



FINAL SAR 05-2

STRATEGIC ANALYSIS REPORT

on Northeast Waterfront Transportation Issues

Initiated by Commissioner Peskin
Adopted by the Authority on October 25, 2005

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I. BACKGROUND

This SAR was requested to better understand the likely transportation effects of five proposed development projects on the performance of the multimodal network in the section of the waterfront between Fort Mason and Market Street.

The report examines existing and future conditions, analyzes a range of policy responses for consideration, and suggests next steps for consideration by planners and decision-makers. It finds that land use and transportation development must be planned in a coordinated and comprehensive fashion, with sensitivity to the balance of transportation functions in the area. The proposed projects will likely generate a large number of vehicle trips causing circulation, pedestrian and bicyclist travel impacts. A range of measures is suggested to avoid, minimize or mitigate these. The cost of providing needed transit to meet future demand exceeds the City's expected receipts from Transit Impact Fee Development revenues within the first year of operation. More sustainable transit funding sources are required to meet the City's growth and development needs. Parking management should be strengthened in the greater Northeast Waterfront area, including through pricing or other parking management strategies. A transit circulator service could be implemented quickly to meet near-term transit demands.

A. About SARs: Purpose of Document

This Strategic Analysis Report (SAR), initiated at the request of Commissioner Peskin, analyzes the transportation issues of San Francisco's Northeast Waterfront in light of significant development changes proposed in that area. This SAR examines current and future transportation needs and highlights the policies, regulations and investments that will be required to accommodate development in the waterfront area in order to maintain the high degree of livability and economic vitality.

This SAR is designed to inform policy-level decision-making by the Authority Board. Technical discussion has been condensed, and only the facts essential to outline the policy-level issues are included. Additional information is available from the sources cited, or by calling Tilly Chang, Deputy Director for Planning, at (415) 522-4832.

B. The Issue

San Francisco's Northeast Waterfront has been experiencing significant changes, including the transformation that came with the demolition of the Embarcadero Freeway and subsequent major improvements in transit, bicycling, pedestrian safety and urban design. These investments benefit the overall livability and economic vitality of the area, which is one of the densest neighborhoods in the city and also one of its most important economic centers for tourism. The new open space and attractive facilities also created demand for new development, including a number of waterfront and area projects that are proposed by the Port of San Francisco and other project sponsors.

This SAR was requested to better understand the likely transportation effects of five proposed development projects on the performance of the multimodal transportation network in the section of the waterfront between Fort Mason and Market Street.

The SAR examines existing and future conditions, discusses a range of potential policy responses for further consideration, and suggests next steps.

C. Review of Other Documents

This section summarizes the relevant studies and plans that were reviewed in the Northeast Waterfront area.

Fisherman's Wharf Planning Committee Recommendations ⁽ⁱ⁾

In November 2002 the Bay Conservation and Development Commission (BCDC) and San Francisco Port Commission (Port) formed a joint Fisherman's Wharf Planning Committee. The report summarizes the Committee's recommendations regarding open space and pedestrian amenities, circulation, and parking for its collective jurisdiction North of Jefferson Street from Hyde to Powell and North of Beach Street from Powell to Grant. The Committee also made recommendations for areas as far South as Bay Street. It did not explicitly address future development or land use beyond these areas.

The report recommends much of Pier 43½ be developed to

create an open water basin and promenade. New plazas, landscaping and connections would complement the promenade and create a more amenable pedestrian environment between the water and Jefferson Street, the Wharf's "Main Street." Many of these recommendations focused on improving the Triangle Parking Lot at Piers 43 and 43½. The Committee also recommended evaluating the feasibility of a shared bicycle lane on Jefferson Street.

The report also recommends improved signage and other street-level measures to improve circulation. For example, the report calls for relocated crosswalks, pedestrian signage and vendor management to increase pedestrian safety and improve traffic flow. Real-time electronic signage is also recommended to direct drivers to parking facilities in Fisherman's Wharf and throughout the entire planning area that have capacity. The report also calls for extending Mason Street to the Embarcadero, dedicating loading zones on Jefferson Street and adding traffic control officers during busy times. The report recommends increasing F-Line and Muni transit service and supports increased metering to encourage transit use and better utilization of parking facilities.

Piers 27-31 Transportation Study – May 2004 ⁽ⁱⁱ⁾

This study, conducted by Korve Engineering for the San Francisco Planning Department, analyzed the transportation impacts of the 19-acre, mixed-use recreation project proposed for Piers 27-31 by The Mills development team.

The site for the project is situated on the bayside of the Embarcadero, at the eastern end of Chestnut and Lombard Streets. The project would be nearly 1.2 million square feet (excluding water), just over half of which would be programmed for recreation, office, retail, restaurants, open space and maritime uses. Recreational space amounts to just over ¼ of programmed space. Compared to previous proposals, the August 2004 proposal increased recreational space and parking facilities, while reducing commercial and office space.

The study states that parking demand would be handled by a combination of on-site, off-site, and valet parking facilities totaling 425 spaces. This supply would be shared across the project's proposed uses and is expected to be sufficient to meet demand. The study finds that some significant impacts on automobile travel can be expected from the project. In the short-term, one intersection en route to the Bay Bridge will decline in Level of Service (LOS) to a level of E or F during the weekday P.M. peak. In the year 2020 Cumulative Condition, an additional three intersections on the Embarcadero decline in service to LOS E or F during either the weekday P.M. peak or during the weekend P.M. peak. The report deems these impacts significant, but unavoidable.

The report projects project-related transit ridership on the F-line to be 98 new office-related trips in the p.m. peak hour and 194 new transit trips for all other purposes, for a total of 292 trips. The assumption is made that F-line capacity exists and can absorb 102 trips and that the project's TIDF contribution will account for the 98 office-related trips. The balance of 92 trips is then converted to a fleet impact estimate of 1.3 vehicles.

The project design presents potential conflicts for bicycle and

pedestrian travel. Although it reduces the number of crossing locations, the project nearly triples the number of vehicles crossing the Embarcadero Class II bicycle lane (from 197 vehicles per hour currently to 590 vehicles per hour with the project). A slightly lower number of vehicles is projected to cross the sidewalk (521 vehicles per hour). The number of vehicles crossing the sidewalk will be lower than that crossing the bicycle lanes because the project proposes curbside drop-off/pick-up zones between the bicycle lane and sidewalk. As proposed, these zones will reduce the effective width of the pedestrian promenade due to the loading/unloading activities. The actual width of sidewalk varies but is between 27 and 29 feet currently and will be reduced to 21 feet at some locations. With the development and loading zones, the usable width for pedestrian activity is reduced to 11 feet of effective sidewalk. "Effective width" is a measure that accounts for building shy distance and obstructions such as trees and street furniture.

The project includes the hiring of a full-time coordinator to distribute transit and transportation-related information, organize carpools and monitor the Travel Demand Management program. CityCarShare will provide seven cars on-site.

