

Administrative Update on the Metro Line LRT Signalling System Audit

Recommendation:

That the August 24, 2015, Transportation Services report CR_2595, be received for information.

Report Summary

This report provides an administrative response to the Office of the City Auditor's Metro Line LRT Signaling System Audit report. Administration accepts the three recommendations as made by the Auditor and provides an update on recent actions.

Report

Background

In the late 1990s, Edmonton City Council led a public conversation about public transit and options for expanding Light Rail Transit (LRT) across the city. In 1999, City Council approved a Transportation Master Plan recommending a city-wide, high speed transit system. In 2004, a study recommended high-speed transit between downtown and the Northern Alberta Institute of Technology (NAIT). In 2005, another study explored route options and land use planning, and in 2007, Council approved funding for concept planning and preliminary engineering for the North LRT Extension (renamed Metro Line in 2013). In 2008, City Council approved the North LRT Extension concept plan, and in 2009 through 2011, the City began actively planning for the construction and operation of the extension. (It is worth noting that between 2004-2010, the City was simultaneously extending the LRT south from University Station to five new stations, terminating at Century Park Station).

For several reasons, the City decided to use advanced Communication Based Train Control for the signalling system for the Metro Line. The primary advantage to using Communication Based Train Control over traditional railway fixed block train control and signals was the increased frequency and speed of trains using the advanced signalling system. This increased functionality would allow for two LRT lines - the Metro Line and the Capital Line - to share a single set of tracks joining underground at Churchill Station and proceeding south to Health Sciences Station and Century Park Station.

Communication Based Train Control also offered an advantage to managing future ridership growth with two-and-a-half minute service frequency through Edmonton's downtown core. Also, Communication Based Train Control offers optimal operations on embedded track that is in place on segments of the Metro Line.

This innovative approach to managing train movements is being used on most new and refurbished signalling systems on subways and LRT systems throughout the world. A

scan of recent trade news reveals that issues with integration of systems are not uncommon.

Through the life of the Metro Line project, the Communication Based Train Control contractor missed deliverables and milestones. The contractor provided adjusted schedules indicating additional effort at later stages to recapture the lost time.

As identified in the audit, there were concerns about meeting timelines. Early in the process concerns were identified and the City should have escalated these matters to senior Administration and Council early in 2013.

In 2013, the City was advised by the signalling contractor that they would miss all targets necessary to meet the contracted delivery date, meaning the whole Metro Line project opening would be delayed. City council was first informed of the delay during budget deliberations in December of 2013. The City's Owner's Engineer on the project established that the signalling contractor was significantly underperforming on the contract deliverables. To mitigate further delays, a staged implementation of the Metro Line was proposed by the signalling contractor. Stage one implementation would limit installation of Communications Based Train Control to the green field new portion of the Metro Line - interfacing with the existing signals system at Churchill Station. Transportation Committee was advised of this staged implementation and significant delay in March of 2014.

Contract/Project Management

Beginning in 2013, the City put into place the Corporate Project Management Reference Guide. This guide serves as the City's guidelines and toolkit for managing Projects. This guide outlines roles, responsibilities, and practices for managing city projects. It was not in place in 2010, when plans for Metro Line construction and contracting were being developed. In its place the North LRT Expansion Project Control Manual was used to outline, in detail, project management control functions and responsibilities. The North LRT Expansion Project Control Manual created the foundation for managing the Metro Line Project.

As the Metro Line LRT Signalling System Audit explains, an evaluation and decision process was undertaken to determine the contract delivery methods and structure. This process identified risks and benefits for two overall project structures: a single contract with full project accountability and a split contract with separate contract accountabilities (one for civil construction, the other for signalling). The single contract structure offered the benefits of more integrated schedule coordination, enhanced performance and an overall a project management desire for single point of contract accountability. The split contract structure offered closer involvement between City staff and the Communication Based Train Control signalling integration, which included a dual opportunity to harvest ETS expertise with LRT signals and direct ETS involvement with Communication Based Train Control system integration.

Upon weighing the balance of risks and benefits, the City decided to split the Metro Line contract in 2010. In 2011, contracts were awarded for the design and construction of the civil infrastructure works for the Metro Line, as well as for the Communication Based Train Control signalling system. For the signaling contract, the City conducted a standard procurement competition and the successful proponent for this contract, Thales Rail Signalling Solutions, was responsible for designing and building the Communication Based Train Control signalling system for the Metro Line. LRT Design and Construction maintained overall accountability for the civil construction contract and the overall Metro Line capital profile.

Communication Based Train Control Contract

As the Audit explains, the Communication Based Train Control contract experienced early significant challenges meeting milestones and deliverables. Prior to the Request for Proposals being issued and awarded, potential vendors estimated it would take between 32 and 45 months for the development and implementation of a Communication Based Train Control system. The Request for Proposals and the contract with the successful proponent defined a requirement for practical completion of the work by the end of 2013, approximately 32 months from the date the contract was awarded.

