City of Cornwall

Universal Water Metering and AMI Project

Financial Report

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This Financial Report is provided in conjunction with the Findings and Recommendation Report on Universal Water Metering and AMI. A full list of Acronyms and Terms can be found in that report.

1. Financial Model Background

The financial assessment contained herein builds on the database analysis which helped determine meter assets that would be retained and those that would need to change as part of this AMI project.

The financial model developed incorporates the initial capital costs for the Universal Water Metering Project with Advanced Metering Infrastructure (AMI) and the financial operational impacts on key City operations including meter reading, meter maintenance, customer service and billing, information technology (IT) and distribution management. The financial model allows the City of Cornwall to compare the financial implications of the two key technologies that are the most applicable (a Fixed Network and a Cellular Network) and understand the impact of the different meter change-out decisions.

1.1. Scenarios Developed in the Financial Model

The financial model includes capital costs of two AMI technology scenarios as described below. It also considers the operational benefits and cost of both scenarios as compared to how operations are being conducted today. For comparison purposes, the scenarios, technology, and key assumptions are detailed below:

Scenarios	Description
Scenario 0 – Existing Situation: AMR meter reading on 275 meters billed on metered consumption. All other customers receive a flat rate bill. Each account is billed twice per year.	This scenario provides the City's baseline of 275 AMR enabled meters that is used as a comparison to the operational impacts of installing AMI enabled meters at all customer locations
Scenario 1 – Standalone AMI Fixed Network	This scenario assumes that the City will install radio transmitters at all water customers, as well as perform meter replacements at customers that currently have a meter or new meter cut-ins as required over a 29-month

Scenarios	Description
	period (6-month startup, 4-month Proof of Concept, 18-month installation and deployment and 1-month close-out). This scenario assumes a standalone AMI system is deployed across the City of Cornwall.
Scenario 2 – Cellular AMI Network	This scenario assumes that the City will install radio transmitters at all water customers, as well as perform meter replacements at customers that currently have a meter or new meter cut-ins as required over a 29-month period (6-month startup, 4-month Proof of Concept, 18-month installation and deployment, and 1-month close-out). It further assumes the network infrastructure would be an existing public carrier cellular network.

Table 1 – Definition of Technology Scenarios

1.2. Financial Operational Impacts

The City of Cornwall is relatively unique in that its water customers are largely unmetered. Virtually all water utilities have meters installed to promote conservation, provide more equitable billing, and increase operational efficiencies around water loss management and energy usage as a few examples. The City of Cornwall has these same reasons as well as those mentioned in the Organizational Goals and Needs and AMI Business Drivers chapters of the Findings and Recommendations Report to implement universal water meters.

Moving the City's water customer base from mostly unmetered to entirely metered will increase operational costs. There will be additional calls to the Customer Service department that come with billing customers on metered usage, additional meter maintenance tasks to ensure meters are working correctly, and additional costs for maintaining the infrastructure (Software as a Service (SaaS) fees, field infrastructure maintenance, radio transmitter failures) that the City does not incur today. This would be partially offset by operational savings as outlines in Section 1.2.1 Benefits of Water Metering.

Some operational costs are more easily determined than others, but all will impact the City's operational budget. The financial impact calculation for installing meters and for each technology scenario is an estimate that needs to be revisited as actual data becomes available. The assumed changes, and the overall financial impact of these changes, are summarized by function: meter reading, customer service and water billing, meter maintenance, distribution system management, and IT support costs.

The detailed assumptions and calculations for each functional area are detailed below.

1.2.1. Benefits of Water Metering

In September 2021, Watson & Associates Economists Ltd. prepared a Water Conservation and Servicing Master Plan for the City. This report quantifies reductions in consumption and associated savings that can be expected as a result of universal metering. For example, reducing residential water consumption from current estimates of 400 litres per capita per day to 250 litres per capita per day would save approximately $300,000 per year at the Water Purification and Wastewater Treatment plants. With the implementation of a water audit program, an additional $70,000 in operating costs savings could be witnessed annually in relation to increased leak detection with the installation of water meters and AMI technology.

