

**U.S. DOT Federal Railroad Administration
Office of Passenger and Freight Programs**

Monitoring Procedure 40a – Risk and Contingency Review (Sponsor-led)

1.0 PURPOSE

This Monitoring Procedure (MP) describes FRA requirements for the Monitoring and Technical Assistance Contractor (MTAC) when evaluating the Grantee's (Sponsor's) plan for mitigating and managing project risks. This MP does not require an independent MTAC risk assessment; its intent is to rely primarily on the risk assessment and contingency plans developed by the Sponsor. See Appendix D.

Risk management helps to improve the reliability of project delivery. The MTAC's evaluation of the Sponsor's risk plans provides FRA with critical information related to the potential success of the Sponsor's project. In addition, it provides a basis for FRA decisions regarding project advancement and funding. It also helps to build the professional credibility of the rail industry including FRA.

2.0 KEY PRINCIPLES

This review requires an evaluation of the Sponsor's process for development of its Risk and Contingency Management Plan, including its identification of uncertainties and risks; assessment of project risk; and consideration of risk response options and alternatives including the use of cost and schedule contingencies.

Under this review, heavy reliance is placed upon the Sponsor's work. To best achieve confidence in Sponsor-led plans, the MTAC is highly encouraged to participate in the Sponsor's risk workshops and other meetings in which the Sponsor's planning and methods for dealing with risk are demonstrated.

This review is applicable to projects using any project delivery method: Design-Build-Build (DBB), Design-Build (DB), Construction Manager/General Contractor (CM/GC), etc.

3.0 REQUIRED DOCUMENTS AND PREPARATION FOR THE REVIEW

Where possible and before the Sponsor undertakes its risk management process, the MTAC should initially review the Sponsor's risk-related organization and proposed processes for development of its Risk and Contingency Management Subplan (RCMP). The purpose of this initial review is to develop an opinion regarding the Sponsor's readiness to perform its risk identification, assessment, and mitigation plans. The MTAC shall notify the FRA of its opinion regarding the Sponsor's readiness for the risk planning tasks.

This initial review should consider the following:

- Appropriate technical experts are identified for inclusion in the risk identification process;
- Appropriate technical experts are identified for developing the risk modeling;
- Sufficient management plans have been developed to establish the basis of scope, estimate, and schedule; and

- Sufficient management plans have been developed for successfully completing all important elements of the Risk and Contingency Management Plan.

In advance of reviewing the completed Sponsor RCMP, the MTAC should obtain the Sponsor's Project Management Plan (including the Risk and Contingency Management Plan). The Risk and Contingency Management Plan (RCMP) should at a minimum include the following. Reference also Appendix G below.

- A risk register that sufficiently describes the individual risks with likelihood of occurrence and magnitude of outcome;
- Appropriate characterization of total project risk, including whether total project risk is sufficiently modeled through individual risk events;
- A description of the cost and schedule risk mitigation measures;
- The progress-reporting intervals for tracking the performance of mitigation actions;
- Clear identification of cost and schedule contingencies; the process for tracking and managing current and minimum levels of contingency; and the policies for use and custody of contingencies;
- Other items as the MTAC may, in consideration of the project specifics, deem appropriate for a thorough review.

The Sponsor's schedule risk mitigation recommendations should specifically treat both critical path and non-critical path activities.

Supporting documents shall include appropriate design, cost, and schedule information sufficient to establish the basis of the project upon which the risk management process was developed.

The MTAC should perform an initial review of these submittals and notify the FRA of important discrepancies in the project information that would hinder the review; an example would be insufficient detail or a mismatch between drawings and cost estimate in which the drawings are current and the cost estimate is significantly older.

4.0 SCOPE OF WORK

4.1 Overview

The risk management review builds upon reviews of scope, schedule, cost, and Sponsor management capacity and capability in other MPs that may have been previously performed. The risk management review includes evaluation and recommendations regarding the Sponsor's project risk identification and assessment, mitigation, and contingency plans, as reflected in its Risk and Contingency Management Subplan.

The MTAC will comprehensively address and report findings, conclusions, professional opinions, and recommendations, according to the format in MP 01. If necessary and upon significant findings of concern, the FRA may require the MTAC to independently develop other review products to provide a thorough analysis of the Sponsor's project.

4.1.1 Sponsor interface

MTAC interface with the Sponsor during its risk review facilitates and expedites the process and provides the MTAC with the background necessary to recommend revisions, if any, to the Sponsor's Project Management Plan and Risk and Contingency Management Subplan. Where possible and subject to FRA approval, the MTAC should encourage the Sponsor to involve the MTAC in the processes for development of its risk identification, risk assessment, and risk mitigation. A typical structure for Sponsor interface meetings is presented in Appendix C.

4.2 Project Status Evaluation: Sponsor's Efforts to Validate Basic Project Elements

While the basic goal of the risk review is to identify and quantify uncertainties and their potential impacts on a project's estimate and schedule, the necessary first step of the risk review is to understand the status and soundness of the project's basic—and known—elements. These elements (such as scope, design quality, cost estimates, and schedule) serve as the starting points for identifying risks and opportunities. It is, therefore, crucial that these known project elements be validated or, if necessary, adjusted before attempting to address a project's uncertain elements. The MTAC should review and comment upon the Sponsor's efforts at such validation of the basic project elements.

