**Minute No. 211**
**Report – Executive Policy Committee – February 11, 2009**

**Item No. 9 Capital Project Management Audit - Final Report**
**eFile FA-2**

COUNCIL DECISION:

Council concurred in the recommendation of the Executive Policy Committee and adopted the following:

1. That the Capital Project Management Audit – Final report dated November 2008 be received as information.

2. That the Proper Officers of the City be authorized to do all things necessary to implement the intent of the foregoing.

**Report – Executive Policy Committee – February 11, 2009**

DECISION MAKING HISTORY:

Moved by His Worship Mayor Katz,
That the recommendation of the Executive Policy Committee be adopted.

Carried

Councillors Smith and Thomas asked to be recorded as having voted against the item, in accordance with Rule 47.7 of the Procedure By-law.

EXECUTIVE POLICY COMMITTEE RECOMMENDATION:

On February 11, 2009, the Executive Policy Committee concurred in the recommendation of the Audit Committee and submitted the matter to Council.

AUDIT COMMITTEE RECOMMENDATION:

On February 9, 2009, the Audit Committee received as information the Capital Project Management Audit – Final report dated November 2008 and submitted the matter to the Executive Policy Committee and Council.

Winnipeg

Audit Department

# Capital Project Management Audit
# Final Report
# November 2008

*Leaders in building public trust in civic government*

## Table of Contents


Executive Summary ..... 3
Message From The Deputy CAO/ Chief Financial Officer ..... 11
Mandate of the City Auditor ..... 13
Audit Background ..... 13
Audit Objectives ..... 13
Audit Approach ..... 14
Audit Scope ..... 14
Audit Conclusions ..... 15
Acknowledgement ..... 16
Part I ..... 17
Capital Planning, Budgeting, Monitoring and Reporting ..... 17
- Capital Planning and Budgeting ..... 17
- Capital Project Financing ..... 29
- Capital Project Monitoring and Reporting ..... 30

Part II ..... 34
Capital Project Management Guidance and Procedures and Practices ..... 34
Review of Capital Project Management ..... 36
Review of Capital Project procedures and practices against PMBOK® ..... 42
- A. Project Scope Management ..... 42
- B. Project Schedule (Time) Management ..... 43
- C. Project Cost Management ..... 44
- D. Project Quality Management ..... 46
- E. Project Human Resources Management ..... 48
- F. Project Communications Management ..... 49
- G. Project Risk Management ..... 52
- H. Project Procurement Management ..... 53
- I. Project Integration Management ..... 62

Part III ..... 64
Review of Project Management for the Seven Selected Projects ..... 64
- Millennium Library Expansion ..... 64
- Public Works and Water and Waste Facility Consolidation ..... 67
- Kenaston Underpass ..... 70
- Street Renewal ..... 74
- CIPP Lining Projects ..... 78
- Water Treatment Project ..... 80
- Chief Peguis Trail ..... 83

Appendix 1 – Audit Process ..... 84
Appendix 2 – 2008 Capital Budget Process ..... 85
Appendix 3 – Budget Process 2004-2006 Preliminary Operating Budget ..... 86
Appendix 4 – Office of the Manager of Capital Projects Recommended Organization Structure 87
Appendix 5 - PMBOK® Project Management Body of Knowledge ..... 87
Appendix 6 - Capital Project Delivery Methodologies ..... 92
Appendix 7 City of Calgary Prioritization Criteria ..... 98
Appendix 8 – Audit Recommendations ..... 99

## EXECUTIVE SUMMARY

Successful capital project management is key to providing value for money and demonstrating sound stewardship in service delivery. It is critical that capital projects are planned, budgeted for, and managed successfully. An integrated project control framework that applies across departments and is appropriate for the level of project risk and complexity enhances the likelihood of realizing project outcomes. This approach should ensure that accountability for outcomes is clear, appropriate controls are in place to minimize risk, key project stakeholders are consulted, and outputs and outcomes are monitored and reported.

The City's capital budget was $427,323,000 for 2007 and $421,099,000 for 2008. According to the 2009 to 2013 five year forecast, the capital budget is expected to remain at a high level for the foreseeable future. Three departments manage most of the capital construction projects undertaken by the City of Winnipeg: Public Works, Water and Waste and Planning, Property and Development.

Capital construction is generally funded, planned and executed as individual, discrete projects, each of which has a specific set of objectives. Four objectives which are common to every construction project are:

**Scope** – completing the full scope of work necessary to meet the intended purpose of the facility.

**Cost** – completing the project within the budget established for that project.

**Schedule** – completing the project within the time set for the execution of the project.

**Quality** – completing a project that meets the functional standards established for the project.

The primary focus of Project Management is to plan and execute a project in such a manner as to maximize the ability to meet those four primary project objectives.

### Audit Objectives

An audit of Capital Project Management was identified in the City Auditor's 2007-2009 Audit Plan and endorsed by the Audit Committee. The audit objectives were:

- to review the adequacy of the corporate management control framework for the management of capital projects; and
- to review several selected capital construction projects to determine whether adequate processes were in place to identify and manage the risks associated with capital construction projects.

We engaged Pegasus-Global Holdings, Inc. (Pegasus-Global) to review the required procedures and the project management and control practices employed on a sample of seven capital projects.

### Audit Conclusions

The audit work performed led us to the following conclusions:

- The corporate management control framework for the management of capital projects, which includes capital planning, budgeting, monitoring and reporting, needs to be strengthened. While we acknowledge that the City's

processes meet accepted, recommended practices in some areas, there still exist some significant gaps in the City's processes. To ensure that the City's capital program is delivered in the most effective and efficient manner there needs to be significant improvement in several areas: the timing and level of public and political input; capital planning and project prioritization; standardization and transparency of capital estimates; and the oversight and reporting functions.

- Significant revision and development of capital project management procedures and processes are required to bring the City up to contemporary industry standards. Despite this, for the projects reviewed in this audit, the gaps in the processes were filled in many instances by the practices of the City's current complement of skilled and experienced project managers. Reliance on experienced project managers to fill the void in procedures is neither sustainable nor desirable, in part due to the expected shortage of these skilled project managers in the not-too-distant future. In addition, based on the projects reviewed and with some exceptions, project management practices with respect to project planning, quality management, risk management and performance reporting require improvement.

## Summary of Audit Observations

The report is presented in three parts. Key observations for each part are summarized below:

### Part I - Capital Planning, Budgeting, Monitoring and Reporting

#### Key Observations

*Capital Planning and Budgeting*

We acknowledge that the City has been working towards compliance with Government Finance Officers Association (GFOA) recommended capital planning and budgeting practices. Nevertheless, we have identified several opportunities to improve the current capital planning and budgeting practices to achieve best practices for local governments:

- Public input and political direction should be obtained earlier in the process. Although some direction is provided through the five year capital forecast, most of the political direction and public input is currently received at the end of the process after the Public Service has expended considerable effort preparing the draft capital budgets.
- Objective criteria should be further developed to evaluate and prioritize capital projects based on a broader range of criteria, encompassing political input and sound asset management practices. To date, there has only been a limited attempt to allocate the budget based on the City's needs as a whole.
- The City should adopt a three year capital budget and develop a ten year capital plan. Edmonton, Calgary and Kingston have all adopted this practice. This should result in a more predictable capital program over the longer term and

should facilitate a smoother annual capital budget process.

- Guidelines should be provided for the level of accuracy of capital project estimates required. The estimates should be reviewed and revised annually. In the past, project estimates that support the capital budget and forecast were based on different levels of design and were not usually reviewed or revised until the project budget was approved by City Council. This sometimes resulted in large "unexpected" increases to authorized project budgets as the project became more defined and the design work more complete. We noted that Corporate Finance has made the disclosure of the level of estimate using a classification system a requirement for the 2009 capital budget which should enhance transparency.
- Project plans should be required and submitted with all major capital project budget requests. Some budget submissions have lacked robust project plans and did not adequately address the management of the project's risks. Subsequent to the initiation of this review, Corporate Finance has recommended project plans be created for all capital projects for the 2009 budget year.
- The financial impact of capital projects should be fully considered and reflected in the operating budget. Currently the incremental operating costs or savings associated with the majority of new capital projects are not quantified in the capital budget except for the related increase to debt and finance charges. The City may be constructing capital assets that it cannot afford to maintain into the future. This can lead to a reduction in the overall level of service provided to citizens as the required maintenance is deferred to meet budget targets.
- The Cash to Capital account in the capital budget should reconcile to the amount appropriated from the operating budget in any given year. This ensures that the City has sufficient funds set aside to complete all of the projects that were approved through the capital budget process.
- The capital and operating budgets should be approved at the same time. We were advised that the City's goal for the 2009 budget year is to achieve this. This is consistent with the recent movement of the other cities we reviewed to synchronize their capital and operating budgets.
- The City should transition to the extent practical to a capital budget where the funds approved are intended to be spent in the year in which they are budgeted. The City had approximately $508 million in unspent capital budget funds as of December 31, 2007. This amount of unspent funding at the end of 2007 exceeds the total capital budget for 2007 ($427 million). Some of the backlog is due to large multi-year projects such as the water treatment plant or construction delays. It is also due, in part, to the approach the City uses to budget for capital projects. Some departments, primarily those reliant on tax supported City funding, have to "save up" for capital projects over a period of several years of smaller appropriations instead of one large appropriation. Some smaller projects are also delayed due to the recent growth in the capital program without an increase in project management staff to deliver the expanded program. This creates a situation where the City has tied up scarce budget resources for a project that will not be started for several years.

These delays can also cause significant changes to the budgeted costs causing the department to significantly reduce the scope of the project or request additional funding.

*Capital Project Financing*

- The Equity in Capital Assets Fund should be eliminated. The fund was established to provide a mechanism to "charge" departments for the capital assets they need to deliver their services (similar to amortization) in the operating budget. The Fund has been rendered redundant with the adoption last year of the *Tangible Capital Assets* section of the CICA Handbook for financial statement reporting purposes.
- The status of outstanding borrowing authority should be reported to Council annually. Borrowing authority is an amount that Council has approved the City to borrow to fund a specific capital project. We noted, however, that it is currently being used as a "line of credit" to be used to complete any open capital project.

*Capital Project Monitoring and Reporting*

- An oversight role should be established at the corporate level that has the clear authority and accountability for ensuring that capital projects are adequately monitored and reported on. Reporting requirements and tools should be developed to ensure consistent reporting throughout the City. This move to a centralized oversight role over capital projects at the corporate level is being implemented in several cities. Kingston has taken this a step further by placing the oversight role in a department independent of and separate from the departments managing the projects. The lack of an oversight role being performed at the corporate level has resulted in different levels of quality of information provided to senior management and Council regarding the status of capital projects.
- In the opinion of our consultant, Pegasus-Global, the creation of the Manager of Capital Projects position was necessary to bring the City's management of capital projects into alignment with current good industry practices. While an excellent first step, Pegasus-Global believes for the Manager of Capital Projects to fully discharge his responsibilities, staff is required in the following areas: Project Cost, Project Planning and Project Quality. A suggested organization chart is included in an appendix to the report.
- The current quarterly reporting cycle for major capital projects (projects that are $10 million or over) should be revised to include a well defined reporting process that enables monthly progress reporting to the Manager of Capital Projects. Without accurate, complete and timely information on the condition of a project, the owner forfeits the ability to make timely and informed decisions which might have serious ramifications on the ultimate project scope, cost, schedule and quality. In addition, the status of all capital projects should be reported to Council on an annual basis. In 2008, the Corporate Controllers Division issued an *Open Capital Projects Status Report* for the first time. This report is a good start but needs to be refined to provide more performance related information.

## Part II - Capital Project Management Guidance, Procedures and Practices

We engaged Pegasus-Global to review the required procedures and the project management and control practices employed on a sample of seven capital projects compared to the PMBOK® standards issued by the *Project Management Institute*. The seven projects were as follows:

- Millennium Library Addition
- Public Works/Water & Waste Facility Consolidation
- Kenaston Underpass
- Local Street Renewal
- Cure-in-Place Pipe (CIPP) Lining
- Water Treatment Plant
- Chief Peguis Trail

### Key Observations

*Capital Project Management Procedures*

Two administrative directives, *Materials Management Policy* FM-002 and *Capital Project Administration* FM-004, and the *Draft Manual of Project Administration Practice* provide the guidance for capital project management. The *Draft Manual of Project Administration Practice* was developed in1992 but never formally adopted by the City.

Notwithstanding its unofficial status, Pegasus-Global found that the *Draft Manual of Project Administration Practice* is still in general use across departments as a guide to planning and executing projects. Even though the *Draft Manual of Project Administration Practice* was not aligned with current City directives, bid documents and contract templates, it was identified as the only comprehensive reference source available to guide the planning and execution of a project.

The *Draft Manual of Project Administration Practice* should be updated to reflect contemporary practices in the construction industry in the following areas:

- Scope control
- Project schedule (time) management
- Project cost budgeting and cost control
- Project human resources management
- Project procurement management

Pegasus-Global found that the *Draft Manual of Project Administration Practice* should also be revised to include procedures to address the following areas:

- Scope planning, definition, verification and work breakdown structure
- Project cost estimating
- Project quality management and control
- Project progress reporting
- Project risk management
- Project integration management

In addition, the Manager of Capital Projects should develop document control and retention procedures which are currently not uniform across departments or projects.

*Capital Project Management Practices*

The projects reviewed by Pegasus-Global were managed in compliance with the policies and directives governing capital projects established by the City. Unfortunately, where gaps existed in City procedures, the same gaps appeared in project management practices in some cases. However, in many instances, Pegasus-Global found that the project management teams, on their own initiative, had developed practices which addressed some of the gaps that exist in the City's project management procedures. Observations

on the overall performance of the projects teams by PMBOK® functional area is presented below:

Scope Management
Pegasus-Global found that the scope management and control practices for the projects reviewed generally complied with industry standards. The practice that needs to be improved is the documentation of scope verification.

Time Management
Pegasus-Global found that the majority of projects reviewed used a detailed critical path method schedule with weekly based Gantt charts which is consistent with industry standards.

Cost Management
Pegasus-Global recommended that a standard estimating procedure be used for preparing project estimates. In general, Pegasus-Global found that the estimates in place at the time of authorization by City Council did not come up to the standard definition of a budget authorization estimate, primarily because the requisite level of design and engineering had not been completed at the time of that authorization. As a result, Pegasus-Global found projects that required multiple budget actions by City Council.

Quality Management
Pegasus-Global found that the City lacks a formal quality management and control program for projects. This represents a major gap in the project management control framework. Pegasus-Global also found that the projects lacked quality management plans and reports. As a result quality management was not performed, documented and reported consistently in the projects reviewed. Some quality procedures were included in the Contractor Administrator's contracts reviewed and some procedures were performed by project managers. In some cases, quality practices were limited to the use of standard warranty clauses in the contracts. Quality management and control is not synonymous with warranties. The City needs to establish a formal quality management and control program. Formal quality management and control is a preventative program by which the owner, designer and contractor work to ensure to the maximum extent possible that a warranty is never invoked or applied to a finished project.

Human Resources Management
Pegasus-Global recommends the use of a formal staffing plan for the management of capital projects. Pegasus-Global found that the availability of staff resources at the time of the project was the primary consideration for project staffing rather than a detailed examination of the specific needs of the project. This approach can result in important project management functions being under resourced or projects deferred until staff become available.

Communications Management
Pegasus-Global has concluded that project performance reporting is a serious gap in the management and control of the City's capital projects which should be addressed as quickly as possible. A contributing factor is the absence of established corporate reporting requirements and tools to enable consistent and appropriate reporting. Pegasus-Global found that the comprehensiveness and frequency of progress reporting varied from projects which had no formal reporting to projects that had very specific reporting requirements. Pegasus-Global found that certain projects dropped reporting requirements shortly after initiating the project. In the absence of comprehensive periodic progress and performance reporting, the owner is

placed in the position of reacting to surprise revelations of cost overruns, schedule delays, scope increases and/or quality defects at a point when avoidance and mitigation actions are no longer available options.

Risk Management

Risk management has become one of the primary project management functions within the capital construction industry and should be performed on all capital projects. The Water Treatment Plant Project and the Kenaston Underpass Project were the only two projects under review that implemented a formal project risk management process. The Kenaston project manager cited risk management as beneficial in planning and coordinating work and helping to avoid problems and minimize the impact of issues.

Procurement Management

Pegasus-Global identified several practices related to procurement management that should be revised to improve the outcomes achieved in capital project delivery:

- *Selection of Project Delivery Methodology* - Pegasus-Global believes that the City is not taking advantage of the full range of project delivery methodologies available such as Design Build, Construction Manager at Risk, and Private Public Partnerships (P3s). Pegasus-Global found that directives governing procurement created a significant barrier to the use of project delivery methodologies other than the traditional Design-Bid-Build (DBB) delivery methodology.
  During our review, the City has undertaken the planning for the Disraeli Capital Project as a P3 Project. We are pleased to see that the City has established a P3 committee to oversee the review of the planning for the project. The City has also retained external expertise to provide financial, engineering, procurement and legal advice to assist in the delivery of this project and to develop project delivery methodology procedures and processes for the delivery of other P3 projects in the future.
- *Roles and Responsibilities of Third Parties* – Pegasus-Global recommends that the roles and responsibilities of third parties should be reviewed. There are alternatives to the City's current practice which may reduce the City's risk of claims and disputes, while improving the overall management and control of project planning and execution.
- *Changes to Design Consulting Fees* – Pegasus-Global found that the calculation of fees actually due and owing to design consultants was a significant issue which needs to be addressed by the City. Pegasus-Global does not believe that design consultants should be paid additional money as a result of project cost increases which have no impact on scope of design work set within the original design consultant agreement. This issue was raised in a previous Audit Department report.
- *Short-form contracting and multi-year awards* – Pegasus-Global identified an opportunity to take advantage of non-traditional procurement strategies for routine, repetitive projects such as the Local Street Renewal Project. Short-form Bidding and Contracting, Project Bundling, and Multi-year awards could serve to attract more bidders and cut administrative costs.
- *Contract Closure* – Pegasus-Global recommends that procedures be followed for the closure of construction contracts that are linked to specific actions within specific time constraints. Pegasus-Global

found that some project contracts were held open for extended periods beyond project completion which does not conform to sound industry practice.

Integration Management

Pegasus-Global recommends that an execution plan be developed and used to manage all capital projects. The project managers tended to rely on the contract document set as the source for many of its actions; however, the contract document set does not integrate key activities into a cohesive, cogent plan for the execution of the project.

### Part III - Review of Project Management Practices for the Seven Selected Projects

This part of the report contains a brief description of each of the seven projects reviewed and observations about the management of the capital projects included in our report. For each project a high level review of the project cost, project scope and project schedule was performed.

The recommendations that resulted from the review of the seven projects were previously reported in Part I and Part II of the report. A complete list of the recommendations is provided in Appendix 8.

**Final Perspective**

The current project management structure is heavily dependent upon the experience, knowledge, skills and abilities of individual project managers in each department. Our consultants, Pegasus-Global, found that these managers used their knowledge and experience in many cases to supplement current City policies and procedures to ensure that the management of capital projects conformed to accepted industry practices. We want to acknowledge the efforts of these managers. The City faces the possibility of a serious shortage of qualified project management personnel in the not-too-distant future. Senior management should move quickly to tap the knowledge and experience of these project managers to help fill the gaps in project management procedures and practices identified in this audit. This will require an investment of resources to accomplish in the short term. However, this investment in project management procedures and practices will pay immediate dividends to departments dealing with the retirements of experienced project management staff. We believe that the implementation of our recommendations should result in more efficient and uniform delivery of capital projects. In addition, better and more transparent information on capital projects will be available for decision makers and citizens. This will result in greater accountability for tax dollars spent on the City's capital program.

## MESSAGE FROM THE DEPUTY CAO/ CHIEF FINANCIAL OFFICER

November 7, 2008

Members of City Council
Shannon Hunt, City Auditor

Thank you for this opportunity to respond to the Capital Project Management Audit. I appreciate all the hard work the City Auditor and her team have done to provide an independent review of our capital project planning, budgeting, and management processes, and the opportunities for improvement that have been identified; as a Public Service, we are committed to taking those steps necessary to provide the citizens of the City of Winnipeg good value.

In keeping with Council's direction, strengthening the City's handling of significant capital projects has been a major focus for the Public Service, particularly for Corporate Finance, for the last several years. We have been working hard to build a culture of continuous improvement with respect to all our budgeting, both operating and capital, having been recognized by the Government Finance Officers' Association most recently with its Distinguished Budget Presentation Award for the triennial period from 2004 to 2006.

Eighteen months ago, we took a new and important step by hiring the City's first Manager of Capital Projects, who has been working diligently to ensure that Council receives adequately developed project cost estimates, that capital projects are delivered in a cost-effective manner, and that we have a strong, workable team approach in place for handling the capital projects procurement process. In addition, the Public Service issued Administrative Directive No. FM-004 – Capital Project Administration which provided the City with strong direction on issues relating to capital project management.

With these tasks successfully under way, the Capital Project Management Audit will help us proceed to make further improvements. We are pleased that the Audit makes note of the efforts made by Corporate Finance to date, the important reporting advance represented by the issuance of the first Open Capital Projects Status Report this year, and the significant efforts of project managers across the Public Service to ensure that the management of capital projects conforms to accepted industry practices.

We will continue working with Council and with the Executive Policy Committee to improve our capital budgeting processes, in keeping with best business practices and the provisions of the City's Organizational By-Law. As the Auditor has recommended, we will review the Capital Priority Rating System, refine our capital budgeting guidelines, and work to provide more precise cost estimates and budget implications.

We will continue to develop our Open Capital Projects Status Report, and strengthen the role of our Manager of Capital Projects in capital projects oversight. We will complete the amendments to the Administrative Directives, update and deliver the Project Management Manual, and tap the knowledge and experience of current project managers to ensure that our procedures and processes are documented for a new generation of managers.

We have responded more fully to the City Auditor's recommendations in the report that follows. I would like to emphasize, though, our strong agreement with the Audit's key finding: that we need to continue working to fill in the gaps in our capital project management procedures and practices, so we can ensure consistency and good management into the future. We are determined to continue making progress – and we will work closely with Council and all our departmental capital project managers, as we move forward.

Yours sincerely,

Michael Ruta, FCA
Deputy CAO/ Chief Financial Officer

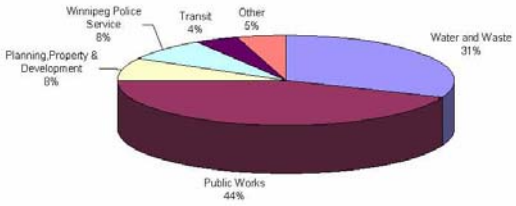
## MANDATE OF THE CITY AUDITOR

The City Auditor is a statutory officer appointed by City Council under the *City of Winnipeg Charter Act*. The City Auditor reports to Council through the Audit Committee (Executive Policy Committee) and is independent of the City's Public Service. The City Auditor conducts examinations of the operations of the City and its affiliated bodies to assist Council in its governance role of ensuring the Public Service's accountability for the quality of stewardship over public funds and for the achievement of value for money in City operations. Once an audit report has been communicated to Council, it becomes a public document.

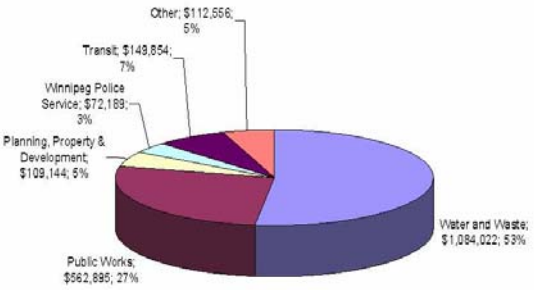
## AUDIT BACKGROUND

In 2006, the City of Winnipeg spent $263,066,000 on capital projects. The capital budget for 2007 was $427,323,000 and $421,099,000 for 2008. Three departments, Public Works, Water and Waste, and Planning, Property and Development, are responsible for managing the City's capital construction projects. As seen in the first chart in the next column, together they account for 83% of the 2008 capital budget. The second chart also highlights that for the period 2008 to 2013 the three departments will account for 85% of the total capital budget. Water and Waste represents 53%, primarily due to the construction and renovation of the water and waste water treatment plants. Planning, Property and Development also manages the building projects that are budgeted in other departments which more than doubles the percentage of capital projects it is are directly responsible for managing. A significant portion of Transit's capital budget is dedicated to bus replacement.

**Distribution of 2008 Capital Budget By Department**




**Distribution of 2008-2013 Capital Budget by Department ('000s)**




An audit of Capital Project Management was identified in the department's 2007-2009 Audit Plan and endorsed by the Audit Committee.

## AUDIT OBJECTIVES

The audit objectives were

- to review the adequacy of the corporate management control framework for the management of capital projects; and
- to review several selected capital construction projects to determine whether adequate processes were in place to identify and manage the

risks associated with capital construction projects.

## AUDIT APPROACH

We have conducted the audit in accordance with generally accepted auditing standards. **Appendix 1** provides a flowchart of the audit process.

Our review of the corporate management control framework for capital projects included the following:

- interviews with the Chief Financial Officer (CFO), Corporate Finance managers and department directors with respect to the effectiveness of the capital project management control framework;
- review of roles and responsibilities for the governance and management of the capital program;
- review of the *Administrative Directive on Capital Project Administration* and other policies and procedures related to project selection, approval, planning, budgeting, procurement and management;
- review of the process for selecting and approving capital projects included in the 2008 capital budget;
- review of the quality, completeness and frequency of reports on capital projects; and
- comparison of the City of Winnipeg capital budgeting practices to the Government Finance Officers Association (GFOA) best practices and to the cities of Calgary, Edmonton, Hamilton and Kingston.

The Audit Department also engaged the assistance of Pegasus Global Holdings Inc. (Pegasus-Global) to review a sample of capital construction projects to evaluate whether adequate management processes were in place.

Pegasus-Global evaluated the adequacy of the project planning, project management and project reporting practices for the seven projects selected.

The conclusions in our report are based upon information available at the time. In the event that significant information is brought to our attention after completion of the audit, we reserve the right to amend the conclusions reached.

## AUDIT SCOPE

The review of the capital project management control framework at the corporate level is focused on corporate capital planning (including project selection, project approval and capital budgeting), monitoring and reporting on capital projects.

We selected seven projects for detailed review. The composition of the sample was driven by an effort to select a representative mix of large and small projects, routine and one-of-a-kind projects, and process facilities and basic structures. The review of capital construction projects focused on project planning, project management and project reporting.

Pegasus-Global reviewed the project management and control practices employed on actual projects in three City Departments as follows:

Planning, Property & Development Department

- Millennium Library Addition
- PW/W&W Facility Consolidation

Public Works Department

- Chief Peguis Trail
- Kenaston Underpass
- Local Street Renewal

Water & Waste Department

- CIPP Lining
- Water Treatment Plant

## AUDIT CONCLUSIONS

The audit work performed led us to the following conclusions:

- The corporate management control framework for the management of capital projects, which includes capital planning, budgeting, monitoring and reporting, needs to be strengthened. While we acknowledge that the City's processes meet accepted, recommended practices in some areas, there still exist some significant gaps in the City's processes. To ensure that the City's capital program is delivered in the most effective and efficient manner there needs to be significant improvement in several areas: the timing and level of public and political input; capital planning and project prioritization; standardization and transparency of capital estimates; and the oversight and reporting functions.
- Significant revision and development of capital project management procedures and processes are required to address associated risks and bring the City up to contemporary industry standards. Despite this, for the projects reviewed in this audit, the gaps in the processes were filled in many instances by the practices of the City's current complement of skilled and experienced project managers. Reliance on experienced project managers to fill the void in procedures is neither sustainable nor desirable, in part due to the expected shortage of these skilled project managers in the not-too-distant future. In addition, based on the projects reviewed and with some exceptions, project management practices with respect to project planning, quality management, risk management and performance reporting require improvement.

