MEMORANDUM

TO: Policy Steering Committee **DATE:** February 19, 2010

FROM: Jim Cunradi, BRT Project Manager

SUBJECT: AGENDA ITEM 7: Request for Information – Capital Cost Components

SUMMARY

This memorandum is in response to a request by the PSC for a more detailed understanding of the costs associated with each component of BRT and the benefits of individual features or combination of features. The memorandum is divided into two parts: Component Costs and Benefits & Synergies.

Introduction

Bus Rapid Transit (BRT) is "an integrated system of facilities, services, and amenities that collectively improves the speed, reliability, and identity of bus transit" (*Transit Cooperative Research Program*). The challenge for designers of BRT systems is to develop a cost-effective "bundle" of improvements that meets the project's goals and objectives. Implicit in this approach is that certain elements work in synergy with other elements to provide greater benefits than these elements could provide in isolation. The key is in the bundling: one or two special features don't transform a bus line into a BRT line. The exact bundle of features is generally based on cost and on project goals and objectives.

Developing costs of the component parts of a capital development project like East Bay BRT is fairly simple. However, measuring the effectiveness of each of those individual parts is not currently possible in the current state of the art of transit planning; future experience with this mode in the US may yield more quantifiable data later on. The chief problem with such a reductionist approach is that it cannot measure the precise impact of any one amenity, nor can it account for the synergies between multiple elements. These synergies will be discussed under the Benefits section.

Component Costs

The table below summarizes the capital cost estimate for BRT that was prepared for AC Transit's 2009 Federal Small Starts submittal. This shows estimated costs for various components. The project is 17 miles long with approximately 85% dedicated bus lanes. The Small Starts submittal included a projection for 47 new BRT stations, substantial upgrades to communications and traffic signals, and installation of infrastructure necessary to support Proof-Of-Payment (POP) ticket validation.

Bus lanes account for $29.2 million, or $1.4 million per mile and 12.5 percent percent of the total project cost).

TABLE 1: CAPITAL COST BY ELEMENT

Element	Quantity	Cost per unit ($ x 000)	Total Cost ($ x 000)	Percent of Total
Bus Lanes	16.91	1,728	29,221	12.5%
BRT Stations	47	1,212	56,945	24.3%
Support Facilities, Yards, Shops, Administrative Buildings	16.91	0	0	0.0%
Other Roadwork and Improvements	16.91	3,734	63,136	26.9%
Communication, Security & Fare Systems	16.91	3,320	56,142	23.9%
ROW, Land, Existing Improvements	16.91	1,048	17,720	7.6%
Vehicles	16.91	0	0	0.0%
Unallocated Contingency	16.91	673	11,389	4.9%
Finance Charges	16.91	0	0	0.0%
Total Project Cost			**234,553**	**100.0%**

Other roadway work and improvements would cost $63.1 million and include additional work on the street such as medians and some work on adjacent pavement and sidewalks. This accounts for nearly 27 percent of total project cost, more than the cost of the bus lanes.

Systems for communication, security, fare collection and operations account for $56.1 million or 24 percent of project cost. Systems include traffic signals, communication links, fare payment and central control elements.

BRT stations include level platforms, shelters and other amenities. Stations cost $56.9 million or 24.3 percent of the total, based on the assumption of 47 stations. The per-station cost is about $1 million.

In this estimate there are three assumptions that need to be clarified. First, BRT vehicles are assumed initially to be buses already in operation. Buses would be upgraded on the normal bus replacement schedule. Second, there would be no additional cost for "Support Facilities, Yards, Shops, and Administrative Buildings." AC Transit would use existing facilities for BRT vehicle maintenance and operations management and would not need to expand any facility. Third, the funding would be received during the construction period so that no finance charges would be incurred.

Benefits & Synergies

Cities and transit agencies have various motivations for developing BRT systems, including: improving the livability of the community; improving bus speed and reliability; attracting patrons not currently using transit; and producing positive effects on urban revitalization and environmental concerns. BRT has been shown to have benefits beyond its public transit function.

However, according to Federal Transit Administration (FTA) policy, to measure the benefits to the transit passengers and the calculation of cost-effectiveness, only travel time savings are considered. How well BRT can reduce travel time determines its overall benefit, measured in person-hours saved. Its cost-effectiveness is measured in the cost in dollars for one person-hour of travel time. Travel time is also the key

determinant of BRT's ability to attract riders from the motoring population and reduce the negative impacts of auto traffic.

