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| 1 | 9:30 AM | Introductions (5 minutes)

<i>Attachment A: Meeting Schedule and Topics</i>
<i>Attachment B: Schedule for Other Committees' Feedback</i> |
| 2 | 9:35 AM | Discussion: Benefit-Cost Methodology (70 minutes)

<i>Attachment C: Plan Bay Area 2040 – Benefit-Cost Assessment Methodology</i> |
| 3 | 10:45 AM | Discussion: Targets Criteria Update (45 minutes)

<i>Attachment D: Plan Bay Area 2040 Performance Targets Criteria – Updated Proposal</i> |
| 4 | 11:30 AM | Discussion: Project-level Equity Assessment (25 minutes)

<i>Attachment E: Plan Bay Area 2040 – Project-level Equity Assessment</i> |
| 5 | 11:55 AM | Next Steps |

PERFORMANCE WORKING GROUP

Meeting Schedule and Topics *(subject to change)*

1	April 29, 2015 9:30 AM to 12:00 PM	- Overview & Performance Framework <u>Targets</u> – Climate Protection, Healthy & Safe Communities, Open Space & Agricultural Preservation, Equitable Access
2	May 22, 2015 9:30 AM to 12:00 PM	<u>Targets</u> – Equitable Access, Adequate Housing, Economic Vitality, Transportation System Effectiveness
3	June 18, 2015 9:30 AM to 12:00 PM	<u>Targets & Project Performance</u> – State of Good Repair - Draft Targets Proposal to RAWG <u>Project Performance</u> – Overview
4	July 10, 2015 1:00 PM to 3:30 PM	- Project Performance – Framework - Project Performance – Targets Assessment Methodology
5	August 6, 2015 9:30 AM to 12:00 PM	<u>Project Performance</u> – Benefit-Cost Assessment Methodology <u>Project Performance</u> – Targets Criteria <u>Project Performance</u> – Equity Assessment Methodology
6	Meeting TBD – Late 2015	Draft Results of Project Performance Assessment

PERFORMANCE WORKING GROUP

Schedule for Other Committees' Feedback (*subject to change*)

Goals & Performance Targets: Initial Recommendation

- April & May – First Round of Public Workshops¹
- June – Policy Advisory Council
- July – Regional Advisory Working Group
- July – Joint MTC Planning / ABAG Administrative Committee

Goals & Performance Targets: Approval

- **September – Joint MTC Planning / ABAG Administrative Committee**
- **September – MTC Commission**

Project Performance Assessment: Conceptual Framework

- July – Transit Finance Working Group
- July – Regional Advisory Working Group
- July – Equity Working Group
- July – Policy Advisory Council
- July – Local Streets & Roads Working Group

Project Performance Assessment: Draft Results

- December – Regional Advisory Working Group
- December – Policy Advisory Council
- December – Planning Committee
- December – Local Streets & Roads Working Group
- December – Transit Asset Management Working Group

Project Performance Assessment: Final Results, High-Performers, and Low-Performers

- January – Regional Advisory Working Group
- January – Policy Advisory Council
- January – Planning Committee

Project Performance Assessment: Compelling Case Process

- March – Regional Advisory Working Group
- March – Policy Advisory Council
- March – Planning Committee

¹ For more information, refer to: <http://content.govdelivery.com/accounts/CAMTC/bulletins/ff32b4>

To: Performance Working Group
From: Kristen Carnarius, Dave Vautin, and Anne Spevack
Re: Plan Bay Area 2040 – Benefit-Cost Assessment Methodology

At the last two Performance Working Group meetings, staff presented the general framework for the benefit-cost estimation of the project performance assessment. This memo provides answers to some of the questions from the working group, along with detailed technical information of the methodology. Please refer to packets from June and July for general background of the benefit-cost assessment.

Attachment C.1 presents answers to some over-arching questions for the benefit-cost assessment. Attachment C.2 explains how each component of the benefit-cost assessment is calculated. Attachment C.3 presents the proposed valuations that will convert the benefits into monetary terms. Attachment C.4 presents proposals for two assessments that staff will use to check and verify the findings of the performance assessment. Attachment C.5 presents the proposal for the project-level equity assessment.

Enclosed:

- C.1 Benefit-Cost Questions and Answers
- C.2 Benefit-Cost Estimation Methodology
- C.3 Benefit Valuations
- C.4 Supplemental Assessments
- C.5 Equity Assessment

Attachment C.1 - Benefit-Cost Questions & Answers

How did you determine which benefits would be included in the benefit-cost assessment?

Benefits and disbenefits for a benefit-cost assessment are measurable and have economic value. The current list of benefits includes the user and society benefits that staff can forecast and quantify with the travel demand model or with outputs from the model.

Is it possible to include economic benefits in the benefit assessment?

A project's economic impact could be measured as the effect of the project on the economy of a particular area, measured in terms of the change in business sales, jobs, value added, income, or tax revenue. These factors measure the amount and type of economic activity in a region and are typically handled in an economic impact assessment. Economic impacts should be considered separate from the benefit cost assessment for two reasons:

1. The causal relationship between travel time savings (from a project) and economic development is difficult to quantify and MTC does not currently have a method for developing this estimate at the project-level.
2. Economic impacts are examples of “follow-on” benefits that indirectly follow cost and time savings from the project. Adding the economic benefits to the benefit-cost assessment might lead to double-counting of the direct travel time and cost benefits.

The benefits include a subset of the topics included in the targets. Is that a duplication?

The benefit-cost and target assessments are complementary. The benefit-cost assessment quantifies the full suite of benefits (some of which are also handled by the targets). The target assessment handles issues that are not easily quantified at a project level (e.g. displacement) and the connection to land use decisions.

How are changes in land use assessed?

Changes in land use (new residential or commercial development) and the effects of new development on project metrics are not captured in the benefit-cost assessment. Staff cannot estimate land use changes likely to occur with each project with enough accuracy to include in the project level assessment. Staff qualitatively incorporates land use considerations in the targets assessment, however, by assigning higher points to projects that meet criteria within land use targets (e.g. adequate housing and affordable housing). Land use changes will be quantitatively assessed at the scenario level using the performance targets.

What about projects with significant local impacts that don't make a big impact regionally?

The performance assessment is focused on identifying projects for regional discretionary funding and to scrutinize large, low-performing projects. County transportation agencies also receive a discretionary funding budget within the regional planning process with which they can prioritize local projects.

Attachment C.2 – Benefit-Cost Estimation Methodology

Benefits

All benefits are calculated and forecasted using MTC's travel demand model, Travel Model One, which is an activity-based model that simulates travel decisions over a typical workday for the entire Bay Area. Benefits (or dis-benefits) are evaluated for each project individually and compared to a baseline, no-project model run in the same horizon year. Benefits are then annualized, monetized, and summed over all benefits for inclusion in the benefit-cost ratio.

