

CENTRAL SUBWAY

TOO MUCH MONEY FOR TOO LITTLE BENEFIT



CIVIL GRAND JURY
CITY AND COUNTY OF SAN FRANCISCO
2010-2011

THE CIVIL GRAND JURY

The Civil Grand Jury is a government oversight panel of volunteers who serve for one year. It makes findings and recommendations resulting from its investigations.

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Each published report includes a list of those public entities that are required to respond to the Presiding Judge of the Superior Court within 60 to 90 days as specified. A copy must be sent to the Board of Supervisors. All responses are made available to the public.

For each finding the response must:

- 1) agree with the finding, or
- 2) disagree with it, wholly or partially, and explain why.

As to each recommendation the responding party must report that:

- 1) the recommendation has been implemented, with a summary explanation; or
- 2) the recommendation has not been implemented but will be within a set timeframe as provided: or
- 3) the recommendation requires further analysis. The officer or agency head must define what additional study is needed. The Grand Jury expects a progress report within six months; or
- 4) the recommendation will not be implemented because it is not warranted or reasonable, with an explanation.

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SUMMARY

The Central Subway project is ambitious, complex, breathtakingly expensive and very controversial. In its decision to investigate the project, the San Francisco Civil Grand Jury based its analysis on two premises:

- The project will proceed.
- San Francisco Municipal Transportation Agency's (SFMTA) past and present performance is the proper tool to measure the Agency's competence to build and run the Central Subway.

Seven months later, the Civil Grand Jury has concluded the Central Subway project should be redesigned.

- The Jury believes SFMTA is currently unable to adequately maintain its fleet in good working order. Adding a new capital project while struggling to meet current needs could overwhelm the agency's ability to deliver service.
- The Jury believes the SFMTA could design a better system to more fully address transit needs along the Chinatown/Financial District corridor.

In conversations with the Jury, SFMTA officials have declared the Central Subway "the highest priority transit project for San Francisco."

The Civil Grand Jury does not agree.

As the Jury began its process of investigating the Central Subway project, it became clear that a project of this scope and magnitude would affect the entire SFMTA system. The Jury found it crucial to investigate not only the Central Subway project, but also aspects of the current and future state of SFMTA in light of the project.

The investigation proved timely. The SFMTA is in the final stages to obtain full funding to build a subway of 1.7 miles. The current cost of this project is \$1.578 billion, or \$176,000 per foot of construction. It is the most expensive public transit project currently considered for federal funding under the New Starts Program.

An investigation of several months has answered many of the Jury's concerns. It also led to many unanswered and new questions.

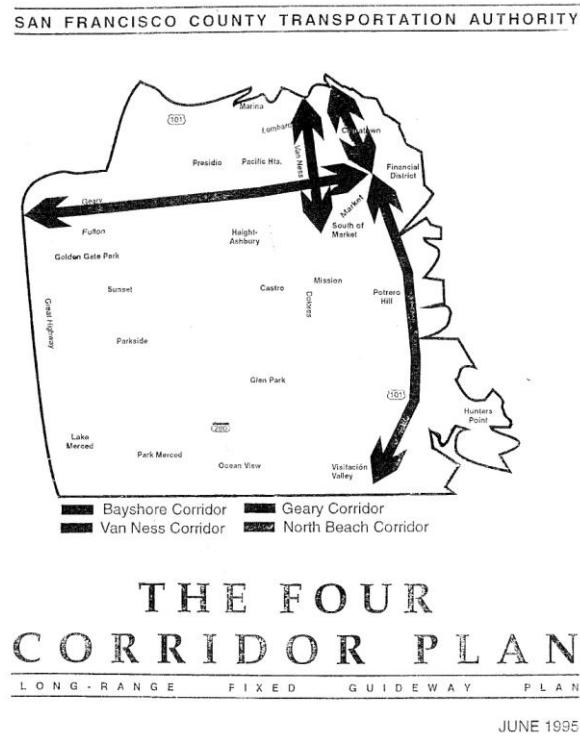
BACKGROUND

San Francisco's topography is both a gift and a challenge. Its steep hills create fabulous views and a magnificent landscape. They also divide the small, dense city into distinct neighborhoods or mini-villages. It is rare to find a city with such diverse topography in a small peninsula of 49 square miles.

Keeping these neighborhoods connected and giving its inhabitants a sense of the whole is a challenge. The San Francisco Municipal Transportation Agency (SFMTA) aims to meet that challenge. For its latest construction project the SFMTA chose as its motto, "Connecting People. Connecting Communities."

The challenge to connect is not new. When the City was rebuilt after the 1906 earthquake and fire, plans were made to address this goal. The Municipal Railway was established in 1912, and two years later City Engineer Michael O'Shaughnessy envisioned a Four Corridors Plan.¹ From 1914 to 1927 he built an intricate transportation system linking Potrero Hill in the south northward to the Marina, and from Downtown to what was then known as the Outlands.

Nearly a hundred years later, the names have changed, but those basic corridors remain the City's main thoroughfares: Bayshore, Geary, North Beach and Van Ness.²

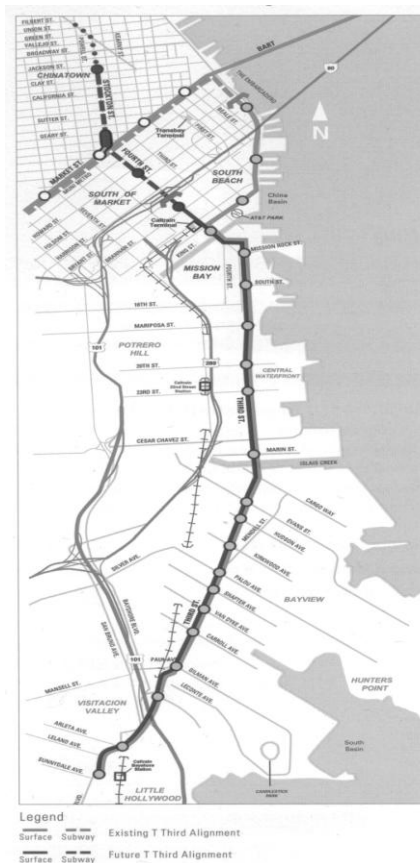


Many have tried to solve the transportation needs of the growing city. Boulevards have replaced aging neighborhoods; freeways have been built and destroyed.

In 1989, transportation officials looked once more at the four routes and sought public support for improvement. Proposition B was passed by the voters. An estimated \$200 million would be generated by a ½ cent sales tax over 20 years. At that point Proposition B would expire.

This money was to be used exclusively for major improvements along the Four Corridors. However, it proved to be insufficient for even one project on five miles of the Bayshore Corridor. This first project, the T-Third railway, cost \$648 million, far beyond the \$200 million estimate for rebuilding all Four Corridors. Issues raised by these cost increases are discussed in detail below.

Because of its escalating cost, the T-Third was declared Phase One of a two part Bayshore/North Beach corridor project. The second part has since become known as the Central Subway. Once again, San Francisco voters were asked for financial support. To cover escalating costs, they approved Proposition K which extended the Proposition B sales tax from 2009 until 2033.³



As seen here, the T-Third's first phase was completed in 2007. It was 18 months late in completion and seriously over budget. It now connects Visitacion Valley to the Embarcadero.

The next phase of the Bayshore/North Beach transit project, now known as the Central Subway, was planned to complete the T-Third's northern extension.

The subway's original opening date was to be this year, 2011. Its earliest completion date is now projected to be 2019.

Project Scope

The Central Subway is not only the agency's single largest capital project. At \$1.578 billion, it is also the most expensive 1.7 miles of construction in the City's history. To put this into a familiar perspective, compare its length to that of the Golden Gate Bridge. Both are 1.7 miles long. If the bridge needed to be replaced, figures from 2003 estimated it would cost \$1.2 billion.⁵

The Central Subway project has a pattern of sharply rising estimates: from \$648 million in November 2003, to \$763 million in 2004, to \$994 million in 2006, and now to \$1.578 billion.

The Central Subway's construction scope is as grand as its financing. When completed the T-Third line and its subway extension will be a "stand-alone" line, meaning it will operate "separate from the guideway, signal system, and schedules of the existing Muni Metro service under Market Street."⁶ The SFMTA declares this "equivalent to starting up a new light rail system."

The Central Subway will start at an above ground station at Fourth & Brannan and then travel underground with stops at Moscone Center, Union Square and Chinatown. To make this connection, the current T-Third route will no longer turn right at Fourth and King to travel down Embarcadero to Market Street. Thus, direct connectivity to the Muni Metro is eliminated from the T-Third route.⁷

Project Funding

Funds to build the Central Subway are slated to come from three sources:

The Federal Government:	61%	\$966 million
The State of California	31%	\$488 million
San Francisco (Proposition K)	8%	\$124 million
	TOTAL	<hr/> \$1.578 billion ⁸

It appears that for San Francisco to successfully fund this project, sacrifices must be made. "Due to budget constraints, SFMTA has deferred certain capital projects that include expenditures to maintain its transit assets in a SOGR (State of Good Repair.)"⁹ Translated, that means maintenance funding, which the Jury investigated in detail as described below. In addition to maintenance, other projects such as a new communications system were deferred.

MUNI MANAGEMENT AND FUNDING ASSESSMENT

Financial and operational stability is critical to any business, community or agency about to develop a major capital project. One way to determine how well a transit agency is funded and managed is to examine its performance levels.

To this end, the Jury reviewed publicly available data on the SFMTA's website.¹⁰ The website has data for numerous measurement metrics. To contain the scope of this report, the Jury focused on "schedule adherence," "headway adherence," and "scheduled service hours delivered."

Performance Levels

"Schedule Adherence" measures Muni's adherence to its published schedule of delivering transit services. This is the percentage of time that Muni vehicles appear at stops on time. In 1999, San Francisco voters approved Proposition E which included the requirement that Muni would have at least an 85% on-time record by July 1, 2004.

The Jury's review of available data showed that Muni has never met this requirement.

For example:

- in fiscal year 2007-2008, Muni averaged 70.5% on-time performance;
- in fiscal year 2008-2009, that number increased to 73%; and,
- in fiscal year 2009-2010, that number remained at 73%.

For the first two quarters of fiscal year 2010-2011, that number decreased to 72%.