The 29 recommendations contained in the report have been summarized in Appendix 8.

## ACKNOWLEDGEMENT

The Audit Department wants to extend its appreciation to the management and staff of all City departments who participated in the review and, in particular, the Manager of Capital Projects. In addition, we acknowledge the assistance provided by Pegasus Global Holdings, Inc.

| Members of the Audit Team |
| --- |
| Brian Whiteside, CA, CIA<br>Deputy City Auditor<br><br>Jason Egert, CA, CIA<br>Senior Auditor |

November 2008

Shannon Hunt, FCGA, CFE
City Auditor

Date

# PART I
# CAPITAL PLANNING, BUDGETING, MONITORING AND REPORTING

Part 1 of our report deals with the review of the capital project management control framework at the corporate level. The review focused on corporate capital planning (including project selection, project approval and capital budgeting), monitoring and reporting on capital projects.

## *Capital Planning and Budgeting*

### *Capital Budget Process*

The Government Finance Officers Association (GFOA) is an organization that was established to enhance and promote the professional management of governments for the public benefit by identifying and developing financial policies and practices and promoting them through education, training and leadership. It is a leading source for guidance on sound governmental finance policy and practices for state/provincial and local governments in Canada and the United States. The GFOA recommended practices were used as a basis for evaluation of the City's capital management control framework at the corporate level in addition to a comparison to leading practices of other jurisdictions.

*The Recommended Budget Practices: A Framework for Improved State and Local Government Budgeting* authored by the GFOA defines the mission for the budget process as follows:

> *"The mission of the budget process is to help decision makers make informed choices about the provision of services and capital assets and promote stakeholder participation in the process."*

The focus is on helping decision makers make informed choices; this necessitates a high level of transparency throughout the capital planning, budgeting, monitoring and reporting processes. GFOA goes on to state that the quality of decisions resulting from the budget process and the level of their acceptance depends on the characteristics of the budget process used. Governments allocate scarce resources to programs and services through the budget process. A budget process that is well integrated with other activities of government, such as the planning and management functions, will provide better financial and program decisions and lead to improved governmental operations. A process that effectively involves all stakeholders — elected officials, the Public Service, citizens and business leaders — and reflects their needs and priorities will serve as a positive force in delivering the services the stakeholders want at a level they can afford.

**City of Winnipeg Capital Budget Process**

The City's capital budget is a one-year budget with a forecast for the next five years, with the current year being approved by Council for spending. Council may authorize expenditures of up to 30% of the previous fiscal year's capital budget prior to adoption of the capital budget for the current fiscal year. The other five years (years two to six of the capital budget) are forecasts which are approved by Council but are not authorized for spending. The City's current practice of having a one-year budget with a multi-year forecast is consistent with GFOA recommended practices.

The capital budget contains projects and programs that are funded by discretionary and non-discretionary sources of funding. Non-discretionary funding is from other levels of government, from specific reserves earmarked for specific projects or programs, or from funding raised through utility rates that are used solely for the utilities. Some non-discretionary funding is time sensitive which may cause projects to be fast tracked and result in the City having to redirect

some of its capital funding to take advantage of the external funding available. The availability of non-discretionary funding may limit the City's ability to budget for and complete projects on a time table based solely on the City's priorities. For example, the 2008 Adopted Capital Budget of $421.1 million includes approximately $179.9 million (42.7%) of non-discretionary funding. In 2008, the City had discretion over more than 50% of its capital funding.

The capital budget is political in nature in the sense that Executive Policy Committee (EPC) tables the preliminary budget for consideration by all standing policy committees and, finally, by all members of Council. Executive Policy Committee sets the timeline for budget approval. Public consultation processes are confirmed each year based on EPC direction. At a minimum, after a preliminary budget is tabled by EPC, near the end of the budget process, public delegations are part of budget review meetings at Standing Policy Committees and subsequently EPC. This input is then considered by EPC before final budget recommendations are tabled for Council's consideration. Public delegations can also be made to Council at the meeting(s) scheduled to adopt the budgets.

The City's capital budget is an authorization budget as opposed to a spending budget. This means that all projects approved in a given year are not necessarily started and/or completed in that same year. Spending budgets typically only include amounts that are expected to be spent in that particular year. Most other cities we consulted have a blend of authorization and spending budgets. No city has moved solely to an spending budget due in part to the size of some of the capital projects undertaken (i.e. departments need the full budget amount approved prior to tendering for the work to be done in order to comply with established policies).

The Public Service has clearly defined processes and deadlines, at both the corporate and department level, for the creation of the draft budgets for review by the political level; however, the schedule is subject to change every year due to the political nature of the budget. (See Appendix 2 for a detailed chronology of the 2008 capital budget process.) The annual capital budget exercise is led and coordinated by the Financial Planning and Review Branch in Corporate Finance. A call letter is sent out to departments giving them the guidelines for submitting their draft capital budgets. The guidelines focus on the financial aspects of the budget and are largely based on the previous year's Council adopted forecast. Departments use this direction to shape their own capital planning and budgeting processes. These processes include the utilization of asset management methodology (for some departments) to determine where to most effectively allocate the available resources to best manage the City's existing capital assets. These preliminary capital plans are vetted through management reviews at the department level. This information is then supplemented with direction received from the call letter and the initial draft capital budget is produced and submitted it to Financial Planning and Review.

Financial Planning and Review performs the challenge and review functions from the Public Service perspective. Administrative feedback/direction and any available political direction is shared with departments and options are reviewed. Revised capital information is then reviewed by the CFO, the CAO, and brought forward to EPC members. Decisions are incorporated into the preliminary budget tabled by EPC. The preliminary budget is reviewed by Standing Policy Committees and recommendations for changes referred to EPC. EPC considers all recommendations from public delegations and the Standing Committees and tables its final recommendations to Council. Council reviews the preliminary budget, in addition to the final recommendations of EPC, debates and then adopts the budget, including any

Council-approved changes. This process takes a total of eight months from start to finish. We noted that for the 2008 capital budget, the Capital Project Manager was also involved in the City's capital budget process performing a limited challenge and oversight function. The Capital Project Manager's role was to specifically review the appropriateness of the contingencies and escalation factors used for updating the capital project budgets. This provided the City with a more consistent approach for ensuring that capital project budgets were adequate.

We acknowledge that the City's capital planning and budgeting practices are generally compliant with GFOA recommended practices. Nevertheless, there remain some opportunities to improve the current practices at the City to achieve best practice for local governments. For example, we noted that other jurisdictions such as Hamilton and Calgary have centralized the capital budget and project management oversight role into an Office of Infrastructure type of function in order to better coordinate and oversee capital project activities.

***Public input and political direction needs to be obtained earlier in the process.***

Political direction is provided at the beginning of the annual capital budget process in the form of *Plan Winnipeg*, the City's long-term strategic plan, and the five year forecast from the previous year. This is a good start but not sufficient, especially considering that *Plan Winnipeg* has not been updated since 2001. Council announced on May 26, 2008 spending of more than $3 million to update *Plan Winnipeg*. This is a positive step towards providing better guidance early in the capital budgeting process. Most of the public input is currently received at the end of the process after the Public Service has already expended considerable effort preparing the draft capital budgets.

The current process results in a significant time spent by the Public Service "guessing" what Council's priorities will be. Obtaining public input at the last moment can also cause delays to the start of projects while different options for a project are debated. The current process can also be adversarial at times because it puts the Public Service and Council at odds as to what the priorities should be. In addition, the timeline to process any changes to the draft budget is very limited. Significant changes to the projects or the inclusion of new projects at the end of the process can impact the quality of capital project estimates included in the capital budget. Lower quality estimates often result in significant adjustments to the budget once the project construction contract is awarded.

We noted that the budget process outlined in the City of Winnipeg 2004-2006 Preliminary Operating Budget (Appendix 3) is best practice in terms of the timing and level of involvement of the public, Council and the Public Service. However, the City is currently not following this process. If the City followed this process it would be consistent with recommended and leading budget practices.

The City of Kingston's capital budget process is closer to this ideal. The City of Kingston, through a public consultation process, has arrived at a Group of Seven Community Priorities that guide the annual capital budget process. The Group of Seven Community Priorities are specific projects that Council has committed to addressing including three "large initiatives" in its current term. The Group of Seven form the strategic agenda that is provided to management at the start of the budget process to guide the establishment of priorities and resource allocation to major initiatives that will make a significant difference to the City. The City of Kingston also directs capital funds based on City priorities and not departmental priorities, where possible moving closer to true zero based budgeting where budget funds are

allocated to projects that provide the greatest benefit to the City and its citizens.

We believe that political direction and public input is needed at the beginning of the process to establish long term plans, develop capital project prioritization criteria and provide public consultation at the concept phase of major capital projects. The expected result will be better alignment of the City's capital program with Council and Public priorities and more efficient and effective management of Public Service resources dedicated to capital projects.

***Recommendation 1***
We recommend that the planning process be amended so that the public input and political direction are given at the beginning of the process to be incorporated into the initial draft of the capital budget.

***Management Response***
*The Public Service will support the Executive Policy Committee's plan for budget direction setting and the public input process.*

### *The process for prioritization of capital projects needs to be improved.*

An objective prioritization process which involves the public, Council and the Public Service is fundamental in ensuring that the City uses its limited resources on the capital projects that will provide the most value to citizens.

Capital projects can be categorized into two groups: new projects arising from growth, new technology or changes in government regulations and asset management projects arising from the need to replace, rehabilitate or repair existing physical assets. Choices must be made about building new assets versus repairing or replacing existing assets.

In the current process, departments are given guidance (targets) that are based on the prior year's estimates and the estimates in the five year forecast. There is a limited attempt to allocate the budget based on the City's needs as a whole. Some guidance is provided on capital project prioritization in COW Standard Procedure 3.07 through the Capital Priority Rating System. It rates the priority based on two factors: priority of function (i.e. Vital services, Essential services, Standard services and Desirable services) and degree of priority (i.e. Should be done without delay to Could be delayed three years or more). These criteria are not linked to specific Council initiatives and would always rate parks and recreational facilities and libraries as the lowest priority. There is also no combination of these criteria to establish a relative ranking of the projects.

In contrast, Calgary utilizes software with twenty-one pre-established criteria (see Appendix 7) that were developed with input from the public, political and administrative levels. Calgary's twenty-one criteria are based on a much broader set of goals for the City and include five main categories as follows: External Economics (community), Internal Economics (corporate), Social, Cultural and Environmental. These criteria are better aligned with Calgary's vision and better reflect the public's priorities. Calgary's tax-supported projects are initially ranked objectively based on these criteria. A committee then makes the final determination of priority. While ultimately based on judgment, decisions still have to be defended on the merits of the twenty-one pre-established criteria, thus ensuring that the capital projects that add the most value to the City are approved for funding regardless of which department proposes them.

The use of objective criteria based on a broad set of goals to prioritize capital projects will result in more optimal capital decisions.
***Recommendation 2***
We recommend that objective criteria be developed through consultation with Council

and the Public Service to evaluate and prioritize capital projects to support a capital budget based on City wide priorities, sound asset management practices and projects where the greatest need and benefit is demonstrated.

***Management Response***
*Agreed. The Public Service will review the Capital Priority Rating System by the end of 2009, and any recommended changes will be brought forward to the Standing Policy Committee on Finance and the Executive Policy Committee.*

### *There should be more rigorous review of capital projects included in the first two years of the capital forecast.*

The City has an annual capital budget and a five year capital forecast. The capital budget for the year is typically approved by City Council in December of the preceding year. A forecast for the next five years is included for information purposes.

Currently the projects that receive the most scrutiny and review of the quality of estimates are the projects included in the budget. These are the project budgets that will be approved by Council. The Public Service does not have the authority to spend funds for projects in year two to year six of the forecast unless specifically authorized under section 288(2) of the City of Winnipeg Charter Act this allows expenditures up to thirty percent of the previous year's budget to be made prior to the current fiscal year's budget being adopted.

Projects are placed into the forecast (usually in year six) with varying amounts of design work to support the estimates included in the forecast. These forecast project costs are not usually materially adjusted until the project budget is approved by City Council (year one). Durations of that length will likely result in a significant increase in the budget authorized for the project compared to the original forecast amount that was based on the original conceptual cost estimate completed five years (or more) earlier. In fact, this was observed by Pegasus-Global in their review of specific projects.

City Council needs to forecast and plan for capital construction project expenditures into the future; however, capital construction cost estimates prepared so far in advance of any significant level of engineering, design and execution planning are of limited value in attempting to ascertain the true cost of a capital construction project. To produce a more predictable capital program a more rigorous review of capital projects included in first two years of the capital forecast should be done. One way to accomplish this is to adopt a three year capital budget.

Calgary, Edmonton and Kingston have all adopted a three-year capital budget. Calgary approves the capital budget for three years at a time and only annually updates the budget during the three years. The budget cycle corresponds to the term of Council and is timed to have an overlap year for the year Council is elected. The move to a three year capital budget cycle appears to be the emerging best practice. It should result in a more predictable capital program over the longer term and facilitate a smoother annual budget process. It should also provide the opportunity to capture the benefits of longer term approval such as improved planning, project management and procurement. These jurisdictions also have a ten year capital plan that accompanies and feeds into the three year budget. This ten year capital plan is subject to annual updates.

The City of Winnipeg Charter Act currently limits City Council to authorizing a one year budget. Approving a budget for a period greater than one year will require an amendment to the City of Winnipeg Charter Act.

***Recommendation 3***
We recommend that the City adopt a three year capital budget. The three year capital budget should be updated and approved annually.

***Management Response***
*The Public Service will provide support if the Executive Policy Committee's plan includes a move to a three-year adopted capital budget. A City of Winnipeg Charter amendment would be required from the Province.*

***Recommendation 4***
We also recommend that the City develop a ten year capital project plan.

***Management Response***
*The Public Service will provide support if the Executive Policy Committee's plan includes a move to a ten-year capital project plan. The water and sewer utilities currently prepare a ten-year capital project plan.*

### *Budget Process is not fully automated and integrated.*

The City's current capital budget process is primarily conducted outside of the City's ERP system except for the final input of the numbers. The current process is very time consuming, especially at the department level, and utilizes scarce human resources that could be re-deployed to provide value-added analysis. Both Public Works and Water and Waste have a dedicated position for capital planning, budgeting and reporting with a large portion (over 50%) of the time dedicated to the capital planning and budgeting process. The time spent on inputting and re-inputting numbers into the templates and their own spreadsheets could be reduced freeing up time to provide higher level analysis and compressing the capital budget process.

Most of the budget planning documents are not linked to one another and are on Excel spreadsheets resulting in an inability to incorporate changes to the budget in a timely manner without considerable effort. There is also an increased risk of input errors due to multiple entry points for the same information. The City should consider moving towards greater use of the ERP system to reduce the duplication of effort and risk of error due to multiple data entry points.

### *No guidelines are provided for the level of accuracy of capital project estimates required for projects included in the capital budget.*

Capital project estimates can range significantly in their range of accuracy depending on the level of project definition (i.e. scope and design work) completed prior to the formulation of the estimate. The estimate classification system recommended by the American Association of Cost Engineers International (AACEi) uses a scale of Class 1 to 5, which corresponds to the level of project definition completed in formulating the estimate. A Class 1 estimate having 50% to 100% of the project definition completed is expected to provide an expected accuracy range of -10% to +15%. This differs significantly from the expected accuracy range for a Class 5 estimate which is only -50% to +100%. The table below summarizes the estimate classification system developed by AACEi:[1]

| Estimate Class | Level of Definition of Project | End Usage | Expected Accuracy Range |
|---|---|---|---|
| Class 5 | 0% to 2% | Conceptual | L: -20% to -50%<br>H:+30% to +100% |
| Class 4 | 1% to 15% | Feasibility | L: -15% to -30%<br>H: +20% to +50% |
| Class 3 | 10% to 40% | Budget Authorization | L: -10% to -20%<br>H: +10% to +30% |
| Class 2 | 30% to 70% | Control or Tender | L: -5% to -15%<br>H: +5% to +20% |
| Class 1 | 50% to 100% | Check or Tender | L: -3% to -10%<br>H: +3% to + 15% |

[1] Cost Estimate Classification System, American Association of Cost Engineers International, Recommended Practice No. 18R-97, 2005, page 2

Prior to the initiation of this audit, the City had no guidance on the level of estimate that is required for the inclusion of the project in the capital budget and forecast. This has resulted in project estimates included in the capital budget and forecast that have different levels of precision associated with them. Because the budget estimate process is not standardized among departments, capital project estimates vary considerably in terms of accuracy depending on the class of the estimate.

The lack of disclosure and consistency in the level of design associated with a project estimate contained in the capital budget has lead to a misunderstanding about the level of precision associated with the budget estimate. The use of Class 4 and 5 estimates in the capital budget, which has been the practice, can result in large "unexpected" increases to authorized project budgets as the project becomes more defined and the design work is more complete. This lack of clarity on the level of accuracy to be expected from initial capital project estimates contained in the five year forecast has contributed to a lack of trust in the Public Service's ability to accurately estimate the cost of capital projects and fostered conflict between the political and Public Service levels.

It is critical to note that estimates are never expected to be 100% accurate simply because no one can predict the future with 100% accuracy. A single event, such as a labour action, can have an immediate negative impact on the accuracy of the estimate. As a result, estimates are discussed in terms of accuracy ranges, with both low and high ranges of accuracy set for each class of estimate.

A Class 3 estimate, which is considered suitable by AACEi for budget authorization purposes, has an expected accuracy range as described below:

> *"The estimate may be somewhere between 10% to 20% lower than the final actual cost, or the estimate may be somewhere between 10% to 30% higher than the final actual cost."*

It is important to also note that these estimates require at least 10% to 40% of the project to be defined (i.e. preliminary design and engineering work completed).
In absolute terms, a Class 3 estimate should be within -20% and +30% of the final actual cost assuming that the "basis of estimate factors" does not change during execution of the project. If the basis of estimate factors used in preparation of the estimate does not match the actual conditions experienced during the execution of the project (positively or negatively) then the accuracy of the estimate as compared to the final actual cost of the project will be impacted (positively or negatively).

If the authorizations made by City Council were based on a "true" Class 3 estimate City Council should expect that the project final actual cost will be between 20% lower than the estimate and 30% higher than the estimate. For example, for a project estimate of $100,000, if the estimate is a true Class 3 estimate, the final actual cost of the project assuming no changes to the basis of estimate should be between $80,000 and $130,000. If the actual final cost of the project falls within that range the estimate would have met its Class target accuracy.

As shown in the Classification table on the previous page, the greater the degree of project definition completed at the time the estimate is prepared, the narrower the estimate accuracy range which should be expected. There are a number of reasons (or combination of reasons) which may impact whether or not an estimate of any class comes within the accuracy range expected at the completion of a project, among them:

- one or more of the basis of estimate assumptions were inaccurate;

- the project definition was not to the level of completion assumed at the time of the estimate;
- the project definition changed (increased or decreased) after the estimate was prepared;
- unforeseen (and unforeseeable) conditions impacted the cost of one or more of the basis of estimate assumptions; and/or
- the execution of the project was postponed or delayed.

Subsequent to the start of our review, we noted that Corporate Finance made the disclosure of the level of estimate using AACEi guidelines a requirement for the 2009 capital budget process which is a positive step forward in making the capital budget process more transparent. We strongly support this move.

***Recommendation 5***
We recommend that the guidelines established for the 2009 capital budget process be further refined to outline the level of project estimate required for inclusion in the capital budget based on:

- Size of project
- Complexity of project
- Time to project initiation

Consideration should be given to requiring a Class 3 estimate (AACEi) be prepared for larger projects at least one year prior to the anticipated start of that project. These guidelines should be incorporated into the administrative directive governing capital projects.

***Management Response***
*The Public Service concurs with this recommendation. The guidelines established for the 2009 Capital Budget were implemented as a starting point upon which to build and improve. The Manager of Capital Projects will be developing capital project management procedures in consultation with the City departments and these procedures will include recommended estimate classifications relative to the size, complexity, timing and particularly the stage of the project, i.e. concept, preliminary, detailed design, construction.*

*The Public Service concurs with the requirement that a class 3 estimate be prepared for projects prior to construction. However, the current budget process requires the Public Service to provide estimates in advance of construction, at the concept stage, to "budget" for future years. The process and procedures must address this issue and the fact higher classification of estimates will be used for future projects and subsequently refined as they move towards construction. The practice of preparing Class 3 estimates prior to construction is currently followed on some larger projects, such as the water treatment plant and biological nutrient removal for the South End Water Pollution Control Centre.*

*The Public Service have used the AACEi classification system this year as a first step. As the Project Management procedures are developed, the City will produce its own classification system referred to in the recommendation, which is more in line with the diverse range of projects covered by the City's departments.*

*The Public Service will incorporate direction with respect to project estimates into the budget call letter for the 2010 capital budget process and the administrative directive governing capital projects by the end of 2009.*

***Recommendation 6***
We recommend that the City disclose in the Capital Budget all capital projects (if any) whose approved budgets are not supported by a class 3 estimate (or better).

***Management Response***
*The Public Service concurs with the recommendation and will incorporate into the 2010 capital budget process.*

***Recommendation 7***
We recommend that capital project estimates and forecasts be reviewed and updated at least annually, if necessary, to reflect known changes and impacts to the design and costs.

***Management Response***
*Agreed. In most instances, this is presently being done, but the Public Service will continue to seek improvements in this area. The budget call letter for the 2010 capital budget process will contain direction in this regard.*

***Recommendation 8***
We recommend that the CFO consider requesting City Council to authorize funding for major capital construction projects to perform detailed estimates three years prior to project start where higher level of estimates are required. This funding would enable the Public Service to prepare more precise cost estimates over the span of the three year capital budget.

***Management Response***
*Agreed. The Public Service will work toward this recommendation, subject to the timing, available funding and policy priorities of each capital budget. The budget call letter for the 2010 capital budget process will contain direction in this regard.*

### *The level of project planning is inadequate for budget approval.*

Prior to our review of capital project management there were no specific requirements for the composition of project plans that should accompany capital budget requests. Project plans should clearly outline the project scope and schedule and identify the project's most significant risks as well as strategies to manage those risks. These details are essential to ensure that capital projects are delivered with the expected benefits in a fiscally responsible manner. Since the City does not outline what is required in a project plan that accompanies a budget submission, some budget submissions have lacked robust project plans and did not adequately address the management of the project's risks. These capital projects are more likely to be poorly managed with the potential to go significantly over budget and behind schedule.

Subsequent to the initiation of this review, Corporate Finance has established a requirement to provide a detailed risk and project plan for Class 3 or better estimates for the 2009 budget year.

***Recommendation 9***
We recommend that a complete project execution plan be required and submitted with all major capital project budget requests.

***Management Response***
*The Public Service concurs with this recommendation. The submission of a project execution plan will be incorporated into the budget call letter for the 2010 capital budget process.*

### *The impact of capital projects on the operating costs is not being fully considered or reflected in the operating budget.*

During our review, we noted that the incremental operating costs or savings associated with the majority of the new capital projects are not quantified in the capital budget except for the related increase to debt and finance charges. We also observed that the impact on the operating costs (excluding the debt and finance charges) were only quantified in 4 out of the 210 listed capital projects and programs in the 2008 capital budget.

Both GFOA recommended practices and leading practices suggest that operating budget implications of capital projects should be fully reflected in the respective operating budgets. By not quantifying and funding incremental operating costs the City may be constructing capital assets that it

cannot afford to maintain into the future. This can lead to a reduction in the overall level of service provided to citizens as the required maintenance is deferred to meet budget targets.

***Recommendation 10***
We recommend that all operating budget implications of capital projects be fully quantified and reflected in the respective capital and operating budgets.

***Management Response***
*Agreed. The Public Service will quantify and reflect operating impacts of capital projects in both the capital and operating budgets, subject to timing, available funding and policy priorities of each capital and operating budget. The budget call letter for the 2010 budget process will contain direction in this regard.*

### *The capital and operating budgets "cash to capital" amounts are not equal.*

In the capital budget, the annual appropriation funded by taxes is reflected in the *Cash to Capital* (Equity in Capital Assets) account. In the operating budget, the annual appropriation for capital projects is reflected in the *Internal Financing – Principal and Internal Financing – Interest expense* accounts. The amount budgeted in the capital budget should equal to the amount appropriated from the operating budget in any given year to ensure that the City has sufficient funds set aside to complete all of the projects that were approved through the capital budget process.

In 2008, the Cash to Capital amount was approximately $61.5 million for both tax supported and utilities. The accounts in the operating budget combined to total approximately $56.2 million for both tax supported and utilities resulting in a difference of approximately $5.3 million. This difference is primarily due to timing differences in when the cash is expected to be used versus when the funds were authorized which is primarily related to the internal service divisions (e.g. Civic Accommodations). Nevertheless, this difference essentially amounts to under funding of the authorized capital program in a given year. We also found that the budget for 2007 was under funded by $5.98 million and the forecast for 2009 was under funded by $2.08 million. If this annual funding deficit were allowed to continue indefinitely, at some point the completion of City's capital program would be placed at risk.

We also noted that the accounting for the Cash to Capital and related accounts is not transparent. Nowhere in the budget documents can a reader easily discern whether or not the funding represented in the capital budget is appropriated in the operating budget and where the funding is coming from in the operating budget. In addition, it is not clear from the City's financial statements if the City has adequate or excess funds to complete all the capital projects it has authorized. A *Winnipeg Free Press* May 28, 2008 article "*Money's just lying around*" highlights the level of confusion surrounding the funding for capital projects.

All other jurisdictions we consulted with (Calgary, Kingston, Hamilton and Edmonton) ensured that capital fund appropriations from their general revenue funds (operating budgets) were equal to the amounts provided for in their capital budgets in any given budget year. They further ensured these funds were available by setting up a specific fund or reserve where these appropriations and the respective capital expenditures were accounted for.

***Recommendation 11***
We recommend that the City establish a Capital Project Reserve to be funded with monies appropriated from the operating budget each year for the capital program.

The appropriation for capital projects (Cash to Capital) in the capital budget should equal the appropriation for capital projects (Cash to Capital) in the operating budget for any given year.

In the event that the City does not appropriate funds in the operating budget equal to the Contribution to Capital approved in the capital budget this funding gap should be disclosed in the operating budget. This disclosure will improve transparency with respect to capital project funding.

***Management Response***
*Commencing in 2009, in the event the City does not have appropriate funds in the operating budget equal to the contribution to capital approved in the capital budget, the Public Service will disclose the variances in the adopted operating budget through a note in the adopted operating budget. Furthermore, by the end of 2009, the Public Service will investigate a more transparent means by which to account for the annual amounts appropriated from the operating budget each year for the capital program including exploring the merits of establishing a separate reserve.*

### *The capital and operating budgets are not approved at the same time.*

The 2008 capital budget was approved in December, 2007 and the operating budget was approved in March, 2008. One of the implications of approving a capital budget three months in advance of the operating budget is that it can not be fully known if the City can afford to make the contributions to capital at the level included in the capital budget.