4.3 Identification and Categorization of Risks: Sponsor's Efforts

Risk identification plays a significant role in the overall risk management process. Sufficient efforts should be made by the Sponsor to ensure that adequate resources and processes have been used to develop a thorough listing of risk events, appropriate to the current project phase. This "Risk Register" shall include at a minimum a description of the potential risk event; its qualitatively-evaluated potential consequences and likelihood of occurrence; its SCC category (refer to MP 33) and risk category; the contract package in which it falls (where appropriate); a method for prioritizing among risks; and potential actions to mitigate the risk.

4.3.1 Example of risk register

A simplified example partial risk register is included in Appendix E.

4.4 Not used.

4.5 Risk Assessment: Sponsor's Efforts

4.5.1 Sponsor-developed Cost Risk Assessments

Where a Sponsor has independently developed a cost-risk assessment, the MTAC shall review the risk assessment submittal and comment as to whether the Sponsor has:

- Sufficiently described the individual risks for adequate assessment of likelihood of occurrence and magnitude of outcome;
- Established appropriate risk range and distribution functions for any given individual risk event;
- Adequately modeled project risk using stochastic (Monte Carlo), risk range, or expected value methods;
- Applied appropriate methods to characterize total project risk if not sufficiently modeled through individual risk events; and

- Provided a reasonable analysis of model results, sufficient for evaluating adequacy of budget, contingencies, and secondary mitigations.

4.5.2 Sponsor-developed Schedule Risk Assessments

Where a Sponsor has independently developed a schedule risk assessment, the MTAC shall review the assessment submittal and comment whether the Sponsor has:

- Sufficiently described the individual risks for adequate assessment of likelihood of occurrence and magnitude of outcome;
- Established appropriate risk distribution functions and duration ranges for the modeled schedule activities;
- Adequately modeled schedule risk using stochastic (Monte Carlo), risk range, or expected value methods;
- Applied appropriate methods to characterize total project risk; and
- Provided a reasonable analysis of model results for evaluating sufficiency of schedule and schedule contingencies.

4.6 Not used

4.7 Risk Mitigation: Sponsor’s Efforts

The MTAC shall review and make recommendations regarding Sponsor risk mitigation plans, as documented in its Risk and Contingency Management Plan—a part of the Project Management Plan. Areas of review and comment shall include the development and management of:

- Primary mitigation;
- Secondary mitigation; and
- Contingencies and contingency draw-down curves.

4.7.1 Risk Mitigation Recommendations

The review and recommendations shall be organized appropriately by Mitigation Structure (defined below), SCC, and Risk Type. Each mitigation recommendation shall include an indication of the Mitigation Type(s) (defined below) that best describe the mitigation recommendation.

4.7.2 Mitigation Structure

Mitigation structure refers to varying levels by which the Sponsor and its consultants and contractors may respond to the risk events identified through the review processes described above. This structure consists of three parts: Primary Mitigation, Secondary Mitigation, and Contingencies.

Primary Mitigation occurs throughout the various project phases and is the result of the planned actions of the Sponsor and its consultants and contractors as described in the Risk Management Subplan of the Project Management Plan, as supplemented with the MTAC’s recommendations resulting from this review. Such activities are scheduled at the earliest phase during which the mitigation activity may occur, and are expected to be completed on a timely basis to achieve the cost- and schedule-risk parameter targets at the end of that phase. Examples of mitigation might be completing design, or a

geotechnical survey, etc.

Secondary Mitigation consists of pre-planned, potential scope or process changes that may be triggered when risk events occur that cause overuse of project contingencies. Example events that may incur secondary mitigation include construction bids that are significantly over the estimate, or unexpected geotechnical hazards that are encountered, etc., such that the change is likely to cause a significant over-budget condition. Such “triggered” mitigation enables the Sponsor to make cost reductions in a planned and orderly process and preserves contingencies for use later in the project. Secondary Mitigation is fundamentally different than value engineering, which is a formal, systematic, multi-disciplined process designed to optimize the value of each dollar spent.

Contingencies are set-aside estimated amounts (monetary set-asides for cost and time set-asides for schedule) that are included within the overall cost or schedule targets for the project. The amounts are to be used to overcome increases in cost or schedule that are due to potential risks, and for which no other mitigation measure is available. These contingency amounts may be associated with a particular activity or category of cost, or may be set aside in a general fund. In most cases, the amount of risk a project experiences reduces as the project progresses toward completion; similarly, it is expected that the amount of contingencies required for a project also decreases over time; however, at no time should the contingency be totally consumed until all project risk is removed—usually only at project completion or beyond.

4.8 Sponsor’s Risk and Contingency Management Plan (RCMP)

The MTAC shall ensure that the Sponsor’s RCMP considers all aspects of potential risk, including management capacity and capability, project performance, cost and schedule risk. A recommended structure for the Risk and Contingency Management Plan is included in Appendix G.