"Headway Adherence" measures Muni's adherence to its published schedule of elapsed time between vehicle arrivals at a given stop on any particular line. This is measured as the percentage of time that Muni vehicles are properly spaced to arrive at any given stop at regularly timed intervals. Muni's internal goal for this metric is at least 85% headway adherence.

The Jury's review of available data showed that, for the last three years, Muni has not met this goal either:

- in fiscal year 2007-2008, Muni averaged 63% headway adherence;
- in fiscal year 2008-2009, that number decreased to 60%; and,
- in fiscal year 2009-2010, that number increased slightly to 61%.

For the first two quarters of fiscal year 2010-2011, that number increased to 64%.

“Scheduled Service Hours Delivered” measures the percentage of Muni’s actual delivery of service hours as compared to what is publicly scheduled. Its goal is to deliver at least 98.5% of its scheduled service hours. As with the other measures, Muni has failed to meet its own goals for at least the last three fiscal years:

- in fiscal year 2007-2008, Muni delivered an average of 96% of the scheduled service hours;
- in fiscal year 2008-2009, that number increased to 97%; and,
- in fiscal year 2009-2010, that number did not change.

For the first two quarters of fiscal year 2010-2011, that number has not changed. Though Muni is closer to meeting its goal of scheduled service hours delivered than the previous two metrics, it is still failing to meet its goals. Muni is not providing adequate service to its customers.

Muni’s Current Fiscal Condition

Muni is funded from many sources: Federal grants, state grants, local grants via Proposition K, San Francisco general funds, the SFMTA revenue stream (i.e. parking fines), and fare box collections. Fare box collections account for only 23% of Muni’s revenue.

An SFMTA official informed the Jury that “Muni currently has an annual structural operating deficit of approximately \$150 million.” This number has remained essentially unchanged for each of the last five years.

That official explained that, in addition to its current funding levels, Muni needs this amount of money to meet its reliability and on-time performance requirements as set out in the city charter. Due to the recent economic downturn, the SFMTA has lost almost \$180 million of funding from the state of California and almost \$50 million from local funding over the last three years.

Over the next five years, Muni has planned for \$4.5 billion in capital needs. Currently, SFMTA has only been able to identify sources for \$2 billion, less than half of what it says it will need. The source for the remaining \$2.5 billion that SFMTA needs to fund future capital needs has yet to be identified.

A panel of financial experts informed the agency’s Board of Directors on 2/15/11 that unless the SFMTA can slash \$30 million in spending and generate \$50 million in new revenue annually, it faces a \$1.6 billion deficit over the next 20 years.¹¹

2010 Service Cuts

In May 2010, Muni transit service was cut by an unprecedented 10%. These cuts were due to a loss of state and local funding to the agency. While 61% of those cuts were restored in September 2010, the remaining 39% of those cuts have yet to be restored.

The Jury was informed that plans to restore the remaining cuts are currently “only in the conceptual phase.” An unpublicized, early plan targets “addressing [though not necessarily fully restoring] the remaining cuts in fiscal year 2013-14 and 2015-16.”

Recent events suggest that more service cuts could happen in fiscal year 2012. In March 2011, the Mayor’s office asked city departments to figure out how to cut 10% from their budgets and another 10% in contingency reductions. At the time of writing this report, there has been no news about how SFMTA plans to meet this goal.

However, in speaking with SFMTA, it was one official’s opinion that the last time SFMTA cut Muni’s budgets the process was not done “surgically.” This employee metaphorically conveyed the impression that the cuts were not done in a way that minimized the overall impact on the entire system.

Maintaining the Existing Fleet

One of the myriad costs of operating a public transit system is maintenance. In order to have vehicles available for transit service, a transit system must maintain the vehicles in a state of good repair throughout their lifetime. Additionally, vehicles need ongoing repair in order to stay in service for a manufacturer’s expected useful life. In speaking with SFMTA officials, the Jury learned how inadequate the budget is to maintain Muni’s existing fleet and how little is dedicated to buying vehicle parts.

The SFMTA recently conducted a “high level capital asset inventory.” This inventory looked at the state of condition for its vehicles and quantified the yearly maintenance needs that would be required to have a vehicle in service for its “useful life.” The maintenance needs were calculated from 2010 through 2029.

The SFMTA calculated it will need \$2.9 billion to satisfy anticipated maintenance needs. Of that amount, the agency is able to identify sources of financing for \$2.5 billion, or 86%. The agency has yet to identify a source for the additional \$400 million.

According to the SFMTA, even this partial financing assumes that:

“adequate funding is identified to purchase new vehicles and rehabilitation of the historic fleet as required during the 20-year period. If this funding is not available, the deferred maintenance figures will increase accordingly. We will continue to work with our funding partners at the federal, state and local levels to close the shortfall.”

Generally speaking, there are two types of scheduled vehicular maintenance: 1) ongoing, preventive maintenance and 2) mid-life overhauls. Muni’s existing fleet is not currently receiving enough maintenance of either type.

Manufacturers set maintenance guidelines for the vehicles they make and sell. These guidelines lay out the expected maintenance for its vehicles if an agency expects those vehicles to remain in use for their expected lifetime. San Francisco’s unique geography, combining extremely steep hills, narrow streets, few dedicated transit lanes, heavy stop-and-go driving, and tight turns puts more wear and tear on transit vehicles than would be expected in the “average” city. Therefore, San Francisco’s transit vehicles tend to require more maintenance, and that maintenance must occur more frequently.

Regarding ongoing, preventive maintenance, the SFMTA official we spoke with stated that when SFMTA allocated money to Muni, not enough importance was placed on budgeting for maintenance. This official stated there are periods when not enough money is budgeted for maintaining vehicle parts. To quote that official, “that part of the budget has been starved.” Rather than having its own budget line item, parts maintenance was to be funded from a central budget area.

Support for this official’s assertion can be found in the City and County of San Francisco’s Proposed Capital Plan for fiscal years 2012-2021. It notes that:

“Unless additional funding can be secured, a number of important capital projects will need to be deferred beyond the next 10 years. While the federal economic stimulus (ARRA) of the past two years has helped, it will most probably be terminated in 2011, once again leaving the SFMTA with a budget gap on a number of projects. Potential deferred projects include . . . [the] Shop Equipment Program. [SFMTA will need to defer] the acquisition and replacement of the equipment needed to support all aspects of SFMTA’s operations and maintenance functions. A significant backlog of equipment needs exists due to the lack of capital grants available for equipment replacement.”

San Francisco has a unique maintenance situation: If a certain part of a vehicle needs to be replaced, and funding is available for a replacement, one will be ordered. However, rather than throwing out the part to be replaced, it is cleaned up and stored for future use elsewhere in the system. That way, if the same type of part breaks down in the future and there is no funding available for a replacement, there is a backup plan.

Though the effort of SFMTA to live by the “reduce, reuse, recycle” motto is commendable, this example illustrates how little funding is available for fleet maintenance.

Another example of the City’s “reduce, reuse, recycle” motto being taken to extremes is the cannibalizing of wrecked light rail vehicles for parts. When a light rail vehicle is involved in a crash, it is sent to a repair yard to be repaired.

However, there is not always enough budget for the parts and/or manpower required to repair the wrecked vehicle. Additionally, there is not always enough budget to buy parts required for preventive/reparative maintenance on other vehicles. Rather than have the wrecked vehicle sit unused, Muni repair crews regularly strip these wrecked vehicles for parts to repair other vehicles.

Stripping wrecked vehicles for parts is an ineffective way to save money. It would be cheaper to repair the wrecked vehicle and buy new parts for other vehicles rather than buy a completely new vehicle to replace the cannibalized one.

One way to illustrate how vehicle maintenance impacts Muni’s reliability is to examine the state of the Light Rail Vehicle fleet. Currently, Muni owns 151 LRVs. Of these vehicles, about eight have been cannibalized as described above. These vehicles cannot be driven. Therefore, they are unavailable for use. That leaves around 143 vehicles that could, theoretically, be put into service.

However, due to maintenance demands, all 143 vehicles are not available for use. In fact, over a six-week period during the first quarter of 2011, Muni was unable to have 119 vehicles available to meet peak demand. Neither was it able to achieve its internal goal of 114 vehicles. It is worth noting that Muni’s internal goal of LRV availability is less than the number needed to meet peak demand.

In addition to ongoing, preventive maintenance, manufacturers also suggest a mid-life overhaul for vehicles to ensure they can be used for their entire expected lifespan. Muni’s light rail

vehicle fleet consists solely of Breda-brand vehicles. The average expected lifespan for these vehicles, assuming appropriate preventive maintenance and a mid-life overhaul, is 25-30 years.

However, a Muni official said the fleet is “limping” to reach that age. As discussed above, San Francisco’s geography, combined with heavy system use, can lower that number. Accordingly, a mid-life overhaul of light rail vehicles should take place no later than 15 years after they are put into service. The current light rail vehicle fleet is, on average, 15 years old. Therefore, it is the appropriate time for a mid-life overhaul.

Mid-life overhauls are not cheap. However, when viewed as an investment to get the most out of an expensive asset already owned, it is a highly valuable and wise use of funds. As a sign that Muni does not have enough funds for sufficient maintenance, the City and County of San Francisco’s Proposed Capital Plan for fiscal years 2012-2021 notes that:

“Unless additional funding can be secured . . . [p]otential deferred projects include . . . Mid-life Rebuilds of the Fleet. Motor coaches, trolley coaches, and light rail vehicles all require mid-life rebuilds in order to attain the required usable life and maintain adequate vehicle availability throughout that period. Funding priorities for federal transit capital dollars in the region do not give priority for mid-life rebuilds, and funding availability is limited.”

On October 14, 2010, SFMTA officials announced that they had secured enough federal funding to perform mid-life overhauls on the 143 operating light rail vehicles.¹² SFMTA plans to overhaul all vehicles over a span of six years. This averages two vehicles per month. Accordingly, when the last vehicles are getting their overhaul, they will be 21 years old, well past their mid-life.

Officials at Muni have also requested a one-time \$4 million funding to cover a mid-life “targeted component rebuild” of the light rail vehicles. This request will focus on four key system components in the light rail vehicles: propulsion, brakes, on-board computers, and doors/steps. Because these parts get more wear and tear during operation, they require more focused attention than they will receive in a generalized mid-life overhaul.

Investing in major mid-life maintenance ensures a capital asset can be used for as long as safely possible. It is a wise use of transit funds.

