Appendix L
Water Sampling Reports

Appendix L-1
Crandall Engineering Ltd., 2019

Crandall File: 18428-00-C
January 4, 2019

"SENT VIA E-MAIL"

CertainTeed Gypsum Inc.
57 Quality Way
McAdam, NB
E6J 1B1

ATTENTION: Ms. Agata Sulkiewicz, Quality & Environment Manager

Fall 2018 – Surface Water Quality Testing – CertainTeed Gypsum, McAdam, NB

Dear Ms. Sulkiewicz:

Sampling of four surface water stations, as per your 'Approval to Operate' at the CertainTeed Gypsum Inc., McAdam site was carried out on December 14, 2018 by Crandall personnel. The temperatures had been below zero for several weeks and the streams were frozen over. Water samples were taken from under the ice. The samples were taken at the following locations: SW7 approximately 615 m downstream of where the stream enters the property, SW9 at the settling pond, and SW10 where the stream exits the property. It was attempted to take a sample at SW1 where the stream enters onto the property. However, the stream was frozen from the surface to the bottom (approximately 200mm) and it was not possible to collect a sample. Figure 1 shows the locations of the surface water monitoring stations.

All samples were analysed at the RPC laboratory in Fredericton for sulphide, Ca, sulfate, TDS, TPH, and petroleum hydrocarbons (BTEX). Field water quality measurements were also taken at the four sampling stations with a YSI multi-

parameter probe. Measurements included temperature, pH, conductivity, salinity, total dissolved solids, and dissolved oxygen. Stream flow estimates could not be obtained because of the ice cover at the monitoring locations.

The monitoring results are included in the attached Tables 1 & 2. The following table summarizes the findings.

Field Analysis	
Temperature, pH, conductivity, salinity, TDS, dissolved oxygen	The dissolved oxygen concentrations were near normal values for season. The pH values were all within range of the Canadian Guidelines for the Protection of Aquatic Life (6.5-9.0) except for SW9 with was recorded at 6.3. Conductivity, Salinity and TDS values were within normal range at all locations.
Laboratory Analysis	
Hydrocarbons	Hydrocarbons were not detected or below the guideline values in all samples.
Calcium, Sulfate, Sulfide, Total Suspended Solid	Sulfate levels show an increasing trend at SW9 and SW10, and sulfate also increased at SW7. Sulfide was detected at SW9 and SW10. Suspended solids readings were increased at SW9 and were below the detection limit in SW7 and SW10.

CONCLUSIONS AND RECOMMENDATIONS

Overall, the water quality at SW7 and SW10 appeared to be good. The water quality at SW9 showed increases in all general chemistry parameters and should be watched for increasing trends. Testing should be continued twice annually.

We trust that this information meets your requirements. Please do not hesitate to call, should you have any questions.

Yours very truly,

CRANDALL ENGINEERING LTD.

Teresa Cleghorn
Technician

Jochen Schroer, M. Eng., P. Eng.
Project Manager

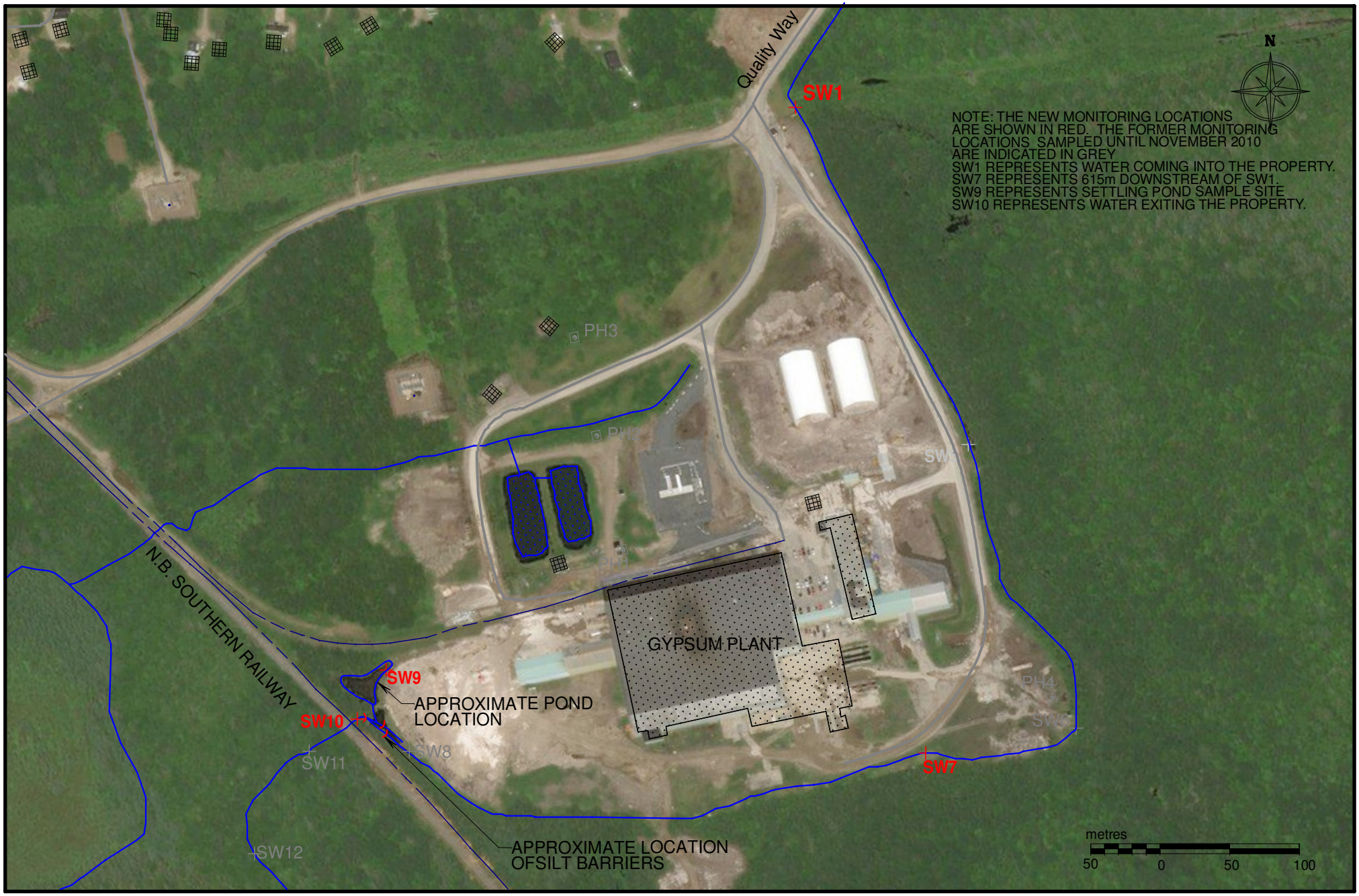
Attachments: 1 figure, 2 tables

Crandall Engineering Ltd.
1077 boul. St. George Blvd.
Suite 400
Moncton, NB Canada E1E 4C9
Tel: (506) 857-2777
Fax: (506) 857-2753

133 Prince William St.
Suite 703
Saint John, NB E2L 2B5
Tel: (506) 693-5893
Fax: (506) 693-3250

564 Prospect St.
Suite 101
Fredericton, NB E3B 9M3
Tel: (506) 451-4400
Fax: (506) 857-2753

CRANDALLENGINEERING.CA



CertainTeed Gypsum Inc.
McAdam Site
Fall 2018 Sampling Locations

crandall a division of Englobe

DATE:	SCALE:
2018/12/14	As Shown
FILE:	FIGURE:
18428	1

Table 1. Field measurements for surface water locations SW1, SW7, SW9 and SW10 (Historical summary)

Parameter	Unit	Canadian Guidelines for the Protection of Aquatic Life (1)	SW1															
			Dec14/18	May 30/18	Oct 27/17	Apr 21/17	Oct 25/16	Apr 26/16	Nov 5/15	May 8/15	Oct 27/14	May 21/14	Oct 11-13	Apr 23/13	Oct 4/12	May 2/12	Nov 18/11	May 26/11
Estimated flow	L/sec		NA	10		60	10	3	n/a	5	3	16	2	12	12	36	10	45
Temperature	°C		NA	21.3	12.9	3.7	6.0	9.7	7.4	8.1	8.6	10.7	8.6	3.3	12.9	8.4	3.7	13.3
pH	units	6.5 - 9.0	NA	7.6	6.7	8.8	7.5	7.4	7.1	7.0	7.4	6.7	8.0	9.0	7.9	7.8	6.7	7.5
Conductivity	mS/cm		NA	0.23	0.53	0.01	0.29	0.23	0.16	0.28	0.17	0.20	0.12	0.16	0.19	0.21	0.21	0.25
Salinity	mg/L		NA	0.11	0.26	0.00	0.14	0.11	0.08	0.13	0.08	0.10	0.06	0.08	0.09	0.10	0.10	0.10
Total Dissolved Solids (calculated)	g/L		NA	0.15	0.34	0.01	0.19	0.15	0.11	0.18	0.11	0.13	0.08	0.11	0.13	0.14	0.14	0.14
Dissolved Oxygen	%		NA	63	59	78	88	95	80	-	-	-	-	-	-	-	-	-
Dissolved Oxygen	mg/L	> 6.5	NA	5.6	6.2	10.3	11.0	10.8	9.7	9.0	9.6	8.6	9.4	10.3	7.1	9.6	8.9	8.1

Parameter	Unit	Canadian Guidelines for the Protection of Aquatic Life (1)	SW7												
			Dec14/18	May 30/18	Oct 27/17	Apr 21/17	Oct 25/16	Apr 26/16	Nov 5/15	May 8/15	Oct 27/14	May 21/14	Oct 13/10	June 9/10	May 11/10
Estimated flow	L/sec		NA	0.2	177	80	28	13	37	17	17	63	0	stagnant	42
Temperature	°C		0.9	15.9	13.2	3.0	7.8	6.9	7.5	7.4	9.2	9.8	8.9	11.4	7.4
pH	units	6.5 - 9.0	7.9	7.2	**5.2**	8.2	7.0	6.8	6.6	6.8	6.9	**5.9**	7.1	6.5	7.3
Conductivity	mS/cm		0.34	0.14	0.29	0.12	0.34	0.05	0.21	0.01	0.20	0.18	0.62	0.18	0.18
Salinity	mg/L		0.17	0.07	0.14	0.05	0.17	0.02	0.09	0.16	0.09	0.08	0.30	0.09	0.08
Total Dissolved Solids (calculated)	g/L		0.23	0.93	0.19	0.08	0.22	0.03	0.13	0.21	0.13	0.11	0.40	0.12	0.12
Dissolved Oxygen	%		58	109	93	92	91	95	84	-	-	-	-	-	-
Dissolved Oxygen	mg/L	> 6.5	8.2	10.8	9.8	12.4	10.9	11.6	10.1	9.2	10.7	9.8	6.1	9.7	11.1

Parameter	Unit	Canadian Guidelines for the Protection of Aquatic	SW9								
			Dec14/18	May 30/18	Oct 27/17	Nov 08/10	Oct 13/10	June 9/10	May 11/10	Oct 8/09	Sept 24/09
Estimated flow	L/sec		NA	0	0	0	0	0	**stagnant**	0	0
Temperature	°C		-0.4	22.6	14.93	8.9	0.0	0.0	10.0	0.0	0.0
pH	units	6.5 - 9.0	6.3	6.7	**6.27**	**6.3**	0.0	0.0	7.2	0.0	0.0
Conductivity	mS/cm		0.01	2.32	2.1	0.43	0.00	0.00	2.77	0.00	0.00
Salinity	mg/L		0.00	1.20	1.08	0.21	0.00	0.00	1.45	0.00	0.00
Total Dissolved Solids (calculated)	mg/L		0.01	1.52	1.363	0.27	0.00	0.00	1.81	0.00	0.00
Dissolved Oxygen	%		78.50	79	25						
Dissolved Oxygen	mg/L	> 6.5	11.6	6.7	2.47	8.8	0.0	0.0	2.7	0.0	0.0

Parameter	Unit	Canadian Guidelines for the Protection of Aquatic Life (1)	SW10																			
			Dec14/18	May 30/18	Oct 27/17	Apr 21/17	Oct 25/16	Apr 26/16	Nov 5/15	May 8/15	Oct 27/14	May 21/14	Oct 11-13	Apr 23/13	Oct 4/12	May 2/12	Nov 18/11	May 26/11	Nov 08/10	Oct 13/10	June 9/10	May 11/10
Estimated flow	L/sec		NA	0	190	100	36	16	49	18	40	104	7	31	27	162	26	260	224	20	104	stagnant
Temperature	°C		0.9	18.1	13.1	3.5	7.5	7.2	7.6	7.2	9.2	9.9	9.4	4.8	13.2	7.7	3.7	11.5	8.6	8.4	12.1	8.5
pH	units	6.5 - 9.0	6.8	7.0	6.5	7.8	6.9	6.7	7.0	7.0	7.2	**5.8**	7.1	7.5	7.1	6.8	**6.2**	6.9	**6.1**	7.2	6.9	7.3
Conductivity	mS/cm		0.00	0.92	0.41	0.36	0.53	0.57	0.39	0.00	0.36	0.36	0.10	0.26	0.45	0.44	0.39	0.42	0.20	1.06	0.35	0.61
Salinity	mg/L		0.38	0.46	0.2	0.17	0.26	0.28	0.19	0.27	0.17	0.17	0.04	0.12	0.22	0.21	0.18	0.21	0.10	0.53	0.17	0.30
Total Dissolved Solids (calculated)	g/L		0.51	6.00	0.27	0.23	0.35	0.37	0.25	0.37	0.23	0.23	0.07	0.17	0.29	0.28	0.26	0.28	0.13	0.69	0.23	0.40
Dissolved Oxygen	%		54	87	86	95	92	74	84	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Oxygen	mg/L	> 6.5	6.8	8.2	9.1	12.6	11.1	8.9	10.1	9.3	11.1	9.8	8.5	12.4	7.3	9.7	10.5	9.7	12.3	8.0	9.2	11.0

