Community Meeting



Water Treatment Infrastructure Small Communities Fund Design Project January 27th, 2018





About SBA





- SBA's expertise is built up by senior staff with over 30 years of Engineering and Project Management experience.
 - Some of our services include;
 - Water Supply, Treatment and Distribution Design
 - Sewage Treatment, Collection and Disposal Design
 - Community Planning and Development Services
 - Environmental Services
 - Watershed Management
 - Building Services
 - Land Development and
 - Project Management and Contract Administration



About SBA Cont'd

- SBA has successfully completed several projects for a number of Municipalities, First Nation Communities and Private Sector Clients.
- Some of our Past and Present Clients include:-
 - Georgina Island FN
 - Moose Deer Point FN
 - Mississaugas of Scugog Island FN
 - Lac Seul FN
 - Township of Emo
 - Town of Shelburne
 - Town of Orangeville
 - Town of Mono





The SCF Program

- The SCF (Small Community Fund) program was initiated as part of the New Building Fund to provide financial support to eligible and successful applicants to help develop new economic opportunities and to support critical infrastructure
- Wahta Mohawks First Nation was successful in the completion of this application and received \$3.5 Million to complete the necessary water treatment infrastructure upgrades within the community
- The SCF program funding contribution is a collaboration between the Federal and Provincial governments as well as a third of the funding being provided by the community
- Regular reporting is required to ensure that the project stays on track and within budget and SBA has been working with the community in completing the work required for this important project.



Project Work Plan





Your Project



Background:-

SBA introduced Wahta Mohawks FN to Small Community Fund Program in Fall 2015

- SCF 2.0 EOI Application Submitted Sept 2015 WTP Project
- Detailed Application Submitted Feb 2016
- Approval SCF 2.0 Aug 2016 2/3rd SCF Funding \$3.5 M
 - Agreement Signed Fall 2016 \$1.166 M each.
 - SCF provided waiver, SBA Instructed to proceed Winter 2016/2017
 - Kick off Meeting held Feb 2017
 - Design Ongoing since March 2017

The Problem:-

Non-compliant systems that do not meet Canadian Standards for Drinking Water



Actual Challenges

Communal Water Supply System/Band Office

- Drinking water ban
- Not safe for consumption (sanitary use only)
- No back-up power or diesel pump for fire protection
- Lack of safety equipment including eyewash station etc.
- Frequent exceedances in turbidity levels
- Considered high risk

Individual/Private Domestic Systems

- Several individual systems do not meet Ontario's Standard for Drinking Water
- Exceedances in several microbiological, chemical and physical properties
- Wells do not meet proper construction standards or have any wellhead protection





Water Quality Concerns

Source: Health Canada Data 2012-2017:-

WMFN Water Quality Summary Sheet	Date:	January 22, 2018
SBA File No.: F16028	Version:	1.0
	Name:	Daymar

Distribution

	Units	GCDWQ (2014)	ODWS (2006)	Lower Limit	Upper Limit	# of Samples	Min Value Observed	Max Value Observed	Average Value
TABLE 1: Microbiological Standards									
Escherichia coli	CFU/100mL	ND	ND, MAC	-	0	71	0	4	0.1408
Fecal Coliform						0	0	0	0.0000
Total Coliforms	CFU/100mL	ND, MAC	ND, MAC	-	0	325	0	50	2.3272
Background Colony count						0	0	0	0.0000
Heterotrophic plate count	CFU/mL	ND, MAC	ND, MAC	-	0	5	2	167	59.6000
TABLE 2: Chemical Standards									
Alachlor	mg/L	-	0.005, IMAC	-	0.005	29	0.0003	0.001	0.0006
Aldicarb	mg/L	-	0.009, MAC	-	0.009	29	0.003	0.009	0.0088
Aldrin + Dieldrin	mg/L	-	0.0007, MAC	-	0.0007	29	0.000012	0.00002	0.0000
Antimony	mg/L	0.006, MAC	0.006, IMAC	-	0.006	29	0.0001	0.0023	0.0005
Arsenic	mg/L	0.01, MAC	0.025, IMAC	-	0.01	58	0.0003	0.062	0.0020
Fluoride	mg/L	1.5, MAC	1.5 b, MAC	-	1.5	61	0.1	2.51	0.8707
Glyphosate	mg/L	0.28, MAC	0.28, IMAC	-	0.28	29	0.01	0.025	0.0105
Haloacetic acids – Total (HAAs)	mg/L	0.08 ALARA, MAC	-	-	0.08	20	0.002	0.002	0.0020
Heptachlor + Heptachlor Epoxide	mg/L	-	0.003, MAC	-	0.003	0	0	0	0.0000
Lead	mg/L	-	0.01c, MAC	-	0.01	61	0.00003	0.038	0.0022
Lindane	mg/L	-	0.004, MAC	-	0.004	19	0.000006	0.0001	0.0000
Malathion	mg/L	0.19, MAC	0.19, MAC	-	0.19	29	0.005	0.005	0.0050
Mercury	mg/L	0.001, MAC	0.001, MAC	-	0.001	57	0.00002	0.0001	0.0001
Methoxychlor	mg/L	-	0.9, MAC	-	0.9	29	0.000006	0.0001	0.0000
Terbufos	mg/L	-	0.001, IMAC	-	0.001	29	0.0003	0.002	0.0008
Tetrachloroethylene (perchloroethylene)	mg/L	0.03, MAC	0.03, MAC	-	0.03	29	0.0002	0.0003	0.0003