Upon FRA approval, the MTAC shall make available to the Sponsor the assessments and recommendations developed in this MP for inclusion in the Sponsor’s Risk and Contingency Management Plan (RCMP), a subplan of the Project Management Plan. The MTAC shall work collaboratively with the Sponsor, as the Sponsor prepares and/or revises the Risk and Contingency Management Plan (RCMP) to reflect the recommendations and considerations provided by the MTAC.

4.9 MTAC’s Monitoring of Sponsor’s Risk and Contingency Management Plan

Post-assessment monitoring by the MTAC is intended to assess the Sponsor’s performance in risk management and ensure that the Sponsor’s project implementation achieves its risk management objectives and targets. The MTAC shall use the Sponsor’s RCMP, which has been collaboratively amended with the MTAC’s recommendations, as its guide for post-risk review monitoring.

Monitoring shall consist of evaluation and reporting of:

- The Sponsor’s prosecution of the Primary Mitigation action items, including the effectiveness of the action to mitigate the potential risk event and the timeliness of the completion of the action item;
- The occurrence of risk events on the project, whether or not previously identified, and their estimated effect on the project’s cost and schedule goals;

- The use of cost and/or schedule contingencies and whether such use threatens minimum levels of contingency required for future phases;
- Successful implementation of other major initiatives noted in the RCMP; and
- The effectiveness of the Sponsor's organization to fully manage its Risk and Contingency Management Plan.

Appendix C (A & B not used)

Sponsor Risk Interface

Due to the reliance on the Sponsor's process, reflected through its Project Management Plan, RCMP, scope, schedule, and cost documents, interface with the Sponsor during the risk review—wherever possible—is important to understand and build confidence in the Sponsor's risk process. Formal establishment of this interface ensures a robust Sponsor review.

A suggested structure for the joint MTAC and Sponsor interface is as follows: the MTAC shall assess the level of project completion and familiarity of the Sponsor with the risk review process to determine whether adjustment to the following structure is appropriate. It is emphasized that the meetings described as follows are not intended to be the only risk management-related interface with the Sponsor. Wherever possible, the MTAC should seek to attend Sponsor-led internal risk meetings and workshops.

Kickoff meeting:

- Introduce MTAC team and Sponsor team;
- Sponsor presents the project to MTAC team:
 - Agency organization, including project team and plan for staffing;
 - Description of work and reviews over the previous year;
 - Discussion of schedule, cost estimate, Sponsor's RCMP and risk register;
- Risk review of the project by discipline, organized by SCC;
 - Review the status of Sponsor's risks listed on its Risk Register, and discuss and record any additional risks discovered during the workshop, including qualitative characterization of likelihood and magnitude of cost and/or schedule impact for the identified risks;
- Summarize findings, conclusions, recommendations, questions, and enter into discussions with the Sponsor's project team to resolve open questions;
- Discuss actions required to facilitate the MTAC risk review; and
- Inform the Sponsor of next steps in the risk review process.

Risk Review Workshop: This workshop should occur after MTAC team has reviewed the documentation provided by the Sponsor and has developed opinions regarding Sponsor's organization, scope, schedule, budget, contingency, and risk mitigation.

- Introduce MTAC team and Sponsor team;
- Describe the process used to review and establish scope, schedule, cost, and risk opinions;
- Summarize the key findings of the review and recommendations;
- Review specific suggested revisions to the Sponsor's risk processes, risk register, or other risk-related items; and
- Discuss action items and next steps in the risk management and FRA review process.

APPENDIX D
Risk and Contingency Review Levels

The following generally depicts differences between MP40a and 40b. The FRA will determine in its sole discretion the level of risk and contingency review to apply to any project, and the level of review may change at any time during a project.

	Activity	MP 40a Sponsor-led	MP 40c Full
A	Review of management capacity and capability, scope, cost, schedule	Sponsor presents organization, scope, schedule, and estimate; MTAC reviews and comments	Perform full MTCC, scope, cost, schedule reviews. Generally 2-3 month process.
B	Review Sponsor's risk identification	Sponsor presents risk register; MTAC reviews and comments	Review, comment on, and provide amendments to sponsor's risk register
C	Review Sponsor's assessment	Review and comment on Sponsor's assessment	Review and comment on Sponsor's assessment process; contrast against MTAC risk assessment
D	Develop or refresh MTAC's Beta Range assessment and develop or refresh schedule risk model	No PMOC risk assessment required	Usually requires a separately scheduled risk workshop
E	Review Sponsor's risk response plans (primary mitigation)	Sponsor presents mitigation management; MTAC reviews and provides comment	Review, comment on, and provide amendments to Sponsor's primary mitigation plans
F	Review Sponsor's contingency and contingency management	Sponsor presents contingency planning; MTAC reviews and provides comment	Provide modeled contingency recommendations; compare to Sponsor's contingency. Review and comment on Sponsor's contingency management planning.
G	Review Sponsor's RCMP	Sponsor presents its RCMP; MTAC reviews and provides comments	Review and comment on Sponsor's PMP and RCMP Subplan. Focus on risk organization and levels of contingency authority

APPENDIX E
Example Risk Register

The following is provided only as an example of a risk register used for risk identification; the intention is to convey the basic content for a robust risk register. Other more detailed formats have been found useful in practice, depending on professional experience and project-specific requirements. The Risk Register developer is encouraged to obtain the most recent examples before establishing his or her own Risk Register format.