Components of Benefits	
Travel Time	– Auto/Truck Free-flow Time + Recurring Delay – Non-Recurring Freeway Delay – Transit In-Vehicle – Transit Out-of-Vehicle – Walk/Bike
Travel Cost	– Operating Costs – Parking Costs – Vehicle Ownership (Modeled)
Air Pollutants	– PM2.5 – CO2 – Other: NOx, SO2, Acetaldehyde, Benzene, 1,3-Butadiene, Formaldehyde, Other volatile organic compounds
Collisions, Active Transportation, Noise	– Fatalities Due to Collisions – Injuries Due to Collisions – Property Damage Only Collisions – Active individuals – Noise

Costs

Project costs reflect total project cost over the lifetime of the project (e.g. lifecycle costs), converted to 2017 dollars. Capital costs are annualized based on the expected useful life of the corresponding transportation asset. Annualized capital costs are combined with annual operating and maintenance costs. The project cost is the denominator in the benefit-cost ratio.

The following table further describes the methodology and rationale for each benefit along with details on calculating project costs.

Table 1. Benefit-Cost Methodology

Benefit-Cost Component	Methodology	Reflects	Data Source
<i>Travel Time¹</i>			
Auto/truck travel time + recurring delay (hours)	Sum of vehicle hours traveled across all roadways and transformed to person hours by using an assumption of occupancy for carpoolers	Discomfort to travelers of enduring transportation-related delay and the loss in regional productivity for on-the-clock travelers and commuters	Travel Model One
Auto/truck non-recurring freeway delay (hours)	Sum of incident delay across all roadways; incident delay as a function of volume-to-capacity ratio and number of lanes on a roadway.	Additional traveler frustration of experiencing non-expected incident	Travel Model One/FHWA IDAS
Transit in-vehicle time (hours)	Sum of transit trips multiplied by the in-vehicle time for those trips, by transit mode (local bus, light rail/ferry, express bus, heavy rail, and commuter rail)	Discomfort to travelers of enduring transportation-related delay and the loss in regional productivity for on-the-clock travelers and commuters	Travel Model One
Transit out-of-vehicle time (hours)	Sum of transit trips multiplied by out-of-vehicle time for those trips, by time spent walking to/from transit, driving to/from transit, waiting for transit to arrive, and an adjustment	Additional discomfort to travelers of experiencing uncertainty of transit travel arrival time, exposure to incident weather, and exposure to safety risk	Travel Model One
Walk/bike travel time (hours)	Sum of walk and bike trips multiplied by walk and bike times, converted from distance by assuming an average travel speed (3 mph for walk trips and 12 mph for bike trips)	Discomfort to travelers of enduring transportation-related delay and the loss in regional productivity for on-the-clock travelers and commuters	Travel Model One

¹ Travel time and travel cost differences between a baseline and a project scenario are trying to estimate a change in consumer surplus, which is the economic value of a transportation project for the user. Plan Bay Area used travel time and cost reductions as an approximate estimation of this change. Another option is to use the utility calculations from the travel demand model. Staff are currently exploring this methodology and trying to implement it within the benefit-cost framework. The utility method would replace the separate estimates of travel time and cost for all modes with one item valuing the change in utility with the project.

Benefit-Cost Component	Methodology	Reflects	Data Source
<i>Travel Cost²</i>			
Auto/truck operating cost (\$/mile)	Sum of roadway costs multiplied by the volume of autos and trucks that travel those roadways; do not include bridge or value tolls (HOT lanes)	Variable cost of owning a vehicle, including fuel, maintenance, depreciation and tires	Travel Model One
Parking cost (\$/trip)	Number of work and non-work auto trips multiplied by an assumed parking cost incurred in each county	Additional cost of completing an auto trip	Travel Model One
Vehicle ownership (\$/vehicle)	Predicted from Travel Model One vehicle ownership model, based on household demographics and accessibility estimates	Additional cost of owning vehicle to reflect purchase/lease cost, maintenance, and finance charges	Travel Model One
<i>Air Pollutants</i>			
PM2.5 (tons/VMT)	Sum of vehicle miles travelled by time period, vehicle class and speed multiplied by an estimate of future PM2.5 emissions from EMFAC; calculated for gasoline and diesel vehicles	Negative health effects of PM2.5 emissions	Travel Model One/EMFAC
CO2 (metric tons/VMT)	Sum of vehicle miles travelled by time period, vehicle class and speed multiplied by an estimate of future CO ₂ emissions from EMFAC	Global social effects of CO ₂ emissions	Travel Model One/EMFAC

² Travel time and travel cost differences between a baseline and a project scenario are trying to estimate a change in consumer surplus, which is the economic value of a transportation project for the user. Plan Bay Area used travel time and cost reductions as an approximate estimation of this change. Another option is to use the utility calculations from the travel demand model. Staff are currently exploring this methodology and trying to implement it within the benefit-cost framework. The utility method would replace the separate estimates of travel time and cost for all modes with one item valuing the change in utility with the project.

Benefit-Cost Component	Methodology	Reflects	Data Source
Other (tons/VMT)	Sum of vehicle miles travelled by time period, vehicle class and speed multiplied by an estimate of future volatile organic compound emissions from EMFAC	Negative health effects of volatile organic compounds	Travel Model One/EMFAC
<i>Safety, Active Transportation, Noise</i>			
Fatalities due to collisions (collisions/VMT)	Sum of vehicle miles travelled by area type, facility type, and number of lanes multiplied by an estimate of fatalities due to collisions	Costs of losing a life for the collision victim, family of the victim, and society	Travel Model One/SWITRS
Injuries due to collisions (collisions/VMT)	Sum of vehicle miles travelled by area type, facility type, and number of lanes multiplied by an estimate of injuries due to collisions	Costs of pain, inconvenience, and loss of productivity to society	Travel Model One/SWITRS
Property damage due to collisions (collisions/VMT)	Sum of vehicle miles travelled by area type, facility type, and number of lanes multiplied by an estimate of property damage due to collisions	Costs of time loss resulting from the collision, inconvenience, and loss of productivity to society	Travel Model One/SWITRS
Active individuals (minutes/person)	Sum of average minutes walking and biking multiplied by an estimate of number of inactive persons	Costs of an insufficiently active adult in terms of health care and productivity	Travel Model One
Noise (\$/VMT)	Sum of auto and truck vehicle miles travelled multiplied by a valuation	Cost of property value decreases and social cost of noise abatement	Travel Model One/FHWA