SW1 was sampled upstream of the plant, near Quality Way
SW7 was sampled 615 m downstream of SW1
SW9 was sampled at the settling pond
SW10 was sampled downstream of the discharge of the settling pond, immediatly upstream of the culvert under the railway tracks
Highlighted values show an increasing trend, and bolded values are outside of the range of the Canadian Water Quality Guidelines for the Protection of Aquatic Life
(1) Canadian Water Quality Guidelines for the Protection of Aquatic Life, Canadian Council of the Ministers of the Environment (2017)

Table 2. Laboratory analyses for surface water locations SW1, SW7, SW9, and SW10 (Historical summary)

Parameter	Unit	Canadian Guidelines for the Protection of Aquatic Life (1)	SW1															
			Dec 14/18	May 30/18	Oct 27-17	Apr 21/17	Oct 25/16	Apr 26/16	Nov 5/15	May 8/15	Oct 27/14	May 21/14	Oct 11-13	Apr 23/13	Oct 4/12	May 2/12	Nov 18/11	May 26/11
General chemistry																		
Calcium	mg/L		NA	32.6	64	12	20	18	15	16	13	12	18	12	13	13	15	17
Sulfate	mg/L		NA	52	171	< 5	7	16	<5	15	6	1	< 1	13	< 5	15	19	9
Sulfide	mg/L		NA	< 0.05	< 0.05	< 0.05	< 0.05	<0.05	<0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	<0.05	< 0.05
Total Suspended Solids	mg/L	<5 to <25 above background	NA	51	< 5	< 5	< 5	<5	<5	< 5	< 5	< 5	53	160	6	< 5	8	10
Hydrocarbons																		
Benzene	mg/L	< 0.370	NA	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Toluene	mg/L	< 0.002	NA	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Ethylbenzene	mg/L	< 0.090	NA	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Xylenes	mg/L		NA	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
VPH C6-C10 (Less BTEX)	mg/L		NA	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
EPH >C10 - C16	mg/L		NA	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
EPH >C16 - C21	mg/L		NA	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
EPH >C21-C32	mg/L		NA	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Modified TPH Tier 1	mg/L		NA	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1

Parameter	Unit	Canadian Guidelines for the Protection of Aquatic Life (1)	SW7										
			Dec 14/18	May 30/18	Oct 27-17	Apr 21/17	Oct 25/16	Apr 26/16	Nov 5/15	May 8/15	Oct 27/14	May 21/14	Oct 13/10
General chemistry													
Calcium	mg/L		54	17.9	33	38	48	59	29	42	25	20	107
Sulfate	mg/L		102	37	93	88	115	120	60	96	54	33	200
Sulfide	mg/L		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	<0.05	<0.05	< 0.05	< 0.05	< 0.05	< 0.05
Total Suspended Solids	mg/L	<5 to <25 above background	<5	22	< 5	< 5	< 5	<5	<5	< 5	< 5	< 5	11
Hydrocarbons													
Benzene	mg/L	< 0.370	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Toluene	mg/L	< 0.002	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Ethylbenzene	mg/L	< 0.090	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Xylenes	mg/L		< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
VPH C6-C10 (Less BTEX)	mg/L		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
EPH >C10 - C16	mg/L		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.06
EPH >C16 - C21	mg/L		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
EPH >C21-C32	mg/L		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Modified TPH Tier 1	mg/L		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1

Parameter	Unit	Canadian Guidelines for the Protection of Aquatic Life (1)	SW9									
			Dec 14/18	May 30/18	Oct 27-17	Nov 08/10	Oct 13/10	June 9/10	May 11/10	Oct 8/09	Sept 24/09	May 11/08
General chemistry												
Calcium	mg/L		870	607.	417	67.5	533	224	577	128.	648.	344
Sulfate	mg/L		1460	1320	1010	149	900	280	1000	250	1090	650
Sulphide	mg/L		1.9	< 0.05	< 0.05	< 0.05	< 0.05	3	N/D	1.0	0.13	1.9
Total Suspended Solids	mg/L	<5 to <25 above background	196	15	< 5	< 5	< 5	< 5	7	7	15	<5
Hydrocarbons												
Benzene	mg/L	< 0.370	< 0.002	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.005
Toluene	mg/L	< 0.002	< 0.002	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.005
Ethylbenzene	mg/L	< 0.090	< 0.002	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.005
Xylenes	mg/L		< 0.002	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.005
VPH C6-C10 (Less BTEX)	mg/L		< 0.02	< 0.01	< 0.01	< 0.01	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.05
EPH >C10 - C16	mg/L		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05					
EPH >C16 - C21	mg/L		0.08	< 0.05	< 0.05	< 0.05	0.12					
EPH >C21-C32	mg/L		0.3	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Modified TPH Tier 1	mg/L		0.4	< 0.1	< 0.1	< 0.1	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1

Parameter	Unit	Canadian Guidelines for the Protection of Aquatic Life (1)	SW10																
			Dec 14/18	May 30/18	Oct 27-17	Apr 21/17	Oct 25/16	Apr 26/16	Nov 5/15	May 8/15	Oct 27/14	May 21/14	Oct 11-13	Apr 23/13	Oct 4/12	May 2/12	Nov 18/11	May 26/11	June 9/10
General chemistry																			
Calcium	mg/L		147	180.	68	54	92	116	74	86	58	52	92	37	57	61	62	59	48
Sulfate	mg/L		270	370	160	126	170	230	149	187	104	90	183	78	111	117	130	127	107
Sulfide	mg/L		1.50	< 0.05	< 0.05	< 0.05	< 0.05	<0.05	<0.05	0.12	< 0.05	< 0.05	< 0.05	< 0.05	0.65	0.15	0.45	0.12	0.16
Total Suspended Solids	mg/L	<5 to <25 above background	<5	5	< 5	9.00	< 5	<5	5	< 5	< 5	11	< 5	< 5	9	< 5	<5	9	6
Hydrocarbons																			
Benzene	mg/L	< 0.370	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Toluene	mg/L	< 0.002	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Ethylbenzene	mg/L	< 0.090	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Xylenes	mg/L		< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
VPH C6-C10 (Less BTEX)	mg/L		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
EPH >C10 - C16	mg/L		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.0
EPH >C16 - C21	mg/L		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.0
EPH >C21-C32	mg/L		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Modified TPH Tier 1	mg/L		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1

SW1 was sampled upstream of the plant, near Quality Way
SW7 was sampled 615 m downstream of SW1
SW9 was sampled at the settling pond
SW10 was sampled downstream of the discharge of the settling pond, immediately upstream of the culvert under the railway tracks
Highlighted values show an increasing trend, and bolded values are outside of the range of the Canadian Water Quality Guidelines for the Protection of Aquatic Life
(1) Canadian Water Quality Guidelines for the Protection of Aquatic Life, Canadian Council of the Ministers of the Environment (2017)

Appendix L-2
NATECH Environmental Services Inc., 2017 & 2018

NATECH Environmental Services Inc.
2492 Route 640, Hanwell, NB E3E 2C2 Tel.: (506) 455-1085 Fax: (506) 455-1088

November 28, 2017

Ms. Agata Sulkiewicz, Quality & Environment Manager

CertainTeed Gypsum Inc.

57 Quality Way

McAdam, NB

E6J 1B1

Re**: Surface Water Quality Testing - CertainTeed Gypsum, McAdam, NB**

Dear Ms. Sulkiewicz:

Sampling of four surface water stations, as per your 'Approval to Operate' at the CertainTeed Gypsum Inc., McAdam site was carried out on October 27, 2017 by NATECH personnel. The samples were taken at the following locations: SW1 where the stream enters onto the property, SW7 approximately 615 m downstream of SW1, SW9 at the settling pond, and SW10 where the stream exits the property. Figure 1 shows the locations of the surface water monitoring stations.

The surface water samples were analysed for calcium, sulfate, sulfide, total suspended solids, and petroleum hydrocarbons (BTEX). All samples were analysed at the RPC laboratory in Fredericton. Field measurements were also taken at the three sampling stations with a YSI multi-parameter probe. Measurements included temperature, pH, conductivity, salinity, total dissolved solids, and dissolved oxygen. Stream flows were estimated based on velocity observations and cross-section measurements.

The monitoring results are included in the attached Tables 1 and 2. The following table summarizes the findings.

SURFACE WATER	
Field Measurements	The stream flow at SW1 was not measured, as the alders and small brush made it impossible to collect the data. The flow at SW7 was 177 L/sec, and SW10 had a flow of 190 L/sec. The abnormally high flows are the results of very heavy rain on the previous day. The dissolved oxygen concentrations were at within the range expected for surface runoff. The pH value at SW7 was 5.2 and at SW9 with a value of 6.27 which is lower than the Canadian Guidelines for the Protection of Aquatic Life (6.5). Conductivity, Salinity and TDS values were elevated significantly at SW1. This observation is likely the result of the large amount of surface runoff.
Hydrocarbons	There were no hydrocarbons detected in any of the samples.
Calcium, Sulfate, Sulfide, Total Suspended Solid	Sulfate levels were near normal levels at SW7 and SW10. Significant increases were observed at the other two stations. Suspended solids readings were low in all samples.

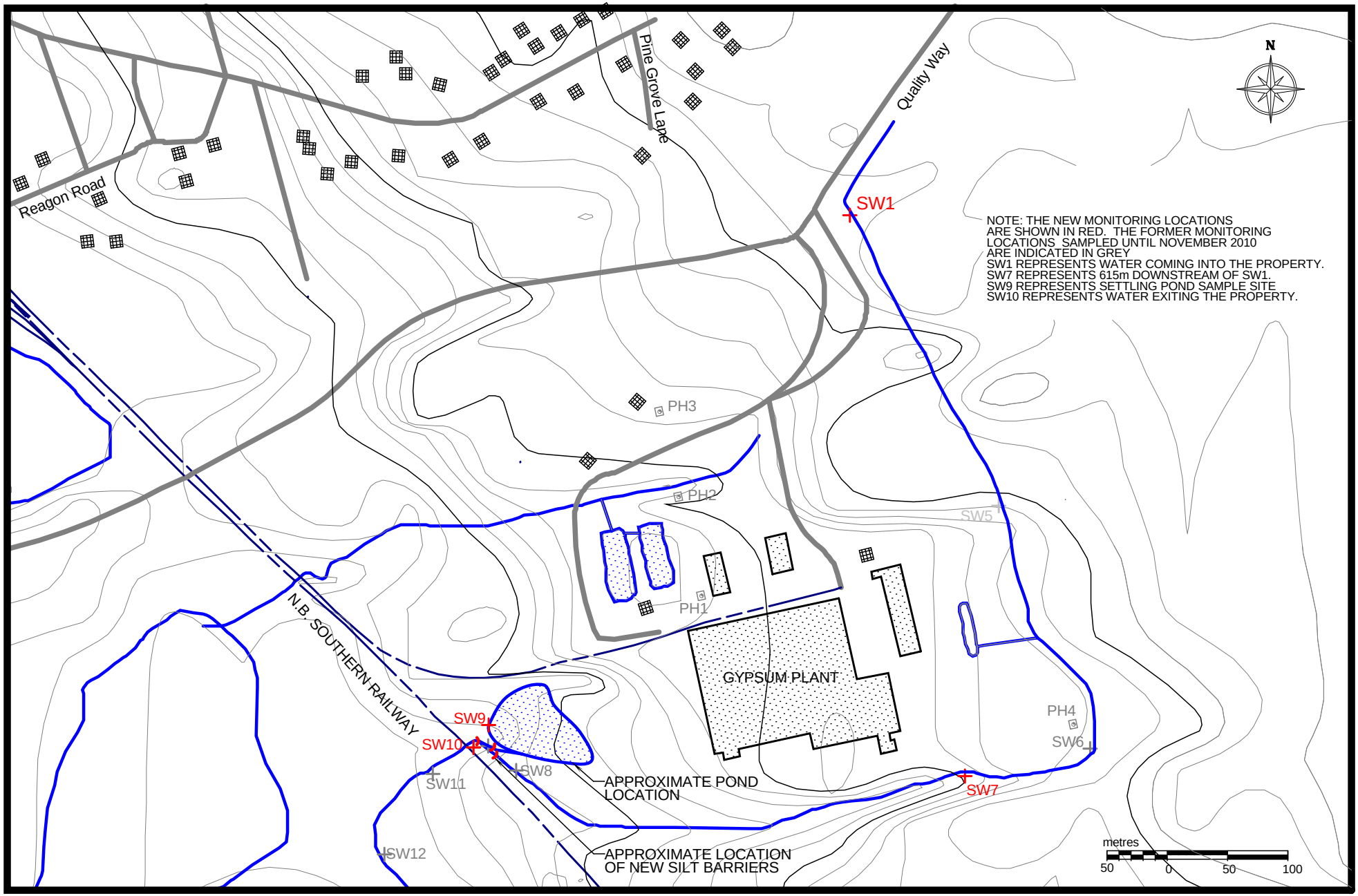
CONCLUSIONS AND RECOMMENDATIONS
Overall, the water quality appeared to be good. Observed increases in sulfate and decreases in pH can be explained with the high runoff amounts resulting from the large rainfall on the previous day (more than 30 mm/d). Testing should be continued next year with attention focussed on the pH and sulfate levels at SW10.