RISK REGISTER					Rating	Low (1)	Med (2)	High (3)	Very High (4)	Significant (5)
Grantee:	Project:	Date:			Probability	<10%	10><50%	>50%	75%><90%	>90%
					Cost	<\$250K	\$250K><\$1M	\$1M><\$3M	\$3M><\$10M	>\$10M
					Schedule	<1 Mths	1><3 Mths	3><6 Mths	6><12 Mths	>12 Mths
					Ranking	<=3	3.1-9.49		>=9.5	
					Risk Ranking					
					Probability	Cost	Schedule	Risk Rating		
SCC	ID	Risk Cat.	Risk Description	Outcome	[P]	[C]	[S]	(P) X (C+S)/2	Mitigation Action	
10.01	3	1-Requirements	Third parties may influence the alignment in an untimely manner.	Delay and cost.	2	1	0	1	Obtain municipal consent buy-in at 30% design.	
10.01	5	1-Requirements	Delays may occur in reconfiguring Railroad connection project.	If Railroad connection is not completed in time, entire Agency project could be subject to indefinite delay.	3	2	5	10.5	Agency undertake design	
10.01	6	1-Requirements	The drawings indicate that there are freight tracks close to the LRT guideway. Is clearance an issue at any of these locations? Is there the possibility of crash walls or something similar required?	Could cause additional costs and studies involved with providing greater physical separation between light rail and freight rail lines.	3	4	0	6	Evaluate whether the current estimate reflects this scope for crash walls. May be an estimate reduction	
20.01	43	1-Requirements	As all stations have center island platforms at grade, if a decision, for safety or operations reasons, is made to avoid pedestrian grade crossings, all stations will need tunnels or bridges along with multiple vertical circulation elements to replace them.	Much greater cost per station.	1	5	0	2.5	History indicates a very low probability	
20.01	153	2-Design	Potential elevated pedestrian connection between park-and-ride and LRT station (814)		3	3	0	4.5		
30.02	55	1-Requirements	Failure to identify economical, environmental-suitable, and practical location for maintenance facility could cause excessive project costs.	Much higher costs, both for real estate acquisition and construction cost and for O&M costs when the project goes into operation.	1	3	0	1.5	Is currently under choice selection, among final 4 sites. Re-evaluate costs when a site is chosen.	
40.01	61	1-Requirements	Balance of earthwork is unknown at this time, although it would appear that there may be more fill than cut. Lack of economical embankment material could be a problem.	Higher cost if material is hard to find.	4	4	3	14	Evaluate as an estimate adjustment. Figure out more during design.	
40.02	62	1-Requirements	Since a number of the "tunnels" are only shallow cut & cover grade separations under existing streets (where the utilities are usually buried), there are likely to be utility issues to be dealt with.	Costly relocations of utilities. Short construction season may require expedited advance utility relocation packages to avoid delaying project.	2	3	0	3	Perform utility location studies during early PE	
60.01	139	1-Requirements	Potential impact to loading dock access of existing commercial building (124)		5	4	0	10	Evaluate for estimate adjustment	

APPENDIX G (F not used)

Risk and Contingency Management Plan (RCMP) Structure

Risk and Contingency Management Plan (RCMP) Structure

Note: the following narrative for potential structure of the RCMP contains elements or details that may not be appropriate for all phases of the project. For example, early in the design phase, some details may be undeveloped and only broad characterization of project elements or risk management plans may be available. The MTAC's review of the Sponsor's RCMP should appropriately consider the phase of the project development, and the MTAC should adjust its review accordingly.

The Risk and Contingency Management Plan (RCMP) is a subplan of the Sponsor's Project Management Plan (PMP); its successful implementation depends upon a fully updated and active PMP. It is the purpose of the RCMP to highlight specific areas of management focus as identified through the risk evaluation process, which should be implemented along with Sponsor's normal project operations as described elsewhere within the PMP. Further, the RCMP provides a means for monitoring Sponsor's progress as it moves the project forward to its next phase. These areas of management focus may include actions to strengthen management capacity and capability, project performance, cost and schedule analyses, mitigations of identified project risks, and others.

Information contained within the RCMP should complement and not be in conflict with information contained elsewhere within the PMP or in other FRA guidance documents. Such areas of concordance should include, for example, the project estimate and schedule, and FRA's completion criteria for planning, preliminary engineering, or final design.

Successful implementation of the RCMP is important to the goals of both the Sponsor and the FRA, and monitoring of the RCMP implementation will be undertaken by both the Sponsor and the FRA (through the MTAC). It is important, therefore, that the FRA, MTAC, and Sponsor work collaboratively and develop agreement on the substance of the RCMP.