These savings reflect a decrease in operational costs, including reduced chemical costs of treating water and wastewater as well as a reduction in electricity used at both plants. From a capital cost perspective, a reduction in City-wide water consumption will also reduce costs of replacing City infrastructure or make possible the deferral of capacity expansions. While it will take time to achieve such savings, a universal metering program is critical to the success.

Metering can also help the City with the accuracy of billing and revenue collection, as well as improve the management of water supply and demand by having the data for better infrastructure planning.

From a customer perspective, installing a water meter can help customers to better understand and manage their water usage, which can lead to lower water bills and greater conservation of water resources. The reduction in residential water

consumption mentioned above can be achieved, in part, by the ability of meters to help customers detect leaks within their premises.

1.2.2. Meter Reading Impact

The City of Cornwall currently reads 275 meters bi-annually but once fully metered, it will move to reading ~ 17,691 meters daily. The City estimates that the cost of all existing meter-related duties is approximately 20% of one FTE ($17,500).

Meter Reading will move from a field activity to an automated office activity performed by the AMI network and its data collection software. An AMI data analyst (25% of an FTE) would monitor this activity and the cost for this role is placed under Environmental Services - Water.

AMI Scenarios 1 and 2 would eliminate manual meter reading costs. Given meter reading is performed internally by City of Cornwall staff now, and there will not be staffing implications by eliminating this task, it is seen as an efficiency gain rather than something that will have a budgetary impact.

1.2.3. Water Billing and Customer Service Impact

Within the customer service and water billing functions, there are several reasons staff will be impacted when moving to metered billing and AMI. Given the City of Cornwall is mostly unmetered today, the new challenges the City may encounter are as follows:

- Water Bill Estimates: where the billing agent could not obtain a valid reading and they are required to estimate the water bill based on past consumption.
- High Bill Complaint: where a customer calls to complain of a high-water bill.
- High Bill Review: water bills are flagged for office review because of unusual consumption.
- Billing Dispute: where a customer calls the City to dispute the amount of the bill.
- Leak Calls: where a customer calls to complain of a possible leak at some point after water passes through the meter.
- Balance Request: where customers call to inquire how much is owed on their water bill.
- Payment Arrangements: where customers call for financial assistance and/or long-term payment arrangements.

- Request Bill: where a customer calls and asks for a copy of their bill.
- Leak Forgiveness Administrative Effort: where leak forgiveness requests are made that must be evaluated by the City of Cornwall staff.
- Leak Forgiveness Claims: where actual dollars are “forgiven” or financial relief is provided to customers.
- On-cycle Monthly Bill Processing: reflects the amount of time to process on-cycle bills.
- On-cycle Bill Exception Processing: reflects the number of bill exceptions requiring manual intervention by the City.
- Move-in and Move-out: where time and effort is provided by City staff to process final reads.
- Bill Postage, Printing and Processing: includes the cost of providing paper bills to customers.

Initially, the City might expect to receive one call per customer per year during the conversion to metered consumption and metered billing. To help prepare the City for the increased call volume and help prepare customers for the impact of being billed on metered consumption, the City’s implementation plan will include “mock-billing” for 6 months. However, the City will still receive calls it does not receive today such as those questioning the accuracy of the water meter, high bills, or leak forgiveness requests to name a few. Depending on factors such as customer portal participation and education programs, this number should reduce over time by up to half. The City should expect higher call volumes when it first moves to metered billing that will require additional resources compared to current call volumes.

Diameter estimates the City of Cornwall will, at a minimum, require one additional FTE to help handle the increased call volume. The cost of this resource is shown in Table 2. Additional operational costs in Customer Service and Billing include leak forgiveness claims that are approved by the City and the bill printing, stuffing, and mailing costs to move to bi-monthly billing (we have assumed that 2,400 customers move to e-billing). Scenario 0 shows the estimated current cost of semi-annual bill processing, stuffing, and mailing.

