Risk Management Guidelines

Guideline as defined for this manual is a detailed minimum requirement to implement Risk Management

05/28/2021

Metropolitan Sewer District of Greater Cincinnati

Risk Management Guidelines

Contents

Section 1 - Overview

1.1 Purpose

The purpose of these guidelines is to document the approach used by the Metropolitan Sewer District of Greater Cincinnati (MSD) to identify, assess and manage risks associated with delivery of capital projects. The guidelines also serve to outline the interface between project and program-level risk management so those responsible for each level understand their role in the larger effort to manage the risk associated with capital project delivery at MSD. The Planners and Project Managers are responsible for managing project-level risk while the Capital Program Risk Manager is responsible for program-level risks. All staff involved with managing risk need to utilize the same approach in order for risks to be communicated effectively.

1.2 Master Program Management Plan

These guidelines are used in conjunction with the Project Risk Management Procedure and the Risk Register Template (Excel file) which are both included in the Master Program Management Plan (MPMP). The Project Risk Management Procedure establishes the roles and responsibilities for implementation of project-level risk management. The Risk Register is designed to be used by Planners, Project Manager and the Capital Program Risk Manager and contains pre-established categories and sub-categories that allow ease of roll-up and communication of risks.

1.3 Organization of Guidelines

These guidelines have been organized as follows:

Section 2 – Background: Provides standard definitions for risk and issues, clarifies difference between risks and action items, and addresses the scalability of the risk management process.

Section 3 – Approach to Risk Management at MSD: Presents an overview of how MSD conducts risk management at the project level, the program level and the enterprise level. Also establishes when risk management must be included on a project and requirements for periodic updates.

Section 4 – Project Risk Management Methodology: Provides step-by-step instruction for preparing a project risk register, guidance for qualitative and quantitative assessment of project risk, preparation of risk management strategies and plan, and determining retained risk. The section includes a description for how Planners and Project Managers should manage the project risk through Monitor and Control.

Section 2 - Background

2.1 Definitions

Risk - an uncertain event that, if it occurs, has a positive or negative effect on a project's objectives. Risk Score is expressed by the following formula:

Risk Score = Consequence x Likelihood of Occurrence

Issue – An incident that has already happened and has immediate potential for adversely impacting the project. In other words, a risk becomes an issue after it is "realized" and begins to adversely affect project schedule, cost or quality.

Action Item – Is a matter that requires follow-up execution and usually occurs on an ad hoc basis during meetings or as a by-product of working on another activity. A series of action items might be required as part of a risk response plan but action items themselves are not necessarily risks that need to be tracked as part of the risk management process.

Project-Level Risks - Risks that are unique to individual projects. An example of a project-level risk is, "Delay in acquiring a critical easement that is needed before the project can be bid."

Program-Level Risks are those that apply to multiple projects or a single risk that could affect the overall program. A project-level risk rises to the level of a program-level risk if multiple projects all have the same or similar risk, requiring it to be managed at the program level. There are program risks such as inflation, bond market fluctuation and contractor capacity that potentially affect all projects in the program.

2.2 Risk Management Process Scalability

Larger, more complex projects will require rigorous risk management due to the larger number of risks that will be identified over the life of the project. Smaller, more straightforward projects are more likely to have fewer risks and less involved responses. Regardless of the size of the project, the basic process followed for risk management remains the same. That basic process includes identifying and managing risks before they are realized.

Section 3 - Approach to Risk Management at MSD

3.1 Project Risk Management

The Planners and Projects Managers are responsible for developing and maintaining risk management plans for their projects. The following are several key points about project-level risk management:

- ♦ Project risk management is required on all projects or as required by the Principal Engineer.

- ♦ If project risk management is required on a project, the risk documents must be included when the project is turned over from PBD to PD.

♦ Updated risk registers shall be sent to document control at each project milestone or sooner. The Capital Program Risk Manager will review risk registers for potential program level risks.

♦ The tasks of risk management may be delegated or assigned to members of the project team, including planning and design consultants. However, the responsibility for maintaining the risk register (e.g. updating with new/emerging risk, ensuring that risk response plans are implemented) remains with the Planner and Project Manager.

♦ Staff in the Engineering & Quality Assurance Branch monitor and report on Planner and Project Manager compliance with the Risk Management Guidelines and the Risk Management Procedure. For example, the Engineering & Quality Assurance staff may comment on whether a risk register has been developed for a project, whether or not the risk register is being updated, and whether progress has been made in implementing the recommended risk responses.

