacity mitigations identified.*	X	X	72.5	N/A
Bayswater Avenue/Myrtle Road	GX23	Burlingame	There are tracks on the west side, so surface intersection improvement would require building acquisition and on-street parking loss in a commercial district, which is considered unacceptable. The at-grade crossings in Burlingame at Oak Grove Avenue, Howard Avenue, Bayswater Avenue, and Peninsula Avenue are identified as candidates for grade separations in the San Mateo Measure A Grade Separation Program, but none of those projects are currently fully funded and due to cost, grade separation at this location is considered infeasible. *No feasible intersection capacity mitigations identified.*	X	X	N/A	N/A
First Avenue/Transit Center Way	GX32	San Mateo	There are rail tracks on the east side, so surface intersection improvement would require building acquisition and on-street parking loss in a commercial district, which is considered unacceptable. The at-grade crossings in San Mateo at First Avenue, Third Avenue, Fourth Avenue, Fifth Avenue, and Ninth Avenue are identified as candidates for grade separations in the San Mateo Measure A Grade Separation Program, but none of those projects are currently fully funded, and due to cost, grade separation at this location is considered infeasible. *No feasible intersection capacity mitigations identified.*	X	X	21.4	N/A
Third Avenue/South B Street	GX35	San Mateo	Intersection widening would require loss of on-street parking, elimination of pedestrian bulbouts, and potential building acquisition in a commercial district, which is considered unacceptable. The at-grade crossings in San Mateo at First Avenue, Third Avenue, Fourth Avenue, Fifth Avenue, and Ninth Avenue are identified as candidates for grade separations in the San Mateo Measure A Grade Separation Program, but none of those projects are currently fully funded, and due to cost, grade separation at this location is considered infeasible. *No feasible intersection capacity mitigations identified.*	X	X	19.8	N/A
Third Avenue/South Claremont Street	GX36	San Mateo	Intersection widening would require loss of on-street parking, elimination of pedestrian bulbouts, and potential building acquisition in a commercial district, which is considered unacceptable. The at-grade crossings in San Mateo at First Avenue, Third Avenue, Fourth Avenue, Fifth Avenue, and Ninth Avenue are identified as candidates for grade separations in the San Mateo Measure A Grade Separation Program, but none of those projects are currently fully funded and due to cost, grade separation at this location is considered infeasible. *No feasible intersection capacity mitigations identified.*	X	X	23.8	N/A
Fourth Avenue/South B Street	GX37	San Mateo	Intersection widening would require loss of on-street parking, elimination of pedestrian bulbouts, and potential building acquisition in a commercial district, which is considered unacceptable. The at-grade crossings in San Mateo at First Avenue, Third Avenue, Fourth Avenue, Fifth Avenue, and Ninth Avenue are identified as candidates for grade separations in the San Mateo Measure A Grade Separation Program, but none of those projects are currently fully funded and due to cost, grade separation at this location is considered infeasible. *No feasible intersection capacity mitigations identified.*	X	X	20.7	N/A
Fifth Avenue/South B Street	GX39	San Mateo	Intersection widening would require loss of on-street parking, elimination of pedestrian bulbouts, and potential building acquisition in a commercial district, which is considered unacceptable. The at-grade crossings in San Mateo at First Avenue, Third Avenue, Fourth Avenue, Fifth Avenue, and Ninth Avenue are identified as candidates for grade separations in the San Mateo Measure A Grade Separation Program, but none of those projects are currently fully funded and due to cost, grade separation at this location is considered infeasible. *No feasible intersection capacity mitigations identified.*	X	X	42.5	N/A
Ninth Avenue/South B Street	GX41	San Mateo	Widening would require loss of on-street parking and potential building acquisition in a commercial district, which is considered unacceptable. The at-grade crossings in San Mateo at First Avenue, Third Avenue, Fourth Avenue, Fifth Avenue, and Ninth Avenue are identified as candidates for grade separations in the San Mateo Measure A Grade Separation Program, but none of those projects are currently fully funded and due to cost, grade separation at this location is considered infeasible. *No feasible intersection capacity mitigations identified.*	X	X	23.3	N/A

Mitigation Measure or Intersection Location	Intersection(s)	Community	Detail	Alt. A	Alt. B	Traffic Delay	MM Benefit
East Third Avenue/South Delaware Street	GX44	San Mateo	Intersection improvement would require building acquisition in a commercial district, which is considered unacceptable. The at-grade crossings in San Mateo at First Avenue, Third Avenue, Fourth Avenue, Fifth Avenue, and Ninth Avenue are identified as candidates for grade separations in the San Mateo Measure A Grade Separation Program, but none of those projects are currently fully funded and due to cost, grade separation at this location is considered infeasible. *No feasible intersection capacity mitigations identified.*	X	X	41.9	N/A
East Fifth Avenue/South Delaware Street	GX46	San Mateo	Widening would require loss of on-street parking and potential building acquisition in a commercial district, which is considered unacceptable. The at-grade crossings in San Mateo at First Avenue, Third Avenue, Fourth Avenue, Fifth Avenue, and Ninth Avenue are identified as candidates for grade separations in the San Mateo Measure A Grade Separation Program, but none of those projects are currently fully funded and due to cost, grade separation at this location is considered infeasible. *No feasible intersection capacity mitigations identified.*	X	X	N/A	N/A
Ninth Avenue/South Claremont Street	GX47	San Mateo	Widening would require loss of on-street parking and potential building acquisition, which is considered unacceptable. The at-grade crossings in San Mateo at First Avenue, Third Avenue, Fourth Avenue, Fifth Avenue, and Ninth Avenue are identified as candidates for grade separations in the San Mateo Measure A Grade Separation Program, but none of those projects are currently fully funded and due to cost, grade separation at this location is considered infeasible. *No feasible intersection capacity mitigations identified.*	X	X	16.5	N/A
Brewster Avenue/El Camino Real	GX57	Redwood City	Intersection improvements would require building acquisition, which is considered unacceptable. The at-grade crossings in Redwood City at Whipple Avenue, Brewster Avenue, Broadway Avenue, and Main Street are identified as candidates for grade separations in the San Mateo Measure A Grade Separation Program, but none of those projects are currently fully funded and due to cost, grade separation at this location is considered infeasible. *No feasible intersection capacity mitigations identified.*	X	X	N/A	N/A
Brewster Avenue/Arguello Street	GX59	Redwood City	There are rail tracks on west side, so intersection improvement would require building acquisition, which is considered unacceptable. The at-grade crossings in Redwood City at Whipple Avenue, Brewster Avenue, Broadway Avenue, and Main Street are identified as candidates for grade separations in the San Mateo Measure A Grade Separation Program, but none of those projects are currently fully funded and due to cost, grade separation at this location is considered infeasible. *No feasible intersection capacity mitigations identified.*	X	X	N/A	N/A
Broadway/Arguello Street	GX62	Redwood City	Reconfigure the eastbound and westbound Broadway approaches to the Broadway/Arguello Street intersection to add an eastbound left turn lane and reduce the number of westbound lanes upstream from the intersection from two to one in conjunction with signal phasing and timing changes. This improvement would require traffic signal modifications.	X	X	N/A	Negligible
Broadway /El Camino Real	GX60	Redwood City	Intersection improvement would require loss of on-street parking and building acquisition in a commercial district, which is considered unacceptable. The at-grade crossings in Redwood City at Whipple Avenue, Brewster Avenue, Broadway Avenue, and Main Street are identified as candidates for grade separations in the San Mateo Measure A Grade Separation Program, but none of those projects are currently fully funded and due to cost, grade separation at this location is considered infeasible. *No feasible intersection capacity mitigations identified.*	X	X	19.5	N/A
Fair Oaks Lane/Lloyden Drive	GX68	Atherton	There are rail tracks on east side, and the intersection is on an s-curve adjacent to tracks, so intersection improvements would require acquisition of adjacent residential property, which is considered unacceptable. The at-grade crossing in Atherton at Fair Oaks Lane is identified as a candidate for grade separation in the San Mateo Measure A Grade Separation Program, but the project is currently not fully funded, and due to cost, grade separation at this location is considered infeasible. *No feasible intersection capacity mitigations identified.*	X	X	32.6	N/A

