Oversight Procedure 51–Readiness to Enter Engineering

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 project's readiness to enter Engineering.

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

FTA considers advancing a proposed project into Engineering only if:

- The National Environmental Policy Act (NEPA) process is complete;
- FTA has accepted the New Starts submittal and the project is rated favorably;
- FTA received approval to enter Project Development and the design has been developed to a level described within Appendix B of this OP;
- A project cost estimate and detailed schedule have been developed to a level commensurate with the design; and
- The project sponsor can demonstrate adequate management capacity and capability to carry out Engineering ("design development") for the proposed project, among other requirements. All applicable Federal and FTA program requirements for Project Development and readiness to enter Engineering must have been satisfied.

FTA's approval will be based on the results of its evaluation as described in 49 Code of Federal Regulations (CFR) Sections 611.9–611.13, Major Capital Investment Projects. The FTA Office of Program Management (TPM) works closely with the Office of Planning and Environment (TPE) in determining whether a project sponsor is ready to enter Engineering. The Office of Capital Project Management at TPM (TPM-20) has a critical role in determining technical readiness to enter Engineering. This differs from TPE's role, which is to evaluate whether environmental and planning requirements have been satisfied.

Between Project Development and Engineering, the project is likely to be subject to an in-depth review for management capacity and capability. Whether the project sponsor has the necessary management approach and organizational structure, internal and external controls, and other resources available to administer a project also determines readiness to enter Engineering. The procedures for making these assessments are established in OP 21: Management Capacity and Capability.

Similarly, Project Development and Engineering, project scope, schedule, and cost are subject to intensive reviews as described in separate OPs. These reviews may culminate in a risk assessment and the development of a risk and contingency management plan. The risk

assessment identifies and assesses risk, considers approaches to mitigations, and develops a risk management plan to inform the project sponsor's project management practices.

3.0 OBJECTIVES

This review is based on the PMOC's examination of the project sponsor's preliminary design documents, schedule, cost estimate, and other documents. The objective of this review is to synthesize findings, and provide FTA with evaluations, conclusions, recommendations, and well-grounded professional opinions regarding the following:

- The completeness, quality, and accuracy of the design, project schedule, and Capital Cost Estimate at the conclusion of Project Development;
- The project sponsor's program for advancing the design, schedule, and Cost Estimate to the point of construction-ready bid documents for Design-Bid-Build (DBB) project delivery, or the project sponsor's plan for preparing bridging documents for alternative delivery method contracts;
- The project sponsor's ability to execute design and construction (for example, management capacity and capability), and whether the project sponsor has implemented the project with a risk-based management approach that incorporates findings of a project risk assessment;
- The adequacy of the project sponsor's project controls, management policies, and procedures to execute the project, including those for maintaining the following:
  - Quality assurance/quality control (QA/QC) of products and services;
  - Safety and security;
  - Construction, operation, and acquisition of required right-of-way (ROW) among other policies and procedures; and
- Overall readiness to advance to Engineering.

This information, combined with findings from environmental, New Starts, financial, and other FTA-directed reviews will support FTA's determination regarding advancement of the project sponsor's project into the engineering phase.

4.0 REFERENCES

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

- FTA enabling statutes, 49 United States Code (U.S.C.) Chapter 53
  - 49 U.S.C. 5309(e), Core Capacity Improvement Projects
  - 49 U.S.C. 5309(e)(2)
- Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended (Public Law 91-646; 42 U.S.C. 4601, et seq.)

- Infrastructure and Investment Jobs Act (IIJA), Public Law 117-58, effective November 15, 2021 (also known as the "Bipartisan Infrastructure Law")

4.2 Regulations

- 23 CFR Part 450, Planning Assistance and Standards (Joint FTA/FHWA regulations)
- 23 CFR Part 771, Environmental Impact and Related Procedures (Joint FTA/FHWA regulations)
- 49 CFR Part 611, Major Capital Investment Projects (in particular Sections 611.9–611.11)
- 49 CFR Part 24, Uniform Relocation Assistance and Real Property Acquisition for Federal and Federally Assisted Programs
- 49 CFR Part 633, Project Management Oversight

4.3 FTA Circulars

- C 4220.1F, Third Party Contracting Requirements
- C 5010.1E, Award Management Requirements (or most recent version)
- C 5800.1, Safety and Security Management Guidance for Major Capital Projects

4.4 Guidance

- Final Guidance on Railroad ROW Acquisition FTA Guidance on the Application of 49 U.S.C. 5324 to Railroad Right-of-Way (ROW) Acquisition (2016)
- FTA Master Agreement
- FTA Standard Cost Category (SCC) workbooks:
  - New Starts SCC Workbook
  - Small Starts SCC Workbook
  - Core Capacity SCC Workbook

5.0 PROJECT SPONSOR SUBMITTALS

Before performing the review, the PMOC should obtain and study the project documents identified in Appendix B of this OP. The purpose of this checklist is to provide a categorized list of elements to complete prior to FTA's approval for Entry to Engineering. A brief description follows each list item to explain what needs to happen for that item to be complete. The PMOC should notify FTA of important discrepancies in the project information that would hinder the review. An example of a discrepancy is a mismatch between drawings and cost estimate in which the drawings are current, and the cost estimate is two years old.

6.0 SCOPE OF WORK

Appendix B provides the PMOC with details for each relevant element to be assessed by the PMOC. For entry to Engineering, the project sponsor must have a suitable organizational structure in place to effectively manage the project. In addition, they must have made satisfactory progress in advancing the project design and the corresponding cost estimate and

schedule. At a minimum, the level of design detail described in Appendix B of this OP must be provided in drawings. The supporting Capital Cost Estimate must be based on the following:

- Quantities of work established in the drawings; and
- A substantial level of detail for cost line-items and backup for all other costs, including:
  - Vehicles
  - Equipment;
  - Real estate;
  - Professional services;
  - Unallocated and allocated contingencies; and
  - Financing costs.

The master schedule should include sufficient detail to identify all significant activities, their durations, and logical ties to other activities, as described in Appendix B. In addition, the master schedule tells the PMOC what information the project sponsor needs to provide to demonstrate technical readiness to enter Engineering.

In general, for each work item listed in Appendix B, the PMOC will follow a similar analytical approach:

1. Review and analyze the pertinent information available for completeness, adequacy, consistency, and appropriate level of detail given the phase of the work.
2. Identify all apparent discrepancies and deficiencies.
3. State findings in descending order of importance (most likely, largest consequences, least likely, moderate/minor consequences) and make recommendations for modifications or additional work by the project sponsor along with a time frame for the performance of the work.
4. For major findings, provide recommendations for the project sponsor and/or FTA to implement that will address the issue or correct or mitigate the deficiency.
5. Identify any action items and next steps.
6. Document the assessment, including objectives, approach/methodology, findings, and recommendations and provide back-up information in appendices or attachments to the main body of any report.

It is important to note that the individual OPs describe the procedures for evaluating the reasonableness and accuracy of each review element for the project. The PMOC shall incorporate the results of these reviews into this assessment of Readiness to Enter Engineering.

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.

The PMOC's readiness report shall:

1. Integrate the findings and recommendations of the reviews discussed in this OP.

2. Include an executive summary in three pages or less that includes the following:
   a) Synthesis of findings on scope, schedule, and cost;
   b) Characterization of significant uncertainties in terms of likelihood (probable, remote, improbable) and their consequence (catastrophic, critical, serious, moderate, marginal);
   c) Professional opinion regarding the reliability of the project scope, schedule and cost, and the ability of the project sponsor to manage the project;
   d) Statement of potential cost range (lower, upper bound and most likely); and
   e) To reduce important uncertainties, recommendations for additional work of any kind including, but not limited to, investigation, 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).
3. Document the assessment methodology.
4. Provide back-up information in appendices.