City Council cannot be sure that it is able to provide the funding for capital projects until it balances the operating budget. In addition, the impact of incremental operating expenses to the operating budget from the capital projects approved is not known when the capital budget is approved.

Subsequent to the start of our review, we were advised that the City's goal for the 2009 budget year is to have both the capital and operating budgets approved by the end of the year. This is consistent with the recent movement of the other cities we reviewed to synchronize their capital and operating budgets. The City of Calgary approved the capital and operating budgets at the same time for the first time in 2008.

***Recommendation 12***
We recommend that the City review and approve the capital and operating budgets at the same time.

***Management Response***
*The Public Service will provide support if the Executive Policy Committee's plan includes adopting the capital and operating budgets at the same time.*

### *Funds approved in the capital budget may not be spent for several years.*

Based on the *Open Capital Projects Report* submitted to the Standing Policy Committee on Finance on May 27, 2008, the City had approximately $508 million in unspent capital budget as of December 31, 2007. This amount of unspent budget at the end of 2007 exceeds the total capital budget for 2007 ($427 million). Some of the backlog is due to large multi-year projects such as the water treatment plant or construction delays but a portion is also due to the City not having the capacity to complete the projects on a timely basis. Some smaller projects have been delayed due to the recent growth in the capital program without an increase in project management staff to deliver the expanded program. Also the approach the City uses when generating the capital budget contributes to the situation.

Departments are given guidance (targets)

for the capital budget based on the prior year's estimates and estimates in the five year forecast. There is a limited attempt to allocate the budget based on the City's needs as a whole.

Due to the limitations inherent in a "prior year plus or minus" budget formula and an authorization budget some departments, departments primarily reliant on tax supported City funding, cannot afford to do necessary capital projects for a number of years. These departments have to "save up" for larger capital projects over a period of several years of smaller capital budget appropriations instead of one large appropriation. While we acknowledge the need for the City to save up for major capital projects, reserves are usually the mechanism for this. Using the capital budget as a vehicle for saving up for larger projects rather than a reserve ties up scarce budget room for a project that will not be started for several years. This could result in a situation where a series of smaller projects that could be completed in current year are postponed until the City has adequate budget room to accommodate the projects. In the current construction environment, these delays will most likely result in cost escalations. We noted that in the *Open Capital Projects Status Report* to December 31, 2007 that there was approximately $78 million unspent but committed dollars for capital projects budgets authorized in 2004 or prior years.

Another problem created by this method of funding capital projects is that Council and the public expect to see progress on projects that are specifically identified in a capital budget year only to find out that they cannot be started until the department has "saved up" enough capital budget. These delays can also cause significant changes to the budgeted costs causing the department to delay the project, significantly reduce the scope of the project, or request additional funding.

Leading jurisdictions, such as Hamilton and Calgary, are moving towards a spending budget to the extent practical while acknowledging that there are still limitations that prevent any jurisdiction from moving solely to a spending budget. The City's main limitation is the restriction to authorize only a one year capital budget. The City must have sufficient funds authorized in the budget before the City can procure the services to complete the capital work. For major projects the procurement process can take a significant portion of a year, and compounded with the City's limited construction season, limits the City's ability to move fully to a spending budget. But, the closer the City can move to a spending budget, where only the money expected to be spent on a capital project for a given year is budgeted in that year, the more effectively the City can manage and oversee the capital program.

Assuming the City can transition to a three year capital budget, an example of a how a spending budget for a capital project of $20 million completed over the three years would work is provided below.

- In Year 1, costs for preliminary design work (about 5% of total project costs) to generate a Class 3 estimate would be included in the budget. A Class 4 or 5 estimate would be used for the project budget for Year 2 (70% of total project costs) and Year 3 (25% of total project costs).
- In Year 2, the Class 3 estimate would be used for determining what would be included in the budget for Year 2 and Year 3. Any adjustment to the project budget arising from the Class 3 estimate would be processed in Year 2.
- In Year 3, an update of the budget for cost escalations and scope changes should be performed.

In this example, it should be clear that it is expected that the project will be completed in Year 3. The capital budget would show how the project costs are to be budgeted

and spent over the three year term. The authorization of the three year budget enables the City to award a contract for the construction of the project in Year 2 even though 25% of the costs are not budgeted until Year 3.

A spending budget does not guarantee that all capital projects budgeted in a given year will be completed or that all the money budgeted will be spent nor is it expected. But, spending budgets make it much easier to measure the progress departments are making in delivering their capital program and allows for better management of the City's scarce capital budget resources.

***Recommendation 13***
We recommend that the City transition, to the extent practical, to a capital budget where the funds approved are intended to be spent in the year in which they are budgeted.

***Management Response***
*Implementation of this recommendation is contingent on support for Recommendation 3 above, which is the adoption a three-year capital budget. In order to move to a budget where the annual funds approved are intended to be spent in that year, multi-year budget approval would be necessary to award contracts for projects with authorizations included in the "out years".*

## Capital Project Financing

### The maintenance of Equity in Capital Assets Fund provides limited value.

On May 23, 2001, Council approved the renaming of the General Reserve Fund to the Equity in Capital Assets Fund. The fund has been used since it was created for financing capital construction. Historically, the City only capitalized and amortized physical assets that were funded by debentures; all other capital expenditures were expensed in the year incurred. Therefore, the true costs of delivering a service were not reflected in the operating statements of the City. The establishment of the Equity in Capital Assets Fund provided a mechanism to "charge" departments for the capital assets they need to deliver their service (similar to amortization) in the operating budget. It was also a method to ensure the annual appropriation to the capital program from the operating budget remained unaltered throughout the operating budget process.

However, since the adoption of *Section 3150 – Tangible Capital Assets*, which requires the City to identify and account for all of the City's tangible capital assets, the Equity in Capital Assets Fund has been rendered redundant.
This fund is eliminated on consolidation and the transactions do not involve any transfers of funds (cash). The transactions are simply accounting entries.

The accounting for this fund is also very complex and is performed by two separate areas of Corporate Finance (Corporate Controllers Branch and Financial Services Branch) and four different individuals. This has resulted in no one person fully understanding the purpose and the function of the fund and how it interconnects with other funds in the City. This contributes to the confusion as to what the balance in the fund represents, with some believing that it represents cash the City is sitting on and available to spend on more capital projects.

Because this fund has become redundant, involves a considerable amount of time and effort and adds to the lack of transparency around the capital budget, capital funding and capital reporting, the fund should be eliminated.

***Recommendation 14***
We recommend that Corporate Finance eliminate the Equity in Capital Assets Fund.

***Management Response***
*The Public Service will investigate fully the impacts of eliminating the Equity in Capital*

*Assets Fund and make its recommendation to the Chief Financial Officer in 2009. There would be a number of implications involved in eliminating the Equity in Capital Assets Fund, both budget- and accounting-related. While the recommendation has merit, its impact needs to be fully explored prior to its being implemented.*

### *Reporting on Borrowing Authority needs to be more transparent.*

Borrowing authority is an amount that Council has approved the City to borrow to fund a specific capital project or program. The borrowing authority is supposed to be identifiable to a specific project. We noted, however, that it is currently being used more as a "line of credit" to be used to complete any open capital projects. A statement in *The City of Winnipeg 2007 Detailed Financial Statements* discloses that approximately $67 million of the total $89 million in outstanding borrowing authority was approved in 1997 or earlier.

Although the borrowing authority is reported on in *The City of Winnipeg 2007 Detailed Financial Statements*, the reporting format does not identify the capital projects the borrowing authority relates to nor indicate if it is sufficient in combination with the other sources of funding to complete all open capital projects. The Public Service does not report on the use and availability of borrowing authority with respect to capital projects on annual basis. Historically, an analysis of borrowing authority as it relates to capital projects has been performed on an as-needed basis. The objective is to determine if the current level of borrowing authority is sufficient to pay for the completion of all outstanding capital projects after taking into account the funds appropriated from the City's operating funds and the funding received from the other levels of government. The most recent analysis was performed for the year ended December 31, 2007. This analysis indicated that the City does have sufficient borrowing authority combined with the other sources of funding to complete all of the approved open capital projects. We also noted that Corporate Finance has used this analysis periodically in the past to cancel excess borrowing authority.

A report outlining the remaining borrowing authority as it relates to both open and closed projects as well as an analysis of the adequacy of the level of borrowing authority combined with the other sources of capital funding to complete projects in progress would improve the transparency of communication between Senior Management and Council.

***Recommendation 15***

We recommend that reporting on the status of outstanding borrowing authority as it relates to specific capital projects be done annually and reported to Council.

***Management Response***

*The Public Service concurs with this recommendation as it would improve upon transparency and understandability. This could be done in conjunction with the City's 2008 annual reporting.*

***Recommendation 16***

We recommend that Corporate Finance establish an annual process that ensures that unused borrowing authority is cancelled upon the completion of a project.

***Management Response***

*The Public Service will investigate the merits of this recommendation and report to the Chief Financial Officer in 2009.*

## *Capital Project Monitoring and Reporting*

### *The current level of reporting on capital projects needs to be improved.*

At the corporate level, the only formal progress and performance reports required by the City are the quarterly performance reports, which are limited to "major

projects", defined as projects that are $10 million or over in total cost to complete. Frequent and timely progress reporting on major projects is a crucial element of project management and control. Without accurate, complete and timely information on the condition of a project, the owner forfeits the ability to make timely and informed decisions which might have serious ramifications on the ultimate project scope, cost, schedule and quality. We believe that the Manager of Capital Projects should receive monthly progress reports on major capital projects.

We also noted that there are no requirements for progress or performance reporting at the corporate level for projects under $10 million unless Council needs to approve changes to the budget. In 2008, for the first time, the Corporate Controller's Division issued an *Open Capital Projects Status Report to December 31, 2007* to the Standing Policy Committee on Finance on May 27, 2008. This information is intended to be reported on a semi-annual basis. The report lists all the open projects as at a certain date. This report highlights the year the project was approved, its status, the amended budget, actual costs, and the unspent amount and percentage. Future plans are to include an original adopted budget amount. The report is a good start and will provide a high level overview of all outstanding capital projects. It should provide information to assist departments and Council in their future decisions on the level of capital spending for any given year. However, it is still a report of data; there is a need for summary and exception reporting at the senior management and political levels to provide focus on the major issues that require action. Exception reports should provide information on projects where results are not meeting expectations and could include the following situations:

- projects that are in progress and are significantly behind schedule;
- projects in progress that are expected to incur costs to complete that are significantly higher than budgeted;
- projects that have not started on time; and
- projects that remain "open" that have been completed for a significant period of time.

This information should be reported on a regular (at least annual) basis so that senior management and Council are aware of and can deal with these issues in a proactive manner.

***Recommendation 17***
We recommend that the CFO consider revising the current quarterly reporting cycle for major capital projects and develop a well defined reporting process that enables monthly progress reporting to the Manager of Capital Projects.

We recommend that the CFO implement an annual status of capital projects report that includes all capital projects.

***Management Response***
*The Public Service will review the advantages and disadvantages of more frequent reporting of capital projects and will report its recommendations to the Chief Financial Officer. This will be carried out as soon as possible for implementation in 2009.*

*The Public Service already reports to Standing Policy Committee on Finance on its open capital projects on a semi-annual basis. Presently a work in progress, the reports will evolve to comment on major capital projects' progress concerning timing, scope and budget. It is anticipated that this evolution will be completed by the end of 2009.*

### *Monitoring of capital projects at the corporate level needs to be improved.*

Through our review of *Administrative Directive FM-004,* we noted that other than the open projects procedures, there is no specific reference to the Manager of Capital Projects performing an oversight role with respect to capital projects. In fact, the Manager of Capital Projects is currently actively managing the City's P3 projects. In the last year, several steps were taken towards establishing a more robust oversight role at the corporate level. The Manager of Capital Projects was involved in the review of the quality of capital project estimates contained in the capital budget. Corporate Finance established procedures to ensure that open projects greater than five years are closed in a timely manner and the *Open Capital Projects Status Report* was produced. Until 2007, only major capital projects (>$10 million) were being monitored at the corporate level.

The lack of an oversight role being performed at the corporate level has resulted in different levels of quality in information provided to senior management and Council regarding the status of capital projects. It has also led to a large number of approved projects that have not been started, tying up scarce budget resources.

This move to a centralized oversight role over capital projects at the corporate level is being implemented in several jurisdictions. The City of Kingston has taken this a step further by placing the oversight role in a department independent and separate from the service departments that are managing the projects and staffing it with both financial and project management professionals. This independence combined with the level of expertise in both financial and project management will allow staff to gain the necessary trust and respect from the service, senior management and political levels to effectively perform an oversight role.

***Recommendation 18***

We recommend that an oversight role be further developed at the corporate level that has the clear authority and accountability for ensuring that capital projects are adequately monitored and reported on.

***Management Response***

*The Public Service concurs with this recommendation. With departments accountable for project delivery, the role of the Manager of Capital Projects will focus on oversight. The role will be developed throughout 2009, coincident with the completion of the current capital projects procurement process.*

### *The Office of the Manager of Capital Projects needs more resources.*

In the opinion of our consultant, Pegasus-Global, the creation of the Manager of Capital Projects position was necessary to bring the City's management of capital projects into alignment with current good industry practices. Pegasus-Global believes that this position is vital to the City if it is to move forward with the goals and objectives set forth in FM-004, and if it is to undertake and implement the recommendations which are set forth in this audit report.

The Manager of Capital Projects, however, currently has no staff or support structure to assist in performing the twenty significant responsibilities listed in FM-004. Pegasus-Global believes that it is unrealistic to assume that a single person can address the full scope and breadth of the tasks put forward within FM-004 and this audit report. Pegasus-Global believes for the Manager of Capital Projects to fully discharge his capital project management and control responsibilities he requires staff in the following areas: Project Cost, Project Planning and Project Quality. Consideration should be given to centralizing certain responsibilities and staff to resource the office.

The staff would be in place to both establish and monitor the management and control processes at a macro-level, and to assist project managers as they plan and execute those functional management and control responsibilities on individual projects. Pegasus-Global believes that the Manager of Capital Projects faces a very challenging set of tasks, even with the minimal staff complement identified in the organization chart in Appendix 4.

***Recommendation 19***
We recommend that the Manager of Capital Projects be provided with professional staff in the areas of Project Costing, Project Planning and Project Quality so that he can perform the responsibilities set out in *Administrative Directive FM-004*.

***Management Response***
*The Public Service concurs with this recommendation. In 2009, budgets will be reviewed to identify opportunities for the necessary resources either on a full-time or shared basis.*

# PART II

## CAPITAL PROJECT MANAGEMENT GUIDANCE AND PROCEDURES AND PRACTICES

In December 2007, the City Auditor engaged Pegasus Global Holding, Inc. (Pegasus-Global) to conduct a review of the adequacy and appropriateness of the following:

- the policies, procedures and processes which govern all projects planned and executed at the City of Winnipeg; and
- the practices actually employed by City of Winnipeg project management teams during the execution of a sample of capital projects.

Part II of this report summarizes the broad observations and recommendations developed by Pegasus-Global as a result of the audit conducted between December 13, 2007 and May 30, 2008.

Part III includes specific observations on the management of the seven projects that were included in the scope of this audit.

### *Capital Project Management Objectives*

Capital construction is generally funded, planned and executed as individual, discrete projects or as scalable programs, each of which has a specific set of objectives. Four objectives which are common to every construction project are

**Scope** – completing the full scope of work necessary to meet the intended purpose of the facility.
**Cost** – completing the project within the budget established for that project.
**Schedule** – completing the project within the time set for the execution of the project.
**Quality** – completing a project that meets the functional standards established for the project.

The primary focus of project management is to plan and execute a project in such a manner as to maximize the ability to meet those four primary project objectives. Internationally, the construction industry has acknowledged that the art of managing projects involves certain standard procedures, processes and practices which, if followed, greatly increase the ability of the project management team to achieve those primary objectives. The international capital construction industry follows generally accepted project management standards of care and practice which have been adopted by owners, engineers, contractors, consultants, subcontractors, equipment and material suppliers and various legal jurisdictions.

### *Audit Criteria*

Pegasus-Global selected the project management standards promulgated by the Project Management Institute (PMI) in the Project Management Body of Knowledge (PMBOK®) as the standards against which the City of Winnipeg capital project procedures and practices would be compared. These standards are the most widely accepted globally, and have been used throughout North America for nearly 25 years.

Using all of the documentation and information gathered through the interview process, Pegasus-Global compared the City's management of projects against nine functional management elements delineated within the PMI PMBOK®:

- Project Scope Management
- Project Time Management
- Project Cost Management
- Project Quality Management
- Project Human Resource Management
- Project Communications Management
- Project Risk Management

- Project Procurement Management
- Project Integration Management

(See Appendix 5 for more information.)

Pegasus-Global found that departmental staff involved in capital construction projects were familiar with PMI, the PMBOK® and that some City staff were certified Project Management Professionals by PMI.

The audit methodology was agreed between the City Auditor and Pegasus-Global at an initial meeting held in Winnipeg the week of December 10th, 2007. The general methodology developed with the City Auditor involved conducting an analysis under which the policies, procedures, processes and practices of the City would be compared against those project management policies, procedures, and processes recognized as "good professional practice" within the capital construction industry at large.

The second phase of Pegasus-Global's review dealt with how capital construction projects were actually executed by the City and departments. Pegasus-Global reviewed the project management and control practices employed on seven capital projects executed under three City departments as follows:

Planning, Property & Development Department

- Millennium Library Addition
- PW/W&W Facility Consolidation

Public Works Department

- Chief Peguis Trail
- Kenaston Underpass
- Local Street Renewal

Water & Waste Department
- CIPP Lining
- Water Treatment Plant

The projects to be reviewed were selected by the City Auditor in an effort to provide a representative mix of large and small projects, routine and one-of-a-kind projects, and process facilities and basic structures.

Pegasus-Global reviewed the project management practices employed by the project management teams and compared them against both the procedures in place at the City and the PMI PMBOK® standards of care. There were instances in which the practices complied with the City's procedures but did not meet the standards promulgated by PMI. In those instances Pegasus-Global determined that the project manager's obligation was to comply with the City's procedures even if those procedures did not represent current good industry practice.

## Review of Capital Project Management

In the course of the review of the City's capital project management procedures and practices Pegasus-Global reviewed the following areas at the corporate level:

- Capital project procurement rules and contracts
- Capital project management procedures

This section of the report deals with the observations and recommendations pertaining to those two areas.

### *Capital Project Procurement Rules and Contracts*

The procurement rules and contract conditions and provisions which govern the execution of the project are crucial to the ability to manage and control a project. This element of project management is not contained within the PMBOK®:

The procurement of capital projects by public owners is typically a challenging and difficult process. The challenge and the difficulty are due to the fact that capital project designs are drawn specifically for a designated building or facility. The project incorporates standard market components using drawings and specifications that may contain errors and omissions. There is usually vigorous competition that leads to tight margins that create little room for accommodating mistakes or changes.

The broad goals of contract administration of capital projects are to ensure that the City obtains the needed work on time, the quality of the work is in accord with the contract drawings and specification, and the contractor is properly compensated for the work performed.

The City exercises the prerogative of procurement of capital projects through the management delegation and retention of authority from City Council (Council) to the City's Chief Administrative Officer (CAO). This delegation of Council's authority to award contracts to the CAO is then further delegated to the CFO and then to the heads of the City's departments and the Manager of Materials. This process includes a complex matrix of authorities, oversight and layered approvals. This process is presented in the Council Policy on *Materials Management Policy* (Council Policy / Policy) and *Administrative Directives No. FM-002* and *FM-004*.

***Corporate procurement management procedures as promulgated primarily in Administrative Directive No. FM-002 are clear and comprehensive.***

Corporate procurement management procedures as promulgated primarily in *Administrative Directive No. FM-002* are clear and comprehensive. FM-002 includes both procedural requirements and links to other City policies and directives which govern elements of the procurement of goods and services for the City.

*Administrative Directive FM-002* dated June 2007 (FM-002) "*outlines the delegations of authority related to procurement and contract administration*". This directive updates the delegations found in the Council Policy discussed above. It also delegates specific CAO authorities to the CFO who, in turn, further delegates to the Manager of Materials (also within the Corporate Finance Department) authority to make and take various contract actions. There is a new instruction that requires department heads to file an Administrative Award Report under certain circumstances that then is transmitted to the appropriate Council standing committee to insure budgetary requirements are met. The CAO retains the right to review or deal with any matter that is within the CAO's authority. There is also a prohibition against any

further delegations unless permitted by FM-002.

FM-002 makes a point of distinguishing Award Authority and Signing Authority and inserts the requirement for legal review of the contract by the City Solicitor and approval of same as to form prior to signing the contract document.

### *Review of Award Reports should be transparent.*

The *Award Report* (Appendix 4 - FM-002) lists "some of the criteria used by Legal Services and Materials Management" in their review of the *Award Report*. In Pegasus-Global's opinion, the nature and scope of this review should be transparent and understood. The directive should be specific on what is required of the departments and the reason for the requirement. One element of this appendix that requires clarification is the discussion concerning correct bid evaluation. It is unclear whether the City is intent on disrupting the award of a contract because Legal Services or Materials Management was not consulted during the bid evaluation process. The requirements for Legal Services and Materials Management participation should be incorporated with specificity in the bid evaluation process. Slowing down or preventing award of a contract must be grounded in specific omissions. Pegasus-Global believes that a form can be created that allows the submitting department to answer the concerns raised in Appendix 4 as part of the award review process.

***Recommendation 20***
We recommend that *Administrative Directive FM-002* be amended to clearly define the role of Materials Management and Legal Services in the bid evaluation process and the review of the *Award Report.*

***Management Response***
*Corporate Finance is in the process of amending Administrative Directive FM-002 to more clearly define the role of Materials Management and Legal Services in the bid evaluation process. Further, a comprehensive evaluation guide is being prepared for use in the evaluation of various types of bids.*

*The Appendix in Administrative Directive FM-002 on Award Reports will be amended to clearly define the roles of Materials Management and Legal Services and to provide a more comprehensive guideline to preparing award reports. Upon consultation with departments, the above amendments will also define an appropriate role for the Manager of Capital Projects' involvement in the evaluation of capital project bids and Award Reports.*

## *Capital Project Management Procedures*

Based on the review of the project management procedures established by the City of Winnipeg, Pegasus-Global made the following observations:

### *Capital Project Administration Administrative Directive No. FM-004 was needed when issued.*

The Capital Project Administration Administrative Directive is an extremely important directive and in Pegasus-Global's opinion was needed at the time it was issued to address perceived problems in the capital project administration process. Pegasus-Global found that many critical issues were in need of resolution and that committees were created to further that result.

*Administrative Directive No. FM-004* (FM-004) was issued in March 2007 with the stated purpose of describing the process for planning, delivering and executing a capital project. Pegasus-Global identified FM-004

as one of the key sources of procedures governing the management of capital construction projects at the City. Within FM-004, the City specifically noted that to date it had in the past been able to execute its capital construction projects on budget, but

> *… over the past few years, price increases in materials and labour have resulted in a dramatic and unexpected impact on capital budges.*
>
> *As a result, it is timely to re-examine the processes and procedures applied by the City in delivering capital projects. For this purpose, the Directive provides details regarding capital project management.*

Some portion of the City's recent experience in the rise in construction material and labour costs is not within its direct control, but is driven by market forces within the industry itself. That said, the City's action in producing FM-004 represented a sound response to those conditions.

### *The City lacks a complete, current, organized and cross-referenced set of project management procedures.*

Pegasus-Global found that the procedures established at the corporate level do not meet current project management standards of care generally practiced within the construction industry at large. This is due to either (1) gaps which exist within the procedures (i.e. the procedure does not exist at the corporate level); or (2) the fact that the current procedures in place are outdated.

During interviews with project managers Pegasus-Global was consistently informed of the need for the City to gather and index the myriad of policies, directives, procedures and processes addressing capital project planning and execution into a single, codified location and to update the 1992 *Draft Manual of Project Administration Practice* to better reflect the current policies, directives, procedures and processes.

### *Draft Manual of Project Administration Practice is in use despite being outdated and inconsistent with administrative directives and procurement documents.*

Notwithstanding its unofficial status, Pegasus-Global found that the *Draft Manual of Project Administration Practice* is still in general use across Public Works, Water and Waste and Planning Property & Development as a guide to planning and executing projects. Even though the *Draft Manual of Project Administration Practice* was not in alignment with current City directives, bid documents and contract templates, it was identified as the only comprehensive reference source available to guide the planning and execution of a project.

Pegasus-Global found that experienced project management personnel responsible for the execution of projects have "adjusted" their administrative manuals as necessary to reflect the changes in administrative directives and procurement documents which have occurred since 1992. However, each of those "edits" made by an experienced project manager was unique to that project manager and there was no consistent pattern in which elements of the *Draft Manual of Project Administration Practice* were edited. In essence, the standards contained in the *Draft Manual of Project Administration Practice* were not only out of date; they were no longer "standard" across all departments or projects.

To an inexperienced City project manager the use of *Draft Manual of Project Administration Practice* could create a level

of confusion since it is dated to the point where it contains citations to Contract General Conditions which have been revised as to content or location. For example, *the Draft Manual of Project Administration Practice* references General Conditions *Provision 8.0* as containing the scheduling requirements for a contractor. The current General Conditions *Provision 8.0* contains requirements relative to "Rights of Entry" on the project site. Wherein the General Conditions cited in the *Draft Manual of Project Administration Practice* reference and quote an extensive set of schedule requirements on the contractor, the current set of General Conditions contain no provision which addresses a contractor's schedule of the work.

The Public Works Department and Water and Waste Department have both attempted to develop a set of written standard project management procedures to update the *Draft Manual of Project Administration Practice*. Lack of resources has resulted in very little progress as the limited resources have been used to manage the increasing project load. To make progress resources will have to be allocated for the duration of the development of the procedures as well as keeping them up to date. The costs associated with these resources should be recovered over time through improved capital project management and performance.

### *The City lacks consistent document control and retention procedures.*

Pegasus-Global discovered that the document control and retention practices were unique to each department and often unique to specific projects. Pegasus-Global was provided with literally hundreds of documents for the projects which were examined; yet Pegasus-Global discovered that the documents were not uniformly produced or organized across the departments or projects. This made identifying and locating documents difficult since there was no uniform basis of document description or retention. For example, Pegasus-Global asked for representative "Progress Reports" from each of the projects to be examined. In response to that request Pegasus-Global received a variety of different documents ranging from schedules that had been hand marked to show progress, to formal meeting minutes, to actual monthly progress reports prepared by contractors.

***Recommendation 21***

We recommend that the Manager of Capital Projects in consultation with the departments responsible for administering the City's capital projects update the project management manual by deleting outdated procedures, while at the same time identifying gaps or internal inconsistencies in procedures which should be filled or corrected. (See *Review of Capital Project Procedures and Practices against PMBOK®* sections for specific recommendation # 23 on changes to the content of the manual.)

The Manager of Capital Projects should ensure that the body of capital project procedures is codified to enable the production of a comprehensive index of those procedures for easy identification and access.

The Manager of Capital Projects should develop and maintain a "Procedure Control" system which will enable him to periodically conduct reviews, updates and re-alignment of procedures as needed and necessary.