Mitigation Measure or Intersection Location	Intersection(s)	Community	Detail	Alt. A	Alt. B	Traffic Delay	MM Benefit
Glenwood Avenue/El Camino Real	GX72	Menlo Park	Intersection improvements would require building acquisition, which is considered unacceptable. The at-grade crossings in Menlo Park at Oak Grove Avenue and Ravenswood Avenue are identified as candidates for grade separation in the San Mateo Measure A Grade Separation Program, but none of those projects are currently fully funded and due to cost, grade separation at this location is considered infeasible. *No feasible intersection capacity mitigations identified.*	X	X	13.1	N/A
Oak Grove Avenue/El Camino Real	GX74	Menlo Park	Intersection improvements would require building acquisition, which is considered unacceptable. The at-grade crossings in Menlo Park at Oak Grove Avenue and Ravenswood Avenue are identified as candidates for grade separation in the San Mateo Measure A Grade Separation Program, but none of those projects are currently fully funded and due to cost, grade separation at this location is considered infeasible. *No feasible intersection capacity mitigations identified.*	X	X	17.1	N/A
Oak Grove Avenue/Merrill Street	GX75	Menlo Park	Intersection improvements would require building acquisition, which is considered unacceptable. The at-grade crossings in Menlo Park at Oak Grove Avenue and Ravenswood Avenue are identified as candidates for grade separation in the San Mateo Measure A Grade Separation Program, but none of those projects are currently fully funded and due to cost, grade separation at this location is considered infeasible. *No feasible intersection capacity mitigations identified.*	X	X	12.2	N/A
Oak Grove Avenue/Laurel Street	GX77	Menlo Park	Intersection improvements would require building acquisition, which is considered unacceptable. The at-grade crossings in Menlo Park at Oak Grove Avenue and Ravenswood Avenue are identified as candidates for grade separation in the San Mateo Measure A Grade Separation Program, but none of those projects are currently fully funded and due to cost, grade separation at this location is considered infeasible. *No feasible intersection capacity mitigations identified.*	X	X	31.8	N/A
Santa Cruz Avenue/El Camino Real	GX78	Menlo Park	Intersection improvements would require loss of on-street parking and building acquisition in a commercial district, which is considered unacceptable. The at-grade crossings in Menlo Park at Oak Grove Avenue and Ravenswood Avenue are identified as candidates for grade separation in the San Mateo Measure A Grade Separation Program, but none of those projects are currently fully funded and due to cost, grade separation at this location is considered infeasible. *No feasible intersection capacity mitigations identified.*	X	X	4.3	N/A
Ravenswood Avenue/El Camino Real	GX80	Menlo Park	Analyzed potential project in the Menlo Park Transportation Master Plan (TMP 89) to remove median and add northbound right turn lane. Evaluation of this measure indicated that it would not mitigate project impacts. Other intersection improvements to expand roadway capacity would require building acquisition, which is considered unacceptable. The at-grade crossings in Menlo Park at Oak Grove Avenue and Ravenswood Avenue are identified as candidates for grade separation in the San Mateo Measure A Grade Separation Program, but none of those projects are currently fully funded and due to cost, grade separation at this location is considered infeasible. *No feasible intersection capacity mitigations identified.*	X	X	6.8	N/A
Ravenswood Avenue/Merrill Street	GX81	Menlo Park	Intersection improvements would require building acquisition, which is considered unacceptable. The at-grade crossings in Menlo Park at Oak Grove Avenue and Ravenswood Avenue are identified as candidates for grade separation in the San Mateo Measure A Grade Separation Program, but none of those projects are currently fully funded and due to cost, grade separation at this location is considered infeasible. *No feasible intersection capacity mitigations identified.*	X	X	23.5	N/A
Ravenswood Avenue/Laurel Street	GX83	Menlo Park	The at-grade crossings in Menlo Park at Oak Grove Avenue and Ravenswood Avenue are identified as candidates for grade separation in the San Mateo Measure A Grade Separation Program, but none of those projects are currently fully funded and due to cost, grade separation at this location is considered infeasible. A potential modification to southbound Laurel Street was evaluated to provide a left turn lane and a southbound through/right turn lane if the City of Menlo Park or other entities have not yet implemented this project. This improvement would require removal of parking on the west side of Laurel Street north of Ravenswood Avenue for approximately 100 feet and signal timing modifications. Evaluation of this measure identified that it would not improve traffic conditions, so it was not advanced.	X	X	N/A	N/A

Mitigation Measure or Intersection Location	Intersection(s)	Community	Detail	Alt. A	Alt. B	Traffic Delay	MM Benefit
Palo Alto Avenue/El Camino Real	GX84	Palo Alto	There are rail tracks on the east side, a creek on the north side, and intersection improvements would require acquisition of portion of a shopping center on the west side and/or recreational uses on the east side and/or encroachment on the creek, which is considered unacceptable. *No feasible intersection capacity mitigations identified.*	X	X	16.8	N/A
Palo Alto Avenue/Alma Street	GX85	Palo Alto	There are rail tracks on the west side, a creek trail on the north side, so intersection improvements would require major building acquisition on the east side and possibly trail effects, which is considered unacceptable. *No feasible intersection capacity mitigations identified.*	X	X	53.2	N/A
Churchill Avenue/Alma Street	GX86	Palo Alto	There are rail tracks on the west side and bike lanes on Churchill, which would mean intersection improvements would require acquisition of residential properties and potential effects on the bike lanes, which is unacceptable. *No feasible intersection capacity mitigations identified.*	X	X	29.0	N/A
Churchill Avenue/Mariposa Avenue	GX87	Palo Alto	There are rail tracks on the east leg, bike lanes on Churchill, and the high school stadium on the north side, so intersection improvements would likely require acquisition of residential properties, possible effects on bike lanes, and possible effects on the high school, which is considered unacceptable. *No feasible intersection capacity mitigations identified.*	X	X	56.5	N/A
Meadow Drive/Park Boulevard	GX89	Palo Alto	There are tracks on the east leg and bike lanes on Meadow Drive, so intersection improvements would require acquisition of residential properties and possible effects on the bike lanes, which is considered unacceptable. *No feasible intersection capacity mitigations identified.*	X	X	N/A	N/A
Charleston Road/Park Boulevard	GX91	Palo Alto	There are rail tracks on the east leg and bike lanes on Charleston Road, so intersection improvements would require acquisition of residential properties and possible effects on the bike lanes, which is considered unacceptable. *No feasible intersection capacity mitigations identified.*	X	X	N/A	N/A
Churchill Avenue/Castilleja Street	GX95	Palo Alto	There are bike lanes on Churchill and a high school sports fields on the north side, so intersection improvements would require acquisition of residential properties, and possible effects on the bike lanes and the high school, which is considered unacceptable. *No feasible intersection capacity mitigations identified.*	X	X	N/A	N/A
Charleston Road/Wilkie Way	GX96	Palo Alto	There are bike lanes on Charleston Road, so intersection improvements would require acquisition of residential properties and possibly effects on the bike lanes, which is considered unacceptable. *No feasible intersection capacity mitigations identified.*	X	X	N/A	N/A
Rengstorff Avenue/Central Expressway	GX97	Mountain View	There are rail tracks on the west leg, so intersection improvements would require building/business acquisitions, which is considered unacceptable. The Rengstorff Grade Separation Project (estimated cost of $150 million) in Mountain View, which is currently not fully funded, would mitigate impacts at this location, but due to cost, grade separation at this location is considered infeasible. *No feasible intersection capacity mitigations identified.*	X	X	N/A	N/A
Rengstorff Avenue/Crisanto Avenue	GX98	Mountain View	There are rail tracks on the east leg and a park on the west side, so intersection improvements would require building/business acquisition on the north side, which is considered unacceptable. The Rengstorff Grade Separation Project (estimated cost of $150 million) in Mountain View, which is currently not fully funded, would mitigate impacts at this location, but due to cost, grade separation at this location is considered infeasible. *No feasible intersection capacity mitigations identified.*	X	X	N/A	N/A

