METRO'S 28 BY 2028 PLAN:
A CRITICAL REVIEW
VIII. METRO HAS FREQUENTLY UNDERSTATED TRANSPORTATION PROJECT COSTS

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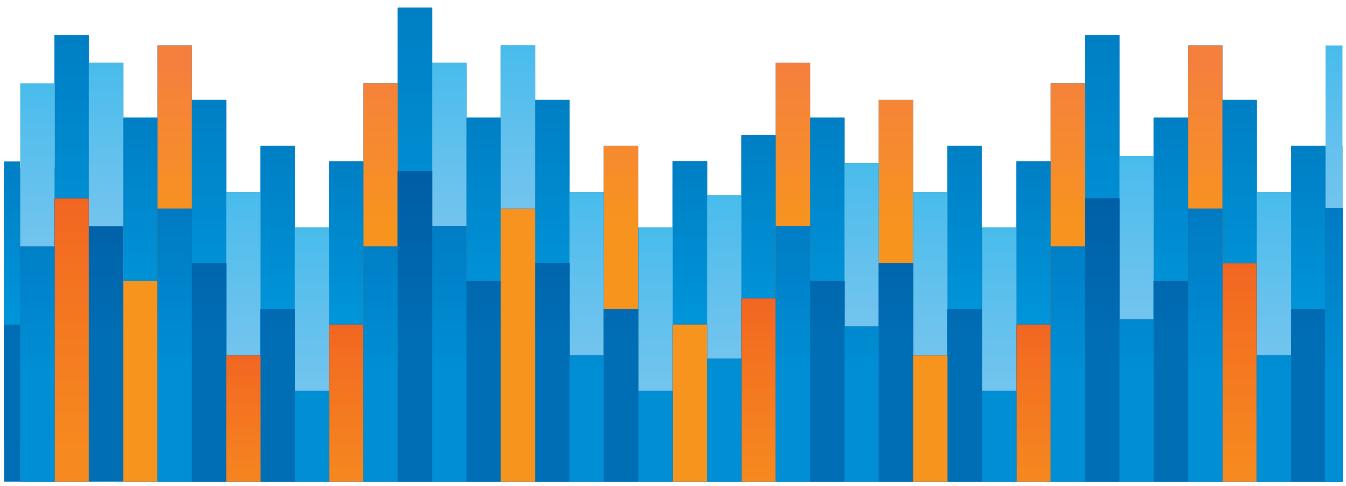

VIII. METRO HAS FREQUENTLY UNDERSTATED TRANSPORTATION COSTS

Metro and its predecessor agencies, particularly the Los Angeles County Transportation Commission (LACTC), have a long history of major construction projects coming in significantly over budget.

LONG BEACH-LOS ANGELES BLUE LINE

The Blue Line was the LACTC's first major project. In the early 1980s, LACTC staff presented a Blue Line cost projection of $125 million to the U.S. Urban Mass Transportation Administration (UMTA, now the Federal Transit Administration) as part of an unsuccessful effort to persuade UMTA to classify the costs of the Blue Line as local matching funds for the construction of the Red Line subway, and thereby increase the federal share of Red Line costs.[1]

Jonathan Richman, in *Transport of Delight—The Mythical Conception of Rail Transit in Los Angeles*,[2] traces public cost projections for the Blue Line starting at $147 million in 1981 and growing to $254 million to $280 million (1982), $350 million to $400 million (1983), $393 million to $561 million (1984), $500 million to $600 million (1984), $595 million (1985), and $887 million (1990). Metro's final cost was $863.9 million, in 2005.[3] All values expressed here and following are in year-of-expenditure dollars, except where otherwise noted. The Blue Line was opened in three segments, the last in the summer of 1991, but the final close-out expenditures were not made until FY05. The LACTC ignored a state statute requiring it to include the costs of capitalized interest during construction, which would have added over $100 million to the total.

The Blue Line was one of the first light rail lines to be constructed in the U.S., so some degree of budget overrun is to be expected. However, the LACTC also can be expected to have learned from its

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1 Author (Rubin) interview with an UMTA staffer who participated in this meeting.

2 This was originally his thesis for his Ph.D. at MIT, 199, see 64-65: http://jonathanrichmond.com/publications/transportofdelightthesis.pdf

3 The easiest way to track costs of Metro capital projects is through its *Adopted Budgets*, which all have a single page with a title such as "Major Construction" or "Transit Construction Projects." The full set of *Adopted Budgets* can be accessed at: https://www.metro.net/about/financebudget/

The $863.9 million referenced above can be found on page V-13 of the *FY05 Adopted Budget*; which will hereinafter be referred to in the style of *FY05*, page V-13.

Blue Line experience to better plan, design, construct, cost and schedule future rail construction projects. It has not.