How are travel time savings achieved and quantified, and how are the benefits measured? Below is a table that shows the speed and delay elements of a person's total travel time, and the BRT features that provide a time benefit for those elements:

TABLE 2: COMPARISON OF SOURCES OF DELAY & BRT FEATURES

Speed/Delay Element	BRT Feature
In vehicle travel time	Exclusive lanes, traffic signal priority (TSP), stations
Passenger boarding & alighting	Level boarding, proof-of-payment ticketing, exclusive lanes, all-door boarding
Signal delay	Traffic Signal Priority
Congestion delay	Exclusive lanes, traffic signal priority
Fare collection	Proof-of-payment ticketing (POP)
Wait time	Higher frequency service (enabled by all speed-enhancing features together)
Walk time	Station spacing & location

It is possible to test a discrete set of alternatives with different travel time and cost characteristics to get estimates of ridership and cost-effectiveness. The Federal Transit Administration requires that project sponsors report the cost effectiveness of the project's ability to reduce passenger travel time. The East Bay Bus Rapid Transit project is ranked high for cost-effectiveness in this area.

- Incremental Cost per Incremental Trip (i.e., cost per new rider) = $9.71
- Cost per Hour of Transportation System User Benefit or TSUB (e.g., cost to save one hour of travel time for one person) = $9.74

The table below shows the the cost effectiveness breakpoints for the TSUB measure used by FTA to measure the benefits to the user.

TABLE 3: FEDERAL SMALL STARTS COST EFFECTIVENESS BREAKPOINTS

High	$11.99 and under
Medium-High	$12.00 - $15.49
Medium	$15.50 - $23.99
Medium-Low	$24.00 - $29.99
Low	$30.00 and over

The East Bay BRT project has been ranked "high" for user benefit. The following table compares the cost-effectiveness of BRT with recent Bay Area transit projects. Because the BRT project would convert travel lanes to bus lanes, the measure reported here represents the net gain for users and accounts for delays to motorists.

TABLE 4: COST EFFECTIVENESS OF BAY AREA TRANSIT PROJECTS

Project	$ Per New Transit Trip	Cost Effectiveness ($ per hr)
East Bay BRT	$9.71	$9.74
BART to SFO	$27.44	No data
MUNI Central Subway	$27.31	$21.39
Van Ness BRT	$24.56	$10.80
Tasman West LRT	$26.15	No data
3rd St LRT	$50.64	No data

Attempts have been made to measure the impact of isolated BRT elements. These efforts have not met with great success. However, by comparing alternatives that combine different bundles of elements, staff can get a rough idea of the advantages in bundling different features together. This is the approach for this project and other BRT projects. For example, comparing Rapid Bus, which has a relatively simple bundle (Traffic signal priority), with Rapid Bus Plus (TSP +POP) and with BRT, which has the most complex and rich bundle (exclusive lanes, TSP, POP, level boarding, etc.). By analyzing a bundle, staff can implicitly account for synergies between elements that are not possible for individual elements.

Another limitation to models is that they consider time but not other, more difficult to quantify features that may attract riders. For instance, attractive branding, nice shelters, public art and comfortable vehicles all have the potential to improve the public's experience of BRT, but they are not quantifiable in terms of the accepted measures of benefit. Since the model can only evaluate the attributes that affect the speed and price of the trip, it is unable to give "credit" to an alternative that incorporates these other features, even though real-life experience has proven their value to increasing ridership. The BRT mode is still too new for much documentation to be amassed on existing systems and consumer preferences. For local buses, commuter rail, heavy rail and light rail, and other well established modes, the model can incorporate what are called "k factors." These statistically evaluate consumer preferences for the broad attributes of the mode like comfort, appearance, status, etc. By contrast, only attributes like bus lanes and traffic signal priority that directly affect speed can be used by computer models to forecast ridership and travel time savings.

Synergies are said to exist when two or more features together provide a greater benefit than any one feature alone. For example, TSP provides a proven benefit in travel time savings. However, its contribution is greater when combined with bus lanes because the bus speed between traffic signals is more predicable and more efficient.

Because the bundle of BRT elements is flexible, there are opportunities to tailor a project to a particular budget or local conditions. However, there is a real risk in excluding or removing elements that play a central synergistic role. Bus lanes, for instance, amplify the benefits of TSP, POP and other features, yet are a relatively low cost item. Further, there are theoretical bundles that would be impossible to build or have poor cost effectiveness. Bus lanes with no stations would be a bundle that could not work because there would be no location for passengers to board the bus. Similarly, stations without lanes could work, but would not achieve the synergy of the two elements

together, and would also be more expensive to build. In broad terms, to save money on capital costs or meet other criteria, project sponsors run the risk of diminishing BRT's attractiveness to the more demanding market segments (motorists) that were an important target market of the project.