We trust that this information meets your requirements. Please do not hesitate to call, should you have any questions.

Yours sincerely,

Jochen Schroer, M. Eng., P. Eng., President
NATECH Environmental Services Inc.

JS/em
Attachments: 2 Tables, 1 Figure
ref.:...\Docs 2017\CertainTeed Monitoring - Fall 2017



CertainTeed Gypsum Inc.
McAdam Site
Fall 2017 Sampling Locations

NATECH
Environmental Services Inc.
2492 Route 640, Hanwell, NB E3E 2C2
ph: (506) 455-1085, fax: (506) 455-1088

DATE:	SCALE:
2017/11/03	As Shown
FILE:	FIGURE:
CTM-11-17	1

Table 1. Field measurements for surface water locations SW1, SW7, SW9 and SW10 (Historical summary)

Parameter	Unit	Canadian Guidelines for the Protection of Aquatic Life (1)	SW1													
			Oct 27/17	Apr 21/17	Oct 25/16	Apr 26/16	Nov 5/15	May 8/15	Oct 27/14	May 21/14	Oct 11/13	Apr 23/13	Oct 4/12	May 2/12	Nov 18/11	May 26/11
Estimated flow	L/sec			60	10	3	n/a	5	3	16	2	12	12	36	10	45
Temperature	°C		12.9	3.7	6.0	9.7	7.4	8.1	8.6	10.7	8.6	3.3	12.9	8.4	3.7	13.3
pH	units	6.5 - 9.0	6.7	8.8	7.5	7.4	7.1	7.0	7.4	6.7	8.0	9.0	7.9	7.8	6.7	7.5
Conductivity	mS/cm		0.53	0.01	0.29	0.23	0.16	0.28	0.17	0.20	0.12	0.16	0.19	0.21	0.21	0.25
Salinity	mg/L		0.26	0.00	0.14	0.11	0.08	0.13	0.08	0.10	0.06	0.08	0.09	0.10	0.10	0.10
Total Dissolved Solids (calculated)	g/L		0.34	0.01	0.19	0.15	0.11	0.18	0.11	0.13	0.08	0.11	0.13	0.14	0.14	0.14
Dissolved Oxygen	%		59	78	88	95	80	-	-	-	-	-	-	-	-	-
Dissolved Oxygen	mg/L	> 6.5	6.2	10.3	11.0	10.8	9.7	9.0	9.6	8.6	9.4	10.3	7.1	9.6	8.9	8.1

Parameter	Unit	Canadian Guidelines for the Protection of Aquatic Life (1)	SW7										
			Oct 27/17	Apr 21/17	Oct 25/16	Apr 26/16	Nov 5/15	May 8/15	Oct 27/14	May 21/14	Oct 13/10	June 9/10	May 11/10
Estimated flow	L/sec		177	80	28	13	37	17	17	63	0	stagnant	42
Temperature	°C		13.2	3.0	7.8	6.9	7.5	7.4	9.2	9.8	8.9	11.4	7.4
pH	units	6.5 - 9.0	**5.2**	8.2	7.0	6.8	6.6	6.8	6.9	**5.9**	7.1	6.5	7.3
Conductivity	mS/cm		0.29	0.12	0.34	0.05	0.21	0.01	0.20	0.18	0.62	0.18	0.18
Salinity	mg/L		0.14	0.05	0.17	0.02	0.09	0.16	0.09	0.08	0.30	0.09	0.08
Total Dissolved Solids (calculated)	g/L		0.19	0.08	0.22	0.03	0.13	0.21	0.13	0.11	0.40	0.12	0.12
Dissolved Oxygen	%		93	92	91	95	84	-	-	-	-	-	-
Dissolved Oxygen	mg/L	> 6.5	9.8	12.4	10.9	11.6	10.1	9.2	10.7	9.8	**6.1**	9.7	11.1

Parameter	Unit	Canadian Guidelines for the Protection of Aquatic Life (1)	SW9						
			Oct 27/17	Nov 08/10	Oct 13/10	June 9/10	May 11/10	Oct 8/09	Sept 24/09
Estimated flow	L/sec		**0**	**0**	**0**	**0**	**stagnant**	**0**	**0**
Temperature	°C		14.93	8.9	0.0	0.0	10.0	0.0	0.0
pH	units	6.5 - 9.0	**6.27**	**6.3**	0.0	0.0	7.2	0.0	0.0
Conductivity	mS/cm		2.1	0.43	0.00	0.00	2.77	0.00	0.00
Salinity	mg/L		1.08	0.21	0.00	0.00	1.45	0.00	0.00
Total Dissolved Solids (calculated)	mg/L		1.363	0.27	0.00	0.00	1.81	0.00	0.00
Dissolved Oxygen	%		24.6						
Dissolved Oxygen	mg/L	> 6.5	**2.47**	8.8	**0.0**	**0.0**	**2.7**	0.0	**0.0**

Parameter	Unit	Canadian Guidelines for the Protection of Aquatic Life (1)	SW10																	
			Oct 27/17	Apr 21/17	Oct 25/16	Apr 26/16	Nov 5/15	May 8/15	Oct 27/14	May 21/14	Oct 11/13	Apr 23/13	Oct 4/12	May 2/12	Nov 18/11	May 26/11	Nov 08/10	Oct 13/10	June 9/10	May 11/10
Estimated flow	L/sec		190	100	36	16	49	18	40	104	7	31	27	162	26	260	224	20	104	stagnant
Temperature	°C		13.1	3.5	7.5	7.2	7.6	7.2	9.2	9.9	9.4	4.8	13.2	7.7	3.7	11.5	8.6	8.4	12.1	8.5
pH	units	6.5 - 9.0	6.5	7.8	6.9	6.7	7.0	7.0	7.2	**5.8**	7.1	7.5	7.1	6.8	**6.2**	6.9	**6.1**	7.2	6.9	7.3
Conductivity	mS/cm		0.41	0.36	0.53	0.57	0.39	0.00	0.36	0.36	0.10	0.26	0.45	0.44	0.39	0.42	0.20	1.06	0.35	0.61
Salinity	mg/L		0.2	0.17	0.26	0.28	0.19	0.27	0.17	0.17	0.04	0.12	0.22	0.21	0.18	0.21	0.10	0.53	0.17	0.30
Total Dissolved Solids (calculated)	g/L		0.27	0.23	0.35	0.37	0.25	0.37	0.23	0.23	0.07	0.17	0.29	0.28	0.26	0.28	0.13	0.69	0.23	0.40
Dissolved Oxygen	%		86	95	92	74	84	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Oxygen	mg/L	> 6.5	9.1	12.6	11.1	8.9	10.1	9.3	11.1	9.8	8.5	12.4	7.3	9.7	10.5	9.7	12.3	8.0	9.2	11.0

SW1 was sampled upstream of the plant, near Quality Way
SW7 was sampled 615 m downstream of SW1
SW9 was sampled at the settling pond
SW10 was sampled downstream of the discharge of the settling pond, immediately upstream of the culvert under the railway tracks
Highlighted values show an increasing trend, and bolded values are outside of the range of the Canadian Water Quality Guidelines for the Protection of Aquatic Life
(1) Canadian Water Quality Guidelines for the Protection of Aquatic Life, Canadian Council of the Ministers of the Environment (2017)

Table 2. Laboratory analyses for surface water locations SW1, SW7, SW9, and SW10 (Historical summary)

Parameter	Unit	Canadian Guidelines for the Protection of Aquatic Life (1)	SW1													
			Oct 27/17	Apr 21/17	Oct 25/16	Apr 26/16	Nov 5/15	May 8/15	Oct 27/14	May 21/14	Oct 11/13	Apr 23/13	Oct 4/12	May 2/12	Nov 18/11	May 26/11
General chemistry																
Calcium	mg/L		64	12	20	18	15	16	13	12	18	12	13	13	15	17
Sulfate	mg/L		171	< 5	7	16	<5	15	6	1	< 1	13	< 5	15	19	9
Sulfide	mg/L		< 0.05	< 0.05	< 0.05	<0.05	<0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	<0.05	< 0.05
Total Suspended Solids	mg/L	<5 to <25 above background	< 5	< 5	< 5	<5	<5	< 5	< 5	< 5	53	160	6	< 5	8	10
Hydrocarbons																
Benzene	mg/L	< 0.370	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Toluene	mg/L	< 0.002	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Ethylbenzene	mg/L	< 0.090	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Xylenes	mg/L		< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
VPH C6-C10 (Less BTEX)	mg/L		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
EPH >C10 - C16	mg/L		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
EPH >C16 - C21	mg/L		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
EPH >C21-C32	mg/L		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Modified TPH Tier 1	mg/L		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1

Parameter	Unit	Canadian Guidelines for the Protection of Aquatic Life (1)	SW7								
			Oct 27/17	Apr 21/17	Oct 25/16	Apr 26/16	Nov 5/15	May 8/15	Oct 27/14	May 21/14	Oct 13/10
General chemistry											
Calcium	mg/L		33	38	48	59	29	42	25	20	107
Sulfate	mg/L		93	88	115	120	60	96	54	33	200
Sulfide	mg/L		< 0.05	< 0.05	< 0.05	<0.05	<0.05	< 0.05	< 0.05	< 0.05	< 0.05
Total Suspended Solids	mg/L	<5 to <25 above background	< 5	< 5	< 5	<5	<5	< 5	< 5	< 5	11
Hydrocarbons											
Benzene	mg/L	< 0.370	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Toluene	mg/L	< 0.002	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Ethylbenzene	mg/L	< 0.090	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Xylenes	mg/L		< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
VPH C6-C10 (Less BTEX)	mg/L		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
EPH >C10 - C16	mg/L		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.06
EPH >C16 - C21	mg/L		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
EPH >C21-C32	mg/L		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Modified TPH Tier 1	mg/L		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1

Parameter	Unit	Canadian Guidelines for the Protection of Aquatic Life (1)	SW9							
			Oct 27/17	Nov 08/10	Oct 13/10	June 9/10	May 11/10	Oct 8/09	Sept 24/09	May 11/08
General chemistry										
Calcium	mg/L		417	67.5	533	224	577	128.	648.	344
Sulfate	mg/L		1010	149	900	280	1000	250	1090	650
Sulphide	mg/L		< 0.05	< 0.05	< 0.05	3	N/D	1.0	0.13	1.9
Total Suspended Solids	mg/L	<5 to <25 above background	< 5	< 5	< 5	< 5	7	7	15	<5
Hydrocarbons										
Benzene	mg/L	< 0.370	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.005
Toluene	mg/L	< 0.002	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.005
Ethylbenzene	mg/L	< 0.090	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.005
Xylenes	mg/L		< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.005
VPH C6-C10 (Less BTEX)	mg/L		< 0.01	< 0.01	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.05
EPH >C10 - C16	mg/L		< 0.05	< 0.05	< 0.05					
EPH >C16 - C21	mg/L		< 0.05	< 0.05	0.12					
EPH >C21-C32	mg/L		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Modified TPH Tier 1	mg/L		< 0.1	< 0.1	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1

Parameter	Unit	Canadian Guidelines for the Protection of Aquatic Life (1)	SW10														
			Oct 27/17	Apr 21/17	Oct 25/16	Apr 26/16	Nov 5/15	May 8/15	Oct 27/14	May 21/14	Oct 11/13	Apr 23/13	Oct 4/12	May 2/12	Nov 18/11	May 26/11	June 9/10
General chemistry																	
Calcium	mg/L		68	54	92	116	74	86	58	52	92	37	57	61	62	59	48
Sulfate	mg/L		160	126	170	230	149	187	104	90	183	78	111	117	130	127	107
Sulfide	mg/L		< 0.05	< 0.05	< 0.05	<0.05	<0.05	0.12	< 0.05	< 0.05	< 0.05	< 0.05	0.65	0.15	0.45	0.12	0.16
Total Suspended Solids	mg/L	<5 to <25 above background	< 5	9.00	< 5	<5	5	< 5	< 5	11	< 5	< 5	9	< 5	<5	9	6
Hydrocarbons																	
Benzene	mg/L	< 0.370	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Toluene	mg/L	< 0.002	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Ethylbenzene	mg/L	< 0.090	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Xylenes	mg/L		< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
VPH C6-C10 (Less BTEX)	mg/L		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
EPH >C10 - C16	mg/L		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.0
EPH >C16 - C21	mg/L		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.0
EPH >C21-C32	mg/L		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Modified TPH Tier 1	mg/L		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1

SW1 was sampled upstream of the plant, near Quality Way
SW7 was sampled 615 m downstream of SW1
SW9 was sampled at the settling pond
SW10 was sampled downstream of the discharge of the settling pond, immediately upstream of the culvert under the railway tracks
Highlighted values show an increasing trend, and bolded values are outside of the range of the Canadian Water Quality Guidelines for the Protection of Aquatic Life
(1) Canadian Water Quality Guidelines for the Protection of Aquatic Life, Canadian Council of the Ministers of the Environment (2017)

NATECH Environmental Services Inc.
2492 Route 640, Hanwell, NB E3E 2C2 Tel.: (506) 455-1085 Fax: (506) 455-1088

July 19, 2018

Ms. Agata Sulkiewicz, Quality & Environment Manager

CertainTeed Gypsum Inc.

