TOWN OF STEWIACKE GROUNDWATER SUPPLY INVESTIGATION – PHASE 3 REPORT

TOWN OF STEWIACKE

JUNE 2022 FINAL

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FINAL
WSP PROJECT NO.: 191-03686
DATE: JUNE 2022

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June 03 2022

TOWN OF STEWIACKE
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Attention: Dale Bogle, Chief Administrative Officer

Subject: **Town of Stewiacke Groundwater Supply Investigation – Phase Three**

WSP Canada Inc. is pleased to present the observations and findings of Phase Three of WSP's groundwater supply investigation for the Town of Stewiacke.

We trust this report is sufficient for your purpose at this time, however, if you have any questions or concerns, please do not hesitate to contact the undersigned at your convenience.

Yours sincerely,

Molly Noseworthy, EIT.
Junior Hydrogeologist

Timothy Bachiu, P. Geo, PMP
Project Manager

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REVISION HISTORY

FIRST ISSUE		
June 03, 2022	**Draft Issue**	
Prepared by	**Reviewed by**	**Approved by**
Molly Noseworthy, EIT.	Tim Bachiu, P. Geo, PMP	Tim Bachiu, P. Geo, PMP

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1 UNDERSTANDING OF THE PROJECT

1.1 BACKGROUND

The Town of Stewiacke (Town) currently utilizes the St. Andrews River as a potable water supply. The range of flow volumes and turbidity in the River present challenges to managing the water supply. The Town would like to develop an alternative water supply to limit their reliance on surface water.

Preliminary drilling has been led by WSP within the Town and has indicated the presence of a high yield aquifer unit consisting of siltstone/limestone and gravel beneath the glacial till. In 2020 WPS Canada Inc installed a 6" test well to assess the production capacity of the unit. A 72-hour pumping test was conducted at a rate of 108 gpm (gallons per minute), resulting in a maximum drawdown of 0.13 m. To further assess the viability of this groundwater resource more aggressive testing is required. Based on preliminary testing and projected water demands, WSP recommended drilling and testing a production well capable of pumping at a maximum rate of 400 pgm.

The objectives of Phase 3 of the project were to:

- Drill and test well up to two 10" production wells to satisfy the projected future water demand of the Town;
- Completed a 10 day pumping test; and
- Provide WSP's interpretation on the viability of the groundwater supply.

1.2 SCOPE

The following summary reflects the project scope completed over three sub-phases; field preparation, drilling and testing, and analysis and reporting. A summary of the work conducted by WSP as part of the Phase 3 work plan is outlined below:

FIELD PREPARATION

- Provided recommendations to the Town for the selection of drilling contractor, based on the contractor responses to the tender issued by the Town;
- Assisted in the selection of the location of the municipal production well within the Densmore property boundary;
- Identified groundwater monitoring locations (residential wells within the Town and surrounding area) and coordination with the community.;
- Reviewed and confirmed the drilling approach and well design with the Town's drilling contractor;
- Conducted a Site visit with the Town's drilling and testing contractor(s);
- Developed a discharge management plan with the Town's testing contractor in compliance with applicable NSE regulation;
- Coordinated any necessary access upgrades to the Densmore property with the Town; and
- Developed a Health and Safety plan for the drilling and testing field work.

DRILLING & TESTING

- Provided field oversight for the drilling of one (1) 10" municipal production wells within the limestone/siltstone unit;
    - Note: the first well drilled could allow for testing at a rated greater than the projected demand of the Town. Therefore a second production well was not drilled as part of this scope, The need for additional wells will be addressed based on subsequent engineering design recommendations..
- Installation of water level monitoring equipment (pressure transducers) within predetermined monitoring locations;
- Oversight of the completion of a 6-hour step test on the production well;
- Oversight of the completion of a 10-day constant-rate pumping test on production well. Oversight included the following:
    - Daily coordination with the testing contractor
    - Daily assessment of all monitoring/observation wells
    - Completion of 5 groundwater sampling events:
        - 6 RCAP MS (Including 1 duplicate)
        - 3 Bacteria (Including 1 duplicate)
- Monitoring of precipitation levels over the course of the testing program. Monitoring was facilitated through downloads of the hourly Environment Canada precipitation data for the upper Stewiacke region; and
- Monitoring of the surface water levels within the St. Andrews River. Monitoring was facilitated thought the Real-Time Hydrometric data Graph for the St. Andrews river available through the Environment Canada website.

ANALYSIS & REPORTING

- Download and calibrate all field data collected from the step and constant-rate tests;
- Analysis of the constant-rate test data to determine the transmissivity, specific yield, long-term safe yield, maximum drawdown and any boundary conditions of the production well(s);
- Preliminary analysis of the potential impact of the production well(s) on surrounding groundwater users, identifying any well interference / radius of influence;
- Analysis of the production well(s) water quality against the Nova Scotia Guidelines for Monitoring Public Drinking Water Supplies and Guidelines for Canadian Drinking Water Quality; and
- Completion of a technical report outlining the Phase 3 findings and WSP's interpretation on the viability of the groundwater supply.

2 DRILLING PROGRAM

2.1 PRODUCTION WELL (PW21-01)

A 10" water supply well was drilled between December 7th – 15th, 2021 by Brewster Well Drilling (Brewster). The well was drilled on private property (Densmore) within the Town of Stewiacke. The well location can be referenced on Figure 1 – Appendix A. It was anticipated that the desired siltstone/shale/limestone would be located approximately 29.5 to 43.5 mbgs as encountered in MW20-01 and TW20-01. Cuttings were collected every 1.5 – 3 m to assess the subsurface materials for comparison against the known surficial and bedrock geology of TW20-01.

Drilling began with the advancement of a 12" casing into bedrock. Prior to contacting bedrock, rounded gravels were presenting in the drill cutting, indicative of a sand/gravel seam above the bedrock. This observation was not made when drilling MW20-01 nor TW20-1. It is believed that the seam was always present however the size of the well / volume of cuttings returned it was not evident. This sand/gravel layer was encountered between 30.8-35.9 mbgs. For the purpose of this assessment WSP is considering that bedrock was encountered at PW21-01 at a depth of 35.9 mbgs. At this depth the 12" casing was grouted to surface and drilling resumed with a 10" casing.

Water fractures were encountered at the depth of 43.6 mbgs. At this depth challenging drilling conditions resulted in the use of flowgaurd to complete the well to a depth of 50.6 mbgs. Majority of the drilling circulation (water) was lost to the formation with limited cuttings being returned.

An air lift yield measurement resulted in an approximate flow rate of 40 igpm (182 Lpm).

Table 2-1: PW21-01 Completion Details

	DEPTH (MBGS)
Total Drilled Depth	50.6
Bedrock Depth	35.9
12" Casing Depth	35.4
10" Casing Depth	50.6
Perforated Interval	28.9 - 50.3

Once the total depth was reached, the 10" casing was perforated insitu using a pneumatic perforation tool. Perforations were made between 28.96 to 50.29 mbgs; the wetted length of the casing. Individual perforations were approximated at 0.1 in^2, with 24 perforations made per foot of casing. A total of 166 in^2 of perforations were created providing over 200% of the required perforated area to account for drawdown and or silt accumulation. The benefit of this well installation is that the perforated casing can be retrieved and replaced if required in the future. This approach was considered preferable to the installation of a screened well because of potential concerns related to scaling and/or corrosion from the hardness of the groundwater.

Well completions, and PW21-01 log details can be referenced in Table 2-1, as well as the WSP well log and Brewster drilling record which can be referenced in Appendix B.

3 GROUNDWATER MONITORING

3.1 OBSERVATIONS WELLS

To better understand the impact of the potential municipal groundwater withdrawal additional wells, consisting of exploratory monitoring wells completed as part of the 2019/202 WSP project scope and private groundwater, were monitored for various periods. The water levels of each well were monitoring using Solinst Leveloggers and Schlumberger Drivers (pressure transducers). The following Table 3-1 outlines the various wells used as observations wells and their respective data collection periods. All well locations can be referenced on Figure 1 – Appendix A.

Table 3-1 – OBSERVATION WELL LOCATIONS & DATA COLLECTION PERIODS

WELL ID	DATA COLLECTION PERIOD	DISTANCE FROM PW21-01 (M)	DATA COLLECTION FREQUENCY (MIN)
TW20-01	February 2021 – January 2022	48	60 – Long-term Monitoring 5 – Test Observations
MW20-01	February 2021 – January 2022	768	60 – Long-term Monitoring 5 – Test Observations
925 Stewiacke Road	January 18 – February 22 2022	1983	5
668 Hwy 2	January 18 – February 22 2022	1859	5

3.2 LONGTERM MONITORING

Data loggers were installed within MW20-01 and TW20-1 between February 11, 2021 and April 30, 2021 and remained in place until the termination of the PW21-01 testing period, February 22, 2022. These instruments were programed to collect a water level reading every hour to adequately monitor the relationship between the two wells and the impact of the surrounding environmental factors.

4 PW21-01 TESTING

Testing of PW21-01 was completed by Brewster Well Drilling (Brewster). Testing on Site was supervised by WSP, under direction of hydrogeologist Tim Bachiu.

4.1 6 HR STEP TEST

Step testing of PW21-01 was initiated to determine an adequate pumping rate for the 10-day constant rate pumping test. On January 25, 2022, Brewster installed a 40 HP 7t-500 pump, with the intent of completing a six-step step test at 100, 200, 300, 400, 500, 550 US gpm. Data was collected using a digital flow meter and manual water level readings using a Solinst Water Level Meter – Model 101. During testing water was discharged through 4-inch hose, 30 m away from the well location. The topography of the land where the water was discharges resulted in the water flowing away from the pumping site towards a small creek. The step test pumping intervals and total drawdown can be referenced in Table 4-1.

Table 4-1: TW20-01 Step Test Details

STEP	DURATION (MINUTES)	AVERAGE FLOW RATE US GPM	AVERAGE FLOW RATE IGPM	AVERAGE FLOW RATE LPM	CUMULATIVE DRAW DOWN OBSERVED METERS
1	60	100	83	379	0.05
2	60	200	167	757	0.08
3	60	300	250	1136	0.14
4	60	400	333	1514	0.19
5	60	500	416	1893	0.27
6	60	540	450	2044	0.31

Observations indicated that the water level did fluctuate with pumping activity, with a total drawdown of 0.31 m. Testing suggested that the well can accommodate a withdrawal rate in excess of the Town's future anticipated demand of 411 gpm (1556 lpm). Given the extended duration of the pumping test and ensuring that adequate operations controls for the pump to ensure a constant rate could be maintained, a constant test rate of 450 gpm (1678 lpm) was proposed.

4.2 10 DAY CONSTANT RATE PUMPING TEST

A 10-day pumping test was conducted on PW21-01 between January 31, 2022 to February 10, 2022. Pumping was conducted at an average rate of 448 gpm. The flow rate as monitored using a digital flow meter, and adjustable valve. Minor fluctuations in flow rate was observed between 396 - 507 gpm (1499 -1919 lpm) over the test duration. All discharge was direct to the wooded area west of approximately 30m from the well. The discharge zone was continually monitored over testing period to ensure water was dissipating. Based on field observations the discharged water appeared to flow overland towards a south flowing stream which contributes to the St. Andrew's River.

The well water level was monitored using Leveloggers and manual water level readings using a Solinst Water Level Meter – Model 101. The barometric pressure at the well location was monitored over the duration of the test using a Barrologger. The barometric pressure data were used to correct the water level data for fluctuations related to changed

in barometric pressure. All data records were collected by Brewster and provided to WSP. The drawdown and recovery of the water level within PW21-01 can be referenced in Figure 2 – Appendix A. A maximum drawdown of approximately 1 m was recorded.

The total amount of precipitation recorded for Upper Stewiacke by Environment and Natural Resources Canada during the 10-Day testing period was a total of 84 mm. Sixty-three percent of this precipitation fell on February 8th, between 5 am and 10 pm. A total of 4 mm of rain fell during the recovery period. Changes in atmospheric pressure are varied between the bounds of 97.9 and 103.8 kPA (0.59 m H_20) during the 10-day pumping period. A graphical representation of the variation in atmospheric pressure can be referenced in Figure 3 – Appendix A.

4.3 WATER QUALITY SAMPLING

Five water sampling events were conducted over the duration of the 10-day constant rate pumping test to observe any changes in water quality with prolonged withdrawal. The sampling events are in the below Table 4-2. All samples were submitted to AGAT laboratories in Dartmouth, Nova Scotia for general chemistry, metal and bacterial analysis).

Table 4-2 – Groundwater Sampling Events

SAMPLING EVENT	DATE	SAMPLE ID(S)	ANALYSIS COMPLETED
1	31/01/22	PW21-01 S1	General Chemistry, Dissolved Metals
2	01/02/22	PW21-01 S2	General Chemistry, Dissolved Metals
3	06/02/22	PW21-01 S3	General Chemistry, Dissolved Metals
4	08/02/22	PW21-01 S4	Total Coliforms / E.coli
5	10/02/22	PW21-01 S5 PW21-01 S6 PW21-01 S7	General Chemistry, Total Metals
			General Chemistry, Dissolved Metals Total Coliforms / E.coli
			General Chemistry, Dissolved Metals Total Coliforms / E.coli (Duplicate)

5 DATA ANALYSIS

PW21-01 loggers were removed on February 14, 2022. All observation well dataloggers were removed on February 22, 2022. The data sets were calibrated for change in barometric pressure prior to analysis.

5.1 PW21-01

The PW21-01 pumping test data was analysed to estimate the transmissivity of the production well to determine the quantity of water available for sustainable groundwater extraction. Both manual and digital data was reviewed.

Drawdown vs Time curves were plotted for both manual and digital data sets and can be referenced on Figure 4, Appendix A. The following observations were made from the graphical data:

- There is agreement between the manual and digital data sets. Both data sets represent the identical patterns and average water level elevations. It is noted that there is 'noise' or disturbance in the digital data set for PW21-01. This is true for the data extracted from both dataloggers that were installed in the production well. It is inferred that this noise is a result of pumping activity continually agitating the data logger. Given the accurate alignment of the manual data set, the manual data was used for all analysis and interpretations.
- Pumping at an average of 448 US gpm (1678 lpm) had minor impacts on the water level. Over 94% of available head remained following the completion of testing, indicating that the well is capable of producing in excess of 448 US gpm (1678 lpm).
- Water level data collected over the first five days of testing generated the anticipated time-drawdown curve. A rapid decline in water level followed by a stabilized water level elevation at approximately 11.29 masl. On February 5th, during the 120th hour of testing the water level began to drop. Initial field observations indicated that a potential boundary condition was encountered. Thirty-two hours later, on the 152nd hour of testing, the water level stabilized for a second time at 11.10 masl. Graphical depiction of the water level resembles that of a step test. However, no significant changes in the pumping rate were made at this time. A total change of 0.19 m was observed, approximately 20% of the total drawdown observed over the 10 day testing period. Rebound to was then observed to begin on February 7th. This rebound rate of change was rapid until the water level stabilized once again at 11.28 masl. As depicted on Figure 2, the rebound was continual however the recharge rate of change was much slower as represented by the drastic change in slope. A slow rise in water level was then observed for the remainder of the pumping period.
- A total drawdown of 1.02m was observed. This drawdown was less then 6 % of the PW21-01 available head (17.7 m). It is noted that this drawdown is calculated from the static level (29.89 mgbs) at the beginning of the step test and not the constant rate test. Given the observed behaviours of the well, there is some variability water level, making it challenging to determine the true static conditions. The maximum drawdown was observed on February 7th for a period less then 8 hours. A total of 0.88 m drawdown was observed during the constant rate test when treating the water level at the beginning of the constant rate test as the static water level (30.03).
- An increase the water level recorded (approximately 0.19 m) between 7:30 AM on February 7th and 6:30 PM on February 8th. This rebound was observed while maintaining a constant pumping rate. This rebound aligned with a significant rain event (57.7 mm) and change in barometric pressure. Further evaluation of the fluctuations in groundwater are required to determine the cause of changes in groundwater levels during precipitation events and fluctuations in barometric pressure.

Aquifer Test 9.0, a data analysis software produced by Waterloo Hydrogeologic was used to assess the pumping test data. The pumping test data set was inputted into the software. Brewster's manual data was inputted for the pumping periods and digital data was imputed for the recovery. Given that the drawdown observed (maximum of 1.02m) was less then 6 % of the PW21-01 available head (17.7 m) a detailed analysis of the aquifer could not be completed with precision. However, preliminary analysis has indicated that a transmissivity of 6 x10^{-3} m^2/s. This value was obtained by analysing the testing data using the double porosity method.

5.2 OBSERVATION WELLS

A total of four wells were used to monitor the potential impact of PW21-01 on local ground water users. All wells were located within a 2 km radius of the production well. Table 5 below, outlines the maximum drawdown observed within each of the monitoring wells over the course of the PW21-01 10-day pumping test. Refer to Figures 5-9, Appendix A, for graphical representation of the observation well water levels.

Table 5-1: Observation Well Water Level Changes

WELL ID	MAX DRAWDOWN (M)	% TOTAL HEAD	% COMPARED TO PW21-01	DISTANCE FROM PW21-01 (M)
TW20-01	0.80	NA	86%	48
MW20-01	0.41	NA	44%	768
925 Stewiacke Road	0.68	2.6%	73%	1983
668 Hwy 2	0.55	NA	59%	1859

The water levels in all observation wells mimicked the patterns of the production well, PW21-01. A decrease in water level was seen in all wells as a direct results of groundwater extraction indicating that the radius of influence extends beyond 2 kms. Additional studies would be required to assess the extent of the influence. It is noted that at the operational pumping rate of 448 gpm the groundwater extraction impacted the available head of a private well located 1983 m by less then 3%.

5.3 LONGTERM MONITORING 2021

Data loggers installed within MW20-01 and TW20-1 between February 11, 2021 and April 30, 2021 provide insight into the seasonal variation of the water levels. As these wells intersect the same geology as PW21-01 it is anticipated the water level of PW21-01 would follow similar trends. The longer-term data may be utilized in the future for further analysis.

6 WATER QUALITY ASSESSMENT

A total of seven (7) water samples including one (1) field duplicate were collected from PW20-01 to assess the existing water quality and changes in quality with prolonged pumping. Refer to Table 4-1 for a break down of the sampling events. Samples were submitted to AGAT Laboratories for general chemistry and metals (RCAP-MS) and bacteria analysis.

With the intent of the Site water supply being used for potable water, the water samples were compared with the Health Canada Guidelines for Canadian Drinking Water Quality (GCDWQ) Maximin Acceptable Concentration (MAC) values and Aesthetic Objectives (AO). The tabulated and screened water quality data can be referenced in Appendix C, and certificates of analysis are presented in Appendix D.

6.1.1 GENERAL CHEMISTRY

A total of six (6) samples, including one (1) duplicate, were analysed for general chemistry analysis to determine if any parameters exceeded the GCDWQ. A review of the results indicated that all samples reported Total Dissolved Solids (TDS), and sulphate levels, in excess of the GCDWQ aesthetic objectives.

Three (3) samples, PW21-01 S1, S2 and S5, reported iron concentrations in excess of the GCDWQ aesthetic objectives.

One (1) sample, PW21-01 S2, reported True Color results in excess of GCDWQ aesthetic objectives.

Turbidity levels in both samples were also reported at levels in excess of the recommended level of < 1 NTU for groundwater entering a distribution system.

All samples reported general chemistry parameters within CDWQ MAC guidelines. The tabulated and screened water quality data can be referenced in Appendix C – Table A.

6.1.2 METALS

A total of six (6) samples, including one (1) duplicate, were analysed for metals to determine if any parameters exceeded the GCDWQ criteria. It is noted that PW21-01 S5 was collected at the sample time as S6 and S7 (duplicate). PW21-01 S5 was analysed for total metals while S6 and S7 were ran for dissolved, this was completed for comparison purposes.

A review of the results indicated that all six (6) samples reported manganese concentrations in excess of the aesthetic objective.

Three (3) samples, PW21-01 S1, S2 and S5, reported iron concentrations in excess of the GCDWQ aesthetic objectives.

All samples reported metal parameters within CDWQ MAC guidelines. The tabulated and screened water quality data can be referenced in Appendix C – Table A.

6.1.3 TOTAL COLIFORMS

A total of three (3) bacteria samples (Total Coliform Bacteria and E.coli Bacteria), including one duplicate, were collected from PW21-01. The samples were analyzed for E.coli and Total Coliforms counts.

All three (3) samples were reported as non-detect.

The tabulated and screened water quality data can be referenced in Appendix C – Table B.

7 INTERPRETATION OF RESULTS

The pumping test of PW21-01 confirmed that the water bearing zone is capable of producing flowrates in excess of 448 gpm. Given that the drawdown observed (maximum of 1.02m) was less then 6 % of the PW21-01 available head (17.7 m) a detailed analysis of the aquifer could not be completed with precision. However, preliminary analysis has indicated that a transmissivity of 6×10^{-3} m^2/s. This value was obtained by analysing the testing data using the double porosity method. This preliminary value indicates that the well is high producing. A sustainable yield could not be calculated at this time.

Test results indicate that PW21-01 is hydraulically connected to TW20-01 and MW20-01 in addition to private well users. A decrease in water level was seen in all observations wells as a direct results of groundwater extraction indicating that the radius of influence extends beyond 2 kms. This finding was attributed to the observation of drawdown within the observation wells while pumping PW21-01. Notably, the drawdown observed in one well located approximately 2 km from PW21-01 was approximately 78% of the drawdown with PW21-01, while other wells did not display similar influence from pumping. The variations in drawdown with distance could be attributed to heterogeneity in the aquifer and differences in well completions. Despite the uncertainty in the potential causes of the variations, it is noted that at the operational pumping rate of 448 gpm the groundwater extraction impacted the available head of a private well located 1983 m by less then 3%.

Analytical results of the groundwater quality for PW21-01 presented similar findings in comparison to the 2020 sampling of TW20-01. As previously communicated to the town of Stewiacke, additional is expected to be required to provide potable water to distribution to the Town. A prolong pumping period, 10-day was completed, in comparison to 3-day, to assess any potential changes in groundwater quality with time. Decreased in sulphate and TDS were observed over the first five days of testing. All sample parameters appeared to stabilize over the second half of the testing period. All samples were screened against CDWQGs. No MAC exceedances were reported. Concentrations in excess of CDWQG aesthetic objective were reported for Sulphate, Iron, Manganese and TDS. Turbidity levels exceed that accepted for treated water distribution.

8 CONCLUSIONS & RECOMENDATIONS

Groundwater exploration and water well drilling has been led by WSP within the Town and has identified the presence of a high yield aquifer unit consisting of gravel and fractured bedrock. In December 2021 a 10" production well was drilled and tested in January 2022. The testing program consisted of a 10-day constant rate test at 448 gpm with a maximum observed drawdown of 1.02 m in the pumping well. This drawdown is within the bounds of the natural water level variation of the well; as captured in the 2021/22 monitoring data. As the well was not significantly stressed the resulting data set could not be analysed with accuracy to determine the sustainable yield from PW21-01.

The production well that was drilled and tested as part of the Phase 3 scope of has characteristics that can provide a groundwater supply to meet the current demands of the Town and the anticipated demand of the future.

