

A G E N D A

“Greenwood Source Water Protection Advisory Committee Meeting”

Via WebEx

March 11th, 2021

10:00 a.m.

1. Meeting to Order
2. Roll Call
3. Amendments to the Agenda
4. Approval of the agenda
5. Business Arising from previous minutes
 - Scheduling a Wellfield tour.
6. Approval of Minutes
7. Disclosure of Conflict of Interest
8. New Business
 - Source Water Protection Policy Review
 - 2021 Education and Stewardship plan
9. Other Business
 - Management Plan Evaluation – Annual Report
 - Municipal Land-Use Planning updates
 - Landowner concerns
10. Correspondence
11. Date of Next Meeting
12. Public Comments
13. Adjournment

**GREENWOOD SOURCE WATER PROTECTION
ADVISORY COMMITTEE
MINUTES OF October 1, 2020
Via WebEx**

1. Meeting to Order:

Chairperson Paul Spicer called the meeting to order at 10:00 a.m. Introductions were made around the table.

2. Roll Call:

Attending:

Councilor Paul Spicer, Chair
Commissioner Bob Baker, Village of Greenwood
Violet (Marie) Corbett-MacDonald, Citizen Representative
Scott Quinn, Director of Engineering & Public Works, Lands & Parks
Lisa Langille, Compliance Officer, Municipality of Kings County
Lisa Amon, Recording Secretary, Municipality of Kings
Mark Fredericks, Planner, Municipality of Kings County
Justine Ridgeway, Property Officer 14 Wing Greenwood
Michael Allen, Nova Scotia Environment

Regrets:

Kim Kelsey, Property Officer 14 Wing Greenwood

Violet (Marie) Corbett-MacDonald and Scott Quinn both advised the committee they need to leave the meeting a bit early.

3. Amendments to the Agenda:

The agenda was amended for the Presentation for the Potential New Well to be the first item of business.

4. Approval of the Agenda:

The agenda for the October 1, 2020 meeting of the Greenwood Source Water Advisory Committee was amended.

Lisa Langille moved for approval of the agenda as amended; seconded by Mark Fredericks.

5. Potential New Well Update:

Scott Quinn advised the new Well site has been secured and some construction has started. The install will include treatment pump house infrastructure and transmission main. Councillor Spicer asked if the timeline would be one or two years for the connection of the wells to the tower and pump houses. Scott advised there needs to be some upgrades to the UV house as well. Councillor Spicer asked if staff have the permission of the land owners. Scott stated it is part of the process when you develop infrastructure.

6. Business Arising from the previous minutes:

Lisa Langille advised there has not been much public education due to COVID19, aside from communications about water conservation.

7. Approval of the Minutes:

The minutes of the March 12, 2020 meeting of the Greenwood Source Water Advisory Committee were circulated with the agenda and reviewed.

Lisa Langille moved for approval of the Greenwood Source Water Protection Advisory Committee minutes of March 12, 2020; seconded by Violet (Marie) Corbett-MacDonald.

8. Disclosure of Conflict of Interest:

None

9. Business:

Water Conservation By-law – Lisa L gave a brief review of the Conservation By-Law; as an item for our approval to operate, we are required to have a water conservation plan in place and in addition to this, we had a study done to determine parameters for conservation with our well levels. We currently have a water conservation plan in place but all elements of it are voluntary.

Lisa L explained the By-law process has been long and that the Conservation By-law is now approved.

Because it is new, this year was for educating about the Conservation By-law. Michael Allen stated he believes we are in the top in the area right now for having the Conservation By-law established. He believes the Town of Wolfville, Municipality of Kings and Cumberland County have Conservation By-laws. Conservation By-laws will be mandatory in the next few years.

Management Plan Evaluation – Annual Report: The 2020 Bi - Annual Report was reviewed with the committee. The pH in monitoring Well #1 and #2 show a little higher, this is upstream of the plant and it is generally more apparent following a heavy rain otherwise they are all following normal seasonal trends.

There were a few instances of total coliform in the monitoring wells but not unusual for shallow wells that are frequently opened. The third quarter showed there was an increase in aluminum which we will continue to monitor.

Lisa Langille reported that quarterly testing for manganese in the production wells exceeded Health Canada's aesthetic objectives but was under the maximum acceptable concentration therefore no action is required at this time.

10. Other Business:

Municipal Land-Use Planning updates – Mark advised there is no planning items to report in Greenwood area that would be near the wells.

Tour of the Wellfields –

Lisa L will send out some dates to meet to do a tour of the Wellfields at 893 Meadowvale Rd.

11. Correspondence:

None.

12. Date of Next Meeting:

It was agreed the next meeting of the Committee will take place on Thursday, March 11, 2021.

13. Public Comments:

None.

14. Adjournment:

With no further business to discuss, the meeting was adjourned at 11:25am as moved by Commissioner Baker and seconded by Mark Fredericks.



MUNICIPALITY OF THE COUNTY OF KINGS

Greenwood Water Utility Source Water Protection Committee Policy

Creation Date: August 28, 2012
Approval Date: September 18, 2012
Revision Date: September 2, 2014
May 3, 2016

Policy Category: Engineering & Public Works
Next Review Date: September 2015
Replaces:

1. Committee Mandate:

The function of the Greenwood Source Water Protection Committee (*"the Committee"*) is to advise Municipal Council and staff on the development and maintenance of a mutually beneficial, locally developed and administered Source Water Protection Program that protects the water source(s) of the Greenwood Water Utility (*"the Utility"*).

2. Authority:

Nova Scotia Environment requires the Municipality to implement certain policies and procedures to safeguard the source waters of the Greenwood Water Utility as part of the Greenwood Water Utility's operating permits. Per Section 23(1) (c) and Section 24 of the Municipal Government Act, Municipal Council authorizes the formation of the Committee and authorizes it to conduct the activities outlined in this Policy on its behalf.

3. Definitions:

- 3.1 "EPW" means the Engineering and Public Works section of the Municipality of the County of Kings.
- 3.2 "Source Water Protection Program" means a program developed by the stakeholders of a water utility to protect and monitor the health of a source water supply.
- 3.3 "Source Water Protection Area Boundary" means the area of land which contributes water to the Utility's production wells.

4. Committee Composition:

The Committee shall be composed of stakeholders of the Utility. The Committee will consist of the following:

- Planning Advisor (Municipality's Manager of Community Development or designate)

MASTER





MUNICIPALITY OF THE COUNTY OF KINGS

Greenwood Water Utility Source Water Protection Committee Policy

- Engineering Advisor (Municipality's Manager of EPW, Lands and Parks Services or designate)
- District Councillor
- Citizen Representative appointed by Council for a two year term commencing in the fall of the appointment year
- A Commissioner from the Village of Greenwood appointed by Council for a two year term commencing on the first day of May of the appointment year
- Representative of Nova Scotia Environment
- Representative from the Greenwood Water Utility (employee of the Municipality)
- Representative from 14 Wing Greenwood (Ex officio, non-voting)

The Chair shall be the District Councillor. The Vice-Chair will be appointed by members of the Committee.