57 Quality Way

McAdam, NB

E6J 1B1

Re**: Surface Water Quality Testing - CertainTeed Gypsum, McAdam, NB**

Dear Ms. Sulkiewicz:

Sampling of four surface water stations, as per your 'Approval to Operate' at the CertainTeed Gypsum Inc., McAdam site was carried out on May 30, 2018 by NATECH personnel. The samples were taken at the following locations: SW1 where the stream enters onto the property, SW7 approximately 615 m downstream of SW1, SW9 at the settling pond, and SW10 where the stream exits the property. Figure 1 shows the locations of the surface water monitoring stations.

The surface water samples were analysed for General Chemistry and trace Metals, and petroleum hydrocarbons (BTEX). All samples were analysed at the RPC laboratory in Fredericton. Field measurements were also taken at the four sampling stations with a YSI multi-parameter probe. Measurements included temperature, pH, conductivity, salinity, total dissolved solids, and dissolved oxygen. Stream flows were estimated based on velocity observations and cross-section measurements.

The monitoring results are included in the attached Tables 1, 2 & 3. The following table summarizes the findings.

SURFACE WATER	
Field Measurements	The stream flow at SW1 was at 10 L/sec., at SW7 was 0.2 L/sec, and SW9 & SW10 were stagnant. The dissolved oxygen concentrations were near normal values for season. The pH values were all within range of the Canadian Guidelines for the Protection of Aquatic Life (6.5-9.0) except for SW7 with was recorded at 9.4 by the lab. Conductivity, Salinity and TDS values were within normal range at all locations.
Hydrocarbons	There were no hydrocarbons detected in any of the samples.
Calcium, Sulfate, Sulfide, Total Suspended Solid	Sulfate levels increased slightly at SW9 and SW10, and decreased at SW1 and SW7. Suspended solids readings were increased in all samples.

CONCLUSIONS AND RECOMMENDATIONS
Overall, the water quality appeared to be good. Testing should be continued twice annually.

We trust that this information meets your requirements. Please do not hesitate to call, should you have any questions.

Yours sincerely,

Jochen Schroer, M. Eng., P. Eng., President
NATECH Environmental Services Inc.

JS/tc
Attachments: 3 Tables, 1 Figure
ref.:...\Docs 2018\CertainTeed Monitoring - Spring 2018

Table 1. Field measurements for surface water locations SW1, SW7, SW9 and SW10 (Historical summary)

Parameter	Unit	Canadian Guidelines for the Protection of Aquatic Life (1)	SW1														
			May 30/18	Oct 27/17	Apr 21/17	Oct 25/16	Apr 26/16	Nov 5/15	May 8/15	Oct 27/14	May 21/14	Oct 11/13	Apr 23/13	Oct 4/12	May 2/12	Nov 18/11	May 26/11
Estimated flow	L/sec		10		60	10	3	n/a	5	3	16	2	12	12	36	10	45
Temperature	°C		21.3	12.9	3.7	6.0	9.7	7.4	8.1	8.6	10.7	8.6	3.3	12.9	8.4	3.7	13.3
pH	units	6.5 - 9.0	7.6	6.7	8.8	7.5	7.4	7.1	7.0	7.4	6.7	8.0	9.0	7.9	7.8	6.7	7.5
Conductivity	mS/cm		0.23	0.53	0.01	0.29	0.23	0.16	0.28	0.17	0.20	0.12	0.16	0.19	0.21	0.21	0.25
Salinity	mg/L		0.11	0.26	0.00	0.14	0.11	0.08	0.13	0.08	0.10	0.06	0.08	0.09	0.10	0.10	0.10
Total Dissolved Solids (calculated)	g/L		0.15	0.34	0.01	0.19	0.15	0.11	0.18	0.11	0.13	0.08	0.11	0.13	0.14	0.14	0.14
Dissolved Oxygen	%		63	59	78	88	95	80	-	-	-	-	-	-	-	-	-
Dissolved Oxygen	mg/L	> 6.5	**5.6**	6.2	10.3	11.0	10.8	9.7	9.0	9.6	8.6	9.4	10.3	7.1	9.6	8.9	8.1

Parameter	Unit	Canadian Guidelines for the Protection of Aquatic Life (1)	SW7											
			May 30/18	Oct 27/17	Apr 21/17	Oct 25/16	Apr 26/16	Nov 5/15	May 8/15	Oct 27/14	May 21/14	Oct 13/10	June 9/10	May 11/10
Estimated flow	L/sec		0.2	177	80	28	13	37	17	17	63	0	stagnant	42
Temperature	°C		15.9	13.2	3.0	7.8	6.9	7.5	7.4	9.2	9.8	8.9	11.4	7.4
pH	units	6.5 - 9.0	7.2	**5.2**	8.2	7.0	6.8	6.6	6.8	6.9	**5.9**	7.1	6.5	7.3
Conductivity	mS/cm		0.14	0.29	0.12	0.34	0.05	0.21	0.01	0.20	0.18	0.62	0.18	0.18
Salinity	mg/L		0.07	0.14	0.05	0.17	0.02	0.09	0.16	0.09	0.08	0.30	0.09	0.08
Total Dissolved Solids (calculated)	g/L		0.93	0.19	0.08	0.22	0.03	0.13	0.21	0.13	0.11	0.40	0.12	0.12
Dissolved Oxygen	%		109	93	92	91	95	84	-	-	-	-	-	-
Dissolved Oxygen	mg/L	> 6.5	10.8	9.8	12.4	10.9	11.6	10.1	9.2	10.7	9.8	**6.1**	9.7	11.1

Parameter	Unit	Canadian Guidelines for the Protection of Aquatic Life (1)	SW9							
			May 30/18	Oct 27/17	Nov 08/10	Oct 13/10	June 9/10	May 11/10	Oct 8/09	Sept 24/09
Estimated flow	L/sec		0	**0**	**0**	**0**	**0**	**stagnant**	**0**	**0**
Temperature	°C		22.6	14.93	8.9	0.0	0.0	10.0	0.0	0.0
pH	units	6.5 - 9.0	6.7	**6.27**	**6.3**	0.0	0.0	7.2	0.0	0.0
Conductivity	mS/cm		2.32	2.1	0.43	0.00	0.00	2.77	0.00	0.00
Salinity	mg/L		1.20	1.08	0.21	0.00	0.00	1.45	0.00	0.00
Total Dissolved Solids (calculated)	mg/L		1.52	1.363	0.27	0.00	0.00	1.81	0.00	0.00
Dissolved Oxygen	%		79	25						
Dissolved Oxygen	mg/L	> 6.5	6.7	**2.47**	8.8	**0.0**	**0.0**	**2.7**	0.0	**0.0**

Parameter	Unit	Canadian Guidelines for the Protection of Aquatic Life (1)	SW10																		
			May 30/18	Oct 27/17	Apr 21/17	Oct 25/16	Apr 26/16	Nov 5/15	May 8/15	Oct 27/14	May 21/14	Oct 11/13	Apr 23/13	Oct 4/12	May 2/12	Nov 18/11	May 26/11	Nov 08/10	Oct 13/10	June 9/10	May 11/10
Estimated flow	L/sec		0	190	100	36	16	49	18	40	104	7	31	27	162	26	260	224	20	104	stagnant
Temperature	°C		18.1	13.1	3.5	7.5	7.2	7.6	7.2	9.2	9.9	9.4	4.8	13.2	7.7	3.7	11.5	8.6	8.4	12.1	8.5
pH	units	6.5 - 9.0	7.0	6.5	7.8	6.9	6.7	7.0	7.0	7.2	**5.8**	7.1	7.5	7.1	6.8	**6.2**	6.9	**6.1**	7.2	6.9	7.3
Conductivity	mS/cm		0.92	0.41	0.36	0.53	0.57	0.39	0.00	0.36	0.36	0.10	0.26	0.45	0.44	0.39	0.42	0.20	1.06	0.35	0.61
Salinity	mg/L		0.46	0.2	0.17	0.26	0.28	0.19	0.27	0.17	0.17	0.04	0.12	0.22	0.21	0.18	0.21	0.10	0.53	0.17	0.30
Total Dissolved Solids (calculated)	g/L		6.00	0.27	0.23	0.35	0.37	0.25	0.37	0.23	0.23	0.07	0.17	0.29	0.28	0.26	0.28	0.13	0.69	0.23	0.40
Dissolved Oxygen	%		87	86	95	92	74	84	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Oxygen	mg/L	> 6.5	8.2	9.1	12.6	11.1	8.9	10.1	9.3	11.1	9.8	8.5	12.4	7.3	9.7	10.5	9.7	12.3	8.0	9.2	11.0

SW1 was sampled upstream of the plant, near Quality Way
SW7 was sampled 615 m downstream of SW1
SW9 was sampled at the settling pond
SW10 was sampled downstream of the discharge of the settling pond, immediatly upstream of the culvert under the railway tracks
Highlighted values show an increasing trend, and bolded values are outside of the range of the Canadian Water Quality Guidelines for the Protection of Aquatic Life
(1) Canadian Water Quality Guidelines for the Protection of Aquatic Life, Canadian Council of the Ministers of the Environment (2017)

Table 2. Laboratory analyses for surface water locations SW1, SW7, SW9, and SW10 (Historical summary)

Parameter	Unit	Canadian Guidelines for the Protection of Aquatic Life (1)	SW1														
			May 30/18	Oct 27/17	Apr 21/17	Oct 25/16	Apr 26/16	Nov 5/15	May 8/15	Oct 27/14	May 21/14	Oct 11/13	Apr 23/13	Oct 4/12	May 2/12	Nov 18/11	May 26/11
General chemistry																	
Calcium	mg/L		32.6	64	12	20	18	15	16	13	12	18	12	13	13	15	17
Sulfate	mg/L		52	171	< 5	7	16	<5	15	6	1	< 1	13	< 5	15	19	9
Sulfide	mg/L		< 0.05	< 0.05	< 0.05	< 0.05	<0.05	<0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	<0.05	< 0.05
Total Suspended Solids	mg/L	<5 to <25 above background	**51**	< 5	< 5	< 5	<5	<5	< 5	< 5	< 5	53	160	6	< 5	8	10
Hydrocarbons																	
Benzene	mg/L	< 0.370	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Toluene	mg/L	< 0.002	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Ethylbenzene	mg/L	< 0.090	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Xylenes	mg/L		< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
VPH C6-C10 (Less BTEX)	mg/L		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
EPH >C10 - C16	mg/L		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
EPH >C16 - C21	mg/L		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
EPH >C21-C32	mg/L		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Modified TPH Tier 1	mg/L		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1

Parameter	Unit	Canadian Guidelines for the Protection of Aquatic Life (1)	SW7									
			May 30/18	Oct 27/17	Apr 21/17	Oct 25/16	Apr 26/16	Nov 5/15	May 8/15	Oct 27/14	May 21/14	Oct 13/10
General chemistry												
Calcium	mg/L		17.9	33	38	48	59	29	42	25	20	107
Sulfate	mg/L		37	93	88	115	120	60	96	54	33	200
Sulfide	mg/L		< 0.05	< 0.05	< 0.05	< 0.05	<0.05	<0.05	< 0.05	< 0.05	< 0.05	< 0.05
Total Suspended Solids	mg/L	<5 to <25 above background	**22**	< 5	< 5	< 5	<5	<5	< 5	< 5	< 5	11
Hydrocarbons												
Benzene	mg/L	< 0.370	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Toluene	mg/L	< 0.002	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Ethylbenzene	mg/L	< 0.090	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Xylenes	mg/L		< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
VPH C6-C10 (Less BTEX)	mg/L		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
EPH >C10 - C16	mg/L		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.06
EPH >C16 - C21	mg/L		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
EPH >C21-C32	mg/L		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Modified TPH Tier 1	mg/L		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1

Parameter	Unit	Canadian Guidelines for the Protection of Aquatic Life (1)	SW9								
			May 30/18	Oct 27/17	Nov 08/10	Oct 13/10	June 9/10	May 11/10	Oct 8/09	Sept 24/09	May 11/08
General chemistry											
Calcium	mg/L		607.	417	67.5	533	224	577	128.	648.	344
Sulfate	mg/L		1320	1010	149	900	280	1000	250	1090	650
Sulphide	mg/L		< 0.05	< 0.05	< 0.05	< 0.05	3	N/D	1.0	0.13	1.9
Total Suspended Solids	mg/L	<5 to <25 above background	**15**	< 5	< 5	< 5	< 5	7	7	15	<5
Hydrocarbons											
Benzene	mg/L	< 0.370	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.005
Toluene	mg/L	< 0.002	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.005
Ethylbenzene	mg/L	< 0.090	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.005
Xylenes	mg/L		< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.005
VPH C6-C10 (Less BTEX)	mg/L		< 0.01	< 0.01	< 0.01	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.05
EPH >C10 - C16	mg/L		< 0.05	< 0.05	< 0.05	< 0.05					
EPH >C16 - C21	mg/L		< 0.05	< 0.05	< 0.05	0.12					
EPH >C21-C32	mg/L		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Modified TPH Tier 1	mg/L		< 0.1	< 0.1	< 0.1	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1

