



PROJECT MEMORANDUM

D-TO-M STREETS TRACK & SIGNAL PROJECT SURFACE WATER HYDRAULIC ANALYSIS

Date: December 13, 2022
Project No.: 10964A00

City of Tacoma

To: Karen Bartlett
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Subject: Escalated Cost Opinion for AACE Class 4 Full Buildout Conceptual Design

Background and Purpose

The D-to-M Streets Track & Signal Project (Project) was completed by Sound Transit (ST) as part of a larger expansion of a regional rail line within Western Washington. This 19-acre portion of the expansion reconstructed City of Tacoma (City) streets from South 'D' Street to South 'M' Street, installed a new rail bed, and regraded an existing rail bed. The Project relocated over 4,000 linear feet of storm drainage pipe, replacing piping in the area with new pipes having diameters ranging in size from 12 inches to 72 inches. These relocations were performed to allow for the lowering of the roadway grade and the installation of a railway bridge over the roadway. Following construction, multiple storm manholes within the Project area have surcharged and flooded the lowered roadway during large storm events. Carollo Engineers, Inc. (Carollo) independently completed an alternatives analysis and cost opinion (*Stormwater Conceptual Design Report*, February 2020) to identify a viable solution that complies with the City's 2008 Surface Water Management Manual (TSWMM) requirements within the Project area.

The purpose of this project memorandum is to escalate the original cost opinion from December 2019 dollars to March 2023 dollars. Unless otherwise indicated in this memorandum, this update does not change the basis of cost provided as part of the original work. As the project design matures, cost estimates are subject to change, and the cost of labor, materials, and equipment may continue to vary.

Escalation Methodology

Water/wastewater treatment and conveyance project construction cost escalation are often benchmarked against commonly known indices such as Engineering News-Record's Construction Cost Index (ENR's CCI) or the Consumer Price Index (CPI) published by the U.S. Bureau of Labor. However, those indices are comprised of factors that have little to do with these types of linear pipeline projects. Specifically, the CCI index is comprised of 200 hours for a common laborer, 25 cut-weight tonnage (cwt) of structural steel shapes at mill price, 1.128 tons of Portland cement, and 1,088 board feet of 2x4 lumber. The CPI, in contrast, is designed to reflect common consumer expenditures such as food, energy, apparel, housing, vehicles, electronics, and household services.

Carollo's cost estimating team, using a consistent team of estimators, software, and methodology, maintains a centralized catalog of more than 250 cost opinions for water treatment and conveyance projects that have been prepared since 2019. This consistency in approach, combined with the collection and analysis

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of approximately 50 corresponding bid results has allowed the team to continually track escalation costs due to material supply, general and subcontractor bid participation, and the inherent risks of bidding work during the last three years where the industry has faced domestic and international challenges regarding labor shortages, supply chain and logistics disruptions, changing economic policies, and war.

Throughout 2019, most contractors maintained a strong backlog. Although the cost of work was more expensive in some markets than some would expect, the rate of escalation was relatively predictable by maintaining the historically consistent 3 to 4 percent annual rate. Beginning in March of 2020, the response to the emerging pandemic disrupted the economy and contractors went through a period of uncertainty followed by shortages of both labor and materials. The response to these added risks caused many contractors to re-calibrate their bidding strategies to remain competitive while protecting their company's interests. Toward the end of 2020 and throughout 2021, the already stressed material supply chain began experiencing massive delays at the nation's ports, railyards, and warehouses. This, combined with manufacturer's inability to procure raw materials, created significant and disproportional upward swings in the cost manufactured goods. This trend continued through the first quarter of 2022. Although costs continue to rise, the rate of increase appears to be easing.

Carollo has concluded that to determine the impact of cost escalation more accurately during times of high market volatility, a weighted average of key project cost drivers should be applied to an estimate's direct costs. A study of internal estimate data for pipeline type projects reveals that a common distribution of direct cost for a self-performing pipeline contractor are as follows:

- Labor, 12 percent.
- Material, 53 percent.
- Subcontracts, 23 percent.
- Equipment and Tools, 12 percent.

Escalated Cost Opinion

Carollo incorporates raw material costs trends from the Producer Price Index (PPI) for specific commodities related to the water treatment and conveyance industry while adjusting for the increasing but less aggressive upswing in labor costs. This allows for the creation of an industry-specific factor that could be used for project estimate preparation. For the period between December 2019 and March 2023, the following escalation adjustments could be considered:

- December 2019-March 2020, 4 percent per year.
- April 2020-March 2022, 14 percent per year.
- April 2022-March 2023, 8 percent per year.

The approximate net increase on average direct costs for a typical pipeline project during that timeframe could be approximately 146 percent. This escalation impact applied to the Project is summarized in Table 1 below.

Table 1 Parallel Pipeline Project Cost Opinion

Cost Type	Upper Range (+50%, Dec 2019\$)	Upper Range (+50%, Mar 2023\$)
Construction Cost	\$6,700,000	\$9,700,000
Project Cost	\$9,700,000	\$14,100,000

Note: The cost estimate herein is based on our perception of current conditions at the project location. This estimate reflects our professional opinion of accurate costs at this time and is subject to change as the project design matures. Carollo Engineers has no control over variances in the cost of labor, materials, equipment; nor services provided by others, contractor's means and methods of executing the work or of determining prices, competitive bidding or market conditions, practices or bidding strategies. Carollo Engineers cannot and does not warrant or guarantee that proposals, bids or actual construction costs will not vary from the costs presented as shown.