S. BURNETT & ASSOCIATES LIMITED Water Quality Concerns Cont'd

Source: Health Canada Data 2012-2017:-

Distribution

	11. Jac	GCDWQ	ODWS	Leven Linds	ula Universitània	#	Min Value	Max Value	Average
	Units	(2014)	(2006)	Lower Limit	Upper Limit	# of Samples	Observed	Observed	Value
TABLE 4: Chemical/Physical Objectives and Guidelines									
Alkalinity (as CaCO3)	mg/L	-	30-500, IMAC	30	500	49	16	213	143.8367
Aluminum	mg/L	0.1 _(conventional) or 0.2	0.1, IMAC	-	0.1	49	0.01	0.19	0.0196
Calcium	mg/L	-	-	-	-	49	1	415	62.7376
Chloride	mg/L	250, other	250, MAC	-	250	49	5	374	106.6816
Colour	TCU	15, AO	5, MAC	-	5	49	1	27	5.1224
Conductivity	-	-	-	-	-	44	138	2610	982.6818
Copper	mg/L	1, AO	1, MAC	-	1	44	0.001	0.668	0.0628
Dissolved Organic Carbon	mg/L	-	5, MAC	-	5	44	0.5	46.9	10.3795
Ethylbenzene	mg/L	0.14, MAC//0.0016, AO	0.0024, MAC	-	0.0024	0	0	0	0.0000
Hardness (as CaCO3)	mg/L	-	80-100, OG	80	100	49	1	1120	201.8980
Iron	mg/L	-	0.3, AO	-	0.3	49	0.005	14.2	0.4343
Lead	mg/L	0.01, MAC	0.01 6, AO	-	0.01	61	0.00003	0.038	0.0022
Manganese	mg/L	-	0.05, MAC	-	0.05	49	0.001	1.59	0.1144
Magnesium	mg/L	-	-	-	-	49	1	66	11.3543
Methane	L/m3	-	3, MAC	-	3	0	0	0	0.0000
Odour	-	-	Inoffensive, MAC	-	Inoffensive	0	0	0	0.0000
Organic Nitrogen	mg/L	-	0.15, IMAC	-	0.15	0	0	0	0.0000
pH	-	6.5-8.5	6.5-8.5	6.5	8.5	44	6.34	9.48	7.9511
Sodium	mg/L	200, AO	b, MAC	20	200	61	7	354	128.4885
Sulphate	mg/L	500, AO	500c, MAC	-	500	49	1	937	190.2653
Sulphide	mg/L	0.05, AO	0.05, MAC	-	0.05	0	0	0	0.0000
Taste	-	-	Inoffensive, MAC	-	Inoffensive	0	0	0	0.0000
Temperature	EC	15, AO	15, MAC	-	15	0	0	0	0.0000
Toluene	mg/L	0.06, MAC//0.024, AO	0.024, MAC	-	0.06	0	0	0	0.0000
Total Dissolved Solids	mg/L	500, MAC	500, MAC	-	500	44	10	2260	656.5909
Total Suspended Solids	mg/L	-	-	-	-	44	2	38	2.9545
Turbidity	NTU	1.0, Distribution	5 d, MAC	-	5	49	0.1	12	1.1612
Ultraviolet Transmission (UVT)						0	0	0	0.0000
Xylenes	mg/L	0.09, MAC//0.02, AO	0.3, MAC	-	0.09	0	0	0	0.0000
Zinc	mg/L	5, AO	5, MAC	-	5	44	0.01	4.5	0.1170



The Solution



Communal Water Treatment Plant Design Project:-

Project Goals:

- Provide potable water that meets Federal and Provincial Drinking Water Standards
- Provide adequate supply for existing community and proposed future 20-year growth projections

Scope:

- Identify and develop central groundwater Well
- Design and install low lift pumping equipment to extract Well water
- Design and implement a multi barrier WTP technology
- Design and install high lift pumping equipment to deliver treated water
- Design and construct storage reservoir/standpipe with capacity for some level of fire protection
- Design SCADA system for process monitoring and WTP evaluation
- Building construction
- Installation of watermain to service core area of community
- Decommissioning of existing non-compliant individual systems made obsolete by the proposed system