Customer Services	Scenario 0 - Manual Meter Reading	Scenario 1 - Standalone	Scenario 2 - Cellular
One Additional Customer Service FTE	$0	$65,600	$65,600
Leak Forgiveness Claims	$0	$30,000	$30,000
Bill Postage, printing, and Processing	$34,769	$105,035	$105,035
Total	**$34,769**	**$200,635**	**$200,635**
Financial Impact		**$(165,867)**	**$(165,867)**

Table 2 – Water Billing and Customer Service Financial Impact by Scenario

1.2.4. Water Meter Maintenance Impact

Applying meters and AMI technology to the City of Cornwall's water meter maintenance group may impact several tasks that are the responsibility of the department. Additional tasks the City can expect to undertake include:

- Radio Transmitter - Maintenance/replacement. Estimate that on average 0.4%/year will need to be replaced because of failure or vandalism.
- 88 Stopped Meters because of meter register or meter measuring element issues.
- 177 High Consumption Investigations.
- 177 High water bill review process, resulting in a field visit.
- 88 Zero Consumption Investigations

The financial operational impacts are shown in the following table. These are additional annual costs in Water Meter Maintenance the City can expect when moving to water meters.

Meter Maintenance	Scenario 0 - Manual Meter Reading	Scenario 1 - Standalone	Scenario 2 - Cellular
Radio Transmitter - Maintenance/replacement (Product Cost)	$0	$8,491	$8,491

Meter Maintenance	Scenario 0 - Manual Meter Reading	Scenario 1 - Standalone	Scenario 2 - Cellular
Stopped Meters Requiring Meter Replacement – Materials*	$0	$11,057	$11,057
Stopped Meters Revenue loss	$0	$1,845	$1,845
Vehicle Costs	$0	$10,000	$10,000
One Additional Meter Maintenance FTE	$0	$87,500	$87,500
Total	**$0**	**$118,893**	**$118,893**
Financial Impact		**($118,893)**	**($118,893)**

Table 3 – Water Meter Maintenance Financial Impact by Scenario

1.2.5. Distribution System Management Impact

Meter reading technology can be used to better manage and potentially monitor system wide non-revenue water such as distribution system losses. Granular, time-stamped consumption data provides an opportunity for utilities to focus on reducing non-revenue water through district metering. The consumption data provided by AMI enables a utility to compare the amount of water being consumed with the amount being provided into a particular district so water losses can be accurately determined. This requires a district meter attached with an AMI transmitter that delivers time stamped interval data (15 minute or hourly data) and AMI radio transmitters at consumption points delivering the same time-stamped interval data. Although district metering is something the City might consider over time, it was not considered an Important or Essential business driver. As a result, reducing system losses was not considered in the distribution system impact.

A critical business driver for the City of Cornwall was having data to support its water audits. An example would be the American Water Works Association (AWWA) C35 water balance is shown below.

