



Memorandum

Date: 05.30.08 **RE:** Van Ness Citizens Advisory Committee
June 3, 2008

To: Van Ness Avenue Citizens Advisory Committee

From: Rachel Hiatt – Senior Transportation Planner

Subject: **ACTION** – Approve the Transportation Performance Analysis Framework

Summary

One of the key environmental impact areas being analyzed as part of the Van Ness Avenue BRT EIR/EIS is transportation performance. Our analysis of the effects – both benefits and impacts – of Van Ness Avenue BRT on motorized transportation performance will encompass several horizon years, and involve a comprehensive array of impact and benefit measures. The analysis of transportation performance will encompass three study areas: Van Ness Avenue itself; the Van Ness Avenue Corridor, which includes parallel streets; and, for select performance measures such as diversions, areas beyond the Van Ness corridor and citywide. Three transportation modeling tools will provide quantitative estimates of these performance measures, including: the SF-CHAMP countywide travel demand forecasting model; the Synchro traffic operations model; and the VISSIM microsimulation model; each is designed to provide a different set of information. Finally, in addition to the basic set of model scenarios, we will provide some sensitivity / scenario tests, including an operating plan variation, an alternative land use scenario, and a scenario reflecting increased driving costs. **We are seeking approval of the Transportation Performance Analysis Framework.**

BACKGROUND

The purpose of the Environmental Impact Report / Statement (EIR/EIS) for the Van Ness Avenue BRT project is to disclose potential negative environmental impacts of the project, and develop measures to mitigate any impacts. One of the key environmental impact areas being analyzed as part of the EIR/EIS is transportation performance.¹ Our analysis of the effects – both benefits and impacts – of Van Ness Avenue BRT on motorized transportation performance will be based on a comprehensive array of performance measures. We will analyze not only the performance of Van Ness Avenue itself, but the wider Van Ness corridor and effects on system performance beyond the corridor and citywide.

The purpose of this memo is to summarize our approach to analyzing the effects of Van Ness BRT on motorized transportation performance, including both the measures of evaluation and the technical (modeling) tools we are developing to provide that information. A summary is provided in Appendix A, Transportation Performance Analysis Framework.

STUDY AREAS

The analysis of transportation performance will encompass three study areas, with different measures of evaluation will be produced for each. The three study areas, illustrated in Appendix B, Map of Study Areas, are:

¹ Both motorized and non-motorized (pedestrian and bicycle) effects will be analyzed in the EIR/EIS; this memo focuses on motorized (transit and auto) transportation. Non-motorized transportation will be the focus of a future agenda item.

Van Ness Avenue: The Van Ness Avenue study area refers to, beginning from the south, Mission Street at Division/Duboce, to South Van Ness Avenue at Mission Street, continuing north on Van Ness Avenue through Lombard Street.

Our analysis of Van Ness Avenue intersections will include the directional approaches (north and south approaches on Van Ness Avenue itself) as well as the intersection approaches on streets perpendicular to Van Ness Avenue. We will also analyze performance of the intersections as a whole, considering all approaches.

Van Ness Avenue Corridor: The Van Ness Corridor refers to the key sets of streets running parallel to Van Ness Avenue. To the west, Franklin and Gough, a high-capacity one way arterial pair, are included in the corridor. To the east, Polk Street, a neighborhood commercial street, and Larkin and Hyde Streets, another one-way arterial pair, are included in the corridor.

Just as for Van Ness Avenue, we will analyze both the directional (north-south) intersection approaches, in addition to intersection approaches on cross-streets within the corridor.

Beyond Van Ness Corridor / Citywide: Some performance measures will be provided at the citywide level, such as citywide changes in mode share or transit ridership. Other performance measures require analysis of selected locations beyond the Van Ness corridor – most notably, diversions of auto traffic will be analyzed this way. The approach to analyzing auto diversions is discussed further in the next section.

MEASURES OF EVALUATION

In order to comprehensively analyze the effects of Van Ness Avenue BRT on transportation performance, we are developing a set of transportation models that encompass several horizon years and study areas, and which can provide a broad array of benefit and impact measures. This section summarizes the evaluation measures that we will use to analyze motorized transportation performance.