Mitigation Measure or Intersection Location	Intersection(s)	Community	Detail	Alt. A	Alt. B	Traffic Delay	MM Benefit
Castro Street/Moffett Boulevard/Central Expressway	GX99	Mountain View	There are light rail and commuter rail tracks on the west side, and a rail station on the west side, so intersection improvements would require major building acquisitions, which is considered unacceptable. The Castro Street At-Grade Closure project (estimated cost of $45–60 million) in Mountain View, which is currently not fully funded, would mitigate impacts at this location, but due to cost, grade separation at this location is considered infeasible. *No feasible intersection capacity mitigations identified.*	X	X	N/A	N/A
Castro Street/Villa Street	GX104	Mountain View	Castro is a downtown street with no parking, and intersection improvement would require elimination of on-street parking on Villa and major building acquisitions, which is considered unacceptable. The Castro Street At-Grade Closure project (estimated cost of $45–60 million) in Mountain View, which is currently not fully funded, would mitigate impacts at this location, but due to cost, grade separation at this location is considered infeasible. *No feasible intersection capacity mitigations identified.*	X	X	42.3	N/A
1Castro Street/Dana Street	GX105	Mountain View	Castro is a downtown street with no parking, intersection improvement would require elimination of on-street parking on Dana and major building acquisitions, which is considered unacceptable. The Castro Street At-Grade Closure Project (estimated cost of $45–60 million) in Mountain View, which is currently not fully funded, would mitigate impacts at this location, but due to cost, grade separation at this location is considered infeasible. *No feasible intersection capacity mitigations identified.*	X	X	54.7	N/A
Evelyn Avenue/Hope Street	GX106	Mountain View	Mountain View Caltrain Station is on the east leg and a bike lane is on Evelyn, so intersection improvement would require loss of on-street parking on Hope and downtown commercial building acquisitions, which is considered unacceptable. The Castro Street At-Grade Closure project (estimated cost of $45–60 million) in Mountain View, which is currently not fully funded, would mitigate impacts at this location, but due to cost, grade separation at this location is considered infeasible. *No feasible intersection capacity mitigations identified.*	X	X	N/A	N/A
Moffett Boulevard/Central Avenue	GX107	Mountain View	Intersection improvement would require loss of parking on Moffett and commercial building acquisitions, which is considered unacceptable. The Castro Street At-Grade Closure project (estimated cost of $45–60 million) in Mountain View, which is currently not fully funded, would mitigate impacts at this location, but due to cost, grade separation at this location is considered infeasible. *No feasible intersection capacity mitigations identified.*	X	X	N/A	N/A
Mary Avenue/Evelyn Avenue	GX101	Sunnyvale	There are rail tracks on the east side and bike lanes on the west leg, so intersection improvements would require commercial and residential building acquisitions, which is considered unacceptable. The Mary Avenue Grade Separation project in Sunnyvale, which is currently not fully funded, would mitigate impacts at intersections GX101 but due to cost, grade separation at this location is considered infeasible. *No feasible intersection capacity mitigations identified.*	X	X	5.9	N/A
TR-MM#X.2: Coleman Avenue/Hedding Street—Widen and Reconfigure Eastbound Approach	D41	San Jose	Widen the eastbound Hedding Street approach to provide an additional left turn lane and an exclusive right turn lane, with the elimination of the existing channelized right turn. Modification to the traffic signal and removal of on-street parking on the south side of Hedding Street between Coleman Avenue and Chestnut Street.		X	6.8	-19.9
TR-MM#X.3: Coleman Avenue/Taylor Street—Widen and Reconfigure Southbound Approach	D42	San Jose	Widen the southbound Coleman Avenue approach to the Taylor Street intersection to include an exclusive right turn pocket and convert the existing shared through right to through-only lane. Modification to the traffic signal		X	5.3	-17.2
TR-MM#X.4: Delmas Avenue/West San Fernando Street—Add Eastbound and Westbound Left Turn Lanes	D44	San Jose	Modify the Delmas Avenue/West San Fernando Street intersection to provide exclusive eastbound and westbound (West San Fernando Street) left turn lanes. Modifications to the traffic signal at Delmas Avenue/West San Fernando Street intersection to accommodate the new movements and new protected phasing in the eastbound and westbound directions would also be necessary. Modifications to the adjacent VTA light rail crossing and signal system would be required.		X	13.7	-23.4
TR-MM#X.5: Autumn Street/West Fernando Street—Provide Eastbound and Westbound Left Turn Lanes	D25	San Jose	Modify the Autumn Street/West San Fernando Street intersection to provide exclusive eastbound and westbound (West San Fernando Street) left turn lanes and would apply to all project alternatives. This improvement would require the widening of West San Fernando Street and the acquisition of right-of-way from adjacent properties. Modifications to the traffic signal at Autumn Street/West San Fernando Street intersection to accommodate the new movements and new protected phasing in the eastbound and westbound directions would also be necessary.		X	8.5	N/A

Mitigation Measure or Intersection Location	Intersection(s)	Community	Detail	Alt. A	Alt. B	Traffic Delay	MM Benefit
TR-MM#X.6: Montgomery Street/Park Avenue: Reconfigure Northbound and Eastbound Approaches	D27	San Jose	Reconfigure the northbound and eastbound approaches to the intersection. This measure would reconfigure the northbound Montgomery Street approach to the Park Avenue intersection, removing the channelized right turn lane and restriping the northbound approach to provide two left turn pockets, one through lane and one shared through-right lane. This modification would also involve signal phasing changes, from the current north-south lead left phasing to a lead-lag phasing. This measure would also modify/restripe the eastbound lanes of Park Avenue at the Montgomery Street/Park Avenue intersection to provide two eastbound lanes on Park Avenue entering and departing the intersection. This measure would require the widening by restriping of the roadway to four lanes for 300 feet on either side of Montgomery Street, with standard transitions.		X	28.6	N/A

