



CORPORATE REPORT

DEPARTMENT: Administration	REPORT NO. 2023.144
DATE PREPARED: September 6, 2023	MEETING DATE: September 12, 2023
	NO. OF PAGES 18 incl. attachment
SUBJECT: Arsenic in Rosslyn Village Drinking Water System	

RECOMMENDATION

THAT with respect to Report 2023.144 we recommend engaging the Walkerton Clean Water Centre to do the additional work for the Pilot Testing Project outlined in its proposal dated Sept. 6/23 for the estimated cost of 6,693.00, BE APPROVED;

AND THAT with respect to Report 2023.144 we recommend authorizing the CAO/Clerk to purchase the sea can currently housing the testing equipment of the Walkerton Clean Water Centre and install a concrete foundation for the sea can estimated to cost \$15,000.00;

AND THAT with respect to Report 2023.144 we recommend authorizing the CAO/Clerk to engage Kozar Engineering Inc. to do engineered diagrams for the incorporation of chlorinated cartridge filtration into the water treatment system estimated to cost \$10,000.00

PURPOSE

To obtain Council approval to have the Walkerton Clean Water Centre do additional work on the pilot testing project for the removal of arsenic in the Rosslyn Village Drinking Water System and take concrete steps to move toward a solution to remove arsenic based on the results of the pilot testing project

BACKGROUND

On May 31st Council received Report 2023.99 on our ongoing efforts to resolve the arsenic issue affecting the Rosslyn Village Drinking Water System (RVDWS). The Report presented a proposal for an estimated cost of \$7,669.38 from the Walkerton Clean Water Centre (WCWC) to conduct a pilot testing project. WCWC proposed building at its cost a pilot treatment system with 3 filtering options, shipping it to Rosslyn, deploying its personnel to conduct the testing and finally doing lab work to generate results. After discussion Council passed Resolution 199A-2023 approving the proposal.

REPORT

Early last month a sea can was rented to house the pilot treatment system. The skids shipped by WCWC arrived on August 10th. WCWC personnel were on site conducting the project the following week from Aug. 15th – 17th.

On August 31st WCWC presented the results to administration in a virtual meeting. Attached is the 12-page set of slides provided by WCWC.

On p.4 the 3 treatment options are listed. A diagram showing the options is on p.6. On p.9 the results are provided. The raw water tested had arsenic levels in the 13 to 14 microgram per litre range. The acceptable level is 10 micrograms/litre. The 1st treatment option, chlorination-filtration, using a 5.0 micron filter reduced the arsenic level to approximately 4 micrograms/litre. Filtration using 1.0 micron and 0.35 micron filters did not generate much better results. The 2nd treatment option, chlorination-adsorption, virtually eliminated arsenic. The 3rd treatment option, chlorination-filtration with ferric chloride, also significantly reduced arsenic. Results on pp. 10 and 11 show the options are also effective at reducing manganese and iron respectively.

While the latter 2 options are more effective at reducing arsenic they are more costly in terms of equipment and operating costs (Note: Option 2 is proprietary). On p. 4 you can see their flow rate is lower since they offer more resistance to the flow of water. That indicates more power is needed to drive water through than is required with chlorination filtration. As well the 2nd and 3rd treatment options generate water losses whereas water loss is not an issue with filtration.

On p. 12 WCWC proposes to do additional testing. WCWC wants to run the chlorination-adsorption testing again since the 1st test module did not function properly and no results were generated from it. Administration asked WCWC to rerun the chlorination-filtration testing to confirm the results of the initial testing. On Sept. 6th WCWC sent the attached proposal. WCWC wants \$6,693.00 for the additional work.

Based on this initial set of results administration would like to move forward with the chlorination-filtration option. It is effective and is the least costly option. Administration is thinking that if the arsenic level of the raw water were higher, the 5.0 micron filter should still reduce arsenic to an acceptable level. More backwashing likely would be required. If acceptable levels of arsenic could not be reached, 1.0 or 0.35 micron filtration could be added to improve results. As a last resort the chlorination-filtration with ferric chloride could be employed.

Moving Forward

Administration notes in late March MECP exempted the RVDWS from arsenic testing requirements until Dec. 23rd. By that time MECP is expecting a plan to remove arsenic. By that time administration believes we could have an engineered plan for chlorination-filtration.