In analyzing the level of maintenance of Muni vehicles, one of Muni's internal metrics provides great insight: "mean distance between failures."¹³ This metric measures the average number of hours a vehicle is in use before it needs to be taken out of service to be fixed.

For Muni's buses (both electric and diesel) in fiscal years 2008-2009 and 2009-2010, the SFMTA had an internal goal of averaging 2,611 hours of use between failures. Muni exceeded this goal by 8 hours in 2008-2009 and fell short by 142 hours in 2009-2010. These numbers represent an excess of 0.3% and a shortfall of 5.4%, respectively.

SFMTA has raised its goal for fiscal year 2010-2011 to 2,669 hours of use between failures. For the first two quarters of 2010-2011, Muni buses have averaged 2,666 hours of use between failures. This represents a shortfall of 0.1%.

Unfortunately, the numbers for the light rail vehicles paint a much grimmer picture. For Muni's LRVs in fiscal years 2008-2009 and 2009-2010, the SFMTA had an internal goal of averaging 5,000 hours of use between failures. Muni fell short of this goal by a whopping 2,220 hours in 2008-2009. The numbers were even worse for 2009-2010: a shortfall of 2,539 hours. These numbers represent a shortfall of 44% and 51%, respectively.

Perhaps recognizing its inability to even remotely approach its own goal for this metric, the SFMTA substantially lowered its goal for fiscal year 2010-2011 from 5,000 hours to 3,500 hours, a 30% decrease. Yet, it appears Muni will still have substantial trouble getting close to meeting these lowered expectations.

For the first two quarters of this fiscal year, Muni's LRVs had a mean distance between failures of 2,164 hours. This is 1,336 fewer hours, or 38% lower, than its goal. In fact, the average number of hours of use between failures for LRVs has steadily declined over the last three fiscal years from 2,780 to 2,461 to 2,164.

Having examined just some of SFMTA's current problems with funding, operating, and maintaining Muni and its vehicles, the Jury next investigated the last major capital project the SFMTA completed and an upcoming major capital project: the T-Third line and the Central Subway.

OVERSIGHT & IMPLEMENTATION

Through interviews with transit professionals, the Jury learned that the biggest reason a transit project goes over budget is its inability to stay on schedule. Some examples of how a delay can increase the cost of a project include:

- a longer duration of insuring the project,
- a longer duration of renting construction equipment,
- a longer disruption of normal activity caused by maintaining a construction site,
- a “snowball” effect of delays causing other delays.

Additionally, delays affect when a transit agency starts collecting revenue from passengers.

To help predict whether the SFMTA can reasonably be expected to complete the Central Subway according to its own schedule, the Jury looked at the SFMTA’s rollout of its most recent light rail vehicle service expansion, the T-Third line. The T-Third line was given final design approval in 2002. The projected date of revenue service was October 5, 2005. Full revenue service actually started on April 7, 2007. This represents a one and a half year delay on what was slated to be a three-year construction project.

When queried by the Jury about the reasons for the delay in the rollout of T-Third service, the SFMTA cited numerous causes. These causes can roughly be divided into two categories: Internal Factors and External Factors.

Internal Factors

The first factor cited was the extra time required to hire and train operators. Since the SFMTA was clearly planning on having operator-driven trains (as opposed to completely computer-driven), it stands to reason that these would-be operators would need to be trained in operating LRVs.

However, this need was either not noticed by anyone planning the T-Third project or it was noticed and consciously disregarded. The SFMTA did not explain why this oversight happened. It is difficult to understand how something as seemingly obvious as operator hiring and training for a new part of the Muni system could go unnoticed when planning the T-Third project.

The second factor cited was the need to take light rail vehicles out of regular service to provide training on the new T-Third alignment. Muni was unable to train its operators because if all the vehicles needed for training were taken out of service, the remaining day-to-day LRV service would have suffered. It seems this will be a problem again in the rollout of the Central Subway.

The SFMTA gave the Jury a spreadsheet detailing vehicle availability and necessity by fiscal year, through fiscal years 2029-30. Currently, the Central Subway line is slated to open in the beginning of calendar year 2019. According to the vehicle availability spreadsheet, the peak vehicle demand for LRVs in 2018-19 is 147 vehicles. An additional 32 vehicles are slated to be unavailable due to maintenance demand.

This means Muni will need a total of 179 vehicles in its fleet in order to meet expected peak demand. However, the fleet in 2018-19 will consist of only 175 vehicles. Therefore, there will be a vehicle deficit of 4 cars. This means that Muni currently forecasts an inability to meet peak vehicle demand for all LRV lines when the Central Subway opens.

Interestingly, for the fiscal years 2011-25, SFMTA forecasts a light rail vehicle deficit of between two and fifteen cars every year except 2017-18. Beginning in 2025-26, SFMTA forecasts a light rail vehicle surplus.

In predicting the peak vehicle demand, SFMTA shows a regular annual increase of 3-4 vehicles per year. There does not seem to be any allocation between now and 2019 for additional vehicle demand for training.

Related to the second factor is a third: the lack of available LRVs to make pullouts for all scheduled service and insufficient maintenance staff to maintain target goal of pullouts. This Jury understands the term “pullout” to mean a vehicle being put into service on a scheduled run. As discussed above, Muni is currently unable to meet peak demand for LRVs or adequately maintain its fleet of vehicles, including LRVs.

The remaining internal factors are: extended testing of signaling systems at freight rail crossings, turnout switches and lift bridges; unavailability of the Muni Metro East Maintenance Facility and the need to develop a new satellite yard at 6th Street. It appears that these factors were unique to the T-Third project and will not affect the Central Subway project. Additionally, the Muni Metro East Maintenance facility is now built and the SFMTA has informed the Jury that it is fully staffed and operational.

External Factors

To explain the delays in the T-Third rollout, SFMTA cited:

- completion delay of the Fourth Street Bridge;
- Islais Creek bridge construction issues including unforeseen site conditions; and
- schedule changes addressing neighborhood traffic routes.

It appears that these particular factors were unique to the T-Third project and will not affect the Central Subway Project. This does not guarantee, however, that the new project will be free from different but unexpected problems.

The Central Subway project was given final design approval in 2010 with construction projects beginning in 2011. Construction is scheduled to finish in 2018 with full revenue service starting in January 2019.

DIFFERENCES BETWEEN THE T-THIRD AND CENTRAL SUBWAY PROJECTS

Ridership Modeling for a New LRV Line

Anyone who was using Muni regularly around the time of the T-Third rollout should remember the process as being anything but smooth. One of the reasons cited for the bumpy rollout was the internal decision to use outdated ridership models. The original ridership models forecasted a 2005 opening for the line. However, the line did not open until 2007.

Leading up to this delayed rollout, the question was raised whether SFMTA should ask the County Transportation Authority (SFCTA) to perform updated ridership modeling based on the changed circumstances. The SFMTA employee charged with answering this question opted to forego running updated modeling.

This Jury found no information suggesting that there were any internal challenges to this decision. The SFMTA has assured the Jury that the person involved in making this decision is no longer with the agency.

Federal Oversight

In its communications with SFMTA, the Jury found optimism within the agency regarding its ability to manage this project more efficiently than its last major LRV installation, the T-Third line. This confidence appears to be based on the heightened Federal Transit Administration (FTA) oversight for Central Subway construction that was not in place for T-Third construction.

As an example, the SFMTA refers to the FTA's requirement that the agency develop and implement a Project Management Plan. This "establishes a master plan of best practices for controlling costs, schedule and scope." The presence of a separate body helping oversee the Central Subway's construction appears to give some relief to the anxiety many San Franciscans feel about SFMTA's ability to adequately manage this project. However, the actual management and implementation of the program will be left to the control of the SFMTA.

Irrespective of the federal oversight on the Central Subway project, there have been numerous changes in the project's cost, scope, and projected opening date since its inception. For example, in its November 2008 filing with the FTA, the SFMTA proposed the Central Subway Project would have 3 stations and cost \$1,297,950,000. When the SFMTA made the same filing in November 2010, those numbers had increased to 4 stations and a cost of \$1,578,300,000.

Additionally, both the 2008 and 2010 filings describe an “Opening Year Ridership” for 2016. However, the SFMTA’s “Central Subway, Upcoming Contracts” pamphlet, published around the third quarter of 2010, claimed revenue service was projected to start in 2018. The SFMTA’s own “Risk and Contingency Management Plan,” dated April 1, 2011, projects revenue service will begin in the fourth quarter of 2018. As of the writing of this report, projections have been moved out to January 2019.

Track Alignment and Construction Conditions

Another reason the SFMTA thinks it can manage the Central Subway project better than the T-Third project is that there are differences in the track alignment and construction conditions. For example, the T-Third railway was a 5.1 mile alignment. By contrast, the Central Subway is only 1.7 miles long.

The SFMTA reasons that a shorter line will be easier to install. However, the T-Third railway was entirely above ground, whereas the vast majority of the Central Subway is underground. Underground construction raises hydrology and seismology issues that were not present in the T-Third project.

A second construction difference between the two projects is the construction of the stations and stops. Construction of the T-Third line included 18 new stops. The Central Subway will only require construction of 4 stops. Fewer stops should, in theory, mean that part of the project will be simpler.

However, the T-Third stops are merely raised, concrete “pedestrian islands”, whereas three of the Central Subway stops will be underground stations. Clearly, underground stations involve many more complex construction issues than a concrete “pedestrian island.” Hydrology and seismology issues, construction of mezzanines, platforms, staircases, escalators, and elevators all bring additional complications.

The SFMTA states that the subway stations will each be a “confined workspace” and the “management of the vertical structure within these enclosed sites is based on conventional vertical structure construction methodology.”

It is worth noting that the last time SFMTA oversaw the building of a confined, underground station was 1978. It is doubtful that anyone who oversaw the underground work in the 1970s and could provide insight into underground construction in San Francisco is still with the agency. No one at SFMTA has informed the Jury that any agency employee involved in the Central Subway project has practical experience managing this type of construction.

Contract Bidding Process

The third difference SFMTA cites is the process of putting contracts out to bid. When constructing the T-Third line, SFMTA divided the project into a dozen segments. In contrast, the Central Subway project has only six segments: tunneling, utility relocation, three underground stations, one multi-faceted segment covering track work, systems, and the surface station.

Though the Central Subway project has been divided into fewer segments than the T-Third project, the Central Subway project raises complex construction issues that were not present in the T-Third project. This will be a more complex, and therefore, harder to manage, project.

