Minutes – Standing Policy Committee on Finance – July 6, 2017

REPORTS

Item No. 5 Water Supervisory Control and Data Acquisition (SCADA) Upgrade Financial Status Report No. 9 for the Period from February 1, 2017 to April 30, 2017

STANDING COMMITTEE DECISION:

The Standing Policy Committee on Finance concurred in the recommendation of the Winnipeg Public Service and received the report as information.

DECISION MAKING HISTORY:

Moved by Councillor Lukes,

That the recommendation of the Winnipeg Public Service be concurred in.

Carried

ADMINISTRATIVE REPORT

Title: **WATER SUPERVISORY CONTROL AND DATA ACQUISITION (SCADA) UPGRADE FINANCIAL STATUS REPORT NO. 9 FOR THE PERIOD FROM FEBRUARY 1, 2017 TO APRIL 30, 2017**

Critical Path: **The Standing Policy Committee on Finance**

AUTHORIZATION

Author	Department Head	CFO	CAO
G. K. Patton, P. Eng., Manager of Engineering Services	M. L. Geer, CPA, CA Director, Water and Waste Department	M. Ruta	D. McNeil

EXECUTIVE SUMMARY

This report provides a quarterly update on the status of the Water Supervisory Control and Data Acquisition (SCADA) Upgrade Project. This capital project is financed from the approved Capital Budget for Water Supervisory Control and Data Acquisition (SCADA) Upgrades. The SCADA Upgrade Project will address hardware and software that has reached end of life. These upgrades will help ensure a continuous supply of water to the City of Winnipeg. A Contract to retain an Owner's Advocate Engineer was awarded February 28, 2017. Preliminary design work has been initiated under the Contract. During this reporting period, the Department completed the procurement of a storage array to minimize operating risk in the event of SCADA failure prior to project completion. The project is currently on schedule and on budget.

RECOMMENDATIONS

That this report be received as information.

REASON FOR THE REPORT

Administrative Directive No. FM-004 requires quarterly reporting to the Standing Policy Committee on Finance.

IMPLICATIONS OF THE RECOMMENDATIONS

There are no implications associated with receiving this report as information.

HISTORY / DISCUSSION

1. MAJOR CAPITAL PROJECT STEERING COMMITTEE

Administrative policy for projects with capital cost exceeding $20 million requires formation of Major Capital Project Steering Committee. This threshold was approved by Council on October 28, 2015. Also included in that Council Approval was that the threshold be adjusted for construction inflation on an annual basis. Per Appendix 6 in the 2017 Capital Budget Book, the threshold for 2017 is $21 million. The Committee has been formed and its members are:

Cindy Fernandes, Director of Community Services
John Kiernan, Director, Planning, Property and Development
Georges Chartier, Chief Asset & Project Management Officer
Moira Geer, Director of Water and Waste
Lucy Szkwarek, Acting Manager of Finance and Administration, Water and Waste
Geoffrey Patton, Manager of Engineering, Water and Waste

2. DESCRIPTION OF PROJECT

The Water Services Division utilizes a Regional SCADA control system to operate, control and monitor processes at the Shoal Lake Intake Facility, regional pumping and booster stations, and the Deacon Chemical Feed Facility. The Regional SCADA provides automated control and visualization of the water supply and distribution system to operators on a 24/7 basis so they can control and monitor these processes. The Regional SCADA system is made up of instrumentation, remote communication equipment and specialized computer hardware with customized software, such as Programmable Logic Controllers (PLCs). The regional pumping and booster stations as well as the water supply intake at Shoal Lake are controlled locally via PLCs and are monitored remotely via the City's Regional SCADA.

The Regional SCADA is comprised of server hardware and software that are approaching end of life. In addition, the PLCs at the aforementioned locations have also reached the end of their useful life and are no longer manufactured.

The Department currently has two water SCADA system providers; Telvent, which is used for the regional water system, and Wonderware, which is used for the water treatment plant. A Regional SCADA Upgrade Life Cycle Cost Analysis was completed in June 2015. The analysis considered two options for upgrading the Regional SCADA system:

1. Updating the existing Telvent system
2. Replacing the existing Telvent system with a Wonderware system

The analysis considered costs for hardware, software and support agreements over a 25-year period. The report found that Wonderware was the preferred option having the lowest life-cycle cost.

