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1.0 INTRODUCTION

1.1 Purpose

Risk Management documents the processes and procedures that are used to manage risks in the Project. It defines how risks are identified and tracked throughout the Project lifecycle, describes the tools used, identifies the person responsible for managing various areas of risk, and the terms by which contingency plans are derived and implemented.

The ultimate goal of risk management is to increase the probability of Project success by focusing attention on problem areas early and reducing the amount of costly rework in the future. For each and every risk, there is the potential impact of cost overruns, schedule delays and compromises in quality and safety if the risk occurs. Hence, risk management will be applied continuously throughout the Project lifecycle.

A “risk” is an event that has the potential to cause an unwanted change in the Project. A risk is as follow:

- A definable event with a probability of occurrence
- A definable event with a consequence or “impact” if it occurs

A measure of the severity of risk is:

$$\text{Severity} = \text{Probability} \times \text{Impact}$$

For every risk, there will be a “Mitigation Plan.” A mitigation plan either lowers the probability and/or the impact to reduce the severity to an acceptable level.

Managing risk is a key element of the Project Management process for both the planning and the performance phases of the Project. As such, the Risk Management develops a methodology to identify and quantify specific risks to the Project, determine their consequence and associated probability and develop mitigation strategies.

1.2 Best Practice

Project Management Institute, USA “Standard for Risk Management” as guidance on the risk management.

2.0 PROJECT RISK COMMON AREAS

2.1 Project Risk Areas and Significant Risks

Equipment and Plants

- Major plants, equipment and machinery selection and procurement
- Inadequate planning for long lead items and vendor support

Design

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- Scope not well defined
- Design relies on immature technologies or “exotic” materials to achieve performance objectives
- Design not cost effective

Requirements

- Operational requirements not properly established or vaguely stated
- Requirements are not stable

Schedule

- Funding profile not stable from Project phases to budget cycle
- Schedule does not reflect realistic planning
- Schedule objectives not realistic and attainable
- Resources not available to meet schedule

Supplier Capabilities

- Restricted number of available vendors and contractors

Cost

- Realistic cost objectives not established early
- Funding profile does not match with Project implementation strategy
- Fluctuations in cost of materials and equipment for the Project

Technology

- Technology has not been demonstrated in required operating environment
- Technology relies on complex process and design

Project Management

- Project Management strategy does not give adequate consideration to various essential elements, e.g. business need, test and evaluation, technology etc.
- Subordinate strategies and plans are not developed in a timely manner
- Proper mix (experience, skills, stability) of people not assigned to the Project
- Effective risk assessments not performed or results not understood and acted upon

2.2 Description and Categorization of Project Major Risks by “Source of Risk Classification” and “Drivers”

Drivers and Related Risks

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Driver	Source of Risk	Description
External	Government	<ul style="list-style-type: none"> • Change of government • Change of government policy
	Economic	<ul style="list-style-type: none"> • Poor financial markets • Inflation • Price fluctuations
	Technical	<ul style="list-style-type: none"> • Design changes • Construction Method
	Legal	<ul style="list-style-type: none"> • Contract laws • Local laws
	Natural Environment	<ul style="list-style-type: none"> • Weather conditions • Ground conditions and contaminants • Site conditions
	Security	<ul style="list-style-type: none"> • Accidents and injuries • Theft on site • Vandalism
	Management	<ul style="list-style-type: none"> • Competence of vendors, consultants and contractors • Quality and performance control
	Financial	<ul style="list-style-type: none"> • Financial failure • Delay in payment
Internal	Resources	<ul style="list-style-type: none"> • Productivity of contractors and labor • Availability of professional and experienced management, workforce, contractors and labor • Defective machinery, materials and material shortages
	Relationship	<ul style="list-style-type: none"> • Project Sponsor and Stakeholders • Poor communication amongst Project team, client and consultants • Lack of commitment • Organization and co-ordination

2.3 Sample Top Ranked Risks

Sr. No.	Risk Type	Risk Description	Category
1	Internal	Assumptions of feasibility to be tested and verified with actual statistical data	Feasibility
2	Internal	Scope not well defined	Scope
3	Internal	Schedule does not reflect realistic planning	Schedule
4	Internal	Funding profile does not match with Project implementation strategy & financial requirements	Cost Management
5	Internal	Project design not catering for hygiene required	Design