Previous Project Highlights

Previous Studies

- Capital Planning Study, RJ Burnside, 1994:-
- Recommends a communal Well supply for the Core Area
- Recommends the use of <u>Ferdinand's Well</u> and a second Well in the same vicinity for redundancy
- Proposes an underground reservoir or standpipe for storage
- Pre-Design Report, UMA Engineering Ltd., 2001:-
- Also recommends a communal Well supply for the Core Area using Ferdinand's Well
- Recommends treatment of groundwater by Filtration and reverse Osmosis. The option of treatment will be investigated by SBA and a final design will be based on the results of a treatability study.
- Recommends a Standpipe as the means of Storage



Current Project Highlights

Current Studies

- ***** Topographical Investigation in Core Area SMC Geomatics, July 2017:-
- Report identified survey data about the natural and man made features of the land
- Elevations ranged from high of 215 m North of road 38 to a low of 195 m near Lafarce Lake on the southeast
- Geotechnical Investigation in Core Area Soil Engineers Ltd., August 2017:-
- 23 boreholes were advanced
- Report confirmed shallow overburden and high bedrock elevations
- Localised blasting or pipe insulation and heat tracing will be required for pipeline installation
- Locates Report– G-Tel, May 2017:-
- Report conclude that proposed location for Water Treatment Plant is clear of any major underground utilities



Domestic Well Sources



SBA SOCIATES LIMITED A ASSOCIATES LIMITED ENGINEERING & ENVIRONMENTAL Well Stratigraphy and High Bedrock Elevations





Preferred Wells

- Closer to Proposed WTP location and Core Area
- Less piping = less Capital
- Less pumping
- More savings from less energy consumption
- More flexibility for Plant
 Operation





Preferred Well Inventory

							Level		
					Pumping		after		
Borehole					Rate	Static	pumping	Recommended	l
ID	Stratigraph	ny (type and de	epth (m)) - Grou	nd Elev. = 0	(L/min.)	Level (m)	(m)	Depth (m)	Casing
	sand	clay	gravel	granite					
10259360				44.2	3.8	8.8	42.7	42.7	Steel
10257733		5.5		25.0	7.6	1.8	21.3	21.3	Steel
10258873				19.8	15.2	4.9	11.3	18.3	Steel
10259361		0.6		80.8	Low Flow	6.1	0.0	70.1	Steel
10259710	0.6			73.2	3.8	1.8	73.2	71.6	Steel
10259744	0.3			103.7	7.6	14.3	103.7	91.5	Steel
10259745	0.3			30.5	19.0	5.2	30.5	29.0	Steel
10260061	1.2			115.9	11.4	9.1	0.0	240.0	Steel
10260086	0.6	2.1		24.4	113.7	4.9	0.0	60.0	Steel
10260176	1.2			109.8	3.8	4.0	0.0	103.7	Steel
10260346	0.9			91.5	56.9	18.3	0.0	61.0	Steel
10260959	1.5			36.6	56.9	12.5	36.0	30.5	Steel
10263473	0.3			122.0	45.5	7.6	22.3	61.0	Steel
10520000	0.0		1.5	122.0	45.5	11.6	49.4	115.9	Steel
10260502	0.9			76.2	22.7	11.0	0.0	36.6	Steel
10545916	1.5			54.9	11.4	21.3	48.8	48.8	Steel
10259368	0.3			80.8	11.4	10.7	0.0	70.1	Steel
11321969		0.9		42.7	57.0	5.5	42.0	30.5	Steel
10257727		1.5		29.0	37.9	8.5	9.1	-	Steel
10257732	0.3			25.0	11.4	4.9	22.9	23.8	Steel



Design Update

Population Projection:

Projected Data							
		Population	Increase over 2	0 years			
Years	Years	On Reserve	Off Reserve	Total			
		(1.914%)	(4.391%)	(3.481%)			
-1	2017	160	652	809			
0	2018	163	681	837			
1	2019	166	711	866			
2	2020	169	742	896			
3	2021	173	774	928			
4	2022	176	808	960			
5	2023	179	844	993			
6	2024	183	881	1028			
7	2025	186	919	1064			
8	2026	190	960	1101			
9	2027	193	1002	1139			
10	2028	197	1046	1179			
11	2029	201	1092	1220			
12	2030	205	1140	1262			
13	2031	209	1190	1306			
14	2032	213	1242	1352			
15	2033	217	1297	1399			
16	2034	221	1354	1447			
17	2035	225	1413	1498			
18	2036	229	1475	1550			
19	2037	234	1540	1604			
20	2038	238	1607	1660			
	Year						
	Design						