In conclusion, it is not currently possible to estimate the value of isolated components of BRT that contribute to travel time savings. This difficulty is even greater for features that generate intangible benefits, such as comfortable waiting areas and upscale buses. The best that can be done is to measure the tangible benefits, like travel time, that result from a particular bundle of components. Staff can be relatively sure that additional ridership is likely to be attracted by these components, but cannot quantify them at this time nor can they be separated from the bundle to determine their isolated cost effectiveness.

MEMORANDUM

TO: Policy Steering Committee **DATE:** February 22, 2010

FROM: Tina Spencer, Long Range Planning Manager

SUBJECT: AGENDA ITEM 8: Request for Information – Decision Making Regarding Dual Door Buses

SUMMARY

This memorandum is in response to a request by the PSC for information regarding decision-making aspects relative to the proposal to seek funds for dual side door buses, and how such decisions may impact the BRT project

Introduction

At the January 20, 2010 Policy Steering Committee, the issue of dual side door buses was raised as the result of a grant proposal from AC Transit to investigate the purchase of new and different vehicles for the BRT corridor. This memo is intended to provide an explanation of how decisions related to the BRT project—such as the consideration of dual door buses or other technological advancements—are integrated into the overall decision making that the cities will be involved with over the next few months and years.

BRT Decision Making

It is important to note that decisions made by the cities and Caltrans only *begin* with the selection of the Locally Preferred Alternative (LPA). Throughout the project development process to construction, the cities' and Caltrans' input is not only crucial, it is required as part of the federal process. To help explain the anticipated city and Caltrans decision points, AC Transit has developed a graphic depiction that explores the types of review and decision-making by BRT development phase (Attachment A).

Below is a summary, by phase of the major decision points, recognizing that the city-sponsored process may be slightly different from city to city; and recognizing that actions involving Caltrans may be slightly different than the cities, due to the federal requirements for participation.

FEIS/FEIR

As stated earlier, city and Caltrans input and decision making does not end with the selection of the LPA; it is only the beginning of the joint decision-making process between AC Transit and its local jurisdictions.

The major action after the selection of the LPA will be the development and adoption of a Memorandum of Understanding (MOU). In some cases, the cities may want to have a "master MOU" for the project to ensure that all related negotiated items are captured in one master document. This approach was taken with the "Smart Corridor" project that included cities along

the San Pablo, Telegraph, International and E.14th Street corridors. The MOU for the BRT project should lay out the following:

- Selection of the project for the Record of Decision (ROD) in order for the project to proceed into Preliminary Engineering
- Roles and Responsibilities of the Cities/Caltrans and AC Transit relative to the further development of the BRT project

Design (Preliminary Engineering and Final Design):
Because the Design Phase includes both Preliminary Engineering (P.E.) and Final Design (F.D.), there are a number of very important decision points that cities will be making throughout the process. Most notably, this phase will include Design Review and Concurrence of station location and streetscape features. Also during this phase, the cities and Caltrans will be negotiating and adopting a "Joint Use Agreement" that identifies items such as: how the roadway and stations will be maintained; how the investments will be recapitalized in the long range plan; or other functional areas that need agreement between the parties. Additionally, during F.D., cities will be reviewing and concurring on construction phasing plans and more refined design features of the stations and streetscape.

However, early in P.E. there is a need for consideration of Technological Innovations that could improve the BRT project or increase the District's ability to mitigate impacts. The timing of these decisions is dependent on the timing and availability of funding, project schedule, current information about and readiness of available technologies. The approach in the environmental evaluation has always been to use conservative assumptions in the technology area so that impacts are not underestimated and benefits are not overestimated.

These Technological Innovations include:

- Buses with doors on both sides;
- Alternative propulsion such as hybrids or non-petroleum-fueled vehicles
- Electronic guidance

Each of these elements could improve the project by reducing costs, reducing parking and traffic impacts and improving emissions. In all these instances, however, there are circumstances that make it impossible to evaluate these technologies in the EIS/R. Because of their potential benefits, it is important to allow for these technologies to be evaluated or implemented at the appropriate time in the decision-making process.

Dual Side Buses
Dual side door buses and alternative propulsion both refer to characteristics of the vehicle. Dual side door buses have the potential to reduce BRT infrastructure costs and reduce parking impacts. Hybrid or alternative fuel vehicles have the potential to reduce air pollution and gases that contribute to climate change. Because of the constraints of Federal Small Starts funding, the BRT was designed to use existing vehicles and then transition to a new fleet as current buses are retired. This allows use of available funding for the infrastructure, and replacement of buses using conventional sources. However, a recent announcement of unallocated Bus Discretionary funds raised the possibility of purchasing buses with doors on both sides. These buses may also be powered with hybrid drives. If the District is successful in its application for these funds (unknown at present), the BRT design could be modified to utilize these vehicles. Because the more impactful project would already have been environmentally cleared, a late improvement like this could be incorporated into the project during the P.E. phase. This

decision will likely be made after a ROD has been issued in the Fall 2010. Currently, staff cannot conclude that the buses would be available and that the benefits could be accounted for in the FEIS.