Draft Embarcadero Parking Study – June 2005 ⁽ⁱⁱⁱ⁾

The Port of San Francisco examined current and future parking conditions in the Embarcadero waterfront area in their 2005 Embarcadero Parking Study, which is pending release. The study presented parking demand estimates of current uses and possible future development on Port property, between China Basin and Pier 35, under four future scenarios. It discusses the importance of City's Transit First policy and the challenge of implementing the policy area-wide through parking management, transit provision and demand management.

The study finds that existing parking supply is adequate to meet current parking needs; occupancies in the Northeast Waterfront subarea (Pier 35 to 9) overall range from 33% in the weekend midday to 68% in the weekday midday.^(iv) However, the report notes that there is a perceived parking shortage because drivers are frequently unaware of parking availability that is not immediately on the waterfront – such as in garages just one or two blocks away from main destinations in the area.

The study analyzed the effect of expected Port development over a 20 year time frame in order to evaluate the adequacy of parking (and transit) under a range of four policy alternatives.^(v) In recognition that demand for parking is a function of its price, availability and the attractiveness of the alternatives to driving, such as transit, the four scenarios employed a range of assumptions in those areas:

Scenario 1: Do nothing - assumes there is no change in the way people travel today in the Northeastern Waterfront area.

Scenario 2: Assume Scenario 1 but only allow short-term parking (mostly visitor) and not long-term parking (mostly monthly commuters).

Scenario 3: Assume long and short term parking is allowed as exists today, but automobile use and parking demand changes

over time to match the patterns found in the C-3 downtown districts today (lower automobile use, higher transit, walking and

	Existing	Scenario 1	Scenario 2	Scenario 3	Scenario 4
Northeast Subarea (Pier 35-7)	68%	123%	96%	106%	93%
Ferry Building Subarea (Pier 5-22 1/2)	87%	105%	98%	101%	99%

Figure 1. Existing and Future Public Parking Occupancy by Area and Scenario ^(vi)

cycling). This scenario assumes significant investment in and operation of transit service along the Embarcadero, consistent with MUNI's Short-range Transit Plan.

Scenario 4: Assumes more transit service combined with more aggressive transportation demand management and parking management measures at Port owned facilities than Scenario 3.

The report then converted assumed mode shares under each scenario into automobile and transit trip rates and compared these demand levels with future parking and transit supply. The results of the parking analysis are shown in Figure 1.

The study estimated that a parking shortage (defined as >95% occupancy) could be expected to varying degrees in most subareas under each Scenario (more so in Scenarios 1 and 3, and only marginally so in Scenarios 2 and 4). Scenarios 2 and 4, which limited long-term parking in favor of short-term parking and combed increased transit with active demand and parking management measures, performed better than Scenario 3.

A parallel finding was that MUNI transit service along the Embarcadero would be insufficient for future needs under each scenario, as shown in Figure 2.

With the addition of the E-Line service to 15 streetcars per hour (per Muni's Short Range Transit Plan) and assuming a maximum capacity of 70 passengers per vehicle, the load factors at the Maximum Load Point (MLP) at Broadway and Embarcadero exceeds MUNI's service planning standard of 0.85 in each scenario. The report calls for a comprehensive transportation management strategy that coordinates parking and transportation demand management — including adequate transit services — in an integrated fashion for both Port and non-Port sites in the Northeast Waterfront area.

Transportation Impact Analysis Guidelines for Environmental Review – January 2000

San Francisco Planning Department environmental review processes for all projects must consider project-specific impacts as well as cumulative impacts. For cumulative impacts, the guide-

	Existing	Scenario 1	Scenario 2	Scenario 3	Scenario 4
Transit Ridership	440	1230	1800	1320	1510
Load Factor in 2025		1.17	1.71	1.26	1.44

Figure 2. Transit Ridership and P.M. Load Factors at Maximum Load Point (Broadway and Embarcadero) on E/F Line, 2025 ^(vii)

lines recommend assuming a growth factor of one percent per year for "background" traffic unless an areawide cumulative forecast is specifically defined. Then, project-specific traffic is reported as a percentage of this background traffic.

San Francisco Countywide Transportation Plan – 2004

The Countywide Transportation Plan reiterates the City's commitment to a "Transit First" transportation philosophy, which encourages transit, pedestrian, bicycle travel and other alternatives to solo car driving as the best way to efficiently move people in San Francisco while improving the city's quality of life. The Plan's investment component includes the Prop K Transportation Sales Tax Expenditure Plan, which identifies major new investment in transit and specific transit improvements along the Embarcadero,

"THE VARIOUS TRANSPORTATION MODES FUNCTION AS AN INTERDEPENDENT SYSTEM... THE OPERATION OF ONE DIRECTLY AFFECTS THE OTHERS IN MEETING OVERALL MOBILITY NEEDS..."

including new MUNI E-Line service between Fort Mason and the 4th St/King St. Caltrain station. The Plan also recognizes a continued need to maintain and improve F-Line service and institute parking and demand management measures in high demand areas like the northeast waterfront.

Chapter 5 of the Plan identifies a number of Strategic Initiatives that are necessary policies to achieve the

Plan's goals which include mobility, neighborhood accessibility, environmental quality and economic vitality. One of the main areas for strategic management is parking. Because demand for parking is so great, and the City's ability to add parking is limited, parking management is needed to raise the utilization of each space as much as possible, as a way to promote transit use and to generate revenues to fund development of alternative transportation modes. The Parking management refers to a toolkit of strategies to regulate parking supply and shape demand. Parking management measures include pricing the existing supply appropriately, promoting shared parking and car sharing, and limiting the supply of parking in transit rich areas. Parking management is also used in conjunction with demand management measures that promote transit and other alternatives to driving, such as shuttle programs between activity centers and remote parking facilities, to manage overall demand for transportation.

San Francisco Municipal Railway Short Range Transportation Plan (2003) and Draft Short Range Transportation Plan (2005)

We reviewed Muni's 2003 Short Range Transportation Plans (SRTP) as well as the Draft 2005 SRTP. Muni prepares the SRTP every two years to update its plans for improving transit service. The SRTP describes existing service and performance levels, and MUNI's Capital Improvement Program (CIP) and Operating Financial Plan for a twenty year period.

Currently, Muni operates the historic F Line streetcars and F

Line shuttle on the Embarcadero, with a ridership of 14,000 trips per weekday. The F-line operates from the Castro along Market Street and heads north on the Embarcadero to Fisherman's Wharf. The headway (time between vehicles) is 8 minutes on weekdays between 7 a.m. and 7 p.m. The F-line shuttle is an overlay service between the Ferry Building and Fisherman's Wharf. This supplemental short-line service lowers headways on the Embarcadero to 7 minutes.