Alt. = alternative
EB = eastbound
LOS = level of service
MM = mitigation measure
MTC = Metropolitan Transportation Commission
NA = not applicable
RTP = regional transportation plan
SR = State Route
SSJ = South San Jose
US = U.S. Highway
VTA = Santa Clara Valley Transportation Authority

Table 2 Traffic Mitigation Measures Screening Evaluation, Part Two

Mitigation Measure	Intersection(s)	Community	Alt. A	Alt. B	Secondary Effect	Additional ROW?	Displacement?	More effect?	C1: Increase VMT?	C2: Contradict objectives of SB 743?	C3: More Disruptive than Traffic Effect?	C4: Unmitigable Secondary Effect?	C5: Practicable?	Pass Screening?
TR-MM#1a.1 Scott Street/San Mateo Avenue—Install Traffic Signal	GX43	San Bruno	X	X	All work would be accomplished in the existing roadway right-of-way.	No	No	No	No	No. See text discussion.	No	No	Yes	Yes
TR-MM#1a.2: North Lane/California Drive—Install Traffic Signal	GX17	Burlingame	X	X	All work would be accomplished in the existing roadway right-of-way.	No	No	No	No	No. See text discussion.	No	No	Yes	Yes
TR-MM#1a.3: North Lane/Carolan Avenue—Install Traffic Signal	GX18	Burlingame	X	X	All work would be accomplished in the existing roadway right-of-way.	No	No	No	No	No. See text discussion.	No	No	Yes	Yes
TR-MM#1a.4: Peninsula Avenue/Arundel Road—Install Traffic Signal	GX26	Burlingame	X	X	All work would be accomplished in the existing roadway right-of-way.	No	No	No	No	No. See text discussion.	No	No	Yes	Yes
TR-MM#1a.5: Brewster Avenue/Perry Street—Install Traffic Signal	GX58	Redwood city	X	X	All work would be accomplished in the existing roadway right-of-way.	No	No	No	No	No. See text discussion.	No	No	Yes	Yes
TR-MM#1a.6: Main Street/Beech Street—Install Traffic Signal	GX65	Redwood City	X	X	All work would be accomplished in the existing roadway right-of-way.	No	No	No	No	No. See text discussion.	No	No	Yes	Yes
TR-MM#1x.7: Cahill Street/Stover-Crandall Street—Install Traffic Signal	D21	San Jose Diridon	X	X	All work would be accomplished in the existing roadway right-of-way.	No	No	No	No	No. See text discussion.	No	No	Yes	Yes
TR-MM#1x.8: Montgomery Street/Stover-Crandall Street—Install Traffic Signal	D22	San Jose Diridon	X		All work would be accomplished in the existing roadway right-of-way.	No	No	No	No	No. See text discussion.	No	No	Yes	Yes
TR-MM#1x.9: Cahill Street/West San Fernando Street—Install Traffic Signal	D23	San Jose Diridon	X	X	All work would be accomplished in the existing roadway right-of-way.	No	No	No	No	No. See text discussion.	No	No	Yes	Yes
TR-MM#1b: Second Street/Townsend Street—Add Protected Signal Phase and Optimize Signal Timing	SF17	San Francisco	X	X	All work would be accomplished in the existing roadway right-of-way.	No	No	No	No	No. See text discussion.	No	No	Yes	Yes
TR-MM#1c: Harney Way/Thomas Mellon Circle-Near-term Harney Way Improvements	MF10	San Francisco	X	X	All work would be accomplished in the existing roadway right-of-way.	No	No	No	No	No. See text discussion.	No	No	Yes	Yes
TR-MM#1d: Scott Street/Herman Street—Install Traffic Signal, Extend Sidewalk, and Add Northbound and Southbound Right Turn Lanes	GX8	San Bruno	X	X	All work would be accomplished in the existing roadway right-of-way.	No	No	No	No	No. See text discussion.	No	No	Yes	Yes
TR-MM#1e: El Camino Real (SR 82)/Murchison Drive—Reconfigure Westbound Approach to Add Left and Right Turn Lanes; Add Overlap Signal Phase; Install New Traffic Signal at California Drive/ Murchison Drive.	MB6	Millbrae	X	X	All work would be accomplished in the existing roadway right-of-way.	No	No	No	No	No. See text discussion.	No	No	Yes	Yes
TR-MM#1f: Millbrae Avenue/Rollins Road—Optimize Signal Timing and Coordination	MB8	Millbrae	X	X	All work would be accomplished in the existing roadway right-of-way.	No	No	No	No	No. See text discussion.	No	No	Yes	Yes
TR-MM#1g: Millbrae Avenue/US 101 Northbound Ramps-Widen Off-Ramp to Extend Northbound Left Turn Lane Storage	MB11	Millbrae	X	X	All work would be accomplished in the existing roadway right-of-way.	No	No	No	No	No. See text discussion.	No	No	Yes	Yes
TR-MM#1h: Whipple Avenue/El Camino Real—Add Overlap Signal Phase and Optimize Signal Timing	GX55	Redwood City	X	X	All work would be accomplished in the existing roadway right-of-way.	No	No	No	No	No. See text discussion.	No	No	Yes	Yes

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TR-MM#1i: Whipple Avenue/Arguello Street—Optimize Signal Timing	GX56	Redwood City	X	X	All work would be accomplished in the existing roadway right-of-way.	No	No	No	No	No. See text discussion.	No	No	Yes	Yes
TR-MM#1j: The Alameda (SR 82)/Taylor Street–Naglee Avenue—Restripe Northbound Approach	D4	San Jose Diridon		X	Removing curb on-street parking for the block between West Taylor Street and Naglee Avenue on the east side of The Alameda.	No	No	Yes	No	No. See text discussion.	No	No	Yes	Yes
TR-MM#1k: Optimize Signal Coordination on West Santa Clara Street from Stockton Street to Autumn Street in San Jose	D13, D14, D15	San Jose Diridon	X	X	All work would be accomplished in the existing roadway right-of-way.	No	No	No	No	No. See text discussion.	No	No	Yes	Yes
Fourth Street/Townsend Street	SF1	San Francisco	X	X	Building acquisitions on 4 corners and potential removal of bike lanes.	Yes	Yes	Yes	No	No. See text discussion.	Yes	Yes	No. Extensive acquisitions.	No
Fourth Street/King Street	SF2	San Francisco	X	X	Building acquisitions on 3 corners.	Yes	Yes	Yes	No	No. See text discussion.	Yes	Yes	No. Extensive acquisitions.	No
Fifth Street/King Street/I-280 ramps	SF3	San Francisco	X	X	Building acquisitions on 3 corners.	Yes	Yes	Yes	No	No. See text discussion.	Yes	Yes	No. Extensive acquisitions.	No
Fourth Street/Brannan Street	SF4	San Francisco	X	X	Building acquisitions on 4 corners.	Yes	Yes	Yes	No	No. See text discussion.	Yes	Yes	No. Extensive acquisitions.	No
Fourth Street/Bluxome Street	SF8	San Francisco	X	X	Building acquisitions on 4 corners.	Yes	Yes	Yes	No	No. See text discussion.	Yes	Yes	No. Extensive acquisitions.	No
Fifth Street/Bryant Street	SF10	San Francisco	X	X	Removal of complete street improvements.	Yes	No	Yes	No	No. See text discussion.	Yes	Yes	Yes	No
Sixth Street/Brannan Street/I-280 ramps	SF15	San Francisco	X	X	Building acquisitions on 3 corners.	Yes	Yes	Yes	No	No. See text discussion.	Yes	Yes	No. Extensive acquisitions.	No
Seventh Street/Townsend Street	SF18	San Francisco	X	X	Displacing a portion of the railyards or building acquisitions on 3 corners and possibly displacing recently added bike lanes.	Yes	Yes	Yes	No	No. See text discussion.	Yes	Yes	No. Extensive acquisitions.	No
Mission Bay Drive/Seventh Street	GX1	San Francisco	X	X	Surface intersection improvements: Building acquisition on west side.	Yes	Yes	Yes	No	No. See text discussion	Yes	Yes	No. Extensive acquisitions.	No
					The Pennsylvania Tunnel Extension would have substantial construction disruption.	Likely	Possibly	Yes	No	No. See text discussion.	No determination made	No determination made	No. Cost Prohibitive.	No
Mission Bay Drive/Berry Street	GX2	San Francisco	X	X	No feasible surface improvement.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
					The Pennsylvania Tunnel Extension would have substantial construction disruption.	Likely	Possibly	Yes	No	No. See text discussion.	No determination made	No determination made	No. Cost Prohibitive.	No

