



Oversight Procedure 33 — Capital Cost Estimate Review

1.0 PURPOSE

The purpose of this Oversight Procedure (OP) is to describe the review, analysis, and recommended procedures and reporting requirements that the Federal Transit Administration (FTA) expects from the Project Management Oversight Contractor (PMOC) regarding the following:

- Soundness of the project sponsor’s cost estimating methods and processes compared to proven professional quantity surveying and cost estimating practices;
- Congruence of the project cost estimate with the project scope and schedule, i.e., do these three elements fully reflect each other;
- Reliability of the estimate for procurements, contract bids, and contract closeout, i.e., will the project budget prove to be adequate at these milestone events.

While this OP focuses on Capital Investment Grant (CIG) projects, which have specific requirements by law, it also applies to all capital projects. FTA will issue Implementation Plans (IPs) to clarify the specific reviews and expected deliverables based on the project types.

2.0 BACKGROUND

Congress and FTA’s good stewardship of Federal funds require that a project sponsor’s project cost estimates be reliable before they continue into Entry into Engineering and at Full Funding Grant Agreement (FFGA) or Small Starts Grant Agreement (SSGA) award, as well as other points in Project Development (PD). When requested by FTA, the PMOC will perform a thorough evaluation of the project scope, schedule, and cost to confirm the reliability of the estimate.

The FTA oversight approach is data driven, requires risk/opportunity assessment, confirms a shared understanding of the project scope and technical requirements with the project sponsor, and leverages FTA’s experience with major capital projects to ensure project cost estimates are of a high quality. When developing cost estimates for projects in the Capital Investment Grants (CIG) program, project sponsors must use FTA’s Standard Cost Categories (SCC) workbooks (see References section) to ensure a consistent format for the reporting, estimating, and managing of capital costs for CIG projects.

By regulation, a project sponsor is required to develop a Project Management Plan (PMP) for FTA-funded major capital projects. The PMP is a written document prepared by a project sponsor that explicitly defines all tasks necessary to implement a major capital project. Several elements of the PMP are directly relevant to the project cost estimate, including recipient staff organization and qualifications, project budget, construction schedule, cost and schedule control procedures, periodic updates, and management of risks, contingencies, and insurance.

3.0 OBJECTIVES

FTA’s objective is to assess the consistency of cost estimating information, understand its characteristics, evaluate the methodologies, and confirm that the estimate adequately reflects the overall project scope, the estimated quantities shown on the design documents, the anticipated market conditions, the risk elements associated with the project, and the project schedule. This procedure is applicable to Design-Bid-Build, Design-Build (DB), and other delivery methods. A cost or cost range is established as a base from which future estimates are measured. Later, when contract packages are conceived, the PMOC will evaluate the estimates in the packages. The PMOC may perform this review prior to FFGA or SSGA and issuance of documents for bid, or during construction. The review results should help the project sponsor with decisions regarding the level of cost control measures, appropriateness and reasonableness of contingency provisions, and mitigations required; in addition, the results will assist FTA with decisions regarding project advancement and funding.

4.0 REFERENCES

FTA encourages project sponsors to consider applying the United States (U.S.) Government Accountability Office (GAO) 12-step methodology [Cost Estimating and Assessment Guide \(GAO-20-195G\)](#) when developing a project cost estimate. The GAO’s Cost Guide outlines best practices pertaining to cost estimation principles, presenting 12 steps to create high-quality estimates. These steps are generally applicable in a variety of circumstances and range from defining the purpose of the estimate to obtaining data to presenting the estimate to management for approval. Applying these principles should result in reliable and valid cost estimates that project sponsor management can use to make informed decisions.

The PMOC shall become familiar with the following references to Federal legislation, regulation, and guidance before reviewing the project sponsor’s work. These are the principal references, but this list is not exhaustive:

4.1 Legislative

- [Infrastructure and Investment Jobs Act \(IIJA\)](#), Public Law 117-58, effective November 15, 2021 (also known as the “Bipartisan Infrastructure Law”)
- [49 United States Code \(U.S.C.\) 53](#), Public Transportation, as amended by IIJA provisions

4.2 Regulations

- [49 Code of Federal Regulations \(CFR\) Part 633](#), Part Project Management Oversight

4.3 Guidance

- [FTA Project and Construction Management Guidelines](#) (2016)
- [FTA Project Construction Project Management Handbook](#) (2016)
- FTA SCC workbooks:
 - [New Starts SCC Workbook](#)
 - [Small Starts SCC Workbook](#)
 - [Core Capacity SCC Workbook](#)

4.4 Oversight Procedures

The statutes, regulations, policies, guidance documents and circulars in OP 01 apply. The project sponsor's estimate should conform to industry standards as published by leading project management and control organizations. Typically, the cost estimation and project control reviews are coordinated with:

- OP 32C, Project Scope Review
- OP 34, Project Schedule Review

Additionally, the project cost review is a key component of:

- OP 40, Risk and Contingency Review
- OP 51, Readiness to Enter Engineering
- OP 52, Readiness to Execute FFGA/SSGA
- OP 53, Readiness to Procure Construction Work

5.0 PROJECT SPONSOR SUBMITTALS

The PMOC shall obtain and study the project sponsor's current cost information including:

- Summary of operations and maintenance cost assumptions/productivities;
- Capital cost estimate in original and SCC format;
- Capital cost estimate backup data (take-offs, cut sheets, work breakdown structure, calculations, and recapitulation) for the purpose of traceability or mapping;
- Capital cost estimating methodology memo (refer to Appendix B);
- Assumptions used for all escalation and contingency (allocated, unallocated, and hidden or latent) provisions; and
- Before and After study documentation.

In addition, the PMOC shall obtain and study the project environmental documents, project drawings, specifications, narratives, design criteria reports, project schedule, information on land acquisitions and relocations, and procurement of vehicles, material, and equipment.

6.0 SCOPE OF WORK

Using the GAO's research, a reliable cost estimate should be comprehensive, well documented, accurate, and credible. The PMOC may perform a cost review during any project life cycle phase — planning, design, engineering, or construction. The PMOC shall assess the consistency of the cost estimating information provided by the project sponsor, evaluate the methodologies used, and confirm that the estimate adequately reflects the overall project scope, the estimated quantities shown on the design documents, the anticipated market conditions, the risk elements associated with the project, and the project schedule.

FTA may specify the extent of the review and add re-assessments or specialized analyses. The PMOC shall provide a written comparison of the proposed cost estimate with similar project(s) and analyze the differences. To the extent possible in the project early stages, the PMOC shall use the [FTA Capital Cost Database](#) for comparison purposes, such as confirming categories and

quantities of the scope analysis (also see paragraph 6.4.3 below). The PMOC should then draw conclusions and provide recommendations based on this comparison, if applicable. Under the CIG program, PMOC cost reviews will occur as directed by FTA and most likely at the following stages (see below).

REVIEWS DURING PROJECT DEVELOPMENT (PD)

Preparation of a comprehensive capital cost estimate in native and SCC format should occur during PD. The PMOC should review the cost estimate and also review the project sponsor's cost estimate staffing, capabilities, and processes. OP 51 Readiness to Enter to Engineering, Appendix A, Section 6 provides criteria for evaluating the completeness, level of detail, and reasonableness of the project cost estimate at Entry into Engineering.

