APPENDIX B – CITY OF WINNIPEG'S PROJECT MANAGEMENT MANUAL

Asset Management
Project Management Manual

Version 3.0

Prepared by

The City of Winnipeg
Infrastructure Planning Division

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Corporate Finance Department
Winnipeg, MB. R3B 1B9

Disclaimer for Non-City representatives:

This Project Management Manual (Version 3) is prepared by the City of Winnipeg for its own internal purposes and parties hired to represent the City in projects. The City of Winnipeg makes no representations, warranties or guarantees as to the accuracy or sufficiency of this Project Management Manual or the information contained herein. Further, notwithstanding your use of this Project Management Manual or the information contained herein, you have been engaged by the City to provide professional advice and services and are expected to do so in accordance with your contract and all applicable professional and industry standards.

The Asset Management - Management System (AMMS) is not fully developed and implemented

The AMMS governance structure includes the Asset Management Policy, Administrative Standard, Investment Planning Manual and this Project Management manual. These governance documents are at various stage of development and not all the documents including procedures and templates have been finalized.

As you read the manual, you will notice some sections that are noted as "Future development or under-development". These elements will be incorporated and made available as finalized.

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1 Introduction

1.1 Background

In 2008, the City Auditor engaged Pegasus-Global Holdings to review required procedures and the project management and control practices for the City of Winnipeg's Capital program. The resultant report made 29 recommendations for improvement of the City's Capital Project Management. Three of the recommendations involved revisions to the draft Project Management Manual that was developed by the City in 1992, but never finalized or formally adopted.

In response to these recommendations, and due to the significant evolution in project management best practices between 1992 and present, the City engaged CH2MHill to aid in the development of this manual. This manual has been developed based on the Project Management Book of Knowledge (PMBOK), which is generally regarded to be North American best practices in project management. The manual has also been developed to be consistent with existing Council adopted policies and accompanying Administrative Directives.

The status of this manual is that it has been finalized and is available for use, but not yet mandatory for all projects. In transitioning to this new methodology, departments will be requested to begin piloting the process on projects and to provide feedback to the Manager of Capital Projects. There are a number of accompanying forms in development and there is staff training that will be necessary before the manual can become mandatory for all City capital projects.

This manual is meant to be a living document and as such, will be updated on a periodic basis by the Manager of Capital Projects. This manual is expected to be updated in the first year of release based on department experience from piloting the manual as well as for additional recommendations made by the City Auditor on subsequent audits which are being addressed.

The 2008 City Auditor report also made two recommendations (Recommendation #19 and #22) as to the requirement for additional resourcing both corporately and in departments to fully implement the recommendations as set out in their report. Currently, there is an accompanying human resource plan that is being considered as part of the 2015 budget process. The processes as currently laid out in the manual would require further revision to be deliverable within the existing resources.

While project management processes are subject to continuous improvement, the issuance of this manual is a significant milestone in improving the consistency and quality of capital project delivery in the City. This manual has taken considerable time and effort to develop, both on the part of City staff and our consultant partners. We wish to thank City staff, project delivery departments and our consultant partners for the considerable time, effort and support that went into the development of this manual.

1.2 Purpose of the Project Management Manual (PMM)

City of Winnipeg (the City) approves a large capital program every year for expanding, upgrading, and renewing its infrastructure and providing services to support its operations. New construction and repair or replacement of streets, bridges, sewer systems, community infrastructure, IT systems and amenities

accounts for most of the capital budget. With aging infrastructure, city growth, and environmental regulations, expenditures will likely continue to be greatest in these areas.

The traditional method of delivery for large projects has been through a design-bid-build (DBB) process. In DBB, City Project Managers (PMs) engage Consultants to design and prepare bid documents for the work, which is then awarded to Contractors for construction. The DBB process will continue to be the main delivery method for project delivery in the City, however for major capital projects where significant risks exist, the City will consider other delivery methods (including P3).

This Project Management Manual (PMM) has been developed and is being implemented to provide consistency in project delivery in the City. It is to be used by all business units in all departments for delivery of Capital Projects in the City.

This manual is largely based on the Project Management Body of Knowledge (PMBOK), which is generally considered to be best practices for project management in North America. Following best practices for project management is intended to improve the quality of projects being delivered by the City. By following a defined methodology, the manual will lead the PM through the process of properly initiating, planning, executing, monitoring/controlling and closing the project. This is meant to aid the PM and will not replace the experience and judgement required to deliver quality projects that meet customer expectations of cost, quality/scope and schedule.

The PMM is a how-to document for both City and Consultant PMs to use for delivery of projects. Initially prepared in response to a need for use on large and complex capital construction projects, the manual applies to all Capital Projects. It is important to emphasize that, while the PMM prescribes a standard methodology, it is not intended to be applied on a one-size-fits-all basis, however is a flexible method that can be tailored to the size and context of a specific project.

The manual is intended to help PMs be proactive. A desired outcome of a more proactive approach is increasing the confidence of stakeholders and the credibility of the project management discipline. Defining processes and procedures more clearly facilitates communication and understanding of expectations for all project stakeholders.

For the PM, the PMM addresses the following questions about project delivery:

- What steps are involved?
- What processes are applied?
- How are the processes applied?
- What are the PM's roles and responsibilities?
- What tools and templates are available?

As a living document, the PMM should be continually reviewed and updated by the Manager of Capital Projects. Update sources may include an internal lessons-learned process, observations from quality assurance reviews, and new information published in *A Guide to the Project Management Body of Knowledge*, Fourth Edition (PMBOK Guide; Project Management Institute [PMI], 2013) and its updates and other industry sources.

1.3   How to use the PMM

A Project Manager has a few options in how to use the PMM. The key methods are below:

- Go to the specific project delivery process chart in Appendix A and follow the delivery process along. The process steps have references to specific section in the manual, procedures and templates. Follow those reference links to obtain more detailed information on that step in the process.

- From a template use the reference links identified to go to specific sections in the manual and procedures.

- In the manual, use the table of content to find the section that contains the information you are interested. Within each section there are references to other sections, procedures or templates

Note:

The hyper-links are not active at this time. These hyper-links will be activated once the content becomes more stable

Not all the referenced material and documents are completed and integrated into the manual. I.e. not all the templates have been finalized and only the DBB delivery process is included. More content will be included with subsequent versions of the manual.

1.4　Structure of the PMM

The PMM project delivery methodology was developed by applying PMBOK project management standards to the City of Winnipeg's specific situation. Alignment with PMBOK leverages the investment in corporate and institutional training programs and reinforces use of a common project management language and structure throughout the organization.

The PMM was structured according to PMBOK's five process groups (Figure 1-1), rather than using a project life-cycle phase approach. This structure allows a single description of the processes that are repeated in each phase; deliverables for each phase are identified in the delivery framework in Section 3.2.

The PMM contains the following sections:

- **Section 1.0 – Introduction**: This section introduces the PMM and explains its use.

- **Section 2.0 – Governance:** This section provides the governance associated with project management and interactions with other City programs and models.

- **Section 3.0 – Project Delivery Framework**: This section describes how all the project management components are integrated into a single unified approach.

- **Sections 4.0 to 8.0 – Project Management Process Groups:** These five sections detail what is to be done and how to do it, describing what is expected in terms of processes and outcomes or deliverables.

- **Appendix A – Process Charts:** These charts show role responsibilities for specific actions and are the primary reference to use to determine the sequence of operation. Processes in the chart can be matched with detailed descriptions of *what* to do given in Sections 4.0 to 8.0, and with steps for *how* to do it given in Appendix E.

- **Appendix B – Templates:** These templates and forms facilitate presenting information consistently and coherently across the organization.

- **Appendix C – Alternative Project Delivery:** This Technical memo provides information of alternative project delivery options.

- **Appendix D – Glossary:** The glossary defines the terms, acronyms, and abbreviations used in this PMM.

- **Appendix E – Procedures:** These procedures are detailed, step-by-step instructions on how to complete specific steps of the processes.

Figure 1-1: Standard PMM Project Phases and PMBOK Process Groups
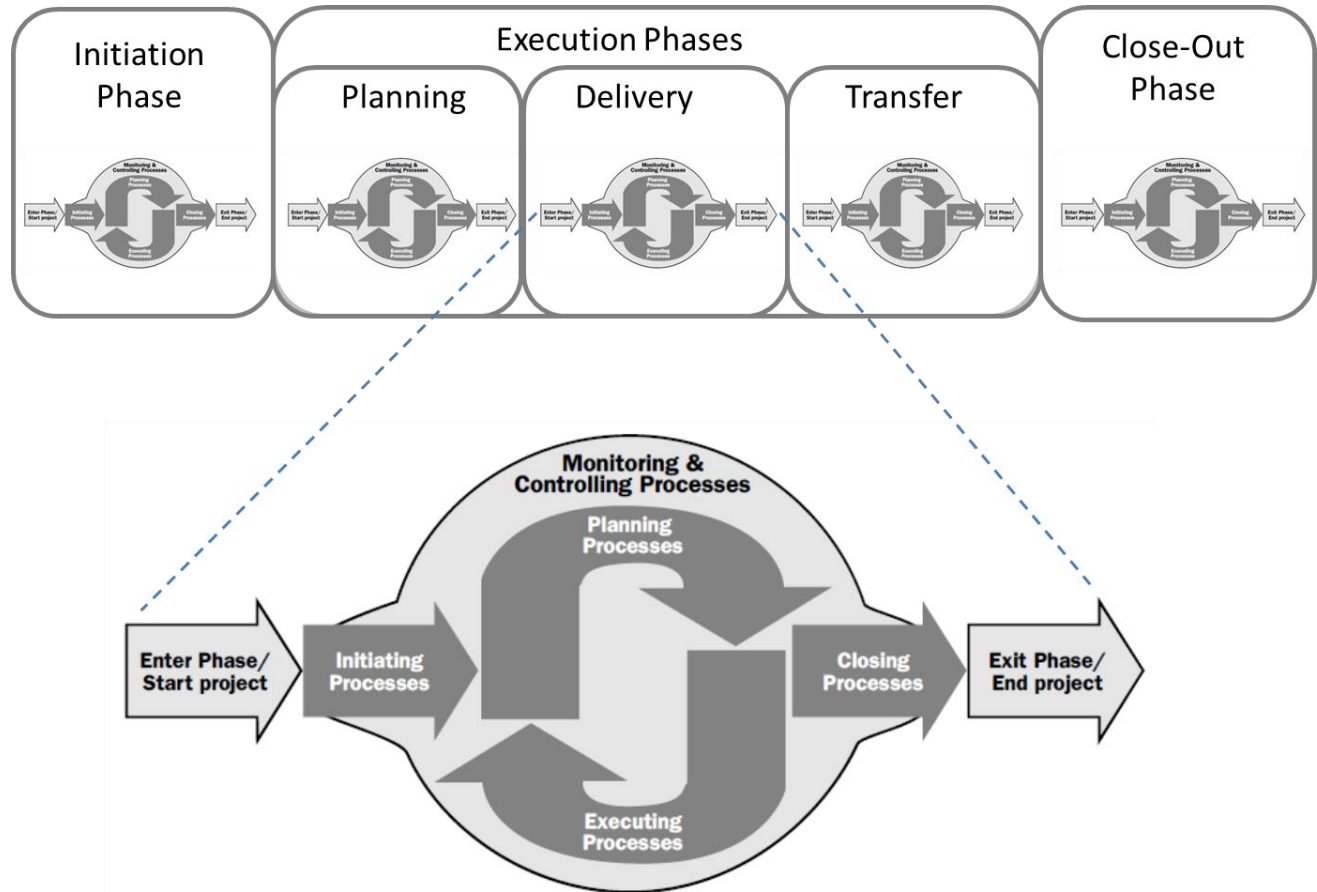
Figure 1.1 shows the relationship between project phases and the process grouping structure used in this manual. Each of the project phases includes the five process groups as shown in the lower graphic blow-up. Descriptions for these process groups are presented in Sections 4.0 to 8.0 of the manual. By example, the Initiating processes for the initiation, execution and close-out project phases are described in Section 4.0 of the manual. The process workflow is presented for a specific project delivery method in Appendix A.

In addition to PMBOK, the project management methodology described in Projects in Controlled Environments 2 (PRINCE2) was also reviewed during development of the PMM. This industry-leading, process-driven reference is used in over 20,000 public and private organizations and has been applied on thousands of projects worldwide. It was developed by the United Kingdom's (UK's) Office of Government Commerce and is required by the UK government. Unlike PMBOK, which provides standards however not a prescribed methodology, PRINCE2 provides a structured methodology and gives direction on applying its concepts.

One PRINCE2 feature adapted for the PMM is use of "phase gates." Phase gates initiate a phase-end review and a response to a phase's deliverable(s). As the final process of the closing process group, a phase gate is included at the end of each project phase.

1.5   Documentation Requirements/Scaling the PMM

The documentation required by the PMM will differ depending on the nature of the approved Capital Budget.   This section will guide the PM through the determination of the required documentation.

Figure 1-2: PDP Selection Guide
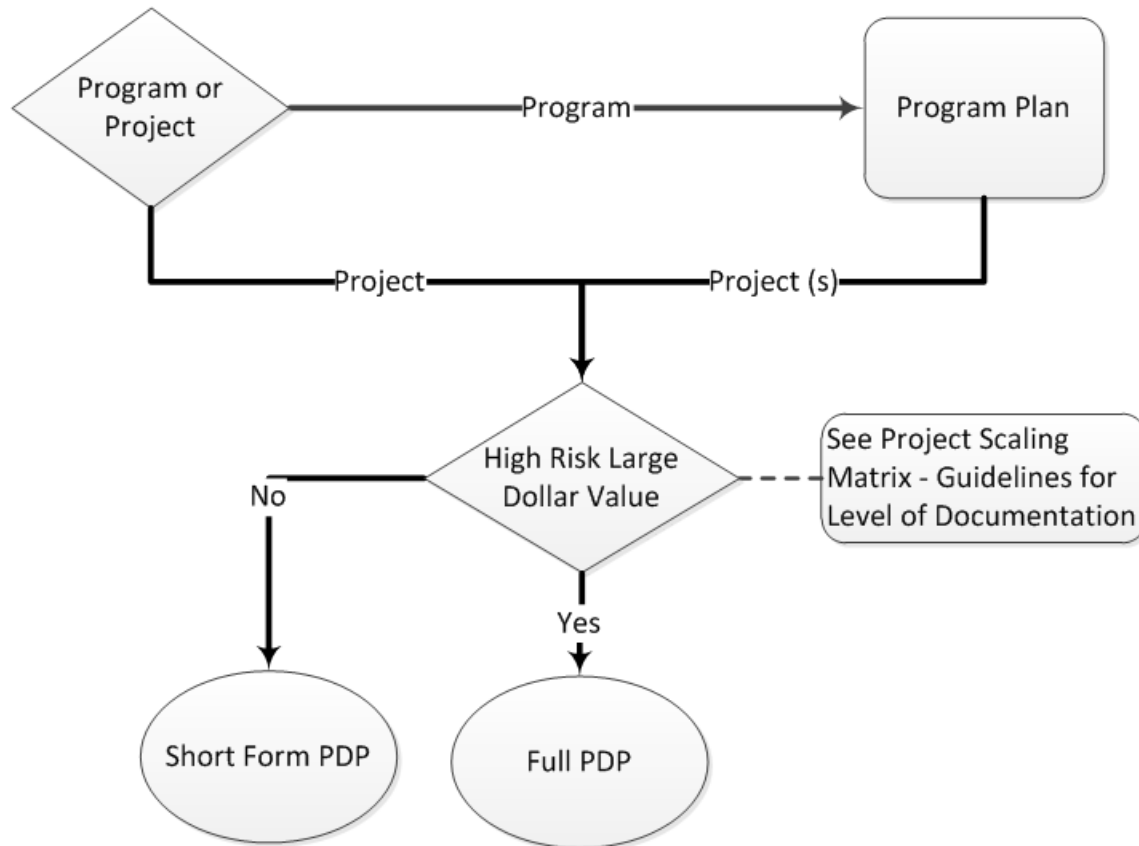
When to use a Short Form Project Delivery Plan (PDP)

Program or Project

The first decision point is the determination if the capital authorization is either a program or a project. In most instances, identifying whether a budget is a program or a project is relatively straight forward. Appendix D of this manual provides definitions of both a program and a project as follows:

> ***Program*** – a group related projects managed in a coordinated way to obtain benefits and control not available from managing them individually.

> ***Project*** – a temporary endeavour undertaken to create a new project, service or result.

The approved Capital Budget may also identify the budget as a program or a project.

If the budget authorization is a program, then the PM is required to complete the documentation required for the Program Delivery Plan. It should be noted that if there are any individual projects within the program that meet the requirements for full PDP as set out below, then the full PDP must be completed for that project.

Short PDP or Full PDP

If the budget authorization is for a project, then the level of documentation will be dependent on both the risk and size of the project.

The PM should first make an overall risk assessment of the project and determine the level of risk as either 'High', 'Moderate' or 'Low'. Project complexity, project specific risks, potential to impact service delivery, potential to impact tax/utility rates and public profile are some of the considerations in determining project risk. The definitions of project risk are as follows:

> **High Risk** – The risk is severe and if it occurs has negative effects that could greatly impact the project's cost, schedule, scope and quality putting the project in jeopardy of being completed on time and on budget.

> **Moderate Risk** - The risk has negative impacts on cost, schedule, scope and quality and if it occurs could put the project in jeopardy of being completed on time and on budget.

> **Low Risk** - The risk is minimal and the impact on cost, schedule, scope and quality is such that it should not jeopardize the project from being completed on time and on budget.

In assessing the level of risk as defined above, the PM should consider the following potential outcomes:

- If there is any potential impact on health and safety of the public or employees
- If there is any potential to impact/interrupt service delivery to the public
- If there is any potential impact on City finances including additional borrowing or increases to property taxes or utility rates
- Reputational risk to the City of Winnipeg
- Potential to disrupt the City's workforce in the performance of their daily duties
- Project complexity
- If the project is non-repetitive in nature
- Potential for environmental impacts
- Other project specific risks

The next assessment the PM must make is the category of project based on size. Project size is the taken from the approved Capital budget and fits into categories as follows:

- **Small** – below $1.0 million
- **Medium** -. $1.0 million to $4.99 million
- **Large** - $5.0 million to $9.99 million
- **Major** - $10 million and above

The following matrix is a summary illustration of the potential risk / size classifications for any given project:

Project Scaling Decision Matrix - Risk/Size

		Project Size			
		Small	**Medium**	**Large**	**Major (XL)**
Project Risk	**High**	High/Small	High/Medium	High/Large	High/Major
	Moderate	Moderate/Small	Moderate/Medium	Moderate/Large	Moderate/Major
	Low	Low/Small	Low/Medium	Low/Large	Low/Major
		Below $1.0 million	**$1.0 million to $4.99 million**	**$5.0 million to $9.99 million**	**$10.0 million and above**

The following matrix is an illustration of the documentation requirements based on project Risk / Size.

Project Scaling - Guidelines for Level of Project Documentation

		Project Size			
		Small	**Medium**	**Large**	**Major (XL)**
Project Risk	**High**	Full PDP	Full PDP	Full PDP	Full PDP
	Moderate	Short PDP	Short PDP	Full PDP	Full PDP
	Low	Short PDP	Short PDP	Short PDP	Full PDP
		Below $1.0 million	**$1.0 million to $4.99 million**	**$5.0 million to $9.99 million**	**$10.0 million and above**

The above matrix was developed considering impact on resources and cost benefit. The major objective is to expend additional resources where there is significant risk or large dollar amounts at stake.

Major Capital Projects are normally very complex and due to their size, cost overruns can have an impact on taxpayer rates. As such, a low/major classification is very unlikely. The PM should reassess any 'low/major' classifications carefully prior to finalization.

Bundling of smaller projects together is a fairly common occurrence in programs such as Local Streets. Local Streets packages would tend to fall in the 'low/large' category. Due to the low risk nature of small projects, bundling several small projects does increase project risk. Short Form PDP is recommended for this classification.

The appropriate level of reporting/documentation should be determined by the PM and approved by the Project Sponsor.

For projects that only require the Short PDP, the PM may find there to be additional value supplementing the short PDP select templates from the Full PDP. Examples would include supplementing the short PDP with a Project Charter or Project Risk Matrix. Therefore, while not a requirement, the PM is encouraged to use the additional templates to supplement the Short PDP where it would add value.

1.6 The Portfolio, Program, Project Management and Change Management Disciplines

Management of portfolios, programs, and projects is aligned with and driven by organizational strategies. Each level of management contributes in different ways to achievement of strategic goals (Figure 1-3):

- **Portfolio Management –** Centralized management of programs and projects at both the corporate and department levels to achieve the City's strategic objectives for services and assets.

- **Program Management –** Management of a group of projects to obtain the benefits (or result) according to an agreed-upon business case and control not available by management of projects individually.

- **Project Management –** Management of an endeavour of finite duration undertaken to create a unique product, service, or result according to an agreed-upon business case (which addresses how an idea is developed into a viable investment proposition).

Figure 1-3: Portfolio, Program, and Project Disciplines

PORTFOLIO MGMT
- Led by the business
- Investments are aligned to business
- goals and strategies
- Investments based on service targets, risk and benefit assessments

PROGRAM MGMT
- Sponsored by the business
- Projects align with overall program benefits
- Multiple projects
- Compliance with project management standards

PROJECT MGMT
- Delivery of product or service
- Balance scope, cost and schedule constraints
- Responsible for quality of the deliverable (s)

The hierarchical relationship between delivery components is illustrated in Figure 1-4. Each component can have multiple subcomponents; that is, relationships can be "one-to-many."

Figure 1-4: Portfolio, Program, and Project Relationships

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                          ┌───────────────┐
                          │   Portfolio   │
                          └───────┬───────┘
          ┌───────────────────────┼───────────────────────┐
   ┌──────┴──────┐        ┌───────┴───────┐        ┌──────┴──────┐
   │   Project   │        │    Program    │        │   Project   │
   └─────────────┘        └───────┬───────┘        └─────────────┘
                    ┌─────────────┴─────────────┐
            ┌───────┴───────┐           ┌───────┴───────┐
            │    Project    │           │    Project    │
            └───────┬───────┘           └───────┬───────┘
          ┌─────────┴─────────┐       ┌─────────┴──────────┐
   ┌──────┴──────┐   ┌────────┴────┐ ┌┴────┐      ┌────────┴───────┐
   │  Contract   │   │  Contract   │ │ PO  │      │   City Work    │
   └─────────────┘   └──────┬──────┘ └─────┘      │     Order      │
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          │     PO      │     │     PO      │  ┌─┴───┐         ┌─────┴─┐
          └─────────────┘     └─────────────┘  │ PO  │         │  PO   │
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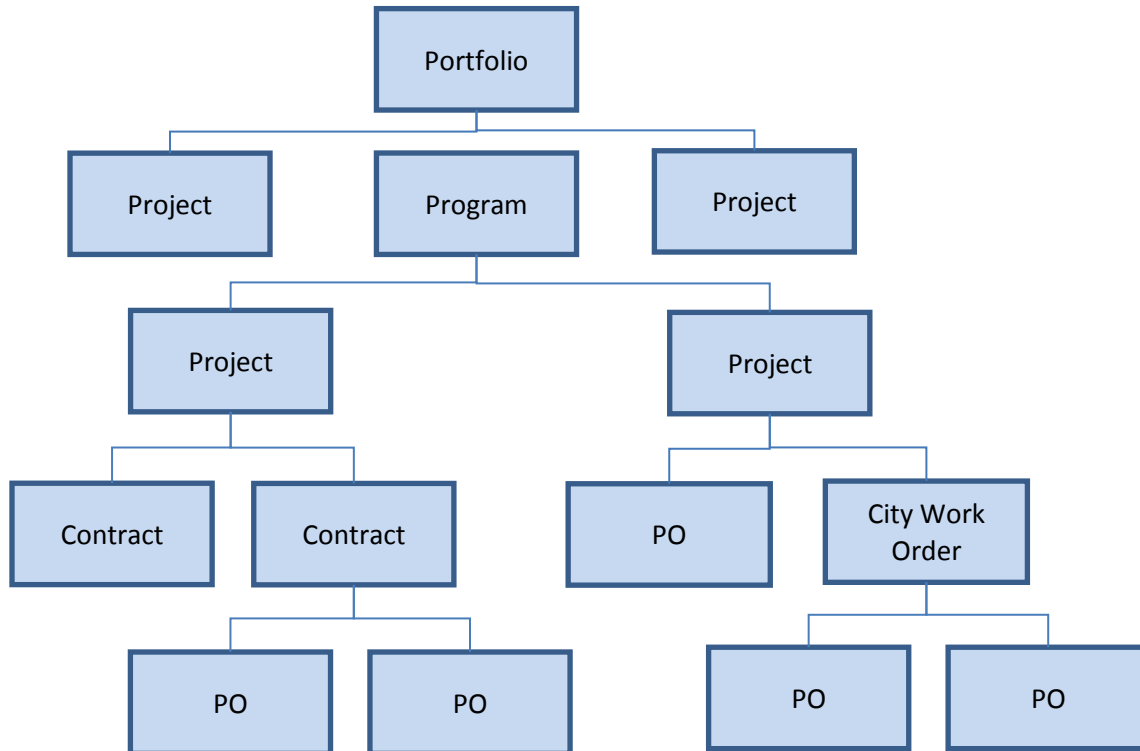
1.7   Other Key Disciplines

- **Contract Administration –** As identified in Figure 1-4, contracts and the administration of those contracts (contract Administration) is significantly involved in and integrated with project management. The role includes managing contract relationships, monitoring contract performance, and modifying contracts as appropriate.

- **Change Management** - Refers to the management of *organizational* change and as such, should not be confused with *change control*. Change management is a discipline that offers a structured approach that is aligned with Project Management Institute (PMI) project delivery lifecycle. The purpose of change management is to promote and enable the adoption of changes that may occur as the result of project delivery, and thereby to support the achievement of project results and outcomes.

- **Public Engagement** – refers to a process, involving communication and interaction between the City of Winnipeg and its residents that serves to inform and involve the public, and uses public input to make better decisions. The purpose of engaging the public is to achieve decisions that are sensitive and responsive to community values and concerns. It ranges from the mere provision of information through to empowering the community to make decisions as outlined in section 5.8.

1.8 Integration with the Asset Management - Management System

The City has adopted an Asset Management - Management System (AMMS) that aligns with International Organization for Standardization (ISO) 55000 standards and the British Standards Institution's (BSI's) Publicly Available Specification (PAS) 55 asset management system. The AMMS defines the framework for integrating asset management components throughout an asset's life cycle. This framework will help establish a common language and direction within the City's multi-functional organization.

The AMMS establishes a disciplined approach to creating the best stakeholder value for each asset portfolio. This approach requires breaking down departmental barriers; establishing planning, coordination, and prioritization; and rationalizing competing performance goals. As illustrated in Figure 1-5, the AMMS is defined in terms of governance, processes, and outputs. These elements frame how the City manages its assets.

Governance is at the core of the model (centre of the circle) and provides the policy, directives, and rules for managing the assets. The defined processes (middle circle – yellow area) define how work will be done in order to optimize costs and performance. A sample of the process outputs are noted in the outer circle (green).

The AMMS makes an important distinction between a ***product*** life cycle and a ***project*** life cycle. The product life cycle extends around the full circumference of the circle in Figure 1-5 (above), from creation (investment planning) through to retirement and final disposal. Products may be in various forms, such as roads, bridges, buildings, or sewer assets. The project life cycle is confined to the project delivery stage of the circle in Figure 1-5.

The project delivery stage (lower right quadrant of the circle) addresses implementation of projects for products or service where an asset (product) is physically created. The two key integration points for the product life cycle are with the adjacent planning stage and with the operations and maintenance stage. The integration points in the planning stage are the business case and budget approval processes. The integration point in the operations and maintenance stage is the formal transfer of defined documentation, such as instructions for operations and maintenance of the completed product or service.

Figure 1-5: City of Winnipeg Asset Management - Management System

Asset Management - Management System
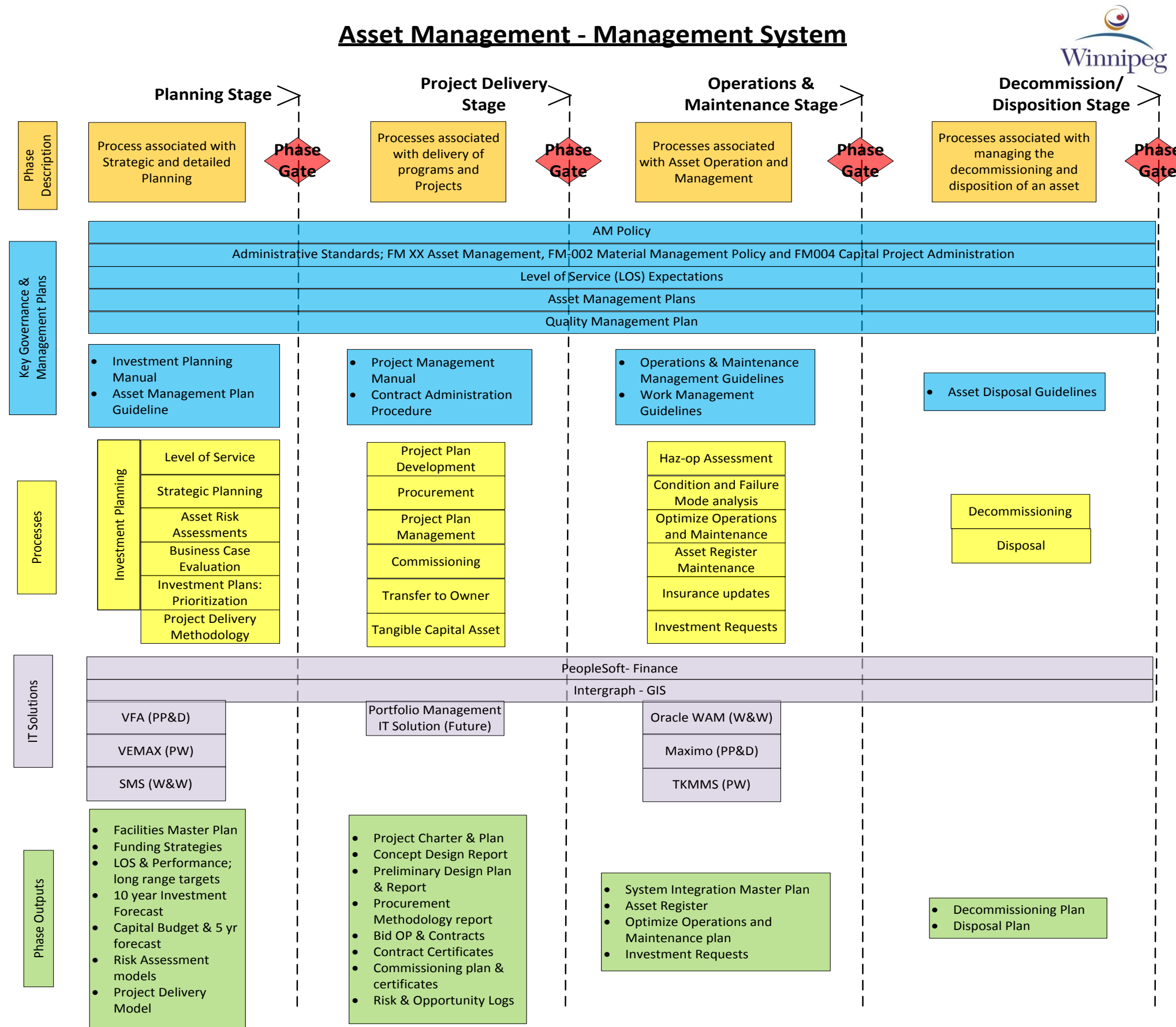
1.9   Change Management

Change management refers to the management of *organizational* change and as such, should not be confused with *change control*. Change management is a discipline that offers a structured approach that is aligned with Project Management Institute (PMI) project delivery lifecycle and the City's Project Delivery Framework. The purpose of change management is to promote and enable the adoption of changes that may occur as the result of project delivery, and thereby to support the achievement of project results and outcomes.

The City of Winnipeg has certified Change Managers (ChM) located in every department who form a Change Management Working Group sponsored by the CAO. This group is a change management resource pool for projects. Its members are trained to apply tools and methods for change management within the change lifecycle framework.

Project Managers should know who their departmental Change Managers are and should engage them in all the Phases of the project lifecycle. For a list of departmental Change Managers, refer to the distribution list in MS Outlook, CITY-ADKAR-Change-Managers, or contact the Manager, City Asset Management Program.

PMI recognizes that change management is an important feature of project management and successful project delivery. Without attention to change management, less than 40% of projects are successful. Thus, the inclusion of change management activities within the project delivery model is essential for minimizing barriers to change and for ensuring rapid and effective implementation of project outcomes.

When a PM develops the project's stakeholder assessment in the Project initiation phase, the need to follow the City's formal integrated change management procedure should be identified. This need should be included in the Project Charter and discussed with the Project Sponsor.

By following the change management procedure together with developing the PDP, a PM will formulate a solid plan to manage the change created by the project.

The PM may assign a separate Change Manager, if applicable. Criteria could be developed based on project complexity, risks, financial loss, quantity of stakeholders, rushed timeline, etc. For projects deemed high risk, a separate Change Manager could be assigned and implement the ADKAR model which would be of great assistance for the PM.

1.9.1.1 How to do Change Management

Refer to Appendix E "Change Mgt Procedures" for the details of how-to manage the change created by initiating a project

1.10 Public Engagement

Public Engagement is a process, involving communication and interaction between the City of Winnipeg and its residents that serves to inform and involve the public, and uses public input to make better decisions. The purpose of engaging the public is to achieve decisions that are sensitive and responsive to community values and concerns.

In order to achieve its intended purpose, engagement must be meaningful. This means that it:

- acknowledges the community's desire to participate in decisions that affect them and provides a means for incorporating the public's values, interests, needs and desires into decisions;

- facilitates understanding – by both the public and the decision-makers – regarding:

    - the definition of the problem or opportunity being addressed,
    - the issues of relevance,
    - the common ground from which options for a solution can be developed and evaluated,

- • the rationale for the ultimate decision;
- improves decisions as it:

  - • identifies critical issues early, when flexibility in the process is greatest, and
  - • brings all perspectives to the table, thereby improving the likelihood that a broader range of perspectives is addressed, there is a positive attitude towards decision outcomes, and therefore that it is less likely to result in decisions being overturned or vetoed;
- opens doors to innovation, creative problem solving, improved service, greater efficiency and win-win conflict resolution.

The Project Manager may assign a separate Public Engagement advisor or coordinator to oversee the detailed development and implementation of a Public Engagement Plan that supports the overall Project Delivery Plan. Criteria could be developed based on such things as project complexity, risk, quantity of stakeholders and significance of their interests. This Engagement Coordinator role could be filled by an external public engagement consultant. When hiring a PE consultant serious consideration should be given to hiring them as an independent consultant rather than a sub to another consultant being hired for the project, since public engagement is concerned with sensitivity and responsiveness to community values and concerns for the overall project.

1.10.1.1   How to do Public Engagement

Refer to Section 5.8 Plan Communications. Appendix E "Public Engagement Procedures" under development.

2 Project Management Governance

Governance is at the centre of the AMMS presented in Figure 1-5 and applies to all stages of the AMMS. It includes the policies, directives, standards, and rules defined by the corporation in documents. City governance documents that provide direction for project delivery are listed in Table-2-1.

Table 2-1: The City's Project Delivery Governance Documents

Governance Document	Remarks	Link
Materials Management Policy	City's Procurement Policy	http://www.winnipeg.ca/matmgt/info.stm
Administrative Standard FM-002	Material Management Administrative Standard	http://citynet/cao/administrative_directives/financial_management/default.stm
FM-004 Capital Project Administration	Currently under review	
Administrative Standard Asset Management	Currently under development	Website under development.
Special Operating Agency (SOAs) Operating Charters	While SOA's adhere to the Materials Management Policy guidelines and other directive listed above, the Operating Charters of the SOAs note other delegations and exemptions for purchasing authorities	Individual SOAs have their operating charters on file.

In some instances, in order to assist the project manager in the delivery of capital projects, the PMM may contain discussion certain Policies and Administrative Directive. Should there be any cases of conflict between the manual and these other documents, the Policy/Administrative Directive shall take precedence. Any cases of conflict should be brought to the attention of the Manager of Capital Projects. The manual is not meant to fully replace or replicate Policy/Administrative Directives, as such the PM should read and become familiar with the relevant Policy/Directive and not rely solely on the discussion in the PMM.

2.1 Policies

ASSET MANAGEMENT POLICY

THE ASSET MANAGEMENT POLICY IS CURRENTLY UNDER DEVELOPMENT.

MATERIALS MANAGEMENT (MM) POLICY

The MM Policy was adopted by City Council in 2004 and governs the Materials Management functions covering most types of procurement, including those normally associated with consulting services and capital project delivery. Guiding principles for the document were to meet the City's needs effectively and efficiently, at the best value, and in a fair and ethical manner.

While providing for broad-level governance, the Materials Management Policy also stipulates conditions under which authority is delegated to the administration. The Materials Management Policy grants the chief administrative officer (CAO) the authority to approve directives consistent with the Policy, and provides the authority to further delegate certain responsibilities.

2.2   Administrative Standards

An Administrative Standard (FM-002) and a Directive FM-004 (NOTE: THE CITY IS CURRENTLY UPDATING FM-004 TO ADDRESS A NUMBER OF AUDIT RECOMMENDATIONS) relate to process clarifications, procedural requirements, and delivery for management of projects.

FM-002 provides direction on the following:

- Delegation of authority from the CAO to other levels of administration
- The procurement – solicitation process
- Procedures for soliciting and evaluating competitive offers
- Award report requirements
- Procedures to be used when award criteria are not met
- Award and signing authorities
- General requirements for engagement of Consultants
- Reference to the City authorities for dealing with contract over-expenditures
- Reporting requirements for Consultant assignments

FM-004 (SEE NOTE ABOVE RE REVISIONS TO FM-004) directly addresses project administration and describes the processes that must be considered when planning, delivering, and executing projects, specifically addressing the following:

- Roles and responsibilities of the following personnel/unit for major projects:
    - Chief Administrative Officer (CAO)
    - Chief Financial Officer (CFO)
    - Manager of Capital Projects
    - Departments
- Establishment and mandate of the P3 review committee
- Establishment and role of the Major Capital Project Steering Committee
- Project delivery process and procedures
- Management of unspent capital accounts
- Rules for project over expenditures

An administrative standard for asset management is under development and, when approved, will provide broad governance over the full life cycle of assets.

2.3   Organizational Governance

With City-wide adoption of the PMM, the City's corporate and departmental entities will need to shift towards a "Portfolio – Project Management Office (PMO)" organizational governance structure defined in Figure 2-1.

THE PMO CONCEPT IS CURRENTLY BEING ASSESSED TO DETERMINE THE IMPACT TO THE CITY ORGANIZATION AND HOW BEST TO IMPLEMENT THIS GOVERNANCE STRUCTURE. THIS SECTION IS BEING INCLUDED AS INFORMATION AT THIS TIME. ONCE FINALIZED, THE ORGANIZATIONAL GOVERNANCE WILL BE INCLUDED IN AN UPDATED FM-004.

Figure 2-1: City of Winnipeg Corporate and Departmental Governance Framework

Corporate PMO

Corporate's PMO is responsible for;
- Developing and managing the governance documentation, processes, procedures, tools and templates
- Ensuring that components of the Asset Management - Management System are followed
- Quality management reviews and performance management

Governance -
Quality Management -
Training -
Corporate Strategic direction -

- Key Performance Metric
- Benefit Realization results

Department PMO

Department's PMO is responsible for:
- Management of the processes & procedures outlined in the governance documents
- Quality management of programs and projects

- Performance Reports

Program & Project Managers

PMs are responsible for:
- Delivering the program or project based on processes and procedure outlined in the governance documents
- Performance reporting

3 The Project Delivery Framework

3.1 The Project Delivery Framework

The goal of project delivery is to implement a project in accordance with its approved business case. Project delivery is carried out using a consistent framework that guides project planning and implementation. Project life-cycle phases for the framework are illustrated in Figure 3-1.

Figure 3-1: Project Delivery Framework Showing Project Phases and their Main Components
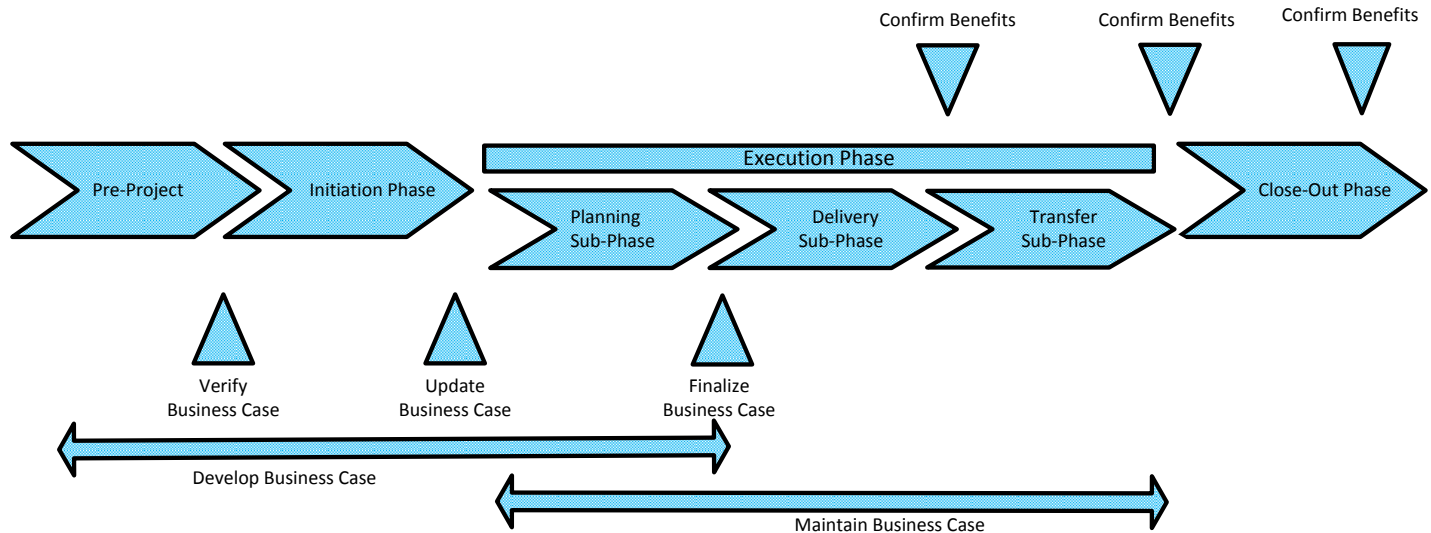
Project life-cycle phases are:

- **Pre-Project Phase** – This phase encompasses strategic planning, investment planning, and budgeting. These processes must be completed before project initiation. However, considerations for project delivery are integrated concurrently during business case development.

- **Initiation Phase** – This phase involves clearly defining the project from planning to delivery, developing a project charter

- **Execution Phase –** In this phase, processes are completed that result in a product. Activities and deliverables can vary widely between projects, however three sub-phases involving the following processes apply to all projects:

    - **Planning sub-phase: Planning** the delivery of the product, result or service

    - **Delivering sub-phase:** Delivering the product, result, or service per the project plan

    - **Transferring sub-phase: Transferring** the product or service to the Business Owner

- **Close-Out Phase –** As all projects have a defined life, this phase defines the processes and activities that end the life of a project.

Business Case – This is developed at the beginning of a project and maintained throughout the project's lifecycle. The delivery framework is tightly integrated with the business case and changes resulting from delivery need to be updated, verified, and validated in the business case. The business case establishes the baseline for assessing the initial investment decision, project risk, issues, or changes. Assessment involves determining how the matter affects the

viability of the investment objectives and benefits. The milestone stages that include formal review of the business case during a project's life cycle are shown in Figure 3-1.

- **Develop Business Case –** Acquire information required to make the investment decision. Refer to the Investment Planning manual for more detailed information.

  - **Verification –** Assess whether the project has a valid business case to proceed.

  - **Update -** Update the business case with more detailed information not available until the project has expended resources to produce, i.e. planning studies.

  - **Finalize –** Approve the Investment to proceed or not based on the business case put forward. Information in the business case needs to be at a class 3 level per AACE.

- **Maintain Business Case –** Continue to reference the business case in assessing project change control decisions and tracking quantified benefits until the product is turned-over to the business owner or operations (Care & Use owner).

  - **Confirm Benefits -** Assess whether the intended benefits have been (or will be) realized; occurs primarily after the project is closed.

3.2   The Project Delivery Framework Integration

Figure 3-2 shows how the themes, processes, and deliverables of the project delivery framework are integrated.

Figure 3-2: Project Delivery Framework Component Integration

Winnipeg

Pre-Project → **Initiation Phase** → **Phase Gate** → **Execution Phase** → **Close-out Phase**

Execution Phase sub-phases: **Planning Sub-Phase** → **Phase Gate** → **Delivery Sub-Phase** → **Phase Gate** → **Transfer Sub-Phase** → **Phase Gate**

Phase Description

| Processes associated with initiating a Project | Processes associated with planning the delivery of Project's Product or Service | Processes associated with delivery of Project's Product or Service | Processes associated with transferring of Project's Product or Service to the Business Owner | Processes associated with closing out the Project |

Core Project Management Themes

- Policy, Administrative Standards & Manuals
- Business Case
- Project Organization
- Risk Management
- Quality Management
- Plans and Progress Approval
- Organizational Change
- Integrated Change Control

Processes (per PMBOK)

(Process diagrams: Enter Phase/Start project → Initiating Processes → Planning Processes / Monitoring & Controlling Processes / Executing Processes → Closing Processes → Exit Phase/End project)

Phase Deliverables (not an all inclusive list)

Initiation Phase:
- Assign Project Sponsor
- Project Charter
- Project Advisory Committee
- Project Delivery Model Selection
- Project Delivery Plan (PDP): Scope, Financial, Schedule, Quality, Procurement, Risk, Communications and Stakeholder Engagement, etc.
- Commissioning Strategy
- Issue Log

PDP would detail the entire Project life-cycle or work needed to develop a Business Case or to do the next phase (s) of the project

Planning Sub-Phase:
- Team Charters
- Contracts
- Defined Deliverables
- Project Delivery Plan updates by City, Vendors, Consultants
- Vendor Performance Reviews
- Stakeholder Engagement

PDP may be updated to reflect work to be completed in this phase or a Vendor produces a PXP based on RFQ requirements: Both options reflect work to be undertaken in this phase and possible others

Delivery Sub-Phase:
- Team Charters
- Contracts
- PDP updates by City, Vendors, Consultants
- Commissioning Plan
- Quality Assurance/Quality Control Reports
- Vendor Performance Reviews
- Stakeholder Engagement

PDP would either be updated to reflect work completed in previous phase or a new Vendor develops a PXP based on RFQ requirements

Transfer Sub-Phase:
- Deliverable Hand-Over - Operations & Maintenance Manuals (O&M), As-builts
- Asset Register
- Tangible Capital Asset (TCA)
- Benefits Review Plan

Close-out Phase:
- Financial Account close-out
- Purchase Orders/Work Order close-out
- Consultant/Contractor review filing
- Lessons Learned filing

Product Deliverables (not an all inclusive list)

Pre-Project / Initiation:
- Update Business Case (BC)
- Update Requirements Specification

Planning Sub-Phase:
- Update Business Case
- Finalize Requirements Specification
- Concept Design Report
- Preliminary Design Report
- Detailed Design Report

Delivery Sub-Phase:
- Confirm Business Case Benefits
- Deliver Buildings
- Deliver IT Systems
- Deliver Services

Transfer Sub-Phase:
- Confirm Business Case Benefits
- O&M Manuals
- Haz-Op Manuals
- H&S Manuals
- As-built Drawings
- Warranty documentation
- Insurance Policy updates

Close-out Phase:
- Transfer Tracking of BC Benefits

The primary components in the project delivery framework are:

- **Project Phases** – Project phases provide a high-level project delivery roadmap. They are generally sequential however may overlap.

- **Phase Gates** – Gates between project phases are logical points for reviews. Completion of a phase typically means completion of one or more deliverables. The phase gate review includes a status review and business case update to validate the benefits before authorization to continue to the next phase.

- **Project Management Themes** – A "theme" is a concept or direction that is common to all the project phases and is progressively developed or consistently applied in each. The PMM themes are described in Section 3.3.

- **Processes** – Processes are at the core of project delivery and identify what is to be done. PMBOK uses the process groups *initiating, planning, executing, monitoring and controlling,* and *closing*.

- **Project Phase Deliverables** – In project phases, specific results, referred to as project phase deliverables and outputs, are achieved that may then be used to manage the project and/or support delivery. For example, the project delivery plan (PDP) is a project phase deliverable or output used for management throughout the project.

- **Product or Service Deliverables** – The product or service deliverables are the project's results. An operations and maintenance manual and a new transit garage are both product deliverables.

3.3 Project Management Themes

Themes describe aspects of project management that must continually be addressed. To various degrees, themes are applied across all project phases. PMM themes include:

Note: The themes identified below were developed based on the PRINCE2 theme concept.

