# Los Angeles County
# Metropolitan Transportation Authority
# Office of the Inspector General

# Review of Metro Construction Projects Quantitative Data

**Case Number: 2023-0019** **October 3, 2023**
**Legistar Report No. 2023-0474**

Metro

Los Angeles County
Metropolitan Transportation Authority

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**DATE:** August 24, 2023

**TO:** Sharon Gookin

**FROM:** Karen Gorman, Inspector General

**SUBJECT:** Review of Metro Construction Projects Quantitative Data, a companion report to the 2023 OIG Construction Best Practices Report

The OIG has completed its Review of Metro Construction Projects Quantitative Data. This is a companion report to the 2023 OIG Construction Best Practices Report (Follow Up to the 2016 OIG Construction Best Practices Report). [1]

In this report the OIG presents data on Cost/Budget, Schedule, and Safety. We gathered data from Program Managements PMIS program of the data repository from years 2015 to 2023. The budget information includes change orders activity across 29 construction contracts to identify "challenge" areas and Life of Project ("LOP") budgets escalation history. This report will discuss schedule compliance and extensions across a sample of Metro's capital projects. Lastly, this report presents construction safety data from several projects.

The data presented in this report can be used to create a baseline for PMG to conduct subsequent studies to identify trends and improve management of capital projects.

We know this is short notice but could you please review this report and respond to the 13 recommendations on Cost/Budget, Schedule, and Safety. Please provide your responses on the spread sheet on or before August 31, 2023 so we may submit in time for FINAL CEO submittal into Legistar.

Respectfully,

Karen Gorman
Inspector General

cc: Stephanie Wiggins Sharon Gookin Sameh Ghaly Tim Lindholm Julie Owen Gina Osborn Kenneth Hernandez Vijay Khawani

[1] The 2023 OIG CONSTRUCTION BEST PRACTICES REPORT (Follow Up to the 2016 OIG Construction Best Practices Report) will be published as Legistar Report No. 2023-0178 and OIG Report No. 2021-0046). This 2023 report follows up on progress since the OIG's 2016 Capital Project Construction Management Best Practices Study, ("2016 Best Practices Study," OIG Report No. 16-AUD-01).

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# INTRODUCTION

At the April 20, 2023, Construction Committee meeting, a Board Director posed the question to the Office of Inspector General (OIG), "How are we doing? Are things getting better? Given all the checks and balances and systems and processes that appear to be in place, has the OIG seen any measurable results related to the number and amount of change orders showing that Metro is moving in the right direction?" The Director stated that the public would benefit from a "report card" providing visibility on Metro's success in managing its capital program dollars.

The Inspector General responded that an OIG team is finalizing a report on a 2023 follow up on implementation of 2016 OIG Construction Best Practices Recommendations report ("2023 OIG Construction Best Practices Report")[2] which describes the current status of Metro's implementation of construction management best practices and would respond at least partially to the Director's inquiry. This is the companion report to the 2023 follow up report as promised.

The 2023 OIG Construction Best Practices Report (follow up to the 2016 OIG Construction Best Practices Report) found that Metro's Program Management Group ("PMG") implemented 64 of the OIG's 109 recommendations in the prior OIG report. For 31 other recommendations, improved practices were identified as actively "evolving" in response to iterative lessons learned. Lastly, the OIG determined 14 of the previous recommendations need further improvement. The Director's inquiry inspired the OIG to bridge the conceptual findings of the 2023 OIG Construction Best Practices Report with supplemental data describing the cost/budget, schedule, and safety impacts across a sample of Metro's capital projects.

In this companion report, the OIG presents data on costs/budget, schedules, and safety. The cost/budget information includes Life of Project ("LOP") budgets escalation history and change order activity since 2013 across 29 construction contracts allowing for quantitative review. This report will discuss cost/budget challenge areas along with related schedule conformance across a sample of Metro's capital projects. Lastly, this report presents construction safety data from several projects. The data presented in this report can be used to create a baseline for PMG to conduct subsequent studies to identify trends and improve management of capital projects.

We attempted to determine if the implementation of the best practices following the 2016 report has clearly resulted in cost/budget, schedule, and safety improvements. We are unable to make that certain correlation at this time, but we think this report can serve as a baseline for tracking data in the future to begin to make that correlation.

[2] The 2023 OIG CONSTRUCTION BEST PRACTICES REPORT (Follow Up to the 2016 OIG Construction Best Practices Report) will be published as Legistar Report No. 2023-0178 and OIG Report No. 2021-0046). This 2023 report follows up on progress since the OIG's 2016 Capital Project Construction Management Best Practices Study, ("2016 Best Practices Study," OIG Report No. 16-AUD-01).

# RESULTS OF REVIEW

## A. COSTS/BUDGET

### 1. Project Data

Program Management Group ("PMG") provided budget and schedule data for seventeen (17) projects active during the 2013-2023 period. A project's budget includes costs for associated construction contracts. Table 1, summarizes the 17 projects and lists each project's associated construction contract(s).[3]

| Project Name | Contract No. | Contract Name |
|---|---|---|
| Patsaouras Plaza Station Improvement | C0970 | Union/Patsaouras Plaza Busway Station |
| Crenshaw LAX Transit Corridor | C0988 | Crenshaw/LAX Transit Corridor Design-Build |
| Crenshaw Closeout | C1217 | Crenshaw/LAX Construction Punch Out Work |
| Regional Connector | C0980 | Regional Connector Transit Corridor Project Design/Build |
| Willowbrook Rosa Parks | C1157 | Willowbrook/Rosa Parks Station Improvements Package E & F |
| | C1161 | Willowbrook/Rosa Parks Station Improvement - A & C |
| MBL Track/System Refurbish | C1161 | Willowbrook/Rosa Parks Station Improvement - A & C |
| | C1168 | Metro Blue Line Track and System Refurbishment |
| I5N North County | C0988 | Crenshaw/LAX Transit Corridor Design-Build |
| | C0991 | Division 16: Southwestern Yard |
| Eastside Access | C1207 | Eastside Access Improvements |
| Soundwall 11 | C1101 | Soundwall Package 11 |
| Metro Center Street | C--1169-2 | Metro Center St Project Design/Build |
| Division 20 Portal Widening | C1136 | Division 20 Portal Widening Turnback |
| | C--1184 | Division 20 Traction Power Substation PWT2 |
| Purple Line Section 2 | C1120 | Westside Purple Line Extension, Section 2 - Design/Build |
| Rosecrans/Marquardt | C--1210 | Rosecrans/Marquardt Grade Separation Project |
| Rail to Rail | C1166 | Rail to Rail Active Transportation Corridor |
| Purple Line Section 1 | C1034 | WSE Project Exploratory Shaft |
| | C1045 | Westside Subway Extension Project, Section 1 |
| | C1048 | WSE Project Advanced Utility Relocations (La Brea Station) |
| | C1055 | Advanced Utility Relocations (Fairfax Station) |
| | C1056 | Advanced Utility Relocations (La Cienega Station) |

[3] A project may have more than one construction contract. Also, a construction contract may "touch" more than one project which is the case with C0988, C0991 and C1161 (red font). Multiple projects may pertain to related work, e.g., the two listed Crenshaw/LAX projects. For I5 North, the OIG reviewed LOP and change data for Project No. 460303, but only change order data for Project No. 460313

| | | |
|---|---|---|
| | C1078 | Maintenance of Way/Non Revenue Vehicle Maintenance Building 61S |
| Purple Line Section 3 | C1151 | Purple Line Extension Sec 3 Tunnels Project |
| | C1152 | Purple Line Extension Section 3 Stations Project - Design/Build |
| | C1153 | Advanced Utility Relocations for Section 3 |
| | C1204 | VA Shuttle and Valet Services During Construction |
| Airport Metro Connector | C0988 | Crenshaw/LAX Transit Corridor Design-Build |
| | C0991 | Division 16: Southwestern Yard |
| | C1197 | Airport Metro Connector Transit Station/96th Street Station |

Table 1: List of 17 Projects with Construction Contracts

## 2. Establishing and Holding to the Life of Project Budget

Project conception and development starts in Metro's Countywide Planning and Development Department ("Planning") and incorporates early but limited PMG involvement. Typically, at the conclusion of the environmental compliance process and preliminary engineering (approximately 30% engineering), project management responsibility fully transitions from Planning to PMG. PMG is responsible for developing, and getting the approval of Metro's Board for, "all budget necessary for internal and external resources required to advance the project through Engineering and into a Delivery Procurement …"[4]

PMG develops a Life of Project ("LOP") budget for each construction project. In lieu of a baseline LOP budget, a "preliminary LOP budget" sufficient to cover early-stage costs and contingency for risk may be developed. The "true" board-approved LOP budget covers all costs for project implementation through the end of the project.[5] The OIG's 2023 Construction Best Practices Report describes development of an enhanced LOP budget process where the LOP budget may be "phased" in two steps to allow for refinements following completion of preconstruction investigation and design.

Metro's current policies and procedures implement best practices for establishing and holding to the board-approved LOP budget. In practice, a number of circumstances impact Metro holding to its LOP budget, including:

- The status of funding for an entire project which may prompt interim budget actions for severable components phased for implementation;
- The reliability of cost estimates;
- Risk analyses identifying and establishing contingency based on "known-unknowns";

[4] See the PMG's PC14 – Readiness Review Procedure.

[5] Pursuant to PC-14 – Readiness Review, Budget/Cost considerations include a "rough order of magnitude (ROM) or parametric level (Class 5) cost estimate covers design and construction costs, utilities, real estate, vehicles, professional services, contingency, finance charges, and escalation to Year of Expenditure (YOE)"; and "a cost estimate Basis & Assumptions document is in place that describes the estimating methodology, sources of unit costs, escalation, allocated and unallocated contingency, parametric estimating approaches, use of design allowance and escalation. . ."

- Minimal changes or additions to scope by Metro, including pursuant to third-party stakeholders' requests;
- Materially accurate and timely pre-construction site investigations;
- Comprehensive and accurate plans and specifications considering local requirements;
- Minimal impacts from force majeure events, including, weather, pandemics, supply chain disruptions, global inflation.

### 3. Life of Project Budget Data

Data for the 17 separate projects includes the original LOP budget, current LOP budget, total LOP budget variance (current budget less original amount), the calculated percent increase, and the count of increases following the original LOP budget.

Table 2 summarizes by project the LOP budget amounts, budget variances, and percent increases. The white-shaded rows show projects with no LOP budget variance.

| PROJECT Information | | PROJECT Cost Data | | | | |
|---|---|---|---|---|---|---|
| No. | Project | Orig LOP | Current LOP | Variance | % Variance | # Increase |
| 202317 | Patsaouras Plaza Station Improv. | 16,800,000 | 50,900,000 | 34,100,000 | 203% | 3 |
| 865518 | Purple Line Section 1 | 2,774,000,000 | 3,129,000,000 | 355,000,000 | 13% | 3 |
| 869512 | Crenshaw Closeout | 30,000,000 | 57,000,000 | 27,000,000 | 90% | 2 |
| 212121 | Metro Center Street | 112,700,000 | 143,700,000 | 31,000,000 | 28% | 2 |
| 460324 | Soundwall 11 | 89,200,000 | 111,000,000 | 21,800,000 | 24% | 2 |
| 860228 | Regional Connector | 1,420,000,000 | 1,755,800,000 | 335,800,000 | 24% | 2 |
| 865512 | Crenshaw/LAX Pre-Award | 1,762,900,000 | 2,148,000,000 | 385,100,000 | 14% | 2 |
| | Crenshaw/LAX Post-Award* | 2,058,000,000 | 2,148,000,000 | 90,000,000 | 4% | 1 |
| 210509 | Rail to Rail* | 115,900,000 | 140,290,000 | 24,390,000 | 21% | 2 |
| 865519 | Division 20 Portal Widening | 802,000,000 | 957,000,000 | 155,000,000 | 19% | 2 |
| 865523 | Purple Line Section 3 | 3,169,000,000 | 3,224,000,000 | 55,000,000 | 2% | 1 |
| 210151 | Willowbrook Rosa Parks | 109,300,000 | 128,300,000 | 19,000,000 | 17% | 1 |
| 205115 | MBL Track/System Refurbish | 90,800,000 | 102,300,000 | 11,500,000 | 13% | 1 |
| 865522 | Purple Line Section 2 | 2,440,969,299 | 2,574,969,299 | 134,000,000 | 5% | 1 |
| 460303 | I5N North County | 679,300,000 | 679,300,000 | 0 | 0% | 0 |
| 463300 | Eastside Access | 29,700,000 | 29,700,000 | 0 | 0% | 0 |
| 460066 | Rosecrans/Marquardt | 156,400,000 | 156,400,000 | 0 | 0% | 0 |
| 860303 | Airport Metro Connector | 898,600,000 | 898,600,000 | 0 | 0% | 0 |

Table 2: 17 Projects –Original and Current LOP Budget, Variance and Percent Increase

In Table 2, after discussion with PMG, the OIG agreed to adjust the "raw" original LOP data (provided by PMG) for the Crenshaw and PLE-3 projects to include amounts added once

Metro's funding actions were completed.

- PLE-3 original budget was adjusted to include an increase of $1,849,000,000. This projects' original LOP budget covered advanced the utility relocation and the tunnel contracts, but there was a planned additional contract to incorporate the stations contract once funding become available. The new addition, which caused of $53,000,000 was from an unanticipated request to construct the VA hospital parking garage. PLE-3's final LOP of $3.22 billion incorporates all contracts for the PLE-3 project. PMG clarified that the increase was from Metro issuing multiple interim life of project budgets pending approval of the Federal Transit Administration's ("FTA") full funding grant agreements (FFGA) – not to unanticipated project changes. The OIG thus learned that issuing interim LOP budgets as a project is phased, is in accordance with FFGA approved funding but is an exception to typical PGM practices.

- Records show that the Crenshaw/LAX Project's original budget started at ($1.749M). LOP increases were based on: (a) $13.9M from an FTA TIGER II Discretionary Grant, (b) $160.1M from to higher-than-expected cost proposals, (c) $135.0M to fund Crenshaw/Vernon and Florence/Hindry stations, and (d) $90M for extension of project beyond substantial completion. For this report, Project Controls reported an original "Pre-Award" (construction) LOP budget of $1.762M. Program Management says $2.058M is the "Post-Award" (construction) LOP which includes 2 addition stations. No pending end-of-project claim amounts are included in the LOP.

In the aggregate, the total original LOP budgets are $14,697,569,299 and the sum of the variance amounts are $1,588,690,000. Thirteen (13) of the 17 projects experienced LOP budget increases for an overall 11% increase in total LOP budget. The discussion that follows briefly summarizes LOP budget increases and does not attempt a comprehensive review of each project's LOP increase.

Summary of Project LOP Budgets

Two projects experienced 3 LOP budget increases. Patsaouras Bus Plaza infamously encountered sensitive archeological artifacts causing the project to be placed on standby status leading to delay damages payable to the contractor. Purple Line Extension Section 1 ("PLE-1"), increases for the most part, result from differing subsurface site conditions. These differing site conditions could have been more foreseeable with a robust geological study but not wholly avoidable.

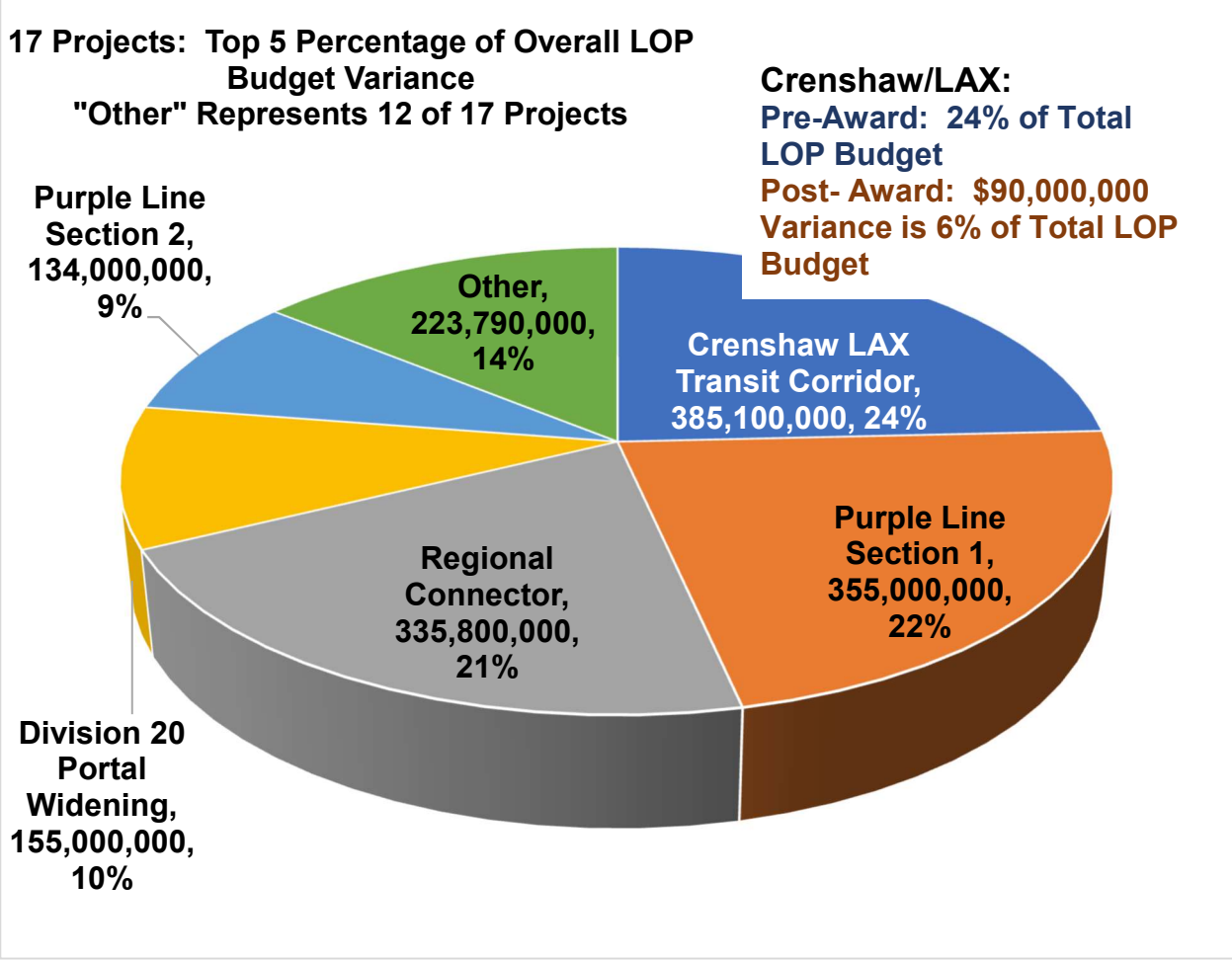
Seven (7) projects currently show 2 increases to the LOP budget. For 3 projects, PMG provided brief explanations of the increases: the Crenshaw/LAX Transit Center budget was revised to include additional stations; the Metro Center Street Project budget was set before the start of design (essentially guaranteeing a need to revisit), and the Rail-to-Rail Project had an increase to the LOP budget with receipt of funding from the City of Los Angeles.