REVIEWS AT ENTRY INTO ENGINEERING

Preparation of an appropriately detailed cost estimate developed using acceptable methodologies, with all elements identified in the SCC format at the subcategory level (e.g., 10.04), including costs for third party, utility, and critical right-of-way (ROW) agreements. FTA conducts risk assessments prior to Entry into Engineering. FTA uses the detailed project cost estimate to lock in the Section 5309 CIG funding amount (not the Federal share, but the actual CIG dollar amount) at the level requested by the project sponsor with Entry into Engineering. Should the project cost change after a project has entered engineering, additional Section 5309 CIG funding is not provided. Additional cost estimating analyses may need to be performed to support processes required under OP 40.

REVIEWS DURING ENGINEERING

Upon Entry into Engineering, the PMOC updates the cost estimate review. FTA may conduct a risk assessment, which could range from a project sponsor-led expedited review, FTA-led expedited review, or FTA-led full review. This review could be used to award Letter of No Prejudice (LONP), Letter of Intent (LOI) or Early Systems Work Agreement (ESWA), or commitment of Federal share.

REVIEWS FOR AWARD OF FFGA/SSGA

FTA may request that the PMOC update or refresh their cost estimate review (in addition to project scope, schedule, and risk) as part of their evaluation of the project sponsor's readiness to receive an FFGA/SSGA. The PMOC cost estimate review for FFGA/SSGA will need to be commensurate with the project sponsor's documents available at the time and requires the PMOC team performing the update to evaluate the suitability of the project documents to the project sponsor's project execution and contracting strategy. The cost estimate review is applicable for all project delivery methods.

REVIEWS DURING CONSTRUCTION

During construction, FTA may require that the PMOC monitor the following:

- The project sponsor’s compliance with the cost and estimating elements of the PMP and their subplans,
- Risks to the budget, including contingency levels, and
- The appropriate cost and estimating capacity and capability of the project sponsor’s organization.

In addition, the PMOC shall complete the following:

- Assess and evaluate the project sponsor’s cost estimate and their plan for cost control;
- Consider the adequacy of the project sponsor’s project control staff, systems, and software for the size and complexity of the project;
- Validate the usefulness of the cost estimate as a project management tool;
- Consider the level of definition of the cost estimate and elements within the SCC workbooks for appropriateness to the project phase; and
- Identify cost uncertainties in the project baseline and issues with the project estimate fundamental and reasonable soundness.

The PMOC shall review the project sponsor’s cost control including internal procedures and estimate reviews; consider the timing and adequacy of such reviews to determine if the cost estimate is sufficiently developed, properly maintained, and consistent with the progress of the project; and review the project sponsor’s processes and procedures for developing, monitoring, and changing the cost estimate. Additionally, the PMOC should determine if the project sponsor has a formalized configuration management process that controls the baseline budget and any re-baselining controls for cost revisions.

The PMOC shall provide recommendations to improve the development and implementation of cost management and proactively help the project sponsor solve cost problems. In a report, the PMOC shall document their findings, professional opinions, and recommendations.

The PMOC shall:

1. Evaluate the project sponsor’s development and implementation of the following cost management components:
 - a) Project control organizational structure, which includes the project sponsor’s staff combined with the potential blending of other consultant project controls staff for all project phases;
 - b) Project control systems, tools, and software used; and
 - c) Review of project control plans, procedures, and cost management contractual requirements.
2. Conduct a technical estimate review:
 - a) Assure consistency with project scope; and
 - b) Conduct a fundamental and reasonable soundness check.
3. Assess readiness to conduct a cost risk analysis as defined in OP 40 – Risk and Contingency Review, if applicable.

6.1 Review of Project Sponsor's Estimate Review Process

The project sponsor should have a review process for their own cost estimate and they should continually monitor and update their estimate using this process. The PMOC should review the project sponsor's approach to this task for adequacy and timing. Checks may be in the form of peer reviews and/or independent cost estimates or internal reviews that ensure the estimate provided to the PMOC for FTA's review is, at a minimum, internally consistent, coordinated, and reflects current assumptions and project status.

6.2 Review of Project Sponsor's Cost Estimate

The PMOC should perform any or all of the following after discussing the following options with FTA staff:

- A full project level cost characterization;
- A limited cost element review;
- Development of a cost estimate baseline;
- Specialized quantitative cost modeling or assessments, surveillance reporting or trends analysis;
- Reevaluation of project cost information on a periodic or event driven basis;
- Coordination of the cost estimate with the project scope and schedule;
- Coordination of the cost estimate with any known risk elements worthy of forecast adjustments;
- Presentation to the project sponsor of findings, analysis, recommendations, and opinions; and
- Participation in a workshop with the project sponsor to discuss the project.

6.2.1 Proposed Approach to Reviewing the Estimate – A Sampling Plan

After briefly evaluating the project sponsor's submittals associated with their current cost estimate (and discussing it with them), the PMOC shall propose to FTA an approach to reviewing the project sponsor's cost estimate that, regardless of the level of development of the estimate, will provide FTA with reliable findings and recommendations. The PMOC's proposed approach should be commensurate with the level of development of the project sponsor's cost estimate, which typically becomes more detailed as design progresses.

In addition, depending on the project sponsor's chosen Project Delivery method(s), the PMOC may need to structure the proposed approach for reviewing the project sponsor's cost estimate to be appropriate for the planned delivery method(s) (e.g., DB, Construction Manager/General Contractor (CM/GC), or other hybrid approaches might necessitate different and refined techniques for evaluating the project sponsor's cost estimate). Further, the project sponsor's cost estimating techniques and methodologies are often different based on the size of the project (from an overall projected cost standpoint), complexities, number of anticipated contract packages, and other factors.

When proposing an appropriate and reasonable approach to reviewing the project sponsor's cost estimate, the PMOC should consciously consider the stage of PD, the methodology and degree of development of the project sponsor's cost estimate, and the size, complexities, and circumstances surrounding the project being evaluated. The proposal should include a description of the level

of sampling of the estimate line items, and, if possible, examples of a sampling approach taken from a previous project(s). The plan shall also identify the sources of comparable data to be reviewed including third parties, market indices, other projects or databases, schedule options, etc.

6.2.2 Review of Project Sponsor’s Cost Estimating Capabilities

When applicable, as part of the OP 51 – Readiness to Enter Engineering, Appendix A Checklist for Approval to Enter Engineering, Section 3, Project Sponsor Organization, the PMOC should request the names, resumes, and job descriptions of the sponsor’s cost estimating representatives, along with any organizational or project-specific policies or procedures that the cost estimating representatives are tasked with following. Although this test is also covered in the OP 21 — Management Capacity and Capability Review, the importance of having a sufficient number of qualified cost estimators in support of a major capital project cannot be emphasized enough. As such, the PMOC should review the project sponsor’s capabilities in this regard as part of their overall evaluation of the project sponsor’s cost estimate.

In addition, when applicable, the PMOC shall reference the OP 51 – Readiness to Enter Engineering, Appendix B Checklist, Section 2.0 Project Management Plan, to confirm that the project sponsor’s PMP incorporates the practices and procedures needed to manage the cost estimates and cost control processes.

6.3 Basic Review

6.3.1 Review for Traceability, Integration, Coordination, Consistency

The PMOC should check that the Cost Estimate is:

- Mathematically correct;
- Appropriately detailed, logically structured and complete, and free of any material inaccuracies or incomplete data;
- Consistent with relevant, identifiable industry or engineering practices;
- Consistent and reasonable approach taken and format used by the project sponsor’s cost estimators;
- Consistent and reasonable methods of calculation/application of multipliers for escalation, inflation, general conditions, contingencies, cost of money, and taxes
- Consistent with the project scope described in National Environmental Policy Act document, Record of Decision, and design documents;
- Organized into SCC cost accounts categories; and
- Consistent with the current project schedule.