To prepare for the chlorination-filtration solution the rented sea can could be purchased and a foundation poured for it. The sea can is large enough to house the contemplated filtration equipment. Kozar Engineering Inc. could be engaged to do engineered drawings to submit to MECP and then apply to have chlorination-filtration added to our drinking water licence.

Building the chlorination filtration treatment system would be the next step. At this point administration does not even have a ballpark estimate for the cost; that is something we could get from Kozar Engineering Inc.

Finances

Attached is the 2024 RVDWS Approved Budget. There are 5 capital items listed totaling \$76,700 that were to be funded transferred from the RVDWS balance sheet account, i.e., the amount is due from the RVDWS to the Municipality.

All of the costs incurred due to the March 9th discovery of arsenic in the water are unbudgeted. We can try to secure a grant to build the envisioned arsenic treatment system but grant money from sources like the Building Better Fund announced at the 2023 AMO Conference may be far in the future whereas we have a pressing need. It may turn out that we have no choice but to forge ahead without grant help. The costs could be recorded as a due from the RVDWS to the Municipality.

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Reducing Arsenic in the Rosslyn Village Drinking Water System

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August 31, 2023

Disclaimer

The pilot testing project report is presented solely for information purposes and is not intended to provide specific advice or recommendations in any circumstances. This pilot testing project report includes information from different sources and such information has not been independently confirmed for correctness or completeness. The information provided does not imply on the part of the Government of Ontario, the Walkerton Clean Water Centre (Centre) or its employees, any endorsement or guarantee of any of the information. The Government of Ontario, the Centre, and its employees, do not assume and are not responsible for any liability whatsoever for any information, interpretation, comments, or opinions expressed in the pilot testing project report.

Introduction

- Source Water Arsenic: North well – 21 µg/L and South well – 15 µg/L
- Water quality of the two wells are similar depending on which well is working
- Arsenic has a significant health impact
- Regulated at 10 µg/L for arsenic in treated water (MECP, 2020)