3.2 Program Risk Management

The Capital Program Risk Manager reviews information from multiple sources in implementing the program risk management plan and identifying new and emerging risks to the program. The Capital Program Risk Manager uses the information obtained from these sources to maintain the program risk management plan and to prepare reports on the program risk management activity. This report lists the active risks by group (Legal, Fiscal, etc.), the action taken during the month on each item, and any new recommended risk responses. The sources of information used by the Capital Program Risk Manager include:

♦ Level 3 Project Reports: Monitor to determine if issues are being generated from unidentified risks

♦ Document Control: Research background information for issues and risks in project files

♦ Invoice Review: Review invoice processing issues and turnaround times

♦ Change Management: Monitor changes to design and construction contracts (Change Order Requests) and project scope, schedule and budget (Notice of Advisement)

♦ Lessons Learned: Monitor to determine if issues and risks are being captured as a lesson learned

♦ Monthly Program Cost & Schedule Reports: Review schedule- and cost-performance metrics

♦ Project Risk Management: Identify common project-level risks that are more effectively managed at the program level

♦ Estimating: Monitor trends with estimating accuracy and turnaround times

The Capital Program Risk Manager is also responsible for assisting with the development and implementation of project risk management. The purpose of this is two-fold:

1. The Capital Program Risk Manager has expertise in risk management and can assist the Planners and Project Managers in preparing risk registers, conducting risk assessments and developing risk management strategies.

2. Involving the Capital Program Risk Manager in project-level risk management helps in the identification of similar risks being encountered on multiple projects thereby constituting the need for a program-level response to that risk. In other words, the Capital Program Risk Manager will benefit from a deeper understanding of the project-level risks while the Project Manager will benefit from program-level perspective to risk management.

3.3 Enterprise Risk Management

MSD performs Enterprise-Level Risk Management using tools developed and maintained by the Office of the Director. These tools and procedures are not associated with the capital project delivery processes in the Project & Business Development or Project Delivery Division and therefore are not described in detail within these guidelines. The Capital Program Risk Manager is responsible for maintaining the capital project risks in the enterprise risk management tracking system in iWave (PeopleSoft). Refer to **Figure 1**.

Figure 1: Enterprise, Program and Project Risk Management
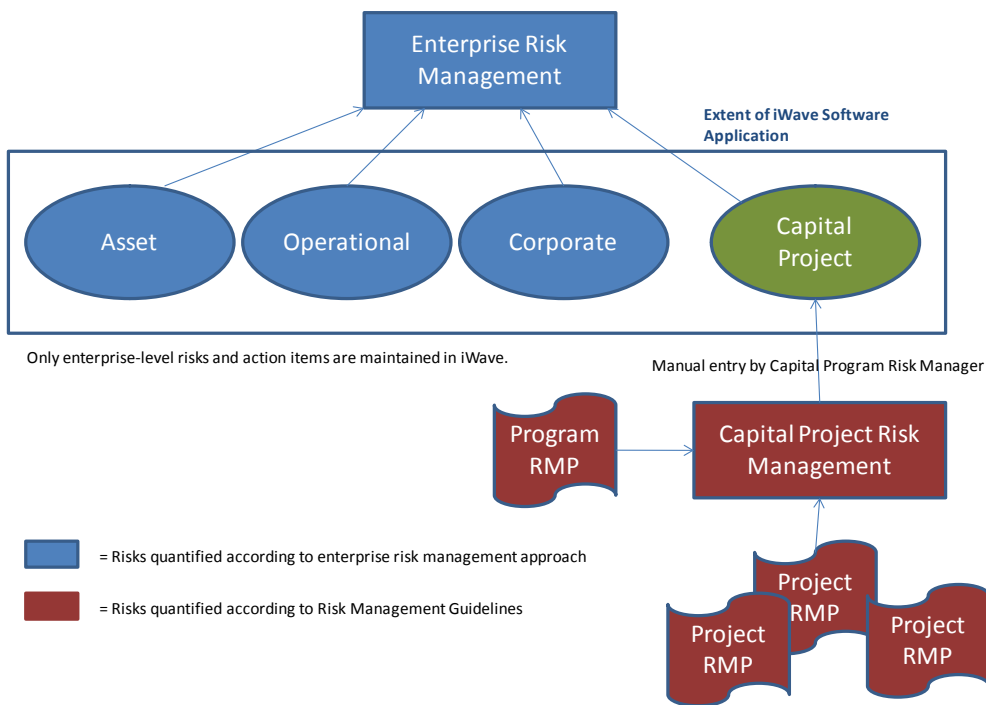
Section 4.0 Project Risk Management Methodology

4.1 Risk Management Process Steps

The development of risk management at MSD occurs using the following four step process.