6.3.2 Characterize the Level of Estimating

The PMOC should:

- Characterize the estimating methodologies used:
 - Parametric (Statistical) — A cost estimating methodology using statistical relationships (see Appendix C). Commonly referred to as “Top Down” estimating.

- Analogous (Comparison) — An estimate of costs based on historical data of a similar (analog) item.
- Bottom-Up (Detailed Engineering) — This involves using a detailed Work Breakdown Structure and pricing out each work package making up the project.
- Extrapolation (Earned Value) — Estimates which are based on actual project costs.
- Characterize the nature of the support for the costs estimated for the estimated elements i.e., how these were derived so that the basis of estimate is documented in terms how the scope was captured, how it was priced and what assumptions were considered in the cost.
 - **Level 1: Characterize the line quantities and nature of the estimate as being:**
 1. The product of unit cost and quantity (Unit costs are defined when the estimate separately identifies direct and indirect cost components);
 2. A Cost Estimating Relationship (CER); (Unit pricing is classified as CER); and
 3. A lump sum (sometimes referred to as an “allowance” or “plug number”).
 - **Level 2: Subdivide Level 1 as follows:**
 1. Quantities indicated in both the design documents and the cost estimate;
 2. Quantities indicated only in the cost estimate; and
 3. Quantities indicated only in the design documents.
 - **Level 3: Subdivide Level 2 into the following subcategories:**
 1. Cost to cost CERs;
 2. Non-cost to cost CERs; and
 3. Cost or non-cost to non-CERs.
 - **Level 4: Subdivide Level 3 as follows:**
 1. Project direct costs;
 2. Escalation of materials and labor;
 3. Total project allowances;
 4. Project indirect costs;
 5. Construction contractor profit;
 6. Total inflation costs (nationwide/regional change in costs over time); and
 7. Total project contingency (allocated, unallocated, hidden, or latent) (coordinate work under this section with work performed separately under OP 40 for risk and contingency).

The PMOC shall provide their professional opinion regarding the over/understatement in the project sponsor’s cost estimate and shall support their opinion with their own spreadsheets and calculations. The PMOC shall assess the integration and traceability of the estimate with the defined scope and schedule of the project for purposes of identifying a “baseline” or initial project estimate. The PMOC shall assess the escalation factors used for material, labor, and other costs, as well as the inflation of costs from the base year to the Year of Expenditure cost, the soundness of the economic forecasts and factors used, and the appropriateness and reasonableness of contingency levels, noting the use of inconsistent and questionable rates or costing techniques within the estimate.

6.4 Specific Reviews

6.4.1 Review of Parametric Project Cost Estimate (Refer to Appendix C for Description)

The PMOC shall characterize the project sponsor's parametric estimate of project cost to determine that it:

- Identifies the key input drivers (i.e., independent variables) and explains their relative impact on the estimate;
- Adequately provides and supports the data and inputs used in calibration;
- Demonstrates that the model uses historical costs that are calibrated to current conditions within a reasonable degree of accuracy;
- Explains any adjustments to the model or to the key inputs and provides adequate rationale for such adjustments;
- Demonstrates that the calibrated model produces reliable estimates in comparison to some other benchmark (e.g., actuals, comparative estimates).

6.4.2 Review of Definitive Project Cost Estimate (Refer to Appendix E for Checklist)

The PMOC shall perform a technical review and characterization of the project sponsor's cost estimate using the checklist from Appendix D. Determine whether that the estimate reflects a thorough and reasonable incorporation of all cost elements consistent with the project scope, schedule, known and unknown risk elements, and determine if it correlates with current construction contractor pricing and work quantities.

Assess and evaluate the construction contract package elements and the impact of the terms in the General and Supplementary Conditions section of the contract and the Division 1 provisions, on the anticipated bid price). Describe and characterize the project sponsor's construction contract package information as follows:

- Identification of restrictive schedule or mobilization requirements that would materially affect bid prices;
- Identification of construction contract elements or contract language that would reasonably serve as a basis for reduced competition, increased pricing (due to passed-on risks), and ambiguous or incomplete terms leading to additional compensation, which is not part of a scheduled payment item;
- Geotechnical data;
- Provision for third party, real estate, utility relocations and support issues.
- Evaluative and pricing approach to changed conditions;
- Unit pricing and allowed variability in unit pricing (including maximum limits of variance);
- Provision for an adequate amount for the construction contractor's general conditions; and
- Requirements for specific services such as quality assurance/quality control (QA/QC) or scheduling, appropriately allocated to each contract and evident in bidding documents.

The PMOC shall develop an independent detailed cost estimate of the construction contractor's general conditions for the systems work and for the three largest construction contracts and shall compare and contrast and make recommendations for changes to the project sponsor's estimate.

6.4.3 Comparison Between Project Sponsor's Project Cost Estimate and FTA Database

FTA maintains a [Capital Cost Database](#) on FTA's website. The FTA Capital Cost Database is a Microsoft Access database of "as-built" costs for federally funded CIG projects. Project costs are tracked in the SCC format. While the database should not be used exclusively or predominantly as the PMOC's cost estimating review tool, it should be consulted as it allows for a comparison to historical CIG projects, having generally similar characteristics. It provides a tool for assessing and evaluating the project sponsor's project estimate, specifically identifying variances in unit costs and quantities from database averages, while promoting analysis of variances. Additionally, the database can be used to confirm categories, units, and quantities of the Scope analysis.

The PMOC should continually consult the database with each cost estimate review as the database will be further developed, adding new project datasets periodically and updates of the inflationary factors.

6.4.4 During Engineering, Pre-Bid, Post-Bid: Market Conditions Review

During project implementation, the project sponsor will receive bids or offers that may have a significant impact on the project budget. The PMOC shall analyze project information pre-bid:

- Identify, organize, characterize, and analyze substantial construction contracts, signaling, and equipment procurements;
- Describe and evaluate the project sponsor's contract packaging strategy, their relationship to the project cost estimate, and the rationale (political, economic, engineering, etc.) for the contract packaging strategy;
- Characterize and evaluate the project sponsor's proposed plan and processes for solicitations;
- Characterize and evaluate the material elements of the project risk assessments as available, emphasizing scope, cost and schedule reviews as highlighted in internal risk registers, and the project sponsor's Risk and Contingency Management Plan. Correlate these elements with the contract packaging strategy analysis, bid/bidder information, market conditions information, specialty equipment requirements, etc.

Address the following post-bid:

- Correlate and analyze bids or proposal amounts against the estimated values for each bid or proposal by element. Assess the impact of each deviation on the overall estimate, risk assessments, cost risk-cost ranges, and risk mitigations;
- Characterize and evaluate the project sponsor's bid process (plan sets distributed, pre-bid conference attendance, bid question activity, exit conferences, telephone interviews, analytical products, bid tabulations);
- Characterize estimate reconciliation exercises performed between the project sponsor and the contractor (i.e., post bid negotiations, inclusions and exclusions);

- Where significant variances between bid received and estimates are discovered:
 - Trace variances on bid tabulation elements back to the cost estimate and risk register;
 - Sample unit cost and quantity information to evaluate the reliability of estimate compared with bid pricing, obtain independent market data, and adjust as necessary to compare to pricing and estimate.
 - Sample scope elements from the contract documents to support conclusions;
 - Survey the market to determine the reasons for no bids, price drivers, retained risks, etc.;
 - Develop an estimated allocation between unit cost and quantity variance;
 - Organize causal factors into groups such as market factors, general conditions, risk transfers, etc.;
 - Evaluate contract award against design scope to assess whether the contract includes all of the planned scope as originally estimated (sometimes designs are adjusted after the estimate is prepared and large portions of work are not included in the solicitation package leading up to contract award); and
 - Determine whether the project sponsor has established a plan to use bid results to adjust future packages for similar unsolicited work (if necessary).