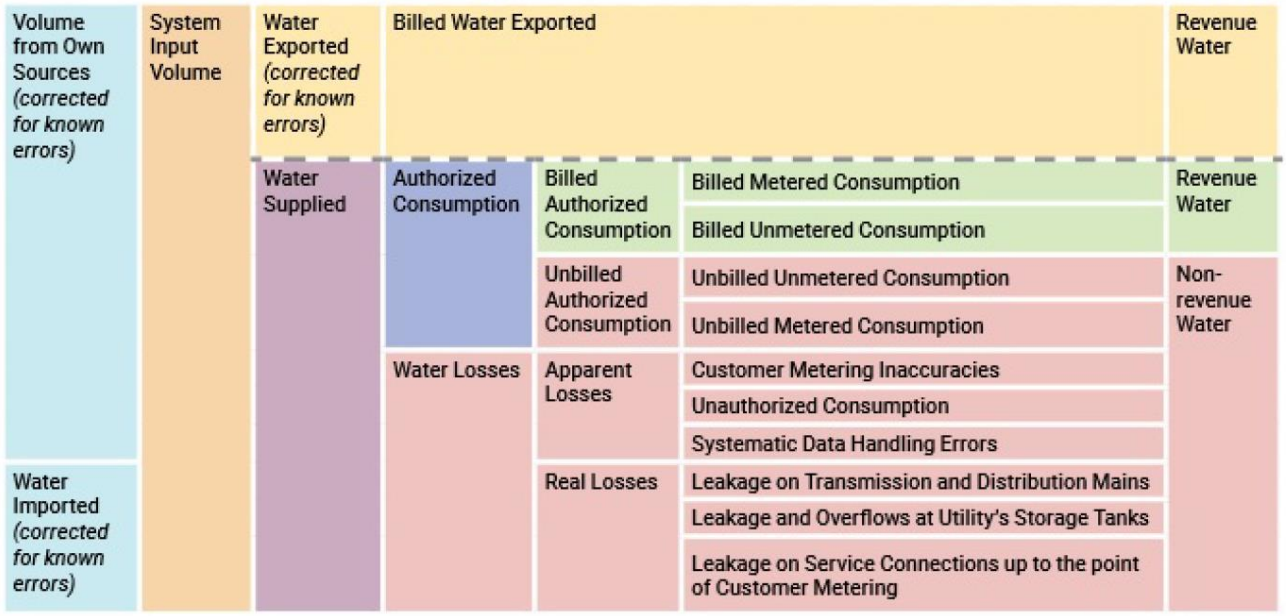

Figure 1 –AWWA Water Balance Chart

The data provided by AMI supports this audit in a variety of ways. Knowing how much water is consumed vs. the volume of water input into the distribution system provides a starting point for determining system losses, unbilled unmetered consumption, and unauthorized consumption. Tracking this data over time enables the City to analyze trends and make targeted corrections ensuring it maximizes revenue and reduces system losses. For example, volume of water input into the system might be increasing over time while metered consumption remains constant indicating the potential for increased distribution system losses.

One example of how Apparent Losses can be reduced using AMI technology stems from the ability to “right size” meters at each service and more quickly respond to meters that are not registering or are not registering properly. Meters that are too large for their intended purpose can be identified and changed to maximize revenue and reduce Apparent Losses at that location. With daily consumption information, the City can identify meters which have potentially stopped or where bypasses may have been opened. While “right sizing” meters was not a Business Driver considered by the City, the data will inherently allow it to be accomplished upon analysis.

Since the City of Cornwall currently bills on flat rate, Apparent Losses in the form of unauthorized water consumption is not a major concern. However, the move to metering water will encourage unauthorized consumption among some customers. A conservative 0.5% was estimated for unauthorized consumption even though anecdotally 1% is often used. According to a study conducted by the Water Research Foundation in 2010, water utilities in the United States reported losing an average of 1.6% of their water to unauthorized consumption. The reality is unauthorized use is difficult to identify and can vary widely depending on factors such as the size of the utility, the location of the utility, and the utility's ability to detect and thwart theft. There are strategies the City can implement to manage and prevent theft.

The City of Cornwall's Water and Wastewater budget suggests that 30,500 m3 of water is pumped into its system daily. Given the statistics above, the table below will consider expected unauthorized consumption when the City moves to metered billing understanding the move to meters is expected to reduce consumption in Cornwall by approximately 37% as suggested by the City of Cornwall Master Plan.

Description	Variables	Total (m3)
Estimated Net System Input (annually)		11,205,500
Reduction in Consumption (due to transition to metered consumption)	37%	4,146,035
Estimated Net System Input (post metering)		7,059,465
Estimated Unauthorized Consumption	0.5%	35,297

Table 4 – Estimated Apparent Losses due to Unauthorized Consumption

The financial impact of unauthorized consumption is estimated in the following table using $2.50/m3 for water and wastewater charges. Both water and wastewater charges are used in this calculation since that is the revenue not being captured by the City of Cornwall.

Distribution System Management	Scenario 0 - Manual Meter Reading	Scenario 1 - Standalone	Scenario 2 - Cellular
Unauthorized Consumption	$0	($88,243)	($88,243)
Total	**$0**	**($88,243)**	**($88,243)**
Financial Impact		**($88,243)**	**($88,243)**

Table 5 – Distribution System Management Financial Impact

1.2.6. IT Operational Cost Impact

Meter reading software and equipment currently in use by the City requires very little IT support to operate and maintain. The City of Cornwall currently has one Trimble handheld unit (not in use) and a mobile data collector for collecting AMR radio transmitter meter readings. Meter Readings are uploaded into Neptune 360 and are manually inputted to Diamond's CIS to provide meter reading as required. The City currently has no customer portal but sees the requirement for one that allows customers to pay bills, view their consumption, receive notifications (i.e., leak), access news and updates, or start and stop their water service.

From an operational standpoint, introduction of AMI technology will require an AMI data analyst role (25% of an FTE) that currently doesn't exist at the City of Cornwall. AMI also requires additional software such as data collection/network management software, a meter data management repository and possibility additional analytic software depending on the solution chosen and functionality required. AMI vendors have moved to a SaaS and we have assumed all software will be paid annually based on the number of radio transmitters.