The Manager of Capital Projects should establish document control and retention procedures for capital projects.

***Management Response***

*The Public Service concurs with this recommendation. The project management manual and procedures will be developed to provide the necessary processes for project management from start to finish. These procedures will be developed as quickly as available resources allow. The Public*

*Service plans to develop and implement them in stages, throughout 2009 and 2010.*

## Capital Project Managers

This section of the report deals with summary observations made by Pegasus-Global pertaining to the performance of the project managers for the seven projects reviewed.

***The projects were managed in compliance with the policies and directives governing capital projects established by the City.***

Pegasus-Global found that the projects as a whole were managed in compliance with the policies and directives governing capital projects established by the City. An unfortunate effect of that strict adherence was that in many cases where gaps existed in the City's project management procedures (such as quality management), those same gaps, in general, were also found in the project management practices.

***Project managers had developed practices that addressed many of the gaps that exist in the City's project management procedures.***

In general, Pegasus-Global found that the project management teams, in many instances, had developed practices which addressed the majority of the gaps that exist in the City's project management procedures. However, as might be expected, the practices developed tended to be project specific and therefore were not uniformly practiced in the seven projects reviewed. For example, while all project managers addressed progress reporting, each of the project managers had a different method of progress reporting in place, from weekly meetings with minutes to formal progress reports. This lack of uniformity should be addressed with the development of set of standard procedures at the corporate and/or department levels.

***The City's experienced project managers who will be eligible to retire in the near future should be used as a resource to fill the gaps in project management procedures.***

Pegasus-Global found, without exception, that the current cadre of Project Managers available within the departments represent an experienced and valuable resource who, as a group, are approaching the point in their careers where retirement from City service is a viable alternative. Pegasus-Global found that the group had extensive knowledge of the City's policies, directives and procedures and, perhaps just as importantly, extensive experience in planning and managing capital construction projects.

Since the current project management structure is heavily dependent upon the experience, knowledge, skills and abilities of those individual project managers, the City faces the possibility of a serious shortage of qualified project management personnel in the not-too-distant future.

Compounding the problem of project managers approaching possible retirement, Pegasus-Global found that individual project managers were seldom assigned to a single project. Rather, the general rule was that every project manager was responsible for multiple projects simultaneously. While it is possible for a single project manager to execute multiple projects assuming that those projects are relatively small and of like scope, cost and complexity, it is not normal for a single project manager to be responsible for the execution of multiple projects which are relatively large, and dissimilar in scope, cost, and complexity.

***Recommendation 22***

We recommend senior management move quickly to tap the knowledge and experience of the current project managers to assist in filling the gaps in project management procedures and practices identified in this audit and to build a

comprehensive project management control framework which can be followed by their successors.

The Manager of Capital Projects should provide guidance on monitoring the workload capacity of project managers assigned to the more complex and larger scale construction projects to ensure that the scope of responsibilities is reasonable.

***Management Response***

*The Public Service concurs with this recommendation. Departments and experienced project management staff will be involved in the development of the project management procedures to take advantage of their experience and document procedures that are currently being followed. This will be done in conjunction with recommendation 21, as quickly as staff schedules and resources permit.*

*The Public Service concurs with this recommendation. Guidance on this already exists, major capital projects need to have a dedicated project manager. This has been and will continue to be an issue as departments are challenged to adequately resource ongoing projects. In consultation with departments and when appropriate, the Manager of Capital Projects will make recommendations regarding the adequacy of project management resourcing.*

## Review of Capital Project procedures and practices against PMBOK®

This section of the report deals with Pegasus-Global's review of the City's Capital Project procedures, processes and practices against PMBOK® which represents "good professional practice" within the capital construction industry at large. Observations and recommendations were developed from the review of the City's capital project management procedures and from a review of the seven projects included in this audit.

### *A. Project Scope Management*

***The City has no requirements and little guidance concerning scope planning, scope definition, work breakdown structure (relative to scope definition), and scope verification functions.***

Pegasus-Global found no requirements and little guidance concerning the scope planning, scope definition, work breakdown structure (relative to scope definition), and scope verification functions identified by PMBOK® as good management practices.

The General Conditions of Contract did not have a specific definition of "scope of work" but did define "work" as follows: "… *means the carrying out and the doing of all things, whether of a temporary or permanent nature, that are done by the Contractor pursuant to the Contract and, without limiting the generality of the foregoing, includes the furnishing of all plant, material, labour and services necessary for or incidental to the fulfillment of the requirements of the Contact, including all Changes in Work which may be ordered as herein provided.*" That definition of work is extremely broad and open to a significant level of interpretation by the parties to the contract.

The General Conditions of Contract and the *Draft Manual of Project Administration Practice* each contain sections on scope control. Each of those two sources addressed the main elements of scope control during execution; however, the process described was not the same. This can be attributed to the *Draft Manual of Project Administration Practice* predating the current General Conditions of Contract by approximately 15 years (1992 to 2007). The requirements for scope control (i.e. change management) were fairly comprehensive, but unaligned and inconsistent. Once the elements of the process are aligned, the scope control process would be brought into conformance with current industry practice.

Pegasus-Global found only one document which addressed management of a project scope of work, *Administrative Directive FM-004*, which recognized the need to: "… manage project scope in relation to the capital budget and potential opportunities regarding project timing …" Beyond that statement, FM-004 contains only one additional discussion or direction relative to project scope management: "*Change orders have always been an issue with respect to project management. Significant changes from original design can lead to cost overruns. Budgets should include appropriate estimates for contingencies*". "*Including an appropriate estimate for contingencies…*" is certainly one response to scope change; however, it is not a *process* whereby the project management team *controls* scope change on the project.

***Except for scope verification, scope was generally well managed in the projects reviewed.***

Pegasus-Global found that the scope management and control practices for the projects reviewed generally complied with the PMBOK® standards. The only scope

management process that was not always adequately performed was the scope verification process. Some projects lacked documented certification of total completion or a formal process of turnover and acceptance.

***Recommendation 23 (a)***
We recommend that the Manager of Capital Projects should oversee the revisions to the *Draft Manual of Project Administration Practice* to establish procedures pertaining to:

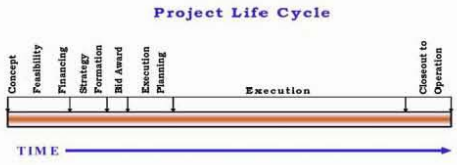
project scope planning, scope definition, work breakdown structure (relative to scope definition), scope verification and scope control. These procedures should be aligned with the administrative directives governing capital projects and with bid opportunity documents and contracts.

***Management Response***
*The Public Service concurs with this recommendation. See comments on recommendations 9, 17, 21 and 22.*

## B. Project Schedule (Time) Management

### *The City has a longer concept, feasibility and financing stage in its construction project life cycle.*

Capital construction projects have a specific life cycle which is graphically depicted below:




The stages represented above are typical across the capital construction industry and, generally, Pegasus-Global found that the project life cycle within the City follows that same pattern. However, the City's project life cycle reflects a longer Concept, Feasibility (including design) and Financing stage due to the requirements of the City relative to capital planning and budget authorization timing.

### *Project schedule management procedures require updating.*

Pegasus-Global found essentially no guidance governing time (schedule) management at the corporate level. FM-004 linked schedule management to project scope: *"managing project scope in relation to the capital budget and the potential opportunities regarding project timing"*. FM-004 also listed certain processes for "consideration", including: "*Commencement and completion dates should be well controlled by penalty provisions through the liquidated damages sections in contracts. However, if contractors know they cannot complete on time, their bid price often reflects the amounts relating to liquidated damages.*" While the inclusion of schedule based liquidated damages is a response to the failure to maintain schedule, it is not a management process intended to proactively plan, manage and control the project schedule during execution.

The *Draft Manual of Project Administration Practice* contained a set of procedures relative to schedule control; however those procedures cited General Conditions of Contract that are no longer in existence and are based on an outdated set of practices and tools. *Appendix B* of the *Draft Manual of Project Administration Practice* contains a summary of the process steps to be taken to develop and implement a critical path method schedule. Between *Section 7.4* and *Appendix B*, the *Draft Manual of Project Administration Practice* essentially addresses each of the schedule management processes identified within the PMBOK®. Since 1992, however, there have been significant advancements in critical

path method scheduling tools and processes which are not reflected in the *Draft Manual of Project Administration Practice*.

In the *Draft Manual of Project Administration Practice*, authority to manage, direct and control the project schedule was not delegated to the Contract Administrator which is the case in the current General Conditions of Contract. This observation is further discussed in *Section H. Project Procurement Management*.

Because the schedule control procedures that do exist in the *Draft Project Administration Manual* do address the PMBOK® schedule processes, even if outdated, Pegasus-Global concluded that by updating those procedures, the schedule control processes could be brought into conformance with current industry practice.

### *Time management practices exceed requirements and, in general, were adequate.*

Pegasus-Global found that the majority of projects reviewed during this audit required a detailed critical path method schedule with weekly based Gantt charts. The requirements contained in the Supplemental Conditions along with schedule documents prepared by the contractors during execution of the projects led Pegasus-Global to find that the schedule practices of the projects met the standards put forth in the PMBOK®.

The fact that some projects took longer than originally planned does not mean that the project failed to follow good schedule management procedures and processes. Because there is no formal, uniform periodic progress reporting procedure or process in place it is difficult to identify or track the events which would have been responsible for the extended periods of construction. The lack of a formal, uniform, periodic progress reporting procedure and process is a significant gap in the management of projects by the City and addressed in *Section F. Project Communications Management*.

***Recommendation 23 (b)***
We recommend that the Manager of Capital Projects should oversee the revisions to the *Draft Manual of Project Administration Practice* to establish procedures pertaining to:

project schedule management and control processes. The existing procedures should be updated to reflect contemporary scheduling methodology. These procedures should be aligned with corporate project schedule management and control procedures and procurement documents.

***Management Response***
*The Public Service concurs with this recommendation. See comments on recommendations 9, 17, 21 and 22.*

## *C. Project Cost Management*

### *Procedures for project cost estimating need to be established.*

The City focused more attention on cost management and control than any of the other eight project management processes under review by Pegasus-Global. Administrative directives which focus on capital budget planning, budget authorization, delegations of approval authority (by project dollar value) bidding (materials management), budgeting, contracting, financial reporting, and auditing are in place. Pegasus-Global reviewed the administrative directives and found that they did provide some direction to project managers.

With respect to the PMBOK® cost management and control processes of cost estimating, cost budgeting and cost control

Pegasus-Global found that there were procedures in place for project cost budgeting and project cost control. The *Draft Manual of Project Administration Practice* needs to be brought up to date with the cost budgeting and control requirements in place. However, project cost estimating appeared to be an area of project cost management that was only superficially addressed.

Beyond the issue of estimating project costs six years in advance of authorization and without having set a comprehensive scope definition, there is the issue of developing of a project cost estimate and the procedures which should guide that process. Pegasus-Global did not identify any policy or directive which established any standard basis for the preparation of project estimates.

Standard progress reports are to be prepared on a quarterly basis. The quarterly reporting requirement only applies to major capital projects ($10 million or more). Pegasus-Global is concerned that capital construction is a dynamic environment within which innumerable factors can impact a project's cost within a very short period of time. Once a cost impact event or situation has occurred the owner is placed in a reactive environment, which generally requires the owner to act quickly and decisively in order to mitigate the cost impact as quickly as possible. The quarterly reporting requirement places the City at a disadvantage relative to moving to take quick, considered and decisive cost impact actions in response to those dynamic events and situations. Relative to both time management and cost management, the time from event to decisive reaction is a critical factor in the ability to mitigate to the greatest extent possible the impact to project cost and schedule.

Pegasus-Global found that the cost budgeting and control processes were comprehensive and internally consistent, with the exception that the *Draft Manual of Project Administration Practice* is not aligned with current administrative directives. Except for the lack of standards for the preparation, management or control of project cost estimates, Pegasus-Global concluded that the cost management controls were uniform, transparent and had an identified point of accountability.

***The project budget estimates in place at the time of budget authorization by City Council did not come up to the definition of a Class 3 estimate.***

Because there were no standard estimating procedures applicable across the City departments, Pegasus-Global found that for most projects a number of estimates may have been prepared prior to the actual initiation date of the project by a department. Pegasus-Global encountered situations which involved multiple budget actions by City Council as a result of the extended budgeting process in place for the City.

Pegasus-Global attempted to work backward from the estimates in place for a project at the point of City Council authorization to ascertain if the estimate in place at the time of authorization met the definition of a Class 3 estimate. In general, Pegasus-Global found that the estimates in place at the time of authorization by City Council did not come up to the definition of a Class 3 estimate, primarily because the requisite level of design and engineering had not been completed at the time of that authorization action by City Council. The less complete the project definition at the time an estimate is prepared the greater the "accuracy range" of the estimate prepared. It is critical to note that estimates are never expected to be 100% accurate simply because no one can predict the future with 100% accuracy. A single event, such as a labour action, can have an immediate negative impact on the accuracy of the estimate.

Organizations such as the AACEi routinely publish and update recommended practices

for cost management and control, covering technical issues such as estimating guidelines and processes and management issues such as data collection and reporting practices. Pegasus-Global used the AACEi classification system during its examination of the estimates during this audit; however, there are several well known and accepted classification systems in existence which could be used as the foundation for a uniform estimating procedure and process by the City. All of those systems are essentially based on the same parameters relative to the level of project definition in place at the time the estimate is prepared and all follow generally the same process steps by which an estimate should be prepared. Regardless of whether the City prepares its own estimates internally or contracts that function to a third party (i.e. the design consultant), the procedure and process has to be uniformly applied across all City departments and for all projects. Pegasus-Global suggests that the Manager of Capital Projects, with the assistance of departments, develop and/or adopt a standard estimating procedure, including an formal estimate classification system that can be applied against the estimates prepared. In this way, City Council and Senior Management can understand the "accuracy range" of the estimates being used in reaching project critical decisions and authorizations. A sound, uniform cost estimate is simply the starting point for an effective and efficient cost management and control system.

***Recommendation 23 (c)***
We recommend that the Manager of Capital Projects should oversee the revisions to the *Draft Manual of Project Administration Practice* to provide guidance pertaining to:

project estimates by both the departments and its contractors and consultants. This guidance should be based on current industry standards for the preparation of capital construction estimates and be consistent with administrative directives governing cost management and control.

***Management Response***
*The Public Service concurs with this recommendation. See comments on recommendations 9, 17, 21 and 22.*

## *D. Project Quality Management*

### *The City lacks guidance and procedures for project quality management.*

As reflected within the PMBOK®, the international capital construction industry at large identifies quality as one of the four primary goals set by an owner. Pegasus-Global found almost no mention of quality management and control among the two key administrative directives and the *Draft Manual of Project Administration Practice.* The only oblique reference to quality found was in FM-004 as follows: "*The purpose of the directive is to describe processes that must be considered when planning, delivering and executing a capital project on behalf of the City to ensure that they are completed… with sufficient due diligence …*".

The *Draft Manual of Project Administration Practice* notes that the owner and the consultant have the responsibility to "*Encourage Quality*". Pegasus-Global disagrees with this limited direction; the owner has paid for a specific facility designed and constructed to a specific set of specifications in order to fulfill a specific need or function, which taken together represent the quality that the owner has paid both the consultant and the contractor to meet.

The General Conditions of Contract do not directly address quality control or assurance procedures. The General Conditions of Contract simply state under Provision *C13*, Warranty: "*The Contractor warrants that the Work will be free of any and all defects or deficiencies during the warranty period*". While the above provision sets the warranty

requirements for the contractor, it does not establish any quality control or quality assurance procedures which are to be implemented on a capital construction project. Quality control and quality assurance are activities undertaken to ensure that the owner is receiving the quality which the owner has paid for under the contracts with the designer(s), vendor(s), supplier(s) and constructor(s). A warranty on the other hand is not intended to proactively ensure quality is designed, manufactured and built into the project; a warranty is only good insofar as it provides a vehicle by which, and duration over which, defects discovered in the structure or facility can be corrected by the builder/designer.

Pegasus-Global has concluded that the absence of guidance relating to quality management and control represents a significant gap in the project management control framework. Because this gap in the control framework involves one of the four primary owner project objectives Pegasus-Global considers this to be a major gap in the City's project management control framework.

### *The projects reviewed lacked formal quality management practices.*

Pegasus-Global was surprised to find that there was virtually no mention of quality at any level of the City's capital project organization. During several of their interviews, individuals would respond to questions about quality by reverting to the standard warranty clauses of the contract templates.

Pegasus-Global found that the projects lacked quality management plans and reports. As a result, quality management was not performed and documented and reported consistently in the projects reviewed. Some quality procedures were included in the Contractor Administrator's contracts reviewed and some procedures were performed by project managers. In some cases quality practices were limited to the use of standard warranty clauses in the contracts.

Quality management and control is not synonymous with warranties. A warranty is an after the fact guarantee of a structure or facility being fit for its designed purpose. In effect, it is a type of insurance policy taken out by the owner through the designer/contractor under which identified flaws in the facility or structure can be corrected at no additional cost to the owner.

Quality management and control, however, is a preventative program by which the owner, designer and contractor work to ensure to the maximum extent possible that a warranty is never invoked or applied to a finished project. The industry recognizes two elements of any quality management and control program:

- ***Quality Control*** – the actions which the owner, designer and contractor take in "real time" which are intended to maintain the desired quality over the "work" as it is in process. The quality control program covers every aspect of the scope of work from development of design documents, through final testing and start-up of the facility or structure and generally involves a formal program of reviews, inspections and immediate corrective actions during the actual execution of each element of the total scope of work.

- ***Quality Assurance*** – a program by which the owner, designer and contractor plan, execute and formally document the quality of the elements of work which have gone into the execution of the project.

Quality management and control programs are founded on one axiom: it is ultimately less costly to find and correct defects at the point of action than it is after the project is completed and the structure or facility is in operation.

The City needs to establish a formal quality management and control program. Formal quality management and control is a preventative program by which the owner, designer and contractor work to ensure to the maximum extent possible that a warranty is never invoked or applied to a finished project and the structure or facility is built right the first time.

***Recommendation 23 (d)***
We recommend that the Manager of Capital Projects should oversee the revisions to the *Draft Manual of Project Administration Practice* to establish procedures pertaining to:

quality control and quality assurance.

***Management Response***
*The Public Service concurs with this recommendation. See comments on recommendations 9, 17, 21 and 22.*

## *E. Project Human Resources Management*

### *The City lacks procedures for project human resources management.*

Pegasus-Global expected to find some detailed project staffing procedures in place that would provide guidance on to how to identify critical project staff positions or which outlined the process or procedure to be followed in order to ascertain the minimally acceptable level of staffing for a capital construction project. The procedure should address how each position is to be staffed, by whom, and with what authorities. Pegasus-Global was unable to find any such management and control staff procedures at the City. The default position appeared to be that all project management and control functions were the responsibility of the Project Manager; however, there was little guidance as to how that Project Manager was to organize, staff and execute those project management and control functions.

The functions and processes required to successfully execute a project from initial planning to final completion delineated within PMBOK® remain whether or not personnel are available to discharge those functions and processes. If they are not staffed by the City then either the functions and processes must be left undone or those functions and processes must be allocated to resources which are outside of the City's direct control. Pegasus-Global found that both conditions exist at the corporate and department levels: through the allocation of "*authority to act on behalf of the City*" relative to some vital functions being contracted to Contract Administrators (i.e. scope control change management) and by simply failing to address other functions (i.e. quality control and quality assurance).

Because the staffing of capital projects appeared to be almost a "by default" decision based on staff available rather than on the basis of staff functions required, the departments have to make staffing plans and project assignment decisions that do not appear uniform or transparent. However, in every interview conducted, the department directors and senior department staff took full and complete responsibility for the staffing decisions made relative to specific projects; therefore, every staffing decision could be traced to a single point of accountability.

The Manager of Capital Projects should establish "blank box" positions, with complete descriptions of functional responsibilities. Department directors and project managers can determine which of those functional boxes should be filled internally and which could be contracted to a third party. In instances where a functional position is to be contracted, the procedure should clearly specify the limits of authority, responsibility and expected actions the contracting party is to follow. The contracting party should have identified a single point of contact within the department

for purposes of direction, decisions and communications.

Pegasus-Global has addressed the current practice of a third party Contract Administrator in *Section H. Project Procurement Management* later in this report and notes that should the City decide to continue the current practice of contracting with a single Contract Administrator it should require that the Contract Administrator have in place a comprehensive functional staffing plan to ensure that every primary functional management and control position is filled with an adequately trained and experienced individual.

***All projects reviewed lacked a documented human resource plan although, in some cases, it appeared that significant planning had gone into project staffing.***

Pegasus-Global found no detailed staffing plan for the projects reviewed. During interviews, it appeared that the availability of staff resources at the time of the project was a primary consideration relative to total project staffing rather than a result of any detailed examination of the specific needs of the project. The interviews revealed that no mandated procedural requirements or processes (i.e. quarterly reporting for major projects) were "abandoned" due to a lack of staff. At the same time, certain management and control functions which the project management team believed should have been more closely managed and controlled than required by corporate and department level procedures (i.e. progress and schedule monitoring and reporting) were not expanded due to limited staff resources. In summary, the staff assignments were made in response to the need to meet the requirements of the corporate and department level procedures rather than in conformance with a formal staffing plan set for the project.

Through interviews, Pegasus-Global found that capital project team members were fully knowledgeable as to the responsibilities of their respective positions, with clear lines of responsibility and authority provided by the Project Manager.

***Recommendation 23 (e)***
We recommend that the Manager of Capital Projects should oversee the revisions to the *Draft Manual of Project Administration Practice* to establish procedures pertaining to:

project management staffing from a function and process perspective.

***Management Response***
*The Public Service concurs with this recommendation. See comments on recommendations 9, 17, 21 and 22.*

## *F. Project Communications Management*

***Required reporting is too infrequent for capital projects.***

Pegasus-Global was concerned that the formal reporting requirement is centered on the cost and financial reports for major projects only (+$10 million) and is based on a quarterly reporting cycle.

There is no requirement for reporting progress on projects under $10 million in total value. Pegasus-Global notes that it is unusual for an owner to set a "lower limit" under which it does not require some type of routine, periodic performance and progress reporting on capital construction projects.

***The existing requirements for performance reporting lacked specific detail.***

Pegasus-Global found that the lack of standard periodic progress and performance reporting at the project level

was contrary to standard industry practice. While the executing departments were doing exactly what they were required to do by the City, as a practical matter, what those departments were doing was inadequate, in Pegasus-Global's opinion, when measured against the processes as practiced throughout the industry.

Pegasus-Global found that the requirements for performance reporting lacked sufficient detail. The General Conditions of Contract contain only one passing reference to what might be considered performance reporting at Provision *C 12*:

*"The amounts paid by the City to the Contractor shall be the sums certified by the Contract Administrator in the interim and final progress estimates. (C12.1)*

*...*

*By the fourteenth (14) Calendar Day after the end of each month, or as soon thereafter as possible, the Contract Administrator shall, subject to having received all necessary information from the Contractor by the seventh (7) Calendar Day after the end of the month, prepare a progress estimate setting out the quantity and value of the Work performed during the preceding month. (C12.7)"*

Beyond the two citations above, the General Conditions of Contract are silent on progress measurement or reporting requirements during construction of a capital project.

The majority of responsibility for communications management (including reporting) has been delegated to the Contract Administrator.

*Section 7.7.1* of the *Draft Manual of Project Administration Practice* specifically addressed "Project Reports", and identified four categories of reports: "*cost control, quality determinants, progress reports, and level of effort reports*." Overall, Pegasus-Global found *Section 7.7.1*, while somewhat dated, would provide a sound point from which to expand and update this functional element of a Communications Management Procedure governing all project communications.

***The review of projects revealed that performance reporting on projects needs improvement.***

As might be expected, because of the lack of any uniform project progress or performance reporting procedure, those reporting requirements which were developed and implemented at the department level varied greatly: from no formal progress and performance reporting at all to very specific monthly progress and performance reporting requirements.

Pegasus-Global acknowledges that every project reviewed during the program audit held weekly or bi-weekly job progress meetings with the design consultant and the contractor(s) as a means of determining the current progress of the project. However, in Pegasus-Global's opinion, such meetings do not meet the need for information required by an owner attempting to meet its project goals and objectives.

As a general rule, Pegasus-Global has found that formal reports require a much more accurate and precise presentation of actual progress for the period and to date than a meeting where the presentation of progress tends to be more global in nature. It is easier to avoid discussions of possible problems and patterns and trends in a meeting than it is in a formal, written document. While minutes were kept of those progress meetings, Pegasus-Global found that, as a general rule, those minutes lacked the depth of detail which would be expected in a formal written monthly progress report.

Periodic progress reports provide a detailed history of project execution from day one to completion, which is critical to an effective "lessons learned" program and in the event

that claims or disputes arise among parties to the project.

Formal written progress reports can be verified and vetted more easily and precisely than oral representations of progress or performance. By "walking the job" with the formal report in hand an owner can tell almost immediately if the progress and performance claimed by a consultant or contractor is as represented in the report.

Periodic progress and performance evaluation and reporting are crucial elements of project management and control. Without accurate, timely and complete information on the condition of a project, the owner forfeits the ability to make timely and informed decisions which might have serious ramifications on the ultimate project scope, cost, schedule and quality.

In the absence of comprehensive periodic progress and performance reporting the automatic default is to "management by surprise"; the owner is placed in the position of reacting to surprise revelations of cost overruns, schedule delays, scope increases and/or quality defects at a point when avoidance and mitigation opportunities and alternatives are no longer options available to the owner.

Further, Pegasus-Global sees this gap in management and control of the City's capital projects as significant and that improvement to performance reporting should be given a high priority.

### *Project managers reduced or eliminated the need to produce required progress reports during the execution of a project.*

Pegasus-Global was informed on a couple of occasions during interviews that a project had started with stronger requirements for periodic progress and performance reports only to drop those requirements shortly after initiating the project. The reasons given for dropping those requirements were varied, but the general theme was that the preparation of the reports simply took too much time and cost too much money.

Pegasus-Global response to this finding is two-fold:

- If those periodic performance and progress report requirements were included in and known to the design consultants and contractors at the time of bid then they should have been priced by the design consultant and contractor, and adequate resources planned to complete that obligation. If the design consultant or contractor did not include that in their price and plan then that was their mistake, not the City's. If the design consultant or contractor did include the cost and time to complete those reports, then the City paid for a deliverable that it did not receive from the design consultant or contractor.

- The cost of failing to identify patterns and trends in scope, cost, schedule and/or quality in a timely manner is often much more than the cost to prepare and utilize a periodic progress and performance report.

The City cannot be sure that it has taken every possible action available to it in its efforts to maximize value-for-money on a given project without some form of formal periodic progress and performance report. Further, Pegasus-Global doubts that the City can sustain any meaningful lessons learned program if it cannot avail itself of the historical information relative to patterns and trends which is lost without a formal periodic progress and performance reporting requirement.

***Recommendation 23 (f)***
We recommend that the Manager of Capital Projects should oversee the revisions to the *Draft Manual of Project Administration*

*Practice* to establish procedures pertaining to:

project communications that reflect currently accepted capital construction industry standards for progress reporting. The *Administrative Directive FM-004* and project manual should be amended to include a section dealing with the responsibilities of the project manager to ensure that the Contract Administrator/Construction Manager provides the required periodic project progress and performance reports.