GREEN LINE

The first public cost for the Green Line was $174 million,[4] and Metro's final cost was $712.3 million (*FY05*, page V-13). However, this was not the full cost.

Metro has a long practice of establishing multiple line items for the same project, particularly when a project is going over budget. Segregating projects into multiple parts has the effect of achieving a cosmetic version of budget compliance. For the Green Line, the largest such item was $215.3 million (*FY05*, page V-13) for the "L.A. Rail Car." The civil construction work for the Green Line infrastructure and procuring the passenger rail cars to operate on it were not two separate projects, and these costs should have been accounted for in a coupled way. The "L.A. Rail Car" was such an unusual procurement that it was featured on the national nightly news broadcasts of the three major television networks.

Half of these cars were used for the Pasadena Gold Line and Metro press releases[5] identified half of the rail car purchase as costs of that project. Metro never identified the other half, $107.6 million, as Green Line costs.

The Green Line operates in the median of I-105, the Glenn Anderson Freeway. The deal between the various agency partners to complete the entire Century Freeway/Green Line project included construction of an overpass bridge for Imperial Highway at Wilmington Avenue. The Imperial Grade Separation was not part of the Green Line right of way, but the negotiated LACTC/Metro portion of the cost was $4 million (*FY05*, page V-13), and should be identified as part of the Green Line costs.

Finally, the "Green Line Closeout" item for $0.3 million (*FY07*, page V-9) should be included as a Green Line cost. The total cost for the Green Line comes to $842.2 million, compared to the original cost projection of $174 million.

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4 LACTC. *Preliminary Official Statement, $700 Million Sales Tax Revenue Bond.* July 8, 1986.

5 Metro. "MTA Poised to Open the Los Angeles to Pasadena Metro Gold Line to the Public on Saturday, July 26." July 7, 2003. https://www.metro.net/news/simple_pr/mta-poised-open-los-angeles-pasadena-metro-gold-li/

A major share of the Green Line cost overrun was the result of site condition changes and scope creep:

- The original plan was for the Blue Line and Green Line to be operated together, sharing an operating/maintenance light rail yard and a rail car purchase. However, the site selected for the Blue Line Yard (Division 11) turned out to be contaminated, and only part of it was usable. The yard was redesigned at considerable cost to make the most of the usable area, which made it difficult to perform common maintenance operations such as wheel truing. It also reduced the storage capacity of the yard, so a separate rail yard had to be added for the Green Line. This had the operational advantage of eliminating the need to deadhead empty Green Line trains along the Blue Line route to access the Green Line, and then reversing this at the end of the service day.
- LACTC's first purchase of 54 light rail vehicles was intended to be sufficient for both the Blue Line *and* the Green Line, but the ridership on the Blue Line quickly exceeded the estimates for the first years of operation. This meant that there were no cars left for Green Line service, which is a large part of the reason for the L.A. Rail Car procurement.

  The Blue Line ridership spike was due in large part to the line's change to a simple flat fare structure, with an adult cash fare for end-to-end trips of $1.10, compared with the original zone fare with a $3.20 end-to-end trips. Southern California Rapid Transit District (SCRTD) modeling showed that over half of the total ridership was due to these bargain fares, with large end-to-end ridership.
- The Green Line was extended after the original cost projection, adding the four stations on the north-south section at the west end of the alignment.
- County Supervisor Peter Schabarum had a deep dislike of the SCRTD bargaining units, which would under state statute gain the right to operate and maintain the Green Line. He had LACTC study running the Green Line without operators as Automated Guideway Transit (AGT). It is not possible to isolate the incremental costs of this intervention, and it is unclear if they appear in the Green Line total. There were informal estimates that this effort cost $50 million before it was cancelled. Automating the line could have *increased* its operating costs due to the complex personnel requirements of AGT, and the provisions of the various SCRTD bargaining unit agreements.

RED/PURPLE LINE

The original construction cost projection for this subway was $3,108.3 million.[6] After the alignment was changed and the project delayed, the costs for the revised Red Line were $3,024 million in 1985 dollars and $3,762.9 million in year-of-expenditure dollars.[7] By the end of the project, the total costs were:

Red Line Segment 1 (*FY05*, page V-13)	$1,440,239,000
Red Line Segment 2 (*FY05*, page V-13)	1,795,761,000
Red Line Segment 3 North Hollywood (*FY05*, page V-13)	1,313,815,000
Universal City Station Site (*FY05*, page V-13)	5,838,000
MRL (Metro Red Line) Segment II Closeout (*FT13*, page 27)	22,867,000
MRL Segment III North Hollywood Closeout (*FT13*, page 27)	22,139,000
Total	$4,600,659,000

This accounts for completion of the Red/Purple Line through the completion of Union Station to the Wilshire/Western and North Hollywood stations, with the last section opening in 2000, and two subsequent extensions. This total is 22% over the Supplemental Environmental Impact Statement/Supplemental Environmental Impact Report (SEIS/SEIR) year-of-expenditure projection, which is a surprisingly modest cost overrun given that the project encountered a large number of unanticipated problems:

- As construction was getting underway, a methane fire at a Ross Dress for Less store along the Wilshire alignment led to safety fears, a congressional ban on construction through the intended zone, and the Congressionally Ordered Re-Engineering (CORE) and other studies. These issues, plus reservations in Congress about funding rail construction, delayed major construction. Federal funding was approved during a period of relatively high inflation, and the decision-makers in Los Angeles decided to enter into the federal full funding agreement to get the project fully underway as quickly as possible, when they might have instead waited and sought an increase in federal funding.
- The main construction site near Union Station was on unexpectedly contaminated ground, which required that water removed during excavation be treated before being discharged into the Los Angeles River, requiring construction of a water treatment plant.

[6] Southern California Rapid Transit District. Draft Environmental Impact Statement and Environmental Impact Report. Los Angeles Rail Rapid Transit Project – Metro Rail. June 1983. 2-67.

[7] Southern California Rapid Transit District. Supplemental Environmental Impact Statement (SEIS) and Subsequent Environmental Impact Report (SEIR). Los Angeles Rail Rapid Transit Project – Metro Rail. July 1989. S-4-2 and 4-3-2, respectively, http://libraryarchives.metro.net/DPGTL/eirs/1989_Rail_Rapid_Transit_FinalSupplemental.pdf

- In July 1991, a fire erupted in the Red Line tunnel being constructed under US 101 just South of Union Station, which caused considerable damage. At one point, there was fear of the freeway collapsing. Recovery was expensive and delayed construction.
- There were conflicts between SCRTD and LACTC from the inception of the Commission. After construction of the Red Line began, the conflict escalated and the LACTC took over Red Line construction, absorbing most of the SCRTD construction staff. This resulted in considerable bad feelings, some duplication of work, and employees who were not 100% concentrated on the work because of concern about their jobs.
- The conflict between the two agencies finally resulted in state legislation to merge the two entities, passed in late 1991, and effective April 1, 1993. This meant that the merged agency (Metro) would need a CEO. The LACTC executive director was aggressively seeking the position and, in what may have been an attempt to demonstrate his qualifications for the position, ordered that the Red Line Minimum Operating Segment 1 (MOS-1) be opened for service months early, by the end of January 1993. This effort required considerable overtime and incurred other additional costs, and he didn't get the Metro CEO position.
- During construction under Hollywood Boulevard, a tunneling machine encountered a previously unknown underground river. Considerable time and cost were required to seal off the river from the tunnel, pump out the tunnel, and renew construction.
- Farther west, under Hollywood Boulevard, the tunneling encountered soil conditions requiring unplanned actions, such as compaction grouting to fill gaps and improve soil adhesion, which Metro declined to authorize. The street above the tunnel and buildings on either side began to subside. After construction was halted, there was a major effort to revise procedures and restructure construction management. When tunneling recommenced, the street above almost collapsed into the tunnel, with several construction workers barely escaping the site. The costs to settle the claims from building owners were extensive. The contractor was terminated for cause, and Metro announced that it would pursue the contractor for damages. After the contractor produced letters showing that it recommended changes in the tunneling procedures, and that Metro declined to allow the proposed changes, the grounds for termination were changed to convenience of the owner. The contractor was paid for work performed but previously not paid, plus retainage, demobilization costs and legal fees. Because this matter involved legal issues that did not have to be made public, the costs are not known, but the budget for MOS-2 was increased significantly.

Considering all of these problems, and the inherent challenges in building a subway under Los Angeles in an active earthquake area with technical challenges and unknown conditions, Metro's cost overrun was modest relative to the SEIS/SEIR projection, particularly compared with the overruns on the Blue and Green Lines.

EXPO LINE

Unfortunately, Metro's Red Line cost performance was not the beginning of a trend. The original cost projection for the Expo Line was $792.2 million in 1990 dollars,[8] or $1.14 billion in 2016 dollars, the mid-year of construction (conversion by authors).[9]

The latest costs reported by Metro are:

Expo Blvd. Light Rail Transit Phase I	$ 978.900,000
Expo Blvd. Light Rail Transit Phase II	1,533,744,000
Total	**$2,512,644,000**

This is a budget overrun of $1,373 million, or 120%, in year-of-expenditure dollars.

GOLD LINE EASTSIDE

Metro reports this project came in on budget at $898 million, but the list of "Major Construction" projects on page 34 of the *FY11 Budget* shows two projects:

- Metro Gold Line Eastside Extension, with a Life of Project budget of $898,814,000
- MGL Eastside Extension Enhancements, with a Life of Project budget of $55,903,000

The first item shows the project coming in exactly on budget at $898.8 million. The purpose of the second item, "MGL Extension Enhancements," is less obvious.