6.4.5 During Construction – Assessment of Project Sponsor’s Cost Estimate

Characterize the project sponsor’s estimate of the project cost to complete the project. Describe the level to which it:

- Is integrated with and makes adequate use of the project sponsor’s previously developed supporting documentation for the estimate;
- Reflects current project schedule, including the contractor’s Critical Path Method scheduling plan;
- Reflects the project sponsor’s change order experience on the project;
- Evaluates and incorporates project progress and trends to date; and
- Reflects reasonable provisions for testing, commissioning, start-up, and revenue service.

6.4.6 During Construction – Assessment of Project Sponsor’s Cost Estimate – Contingency and Risk

1. **Cost Contingency:** Per the requirements of OP 40, perform a review of the project cost contingency to ensure that appropriate amounts are included commensurate with the stage of PD. Using OP 40 Appendix M as a guide, prepare a cost drawdown curve including both forward pass and backward pass analyses. Also, refer to the requirements of OP 40, Appendix N – Risk and Contingency Management Plan Content to ensure that the estimate itself is fully coordinated with the project sponsor’s plan.
2. **Readiness to Perform OP 40 Risk and Contingency Review:** During the project, FTA may direct the PMOC to conduct or refresh an OP 40 Risk and Contingency Review. The risk assessment includes a cost and schedule risk analysis as described in OP 40. In order to perform a cost risk analysis, the project estimate must first be reviewed or characterized (OP

33) and adjustments must be made if so determined by the PMOC. Most importantly, similar to the project schedule, the project estimate must be completely stripped of all contingencies (patent and latent).

- a) Once all contingencies have been identified and documented during the Technical Review, all contingencies must be removed from the project estimate.
- b) Once all constraints are identified and documented during the Technical Review, all constraint must be removed from the project estimate.

6.4.7 Avoid Common Mistakes and Omissions

To improve the quality, consistency and accuracy of a cost estimate reviews, avoid common mistakes and omissions by taking action to:

- Ensure that each cost element of the estimate is assigned to a specific SCC code, preferably at the subcategory or second level.
- Confirm that the basis of estimate pricing bid quantities, takeoff quantities, and unit definitions are stated and realistic.
- Refrain from using lump sum units of measure as these items cannot be verified.
- Verify that the scope is appropriately defined and not understated for the design level.
- Trace the responsibility of the technology procurement.
- Check that the scope and price for real estate acquisitions and utility relocations are free from optimism bias.
- Coordinate the cost estimate with the project schedule and check that:
 - Construction durations align with estimated general conditions;
 - SCC inflation cost loading time frames match the schedule; and
 - Additional costs for difficult means, methods, and staging are included.
- Check for proper SCC code alignment. Appendix F serves as a template to summarize the cost elements in each SCC category, with particular note for these cost elements:
 - Are all construction costs contained in SCC 10 through 50?
 - Are costs associated with stations in SCC 20?
 - Are indirect costs such as general conditions, overhead, and profit allocated among the construction costs in Categories 10 through 50, or are these costs included in 40.08?
 - Are electronics costs, including electric vehicle charging equipment, in SCC 50?
 - Are vehicle spare parts in SCC 70.07?
 - Are costs for design, administration, testing, etc. in SCC 80 Professional Services?

7.0 REPORTS, PAPERS, PRESENTATIONS

The PMOC shall provide the COR/ACOR with a written report, formatted in compliance with OP 01, of their findings, analyses, recommendations, professional opinions, and description of the review activities undertaken, as well as other supporting information.

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After the COR/ACOR has transmitted formal acceptance of the report, the PMOC should share the report with the project sponsor. If there are differences of opinion between the PMOC and the project sponsor regarding the PMOC's findings, the COR/ACOR may direct the PMOC to reconcile their findings with the project sponsor and provide the COR/ACOR with a report addendum covering the modifications agreed upon by the project sponsor and PMOC.

When directed by the COR/ACOR, the PMOC shall perform data analysis and develop data models that meet FTA requirements using Microsoft Office products, such as Excel and Word, and use FTA templates when provided.

Upon approval by the COR/ACOR, the PMOC may add other software as required, but they should provide the COR/ACOR with documentation and report data when complete.



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APPENDIX A: ACCEPTABLE QUALITY LEVEL

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APPENDIX B: PROJECT SPONSOR’S MEMO REGARDING COST ESTIMATING METHODS

The Project Management Oversight Contractor shall review the project sponsor’s memo or report regarding their cost estimating methodologies and approach. The project sponsor should develop this memo as part of their alternative analysis work and should update it with each subsequent estimating effort. The memo or report outline should contain the following:

1. Introduction to the project;
2. Estimating Methodology: Describe the general approach to defining and quantifying the project capital cost estimate;
3. Sources of Cost Data: Define the nature and sources for cost data used in the preparation of the estimate;
4. Cost Estimating Assumptions:
 - a) Allocated Contingency
 - b) Unallocated Contingency
 - c) Latent (or hidden) Contingency
 - d) Estimating Procedures: If multiple parties are estimating parts of the project, this memo should help to ensure reasonableness and consistency of approach.
 - i) Parametric Approach: See Appendix C;
 - ii) Top-Down Approach: Using peer data, historical database information, etc.; typically used by project sponsors prior to engineering or for Design-Build contracts;
 - iii) Bottom-Up Approach: Using built-up quantities and units for labor, material, equipment, and all supporting services or acquisition costs and based upon more defined and educated provisions as developed during the design process; typically used by project sponsors during and at the conclusion of final design for Design-Bid-Build contracts;
 - iv) Facilities: Guideway, stations, support facilities costing procedures for typical vs. non-typical components;
 - v) Organization and Management of Cost Data: By segment elements; project-wide elements;
5. Estimate Limitations: Describe perceived or known risks, as well as unknowns that could lead to changes in the estimate due to changes in project scope and design standards, schedule, incorrect unit cost or quantity assumptions, and unforeseen problems in implementation.
6. Tracking Costs: Describe how capital expenditures in the Standard Cost Categories (SCC) format will be tracked through design, construction, revenue service, etc. (e.g., provision in Division 1 contract terms and conditions requiring contractor/consultant to submit SCC update with monthly pay application). FTA requires that costs be tracked in the SCC format through construction, into revenue service and through two years post-revenue service to document contract closeout and to establish the “after” point for the Before and After Study.



APPENDIX C: PARAMETRIC ESTIMATING

The term “Parametric,” as applied to estimating, denotes determination of the position of the estimate for a new project within the limitations of cost parameters developed by cost experience on similar previous projects. The Department of Defense and the [International Cost Estimating and Analysis Association \(ICEAA\)](#) define “parametric estimating” as a technique that “...develops estimates based upon the examination and validation of the relationships which exist between a project's technical, programmatic, and cost characteristics, and the resources consumed during its development, manufacture, maintenance, and/or modification.”