Benefit-Cost Component	Methodology	Reflects	Data Source
Project Cost			
Capital cost	Capital cost is the total fixed cost of the project, expensed throughout all phases of the project. Capital costs include planning, design, environmental, right of way and rolling stock acquisition, and construction. Costs are collected by phase and inflated (or deflated) based on the mid-point of the phase to reflect 2017 dollars. Project sponsors will submit cost estimates through the Call for Projects. Before conducting the assessment, MTC will review costs for accuracy and inclusiveness.		Sponsor + MTC
Net operating and maintenance cost	Operating and maintenance costs reflect on-going costs of the transportation investment. For road projects, lane-mile maintenance costs are estimated using typical lane-mile costs by facility type. For transit projects, sponsors submit gross operating and maintenance costs. These are converted to net annual operating costs using the agencies' current farebox recovery ratios, thus rewarding agencies that recoup more of their operating costs through new farebox revenue. Project sponsors will submit O&M estimates through the Call for Projects. MTC will review these estimates and calculate <i>net</i> O&M, or the additional O&M that is not recouped by the project. MTC might also add O&M costs to roadway or transit projects that do not submit O&M costs through the Call.		Sponsor + MTC

Attachment C.3 Benefit Valuations

This attachment summarizes recommended benefit valuations for the benefit-cost assessment for Plan Bay Area 2040, based on a review of recent research and best practices for monetizing benefits from transportation projects. Table 1 presents the draft recommended valuations for each benefit category, including a comparison to the Plan Bay Area valuation and a description of the basis of the valuation.

It is important to note that staff is currently investigating a different method for evaluating user benefits based on estimates of utility from the travel demand model. The units for utility are in time, so a change in utility would have the same valuation as travel time. A move to the utility methodology would eliminate the need to separately value the variables included in the utility calculation: in-vehicle travel time, out-of-vehicle travel time, travel costs, and parking costs. Variables for truck travel time, vehicle ownership, non-recurring delay, and societal benefits (GHG emissions, collisions, noise) would still need to be evaluated separately.

There are three types of valuation updates:

- **Major Update:** Valuation update involved an adjustment to the methodology or a significant change in the source material used to determine the valuation.
- **Minor Update:** Valuation update retained the methodology and sources used in Plan Bay Area, but used an updated source.
- **Inflation Only:** Valuation updated directly from the Plan Bay Area values, to \$2014 using the San Francisco-Oakland-San Jose Consumer Price Index (CPI) from the Bureau of Labor Statistics and to \$2017 using a 2.2% expansion rate.

Table 1. Draft Recommended Benefit Valuations

Benefit	Plan Bay Area Valuation (\$2013)	Plan Bay Area 2040 Valuation (\$2017)	Type of update	What does this valuation include?
In-Vehicle Travel Time per Person Hour of Travel	\$16.03	\$12.66	Minor Update	In-vehicle travel time for auto and transit users is set at 50% of the median regional wage rate (\$25.32). The valuation represents: • The discomfort to travelers of enduring transportation-related delay • The loss in regional productivity for on-the-clock travelers and commuters. Sources: US Department of Transportation; Bureau of Labor Statistics Occupational Employment and Wage, 2014

Benefit	Plan Bay Area Valuation (\$2013)	Plan Bay Area 2040 Valuation (\$2017)	Type of update	What does this valuation include?
Transit Out-of-Vehicle Travel Time per Person Hour of Travel	\$35.27	\$27.85	Minor Update	This value is equal to 2.2 times the valuation of in-vehicle travel time. The valuation represents the additional discomfort to travelers of experiencing uncertainty of transit arrival time, exposure to inclement weather conditions, and exposure to safety risks. <i>Source: FHWA Surface Transportation Economic Analysis Model (STEAM)</i>
Freight/Truck In-Vehicle Travel Time per Vehicle Hour of Travel	\$26.24	\$31.10	Minor Update	The valuation is the total hourly compensation paid to truck drivers. This valuation represents the labor cost of transporting goods on the roadway network. <i>Source: FHWA Highway Economic Requirements System; Bureau of Labor Statistics Occupational Employment and Wage, 2014</i>
Auto Travel Time Reliability per Person Hour of Non-recurring Delay	\$16.03	\$12.66	Minor Update	The value is set equal to the value of in-vehicle travel time for autos. The valuation represents the additional traveler frustration of experiencing non-expected incident related travel delays. <i>Source: SHRP2 L05 Project – “Incorporating Reliability Performance Measures into the Transportation Planning and Programming Processes”</i>
Freight/Truck Travel Time Reliability per Vehicle Hour of Non-recurring Delay	\$26.24	\$31.10	Minor Update	The value is set equal to the value of in-vehicle travel time for trucks. The valuation represents the additional loss of regional productivity due to experiencing non-expected incident related travel delays. <i>Source: SHRP2 L05 Project – “Incorporating Reliability Performance Measures into the Transportation Planning and Programming Processes”</i>

Benefit	Plan Bay Area Valuation (\$2013)	Plan Bay Area 2040 Valuation (\$2017)	Type of update	What does this valuation include?
Fatality Collisions (per fatality)	\$4.59 million	\$10.8 million	Major Update	The valuation includes the internal costs to a fatality collision victim (and their family) resulting from the loss of life, as well as the external societal costs. The valuation represents: • Loss of life for the victims. • Medical costs incurred in attempts to revive victims. • Loss of enjoyment of family member to other members of the family. • Loss of productivity to the family unit (e.g., loss of earnings). • Loss of productivity to society. • Loss of societal investment in the victim (e.g., educational costs). Source: National Highway Traffic Safety Administration, 2015
Injury Collisions (per injury)	\$64,000	\$125,000	Major Update	The valuation includes the internal costs to an individual (and their family) resulting from the injury, as well as the external societal costs. The valuation represents: • Pain and inconvenience for the individuals. • Pain and inconvenience for the other family members. • Medical costs for injury treatment. • Loss of productivity to the family unit (e.g., loss of earnings). • Loss of productivity to society. Source: National Highway Traffic Safety Administration, 2015
Property Damage Only Collision (per incident)	\$2,455	\$4,590	Value Update	The valuation includes the internal costs to a property damage collision victim (and their family) resulting from the time required to deal with the collision, as well as the external societal costs from this loss of time. The valuation represents: • Inconvenience to the individual and to other members of the family. • Loss of productivity to the family unit. • Loss of productivity to society. Source: National Highway Traffic Safety Administration, 2015