Parameter	Unit	Canadian Guidelines for the Protection of Aquatic Life (1)	SW10															
			May 30/18	Oct 27/17	Apr 21/17	Oct 25/16	Apr 26/16	Nov 5/15	May 8/15	Oct 27/14	May 21/14	Oct 11/13	Apr 23/13	Oct 4/12	May 2/12	Nov 18/11	May 26/11	June 9/10
General chemistry																		
Calcium	mg/L		180.	68	54	92	116	74	86	58	52	92	37	57	61	62	59	48
Sulfate	mg/L		370	160	126	170	230	149	187	104	90	183	78	111	117	130	127	107
Sulfide	mg/L		< 0.05	< 0.05	< 0.05	< 0.05	<0.05	<0.05	0.12	< 0.05	< 0.05	< 0.05	< 0.05	0.65	0.15	0.45	0.12	0.16
Total Suspended Solids	mg/L	<5 to <25 above background	5	< 5	9.00	< 5	<5	5	< 5	< 5	11	< 5	< 5	9	< 5	<5	9	6
Hydrocarbons																		
Benzene	mg/L	< 0.370	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Toluene	mg/L	< 0.002	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Ethylbenzene	mg/L	< 0.090	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Xylenes	mg/L		< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
VPH C6-C10 (Less BTEX)	mg/L		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
EPH >C10 - C16	mg/L		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.0
EPH >C16 - C21	mg/L		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.0
EPH >C21-C32	mg/L		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Modified TPH Tier 1	mg/L		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1

SW1 was sampled upstream of the plant, near Quality Way
SW7 was sampled 615 m downstream of SW1
SW9 was sampled at the settling pond
SW10 was sampled downstream of the discharge of the settling pond, immediately upstream of the culvert under the railway tracks
Highlighted values show an increasing trend, and bolded values are outside of the range of the Canadian Water Quality Guidelines for the Protection of Aquatic Life
(1) Canadian Water Quality Guidelines for the Protection of Aquatic Life, Canadian Council of the Ministers of the Environment (2017)

Table 3. Laboratory analyses for surface water samples

Parameter	Unit	SW1 (stream)	SW7 (stream)	SW9 (leachate)	SW10 (stream)	Surface Water Quality Guidelines (1)
		May 30/18	May 30/18	May 30/18	May 30/18	
General chemistry - Measurements						
Ammonia (as N)	mg/L	0.05	< 0.05	< 0.05	< 0.05	<0.29 to <2.7
pH	units	6.9	6.4	7.6	7.2	6.5 - 9.0
Alkalinity (as CaCO3)	mg/L	32	9	200	140	
Chloride	mg/L	52.6	12.0	66.1	23.1	
Sulfate	mg/L	52	37	1320	370	
Sulfide	mg/L	< 0.05	< 0.05	< 0.05	< 0.05	
Nitrate + Nitrite (as N)	mg/L	< 0.05	< 0.05	< 0.25	< 0.05	<2.9
o-Phosphate (as P)	mg/L	< 0.01	< 0.01	< 0.01	< 0.01	
r-Silica (as SiO2)	mg/L	6.0	4.8	6.0	11.4	
Carbon - Total Organic	mg/L	13.7	12.2	44	7.3	
Turbidity	NTU	3.8	5.1	6.6	3.8	<+2 or <+8
Solids - Total Suspended	mg/L	51	22	15	5	<+5 or <+25
Conductivity	µS/cm	359	156	2570	1010	
General chemistry - Calculated parameters						
Bicarbonate (as $CaCO_3$)	mg/L	32.0	9.0	199.	140.	
Carbonate (as $CaCO_3$)	mg/L	0.024	0.002	0.745	0.208	
Hydroxide (as $CaCO_3$)	mg/L	0.004	0.001	0.020	0.008	
Cation Sum	meq/L	3.44	1.38	33.0	10.5	
Anion Sum	meq/L	3.21	1.29	33.3	11.2	
Percent Difference	%	3.58	3.26	-0.54	-3.06	
Theoretical Conductivity	µS/cm	352	154	2940	1070	
Hardness (as $CaCO_3$)	mg/L	90.1	48.3	1540	477	
Ion Sum	mg/L	203	88	2180	700	
Saturation pH (5°C)	units	8.6	**9.4**	6.8	7.3	
Langelier Index (5°C)	-	-1.70	-2.96	0.82	-0.13	
Trace metals						
Aluminum	µg/L	**363**	**408**	84	42	<100
Antimony	µg/L	0.2	0.1	0.8	0.1	
Arsenic	µg/L	1	< 1	< 5	2	<5
Barium	µg/L	32	8	34	28	
Beryllium	µg/L	< 0.1	< 0.1	< 0.5	< 0.1	
Bismuth	µg/L	< 1	< 1	< 5	< 1	
Boron	µg/L	17	8	606	697	<1,500
Cadmium	µg/L	0.06	0.02	0.28	0.06	<0.09
Calcium	µg/L	32600	17900	607000	180000	
Chromium	µg/L	< 1	< 1	< 5	< 1	<1.0 to <8.9
Cobalt	µg/L	8.1	0.6	< 0.5	1.1	
Copper	µg/L	2	1	< 5	1	<2 to <4
Iron	µg/L	**2940**	**910**	**900**	**750**	<300
Lead	µg/L	1.5	0.7	< 0.5	< 0.1	<1 to < 7
Lithium	µg/L	1.3	1.8	1.9	3.8	
Magnesium	µg/L	2110	880	6710	6700	
Manganese	µg/L	1810	114	683	1420	
Molybdenum	µg/L	0.1	0.2	1.3	0.5	<73
Nickel	µg/L	2	1	< 5	7	<25 to <150
Potassium	µg/L	1910	710	5800	4030	
Rubidium	µg/L	5.5	1.8	4.9	3.2	
Selenium	µg/L	< 1	< 1	< 5	< 1	<1
Silver	µg/L	< 0.1	< 0.1	< 0.5	< 0.1	<0.1
Sodium	µg/L	31400	7790	44200	17500	
Strontium	µg/L	136	75	4160	996	
Tellurium	µg/L	< 0.1	< 0.1	< 0.5	< 0.1	
Thallium	µg/L	< 0.1	< 0.1	< 0.5	< 0.1	<0.8
Tin	µg/L	< 0.1	< 0.1	< 0.5	< 0.1	
Uranium	µg/L	< 0.1	0.1	1.9	5.3	<15
Vanadium	µg/L	1	1	< 5	< 1	
Zinc	µg/L	**35**	4	8	9	<30
Hydrocarbons						
Benzene	mg/L	< 0.001	< 0.001	< 0.001	< 0.001	<0.370
Toluene	mg/L	< 0.001	< 0.001	< 0.001	< 0.001	<0.002
Ethylbenzene	mg/L	< 0.001	< 0.001	< 0.001	< 0.001	<0.090
Xylenes	mg/L	< 0.001	< 0.001	< 0.001	< 0.001	
VPH C6-C10 (Less BTEX)	mg/L	< 0.01	< 0.01	< 0.01	< 0.01	
EPH >C10 - C16	mg/L	< 0.05	< 0.05	< 0.05	< 0.05	
EPH >C16 - C21	mg/L	< 0.05	< 0.05	< 0.05	< 0.05	
EPH >C21-C32	mg/L	< 0.1	< 0.1	< 0.1	< 0.1	
Modified TPH Tier 1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1	

Note: highlighted values indicate exceedances of the guideline values

(1) Canadian Guidelines for the Protection of Aqautic Life, CCME, 2017

Appendix L-3
Conestoga-Rovers and Associates, 2008

CONESTOGA-ROVERS
& ASSOCIATES

466 Hodgson Road
Fredericton, New Brunswick, Canada E3C 2G5
Telephone: (506) 458-1248 Facsimile: (506) 462-7646
www.CRAworld.com

December 16, 2008 Reference No. 802667-01

Ms. Agata Sulkiewicz
Certainteed Gypsum Canada Inc.
57 Quality Way
McAdam, NB E6J 1B1

Dear Ms. Sulkiewicz:

Re: Summary of Water Sampling Program
Following Completion of Surface Water Quality Improvements, November 2008
Certainteed Gypsum Plant, McAdam, NB

A surface water sampling program was completed on November 3, 2008, following the completion of all surface water quality improvements initiated in 2007 and 2008. Improvements included rock check dams, ditch regrading, pond dredging, terra tubes and hydroseeding (Figure 1). This work was completed in general accordance with CRA's recommendations approved by the NB Department of Environment on September 25, 2007. The recycle pile was also reduced by crushing and incorporation back into the process. At your request, a sludge sample from the stockpile of sludge removed from the ponded area near sample point 9, was also obtained. The following information outlines the monitoring activity and presents the analytical results from the recent and historical sampling events.

The following nine sampling locations, as illustrated on Figure 1, were monitored (where possible): Wells #1, #2, #3 and #4; in the site perimeter ditch, upstream of the operations (location #5); at the inlet of a stream from the east into the perimeter ditch (location #6); at the culvert effluent beneath the train tracks (0 metres downstream, location #10); 30 metres downstream of the effluent point (location #11); and 100 metres downstream of the effluent point (location #12). Field measurements for pH were taken at each sample location and are presented in Table 1.

The water samples were collected in laboratory-supplied bottles and submitted to RPC Laboratories in Fredericton, NB for the analysis of calcium, sulfate, sulphide, total suspended solids and total petroleum hydrocarbon (TPH) with a benzene, toluene, ethyl-benzene and xylene (BTEX) breakdown. The analytical results for the November 2008 sampling event are presented in the attached Table 1, along with the results from previous sampling events for comparison purposes. A copy of the laboratory certificates is also attached. Results showed that suspended solids were not detected at any of the sampling points, indicating the surface water quality improvements are effective.

During the November 3, 2008 site visit, flow measurements were collected from the culvert effluent beneath the train tracks (0 metres downstream, Location #10). These flow measurements were used to determine average flow of water leaving site, which was determined to be 3.3 l/s. The flow data is presented in Appendix A.

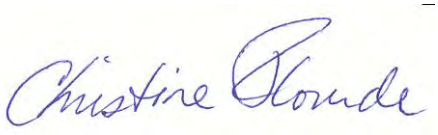
As requested a sample was collected of the sludge that has been removed from the sediment pond and stock piled on-site. The sludge sample was collected in laboratory-supplied bottles and returned to RPC Laboratories. The analytical results are presented in the attached Table 2. Results meet the Canadian Council of Ministers of the Environment (CCME) Canadian Soil Quality Guidelines (SQG) for the Protection of Environmental and Human Health (Update 7.1, December 2007) and therefore it is considered acceptable for the sludge to remain on site. A copy of the laboratory certificates is also attached.

In conclusion, CRA confirms that surface water quality improvements have been completed in general accordance with our recommendations in the Proposed Surface Water Quality Works Plan prepared for Certainteed. Confirmatory surface water sample results indicate consistently low levels (non-detect in most cases) of total suspended solids leaving the Certainteed property. Therefore, CRA considers the Surface Water Quality Improvements project to be complete, and recommends that monitoring frequency be reduced to that required by Certainteed's Approval to Operate.

We trust this information is sufficient for your requirements. Please contact our office should you have any questions.

Yours truly,

CONESTOGA-ROVERS & ASSOCIATES



Christine Plourde, P.Eng.

CP/ad/1
Encl.

c.c.: Ms. Sheryl Johnstone
New Brunswick Department of the Environment

0 20 40 60m

5 UPSTREAM

REMOVED SEDIMENT AND REGRADED EXISTING SWALE

REMOVED SEDIMENT FROM BOTTOM OF CHANNEL

SWALE

ROCK CHECK DAM

3 WELL

2 WELL

1 WELL

ROCK CHECK DAM

ROCK CHECK DAM

10m³ SUMP

CREATE SUMP

DREDGED PONDED AREA

CLEARED AND WIDENED CHANNEL

9 POND

RECYCLE PILE REMOVED TO MATCH SURROUNDING GROUND TO EAST

10 0m DOWNSTREAM

8 DITCH UPSTREAM

11 30m DOWNSTREAM

TERRA TUBES IN OUTLET CHANNEL AT PROPERTY LINE

12 100m DOWNSTREAM

AREAS WITH ESTABLISHED VEGETATION UNDISTURBED

WELL CASING

6 INLET

4 WELL

7 CULVERT

GREEN ARMOUR

WIDENED CHANNEL AND REGRADED DITCH

ROCK CHECK DAM

WIDENED CHANNEL AND REGRADED DITCH

ROCK CHECK DAM

LEGEND

AREA HYDROSEEDED

ROCK CHECK DAM

SAMPLING LOCATION

figure 1

SURFACE WATER QUALITY WORKS & MONITORING LOCATIONS
WATER SAMPLING PROGRAM
CERTAINTEED GYPSUM CANADA INC.
McAdam, New Brunswick