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

	Desired Outcome	Performance Requirement	Checklist	Performance Measure	Acceptable Quality Level	Monitoring Method
1	The Project Management Oversight Contractor (PMOC) shall review and analyze project documents to determine the project's readiness to enter Engineering. This includes completeness, quality, and accuracy of cost, schedule, budget, and design.	R1a. The PMOC shall develop and document a process for review and analysis of the project cost, schedule, and design documents; the project sponsor's ability to successfully complete the project; and the project's readiness to enter Engineering.	☐	M1a. There is a review of the process documentation.	Q1a. PMOC provides documentation of the process.	MM1a. Periodic review by the Federal Transit Administration (FTA) or its agent.
		R1b. The PMOC shall use their process and project management judgment to review and analyze project documents to determine the project's readiness to enter Engineering, including the completeness, quality, and accuracy of cost, schedule, budget, and design.	☐	M1b. There is a documented review and analysis of project documents to determine the project's readiness to enter Engineering, including the completeness, quality, and accuracy of cost, schedule, budget, and design.	Q1b. The PMOC conducts a review and provides internal verification that the process as documented has been followed.	MM1b. Periodic review by FTA or its agent and the PMOC's internal verification.
2	The PMOC shall form a professional opinion and make findings and	R2a. The PMOC shall perform a review and analysis of the	☐	M2a. The PMOC's review and opinion as to the completeness,	Q2a. The PMOC offers their professional opinion	MM2a. Periodic review by FTA or its agent.

	Desired Outcome	Performance Requirement	Checklist	Performance Measure	Acceptable Quality Level	Monitoring Method
	recommendations regarding the project's readiness to enter the engineering phase.	completeness, quality and accuracy of the engineering design, schedule, and Capital Cost Estimate for the project at the conclusion of Project Development and make suitable findings and recommendations.		quality and accuracy of the Project cost, schedule, and engineering documents at conclusion of Project Development demonstrates sound management, logical engineering practices, and professional experience.	as to the completeness, quality and accuracy of engineering design, cost, and schedule documents at conclusion of Project Development.	
		R2b. The PMOC shall provide their findings and recommendations after they review and analyze the project sponsor's program for advancing the project to the point of construction-ready bid documents.	☐	M2b. The PMOC's review and opinion as to the suitability of the project sponsor's program demonstrates sound management and engineering practices and professional experience.	Q2b. The PMOC provides their professional opinion as to the suitability of the project sponsor's program for advancing the project to the point of construction-ready bid documents.	MM2b. Periodic review by FTA or its agent.
		R2c. The PMOC shall review and analyze the project sponsor's management system approach, management capability, and capacity to execute Engineering and construction of the project and make suitable	☐	M2c. The PMOC uses sound management and engineering practices along with professional experience to review, provide opinions, and, if necessary, offer recommendations regarding management approach and	Q2c. The PMOC provides their professional opinion and recommendations where necessary regarding the project sponsor's management approach and technical capability and capacity to execute	MM2c. Periodic review by FTA or its agent.

	Desired Outcome	Performance Requirement	Checklist	Performance Measure	Acceptable Quality Level	Monitoring Method
		findings and recommendations.		management capability and capacity.	Engineering and project construction.	
		R2d.The PMOC shall determine whether the project sponsor has necessary project controls, management policies, and procedures in place, including quality control/quality assurance, safety and security, and right-of-way acquisition, and other necessary components to assure successful project execution. The PMOC shall make suitable findings and recommendations.	☐	M2d. The PMOC's review, opinions, and, if necessary, recommendations regarding the project sponsor's management system and project procedures demonstrate sound management and engineering practices and professional experience	Q2d. The PMOC provides their professional opinion and recommendations where necessary regarding the project sponsor's project controls, management system, and project procedures.	MM2d Periodic review by FTA or its agent.
3	The PMOC shall provide FTA with a written report of their findings, analysis, recommendations, and professional opinions.	R3. The PMOC shall present their findings, analysis, recommendations, and professional opinions to FTA in a written report and, when directed by FTA, seek to reconcile their findings with the project sponsor to the extent possible. The	☐	M3. There is a review of the PMOC's presentation of findings, analysis, recommendations, and professional opinions by FTA.	Q3. Reports and presentations are professional, clear, concise, and well written. The findings and conclusions have been reconciled with other PMOC reports and have been reconciled with the	MM3. Periodic review by FTA or its agent.

	Desired Outcome	Performance Requirement	Checklist	Performance Measure	Acceptable Quality Level	Monitoring Method
		PMOC shall file a supplemental report to describe the results of reconciliation attempts.			project sponsor to the extent possible.	

APPENDIX B: CHECKLIST FOR APPROVAL TO ENTER ENGINEERING

The purpose of this checklist is to provide a categorized list of elements to be completed, ideally, prior to the Federal Transit Administration's (FTA's) approval for Entry to Engineering. Each listed item is followed by a brief description of the expected level of completion for that item. The Project Management Oversight Contractor (PMOC) should note elements that need attention by the project sponsor and adjudge their significance to the overall project readiness to enter the engineering phase.

Item	Description	OP	PMOC Review	Done
1.0	**PROJECT DEFINITION**			
1.1	**System Definition**			
1.1.1	Alignment Definition	32C	General alignment is defined to include the approximate horizontal and vertical alignment, approximate station locations, and length. The alignment should be developed beyond the definition contained in the locally preferred alternative (LPA) to describe all structures necessary for the project. Minor alternative alignments may be evaluated within the corridor, as required, to the degree they are within the LPA definition.	☐
1.1.2	Configuration Management Plan	20	Configuration management should document the process of managing the physical configurations and their supporting processes through documents, records, and data. Configuration management should demonstrate a process that accommodates changes and continually documents how a physical system is configured, ensuring that documents, records, and data remain concise and valid.	☐
1.1.3	Station requirements	32C	Station design characteristics include station locations and station sizing. Platform lengths and support spaces for mechanical/electrical equipment should be identified.	☐
1.2	**Environmental Constraints**			
1.2.1	NEPA	32B	The National Environmental Policy Act (NEPA) requirements for entry into Engineering include preparation of an Environmental Impact Statement (EIS) where effects from a proposed project are significant, or a Finding of No Significant Impact (FONSI) and accompanying environmental assessment (EA) where effects are less than significant. For an EIS, FTA approves the preferred	☐

Item	Description	OP	PMOC Review	Done
			project through issuance of a Record of Decision (ROD). The ROD describes the scope of the projected and committed mitigations to reduce the effects of identified impacts.	
1.2.2	Third party requirements	20	1. Evaluate third-party agreement processes and the status of agreements. When agreements are not available, the project sponsor should provide an outline or term sheet(s). When this information is not available, the project sponsor shall identify the needed agreement and note any issues or obstacles to executing the agreements.	☐
			2. Types of agreements and information to be reviewed include, but are not limited to: • Utility relocation agreements (public-water, sewer, etc.); • Intergovernmental agreements (IGA) with local, State, and Federal entities; • Agreements with railroad companies (design, construction, operating); • Agreements with airport and port authorities; • Third-party franchise agreements (gas, telephone, cable TV, other communications, power); • Universities, colleges, and other educational institutions agreements; • Private sector parties impacted, and public/private funding arrangements (including transit-oriented development (TOD)); • encroachment on Right of Way (ROW); • Permits and/or waiver/exceptions; and • Master permitting plan and schedule.	☐
			3. The framework and content of these agreements must conform to the needs of the project. Agreements should be negotiated and completed to the extent	☐