5. Related Policies, Procedures and Legislation:

Environment Act 1994-95, Province of Nova Scotia

Greenwood Wellfield Approval for Water Withdrawal No. 2004-039399-A01, Province of Nova Scotia

Greenwood Water Utility Approval to Operate No. 2009-066399-A01, Province of Nova Scotia

Water for Life: Nova Scotia's Water Resource Management Strategy, Province of Nova Scotia

Water and Wastewater Facilities and Public Drinking Water Supplies Regulations, Province of Nova Scotia

6. Responsibilities:

The Committee is responsible for advising Council about the following issues:

6.1 Source Water Protection Area Boundary

- a) Identify and delineate the source water supply area.
- b) Assess the delineated boundary to ensure it adequately encompasses the source water supply area and meets the needs of the stakeholders.
- c) Recommend changes to the delineated area, as required, within the confines of the regulations.

MASTER





MUNICIPALITY OF THE COUNTY OF KINGS

Greenwood Water Utility Source Water Protection Committee Policy

6.2 Identify Potential Contaminates and Assess Risks

- a) Identify and document potential sources of contamination.
- b) Assess the risk they pose to the source water supply area.
- c) Recommend to staff and Council as appropriate any changes in laws, policies, or regulations governing the Utility.

6.3 Source Water Protection Management Plan

- a) Review and comment on the Plan and any proposed amendment thereto.
- b) Work with and consult community members and the Village of Greenwood when drafting the Source Water Protection Plan or revisions thereto.
- c) Work with staff to develop community education and awareness strategies on the Plan.
- d) Review monitoring results at an acceptable frequency, at least annually, to verify the continued quality of the source water to ensure the management plan is effective and current to conditions within the supply area.

6.4 Compliance with Laws, Regulations and Guidelines

Review as required, reports from staff and others relating to the Utility's compliance with laws, regulations and other obligations governing the Source Water Protection Plan.

7. Operating Procedures and Principles:

The Committee shall conduct itself in accordance with the following principles and procedures:

7.1 Committee Values

The Committee and staff are expected to operate in compliance with the Municipal Code of Conduct, and the policies, laws, and regulations governing the Municipality. The Committee is expected to use a consensus-based approach to its decision making.

7.2 Communications

The Committee members will maintain direct, open, frank communications with staff, Council and other key advisors as appropriate.

MASTER





MUNICIPALITY OF THE COUNTY OF KINGS

Greenwood Water Utility Source Water Protection Committee Policy

7.3 Policy Development

Review and comment on all applicable materials to help staff and Council to establish technically sound and achievable goals using a combination of management practices as referred by NSE; Acquisition of Land, By-laws, Best Management Practices, Contingency Plans, Designation, and Education. The Committee may invite experts or other appropriate resource person(s) to provide advice on matters before it and may in good faith rely upon any reports and findings they provide.

7.4 Meetings

Meetings shall be held semi-annually at a time to be established by the Committee. Special meetings may be convened throughout the year at the request of the Chair, the Utility Representative, or at the written request by a majority of the Committee's member. A copy of the minutes of each meeting shall be provided to each member in a timely fashion.

7.5 Accountability and Reporting

The Committee is accountable to Council. The Committee shall report to Council as often as necessary but at least annually. Reporting shall normally be done through the Committee's Chair.

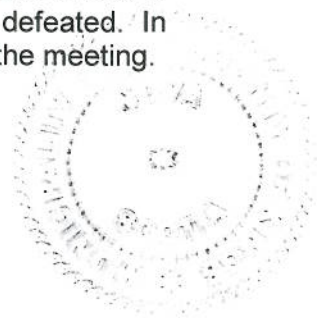
7.6 Committee Self Assessment

The Committee shall annually review, discuss and assess its performance. The Committee will review this Policy on an annual basis and recommend any changes to this Policy that may be considered appropriate.

8. Quorum and Decision Making:

A quorum consists of a majority of the voting members of the Committee. The Committee shall use a consensus-based approach in its decision making. The Chair may put the matter to a vote if they deem that a consensus is not achievable. Each Committee member is entitled to one (1) vote and decisions shall be majority vote of those present. The Chair presiding at any meeting of the Committee shall have a vote in all matters considered by the Committee. In the event of a tie the motion is defeated. In the absence of the Chair of the Committee, the Vice-Chair will preside over the meeting.

MASTER





Municipality of the County of Kings

181 Coldbrook Village Park Dr.

Coldbrook NS

www.countyofkings.ca

Tel: (902) 690-2215

Fax: (902) 690-2212

Tel: 1-888-337-2999

Land of Orchards, Vineyards and Tides

Greenwood Source Water Protection Monitoring Plan Evaluation

2020 Annual Report

1. By-Laws

Complete Jan. 12/12.

2. Best Management Practices

Adopted as a resource March 24, 2016. A review of the *"A Guide to Agricultural Best Management Practices within Municipal Drinking Water Supply Areas in Nova Scotia"* was conducted at the September 2018 meeting.

3. Greenwood Sewage Treatment Plant Monitoring Wells Program

The Groundwater monitoring wells were tested weekly as per the "Groundwater Monitoring Program for the Greenwood Sewage Treatment Facility" developed for the Municipality by CBCL Ltd.

The weekly parameters are attached (Jan 2019 - Dec 2020), the graph results are as follows:

Water level – Following normal seasonal trends. Well 4B was dry in 2020. Well 5 was dry for much of the Fall 2020.

Toward the end of June there is an upturn in water levels over all of the wells, this stabilized over the summer and then experienced another rise in the fall when we were seeing a increase in precipitation. Although this trend does not appear to follow the seasonal trends of 2019, it is inline with 2018 levels.

Temperature – Following normal seasonal trends.

pH –We are following normal seasonal trends. There are a few spikes in well #1, these usually follow a heavy precipitation event and although they appear outside of normal trend, they are a normal pattern for this well. We are not seeing any unusual trends as per the quarterly chemical testing, therefore we will continue to monitor.

DO – Following normal seasonal trends.

Conductivity – Following normal seasonal trends. We are not seeing any unusual trends as per the quarterly chemical testing, therefore we will continue to monitor.

The quarterly testing has indicated no unusual trends. The only exceedances of the Canadian Drinking Water Guidelines was total coliform, with relatively low counts found in all wells throughout the year. This is not unusual for wells that are shallow and opened up so frequently. They were all absent for E. coli so no further investigation was required.