Future service changes outlined in the SRTP include a modest increase in F line service, operational improvements on Market Street and the Embarcadero, and the implementation of a new E-line service along the Embarcadero from Fisherman's Wharf to the Caltrain Depot in Mission Bay. Because most historic streetcars have doors on the right side and operating controls at one end only, the E Line will require either construction of a turnback loop at its southern terminus, or double-ended cars. Redesigned low-platform stations south of the Ferry terminal may also be necessary.

At the time of the 2003 SRTP, Muni had planned to start trial service on the E line in 2006 and substantial service in 2007; however, given the ongoing operating budget crisis, the Draft 2005 SRTP delays the start of substantial E line service to 2009. In June 2000, Muni prepared a Preliminary E line Operating Plan, which outlined the steps necessary for implementation of E line service. Issues identified by this plan include maintenance facility capacity, a new loop turnaround for single-ended historic streetcars in the Mission Bay area, and securing adequate operating and capital funding. Capital funds are needed to build either a turnback loop for the E line or to provide a whole fleet of double-ended historic rail cars. Operating funds also have not yet been identified.

II. STRATEGIC ANALYSIS



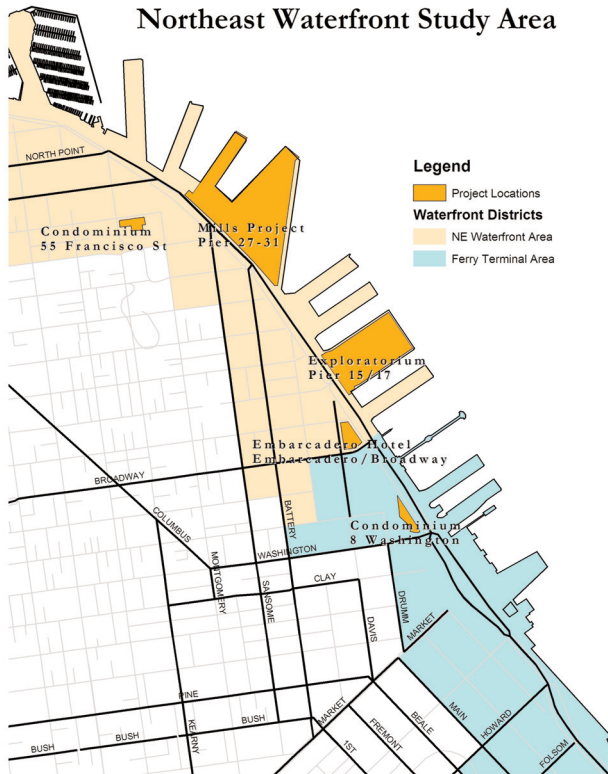
The purpose of this SAR is to assess the cumulative transportation impacts and potential transportation benefits of five proposed development projects (see [Figure 3: Northeast Waterfront Study Area](#)) on the performance of the multimodal Embarcadero network in the section of the waterfront between Fort Mason and Market Street:

1. Piers 27-31 project - a retail/office/recreation development
2. Embarcadero Hotel (Embarcadero/Broadway)
3. 55 Francisco condominium (Francisco/Montgomery)
4. Exploratorium Development (Piers 15-17)
5. 8 Washington condominium project

Transportation Analysis Methodology

The analysis methodology recognizes that the full spectrum of transportation functions in the Northeast Waterfront area needs to be analyzed comprehensively as an integrated system. The various transportation modes function as an interdependent system – the operation of one directly affects the others in meeting overall mobility and accessibility needs in the area.

Figure 3.
Northeast Waterfront Study Area



Source: SFCTA

The SAR's existing conditions analysis focused on a literature review of relevant studies, plans, and data (e.g. Prop E Muni performance data), interviews with agency staff and developer representatives, field visits, and some limited new data collection to complement other data that has been collected, or is being collected, by project sponsors.

The Authority collected data on pedestrian flows, bicycle trips, and traffic vehicle speeds on the weekend of June 4 from 1 p.m. to 4 p.m. to augment weekday data from various sources. Per Commissioner Daly's request, the pedestrian data collection included measurement of skateboarders and rollerbladers.

The main analysis tool for examining future conditions was the Authority's travel demand forecasting model, which was used to estimate existing and future transportation conditions under a range of alternative transportation policy scenarios. The model runs were supplemented with other analyses and calculations. The Planning Department's land use scenario "B" was assumed for all future alternatives.

Land Use Assumptions

The San Francisco Planning Department maintains land use forecasts of future growth. Many future developments in the northeast waterfront area are anticipated in these forecasts, including the Piers 27-31 project, the Embarcadero Hotel, and the 8 Washington condominium project.

For each of the five projects, the Authority obtained square footage estimates from the Planning Department, broken down by the type of development (such as housing units, office space, cultural/institutional, retail, visitor, and restaurant space). Depending on the timing and mix of use for each project, there may be a developer contribution required under the City's Transit Impact Development Fee (TIDF) program. Figure 4 summarizes the size of proposed developments, their status under TIDF and the expected TIDF payment at approval.

The proposed development projects that are the subject of this SAR are all at various stages of planning and development, so these square footage estimates are subject to change, and some have even changed during the timeframe of this study. As this SAR is not taking the place of the CEQA-required full impact analyses for these projects, the exact land use estimates are not as critical as gaining an understanding of the overall implications of the scale of development being considered.

A. Existing Conditions

Pedestrian and Bicycle Conditions on Herb Caen Way

The quality of the pedestrian environment and pedestrian amenities is generally high along Herb Caen Way, the Embarcadero promenade. The sidewalk promenade varies in width, from approximately 38 feet near Kearny to approximately 17 feet near Broadway. Bicycle lanes are striped in both directions on the Embarcadero, ending at North Point, one block north of Bay Street.

We collected data on pedestrian flows, bicycle travel and sidewalk activity along Herb Caen Way at Bay Street and at Broadway during the afternoon peak hours of 1 p.m. - 4 p.m. on a typical early summer Saturday. Observers tallied the number of pedestrians, cyclists in the street, cyclists on the sidewalk, skateboarders and in-line skaters (traveling in both northbound and southbound directions) along the Bay side of the Embarcadero.

Figure 4. Land Use and TIDF Assumptions

	Piers 27-31	Exploratorium	55 Francisco	8 Washington	Embarcadero Hotel	TOTAL
Square Ft (non-res)	680,025	386,835	0	10,000	237,747	1,314,607
Residential Units	0	0	51	120	0	171
Hotel Rooms	0	0	0	0	267	267
TIDF	Office space only	All non-res space	All non-res space	All non-res space	Office space only	
	\$2,060,000	\$3,094,680	\$0	\$100,000	\$1,836,198	\$7,090,878

Activity was high along the Embarcadero during the data collection period. The total number of people walking, cycling and recreating varied between 700 and 1,000 persons per hour (see Figure 5: Non-motorized Trips on Herb Caen Way Promenade).

(We note here that demand for all transportation - and particularly visitor trips - is seasonal and can vary throughout the year. For example, the Piers 27-31 Study reports higher pedestrian volumes at 1400 pedestrians per hour, on August 13, 2003.)