A potential structure for the RCMP follows:

Overview

This section should indicate that the RCMP is a subplan of the over-arching PMP, including an indication of the latest version of the PMP upon which the RCMP is based. If the RCMP depends specifically on other sections of the PMP, those sections should be noted, including an indication of their latest versions.

A brief description of the important, actionable findings of the RCMP should be included in the overview. If further actions are required to finalize the current draft of the RCMP, those should also be indicated along with expected completion dates.

A brief summarization of topics covered within the RCMP should be included, including such topics as:

Primary Mitigation, organized by significant project activities, such as:

- Management Capacity and Capability

APPENDIX G (F not used)

Risk and Contingency Management Plan (RCMP) Structure

- Project Scoping and Design;
- Delivery Methods and Contracting;
- Construction Process;
- Project Tracking, including:
 - Cost Estimating, Financing and Financial Management; and
 - Project Schedule Management.

Insurance:

- Professional services, construction phase, wrap-up, or other specialized insurances purchased for reduction of risk exposure.

Contingency Management:

- Cost Contingency Management Plan; and
- Schedule Contingency Management Plan.

Secondary Mitigation:

- Establishment of Secondary Mitigation actions and cost targets which may trigger the implementation of Secondary Mitigation.

Risk Management:

- Risk management and mitigation monitoring, change identification, and management controls.

Goals and Objectives

The major goals of the RCMP should be stated, including establishment of measures to complete the project within budget and on schedule, implementation of project cost and time contingency procedures, risk mitigation, and development of available risk mitigation capacity.

Broad goals expected to be accomplished prior to the next stage of RCMP revision (including revisions required at FRA milestones) should be noted. For example, for a project in preliminary engineering or final design, such goals may include (similar, phase-appropriate goals would apply to other project phases):

- Adherence to environmental requirements, such as the National Environmental Policy Act (“NEPA”) requirements;
- Mitigation of design risks where possible, or appropriate transfer of such risks;
- Mitigation of other identified risk events;
- Reasoned analysis and assessment of likely market risks to be encountered;
- Cost and schedule risk mitigation capacity developed and implemented as needed, including targets to be achieved during the current phase and forecasted cost and schedule risk management mitigation capacity for subsequent phases;
- Uncertainty in cost estimates and forecasts and project schedules, including tracking mechanisms to identify trends in known costs and risk reduction; and
- Maintenance of minimum cost contingency and schedule contingency targets.

APPENDIX G (F not used)

Risk and Contingency Management Plan (RCMP) Structure

A description of each goal and associated metrics should be set forth in the RCMP; the level of success should be measured using the metrics in project evaluation.

The RCMP should note that the Sponsor and its local and state partners understand that the plan was developed with FRA's concurrence (if it is so), that implementation of the RCMP is an important consideration in further FRA approvals, and that the RCMP describes processes and requirements that must be adhered to, in addition to current FRA grant contracts and related FRA Circulars, regulations and guidance.

Risk Review Process:

This section should include a description of procedures used to develop the Risk and Contingency Management Plan, including procedures for development of risk identification, risk assessment, risk response recommendations, risk protection measures (including Secondary Mitigation and minimum contingencies) and risk management and control.

[Note: In the following sections, the Sponsor should provide an outline of its strategic, performance-based project management activities to identify, assess and respond to the project risks. It is the intent of the following to view risk management as a process of continual risk reduction; i.e., while the mitigation of any specific identified risk is an important activity, the identification, addition and mitigation of newly-discovered risks forms a process that provides both the Sponsor and the FRA (through its MTAC) with the means and methods to best ensure satisfactory outcomes for the project. The goal of the RCMP is to provide a plan to take the Sponsor through the upcoming phase, and prepare it for subsequent phases, with:

- *Cost estimates and forecasts and project schedules continuing to be developed as planned;*
- *Reasoned analysis and assessment of likely upcoming risks, including risks associated with Sponsor's management capacity;*
- *Mitigation of risks at the earliest possible time;*
- *Completion of all mitigation actions scheduled for the upcoming phase;*
- *Cost and schedule risk mitigation capacity developed, implemented as needed, and targets achieved; and*
- *Minimum cost and schedule contingency targets continuing to be achieved.]*

Insurance

This section should summarize current or future major insurances provided to the project to respond to identified risk, including unusual, highly likely, or high exposure risk identified through the risk review process. Such insurances may include professional services, builder's risk, wrap-up, or other specialized insurances purchased for reduction of risk exposure. Detailed insurance information should be included as an appendix to the RCMP or reflected elsewhere in the PMP.

APPENDIX G (F not used) Risk and Contingency Management Plan (RCMP) Structure

Primary Mitigation

The primary mitigation section should include the process used to develop the Risk Register, which outlines risks and mitigations that require Sponsor managerial, administrative, and technical action. The section should be organized as follows; each area below should include a brief summary of key risks and action items as of the date of the latest RCMP update. A detailed listing of all identified risks and proposed mitigations should be included as a separate report, or attached as an appendix, as further indicated below; this separate report should be updated at the frequency noted in the RCMP.