ISPA goes on to note that practitioners use a number of parametric techniques to estimate costs, including cost estimating relationships (CERs) and parametric models. ISPA defines a CER as a mathematical expression, which describes how the values of, or changes in, a “dependent” cost variable are partially determined, or “driven,” by the values of, or changes in, one or more “independent” variables.

In practice, CERs are usually derived using a single, independent cost variable. Since a parametric estimating method relies on the value of one or more input variables, or parameters, to estimate the value of another variable, a CER is actually a type of parametric estimating technique.

ISPA defines a cost CER as one in which cost is the dependent variable. In a “cost-to-cost” CER the independent variables are also costs. The cost of one element is used to estimate, or predict, that of another.

In a non-cost-to-cost relationship, the CER uses a characteristic of an item to predict its cost. Examples are CERs that estimate the quantity of revenue vehicles as a function of guideway mileage (independent variable), or the design engineering costs from the number of engineering drawings (independent variable) involved.



APPENDIX D: DEFINITIVE PROJECT COST ESTIMATE REVIEW CHECKLIST

The components of the cost estimate are to be reviewed against the following criteria. Structure the review to incorporate as much of this terminology and these concepts as is practical and consistent with the project sponsor's project design or construction plan.

Review of the project sponsor's cost estimate shall indicate whether:

- Estimate was developed by those with substantial experience in the type of construction under consideration;
- Sufficient judgment was applied to forecast design development, especially during early design stages;
- Evidence exists indicating sufficient collaboration with design team, especially in the application of value engineering;
- Work Breakdown Structure has been formatted to conform to the FTA Standard Cost Categories (SCC).

The PMOC shall further consider the following category-specific items:

- SCC category 10-50: Fixed Construction (guideways, stations, support facilities, site work, systems)
 - Construction Materials
 1. Quantities have been calculated with appropriate conservatism to accommodate development to a more advanced stage of design if appropriate;
 2. Allowances for material quantities have been included for commodities which cannot be fully quantified at the present level of design;
 3. Unit Prices have been developed using the best available local market information;
 4. Project sales tax exemption status has been established if appropriate and incorporated in material cost projections;
 5. Quotes have been obtained for specialty and price-sensitive materials;
 6. Material cost projections reflect reasonable allowances/provisions for market volatility;
 - Construction Labor
 1. Local wage rates, fringe benefits, and work rules are incorporated and are consistent with Federal labor laws (e.g., Davis-Bacon Act);
 2. Local payroll taxes and insurance rates are incorporated;
 3. Holiday / show-up / vacation pay is incorporated;
 4. Crew productivity is appropriate and conservative for the task under evaluation;
 5. Availability and variability of utility and railroad outages and "track time" have been incorporated in a conservative manner in determining the crew productivities for impacted work;
 - Construction Equipment

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1. Local equipment rental rates and current fuel costs are incorporated;
 2. Consideration has been given to procuring certain pieces of equipment via a cost/benefit analysis that supports purchasing, rather than leasing;
 3. Quotes have been obtained for specialty equipment (Tunnel Boring Machines, etc.), an appropriate evaluation of market conditions has been incorporated, and currency adjustments as applicable have been made.
- Escalation for Construction Materials, Labor and Equipment
 1. Confirm that reasonable escalation rates have been applied to estimates of material, labor, and equipment costs to anticipate prices at the time of project bid. Cost escalation can result from increased global or local demand (example is China's construction boom results in high demand for copper, steel, cement), or reduced supply (example is the reduced labor pool in neighboring states when construction workers flocked to New Orleans after Hurricane Katrina).
 - Special Considerations
 1. Utility and railroad labor, equipment, and overhead rates have been verified and incorporated in third party or "force account" work pricing, as well as local utility/RR work and safety rules; and
 2. Special consideration has been given to support operations and facilities for tunneling operations, facilities to support operations in contaminated/hazardous materials, etc.
 - Construction Indirect Costs, Multipliers for Risk etc.
 1. Contractor indirect and overhead costs are advanced beyond a percent of the associated construction direct costs and should be analyzed based on field and home office indirect costs such as contract duration, appropriate levels of staffing (including project managers, engineers, safety engineers, schedulers, superintendents, QA/QC engineers, craft general foreman, labor stewards / nonproductive labor, warehousing, project trucking, survey layout, purchasing, timekeeping, etc.), mobilization / demobilization costs, equipment standby / idle time costs, reviewer office / lab / tool facilities, safety equipment, QA/QC testing equipment, temporary utilities (sanitary / power / light / heat), job site and public security measures, etc.
 2. Appropriate provisions have been included for payment and performance bonds and special insurance requirements (railroad protective, pollution liability, etc.).
 3. Other construction insurance provisions and/or project-wide coverage (owner-controlled insurance policy) has been included based on quotes from appropriate carriers.
 4. Contractor profit / risk costs have been incorporated that reflect the expected level of competition by contract package (higher profit margin where few competitors will bid) and the sharing or assumption of risks by the contracting

community as a result of the contract terms and conditions, project scope, and schedule.

- Category 60 — Real Estate
 - Verify that provisions for professional services (contracted and in-house legal, appraisal, real estate and relocation consultants) and conservative provisions for property acquisitions, easements, and associated costs for the real estate and relocations have been included.
 - Check that easements, acquisitions, inspections, takings, etc. have been appraised or estimated by qualified professionals familiar with local real estate markets and practices.
 - Verify, for projects that involve acquisition of railroad property or property rights, that the estimate has been performed by a specialist familiar with these unique transactions. Include reasonable provisions for any market volatility and taxes.
 1. The real estate estimate should also contain an additional allowance above each estimated Fair Market Value to reflect settlements and court awards which should be considered inevitable.
 2. This allowance should be based on historical data regarding complete acquisition costs on similar projects in the recent past. The cost estimate for real estate should include all of the relevant cost elements identified in OP 23 Real Estate Acquisition and Management Plan Review, Appendix C.
- Category 70 — Vehicles
 - Assess the costs for professional services (both contracted and in-house) for vehicle design and procurement as well as construction of prototypes and vehicles themselves.
 - Review estimates for current purchase prices for similar vehicles or quoted prices from manufacturers; costs for spare parts and project requirements for non-revenue support vehicles are included.
 - Consider current market conditions and production schedules due to the relative shortage of vehicle suppliers.
- Category 80 — Professional Services
 - Review costs both contracted and in-house for all professional, technical and management services related to the design and construction of fixed infrastructure (Categories 10 – 50) during the engineering, construction, testing, and start-up phases of the project.
 1. This includes environmental work; surveying; geotechnical investigations; design; engineering and architectural services; materials and soils testing during construction; specialty services such as safety or security analyses; value engineering, risk assessment, cost estimating, scheduling, Before and After studies, ridership modeling and analyses, auditing, legal services, administration and management, etc. by agency staff or outside consultants.