***Management Response***
*The Public Service concurs with this recommendation. See comments on recommendations 9, 17, 21 and 22.*

## G. Project Risk Management

### *The City lacks project risk management processes and procedures.*

Risk management has become one of the primary project management functions within the capital construction industry world wide. The importance of risk management is acknowledged in *Administrative Directive FM-004*. One section of the directive is devoted to risk management, noting that "*risk management practices must be used throughout the project from beginning to end*." FM-004 also mandated that:

*"All major capital projects require a formal risk management plan completed by internal staff or external consultants that will highlight potential risks. The contract administrator or project manager should review, consider and address these risks during the course of the project.*

*The risk analysis represents a dynamic process that should be reviewed regularly throughout the project to identify and address new risks that might arise."*

Pegasus-Global fully agrees with *Administrative Directive FM-004*. Risk management programs are a critical tool for any owner attempting to maximize the probability to achieve the objectives set for each capital project. However, Pegasus-Global found no other documents which provided guidance on how to address risk management from a procedural perspective. Therefore the lack of specific processes and procedures means that there are no uniform, transparent or single point accountability requirements for project risk management.

### *Only two projects included in the audit implemented a formal project risk management process.*

The Water Treatment Plant Project and the Kenaston Underpass Project were the only two projects that implemented a formal project risk management process.

Pegasus-Global found that for the Water Treatment Plant Project a formal risk management program was conducted by the Construction Management Consultant that employed the normal processes of risk identification, quantification, qualification and response planning. In addition, the project formed a Risk Committee which met monthly to track, monitor and update the project risk profile during execution of the project. The project team indicated that every significant risk (high probable impact to project objectives) was allocated to an "owner" that held the primary responsibility to both monitor the risk and develop specific response or treatment options in the event that the risk element manifest itself during the project.

The Kenaston Underpass Project instituted a formal risk management program with the assistance of the Audit Department for the Project. Risk elements to the successful completion of the project were identified by

the stakeholders, quantified as to potential impact, and avoidance and mitigation plans were developed. Further, the Public Works project management team, in conjunction with the Contract Administrators, monitored the identified risk elements on a monthly basis, initiating avoidance and/or mitigation plans as necessary.

The Kenaston project manager cited risk management as beneficial in planning and coordinating work and helping to avoid problems and minimize the impact of issues. The value of the project risk management should be formalized into a "lesson learned" for distribution among departments and used as a basis from which a standard procedure for addressing capital project risk management could be developed.

***Recommendation 23 (g)***
We recommend that the Manager of Capital Projects should oversee the revisions to the *Draft Manual of Project Administration Practice* to establish procedures pertaining to:

capital project risk management for departments and project managers.

***Management Response***
*The Public Service concurs with this recommendation. See comments on recommendations 9, 17, 21 and 22.*

## *H. Project Procurement Management*

### *Bid and Contract documents serve to limit project delivery to Design-Bid – Build (DBB).*

Six of seven projects reviewed were executed following a DBB delivery methodology. This DBB project delivery methodology was followed on the full range of projects, from the largest to the smallest and from process facilities to road resurfacing. One project (Chief Peguis Trail) is being considered for a P3 project delivery methodology.

The DBB project delivery methodology has been used for decades by public entities internationally. The DBB project delivery system is based on a generally linear progression through the capital construction project by separate parties:

- The public entity identifies the need for a specific project, establishes the preliminary project definition and technical specification from which a bid package for design services is developed.
- Design consultants bid on the services, with the public entity selecting a design consultant to undertake and complete the design.
- Once the design is complete and approved, the design consultant typically prepares, and the public entity issues, a construction bid package consisting of the design, specification, contract terms, etc. to solicit bids from contractors for the construction scope of work.
- The public entity selects and contracts with a contractor for construction services.
- The construction of the project is executed under the direction of a either the owner or a third party construction manager or contract administrator named by the public entity.

One of the primary considerations in employing a DBB delivery methodology is that the owner (in this case the City) intends to maintain maximum direct involvement and control during the execution of the project at all stages of the project life cycle.

Taken together, FM-002 and the current Contract General Conditions align with the DBB project delivery system, and while those procedures and contract provisions do not actually prohibit the use of any other project delivery system, it appears that the

use of any non-DBB delivery system would constitute an "exception condition" to both the standard Contract conditions and FM-002 Materials Management Procedure.

The structure of the Materials Management procedures may have had an unintended consequence in that they are structurally best suited for a DBB project delivery system, assuming that the design engineer (consultant) and the construction contractor will be separate entities.

Pegasus-Global also found that directives governing procurement created a significant barrier to the use of project delivery methodologies other than the traditional DBB delivery methodology.

Pegasus-Global found that six of the seven projects had utilized the Contract General Conditions for both construction and design consulting services exactly as promulgated by Materials Management. The seventh, the Chief Peguis Trail, was being contemplated as a P3 project and no decisions had been made as to the contract structure as of the date of this audit.

**The City is not taking full advantage of the full range of project delivery methodologies.**

Pegasus-Global found that the City was under no restrictions from either the Province or its own City policies to prevent the use of any of the project delivery methodologies which are currently in use within the industry at large.

Pegasus-Global found it encouraging that the City is attempting to design and install a P3 project delivery methodology, one of the more recent forms of delivery in public capital projects. The City, for the most part, appears not to have pursued the use of other alternative project delivery methodologies which have been in place for many years.

Within the industry at large, including Canada, it is generally accepted that one important element in managing capital project risk is in matching the scope, cost, schedule and quality objectives of a project to the project delivery system which provides the best management and control fit to City and department objectives

Pegasus-Global believes that the City is not taking full advantage of the full range of project delivery methodologies available to it under its Charter from the Province and, to the extent possible, the City should consider expanding the use of alternative project delivery methodologies such as Design Build, Construction Manager at Risk, and P3. (See Appendix 6 for more information on Capital Project Delivery Methodologies.)

The CFO and the Manager of Capital Projects should continue to carefully examine the full spectrum of risks inherent in using a P3 project delivery methodology and develop a project delivery methodology for P3's that identifies and allocates risks to the party in the best position to manage the risk. Initially, the tendency globally was for the P3 methodology to be thought of as a methodology which relieved the owner of practically all risk inherent in the project while at the same time securing private financing of the project without incurring any public debt. In a number of projects in which Pegasus-Global has been involved, neither assumption has proven true.

***Recommendation 24***

We recommend that the Manager of Capital Projects should examine project delivery methodologies in practice by public sector entities around the world to ascertain which of those methodologies might be beneficially adopted by the City for its particular project composition and inventory.

The CFO and the Manager of Capital Projects should amend *Administrative Directive FM-004* to include guidance on the selection of a project delivery methodology which will be a fit with the project conditions,

goals and objectives. The Manager of Capital Projects needs to establish clear criteria for the selection of a capital project delivery system that is best suited for a particular project.

The current procurement procedures promulgated by Materials Management and the contract templates used for capital projects would need to be expanded and/or modified to support the particular systems and methodologies adopted. Contract templates for Design Build and other project delivery methodologies need to be developed to support the choice of appropriate project delivery methods.

***Management Response***
*The Public Service concurs with this recommendation. Since joining the Public Service, the Manager of Capital Projects has made identification of best practices in this area a priority; he will continue to examine project delivery methods with a view to working with departments to develop appropriate contracting strategies relating to specific projects.*

*Corporate Finance does agree that FM-004 needs to be amended; however, guidance on the selection of project methodologies suited to particular projects will be provided by criteria to be included in the new project procedures being developed, pursuant to recommendations 21, 22, and 23.*

*All the templates will be reviewed and modified for use with capital projects. Also, consideration will be given to industry-specific model forms or contracts rather than the City templates, where their use is beneficial to the project.*

### *The role and responsibilities of the Contract Administrator should be reviewed.*

The primary structure of the DBB currently in general use in the City today appears to have been based on the 1987 International Federation of Consulting Engineers (FIDIC) "Red Book". The FIDIC Red Book was predicated on a construction delivery scheme originally utilized in the United Kingdom under which separate contracts were issued for engineering/design and construction. Under the Red Book the engineering contractor often served as an agent of the Owner as a "contract administrator" overseeing the work of the construction contractor.

The DBB methodology is often believed to be a "predictable" system under which each of the parties (designer and contractor) is placed in a position of "contractual equilibrium" to one-another. If the duty and responsibility to "administer" the contractor's contract is given to the design entity it endangers that perceived predictability by negating the contractual equilibrium between the parties. This result is due to the fact that the "checks and balances" between the designer and the construction contractor the owner seeks by using a DBB delivery methodology is compromised by then naming the designer as the "contract administrator" with the authority to oversee the work of the construction contractor. This situation creates the potential for the design consultant and contractor to use one-another as the "root cause" for a particular issue or problem. For example: a design consultant may claim that a particular system or element of project is "faulty' (or late or over budget) because of the actions (or inaction) of the contractor; while at the same time the contractor may claim that the root cause for the same issue or problem is a result of "faulty design" by the design consultant. Resolving such claims can be both time consuming and costly.

Five of the seven projects had been executed with a Contact Administrator that had been supplied by the design consultant. One project (Chief Peguis Trail) is being considered for P3 project delivery methodology and therefore no final decisions had been made relative to the project organizational structure as of the date of this audit. One project (Water

Treatment Plant) was identified by the project team as having utilized a Construction Manager that was also a Contract Administrator.

Pegasus-Global found through interviews with department directors, managers, project managers and staff that the City's level of direct involvement in the execution of capital projects has been reduced over the past eight to ten years to the point where there is little City staff involvement in project execution beyond an administrative level, particularly after the completion of the design phase.

The City has relied on its agent - titled the "Contract Administrator" - to manage and control the project during construction, including managing and controlling the interface between the design consultant and the contractor. It was apparent during the individual project reviews and interviews that the common practice was to name an engineer/designer from the same firm as the Contract Administrator.

Given that the City routinely assigns the Design Consultant as the Contract Administrator, an employee of the Design Consultant, acting as the City's Contract Administrator, has the authority to modify, change, correct or delete design drawings or specifications at any time, even if those changes, modifications or additions are done in order to correct errors or omissions which may have been made by the Contract Administrator's own employer, the Design Consultant.

The potential for such a situation is one reason why FIDIC abandoned this element of its 1987 Red Book in favour of more "modern" project delivery systems which provide greater flexibility of choice to the owner when attempting to match a project's goals, objectives and scope to an effective and efficient management and execution delivery system and has eliminated the role of the engineer as the designated "contract administrator" over the construction contractor.

***Recommendation 25***
We recommend that the CFO in consultation with the Directors of Water & Waste, Public Works, PP&D and the City Solicitor should examine the City's current agency practices insofar as the selection of a Contract Administrator. There are alternatives to the City's current practice which may reduce the City's risk of claims and disputes while improving the overall management and control of project planning and execution.

***Management Response***
*As recommended by the City Auditor, the CFO, in consultation with the Directors of Water and Waste, Public Works and PP&D, and the City Solicitor, will examine the City's current agency practices with respect to the selection of a Contract Administrator, and will develop guidelines to determine when alternatives to the City's current practices would be appropriate.*

### *The City should review what project management and control processes should be allocated to third parties.*

Sound project management is based in large part on controlling the execution of a project through its various phases and activities. Control is exercised in a number of different ways and to different degrees by each of the parties involved in the execution of a project. It is always the owner's choice as to how much of that control to retain versus how much of that control to allocate to others.

There is no standard formula or process an owner can follow in making decisions as to where control of the project is to reside; it is essentially a matter of how much direct involvement the owner intends to exercise over the planning and execution of a project.

However, in return for allocating control of the management function to another party to the project, the owner also must cede its own ability to control that management function. In summary, if an owner gives up control over a management function it is difficult for the owner to attempt to impose its own control over that management function in the future. That leads to the logical conclusion that the more control allocated to others the less control the owner can expect to have over that project.

Currently, there is little in-house support for the department project manager in terms of project controls personnel (i.e., cost engineers, schedulers, superintendents, quality assurance and control inspectors). This has resulted in an almost total reliance on various outside consultants for project management functional activities. Given the current state of the City's procedures and practices, this represents a significant gap in the ability of the City to exercise comprehensive control over the planning and execution of its capital projects. As a result, the City has ceded some of its ability to directly and immediately control project execution to outside consultants.

What every owner should do is to find the proper balance which enables it to retain control over those elements of the project which are critical to the owner and/or which the owner is capable of discharging, and those elements of the project which are not critical to the owner and/or which the owner is not capable of performing. It is up to the owner to determine how and when to retain or cede control to another party and there is no right or wrong way to determine what that balance should be for an individual owner. However, there are two situations that an owner must try to avoid when allocating management control in a project:

- The first is to cede control to a contracted third party only to exercise that control during the actual execution of the project, effectively overriding the management of the contracted third party.

- The second is to cede management control to a contracted third party without allocation of the concomitant risks which always accompany the allocation of that management control.

From Pegasus-Global's review, it appears that both conditions exist within the City capital construction program. The General Conditions of Contract at Provision 5 cedes several management functions to the Contract Administrator, having given the Contract Administrator "*…authority to act on behalf of the City to the extent expressly provided for in the Contract.*"[2] The General Conditions include the statement that the contractor is bound to follow any instructions or orders issued by the Contract Administrator. During interviews, however, Pegasus-Global learned that the project manager seldom gave the Contract Administrator that latitude during the management of the project. This creates a situation in which the provisions of the contract do not align with the actions of the department's project management team. At best this creates confusion as to the party which really exercises management control over the project and, at worst, provides a Contract Administrator with an excuse for any failure to undertake and carry out the duties which, by contract, are its responsibility.

Pegasus-Global also found that the Contract Administrator is not at risk for the management decisions made or actions taken during the execution of its management functions. While the Contract Administrator should follow the industry standard of care, by the actions of the project management team reinserting itself into the management of the project and, by the fact that no specific penalties are imposed for any failure to act to the

[2] General Conditions of Contract, 12 April 2007, Provision C5.1, page 4

unspecified industry standard of care, the Contract Administrator is essentially free of any direct or immediate consequences which may result from its actions. Pegasus-Global noted previously that the use of a contract administrator from the design consultant to oversee the work of the construction contractor has become increasingly rare in their experience. This has coincided with the growth of the Construction Manager at Risk delivery methodology, under which both of the problem issues cited above have been addressed by the industry. (See Appendix 6 for a description of this methodology.)

***Recommendation 26***

We recommend that the CFO working with the City Solicitor should clarify the City's position on what management and control processes can be ceded to a third party, the role of the owner's project management team in those instances where allocation of management and control has been made to a third party and, finally, the correct alignment of those management and control allocations with the provisions of the contract document set.

***Management Response***

*As recommended by the City Auditor, the City Solicitor will work with the CFO on the matters discussed above. The contract document set should include the contractual arrangements with third party Contract Administrators. In considering what management and control processes can be delegated to a third party, it should be noted that City staff, Contract Administrators, and third party Contract Administrators must all comply with the City's financial management processes, such as the approval authorities for contract over-expenditures.*

### *Changes to Design Consultants' fees should be based on work performed.*

Pegasus-Global found that the calculation of fees actually due and owning to design consultants was a significant issue which needs to be addressed by the City. As Pegasus-Global understands the design consultant fee structure, the fee is calculated as a fixed percentage of the total cost of the facility or structure. For example, a design consultant's fee might be set at a flat rate of 7% of the total value of the constructed facility. The primary problem with that methodology is that the design consultant's fee is not linked directly to actual work done by the design consultant, and thus when applied can result in the design consultant receiving additional fees when no work has been done by the design consultant to warrant that increase in fee. This issue was previously reported in 2006 in the *Use of Consultants Audit Report* by the City Auditor.

As noted earlier in this audit report, construction is a volatile industry relative to the pricing of certain commodities, materials and equipment. If, for example, during the actual construction of the project, steel prices increase by $200,000, the cost of the project will increase by $200,000, yet the quantities of steel and the design do not change. That increase in steel price would result in an increase of $14,000 (7% of $200,000) in the design consultant's fee; yet the design consultant would have done no work to earn that increase. This same situation could occur in change situations where changes introduced by the design consultant and accepted by the City also result in an increase in the total project cost. Such a fee arrangement would appear to actually encourage a design consultant to find situations in which the total cost of the project could be increased, rather than search for opportunities to find situations in which the total cost of the project could be decreased. Pegasus-Global believes that design consultants should be paid for work that is done which is beyond the original design scope of work. However, Pegasus-Global does not believe that design consultants should be paid additional money as a result of project cost increases which have no impact on the scope of

design work set within the original design consultant agreement.

The design consultant should submit a fixed price for the original project scope of design work with a fixed fee. In the event that the design consultant believes a change has been made to that original project scope of design, it can submit a *Design Change Request*. The *Design Change Request* defines the scope of the design change and the cost and schedule impacts (if any) of executing that change in design. This is the same process expected of the construction contractor on City projects.

***Recommendation 27***
We recommend that the design consultant be paid based on a fixed price for the original project scope of design work with the provision that a *Design Change Request* can be submitted where the design consultant believes that a change has been made to the original project scope of design.

***Management Response***
*The Public Service concurs with this recommendation. A complete review of how consultants are engaged for capital projects will be carried out and guidelines produced to assist the departments. This will be done in conjunction with the development of project management procedures.*

### *Capital "program" type projects could benefit from alternative contracting methods.*

In Pegasus-Global's experience small, repetitive projects can be effectively and efficiently managed using what is known in the industry as "short-form" contracting and procurement templates which are specifically tailored to the project type and size. For example, Public Works is already having difficulty in attracting bidders for its street renewal program and has been forced to bundle projects and then allocate the project bundles across a number of contractors and consultants. Any actions which could be taken to revise procedures (i.e. formal approvals, documentation distribution, etc.) and templates (i.e. short-form contracts and standard progress reporting forms) would make the current procurement process shorter, more efficient, cost less and be more aligned with the true nature and size of the project scope of work. Pegasus-Global suggests that the Manager of Capital Projects work with Public Works to examine other non-traditional project delivery actions which may further improve the marketability of these street renewal projects while at the same time improving the effectiveness and efficiency of executing those projects, for example:

- Public Works could move to segment the City into specific "zones" within which all surface street renewal projects would be considered a "single zone project". Zoning would extend that bundling currently done by Public Works, with an added benefit of accommodating multi-year project planning within each zone. That planning would enable Public Works to set its project priority parameters within a zone and across several zones.
- Multi-year planning and prioritization would enable the City to move to a "rolling" two year award and execution cycle for each zone. By staggering the rolling cycle among the zones, Public Works could competitively bid a higher zone volume of work (i.e. a higher project value), which should attract additional interest in bidding the street renewal work. By staggering the zone bid cycles Public Works would spread the bid preparation work over a longer period, yet improve the amount of attention that could be paid to each of the zones during the elongated planning period.
- Multi-year contract awards would provide flexibility to re-sequence work specific project elements within a zone in the event that problems arose with a particular zone project element. In short, "zone project delays" could be mitigated by the contractor's ability to move

quickly to another project element within the same zone with minimum disruption in the overall zone project.
- Zone projects would allow the contractor to take advantage of cost saving opportunities such as better coordinated traffic management, bulk purchase of materials and supplies, centralized staging, labour allocation flexibility, etc.

The effect of implementing these strategies on the long-term competitive environment also needs to be considered.

By taking advantage of non-traditional planning, award and execution strategies Public Works should be able to address its current two biggest concerns : (1) attracting more bidders to the work; and (2) maximizing the effectiveness of its limited human resources. Pegasus-Global believes that if the current reliance on the more traditional delivery methodology is not altered, those two problems will simply worsen with time.

***Recommendation 28***
We recommend that the Manager of Capital Projects should consider the use of Short-form Bidding and Contracting, Project Bundling and Multi-year awards for routine, repetitive projects (such as street renewal projects).

***Management Response***
*The Public Administration concurs with this recommendation. This will form part of the project execution plan, which will include recommended contract strategy for each project or program. It should be noted that policy changes will be required for multi-year contracts.*

### *Contracts are not being closed on a timely basis.*

Pegasus-Global found that some contracts were held open for extended periods beyond project completion even though the project team and departments were fully aware of the risks involved in leaving a project "open" for years after completion of construction and beneficial occupation by the City. Pegasus-Global believes that leaving this situation unresolved for this period of time after completion does not conform to sound industry practice. While the City does have in place project close out procedures, those procedures are essentially based on completing certain forms and certification of contract completion. Pegasus-Global recommends that in addition to the current close out forms and certifications the City prepare and adopt formal standard procedures and processes for closure of capital construction projects which are linked to specific actions within specific time constraints. Deviations from those procedures and processes should be the subject of formal, periodic "Exception Reports", which track the reasons for the inability to close the project and reflect a plan for project closure.

***Recommendation 23 (h)***
We recommend that the Manager of Capital Projects should oversee the revisions to the *Draft Manual of Project Administration Practice* to establish procedures pertaining to:

closure of capital construction projects which are linked to specific actions within specific time constraints.

***Management Response***
*The Public Service concurs with this recommendation. See comments on recommendations 9, 17, 21 and 22.*

### *The city must continue to plan for the risks inherent in the use of the P3 project delivery methodology.*

Because the P3 procedures at the City are still in the process of being developed, Pegasus-Global was unable to conduct any comparative analysis between these procedures and the PMBOK®. However, Pegasus-Global does have some general observations relative to execution of capital

projects following a P3 project delivery methodology that follow:

- The P3 methodology is essentially a mechanism of risk allocation under which the financing and execution of a capital project is shifted to a single contracting entity (i.e. it is not generally a DBB methodology). One of the more critical elements is that in return for the financing, the contracting entity generally is free to execute the project following its own policies, procedures, means and methods. During the execution, the owner's role is generally limited to one of oversight insofar as scope, cost, schedule and quality elements of the project.

- The P3 methodology is generally one in which the contracting entity is executing the project against a performance specification set by the owner which defines the "broader limits" for scope, cost, schedule, and quality. For example, the Chief Peguis Trail would identify location, road attributes (i.e. sub-base composition, pavement thickness and material, etc.), the maximum cost, the completion date and the minimal quality requirements. The contracting entity would be responsible for execution from detailed design through construction. Note that any enhancement of the performance specifications represents a changed condition, which would entitle the contracting entity to seek an adjustment in the financing amount and other contract conditions.

- Financing is done to a fixed cost basis for the scope of work defined within the preliminary design (performance specification). Like any fixed cost project, changes can result in modifications to the fixed cost basis of the bid and may not only impact the total cost, but may trigger changes in financing charges such as interest rates, etc. The basis of estimate and the financing conditions must be very well defined within the contract document set in order to insure that there is a minimum of conflict between the contracting parties as changes are introduced into the project.

Pegasus-Global notes that most of the procedures currently in place at the City including the General Conditions of Contract, the Procurement Requirements, and the *Draft Manual of Project Administration Practice* are not suitable for management and control of a project to be executed under a P3 project delivery methodology.

Further, Pegasus-Global is concerned that the City project staff assigned to the P3 projects need to be carefully trained to the delivery system in general and to the specific conditions under which a capital project is awarded to the P3 contracting entity. At the present time the experience of project staff resources within the departments has been primarily focused on the traditional City DBB delivery methodology, which gives the owner maximum involvement in and control over project execution (whether by direct personnel or via an "agent" such as the Contract Administrator). Should the City project management staff attempt to apply the project management practices employed with the City's traditional DBB methodology in a P3 delivery methodology project the result will be both confusing and potentially costly both in terms of money and time to completion.

During our review the City had undertaken the planning for the Disraeli Capital Project as a P3 Project. We are pleased to see that the City has established a P3 committee to oversee the review of the planning for the project. The City has also retained external expertise to provide financial, engineering, procurement and legal advice to assist in the delivery of this project and to develop project delivery methodology procedures

and processes for the delivery of other P3 projects in the future.

***Recommendation 29***
We recommend that the CFO and the Manager of Capital Projects should continue to carefully examine the full spectrum of risks inherent in using a P3 project delivery methodology and develop a project delivery methodology for P3s that identifies and allocates risk to the party in the best position to manage the risk.

***Management Response***
*The Public Service concurs with this recommendation. The City will continue following industry best practices in the identification and allocation of project risks.*

## *I. Project Integration Management*

### *The City lacks a comprehensive procedure to integrate project management functions into a project management and control plan.*

Project Integration Management is essentially rolling the processes identified in the previous eight management functions up into a comprehensive project management and control plan to be followed during the execution of the project throughout its life cycle.

In essence, what Pegasus-Global was looking to find was the requirement for the development and implementation of a comprehensive project management execution plan. Since the City lacks management and control functional processes recommended as good practice by PMI, any requirement for an integrated management plan would be incomplete in comparison to the PMBOK® standards used by Pegasus-Global as the basis of comparison.

Pegasus-Global notes that within the existing directives and manual many of the seven elements listed by PMI for Project Integration are addressed; for example, the City does require a formal authorization of a project by City Council and that authorization is based upon a preliminary scope statement. However, Pegasus-Global did not find a directive at the corporate level which established the requirement for there to be a formal integrated project management plan.

The *Draft Manual of Project Administration Practice* constituted, in effect, a procedure for project management integration as it addressed those elements of the project management and control which the departments believed critical to the successful execution of capital projects. Although the manual is outdated relative to current good practices within the industry and even outdated relative to the current administrative directives, the management functions addressed within the manual were intended to provide project management with sound guidance during all phases of the project life cycle.

Although the manual provides a foundation from which project management integration planning procedures can be developed and issued, as it currently stands, the manual does not meet the standards set within the PMBOK® for this management function. In summary, Pegasus-Global was unable to find any comprehensive procedure intended to integrate all the primary management functions into a project management and control plan. As a result Pegasus-Global found that the integration of project management and control functions was not uniform, transparent or had a single source of accountability.

### *The projects reviewed lacked a formal project execution plan.*

Every project team interviewed identified the critical importance of execution planning to achievement of project goals and objectives. However, every project team interviewed had a different definition of what constituted a project execution plan, which

given the lack of a corporate procedure or process is not unexpected. A project plan is a road map to execution of the *entire project*, regardless of the value, size or complexity of that project. In simple terms planning is determining, *in advance*, what needs to be done, by whom, and by when, in order to fulfill the project goals and objectives. The project execution plan not only describes the desired outcomes and deliverables, it describes in appropriate detail the systems and processes by which the execution of the project will be managed and controlled.

The project managers tended to rely on the contract document set as the source for many of its procedures. However, the contract document set identifies a discrete set of requirements, obligations and functions; it does not integrate those elements into a cohesive, cogent plan for the execution of the project. As there are normally multiple contracts (and multiple parties to the project) the issue becomes one of having to "conform" each of those contract document sets into a complete and comprehensive body of duties, obligations, goals, objectives, etc. to be able to distill a total project execution plan from those disparate document sets.

Ideally, an execution plan format should be developed that is uniform and comprehensive but which also is flexible enough to accommodate a wide range of project sizes and types without imposing an undue administrative burden on relatively smaller, less complex projects.

***Recommendation 23 (i)***
We recommend that the Manager of Capital Projects should oversee the revisions to the *Draft Manual of Project Administration Practice* to establish procedures pertaining to:

an execution plan. The format of the execution plan should be developed with assistance and input of project managers representing each of the departments and a cross section of project types. An execution plan should be required for all capital projects.