The project objective is to upgrade the Regional SCADA and PLCs to ensure timely replacement of end of life hardware and software. The delivery method for this project is design-build (D-B). The project requires specialized systems integration knowledge. As such, an Owner's Advocate Engineer will be engaged to assist the City in developing the D-B Request for Proposal (RFP) and monitoring implementation. Proponents for the D-B RFP will be shortlisted using a Request for Qualifications (RFQ) process.

A preliminary design for the PLC upgrades was completed in 2013. This predesign was undertaken in conjunction with the predesign of power reliability upgrades required at the pumping stations.

The Water SCADA Upgrade adopted project roll up includes the following Project Identifications:

Project ID 2005100200	Project Year	Amended Budget
2005000211	2011	$367,339[1]
2005000214	2014	$35,000
2005000216	2016	$3,864,661
2005000217	2017	$8,033,000
Total Amended Budget		$12,300,000

[1] Does not appear in the Capital Expenditures Monthly Report as the funds have been expended and it is designated as a closed Project ID

The Executive Project Sponsor is the Director of Water and Waste. The Project Manager is Alison Weiss, P. Eng.

3. RISKS AND RISK MITIGATION STRATEGIES

An ongoing risk management strategy has been implemented for the project encompassing a proactive process of identifying and assessing project risk, defining appropriate risk handling strategies and plans, and monitoring those actions to completion.

Formal risk and opportunity analyses of the project are scheduled to be performed by the project team at major milestones as the project progresses. Global project risks of significance include:

Risk Matrix[1]	
Risk Statement and Explanation	**Mitigation**
PLC components to be replaced are at the end of their intended service life and may fail prior to project completion. These components are no longer manufactured.	An inventory of spare PLC components has been obtained by the Department. D-B has been selected as the delivery method for this project, allowing for design and implementation to occur simultaneously, resulting in earlier replacement of PLC components.
SCADA hardware to be replaced is at the end of its intended service life and may fail prior to project completion.	The Department has procured SCADA servers and virtualization software and is in the process of virtualizing the existing Regional SCADA to minimize system impacts and maintain system operation in the event of a failure prior to project completion. The purchased hardware will be re-used in the upgraded SCADA system as a test bed platform.
D-B reduces the City's control during detailed design, resulting in a sub-optimal final design.	Project requirements will be specified as detailed as possible in the D-B RFP. The RFP will include strict performance requirements.

Risk Matrix[1]	
Risk Statement and Explanation	**Mitigation**
Bid prices for the D-B RFP exceed budget resulting in inability to award and schedule delay.	Ongoing discussion with the Owner's Advocate Engineer on any significant cost impacts, obtain an updated cost estimate of D-B RFP as early as possible.
An unqualified/inexperienced contractor bids on the D-B RFP with a low price that skews the evaluation.	Bidders for the D-B RFP will be pre-qualified using an RFQ.
D-B reduces the City's ability to control risks associated with tie-ins to existing equipment and coordination of work.	Project constraints will be clearly defined in the D-B RFP. D-B proponents will be required to submit a detailed implementation plan.

[1]Risk Matrix is arranged vertically from higher to lower assessed risk

SCHEDULE:

The SCADA and PLC upgrades will be undertaken in conjunction with power reliability upgrades required at the pumping stations in order to reduce pumping station shut-down times and potentially reduce design and implementation costs. Any design or implementation delays related to the power reliability upgrades have the potential to affect the schedule of the SCADA and PLC upgrades. As station shut downs will only be permitted during periods of low demand and, as no more than two stations will be upgraded at one time (to minimize potential risk to the distribution system), design issues can be dealt with in advance of, or between, station upgrades. Implementation issues will be minimized through careful planning including the development of an overall implementation schedule, implementation/changeover planning, and preparation of shutdown protocols. Further, lessons learned through the sequential station upgrading will be applied to succeeding upgrades.

COST RISK:

The cost estimate of $9 million for engineering and implementation for the PLC upgrade work is based on a Class 3 estimate, prepared as part of the preliminary design, with an expected accuracy range of -20% ($7.2 million) to +30% (11.7 million). The cost estimate of $9 million includes a 20% contingency ($1.5 million).