2. Assess provisions for professional liability insurance and other non-construction insurance should be included on 80.05.
 - Refer to the project sponsor's contracts for services.
 - Confirm that cost estimates are based on realistic levels of staffing for the duration of the project through close-out of construction contracts.
 - Confirm that the project sponsor has developed a staffing plan that properly contemplates the cost of attrition, staffing interruptions, and replacement of key personnel.
 - Confirm that costs for permitting, agency review fees, legal fees, etc. have been included.
- Category 90 — Unallocated Contingency
 - Confirm that adequate contingency has been added to the total project cost based on the perceived project risk and the stage of design/construction development.
- Category 100 — Finance Charges
 - Confirm that finance charges are included if necessary.
 - Ensure that the project sponsor and FTA's Financial Management Oversight Consultant review the reasonableness of the amount of finance charges.
- Allocated Contingency
 - Confirm that adequate contingency has been allocated to each of the SCC categories based on the perceived risk inherent to each and the stage of project development.
- Inflation
 - Confirm that adequate and reasonable inflation rates have been applied to base year project costs to anticipate costs at procurement or bid (through the use of cash flow analysis).
 - 1. The Year of Expenditure costs should be developed thoughtfully. Reference indices that may be useful are the U.S. Bureau of Labor Statistics Producer Price Index Transportation State and Local index (Line 38), RSMeans Construction Cost Index, Engineering News Record Building Cost Index, and Construction Cost Index, some with regional cost databases.



APPENDIX E: BODY OF REPORT

Body of Report (Refer to OP 01 – Administrative Conditions and Requirements for more information on report requirements)

1. Executive Summary

- a) The Project Management Oversight Contractor (PMOC) shall provide an executive summary in three pages or less that includes the following:
 - i) Synthesis of findings as related to the cost estimate;
 - ii) Characterization of significant uncertainties in terms of likelihood (probable, remote, improbable) and their consequence (catastrophic, critical, serious, moderate, marginal);
 - iii) Professional opinion regarding the reliability of the cost estimate;
 - iv) Statement of potential range of cost (lower, upper, and most likely);
 - v) To reduce important uncertainties, recommendations for additional work of any kind including but not limited to investigation, and planning or design work by the project sponsor or other party with a schedule for the performance of the work (recommend performance either before or after FTA’s decision regarding project advancement or funding.)

2. Introduction

- a) Indicate date of estimate received in original and Standard Cost Categories (SCC) format;
- b) Indicate the level of design completion represented by the cost estimate;

3. Methodology – Describe the PMOC’s approach to:

- a) Sampling; provide rationale for approach (e.g., higher sample rate for higher cost items, etc.); define the overall sampling rate of (___ percent);
- b) Checking costs against scope and schedule;
- c) Identifying allowances;
- d) Identifying patent (exposed) and latent (hidden) contingencies;
- e) Evaluating provisions for escalation and inflation;
- f) Evaluating provisions for risk elements;
- g) Accepting project sponsor cost and other information with/without adjustment;

4. PMOC Team Review (of various cost and other documents provided by the project sponsor following this outline):


- a) Description of the structure, quality, level of detail of the project information (including project sponsor and third party information);
 - i) describe the contract packages and the estimating approach/consistency for each;
 - ii) describe the manner of tying the estimate line items to the FTA SCC line items;
- b) Characterization or Stratification of Cost Items
 - i) Characterize estimate data into one of three cost item categories or classifications — Lump Sum, Unit Cost or Cost Estimate Relationship. Organize project sponsor costs in the format shown in Appendix G;

- ii) Select sample totals based on individual sampling rates for each category;
 - iii) Identify cost items for detailed review based on random selection of individual cost items;
 - iv) Allowances: Evaluate use of allowances for reliability with respect to the scale of the work covered and known project risks.
- c) Mathematical Check of Estimate
- i) Calculate all lump-sum prices, unit price and quantity calculations, and cost estimating relationships to confirm the project sponsor's total cost estimate;
 - ii) Perform a mathematical check of all sampled unit price or quantity calculations;
 - iii) Mathematically check the crosswalk and cost sums from the contract packages to the FTA SCC; and
 - iv) Mathematically check all escalation and inflation provisions through a cash flow analysis.
- d) Comparison to Industry Standards
- i) Review sampled unit prices and quantities for conformance to industry standards, regional variations or other unique characteristics;
 - ii) Check sampled unit costs of similar items used in differing conditions to ensure local conditions and difficulty factors were considered in the individual estimated units; and
 - iii) Check sampled quantities to confirm basis of calculations are consistent with design documents and core assumptions.
- e) Correspondence with Scope Review
- i) Cross-check sampled quantity estimates with the project scope contained in the design documents to determine degree of correlation between the design deliverables and the project cost estimate down to the second level Work Breakdown Structure;
 - ii) Perform general "Overview" of total estimate to give it a "sanity check" and ensure that all major components appear, conscious of any risk assessments that have occurred; and
 - iii) Review sample quantities for reasonableness and to be representative of industry standards and the design scope of work with respect to major components.
- f) Evaluation of Contract Package Elements
- i) Assess certain contract package elements as to requirements and associated reviewer payments, characterizing elements as:
 - (1) Contract requirements for specific services such as QA/QC and scheduling that would be material elements in the development of bids;
 - (2) Elements of contract language that would reasonably serve as a basis for additional compensation not part of a scheduled payment item;
 - (3) Restrictive schedule or mobilization requirements that would be material pricing elements in developing a bid;
 - (4) Geotechnical data and pricing approach to changed conditions;

- (5) Unit pricing and allowed variability in unit pricing; and
 - (6) Risk elements that will be absorbed by the contractor.
 - g) Costs associated with General and Supplementary Conditions of the Construction Contract; Division 1 Provisions:
 - i) By contract package, evaluate the project sponsor's proposed language and the allocation of scope, schedule, and cost risk described therein;
 - ii) For comparison with the project sponsor's estimates, the PMOC is to develop independent cost estimates for General/Supplementary Conditions/Division 1 for the three largest construction contracts and the systems work;
 - h) Contingencies: Present and evaluate cost contingency elements in the project sponsor's cost estimate — patent (exposed) and latent (hidden costs that are functionally equivalent to contingency but not identified). Are the contingency amounts appropriate for the level of risk and stage of design/construction development?
 - i) Escalation and Inflation Review
 - i) Building up from the second SCC level, evaluate uniformity of application of escalation and inflation factors. Review and evaluate the application of the escalation factors to costs for materials, labor and equipment. Review and evaluate the application of inflation rates to the base year dollar costs to arrive at year of expenditure dollars.
 - (1) Consider the adequacy and reasonableness of the rates, the soundness of the economic forecasts, and whether the project sponsor has performed any sensitivity analysis to supports their projections;
 - ii) Compare escalation and inflation factors used by project sponsor to Producer Price Index data from the U.S. Bureau of Economic Analysis, Bureau of Labor and Statistics and other sources such as Engineering News-Record, Associated General Contractors of America, RSMeans, Richardson, etc. to ensure adequate escalation and inflation cost is included to carry the project to the mid-point of construction (the assumed time when contract unit awards will be complete).
 - iii) Consider using separate rates to improve the cost estimate, if market conditions are such that it may be appropriate to calculate inflation and escalation factors by SCC.
 - (1) Construction annual inflation/escalation rate applied to SCCs 10 through 50, and 80 costs;
 - (2) Real estate annual inflation/escalation rate applied to SCC 60 costs;
 - (3) Vehicle annual inflation/escalation rate applied to SCC 70 costs; and
 - (4) Weighted average compounded inflation/escalation factor applied to the Unallocated Contingency (SCC 90).
5. Appendices
- a) PMOC evaluation team member and qualifications
 - b) Other appendices as required



APPENDIX F: COST ESTIMATE REVIEW SUMMARY BY SCC

OP 33 Cost Estimate Review Summary by SCC Project Name: _____ Review Date: _____	 Federal Transit Administration
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Project Mode: _____ Project Delivery Method: _____

Use this template to summarize which cost elements by SCC are present for the Project. Add or delete cost element text to match the Project.