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16th Street/Seventh Street/Mississippi Street	GX3	San Francisco	X	X	Surface intersection improvements: Building acquisition on west side.	Yes	Yes	Yes	No	No. See text discussion	Yes	Yes	No. Extensive acquisitions.	No
					The Pennsylvania Tunnel Extension would have substantial construction disruption.	Likely	Possibly	Yes	No	No. See text discussion.	No determination made	No determination made	No. Cost prohibitive	No
16th Street/Third Street	GX7	San Francisco	X	X	Surface intersection improvements: Building acquisition on 4 corners including Benioff's Children's Hospital, Chase Center office.	Yes	Yes	Yes	No	No. See text discussion	Yes	Yes	No. Extensive acquisitions.	No
					The Pennsylvania Tunnel Extension would have substantial construction disruption.	Likely	Possibly	Yes	No	No. See text discussion.	No determination made	No determination made	No. Cost prohibitive	No
Geneva Extension/US 101 Northbound Ramps	MF16	San Francisco	X	X	New fill in San Francisco Bay.	No	NO	Yes	No	No. See text discussion.	Yes	No	Yes	No
Linden Avenue/Dollar Avenue	GX5	South San Francisco	X	X	Surface intersection improvements: Building acquisition on the west side.	Yes	Yes	Yes	No	No. See text discussion	Yes	Yes	No. Extensive acquisitions.	No
					Grade separation at Linden Ave would have construction disruption and likely right-of-way acquisition.	Likely	Possibly	Yes	No	No. See text discussion.	No determination made	No determination made	No. Cost prohibitive.	No
Linden Avenue/San Mateo Avenue	GX6	South San Francisco	X	X	Building acquisition on 3 corners.	Yes	Yes	Yes	No	No. See text discussion.	Yes	Yes	No. Extensive acquisitions.	No
El Camino Real (SR 82)/Hillcrest Boulevard	MB1	Millbrae	X	X	All work would be accomplished in the existing roadway right-of-way.	No	No	No	No	No. See text discussion.	No	No	No. City opposed to measure.	No
El Camino Real/Victoria Avenue	MB2	Millbrae	X	X	Intersection improvement would be infeasible due to right-of-way constraints and/or additional displacements would occur.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No. Extensive acquisitions.	No
El Camino Real/Linden Avenue (relocated)	MB4	Millbrae	X	X	Intersection improvement would be infeasible due to right-of-way constraints and/or additional displacements would occur.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No. Extensive acquisitions.	No
El Camino Real/Millbrae Avenue	MB5	Millbrae	X	X	Building acquisition on 3 corners.	Yes	Yes	Yes	No	No. See text discussion.	Yes	Yes	No. Extensive acquisitions.	No
El Camino Real/Trousdale Drive	MB7	Millbrae	X	X	Building acquisitions and impaired access and parking for adjacent businesses.	Yes	Yes	Yes	No	No. See text discussion.	Yes	Yes	Yes	No

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Rollins Road/Adrian Road	MB9	Millbrae	X	X	Property acquisition and substantial impact on adjacent business operations.	Yes	Yes	Yes	No	No. See text discussion.	Yes	Yes	No. Extensive acquisitions.	No
Millbrae Avenue/US 101 Southbound Ramps	MB10	Millbrae	X	X	Substantial acquisition and displacement to acquire the additional right-of-way.	Yes	Yes	Yes	No	No. See text discussion.	Yes	Yes	No. Extensive acquisitions.	No
Broadway/California Drive	GX10	Burlingame	X	X	Surface intersection improvements: Acquisition of businesses on west side.	Yes	Yes	Yes	No	No. See text discussion	Yes	Yes	No. Extensive acquisitions.	No
					Broadway grade separation would have construction disruption and likely right-of-way acquisition.	Likely	Possibly	Yes	No	No. See text discussion.	No determination made	No determination made	No. Cost prohibitive.	No
Broadway/US 101 Southbound Ramps	GX13	Burlingame	X	X	Surface intersection improvements: Acquisition of businesses on west side.	Yes	Yes	Yes	No	No. See text discussion	Yes	Yes	No. Extensive acquisitions.	No
					Broadway grade separation would have construction disruption and likely right-of-way acquisition.	Likely	Possibly	Yes	No	No. See text discussion.	No determination made	No determination made	No. Cost prohibitive.	No
Rollins Road/Cadillac Way	GX14	Burlingame	X	X	Surface intersection improvements: Building acquisition on west side.	Yes	Yes	Yes	No	No. See text discussion	Yes	Yes	No. Extensive acquisitions.	No
					Broadway grade separation would have construction disruption and likely right-of-way acquisition.	Likely	Possibly	Yes	No	No. See text discussion.	No determination made	No determination made	No. Cost prohibitive.	No
Oak Grove Avenue/California Drive	GX15	Burlingame	X	X	Surface intersection improvements: Building acquisition on west side.	Yes	Yes	Yes	No	No. See text discussion	Yes	Yes	No. Extensive acquisitions	No
					Grade separation at Oak Grove would have construction disruption and likely right-of-way acquisition.	Likely	Possibly	Yes	No	No. See text discussion.	No determination made	No determination made	No. Cost prohibitive.	No
Oak Grove Avenue/Carolan Avenue	GX16	Burlingame	X	X	Surface intersection improvements: Building acquisition on east side and possibly elimination of the bike lane.	Yes	Yes	Yes	No	No. See text discussion	Yes	Yes	No. Extensive acquisitions.	No
					Grade separation at Oak Grove at-grade crossing would have construction disruption and likely right-of-way acquisition.	Likely	Possibly	Yes	No	No. See text discussion.	No determination made	No determination made	No. Cost prohibitive.	No
Howard Avenue/California Drive	GX19	Burlingame	X	X	Surface intersection improvements: Building acquisition on 4 corners.	Yes	Yes	Yes	No	No. See text discussion	Yes	Yes	No. Extensive acquisitions.	No