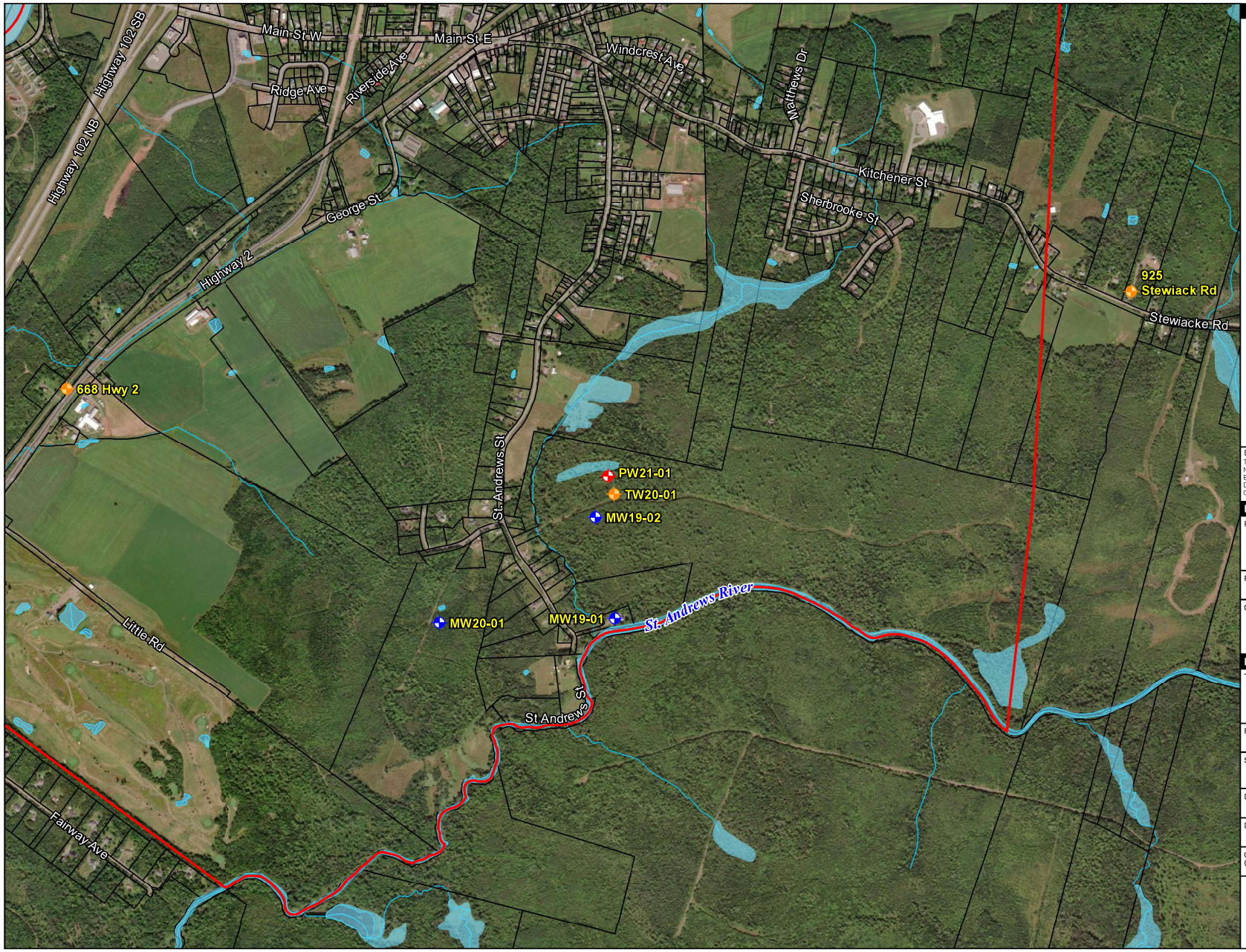
Additional work is required to develop the groundwater resources into a functioning water supply. The next steps of the process will be to complete permitting for groundwater withdrawal and begin preliminary designs of the water supply system.

WSP recommends follow up work including:

- **Phase Four: Pre-Design Study**
    1. Preparation and submission of a Groundwater Withdrawal Application to Nova Scotia Environment and Climate Change (NSECC).
    2. Pre-design study for the infrastructure required to develop the aquifer into a potable water supply for the Town.

APPENDIX

A FIGURES



LEGEND:

WELL TYPE

- MONITORING WELL
- 10" PRODUCTION WELL
- 6" WELL
- WATERCOURSE
- TOWN OF STEWIACKE BOUNDARY
- PROPERTY BOUNDARIES (NSDNR, 2017)

N W E S

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PROJECT:

PROJECT:
GROUNDWATER SUPPLY PROJECT

PROJECT NO.:
191-03686

CLIENT:
TOWN OF STEWIACKE

FIGURE:

TITLE:
WELL LOCATIONS

FIGURE NO.:	REVISION NO.:
4	0

SCALE: 1:12,500
0 100 200 400 600 Meters

DATUM:	PROJECTION:
NAD 83 CSRS	UTM ZONE 20 NORTH
DRAWN BY:	CHECKED BY:
T. MOREHOUSE	M. NOSEWORTHY
CREATED DATE: (YYYY-MM-DD) 2020-12-07	REVISION DATE: (YYYY-MM-DD) 03/06/2022

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PATH: S:\GIS\2_PROJECTS\2019\191_03686_TownofStewiacke_GWSupply_NS\8_MXD\20220603_191_03686_FIG04_WellLocation.mxd

FIGURE 2: PW21-01 10 Day Pumping Test : *PW21-01 Water Level Elevations*

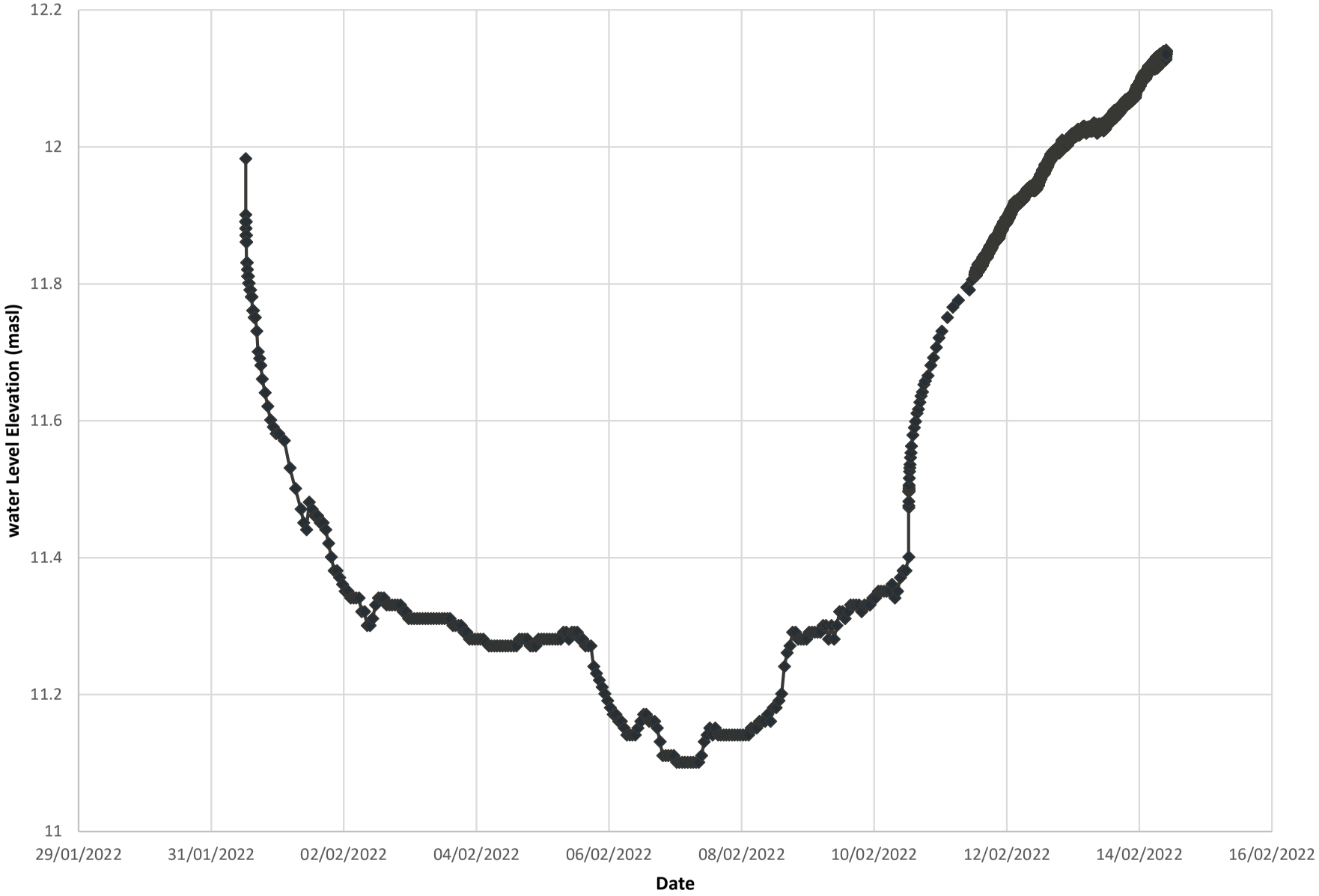


FIGURE 03: Stewiacke Barrometric Pressure 31-01-2022 to 22-02-2022

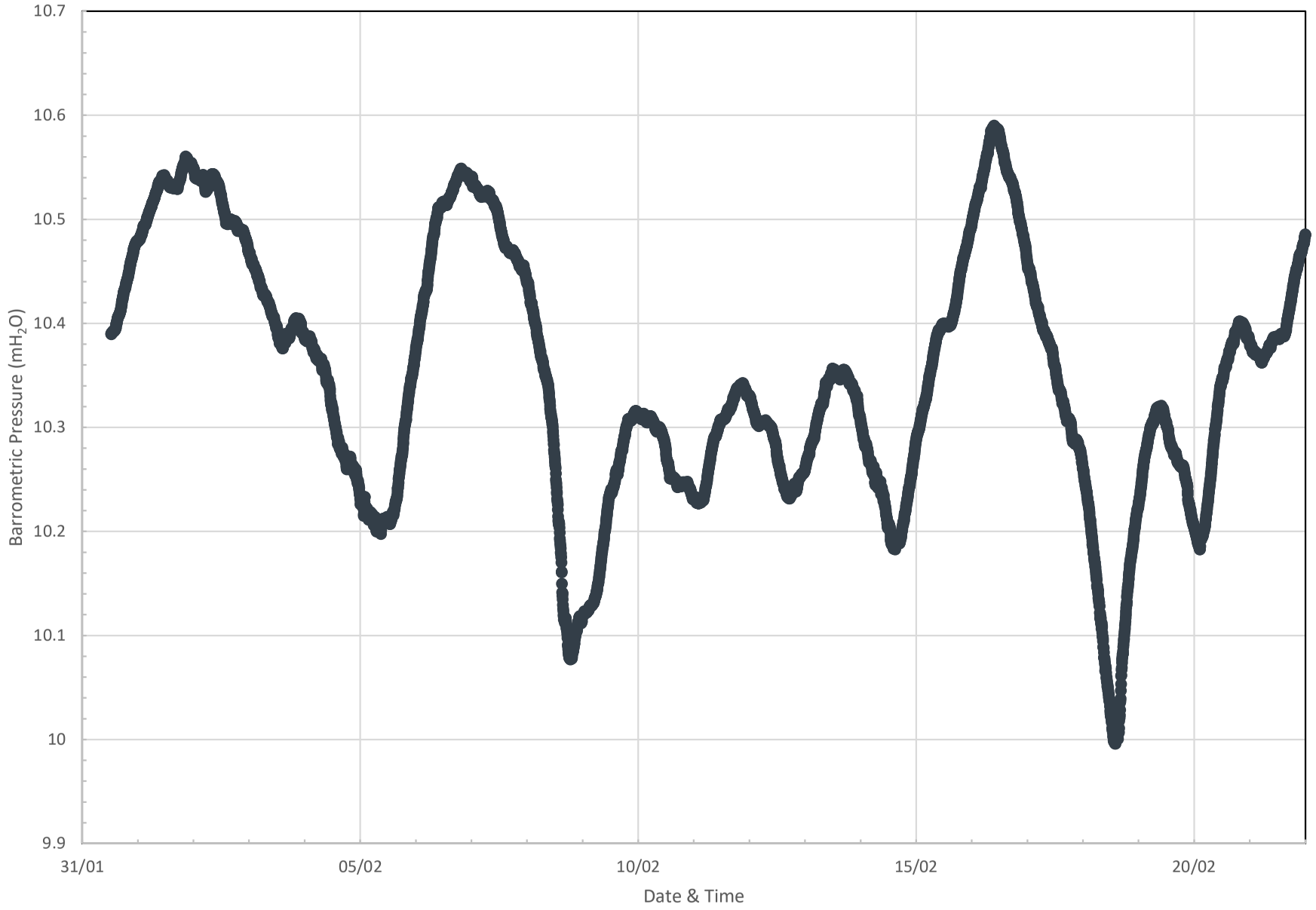


FIGURE 4: PW21-01 Pumping Test Data: *Manual vs Digital Data*

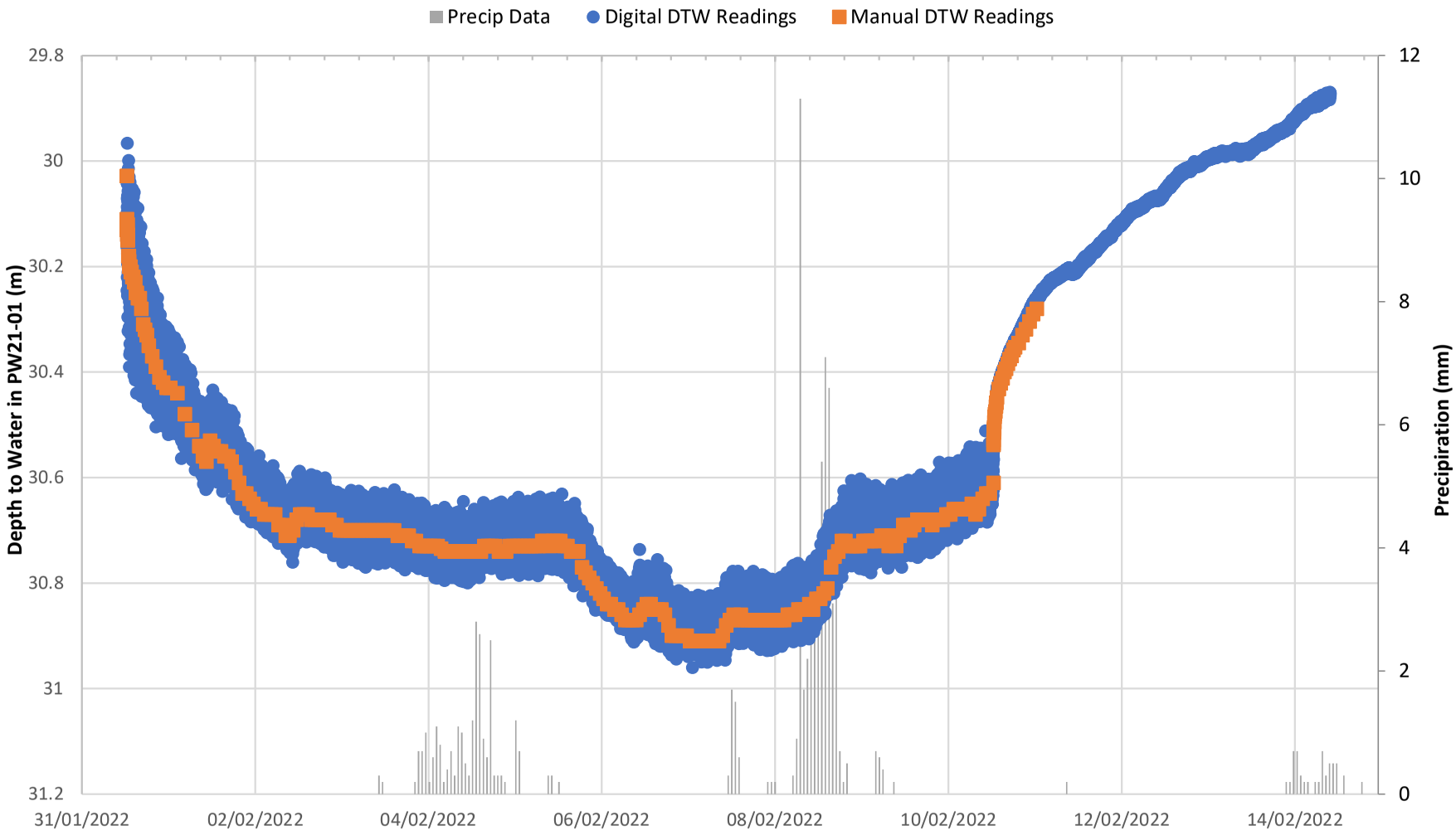


FIGURE 5: PW21-01 10 Day Pumping Test: *TW20-01 Water Level Elevations*

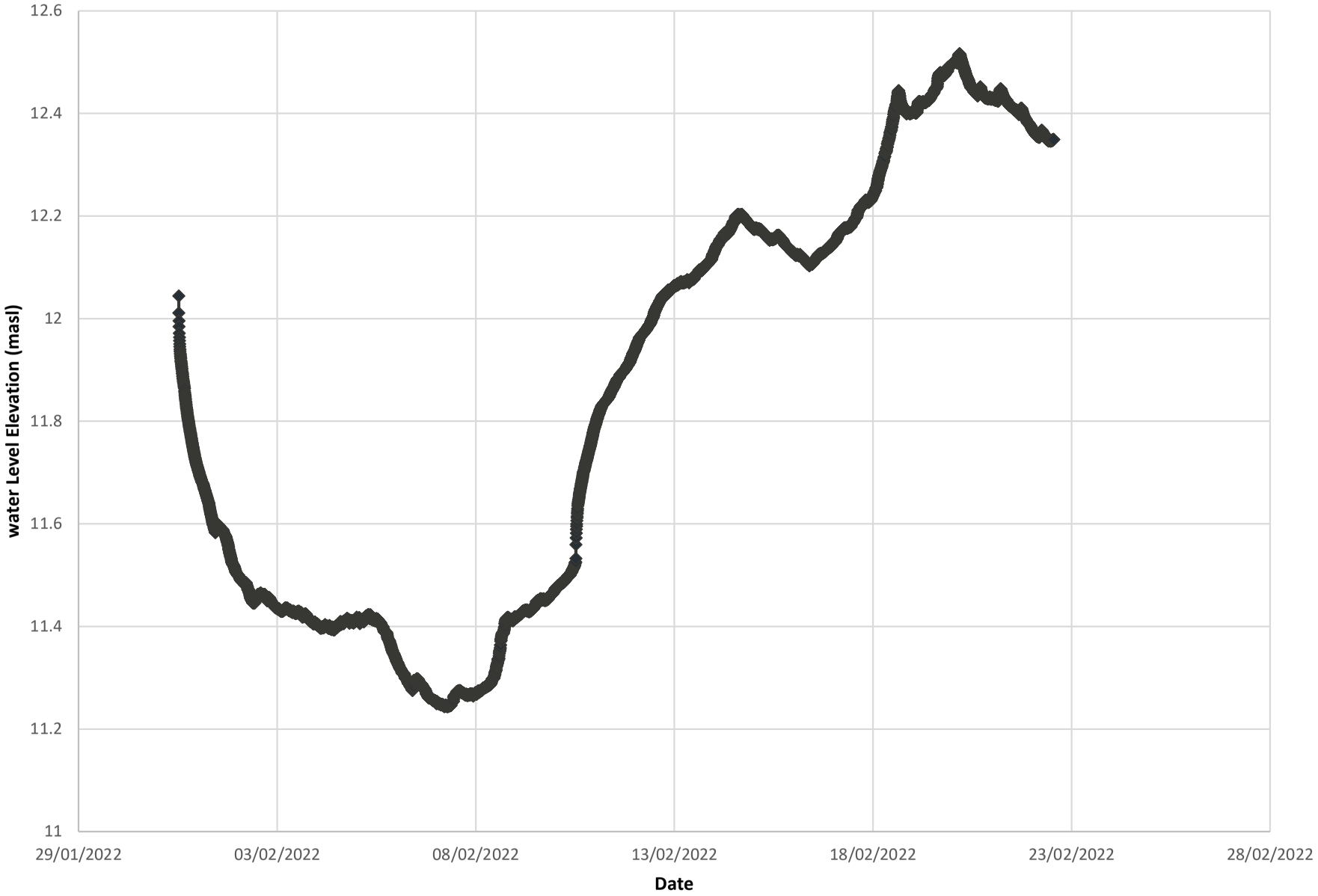


FIGURE 6: PW21-01 10 Day Pumping Test : *MW20-01 Water Level Elevations*

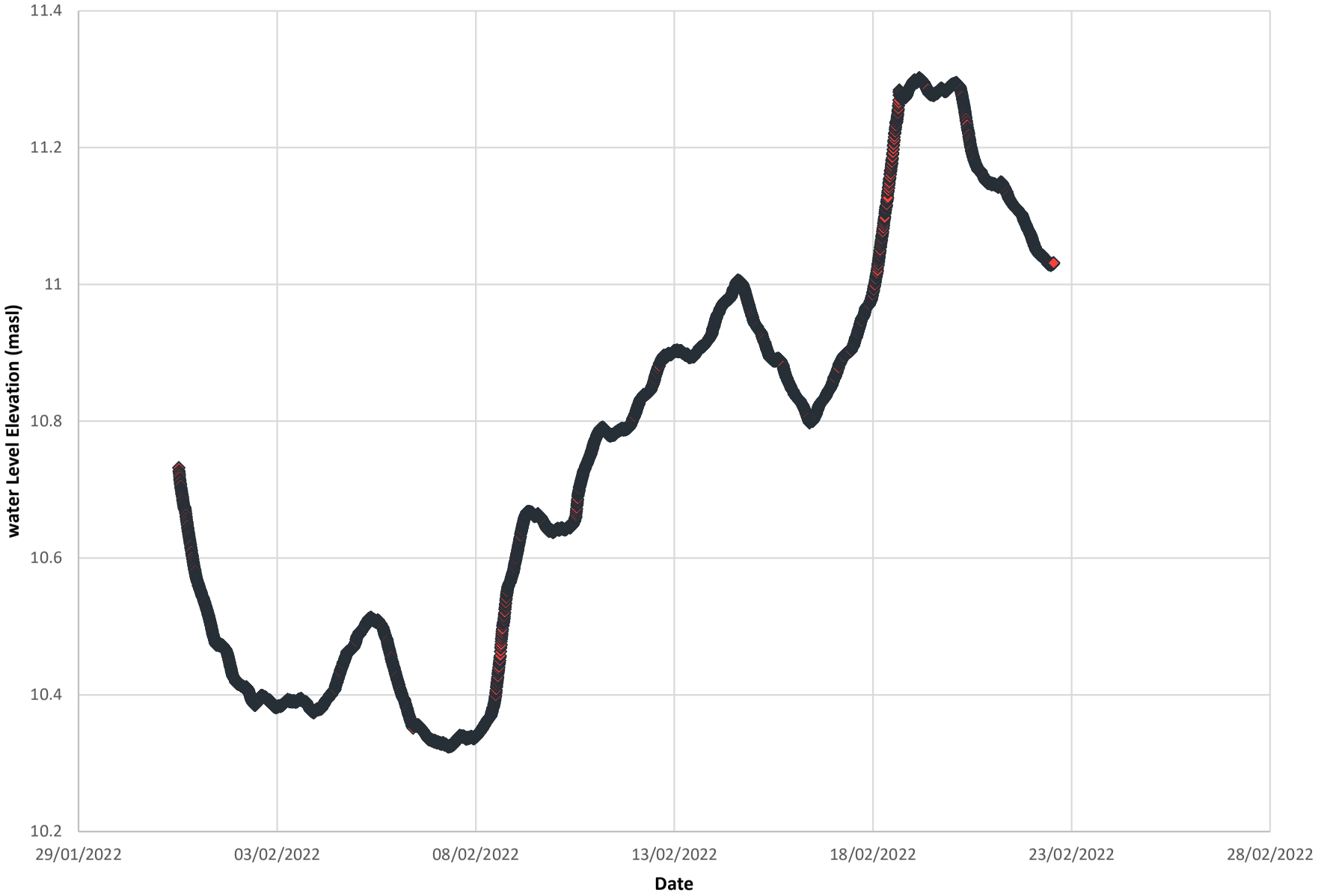


FIGURE 7: PW21-01 10 Day Pumping Test : *925 Stewiacke Rd Water Level Elevations*