T-Third Cost Overruns – Can We Expect the Same for Central Subway?

At the time of final design, the budget for the T-Third project was approximately \$567 million. This amount included a contingency of \$35.6 million. Put another way, the project was expected to cost \$531.4 million and an extra \$35.6 million was included in the budget in case cost estimates proved inaccurate. This represents less than a 7% contingency. The final cost was \$648 million - \$81 million more than originally budgeted. This \$81 million cost overrun is in addition to the originally planned \$35.6 million contingency. Therefore, had the project been properly budgeted, it would have allotted \$116.6 million to contingency, or about 22%.

In researching this report, the Jury spoke with a high level transit official experienced in managing large projects like the Central Subway. This person said that transit agencies can generally expect an overage of 20% of the originally planned cost on large construction projects. Thus, the 22% cost overrun on the T-Third project is substantially in line with industry expectations.

The Central Subway project is currently estimated to cost \$1,578,300,000. The SFMTA's Risk and Contingency Management Plan for the Central Subway project allocates \$262,809,536 for contingencies. Put another way, the project is expected to cost about \$1,315,490,464 and an extra \$262,809,536 is included in the budget in case cost estimates prove inaccurate. This represents a 20% contingency. If the Central Subway project ends up requiring the same 22% contingency as the T-Third project, that amounts to an extra \$26,598,366.

Having said that, it is worth noting that if the Central Subway project goes over its budget, neither federal nor state funds will be made available for cost increases.

San Francisco will be liable for any cost overruns.

SFMTA cites the following factors as having contributed to the cost increase for the T-Third project:

“Added/changed (post-final design) scope of project, rebidding based on the changed scope, significant increase in material costs due to world market, additional traffic control on Highway 101 during certain construction, various change orders for certain segments of the project, including unforeseen site conditions, various change orders due to delays by ongoing work of other contracts, added insurance payments due to the extended schedule, staff costs for extended schedule and additional start-up and testing effort.”

Through the many communications the Jury had with the SFMTA, the Jury gets the impression that the SFMTA believes that none of these factors which affected the T-Third project will affect the Central Subway project.

However, it seems that any or all of these factors that occurred with the first project can again occur during the second. Once the contractors begin boring tunnels, it is quite possible that an unexpected situation, such as ground water issues or land subsidence, will be encountered. This could lead to a changed scope of the tunneling project requiring rebidding.

As for an increase in material costs due to the world market, there is no accurate way to predict what will happen to the price of construction materials. However, based on project experiences in recent years¹⁴, it is reasonable to expect that the price of the materials will either stay the same or continue to rise over the 7-8 years it takes to complete the Central Subway.

Finally, given that the schedule of the project has been changed multiple times, with the end date being pushed further out, the Jury expects that these changes will increase the cost of the project for the reasons cited by the SFMTA regarding the T-Third’s delays.

Interagency Communication

In speaking with Muni officials about the lessons learned from the T-Third construction project, the issue of interagency coordination was raised. New transit line construction can impact agencies not directly involved in the project. Therefore, the various agencies must coordinate to minimize a project’s collateral impact.

For example, during the T-Third development, aspects of Muni's project required input and information from City parking and traffic engineers who were not employed by Muni. According to Muni officials, a lack of interagency coordination complicated communications between parking and traffic engineers and Muni engineers.

In 1999, San Francisco voters approved the creation of the SFMTA. This agency is responsible for the following aspects of transportation in San Francisco: public transit, bicycle, walking, taxis, parking, and traffic. Muni officials pointed to the SFMTA's creation as a reason why interagency communication would no longer be a problem: traffic engineers, parking engineers, and Muni engineers all now work in the same agency.

The T-Third project was formalized in 1995 and opened in 2007. It stands to reason that during at least some of the T-Third construction, the city's parking and traffic engineers were employed by a different agency than the Muni engineers. Since all involved engineers now work for the same agency, the inefficiencies experienced during the T-Third construction should, theoretically, not be present during the Central Subway's construction. However, the SFMTA did not explain to the Jury what specific steps have been enacted to facilitate better intra-agency communication.

Though the specific interagency communication problems during T-Third construction might be avoided due to the creation of the SFMTA, the Central Subway project can pose new problems.

Central Subway construction will have an impact on the BART system, and interagency communication will be crucial. The tunnel under Fourth Street will turn right at Stockton Street to continue traveling north. Along this path, the Central Subway will pass underneath the BART tunnel at the Powell Street station.

According to a BART official, construction of this segment of the Central Subway tunnel could have adverse impacts on the BART Powell Street tunnel. For example, water displacement and soil removal occurring during the Central Subway construction "could affect the integrity of BART's tunnel."

This same official also explained that the transfer between the Central Subway's Union Square/Market Street station and the Metro's Powell Street station will yield increased pedestrian traffic through the Powell station. This increased traffic can affect BART customers' use of that station.

In April 2011, SFMTA and BART signed a “Cooperative Agreement between the City and County of San Francisco and the San Francisco Bay Area Rapid Transit District.” Based on its contents, it appears that the two agencies are aware that communication is critical during this project.

Accuracy of Communications

As the Central Subway project has moved forward, the SFMTA has been regularly publishing written material about the project’s progress. This material can be found online, at the SFMTA’s office, and the SFCTA’s office. In reviewing some of these materials, the Jury has discovered numerous factual inconsistencies and inaccuracies.

In drawings on an official SFMTA publication regarding the Central Subway, there are two renderings of the Union Square/Market Street “Redesign Passed by the Recreation & Park Commission.” (Appendix A) One is a “bird’s eye” view of the entrance on Geary and Stockton streets. The other is a “[b]elow ground cut-away rendering of the station levels.” In comparing these two renderings, it is quite easy to notice that they do not match each other. For example, an elevator shaft in the cut-away does not appear in the “bird’s eye” view.

Additionally, the drawing that SFMTA has published for the Chinatown station depicts three pairs of escalators, or a total of six, for descending from street level to the subway platform.¹⁵ (See page 26) However, as discussed in “The Mechanical Conveyances” below, the SFMTA has informed the Jury that the Chinatown station will only have four escalators.

More important than ensuring that artists’ renderings remain constant in SFMTA’s communications (or that any changes are noted and explained) is whether the architects, engineers, and contractors have access to a single, official set of plans. It is unknown whether the disunity affecting renderings and public communications also affects the communication among architects, engineers, contractors, and the SFMTA.

While it is possible that these are merely artists’ renderings with little/no bearing on the architectural layout of the station, it is curious that the SFMTA employee who is charged with overseeing such renderings wouldn’t ensure consistency of the station’s portrayal. Also, if these artists’ renderings are not meant to convey accuracy, it begs the question of why they have the renderings in the first place.

There are also mislabelings of traffic and neighborhood features impacted by the project. On a “CTA Fact Sheet” about the Central Subway project, published in January 2011, Interstate 80 is incorrectly identified as Highway 101. (Appendix B) In a pamphlet from the SFMTA entitled “Upcoming Contracts”, published around the third quarter of 2010, the Financial District is

incorrectly labeled as Chinatown. (Appendix C) These mistakes are being made by city employees who work in transportation agencies and are expected to have more than a passing familiarity with the city's traffic and neighborhood configurations.

After analyzing SFMTA's ability to oversee and implement the construction of a new LRV line, the Jury investigated aspects of the Central Subway's design.

THE CENTRAL SUBWAY PLAN

“CONNECTING PEOPLE. CONNECTING COMMUNITIES.”

The case for completing the T-Third/North Corridor is simple and noble: to serve the public and strengthen connections between neighborhoods. Its completion would fulfill O’Shaughnessy’s early vision.

The City has used several means of transportation, and certainly subways have proven useful. If done in the right way, with efficiency and economy, a subway is often the best solution. San Francisco has been served well by the tunnel connecting West Portal and downtown San Francisco, by the tunnel connecting Duboce Park with Cole Valley. Such projects cover large distances, cut travel time and avoid hilly topography.

A successful route from the T-Third line to the Financial District, Chinatown and North Beach is of prime importance. A direct route would serve all communities and create quick connections to other major transit lines. Unfortunately, the Central Subway as currently designed does neither.

The Route

Currently the T-Third line turns right on 4th and King Streets and runs down the Embarcadero to Market Street. Here, at the Ferry Building, it brings passengers to the Muni Metro, BART and the Ferry system. It also becomes the “K-Ingleside” and travels across town to the Balboa Park station. This is a line which truly connects communities.

If connectivity is in fact the overarching goal of the project, then its design is flawed. In 2019, the T-Third/Central Subway will become an independent train system with no direct connection to the rest of Muni Metro, BART and the ferry system. Instead, the surface train travels below ground at 4th and Brannan, stops at Moscone Center, then stops at what is called the Union Square/Market Street station, and terminates at Stockton and Washington Streets. Reconfiguration of the current T-Third route to mesh with the subway extension does little to offer passengers a seamless transportation experience.

By naming this station “Union Square/Market Street,” SFMTA clearly hopes to convince the public that it is a direct connection to Muni Metro below Market Street. As described in detail below, passengers will be faced instead with an underground trek of over a thousand feet from the Union Square station to the Muni Metro.

Missed Connections

One other vital transit point would be a connection between the Central Subway line and a future Geary light rail corridor. The Jury has received conflicting information about whether the current configuration of the Central Subway's Union Square/Market Street station will allow for future connectivity between the two lines.

A BART official, with expansive knowledge of Bay Area public transit, explained to the Jury why the underground positioning of the proposed Union Square station and the existing Powell Street station make it impossible for a future Geary light rail corridor to connect with the Central Subway there. This lack of possible connectivity is noted by this official as one reason why the Central Subway has lost his support. However, in written communications with the Jury, the SFMTA declared that future light rail connectivity is, in fact, possible.

The stated purpose for the Central Subway's placement is that it will serve Chinatown's residents and shoppers. No one could argue that this extremely densely populated area is now well-served. In fact, SFMTA admits that the Stockton corridor is already operating at capacity.¹⁶ The 30-Stockton is infamous for its crowded and cumbersome route, leaving both resident and visitors to Chinatown frustrated and ill-served.

However, to say that the Central Subway will alleviate this problem is disingenuous.

The subway station is on Washington Street, blocks south of the commercial hub. Even more disturbing, the SFMTA has no current plans to alleviate the neighborhood's public transit problems before the project's completion currently slated for 2019. Chinatown residents and visitors face at least eight more years of lost connections.