802667-01(SULKIEWICZ001)GN-FR001 DEC 16/2008

Table 1
Water Analytical Results, mg/L
CertainTeed Gypsum Canada Inc.
McAdam, NB

Analyte	*Date*	*Well #1*	*Well #2*	*Well #3*	*Well #4*	*Upstream (In Swale)*	*Inlet (from Stream)*	*Culvert 1 Out*	*Swale to Culvert 2 (Stream)*	*Pond (Culvert 2 In)*	*Downstream 0 metres (Culvert Out)*	*Downstream 30 metres*	*Downstream 100 metres*	*Comments*
		(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**	**(10)**	**(11)**	**(12)**	
Calcium (mg/L)	6-Jun-95	NS	49.6	50.9	30.1	NS	NS	NS	NS	NS	NS	65.1	NS	
	28-Sep-95	NS	67.5	68.8	42.9	NS	NS	NS	NS	NS	NS	420	NS	
	27-May-96	NS	84.3	75.6	50.2	NS	NS	NS	NS	NS	NS	72.7	68.1	
	26-Sep-96	NS	66.7	68.7	51.2	NS	NS	NS	NS	NS	NS	128	133	
	21-May-97	NS	83.7	79.7	48.3	NS	NS	NS	NS	NS	NS	124	127	
	9-Sep-97	NS	80	78.2	49	NS	NS	NS	NS	NS	NS	477	475	
	11-May-98	NS	100.6	83.9	56.7	NS	NS	NS	NS	NS	NS	143	142	
	14-Sep-98	NS	92.9	90.1	58.2	NS	NS	NS	NS	NS	NS	619	555	
	13-May-99	NS	88.1	90.8	59	NS	NS	NS	NS	NS	NS	211	288	
	24-Sep-99	NS	83	97	54.4	NS	NS	NS	NS	NS	NS	223	328	
	29-May-00	NS	88.4	84.6	50.7	7.04	NS	NS	NS	NS	NS	67.5	69.4	
	25-Sep-00	NS	71	89.8	54.1	NS	NS	NS	NS	NS	NS	537	583	
	9-Oct-01	NS	75.5	66.1	53.1	NS	NS	NS	NS	NS	NS	479	473	
	20-Jun-02	NS	115	65.5	74.1	NS	NS	NS	NS	NS	NS	219	238	
	21-Oct-02	75.5	107	67.4	77.3	NS	NS	NS	NS	NS	NS	444	443	
	8-Sep-03	82.3	108	69.6	69	NS	NS	NS	NS	NS	NS	544	514	
	15-Apr-04	90	98.8	83	65.4	8.08	NS	NS	NS	NS	NS	45.3	53.7	
	7-Sep-04	85.2	103 unfiltered	66.2	56.2	14.1	NS	NS	NS	NS	NS	152	156	
							NS	NS	NS	NS				
			102 filtered				NS	NS	NS	NS				
							NS	NS	NS	NS				
	7-Apr-05	45.4	80.6	81.6	55.7	4.45	NS	NS	NS	NS	NS	45.9	46.4	
	8-Sep-05	72.2	129	67.6	52.9	54.2	NS	NS	NS	NS	NS	398	382	
	8-Oct.-05	NS	NS	NS	NS	104	NS	536	NS	NS	78	343	353	
	3-May-06	80.4	111	77	51.4	117	NS	NS	NS	NS	NS	35.2	37	
	5-Oct-06	73.6	113	73.2	46	492	190	386	413	463	441	431	407	
	19-Apr-07	79.1	124	76.2	48.2	254	10.9	35	29.3	350	46	43.7	42.2	
	21-Sep-07	79.4	115	69.4	43	NS	NS	399	NS	NS	NS	NS	NS	
	7-Dec-07	NS	NS	NS	NS	NS	21.8	23.4	75	105	82.4	103	102	Dry event
	30-Apr-08	75.4	147	82.9	48.2	472	9.7	40.9	44.4	308	71.6	60.6	62.3	Rain event
	3-Nov-08	84.4	112	97.8	46.9	32.4	8.39	NS	NS	NS	79.3	78.6	76	3.3 L/S Flow
Sulphate (mg/L)	6-Jun-95	NS	32	17.7	15.9	NS	NS	NS	NS	NS	NS	123	NS	
	28-Sep-95	NS	23.8	23.4	13.3	NS	NS	NS	NS	NS	NS	815	NS	
	27-May-96	NS	120	24	24.3	NS	NS	NS	NS	NS	NS	339	338	
	26-Sep-96	NS	72	30.5	31.1	NS	NS	NS	NS	NS	NS	230	231	
	21-May-97	NS	103	36.8	25.4	NS	NS	NS	NS	NS	NS	230	244	
	9-Sep-97	NS	43	32	26.9	NS	NS	NS	NS	NS	NS	740	860	
	11-May-98	NS	130	46.6	38.5	NS	NS	NS	NS	NS	NS	283	288	
	14-Sep-98	NS	81	53	37.6	NS	NS	NS	NS	NS	NS	1100	1100	
	13-May-99	NS	106	58	39.7	NS	NS	NS	NS	NS	NS	436	620	
	24-Sep-99	NS	89	51	43	NS	NS	NS	NS	NS	NS	470	560	
	29-May-00	NS	91	88	37	12.5	NS	NS	NS	NS	NS	150	205	
	25-Sep-00	NS	93	73	47	NS	NS	NS	NS	NS	NS	1100	1370	
	9-Oct-01	NS	42.1	29.8	43.1	NS	NS	NS	NS	NS	NS	994	1080	
	20-Jun-02	NS	202	22.6	79.5	NS	NS	NS	NS	NS	NS	320	340	

Table 1
Water Analytical Results, mg/L
CertainTeed Gypsum Canada Inc.
McAdam, NB

Analyte	*Date*	*Well #1*	*Well #2*	*Well #3*	*Well #4*	*Upstream (In Swale)*	*Inlet (from Stream)*	*Culvert 1 Out*	*Swale to Culvert 2 (Stream)*	*Pond (Culvert 2 In)*	*Downstream 0 metres (Culvert Out)*	*Downstream 30 metres*	*Downstream 100 metres*	*Comments*
		(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**	**(10)**	**(11)**	**(12)**	
Sulfate (mg/L) Continued	21-Oct-02	101	169	29.2	119	NS	NS	NS	NS	NS	NS	710	978	
	8-Sep-03	95	182	34	87	NS	NS	NS	NS	NS	NS	1190	1150	
	15-Apr-04	109	134	79	70	19	NS	NS	NS	NS	NS	96	108	
	7-Sep-04	86	130	26	45	17	NS	NS	NS	NS	NS	300	280	
	7-Apr-05	35	64	48	60	11	NS	NS	NS	NS	NS	95	95	
	8-Sep-05	70	241	35	62	130	NS	NS	NS	NS	NS	790	800	
	8-Oct.-05	NS	NS	NS	NS	240	190	1140	NS	520	740	700	840	
	3-May-06	98	162	72	42	110	NS	NS	NS	NS	NS	90	98	
	5-Oct-06	100	220	70	34	1280	340	470	480	860	580	740	480	
	19-Apr-07	70	210	47	46	700	24	700	70	600	80	70	70	
	21-Sep-07	110	240	43	39	NS	NS	1000	NS	NS	NS	NS	NS	
	7-Dec-07	NS	NS	NS	NS	NS	50	80	170	230	180	220	220	Dry event
	30-Apr-08	70	290	49	45	1110	27	94	95	640	148	128	134	Rain event
	3-Nov-08	120	170	120	35	44	9	NS	NS	NS	150	130	140	3.3 L/S Flow
Sulphide (mg/L)	14-Sep-98	NS	<0.05	<0.05	<0.05	NS	NS	NS	NS	NS	NS	<0.05	<0.05	
	13-May-99	NS	0.03	0.007	0.007	NS	NS	NS	NS	NS	NS	0.1	0.195	
	24-Sep-99	NS	<0.05	<0.05	<0.05	NS	NS	NS	NS	NS	NS	0.19	0.22	
	29-May-00	NS	<0.05	<0.05	<0.05	<0.05	NS	NS	NS	NS	NS	0.15	0.07	
	25-Sep-00	NS	<0.05	<0.05	<0.05	NS	NS	NS	NS	NS	NS	0.2	<0.05	
	9-Oct-01	NS	<0.05	<0.05	<0.05	NS	NS	NS	NS	NS	NS	<0.05	<0.05	
	20-Jun-02	NS	<0.05	<0.05	<0.05	NS	NS	NS	NS	NS	NS	0.17	<0.05	
	21-Oct-02	<0.05	<0.05	<0.05	<0.05	NS	NS	NS	NS	NS	NS	<0.05	<0.05	
	8-Sep-03	<0.05	<0.05	<0.05	<0.05	NS	NS	NS	NS	NS	NS	<0.05	<0.05	
	15-Apr-04	<0.05	<0.05	<0.05	<0.05	<0.05	NS	NS	NS	NS	NS	<0.05	<0.05	
	7-Sep-04	<0.05	3	<0.05	<0.05	<0.05	NS	NS	NS	NS	NS	0.4	0.13	
	7-Apr-05	<0.05	<0.05	<0.05	<0.05	<0.05	NS	NS	NS	NS	NS	0.9	0.25	
	8-Sep-05	<0.05	<0.05	<0.05	<0.05	<0.05	NS	NS	NS	NS	NS	<0.05	<0.05	
	8-Oct.-05	NS	NS	NS	NS	<0.05	<0.05	<0.05	NS	<0.05	<0.05	<0.05	<0.045	
	3-May-06	<0.05	0.07	<0.05	<0.05	<0.05	NS	NS	NS	NS	NS	<0.05	<0.05	
	5-Oct-06	<0.05	<0.05	<0.05	<0.05	<0.05	0.07	0.08	<0.05	5	0.6	0.21	0.1	
	19-Apr-07	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	8	0.9	0.8	0.2	
	19-Apr-07	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	8	0.9	0.8	0.2	
	21-Sep-07	<0.05	<0.05	<0.05	<0.05	NS	NS	0.15	NS	NS	NS	NS	NS	
	7-Dec-07	NS	NS	NS	NS	NS	<0.05	<0.05	<0.05	4	1.1	2	0.1	Dry event
	30-Apr-08	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	2.7	0.08	0.09	<0.05	Rain event
	3-Nov-08	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	NS	NS	NS	1.3	0.9	0.1	3.3 L/S Flow

Table 1
Water Analytical Results, mg/L
CertainTeed Gypsum Canada Inc.
McAdam, NB

Analyte	*Date*	*Well #1*	*Well #2*	*Well #3*	*Well #4*	*Upstream (In Swale)*	*Inlet (from Stream)*	*Culvert 1 Out*	*Swale to Culvert 2 (Stream)*	*Pond (Culvert 2 In)*	*Downstream 0 metres (Culvert Out)*	*Downstream 30 metres*	*Downstream 100 metres*	*Comments*
		(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**	**(10)**	**(11)**	**(12)**	
Total Suspended Solids (mg/L)	6-Jun-95	NS	2	<2.0	<2.0	NS	NS	NS	NS	NS	NS	7	NS	
	28-Sep-95	NS	<2.0	<2.0	<2.0	NS	NS	NS	NS	NS	NS	4	NS	
	27-May-96	NS	2	3	2	NS	NS	NS	NS	NS	NS	2	3	
	26-Sep-96	NS	<2.0	<2.0	<2.0	NS	NS	NS	NS	NS	NS	4	3	
	21-May-97	NS	12	2	<2.0	NS	NS	NS	NS	NS	NS	15	10	
	9-Sep-97	NS	5	3	6	NS	NS	NS	NS	NS	NS	52	4	
	11-May-98	NS	5	3	6	NS	NS	NS	NS	NS	NS	4	5	
	14-Sep-98	NS	<2.0	5	4	NS	NS	NS	NS	NS	NS	9	3	
	13-May-99	NS	<2.0	<2.0	<2.0	NS	NS	NS	NS	NS	NS	32	90	
	24-Sep-99	NS	14	8	5	NS	NS	NS	NS	NS	NS	171	150	
	29-May-00	NS	<2.0	<2.0	3	3	NS	NS	NS	NS	NS	3	3	
	25-Sep-00	NS	120	219	79	NS	NS	NS	NS	NS	NS	745	555	
	9-Oct-01	NS	5	4	3	NS	NS	NS	NS	NS	NS	12	9	
	20-Jun-02	NS	<2	<2	<2	NS	NS	NS	NS	NS	NS	<2	<2	
	21-Oct-02	<2	<2	<2	<2	NS	NS	NS	NS	NS	NS	3	4	
	8-Sep-03	<5	<5	5	<5	NS	NS	NS	NS	NS	NS	33	11	
	15-Apr-04	<5	8	<5	<5	<5	NS	NS	NS	NS	NS	19	<5	
	7-Sep-04	<5	24	<5	<5	7	NS	NS	NS	NS	NS	<5	6	
			221				NS	NS	NS	NS	NS			
	7-Apr-05	<5	<5	<5	<5	<5	NS	NS	NS	NS	NS	<5	<5	
	8-Sep-05	<5	<5	<5	<5	<5	NS	NS	NS	NS	NS	6	14	
	8-Oct-05	NS	NS	NS	NS	6	5	462	NS	56	90	126	98	
	3-May-06	<5	36	<5	<5	<5	NS	NS	NS	NS	NS	<5	<5	
	5-Oct-06	<5	86	<5	<5	5	12	<5	<5	10	15	<5	<5	
	19-Apr-07	<5	<5	<5	<5	<5	<5	<5	7	<5	<5	8	<5	
	21-Sep-07	<5	<5	<5	<5	NS	NS	13	NS	NS	NS	NS	NS	
	7-Dec-07	NS	NS	NS	NS	NS	<5	120	<5	<5	<5	23	<5	Dry event
	30-Apr-08	<5	<5	<5	<5	11	<5	12	<5	5	<5	5	<5	Rain event
	3-Nov-08	<5	<5	<5	<5	<5	<5	NS	NS	NS	<5	<5	<5	3.3 L/S Flow

