OneBayArea

Date: May 3, 2011

To: RAWG

From: Dave Vautin, Sean Co, and Lisa Klein, MTC

Subject: Plan Bay Area Transportation Project Performance Assessment – Revised Approach

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At the February RAWG meeting, MTC staff described an approach to assess transportation projects and programs considered for inclusion in the Draft Financially Constrained Plan Bay Area (SCS/RTP) adopted by the Commission. Building on the approach used in *Transportation 2035* (T-2035), transportation projects and programs submitted through the call for projects will be evaluated using both benefit-cost and targets project-level analyses. This process is designed to identify projects and programs that advance the Plan Bay Area targets, support the land use strategy, and are cost-effective. The results of the analysis will help inform the Commission's discussions of the trade-offs of various transportation investment strategies when selecting a set of projects for inclusion in the financially-constrained Draft Plan Bay Area.

Progress on Project Performance Assessment Methodology

Since MTC and ABAG adopted the performance measures, staff has been developing the project performance assessment methodology. This process has taken place over the past four months with input from a technical committee with members from local government, CMAs, transit agencies, MTC's Policy Advisory Council, and ABAG's Regional Planning Committee (RPC). The committee has focused on a number of methodological issues related to project assessment, including the identification of benefit types, the analysis timeframe for benefit-cost calculations, the criteria for the targets assessment, and potential for considering equity issues within this framework. Over this period, staff has also discussed the general assessment approach with the Partnership Technical Advisory Committee (PTAC), the Partnership Board, and MTC's Policy Advisory Council.

Approach to Project Performance Assessment Methodology

The proposed approach is summarized in **Attachment 1**. The attachment also shows how the approach for Plan Bay Area builds on the approach from *Transportation 2035*. Through both the targets assessment and the benefit-cost assessment, we hope to support an informed discussion of trade-offs between the various projects.

<u>Targets Assessment</u>

The most significant change since the February RAWG meeting is the revision of the goals assessment to more closely align with the adopted performance targets of Plan Bay Area. This analysis, now renamed the "Targets Assessment", will capture the extent to which projects support or adversely affect each of the performance targets. This approach better reflects the adopted policies of MTC and ABAG. For your reference, the proposed targets assessment criteria are shown in **Attachment 2**.

For large projects *(with greater than $50 million in costs and/or regional impacts)*, this revision will allow us to use quantitative model results to evaluate target performance. An example of this evaluation is shown in **Attachment 3**. Each project will be analyzed using the output of MTC's travel model, if feasible. Targets that cannot be forecasted using MTC's travel model will be analyzed qualitatively.

For smaller-scale projects *(with less than $50 million in costs)*, projects will be categorized by project type in order to perform the targets assessment. The project types will be assessed qualitatively based on how well they would likely support each of the adopted targets. For some project types, project performance may

vary depending on the specific project within that category; this will be appropriately noted in the targets assessment.

Listed below are the performance targets that will be assessed quantitatively and qualitatively:

- **Perform target assessment quantitatively (when feasible) for:** CO_2, $PM_{2.5}$, PM_{10}, collisions, active transportation, low-income households' transportation costs, non-auto travel time, non-auto mode share, and VMT
- **Perform target assessment qualitatively for:** housing, PM in Community Air Risk Evaluation (CARE) communities, open space/agricultural preservation, economic vitality, and maintenance

In addition, each project will be evaluated based on its level of support for growth within Priority Development Areas (PDAs). As focused growth is a critical part of the SCS land use strategy, we propose using one or more of the following criteria to determine the extent to which a project supports PDA growth:

- **Does the project serve a PDA?**
  Transportation projects located within or serving a PDA provide additional capacity for focused growth.
- **How does the project impact mode choice within the PDA?**
  Multimodal options allow for higher levels of density and create a sense of place within a PDA.

An example of this proposed project-level evaluation of PDA support is shown in **Attachment 3**.

Benefit-Cost Assessment

Staff has refined the benefit-cost evaluation based on further consideration of these analyses. The benefit-cost assessment reflects a range of impacts beyond the adopted targets, as per best practices. The proposed benefits to be included in the Plan Bay Area project performance assessment are listed in **Attachment 1**. The benefit-cost assessment will rely on travel model output (or off-model analysis, if necessary). Staff continues to work on the valuation and approach for quantifying each benefit included in this analysis.

Based on discussions with the technical committee, staff does propose to rely on a 2035 horizon year analysis approach, as was used in *Transportation 2035*. In the previous discussion with RAWG, staff had been considering looking at the stream of benefits throughout the lifespan of the plan; however, it would be difficult to accurately forecast each project's annual benefits, given time and resource constraints. Therefore, we will use the horizon year approach; at the same time, we will flag projects that yield benefits early in the plan's lifespan or projects that yield significant benefits beyond the 2035 horizon year.