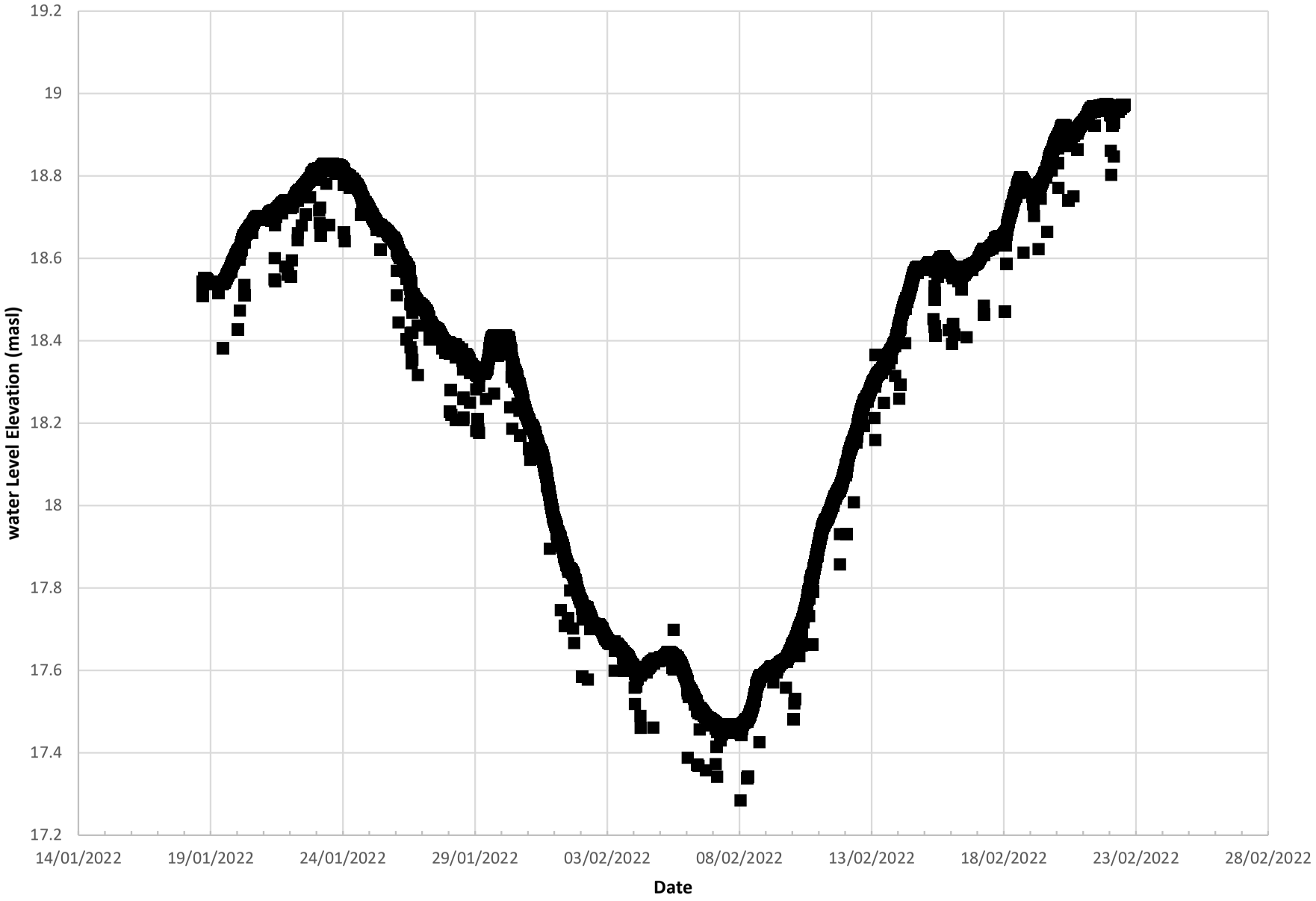
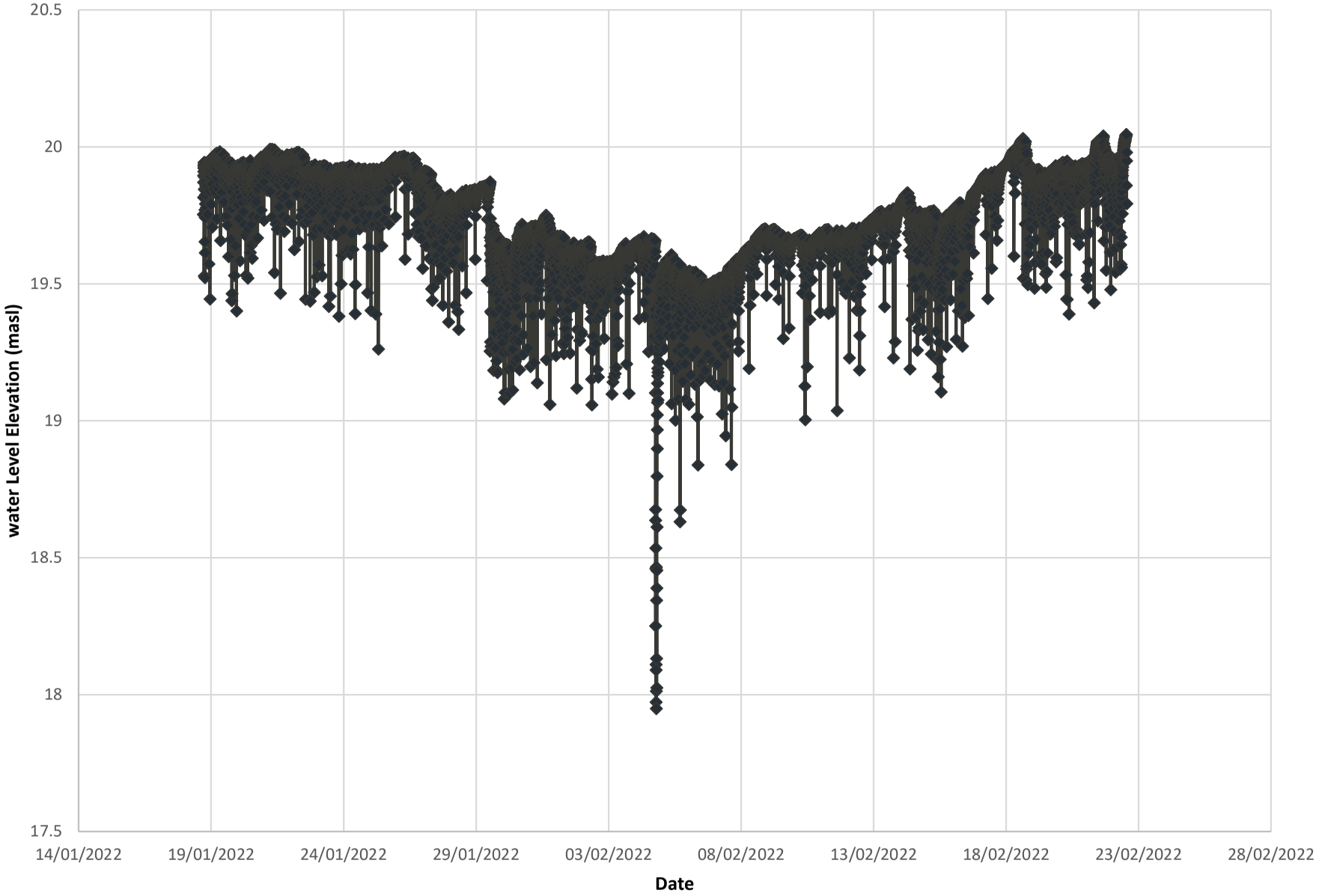


FIGURE 8: PW21-01 10 Day Pumping Test: *688 HWY2 Water Level Elevations*



APPENDIX

B WSP WELL LOGS

WSP Canada Inc.
1 Spectacle Lake Drive
Dartmouth, Nova Scotia, B3B 1X7
Telephone: (902) 835-9955

WELL NUMBER PW21-01

CLIENT Town of Stewiacke
PROJECT NAME Town of Stewiacke Ground Water Supply
PROJECT NUMBER 191-03686
PROJECT LOCATION Stewiacke, NS
DATE STARTED 7/12/21 **COMPLETED** 15/12/21
GROUND ELEVATION 41.266 m **HOLE SIZE**
DRILLING CONTRACTOR Brewster
GROUND WATER LEVELS:
DRILLING METHOD Dual-Rotary
AT TIME OF DRILLING ---
LOGGED BY M. Noseworthy **CHECKED BY**
AT END OF DRILLING ---
NOTES
AFTER DRILLING 29.95 m / Elev 11.32 m

DEPTH (m)	SAMPLE TYPE NUMBER	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
			TILL: Compact to very dense reddish brown silty clay with some cobble.	Casing Top Elev: 42.011 (m) Abovegound Protective Casing Grout (AQUAGAURD)

(Continued Next Page)

WSP Canada Inc.
1 Spectacle Lake Drive
Dartmouth, Nova Scotia, B3B 1X7
Telephone: (902) 835-9955

WELL NUMBER PW21-01

CLIENT Town of Stewiacke **PROJECT NAME** Town of Stewiacke Ground Water Supply

PROJECT NUMBER 191-03686 **PROJECT LOCATION** Stewiacke, NS

DEPTH (m)	SAMPLE TYPE NUMBER	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
			TILL: Compact to very dense reddish brown silty clay with some cobble. *(continued)*	
30			30.50 10.77	
			SAND & GRAVELS	
35			36.00 5.27	Bentonite Seal
			LIMESTONE	
40				Perforated 10" Casing
45				
50			50.60 -9.33	END OF PW21-01

Bottom of hole at 50.60 m.

GENERAL BH / TP / WELL X-SECTIONS_191-03686_MW19-01 MW19-02 MW20-01.GPJ GINT STD CANADA LAB.GDT 3/6/22

NOVA SCOTIA

Drilled Well Report

NSE Well No. _____ (Departmental use)

Certified Well Contractor

Name: PHILIPPE GINDRAS

Certificate No.: Licence # 738

Company: Brewster Well Drilling

Address: 77 James Boyle Dr.

Mount Uniacke NS B0N 1Z0

Helpers Name(s): MAX WILLIAMSON / IVAN GOUGH

Well Owner/Contractor Information

Well drilled for: Owner: TOWN OF STEWIACKE

or Contractor/Builder/Consultant/etc.:

Civic Address of well:

Lot No. and Subdivision of well:

County: COLCHESTER Postal Code: B0N 2T0 Phone: 902 639 2231

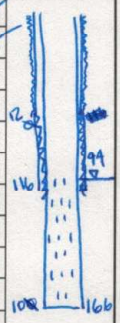
Nearest Community in: ☑ NS Atlas ☐ NS Map Book STEWIACKE

Stratigraphic Log

Depth in feet From	To	Colour	General Description of Overburden/Bedrock	Water Found
0	101	BROWN	DRY SILTY CLAY	Y ☑
101	118	BROWN	WEATHERED GRAVELS / LIMESTONE	Y ☑
118	166	GREY	LIMESTONE	☑ N
				Y N
				Y N
				Y N
				Y N
				Y N
				Y N
				Y N
				Y N
				Y N
				Y N

Attach Another Sheet if Needed

Well Sketch



Well Location

Property (PID):

GPS (WGS84 UTM)

Northing 45°07'29.8 m

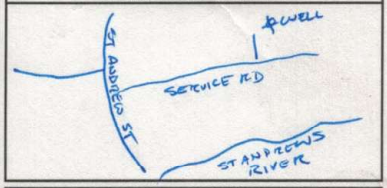
WEST ~~Easting~~ 63° 20' 39.7 m

☐ NS Atlas ☐ NS Map Book

Page Column Row

Roamer Letter Roamer Number

Well Location Sketch



Well Construction Information

Total depth below surface: 166 ft

Depth to bedrock: 118 ft

Water bearing fractures encountered: _____ ft

_____ ft _____ ft _____ ft _____ ft

Well Casing

Outer Casing	*Inner Casing*
From 0 To 116'4" ft	From 0 To 166 ft
Diameter 12.75 in	Diameter 10.75 in
Wall Thickness 0.25 in	Wall Thickness 0.25 in
Material: ☑ steel or	Material: ☑ steel or
ASTM spec.	ASTM spec.

Length of casing above ground: 2 ft _____ in

☐ driveshoe: type ROTARY CUTTING

☑ grout: type BENTONITE ☐ packer: type _____

Well Finish

☐ open hole ☑ slotted casing ☐ screen ☐ gravel pack

Screens: make _____ material _____

length _____ ft from _____ to _____ ft slot size _____

length _____ ft from _____ to _____ ft slot size _____

Gravel pack: size _____ from _____ to _____ ft

Clearance Distance to Nearest

Oil tank: N/A ft

Roadway outer boundary: 1200 ft

Road name: ST ANDREW ST

On-site sewage system: 1200 ft

Off-site sewage system: N/A ft

Cesspool or other potential source of contamination: N/A ft (please identify source)

Watercourse 1700 ft Well 150 ft

Water Yield

Method: ☑ Air blown ☐ Bail ☐ Pump

Rate 40* igpm Duration 2 hrs

Test depth 166 ft

Depth to water at end of test _____ ft

Total drawdown _____ ft

Water level recovered to _____ ft

by _____ hrs _____ mins after test ended.

Depth to static level 44 ft

☐ Overflow

Water Quality

Colour _____ Taste _____ Odour _____ Other _____

Final Status of Well

☑ Water supply
☐ Observation Well
☑ Test Hole
☐ Recharge Well
☐ Abandoned, insufficient supply
☐ Abandoned, poor quality
☐ Abandoned, salt water
☐ Unfinished
☐ Other

Water Use

☐ Domestic
☐ Industrial
☐ Commercial
☑ Municipal
☐ Irrigation
☐ Public Supply
☐ Agricultural
☐ Heat Pump
☐ Other

Method of Drilling

☐ Rotary
☐ Cable Tool
☐ Jet
☑ Other DUAL ROTARY
☐ Drilling Fluids

Type: _____

Driller's Comments

* WELL YIELD EXPECTED TO BE HIGHER THAN BAIL RESULTS

Certification

I certify this well has been constructed in accordance with the *Nova Scotia Environment Act and Well Construction Regulations.*

Date Well completed DEC 06 2021

Signature _____

Date Signed JAN 14 2021

Mail to:

Nova Scotia Department of Environment
30 Damascus Road, Suite 115
Bedford, Nova Scotia B4A 0C1

Important Home Owner's Document - Safeguard with legal documents.

Original to NSE Copy to Customer Copy to Contractor

Rev 08/13

APPENDIX

C

WATER QUALITY ANALYTICAL DATA

TABLE A

Groundwater Analysis - General Chemistry & Metals
Town of Stewiacke, Stewiacke, Nova Scotia
Project No.: 191-03686

Parameter	Units	RDL	CDWQ[1]	Water Samples					
				PW21-01 S1 3470271 31-Jan-22	PW21-01 S2 3471805 1-Feb-22	PW21-01 S3 3487335 6-Feb-22	PW21-01 S5 3500775 10-Feb-22	PW21-01 S6 3500777 10-Feb-22	PW21-01 S7 3500778 10-Feb-22
pH	-	-	7.0-10.5	7.8	7.88	7.85	7.6	7.7	7.67
Reactive Silica as SiO2	mg/L	0.5	-	9.9	8.6	9.8	7.7	7.1	7.1
Chloride	mg/L	1.0	250 AO	27	28	28	34	34	34
Fluoride	mg/L	0.1	1.5	0.47	0.47	0.41	0.49	0.19	0.17
Dissolved Sulphate (SO4)	mg/L	2.0	500 AO	**1250**	**1270**	**847**	**802**	**800**	**803**
Total Alkalinity (as CaCO3)	mg/L	25.0	-	114	116	113	114	114	115
True Color	TCU	5.0	15 AO	<5.00	**17.3**	<5.00	<5.00	<5.00	<5.00
Turbidity	NTU	1.0	0.1 - 1.0[2]	5.7	10.6	12.4	7	10.7	10.5
Electrical Conductivity	uS/cm	1.0	-	2070	2010	2070	2020	2060	2030
Nitrate + Nitrite as N	mg/L	0.05	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Nitrate as N	mg/L	0.05	10	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Nitrite as N	mg/L	0.01	1	<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	<0.03	0.14	<0.03
Total Organic Carbon	mg/L	0.5	-	0.8	1.1	1.6	0.9	1.1	1.2
Ortho-Phosphate as P	mg/L	0.01	-	<0.01	<0.01	0.07	<0.01	<0.01	<0.01
Dissolved Sodium	mg/L	0.1	200 AO	40.1	37.7	37.8	42	36.8	42.6
Dissolved Potassium	mg/L	0.1	-	0.9	0.9	<0.1	1.7	1.5	1.6
Dissolved Calcium	mg/L	0.1	-	463	456	403	507	457	488
Dissolved Magnesium	mg/L	0.1	-	30.8	27.8	27.8	22.3	30.5	21.3
Dissolved Phosphorous	mg/L	0.01	-	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02
Bicarb. Alkalinity (as CaCO3)	mg/L	1.0	-	114	116	113	114	114	115
Carb. Alkalinity (as CaCO3)	mg/L	1.0	-	<10	<10	<10	<10	<10	<10
Hydroxide	mg/L	5.0	-	<5	<5	<5	<5	<5	<5
Calculated TDS	mg/L	1.0	500 AO	**1880**	**1890**	**1410**	**1480**	**1430**	**1460**
Hardness	mg/L	1.0	-	1280	1250	1120	1360	1270	1310
Langelier Index (@20C)	NA	-	-	0.81	0.89	0.81	0.66	0.71	0.72
Langelier Index (@ 4C)	NA	-	-	0.49	0.57	0.49	0.34	0.39	0.4
Saturation pH (@ 20C)	NA	-	-	6.99	6.99	7.04	6.94	6.99	6.95
Saturation pH (@ 4C)	NA	-	-	7.31	7.31	7.36	7.26	7.31	7.27
Anion Sum	me/L	-	-	29.1	29.5	20.7	19.9	19.9	20
Cation sum	me/L	-	-	27.5	26.8	24.1	29.1	27	28
% Difference/ Ion Balance (NS)	%	-	-	2.8	4.9	7.6	18.7	15.2	16.8
Dissolved Aluminum	ug/L	5.0	100 OG AO	<5	<5	<5	<5	<5	<5
Dissolved Antimony	ug/L	1.0	6	<2	<2	<2	<2	<2	<2
Dissolved Arsenic	ug/L	1.0	10	<2	<2	<2	<2	<2	<2
Dissolved Barium	ug/L	1.0	2000	15	16	15	15	13	15
Dissolved Beryllium	ug/L	1.0	-	<2	<2	<2	<2	<2	<2
Dissolved Bismuth	ug/L	2.0	-	<2	<2	<2	<2	<2	<2
Dissolved Boron	ug/L	50	5000	145	133	118	137	124	127
Dissolved Cadmium	ug/L	0.01	7	<0.017	<0.017	<0.017	<0.09	<0.017	<0.017
Dissolved Chromium	ug/L	1.0	50	2.00	2.00	2.00	<1	2.00	2.00
Dissolved Cobalt	ug/L	0.4	-	<1	<1	<1	<1	<1	<1
Dissolved Copper	ug/L	0.5	1000 AO	<2	<2	<2	<1	<2	<2
Dissolved Iron	ug/L	50	300	**607**	**755**	77	**1040**	59	62
Dissolved Lead	ug/L	0.5	5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dissolved Manganese	ug/L	2.0	120	**80**	**75**	**66**	**85**	**67**	**68**
Dissolved Molybdenum	ug/L	2.0	-	2	2	2	2	2	2
Dissolved Nickel	ug/L	2.0	-	9.00	9.00	11.00	13.00	15.00	7.00
Dissolved Selenium	ug/L	0.5	50	2.00	1.00	2.00	2.00	2.00	1.00
Dissolved Silver	ug/L	0.1	-	0.20	<0.1	<0.1	<0.1	<0.1	<0.1
Dissolved Strontium	ug/L	20.0	7000	4320	4360	4610	4900	4610	4860
Dissolved Thallium	ug/L	0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dissolved Tin	ug/L	2.0	-	<2	<2	<2	<2	<2	<2
Dissolved Titanium	ug/L	2.0	-	<2	<2	<2	<2	<2	<2
Dissolved Uranium	ug/L	0.1	20	0.5	0.3	0.2	0.4	0.2	0.3
Dissolved Vanadium	ug/L	2.0	-	<2	<2	<2	<2	<2	<2
Dissolved Zinc	ug/L	5	5000 AO	22.00	8.00	6.00	14.00	7.00	7.00

Notes:

[1] Health Canada Guidelines for Canadian Drinking Water Quality , September 2020. AO denotes an exceedance in aesthetic guidelines.

[2] Health Canada guideline for distribution systems / treated water. Not applicable to current samples but used for reference.

	shading denotes a guideline exceedance
BOLD	bold lettering denotes a guideline exceedance in aesthetic objectives
RDL	denotes laboratory reported detection limit
-	denotes no value/not analysed

S1	WSP Sample ID
LEK354	Laboratory Sample ID
29-Oct-19	Sampling date

TABLE B **Total Coliforms and E.coli**
Town of Stewiacke, Stewiacke, Nova Scotia
Project No.: 191-03686

Parameter	Units	RDL	CDWQ[1]	Water Samples		
				PW21-01 S4 3492013 8-Feb-22	**PW21-01 S6** 3500777 10-Feb-22	**PW21-01 S7** 3500778 10-Feb-22
E.coli (MPN)	CFU/100 mL	1	ND/100 mL	<1	<1	<1
Total Coliforms (MPN)	CFU/100 mL	1	ND/100 mL	<1	<1	<1

Notes:

[1] Health Canada Guidelines for Canadian Drinking Water Quality , September 2020. AO denotes an exceedance in aesthetic guidelines.

	shading denotes a guideline exceedance
RDL	denotes laboratory reported detection limit
-	denotes no value/not analysed

PW21-01 S4	WSP Sample ID
3492013	Laboratory Sample ID
8-Feb-22	Sampling date

APPENDIX

D CERTIFICATES OF ANALYSIS

AGAT Laboratories

11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
FAX (902)468-8924
http://www.agatlabs.com

CLIENT NAME: WSP CANADA INC.
1 SPECTACLE LAKE DRIVE
DARTMOUTH , NS B3B1X7
(902) 835-9955
ATTENTION TO: Molly Noseworthy
PROJECT: 191-03686
AGAT WORK ORDER: 22X859187
WATER ANALYSIS REVIEWED BY: Sara Knox, Data Reviewer
DATE REPORTED: Feb 07, 2022
PAGES (INCLUDING COVER): 9
VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (902) 468-8718

*Notes

Disclaimer:

- All work conducted herein has been done using accepted standard protocols, and generally accepted practices and methods. AGAT test methods may incorporate modifications from the specified reference methods to improve performance.
- All samples will be disposed of within 30 days after receipt unless a Long Term Storage Agreement is signed and returned. Some specialty analysis may be exempt, please contact your Client Project Manager for details.
- AGAT's liability in connection with any delay, performance or non-performance of these services is only to the Client and does not extend to any other third party. Unless expressly agreed otherwise in writing, AGAT's liability is limited to the actual cost of the specific analysis or analyses included in the services.
- This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
- The test results reported herewith relate only to the samples as received by the laboratory.
- Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, warranties of merchantability, fitness for a particular purpose, or non-infringement. AGAT assumes no responsibility for any errors or omissions in the guidelines contained in this document.
- All reportable information as specified by ISO/IEC 17025:2017 is available from AGAT Laboratories upon request.

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Western Enviro-Agricultural Laboratory Association (WEALA)
Environmental Services Association of Alberta (ESAA)

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AGAT Laboratories
11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
FAX (902)468-8924
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 22X859187

PROJECT: 191-03686

CLIENT NAME: WSP CANADA INC.