Item	Description	OP	PMOC Review	Done
			possible prior to start of the engineering phase. For anything that is incomplete, a defined process for achieving completion should be in place.	
1.2.3	Geotechnical Baseline	32C	A geotechnical baseline report should be prepared for projects involving tunnels or other underground structures, or where specific structures (for example, major bridges, retaining walls, levees, or other facilities) will be located on material with questionable or unknown load bearing capacity.	☐
2.0	**PROJECT MANAGEMENT PLAN**			
2.1	Basis of project documented	20	Note: Some of the items listed are repeated below where additional review guidance is provided. 1. FTA's regulations are found in 49 CFR 633.25, which requires a Project Management Plan (PMP) to contain at a minimum the following: a) A description of adequate recipient staff organization, complete with well-defined reporting relationships, statements of functional responsibilities, job descriptions, and job qualifications; b) A budget covering the project management organization, appropriate consultants, property acquisition, utility relocation, systems demonstration staff, audits, and such miscellaneous costs as the recipient may be prepared to justify (Note: budget should also address design, construction, and start-up/commissioning); c) A construction schedule (Note: schedule should address entire project from design through revenue operations); d) A document control procedure and recordkeeping system; e) A change order procedure, which includes a documented, systematic approach to the handling of construction change orders (Note: should also address change orders for all procurements);	☐

Item	Description	OP	PMOC Review	Done
			f) A description of organizational structures, management skills, and staffing levels required throughout the construction phase (Note: budget should also address design, construction, and start-up/commissioning); g) Quality control and quality assurance programs (QA/QC), which define functions, procedures, and responsibilities for construction and for system installation and integration of system components (Note: QA/QC program should also address design, procurement, and start-up/commissioning); h) Material testing policies and procedures; i) Plan for internal reporting requirements, including cost and schedule control procedures; and j) Criteria and procedures to be used for testing the operational system or its major components.	
			2. Legal authority for project	☐
			3. FTA or its PMOC may recommend a workshop to help establish roles and responsibilities and define baseline standards of performance related to project management. Few, if any, project sponsors have all the capabilities or authorities to plan, design, and implement a major capital project by themselves. Bringing project sponsor staff, consultants, and relevant third parties together in a workshop early in the project can help to shape the project management approach. Through workshop discussions, all parties can gain a better understanding of each other's requirements, responsibilities, and authorities, as related to the project. The PMOC will review and summarize their findings and opinions and present recommendations with respect to the adequacy and soundness of the project sponsor's plans and procedures, and the successful implementation of such plans and procedures for:	☐

Item	Description	OP	PMOC Review	Done
			• NEPA coordination: The project sponsor's plan for managing and implementing mitigation actions should be in place and environmental mitigation work should be incorporated into the design documents, cost estimates, and schedules. • Design control**:** The project sponsor should implement appropriate plans and procedures for design control in all aspects. These plans and procedures should illustrate: o Consistency with design criteria; o Coordination and change control among design disciplines for drawings and specifications; o Completeness of soils testing and site surveys; o Coordination with third parties; and o Completeness of project documents for bidding.	
			4. The PMP should implement project controls in all aspects, including procedures for cost and schedule control, risk management, and dispute or conflict resolution during construction. The PMP should include procedures on cost sharing. Risk and contingency management policies and procedures should be in place and routinely used.	☐
			5. The PMP should confirm implementation of plans and procedures for project delivery and procurement. Specifically, it should focus on the schedule for bidding construction packages and procuring equipment and vehicles.	☐
			6. Labor Relations and Policies should be in development.	☐
			7. Development should be underway for plans and procedures regarding the following:	☐

Item	Description	OP	PMOC Review	Done
			• Construction administration; • Construction management; • Construction inspection; • Coordinating construction work by third parties; • Site logistics; and • Construction change order and shop drawing document flow and authorities.	
			8. Development of Start-up and Revenue Operations should be underway to establish plans and procedures regarding testing/commissioning, closeout of construction contracts, and training of staff.	☐
			9. PMP subplans should include the Quality Assurance / Quality Control Plan, Safety and Security Management Plan, Real Estate Acquisition Management Plan, and Bus and Rail Fleet Management Plans.	☐
2.2	Environmental mitigation/ assessment documented	20	1. Description of Mitigation Principles	☐
			2. Plan for Management and Implementation of Mitigation Actions	☐
2.3	Design Procurement and Control Plan	20	1. Design contracting plan for the engineering phase	☐
			2. Description of relationship between forecast ridership, operating plan, and proposed project transit capacity in guideways, stations, and support facilities	☐
			3. Design criteria for each discipline	☐
			4. Schedule for the development of contract documents (level of development expected at each milestone for design/construction drawings, specifications,	☐

Item	Description	OP	PMOC Review	Done
			general and supplementary conditions of contracts for construction, and Division 1)	
			5. Plan/procedures for design drawings and specifications	☐
			6. Procedures for design change and configuration control of documents during Design and Construction	☐
			7. Plan (list and schedule) for third-party agreements and permits including utilities, real estate, railroads, transit-oriented development/joint development, etc.	☐
			8. Investigation and Testing Plan (list and schedule) for site surveys, geotechnical and materials investigation before/during design	☐
2.4	Project Controls	20	1. Document and records controls	☐
			2. Internal reporting procedures	☐
			3. Cost control procedures	☐
			4. Schedule control procedures	☐
			5. Risk control procedures	☐
			6. Dispute/Conflict Resolution Plan (claims avoidance and claims resolution)	☐
2.5	Project construction delivery and procurement plan	20	1. Procedures for procurement	☐
			2. Procurement plan and schedule	☐

Item	Description	OP	PMOC Review	Done
			3. Contracting strategy for transit-oriented development and joint development, if applicable	☐
			4. Identification of Disadvantaged Business Enterprises (DBE) Opportunities, Federal DBE, State/Local Women Business Enterprises (WBE) & Minority Business Enterprises (MBE), Plans and Goals	☐
			5. Negotiating and approving change orders and claims	☐
			6. Procedures for claims avoidance	☐
2.6	Labor relations and policies	20	1. Wage rates and classifications	☐
			2. Wage and hour requirements	☐
			3. State and local regulations	☐
2.7	Construction Procedures for Fixed Infrastructure	20	1. Construction Contract Administration	☐
			2. Construction Management	☐
			3. Construction Inspection	☐
			4. Coordination with third parties	☐
			5. Site Logistics Plan (materials transport and storage; temporary site facilities; maintenance of existing pedestrian ways, transit and traffic operations during construction; protection of existing utilities)	☐
			6. Processing Shop Drawings, Bulletins, and Requests for Information (RFIs)	☐

Item	Description	OP	PMOC Review	Done
			7. Substantial Completion; Final Completion	☐
2.8	Start up and Revenue Operations	20	1. Testing plan elements are identified and would be expanded at a later date	☐
			2. Closeout materials (warranties, testing results, O&M manuals, spare parts, etc.) to be identified to provide direction to the engineer	☐
			3. Plan for staff training to be developed later	☐
2.9	QA/QC Plan	24	At entry to Engineering, the QA/QC Program Plan shall fully address all elements governing project activities through the design phase. It should also contain, at least in outline form and to the level of detail possible, information relative to the upcoming construction phase. The PMOC shall also confirm that the project sponsor has exhibited both a Quality Assurance and Quality Control review of the PD package.	☐
2.10	Safety and Security Management Plan	22	In place and follows FTA guidance as provided in Circular C 5800.1. Preliminary Hazard Analysis (PHA) and Threat and Vulnerability Assessment (TVA) are complete. Safety and Security Design Criteria development is underway.	☐
2.11	Real Estate Acquisition and Relocation Plan	23	1. Conforms with and is expressly incorporated within the design drawings, master schedule, and budget for all phases and types of work planned or anticipated. Further, the Real Estate Acquisition and Management Plan (RAMP) must meet all Federal requirements. The project sponsor should provide a complete list of all parcels with title searches on all properties to be acquired and RAMP procedures.	☐
			2. Preparation of a relocation plan to include interviews with potential displacees that stresses that displacees are not to move until project plans have been finalized.	☐