"MGL" is the Metro Gold Line, "Extension" is the Eastside Extension, and "Enhancement" is the construction of Ramona Opportunity High School for the Los Angeles Unified School District (LAUSD). Metro wanted to take a small slice of the old school site to build the line.[10] To construct the line as the decision-makers wanted, it had to turn a very tight corner, so it was necessary to take a small piece of a plot with a LAUSD gymnasium building.

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8 Metro. *Mid-City/Westside Transit Corridor Draft EIS/EIR*. April 2001. Table 5-1B. "Capital Cost Composite for Project Alternatives." Alternative 3. "Exposition LRT (subway design option at USC/Exposition Park)." $674.4 million Total Capital Cost (for construction), plus LRT Vehicle Cost of $117.8 million. 5-3. http://libraryarchives.metro.net/DPGTL/eirs/Expo/docsExpoP1DEIR/page_5.0.pdf

9 U.S. Department of Commerce. Bureau of Labor Statistics. Consumer Price Index-All Urban Consumers. Los Angeles-Long Beach-Anaheim, CA. https://data.bls.gov/pdq/SurveyOutputServlet?data_tool=dropmap&series_id=CUURS49ASA0,CUUSS49ASA0

10 During the period when the planning, design, and construction of the Gold Line Eastside was underway, one of the authors (Rubin) was the consultant to the LAUSD Construction Bond Citizens' Oversight Committee and devoted many hours to attempting to find a good alternative that would best serve both agencies and the residents they serve.

At first, Metro believed that these costs would be minor, and that it would only cost a few million dollars to tear down the old structure and replace it with a new building, despite being informed by LAUSD facilities staff that requirements for school construction would make any such changes a very expensive undertaking. The campus involved was out of date, and replacing the gymnasium effectively was going to require replacing the entire school.

Metro might not have believed this, and did not change its approach until it became impossible to deny the increased costs. After years of denying that this replacement would be a major cost, Metro inserted a first appearance of this cost into the *FY06 Budget* (page V-8) at $18,000,000. Tracking the growth of "enhancements" cost through the Metro budget, the item grows steadily until *FY11* (page 34), culminating at $55,903,000.

PURPLE LINE

The third leg of the Purple Line extension was projected to cost $1,980 million in the Measure M Ordinance[11] in 2016, but the estimate was increased to $3,223 million at the February 28, 2019 Metro Board meeting.[12] For this 2.56 mile[13] segment, that is just over one-and-one-quarter-billion-dollars per mile. As the project is just entering construction, further increases are possible.

Table 1 provides a summary of Metro's cost overruns on different heavy- and light-rail lines.

TABLE 1: Los Angeles County Metropolitan Transportation Authority Passenger Rail Construction Projects Original Cost Projections and Actual or Most Recent Projected Costs

Rail Line	(Millions $$)			Percentage Increase
	Original Cost Projection	Actual or Most Recent Projection	Dollar Increase	
Blue Line	125.0	863.9	738.9	591%
Green Line	174.0	842.2	668.2	384%
Red/Purple Line	3,762.9	4,595.4	832.5	22%
Expo Line	1,140.0	2,512.6	1,372.6	120%
Gold Line Eastside	898.0	953.9	55.9	6%
Purple Line Extension Segment 3	1,980.0	3,223.0	1,243.0	63%

[11] Attachment A. "Groundbreaking Sequence." https://data.bls.gov/pdq/SurveyOutputServlet?data_tool=dropmap&series_id=CUURS49ASA0,CUUSS49ASA0

[12] Metro. https://boardagendas.metro.net/event/regular-board-meeting-34059cc41a28/

[13] Metro. "Purple Line Extension." https://www.metro.net/projects/westside/

CONCLUSIONS

This inventory is not exhaustive, but it captures several examples of Metro's performance with respect to forecasting rail construction costs, which demonstrate that the agency has a continuing problem with respect to both projecting and controlling costs.

1. The projected costs of Metro's major construction projects start low and increase over time.
2. The actual costs of Metro's major construction projects increase even more over time. Overruns tend to be recognized gradually over multiple years, diminishing the likelihood that a casual inspection of agency fiscal performance will identify the true extent to which Metro projects are over budget relative to initial forecasts.
3. Metro's construction authority cost control practices have led to substantial cost increases.
4. There is strong documentation of optimism bias with respect to Metro's cost projections. Unbiased forecasts, including construction cost estimates, are as likely to be low as they are to be high. No Metro major construction project has ever come in under the original cost projection. While some of the projects we included in this survey were only 20% over budget, others were five to seven times the original cost projections.
5. Metro has not substantially changed its forecasting metrics used to produce project costs projections, leaving Metro, the taxpayers, and transit users vulnerable to future cost overruns.