Four (4) projects required one revision to the LOP budget. The LOP budget for Purple Line Extension Section 2 ("PLE-2"), was increased in July 2023 for reasons including (1) previously unidentified scope; (2) third party requirements; and (3) professional services and utility companies' costs.[6] Moreover, additional risks have developed from the contractor submitting

[6] PMG's data was supplemented by the LOP budget increase for PLE-2. (See Legistar #2023-0316.)

Request for Change notices alleging compensable schedule delay costs. The Purple Line Extension Section 3 ("PLE-3") LOP budget was increased to accommodate separate contracts. Metro instituted a phased approach to this project resulting in phasing of the LOP budget to include: advanced utility relocations, tunnels, stations, and a parking garage structure.

Four (4) projects show no revision to the original Board approved LOP budget. Those projects are "open" with the potential for an increase to budget. Two of the construction contracts under I-5 North County project show no change order activity after June 2022 and PMG reports minimal change order activity on its primary open contract (the OIG was not provided that data).




Five (5) projects are responsible for 86% of the $1.6 billion LOP budget increase.

Chart 1: Top 5 Projects by Allocation of Total LOP Budget Increase

Chart 1, shows the 5 projects and the percentage of the $1.6 billion for which the project is responsible.

Correlating LOP Budget Increases to Hard versus Soft Project Costs

The baseline LOP budget is "based on cost estimates for each procurement and construction contract, professional services, right-of-way acquisition, vehicles, and contingency for the

project."[7] The LOP budget is developed during the project adoption process and is approved by Metro's Board of Directors. The LOP budget does not include amounts incurred prior to submission of Metro's application to the Federal Transit Administration for a full-funding grant agreement ("FFGA") which typically includes early planning costs, such as environmental review and preliminary engineering costs.

For this report, the OIG distinguishes two categories of costs.

- Hard Costs: Amounts that will be paid under construction/design contracts, including an assumed 15% contingency.
- Soft Costs[8]: All other costs accounted for under the LOP budget to implement a project once (1) the project is transferred to PMG as the lead project manager, and (2) Metro's FFGA application has been submitted. These costs may include legal review, program, project and construction management services and additional contingency.

PMG provided data for 29 construction contracts including original contract amount and all associated change order activity. A total of 2,261 final, approved change orders (contract modification) were provided by PMG with each having the effect of modifying the original contract to (a) add or change the Scope of Work and, as appropriate, (b) compensating the contractor for additional costs or schedule time. A change order can be deductive - reducing work, costs, or time - as well as additive.

Table 3 summarizes for the 29 construction contracts, the quantity count, and value, of change orders. The contracts are sorted by highest to lowest Change Order activity by percent of the original contract amount. "Change Order" is abbreviated "CO" in the column headings. The Top 7 highest percentage change order projects (over 30%) are bolded. Table 4 provides a "key" for identifying the Top 7 construction contracts by name and project. (Refer to Table 1, for contract number and project/contract name.)

| Contract Number | Original Contract Amount | CO Count | CO Total | Revised Contract Amount | CO % |
|---|---|---|---|---|---|
| **C0970** | **19,832,000** | **35** | **$12,353,618** | **$32,185,618.35** | **62%** |
| **C1161** | **53,752,115** | **148** | **$29,260,843** | **$83,012,958.00** | **54%** |
| **C1048** | **6,181,000** | **40** | **$2,242,237** | **$8,423,237.00** | **36%** |
| **C1168** | **67,953,655** | **39** | **$24,368,112** | **$92,321,767.42** | **36%** |
| **C1204** | **2,952,701** | **2** | **$1,018,159** | **$3,970,860.00** | **34%** |
| **C1078** | **52,830,310** | **51** | **$17,137,597** | **$69,967,906.62** | **32%** |
| **C0980** | **927,226,995** | **258** | **$276,405,958** | **$1,203,632,952.95** | **30%** |
| C1136 | 431,777,000 | 196 | $119,530,910 | $551,307,910.16 | 28% |
| C60373-C1184 | 16,187,495 | 19 | $3,693,567 | $19,881,062.00 | 23% |
| C1101 | 66,041,760 | 73 | $11,908,122 | $77,949,881.63 | 18% |
| C1153 | 11,439,000 | 13 | $2,036,849 | $13,475,849.02 | 18% |
| C1045 | 1,636,418,585 | 191 | $272,864,722 | $1,909,283,306.51 | 17% |
| C0988 | 1,272,632,356 | 561 | $176,734,198 | $1,449,366,554.43 | 14% |
| C1120 | 1,376,500,000 | 192 | $152,173,015 | $1,528,673,015.43 | 11% |
| C1166 | 84,548,733 | 43 | $8,930,546 | $93,479,279.30 | 11% |
| C1081 | 81,513,000 | 23 | $8,447,654 | $89,960,654.26 | 10% |

[7] See PMG Policy & Procedure, PC02, Project Budget.
[8] The OIG use of the term "soft costs" differs from Federal Transit Administration definitions for funding purposes.

| | | | | | |
|---|---|---|---|---|---|
| C1151 | 410,002,000 | 25 | $24,439,564 | $434,441,563.74 | 6% |
| C1207 | 8,947,201 | 15 | $374,022 | $9,321,223.38 | 4% |
| C0991 | 86,532,695 | 59 | $2,937,193 | $89,469,888.11 | 3% |
| C1034 | 6,487,020 | 13 | $156,712 | $6,643,732.27 | 2% |
| C1152 | 1,363,620,000 | 126 | $32,801,845 | $1,396,421,844.63 | 2% |
| C1197 | 470,627,000 | 23 | $9,721,218 | $480,348,218.00 | 2% |
| C1217 | 6,777,065 | 3 | $137,436 | $6,914,501.36 | 2% |
| C77307C1210 | 48,376,253 | 4 | $556,634 | $48,932,887.00 | 1% |
| C52151C11692 | 83,650,722 | 38 | $911,506 | $84,562,228.18 | 1% |
| C70396C1205 | 379,957,232 | 27 | $180,654 | $380,137,885.95 | 0% |
| C1055 | 14,430,000 | 25 | -$352,220 | $14,077,780.35 | -2% |
| C1056 | 20,250,000 | 13 | -$1,096,590 | $19,153,410.11 | -5% |
| C1157 | 3,004,000 | 6 | -$1,501,754 | $1,502,246.00 | -50% |
| **Grand Total** | **9,010,447,893** | **2,261** | **$1,188,372,329** | **$10,198,820,222** | **13%** |

Table 3: Total Change Order Activity for 29 Construction Contracts

| Contract # | Contract Name | Project # | Project Name |
|---|---|---|---|
| C0970 | Union/Patsaouras Plaza Busway Station | 202317 | Patsaouras Plaza Station Improvement |
| C0980 | Regional Connector Transit Corridor Project Design-Build | 860228 | Regional Connector |
| C1048 | WSE Project Advanced Utility Relocations (La Brea Station) | 865518 | Purple Line Section 1 |
| C1078 | Maintenance of Way/Non Revenue Vehicle Mntce Building 61S Design Build | 865518 | Purple Line Section 1 |
| C1168 | Metro Blue Line Track and System Refurbishment | 205115 | MBL Track/System Refurbish |
| C1204 | VA Shuttle and Valet Services During Construction | 865523 | Purple Line Section 3 |
| C1161 | Willowbrook/Rosa Parks Station Improvement - A & C | 210151 | Willowbrook Rosa Parks |
| | | 205115 | MBL Track/System Refurbish |

Table 4: Top 7 Construction Contracts by Percent Change Order Activity

The OIG adjusted original LOP budgets to reflect interim budgeting based on FFGA funding, however, we did not modify change order data under the construction contracts under Crenshaw/LAX or PLE-3.

Combining LOP budget data with construction contract data, the OIG analyzed the allocation of hard to soft costs using the following methodology:

Step 1: Total hard costs by construction contract: For each of the construction contracts, the OIG added a 15% reserve contract amount.

Step 2: Total hard costs by project: For each project, the OIG summed the total hard costs across all construction contracts under the project.

Step 3: Total "soft costs" by project: The OIG deducted the total hard costs from the LOP budget to identify the remaining costs as soft costs.

Step 4: The OIG analyzed the proportion of hard cost to soft cost for (a) the Original LOP Budget and (b) the Current LOP Budget. The distinction between "(a)" and "(b)" is that for "(b)" in Step 1, OIG supplements the hard costs with total change orders to date; for Step 2, the OIG uses the current revised LOP budget amount to allocate current soft costs.

Step 5: Project Status: The OIG applies an assumption regarding project status designating a project as "open" if there has been change order activity after June 2022; if not, the project is deemed "closed." The OIG acknowledges that administrative matters such as end-of-project claims may be pending.

Table 5 (appearing on page 10) summarizes the status of the LOP budget in relation to original and post-change order construction contract amounts. The data is high level (lacking detail or nuance on the circumstances of a particular project) but it offers the opportunity for observations on Metro's performance of the LOP budgets.

Negative values are shown where initial LOPs were insufficient to cover the original hard costs for construction. See, e.g., Patsaouras Plaza and PLE-1. The I-5 North County project calculated 0% hard costs – reflecting error or anomaly and is excluded from observations.

On average, the allocation for original LOP budgets is 67% hard costs and 33% soft costs. For current LOP budgets, the average allocation changes to 66% for hard costs and 34% for soft costs. In the aggregate, there minimal variability of the allocation from the original to current LOP budget. There can be wide variability within projects that are not explainable from the data alone. One can speculate that a project with hard costs lower than the average allocations (and concurrently higher soft cost allocation) has increased its reserves for additional work.

To achieve reliability in any analysis, PMG's data would have to include approved change orders and pending change orders and additionally provide transparency to received/rejected Requests for Change ("RFC"). The OIG surmises that in some instances a current LOP budget includes risk-based amounts, as mentioned in the recent LOP increase for PLE-2. However, the analysis reveals the only allocation of soft costs appears to be large or increase when either (a) there is little change order activity or (b) there may be the potential for a large end of project change order.

PMG has described that there is full visibility in its database system for all received/rejected RFCs. PMG emphasizes the timely processing of approved RFCs (which become change orders); however, with rejected RFCs, the OIG understands that the timing for final response to the contractor is less tightly controlled. The OIG will recommend robust and timely RFC tracking for purposes of monitoring the risk of potential claims by a contactor. Additionally, this information becomes key to defending Metro if the rejected matters become part of an end of project claim.

The OIG makes no recommendation about the anomaly created when a project's LOP budget is an exception to the budget process where a project can be phased but the budget is developed using an interim budget approach pending the FFGA funding. In undertaking this quantitative data analysis, the OIG assumed that revisions to the LOP budget would universally relate to construction management performance. However, we found this is not true. Policy decisions to phase separable project components due to funding constraints result in undermining the usefulness of the LOP budget as performance indicator. In such cases, it may be appropriate for Metro's Board to review and approve a "program-level" project budget concurrently with its review and approval of the latest LOP budget to allow for full transparency to the public on project costs.

## Review of Metro Construction Projects Quantitative Data

| PROJECT Information | PROJECT Cost Data | | Original LOP - Soft Costs Analysis | | Hard Costs | Current LOP - Soft Costs Analysis | | Hard Costs |
|---|---|---|---|---|---|---|---|---|
| Project Name | A. Original LOP Budget | B. Current LOP Budget | C. Original LOP Less Orig Contract Plus 15% | D. Original Percent Soft Costs (C ÷ A) | Percent of LOP 100% - Soft % (D) | E. Current LOP Less New Contract Value Plus 15% | F. Current LOP Percent Soft Costs/Reserves (E ÷ B) | Percent of LOP 100% - Soft % (F) |
| **Closed Projects** | | | | | | | | |
| MBL Track/System Refurbish | 90,800,000 | 102,300,000 | 12,653,297 | 14% | 86% | -$722,816 | -1% | 101% |
| Regional Connector | 1,420,000,000 | 1,755,800,000 | 353,688,956 | 25% | 75% | $413,082,998 | 24% | 76% |
| Crenshaw LAX Transit Corridor | 1,762,900,000 | 2,148,000,000 | 299,372,791 | 17% | 83% | $545,105,363 | 25% | 75% |
| Willowbrook Rosa Parks | 109,300,000 | 128,300,000 | 44,030,468 | 40% | 60% | $35,779,379 | 28% | 72% |
| Patsaouras Plaza Station Improvement | 16,800,000 | 50,900,000 | -6,006,800 | -36% | 136% | $15,739,582 | 31% | 69% |
| Crenshaw Closeout | 30,000,000 | 57,000,000 | 26,604,394 | 89% | 11% | $52,586,235 | 92% | 8% |
| **Open Projects** | | | | | | | | |
| Soundwall 11 | 89,200,000 | 111,000,000 | 13,251,976 | 15% | 85% | $23,143,854 | 21% | 79% |
| Rail to Rail | 115,900,000 | 140,290,000 | 18,668,957 | 16% | 84% | $11,784,484 | 24% | 76% |
| Purple Line Section 1 | 2,774,000,000 | 3,129,000,000 | 776,913,548 | 28% | 72% | $840,961,090 | 27% | 73% |
| Metro Center Street | 112,700,000 | 143,700,000 | 16,501,670 | 15% | 85% | $46,590,164 | 32% | 68% |
| Purple Line Section 2 | 2,440,900,000 | 2,574,969,299 | 857,925,000 | 35% | 65% | $839,821,284 | 33% | 67% |
| Division 20 Portal Widening | 802,000,000 | 957,000,000 | 286,840,831 | 36% | 64% | $318,616,354 | 33% | 67% |
| Purple Line Section 3 | 3,169,000,000 | 3,224,000,000 | 1,112,784,244 | 35% | 65% | $1,107,996,906 | 34% | 66% |
| Airport Metro Connector | 898,600,000 | 898,600,000 | 357,378,950 | 40% | 60% | $345,699,212 | 38% | 62% |
| Rosecrans/Marquardt | 156,400,000 | 156,400,000 | 100,767,309 | 64% | 36% | $100,210,675 | 64% | 36% |
| Eastside Access | 29,700,000 | 29,700,000 | 19,410,719 | 65% | 35% | $19,036,696 | 64% | 36% |
| I5N North County | 679,300,000 | 679,300,000 | 679,300,000 | 100% | 0% | $639,384,644 | 94% | 6% |
| **Totals** | 14,697,500,000 | 16,286,259,299 | | | | | | |
| **Average Soft Cost Estimated Allocation** | | | **4,970,086,308** | **34%** | **66%** | **5,354,816,103** | **33%** | **67%** |
| **Average Hard Cost Estimated Allocation** | | | **9,727,413,692** | **66%** | **34%** | **10,931,443,196** | **67%** | **33%** |

Table 5: Estimated Allocation of Hard & Soft Costs for 17 Projects' LOP Budgets

### 4. Visibility on Reasons for Increases to the LOP Budget

Section 3 encountered and discussed circumstances when it might be appropriate to adjust an original LOP budget to avoid mischaracterizing the bases for revisions to the LOP budget. Having established the appropriate baseline LOP budget, the OIG next reviewed LOP budget increases in the context of increases to the project's hard costs (e.g., costs paid to a contractor to design and/or build a project). For each construction contract, the OIG analyzed the "reason for change" assigned to each individual change order. In the aggregate, change order reasons data illuminates the areas of challenge for Metro in establishing and holding to its LOP budget.

The record supporting a change order must include a merit determination describing the contractor's entitlement to a change order. PMG currently uses two systems of "shorthand" descriptions to track the reasons for change in Metro's change order database. The "1994 Reasons" is Metro's legacy system used for all 2,261 change orders. Table 6 summarizes the 1994 Reasons. PMG's formal procedure "Contract Change Basis Coding System" is attached in the appendix as Attachment A.

| 1994 REASON - Change Basis | |
|---|---|
| 110 - Extra Work | 440 - Quantity Adjustments |
| 120 - Deletion of Work | 510 - Owner Design Changes |
| 130 - Contract Scope Deletion | 530 - Document Corrections |
| 210 - Delay of Work (Compens) | 540 - Value Eng - Contractor |
| 220 - Acceleration of Work | 620 - Comprehensive Claims |
| 230 - Milestone Rev (No Cost) | 710 - Outside Agency Request |
| 310 - Diff. Site Condition | 720 - Design Changes |
| 320 - Hazardous Material | 730 - Outside Agency |
| 330 - Safety Conditions | 800 - Exercz Contract Options |
| 410 - Terms/Conditions -Owner | 810 - Period of Performance |
| 430 - Editorial Clarification | 900 - Other |

Table 6: Change Basis – 1994 Reasons

A newer coding basis initiated in approximately 2018, "Reasons – Streamlined" is summarized in Table 7. PMG's initial export of data dated from January 2017 included this basis on all change orders. A second data release from 2013 forward was incomplete. Therefore, 861 change orders for the period 2013 through 2016 do not use this coding basis. For that reason, the OIG will limit its use of the "Reasons – Streamlined data.

| REASON - Streamlined Change Basis |
|---|
| 1 - Betterment |
| 2 - Third Party |
| 3 - Differing Site Conditions |
| 4 - Regulatory Requirements |
| 5 - Scope |
| 6 - Value Engineering |
| 7 - Safety |

Table 7: Change Basis - Streamlined

As a first step, the OIG analyzes the change order reason data "globally" with no parsing based on type of project for an understanding of the general distribution of change orders across "reasons for change."

