

**Meeting Date:** July 15, 2019  
**Department:** Engineering & Public Works  
**Prepared By:** Paul Zuberbuhler, CET, Manager of Environmental Services  
**Submitted By:** George Elliott, P.Eng., Director of Engineering & Public Works  
**Approved By:** Greg McClinchey, Chief Administrative Officer  
**Subject:** **Water Meter Replacement and Automated Meter Reading Technology**  
**Report No. EPW 19-016**

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## **RECOMMENDATION:**

It is recommended:

1. That Council receive Report EPW 19-016 regarding Water Meter Replacement and Technology Upgrade Project to implement an Automatic Meter Reading (AMR) mobile system, and
2. That Council authorize the issuance of an RFP for the Water Meter Replacement and AMR Upgrade Project to implement a system wide mobile reading system and increase the project budget by \$33,000 funded from the Water Capital Reserve, and
3. That Council approve the extension of the consulting services by Diameter Services to complete the Procurement Phase for a cost of \$59,686.60 including HST.

## **BACKGROUND**

The Municipality of Strathroy-Caradoc engaged the consulting firm, Diameter Services, to undertake a water meter technology and replacement evaluation. The Municipality has over 7,000 water customers. Of these customers, approximately 49% of the existing meters were determined to be at or beyond their useful life. All meters are currently manually read and billed by Entegrus who utilizes a third party water meter reading company.

The Municipal staff from Finance, Information Technology, EPW and the CAO participated in workshop discussions with Diameter Services. The scope of this exercise included the examination of the current processes, assessment of future goals, investigation of business drivers and how they relate to the various technology options. This included Automatic Meter Reading (AMR) and Advance Metering Infrastructure (AMI). From this information a capital cost estimate was completed.

The overarching goals were determined taking into consideration the vision for the overall AMI/AMR project, technology expectations and installation delivery. The following table summarizes these goals and provides a description of the challenges faced currently.

Key Project Goals	Current Challenges to Address
Better Control Over Meter Reading and Billing Functions	<ul style="list-style-type: none"> <li>• Reduce billing estimates</li> <li>• Establish and monitor Key Performance Indicators</li> <li>• Information to support customer service and operational functions</li> <li>• Reduce meter reading costs and costly final reads</li> </ul>
Improve Meter Maintenance	<ul style="list-style-type: none"> <li>• Water meter age is leading to billing inaccuracies and lost revenue</li> <li>• Current technology leads to inaccurate readings and billing issues</li> <li>• Almost 99% of the existing meters are low resolution</li> <li>• Reduce non-revenue water</li> <li>• Installations requires multiple visits</li> <li>• No ability to detect theft/tamper</li> <li>• Mitigate existing maintenance issues particularly wiring issues</li> </ul>
Enhance Customer Service Experience	<ul style="list-style-type: none"> <li>• Unable to provide first call resolution service</li> <li>• Ensure customers are billed accurately</li> <li>• Instantaneous access to data to support customer inquiries</li> </ul>

## COMMENTS

In collaboration with the Municipality, Diameter Services reviewed, assessed and ranked 29 different business drivers. Diameter Services evaluated how each technology allows the Municipality to implement or achieve these business drivers in terms of the needs of the utility. The following table provides a summary of the business driver assessment summarizing only those ranked as essential and important.

Revenue Protection	Monthly reading and billing
	Tamper detection / zero consumption
	Detect misapplied meters
Operational Efficiency	Improve meter reading reliability
	Reduce billing exceptions
	Detect register and cut wiring problems
	Reduce regular meter reading cost
	Same day final / special reads
Improved System Distribution Management	Detect backflow events
Customer Service Enhancements	Reactive use of leak detection
	Proactive leak detection alerts
	Customer consumption analysis

From a technology perspective, AMR mobile, AMI fixed network, and AMI Cellular were all examined taking into consideration features/functionality, how AMI and AMR technology could support the Municipality’s visions and goals, capital costs and on-going operational costs. The following table provides a summary of the scenarios:

Scenario 1 AMR Mobile	Scenario 2 AMI Fixed	Scenario 3 AMI Cellular
Replace all meters and connect an AMR radio transmitter. Monthly readings using a mobile data collector solution	Replace all meters and connect an AMI radio transmitter. Hourly readings through a fixed network solution	Replace all meters and connect an AMI cellular radio transmitter. Hourly readings through the cellular network
Lowest cost option  Provides some functionality/benefits  Solid market experience  Ability to Migrate to AMI  Allows for On-premise software	More expensive option  Provides the most functionality/benefits  Newer technology  Requires additional software and maintenance  SaaS* would likely be required	More expensive option  Provides the most functionality/benefits  Newest Technology  Requires additional software and maintenance  SaaS is mandatory  Easier to install, easier to maintain

\* Software-as-a-Service

Both financial and non-financial benefits were taken into consideration and an AMR solution was deemed the best value for money for the Municipality. During an AMR project, radio transmitters would be installed on the interior of the property as a strategy to minimize the use of wires and future maintenance issues. This option would allow migration to an AMI system in the future. Some additional data collector equipment may be required.

From a procurement perspective, the best strategy would be to conduct two separate Request for Proposals (RFP). The first for an AMR technology, followed by a second RFP for meter supply and installation. This strategy provides the greatest selection in AMR technology and broadens the choices with respect to meter manufacturers.

Should the Municipality proceed with the procurement phase, the proposed timeline would enable the project to be completed by the end of 2020:

**Procurement Phase Timeline (based on 2 RFP procurements)**

- July 22 to August 26      Preparation of RFP documentation
- August 26                      Release RFP for AMR
- September 13                AMR RFP Closes
- September 30                Completion of AMR RFP evaluation
- October 9                      Release Meter/Installation RFP
- October 21                    Report to Council for approval of AMR Vendor
- November 1                    Close Meter/Installation RFP
- November 20                Completion of Meter/Installation RFP evaluation
- December 16                Report to Council for approval of Meter/Installation Vendor
- January, 2020                Finalize Contracts with Vendors and Project Start
- Feb to Nov, 2020            Installation of radio transmitters and meters
- December, 2020            Project Wrap-up

**FINANCIAL IMPLICATIONS**

A project of this nature is not a typical engineering type project. It is a combination of products, services and software applications that need to be supported by both internal and external resources. When planning for a project of this nature there are six main cost categories which include: water meter supply, AMI/AMR supply, installation, consulting, and internal project support. Water meter replacements are often coupled with an AMI/AMR project, since both devices have similar expected life of approximately 18 to 20 years.

**Costing Analysis Results**

The financial model for full the full meter replacement program compared the meter reading technology scenarios including touch pad (existing situation), AMR mobile, AMI fixed network, and AMI Cellular. Below is a summary of the Total Life Cycle Costs:

	Touch Pad	AMR Mobile	AMI Fixed	AMI Cellular
Capital Cost	\$ 1,437,330	\$ 2,677,174	\$ 3,233,156	\$ 2,993,415
20 Year Operating cost	\$ 2,252,125	\$ 640,640	\$ 2,323,856	\$ 2,401,182
20 Year Revenue Improvement	\$ (2,680,705)	\$ (2,680,705)	\$ (2,680,705)	\$ (2,680,705)
<b>Total Life Cycle Cost</b>	<b>\$ 1,094,100</b>	<b>\$637,108</b>	<b>\$2,876,306</b>	<b>\$ 2,713,892</b>

The approved 2019 Water Capital Project Budget is \$50,000. The Design Phase cost of \$23,000 was funded from this, leaving the remaining \$27,000 for the Procurement Phase. The cost to complete the procurement phase would be \$60,000. In addition to the \$27,000 remaining from the initial capital budget another \$33,000 would be required from the Water reserves to complete the procurement phase of the project.

It should be noted that the final implementation phase of the project represents approximately \$2,700,000 (excl HST) of work. These costs would be proposed in the 2020 Capital Budget based on firm bid prices from the Procurement Phase. The approval of this procurement phase does not commit Council to the larger works of implementation. Based on the proposal results, Council will be able to choose if the project should proceed.

### **CONSULTATION**

The preparation of this report and recommendation was completed in consultation with:

- Chief Administrative Officer
- Director of Engineering and Public Works
- Director of Financial Services
- Director of Information Technology

### **ATTACHMENTS**

None