Electronic Guidance

The District has faced a similar situation regarding the use of electronically guided buses. There are two electronic guidance technologies (GPS & magnets) currently being evaluated by AC Transit in cooperation with UC Berkeley Partners for Advanced Transit & Highways, Caltrans, Lane County Transit and several private companies. A real-world test of the technology was conducted in 2008 along East 14th Street in San Leandro. AC Transit intends to test the technology in revenue service in 2010-2011. This technology promises to allow narrower bus lanes, potentially freeing up road space to accommodate traffic, bike lanes, wider sidewalks or parking. It could also provide a smoother, more rail-like ride for passengers and increase safety. However, there are no firms that are offering market-ready products that use this technology. Consequently, staff cannot conclude that the guidance technology would be available and that the benefits could be accounted for in the FEIS. Other guidance technologies, such as those in used in Cleveland and other cities, will need to be discussed during the early P.E. phase.

Construction:

By the time the project reaches the construction phase, many of the decisions regarding the project will be negotiated and agreed upon. However, there still is an important role for the cities: on-going construction consultation. During this phase, construction permits are issued for improvements based on the construction phasing plan. Additionally, there will be consultation with the cities and Caltrans on minor issues and project features that arise during construction.

EAST BAY BRT LPA ADOPTION PROCESS AND FEIS/R SCHEDULE - Revised February 16, 2010

	Activity	2009 August	September	October	November	December	2010 January	February	March	April	May	June	July	August	September
	City of Berkeley														
1	Technical Analysis & Prep for Public Outreach														
2	Stakeholder Mtgs & Public Workshop		SM SM	SM											
3	Prepare LPA Document		X												
4	Transportation Commission Presentation				M			M							
5	Planning Commission Presentation/Selection					M		M							
6	**City Council LPA Selection**								M	✸					
	City of Oakland														
1	Tech Anal & Prep for Public Outreach	C C													
2	Preparation for Public Outreach/Draft LPA	Charrette "wrap-up"													
3	Draft LPA Report			Draft LPA Report											
4	Public Meetings						PPPPPPP								
5	Public Works Sub Committee Status Report					M									
6	Planning Commission Presentation							M M							
7	Public Works Sub Committee Presentation/Recommendation								M						
8	**City Council LPA Selection**									✸					
	City of San Leandro														
1	Technical Analysis & Prep for Public Outreach														
2	Public Outreach			IB P SM	IB P SM										
3	Planning Commission Presentation					M									
4	Facilities and Transportation Committee							M							
5	Planning Commission Selection								M						
6	**City Council LPA Selection**									✸					
	AC Transit														
1	Provide Technical Information to Cities														
2	Prepare Outreach Materials for Cities														
3	TAC Meetings	M	M	M	M	M	M	M	M						
4	PSC Meetings	M	M	M	M	M	M	M	M	M					
5	Board Updates		M			M		M	M						
6	LPA Development														
7	**Prepare FEIS/R And Submit to FTA**		Prepare and Submit Administrative Draft FEIS/R to FTA								✸				
8	Circulate FEIS/R														
9	Staff LPA Recommendation Prepared														
10	**Board Adopts LPA**									✸					
11	**Board Certifies FEIS/R**													✸	
12	FTA Issues ROD													✸	
13	Update Small Starts Templates for FTA's 2012 President's Budget Recommendation														
	Caltrans	(Caltrans schedule dependent on execution of Co-Op Agreement which is currently in review by Caltrans and AC Transit)													
1	Co-Operative Agreement														
2	Draft Fact Sheets														
3	Draft PSR/PR														
4	Final Fact Sheets														
5	**Caltrans Approval / Final PSR/PR**										✸				

P / WS = Public Meeting / Citywide Workshops
SM = Stakeholder Meetings
IB = Informational Briefing

C = Technical Charrette
M = Meetings/Decisions
✸ = **Key Milestone, Meeting or Decision**

ASSUMPTIONS

1. AC Transit technical information is submitted in timely fashion
2. No public meetings are held during summer months (when school is out)
3. Adequate time is provided for internal City/AC TRANSIT reviews
4. City commissions and councils will adhere to schedule as indicated