Management Capacity:

The RCMP should summarize key management capacity risks identified in the Risk Register. A plan should be indicated for additional resource commitments, additional requirements for methods and resources, and improved management strategies to address the findings of risk. Management strategies should include specific plans or products, project control, responsibilities, authorities, and measures of performance.

Detailed risk issues related to Management Capacity should be specifically cited in an appendix, and should be noted as *Management Capacity Risks and Mitigations*. This list should include proposed mitigation activities, responsibility for action and targeted date for completion.

Project Scoping and Design:

Requirements: A summary of key requirements risks and proposed mitigations should be discussed in the body of the report to provide a succinct overview of the outstanding risk mitigation work to be accomplished. In addition, all outstanding project requirements risks, including undefined project goals, third party requirements, and environmental considerations should be listed in an appendix, indicated as Requirements Risks and Mitigations. Such activities should also include risk associated with all compliance of NEPA activities consistent with the NEPA Final Determination; and public and governmental reviews and critiques.

Design: A summary of important design risks and proposed mitigations should be discussed in the body of the report to provide a succinct overview of the outstanding design risk mitigation work to be accomplished. In addition, all design activities indicated in the risk review as potential risk events, including activities associated with unproven project technologies, unresolved alternate design approaches, late design, and others should be listed in an appendix, indicated as Design Risks and Mitigations. As appropriate, statements of subconsultant responsibilities for risk mitigation should be included.

Where value engineering efforts have been or will be undertaken, a summarized discussion of the effect on project risk should be discussed, including plans for closure of the value engineering process. Detailed value engineering items should be referenced elsewhere in the PMP, or included in an appendix.

APPENDIX G (F not used) Risk and Contingency Management Plan (RCMP) Structure

Delivery Methods and Contracting:

The purpose of this section is to illustrate the Sponsor's plans for efficient risk allocation through choice of delivery method and through contractual risk allocation; such risks so considered should include common design, market, and construction risks as well as those risks identified in the risk review. All contracts should be considered, including design, vendor, and construction contracts. The Sponsor should discuss the following:

- Strategies for contractual risk allocation or risk sharing through explicit contract language, ordinary custom/commercial/trade practices, or statutory authority such as the Uniform Commercial Code. The risk allocation plan should include allocations of future and prior contracted work, should complement other PMP sub-plans, such as the Project Delivery/Contract Package Plan and future individual contracts, the Real Estate Acquisition Management Plan ("RAMP"), and all NEPA-related documentation;
- The effect of the chosen strategy on market pricing for the various contracts;
- Assessment of the contracted party's capacity to efficiently mitigate its allocated project risk exposure, including market risk, such that the risk allocation represents the best value for the project; and
- Actions to implement the strategy.

Detail for the proposed allocation strategy should be referenced elsewhere in the PMP or should be included in an appendix. Individual risks identified in the risk review should be indicated as *Delivery Methods and Contracting Risks and Mitigations*.

Construction Process:

This section should demonstrate the Sponsor's plans for effective management of risk during the construction process. It should summarize the key construction phase risks identified in the risk review and plans to mitigate and respond to those risks. Special attention should be placed on those risks that have not been wholly transferred to a contracted party. In addition, all outstanding project construction risks identified in the risk review should be listed in an appendix, indicated as *Construction Risks and Mitigations*.

Project Tracking:

This section should discuss the tracking and forecasting of cost and schedule changes to enable measurement of potential increased cost or time due to project risk. Such increases may require actions, such as use of contingencies or may trigger the implementation of Secondary Mitigation. This section should complement and may reference other related sections of the PMP. Where the risk review has identified risks associated with project cost and time tracking, a detailed listing of all identified risks and proposed mitigations should be included in an appendix, indicated as *Project Tracking Risks and Mitigations*. The section should be organized as follows; each area below should include a brief summary of key risks and action items:

APPENDIX G (F not used)

Risk and Contingency Management Plan (RCMP) Structure

Cost Estimating and Forecasting: Discussion should include the process used for development and management of project cost and project cost uncertainty, including the effect of schedule risk uncertainty on cost risk results.

The following efforts for reduction of cost uncertainty should be indicated or referenced elsewhere in the PMP:

- Continuous administrative and management efforts for increased detailed development of the cost estimate;
- Internal quality control to ensure adequate technical provision of all estimating and forecasting work;
- Methods for adjustment of cost schedules in reaction to realized schedule risks.

Detailed cost and cost risk information should be referenced as available elsewhere in the PMP or made available in an appendix to the RCMP.

Project Schedule Management: Discussion should include the process used for development and management of project schedule forecasts and project schedule uncertainty, including any effect of cost risk uncertainty on the schedule risk results. Such external requirements as NEPA compliant related work and community involvement should be considered in the discussion of risk-related schedule management.

