



OFFICE OF THE
City Auditor

Capital Projects Advisory Assistance Status Report

January 22, 2014

The Office of the City Auditor conducted
this project in accordance with the
*International Standards for the
Professional Practice of Internal Auditing*

Capital Projects Advisory Assistance

1. Introduction

Following the release of our 2008 report on the 23rd Avenue and Gateway Boulevard Interchange Project,¹ the General Manager of the Transportation Services Department requested that the OCA implement a proactive process to assess capital projects prior to and during construction. The objective of this type of review is to determine if sound project management practices are being applied consistently throughout the life of a project.

Benefits that result from proactive audit involvement in major capital projects include:

- Improved audit efficiency as project staff are familiar with current issues.
- Project documentation is current and readily available, thus eliminating the challenge of locating archived documentation after a project is complete.
- More timely input into actual project management practices, providing stakeholders confidence that the project is progressing in a controlled manner.

2. Background

Project Management

In our 2008 report on the 23rd Avenue and Gateway Boulevard Interchange Project and our 2011 report on Capital Construction,² we recommended a number of improvements to the City's project management practices. Actions to address all of our recommendations are not yet complete. However, the following significant actions have been taken to date:

1. A Corporate Centre for Project Management has been established to lead the improvement of project management for all construction projects across the Corporation.
2. An Administrative Directive has been reviewed and approved by the Corporate Leadership Team. The purpose of the Directive is to ensure that:
 - Performance standards for project management are established and actual performance is monitored and controlled for all construction projects, and
 - All City of Edmonton construction projects consistently follow established project management best practice.

¹ 23rd Avenue & Gateway Boulevard Interchange Project Review
(http://www.edmonton.ca/city_government/documents/PDF/07239_23rd_Avenue_Interchange.pdf)

² Capital Construction Audit, Roads Design and Construction Branch
(http://www.edmonton.ca/city_government/documents/11325_Capital_Construction.pdf)

3. An on-line interactive Project Management Reference Guide (PMRG) has been implemented. The PMRG is designed to help project managers deliver projects in a uniform manner using corporately-defined processes and tools.

The PMRG is a standardized project management methodology developed for construction branches. It was created with assistance from the construction branches, integrating City of Edmonton processes with the PMBOK® *Guide*.³ Future versions of the PMRG will evolve under the direction of a multi-branch stewardship committee.

The first version of the guide was released in October 2013. Projects have been selected to test the procedures included in the PMRG. Full deployment of the guide to be used for all new construction projects is expected to start in July 2014.

4. A project management training program has been developed specifically for the City and is being delivered to City staff who have capital project management responsibilities. Surveys are also underway to collect information on further training requirements.

Project Management Life Cycle

The City developed the following Project Stages Framework to help consistently show and explain the different stages of a capital project life cycle.



Each time a project moves to a new stage, decisions are made that define the scope, level of detail available or required, and the ability to influence costs. As the project moves through these stages, different work groups and sometimes different departments take the lead in managing the project.

Capital Project Selection

The 2012-2014 Capital Budget was approved at \$2.8 billion. The General Manager of Transportation Services requested that we proactively review practices in the following two projects that are part of Transportation Services' \$1.5 billion capital budget.

- Walterdale Bridge Replacement – Capital Project 12-66-1466, approved budget \$132 million.
- Light Rail Transit (LRT), NAIT to downtown – Capital Project 08-66-1672, total approved budget \$755 million with \$495 million for 2012-2014.

³ PMBOK stands for Project Management Body of Knowledge that is published by the Project Management Institute (PMI). It covers 13 knowledge topics including: cost, schedule, scope, communications and risk.

3. **Walterdale Bridge Replacement**

Walterdale Bridge, crossing the North Saskatchewan River near Edmonton's downtown, is approaching 100 years of age and the end of its useful life. The bridge is an important link in the City transportation system, carrying two traffic lanes northbound into downtown from Gateway Boulevard and 109 Street via Queen Elizabeth Park Road and Walterdale Hill Road. The bridge operates at capacity during peak hours, which results in significant congestion on the south approaches.



The bridge replacement will be a signature arch, include one additional northbound lane, and be designed to accommodate a fourth lane in the future. The bridge structure will also include improved facilities to accommodate alternative modes of transportation.