Furthermore, staff proposes to rate the level of confidence in the benefit-cost results for each project. This analysis would consider not only the distribution of benefits throughout the lifespan of the plan, but also the degree to which major benefits are accurately captured in the benefit-cost assessment. Staff will note if the B/C ratio results are likely to be underestimated or overestimated through this framework. An example of this confidence analysis is shown in **Attachment 3**.

Project-Level Equity Considerations

Staff proposes including equity considerations in the project performance assessment process, in order to capture key equity benefits both quantitatively and qualitatively.

From a quantitative perspective, we propose to look at out-of-pocket cost savings and travel time benefits by income level. By examining the aggregate benefits across the entire region by income level, we can capture the magnitude of project benefits for each income group across the region. Staff also proposes to provide information about each project's impact on users. An example of this assessment is shown in **Attachment 3**.

In addition to the quantitative analysis of project-level equity impacts, the targets assessment will capture several key equity benefits as listed in the attached slides. In particular, support for affordable housing, overall transportation cost impacts for low-income households, and particulate emission reductions in highly impacted areas (defined as CARE communities) will be included as a part of that assessment.

We recognize that this equity approach has some limitations. Modeling constraints limit our quantitative evaluation to travel time and cost impacts at the project level. However, this represents a good first step, allowing us to evaluate project-level equity impacts quantitatively while considering additional equity issues in the targets assessment. It is important to remember that the project performance assessment is just one source of information that will be relevant when the Commission reviews the merits of various projects for inclusion in the financially constrained draft plan.

Next Steps

Through mid-May, staff will continue to refine the project performance assessment methodology based on feedback received. The revised methodology will then be used over the summer to analyze transportation projects received in the Call for Projects. Project assessment results will subsequently be released in August and September. Refinements to the methodology may be possible at that time.

Schedule for Transportation Project Performance Assessment

- May 11, 2011 – Present revised approach to the MTC Policy Advisory Council
- May to July 2011 – Conduct performance assessment and release results
- July 2011 – Define detailed scenarios
- August – September 2011 – Present draft results of project assessment to technical committees
- September 9, 2011 – Present results of project assessment to Planning Committee
- October – December 2011 – Detailed scenario results and discussion of trade-offs to define draft SCS/RTP investments and land use

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Attachment 1 – Transportation Project Performance Assessment Overview [updated 4/21/2011]

Changes since the initial project evaluation proposal (January 2011) are marked in italics.

	Transportation 2035	**Plan Bay Area – Proposed Approach**
Smaller Projects (<$50 M in costs or localized impacts)	Qualitative Goals Assessment • All projects (700+) assessed, grouped into 13 project type • How well projects address each goal/number of goals addressed • Conducted by panel of MTC & regional agency staff	*Targets Assessment* • Same as for Transportation 2035 (qualitative assessment by project type) – *but reflecting Plan Bay Area targets instead of broader goals*
Larger Projects Benefit-Cost Assessment (>$50 M in costs or regional impacts)	Qualitative Goals Assessment – same as above. Benefit/Cost Assessment • 60 large-scale uncommitted projects as well as uncommitted regional programs • MTC model analysis , with off model analysis for regional programs 1. B/C ratio in 2035 including o Delay o CO_2 o PM_{10} and $PM_{2.5}$ o Injuries & fatalities o Direct user costs (vehicle operating/ownership) o Cost savings for on-time maintenance 2. Cost per reduction on CO_2 3. Cost per reduction in VMT 4. Cost per low-income household served by new transit Goals not reflected in B/C are captured through the qualitative assessment	*Targets Assessment* • *Evaluate project performance towards adopted targets:* o *quantitatively through project benefits (e.g. tons of PM_{10} emissions reduced by project), when possible* o *qualitatively through criteria-based evaluation (for all other targets)* Benefit/Cost Assessment • Same types of projects as in T-2035 but more projects due to revised definition of Committed Projects • MTC model analysis, *combined with off-model analysis where applicable* B/C ratio in 2035 including o Travel time *(with adjustments to valuation of nonrecurring delay)* o Emissions (CO_2, $PM_{2.5}$, PM_{10}, *ROG, NOx*) o Health costs associated with changes in active transportation levels o Collisions causing injuries, fatalities, *or property damage only* o Direct user costs (vehicle operating/ownership) o *Noise* o Cost savings for on-time maintenance • *Determine level of confidence in the B/C results for each project (also known as the "inclusiveness analysis")* o *Degree to which major benefits are captured* o *Degree to which benefits accrue early or late* • *Project-level benefits (aggregate travel time and direct user costs) will be analyzed to determine the distribution of benefits across income levels*