***Management Response***
*The Public Service concurs with this recommendation. See comments on recommendations 9, 17, 21 and 22.*

## Part III

## Review of Project Management for the Seven Selected Projects

What follows below is a brief description of each of the seven projects reviewed and observations about the management of the capital projects included in our report. For each project a high level review of the project cost, project scope and project schedule was performed.

Pegasus-Global did not conduct a financial audit of any of the projects reviewed. The amounts with which Pegasus-Global had to work were often forecast figures, which are based on various assumptions which may or may not prove accurate at the final completion of a project. The purpose of this review was to examine how cost was managed by the City during project execution.

The recommendations that resulted from the review of the seven projects have been reported in the previous section of the report.

### *Millennium Library Expansion*

The Millennium Library Expansion Project (Millennium Project) was a capital project to expand and update the downtown library constructed in 1975. The Millennium Project was a cooperative effort between the City (PP&D) and a Foundation formed for the purpose of raising money to support the expansion and modernizing of the original library facility. The funding for the expansion was a combination of federal, provincial, City and Foundation money. The project manager attempted to use the Construction Manager structure but, as normal for City projects, the Millennium Project was executed following the traditional DBB delivery methodology.

In 1996, the Foundation compiled a "wish list" for the facility based on input from the community and, in April 1997, a request for proposal for the facility scope of work encompassed within that community "wish list" was prepared and released. PP&D engaged a specialty design firm under a $100,000 design contract to prepare a preliminary design and cost estimate for the expansion.

The initial cost estimate was set at approximately $35,000,000. This estimate was well in excess of the funds available for the Millennium Project. This put the project on hold pending additional work by the Foundation to modify the scope of the project and continue its fund raising efforts.

#### *Project Cost*

In 2001, the redefined scope of the Millennium Project was prepared and money for the project was secured from the Foundation, the Federal Government, Province and City Council. In July 2001, the project was estimated to cost a total of $17,000,000. The construction cost of the project was estimated at $14,000,000.

**Construction Costs - Budget to Estimated Actual**

| Estimates | Date | Amount |
|---|---|---|
| Budget estimate | July 2001 | $14,000,000 |
| Construction estimate | Jan. 2004 | $16,766,000 |
| Completed Construction | May 2005 | $18,071,525 |

As of May 2005, the estimated/forecast project cost at completion had risen to $18,071,525. This represented an increase of $4, 071,525 (29.1% higher than estimated in 2001). The variance between the original project estimate was within the accuracy range (-20% to +30%) considered typical of a Class 3 budgetary estimate. An analysis of the increase follows:

- $2,766,000 was attributed to the fact that the project was not actually tendered for construction bid until late 2003, approximately 2 years after the original budget estimate was prepared, and construction costs had risen since that original budget.

- In total, the escalation of construction costs between the original budget estimate (July 2001) and the actual tendered price (January 2004) account for 68% of the total final increase in cost between the original estimate of $14,000,000 and the final forecast to completion of $18,071,525. However, the final costs for the project are still not known as the project is still open since certain items are under dispute.

Construction costs were escalating rapidly between 2001 and 2004 (and continue to do so through the current time) and Pegasus-Global does not find it unusual that the original budget estimate underestimated the total cost of construction as a result of the time lag between the preparation of that estimate and the date of the actual tendered price (over two years – July 2001 to January 2004). Although only a detailed line item by line item audit can pinpoint the root cause for the increase experienced, from the examination made by Pegasus-Global and based on the state of the industry during the period, Pegasus-Global believes the increase experienced was predominately a result of the higher than anticipated escalation of construction costs during the period in question.

### *Project Scope*

Through May 2005 a total of 60 approved change orders had been approved and issued on the project for a total direct cost of $2,445,089.

| Millennium Library | Number | Amount |
|---|---|---|
| Change Orders | 60 | $2,445,089 |

According to the project reports, however, the change order costs were placed into three categories:

- Unforeseen sit conditions accounted for $779,126 or 32% of the total value of charge orders. Two of the biggest issues that required change orders were structural remediation related to the existing concrete floors throughout the library and additional work to the roof structure necessary due to unanticipated deterioration of the existing roof structure; and

- Owner requested changes at a total additional cost of $1,185,487 or 48% of the total charge order value. The costs were spread among several change orders, the majority of which appear to have been related to structural, architectural, mechanical and electrical revisions to the original design; and

- Design Continuance accounted for $490,476 or 20% of the total charge order value.

Although Pegasus-Global did not do an in-depth review of the individual change orders, it appeared to Pegasus-Global that all of the change orders had followed the required procedures and processes for review, negotiation and approval. In all, change orders accounted for approximately 13.5% of the total estimate cost at completion of $18,071,525, which is higher than expected in a project of that size. However, pre-existing structural defects which were unknown prior to the start of construction had a significant impact on the cost of the approved change orders.

### *Project Schedule*

The construction contract was awarded in January 2004 and construction started in February 2004.

| Schedule | Contract Date | Actual Date |
|---|---|---|
| Construction Complete | July, 2005 | August, 2005 |

Pegasus-Global was told that PP&D dropped the Construction Manager structure and converted the project back to the City's traditional Contract Administrator structure after award of the construction contract. Construction was initiated in February 2004 and was substantially completed in August 2005, approximately one month later than the planned July 2005 completion date.

***Summary Observations***

Overall, Pegasus-Global found that the management and control practices exercised during the planning and execution of the Millennium Library Project met or exceeded the procedures established by the City. The only two significant gaps that Pegasus-Global identified in the practices involved Quality Management and Risk Management, both of which were also found by Pegasus-Global to have been gaps in the corporate and department level procedures.

During the review of the documents provided and interviews conducted Pegasus-Global also determined the following:

- The phased development of the design definition enabled the project to adjust that scope when the initial estimate came in at twice the cost expected. This in turn enabled the project manager to make decisions relative to scaling back the full scope of work to meet expected funding levels for the project prior to initiating full execution of the project.

- The staffing for the project was dependent upon the approved annual budget at the time the project was initiated. This made planning for staff as much a function of funds available as staffing needs identified for the project.

- Interviews confirmed that consideration was given to the Construction Manager project delivery methodology. No other methodologies beyond the standard DBB system traditionally employed by the City were considered. The reason given was that the procedures and forms established are best suited to a DBB system. PP&D noted that its projects range from simple facilities (office buildings), to specialized facilities (fire and police), to parks and recreation facilities and that some of the projects falling under PP&D could be more effectively and efficiently executed following project delivery methodologies other than DBB. Pegasus-Global believes that the Construction Manager at Risk methodology originally selected by the department would have been a better choice given the size, complexity and multiple stakeholder investments and interests in the project.

- The project management team confirmed that it had used an "updated" version of the *Draft Manual of Project Administration Practice* as a guide in planning and executing the Millennium Project. It appeared to Pegasus-Global that the manual had been amended by the project team as that team believed necessary to meet the needs of the project. Therefore, the alterations made to the manual would not necessarily be uniform or transparent beyond the boundaries of the Millennium Project for which it was produced.

- There remains a disagreement as to the total amount due and owning to the design consultant, which was based on a percentage of the total estimated cost of the project. In this interview (and in other interviews conducted over the course of the Audit) Pegasus-Global found that the calculation of fees actually due and owning to design consultants was a significant issue which needs to be addressed by the City.

## *Public Works and Water and Waste Facility Consolidation*

The consolidation of the Public Works Department (PW) and the Water & Waste (W&W) Department (Consolidation Project) into a consolidated facility was undertaken in 2003 by PP&D. The project involved major renovation and expansion of an existing structure (referred to as the 1155 building) and the addition of a new structure (referred to as the 1199 building) at a single location.

Prior to the Consolidation Project both the departments had grown to the point where operational staff were spread through various City owned facilities. The goal of the Consolidation Project was to provide both the PW and the W&W departments with expanded facilities which would enable those departments to move their respective staff operations into a single location. In order to maximize the efficiency and economy of designing and building the two department headquarters, the decision was made to co-locate the two facilities at the same location, using an existing structure from which to design and construct the consolidated facility.

Planning for the project was complex since the 1155 building was already occupied and operations could not be halted while the Consolidation Project was executed. To that end PP&D working with the affected departments prepared a detailed logistical plan intended to disrupt the on-going operations to the minimal extent possible. In summary, the 1199 building (new structure) had to be constructed first, with the operations in the 1155 building being temporarily moved into the 1199 building while the 1155 building was renovated and the necessary additions constructed to that building. The operations cadre had to be relocated back to the 1155 building from the 1199 building to enable W&W to move into the 1199 building. Timing the scopes of work for the two buildings was a critical factor in the planning and execution of the Consolidation Project.

Equally critical was managing scope change on the project since there were certain elements of the consolidated facility which were "shared" or interdependent (i.e. electrical service), where a change made in one facility had the potential to impact the work (and cost) in the other facility.

Ultimately PP&D held the total budget for the Consolidated Project and acted (and continues to act) as the asset manager for the consolidated facility. The Consolidation Project was executed as a traditional City DBB, including naming the Contract Administrator from the Design Consulting firm. The design consultant was contracted in March 2003, with the construction contract awarded in September 2004.

### *Project Cost*

The Consolidation Project was included with several other smaller projects into a "program". The "program" was first estimated in March 2003 at a total cost of $20,510,000. The budget estimate for the Consolidated Project within the "program" was $12,853,000. This original estimate was essentially a "conceptual estimate", meaning that it was not based on any significant level of detailed planning or design having been conducted as to the particulars of the projects.

| Budget to Actual Estimate | Date | Amount | Class of Estimate |
|---|---|---|---|
| Original estimate | Mar. 2003 | $12,853,000 | 5 |
| Pre-tender construction | May 2004 | $ 9,867,480 | 2 |
| Contract Award | Sept. 2004 | $ 10,897,000 | |
| Project cost | To date | $ 13,138,965 | |

At the completion of design the construction costs for the Consolidation Project were estimated at $9,876,480. The contractor's

tendered price was $10,897,000. According to AACEi International, a Class 2 tender estimate would be expected to be between 15% lower than and 20% higher than the tendered bid. In this instance the estimate was 10.3% lower than the tendered bid.

As of the date of this audit report the total construction cost reported was $13,138,965. (The Project had not been closed out as of the date of this audit.)

Tracking the estimating and cost history of the project, the original estimate was $12,853,000 while the final cost (to date) was $13,138,965; an increase from the original plan estimate of $285,965. During interviews with the project staff Pegasus-Global learned that the basic project plan was altered significantly by relocating the physical site of the project to make use of facilities which were already in place (renovation) and adding new facilities at that site. Pegasus-Global found that the project team and department had thorough knowledge of and documentation in support of the money expended on the execution of the project.

### *Project Scope*

There were 39 change orders issued to date on the project.

| Consolidation Project | Number | Amount |
|---|---|---|
| Change Orders | 39 | $1,250,000 |

Of 39 change orders, 20% ($250,000) of that total value was attributable to changes requested by additional design and ultimate user changes. The remaining 80% of the change order value ($1,000,000) was issued as a result of unforeseen/unexpected conditions which impacted the execution of the project as planned. Given that there were two "clients" attempting to accommodate a wide range of managerial task elements into contiguous locations the number and cost magnitude of the changes orders appeared reasonable to Pegasus-Global.

### *Project Schedule*

According to information gained from the project team the project was intended to be substantially complete within 340 working days of the Notice to Proceed (NTP) (September 2004), which in this instance would have been in September of 2005.

| Schedule | Contract Date | Actual Date |
|---|---|---|
| Construction Complete | March 2006 | July 2006 |

Actual completion of the "*new office*" phase of the project occurred at the end of November 2005, approximately 313 working days after NTP. Pegasus-Global also learned that the "renovation" phase of the project was not completed until July of 2006, approximately 412 working days after NTP, or 72 working days later than originally planned. An extension of the project duration of approximately 47 working days was explained as resulting from "*delivery, changes in design and unforeseen conditions*" which resulted in the additional time. This time extension was granted per the current City procedures and following the department practices in place.

While the delays of 72 working days (renovation) is an issue, Pegasus-Global was equally concerned with the fact that contractually "Total Performance" of the entire contract was to be completed within 360 working days of the NTP; yet the project team reported most recently that "Total Performance" of the contract had not been achieved as of August 2008. Assuming an average of 250 working days in a year, as of the end of August 2008, over 980 working days have elapsed since NTP, yet the project is still not closed. This represents a total delay to Total Performance of approximately 620 working days overall. According to the project team the project remains open as the department continues to "wrap-up some deficiencies" with the contractor.

***Summary Observations***

Overall, Pegasus-Global found that the management and control Practices exercised during the planning and execution of the Consolidation Project met or exceeded the procedures which exist at the corporate and department levels. Pegasus-Global found only two significant gaps in the Consolidated Project Practices – Quality Management and Risk Management - insofar as the PMBOK® management function standards are involved (which were also identified as gaps at the corporate and department levels). In addition, Pegasus-Global found the lack of an integrated project execution plan and the less than industry standard progress reporting content and duration to be significant concerns for a project of this size and complexity; however, since the City procedures do not require more than what was done during the project, Pegasus-Global could not conclude that the Consolidation Project practices failed to meet the required City procedures.

During the review of the documents provided and the interviews conducted, Pegasus-Global also determined the following:

- Even though the construction of the project was complete in July 2006, as of the date of this audit report, the contract remains "open" due to what was described by the project management team as the continuing effort to "wrap up some deficiencies". Although the project team and department were fully aware of and knowledgeable as to the risks involved in leaving a project "open" for two years after completion of construction and beneficial occupation by the City, Pegasus-Global believes that leaving this situation unresolved for this period of time after completion does not conform to sound industry practice.

- Although the contractual language relative to the authority of the Contract Administrator was the same as in the contract templates issued by Materials Management, the project manager for PP&D had instructed the Contract Administrator that all decision making authority rested with him and not with the Contract Administrator as specified in the General Conditions of Contract. The project manager had determined that due to the logistical challenges of the Consolidation Project, he could not empower the Contract Administrator to make project decisions which may bind PP&D to the Contract Administrator's view of the project. Pegasus-Global notes that the directive issued by the project manager was not aligned with the General Conditions of Contract. Given the specificity of the General Conditions of Contract concerning the authority of the Contract Administrator, PP&D should have modified the language of the General Conditions of Contract to reflect the directive given by the PP&D project manager to ensure that there could be no misinterpretations of roles, responsibilities and authorities between the Contract Administrator and PP&D.

- Pegasus-Global found that the project management team for the Consolidation Project had used an "updated" version of the 1992 *Draft Manual of Project Administration Practice* as a guide in planning and executing the Consolidation Project. It appeared to Pegasus-Global that the *Draft Manual of Project Administration Practice* had been edited to suit the needs of the project and, therefore, would not necessarily be uniform or transparent beyond the boundaries of that project.

### *Kenaston Underpass*

The Kenaston Underpass Project, like the Chief Peguis Trail, is a project which had been under consideration by the City for at least 20 years. The general intent of the Kenaston Underpass Project was to modify a roadway to enable it to pass under certain rail lines, thereby improving vehicle traffic flow and safety on what has become a major City surface thoroughfare.

In 2004, a tri-party agreement was struck between the federal government, the provincial government and the City of Winnipeg. CNR's participation was a result of the Canada Transportation Act. The federal government and the provincial government each contributed $13 million. CNR's contribution has not yet been determined. During the interviews of the project management team, Pegasus-Global learned that due to the physical location of the Kenaston Underpass Project and the fact that there were multiple stakeholders to the project with concurrence and/or approval power over the ultimate scope and design of the project, the scope of the project changed repeatedly throughout the period from 2003 into 2005. Those changes were based almost entirely on stakeholder input and decisions made during the initial development and design period of the project and, to the department's credit, the various avenues of input and communications were open, maintained and documented in a manner which captured the discussions and the decisions made during that period.

The Kenaston Underpass Project was a complex project which involved multiple phases (traffic could be rerouted but not blocked and trains could not be impacted), with multiple interface elements due to impacts to water and sewer lines, electrical distribution lines, storm water and discharge lines, etc. In order to properly phase the work to accommodate the physical conditions, the service impact conditions and the stakeholder interests, Public Works determined to split the project into multiple packages, each with defined physical boundaries and definitive scopes of work base on a Value Engineering exercise involving contractors and an engineering specialist.

In this instance Public Works "sole sourced" all the engineering of the various phases and packages to a blended team composed from two specialist design firms. This was done in order to shorten the total engineering/design duration and to maintain an integrated multi-discipline team throughout the design and construction phase.

Each construction package had a dedicated Contract Administrator; however, as normal for the City, the Contract Administrators all came out of one of the two design firms forming the multidiscipline engineering team. Pegasus-Global noted during the interview of the Public Works project management team that there were a number of instances in which the "expectations" as to the Contract Administrator's role, authority and responsibility were a source of "disagreement" between Public Works and the design firms from which the Contract Administrators were employed. In summary, Public Works expected the Contract Administrators to "live to the detail of the contract" relative to management and control of the work (i.e. monthly progress reports, CPM schedules and updates, change management, etc.) while the Contract Administrators pushed to restrict their role to that contained in the City's earlier contract conditions (circa 1992) in which the Contract Administrator's role was to "advise the City", not actively be involved in the management and control work. According to Pubic Works it enforced the terms and conditions of the current contract document set, insisting that the Contract Administrators live up to the requirements contained in those contract documents.

Pegasus-Global noted that the lack of a comprehensive set of project procedures (e.g. an updated *Draft Manual of Project Administration Practice*) which is conformed to the provisions of the contract document set essentially invites such "disagreements" between the City and its consultants and contractors.

Of particular note is that the Kenaston Underpass Project instituted a formal risk management program, with assistance from the Audit Department. Risk elements to the successful completion of the project were identified by the stakeholders, quantified as to potential impact, and avoidance and mitigation plans were developed. Further, the Public Works project management team, in conjunction with the Contract Administrators monitored the identified risk elements on a monthly basis, initiating avoidance and/or mitigation plans as necessary.

### *Project Cost*

The original Kenaston Project cost estimate done in 2003 was for $39,000,000. According to the project management team that estimate was prepared prior to undertaking any preliminary design. Since no design had been undertaken, the estimate would be considered a Class 5 conceptual estimate following the AACEi estimating classification system, with an accuracy range of -50% to +100%.

Kenaston Project - Budget to Actual

| | Date | Amount | Class of Estimate |
|---|---|---|---|
| Original estimate | 2003 | $ 39,000,000 | 5 |
| Pre-tender | 2004 | $ 44,250,000 | 3 |
| Construction cost | To Date | $ 47,616,000 | |

At the completion of preliminary design the cost estimate for the project increased to $44,250,000 (Note: this estimate did not include funding to be provided by Canadian National Railway or all of the Canadian National Railway design limitations which would subsequently be introduced into the project design). This estimate would be considered a Class 3 budget estimate following the AACEi estimating classification system, with an accuracy range of -20% to +30%. The final cost of the project is currently projected at $47,616,000 at final contract close-out.[3] From an estimating perspective, the Class 3 estimate at $44,250,000 was approximately 14% higher than the original Class 5 estimate, which is well within the accuracy range of that original Class 5 estimate. The final projected cost of $47,616,000 is approximately 7% higher than the Class 3 budget estimate of $44,250,000, which is again well within the accuracy range of the Class 3 estimate. In summary, the estimating process and results reflect the fact that sound estimating and cost control processes and practices were followed during the execution of the Kenaston Project. Overall, Pegasus-Global found that the estimating by the project team was within the accuracy levels for each of the estimates prepared at different points in the project life cycle.

### *Project Scope*

There were 64 change orders issued during the project totaling $1,103,491.10 in cost increases. Pegasus-Global noted that the change orders issued reflected both increases in cost and decreases in cost, meaning that the Kenaston team was closely monitoring and adjusting the scope of work on the project up and down as conditions dictated.

| Kenaston Project | Number | Amount |
|---|---|---|
| Change Orders | 64 | $1,103,491 |

[3] Funding for the project was from multiple sources and the exact proportion of funding has not been finalized with Canadian National Railway as of this report. Winnipeg City Council approved a final budget of $48,250,000 to "bridge" the financing for the project until the Canadian National Railway contribution is finalized.

Design changes accounted for $956,471 (87%) of the total value while unexpected site conditions accounted for $149,020 (14%). Given the complexity of the project, the multiple stakeholders involved and the fact that multiple contractors were engaged to execute the construction scope of work, Pegasus-Global found the number and total cost of the change orders issued to date on the Kenaston Project well within reason. In total, the results of the estimating and cost control practices employed on the Kenaston Project reflect the use of sound industry practices.

### *Project Schedule*

Detailed design of the project began in September 2004 with construction work planned to start in May 2005.

| Schedule | Contract date | Actual Date |
|---|---|---|
| Construction Complete | Oct. 27, 2006 | Sept. 22, 2006 |

During detailed design the scheduled completion of construction was estimated as of October 27, 2006. The facility was opened to traffic on September 22, 2006, approximately one month earlier than planned during the preparation of detailed design. (Note that landscaping work and site restoration was scheduled to be completed in 2007 due to seasonal constraints.) At this time the contracts remain open and will continue to be open until the lapse of the warranty provisions has occurred in 2009. Pegasus-Global found that the management and control of the project schedule (and multiple sub-phase schedules) met the standards expected within the industry, as reflected in the results attained during the execution of the project.

### *Summary Observations*

Overall Pegasus-Global found that the management and control practices exercised during the planning and execution of the Kenaston Underpass Project exceeded many of the requirements established by the City. Further, as there was a risk management program instituted at the Kenaston Underpass Project, Pegasus-Global only found one significant gap in the Practices which involved Quality Management, which Pegasus-Global found to have been a gap in the City's procedures.

Through the review of the documents provided and interviews conducted Pegasus-Global also determined the following:

- The positive impact of a formal risk management program on the planning and execution of the project was repeatedly expressed by the Kenaston Underpass Project management team. The risk management program should be formalized into a "lesson learned" for distribution among the departments and used as a basis from which a standard procedure addressing risk management could be developed for capital projects executed by the City.

- The Kenaston Underpass Project again relied on the traditional City DBB process, including the naming of Contract Administrators from the ranks of the design consultants engaged on the project. Given the complexity of the project, the multiple stakeholders and the ultimate decision to break the total project into discrete packages for execution, this may have been an instance in which an alternative delivery methodology could have been more effective. For example, the project could have aligned well with the naming of an independent specialized Construction Manager at risk overseeing the full project rather then multiple Contract Administrators.

- Pegasus-Global found during the audit that project document management and control was not uniform across the departments or the individual projects. Because of this lack of uniformity,

Pegasus-Global discovered that documents which they believed did not exist actually did exist at the project level, or vise versa. This lack of a uniform document management and control system made it difficult to track practices across the departments and the individual projects.

- It was obvious during the interviews that the Kenaston Underpass Project management team had instituted a continuous "lessons learned" program whereby they applied what was learned during the execution of one execution package to the planning and execution of succeeding execution packages. Unfortunately that practice was not well documented and relied a great deal on the individuals involved in the management and control of the project rather than on a systematic lessons learned program. Even so, Pegasus-Global believes that continuous lessons learned process would be a valuable addition for use in any large, complex, multi-package capital project executed by the City.

- The Kenaston Underpass Project management team undertook a very deliberate planning process which ultimately enabled it to execute a complex, multi-stakeholder, multi-contractor project with what appeared to have been minimal conflicts between those stakeholders and contractors. While the evidence of that high level of planning exists in multiple documents and was equally apparent during the interviews conducted, the missing element was a conformed, detailed project master plan which may have made the actual management of the project easier. The project management team agreed during the interviews that there needed to be a higher level of "formalization" relative to the plans developed.

- Pegasus-Global noted that during interviews one of the repeated themes was the existence of disagreements between the Contract Administrators and the Public Works project management team relative to roles, responsibilities and authorities and controlling expectations of stakeholders. It is possible that a master project plan document could have reduced those disagreements and helped to inform expectations of the different stakeholders during project execution.

  Pegasus-Global believes that the formalization of the planning process undertaken by the Kenaston Underpass Project would have aided the project management team in addressing those situations and, perhaps just as importantly, provided an excellent foundation for the development of guidance on project planning on large, complex capital projects.

### *Street Renewal*

Street Renewal is not strictly a "project"; rather, it is a program consisting of multiple small projects which are intended to maintain and repair local surface streets within the City. The types of projects included in Street Renewal include

- Maintenance – routine maintenance and minor repairs
- "Mill & Fill" – potholes and crack repair
- Refurbishment – stripping pavement and relaying

A significant amount of the routine maintenance and "mill and fill" work is performed by Public Works Department employees, using City owned equipment and City purchased supplies. Because of the relatively small size of these projects Public Works follows procedures and practices which are significantly more standardized then those followed to execute what the department refers to as "one off" projects such as the Kenaston Underpass or the Chief Peguis Trail. For projects under $100,000, Public Works either performs the work or contracts with one of a pre-selected and pre-qualified group of construction contractors to undertake and complete Street Renewal projects.

Public Works treats the City streets as an asset and thereby schedules periodic asset reviews to identify maintenance, repair and refurbishment projects on an annual basis. Depending on the City Council budget authorization, (for example $13 million in 2005), Public Works prioritizes the needed maintenance, repair and refurbishment projects which can be accomplished within that authorized budget amount. Public Works will then determine which projects Department staff will perform and which it will award to specialty contractors to perform. Where logical and warranted, Public Works will "bundle" a number of small refurbishment projects into a program and bid that bundle of projects. The bundling of projects has become more prevalent in recent years as it has gotten increasingly difficult to interest bidders in tendering bids for very small projects.

Another critical factor in the planning and execution of Street Renewal projects is the relatively short construction season within which to complete the work. Due to the low temperatures which exist from late fall to spring, the planning and award of the projects scheduled for a given season must be let by June of each year in order to assure that the selected projects can be completed prior to the onset of the cold season. The actual number of Street Renewal projects undertaken in any given season is directly controlled by the funds authorized by the City Council and the estimated cost of the individual projects identified for renewal.

An example of a typical "bundled" Street Renewal project is Bid Opportunity No. 184-2005, which identified the following projects:

Major Rehabilitation
- Rue De La Morenie
- Ducharme Avenue
- Elizabeth Road
- Kings Drive
- Lawndale Avenue

Reconstruction
- Ave Gendreau
- Rue Lestang

New Pavement
- Horace/Eugenie Lane
- Tremblay/St. Catherine Lane

In total, Pegasus-Global was informed that the work comprising those projects as bundled was estimated to cost $1,480,000.

In a document dated 2005 entitled "Recommended Locations", Public Works identified 70 Street Renewal projects with

estimated total cost of $13,311,000.[4] The project cost estimates ranged from a low of $22,000 to a high of $473,000. According to that document, 29 of those projects (41%) with a total estimated cost of $5,055,000 were planned to be executed using in-house resources. The remaining Street Renewal projects were bundled by identified consultant as follows:

- Dillon – 6 Projects estimated at $1,048,000
- Earth Tech – 5 Projects estimated at $1,402,000
- KGS – 3 Projects estimated at $734,000
- ND Lea – 7 Projects estimated at $989,000
- SEG – 7 Projects estimated at $1,488,000
- Stantec – 3 Projects estimated at $593,000
- UMA – 5 Projects estimated at $844,000
- Wardrop – 5 Projects estimated at $1,158,000

In total, the 70 Street Renewal projects averaged an estimated cost of $190,157 per project with each project bundle totaling an average estimated cost of $1,479,000 ($13,311,000 / 9 bundles). If the City staff performed bundle is removed, the remaining six bundles had an average estimated cost of $1,032,000 ($8,256,000 / 8 bundles).