In the second quarter testing we saw an increase in aluminum but was well within the operational guidelines. It had returned to normal baseline numbers in the next testing bout.

In the third quarter testing bout we saw an increase in the Total Kjeldahl Nitrogen (TKN) numbers for all wells. These numbers are based on a nitrogen and ammonia relationship, these numbers during this testing period were well within normal baseline numbers so it may be an anomaly. Testing conducted in the fourth quarter indicated a return to normal trends.

4. Production Well Raw Water pH Monitoring

We are observing slightly downward trend of raw pH values in the production wells throughout 2019 and stabilizing in January 2020. There are no other notable parameter changes amongst our extensive testing regime. We will continue to monitor.

5. Greenwood Production Well Weekly/Annual Sampling:

All weekly microbial testing came back absent for coliform and E.coli since January 2020.

Guidelines for Monitoring Public Drinking Water Supplies – completed in June and all within compliance with the exception of manganese in Well GW13. We are meeting Health Canada's Maximum Acceptable Concentration but exceeding aesthetic objectives. We are awaiting guidance from Nova Scotia Environment but this is not a health concern.

Guidelines for Canadian Drinking Water Quality testing, conducted every 5 years, was also completed in July 2017, all results were within the guidelines. MPA (Microscopic Particulate Analysis) Sampling was completed in spring of 2019. Testing has indicated Well GW13 is low risk and GW8 is medium risk GUDI this indicates our status of medium risk GUDI (Groundwater Under the Influence of Surface Water) remains the same. We are also carrying out some of the recommendations made by the consultant, i.e. raising the wellhead for GW13 and creating better drainage for the wellfield to eliminate standing water.

6. Contingency Planning:

Up to date.

7. Education and Stewardship:

Water conservation was the area of concentration for 2020 with adoption of the Water Conservation By-law #107 in May of 2020. Social media and Public Service Announcements were utilized.

Appendix A

Greenwood Sewage Treatment Plant Groundwater Monitoring Wells – Quarterly

Greenwood Sewage Treatment Plant Monitoring Well

Well #1

Parameter	Unit	G/S (mg/L)	RDL	Baseline	2019-03-19	2019-06-07	2019-10-07	2019-12-20	2020-03-16	2020-06-23	2020-08-10	2020-12-15
pH	NA	7.0-10.5		7.8	7.05	7.47	7.08	7.12	7.12	7.18	7.29	6.97
Reactive Silica as SiO2	mg/L		0.5	12.5	8.4	8.39	12	8.3	8.3	9.6	10.1	
Chloride	mg/L	AO </= 250	1	11	7	5	3	3	3	3	4	2
Fluoride	mg/L	1.5	0.1	0.1	<0.12	<0.12	<0.12	<0.12	<0.12	<0.12	<0.12	
Sulphate	mg/L	AO </= 500	2	5	3	2	<2	<1	4	<2	<2	<2
Alkalinity	mg/L		5	46	21	20	30	12	14	27	24	21
True Colour	TCU	AO </= 15	5	<5	<5	<5	<5	<5	<5	<5	<5	
Turbidity	NTU		0.1	7200	1.3	1.3	2.2	5	3.6	2	3.1	
Electrical Conductivity	umho/cm		1	135	73	61	76	41	40	75	66	52
Nitrate+Nitrite as N	mg/L		0.05	0.11	0.06	0.08	0.07	0.07	0.32	0.05	0.14	0.21
Nitrate as N	mg/L	10	0.05	0.11	0.06	0.08	0.07	0.07	0.32	0.05	0.14	0.21
Nitrite as N	mg/L	1	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ammonia as N	mg/L		0.05	0.05	<0.03	<0.03	0.07	<0.03	<0.03	<0.03	<0.03	<0.03
Total Organic Carbon	mg/L		0.5	3	<0.5	1.7	<0.5	1.2	<0.5	0.9	0.6	
Ortho-Phosphate as P	mg/L		0.01	0.02	0.02	<0.01	0.02	<0.01	0.02	0.01	<0.1	
Sodium	mg/L		0.1	4.1	3.3	3.6	4.1	2.7	1.6	3.8	3.1	2.9
Potassium	mg/L		0.1	1.3	0.6	0.6	0.9	0.6	0.3	0.8	0.7	0.7
Calcium	mg/L		0.1	14.1	5.7	5	7.2	3.5	2.4	7.3	5.9	
Magnesium	mg/L		0.1	1.8	1	1	1.3	0.7	0.5	1.6	1.3	
Bicarb Alkalinity (CaCO3)	mg/L		5	46	21	20	30	12	14	27	24	21
Carb Alkalinity	mg/L		10	<10	<10	<10	<10	<10	<10	<10	<10	
Hydroxide	mg/L		5	<5	<5	<5	<5	<5	<5	<5	<5	
Calculated TDS	mg/L	AO </= 500	1	65	33	30	35	18	22	33	30	<5
Hardness	mg/L			42.6	18.4	16.6	23.3	11.6	8.1	24.8	20.1	
Langelier Index (20C)	NA			-0.96	-2.41	-2.06	-2.13	-2.77	-2.87	-2.06	-2.09	
Langelier Index (4C)	NA			-1.28	-2.73	-2.38	-2.45	-3.09	-3.19	-2.38	-2.41	
Saturation pH (20C)	NA			8.76	9.46	9.53	9.21	9.89	9.99	9.24	9.38	
Saturation pH (4C)	NA			9.08	9.78	9.85	9.53	10.2	10.3	9.56	9.7	
Anion Sum	me/L			1.34	0.68	0.59	0.69	0.33	0.47	0.63	0.6	
Cation Sum	mg/L			1.07	0.53	0.5	0.67	0.37	0.24	0.68	0.55	
Ion Balance	%			11.4	13.1	7.7	1.2	5.1	32.8	4.3	4.2	
Biochemical Oxygen Demand	mg/L		2	<2	<2	<2	3	<2	<2	3	<2	<2
Total Suspended Solids	mg/L			8300	<5	<5	<5	8	<5	8	5	<5
Total Kjeldahl Nitrogen as N	mg/L		0.4	2.4	<0.4	1.1	<0.4	<0.4	<0.4	2.5	8.3	<0.4
Dissolved Organic Carbon	mg/L		0.5	0.7	<0.5	1.3	<0.5	1.3	<0.5	0.9	1.1	<0.5
Total Coliforms	MPN/100mL	0	1	<2	<1	<1	<1	<1	<1	<1	<1	<1
Escherichia coli	MPN/100mL	0	1	<2	<1	<1	<1	<1	<1	<1	<1	<1
Fecal	CFU/100mL	0	2									<1
Aluminum	ug/L	OG < 100	10	<5	<5	<5	<5	<5	<5	20	<5	
Antimony	ug/L	6	2	<2	<2	<2	<2	<2	<2	<2	<2	
Arsenic	ug/L	10	2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Barium	ug/L	1000	5	7	6	<5	<5	<5	<5	<5	<5	<5
Beryllium	ug/L		2	<2	<2	<2	<2	<2	<2	<2	<2	
Bismuth	ug/L		2	<2	<2	<2	<2	<2	<2	<2	<2	
Boron	ug/L	5000	5	8	<5	<5	<5	<5	<5	<5	<5	6
Cadmium	ug/L	5	0.3	<0.017	<0.09	<0.09	<0.017	0.029	<0.017	0.048	0.037	<0.03
Chromium	ug/L	50	2	<1	<1	<1	1	<1	<1	1	<1	<2
Cobalt	ug/L		1	<1	<1	<1	<1	<1	<1	<1	<1	
Copper	ug/L	AO </= 1000	2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Iron	ug/L	AO </= 300	50	<50	<50	<50	<50	<50	<50	<50	<50	<50
Lead	ug/L	10	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Manganese	ug/L	AO </= 50	2	3	<2	<2	<2	<2	<2	<2	<2	<2
Mercury	ug/L	1										<0.005
Molybdenum	ug/L		2	<2	<2	<2	<2	<2	<2	<2	<2	
Nickel	ug/L		2	<2	<2	<2	<2	<2	<2	<2	<2	
Phosphorus	mg/L		0.03	<0.02	<0.02	<0.02	<0.02	0.02	0.02	<0.02	<0.02	<0.03
Selenium	ug/L	10	2	<1	<1	<1	<1	<1	<1	<1	<1	
Silver	ug/L		0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
Strontium	ug/L		5	44	19	13	23	15	7	22	19	
Thallium	ug/L		0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
Tin	ug/L		2	<2	<2	<2	<2	<2	<2	<2	<2	
Titanium	ug/L		2	<2	<2	<2	<2	<2	<2	<2	<2	
Uranium	ug/L	20	0.1	0.9	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	
Vanadium	ug/L		2	<2	<2	<2	<2	<2	<2	<2	<2	
Zinc	ug/L	AO </= 500	5	<5	<5	<5	<5	<5	<5	<5	<5	<5