Table 3-1: Project Management Framework Themes

PRINCE2 Theme	Description	Question Answered	PMM Section
Policy, Administrative Standards and Manuals	Adhering to project governance identified in Polices, Administrative Standards and Manuals.	Who, What, Where, When and Why?	2.0 PM Governance
Business Case	Developing and managing the business case process that integrated with the Project Delivery process. How an idea with potential value for an organization is developed into a viable investment proposition, and how project management maintains the focus on the organization's objectives.	Why?	4.1 Acquire Approval 5.2 Plan Scope 7.1.1 Control Scope 8.1 Update Business Case
Project Organization	Providing project organization by structuring the project human resources with defining roles, responsibilities and authorities. The Project Sponsor allocates work to PMs, who steer the project to completion. The project organization addresses the roles, responsibilities, and authority of the project management team and specific stakeholder.	Who?	5.6 Plan Human Resources 5.7 Plan Communications 6.3 Manage Team 6.7 Manage Communications

Table 3-1: Project Management Framework Themes

PRINCE2 Theme	Description	Question Answered	PMM Section
Risk Management	Applying the risk management process throughout the project. Projects typically entail more risk than do stable operational activities. This theme addresses how project management manages the uncertainties in plans and in the wider project environment.	What if?	5.8 Plan Risk Management 7.3 Manage Risks
Quality Management	Providing formal Quality Management through quality assurance and control processes. Focuses on the quality attributes of the not only the products or service but the project management processes to ensure the product or service is delivered as defined.	What?	5.4.5 Plan Quality 6.6 Manage Quality 7.1.4 Control Quality
Plans and Progress Approval	Developing a process that identifies formal review and approve phase gates and reporting requirement. Projects proceed using a series of approved plans, which are the focus for communication and control. Addresses the ongoing viability of plans and is used to determine whether and how a project should proceed.	How? How much? When? Where are we now? Where are we going? Should we proceed?	4.1 Acquire Approval 5.0 Project Delivery Plan (entire section) 6.0 Project Execution 7.4 Report Performance 8.6 Update Business Case
Organizational Change Management	Providing a process to manage organizational change that is created with the initiation of a project and the ultimate delivery of the final product.	Who?	1.7 Organizational Change Management
Integrated Change Control	Providing a process to review, reject or approve changes to the project delivery plan and related project control documents. How project management assesses and addresses issues that may affect project plans and completed products. Issues may be unanticipated general problems, requests for change, or instances of quality failure.	What's the impact?	5.7.2 Define Performance Reports 7.0 Integrated Change Control (entire section)

4   Initiating Process Group

Initiating is the first of the five project management process groups. Like all process groups, it applies to each phase of a project life cycle, from project initiation through execution to project close. The initiating process defines the new project and its authorization, and similar initiating processes are carried out for the next project phases.
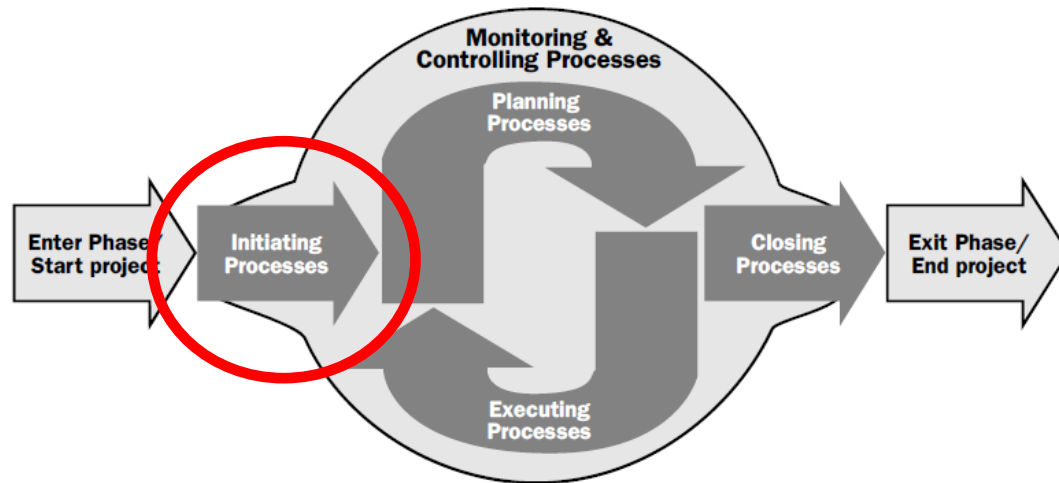
4.1   Acquire Project or Phase Approval

The PMM methodology includes the concept of phase approvals, with authorization from the previous project phase required prior to commencement of the subsequent phase. The process requires the PM to summarize the prior phase outputs and deliverable and identify potential changes to delivery.

4.1.1.1 How to Acquire Phase Gate Approval

The project initiation phase begins with Council approval of the project, which is normally the approval of the Capital Budget. In some instances, projects may be approved by Council in-year by approval of Administrative Report.

For subsequent project phases, the outcomes and deliverables are summarized by the PM and then reviewed and approved by the Project Sponsor prior to proceeding to the next project phase. The phase gate approval will be considered on the basis of these deliverables being approved. In situations where the project is not meeting the business case objectives, the Project Sponsor may request that the PM prepare a recovery plan to outline how to get the project back on track, prior to making the approval.

4.2   Identify Project Sponsor, Manager and Key Stakeholders

Identifying the Project Sponsor and PM is the first priority, since they will be responsible for project delivery. They will also execute the initiating phase processes, including defining the rest of the stakeholders.

4.2.1   Assign a Project Sponsor

All projects must have a Project Sponsor. The department responsible for the project budget is identified in the annual Capital Budget. The Department Head of that department is responsible for appointing a Project Sponsor. For example, if the Capital Budget identifies a Public Works budget account number for the project in the Capital Budget (#18XXXXXXX), the Director of Public Works is responsible for assigning a Project Sponsor to that project.

The Project Sponsor is the individual responsible to provide resources and support for delivery of the project within the business unit delivering the project. The Project Sponsor must be at a level in the business unit to address the type of issue that will occur based on the magnitude of the project.

The business owner (control & use owner) of the Investment which the project was created to delivery is a separate role in the project organizational structure. The business owner can be the project sponsor if the project is being initiated within the same business unit. Typically however, the business owner is from a different division within the same City Department or even different Department. See section 5.7 Plan Human Resources for details on the project organizational structure and responsibilities and authorities of both roles.

The Project Sponsor and business owner must be identified in the project and team charters, and their role and responsibilities must be defined in the PDP. The Project Sponsor is, at a minimum, expected to maintain awareness of the project, its progress, and its issues and to be available for participation in decision-making and dispute resolution.

4.2.1.1 How to Select and Assign a Project Sponsor

The department head responsible for project delivery organization selects a Project Sponsor appropriate for the magnitude of the project that is being delivered. The Sponsor will:

- Be at a level within the business unit delivering the project to provide resources, break down barriers and be the champion for the project.

- Provide the support necessary for the project to succeed and meet the business owner's requirements.

There are no specific rules for assigning the Project Sponsor. The Project Sponsor's formal commitment to the project is confirmed through endorsement of the project charter.

4.2.2   Assign a Project Manager

A PM is required at the beginning of the project initiation phase and continues in that role through the project close-out phase. The organization assigns a PM to deliver the project, as defined in the business case, with the expectation that the project objectives will be met.

The PM must have the necessary skills and qualifications to plan, manage, administer, coordinate, control, and report on the entire project life cycle, so the PM must have competencies appropriate for the size and nature of the project. Project risk implications, such as PM workload, should also be considered in PM selection, and, as with any risk areas, a risk response must be defined where warranted.

4.2.2.1 How to Select and Assign a Project Manager

Selection of a PM is the business unit's responsibility, with input from the Project Sponsor.

A PM requires knowledge of PM practices acquired through formal training, experience on similar types of projects, a track record of success, leadership skills, and strong planning, organizing, and communication traits are all useful for predicting good performance.

Expectations for the City's technical or business participation must also be considered when selecting the PM. If the City will provide quality assurance, a PM with knowledge of the product function, service, or operation will be an asset. If the vendor is responsible for the deliverable, however, a PM's product knowledge may not be an asset and may in fact make it difficult for the PM to abstain from contributing inappropriately. The business unit's ability to commit the PM's time to the project is critical; this ability must be ascertained before PM selection.

4.2.3 Determination of Committee Requirements

The requirement for a project to form a Committee will depend on both the risk and size of the project.

It should be noted that the decision making in this section is largely a continuation of the work performed in relation to Section 1.5 Documentation Requirements/Scaling of the PMM.

The guidelines below were developed considering impact on resources and cost benefit. As committees involve multiple individuals, there is a significant cost to establishment of committees. The major objective is to expend additional resources where there is significant risk or large dollar amounts at stake.

In determining the required level of documentation for the project, the PM will have made a determination as to both the project risk and project size.   Guidance as to how to determine project risk and project size is contained in Section 1.5 of this manual.

All projects that are $10 million or greater require a Major Capital Steering Committee per Administrative Directive FM-004.

All projects that are high risk require a Project Advisory Committee. Large projects that are determined to be high or moderate risk require a Project Advisory Committee. Large projects that are low risk do not require a committee.

The following matrix summarizes the project's committee requirements based on project risk/project size.

Guidelines for Committee Requirements

		Project Size			
		Small	**Medium**	**Large**	**Major (XL)**
Project Risk	**High**	Project Advisory Committee	Project Advisory Committee	Project Advisory Committee	Major Capital Projects Steering Committee
	Moderate	None	None	Project Advisory Committee	Major Capital Projects Steering Committee
	Low	None	None	None	Major Capital Projects Steering Committee
		Below $1.0 million	**$1.0 million to $4.99 million**	**$5.0 million to $9.99 million**	**$10.0 million and above**

It should be noted that projects that are required to follow Full PDP must have a Committee. Projects that are required to follow the Short PDP have no Committee requirements.

4.2.3.1 How to Establish the Major Capital Project Steering Committee

The process for establishing the Major Capital Project Steering Committee is defined in Administrative Directive FM-004.

The department head for the department responsible for the project budget is responsible for establishing the Major Capital Project Committee in accordance with Administrative Directive FM-004. The Project Sponsor is the Chair of the Committee.

Due to the senior management representation on these committees, Major Capital Project Steering Committees provide direction to PMs.

4.2.4 Establish the Project Advisory Committee

The department head for the department responsible for the project budget is responsible for establishing the Project Advisory Committee.

The PM shall conduct the analysis as set out above to determine if there is a requirement for a Project Advisory Committee. If there is a requirement for a Project Advisory Committee, the PM shall advise the Project Sponsor of the requirement.

The Project Sponsor will be the chair of the committee and shall appoint a minimum of two other members of the committee. For clarity, the PM reports to the committee and is not a member of the committee. The Project Sponsor's appointments shall be approved by the department head responsible for the project budget.

These committees are advisory in nature and not intended to give direction to the PM on the project. The committee is meant to be an additional resource to the PM to aide in the successful delivery of the project.

4.2.5   Stakeholder Assessment

In addition to the major stakeholders already identified, all the other people and organizations affected by the project or who have an interest in the project must be identified. It is important to define the stakeholders early in the process and identify their interest and determine their level of participation, since the level of effort in interacting with stakeholders can vary widely and in some cases can be extensive. This process cannot be overemphasized through stakeholder assessment ensures that all perspectives are brought to the table. This improves the likelihood that a broad range of perspectives are addressed, that there is a positive attitude to decision outcomes and that as a result it is less likely to result in changes to project scope, schedule and costs.

For the Winnipeg Public Service, the number and types of stakeholders may vary widely according to the project type, and may include:

- Internal staff
- Operations and maintenance
- Regulators and other authorities
- Customers
- Vendors
- Special Interest Groups
- Members of the Public
- Utilities
- Biz Groups

4.2.5.1 How to Prepare a Stakeholder Assessment

A stakeholder assessment must be developed to record stakeholder interests and expectations and to define their importance and influence. This information is used to categorize stakeholders by potential impact on the project, and strategies are developed to minimize potential negative impacts and maximize positive impacts.

The stakeholder assessment is part of the project communication plan and public engagement plan. The assessment guides how project communication will be managed. As well, the assessment will be used on any Change Management activities occurring on the project and how public engagement activities are planned and executed.

See section 5.8 Plan Communication for additional information on Stakeholder assessment, Communication plan and Public Engagement.

4.2.5.2 Stakeholder Assessment Template

The Stakeholder Assessment template is part of the Stakeholder Assessment and Communication template provided in Appendix B.

4.2.6   Update Stakeholder Assessment

The Stakeholder Assessment is updated as the project progresses since new stakeholders may be identified who were previously unknown. The communication plan is reviewed at the same intervals for the same reason. New stakeholders and/or multiple parties not known at the outset of the project will require the communication plan to be updated.

4.3   Develop Project Charter

The project charter initiates the transition from the Pre-Project to Project Initiation phase. It formally authorizes the project to proceed and forms the agreement between the PM and the Project Sponsor. It functions like a work order by setting out the high-level expectations for delivery and commits the organization to providing the identified capital (and/or operating) budget, resources, and project support. The completed project charter provides a clear set of expectations for the PM and is used to develop the PDP, which is the baseline for monitoring progress and performance.

The project charter is developed from existing information, which may be known at the initiation phase only at a high level. At a minimum, the project charter should provide the following information:

- A project definition and estimated costs from the business case
- The approved capital (and/or operating) budget and any anticipated commitments, allowances, and contingencies identified

It is imperative that the project charter be endorsed by the Project Sponsor and the PM. After their agreement, the project charter provides the basis for the PM to develop the PDP.

A project may have more than one type of charter. The project charter documents the project as defined by the City and incorporates the project's scope of services. A teaming charter, as introduced in the *planning* process group, is produced to define internal team roles, responsibilities, and expectations. Consultants may produce additional teaming charters for their services, in which the City team may also participate.

4.3.1.1 How to Develop the Project Charter

The following items should be included when available:

1. Project Description
2. Project Deliverables
3. Out of Scope items
4. Schedule; Key Milestone Dates per Deliverable, if applicable
5. Project Budget
6. Establish the order of priority for the Project Scope, Cost and Schedule
7. Initial Requirements, Risk & Opportunities
8. Stakeholder Identification and Assessment
9. Change Management

Even though the project charter is much less detailed than a PDP, it helps to use the same structure for each, since the information in the project charter is carried forward to the PDP.

4.3.1.2 Endorse the Project Charter

The project charter gives the Project Sponsor's instructions for delivering the project to the PM, whose skills and expertise are used to develop the details, carry out the work, and fulfil the Project Sponsor's expectations. The Project Sponsor's endorsement of the project charter confirms the corporate/departmental expectations for the project and commits the resources needed for completion. The PM's endorsement of the project charter indicates understanding of the corporate expectations, the nature of the work, and the impediments to delivery, documented in the project charter (if any).

In many cases, the PM will have prepared the project charter and thus be able to endorse it with confidence. If not, the PM should be given time to review the project charter and potentially contribute to it to increase the project's chance of success.

Prior to finalizing the Project Charter, the Project Charter should be compared to the business case to ensure that the benefits identified in the business case are still there.

4.3.1.3 Project Charter Template

A template for the Project Charter is provided in Appendix B.

4.4 Starting a New Phase of the Project

Prior to starting the next phase of the project, the following should be completed / in place.

- Project Sponsor in place
- Project Manager in place
- Committee (if required) appointed and in place
- Project Charter - completed and signed by the Project Sponsor and Project Manager
- Key Stake Holder Analysis completed

5   Planning Process Group

Planning is the second of the five project management process groups. Planning is a critical step in project delivery. While improper planning is the number one reason for poor performance, high-quality planning is the most effective way to increase the chance of exceeding expectations.

The PMM planning approach starts with the project charter and continues by developing project objectives and the delivery approach in more detail. Plans must be continually updated throughout the execution and close-out phases. Plans are also important as they provide the basis for monitoring and control.
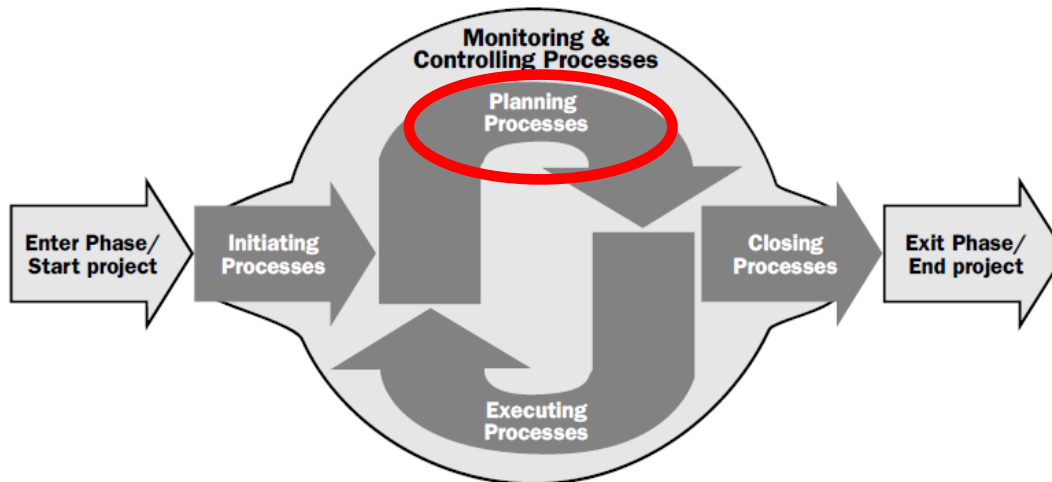
5.1   Develop Project Delivery Plan (PDP)

The PDP is a comprehensive document that deals with all aspects of the delivery, including project management. The PDP is actually a compendium of a number of more specific plans. With the initial PDP, the PM presents their project understanding and approach to the Project Sponsor. By reviewing and approving the PDP, the Project Sponsor accepts the delivery approach and resource requirements. The Project Sponsor may reject all or parts of a PDP and request revisions for better alignment of resources with the business case. After approval, the PDP becomes the roadmap for carrying out, monitoring, controlling, and reporting on the work.

The PDP applies to two project delivery approaches, either Consultant or in-house-delivered. In either case the PDP covers the City's project planning.

With the consultant-delivered approach, the Consultant has a subproject within the City's project. The City's PDP defines the nature and extent of the consultant's services, however the Consultant provides the details of the product planning and associated project management in a project execution plan (PXP), which complements the PDP.

With the in-house-delivered approach, the PDP includes product planning and delivery details.

5.1.1.1 How to Prepare a Project Delivery Plan

The PDP provides the PM, project delivery team, Project Sponsor, and stakeholders a common understanding of the work plan and planning requirements throughout the project. The PDP should include detailed plans for the following:

- Scope
- Financials (budget and cost per deliverable)
- Schedule (including identification of the critical path)
- Quality
- Procurement
- Human & other Material Resources
- Stakeholder Assessment and Communications (Public Engagement)
- Risks
- Requirements Management
- Integrated Change Control
- Health, Safety, Security, and Environment (HSSE)
- Commissioning
- Close-Out

The PDP is constructed by developing project-specific information for each of the project management plans. It provides the baselines that are used for monitoring and controlling the project.

5.1.1.2 Project Delivery Plan Template

A template for the Project Delivery Plan is provided in Appendix B.

5.2 Plan Scope

5.2.1 Define Scope

The PM is responsible for developing details of the scope defined in the business case and project charter. As noted in Section 4.3, the project charter describes the product, service, or result to be delivered, and may identify key project objectives and deliverables. Further development includes identification of the delivery approach, project implementation phases, and support service requirements.

All project definitions begin with a scope statement. The scope statement is an overview that describes the project and its product. It provides a common understanding of what is included and what is not included in the project.

5.2.1.1 How to Develop a Scope Statement

The Project Sponsor, Project Advisory Committee, and other relevant stakeholders should be involved in developing the scope. Often the author of the business case and members of the project delivery team are involved, or at least to review the draft scope statement.

Since the sole purpose of the project is to meet the needs expressed in the business case, the scope statement must be consistent with the business case. The scope statement should be a narrative describing the scope and its deliverables, and should provide any needed clarifications, including:

- Out-of-Scope Work or Deliverables
- Constraints
- Assumptions

- Acceptance Criteria

The scope statement must have sufficient detail and clarity to be used as a metric for performance reporting. It is usually based on levels of service and defined in terms of products or services. If the deliverables change during the project, a review using the change control process is warranted.

5.2.2   Gather Requirements (Future)

5.2.3   Work Planning

Work planning involves development of a number of project management and product work plans for a defined scope. The work plan is a collection of all the project components, arranged according to a work breakdown structure (WBS; refer to Section 5.2.4). The work planning process requires hands on effort by the PM, expert judgement and preferably with the input from an experienced team.

A commonly used project planning tool is Microsoft Project (MS Project). The intent is for MS Project to be applied to PMBOK based PMM processes and procedures. In general this can occur seamlessly. However, one of the cases where MS Project cannot be modified to match terminology from PMBOK, is with the use of the term "task".

For MS Project the task can refer to Phases or Deliverables or Work Packages. Each Phase can be broken down to Deliverables, a Deliverable to Work Packages and so on.

The tasks or activity for each deliverable will have (1) a work description, which defines the effort required for specific outcomes or deliverables, (2) resources (people and time) required, and (3) a schedule. Each of these three parts is essential for effective planning, monitoring, and controlling of projects. A change to any one of these will result in a change in one or both of the others. The three parts are integrated in the project management approach shown in Figure 5-1.

Figure 5-1: Task Components Integrated into the Project Management Approach
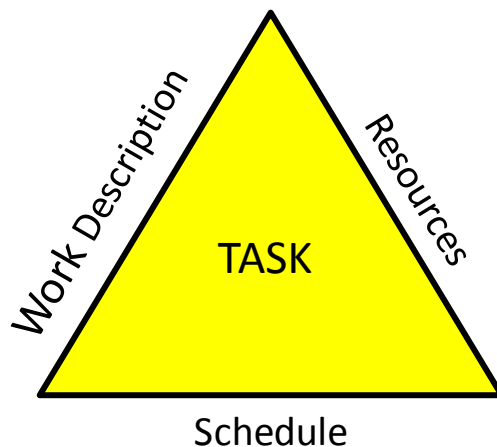
5.2.4   Create a Work Breakdown Structure (WBS)

The WBS is a deliverable-oriented representation of the work. It presents a hierarchal view of the project comprising the total project as defined in the scope statement. The WBS subdivides the project into smaller packages for effective planning, management and delivery of the work. It defines in explicit terms no only

what deliverables the customer/stakeholder will get when the project is complete however also the specific project deliverables that are produced for the project itself, i.e. a PDP. All projects should have a WBS.

Creating a WBS is the process of subdividing the deliverables and project work into increasingly smaller and more manageable components. Work packages are at the lowest level and are defined such that they can be scheduled, estimated, monitored and controlled.

The WBS provides the formal record of deliverables and associated costs. Deliverables for a project are fixed and can only be changed through the change control process. Activities on the other hand are what is required to produce the deliverables, and within limits can change during the delivery of the work.

Various layouts are commonly used for the WBS. Selection depends on the type and nature of the project with the level of detail being based on the complexity of the project. The PMM structure for project delivery aligns with the Project Delivery framework as presented in Figure 3-2. It includes the project at the top level followed by project phases at the next level. Specific project or product deliverables are at subordinate levels, and work packages at the lowest level as illustrated in Figure 5.2.

Figure 5-2: A WBS Tree Structure Organized by Project Phases
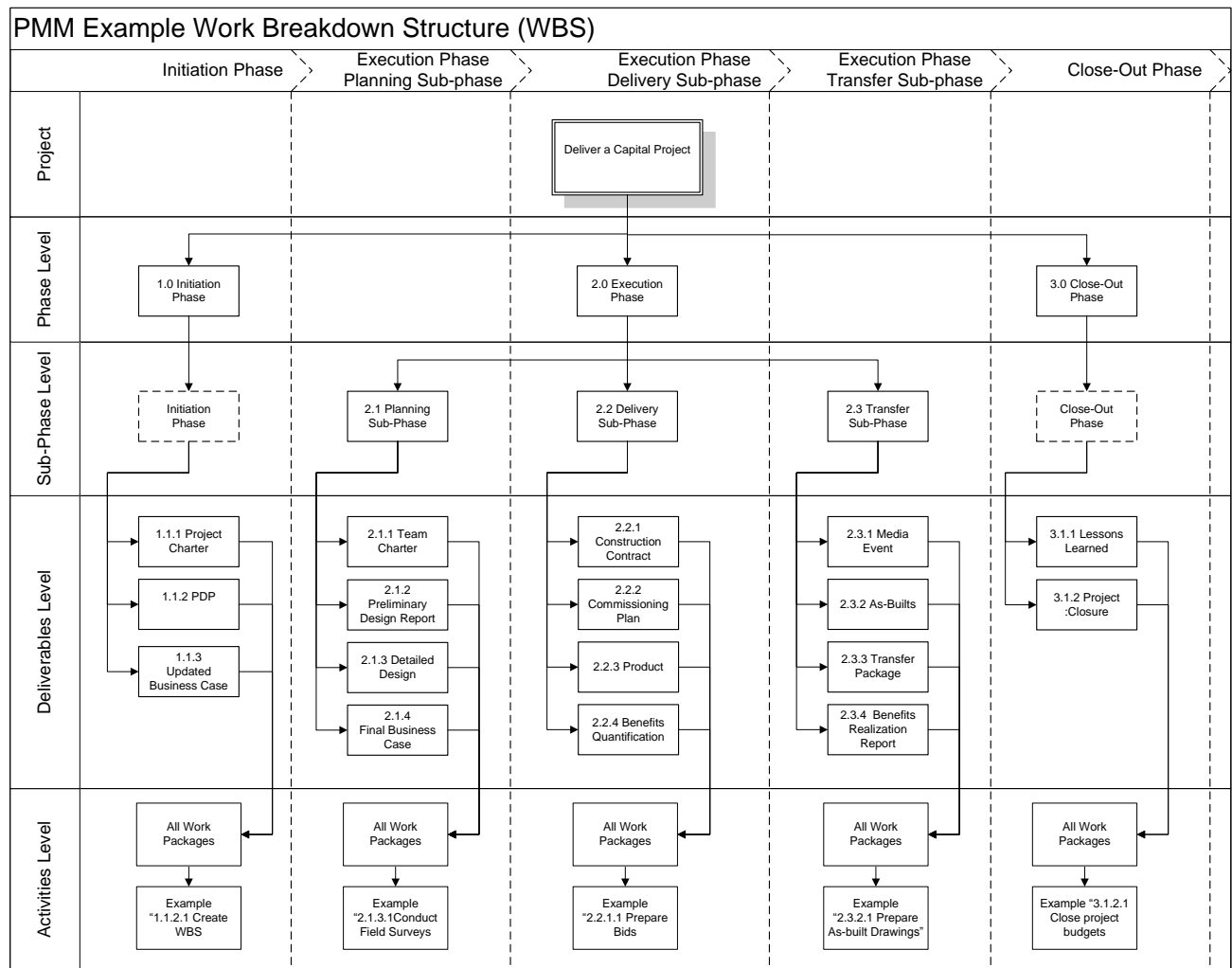
The "Deliver a Capital Project" example in the figure is for a typical DBB project. The example has been prepared for illustration and explanation purposes; it is not intended to be complete and the illustration includes features not normally shown on a WBS:

- Swim lanes for project phases and the vertical bars for project phases have been included for clarity.
- The deliverables are shown in a vertical orientation to accommodate the page size.
- The activities are not detailed however just shown on the figure as placeholders.

The significant features of the WBS are as follows:

- **Project Level:** The top level of the WBS is the project itself, often referred to as "Level 0".
- **Phase Level:** The levels immediately below the project are the project phases. The Project Delivery framework includes three top level project phases.
- **Sub-Phase Level:** The execution phase for the Project Delivery framework is further subdivided into three sub-phases. The actual number of phases and sub-phases in the WBS will depend on the project requirements.

    – The use of phases and sub-phases must accommodate phase gates.

    – In some cases additional sub-phases may be required for intermediate cost estimates, project reviews and decision making, as described subsequently in Section 5.2.4.2.

- **Deliverable Level:** The deliverable level must include all project and product/service deliverables so that nothing is omitted.
    – The deliverables must be tangible items that can be quantified when delivered. Not task activities.

    – The degree of breakdown and size of the end packages may vary by project size and type.

    – More than one level of deliverables may be used. That is, a large deliverable may be broken down into more deliverables.

    – The critical feature is that all deliverables must be included.

- **Activities Level:** The activities are not know for each deliverable at the early stage of the project and therefore are not included, unless known. The activities are the detailed steps necessary to complete the deliverable as defined. The activities may be in terms of the work to be done for the deliverables, or in terms of defined work packages. All of the activities must roll up to a deliverable.

Rolling Wave Planning Technique: The refinement of the work breakdown structure occurs progressively in each phase, which is known as the Rolling Wave Planning technique.

In the example, the Consultant and Contract sub-projects have been included at the highest level in the early stage of the project and will be broken down into more refined deliverables and activities as the project progress.

The Rolling Wave often results in the earlier phase WBS having less detail than the WBS in the later phases, specifically at the activity level.

The 100% percent rule applies to each phase and level of the WBS:

    – Each level of the WBS must include all of the work.

    – Each of the levels in a project phase must include all the deliverables necessary to complete the project.

    – With reference to Figure 5-2, just as the top level encompasses the entire project, so does every level below it.

    – Because of the 100% rule, the total project cost at the top level will be equal to the sum of the phases, the sum of the deliverables, and the sum of the activities. This allows the WBS to be either broken down or rolled-up by each phase to any selected level.

The WBS is a building block for further project definition. It provides the structure for developing the basis of estimate and the schedule.

5.2.4.1 How to Create a Work Breakdown Structure (WBS)

A WBS is developed by subdividing the work described in the scope statement into successively smaller components (deliverables) until each is in a manageable work package.

The steps for development of a WBS are:

1. **Identify deliverables** – The WBS is a deliverable-oriented representation of the work, and as such must encompass all project and product deliverables. The first step is to identify and analyze the project and product deliverables and related work, and then determine what activities are needed. The project management deliverables will be as defined in the PDP and tailored for the project. These include tangible deliverables such the PDP itself. The PDP may be further broken down into its components such as the project charter, risk assessment, requirements specification, etc., or they may be included as part of the PDP. The critical requirement is that all deliverables must be included. The deliverables must also include the main product deliverables which may be capital assets, a result, or a service and will be known from the project charter and scope statement. For the first version of the WBS these may be defined at a high level and later broken down to greater levels of detail through the Rolling Wave process.

2. **Create the WBS structure** – The WBS is to be organized in a tree structure as illustrated in 5-2. Use of the tree structure permits the lower levels to be rolled up to the higher levels, with the complete rollup encompassing the entire project.

    The project title is placed at the top level, with the project phases (initiation, execution, and close-out) as defined in the Project Delivery framework (Figure 3-2) on the second level. The subsequent phases will depend on the project requirements, and may be subdivided into the three standard project phases on the third level (planning, delivery, and transfer) or even further.

    Project specific deliverables are to be included under each project phase or branch of the tree. The level of detail for deliverables must be selected to suit the project size and complexity. For large projects there may be two or more levels for deliverables, with increasing levels of detail.

    It is critical that the deliverables be defined as tangible products, results or services that will be created or produced by the project and not work activities or effort to produce them. As a result the deliverables are always defined as a noun.

    The activities taken to create or produce the deliverables are included in the WBS level below the deliverables. They are defined as the direct activities needed to produce the deliverables, or are work packages describing a sequence of actions or steps to produce the deliverables. The activities must all roll up to deliverables.

3. **Defining Work Packages -** The extent of the work breakdown for the activities depends on the granularity required for delivery and management of the project. As a guide, a work package is small enough when it can be estimated for work effort, cost, and time. The breakdown should not proceed to the point where it becomes overly restrictive or causes excessive effort to manage.

4. **Identify WBS names and WBS codes** – An outline naming and numbering scheme is required for the WBS. For WBS numbering the project level is typically considered to be "Level 0" with the subordinate levels numbered sequentially. Note: in MS Project there are two options, "Outline" numbers or WBS codes.

The WBS structure can be listed in an outline view as shown in Table 5-1. This results in the complete WBS sequenced by phase.

The outline view for the WBS is the most useful and practical method of presenting the WBS. While the tree approach provides a good illustration, it is not easy to integrate with the WBS dictionary, schedule and resource matrix.

Table 5-1: WBS Outline View for "Deliver a Capital Project" Example

Project	Deliver a Capital Project
1.0	**Initiation Phase**
1.1	Initiation Phase *(intentional duplicate)*
1.1.1	Project Charter
1.1.1.1	Develop Project Charter
1.1.1.2	Endorse Project Charter
1.1.2	Project Delivery Plan
1.1.2.1	Define Scope
1.1.2.2	Create WBS
1.1.2.3	Determine Budget
1.1.2.4	Prepare Schedule
1.1.2.5	Plan Procurements
1.1.2.6	Plan Communications
1.1.2.7	Approve Project Delivery Plan
1.1.2.8	Initiation Phase Closure
1.1.3	Updated Business Case
1.1.3.1	Update Business Case
1.1.3.2	Acquire Phase Approval
2.0	**Execution Phase**
2.1	Planning Sub-Phase
2.1.1	Team Charter
2.1.1.1	*List Team Charter Activities*
	etc.
3.0	**Close-Out Phase**
	etc.

The outline numbering can be structured to best facilitate execution of the project. If MS Project is to be used it is desirable to assign the items in each WBS level at the same hierarchy in the numbering. By doing this similar types of information will be displayed when sorting by outline levels in the software. For the above example this would require the insertion of item "1.1 Initiation" which would be a placeholder and a repetition of the Initiation phase item.

5.2.4.2 How to Select Delivery Sub-Phases

The standard project phases may be subdivided to accommodate complex projects. For example, a project such as the South End Water Pollution Control Centre upgrade may include multiple design delivery phases, such as conceptual, functional, preliminary and detailed design. Conversely, a one-block water main or street renewal project may require only preliminary and detailed design.

These sub-phases may be used to identify discrete review points (stage gates). A common practice is to provide cost estimates and technical review of products at the end of these various phases.

Preliminary Design

The City's Definition of Standard Consulting Engineering Services defines "preliminary design" as a prelude to detailed design. Preliminary design includes:

- Preliminary engineering studies
- Surface and subsurface site explorations, measurements, investigations, and surveys
- Operations studies including drainage and traffic studies
- Functional planning
- Physical, economic (capital and operating), and environmental studies including evaluation, comparison, and recommendation of alternative preliminary designs
- Development and submission of a report and appropriate drawings documenting data gathered, explaining the assessment made, and stating the resulting conclusions; the report must contain all recommendations relevant to this stage of the project
- Special applications to public agencies for necessary authorizations, preparation and submission of reports and drawings, and appearance in support of the application

The Association of Professional Engineers and Geoscientists of the Province of Manitoba (APEGM) guide for engaging a consulting professional engineer uses the term "pre-design" rather than preliminary design. Both terms refer to what has to be done before final engineering services may begin; that is, both terms encompass the design activities carried out prior to detailed design. This work is largely investigative and subject to variation. Examples of work in this category are given on the APEGM website at http://www.apegm.mb.ca/FindingAConsultant.html.

Conceptual Design

Preliminary design is often broken into conceptual and functional design in large and complex projects. Conceptual design is often referred to in the scope of work and Consultant proposals for these projects.

Conceptual design, as the name implies, deals with operational concepts. For complex projects such as a wastewater treatment plant, conceptual design deals with the types of processes to be used, their major components, and the interactions among the processes. "Conceptual design" may also relate to a level of progress in an engineering study. This is of practical value when the level of effort relates to a desired precision for the cost estimate.

Functional Design

Functional design, like conceptual design, is used for large and complex projects. The term has various definitions, depending on the circumstances and the need to break down the WBS into smaller phases.

As with conceptual design, functional design can be used to define a level of design completion and is related to a specific cost estimate classification. For complex projects, such as a Wastewater Treatment Plant, the functional design is based on completion of process and instrumentation diagrams (P&IDs). The process flows and controls are known at this stage, which results in a more refined deliverable or product and therefore a more accurate cost estimate can be determined.

Detailed Design

Detailed design includes preparation of the detailed engineering designs, drawings, specifications, and bid opportunity for the work to be constructed. The City's expectation is for the design referenced in the bid document to be prepared to a Class 1 estimate.

5.2.5 Develop a Work Breakdown Structure (WBS) Dictionary

The WBS dictionary is an output of the create WBS process. It is a document or spreadsheet that provides more detailed descriptions of the WBS components, including work packages and control accounts. The descriptions support development of the delivery schedule and estimation of the resources required to complete the work.

5.2.5.1 How to Develop a WBS Dictionary

The WBS dictionary should be developed based on the project complexity. An example is given in Table 5-2. The information must include the WBS name and number and the WBS code so that it can be related to the schedule and budget. Additional information as determined by the Project Manager may be included or referenced.

Table 5-2: Sample WBS Dictionary

WBS Dictionary	
Project Name: Deliver a Capital Project	
Deliverable: 1.1.1 Project Charter	
Work Package ID: 1.1.1.1	**Account Code:** XX-XXXXXX
Work Package Name: Develop Project Charter	
Description of Work: Develop a Project Charter based on PMM procedure Section 4.3.1.1	
Assumptions:	
Assigned to:	**Date assigned:**
Estimated cost:	**Due Date:**
Resources:	

5.2.6 PDP and PXP Relationship

If the project is to be consultant-delivered, the Consultant will develop a detailed PXP (consultant delivered project delivery plan) with a WBS, schedule, and task descriptions for their specified deliverables based on the PMM. The City's PDP will identify the Consultant's deliverables (i.e. preliminary design report) the City's deliverable and tasks associated with each Consultant deliverable: i.e. Consultant contract (deliverable): soliciting, awarding, and contract administration (activities).

5.3 Plan Financials

5.3.1 Determine Budget

The total funds authorized to execute the project is termed the "budget." The budget is critical for work planning, progress and performance reporting. All business cases proceeding to implementation are accompanied by an approved budget, which cannot be changed without further formal approval.

For total cost accounting, all internal costs for delivery of the project are included in the budget. However, the City does not always use total cost accounting, and often projects span multiple budgets, so the PM must account for which costs are allocated to the project budget and which are funded from separate accounts.

The budget will be set based on compilation of cost estimates developed at the pre-project phase, and may be updated based on revised estimates during subsequent project phases. Often the business case will have

been developed from projection of historical costs or from parametric costs with a low level of accuracy however with a compensating contingency allowance. Updated estimates at subsequent phases must be compared to the budget as the project proceeds. Phase gates are the formal points for review and comparison of updated estimates with the budget.

5.3.1.1 How to Determine Budget

The initial budget is provided to the PM at the outset from the Business Case, prior to the process for developing the project charter. This is the first opportunity for the PM to flag issues prior to acceptance and buy-in. The PM must review the budget and request any necessary clarifications to confirm or identify necessary changes to the budget.

Determining a budget involves aggregating the expected cost estimates for individual deliverables and any other project cost components to establish a total cost.

The cost estimates typically include the following components of a project:

- Project Management
- Consultant or in-house engineering (in some cases, Team Members Salaries)
- Construction
- Operational costs – See below for details
- Third-party involvement
- Overheads (Finance and Admin) – See below for details
- Contingencies
- Inflation
- Other costs and fees

Finance and Administration Charges

With some specific projects, the City makes a major investment outside of normal budget categories. The City recoups these costs through finance and administration charges to the project.

Administration charges of 1 percent to a maximum capital value of $100,000 are applied to the capital budget to recover the City's internal administrative costs for expenses such as making awards, preparing contracts, and providing associated legal services.

Interest is charged at a rate of 2 percent to the capital budget to reimburse the operating budget for interim financing. Interim financing includes the City's share of the funding and debt charges and all other costs except for salaries, Consultant fees, and legal fees. Interest is not applied to external funding, such as grants.

Operations Cost

The business case considers the asset life cycle, with operational costs forming a major component. Project delivery does not directly address operating costs; however, when the capital program changes, operating costs may change and must be updated in the business case, operating and project budgets.

Estimates roll—up to the Deliverable level per the WBS

The above cost estimates roll-up to the each project deliver able to facilitate consistent project reporting and the monitoring and tracking of progress, generally:

- Costs internal to the City and assigned to external parties need to be assigned to each deliverable.
- Consulting and construction contracts will have separate estimates and need to be assigned to each deliverable.
- Management reserves and risk reserve contingencies are managed as separate line items.

Project costs are continually forecast and compared with the base line estimates and the project budget during project execution, which may lead to the need to transfer of funds between line items or the need to obtain additional budget funds or a reduction of budget funds!

5.3.2 Estimate Costs

Estimating costs is the process of developing an approximate value of the monetary value needed to complete the project component. The initial cost estimate is provided from the Business Case (from the pre-project phase) and updated by the PM based on development of the PDP. As the project proceeds and additional information becomes available the PM will also be responsible for developing, updating, compiling and reporting a number of intermediate cost estimate updates at different phases of the project for input to approval processes.

The cost estimate accuracy increases through the project life-cycle as the information on the product becomes more defined. At the early stages of a project the level of accuracy is the least and the cost uncertainty is the highest. The cost classification system attempts to improve communication among stakeholders and reduce the misunderstanding of what they represent.

5.3.2.1 How to Classify Costs

The City has adopted the Association for the Advancement of Cost Engineering (AACE International) cost estimate classification system as the de facto standard. This classification system has reasonably broad acceptance within engineering and construction communities. The classification system maps cost estimating accuracy to the phases of project completion, or degree of project definition.

The primary characteristic used to define the classification category is the level of project definition. A "countdown" approach using five categories is used labeled Class 5 through 1, with 5 being the lowest level of project definition, having for example only between 0 and 2 percent of engineering being complete.

The classification system relates a level of accuracy to the estimate, expressed as an over or under (+/-) percentage that decreases in value as the project progresses. An accuracy of +100/-50 percent means that the real value could reasonably end up as high as double (i.e. 100% of initial + 100% of increase = 200% of initial), or as low as half of the expected value. As an example, an estimate of $500,000 could be as high as $1,000,000, or as low as $250,000. Unlike contingency, the accuracy estimate is not added to the estimate, however used to demonstrate the potential range. It is also a factor for consideration in setting the contingency allowance.

Application of the classification system to the Project Delivery framework (Figure 3-2) is shown in Figure 5-3. At the pre-project phase the cost estimates is likely to be Class 5, and with the progressive refinement in project scope the accuracy increases as the project proceeds.

Figure 5-3: Project Delivery Cost Classification System
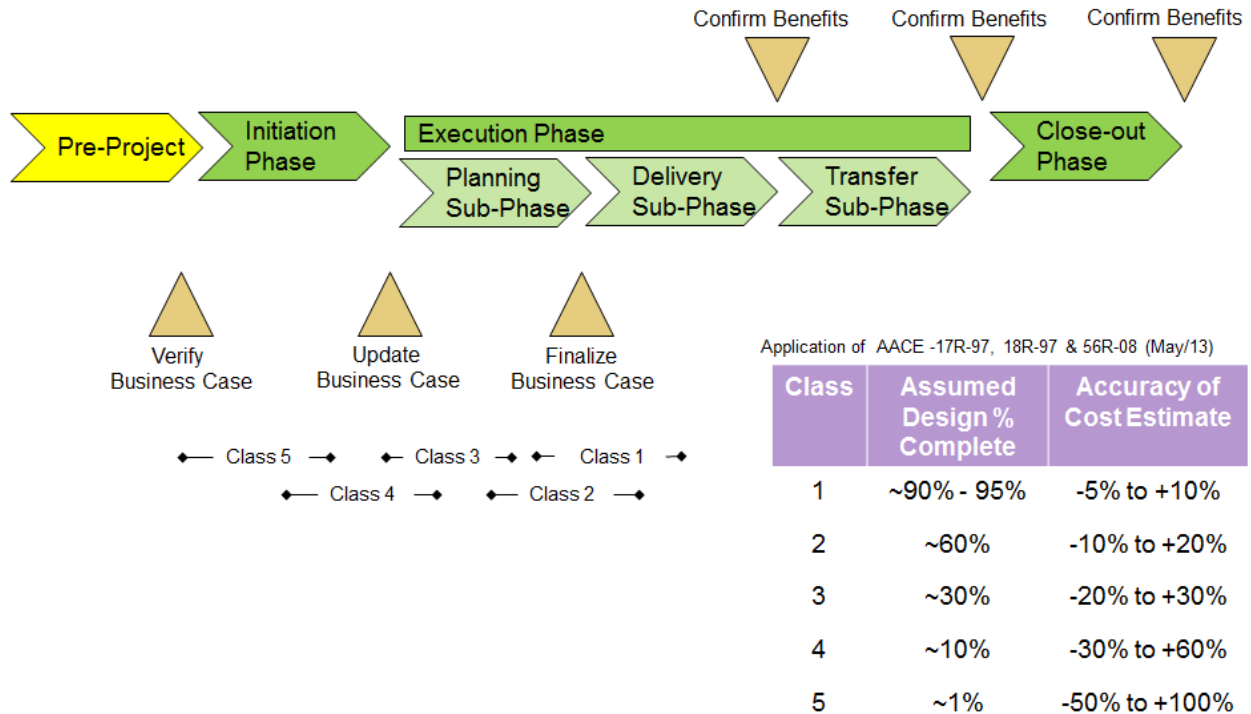
COST CLASSIFICATION RELATED TO PROJECT DEFINITION

ESTIMATE CLASSIFICATION*	PROJECT DEFINITION	DESIGN % COMPLETE	ACCURACY OF COST ESTIMATE
Class 1	Detail Design Drawing and Specification Complete, Pre-Tender Estimate	~90% - 95%	-5% to +10%
Class 2	Design Development in progress	~60%	-10% to +20%
Class 3	Preliminary Design for Budget Authorization	~30%	-20% to +30%
Class 4	Feasibility Study	~10%	-30% to +60%
Class 5	Concept Screening, Rough Order of Magnitude Estimate	~1%	-50% to +100%

COST ESTIMATE CLASS DESCRIPTIONS

- Class 1 - Estimates prepared based on completed detail design documentation (plans and specifications) as well as complete project delivery plans. At pre-tender estimate stage.

- Class 2 - Estimates prepared in progressive detail from a class 3 and are used to establish a contract value against which decisions can be made to revise the scope of the project and manage risk at a specific milestone in the design development.

- Class 3 - Estimates based on completed preliminary design documentation. This Class 3 estimate will form the basis for budget authorization and set initial control estimate against which project deliverables will be measured (i.e. on budget).

- Class 4 - Estimates prepared based on limited information with some engineering work completed and preliminary scope determination.

- Class 5 - Rough estimate prepared based on very limited information with no engineering work completed. Used to make an assessment of initial viability and for long range capital planning.

5.3.2.2 How to Estimate Costs

Cost estimates are required for each component of the project.

A Basis of Estimate (BOE) template is being developed to standardize the way estimates are developed and presented.

The WBS provides the structure for cost estimates. All costs must relate to specific deliverables in the WBS. A well-developed WBS with all deliverables identified and activities defined for their delivery provides the basis for the project and product costs.

Project Management Costs

Project management costs are those associated with running the project. Costs are developed through bottom-up estimating for each deliverable detailed in the WBS. The resource matrix which relates the number of hours for each individual and their billing rate to the tasks described in Section 5.6 is used for this purpose. It includes a table with personnel and their estimated time commitments for each task. The estimating process takes the following steps:

1. Assign a labour rate to each individual, including a percentage for benefits (~2014-19%)
2. Multiply the labour rate by the number of task hours for each individual.
3. Total the values for the entire project.
4. Add any additional project expenses for materials, equipment, and incidentals.

The task costs then may be rolled up from the deliverables to higher levels of the WBS. Rolling the costs up to the top level for every deliverable provides the total cost for the project.

A number of internal services and expenses identified in the PDP may not be allocated to the project budget. These may include internal support staff time, office overhead, etc., or in some cases the PM time may even be allocated to a non-project budget. While it is important to identify them, they must be considered separately for comparing the cost estimates with the budget. In the future, the City may track and record all capital-project-related costs, however systems for this are not yet in place.

Consulting Service Fees

Consulting services, such as those for engineering consultants, relate to specific deliverables(s) defined in the WBS. Consultants will track and submit costs to these identified deliverables in order that costs can be managed per the change control process.

Product Cost

For the initial PDP, the PM should start with the costs presented in the most current business case and update as required. As the project is now live, the PM should be performing additional due diligence/taking a deeper dive into cost estimates.   If the PM has access to or knowledge of additional information, such as more relevant estimating tables, or experience from previous projects for cross-checking the costs, the PM should include the additional information to increase the accuracy of the delivery plan.

Product costs are then developed and refined as part of the project execution. For large projects, the product cost is typically the largest cost component of the project and development of the costs should be appropriate based on the project's' complexity.

In many cases qualified estimators or quantity surveyors are required to perform this function.

Other Incidental Costs and Fees

Other incidental costs and fees must be identified and updated. If not specifically detailed, they may be accounted for in an all-inclusive capital cost estimate or considered as part of a contingency allowance. Identifying and tracking incidental costs and fees on an individual basis becomes more important as the project becomes more defined. Potential costs in this category include:

- Costs from other levels of government and authorities for permits, inspections, and approvals
- Third-party costs for specialist inspections, miscellaneous work, and services
- Regulatory and intervener costs for which special approvals are required
- Utility services and upgrades
- Public open houses and official openings for public programs
- Commissioning costs and customized manuals
- Operating costs during commissioning and start-up
- Use of temporary facilities and equipment
- Training costs
- Inflation
- Overhead
- Taxes

Cost Escalation

Inflation is a universal cost category that requires special attention. The estimating process must identify how inflation has been or will be addressed and managed. The most conservative approach is to assume inflation rates are applicable and then apply them on an annual basis to each of the component estimates. This requires that the schedules be defined and that this method be permitted in the budgeting process. Using a transparent method like this allows for proper monitoring and addressing unanticipated marketplace fluctuations.

Contingency Allowances

Contingency allowances are added to estimates to account for project uncertainty (risk) that could have a financial impact. Risks and consequently contingency allowances are generally higher at the early stages of a project and are reduced or eliminated as more precise information becomes available.

A variety of contingency allowances are used for different purposes at different points in the project, as shown in Table 5-3.