Transit Operations and Performance: The basic measures of transit performance for the BRT routes include changes in travel times / speeds, delays, and reliability (the standard deviation in travel times and the incidence of bus bunching). This analysis will be performed for the BRT routes (Muni routes 47 and 49), as well as for Golden Gate Transit routes using the BRT corridor.

Our analysis of intersection performance will also provide information on delays to transit on the streets crossing Van Ness (e.g., Fulton, Geary, Union, and others).

Additionally, we will analyze how the Van Ness BRT project may affect ridership and mode share on the overall transit network.

Finally, the Federal Transit Administration (FTA) uses a specialized measure of evaluation when assessing projects; the purpose of their measure is to provide a common metric that can fairly compare and help prioritize funds for projects nationwide. In precise terms, the FTA's measure is *the ratio of annualized incremental project cost to annualized incremental project user benefits*; it is a measure of the cost-effectiveness of a project. In shorthand, this measure can be called the “user benefits” measure.

System Operations and Performance: Analysis of system performance requires multimodal measures, or measures that assess the movement of people traveling by any mode. We will analyze overall person-delays for people on transit, in cars, and walking along Van Ness. We will also analyze person-delay on

streets crossing Van Ness Avenue. Finally, we will assess system performance is to look at the mode share of trips to and from the Van Ness corridor and the mode share of motorized trips made on Van Ness Avenue itself.

Mixed Traffic Operations and Diversions: We will analyze both the performance of mixed traffic on Van Ness Avenue and the Corridor streets, and additionally, determine the extent of traffic diversions off Van Ness Avenue to parallel streets or other streets beyond the Van Ness corridor, and assess the effect of those diversions on the relevant streets.

Measures of performance for mixed traffic on Van Ness Avenue and the Corridor include evaluation of auto travel times, speeds, and delays at intersections. We will also assess auto travel time reliability and queue lengths on Van Ness Avenue.

To analyze the magnitude and impact of traffic diversions, we will determine the volume of vehicles diverted off Van Ness Avenue, and the proportion of vehicles that divert to an alternate mode; to an alternate time period; or to an alternate street. This will involve a citywide examination of traffic diversions resulting from the BRT project. We will assess the volume of traffic diverted to the streets in the Van Ness corridor versus other streets in the citywide network, and evaluate the significance of impacts on the operations of those streets; again, we will look at the citywide network to identify locations of significant traffic diversion. We will focus on locations beyond the Van Ness corridor where the magnitude of expected diversions is greatest.

TRANSPORTATION MODELING TOOLS

Three separate transportation modeling tools will provide quantitative estimates of these performance measures; each is designed to provide a different set of information. The models developed in support of the EIR/EIS build extensively on those already developed for the Van Ness Avenue BRT Feasibility Study. This section briefly summarizes the model types.

SF-CHAMP Countywide Travel Demand Forecasting Model: SF-CHAMP is a countywide travel demand forecasting model that provides information on travel patterns and performance for San Francisco as a whole and for neighborhoods and corridors within San Francisco. SF-CHAMP also incorporates regional travel patterns from the nine-county Bay Area, and is the source for information on how Van Ness BRT affects travel to and from San Francisco and other counties. SF-CHAMP will also provide a foundation for analyzing the magnitude and significance of diversions.

Synchro Traffic Operations Model: Traffic operations on the Van Ness corridor will be analyzed using a Synchro traffic operations model. This tool is designed to provide information on traffic speeds, delays, queue lengths, and other operational measures.

VISSIM Microsimulation Model: The VISSIM microsimulation model also provides detailed operational performance measures, but unlike Synchro, includes transit and pedestrian traffic, as well as trucks and cars. The VISSIM model will encompass Mission Street at Division / Duboce, through S. Van Ness Avenue and Mission Street, continuing north along Van Ness Avenue through Clay Street, and include some key intersections north of Clay, such as Broadway, Union, and Lombard. The microsimulation model will provide a key tool for analyzing the effects of BRT on transit performance, including travel times and reliability, and its effects on cross-traffic and cross-transit. We will use VISSIM to optimize signal timing on Van Ness Avenue and design a transit signal priority system for Van Ness Avenue BRT.