ATTENTION TO: Molly Noseworthy

SAMPLING SITE:

SAMPLED BY:

Standard Water Analysis + Dissolved Metals (Lab Filtered)

DATE RECEIVED: 2022-02-01

DATE REPORTED: 2022-02-07

		SAMPLE DESCRIPTION:		PW21-01 S1
		SAMPLE TYPE:		Water
		DATE SAMPLED:		2022-01-31 13:30
Parameter	Unit	G / S	RDL	3470271
pH				7.80
Reactive Silica as SiO2	mg/L		0.5	9.9
Chloride	mg/L		1	27
Fluoride	mg/L		0.12	0.47
Sulphate	mg/L		40	1250
Alkalinity	mg/L		5	114
True Color	TCU		5.00	<5.00
Turbidity	NTU		0.5	5.7
Electrical Conductivity	umho/cm		1	2070
Nitrate + Nitrite as N	mg/L		0.05	<0.05
Nitrate as N	mg/L		0.05	<0.05
Nitrite as N	mg/L		0.05	<0.05
Ammonia as N	mg/L		0.03	<0.03
Total Organic Carbon	mg/L		0.5	0.8
Ortho-Phosphate as P	mg/L		0.01	<0.01
Dissolved Sodium	mg/L		0.1	40.1
Dissolved Potassium	mg/L		0.1	0.9
Dissolved Calcium	mg/L		0.1	463
Dissolved Magnesium	mg/L		0.1	30.8
Bicarb. Alkalinity (as CaCO3)	mg/L		5	114
Carb. Alkalinity (as CaCO3)	mg/L		10	<10
Hydroxide	mg/L		5	<5
Calculated TDS	mg/L		1	1880
Hardness	mg/L			1280
Langelier Index (@20C)	NA			0.81
Langelier Index (@ 4C)	NA			0.49
Saturation pH (@ 20C)	NA			6.99
Saturation pH (@ 4C)	NA			7.31
Anion Sum	me/L			29.1

Certified By: Lara Knox

Results relate only to the items tested. Results apply to samples as received.

AGAT Laboratories
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Dartmouth, Nova Scotia
CANADA B3B 1M2
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Certificate of Analysis

AGAT WORK ORDER: 22X859187

PROJECT: 191-03686

CLIENT NAME: WSP CANADA INC.

ATTENTION TO: Molly Noseworthy

SAMPLING SITE:

SAMPLED BY:

Standard Water Analysis + Dissolved Metals (Lab Filtered)

DATE RECEIVED: 2022-02-01

DATE REPORTED: 2022-02-07

		SAMPLE DESCRIPTION:		PW21-01 S1
		SAMPLE TYPE:		Water
		DATE SAMPLED:		2022-01-31 13:30
Parameter	Unit	G / S	RDL	3470271
Cation sum	me/L			27.5
% Difference/ Ion Balance	%			2.8
Dissolved Aluminum	ug/L		5	<5
Dissolved Antimony	ug/L		2	<2
Dissolved Arsenic	ug/L		2	<2
Dissolved Barium	ug/L		5	15
Dissolved Beryllium	ug/L		2	<2
Dissolved Bismuth	ug/L		2	<2
Dissolved Boron	ug/L		5	145
Dissolved Cadmium	ug/L		0.017	<0.017
Dissolved Chromium	ug/L		1	2
Dissolved Cobalt	ug/L		1	<1
Dissolved Copper	ug/L		2	<2
Dissolved Iron	ug/L		50	607
Dissolved Lead	ug/L		0.5	<0.5
Dissolved Manganese	ug/L		2	80
Dissolved Molybdenum	ug/L		2	2
Dissolved Nickel	ug/L		2	9
Dissolved Phosphorus	mg/L		0.02	<0.02
Dissolved Selenium	ug/L		1	2
Dissolved Silver	ug/L		0.1	0.2
Dissolved Strontium	ug/L		5	4320
Dissolved Thallium	ug/L		0.1	<0.1
Dissolved Tin	ug/L		2	<2
Dissolved Titanium	ug/L		2	<2
Dissolved Uranium	ug/L		0.1	0.5
Dissolved Vanadium	ug/L		2	<2
Dissolved Zinc	ug/L		5	22

Certified By: Lara Knox

Results relate only to the items tested. Results apply to samples as received.

AGAT Laboratories

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Certificate of Analysis

AGAT WORK ORDER: 22X859187

PROJECT: 191-03686

CLIENT NAME: WSP CANADA INC.

ATTENTION TO: Molly Noseworthy

SAMPLING SITE:

SAMPLED BY:

Standard Water Analysis + Dissolved Metals (Lab Filtered)

DATE RECEIVED: 2022-02-01

DATE REPORTED: 2022-02-07

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

3470271 Metals analysis completed on a lab filtered sample.
% Difference / Ion Balance, Hardness, Langelier Index, Nitrate + Nitrite, Hydroxide and Saturation pH are calculated parameters. The calculated parameters are non-accredited. The component parameters of the calculations are accredited.

Analysis performed at AGAT Halifax (unless marked by *)

Certified By: Lara Knox

Results relate only to the items tested. Results apply to samples as received.

AGAT Laboratories

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Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
FAX (902)468-8924
http://www.agatlabs.com

Quality Assurance

CLIENT NAME: WSP CANADA INC.
PROJECT: 191-03686
SAMPLING SITE:

AGAT WORK ORDER: 22X859187
ATTENTION TO: Molly Noseworthy
SAMPLED BY:

Water Analysis

RPT Date: Feb 07, 2022			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Standard Water Analysis + Dissolved Metals (Lab Filtered)															
pH	3471580		8.00	8.02	0.2%	<	101%	80%	120%	NA	80%	120%	NA	80%	120%
Reactive Silica as SiO2	3471580		3.9	4.1	5.8%	< 0.5	102%	80%	120%	101%	80%	120%	102%	80%	120%
Chloride	3468132		19	19	1.3%	< 1	92%	80%	120%	NA	80%	120%	NA	70%	130%
Fluoride	3468132		<0.12	<0.12	NA	< 0.12	104%	80%	120%	NA	80%	120%	110%	70%	130%
Sulphate	3468132		4	4	NA	< 2	106%	80%	120%	NA	80%	120%	97%	70%	130%
Alkalinity	3471580		84	84	0.2%	< 5	89%	80%	120%	NA			NA		
True Color	3471580		<5.00	6.85	NA	< 5	101%	80%	120%	95%	80%	120%	NA		
Turbidity	3461067		4.1	4.4	7.5%	< 0.5	93%	80%	120%	NA			NA		
Electrical Conductivity	3471580		1730	1740	0.6%	< 1	102%	90%	110%	NA			NA		
Nitrate as N	3468132		3.24	3.30	1.9%	< 0.05	102%	80%	120%	NA	80%	120%	NA	70%	130%
Nitrite as N	3468132		<0.05	<0.05	NA	< 0.05	92%	80%	120%	NA	80%	120%	107%	70%	130%
Ammonia as N	3468345		<0.03	<0.03	NA	< 0.03	99%	80%	120%	98%	80%	120%	113%	70%	130%
Total Organic Carbon	1		2.7	2.9	7.1%	< 0.5	103%	80%	120%		80%	120%	103%	80%	120%
Ortho-Phosphate as P	3471580		<0.01	<0.01	NA	< 0.01	97%	80%	120%	96%	80%	120%	109%	80%	120%
Dissolved Sodium	3460957		160	161	0.8%	< 0.1	109%	80%	120%	109%	80%	120%	NA	70%	130%
Dissolved Potassium	3460957		6.6	6.9	4.3%	< 0.1	103%	80%	120%	107%	80%	120%	NA	70%	130%
Dissolved Calcium	3460957		20.8	20.8	0.0%	< 0.1	100%	80%	120%	102%	80%	120%	NA	70%	130%
Dissolved Magnesium	3460957		7.1	7.5	4.7%	< 0.1	101%	80%	120%	107%	80%	120%	NA	70%	130%
Bicarb. Alkalinity (as CaCO3)	3471580		84	84	0.2%	< 5	NA	80%	120%	NA	80%	120%	NA	80%	120%
Carb. Alkalinity (as CaCO3)	3471580		<10	<10	NA	< 10	NA	80%	120%	NA	80%	120%	NA	80%	120%
Hydroxide	3471580		<5	<5	NA	< 5	NA	80%	120%	NA	80%	120%	NA	80%	120%
Dissolved Aluminum	3460957		8	8	NA	< 5	97%	80%	120%	99%	80%	120%	105%	70%	130%
Dissolved Antimony	3460957		<2	<2	NA	< 2	80%	80%	120%	NA	80%	120%	112%	70%	130%
Dissolved Arsenic	3460957		5	5	NA	< 2	100%	80%	120%	102%	80%	120%	99%	70%	130%
Dissolved Barium	3460957		170	167	2.1%	< 5	86%	80%	120%	93%	80%	120%	NA	70%	130%
Dissolved Beryllium	3460957		<2	<2	NA	< 2	103%	80%	120%	105%	80%	120%	107%	70%	130%
Dissolved Bismuth	3460957		<2	<2	NA	< 2	88%	80%	120%	103%	80%	120%	NA	70%	130%
Dissolved Boron	3460957		168	168	0.4%	< 5	100%	80%	120%	105%	80%	120%	NA	70%	130%
Dissolved Cadmium	3460957		0.048	0.044	NA	< 0.017	98%	80%	120%	106%	80%	120%	98%	70%	130%
Dissolved Chromium	3460957		<1	<1	NA	< 1	100%	80%	120%	101%	80%	120%	90%	70%	130%
Dissolved Cobalt	3460957		1	1	NA	< 1	100%	80%	120%	102%	80%	120%	92%	70%	130%
Dissolved Copper	3460957		<2	<2	NA	< 2	100%	80%	120%	104%	80%	120%	92%	70%	130%
Dissolved Iron	3460957		<50	<50	NA	< 50	98%	80%	120%	99%	80%	120%	90%	70%	130%
Dissolved Lead	3460957		<0.5	<0.5	NA	< 0.5	100%	80%	120%	107%	80%	120%	78%	70%	130%
Dissolved Manganese	3460957		392	400	2.1%	< 2	98%	80%	120%	101%	80%	120%	NA	70%	130%
Dissolved Molybdenum	3460957		<2	<2	NA	< 2	93%	80%	120%	97%	80%	120%	73%	70%	130%
Dissolved Nickel	3460957		3	3	NA	< 2	100%	80%	120%	105%	80%	120%	126%	70%	130%
Dissolved Phosphorus	3460957		<0.02	<0.02	NA	< 0.02	109%	80%	120%	109%	80%	120%	108%	70%	130%
Dissolved Selenium	3460957		1	1	NA	< 1	94%	80%	120%	92%	80%	120%	84%	70%	130%

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Results relate only to the items tested. Results apply to samples as received.

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Quality Assurance

CLIENT NAME: WSP CANADA INC.
AGAT WORK ORDER: 22X859187
PROJECT: 191-03686
ATTENTION TO: Molly Noseworthy
SAMPLING SITE:
SAMPLED BY:

Water Analysis (Continued)

RPT Date: Feb 07, 2022			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Dissolved Silver	3460957		<0.1	<0.1	NA	< 0.1	93%	80%	120%	115%	80%	120%	79%	70%	130%
Dissolved Strontium	3460957		69	71	2.7%	< 5	88%	80%	120%	87%	80%	120%	NA	70%	130%
Dissolved Thallium	3460957		<0.1	<0.1	NA	< 0.1	98%	80%	120%	104%	80%	120%	81%	70%	130%
Dissolved Tin	3460957		<2	<2	NA	< 2	97%	80%	120%	103%	80%	120%	98%	70%	130%
Dissolved Titanium	3460957		<2	<2	NA	< 2	102%	80%	120%	103%	80%	120%	95%	70%	130%
Dissolved Uranium	3460957		<0.1	<0.1	NA	< 0.1	99%	80%	120%	106%	80%	120%	86%	70%	130%
Dissolved Vanadium	3460957		5	5	NA	< 2	95%	80%	120%	97%	80%	120%	91%	70%	130%
Dissolved Zinc	3460957		<5	<5	NA	< 5	99%	80%	120%	103%	80%	120%	98%	70%	130%

Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

Certified By: Lara Knox

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Method Summary

CLIENT NAME: WSP CANADA INC.

AGAT WORK ORDER: 22X859187

PROJECT: 191-03686

ATTENTION TO: Molly Noseworthy

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis			
pH	INOR-121-6001	SM 4500 H+B	PC TITRATE
Reactive Silica as SiO2	INOR-121-6027	SM 4500-SiO2 F	COLORIMETER
Chloride	INORG-121-6005	SM 4110 B	ION CHROMATOGRAPH
Fluoride	INORG-121-6005	SM 4110 B	ION CHROMATOGRAPH
Sulphate	INORG-121-6005	SM 4110 B	ION CHROMATOGRAPH
Alkalinity	INOR-121-6001	SM 2320 B	
True Color	INOR-121-6008	SM 2120 B	LACHAT FIA
Turbidity	INOR-121-6022	SM 2130 B	NEPHELOMETER
Electrical Conductivity	INOR-121-6001	SM 2510 B	PC TITRATE
Nitrate + Nitrite as N	INORG-121-6005	SM 4110 B	CALCULATION
Nitrate as N	INORG-121-6005	SM 4110 B	ION CHROMATOGRAPH
Nitrite as N	INORG-121-6005	SM 4110 B	ION CHROMATOGRAPH
Ammonia as N	INOR-121-6047	SM 4500-NH3 H	COLORIMETER
Total Organic Carbon	INOR-121-6026	SM 5310 B	TOC ANALYZER
Ortho-Phosphate as P	INOR-121-6012	SM 4500-P G	COLORIMETER
Dissolved Sodium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Potassium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Calcium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Magnesium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Bicarb. Alkalinity (as CaCO3)	INORG-121-6001	SM 2320 B	PC TITRATE
Carb. Alkalinity (as CaCO3)	INORG-121-6001	SM 2320 B	PC TITRATE
Hydroxide	INORG-121-6001	SM 2320 B	PC-TITRATE
Calculated TDS	CALCULATION	SM 1030E	CALCULATION
Hardness	CALCULATION	SM 2340B	CALCULATION
Langelier Index (@20C)	CALCULATION	CALCULATION	CALCULATION
Langelier Index (@ 4C)	CALCULATION	CALCULATION	CALCULATION
Saturation pH (@ 20C)	CALCULATION	CALCULATION	CALCULATION
Saturation pH (@ 4C)	CALCULATION	CALCULATION	CALCULATION
Anion Sum	CALCULATION	SM 1030E	CALCULATION
Cation sum	CALCULATION	SM 1030E	CALCULATION
% Difference/ Ion Balance	CALCULATION	SM 1030E	CALCULATION
Dissolved Aluminum	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Antimony	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Arsenic	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Barium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Beryllium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Bismuth	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Boron	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Cadmium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS

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Method Summary

CLIENT NAME: WSP CANADA INC.

AGAT WORK ORDER: 22X859187

PROJECT: 191-03686

ATTENTION TO: Molly Noseworthy

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Dissolved Chromium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Cobalt	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Copper	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Iron	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Lead	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Manganese	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Molybdenum	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Nickel	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Phosphorus	MET-121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Selenium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Silver	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Strontium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Thallium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Tin	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Titanium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Uranium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Vanadium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Zinc	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS

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Chain of Custody Record

Laboratory Use Only

Arrival Condition: ☐ Good ☐ Poor (see notes)
Arrival Temperature: 5.3, 5.8, 5.9
Hold Time:
AGAT Job Number: ~~22~~ 22X859187

Notes: pres. rinsed from '22FEB 11 11:12AM metals bottle

Report Information

Company: WSP
Contact: Molly Noseworthy
Address: 1 Spectacle Lake Dr

Phone: 902-943-0022 Fax:
Client Project #: 191-03686
AGAT Quotation:
Please Note: If quotation number is not provided client will be billed full price for analysis.

Report Information (Please print):

1. Name: Molly Noseworthy
   Email: molly.noseworthy@wsp.com
2. Name:
   Email:

Report Format

☐ Single Sample per page
☐ Multiple Samples per page
☐ Excel Format Included
☐ Export

Turnaround Time Required (TAT)

Regular TAT ☒ 5 to 7 working days

Rush TAT ☐ Same day ☐ 1 day ☐ 2 days ☐ 3 days

Date Required:

Regulatory Requirements (Check):

☐ List Guidelines on Report ☐ Do not list Guidelines on Report
☐ PIRI
☐ Tier 1 ☐ Res ☐ Pot ☐ Coarse
☐ Tier 2 ☐ Com ☐ N/Pot ☐ Fine
☐ Gas ☐ Fuel ☐ Lube

☐ CCME ☐ CDWQ
☐ Industrial ☐ NSEQS-Cont Sites
☐ Commercial ☐ HRM 101
☐ Res/Park ☐ Storm Water
☐ Agricultural ☐ Waste Water
☐ FWAL
☐ Sediment ☐ Other

Drinking Water Sample: ☐ Yes ☐ No Salt Water Sample ☐ Yes ☐ No
Reg. No.:

Invoice To Same Yes ☒ / No ☐

Company:
Contact:
Address:

Phone: Fax:
PO/Credit Card#:

Sample Identification	Date/Time Sampled	Sample Matrix	# Containers	Comments – Site/Sample Info. Sample Containment	Field Filtered/Preserved	Standard Water Analysis	Metals: ☐ Total ☒ Diss ☐ Available	Mercury	☐ BOD ☐ CBOD	pH	☐ TSS ☐ TDS ☐ VSS	TKN	Total Phosphorus	Phenols	Tier 1: TPH/BTEX (PIRI) ☐ low level	Tier 2: TPH/BTEX Fractionation	CCME-CWS TPH/BTEX	VOC	THM	HAA	PAH	PCB	TC + EC ☐ P/A ☐ MPN ☐ MF	☐ HPC ☐ Pseudomonas	Fecal Coliform ☐ MPN ☐ MF	Other:	Other:	Hazardous (Y/N)
PW21-01 S1	31/01/22 13:30	GW	3	metals to be filtered and preserved	1	X	X																				

Samples Relinquished By (Print Name):	Date/Time	Samples Received By (Print Name):	Date/Time
Molly Noseworthy	01/02/22 13:30		
Samples Relinquished By (Sign):	Date/Time	Samples Received By (Sign):	Date/Time
		Kallen	

Pink Copy - Client
Yellow Copy - AGAT
White Copy- AGAT

Page 1 of 1

N°: 75230

AGAT Laboratories

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CLIENT NAME: WSP CANADA INC.
1 SPECTACLE LAKE DRIVE
DARTMOUTH , NS B3B1X7
(902) 835-9955
ATTENTION TO: Molly Noseworthy
PROJECT: 191-03686
AGAT WORK ORDER: 22X859187
WATER ANALYSIS REVIEWED BY: Sara Knox, Data Reviewer
DATE REPORTED: Feb 07, 2022
PAGES (INCLUDING COVER): 9
VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (902) 468-8718

*Notes

Disclaimer:

- All work conducted herein has been done using accepted standard protocols, and generally accepted practices and methods. AGAT test methods may incorporate modifications from the specified reference methods to improve performance.
- All samples will be disposed of within 30 days after receipt unless a Long Term Storage Agreement is signed and returned. Some specialty analysis may be exempt, please contact your Client Project Manager for details.
- AGAT's liability in connection with any delay, performance or non-performance of these services is only to the Client and does not extend to any other third party. Unless expressly agreed otherwise in writing, AGAT's liability is limited to the actual cost of the specific analysis or analyses included in the services.
- This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
- The test results reported herewith relate only to the samples as received by the laboratory.
- Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, warranties of merchantability, fitness for a particular purpose, or non-infringement. AGAT assumes no responsibility for any errors or omissions in the guidelines contained in this document.
- All reportable information as specified by ISO/IEC 17025:2017 is available from AGAT Laboratories upon request.

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Western Enviro-Agricultural Laboratory Association (WEALA)
Environmental Services Association of Alberta (ESAA)

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Certificate of Analysis

AGAT WORK ORDER: 22X859187

PROJECT: 191-03686

CLIENT NAME: WSP CANADA INC.

ATTENTION TO: Molly Noseworthy

SAMPLING SITE:

SAMPLED BY:

Standard Water Analysis + Dissolved Metals (Lab Filtered)

DATE RECEIVED: 2022-02-01

DATE REPORTED: 2022-02-07

		SAMPLE DESCRIPTION:		PW21-01 S1
		SAMPLE TYPE:		Water
		DATE SAMPLED:		2022-01-31 13:30
Parameter	Unit	G / S	RDL	3470271
pH				7.80
Reactive Silica as SiO2	mg/L		0.5	9.9
Chloride	mg/L		1	27
Fluoride	mg/L		0.12	0.47
Sulphate	mg/L		40	1250
Alkalinity	mg/L		5	114
True Color	TCU		5.00	<5.00
Turbidity	NTU		0.5	5.7
Electrical Conductivity	umho/cm		1	2070
Nitrate + Nitrite as N	mg/L		0.05	<0.05
Nitrate as N	mg/L		0.05	<0.05
Nitrite as N	mg/L		0.05	<0.05
Ammonia as N	mg/L		0.03	<0.03
Total Organic Carbon	mg/L		0.5	0.8
Ortho-Phosphate as P	mg/L		0.01	<0.01
Dissolved Sodium	mg/L		0.1	40.1
Dissolved Potassium	mg/L		0.1	0.9
Dissolved Calcium	mg/L		0.1	463
Dissolved Magnesium	mg/L		0.1	30.8
Bicarb. Alkalinity (as CaCO3)	mg/L		5	114
Carb. Alkalinity (as CaCO3)	mg/L		10	<10
Hydroxide	mg/L		5	<5
Calculated TDS	mg/L		1	1880
Hardness	mg/L			1280
Langelier Index (@20C)	NA			0.81
Langelier Index (@ 4C)	NA			0.49
Saturation pH (@ 20C)	NA			6.99
Saturation pH (@ 4C)	NA			7.31
Anion Sum	me/L			29.1

Certified By: Lara Knox

Results relate only to the items tested. Results apply to samples as received.

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Certificate of Analysis

AGAT WORK ORDER: 22X859187

PROJECT: 191-03686

CLIENT NAME: WSP CANADA INC.

ATTENTION TO: Molly Noseworthy

SAMPLING SITE:

SAMPLED BY:

Standard Water Analysis + Dissolved Metals (Lab Filtered)

DATE RECEIVED: 2022-02-01

DATE REPORTED: 2022-02-07

		SAMPLE DESCRIPTION:		PW21-01 S1
		SAMPLE TYPE:		Water
		DATE SAMPLED:		2022-01-31 13:30
Parameter	Unit	G / S	RDL	3470271
Cation sum	me/L			27.5
% Difference/ Ion Balance	%			2.8
Dissolved Aluminum	ug/L		5	<5
Dissolved Antimony	ug/L		2	<2
Dissolved Arsenic	ug/L		2	<2
Dissolved Barium	ug/L		5	15
Dissolved Beryllium	ug/L		2	<2
Dissolved Bismuth	ug/L		2	<2
Dissolved Boron	ug/L		5	145
Dissolved Cadmium	ug/L		0.017	<0.017
Dissolved Chromium	ug/L		1	2
Dissolved Cobalt	ug/L		1	<1
Dissolved Copper	ug/L		2	<2
Dissolved Iron	ug/L		50	607
Dissolved Lead	ug/L		0.5	<0.5
Dissolved Manganese	ug/L		2	80
Dissolved Molybdenum	ug/L		2	2
Dissolved Nickel	ug/L		2	9
Dissolved Phosphorus	mg/L		0.02	<0.02
Dissolved Selenium	ug/L		1	2
Dissolved Silver	ug/L		0.1	0.2
Dissolved Strontium	ug/L		5	4320
Dissolved Thallium	ug/L		0.1	<0.1
Dissolved Tin	ug/L		2	<2
Dissolved Titanium	ug/L		2	<2
Dissolved Uranium	ug/L		0.1	0.5
Dissolved Vanadium	ug/L		2	<2
Dissolved Zinc	ug/L		5	22

Certified By: Lara Knox

Results relate only to the items tested. Results apply to samples as received.