Plans to maintain schedule tracking should be discussed, including both design and construction schedules, to detect schedule deviation through techniques such as earned value. Such plans should indicate responsibility and frequency of reporting (usually monthly). Where appropriate, the RCMP should indicate efforts made to ensure that consultants and contractors comply with similar measures. Such tracking is important for the establishment of risk response actions, such as potential use of schedule contingency; this discussion shall rely upon and complement schedule control discussions contained within the scheduling section of the PMP.

Contingency Management

The purpose of this section is to discuss the Sponsor's plans for establishment and management of cost and schedule contingency protections. The section should be organized as follows:

Cost Contingency Management Plan:

- Results of cost contingency recommendations developed, including minimum contingency hold points by milestone and reflected in a minimum cost contingency draw-down curve;
- Sponsor plans to reach substantial conformance with the contingency recommendations on a timely basis;
- Procedures in place to implement and maintain throughout the project, a Cost Contingency Management Plan as an identifiable element in the RCMP, including authorities and procedures for distribution, transfer and use of all cost contingency in conformance with the requirements of this plan and sufficient documentation as each transfer occurs. This Cost Contingency

APPENDIX G (F not used)

Risk and Contingency Management Plan (RCMP) Structure

Management Plan should also describe the manner in which the Sponsor will forecast and trend the project contingency; and

- Sponsor plans to recover in those cases where cost estimate forecasts indicate contingency levels have fallen below the minimum planned contingency hold points, including as necessary implementation of a formal Recovery Plan or adjustment of the expected project final cost with FRA approval.

Schedule Contingency Management Plan:

- Results of schedule contingency recommendations developed, including minimum contingency hold points by milestone and reflected in a minimum schedule contingency draw-down curve;
- Sponsor plans to reach substantial conformance with the contingency recommendations on a timely basis;
- Procedures in place to implement and maintain a Schedule Contingency Management Plan as an identifiable element in the RCMP, including authorities and procedures for distribution, transfer and use of all schedule contingency in conformance with the requirements of this plan and sufficient documentation as each transfer occurs. This Schedule Contingency Management Plan should also describe the manner in which the Sponsor will forecast and trend the project contingency; and
- Sponsor plans to recover in those cases where schedule estimate forecasts indicate contingency levels below the minimum planned contingency hold points, including as necessary a formal Recovery Plan or adjustment of the expected completion date for the project or appropriate milestones.

Secondary Mitigation

This section should discuss the Sponsor's plans for establishment and management of Secondary Mitigation protections. The section should discuss the following:

- Results of Secondary Mitigation recommendations developed and the process for reviewing and developing future items;
- A summary discussion of such Secondary Mitigation, including a brief description of a prioritized list of identified Secondary Mitigation items and the timing necessary for their implementation, especially including dates beyond which the items may no longer be effective;
- A discussion of those points of project completion at which Secondary Mitigation items are no longer available to be triggered for implementation; and
- Procedures in place to track such trigger points and to implement available Secondary Mitigation, including authority and responsibility for such actions.

If the project has progressed to a stage at which no available Secondary Mitigation has been identified, this condition should be discussed in the report.

Risk Management and Risk Mitigation

The Sponsor should describe its plans to implement, administer and maintain throughout the project, a

APPENDIX G (F not used)
Risk and Contingency Management Plan (RCMP) Structure

Risk and Contingency Management plan for:

- Assessing (identifying and analyzing) project cost and schedule risk;
- Developing risk-handling options inclusive of primary risk mitigation;
- Developing a secondary mitigation plan to handle risk events or “triggered” mitigation activities;
- Monitoring risks to determine how risks have been handled or changed; and
- Documenting and reporting to the FRA the risk management program.

The risk management description should include such considerations as:

- Design control processes to detect potential consultant failure, such as scope, schedule, and budget “earned value” metrics;
- Clearly established Sponsor, consultant, and contractor responsibilities for risk management;
- Plans for amendment of the risk register during the course of the 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 Sponsor and the FRA; and
- Plans and timing for systematically updating the RCMP.

APPENDIX H

MTAC's Risk Report Format

Reporting should occur soon after conclusion of the risk workshops; timely reporting will facilitate Sponsor's early adoption of the recommended risk mitigation measures into its Project Management Plan.

In the conduct of this report, the MTAC shall use its professional judgment to identify and categorize, assess and evaluate the uncertainties in the Sponsor's project information, considering the project's administrative, management, political, legal, financial and physical conditions. The MTAC will document and report its professional opinions and its recommendations for responding to identified risk, including recommendations for mitigations including contingencies. Unless otherwise directed, the report will be sectioned as follows:

Title Page

Include disclaimer, below.

Disclaimer *Insert:* This Monitoring and Technical Assistance Contractor (MTAC) report and all supporting reports and back-up materials contain the findings, conclusions, professional opinions and recommendations stemming from a risk-informed evaluation and assessment, prepared solely for the Federal Railroad Administration (FRA). This report should not be relied upon by any party, except FRA or the project Sponsor, in accordance with the purposes of the evaluation and assessment as described below. For projects funded through FRA's capital program, FRA and its MTACs use a risk-informed process to review and reflect upon a Sponsor's scope, schedule, and cost, and to analyze the Sponsor's project development and management. This process is iterative in nature. The results represent a "snapshot in time" for a particular project under the conditions known at that point. The evaluation or assessment and related results may subsequently change due to new information, changes in circumstances, additional project development, specific measures a Sponsor may take to mitigate risks, Sponsor's selection of strategies for project execution, etc.