SCC 10 GUIDEWAY & TRACK ELEMENTS

SCC	CATEGORY DESCRIPTION	COST ELEMENTS	
10.01	Guideway: At-grade exclusive right-of-way	rough grading excavation concrete base	rumble strip track slabs
10.02	Guideway: At-grade semi-exclusive (allows cross-traffic)	rough grading excavation concrete base	rumble strip track slabs
10.03	Guideway: At-grade in mixed traffic	rough grading excavation concrete base	rumble strip track slabs
10.04	Guideway: Aerial structure	foundation excavation caissons columns bridges	viaducts cross-over fly-over
10.05	Guideway: Built-up fill	earthen berms	
10.06	Guideway: Underground cut & cover	excavation excavation support cut-&-cover concrete structures retaining walls finishes	backfill underground guideway structure geotechnical monitoring activities
10.07	Guideway: Underground tunnel	tunnel boring machine drill blasting mining immersed tube tunneling tunnel structure Finishes Mechanical systems and testing Tunnel lighting	Conveyors plant and linear equipment procurements Excavation and support concrete corbels slabs geotechnical monitoring
10.08	Guideway: Retained cut or fill	excavation retaining walls backfill underground guideway structure finishes	retained cut concrete structures Intrusion Barrier support-of-excavation concrete and geotechnical monitoring
10.09	Track: Direct fixation	Rails Track and rail-slab construction	connectors corrosion control operations
10.10	Track: Embedded	Rails Ties	ballast
10.11	Track: Ballasted	Rails	Ballast



APPENDIX G: PROJECT COST ESTIMATE CLASSIFICATION

Estimate Classification	Quantity	UM	n	Unit Pricing	n	CER	n	Lump Sum / Allowance	Σn	Total	Percent n	Percent \$
Percent Of Total			88.7 %	43.0%	1.4%	22.4%	10.0%	34.6%				
10 GUIDEWAY & TRACK ELEMENTS (route miles)	9.40	RM	258	\$ 73,570,533	4	\$ 38,348,813	29	\$59,196,427	291	\$171,115,773		
Drawings / Specifications			257	\$63,214,438	3	\$32,950,675			260	\$96,165,113	89.3%	56.2%
Schedule (Includes Escalation)			1	\$10,356,094	1	\$ 5,398,138	1	\$8,332,735	3	\$24,086,968	1.0%	14.1%
Design Report				\$ -		\$ -	28	\$50,863,692	28	\$50,863,692	9.6%	29.7%
GCs				\$ -				\$ -	-	\$ -	0.0%	0.0%
Percent Of Total			54.3 %	28.1%	11.4%	18.0%	34.3%	53.8%				
20 STATIONS, STOPS, TERMINALS, INTERMODAL (number)	11.00	EA	19	\$7,299,565	4	\$4,683,534	12	\$13,967,320	35	\$25,950,418		

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Estimate Classification	Quantity	UM	n	Unit Pricing	n	CER	n	Lump Sum / Allowance	Σn	Total	Percent n	Percent \$
Drawings / Specifications			18	\$ 6,272,000	3	\$4,024,229			21	\$10,296,229	60.0%	39.7%
Schedule (Includes Escalation)			1	\$1,027,565	1	\$659,304.4	1	\$1,966,190	3	\$3,653,059	8.6%	14.1%
Design Report				\$ -		\$ -	11	\$12,001,130	11	\$12,001,130	31.4%	46.2%
GCs				\$ -				\$ -	-	\$ -	0.0%	0.0%
Percent Of Total			0.0%	0.0%	0.0%	0.0%	0.0%	0.0%				
30 SUPPORT FACILITIES: YARDS, SHOPS, ADMIN. BLDGS	9.40	RM	-	\$ -	-	\$ -	-	\$ -	-	\$ -		
Drawings / Specifications						\$ -			-	\$ -	\$ -	\$ -
Schedule (Includes Escalation)				\$ -		\$ -		\$ -	-	\$ -	\$ -	\$ -
Design Report				\$ -		\$ -		\$ -	-	\$ -	\$ -	\$ -

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Estimate Classification	Quantity	UM	n	Unit Pricing	n	CER	n	Lump Sum / Allowance	Σn	Total	Percent n	Percent \$
GCs				\$ -				\$ -	-	\$ -	\$ -	\$ -
Percent Of Total			48.3%	42.1%	32.8%	47.9%	18.9%	10.0%				
40 SITEWORK & SPECIAL CONDITIONS	9.40	RM	115	\$34,909,305	78	\$39,674,285	45	\$ 8,243,518	238	\$82,827,108		
Drawings / Specifications			114	\$29,995,357	77	\$34,089,602	44	\$ 7,083,134	235	\$71,168,093	98.7%	85.9%
Schedule (Includes Escalation)			1	\$4,913,948	1	\$ 5,584,682	1	\$ 1,160,385	3	\$11,659,015	1.3%	14.1%
Design Report				\$ -					-	\$ -	0.0%	0.0%
GCs				\$ -					-	\$ -	0.0%	0.0%
Percent Of Total			9.8%	9.8%	7.8%	23.2%	82.4%	67.0%				
50 SYSTEMS	9.40	RM	5	\$2,459,937	4	\$5,847,541	42	\$16,888,973	51	\$25,196,451		
Drawings / Specifications			4	\$2,113,650	-	\$ -	-	\$ -	4	\$2,113,650	7.8%	8.4%

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Estimate Classification	Quantity	UM	n	Unit Pricing	n	CER	n	Lump Sum / Allowance	Σn	Total	Percent n	Percent \$
Schedule (Includes Escalation)			1	\$346,287	1	\$823,163	1	\$2,377,473	3	\$3,546,923	5.9%	14.1%
Design Report				\$ -	3	\$ 5,024,379	41	\$14,511,500	44	\$19,535,879	86.3%	77.5%
GCs				\$ -		\$ -		\$ -	-	\$ -	0.0%	0.0%
Percent Of Total			0.0%	0.0%	50.0%	9.1%	50.0%	90.9%				
60 ROW, LAND, EXISTING IMPROVEMENTS	9.40	RM	-	\$ -	2	\$2,107,818	2	\$21,078,182	4	\$23,186,000		
Drawings / Specifications				\$ -		\$ -		\$ -	-	\$ -	0.0%	0.0%
Schedule (Includes Escalation)				\$ -	1	\$107,818	1	\$1,078,182	2	\$1,186,000	50.0%	5.1%
Design Report				\$ -	1	\$2,000,000	1	\$20,000,000	2	\$22,000,000	50.0%	94.9%
GCs				\$ -		\$ -		\$ -	-	\$ -	0.0%	0.0%
Percent Of Total			0.0%	0.0%	50.0%	9.1%	50.0%	90.9%				