Table 5-3: Types of Contingency Allowances

Contingency Allowance	Cost Risk Type	Purpose	Owner	Value	Updating	Release
Estimating Contingency	(Known-unknown)	Accounts for imprecise knowledge of product details	PM	Varies with the level of cost estimate	Updated at milestones, such as conceptual or detailed design	The size of the contingency decreases during the project life cycle and is eliminated or replaced by the capital cost allowance upon construction award

Table 5-3: Types of Contingency Allowances

Contingency Allowance	Cost Risk Type	Purpose	Owner	Value	Updating	Release
Risk Reserve	(Known-unknown; should be identified in the business case; if not, they are unknown-unknown)	For response to realized risk events	PM	Determined through risk analysis, and set based on risks and risk tolerance	Continually monitored and adjusted as risks change	Formal process for release if risk is realized; surplus funds are retired after the risk has been eliminated
Capital Cost Allowance	(Unknown-known)	Accommodates routine changes during execution	PM and Project Sponsor	Usually set at a fixed percentage, such as 5%	Only changed by exception	The allowance is drawn down by issuing change orders
Management Reserve	(Unknown-unknown)	For expenses outside of formal project delivery	Project Sponsor (Senior Management – Director)	Varies	Varies	Upon authorization of the Project Sponsor

As Table 5-3 shows, the type of risk may be known or unknown, and a risk's extent and consequences may be known or unknown, which yields the following combinations:

- Known-unknown – The risk has been identified, however whether it will actually occur and, if it does, to what extent, is unknown. Knowing what the risk could be allows a rough estimate of the consequence to be made. An example is the effect of inflation on input costs due to global economy fluctuations.

- Unknown-unknown – Neither the risk nor its extent and consequences are known in advance. An example is encountering archaeological ruins in an excavation.

- Unknown-known – The particular risk has not been identified, however the general risk is expected to occur to a predictable extent with known consequences. An example of this is cumulative minor changes in a construction project.

Proper application, management and control of contingencies require that they have definitions and rules for how the values are determined, who owns them, how they are released, and how they are retired. The method of determining and applying contingency allowances is included in the following section. The method of identifying and quantifying project-specific risks that affect risk reserve contingency values is described in Section 5.9 and the process for tracking and managing contingency allowances are described in Section 7.3.

5.3.2.3 How to Apply Contingency Allowances

A fundamental issue that the PM must deal with is whether the project budget is sufficient to complete the project. Contingency allowances may be added to estimates to address various types of uncertainty and risks to improve the chances of the project being within budget, however they must not be applied to the point where the additional commitment will encumber funds that could otherwise be put to productive use or negatively impact the project's business case.

The use of contingency allowances as they apply through the project life-cycle is illustrated in Figure 5-4.

Figure 5-4: Application of Contingency Allowances through Project Phases
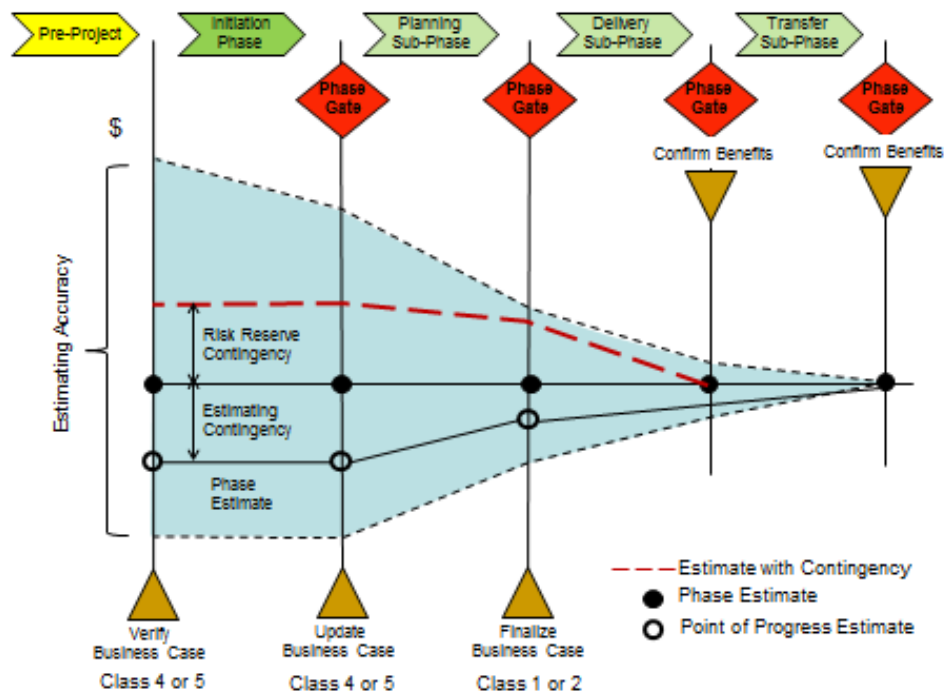
The estimating contingency, capital cost allowance, risk reserve contingency and management reserve are applied to the project estimates at the project phases as follows:

Estimating Contingency: At the early phases of a project, the product cost estimate will be based on a limited amount of information, a low degree of project development and will have a high degree of uncertainly. It is generally accepted that a number of factors (known-unknowns) will cause the subsequent estimates to increase and therefore an estimating contingency is added to the phase estimate to account for the expected increases. The value of the contingency depends on the nature of the product and the level of project development. The estimating contingency is maintained through the project phases at diminishing values in general proportion to the estimating accuracy until a fixed value is received for the product.

Capital Cost Allowance: When a project proceeds to the delivery phase, a bid for the product is received which in effect eliminates the estimating risk because a price is received which provides a level of cost certainty. The estimating contingency then in effect is converted to a capital cost allowance to address the unknown-known items of the delivery phase. The capital cost allowance is released during the execution based on the Change Control process or retired at the end of the delivery phase. There is no fixed rule for its quantification, however a value of five percent is common based on industry practices and precedence for most major projects.

Risk Reserve Contingency: The risk reserve is a contingency added to the phase estimates to improve the chances that the project will remain within budget. The risk reserve addresses both systemic and project specific risks and is quantified through the risk management process as described in Section 5.8. The risk reserve addresses the following:

- Risks that are to be accepted or are to be managed through a defined contingency allowance response will increase the required amount of the risk reserve contingency
- Risks not to be included in the risk reserve include:
  - Extraordinary events such as extreme weather, earthquakes, riots, acts of war, new government regulations, major strikes

- Major scope changes such as changes in product specifications, building sizes, etc. This risk should be eliminated early in the process through stakeholder requirements gathering.

Management Reserve: Management reserve is a provision held by the Project Sponsor for possible changes in project scope, extraordinary risks, and unforeseen external risks. Because of its nature and variability between projects, there is no industry practice or standard recommended for its quantification.

There are several methods available for quantification of contingency amounts. Selection of the method will depend on the type of contingency under consideration and nature of the project.

5.3.3 Prepare Basis of Estimate (BOE)

AACE recommends that a basis of estimate document be prepared as a deliverable to accompany the cost estimate. The BOE should clearly and concisely indicate the purpose and scope of the estimate, pricing basis, methodology, allowances, and classification of estimate, other assumptions and any deviations from standard practices. In addition to providing the background for development of the cost estimate it is intended to support review and validation of the estimate.

5.3.3.1 How to Prepare BOE

The BOE is to accompany and be a component of the cost estimate. The basic BOE shall include:

- Project
- Estimator(s)
- Description of the estimate
- Reference to the WBS deliverable
- Estimating methodology and cost basis
- Assumptions
- Classification of estimate
- Basis for contingency and allowances

5.3.3.2 Basis of Estimate Template

A template for the Basis of Estimate is provided in Appendix B.

5.3.4 Cost Sharing Projects (Future)

5.4 Plan Schedule

Scheduling is one of the three interconnected project components, as discussed in Section 5.1.1. Every project must have at least one schedule. The schedule developed by the PM at the outset of the project and reported in the PDP is the master schedule for the entire delivery chain and encompasses all the project components whether in detail or rolled up. It must commence from the date the project charter is approved and continue to the end of the project close-out phase. There may be multiple sub-schedules within the overall master schedule for delivery of various components, with the level of detail depending on the purpose of the schedule.

The schedule prepared with the PDP, as well as schedules incorporated into consulting and construction contracts, are the baselines for monitoring and control. Progress is measured against these schedules, and can only be revised through a formal authorization process.

The standard schedule format is the Gantt chart. MS Project is the City's de facto tool for scheduling. This tool, along with others on the market, provide many useful features, such as resource-loaded schedules that can be developed with unit rates for labour and material, and can be used for load levelling, critical path management, tracking, and progress reporting.

A critical path method (CPM) schedule is another type of schedule often used on complex projects. The CPM provides a method for finding the series of interdependent tasks that if carried out in a particular sequence will result in the shortest time the project can be completed. These tasks are then defined to be critical and delays to any of them will extend the project duration. While the CPM is a useful tool under some circumstances, most projects utilize only the Gantt chart.

5.4.1.1 How to Develop a Gantt Chart Schedule

The Gantt chart schedule is developed by:

- **Sequencing the WBS activities:** The logical relationships between the activities must be identified. Most projects will have relationships where one activity cannot commence until a previous one has been completed, or where one activity must follow another one.

- **Defining project milestones:** A milestone is a significant point or event in the project, this may be a completion date, required in-service date, contractual date, or a combination of dates.

- **Estimating activity resources and durations:** The activity durations and material delivery times must be identified and considered in scheduling. The activity durations will depend on the resources available and level of effort, and is closely tied to the process of creating a project team.

- **Developing the schedule:** This is the process of analyzing the inputs and creating a schedule. This is often an iterative process until the best fit is achieved. Scheduling software provides a valuable tool for this process.

The Gantt chart is the basic schedule used on most projects. It provides a graphic display of schedule information with bars representing work durations on a timeline for a series of activities. An example of an MS Project Gantt chart is provided in Figure 5-5 for the first few components of the WBS previously presented.

Figure 5-5: Gantt Chart example prepared with Microsoft Project
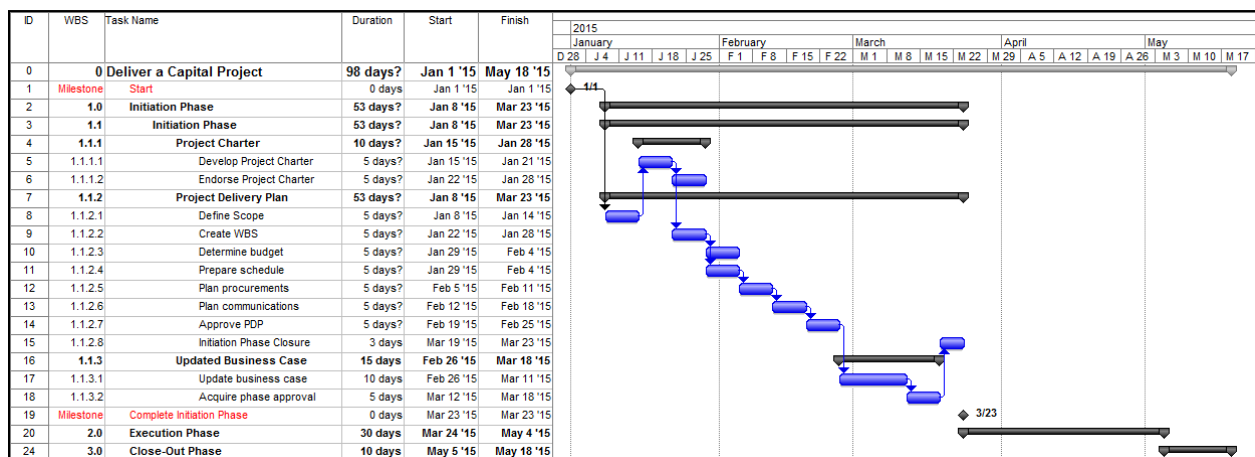
The MS Project example schedule is based on the WBS of Figure 5-2, and includes the following:

- The WBS outline numbering has been included on the schedule, and provides a cross reference for all WBS components. The third level defines the deliverables and the fourth level the activities.
- MS Project has user defined calendars, and the Gantt chart time scale can be adjusted as desired.

- The Gantt chart includes a summary task 'Deliver a Capital Project' at the first line, this is the project title, and defines the total project duration. If labour hours, resources and costs are included within the tool the will also be rolled up in the summary task. The entire duration for the summary task is calculated from individual tasks beneath it.
- Gantt chart shows selected outline levels, third and fourth levels for the Execution Phase are hidden, as well as the second, third and fourth for the Close-Out Phase.
- Work is only assigned to activities (fourth level tasks on the chart), higher level tasks only provide summaries.
- A series of finish-to-start links has been included (the preceding task must be completed before the next task commences); links can be modified as needed. Other relationships that can be used are start-to-start, start-to-finish, and finish-to-finish, or none at all, with only fixed dates specified. The resulting schedule includes a number of work packages being carried out concurrently and a number sequentially.
- Milestones have been inserted at the start and end of the Initiation Phase, the activities have been sized to fit within the time frame. The Milestones are of 0 duration (days) and they are represented as filled up diamonds. Note that milestones need not be of zero duration. Though a milestone is not needed while creating a WBS, it is a good idea to have.
- MS Project is a very useful tool with a number of additional features not mentioned in the preceding example, including tracking and reporting capabilities.

5.5   Plan Quality Management

Quality—the degree to which the project fulfills requirements as intended in the business case—is one of the four project objectives. Poor quality can affect project delivery success and the product function, performance, life-cycle costs, and customer satisfaction.

5.5.1   Plan Project Quality Management

The process to identify the quality requirements and standards that will be used on the project. The documenting how the project will demonstrate compliance with those quality requirements.

5.5.2   Develop Project Quality Management Plan (PQMP)

The project quality management plan documents the quality requirements for the project and product, and how the project will achieve compliance.

The skills and qualifications of the resources providing services greatly affect planning for and delivering quality requirements. The quality management plan must therefore also specify selection of a suitable delivery team using the following guidelines:

- Adherence to professional or trade standards may be required for certain types of work.
- Minimum qualifications and levels of experience should be considered in filling all positions.
- The procurement plan should consider the relationship between qualifications, quality, and risk in the selection criteria, and be commensurate with the project needs.

The PQMP is part of the PDP.

5.5.2.1 How to Develop a PQMP

The Project Manager identifies the foundation quality requirements that will be used by the project. For project delivery the PM will utilize the PMM as a foundational quality requirement. Other foundation requirements are included in Industry standards for a specific product or service. This could include Industry standards such as the City Construction Specification, AWWA standards and Building codes, etc..

The intent is to identify the core quality requirements in order that the project team understands what processes and procedure are to be followed on the project. The quality requirements are known at a high level at the early stages of the project and can be refined as the project evolves. The quality requirements are also included in other documents such as consultant and contractor specification (contracts) as the project evolves.

Quality assurance and quality control activities are generated from the quality management requirements. The details are noted below.

5.5.3   Plan Quality Assurance and Quality Control

- **Quality Assurance (QA)** – The process of reviewing (or auditing) the quality requirements and the results from quality control measurements to ensure that appropriate quality standards and operational definitions are used. Quality Assurance ensures you are doing the right things, the right way. Results from this process are used to adjust the "plan", "technical specification" or "way the work is being performed" in order to ensure customer requirements and expectations are met.

- **Quality Control (QC)** – The process of monitoring, evaluating, and recording results of executing the quality activities to assess performance and recommend necessary changes. Quality Control ensures the results of what has been done are what were expected. If not, actions must be taken to assess the reason and adjust either the process or the control parameters.

A comparison of QA and QC is described in Table 5-4.

Table 5-4: Definition of Quality Assurance and Quality Control

	Quality Assurance (QA)	**Quality Control (QC)**
Definition	QA is a set of activities for ensuring quality in the processes by which products are developed.	QC is a set of activities for ensuring quality in products. The activities focus on identifying defects in the actual products produced.
Focus on	QA is **process oriented** and focuses on defect *prevention.* QA is a proactive quality process.	QC is **product/service oriented** and focuses on defect *identification.* QC is a reactive quality process.
Goal	The goal of QA is to improve development and test processes so that defects do not arise when the product is being developed. Quality Assurance makes sure you are doing the right things, the right way.	The goal of QC is to identify defects after a product is developed and before it's released. Quality Control makes sure the results of what you've done are what you expected.
How	Establish a good quality management system/plan and the assessment of its adequacy. Periodic conformance audits of the how the system/plan operates.	Finding and eliminating sources of quality problems through tools & equipment so that customer's requirements are continually met. Results are used in QA to adjust the process to eliminate consistent defects.
What	Prevention of quality problems through planned and systematic activities including documentation.	The activities or techniques used to achieve and maintain the product quality, process and service.

Table 5-4: Definition of Quality Assurance and Quality Control

	Quality Assurance (QA)	**Quality Control (QC)**
Responsibility	Everyone on the team involved in developing the product is responsible for quality assurance.	Quality control is usually the responsibility of a specific team that tests the product for defects.
Example	Verification is an example of QA. Verify that the PM followed the PMM and PDP. Verify that a Supplier follows their mixing procedure or IT followed their scripts.	Test results are an example of QC. The number of Change Orders on a project. Concrete testing is an example of QC.
As a tool	QA is a managerial tool.	QC is a corrective tool.

The QA and QC processes are required for every project. The expectation is for the PM to use these tools to plan, arrange, monitor, and administer the project to a standard that meets the project quality requirements.

The QA/QC plans and their monitoring may be assigned to a QA/QC manager or be undertaken by the PM. Reviews must be undertaken by someone other than the person who performed the work.

5.5.3.1 How to Plan Quality Assurance

The Project Sponsor, PM and project team are to provide QA throughout all project phases, regardless of the delivery method. The PM promotes QA by ensuring project team members follow a quality process. Refer to the table below for examples of Quality Plan, Quality Assurance and Quality Control.

The PQMP will include specific processes for checking the work, outputs, and deliverables. The PM coordinates the internal reviews and clearly defines reviewer expectations. Formal QA reviews may include:

- The Project Sponsor utilizing the Project Management Check List to ensure the PM is following the processes outlined.
- Project Sponsor review and sign-off of the PDP at stage gates.
- Review of technical memoranda and reports, which are typically submitted as drafts and updated to final documents after the review.
- Staged reviews for large and complex projects; this may include splitting the product life cycle into multiple phases, for example, splitting preliminary engineering into conceptual and functional design.
- For detailed design, sequential design reviews at the 30, 60, and 95 percent complete steps are common.

The PQMP identifies the process, who will participate in the reviews and includes updated review schedules. The PM needs to define the review period expectations so that the project team can properly plan and schedule its input.

The PM is responsible for initiating corrective action when the quality assurance objectives are not met.

5.5.3.2 How to Plan Quality Control

Quality Control applies to meeting identified project quality requirements for both project management and product delivery. The Project quality requirements define the specific QC processes and activities that need to be undertaken to ensure the product or service is meeting the specification identified.

This is a Monitoring and Control process, and is where every deliverable is inspected, measured in some way, and tested. It checks that the results conform to quality requirements (standards). It covers both the project and its products through the project. If any defects are found, then they will need to be corrected. The QC process needs to identify what the process is to address non-conformance.

5.5.3.3 How to Develop a Product Quality Control (QC) Plan

A product QC plan includes processes for adherence to the Quality requirements for the following:

- QC review and inspection events
- Procedures for reviews and inspections
- Timing of QC events and identification of reviewers and inspectors
- Checklists and forms for event tracking and documentation
- Quality metrics for comparison of results
- Process for addressing deficiencies, corrective actions and Non-conformance
- QC sign-off forms

5.5.3.4 Sample of Project Quality Management Plan

The following table identifies how the three quality elements interact.

Quality Requirement	Quality Assurance	Quality Control
Follow the PMM	Project Sponsor to utilize the Project Quality Check List to ensure the processes are being followed.	Phase Gate reviews. Sign-off on key deliverables.
Develop a Training Plan	The PM would review the training to ensure the processes outlined are being followed.	
Concrete meets a specific CSA standard	The CA ensures that the consultant, contractor and supplier are aware and follow the CSA standard (process).	Concrete tests. Concrete test results. Non-conformance identification and actions.

5.5.3.5 Project Delivery Check List Template

A template for the Project Delivery Check List is provided in Appendix B.

5.5.4 Plan Value Engineering (VE)

Value engineering (VE) is a technique that can be used on most projects to increase value and should be considered for all large projects. VE identifies unnecessary costs for products and services that can be reduced, while still ensuring that quality, reliability, performance, and other critical factors meet or exceed customer expectations. It seeks to develop best-value solutions, not necessarily lowest capital costs.

A multi-disciplinary team identifies the improvements through structured application of VE. The team identifies the product function or service; establishes a worth for the function; generates alternatives through brainstorming and creative thinking; and provides the needed functions and reliability at the lowest cost. Led by a VE facilitator, the team can comprise those involved in design, construction, and maintenance, as well as technical experts. A number of firms with qualified practitioners can provide VE expertise.

5.5.4.1 How to Plan Value Engineering

For a large and complex project, VE is usually undertaken at the end of the functional design phase, and results are incorporated into the functional design report. The VE team's recommendations are suggestions only; the City and the project Consultant make the decisions.

The cornerstone of effective VE is generation of a large number of ideas that may be developed into feasible changes. One of the best methods for obtaining a wide spectrum of ideas is to use an interdisciplinary team of specialists. It is helpful to have at least one team member from a markedly different background, since their comparatively naive viewpoint often produces fresh, unconditioned questioning. The team is headed by a person specifically trained to conduct VE reviews, and should include the project engineer or another employee of the project consultant who is familiar with the project design. Whenever practical, a representative of the City should participate. The VE workshop is an intense working session that culminates in an oral presentation of the VE recommendations.

Each member of the VE team contributes a different pattern of thinking and ideas that reflect their own experience. The ideas of each team member tend to stimulate responses and contributions from other team members, based on their backgrounds. Each team member readily responds, and the effect is that ideas represent each participant's own area of interest.

All VE efforts include some form of cost estimating or economic analysis, however experience has shown that the beneficial effect is not restricted to economic savings. Significant improvements are often made in function, reliability, maintainability, reduction in complexity, and other attributes.

Early VE tends to produce greater results, however there are opportunities for improvement at any stage. The ideas that are feasible for adoption change as a project moves from concept to completed design to construction and through to operation.

The conceptual design phase is one of the most productive times for VE review. As mentioned earlier, VE is undertaken at the end of the functional design phase. Changes are more readily adopted before the detailed design phase has been started. However, at the conceptual design phase, the engineering experience and competence of the VE team is critical, since appraisals must be made before the complete design is available.

Another type of VE review is often conducted when detailed design is 80 to 90 percent complete. At this stage it is usually too late to change basic concepts, however there are opportunities for improvements in details.

During the operations stage, cost-saving studies have not generally been called VE, however a VE-like process can still be carried out. To obtain savings at this stage, additional capital expenditure is often required. The VE team for an operational facility should have a combination of practical and theoretical skills.

Use of VE to reduce costs or enhance a facility's reliability, efficiency, or performance has been demonstrated in many different projects. The VE team has a rare opportunity to review the conceptual or functional design. For a relatively low expenditure, the VE team may identify substantial cost savings. At a minimum, a VE study increases overall sensitivity to project costs and boosts confidence for both the City and the project consultant even if significant changes in the design are not made. The City is thus assured of receiving the best value for the project budget.

Several approaches are used for VE reviews. One of the most direct uses steps labeled Information, Creative, Evaluation, Development, Presentation, and Report, as described below.

Information – During the Information step, the VE team reviews the proposed design, becoming familiar with available information on function, design, construction techniques, and costs. The worth of each project element (the least-costly way to perform it) is then determined, and the cost-to-worth ratio is calculated. A high cost-to-worth ratio indicates an area where VE effort may be profitable. Several other

techniques are also used to help the VE team target the project elements that have high potential for cost savings or project improvement.

Creative – After identifying areas with high improvement potential, the VE team begins a creative effort, sometimes called "brainstorming," to generate ideas for alternative methods of providing the basic function. Criteria and indicated requirements are challenged, and the broadest possible range of alternatives is considered.

Evaluation – The team leader rejects ideas obviously not suitable for implementation. The entire team then ranks the remaining ideas, listing advantages and disadvantages of each and evaluating items such as technological risks, time required for implementation, and cost. The most promising alternatives are selected for further study and refinement.

Development – The best alternatives are developed into more complete proposals with more detailed cost estimates and a summary of relevant information. Cost comparisons, as estimates of savings, are made on a total life-cycle cost basis that includes both construction cost and operation and maintenance cost.

Presentation – The VE team presents the alternatives to the City, the project Consultant, and other decision-makers. The City usually considers the project Consultant's response before making a final decision on which alternatives to incorporate into the project.

Report – A formal report of the VE study is prepared listing recommended alternatives, providing complete background information on the study, and describing the basis of recommended changes. The report ordinarily summarizes the life-cycle cost savings that would be achieved through adoption of the recommended changes. Sometimes, the most valuable VE suggestions do not result in cost savings, however all are included in the report.

5.5.4.2 Value Engineering Template (Future)

5.6   Plan Procurement

All capital projects should have previously considered the delivery method at a higher level of analysis as part of the business case development. Considerations may have included:

- Public Private Partnership (P3)
- Design Build (DB)
- Construction Manager (CM)
- Design Bid Build (DBB)
- In-House

The delivery method should be reviewed as part of the Planning phase and a more in-depth analysis may be warranted.

The Public Service normally procures infrastructure using the design, bid, build approach, which is the most common delivery model for most government projects in Canada. As such, the City has standardized contracts in place for this model.   The allocation of risk between the City and the contractor is well defined and understood by all parties. Further, the City has established process and experience in administering of DBB contracts.

Standardized contractual documents likely do not normally exist for other delivery methods and likely have to be specifically developed for the project. Therefore, there is additional time and expense associated with developing new contracts for alternative delivery methods. These contracts have a different allocation of risk between the two parties and the City staff will not have experience in drafting or administering these

contracts. As such, there may also be additional risk associated with pursuing alternative delivery approaches.

Therefore, due to cost, schedule and contract risk, alternative delivery approaches would only normally be considered for Major Capital Projects. Alternative delivery approaches do not normally provide significantly positive value on smaller dollar value projects, thus would not normally be pursued on projects below the Major classification.

5.6.1 Review of Project Delivery Methods for Major Capital Projects

As Major Capital Projects involve large dollar amounts and risk, it important that the correct delivery method is selected an early stage of the project. Different delivery methods involve different allocations of risk between the contractor and the City and have the potential to impact the City's finances in both a positive and negative manner. As such, the PM must examine the project and determine the best delivery method for that project, considering alternative delivery methods.

Determination of the best method of project delivery will take considerable judgement on the part of the PM. This manual includes a Technical Memorandum developed by CH2MHill as a general guide to assist the PM in the determination of the best delivery method for the project. The analysis performed by the PM should consider the project risk profile, past experience with similar projects delivered using the DBB model as well as the overall project fit with a particular delivery model.

A professional consultant may need to be retained to assist the PM in the determining that the best method of delivery for a specific project.

5.6.1.1 Process for Review of Delivery Methods for Major Capital Projects

For all Major Capital Projects, the process would be for the department to determine the best delivery method for the project. The assessment of various delivery methods would be performed by the PM and approved by the Project Sponsor. Department Head approval should be obtained prior to submission to the Manager of Infrastructure Planning division.

The PM would then submit the recommendation and supporting analysis to the Manager of the Infrastructure Planning division.

The Manager of Infrastructure Planning Division would then perform a second party review on behalf of the CFO.

If confirmed by the Manager of Infrastructure Planning Division, the Project Sponsor would present the recommendation of delivery method to the Major Capital Projects Steering Committee for approval.

In the event the recommendation is for the project to be procured using an alternative delivery method, the next step would normally be to have performed an independent assessment of Value for Money.

Consideration should be given to whether Council approval of the delivery method is required as there is some precedent in having alternative delivery methods approved by Council.

The PM must also ensure that all projects delivered using an alternative delivery method are compliant with Provincial Legislation and Regulations (i.e. – The Public-Private Partnerships Transparency and Accountability Act).

5.6.2   Review Design-Bid-Build Delivery Option

The most common project delivery method for infrastructure projects is DBB. This method is routinely selected for consultant and is the base assumption for the processes and procedures in this PMM.

At least two procurements are required for DBB projects delivered by a Consultant. The first is for the Consultant, who is assigned specific product delivery responsibilities, with the City's PM administering the consultant's services contract. The second procurement is for the Contractor.

With this approach, the Consultant and Contractor do not form a contractual arrangement with each other; instead, the project owner has a contract with each. The City authorizes the Consultant to act on the City's behalf in inspection and oversight of construction, as illustrated in Figure 5-6. Procurement and monitoring and control procedures consistent with the contractual arrangements are required. Roles, responsibilities and authority for the DBB delivery approach are provided in Section 5.6.

Figure 5-6: Design-Bid-Build Contractual Relationships
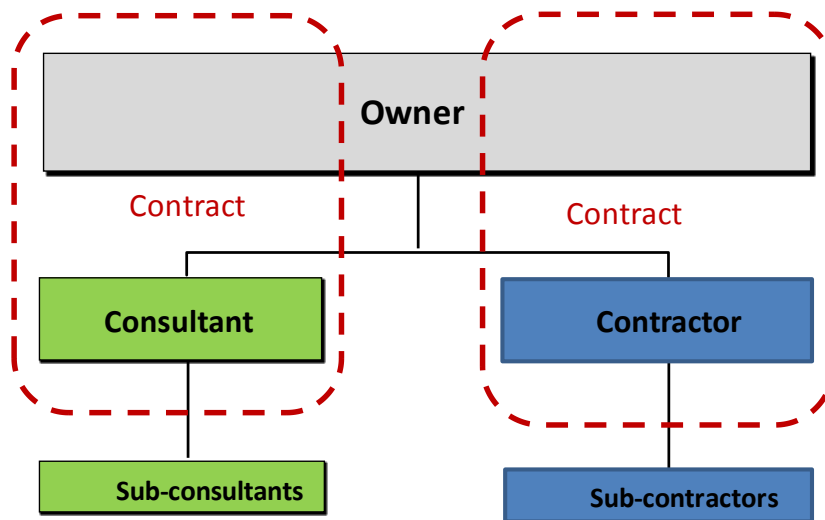
The procurement plan must consider which procurements are required, the schedule for procurements, how assignments will be made, who will be involved in the process, and whether any special requirements exist (refer to Section 6.3 for detailed descriptions of the procurement process and links to related City websites).

Consultant Selection – Every supply is to be initiated through competitive offers unless permitted as an exception under the Materials Management Policy (Policy clause B3). FM-002 further defines rules for exceptions on consulting assignments for capital, and non-capital projects. For assignments below the threshold limits, single-source (direct) assignments are permitted. Single-source assignments exceeding the FM-002 values must be approved by the Executive Policy Committee. In most cases, a competitive process is required for consultant selection.

Before soliciting proposals, the City must define its requirements by developing a request for proposals (RFP). The RFP approach is well suited to consulting services, since it allows Consultants to use their creativity and expertise in crafting proposals with unique features and approaches. For competitive proposals, the Consultant balances features with costs in attempting to arrive at a winning proposal. In all but exceptional circumstances, the Consultant pays proposal preparation costs.

Although required for every Consultant assignment, RFPs may vary in content and complexity, depending on the size and nature of the project. RFP preparation is discussed in "executing process group" in Section 6.4.

The time and effort needed to assign a consultant can be significant, because:

- The RFP is a major document that must include an accurate scope
- The project team must have the opportunity for input and review before the RFP can be issued
- Once the RFP is issued, consultants must have adequate time to prepare proposals and respond
- The proposals must be reviewed in detail and scored by the evaluation committee
- Consultant interviews may take time for coordination and execution
- After the selection committee has completed its rating, further time may be needed for internal recommendation reporting, review, and approval

If there are any other special requirements, they must be factored into the timeframe and cost. For example, if a two-stage proposal is used, a much longer time will be needed to assign a consultant.

Contractor Selection – For the DBB method of delivery, the design, drawings, and specifications are prepared by the Consultant (or by the City for in-house projects) and packaged into a bid opportunity for solicitation of competitive bids.

Construction contracts are the largest component of the capital budget and it is important to consider the contracting strategy when planning the work. Availability of contractors, size of the contract packages, sequencing of the work, and even time of year are potential considerations for packaging and issuing bid opportunities.

Third-Party Contracts – The need for third parties to participate in the work must be considered as part of the procurement planning process. Examples of potential third-party contracts are:

- Laboratory testing
- Specialist inspectors and testing agencies (concrete, roofing, welding, and air movement)
- Geotechnical Consultants
- Commissioning Contractors

The procurement plan must identify whether these services are to be contracted directly by the City, included within the consulting contract, or included within a construction contract.

Once all the procurement details are known and the plan is developed, the details must be added to the work plan, with an appropriate work description, schedule, and cost estimate.

5.6.2.1 How to Plan Procurement

A procurement decision model based on the Materials Management Policy and FM-002 is shown in Figure 5-7. The model applies to all procurements, including consultant services and construction contracts. The decisions are based on budget amounts, whether the procurement is for a consultant, and whether the solicitation will be competitive or single source. If it is to be single source, the next decision is whether it requires Executive Policy Committee (EPC) approval. Consultant assignments below the FM-002 limits do not; limits are different depending on whether the supply is for a capital project. In most cases, higher-value capital projects require competitive proposals for both consultant services and construction contracts.

Figure 5-7: Process Decision Chart for Procurement Planning
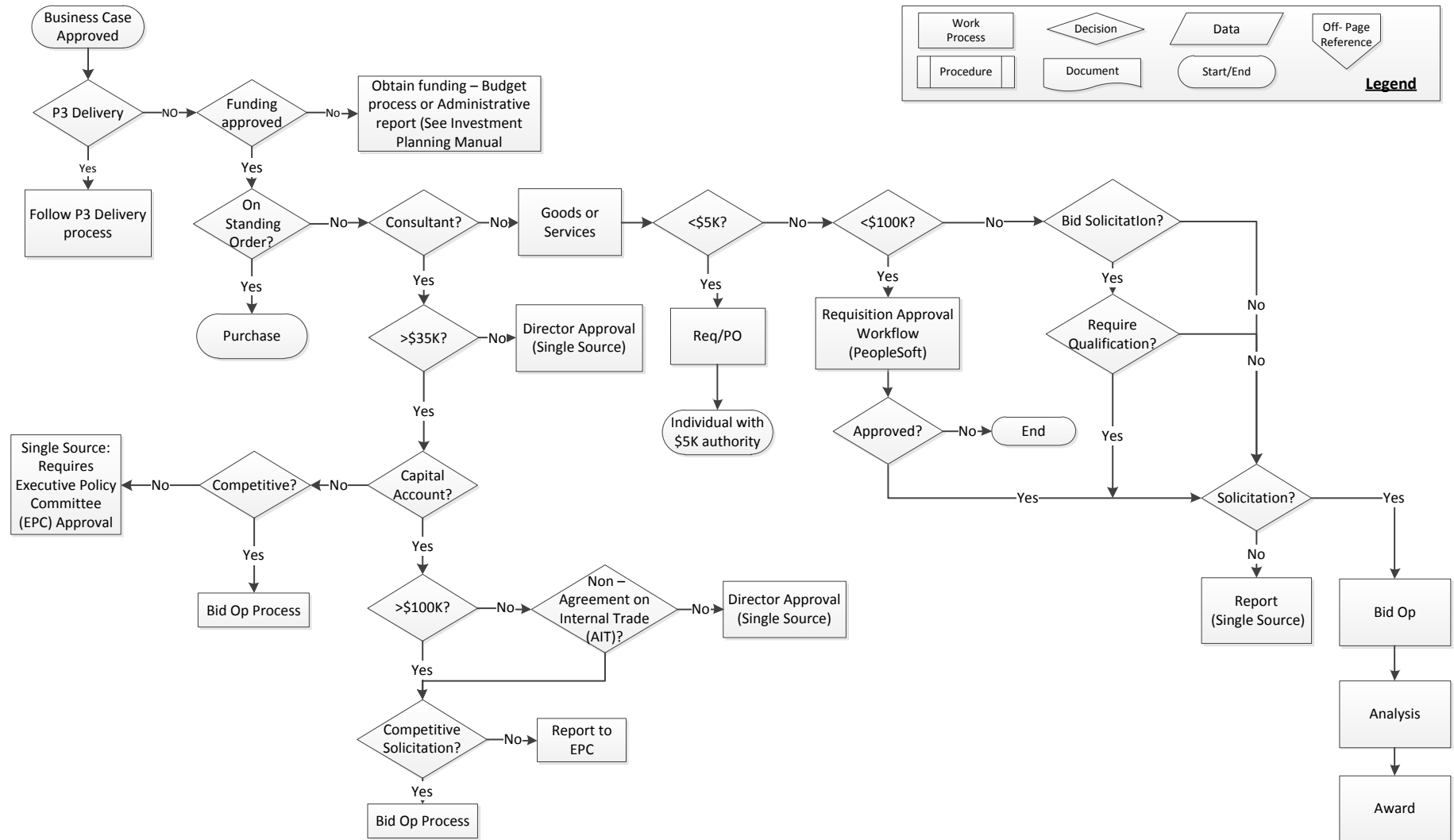
5.7   Plan Human Resources

The human resources planning process includes identifying the organizational structure for the project, the resource requirements, and roles, responsibilities, and authority for project delivery.

5.7.1   Organizational Structure

By definition, projects are temporary endeavours; the team structure lasts only as long as the project. However, some organizational structure features are used repetitively, with the same individuals filling the senior roles for most projects.

A Project Sponsor, PM, and project team are always required regardless of project size, with the team members, committees, and support staff depending on size and nature of the project.

The generic organizational structure for a consultant-delivered project is shown in Figure 5-8 (a Consultant is one type of vendor). The Project Sponsor, Major Capital Project Steering Committee, Project Advisory Committee and PM are all City personnel. The only expectation is that outside experts are sometimes added to the steering and Advisory committees.

Additional project staff from the City and from the Consultant are added, depending on the project needs, and the project-specific organizational structure is defined in the PDP.

Figure 5-8: Project Delivery Organization Chart
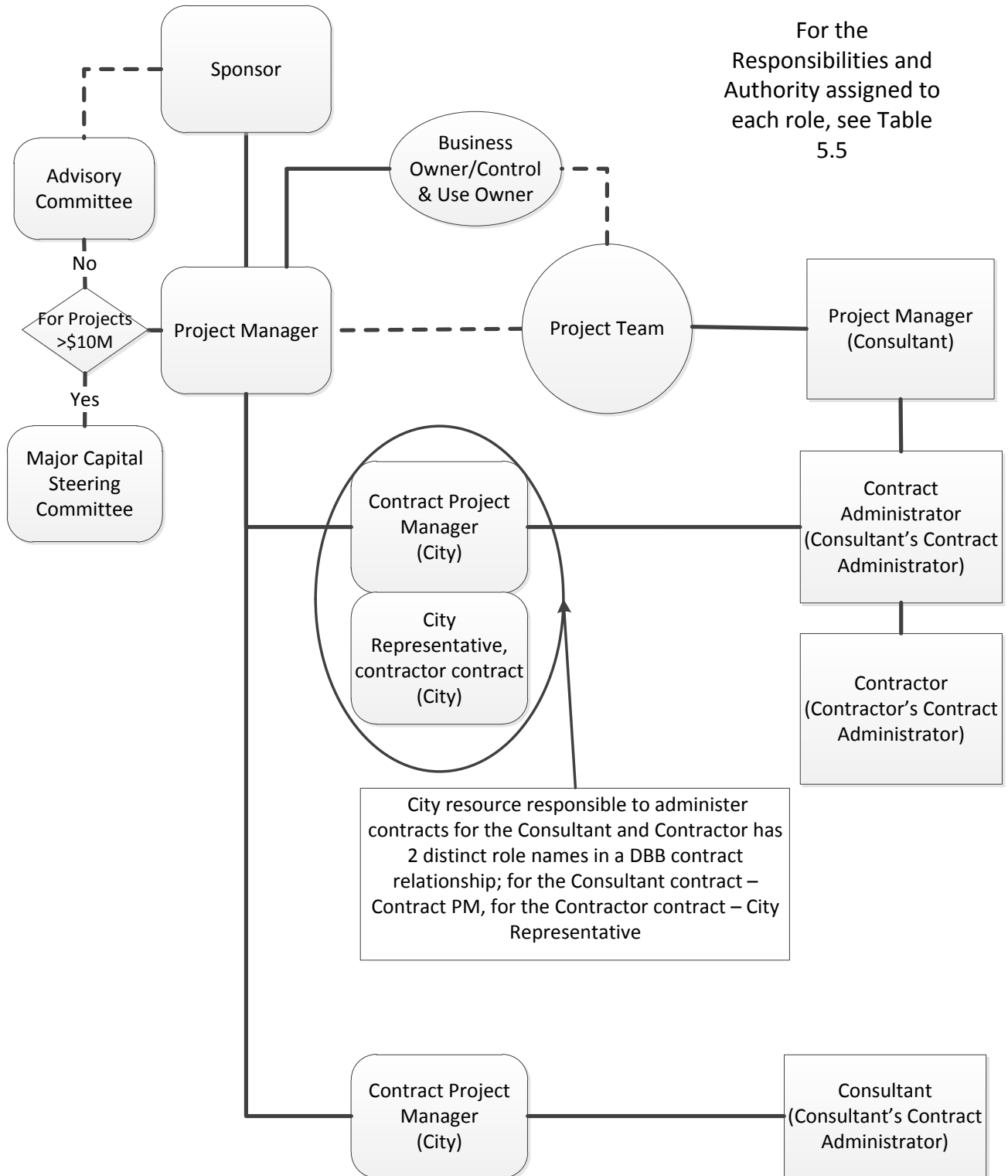
The organizational structure requirements for P3 and alternative project delivery (APD) option may be quite different than for a DBB delivered project, and may be specific to the project. In many cases, for P3 and APD the project delivery and its planning, execution, monitoring, and control are solely the vendor's

responsibility, so the City does not require the traditional organizational structure. It is the PM responsibility to define and populate the project organizational structure with the key roles in the PDP regardless of the delivery approach.

5.7.2   Resource Requirements

The resource requirements are identified during the development of the work plan. The resources required on the project will depend on factors such as:

- Skill set for specific tasks – require a design engineer for a specific discipline

- Time constraints – need more resources to complete in a specific time

- Resource availability – when resources are available based on current workloads

These factors need to be assessed in the development of the project work plan and the result captured in the resource section of the PDP.

5.7.3   Roles, Responsibilities, and Authority

Many individuals and groups of people may be involved in a project. Table 5-5 provides an overview of the participant's roles and their responsibilities and authority. Details on specific responsibilities and authority for each role are provided in the process and procedures in this PMM and built into the project delivery process charts in Appendix A.

The roles, responsibilities and authority and any updates or revisions are a refinement of the roles, responsibilities and authorities in the most current City policies, standards and directives, which were identified in PMM Section 2.0.

Table 5-5: Project Roles, Responsibilities, and Authority

Role	Responsibility and/or Description	Authority
City of Winnipeg (City)	Legal entity named on all City contracts.	Authority is delegated to members of the City's administration via the City of Winnipeg Charter
Chief Administrative Officer (CAO)	The CAO is the most senior bureaucrat in the civic service, responsible for management and operation of the corporation.	Under the Materials Management Policy, City Council has delegated senior levels of authority to the CAO, including materials management authority
Chief Financial Officer (CFO)	The CFO is responsible to ensure that there is a formal project management system and that a quality management plan is utilized to ensure the system operates as designed.	The CFO has delegated authority under FM-002 for Policy item administration and is the ultimate decision-maker on most project delivery issues. The CFO may further delegate authority to the Project Sponsor.

Table 5-5: Project Roles, Responsibilities, and Authority

Role	Responsibility and/or Description	Authority
Project Sponsor	− The individual within in the business unit that is responsible to deliver the project who has the authority to assign resources and ensure the project is successful. − Is at a level in the organization that can provide the support that the project need to be successful − Acts as a project champion, supporting the project's goals and objectives; keeps updated on major project activities; and is a decision-maker for the project. − takes part in selection of the PM, project initiation, and development of the project charter. − is involved in the project planning process and reviews and accepts the PDP and its updates. − supports the PM; assists with major issues, problems, and policy conflicts; and removes obstacles.	The Project Sponsor authorizes use of resources for the project, approves major deliverables for delivery to the business owner, and signs off on each project phase.
Manager of Capital Projects	The Manager of Capital Projects prepares and guides capital projects management by introducing methodologies, conducting QA reviews, and preparing annual reports.	The Manager of Capital Projects is the owner of the PMM and authorizes changes and updates.
Major Capital Project Steering Committee	The Major Capital Project Steering Committee is project-specific and is formed for major capital projects. It is responsible for monitoring and managing project risks. The Project Sponsor is the Committee Chair.	The Major Capital Project Steering Committee provides direction to the PM on managing project risk and has decision-making authority.
Project Manager	The PM develops the PDP and delivers the project with support from the project team. The PM manages the project team's performance and secures acceptance and approval of deliverables from the Project Sponsor. The PM is responsible for communications, risk management, escalation of issues that cannot be resolved in the team, and making sure a quality project is delivered on budget, on schedule, and within scope.	The PM is responsible for project delivery, and acts within the boundaries of the PDP.
Change Manager	The ChM acts as a resource to the PM and the project team. The ChM is responsible for change management deliverables, such as stakeholder and change assessments, communications, change management planning and implementation.	The ChM's authority is defined by the CAO and by Department Directors who select departmental change managers for training and certification.
Contract Administrator (CA)	The CA is the City's representative for administration of contracts. This role may be filled by the Consultant or by a City representative on in-house projects.	The CA's authority is defined in the general conditions (Cs) for the contract.
Project Team	The project team executes the project along with the PM. It consists of a variable number of members who are brought in to perform tasks according to the project work plan and schedule. The project team members produce outputs or deliverables as outlined in the plan at the level of effort defined for them. On larger projects, some project team members may serve as task leads, managing staff on tasks and providing technical leadership.	The project team performs administrative and technical functions in accordance with industry practices, as defined by the PDP and under the direction of the PM or delegate.

Table 5-5: Project Roles, Responsibilities, and Authority

Role	Responsibility and/or Description	Authority
Project Advisory Committee	The Committee is advisory in nature and provides advice/not direction to the PM. The advisory members act individually and collectively as vocal and visible project champions in their representative organizations. The Committee is meant to provide a support function to the PM, drawing on experience and expertise from a variety of backgrounds to improve the overall quality of the project delivery. The Committee may also facilitate better coordination of project activities between different areas of the City. The Project Sponsor is the Committee Chair.	Provides guidance to the project and advice on project deliverables, issue resolutions, policy decisions, and scope changes, but does not have decision-making authority.
Selection or Evaluation Committee	Evaluating proposals or bids with multiple weighted criteria requires an Evaluation Committee with appropriate expertise. The team should consist of a technical and financial representative and have access to Legal Services and Materials Management.	Reviews and rates proposals, provides evaluations.
Corporate Administration	The project delivery team includes multiple parties at various steps with various roles. Corporate administration participants include Materials Management and Legal Services, which each have a defined and sometimes ad-hoc role in project delivery.	Provides support and advice for effective project delivery related to City processes and procedures.
Customers	The customer is the end user of the service that the product or service provides. The customer can be external or internal entities.	Provides input and opinions into the City's Service Level targets.
Business Owner	The entity in the project organizational structure that accepts receipt (ownership) of the final product or service (deliverables). Is a generic role name used for both asset and non-asset based projects. Have the responsibility or authority in the organization for the investment. the control and use owner and the business owner can be the same individual on a project.	Sign-off of the initial requirements and the final deliverables.
Control & Use Owner	Responsible for ownership of the asset on the City's behalf. Responsible to define the service level targets based on consultation with the customer. Defines the strategic service need which includes the service the asset provides. Manages the risk of existing assets to ensure service target are meet at the lowest lifecycle costs. Ensure that the Investments and resulting benefits meet the needs of the customer. the control and use owner and the business owner can be the same individual on a project.	Provide the service that the customer needs and is willing to pay for.
Vendors	Vendors are contracted to provide additional products or services the project will require. Consultants are one type of vendor, as are Construction Contractors and those providing third-party paid services.	Provides products or services in accordance with contracts.

Table 5-5: Project Roles, Responsibilities, and Authority

Role	Responsibility and/or Description	Authority
Stakeholders	Stakeholders are all those groups, units, individuals, or organizations, internal or external to the organization, that have an interest in, are impacted by, or can impact, the outcomes of the project. This includes the project team, Project Sponsors, Steering Committee, customers, customer co-workers, public, special interest groups, and regulators.	Authority depends on the type of stakeholder (see above).

5.7.4   Duties and Obligations

Successful projects are planned, designed, and built by a project team consisting of a PM, Project Delivery Team, Consultant, and Contractor. Quality can only be achieved when each team member competently and in a timely fashion fulfills their responsibilities in cooperation with the other team members. The duties and obligations inherent in these responsibilities and required for the success of the project are listed in Table 5-6 for a project team.