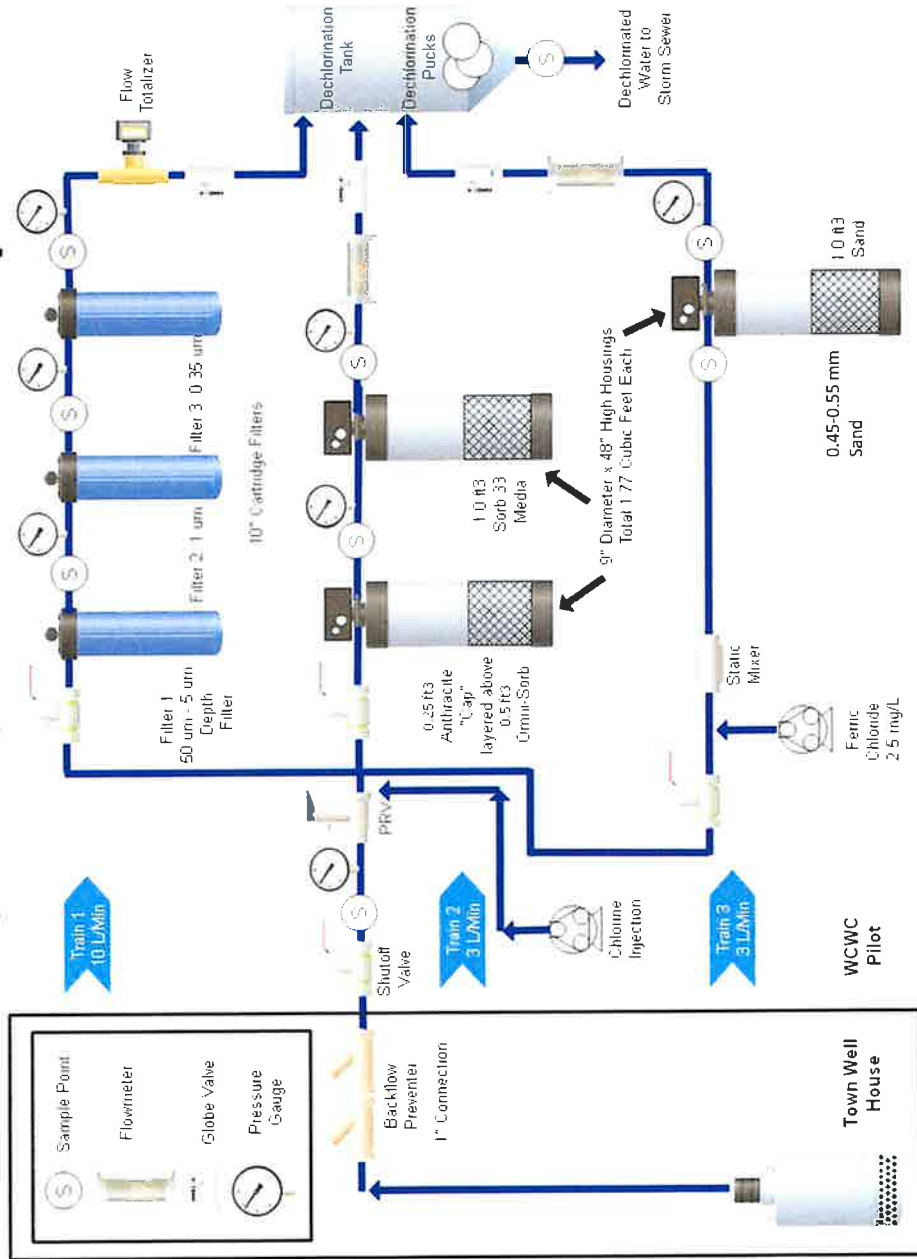
Objectives

- The overall objective of this pilot testing project will be to reduce the arsenic in the treated water as low as possible; below Ontario's MAC of 10 µg/L.
- The specific treatment objective: compare **three treatment options** for arsenic removal
 - 1) Chlorination, followed by cartridge filtration (50-5 µm depth filter, 1 µm filter, and 0.35 µm filter, in series).
 - 2) Chlorination-adsorption using Omni-SORB™ and SORB 33® media filtration, in series.
 - 3) Chlorination-filtration, with ferric chloride (FeCl₃) addition, followed by sand filtration.

Preliminary bench scale experiments

- Identified water quality in preparation for pilot testing
- To identify chlorine demand for the water received from the Rosslyn DWS

Schematic of Pilot Set-up



Run times of each treatment train

Train	Filter Bed	Flow rate (L/min)	Total Volume (L)	EBCT / Detention time (min)	Run time (h)
1	Cartridge filters	10	7.8	0.78	1.0
2	Omni-SORB TM and SORB 33 [®]	3	49.53	16.5	3.0
3	Sand (with a static mixer)	3	28.3	9.44	2.0

August 15-17th Pilot Testing

Day 1:

- Setup pilot plant & lab equipment

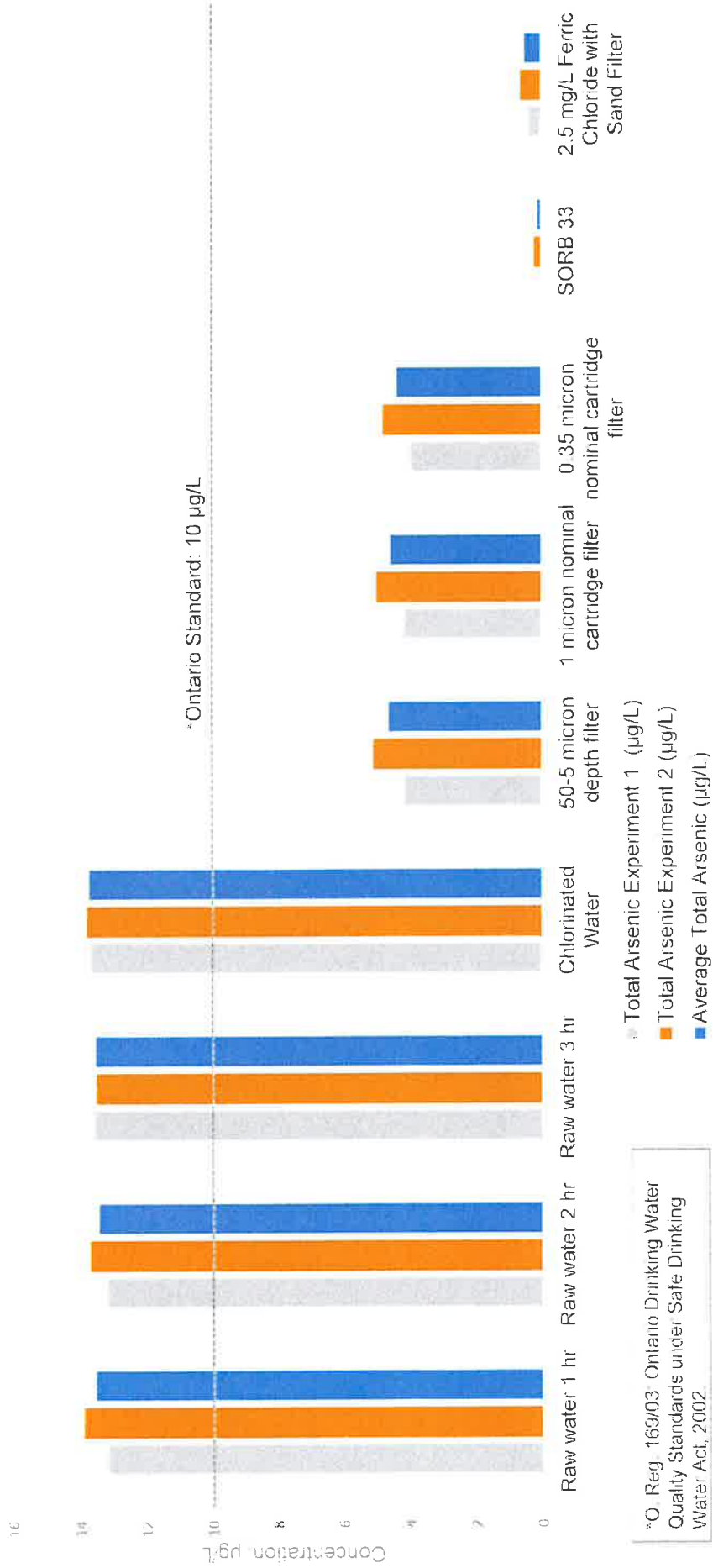
Day 2:

- Conduct two 180 min experiments

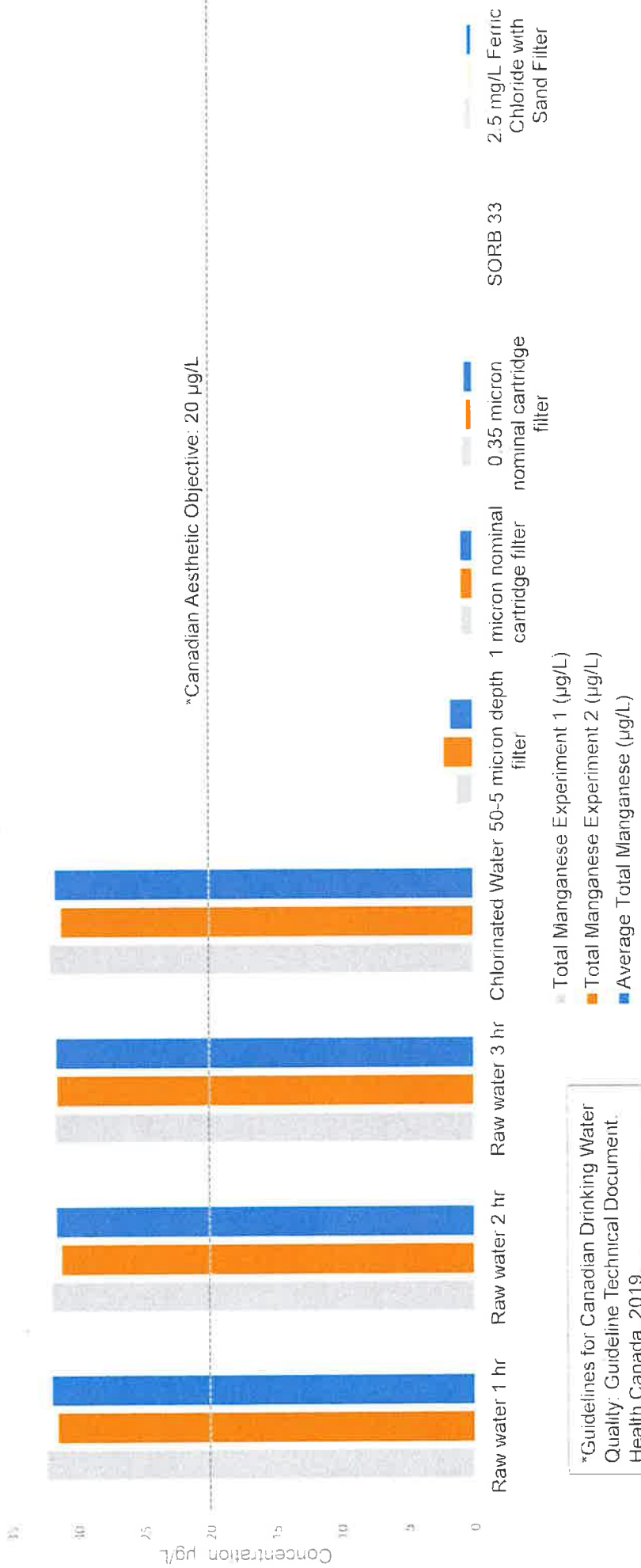
Day 3:

- Clean-up, ship equipment and send samples to SGS

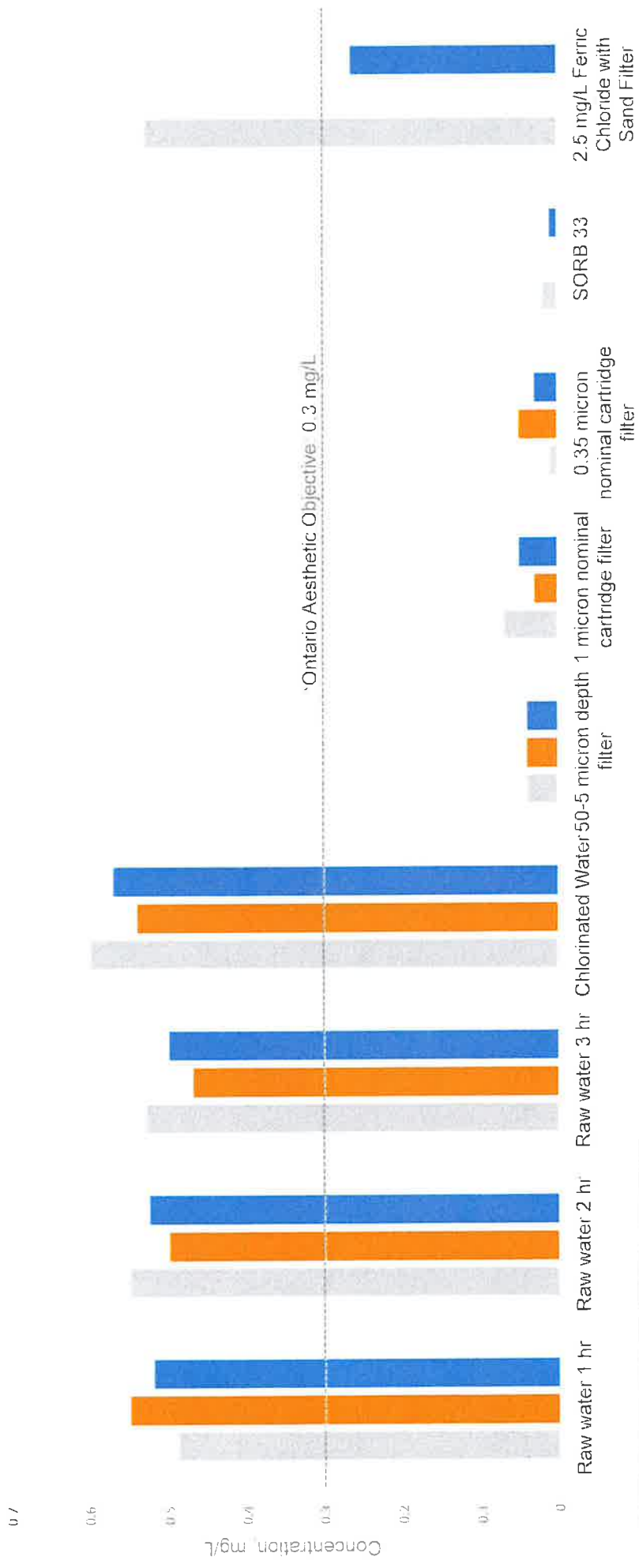
Total Arsenic, North Well



Total Manganese, North Well



Total Iron, North Well



Ontario Aesthetic Objective 0.3 mg/L

Technical Support Documents for Ontario Drinking Water Standards, Objectives and

Total Iron Experiment 1 (mg/L)
 Total Iron Experiment 2 (mg/L)
 Average Total Iron (mg/L)



Next Steps

- Conduct additional experimentation
 - Run train 2 exclusively
 - Two 180 min experiments
 - Collect data regarding Omni-SORB™
- Update budget accordingly



Pilot testing Amendment to Proposal

Reducing Arsenic in Rosslyn Village Drinking Water System

September 6, 2023

Background

Following the review of the results obtained from the pilot testing conducted in Rosslyn and the meeting of August 31, it is proposed to add additional testing as follows:

- Run again the cartridge train to confirm results.
- Run Omni-Sorb 33™.
- Run the sand filter without addition of ferric chloride.

