





Memorandum

Date: 12.02.14 **RE:** Plans and Programs Committee
December 9, 2014

To: Plans and Programs Committee: Commissioners Mar (Chair), Kim (Vice Chair), Breed, Campos, Yee and Avalos (Ex Officio)

From: Lee Saage – Deputy Director for Capital Projects 

Through: Tilly Chang – Executive Director 

Subject: **INFORMATION** – T-Third Phase 3 Concept Study

Summary

Earlier this year, the Transportation Authority funded the T-Third Phase 3 Concept Study to assess the feasibility of extending the Central Subway rail service to North Beach and Fisherman's Wharf. The Central Subway Light Rail line, also known as the T-Third Phase 2, will be completed in 2018, providing rail service as far north as Washington Street in Chinatown. At the request of Commissioner Chiu and community members interested in the possibility of preserving corridor rights-of-way for a potential extension project, the San Francisco Municipal Transportation Authority (SFMTA), Transportation Authority, and Planning Department recently conducted the Concept Study to evaluate continuing rail service further north to Fisherman's Wharf. This high-level technical feasibility study evaluated the potential benefits, costs and constructability of alternative alignments in three sample corridors. The study finds that several concepts are technically feasible, and most score in the highest category of the Federal Transit Administration's cost effectiveness measures. All-underground concepts have the greatest benefits and remain cost effective despite higher costs. The study does not recommend a specific alternative or next steps, but is intended to inform several upcoming planning efforts (e.g. SFMTA's Rail Capacity Study and the San Francisco Transportation Plan update) which will consider this project's local and regional priority. **This is an information item.**

BACKGROUND

In 2018, the T-Third Phase 2 (Central Subway) will be complete and light rail transit (LRT) service between the Caltrain Station at 4th and King Streets and Chinatown will begin. The new service will serve approximately half of the North Beach corridor identified in the 1994 Four Corridor Plan that established priorities for Muni rail expansion. In response to a request by Commissioner Chiu and community members interested in the possibility of preserving corridor rights-of-way for a potential future extension project, the Transportation Authority funded the T-Third Phase 3 Concept Study to assess the feasibility of continuing Central Subway rail service to North Beach and Fisherman's Wharf.

The T-Third Phase 3 Concept Study is a joint effort between the Transportation Authority, the San Francisco Municipal Transportation Agency (SFMTA), and the San Francisco Planning Department (Planning Department), with SFMTA serving as the lead agency. In March of this year, the Transportation Authority approved a scope of work for the study and allocated \$173,212 in Prop K funds to support the effort. The scope called for a report that included the following elements and sections:

- Alignment
- Grade Options
- Construction Methods
- Transit & Traffic Analysis
- Costs & Funding
- Land Use & Economic Development