Table 5-6: Duties and Obligations of the Project Team

Duty/Obligation	Details/Examples
• Fully disclose facts	• Provide access to all pertinent project data • Identify all known constraints • Define project objectives and expectations and communicate them accurately • Provide other agencies and public authorities with required information
• Be truthful	• Establish and maintain trust • Recognize the need for professional respect and collaboration • Keep commitments
• Maintain integrity (perform on a highly ethical plane)	• Be truthful; don't simply tell team members and stakeholders what they want to hear • Fully disclose related external interests • Avoid conflicts of interest • Only accept work you are qualified for (or add appropriate expertise to the team)
• Demonstrate leadership	• When crises occur, carefully define the problem, not just the symptoms, and take positive authoritative action to solve it
• Enhance communications	• Facilitate and encourage communication • Inform the Consultant of how and why the City/system works • Avoid the we/they mindset • Be articulate; explain clearly and succinctly the merit and the benefit of proposed schemes in a balanced and objective, yet authoritative, manner • Create a process that allows Control & Use owners and key stakeholders to contribute

Table 5-6: Duties and Obligations of the Project Team

Duty/Obligation	Details/Examples
• Establish reasonable and attainable objectives	• Reach early agreement on a reasonable program of requirements and attainable performance requirements • Carefully consider relationships between cost performance, function, and aesthetics • Provide detail on objectives and refer to specific aspects of a project, such as function, operation, schedule, technical matters, quality, aesthetics, and administrative, fiscal, or management requirements
• Be responsive to the established scope, budget and schedule	• Be vigilant and committed, showing forethought and anticipation in protecting the City's interests (and hence, those of the public) in the conduct of assigned projects
• Be prepared	• Maintain files in order • Be prepared for meetings • Respond to team members and stakeholder requests in a timely fashion • Keep the Control & Use owner informed
• Allow adequate time for performance	• Mutually develop a realistic schedule • Recognize that an unrealistic work schedule may discourage sound professional judgment
• Delegate or assign decision-making authority appropriately and support that authority	• Establish at the outset and maintain the necessary and appropriate channels of responsibility and authority • Empower the PM with appropriate authority
• Be realistic in the assumption of risks and liability	• Cleary identify conditions that are not easily understood or determined in advance
• Encourage quality	• Develop the plans and follow the plan • Focus on the process and continuous improvement • Encourage innovation and creativity in the project team
• Accept authority and responsibility	• Be accountable for satisfactory overall project execution and control of budget • Be responsible for all project staff, including vendors • Carefully consider and define fee arrangements without resorting to subsequent requests for additional fees on the basis of alleged misunderstandings on the scope of services to be provided • Ensure that work is accurate and precise so the City need not duplicate the design process to correct drawings and specifications
• Fund project adequately	• Recognize that design is critical to the overall project success; saving money at the expense of a competent design is a poor economic decision
• Strive for efficiency and economy	• Effectively coordinate all administrative and cost expenditures on the project
• Make timely decisions	• Provide strong leadership to make and encourage sound and timely decisions, including project reviews and approvals
• Allow freedom for innovation	• Be open to new ideas • Allow open discussion on problems and situation to promote new thinking and concepts

Table 5-6: Duties and Obligations of the Project Team

Duty/Obligation	Details/Examples
• Be responsive to public	• Be receptive of and responsive to public input to serve the public well on the City's behalf
• Comply with codes, regulations, and laws	• Be familiar with and current on a broad range of legislation and regulations to best assist the City in securing the most acceptable project and in obtaining the most advantageous cost sharing
• Be familiar with city procedures	• Ensure that assigned personnel are familiar with City procedures and requirements; do not expect City personnel to train the Consultant's personnel

5.7.5 Create a Project Team Organization Structure

A human resources plan is recommended for each project to define the specific organizational features and identify personnel assigned.

Human resources are grouped into two subsets, the project management team and the product team. The project management team is responsible for leadership and for carrying out the initiating, planning, executing, monitoring, controlling, and closing project management processes throughout the project phases. The product team is technical and is responsible for delivering the product, including studies, designs, and construction, or for providing other types of products, results, or services.

For in-house projects, the human resources plan includes individuals with the required skills and qualifications to complete the product work. This may include engineering resources, technical support, site supervisors, construction workers, and site inspectors if the project is for construction, or many other combinations of human resources and skills, depending on the product.

For consultant projects, the Consultant assigns resources to the product work, and the City's role is focused on project management and administration of the associated contracts.

The human resources plan includes the following components:

- An organization chart
- A list of roles and responsibilities for the project positions
- A resource matrix detailing the time allocations for each individual on a task-by-task basis

5.7.5.1 How to Prepare a Project Organization Chart

The project organization chart is prepared by selecting the positions and reporting relationships for the project. The organization chart can draw from the generic organizational structure, however only those relevant and needed for the project should be included.

The human resources plan must assign personnel to each position. The commitment of the project team proposed for a project must be approved by the Sponsor or in some situation the appropriate Departmental Manager.

The roles, responsibilities, and levels of authority for each position must also be identified for the organization chart. Any variation to the standard role, responsibility, or level of authority definitions must be specifically identified in the human resources plan.

5.7.5.2 Project Organization Chart Template

A template for the Project Organization Chart is provided in the PDP template in Appendix B.

5.7.5.3 How to Prepare a Resource Matrix

The resources matrix consists of a table of labour input for each position identified for each task, as shown in Table 5-7, and includes the following:

- The WBS and task names are identified in the left-most columns
- All positions are included as column headings, whether they are part of the project team or support services
- The matrix cells include the labour for each position, usually reported in hours

5.7.5.4 Resource Matrix Template

No standalone resource matrix template has been developed however MS Project has this template and features to assist a PM in managing resources.

Table 5-7: Example Resource Matrix

WBS	Task Name	Project Sponsor	Member 1	Member 2	Member 3	Member 4	Project Manager	Administrative Assistant	Total Hours
			Advisory Committee						
0	**Deliver Capital Project**								
1.0	Initiation Phase								
1.1.1	Project Charter								
1.1.1.1	Develop Project Charter	5	10	10	10	10	25	15	85
1.1.1.2	Endorse Project Charter	5	2	2	2	2	8	5	26
1.1.2	Project Delivery Plan								
1.1.2.1	Define Scope						20	5	25
1.1.2.2	Create WBS						20		20
1.1.2.3	Determine budget						20		20
1.1.2.4	Prepare schedule						10		10
1.1.2.5	Plan procurements						10		10
1.1.2.6	Plan communications						5	5	10
1.1.2.7	Approve PDP						30	25	55
1.1.2.8	Initiation Phase Closure	5					5	2	12
1.1.3	Updated Business Case								
1.1.3.1	Updated business case						40	5	45
1.1.3.2	Acquire phase approval						80		80
2	Execution Phase								
3	Close-Out Phase								

5.8 Plan Communications

Communications planning is the process of determining the project information needs and defining the approaches to be used. The communications plan documents the project approach, with the information in

a specific format, provided at the right time, and limited to only what is needed. The PM is responsible for the project communications plan.

5.8.1 Develop a Stakeholder Assessment

The stakeholder assessment is first developed in the Initiation phase and continues to develop. See Section 4.0 for information on the initial stakeholder assessment.

Assessment of the project stakeholders is critical to the PM and the team in understanding who is impacted, what their impact is, their importance and influence and how the stakeholders will be managed.

Some of the questions to ask about the overall project AND various decisions being made within the project include:

- How interested will the community be?
- What information do we need from the community?
- What issues or historical factors should be considered?
- What are the risks of engaging the community?
- What opportunity exists to adjust the scope of the project to respond to newly identified community perspectives?
- Who are the obvious and not-so obvious stakeholders?

Assessing stakeholder interests in the project, requires consideration of the project objectives, as well as an exploration of unintended issues that the project might impact.

Once the Stakeholder assessment is completed a number of strategies can be developed to address stakeholder interests or needs.

The communication plan identifies how each stakeholder will be communicated with in order to address their interest or needs.

Table 5.9 in section 5.8.2.1 provides a format for documenting communication and engagement activities designed to address issues and interests identified in the stakeholder assessment

The assessing of stakeholders and communicating to those stakeholders evolves as the project lifecycle processes. This is an iterative process where the PM is continually has to manage the plan based on feedback. Communication is two way.

5.8.1.1 How to Develop a Stakeholder Assessment

Table 5.8 provides an example of a Stakeholder Assessment

Table 5-8: Stakeholder Assessment Example

Stakeholder	Interest and Expectations	Importance and Influence	Assessment of Impact	Strategies for Gaining Support or Reducing Obstacles

5.8.2   Develop a Communications Plan

The information needs and the distribution methods for project communications vary widely for different types of projects, and must be developed for each project. The core of the communication plan defines who will communicate with whom (stakeholder assessment) and who will receive what information when (communication plan). An essential output from the communication planning process will be defining a balance between too much or too little communication.

5.8.2.1 How to Develop a Communications Plan

Table 5-9 provides an example of a communications plan.

Table 5-9: Communications Plan Example

Target Audience	Objective (Need/Why)	Messages (What)	Timing (When)	Delivery Method (How)	By Whom	Feedback Mechanism
Project Sponsor						
Major Projects Steering Committee						
Advisory Committee						
Business Unit Owner						
Customers						
Mayor & Council Members						
Special Interest Groups						
Regulators						
General Public						

The following principles guide development of a communications plan:

- **Target audience –** The stakeholder log lists people and groups to be included in the communications plan and receive information.

- **Purpose or objective –** The underlying reason for any communication should be clearly understood. Purposes include complying with reporting requirements, asking for special permission, and conveying new information.

- **Messages –** Messages must be consistent with their purpose and compatible with their audience.

- **Timing –** The timeframe and frequency of communications should be identified.

- **Delivery methods –** The delivery methods to be used should be specified. Delivery methods include in-person meetings, conference calls, video conferencing, online meetings, emails, and hard-copy reports.

- **Responsibility –** The person responsible for communicating each type of information should be identified. For sensitive information, the person who can authorize release must also be identified.

- **Feedback mechanism –** The need for feedback and any requirements for the feedback such as what is expected and the timeframes should be identified.

Official Openings or Ground breaking ceremonies

A common part of a project communication plan relates to the ground breaking or official opening ceremonies for completed major projects. These events recognize the City's efforts and public contributions for the benefit of the public.

The CAO supports official ceremonies for designated projects involving central council or community facilities. The PM is responsible for including these ceremonies in the communication plan.

Guidelines include:

- The time and date for the opening ceremony for a Central Council facility will be determined by the appropriate director in consultation with the Mayor's Office.
- The Mayor's Office will prepare invitation lists in consultation with the department.
- The Mayor's Office will print invitations, and the department will address and mail them.
- Where the provincial government has been involved in funding a facility, provincial representatives must be invited to the official opening.
- The Mayor's Office, in consultation with the department, will determine program format.
- A bronze plaque dedicating the facility to the citizens will form part of the ceremony when the capital cost of the facility exceeds $500,000.
- The project budget is to include all costs associated with the opening.
- If the provincial government has been involved in funding a facility, provincial representatives must be invited to the official opening.

Project Manager Responsibilities

For official openings, the PM with the assistance of the Dept/Corp Communications Officer, is responsible for coordinating all arrangements and overseeing the conduct of the ceremony, some possible activities including:

- Preparing text for the brochure, plaque, media release, and project sign
- Determining a suitable site for the ceremony
- Providing for parking at the site, or for alternate transportation (transit)
- Designing the site setting, monument, and plaque
- Constructing the site, monument, and plaque
- Developing information brochures and invitations
- Developing guest list (Consultants, Contractors, City Representatives, Politicians, members of the public, and so forth)
- Developing ceremony program (format, speakers, ribbon cutting, music,)
- Arranging for photography
- Preparing alternate arrangements in case of inclement/unseasonal weather
- Arranging for site facilities/services (lectern, public address system, flags, cleaning crews, traffic control,)
- Making post-ceremony reception arrangements (location, food, refreshments, entertainment)
- Arranging for site clean-up and full opening of the facility

5.8.2.2 Stakeholder Assessment and Communication Plan Template

A template for the Stakeholder Assessment and Communication Plan is provided in Appendix B.

5.8.3   Public Engagement

References exist throughout the "OurWinnipeg" plan and its direction, strategies and related policy documents, which highlight the importance of and interest in working with community stakeholders to identify and address community needs and issues in the work undertaken by the City of Winnipeg. "Public Engagement" encompasses the range of activities that support this relationship between the City and its community members.

As we heard through SpeakUp Winnipeg (the public engagement program associated with the development of OurWinnipeg) Winnipeggers expect to be involved in the decisions that affect them and their city, including determining what is important to them and how their community grows and develops.

The Spectrum of Public Engagement

The spectrum of public engagement (Refer to Table 5-10 below) demonstrates the range of possible types of engagement with stakeholders and communities. It ranges from the mere provision of information through to empowering the community to make decisions. The role and input of citizens becomes stronger from left to right across the spectrum. Table 5-10 identifies the goals associated with each level of engagement. It also identifies the level of commitment that each level represents (and is typically expected by the public) in order for members of the public to feel that the process has been meaningful.

Table 5-10: The Spectrum of Public Participation

	Inform	Consult	Involve	Collaborate	Empower
Public Participation Goal	To inform the public with balanced and objective information to assist them in understanding the problem, alternatives, opportunities and/or solution	To obtain public feedback on analysis, alternatives and/or decisions.	To work directly with the public throughout the process to ensure that public concerns and aspirations are consistently understood and considered.	To partner with the public in each aspect of the decision including the development of alternatives and the identification of preferred solutions.	To place final decision-making in the hands of the public.
Promise to the Public	We will keep you informed.	We will keep you informed, listen to and acknowledge concerns and aspirations, and provide feedback on how public input influenced the decision.	We will work with you to ensure that your concerns and aspirations are directly reflected in the alternatives developed and provide feedback on how public input influenced the decision	We will look to you for advice and innovation in formulating solutions and incorporating your advice and recommendations into the decisions to the maximum extent possible.	We will implement what you decide.
Example Techniques	• Fact sheets • Web sites • Open houses	• Public comment • Focus groups • Surveys • Public meetings	• Workshops • Deliberative polling	• Citizen advisory committees • Consensus-building • Participatory decision-making	• Citizen juries • Ballots • Delegated decisions

It is sometimes assumed that the level of difficulty involved in the engagement process increases with the level of participation, however in reality, where engagement is effective, no part of the continuum is more difficult or preferable to another. Every public engagement process requires balanced and objective

information to assist participants in understanding the question at hand, the alternatives to choose from and the opportunities the decision presents.

Determining the appropriate level of engagement requires thoughtful consideration of the degree of decision-making control that can be legitimately allocated to members of the public. The statements in the table below can help identify the appropriate level of engagement:

Table 5-11: The Public Engagement Framework

Level of engagement	Which statement applies to the decision being made
Inform	I need to share information with individuals or groups about a decision that has been made, or about a decision that needs to be made.
Consult	I need to ask residents, groups or specific stakeholders about their views on the decision being made. Their feedback will be considered when the decision is being made.
Involve	I need to get feedback from an individual or group to find out how they will be affected by the outcome of a decision. Their feedback will be considered when the decision is made.
Collaborate	We need to develop joint alternatives, working with community members/groups and employees to propose alternatives that will work for and be supported by those affected by the decision.
Empower	I need to work with a community member of group in a process in which they have the final decision-making power.

It is important to consider these statements for each phase or deliverable within the project management plan and to acknowledge that each step in the process may have more than one public participation objective. For example, communication should occur at each decision point at minimum to ensure the public is kept informed.

Guiding Principles

Effective Public Engagement depends on commitment to a number of guiding principles. The following have been adapted from the City of Guelph's Community Engagement Framework and reflect commonly recognized characteristics and core values of best practices in public engagement:

- **Inclusive:** Participation by those who will be affected by a decision is encouraged. Relationships with stakeholders are built by using a range of tools to engage varied audiences.

- **Early Involvement:** The public is involved as early as possible in the community engagement process so stakeholders have time to learn about the issue and actively participate.

- **Access to Decision-Making:** Processes are designed to give participants the opportunity to influence decisions.

- **Coordinated Approach:** Community engagement activities are coordinated to use community and City resources effectively.

- **Transparent and Accountable:** Processes are designed to be open and clear. Stakeholders will understand their role, the level of engagement and the outcome of the process.

- **Open and Timely Communication:** Information is provided that is timely, accurate, objective, easily understood, accessible, and balanced.

- **Mutual Trust and Respect:** The community is engaged in a fair and respectful way that fosters understanding between diverse views, values, and interests.

- **Evaluation and Continuous Improvement:** Resources are committed to evaluating engagement processes to ensure engagement activities are effective.

- **Equitable Engagement Process:** Engagement processes are designed to allow all community members a reasonable opportunity to contribute and to develop a balanced perspective. This may require special outreach to especially vulnerable or marginalized populations.

Supplementary Considerations:

Consideration of the guiding principles is important at every stage of planning, implementing and evaluating public engagement activities. The following provide more specific considerations that support these guiding principles, and should also be considered throughout the process of planning, implementing and evaluating public engagement activity.

City of Winnipeg Universal Design Policy

According to the City of Winnipeg Universal Design Policy, all communications and public engagement activities of the City of Winnipeg shall take place in accordance with Universal Design Principles.

If preparing printed materials for engagement activities, please refer to the CNIB Clear Print Guidelines, available at http://www.cnib.ca/en/services/resources/clearprint/pages/default.aspx.

For guidance on how to make engagement activities accessible, please contact the Universal Design Coordinator.

Plain Language

Like good communication of any kind, plain language is clear, concise, and uses simply constructed sentences. Plain language tells the audience exactly what the audience needs to know without using unnecessary words or expressions. It is not baby talk or overly simplistic, however lets the audience understand the message easily.

Plain language is more than just short words and short sentences — although those are often two very important guidelines for plain language. When you write in plain language, you also organize it logically to make it easy for the audience to follow. You consider how well the layout of your pages or screens works for your audience. You also ensure that the information you provide is relevant to the audience. What is plain language for one audience may not be plain language for another audience.

Communication that is clear and to the point helps improve all communication because it takes less time to read and understand. It also improves audience response to messages. Using plain language avoids creating barriers that set us apart from our audience.

Manitoba Freedom of Information and Protection of Privacy Act (MB FIPPA)

When obtaining personal information from community members, it is important to remember that the MB FIPPA imposes obligations on the City as to how information, particularly personal information is collected, used, disclosed and disposed of (destroyed). The Act controls the manner in which public bodies like the City of Winnipeg collect personal information, and protects individuals against unauthorized use or disclosure of personal information.

The Act which can be found at http://www.gov.mb.ca/chc/fippa/understanding_fippa.html#21 , identifies an extensive list of what constitutes "personal information". Any time you consideration collecting information that is personal in nature, a good rule of thumb is to collect only the minimum amount of information necessary to accomplish the purpose for which it is being collected.

It is also important to note that a record of personal information can take various forms. It can be information that is written, photographed, recorded or stored in any manner, on any storage medium or by any means including by graphic, electronic or mechanical means.

If consideration is being given to creating records of any personal information through your public engagement activities, please consult with your departmental FIPPA contact before any information is collected.

5.8.3.1 Public Engagement Procedure

A Public Engagement procedure is under development.

5.8.4 Define Performance Reports

Once the communications plan has been established, the PDP must identify the reports and the reporting format for the project. The PMM identifies in Table 5-12 below, the specific performance reports that will be used in the City of Winnipeg. The intent is ensure that the stakeholder both horizontally and vertically in the organization become familiar with information that is needed to communicate the project performance status accurately. The intent is move away from ad-hoc reporting where individuals develop stand-alone reporting template.

Note: A number of the reports below are being reviewed and are not fully developed. Some may be deleted from the inventory of standard reports templates.

Table 5-12: Common Performance Reports

Report	Purpose
PM Checklist	Provides a record of completion of PMM-required actions.
Status Report – Project Management	Summarizes data, tracks progress, and compares progress with baselines defined in the PDP, risk, schedule, financial forecasts and may include earned value management.
PM Dash Board Report	
Status Report – Contract	
Status Report – Consultant	
Project Issue-Decision Log	Tabulates and tracks all project issues and resulting decisions on the project communications.
Project Change Log	Track changes and potential changes.
Change Control Report	Provides an integrated view of the project, consultant, and construction changes, enabling forecasting.
Risk Register and Report	Identifies exposure to risk events for the Consultant and Construction Contractor, identifies actions taken and required, and provides information for integrated change control.
Consultant Performance Review	Documents Consultants' performance and provides feedback to Consultants.
Final Close-Out Checklist	Prompts for final documentation and closure of all tasks and budgets.
Lessons Learned	Documents what went well and what did not for future reference and application to the continual improvement process.

A key concept that is being implemented into the report design is a hierarchal reporting structure. Construction reports will roll-up to Consultant reports, which will roll-up to PM reports, which will roll-up to PMO reports, and ultimately to Dash Board reports.

 The standard performance reports will have guidelines for distribution to specific roles in the project organizational structure and frequency of distribution. These guidelines will be embedded in the help notes.

The PDP is to identify any ad-hoc or non-standard reports required, distribution and the frequency of distribution.

5.8.4.1 Performance Report Templates

The templates listed in the above table will be provided in Appendix B as they become available.

5.8.5 Reporting to Committee

FM-004 requires the administration to report to the Council quarterly on all Consultant contracts. A standard report is available from the City's website at http://www.winnipeg.ca/matmgt/templates/consultants/ Consultant_Information_Page.stm.

FM-004 identified a report that must be submitted quarterly in the standard format with no exceptions on project > $10 million.

The PM must ensure the accuracy of reports as they pertain specifically to each Consultant assignment and project.

5.8.5.1 Council Quarterly Report Template

A template for the Council Quarterly Report is provided in Appendix B.

5.8.6 Plan Records Management

Projects must be managed in accordance with a comprehensive records management system managed by the owning business unit. The primary objectives for a system of this type are to:

- Provide an efficient and intuitive document identification system
- Store all related documents efficiently so they can be readily retrieved
- Record the history of each document including versions, approvals, and certifications
- Minimize the cost and time of records management
- Facilitate provision of records to stakeholders for all aspects of the project

For the City, the Freedom of Information and Protection of Privacy Act (FIPPA) and the Records Management By-law No. 86/2010 define a record as "any kind of recorded information that is created or received by, or in the custody or control of, the City regardless of its physical form or its characteristics."

5.8.7 Record Types

The table below identifies the type of records generated on a project.

Table 5-13: Record Types

Record Category	Description
Drawings	This includes all formal drawings produced as a stand-alone document or design packages. These are typically defined as "Design or Construction drawings" however the intent is any drawing produced and formally used on the Program will fall under this category.
Project Deliverables	Are specific formal document that is a product of a Project, however the life of the document continues on past the end of the Project. These can include as an

	example; Concept Design reports, Preliminary Design Reports, O&M, Contracts and Standard Operating Procedures. Other documents include land purchase, environmental impact reports
Project Records	These are documents produced to support the management of a project. These documents have no active use once the Project has been closed. These can include as an example; Progress Estimates, Change Orders, Schedules, Meeting minutes. **Will include Administration records such as:** • Financial (Project costing, invoices and other accounting records) • General correspondence • Reporting • Human Resource Management • Planning • Project specific Procedures
Uncontrolled documents	All hardcopy documentation, if not controlled by an authorised person shall be deemed "uncontrolled" by the person who prints the document

5.8.8 Project Record Index (PRI)

The PDP must consider the use of a project record index (PRI) and define the rules for its use if one is to be used. The PRI is used to track and monitor changes in the work. As soon as an issue is identified which has the potential to cause amendment to the original contract, it is entered in the PRI. A unique number is assigned to the issue for recording in the PRI that associates all subsequent and associated change management documentation, including the reason for the potential change. All subsequent correspondence related to the change is then referenced in the PRI through the numbering system.

5.8.8.1 Record Management Procedure

A record management procedure is in Appendix E.

5.9   Plan Risk Management

Risk is inherent in delivery of all projects, and risk management must be applied to all major projects. The objective of risk management is to reduce the chance that the project will not meet its goals and objectives.

The five processes in a complete risk management plan (RMP) are:

• **Identify risks –** This process identifies risks and documents their characteristics. Each risk must relate to at least one of the project objectives (cost, scope, schedule, and quality). Risks are recorded on a risk register that will be further developed as part of subsequent processes and maintained and managed throughout the project.

• **Perform qualitative risk analysis –** For this process the identified risks are evaluated by assigning probability of occurrence and consequence scores to each risk and prioritizing the results. The qualitative risk analysis provides a rational basis for quantification of a risk contingency reserve.

- **Perform quantitative risk analysis** – Quantitative risk analysis is the process of numerically analyzing specific risks to the project objectives. This level of risk analysis can be very detailed and complex and is therefore only applied to specific risks under specific conditions.

- **Plan risk responses** – Once risks have been identified and analyzed, the threats they pose to the project can be dealt with through risk responses.

- **Monitor and control risks** – The monitoring and control process is for implementing the risk response plans and monitoring, evaluating, and updating the process throughout the project. The risk register is used for this purpose.

The PMM takes a progressive approach to risk management through the project phases, providing a continuum from the initiation phase to close-out, as outlined below.

- **Business Case Risks** – Risk analysis is considered in project pre-planning and an identified risk contingency reserve may have been established in the project budget. Risks are typically defined in the initial business case at a high level because specific deliverables may not have been defined and many of the details are not known. Similar projects that have been completed can often provide an initial sense of project delivery risks.

- **Project Delivery Plan** – The RMP is a document summarizing how the risk related activates are structured and performed on a project. The RMP is defined and documented in the PDP. As with the other plans in the PDP, the RMP is continually updated with each project phase. As projects progress, many of the risks are eliminated and retired as part of the RMP process.

5.9.1   Prepare a Risk Management Plan (RMP)

The PM produces an RMP and manages it throughout the project. The RMP is regularly updated and reported to the project team, Project Sponsor, Project Advisory Committee or Major Capital Project Steering Committee.

The type of Risk assessment as identified below depends on the complexity of the project.

- **Risk Assessment** – Small, routine low-risk projects require only a risk register, which is used exclusively to identify potential risk events and responses. The risks are identified by the PM or delivery team, or extracted from other sources requiring only a low level of effort. Refer to Table 5-14

- **Qualitative Risk Assessment** – A qualitative risk assessment is used for projects that are not small or routine however are not of significant concern. A short-form numerical approach and risk identification method may be used. The risks are identified by the PM or delivery team, or extracted from other sources requiring only a low level of effort.

- **Comprehensive Qualitative Risk Assessment** – A comprehensive and detailed qualitative risk assessment must be completed for projects that have medium to high risks. Detailed scoring and a risk ranking for each risk event is required. A more formal process with participation of a broad range of stakeholders is used, typically in a workshop setting.

- **Quantitative Risk Assessment** – High-risk projects, or those identified by the Major Capital Project Steering Committee, require quantitative risk assessments.

The RMP must address project delivery risks as well as product risks. Just as risk to project delivery may cause costly overruns or start-up delays, risk to the product may cause a poorly functioning product or costly re-work that may far exceed the consequences of project delivery risk. Separating project delivery risk and product risk allows focus and discipline to be maintained for both.

- **Project Delivery Risk** – Project delivery risk addresses threats to project delivery in terms of scope, cost, schedule, and quality. Examples are inadequate budgeting, inadequate resources, or excessive demands from stakeholders.

- **Product Risk** – Product risk addresses the product implementation and the product's function. Examples include uncertainty of soil conditions, a shortage of skilled contractors, and use of unproven technology.

Product risks are more likely to be identified by technical staff or others experienced with the product. A separate risk analysis process such as a workshop convened later in the project may be used. Product risk RMPs are updated with a different frequency than are project delivery RMPs.

Risk responses must be identified as part of the risk management process, either during or after the risk assessments. The RMP also identifies the frequency of or triggers for risk reassessments.

The PM is responsible for tracking all risks with summary reports submitted to the Major Capital Project Steering Committee and manager of capital projects. The Major Capital Project Steering Committee is directly involved in reviewing risks, as indicated in FM-002. RMP updates are included in quarterly reporting on major capital projects and are required for project phase gate approvals.

The RMP should also consider opportunities, which are simply risks with positive impacts. Although not described in detail in this PMM, the processes and procedures for considering opportunities are similar to those for considering threats.

5.9.1.1 How to Prepare a Risk Management Plan

The RMP accompanies the PDP and documents the results of risk planning. It defines how to conduct risk management, so that the process is commensurate the risks and importance of the project and the information is available to project stakeholders. It will depend on the complexity of the project (refer to section 1.5) and as a minimum is to include:

- Project description
- RMP scope and reference to WBS deliverable
- Organization, roles and responsibilities
- Risk management methodology
    - Evaluation approach
    - Tools
- Reporting
- Risk register

5.9.2 Risk Statements

Properly structured risk statements aid in developing and tracking the responses. Fundamental concepts used in risk statements are:

- A **Cause** is the condition that exists in the project and gives rise to the threat (or opportunity); one cause may generate multiple threats (or opportunities)
- The **Risk** is the event that may or may not occur
- The **Effect** is the unplanned impact on at least one of the project objectives

The above concept has been embedded into the Risk Management Plan template.

5.9.2.1 Risk Management Plan Template

A template for the Risk Management Plan is provided in Appendix B.

5.9.2.2 How to Identify Risks

Every project is exposed to multiple risks of different types. The risks may relate to either or both of the project or product, and affect any of the four project objectives, scope, cost, schedule and quality. It is useful to categorize risks prior to attempting to quantify them or develop risk response strategies.

A recommended practice provided in AACE No. 42R-08 defines risk into two categories: risks that have systematically predictable relationships to overall project cost growth (systemic) and those that don't (project-specific). Table 5-14 provides examples of the Risk Categories for the two risk types.

Table 5-14: Examples of System and Project-Specific Risk

Examples of Risk Type and Categories of Risk		
Risk Type	**Systemic Risks**	**Project-Specific Risks**

Category of Risk	Design Complexity
	  • Technology
	  • Process Complexity
	  • Material Impurities
	Project Definition (how defined)
	  • Site/Soils Requirements
	  • Engineering and Design
	  • Health, Safety, Security, Environmental
	  • Planning and Schedule Development
	Project Management and Estimating Process
	  • Estimate Completeness (due to scope definition)
	  • Team Experience/Competency
	  • Cost Information Available
	  • Estimate Bias
		• Weather
		• Site Subsurface Conditions
		• Delivery Delays
		• Constructability
		• Resource Availability
		• Project Team Issues
		• Quality Issues (e.g., rework)

- **Systemic Risks -** The term systemic implies that the risk is a product of the project "system", culture, business strategy, process system complexity, technology, and so on. Measures of these risks are generally known even at the earliest stages of project definition and, furthermore, the impacts of these risks tend to be highly dominant for early estimates. However the ability to directly estimate these events is difficult. (For example, the cost of a complex design cannot be clearly quantified but identification that there is a risk is possible). Finally, systemic risks tend to be "owner" risks; i.e., the owner is responsible for early definition, planning, technology, and decisions so these risks cannot be readily transferred.

- **Project Specific Risk -**The impacts of these risks are not highly predictable between projects within a system or within an industry as a whole. For example, rain may have much more impact on one project than another depending on the project characteristics and circumstances. Measures of these risks are generally not known at the earliest stages of project definition. The link between *project-specific* risks and cost impacts is more deterministic in nature; i.e., they are related to individual understanding and to estimating the impact of these risks on particular items or activities (for example, the risks of excess rain on something like site preparation or concrete foundations can be estimated). These risks are more negotiable during project contracting strategy as to who will carry them.

Individual risk may be identified by the PM, or for larger projects a team of experts should be used. After the risk identification process the details of the individual risks are then listed on a risk register for managing and tracking.

5.9.2.3 How to Create a Risk Register

A risk register is required for all projects. A risk register includes:

- **Project objective –** All project objectives (scope, cost, schedule, quality) are considered in the risk assessment. The risk register includes a column listing the objectives to prompt consideration of each. "N/A" should be written if there are no risks for an objective.

- **Threat or opportunity –** Risks can be either unfavourable to the outcome, in which case they are threats, or favourable to the outcome, in which case they are opportunities. The risk table indicates which type the risk is expected to be.

- **Meta language risk descriptions –** The risks should be described with a three-part "metalanguage" description in the form of "As a result of < definite *CAUSE*>, < uncertain *EVENT*> may occur, which would lead to < *EFFECT* on objective(s)>". This approach promotes separation of the cause and effect from the risk.

- **Risk response –** A risk response must be identified for each risk.

An example risk register form is shown in Table 5-15.

Table 5-15: Basic Risk Register

Risk Event Identification					Risk Response	Risk Response Owner
Project Objective	Threat or Opportunity?	As a result of (*Risk Cause*)	This event may occur (*Uncertain Event*)	Which leads to (*Effect on objectives*)	This <*Response*>	
Scope						
Cost						
Schedule						
Quality						

Risk registers for more detailed risk assessments include additional columns, such as a formal referencing system, and likelihood and consequence scores.

5.9.2.4 Risk Register Template

The Basic Risk Register template is embedded in the RMP (short form) template provided in Appendix B.

5.9.2.5 How to Prepare a Qualitative Risk Assessment

A qualitative risk analysis is carried out by estimating the likelihood (probability) of each risk to occur and the consequences (impact) if it does. The two scores are then combined and the risk is prioritized. An

example of a probability scale is provided in Table 5-16 and an example of a consequences scale is provided in Table 5-17 for a basic qualitative risk analysis.

Table 5-16: Basic Risk Probability Scale

Score	Likelihood/Probability	Description
5	Almost Certain	Is expected to occur unless circumstances change
4	Likely	Will probably occur in most circumstances
3	Possible	Might occur under current circumstances
2	Unlikely	Could occur if circumstances change
1	Rare	May occur only in exceptional circumstances

Table 5-17: Basic Risk Consequences (or Impact) Scale

Score	Consequence/Impact	Description
5	Extreme	Heavy damages
4	Major	Significant damages
3	Moderate	Serious damages
2	Minor	Minor damages
1	Insignificant	Insignificant damages

Risks may be identified and scored by the project team, stakeholders, or others with related experience. The Major Capital Project Steering Committee may also identify risk, as its members can draw on experiences from other large City projects. A typical method of capturing the information is through team brainstorming sessions. A process for conducting this analysis should be developed and agreed on by the team for each project, commensurate with the project needs.

Probability and consequence scores can be plotted in a matrix, as illustrated in Figure 5-9.

Figure 5-9: Example of a Qualitative Risk Matrix (Illustrating a Planned Risk Response)
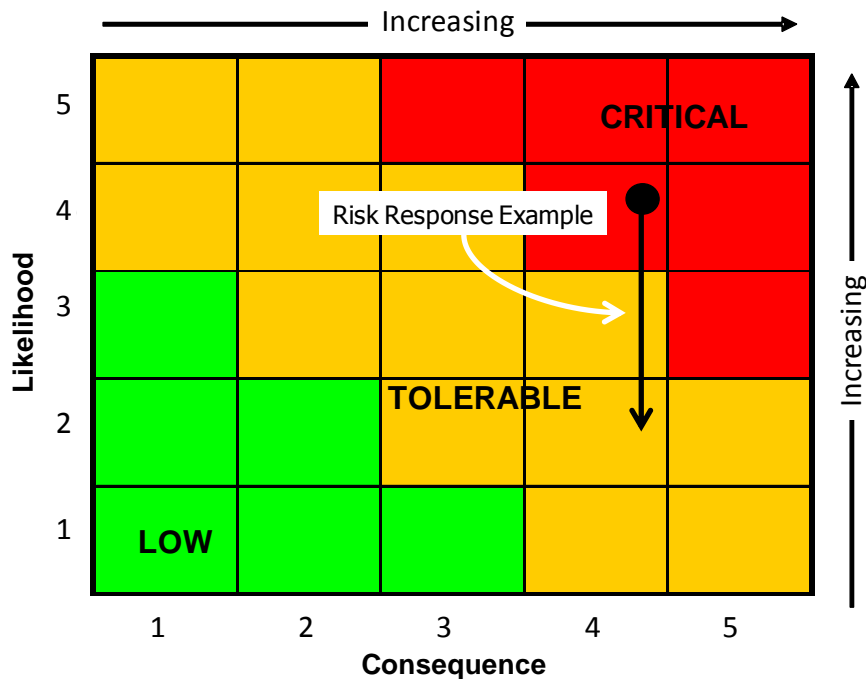
As shown in Figure 5-9, a risk matrix indicates the level of risk and basis for risk prioritization. Risks with a combination of high likelihood and high consequences will be of the most concern. A risk response will be required to manage critical risks. In many cases the risk response will only address either the likelihood or the consequence. Figure 5-9 shows risk response decreasing as likelihood decreases.

5.9.2.6 How to Prepare Quantitative Risk Assessment

Quantitative risk assessments are prepared after the risks have been identified and rated through the qualitative process. A quantitative assessment is used for cases where the risk will be accepted or it has been determined that a contingency allowance should be applied. The individual risk contingencies are then compiled and itemized into the risk reserve contingency. Refer to Section 5.0 for application of the risk reserve contingency to project estimates.

The factors that affect the quantification of the risk reserve are complex and by necessity or for convenience a lot of assumptions are usually made. It is important to note:

- The risk reserve is to be added to the phase estimate with the estimating contingency included, however, do not double count any risks already considered.
- It would be incorrect and a budgeting error to set the contingency amount as the total of all of the potential risks, since it is unlikely all risks would occur on any one project at the same time, and the potential for realization of opportunities would be overlooked.
- The contingency must reflect the stakeholders risk tolerance level.

The method of risk quantification will depend on the category of risk and the project needs. Three alternative methods are identified in the following for quantification of the risk reserve:

1. *Single-Point estimate*

In single-point estimating the estimator assigns a fixed contingency or percentage risk reserve value to a single-point estimate. For systemic risks the value may be determined through intuition, experience or from historical data. For project-specific risks the Expected Monetary Value (EMV) approach is used:

- EMV requires the probability of the event to be estimated as well as the monetary consequences. The amount of the contingency is then determined by the multiplication of the two values.
- The EMV estimates are improved by applying different contingency percentages to each major cost element. This recognizes that some parts of the project may have greater uncertainty than others. This method is considered more rational and reliable than the simple application of one overall percentage to the total cost because it encourages closer examination of each cost area

The calculated amount is the risk reserve contingency to be added to the estimate, and is managed as a separate line item through the contingency management process.

This single-point method is easy to apply, and is satisfactory for projects where there may be a substantial amount of experience with the type of project to justify the approach. The drawback is that the single-figure prediction of estimated cost implies a degree of certainty that is not justified. The probability of achieving this cost is not fully evaluated and does not take into account the surrounding uncertainty.

The single-point method may be used for smaller projects, and at the first phases of larger projects. It is not suitable for large and complex projects.

2. *Three-point range estimate*

Range estimating provides a simple quantitative method of risk assessment. It is based on an assumed probabilistic distribution of the cost estimates, providing an improved prediction of the actual uncertainty and justification for the contingency values as compared to the single-point method.

The three-point technique can be used for any type of estimate, either at the project or component level. In its simplest form it only requires that three estimates be prepared at the project level:

- a = Best case estimate - is the value where there would only be a 5-10% chance of a lower value
- m = Expected value - is normally the estimated value, and the most likely case, prior to risk allowances being applied
- b = Worst case - is the value where there would only be a 5-10% chance of a higher value

The technique assumes that the resulting relationship is a normal distribution, which is represented by a bell curve as shown in Figure 5-10.

Figure 5-10: Probability Distribution based on the Three-Point Range Technique
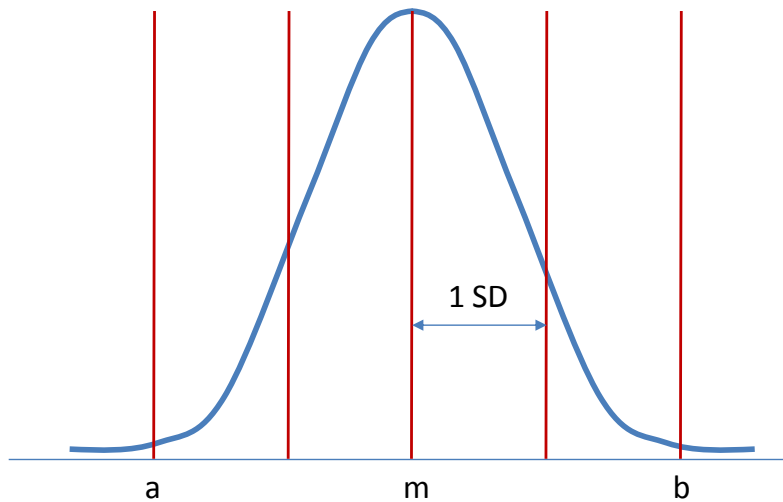
When a single three-point estimate is used the expected value is equal to point "m" and the standard deviation (SD) can be calculated as:

SD = (b-a)/6

Confidence levels can then be determined from the SD:

- there is a 68% probability the estimate will fall within one SD higher or lower than the estimate
- there is a 84% probability that the project will cost less than the estimate plus one SD

This method can be applied directly for systemic risks, with or without use of the risk register. The best and worst case estimates can be developed from prior experience, educated guesses, or more preferably from the risk register results.

Accuracy of the estimate is improved by applying the technique to a number of component estimates for multiple deliverables, rather than at the project level. This is done by:

- Selecting deliverables with the highest risk and potential variation
- Developing cost estimates for the selected deliverables and their SDs
- Calculating the total project estimate by summating the component estimates
- Calculating the total project SD by taking the square root of the summation of the squares of the SDs

The project-specific risks from the risk register can be added to the systemic risk contingency. This is done by modifying the best and worst case point values and recalculating the SD, as shown in Figure 5-11.

Figure 5-11: Three-Point Range Estimate with Project-Specific Risks
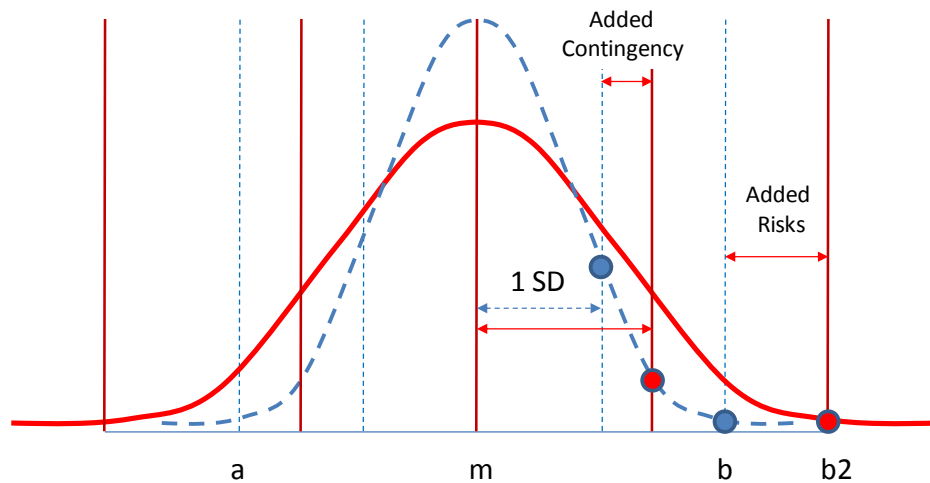
The risk consequences from the risk register are totalled and added to the worst case estimate (new point "b2"). A similar adjustment should also be made for the best case (opportunities) and their potential cost reductions. The resulting distribution is assumed to remain to be "normal" and the contingency allowance can be calculated as described previously with the new values.

The accuracy of the estimate is improved if multiple component estimates are used rather than at the project level, with the individual risks applied to their respective deliverables.

The three-point range estimating method doesn't define the cumulative risk reserve value, however provides a rational basis for its selection, based on the desired confidence limits. This would be determined from the organization's budgeting strategies and tolerance for cost overruns. The approach and contingency value selection are to be reported in the basis of estimate.

The calculated risk reserve contingency is added to the estimate, and is to be managed as a separate line item through the contingency management process.

3. *Monte Carlo Simulation*

The Monte Carlo simulation method (MCS) is a more sophisticated quantitative technique for analyzing risk and quantifying the contingency value. As with the three-point range estimate, the output of MCS is a probability distribution for total cost of the project.

The MCS requires a higher level of input definition and uses a series of calculations in computing the results. It is typically carried out by experienced estimators using commercially available software, and its specific application is not included in this manual.

The MCS should be considered for large complex projects.

5.9.2.1 Qualitative Risk Assessment Template

The Qualitative Risk Assessment template is embedded in the Risk Management Plan template provided in Appendix B.

5.9.3   Risk Response Plan

Risk responses are developed after the risk events have been identified and prioritized. Not all risks require formal risk response plans. The level of effort to identify response strategies and follow-up risk management depends on the level of risk.

5.9.3.1 How to Develop Risk Responses

Risk response strategies can be applied to the cause, the risk, or the effect, and are described below.

Avoid – A threat can be avoided by removing the cause or breaking the cause-risk link. For example, if use of unproven technology causes a risk, the risk could be avoided by using a standard approach.

Transfer – Transfer does not change the true likelihood or consequence of a threat however relieves the City of responsibility for it. Insurance and performance bonding are examples of risk transfer.

Reduce – A threat can be reduced by addressing either the cause or the effect, and either the likelihood of the threat or the consequences of the threat can be reduced. This could include additional work to reduce the risk.

Accept – Some threats are too difficult to attempt to control, and must be left to chance. In this case neither the likelihood nor the consequences can be reduced and the response is to deal with the effect if it happens. Providing a risk contingency reserve is the main response to this threat. Often "Plan B" contingencies should be considered and developed as well.

Higher order RMPs must include detailed risk response plans that also identify the risk response owner, response triggers, managing contingencies and a schedule for actions, reviews, and reporting.

5.10 Plan Integrated Change Control

5.10.1.1   For Integrated Change Control see section 7.0

5.11 Plan Health, Safety, Security, and Environment

The Manitoba Workplace Safety and Health Act (WHSA) require employers to develop workplace safety and health criteria to evaluate, select and monitor contractors working at the workplace. Details can be found on the City's website at http://www.winnipeg.ca/matmgt/Safety/default.stm. An additional CityNet site for internal City Contract Administrators can be accessed through http://citynet/hrintra/workplacewellness/Safety/Safety-MainPage.stm

The City of Winnipeg process applies to Contractors who perform work for the City in the following circumstances:

- Construction contracts with an estimated cost greater than $100,000 or considered to have high safety risk by the City and
- Non-construction contracts considered to have high safety risk by the City.

5.11.1 Contractor Safety & Health Program Evaluations

The City's process requires bidders on affected Bid Opportunities, to submit, within 5 business days of a request by the City, proof of an "acceptable" safety and health program. Bidders who cannot provide this proof are not awarded the contract.

"Acceptable" means that the program meets or exceeds the elements required of a safety program as outlined in Section 7.4(5) of the Workplace Safety and Health Act.

Proof of an acceptable safety and health program is considered to be one of the following:

1. **Written confirmation of a Manitoba COR™ or SECORTM program:**

   - Manitoba COR™ or SECORTM companies must submit a copy of their certificate along with their most recent letter of good standing to their assigned Contract Administrator. If a Contract Administrator has not yet been assigned, this information is to be sent to the designated City contact person.

2. **Written evaluation and verification by an independent workplace safety and health consultant:**

   - Bidders/Contractors can meet the requirement for independent verification without obtaining COR™ or SECORTM by providing written confirmation from an independent workplace safety and health consultant satisfactory to the City.
   - The safety and health program review is conducted using the Contractor Safety & Health Program Evaluation Document, and is based on the requirements of Manitoba's Workplace Safety and Health Act.
   - Independent workplace safety and health consultants satisfactory to the City include persons who:
     – have been approved to conduct COR™ or SECORTM audits; or

     – hold certification such as Canadian Registered Safety Professional (CRSP) or equivalent

5.11.2 Safe Work Plans

Before work begins, a Safe Work Plan is developed by the Contractor in consultation with the Contract Administrator.

To ensure the Safe Work Plan includes consistent safety and health information, the Contractor may be required to use the City's Safe Work Plan Document.

The Safe Work Plan demonstrates that a Contractor:

- Is aware of the hazards associated with the work; and
- Has identified appropriate control measures to manage the hazards.

The Contract Administrator reviews the Safe Work Plan with the Contractor and requests clarification from the Contractor as required. The Contract Administrator can request assistance from their departmental safety resource as required. The Safe Work Plan is to be provided to the Contract Administrator within the time frame mentioned in the contract. The time frame is usually at least 5 days before the work is scheduled to begin.

5.12 Plan Commissioning

Planning for commissioning is included in the PMM because of its significance in the AMMS. Commissioning requirements may be product-specific, and the PM should communicate with the Business Owners and

experts in its development. However, commissioning planning may not be applicable to all projects, and, as with other processes, it should only be applied as necessary.

Early consideration of commissioning is important so that assets can be transferred to operations, where coordination of a number of parties is required, including the Business Owner, Operator, Consultant, Contractors, trades people, utilities staff, suppliers, permitting agencies, and, potentially, third-party testing and commissioning firms.

Coordination may also be needed for operating expertise, documentation, training, operating supplies, temporary services and testing, and budgets for the transition and for management of the transition services.

5.13 Plan Close-Out

Close-Out is included in the PMM as a process to be planned under the planning process group. Close-Out planning should identify which tasks, deliverables, and phases can be closed and when, as well as the resources needed for their closing. The PM is responsible for confirming that all required work and deliverables have been completed prior to the close-out and that all documentation is in place.

The PDP needs to integrate the following into the Project's phase or project close-out deliverable and tasks:

- A business case update for the Project Sponsor's consideration prior to beginning of the next phase.
- After each phase however especially at the execution phase stage gate with completion of a class 3 estimate, the Sponsor (and Business Owner) need to assess whether the investment (project) should still proceed. This assessment includes multiple factors such as value for money, risk assessment and level of service - willingness to pay target (criteria). See the Closing process for details.
- Confirmation that products, services, or results are being transferred to the next project phase, or (upon completion of the project) to the Business Owner
- At the end of the project, a "lessons learned" discussion, which provides information to support the City's continual improvement process
- At the end of the project, a benefits realization report

5.14 Update Project Delivery Plan

The PDP must be updated as one of the initial activities of each phase.

5.15 Plan Tangible Capital Asset (TCA) Updates (Under Development)

Public accounting rules require capital assets to be identified and tracked. The City is developing procedures for tangible capital asset accounting that integrate into the PM Framework.

6 Executing Process Group

Executing is the third of the five project management process groups. The executing process group includes processes for executing and updating plans developed in the initiating and planning process groups.
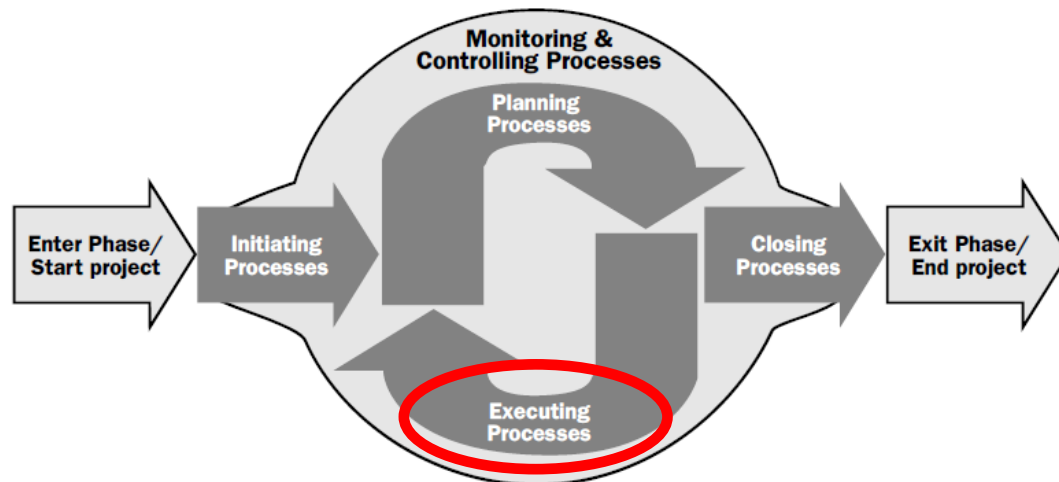
6.1 Acquire Project Team

The PM, in consultation with the Project Sponsor, is responsible for identifying candidates to fill the roles identified on the project organization chart. For senior positions and most support functions, the roles are filled by personnel who already have organizational responsibility for a related function, and a candidate selection process is not required.