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Sr. No.	Risk Type	Risk Description	Category
6	Internal	Energy efficient equipment not selected for the Project	Technical
7	Internal	Low quality construction	Project Management
8	Internal	Major equipment development and inadequate planning for long lead items and vendor support	Project Management
9	External	Foreign Exchange Adverse Fluctuation	Cost Management
10	External	Change of government and change of government policy and duty structure on imported equipment at time of clearance	Government
11	External	Weather conditions, ground conditions and contaminants, site conditions	Project Management
12	External	Product doesn't sell	Commercial

2.4 General Classification of Construction Risks

It would be impossible to enumerate all the risks which may arise during the development of construction, as the likelihood and un-foreseeability of accidents are sufficient factors to have them covered. Therefore, Project Team shall focus on those usually subject to insurance coverage. These are divided into three different categories:

2.4.1 Conventional Risks

The most frequent ones are:

Fire

There are many different reasons for a fire starting. Following are typical circumstances that imply the existence of a high fire load: messy storage of wood, use of flammable liquids for engine combustion, use of plastics and combustible materials, welding works, heaters in warehouses, cigarette butts not properly extinguished.

Lightning

Atmospheric electricity may cause damage, especially to transformers and buildings higher than others nearby. It is important to take into account the lack of lightning arrestors during the construction stage. Moreover, the risk is sometimes aggravated by the presence of cranes, masts or flagpoles.

Explosion

Boilers, transformers for welding and electricity supply, compressors or other devices may be installed at the worksite with a risk of explosion. Possible explosions originated outside the site should also be considered.

Theft

It should be covered in the beginning, but nowadays almost all the insurance providers exclude this risk from the policy wording.

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2.4.2 Catastrophic Risks (Force Majeure or Extraordinary Risks)

The most remarkable are those derived from Acts of God (which are foreseeable, although their effects are unavoidable), as well as other risks which are absolutely unforeseeable.

Among the catastrophic risks, the ones caused by acts of God comprise the following:

- Winds and storms: They may cause serious damage, and hence this fact must be taken into account in the Project at the time of making the calculations in compliance with the regulations regarding this matter; these hazards may arise during the construction stage
- Floods and water-induced damage: Atmospheric variations imply that hydrological phenomena are likely to happen. Along with the fact that the mere existence of water at the worksite is already a permanent risk for the construction, it can be concluded that damage by water is one of the most frequent ones in insurance claims

2.4.3 Earthquakes

The risk of seismicity in the area will be a fact that must be taken into consideration in Project Management by applying the seismic regulations in force.

3.0 ROLES AND RESPONSIBILITIES

The following table discusses the roles and responsibilities of the various personnel involved in the Project Management.

Role	Responsibilities
Project Management team (Includes independent verification & validation consultant)	<ul style="list-style-type: none"> • Attend Risk Meetings as required • Identify and assist to classify new risks • Assist in determining probability, impact and time frame • Recommend approach and actions • Prioritize identified risks • Consult with Subject Matter Experts when necessary

Role	Responsibilities
Risk Owner	<ul style="list-style-type: none"> • Attend Risk Meetings as required • Map each high and medium risk to their WBS element(s) that will need to include response activities for that risk • Determine the probability, impact and exposure rating of their identified risks • Ensure accuracy of probability/impact/timeframe estimates • Decide on the best response to each high risk: avoid, transfer, mitigate or accept • Include specific activities to address the identified risks as part of his or her plan for producing the WBS element • Report the results of that analysis back to the Risk Manager using the Risk Identification and Response Plan Form • Responsible for implementing individual risk response plans • Report progress to Risk Manager on an agreed timeframe • Consult with Subject Matter Experts when necessary
Project Manager	<ul style="list-style-type: none"> • Participate in the Risk Management process • Make control decisions (analyze, decide, execute) for top project risks • Assign and change responsibility for risks and mitigation plans within the project • Authorize expenditures of resources for mitigation/contingency planning execution • Coordinate communication with Task Managers and external customers • Review general risk measures/metrics with Finance Department and Consultants • Escalate as required and outlined in this plan • Ultimately responsible for the final decisions on risk actions
Risk Manager	<ul style="list-style-type: none"> • Responsible for leading the risk management efforts • Sponsor risk identification activities • Facilitate the communication throughout the risk management process • Report on risk management at biweekly meetings • Ensure the risk spreadsheet is maintained • Provide the Project Manager with recommendations and status of risks • Consult with Subject Matter Experts when necessary
Subject Matter Experts	<ul style="list-style-type: none"> • Participate in risk meetings and reviews as required • Provide expertise to Project Management Team as necessary • Assist in determining probability, impact and time frame • Advise on accuracy and completeness of information in his or her area of expertise