The cost estimate for the Regional SCADA upgrade has been refined from a Class 5 estimate of $3.3 million to a Class 4 estimate of $3.1 million based on the results of the life cycle cost analysis completed in 2015. The current estimate is slightly lower than the original estimate; however, the Department is not recommending a change in the requested budget at this time due to the class of the estimate. The updated cost estimate has an expected accuracy range of -30% ($2.17 million) to +60% ($4.96 million). The cost estimate of $3.1 million includes a 20% contingency ($0.5 million).

Total project contingency is $2 million. No project contingency funds have been expended to date.

It is AACE International accepted practice that cost estimates are adjusted as design progresses.

4. CURRENT PROJECT STATUS

Preliminary design work has been initiated under the Owner's Advocate Contract (RFP 583-2016). The project is currently on schedule and on budget.

Current key schedule milestones are:

SCADA Upgrade		
Milestone Description	**Timeline**	
	Previous Report	**This Report**
Issue RFP for Owner's Advocate Engineer	Issued October 2016	Issued October 2016
Start D-B RFQ/RFP Development	Q3 2017	Q3 2017
Issue D-B RFQ	Q4 2017	Q4 2017
Issue D-B RFP	Q4 2018	Q4 2018
Start SCADA Detailed Design/Upgrading	Q4 2019	Q4 2019
Complete SCADA Upgrading/Commissioning	Q3 2020	Q3 2020
Start PLC Upgrading Phase 1 (Tache/Shoal Lake)	Q4 2020	Q4 2020
Start PLC Upgrading Phase 2 (McPhillips/Hurst)	Q4 2021	Q4 2021
Start PLC Upgrading Phase 3 (MacLean/Deacon)	Q4 2022	Q4 2022
Complete Commissioning of all project components	Q3 2023	Q3 2023

The constraints on implementation to minimize potential impacts on the water supply system mean that small changes in the schedule can cause completion date shifts of up to a year.

The project schedule will be adjusted as the project progresses with key schedule reviews anticipated prior to the release of the D-B RFP, after award of the D-B contract and upon completion of the SCADA upgrade.

5. CHANGES FROM LAST REPORT

The Contract for an Owner's Advocate Engineer (RFP 583-2016) was awarded to Dillon Consulting Limited on February 28, 2017. Preliminary design work has been initiated under the Contract.

As part of the virtualization of the existing SCADA system to minimize operating risk in the event of failure prior to project completion, a storage array was procured through a modified competition approved by Materials Management during this reporting period. The purchase of the storage array is reflected in the costs submitted this report shown in Appendix 1 ($12,213).

6. FINANCIAL ANALYSIS

The status of current RFPs and Bid Opportunities are as follows:

RFP or Bid Opportunity	Description	Current Status	Contract Value (GST and MRST extra as applicable)
RFP 224-2012	PLC Replacement and Power Reliability Upgrades Preliminary Design	Completed by SNC Lavalin Inc.	$315,563
Sole Source Consultant Assignment 307-2012	Equipment Identification Standard and Electrical Design Guide Development	Completed by SNC Lavalin Inc.	$46,948
Consultant assignment at or under $35,000	Regional SCADA Life Cycle Cost Analysis	Completed by Dillon Consulting Ltd.	$35,000
RFP 583-2016	Owner's Advocate Engineer and Professional Engineering Services for PLC, Regional SCADA and Power Reliability Upgrades	Phase I awarded to Dillon Consulting Ltd. Phase II to be awarded at a later date subject to the conditions of RFP 583-2016	$552,981 $509,000 is funded by the Water SCADA Upgrade authorized capital and $43,981 is funded by the Pumping Stations Reliability Upgrades authorized capital

Future major RFQs, RFPs and Bid Opportunities include:

- RFP 583-2016 Phase II (Contract Administration, Post Construction Services and associated Project Management) to be awarded at a later date subject to the conditions of RFP 583-2016
- RFQ – Design & Build PLC, Regional SCADA and Power Reliability Upgrades
- RFP – Design & Build PLC, Regional SCADA and Power Reliability Upgrades

Project funding

The approved capital budget is as follows:

Year	Capital Program	Actual and Projected Cash Flows	Cumulative Capital Budget Remaining
Up to 2015	$402,339	$402,339	$0
2016	$3,864,661	$65,074	$3,799,587
2017	$8,033,000	$264,214	$11,568,373
2018		$124,000	$11,444,373
2019		$236,000	$11,208,373
2020		$5,250,000	$5,958,373
Beyond 2020		$5,958,373	$0
Total	$12,300,000	$12,300,000	

A summary of the budget to forecast comparison is contained in Appendix 1 (attached). The projected cash flows are tied to the project schedule and will be adjusted as the project progresses.