By choosing a route traveling up Stockton, only Chinatown is served. Had the subway been on Kearny, both the Chinatown community and the Financial District could have been served.

The Walk

“There's no question that the transfer between [Central Subway and Muni Metro] is probably just as important as the connection to Chinatown.”

Nationally respected transit engineer.
Civil Grand Jury Interview

This statement to the Jury by a noted transportation engineer highlights one major problem with the Central Subway design. As noted in the introduction, by changing the current T-Third route, direct connectivity to the Muni Metro is eliminated.

Riders not only lose direct connections. They face “The Walk.” According to the SFMTA, “to get from the Union Square/Market Street Station to the Powell Street Muni Metro Station is about a thousand feet.”

“It’s awkward.” (a noted transportation engineer)

“It’s too long.” (an influential city planner)

“It’s a significant distance.” (a former City Supervisor)

Grand Jury interviews

To put this in perspective, imagine running a 100-yard touchdown on Candlestick Park three times in a row. Meanwhile, you are jostling other commuters. Fortunately, unlike those who regularly play at Candlestick Park, the commuters are not determined to tackle you.

The SFMTA believes passengers can make that walk in less than five minutes. Many can. But what about the disabled? The elderly? Those burdened by shopping bags, luggage and briefcases? In such situations, consumers rely on a system’s mechanical conveyances.

The Mechanical Conveyances

Moving sidewalks are useful conveyances for covering long distances, particularly for the elderly and disabled. They were cited by a noted urban planner as an advantageous design feature. In the Jury’s investigation, sources conflict as to whether these features were part of the original plan. If they had been, they were removed years ago. When queried by the Jury, SFMTA explained the lack of moving sidewalks by saying:

“[They] are not typically used for underground connections, where space is more limited than in the familiar application of long, above-ground hallways in airports.”

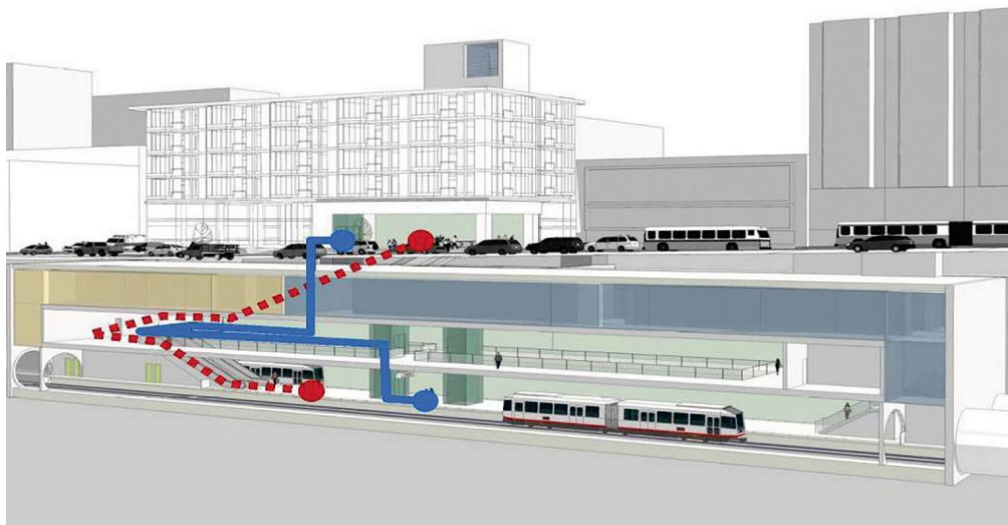
SFMTA stated that moving sidewalks were not included in the plans because the passages are too narrow.¹⁷ It is worth noting that the SFMTA has been in control of drafting passageway designs.

Equipment failures are a nuisance for most riders, but for the disabled a broken escalator or elevator can create an uncertain environment. Physically able passengers compete with less mobile people for elevators when escalators are broken.

The Jury paid particular attention to the plans for elevators and escalators. Because the SFMTA has a long history with escalators, the Jury was able to investigate their service and maintenance. On average, one Muni escalator is broken every two days. Their repairs cost Muni nearly \$5 million a year.¹⁸

In its correspondence with the Jury, the SFMTA noted the following number of escalators and elevators per station:

Moscone - 4 escalators, 4 elevators



MOSCONE STATION

Union Square - 7 escalators (2 “primarily up”), 6 elevators



UNION SQUARE/MARKET STREET STATION

Chinatown - 4 escalators, 4 elevators



CHINATOWN STATION

The plans call for a total of 29 conveyances.

Redundancy of mechanical conveyances is a valuable aspect of transit. For instance, if a descending escalator breaks down, another descending escalator should be available. In most situations, redundancy requires three escalators.

The four escalators at the Moscone and Chinatown stations will be arranged identically: Each station will have two escalators to carry passengers between the street and mezzanine levels, and another two escalators between the mezzanine and subway platform. This design does not provide for redundancy. Should one of the escalators between the street and mezzanine levels breakdown, there will only be one functioning escalator between levels. Therefore, either the ascending or descending passengers will have to use the stairs instead of an escalator.

The Union Square/Market Street station has seven escalators. Five escalators will move passengers between the subway platform and the mezzanine. Three escalators will be at one end of the platform and two will be at the other. Therefore, the design provides for escalator redundancy between these two levels.

However, between the mezzanine and street levels, there are only two escalators. SFMTA noted these escalators will be on “opposite ends, both primarily up.” When asked where these escalators would be located, SFMTA did not respond in a timely manner. Regardless of their location, descending passengers will almost always have to use the stairs. Additionally, if one of the escalators breaks down, the ascending passengers, too, will be relegated to the stairs.

While elevators can be an alternative to escalators, they lack the ability to move large volumes of people quickly.

The Muni system has a record of mechanical failures. The Civic Center station escalators are a particular bane. Can we predict more reliable elevator and escalator service for the Central Subway line?

This is not a small matter. Escalators in the Union Square station descend a total of 80 feet, or 8 stories. The elevators, of course, descend the same distance. Muni is relying on better escalator technology as well as expertise learned from past history. It informed the Jury that:

“Similar to other transportation technology such as autos or airplanes, the procurement of new escalators will call for proven improvements over past systems that should achieve greater reliability for sources of downtime described . . . (micro switches, tension carriages and chains.) In addition, the experience of maintaining escalators open to the elements as designed at the time BART was constructed – the first new rapid transit line in the US in 50 years – is reflected in the Central Subway’s design to place canopies or other architectural covers over all surface escalators.”

Yes, engineers have made technological advances with mechanical equipment. At the same time, this equipment is still mechanical, vulnerable to failures and power outages.

Hybrid vs. Level-Boarding Light Rail Vehicles

Currently, any passenger boarding an outbound train in the Muni Metro steps directly from the platform onto the train. This is level-boarding.



LEVEL-BOARDING
PASSENGERS SIMPLY WALK STRAIGHT ABOARD

However, when the train exits the Metro and begins traveling on the streets, a set of steps inside the door descends. When the doors open at any stop, boarding passengers climb up three steps. Thus, SFMTA's current fleet of light rail vehicles supports a hybrid boarding system.



NON-LEVEL-BOARDING
PASSENGERS MUST STEP UP TO BOARD

Vehicles dedicated solely to level-boarding have fewer moving parts than hybrid vehicles. Therefore, they are cheaper and easier to maintain in a state of good repair. Additionally, level-boarding “offers quicker boarding and alighting for passengers and accommodation of people with disabilities.”¹⁹

Uniformity of design specifications within a single system has an impact on financial, procurement and maintenance issues. Therefore, it seems logical for SFMTA to buy hybrid vehicles for the Central Subway. However, since the route will be stand-alone, for all practical purposes, its vehicles need not be compatible with the rest of the system.

SFMTA is planning to buy four new hybrid boarding light rail vehicles for the Central Subway. However, all stops within the Central Subway and along the remainder of the T-Third route use level-boarding. Therefore, a vehicle dedicated to level-boarding would suffice.

Methods of Fare Collection

There are two main styles of fare collection used by public transit agencies. Proof-of-payment, or POP, is akin to an honor system. A passenger’s fare is collected when buying a ticket before or upon entering a vehicle. The rider then holds the ticket as proof of fare payment. Fare gates, or barriers, require a passenger to put money into a turnstile. That then allows the passenger to pass through, entering the station’s paid area. Fare gates are not used on vehicles; they are only used in stations.

Just as the SFMTA has a hybrid boarding system, it also has a hybrid fare collection system: proof-of-payment and fare gates.

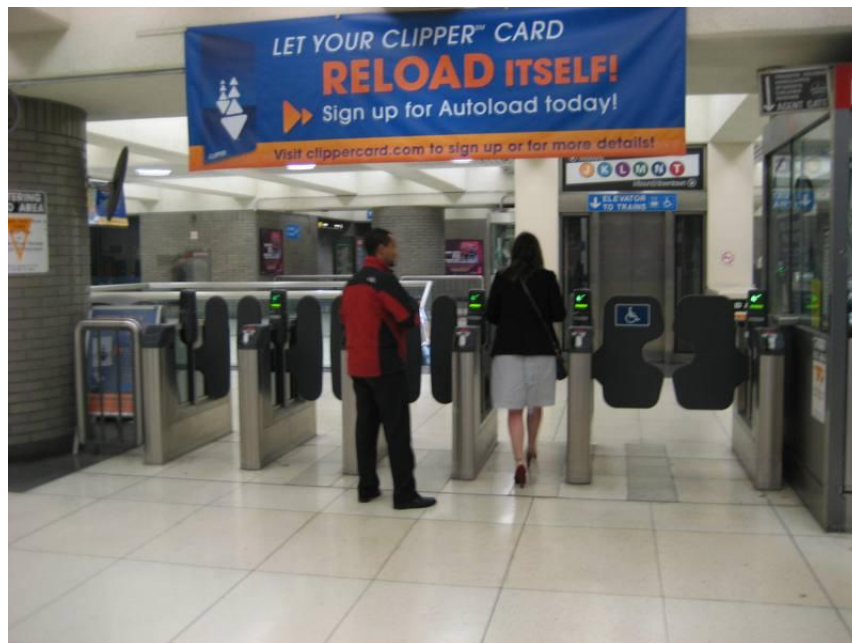
With the introduction of the Clipper smart card, SFMTA provided easier access on surface lines. Passengers can enter any door and swipe the transmitter. The scanned card is the passenger’s proof-of-payment. For passengers with cash, it’s just like the old days: enter at the front of the vehicle, pay the fare, and get a transfer. That transfer then acts as proof-of-payment.