Table of Contents

List of Figures and Tables

Executive Summary

The MTAC should provide an executive summary in three pages or less that includes the following:

- 1) Purpose
- 2) Project Description
- 3) Results and Recommendations - MTAC's professional opinion regarding:
 - a) Contract packaging review and assessment, including construction work by railroads
 - b) Total project cost, including statement of potential range of cost (lower reporting range, conditioned estimate and upper reporting range) and recommended cost contingency where a separate MTAC risk assessment has been performed;
 - c) Project schedule and schedule contingency, including statement of separate MTAC findings where a MTAC assessment has been performed; and

APPENDIX H

MTAC's Risk Report Format

- d) Top Risks, mitigations, and recommended actions.

Project Background

Project descriptions and data shall be consistent with MP 25; also include description of project purpose; intended service and infrastructure improvements; railway relation to grade throughout the alignment; project delivery method.

Summary of Project Status from other OPs

Summary-level information from MP 21 Sponsor Management Capacity and Capability, MP 32C Project Scope, MP 33 Project Estimate, and MP 34 Project Schedule reviews if performed. Specifically cite elements from prior reviews that help to reader to understand the issues presented later in the report.

Risk Identification

Provide a summary of the process used for identification of risks, and provide a narrative discussion of key risk events (categorized by SCC), including their potential impact on the project. Characterize the remaining elements of the Risk Register, which is to be attached as an appendix.

Risk Assessment

For projects with prior risk reviews, include comparisons of the currently-assessed project risk to the prior-assessed project risks and comment on the changes indicated.

Sponsor-developed Cost and/or Schedule Risk Assessments

Where the MTAC's review is based on a Sponsor-developed cost and/or schedule risk assessment, the purpose of this section is to present the Sponsor-developed risk assessment models, including a narrative and appropriate graphics that explain the primary findings from the project cost or schedule risk models.

MTAC Cost Risk Assessment

Where the cost risk review is based on an independent MTAC risk assessment, describe the methodology used to deliver the risk assessment products. Further, present any cost estimate adjustments and selection of cost range factors; especially discuss any factors that vary from standard recommendations. Provide a summary of key risks that influence MTAC's characterization of level of project risk by SCC. The MTAC shall present detailed data and analysis in a separate appendix as necessary in order to maintain readability of the report.

MTAC Schedule Risk Modeling

Where the schedule risk review is based on an independent MTAC risk assessment, describe the methodology used to deliver the risk assessment products. This section shall present the findings resulting from the schedule risk modeling, including development of the summary schedule activities, ranges for activity durations in the summary schedule, and characterization of specific risks that influence important schedule activities; characterization of the results of the schedule risk modeling, including confidence levels for achieving the Sponsor's Revenue Service Date target; the MTAC's professional opinion regarding the most likely schedule for Revenue Service Date; and MTAC's recommended actions.

APPENDIX H MTAC's Risk Report Format

Risk Mitigation

The purpose of this section is to present the MTAC's review and recommendation for any adjustment of risk mitigation efforts by the Sponsor. The MTAC's narrative should allow FRA management and the Sponsor to maintain focus upon these risk mitigation efforts as the means to maintain the baseline cost estimate and avoid potential cost escalation from these potential project risks.

The report should include separate subsections for Primary Mitigation, Secondary Mitigation and Contingency Recommendations.

Primary Mitigation Specific mitigation recommendations shall be presented, including appropriate timeframes for completion of the mitigation activity, especially focused on those mitigations considered necessary for successful advancement into the next project phase. Where an MTAC assessment has been performed, link the mitigation activity to the risk register and/or the assignment of exceptional risk factors. Such mitigation recommendations shall be segregated by SCC and Risk Category.

For projects with prior risk reviews, include discussions (as appropriate for project phase) of Sponsor's historic mitigation efforts by Risk Category.

Secondary Mitigation Provide recommendations for adjustments to amounts of Secondary Mitigation capacity developed by the Sponsor. Where the risk review has provided such, include suggested additional areas for potential Secondary Mitigation.

Contingency Provide a narrative indicating minimum recommended levels of both cost and schedule contingency, including a summary of the basis for development of the recommended minimums. Further, provide graphical or tabular representations of the Sponsor's contingency draw-down curves, including review comments and MTAC's recommendations for adjustment, if any.

Monitoring Plan Basis

Indicate a plan for testing the implementation and effectiveness of Sponsor mitigation measures on the project.

Conclusion

Appendices As required, include the following or other additional information:

Risk Register

Sponsor Data Characterization Provide a descriptive listing of documents used in this analysis, including a narrative characterization of their completeness and sufficiency as appropriate for the project phase during which this review was conducted.