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					Grade separation at Howard Ave at-grade crossing would have construction disruption and likely right-of-way acquisition.	Likely	Possibly	Yes	No	No. See text discussion.	No determination made	No determination made	No. Cost prohibitive.	No
Howard Avenue/East Lane	GX21	Burlingame	X	X	Surface intersection improvements: Building acquisition on north side and on-street parking loss in commercial district.	Yes	Yes	Yes	No	No. See text discussion	Yes	Yes	No. Extensive acquisitions.	No
					Grade separation at Howard Ave at-grade crossing would have construction disruption and likely right-of-way acquisition.	Likely	Possibly	Yes	No	No. See text discussion.	No determination made	No determination made	No. Cost prohibitive.	No
Bayswater Avenue/Myrtle Road	GX23	Burlingame	X	X	Surface intersection improvements: Building acquisition and on-street parking loss in commercial district.	Yes	Yes	Yes	No	No. See text discussion	Yes	Yes	No. Extensive acquisitions.	No
					Grade separation at Bayswater at-grade crossing would have construction disruption and likely right-of-way acquisition.	Likely	Possibly	Yes	No	No. See text discussion.	No. See text discussion.	No determination made	No. Cost prohibitive.	No
First Avenue/Transit Center Way	GX32	San Mateo	X	X	Surface intersection improvements: Building acquisition and on-street parking loss in commercial district.	Yes	Yes	Yes	No	No. See text discussion	Yes	Yes	No. Extensive acquisitions.	No
					Grade separation at First Ave at-grade crossing would have construction disruption and likely right-of-way acquisition.	Likely	Possibly	Yes	No	No. See text discussion.	No determination made	No determination made	No. Cost prohibitive.	No
Third Avenue/South B Street	GX35	San Mateo	X	X	Surface intersection improvements: Loss of on-street parking, elimination of pedestrian bulbouts, and potential building acquisition in commercial district.	Yes	Yes	Yes	No	No. See text discussion	Yes	Yes	Yes	No
					Grade separation at Third Ave at-grade crossing would have construction disruption and likely right-of-way acquisition.	Likely	Possibly	Yes	No	No. See text discussion.	No determination made	No determination made	No. Cost prohibitive.	No
Third Avenue/South Claremont Street	GX36	San Mateo	X	X	Surface intersection improvements: Loss of on-street parking, elimination of pedestrian bulbouts, and potential building acquisition in commercial district.	Yes	Yes	Yes	No	No. See text discussion	Yes	Yes	Yes	No
					Grade separation at Third Ave at-grade crossing would have construction disruption and likely right-of-way acquisition.	Likely	Possibly	Yes	No	No. See text discussion.	No determination made	No determination made	No. Cost prohibitive.	No
Fourth Avenue/South B Street	GX37	San Mateo	X	X	Surface intersection improvements: Loss of on-street parking, elimination of pedestrian bulbouts, and potential building acquisition in commercial district.	Yes	Yes	Yes	No	No. See text discussion	Yes	Yes	Yes	No

Mitigation Measure	Intersection(s)	Community	Alt. A	Alt. B	Secondary Effect	Additional ROW?	Displacement?	More effect?	C1: Increase VMT?	C2: Contradict objectives of SB 743?	C3: More Disruptive than Traffic Effect?	C4: Unmitigable Secondary Effect?	C5: Practicable?	Pass Screening?
					Grade separation at Fourth Ave at-grade crossing would have construction disruption and likely right-of-way acquisition.	Likely	Possibly	Yes	No	No. See text discussion.	No determination made	No determination made	No. Cost prohibitive.	No
Fifth Avenue/South B Street	GX39	San Mateo	X	X	Surface intersection improvements: Loss of on-street parking, elimination of pedestrian bulbouts, and potential building acquisition in commercial district.	Yes	Yes	Yes	No	No. See text discussion	Yes	Yes	Yes	No
					Grade separation at Fifth Ave at-grade crossing would have construction disruption and likely right-of way-acquisition.	Likely	Possibly	Yes	No	No. See text discussion.	No determination made	No determination made	No. Cost prohibitive.	No
Ninth Avenue/South B Street	GX41	San Mateo	X	X	Surface intersection improvements: Loss of on-street parking and potential building acquisition in commercial district.	Yes	Yes	Yes	No	No. See text discussion	Yes	Yes	Yes	No
					Grade separation at Ninth Ave at-grade crossing would have construction disruption and likely right-of-way acquisition.	Likely	Possibly	Yes	No	No. See text discussion.	No determination made	No determination made	No. Cost prohibitive.	No
East Third Avenue/South Delaware Street	GX44	San Mateo	X	X	Surface intersection improvements: Building acquisition in commercial district.	Yes	Yes	Yes	No	No. See text discussion	Yes	Yes	No. Extensive acquisitions.	No
					Grade separation at Third Ave at-grade crossing would have construction disruption and likely right-of-way acquisition.	Likely	Possibly	Yes	No	No. See text discussion.	No determination made	No determination made	No. Cost prohibitive.	No
East Fifth Avenue/South Delaware Street	GX46	San Mateo	X	X	Surface intersection improvements: Loss of on-street parking and potential building acquisition in commercial district.	Yes	Yes	Yes	No	No. See text discussion	Yes	Yes	Yes	No
					Grade separation at Fifth Ave at-grade crossing would have construction disruption and likely right-of-way acquisition.	Likely	Possibly	Yes	No	No. See text discussion.	No determination made	No determination made	No. Cost prohibitive.	No
Ninth Avenue/South Claremont Street	GX47	San Mateo	X	X	Surface intersection improvements: Loss of on-street parking and potential building acquisition.	Yes	Yes	Yes	No	No. See text discussion	Yes	Yes	Yes	No
					Grade separation at Ninth Ave at-grade crossing would have construction disruption and likely right-of-way acquisition.	Likely	Possibly	Yes	No	No. See text discussion.	No determination made	No determination made	No. Cost prohibitive.	No
Brewster Avenue/El Camino Real	GX57	Redwood City	X	X	Surface intersection improvements: Building acquisition.	Yes	Yes	Yes	No	No. See text discussion	Yes	Yes	No. Extensive acquisitions.	No
					Grade separation at Brewster Ave at-grade crossing would have construction disruption and likely right-of-way acquisition.	Likely	Possibly	Yes	No	No. See text discussion.	No determination made	No determination made	No. Cost prohibitive.	No

