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COMMISSION

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Memorandum

TO: Partnership Technical Advisory Committee

DATE: April 18, 2011

FR: Dave Vautin and Lisa Klein

W.I.

RE: Plan Bay Area (SCS/RTP) Transportation Project Performance Assessment – Revised Approach

At the March PTAC 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 goals, 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.

Revisions to Project Performance Assessment Methodology

Since the March meeting of this committee, staff has continued to update the project performance assessment methodology. This process has taken place 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).

Based on feedback from this technical committee and further evaluation by MTC staff, we propose to revise the T-2035 project performance assessment methodology for the new Plan Bay Area as summarized in **Attachment 1**. For your reference, the proposed targets assessment criteria are shown in **Attachment 2**. Staff has also been focused on revising the benefit-cost and project-level equity evaluations based on further consideration of these analyses. Sample results from the project performance assessment process are included in **Attachment 3**; these documents show how the results of the project assessment could be presented later this year.

Revision #1: Refocus Goals Assessment on Targets

The most significant change since the March PTAC 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 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:** CO₂, PM_{2.5}, PM₁₀, 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

Lastly, MTC and ABAG are continuing to discuss how PDAs might be included in this project assessment framework. We anticipate that we will have additional guidance on project assessment's potential consideration of PDAs by the time we begin the analysis in mid-May.

Revision #2: Rely on Benefit-Cost Horizon Year Approach

In general, the proposed benefit-cost methodology is substantially the same as was discussed at last month's meeting. Staff continues to work on the valuation and approach for quantifying each benefit included in this analysis.

Staff does propose to rely on a 2035 horizon year analysis approach, as was used in *Transportation 2035*. In previous discussions with PTAC, 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. Projects will be flagged if the B/C ratio results are likely to be underestimated or overestimated through this framework.

Revision #3: Focus on Aggregate Benefits for Project-Level Equity Analysis

The project-level equity analysis, as discussed briefly at your March meeting, has been revised somewhat to provide more useful and more detailed information at the project level. From a quantitative perspective, we still propose to look at out-of-pocket cost savings and travel time benefits by income level. However, we would like to refine this approach to look at aggregate benefits across the entire region by income level, rather than per-trip benefits. This will tell us more about 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. In particular, 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.

Next Steps

Through early 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

- April 30, 2011 – Submittal deadline for transportation projects
- May 3, 2011 – Present revised approach to RAWG
- 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