AGAT Laboratories

11 Morris Drive, Unit 122
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Certificate of Analysis

AGAT WORK ORDER: 22X859187

PROJECT: 191-03686

CLIENT NAME: WSP CANADA INC.

ATTENTION TO: Molly Noseworthy

SAMPLING SITE:

SAMPLED BY:

Standard Water Analysis + Dissolved Metals (Lab Filtered)

DATE RECEIVED: 2022-02-01

DATE REPORTED: 2022-02-07

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

3470271 Metals analysis completed on a lab filtered sample.
% Difference / Ion Balance, Hardness, Langelier Index, Nitrate + Nitrite, Hydroxide and Saturation pH are calculated parameters. The calculated parameters are non-accredited. The component parameters of the calculations are accredited.

Analysis performed at AGAT Halifax (unless marked by *)

Certified By: Lara Knox

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Quality Assurance

CLIENT NAME: WSP CANADA INC.
PROJECT: 191-03686
SAMPLING SITE:

AGAT WORK ORDER: 22X859187
ATTENTION TO: Molly Noseworthy
SAMPLED BY:

Water Analysis

RPT Date: Feb 07, 2022			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Standard Water Analysis + Dissolved Metals (Lab Filtered)															
pH	3471580		8.00	8.02	0.2%	<	101%	80%	120%	NA	80%	120%	NA	80%	120%
Reactive Silica as SiO2	3471580		3.9	4.1	5.8%	< 0.5	102%	80%	120%	101%	80%	120%	102%	80%	120%
Chloride	3468132		19	19	1.3%	< 1	92%	80%	120%	NA	80%	120%	NA	70%	130%
Fluoride	3468132		<0.12	<0.12	NA	< 0.12	104%	80%	120%	NA	80%	120%	110%	70%	130%
Sulphate	3468132		4	4	NA	< 2	106%	80%	120%	NA	80%	120%	97%	70%	130%
Alkalinity	3471580		84	84	0.2%	< 5	89%	80%	120%	NA			NA		
True Color	3471580		<5.00	6.85	NA	< 5	101%	80%	120%	95%	80%	120%	NA		
Turbidity	3461067		4.1	4.4	7.5%	< 0.5	93%	80%	120%	NA			NA		
Electrical Conductivity	3471580		1730	1740	0.6%	< 1	102%	90%	110%	NA			NA		
Nitrate as N	3468132		3.24	3.30	1.9%	< 0.05	102%	80%	120%	NA	80%	120%	NA	70%	130%
Nitrite as N	3468132		<0.05	<0.05	NA	< 0.05	92%	80%	120%	NA	80%	120%	107%	70%	130%
Ammonia as N	3468345		<0.03	<0.03	NA	< 0.03	99%	80%	120%	98%	80%	120%	113%	70%	130%
Total Organic Carbon	1		2.7	2.9	7.1%	< 0.5	103%	80%	120%		80%	120%	103%	80%	120%
Ortho-Phosphate as P	3471580		<0.01	<0.01	NA	< 0.01	97%	80%	120%	96%	80%	120%	109%	80%	120%
Dissolved Sodium	3460957		160	161	0.8%	< 0.1	109%	80%	120%	109%	80%	120%	NA	70%	130%
Dissolved Potassium	3460957		6.6	6.9	4.3%	< 0.1	103%	80%	120%	107%	80%	120%	NA	70%	130%
Dissolved Calcium	3460957		20.8	20.8	0.0%	< 0.1	100%	80%	120%	102%	80%	120%	NA	70%	130%
Dissolved Magnesium	3460957		7.1	7.5	4.7%	< 0.1	101%	80%	120%	107%	80%	120%	NA	70%	130%
Bicarb. Alkalinity (as CaCO3)	3471580		84	84	0.2%	< 5	NA	80%	120%	NA	80%	120%	NA	80%	120%
Carb. Alkalinity (as CaCO3)	3471580		<10	<10	NA	< 10	NA	80%	120%	NA	80%	120%	NA	80%	120%
Hydroxide	3471580		<5	<5	NA	< 5	NA	80%	120%	NA	80%	120%	NA	80%	120%
Dissolved Aluminum	3460957		8	8	NA	< 5	97%	80%	120%	99%	80%	120%	105%	70%	130%
Dissolved Antimony	3460957		<2	<2	NA	< 2	80%	80%	120%	NA	80%	120%	112%	70%	130%
Dissolved Arsenic	3460957		5	5	NA	< 2	100%	80%	120%	102%	80%	120%	99%	70%	130%
Dissolved Barium	3460957		170	167	2.1%	< 5	86%	80%	120%	93%	80%	120%	NA	70%	130%
Dissolved Beryllium	3460957		<2	<2	NA	< 2	103%	80%	120%	105%	80%	120%	107%	70%	130%
Dissolved Bismuth	3460957		<2	<2	NA	< 2	88%	80%	120%	103%	80%	120%	NA	70%	130%
Dissolved Boron	3460957		168	168	0.4%	< 5	100%	80%	120%	105%	80%	120%	NA	70%	130%
Dissolved Cadmium	3460957		0.048	0.044	NA	< 0.017	98%	80%	120%	106%	80%	120%	98%	70%	130%
Dissolved Chromium	3460957		<1	<1	NA	< 1	100%	80%	120%	101%	80%	120%	90%	70%	130%
Dissolved Cobalt	3460957		1	1	NA	< 1	100%	80%	120%	102%	80%	120%	92%	70%	130%
Dissolved Copper	3460957		<2	<2	NA	< 2	100%	80%	120%	104%	80%	120%	92%	70%	130%
Dissolved Iron	3460957		<50	<50	NA	< 50	98%	80%	120%	99%	80%	120%	90%	70%	130%
Dissolved Lead	3460957		<0.5	<0.5	NA	< 0.5	100%	80%	120%	107%	80%	120%	78%	70%	130%
Dissolved Manganese	3460957		392	400	2.1%	< 2	98%	80%	120%	101%	80%	120%	NA	70%	130%
Dissolved Molybdenum	3460957		<2	<2	NA	< 2	93%	80%	120%	97%	80%	120%	73%	70%	130%
Dissolved Nickel	3460957		3	3	NA	< 2	100%	80%	120%	105%	80%	120%	126%	70%	130%
Dissolved Phosphorus	3460957		<0.02	<0.02	NA	< 0.02	109%	80%	120%	109%	80%	120%	108%	70%	130%
Dissolved Selenium	3460957		1	1	NA	< 1	94%	80%	120%	92%	80%	120%	84%	70%	130%

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Quality Assurance

CLIENT NAME: WSP CANADA INC.
AGAT WORK ORDER: 22X859187
PROJECT: 191-03686
ATTENTION TO: Molly Noseworthy
SAMPLING SITE:
SAMPLED BY:

Water Analysis (Continued)

RPT Date: Feb 07, 2022			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Dissolved Silver	3460957		<0.1	<0.1	NA	< 0.1	93%	80%	120%	115%	80%	120%	79%	70%	130%
Dissolved Strontium	3460957		69	71	2.7%	< 5	88%	80%	120%	87%	80%	120%	NA	70%	130%
Dissolved Thallium	3460957		<0.1	<0.1	NA	< 0.1	98%	80%	120%	104%	80%	120%	81%	70%	130%
Dissolved Tin	3460957		<2	<2	NA	< 2	97%	80%	120%	103%	80%	120%	98%	70%	130%
Dissolved Titanium	3460957		<2	<2	NA	< 2	102%	80%	120%	103%	80%	120%	95%	70%	130%
Dissolved Uranium	3460957		<0.1	<0.1	NA	< 0.1	99%	80%	120%	106%	80%	120%	86%	70%	130%
Dissolved Vanadium	3460957		5	5	NA	< 2	95%	80%	120%	97%	80%	120%	91%	70%	130%
Dissolved Zinc	3460957		<5	<5	NA	< 5	99%	80%	120%	103%	80%	120%	98%	70%	130%

Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

Certified By: Lara Knox

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Method Summary

CLIENT NAME: WSP CANADA INC.

AGAT WORK ORDER: 22X859187

PROJECT: 191-03686

ATTENTION TO: Molly Noseworthy

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis			
pH	INOR-121-6001	SM 4500 H+B	PC TITRATE
Reactive Silica as SiO2	INOR-121-6027	SM 4500-SiO2 F	COLORIMETER
Chloride	INORG-121-6005	SM 4110 B	ION CHROMATOGRAPH
Fluoride	INORG-121-6005	SM 4110 B	ION CHROMATOGRAPH
Sulphate	INORG-121-6005	SM 4110 B	ION CHROMATOGRAPH
Alkalinity	INOR-121-6001	SM 2320 B	
True Color	INOR-121-6008	SM 2120 B	LACHAT FIA
Turbidity	INOR-121-6022	SM 2130 B	NEPHELOMETER
Electrical Conductivity	INOR-121-6001	SM 2510 B	PC TITRATE
Nitrate + Nitrite as N	INORG-121-6005	SM 4110 B	CALCULATION
Nitrate as N	INORG-121-6005	SM 4110 B	ION CHROMATOGRAPH
Nitrite as N	INORG-121-6005	SM 4110 B	ION CHROMATOGRAPH
Ammonia as N	INOR-121-6047	SM 4500-NH3 H	COLORIMETER
Total Organic Carbon	INOR-121-6026	SM 5310 B	TOC ANALYZER
Ortho-Phosphate as P	INOR-121-6012	SM 4500-P G	COLORIMETER
Dissolved Sodium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Potassium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Calcium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Magnesium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Bicarb. Alkalinity (as CaCO3)	INORG-121-6001	SM 2320 B	PC TITRATE
Carb. Alkalinity (as CaCO3)	INORG-121-6001	SM 2320 B	PC TITRATE
Hydroxide	INORG-121-6001	SM 2320 B	PC-TITRATE
Calculated TDS	CALCULATION	SM 1030E	CALCULATION
Hardness	CALCULATION	SM 2340B	CALCULATION
Langelier Index (@20C)	CALCULATION	CALCULATION	CALCULATION
Langelier Index (@ 4C)	CALCULATION	CALCULATION	CALCULATION
Saturation pH (@ 20C)	CALCULATION	CALCULATION	CALCULATION
Saturation pH (@ 4C)	CALCULATION	CALCULATION	CALCULATION
Anion Sum	CALCULATION	SM 1030E	CALCULATION
Cation sum	CALCULATION	SM 1030E	CALCULATION
% Difference/ Ion Balance	CALCULATION	SM 1030E	CALCULATION
Dissolved Aluminum	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Antimony	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Arsenic	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Barium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Beryllium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Bismuth	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Boron	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Cadmium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS

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Method Summary

CLIENT NAME: WSP CANADA INC.

AGAT WORK ORDER: 22X859187

PROJECT: 191-03686

ATTENTION TO: Molly Noseworthy

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Dissolved Chromium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Cobalt	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Copper	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Iron	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Lead	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Manganese	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Molybdenum	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Nickel	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Phosphorus	MET-121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Selenium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Silver	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Strontium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Thallium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Tin	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Titanium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Uranium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Vanadium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Zinc	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS

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Chain of Custody Record

Laboratory Use Only

Arrival Condition: ☐ Good ☐ Poor (see notes)
Arrival Temperature: 5.3, 5.8, 5.9
Hold Time:
AGAT Job Number: ~~22~~ 22X859187

Notes: pres. rinsed from '22FEB 11 11:12AM metals bottle

Report Information

Company: WSP
Contact: Molly Noseworthy
Address: 1 Spectacle Lake Dr

Phone: 902-943-0022 Fax:
Client Project #: 191-03686
AGAT Quotation:
Please Note: If quotation number is not provided client will be billed full price for analysis.

Report Information (Please print):

1. Name: Molly Noseworthy
   Email: molly.noseworthy@wsp.com
2. Name:
   Email:

Report Format

☐ Single Sample per page
☐ Multiple Samples per page
☐ Excel Format Included
☐ Export

Turnaround Time Required (TAT)

Regular TAT ☒ 5 to 7 working days

Rush TAT ☐ Same day ☐ 1 day ☐ 2 days ☐ 3 days

Date Required:

Regulatory Requirements (Check):

☐ List Guidelines on Report ☐ Do not list Guidelines on Report
☐ PIRI
☐ Tier 1 ☐ Res ☐ Pot ☐ Coarse
☐ Tier 2 ☐ Com ☐ N/Pot ☐ Fine
☐ Gas ☐ Fuel ☐ Lube

☐ CCME ☐ CDWQ
☐ Industrial ☐ NSEQS-Cont Sites
☐ Commercial ☐ HRM 101
☐ Res/Park ☐ Storm Water
☐ Agricultural ☐ Waste Water
☐ FWAL
☐ Sediment ☐ Other

Drinking Water Sample: ☐ Yes ☐ No Salt Water Sample ☐ Yes ☐ No
Reg. No.:

Invoice To Same Yes ☒ / No ☐

Company:
Contact:
Address:

Phone: Fax:
PO/Credit Card#:

Sample Identification	Date/Time Sampled	Sample Matrix	# Containers	Comments – Site/Sample Info. Sample Containment	Field Filtered/Preserved	Standard Water Analysis	Metals: ☐ Total ☒ Diss ☐ Available	Mercury	☐ BOD ☐ CBOD	pH	☐ TSS ☐ TDS ☐ VSS	TKN	Total Phosphorus	Phenols	Tier 1: TPH/BTEX (PIRI) ☐ low level	Tier 2: TPH/BTEX Fractionation	CCME-CWS TPH/BTEX	VOC	THM	HAA	PAH	PCB	TC + EC ☐ P/A ☐ MPN ☐ MF	☐ HPC ☐ Pseudomonas	Fecal Coliform ☐ MPN ☐ MF	Other:	Other:	Hazardous (Y/N)
PW21-01 S1	31/01/22 13:30	GW	3	metals to be filtered and preserved	1	X	X																				

Samples Relinquished By (Print Name):	Date/Time	Samples Received By (Print Name):	Date/Time
Molly Noseworthy	01/02/22 13:30		
Samples Relinquished By (Sign):	Date/Time	Samples Received By (Sign):	Date/Time
		Kallen	

Pink Copy - Client
Yellow Copy - AGAT
White Copy- AGAT

Page 1 of 1

N°: 75230

AGAT Laboratories

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TEL (902)468-8718
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CLIENT NAME: WSP CANADA INC.
1 SPECTACLE LAKE DRIVE
DARTMOUTH , NS B3B1X7
(902) 835-9955
ATTENTION TO: Molly Noseworthy
PROJECT: 191-03686
AGAT WORK ORDER: 22X859481
WATER ANALYSIS REVIEWED BY: Sara Knox, Data Reviewer
DATE REPORTED: Feb 08, 2022
PAGES (INCLUDING COVER): 9
VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (902) 468-8718

*Notes

Disclaimer:

- All work conducted herein has been done using accepted standard protocols, and generally accepted practices and methods. AGAT test methods may incorporate modifications from the specified reference methods to improve performance.
- All samples will be disposed of within 30 days after receipt unless a Long Term Storage Agreement is signed and returned. Some specialty analysis may be exempt, please contact your Client Project Manager for details.
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- This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
- The test results reported herewith relate only to the samples as received by the laboratory.
- Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, warranties of merchantability, fitness for a particular purpose, or non-infringement. AGAT assumes no responsibility for any errors or omissions in the guidelines contained in this document.
- All reportable information as specified by ISO/IEC 17025:2017 is available from AGAT Laboratories upon request.

Member of: Association of Professional Engineers and Geoscientists of Alberta (APEGA)
Western Enviro-Agricultural Laboratory Association (WEALA)
Environmental Services Association of Alberta (ESAA)

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AGAT Laboratories
11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
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TEL (902)468-8718
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http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 22X859481

PROJECT: 191-03686

CLIENT NAME: WSP CANADA INC.

ATTENTION TO: Molly Noseworthy

SAMPLING SITE:

SAMPLED BY:

Standard Water Analysis + Dissolved Metals (Lab Filtered)

DATE RECEIVED: 2022-02-01

DATE REPORTED: 2022-02-08

		SAMPLE DESCRIPTION:		PW21-01 S2
		SAMPLE TYPE:		Water
		DATE SAMPLED:		2022-02-01 13:15
Parameter	Unit	G / S	RDL	3471805
pH				7.88
Reactive Silica as SiO2	mg/L		0.5	8.6
Chloride	mg/L		1	28
Fluoride	mg/L		0.12	0.47
Sulphate	mg/L		40	1270
Alkalinity	mg/L		5	116
True Color	TCU		5.00	17.3
Turbidity	NTU		0.5	10.6
Electrical Conductivity	umho/cm		1	2010
Nitrate + Nitrite as N	mg/L		0.05	<0.05
Nitrate as N	mg/L		0.05	<0.05
Nitrite as N	mg/L		0.05	<0.05
Ammonia as N	mg/L		0.03	<0.03
Total Organic Carbon	mg/L		0.5	1.1
Ortho-Phosphate as P	mg/L		0.01	<0.01
Dissolved Sodium	mg/L		0.1	37.7
Dissolved Potassium	mg/L		0.1	0.9
Dissolved Calcium	mg/L		0.1	456
Dissolved Magnesium	mg/L		0.1	27.8
Bicarb. Alkalinity (as CaCO3)	mg/L		5	116
Carb. Alkalinity (as CaCO3)	mg/L		10	<10
Hydroxide	mg/L		5	<5
Calculated TDS	mg/L		1	1890
Hardness	mg/L			1250
Langelier Index (@20C)	NA			0.89
Langelier Index (@ 4C)	NA			0.57
Saturation pH (@ 20C)	NA			6.99
Saturation pH (@ 4C)	NA			7.31
Anion Sum	me/L			29.5

Certified By: Lara Knox

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Standard Water Analysis + Dissolved Metals (Lab Filtered)

DATE RECEIVED: 2022-02-01

DATE REPORTED: 2022-02-08

		SAMPLE DESCRIPTION:		PW21-01 S2
		SAMPLE TYPE:		Water
		DATE SAMPLED:		2022-02-01 13:15
Parameter	Unit	G / S	RDL	3471805
Cation sum	me/L			26.8
% Difference/ Ion Balance	%			4.9
Dissolved Aluminum	ug/L		5	<5
Dissolved Antimony	ug/L		2	<2
Dissolved Arsenic	ug/L		2	<2
Dissolved Barium	ug/L		5	16
Dissolved Beryllium	ug/L		2	<2
Dissolved Bismuth	ug/L		2	<2
Dissolved Boron	ug/L		5	133
Dissolved Cadmium	ug/L		0.017	<0.017
Dissolved Chromium	ug/L		1	2
Dissolved Cobalt	ug/L		1	<1
Dissolved Copper	ug/L		2	<2
Dissolved Iron	ug/L		50	755
Dissolved Lead	ug/L		0.5	<0.5
Dissolved Manganese	ug/L		2	75
Dissolved Molybdenum	ug/L		2	2
Dissolved Nickel	ug/L		2	9
Dissolved Phosphorus	mg/L		0.02	<0.02
Dissolved Selenium	ug/L		1	1
Dissolved Silver	ug/L		0.1	<0.1
Dissolved Strontium	ug/L		5	4360
Dissolved Thallium	ug/L		0.1	<0.1
Dissolved Tin	ug/L		2	<2
Dissolved Titanium	ug/L		2	<2
Dissolved Uranium	ug/L		0.1	0.3
Dissolved Vanadium	ug/L		2	<2
Dissolved Zinc	ug/L		5	8

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Certificate of Analysis

AGAT WORK ORDER: 22X859481

PROJECT: 191-03686

CLIENT NAME: WSP CANADA INC.

ATTENTION TO: Molly Noseworthy

SAMPLING SITE:

SAMPLED BY:

Standard Water Analysis + Dissolved Metals (Lab Filtered)

DATE RECEIVED: 2022-02-01

DATE REPORTED: 2022-02-08

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

3471805 Metals analysis completed on a lab filtered sample.
% Difference / Ion Balance, Hardness, Langelier Index, Nitrate + Nitrite, Hydroxide and Saturation pH are calculated parameters. The calculated parameters are non-accredited. The component parameters of the calculations are accredited.

Analysis performed at AGAT Halifax (unless marked by *)

Certified By: Lara Knox

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Quality Assurance

CLIENT NAME: WSP CANADA INC.
PROJECT: 191-03686
SAMPLING SITE:

AGAT WORK ORDER: 22X859481
ATTENTION TO: Molly Noseworthy
SAMPLED BY:

Water Analysis

RPT Date: Feb 08, 2022			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Standard Water Analysis + Dissolved Metals (Lab Filtered)															
pH	3471805	3471805	7.88	7.89	0.1%	<	102%	80%	120%	NA	80%	120%	NA	80%	120%
Reactive Silica as SiO2	3471580		3.9	4.1	5.8%	< 0.5	102%	80%	120%	101%	80%	120%	102%	80%	120%
Chloride	3471472		19	19	2.0%	< 1	89%	80%	120%	NA	80%	120%	NA	70%	130%
Fluoride	3471472		<0.12	<0.12	NA	< 0.12	97%	80%	120%	NA	80%	120%	76%	70%	130%
Sulphate	3459368		11	11	0.3%	< 2	105%	80%	120%	NA	80%	120%	NA	70%	130%
Alkalinity	3471805	3471805	116	115	0.5%	< 5	88%	80%	120%	NA			NA		
True Color	3471580		<5.00	6.85	NA	< 5	101%	80%	120%	95%	80%	120%	NA		
Turbidity	3471472		1.0	1.0	NA	< 0.5	97%	80%	120%	NA			NA		
Electrical Conductivity	3471805	3471805	2010	2010	0.1%	<1	105%	90%	110%	NA			NA		
Nitrate as N	3471472		5.05	5.23	3.4%	< 0.05	97%	80%	120%	NA	80%	120%	NA	70%	130%
Nitrite as N	3471472		0.13	0.11	NA	< 0.05	88%	80%	120%	NA	80%	120%	82%	70%	130%
Ammonia as N	3471580		20.1	17.4	14.6%	<0.03	97%	80%	120%	103%	80%	120%	113%	70%	130%
Total Organic Carbon	1347000		4.6	4.5	2.2%	< 0.5	103%	80%	120%		80%	120%	100%	80%	120%
Ortho-Phosphate as P	3471580		<0.01	<0.01	NA	< 0.01	97%	80%	120%	96%	80%	120%	109%	80%	120%
Dissolved Sodium	3471805	3471805	37.7	37.7	0.0%	< 0.1	106%	80%	120%	108%	80%	120%	NA	70%	130%
Dissolved Potassium	3471805	3471805	0.9	0.9	0.4%	< 0.1	100%	80%	120%	105%	80%	120%	79%	70%	130%
Dissolved Calcium	3471805	3471805	456	454	0.5%	< 0.1	100%	80%	120%	103%	80%	120%	NA	70%	130%
Dissolved Magnesium	3471805	3471805	27.8	29.0	3.9%	< 0.1	99%	80%	120%	98%	80%	120%	NA	70%	130%
Bicarb. Alkalinity (as CaCO3)	3471805	3471805	116	115	0.5%	< 5	NA	80%	120%	NA	80%	120%	NA	80%	120%
Carb. Alkalinity (as CaCO3)	3471805	3471805	<10	<10	NA	< 10	NA	80%	120%	NA	80%	120%	NA	80%	120%
Hydroxide	3471805	3471805	<5	<5	NA	< 5	NA	80%	120%	NA	80%	120%	NA	80%	120%
Dissolved Aluminum	3471805	3471805	<5	<5	NA	< 5	100%	80%	120%	104%	80%	120%	74%	70%	130%
Dissolved Antimony	3471805	3471805	<2	<2	NA	< 2	80%	80%	120%	NA	80%	120%	99%	70%	130%
Dissolved Arsenic	3471805	3471805	<2	<2	NA	< 2	100%	80%	120%	103%	80%	120%	110%	70%	130%
Dissolved Barium	3471805	3471805	16	16	NA	< 5	88%	80%	120%	93%	80%	120%	79%	70%	130%
Dissolved Beryllium	3471805	3471805	<2	<2	NA	< 2	102%	80%	120%	103%	80%	120%	87%	70%	130%
Dissolved Bismuth	3471805	3471805	<2	<2	NA	< 2	86%	80%	120%	96%	80%	120%	NA	70%	130%
Dissolved Boron	3471805	3471805	133	138	3.8%	< 5	100%	80%	120%	104%	80%	120%	NA	70%	130%
Dissolved Cadmium	3471805	3471805	<0.017	<0.017	NA	< 0.017	105%	80%	120%	106%	80%	120%	97%	70%	130%
Dissolved Chromium	3471805	3471805	2	2	NA	< 1	98%	80%	120%	99%	80%	120%	95%	70%	130%
Dissolved Cobalt	3471805	3471805	<1	<1	NA	< 1	98%	80%	120%	98%	80%	120%	104%	70%	130%
Dissolved Copper	3471805	3471805	<2	<2	NA	< 2	100%	80%	120%	100%	80%	120%	102%	70%	130%
Dissolved Iron	3471805	3471805	755	812	7.3%	< 50	100%	80%	120%	94%	80%	120%	NA	70%	130%
Dissolved Lead	3471805	3471805	<0.5	<0.5	NA	< 0.5	97%	80%	120%	102%	80%	120%	84%	70%	130%
Dissolved Manganese	3471805	3471805	75	80	7.2%	< 2	97%	80%	120%	99%	80%	120%	NA	70%	130%
Dissolved Molybdenum	3471805	3471805	2	2	NA	< 2	92%	80%	120%	97%	80%	120%	NA	70%	130%
Dissolved Nickel	3471805	3471805	9	9	NA	< 2	100%	80%	120%	104%	80%	120%	123%	70%	130%
Dissolved Phosphorus	3471805	3471805	<0.02	<0.02	NA	< 0.02	86%	80%	120%	93%	80%	120%	NA	70%	130%
Dissolved Selenium	3471805	3471805	1	1	NA	< 1	89%	80%	120%	97%	80%	120%	121%	70%	130%

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Quality Assurance

CLIENT NAME: WSP CANADA INC.