Greenwood Sewage Treatment Plant Monitoring Well

Well #2

Parameter	Unit	G/S (mg/L)	RDL	Baseline	2019-03-19	2019-06-07	2019-10-07	2019-12-20	2020-03-16	2020-06-23	2020-08-10	2020-12-15
pH	NA	7.0-10.5		7.9	6.58	7.13	7.08	6.78	6.85	6.62	6.75	6.22
Reactive Silica as SiO2	mg/L		0.5	12.6	9.1	9.2	11.8	11	9.7	10.7	12.1	
Chloride	mg/L	AO </= 250	1	89	6	5	4	5	4	5	5	10
Fluoride	mg/L	1.5	0.1	<0.1	<0.12	<0.12	<0.12	<0.12	<0.12	<0.12	<0.12	
Sulphate	mg/L	AO </= 500	2	5	3	2	3	4	4	3	3	3
Alkalinity	mg/L		5	52	15	12	16	12	17	15	27	
True Colour	TCU	AO </= 15	5	<5	7	<5	<5	<5	6	9	<5	
Turbidity	NTU		0.1	3000	1.4	2.7	1.3	0.7	3	2.4	6.4	
Electrical Conductivity	umho/cm		1	405	67	58	64	58	62	63	87	93
Nitrate+Nitrite as N	mg/L		0.05	0.16	0.13	0.13	0.22	0.23	0.11	0.09	0.06	0.87
Nitrate as N	mg/L	10	0.05	0.16	0.13	0.13	0.22	0.23	0.11	0.09	0.06	0.87
Nitrite as N	mg/L	1	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ammonia as N	mg/L		0.05	0.04	<0.03	>0.03	0.05	<0.03	<0.03	<0.03	<0.03	<0.03
Total Organic Carbon	mg/L		0.5	2.5	<0.5	1.2	<0.5	1	0.6	0.8	2	
Ortho-Phosphate as P	mg/L		0.01	0.01	0.01	<0.01	0.02	<0.01	0.02	0.01	0.02	
Sodium	mg/L		0.1	36.9	4.2	3.5	4.5	3.8	2.8	4.5	4.8	5.5
Potassium	mg/L		0.1	2.5	0.8	0.6	0.9	0.9	0.5	0.9	1	1.5
Calcium	mg/L		0.1	24.6	4.3	3.4	4.4	3.5	3	4.4	6.9	7
Magnesium	mg/L		0.1	3.5	1	0.9	1	1	0.8	1.2	1.8	1.9
Bicarb Alkalinity (CaCO3)	mg/L		5	52	15	12	16	12	14	15	27	22
Carb Alkalinity	mg/L		10	<10	<10	<10	<10	<10	<10	<10	<10	
Hydroxide	mg/L		5	<5	<5	<5	<5	<5	<5	<5	<5	
Calculated TDS	mg/L	AO </= 500	1	194	29	23	28	26	25	28	39	40
Hardness	mg/L			77.1	14.9	12.2	15.1	12.9	10.8	15.9	24.6	
Langelier Index (20C)	NA			-0.61	-3.14	-2.78	-3.21	-3.13	-3.05	-3.09	-2.53	
Langelier Index (4C)	NA			-0.93	-3.46	-3.1	-3.53	-3.45	-3.37	-3.41	-2.85	
Saturation pH (20C)	NA			8.51	9.72	9.91	9.69	9.91	9.9	9.71	9.28	
Saturation pH (4C)	NA			8.83	10	10.2	10	10.2	10.2	10	9.6	
Anion Sum	me/L			3.67	0.54	0.43	0.53	0.48	0.5	0.51	0.75	
Cation Sum	mg/L			3.21	0.5	0.41	0.52	0.45	0.35	0.54	0.73	
Ion Balance	%			6.6	3.9	2.4	1.3	3.8	18.1	3.2	1.4	
Biochemical Oxygen Demand	mg/L		2	<2	<2	<2	2		<2	<2	<2	<2
Total Suspended Solids	mg/L			9580	<5	<5	<5	<5	<5	8	33	<5
Total Kjeldahl Nitrogen as N	mg/L		0.4	4.2	<0.4	<0.4	<0.4	<0.4	<0.4	0.5	19.1	<0.4
Dissolved Organic Carbon	mg/L		0.5	0.6	<0.5	1	<0.5	0.9	<0.5	0.8	0.8	<0.5
Total Coliforms	MPN/100mL	0	1	<2	<1	<1	1	<1	<1	<1	<1	<1
Escherichia coli	MPN/100mL	0	1	<2	<1	<1	<1	<1	<1	<1	<1	<1
Fecal	CFU/100mL	0	2									<1
Aluminum	ug/L	OG < 100	10	<5	<5	<5	<5	<5	<5	53	7	
Antimony	ug/L	6	2	<2	<2	<2	<2	<2	<2	<2	<2	
Arsenic	ug/L	10	2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Barium	ug/L	1000	5	32	<5	<5	<5	5	<5	<5	6	7
Beryllium	ug/L		2	<2	<2	<2	<2	<2	<2	<2	<2	
Bismuth	ug/L		2	<2	<2	<2	<2	<2	<2	<2	<2	
Boron	ug/L	5000	5	12	<5	<5	<5	5	<5	5	5	7
Cadmium	ug/L	5	0.3	<0.017	<0.09	<0.09	0.115	0.025	<0.017	0.079	0.034	<0.03
Chromium	ug/L	50	2	<1	<1	<1	1	1	<1	2	2	<2
Cobalt	ug/L		1	<1	<1	<1	<1	<1	<1	<1	<1	
Copper	ug/L	AO </= 1000	2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Iron	ug/L	AO </= 300	50	<50	<50	<50	<50	<50	<50	<50	<50	<20
Lead	ug/L	10	0.5	0.6	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Manganese	ug/L	AO </= 50	2	30	<2	<2	<2	<2	<2	3	<2	<2
Mercury	ug/L	1										<0.05
Molybdenum	ug/L		2	<2	<2	<2	<2	<2	<2	<2	<2	
Nickel	ug/L		2	<2	<2	<2	<2	<2	<2	<2	<2	
Phosphorus	mg/L		0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.03
Selenium	ug/L	10	2	<1	<1	<1	<1	<1	<1	<1	<1	
Silver	ug/L		0.5	<0.1	<0.1	<0.1	<0.1	0.2	<0.1	<0.1	<0.1	
Strontium	ug/L		5	156	20	13	19	23	13	18	32	
Thallium	ug/L		0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
Tin	ug/L		2	<2	<2	<2	<2	<2	<2	<2	<2	
Titanium	ug/L		2	<2	<2	<2	<2	<2	<2	<2	<2	
Uranium	ug/L	20	0.1	0.7	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
Vanadium	ug/L		2	<2	<2	<2	<2	<2	<2	<2	<2	
Zinc	ug/L	AO </= 500	5	<5	<5	<5	<5	<5	<5	<5	<5	<5