For the Project Advisory Committee, a broad cross-section of the organization should be represented to provide objective advice, guidance, and recommendations for decision-making. A committee consisting of only end users or customers may not be impartial about options and may cause the decisions to deviate from the business case.

For situations in which a selection process is required, such as for filling roles with personnel from the private sector, careful consideration must be given to matching the candidate's qualifications to the project needs. Many projects have positions, especially for the technical roles, for which certification is required, and most projects benefit from selection of well-qualified personnel. Lack of qualified staff should be considered a project risk and should be addressed under the risk management process.

6.2 Develop Team Charter

The project team uses the process of team chartering to define itself. Team chartering takes place early in the project, however, after the PDP has been developed and approved and the team members have been selected. The main goal of team chartering is to increase the probability of success.

A project may have multiple team charters, with the initial charter developed during the planning phase for City team members. The internal team chartering does not involve consultant team members, however, Consultants normally hold another chartering session once retained that involves internal and external team members.

Team chartering informs the team of the project plans and defines their roles and expected participation while increasing cohesion, alignment, and motivation. The process benefits the project by:

- Defining the project objectives for the team
- Identifying and clarifying team member roles, responsibilities, and authority
- Defining expectations
- Building agreement on how the team will function
- Building a common vision and goals
- Empowering team members
- Motivating the team

The benefits of chartering far outweigh the costs, and results in team behaviours that are stronger than individual behaviours and make better use of resources. Team chartering makes it possible to achieve far more than if each team member were performing merely as an individual.

6.2.1.1 How to Develop a Team Charter

The project charter identifies how the team will work together to achieve the objectives of the project as outlined in the PDP. The PM leads the team chartering process however all team members provide their written endorsement of the team charter and take ownership.

Team charter topics include:

1. Review Project Charter
2. Team purpose
3. Project Organization Structure (from the PDP)
4. Team membership (from the team acquisition process)
5. Roles, responsibilities, and authority (from the PDP)
6. Measures of team success
7. Issue resolution process

6.2.1.2 Team Charter Template

A template for a Team Charter is provided in Appendix B.

6.2.1.3 Team Chartering Workshop

A team meeting is an important component of team chartering. The meeting brings team members together to focus on common project goals and begins the team-building process. The team chartering session must be tailored to the size of the project. A generic agenda for a team chartering session is:

1. Introductions
2. Purpose of team chartering
3. Project description
4. Project Organizational Structure
5. Project Delivery Plan (PDP)
6. Team roles, responsibilities, and authority
7. Issue resolution process
8. Critical success factors
9. Non-team chartering topic
10. Team Charter endorsement

6.2.1.4 Endorse the Team Charter

It is imperative that the team charter be endorsed and signed by all team members. Endorsing the team charter is part of the team-building exercise and builds a sense of ownership and commitment.

6.2.2 Update the Team Charter

A team charter is required from the time of the team's development in the planning phase to final project close-out. The team charter must be updated at the beginning of all execution sub-phases, as well as at the beginning of the close-out phase, since new staff may be involved at any time, or the project may change.

6.3 Manage Project Team

Managing the project team is the process of engaging and communicating with team members, developing the team, building relationships, fostering teamwork, motivating the team, coordinating input and feedback, resolving issues, and celebrating successes.

Managing the team is one of the PM's greatest and often most challenging responsibilities. The PM must have the confidence to lead a team that in many cases includes senior members with more authority, more knowledge of the operation, and greater product knowledge and technical skills than the PM. In other situations, the PM must have the diplomacy to deal with junior members with less experience and knowledge, even in their own area of responsibility, than the PM. The PM must be prepared to deal with a variety of team structures and team dynamics and dedicate the time and effort to the team's success.

6.3.1.1 How to Manage the Project Team

The first and most effective ingredient for team management is selection of a PM with well-balanced leadership, business, and interpersonal skills. Team members with similar characteristics also benefit the team, however as with most groups a wide variety of personality types is likely. A well-structured PDP has the following features to promote team success:

- Team chartering intended to address team-building directly by aligning the team to common goals and providing clarity for each team member's role
- Clear direction and effective and transparent decision-making, as identified in the Project Organizational Structure, to aid in team buy-in and ownership
- An issues log so team members are clear on expectations

The PDP should be supplemented by the following PM and project team actions:

- The Project Sponsor should be a project champion and provide visible support
- The PM must provide regular and frequent communications to keep the team informed
- The PM should include Consultants in team-building and encourage them to adopt the same team strategies
- A conflict management approach should be developed for handling challenges
- All team members should strive for consistent positive thinking and celebrate successes as a team

6.4 Conduct Procurement Solicitations

As discussed in Section 5.6, most procurement for large projects will be through solicitation of competitive offers. This section defines the processes for selecting a Consultant and a Contractor. The City defines the

term "bidder" to mean any person submitting a Bid for the Work and "Consultant or Contractor" to mean the person undertaking the performance of the Work. Processes for other delivery methods, whether P3 or another form of an Alternative Project Delivery, may have special requirements not addressed in this PMM.

6.4.1   Prepare Request for Proposals (RFP)

An RFP is an invitation for bidders to submit proposals to the City to perform specific work, while the vendor's proposal in response to the RFP is an offer of the services. Two common approaches to the proposal process are single-stage and two-stage requests.

A single-stage request is the most common approach, with the request for qualifications and the technical approach all included in one RFP.

The two-stage process separates the qualifications from the technical submissions and is typically only used in specific situations, usually to reduce the number of RFP submissions on large and complex projects. The first stage is a request for qualifications. After evaluation, the submissions are shortlisted based on pre-defined criteria. A general scope of work is required for the qualifications stage and submissions are not expected to have a work plan or costs. The second stage, for the technical and cost submission, is restricted only to proponents shortlisted in the first stage.

The RFP must define the City's expectations, including the detailed scope of work and terms and conditions under which the offer is to be made. The City has GCs that are a set of standard terms and conditions for use in RFPs. They are periodically updated, and are available on the City's website at http://www.winnipeg.ca/matmgt/gen_cond.stm. When the GCs are identified early in the process, the bidders are aware of the requirements and can accommodate them in their proposals.

The City uses a standard template for RFPs that can be found on the City's website at http://www.winnipeg.ca/matmgt/templates . The template incorporates the GCs and includes bidding procedures and forms to standardize and simplify the RFP's preparation. The template requires proposals to be submitted prior to the submission deadline.

A fundamental feature of the RFP process is competition. The competitive nature allows equal access to public projects for all applicants and at the same time guarantees competitive pricing.

6.4.1.1 How to Prepare a Request for Proposals

The first step in preparing an RFP is to access the City's website for up-to-date documents. The PM is responsible for RFP preparation, including identifying requirements, preparing the document, coordinating selection team input, issuing the request, and communicating with bidders.

The RFP template is structured into the proposal submission forms, bidding procedures, GCs, supplemental conditions (SCs), and specifications. The template provides a basic format, and the user enters project-specific inputs.

Some key inputs are:

- **Scope of Work –** The major and most critical effort in preparing the RFP is developing the scope of work. A well-defined project scope is the cornerstone for a responsive proposal. The scope of work is developed from the statement of work in the Project Plan, which reflects the intent of the business case. The structure of the scope of work depends on the nature and intent of the project:
    - A prescriptive approach can be used when the methods and deliverables are clear and there is little advantage in pursuit of alternative and creative solutions.

– A performance-type scope is appropriate for projects that would benefit from creativity, industry experience, initiative, and innovation.

- **Evaluation Criteria –** The RFP must identify the intended criteria for evaluation. Sample criteria from the template and their weights are shown in Table 6-1. The RFP template may list the minimum weights to give various components of the RFP.

Table 6-1: Sample Evaluation Criteria and their Weights from the Request for Proposal Template

Evaluation Criterion	Weight (%)
Fees (minimum)	40
Experience of proponent and sub-consultants	20
Experience of key personnel assigned to the project	10
Project understanding and methodology	20
Project schedule	10

- **Indemnity –** The GCs include an indemnity clause to protect the City against negligent acts, defects, errors, or omissions of the Consultant during the performance of the contract.

- **Insurance –** Consultants/Contractors are required to carry insurance policies, with the minimum requirements identified in the bid opportunity. The Corporate Finance, Risk Management Division must be contacted about any revisions. Special considerations for wrap-up policies with errors and omission coverage are discussed in Section 6.4.3.

- **General Conditions** – The GCs cover a number of standard boilerplate requirements. If the RFP requires exceptions to the GCs, they are stipulated in the SCs without altering the GCs, and the SCs then take precedence over the GCs.

The PM is responsible for coordinating advertising and submission with the Materials Management Division. The procurement solicitation process is the same for all types of projects, with some variation in the procedures depending on whether an RFP or bid opportunity is used. The process for soliciting and receiving bids is described in more detail in Section 6.4.3.

6.4.1.2 RFP template

The City uses a standard template for RFPs that can be found on the City's website at http://www.winnipeg.ca/matmgt/templates.

6.4.1.3 How to Make a Single Source Procurement

 The justifications for single source procurement are detailed in B4 of the Materials Management Policy and must be in accordance with Administrative Standard FM-002.

6.4.2 Evaluate Proposals and Award Contracts

Competitive proposals received from bidders must be treated equally and evaluated fairly in accordance with the evaluation criteria and methods stipulated in the RFP. The proposals are evaluated by an Evaluation Committee, which must commit to proposal review, scoring (individual and consensus) and attendance at interviews, if applicable.

Proposal scoring includes both financial and non-financial criteria that are combined into a single score. The City uses a standard scoring matrix that incorporates technical scores and fees into one combined value. The evaluation approach is available from the City's website at http://www.winnipeg.ca/matmgt/templates/Bid_Evaluation/Bid_Evaluation.stm.

In some cases interviews may be necessary. The interviews are for clarification and demonstration of aspects of proposals and must be used with caution. Interview protocols should be defined by the Evaluation Committee in advance and applied consistently throughout the process.

The final step of bidder selection is a debriefing to provide feedback to the bidders on their submissions, if requested in writing. This must be tactfully managed, as it typically involves negative feedback. A method that demonstrates objective scoring for defined criteria is the best way to approach the situation. Be aware that you can only share information about the evaluation of the bidder being debriefed. Do not provide the bidder with a copy of the evaluation matrix.

6.4.2.1 How to Evaluate Proposals and Make Awards

The PM is responsible for coordinating the proposal reviews, scoring, and final evaluations, and for preparing the award recommendation. The approach for evaluating proposals and recommending award is:

- Proposals are received in the Materials Management Division, where they are recorded, checked for obvious irregularities, and forwarded to the PM.
- The PM reviews the proposals for irregularities and responsiveness.
- The Evaluation Committee is assembled and proposals are distributed.
- Evaluation Committee members independently review and score all proposals according to the evaluation criteria and scoring method in the evaluation matrix.
- The PM contacts company references, if applicable, and documents findings.
- An Evaluation Committee consensus meeting is held to discuss merits and anomalies of each proposal and identify potential points needing clarification. This consensus meeting may be repeated based on the results of any clarifications, interviews or demonstrations.
- Clarification letter must be vetted through Materials Management.
- All Evaluation Committee members must attend interviews, if applicable.
- At the consensus meeting, the PM or designate, records the consensus non-financial scores, and justification for each score.
- The PM or designate, combines financial and non-financial scores to determine proposal total scores.
- The proposal with the highest combined score is recommended for award. In some cases negotiations may take place prior to award in consultation with Materials Management and Legal Services.
- If the recommended bidder is not the lowest priced bidder a detailed explanation of the reasons for non-award to any lower priced bidders must be provided to Materials Management prior to the award report.

The project team includes corporate administration personnel (from areas such as Materials Management and Legal Services), who provide advice and assistance with irregularities that arise during the process.

Once the proposals have been evaluated, the award process is the same as for all bid submissions, as described in Section 6.4.4.

6.4.3 Prepare Bid Opportunities

The City uses a formal bidding process to solicit offers for a wide variety of purchases, in addition to offers of consultant services. These offers include bids for construction contracts, services, and the supply of goods.

All these purchases fall under the Materials Management Policy and are subject to the additional conditions stipulated under Administrative Standards.

Each department that is responsible for either preparing a bid opportunity, in-house or retaining a Consultant to prepare a bid opportunity must ensure that the document has been prepared in accordance with the prescribed format and that the approved forms have been used.

A further requirement is that each PM thoroughly review the bid opportunity before it is submitted to the Materials Management Division to ensure that it is clear and unambiguous, that the information it contains is accurate and complete, and that prescribed formats and forms have been used. Guidance on bid preparation and rules for advertising, handling enquiries, and issuing addenda are given in the following section.

6.4.3.1 Forms and Documents Used in the Bidding Process

The City maintains standard documents, forms, and templates on a central website, including the items described below.

Bidding Procedures

Bidding procedure templates applicable to all Bid Opportunities are available from the City website at http://www.winnipeg.ca/matmgt/templates/Const_Gen_HighRisk_template.stm.

General Conditions (GCs)

GCs are requirements applicable to all Bid Opportunities. The GC area of the City website, at http://www.winnipeg.ca/matmgt/gen_cond.stm, must always be accessed to obtain the most current versions of the documents.

The GCs include contract clauses of general application which can be modified as required in the supplemental conditions. The GCs also define the respective roles and responsibilities of the City, the CA, and the Contractor.

Supplemental Conditions (SCs)

The SCs are the project-specific provisions in the bid opportunity. On projects with underground and surface works, the supplemental conditions section must incorporate the appropriate sections/specifications from the current *Standard Construction Specifications available at* http://www.winnipeg.ca/matmgt/Spec/Default.stm .

Drawings

The drawings section consists of drawings that show the nature and scope of the work to be performed and that have been prepared or approved by the PM and are referred to in the Bid Opportunity documents.

Specifications

The specifications section consists of a written description of the physical or functional characteristics of the work that is to be undertaken by the Contractor, including (without limitation) any requirement for testing or inspection. The role of the specifications is to describe the type and quality of materials and workmanship to be incorporated in the work.

While the drawings present the scope of work in terms of quantities, dimensions, form, and building details, the specifications provide the qualities of materials and workmanship for construction of the work.

Bid Opportunity

The resultant bid opportunity establishes the terms and conditions for the contract. The documents have the following multiple clauses that reduce the City's risk on the contracts:

- **Qualifications –** Minimum qualifications can be stipulated so that only those with experience and capabilities to perform the work will be selected

- **Performance Security –** Performance bonds or other forms of security provide protection against contractual defaults

- **Events of Default –** The GCs are structured to permit the work to continue if there is a legal dispute or terminate the work, if appropriate.

- **Insurance –** Minimum insurance levels are stipulated to protect the City against losses

- **Indemnity –** The GCs include an indemnity clause to protect the City against loss from acts or omission as a result of the Contractor

- **Warranty –** A 1-year warranty is standard in the GCs however may be extended in the Supplemental Conditions. The warranty provides a proving period for the Work.

- **Liquidated Damages –** This clause allows the City to recover its additional costs if the contract is not completed on schedule. The purpose of the liquidated damages clause is to clearly warn all bidders when bidding for the job (and ultimately the successful Contractor), the quantum of loss or damage that the City will suffer and that the Contractor will have to pay the City in the event that the interim completion dates, if specified, are not met or if the dates specified for Substantial and/or Total Performance are not met.

6.4.3.2 How to Select the Type of Pricing for a Bid Opportunity

The City has traditionally used two types of pricing for bid opportunity work: the lump sum (or fixed price) contract and the unit price contract.

Lump Sum Contracts

- In a lump sum contract, the bidders must submit a single price for the complete work on Form B: Prices (Lump Sum). The onus is on the bidder rather than on the City to determine the quantities of materials that will be required to complete the work. The test to determine whether or not the City should use a lump sum contract for bid opportunity work is whether the work can be specified in precise enough detail in the bid opportunity, drawings and specifications to ensure that there will be no possibility of or necessity for additional work.

Arguments for using a lump sum contract are:

- The City will know upon receipt of the bids and following award of contract exactly what the work will cost.
- It is easy to administer, provided that no additional work becomes necessary.
- It requires less administration effort to process progress payments.

Arguments against using a lump sum contract are:

- Unless the work is defined in precise detail and the drawings and specifications are complete, the City cannot be sure the bid/contract price will be the price it must ultimately pay for the work.
- It is difficult to accurately value work-in-progress, and, as a result, there is a potential for under/overpaying the Contractor during the various stages of the construction.
- A lump sum contract requires more administration effort if additional/extra work is encountered.

When preparing a bid opportunity for a lump sum contract, the CA or PM (i.e., the in-house representative or a consultant) must ensure that:

- A payment clause is included in the supplemental conditions section and that the payment clause clearly specifies the basis upon which the City will pay the Contractor. For example, the payment clause should specify when the City will pay the Contractor.
- The bidder is not requested to break down the lump sum price on Form B: Prices (Lump Sum). If the City requires a breakdown of the lump sum price, a clause should be included in the supplemental conditions section that requires the Contractor to provide the breakdown within a specified period of time after the award of contract.

Unit Price Contracts

For a unit price contract, the bidders are required to submit individual prices for specific items (material or segment) of the work. The individual prices may be based on either a "unit price" or a "lump sum." A lump sum price for an individual item should be used only under the same conditions provided in the section above.

Arguments for using a unit price contract are:

- The City can estimate the cost of the work by multiplying the approximate number of units by the price bid for each unit.
- It is easy to administer, especially in terms of determining the cost of extra work.
- It requires a minimum number of people to administer it.

Arguments against using a unit price contract are:

- The work must be precisely broken down into individual items.
- The drawings and specifications must be complete, except for a final determination of the quantity of work to be performed.
- If the City has grossly underestimated or overestimated the quantities, the Contractor may have remedies available under the contract.
- The CA must be able to measure the quantity of work performed.

When preparing the bid opportunity for a unit price contract, the CA or PM (i.e., the in-house representative or the consultant) must ensure that:

- Quantities, although expressed as approximations only, are as accurate as possible.
- Each type of work described in the specifications section is included as an individual item in Form B: Prices (Unit Price)

The unit price contract has particular application to heavy construction for which exact quantities cannot be determined in advance (for example, excavation of subsurface material).

6.4.3.3 How to Prepare Bid Opportunities

For DBB projects, the Consultant or in-house design staff develop designs, drawings, and specifications for products or components during the project planning phase and assemble the information and requirements into bid opportunities for advertising and receipt of bids.

The type of bid opportunity to be used depends on what is being procured and whether there are any unique procurement requirements. The City's website has a page that helps users navigate the decision-making process to find the specific application developed to help in preparation of a bid opportunity: http://www.winnipeg.ca/matmgt/templates/decisions/Contract_Type_decision.stm.

The bid opportunities must incorporate a set of the City's GCs. Like the GCs for consultant services, other GCs are a set of standard terms and conditions for use in a specific area. They are periodically updated, and are available on the City's website at http://www.winnipeg.ca/matmgt/gen_cond.stm.

The website lists multiple versions of the GCs and the user must select the current version. Multiple versions of the same GCs may be posted. This is because revisions to the GCs are not retroactive to contracts that have already been awarded, and whichever version was included in the contract remains in effect. New bid opportunities must use the most recent version.

The City uses standard templates for each of the bid types. The website offers templates for various types of infrastructure that are applicable to DBB projects. A template for general construction (referred to as *Construction Complex Projects Contract*) and the conditions under which it applies can be found at http://www.winnipeg.ca/matmgt/templates/Const_Gen_HighRisk_template.stm.

The general construction template and others are formatted with hidden instructions to guide the user through preparation. The document references the GCs and the specifications and drawings to be appended to the document to form the bid opportunity.

The bid opportunity documents include multiple terms and conditions and contractual requirements that impact the project management processes. The bid opportunity document is normally prepared by the Consultant or in-house, however the PM, and project team must review it and provide input.

Construction contracts are normally structured as lump sum or unit price contracts. Evaluation criteria may be used, however this occurs infrequently because the work is usually specifically defined with little opportunity for other criteria impacting the bids.

The PM coordinates a review of the bid opportunity prior to advertising. The review is to check conformance to the bidding process, bid documents, and procedures.

A template for the Bid Opportunity is provided on Materials Management website.

6.4.3.4 Cardinal Rules for Bid Opportunity Preparation

Five cardinal rules must be followed when preparing a bid opportunity, as described below.

Provide Accurate Information – It is the City's responsibility to ensure that all information included in the bid opportunity is accurate.

When the City prepares a bid opportunity in-house or retains a consultant to prepare a bid opportunity on its behalf, the City or Consultant must ensure that the document includes the best information in the City's/Consultant's possession (and all of it), and that the information is accurate. In addition, if the City and/or its Consultant becomes aware of an error or omission in the bid opportunity during the bid opportunity process, the City/Consultant must bring that error or omission to the attention of the bidders and correct it by issuing an addendum before the bidders submit their bids.

If the City and/or its Consultant fails to include accurate information and/or to advise the bidders of an error or omission that has come to their attention, the City may not be able to successfully defend a Contractor's claim for breach of contract and/or negligent misrepresentation if the Contractor who has relied on the accuracy of the information presented suffers a loss or damage as a result of the error.

The accuracy of information typically becomes an issue when dealing with the nature of an installation, site conditions, and estimated quantities.

Disclose all Pertinent Information – It is the City's responsibility to include, or ensure its Consultant includes, all information pertinent to the project or the Contractor's ability to carry out the work as disclosed, including the following types of information:

- Original as-built construction drawings including original structure drawings
- Rehabilitation and maintenance drawings
- Recent condition surveys (e.g., bridge deck surface delamination survey, pavement cores, sewer condition survey)
- Recent inspection reports
- Recent materials testing results (e.g., concrete cores)
- Geotechnical test results and/or reports such as soils reports
- Structural evaluation reports
- Infrastructure upgrading alternatives report
- Previous on-going contracts awarded for the project that will overlap with the project in time
- Proposed additional on-going contracts scheduled to be awarded on the project that could overlap with the project in time
- Other on-going activities/work on the project managed by others (e.g., Manitoba Hydro, MTS, , legal surveys)
- Restrictions on access to the site

If the City and/or its Consultant fails to disclose all information in its possession that is pertinent to the project, the City may not be able to successfully defend a Contractor's claim for breach of contract and/or negligent misrepresentation if the Contractor has relied on the information that was presented and suffers a loss or damage as a result of pertinent information in the possession of the City or its Consultant however not disclosed.

Pertinent information disclosure typically becomes an issue for site conditions, inspection/condition reports, and site accessibility.

Provide Clear, Unambiguous, and Consistent Provisions – The City must ensure that the provisions in the bid opportunity are unambiguous and consistent. Special care should be taken to avoid the practices described below, which commonly result in an ambiguous bid opportunity.

The **"copy and paste"** method of bid opportunity preparation involves copying provisions from an existing bid opportunity for a similar project and pasting them into the City's standard form. In theory, this method saves time, however in reality, the problems that may result requires more time to resolve than the time that might have been saved. The risks include:

- Incorrect specifications/cross references. For example, references in the supplemental conditions section to BI:12 that should have been to BI:10.
- Inclusion of language that does not apply at all, is old, or is inappropriate for the current project.

- Inconsistent use of language between sections and use of language that conflicts either within a section or between sections. For example, the GCs may specify that dates for "substantial and total performance" will be specified in the supplemental conditions section of the bid opportunity, however the supplemental conditions section refers instead to "completion dates."

In the **"impossible"** method of bid opportunity preparation, the CA or PM designs engineering or architectural rules without considering the realities of construction. The result is that the bid opportunity specifies things that cannot or should not be done, such as:

- Required equipment that won't fit through the door
- Equipment that cannot be accessed after installation for servicing
- Anchors that are to be installed in inaccessible areas

In the **"incomplete"** method of bid opportunity preparation, the CA or PM fails to specify the work in enough detail to allow the bidder to understand the City's expectations. This problem may appear anywhere in the bid opportunity. Examples are notations such as "see specs" rather than "see Part 3, Clause 3.1, Section 15800, Air Distribution" and "Refer to soils information" rather than "Refer to soils information contained in Appendix A to this bid opportunity." The incomplete method may also result in the Contractor not performing all the work that the City expected. An assumption is that the information has been provided, so its inclusion is not verified and it is left out. The incomplete method may also lead to disputes between the city and the Contractor because they have different expectations of the work that was to be included in the contract.

While the GCs specify how conflicts between the sections of the contract documents (such as bidding procedures, GCs, and SCs) will be resolved, it is of no assistance if the provisions within a section conflict or the provisions between sections are ambiguous. It is therefore imperative that each section of the bid opportunity is carefully reviewed to ensure that the provisions are clear, consistent, and complete.

Include All Bid Evaluation Criteria – The City must include all criteria it intends to use to evaluate bids in the bid opportunity and must use only those criteria in its evaluation of the bids.

The evaluation criteria are in the bidding procedures section of the bid opportunity. Depending on the project-specific requirements, it can include such diverse criteria as:

- Bid price
- Bidder's past performance on projects of a similar nature, size, and complexity
- Bidder's staff resources
- Bidder's equipment resources
- Bidder's identified supervisory and back-up supervisory staff
- Named sub-contractors' past performance on projects of a similar nature, size, and complexity
- Named sub-contractors' staff resources
- Financial responsibility of the bidder
- Adequacy and completeness of information supplied by a bidder in response to an instruction in the bid opportunity

Where price is not the only factor in evaluating the alternatives, other evaluation criteria such as the following are necessary when the bid opportunity requires bids on two or more alternatives:

- "Concrete" vs. "Steel" girder bridge alternative – Criteria for evaluation of life-cycle maintenance costs associated with each of the two girder alternatives
- "Full" vs. "Partial" traffic closure alternative – Criteria for evaluation of public impact costs associated with each of the two closure alternatives

Where the work/project includes purchase of major pieces of equipment or machinery that the bidder may purchase from a number of manufacturers, evaluation criteria such as the following may be included:

- Length and extent of warranty
- Availability of spare parts
- Service and maintenance—quality and response time
- Cost of replacement parts

The consequence of not including criteria the City intends to use to evaluate bids or of using criteria that it has not disclosed to bidders is that the courts may find the City to be in breach of its duty to treat all bidders fairly.

Request only Relevant Information in Bid Opportunity Submission – The City must ensure that bidders are not required to be submitting information with their bid opportunity submissions that the City does not need to evaluate the bids. The bid opportunity template specifies that the Award Authority may reject a Bid as being non-responsive if the Bid is incomplete, obscure or conditional, or contains additions, deletions, alterations or other irregularities. The Award Authority may reject all or any part of any Bid, or waive technical requirements or minor informalities or irregularities, if the interests of the City so require.

The bid opportunity specifies that a bidder must complete and return the enclosed bid opportunity submission forms and documents with its bid opportunity submission and the bidder either does not return the specified forms or does not supply the specified documents (or, alternatively, completes the forms in part or supplies some however not all of the specified information), then in consultation with Materials Management a determination, needs to be made if the bid is acceptable or should be determined to be non-responsive.

If an incorrect determination is made, the City may be liable for damages to the bidder, who would have been awarded the Contract had a correct determination been made.

6.4.3.5 How to Specify Insurance

The Corporate Finance, Risk Management Division, Insurance Branch, should be contacted to determine the appropriate coverage and limits. As much lead time and detail as possible should be provided in order to gather the correct requirements. Projects with values over $10 million require the City to provide the insurance. The insurance branch will provide the insurance clauses to be included in the Bid Opportunity and will arrange for the respective policies.

To protect itself against liability and property damage claims, the City must insist on contractual indemnities from both its Contractor (addressed in the GCs) and its Consultant, as well as on insurance protection from both its Contractor (addressed in the GCs and the SCs) and its Consultant.

On certain types of major projects, the City may elect to provide contract wrap-up insurance, with the Contractor providing their own automobile and equipment insurance. However, on most projects, the Contractor is required to provide all insurance coverage in accordance with the contract requirements.

Claims arising out of a construction project generally fall into two broad categories—*liability* and *property damage* claims. Claims that arise or occur prior to the total performance of the work are called *course of construction occurrences,* and those that occur any time after total performance of the work are called *past construction occurrences*.

Construction projects commonly require four types of liability insurance policies:

1. Comprehensive or Commercial General Liability Policies
2. Automobile Liability Policies
3. Architect and Engineer Errors and Omissions (Professional Liability) Policies

4. Wrap-Up Liability Policies

On some occasions due to the known history or condition of a site the insurance branch may also recommend Contractor's Pollution Liability.

Construction projects commonly require three types of property insurance policies:

1. Course of Construction or "all risks builders risk" Course of Construction Policies
2. Contractor's Equipment Insurance Policy
3. Installation Floater Policies (for smaller valued projects)

These types of liability and property insurance policies are described below.

6.4.3.6 Liability Insurance Policies in Construction

Comprehensive or Commercial General Liability Policies ("CGL Policies")

The City requires its Contractors to provide and maintain a Comprehensive or Commercial General Liability (CGL) policy of at least $2 million listing the City as an additional insured and containing a cross-liability and contractual liability clause. For all construction projects, the City will require its Contractor to include products and completed operations endorsement to the policy. Deductibles must be borne by the Contractor and set at amounts acceptable to the City.

In brief, a CGL policy protects the City from third-party claims of bodily injury or property damage that allegedly arise as a result of the Contractor's operations or work on the construction project from persons not associated with the project.

CGL policies do not protect the City from claims of professional negligence (such as errors and omissions) of its consultant/design professionals. In fact, professional negligence is expressly excluded from coverage in CGL policies.

Automobile Liability Policies

The City also requires its Contractor, especially on large bridge, sewer, and road renewal projects and on large building construction projects, to provide and maintain an Automobile Liability Policy for owned and non-owned automobiles of at least $2 million. For these policies, the City is not listed as an additional insured. Deductibles must be borne by the Contractor and set at amounts acceptable to the City.

An Automobile Liability Policy protects the Contractor and therefore the City against a claim from a third party who has been injured by one of the Contractor's cars or trucks while undertaking the construction work. While the City is not an additional insured on the Contractor's policy, the Contractor's insurance can be called upon to back up the contractual indemnity it has given the City and to respond to claims for damage assessed against the City provided we can identify the Contractor and/or vehicle

Errors and Omissions Policies (Professional Liability)

The City should always require its architectural and engineering consultants to provide and maintain an Errors and Omissions (E & O) Policy in an amount that is satisfactory for the particular project. The current Materials Management templates suggest $5 million, however the Insurance Branch should be consulted to determine the appropriate limit for the project. E & O policies protect the City against claims of professional negligence of its Consultant (such as for defects or deficiencies in the drawings or specifications resulting in a failure).These policies should remain in effect either 12 or 24 months after total completion of the project to allow for discovery/recovery under this coverage.

Wrap-Up Policies

Both CGL and E & O coverage can be provided on a wrap-up basis. Depending on the capital cost and/or the complexity of the project the City may provide or can require its Contractor to provide the CGL wrap-up policy and its Consultant to provide the E & O wrap-up policy.

The advantages of wrap-up policies are:

- Overlapping coverage and the problems associated with multiple insurers are eliminated. Overlapping coverage results when the City requires the Contractor/Consultant to provide a single CGL/E & O policy and the Contractor/Consultant requires each of its sub-contractors/sub-consultants to provide a CGL/E & O policy.
- Broader coverage can be provided and higher limits are available.
- When purchased by the City, wrap-up coverage provides greater certainty of coverage as the insurance is for a specific project and the limit of liability has not been eroded by other claims.
- When purchased by the City, wrap-up coverage allows the City greater input into the settlement of a claim.

6.4.3.7 Property Insurance Policies in Construction

All Risks Course of Construction Insurance Policies

Depending on the value of the project or its complexity the City may purchase or require its Contractors to provide and maintain an All Risks Builders' Risk/Course of Construction Policy for all large-building construction projects in the amount of 100 percent of the contract price, listing the City as a named insured. Deductibles are borne by the Contractor and must be acceptable to the City.

While the need may sometimes be less apparent, it is just as important to require an all risks policy for engineering-type work such as water mains, sewers, tunnels, overpasses, bridges, roads, towers, and transmission lines (i.e., structures). In building projects, as well as land drainage projects, it is necessary to ensure that testing and commissioning is included in the policy for 10 days after testing is expected to be completed. This enhancement to the coverage will protect the structure/equipment in the case of failure that results in physical damage.

All risks policies protect an insured against all risks of direct physical loss or damage to an insured's building or structure and equipment unless a peril is expressly excluded by the policy. Risk of loss or damage due to a fire is typically included.

Contractor's Equipment Insurance Policies

The City may require its Contractor to provide and maintain a contractor's equipment policy (including tools) on large projects such as tunnelling, sewer renewals, or other projects involving extensive outlays.

Installation Floater Policies

For smaller projects that do not require a Builder's Risk/Course of Construction Policy a Contractor will be requested to provide an Installation Floater Policy. This coverage will provide the cost of the materials that a Contractor is planning to include in the project while they are en route to the site or while being stored at the work site. It will not pay for damage to a structure as a result of improper installation.

6.4.3.8 How to Specify Bid and Performance Security

The City may require the bidder to provide bid security initially in the form of a bid bond, agreement to bond, letter of credit, bank draft or certified cheque with their bid. The City may also require the Contractor to provide a performance security in the form of a performance bond letter of credit, bank draft or certified cheque, after award of a contract. Administrative Standard FM-002 provides guidelines for amounts of performance security.

Bid Bond, Agreement to Bond and Performance Bond, Letter of Credit

The requirements for bid and performance security and the standard forms are set out in the Bid Opportunity Templates.

6.4.3.9 How to Specify Liquidated Damages

When time is of the essence in a construction contract, it is absolutely imperative that a clause be included in the SCs specifying the dates upon which the Contractor is to achieve both Substantial and Total Performance of the Work. Beyond that, if certain phases of the Work must be completed by particular dates, then those key dates must also be specified in the SCs. In the event that the Contractor does not complete those portions of the Work on the dates specified, then the Contractor will be in breach of the terms of its Contract. The consequence of a breach is that the Contractor will be liable to the City for losses or damages sustained by the City as a result of that breach.

The City has elected to specify in the Contract, a genuine pre-estimate of the losses or damages that it will suffer, by including a liquidated damages clause in the SCs of the Bid Opportunity Template. In the event of a delay breach by the Contractor, the Contractor will be liable to pay the City the sum stipulated in the Contract as liquidated damages for each and every day the work is late, ending on the day immediately preceding the day that the Work has been achieved and is so certified by the CA, unless specified otherwise in the SCs.

As a result, it is a requirement that the SCs contain specific details on specified dates, whether the assessments will be based on calendar or working days, and liquidated damages amounts. It is imperative that the determination of "calendar" or a "working" day basis be made. There are certain types of major contracts where a "calendar day" basis may be more appropriate. For example, the Contract may impose an obligation on the Contractor to work Saturdays, Sundays and holidays in order to facilitate an early opening or re-opening of a facility.

A properly drafted liquidated damages clause will:

1. Explicitly confer a power to extend time in general terms for any breach of contract or prevention by the City and in particular by reasons of Changes in the Work or delay in issuing instructions or information;
2. Define with precision any other circumstances for which an extension of time is to be granted;
3. Make it clear that the power to extend time is exercisable at any time;
4. Empower the City either to deduct liquidated damages from any payment or sum certified under the Contract or to recover them from the Contractor by way of action or arbitration; and
5. Define the per diem amount for liquidated damages.

Determination of Liquidated Damages Amount

Liquidated damages are intended to be a genuine pre-estimate of the City's loss in the case of default by the Contractor, and documentation of its value and the basis of estimate is to be retained in Contract file.

Examples of costs which should be included when determining the amount of liquidated damages for any given contract would be:

- Additional engineering fees and disbursements

- Extra costs for engaging another Contractor to complete the Work, in the event that neither the defaulting Contractor or its Bonding Company is prepared to acknowledge the default
- Utility costs,
- Cost of hiring a security firm to secure the site
- Legal costs.

In the event that a default occurs and the recommended amount of liquidated damages is found to be inadequate, the City would not be able to recover the shortfall from the Contractor. That is, if the SCs specify liquidated damages of $2,000.00 per working day and it actually costs the City $3,000.00 per working day, the City will not be able to recover the extra $1000.00 per working day from the Contractor. However, for a consultant delivered project, the City may be in a position to recover the deficiency from the Consultant.

6.4.3.10   How to Specify Training

Training is an obvious prerequisite to long term operation and maintenance of new works. Training often begins at the design phase, ideally carries through construction, and becomes a prominent activity during commissioning.

The specifications must give an indication as to duration and types of training required. In addition, the knowledge and skill level of the trainees, and that expected of the trainer should be considered in the development of the specification. Often several training sessions must be set up for one system. In a complex system, operators are trained in separate session from mechanical maintenance personnel. Electrical and control maintenance personnel may be trained separately on the same components. Finally programmers, users, and even managers may need training, all at different levels, about different aspects of a product or project.

The specifications must indicate what products are to be included in training. Often training manuals, video training tapes, and other O & M manuals should be included in a training specification.

6.4.3.11   How to Solicit and Receive Bids

The City has a structured process through the Materials Management Division for soliciting and receiving bids, which is illustrated in Figure 6-1. The solicitation must not be advertised until all the preliminary requirements have been met. These include:

- All funds associated with the proposed construction work have been approved by Council for the project.
- Any additional funds required to offset a projected contract or project shortfall based on the pre-bid opportunity estimate have been secured.
- All outside agency approvals associated with the contract or project have been secured.
- ** All arrangements concerning land associated with the contract or project have been completed.
- Documentation is on file verifying how the amount specified for liquidated damages was determined.
- The bid opportunity has been thoroughly reviewed by the department and approved by the PM, who then authorizes advertising. Materials Management reviews prior to advertising.

Figure 6-1: Procurement- Solicitation: Bid Solicitation, Receipt of Bids
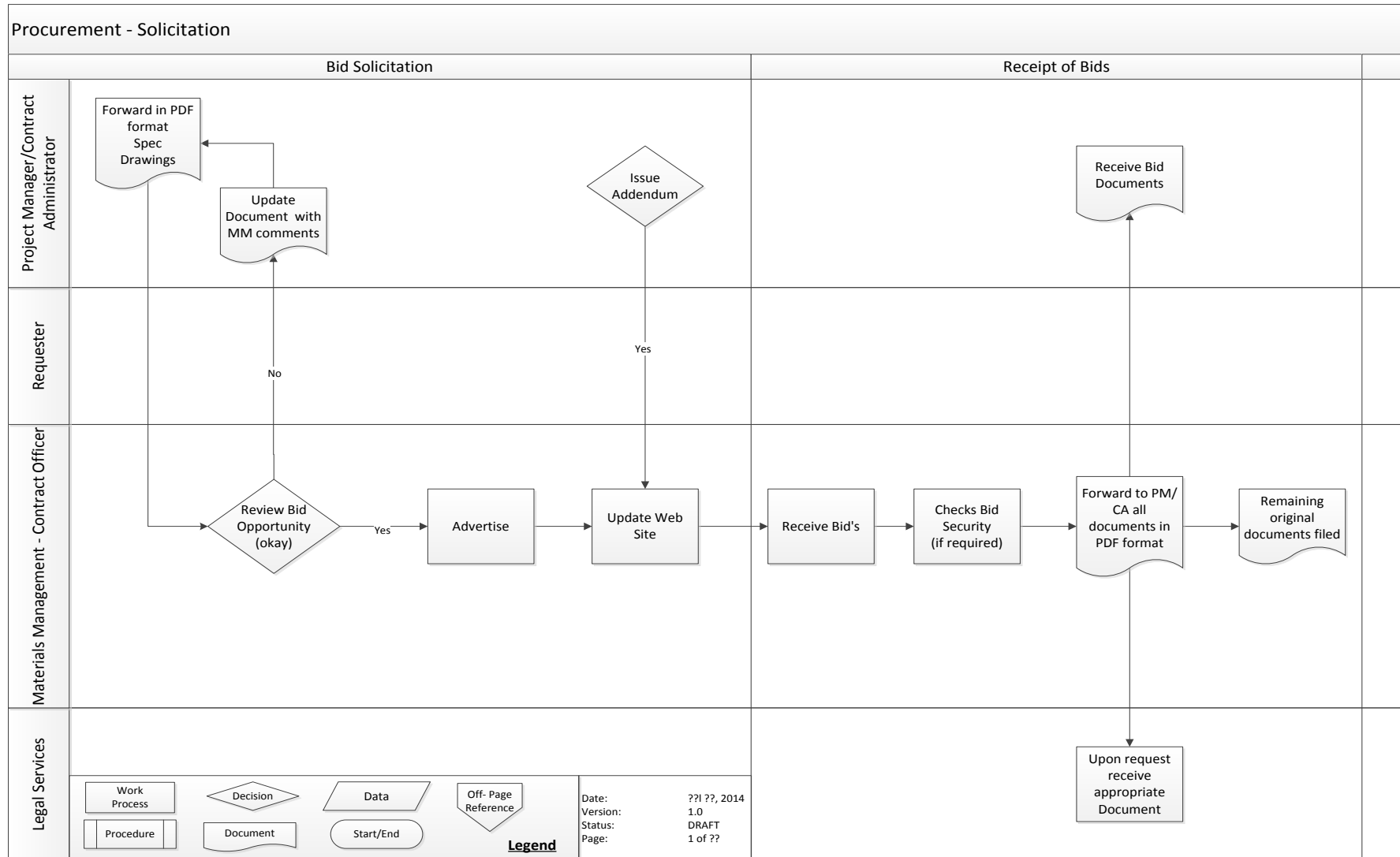
The solicitation process begins once all of the authority requirements have been fulfilled. The process uses a combination of online services, with Materials Management providing the users with support and assistance after the process has been initiated. The CA initiates the process with a request for a bid opportunity on the City's website at **http://winnipeg.ca/matmgt/templates/bidoopp_num_request.stm.**

After receiving the Bid Opportunity document, Materials Management begins review and processing, including checking the following for conformance with the template:

1. Check bid document for consistency with the advertisement.
   a. Time and date set for final receipt of bids

2. Check bid document for completeness.
   a. Bid opportunity submission forms
   b. Bidding instructions
   c. GCs (to be inserted or referenced)
   d. SCs
   e. Specifications
   f. Drawings

3. Check forms in bid opportunity submission for consistency with text.
   a. Validity period of bids
   b. Amounts of bid security/ performance security where required.
   c. Duration of warranty period
   d. Basis for prices
   e. Basis for schedule of work

The CA contacts Materials Management to arrange a mutually acceptable date for final receipt of bids, considering:

- The worst case scenario for the processing the bid opportunity evaluation and award period, especially if the recommendation for award has to go to Standing Committee or Council.
- The number of bid closings already scheduled in the same timeframe and on any particular day.
- The date for final receipt of bids, which must not be less than 15 calendar days following the advertisement date.
- Any key event (e.g., a site tour) that occurs before the time and date set for final receipt of bids must be made known at this time and must be included in the advertisement.

Bid Opportunity Enquiries

The Contract Administrator must fully document all enquiries received during the bidding period, and the resolution of each. The resolution of each matter brought forward must be one of the following:

1. By satisfactory clarification in accordance with the bid opportunity, in the case of simple misinterpretations.

2. By issuance of a specific addendum clause to provide the necessary clarification, in the case of any inconsistency, omission, discrepancy, change, and/or approval of a substitute.

The Contract Administrator must not disclose any confidential information related to the project, such as the pre-bid opportunity estimate or the project budget.

Addendum Issuance

The Contract Administrator must ensure that each addendum is developed accurately in accordance with the standard City format and practice. The addendum is delivered to Materials Management for issuance to the City's Materials Management website.

Bid Opportunity Opening

Materials Management will oversee the final receipt of bids and conduct the bid opportunity opening in the Materials Management office immediately following the expiration of the time and date set for final receipt of bids. Any bid received after the deadline for final receipt will not be accepted.

The bids received by Materials Management will be recorded on the bid receipt record form. Any bid not containing the required submissions may be rejected. . Materials Management will notify the Contract Administrator of any informalities noted during the bid opening.

The PM and Contract Administrator may attend the bid opportunity opening to observe.

Bid Opportunity Submission Document Disposition

Materials Management forwards a PDF of all bids to the Contract Administrator. The Contact Administrator ensures that all bid information provided by each bidder in the bid opportunity submission documents remains confidential.

After reviewing the bids the CA's recommendation for contract award is sent to the PM for department record and contract preparation purposes. Four sets of the bid opportunity, complete with all addenda, must also be returned to the applicable department for contract preparation purposes.

6.4.3.12   How to Determine whether a Bid is Responsive

A responsive bid is one that conforms to the invitation to bid opportunity in all material respects: that is, there is no non-conformity or irregularity in the bid that would materially affect the contractual relations of the parties or the Contractor's performance the waiver or correction of which would not reasonably be expected to cause prejudice against other bidders.

A non-responsive bid is one that fails to conform to the bid opportunity in a way that materially affects the contractual relations of the parties or the Contractor's performance, or for which the waiver or correction would reasonably be expected to cause prejudice against other bidders.

Details on determining whether a bid is responsive or non-responsive are:

1. The authority having jurisdiction to award must make the determination.

2. The determination depends on the unique characteristics (requirements, evaluation criteria, and so forth) of the particular bid opportunity.

3. A bid may be responsive even though it has one or more irregularities (items that do not conform exactly to the bid opportunity requirements).

4. The correction of clerical errors in bids and revisions made for clarification may be allowed if the irregularities do not render a bid non-responsive (that is, they do not offend the criteria) and the changes are related to technical requirements that the award authority to waive. Examples of irregularities in a bid that would <u>not</u> automatically render the bid non-responsive are:

   a. The bidder fails to affix its corporate seal to its bid opportunity forms. This failure does not materially affect the contractual relations between the City and the bidder because the Corporations Act of

Manitoba provides that an instrument executed on behalf of a corporation by a Director, an Officer, or an Agent of the corporation is not invalid <u>merely</u> because a corporate seal is not affixed. Lack of the seal does not affect the Contractor's performance, and waiver or correction would not reasonably be expected to cause prejudice against other bidders.

b. On a unit price contract, the bidder makes an extension error by multiplying the approximate number of units by their bid/unit price improperly or totals the correctly extended unit prices improperly.

c. The bidder makes corrections or erasures without initialling them.

d. The bidder submits the wrong form of bid bond or agreement to bond.

e. An incorrect warranty period is shown on the agreement to bond (i.e., 1 instead of 2 years).

5. Examples of irregularities in a bid that <u>may</u> render the bid non-responsive are:

a. The bidder fails to submit bid security with their bid opportunity submission.

b. The bidder qualifies/conditions their bid; for example:

- Proposing commencement or completion dates other than those required by the bid opportunity;
- Failing to submit or complete forms required for evaluation of bids;
- Making the bid conditional on being awarded the whole contract when the bid opportunity states that the City may award the sections of work separately; or
- Proposing an alternative to the specified work (e.g., an XYZ pump instead of the ABC pump specified in the invitation to bid opportunity) without obtaining the CA's prior written approval.

The authority having jurisdiction to award the contract has no discretion to award a contract to a bidder submitting a non-responsive bid. The authority must reject the non-responsive bid.

6.4.3.13   How to Determine whether a Bid is Responsible

A responsible bidder is one who meets the following criteria:

- Adequate financial resources;
- Necessary experience, organization, and technical qualifications;
- Satisfactory record of performance on work similar in scope and value, however also has the present capability (staff, equipment) to comply with the specified performance schedule including the contract completion date, considering all existing commitments.

No contract can be awarded to any bidder who, in the judgment of the award authority, is not a responsible bidder or does not have all the necessary experience, capital, organization, and equipment to perform the work in strict accordance with the terms and provisions of the contract.

The authority having jurisdiction to award a contract must determine whether a bidder is responsible prior to the award of a contract. The authority having jurisdiction to award is prohibited from awarding a contract to other than a responsible bidder.

The Bid Opportunity document sets out the requirements for a responsible bidder.

6.4.4   Evaluate Bids and Award Contracts

Bids must be evaluated strictly in accordance with the criteria specified in the bid opportunity. If the City either does not evaluate the bids received strictly in accordance with the specified criteria or uses other than the

specified criteria to evaluate the bids received, the unsuccessful bidder(s) may bring an action for damages against the City that the City cannot successfully defend.

6.4.4.1 How to Evaluate Bids and Recommend Award

The Materials Management Division forwards a PDF of the original bid submissions to the CA, whether the CA is a City employee or a Consultant.

The procedure for the CA's detailed bid evaluation is:

- **Determination of the Responsiveness of the Bids –** Based on a thorough evaluation of the bid submissions received from each bidder, the CA independently assesses whether the informalities are material (so the bid is non-responsive) or technical (only the Award Authority has authority to waive informalities related to technical details). The CA must provide reasons for determining the bid to be responsive or non-responsive, (in consultation with Materials Management or Legal Services).

- **Evaluation of the Prices (Form B: Prices—Unit Prices) –** The CA must first extend all unit prices to verify the total price bid for each item of work, and for the total bid price for each bidder. These results are summarized in a "tabulation of bids" in the standard City format, showing and describing all informalities. The final tabulation of bids shall be sent back to Materials Management for posting to the website.

- **Evaluation of the Prices (Form B: Prices—Lump Sum) –** The CA must confirm that each bidder has entered a total bid price on Form B: Prices—Lump Sum.

- **Evaluation of all Other Bid Submission Forms and Documents Required to Be Submitted by the Bidder –** The CA must examine all other forms and documents submitted by each bidder, identify all informalities found in the forms and documents, and summarize the results in a "summary of bids" on the standard City format, showing and describing all informalities (e.g., what areas are incomplete).