Second, the OIG analyzes the change order reasons data in accordance with the OIG's Spot Check program which was adopted as a quality assurance measure following the Metro Board's adoption of the 2018 Delegation of Authority Policy reporting PMG's contracting and change order actions.[9] Under this program, selected change orders over $500,000 are reviewed for compliance with PMG's policies and procedures and to confirm best practices were used for merit and significant determinations. Additionally, recommendations and lessons learned are made in these reports. For this review, change orders were grouped by value, as follows: (a) over $500,000 (OIG Spot Check threshold value); (b) from $.01 to $500,000; and (c) $0 and net credit (deductive).

Third, the OIG classifies the data by "delivery method," referring to the type of procurement used by Metro to implement the project. For the design bid build ("dbb") method, Metro oversees pre-design research and the design process before inviting bids from general contractors to implement the completed 100% design. The subsequent construction contract involves only construction work. For a design build ("DB") type project, Metro tackles a portion of pre-design work to create preliminary designs and project requirements.[10] Metro then invites bids from vendors interested in performing both the final design (including final plans and specifications) and implementing the construction work. Bidders on DB projects are typically joint enterprises composed of independent designers and general contractors. A project that involves multiple construction contracts may have a mix of DB and dbb delivery methods. This is the case for both PLE-1 and PLE- 2 using dbb for advanced utility relocation and DB for stations and tunnels construction.

Change Order Reason Analysis

Tables 8 and 9 summarize the count and value of all 2,261 change orders by change basis code. The data is sorted from highest to lowest percent of change order by change basis. For "1994 Reasons," the Top 7 basis for change (by percentage) are bolded. The bolded data is then summarized by the accompanying Chart 2.

Consistently across all contracts and both change coding bases, the top reason for change is "Extra Work" (change to scope). The next top reasons for change orders are "Owner Design Changes," "Differing Site Conditions" and "Outside Agency" (also referred as "Third Party"). Still on the chart but as a smaller percentage is "Comprehensive Claims" and "Delay." This data appears to convey that either (a) Metro awards its construction contracts prior to establishing a fixed and stable work scope, and/or (b) Metro awards its construction contracts prior to completed pre-construction work that would allow for incorporation of all project work site constraints.

Regardless of what the data appears to convey, the OIG makes no findings on the data because descriptors are too vague to capture the true reason for a change order; as such, they

[9] See Compliance Bulletin 18-03/(Re)Delegation of Authority – Matrix Compliance Bulletin 18-03/Re-Issue of Change Order Streamlining Rules.

[10] Metro is expanding its methodologies to include variations on standard DB approaches (e.g., "progressive DB"). PMG may want to "code" its delivery methods to capture these DB variations.

are not a useful diagnostic tool for lessons learned. For example, the 110 code, Extra Work, has 958 change orders (42% of the total 2,261 change orders) and appears to be a "catch all" for a person who may not be fully informed to the exact problem.

The reasons for these changes should be more specifically identified to inform Executive Management and Metro's Board whether a change was "avoidable" versus "unavoidable." Further distinctions of descriptors could include a category of "avoidable," a term which implies the ability to apply Metro's resources *pre-procurement* to avoid the change.[11] Differing Site Conditions related to anything found under the soil, including utilities, are classic subsurface examples that could be avoidable with a more robust geotechnical exploration and supporting geotechnical report. Additionally, better coding could help identify future lessons learned and help Metro to compare the costs of better site investigation versus other change related costs for additional work.

PMG describes that its database program for tracking change orders includes a field for "Cost Recovery Type" that may provide the additional detail the OIG describes as useful and necessary. Opportunities for enhanced reporting are readily available, with improved coding standards, training, consistent, and utilization. Metro will have a much-improved change basis reporting system.

| 1994 REASON | CO Count | CO Total |
|---|---|---|
| **110 - Extra Work** | **958** | **$520,700,202** |
| **510 - Owner Design Changes** | **340** | **$228,429,064** |
| **310 - Diff. Site Condition** | **200** | **$157,199,723** |
| **620 - Comprehensive Claims** | **45** | **$87,064,248** |
| **210 - Delay of Work (Compens)** | **23** | **$60,119,831** |
| **710 - Outside Agency Request** | **173** | **$48,827,539** |
| **730 - Outside Agency** | **56** | **$30,359,462** |
| 410 - Terms/Conditions -Owner | 56 | $28,567,029 |
| 800 - Exercz Contract Options | 10 | $23,455,675 |
| 530 - Document Corrections | 160 | $22,469,535 |
| 220 - Acceleration of Work | 14 | $12,878,638 |
| 330 - Safety Conditions | 31 | $6,562,492 |
| 440 - Quantity Adjustments | 15 | $5,591,585 |
| 320 - Hazardous Material | 26 | $2,814,685 |
| 900 - Other | 5 | $1,611,401 |
| 810 - Period of Performance | 9 | $233,896 |
| 720 - Design Changes | 1 | $217,004 |
| 230 - Milestone Rev (No Cost) | 12 | $0 |
| 430 - Editorial Clarification | 49 | -$106,760 |
| 120 - Deletion of Work | 52 | -$13,112,073 |
| 130 - Contract Scope Deletion | 19 | -$13,127,098 |
| 540 - Value Eng - Contractor | 7 | -$22,383,748 |
| **Grand Total** | **2,261** | **$1,188,372,329** |

Table 8: 1994 Reason for Change - All COs – Top 7 Reasons in Bold.

| REASON - STREAMLINED | CO Count | SubTotal |
|---|---|---|
| #N/A | 861 | $413,154,981 |
| 5 - Scope | 823 | $422,394,845 |
| 3 - Differing Site Conditions | 172 | $175,950,321 |
| 2 - Third Party | 265 | $115,375,120 |
| 1 - Betterment | 25 | $59,274,704 |
| 7 - Safety | 59 | $20,055,398 |
| 4 - Regulatory Requirements | 43 | $7,525,174 |
| 6 - Value Engineering | 13 | -$25,358,214 |
| **Grand Total** | **2,261** | **$1,188,372,329** |

Table 9: Reason - Streamlined - All COs

[11] The OIG recognizes that variations on the DB delivery method are being instituted to leverage opportunity to phase construction work in a way that avoids the need for change orders.

Chart 2 displays the 1994 Reasons showing only the Top 7 change reasons and combining all other changes (only 5%) in one group referenced as "Other."

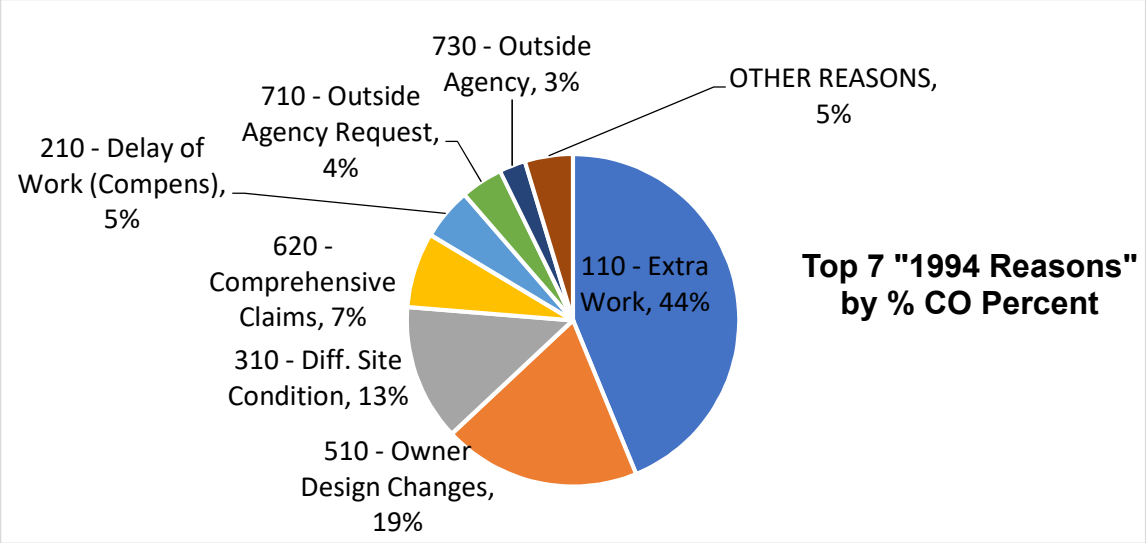



Chart 2: Top 7 "1994 Reasons" for Change Orders by Percent Across 29 Contracts

Applying the OIG's Spot Check criteria, Table 10, summarizes for 29 construction contracts initiated after 2013 the total count and value of change orders, and categorizes and subtotals the change orders according to whether they have a value of (a) no or credit amount ($0 or net credit), (b) under $500,000 and (c) over $500,000 (OIG Spot Check threshold value).

| Change Orders | Count | Value | % Count | % Value | Average Value |
|---|---|---|---|---|---|
| Over $500k | 322 | $1,068,097,081 | 14% | 90% | $3,317,072 |
| Under $500k | 1,641 | $185,205,139 | 73% | 16% | $112,861 |
| $0/Credit | 298 | -$64,929,891 | 13% | -5% | -$217,886 |
| **All COs** | **2,261** | **$1,188,372,329** | **100%** | **100%** | **$525,596** |

Table 10: Summary of Change Order Count/Value by OIG Spot Check Threshold

To highlight the impact that high dollar change orders have on the quantitative analysis of change orders, Table 11 displays a secondary sort of change orders over $10 million (each) to identify which specific construction contracts most contributed to in increased project costs. These relatively few change orders account for 53% of the value of the Over $500k change orders.

| Contract Title of Change Orders Over $10 million | DB or dbb | Change Order Value |
|---|---|---|
| Regional Connector Transit Corridor Project Design-Build | DB | $161,400,000 |
| Westside Subway Extension Project, Section 1 | DB | $136,610,016 |
| Westside Purple Line Extension, Section 2 - Design/Build | DB | $95,930,258 |
| Crenshaw/LAX Transit Corridor Design-Build | DB | $70,500,000 |
| Division 20 Portal Widening Turnback | dbb | $43,300,000 |
| Metro Blue Line Track and System Refurbishment | DB | $18,251,899 |
| Willowbrook/Rosa Parks Station Improvement - A & C | DB | $14,330,374 |
| Purple Line Extension Section 3 Stations Project - Design/Build | DB | $11,585,029 |
| Purple Line Extension Section 3 Tunnels Project | DB | $11,217,006 |
| **Grand Total** | | **$563,124,582** |
| Grand Total as Percentage of $1,068,097,081 (from Table 10) | | **53%** |

Table 11: Construction Contracts with Change Orders over $10 million

Table 12, along with Chart 3 summarizes the "Reasons" data for change orders valued over $500,000.

| OIG Spot Check Threshold Over $500,000 | | |
|---|---|---|
| REASON | Count | CO Total |
| **110 - Extra Work** | **159** | **$433,747,523** |
| **510 - Owner Design Changes** | **50** | **$200,432,418** |
| **310 - Diff. Site Condition** | **29** | **$142,365,753** |
| **620 - Comprehensive Claims** | **11** | **$83,403,353** |
| **210 - Delay of Work (Compens)** | **14** | **$59,123,642** |
| **710 - Outside Agency Request** | **18** | **$33,129,741** |
| **410 - Terms/Conditions -Owner** | **4** | **$32,120,971** |
| 730 - Outside Agency | 8 | $25,591,513 |
| 800 - Exercz Contract Options | 8 | $23,015,675 |
| 220 - Acceleration of Work | 3 | $11,512,634 |
| 530 - Document Corrections | 8 | $8,542,823 |
| 440 - Quantity Adjustments | 3 | $4,606,000 |
| 330 - Safety Conditions | 5 | $4,571,897 |
| 900 - Other | 1 | $4,400,000 |
| 120 - Deletion of Work | 1 | $1,533,138 |
| **Grand Total** | **322** | **$1,068,097,081** |

Table 12: "1994 Reasons" - Change Orders over $500,000Top 7 Reasons in Bold

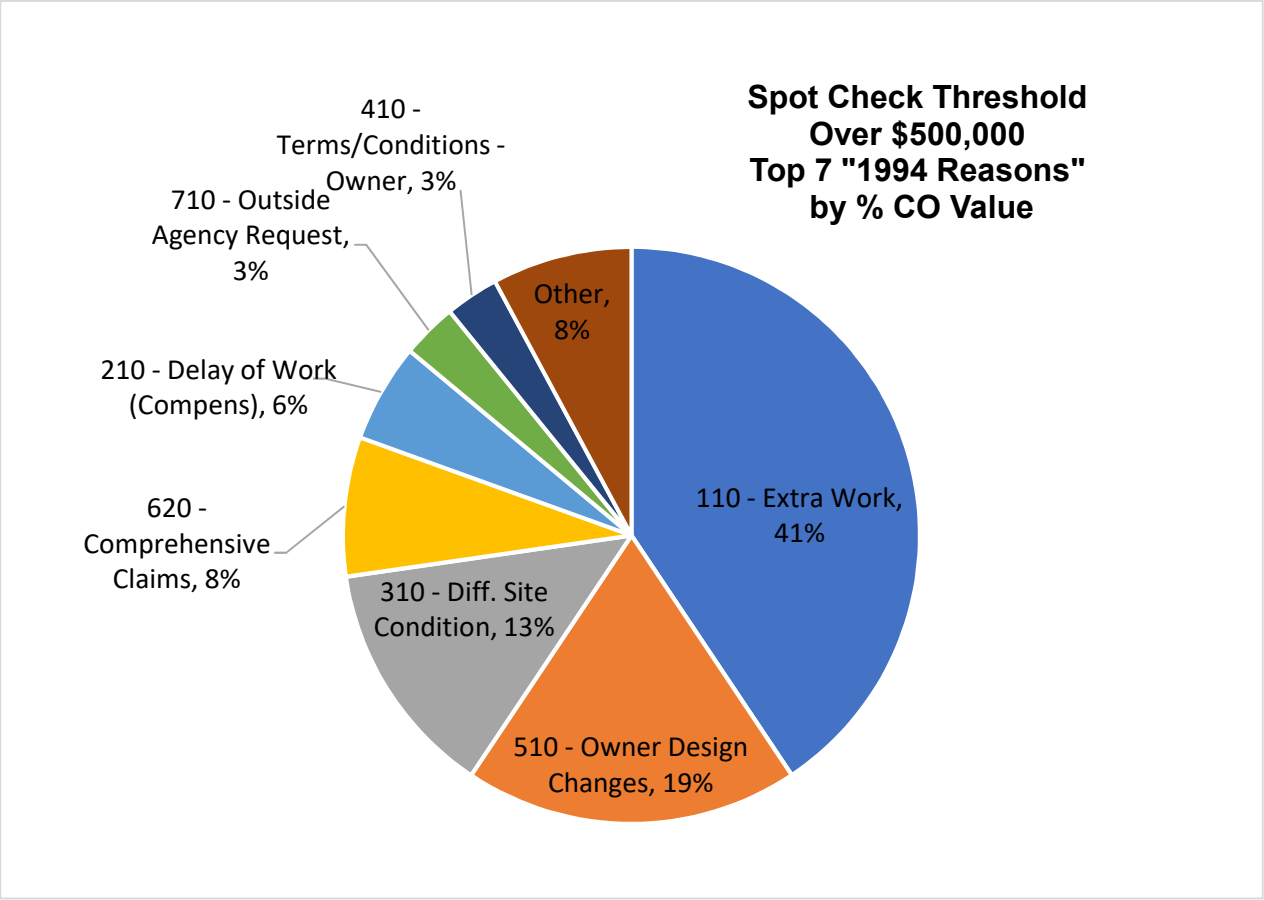



Chart 3: Top 7 “1994 Reasons” for Change Orders Over $500,000 by Percent

Charts 4 and 5, summarize the Top 7 Reasons for Change by percentage of change orders for change orders valued under $500,000 and $0/credit value.