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

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

	Transportation 2035	Plan Bay Area – Proposed Approach
<p>Smaller Projects (<\$50 M in costs or localized impacts)</p>	<p><u>Qualitative Goals Assessment</u></p> <ul style="list-style-type: none"> • 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 	<p><u>Targets Assessment</u></p> <ul style="list-style-type: none"> • Same as for Transportation 2035 (qualitative assessment by project type) – <i>but reflecting Plan Bay Area targets instead of broader goals</i>
<p>Larger Projects Benefit-Cost Assessment (>\$50 M in costs or regional impacts)</p>	<p><u>Qualitative Goals Assessment</u> – same as above.</p> <p><u>Benefit/Cost Assessment</u></p> <ul style="list-style-type: none"> • 60 large-scale uncommitted projects as well as uncommitted regional programs • MTC model analysis , with off model analysis for regional programs <ol style="list-style-type: none"> 1. B/C ratio in 2035 including <ul style="list-style-type: none"> ○ Delay ○ CO₂ ○ PM₁₀ and PM_{2.5} ○ Injuries & fatalities ○ Direct user costs (vehicle operating/ownership) ○ Cost savings for on-time maintenance 2. Cost per reduction on CO₂ 3. Cost per reduction in VMT 4. Cost per low-income household served by new transit <p>Goals not reflected in B/C are captured through the qualitative assessment</p>	<p><u>Targets Assessment</u></p> <ul style="list-style-type: none"> • Evaluate project performance towards adopted targets: <ul style="list-style-type: none"> ○ quantitatively through project benefits (e.g. tons of PM₁₀ emissions reduced by project), when possible ○ qualitatively through criteria-based evaluation (for all other targets) <p><u>Benefit/Cost Assessment</u></p> <ul style="list-style-type: none"> • Same types of projects as in T-2035 but more projects due to revised definition of Committed Projects • MTC model analysis, <i>combined with off-model analysis where applicable</i> <p>B/C ratio in 2035 including</p> <ul style="list-style-type: none"> ○ Travel time (<i>with adjustments to valuation of nonrecurring delay</i>) ○ Emissions (CO₂, PM_{2.5}, PM₁₀, ROG, NO_x) ○ Health costs associated with changes in active transportation levels ○ Collisions causing injuries, fatalities, <i>or property damage only</i> ○ Direct user costs (vehicle operating/ownership) ○ Noise ○ Cost savings for on-time maintenance <ul style="list-style-type: none"> • Determine level of confidence in the B/C results for each project (also known as the "inclusiveness analysis") <ul style="list-style-type: none"> ○ Degree to which major benefits are captured ○ 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.	<ul style="list-style-type: none"> • Provides accessibility to and from areas with planned housing growth • Level of planned housing growth in areas served • Amount of planned affordable housing planned
Healthy and Safe Communities	3	Reduce premature deaths from exposure to particulates <ul style="list-style-type: none"> • Reduce premature deaths from exposure to fine particulates (PM_{2.5}) by 10% • Reduce coarse particulate emissions (PM₁₀) by 20% • Achieve greater reductions in highly impacted areas 	Quant.	<ul style="list-style-type: none"> • Tons of PM_{2.5} reduced
	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.	<ul style="list-style-type: none"> • Provides essential access and mobility for planned growth in the urban footprint • Preserves farmland, habitat, and open space by promoting economic viability and providing access
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.	<ul style="list-style-type: none"> • 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.	<ul style="list-style-type: none"> • 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 <ul style="list-style-type: none"> • 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.	<ul style="list-style-type: none"> • 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
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 underestimated	Support - 5 Adverse - 2
Low B/C	0010	Regional Bicycle Network			0.9			

Sample Targets Assessment 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	PM _{2.5}	PM ₁₀	ROG	NO _x	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 underestimated	-1.4 mil. tons	\$10 BILLION	\$100 million
							\$100M	\$25M	\$25M	\$25M	\$25M	\$15M	\$75M	\$100M	\$100M	\$10M			
							\$285/ton			
0010	Regional Bicycle Network			0.9															

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

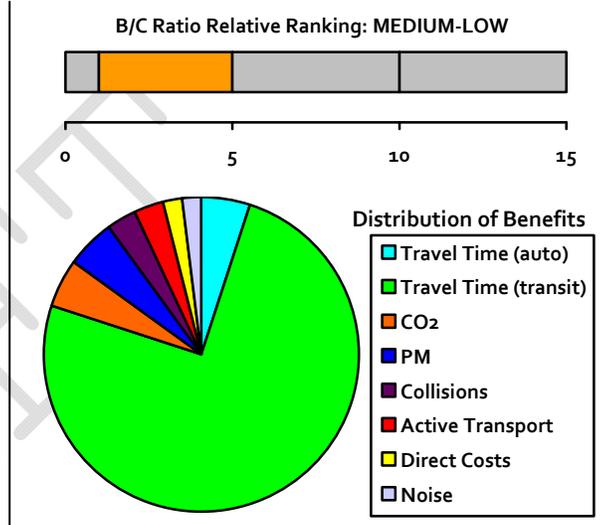
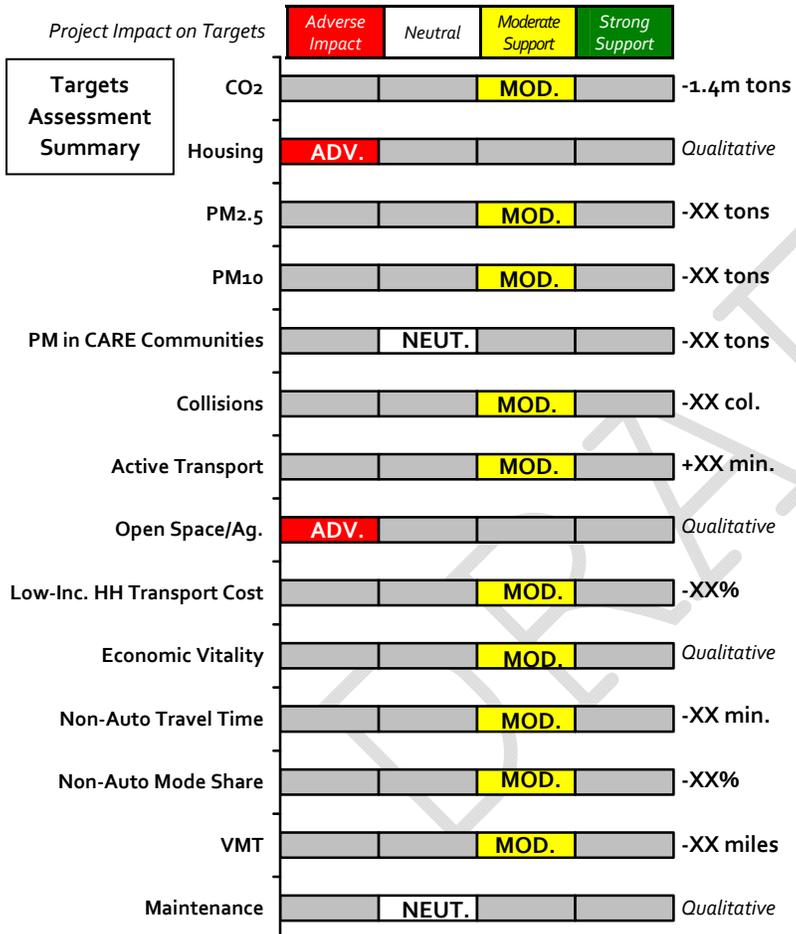
Sample Targets Assessment Results (not based on actual analysis results)