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Role	Responsibilities
Independent Project Oversight Consultant	<ul style="list-style-type: none"> • Participate in Risk Meetings and reviews as required • Perform their own risk identifications • Provide Oversight of the project and report to stakeholders • Submit a status report to Finance Department as required
Risk Steering Committee	<ul style="list-style-type: none"> • Review and adopt or reject risk response strategy as recommended by the Project Manager

4.0 RISK MANAGEMENT PROCESS

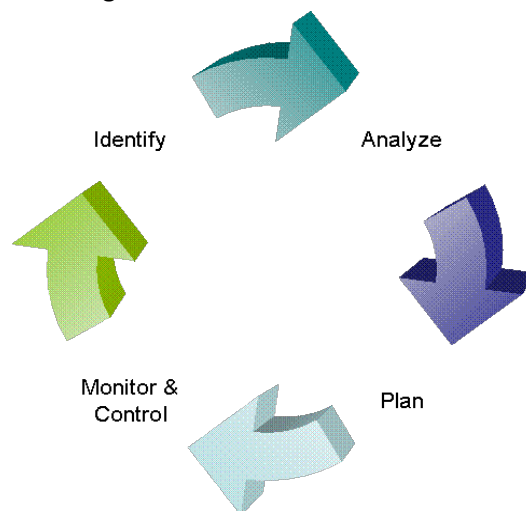
The risk management process will be adapted from “Risk Management Standard” of Project Management Institute, USA and it has the following steps.

Step 1 – Risk Identification

Step 2 – Risk Analysis (Qualitative and Quantitative Analysis)

Step 3 – Risk Response Planning

Step 4 – Risk Monitoring and Controlling



4.1 Risk Identification

Risk Identification is the process of determining those risks that might affect the project and its outcome. When a risk and its characteristics are identified and documented, then a response to the risk can be planned and monitored.

Risk identification is an iterative, on-going task throughout the Project lifecycle. It consists of a formal and an informal approach.

4.1.1 Formal Risk Identification

The Risk Manager is responsible for conducting formal risk identification activities. The Risk Manager stays apprised of the progress of the Project and communicates with Project team members to specifically identify risk.

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4.1.2 Informal Risk Identification

Informal risk identification occurs as a result of normal Project business. Any person associated with Project including contractor's staff, consultant's representatives, stakeholders and users are expected to identify and document a candidate risk.

4.1.3 Initiating and Documenting of the Candidate Risk

The "Risk Identification and Response Plan" form in Appendix A is used to document risk in the Project. The identification of a risk is initiated by documenting what is known about the specific risk in the top three rows of the form. The description of the risk clearly indicates the concern, likelihood (if known), and the possible consequences. The description may also include assumptions, constraints and relationship to other Project risks, issues or activities, and potential impacts to Project scope, cost & budget, schedule, quality or stakeholders.

The initiator submits the form to the Risk Manager. The Risk Manager and the initiator ensure that the initiating information is complete. The Risk Manager assigns a unique identifier and inputs the information into the "Project Risk Register".

4.1.4 Assignment of the Risk to a Risk Owner

When a risk is deemed valid, Project Manager will assign the risk to a Risk Owner. The Risk Owner is a Project Management team member assigned to monitor, track and prepare a response for an identified risk.

4.1.5 Subject Matter Expert (SME) in Risk Identification

When necessary, the Risk Owner and/or the Risk Manager will enlist SME(s) to assist in risk identification.

4.2 Risk Analysis

Analysis of the risk is necessary so that a proper response to the risk can be planned and implemented. The risk description and primary risk areas as identified by the initiator on the Risk Identification Form, indicate to the Risk Owner the WBS elements in which Project team can take steps to respond to the risk. The Risk Owner can enlist other team members or SME to assist in identifying those WBS elements in which avoidance, mitigation or transfer of the risk can take place. Additionally, the characteristics of the risk will also help place it in the time frame of Project lifecycle.