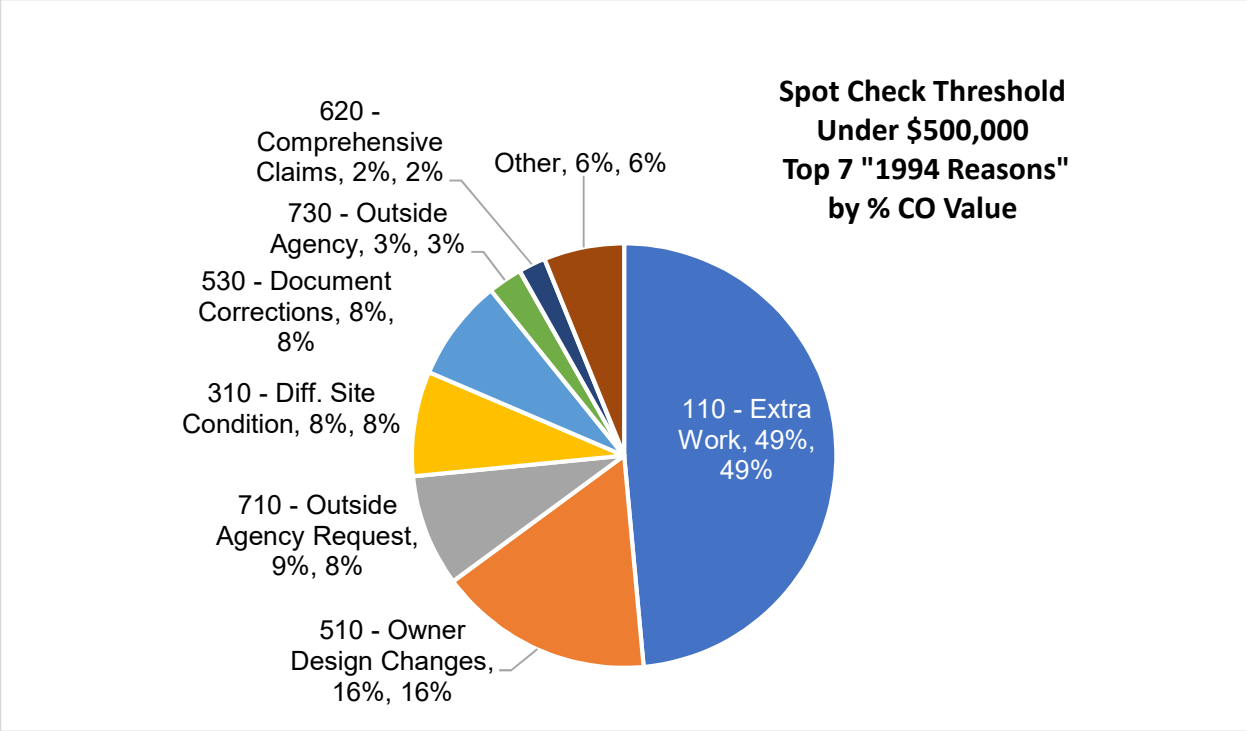



Chart 4: Top 7 "1994 Reasons" for Change Orders Under $500,000 by Percent

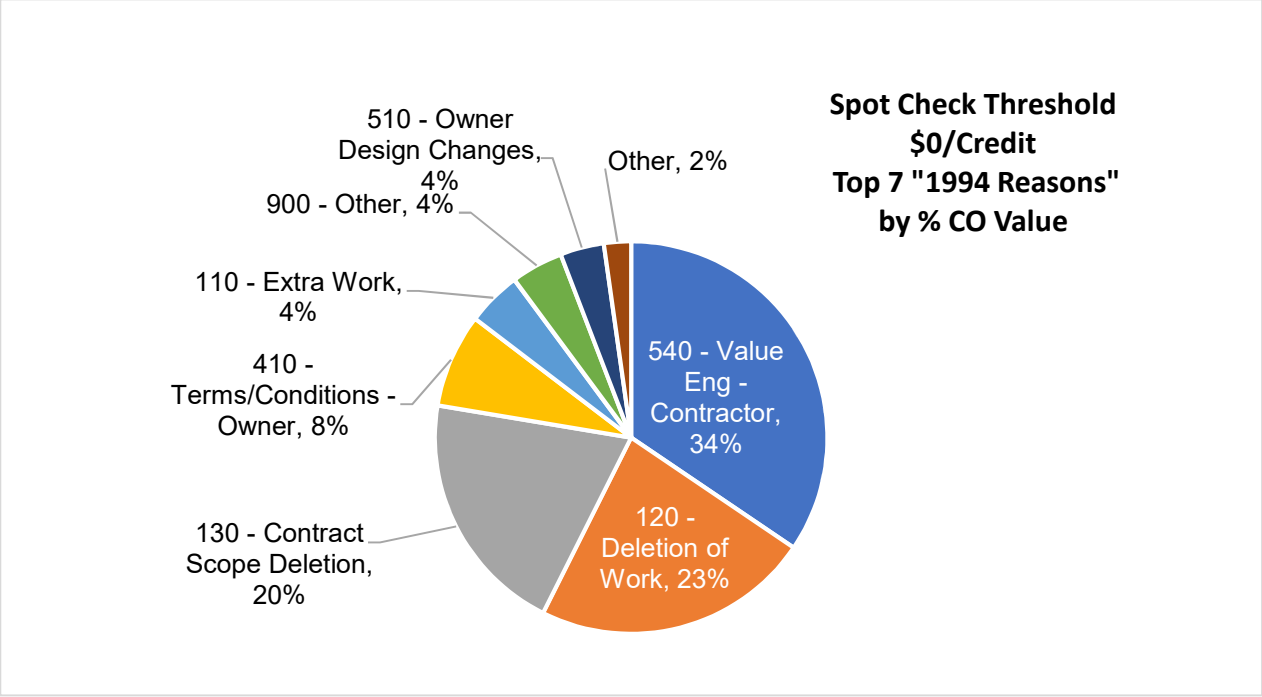



Chart 5: Top 7 "1994 Reasons" for Change Orders for $0/Credit by Percent

Finally, the OIG analyzed the change order data for distinctions or patterns related to delivery method for Design Build (DB) versus Design Bid Build (dbb) projects using only the "Reasons-Streamlined" coding basis. Tables 13 and 14 summarize the Top 7 1994 Reasons with all remaining change orders combined under the category of "Other") with a dollar total and a count of change orders for each classification.

| DESIGN BUILD CONSTRUCTION CONTRACTS | | | |
|---|---|---|---|
| **1994 REASON** | **% CO** | **SubTotal** | **Count** |
| 110 - Extra Work | 47% | $485,211,952 | 796 |
| 510 - Owner Design Changes | 15% | $157,545,580 | 257 |
| 310 - Diff. Site Condition | 13% | $135,545,497 | 134 |
| 620 - Comprehensive Claims | 8% | $87,064,248 | 45 |
| 210 - Delay of Work (Compens) | 5% | $49,632,191 | 16 |
| 710 - Outside Agency Request | 4% | $44,704,342 | 159 |
| 410 - Terms/Conditions -Owner | 3% | $29,565,467 | 44 |
| Other | 4% | $40,064,794 | 301 |
| **Grand Total** | | **$1,029,334,072** | **1752** |

Table 13: Top 7 1994 Reason for Change - DB Contracts

| DESIGN-BID-BUILD CONSTRUCTION CONTRACTS | | | |
|---|---|---|---|
| **1994 REASON** | **% CO** | **SubTotal** | **Count** |
| 510 - Owner Design Changes | 45% | $70,883,484 | 83 |
| 110 - Extra Work | 22% | $35,488,251 | 162 |
| 310 - Diff. Site Condition | 14% | $21,654,225 | 66 |
| 530 - Document Corrections | 9% | $14,536,322 | 89 |
| 210 - Delay of Work (Compens) | 7% | $10,487,639 | 7 |
| 710 - Outside Agency Request | 3% | $4,123,197 | 14 |
| 730 - Outside Agency | 2% | $3,975,775 | 16 |
| Other Reasons | -1% | -$2,110,636 | 72 |
| **Grand Total** | | **$159,038,258** | **509** |

Table 14: Top 7 1994 Reason for Change - dbb Contracts

Charts 6 and 7 visually summarize the data in Tables 13 and 14 and show that the majority of changes under both DB and dbb related to either (a) Extra Work or (b) Owner Design Changes. However, the proportion of each of those change categories "flips" for DB versus dbb projects. For DB projects, Extra Work is 47% of the change orders, for dbb the proportion is only 22%. For dbb projects, Owner Design Changes is 45% of the change orders and for DB that reason for change is 15% of change orders. The OIG observes that the total amount of these two categories of changes (Extra Work plus Owner Design Changes) is 62% for DB projects and 67% for dbb projects.

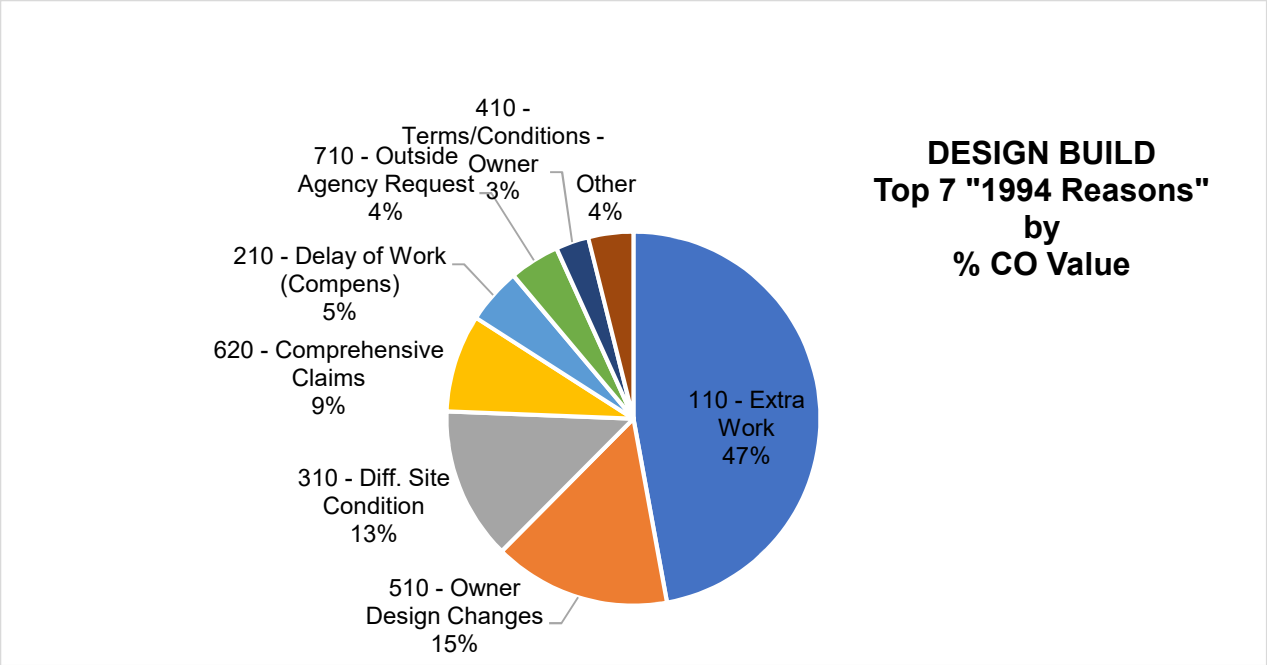



Chart 6: Top 7 DB 1994 Reasons for Change, by Change Order Value

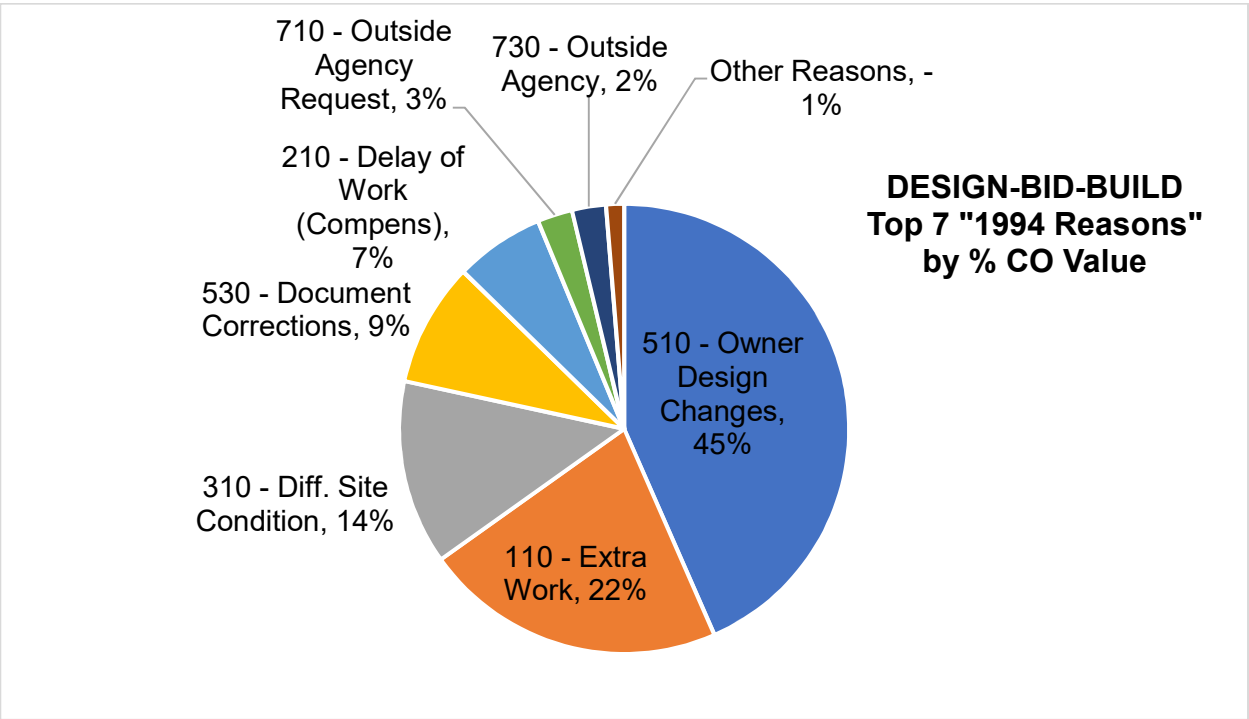



Chart 7: Top 7 dbb 1994 Reasons for Change, by Change Order Value

The OIG surmises that for the DB delivery method the contractor's involvement at the design phase limits the need for post-award design changes but will lead to extra work not identified at the time of contract award. Conversely, for dbb delivery method projects, changes identified after contract award are typically the result of design errors or omissions. Since these two categories of change together account for between 62% to 67% of changes, one method of delivery may not necessarily be "better than the other" for avoiding change orders. But looking at Table 15, it does appear that the dbb method tends to have a lower overall change order cost impact.

| Contract No. | Original Contract Amount | COs Count | Total of COs | Av CO Value | New Contract Value | % COs |
|---|---|---|---|---|---|---|
| **CLOSED DESIGN-BUILD (DB)** | | | | | | |
| C0970 | $19,832,000 | 35 | $12,353,618 | $352,961 | $32,185,618 | 62% |
| C0980 | $927,226,995 | 258 | $276,405,958 | $1,071,341 | $1,203,632,953 | 30% |
| C0988 | $1,272,632,356 | 561 | $176,734,198 | $315,034 | $1,449,366,554 | 14% |
| C0991 | $86,532,695 | 59 | $2,937,193 | $49,783 | $89,469,888 | 3% |
| C1078 | $52,830,310 | 51 | $17,137,597 | $336,031 | $69,967,907 | 32% |
| C1081 | $81,513,000 | 23 | $8,447,654 | $367,289 | $89,960,654 | 10% |
| C1157 | $3,004,000 | 6 | -$1,501,754 | -$250,292 | $1,502,246 | -50% |
| C1161 | $53,752,115 | 148 | $29,260,843 | $197,708 | $83,012,958 | 54% |
| C1168 | $67,953,655 | 39 | $24,368,112 | $624,823 | $92,321,767 | 36% |
| **Subtotal** | **$2,565,277,126** | **1,180** | **$546,143,420** | **$462,833** | **$3,111,420,546** | **21%** |
| **OPEN DESIGN-BUILD (DB)** | | | | | | |
| C1045 | $1,636,418,585 | 191 | $272,864,722 | $1,428,611 | $1,909,283,307 | 17% |
| C1120 | $1,376,500,000 | 192 | $152,173,015 | $792,568 | $1,528,673,015 | 11% |
| C1151 | $410,002,000 | 25 | $24,439,564 | $977,583 | $434,441,564 | 6% |
| C1152 | $1,363,620,000 | 126 | $32,801,845 | $260,332 | $1,396,421,845 | 2% |
| C52151C1169-2 | $83,650,722 | 38 | $911,506 | $23,987 | $84,562,228 | 1% |
| **Subtotal** | **$4,870,191,307** | **572** | **$483,190,651** | **$844,739** | **$5,353,381,958** | **10%** |
| **Open+Closed** | **$7,435,468,433** | **$1,752** | **$1,029,334,072** | **$587,519** | **$8,464,802,505** | **14%** |
| **CLOSED DESIGN-BID-BUILD (dbb)** | | | | | | |
| C1034 | $6,487,020 | 13 | $156,712 | $12,055 | $6,643,732 | 2% |
| C1048 | $6,181,000 | 40 | $2,242,237 | $56,056 | $8,423,237 | 36% |
| C1055 | $14,430,000 | 25 | -$352,220 | -$14,089 | $14,077,780 | -2% |
| C1056 | $20,250,000 | 13 | -$1,096,590 | -$84,353 | $19,153,410 | -5% |
| C1153 | $11,439,000 | 13 | $2,036,849 | $156,681 | $13,475,849 | 18% |
| C1217 | $6,777,065 | 3 | $137,436 | $45,812 | $6,914,501 | 2% |
| **Subtotal** | **$65,564,085** | **107** | **$3,124,425** | **$29,200** | **$68,688,510** | **5%** |
| **OPEN DESIGN-BID-BUILD (dbb)** | | | | | | |
| C1101 | $66,041,760 | 73 | $11,908,122 | $163,125 | $77,949,882 | 18% |
| C1136 | $431,777,000 | 196 | $119,530,910 | $609,852 | $551,307,910 | 28% |
| C1166 | $84,548,733 | 43 | $8,930,546 | $207,687 | $93,479,279 | 11% |
| C1197 | $470,627,000 | 23 | $9,721,218 | $422,662 | $480,348,218 | 2% |
| C1204 | $2,952,701 | 2 | $1,018,159 | $509,080 | $3,970,860 | 34% |

| | | | | | | |
|---|---|---|---|---|---|---|
| C1207 | $8,947,201 | 15 | $374,022 | $24,935 | $9,321,223 | 4% |
| C60373C1184 | $16,187,495 | 19 | $3,693,567 | $194,398 | $19,881,062 | 23% |
| C70396C1205 | $379,957,232 | 27 | $180,654 | $6,691 | $380,137,886 | 0% |
| C77307C1210 | $48,376,253 | 4 | $556,634 | $139,159 | $48,932,887 | 1% |
| **Subtotal** | **$1,509,415,375** | **402** | **$155,913,833** | **$387,845** | **$1,665,329,207** | **10%** |
| **Open+Closed** | **$1,574,979,460** | **509** | **$159,038,258** | **$312,452** | **$1,734,017,718** | **10%** |
| **Grand Total** | **$9,010,447,893** | **2,261** | **$1,188,372,329** | **$525,596** | **$10,198,820,222** | **13%** |

Table 15: All Change Orders by Delivery Method, Status, Count, Value and CO Percent

Table 15 shows that DB projects experience a slightly higher level of cost increase due to change order activity (whether open or closed) than dbb projects (DB 14% vs dbb 10%).