Item	Description	OP	PMOC Review	Done
			3. The project sponsor shall exhibit management capacity and capabilities to implement the real estate acquisition and relocation process, including organization structure and staffing plan and any consultant agreements undertaken in support of these activities.	☐
2.12	Rail and Bus Fleet Management	37	Plan demonstrates consistency with the project scope, NEPA documents, and the project's Operations Plan.	☐
3.0	**MANAGEMENT CAPACITY AND CAPABILITY**			
3.1	Organizational charts	21	Project organization charts show the complete organization, covering all project functions and all project personnel, regardless of affiliation. Staffing levels should be indicated. Charts should be time-oriented to show different organizational arrangements for different phases of the project.	☐
3.2	Staff qualifications/experience chart	21	Key personnel in all organizations should be identified with definitions included of their principal duties, reporting relationships, job descriptions, job qualifications, and assigned responsibility and delegated authority. The size, qualifications, and availability of new and existing staff resources must be considered in relation to the human resource requirements and duration of the project. A responsibility matrix should be developed that identifies critical management activities and demonstrates the staff's ability to satisfy these requirements.	☐
3.3	Staffing plan	21	Staffing levels should be indicated. Charts should be time-oriented to show different organizational arrangements for different phases of the project. The organization chart should be supplemented with a tabular staffing plan that shows information pertaining to percent utilization, mobilization start date, and release date (where applicable).	☐
3.4	Engineering/Design Consultants	21	During construction planning, careful examination of the existing labor situation has determined the impacts of DBE participation.	☐
3.5	Agency-level processes and procedures	21	Should include project management policies and procedures and an adequate staff of professionals skilled in but not limited to, project controls, QA/QC, cost	☐

Item	Description	OP	PMOC Review	Done
			estimation, scheduling, procurement, change control, risk management, transit operations, and public participation.	
3.6	Resumes of project team members	21	Resumes should be provided for both agency and consultant key staff. Resumes must demonstrate experience and ability to manage each of the following key project areas: • Project management; • EA and mitigation leads; • Operations planning, fleet management lead; • Design team leads; • Quality assurance and Quality control lead; • Project controls leads; • Construction, permits, testing, start-up leads; • Real estate lead; and • Safety review lead.	☐
4.0	**SCOPE**			
4.1	Scope development	32C	1. Definition of the project (i.e., scope) contained in the project ROD/FONSI and most recent New Starts submittal agree with the scope as developed in Project Development materials, including the approved PMP and the engineering design plans and specifications. Discrepancies or unclear scope items in the plans should be noted.	☐
			2. Basic quantities, such as number and locations of facilities, peak and total vehicles, etc., identified in the environmental document and ROD/FONSI are the same as assumed in the current project definition.	☐

Item	Description	OP	PMOC Review	Done
			3. The current project design satisfies the capacity and operational objectives established in the approved environmental document.	☐
			4. Mitigations committed to in the ROD (or project mitigation plans), when involving a physical or operational feature of the project, are incorporated—or are in the process of being incorporated—into the engineering design, proposed construction program, and/or other implementation plans. Mitigations could include changes in design, use of different types of material, modified traffic control, restricted construction activities, etc.	☐
			5. Results of the hazard and threat and vulnerability analyses are incorporated in the design criteria and the scope of work.	☐
4.2	Design package	32C	A Basis of Design Report is required which presents the following content: 1. The project sponsor accepted design standards and performance objectives including consistency with the required transit capacity.	☐
			2. Design, construction, system, and vehicle interfaces are well known and defined. Vehicle dynamic clearance and structure clearance diagrams are prepared.	☐
			3. Design Reports, Concept of Operations Report, and configuration studies are adequate and complete.	☐
			4. Design packages and contract packages are defined and delineated.	☐
			5. The documents possess a level of definition, clarity, presentation, and cross-referencing consistent with the scope definitions in following sections.	☐

Item	Description	OP	PMOC Review	Done
			6. The project is constructible. Adequate construction access and staging areas are identified.	☐
4.3	Project Delivery Method Plan	32D	Procedures for Procurement (advertising, bidding, awarding of contracts for consultants, and construction contractors, procurement for equipment, etc.) are established including: Procurement Plan and Schedule (indicate project phase, durations for Request for Proposal (RFP), screening, interviews, selection, board approvals, etc.); Contracting Strategy for Transit-oriented and Joint Development; and identification of DBE Opportunities and Federal DBE and State/Local WBE & MBE Plans and Goals.	☐
4.4	Constructability	32C	The project sponsor's construction planning of the project has sufficiently and adequately addressed the constructability of the project. An in-depth constructability review is required of the project sponsor. It is a critical tool for synthesizing the preliminary design work.	☐
4.5	Site and geotechnical conditions	32C	1. Digitized aerial photogrammetry (aerial photo background; planimetric, and topographic mapping) is complete.	☐
			2. Photo simulations and/or schematic renderings are available for stations, samples of the alignment, and unique features of the line.	☐
			3. Preliminary geotechnical investigations are complete, including a subsurface exploration or laboratory testing program. Requirements for additional geotechnical investigations have been defined. Identification of buried structures and utilities and identification of contaminated soils and other hazardous materials are complete.	☐
4.6	SCC 10 Guideway	32C	1. Major or critical design decisions have been researched and decided including location and extent of elevated or underground structures, rehabilitation or reuse of any existing infrastructure, structures, facilities, or systems.	☐

Item	Description	OP	PMOC Review	Done
			2. The choice of track or roadway design has been made for the line. Grade crossing construction is defined and clearances established for operations, maintenance, and emergency evacuation. Guideway drainage has been defined.	☐
			3. Major or critical work details, structural element dimensions, design interfaces, and physical interfaces have been identified and are defined in terms of drawings, standards, criteria, and specifications.	☐
			4. Structural systems are established. Aerial guideway is dimensioned to show number of spans, span length, substructure design, etc.	☐
			5. Preliminary mass balance diagrams have been developed for vertical alignments on fill or cut supported by topographic surveys and soil investigations.	☐
			6. Retaining walls and fills are located, dimensioned, and defined in terms of drawings, standards, criteria, and specifications.	☐
			7. Tunnels, both cut-and-cover and mined, are defined in terms of the following: • Access and egress; • Construction access and laydown; • Openings for stations; • Passage chambers; • Ventilation or emergency access shafts or audits; • Sections; and • Profiles to depict and dimension major tunnel features.	☐