Currently the Communication Based Train Control system is not complete, nor is it close to practical completion according to the terms of the contract. There remain significant deficiencies that are yet to be resolved and significant functionality yet to be delivered. The signalling contractor continues working to remediate deficiencies and retrofit Light Rail Vehicles. This work is progressing much slower than envisioned or intended. Milestone payments have been made for work completed and verified, but a significant holdback of (approx. 40 percent of contract value) related to Performance Demonstration remains.

In addition to the full completion of the system functionality, issues related to final design drawings, maintenance training, and spare parts and warranty remain outstanding. Each of these are required to be completed and satisfied prior to the contract being considered complete.

While the decision to split the Metro Line work into two contracts appears to have been made in full consideration of the implications and alternatives, it is apparent that the difficulty in implementing these systems was not fully appreciated or understood. The difficulties with the signalling contract are more significant than initially estimated, and are taking longer to resolve than expected in 2011 when the contract was initiated.

As outlined in the audit findings, management of the signalling contract did not have clearly defined roles and responsibilities, which resulted in a breakdown in the chain of command and an inability to escalate attention to emerging issues in a timely manner. Clearly defined roles and responsibilities are key components of delivering a project successfully and are essential organizational supports for staff managing contracts and projects for the City.

Lessons Applied

The City has taken steps to ensure that lessons learned on the Metro Line project are incorporated into project decision-making. The City is currently undertaking a review of its procurement methodology and reviewing internal best practices.

Since the launch of the Project Management Reference Guide in October 2013, Transportation Services has standardized its project management methodologies with those developed for City of Edmonton construction branches. Transportation Services is an active member in the Project Management Business Process Stewardship Committee created to ensure the long-term successful operation and continuous improvement of Project Management business processes across the City of Edmonton.

Transportation Services continues to work closely with the Corporate Centre for Project Management to enhance Project Management Reference Guide orientation and training within the department, enhance corporate project management frameworks and administrative directive for capital construction projects, and identify improvements in project management tools. In January 2014, the Transportation Services General Manager began regular weekly project management meetings to ensure senior level oversight on the Metro Line project and to ensure that project progress, roles, responsibilities, communications and decision authority were clearly defined and accountability maintained. Regular communications were initiated with the senior leadership of the signaling contractor.

Transportation Services failed to promptly inform senior administration and Council when risks associated with the Metro Line signaling became evident. A directive was set in January 2014 to begin correcting this communication gap. Transportation Services continues to improve its reporting to Council and citizens (bringing five reports forward in the past fifteen months regarding Metro Line status) and has increased the frequency of memos to Council to better communicate status of this project. These memos are publicly posted on the City's website.

Transportation Services is currently in the process of conducting organizational and leadership reviews. The Organizational Effectiveness Review will propose improvement to the integration and alignment across the Department, clarify purpose, processes and roles related to planning and service delivery, and develop a strategy and action plans directed at improving the working relationships across the Department.

Lessons from the Metro Line project were applied to the Valley Line Public Private Partnership (P3) agreement that places substantial financial incentives on the proponent for complete delivery and incorporates an independent safety audit into the compulsory hand-off process. The single line of contractual accountability between the City and the proponent creates significant incentive for the proponent and its partners to meet the specified deliverables.

Recommendation 1 – Contract Management Principles: Accepted

Transportation services has completed a Gap Analysis for all major projects to ensure

consistent adherence to Contract Administration principles and methodologies as per the corporate Project Management Resource Guide's 13 project management knowledge areas (principles). Transportation Services will complete a Gap Analysis for the remainder of projects by December 31, 2015, and have an Implementation Plan in place by March 31, 2016.

Recommendation 2 – Project Management Improvements: Accepted

Project rigor has been established regarding project roles, responsibilities, lines of communication, management of working relationships and decision authority levels as per the directives present in the Project Management Resource Guide. All projects are evaluated based on Project and Enterprise Risk Management principles. This evaluation prescribes consistent methodologies and principles across all Transportation Services projects and ensures the necessary roles, responsibilities and authorities are in place for the success of the project.

This review will be complete by December 31, 2015, and will confirm that for major projects appropriate Roles, Responsibilities and Authorities are in place.

Recommendation 3 – Project Reporting: Accepted

Transportation Services has begun work with Financial Services and Utilities and the Corporate Centre for Project Management staff to develop a standard corporate reporting methodology for major capital projects which includes schedule, scope and budget status as well as overall risk assessment and quality management. This will include a best practice scan for project reporting and development of a standardized corporate reporting methodology.

This Best Practice Scan will be completed by December 31, 2015, and initial project reporting in place by June 30, 2016.

Others Reviewing this Report

- Kate Rozmahel, General Manager, Corporate Services