- DB – The data also shows that closed DB projects experienced a higher percentage cost increase due to change orders than open projects are currently experiencing. This could mean either early DB projects had a high "learning curve" – or there could be forthcoming additional change order activity on open projects. There is no data to suggest the 21% change order cost increase for DB contracts is "typical," but there is no evidence to suggest the 10% level for the open DB contracts will hold.
- dbb – The data shows closed dbb projects had about 5% in cost increase due to change orders and open projects are currently at 10%. It is notable that larger value contracts are now "in the mix" for open status dbb construction contracts, as compared to closed dbb contracts.

The "Grand Total" row shows that overall, Metro is experiencing a 13% average cost increase due to change order activity across all projects from 2013 to today. However, over half the construction contracts are still open and may have pending or future claims that may result in additional change orders to the contract.

### 5. Enhancements on the Horizon

The 2023 OIG Construction Best Practices Report identifies and discusses three strong initiatives in place and evolving in response to lessons learned that promise to improve Metro's performance on budget and schedule. The OIG also proposes (without necessarily recommending), expanding tools in the negotiation toolbox for resolving disputed delay matters.

LOP Budget Process: In the March 2023 Construction Committee meeting, [Legistar # 2023-0172], PMG presented an 18-point strategic initiative for enhancing its LOP budgeting processes. These new initiatives promise across-the-board improvement to the FY24 Annual Program Evaluation (APE) process and underlying budgeting practices. PMG in collaboration in the Office of Management and Budget have identified enhancements to the process typically used to establish the LOP budget. As discussed, PMG's procedures already contemplate that a "preliminary LOP budget" could be put in place which would be superseded by the "true" baseline LOP budget. One baseline LOP budget may not support the design-build delivery method. Multiple reviews may be needed to reach the final baseline LOP budget as the project's design is moved toward completion. The OIG makes no recommendation in this regard, but it may be necessary for PMG and the Office of Management and Budget to engage in multiple budget reviews.

Risk Management – Metro's Risk Management program appears to be well-developed and ready to provide important and constructive guidance across all projects. Reliable LOP budgets require careful consideration of the risk guidance. Risk reviewers suggest mitigation measures and make estimates based on the agency adhering to construction best practices and include this in a comprehensive pre-construction investigation and preparation reports. If this approach is not followed without justification for a less conservative risk method, management may be foregoing a best practice approach. If the extent of the risk is not identified, the LOP budget may be exceeded.

Early Intervention Team ("EIT") –The EIT shows promise of both enhancing Metro's construction management best practices and improving capital project delivery outcomes. Coordinated inter-departmental collaboration across the project life cycle will be a potentially stronger mitigator of cost impacts.[12,13]

The EIT's Project Review Program describes that an inter-departmental Metro team will review and analyze project planning and readiness across 7 key intervention points. Importantly, the soundness of the LOP budget will be visited at 6 of the review stage gates:

1. EIT Project Review #1 ("EIT-1") – Simultaneously with the development of the Draft Environmental Impact Report, the EIT will identify whether a rough order of magnitude ("ROM") has been developed for each project alternative.
2. EIT-2, Pre-Final Environmental – At this intervention point, the EIT will revisit current ROMs for the project alternatives and encourage deep review of value and cost drivers.
3. EIT-3, Pre-transition to Engineering – As early engineering plans are developed and refined, the EIT will check in on the process of moving from the ROM toward a "best practice" cost and schedule estimate.
4. EIT-4, Pre-Final Delivery Method Selection – As the selected project alternative moves into the Engineering Phase, Metro will start looking at delivery method. The EIT will intervene to review risk issues and the developing schedule and cost estimates.
5. EIT-5, Pre-RFP/IFB Release[14] – The EIT will engage to review "true readiness" to ensure that scope, schedule and cost risk is properly allocated between the designer, contractor, and Metro.
6. EIT-6, Pre-Notice to Proceed – The EIT will intervene to check whether baseline schedule, and awarded construction costs are within the LOP budget, including acceptable level of contingency for risks.

[12] Experts from the Office of the CEO, Operations, Program Management, Countywide Planning and Development, Office of Management and Budget, Vendor/Contract Management, Government Relations and Customer Experience participate. See Board Report Nos. 2023-0073 and 2023-0106 - Informational Reports with detailed Attachments presented to the Construction Committee on March 16, 2023.

[13] Board Report No. 2023-0106, Attachment A, provides a summary of the context and history of the EIT. Board Report Nos. 2022-0168, 2022-0361, and 2022-0565 offer a "deeper dive" into EIT's history.

[14] "RFP" is "Request for Proposal" and "IFB" is "Invitation for Bids."

OIG Proposal for Facilitating Resolution of Delay-Related Impacts – Metro's goal should be to quickly and comprehensively "resolve the resolvable." Expanding the "tools" available to resolve contested delay issues may be necessary.

PMG and V/CM are encouraged to consider adding to all future construction contracts three alternative escalating scenarios for substantiated "delay damages" not feasible to mitigate through acceleration or other measures. These provisions will require detailed contract language to define and administer. As a condition of receipt of an equitable adjustment for delay, the Contractor must provide a written release agreeing that accepting the enhanced markup releases Metro from further liability for alleged delay and ripple effect impacts related to the Additional Work which will include all subcontractors of any tier. In the event of dispute, the contract should provide notice that the rates will be subject to audit. From lowest to highest delay impacts:

(a) Additional Supervision Delay ("ASD") Rate: For this type of delay, Metro would agree to pay an enhanced mark up to labor for the Additional Work, e.g., 15 + x% instead of 15%.

(b) Field Overhead and Ripple Effect Delay ("FORED") Rate: In addition to an enhanced 15 + x% labor markup, Metro agrees to pay to the contractor the bid FORED daily rate that compensates for material impacts to non-critical path work and other alleged delay and ripple effect impacts. The FORED shall not exceed x% of the daily rate bid for critical path delays, e.g., CPRED.

(c) Critical Path and Ripple Effect Delay ("CPRED") Rate: In addition to an enhanced 33% labor markup, Metro agrees to pay to the contractor the bid CPRED daily rate that compensates for material impacts to critical path work and other alleged delay and ripple effect impacts.

## OIG Part A "COST/BUDGET" Recommendations

1. PMG should enhance LOP budget revision tracking by implementing coding to capture reasons for revisions to the LOP budget so management and the Board can readily identify why the increase is requested.

2. PMG should separately track and report project soft costs versus hard costs (construction) to enhance LOP budget usage and report in the Annual Program Evaluation presented to the Board.

3. PMG should expand the Revised Change Base Coding for "Extra Work" to specifically identify the nature of the change (from 5 to 10 codes max) and allow differentiation between field changes. All project staff and V/CM must be trained in the new codes to appropriately choose the correct base coding. This extra identification will provide transparency to the public regarding the reasons for post-award change orders to contractors.

4. PMG should determine if adding an identification of "avoidable" for coding of change orders would enhance future reporting and better allocate resources where needed.

5. PMG should determine if it would benefit Metro and the public to: Identifiably track change orders that have been resolved following Dispute Resolution Board and/or partnering efforts.

6. PMG should determine if it would be helpful to track Document Control smaller projects the same as larger, because smaller projects still involve many millions of taxpayer dollars.

## B. SCHEDULE

In this section, the OIG is using PMG's data to review the status of Project Schedules. PMG provided schedule data for 13 projects including planned versus revised data schedule data. For each project, the OIG was provided (a) the original and revised substantial completion date and (b) the original and revised revenue service dates. PMG provided a "variance" (in months) calculated from the difference between the original and revised dates (same result whether based on substantial completion or revenue service).[15]

The OIG converted the delay from months to days. For seven (7) DB projects, in response to the OIG's request for a project "start date," PMG provided an award date for at least one associated construction contract. The OIG used that date to compare original project time to actual/forecasted project time.

For "closed" projects, the OIG assumes that schedule data is fixed and reliable. For "open" projects, the OIG makes no similar assumption.[16] The number of days delay to a project may not be the same as the number of days delay to a construction contract but delay to construction contracts are typically drivers to project delay.

Table 19 below summarizes schedule delay from 0 to almost 1600 days (4.3 years) by project showing Open versus Closed status and showing the delivery method.

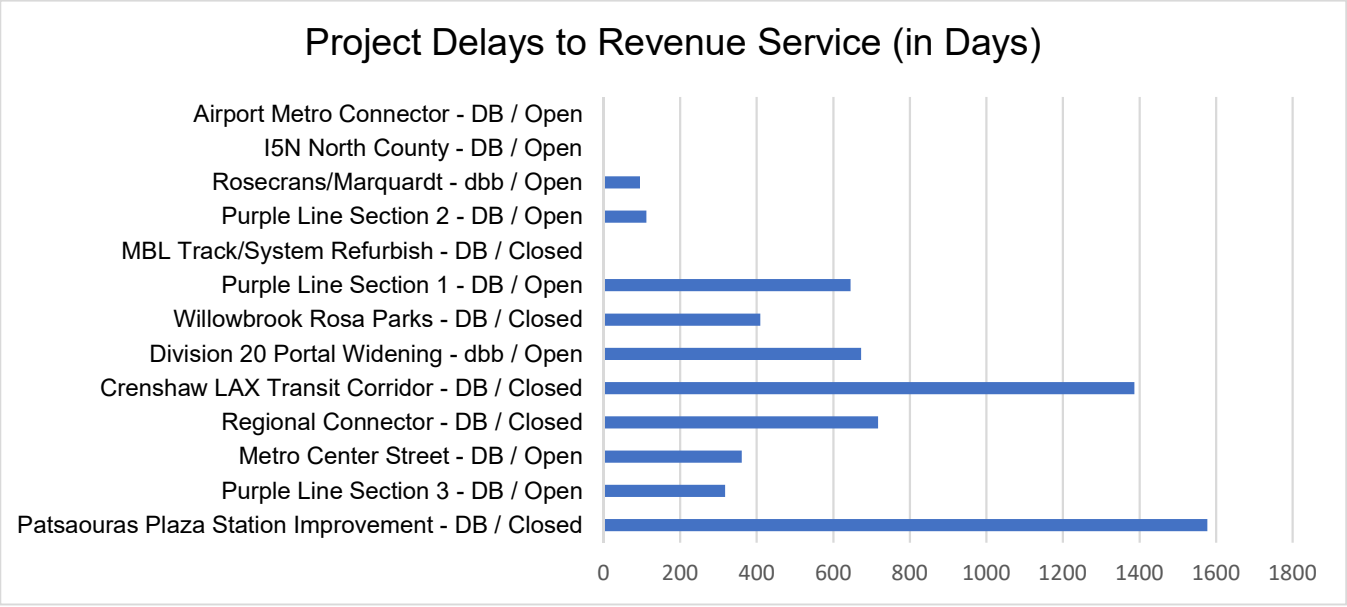



Chart 7: Project Schedule Delay by Days, Status and Delivery Method

[15] For this review, the OIG did not adjust the original LOP budget to reflect interim budgeting practices, as described under A. COSTS/BUDGET.

[16] The OIG's 2023 Best Practices Report touches upon construction management challenges related to (a) resolution of delay claims, and (b) transparent and useful tracking of disputed claims.

Table 20 lists the 7 projects that the PMG provided an award date for at least one construction contract. The OIG used that award date as a "proxy" for the "start date" of the project (which may not be 100% accurate) and calculated the original anticipated number of days for the project (original revenue service date less contract award date). This provided a "schedule variance" as an additional data point to the schedule variance based on the count of days. This data does not demonstrate a clear correlation between LOP budget variance and schedule variance.

| Project #'s | Project | LOP Variance | Schedule Variance |
|---|---|---|---|
| 210151 | Willowbrook Rosa Parks - DB / Closed | 17% | 85% |
| 202317 | Patsaouras Plaza Station Improvement - DB / Closed | 203% | 64% |
| 865512 | Crenshaw LAX Transit Corridor - DB / Closed | 23% | 41% |
| 860228 | Regional Connector - DB / Closed | 24% | 22% |
| 865518 | Purple Line Section 1 - DB / Open | 13% | 17% |
| 205115 | MBL Track/System Refurbish - DB / Closed | 13% | 0% |
| 860303 | Airport Metro Connector - DB / Open | 0% | 0% |

Table 20:

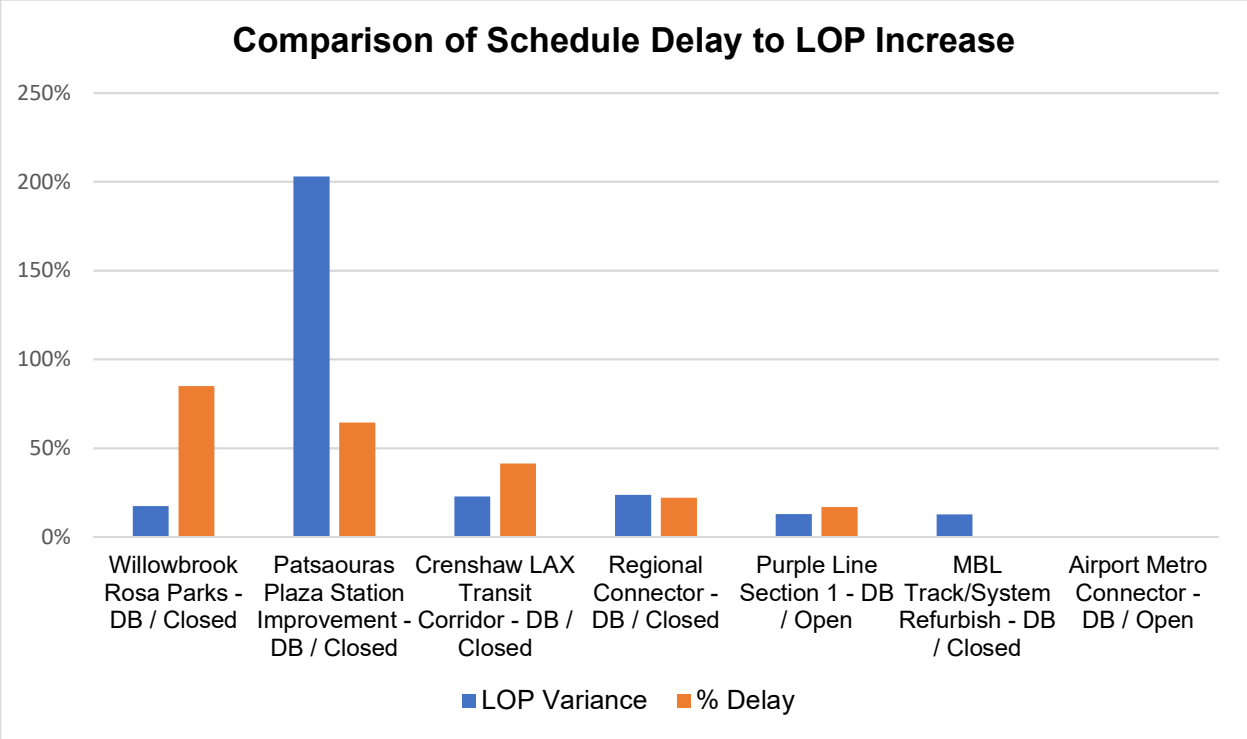



Chart 8: Comparison of Percent Delay to Percent LOP Variance.

Chart 8 allows for review of the correlation between schedule delay and LOP budget increases. The LOP budget increase and delays to the schedule may have a greater correlation to the reason for change order than any other factor and reveals distinctions that bear explanation. The Patsaouras Bus Plaza project appears to have LOP increases much larger

than impacts on the schedule. The OIG understands that archeological mitigation took a full year which incurred substantial delay costs. The Willowbrook project shows a much greater delay variance when compared to LOP variance, which suggests the delays occurred were not wholly compensable in nature. As for the Crenshaw/LAX project, the delay percentage appears to exceed LOP budget variance; close-out claims are pending, and these variances may change. The other projects shown seem to have comparable delay and LOP budgets variances. Currently, the Airport Metro Connector shows no increase to cost or time.

Two challenges are apparent from the quantitative review of schedule data, (1) Disputes between Metro and the contractor on delay issues may result in some lack of visibility as to actual or forecasted delay; and (2) there is no separate protocol for assigning a "reason for change" solely to contract time extensions. For schedule disputes, the PMG may want to consider independently tracking under project data (not construction contract data) "trend" information related to schedule.

Schedule delay disputes typically pertain to monetary damages (e.g., liquidated damages to Metro and/or compensation to the contractor). Regardless of outcome, if a project is trending as delayed, this information needs to be tracked and reported. The 1994 Reasons discussed earlier in this report has a code for "delay of work" when, if used, obfuscates the underlying reason for the delay (such as for differing site conditions versus design change).

**OIG Part B "SCHEDULE" Recommendations:**

7. PMG should enhance Metro's LOP schedule reporting by providing visibility to specific project delay at the project level and at the construction contract level. In Part A, Costs/Budget, above, the OIG provided recommendation(s) pertaining to enhanced change order reasons coding. A new separate coding basis should be considered at the project level to distinguish between construction contract-related delay, e.g., if funding is delayed.