Attachment 2 – Proposed Targets Assessment Criteria

Outcome/ Goals	**Adopted Targets** (all targets are for year 2035 compared to year 2005 base)		**Assessment Criteria** (all quantitative criteria compare a No-Build and Build scenario in 2035)	
Climate Protection	**1**	Reduce per-capita CO_2 emissions from cars and light-duty trucks by 15%	Quant.	Tons of CO_2 reduced (from cars and light duty trucks only)
Adequate Housing	**2**	House 100% of the region's projected 25-year growth by income level without displacing current low-income residents	Qual.	• Provides accessibility to and from areas with planned housing growth • Level of planned housing growth in areas served • Amount of planned affordable housing • Supports PDA growth
Healthy and Safe Communities	**3**	Reduce premature deaths from exposure to particulates • Reduce premature deaths from exposure to fine particulates (PM2.5) by 10% • Reduce coarse particulate emissions (PM10) by 20% • Achieve greater reductions in highly impacted areas	Quant. Quant. Qual.	• Tons of PM2.5 reduced • Tons of PM10 reduced • Particulate emissions reduced in CARE communities
	4	Reduce by 50% the number of injuries and fatalities from all collisions (including bike and pedestrian)	Quant.	Total injury and fatal collisions averted (combined)
	5	Increase the average daily time walking and biking per person for transportation by 60%	Quant.	Increase in average minutes of walking/biking
Open Space and Agricultural Preservation	**6**	Direct all non-agricultural development within the urban footprint (existing urban development and urban growth boundaries)	Qual.	• Provides essential access and mobility for planned growth in the urban footprint • Provides farm-to-market access and/or preserves habitat and open space by promoting economic development in the urban footprint
Equitable Access	**7**	Decrease by 10% the share of low-income and lower-middle income residents' household income consumed by transportation and housing	Quant.	Decrease in low-income expenditures on transportation
Economic Vitality	**8**	Increase gross regional product (GRP) by 90%	Qual.	• Improves operations to/from ports or in truck corridors • Improves access to/from employment centers and areas • Encourages job growth
Transportation System Effectiveness	**9a**	Decrease average per-trip travel time by 10% for non-auto modes	Quant.	• Decrease in per trip non-auto travel time OR increase in non-auto mode share (dependent on target for scenario analysis)
	9b	Decrease auto vehicle miles traveled per capita by 10%	Quant.	VMT reduced
	10	Maintain the system in a state of good repair • Increase local roadway pavement condition index (PCI) to 75 or better • Decrease distressed lane-miles on the state highways to less than 10% of the system • Reduce average transit asset age to 50% of useful life	Qual.	• Improve roadway surface condition • Improve or replace existing transit assets

Attachment 3: Sample Evaluation Results (not based on actual analysis results)

1. Large Scale Projects: Summary of B/C and Targets Assessment

	Project Number	Project Name	Annualized Benefits (2035)	Annualized Costs (2035)	B/C Ratio	Net Benefits	B/C Confidence	Impact on Targets	PDA Support
High B/C	0001	Geary BRT			11.0				
Medium B/C	0002	Freeway Performance Initiative			6.8				
	0003	AC Transit Signal Priority			6.1				
	0004	Regional Express Lanes Network			5.8				
Medium -Low B/C	0005	Construction of second Transbay Tube			4.0				
	0006	BART expansion to San Jose			3.1				
	0007	Freeway widening of I-580 over Altamont Pass			2.3				
	0008	Oakland Streetcar from MacArthur BART to Jack London Square			1.6				
	0009	BART expansion to Sacramento	$500 million	$400 million	1.3	$100 million	B/C under-estimated	Support – 5 Adverse – 2	Strong Support
Low B/C	0010	Regional Bicycle Network			0.9				

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Attachment 3 (continued): Sample Evaluation Results (not based on actual analysis results)