Benefit	Plan Bay Area Valuation (\$2013)	Plan Bay Area 2040 Valuation (\$2017)	Type of update	What does this valuation include?
CO ₂ per Metric Ton	\$55.35	\$100	Major Update	This valuation represents the full global social cost of an incremental unit (metric ton) of CO ₂ emission from the time of production to the damage it imposes over the whole of its time in the atmosphere. <i>Source: Federal Interagency Working Group on the Social Cost of Carbon, Revised 2015</i>
Diesel PM _{2.5} (Fine Particulate Matter) per Ton	\$490,300	\$665,400	Value Update	These valuations represent the negative health effects of increased emissions including: • Loss of productive time (work & school) • Direct medical costs from avoiding or responding to adverse health effects (illness or death). • Pain, inconvenience, and anxiety that results from adverse effects (illness or death), or efforts to avoid or treat these effects • Loss of enjoyment and leisure time • Adverse effects on others resulting from their own adverse health effects <i>Source: BAAQMD, 2015</i>
Direct PM _{2.5} (Fine Particulate Matter) per Ton	\$487,200	\$658,800	Value Update	
NO _x per Ton	\$7,800	\$6,000	Value Update	
Acetaldehyde (ROG) per Ton	\$5,700	\$5,100	Value Update	
Benzene (ROG) per Ton	\$12,800	\$15,200	Value Update	
1,3-Butadiene (ROG) per Ton	\$32,200	\$42,600	Value Update	
Formaldehyde (ROG) per Ton	\$6,400	\$5,900	Value Update	
All Other ROG per Ton	\$5,100	\$4,300	Value Update	
SO ₂ per Ton	\$40,500	\$22,200	Value Update	
Auto Operating Costs per Auto Mile Traveled	\$0.2518	\$0.3072	Major Update	This valuation represents the variable costs (per mile) of operating a vehicle, including fuel, maintenance, depreciation (mileage), and tires. Fuel costs and efficiencies reflect 2040 forecasts.
Truck Operating Costs per Truck Mile Traveled	\$0.3700	\$0.8679	Major Update	<i>Source: 2014 High-Speed Rail Benefit-Cost Analysis</i>

Benefit	Plan Bay Area Valuation (\$2013)	Plan Bay Area 2040 Valuation (\$2017)	Type of update	What does this valuation include?
Costs of Physical Inactivity	\$1,220	\$1,310	Inflation only	This valuation represents the savings achieved by influencing an insufficiently active adult to engage in moderate physical activity five or more days per week for at least 30 minutes. It reflects annual Bay Area health care cost savings of \$326 (2006 dollars), as well as productivity savings of \$717 (2006 dollars). <i>Source: California Center for Public Health Advocacy/Chenoweth & Associates 2006, "The Economic Costs of Overweight, Obesity, and Physical Inactivity Among California Adults"</i>
Parking Costs per Auto Trip	Varies by county	Model Output	Major Update	This valuation is consistent with parking cost estimation in Travel Model One.
Auto Ownership Costs per Vehicle (change in the number of autos)	\$6,290	\$6,940	Inflation only	This valuation represents the annual ownership costs of vehicles, beyond the per mile operating costs. This valuation includes purchase/lease costs, maintenance, and finance charges. <i>Source: Travel Model One</i>
Noise per Auto Mile Traveled	\$0.0012	\$0.0013	Inflation only	This valuation represents the property value decreases and societal cost of noise abatement. <i>Source: FHWA Federal Cost Allocation Report</i>
Noise per Truck Mile Traveled	\$0.0150	\$0.0170	Inflation only	

Attachment C.4 – Supplemental Assessments

During Plan Bay Area, stakeholders suggested an evaluation of the limitations in the performance methodology. Given that all evaluation methods have limitations, it was important to document known shortcomings of the approach, acknowledgement of which better informed policymakers of the strengths and weaknesses of the performance outcomes. Staff proposes to retain the supplemental assessment developed during Plan Bay Area. These include the benefit-cost confidence assessment and benefit-cost sensitivity testing.

Confidence assessment – this analysis identifies the primary shortcomings of the quantitative assessment approach, including limitations in travel model specificity or calibration, completeness of benefit estimation, and the horizon-year approach.

Sensitivity testing – this analysis documents the impact of benefit valuations on the estimate of cost-effectiveness by varying the valuations of key benefits and evaluating the effects on project ranking.

Confidence Assessment

For Plan Bay Area, the confidence assessment addressed three limitations to the benefit-cost assessment related to travel model limitations, ability to capture all benefits, and ability to value benefits in the short term relative to benefits in the long term. The assessment is a qualitative consideration of the following questions:

Travel Model Output

- Does the travel model have limitations in understanding a particular type travel behavior (e.g. weaving)?
- Does the travel model lack an understanding of specific travel conditions (e.g. ridership or traffic volumes)?

Framework Completeness

- Does the travel model output capture all of the primary benefits of the project?
- Are we capturing all of the real-world limitations of relevant transportation systems (e.g. transit vehicle crowding)?

Timeframe Inclusiveness

- Is the project an “early winner” (i.e. can be implemented quickly and provides key benefits in the short term)?
- Is the project a “late bloomer” (i.e. benefits will not be realized until the final years of the planning horizon)?

Sample output

Project Type	Confidence Assessment Criteria			Starred Comments
	Travel Model	Framework	Timeframe	
Bus Rapid Transit			*	BRT can be implemented quickly for near-term benefits.
Auxiliary Lanes	*			The model does not explicitly represent weaving (thus ignoring the benefits of longer weaving sections or other improvements).
Project Primarily Serving Vineyards		*		Analysis is performed for a typical weekday, but many of the project's benefits will be accrued on weekends due to recreational traffic.

Proposal for Confidence Assessment in Plan Bay Area 2040

Evaluate the confidence of the same topics as in Plan Bay Area:

1. Travel Model
2. Framework
3. Timeframe

Sensitivity Assessment

The sensitivity assessment evaluates how the results depend on assumptions, both technical and methodological. In contrast to the confidence assessment, this is a purely quantitative evaluation and determines if project rankings would change with different assumptions. In Plan Bay Area, staff assessed the sensitivity of the transit operations and maintenance cost assumption, and the valuations of several benefits: carbon dioxide emissions, non-recurring delay, collisions, noise, and travel time.

Of the sensitivity tests, only changes to the value of time had any substantial effects on the benefit-cost ratio. An additional test that might influence results is changing project costs, which was not part of the assessment in the last Plan. For Plan Bay Area 2040, staff proposes to evaluate the sensitivity of travel time valuation again and add in variations to the project costs. The variation in project costs might reflect the status of the project with a higher level of uncertainty added to the projects in the early planning phase.

Proposal for Sensitivity Assessment in Plan Bay Area 2040

Evaluate the sensitivity of the benefit-cost assessment to the following:

1. Decreasing travel time valuations substantially
2. Increasing project cost estimates based on project status as a proxy for risk of cost overruns

PERFORMANCE WORKING GROUP

Staff Briefing Memo
August 6, 2015

To: Performance Working Group
From: Kristen Carnarius and Dave Vautin
Re: Plan Bay Area 2040 Performance Targets Criteria – Updated Proposal

At the July 10th meeting of the Performance Working Group, members had an opportunity to provide feedback on the draft criteria for the project-level targets score. Since that meeting, staff have incorporated feedback from the working group members, as well as from ABAG and internal stakeholders. This memorandum presents the currently proposed criteria with an explanation of what has changed since the July 10 proposal and an explanation for the change.