### *Project Cost*

Pegasus-Global examined one "bundle" of projects awarded to Dillon (the "Dillon Bundle") in order to test the cost and schedule management and control processes in place for that project bundle. The initial project estimate prepared for planning purposes for the Dillon Bundle was $1,020,000. At the completion of detailed design the construction estimate for the Dillon Bundle had risen to $1,416,483, an increase of $396,483 (49%). This was mainly due to a change in scope subsequent to the approval of the budget. One roadway was changed from rehabilitation to a reconstruction.

The increase in estimates between conceptual (Class 5) and budgetary (Class 3) was just within the accuracy ranges expected using the AAECi estimate classification system.

There was one other addition to the full scope of work estimated at $137,800 prior to tender which raised the total estimated budget amount to $1,480,000. The actual project cost to date was reported at $1,477,167, or $2,833 lower than budgeted.

**Budget to Actual**

| Estimate | Date | Amount | Class of Estimate |
|---|---|---|---|
| Original estimate | 2005 | $ 1,020,000 | 5 |
| Pre-tender | 2005 | $ 1,416,483 | 3 |
| Contract Award | 2005 | $ 1,480,000 | |
| Construction cost | To Date | $ 1,477,167 | |

### *Project Scope*

Although there were eight change orders issued for a total of $88,692, the cost increase was absorbed by the additional funds included within the final tender budget. As a result, the changes orders issued had no appreciable impact on the final cost of the project compared against the final construction budget set.

| Street Renewal Program | | |
|---|---|---|
| Dillon Bundle | Number | Amount |
| Change Orders | 8 | $88,692 |

### *Project Schedule*

The construction was planned to commence at the end of May 2005 and be completed as of the end of July 2005.

| Schedule | Contract date | Actual Date |
|---|---|---|
| Construction Complete | July 31, 2005 | October 24,2005 |

[4] *Recommended Locations* – 2005, Public Works Department, January 25, 2005

Actual construction completion was October 24, 2005, with total performance completion achieved on November 9, 2005. Although the Dillon Bundle took longer than planned the project team noted that the delay was primarily due to the changes made in the scope of work and the fact that the contractor encountered poorer than expected soil conditions during construction.

***Summary Observations***

With the exception of Quality Management and Risk Management, Pegasus-Global found that the Practices in place for Street Renewal Projects generally complied with the standards promulgated within the PMBOK® and the requirements in place at the City.

Through the document review and interviews, Pegasus-Global also determined the following:

- Despite the relatively small size of the projects, even when bundled, Public Works still executed the projects (individual or bundled) following the procedures and formats promulgated by Materials Management via *Administrative Directive No. FM-002*. While some "short cuts" were taken by awarding bundled projects to pre-screened and qualified design consultants Pegasus-Global found that the same procedures, contract documents and procurement templates were in use by Public Works to execute Street Renewal Projects as those used for the major projects examined as part of this audit.

- The repetitive nature of the work and the relatively small size of the individual projects would lend itself to the development of "short-form" procurement, contract and management procedures, processes and templates. Again, to attract the maximum amount of interest, the administrative and management requirements should be as minimal as is reasonably possible.

- While Pegasus-Global normally is not a proponent of "check list" management tools, given the size of the projects and the repetitive nature of the work the use of standard check lists for risk management, quality control and assurance, and various other management processes could be used effectively in this instance.

- Pegasus-Global found that the use of a simple bar chart schedule in which the activities are standard to the scope of work (i.e. removal and replacement of paving) should be acceptable assuming the process does not become so automatic that no thought is given to schedule by the contractor. Pegasus-Global specifically directs attention to Supplemental Condition D12.5 of Bid Opportunity No. 184-2005 in which the contract actually identified the activities to be shown on the bar chart, essentially leaving the contractor to "fill in the date information".

- Pegasus-Global noted that the Street Renewal Projects continued the typical DBB methodology with the naming of a Contract Administrator from the design consultant(s) to manage each of the project bundles. Given the small size of the projects Pegasus-Global questions the efficiency of using multiple Contract Administrators to oversee the execution of the individual projects or even the project bundles. Public Works may wish to consider the alternative which would be to identify a single organization (with appropriate management personnel resources) to administer all of the Street Renewal Projects. The issue is one of economy and efficiency (value for money spent) and, if combined with short form templates and procedures, may reduce both the cost of management and administration and

improve the efficiency and effectiveness of management and administration.

- Of all the projects examined by Pegasus-Global, Street Renewal could benefit most from a set of customized procedures specific to its project type and size. Attempting to fit these projects into a one-size-fits-all set of procedures or templates is simply inefficient and ineffective. Public Works, and in particular the unit responsible for Street Renewal Projects, should work with the Manager of Capital Projects and Materials Management to develop procedures and tools which are better aligned with the projects associated with the Street Renewal Program.

### *CIPP Lining Projects*

The Cure-In-Place-Pipe (CIPP) Lining Project (CIPP Project) is, in effect, an ongoing asset management driven project under which specific portions of the City sewer system were inspected, cleaned and repaired as necessary and to the extent necessary.

In the summer of 2006 W&W awarded three contracts for "rehabilitation" of the City's sewer involving the following scope of work:[5]

- sewer cleaning and video inspection;
- internal sewer repairs;
- flow control services;
- full segment lining by CIPP;
- CIPP internal point repairs;
- catch basin lead inspections; and
- surface restoration, site clean-up and demobilization.

The three contracts were awarded as follows:

| Contract no. | Pre-tender estimate | Award |
|---|---|---|
| 426-2006 | $1,226,663 | $ 823,812 |
| 429-2006 | $1,603,585 | $1,533,421 |
| 273-2006 | $ 976,617 | $1,368,030 |
| Total | $3,806865 | $3,725,263 |

All three contracts were award to the same firm.

### *Project Cost*

The initial project construction for Bid Opportunity No. 273-2006 estimate was set at $976,617 in the five year capital budget plan. At the completion of detailed design the construction estimate was set at $976,617 identical to the amount set in the initial capital budget. This suggests that the designer either actually designed to a scope of work limitation imposed by the approved budget or that the estimate was capped at the plan amount of $976,617 producing what was essentially a "factored estimate" wherein a specific limitation caps the data upon which the estimate is based. Given the relatively small size of the project in question, designing to a set amount (a cost factor) is an accepted methodology; however, if the budget estimate was artificially capped without regard to the full scope of work this would represent a practice which is not generally acceptable within the industry at large.

| Budget to Actual Estimate | Date | Amount |
|---|---|---|
| Original estimate | 2005 | $ 976,617 |
| Contract Award | 2006 | $ 1,368,030 |
| Construction cost | To Date | $ 1,447,157 |

The construction tender amount was $1,368,030, which was $391,413 (40%) higher than the budget and design estimate. The difference between the estimate amount and the tendered bid was explained within the award report submitted as required through Materials Management. The 2006 program bid price was 2% lower than the pre-tender estimates, to date the total cost of contract 273-2006 is $1,644,998 including the cost of external consultants.

On the surface it appears that the cost of the project grew from an original estimate of $976,616 to $1,644,998, a difference of $668,382. However, just less than 59% of that apparent total overrun was due to the tender price being $391,313 higher than estimated; while an additional 26% ($170,233) was due to specifically identified changes in project scope made after the project was awarded. If adjusted for those two cost issues, the total apparent overrun to date calculates to only $106,836, which calculates to 16% of the total cost overrun to-date but only 6% of the total costs expended to-date.

[5] Bid Opportunity No. 273-2006, Supplemental Conditions, Section D2.2, page 1

While the amounts cited above are not seriously out of line with expected industry norms, Pegasus-Global notes that the single biggest increases were experienced in the bid tender amount exceeding the budget estimate and the three change orders issued after award.

### *Project Scope*

During the project three change orders were issued by the City which expanded the scope of work and resulted in a total cost increase of $170,232.73.

| CIPP Lining Projects | Number | Amount |
|---|---|---|
| Change Orders | 3 | $170,233 |

### *Project Schedule*

The Project start date was the date of contract award (August 2006) with completion required as of June 30, 2007.

| Schedule | Contract date | Actual Date |
|---|---|---|
| Construction Complete | June 30, 2007 | July 9, 2007 |

The project was construction complete as of July 9, 2007, which essentially met the contractual conditions of the project. From a schedule perspective the project was executed as required.

### *Summary Observations*

Pegasus-Global found that the project management practices employed by the CIPP project team complied with the City's required procedures. As with the majority of projects examined during this audit, the CIPP Project management practices actually exceeded the City's requirements in addressing some of the PMBOK® functions and processes which had not been included in the City's guidance.

Pegasus-Global also observed the following:

- W&W has a proportionally higher number of "major projects" than either PP&D or Public Works. This is primarily due to the fact that W&W facilities are process projects rather than structure or road projects.
- W&W has an in-house design capability for renewal projects which enables the department to develop early preliminary design and scope definitions, which aids in planning and estimating projects at an earlier stage. To this end, W&W could prepare iterative designs and sequentially more accurate cost estimates over time.
- Although the size of certain of the projects executed by W&W might benefit from a project delivery methodology other than DBB with a Contract Administrator, W&W has not actively pursued the use of those alternatives for the vast majority of projects. As noted earlier, Pegasus-Global believes that the CIPP project management efficiency for both the City and the contractor could be improved by adopting alternative or even innovative project delivery methodologies (i.e. short form contracting, project bundling, etc.) intended to reduce the management and administrative burden on both the City and the contractor.

### *Water Treatment Project*

The Water Treatment Project (Treatment Project) was the only process facility project examined by Pegasus-Global during this audit and was the most complex and costliest of the projects examined.

The Treatment Project was planned and executed as DBB with multiple prime construction contracts to be held by the City. There were two design consultants engaged to execute the engineering and design; however, breaking with the traditional City delivery methodology W&W engaged a Construction Manager from an independent consultant (UMA) not involved in the engineering and design of the project. However, within the Contractor's contract documents, the position was still referred to as the "Contract Administrator" not as a "Construction Manager". The Contractor Administrator's contract document set contained the City's "traditional" provisions under which the role of the Contract Administrator as the City's agent was put forth.

In a second break with the City's traditional DBB delivery methodology, the decision was made to "fast track" the project, which means that construction would be phased to start before engineering and design was completed. For example, as soon as the foundation engineering and detailed design was complete construction work would begin on the foundations, without waiting for engineering and design to be completed for other elements and systems in the Treatment Project.

Preliminary design was completed in July 2005, at which time a baseline cost estimate was completed showing the total cost of the Treatment Project as $230.1 million (Class 3 estimate update and revision based on additional engineering and scope definition). By April 2006, the project management team recognized that the estimated budget for the project would be exceeded and the total duration to completion would be longer than originally forecast. To the best of Pegasus-Global's knowledge, the potential extensions of the project schedule and increases in project cost have been reported to the Major Capital Project Steering Committee as required by the City policy and directives.

As of the date of this report (September 2008), the project is still under construction, with final completion expected sometime during the first quarter of 2009.

### *Project Cost*

In 1999, the conceptual design and estimate was completed which estimated (Class 4 – preliminary estimate) the total cost of $204 million.

Budget

| Estimates | Date | Amount | Class of Estimate |
|---|---|---|---|
| Original estimate | 1999 | $204,000,000 | 4 |
| Budget estimate | 2002 | $214,000,000 | 3 |
| Revised estimate | 2005 | $230,100,000 | 3 |
| Revised estimate | 2008 | $300,142,000 | |

In 2002, City Council approved the Treatment Project at a total cost of $214 million (Class 3 – authorization estimate) with a forecast completion set in 2007. The 2005 revised estimate was based on a Council approved scope change to deal with the onsite production of chlorine and provision of back-up power capability.

According to a November 20, 2007 report the original approved budget for the project was $230,100,000. As of February 29, 2008, the capital estimate for the project was reported at $300,142,000, an increase of $70,042,000 an increase of 30% which is the upper range of a Class 3 estimate. The original total construction tender estimate had been set at $165,052,910; however, the actual construction tenders received were $63,689,325 higher than that estimate, totaling $228,742,235. That variance

between estimate and tender accounted for 91% of the gap between the original project estimate ($230,100,000) and the project cost estimate as of February 2008 ($300,142,000). Because 91% of the difference between the original estimate and the most current estimate appears attributable to the higher than expected tender bids for the work, Pegasus-Global suggests examining the basis of the original estimate against the detailed bids tendered to ensure that the estimate scope of work was complete and the factors used within the estimate realistic. This exercise should be conducted as a lessons learned exercise. As noted in several instances earlier in this audit report, Pegasus-Global also recommends that the City produce and issue a standard procedure for the preparation of construction and project estimates as a way to ensure that all estimates are prepared following a standard set of practices and processes.

At an interim stage in the project, the department did conduct an in depth analysis of the project to develop a "lessons learned" document to use in the delivery of future projects.

### *Project Scope*

At the time of this report Water & Waste reported a total of 359 change orders issued on the project, for a total of $4,944,982 (rounded to the nearest dollar).

| Water Treatment Project | Number | Amount |
|---|---|---|
| Change Orders (to date) | 359 | $4,944,982 |

W&W has classified the change orders into the following categories:

- Design Error
- Design Omission
- Design Modification
- Design Change
- Construction Coordination
- Scope Adjustment
- Other

The total value of the scope changes to date appears reasonable given the size and complexity of the project. Pegasus-Global learned that project costs may be an issue in dispute on the project and, as a result, did not examine any of the underlying conditions which may explain the change order classifications made by W&W.

### *Project Schedule*

In May 2004, the project team forecast the project to be operational in 2007. As of February 29, 2008, the project team forecast the project to be complete in the first quarter of 2009, with commissioning of the plant completed by September 2009. Pegasus-Global learned that the delay to the completion of the project is an issue in dispute at this time and as a result did not examine any of the underlying conditions which may explain the delay to forecast completion.

### *Summary Observations*

With the exception of quality management Pegasus-Global found that the Treatment Project Practices complied with the procedures established by the City. However, Pegasus-Global believes that those required procedures established by City are insufficient to guide the planning and execution of a project of the size and complexity of the Treatment Plant. Projects of this magnitude and complexity require a highly developed and coordinated set of processes which provide the management of the project with the real time information necessary to identify and track patterns and trends in execution. Once those patterns and trends have been identified, the management team can forecast possible outcomes, and, if necessary, develop and implement avoidance and mitigation plans which can address issues before they become major obstacle to the attainment of project goals and objectives.

For example, Pegasus-Global believes that projects of the size and complexity of the Treatment Project need formal periodic progress and performance reports which enable a project team to have full and complete information as to the exact status

of the project at any given time. This is even more critical when the project delivery methodology involves multiple prime construction contractors where coordination among and between those contractors is an important project management function.

Quarterly reporting such as was done by W&W on the Water Treatment Project is, in Pegasus-Global's opinion, insufficient for a project of this size, complexity and importance to the City. Those gaps in the formal reporting procedures make it more difficult for the project manager or the department director to identify problems at a point in time when the greatest number of options to deal with the problems still remain available to the project management team.

Interviews with the project manager confirmed that the Construction Manager position functioned as Construction Manager even though it was referred to as the Contract Administrator within the Contractor's contract document set. This is an example where the critical project documents (in this case two different contract sets, one for the Construction Manager and one for the Contractor) had not been coordinated or aligned. Such misalignments between critical project documents are generally indicative of a gap in procedures (in this case the lack of a procedure governing the use of a Construction Manager – see FM-002, Appendix 2) and a failure to conduct a detailed, coordinated review of those contract document sets prior to award.

Finally, Pegasus-Global has previously alluded to the fact that two problems exist relative to the City's management and control of contracts: (1) contract provisions are not fully aligned with the project delivery methodology; and (2) contract provisions are not enforced by the project teams during execution.

Pegasus-Global believes that both of those situations represent potentially serous risks to the City, in particular, on projects of the size and complexity of the Treatment Project. Whether the contract provisions are not fully enforced because those clauses are not fully aligned with the project delivery methodology or whether they are not fully enforced for some other project specific reason is irrelevant; a project's contract document set is the single most critical document in any project, both from a execution management perspective and from the perspective of protecting the City's and the contractor's rights and expectations during the execution of that project. Any failure to "manage the contract" at any level of project structure, City, Contract Administrator, Construction Manager, Design Consultant or Contractor opens the way for misunderstandings, claims and disputes.

### *Chief Peguis Trail*

Unlike the other six projects which were reviewed by Pegasus-Global during this audit, the Chief Peguis Trail is still in the initial planning and preliminary design and engineering stage, with only a limited amount of work completed on the Project. The Chief Peguis Trail will be a four lane expressway with three major intersections. As originally planned, the Chief Peguis Trail was to be executed as a traditional City DBB project, with the design consultant also providing Contract Administration services.

However, the City is currently considering executing the Chief Peguis Trail Project as a Public Private Partnership (P3). Under that process once preliminary design is completed the City would enter into a P3 agreement whereby the detailed engineering and construction would be contracted to a private entity that would provide the financing to complete the design, construct and delivery of the Chief Peguis Trail Project to the City. The contracting venture would then receive what, in effect, is a set "lease payment" for a defined period of time during which the financing for the project would be paid back to the contracting venture. Construction was scheduled to begin in September or October of 2008 with a preliminary construction estimate set at $60 million employing the P3 delivery methodology.

Pegasus-Global was informed during the interviews with Chief Peguis Trail project staff that the project has actually been under consideration for over 20 years (since the 1980's). The original cost estimate for the project employing the City's traditional DBB project delivery methodology was set at between $12 and $15 million in 1983. As of late 2007, the estimate for the project stood at over $60 million and was based on preliminary design work having already been completed, including a formal scope of work definition. That estimate appeared to be at least a Class 4 and perhaps an early Class 3 estimate. However, as this project is currently identified as one which may be executed under a P3 project delivery arrangement, a definitive cost estimate (at least Class 2) should be prepared by the City prior to setting the funding arrangements in place with the P3 contractor.

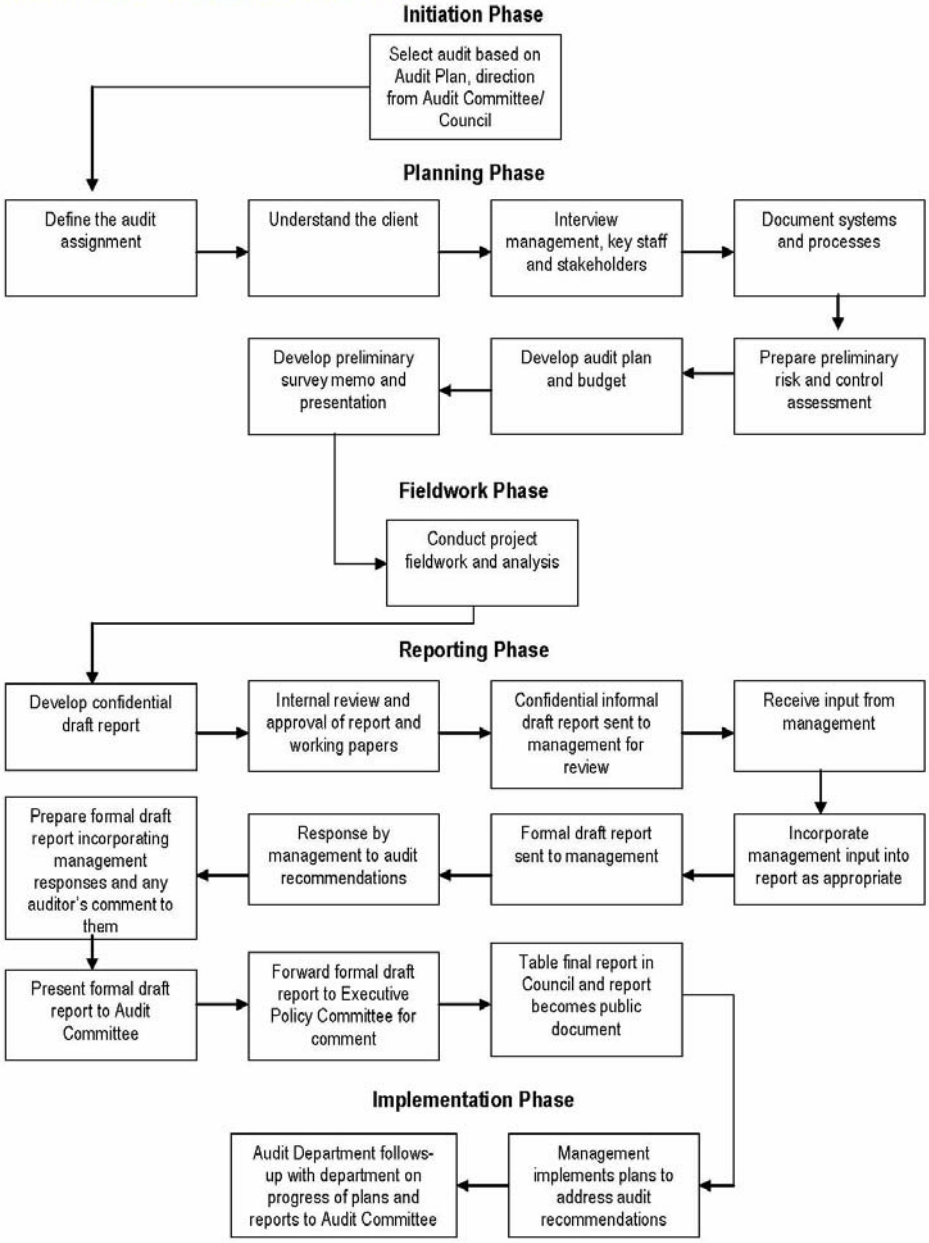
The Project start and completion dates are somewhat uncertain at this time, although the last schedule published for the Project set the start of construction as the Fall of 2008.

#### ***Summary Observations***

Unlike the other six projects which were reviewed by Pegasus-Global during this program audit, the Chief Peguis Trail is still in the initial planning and preliminary design engineering and stage, with only a limited amount of work done on the Project.

Pegasus-Global is concerned that the City project staff assigned to the Chief Peguis Trail Project need to be carefully trained to the delivery system in general and to the specific conditions under which the Chief Peguis Trail Project is awarded to the P3 contracting entity. At the present time the experience of project staff resources within the departments has been primarily focused on the traditional City DBB delivery methodology, which gives the owner maximum involvement in and control over project execution (whether by direct personnel or via an "agent" such as the Contract Administrator). Should the City project management staff attempt to apply the project management practices employed with the City's traditional DBB methodology in a P3 delivery methodology project the result will be both confusing and potentially costly both in terms of money and time to completion.

## APPENDIX 1 – AUDIT PROCESS



## APPENDIX 2 – 2008 CAPITAL BUDGET PROCESS

| Month | Budget Procedure |
|---|---|
| May | Corporate Finance (Financial Planning and Review) conducts a Capital Budget Training workshop for departments. (This is optional, not mandatory.) |
| End of May | Call Letter is sent out to departments (i.e. request to departments to prepare the draft capital budget). |
| Beginning of June | Corporate Finance provides a budget submission template to the departments which is included in the Resource Package Budget Submission; this package also contains a Budget submission checklist to guide the departments. |
| First week of July | Draft Capital Budget Submission deadline. |
| July | Executive Policy Committee (EPC) provides formal direction on priorities (did not occur for 2008 budget). |
| July-August | Submissions reviewed and challenged by CFO, City Treasurer and Corporate Finance provide feedback to departments for follow-up. |
| September | Corporate Finance holds meetings with departments and EPC. |
| October – November | Review of preliminary capital budget submissions by Chief Administrative Officer (CAO), Chief Financial Officer (CFO) and Budget Working Group (a subset of EPC) with departments (if necessary). |
| November | Departments amend budget submissions to incorporate feedback from CAO, CFO, and Budget Working Group. |
| Mid November | EPC reviews Preliminary Draft Capital Budget with all amendments. |
| November - December | Relevant Standing Policy Committees review Preliminary Draft Capital Budget and provide feedback. |
| Mid December | EPC tables final recommendations for the Capital Budget. (Public input is sought at this time prior to tabling the final recommendations.) |
| End of December | Council adopts Capital Budget. |

Source: The table above is a summarization of the 2007 Budget Planning Calendar for the 2008 Capital and Operating Budgets produced by Financial Planning and Review and subsequent interviews with Financial Planning and Review staff.

## APPENDIX 3 – BUDGET PROCESS 2004-2006 PRELIMINARY OPERATING BUDGET

FINANCIAL ANALYSIS

### Budget Process

Timing of the City of Winnipeg's budget process varies from year to year; however, the general elements of the budget process remain relatively constant. All operating and capital budgets follow a similar preparation, review, approval, and communication process. In the past, the development of the operating budget, from preliminary through to the setting of the mill rate, required approximately a year from beginning to end. However, given the implementation of a multi-year budget in the second year of the Council term, the process in some years may be shortened.

**STEP 1**

**Budget Consultative Sessions**

- Public budget consultative sessions are held. Ideas and comments are solicited from the public and then used to develop strategies and financial principles to be used in the annual development of budget guidelines and the estimates. The level and extent of consultation may depend on which year of the Council term is being reviewed.

**STEP 2**

**Initial Development**

- The Executive Policy Committee provides guidelines to the administration for budget development. These guidelines are followed by the administration in preparing both operating and capital budgets. Departments, in the development of their business plans, identify services, develop goals and strategies for operations, and quantify the financial impact of those goals and strategies.
- Departmental business plans are submitted for administrative review to ensure alignment with corporate objectives and to determine affordability.

**STEP 3**

**Table Preliminary Budgets**

- The Executive Policy Committee has responsibility for budget development
- The Preliminary 2004 - 2006 Operating Budget is being tabled at a meeting of the Executive Policy Committee on February 24, 2004.
- The Executive Policy Committee refers the preliminary operating and capital budgets to the City's three Standing Policy Committees for review and recommendations. Each Standing Policy Committee - Protection and Community Services, Public Works, and Property and Development - review the part of the budget related to its jurisdiction. The Committees may hear presentations by departments to clarify budget issues and implications. Members of the public may also make presentations at these meetings.

**STEP 4**

**Committee Review**

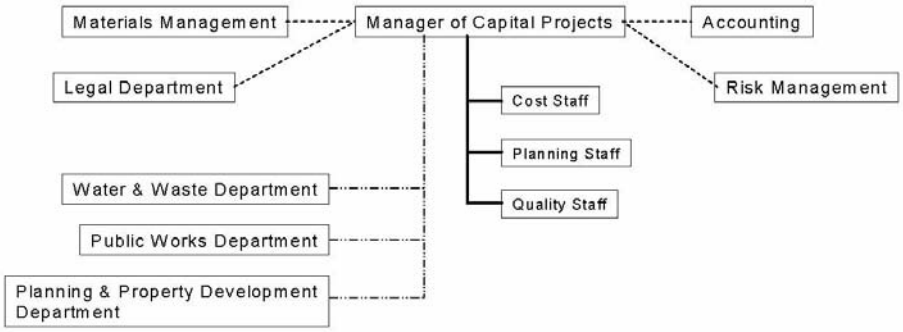
- The Executive Policy Committee provides for delegations from the public and reviews the recommendations from the Standing Policy Committees. Recommendations are finalized by the Executive Policy Committee and tabled with Council for approval.