- **Unsolicited Information –** The CA must not review or consider any unsolicited information or documentation that may appear during the bid evaluation period. The CA also must not contact any bidder or otherwise request additional information or clarification from any bidder without the prior approval of the Materials Management or Legal Services.

Bid Mistakes

The law provides that the City cannot accept a bid submission from a bidder if a mistake is apparent on the face of the bid unless the bidder consents to waive the mistake.

Mistakes apparent on the face of a bid submission for a lump sum contract typically are in one of these two categories:

1. The bid price of the lowest bidder is substantially lower than the pre-bid opportunity estimate. This assumes the other bids received are close to the estimate; if *all* of the bid prices received are substantially higher or lower than the estimate, the estimate does not help in assessing a bidder's request to withdraw on the grounds that its submission contains a mistake.

2. The bid price of the lowest bidder is substantially lower than all the other of the bids received.

Mistakes apparent on the face of a bid submission for a unit price contract are generally easier to detect than on a lump sum contract. They include:

1. The bidder has failed to include a price for a work item on Form B: Prices—Unit Prices.

2. The bid prices of the lowest bidder for one or more items of work on Form B, Prices—Unit Prices or for the work as a whole are substantially lower than the pre-bid opportunity estimate(s).

3. The bid price of the lowest bidder for any one or more of the work items on Form B: Prices—Unit Prices or for the work as a whole is substantially lower than the bid prices received from all other bidders.

Procedure to Follow When Bidder Advises of Bid Mistake

A bidder seeking to withdraw a bid on the grounds that it contains a bid mistake usually does so within hours of bid opportunity closing. If the City receives an oral communication (i.e., telephone call) from a bidder advising of its bid mistake, the bidder should be instructed to put the information in writing, including details of the mistake and how it was made and the request to withdraw, and to send it to Manager of Materials,. The CA or other City staff should make no comments to the bidder. The entire project team should also be instructed to refer any similar oral communications without comment directly to the Manager of Materials.

The Manager of Materials in consultation with Legal Services determines whether the mistake is a bid mistake apparent on the face of the bid.

If the Manager of Materials and Legal Services concur that the bidder has made a mistake that is apparent on the face of its bid submission, the Manager of Materials should prepare a letter to the bidder permitting the bidder to withdraw the bid without penalty.

If the Manager of Materials and Legal Services Department concur that there is no mistake apparent on the face of the bidder's bid submission, the CA on behalf of the department should immediately write an award report recommending that the contract be awarded to the bidder, notwithstanding its request to withdraw, and should forward the recommendation to the Award Authority for approval. The award report must advise the Award Authority that the bidder has made a request to withdraw its bid due to an alleged mistake; it must provide the Award Authority with all details and reasons the bidder gave to the City for the mistake and it must detail why the Manager of Materials in consultation with Legal Services has concluded that there is no mistake apparent on the face of the bid submission and why it has recommended that the Award Authority reject the bidder's request to withdraw without forfeiting its bid security.

Immediately following a decision of the Award Authority not to allow the bidder to withdraw the bid without forfeiting the bid security and in no event later than the time period specified in the bid opportunity form, the Department Head must issue a Letter of Intent (LOI) to the bidder advising that the bidder has been awarded the contract. If the Letter of Intent is not issued within the specified time period, the bidder's bid, together with any entitlement the City may have to its bid security, will lapse.

On receipt of the Letter of Intent, the Legal Services prepares the contract documents and forwards them to the bidder for execution and return. The bidder advises the City upon receipt of either the Letter of Intent or the contract documents that it will undertake the work for the price bid or that it will not undertake the work, notwithstanding the Award Authorities decision. If the latter, the Department must notify the Legal Services, which will make demand on the bidder's surety company if its bid security was a bid bond, or on the bidder's financial institution if its bid security was a letter of credit.

Following a demand on the bidder's Surety Company or financial Institution and on the advice of the Legal Services, the Department then instructs the authority with jurisdiction to award the contract to issue a letter of intent to the bidder submitting the second-lowest evaluated responsive bid.

Withdrawal of Bids prior to the Award of Contract

Bidders are only entitled to withdraw their bids without forfeiting their bid securities at any time prior to the time and date set for final receipt of bids specified in the bid opportunity. Bidders are not entitled to withdraw their bids without forfeiting their bid securities after the time and date for final receipt of bids. Bidders who

withdraw their bid after the time and date set for final receipt of bids however before an award of contract forfeit their bid securities, unless Manager of Materials or Award Authority, in consultation with Legal Services, allows otherwise.

Contract Administrator's Recommendation of Award

After completing evaluation of bids, the CA meets with the PM to review the findings summarized in the "Summary of Bids" and "Tabulation of Bids" forms to:

(1) Discuss any informalities found in the bids,

(2) Determine whether the CA's assessment that a bid is either responsive or non-responsive can be supported by the reasons the CA has given (the department may have to follow up and obtain the opinion of the Legal Services Department before confirming),

(3) Discuss the qualifications of the lowest-evaluated responsive bidder and their sub-contractors to perform the work, and (upon resolution of all uncertainties) tentatively schedule an early date for the pre-award meeting.

Pre-Award Meeting with Lowest Evaluated Responsive Bidder

The pre-award meeting should generally involve only the three principal participants: the lowest evaluated responsive bidder, the CA, and the PM. The CA may also request that certain or all of the designated sub-contractors listed in the bid submission be available for discussions involving their capabilities and commitment to their aspects of the work.

The CA should chair the pre-award meeting, opening with the standard disclaimer that "it is not the intent of this meeting to award the contract or make any changes however only to confirm the intent and ability of the Contractor to undertake and perform the work in accordance with the bid opportunity documents and the bid."

The CA should then review the scope and schedule of the work to ensure that the bidder has no misunderstanding about the extent of the work and to confirm that they have no reason to believe that they cannot perform the contract in accordance with the bid opportunity documents. , the CA should advise the Contractor that they have an obligation to enter into contracts with the sub-contractors that require them to perform their work in complete conformance with and subject to the terms and conditions of the Contractor's contract with the City. Further, the CA should discuss any site investigations carried out by the bidder to ensure that the bidder's findings were consistent with the site information disclosed in the bid opportunity.

The CA keeps proper detailed minutes of the pre-award meeting, and promptly transmits a copy of them to all parties for confirmation of accuracy in the recording.

Contract Administrator's Final Recommendation of Award

The CA prepares and transmits to the department an unequivocal recommendation for award, supported by reasons. The letter of recommendation must be accompanied by the "Summary of Bids" and "Tabulation of Bids" forms, and the bid opportunity submissions of all bidders.

A recommendation to reject any bid(s) as non-responsive, and/or a recommendation to award to other than the lowest evaluated responsive bidder, must be fully explained to the satisfaction of the department.

6.4.4.2 How to Award Contracts

The department reviews the final recommendation of award from the CA and promptly resolves any identified inconsistencies that could impede concurrence or implementation of the contract award. If the department

and CA recommendations differ, the difference must be resolved in consultation with Materials Management and Legal Services prior to the department's award report.

The City has a structured process for approval of award and final award. A process chart for the bid opportunity submission approval process is shown as Figure 6-2.

6.4.4.3 Award of Contract Template

A template for the award report can be found on the City's website at
http://citynet/cao/administrative_directives.

Figure 6-2: Procurement – Solicitation: Bid Approval.
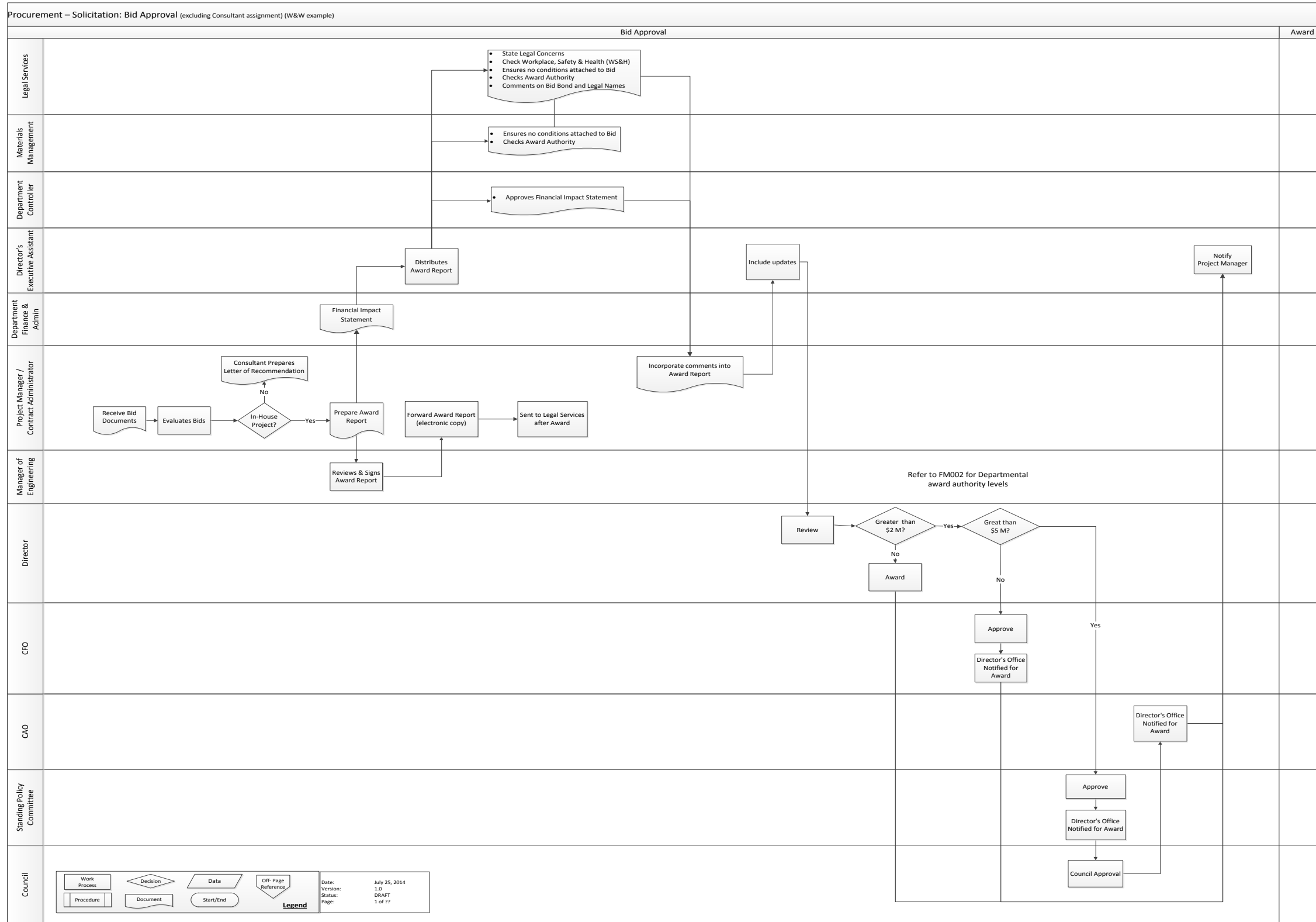
The PM must prepare an award report in accordance with the current standard format, including a one-page executive summary if the report exceeds three pages.

Award reports on major/complex projects and/or award reports that must address bidding irregularities, construction alternatives, budget complications or overruns, or the exercise of an option to add/delete alternative or separate price items must be expanded to fully explain and justify the proposed course of action. An expanded discussion section is required related to the following award complexities:

1. Additional funding requirement
   a. Applies to either the contract or other parts of the project.
   b. If not available from surplus funding in the department, must be sought from other funding sources.

2. Outside agency approvals
   a. All approvals required for the project to proceed must be secured.
   b. Explanation of each approval must be provided.
   c. Property acquisition or easement agreement for the project to proceed must be in place.

3. Construction alternatives
   d. Explanation of the alternative.
   a. Reason for recommending the one chosen.

4. Public (traffic) disruption
   a. Identify impact based on project schedule/alternatives.

5. Accelerated completion bonus
   a. Cost/benefit statement to justify recommendation.

Legal Services, Materials Management, and Controller Approvals

The award report must be approved by Legal Services, and Materials Management and the department controller before being forwarded for approval and award at the designated level.

> **Legal Services –** Legal Services reviews the award report and may either approve it (with or without comments) or not approve it, stating the legal concerns and/or ramifications associated with proceeding with the award.

> **Materials Management –** Materials Management reviews the award report and may either approve it (with or without comments) or not approve it, stating the reason(s) for withholding the approval.

> **Controller –** The controller reviews the award report and may either approve or not approve it, on the basis of verification of the availability of sufficient authorized funding for the designated project work.

Legal Services and Materials Management review the award report to ensure that:

1. The recommendation for award is to the bidder submitting the lowest evaluated responsive bid (or most advantageous offer in the case of an RFP).

2. The department has correctly determined that the bidder recommended for the contract award is indeed the bidder submitting the lowest evaluated responsive bid.

3. Known informalities or irregularities in the recommended bidder's bid opportunity submission have been identified and that a correct determination has been made about their materiality.

4. The department and its Consultant have determined that the recommended bidder is responsible (qualified to do the work).

5. The department has confirmed that there are sufficient monies available in the budget (or to be transferred in) to pay for the work once the contract is awarded.

Approval of the Award Report from Legal Services and Materials Management does not mean that the department has evaluated the bid submissions correctly unless the department has consulted with Legal Services or Materials Management during the evaluation process.

Award Process

The Award Report must be routed to the appropriate approvers and award authority. In some cases, however not all, approval and award are by the same authority. Council and its committees may approve of an award of contract to be made by the CAO. The CAO has delegated the issuance of all letters of intent awarding the contract to the Department Head).

The award authority for a contract depends on its type and value, and on availability of budget funds. A complete explanation of the process is provided in Administrative Standard FM-002 located on the City website, at http://citynet/cao/administrative_directives/financial_management/default.stm .

6.4.4.4 How to Form a Contract

After all the approvals have been made, a contract must be formed. There are three options for this identified in one or more of the RFP and bid opportunity templates and GCs:

- A Letter of Intent (LOI) is issued by the award authority with a requirement to execute a formal contract within a specified time period. The contract is prepared by Legal Services.
- A purchase order (PO) is issued in lieu of the execution of a contract.

A Letter of Intent is issued by the award authority in lieu of the execution of a contract, with the bid documents in their entirety deemed to be incorporated into, and form part of, the contract. There is a specialized form of Letter of Intent for Consultants located on the City website, at http://www.winnipeg.ca/matmgt/templates/contract_administration/ Contract_Administration_Letters.stm.

The process is illustrated in the process chart included as Figure 6-3

The contract must be signed by an approved signing authority. The award authority and signing authority are not the same.
Templates for the Letters of Intent and Regrets Letters for the unsuccessful bidders are available from this page on the City's website: http://www.winnipeg.ca/matmgt/templates/contract_administration/ Contract_Administration_Letters.stm.

Standard consulting agreements are available from this page on the City's website: http://www.winnipeg.ca/matmgt/templates/consultants/Consultant_Information_Page.stm.

Figure 6-3: Procurement – Solicitation: Award

Procurement – Solicitation: Award Process (example from W&W)

Bid Approval	Award

Vendor
- Vendor Commences work
- Signs Formal Contracts

Legal Services
- Creates Formal Contract Documents
- Issue Formal Contracts
- Distribute Final Contract

Senior Financial Analyst
- Approval

Executive Assistant
- Notify PM

Dept. Clerk
- Forwards to Vendor
- Create Purchase Order (PO)
- Enter into PeopleSoft Finance Workflow Approval System
- < $1 M?
- Yes
- No

Capital Analyst
- Approval

Project Manager / Contract Administrator
- Prepare Letter of Intent (LOI)
- Review and Obtain Signatures for Formal Contract Document

Division Manager
- Does Director need to sign: Over $2M?
- No
- Yes

Director
- Award Authority Decision
- Sign & Distribute Letter of Intent (LOI)
  - PM
  - Finance – Capital or Operations Clerk
  - Legal
- Approval

Legend:
- Work Process
- Procedure
- Decision
- Document
- Data
- Start/End
- Off- Page Reference

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6.5   Direct and Manage Work

The work activities are directed and managed in order to achieve the project's objectives. Directing and managing may include one or more of the following:

- Managing project activities
- Administering contracts, which may include those for consultants, construction or third parties
- Directing and managing in-house delivery

Directing and managing work involves a variety of activities, such as managing the team, directing project communications, reviewing project deliverables, making decisions, and generating and providing project data.

Contract administration for Consultants, Construction Contractors, and third-party Contractors is similar. Each is a type of vendor that has a contract with the City, and contract administration for any of the three involves managing the work provided in accordance with the terms and conditions of the contract. The contracts with the three types can be different, which creates differences in the City's role, relationship with the vendor, and administration activities, however the applicable project management and contract administration processes are the same.

Directing and managing differs from monitoring and controlling, which involves managing changes and taking corrective action, as described in Section 7.

6.5.1   Manage the Project Delivery Plan

The project management work is defined in the PDP is based on an overarching plan for project management and delivery, encompassing the entire project delivery chain to be managed by the PM.

The PM is responsible for acquiring a project team and directing their work assignments, including scope of services, level of effort, and expectations. The PM confirms that the services are being provided and delivered as required to meet the objectives of the business plan. For projects involving in-use facilities, it can be particularly challenging to maintain normal operations during construction. The PM must coordinate either directly, by communicating with operations staff, or indirectly, by facilitating and monitoring other set procedures. The coordination requirements may include:

- Maintaining operation of the existing facility during construction
- Maintaining proper lines of communication
- Planning and preparing for operation of the new work well in advance of actual transfer

City representatives for site work may be assigned to assist or take a lead role to support the PM. Under either working relationship, the PM must retain responsibility for quality and project delivery. Communication and coordination responsibilities are vulnerable to breakdown under these situations, particularly when the Contractor's work encroaches on the operating staff's daily responsibilities. Even though authority may be assigned to the Consultant to act on the City's behalf for these services, the PM must monitor site communications for conformance with protocols and formal lines of communication as identified in the PDP and the contracts.

Projects may have third-party commitments, such as utility coordination. The PM must see that the required coordination is carried out, either directly, by communicating with others, or indirectly, by facilitating and monitoring other set procedures.

The PM is responsible for the entire project budget throughout the full project delivery chain. This may include cost items in addition to the product itself, such as application fees, utility coordination, and

engagement of third-party services. The PM reviews progress and billings and coordinates with Accounts Payable for payment. The PM is responsible for taking corrective action if the costs or projections do not conform to the PDP and project budgets, as described in Section 7.

The PM is responsible for coordinating events within the PDP schedule. The PDP schedule for the full project delivery chain is likely to commence earlier and extend well beyond those for Consultant or Contractor services. The PM reviews schedules and confirms that critical dates and milestones are being met and are achievable.

Project-level communication is required as identified in the PDP. The PM is responsible for arranging and undertaking the communications, which may include communications with the following individuals:

- Project Sponsor, to provide updates or request advice or input
- Major Capital Project Steering Committee, to address risks and major project issues
- Project Advisory Steering Committee, for updates and decisions
- Business Owners and operations personnel, to receive input or provide information on operating issues or impacts
- Other business units or departments, for coordination
- Manager of Capital Projects, for project updates and issues

6.5.2 Manage DBB Projects

For consultant delivered DBB delivered projects, the CA (Note: per section 5.6 the role is designated as "contract project manager") must administer the Consultant's contract. Maintaining focus on the unique product, service, or result is of paramount importance, since the project is undertaken to achieve a benefit as defined in the business case. The most effective way for the City and Consultant project team(s) to meet this goal is to work collaboratively. The PM and project teams accomplish this through a teamwork approach, not only by administering however by facilitating and supporting the Consultant in developing deliverables and providing timely reviews and approvals.

The CA is responsible for administering services in accordance with the Consultant contract, which is drawn from the RFP, GCs, proposal and the Consultant PXP. The Consultant will be required to prepare PXP consistent with the requirement of the City's PDP. The services include a variety of coordination, facilitation, and decision-making relating to scope, schedule, and deliverables and making payments for the services. The City PM will have specific deliverables and task assignments based on the approved PDP and must manage and facilitate City interactions and participation.

The consultant service contracts may vary with a wide range in the deliverables. For the DBB project the Consultant will normally be responsible for the means and methods of the assignment and the City PM will be responsible for contract administration of the Consultant contract regardless of the details. The City PM is responsible for approval and monitoring of the Consultant PXP.

The Consultant will develop their PXP based on the requirements in the contract, the PMM and their own internal project management and product delivery processes. If any conflicts exist in best practises the City will provide the Consultant formal direction via the change control process. The goal is for Consultants to follow the PMM processes and conform with the PDP in meeting the project goals, and ensure consistency and best practise in how projects are managed and delivered. This will not interfere or limit the Consultant from implementing new concepts or designs in the product or service being delivered.

The Consultant PXP will include a team chartering process. Project management best practices identify project team chartering as a key enabler for project success in developing a project team. The preferred

approach is for the Consultant chartering session to include the City's PM, at a minimum, and preferably the entire City project team, operations, and Senior Management staff, including the Project Sponsor.

The main work to manage and direct the project is defined in the consultant contract and as detailed in their PXP. Contract administration is carried out by the CA (CA is role based – the PM may also fill the CA role) for all types of project. The CA responsibilities generally include the following:

- **The Deliverables to be provided -**when and for how much money

- **Information Transfer –** Providing information is a City deliverable for the consulting contract and it is a critical task that must be carried out in a timely manner, since the Consultant's ability to perform work depends on it. The PM and project team collect, or coordinate collection of, all internal data and information and confirm that the information has been transferred.

- **Decisions –** The City is responsible for timely review and a prompt response for decisions to Consultant submissions and requests. Response times for City review periods should conform to those identified in the PXP or contracts and are to be managed by the PM.

- **Communications –** Communications are carried out according to the contract or as further agreed on. For larger projects, regularly scheduled meetings should be held between the PM and Consultant representative, along with regular or milestone project update meetings with the City's project management team and Project Advisory Committee.

- **Schedule –** The Consultant's work schedule included in the contract should be used for coordinating and scheduling work. The Consultant and PM regularly update progress against the baseline. The original schedule must not be changed even if target dates will not be met, unless authorized through a change process as part of the project controls, as discussed in Section 8. The PM is responsible for providing any City input to the schedule within the timeframes identified.

- **Quality Management –** For major projects, Consultants should have an internal QA/QC process. While the process should be developed, owned, and administered by the Consultant, familiarity with the program and its use will give the PM an additional QA measure to use. An effective Consultant QA/QC program may warrant reduction of the level of risk assigned under the risk assessment.

- **Cost Estimating –** Cost estimates for a product are required as part of most consultant assignments. While there are well-defined techniques for developing estimates, the process can be challenging on certain types of projects. The contract should identify the estimating technique to be used and the estimate classification system, which the PM can then monitor under the QA process.

- **Payments –** Standard consultant contracts provide for monthly billing, with the billing method and conditions defined in the consultant contract. The process for approving payments is:

  – The Consultant submits a monthly invoice based on the deliverables status and progress

  – The CA reviews the invoice and notifies the Consultant of any errors or omissions

  – The PM verifies the progress and authorizes payment for consultant services

The CA is responsible for measurement and payment. Work progress is measured through the monitoring and control processes and is usually straightforward, as it is readily measured and confirmed through submission of deliverables. It may be more complex at interim levels of completion where level of progress must be estimated. Regular communications between the CA and the Consultant should provide sufficient validation of progress and support for approval of payments.

6.5.2.1 How to Manage Consultants

Consultants are an important part of the City's project delivery chain. They typically have a close working relationship with the PM and project team and play a major role in shaping or influencing the project direction.

Consultants work under contract with the City and the PM/CA must, without exception, administer their services according to the terms and conditions of the contract. This means that if the Consultant is expected to manage a project in a certain way, it must be stipulated in the RFP, incorporated in the contract and detailed in their PXP.

In most cases, the Consultant has expertise in project management as well as in providing technical services. Prescribing Consultants' work methods and procedures should be balanced and consistent with the contract, considering both the extent of the need and the potential increase in costs and benefits.

6.5.3 Manage Design-Bid-Build Construction Contract

DBB contracts are the most common method of delivery for construction projects and are used for consultant and in-house delivery. They also have unique contractual arrangements for the construction contract.

For consultant delivered DBB contracts the Consultant usually provides resident and non-resident contract administration services with authority for CA granted to the Consultant by the City under the GCs and SCs. The GCs define the CA as "the City's representative throughout the duration of the contract" and state that the administrator "shall have authority to act on behalf of the City to the extent expressly provided for in the contract." The person or firm filling the role is identified in the SCs of the bid opportunity.

This situation can cause confusion at the project team level between the City and people in consulting roles. The City representative role in the construction contracts is "City Representative" – see Section 5.6). To effectively perform the CA services, the delivery team must understand their roles, responsibilities and authority and the Consultant must have the autonomy and support needed.

The Consultant CA is responsible for:

- Administering the construction contract(s)
- Communicating with the Contractor
- Providing project direction
- Administering contract deliverables
- QA and QC inspections
- Measuring (verifying) for payment for the construction contract

While carrying out these services, the Consultant coordinates with the City (City Representative) on:

- Advice to the City
- Review of alternatives
- Status updates and reports
- Regular communication

For DBB, Consultant deliverables are in the form of both products and services. Since the Consultant is the CA, the deliverables are construction information, including schedule, quality, and adherence to budgets, as well as information needed for transferring the completed project.

The PM is responsible for administration of the consulting contract and, therefore, indirectly, for the construction contract. Accordingly, the PM must monitor the Consultant's services, referring to consultant-provided information in construction status reports and forecasts.

Standard construction contracts provide information on monthly progress payments. As CA, the Consultant is responsible for measuring or verifying that the amount billed matches the actual completed work. The Consultant then recommends that the City pay the Contractor. Monitoring and managing changes for construction projects is discussed in Section 7.

The Consultant may be responsible for the actual commissioning or for coordination of commissioning, or a separate contract may be used for commissioning. The PM must provide coordination and process oversight in either the case.

6.5.3.1 How to Perform Contract Administration

A Contract Administration manual is provided in Appendix E. The manual description of best practices for administration of construction contracts throughout their duration and during the warranty period.

Change Control on contract is provided in Section 7. Construction contracts are part of the delivery chain, they need to be monitored and controlled and must be included in the integrated change control process.

6.5.3.2 Contract Administration Manual

 A Contract Administration manual is provided in Appendix E.

6.5.3.3 Contract Administration Templates

Appendix B references a number of Contract Administration templates.

6.5.4 Manage In-House Projects

The project management processes for in-house delivery are the same as for consultant projects, using the planning processes and outputs described in the PMM Section 5. The main difference is that City staff take on the technical role and produce services, results, or product deliverables such as conceptual designs, detailed designs, and drawings and specifications for construction projects.

The organizational structure includes internal City staff for this method of delivery. As for consultant projects, study managers, design managers, task leads, and discipline staff may be needed.

6.5.5 Design Management (Future)

6.5.5.1 How to Manage Design (Future)

Refer to Appendix E for procedure on Design Management Quality procedure.

6.6　Manage Quality

6.6.1　Perform Quality Control

QC involves preparing and following the plans identified in the PDP or PXP and carrying out the QC methods and techniques defined in the quality management plan. Quality is a shared responsibility, and each team member must:

- Be aware of their shared responsibility for quality.
- Follow quality and design standards as defined.
- Carry out draft reports and interim reviews as scheduled.
- Complete calculation and design checks.
- Use checklists and validate information.

For quality related to the PDP, the PM is assigned the role of quality manager. The quality manager is responsible for development of quality plans, dissemination of quality procedures to the team, and confirmation of compliance with the procedures. The quality manager is not necessarily responsible for carrying out all of the quality checks, as quality is a shared responsibility.

6.6.2　Perform Quality Assurance

QA is performed in accordance with the PDP quality plan. QA includes those tasks specifically listed in the QMP and the following:

- Assess the QC result to determine what processes and procedures need to revised to ensure the customer requirements are meet.
- Review outputs and deliverables at defined stages.
- Timely reporting of results.
- Review and updating the processes, procedure and QC standards.

QA is an inherent requirement of the PM. The expectation is for the PM will develop the PDP according the PMM. The PM will plan, arrange, monitor, and administer the project to the PDP that meets the project goals and objectives. QA from this perspective is carried out through review or auditing and, for PDP related activities, includes:

- Review and monitor progress for the entire project for completeness and ability to meet the defined goals and objectives.
- Review and monitor progress for the entire project for impact on operations and ability to meet the defined goals and objectives.
- Review and monitor Project performance measurers.

The quality plan identifies specific review and audit requirements. The PM and project team provide formal QA during the project phases through direct reviews of the reports and designs submitted by Consultants. This includes review of draft documents and staged and final design reviews.

The PM must manage problems identified from the quality reviews. Remedies for deficiencies are addressed in the monitoring and control processes discussed in Section 7.

6.7   Manage Communications

Managing communications is the process of distributing information, carrying out stakeholder communications, and managing stakeholder expectations. The execution follows the detailed communications plan listed in the PDP.

6.7.1   Distribute Information

The "distribute information" process involves carrying out the communications defined in the PDP communications plan. New data are produced continually during project execution and the data and information must be reported and distributed as identified in the plan.

6.7.1.1 How to Manage Consultant Communications

Consultants sell knowledge and confidence, with their primary resource being human talent. Fully 70 percent of a Consultant's operational cost is made up of salaries and benefits. The critical operational element in any project is therefore to ensure effective use of the Consultant's human resources. This is naturally a management role, with the success of the service being a direct function of the PM's involvement. The ability to effectively communicate with the Consultant is therefore a vital element of project success.

Effective communication is not only key to project success, it is also the principal way to avoid unnecessary disagreement, and the potential for costly and protracted legal actions that frequently stem from misunderstanding, misinformation, or no information at all. When dealing with the Consultant, whether "speaking or sending," it is important to be clear about the message and to know its purpose, which could be to:

1. Give project-related information and objective data.
2. Reveal concerns, opinions, feelings, or subjective data.
3. Initiate action (for example, requests, requirements, commitments, or changes).

The PM and the Consultant should understand that effectiveness decreases considerably as communication moves from face-to-face (direct) to telephone, and again from telephone to written. However, each form has its place in continuing coordination, and each must be used appropriately. Generally, these guidelines apply:

- Direct communication during meetings or consultations is useful to address issues, problems, or complex matters; gather ideas interactively; and initiate important actions or decisions.
- Telephone conversations (or conferences) are useful to solicit information, provide sensitive information, or serve as an urgent substitute for direct communication.
- Written communications, such as memorandums, letters, or reports, are useful to transmit factual information, request formatted information, or provide updates or routine changes confirming discussions and interpretations.

While speaking directly to the Consultant is the most effective means of communication, in a court of law, unwritten evidence may be considered hearsay, and is always considered less reliable than written records. Therefore, maintaining clear and concise business records for every project must be standard operating procedure for every PM. Moreover, these procedures must be designed to build chronological records of a service undertaking from its inception to its conclusion.

While most documentation is the Consultant's responsibility, it is advantageous for the PM to maintain records that clearly identify all decisions, instructions, changes, progress check points, inspection results, and other activities affecting the outcome of the work effort.

The following written records should be maintained for all projects:

- Memoranda of all conferences (i.e. minutes of meeting)
- Names and addresses of all parties concerned with the project
- List of all data furnished to the Consultant
- Copies of all communications to and from the Consultant, to include memoranda of all telephone communication
- Memoranda listing all work products submitted from the Consultant, with date of submittal and date of acceptance and/or approval by the PM
- Proposed and actual completion dates for each service activity or phase of service production
- Date of submission and approval of drawings and other data required by governmental review and regulatory agencies
- Final construction estimate
- Amounts of all bids and sub-bids
- Date of issuance and return of all documents by Contractors
- Date of approval or acceptance and copies of surety bonds, certificates of insurance, progress schedules, tests, and schedules of values
- Dates and results of shop drawing and sample review
- Copies of certificates for payment and change orders
- Reports from project inspectors and field representatives
- Dates of approval or rejection of work or materials
- Copies of certificate of completion, certificate of total performance, and certificate of acceptance
- Final construction costs
- Summary of all project service expenses
- Photographs taken before, during, and after construction

Meetings can be productive ways to provide and receive continuing updates of project status. The PM's and Consultant's time is valuable, so the following guidelines are used to help make meetings brief and effective:

- Call meetings only when they facilitate problem-solving, or when direct communication or resolution is required.
- Explain the purpose of the meeting and have an agenda.
- Identify each item as meant to (1) provide information, (2) promote discussion, or (3) initiate action.
- Set time estimates or targets for each item on the agenda, as well as for the entire meeting; keep presentations and discussions moving along.
- Agreements, conclusions, and responsibilities resulting from the meeting must be summarized, usually after each point (if practical to do so) and also preferably in writing at the end of the meeting, by means of memoranda to file, telephone memoranda, job memoranda, or field memoranda.

6.7.2   Manage Stakeholder Expectations

Managing stakeholder expectations involves planned and unplanned communications with stakeholders to minimize their concerns and influence their expectations. The objective is to increase the likelihood of project success; goals are to resolve issues, build trust, increase buy-in, and overcome resistance to change.

Sensitive unplanned communications may be needed. Undertaken directly by the PM or coordinated through the PM, these include communication with:

- Regulatory or permitting authorities
- Stakeholders, for education, information, and input
- The public, for general communications
- The media

- Any special protocols as identified in the communications plan for this type of communication must be followed.

7 Monitoring and Controlling Process Group

Monitoring and controlling is the fourth of the five project management process groups. The monitoring and controlling process group consists of tracking, reviewing, and regulating the project through all phases, including project management and product delivery tasks for all four project objectives (scope, costs, schedule, and quality). Monitoring and controlling processes are closely related to and often overlap with the "direct and manage" processes of Section 6. Monitoring includes measuring, collecting, reporting, and distributing performance information. Controlling includes determining preventive or corrective actions and following up on action plans to determine whether the actions taken resolved the performance issue.

To be effective, monitoring and controlling must be carried out in relation to a baseline, which will have been produced from the planning processes and documented in the PDP.
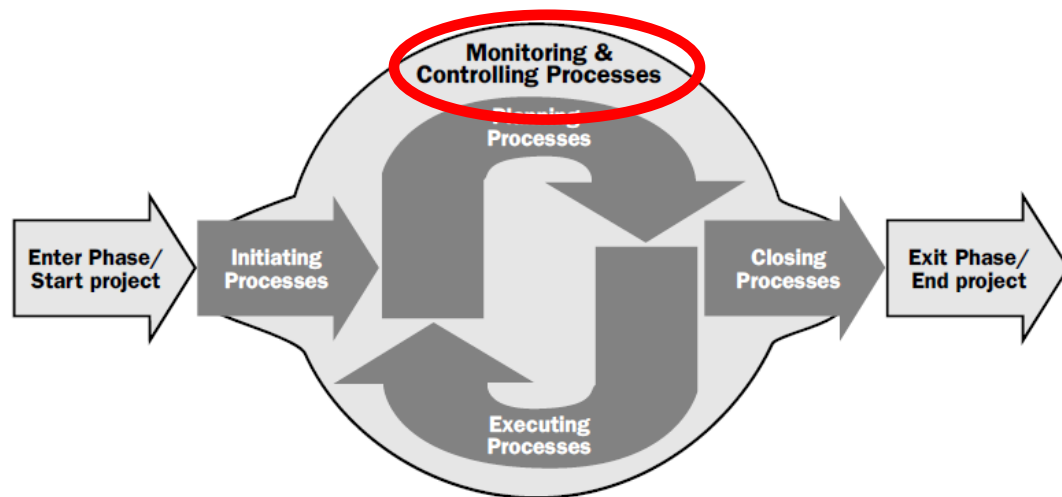
7.1 Monitor and Control

Once the baseline plan has been developed and execution is underway, the PM manages any variance to the baseline. Figure 7-1 notes the main components of the monitoring and controlling processes.

Figure 7-1: Change Control Process Main Components
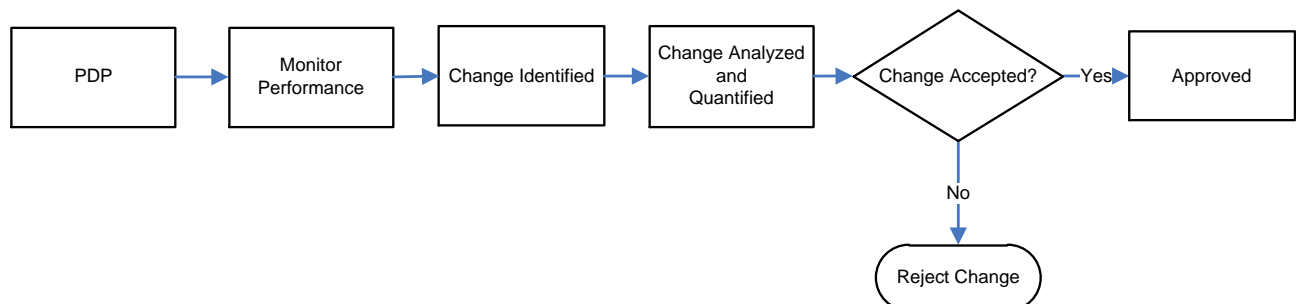
The main integrated change control processes are:

- **PDP –** The PDP serves as the baseline from which to monitor, control, and report specific project activities. The objective is to have the appropriate performance measures to identify potential change events and take corrective actions.

- **Monitor Performance –** The purpose of the monitoring process is to identify potential problems early to prevent unfavourable events or minimize their impact. Integrated change control provides a process for managing changes, once they are identified. Performance reporting provides insight into potential and realized issues. Performance reporting is covered in Section 7.5.

- **Change Identified –** Once a change event has been identified as potential, forecast, or real, the PM takes specific actions identified in the change control process to manage the change.

- **Change Analyzed and Quantified –** The PM analyzes and quantifies changes from respective baselines. The baselines could be either the product/service requirements or project-based criteria such as scope, cost, or time. The PM quantifies the change and determines whether the change is warranted. With each change, the corresponding business case benefits must be continually assessed and updated. The change is vetted with the appropriate approval authorities such as Project Sponsors, operations staff, Business Owners, or others identified in the PDP as having authority to approve specific changes. The review will result in the change decision.

- **Change Decision –** Under the change decision results in the change either being accepted or rejected:

  - If the c**hange is accepted** it must be approved and acted upon in a timely and efficient manner.
  - If the **change is rejected** the affected party must be informed and any fall-out managed using either the project issue resolution process or the procedures in the contract documents.

The industry generally recognizes that some change will occur, and they should be accommodated within the applicable contract. The PM monitors the changes and determines whether they are reasonable or excessive (i.e., indicative of errors or omissions).

7.1.1   Monitor and Control Scope

Controlling scope is the process of monitoring the status of the project scope and managing changes. The goal for project delivery is to achieve the benefits defined in the business case without any unwarranted changes to the scope. The assessment and quantification of changes in scope are always referenced to the approved baseline:

The following sources provide the source of the baseline for scope control:

- **Scope Statement –** The PDP includes a scope statement describing the project in broad terms. The statement is important, as it provides a common definition, which promotes understanding and buy-in among stakeholders. The PM must track the project and check for alignment to the scope statement to maintain the confidence of the stakeholders, who may not know the details of the contracts.

- **Project Delivery Plans –** The PDP and PXP identify detailed project management and product delivery tasks for each deliverable that must be monitored and controlled. Their work plans include the detailed task descriptions for studies and designs that state what is to be done and what is to be delivered for each task. The PM must monitor progress against these deliverables and identify deviations.

- **Product Deliverable –** Specific details of the products often evolve through the project life-cycle. The scope definition may change from the study to the preliminary engineering and design services. The changes must be monitored and the project controlled accordingly.

- **Contracts –** Contracts always provide some form of a scope, in terms of either specific deliverables or performance.

- **Plans and Specifications –** The scope for construction projects is packaged into much smaller components using drawings and specification clauses. The contract usually requires each component to be included to result in the final product. Unless the project is performance based, the scope of the project can be tracked and controlled through the specifications. The work is expected to be completed in accordance with the contract, and the deliverables are expected to be submitted as defined. If this is not the case, the work is considered non-compliant if it is deficient or incorrect. If unspecified work is completed, completion is out of scope. It is the PM's responsibility to proactively monitor and manage the work and, when there are issues, to manage the scope. The City's GCs and relevant contracts must be consulted for dealing with scope changes. The GCs define how to manage scope changes, how to compensate for them, and how to manage disputes.

7.1.1.1 How to Verify Scope

Verifying scope is the process for formalizing acceptance of the completed project deliverables. It involves reviewing the deliverables with the Project Sponsor and customer and formalizing acceptance. Verifying scope is the final step of the QA review for each of the deliverables and the final product, service, or result. Scope verification can be achieved through the use of final acceptance certificates.

7.1.2 Monitor and Control Costs

Controlling costs is the process of monitoring the financial status of the project and managing changes. All project delivery chain component costs must be monitored, including not only the largest and most obvious consultant and construction costs, however multiple other costs and fees, as described in Section 5.2.

The PM must proactively monitor and manage costs, reviewing the project routinely to confirm that costs and expenditures are as planned. The process includes:

- Review and update costs and expenditures regularly.
- Account for any additional and unanticipated costs as soon as possible.
- Identify and track potential changes and additional expenditures.
- Account for inflation and other types of escalation throughout the project.
- Develop Estimate at Completion (EAC) forecasts on cost and performance trends.

All these costs, when added together and forecast to project close-out, must be within the approved budget. If they are not, the PM must inform the Project Sponsor and a recovery plan must be produced and added to the PDP.

The key to monitoring costs is to have a well-defined WBS with work packages that can be readily measured and compared to their budgets.

Routine monitoring and reporting is completed using the Earned Value Management (EVM) method. The EVM report integrates scope, schedule, and costs, providing complete information on progress and performance, as shown in Figure 7-2.

Figure 7-2: Example Earned Value Management Report
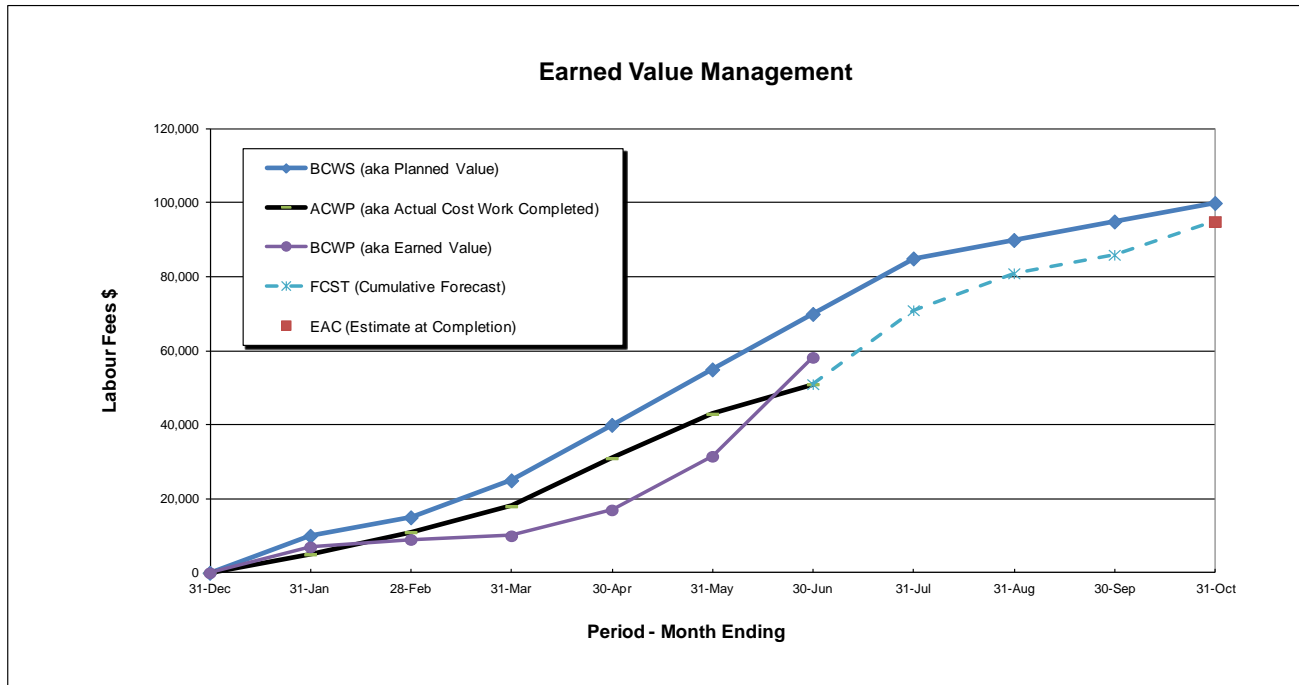
The EVM provides a graphical representation of project performance. It also provides the basis for variance indicators.

- Schedule variance is a measure of schedule performance equal to the earned value minus the planned value.
- Cost variance is a measure of cost performance equal to the earned value minus the actual cost.

Progress payments must be billed in accordance with the contractual agreements. The only acceptable method for changing the amount to be billed is through a formal scope change (change in services).

Even with proper planning, execution, and safeguards, contract amounts do change. The PM must always be aware of circumstances and prepared to deal with changes. The GCs allow for scope changes proposed by either the vendor or the City and define how the fees are to be adjusted. The City has the right to change the services at any time, and the Consultant may request changes through a change request process.

Conventional contracts are based on lump sum or unit price payments. There is a contractual obligation to perform the specified work for the approved price. While both Consultants and Contractors are vendors and similar contract administration is carried out by the City, each type of contract is governed by a different set of GCs and must be administered accordingly.

Unit price contracts are amenable to most types of changes since the quantities are only estimated in the contract and final payment is made to the actual final measured quantity. For lump sum contracts, the quantities are thought to be known when the specifications are drafted, and payments for different quantities cannot be made without a formal scope change.

7.1.2.1 How to Prepare an EVM Report

The example provided in Table 7-1 illustrates how to perform EVM calculations.

Table 7-1: Earned Value Management Example

WBS	Tasks	Labour Budget	31-Dec	31-Jan	28-Feb	31-Mar	30-Apr	31-May	30-Jun	31-Jul	31-Aug	30-Sep	31-Oct
BCWS (aka Planned Value)													
1.1.1	Deliverable 1												
1.1.1.1	Task 1	$10,000		$10,000									
1.1.1.2	Task 2	$20,000			$5,000	$10,000	$5,000						
1.1.1.3	Task 3	$25,000					$10,000	$15,000					
1.1.1.4	Task 4	$30,000							$15,000	$15,000			
1.1.1.5	Task 5	$15,000									$5,000	$5,000	$5,000
	Monthly Total	$100,000	$0	$10,000	$5,000	$10,000	$15,000	$15,000	$15,000	$15,000	$5,000	$5,000	$5,000
	Cumulative BCWS		$0	$10,000	$15,000	$25,000	$40,000	$55,000	$70,000	$85,000	$90,000	$95,000	$100,000
ACWP (aka Actual Cost Work Completed)													
1.1.1	Deliverable 1												
1.1.1.1	Task 1			$5,000	$1,000			$2,000					
1.1.1.2	Task 2				$5,000	$7,000	$3,000						
1.1.1.3	Task 3						$10,000	$10,000					
1.1.1.4	Task 4								$8,000				
1.1.1.5	Task 5												
	Monthly Invoices (Labour)		$0	$5,000	$6,000	$7,000	$13,000	$12,000	$8,000				
	Cumulative (ACWP)		$0	$5,000	$11,000	$18,000	$31,000	$43,000	$51,000				
BCWP (aka Earned Value)													
1.1.1	Deliverable 1												
1.1.1.1	Task 1			70%	80%	80%	80%	90%	90%				
1.1.1.2	Task 2				5%	10%	20%	50%	100%				
1.1.1.3	Task 3						20%	50%	90%				
1.1.1.4	Task 4								20%				
1.1.1.5	Task 5								5%				
	Total												
	Cumulative BCWP		$0	$7,000	$9,000	$10,000	$17,000	$31,500	$58,250	$0	$0	$0	$0
ETC Estimate to Complete													
1.1.1	Deliverable 1												
1.1.1.1	Task 1												$2,000
1.1.1.2	Task 2												$0
1.1.1.3	Task 3												$2,000
1.1.1.4	Task 4												$25,000
1.1.1.5	Task 5												$15,000
ETC (Estimate to Complete)													$44,000
EAC (Estimate at Completion)													$95,000

The example is for a project valued at $100,000 to be completed between January 1st and October 31st. The table is constructed according to the WBS with the work packages rolling up to deliverables, and the deliverables rolling up to project phases (only selected items from the WBS are shown in the table for brevity). The evaluation may be done for the entire project as a whole, or viewed in portions if required. The EVM can include only the labour component if it is primarily a services project as is shown in the table or the total project costs if the other components are of interest.

The risk reserve contingency and management reserve are not included in the project EVM since they are managed and controlled as separate items. Once the contingencies have been converted to project costs through a formal scope change they then become included in the evaluation.

The EVM is completed as follows:

- **Planned Value:** The budgeted cost of work scheduled (BCWS) is entered as planned for each task. This must include the work package level detail in the time increments to me monitored and controlled.

- **Actual Cost of Work Completed:** Actual costs are based on the most current information available, which in many cases may be consultant or contract billings.

- **Earned Value:** An earned value estimate is entered for each item for each time increment based on a bona fide estimate of the work completed. The example is structured in terms of percent completed.

- **Estimate to Complete:** The estimate to complete is a bona fide estimate of the amount of work remaining to be needed to complete each work package for each time increment. The value is reported in terms of cost estimates to complete, however the basis for estimating would normally be in terms of working time.

- **Estimate at Complete:** The estimate at complete is calculated from the addition of the cumulative ACWC and ETC.

The EVM is normally presented in graphical format as shown in Figure 7-2. The trend lines for the example were plotted in Excel based on the cumulative rows highlighted in the table. One additional trend is included in the table for the cumulative forecast (FCST), which can be included if additional detail is required beyond the EAC.

7.1.2.1 EVM Template

No template for EMV is being developed as MS Project has this feature embedded.

7.1.2.2 How to Prepare Recovery Plan

Cost overruns create concern because of the risk of exceeding the project budget and having insufficient resources to fully fund the project. The PM must report on the reason for the discrepancy and identify a method of recovery. If recovery can be achieved through corrective actions within the current work plan and contractual requirements can be met without changes to baselines, a formal recovery plan is not required.