Well 3A

[illegible]

Greenwood Sewage Treatment Plant Monitoring Well

Well 3B

Parameter	Unit	G/S (mg/L)	RDL	Baseline	2020-03-16	2020-06-23	2020-08-10	2020-12-15
pH	NA	7.0-10.5			6.05	Dry	Dry	5.47
Reactive Silica as SiO ₂	mg/L		0.5		6.8			
Chloride	mg/L	AO <= 250	1		2			6
Fluoride	mg/L	1.5	0.1		<0.12			
Sulphate	mg/L	AO <= 500	2		2			3
Alkalinity	mg/L		5		8			
True Colour	TCU	AO <= 15	5		<5			
Turbidity	NTU		0.1		19.7			
Electrical Conductivity	umho/cm		1		30			42
Nitrate+Nitrite as N	mg/L		0.05		<0.05			<0.05
Nitrate as N	mg/L	10	0.05		<0.05			<0.05
Nitrite as N	mg/L	1	0.05		<0.05			<0.05
Ammonia as N	mg/L		0.05		0.04			<0.03
Total Organic Carbon	mg/L		0.5		<0.5			
Ortho-Phosphate as P	mg/L		0.01		0.02			
Sodium	mg/L		0.1		1.7			4.0
Potassium	mg/L		0.1		0.3			0.3
Calcium	mg/L		0.1		0.6			1.4
Magnesium	mg/L		0.1		0.5			1.2
Bicarb Alkalinity (CaCO ₃)	mg/L		5		8			6
Carb Alkalinity	mg/L		10		<10			
Hydroxide	mg/L		5		<5			
Calculated TDS	mg/L	AO <= 500	1		12			80
Hardness	mg/L				3.6			
Langelier Index (20C)	NA				-4.76			
Langelier Index (4C)	NA				-5.08			
Saturation pH (20C)	NA				10.80			
Saturation pH (4C)	NA				11.10			
Anion Sum	me/L				0.26			
Cation Sum	mg/L				0.16			
Ion Balance	%				24.10			
Biochemical Oxygen Demand	mg/L		2		<2			<2
Total Suspended Solids	mg/L				239			170
Total Kjeldahl Nitrogen as N	mg/L		0.4		0.4			4.6
Dissolved Organic Carbon	mg/L		0.5		<0.5			<0.5
Total Coliforms	MPN/100mL	0	1		<1			<1
Escherichia coli	MPN/100mL	0	1		<1			<1
Fecal	CFU/100mL	0	2					<1
Aluminum	ug/L	OG < 100	10		14			
Antimony	ug/L	6	2		<2			
Arsenic	ug/L	10	2		<2			<2
Barium	ug/L	1000	5		7			12
Beryllium	ug/L		2		<2			
Bismuth	ug/L		2		<2			
Boron	ug/L	5000	5		<5			8
Cadmium	ug/L	5	0.3		0.286			<0.3
Chromium	ug/L	50	2		<1			
Cobalt	ug/L		1		<1			<2
Copper	ug/L	AO <= 1000	2		<2			<2
Iron	ug/L	AO <= 300	50		<50			<50
Lead	ug/L	10	0.5		<0.5			<0.5
Manganese	ug/L	AO <= 50	2		3			11
Mercury	ug/L	1						<0.05
Molybdenum	ug/L		2		<2			
Nickel	ug/L		2		<2			
Phosphorus	mg/L		0.1		<0.02			<0.03
Selenium	ug/L	10	2		<1			
Silver	ug/L		0.5		<0.1			
Strontium	ug/L		5		5			
Thallium	ug/L		0.1		<0.1			
Tin	ug/L		2		<2			
Titanium	ug/L		2		<2			
Uranium	ug/L	20	0.1		<0.1			
Vanadium	ug/L		2		<2			
Zinc	ug/L	AO <= 500	5		<5			<5