The vast majority of activity was pedestrian travel, reaching 900 persons per hour at the peak. The majority of pedestrians counted were walking northbound, with slightly more

at Bay Street than at Broadway. The northbound peak direction could be explained by the existence of BART and parking facilities near the Ferry Building at Market Street and suggests a peaking issue for Embarcadero transit in the reverse direction.

Other sidewalk users were few in number - generally two thirds were cyclists, 20% were in-line skaters, and 10% were skateboarders. In-line skaters and skateboarders were also present, though in small numbers. In-line skaters fluctuated between 4 and 12 per hour; skateboarders between zero and five per hour. By slim margins, the highest counts of both were observed heading northbound at Broadway.

The Embarcadero is a wide roadway, spanning up to 100 feet from curb to curb, with several major intersections that are difficult to cross, such as Battery, Lombard, and Embarcadero. Traffic speeds range from an average 19 mph (Market to Broadway segment) to 11 mph (Broadway to Bay segment) with the Class II bicycle lane acting as a buffer between pedestrians and traffic. On-street parking provides some buffer as well. Occasional obstacles such as vehicle curb cuts or public art (low rise squares) hinder pedestrian travel.

While conditions for pedestrians have improved tremendously with the development of the Herb Caen Way promenade, improvements are still needed to ensure safe access and circulation. For the most part, adequate pedestrian refuges and basic facilities (pedestrian countdown signals and crossing times, curb ramps, and visible crosswalks) are provided. However, the level of service is reduced by the many curb cuts along the Promenade that create potential for conflicts between pedestrians and cars and trucks. This could be partly addressed through better caution signs or audible warnings. Long curb cuts exist at every Pier entrance, and shorter curb cuts provide access to small parking lots between most Piers. In addition, more consistent placement of railings at

Figure 5: Non-motorized Trips on Herb Caen Way

	Embarcadero at Bay Street		Embarcadero at Broadway	
Pedestrians	799	86%	642	83%
Bicycles (on Bay-side of roadway)	68	7%	88	11%
Bicycles (on sidewalk)	43	5%	28	4%
In-line skates	12	1%	13	2%
Skateboards	5	0%	4	0%
Total	926	100%	774	100%

Source: SFCTA

F - line platforms is needed to direct channelize pedestrian traffic to crosswalks at intersections.

Pedestrian circulation conditions at Fisherman's Wharf are particularly challenging. Sidewalks are not wide enough to accommodate pedestrian flows, striping at loading zones can be unclear or in poor condition, and vendor stands clutter the walkway. The intersection crossing conditions could be

improved with more consistent treatment of signals, signage and striping.

Cyclists traveling in the on-street bicycle lane numbered about 100 per hour at the peak hour. Most cyclists traveled northbound and in the street. The average rates of cyclists traveling northbound in the bike lane were 87 cyclists per hour at Broadway and 68 cyclists per hour at Bay Street. For the entire afternoon, only two cyclists traveled southbound - the wrong direction - in the street. Bicycling on the sidewalk was more prevalent at Bay Street than at Broadway. There, 43 cyclists per hour rode on the sidewalk, whereas only 28 did so at Broadway. Of those riding bicycles on the sidewalk, slightly more were riding southbound.

The numbers of cyclists on the sidewalk and against traffic is fairly high for a route with a striped Class II lane, possibly indicating a concern on the part of cyclists about traffic speeds and/or in response to freight loading/unloading or other parking activities blocking the bike lane. Another possibility is rider preference for the Bay side of the roadway. An examination of traffic speed data suggests the issue is more likely to be related to one of the latter two reasons than the former. The average vehicle speed between Market and Broadway (19 mph) was significantly higher than that between Broadway and Bay (11 mph) between 1 p.m. and 4 p.m. - yet over 50% more cyclists rode on the sidewalk in the Broadway to Bay segment than the Market to Broadway segment during the same time period.

Field checks of the bike lane operation during a typical weekday midday also found that double-parked cars or freight loading/unloading activities tended to block the bike lanes, and this was causing the majority of cyclists to use the Promenade. The potential safety conflicts between bicyclists and pedestrians on the Promenade could be reduced with better facilities for freight loading/unloading. Future developments need to minimize crossings of the Embarcadero bicycle and pedestrian facilities and provide adequate site planning for freight loading and unloading zones in order to maintain bicycle lane accessibility and ensure bicyclist safety.

Transit Conditions

Muni's "F-Line" operates historic trolleys along the Embarcadero between Fisherman's Wharf and the Ferry Building.

Ridership. Currently, according to Muni planners, streetcar ridership along the Embarcadero is highest on Saturday after-

“...WHILE CONDITIONS FOR PEDESTRIANS HAVE IMPROVED TREMENDOUSLY WITH THE DEVELOPMENT OF THE... PROMENADE, IMPROVEMENTS ARE STILL NEEDED TO ENSURE SAFE ACCESS AND CIRCULATION.”

noons, averaging 450 passengers per hour at the Ferry Terminal in each direction. Weekday demand levels along the Embarcadero are approximately 300 passengers per hour in each direction. The F-Line currently carries more than 10,000 daily trips each weekday on the Embarcadero segment of the route.

Mode Share. The Countywide Transportation Plan estimates that transit carries approximately 17 percent of all daily trips made to or from San Francisco. Given the high levels of transit service, transit performs slightly better in the SAR study area, carrying about twenty percent of daily trips to or from the waterfront. In the peak periods, transit carries a larger share of trips from the waterfront, up to almost thirty percent in the P.M. peak.

Crowding. MUNI collects Prop E data on the F-Line crowding levels and service reliability. Prop E data for the F-Line are calculated on a peak period basis that compares overall demand with overall supply over a 3-hour peak period and generally do not show a crowding problem. However, the Authority conducted more detailed analysis of recent weekend data which revealed that almost half (45%) of all inbound streetcars operate at or above MUNI's capacity guidelines (85% of their total seated and standing capacity, or 70 passengers per vehicle) on Saturday afternoons. Trends indicate that crowding on the F-line is worsening.

Reliability. Prop E data on the on-time performance (more than 1 minute early or 4 minutes late) for the F-Line indicates the service is not on time over 35% of the time. Trends indicate that reliability is stable, but below the Prop E-mandated standard of 85%. This variation in the time between vehicles can create a condition where F-Line vehicles are "bunched," with two vehicles arriving in tandem or closely spaced in time, followed by a longer-than-scheduled gap before the third vehicle arrives. The bunching

phenomenon is related to the crowding problem as "lead" vehicles in a bunched set must pick up more and more people while "follow" vehicles are under-utilized. Recent experience on the F-Line during the Authority's on-board transit service indicates that F-line vehicles do bunch. Typically, this is attributable to variability in travel times due to the fact that streetcars operate in mixed traffic (e.g. on the Market Street segment), or because F-line vehicles are not pulling out on time at the start of runs.