- ♦ Prepare Risk Register – identify risks to project or program.

- ♦ Conduct Risk Assessment – describe consequence of each risk, determine maximum foreseeable loss, assign consequence rating (scale of 1 to 10) and assign likelihood of occurrence (scale of 1 to 9).

- ♦ Develop Risk Management Strategy and Plan – develop possible management strategies and recommend a risk response plan.

- ♦ Determine Remaining Consequences – estimate the remaining consequences that will exist after the management plan has been implemented.

The following sections describe in detail the four step process for developing a risk register as well as a description for monitor and control.

4.2 Risk Register

A risk register is quite simply a list of risks that might affect the project. There are many techniques for developing a risk register but the one that is most common and easily implemented is brainstorming. This involves conducting a risk workshop early in the project that assembles a multi-disciplined team and asks the question of "What can go wrong or right with the implementation of this project?" Risk management plans for smaller projects can be developed by Planners and Project Managers on their own while larger projects may require the involvement of outside consultants with specific expertise in the planning, design and construction of unique projects. Planners and Project Managers could refer to risk management plans developed for similar projects as a reference or to confirm their results of a risk workshop. However, it is not advised to copy a risk management plan from a similar project because each project has a unique set of risks that need to be considered.

MSD has established a set of categories to be used both at the project and program level to standardize categories of risk. (Refer to **Table 1.**) They are listed in Table 1 and are pre-programmed into the Project Risk Register Template.

Table 1: Risk Categories

CATEGORY	SUB-CATEGORY
Environmental, Health & Safety	Contamination
	Protection/Preservation
	Safety
Fiscal	Economic
	Financing
	Budget
Legal	Contracts
	Consent Decree Stipulated Damages
	Third Party Lawsuits
Management	Governance
	Schedule
	Management Capability
	Mitigation/Permit Compliance
	Small Business Advocacy
	Technology Platforms
	Public Communications
	Easement Acquisition
Technical	Conveyance
	Tunneling/Jacking
	Storage/Treatment
	Pipe Lining
	Construction - General
	Design
	Instrumentation & Controls
	Sewer Separation
	Commissioning, Operation & Maintenance

4.3 Risk Assessment

The risk assessment, performed for each risk on the register, is the next step in the process. The risk assessment involves the assignment of a consequence and likelihood of occurrence rating to each identified risk. Assigning a consequence rating requires the Planner or Project Manager to determine (or estimate) the maximum foreseeable loss associated with a risk if it were to be realized. However, many times it is difficult to assign an amount and therefore a qualitative assessment can be assigned. It is acceptable to make an educated guess at the consequence and likelihood of occurrence ratings. (Refer to **Tables 2 & 3**.)

Table 2: Consequence Rating

CONSEQUENCE RATING	MAXIMUM FORESEEABLE LOSS	QUALITATIVE DESCRIPTION
1	1% Reduction in Contingency (cost or time)	Insignificant
2-3	2%-50% Reduction in Contingency (cost or time)	Minor impact
4-6	51%-100% Reduction in Contingency (cost or time) *Up* To 10%-20% Over Budget/Project Delay	Moderate impact
7-9	21%-30% Over Budget/Project Delay *Up* To 40% Over Budget/Project Delay	Significant impact
10	>40% Over Budget/Project Delay	Major impact

It is highly recommended that the range of maximum foreseeable loss shown in **Table 2** be utilized on all MSD projects. However, the Planner or Project Manager may modify the ranges on certain projects as appropriate. The likelihood of occurrence rating is assigned using the following guidelines in **Table 3**.

Table 3: Likelihood of Occurrence Rating

LIKELIHOOD RATING	LIKELIHOOD OF OCCURRENCE	QUALITATIVE DESCRIPTION
1-2	1%-20%	Highly unlikely to occur
3-4	21% - 40%	Unlikely to occur
5-6	41%-60%	Likely to occur
7-8	61%-80%	Very likely to occur
9	81%-90%	Highly likely to occur

A risk score is calculated as the product of the consequence rating and likelihood of occurrence rating. The risk score classification is established as show in **Table 4**.