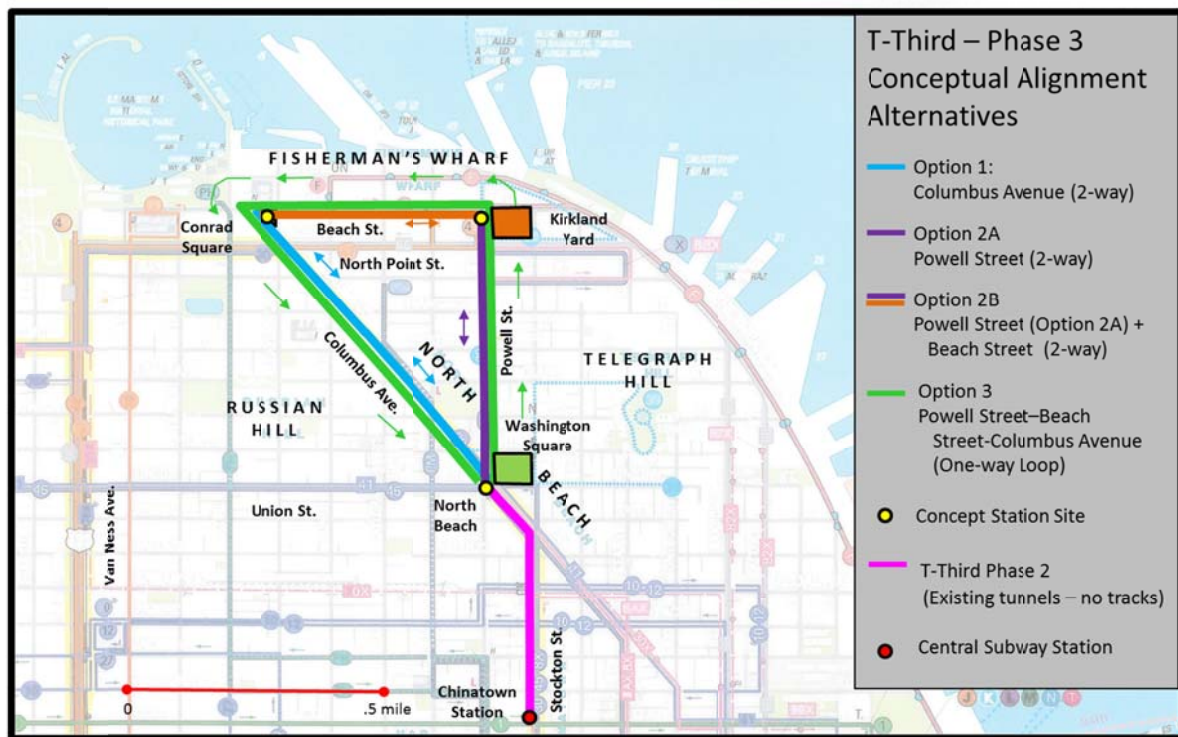
DISCUSSION

The purpose of this memorandum is to provide an overview of the T-Third Phase 3 Study, which is being presented as an information item to the SFMTA Board, the Planning Commission and the Transportation Authority's Plans and Programs Committee in December. The goal of the study is to assess the general feasibility of a potential extension of the T-Third light rail project to Fisherman's Wharf, including examining potential alignments and the potential benefits, costs, and constructability of such an investment. The study looked at 3 sample corridors, 3 station locations, and a variety of configurations for a total of 14 concept alignments. The study offers a high-level evaluation, largely based on existing data. The study does not recommend a specific alternative or next steps but is rather intended to inform policy-maker consideration in light of several upcoming planning efforts (e.g. SFMTA's Rail Capacity Study and the San Francisco Transportation Plan update) to determine its local and regional priority.

Alignment and Grade Options: Four general alignments were suggested by earlier Phase 2 studies and a 2013 charrette, including two-way service along Columbus Avenue (Option 1), two-way service along Powell Street (Option 2A), two-way service along Powell Street and Beach Street (Option 2B), and a one-way loop along Powell Street, Beach Street, and Columbus Avenue.

All alignments included a North Beach station near the current terminus of the Central Subway tunnel at Columbus Avenue and Union Street. Depending on the alignment, Fisherman's Wharf station options were considered near the SFMTA's Kirkland Yard at Powell Street and Beach Street; at Conrad Square near Columbus Avenue and Beach Street; or at both locations. (See figure.)

Figure: T-Third Phase 3 Study Conceptual Alignments



For each horizontal alignment, variations of station location and of vertical alignment were considered, resulting in 14 concept alignments for study. Both surface and subway vertical alignments were analyzed, and initial analysis on tunnel issues (ground types, utilities, etc.) was performed.

Construction Methods: Use of a tunnel boring machine (TBM) appears feasible and economical, with tunnel depths of approximately 50' to 60' below ground. A launching pit and turn-back or retrieval pit would be required for this method. Some areas, including the stations and the connection to the existing Central Subway tunnels, would require additional excavation. This work could be performed using either sequential excavation method (SEM) or cut-and-cover construction. Cost considerations and availability of staging areas will factor into choosing a construction method at each site. SEM is considered less disruptive to the surface environment, but is more expensive and requires a nearby staging area. The current TBM retrieval site (Pagoda Palace) would be feasible to use as staging for the tunnel connection. Other sites are also possible. Cut-and-cover is cheaper but must be staged directly on the alignment; for stations under streets (as North Beach is likely to be, due to the tunnel connection), cut-and-cover construction would be significantly disruptive.

An extension beyond the planned terminal station at Chinatown would require a new environmental review effort along with other significant project development and funding activities; thus, no investment decision is imminent. Regarding the Pagoda Palace site, the SFMTA lease to use the property for TBM retrieval expires on May 10, 2015. The owner has obtained entitlement from the San Francisco Planning Commission to build a 19-unit residential structure on the site thereafter.

Traffic and Transit Analysis: Estimated one-way travel times from the Chinatown station to either a station at Conrad Square or a station at Kirkland Yard ranged from 3-3.5 minutes by subway to 4.5-5 minutes by surface LRT. For transit service from Caltrain to the Wharf, this represents a 50%-60% travel time improvement over present day conditions. A representative transportation model run, using the Columbus Avenue subway concept alignment, estimated ridership of 41,000 trips per day and significant relief of overcrowding on other Muni lines in that area.

The planned 2-car trains and platforms of the Central Subway would be adequate to carry projected ridership peaks, but only if the planned service levels of 2.5 minutes are maintained. Some extension configurations could help maintain the frequent headways by adding loops or additional crossover tracks to facilitate turn-around performance. An additional 6 to 14 Light Rail Vehicles (LRVs, 3 to 7 train sets) would be needed to maintain project service levels.