AGAT WORK ORDER: 22X859481

PROJECT: 191-03686

ATTENTION TO: Molly Noseworthy

SAMPLING SITE:

SAMPLED BY:

Water Analysis (Continued)

RPT Date: Feb 08, 2022			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Dissolved Silver	3471805	3471805	<0.1	<0.1	NA	< 0.1	85%	80%	120%	105%	80%	120%	84%	70%	130%
Dissolved Strontium	3471805	3471805	4360	4250	2.4%	< 5	87%	80%	120%	89%	80%	120%	NA	70%	130%
Dissolved Thallium	3471805	3471805	<0.1	<0.1	NA	< 0.1	98%	80%	120%	102%	80%	120%	82%	70%	130%
Dissolved Tin	3471805	3471805	<2	<2	NA	< 2	96%	80%	120%	99%	80%	120%	86%	70%	130%
Dissolved Titanium	3471805	3471805	<2	<2	NA	< 2	97%	80%	120%	100%	80%	120%	89%	70%	130%
Dissolved Uranium	3471805	3471805	0.3	0.4	NA	< 0.1	98%	80%	120%	101%	80%	120%	97%	70%	130%
Dissolved Vanadium	3471805	3471805	<2	<2	NA	< 2	98%	80%	120%	100%	80%	120%	105%	70%	130%
Dissolved Zinc	3471805	3471805	8	9	NA	< 5	98%	80%	120%	100%	80%	120%	123%	70%	130%

Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

Certified By: Lara Knox

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Method Summary

CLIENT NAME: WSP CANADA INC.

AGAT WORK ORDER: 22X859481

PROJECT: 191-03686

ATTENTION TO: Molly Noseworthy

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis			
pH	INOR-121-6001	SM 4500 H+B	PC TITRATE
Reactive Silica as SiO2	INOR-121-6027	SM 4500-SiO2 F	COLORIMETER
Chloride	INORG-121-6005	SM 4110 B	ION CHROMATOGRAPH
Fluoride	INORG-121-6005	SM 4110 B	ION CHROMATOGRAPH
Sulphate	INORG-121-6005	SM 4110 B	ION CHROMATOGRAPH
Alkalinity	INOR-121-6001	SM 2320 B	
True Color	INOR-121-6008	SM 2120 B	LACHAT FIA
Turbidity	INOR-121-6022	SM 2130 B	NEPHELOMETER
Electrical Conductivity	INOR-121-6001	SM 2510 B	PC TITRATE
Nitrate + Nitrite as N	INORG-121-6005	SM 4110 B	CALCULATION
Nitrate as N	INORG-121-6005	SM 4110 B	ION CHROMATOGRAPH
Nitrite as N	INORG-121-6005	SM 4110 B	ION CHROMATOGRAPH
Ammonia as N	INOR-121-6047	SM 4500-NH3 H	COLORIMETER
Total Organic Carbon	INOR-121-6026	SM 5310 B	TOC ANALYZER
Ortho-Phosphate as P	INOR-121-6012	SM 4500-P G	COLORIMETER
Dissolved Sodium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Potassium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Calcium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Magnesium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Bicarb. Alkalinity (as CaCO3)	INORG-121-6001	SM 2320 B	PC TITRATE
Carb. Alkalinity (as CaCO3)	INORG-121-6001	SM 2320 B	PC TITRATE
Hydroxide	INORG-121-6001	SM 2320 B	PC-TITRATE
Calculated TDS	CALCULATION	SM 1030E	CALCULATION
Hardness	CALCULATION	SM 2340B	CALCULATION
Langelier Index (@20C)	CALCULATION	CALCULATION	CALCULATION
Langelier Index (@ 4C)	CALCULATION	CALCULATION	CALCULATION
Saturation pH (@ 20C)	CALCULATION	CALCULATION	CALCULATION
Saturation pH (@ 4C)	CALCULATION	CALCULATION	CALCULATION
Anion Sum	CALCULATION	SM 1030E	CALCULATION
Cation sum	CALCULATION	SM 1030E	CALCULATION
% Difference/ Ion Balance	CALCULATION	SM 1030E	CALCULATION
Dissolved Aluminum	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Antimony	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Arsenic	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Barium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Beryllium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Bismuth	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Boron	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Cadmium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS

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Method Summary

CLIENT NAME: WSP CANADA INC.

AGAT WORK ORDER: 22X859481

PROJECT: 191-03686

ATTENTION TO: Molly Noseworthy

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Dissolved Chromium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Cobalt	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Copper	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Iron	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Lead	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Manganese	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Molybdenum	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Nickel	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Phosphorus	MET-121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Selenium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Silver	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Strontium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Thallium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Tin	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Titanium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Uranium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Vanadium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Zinc	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS

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Chain of Custody Record

Laboratory Use Only
Arrival Condition: ☐ Good ☐ Poor (see notes)
Arrival Temperature: ~~9.2~~ 9.9, 10.9.1
Hold Time:
AGAT Job Number: 22X859481
Notes:
'22 FEB 1 4:39 PM

Report Information
Company: WSP
Contact: Molly Noseworthy
Address: 1 Spectacle Lake Dr
Phone: 902 943 0022 Fax:
Client Project #: 191-03686
AGAT Quotation: WSP 20
Please Note: If quotation number is not provided client will be billed full price for analysis.

Report Information (Please print):
1. Name: Molly Noseworthy
Email: molly.noseworthy@wsp.com
2. Name:
Email:

Report Format
☐ Single Sample per page
☐ Multiple Samples per page
☐ Excel Format Included
☐ Export

Turnaround Time Required (TAT)
Regular TAT ~~☑~~ 5 to 7 working days
Rush TAT ☐ Same day ☐ 1 day ☐ 2 days ☐ 3 days
Date Required:

Regulatory Requirements (Check):
☐ List Guidelines on Report ☐ Do not list Guidelines on Report
☐ PIRI
☐ Tier 1 ☐ Res ☐ Pot ☐ Coarse
☐ Tier 2 ☐ Com ☐ N/Pot ☐ Fine
☐ Gas ☐ Fuel ☐ Lube
☐ CCME ☐ CDWQ
☐ Industrial ☐ NSEQS-Cont Sites
☐ Commercial ☐ HRM 101
☐ Res/Park ☐ Storm Water
☐ Agricultural ☐ Waste Water
☐ FWAL
☐ Sediment ☐ Other

Drinking Water Sample: ☐ Yes ☐ No **Salt Water Sample** ☐ Yes ☐ No
Reg. No.:

Invoice To Same Yes ~~☑~~ / No ☐
Company:
Contact:
Address:
Phone: Fax:
PO/Credit Card#:

Sample Identification	Date/Time Sampled	Sample Matrix	# Containers	Comments – Site/Sample Info. Sample Containment	Field Filtered/Preserved	Standard Water Analysis	Metals: ☐ Total ☐ Diss ☐ Available	Mercury	☐ BOD ☐ CBOD	pH	☐ TSS ☐ TDS ☐ VSS	TKN	Total Phosphorus	Phenols	Tier 1: TPH/BTEX (PIRI) ☐ low level	Tier 2: TPH/BTEX Fractionation	CCME-CWS TPH/BTEX	VOC	THM	HAA	PAH	PCB	TC + EC ☐ P/A ☐ MPN ☐ MF	☐ HPC ☐ Pseudomonas	Fecal Coliform ☐ MPN ☐ MF	Other:	Other:	Hazardous (Y/N)
PW21-01 S2	01/02/22 13:15	GW	3	LAB FILTER METALS		X	X																				

Samples Relinquished By (Print Name): M. Noseworthy
Samples Relinquished By (Sign):
Date/Time: 01/02/2022 4:37
Samples Received By (Print Name):
Samples Received By (Sign):
Date/Time:

Pink Copy - Client
Yellow Copy - AGAT
White Copy- AGAT

Page 1 of 1
N°: 75231

Document ID: DIV-133-1502.002
Date revised: May 19, 2016

AGAT Laboratories

11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
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CLIENT NAME: WSP CANADA INC.
1 SPECTACLE LAKE DRIVE
DARTMOUTH , NS B3B1X7
(902) 835-9955
ATTENTION TO: Molly Noseworthy
PROJECT: 191-03686
AGAT WORK ORDER: 22X861099
WATER ANALYSIS REVIEWED BY: Sara Knox, Data Reviewer
DATE REPORTED: Feb 16, 2022
PAGES (INCLUDING COVER): 9
VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (902) 468-8718

*Notes

Disclaimer:

- All work conducted herein has been done using accepted standard protocols, and generally accepted practices and methods. AGAT test methods may incorporate modifications from the specified reference methods to improve performance.
- All samples will be disposed of within 30 days after receipt unless a Long Term Storage Agreement is signed and returned. Some specialty analysis may be exempt, please contact your Client Project Manager for details.
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- The test results reported herewith relate only to the samples as received by the laboratory.
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- All reportable information as specified by ISO/IEC 17025:2017 is available from AGAT Laboratories upon request.

Member of: Association of Professional Engineers and Geoscientists of Alberta (APEGA)
Western Enviro-Agricultural Laboratory Association (WEALA)
Environmental Services Association of Alberta (ESAA)

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Certificate of Analysis

AGAT WORK ORDER: 22X861099

PROJECT: 191-03686

CLIENT NAME: WSP CANADA INC.

ATTENTION TO: Molly Noseworthy

SAMPLING SITE:

SAMPLED BY:

Standard Water Analysis + Dissolved Metals (Lab Filtered)

DATE RECEIVED: 2022-02-07

DATE REPORTED: 2022-02-16

		SAMPLE DESCRIPTION:		PW21-01 S3
		SAMPLE TYPE:		Water
		DATE SAMPLED:		2022-02-06
Parameter	Unit	G / S	RDL	3487335
pH				7.85
Reactive Silica as SiO2	mg/L		0.5	9.8
Chloride	mg/L		1	28
Fluoride	mg/L		0.12	0.41
Sulphate	mg/L		20	847
Alkalinity	mg/L		5	113
True Color	TCU		5.00	<5.00
Turbidity	NTU		0.5	12.4
Electrical Conductivity	umho/cm		1	2070
Nitrate + Nitrite as N	mg/L		0.05	<0.05
Nitrate as N	mg/L		0.05	<0.05
Nitrite as N	mg/L		0.05	<0.05
Ammonia as N	mg/L		0.03	<0.03
Total Organic Carbon	mg/L		0.5	1.6
Ortho-Phosphate as P	mg/L		0.01	0.07
Dissolved Sodium	mg/L		0.5	37.8
Dissolved Potassium	mg/L		0.1	<0.1
Dissolved Calcium	mg/L		0.6	403
Dissolved Magnesium	mg/L		0.8	27.8
Bicarb. Alkalinity (as CaCO3)	mg/L		5	113
Carb. Alkalinity (as CaCO3)	mg/L		10	<10
Hydroxide	mg/L		5	<5
Calculated TDS	mg/L		1	1410
Hardness	mg/L			1120
Langelier Index (@20C)	NA			0.81
Langelier Index (@ 4C)	NA			0.49
Saturation pH (@ 20C)	NA			7.04
Saturation pH (@ 4C)	NA			7.36
Anion Sum	me/L			20.7
Cation sum	me/L			24.1

Certified By: Lara Knox

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ATTENTION TO: Molly Noseworthy

SAMPLING SITE:

SAMPLED BY:

Standard Water Analysis + Dissolved Metals (Lab Filtered)

DATE RECEIVED: 2022-02-07

DATE REPORTED: 2022-02-16

		SAMPLE DESCRIPTION:		PW21-01 S3
		SAMPLE TYPE:		Water
		DATE SAMPLED:		2022-02-06
Parameter	Unit	G / S	RDL	3487335
% Difference/ Ion Balance	%			7.6
Dissolved Aluminum	ug/L		5	<5
Dissolved Antimony	ug/L		2	<2
Dissolved Arsenic	ug/L		2	<2
Dissolved Barium	ug/L		5	15
Dissolved Beryllium	ug/L		2	<2
Dissolved Bismuth	ug/L		2	<2
Dissolved Boron	ug/L		5	118
Dissolved Cadmium	ug/L		0.017	<0.017
Dissolved Chromium	ug/L		1	2
Dissolved Cobalt	ug/L		1	<1
Dissolved Copper	ug/L		2	<2
Dissolved Iron	ug/L		50	77
Dissolved Lead	ug/L		0.5	<0.5
Dissolved Manganese	ug/L		2	66
Dissolved Molybdenum	ug/L		2	2
Dissolved Nickel	ug/L		2	11
Dissolved Phosphorus	mg/L		1.0	<1.0
Dissolved Selenium	ug/L		1	2
Dissolved Silver	ug/L		0.1	<0.1
Dissolved Strontium	ug/L		16	4610
Dissolved Thallium	ug/L		0.1	<0.1
Dissolved Tin	ug/L		2	<2
Dissolved Titanium	ug/L		2	<2
Dissolved Uranium	ug/L		0.1	0.2
Dissolved Vanadium	ug/L		2	<2
Dissolved Zinc	ug/L		5	6

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Certificate of Analysis

AGAT WORK ORDER: 22X861099

PROJECT: 191-03686

CLIENT NAME: WSP CANADA INC.

ATTENTION TO: Molly Noseworthy

SAMPLING SITE:

SAMPLED BY:

Standard Water Analysis + Dissolved Metals (Lab Filtered)

DATE RECEIVED: 2022-02-07

DATE REPORTED: 2022-02-16

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

3487335 Metals analysis completed on a lab filtered sample.
% Difference / Ion Balance, Hardness, Langelier Index, Nitrate + Nitrite, Hydroxide and Saturation pH are calculated parameters. The calculated parameters are non-accredited. The component parameters of the calculations are accredited.

Analysis performed at AGAT Halifax (unless marked by *)

Certified By: Lara Knox

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Quality Assurance

CLIENT NAME: WSP CANADA INC.
PROJECT: 191-03686
SAMPLING SITE:

AGAT WORK ORDER: 22X861099
ATTENTION TO: Molly Noseworthy
SAMPLED BY:

Water Analysis

RPT Date: Feb 16, 2022			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Standard Water Analysis + Dissolved Metals (Lab Filtered)															
pH	3487705		7.83	7.89	0.8%	<	102%	80%	120%	NA	80%	120%	NA	80%	120%
Reactive Silica as SiO2	3459348		11.0	11.0	0.4%	< 0.5	114%	80%	120%	96%	80%	120%	95%	80%	120%
Chloride	3487705		6	6	0.9%	< 1	91%	80%	120%	NA	80%	120%	93%	70%	130%
Fluoride	3487705		0.15	0.17	NA	< 0.12	104%	80%	120%	NA	80%	120%	102%	70%	130%
Sulphate	3490964		7	4	NA	< 2	103%	80%	120%	NA	80%	120%	98%	70%	130%
Alkalinity	3487705		167	167	0.1%	< 5	88%	80%	120%	NA			NA		
True Color	3476254		18.8	17.7	NA	< 5	95%	80%	120%	96%	80%	120%	NA		
Turbidity	3479973		<0.5	<0.5	NA	< 0.5	105%	80%	120%	NA			NA		
Electrical Conductivity	3487705		348	349	0.3%	< 1	101%	90%	110%	NA			NA		
Nitrate as N	3487705		<0.05	<0.05	NA	< 0.05	99%	80%	120%	NA	80%	120%	88%	70%	130%
Nitrite as N	3487705		<0.05	<0.05	NA	< 0.05	88%	80%	120%	NA	80%	120%	91%	70%	130%
Ammonia as N	3476254		<0.03	<0.03	NA	< 0.03	106%	80%	120%	99%	80%	120%	113%	70%	130%
Total Organic Carbon	1347997		3.7	3.8	2.7%	< 0.5		80%	120%		80%	120%		80%	120%
Ortho-Phosphate as P	3459348		0.14	0.14	1.2%	< 0.01	116%	80%	120%	111%	80%	120%	100%	80%	120%
Dissolved Sodium	3487335	3487335	37.8	38.7	2.4%	< 0.1	100%	80%	120%	108%	80%	120%	NA	70%	130%
Dissolved Potassium	3487335	3487335	<0.1	<0.1	NA	< 0.1	102%	80%	120%	99%	80%	120%	NA	70%	130%
Dissolved Calcium	3487335	3487335	403	420	4.1%	< 0.1	98%	80%	120%	102%	80%	120%	NA	70%	130%
Dissolved Magnesium	3487335	3487335	27.8	30.1	8.1%	< 0.1	105%	80%	120%	120%	80%	120%	NA	70%	130%
Bicarb. Alkalinity (as CaCO3)	3487705		167	167	0.1%	< 5	NA	80%	120%	NA	80%	120%	NA	80%	120%
Carb. Alkalinity (as CaCO3)	3487705		<10	<10	NA	< 10	NA	80%	120%	NA	80%	120%	NA	80%	120%
Hydroxide	3487705		<5	<5	NA	< 5	NA	80%	120%	NA	80%	120%	NA	80%	120%
Dissolved Aluminum	3487335	3487335	<5	<5	NA	< 5	99%	80%	120%	110%	80%	120%	74%	70%	130%
Dissolved Antimony	3487335	3487335	<2	<2	NA	< 2	80%	80%	120%	NA	80%	120%	121%	70%	130%
Dissolved Arsenic	3487335	3487335	<2	<2	NA	< 2	95%	80%	120%	102%	80%	120%	120%	70%	130%
Dissolved Barium	3487335	3487335	15	15	NA	< 5	95%	80%	120%	102%	80%	120%	86%	70%	130%
Dissolved Beryllium	3487335	3487335	<2	<2	NA	< 2	97%	80%	120%	108%	80%	120%	84%	70%	130%
Dissolved Bismuth	3487335	3487335	<2	<2	NA	< 2	87%	80%	120%	106%	80%	120%	NA	70%	130%
Dissolved Boron	3487335	3487335	118	121	2.4%	< 5	96%	80%	120%	105%	80%	120%	NA	70%	130%
Dissolved Cadmium	3487335	3487335	<0.017	<0.017	NA	< 0.017	97%	80%	120%	105%	80%	120%	96%	70%	130%
Dissolved Chromium	3487335	3487335	2	2	NA	< 1	98%	80%	120%	105%	80%	120%	98%	70%	130%
Dissolved Cobalt	3487335	3487335	<1	<1	NA	< 1	99%	80%	120%	108%	80%	120%	86%	70%	130%
Dissolved Copper	3487335	3487335	<2	<2	NA	< 2	99%	80%	120%	110%	80%	120%	84%	70%	130%
Dissolved Iron	3487335	3487335	77	141	NA	< 50	95%	80%	120%	103%	80%	120%	NA	70%	130%
Dissolved Lead	3487335	3487335	<0.5	<0.5	NA	< 0.5	96%	80%	120%	104%	80%	120%	84%	70%	130%
Dissolved Manganese	3487335	3487335	66	67	2.2%	< 2	97%	80%	120%	107%	80%	120%	NA	70%	130%
Dissolved Molybdenum	3487335	3487335	2	2	NA	< 2	91%	80%	120%	104%	80%	120%	NA	70%	130%
Dissolved Nickel	3487335	3487335	11	8	NA	< 2	99%	80%	120%	113%	80%	120%	NA	70%	130%
Dissolved Phosphorus	3487335	3487335	<0.02	<0.02	NA	< 0.02	99%	80%	120%	96%	80%	120%	NA	70%	130%
Dissolved Selenium	3487335	3487335	2	2	NA	< 1	103%	80%	120%	89%	80%	120%	NA	70%	130%

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Quality Assurance

CLIENT NAME: WSP CANADA INC.
AGAT WORK ORDER: 22X861099
PROJECT: 191-03686
ATTENTION TO: Molly Noseworthy
SAMPLING SITE:
SAMPLED BY:

Water Analysis (Continued)

RPT Date: Feb 16, 2022			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Dissolved Silver	3487335	3487335	<0.1	<0.1	NA	< 0.1	NA	80%	120%	90%	80%	120%	NA	70%	130%
Dissolved Strontium	3487335	3487335	4610	4740	2.8%	< 5	90%	80%	120%	99%	80%	120%	NA	70%	130%
Dissolved Thallium	3487335	3487335	<0.1	<0.1	NA	< 0.1	97%	80%	120%	104%	80%	120%	98%	70%	130%
Dissolved Tin	3487335	3487335	<2	<2	NA	< 2	91%	80%	120%	103%	80%	120%	88%	70%	130%
Dissolved Titanium	3487335	3487335	<2	<2	NA	< 2	100%	80%	120%	108%	80%	120%	72%	70%	130%
Dissolved Uranium	3487335	3487335	0.2	0.2	NA	< 0.1	97%	80%	120%	105%	80%	120%	89%	70%	130%
Dissolved Vanadium	3487335	3487335	<2	<2	NA	< 2	96%	80%	120%	103%	80%	120%	91%	70%	130%
Dissolved Zinc	3487335	3487335	6	6	NA	< 5	96%	80%	120%	104%	80%	120%	97%	70%	130%

Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

Certified By: Lara Knox

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Method Summary

CLIENT NAME: WSP CANADA INC.