It is important to note that the targets criteria will need to reflect the language and intent of the final Plan Bay Area 2040 targets. The MTC Commission will adopt the targets in September 2015. Staff will incorporate any changes to the criteria based on target language changes that the MTC Commission adopts at a later point in the performance assessment.

Proposed Target Criteria

Goal: Climate Protection

Staff proposal¹	Support if project: • Provides an alternative to driving alone • Likely to cause VMT reduction • Advances clean fuels and/or vehicles beyond CARB targets • Project outside of sea level rise inundation area Impact if project: • Project inside of sea level rise inundation area AND does not include a potential adaptation strategy in project description [only can be used to decrease score by 0.5 points, does not add points to projects outside inundation area]
What changed?	• Changed the sea level rise language to say adaptation rather than mitigation • Added restriction on the sea level rise criterion

The targets criteria are the same as Plan Bay Area, except for the addition of the criteria related to sea level rise. Several of the working group members expressed concern that projects near the bay would inherently be disadvantaged with this criterion. Staff clarified that a project in an inundation area that includes an adaptation strategy could receive strong support for this target. Upon further deliberation of the target, staff is also proposing that the sea level rise criterion could only *decrease* a project's score. This would address the issue of a project far from the bay receiving a boost in the score irrespective of its impact on vehicle-miles travelled.

¹ The staff proposal presents the criteria used to determine if a project supports a target. A project would generally adversely impact the target if it does not accomplish the criteria in the support category, unless otherwise noted.

Staff also changed the wording to reflect the difference between mitigation and adaptation. Mitigation is generally the term used to describe what is being done to reduce pollutants that lead to climate change like GHG reduction strategies. Adaptation refers to strategies to make infrastructure more resilient to sea level rise. To address the impacts of sea level rise, a project in an inundation area would need to consider adaptation strategies or include a plan for developing adaptation strategies. Per Caltrans guidance, adaptation strategies include the decision to rebuild, relocate, or abandon in place.

Goal: Adequate Housing

Staff proposal	Support if project: - Increases accessibility to and from areas with planned housing growth more than 1,500 500 units (moderate support) or more than 10,000 5,000 units (strong support) Does not increase capacity at regional gateways Project serves an area that permitted at least 25% of its 2007-2014 RHNA allocation
What changed?	- Removed “increase capacity at regional gateways” from targets criteria - Reduced the housing thresholds to reflect growth rates for medium-sized cities - Added criteria based on permitting levels in the most recent RHNA allocation cycle

The working group expressed strong concern with having criteria related to capacity at regional gateways associated with this target. Staff agrees and removed the gateway language from the target criteria. The target criteria is now only related to a project’s connection to housing. Per a suggestion from the Association of Bay Area Governments (ABAG), staff also decreased the housing threshold to benefit medium-sized jurisdictions and added a new criterion related to the regional housing needs allocation (RHNA). The RHNA criterion reflects the ability of a jurisdiction to produce adequate housing. The Bay Area permitted 50% of its RHNA allocation for 2007-2014. The RHNA threshold for this target is half of the regional value for the same cycle.

Goal: Healthy and Safe Communities

Staff proposal	Support if project: - Likely to reduce VMT (support for PM2.5, collisions, active transportation) - Has safety component (support for collisions) - Includes infrastructure for walking and biking (support for active transportation) Project increases access to parks or adds park space (e.g. urban greening)
What changed?	Added criteria related to urban greening or access to open space

The working group recommended adding criteria related to increasing access to parks and urban greening to either the healthy and safe communities target or the open space target. Staff recommends inclusion of urban open space in this target since the outcome of urban open space is potentially a healthier community.

Goal: Open Space and Agricultural Preservation

Staff proposal	Support if project: • Project itself would not consume areas of open space • Project itself would not consume areas of agricultural land • Improves freeway, arterial or rail access to agricultural land
What changed?	No change

Staff recommends no change to these target criteria. There was some concern about adding a criterion for access to agricultural land. Staff explained that part of the goal of agricultural preservation is improving the connection between agricultural land and markets. Staff also considered evaluating the type of open space land (e.g. grazing land, farm land, wildlife corridors) that a project might consume. Due to difficulties in assigning scores to different types of open space, staff recommends to consider all open space as contributing equally to the target score.

Goal: Equitable Access**Target: Housing + Transportation Affordability**

Staff proposal	Support if project: • Provides low-cost transportation options for low income households; degree of support varies with the operator's current low-income ridership • Reduces household auto ownership costs/transportation costs for low income households
What changed?	No change

Staff recommends no change from the Plan Bay Area criteria.

Target: Affordable Housing

Staff proposal	Support if project: • Serves a PDA with above average production of affordable housing units (moderate income, low income, very low income) as compared to the regional average for the 2007-2014 RHNA cycle
What changed?	• Added clarification on the definition of affordable housing

Several members of the working group suggested adding displacement language to this target depending on the final target adopted by the MTC Commission in September 2015. See the section on displacement for more information (page 4 of this memo).

--memo continued on next page--

Goal: Economic Vitality**Target: Access to Jobs by Transit or Auto**

Staff proposal	Support if project: • Decreases auto, freight or transit travel times during AM and PM commute hours (strong support for high travel time reduction) AND • Serves regional or subregional job centers OR • Serves goods movement centers
What changed?	• Replaced major job centers with regional or subregional • Added criteria related to improving access to goods movement centers

The working group suggested defining job centers and adding a connection to goods movement or logistics centers. Staff proposes to define job centers in terms of the place types that the Association of Bay Area Governments developed for Plan Bay Area. There are three regional job centers: downtown Oakland, San Francisco, and San Jose. There are also several sub-regional job centers such as downtown Berkeley and downtown Concord that have at least 5,000 jobs. A project will support the target if it increases access to the regional job centers or the sub-regional job centers, defined as the city center place type in the land use strategy of Plan Bay Area. A project will also support the target if it increases access to freight centers such as any of the regional seaports.

Goal: Transportation System Effectiveness**Target: Non-Auto Mode Share**

Staff proposal	Support if project: • Provides alternatives to the single occupant auto • Reduces household vehicle ownership • Creates more direct active transportation routes • Improves transit service and connections to transit • Serves a planned transit-oriented development
What changed?	Added criteria related to accessing planned transit-oriented development

The working group suggested adding a connection to planned transit-oriented development (TOD) in the targets criteria. Staff proposes to add the criteria of serving a planned TOD to the non-auto mode share target.