Costs and Funding: Preliminary cost estimates of the concept alignments ranged from a low of \$400 million (subway and surface to Kirkland), to a high of \$1.400 billion (subway connecting all three locations) in 2014 dollars, not taking into account escalation. Ten alignments were under \$1.0 billion and two were over \$1.0 billion (two were found to be infeasible in a constructability assessment). The choice of tunnel or surface configurations, alignment length, number of stations, and construction method at North Beach were significant drivers of cost differences between concept alignments.

Using current Federal Transit Administration New Starts guidelines, an extension is likely to receive a "high" cost-effectiveness rating for the range of costs estimated in the study and would be competitive to obtain funds from this highly competitive nationwide program. With respect to eligibility, local match for federal funds could come from a variety of sources, including a local transportation sales tax (Prop K extension or a new measure), cap and trade funds, or bridge tolls. The potential for land use value capture was also evaluated (see below). While eligibility may not be a significant challenge, the ability for a project of this magnitude cost to secure funds is given the fact that transportation needs far exceed the capacity of foreseeable revenue sources.

Land Use and Economic Development: Initial land use and economic development analysis showed a potential for value capture funding that could support bonding for 10%-30% of the capital cost via use of a community finance district or infrastructure finance district. These mechanisms require substantial community support to pass. Zoning changes such as height limit

increases would have a modest effect on the bonding capacity.

Summary Evaluation: The representative alignments studied show that an extension is feasible and carries ridership benefits. To aid discussion of potential alignment options and trade-offs for different choices, staff evaluated the concept alignments within seven un-weighted areas of consideration. (See table below.)

- Passenger Experience
- Operational Efficiency
- Transit System Performance
- Local Operations Considerations
- Infrastructure Resiliency
- Construction Disturbance
- Capital Construction Cost & Risk

Table: Evaluation Matrix

Evaluation Matrix														
	1-1	1-2	2A-1	2A-2	2A-3	2A-4	2A-5	2A-6	2B-1	2B-2	2B-3	2B-4	3-1	3-2
Evaluation Elements	Evaluation of Concept Alternatives													
	Columbus Ave. Subway-Surface	Columbus Ave. Subway	Powell St. Subway-Surface	Powell St. subway	Powell St. Subway-Surface w/ surface short loop	Powell St. Subway w/ surface short loop	Powell St. Subway-Surface w/surface F-Line loop	Powell St. Subway w/ surface F-Line loop	Powell St. + Beach St. Subway-Surface	Powell St. + Beach St. Subway	Powell St. + Beach St. Surface-Subway	Powell St. + Beach St. Subway-Surface	One-Way Loop (Powell-Beach-Columbus) Subway-Surface	One-Way Loop (Powell-Beach-Columbus) Subway
Passenger Experience	0	+	0	+	-	-	-	-	-	+	NF	NF	0	+
Operational Efficiency	-	+	-	+	-	0	-	-	-	+	NF	NF	+	+
System Performance	0	+	0	+	0	+	-	-	0	+	NF	NF	+	+
Local Operations Considerations	-	+	-	+	-	0	-	-	-	+	NF	NF	-	+
Infrastructure Resiliency	+	+	0	+	0	-	0	-	0	+	NF	NF	0	0
Construction Disturbance	-	0	-	0	-	-	-	-	-	-	NF	NF	-	-
Capital Construction Cost and Risk	+	0	+	0	+	0	+	0	+	-	NF	NF	+	0
Total	-1	5	-2	5	-3	-2	-4	-6	-3	3	NF	NF	1	3
Capital Cost (\$ millions in 2014 Dollars)	407-482	848-933	367-442	837-912	406-480	875-950	454-529	924-999	443-518	1,333-1,408	NF	NF	496-571	1,087-1,139
Constructability Rating	4	5	3/4	4	3/4	2	3/4	2	3/4	4	1	2	3	3/4

The study does not recommend a particular alignment, nor is it intended to limit alignments to the samples here. That said, the best scoring concepts were all-underground alignments, which supply greater passenger, operations, system, and resiliency benefits, but which cost approximately twice as much as surface alignments.

Next Steps: The study findings will inform several upcoming planning efforts, including SFMTA's Rail Capacity Strategy, the regional San Francisco Bay Area Core Capacity Transit Study (lead by the Metropolitan Transportation Commission in partnership with BART, SFMTA, AC Transit and the Transportation Authority), and the San Francisco Transportation Plan update, which will consider the project's local and regional priority.

This is an information item.

ALTERNATIVES

None. This is an information item.

CAC POSITION

The CAC was briefed on this item at its December 3 meeting.

FINANCIAL IMPACTS

None. This is an information item.

RECOMMENDATION

None. This is an information item.

Enclosure:

1. T-Third Concept Study presentation