To address the problem of bunching, signal timing on Embarcadero roadway should be optimized to allow F line vehicles to meet scheduled travel times and maintain more even spacing between vehicles. MUNI has applied for Transit Preferential Streets (TPS) funds from the Authority's Prop K program, to re-time traffic signals to the benefit of transit vehicles. Muni should collect before and after data on travel time and reliability to analyze the bunching problem as part of this project.

Roadway Conditions

Volumes. The Embarcadero is a main arterial connecting downtown to North Beach and the many attractions along the Northeast Waterfront. There are two auto lanes in each direction, along with some left turn lanes at major intersections. There is also a Class II bicycle lane in the both directions on Embarcadero from Market Street to North Point. Traffic signals are timed to give priority to transit vehicles (F-line cars).

Traffic counts from various studies indicate that automobile volumes on the Embarcadero range from about 1200 vehicles per hour between Vallejo and Lombard to about 1800 vehicles per hour at the maximum load point between Chestnut and Bay Street. These volumes indicate relatively modest demand and fairly good operating conditions given the capacity of the Embarcadero roadway.

Speeds. The Authority collected auto speeds on the Embarcadero during a June weekend, to determine whether the relatively low automobile volumes are due to extreme congestion ("gridlock" conditions) or whether there are indeed fewer vehicles than the operating capacity of the Embarcadero. As reported earlier, northbound auto speeds (the peak direction) averaged 19 miles per hour (mph) between Market Street and Broadway, equivalent to automobile level of service (LOS) "B" for this classification of arterial. Farther north, speeds average 11 mph from Broadway to Bay Streets (LOS "D"), and drop to an average of 6 mph north of Bay Street (LOS "F") Bay Street is north of all five developments which are being analyzed in this report.

Traffic Speeds and Operations. The observed vehicle speeds along the Embarcadero between the Ferry Building and Bay Street do not imply high levels of congestion on weekend peaks. The Authority's LOS Monitoring data collection for the weekday p.m. peak period on the Embarcadero from Townsend to North Point revealed an average northbound speed of 12.3 mph (LOS D) in the Spring of 2004. This LOS was improved over the previous monitoring cycle in 2001. Southbound speeds were not collected because the LOS from the previous monitoring cycle was C or better, indicating only minor delays, and because northbound is the peak direction of travel.

North of Bay Street, near the Fisherman's Wharf area, the slower speed does signify problematic congestion. While this SAR did not include resources to undertake detailed traffic operations studies, the Fisherman's Wharf Planning Committee recommendations on how to improve traffic circulation, parking management, vendor management and pedestrian circulation and safety described above do appear appropriate and could be funded by public or private sources such as developer-funded mitigation measures. The Port's Northeast Waterfront Parking Study also included similar measures to address parking-related congestion and many of these are described below. Finally, as a transportation demand measure, the City might consider adding more taxi stands or installing signage to private hotels with taxi services in the area. Currently, Pier 39 has one loading/unloading zone for taxis, drop-offs, and tour buses.

"...ALMOST HALF OF ALL INBOUND TROLLEYS OPERATE ABOVE MUNI'S CAPACITY GUIDELINES ON SATURDAY AFTERNOONS... PROP E DATA ALSO INDICATES THAT SERVICE IS NOT ON TIME 35% OF THE TIME..."

Parking

Parking is a crucial component of any comprehensive solution to the transportation problems in the Northeast Waterfront area. The Port study finds that existing parking supply meets current needs, with 68 percent overall weekday midday occupancy of spaces in the Northeast Waterfront area (Pier 35 to 9). However, there is a perceived shortage of waterfront parking. This could be because some garages are less visible or in areas that less familiar to tourists, which implies that better driver information systems, even just better signage, would improve the parking situation today. This is precisely the condition in the Fisherman's Wharf area. Real-time information about availability of spaces at each lot is another helpful measure that some garages have implemented.

A comparison of the weekend occupancies of on-street metered spaces (70%), as compared with off-street garage/lot spaces (21%), bears this out, although another explanation for this difference could be that on-street meter rates are priced much lower than off-street garage rates. If this is the case, raising meter rates to be more comparable to garage rates would reduce the incentive of drivers to circle for on-street parking spaces and therefore reduce auto congestion. The occupancies for meters and garages become more similar in the Ferry Building area (Pier 7 to 22 ½).

In order to use pricing as a management tool, parking rates should be raised until occupancies reach the 85% - 90% level. The Port's parking study indicates that Port controlled parking facilities have very high occupancies during the weekday middays, especially compared to non-Port controlled facilities. Even though the Port's parking rates are structured properly to promote short-term parking over long-term parking, this suggests that the short-term rates are too low (\$2/hour with validation at the Ferry Building) compared with the market rate and accessibility profile at places like the Ferry Building. Because demand for parking is relatively inelastic, the Port could increase the turnover and thus effective capacity at its facilities by raising the price of short term parking. This would also raise revenue that the Port could use to fund access by pedestrian, bicycling and transit. For example, the Port could study the need for bicycle parking, transit pick up and drop off facilities, and pedestrian amenities, in conjunction with parking rate and turnover surveys as a basis for considering rate increases and the use of these funds to pay for multimodal improvements in its proposed Prop K-funded Ferry Building Access study. For these efforts to be most effective, however, parking management would need to also be carried out neighborhood-wide, by both the Port and non-Port owners of parking facilities.

The Planning Department and the Authority are currently embarking on a parking management study. The purpose of the Study is to review San Francisco's existing parking management programs and to investigate the potential for using innovative strategies such as parking meter pricing more widely as a transportation demand management tool. The study will evaluate the feasibility, potential benefits, costs and impacts of such a strategy, as well as address the needed implementation mechanisms and legal framework. The larger goal is to expand the City's parking management toolkit to guide neighborhoods in promoting better

utilization of on-street parking spaces, in recognition of these as a scarce and valuable land use. The Study will also analyze the potential revenue streams that could be generated under several collection and distribution scenarios, including via parking benefit assessment districts, which would return some portion of revenues to the areas in which they were collected to pay for neighborhood transportation improvements or services.

B. Future Transportation Conditions

The analysis of future transportation conditions focused on a comparison of existing transit and automobile levels of service with future (2025) conditions assuming implementation of the 5 proposed development projects described above.

The primary tool used for the analysis of future conditions was the Authority's SF-CHAMP travel forecasting model. SF-CHAMP is the Authority's modeling tool to evaluate travel demand and system performance for alternative future scenarios of land use and transportation changes. A 2005 base year model was created, and the results of this model were compared to a range of future scenarios for the year 2025. The five proposed projects were compared against the existing condition as the more proximate development opportunities in the Northeast Waterfront area. Next, other expected growth and development was modeled and combined with two transportation system management strategies: increased pricing of parking and increased bus transit services in the Northeast Waterfront area.