AGAT WORK ORDER: 22X861099

PROJECT: 191-03686

ATTENTION TO: Molly Noseworthy

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis			
pH	INOR-121-6001	SM 4500 H+B	PC TITRATE
Reactive Silica as SiO2	INOR-121-6027	SM 4500-SiO2 F	COLORIMETER
Chloride	INORG-121-6005	SM 4110 B	ION CHROMATOGRAPH
Fluoride	INORG-121-6005	SM 4110 B	ION CHROMATOGRAPH
Sulphate	INORG-121-6005	SM 4110 B	ION CHROMATOGRAPH
Alkalinity	INOR-121-6001	SM 2320 B	
True Color	INOR-121-6008	SM 2120 B	LACHAT FIA
Turbidity	INOR-121-6022	SM 2130 B	NEPHELOMETER
Electrical Conductivity	INOR-121-6001	SM 2510 B	PC TITRATE
Nitrate + Nitrite as N	INORG-121-6005	SM 4110 B	CALCULATION
Nitrate as N	INORG-121-6005	SM 4110 B	ION CHROMATOGRAPH
Nitrite as N	INORG-121-6005	SM 4110 B	ION CHROMATOGRAPH
Ammonia as N	INOR-121-6047	SM 4500-NH3 H	COLORIMETER
Total Organic Carbon	INOR-121-6026	SM 5310 B	TOC ANALYZER
Ortho-Phosphate as P	INOR-121-6012	SM 4500-P G	COLORIMETER
Dissolved Sodium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Potassium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Calcium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Magnesium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Bicarb. Alkalinity (as CaCO3)	INORG-121-6001	SM 2320 B	PC TITRATE
Carb. Alkalinity (as CaCO3)	INORG-121-6001	SM 2320 B	PC TITRATE
Hydroxide	INORG-121-6001	SM 2320 B	PC-TITRATE
Calculated TDS	CALCULATION	SM 1030E	CALCULATION
Hardness	CALCULATION	SM 2340B	CALCULATION
Langelier Index (@20C)	CALCULATION	CALCULATION	CALCULATION
Langelier Index (@ 4C)	CALCULATION	CALCULATION	CALCULATION
Saturation pH (@ 20C)	CALCULATION	CALCULATION	CALCULATION
Saturation pH (@ 4C)	CALCULATION	CALCULATION	CALCULATION
Anion Sum	CALCULATION	SM 1030E	CALCULATION
Cation sum	CALCULATION	SM 1030E	CALCULATION
% Difference/ Ion Balance	CALCULATION	SM 1030E	CALCULATION
Dissolved Aluminum	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Antimony	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Arsenic	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Barium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Beryllium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Bismuth	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Boron	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Cadmium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS

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Method Summary

CLIENT NAME: WSP CANADA INC.

AGAT WORK ORDER: 22X861099

PROJECT: 191-03686

ATTENTION TO: Molly Noseworthy

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Dissolved Chromium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Cobalt	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Copper	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Iron	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Lead	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Manganese	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Molybdenum	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Nickel	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Phosphorus	MET-121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Selenium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Silver	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Strontium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Thallium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Tin	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Titanium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Uranium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Vanadium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Zinc	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS

Results relate only to the items tested. Results apply to samples as received.

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Chain of Custody Record

Laboratory Use Only 7.9, 7.5, 8.1
Arrival Condition: ☐ Good ☐ Poor (see notes)
Arrival Temperature: ~~8.6~~, ~~8.1~~, ~~7.7~~
Hold Time:
AGAT Job Number: 22X861099
Notes: Drop-off

Report Information

Company: WSP
Contact: molly.noseworthy@wsp.com
Address: 1 Spectacle Lake Dr
Phone: 902 943 0022 Fax:
Client Project #: 191-03686
AGAT Quotation: WSP-SO
Please Note: If quotation number is not provided client will be billed full price for analysis.

Report Information (Please print):

1. Name: Molly Noseworthy
   Email: molly.noseworthy@wsp.com
2. Name:
   Email:

Report Format

☐ Single Sample per page
☐ Multiple Samples per page
☐ Excel Format Included
☐ Export

Turnaround Time Required (TAT)

Regular TAT ☑ 5 to 7 working days

Rush TAT ☐ Same day ☐ 1 day ☐ 2 days ☐ 3 days

22 FEB 7 12:03 PM

Date Required:

Invoice To

Same Yes ☑ / No ☐

Company:
Contact:
Address:
Phone: Fax:
PO/Credit Card#:

Regulatory Requirements (Check):

☐ List Guidelines on Report ☐ Do not list Guidelines on Report

☐ PIRI
☐ Tier 1 ☐ Res ☐ Pot ☐ Coarse
☐ Tier 2 ☐ Com ☐ N/Pot ☐ Fine
☐ Gas ☐ Fuel ☐ Lube

☐ CCME
☐ Industrial
☐ Commercial
☐ Res/Park
☐ Agricultural
☐ FWAL
☐ Sediment

☐ CDWQ
☐ NSEQS-Cont Sites

☐ HRM 101
☐ Storm Water
☐ Waste Water

☐ Other

Drinking Water Sample: ☐ Yes ☐ No **Salt Water Sample** ☐ Yes ☐ No
Reg. No.:

Sample Identification	Date/Time Sampled	Sample Matrix	# Containers	Comments – Site/Sample Info. Sample Containment
PW21-01 S3	06/02/2022	GW	3	FILTER & PRS METALS PLEASE

Field Filtered/Preserved	Standard Water Analysis	Metals: ☐ Total ☐ Diss ☐ Available	Mercury	☐ BOD ☐ CBOD	pH	☐ TSS ☐ TDS ☐ VSS	TKN	Total Phosphorus	Phenols	Tier 1: TPH/BTEX (PIRI) ☐ low level	Tier 2: TPH/BTEX Fractionation	CCME-CWS TPH/BTEX	VOC	THM	HAA	PAH	PCB	TC + EC ☐ P/A ☐ MPN ☐ MF	☐ HPC ☐ Pseudomonas	Fecal Coliform ☐ MPN ☐ MF	Other:	Other:	Hazardous (Y/N)
	X	X																				

Samples Relinquished By (Print Name):	Date/Time	Samples Received By (Print Name):	Date/Time
MOLLY NOSEWORTHY	07/02/2022		
Samples Relinquished By (Sign):	Date/Time	Samples Received By (Sign):	Date/Time
M Noseworthy	09/02/22		

Pink Copy - Client
Yellow Copy - AGAT
White Copy- AGAT

Page 1 of

N°: 75249

Document ID: DIV-133-1502.002

Date revised: May 19, 2016

AGAT Laboratories

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http://www.agatlabs.com

CLIENT NAME: WSP CANADA INC.
1 SPECTACLE LAKE DRIVE
DARTMOUTH , NS B3B1X7
(902) 835-9955
ATTENTION TO: Molly Noseworthy
PROJECT: 191-03686
AGAT WORK ORDER: 22X861663
MICROBIOLOGY ANALYSIS REVIEWED BY: Sara Knox, Data Reviewer
DATE REPORTED: Feb 15, 2022
PAGES (INCLUDING COVER): 4
VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (902) 468-8718

*Notes

Disclaimer:

- All work conducted herein has been done using accepted standard protocols, and generally accepted practices and methods. AGAT test methods may incorporate modifications from the specified reference methods to improve performance.
- All samples will be disposed of within 30 days after receipt unless a Long Term Storage Agreement is signed and returned. Some specialty analysis may be exempt, please contact your Client Project Manager for details.
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- Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, warranties of merchantability, fitness for a particular purpose, or non-infringement. AGAT assumes no responsibility for any errors or omissions in the guidelines contained in this document.
- All reportable information as specified by ISO/IEC 17025:2017 is available from AGAT Laboratories upon request.

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Certificate of Analysis

AGAT WORK ORDER: 22X861663

PROJECT: 191-03686

CLIENT NAME: WSP CANADA INC.

ATTENTION TO: Molly Noseworthy

SAMPLING SITE:

SAMPLED BY:

Total Coliforms and E.coli Membrane Filtration

DATE RECEIVED: 2022-02-08

DATE REPORTED: 2022-02-15

				SAMPLE DESCRIPTION:	PW21-01 S4
				SAMPLE TYPE:	Water
				DATE SAMPLED:	2022-02-08 14:15
Parameter	Unit	G / S	RDL	3492013	
Total Coliforms (MF)	CFU/100 mL	1	1	<1	
E. Coli (MF)	CFU/100 mL	1	1	<1	

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to Canadian Drinking Water Quality - updated 2021-03
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

Analysis performed at AGAT Halifax (unless marked by *)

Certified By: Lara Knox

Results relate only to the items tested. Results apply to samples as received.

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Method Summary

CLIENT NAME: WSP CANADA INC.

AGAT WORK ORDER: 22X861663

PROJECT: 191-03686

ATTENTION TO: Molly Noseworthy

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Microbiology Analysis			
Total Coliforms (MF)	MIC-121-7002	Sm 9222 H	MF/INCUBATOR
E. Coli (MF)	MIC-121-7002	SM 9222 H	MF/INCUBATOR

Results relate only to the items tested. Results apply to samples as received.

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Chain of Custody Record

Laboratory Use Only
Arrival Condition: ☐ Good ☐ Poor (see notes)
Arrival Temperature: 2.7, 4.9
Hold Time:
AGAT Job Number: 22x861663
Notes: Drop -o/f
Extra bottle logged as "extra".

Report Information
Company: WSP
Contact: Molly Noseworthy
Address: 1 Spectacle Lake Dr
Phone: 9029430022 Fax:
Client Project #: 191-03686
AGAT Quotation: WSP-SO 2022
Please Note: If quotation number is not provided client will be billed full price for analysis.

Report Information (Please print):
1. Name: Molly Noseworthy
Email: molly.noseworthy@wsp.com
2. Name:
Email:

Report Format
☐ Single Sample per page
☐ Multiple Samples per page
☐ Excel Format Included
☐ Export

Turnaround Time Required (TAT)
22 FEB 8 3:59PM
Regular TAT ☒ 5 to 7 working days
Rush TAT ☐ Same day ☐ 1 day ☐ 2 days ☐ 3 days
Date Required:

Regulatory Requirements (Check):
☐ List Guidelines on Report ☐ Do not list Guidelines on Report
☐ PIRI
☐ Tier 1 ☐ Res ☐ Pot ☐ Coarse
☐ Tier 2 ☐ Com ☐ N/Pot ☐ Fine
☐ Gas ☐ Fuel ☐ Lube
☐ CCME ☐ CDWQ
☐ Industrial ☐ NSEQS-Cont Sites
☐ Commercial ☐ HRM 101
☐ Res/Park ☐ Storm Water
☐ Agricultural ☐ Waste Water
☐ FWAL
☐ Sediment ☐ Other

Drinking Water Sample: ☐ Yes ☐ No **Salt Water Sample** ☐ Yes ☐ No
Reg. No.:

Invoice To Same Yes ☒ / No ☐
Company:
Contact:
Address:
Phone: Fax:
PO/Credit Card#:

Sample Identification	Date/Time Sampled	Sample Matrix	# Containers	Comments – Site/Sample Info. Sample Containment	Field Filtered/Preserved	Standard Water Analysis	Metals: ☐ Total ☐ Diss ☐ Available	Mercury	☐ BOD ☐ CBOD	pH	☐ TSS ☐ TDS ☐ VSS	TKN	Total Phosphorus	Phenols	Tier 1: TPH/BTEX (PIRI) ☐ low level	Tier 2: TPH/BTEX Fractionation	CCME-CWS TPH/BTEX	VOC	THM	HAA	PAH	PCB	TC + EC ☐ P/A ☐ MPN ☐ MF	☐ HPC ☐ Pseudomonas	Fecal Coliform ☐ MPN ☐ MF	Other:	Other:	Hazardous (Y/N)
MW21-01 S4	08/02/22 2:15	GW	2	Bacteria Analysis Extra Bottle just in case. Can be tossed.																			X					

Samples Relinquished By (Print Name):	Date/Time	Samples Received By (Print Name):	Date/Time
MOLLY NOSEWORTHY	08/02/2022		
Samples Relinquished By (Sign):	**Date/Time**	**Samples Received By (Sign):**	**Date/Time**
M. Noseworthy	08/02/2022	Marina Agee	

Pink Copy - Client
Yellow Copy - AGAT
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Page 1 of 1
N°: 71588

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CLIENT NAME: WSP CANADA INC.
1 SPECTACLE LAKE DRIVE
DARTMOUTH , NS B3B1X7
(902) 835-9955
ATTENTION TO: Molly Noseworthy
PROJECT: 191-03686
AGAT WORK ORDER: 22X862431
MICROBIOLOGY ANALYSIS REVIEWED BY: Sara Knox, Data Reviewer
WATER ANALYSIS REVIEWED BY: Sara Knox, Data Reviewer
DATE REPORTED: Feb 22, 2022
PAGES (INCLUDING COVER): 16
VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (902) 468-8718

*Notes

Disclaimer:

- *All work conducted herein has been done using accepted standard protocols, and generally accepted practices and methods. AGAT test methods may incorporate modifications from the specified reference methods to improve performance.*
- *All samples will be disposed of within 30 days after receipt unless a Long Term Storage Agreement is signed and returned. Some specialty analysis may be exempt, please contact your Client Project Manager for details.*
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Certificate of Analysis

AGAT WORK ORDER: 22X862431

PROJECT: 191-03686

CLIENT NAME: WSP CANADA INC.

ATTENTION TO: Molly Noseworthy

SAMPLING SITE:

SAMPLED BY:

Total Coliforms and E.coli Membrane Filtration

DATE RECEIVED: 2022-02-10

DATE REPORTED: 2022-02-22

		SAMPLE DESCRIPTION:		PW21-01 S6	PW21-01 S7
		SAMPLE TYPE:		Water	Water
		DATE SAMPLED:		2022-02-10 10:30	2022-02-10 10:30
Parameter	**Unit**	**G / S**	**RDL**	**3500777**	**3500778**
Total Coliforms (MF)	CFU/100 mL	1	1	<1	<1
E. Coli (MF)	CFU/100 mL	1	1	<1	<1

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to Canadian Drinking Water Quality - updated 2021-03
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

Analysis performed at AGAT Halifax (unless marked by *)

Certified By: Lara Knox

Results relate only to the items tested. Results apply to samples as received.

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AGAT WORK ORDER: 22X862431

PROJECT: 191-03686

CLIENT NAME: WSP CANADA INC.

ATTENTION TO: Molly Noseworthy

SAMPLING SITE:

SAMPLED BY:

Standard Water Analysis + Dissolved Metals (Lab Filtered)

DATE RECEIVED: 2022-02-10

DATE REPORTED: 2022-02-22

		SAMPLE DESCRIPTION:		PW21-01 S6	PW21-01 S7
		SAMPLE TYPE:		Water	Water
		DATE SAMPLED:		2022-02-10 10:30	2022-02-10 10:30
Parameter	Unit	G / S	RDL	3500777	3500778
pH				7.70	7.67
Reactive Silica as SiO2	mg/L		0.5	7.1	7.1
Chloride	mg/L		1	34	34
Fluoride	mg/L		0.12	0.19	0.17
Sulphate	mg/L		40	800	803
Alkalinity	mg/L		5	114	115
True Color	TCU		5.00	<5.00	<5.00
Turbidity	NTU		0.5	10.7	10.5
Electrical Conductivity	umho/cm		1	2060	2030
Nitrate + Nitrite as N	mg/L		0.05	<0.05	<0.05
Nitrate as N	mg/L		0.05	<0.05	<0.05
Nitrite as N	mg/L		0.05	<0.05	<0.05
Ammonia as N	mg/L		0.03	0.14	<0.03
Total Organic Carbon	mg/L		0.5	1.1	1.2
Ortho-Phosphate as P	mg/L		0.01	<0.01	<0.01
Dissolved Sodium	mg/L		0.5	36.8	42.6
Dissolved Potassium	mg/L		0.1	1.5	1.6
Dissolved Calcium	mg/L		0.6	457	488
Dissolved Magnesium	mg/L		0.8	30.5	21.3
Bicarb. Alkalinity (as CaCO3)	mg/L		5	114	115
Carb. Alkalinity (as CaCO3)	mg/L		10	<10	<10
Hydroxide	mg/L		5	<5	<5
Calculated TDS	mg/L		1	1430	1460
Hardness	mg/L			1270	1310
Langelier Index (@20C)	NA			0.71	0.72
Langelier Index (@ 4C)	NA			0.39	0.40
Saturation pH (@ 20C)	NA			6.99	6.95
Saturation pH (@ 4C)	NA			7.31	7.27
Anion Sum	me/L			19.9	20.0

Certified By: Lara Knox

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Certificate of Analysis

AGAT WORK ORDER: 22X862431

PROJECT: 191-03686

CLIENT NAME: WSP CANADA INC.

ATTENTION TO: Molly Noseworthy

SAMPLING SITE:

SAMPLED BY:

Standard Water Analysis + Dissolved Metals (Lab Filtered)

DATE RECEIVED: 2022-02-10

DATE REPORTED: 2022-02-22

		SAMPLE DESCRIPTION:		PW21-01 S6	PW21-01 S7
		SAMPLE TYPE:		Water	Water
		DATE SAMPLED:		2022-02-10 10:30	2022-02-10 10:30
Parameter	**Unit**	**G / S**	**RDL**	**3500777**	**3500778**
Cation sum	me/L			27.0	28.0
% Difference/ Ion Balance	%			15.2	16.8
Dissolved Aluminum	ug/L		5	<5	<5
Dissolved Antimony	ug/L		2	<2	<2
Dissolved Arsenic	ug/L		2	<2	<2
Dissolved Barium	ug/L		5	13	15
Dissolved Beryllium	ug/L		2	<2	<2
Dissolved Bismuth	ug/L		2	<2	<2
Dissolved Boron	ug/L		5	124	127
Dissolved Cadmium	ug/L		0.017	<0.017	<0.017
Dissolved Chromium	ug/L		1	2	2
Dissolved Cobalt	ug/L		1	<1	<1
Dissolved Copper	ug/L		2	<2	<2
Dissolved Iron	ug/L		50	59	62
Dissolved Lead	ug/L		0.5	<0.5	<0.5
Dissolved Manganese	ug/L		2	67	68
Dissolved Molybdenum	ug/L		2	2	2
Dissolved Nickel	ug/L		2	15	7
Dissolved Phosphorus	mg/L		0.02	<0.02	<0.02
Dissolved Selenium	ug/L		1	2	1
Dissolved Silver	ug/L		0.1	<0.1	<0.1
Dissolved Strontium	ug/L		16	4610	4860
Dissolved Thallium	ug/L		0.1	<0.1	<0.1
Dissolved Tin	ug/L		2	<2	<2
Dissolved Titanium	ug/L		2	<2	<2
Dissolved Uranium	ug/L		0.1	0.2	0.3
Dissolved Vanadium	ug/L		2	<2	<2
Dissolved Zinc	ug/L		5	7	7

Certified By: Lara Knox

Results relate only to the items tested. Results apply to samples as received.

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Certificate of Analysis

AGAT WORK ORDER: 22X862431

PROJECT: 191-03686

CLIENT NAME: WSP CANADA INC.

ATTENTION TO: Molly Noseworthy

SAMPLING SITE:

SAMPLED BY:

Standard Water Analysis + Dissolved Metals (Lab Filtered)

DATE RECEIVED: 2022-02-10

DATE REPORTED: 2022-02-22

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

3500777-3500778 Metals analysis completed on a lab filtered sample.
% Difference / Ion Balance, Hardness, Langelier Index, Nitrate + Nitrite, Hydroxide and Saturation pH are calculated parameters. The calculated parameters are non-accredited. The component parameters of the calculations are accredited. Ion Balance is biased high, contributing parameters have been confirmed.

Analysis performed at AGAT Halifax (unless marked by *)

Certified By: Lara Knox

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Certificate of Analysis

AGAT WORK ORDER: 22X862431

PROJECT: 191-03686

CLIENT NAME: WSP CANADA INC.

ATTENTION TO: Molly Noseworthy

SAMPLING SITE:

SAMPLED BY:

Standard Water Analysis + Total Metals

DATE RECEIVED: 2022-02-10

DATE REPORTED: 2022-02-22

				SAMPLE DESCRIPTION:	PW21-01 S5
				SAMPLE TYPE:	Water
				DATE SAMPLED:	2022-02-10 10:30
Parameter	Unit	G / S	RDL		3500775
pH					7.60
Reactive Silica as SiO2	mg/L		0.5		7.7
Chloride	mg/L		1		34
Fluoride	mg/L		0.12		0.49
Sulphate	mg/L		40		802
Alkalinity	mg/L		5		114
True Color	TCU		5.00		<5.00
Turbidity	NTU		0.5		7.0
Electrical Conductivity	umho/cm		1		2020
Nitrate + Nitrite as N	mg/L		0.05		<0.05
Nitrate as N	mg/L		0.05		<0.05
Nitrite as N	mg/L		0.05		<0.05
Ammonia as N	mg/L		0.03		<0.03
Total Organic Carbon	mg/L		0.5		0.9
Ortho-Phosphate as P	mg/L		0.01		<0.01
Total Sodium	mg/L		1		42
Total Potassium	mg/L		0.1		1.7
Total Calcium	mg/L		0.8		507
Total Magnesium	mg/L		0.8		22.3
Bicarb. Alkalinity (as CaCO3)	mg/L		5		114
Carb. Alkalinity (as CaCO3)	mg/L		10		<10
Hydroxide	mg/L		5		<5
Calculated TDS	mg/L		1		1480
Hardness	mg/L				1360
Langelier Index (@20C)	NA				0.66
Langelier Index (@ 4C)	NA				0.34
Saturation pH (@ 20C)	NA				6.94
Saturation pH (@ 4C)	NA				7.26
Anion Sum	me/L				19.9

Certified By: Lara Knox

Results relate only to the items tested. Results apply to samples as received.

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Certificate of Analysis

AGAT WORK ORDER: 22X862431

PROJECT: 191-03686

CLIENT NAME: WSP CANADA INC.

ATTENTION TO: Molly Noseworthy

SAMPLING SITE:

SAMPLED BY:

Standard Water Analysis + Total Metals

DATE RECEIVED: 2022-02-10

DATE REPORTED: 2022-02-22

		SAMPLE DESCRIPTION:		PW21-01 S5
		SAMPLE TYPE:		Water
		DATE SAMPLED:		2022-02-10 10:30
Parameter	**Unit**	**G / S**	**RDL**	**3500775**
Cation sum	me/L			29.1
% Difference/ Ion Balance	%			18.7
Total Aluminum	ug/L		5	<5
Total Antimony	ug/L		2	<2
Total Arsenic	ug/L		2	<2
Total Barium	ug/L		5	15
Total Beryllium	ug/L		2	<2
Total Bismuth	ug/L		2	<2
Total Boron	ug/L		5	137
Total Cadmium	ug/L		0.09	<0.09
Total Chromium	ug/L		1	<1
Total Cobalt	ug/L		1	<1
Total Copper	ug/L		1	<1
Total Iron	ug/L		50	1040
Total Lead	ug/L		0.5	<0.5
Total Manganese	ug/L		2	85
Total Molybdenum	ug/L		2	2
Total Nickel	ug/L		2	13
Total Phosphorous	mg/L		0.02	<0.02
Total Selenium	ug/L		1	2
Total Silver	ug/L		0.1	<0.1
Total Strontium	ug/L		60	4900
Total Thallium	ug/L		0.1	<0.1
Total Tin	ug/L		2	<2
Total Titanium	ug/L		2	<2
Total Uranium	ug/L		0.2	0.4
Total Vanadium	ug/L		2	<2
Total Zinc	ug/L		5	14

Certified By: Lara Knox

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Certificate of Analysis

AGAT WORK ORDER: 22X862431

PROJECT: 191-03686

CLIENT NAME: WSP CANADA INC.

ATTENTION TO: Molly Noseworthy

SAMPLING SITE:

SAMPLED BY:

Standard Water Analysis + Total Metals

DATE RECEIVED: 2022-02-10

DATE REPORTED: 2022-02-22

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

3500775 % Difference / Ion Balance, Hardness, Langelier Index, Nitrate + Nitrite, Hydroxide and Saturation pH are calculated parameters. The calculated parameters are non-accredited. The component parameters of the calculations are accredited. Ion Balance is biased high, contributing parameters have been confirmed.