4.2.1 Qualitative Analysis

Qualitative analysis is a quicker and usually more cost-effective way to analyze risks (as opposed to quantitative analysis). Analysis should be performed with the goal of gathering data on:

- The likelihood of the risk occurring
- The qualitative impact on the Project
- The quality of the risk data being utilized

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4.2.2 Quantitative Analysis

Quantitative analysis utilizes techniques such as simulation and decision tree analysis to provide data on:

- The impact to cost or schedule for risks
- The probability of meeting Project cost and/or schedule targets
- Realistic Project targets on cost, schedule and/or scope

Note: Qualitative analysis should occur prior to conducting quantitative analysis. Not every risk needs to go through quantitative analysis.

4.2.3 Risk Probability Ranking

A current estimate will be performed based on professional judgment and past experience for the probability (in percent) that the risk will occur over the impact time frame given. This value can change over time as the risk is actively managed.

5 (≈90% chance of occurrence)

- Occurrence is very likely and may not be controlled by following existing processes, procedures, and plans

4 (≈70% chance of occurrence)

- Occurrence is most likely and may not be entirely controlled by following existing processes, procedures and plans

3 (≈50% chance of occurrence)

- Occurrence is likely and may not be entirely controlled by following existing processes, procedures and plans

2 (≈30% chance of occurrence)

- Occurrence is unlikely and may be entirely controlled by following existing processes, procedures and plans

1 (≈10% chance of occurrence)

- Occurrence is very unlikely and is generally controlled by following existing processes, procedures and plans

4.2.4 Impact Analysis

Risk will be analyzed for the impact on Project if it materializes. The values 1 to 16 represent a subjective ranking of the impact. Guidelines for the impacts on major objectives of time, scope and quality are listed below:

Evaluating Impact of a Risk on Major Project Objectives					
Impact	Very Low	Low	Moderate	High	Very High
		1	2	4	8

Evaluating Impact of a Risk on Major Project Objectives						
Impact		Very Low	Low	Moderate	High	Very High
		1	2	4	8	16
Objective	Schedule	Insignificant schedule slippage	Schedule slippage < 5%	Overall Project slippage 5-10%	Overall Project slippage 10-20%	Overall Project schedule slips >20%
	Cost	Insignificant cost increase	<5% cost increase	5–10% cost increase	10–20% cost increase	>20% cost increase
Objective	Scope	Scope decrease is barely noticeable	Minor areas of scope are affected	Major areas of scope are affected	Scope reduction unacceptable to the Customer	Scope does not meet purpose and need
	Quality	Barely noticeable	Minor areas are affected	Sponsor must approve quality reduction	Quality reduction unacceptable to Sponsor	Product becomes effectively useless

4.2.5 Impact Time Frame

The earliest and latest WBS elements that the risk could impact will be recorded on the Risk Identification and Response Plan form to determine the risk impact time frame. These identified WBS elements will be used to define the period of time the risk is managed.

4.2.6 Review Risk Analysis and Ranking

The Risk Manager presents the risk analysis for discussion at Project Management team meetings on an appropriate timeframe. At this time the impacts and possible mitigation/contingency options are discussed, and the risk's exposure is assessed. Project team then reviews the risk for its relative rank among existing risks and reviews the risk in combination with other risks. The team may recommend to the Risk Owner to adjust the response plans and/or project priorities to ensure the risk is adequately addressed.

4.2.7 Update Risk Register with Team/Management Comments

After the team and/or management review, the Risk Manager updates the risk register with any comments and documents the next steps for the risk (if any). If the management team changed the ranking of the risks, the Risk Manager updates the risk register to reflect current priorities and concerns.

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4.2.8 Subject Matter Expert (SME) in Risk Analysis

When necessary, the Risk Owner and/or the Risk Manager will enlist SME(s) to assist in risk analysis.

4.3 Risk Response Planning

Those risks with an exposure rating of 12 or above will have a Risk Response Plan prepared to reduce the threat to Project objectives.