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Estimate Classification	Quantity	UM	n	Unit Pricing	n	CER	n	Lump Sum / Allowance	Σn	Total	Percent n	Percent \$
70 VEHICLES (number)	30.00	A	-	\$ -	2	\$ 1,475,182	2	\$14,751,818	4	\$16,227,000		
Drawings / Specifications				\$ -		\$ -		\$ -	-	\$ -	0.0%	0.0%
Schedule (Includes Escalation)				\$ -	1	\$224,182	1	\$2,241,818	2	\$2,466,000	50.0%	15.2%
Design Report			-	\$ -	1	\$1,251,000	1	\$12,510,000	2	\$13,761,000	50.0%	84.8%
GCs				\$ -		\$ -		\$ -	-	\$ -	0.0%	0.0%
Percent Of Total			0.0%	0.0%	80.0%	89.3%	20.0%	10.7%				
80 PROFESSIONAL SERVICES	9.40	RM	-	\$ -	8	\$72,996,814	2	\$8,779,666	10	\$81,776,479		
Drawings / Specifications				\$ -		\$ -			-	\$ -	0.0%	0.0%
Schedule (Includes Escalation)				\$ -	1	\$6,482,377	1	\$779,666	2	\$7,262,043	20.0%	8.9%
Design Report			-	\$ -	7	\$66,514,437	1	\$8,000,000	8	\$74,514,437	80.0%	91.1%
GCs				\$ -		\$ -			-	\$ -	0.0%	0.0%

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Estimate Classification	Quantity	UM	n	Unit Pricing	n	CER	n	Lump Sum / Allowance	Σn	Total	Percent n	Percent \$
90 UNALLOCATED CONTINGENCY			-	\$ -	2	\$ 21,342,960	-	\$ -	2	\$21,342,960		
Drawings / Specifications									-	\$ -	0.0%	0.0%
Schedule (Includes Escalation)					1	\$2,721,995			1	\$2,721,995	50.0%	12.8%
Design Report					1	\$18,620,965			1	\$18,620,965	50.0%	87.2%
GCs									-	\$ -	0.0%	0.0%
100 FINANCE CHARGES			-	\$ -	-	\$ -	-	\$ -	-	\$ -		
Drawings / Specifications									-	\$ -		
Schedule (Includes Escalation)									-	\$ -		

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Estimate Classification	Quantity	UM	n	Unit Pricing	n	CER	n	Lump Sum / Allowance	Σn	Total	Percent n	Percent \$
Design Report									-	\$ -		
GCs									-	\$ -		
Percent Of Total			62.5%	26.4%	16.4%	41.7%	21.1%	31.9%				
Grand Totals	9.40	RM	397	\$118,239,340	104	\$186,476,946	134	\$142,905,904	635	\$447,622,189		



APPENDIX H: ACRONYMS

Acronym	Term
ACOR	Alternate Contracting Officer's Representative
ADA	The Americans with Disabilities Act
AGC	Associated General Contractors of America
ATC	Alternative Technical Concepts
AVS	Associate Value Specialist
BEA	Bureau of Economic Analysis
BLS	Bureau of Labor and Statistics
BRF	Beta Range Factor
BY	Base Year
CATEX or CE or CX or Exclusion	Categorical Exclusion
CCIP	Contractor Controlled Insurance Program
CE	Categorical Exclusion
CER	Cost Estimating Relationship
CFR	Code of Federal Regulations
CIG	Capital Investment Grant
CLIN	Contract Line Item Number
CM	Construction Manager

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Acronym	Term
CM/GC	Construction Manager/General Contractor
CMAR	Construction Manager at Risk
COR	Contracting Officer's Representative
CPM	Critical Path Method
CPTED	Crime Prevention Through Environmental Design
CR	Constructability Review
CVS	Certified Value Specialists
DB	Design-Build
DBB	Design-Bid-Build
DBE	Disadvantaged Business Enterprise
DBF	Design-Build-Finance
DBFOM	Design-Build-Finance-Operate and Maintain
DBOM	Design-Build-Operate and Maintain
DEIS	Draft Environmental Impact Statement
DF	Designated Function
DHS	Department of Homeland Security
DTS	Department of Transportation Services
EA	Environmental Assessment
EIS	Environmental Impact Statement

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Acronym	Term
EMP	Emergency Management Plan
ENR	Engineering News-Record
EPCM	Engineering/Procurement/Construction Management
ESWA	Early Systems Work Agreement
FEIS	Final Environmental Impact Statement
FEMA	Federal Emergency Management Agency
FFGA	Full Funding Grant Agreement
FHWA	Federal Highway Administration
FLSSC	Fire/Life Safety and Security Committee
FONSI	Finding of No Significant Impact
FRA	Federal Railroad Administration
FTA	Federal Transit Administration
GAO	Government Accountability Office
GC	General Contractor
GC/CM	General Contractor/Construction Manager
GMP	Guaranteed Maximum Price
HAZMAT	Hazardous Materials
IP	Implementation Plan
LONP	Letter of No Prejudice

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Acronym	Term
LPA	Locally Preferred Alternative
MBE	Minority Business Enterprise
MCC	Management Capacity and Capability
MDBF	Mean Distance Between Failures
MPO	Metropolitan Planning Organization
NEPA	National Environmental Policy Act
NTE	Not-to-Exceed
NTP	Notice to Proceed
O&M	Operation and Maintenance
OCIP	Owner Controlled Insurance Program
ODCs	Other Direct Costs
OHA	Operational Hazard Analysis
OIG	Office of Inspector General
OMP	Operations and Management Plan
OP	Oversight Procedure
P3	Public Private Partnership
PCMG	Project and Construction Management Guidelines
PD	Project Development
PDM	Project Delivery Method

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Acronym	Term
PHA	Preliminary Hazard Analysis
PMO	Project Management Oversight
PMOC	Project Management Oversight Contractor
PMP	Project Management Plan
POP	Project Oversight Plan
PTASP	Public Transportation Agency Safety Plan
QA/QC	Quality Assurance/Quality Control
R&D	Research and Development
RAMP	Real Estate Acquisition Management Plan
RAP	Rail Activation Plan
RCMP	Risk and Contingency Management Plan
RET	Risk Evaluation Tool
RFI	Request for Information
RFP	Request for Proposal
RFQ	Request for Qualifications
ROD	Record of Decision
ROW	Right-of-Way
RSD	Revenue Service Date
S/DBE	Small/Disadvantaged Business Enterprises

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Acronym	Term
SABCE	Stripped and Adjusted Base Cost Estimate
SABS	Stripped and Adjusted Base Schedule
SAVE	Society of American Value Engineers
SCC	Standard Cost Category
SCIL	Safety Certifiable Items List
SGR	State of Good Repair
SIT	System Integration Testing
SITP	Systems Integration Test Plan
SOP	Standard Operating Procedure
SOW	Scope of Work
SSCVR	Safety Certification Verification Report
SSGA	Small Starts Grant Agreement
SSI	Sensitive Security Information
SSMP	Safety and Security Management Plan
STIP	Statewide Transportation Improvement Program
SYGA	Single Year Grant Agreement
TAR	Travel Authorization Request
TBM	Tunnel Boring Machine
TCC	FTA Office of the Chief Counsel

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Acronym	Term
TCRP	Transit Cooperative Research Program
TIFIA	Transportation Infrastructure Finance and Innovation Act
TIGER	Transportation Investment Generating Economic Recovery
TIP	Transportation Improvement Program
TOD	Transit-Oriented Development
TPE	FTA Office of Planning and Environment
TPM	FTA Office of Program Management
TRB	Transportation Research Board
TSA	Transportation Security Administration
TVA	Threat and Vulnerability Assessment
URA	Uniform Relocation Assistance and Real Property Acquisition Act
U.S.C.	United States Code
VE	Value Engineering
VECP	Value Engineering Change Proposals
WBE	Women Business Enterprise
WBS	Work Breakdown Structure
YOE	Year of Expenditure