Table 1
Water Analytical Results, mg/L
CertainTeed Gypsum Canada Inc.
McAdam, NB

Analyte	*Date*	*Well #1*	*Well #2*	*Well #3*	*Well #4*	*Upstream (In Swale)*	*Inlet (from Stream)*	*Culvert 1 Out*	*Swale to Culvert 2 (Stream)*	*Pond (Culvert 2 In)*	*Downstream 0 metres (Culvert Out)*	*Downstream 30 metres*	*Downstream 100 metres*	*Comments*
		(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**	**(10)**	**(11)**	**(12)**	
pH (units) Lab Analyses	6-Jun-95	NA	8.1	8.2	8.2	NS	NS	NS	NS	NS	NS	7.7	NS	
	28-Sep-95	NA	7.5	7.5	7.8	NS	NS	NS	NS	NS	NS	7.4	NS	
	27-May-96	NA	7	7.5	7.6	NS	NS	NS	NS	NS	NS	7	7.2	
	26-Sep-96	NA	7.7	7.8	7.9	NS	NS	NS	NS	NS	NS	7.2	7.1	
	21-May-97	NA	7.4	7.6	7.8	NS	NS	NS	NS	NS	NS	7.3	7.2	
	9-Sep-97	NA	7.9	7.8	8	NS	NS	NS	NS	NS	NS	7.5	7.5	
	11-May-98	NA	7.7	7.8	7.7	NS	NS	NS	NS	NS	NS	7.4	7.2	
	14-Sep-98	NA	7.8	7.8	7.8	NS	NS	NS	NS	NS	NS	7.5	7.6	
	13-May-99	NA	7.6	7.7	7.9	NS	NS	NS	NS	NS	NS	7.3	7.4	
	24-Sep-99	NA	7.6	7.7	7.8	NS	NS	NS	NS	NS	NS	7.1	6.9	
	29-May-00	NA	7.2	7.3	7.6	7.5	NS	NS	NS	NS	NS	7.2	7.2	
	25-Sep-00	NA	7.5	7.5	7.8	NS	NS	NS	NS	NS	NS	7.4	7.6	
	9-Oct-01	NA	7.8	7.8	7.8	NS	NS	NS	NS	NS	NS	7.5	7.6	
	20-Jun-02	NA	7.7	7.7	7.6	NS	NS	NS	NS	NS	NS	7.3	7.3	
	21-Oct-02	NA	NA	NA	NA	NS	NS	NS	NS	NS	NS	NA	NA	
	8-Sep-03	NA	NA	NA	NA	NS	NS	NS	NS	NS	NS	NA	NA	
	15-Apr-04	NA	NA	NA	NA	NA	NS	NS	NS	NS	NS	NA	NA	
	7-Sep-04	NA	NA	NA	NA	NA	NS	NS	NS	NS	NS	NA	NA	
	7-Apr-05	NA	NA	NA	NA	NA	NS	NS	NS	NS	NS	NA	NA	
	8-Sep-05	NA	NA	NA	NA	NA	NS	NS	NS	NS	NS	NA	NA	
pH (units) field measurement	6-Jun-95	NM	7.7	7.8	NM	NM	NM	NM	NM	NM	NM	6.8	NM	
	28-Sep-95	NM	6.4	6.3	7.5	NM	NM	NM	NM	NM	NM	7.2	NM	
	27-May-96	NM	6.9	5.6	7.1	NM	NM	NM	NM	NM	NM	6	6.7	
	26-Sep-96	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	
	21-May-97	NM	6.9	7.14	7.38	NM	NM	NM	NM	NM	NM	6.75	6.72	
	9-Sep-97	NM	7.02	7.2	7.51	NM	NM	NM	NM	NM	NM	6.7	6.81	
	11-May-98	NM	7.1	7.1	7.1	NM	NM	NM	NM	NM	NM	6.9	6.7	

Table 1
Water Analytical Results, mg/L
CertainTeed Gypsum Canada Inc.
McAdam, NB

Analyte		*Date*	*Well #1*	*Well #2*	*Well #3*	*Well #4*	*Upstream (In Swale)*	*Inlet (from Stream)*	*Culvert 1 Out*	*Swale to Culvert 2 (Stream)*	*Pond (Culvert 2 In)*	*Downstream 0 metres (Culvert Out)*	*Downstream 30 metres*	*Downstream 100 metres*	*Comments*
			(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	
pH (units) field measurement Continued		14-Sep-98	NM	6	6.6	6.8	NM	NM	NM	NM	NM	NM	6.7	7	
		13-May-99	NM	6.9	7.14	7.38	NM	NM	NM	NM	NM	NM	6.75	6.72	
		24-Sep-99	NM	7.3	7.3	6.9	NM	NM	NM	NM	NM	NM	6.7	6.7	
		29-May-00	NM	7.47	7.55	7.88	5.03	NM	NM	NM	NM	NM	6.78	7.22	
		25-Sep-00	NM	7.41	7.48	7.74	NM	NM	NM	NM	NM	NM	7.27	7.59	
		9-Oct-01	NM	6.84	7.18	7.23	NM	NM	NM	NM	NM	NM	6.98	6.82	
		20-Jun-02	NM	7.74	7.79	7.86	NM	NM	NM	NM	NM	NM	7.43	7.44	
		21-Oct-02	7.8	7.4	7.5	7.9	NM	NM	NM	NM	NM	NM	8.1	8	
		8-Sep-03	6.63	6.46	6.31	6.59	NM	NM	NM	NM	NM	NM	8.63	8.61	
		15-Apr-04	6.98	7.04	7.29	6.65	7.71	NM	NM	NM	NM	NM	9.19	8.8	
		7-Sep-04	7.48	7.27	7.56	7.5	5.16	NM	NM	NM	NM	NM	7.02	7.04	
		7-Apr-05	6.95	6.99	7.08	6.69	7.66	NM	NM	NM	NM	NM	9.11	8.72	
		8-Sep-05	7.95	7.45	7.81	7.74	6.31	NM	NM	NM	NM	NM	7.27	7.32	
		8-Oct-05	NM	NM	NM	NM	6.02	5.76	7.65	NM	6.56	6.49	6.37	6.24	
		3-May-06	7.5	7.4	7.5	7.7	7.4	NM	NM	NM	NM	NM	7.9	7.4	
		5-Oct-06	8.1	7.8	8	7.9	7.4	7.6	7.6	7.4	7.2	7.3	7.3	7.4	
		19-Apr-07	7.3	7.2	7.2	7.4	7.1	6.9	7.5	7.3	6.9	7	7.6	7.3	
		21-Sep-07	7.4	7.5	7.5	7.6	NM	NM	7.9	NM	NM	NM	NM	NM	
		7-Dec-07	NS	NS	NS	NS	NS	5	5.4	7.1	6.7	6.8	6.9	6.7	Dry event
		30-Apr-08	7.8	7.8	7.8	7.3	6.1	6	6.7	8.1	7.3	8.3	8.6	10.1	Rain event
		3-Nov-08	7.8	7.7	7.7	7.5	7.1	7.2	NS	NS	NS	7	7	7	3.3 L/S Flow
Benzene (mg/L)		8-Sep-05	<0.001	<0.001	<0.001	<0.001	<0.001	NS	NS	NS	NS	NS	<0.001	<0.001	
Toluene (mg/L)			<0.001	<0.001	<0.001	<0.001	<0.001	NS	NS	NS	NS	NS	<0.001	<0.001	
Ethyl-Benzene (mg/L)			<0.001	<0.001	<0.001	<0.001	<0.001	NS	NS	NS	NS	NS	<0.001	<0.001	
Xylenes (mg/L)			<0.001	<0.001	<0.001	<0.001	<0.001	NS	NS	NS	NS	NS	<0.001	<0.001	
Total Petroleum Hydrocarbons, TPH (mg/L)	C_6-C_{10} (less BTEX)		<0.01	<0.01	<0.01	<0.01	<0.01	NS	NS	NS	NS	NS	<0.01	<0.01	
	C_{10}-C_{21}		<0.05	<0.05	<0.05	<0.05	<0.05	NS	NS	NS	NS	NS	0.1	0.11	
	C_{21}-C_{32}		<0.1	<0.1	<0.1	<0.1	<0.1	NS	NS	NS	NS	NS	<0.1	<0.1	
Modified TPH (mg/L)			<0.1	<0.1	<0.1	<0.1	<0.1	NS	NS	NS	NS	NS	0.1	0.1	
Benzene (mg/L)		21-Sep-07	<0.001	<0.001	<0.001	<0.001	NS	NS	<0.001	NS	NS	NS	NS	NS	
Toluene (mg/L)			<0.001	<0.001	<0.001	<0.001	NS	NS	<0.001	NS	NS	NS	NS	NS	
Ethyl-Benzene (mg/L)			<0.001	<0.001	<0.001	<0.001	NS	NS	<0.001	NS	NS	NS	NS	NS	
Xylenes (mg/L)			<0.001	<0.001	<0.001	<0.001	NS	NS	<0.001	NS	NS	NS	NS	NS	
Total Petroleum Hydrocarbons, TPH (mg/L)	C_6-C_{10} (less BTEX)		<0.01	<0.01	<0.01	<0.01	NS	NS	<0.01	NS	NS	NS	NS	NS	
	C_{10}-C_{21}		<0.05	<0.05	<0.05	<0.05	NS	NS	0.05	NS	NS	NS	NS	NS	
	C_{21}-C_{32}		<0.1	<0.1	<0.1	<0.1	NS	NS	0.6	NS	NS	NS	NS	NS	
Modified TPH (mg/L)			<0.1	<0.1	<0.1	<0.1	NS	NS	0.7	NS	NS	NS	NS	NS	

Table 1
Water Analytical Results, mg/L
CertainTeed Gypsum Canada Inc.
McAdam, NB

Analyte		*Date*	*Well #1*	*Well #2*	*Well #3*	*Well #4*	*Upstream (In Swale)*	*Inlet (from Stream)*	*Culvert 1 Out*	*Swale to Culvert 2 (Stream)*	*Pond (Culvert 2 In)*	*Downstream 0 metres (Culvert Out)*	*Downstream 30 metres*	*Downstream 100 metres*	*Comments*
			(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**	**(10)**	**(11)**	**(12)**	
Benzene (mg/L)		21-Sep-07	<0.001	<0.001	<0.001	<0.001	NS	NS	<0.001	NS	NS	NS	NS	NS	
Toluene (mg/L)			<0.001	<0.001	<0.001	<0.001	NS	NS	<0.001	NS	NS	NS	NS	NS	
Ethyl-Benzene (mg/L)			<0.001	<0.001	<0.001	<0.001	NS	NS	<0.001	NS	NS	NS	NS	NS	
Xylenes (mg/L)			<0.001	<0.001	<0.001	<0.001	NS	NS	<0.001	NS	NS	NS	NS	NS	
Total Petroleum Hydrocarbons, TPH (mg/L)	C_6-C_{10} (less BTEX)		<0.01	<0.01	<0.01	<0.01	NS	NS	<0.01	NS	NS	NS	NS	NS	
	C_{10}-C_{21}		<0.05	<0.05	<0.05	<0.05	NS	NS	0.05	NS	NS	NS	NS	NS	
	C_{21}-C_{32}		<0.1	<0.1	<0.1	<0.1	NS	NS	0.6	NS	NS	NS	NS	NS	
Modified TPH (mg/L)			<0.1	<0.1	<0.1	<0.1	NS	NS	0.7	NS	NS	NS	NS	NS	
Benzene (mg/L)		7-Dec-07	NS	NS	NS	NS	NS	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	Dry event
Toluene (mg/L)			NS	NS	NS	NS	NS	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
Ethyl-Benzene (mg/L)			NS	NS	NS	NS	NS	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
Xylenes (mg/L)			NS	NS	NS	NS	NS	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
Total Petroleum Hydrocarbons, TPH (mg/L)	C_6-C_{10} (less BTEX)		NS	NS	NS	NS	NS	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
	C_{10}-C_{21}		NS	NS	NS	NS	NS	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	
	C_{21}-C_{32}		NS	NS	NS	NS	NS	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
Modified TPH (mg/L)			NS	NS	NS	NS	NS	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
Benzene (mg/L)		30-Apr-08	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	Rain Event
Toluene (mg/L)			<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
Ethyl-Benzene (mg/L)			<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
Xylenes (mg/L)			<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
Total Petroleum Hydrocarbons, TPH (mg/L)	C_6-C_{10} (less BTEX)		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
	C_{10}-C_{21}		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	
	C_{21}-C_{32}		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
Modified TPH (mg/L)			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
Benzene (mg/L)		3-Nov-08	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	NS	NS	NS	<0.001	<0.001	<0.001	3.3 L/S Flow
Toluene (mg/L)			<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	NS	NS	NS	<0.001	<0.001	<0.001	
Ethyl-Benzene (mg/L)			<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	NS	NS	NS	<0.001	<0.001	<0.001	
Xylenes (mg/L)			<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	NS	NS	NS	<0.001	<0.001	<0.001	
Total Petroleum Hydrocarbons, TPH (mg/L)	C_6-C_{10} (less BTEX)		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	NS	NS	NS	<0.01	<0.01	<0.01	
	C_{10}-C_{21}		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	NS	NS	NS	<0.05	<0.05	<0.05	
	C_{21}-C_{32}		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NS	NS	NS	<0.1	<0.1	<0.1	
Modified TPH (mg/L)			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NS	NS	NS	<0.1	<0.1	<0.1	

Note: **"NS"** **Not Sampled**
"NA" **Not Analyzed**
"NM" **Not Measured**
VSS **Volatile Suspended Solids, mg/L**

1

Table 2
Sludge Analytical Results (mg/kg)
Certainteed Gypsum Canada Inc.
McAdam, NB

Analyte	Date	Sludge Pile	CCME 2007
Aluminum	3-Nov-08	11300	na
Antimony	3-Nov-08	0.1	40
Arsenic	3-Nov-08	4	12
Barium	3-Nov-08	52	na
Beryllium	3-Nov-08	0.5	8
Bismouth	3-Nov-08	<1	na
Boron	3-Nov-08	18	na
Cadmium	3-Nov-08	0.08	22
Calcium	3-Nov-08	96800	na
Chromium	3-Nov-08	18	87
Cobalt	3-Nov-08	6.1	300
Copper	3-Nov-08	10	91
Iron	3-Nov-08	14500	na
Lead	3-Nov-08	10.2	260
Lithium	3-Nov-08	23.1	na
Magnesium	3-Nov-08	5600	na
Manganese	3-Nov-08	371	na
Mercury	3-Nov-08	0.02	24
Molybdenum	3-Nov-08	1.1	40
Nickel	3-Nov-08	15	50
Phosphorus	3-Nov-08	510	na
Potassium	3-Nov-08	1800	na
Rubidium	3-Nov-08	20.9	na
Selenium	3-Nov-08	<1	2.9
Silver	3-Nov-08	<0.1	40
Sodium	3-Nov-08	110	na
Strontium	3-Nov-08	392	na
Tellurium	3-Nov-08	<0.1	na
Thallium	3-Nov-08	0.2	1
Tin	3-Nov-08	<1	300
Uranium	3-Nov-08	1.9	33
Vandium	3-Nov-08	23	130
Zinc	3-Nov-08	46	360
Ammonia (as N)	3-Nov-08	<1	na
Chloride	3-Nov-08	<5	na
Kjeldahl Nitrogen	3-Nov-08	430	na
pH (units)	3-Nov-08	7.4	na

na	Guideline not available
CCME 2007	Canadian Council of Ministers of the Environment, Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health, Update 7.1, December 2007.