Transportation System Assumptions

All 2025 forecast years assumed implementation of transportation improvements that are under construction, that are currently programmed and funded, or that are highly likely to materialize and are included in the MTC 2005 Regional Transportation Plan. This includes the Central Freeway/Octavia Boulevard project, and the projects identified in MUNI's latest Short Range Transit Plan such as Third Street light rail service (and associated bus service changes), the Central Subway to Chinatown, and E-Line service from Fort Mason to 4th and King Streets.

Evaluation of Impacts on the Transportation System

Traffic Analysis. The cumulative traffic from the proposed five developments will add to traffic levels along the Embarcadero. The Authority's model forecasts that the cumulative effect of these projects would cause a 10%-15% cumulative increase in traffic along Embarcadero compared with the 2005 condition without these projects. The Piers 27-31 transportation study cited above also found that volumes on Embarcadero would increase and that two or three intersections (depending on time period) en route to the Bay Bridge would reach LOS "F" in the future.

Beyond the traffic impacts, the proposed developments may cause other transportation impacts as well. For example, a review of the proposed Piers 27-31 plans indicates that right turns from northbound Embarcadero will conflict with the existing bicycle lane and pedestrian walkway. The Piers 27-31 study identified a

threefold increase in vehicles crossing the bicycle lane at the project location. The Piers 15-17 Exploratorium development could also create bicycle lane conflicts, as it may have loading and drop-off areas, or even parking facilities which will generate automobile trips. These impacts are discussed further below.

Parking and Demand Management

With respect to office, recreation and visitor activity centers, the supply of public parking in the Northeast Waterfront is likely to remain stable or decrease in the future. Residential parking was not analyzed closely in this SAR due to time and budget constraints, however, it is recommended that the project sponsors implement less than 1:1 parking ratios, unbundle parking from housing unit costs, and implement TDM measures such as condo-Fast Passes (monthly transit passes that can be built into condo fees), in order to provide more housing choices for new residents and to manage demand for car trips in the Northeast Waterfront area.

In general, parking management measures in the entire area will need to include strategies to promote high utilization of each space such as preferential spaces for carpools, Carshare, and bicycles, and techniques such as "lift" parking. To the extent these strategies increase the use of each space, the need to manage parking through pricing measures will be alleviated.

The market price of private parking is likely to rise with rising demand and little supply growth; the city's supply of publicly operated parking should be priced in tandem based on annual surveys. City-controlled public parking should not compete with private parking as may be occurring in the Ferry Building area. Policies regulating parking should also continue to favor short-term parking relative to long term parking and in fact, the City may wish to make this differentiation in its parking tax. Tax incentives could also be offered to parking businesses to provide real-time parking information on site and online.

The Authority tested such a parking strategy using the SF-CHAMP model. For future trips destined to the Northeast Waterfront, the scenario increased short-term rates by 20 percent, while long-term parking rates were increased by 50 percent above the current average in the area. The results show that increasing the parking rates in this area raises the transit mode share from 20 to 21 percent. While this may sound like a small effect, it translates into several hundreds of peak period cars removed from the streets every day. This scenario test is a fairly "blunt" test, designed to show that transit service and parking policies are linked. Actual parking policies that might be successfully implemented are described section III, below.

Pedestrian and Bicycle Analysis

Herb Caen Way is a showcase pedestrian environment, a model of how a place can be transformed through careful planning and investment. Early summer data collection shows almost 1,000 pedestrians per hour during weekend afternoons, and late summer crowds attract even more.

Currently there are few curb cuts across Herb Caen Way that provide access to parking areas and to some portside businesses. The introduction of major recreational and retail attractions on the port

side of the Embarcadero will increase utilization of the promenade even further.

Creating new curb cuts to provide vehicular access to portside developments, such as the proposed Piers 15-17 and Piers 27-31 developments, would introduce new and sizeable conflicts between vehicular traffic and the promenade users. Specifically, autos would cross the bicycle lane to reach parking and loading/unloading zones - a total of 590 crossings during the PM peak hour. In the case of the Piers 27-31 development, the proposed project would require a narrowing of the sidewalk by up to eight feet. Combined with the related loading and unloading activity at the proposed loading zone, the effective sidewalk width is reduced to 11 usable feet. Exiting valet parking queues may also cross the promenade. Autos crossing the promenade would then have to traverse this high volume sidewalk, which carries a diverse mix of pedestrians, bidirectional bicycle traffic, inline skaters, and skateboarders.

The high number of autos entering/exiting combined with the large volumes of promenade users would mandate controlled flow for safety; i.e. dedicated right turn signal phases and possibly pedestrian-only scramble phases. The Embarcadero roadway does not have sufficient width for long right-turn pockets in addition to the current lane configurations, so this conflict will likely cause queuing of vehicles into the Embarcadero through traffic lanes themselves. These queues could in turn cause traffic congestion and backups upstream. Evaluation of this modal conflict should be part of any traffic analysis for portside developments that cause vehicular traffic to cross Herb Caen Way. The Port should also reduce parking to essential loading/unloading, and a minimum of short-term spaces, at sites such as the Piers 27-31 location and Exploratorium development.

Pedestrian safety can be improved through the use of specific technologies and design elements. The addition of in-pavement flashing lights, designing a continuous, flat, pedestrian area, and controlling turn radii through use of "return curbs" all reduce vehicle speed and increase pedestrian and driver awareness and safety.

Transit Analysis

The transit analysis estimates that the 5 proposed development projects would add an additional several hundred transit trips on the Embarcadero compared with current levels. The demand is equivalent to the capacity provided by 5-6 additional historic trolley vehicles. Additionally, assuming implementation of MUNI SRTP planned E and F line services, another 800 trips/hour is projected to be generated from future expected development (beyond the 5 proposed projects) by 2025. This demand is equivalent to the capacity supplied by 12 additional historic trolleys.

Muni's SRTP describes a plan to expand the revenue fleet of historic trolleys by over 25 vehicles by 2007. It is unclear what percentage of the capital costs of the vehicles is funded, but the SRTP

“PROPOSED CURB CUTS TO PROVIDE VEHICULAR ACCESS TO PORTSIDE DEVELOPMENTS WOULD INTRODUCE NEW AND SIZEABLE CONFLICTS BETWEEN VEHICULAR TRAFFIC AND THE PROMENADE USERS.”

is very clear that the E line turnback loop and rehabilitation of double-ended vehicles are not fully funded.

Although the SRTP programs projects based on Prop K Expenditure Plan commitments and historical trends in Federal, State and regional funding, Congress has not yet reauthorized the Federal Surface Transportation Act, the State has not settled its medium term transportation revenue strategy and Muni is struggling with a growing and substantial operating deficit. Muni's present operating deficits need to be addressed not only for the coming fiscal year but through a structural fix, so that operation of the existing system is sustainable into the future. In addition to the escalating cost of operating the existing service, there is the issue of identifying the operating funds needed to operate new service, including the E/F Line service that will be needed to address development growth along the Embarcadero.