## C. SAFETY

### Introduction

Metro's construction contract imposes upon the contractor (a) health and safety requirements for employees as well as Metro's team and third parties, and (b) requirements for security, which includes minimizing harm to Metro's property, contractor's in-process work, equipment and materials, and third-party property. We reviewed data for indicators of Metro's performance in overseeing contractor adherence to best safety practices. The data shows that Metro's success varies based on the contractor's safety culture and practices. Also, Metro's Construction Safety Team ("Safety Team") shared initiatives to enhance safety outcomes, which the OIG adopts as recommendations so that these initiatives continue if successful, are tracked, and updated.

### Construction Safety Data

We reviewed four sample projects: (1) Crenshaw/LAX, (2) Westside Purple Line Extension Section 1 ("PLE-1"), (3) Westside Purple Line Extension Section 2 ("PLE-2"), and (4) Regional Connector. Metro's Safety Team provided the following data topics:

- Project Injury and Incident Logs.
- Contractor's monthly submittal, "Safety – Injury and Work Hours Report" (on the jobsite) for August 2022 (one sample).
- Safety Reviews:
    - June 6, 2023, C1120 Management System Audit Report – Worksite Safety Audit for PLE-2.
    - June 12, 2015, CEO Washington's Response to Metro Board on Crenshaw/LAX Project Safety.

The OIG interviewed two Safety Team members and revisited documentation gathered during the 2023 OIG Construction Best Practices Report, e.g., General Provisions pertaining to safety and Metro's Construction Safety and Security Manual ("Safety Manual"), which is incorporated by reference in the contractor's construction contract.

### Background

Contractor's Duties: Metro's construction contract delegates to the contractor express duties for workplace safety. Contractor's duties include (a) broad direction to comply with applicable laws related to safety, including Cal/OSHA (state/federal law), and (b) specific contractual (including Construction Safety and Security Manual ("Safety Manual")) requirements pertaining to safety submittals, notice of injuries and property incidents, and administrative reporting and documentation requirements. Also, the contractor must notify Metro of the following types of incidents:

- injury to employees (contractor or subcontractor),
- injury to other individuals,
- incidents of damage to public, private, and commercial property, and
- "near miss" incidents related to the above.

Email notice is authorized for injury requiring first aid or less; a Supervisor's Incident Investigation Report, CS-52, is required for more serious injuries.[10] (See Safety Manual, pp. 59-60.)

On a monthly basis, the contractor is required to submit an Injury Summary and Work Hour Report, which needs to comply with Metro's Recordkeeping Policy for Occupational Injuries and Illnesses.

Metro's Duties: Metro's Safety Team (a) receives and reviews the contractor's Safety Program submittals and other related monthly documents, (b) engages daily with the contractor's safety team to encourage and monitor safety practices at the worksite, and (c) acts as Metro's "eyes and ears" on the site to survey and observe safety best practices. In overseeing contractor's safety duties, the Safety Team may not interfere with the contractor's work. In general, any person on a worksite observing a patently unsafe work practice may act to correct or halt the unsafe practice.

Notice and Documentation: Cal/OSHA requires the contractor to keep and submit a Log of Work-Related Injuries and Illnesses (Form 300) documenting defined safety incidents. Annual totals for incident categories are required to be summarized and submitted (Form 300A). An Injury and Illness Incident Report is required for "recordable" work-related injuries and illnesses (Form 301). Cal/OSHA permits employee names to be redacted from documentation for privacy. Cal/OSHA does not require its documentation to be shared with owners such as Metro. Metro's contract does not require the contractor to provide a copy of its Cal/OSHA records.

## Safety of Persons and Property Data

The Safety Team's Excel-based Injury and Incident Logs ("Incident Logs") vary across projects and the log format changes over time and across projects. For instance, the Crenshaw and Regional Connector Incident Logs track: date, company, incident classification, and location (e.g., worksite or a street intersection) and include a "Remarks" field (typically a detailed narrative). PLE-1's Incident Log is like Crenshaw's but omits Company. PLE-2's Incident Log does not track Company or Location but includes Incident Classification and two columns that together provide information about the event and contractor's planned measures to avoid a future similar event.

Crenshaw's lengthy Incident Log (listing 788 incidents) contains some variability on use of the key field of "incident classification" which prompted the OIG to develop its own safety coding to maximize the level of detail that could be analyzed. The coding first distinguishes between two categories titled "(A) Safety/Health" which pertains data on the contractor employees, and "(B) Safety of Property & Third Parties" which relates to all other types of incidents involving non-employees and property. Coding for incident classification and subclassification under each category was also developed and applied. The OIG also coded the incident for general location, e.g., "onsite" versus "offsite."[11] Lack of detail on safety incidents hampered the OIG's use of subclassifications for category "(A) Safety/Health".

[10] Thorough investigations are required to generate recommendations for corrective actions to prevent recurrence of similar incidents. (Safety Manual, p. 61.) The contractor is required to submit its fact-gathering documentation along with drawings and pictures to Metro; and the contractor is required to accommodate Metro's request for a contemporaneous investigation. Upon completion of the investigation, the contractor is to engage in analysis and corrective action.

[11] An example of an offsite incident would be a "fender bender" by an employee while on lunch break.

Tables 22 and 23, depict the OIG safety coding applied to the incident logs for Crenshaw, PLE-1, and PLE-2.

| Codes | (A) SAFETY /Employee Health |
|---|---|
| 1 | Recordable |
| | A. Death |
| | B. Loss of Consciousness |
| | C. Days away from work |
| | D. Restricted work activity/transfer |
| | E. Medical treatment >first aid |
| 2 | First Aid |
| | F. Not Recordable |
| 3 | Other |
| | G. Needlestick |
| | H. Medical removal from field |
| | I. Tuberculosis |
| | J. Hearing Test |
| 4 | Near Miss |
| 5 | Wobbler (Recordable?) |
| 6 | Administrative Non-Compliance & OSHA Inspections |
| 7 | Substance Abuse |

Table 20: Category (A) - Safety/Employee Health

| Codes | (B) SAFETY/Third Party & Property |
|---|---|
| 11 | Property Damage (UTILITY) |
| | K. Contractor probable liability |
| | L. Contractor potential non-liabilty |
| 12 | Property Damage (NON-UTILITY) |
| | M. Vehicle |
| | N. Other |
| 13 | Third Party Involvement |
| | O. Loss - Property, Damage, Theft |
| | P. Non-loss |
| | Q. Other |
| 14 | Workplace Violence w Employees |
| 15 | Work Stop (NON-Gas) |
| | R. Archeology |
| | S. Safety Stand-down/Check |
| | T. Other |
| 16 | Work Stop (GAS) |
| 17 | Work Stop (Other) |
| 18 | Third Party Injury from Work |

Table 21: Category (B) - Safety/Third Party & Property

"Wobbler" is used by the OIG to code for first aid incidents that jump off the page as a potentially recordable event. It may not be Metro's duty to enforce the contractor's Cal/OSHA compliance but if a pattern emerges of "loose" designations, Metro should follow up with the Contractor.

(A) Safety/Employee Health Data

Tables 22A and 22B summarize for the four sample projects the OIG's quantitative analysis of the number and type of safety incidents within and across the four sample projects. The analysis uses the total employee workhours (at the end of the project for closed projects, and "to date" for open projects) to calculate "experience ratings."

The insurance industry has developed a formula for calculating an employer's "experience modification rating" ("EMR") to identify the level of risk of harm to employees on the job site based on recordable injuries.[17] An EMR close to "1.00" indicates average safety incidents.

[17] The formula takes the number of recordable injuries experienced on a job and multiplies that number by 200,000 work hours, then divides by that number by the total number of employee hours.

Lower than 1.00 is considered better than average safety performance; higher than 1.00 is treated as reflecting poor safety outcomes.

Determining an EMR is either infeasible or will be inaccurate for new or small projects based on the low number of workhours. But for large projects, the EMR is very helpful for capturing a project's safety profile and for tracking "trends" over time. The EMR is a "lagging indicator" meaning it may take a cycle or two of changed performance for current practice to be accurately depicted in the data.

| CLOSED PROJECTS (A) SAFETY /Employee Health | | Regional Connector | | % per 200k Work Hours | Crenshaw / LAX | | % per 200k Work Hours |
|---|---|---|---|---|---|---|---|
| 0-9 | Types of Safety Incidents | 7,886,846 Work Hours | | | 12,059,920 Work Hours | | |
| 1 | Recordable | 28 | 25% | 0.71 | 85 | 22% | 1.41 |
| 2 | First Aid | 30 | 27% | 0.76 | 213 | 56% | 3.53 |
| 3 | Other | 1 | 1% | 0.03 | 1 | 0% | 0.02 |
| 4 | Near Miss | 20 | 18% | 0.51 | 52 | 14% | 0.86 |
| 5 | Wobbler (Recordable Not First Aid?) | 0 | 0% | 0.00 | 11 | 3% | 0.18 |
| 6 | Administrative & OSHA Inspections | 28 | 25% | 0.71 | 17 | 4% | 0.28 |
| 7 | Substance Abuse | 3 | 3% | 0.08 | 4 | 1% | 0.07 |
| **Totals** | | **110** | **100%** | **2.79** | **383** | **100%** | **6.35** |

Table 22A: Summary (A) Safety - Employees Incident Data Across CLOSED Sample Projects

| OPEN PROJECTS (A) SAFETY /Employee Health | | PLE-1[18] | | % per 200k Work Hours | PLE-2 | | % per 200k Work Hours |
|---|---|---|---|---|---|---|---|
| 0-9 | Types of Safety Incidents | 8,636,811 | | | 3,390,250 | | |
| 1 | Recordable | 41 | 41% | 0.95 | 51 | 28% | 3.01 |
| 2 | First Aid | 45 | 45% | 1.04 | 99 | 55% | 5.84 |
| 3 | Other | 1 | 1% | 0.02 | 2 | 1% | 0.12 |
| 4 | Near Miss | 8 | 8% | 0.19 | 23 | 13% | 1.36 |
| 5 | Wobbler (Recordable Not First Aid?) | 2 | 2% | 0.05 | 5 | 3% | 0.29 |
| 6 | Administrative & OSHA Inspections | 2 | 2% | 0.05 | 1 | 1% | 0.06 |
| 7 | Substance Abuse | 0 | 0% | 0.00 | 0 | 0% | 0.00 |
| **Totals** | | **99** | **100%** | 2.29 | **181** | **100%** | 10.68 |

Table 22B: Summary (A) Safety - Employees Incident Data Across OPEN Sample Projects

The OIG acknowledges that using the EMR formula for other than recordable injuries is "untested." Using the value of "1.0" as the average would be unsupported based on lack of

[18] For this table, the OIG uses an updated count on recordable injuries that varies from the incident log data, e.g., the incident log included 36 incidents, but an actual contractor count is 41. This discrepancy may relate to either (a) additional recent injuries; (b) the timing of the handover of incident logs, or (c) a communication issue in the pipeline between the contractor and Metro's Safety Team.

cumulative data showing 1.0 as a reliable "average." However, the experience rating can be used to identify trends over time.

Metro's Safety Team describes the closed Regional Connector project as the "gold standard" for safety culture and safety performance. Using the data in Table 22A to compare Regional Connector to Crenshaw/LAX shows that the former had a .71 rating compared to the latter's 1.41 rating. The difference is very stark on first aid incidences, as well. Turning to Table 22B, and open projects PLE-1 and PLE-2, whether comparing the closed projects or to each other, PLE-2's safety rating is abysmal.

The OIG observes a high inspection rating may not be a negative thing - Regional Connector's "Administrative & OSHA Inspections" rating is highest and reflects a high number of tracked disciplinary actions in Metro's incident log for the project. Thus, it appears that a contractor's enforcement actions against its non-compliant employees, or alternatively, proactive safety interventions by Metro or Cal/OSHA, directly correlates with better safety outcomes.

Chart 9 summarizes the counts on safety incidents by Classification code and allows for comparison across each of the four projects. What stands out is that PLE-1 and PLE-2 as open projects are ahead of Regional Connector in counts of recordable and first aid incidents. PLE-2 reports more near miss incidents than a project that is now complete, Regional Connector. It is an interesting data point that the Regional Connector has the most entries in the incident log related to administrative engagements of non-compliances, which shows a greater involvement by the Metro Safety team and Cal/OSHA inspections.

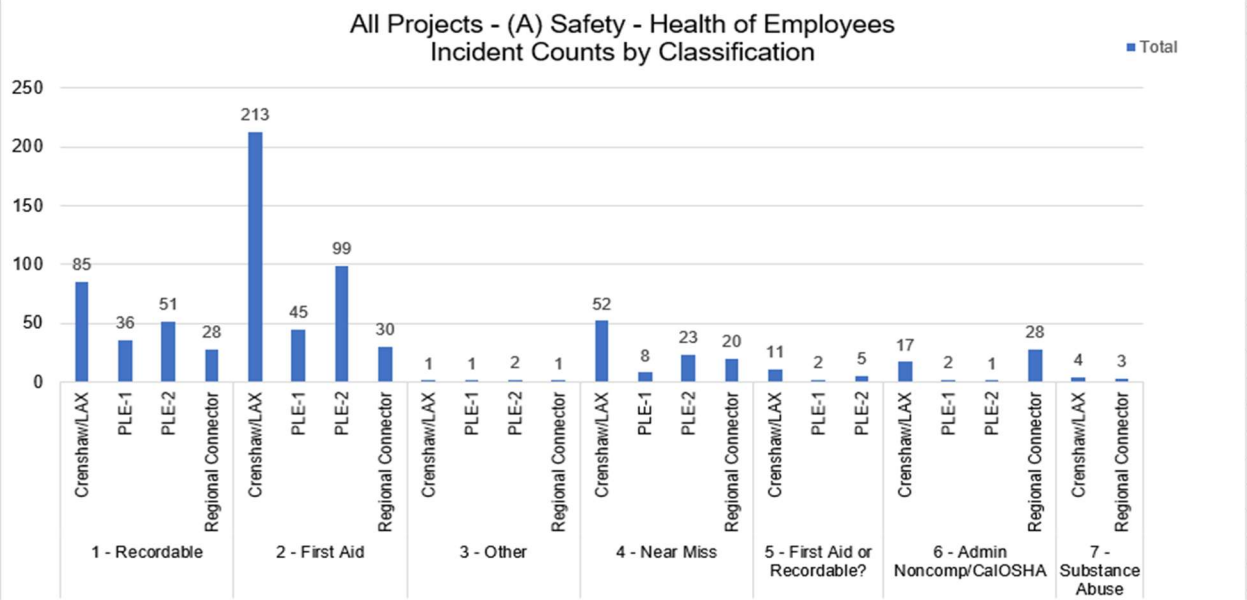



Chart 9: All Projects, (A) Safety – Health of Employees, Incident Counts by Classification & Project

## (B) Safety – Third Parties & Property

Tables 23A and 23B mirror expanded use of the EMR formula as applied to incident data for "(B) Safety – Third Parties & Property." These types of safety incidents involve property damage with utilities and non-utilities. The OIG reiterates that the "1.0" average is not tested for this use.

| CLOSED PROJECTS (B) SAFETY/Third Party & Property | | Regional Connector | | % per 200k Work Hours | Crenshaw / LAX | | % per 200k Work Hours |
|---|---|---|---|---|---|---|---|
| 10-18 | Security Incidents | 7,886,846 Work Hours | | | 12,059,920 Work Hours | | |
| 11 | Property Damage (UTILITY) | 21 | 24% | 0.53 | 126 | 31% | 2.09 |
| 12 | Property Damage (NON-UTILITY) | 22 | 26% | 0.56 | 135 | 33% | 2.24 |
| 13 | Third Party Involvement | 32 | 37% | 0.81 | 143 | 35% | 2.37 |
| 14 | Workplace Violence w Employees | 1 | 1% | 0.03 | 4 | 1% | 0.07 |
| 15 | Work Stop (NON-Gas) | 0 | 0% | 0.00 | 0 | 0% | 0.00 |
| 16 | Work Stop (GAS) | 3 | 3% | 0.08 | 0 | 0% | 0.00 |
| 17 | Work Stop (Other) | 6 | 7% | 0.15 | 0 | 0% | 0.00 |
| 18 | Third Party Injury from Work | 1 | 1% | 0.03 | 0 | 0% | 0.00 |
| **Totals** | | **86** | **100%** | **2.18** | **408** | **100%** | **6.77** |

Table 23A: Summary (B) Safety- Third Parties & Property Incident Data Across CLOSED Sample Projects

| (B) SAFETY/Third Party & Property | | PLE-1 | | % per 200k Work Hours | PLE-2 | | % per 200k Work Hours |
|---|---|---|---|---|---|---|---|
| 10-18 | Security Incidents | 8,636,811 | | | 3,390,250 | | |
| 11 | Property Damage (UTILITY) | 46 | 11% | 1.07 | 30 | 29% | 1.77 |
| 12 | Property Damage (NON-UTILITY) | 51 | 12% | 1.18 | 55 | 53% | 3.24 |
| 13 | Third Party Involvement | 51 | 12% | 1.18 | 10 | 10% | 0.59 |
| 14 | Workplace Violence w Employees | 2 | 0% | 0.05 | 3 | 3% | 0.18 |
| 15 | Work Stop (NON-Gas) | 7 | 2% | 0.16 | 1 | 1% | 0.06 |
| 16 | Work Stop (GAS) | 269 | 63% | 6.23 | 0 | 0% | 0.00 |
| 17 | Work Stop (Other) | 1 | 0% | 0.02 | 1 | 1% | 0.06 |
| 18 | Third Party Injury from Work | 2 | 0% | 0.05 | 3 | 3% | 0.18 |
| **Totals** | | **429** | **100%** | **9.93** | **103** | **100%** | **6.08** |

Table 23B: Summary (B) Safety- Third Parties & Property Incident Data Across OPEN Sample Projects

Looking at Table 23A for closed projects, the Regional Connector had comparable proportions of overall third-party and property incidents, but the "ratings" are not comparable, suggesting that the Crenshaw had a much higher count of incidents per employee work hour. Table 23B data reveals that the PLE-1 and PLE-2 projects are both trending higher than the Regional Connector project across incident classifications but are less than Crenshaw/LAX. However, the exception is that on PLE-2, there is a much higher incidence of property damage involving non-utility property.