On the other hand, those entering below the surface, such as in Muni Metro, must pass through fare gates. Station fare gates no longer accept cash fares. They only accept payment by Clipper cards. Although these gates are faster today due to improved technology, they still create bottlenecks. Indeed, when exiting a Muni Metro station, passengers need to stop momentarily in front of a barrier gate until the motion sensor allows the gate to open.

Additionally, a Bay Area transit manager explained that a physical barrier can create a “psychological” barrier that makes people reluctant to use public transit. By eliminating barrier gates, a transit agency can avoid the installation and maintenance costs associated with the gates.

One of the consequences of using barrier gates for fare collection is they typically are located on mezzanines. All Muni Metro stations have barrier gates on mezzanines, and this design is planned for all three Central Subway stations. When queried by the Jury as to why the new stations are designed with mezzanines, SFMTA could only identify two possible reasons: the use of fare gates and a vague reference to possible future security measures.

If the Central Subway were designed to use proof-of-payment only, the mezzanines could become unnecessary. As for future security use, the Jury was not given enough information to analyze whether this is a valid justification for mezzanines. If neither of these reasons were enough to justify the use of mezzanines in the Central Subway, they could be taken out of the design. This would save both construction costs and shorten the travel time for passengers arriving and departing the stations.



FARE GATE

If the Clipper card acts as proof-of-payment above ground, why not underground also?

SFMTA cites several reasons: “The new gate-fare system provides better security, reduces evasion, gives stronger visual guidance to guide patrons and provides ridership data that was not previously available.” The Jury analyzed each reason in turn:

- Security

When interviewed by the Jury, an SFMTA manager was able to offer only a vague explanation of how a barrier gate system offers better security than proof of payment. This manager explained that in the future, the gates could be equipped with sensors that could detect such things as explosives. However, there was no indication that this idea has moved beyond even the discussion phase. The Jury does not have enough information to analyze the strength of this explanation.

- Evasion of Payment

The SFMTA claims that a barrier system of fare collection is preferable to a proof-of-payment system because it reduces the rate of fare evasion. In analyzing whether a proof-of-payment system is better to reduce fare evasion than a barrier system, it is helpful to first understand two terms: enforcement rate and evasion rate.

Enforcement rate refers to a passenger’s chance of being stopped by a fare inspector for proof-of-payment. For example, a 40% enforcement rate means that any passenger has a 40% chance of being stopped by a fare inspection officer. Evasion rate refers to the percentage of passengers who can ride on public transit without paying and not get caught. A 10% evasion rate means that 10% of the people who ride transit without paying do so without getting caught.

SFMTA informed the Jury that a combination of “gates and fare inspection has cut the percentage of customers without valid proof-of-payment to 5% or under on light rail, significantly better than on routes without [barrier] gates.” This means that, under the SFMTA’s current system of fare collection, there is a 5% evasion rate. The Jury was unable to find out what the SFMTA’s enforcement rate is.

In talking with a Bay Area regional transit manager, the Jury was told that on a system which solely uses proof-of-payment, a 25% enforcement rate results in a 4% evasion rate. In order to compare the success of SFMTA’s current fare collection system to a strictly proof-of-payment system, the Jury would need to know what its current enforcement rate is.

- Visual Guidance

The SFMTA asserts that a barrier system on the Central Subway is preferable to a POP system because it gives stronger visual guidance for patrons. By placing barrier gates along the desired walking route, the passenger is guided by visual markers. However, it would seem that barrier gates are not the only way to clearly indicate passenger routes. Signage with arrows clearly indicates the direction to the subway platform. Indeed, all underground stations currently have such signage. Additionally, the subway stations in San Francisco do not tend to be labyrinthine, such as the subway stations in New York City. Therefore, the need for strong visual guidance is lessened.

- Collection of Data

The final reason cited by the SFMTA for a barrier system is that it allows the agency to collect ridership data. SFMTA did not elaborate on what kind of data it collects from its barrier gates. Presumably, the agency is able to count the number of passengers entering and exiting the system at any station over any period of time.

It would seem that at least some of this same information would be still available to the agency if it used a POP system. Under a POP system, just like a barrier system, a rider “tags” their Clipper card before, or upon, entering a vehicle. Regardless of whether that “tag” opens a gate or simply acts as proof-of-payment, the agency is still able to collect information about when and where passengers are entering the system. However, a POP system does not gather data about when riders exit the system.

Because the Jury is unable to determine what data SFMTA is interested in gathering from barrier gates, a finding cannot be made as to whether one fare collection system is preferable for data collection over another.

CONCLUSION

Over the course of a seven-month investigation, the Jury discovered many problems with the Central Subway plan.

- It has a pattern of increasing cost estimates.
- San Francisco will be responsible for any cost overruns which could be substantial.
- The addition of a new subway line will add to an existing operating deficit and could stretch the existing maintenance environment to the breaking point.
- There are no plans to address existing problems on the Stockton corridor before project completion.
- There is no effective transfer to the Muni Metro and BART systems.
- It ignores service to the Financial District.
- It ignores current transportation trends.

In 2006, the SFMTA commissioned an independent engineering firm to review the Central Subway design. The resulting report contained the following passage:

“Very broadly, what is the role of capital investment in a transit system? It should represent either an opportunity to reduce operating expenses, or represent the most efficient way to bring better service to additional markets. As proposed, this project does not appear to do that – it promises to combine high capital costs with higher operating costs, and . . . does not, apparently, effectively meet the market needs in the corridor it is intended to serve.”²⁰

The Civil Grand Jury agrees that the present project fails to answer San Francisco’s transportation needs.

The Civil Grand Jury supports the expansion of its transit system to fulfill O’Shaughnessy’s Four Corridor vision.

The Civil Grand Jury concludes that the project must be redesigned.

METHOD OF INVESTIGATION

The Jury began its investigation in October 2010 with research concerning planning issues and both local and national transit history.

In November the Jury continued its research with a series of interviews which lasted until May 2011. These twenty sessions included taped interviews with:

- Present and former members of the City's administration
- A former member of the Board of Supervisors
- Current and former administrators, managers and employees of SFMTA
- Current and former employees of SFCTA
- Neighborhood groups affected by the Central Subway plan including Chinatown
- A BART official
- A member of the California Assembly
- Officers of San Francisco Neighborhood Associations
- Urban planners, engineers, transit professionals and administrators

The Jury also conducted correspondence with the Federal Transit Administration, the SFMTA, the SFCTA, and community organizers.

Finally, Jury members attended various public meetings including the Board of Supervisors and the SFCTA.

ENDNOTES

- ¹ Robert Cherny, "Historical Essay", 1994
- ² SFCTA, "The Four Corridor Plan", June 1995
- ³ SFMTA, Third Street Light Rail Phase 1 + 2 Service Integration, Executive Summary, August 2010
- ⁴ <http://www.sfmta.com/cms/mcsp/cspover.htm>
- ⁵ <http://goldengatebridge.org/research/facts.php#GGBOpened>
- ⁶ SFMTA, Third Street Light Rail Phase 1 +2, August 2010
- ⁷ LTK Engineering Services, "Review of Central Subway Alternatives Project Report," April 27, 2006
- ⁸ SFCTA – Fact Sheet, Jan. 2011
- ⁹ SFMTA, 2011 FFGA Financial Plan
- ¹⁰ A review of Muni's performance, as measured against various metrics, can be found at <http://www.sfmta.com/cms/rstd/sstdindx.htm>.
- ¹¹ SFMTA, 2011 FFGA Financial Plan
- ¹² <http://sf.streetsblog.org/2010/10/14/sfmta-reveals-breda-light-rail-vehicle-refurbished-with-federal-stimulus-funds/>
- ¹³ The actual metric uses the singular "failure." However, this Jury thinks the plural "failures" makes more sense.
- ¹⁴ For example, the rapid increase in the price of steel in the early 2000s caused a commensurate increase in the construction costs of the new Bay Bridge replacement and the new Laguna Honda Hospital. See http://articles.sfgate.com/2004-06-10/business/17429261_1_steel-price-hot-rolled-steel-steel-plate.
- ¹⁵ <http://www.sfmta.com/cms/mcsp/cspover.htm>
- ¹⁶ <http://www.sfexaminer.com/local/subway-travel-times-disputed>
- ¹⁷ <http://www.sfexaminer.com/local/transportation/2011/03/central-subway-design-moscone-center-san-francisco-called-inefficient>
- ¹⁸ <http://www.sfexaminer.com/local/transportation/2010/12/muni-renews-effort-keep-escalators-moving>
- ¹⁹ http://www.ottawa.ca/residents/public_consult/tmp/lrt/discussion_papers/floor_en.html
- ²⁰ LTK Engineering Services, "Review of Central Subway Alternatives Project Report," April 27, 2006

FINDINGS

Finding 1

The Central Subway's financial planning appears seriously flawed. Cost estimates have risen 143% from 2003 to 2011.

Finding 2

Muni has done a very poor job of meeting, or even nearing, the requirements of Proposition E.

Finding 3

Muni is not providing adequate service to its customers.

Finding 4

Muni has had financial troubles in recent years and, absent an unforeseen windfall, will continue to have financial troubles in the foreseeable future.

Finding 5

Given the current and projected state of Muni's funding, difficult times lie ahead. This will impact the agency's ability to deliver the level of performance demanded by the charter.

Finding 6

Raising passenger fares can only have a minimal impact on Muni's financial shortfalls.

Finding 7

New financial stresses are adding to Muni's already-existing financial troubles. These stresses will potentially worsen the state of Muni service.

Finding 8

Maintenance of vehicles impacts the agency's ability to provide day-to-day service. Poorly maintained vehicles have negatively affected Muni's ability to operate as many vehicles as needed to meet peak demand.

Finding 9

As a result of forcing maintenance demands to compete with other system demands, maintenance has regularly been underfunded.

Finding 10

Stripping wrecked vehicles for parts is an inefficient way to save money. It would be cheaper to repair the wrecked vehicle and buy new parts for other vehicles than to buy a completely new vehicle to replace the cannibalized one.

Finding 11

Following the manufacturer's suggested preventive maintenance program is inadequate for maintaining Muni's fleet. This inadequate preventive maintenance negatively impacts Muni's ability to properly serve its riders.