Greenwood Sewage Treatment Plant Monitoring Well

Well #4A

Parameter	Unit	G/S (mg/L)	RDL	Baseline	2019-03-19	2019-06-07	2019-10-07	2019-12-20	2020-03-16	2020-06-23	2020-08-10	2020-12-15
pH	NA	7.0-10.5		6.8	6.62	7.04	6.65	6.83	6.66	6.57	6.63	6.24
Reactive Silica as SiO2	mg/L		0.5	11.4	12.4	10.2	13.7	12.9	11.7	12.4	13.2	
Chloride	mg/L	AO <= 250	1	38	7	7	7	3	5	7	7	8
Fluoride	mg/L	1.5	0.1	<0.1	<0.12	<0.12	<0.12	<0.12	<0.12	<0.12	<0.12	
Sulphate	mg/L	AO <= 500	2	6	3	4	3	2	3	4	4	4
Alkalinity	mg/L		5	24	25	16	16	17	16	21	17	
True Colour	TCU	AO <= 15	5	<5	<5	<5	<5	<5	8	<5	8	
Turbidity	NTU		0.1	2200	7.7	2.8	3.9	2.1	2.7	6.2	3.0	
Electrical Conductivity	umho/cm		1	183	94	84	85	81	75	76	81	75
Nitrate+Nitrite as N	mg/L		0.05	0.71	0.65	0.64	0.45	0.16	0.41	0.64	0.35	0.31
Nitrate as N	mg/L	10	0.05	0.62	0.65	0.64	0.45	0.16	0.41	0.46	0.35	0.31
Nitrite as N	mg/L	1	0.05	0.09	<0.05	<0.05	<0.05	<0.05	<0.05	0.18	<0.05	<0.05
Ammonia as N	mg/L		0.05	0.04	<0.03	0.03	0.06	<0.03	<0.03	<0.03	<0.03	<0.03
Total Organic Carbon	mg/L		0.5	2.5	<0.5	1.3	<0.5	1.0	<0.5	0.7	0.6	
Ortho-Phosphate as P	mg/L		0.01	<0.01	0.03	<0.01	0.02	<0.01	0.02	0.01	0.02	
Sodium	mg/L		0.1	28	4.8	5.1	5.6	5.1	3.8	5.1	4.4	5.1
Potassium	mg/L		0.1	1.5	0.9	0.8	1	1.0	0.7	0.9	0.9	1.1
Calcium	mg/L		0.1	6.1	5.9	5.6	6.1	5.4	4.2	5.4	5.9	6.0
Magnesium	mg/L		0.1	1.9	1.5	1.6	1.4	1.5	1.1	1.4	1.4	1.3
Bicarb Alkalinity (CaCO3)	mg/L		5	24	25	16	16	17	16	21	17	16
Carb Alkalinity	mg/L		10	<10	<10	<10	<10	<10	<10	<10	<10	
Hydroxide	mg/L		5	<5	<5	<5	<5	<5	<5	<5	<5	
Calculated TDS	mg/L	AO <= 500	1	99	41	30.6	36	29	29	39	35	80
Hardness	mg/L			23.1	20.9	0.5	21	19.7	15.0	19.2	20.5	
Langelier Index (20C)	NA			-2.62	-2.76	-2.55	-2.9	-2.74	-3.05	-2.92	-2.91	
Langelier Index (4C)	NA			-2.94	-3.08	-2.87	-3.22	-3.06	-3.70	-3.24	-3.23	
Saturation pH (20C)	NA			9.42	9.38	9.59	9.55	9.57	9.71	9.49	9.54	
Saturation pH (4C)	NA			9.74	9.7	9.91	9.87	9.89	10.00	9.81	9.86	
Anion Sum	me/L			1.73	0.81	0.65	0.61	0.48	0.55	0.75	0.65	
Cation Sum	mg/L			1.72	0.65	0.65	0.69	0.64	0.48	0.63	0.62	
Ion Balance	%			0.2	10.7		6.2	14.6	6.7	8.1	1.7	
Biochemical Oxygen Demand	mg/L		2	<2	<2	<2	<2		<2	<2	<2	<2
Total Suspended Solids	mg/L			4700	30	6	<5	<5	8	15	14	56
Total Kjeldahl Nitrogen as N	mg/L		0.4	1	<0.4	<0.4	<0.4	<0.4	3	<0.4	2.4	<0.4
Dissolved Organic Carbon	mg/L		0.5	1.6	<0.5	1.3	<0.5	0.8	<0.5	0.6	1	<0.5
Total Coliforms	MPN/100mL	0	1	<2	<1	<1	<1	<1	<1	<1	7	<1
Escherichia coli	MPN/100mL	0	1	<2	<1	<1	<1	<1	<1	<1	<1	<1
Fecal	CFU/100mL	0	2									<1
Aluminum	ug/L	OG < 100	10	<5	<5	<5	<5	<5	<5	42	<5	
Antimony	ug/L	6	2	<2	<2	<2	<2	<2	<2	<2	<2	
Arsenic	ug/L	10	2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Barium	ug/L	1000	5	20	8	8	8	8	6	7	8	7
Beryllium	ug/L		2	<2	<2	<2	<2	<2	<2	<2	<2	
Bismuth	ug/L		2	<2	<2	<2	<2	<2	<2	<2	<2	
Boron	ug/L	5000	5	9	6	6	<5	6	<5	5	6	8
Cadmium	ug/L	5	0.3	0.038	0.11	0.1	0.023	0.069	0.071	0.083	0.075	<0.3
Chromium	ug/L	50	2	1	<1	1	2	2	<1	2	2	<2
Cobalt	ug/L		1	1	<1	<1	<1	<1	<1	<1	<1	
Copper	ug/L	AO <= 1000	2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Iron	ug/L	AO <= 300	50	<50	<50	<50	<50	<50	<50	<50	<50	<50
Lead	ug/L	10	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Manganese	ug/L	AO <= 50	2	61	<2	<2	<2	<2	<2	<2	<2	<2
Mercury	ug/L	1										<0.005
Molybdenum	ug/L		2	<2	<2	<2	<2	<2	<2	<2	<2	
Nickel	ug/L		2	<2	<2	<2	<2	<2	<2	<2	<2	
Phosphorus	mg/L		0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.03
Selenium	ug/L	10	2	<1	<1	<1	<1	<1	<1	<1	<1	
Silver	ug/L		0.5	<0.1	<0.1	<0.1	<0.1	0.2	0.2	0.2	0.2	
Strontium	ug/L		5	39	31	27	28	38	20	25	31	
Thallium	ug/L		0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
Tin	ug/L		2	<2	<2	<2	<2	<2	<2	<2	<2	
Titanium	ug/L		2	<2	<2	<2	<2	<2	<2	<2	<2	
Uranium	ug/L	20	0.1	0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
Vanadium	ug/L		2	<2	<2	<2	<2	<2	<2	<2	<2	
Zinc	ug/L	AO <= 500	5	<5	<5	<5	<5	<5	<5	<5	<5	<5