The testing plan will include:

- Train 1 - Chlorination followed by three cartridge filters in series.
- Train 2 - Chlorination followed by Omni-Sorb 33™.
- Train 3 - Chlorination followed by sand filtration.

Budget impact for approval

The direct cost of the pilot testing was initially estimated in the proposal as \$7,669.38. The budget impact of the additional testing is estimated at \$ 6,693 (Table 1). Therefore, the total direct cost is estimated at \$14,362.38. The Walkerton Clean Water Centre will invoice the Municipality of Oliver Paipoonge for the actual direct cost upon completion of the project. Staff time and overhead are not invoiced. The Municipality of Oliver Paipoonge must accept the change to the budget prior to the start of the additional testing.

Table 1. Budget impact of the additional testing.

Item	Expense	Details	Quantity	Cost (\$)	Total (\$)
1	Travel	Air Fare	2	500	1,000
		Airport Parking			135
		Accommodation (2 staff, 4 nights)	8	200	2,000
		Travel to Airport			140
		Car rental			220
		Fuel (Rental car)			40
		Meals			450
2	Outsourced lab analysis	Arsenic analysis	18	25	450
		Manganese	18	25	450
		Sample shipment			50
3	Pilot Plant Consumables	Cartridge filters			225
4	Internal lab analysis	Lab reagents, supplies and fees			660
				Subtotal (\$)	5,820
				Contingency (15%)	873
				Total (\$)	6,693

**ROSSLYN VILLAGE WATER SYSTEM
2023 BUDGET**

		2022 BUDGET	2022 As of Dec 31	2023 BUDGET
OPERATING				
REVENUE:				
Direct Water Billing	0406	59,520.00	58,720.00	59,520.00
Transfer from Water B/S account				14,841.51
Grants	0414	-	-	
Interest	0442	-	949.36	-
Well Inspection (5 year)	0460	1,500.00	-	1,500.00
TOTAL OPERATING REVENUE		61,020.00	59,669.36	75,861.51

EXPENDITURES:				
Water - Maintenance Contract	4130	40,562.00	40,562.04	41,345.00
Water - Operator Accreditation	4131	2,400.00	3,762.50	3,000.00
Water-OCWA Transition Costs	4133	-	-	-
Water - Maintenance contract	4134	-	-	-
Water - Telephone	4150	1,200.00	1,428.74	1,350.00
Water - Hydro	4160	3,800.00	5,844.52	4,650.00
Water - Testing/Lab Fees	4162	5,500.00	4,972.86	7,500.00
Water - Meter Calibration	4170	1,500.00	-	1,500.00
Water - Hydrochloride	4171	-	-	-
Water - Maintenance	4172	3,000.00	7,236.89	4,500.00
Water - Sodium	4173	-	-	-
Water - Well Inspection	4174	-	-	-
INSURANCE		-	-	12,016.51
Transfer to Reserve	4181	3,058.00	-	-
TOTAL OPERATING EXPENDITURES		61,020.00	63,807.55	75,861.51
NET OPERATING		-	4,138.19	-

CAPITAL				
REVENUE:				
Transfer from Water B/S account				76,700.00
Green Grant	0404	-	-	688,415.62
TOTAL CAPITAL REVENUE		-	-	765,115.62

EXPENDITURES:				
Replacement of Water pipes	4190	-	-	938,791.25
Meters for Existing users		-	-	20,000.00
Arsenic Proposal (OCWA)		-	-	20,000.00
Upgrade Analyzer (OCWA)		-	-	10,000.00
Storage tank Cleaning (OCWA)		-	-	1,200.00
New Chemical Board (OCWA)		-	-	25,500.00
TOTAL CAPITAL EXPENDITURES		20,000.00	-	1,015,491.25

TRANSFER TO RESERVES:				
Capital Water/Sewer	4181	-	-	-
Total Transfer to Reserves		-	-	-
NET CAPITAL		-	-	(250,375.63)

TOTAL ALL REVENUE		61,020.00	59,669.36	840,977.13
TOTAL ALL EXPENDITURES		81,020.00	63,807.55	174,514.12
Surplus/(Deficit)		-	(4,138.19)	1,015,491.25

\$76,700.00