Design Update

Summary of Design Flows and Storage Volumes

Item	Description	Units	Initial	5 -Year	10-Year	15-Year	20 Year
1	Equivalent Population	Capita	184	201	218	238	259
2	Equivalent Connections	-	61	67	73	79	86
3	Average Day Demand (ADD)	(m ³ /d)	59.9	65.2	71.0	77.3	84.3
4	Maximum Day Factor	-	4.60	4.46	4.31	4.14	3.95
5	Maximum Day Demand (MDD)	(m³/d)	275.7	290.8	305.7	320.0	333.2
6	Peak Hour Factor	-	6.94	4.46	6.49	6.23	5.94
7	Peak Hour Demand (PHD)	(L/s)	4.81	5.07	5.33	5.57	5.80
8	Storage Based on ABC formula	m ³	428.2	432.9	437.5	442.0	446.1
9	Chlorine Contact - Winter	m ³	8.9	9.3	9.8	10.3	10.7



Design Update

Other Design Updates:

- Existing well inventory completed
- Water Quality Collecting/Sampling –Data obtained from HC
- Topographical survey complete
- Geotechnical investigation complete
- Preliminary calculations for pumping equipment and CT requirements complete
- 33% Design Brief/Conceptual Report Ongoing
- Groundwater sourcing and well development ongoing





Ongoing Work



Groundwater Sourcing and Well Development

- Well pumping test to commence after identification of potential well(s) including Ferdinand's Well
- Water quality sampling test and evaluation (Quarterlies throughout project design)

Well Drilling and Pumping Test

- To be undertaken by local contractor
- Community to identify preferred Well Driller*
- Driller will work closely with Project Hydrogeologist (Banks Groundwater Engineering Ltd.)

*Driller not required if existing wells can meet demand

S. BURNETT Immediate Work Required & ASSOCIATES LIMITED – Well Monitoring Program



Tasks:-

- Identify proposed number of monitoring wells
- Monitor existing wells for potential interference
- Perform a 72-hour pump test to confirm capacity
- Perform a 24-hour well recovery monitoring exercise to understand longterm yield
- Prepare hydrogeological report

Schedule:-

Task	Start Date	Duration
Identify proposed number of monitoring wells	February 01 st , 2018	3 days
Monitor existing wells for potential interference	February 6 th , 2018	34 days
Perform a 72-hour pump test to confirm capacity	February 20 th , 2018	4 days
Perform a 24-hour well recovery monitoring exercise to understand long-term yield	February 26 th , 2018	1 day
Prepare hydrogeological report	March 30 th , 2018	35 days





Community Involvement

- Participation of community members will be essential to the successful completion of the project.
- SBA will work with Chief and Council and the Project Team to develop a program that
 facilitates community awareness and participation in the process. As part of this process we
 suggests the use of the following methods to ensure that the community is fully aware of the
 goals and objectives as well as the progress of the project:-
- > Newsletters
- Community Meetings and
- > Briefings





Next Steps

Project Sequence:-

- 1) Conduct Well Capacity Testing on existing community Well(s) Ferdinand Well
- 2) Treatment Technology Evaluation & Feasibility Treatability Study
- 3) Treatment Equipment Supplier RFP
- 4) Commence Negotiations with INAC to Secure Additional Funding
- 5) 33% Design First Submission Dwgs
- 6) 66% Design & Design Brief Submission INAC, HC and MOECC for Comments/Approval
- 7) 99% Design & Design Brief Submission INAC, HC and MOECC for Approvals
- 8) Tendering Phase Provide GC 3 to 4 weeks to bid
- 9) Construction and Commissioning
- 10) Warranty (1 year)



How Will the Community Benefit?

The project will be a long-term solution that permanently removes the longstanding Boil Water Advisory imposed on the community

The new WTP will provide a safe and reliable water supply that will allow for better >plant operation and management in accordance with Ontario Drinking Water Standards

The new system will ensure a multi-barrier approach, as required by the Ontario Drinking Water Act and in accordance with the various regulatory standards with the provision of some fire protection

The design of the new system will also meet the current and future 20-year water demand projections



Project Milestones

Activity	Schedule Date
Start Date of Project/Project Initiation	Feb, 2017
Topographical and Geotechnical Investigation	Complete
Preliminary Design and Design Calculations	Complete
Well Capacity Test and Treatability Study	Ongoing/Feb/Mar, 2018
33% Design/Conceptual Report	Ongoing/March, 2018
66% Design Completion and Review	April/May, 2018
99% Design Completion and Review/Approval	June, 2018
Supplier Select and Tender Award	July, 2018
Start Date of Construction	August, 2018
End Date of Construction	Dec, 2018
End Date of Project/Defects Liability Period Ends	Dec, 2019



Thank You

Questions or Comments?