AC TRANSIT DISTRICT **Board of Directors**		**GC Memo No. 10-045** Meeting Date: February 10, 2010	
Committees:			
Operations Committee	☒	Planning Committee	☐
External Affairs Committee	☐	Finance and Audit Committee	☐
Board of Directors	☐	**Financing Corporation**	☐

SUBJECT: Consider Adopting a Motion Indicating the Present Intention of the District to Enter into a Project Labor Agreement or Project Stabilization Agreement for the Bus Rapid Transit Project when Appropriate

RECOMMENDED ACTION:

☐ **Information Only** ☐ **Briefing Item** ☒ **Recommended Motion**

Adopt a motion of the Board's present intent to direct staff to negotiate a Project Labor Agreement or Project Stabilization Agreement for the Bus Rapid Transit Project when appropriate, considering the status of that project and other policies and laws governing the Board's action.

Fiscal Impact: None at this time. Upwards of $50,000 for future consultant services to assist in negotiation of an agreement.

Background/Discussion:

The District has been pursuing the Bus Rapid Transit (BRT) Project to provide rapid bus service within a 17 mile corridor from the City of Berkeley to the City of San Leandro. The preferred local alternative for the project is expected to be brought to the Board for decision later this year, as is a decision by the Board whether to proceed with the project. If the Board approves the project, construction is expected to commence in 2012.

The District is presently undergoing a review, with the assistance of Mason Tillman Associates, of its Small/Small Local Business, Disadvantaged Business Enterprise and Procurement Policies in order to provide opportunities for small/local businesses and DBEs to participate in providing goods and services to the District, and comply with the District's procurement policies and state and federal law. It has been anticipated that the BRT Project would provide opportunities for participation by these groups.

Recently, Director Peeples met with representatives from the Building & Construction Trades Council of Alameda County who requested that the Board consider adopting a motion to direct staff to negotiate a Project Labor Agreement (PLA) for the BRT Project when and if the District decides to proceed with the project.

PLAs were, for many years, not permitted on federally funded projects by virtue of an Executive Order signed by President George W. Bush. In February 2009, President Obama

repealed the Bush Executive Order and issued an Executive Order encouraging PLAs on any federal project in excess of $25 million.

A PLA, or a similar device with different bargaining obligations called a Project Stabilization Agreement (PSA), is a pre-hire collective bargaining agreement between the public agency or its representative on the project and the building trades that establishes the terms and conditions of employment for a specific construction project. The terms of the agreement apply to all contractors and subcontractors who successfully bid on the project, and supersede any existing collective bargaining agreements those companies may have in place.

A PLA/PSA is not restricted to union contractors but generally requires that nonunion workers pay dues and the nonunion contractors follow union rules on pensions, work conditions, and dispute resolution for the duration of the project. Many PLAs/PSAs require that employees hired for the project be referred by the union hiring halls, although some form of negotiated alternative hiring mechanism is also very common; for example, retention of a contractor's "core" or key employees.

BART and the San Francisco Airport have used PSAs for their airport projects according to a representative of BART. It has been represented that the Port of Oakland has a PLA/PSA for projects it has undertaken. Staff is in the process of confirming what contractual arrangement the Port is using. A PLA/PSA typically includes a no-strike/no lock-out clause which provides some stability for the project. The trade off is that the requirement to pay union rates and follow union rules can increase building costs and can discourage nonunion contractors from bidding on the project.

As noted, the union representatives recognized that the project has not been approved and still has a number of hurdles to clear before it becomes a reality. However, the building trades would like a tentative commitment for a PLA/PSA at this time in order to allow them to participate in the political discussions about the BRT Project. They recognize that the Board is not in a position to make a firm commitment that a PLA/PSA will be negotiated given the status of the project, as well as the need to determine how other District policies and state and federal laws may affect how the District proceeds with the project.

Prior Relevant Board Actions/Policies:

Numerous Board memos re BRT

Attachments: None

Approved by: **Kenneth C. Scheidig, General Counsel**
Prepared by: **Kenneth C. Scheidig**
Thomas Prescott
Date Prepared: **February 4, 2010**

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Dear President of The Board of AC Transit, all Mayors of Berkeley, Oakland and San Leandro,

Driving to or from Berkeley/San Leandro is extremely stressful! Please implement the Rapid Bus Route as soon as possible. Knowing the side effects (congested highways with too many cars, adding to the polution problem, dependence on gas/oil etc.) we need this service implemented ASAP. Please help to lighten an already overstressed community this alternative NOW. It should have been completed yesterday!

Thanks for your consideration and continued service on our behalf,

Kristi Peters

RECEIVED
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