Greenwood Sewage Treatment Plant Monitoring Well

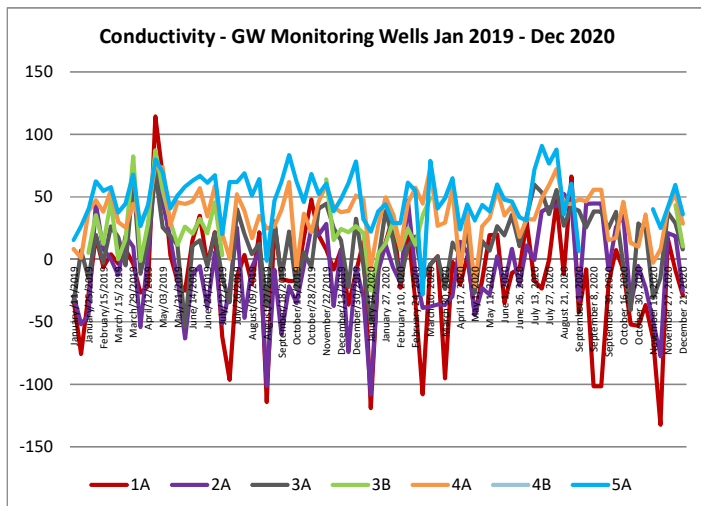
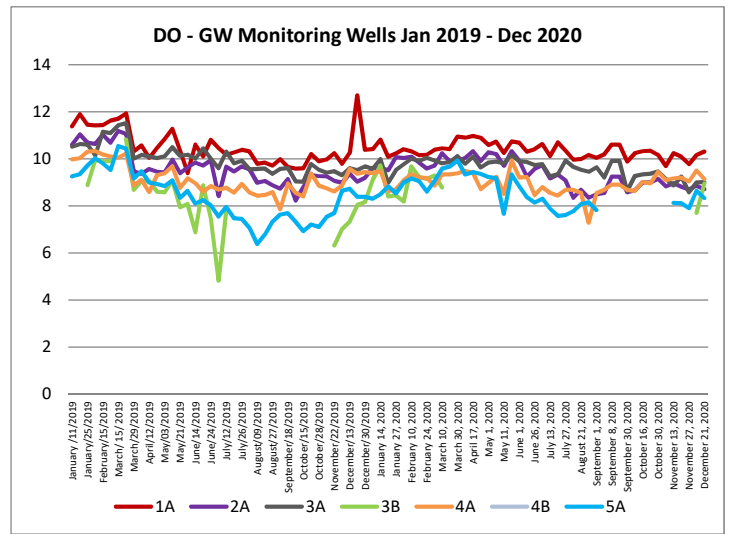
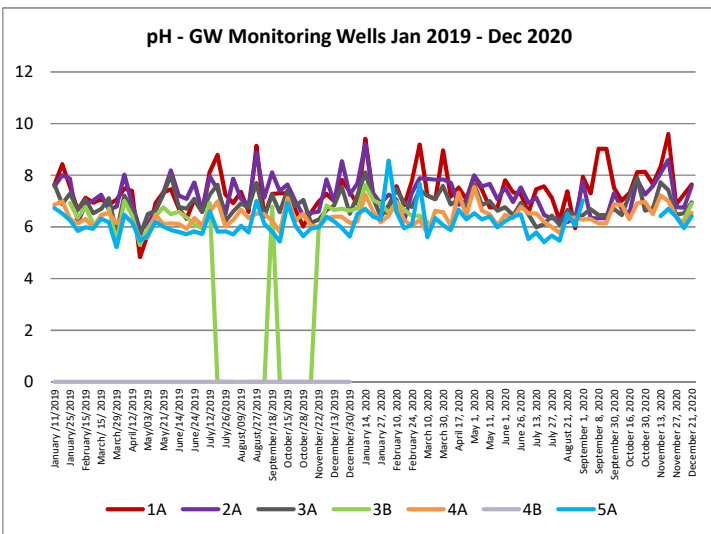
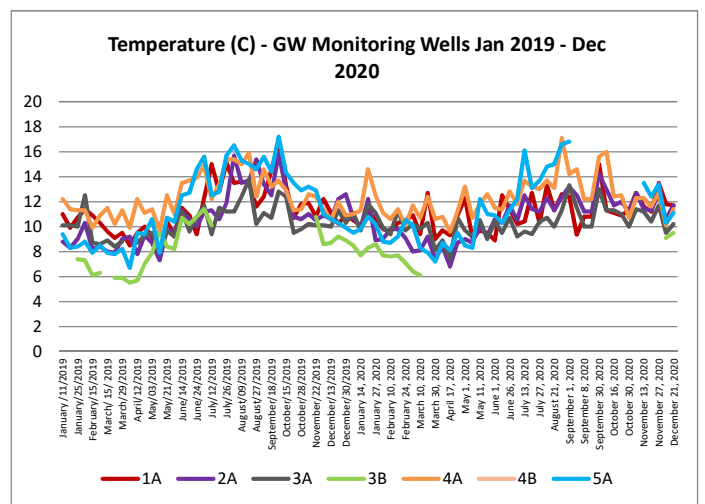
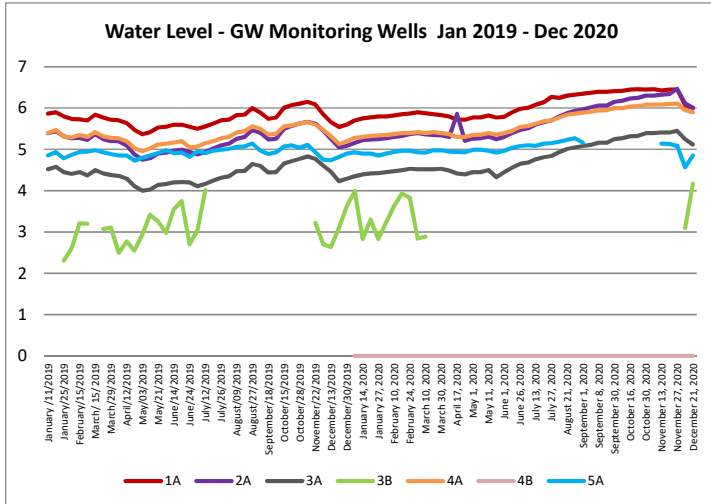
Well #5