Generally, as part of an AMI deployment, utilities will choose to have AMI vendors maintain the network to ensure constant "uptime" under a network service level agreement that is paid to vendors annually. In a utility owned fixed network, the remaining operational cost is typically cellular charges to transport data between each data collector and the head-end software.

The table below summarizes the IT support assumptions:

IT Software Activities	Scenario 0 - Manual Meter Reading	Scenario 1 - Standalone	Scenario 2 - Cellular
Meter Reading software - SaaS	$3,000/year	$0/year	$0/year
AMI Collection Software - SaaS	Not required	$3.50/endpoint (includes MDM)	$7.00/endpoint (includes endpoint cellular charges, MDM, Customer Portal)
Meter Data Management	Not required	Included as outlined above	Included as outlined above
Customer Portal	Not required	$3.57/endpoint	Included as outlined above
RF license	Not required	Vendor specific Not included	Not required
Handheld Support (reading & Maintenance)	$1,200/ handheld	Handheld and Cradle Support =$1,200 / handheld/ year	Handheld and Cradle Support =$1,200 / handheld/ year
Fixed network Data Collector Support	Not required	$3,750/Collector/ year	Not required
Wide Area Network Costs	Not required	$600/year/Collector	Not required
AMI Data Analyst	Not required	25% of FTE	25% of FTE
Cellular AMI Costs	Not required	Not required	Included as outlined above
Data Support	Not required	$7,333/month	$7,333/month

Table 6 – IT Support Assumptions by Scenario

The financial improvements or additional expenses (negative savings) are summarized below.

IT Support Financial Impact	Scenario 0 - Manual Meter Reading	Scenario 1 - Standalone	Scenario 2 - Cellular
Meter Reading software - SaaS	$3,000	$ -	$ -
AMI Collection Software	$ -	$61,920	$176,917
Meter Data Management	$ -	Included in AMI Collection Software	Included in AMI Collection Software
Customer Portal	$ -	$63,158	Included in AMI Collection Software
RF license	$ -	$ -	$ -
Handheld Support (reading & Maintenance)	$1,200	$6,000	$6,000
Network Maintenance	$ -	$18,750	$ -
Wide Area Network Costs	$ -	$3,000	$ -
AMI Data Analyst (Internal position)	$ -	$30,000	$30,000
Cellular AMI Costs	$ -	$ -	$ -
Data Support	$ -	$87,996	$87,996
Total	**$4,200**	**$270,825**	**$300,911**
Financial Impact		($266,625)	($296,711)

Table 7 – IT Support Financial Impact by Scenario

1.2.7. Summary of Operational Impacts

Given the City of Cornwall is not metered currently, there will be increased operational costs to move to meters and AMI technology. The table below summarizes the departmental financial impact detailed above. Each scenario outlines the operational cost change to what is deployed today and is the value put into the net present value calculation.

Operational Cost Category	Scenario 0 - Manual Meter Reading	Scenario 1 - Standalone	Scenario 2 - Cellular
Customer Services	No Impact	($165,867)	($165,867)

Operational Cost Category	Scenario 0 - Manual Meter Reading	Scenario 1 - Standalone	Scenario 2 - Cellular
Meter Maintenance	No Impact	($118,893)	($118,893)
Distribution System Management	No Impact	($88,243)	($88,243)
IT Support Financial Impact	No Impact	($266,625)	($296,711)
Total Financial Impact	**No impact**	**($622,128)**	**($652,214)**

Table 8 – Operational Financial Impact Summary

1.3. Capital Costs

The capital cost of Scenarios 1 and 2 assume the project will be done as a single continuous project with no delays or pauses in the deployment as this would lead to increased costs (i.e., Project Management).

The capital cost assumes the project is done with external resources. Project support is provided through a combination of internal and external (consulting) support resources.

1.3.1. Project Scope

A project of this nature is not a typical engineering 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 an AMI project, the main cost categories would include:

- Installation Cost
- Water Meter Supply Costs
- AMI Technology Costs (including implementation and software licensing)
- Project Support – Internal Resource Costs
- Project Support – Consulting Costs
- Contingency

At the end of the cost section, we compare total capital costs (all categories) for the technologies assessed to provide some understanding of the cost impacts of the different scenarios.