Chart 10 summarizes by classification code, the "count" of property and third-party related safety incidents across the 4 sample projects. The chart shows Crenshaw/LAX had more safety-related incidents involving third parties and property damage than Regional Connector. The data itself does not reveal whether the distinctions relate to the type of project, the circumstances of the work, or the contractor's work practices. This analysis provides some useful visibility as to non-injury events the field and could prompt helpful investigation and/or partnering with the Contractor.

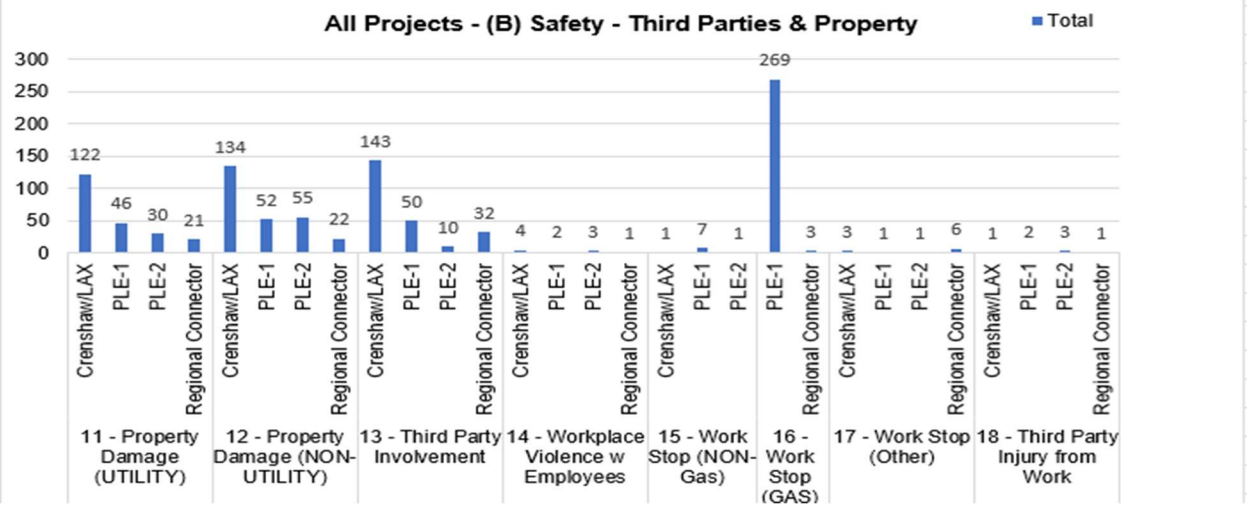



Chart 10: All Projects, (B) Safety – Third Parties & Property, Incident Counts by Classification & Project

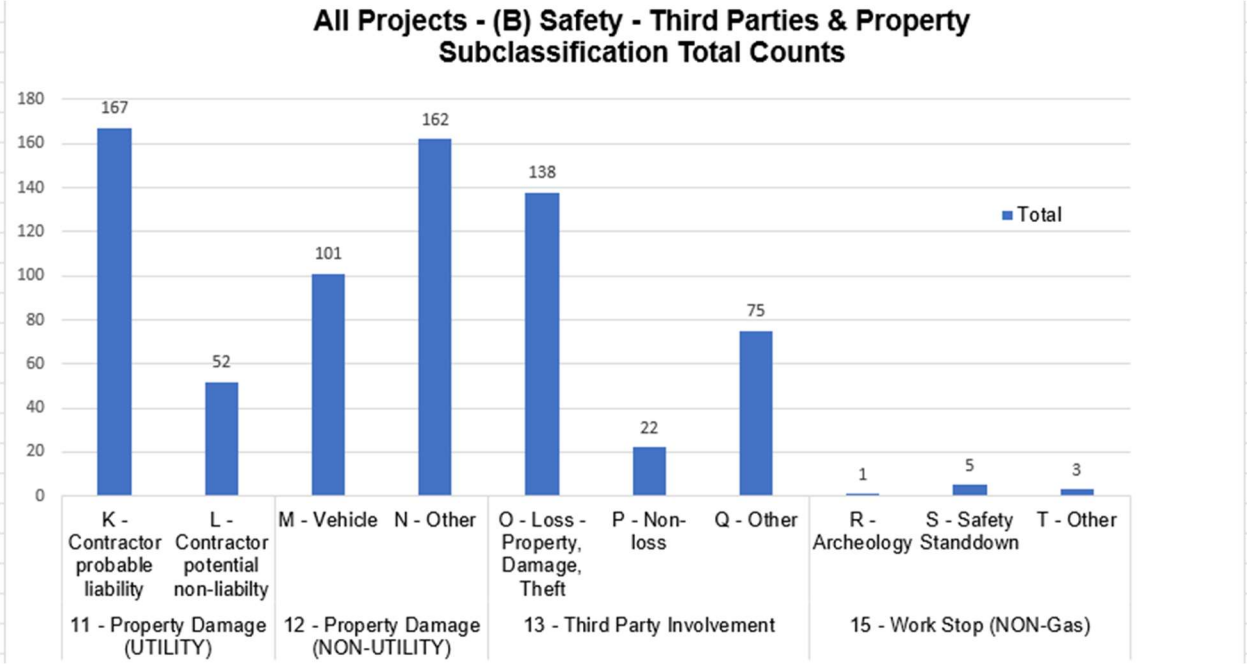



Chart 11: All Projects, (B) Safety – Third Parties & Property, Incident Counts by Subclassification

Chart 11 captures incident log data across all projects (these are typical incidents that can interrupt a contractor in the field). Utility-related incidents are quite common as well as non-utility related incidents. Over the course of a project, there can be quite a bit of damage to on-site vehicles or equipment from the contractor or third parties. Damage can also arise to vehicles by the contractor (or subcontractors) coming or going from the work site. Theft of tools and materials come from the troubling amounts of trespass onto the site. Both the contractor

and Metro, must contend with the unhoused and mentally ill breeching the job site, attacking workers; and there are incidents of gunshots and the need to alert police to criminal behavior.

**OIG Observations -**

Safety Plan Requirements - Positively, Contractors universally cooperate in preparing the Safety Plan as well the required submittals for the project. Contractors, per their contract, cooperate in providing pro-forma monthly reports on general statistics about work hours and reportable injuries.

Negatively, each contractor's characteristics and behavior varies. The OIG has observed (or was told in some cases) variability across contractors (and across superintendents for the same contractors) arise in the following areas:

- Timely and complete reporting of the details of safety incidents and reportable injuries;
- Cooperating with after actions including documenting root cause analyses and corrective actions;
- Openness to sharing information and/or welcoming objective feedback from Metro observations

Contractor's Safety Culture – Negatively, Contractors have demonstrated variability of safety culture across projects. Contractors are duly concerned about the safety of their employees, but they vary in their approach. The OIG was told that some contractors prefer to be "opaque" with respect to safety information and practices. It was mentioned that a contractor's own safety representative may become frustrated with their employer's non-compliance. Further we were told Contractors have not been welcoming collaborative efforts on the part of Metro's Safety Team. Contractors, in their role as employer, may face liability because of safety incidents. This possibility should not be used as an excuse to withdraw from the important practice of root cause review and corrective action reports.

Lessons Learned – OIG observes that it is useful to track the information on incidents that pertain to utility and non-utility incidents as well as damage to vehicles and equipment. In order to provide future contractors sufficient mitigation, a lessons learned is to track the numerous events from the trespassers, unhoused, and mentally ill people coming onto the job sites stealing tools, construction materials, and attacking the workers. Another lessons learned is to consider increased security at particular locations where criminal activity is high. Criminal behavior should be tracked to provide safety to the workers and because the OIG has received several reports of workers having guns in their cars at construction sites. The OIG has alerted the police, Metro's SSLE department, and the contractor's headquarters of these matters. It is likely to be occurring because the construction workers do not feel safe.

Ideas from Metro's Safety Team - The success of Metro's safety management program clearly depends on collaborative and engaged contractors. The Safety Team shared ideas for increasing Metro's chances of hiring contractors with proven safety-first cultures as follows:

1. As part of the procurement process, review markers of a strong safety culture for both the contractor and key subcontractors, i.e., (a) OSHA industry incidence rates for Injury, Illness and Fatalities, and (b) contractor's Workers' Compensation experience modification rates demonstrating low injury rates.

2. Include in Metro's General Provisions a new requirement for contractors to submit to Metro the same documentation submitted to Cal/OSHA, e.g., Forms 300, 300A, and 301.

Separate Safety Session - The OIG recommends for Metro to consider, enhancing the contract General Provisions to include critical safety culture documentation. Currently the Construction Safety and Security Manual ("Safety Manual") is incorporated in the contract by reference only, (an electronic pdf link) which works for legal purposes, but apparently some contractors give these requirements little attention or weight. It is suggested that this document be used for a training session to advise the contractor from the beginning, prior to commencement of work, what they must adhere to. This method suggests the contract winning contractor will know exactly what is required in the Safety Manual and to adhere their safety culture towards it.

Warning System - The OIG offers the methodology used to analyze data tracked in each project's Incident Log as a template for a "Red, Yellow, Green" warning system on safety. The Regional Connector project was described as a safety success story by Metro's Safety Team, and the data supports that conclusion. It may be feasible to set Regional Connector as a "baseline" for comparing the metrics of future projects.

Tracking Data and Future Audits - The PLE-2 safety audit performed under the auspices of Metro's Quality Management Oversight program (which acted to hire an outside consultant) offers important guidance for improving the contractor's performance and for supporting proactive oversight measures by Metro's Safety Team. To improve a contractor's safety practices, whether through calling for a safety stand down or initiate an audit of the type performed this year on the PLE-2 project, Metro's Safety Team must be able to substantiate its concerns with computer based tracked data. This will be key to resisting threats of "change orders" in response to reasonable safety oversight actions. The data base and Audit reports can identify lessons learned to generate improved contract language, enhance the Safety Manual, and assist regular safety reporting to Metro's management.

**OIG Part C "SAFETY" Recommendations**

**8.** PMG should work with Procurement to enhance the contract language by requiring bidder's response to include information reflecting the strength of the contractors Safety Culture such as: (a) OSHA industry incidence rates for Injury, Illness, and Fatalities and (b) bidder's Worker's Compensation experience modification rates demonstrating low injury rates.

**9.** PMG should work with Procurement to enhance the contract language requiring contractors to submit documentation to Metro on Recordable Injuries documentation submitted to Cal/OSHA during project construction (Forms 300, 300A, and 301).

**10.** Metro's Safety Team should work with Procurement and PMG to arrange a training session at the beginning of the contract to review the safety and security manual in detail with the prime contractor, subcontractors, and staff. Additionally, hold periodic refresher training to take place during the performance of the project enhanced by project lessons learned.

**11.** Metro should consider joining with other governmental agencies to lobby to change the law to permit random drug and alcohol testing for safety sensitive heavy civil construction work.

**12**. Metro's Safety Team should establish a consistent and universal practice across all projects for logging incidents into a computer data base that will allow for accessible and transparent data analysis.

**13.** Metro should leverage the Quality Management Oversight (QMO) audit of PLE-2 safety practices (C1120 Management System Audit Report – Worksite Safety Audit for PLE-2) to identify and remediate gaps in: 1) contract requirements, 2) Metro's Safety Manual, and 3) data reporting practices.

# CONCLUSION

In the 2023 OIG Construction Best Practices Report found Metro to be in compliance with most of the recommended best practices over areas such as readiness, procurement, and management of construction projects. In this review we analyzed quantitative data pertaining to three areas – Cost/Life of Project budgets, schedules, and safety management to evaluate the impact of the enhanced best practices. Projects take years to implement and only a small sample of projects have been started, implemented, and completed since the 2016 OIG Construction Best Practices Report. It is difficult to establish a clear nexus between improved best practices and quantitative data. This report's evaluation of data can serve as a baseline for future comparison or as a basis to create baseline data to better establish the nexus.

## A. COSTS/BUDGET

LOP Budget - We reviewed data on the initial and revised Life of Project ("LOP") budgets presented to Metro's Board for authorization to commence and continue projects. Metro's Board reasonably expects accurate budget and schedule data on which to set policy and authorize planning and implementation of transit projects. We found the data suggests that to lessen LOP budgets revisions, Metro should strive for fixed and stable project definitions; enhance its estimating basis and analysis across the project life cycle; accept conservative risk analyses and encourage early and comprehensive site investigation to avoid subsurface conflicts and/or unanticipated extra work.

1. Of the 17 projects reviewed, 4 had no revision to the original Board approved LOP budget, 4 had 1 revision, and 9 had 2-3 revisions. Some of these projects are still open so additional increases to the LOP budget may occur in the future.
2. Substantial LOP budget increases are typically due to changing the definition of the project to add new work or combine work from a separate project, which is the case for PLE-1 and PLE-3. But end-of-project claims for delay-related and change impact costs also contributes to exceeding LOP budgets (which may be the case for Crenshaw/LAX).
3. Comparing the allocation of hard costs to soft costs across projects from the original LOP budget to the revised LOP budget shows that the allocation changes from hard costs are close to 67% of the overall LOP budget, on average. Understanding the reason for "outliers" from the average would require an audit of each project. The OIG speculates, however, that management may be increasing reserves based on claims risk – giving the appearance of increased "soft costs" until the reserves are used for approved change orders.

Change Orders - We reviewed data on change order activity across the 29 construction contracts to identify "challenge" areas and trends. For all construction projects, large or small, transit or non-transit, the number and value of change orders can reveal both challenges and opportunities to be addressed by planners and implementers of design and construction projects.

1. The 29 construction contracts reviewed had a total of 2,261 change orders. These change orders resulted in an average 13% increase to the original value of the contracts. However, over half the construction contracts we reviewed are still open and may have pending or future claims that may result in additional change orders to the contract.

2. The three most common reasons for change orders (based on total value) is: 1) extra work at $520m, 2) owner design changes at $228m, and 3) differing site conditions at $157m.
3. Design - build (DB) method projects experience a higher level of cost increase due to change order activity (whether open or closed) than design – bid – build (dbb) method projects (DB 14% vs dbb 10%).
4. Change orders over $500,000 constitute 90% of change order costs yet equate to only 14% of overall 2,261 change orders. The average change order value in this category is over $3 million. Nine of the 29 construction contracts are responsible for 53% of the total change order value over $500,000.
5. Change Order basis coding broadly describes the reason for a contractor receiving an equitable adjustment to the contract but fails to provide internal visibility to the "true" cause of the change. Enhancements are needed for this data to be utilized for lessons learned purposes. In place of vague descriptors from the contractor's point of view, the Change Order basis coding should inform management of the nature of the additional work and whether the cost was "avoidable" versus "unavoidable," to improve Metro's control and decision-making tools over budget, timing, pre-construction investigation, and the delivery method strategy.
6. Projects started in the last several years may not produce measurable data for some years in the future. The Metro Program Management Group (PMG) presented April 2023 the 18 Strategic initiatives for enhancements to construction management best practices. A few of their initiatives include: a revised LOP budget process, comprehensively applied risk management oversight, reviewing project soft costs, and continued efforts by the Early Intervention Team. As these initiatives are implemented, measurable data should become available for PMG to compare back to this baseline report.

## B. SCHEDULE

Limited data was provided for 13 of the 17 projects, e.g., planned versus revised data schedules. For 7 of the 13 projects, PMG also provided the "award date" which was treated as the start date for the project for the purposes of this report. The OIG used this data to determine schedule variances across the 7 projects.

1. Schedule variance exceeded 40% on 3 of the 7 projects; 2 projects experienced variances between 17% and 22%; and for the remaining 2 projects the schedules showed 0% change. For open projects, there is no assurance the current variances will not change.
2. Correlating schedule variances to LOP variances (looking only at the 7 sample projects), the OIG identified that for Crenshaw/LAX, Regional Connector and PLE-1 cost and delay variance had some correlation which could change based on future change orders. For Patsaouras Plaza, the LOP variance greatly exceeded the delay percentage which may be due to the conservative initial LOP budget and/or the high costs incurred for delay (the project was placed on hold for archeological investigation for about a year). For the Willowbrook Rosa Parks project, schedule variance did not result in a correspondingly high LOP budget variance which may relate to the delay being non-compensable.

The limited nature of reason coding for the schedule changes affected the OIG's ability to engage in complex analysis of a costs to schedule nexus. The OIG recommends enhanced reasons coding for change orders awarding time extensions whether compensable or not.

### C. CONSTRUCTION SAFETY MANAGEMENT

The OIG selected data from four (4) projects to review and found:

1. Contractors universally cooperate in preparing certain required submittals including the Safety Plan for the project and providing pro forma monthly reports on general statistics about work hours, injuries, restricted employees, other matters. Contractors make excuses for not fully participating in safety investigations, root cause analysis and corrective action reports for "liability reasons."
2. Contractors may vary in how proactively they implement a best practices safety culture on the worksite. The Regional Connector sets a high standard for the contractor self-correcting safety non-compliances and working collaboratively with Metro's Safety Team. The OIG observes that this project's Incident Log contained the highest amount of administrative enforcement/engagement entries that demonstrates consequences for safety issues were imposed and reduced serious injuries.
3. Metro's success in overseeing contractor safety compliance depends on Metro hiring contractors with a robust safety culture. That is typically demonstrated by low "experience modification rates" less than 1.0. A rate under 1.0 shows a contractor is lower risk with less insurance claim history; above 1.0 demonstrates a risky contractor not focused on a safety culture and has multiple insurance claims (work site accidents) history.
4. The success of Metro's safety management program clearly depends on identification, of a contractor's willingness to be collaborative and engaged concerning work site safety, throughout the project implementation. Post-award Metro would benefit from receiving from the contractor its documentation required by Cal/OSHA and by increasing periodic training on safety requirements from the Safety Manual that are connected to its contract with Metro.