Item	Description	OP	PMOC Review	Done
			Tunnel design and dimensions have been cross checked to adjacent building foundations and coordinated with the vehicle's dynamic envelope, walkways and egress, tunnel lighting, and systems elements such as ventilation, communications, and traction power.	
			8. Trackwork is advanced to a level where single line schematics of the track layout, plan and profile drawings, dimensioned layouts of turnouts and crossovers, and tabulations of track geometry (horizontal and vertical curve data) have been defined. The alignment of any tunnel structure is referenced to the center line of track and base of rail. Guideway sections, inclusive of aerial, tunnel, and station cross sections, consistently show the distance from centerline of track to critical clearance points such as walls, walkways, and edges of platforms.	☐
			9. Special trackwork is located and adequately defined.	☐
			10. Where used, the contact rail system is specified with typical details and required clearances provided. End ramps and anchors are located. Gaps are coordinated with the traction power supply system. Feeder and return conductor attachment are specified and typical details provided.	☐
			11. The need for special track construction for noise or vibration control is identified with locations and preliminary dimensions and a preliminary choice is made for the noise and vibration control design.	☐
4.7	SCC 20 Stations, Stops, and Terminals	32C	1. Major or critical design decisions have been researched and decided including rehabilitation or reuse of any existing structures, facilities, or systems. Major or critical operational fire/life safety, and security requirements have been	☐

Item	Description	OP	PMOC Review	Done
			defined. Interfaces with other transit facilities or structures are identified and passenger and public circulation concepts defined.	
			2. Station architecture is established. The drawing package consists of site plans and, for station buildings, floor plans, elevations, longitudinal and cross sections, and details illustrating typical and special architectural conditions. The finish concept should be clearly described. The location and outline of fare gates and barriers should be shown. The location of ticket vending machines, electronic passenger information displays, security systems, and other platform amenities should be shown.	☐
		35	3. Within the site context, the building footprints are shown. The relationship of the building to grade and to adjacent facilities is clearly defined, as is the provision for pedestrians and bicycles to access the public way from the building. The provision for motorized vehicles is also shown. Access to the platforms and buildings and within the buildings complies with the American Disabilities Act (ADA). Any parking lots or structures are shown.	☐
			4. Building sections and elevations illustrate the relationship of the station to grade (below, on-grade, elevated structure); the building structural system has been chosen and preliminary dimensions established for clearances.	☐
			5. Station building floor plans show vertical circulation systems including stairs, elevators, escalators, and support spaces for mechanical, plumbing, electrical, and communications systems. The floor plans should show the agent area, fare gate area, retail areas, and any crew or public facilities.	☐
		35	6. Level boarding between the transit vehicle and the boarding platform complies with ADA. Documentation shows passenger level boarding design for all	☐

Item	Description	OP	PMOC Review	Done
			stations and/or satisfactory determination of infeasibility for one or more stations along with a satisfactory alternative plan for accessibility.	
			7. Preliminary identification of arts-in-transit integrated into station design.	☐
			8. Electrical systems should include a single line drawing including the source and distribution of power. Mechanical and electrical systems, including area drainage, piped utilities, heating ventilation and air conditioning, smoke evacuation, power, and lighting, are described and single line drawings are provided.	☐
			9. Design interfaces among disciplines are defined on drawings, in standards, design criteria, specifications, and contract package scopes.	☐
			10. The level of parking structure design is consistent with station buildings as described above, including vertical transportation and interface with the station buildings. Parking design is consistent with ROD.	☐
4.8	SCC 30 Support Facilities: Yards, Shops, Administration Buildings	32C	1. Major or critical design decisions have been researched and decided including rehabilitation, reuse, or expansion of any existing structures, facilities, or systems. Major or critical operational fire/life safety, and security requirements have been defined.	☐
			2. An architectural space program has been prepared for all occupied buildings including for modifications to existing buildings such as Control Centers. The support facility drawings are consistent with the architectural program. Adequate employee parking is provided.	☐

Item	Description	OP	PMOC Review	Done
			3. Based on the vehicles chosen and utilization as set out in the fleet management plans, a review has been done to determine the number of vehicle spots and facilities (jacks, wheel truing, etc.) required.	☐
			4. A preliminary industrial engineering evaluation has been prepared for all workspaces in shops showing clearances, location of utilities (water, electric outlets, hose reels, etc.), and the flow of vehicles from revenue service through servicing and into storage or maintenance and then returning to service. Adequate space should be provided for material storage both in the building and outside.	☐
			5. A site plan has been prepared showing vehicle (revenue, non-revenue, commercial and private) access to shop buildings, storage yard layout, track layout, and location of auxiliary buildings including pump houses, signal houses, and traction power substations. Provisions for fueling and fuel storage are located. The overall site plan (existing and proposed conditions) should include grading and drainage plans, site cross sections, utilities, and roadway and parking plans.	☐
			6. Within the site context, the building footprints are shown. The relationship of the building to grade and to adjacent facilities is clearly defined, as is provision for vehicular and pedestrian access to new buildings. Access to the buildings and within the buildings complies with ADA.	☐
			7. Basic facility architecture is established including vertical circulation requirements. The drawing package consists of site plans and for buildings floor plans, elevations, longitudinal and cross sections, and details illustrating typical and special architectural conditions.	☐

Item	Description	OP	PMOC Review	Done
			8. Building sections and elevations illustrate the relationship of the buildings to grade (below, on-grade, elevated structure); the building structural system has been chosen and is dimensioned for clearances.	☐
			9. Electrical systems should include a single line drawing including the source and distribution of power. Mechanical and electrical systems, including area drainage, piped utilities, heating ventilation and air conditioning, smoke evacuation, power, lighting, and fuel storage and dispensing are described, and single line drawings are provided.	☐
			10. Design interfaces among disciplines are defined on drawings, in standards, design criteria, specifications and contract package scopes.	☐
4.9	SCC 40 Sitework and Special Condition	32C	1. Major drainage facilities, flood control, housing types, street crossings, traffic control, and utilities are defined and physical limits and interfaces identified, based upon alignment base mapping, plans, and profiles.	☐
			2. Major or critical design decisions are defined including rehabilitation or reuse of existing structures or facilities.	☐
			3. Areas requiring clearing or demolition are identified.	☐
			4. Utility key maps, lists of owners, symbols, and notes are provided. Preliminary utility relocation plans have been developed.	☐
			5. Mitigation plans have progressed for environmental issues and have been accepted by the authority having jurisdiction. Mitigation facilities, such as wetlands, buffers, noise barriers, and historic preservation requirements have been identified and located.	☐

Item	Description	OP	PMOC Review	Done
			6. A survey for hazardous materials has been completed.	☐
			7. On-site and off-site mitigation plan requirements are identified and outline plans prepared.	☐
			8. Structural elements for retaining walls and other site structures are advanced in design.	☐
			9. Preliminary mass balance diagrams for vertical alignments on fill or cut are supported by topographic surveys and soil investigations.	☐
			10. Roadway modifications necessary to accommodate stations, guideway, or support facilities are defined and design is complete to a level comparable to that specified for guideway and stations. Traffic control devices or modifications have been defined.	☐
			11. The landscaping requirements, including irrigation systems, are defined on the station, support facility, and guideway plans.	☐
			12. The presence of buried structures, utilities, and contaminated soils which may have to be removed, backfilled, or which would otherwise be unavailable for backfilling, has been considered.	☐
			13. Within the site context, the building footprints are shown. The relationship of the buildings to grade and to adjacent facilities is clearly defined, as are provisions for pedestrians and bicycles and special maintenance access. Provision for motorized vehicle access is shown. Adequate surface parking including spaces for disabled parking and facilities for bicycles is provided, where needed. Access to stations and buildings complies with ADA.	☐