SENSITIVITY / SCENARIO TESTS

The basic set of models to be developed are:

- Existing Conditions in Year 2005
- Future No-Project conditions, for both year 2015 and 2030; and
- Future conditions with BRT, or the “build” alternatives, for both year 2015 and 2030. Both side and center lane BRT alternatives will be modeled.

In addition to the basic set of models, we will prepare some sensitivity / scenario tests for key variables:

- Operating plan variation. We will use SF-CHAMP to test the performance of an alternate BRT operating plan.
- Land Use variation (CPMC). The California Pacific Medical Center is planning a new hospital facility at Van Ness Avenue and Geary Streets. This facility is not incorporated into the baseline demographic projections used by our models; this scenario will incorporate the growth in trips expected due to the CPMC and assess traffic operations with a CPMC facility in place.
- Pricing / cost of driving. We can also provide a sensitivity test, using SF-CHAMP, that assumes an increased cost of driving, such as under conditions of higher gasoline costs. The cost of driving, including the cost of gasoline, is one of the factors known to affect the choice of driving versus taking other modes of transportation, and is embedded in the SF-CHAMP model of countywide travel demand.

Together, this set of models will provide a comprehensive set of performance measures in support of the EIR/EIS analysis of transportation performance.

We are seeking approval of the Transportation Performance Analysis Framework.

ALTERNATIVES

1. Approve the Transportation Performance Analysis Framework, as requested.
2. Approve the Transportation Performance Analysis Framework., with modifications.
3. Defer action, pending additional information or further staff analysis.

RECOMMENDATION

Approve the Transportation Performance Analysis Framework, as requested.

Attachments:

- A. Transportation Performance Analysis Framework
- B. Map of Study Areas

**VAN NESS AVENUE BRT EIR/EIS
TRANSPORTATION PERFORMANCE ANALYSIS FRAMEWORK (1)
PM Peak Period**

	Study Area			Future No-Project (No Build) Alternatives						BRT Project (Build) Alternatives						Sensitivity / Scenario Tests					
	VAN NESS AVENUE	VAN NESS CORRIDOR	BEYOND VAN NESS CORRIDOR / CITYWIDE	Existing Condition (2005)			Year 2015			Year 2030			Year 2015			Year 2030			Operating plan / variation	Land Use / CPMC (3)	Pricing / Cost of Driving
				Observed Data	SF-CHAMP model	Synchro model	VISSIM model	SF-CHAMP model	Synchro model	VISSIM model	SF-CHAMP model	Synchro model	VISSIM model	SF-CHAMP model	Synchro model	VISSIM model	SF-CHAMP model	Synchro model			
TRANSIT OPERATIONS AND PERFORMANCE																					
Transit speed and travel time	X			X			X	X						X	X			X	X	X	
Transit speed and travel time relative to auto	X			X			X	X						X	X			X	X	X	
Transit reliability	X			X			X							X							
User benefits (2)	X				X									X						X	
Transit ridership	X	X	X	X	X			X						X				X	X	X	
SYSTEM OPERATIONS AND PERFORMANCE																					
Mode share	X		X	X	X			X						X				X		X	
Directional (north-south) intersection person delay	X			X			X							X							
Total intersection person delay	X			X			X							X							
MIXED TRAFFIC OPERATIONS																					
Directional (north-south) intersection vehicle delay	X	X		X			X	X		X				X	X			X		X	
Total intersection vehicle delay	X	X		X			X	X		X				X	X			X		X	
Auto travel time reliability				X			X			X				X							
Auto speed and travel time	X	X		X			X	X		X				X	X			X			
Queue lengths	X			X			X	X		X				X	X			X		X	
Diversions / Change in vehicle volumes	X	X	X				X			X				X				X		X	

(1) Framework summarizes the analysis for motorized transportation (transit and vehicles) only. The approach to analyzing non-motorized transportation (pedestrians and bicycling) will be provided separately.

(2) "User benefits" refers to a performance measure required by the Federal Transit Administration for projects seeking federal funds. The measure captures the incremental annual hours of benefit (a consumer surplus measure) for users of the project, relative to the incremental annual cost of the project.

(3) Scenario would incorporate construction of a new CPMC, or the California Pacific Medical Center, hospital at Geary and Van Ness Avenue.