### ENDING COMMENTS

Although the outcome of implementing best practices could not definitively be quantified or measured to cost/budget, schedule, and safety at this time, by comparing similarly situated pre-2016 projects to post 2016 projects, (year references the OIG 2016 Construction Best Practices proposed 109 recommendations) the controls Metro has recently put in place are perceived anecdotally if not quantitatively to have an overall positive impact on the lifecycle of Metro's construction projects. Staff has stated that the Metro construction culture is continuing to improve, such as by the enhanced readiness reviews being performed. Thus, Metro should continue to identify and implement best practices. In this regard, the data presented in this report should be used as an initial baseline for PMG to conduct subsequent studies, identify trends in cost/budget, schedule, and safety, and to improve their management of construction projects.

# RECOMMENDATIONS

The OIG has made 13 recommendations to improve cost through controls and oversight of LOP budgets (including construction change orders), schedule, and construction safety.

**"COST/BUDGET" Recommendations:**

1. PMG should enhance LOP budget revision tracking by implementing coding to capture reasons for revisions to the LOP budget so management and the Board can readily identify why the increase is requested.
2. PMG should separately track and report project soft costs versus hard costs (construction) to enhance LOP budget usage and report in the Annual Program Evaluation presented to the Board.
3. PMG should expand the Revised Change Base Coding for "Extra Work" to specifically identify the nature of the change (from 5 to 10 codes max) and allow differentiation between field changes. All project staff and V/CM must be trained in the new codes to appropriately choose the correct base coding. This extra identification will provide transparency to the public regarding the reasons for post-award change orders to contractors.
4. PMG should determine if adding an identification of "avoidable" for coding of change orders would enhance future reporting and better allocate resources where needed.
5. PMG should determine if it would benefit Metro and the public to: Identifiably track change orders that have been resolved following Dispute Resolution Board and/or partnering efforts.
6. PMG should determine if it would be helpful to track Document Control smaller projects the same as larger, because smaller projects still involve many millions of taxpayer dollars.

**"SCHEDULE" Recommendations:**

7. PMG should enhance Metro's LOP schedule reporting by providing visibility to specific project delay at the project level and at the construction contract level. In Part A, COSTS/BUDGET, the OIG provided recommendation(s) pertaining to enhanced change order reasons coding. A new separate coding basis should be considered at the project level to distinguish between construction contract-related delay. e.g., if funding is delayed.

**"SAFETY" Recommendations**

8. PMG should work with Procurement to enhance the contract language by requiring bidder's response to include information reflecting the strength of the contractors Safety Culture such as: (a) OSHA industry incidence rates for Injury, Illness, and Fatalities and

(b) bidder's Worker's Compensation experience modification rates demonstrating low injury rates.

**9.** PMG should work with Procurement to enhance the contract language requiring contractors to submit documentation to Metro on Recordable Injuries documentation submitted to Cal/OSHA during project construction (Forms 300, 300A, and 301).

**10.** Metro's Safety Team should work with Procurement and PMG to arrange a training session at the beginning of the contract to review the safety and security manual in detail with the prime contractor, subcontractors, and staff. Additionally, hold periodic refresher training to take place during the performance of the project enhanced by project lessons learned.

**11.** Metro should consider joining with other governmental agencies to lobby to change the law to permit random drug and alcohol testing for safety sensitive heavy civil construction work.

**12**. Metro's Safety Team should establish a consistent and universal practice across all projects for logging incidents into a computer data base that will allow for accessible and transparent data analysis.

**13.** Metro should leverage QMO's audit of PLE-2 safety practices (C1120 Management System Audit Report – Worksite Safety Audit for PLE-2) to identify and remediate gaps in: 1) contract requirements, 2) Metro's Safety Manual, and 3) data reporting practices.

# ATTACHMENTS

**ATTACHMENT A: Contract Change Basis Coding**

**ATTACHMENT B: Recommendations and Responses**

# ATTACHMENT A:

# CHANGE BASIS CODING

# CONTRACT CHANGE BASIS CODING SYSTEM

DEFINITIONS AND USAGE GUIDELINES

## BASIS CODE STRUCTURE:

**100 WORK SCOPE CHANGES**
- **110 Extra Work**
- **120 Deletion of Work**
- **130 Contract Scope Deletion (added on 9/13)**

**200 SCHEDULE CHANGES**
- **210 Delay of Work (Compensable)**
- **220 Acceleration of Work**
- **230 Milestone Revisions (Non-compensable)**

**300 DIFFERING/UNFORESEEN CONDITIONS**
- **310 Differing Site Conditions**
- **320 Hazardous Materials**
- **330 Safety Conditions**

**400 ADMINISTRATIVE CHANGES**
- **410 Terms and Conditions - Owner Originated**
- **430 Editorial Clarifications/Document Maintenance**
- **440 Quantity Adjustment**

**500 DESIGN CHANGES**
- **510 Owner Originated**
- **530 Corrections to Plans/Specs**
- **540 Value Engineering**

**600 MANAGEMENT ISSUES/CLAIMS**
- **610 Disruption/Inefficiency Claim**
- **620 Comprehensive Claim**

**700 OUTSIDE AGENCY REQUESTS**
- **710 Work Scope Changes**
- **720 Design Changes**
- **730 Terms and Conditions**

**800 CONTRACT OPTIONS, EXERCISE OF**

**900 OTHER**

**COST RECOVERY CODES: In conjunction with the basis codes provided above, changes may be identified as having cost recovery potential:**

**BK = Backcharge to another construction/procurement contract**
**BT = Betterment for an outside agency or third party**
**EO = Consultant Error or Omission (use the FROM field to identify the responsible consultant)**
**LL = Lessons Learned (Future savings from improved design)**

## BASIS CODE USAGE GUIDELINES

### 100 WORK SCOPE CHANGES

110 EXTRA WORK (within general contract scope)

Use to identify work not specifically identified in the "as-awarded" contract documents but required to complete the original intent of the original contract scope. Extra work not covered by existing bid price items or combination of existing bid price items. [1]

[1] Extra work as defined by CALTRANS standard specifications.

!!NOTE: For changes in design approach, alteration, or correction of existing design elements (including dimension and quantity changes) see 500 series codes, "Design Changes".)

!!NOTE: For additional work arising from a differing site condition or interference (including work related to hazardous materials) use 310, "Differing Site Conditions".

120 DELETION OF WORK

Use to identify work and/or technical requirements that are deleted from the contract entirely, rather than revised. Includes reduction of quantities. Almost always credit or no-cost changes.

130 CONTRACT SCOPE DELETION

Use to identify when scope item is deleted, i.e. entire Bid Item No. and when the cost is not to be credited to the CMA

**200 SCHEDULE CHANGES**

210 DELAY OF WORK (COMPENSABLE)

Use for changes which grant compensable extension of the milestones or completion date due to acknowledged delays in the work.

220 ACCELERATION OF WORK

Use for changes specifically allowing acceleration of work, overtime, increased shifts, etc.

230 MILESTONE REVISIONS (NON-COMPENSABLE)

Use for non-compensable milestone, delivery date, or completion date changes not caused by either owner or contractor delays. Generally "force majeure" changes, or changes to improve coordination.

**300 CHANGED/UNFORESEEN CONDITIONS**

310 DIFFERING SITE CONDITIONS

Use for all* changes arising from acknowledged differing site conditions. Generally subsurface or latent physical conditions *pre-existing contract award* which were not identified in the contract documents. E.G., Obstructions, utility interferences, etc.).

*Use code "320" if hazardous materials are involved.

320 HAZARDOUS MATERIAL

Use for all changes arising from acknowledged differing site conditions involving hazardous or toxic materials. E.G., Gaseous conditions, contaminated soils, asbestos, etc.)

330 SAFETY CONDITIONS

Use to identify changes which primarily correct safety conditions associated with unforeseen site conditions.

## 400 ADMINISTRATIVE CHANGES (NON-TECHNICAL)

### 410 TERMS AND CONDITIONS (OWNER ORIGINATED)

Use to identify owner originated changes affecting the terms and conditions of the contract identified in the non-technical sections of the contract. Generally changes to the General or Special Conditions (other than schedule changes which should be coded under the **200** series and exercise of contract options which should be coded as **800**).

Examples: Revisions to Insurance Requirements
Revisions to Safety Requirements

### 430 EDITORIAL CLARIFICATIONS/DOCUMENT MAINTENANCE

Use for no-cost editorial and non-substantive corrections to contract language, including no-cost corrective amendments to change orders. (E.G., Amended Change Order correcting listing of revised drawings). Use also for routine updating of other baseline documents like the Project Management Plan, Contract Unit Descriptions, etc.

### 440 QUANTITY ADJUSTMENTS

Increases or decreases in the quantity of a Unit, as identified in the SCHEDULE OF QUANTITIES AND PRICES.

## 500 DESIGN CHANGES: **Covers design changes, enhancements, and corrections to existing work covered by existing contract bid items only. All design provided for work not covered under existing bid items should be coded under the 100 series - work scope changes.** ***Use of a design change code is not synonymous with a potential errors or omissions identification. Errors or omissions by a consultant should be identified by a cost recovery code.***

### 510 DESIGN CHANGES/ENHANCEMENTS: OWNER ORIGINATED

Use for METRO initiated changes involving major re-design or change in design approach for work identified in "as-awarded" design approach originated by the owner or owner's agent (i.e., owner's consultant). Revised (rather than new) drawings and/or specifications are generally required. Change titles/descriptions generally contain the terms "revise", "modify", "relocate", "extend", etc.

Includes:

Owner directed Lessons Learned design changes*
Owner originated enhancements and technological upgrades
Owner directed realignments, etc.

*NOTE: Lessons Learned changes should also be identified by the COST RECOVERY code "LL".

### 530 CORRECTIONS TO PLANS AND SPECIFICATIONS

Use for changes issued to clarify and/or correct defective, unclear or insufficient design definition in the contract drawings and specifications (including discrepancies between documents, minor dimensional changes, etc.). Often originate with a "Request for Information". If minor, changes may be made "as-built".

540 VALUE ENGINEERING CHANGES (CONTRACTOR PROPOSED DESIGN CHANGES)

Use for changes implemented as a result of a contractor's formal Value Engineering proposal. Always a credit change.

**600 MANAGEMENT ISSUES (Generally arising from "comprehensive" contractor claims): Use the codes below to identify individual changes allowing for costs related to numerous events which may arise from numerous "technical" causes. Do not use for changes or claims which can be attributed to any other basis code.**

620 COMPREHENSIVE CLAIMS

Use to identify individual changes which grant costs for comprehensive "end-of-contract" claims for which a single major cause cannot otherwise be identified.

**700 OUTSIDE AGENCY OR THIRD PARTY REQUESTS**

710 WORK SCOPE CHANGE - OUTSIDE AGENCY REQUEST/REQUIREMENT

Use to identify additional or extra work requested or required by an outside agency or third party to the project. (Use 720 for design changes required by a outside agency/third party to work covered by existing bid items and within the original intent of the contract scope).

EXAMPLES: Street preparation for L.A. Marathon
Noise Control Investigation
Sound Wall Installation

!!Note: Generally used in conjunction with the "BT" or betterment cost recovery code.

720 DESIGN CHANGES - OUTSIDE AGENCY/THIRD PARTY

Alteration to the "as-awarded" design of the contract however the alteration was initiated or requested by an outside agency (Federal, State, or Local). Use also for design changes due to changes in legislation, or local, state or federal codes or standards.

EXAMPLE: Americans with Disability Action related Changes

730 TERMS AND CONDITIONS CHANGES - OUTSIDE AGENCY ORIGINATED

Changes in the administrative terms and conditions of the contract originated or required by an outside agency (Federal, State, or Local).

Example: Revisions to EEO Reporting Requirements
Revisions to Insurance Coverage requirements

**800 EXERCISE OF CONTRACT OPTIONS**

Use to identify changes which specifically exercise options identified in the original contract documents.

**900 OTHER**

Use for unusual changes/claims which do not fit any of the above categories. **Use of the "OTHER" category is to be avoided whenever possible.**

# ATTACHMENT B:

# RECOMMENDATIONS AND RESPONSES

# QUANTITATIVE DATA RECOMMENDATIONS / RESPONSES

## *A: COSTS/BUDGET*

| 2023 Rec No. | 2023 Recommendation | 2023 Metro Management's Response |
|---|---|---|
| 1.0 | PMG should enhance LOP budget revision tracking by implementing coding to capture reasons for revisions to the LOP budget so management and the Board can readily identify why the increase is requested. | Completed: PC02 Budget, PC05 Cost Forecasting, and PC16 Contingency Drawdown procedures were recently updated and require coding of budget changes and board communication protocols. PMG will use the existing coding system to provide explanations in future Board Reports requesting LOP budget increases. Completed December 2021. |
| 2.0 | PMG should separately track and report project soft costs versus hard costs (construction) to enhance LOP budget usage and report in the Annual Program Evaluation presented to the Board. | Current Practice. Soft cost reporting monitored and reported monthly, submitted to Chief quarterly and Board annually as part of Annual Program Evaluation and Strategic Initiatives. Estimated completion April 2024. |
| 3.0 | PMG should expand the Revised Change Base Coding for “Extra Work” to specifically identify the nature of the change (from 5 to 10 codes max) and allow differentiation between field changes. All project staff and V/CM must be trained in the new codes to appropriately choose the correct base coding. This extra identification will provide transparency to the public regarding the reasons for post-award change orders to contractors. | In Process. PMG in process of expanding change basis coding to expand from 5 to 10 codes and allow further differentiation of contract changes. Project team training will be provided to train staff in accurate change basis coding. Estimated completion by June 2024. |
| 4.0 | PMG should determine if adding an identification of “avoidable” for coding of change orders would enhance future reporting and better allocate resources where needed. | Current Practice. Unifier already has functionality for coding potential cost recovery of changes or avoidance and reporting already exists. Additionally, PMG will use the risk assessment process to guide the extent of geotechnical investigations to mitigate avoidable changes on future projects. |

| | | |
|---|---|---|
| 5.0 | PMG should determine if it would benefit Metro and the public to: Identifiably track change orders that have been resolved following Dispute Resolution Board and/or partnering efforts | Current Practice. Unifier change basis coding already exists for claim resolution. |
| 6.0 | PMG should determine if it would be helpful to include and track Document Control for smaller projects the same as larger, because smaller projects still involve many millions of taxpayer dollars. | Will Consider: PMG will evaluate resources and business need to expand use of PMIS for all capital projects. Estimated completion by June 2024. |

## *B: SCHEDULE*

| 2023 REC. NO. | 2023 Recommendation | 2023 Metro Management's Response |
|---|---|---|
| 7.0 | PMG should enhance Metro's LOP schedule reporting by providing visibility to specific project delay at the project level and at the construction contract level. In Part A, COSTS/BUDGET, the OIG provided recommendation(s) pertaining to enhanced change order reasons coding. A new separate coding basis should be considered at the project level to distinguish between construction contract-related delay, e.g., if funding is delayed. | Completed: PC09 Schedule Development was recently updated and requires managing and monitoring four levels of schedule including program, project, and contract. Total float analysis including schedule erosion or improvement is evaluated monthly including any associated mitigation measures. Completed December 2021. |

## *C:* SAFETY

| 2023 REC. NO. | 2023 Recommendation | 2023 Metro Management's Response |
|---|---|---|
| 8.0 | PMG should work with Procurement to enhance the contract language by requiring bidder's response to include information reflecting the strength of the contractors Safety Culture such as: (a) OSHA industry incidence rates for Injury, Illness, and Fatalities and (b) bidder's Worker's Compensation experience modification rates demonstrating low injury rates. | Completed: PMG, VCM, and County Counsel have developed new evaluation criteria for future construction RFPs based on each proposer's Experience Modification Rating (EMR). Any contractor with an EMR greater than 1.0 will be considered non-responsive. Completed July 2023. |
| 9.0 | PMG should work with Procurement to enhance the contract language requiring contractors to submit documentation to Metro on Recordable Injuries documentation submitted to Cal/OSHA during project construction (Forms 300, 300A, and 301). | Agree: Corporate Safety, PMG, and VCM will consult with County Counsel about requiring contractors on future Capital Projects to submit redacted copies of the referenced forms, omitting personal information. PMG and VCM will reach out to the Association of General Contractors (AGC) for feedback prior to implementation. Target date for completion: July 2024 |

| | | |
|---|---|---|
| 10.0 | Metro's Safety Team should work with Procurement and PMG to arrange a training session at the beginning of the contract to review the safety and security manual in detail with the prime contractor, subcontractors, and staff. Additionally, hold periodic refresher training to take place during the performance of the project enhanced by project lessons learned. | Agree: Future contracts will require the contractor's attendance at a meeting at the beginning of the Contract to review the Construction Safety and Security Manual (CSSM) before any construction work starts. Requirements for periodic meetings to discuss CSSM requirements will also be included in future contracts. |
| 11.0 | Metro should consider joining with other governmental agencies to lobby to change the law to permit random drug and alcohol testing for safety sensitive heavy civil construction work. | Will consider: PMG and Safety will convene a meeting with VCM, DEOD (labor relations), and Government Relations to consider the steps required to change the law. Anticipated completion Oct 2023. |
| 12.0 | Metro's Safety Team should establish a consistent and universal practice across all projects for logging incidents into a computer data base that will allow for accessible and transparent data analysis. | Agree: Metro's Safety Team will establish a log for tracking incidents and create a secured system on Metro's Corporate Safety's Drive with appropriate controls. Target date for completion: September 2023 |
| 13.0 | Metro should leverage QMO's audit of PLE-2 safety practices (C1120 Management System Audit Report – Worksite Safety Audit for PLE-2) to identify and remediate gaps in: 1) contract requirements, 2) Metro's Safety Manual, and 3) data reporting practices. | Agree: PMG (Quality) and Metro Safety will engage the QMO consultant when warranted to perform similar audits on other construction projects. Process to begin Oct 2023. |