Item	Description	OP	PMOC Review	Done
			14. Adequate construction access has been considered; access and staging areas are identified.	☐
			15. Maintenance of traffic and railroad protective flagging are identified and costs estimated.	☐
4.10	SCC 50 Systems	32C	1. Major or critical design decisions have been researched and decided including connections to, and rehabilitation or reuse of, existing systems. Pre-construction site reconnaissance and soil resistivity surveys are complete.	☐
			2. Major or critical work details, structural element dimensions, design interfaces, and physical interfaces have been identified and are defined in terms of drawings, standards, criteria, specifications, and contract package scopes. Single line or functional block drawings are prepared for each system. Technologies have been chosen, evaluated for cost effectiveness, and expected performance defined. Major equipment (for the control room, substations, grade crossings, tunnel ventilation, and traction power) has been defined and identified in terms of basic specifications, outline drawings, general arrangements, and standard drawings and details.	☐
			3. Signaling and train control: Decisions have been made regarding those sections of alignment to be operated under visual or traffic signal control as opposed to train signal systems. Operations analysis has determined the most efficient location of interlockings based on track layout, headways, train lengths, and braking tables as well as requirements of each interlocking and its control limits. Site specific requirements are defined (for signal structural work) and locations for signal enclosures and relay rooms including sizes as well as room layouts (relay, termination, power) are identified and defined. Signal cable routing methodology as well as power supply and distribution are	☐

Item	Description	OP	PMOC Review	Done
			identified and defined. Software and interface requirements (to facilities, existing system, and other system elements) are identified and defined. The scope of construction between contractors and other operators (railroads or existing agency systems) is defined. Maintenance, testing, and training requirements are identified and initially defined (factory acceptance, site acceptance, field integration, start up, etc.).	
			4. Traffic signals: Basic coordination between train control and traffic signals or other traffic controls has been evaluated. The interaction among traffic signals in the immediate area has been coordinated with local jurisdictions. Simulations have been completed on the impact of the transit system on local traffic and the impact of signalization on transit running times. Decisions have been made regarding transit vehicle pre-emption or priority and interaction with emergency vehicle priority systems such as Opticon. Site specific requirements are defined (for structural work) and locations defined for crossing gates and signal enclosures. Related requirements for grade crossing protection, including use of four-quadrant gates or other methods to prevent vehicles from circumventing crossing gates have been identified and defined. The location of vehicle sensing elements is shown on intersection drawings. Software and interface requirements (to the train control system and other system elements) are identified and initially defined. The scope of construction between contractors and others is defined. Maintenance, testing, and training requirements are identified and initially defined (factory acceptance, site acceptance, field integration, start up, etc.).	☐
			5. Traction power: Traction power requirements and the location of substations is established. The basis of design, including nominal project voltage and voltage limits, are identified. The OCS system or contact rail layout is defined, including conductor sizes relative to existing parts of system, as well	☐

Item	Description	OP	PMOC Review	Done
			as any supplementary parallel feeders to meet design requirements for substation out-of-service scenarios. Minimizations of voltage drop, maximization of vehicle propulsion system performance, and train regeneration issues have been initially addressed. Substation equipment requirements are identified. Single line drawings are provided. Preliminary equipment performance specifications have been developed. The source of commercial power is identified. Preliminary negotiations have begun and technical interface conditions are established. Substation grounding, stray current monitoring or testing, lightning arresters, and protective systems for equipment and utility system faults have been identified. Supervisory control has been defined as well as requirements for integration with central control.	
			6. Overhead Contact Systems (OCS): OCS system type is identified, and issues associated with temperature variations are addressed. Decisions have been made regarding the types of support structures or poles to be used, particularly in urban areas. Tensions for the contact wire and messenger wire are defined; maximum distances between tensioning points are identified. OCS is sectionalized in coordination with the traction power supply. The basis for OCS design is established and design issues associated with overlaps, section insulators, and crossing and crossover locations are preliminarily addressed.	☐
			7. Communication system: Communications plans, including building or equipment locations, and provisions for station message signs, public address, emergency phones, security cameras, intrusion detection, and other system elements are defined and coordinated with station, guideway, support facility, and central control building plans. Cabling schemes are coordinated with the guideway and utilities. Preliminary specifications for the radio system have been developed and the system is coordinated with the vehicles and central	☐

Item	Description	OP	PMOC Review	Done
			control. Communication between field locations and central control is defined and coordinated with other systems.	
			8. Fare collection system: The fare collection concept is defined and is accepted by all stakeholders. The number and location of fare collection equipment has been determined and is shown in the drawings. Basic equipment is specified.	☐
			9. Central control: Operations control center plan is provided, including basic layout and space allocation requirements. System interface requirements and modifications for existing central control facilities are coordinated with the systems being controlled. Provisions for security and emergency response are considered. Preliminary equipment and control system requirements are established.	☐
4.11	SCC 60 ROW, Land and existing improvements	32C	1. RAMP is complete. Refer to the OP 23 RAMP for more information. Real estate documents and drawings identify the full takes, partial takes, temporary and permanent easements, and other rights. Any special access requirements for existing structures have been identified. Possible eminent domain actions need to be identified.	☐
			2. Site surveys include property lines and identify structures for buildings, site features, utilities; and surface improvements, such as streets and railroad ROW, including private crossings of railroad ROW.	☐
			3. The real estate information and survey information is fully coordinated with drawings of structures for guideways and buildings; site features; utilities; streets, railroads, transitways; construction easements; and site access and staging areas.	☐

Item	Description	OP	PMOC Review	Done
			4. Parties to be relocated are identified and an action plan is developed.	☐
			5. Hazardous material sites are identified and characterized, and the responsibility and scope of remedial actions is specified.	☐
4.12	SCC 70 Vehicles	32C	1. Refer to OP 38 for additional information.	☐
			2. Vehicle performance requirements are specified and incorporated into the design criteria, the Operations and Maintenance Plan, and the Bus or Rail Fleet Management Plans. Preliminary specifications must include the following: • Allowable vehicle static and dynamic clearance diagrams; • Allowable axle weight; • Allowable total weight; • Door location; • Floor height; • Passenger capacity (seated and under heavy load conditions); and • ADA accommodation. For buses, the specification must also include fuel type and turning radius. For rail, the specification must include acceleration and deceleration characteristics and expected train consist.	☐
			3. System interface functional descriptions have been developed and advanced to include the following: • Definition of the subsystems that constitute the overall vehicle system; • Description and graphic depiction of each interface between onboard subsystems and wayside systems; and • Description of how each subsystem will meet the project requirements.	☐

Item	Description	OP	PMOC Review	Done
			4. Expected vehicle servicing, periodic maintenance, and component repair and replacement requirements (estimated time to repair and frequency of repair) should be compiled to support shop design (SCC 30).	☐
			5. Initial testing requirements have been developed to include the following: • High-level Test Program Plan for both production and on-site acceptance, including requirements for factory inspection and testing; • First article and pre-shipment inspections; • Static and dynamic testing; and • Conditional acceptance.	☐
			6. Maintenance and training requirements should be defined and identified, including development of maintenance and training requirements for new system elements.	☐
			7. Preliminary requirements for special tools and equipment have been established as well as preliminary requirements for initial spare parts orders.	☐
4.13	SCC 80 Professional services	32C	1. The roles and responsibilities of the project sponsor's professional consultants (design, engineering, and construction management) may be distinguished from the project sponsor's own professional staff. If alternative delivery systems (design-build (DB), Construction Manager/General Contractor (CM/GC)) are proposed, the costs of design professionals employed by the contractor should be identified.	☐
			2. Costs associated with construction: building contractors' management, labor, indirect costs, overhead, profit, and construction insurance should not be	☐