Without E Line service, or radically improved F Line service, the demand for transit will substantially exceed the supply along the waterfront. A lack of transit capacity will directly translate into more driving, more traffic congestion and more competition for scarce parking.

The Countywide Transportation Plan anticipated the need for additional sources of funding to meet future transit investment needs, including user fees (from fares and parking rates) and developer contributions. The Transit Impact Development Fee assesses a one-time payment from developers based on the size and mix of proposed uses to help fund transit services to meet demand from their projects. In the case of the five evaluated projects, this payment is estimated to be \$7.1 million (one time fees). This accounts for grandfathering of projects at the old TIDF levels. If all projects were assessed at the current TIDF levels this figure would reach \$12 million.

The Authority estimates that the five waterfront projects will generate an additional demand of approximately 400 transit trips per day. Assuming a full load of 70 passengers per historic trolley, this demand can be met by operating an additional 5 to 6 historic trolley cars along the Embarcadero waterfront. The Municipal Railroad SRTP recommends that the historic streetcar fleet provide a 35% spare ratio due to the antiquated nature of E and F-line operating equipment. Thus, to provide adequate rolling stock for this standard, eight historic trolleys will be needed to support the additional waterfront development. This level of investment is similar to planned Muni E-line service. The recommended initial E-line operating plan calls for a 15 minute headway to complement the existing F-line Embarcadero service. Six vehicles will be needed to operate this route at this initial frequency, with two additional cars held in reserve.

Assuming an initial operating year of 2007, running the E-line service will cost over \$9 million for the first year in operating costs. An additional cost of \$7.2 million will be incurred for the construction of an E-line turnback loop at 6th and Berry streets. This would bring the total cost for the first year to \$26.0 million, including vehicles. Compared with expected TIDF revenues, this means that only ¼ of the needed transit capacity *in the first year* will be funded by developer contributions.

Analysis shows the net present value of the cost to

provide E-line service (15 minute headways) over a 10-year period is \$88 million in 2005 dollars (see Figure 6.)

Expected developer contributions from TIDF (\$7.1 million) will cover less than 10% of this figure. We conclude that the City needs to urgently identify new sources of revenue to fund transit expansion needs along the waterfront. We also note that this situation is not unique to the waterfront area. Muni will not be able to sustain existing service, let alone implement transit service expansions, without new operating revenues.

In the above analysis of E/F Line needs, the most significant cost component, by far, are the ongoing operating costs. In addition to identifying new sources of public funding, the answer to this problem will require that the City revisit the way it assesses developer contributions and the levels of contributions that are appropriate. It is also will require serious analysis of transit operating cost escalation, and even more concerted efforts at cost containment and efficiencies on Muni's part. Concessioned bus services could provide a part of the answer as well.

Enhanced Transit

The F Line is, by all accounts, hugely successful and popular with city residents and visitors alike. The historic streetcars present a challenge to transit planners, because they provide charm, style, and ease of use for riders, but at the same time they are less efficient and have lower capacity than MUNI's other rail vehicles (LRVs have a capacity of 119 passengers, including seated and standees). Since transit capacity along the Embarcadero is already an issue and it is expected to become more so, it will be necessary to consider alternative solutions to meet demand, particularly if more capacity is needed in the short-term.

Other cities have found success in tourist-oriented loop routes; the Sydney Circulator and Red Route buses in London are good examples, as is Miami's use of contracted services to meet demands in its South Beach tourist area. The San Francisco waterfront area has enough attractions, spread over a large enough area, that a similar system might be a viable addition to the travel choices for visitors. A user-friendly all-day transit pass and visitor map could be offered. The visitor transit service could

Figure 6. E-Line cost calculations

E-line Service (2007 costs)	Cost
6th and Berry Turnback	\$7,260,000
8 PCC Vehicles	\$9,680,000
FY2007 Operating cost	\$9,050,265
TOTAL COST 2007	\$25,990,265
<hr/>	
Net Present Value Over 10 Years	Cost
E-line service (15 minute headway)	\$74,107,886
Capital Cost (E-line, 8 vehicles)	\$8,000,000
6th and Berry Turnback	\$6,000,000
TOTAL COST	\$88,107,886

provide access to parking garages and help to manage north-bound pedestrian activity if it operated in a southwesterly loop. The Authority tested such a transit loop service in addition to planned 2025 Muni service levels (see Figure 7). The loop route assumed stops at the Ferry Building, Chinatown/North Beach, Fisherman's Wharf, and Embarcadero/Chestnut. This simple route, even with the loop going in just one direction every fifteen minutes, is estimated to carry almost one thousand passengers daily. The estimated annual cost of producing the service through contracted operators ranges from \$630,000 to \$1.2 million per year. More frequent, two-way service would attract even more riders although this would require a larger operation with higher costs.

This enhanced transit strategy has been modelled elsewhere in the city, often by private sponsors in partnership with public agencies. Chinatown Development Corporation offers a weekend shuttle linking public garages with Chinatown businesses. Golden Gate concourse also operates a shuttle which the Authority has provided TFCA support for in the past. Northeast Waterfront businesses could consider forming a Business Improvement District or other mechanism to fund operation of a shuttle to complement Muni F line service in the near term.

III. FINDINGS AND RECOMMENDATIONS



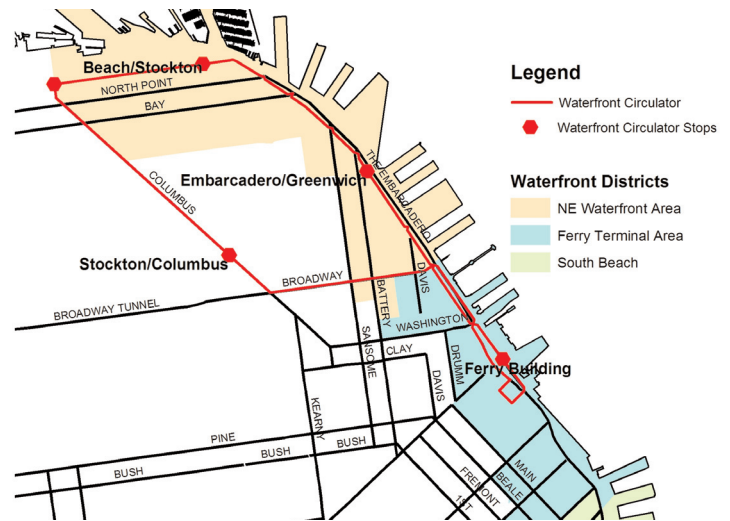
This SAR examined the cumulative transportation impacts of five proposed developments on the Northeastern Waterfront. It found as follows:

Counterposed to the likely economic benefits of each new development, the proposed projects will likely generate significant impacts on automobile circulation, pedestrian and bicyclist safety and circulation. The Planning Department should require project sponsors to undertake detailed traffic operations modeling to evaluate the likelihood of queues forming along the Embarcadero in the northbound direction during weekday peak periods. Depending on available resources, a full operations model could be created. Southbound weekday and bidirectional weekend models should also be developed; however, these types of studies are quite expensive, and the most critical, congested movements occur in the northbound direction.