Strategy and Concept Stages

The Transportation Planning branch had completed work on the strategy and concept stages for the Walterdale Bridge Replacement project. The capital budget was approved prior to the Department asking us to be involved in the project. Therefore, we did not have an opportunity to provide proactive input at the earliest project stages. To gain an understanding on the history and complexities of the project, we reviewed the following key project documentation maintained by the Transportation Planning Branch:



- A 2000 Preliminary Engineering Report on the condition of the Walterdale Bridge,
- A 2001 Walterdale Bridge Rehabilitation Assessment report,
- A 2008 Walterdale Bridge Replacement Strategic Planning Concept Study,
- The final 2011 Walterdale Bridge Replacement and Approach Roads Evaluation Concept Planning Study, and
- Various Transportation Committee/Council reports and budget documents.

The following two observations are from our review of the project documents produced in the Strategy and Concept stages:

- **Risk Management** – The Concept Plan identifies a few key issues, constraints, and opportunities for further consideration. The documents that we reviewed did not include the identification and assessment of risks associated with the project.

Process Improvement

Project management procedures in place at the time this project started provided minimal guidance on risk management. The PMRG, released in October 2013, requires that risk identification and assessment processes be completed at each project stage for all future projects.

- **Budget** – The Walterdale Bridge Replacement Concept Plan report was approved by Council on April 27, 2011. The report stated that the budget/project estimate was in 2011 dollars. The capital budget subsequently submitted to and approved by Council was also prepared in 2011 dollars, not the year-of-expenditure dollars as directed in the budget instructions.

Process Improvement

The PMRG, released in October 2013, reinforces existing capital budget instructions, stating that escalation factors are to be obtained and applied for each type of work based on the year it is scheduled to be completed. In addition, Financial Services is developing a Capital and Operating Budget System (COBS) that will require inflation costs to be shown as a separate budget line item.

Design Stage

The responsibility for managing the Walterdale Bridge Replacement project was transferred to the Roads Design and Construction Branch (RDC) for design and construction. The Design stage was started prior to our involvement. We reviewed biweekly meeting



minutes, lists of outstanding action items and key project documents which included the risk assessment, site location study and design reports that were prepared during the Design stage. We also met with RDC management to discuss the project status and our observations on project management practices.

The project management practices for the Walterdale Bridge Replacement project incorporated a number of learnings from previous audits. These included:

- Assigning a single project manager from the City to oversee both the design and build stages of the project.
- Developing a project charter early in the design stage and communicating the full project scope to senior management and Council for information.
- Enhancing the risk management process to better identify risks and mitigation strategies. This included holding workshops with multiple stakeholders.
- Improved communications and public involvement. This included open houses to keep the public informed during the design stages, consultation with First Nations, and regular project updates posted on the City's website during the design and build stages.

Many of these improvements have been incorporated into the Project Management Reference Guide. The following are key observations that we have discussed with RDC managers:

- Project Manager – There are three project managers for this project, the City Project Manager, a Project Manager appointed by the Consulting firm hired to design and manage the bridge replacement project, and a Project Manager appointed by the contractor. None of the project managers have the authority to approve changes in scope, schedule or cost. This authority rests with the project owner with more significant changes being approved by the Branch Manager and General Manager. The project documentation that we reviewed was not clear on the roles and responsibilities of each project manager.

Process Improvement

The Corporate Centre for Project Management is working with RDC management to develop guidance on the role the City's project manager is to play when there are multiple project managers on a project. The role of a project manager will be updated in the 2014 release of the PMRG.

- Monitoring of Project Milestones – RDC did not have a process in place to track the project status relative to the deadline established for critical milestones. We noted that the minutes of biweekly meetings and the list of outstanding action items maintained by the consultant did not include all critical milestones, consistently identify persons responsible for actions or specify the date actions were to be completed. This limited the City's ability to effectively monitor progress against established milestones.

Process Improvement

RDC agreed to enhance the meeting minutes and list of outstanding action items to capture information to allow effective progress monitoring on critical action items (e.g., Provincial Government approval to change cemetery boundaries).

- Use of Contingency – RDC reallocated the contingency established for this project to cover inflation costs. It is estimated that inflation costs over the construction period will be between \$5.4 and \$7.3 million. Contingency funds are intended to pay for costs resulting from unplanned/unforeseen condition or events and unplanned changes in project scope. Using contingency funds to pay for inflation resulted in a contingency fund level that is much lower than is normally associated with a project of this size and complexity.

Process Improvement

The PMRG states that project costs are to include escalation (inflation) costs based on the planned year of expenditure. It also indicates that the contingency is to be based on the impact of risks identified in the risk register. The appropriate use of contingency funds has been identified as an enhancement to be included in a future release of the guide.

Project Cost – The project cost reflected in current budget documents and other reports is \$155 million, an increase of \$23 million from the original budget.