Item	Description	OP	PMOC Review	Done
			included in SCC 80 but in SCC 10 through 50 as appropriate. Cost estimates should conform to this allocation of cost.	
			3. When the project sponsor's manual labor, equipment, and facilities are used to facilitate construction or to assist in construction of the project, a Force Account Plan and cost estimate should be provided. The cost of these services should be applied to the appropriate State Corporation Commission (SCC) code except for start-up training.	☐
			4. Costs associated with permits, insurance, and taxes are researched, identified, and estimated.	☐
			5. Costs associated with start-up training and simulated operation for operators and supervision is estimated.	☐
5.0	**SCHEDULE**			
5.1	Basis of schedule	34	1. Includes a logical document that discreetly defines the basis for the development of the project schedule. The schedule identifies key elements, issues, and special considerations (assumptions, exclusions, etc.)	☐
			2. Describes the planning basis, including resource planning methodology, activity identification, duration estimating, and source and methodology for determining logic and sequencing.	☐
			3. Identifies labor productivity adjustments, including congestion assessment, extended work hours, winter work, curfews, etc.	☐

Item	Description	OP	PMOC Review	Done
			4. Documents all production rates, identifies basis for startup and sequencing requirements, and defines any owner requirements (regulatory, environmental, quality/inspection).	☐
			5. Is consistent in use of the time sensitive variables in the Capital Cost Estimate, including year of expenditure assumptions, and durations incorporated into the master schedule.	☐
5.1	Schedule format	34	Is consistent with relevant, identifiable industry or engineering practices. Software is appropriate for the size and complexity of the project.	☐
5.3	Schedule structure	34	1. Work Breakdown Structure (WBS) has been applied in the development of the schedule.	☐
			2. WBS is consistent with the analyzed plan and program for all project participants' agreed-upon roles, responsibilities, capabilities, and capacities.	☐
			3. The project schedule is in original and SCC format.	☐
5.4	Schedule level	34	The schedule shall be sufficiently developed in detail to determine the validity of the project's critical path to revenue operations. It should break out the following, at a minimum: • Project milestones; • Full Funding Grant Agreement (FFGA)-related work; • Planning and environmental; • Public involvement; • Project Development; • Value engineering; • Final design;	☐

Item	Description	OP	PMOC Review	Done
			• ROW; • Permits; • Third-party agreements; • Public and private utility relocations; • Safety and security; • Construction; • Trackwork; • Train control systems; • Vehicles; • System integration; • Communications; • Fare collection; and • Startup and testing in sufficient detail to confirm the reasonableness of durations and sequencing and to estimate the probability of schedule risk.	
5.5	Schedule elements	34	1. Schedule reflects the project scope that is described in the approved environmental document.	☐

			2. Schedule includes adequate time and appropriate sequencing for:
			• Reviews
			  ○ Required FTA-related environmental, risk assessment, PMP reviews, readiness reviews at designated milestones, and grant approvals;
			  ○ Project reviews by applicable local, state and Federal jurisdictions and affected third parties;
			• Agreements
			  ○ ROW acquisition; household/business relocations;
			  ○ Utilities relocation;
				☐

Item	Description	OP	PMOC Review	Done
			○ Railroad purchase and/or usage; ○ Interagency Agreements; ○ Funding time frames and/or milestones for FTA and non-FTA sources; ○ Adequate and complete procurement and manufacturing durations for equipment and vehicles, especially for Long Lead Items; ○ Procurement of design contracts for civil/facilities, systems, and vehicles; ○ Performance of design contracts to produce 100 percent complete documents prior to bidding; ○ Bid and award periods reflect the required sequencing and durations for the selected project delivery method and are logically tied to the proper work activities; and ○ Construction processes and durations are adequate and complete, and allow schedule contingency for potential delays, including inter-agency work, utility relocation, civil, architectural, and systems work, project sponsor operations and maintenance, mobilization, and integrated pre-revenue testing.	
5.6	Resource scheduling	34	1. Quantities and costs as defined in the cost estimate match the resources/costs assigned to the activities in the schedule.	☐
			2. The distribution of resources and costs per specification or industry standards are reasonably associated to the activity it is assigned.	☐
5.7	Schedule control	34	Define the approach to and use of scheduling tools, such as scheduling software, project sponsor procedures for schedule change and update, use of a work breakdown structure, assignment of staff responsibility for schedule, cost loading, resource loading, etc.	☐
6.0	**CAPITAL COST ESTIMATE**			

Item	Description	OP	PMOC Review	Done
6.1	Basis of estimate	33	1. The project sponsor needs to provide a Basis of Estimate report describing their cost estimating approach. The project sponsor should develop the report as part of their initial Project Development work and update it with each subsequent estimating effort.	☐
			2. The Basis of Estimate outline should be as follows: • Estimating Methodology: Describe the general approach to defining and quantifying the project capital cost estimate; • Sources of Cost Data: Define the nature and sources for cost data used in the preparation of the estimate; o Cost estimating assumptions; o Allocated contingency; o Unallocated Contingency; o Escalation; and o Contract packages; • Estimating procedures: If multiple parties are estimating parts of the project, this memo should help to ensure consistency of approach; • Organization and management of cost data (by segment elements; project-wide elements); • Bottom up and top down approaches (For example, at entry to Project Development, it could be reasonable to use a bottom up estimating approach for guideway, stations, support facilities; and a top down estimating approach for sitework, systems, ROW land existing improvements, and vehicles); • Facilities (guideway, stations, support facilities) Costing Procedures for typical construction methods and for construction and components unique to transit projects;	☐

Item	Description	OP	PMOC Review	Done
			• Estimate limitations: Describe perceived or known uncertainties, as well as unknowns that could lead to changes in the estimate due to changes in project scope and design standards, incorrect unit cost or quantity assumptions, and unforeseen problems in implementation; and • Tracking costs: Describe how capital costs in the SCC format will be tracked through construction, revenue operations, etc. (For example, a provision in Division 1 requiring the contractor to submit an SCC update with monthly pay application). FTA requires that costs be tracked in the SCC format through construction, revenue operations, and through two years post-revenue operations to document contract closeout and the "after" point for the Before and After Study.	
6.2	Value Engineering (VE) report	33	1. VE effort has been performed on the design completed in Project Development and a report has been prepared. The focus should be on VE recommendations approved by the project sponsor and incorporated into the project. The project sponsor should identify why recommendations were or were not approved.	☐
			2. The cost estimate should incorporate the accepted changes.	☐
6.3	Standard Cost Categories (SCC) Workbooks (see references section)	33	1. WBS is formatted to conform to FTA SCC.	☐
			2. Workbooks include SCC annualized worksheets.	☐
			3. Estimate is in general agreement with the latest SCC information contained in the project sponsor's most recent New Starts submission.	☐
6.4	Capital cost estimate	33	1. SCC category 10-50: Fixed Construction (guideways, stations, support facilities, sitework, systems) • Construction Materials	☐

Item	Description	OP	PMOC Review	Done
			○ Quantities have been calculated with appropriate conservatism to accommodate development to a more advanced stage of design if appropriate; ○ Allowances for material quantities have been included for commodities that cannot be fully quantified at the present level of design; ○ Unit prices have been developed using the best available local market information; ○ Project sales tax exemption status has been established if appropriate and incorporated in materials costs; ○ Quotes have been obtained for specialty and price-sensitive materials; and ○ Materials costs reflect market volatility. • Construction labor ○ Local wage rates, fringe benefits, and work rules are incorporated; ○ Local payroll taxes and insurance rates are incorporated; ○ Holiday/show-up/vacation pay is incorporated; ○ Crew productivity is appropriate and conservative for the task under evaluation; and ○ 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 ○ Local equipment rental rates and current fuel costs are incorporated; and ○ Quotes have been obtained for specialty equipment. • Escalation for Construction materials, labor, and equipment	