1.3.2. Key Assumptions by Scenario

The financial model has several variables and assumptions. The scenarios may differ based on the type of technology being deployed. The differences applied in the financial model for the two scenarios were limited to the types of radio transmitters and data collectors required for a Standalone Network versus a Cellular Network.

1.3.3. Installation Cost

With any water meter project, there are always complications that can prevent the meter replacement or radio transmitter installation from happening. These issues usually include valves not being operational, plumbing fittings that need to be replaced, or remediation costs that might be necessary when installing a meter. The ability to convert as close to 100% of the water meters to the new technology as possible is a fundamental measurement of a successful program. To achieve this level of completion, the City needs to allow the installation contractor to overcome most of the above issues. Allowing for minor work to be done will support the project in achieving the highest completion possible. Not including this work in the project would likely reduce the conversion to below 90%.

The following table summarizes the installation cost for all scenarios. It should be noted that these costs are expected to be the same regardless of technology. Data Collector installation costs for Scenario 1 are accounted for under AMI technology.

Summary of Installation Work	Quantity	Total Cost
Performance Bonds & Mobilization	-	$275,000
SM(1)		$590,500
SM – Cut-In	15,125	$2,272,725
SM – Cut-In Extra Work(2)		$2,347,900
SM – Change-out	2,244	$201,947
SM – Change-out Extra Work(2)		$125,625

Summary of Installation Work	Quantity	Total Cost
SM Extra Work(2)		$81,810
IM – Cut-In	17	$15,000
IM – Cut-In Extra Work(2)		$15,930
IM – Change-out	240	$108,203
IM – Change-out Extra Work(2)		$39,840
LM – Cut-In	15	$34,800
LM – Cut-In Extra Work(2)		$76,100
LM – Change-out	50	$48,825
LM – Change-out Extra Work(2)		$133,350
LM – Extra Work(2)		$26,474
Grand Total	**17,691**	**$6,394,029**

Table 9 - Capital Cost - Installation Cost Summary

*Note: There is no IM – Extra Work listed above as this line item generally includes meter surveys or confined space entry which is not required for Intermediate Meters.

(1) SM means residential service replacements or residential meter pit installations that might be required as well as curb stop support and repair.

(2) "Extra Work" whether for a cut-in or a meter change-out refers to any of the following that might be required during an installation:

- extra plumbing work
- building control valve
- isolation valve
- grounding straps
- carpentry work
- wire runs for locating the radio transmitter on the building's exterior
- constrained/confined space entry
- service line freezes
- large meter surveys

Note that more than one type of Extra Work might apply at the same location (i.e., a single location might require a building control valve, plumbing fittings, and confined space entry).

1.3.4. Water Meter Supply Cost

The City of Cornwall has approximately 2,500 meters that are recommended to be replaced as discussed in Chapter 4 of the Findings and Recommendations Report. The remaining ~15,200 customers will require a new meter to be cut into the plumbing.

Based on the assessment of current water meter change-outs and the expectation for new meters that will be required as outlined in Chapter 4, the meter supply costs only (not including AMI technology costs) are summarized in the following table. The meter supply costs are the same for both scenarios.

	Meter Size	Quantity	Scenario 1 - Standalone	Scenario 2 - Cellular
Mechanical Meter Replacements	15mm (5/8”)	15,732	$1,966,625	$1,966,625
	20mm (3/4")	1,441	$259,380	$259,380
	25mm (1”)	196	$49,500	$49,500
	40mm (1.5”)	111	$67,800	$67,800
	50mm (2”)	146	$117,600	$117,600
Non-Mechanical Meter Replacements	75mm (3”)	42	$107,500	$107,500
	100mm (4”)	19	$80,000	$80,000
	150mm (6”)	4	$39,000	$39,000
	Grand Total	**17,691**	**$2,687,405**	**$2,687,405**

Table 10 - Capital Cost Water Meter Supply Cost Summary

1.3.5. AMI Technology Cost (Including Implementation and Software Licensing)

Scenarios 1 or 2 are applicable to any AMI system manufacturer providing that technology. The AMI project costs are summarized below by category.