2. Large Scale Project Summary of Benefit/Cost Assessment Results

Project Number	Project Name	Annualized Benefits (2035)	Annualized Costs (2035)	B/C Ratio	Net Benefits	B/C Confidence	Change in 2035 Benefits due to Project										Capital Costs	Annual Operating Costs
							CO_2	PM2.5	PM10	ROG	NOx	Active Transport	Collisions	Direct User Costs	Travel Time	Noise		
0001	Geary BRT			11.0														
0002	Freeway Performance Initiative			6.8														
0003	AC Transit Signal Priority			6.1														
0004	Regional Express Lanes Network			5.8														
0005	Construction of second Transbay Tube			4.0														
0006	BART to San Jose			3.1														
0007	Freeway widening of I-580 over Altamont Pass			2.3														
0008	Oakland Streetcar			1.6														
0009	BART expansion to Sacramento	$500 million	$400 million	1.3	$100 million	B/C under-estimated	-1.4 mil. tons $100M $285/ton	... $25M ...	... $25M ...	... $25M ...	... $25M ...	... $15M ...	... $75M ...	... $100M ...	... $100M ...	... $10M ...	$10 BILLION	$100 million
0010	Regional Bicycle Network			0.9														

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Notes:

- Benefits are shown in three formats – (1) net change from existing conditions; (2) monetized benefits for use in B/C analysis; (3) cost-effectiveness based on total annual cost of project and net change from existing conditions

Attachment 3 (continued): Sample Evaluation Results (not based on actual analysis results)

3. Large Scale Project Summary of Targets Assessment Results

Project Type	Impact on Goals	CO2	Housing	PM2.5	PM10	PM in CARE	Collisions	Active Transport	Open Space/AG	Low-Inc. HH Transport Cost	Economic Vitality	Non-Auto Travel Time	Non-Auto Mode Share	VMT	Maintenance
Geary BRT	S Support - 5 M Support - 7 Minimal - 2 Adverse - 0	Mod.	Mod.	Mod.	Mod.	Mod.	Moderate	Strong	Minimal	Strong	Moderate	Strong	Strong	Strong	Minimal
Freeway Performance Initiative	S Support - 0 M Support - 4 Minimal - 2 Adverse - 8	Mod.	Minimal	Adv.	Adv.	Adv.	Adv.	Adv.	Moderate	Moderate	Moderate	Adv.	Adv.	Adv.	Minimal
AC Transit Signal Priority	S Support - 2 M Support - 8 Minimal - 4 Adverse - 0	Mod.	Mod.	Mod.	Mod.	Mod.	Moderate	Minimal	Minimal	Strong	Minimal	Strong	Moderate	Mod.	Minimal
Regional Express Lanes Network															
Construction of second Transbay Tube															
BART to San Jose															
Freeway widening of I-580 over Altamont Pass	S Support - 0 M Support - 2 Minimal - 1 Adverse - 11	Minimal	Adv.	Adv.	Adv.	Adv.	Adv.	Adv.	Adv.	Adv.	Moderate	Adv.	Adv.	Adv.	Moderate
Oakland Streetcar															
BART expansion to Sacramento	S Support - 0 M Support - 10 Minimal - 2 Adverse -2	Mod.	Adverse	Mod.	Mod.	Min.	Moderate	Moderate	Adverse	Moderate	Moderate	Moderate	Moderate	Mod.	Minimal
Regional Bicycle Network	S Support - 3 M Support - 9 Minimal - 2 Adverse - 0	Mod.	Mod	Mod.	Mod.	Mod.	Moderate	Strong	Minimal	Strong	Minimal	Moderate	Strong	Mod.	Moderate

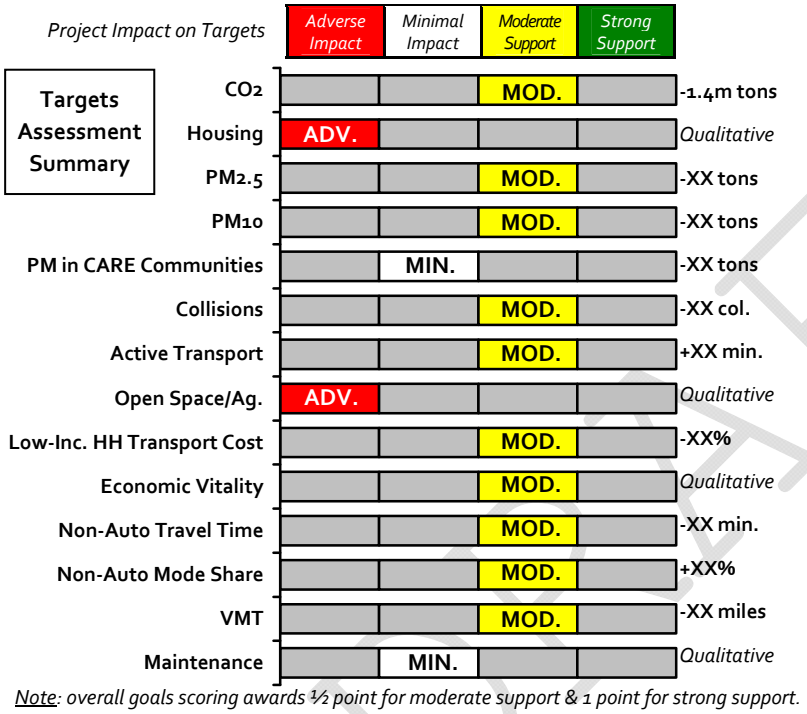
Attachment 3 (continued): Sample Evaluation Results (not based on actual analysis results)