However, the \$155 million does not include \$4 million for work completed in the Strategy and Concept Phases and part of the Design Phase. These costs were charged to a composite project in accordance with current City processes and practices. Neither these costs nor the cost of inflation have been considered when reporting on the total project costs for the Walterdale Bridge Replacement project.

Based on current cost assumptions and cost estimating guidelines, we estimate that the total budget for the Walterdale Bridge Replacement project should have been reported as follows:

○ Original Approved Budget	\$132 million
○ 2013 Supplemental Budget Adjustment for utility relocation	\$3 million
○ Adjustment for higher than anticipated costs following review of construction tenders	\$20 million
APPROVED PROJECT BUDGET	\$155 MILLION
○ Concept planning and design costs incurred prior to budget approval. Funded from a composite project.	\$4 million
○ Allowance for contingency used to cover inflation.	\$6 million
OCA ESTIMATE	\$165 million

Process Improvement

The Business Case section of the PMRG indicates that project costs are to reflect the total project cost. To increase transparency and accuracy of reported project costs, we requested that the PMRG be clarified to require that full costs be reported on all future projects. The Corporate Centre for Project Management has documented our request for inclusion in a future release of the guide.

Build Stage (in progress)

Regular status meetings have been scheduled with RDC management and a representative from the Corporate Centre for Project Management in order to keep current on project management practices and the impact they are having on construction activities.



Our review of key documents such as project plans, change orders and meeting minutes indicate that most practices align with sound project management principles. We identified two items where improvement or action is required.

- Project Oversight – The format of meeting minutes has space to identify individuals responsible for action items and the action due dates. This functionality is not being used consistently. Without this information, tracking of action items is difficult.

Process Improvement

The consultant responsible for maintaining meeting minutes has agreed to improve action item recording as the project moves forward.

- Risk Management – The risk assessment completed during the design stage was not updated at the start of the Build Stage (July 2013). The assessment should have been updated to reflect the status of already identified risks and incorporate new risks associated with construction. We noted that risks were discussed at weekly construction meetings. However, the risk register was not updated until October 2013 following our request for a status update on risk management.

Process Improvement

The PMRG identifies the requirement to identify, assess and monitor risks in all stages of the project life cycle. The Corporate Centre for Project Management advised the OCA that the risk register should be updated at the start of the build stage and maintained throughout the stage to decrease both the likelihood and impact of a risk event occurring.

RDC has made major improvements to their project management practices for the Walterdale Bridge Replacement Project to address recommendations we made in prior audits. Further, the actions of RDC and the Corporate Centre for Project Management to address the opportunities for improvement we identified through our proactive participation demonstrate their commitment to improving their practices. We have discussed our role with RDC management and they believe that our proactive involvement will continue to add value to the Walterdale Bridge Replacement project.

4. Light Rail Transit

Capital Line

The Capital Line runs from Clareview in the Northeast through downtown and the University of Alberta main campus to Century Park in the South.

In 2007, as part of our 23rd Avenue and Gateway Boulevard Interchange Project, we assessed project management practices in four City Branches. At that time, construction of the South LRT extension (Health Sciences station to Century Park) was underway. We reviewed the project control manual and discussed project management practices with the LRT Design and Construction project team. We found that their practices aligned with leading practice and were more advanced than other areas of the City.

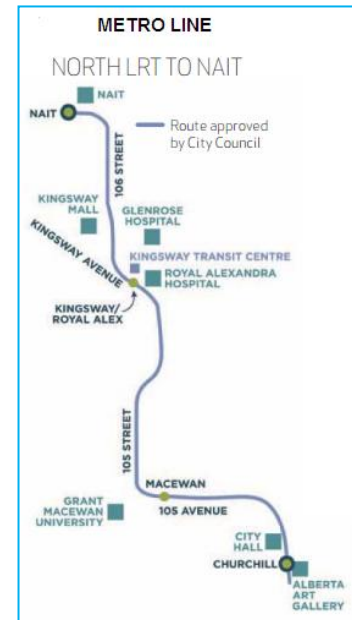


Metro Line

The Metro line runs from NAIT in the North to downtown on dedicated tracks and then integrates with the Capital Line from the downtown Churchill station to the Health Sciences station on the University of Alberta campus. This integration requires that the entire LRT train control system be replaced to accommodate the doubling of traffic on the Capital Line.

The Build Stage of the project management life cycle for the Metro Line was already underway when we were asked to proactively review the project management practices applied to the project.