3. 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
\$500 million	\$400 million	1.3	\$100 million	B/C under-estimated	Support – 5
					Adverse – 2

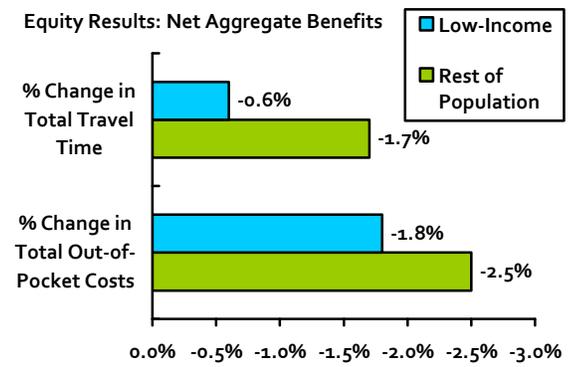


B/C Confidence Analysis		
Criteria	Overestimates B/C?	Underestimate s B/C?
Modeling Accuracy	Yes	
Framework Completeness		No
Timeframe Inclusiveness		Yes
Overall Result		Yes

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.

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

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.

Sample Targets Assessment Results (not based on actual analysis 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 Neutral - 2 Adverse - 0	Mod.	Mod.	Mod.	Mod.	Mod.	Moderate	Strong	Neutral	Strong	Moderate	Strong	Strong	Strong	Neutral
Freeway Performance Initiative	S Support - 0 M Support - 4 Neutral - 2 Adverse - 8	Mod.	Neutral	Adv.	Adv.	Adv.	Adv.	Adv.	Moderate	Moderate	Moderate	Adv.	Adv.	Adv.	Neutral
AC Transit Signal Priority	S Support - 2 M Support - 8 Neutral - 4 Adverse - 0	Mod.	Mod.	Mod.	Mod.	Mod.	Moderate	Neutral	Neutral	Strong	Neutral	Strong	Moderate	Mod.	Neutral
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 Neutral - 1 Adverse - 11	Neutral	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 Neutral - 2 Adverse - 2	Mod.	Adverse	Mod.	Mod.	Neut.	Moderate	Moderate	Adverse	Moderate	Moderate	Moderate	Moderate	Mod.	Neutral
Regional Bicycle Network	S Support - 3 M Support - 9 Neutral - 2 Adverse - 0	Mod.	Mod	Mod.	Mod.	Mod.	Moderate	Strong	Neutral	Strong	Neutral	Moderate	Strong	Mod.	Moderate