Finding 12

Mid-life overhauls are not enough to properly maintain Muni's fleet. Targeted component rebuilds are essential to their maintenance.

Finding 13

While Muni has come close to or exceeded its goals for hours of bus use between failures, it is nowhere near achieving its goal for LRV hours. These failures, some due to a lack of maintenance, are impacting Muni's ability to deliver adequate service to its customers.

Finding 14

The SFMTA's inability to recognize the obvious need to allot time to train new operators causes this Jury to lose faith in the agency's ability to efficiently manage its own projects.

Finding 15

Using the numbers supplied by SFMTA, it appears that the problem of insufficient LRV fleet size experienced during the T-Third rollout will also plague the Central Subway rollout. This will translate to either a delayed opening or further diminished service on the other LRV lines.

Finding 16

There was an 18-month delay on finishing the 3-year T-Third project. This represents a 50% delay. With a commensurate or fractional delay on the 7-year Central Subway project, it will exceed current cost and contingency projections.

Finding 17

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RECOMMENDATIONS

Recommendation 1

Given that San Francisco is responsible for any cost overrun of the Central Subway project, SFMTA should hire an independent entity to investigate whether the \$1.578 billion budget is a realistic estimate.

Recommendation 2

SFMTA should hire an independent auditor to conduct an analysis of whether its internal goals and the requirements in Proposition E are realistic, why Muni has been unable to meet them, and what should be done to improve Muni's service levels.

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Either the City and SFMTA need to increase Muni's funding, or the City and SFMTA need to lower their expectations for Muni's performance.

Recommendation 4

The SFMTA should hire an outside auditor to evaluate the potential gains in revenue brought by higher fares against the potential loss in total ridership due to such higher prices.

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Recommendation 6

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Recommendation 7

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Recommendation 8

The Board of Supervisors, SFCTA, and SFMTA should determine how to fund adequate preventive maintenance and a targeted component rebuild program on an ongoing basis.

Recommendation 9

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Recommendation 10

The SFMTA should explain when it plans to hire and train new operators to ensure a smooth rollout of the Central Subway.

Recommendation 11

The SFMTA should look at the peak demand for vehicles at the time it proposes to conduct new operator training and ensure that such training will not impact its ability to meet peak LRV demand.

Recommendation 12

The SFMTA should explain what changes to the internal decision-approval processes have been put into practice to prevent the types of problems that affected the T-Third project. It should be noted that merely changing staff does not suffice to fix these problems. If such changes have yet to be made, the SFMTA should hire an external management consultant to advise it on how best to change its processes.

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Recommendation 17

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Recommendation 22

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Recommendation 26

The SFMTA should redesign the Central Subway to better serve the San Francisco population.

GLOSSARY

Since its inception under Michael O’Shaughnessy, the titles given to the elements of the Four Corridors plan have changed. The general directions have remained the same, but the nomenclature has not.

Many examples can be found in this particular corridor studied by the Civil Grand Jury. It is not unusual to find varying titles used in the same year. To give a few examples, we have found: Bayshore Corridor, Bayshore/North, Bayshore/North Beach, Phase One, Phase Two, the T line, the T-Third, etc. The list is long. To present a clear narrative, the Jury decided to use the following terms:

Transit Lines

- Bayshore/North Beach Corridor
- Geary Corridor
- Van Ness Corridor
- T-Third Line
- Central Subway

Agencies

- ARRA American Recovery and Reinvestment Act
- BART Bay Area Rapid Transit
- FTA Federal Transit Administration
- SFCTA San Francisco County Transportation Authority
- SFMTA San Francisco Municipal Transportation Agency

Terms

- Schedule Adherence
 - % of time that Muni vehicles appear at stops on time.
- Headway Adherence
 - % of time that Muni vehicles are properly spaced to arrive at any given stop at regularly timed intervals.
- Scheduled Service Hours Delivered
 - % of Muni’s actual delivery of service hours as compared to what is publicly scheduled.
- Level-Boarding
 - Passengers step directly from the platform onto the vehicle.
- Non-Level-Boarding
 - Passengers use stairs to enter or exit the vehicle.

APPENDIX A

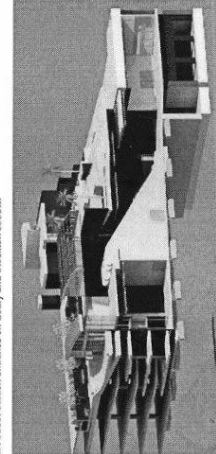
central subway connection

3

UMS Station Redesign Passed by the Recreation & Park Commission



Rendering of the redesign of the Union Square/Market Street Station entrance on Geary and Stockton streets.



Below ground cut-away rendering of the station levels.

On Dec. 2 the Recreation and Parks Commission unanimously voted to approve the conceptual reconfiguration of the Union Square entrance for the Union Square/Market Street Station. This approval allows the project to proceed with the design concept and to finalize the plans for the facility which will likely be the most heavily used station on the Central Subway alignment.

The Central Subway design team identified improvements in the Union Square Station design by reconfiguring the layout of the station including elevator location and ventilation shaft positioning. The result is a reduction of the station footprint which lessens the impact on Union Square. A condition of the Commission's approval is that the SFMTA will compensate the Recreation and Parks Commission for the fair market value of the parking space impacts to the Union Square Garage.

The design team worked with the Union Square Business Improvement District Board Executive Director Linda Mjellmen offered her Board's support and praise for the Board of Directors, the Neighborhood/Parks Council

Property Relocation Program Update

The Central Subway Project is progressing up to 42 months and moving assistance in relocating their personal property. The SFMTA also agreed to work with the Mayor's Office of Housing to develop permanent replacement housing at Broadway and Sansome for the 19 displaced households that are qualified and wish to relocate there. Meetings between the commercial property owners and the SFMTA Board and Board of Supervisors Resolutions of Necessity.

The SFMTA has also prepared a Relocation Impact Study and Last Resort Housing Plan, which addresses the impacts of the fee property acquisition to commercial and residential occupants and ways in which impacts will be addressed and mitigated. The Board of Supervisors approved the plan on December 2010 making way for relocation to begin.

The SFMTA expects that relocation of affected residential tenants will begin in earnest in late January. At that time, meetings will be held to inform tenants of their individual relocation assistance benefits and to provide advisory assistance in relocating them to decent, safe and sanitary dwellings. Tenants are eligible to receive rental assistance for a period of

Other assistance includes the relocation consultant providing referrals to suitable replacement sites based on the needs of the individual businesses, business tenants are eligible to receive relocation benefits and advisory services on an ongoing basis to assist in their relocation to a suitable replacement. The benefits include moving expenses, reestablishment expenses and compensation for any loss of goodwill.

Business tenants will also receive payment for any non-moveable fixtures that will be left in their current location.

The SFMTA expects to complete all tenant relocations in the fourth quarter of 2011 to prepare for construction activity in the third quarter of 2012.

New Social Media Tools Now Online

Are you ready for more social media? We are! In November, the project launched two additional components of our social media program. The Central Subway YouTube channel and Flickr page are now available for your viewing pleasure. Videos and photos have been uploaded and more will be uploaded as the project progresses.

Thanks to the project's online presence, the team has been able to quickly provide information to the public regarding traffic delays, events, meetings, announcements on bids and other project news. We look forward to bringing you more photos and videos of the construction activities along the alignment so stay tuned.

Please visit the YouTube channel at <http://www.youtube.com/MuniCentralSubwaySF> and visit our Flickr page at www.flickr.com/photos/municentralsubway/ to view project photos, ask the project team your questions and see our responses on YouTube.

Upcoming Contracting Opportunities

There are plenty of contracting opportunities for businesses interested in working on this project for the City and County of San Francisco. Be on the lookout as the Central Subway Project will be rolling out construction contract packages in 2011. Invitations for Bid (IFB) will be available in:

- 1st Quarter 2011: Tunnel Contract
- Four additional IFBs will be available in the near future.
- Moacome Station
- Union Square/Market Street Station
- Chinatown Station
- Surface Station and Trackwork/Systems

To stay informed about upcoming bids please visit the project website at www.sfmta.com/central where you can also request to be added to our mailing list.

Community Advisory Group Meeting Schedule

- Next Meeting:
- Thursday, February 17, 2011
 - Location: TBD; 6:00 p.m. - 8:00 p.m.

The Social Media Connection

- Website: www.sfmta.com/central_subway
 Twitter: www.twitter.com/central_subway
 Facebook: www.facebook.com/centralsubway
 YouTube: www.youtube.com/municentralsubway/
 CS blog: www.centrlsubwayblog.com

APPENDIX B

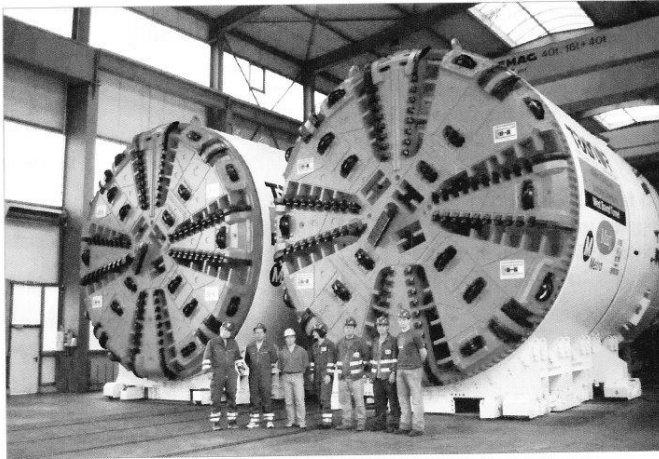


SAN FRANCISCO COUNTY TRANSPORTATION AUTHORITY

Fact Sheet

LAST UPDATED
January 2011

Central Subway Project



The Central Subway is the second phase of the Third Street Light Rail line, which opened in 2007. The Central Subway will extend this line northward from its current terminus at 4th and King Streets to a surface station south of Bryant Street and go underground at a portal under US 101. From there it will continue north to stations at Moscone Center, Union Square—where it will provide passenger connections to the Powell Street Station and BART—and at Chinatown, where the line will terminate. The Central Subway is expected to carry nearly 73,000 passengers a day, making it the second most utilized rail project in the Federal New Starts Program.