If the variation from plan is more significant and greater action is required, a recovery plan must be developed and included in the PDP. The recovery plan may include changes such as redesigning products or reducing scope.

The PM must be prepared to deal with over expenditure forecasts through the integrated change control process described in Section 7.3.

7.1.3 Monitor and Control Schedule

Controlling the schedule is the process of monitoring the project and product schedules and managing changes. The schedules are defined in the PDP and in the consultant and construction contracts. It is the PM's responsibility to proactively monitor and forecast the schedule.

A schedule with well-defined tasks facilitates its management. Knowing the expected duration of each task allows estimation of the completion time for comparison with the schedule.

Contracts specify that work will be completed in accordance with the schedule. If it is not, the work is contractually non-compliant. Any changes to the schedule must be formally approved through the consultant or construction change process. As part of the integrated change control process (Section 7.2), the PM must update the baseline schedule for all underlined approved schedule changes and assesses how the changes might affect the entire project.

The PM is responsible for initiating or taking corrective action if the progress or updated schedule does not conform to the currently approved schedule. Corrective actions may involve adding more resources, working longer hours, or changing how the work is performed.

7.1.4 Monitor and Control Quality

QC is performed throughout the project, and is monitored and recorded to assess performance and recommend changes. Quality standards are used for the monitoring and controlling processes.

The PDP will include a QMP for internal project management services and for the overall project delivery chain. Consultants should have an internal QA/QC plan, which provides an additional QA measure for the PM. For construction projects, the CA monitors quality directly. Product quality standards must be included in the specifications, and the Consultant, the Contractor, or a third party must take the identified site QC measurements. The CA must confirm through the QA process that QC is taking place.

Failure to meet quality is serious; if quality concerns arise, the PM must define the problem and take corrective action.

7.2 Perform Integrated Change Control

Integrated change control is the process of managing all change requests to baseline project documents and deliverables, . Changes are often much more complex than they appear, a change to any one of the four objectives (scope, costs, schedule, or quality) is likely to impact at least one of the others, creating the need for an integrated change control process.

Changes can be a useful tool to enhance a project, however they should only be approved if they add value. If they do not add value, changes should be rejected. The disadvantages to changes are that they can unexpectedly add to the project budget and suggest that the project was originally poorly planned or designed or, is being poorly managed, a perception that may or may not be accurate.

This PMM identifies a comprehensive change process applicable to the entire project delivery chain. Routine changes originating from consultant services, construction contracts, or any other sources must be evaluated with respect to the project objectives and baselines. Direct and indirect impacts of the change must be identified and considered before the change is approved. The process integrates contingency management and administrative over-expenditure procedures.

Baselines are critical to the change process as they provide the reference and measuring point from which changes are evaluated. A thorough and accurate PDP as described in Section 5 and comprehensive contracts as described in Section 6 are essential to the process.

The GCs for consultant services and construction contracts include processes to address changes. Scope changes may address any component of the project objectives —scope, costs, schedule, or quality—and may involve either additions or deletions. The PM is responsible for reviewing and managing all consultant changes in a timely manner according to the contract, while the CA is responsible for processing of construction contract changes.

The GCs for both consultant and construction contracts require change requests to be documented and to include:

- Reason
- Detailed description
- Financial impacts

The GCs provide for the following alternative forms of pricing for changes:

- Lump sum
- Unit prices
- Cost plus

The integrated change control process requires indirect impacts of the change be identified. For example, scope may affect schedule, and a minor change may have a major impact. The information needed to assess the overall impacts must be requested and evaluated before the scope change is approved. The only exception is for a mandatory change, for which either there is no option or time is of the essence.

After the merits and options for change orders have been reviewed and the change is approved, it must be signed and returned to formalize the change and update the contract. For consultant contracts, the PM must review the budget impacts and the rules on over-expenditure before signing the change order. For construction contracts, the change is reviewed by the CA, who has the authority to act on behalf of the City. For most situations the CA will consult with the PM prior to signing to assess the budget and other potential impacts. In urgent situations, the CA may independently approve the change within their delegated authority.

A change tracking system must be maintained for all project changes. Separate logs should be kept for City project management changes, consultant changes, and contract changes. The logs should include the steps of the changes, the dates, the persons responsible, and the results.

Anticipated changes are also to be included in the log. Frequently, the project team is aware of a potential changes, and tracking it increases the accuracy of financial forecasting.

All changes must be formally approved, which in effect makes a change to the contract, and the baselines must be updated to reflect the revisions.

The sum of all the estimated project costs, including updated contingency allowances, is used to forecast the EAC (estimate at completion) as defined in Section 7.1.2. The EAC should be updated and compared with the approved budget regularly and with every major change. The EAC must on exceed the approved capital budget or a recovery plan is required. If the recovery plan involves increasing the budget, either an over-expenditure or a re-budgeting process may be required.

Scope changes are a concern when there are too many or the cumulative cost is too high. A high value of scope changes may indicate they are being used to compensate for inaccurate or deficient work. The PM must manage a process for categorizing changes to track their origin and reason.

7.2.1.1 How to Perform Integrated Change Control

Integrated change control takes place at the program (or project) and contract levels, as described in the following sections.

1. <u>Change Management Process—Program or Project Level</u>

The project-level change management process chart is shown in Figure 7-3.

Figure 7-3: Integrated Change Control—Project Change Control Process Chart

Program/Project - Change Control Process

Identification and Evaluation Stage | Approval Stage | Implementation Stage
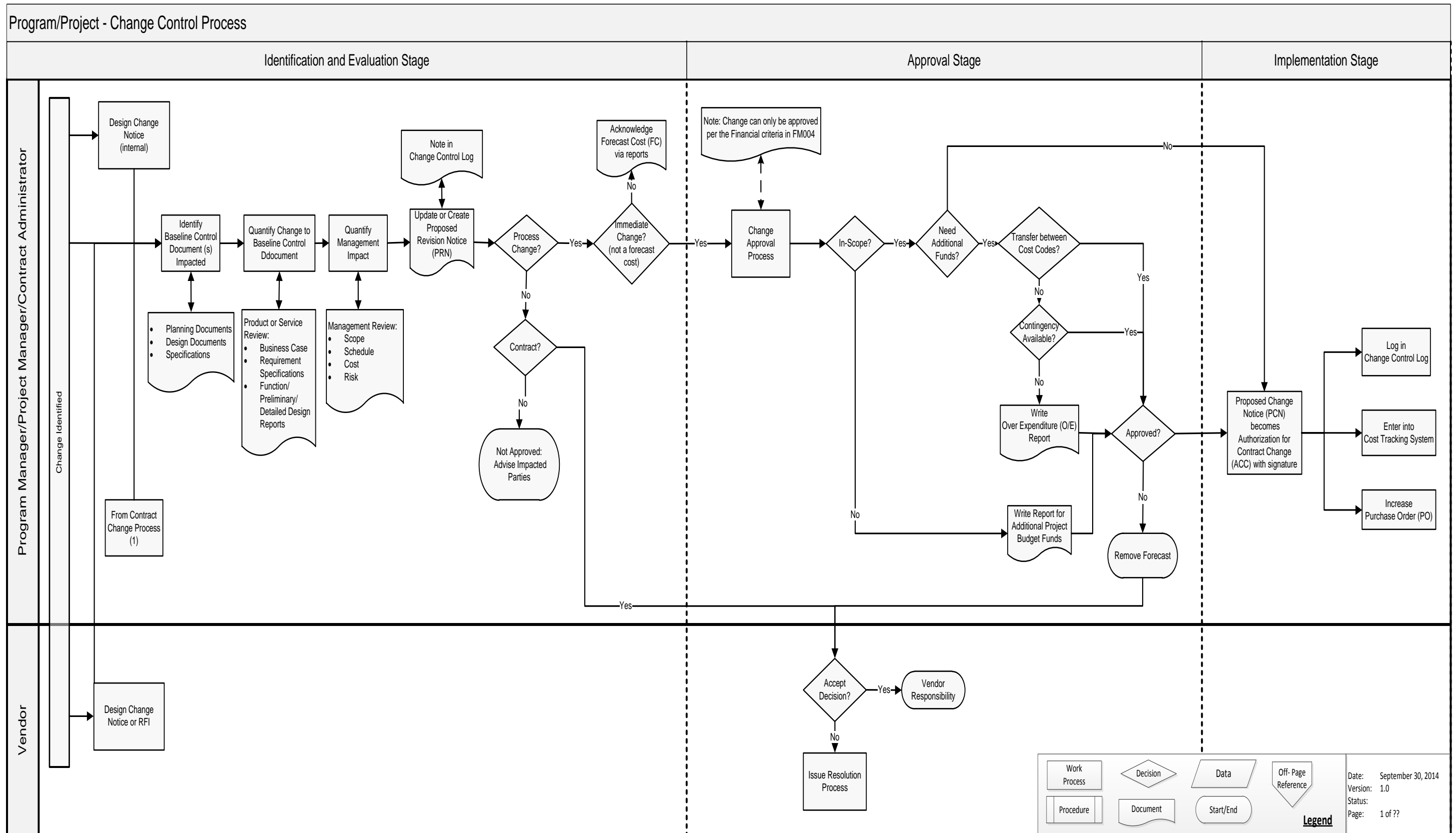
Identification and Evaluation Stage

Changes can be triggered by a variety of sources, including contract changes, or from stakeholder or Business Owner requests. In the identification and evaluation stage, the source and type of the change must be recorded in the request for information (RFI) log, which is used to manage all identified issues and track their disposition.

On major projects the PDP may identify that the PRI method is to be used for change tracking. A sequential number would be assigned to the issue at this point if it is used, and the issue would be tracked by the number for all subsequent references to the issue.

The identification and evaluation stage also includes:

- **Baseline Control Impact –** The PM must identify the product or service impact per the documents used to define the product being delivered. A needed design enhancement or modification could result from constructability concerns or design errors and could impact the project or contract scope, cost, quality or schedule. The PM must assess and quantify the change according to guidelines in appropriate baseline documents such as studies, design documents.

- **Management Impact –** Once the change has been identified, the PM must quantify the impact of the potential change and its magnitude in terms of effects on the PDP (quality, cost, time, risk) and the benefits identified in the business case.

- **Revision Notice –** The revision notice form captures and documents the data gathered as a result of assessing the impact of the change. The revision notice is logged into the change control log to track the change status and to monitor future performance of the types and magnitude of changes. The performance reports developed at the project close-out are to be used in a continual improvement process. If a Project Management Office (PMO) exists, these measures will be assessed across the portfolio of projects to improve the project management process.

- **Process Change –** The PM determine whether the change has been forecast, is imminent, or has occurred. For a forecast change, the impact may or may not occur, so the PM logs the revision notice and records the cost impact as pending so the cost is recorded in the forecast cost report. If the revision notice is to be formally considered for approval, the PM typically discusses the change with the impacted groups such as vendors, team members, Project Sponsors, the Business Owner, and operations personnel. If the change is not approved, the impacted party is notified. In a contract environment, the contract-level formal change management process discussed in the next section is followed. If the change is not in a contract environment, the PM notifies the impacted party (the internal stakeholder or delivery team member) by email or a method appropriate for the type of project.

Approval Stage

The approval hierarchy for each project may be different and should be defined in the PDP. The typical approval hierarchy is shown in Figure 7-4.

Figure 7-4: Change Approval Hierarchy
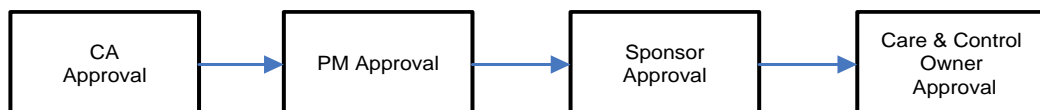
According to FM-002, the revision notice cannot be approved unless sufficient funds exist for the change. Therefore, the PM must decide when to process the revision notice considering funding availability and the need for the change to proceed. The PM may process a revision notice considering unspent funds in the project budget, with the understanding that additional funds will be required at a future time. In this case, an over expenditure report or additional budget fund report will be submitted.

If the change is for new scope not identified in the PDP, the PM obtains new funds rather than taking funds from the contingency allowance, which is reserved for a known-unknown or unknown-unknown events. If these events were to occur and the contingency had been depleted, the PM would need to justify additional funds for needs that had already been identified. The PM will need to determine when the over-expenditure report should be submitted relative to the project status.

To gain additional funds, one of the following methods is used:

1. Access any available funding from the project's cost codes (other deliverables)

2. Access contingency funding that may be appropriate (such as a risk event that has passed or been mitigated)

3. Write an over expenditure report to obtain funding from other sources within the department. See section

Implementation Stage

If funding has been obtained, the revision notice can be formally approved. Once approved, it becomes a change order that can be entered into the change log and cost tracking systems. If the change is for a contract, the PO will need to be increased.

2. Change Management Process—Contract Level

The contract-level change control process chart is shown in Figure 7-5. Key steps in the process are:

- **The vendor or City identifies a change and submits an RFI –** When a Change in the Work is contemplated at the contract level the CA shall compile all technical details supporting the contemplated change and complete a PCN form. Prior to issue of the PCN to the Contractor, the CA shall review the contents of the PCN with the City PM. If the City is in agreement, the PCN shall be forwarded to the Contractor for their action. If the PRI method of tracking is used it should be identified on all correspondence.

    The Contractor will review the contents of the PCN and will respond with a written quotation identifying the increase, decrease or no change in amount on the Contract Price as well as any schedule impact the contemplated Change in the Work will have on Contract Time. A reasonable period of time (typically 5-10 days) for the Contractor to respond to the PCN should be stated on the PCN as well as the method for valuation of the contemplated change (refer to GCs). The CA shall maintain a log of all PCNs and their status.

    When receipt of the Contractors response is in hand, the CA shall record the date of the response and the amount in the PCN Log. The CA shall promptly review the cost proposed by the Contractor and if not acceptable, shall request the Contractor to provide further substantiation of the costs. If the proposed costs are acceptable to the CA, the CA will obtain approval from the City PM to initiate an Authorized Contract Change.

    If either the PM or CA become aware that the contractor performing the work prior to approval, the CA shall immediately issue a stop work order to the contractor. Under the legal concept of unjust

enrichment, if the City is aware the contractor is performing the work and does not stop it, the City will be responsible for the expense. This also is contrary overriding principle of the change control process in that the cost is known in advance of the work.

The PM logs all identified requests or queries that could affect the project on the RFI log, which helps track and manage all identified issues and their disposition.

- **The CA decides whether a contract change is warranted** – The CA assesses each change to determine whether it warrants further investigation or further information is needed. This step helps avoid unnecessary involvement of others. If the change warrants a more detailed review, the change is first assessed for its impact on the contract. If it is time critical (for instance, if the work needs to be completed relative to the schedules of other work), the change should precede according to a formal field instruction and the contract conditions.

  - **If change is rejected –** If the CA and vendor cannot agree on the terms of the change, the CA directs the vendor to proceed based on the CA's decision. If the work needs to occur, the CA can direct the vendor to proceed based on a cost-plus method. The vendor can also follow the issue resolution process in the contract. If the work is not critical and is a contractor-originated issue, the vendor can follow the disputes resolution process specified in the contract.

  - **If change is warranted:**

    - **Field instruction –** If there is insufficient time to process a change request because the work must proceed, a field instruction is provided to the vendor with the understanding that the change will be assessed according to the project change process. The field instruction directs the vendor to proceed under specific conditions that are defined in the contract. At this point the process reverts to the Program/Project change control process (connection point 1 on Figure 7-3)

    - **Revision notice –** Under normal circumstances, sufficient time should exist for the CA to issue a revision notice to the vendor to obtain prices for the change. Once the CA accepts the revision notice with the price from the Contractor, the revision notice can follow the formal change process. At this point the process reverts to the Program/Project change control process (connection point 2 on Figure 7-3)

- **If the formal change process is successful:** Process follows the project change process and an Authorized Change Order is issued.

- **If the formal change is unsuccessful:** The quote may be resubmitted for further consideration, however if this becomes unsuccessful and the change is required, the CA will issue a FI and the process will follow the issue resolution process.

Figure 7-5: Integrated Change Control—Contract Level Change Control Process

Contract - Change Control Process
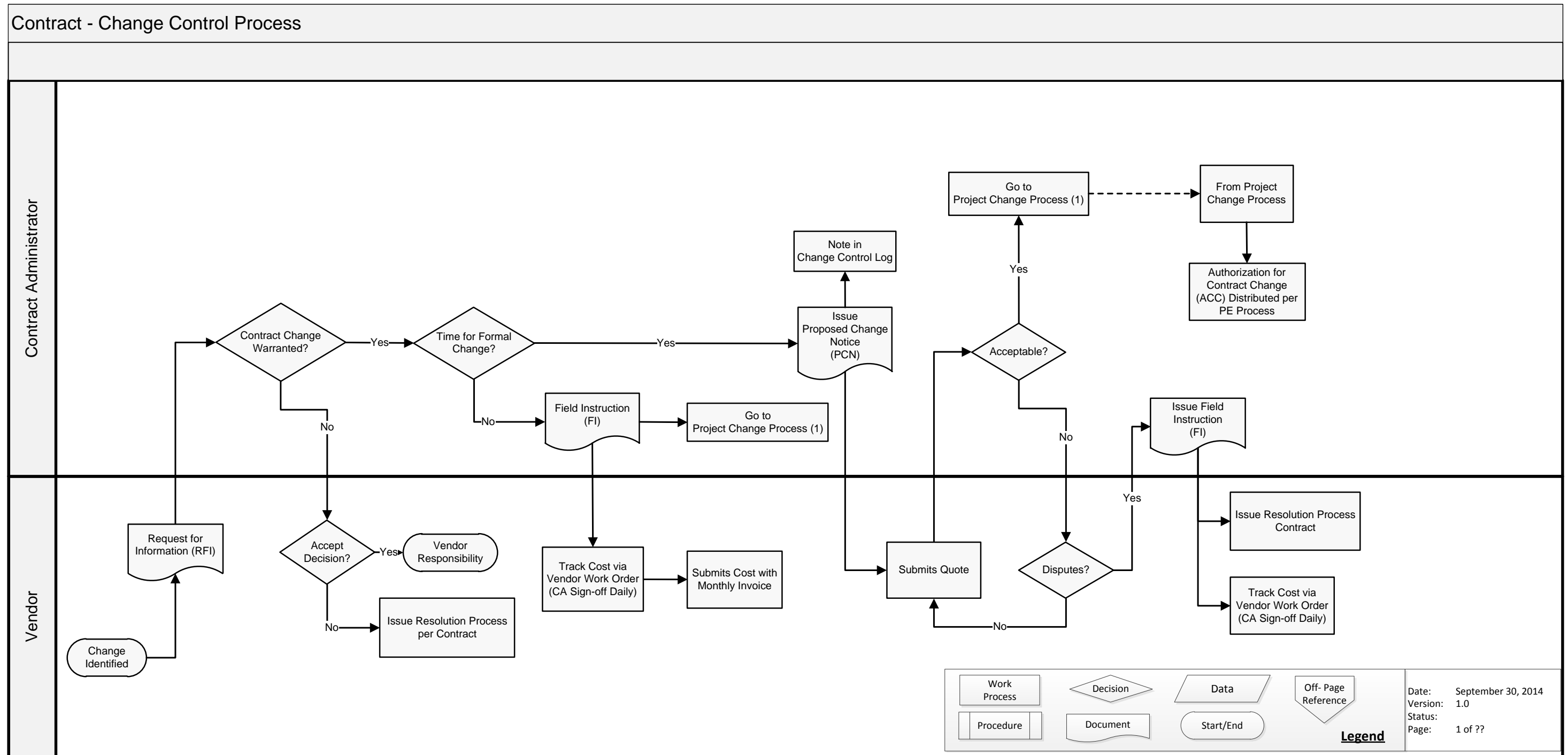
7.2.1.2 Integrated Change Control Templates

Templates for Change Control are provided in Appendix B.

7.3　Manage Contingencies

Changes are recognized as a reality in project delivery, and the change process is an industry accepted practice. Most projects are setup with contingency budgets to accommodate moderate changes, as defined in Section 5.3, and described for risk in Section 5.9.

The PMM identified the following contingency types. Each is to be managed uniquely according to its purpose and defined expectations:

- **Cost-estimating contingency** – The cost-estimating contingency is referenced for completeness here, however it is not part of the formal scope change, project or product monitoring and control processes. The cost-estimating contingency for the product is replaced at the contract award stage with the capital cost allowance.

- **Capital cost allowance –** The capital cost allowance is established for changes to construction and sometimes consulting contracts based on normal industry practice. The amounts are monitored and controlled through the scope change process. To avoid unexpected overruns, it is important that the actual amounts be tracked and compared with the allowance value remaining.

- **Risk reserve –** Risk reserve contingency is a separate budget amount added to the project budget for any risks warranting a contingency risk response. Continual risk review is required. As risks are realized the risk contingency is released by change order to compensate for the consequences of the risk as required. This in effect draws down from the contingency and increases the project cost. Outstanding risk allowances are tracked and compared to the budget. If the potential risk event passes without being realized, the contingency value reserved for the risk may be retired. The retired funds then become surplus to the budget and are allocated according to the PDP or sponsor's discretion.

- **Management reserve –** This contingency is controlled by the sponsor and is managed through the change process if the change directly impacts the project or product delivery.

7.3.1.1 How to Manage Contingencies

The capital cost allowance, risk reserve and management reserve contingencies as identified in the PDP are included in project budgets for specific reasons and must be tracked and managed to fulfil those needs. They will have separate WBS codes and can be tracked much like the project budget and cost values using the EVM approach. Figure 7-6 shows an example of tracking a capital cost allowance.

Figure 7-6: Example Earned Value Management Report for a Project Contingency Account

Contingency Management
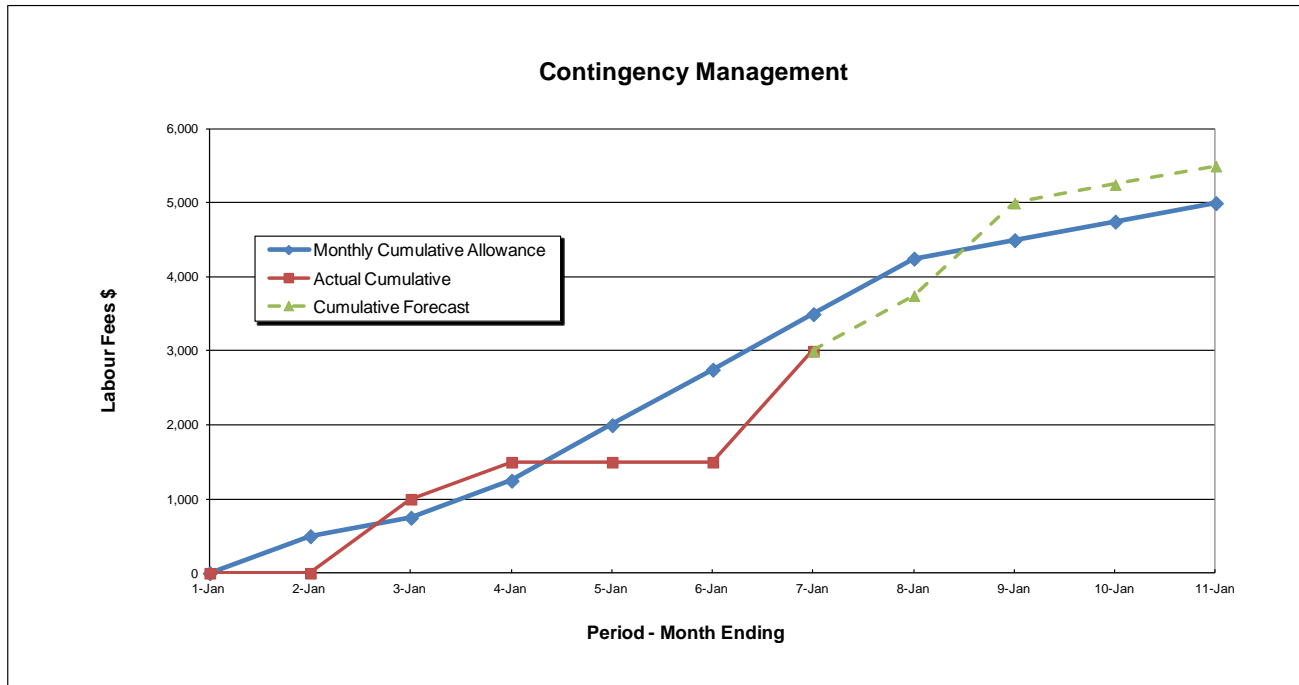
The rate of expenditure can be estimated considering the expected rate of progress and knowledge of when contingencies are most likely to be drawn (risk event is expected to occur). New information can be applied to the forecast as the project proceeds to estimate the contingency expenditure at completion. This tracking method and forecast provides a useful tool for anticipating problems.

Contingency is released to deal with the consequences of the specific risk event when it is realized.

- For the capital cost allowance the risks are unknown-known, which means a variety of risk events are expected to occur however the extent of expenditures is somewhat predictable. An example in practice may be the release of funds for scope changes on a construction contract for situations such as encountering an unmarked utility during an excavation.

- The risk reserve provides a contingency to deal with two types of risks, systemic which are unknown-known and project-specific which are known-unknown. The risk quantification process of Section 5.8 can be used to quantify both of these risks. The systemic risk is managed much like the capital cost allowance, while the project-specific risks are managed based on the discrete risks.

The use of contingency is expected to be variable because by its very nature it deals with uncertainty. If the budgets have been established at a high confidence level as described in Section 5.8, then in most cases the projects will close with a surplus contingency amount. A strategy needs to be established for how to deal with surplus contingencies.

- For the capital cost allowance the expenditures could potentially arise at any time and unless there is a large disparity between the forecast and actual cumulative expenditures, the surplus should not be retired or re-allocated until completion of the project it was intended for.

- The risk reserve contingency allocated for systemic risks is much like the capital cost allowance, and unless there is a large disparity between the forecast and actual cumulative expenditures, the surplus should not be retired or re-allocated until completion of the project it was intended for.

- The risk reserve will have discrete amounts identified for project-specific risk events. Once the chance of the risk has passed or been eliminated the contingency is theoretically not required. The options for managing the surplus in these cases are as follows:

  - *Retire the risk and reallocate the budget:* After the potential for a risk has passed the risk quantification described in Section 5.8 can be recomputed with the risk removed, and a new contingency value determined. The difference in the calculation between the original and reduced risk will be the amount that can be retired or reallocated.

  - *Retain the risk amount in the risk reserve contingency:* The risk reserve allocations for project-specific risks will only partially cover the consequences if the risks are realized. As the project proceeds and the number of remaining risks reduces, there will be a reduced amount of shared risk contingency available if the contingencies are progressively retired. It is therefore prudent to retain some of the contingency in case of a risk occurring late in the project.

  - *Release all outstanding risk contingency at the end of the project:* Projects structured with the contingency vales set at high confidence levels are likely to at least periodically result in significant amounts of risk contingency remaining at the end of the project. This surplus is then available to be reassigned based on established budgeting procedures.

7.3.2 Over Expenditure Procedures

Procedures for over expenditures and the delegated authority to approve them are set out in Appendix 7 of Administrative Standard FM-002. The following is a summarization of those procedures. In case of disagreement, the Administrative Directive shall take precedence.

Accumulated change orders that do not cause the contract to exceed the amount of the award can be approved by the Contract Administrator. Accumulated change orders that will cause the contract to exceed the amount of award cannot be approved by the Contract Administrator and requires additional approval by way of over expenditure report. The level of approval required depends on the delegated approval authority as set out in Administrative Standard FM-002.

Under FM-002 the CAO delegates his/her authority to the CFO to approve over expenditures where the accumulated over expenditure does not exceed $5 million dollars and there is available capital or operating budget as approved by Council. For clarity, the accumulated over expenditure means the accumulated amount of the over expenditure only, and is not the total contract amount, including over expenditures.

Under FM-002 the CFO further delegates the following:
- All Department Heads can approve over expenditures within budget as long as the total contract value including over expenditures does not exceed $5,000
- The Department Heads of Planning Property & Development, Public Works, Transit and Water and Waste can approve over expenditures within budget as long as the total contract value including over expenditures does not exceed $100,000
- The Department Heads of Planning Property & Development, Public Works and Transit can also approve over expenditures within budget for total contract values beyond $100,000 as long as the amount of the over expenditure does not exceed 20% of the original contract value, to a maximum of $250,000

- The Department Head of Water and Waste can also approve over expenditures within budget for total contract values beyond $100,000 as long as the accumulated amount of the over expenditure does not exceed 20% of the original contract value, to a maximum of $500,000

In instances where the amount of the over expenditure exceeds the CFO's delegated authority of $5 million, but it is within the budget approved by Council, the over expenditure may be approved by the relevant standing policy committee.

In instances where additional budget is required to cover the over expenditure, the over expenditure must be approved by Council.

The above is summarized in Table 7-2 below.

Table 7-2: FM-002 Over Expenditure Approval Levels

Over-Expenditure Approval Levels			
Change Order(s)	Project Budget	Required Approval	Comments
Accumulated change orders do not cause total contact to exceed the amount of award	Within Budget	Contract Administrator	Contract has been awarded and approval of change order will not increase the contract value beyond the amount of award
Accumulated change orders increase contract beyond award amount but within Department Head Authority	Within Budget	Department Head	Department Heads of PPD, PW & Transit - $100k or 20% of original contract value to max of $250k Department Head of WW - $100k or 20% of original contract value to max of $500k All other Department Heads can approve over expenditures as long as the total contract value does not exceed $5
Accumulated change orders increase contract beyond award amount but within CFO Authority	Within Budget	CFO	CFO has authority to approve accumulated over expenditures up to $5m
Accumulated change orders increase contract beyond award amount and over CFO Authority	Within Budget	Relevant SPC	SPC can approve over expenditure reports over the CFO's delegated authority as long as it does not exceed the approved budget
Accumulated change orders increase contract amount over Council approved Budget	Additional Budget Required	Council	Any project that requires additional funding requires Council approval. Alternative funding sources are identified and recommended in the over expenditure report

In some instances on construction projects, obtaining the approval in advance of the change order would cause construction to halt and result in delay claims adding additional cost to the City. In these instances and ***where there is approved budget available in the project***, the PM may use their professional judgment and obtain administrative approval after the fact. In these instances, it may be beneficial for the PM to obtain approval via e-mail with formal report to follow. Approves may prefer to accumulate changes and consolidate in a single administrative report towards the end of the project.

In instances where the over-expenditure will cause the project to exceed budget, Administration does not have the delegated authority to approve. The additional budget can only be approved by either relevant SPC or Council. As such, the PM should not be approving changes beyond budget as it exceeds administrative authority and essentially commits the City to additional expenses without Council approval.

7.3.3   Funding Over Expenditures

FM-004 authorizes departments to transfer funds from a non-specified capital account to cover over expenditures. Reallocations are permitted to a maximum of $100,000 or 25 percent of the base budget.

In instances where the over-expenditure will cause the project to exceed budget, Administration does not have the delegated authority to approve. The additional budget can only be approved by either relevant SPC or Council.

7.4   Manage Risks

Monitoring and controlling risks is the process of implementing risk response plans, tracking identified risks, and identifying new risks. Risk management must be carried out according to the RMP schedule, which at a minimum includes reporting to the Project Sponsor, Major Capital Project Steering Committee and/or Project Advisory Committee at the start of all new project phases or as defined in the PDP.

The risk register identifies the primary inputs for this process, including the risk owner, the risk response, and actions taken. The risk owner performs the identified actions, evaluates the situation as conditions change, and provides update reports

The risk assessment includes a review of the risk contingency reserve. If the amount in the reserve exceeds the amount of risk remaining, a recommendation should be made to reduce the contingency. Once a risk has been eliminated it must be closed.

7.5   Report Performance

Report performance is the process of collecting and distributing performance information, including measurements, status reports, and forecasts.

Routine project management activities include collecting information such as reports and logs that can be used for tracking and evaluating performance.

The PDP defines standard reports generally required for every project and ad-hoc reports required for specific projects.

The reporting process provides information critical to assess project performance that the PM must assess on an on-going basis to assess the performance of the project and make decisions. Of particular interest for tracking the project are:

- Monthly EVMs for the project as a whole and consultant and construction sub-projects
- A monthly EAC for the construction contract, consulting services, and the items comprising the total City budget.
- The PM checklist report indicating that the PMM requirements are completed.

8   Closing Process Group

Closing is the last of the five project management process groups.
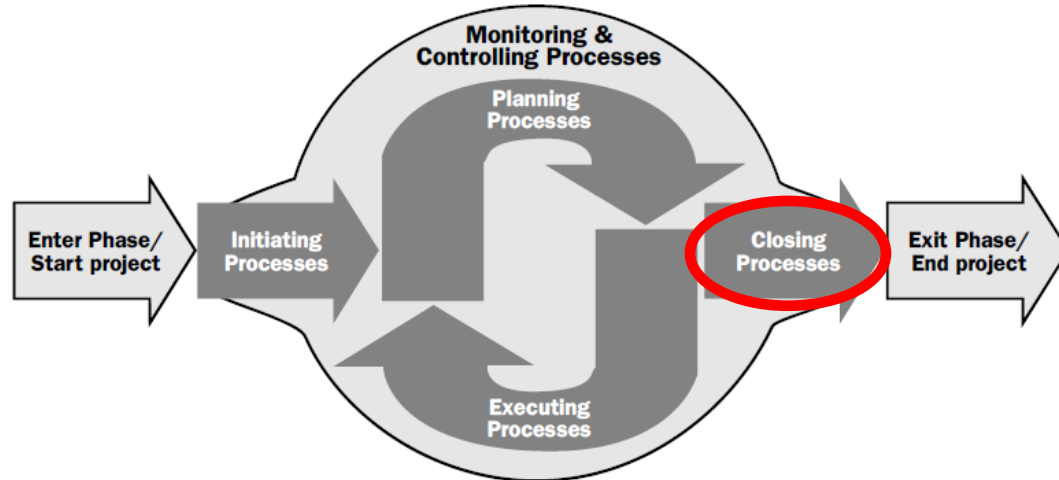
8.1   Update Business Case

The phase gate approval process adopted for the PMM, illustrated in Figures 3-2 and 5-3, requires the business case to be verified, updated or finalized at the early phases of the project, and benefits confirmed for the later phases.

The progressive updating and confirming business benefits proceed through the entire life of the project in order to validate the initial investment. The project produces updated information that is used to update the assumptions used in the initial business case. If any of these assumptions change and have a negative impact to the benefits of making the investment, the project needs to be assessed and consideration given to re-scoping or termination. These decisions are typically make at the end of the planning phase stage gate where more detailed information has been produced to validate the assumptions made in the business case.

The PM Framework is designed such that the project produces information on the product in the early phases so that decisions can be made to cancel or delay the investment before spending the large dollars in the later phases.

8.1.1.1 How to Update the Business Case

The business case contains specific information and metrics that are unique to each project. The business case is updated by applying new information to the existing information, such as actual costs, and refined benefit estimates. It is important that the updates be based on the same baseline metrics to enable meaningful and credible comparisons.

All the information in the business case should be updated, including assumptions used in the need assessment, option analysis - cost evaluation, cost estimates and benefit determination.

For more details refer to the Investment Planning manual.

8.2 Close Project Phase

In the "close project" phase, all activities across the project management process groups are finalized to formally complete the project phase. A PDP status report summarizing project delivery is prepared along with either the business case update or benefit validation.

8.2.1.1 How to Close the Project Phase

The PM must confirm that all project phase work is complete and the phase objectives have been met. The PDP and work plan are used to determine whether the work has been completed and is ready for closure. All deliverables and transfers must be complete before a phase can be closed.

The phase closure assessment depends on the original business case. At a minimum it includes:

- Business case update or benefits validation
- Scope verification
- Report on scope changes
- Budget and cost updates, with EVM and EAC
- Schedule report
- Report on quality
- Risk register and report
- Issues log
- Project check list

8.2.1.2 How to Terminate the Project

At each phase gate in the project, a "go or no-go" assessment is completed based on the forecast cost of the project vs. the benefit of the investment. As the scope, cost, risk and benefits of the project get refined; the business case can be re-assessed with more realistic numbers to re-affirm the cost/benefit and residual risk of the not making the investment.

Typically upon completion of the class 3 estimate (after the planning phase) this decision is made with the Sponsor, Business Owner and in consultation with the Advisory/Steering committee. This assessment includes multiple factors such as value for money, risk assessment, level of service targets vs. willingness to pay and identified benefits.

8.3 Commission and Transfer

Many projects have special procedures that must be completed to provide the Business Owner with the information it needs to successfully take ownership of the operation and maintenance of the work. The PM coordinates with the Business Owner in planning and preparations for the information transfer, commissioning, and start-up of new work. Operating budgets are established and staff are trained to operate and maintain the product or service.

Commissioning and transfer includes the following:

- **Product Data –** Vendor and product information must be collected from the Contractors for all the materials and equipment received. This includes product sheets, operations and maintenance manuals, and shop drawings.

- **Record Drawings –** As-built drawings or record drawings are required to document the as-constructed status of the projects for operations, maintenance, and future repair of the assets and infrastructure. Timely preparation of drawings and operating manuals is imperative for operating facilities and must be completed as soon as possible, turned over to the PM for QA, and submitted to operations for the start-up process.

- **Training –** Product training is frequently required before the City can take ownership of the new equipment and its operation.

- **Commissioning –** This is a process for confirming that the components and systems have been installed as specified and can be operated and maintained according to the design intent. Commissioning is a process for validating product deliverable performance and also facilitates orderly transfer of the product from the constructor to the Business Owner.

- **Start-up –** For complex equipment, the Contractor, vendor, and manufacturer may be required to undertake a start-up process. This can involve the Contractor taking responsibility for operation of the equipment for a specified period to demonstrate its successful operation.

- **Transfer to Operations** – The level of effort and work required in transferring the completed work to the owning and operating business unit (department) depends on the scope and nature of the work. The transfer includes all the project records and new information required for operation and maintenance.

- **Update Asset Registers –** The AMM requires asset information to be captured in an asset register. If maintenance management systems are used, the asset information must also be recorded in the system and the operations and maintenance procedures must be documented. This function may be carried out by the Contractor, the Consultant, or the City, with the approach pre-established and identified in the PDP.

- **Tangible Capital Asset Updates –** The City maintains a register of its tangible capital assets consistent with public sector accounting requirements that must be updated with any additions or deletions that would typically occur during capital projects.

8.4   Review Consultant Performance

FM-002 states that Consultant performance evaluations should occur at least annually and that the review should be kept on file.

8.4.1.1 How to Complete a Consultant Performance Evaluation

The overall goal of consultant performance evaluations is to make consultants more aware of, and responsive to, the City's needs and expectations. An added benefit is that the evaluation should make consultants better at what they do.

Performance evaluations should be carried out based on the following principles:

1. The reviewer remains objective.

2. The meeting remains positive and the reviewer provides constructive criticism. Areas of strong performance should be noted as well as areas for improvement.

3. The evaluation process identifies and quantifies the City's expectations of the consultant's service. For example, the evaluator identifies what is expected in terms of meeting deadlines, communicating problems, accuracy in cost estimating, and accuracy in contract documents.

A standard form for consultant evaluations is provided on the City's website at
http://www.winnipeg.ca/matmgt/templates/consultants/Consultant_Information_Page.stm.

8.5   Close Project

The final process is to close the project. Final closure can be extended well beyond commissioning and start-up because of deficiencies, finalization of manuals and as-built drawings, transfer of documents, and administration of the warranty period.

Close-out is required to:

- Complete the records management processes
- Finalize project deliverables and product turnover
- Document major changes made from the original business case to the final product
- Compare budgeted cost to final cost and explain major deviations
- Compare scheduled events with actual events and explain major deviations
- Summarize major problems or innovations developed during project delivery and assess their overall impact on the budget and the quality of the deliverable
- Complete and document a consultant performance review

8.5.1.1 How to Close the Project

The City's PM is responsible for receipt of formal documentation for completion of the contract, final inspections, and end of warranty. The PM updates final documentation, closes the project files, closes the project accounts, and completes the archiving process.

8.6   Prepare Lessons Learned

Identifying lessons learned is an important part of the continual improvement process for both the Consultant and the City. The process identifies the causes behind the aspects that worked well during the project and those that did not. Once enough lessons learned information has been gathered, recommendations can be made for changes, and the PMM is updated to capture the improvement.

8.6.1.1 How to Prepare Lessons Learned

The lessons learned are initially prepared by the PM and then turned over to the manager of capital projects for managing continual improvement. The lessons learned are developed through a sequence of reviewing the project performance results, identifying successes and areas in need of improvement, and interviewing representatives from the project team and vendors.

Appendix A Procedures

Initiation Phase - Design Bid Build (DBB)

Project Sponsor

Start → Approved Business Case → Assign Project Manager → Sign-off Project Charter? → Agree? → Approved?

Yes (from Agree?)

Major Capital Project Steering Committee

Present Recommendation

Project Advisory Committee

Yes → No

Presented Project Delivery Plan (PDP)

Yes

P3 Review Committee

No

Meet Criteria, proceed as P3 Candidate
PMM 5.6

Present Project Delivery Plan (PDP) ,if P3

No

Project Manager

Identify Stakeholders
PMM 4.2, Template

Develop Project Charter
PMM 4.3, Template

Assess Alternative Project Delivery (APD) Options
PMM 5.6

> $10 M? → Yes

Establish Major Capital Project Steering Committee
PMM 4.2

Private, Public Partnership (P3) Candidate
PMM 5.6

Develop Project Delivery Plan (PDP)
PMM 5.1, Template

Update Business Case, if required

Phase Gate Approval/ Close Initiation Phase
(PMM 8.2)

No → Establish Project Advisory Committee (PAC)
PMM 4.2

P1

Legend

Work Process	Decision
Procedure	Document
	Data
	Start/End
	Off- Page Reference

Date: September 30, 2014
Version: 1.0
Status:
Page: 1 of ??

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Planning Phase – Design Bid Build (DBB)

Preliminary Design Stage

PMO	Report Performance PMM 7.5, Templates
Project Sponsor	Report Performance PMM 7.5, Templates
Project or Major Capital Project Steering Committee	Report Performance PMM 7.5, Templates

Project Manager

P1 → Delivery Method? PMM 5.6 → Design Bid Build (DBB) → Acquire Project Team, if required PMM 6.1 → Prepare Consultant Request for Proposal (RFP) PMM 6.4 → Vendor Solicitation PMM 6.4 → Contract Awarded PMM 6.4 → Contract Administration PMM Appendix E → Report Performance PMM 7.5, Templates → Review and Circulate Report for Approval → Approved? —Yes→ Revise Project Delivery Plan (PDP) or Business Case (BC) → Phase Gate Approval/ Close Planning Phase (PMM 8.2) → P2

Internal

DB

CM

Consultant

Develop Project Delivery Plan PMM 5.1, Template → Preliminary Design Work → Quality Control (QC) Reviews PMM 5.5, Template

Monitor & Control PMM 7.0 → Report Performance PMM 7.5, Templates

Final Milestone Review? —Yes→ Draft: Preliminary Design Report

No

No

Legend

Work Process	Decision	Data	Off- Page Reference
Procedure	Document	Start/End	

Date:	September 30, 2014
Version:	1.0
Status:	
Page:	1 of ??

Delivery Phase – Design Bid Build (DBB)

Design | **Build/Construct**

PMO
- Monthly Reviews or Milestone Events
- Monthly Reviews

Project or Major Capital Steering Committee
- Monthly Reviews or Milestone Events
- Monthly Reviews or as defined per Project

Project Sponsor
- Monthly Reviews or Milestone Events
- Monthly Reviews

Project Manager (City)
- Select New Consultant? — No / Yes
- Prepare RFP **PMM 6.4**
- Acquire Project Team, if req'd **PMM 6.1**
- Vendor Solicitation **PMM 6.4**
- Contract Award **PMM 6.4**
- Contract Administration **PMM Appendix E**
- Integrated Change Control **PMM 7.2**
- Report Performance **PMM 7.5, Templates**
- Reviews
- Approve Design?
- Reviews
- Approve Procurement Package?
- Revise Project Delivery Plan (PDP)
- Track Benefits
- Phase Gate Approval/ Close Design Phase
- Contract Award **PMM 6.4**
- Project Management
- Integrated Change Control
- Report Performance **PMM 7.5, Templates**
- Track Benefits
- Revise Project Delivery Plan (PDP)

Contract Administrator (consultant)
- Project Initiation
- Project Team
- Monitor & Control **(PMM 7.0)**
- Report Performance **(PMM 7.5)**
- Detail Design
- Prepare Procurement Package
- Recommend Award
- Vendor Solicitation **PMM 6.4**
- Contract Initation
- Contract Administration **PMM Appendix E**
- Shop Drawing Approval Process
- Manage Vendor Payment Process
- **Turn-Over Package**
  - Operating Manual
  - Standard Operating Procedure (SOP)
  - Emergency Standard Operating Procedure (ESOP)
  - Piping & Instrumentation Drawings (P&ID)
  - Record Drawings
  - Training material
- Proceed to Performance Testing?
- Phase Gate Approval - Close Transfer Phase
- P3

Contractor(s)
- **Health, Safety, Security, and Environment (HSSE) Plan:** Safe Work Plan (SWP) **PMM 5.11**
- Quality Plan **PMM 5.5**
- Commissioning Plan (start) **PMM 5.12**
- Work
- Milestone Review? — Yes / No
- Quality Control (QC) Inspections **PMM 5.5**
- Manage Deficiency List
- **Contract Deliverables:**
  - Red-Line Drawings
  - Loops Drawings
  - Training material
  - Operations and Maintenance Manual (O&M)
- Asset Data
- Populate Asset Data to Registers
- No

Legend
Symbol	Meaning
Work Process	
Procedure	
Decision	
Document	
Data	
Start/End	
Off- Page Reference	

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Transfer / Commissioning Phase – Design Bid Build (DBB)

	Equipment Demonstration Stage	Process Performance Stage	System Demonstration Stage	Total Performance Stage

Project Manager

Contract Administrator (CA)

Approve Daily Commissioning Activities → Certificate of Satisfactory Training

Substantial Performance? → Form 104 Satisfactory Process Performance

Form 105 Commissioning Completion Certificate → Total Performance

Design Consultant

Technical Training? — Yes

Occupancy Permit?

Operations

Start Test?

Support

Yes

Commissioning Team

No

Yes

Start Test → Process Performance Tests → Satisfactory Process Performance?

No

System Demonstration Test → Transferred to Business Owner?

Yes

No

No

Contractor(s)

No

Equipment Ready to Perform?

Operations & Maintenance (O&M) Manuals → Operations & Maintenance (O&M) Training

No

Deficiencies

Equipment Readiness:
- Form 101 Readiness to Install
- Form 102 Satisfactory Installation
- Form 103 1 Hour Demonstration Test

Legend

Work Process	Decision	Data	Off- Page Reference
Procedure	Document	Start/End	

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Close-Out Phase – Design Bid Build (DBB)

Project Sponsor

Benefit Realization

Project Manager

Contract Final Account: Close-Out Procedure
PMM 8.0

Prepare Lessons Learned
PMM 8.6

Track Beneifts

Approved? —Yes→ Phase Gate Approval/ Close Project
PMM 8.0

Consultant: Contract Administrator

No

No— Close Contract? —Yes→ Acceptance Certificate
PMM Appendix B

Manage Warranty Issues
PMM Apendix E, CA procedure

Contract Close-Out
PMM Appendix E, CA proceedure

Contractor

Address Warranty Issues

Work Process	Decision	Data	Off- Page Reference
Procedure	Document	Start/End	**Legend**

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Appendix B
Templates

PMM – Templates

The PMM makes reference to a number of templates as outputs or deliverables from the procedures. The tables below list the templates and identifies where they are referenced in the PMM document. The documents can be found by clicking on the file name or go to the website (under construction).

Process Group	PMM Reference	Acronym	Description
Initiating	4.2		Stakeholder and Communication plan
Initiating	4.3		Project Charter
Planning	5.1	PDP	Project Delivery Plan
Planning	5.1		PDP Short Form
Planning	5.1		PM Checklist
Planning	5.3	BOE	Basis of Estimate
Planning	5.7		Project Dashboard Report
Planning	5.8		Project Status Report
Planning	5.8		Issue-Decision Log
Planning	5.8		Council Quarterly Report
Planning	5.8	PRI	Project Record Index
Planning	5.9		Project Risk Identification Check-list
Planning	5.9	RMP	Risk Management Plan
Planning	5.9	RMP	Risk Management Plan (Short Form)
Executing	6.2		Team Charter
Executing	6.4	RFP	Request for Proposal
Executing	6.4	BO	Bid Opportunity
Executing	6.4		Summary of Bids
Executing	6.4		Award Reports
Executing	6.4		Letters to Bidders
Controlling	7.2	FWA	Field Work Authorization
Controlling	7.2	PCN	Proposed Change Notice
Controlling	7.2	RFI	Request for Information
Controlling	7.2		RFI Log
Controlling	7.2		Change Control Log
Controlling	7.2	ACC	Authorization for Contract Change
Controlling	7.2	FI	Field Instruction
Controlling	7.3		Contract OE under $100000
Closing	8.4		Consultant Performance Evaluation
Closing	8.6	LL	Lessons Learned
Executing	Appendix E *	PE	Progress Estimate (mixed tax, HB)
Executing	Appendix E *		Pre-award meeting minutes
Executing	Appendix E *		Preconstruction meeting minutes
Executing	Appendix E *		Criminal Record Search Certificate

	Process Group	PMM Reference	Acronym	Description
	Executing	Appendix E *		Training Session Log
	Executing	Appendix E *		Certificate of Satisfactory Classroom Training
	Executing	Appendix E *		Certificate of Satisfactory Field Training
	Executing	Appendix E *		Certificate of Equipment Delivery
	Executing	Appendix E *		Certificate of Readiness to Install
	Executing	Appendix E *		Certificate of Satisfactory Installation
	Executing	Appendix E *		Certificate of Equipment Satisfactory Performance
	Executing	Appendix E *		Certificate of Satisfactory Process Performance
	Executing	Appendix E *	ITP	Inspection and Test Plan
	Executing	Appendix E *		Inspection Report
	Executing	Appendix E *	DCR	Daily Construction Report
	Executing	Appendix E *	NCR	Non Conformance Report
	Executing	Appendix E *		NCR Log
	Executing	Appendix E *		Plant Entry Permit
	Executing	Appendix E *		Process Interruption Permit
	Executing	Appendix E *		Lockout Tag Out Permit
	Executing	Appendix E *		Hot Work Permit
	Executing	Appendix E *		Confined Space Permit
	Executing	Appendix E *		Critical Lift Permit
	Executing	Appendix E *		Lockout Tag Out Permit
	Executing	Appendix E *		Pressure Test Permit
	Executing	Appendix E *	SP	Substantial Performance
	Executing	Appendix E *	TP	Total Performance
	Executing	Appendix E *		Certificate of Acceptance

* Contract Administration Procedure

**Appendix C
Alternative Project Delivery**

T E C H N I C A L   M E M O R A N D U M

CH2MHILL

Alternative Project Delivery:
Procurement and Delivery Methodologies Analysis

PREPARED FOR: City of Winnipeg rev1

PREPARED BY: Leofwin Clark/CH2M HILL

DATE: 24 February 2012

Content - Sections

- The Spectrum of Alternative Project Delivery Methodologies

- Goals for Successful Alternative Project Delivery Procurements

- Tailored Approach to Alternative Project Delivery

- Workshop Methodology to Refine Preferred Alternative Project Delivery Approaches

- Alternative Project Delivery Procurement Procedures Development

Implementing an effective project procurement and project delivery system for a complex infrastructure project requires an understanding of a wide spectrum of proven contracting methodologies and accompanying insight to how varying methodologies can align with specific project needs and risk allocations. This Technical Memorandum provides an overview of these procurement and delivery methods and summarizes the strengths, weaknesses, and risk allocation methodology typical of each model. Next, the City of Winnipeg's specific procurement and project objectives are outlined in the context of these procurement options. Finally, a methodology for defining a preferred procurement approach, including several specific contracting mechanisms, is proposed.