Target: State of Good Repair for Roads and Transit

Staff proposal	Support if project: • Improves roadway surface condition OR • Replaces or extends the life of bus, rail or ferry assets No project would receive adverse impact for this target.
What changed?	No change

The working group expressed concern that expansion projects would increase the burden of funding the existing system. In the assessment, however, a project's cost includes new transit vehicles for a transit extension or pavement costs for roadway expansions. An expansion project might improve the asset condition in the short term but increase the burden in the long term. Due to this complication, most projects will receive a "minimum impact" for this target. Staff proposes to keep the target criteria the same as in Plan Bay Area.

A note on displacement

On July 10, the joint MTC/ABAG Planning and Admin Committee asked MTC and ABAG staff to return to them in September with a memo on the issue of displacement. This memo will include a definition of displacement and policy recommendations about its relationship to the Plan, including recommendations for target language changes. Before the Committee meeting in September, staff will review the proposed displacement methodology from the 6 Wins for Social Equity Network, along with feedback from a special meeting of the Regional Equity Working Group that will exclusively cover displacement. Staff will update the targets criteria depending on the outcome of the September Committee and Commission meetings on performance targets.

A note on multiple criteria per target and assessing regional projects

As in Plan Bay Area, there are two issues with conducting the targets assessment. The first is the treatment of multiple criteria (e.g. more than one bullet point) for single target. The second is the handling of regional projects. During the assessment, staff will develop methods for combining criteria such as assigning half of a point to each of two criteria. For the healthy and safe communities target, a project would receive a strong support if it addressed most of the criteria and a moderate support if it addressed some of the criteria. The second issue is assigning jurisdiction-specific criteria to regional projects or projects that cross multiple jurisdictions, such as for adequate housing, affordable housing, and displacement. In these instances, staff will likely look at county-level information or combine data from multiple cities. For example, if the majority of cities along a BART extension have high planned growth, the project would receive a high score for that target.

To: Performance Working Group
From: Kristen Carnarius, Dave Vautin, and Anne Spevack
Re: Plan Bay Area 2040 – Project-level Equity Assessment

This memo summarizes the proposal for the project-level equity assessment for Plan Bay Area 2040. The equity assessment is conducted in tandem with the benefit-cost and targets assessment to present a complete picture of project performance. The project performance evaluation will lead to the development of Plan scenarios, at which time a separate scenario-level equity analysis will quantitatively and qualitatively evaluate the equity benefits and impacts of the scenarios (packages of projects).

Equity Assessment in Plan Bay Area

In Plan Bay Area, the project equity assessment had two main components: a Communities of Concern geographic analysis and an equity targets score.

1. For the geographic analysis, projects were overlaid with the Plan Bay Area Communities of Concern to determine the potential to affect low-income and minority communities. Each project located in these communities was further evaluated to determine whether it served these communities by providing an access point for the residents of the neighborhood (e.g. bus stop, rail station, on-ramp, intersection). Through this mapping analysis, each project was classified as benefitting a Community of Concern or not.
2. The equity targets score was the summation of the three Plan Bay Area performance target scores most focused on equity issues: adequate housing, particulate emissions in CARE communities, and low-income housing + transportation affordability. The equity targets were scored with the same criteria as in the general targets assessment, and resulted in scores between +3 and -3.

This equity assessment revealed that few projects had adverse equity impacts, and all of the high-performing projects had positive or neutral impacts for each of the equity targets. Further, all of the high performing projects served a Community of Concern (see details in the table below).

High-Performing Transportation Projects from Plan Bay Area	Equity Targets Score (Out of 3)	Any Adverse Impacts?	Serves Community of Concern?*
AC Transit Grand-MacArthur BRT	2.0	No	Yes
BART Metro Program	2.5	No	Yes
BART to San Jose/Santa Clara (Phase 2: Berryessa to Santa Clara)	2.0	No	Yes
Better Market Street	2.0	No	Yes
Caltrain Service Frequency Improvements (6-Train Service during Peak Hours) + Electrification (SF to Tamien)	2.0	No	Yes
Congestion Pricing Pilot	1.5	No	Yes
Freeway Performance Initiative	1.0	No	Yes
Irvington BART Station	1.0	No	Yes
ITS Improvements in San Mateo County	1.0	No	Yes
ITS Improvements in Santa Clara County	1.0	No	Yes
SFMTA Transit Effectiveness Project	2.0	No	Yes
Treasure Island Congestion Pricing	1.0	No	Yes
Van Ness Avenue BRT	2.0	No	Yes

The equity results from Plan Bay Area reinforced that the project performance assessment recommended projects that were not in conflict with equity goals. In fact, the overall targets scores were correlated with the equity targets scores, showing an existing emphasis towards equitable projects in the targets assessment.

Proposed Project Equity Analysis in Plan Bay Area 2040

For Plan Bay Area 2040, staff is proposing to use the same methodological framework as in Plan Bay Area, with adjustments to match the updated targets. The current proposal for the Plan Bay Area 2040 performance targets also includes at least three targets that directly reflect equity goals. Equity is well represented in the targets assessment and will therefore be integrated into the project performance evaluation. The equity assessment will continue to supplement the benefit-cost and targets assessments with equity-specific analyses for each project, allowing staff, policymakers and project sponsors to continue to check that the project performance assessment is providing results in line with the equity goals of the region.

Geographic Analysis

Projects will be overlaid with Communities of Concern boundaries and analyzed in relationship to those communities using the same methodology as in Plan Bay Area. As an example, the maps on the following pages show the Plan Bay Area equity assessment maps for Contra Costa County and Santa Clara County. The Communities of Concern are shaded in purple, with roads and transit lines that serve those communities colored blue. Projects (listed by map ID below the maps) are symbolized by project type and colored by both equity target score and whether or not they serve the community.

Equity Targets Assessment

A combined equity targets score will be calculated using at least three of the Plan Bay Area 2040 performance targets that directly reflect equity goals: adequate housing, housing and transportation costs, and affordable housing. Performance targets are currently being considered for adoption by September 2015, therefore the total number of targets that reflect equity goals may change.