4. Large Scale Project Detail (note: this project will **not** be included in Plan Bay Area!)

Project #0009: BART expansion to Sacramento

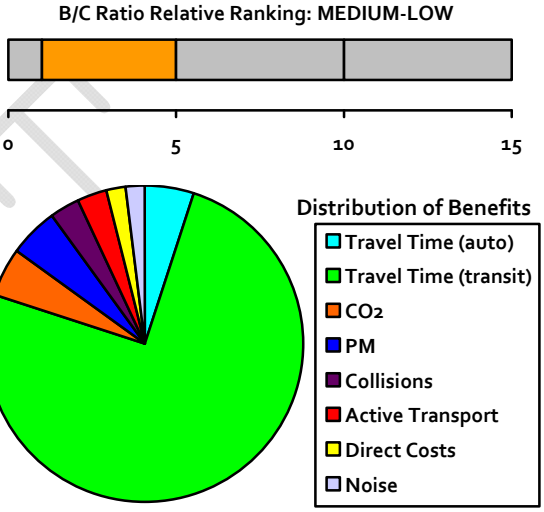
This project would expand the existing Pittsburg/Bay Point BART line to Sacramento, with stops in Fairfield, Vacaville, Dixon, Davis, and Sacramento, providing increased transportation alternatives between San Francisco and Sacramento. It would provide new transit service to underserved areas, but it would likely accelerate urban sprawl.

2035 Annualized Benefits	2035 Annualized Costs	B/C Ratio	Net Annualized Benefits	B/C Confidence	Impact on Targets	PDA Support
$500 million	$400 million	1.3	$100 million	B/C under-estimated	Support – 5 Adverse – 2	Strong Support



Note: overall goals scoring awards ½ point for moderate support & 1 point for strong support.

PDA Assessment		
Criteria	Result	
Project Location	YES	Serves 2 PDAs (Fairfield & Vacaville)
Impact on Mode Choice	STR.	Improves transit facilities
Overall Result	**Strong Support**	

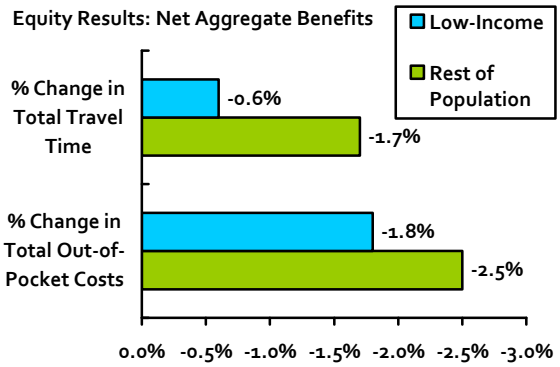


B/C Confidence Analysis		
Criteria	Overestimates B/C?	Underestimates B/C?
Modeling Accuracy	Yes	
Framework Completeness	No	
Timeframe Inclusiveness		Yes
Overall Result		Yes

B/C Confidence Justification:
The model overestimates the ridership on this BART extension, as the service area would be significantly different than existing BART lines. However, the project will take 20 years to build, causing many of the benefits not to be captured (**"late bloomer"**). This leads to a slight underestimation of project benefits in the B/C ratio.

Equity Evaluation – Net Aggregate Benefit Comparison in 2035				
Category	Base Case	With Project	Proj. Impact	% Change
Total travel time (low-income)	7.00m minutes	6.96m minutes	**-40,000 minutes**	**-0.6%**
Total travel time (rest of pop.)	21.14m minutes	20.79m minutes	**-350,000 minutes**	**-1.7%**
Total out-of-pocket costs (low-income)	$5.5m	$5.4m	**-$0.1m**	**-1.8%**
Total out-of-pocket costs (rest of pop.)	$28.0m	$27.3m	**-$0.7m**	**-2.5%**
Project Users	n/a	45,000	**+45,000**	**n/a**

Note: forecasted 2035 low-income population is 2.0 million & 2035 total population is 9.0 million.



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