4.3.1 Risk Response Plan

It is documented in the Risk Identification & Response Plan form by the Risk Owner and then entered into Project risk register by the Risk Manager.

- Verify the Risk Description as described by the Initiator of the risk; clarify if necessary
- Verify the primary risk area (cost/scope/schedule) as described by the Initiator; clarify if necessary
- The WBS element(s) in which the Department will respond to the risk
- A probability, impact and exposure rating
- The Risk Response Type
- Impact time frame in which the risk may occur
- Risk Response description to describe the approach or other background efforts
- Contingency plan trigger under which the contingency plan will be implemented
- Contingency plan, if a contingency plan is part of the response, the actions that will be taken and by whom
- The current status of the risk
- The impact on the critical path
- Whether the control of the risk is internal or external to Project

4.3.2 Tools & Techniques for Risk Response

The standard risk response strategies will be used on the Project:

- Avoidance – Reducing scope, changing Project Plan, adding resources or time, adopting a familiar approach instead of an innovative one or avoiding an unfamiliar subcontractor may be example of avoidance.
- Transference – Shifting the consequence of a risk to a third party with the responsibility for its management via contracts, performance bonds, warranty
- Mitigation – Involves taking early action to reduce the probability and/or consequences of a risk event to an acceptable level of impact to cost, scope or schedule
- Acceptance – This technique indicates that Project team has decided not to change the Project Plan to deal with a risk or is unable to identify any other

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suitable response strategy. Acceptance requires no action leaving the Project team to deal with the risk as it occurs

4.3.3 Contingency Plan

A contingency plan will be applied to risks that are imminent or are occurring. The contingency plan describes what actions are to be taken by whom and in what order to effectively respond to the negative circumstances or events. The contingency plan also gives the initial recommended actions to be taken in the risk management process when a risk event occurs and the risk becomes an issue.

4.3.4 Update Risk Spreadsheet with Risk Response Status

The Risk Owner provides status updates to the Risk Manager who updates the risk register to reflect the actions being taken and document completion of risk response plan tasks. In some cases, the actions also may be tracked in Project work plan to ensure appropriate visibility. Response plan activities and their effectiveness are reported in the biweekly status meetings.

4.3.5 Subject Matter Expert (SME) in Risk Response

When necessary, the Risk Owner and/or the Risk Manager will enlist SME(s) to assist in risk response.

4.4 Risk Monitoring and Control

Risk tracking and control follows the progress of the risk and its probability, as well as the status of any mitigation/contingency strategies that have been executed. When changes to the risk profile occur, as in residual risks or secondary risks, the risk management process is repeated. The Revision History of a risk is documented and updated in the proper field of the risk Identification and response plan form including the date of the entry and a description of any changes affecting the risk.

4.4.1 Monitor Changes to Risk Profiles and Response Plans

The Risk Owner monitors the assigned risk, notifies the Risk Manager whenever there is a significant change to the risk's profile, and makes recommendations to address the changes in the response plans. Recommendations to improve the effectiveness of the plans are discussed, as are whether the measures are providing the necessary information to track the risk's progress.

The deficiencies and proposed changes are discussed with the management team and changes are approved or sent back for further analysis/development, as needed. Changes to risk profiles also are discussed, both individually and across all risks. Risk ranking and Project priorities may be changed as a result. If a risk's profile changes such that its probability and/or impact drops below Project risk tolerances, the risk may be a candidate for retirement or closure.

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4.4.2 Report Risk Status

Risks when first identified have a status of 'Open'. Once a response plan is developed, the risk status changes to 'Executing Response' or 'Future Response' if the WBS response element has not yet occurred. Upon implementation of the proactive portion of the risk response plan, or if the risk strategy is 'Acceptance', the risk status changes to 'Monitor'. If the effectiveness of the response plan leads to the modification of the risk response plan, the risk status reverts back to 'Executing Response' or 'Future Response' until implementation of the updated risk response plan.

The Risk Owner is required to report significant developments to Project team at the team meetings. The Risk Manager reviews the status of risk activities periodically (at least monthly) with Project Manager and Project Management team and discusses the effectiveness of the current response plans. The Risk Manager updates the risk spreadsheet to reflect the current risk state. At the discretion of the Risk Manager, or by the request of Project Manager, Risk Management team meetings may be called in the interim between status meetings.