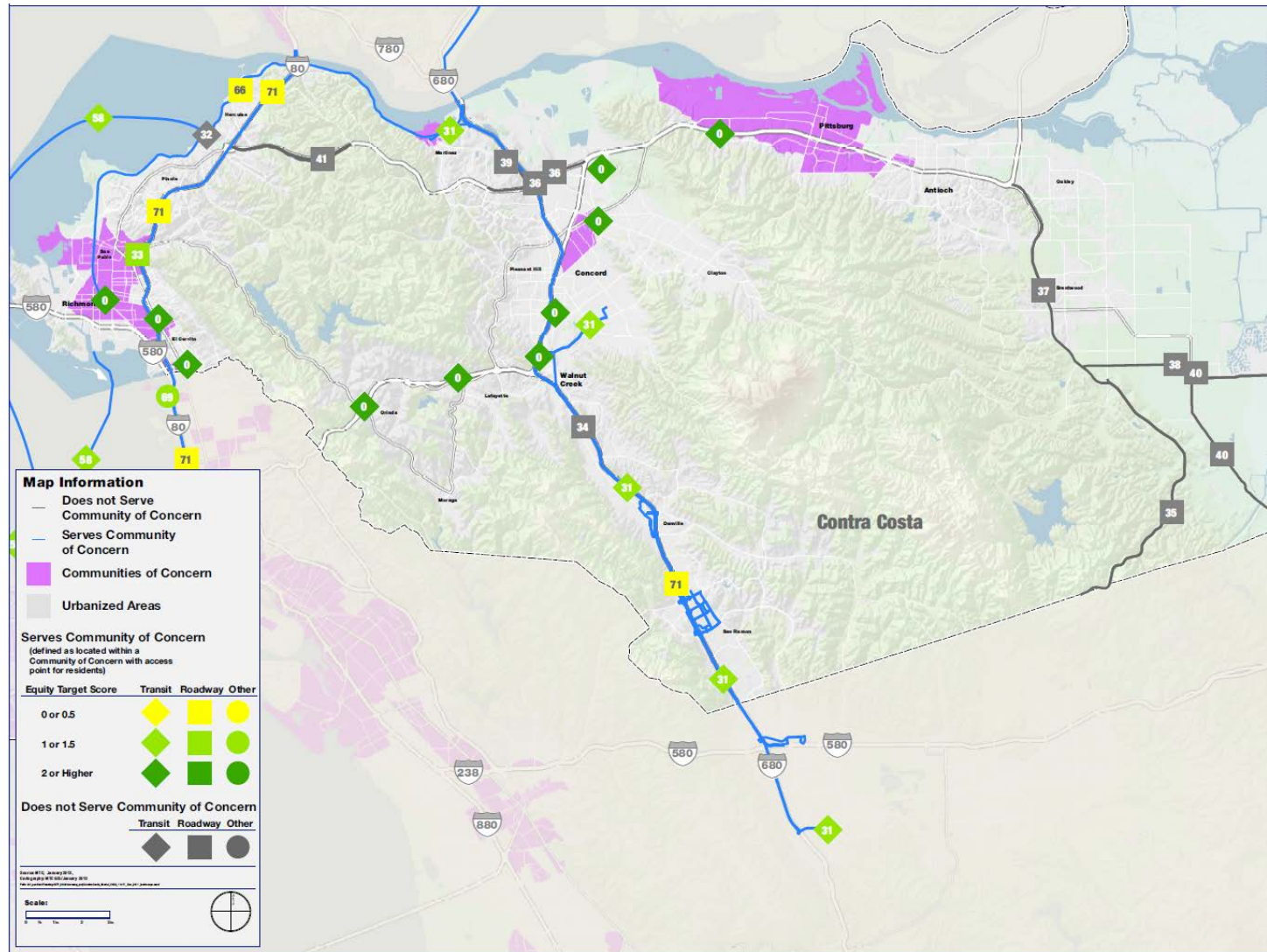
For the equity targets score, the same rating system from the targets assessment will be used to evaluate the scores:

- Strong support (1)
- Moderate support (0.5)
- Minimal impact (0)
- Moderate adverse impact (-0.5)
- Strong adverse impact (-1)

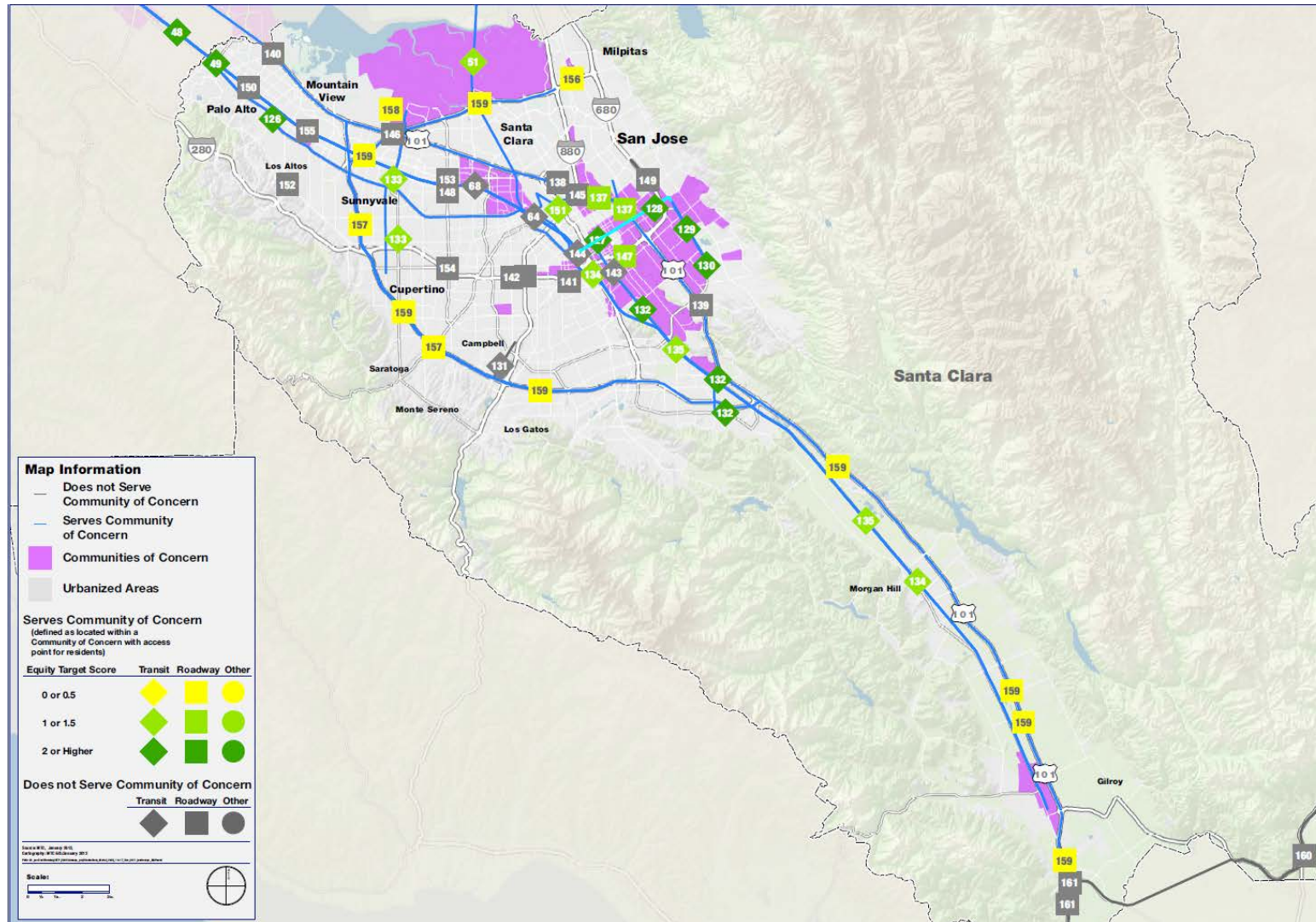
All targets will be evaluated using the same criteria used in the overall targets methodology, which will consider the following issues:

- Planned housing growth
- Past production of housing
- Reducing transportation costs for low-income residents
- Reducing risk of displacement
- Production of affordable housing

Plan Bay Area Geographic Analysis: Contra Costa County



Plan Bay Area Geographic Analysis: Santa Clara County



Plan Bay Area Geographic Analysis: Contra Costa and Santa Clara Counties Project Legend

Map ID	Project ID	Project Name	Map ID	Project ID	Project Name	Map ID	Project ID	Project Name
31	22343	I-680 Express Bus Service Frequency Improvements (Phase 2)	48	240134, 21627	Caltrain Service Frequency Improvements (6-Train Service during Peak Hours) + Electrification (SF to Tamien)	136	240494	ITS Improvements in Santa Clara County
32	230321	Hercules Intermodal Station (Phases 2, 3, and 4)	49	240134, 240521, 21627	Caltrain Vision (10-Train Service during Peak Hours) + Electrification (San Francisco to Tamien)	137	22965	New US-101 Mabury/Taylor Interchange
33	22360	I-80 San Pablo Dam Road Interchange Improvements	51	22009	Capitol Corridor Service Frequency Improvements (Oakland to San Jose)	138	22979	New US-101 Zanker/Skyport/Fourth Street
34	21223, 22353	I-680 HOV Gap Closure (North Main Street to Livoma Road)	64	240036	Caltrain Communications-Based Overlay Signal System (CBOS) and Positive Train Control System (PTC)	139	240437	US-101 Braided Ramps (Capitol Expressway to Yerba Buena Road)
35	22604	Vasco Road Safety & Operational Improvements (Brentwood to San Joaquin County line)	68	240140	Caltrain At-Grade Crossing Improvements	140	240441	US-101/Oregon Expressway/Embarcadero Road Interchange Improvements
36	21205, 22350	I-680/SR-4 Interchange Improvements + SR-4 Widening (Morello Avenue to SR-242)	75	22247	Bicycle/Pedestrian Expansion	141	21719	I-880/I-280/Stevens Creek Boulevard Interchange Improvements
37	22605	SR-4 Bypass Completion (SR-160 to Walnut Avenue)	76	240410	Transportation for Livable Communities (TLC)	142	230537	I-280 Winchester Boulevard Interchange Improvements
38	22981	SR-4 Widening (Marsh Creek Road to San Joaquin County line)	77	240690	Lifeline Transportation Program	143	240048	Caltrain Diridon Station Track Capacity Expansion (Phases 2 & 3)
39	96133	Pacheco Boulevard Widening (Blum Road to Arthur Road)	78	NewFree	New Freedom	144	240063	Caltrain Terminal Station Improvements
40	22400	SR-239 Expressway Construction (Brentwood to Tracy)	79	LS&R	Local Streets and Roads Capital Maintenance Needs	145	240429	I-880/US-101 Interchange Improvements
41	94050	SR-4 Upgrade to Full Freeway (Phase 2: Cummings Skyway to I-80)	80	Transitshort	Transit Capital Maintenance Needs	146	240444	US-101/SR-237 Interchange Improvements
0	240182, 00BART	45 - BART Metro Program 46 - BART Service Frequency Improvements 56 - BART Station Capacity Improvements 57 - BART Station Access Improvements	81	230419	Freeway Performance Initiative	147	240671	New I-280 Senter Road Interchange
58	22120, 22122, 22511, 22512, 230613, 230581	WETA Service Expansion (Treasure Island, Berkeley/Albany, Richmond, Hercules, and Redwood City)	82	230550	Climate Initiatives Program	148	230337	New Lawrence Expressway Interchange (Monroe Street)
60	22003	Capitol Corridor Reliability Improvements (Phase 2)	83	240589	Solar Installations to Offset Electric Vehicle Use	149	240479	I-680 Auxiliary Lanes (McKee Road to Berryessa Road)
69	240571	I-80/I-880 Congestion Pricing and Clean Vehicle Incentive Program	84	240577	Heavy Duty Truck Replacement Program	150	240586	Oregon Expressway Alma Bridge Interchange Improvements
71	HOTe	CTC Application + Alameda County Authorized Lanes Express Lanes Network	85	240582	Heavy-Duty Diesel Truck and Motorcycle Early Retirement Program	151	21922	Mineta San Jose International Airport APM Connector
75	22247	Bicycle/Pedestrian Expansion	126	240119	VTA El Camino BRT	152	22814	Foothill Expressway Deceleration Lane Extension
76	240410	Transportation for Livable Communities (TLC)	127	240375	BART to San Jose/Santa Clara (Phase 2: Berryessa to Santa Clara)	153	230340	New Lawrence Expressway Interchange (Kifer Road)
77	240690	Lifeline Transportation Program	128	22019	Downtown East Valley (Phase 2: LRT)	154	240580	I-280/Lawrence Expressway/Stevens Creek Interchange Improvements
78	NewFree	New Freedom	129	22956	Capitol Expressway Light Rail Extension (Phase 2: to Eastridge Transit Center)	155	230332	Rengstorff Avenue Grade Separation
79	LS&R	Local Streets and Roads Capital Maintenance Needs	130	22978	Capitol Expressway Light Rail Extension (Phases 2 & 3: to Niman)	156	240404	Calaveras Boulevard Overpass Widening (Abel Street to Milpitas Boulevard)
80	Transitshort	Transit Capital Maintenance Needs	131	98119	Vasona Light Rail Extension (Phase 2)	157	240431	SR-85 Auxiliary Lanes (El Camino Real to Winchester Boulevard)
81	230419	Freeway Performance Initiative	132	230547	Monterey Highway BRT	158	240443	Mary Avenue Extension
82	230550	Climate Initiatives Program	133	230554	Sunnyvale-Cupertino BRT	159	HOTd	Silicon Valley Express Lanes Network
83	240589	Solar Installations to Offset Electric Vehicle Use	134	21760	Caltrain Double-Track Improvements (San Jose to Gilroy)	160	230294	New SR-152 Alignment
84	240577	Heavy Duty Truck Replacement Program	135	230534	Caltrain Electrification (Tamien to Gilroy)	161	21714	US-101 Widening (Monterey Street to SR-129)
85	240582	Heavy-Duty Diesel Truck and Motorcycle Early Retirement Program						

NOTE: Project names appearing in grey are not shown on the map.

NOTE: Project names appearing in grey are not shown on the map.