AMI Supply	Scenario 1 - Standalone	Scenario 2 - Cellular
SM – Radio Transmitters	$2,100,420	$2,619,000
IM – Radio Transmitters	$31,710	$39,375
LM – Radio Transmitters	$8,490	$10,575
FN Collectors	$249,000	$0
Software Initial Licenses (Annual SaaS fees – included in Operational Costs)	$186,953	$353,746
Implementation	$105,000	$105,000
Training	$15,000	$15,000
Handheld	$26,250	$26,250
Total	**$2,722,823**	**$3,168,946**

Table 11 - AMI Technology Cost Summary

The additional cost of building a standalone AMI network (Scenario 1) is associated with the data collectors required for this scenario. Five data collectors have been assumed but it should be noted that some vendors will require more data collectors, and some may require less. The cost shown for data collectors is representative of the costs associated with data collectors irrespective of vendor. These costs include data collector installation, the purchase and installation of three poles since the City may not own assets in the areas vendors require, management approval time and extra work such as trenching and electrical.

The additional cost of data collectors in Scenario 1 is offset somewhat by the higher costs of cellular radio transmitters in Scenario 2. Cellular radio transmitters are expected to cost $528,330 more than the radio transmitters for a standalone network included in Scenario 1.

We have allowed $26,250 for five handhelds (Table 12) to be used during Installation and for field work associated with radio transmitter maintenance.

Interface development is included in this AMI technology costs and includes the cost of interfaces between the CIS and Meter Installation System, between the head-end software/MDM and the CIS and between the CIS and Customer Portal.

1.3.6. Project Support – Internal Resources Costs

The following table provides an explanation of the effort various roles should expect during the following phases of the Project:

- Procurement (10 months)
- Start-up (6 months)
- Proof-Of-Concept (POC) (4 months)
- Installation and Deployment (18 months)
- Close-out (1 month)

Description	Scenario 1 - Standalone	Scenario 2 - Cellular
Project Manager	80% FTE during Procurement, S/U, POC and Installation	80% FTE during Procurement, S/U, POC and Installation
Curb Stop Support and Repair (Contractor Support)	25% of FTE during Startup and Installation	25% of FTE during Startup and Installation
Facilities Coordinator*	25% of FTE during Startup and POC	Not Required
Meter Supervisor	10% of FTE during Procurement, 15% during startup and 50% FTE during Installation Deployment	10% of FTE during Procurement, 15% during startup and 50% FTE during Installation Deployment
Field Inspector	Outsourced	Outsourced
AMI Data Analyst	25% of FTE during Startup, Installation and Deployment	25% of FTE during Startup, Installation and Deployment
IT SME - Hardware	SaaS Model – Not Required	SaaS Model – Not Required
IT Resource	15% FTE during Procurement and 10% FTE during Startup,	15% FTE during Procurement and 10% FTE during Startup,

Description	Scenario 1 - Standalone	Scenario 2 - Cellular
	Installation and Deployment	Installation and Deployment
Communications/Public Outreach	25% of an FTE during Startup and POC and 10% of FTE during Install & Deployment	25% of an FTE during Startup and POC and 10% of FTE during Install & Deployment
Billing Lead	15% FTE during Procurement; 50% during Startup, 25% Installation and Deployment	15% FTE during Procurement; 50% during Startup, 25% Installation and Deployment
Billing Clerk	15% FTE during Procurement; 50% during Startup, Installation and Deployment	15% FTE during Procurement; 50% during Startup, Installation and Deployment

Table 12 - Internal Project Support Impact

The internal project support costs over the duration of the project are summarized in the table below.

Role	Scenario 1 - Standalone	Scenario 2 - Cellular
Project Manager	Existing Resource	Existing Resource
Curb Stop Support and Repair (Contractor Support)	$50,000	$50,000
Facilities Coordinator	Existing Resource	Not applicable
Meter Supervisor	Existing Resource	Existing Resource
Field Inspector	Outsourced	Outsourced
AMI Data Analyst	$70,000	$70,000
IT Resource	Existing Resource	Existing Resource
Communications/Public Outreach	Existing Resource	Existing Resource
Mock Billing – Public Communications Costs	$150,000	$150,000
Billing Lead	Existing Resource	Existing Resource
Billing Clerk	$196,800	$196,800
Total	**$466,800**	**$466,800**

Table 13 - Internal Project Support Financial Impact

Some of the above roles are budgeted already within existing positions. Additional costs or positions not previously included have been included.