The Water SCADA upgrade project is funded by retained earnings.

The variance in spending up to 2015 from this report to the Capital Expenditure Monthly Report is $367,339, which is equivalent to the expenditure in the closed 2011 budget. These funds were spent on preliminary engineering.

7. ANTICIPATED PROGRESS DURING NEXT REPORTING PERIOD

Preliminary design work under the Owner's Advocate Engineering Contract will continue during the next reporting period. It is anticipated that development of the RFQ to retain a design-builder will also be initiated during the next reporting period.

FINANCIAL IMPACT

Financial Impact Statement **Date:** **May 19, 2017**

Project Name:

WATER SUPERVISORY CONTROL AND DATA ACQUISITION (SCADA) UPGRADE FINANCIAL STATUS REPORT NO. 9 FOR THE PERIOD FROM FEBRUARY 1, 2017 TO APRIL 30, 2017

COMMENTS:

As this report is submitted for informational purposes only, there is no financial impact associated with this recommendation.

"Original signed by L. Szkwarek, CPA, CGA"
Lucy Szkwarek, CPA, CGA
Acting Manager of Finance and Administration

CONSULTATION

In preparing this report there was consultation with:

N/A

OURWINNIPEG POLICY ALIGNMENT

This report is in accordance with the OurWinnipeg policies through initiative 03-6c SCADA System Investment under the Sustainable Water and Waste Direction Strategy.

OurWinnipeg Reference: Sustainable Water and Waste.

SUBMITTED BY

Department: Water and Waste
Division: Engineering Services
Prepared by: A. M. Weiss, P. Eng.
Date: June 12, 2017
File No.: W-761

c: Major Capital Project Steering Committee (email)

ATTACHMENTS:
Appendix 1 – Costs of SCADA Upgrade Project

WATER SUPERVISORY CONTROL AND DATA ACQUISITION (SCADA) UPGRADE
WATER AND WASTE DEPARTMENT - ENGINEERING DIVISION
APPENDIX 1
As at April 30, 2017

	Components	COSTS			PROJECTED COSTS TO COMPLETE					TOTAL	VARIANCE	NOTE
		Approved Budget To Date[1]	Costs submitted this report	Total Costs Incurred to Date (to April 30, 2017)	2017	2018	2019	2020	Total Costs Remaining to Complete	Total Project Cost	Variance from Budget (Unfavourable)	
A	**PROFESSIONAL SERVICES**	$4,690,000	$0	$402,339	$252,000	$124,000	$236,000	$1,913,000	$1,762,661	$4,690,000	0	[2]
B	**CONSTRUCTION**	$5,610,000	$12,213	$77,288	$0	$0	$0	$3,337,000	$2,195,712	$5,610,000	0	
C	**CONTINGENCIES**	$2,000,000	$0	$0	$0	$0	$0	$0	$2,000,000	2,000,000	0	
	TOTALS	**$12,300,000**	**$12,213**	**$479,627**	**$252,000**	**$124,000**	**$236,000**	**$5,250,000**	**$5,958,373**	**$12,300,000**	**0**	

Percentage Complete 4%

[1] Total budget of $12,300,000 for the Water SCADA Upgrade Project; Distribution of costs to Components A, B and C was done by the Water and Waste Department. The budget included $9 million for PLC upgrades and $3.3 million for SCADA upgrades. The cost estimate for the SCADA upgrades has been refined to $3.1 million, however a change in budget is not recommended at this time. These are estimates and will be revised as the project progresses.

[2] Professional Services include Professional Engineering Services (preliminary design, life cycle cost analysis, detailed design, programming and contract administration), overhead and administration charges.