The Risk Owner has the primary responsibility for monitoring the trigger events associated with mitigation/contingency actions. The Risk Manager assists with tracking triggers and includes any significant development in the regular risk status review in the status meetings.

4.4.3 Execute Contingency Plan(s)

When a trigger event occurs or is imminent, the Risk Owner:

- Implements the contingency portion of the response plan and notifies the Risk Manager or Project Manager about the plan execution.
- Notifies all parties identified in the response plan and ensures all activities are coordinated
- Takes the specific measurements to determine the effectiveness of the activities
- If the activities are not producing the desired effect he/she notifies the Risk Manager immediately and proposes changes to address the deficiencies
- The Risk Manager will work with the Risk Owner to enhance or change the response plan including taking the matter to Project team and SME(s)

4.4.4 Retire Risk(s)

Risks are closed when the risk event actually occurs or when the likelihood of the risk is reduced such that it is not worth expending resources to track it. Response Plans are halted and closed. If the risk could possibly arise again, the risk may be reduced to a 'Dormant' status and evaluated as agreed upon by the Risk Manager or Project Manager and the Risk Owner. Any stakeholder may recommend a risk for retirement.

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Project Manager makes the final decision to retire a risk. If there is any disagreement, Project Steering Committee and/or Sponsor should be involved in the decision to retire a risk.

5.0 RISK COMMUNICATIONS

Communications regarding risks are continuous throughout Project's life cycle both through verbal and written reports.

Meeting Type	Frequency	Target Audience	Inputs	Deliverables
Team Status	Biweekly/ As Needed	Functional Team Leaders	Risks associated with the WBS elements that will be worked on in the upcoming month	New risk identification. Specific activities to address the identified risks as part of the plan for producing each WBS element
Steering Committee	Monthly	Steering Committee	Adopt or reject response strategies for risks	Closure authorization
Control Agencies	As needed or required	Department of Finance	External dependency mitigation recommendations	Monthly Independent Project Oversight Report

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6.0 RISK IDENTIFICATION & RESPONSE PLAN FORMAT

Risk Identification & Response Plan Format Initiator Completes Only the First Three Rows. Initiator's Submittal May Be Altered by the Risk Owner			
Risk ID # and Title: <Risk ID # by Risk Manager; Title entered by Initiator>	Initiator: <Person(s) identifying the risk>	Date Submitted:	
Risk Description: <Initiator documents the risk in the format of "As a result of (If), <cause>, <uncertain event> may occur, which will (may) lead to <effect>" >			
Primary Risk Area (Schedule, Cost, Scope or Quality): <Initiator or Risk Owner documents the area(s) that would be primarily affected and why>			
INITIATOR DOES NOT COMPLETE BELOW THIS LINE. RISK OWNER COMPLETES THE REMAINDER OF THIS FORM.			
Risk Owner: <Project Manager assigns the risk to this person>	WBS element(s) in which the Department will respond to risk: <When the avoidance, mitigation or transfer would take place>		
Risk Probability Ranking: <See RMP Section 4.3.3, 1-5 scale, 1 is very low & 5 is very high>	Impact <1-16 scale, 1 is very low & 16 is very high>	Risk Exposure Rating: <Multiply "Risk Probability Ranking" by "Impact", Possible range 1 (1 x 1) to 80 (5 x 16)>	
Risk Response Type: <Select one or more of the following four>	Impact Time Frame: <Earliest and latest WBS elements the risk may occur in>		
Accept	Avoid	Mitigate	Transfer
Risk Response Description: <If the response type is not "Accept", explain what will be done to avoid, mitigate or transfer the risk>			
Contingency Plan Trigger: <State what event would cause the contingency plan to be implemented as the risk becomes an issue>			
Contingency Plan: <Describe each action that needs to be taken and by whom>			
#	Action	Responsible Party	
Current Status: <List risk responses being implemented>		Critical Path Impacted: <Yes or No>	Control: <Internal or external to team>
Revision History: <Document updates and changes in conditions affecting this risk>			

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7.0 PROJECT RISK MANAGEMENT MATRIX

Using established methods and tools, qualitative risk analysis assesses the probability and the consequences of each identified risk to determine its overall importance. Using these tools helps to correct biases that are often presented in the planning. In particular, careful and objective definitions of different levels of probability and impact are the keys to the credibility of the results.