1.3.7. Project Support – Consulting Costs

The AMI subject matter expert consulting services costs are outlined below. Also included are interface development costs largely the responsibility of CentralSquare.

Project Phase	Scenario 1 - Standalone	Scenario 2 - Cellular
Phase 2 - Procurement	$173,580	$173,580
Phase 3 - Start Up	$269,380	$269,380
Phase 3 – Interface Development	$137,500	$137,500
Phase 4a - POC	$150,000	$150,000
Phase 4b – Installation and Deployment	$408,620	$408,620
Phase 4b - Field Inspections	$480,000	$480,000
Phase 5 - Close Out	$96,340	$96,340
Total	**$1,715,420**	**$1,715,420**

Table 14 - Project Consulting Support Cost

The procurement includes the development of a single procurement document and process. Where the procurement is broken into more than one procurement, additional costs may apply.

Startup is scheduled to take 6 months and at a high level includes AMI Network Deployment, Systems Integration, IUAT (Initial User Acceptance Testing), Installer Training, and Public Education. Proof of Concept is expected to be a 4-month exercise that involves limited field deployment and testing of data flow back to the Diamond CIS, while Installations and Close-out is expected to be completed in 19 months.

1.3.8. Contingency

Assumption	Scenario 1 - Standalone	Scenario 2 - Cellular
Installation	$1,598,508	$1,598,508
Water Meter Supply	$403,111	$403,111
AMI Technology & CIS Support (Interfaces)	$429,049	$495,967
Total	**$2,430,668**	**$2,497,586**

Table 15 - Capital Cost Contingency

A project of this nature requires some contingency for unexpected installation, integration, or technology costs. Included in the financial model is a 25% contingency on Installation costs given the uncertainty in a universal metering project. A 15% contingency was included for both Meter Supply and AMI Supply given the current inflationary environment. Pricing for AMI Supply and Meter Supply use Diameter's experience from similar sized Ontario utilities with an allowance for inflation.

1.3.9. Summary of Capital Costs

The table below provides a capital cost estimate at the conclusion of the project based on meter change-outs of existing meters, and installation of new meters and AMI radio transmitters at locations without existing meters.

Assumption	Scenario 1 - Standalone	Scenario 2 - Cellular
Installation	$6,394,029	$6,394,029
Water Meter Supply	$2,687,405	$2,687,405
AMI Technology	$2,722,823	$3,168,946
Project Support – Internal Resource	$466,800	$466,800
Project Support - Consulting	$1,715,420	$1,715,420
Contingency	$2,430,668	$2,497,586
CPI	$572,341	$596,485
Total	**$16,989,486**	**$17,526,671**

Table 16 – Capital Cost Summary by Category

The above costs were used in the Cashflow analysis and spread out according to the deployment schedule.

1.3.10. Cashflow

Both the operational financial impacts and the capital costs were used in a long term financial cashflow model.

The expected annual cash outflows each calendar year are shown in the table below and assume a 3% annual inflation rate and that the Startup Phase of the Project begins on March 1, 2024, and runs for 6 months. The Proof-of-Concept phase begins in September 2024 and will be a 4-month process. Installation and Deployment and Close-out would be completed over a 19-month timeframe beginning in January 2025.

Scenario 2 has less cash outflow in 2024 due to the fact data collectors are not required for this solution along with the associated costs for poles and installation.

It should be noted that the numbers and timelines outlined below include Procurement which is expected to be completed in March 2024. Note that the cashflows below consider a 2-month lag in payments, as compared to production, for approval process, invoicing, and net 30-day payment terms.

	Calendar Year Cash Outflows			
Scenarios	**2024**	**2025**	**2026**	**Total**
Scenario 1- Standalone	$1,754,359	$8,905,684	$6,329,443	**$16,989,486**
Scenario 2 – Cellular	$1,672,933	$9,240,524	$6,613,214	**$17,526,671**

Table 17 - Expected annual cashflow (29-month Implementation)