The Spectrum of Alternative Project Delivery Methodologies

Procurement methods can take numerous forms, ranging from standard design-bid-build techniques through construction management-at-risk to full at-risk alternative delivery, including many variants of design-build and beyond. This "spectrum" of methodologies is illustrated in Exhibit 1.

Exhibit 1: Project Delivery Spectrum
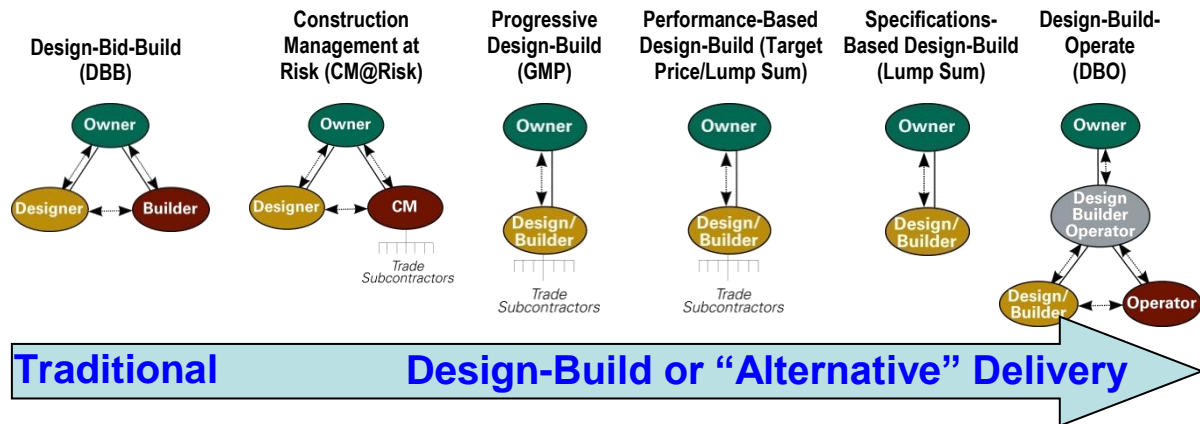
Moving from left to right on the spectrum, project delivery methods generally evolve from the traditional design-bid-build approach implemented by most public entities until the emergence of a variety of alternative delivery methodologies over the last 15 years. Note that the lines in Exhibit 1 take two forms: direct connections indicate firm *contractual* relationships between the giving entities and arrows represent *collaborative* relationships necessary to make the given model a success. While recognizing that, in practice, there is an almost infinite variation on the specific methodologies and relationships represented by this spectrum, the commonly recognized procurement and delivery models include:

Design-Bid-Build, where an owner contracts separately for engineering and design services that are completed prior to issuing a separate request for bid from contractors. The construction scope is handled by a separate contract directly with the owner and the relationship between engineer and builder is ideally collaborative in the resolution of Requests for Information (RFIs) and verification of compliance with the design.

Construction Management At-Risk, where an intentional overlap is created between the engineer and the contractor, allowing the contractor to bring construction insight to bear as early as practical in the design process. Sometimes referred to as "design-build-light" this methodology maintains two separate contracts, however encourages collaboration during design to reduce risk once the contractor proceeds to construction in the field.

While in conformance to most traditional procurement processes (the engineer is selected using traditional professional services criteria), this method introduces the concept of contractor selection without a hard bid of the construction cost. Instead, contractors are generally selected based on their qualifications in combination with their proposed scope of services and fee for service prior to construction as well as their fee and overhead costs for construction services. The ultimate construction cost is developed during the design period, typically in an open-book fashion, and

ultimately agreed upon as a "guaranteed maximum price" (GMP) prior to authorizing the start of construction.

Where agreement on a GMP cannot be reached or construction pricing competitiveness cannot be verified, owners often maintain the option to convert the construction scope to a hard bid request. In many instances, owners convert GMPs to lump sum pricing.

While promoting collaboration early in the design process, the formal contract vehicles with separate agreements between the Owner and Engineer and the Owner and Contractors are essentially unchanged compared to traditional design-bid-build delivery. During construction delivery, traditional practices for managing contractor change orders, RFIs from the designer, and verification of construction performance remain unchanged.

Design-Build, where the entire project is contracted with a single entity (or a consortium of entities acting together as one entity) with a single-point of responsibility to the owner. In practice, design-build can be procured using a number of different methods, often tailored to meet local procurement regulations and practice as well as to align with project complexity and the level of design completion anticipated to be undertaken prior to the procurement.

The various forms of design-build procurements differ largely in the type of pricing requested of proposers and in the degree of problem definition developed for the project in advance of procurement and subsequently provided to the design-builder in the request for qualifications (RFQ)/request for proposals (RFP). The industry recognizes three basic design-build models as follows:

> *Progressive design-build.* In a progressive design-build procurement, a design-builder is selected based primarily on qualifications and, where local practice requires it, limited pricing information generally similar to the construction management at-risk model with an added component of cost for design services (either in a lump-sum for or on a not-to-exceed basis). As the design-builder develops the design, a construction cost estimate is progressively developed, often in conjunction with the 30- and 60 percent levels of design detail. Once the design is well advanced (beyond 60 percent and often up to 90 percent), a GMP is defined for approval by the owner. (As with Construction Management At-Risk, some owners convert GMPs to lump sum pricing.) If the design-builder and the owner cannot reach agreement on an acceptable GMP or lump sum, the owner can use the completed design as the basis for a hard construction bid procurement.

> Progressive procurements are often preferred when a project lacks definition or when an owner prefers to remain involved in the design process while leveraging the schedule, collaboration, and contractual advantages provided by design-build. This model is also valuable when regulatory permitting requires well-developed design solutions, or when an owner believes that they can lower cost by participating in design decisions and in managing risk progressively through the project definition phase.

> Owners do not generally use the progressive procurement method when a project's definition is well advanced prior to the procurement or when a lump sum construction price is preferred (or required) to select a design-builder.

> *Performance-based design-build.* In a performance-based design-build procurement, the RFQ/RFP generally includes a conceptual design as a minimum and a 15 percent design as a maximum. Requirements are stated as measurable performance <u>objectives</u> of the

completed project rather than the specific approaches or processes the design-builder should follow to achieve those objectives.

A performance-based procurement gives design-builders' the flexibility to propose how they will meet the owner's objectives while requiring proposers to provide a lump sum price for completion of the project. Alternatively, owners may ask for a "target price" for construction that establishes a not-to-exceed construction price basis, while allowing the owner to collaborate on and adjust scope during detailed design definition. In this case, the "target" lump sum can be adjusted after award, however only as directed via owner-approved scope changes. Except for these explicitly approved owner changes, the design-builder must conform to their originally proposed price.

Performance-based procurements are often preferred when an owner has a clear vision for how a facility must perform, with limited resources, time, interest in the specific method for gaining required performance. This model is used to prompt industry's most innovative and cost-effective solutions through what is essentially a design competition, typically in combination with a need to accelerate schedule.

Prescriptive design-build. In a prescriptive design-build procurement, the RFQ/RFP typically includes at least a 30 percent design completed by an owner's consultant prior to the procurement, often referred to "bridging documents." Requirements are stated in terms of specific approaches or processes the design-builder must follow.

Prescriptive procurements are often preferred when owners are very clear on their preferences and want to use design-build to accelerate the schedule while allowing selection of a design-builder based on a combination of qualifications and a lump sum price. While a design-builder may offer a variation or alternative concept to the bridging documents, procurement procedures are often established to require owner review and approval of these exceptions or "alternative technical concepts" in advance of the proposal submittal. With this method, the lump sum price in the design-builder's proposal is only adjusted for specific owner-initiated scope changes, generally due to unforeseen conditions or a change in law or regulatory practice.

Design-Build-Operate (DBO) and Design-Build-Maintain (DBM), anchors the end of the alternative project delivery spectrum, providing owners with a whole-life solution for project implementation. Typically, DBO/M procurements are developed from the basis of a performance-based design-build model with the added component of requiring the proposer to operate the facility for an extended period of time (typically no less than 5 years and often as long as 15 or 20 years). The operations component ensures that the performance commitments of the design-build proposal are indeed met as the design-build must deliver on them during its tenure – or alter or repair the facility accordingly. Depending on the type of infrastructure, long-term operations can focus on maintenance and repair or replacement of critical components (typical for transportation projects) or on day-to-day operations with permanent staff (as is typical of water/wastewater projects). In either case, DBO/M entities are typically formed by a consortium of designers, builders, and operators, often led by operators as the majority value of DBO/M contracts can often be in the operations scope versus the capital construction.

DBO/M procurement models allow proposers to evaluate true lifecycle costs of a project while requiring them to operate facilities for an extended period of time, transferring risk to the DBO/M entity. Owners typically select this alternative when whole-life (lifecycle) is of greatest concern, often when they do not currently have a fixed operations staff in place for the given facility. Also,

owners prefer DBO contracts when selecting new or unproven technology that requires long-term, hands-on demonstration of performance.

The DBO methodology is less preferred when an owner already maintains an operations staff in place, particularly if their operators work under public union contracts that are administratively or politically difficult to transfer to the private sector.

DBO/M Finance (DBOF or DBMF), models that include financing are most common in context of public-private-partnerships (P3) in Canada. For example, the Canada P3 Infrastructure fund requires a long-term operations component or a finance component to be considered as a qualified P3 infrastructure project (and, in practice, both operations and financing are preferred. In Manitoba, P3 projects general contain both a financing and operations component. For the purposes of this analysis, P3 considerations are generally considered separately from alternative delivery methodology analyses. Conclusions as to applicability of an alternative delivery method are applicable to a project no matter where its ultimate funding is obtained.

As noted, there are numerous variations on all of these primary delivery types. For example, projects with extremely specialized technical needs or with unusual risk profiles, such as tunnelling, often require a hybrid procurement and delivery approach that blends many of the concepts defined here. Given a defined set of common traditional and alternative delivery models, the next step is to define specific project goals and, if necessary, identify specialized project drivers that require the development of a tailored procurement approach.

Goals for Successful Alternative Project Delivery Procurements

Evaluating the benefits of a given procurement and project delivery models rests on the City of Winnipeg's overarching goals and mission. For this analysis, we identified several goals that are essential to defining a successful procurement and follow-on project:

Transparent. All procurement processes, methodologies, and selection criteria must be fair, objective, and transparent to the professional services and construction community. No work should be awarded outside of a well-advertised and fairly administered competitive process.

Cost effective. Any procurement methodology should ensure that the City of Winnipeg is receiving best value for the services and construction they are purchasing. To the extent possible, services should be priced and price should be evaluated as part of the selection methodology. Generally, this goal supports target, GMP, or lump sum pricing when possible, although fee-based pricing may be acceptable if the contracting methodology provides an "off-ramp" for hard-bidding construction work to ensure cost competitiveness.

Objective-Focused. Procurement selection strategies should be based on clearly defined evaluation criteria that mirror project challenges and opportunities for project success. In turn, the evaluation criteria will support overall project success.

Efficient. The cost to the City of Winnipeg for implementing the procurement process should be minimized in favor of using funding to maximize delivery of actual project scope. Similarly, the bidding community's resources should be respected by minimizing to the extent practical the cost to propose on work.

Timely. Duration of procurement processes should be minimized, allowing for sufficient response time from bidders in conjunction with a reasonable amount of time to evaluate proposals without other undue delays. Valuable time should be conserved and made available for execution of project scope.

Inclusive. The overall procurement process should ensure that local subconsultants and subcontractors have equal access to project scope for which they are qualified. Projects should be packaged to ensure wide participation, especially for alternative delivery models which might otherwise preclude local firms from at-risk work.

Compatible. Procurement methodologies must remain consistent with existing Winnipeg statute and procurement policy unless specific changes are approved to accommodate identified benefits of alternative delivery. Required modifications to procurement process and practice should be clearly identified as part of the alternative delivery analysis. Similarly, alternative project delivery options specific to wastewater should be aligned with the City's Strategic Partner concept and accommodation for the Strategic Partner's participation in the determination and implementation of procurement methodology must be accommodated.

Tailored Approach to Alternative Project Delivery

Recognizing that each project has specific needs, each of the goals identified above should be addressed by the City's menu of potential procurement methodologies. Alternative delivery is not applicable or beneficial to all infrastructure projects. However, alternative delivery's potential benefits should be considered on the merits at the outset of most projects with a focus on:

Single-Point Responsibility. The benefits of contracting with a single entity for both design and construction are well understood. The most important is avoidance of finger-pointing. If problems arise, the designer cannot blame the builder for not adhering to the design, and the builder cannot blame the designer for a faulty design. With the designer and builder working together from the outset, constructability problems are less likely to arise, and if they do arise, the owner can hold the design-builder responsible for dealing with the problems. In contrast, the arms-length relationship between the designer and the builder in a design-bid-build procurement effectively puts ultimate responsibility for the design on the owner.

Value-Based Selection. In public infrastructure procurements, many owners prefer to select based on some form of detailed pricing to protect rate- or taxpayer interests. However for design-build procurements, factors in addition to price can be considered when awarding a contract – factors such as prior experience with similar projects, innovative ideas for meeting project objectives, overall lifecycle costs, and ability and willingness to work as a team with your staff.

Time Savings. Design-build delivery has proven to be particularly effective for water and wastewater projects with strict schedule constraints because construction often begins before the design is completed.

Early Understanding of Total Project Costs. Alternative delivery infrastructure projects are typically priced using a GMP or lump sum approach. The quoted price includes design and construction. This price is arrived either at the initiation of the project or at an early stage of the design effort. This avoids the potential problem in design-bid-build projects of a design that is only constructible at a prohibitive cost.

Based on these recognized advantages of each common delivery method as shown in Exhibit 2 (next page), there is a clear value in *considering* alternative project delivery for a given project.

Exhibit 3: Advantages and Disadvantages of Procurement and Alternative Project Delivery Methodologies

Methodology	Advantages to Owner	Disadvantages to Owner
Design-Bid-Build	Well understood and time-tested process and procedures. Ability to select sub consultants by qualifications and cost in the traditional manner. Limited at-risk exposure to local professional firms. Bids to full plans and specifications. Full going-in construction price known at bid time.	Linear process takes time. Little or no designer/contractor collaboration. Limited job size/scope may not attract best potential technologies/best practices. Relies on engineer's estimates until very late in the project. Hard bids subject to design omissions and resulting change orders. Little opportunity to select contractor on qualifications and past performance in addition to price. Separate contracts for design and construction creates multiple points of contact for owner and does not align business interests.
Construction Management At-Risk	Relies on proven, accepted method for selecting professional engineering services based on qualifications/price. Integrates constructability earlier in the design process. Provides contractor-led estimates earlier and allows scope revision during design to meet project budget. Can reduce overall project risk and contingency. Can reduce design misunderstandings and resulting potential for change orders. Allows qualifications and past performance to be taken into account when selecting a contractor.	Still relies on engineer's estimate for initial cost characterization. Creates a "forced marriage" between designer and contractor that may – or may not – work. Final construction scope still subject to change order potential. Added cost to owner for contractors pre-construction phase services (although may be offset with construction savings due to early collaboration). Requires selection of contractor based on fees without knowing full construction price. Separate contracts for design and construction creates multiple points of contact for owner and does not align business interests.
Progressive Design-Build with GMP	Maximum control over project design, construction, and O&M costs because final contract is not signed until a large portion of the design is complete Single straightforward and inexpensive procurement process can be completed in short timeframe. Increased marketplace interest due to relatively low proposal preparation cost. Allows selection of designer and contractor based on past performance, qualifications, and ability to work as a single-entity team with aligned interests for project success. Provides progressively accurate, contractor's estimates of total project costs from earliest point in project through GMP definition. Provides maximum opportunity for designer, contractor, and owner collaboration to define scope, meet schedule and budget, and tailor	Requires selection based on fee, full construction cost is not known at the time of initial contract. Existing project design investment may not be of value or use to design-builder. May not be as fast to deliver as other design-build methods due to potential for extended design/estimate development period, including involvement of numerous stakeholders in the design process. May not be perceived as being "competitive" for construction pricing. Requires significant owner staff involvement and resources during design. May limit local/small sub consultant participation due to at-risk nature of the work.

Methodology	Advantages to Owner	Disadvantages to Owner
	subcontracting plan.	
	Provides an "off-ramp" to hard-bid construction if GMP is not competitive or cannot be agreed upon.	
	No contractor-initiated change orders.	
	Requires little or no design to be completed by owner in advance of procurement.	
	Single contract and point of contact with owner.	
Performance-Based Design-Build with Target Price or Lump Sum	Maximum potential for design-build cost savings through design innovation during competitive procurement.	If lifecycle cost is not analyzed or operations not included in scope, may result in higher O&M costs or undesirable project features.
	Maximum transfer of design-related performance risk to design-builder.	Proposal evaluation and selection is relatively complex.
	Minimal design work by owner required prior to procurement, resulting in relatively low cost to prepare RFP.	Limited ability to predict what will ultimately be proposed.
	Fastest possible procurement and project delivery schedule.	Lump sum pricing may include excess risk and contingency cost due to undefined project scope.
	Perceived as "competitive" construction pricing, providing full contract cost at bid time.	Limited opportunity for owner and design-builder collaboration on design during procurement process.
	Allows selection of designer and contractor based on past performance, qualifications, and ability to work as a single-entity team with aligned interests for project success.	Limited ability for owner to adjust proposed design, scope without resulting in owner-initiated change orders and resulting price adjustments.
	No contractor-initiated change orders.	May limit local/small sub consultant participation due to at-risk nature of the work.
	Single contract and point of contact with owner.	
Prescriptive-Based Design-Build with Lump Sum	Substantial control over project design and O&M costs.	Procurement schedule is prolonged and RFP preparation is costly due to high level of design required to be developed by owner prior to procurement.
	Proposal selection can emphasize project design-build cost.	Design risk not clearly assumed by the design-builder.
	Allows selection of designer and contractor based on past performance, qualifications, and ability to work as a single-entity team with aligned interests for project success.	Very complex and staff intensive evaluation of proposals.
	Perceived as very "competitive" construction pricing, providing full contract cost at bid time.	Does not promote as much innovation, or results in design-builder "alternative" proposals requiring additional evaluation.
	High level of project definition when the design-build contract is signed.	Limited opportunity for owner and design-builder collaboration on design during procurement process.
	No contractor-initiated change orders.	Limited ability for owner to adjust proposed design, scope without resulting in owner-initiated change orders and resulting price adjustments.
	Single contract and point of contact with owner.	May limit local/small sub consultant participation due to at-risk nature of the work.

Design-Build-Operate	Opportunity to include long-term operations and lifecycle cost.	Requires long-term commitment to contract mechanism and future payments.
	Provides for numerous turn-key delivery options.	Can be complex to implement and controversial.
	May provide method for obtaining project financing not otherwise possible.	May encounter public employee union resistance.

Appendix D
Glossary

Glossary			
Term	**Acronym**	**Definition/Explanation**	**Owner**
A Guide to the Project Management Body of Knowledge, **Fourth Edition**	PMBOK Guide	A set of standard terminology and guidelines for project management published by the **Project Management Institute**, providing a general guide to managing most projects most of the time.	
ADKAR	ADKAR	▪ Prosci's ADKAR Model is an individual change management model. It outlines the five building blocks of successful change, whether that change occurs at home, in the community or at work. The name "ADKAR" is an acronym based on the five building blocks: ▪ **A Awareness** of the need for change ▪ **D Desire** to participate and support the change ▪ **K Knowledge** on how to change ▪ **A Ability** to implement required skills and behaviors ▪ **R Reinforcement** to sustain the change.	
Advisory Committee		A group of stakeholders that works at the request of the project manager and uses consensus to provide advice, options, and recommendations to help the Project Sponsor and Project Manager make decisions.	
Alternative project delivery	APD	Methods of delivery that are not design-bid-build. Alternative methods include design-build, variations of design-build, construction management, and P3. The Project Management Manual has additional requirements for assessing P3s, and treats them differently in this regard.	
As-constructed drawings		The result of revising construction drawings such that the details on the drawings represent what and how the final product was constructed. The two types of as-constructed drawings are: 1) Drawings represent exactly how the project was constructed (e.g., underground works) and are stamped by an engineer. 2) Drawings are produced by the contractor and not stamped by an engineer.	
Asset (facility) strategic plan		A plan that outlines how an asset group or a specific asset will meet the needs of an organization based on the organization's strategic plan or other internal or external force. The view is long term, meeting the organization's strategic vision and the life cycle of the specific asset.	
Asset Management - Management System	AMMS	A set of interrelated or interacting elements that establish policies and objectives on how Assets are to be managed. These elements include governance (policy & administrative standards), processes and technology that work together to achieve those objectives.	
Asset management plan		A tactical plan for managing infrastructure assets to deliver an agreed level of service at an acceptable level of risk.	
Asset risk		Asset risk relates to the consequences and likelihood of asset failure on the delivery of service	

Glossary

Term	Acronym	Definition/Explanation	Owner
Association for the Advancement of Cost Engineering International	AACE	Non-profit association that provides its members resources to enhance their performance, and provides certification in cost management disciplines, including cost engineering, cost estimating, planning and scheduling, decision and risk management, project management, project control, cost/schedule control, earned value management, claims, and more.	
Association of Professional Engineers and Geoscientists of the Province of Manitoba	APEGM	Professional association that governs and regulates the practice of professional engineering and professional geoscience in the Province of Manitoba.	
Basis of Estimate	BOE	A document that defines the scope of the project, and ultimately becomes the basis in the change control process.. When prepared correctly, any person with capital project experience can use the BOE to understand and assess the estimate, independent of any other supporting documentation. A well-written BOE achieves those goals by clearly and concisely stating the purpose of the estimate being prepared (i.e. cost study, project options, funding, etc.), the project scope, pricing basis, allowances, assumptions, exclusions, cost risks and opportunities, and any deviations from standard practices. In addition the BOE is a documented record of pertinent communications that have occurred and agreements that have been made between the estimator and other project stakeholders.	
Bottom-up estimating		Approximating the size (duration and cost) and risk of a project (or phase) by breaking it down into its smallest work components; estimating the effort, duration, and cost of each component; and aggregating them into a full estimate.	
British Standards Institution	BSI	Multinational business services provider whose principal activity is producing standards and supplying standards-related services.	
Business Case	BC	A document that identifies valid Needs, verified through the Needs Assessment process. They are meant to serve as a consolidated information source for each investment, documenting needs, evaluating options, identifying influencers and constraints, and defining the solution. See the IP manual for further details.	
Business Owner		The entity in the project organizational structure that accepts receipt (ownership) of the final product or service (deliverables). Can be the control & use owner on most projects. Equivalent to the client role in a consultant delivered project. See the section 5.6 in the PMM for detailed Responsibilities and Authorities attached to this role.	

Glossary			
Term	**Acronym**	**Definition/Explanation**	**Owner**
Business Unit	BU	An organization term that is used to define the specific level or business area within the City organization. Can be used to define a Department, Division or Branch level.	
Canadian Registered Safety Professional	CRSP	A organization of safety professional in Canada	
capital budget expenditures	Capex	An expenditure incurred against a capital account for fixed assets or to add to the value of an existing fixed asset.	
Capital investment plan	CIP	A plan that provides a detailed understanding of anticipated investments into tangible capital assets, over multiple years.	
Certificate of Recognition	COR™	The (COR™) is an occupational health and safety accreditation program that verifies a fully implemented safety & health program which meets national standards	
Challenge session		A process by which business cases are vetted through, where they are scrutinized by a panel of business unit and Department managers to ensure they provide a comprehensive view and justification for the required investment.	
Change control process		A formal process that ensures changes to a project, product, system, or approach are introduced in a controlled and coordinated manner. Effective project change control processes allow the proper focus to be maintained to complete projects on time and within budget. It properly integrates or postpones requests for changes to the project's scope that may result in revisions to the project's budget and completion schedule. Change control processes provide an efficient and effective method of change control within a project management framework.	
Change management		A formal process to manage change to how people work within an organization. This change is created with the initiation of a project.	
Change Manager	CHM	The City of Winnipeg has certified change managers located in every department who form a Change Management Working Group sponsored by the CAO. Project managers should know who their departmental change managers are and should consult with them during the Initiation Phase of all projects. For a list of departmental change managers, refer to the distribution list in MS Outlook, CITY-ADKAR-Change-Managers, or contact the Manager, City Asset Management Program.	
Change of scope		A request to change the agreed scope and objectives of the project to accommodate a need not originally defined to be part of the project.	

		Glossary	
Term	**Acronym**	**Definition/Explanation**	**Owner**
Change Order	CO	A document within the change management process required to change a baseline control document, planning or design document, contract, or specification. Once a revision notice has been signed by the owner, contractor, and consultant, the change can be implemented. The change Order template is designated as "Authorization for Contract Change"	
Chief Administrative Officer	CAO	City of Winnipeg employee holding the position of Chief Administrative Officer	
Chief Financial Officer	CFO	City of Winnipeg employee holding the position of Chief Financial Officer	
City's General Insurance		The City's General Insurance includes the following: • All risk property insurance • Automobile liability coverage (city vehicles) • Workers compensation coverage • General liability insurance	
Commissioning		The sequence of activities required for a project to become fully operational (intended purpose) and meet the output specifications provided in the performance testing and commissioning plan. On some in-house projects, may be also known as "Go Live".	
Commissioning Completion Certificate		The certificate issued by an architect or engineer designated by the project manager and approved by the sponsor and/or owner confirming that the project has met the commissioning requirements provided in the performance testing and commissioning plan.	
Comprehensive General Liability	CGL	An insurance policy that provides protection from third-party claims of bodily injury or property damage that allegedly arise as a result of the contractor's operations or work on the construction project from persons not associated with the project.	
Conceptual design		A design effort that establishes basic processes, rates, sizes, configurations, and levels of technology. Questions relative to obtaining permits and approvals are addressed. Drawings produced at this level of effort are not used for construction or purchasing. Cost estimates range from approximately 30 percent below to 30 percent above the final construction cost of the facilities defined, not considering inflation. A schedule prepared during conceptual design should show general activities only, preferably in bar-chart form, and any critical path would only be inferred, not stated to any detail. The final product of conceptual design is a report containing the consultant's recommendation supplemented by drawings, cost estimates, schedule, and an approach to obtaining permits and approvals.	

Glossary			
Term	**Acronym**	**Definition/Explanation**	**Owner**
Construction cost estimate		An estimate of the initial capital cost of a constructed facility, not including projected operations and maintenance costs. This forms part of the BOE.	
Construction Manager	CM	The role of the individual in a specific project delivery method. This individual is responsible to construct the product. The role will involve managing many contract and coordinating resources to meet their contractual requirements The construction manager service can be provided as "pay for service" or "at risk". At risk, the construct manager is committed to delivering a specific project at a defined cost and time and can face financial penalties if not delivered.	
Construction Review Record	CRR	A document used to capture the findings of a construction inspection	
Consultant		Vendor contracted by the City to provide engineering or other specialist services for a project	
Contract Administrator	CA	The individual whose role is identified in a contract with specific responsibilities and authority.	
Contractor		Vendor contracted by the City to provide goods and services, including construction contracts	
Control & Use Owner		Responsible for ownership of the asset on the City's behalf. Typically accepts the final project product or service. See the section 5.6 in the PMM for detailed Responsibilities and Authorities attached to this role.	
Critical Path Method	CPM	A critical path is the sequence of project activities which add up to the longest overall duration. This determines the shortest time possible to complete the project. Any delay of an activity on the critical path directly impacts the planned project completion date (i.e. there is no float on the critical path). A project can have several, parallel, near critical paths. An additional parallel path through the network with the total durations shorter than the critical path is called a sub-critical or non-critical path	
Daily Construction Report	DCR	A template that is used to record the daily events on a construction site	
Design Build	DB	A project delivery method where the vendor is contracted to design the product and also build the facility to the requirements identified and approved by the owner	
Design-Bid-Build	DBB	The traditional approach for project delivery where separate entities provide services for the design and construction of a project.	

Glossary

Term	Acronym	Definition/Explanation	Owner
Design-Build-Maintain	DBO/M	A procurement delivery method, where a vendor is retained to prepare the design, construct the product and maintain the finished product but not operate the facility. I.e. build a community centre and maintain the facility but not have staff operating the facility.	
Design-Build-Operate	DBO	A procurement delivery method, where a vendor is retained to prepare the design, constructs and operates the finished product.	
Detailed design		A design effort that includes the preparation of construction drawings and specifications; procurement of all equipment, materials, and construction services; and development of pre-bid estimates and construction schedules. Drawings produced are sealed, dated, and issued for construction. Cost estimates are used for monitoring construction expenditures and should be within 10 percent of the final construction costs. The critical path schedule prepared during preliminary design is updated to reflect design and construction progress. The final product is a complete package of construction drawings and specifications and firm prices obtained for engineered equipment, materials, and construction services in accordance with the cost estimate and schedule.	
Direct costs		A price that can be completely attributed to the production of specific product or service. Direct costs refer to materials, labor and expenses related to the production of a product.	
Earned Value Management	EVM	A management technique used for project delivery for integrating and reporting on scope, schedule, and resources.	
Emergency Standard Operating Procedure	ESOP	Procedures developed in advance of a defined emergency event that is used when that emergency event occurs. Operating in an environment that is not standard way of operating a facility or service due to an unplanned event.	
Environment Act		The Environment Act is intended "to develop and maintain an environmental management system in Manitoba which will ensure that the environment is maintained in such a manner as to sustain a high quality of life, including social and economic development, recreation and leisure for this and future generations." Administered by the Department of Conservation, the Act is used to assess, regulate, and control discharges to the environment. The primary mechanism for achieving this action is through the licensing of developments under the provisions of the Act. The Classes of Development Regulation 164/88 provides the specific undertakings that are considered to be developments under the Act.	
Errors and omissions	E & O	A term used in the insurance industry for fault in professional services in which a mistake is made by not doing something that should have been done, or not including something that should have been included.	

Glossary			
Term	**Acronym**	**Definition/Explanation**	**Owner**
Estimate at Completion	EAC	An estimate of the projected financial status at project completion.	
Estimated costs		The forecasted cost of a project or deliverable.	
Executive Policy Committee	EPC	The Executive Policy Committee is comprised of: • the Mayor • the Chairpersons of the Standing Committees • any other members of Council appointed by the Mayor The general duties of the Executive Policy Committee include: • formulating and presenting recommendations to Council respecting policies, plans, budgets, by-laws and other matters that affect the city as a whole • ensuring the implementation of policies adopted by Council	
Facilities		Building assets that provide a service to the Public or the Public Service.	
Factory acceptance testing	FAT	Pre-defined test that the supplier (factory) of a piece of equipment is required to perform before that piece of equipment is transported to the job site. Purpose is to ensure QA/QC on the equipment prior to transport.	
Field instruction	FI	Written instructions that direct the contractor to take a specific action. The formal change order process should be followed concurrently to obtain required approvals and link up with the FI.	
Field Work Authorization	FWA	Written direction provided by the CA authorizing the contractor to proceed with specific tasks. Typically are only done when time is of the essence and there needs to be a formal written direction given.	
Financial reporting standards		Accounting principles generally accepted in Canada as recommended in the Handbook of the Canadian Institute of Chartered Accountants (GAAP), American Financial Accounting Standards Board (FASB) standards, or International Financial Reporting Standards (IFRS), as applicable, or as may be amended or replaced.	
Freedom of Information and Protection of Privacy Act	FIPPA	An act that defines the rules for what and how information can be shared when requested	
General conditions	GCs	Boiler plate clauses that apply generically to all similar types of work. GCs for City of Winnipeg Consultant Services and Bid Opportunities are published and updated on the City's website.	

Glossary			
Term	**Acronym**	**Definition/Explanation**	**Owner**
Guaranteed maximum price	GMP	Form of contract where the contractor provides a guarantee to the Owner that the product or service will be completed at a maximum price. The scope of the product or service is very defined, with specific risks assigned to the Owner and the contractor based on their ability to control.	
HSSE	Health, Safety, Security and Environment	Health, Safety, Security and Environment	
Implementation phase or Construction phase		The phase that commences immediately following the completion of the preliminary design phase and ends on the commissioning completion date of the capital project.	
Inspection and Test Plan	ITP	A QA/QC plan that outlines the specific test that will be conducted to verify quality. Plan also includes the other key elements as in any plan: who, what, when where and why.	
International Organization for Standardization	ISO	An international standard-setting body composed of representatives from various national standards organizations that promotes worldwide proprietary, industrial, and commercial standards.	
Intervention		An intentional effort, either in the form of a capital project or a change in operational practice, required when an asset is at risk of service delivery failure, an enhanced level of service is required, additional demand needs to be accommodated, or new legislative requirements need to be met.	
Issue		Disagreement among any parties including controversy, conflict, claim, disagreement, or difference of opinion that requires resolution. An issue must be entered into the issue register and resolved via a formal process once the issue has been identified as unresolvable by the initial originating parties.	
Letter of Intent	LOI	A formal document that is issued to the vendor selected via the procurement solicitation process. The letter states the intent of the Owner to enter into a formal contract. The letter provide legal authorization for the vendor to proceed while the formal contractor is prepared for signature	

Glossary			
Term	**Acronym**	**Definition/Explanation**	**Owner**
Level of service	LOS	Level of service is a qualitative measure used to describe the operating condition of a particular asset from a customer/user perspective. Levels of service can be grouped into three separate categories: - **Essential Level of Service**: Aspects of service required by existing legislation/regulation or with regard to public health, such as Health and Safety, Environmental Protection, or Hazardous Materials. - **Quality Level of Service**: Aspects of service that are discretionary to the City or business unit but affects the quality of life and experience of citizens and users, such as the availability of primary amenities, reliability of building components, etc. - **Image Level of Service**: Aspects of service which maintain image or appearance, such as the availability of secondary amenities, or the visual appeal of landscaping, finishes, etc.	
Life-cycle costing	LCC	A technique that establishes the total cost of an asset, or its part throughout its cycle life, while fulfilling performance requirements**.** **See "whole-life costing" for explanation of difference between whole-life costing and life-cycle costing.**	
Likelihood		When performing a risk assessment, likelihood relates to the probability or frequency of the failure occurring within a planning horizon, and is often represented by the estimated return period or remaining life of the asset.	
Materials Management Policy	Policy	Policy that governs the materials management functions and most types of procurement for the City of Winnipeg.	
Microsoft Project	MS Project	Scheduling software provided by Microsoft Corporation.	
Monte Carlo Simulation Method	MCS	Is a more sophisticated quantitative technique for analyzing risk and quantifying the contingency value. As with the three-point range estimate, the output of MCS is a probability distribution for total cost of the project.	
Multi Criteria Prioritization	MCP	An approach to evaluate and rank projects contribution to a range of service and business priorities, to allow for the development of the best-value Investment Plan for a given level of funding.	
Net Present Value	NPV	The total present value of a time series of cash flows. NPV is a standard method for using the time value of money to appraise projects.	
Non Conformance Report	NCR	A formal report to the contractor that details what specific element do not conform with the contract design specification	
Operating expense	OPEX	A category of expenditure that a business incurs as a result of performing its normal business operations.	

Glossary			
Term	**Acronym**	**Definition/Explanation**	**Owner**
Operation and maintenance manuals	O&M Manuals	Manuals that provide concise descriptions, technical details, operating and maintenance instructions and schedules, commissioning records, log books, catalogues, principles of operation, method of operation, and other information that will enable the ongoing operation and maintenance of the plant and equipment. The comprehensive descriptions are accompanied by diagrams and other illustrations to facilitate knowledge and understanding about the operation of the plant and equipment. Examples include hydraulic flow diagrams, electric wiring diagrams, electronic circuit plans, and mechanical air flow diagrams.	
Operations and maintenance		Work and services necessary to operate and maintain project facilities.	
Over expenditure		**Contract over expenditure**: the accumulated expenditure approved exceeds the purchase order amount (contract award amount) for that specific contract. **Budget over expenditure**: the accumulated expenditure for a specific budget line item exceeds the cumulative amount of approved budget for that specific project.	
Partnering		Exercise designed to create a positive, dispute-prevention atmosphere during contract performance. Partnering uses team-building activities to define common goals, improve communication, and foster a problem-solving attitude among individuals who will work together throughout the contract. A central objective of partnering is to encourage contracting parties to change from their adversarial relationships to a cooperative, team-based approach to prevent disputes. Partnering is not about relaxing the contract terms or circumventing the processes, it is not about expecting service providers to do extra work for free, it is not simply about dispute resolution. It is about realizing that time is money, and partnering does mean that if parties can each get what they want out of a situation, by each doing things in a slightly different way, we all win.	
Performance testing and commissioning plan		A plan that demonstrates a project can be readily and reliably operated to achieve the predetermined specifications.	
Performance verification tests		The testing of systems and subsystems of a project and the entire project to confirm that the project meets or exceeds the performance requirements stipulated in the specifications.	

Glossary			
Term	**Acronym**	**Definition/Explanation**	**Owner**
Portfolio/Program/Project Management Office	PMO	An entity within an organization that is used to manage investments either at the portfolio or program or project level. Each level addresses a specific business need within an organization. • Portfolio – Doing the right Investment. Ensuring the investments meet strategic needs. Providing governance and training across the organization. • Program – Managing a major program initiative. Ensure resources are directed to achieve the benefits identified in the business case. • Project – Ensuring the investment is done right. Providing support to the PM and ensuring the processes and procedures are followed	
Preliminary design		A design effort that establishes general arrangements, site plans, and floor plans; specifies and selects major engineered equipment; defines design criteria; and initiates the permit approval process. Drawings and specifications produced at this level are considered permanent. Final project documents when completed are used for major engineered equipment purchasing and general site pioneering and layout. Drawings should be sealed and dated. Cost estimates prepared during this phase should range from 20 percent below to 20 percent above the final construction cost of the facilities and include preliminary prices for engineered equipment obtained from manufacturers. Schedules prepared during this phase make be in the form of a network, and critical paths may be developed. The final product of preliminary design is a report containing design criteria, drawings, major engineered specifications, a critical path schedule of activities including construction and procurement, and applications for obtaining permits and approvals.	
Preliminary design phase		A sub-phase of the project planning phase, usually included on complex projects prior to detailed design.	
Process and Instrumentation Diagrams	P&IDs	An engineering drawing that shows the interconnection of process equipment and the instrumentation used to control the process.	
Procurement plan		The documented defining of the steps and approach for how and when procurement will take place.	
Program		A group of related projects managed in a coordinated way to obtain benefits and control not available from managing them individually.	
Program plan		A document defining a program's benefits and how those benefits will be realized.	

Glossary			
Term	**Acronym**	**Definition/Explanation**	**Owner**
Progress estimate	PE	The PE is the formal document that identifies what items on the contract the contractor will be paid for. The PE is signed off by the contractor and CA prior to processing.	
Project		A temporary endeavor undertaken to create a unique product, service, or result.	
Project Charter		A document issued by the sponsor that formally authorizes the existence of a project and provides the project manager with the authority to apply organizational resources to project activities.	
Project Delivery Plan	PDP	A document defining how the project will be executed, monitored, and controlled. The City of Winnipeg's PDP is defined in the Project Management Manual.	
Project Execution Plan	PXP	Documents defining how a consultant will execute, monitor, and control a project, similar in content to a project delivery plan.	
Project Management Institute	PMI	Non-profit organization with globally recognized standards, providing advocacy for a project management and certification program for members.	
Project Management Manual	PMM	The document prepared by the City of Winnipeg that provides a standard approach for delivering capital projects.	
Project Manager	PM	City of Winnipeg employee assigned the responsibility for managing a project.	
Project plan		A formal, approved document that outlines how the project manager will deliver the project as defined in the project charter. The project plan references and uses the tools within the IMS for both project execution and project control. The primary goal of the project plan is to obtain approval for how the project will be delivered and managed.	
Project Quality Management Plan	PQMP	The project quality management plan documents the quality requirements for the project and product, and how the project will achieve compliance.	
Project Record Index	PRI	A record that tracks all issue identified by the project manager and the ID number that is generated is used to track this event form birth to grave.	
Project Schedule		The planned dates, durations, and sequencing for delivering the project, usually defined in terms of tasks and deliverables.	
Projects IN Controlled Environments 2	PRINCE2	A project management methodology developed by the government of the United Kingdom	
Proposed change notice	PCN	A document that is forwarded to the contractor or others wherein the proposed change in the work is outlined and pricing for the change is requested.	

Glossary

Term	Acronym	Definition/Explanation	Owner
Public Engagement		On major projects that may have significant and/or long-term impacts socially, economically, or aesthetically, a platform for public consultation and input during the design process may be required or desirable. If the Clean Environment Commission determines that a public review hearing is required in advance of a project proceeding, the first step of this process is an advertisement in the newspaper regarding the proposed hearing for the project that invites public response. Based upon the amount and nature of the response, a decision will be made regarding the need for a public hearing. If the hearing proceeds, the public has an opportunity to make representations regarding the proposed project. Another way by which public consultation may be required or mandated is through the Community Committee or City Council responding to public pressure. During the design process, public engagement may be advantageous to provide the public with proper project information and to receive feedback from the public In recent times, there has been an increased usage of public relations consultants to assist the City and project consultants with the preparation and delivery of a clear, concise, and comprehensive message regarding the proposed project. Another opportunity for public engagement is official opening ceremonies for completed major projects. These official openings commemorate the completion of the project and recognize the efforts of the City in completing the projects for the benefit of the public.	
Publicly available specification	PAS	Organization is called PAS55. Optimal management of physical assets was a Publicly Available Specification published by the British Standards Institution. It has been superseded by ISO 55000 series of Asset Management standards.[1][2] This PAS gives guidance and a 28-point requirements checklist of good practices in physical asset management	
Public-Private-Partnership	P3	A public-private partnership (P3 or PPP) is an alternative approach for project delivery where the private sector assumes a major share of the risks and responsibilities in terms of financing, operating, and maintaining public infrastructure.	
Purchase Order	PO	A contractually binding document that sets out the details, prices, and terms and conditions of a purchase.	
Quality assurance	QA	The process of reviewing and auditing the project as a whole or in part for fitness of use in terms of quality standards. QA makes sure the right things are being done, and in the right way.	
Quality control	QC	The process of monitoring, evaluating, and inspecting actions, results, and products during their execution. QC makes sure the results of what is being done are what is expected.	

Glossary			
Term	**Acronym**	**Definition/Explanation**	**Owner**
Request for Information	RFI	A formal document used to communicate a request to clarify or more clearly identify requirements of a specific baseline document.	
Request for Proposals	RFP	Formal request for vendors to provide a service, product, or result in accordance with the way it is defined in the RFP.	
Request for Qualifications	RFQ	A formal procurement process where proponents are requested to submit their qualification for a specific project. The qualification is then analyzed against pre-determined requirements. Those proponents meeting the qualification standard can bid on the next stage in the procurement process.	
Risk assessment		The determination of the quantitative or qualitative value of risk related to a recognized threat (also called a hazard).	
Risk management		A systematic approach to setting the best course of action under uncertainty by identifying, assessing, understanding, acting on, and communicating risk issues.	
Risk Management Plan	RMP	A document describing how project risk management will be structured and performed on the project.	
Risk Register		The record of risk events identified and assessed and actions developed to address those risk events.	
Safety plan		A plan that is details how safety requirement will be implemented on a work site. The goal is to think about safety in advance of doing any activities in order to prevent accidents. The plan also outlines responsibilities and general response procedures in case an incident does occur.	
Small Employer Certificate of Recognition	SECOR(TM)	COR™ for small employers	
Sponsor		The Project Sponsor authorizes use of resources for the project, approves major deliverables, and signs off on each project phase. Individual within the business unit that is responsible to deliver the project and assign the project manager	
Standard deviation	SD	In statistics and probability theory, the standard deviation (SD) (represented by the Greek letter sigma, σ) measures the amount of variation or dispersion from the average. A low standard deviation indicates that the data points tend to be very close to the mean (also called expected value); a high standard deviation indicates that the data points are spread out over a large range of values.	

Glossary			
Term	**Acronym**	**Definition/Explanation**	**Owner**
Standard Operating Procedure	SOP	The procedure documents the steps for how an individual or group of individuals are to operate a facility, piece of equipment or system. The procedure ensure consistency and is a QA process document	
Steering Committee		A group of high-level stakeholders who provide guidance on the overall direction of the project or the business. Steering committees may provide direction to the project within their mandated area of responsibility.	
Strategic Plan		A plan that outlines an organization's long-term vision (10 to 20 years) of where an organization wants to be and how to get there strategically.	
Strategic risk		Strategic risk relates to business, environmental or regulatory factors impacting service delivery.	
Supplemental conditions	SCs	The section of the bid opportunity or request for proposals that supplements or modifies the General Conditions and sets out terms and conditions specific to the Contract.	
Tangible Capital Asset	TCA	Tangible capital assets are those capital assets of an enterprise such as property, plant, and equipment, that have physical characteristics or presence The City uses this process called depreciation to allocate part of the asset's expense (value) to each year of its useful life, instead of allocating the entire expense (value) to the year in which the asset is purchased.	
The City of Winnipeg	the City	The City of Winnipeg as continued under the City of Winnipeg Charter.	
Top-down estimating		Approximating the size (duration and cost) and risk of a project (or phase) by comparing the project as a whole to similar projects. The comparison may be made directly using "analogous estimating," through an algorithm as in "parametric estimating," or from the experience of estimating experts.	
Useful life		The shortest time span associated with the asset's physical, technological, commercial, and legal life.	
Value Engineering	VE	Exercise that uses engineering effort to reduce construction costs, optimizes life-cycle costs, or improves quality.	
Value for Money	VfM	Term used to assess whether the City has obtained the maximum benefit from the goods and services it acquires and/or provides, within the resources available to it. VfM measures the cost of goods and services and evaluates the mix of quality, cost, resource use, fitness for purpose, timeliness, and convenience to determine whether, when evaluated as a whole, they constitute good value. Achieving VfM may be described in terms of the "three Es" – economy, efficiency, and effectiveness.	

Glossary			
Term	**Acronym**	**Definition/Explanation**	**Owner**
Value management		A structured team-based approach that uses concepts and methods to create sustainable value for both the City and stakeholders. Value management identifies functional requirements of projects/contracts to achieve optimum function for minimum cost. The aim of value management is to reconcile stakeholders' views and to achieve the best balance between satisfied needs and available resources.	
Whole-life costing		The total cost throughout its life including planning, design, acquisition, and support costs and other costs directly attributable to owning or using the asset, including disposal costs. OR An economic assessment considering all agreed projected significant and relevant cost flows over a period of analysis expressed in monetary value. The projected costs are those needed to achieve defined levels of performance, including reliability, safety, and availability. Whole-Life Costing vs Life-Cycle Costing Life-cycle costing refers to the periodic replacement of assets based on typical asset life spans, whereas whole-life costing evaluates investment options, based on an evaluation encompassing all of the relevant costs of ownership over a defined time span. Broadly, life-cycle costs are associated directly with constructing and operating an asset, while whole-life costs include other costs such as land, income from the asset, and support costs associated with the asset. The expertise of the construction industry is best placed to deliver life-cycle costs, which clients can use to calculate whole-life costs.	
Work breakdown structure	WBS	A hierarchical representation of the work to be executed in a project to accomplish the project objectives and create the required deliverables.	
Workplace Safety and Health Act	WSHA	An Act intended to "secure workers and self-employed persons from risks to their safety, health and welfare arising out of, or in conjunction with, activities in their workplaces." Federal, provincial, and territorial governments are used as a guideline in Manitoba for drinking water quality.	

Appendix E
Procedure

Procedures - Embedded in the PMM

Procedures - Stand Alone Procedures

Contract Administration Procedure

Change Management Procedure

Record Management System Procedure

Public Engagement Procedure (Under Development)

Design Management Quality Procedure (Future)

Procedure E: Procedures Embedded in the PMM

Procedures provide the detailed instructions for completing the work processes. The PMM describes the work processes in the main body of the text, and in most cases also includes the procedures as a "How to" explanation.

The table below lists the procedures and where they are referenced in the PMM document. By referring to the referenced section the details can then be found within the document or the appendices.

Section #	Procedure Title	Page #

Section #	Procedure Title	Page #