Item	Description	OP	PMOC Review	Done
			○ Confirm that adequate escalation rates have been applied to estimates of material, labor, and equipment costs. Costs should anticipate prices at the time of project bid. • Special considerations ○ 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/railroad work and safety rules; and ○ 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. ○ 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, and heat), jobsite and public security measures, etc.; ○ Appropriate costs have been included for payment and performance bonds and special insurance requirements (RR protective, pollution liability, etc.); ○ Other construction insurance costs and/or project-wide coverage (Owner Controlled Insurance Policy) have been included based on quotes from appropriate carriers; and	

Item	Description	OP	PMOC Review	Done
			○ Contractor profit/risk costs have been incorporated that reflect the proposed delivery method and expected level of competition by contract package (higher profit margin where few competitors will bid).	
			2. Cat. 60 – Real Estate • Includes estimated costs (acquisition costs) for the real estate and associated relocation costs. Costs for professional services, both contracted and in-house legal, appraisal, review appraisal, settlement costs, environmental site assessments, demolition, real estate, and relocation consultants have been included (and not included in SCC 80). Easements, acquisitions, inspections, takings, etc. have been appraised or estimated by qualified professionals familiar with local real estate markets and practices, especially any acquisitions involving freight railroads. Includes allowance for the expected increase in costs over appraised value. Includes costs for taxes attributable to real estate acquisition.	☐
			3. Cat. 70 – Vehicles Estimates account for current purchase prices for similar vehicles or quoted prices from manufacturers. Includes costs for professional services (both contracted and in-house) for vehicle design and procurement, and not included in SCC 80. Estimates allow costs for special tools and equipment and spare parts. Requirements for non-revenue support vehicles identified and included in estimate.	☐
			4. Cat. 80 – Professional Services • Costs are included for both contracted and in-house, for all professional, technical and management services related to the design and construction	☐

Item	Description	OP	PMOC Review	Done
			of fixed infrastructure (Cats. 10 – 50) during the Project Development, engineering, and construction phases of the project. This includes: o Environmental work; o Surveying; o Geotechnical investigations; o Design; o Engineering and architectural services; o Materials and soils testing during construction; o Specialty services, such as safety or security analyses; o Value engineering; o Risk assessment; o Cost estimating; o Scheduling; o Before and After studies; o Ridership modeling and analyses o Auditing; o Legal services; o Administration and management, etc. by agency staff or outside consultants. • Professional liability insurance and other non-construction insurance should be included in 80.05. • Confirmation that cost estimates are based on realistic levels of staffing for the duration of the project through close-out of construction contracts. (The estimate should be consistent with the PMP.) • Confirmation that costs for permitting, agency review fees, legal fees, etc. have been included. • General conditions are included for design, construction, and procurement contracts.	

Item	Description	OP	PMOC Review	Done
			• If alternative delivery systems (DB, CM/GC) are proposed, the costs of design professionals employed by the contractor should be identified.	
6.5	Contingency	33	1. Allocated Contingency: Confirmation that adequate contingency has been allocated to each of the SCC categories based on the perceived risk inherent to each category's estimate.	☐
			2. Cat. 90 - Unallocated Contingency: Confirmation that adequate contingency has been added to the total project cost based on the perceived project risk.	☐
			3. Total Contingency should be consistent with that derived in the Risk and Contingency Management Plan.	☐
6.6	Cat. 100 – Finance Charges	33	Finance charges are included, consistent with FTA's Financial Management Oversight Consultant's review.	☐
6.7	Inflation	33	Confirmation that adequate inflation rates have been applied to Base Year project costs to anticipate costs at procurement or bid; the Year of Expenditure costs should be developed thoughtfully. Reference indices should include Engineering News-Record (ENR) Building Cost Index, and Construction Cost Index or other demonstrated authoritative source.	☐
7.0	**RISK AND CONTINGENCY MANAGEMENT**			
7.1	Risk process established	40	1. Risk organization is in place, with independent reporting to executive management and roles and responsibilities defined.	☐
			2. Contingency management, contingency use authority, and reporting structure is established.	☐
7.2	Risk identification	40	1. Risk register is developed, with risk categories and priorities.	☐

Item	Description	OP	PMOC Review	Done
			2. Process is established to update risk register.	☐
7.3	Risk assessment	40	1. Valuation of project cost risk is completed by method appropriate for project.	☐
			2. Valuation of project schedule risk is completed by appropriate methods.	☐
			3. Documented report exists demonstrating valuation method and result.	☐
7.4	Risk Mitigation	40	1. Mitigation process is in-place with documented responsibilities.	☐
			2. Established insurance plan exists.	☐
			3. Contingency amounts are identified and tied to risk assessment.	☐
			4. Requirements risks are clearly identified and mostly resolved; there are plans in place for unresolved requirements risks.	☐
			5. Secondary mitigation plan is defined and documented.	☐
7.5	Risk management	40	1. Plans are made for amendment of the risk register during work, to both succinctly catalogue additional significant issues that arise, as well as to identify closure of issues as they become resolved to the satisfaction of the project sponsor and FTA.	☐
			2. Plans and timing for systematically updating the Risk and Contingency Management Plan (RCMP).	☐
8.0	**CERTIFICATIONS, REPORTS, AND ADMINISTRATIVE REQUIREMENTS**			
8.1	**Administrative requirements**			

Item	Description	OP	PMOC Review	Done
8.1.1	Legal authority to implement transit mode project		The project sponsor must perform a review of existing statutes to gain a full understanding of their authority and any legal constraints that may affect the project. The purpose should be to identify requirements and constraints in an orderly and timely manner and to deal with them as the project advances. Failure to recognize and accommodate legal requirements may jeopardize the entire project and, at the very least, severely impact the subsequent grant approval process and project schedule, as well as project costs. The project sponsor must be diligent in maintaining cognizance of changes in the legislative/regulatory environment that may impose future constraints on a project. This legal authority must be reviewed to confirm that it addresses all forms of project delivery that may be considered.	☐
8.1.2	Legal authority to use alternative project delivery method		Provide evidence of authority under non-Design-Bid-Build (DBB) format.	☐

APPENDIX C: SAMPLE TABLE OF CONTENTS FOR PMOC OP 51 REPORT

6.0 PROJECT SCHEDULE

- **6.1. PMOC Assessment**
- **6.2. Conclusion**
- **6.3. Recommendations**

7.0 PROJECT COST

- **7.1. PMOC Assessment**
- **7.2. Conclusion**
- **7.3. Recommendations**

8.0 PROJECT RISK AND CONTINGENCY REVIEW, if required

- **8.1. PMOC Assessment**
- **8.2. Conclusion**
- **8.3. Recommendations**

9.0 CONCLUSION/RECOMMENDATIONS

- **9.1. Conclusion**
- **9.2. Recommendations**

APPENDIX D: 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
CM/GC	Construction Manager/General Contractor

Acronym	Term
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
EMP	Emergency Management Plan

Acronym	Term
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
LPA	Locally Preferred Alternative

Acronym	Term
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
PHA	Preliminary Hazard Analysis
PMO	Project Management Oversight

Acronym	Term
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
SABCE	Stripped and Adjusted Base Cost Estimate
SABS	Stripped and Adjusted Base Schedule
SAVE	Society of American Value Engineers

Acronym	Term
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
TCRP	Transit Cooperative Research Program
TIFIA	Transportation Infrastructure Finance and Innovation Act
TIGER	Transportation Investment Generating Economic Recovery

Acronym	Term
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