**STEP 5**

**Council Approval**

- Council debates, amends, and adopts the budgets as submitted by the Executive Policy Committee. Council then passes a by-law to set the mill rate for the operating tax-supported budget.

## APPENDIX 4 – OFFICE OF THE MANAGER OF CAPITAL PROJECTS RECOMMENDED ORGANIZATION STRUCTURE




SOURCE: PEGASUS-GLOBAL

## APPENDIX 5 - PMBOK® PROJECT MANAGEMENT BODY OF KNOWLEDGE

PMI is an international membership organization dedicated to the advancement and improvement of project management with hundreds of thousands of members globally. PMI and the PMBOK® have become the preeminent project management educational resource internationally, extending to the certification of Project Management Professionals (PMP) from around the world.

Over its history, PMI has assembled and published the PMBOK® through three complete editions and a number of specialty project extensions, including a Construction Extension. Pegasus-Global believes that PMI's PMBOK®, Third Edition (2004), coupled with PMI's "Construction Extension" (2000 Edition) to the PMBOK®, represents the most comprehensive and complete compendium of "*good professional practices*" against which to compare the project management functions of the City.

The nine key project management "knowledge areas" identified by PMBOK® and the critical management processes for each are listed below:

Project Scope Management – the processes required to ensure that the project includes all the work required, and only the work required, to complete the project successfully. Project scope management is primarily concerned with defining and controlling what is and is not included in the project.

There are five key management processes identified as critical to management of Project Scope:

a. *Scope Planning* – creating a project scope management plan that documents how scope will be defined, verified, controlled and how the Work Breakdown Structure (WBS) will be created and defined
b. *Scope Definition* – developing a detailed project scope statement as the basis for future project decisions
c. *Create WBS* – subdividing the major project deliverables and project work into smaller, more manageable components
d. *Scope Verification* – formalizing acceptance of the completed project deliverables
e. *Scope Control* – controlling changes to the project scope

Project Time Management – the processes to accomplish timely completion of the project.

There are six key management processes identified as critical to management of Project Time (Schedule):

a. *Activity Definitions* – specific schedule activities that need to be performed to produce the project deliverables.
b. *Activity Sequencing* – identifying the dependencies among schedule activities.
c. *Activity Resource Estimating* – estimating the type and quantities of resources required to complete individual activities.
d. *Activity Duration Estimating* – estimating the number of work periods that will be needed to complete individual activities.
e. *Schedule Development* – analyzing activity sequences, durations and resource requirements and schedule constraints to create the project schedule.
f. *Schedule Control* – controlling changes to the project schedule

Project Cost Management – the processes involved in planning, estimating, budgeting and controlling costs so that the project can be completed within the approved budget.

There are three key management processes identified as critical to management of Project Cost:

a. *Cost Estimating* – developing an approximation of the costs of the resources needed to complete the project activities.
b. *Cost Budgeting* – aggregating the estimated costs of individual activities or work packages to establish a cost baseline.
c. *Cost Control* – influencing the factors that create cost variance and controlling changes to the project budget.

Project Quality Management – the activities of the performing organization that determine quality policies, objectives, and responsibilities so that the project will satisfy the needs for which it was undertaken.

There are three key management processes identified as critical to management of Project Quality:

a. *Quality Planning* – identifying the quality standards that are relevant to the project and determining how to satisfy them.
b. *Quality Assurance* – applying planned, systematic quality activities to ensure that the project employs all processes needed to meet requirements.
c. *Quality Control* – monitoring specific project results to determine whether they comply with relevant quality standards and identifying ways to eliminate causes of unsatisfactory performance.

Project Human Resource Management – the processes that organize and manage the project team. The project team is comprised of the people who have assigned roles and responsibilities for completing the project.

There are four key management processes identified as critical to Project Human Resource Management:

a. *Human Resource Planning* – identifying and documenting project roles, responsibilities, and reporting relationships, as well as creating the staffing management plan.
b. *Acquire Project Team* – obtaining the human resources needed to complete the project.
c. *Develop Project Team* – improving the competencies and interaction of team members to enhance project performance.
d. *Manage Project Team* – tracking team member performance, providing feedback, resolving issues, and coordinating changes to enhance project performance.

Project Communications Management – the processes required to ensure timely and appropriate generation, collection, distribution, storage, retrieval, and ultimate disposition of project information.

There are four key management processes identified as critical to management of Project Communications:

a. *Communications Planning* – determining the information and communications needs of the project stakeholders.
b. *Information Distribution* – making needed information available to project stakeholders in a timely manner.

c. *Performance Reporting* – collecting and distributing performance information, including status reporting, progress measurement and forecasting.
d. *Manage Stakeholders* – managing communications to satisfy the requirements and resolve the issues with project stakeholders.

Project Risk Management – the processes concerned with conducting risk management planning, identification, analysis, responses, and monitoring and control on a project; most of these processes are updated throughout the project.

There are six key management processes identified as critical to management of Project Risk:

a. *Risk Management Planning* – deciding how to approach, plan, and execute the risk management activities for a project.
b. *Risk Identification* – determining which risks might affect the project and documenting their characteristics.
c. *Qualitative Risk Analysis* – prioritizing risks for subsequent further analysis or action by assessing and combining their probability of occurrence and impact.
d. *Quantitative Risk Analysis* – numerically analyzing the effect on overall project objectives of identified risks.
e. *Risk Response Planning* – developing options and actions to enhance opportunities, and to reduce threats to project objectives.
f. *Risk Monitoring and Control* – tracking identified risks, monitoring residual risks, identifying new risks, executing risk response plans, and evaluating their effectiveness throughout the project life cycle.

Project Procurement Management – the processes to purchase or acquire the products, services, or results needed from outside the project team to perform the work.

There are six key management processes identified as critical to Project Procurement Management:

a. *Plan Purchases and Acquisitions* – determining what to purchase or acquire and determining when and how.
b. *Plan Contracting* – documenting products, services and results requirements and identifying potential sellers.
c. *Request Seller Responses* – obtaining information, quotations, bids, offers, or proposals as appropriate.
d. *Select Sellers* – reviewing offers, choosing among potential sellers, and negotiating a written contract with each seller.
e. *Contract Administration* – managing the contract and relationship between the buyer and seller, reviewing and documenting how a seller is performing or has performed to establish required corrective actions and provide a basis for future relationships with the seller, managing contract-related changes and, when appropriate, managing the contractual relationship with the outside buyer of the project.
f. *Contract Closure* – completing and settling each contract, including the resolution of any open items, and closing each contract applicable to the project or a project phase.

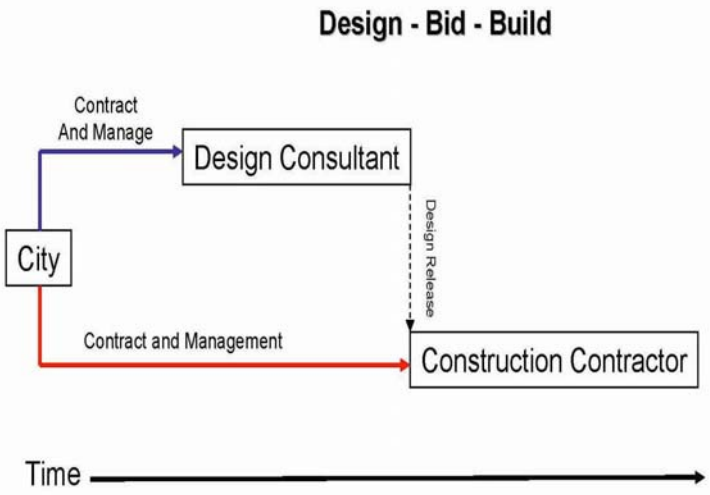
Project Integration Management – the processes and activities needed to identify, define, combine, unify, and coordinate the various processes and project management activities identified in the other eight project management elements.

There are seven key management processes identified as critical to Project Integration Management:

a. *Develop Project Charter* – developing the project charter that formally authorizes a project or a project phase.
b. *Develop Preliminary Project Scope of Work* – developing the preliminary project scope statement that provides a high-level scope narrative.
c. *Develop Project Management Plan* – documenting the actions necessary to define, prepare, integrate, and coordinate all subsidiary plans into a project management plan.
d. *Direct and Manage Project Execution* – executing the work defined in the project management plan to achieve the project's requirements defined in the project scope statement.
e. *Monitor and Control Project Work* – monitoring and controlling the processes used to initiate, plan, execute, and close a project to meet the performance objectives defined in the project management plan.
f. *Integrated Change Control* – reviewing all change requests, approving changes, and controlling changes to the deliverables and organizational process assets.
g. *Close Project* – finalizing all activities across all of the Project Management Process Groups to formally close the project or a project phase.

## APPENDIX 6 - CAPITAL PROJECT DELIVERY METHODOLOGIES

1. Design-Bid- Build (DBB)

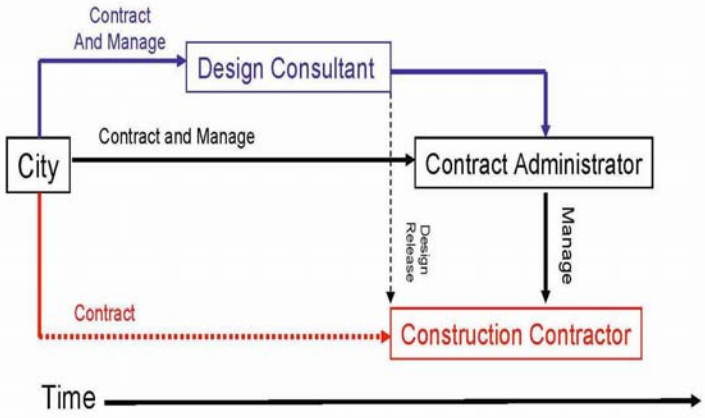



**Traditional DBB Traits**

1. *City holds separate contracts with consultant and constructor.*
2. *Intended for maximum City involvement in management and control functions.*
3. *Design and construction scopes of work separate and distinct.*
4. *No contractual obligation between consultant and constructor.*
5. *Design completed prior to construction bid, award and execution.*
6. *City manages and controls both consultant and constructor.*
7. *City may hold all construction sub-contracts.*
8. *Constructor may hold all construction sub-contracts (General Contractor form).*
9. *City holds and manages significant risk arising from design-to-construction Interface.*

## APPENDIX 6 - CAPITAL PROJECT DELIVERY METHODOLOGIES

**2.** Design-Bid- Build (DBB) – (City of Winnipeg practice)



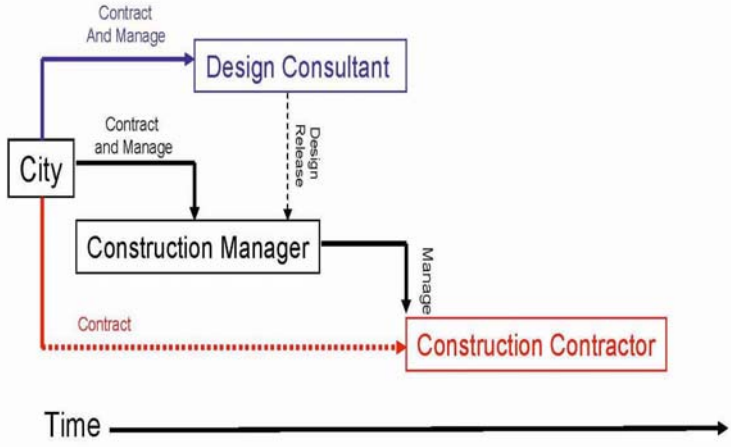

**City with Contract Manager DBB Traits – Same basic contracting strategy as Traditional DBB except:**

1. *City minimizes its involvement in management and control functions.*
2. *City adds a Contract Administrator as "agent" to discharge City's construction management and control functions.*
3. *Contract Administrator manages and controls constructor, interprets designs and design changes.*
4. *As practiced by City, Contract Administrator is part of the Design Consultant organization.*
5. *City still holds and must manage significant risk arising from design-to-construction Interface.*
6. *City holds and must manage significant risk arising from Contract Administrator agency actions and decisions.*

## APPENDIX 6 - CAPITAL PROJECT DELIVERY METHODOLOGIES

3. Construction Manager at Risk

### Construction Manager at Risk



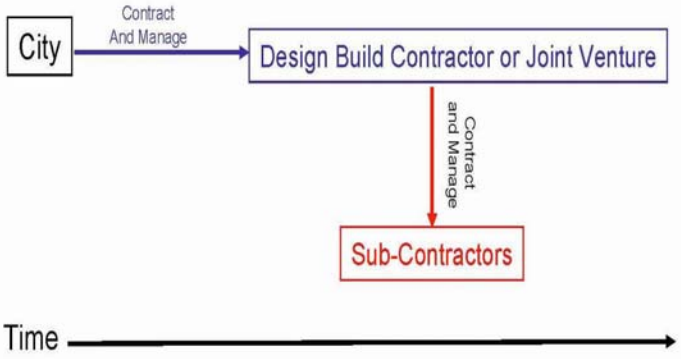

**City with Construction Manager at Risk – Same basic contracting strategy as Traditional DBB except:**

1. *City minimizes its involvement in management and control functions.*
2. *City adds a Construction Manager as "agent" to discharge City's construction management and control functions.*
3. *Construction Manager manages and controls constructor, interprets designs and design changes.*
4. *Construction Manager is independent contractor acting on behalf of City, and for the good of the project.*
5. *City allocates some risk impacts to Construction Manager by "fee-at-risk" provisions relative to cost and schedule.*
6. *City holds and must manage risk arising from Contract Manager agency actions and decisions from both Design Consultant and Construction Contractor.*

## APPENDIX 6 - CAPITAL PROJECT DELIVERY METHODOLOGIES

4. Design Build

**Design Build**
**(w/Lump Sum/Turn Key Contract)**



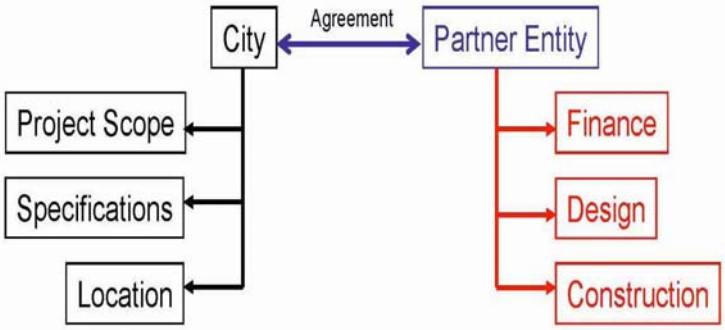

**Design Build Traits:**

1. *City minimizes its involvement in management and control functions.*
2. *City holds a single contract with on party for both design and construction.*
3. *City holds and manages risk arising from single contract conditions except in LSTK contracting which allocates cost, schedule, design and construction risk to single contractor.*
4. *Time may be saved due to ability of DB Contractor to "fast track" design and construction interface.*
5. *"Checks and Balances" between design consultant and construction contractor no longer exist – single point reliance on achieving scope, cost, schedule, and quality objectives.*

## APPENDIX 6 - CAPITAL PROJECT DELIVERY METHODOLOGIES

5. Public Private Partnership (P3)

### Public Private Partnership (General)




**Public Private Partnership Traits:**

1. *City sets basic project scope, specification and location, then executes an agreement with a single entity to finance, design and construct the project (generally in return for either the right to collect fees from the use of the project or from a specific financing arrangement over an extended period of time).*
2. *Except for ensuring that the project is executed per the terms and conditions of the PPP Agreement the City has no direct involvement in management or control of the project.*
3. *The City's risk varies considerably depending upon the terms and conditions of the PPP Agreement and the make-up of the Partner entity holding that Agreement.*
4. *The City must essentially surrender all control over the project during execution.*
5. *The City must minimize changes to scope or specification once the PPP Agreement is in place.*

## APPENDIX 7 – CITY OF CALGARY PRIORITIZATION CRITERIA

The City of Calgary Capital Budget Prioritization Process

### Corporate Criteria for Capital Budget Prioritization

1) External economics (community): attracting, retaining and nurturing businesses.

- the initiative effectively leverages the existing supply of zoned land for business use.
- the initiative contributes to a strong and diversified local economy that attracts corporate investment, increases Calgary's GDP and supports sustainable future economic development.
- the initiative promotes cross industry collaboration to achieve business synergy, including private and public partnerships, etc.
- the initiative supports competition, innovation or entrepreneurial activity.

2) Internal economics (corporate): invests in programs and services that contribute to the sound management of the corporation and inspires public trust.

- the initiative maintains, replaces, or rehabilitates existing infrastructure to improve The Corporation's operational efficiency.
- the initiative expands existing or constructs new corporate assets to accommodate growth pressures. For example, the project expands into a new line of business or redesigns current business practices through innovation.
- the initiative ensures that both short term capital costs and long-term life cycle costs are justified and supported by a financially sustainable model.
- the initiative strengthens the workplace by encouraging a diverse, healthy and engaged workforce.
- the initiative aligns with and/or supports council initiated changes

3) Social: to enhance the prosperity, quality of life, and image of each Calgarian.

**Sense of community:** promotes a sense of belonging, engagement, friendship and identity within the context of our groups and neighborhoods.

**Peace, safety and security:** contributes to a caring, safe and healthy community.

**Recreation:** creates a fully accessible community to support a balanced lifestyle and promotes active living.

**Health and Wellness:** promotes physical, mental and social well-being. (In circumstances in which health is compromised, we can easily access both knowledge and services.)

## APPENDIX 7 – CITY OF CALGARY PRIORITIZATION CRITERIA

The City of Calgary Capital Budget Prioritization Process

**4) Cultural:**

- the initiative preserves and/or protects historic sites.
- the initiative maintains, replaces, or rehabilitates aging or deteriorating arts, culture, heritage, leisure and performance venues.
- the initiative invests in the delivery of new programs, services and special events to enhance the unique cultural identity, quality of life and image of the community.

**5) Environmental:** invests in programs, services, or initiatives that promote or contribute to a positive environmental impact.

**Ecological footprint:** the initiative reduces our ecological footprint by minimizing wasted resources because it helps us reuse, recycle and reduce the materials we consume.

**Air:** the initiative reduces greenhouse gas emissions and other contaminates resulting in increased overall air quality.

**Land and soil:** the initiative promotes the efficient use of the land base, the protection of environmentally significant areas, the remediation and reuse of contaminated sites and the reduction of the amount of land needed for landfill sites.

**Water:** the initiative promotes good stewardship of water, protecting its quality and maintaining the integrity of the hydrologic cycle ensuring that our water supply system is sufficiently secure, flexible and adaptable to changing conditions and circumstances.

**Energy:** the initiative promotes the efficient and responsible consumption of energy by utilizing the most energy-efficient design principles available to ensure sustainability. The use of energy comes from a diverse portfolio of resources that are renewable, have a low impact on the environment and contribute to the positive development of our society.

SOURCE: CITY OF CALGARY

## APPENDIX 8 – AUDIT RECOMMENDATIONS

As a result of the audit work, we are making twenty-nine recommendations that we believe, once implemented, will strengthen the City's capital management control framework.

| Recommendation Number | Recommendation |
|---|---|
| 1 | We recommend that the planning process be amended so that the public input and political direction are given at the beginning of the process to be incorporated into the initial draft of the capital budget. |
| 2 | We recommend that objective criteria be developed through consultation with Council and the Public Service to evaluate and prioritize capital projects to support a capital budget based on City wide priorities, sound asset management practices and projects where the greatest need and benefit is demonstrated. |
| 3 | We recommend that the City should adopt a three year capital budget. The three year capital budget should be updated and approved annually. |
| 4 | We also recommend that the City develop a ten year capital project plan. |
| 5 | We recommend that the guidelines established for the 2009 capital budget process be further refined to outline the level of project estimate required for inclusion in the capital budget based on:<br>• Size of project<br>• Complexity of project<br>• Time to project initiation<br><br>Consideration should be given to requiring a Class 3 estimate (AACEi) be prepared for larger projects at least one year prior to the anticipated start of that project. These guidelines should be incorporated into the administrative directive governing capital projects. |
| 6 | We recommend that the City disclose in the Capital Budget all capital projects (if any) whose approved budgets are not supported by a class 3 estimate (or better). |
| 7 | We recommend that capital project estimates and forecasts be reviewed and updated at least annually, if necessary, to reflect known changes and impacts to the design and costs. |
| 8 | We recommend that the CFO consider requesting City Council to authorize funding for major capital construction projects to perform detailed estimates three years prior to project start where higher level of estimates are required. This funding would enable the Public Service to prepare more precise cost estimates over the span of the three year capital budget. |
| 9 | We recommend that a complete project execution plan be required and submitted with all major capital project budget requests. |

## APPENDIX 8 CONT'D – AUDIT RECOMMENDATIONS

| Recommendation Number | Recommendation |
|---|---|
| 10 | We recommend that all operating budget implications of capital projects be fully quantified and reflected in the respective capital and operating budgets. |
| 11 | We recommend that the City establish a Capital Project Reserve to be funded with monies appropriated from the operating budget each year for the capital program.<br><br>The appropriation for capital projects (Cash to Capital) in the capital budget should equal the appropriation for capital projects (Cash to Capital) in the operating budget for any given year.<br><br>In the event that the City does not appropriate funds in the operating budget equal to the Contribution to Capital approved in the capital budget this funding gap should be disclosed in the operating budget. This disclosure will improve transparency with respect to capital project funding. |
| 12 | We recommend that the City review and approve the capital and operating budgets at the same time. |
| 13 | We recommend that the City transition, to the extent practical, to a capital budget where the funds approved are intended to be spent in the year in which they are budgeted. |
| 14 | We recommend that Corporate Finance eliminate the Equity in Capital Assets Fund. |
| 15 | We recommend that reporting on the status of outstanding borrowing authority as it relates to specific capital projects be done annually and reported to Council. |
| 16 | We recommend that Corporate Finance establish an annual process that ensures that unused borrowing authority is cancelled upon the completion of the project. |
| 17 | We recommend that the CFO consider revising the current quarterly reporting cycle for major capital projects and develop a well defined reporting process that enables monthly progress reporting to the Manager of Capital Projects.<br><br>We recommend that the CFO implement an annual status of capital projects report that includes all capital projects. |
| 18 | We recommend that an oversight role be further developed at the corporate level that has the clear authority and accountability for ensuring that capital projects are adequately monitored and reported on. |

## APPENDIX 8 CONT'D – AUDIT RECOMMENDATIONS

| Recommendation Number | Recommendation |
|---|---|
| 19 | We recommend that the Manager of Capital Projects be provided with professional staff in the areas of Project Costing, Project Planning and Project Quality so that he may perform the responsibilities set out in *Administrative Directive FM-004*. |
| 20 | We recommend that *Administrative Directive FM-002* be amended to clearly define the role of Materials Management and Legal Services in the bid evaluation process and the review of the *Award Report*. |
| 21 | We recommend that the Manager of Capital Projects in consultation with the departments responsible for administering the City's capital projects should update the project management manual by deleting outdated procedures, while at the same time identifying gaps or internal inconsistencies in procedures which should be filled or corrected. (see *Review of Capital Project Procedures and Practices against PMBOK®* section for specific recommendation #23 on changes to the content of the manual.)<br><br>The Manager of Capital Projects should ensure that the body of capital project procedures is codified to enable the production of a comprehensive index of those procedures for easy identification and access.<br><br>The Manager of Capital Projects should develop and maintain a "Procedure Control" system which will enable him to periodically conduct reviews, updates and re-alignment of procedures as needed and necessary.<br><br>The Manager of Capital Projects should establish document control and retention procedures for capital projects. |
| 22 | We recommend that senior management move quickly to tap the knowledge and experience of the current project managers to assist in filling the gaps in project management procedures and practices as identified in this audit and to build a comprehensive project management control framework which can be followed by their successors.<br><br>The Manager of Capital Projects should provide guidance on monitoring the workload capacity of project managers assigned to the more complex and larger scale construction projects to ensure that the scope of responsibilities is reasonable. |

## APPENDIX 8 CONT'D – AUDIT RECOMMENDATIONS

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| 23 | We recommend that the Manager of Capital Projects should oversee the revisions to the *Draft Manual of Project Administration Practice* to establish procedures pertaining to:<br><br>(a) project scope planning, scope definition, work breakdown structure (relative to scope definition), scope verification and scope control. These procedures should be aligned with the administrative directives governing capital projects and with bid opportunity documents and contracts.<br>(b) project schedule management and control processes. The existing procedures should be updated to reflect contemporary scheduling methodology. These procedures should be aligned with corporate project schedule management and control procedures and procurement documents.<br>(c) project estimates by both the departments and its contractors and consultants. This guidance should be based on current industry standards for the preparation of capital construction estimates and be consistent with administrative directives governing cost management and control.<br>(d) quality control and quality assurance.<br>(e) project management staffing from a function and process perspective.<br>(f) project communications that reflect currently accepted capital construction industry standards for progress reporting. The *Administrative Directive FM-004* and project manual should be amended to include a section dealing with the responsibilities of the project manager to ensure that the Contract Administrator/Construction Manager provides the required periodic project progress and performance reports.<br>(g) capital project risk management for departments and project managers.<br>(h) closure of capital construction projects which are linked to specific actions within specific time constraints.<br>(i) an execution plan. The format of the execution plan should be developed with the assistance and input of project managers representing each of the departments and a cross section of project types. An execution plan should be required for all capital projects. |

## APPENDIX 8 CONT'D – AUDIT RECOMMENDATIONS

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|---|---|
| 24 | We recommend that the Manager of Capital Projects should examine project delivery methodologies in practice by public sector entities around the world to ascertain which of those methodologies might be beneficially adopted by the City for its particular project composition and inventory.<br><br>The CFO and the Manager of Capital Projects should amend *Administrative Directive FM-004* to include guidance on the selection of a project delivery methodology which will be a fit with the project conditions, goals and objectives. The Manager of Capital Projects needs to establish clear criteria for selection of capital project delivery systems that is best suited for a particular project.<br><br>The current procurement procedures promulgated by Materials Management and the contract templates used for capital projects would need to be expanded and/or modified to support the particular systems and methodologies adopted. Contract templates for Design Build and other project delivery methodologies need to be developed to support the choice of appropriate project delivery methods. |
| 25 | We recommend that the CFO in consultation with the Directors of Water & Waste, Public Works, PP&D and the City Solicitor should examine the City's current agency practices insofar as the selection of a Contract Administrator. There are alternatives to the City's current practice which may reduce the City's risk of claims and disputes while improving the overall management and control of project planning and execution. |
| 26 | We recommend that the CFO working with the City Solicitor should clarify the City's position on what management and control processes can be ceded to a third party, the role of the owner's project management team in those instances where allocation of management and control has been made to a third party and, finally, the correct alignment of those management and control allocations with the provisions of the contract document set. |
| 27 | We recommend that the design consultant be paid based on a fixed price for the original project scope of design work with the provision that a *Design Change Request* can be submitted where the design consultant believes that a change has been made to the original project scope of design. |
| 28 | We recommend that the Manager of Capital Projects should consider the use of Short-form Bidding and Contracting, Project Bundling and Multi-year Award, for routine, repetitive projects (such as street renewal projects). |
| 29 | We recommend that the CFO and the Manager of Capital Projects should continue to carefully examine the full spectrum of risks inherent in using a P3 project delivery methodology and develop a project delivery methodology for P3s that identifies and allocates risks to the party in the best position to manage the risk. |