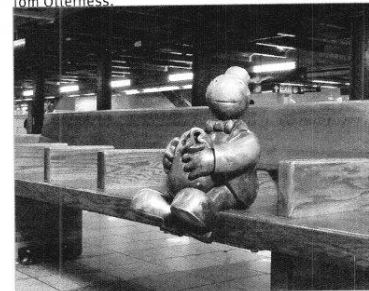
2010 was another successful year for the Central Subway Project. In January 2010 the San Francisco Municipal Transportation Agency (SFMTA) received authorization from the Federal Transit Administration (FTA) to enter into the Final Design Phase of the project, a major milestone in the federal New Starts process. Also in January, SFMTA awarded contracts for the three Final Design contracts—tunnels, stations, and systems. Shortly thereafter, the three design teams moved into a project design office on Brannan St, where they will co-locate for the duration of their services. The first construction package—Utilities Relocation 1—for the relocation of utilities in the area near the Moscone Center and at the tunnel portal site under the Interstate-80 (I-80) Freeway, mobilized on January 4. A groundbreaking ceremony took place on February 9, 2010.

Also in February, the project once again received a medium-high rating from the FTA on its New Starts Report. The project team is now concentrating on the deliverables required for obtaining a Full Funding Grant Agreement (FFGA) from the FTA, which is scheduled for the end of 2011. One of the deliverables required for obtaining an FFGA is the full funding plan.

continued other side



Left: tunnel boring machines, similar to these, will make their way beneath the city from 4th and Harrison Streets to Stockton and Clay Streets; above: Mayor Newsom at the groundbreaking ceremony for utility relocation in February, 2010; below: The San Francisco Arts Commission is conducting the Central Subway Public Arts program to place art in the subway stations, including that of Tom Otterness.



Contact Us!

- Deputy in charge: Lee Saage
415.522.4812
- San Francisco County Transportation Authority
100 Van Ness Avenue, 26th Floor
San Francisco, CA 94102

APPENDIX C

central T subway | SAN FRANCISCO



Connecting people. Connecting communities.

Upcoming Contracts

Second Quarter of 2010 Highlights

- March/April
 - Notice to Proceed for Final Design Station and System Contract.
- May
 - California Transportation Commission awards the Central Subway \$27M for high-speed rail connectivity.
- June
 - Participated in the North American Tunnel Conference Poster Session.

Need more info?

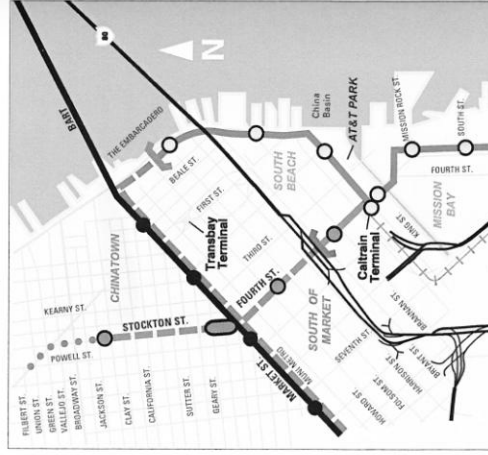
Please contact:
 Brejah Norris, External Affairs Manager
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 San Francisco, CA 94103
 Infoline: 415.701.4371
 Email: central.subway@sfmta.com
 Web site: www.sfmta.com/central

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 Blog: www.centralsubwayblog.com

SFMTA | Municipal Transportation Agency

Central Subway Route



- Legend**
- Existing T Third Alignment (Phase 1)
 - Surface Subway
 - Central Subway Alignment (Phase 2)
 - Surface Subway
 - Central Subway North Beach Tunnel Extension
 - Central Subway Stations
 - T Third Stations
 - BART and Muni Metro Stations
 - Caltrain
 - BART
 - Surface to Subway Portal

RESPONSE MATRIX

FINDINGS	RECOMMENDATIONS	RESPONSE REQUIRED
<p><u>Finding 1</u> The Central Subway’s financial planning appears seriously flawed. Cost estimates have risen 143% from 2003 to 2011.</p>	<p><u>Recommendation 1</u> Given that San Francisco is responsible for any cost overrun of the Central Subway project, SFMTA should hire an independent entity to investigate whether the \$1.578 billion budget is a realistic estimate.</p>	<p>SFMTA</p>
<p><u>Finding 2</u> Muni has done a very poor job of meeting, or even nearing, the requirements of Proposition E.</p>	<p><u>Recommendation 2</u> SFMTA should hire an independent auditor to conduct an analysis of whether its internal goals and the requirements in Proposition E are realistic, why Muni has been unable to meet them, and what should be done to improve Muni’s service levels.</p>	<p>SFMTA</p>
<p><u>Finding 3</u> Muni is not providing adequate service to its customers.</p>	<p><u>Recommendation 3</u> Either the City and SFMTA need to increase Muni’s funding, or the City and SFMTA need to lower their expectations for Muni’s performance.</p>	<p>SFMTA SFCTA Board of Supervisors Mayor</p>

<p><u>Finding 4</u> Muni has had financial troubles in recent years and, absent an unforeseen windfall, will continue to have financial troubles in the foreseeable future.</p> <p><u>Finding 5</u> Given the current and projected state of Muni’s funding, difficult times lie ahead. This will impact the agency’s ability to deliver the level of performance demanded by the charter.</p> <p><u>Finding 6</u> Raising passenger fares can only have a minimal impact on Muni’s financial shortfalls.</p>	<p><u>Recommendation 4</u> The SFMTA should hire an outside auditor to evaluate the potential gains in revenue brought by higher fares against the potential loss in total ridership due to such higher prices.</p>	<p>SFMTA</p> <p>SFCTA</p> <p>Board of Supervisors</p> <p>Mayor</p>
<p><u>Finding 7</u> New financial stresses are adding to Muni’s already-existing financial troubles. These stresses will potentially worsen the state of Muni service.</p>	<p><u>Recommendation 5</u> SFMTA should publicly explain if and when the remaining cuts to Muni service will be restored.</p>	<p>SFMTA</p>
<p><u>Finding 8</u> Maintenance of vehicles impacts the agency’s ability to provide day-to-day service. Poorly maintained vehicles have negatively affected Muni’s ability to operate as many vehicles as needed to meet peak demand.</p> <p><u>Finding 9</u> As a result of forcing maintenance demands to compete with other system demands, maintenance has regularly been underfunded.</p>	<p><u>Recommendation 6</u> Maintenance should be given a higher priority in the budget than it currently is.</p>	<p>SFMTA</p>
<p><u>Finding 10</u> Stripping wrecked vehicles for parts is an inefficient way to save money. It would be cheaper to repair the wrecked vehicle and buy new parts for other vehicles than to buy a completely new vehicle to replace the cannibalized one.</p>	<p><u>Recommendation 7</u> Muni should end its practice of cannibalizing wrecked vehicles to repair other vehicles.</p>	<p>SFMTA</p>

<p><u>Finding 11</u> Following the manufacturer’s suggested preventive maintenance program is inadequate for maintaining Muni’s fleet. This inadequate preventive maintenance negatively impacts Muni’s ability to properly serve its riders.</p> <p><u>Finding 12</u> Mid-life overhauls are not enough to properly maintain Muni’s fleet. Targeted component rebuilds are essential to their maintenance.</p>	<p><u>Recommendation 8</u> The Board of Supervisors, SFCTA, and SFMTA should determine how to fund adequate preventive maintenance and a targeted component rebuild program on an ongoing basis.</p>	<p>SFMTA</p> <p>SFCTA</p> <p>Board of Supervisors</p> <p>Mayor</p>
<p><u>Finding 13</u> While Muni has come close to or exceeded its goals for hours of bus use between failures, it is nowhere near achieving its goal for LRV hours. These failures, some due to a lack of maintenance, are impacting Muni’s ability to deliver adequate service to its customers.</p>	<p><u>Recommendation 9</u> SFMTA should conduct a comparison of Muni’s “mean time between failures” against other cities’ to gauge the impact of Muni’s current maintenance practices on its fleet. It should also take into account any unique aspects of San Francisco transit that might affect its “mean time between failures.”</p>	<p>SFMTA</p>
<p><u>Finding 14</u> The SFMTA’s inability to recognize the obvious need to allot time to train new operators causes this Jury to lose faith in the agency’s ability to efficiently manage its own projects.</p>	<p><u>Recommendation 10</u> The SFMTA should explain when it plans to hire and train new operators to ensure a smooth rollout of the Central Subway.</p>	<p>SFMTA</p>
<p><u>Finding 15</u> Using the numbers supplied by SFMTA, it appears that the problem of insufficient LRV fleet size experienced during the T-Third rollout will also plague the Central Subway rollout. This will translate to either a delayed opening or further diminished service on the other LRV lines.</p>	<p><u>Recommendation 11</u> The SFMTA should look at the peak demand for vehicles at the time it proposes to conduct new operator training and ensure that such training will not impact its ability to meet peak LRV demand.</p>	<p>SFMTA</p>

<p><u>Finding 16</u> There was an 18-month delay on finishing the 3-year T-Third project. This represents a 50% delay. With a commensurate or fractional delay on the 7-year Central Subway project, it will exceed current cost and contingency projections.</p> <p><u>Finding 17</u> Individuals will sometimes make poor decisions. However, a good management and implementation process will catch and correct these decisions. The SFMTA has not shown that it has corrected the internal management and implementation problems from the T-Third project which allowed poor decision-making to go undetected.</p> <p><u>Finding 18</u> Though there are some differences between the T-Third project and the Central Subway project which suggest the latter might be better managed, such as federal oversight, this will be a more complex, and therefore harder to manage project.</p> <p><u>Finding 19</u> The SFMTA has allocated an appropriate amount of the budget for the Central Subway project to cover contingencies and cost overruns.</p> <p><u>Finding 20</u> The SFMTA is unreasonably optimistic that problems with the T-Third project will not reoccur during the Central Subway project.</p>	<p><u>Recommendation 12</u> The SFMTA should explain what changes to the internal decision-approval processes have been put into practice to prevent the types of problems that affected the T-Third project. It should be noted that merely changing staff does not suffice to fix these problems. If such changes have yet to be made, the SFMTA should hire an external management consultant to advise it on how best to change its processes.</p>	<p>SFMTA</p>
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	<p><u>Recommendation 26</u> The SFMTA should redesign the Central Subway to better serve the San Francisco population.</p>	<p>SFMTA</p>