We reviewed the Metro Line project control manual, the construction implementation plan as well as a number of Project Monthly reports. The monthly reports highlighted progress for the period, planned activity for the next period, and hot button items that could impact the project schedule. We also met with members of the LRT Design and Construction project team to obtain clarification and validate our observations.



Based on our review, we believe that the LRT Design and Construction office continues to apply leading project management practices. Two of the leading practices being applied are the use of Work Breakdown Structure (WBS) and Earned Value Analysis (EVA) tools.

- WBS is a deliverable-oriented hierarchical breakdown of the work to be executed to accomplish project objectives and create the required deliverables. It organizes and defines the total scope of the project.
- EVA is a method for measuring project performance by integrating scope, cost, and schedule progress measurements. This allows the project manager to determine what adjustments are needed to keep the project on budget and schedule.

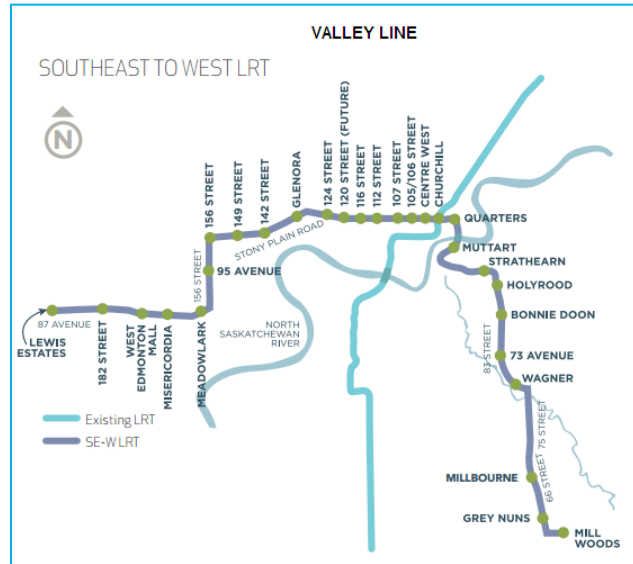
Corporate Process Improvement

The project management process set out in the PMRG recognizes the need to use WBS in all project stages. We were advised that the Corporate Centre for Project Management and the Roads Design and Construction Branch has had discussions with LRT Design and Construction regarding the use of EVA for future capital projects

Valley Line (Capital Project 11-66-1673)

The Valley Line will run from Millwoods in the Southeast through downtown to Lewis Estates in the West. Planning of the Millwoods to Downtown section is currently underway.

The Valley Line will be constructed using a P3 contract (Public-Private Partnership) with funding from PPP Canada. Representatives from the LRT Design and Construction project team advised us that they have sought advice from consultants specializing in P3 contracts, professionals with experience in handling various aspects of P3 relationships, and representatives of organizations who have successfully managed P3 contracts.



The steps taken by the LRT Design and Construction project team provide them with the knowledge to understand the P3 environment to allow them to apply the appropriate project management practices.

Governance

In February 2012, City Council approved a bylaw creating the LRT Governance Board to provide oversight for all LRT projects. The Board’s duties and authorities include:

Duties	Authorities
<ul style="list-style-type: none"> • Determining the best construction delivery method • Determining the procurement method • Selecting the contractor • Monitoring and controlling expenditures within the approved budget • Communication and public consultation • Managing project scope, schedule and contract changes 	<ul style="list-style-type: none"> • Allocate funds made available by City Council and other orders of government • Approve and enter into sole source agreements not related to land • Approve and enter into agreements

Based on our observations, we believe the LRT Design and Construction project team has consistently demonstrated application of project management leading practices. Further, the LRT Governance Board provides oversight to ensure that due diligence is applied throughout the life of a project.

Because the team has demonstrated consistent application of project management leading practices and the LRT Governance Board has taken on oversight tasks, we

believe that the City has an appropriate degree of risk mitigation on LRT projects. We have discussed our role with the LRT Design and Construction Team and we have agreed that we will discontinue ongoing monitoring of LRT project management activity.

5. Conclusion

Our involvement in the Waltherdale Bridge Replacement Project and Metro line LRT, NAIT to downtown construction has provided us with insights into the City's continuous improvement of its project management practices for all business areas involved with capital construction projects. We have seen major improvements in project management practices implemented by the Administration over the past two years through the collaborative process that has been established.

We have been able to identify minor improvements that have been accepted by both the business area and the Corporate Centre for Project Management. We believe that continuing our proactive involvement in select capital projects will allow us to continue adding value to the Administration's continuous improvement process for project management.