In addition, the amount of sidewalk space and integrity of bicycle lanes should be maintained in proposed site plans - off-street parking, excessive curb cuts and vehicle crossings should be minimized through off-peak operations of loading/unloading zones only for freight and off-site parking facilities/validation programs for passenger cars. Proposed dedicated bus shuttle services should be reconsidered and possibly coordinated instead with an area-wide shuttle/TDM program serving the entire waterfront area. Projects that are found to cause significant transportation impacts should be required to consider a wide range of mitigations measures including: pedestrian and bicycle circulation and safety improvements, transit operational improvements, and contributions to area-wide TDM/parking management programs.

For the Fisherman's Wharf area, the Fisherman's Wharf

Figure 7. Circulator Route



Planning Committee recommendations on how to improve traffic circulation, parking management, vendor management and pedestrian circulation and safety described above seem appropriate and could be funded by public or private sources such as developer mitigation fees. The Port's Northeast Waterfront Parking Study also recommended similar measures to address parking-related congestion such as better signage to parking lots and garages and shared parking arrangements.

In general, parking management is a neighborhood level need in the Northeast Waterfront as it is in other San Francisco neighborhoods. For the proposed residential developments, it is recommended that the project sponsors implement less than 1:1 parking ratios, unbundle parking from housing unit costs, and implement TDM measures such as condo-Fast Passes (monthly transit passes that can be built into condo fees), in order to provide more housing choices for new residents and to manage demand for car trips in the Northeast Waterfront area.

To manage neighborhood and neighborhood commercial parking, the Department of Parking and Traffic should work with community representatives to consider undertaking a parking management study (including inventory of unregulated spaces and potential to establish a parking benefit district). The Port should undertake periodic surveys to ensure that Port-controlled pricing is consistent with market rates, particularly for short-term spaces.

Muni historic streetcar operations, though popular, are currently overcrowded and unreliable. Maintenance of off-line vehicles and refurbishment of additional historic railcars for return to enhanced F line service should help to alleviate crowding conditions. To address the problem of transit vehicle bunching, signal timing along the Embarcadero roadway should be optimized to allow F line vehicles to meet scheduled travel times and maintain more even spacing between vehicles. MUNI has applied for TPS funds from the Authority to better time traffic signals to benefit transit, and should collect before and after data on travel time and reliability to analyze the bunching problem as part of this project.

Future transit service needs from development will exceed the

City's ability to provide new service. Furthermore, the cost of providing expanded service for the first year of operation alone will exceed the City's total expected receipts from Transit Impact Fee Development revenues. Addressing the issue of how to pay for transit service expansion, which is not limited to the waterfront, will require the City to revisit its approach to developer contributions, identify new public sources of transit operating revenue, and take a serious look at cost containment and efficiencies within Muni.

In order to manage system needs comprehensively, as noted above, parking management should be strengthened in the greater Northeast Waterfront area, through measures that may include pricing strategies or establishment of a parking assessment district.

Since transit capacity along the Embarcadero is already an issue and is expected to become more so, the City needs to consider alternative solutions to meet demand, particularly if more capacity is needed in the short-term. The San Francisco waterfront area has enough attractions, spread over a large enough area, that a circulator bus route might be a viable addition to the travel choices for visitors.

A transit circulator service could be implemented quickly to meet near-term transit demands, funded from business/developer contributions and/or from proceeds from a parking assessment district in the Northeast Waterfront. The Port and area businesses should be convened to discuss potential service and funding approaches for such as bus circulator, if near term transit demands (including those resulting from proposed developments) cannot be met by Muni's current service implementation timetable and budget.

IV. ENDNOTES



- i. Fisherman's Wharf Planning Committee Recommendations - San Francisco Bay Conservation and Development Commission (BCDC) and San Francisco Port Commission, July 2004
- ii. Revised Draft: Piers 27-31 Transportation Study, Korve Engineering, May 2004
- iii. Embarcadero Parking and Transportation Analysis - Port of SF, SF Planning Dept, Nelson\Nygaard Consulting Associates, Wilbur Smith Associates - Draft May 11, 2005
- iv. The study did not collect parking turnover data to establish current utilization rates.
- v. The report projects a net reduction in parking supply of about 400 spaces (approximately 4 percent of the current supply of 12,820. Half of the eliminated spaces are located in the Northeast Waterfront area between Pier 35 and Pier 7.
- vi. Source: Wilbur Smith Associates analysis in Nelson/Nygaard, Embarcadero Parking and Transportation Analysis pg.28, forthcoming.
- vii. Source: Wilbur Smith Associates analysis in Nelson/Nygaard, Embarcadero Parking and Transportation Analysis pg.31, forthcoming.

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MUNI Short Range Transportation Plan

Revised Draft: Piers 27-31 Transportation Study, Korve Engineering for San Francisco Planning Department, May 2004

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The Authority is indebted to a number of staff members for their contributions to making this SAR possible. Billy Charlton (Principal Planner) led the technical analysis and writing. Ajay Martin (Planner), Jeremy Shaw (Intern) and Aleksandr Prodan contributed data analysis, GIS mapping, and research. Billy Charlton (Principal Planner) and Ajay Martin (Planner) provided the SF Model results. Dave Chan provided valuable research support. Maria Lombardo (Chief Deputy Director) provided guidance, and Tilly Chang, Deputy Director for Planning, oversaw the study and guided the preparation of the report.

JOSÉ LUIS MOSCOVICH, EXECUTIVE DIRECTOR

Appendix 1. Land Use Assumptions for NE Waterfront Projects

		Piers 27-31	Exploratorium	55 Francisco	8 Washington	Embarcadero Hotel
TAZ		763	163	136	588	159
Included in pipeline?		Yes	No	No	Yes	No
Square Footage	TIDF per sq ft					
TOTAL		680,025	386,835	-	10,000	237,747
CIE	\$10.00	3,000				
MED	\$10.00					
MIPS	\$10.00	206,000				14,775
PDR	\$8.00					
RET	\$10.00	419,625			10,000	6,696
RESTAURANT	\$10.00	51,400				5,220
VISIT	\$8.00		386,835			211,056
Residential Units				51	120	
Hotel Rooms						267
TIDF Calculation by Development Type		Piers 27-31	Exploratorium	55 Francisco	8 Washington	Embarcadero Hotel
MIPS		\$2,060,000	\$0	\$0	\$0	\$147,750
RET			\$0	\$0	\$100,000	
VISIT			\$3,094,680	\$0	\$0	\$1,688,448
TOTAL	ALL PROJECTS	\$2,060,000	\$3,094,680	\$0	\$100,000	\$1,836,198
	\$7,090,878					