Table 4: Risk Score Classifications

		1	2	3	4	5	6	7	8	9
Consequence	10	10	20	30	40	50	60	70	80	90
	9	9	18	27	36	45	54	63	72	81
	8	8	16	24	32	40	48	56	64	72
	7	7	14	21	28	35	42	49	56	63
	6	6	12	18	24	30	36	42	48	54
	5	5	10	15	20	25	30	35	40	45
	4	4	8	12	16	20	24	28	32	36
	3	3	6	9	12	15	18	21	24	27
	2	2	4	6	8	10	12	14	16	18
	1	1	2	3	4	5	6	7	8	9
		1	2	3	4	5	6	7	8	9
		Likelihood of Occurrence								

Table 4: Risk Score = Consequence x Likelihood of Occurrence

Key	
Very High	
High	
Medium	
Low	
Very Low	

4.4 Risk Management Strategy and Plan

There are four types of risk management strategies that can be employed for risks; Avoid, Transfer, Mitigate, or Accept. Opportunities are the events that may positively impact a project and they can be; Shared, Exploited, Enhanced, or Accepted.   It is important for the Planner and Project Manager to consider different risk response plans under different strategies in order to select the most appropriate. Upon review of the available strategies for each risk, a single risk response plan is recommended and entered into the risk register. This risk response plan should be specific enough to allow tracking of its implementation.

Note: While those risks with the highest risk score should be the focus of the Planner and Project Manager's attention, it is also important to consider time-sensitive risks.

4.5 Remaining Consequences

The concept of retained risk is important because many of the risks that are being managed by MSD cannot be entirely eliminated. That is to say, that even after implementation of the risk response plan there will be some likelihood of occurrence and consequence that is retained even after the risk has been managed. It is helpful to consider this during the time at which the risk register is developed. The same process used to assess the risks originally is used again when determining the remaining consequences.

4.6 Monitor and Control

The development of risk management at the outset of a project is a good first step and requires iterative updates of the risk register until the risk response plans are implemented and the risks are recorded as closed in the risk register. This is why MSD has chosen to implement risk management as a continuous process where the monitoring and control of the risk register is stressed.   In other words, the ***full reductions in project and program-level risk only occur after the identified risk response plans are implemented.***

Refer to 5.6 Risk Management Procedure (SOP #MPMP-05-06) for more information on the roles and responsibilities for monitoring and controlling the risks.

√	**STARTING THE RISK MANAGEMENT PROCESS**
	Use the MPMP Risk Management Procedure and Risk Management Guidelines and decide who will be involved in identifying risks.
	Initial requirements and risks can be identified early in the Planning process. The Risk Management Plan can be prepared once the project and its requirements are defined and the activities needed to complete the project are identified. The start date of the Risk Management Process is best left to the Planner, who determines when there are adequate planning outputs that can be used to prepare the Risk Management Plan.
√	**IDENTIFY PROJECT RISKS**
	Identify risks by project and activity. Include risks in the risk register spreadsheet. Hint: To differentiate risks from facts and to adequately define risks and be able to address the root cause we use a "cause-risk-effect" format for naming risks. Additional risks are identified throughout the life of the project.

Cause	Risk	Effect (Consequence)
Team members have little knowledge and/or experience with the new technology.	Could lead to delays or unforeseen failures.	Resulting in scope changes that could impact the schedule and cost.

	Any previous risk identification project lists should be used after brainstorming and identifying risks for the present project. Previously developed lists tend to limit creative thinking and are more useful after risks are initially identified.
√	**QUALITATIVE & QUANTITATIVE RISK ANALYSIS**
	Complete the consequence and likelihood of occurrence ratings of project risks. Analyze identified risks and decide which risks warrant a response and create a "short list" of risks. It will need to be determined if it is necessary for the project to make use of a true quantitative analysis, where we go from a likelihood and a consequence number rating to a percent likelihood and a dollar impact or schedule days impact.
√	**PLAN RISK RESPONSES**
	For all "active" risks complete all fields of the risk management plan spreadsheet, including risk responses. Planning risk responses is the time to use creativity in planning responses to risks.
	Risks can be Mitigated, Avoided, Transferred, or Accepted. Do not overlook risks that are opportunities that can positively impact your project. You should try to Share, Enhance, Exploit, or Accept these opportunities to increase the chance of having a positive effect on your project. For example, If our project is using a specific technology where there is a lot of research and development, look for new releases of the technology that may save time or cost to the project and produce an opportunity.
√	**MONITOR AND CONTROL**
	Actively update the risk register.
	Implement Risk Response Plans as risks occur.
	Identify new risks.
	Consider risks forwarded by others.
	Evaluate the effectiveness of the risk responses.
	Update the Risk Register with changes in scope, at major milestones, with new information, and at least on a monthly basis. Risk management is an iterative process and is revisited and updated throughout the life of the project.