Parameter	Unit	G/S (mg/L)	RDL	Baseline	2019-03-19	2019-06-07	2019-10-07	2019-12-20	2020-03-16	2020-06-23	2020-08-10	2020-12-15
pH	NA	7.0-10.5		7.1	6.36	6.93	6.37	6.68	6.53	6.39	6.42	6.32
Reactive Silica as SiO2	mg/L		0.5	6.3	5.1	4.8	7.5	5.4	5.1	6.3	6.6	
Chloride	mg/L	AO <= 250	1	14	7	4	4	6	5	4	5	3
Fluoride	mg/L	1.5	0.1	<0.1	<0.12	<0.12	<0.12	<0.12	<0.12	<0.12	<0.12	
Sulphate	mg/L	AO <= 500	2	7	3	4	3	3	3	4	4	4
Alkalinity	mg/L		5	23	18	22	23	25	14	19	22	
True Colour	TCU	AO <= 15	5	<5	<5	<5	<5	<5	<5	<5	<5	
Turbidity	NTU		0.1	2300	3.9	2.1	5.6	15.1	2.3	4.9	297.0	
Electrical Conductivity	umho/cm		1	105	77	80	86	80	72	73	80	93
Nitrate+Nitrite as N	mg/L		0.05	0.82	0.1	0.62	0.77	0.42	0.32	0.50	0.49	0.80
Nitrate as N	mg/L	10	0.05	0.75	0.1	0.62	0.77	0.42	0.32	0.50	0.49	0.80
Nitrite as N	mg/L	1	0.05	0.07	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ammonia as N	mg/L		0.05	0.03	<0.03	<0.03	0.05	<0.03	<0.03	<0.03	<0.03	<0.03
Total Organic Carbon	mg/L		0.5	2.5	<0.5	1.5	<0.5	1.2	<0.5	1.0	1.2	
Ortho-Phosphate as P	mg/L		0.01	<0.01	<0.01	<0.01	0.01	<0.01	0.01	<0.01	0.01	
Sodium	mg/L		0.1	6.5	3.4	3.8	5.2	4.5	2.5	4.2	4.2	5.5
Potassium	mg/L		0.1	0.8	0.7	0.7	0.9	1.1	0.3	0.7	0.7	1.2
Calcium	mg/L		0.1	8.4	6.9	8	7.6	7.6	3.7	7.2	7.4	10.2
Magnesium	mg/L		0.1	1.5	1	1.3	1.3	1.0	0.6	1.4	1.4	1.2
Bicarb Alkalinity (CaCO3)	mg/L		5	23	18	22	23	25	14	17	22	31
Carb Alkalinity	mg/L		10	<10	<10	<10	<10	<10	<10	<10	<10	
Hydroxide	mg/L		5	<5	<5	<5	<5	<5	<5	<5	<5	
Calculated TDS	mg/L	AO <= 500	1	56	33	38	39	40	25	34	38	80
Hardness	mg/L			27.2	21.3	25.3	24.3	23.1	11.7	23.7	24.2	
Langelier Index (20C)	NA			-2.18	-3.09	-2.37	-2.93	-2.59	-3.28	-3.06	-2.91	
Langelier Index (4C)	NA			-2.5	-3.41	-2.69	-3.25	-2.91	-3.60	-3.38	-3.23	
Saturation pH (20C)	NA			9.28	9.45	9.3	9.3	9.27	9.81	9.45	9.33	
Saturation pH (4C)	NA			9.6	9.77	9.62	9.62	9.59	10.10	9.77	9.65	
Anion Sum	me/L			1.06	0.63	0.68	0.69	0.76	0.51	0.57	0.7	
Cation Sum	mg/L			0.85	0.59	0.69	0.74	0.69	0.35	0.68	0.69	
Ion Balance	%			10.8	2.7	0.8	3.5	5.2	18.1	8.9	0.9	
Biochemical Oxygen Demand	mg/L		2	<2	<2	<2	<2		<2	<2	<2	<2
Total Suspended Solids	mg/L			4370	10	6	10	74	10	10	624	21
Total Kjeldahl Nitrogen as N	mg/L		0.4	1.1	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	5	<0.4
Dissolved Organic Carbon	mg/L		0.5	1.7	<0.5	1.9	<0.5	1.1	<0.5	1	1.2	<0.5
Total Coliforms	MPN/100mL	0	1	690	1	<1	6	<1	<1	<1	<1	1
Escherichia coli	MPN/100mL	0	1	<2	<1	<1	<1	<1	<1	<1	<1	<1
Fecal	CFU/100mL	0	2									<1
Aluminum	ug/L	OG < 100	10	22	<5	<5	<5	8	<5	74	6	
Antimony	ug/L	6	2	<2	<2	<2	<2	<2	<2	<2	<2	
Arsenic	ug/L	10	2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Barium	ug/L	1000	5	27	13	14	15	16	8	13	13	17
Beryllium	ug/L		2	<2	<2	<2	<2	<2	<2	<2	<2	
Bismuth	ug/L		2	<2	<2	<2	<2	<2	<2	<2	<2	
Boron	ug/L	5000	5	5	<5	<5	<5	7	<5	<5	6	9
Cadmium	ug/L	5	0.3	0.03	<0.09	<0.09	0.034	0.058	0.04	0.042	0.025	<0.03
Chromium	ug/L	50	2	<1	<1	<1	2	1	<1	2	1	2
Cobalt	ug/L		1	<1	<1	<1	<1	<1	<1	<1	<1	
Copper	ug/L	AO <= 1000	2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Iron	ug/L	AO <= 300	50	<50	<50	<50	<50	<50	<50	<50	<50	<50
Lead	ug/L	10	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Manganese	ug/L	AO <= 50	2	49	2	3	2	2	2	3	2	<2
Mercury		1										<0.005
Molybdenum	ug/L		2	<2	<2	<2	<2	<2	<2	<2	<2	
Nickel	ug/L		2	<2	<2	<2	<2	<2	<2	<2	<2	
Phosphorus	mg/L		0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.03
Selenium	ug/L	10	2	<1	<1	<1	<1	<1	<1	<1	<1	
Silver	ug/L		0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
Strontium	ug/L		5	40	38	32	39	53	17	33	36	
Thallium	ug/L		0.1	<0.1	<0.1	<0.1	<0.4	<0.1	<0.4	<0.4	<0.4	
Tin	ug/L		2	<2	<2	<2	<2	<2	<2	<2	<2	
Titanium	ug/L		2	<2	<2	<2	<2	<2	<2	<2	<2	
Uranium	ug/L	20	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
Vanadium	ug/L		2	<2	<2	<2	<2	<2	<2	<2	<2	
Zinc	ug/L	AO <= 500	5	6	<5	<5	<5	<5	<5	<5	<5	<5

Appendix B

Greenwood Sewage Treatment Plant Groundwater Monitoring Wells – Weekly

Greenwood STP Monitoring Wells - Weekly Parameters



Appendix C

Production Wells Raw Water pH– Weekly

Raw Water pH GW8 and GW13