Mitigation Measure	Intersection(s)	Community	Alt. A	Alt. B	Secondary Effect	Additional ROW?	Displacement?	More effect?	C1: Increase VMT?	C2: Contradict objectives of SB 743?	C3: More Disruptive than Traffic Effect?	C4: Unmitigable Secondary Effect?	C5: Practicable?	Pass Screening?
Brewster Avenue/Arguello Street	GX59	Redwood City	X	X	Surface intersection improvements: Building acquisition.	Yes	Yes	Yes	No	No. See text discussion	Yes	Yes	No. Extensive acquisitions.	No
					Grade separation at Brewster Ave. at-grade crossing would have construction disruption and likely right-of-way acquisition.	Likely	Possibly	Yes	No	No. See text discussion.	No determination made	No determination made	No. Cost prohibitive.	No
Broadway/Perry	GX61	Redwood City	X	X	All work would be accomplished in the existing roadway right-of-way.	No	No	No	No	No. See text discussion.	No	No	No. Would have tradeoffs of worsening one peak period for the benefit of the other.	No
Broadway/Arguello Street	GX62	Redwood City	X	X	Reconfigure eastbound and westbound approaches and optimize signal timing. All work would be accomplished in the existing roadway right-of-way.	No	No	No	No	No. See text discussion.	No	No	No. Would not meaningfully reduce traffic delay.	No
Broadway /El Camino Real	GX60	Redwood City	X	X	Surface intersection improvements: Loss of on-street parking and building acquisition in commercial district.	Yes	Yes	Yes	No	No. See text discussion	Yes	Yes	No. Extensive acquisitions.	No
					Grade separation at Broadway Ave at-grade crossing would have construction disruption and likely right-of-way acquisition.	Likely	Possibly	Yes	No	No. See text discussion.	No determination made	No determination made	No. Cost prohibitive.	No
Main Street/Beech Street	GX65	Redwood City	X	X	Grade separation at Main Street at-grade crossing would have construction disruption and likely right-of-way acquisition.	Likely	Possibly	Yes	No	No. See text discussion.	No determination made	No determination made	No. Cost prohibitive.	No
Fair Oaks Lane/Lloyden Drive	GX68	Atherton	X	X	Surface intersection improvements: Acquisition of adjacent residential property.	Yes	Yes	Yes	No	No. See text discussion	Yes	Yes	Yes	No
					Grade separation at Fair Oaks Lane at-grade crossing would have construction disruption and likely right-of-way acquisition.	Likely	Possibly	Yes	No	No. See text discussion.	No determination made	No determination made	No. Cost prohibitive.	No
Glenwood Avenue/El Camino Real	GX72	Menlo Park	X	X	Surface intersection improvements: Building acquisition.	Yes	Yes	Yes	No	No. See text discussion	Yes	Yes	No. Extensive acquisitions.	No
					Grade separation at Glenwood at-grade crossing would have construction disruption and likely right-of-way acquisition.	Likely	Possibly	Yes	No	No. See text discussion.	No determination made	No determination made	No. Cost prohibitive.	No

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Oak Grove Avenue/El Camino Real	GX74	Menlo Park	X	X	Surface intersection improvements: Building acquisition.	Yes	Yes	Yes	No	No. See text discussion	Yes	Yes	No. Extensive acquisitions.	No
					Grade separation at Oak Grove at-grade crossing would have construction disruption and likely right-of-way acquisition.	Likely	Possibly	Yes	No	No. See text discussion.	No determination made	No determination made	No. Cost prohibitive.	No
Oak Grove Avenue/Merrill Street	GX75	Menlo Park	X	X	Surface intersection improvements: Building acquisition.	Yes	Yes	Yes	No	No. See text discussion	Yes	Yes	No. Extensive acquisitions.	No
					Grade separation at Oak Grove at-grade crossing would have construction disruption and likely right-of-way acquisition.	Likely	Possibly	Yes	No	No. See text discussion.	No determination made	No determination made	No. Cost prohibitive.	No
Oak Grove Avenue/Alma Street	GX76	Menlo Park	X	X	All work would be accomplished in the existing roadway right-of-way.	No	No	No	No	No. See text discussion.	No	No	No. City opposes this measure.	No
Oak Grove Avenue/Laurel Street	GX77	Menlo Park	X	X	Surface intersection improvements: Building acquisition.	Yes	Yes	Yes	No	No. See text discussion	Yes	Yes	No. Extensive acquisitions.	No
					Grade separation at Oak Grove at-grade crossing would have construction disruption and likely right-of-way acquisition.	Likely	Possibly	Yes	No	No. See text discussion.	No determination made	No determination made	No. Cost prohibitive.	No
Santa Cruz Avenue/El Camino Real	GX78	Menlo Park	X	X	Surface intersection improvements: Loss of on-street parking and building acquisition in commercial district.	Yes	Yes	Yes	No	No. See text discussion	Yes	Yes	No. Extensive acquisitions.	No
					Grade separation at Ravenswood and/or Oak Grove at-grade crossings would have construction disruption and likely right-of-way acquisition.	Likely	Possibly	Yes	No	No. See text discussion.	No determination made	No determination made	No. Cost prohibitive.	No
Ravenswood Avenue/El Camino Real	GX80	Menlo Park	X	X	Analyzed potential project in the Menlo Park Transportation Master Plan (TMP 89) to remove median and add northbound right turn lane. Evaluation of this measure indicated that it would not mitigate project impacts. Other improvements to expand roadway capacity would require building acquisition.	No Yes	Yes Yes	No Yes	No	No. See text discussion	No Yes	No Yes	No. Not effective. No. Extensive acquisitions.	No No
					Grade separation at Ravenswood at-grade crossing would have construction disruption and likely right-of-way acquisition	Likely	Possibly	Yes	No	No. See text discussion.	No determination made	No determination made	No. Cost prohibitive.	No

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Ravenswood Avenue/Merrill Street	GX81	Menlo Park	X	X	Surface intersection improvements: Building acquisition.	Yes	Yes	Yes	No	No. See text discussion	Yes	Yes	No. Extensive acquisitions.	No
					Grade separation at Ravenswood at-grade crossing would have construction disruption and likely right-of-way acquisition.	Likely	Possibly	Yes	No	No. See text discussion.	No determination made	No determination made	No. Cost prohibitive.	No
Ravenswood Avenue/Laurel Street	GX83	Menlo Park	X	X	Grade separation at Ravenswood at-grade crossing would have construction disruption and likely right-of-way acquisition. Modification of southbound Laurel Street to provide a left turn lane and a southbound through/right turn lane would require removal of parking on the west side of Laurel Street north of Ravenswood Avenue for approximately 100 feet and signal timing modifications.	Likely No	Possibly No	Yes No	No No	No. See text discussion.	No determination made No	No determination made No	No. Cost prohibitive. No. Not effective at improving traffic.	No No
Palo Alto Avenue/El Camino Real	GX84	Palo Alto	X	X	Acquisition of portion of shopping center on west side and/or recreational uses on east side and/or encroachment on the creek.	Yes	Yes	Yes	No	No. See text discussion.	Yes	Yes	No. Extensive acquisitions.	No
Palo Alto Avenue/Alma Street	GX85	Palo Alto	X	X	Major building acquisition on east side and possibly trail effects.	Yes	Yes	Yes	No	No. See text discussion.	Yes	Yes	No. Extensive acquisitions.	No
Churchill Avenue/Alma Street	GX86	Palo Alto	X	X	Acquisition of residential properties and potential effects on the bike lanes.	Yes	Yes	Yes	No	No. See text discussion.	Yes	Yes	No. Extensive acquisitions.	No
Churchill Avenue/Mariposa Avenue	GX87	Palo Alto	X	X	Acquisition of residential properties, possible effect on bike lanes, and possible effect on the high school.	Yes	Yes	Yes	No	No. See text discussion.	Yes	Yes	No. Extensive acquisitions.	No
Meadow Drive/Park Boulevard	GX89	Palo Alto	X	X	Acquisition of residential properties and possible effects on the bike lanes.	Yes	Yes	Yes	No	No. See text discussion.	Yes	Yes	No. Extensive acquisitions.	No
Charleston Road/Park Boulevard	GX91	Palo Alto	X	X	Acquisition of residential properties and possible effects on the bike lanes.	Yes	Yes	Yes	No	No. See text discussion.	Yes	Yes	No. Extensive acquisitions.	No
Churchill Avenue/Castilleja Street	GX95	Palo Alto	X	X	Acquisition of residential properties, and possible effects on the bike lanes and the high school.	Yes	Yes	Yes	No	No. See text discussion.	Yes	Yes	No. Extensive acquisitions.	No
Charleston Road/Wilkie Way	GX96	Palo Alto	X	X	Acquisition of residential properties and possibly effects on the bike lanes.	Yes	Yes	Yes	No	No. See text discussion.	Yes	Yes	No. Extensive acquisitions.	No
Rengstorff Avenue/Central Expressway	GX97	Mountain View	X	X	Surface intersection improvements: Building/business acquisitions.	Yes	Yes	Yes	No	No. See text discussion	Yes	Yes	No. Extensive acquisitions.	No