Analysis performed at AGAT Halifax (unless marked by *)

Certified By: Lara Knox

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Quality Assurance

CLIENT NAME: WSP CANADA INC.
AGAT WORK ORDER: 22X862431
PROJECT: 191-03686
ATTENTION TO: Molly Noseworthy
SAMPLING SITE:
SAMPLED BY:

Water Analysis

RPT Date: Feb 22, 2022			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Standard Water Analysis + Dissolved Metals (Lab Filtered)															
pH	3500775	3500775	7.60	7.66	0.8%	<	101%	80%	120%	NA	80%	120%	NA	80%	120%
Reactive Silica as SiO2	3459348		11.0	11.0	0.4%	< 0.5	101%	80%	120%	91%	80%	120%	95%	80%	120%
Chloride	3500687		148	150	1.6%	< 1	87%	80%	120%	NA	80%	120%	NA	70%	130%
Fluoride	3500687		<0.12	<0.12	NA	< 0.12	108%	80%	120%	NA	80%	120%	88%	70%	130%
Sulphate	3514589		500	514	2.7%	< 2	105%	80%	120%	NA	80%	120%	NA	70%	130%
Alkalinity	3500775	3500775	114	115	0.4%	< 5	89%	80%	120%	NA			NA		
True Color	3497497		<5.00	<5.00	NA	< 5	105%	80%	120%	91%	80%	120%	NA		
Turbidity	3502636		0.8	1.0	NA	< 0.5	100%	80%	120%	NA			NA		
Electrical Conductivity	3500775	3500775	2020	2060	1.9%	< 1	102%	90%	110%	NA			NA		
Nitrate as N	3500687		0.47	0.47	0.4%	< 0.05	100%	80%	120%	NA	80%	120%	115%	70%	130%
Nitrite as N	3500687		1.01	1.04	3.3%	< 0.05	93%	80%	120%	NA	80%	120%	NA	70%	130%
Ammonia as N	3495751		0.27	0.29	7.6%	< 0.03	98%	80%	120%	94%	80%	120%	113%	70%	130%
Ortho-Phosphate as P	3459348		0.01	0.01	NA	< 0.01	92%	80%	120%	106%	80%	120%	112%	80%	120%
Dissolved Sodium	3504045		4.9	4.9	1.8%	< 0.1	97%	80%	120%	98%	80%	120%	NA	70%	130%
Dissolved Potassium	3504045		0.5	0.5	0.0%	< 0.1	90%	80%	120%	102%	80%	120%	101%	70%	130%
Dissolved Calcium	3504045		7.9	6.8	13.8%	< 0.1	97%	80%	120%	97%	80%	120%	NA	70%	130%
Dissolved Magnesium	3504045		1.0	0.9	11.4%	< 0.1	88%	80%	120%	109%	80%	120%	99%	70%	130%
Bicarb. Alkalinity (as CaCO3)	3500775	3500775	114	115	0.4%	< 5	NA	80%	120%	NA	80%	120%	NA	80%	120%
Carb. Alkalinity (as CaCO3)	3500775	3500775	<10	<10	NA	< 10	NA	80%	120%	NA	80%	120%	NA	80%	120%
Hydroxide	3500775	3500775	<5	<5	NA	< 5	NA	80%	120%	NA	80%	120%	NA	80%	120%
Dissolved Aluminum	3504045		<5	<5	NA	< 5	96%	80%	120%	101%	80%	120%	102%	70%	130%
Dissolved Antimony	3504045		<2	<2	NA	< 2	80%	80%	120%	NA	80%	120%	NA	70%	130%
Dissolved Arsenic	3504045		<2	<2	NA	< 2	97%	80%	120%	105%	80%	120%	106%	70%	130%
Dissolved Barium	3504045		219	202	8.3%	< 5	98%	80%	120%	109%	80%	120%	NA	70%	130%
Dissolved Beryllium	3504045		<2	<2	NA	< 2	99%	80%	120%	108%	80%	120%	109%	70%	130%
Dissolved Bismuth	3504045		<2	<2	NA	< 2	84%	80%	120%	107%	80%	120%	NA	70%	130%
Dissolved Boron	3504045		<5	<5	NA	< 5	99%	80%	120%	106%	80%	120%	105%	70%	130%
Dissolved Cadmium	3504045		<0.09	<0.09	NA	< 0.017	94%	80%	120%	101%	80%	120%	104%	70%	130%
Dissolved Chromium	3504045		<1	<1	NA	< 1	92%	80%	120%	100%	80%	120%	120%	70%	130%
Dissolved Cobalt	3504045		<1	<1	NA	< 1	95%	80%	120%	100%	80%	120%	96%	70%	130%
Dissolved Copper	3504045		<2	<2	NA	< 2	99%	80%	120%	103%	80%	120%	106%	70%	130%
Dissolved Iron	3504045		<50	<50	NA	< 50	93%	80%	120%	101%	80%	120%	79%	70%	130%
Dissolved Lead	3504045		<0.5	<0.5	NA	< 0.5	100%	80%	120%	108%	80%	120%	78%	70%	130%
Dissolved Manganese	3504045		<2	<2	NA	< 2	92%	80%	120%	99%	80%	120%	97%	70%	130%
Dissolved Molybdenum	3504045		<2	<2	NA	< 2	90%	80%	120%	99%	80%	120%	70%	70%	130%
Dissolved Nickel	3504045		5	<2	NA	< 2	97%	80%	120%	105%	80%	120%	110%	70%	130%
Dissolved Phosphorus	3504045		<0.02	<0.02	NA	< 0.02	96%	80%	120%	93%	80%	120%	118%	70%	130%
Dissolved Selenium	3504045		<1	<1	NA	< 1	101%	80%	120%	109%	80%	120%	106%	70%	130%
Dissolved Silver	3504045		<0.1	<0.1	NA	< 0.1	80%	80%	120%	83%	80%	120%	74%	70%	130%

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Quality Assurance

CLIENT NAME: WSP CANADA INC.
AGAT WORK ORDER: 22X862431
PROJECT: 191-03686
ATTENTION TO: Molly Noseworthy
SAMPLING SITE:
SAMPLED BY:

Water Analysis (Continued)

RPT Date: Feb 22, 2022			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Dissolved Strontium	3504045		22	18	NA	< 5	89%	80%	120%	94%	80%	120%	NA	70%	130%
Dissolved Thallium	3504045		<0.1	<0.1	NA	< 0.1	98%	80%	120%	107%	80%	120%	91%	70%	130%
Dissolved Tin	3504045		<2	<2	NA	< 2	94%	80%	120%	100%	80%	120%	93%	70%	130%
Dissolved Titanium	3504045		<2	<2	NA	< 2	96%	80%	120%	102%	80%	120%	96%	70%	130%
Dissolved Uranium	3504045		<0.1	<0.1	NA	< 0.1	94%	80%	120%	103%	80%	120%	81%	70%	130%
Dissolved Vanadium	3504045		<2	<2	NA	< 2	93%	80%	120%	99%	80%	120%	95%	70%	130%
Dissolved Zinc	3504045		<5	<5	NA	< 5	97%	80%	120%	103%	80%	120%	110%	70%	130%
Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.															
Standard Water Analysis + Total Metals															
pH	3500775	3500775	7.60	7.66	0.8%	<	101%	80%	120%	NA			NA		
Reactive Silica as SiO2	3459348		11.0	11.0	0.4%	< 0.5	101%	80%	120%	91%	80%	120%	95%	80%	120%
Chloride	3500687		148	150	1.6%	< 1	87%	80%	120%	NA	80%	120%	NA	70%	130%
Fluoride	3500687		<0.12	<0.12	NA	< 0.12	108%	80%	120%	NA	80%	120%	88%	70%	130%
Sulphate	3514589		500	514	2.7%	< 2	105%	80%	120%	NA	80%	120%	NA	70%	130%
Alkalinity	3500775	3500775	114	115	0.4%	< 5	89%	80%	120%	NA			NA		
True Color	3497497		<5.00	<5.00	NA	< 5	105%	80%	120%	91%	80%	120%	NA		
Turbidity	3502636		0.8	1.0	NA	< 0.5	100%	80%	120%	NA			NA		
Electrical Conductivity	3500775	3500775	2020	2060	1.9%	< 1	102%	90%	110%	NA			NA		
Nitrate as N	3500687		0.47	0.47	0.4%	< 0.05	100%	80%	120%	NA	80%	120%	115%	70%	130%
Nitrite as N	3500687		1.01	1.04	3.3%	< 0.05	93%	80%	120%	NA	80%	120%	NA	70%	130%
Ammonia as N	3495751		0.27	0.29	7.6%	< 0.03	98%	80%	120%	94%	80%	120%	113%	70%	130%
Total Organic Carbon	1350111		<0.5	<0.5	NA	< 0.5	90%	80%	120%		80%	120%	92%	80%	120%
Ortho-Phosphate as P	3459348		0.01	0.01	NA	< 0.01	92%	80%	120%	106%	80%	120%	112%	80%	120%
Total Sodium	3502199		4.5	4.5	1.0%	< 0.1	100%	80%	120%	103%	80%	120%	NA	70%	130%
Total Potassium	3502199		1.4	1.6	14.7%	< 0.1	94%	80%	120%	112%	80%	120%	NA	70%	130%
Total Calcium	3502199		11.3	11.2	0.7%	< 0.1	100%	80%	120%	102%	80%	120%	NA	70%	130%
Total Magnesium	3502199		0.6	0.7	9.3%	< 0.1	101%	80%	120%	106%	80%	120%	88%	70%	130%
Bicarb. Alkalinity (as CaCO3)	3500775	3500775	114	115	0.4%	< 5	NA	80%	120%	NA			NA		
Carb. Alkalinity (as CaCO3)	3500775	3500775	<10	<10	NA	< 10	NA	80%	120%	NA			NA		
Hydroxide	3500775	3500775	<5	<5	NA	< 5	NA	80%	120%	NA			NA		
Total Aluminum	3502199		423	430	1.6%	< 5	102%	80%	120%	107%	80%	120%	NA	70%	130%
Total Antimony	3502199		<2	<2	NA	< 2	80%	80%	120%	120%	80%	120%	NA	70%	130%
Total Arsenic	3502199		<2	<2	NA	< 2	94%	80%	120%	97%	80%	120%	99%	70%	130%
Total Barium	3502199		27	27	0.2%	< 5	102%	80%	120%	107%	80%	120%	NA	70%	130%
Total Beryllium	3502199		<2	<2	NA	< 2	101%	80%	120%	105%	80%	120%	115%	70%	130%
Total Bismuth	3502199		<2	<2	NA	< 2	92%	80%	120%	106%	80%	120%	100%	70%	130%
Total Boron	3502199		<5	<5	NA	< 5	99%	80%	120%	106%	80%	120%	113%	70%	130%
Total Cadmium	3502199		<0.09	<0.09	NA	< 0.09	94%	80%	120%	103%	80%	120%	100%	70%	130%

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Quality Assurance

CLIENT NAME: WSP CANADA INC.

AGAT WORK ORDER: 22X862431

PROJECT: 191-03686

ATTENTION TO: Molly Noseworthy

SAMPLING SITE:

SAMPLED BY:

Water Analysis (Continued)

RPT Date: Feb 22, 2022			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Total Chromium	3502199		<1	<1	NA	< 1	94%	80%	120%	102%	80%	120%	128%	70%	130%
Total Cobalt	3502199		<1	<1	NA	< 1	98%	80%	120%	104%	80%	120%	100%	70%	130%
Total Copper	3502199		<1	<1	NA	< 1	100%	80%	120%	105%	80%	120%	103%	70%	130%
Total Iron	3502199		176	172	NA	< 50	95%	80%	120%	101%	80%	120%	105%	70%	130%
Total Lead	3502199		<0.5	<0.5	NA	< 0.5	102%	80%	120%	110%	80%	120%	106%	70%	130%
Total Manganese	3502199		454	432	5.1%	< 2	95%	80%	120%	100%	80%	120%	NA	70%	130%
Total Molybdenum	3502199		<2	<2	NA	< 2	92%	80%	120%	101%	80%	120%	100%	70%	130%
Total Nickel	3502199		<2	3	NA	< 2	98%	80%	120%	107%	80%	120%	129%	70%	130%
Total Phosphorous	3502199		<0.02	<0.02	NA	< 0.02	98%	80%	120%	100%	80%	120%	124%	70%	130%
Total Selenium	3502199		<1	<1	NA	< 1	86%	80%	120%	97%	80%	120%	93%	70%	130%
Total Silver	3502199		<0.1	<0.1	NA	< 0.1	92%	80%	120%	NA	80%	120%	NA	70%	130%
Total Strontium	3502199		45	45	0.3%	< 5	90%	80%	120%	96%	80%	120%	NA	70%	130%
Total Thallium	3502199		<0.1	<0.1	NA	< 0.1	103%	80%	120%	109%	80%	120%	106%	70%	130%
Total Tin	3502199		<2	<2	NA	< 2	95%	80%	120%	102%	80%	120%	98%	70%	130%
Total Titanium	3502199		<2	<2	NA	< 2	100%	80%	120%	105%	80%	120%	119%	70%	130%
Total Uranium	3502199		<0.2	<0.2	NA	< 0.2	99%	80%	120%	106%	80%	120%	95%	70%	130%
Total Vanadium	3502199		<2	<2	NA	< 2	94%	80%	120%	99%	80%	120%	99%	70%	130%
Total Zinc	3502199		6	9	NA	< 5	95%	80%	120%	103%	80%	120%	101%	70%	130%

Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

Certified By: Lara Knox

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Method Summary

CLIENT NAME: WSP CANADA INC.

AGAT WORK ORDER: 22X862431

PROJECT: 191-03686

ATTENTION TO: Molly Noseworthy

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Microbiology Analysis			
Total Coliforms (MF)	MIC-121-7002	Sm 9222 H	MF/INCUBATOR
E. Coli (MF)	MIC-121-7002	SM 9222 H	MF/INCUBATOR

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Method Summary

CLIENT NAME: WSP CANADA INC.

AGAT WORK ORDER: 22X862431

PROJECT: 191-03686

ATTENTION TO: Molly Noseworthy

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis			
pH	INOR-121-6001	SM 4500 H+B	PC TITRATE
Reactive Silica as SiO2	INOR-121-6027	SM 4500-SiO2 F	COLORIMETER
Chloride	INORG-121-6005	SM 4110 B	ION CHROMATOGRAPH
Fluoride	INORG-121-6005	SM 4110 B	ION CHROMATOGRAPH
Sulphate	INORG-121-6005	SM 4110 B	ION CHROMATOGRAPH
Alkalinity	INOR-121-6001	SM 2320 B	
True Color	INOR-121-6008	SM 2120 B	LACHAT FIA
Turbidity	INOR-121-6022	SM 2130 B	NEPHELOMETER
Electrical Conductivity	INOR-121-6001	SM 2510 B	PC TITRATE
Nitrate + Nitrite as N	INORG-121-6005	SM 4110 B	CALCULATION
Nitrate as N	INORG-121-6005	SM 4110 B	ION CHROMATOGRAPH
Nitrite as N	INORG-121-6005	SM 4110 B	ION CHROMATOGRAPH
Ammonia as N	INOR-121-6047	SM 4500-NH3 H	COLORIMETER
Total Organic Carbon	INOR-121-6026	SM 5310 B	TOC ANALYZER
Ortho-Phosphate as P	INOR-121-6012	SM 4500-P G	COLORIMETER
Dissolved Sodium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Potassium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Calcium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Magnesium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Bicarb. Alkalinity (as CaCO3)	INORG-121-6001	SM 2320 B	PC TITRATE
Carb. Alkalinity (as CaCO3)	INORG-121-6001	SM 2320 B	PC TITRATE
Hydroxide	INORG-121-6001	SM 2320 B	PC-TITRATE
Calculated TDS	CALCULATION	SM 1030E	CALCULATION
Hardness	CALCULATION	SM 2340B	CALCULATION
Langelier Index (@20C)	CALCULATION	CALCULATION	CALCULATION
Langelier Index (@ 4C)	CALCULATION	CALCULATION	CALCULATION
Saturation pH (@ 20C)	CALCULATION	CALCULATION	CALCULATION
Saturation pH (@ 4C)	CALCULATION	CALCULATION	CALCULATION
Anion Sum	CALCULATION	SM 1030E	CALCULATION
Cation sum	CALCULATION	SM 1030E	CALCULATION
% Difference/ Ion Balance	CALCULATION	SM 1030E	CALCULATION
Dissolved Aluminum	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Antimony	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Arsenic	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Barium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Beryllium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Bismuth	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Boron	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Cadmium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS

Results relate only to the items tested. Results apply to samples as received.

AGAT Laboratories

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http://www.agatlabs.com

Method Summary

CLIENT NAME: WSP CANADA INC.

AGAT WORK ORDER: 22X862431

PROJECT: 191-03686

ATTENTION TO: Molly Noseworthy

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Dissolved Chromium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Cobalt	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Copper	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Iron	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Lead	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Manganese	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Molybdenum	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Nickel	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Phosphorus	MET-121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Selenium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Silver	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Strontium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Thallium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Tin	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Titanium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Uranium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Vanadium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Dissolved Zinc	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Sodium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Potassium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Calcium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Magnesium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Aluminum	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Antimony	MET121-6104 & MET-121-6105	SM 3125	ICP-MS
Total Arsenic	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Barium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Beryllium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Bismuth	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS

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Method Summary

CLIENT NAME: WSP CANADA INC.

AGAT WORK ORDER: 22X862431

PROJECT: 191-03686

ATTENTION TO: Molly Noseworthy

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Total Boron	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Cadmium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Chromium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Cobalt	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Copper	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Iron	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Lead	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Manganese	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Molybdenum	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Nickel	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Phosphorous	MET-121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Selenium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Silver	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Strontium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Thallium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Tin	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Titanium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Uranium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Vanadium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Zinc	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS

Results relate only to the items tested. Results apply to samples as received.

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Chain of Custody Record

Laboratory Use Only
Arrival Condition: ☐ Good ☐ Poor (see notes)
Arrival Temperature: 8.6, 8.4, 9.3
Hold Time:
AGAT Job Number: 22X8602431
Notes: S6+S7 extra 100ml

Report Information
Company: WSP
Contact: Molly Noseworthy
Address: 1 Spectacle Lake Dr
Phone: 902 943 0022 Fax:
Client Project #: 191-03686
AGAT Quotation: WSP-SO 2022
Please Note: If quotation number is not provided client will be billed full price for analysis.

Report Information (Please print):
1. Name: Molly Noseworthy
Email: Molly.Noseworthy@wsp.com
2. Name:
Email:

Report Format
☐ Single Sample per page
☐ Multiple Samples per page
☐ Excel Format Included
☐ Export

Turnaround Time Required (TAT)
Regular TAT ☑ 5 to 7 working days
22FEB10 2:01PM
Rush TAT ☐ Same day ☐ 1 day ☐ 2 days ☐ 3 days
Date Required:

Regulatory Requirements (Check):
☐ List Guidelines on Report ☐ Do not list Guidelines on Report
☐ PIRI
☐ Tier 1 ☐ Res ☐ Pot ☐ Coarse
☐ Tier 2 ☐ Com ☐ N/Pot ☐ Fine
☐ Gas ☐ Fuel ☐ Lube
☐ CCME ☐ CDWQ
☐ Industrial ☐ NSEQS-Cont Sites
☐ Commercial ☐ HRM 101
☐ Res/Park ☐ Storm Water
☐ Agricultural ☐ Waste Water
☐ FWAL
☐ Sediment ☐ Other

Drinking Water Sample: ☐ Yes ☐ No Salt Water Sample ☐ Yes ☐ No
Reg. No.:

Invoice To Same Yes ☐ / No ☐
Company:
Contact:
Address:
Phone: Fax:
PO/Credit Card#:

Sample Identification	Date/Time Sampled	Sample Matrix	# Containers	Comments – Site/Sample Info. Sample Containment
PW21-01 S5	2022/02/10 10:30	GW	3	Total Metals
PW21-01 S6	2022/02/10 10:30	GW	5	Needs lab FILT & Pres
PW21-01 S7	2022/02/10 10:30	GW	5	Needs LAB F&P
				Dissolved only

Sample Identification	Field Filtered/Preserved	Standard Water Analysis	Metals: ☐ Available ☐ Diss ☒ Total	Mercury	☐ BOD ☐ CBOD	pH	☐ TSS ☐ TDS ☐ VSS	TKN	Total Phosphorus	Phenols	Tier 1: TPH/BTEX (PIRI) ☐ low level	Tier 2: TPH/BTEX Fractionation	CCME-CWS TPH/BTEX	VOC	THM	HAA	PAH	PCB	TC + EC ☐ P/A ☐ MPN ☐ MF	☐ HPC ☐ Pseudomonas	Fecal Coliform ☐ MPN ☐ MF	Other:	Other:	Hazardous (Y/N)
PW21-01 S5	X		X																					
PW21-01 S6			X																X					
PW21-01 S7			X																X					

Samples Relinquished By (Print Name): Molly Noseworthy
Date/Time: 14:00
Samples Received By (Print Name):
Date/Time:
Samples Relinquished By (Sign): M. Noseworthy
Date/Time: 14:00
Samples Received By (Sign):
Date/Time:

Pink Copy - Client
Yellow Copy - AGAT
White Copy - AGAT

Page 1 of 1
N°: 75360

Document ID: DOC-133-1502-002
Date revised: May 19, 2016

APPENDIX

E TECHNICAL LIMITATIONS

LIMITATIONS

Limited use

This Report was prepared for the Town of Stewiacke solely for their exclusive use to provide an Assessment of current environmental conditions in association with the Site. WSP will not be responsible for any use of this report by any other party, for any decisions to be made based on it, or for the consequences thereof, unless written reliance is granted by WSP. Unless otherwise agreed in writing by WSP, it shall not be used to express or imply warranty as to the suitability of the property for a particular purpose. WSP disclaims responsibility of consequential financial effects on transactions or property values, or requirements for follow-up actions and costs.

Excerpts

The Report is intended to be used in its entirety. No excerpts may be taken to be representative of the findings in the assessment.

Information from others

In evaluating the Site, WSP has relied in good faith on information provided by others, as noted in the Report. WSP has assumed that the information provided is correct and WSP assumes no responsibility for the accuracy, completeness or workmanship of any such information.

Standard of care

This project has been carried out using investigation techniques and engineering analysis methods consistent with those ordinarily exercised by WSP and other engineering/scientific practitioners, working under similar conditions and subject to the time, financial and physical constraints applicable to this project. The conclusions presented in this Report are based on Work undertaken by trained professional and technical staff and the reasonable and professional interpretation using accepted engineering and scientific practices current at the time the work was performed. Conclusions presented in this report should not be construed as legal advice. WSP makes no other representations whatsoever, including those concerning the legal significance of its findings, or as to other legal matters touched on in the Report, including, but not limited to, ownership of any property, or the application of any law to the findings of the Assessment.

Limited scope

The Report summarizes WSP's review of available data in accordance with the principal components of the stated regulations, standards and guidelines and the scope, terms and conditions of the contract or proposal to which the Assignment was conducted. No other warranties are either expressed or implied with respect to the professional services provided under the terms of the contract or proposal and represented in this Report. Conditions may exist which were not detected given the nature of the inquiry WSP was retained to undertake with respect to the Site. Additional environmental studies and actions may be recommended.

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Changes over time

The Report is based on data and information collected at the time of this Assessment, as stated in the Report. Site use or conditions change and the information and conclusions in the Report may no longer apply following the date of this Report. If any conditions become apparent that differ significantly from that presented in this Report, we request that we be notified to reassess the conclusions and recommendations provided herein. WSP disclaims any obligation to update this Report for conditions that may be identified after the date of this Report; however, WSP reserves the right to amend or supplement this report based on additional information, documentation or evidence.

Variability between test locations

Conclusions are based on the Site conditions observed by WSP at the time the work was performed and may include information obtained at specific testing and/or sampling locations. It is recognized that overall conditions can only be extrapolated to an undefined limited area around these testing and sampling locations. The conditions that WSP interprets to exist between testing and sampling points may differ from those that actually exist. The accuracy of any extrapolation and interpretation beyond the sampling locations will depend on natural conditions, the history of Site development and changes through construction and other activities. In addition, analysis has been carried out for the identified chemical and physical parameters only, and it should not be inferred that other chemical species or physical conditions are not present. WSP cannot warrant against undiscovered environmental liabilities or adverse impacts off-Site.