Step 1: Risk Probability Ranking

Set up a probability matrix to match a percentage (probability of risk) to a ranking number. Project Manager and Risk Manager will use the matrix shown below, but they can set up a different matrix if it would better suit the Project.

Risk Probability Ranking	
Ranking	Probability of Risk Event
5	80–99%
4	60–79%
3	40–59%
2	20–39%
1	1-19%

Step 2: Impact Ranking

Set up an impact matrix to match the objective (time, cost, scope and quality) to a defined impact. Project Manager and Risk Manager will use the impact numbers shown in the matrix below, but they can choose others if it would better suit the project.

Evaluating Impact of a Risk on Major Project Objectives						
Impact		1	2	4	8	16
Objective	Schedule	Insignificant schedule slippage	Delivery plan milestone delay of one week	Delivery plan milestone delay of two weeks	Delivery plan milestone delay of one month	Delivery plan milestone delay more than one month
	Cost	Insignificant cost increase	<5% cost increase	5–10% cost increase	10–20% cost increase	>20% cost increase
	Scope	Scope decrease is barely noticeable	Minor changes in the scope	Major changed in the scope	Scope does not meet purpose and need	Sponsor does not agree that scope meets the purpose and need
	Quality	Barely noticeable	Minor areas are	Sponsor must approve	Quality reduction unacceptable	Product becomes effectively useless

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			affected	quality reduction	to sponsor	
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Step 3: P×I Matrix

Combine the data from the two previous steps. Each risk appears in its own probability and impact (P×I) matrix.

Project Management team and Risk Manager will use a P×I matrix to combine each risk's probability and impact. It will be establishing whether each risk is high, moderate, or low. The risks can then be displayed by high, moderate, and low groupings for each of the four objectives (time, cost, quality and scope). Project Management team and Risk Manager will use the P×I matrix shown below, but they can set up a different matrix and assign different scores if it would better suit the project.

P×I Matrix

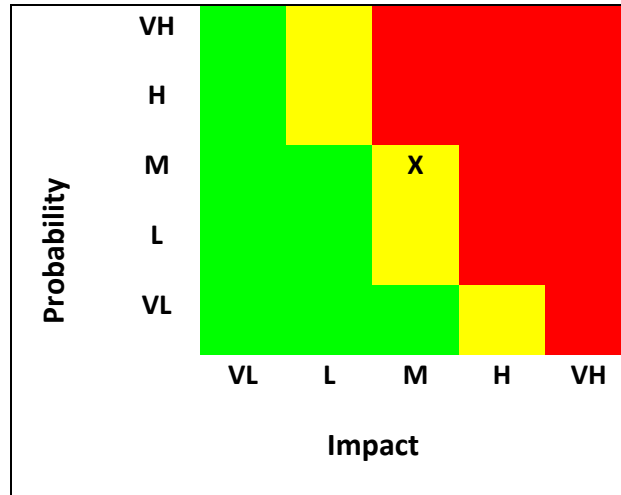
Time, Cost, Scope and Quality Objectives

Large Aversion to High & Very High Impacts

Probability					
5	5	10	20	40	80
4	4	8	16	32	64
3	3	6	12	24	48
2	2	4	8	16	32
1	1	2	4	8	16
	1	2	4	8	16
	Impact				

Translate Score to Risk Rank	
Score	Risk
1 – 6	Low
8 – 14	Moderate
16 – ++	High

Project Management team and Risk Manager can also use a P×I matrix based on narrative probabilities and impacts (very low, low, moderate, high, very high) rather than numerical ones.



8.0 SAMPLE RISK REGISTER

Company Logo:		Project:										Doc. No. 123456789				
		Custodian:	RISK REGISTER											Rev.: 00		
															Date: 00/00/0000	
Risk ID	Risk Event	Risk Type	Risk Category	Initial Risk			Response Strategy	Required Action	Risk Owner(s)	Completion Date	Current Status	Current Risk Status				
				Probability of Occurrence	Impact of Occurrence	Risk Severity						Probability of Occurrence	Impact of Occurrence	Risk Severity		
		(Internal/External)		(P)	(I)	(P×I)	(P)					(I)	(P×I)			
1																
2																
3																