Mitigation Measure	Intersection(s)	Community	Alt. A	Alt. B	Secondary Effect	Additional ROW?	Displacement?	More effect?	C1: Increase VMT?	C2: Contradict objectives of SB 743?	C3: More Disruptive than Traffic Effect?	C4: Unmitigable Secondary Effect?	C5: Practicable?	Pass Screening?
					Grade separation at Rengstorff at-grade crossing would have construction disruption and likely right-of-way acquisition.	Likely	Possibly	Yes	No	No. See text discussion.	No determination made	No determination made	No. Cost prohibitive.	No
Rengstorff Avenue/Crisanto Avenue	GX98	Mountain View	X	X	Surface intersection improvements: Building/business acquisition on north side.	Yes	Yes	Yes	No	No. See text discussion	Yes	Yes	No. Extensive acquisitions.	No
					Grade separation at Rengstorff at-grade crossing would have construction disruption and likely right-of-way acquisition.	Likely	Possibly	Yes	No	No. See text discussion.	No determination made	No determination made	No. Cost prohibitive.	No
Castro Street/Moffett Boulevard/Central Expressway	GX99	Mountain View	X	X	Major building acquisitions.	Yes	Yes	Yes	No	No. See text discussion.	Yes	Yes	No. Extensive acquisitions.	No
Castro Street/Villa Street	GX104	Mountain View	X	X	Elimination of on-street parking on Villa, and major building acquisitions.	Yes	Yes	Yes	No	No. See text discussion.	Yes	Yes	No. Extensive acquisitions.	No
Castro Street/Dana Street	GX105	Mountain View	X	X	Elimination of on-street parking on Dana, major building acquisitions.	Yes	Yes	Yes	No	No. See text discussion.	Yes	Yes	No. Extensive acquisitions.	No
Evelyn Avenue/Hope Street	GX106	Mountain View	X	X	Loss of on-street parking on Hope, downtown commercial building acquisitions.	Yes	Yes	Yes	No	No. See text discussion.	Yes	Yes	No. Extensive acquisitions.	No
Moffett Boulevard/Central Avenue	GX107	Mountain View	X	X	Loss of parking on Moffett and commercial building acquisitions.	Yes	Yes	Yes	No	No. See text discussion.	Yes	Yes	No. Extensive acquisitions.	No
Mary Avenue/Evelyn Avenue	GX101	Sunnyvale	X	X	Surface intersection improvements: Commercial and residential building acquisitions.	Yes	Yes	Yes	No	No. See text discussion	Yes	Yes	No. Extensive acquisitions.	No
					Grade separation at Mary Avenue at-grade crossing would have construction disruption and likely right-of-way acquisition.	Likely	Possibly	Yes	No	No. See text discussion.	No determination made	No determination made	No. Cost prohibitive.	No
TR-MM#X.2: Coleman Avenue/Hedding Street—Widen and Reconfigure Eastbound Approach	D41	San Jose Diridon		X	Removal of on-street parking on the south side of Hedding St between Coleman Ave and Chestnut St, and the acquisition of right-of-way on the south side of Hedding St. Displace commercial building SE corner of Coleman/Hedding and displacement of 3 residences up to 300 feet from intersection.	Yes	Yes (3 residential and 1 commercial) There is available residential and commercial relocation in San Jose.	Yes	No	No. See text discussion.	Yes	Yes	Yes	No
TR-MM#X.3: Coleman Avenue/Taylor Street—Widen and Reconfigure Southbound Approach	D42	San Jose Diridon		X	Widening of Coleman Ave, which would require the acquisition of adjacent property on the west side of Coleman Ave occupied by commercial establishments. Acquisition of parking and one displacement of commercial building	Yes	Yes (commercial) There is available commercial relocation in San Jose.	Yes	No	No. See text discussion.	Yes	Yes	No. Extensive acquisitions.	No

Mitigation Measure	Intersection(s)	Community	Alt. A	Alt. B	Secondary Effect	Additional ROW?	Displacement?	More effect?	C1: Increase VMT?	C2: Contradict objectives of SB 743?	C3: More Disruptive than Traffic Effect?	C4: Unmitigable Secondary Effect?	C5: Practicable?	Pass Screening?
TR-MM#X.4: Delmas Avenue/West San Fernando Street—Add Eastbound and Westbound Left Turn Lanes	D44	San Jose Diridon		X	Acquisition of adjacent property and changes to the adjacent VTA light rail crossing and signal system. Residential (5–7) and commercial building (1) displacement 300 feet on either side of the intersection.	Yes	Yes (5–7 residential and 1 commercial) There is available residential and commercial relocation in San Jose.	Yes	No	No. See text discussion.	Yes	Yes	No. Extensive acquisitions.	No
TR-MM#X.5: Autumn Street/West Fernando Street—Provide Eastbound and Westbound Left Turn Lanes	D25	San Jose Diridon		X	The City of San Jose has recently narrowed Autumn St by one northbound through lane and bike improvements (including bike lanes) have been made and West San Fernando St has also been narrowed to include bike lanes. As a result, this measure would require adding back the through lanes and removing the bike lanes (which would be inconsistent with the City's road diet intent for this location) or acquisition of substantial adjacent property, which would result in commercial and/or residential displacements.	Yes	Yes	Yes	No	No. See text discussion.	Yes.	Yes	No. Extensive acquisitions.	No
TR-MM#X.6: Montgomery Street/Park Avenue: Reconfigure Northbound and Eastbound Approaches	D27	San Jose Diridon		X	The City of San Jose has recently made improvements to the Montgomery St/Park Ave intersection. Northbound Montgomery was narrowed by one through lane to add bike improvements. As a result, this measure would require adding back the through lane and removing the bike lanes, which would be inconsistent with the City's road diet intent for this location, or acquisition of substantial adjacent property, which would result in commercial and/or residential displacements.	Yes	Yes	Yes	No	No. See text discussion.	Yes	Yes	No. Extensive acquisitions.	No
TR-MM#X.12: Grade Separations (in General)	Multiple	San Francisco, South San Francisco, San Bruno, Millbrae, Burlingame, San Mateo, Redwood City, Atherton, Menlo Park, Palo Alto, Mountain View Sunnyvale, San Jose	X	X	Grade separations, depending on location and design can have substantial secondary environmental impacts, including construction disruption to roadways and rail operations as well as construction noise and air pollution emissions, visual aesthetic changes, right-of-way acquisition, displacement of residential and commercial development, encroachment on public parks and open space, removal of trees and vegetation, and impacts on groundwater. However, it is speculative to ascribe specific impacts absent detailed location and designs.	Yes	Yes	Yes	No	No. See text discussion.	Yes	Yes	No. Cost prohibitive	No

Alt. = alternative
Authority = California High-Speed Rail Authority
EB = eastbound
HSR = high-speed rail
IC = interchange
MM = mitigation measure

ROW = right-of-way
SB = southbound
SE = southeast
SR = State Route
US = U.S. Highway
VMT = vehicle miles traveled
VTA = Santa Clara Valley Transportation Authority