RPC
921 College Hill Rd,
Fredericton, N.B. E3B 6Z9
Report No.: 86876-IAS

Conestoga-Rovers & Associates
466 Hodgson Road
Fredericton NB E3C 2G5
Attn: Christine Plourde
Job No.: 802667

November 25, 2007

Fax: 506.462.7646

Analysis of Water

RPC ID	86876-01	86876-02	86876-03	86876-04
Client ID	Well #1 Nov. 03/08	Well #2 Nov. 03/08	Well #3 Nov. 03/08	Well #4 Nov. 03/08
	Concentration (mg/L)			
Calcium	84.4	112	97.8	46.9
Sulfate	120	170	120	35
Sulfide	< 0.05	< 0.05	< 0.05	< 0.05
Total Suspended Solids	< 5	23	< 5	< 5

A. Ross Kean, M.Sc.
Department Head
Inorganic Analytical Chemistry

Peter Crowhurst, B.Sc., C.Chem.
Analytical Chemist
Inorganic Analytical Chemistry

RPC
921 College Hill Rd,
Fredericton, N.B. E3B 6Z9
Report No.: 86876-IAS

Conestoga-Rovers & Associates
466 Hodgson Road
Fredericton NB E3C 2G5
Attn: Christine Plourde
Job No.: 802667

November 25, 2007

Fax: 506.462.7646

Analysis of Water

RPC ID	86876-05	86876-06	86876-07	86876-08	86876-09
Client ID	Upstream Nov. 03/08	Inlet Nov. 03/08	0m Downstream Nov. 03/08	30m Downstream Nov. 03/08	100m Downstream Nov. 03/08
	Concentration (mg/L)				
Calcium	32.4	8.39	79.3	78.6	76.0
Sulfate	44	9	150	130	140
Sulfide	< 0.05	< 0.05	1.3	0.9	0.10
Total Suspended Solids	< 5	< 5	< 5	< 5	< 5

A. Ross Kean, M.Sc.
Department Head
Inorganic Analytical Chemistry

Peter Crowhurst, B.Sc., C.Chem.
Analytical Chemist
Inorganic Analytical Chemistry

Report ID: 86876-OAS
Report Date: 12-Nov-08
Date Received: 05-Nov-08

Attention: Christine Plourde
Fax: 506.462.7646
cplourde@craworld.com

Conestoga-Rovers & Associates
Limited
466 Hodgson Road, Industrial Park
Fredericton, NB E3C 2G5

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

Project #: 802667
Location: McAdam
Hydrocarbon Analysis in Water (Atlantic MUST)

RPC Sample ID:			86876-1	86876-2	86876-3	86876-4	86876-5	86876-6
Client Sample ID:			Well #1	Well #2	Well #3	Well #4	Upstream	Inlet
Date Sampled:			3-Nov-08	3-Nov-08	3-Nov-08	3-Nov-08	3-Nov-08	3-Nov-08
Matrix:			water	water	water	water	water	water
Analytes	Units	RL						
Benzene	mg/L	0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Toluene	mg/L	0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Ethylbenzene	mg/L	0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Xylenes	mg/L	0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
VPH C6-C10 (Less BTEX)	mg/L	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
EPH >C10-C21	mg/L	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
EPH >C21-C32	mg/L	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Modified TPH Tier 1	mg/L	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
VPH Surrogate (IBB)	%		104	103	105	102	103	100
EPH Surrogate (IBB)	%		104	103	103	105	102	99
EPH Surrogate (C32)	%		118	106	114	120	120	116
Resemblance			ND	ND	ND	ND	ND	ND

This report relates only to the sample(s) and information provided to the laboratory.
RL = Reporting Limit

Bruce Phillips
Section Manager
Organic Analytical Services

Angela Colford
Lab Supervisor
Organic Analytical Services

Report ID: 86876-OAS
Report Date: 12-Nov-08
Date Received: 05-Nov-08

Conestoga-Rovers & Associates
Limited
466 Hodgson Road, Industrial Park
Fredericton, NB E3C 2G5

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

Attention: Christine Plourde
Fax: 506.462.7646
cplourde@craworld.com

Project #: 802667
Location: McAdam
Hydrocarbon Analysis in Water (Atlantic MUST)

RPC Sample ID:			86876-7	86876-8	86876-9	86876-5-Dup
Client Sample ID:			0m Downstream	30m Downstream	100m Downstream	Upstream
Date Sampled:			3-Nov-08	3-Nov-08	3-Nov-08	3-Nov-08
Matrix:			water	water	water	water
Analytes	Units	RL				
Benzene	mg/L	0.001	< 0.001	< 0.001	< 0.001	< 0.001
Toluene	mg/L	0.001	< 0.001	< 0.001	< 0.001	< 0.001
Ethylbenzene	mg/L	0.001	< 0.001	< 0.001	< 0.001	< 0.001
Xylenes	mg/L	0.001	< 0.001	< 0.001	< 0.001	< 0.001
VPH C6-C10 (Less BTEX)	mg/L	0.01	< 0.01	< 0.01	< 0.01	< 0.01
EPH >C10-C21	mg/L	0.05	< 0.05	< 0.05	< 0.05	< 0.05
EPH >C21-C32	mg/L	0.1	< 0.1	< 0.1	< 0.1	< 0.1
Modified TPH Tier 1	mg/L	0.1	< 0.1	< 0.1	< 0.1	< 0.1
VPH Surrogate (IBB)	%		103	100	101	96
EPH Surrogate (IBB)	%		102	105	109	112
EPH Surrogate (C32)	%		122	123	121	127
Resemblance			ND	ND	ND	ND

Report ID: 86876-OAS
Report Date: 12-Nov-08
Date Received: 05-Nov-08

Conestoga-Rovers & Associates
Limited
466 Hodgson Road, Industrial Park
Fredericton, NB E3C 2G5

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

Method Summary

Volatile Petroleum Hydrocarbons (VPH) in Water: Purge and trap extraction followed GC/MS analysis; based on Atlantic PIRI Guidelines for Laboratories 2.0, 2006.
Extractable Petroleum Hydrocarbons (EPH) in Water: Hexane extraction followed by GC/FID analysis; based on Atlantic PIRI Guidelines for Laboratories 2.0, 2006.

Resemblance Legend

Resemblance Code	Resemblance
AG	Aviation Gasoline
COMMENT	See General Report Comments
FO	Fuel Oil Fraction
FO.LO	Fuel Oil and Lube Oil Fraction
G	Gasoline Fraction
LO	Lube Oil Fraction
ND	Not Detected
NR	No Resemblance (not-petrogenic in origin)
NRLR	No Resemblance in the lube oil range (>C21-C32).
OP	One Product (unidentified)

Resemblance Code	Resemblance
PAH	Possible PAHs Detected
PG	Possible Gasoline Fraction
PLO	Possible Lube Oil Fraction
PWFO	Possible Weathered Fuel Oil Fraction
PWG	Possible Weathered Gasoline Fraction
TO	Tranformer Oil
UP	Unknown Peaks
WFO	Weathered Fuel Oil Fraction
WG	Weathered Gasoline Fraction

General Report Comments

Report ID: 86876-OAS
Report Date: 12-Nov-08
Date Received: 05-Nov-08

Conestoga-Rovers & Associates
Limited
466 Hodgson Road, Industrial Park
Fredericton, NB E3C 2G5

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0694
www.rpc.ca

Project #: 802667
Location: McAdam

QA/QC Report

RPC Sample ID:			BLANKA0746	BLANKA0749	SPIKEA0737	SPIKEA0740
Type:			VPH	EPH	VPH	EPH
Matrix:			water	water	water	water
Analytes	Units	RL			% Recovery	% Recovery
Benzene	mg/L	0.001	< 0.001	-	110%	-
Toluene	mg/L	0.001	< 0.001	-	107%	-
Ethylbenzene	mg/L	0.001	< 0.001	-	106%	-
Xylenes	mg/L	0.001	< 0.001	-	103%	-
VPH C6-C10 (Less BTEX)	mg/L	0.01	< 0.01	-	102%	-
EPH >C10-C21	mg/L	0.05	-	< 0.05	-	-
EPH >C21-C32	mg/L	0.1	-	< 0.1	-	-
EPH >C10-C32	mg/L		-	-	-	92%
MTBE	mg/L	0.001	< 0.001	-	107%	-

RL = Reporting Limit

RPC
921 College Hill Rd,
Fredericton, N.B. E3B 6Z9
Report No.: 86878-IAS

Conestoga-Rovers
466 Hodgson Road
Fredericton NB E3C 2G5
Attn: Christine Plourde
Job No.: 802667

November 25, 2008

Fax: 506.462.7646

Trace Metals Analysis

RPC ID	86878 RB	SS-2	86878-01A	86878-01B
Client ID	QA/QC	CRM	Sludge Pile Nov. 03/08	Duplicate
	Concentration (mg/kg)			
Aluminum	< 1	16400	11300	11500
Antimony	< 0.1	0.7	0.1	< 0.1
Arsenic	< 1	85	4	5
Barium	< 1	262	52	54
Beryllium	< 0.1	0.8	0.5	0.5
Bismuth	< 1	< 1	< 1	< 1
Boron	< 1	15	18	18
Cadmium	< 0.01	2.24	0.08	0.08
Calcium	< 50	123000	96800	93600
Chromium	< 1	46	18	18
Cobalt	< 0.1	12.9	6.1	6.4
Copper	< 1	202	10	11
Iron	< 20	25000	14500	15200
Lead	< 0.1	139	10.2	11.0
Lithium	< 0.1	17.2	23.1	24.1
Magnesium	< 10	12600	5600	5620
Manganese	< 1	556	371	381
Mercury	< 0.01	0.32	0.02	0.02
Molybdenum	< 0.1	2.9	1.1	1.0
Nickel	< 1	62	15	16
Phosphorus	< 20	830	510	490
Potassium	< 20	4370	1800	1850
Rubidium	< 0.1	31.2	20.9	20.4
Selenium	< 1	< 1	< 1	< 1
Silver	< 0.1	0.6	< 0.1	< 0.1
Sodium	< 50	600	110	110
Strontium	< 1	252	392	349
Tellurium	< 0.1	0.1	< 0.1	< 0.1
Thallium	< 0.1	0.4	0.2	0.2
Tin	3	2	< 1	< 1
Uranium	< 0.1	1.3	1.9	1.9
Vanadium	< 1	45	23	24
Zinc	< 1	517	46	48

Ammonia (as N)	-	-	< 1	-
Chloride	-	-	< 5	-
Kjeldahl Nitrogen	-	-	430	-
pH (units)	-	-	7.4	-

The sample was air dried and portions were digested according to EPA Method 3050B.
The resulting solutions were diluted to volume for trace element analysis by ICP-MS and ICP-ES.
Mercury was determined by Cold Vapour AAS.

A. Ross Kean, M.Sc.
Department Head
Inorganic Analytical Chemistry

Peter Crowhurst, B.Sc., C.Chem.
Analytical Chemist
Inorganic Analytical Chemistry

APPENDIX A

FLOW CALCULATIONS

FLOW CALCULATIONS

Culvert Effluent Beneath the Train Tracks (0 metres downstream, location #10)

notes:
- the following calculations are based on a channel area which was actively flowing during the monitoring event.
- the width of the active channel was taken from field notes.

	Field Data				Flow			
	Horizontal Location (m)	Distance to tape (mm)	Water Depth (mm)	Water Velocity (m/s)	Mean Method (l/s)	Mid Method (l/s)	Average (l/s)	Cross Sectional Area (m^2)
eoc	0	160.5						
	0.10	160.5	100	0.000	0.0	0.0		0.010
	0.20	160.5	100	0.107	0.5	1.1		0.010
	0.30	160.5	100	0.107	1.1	1.1		0.010
	0.40	160.5	100	0.107	1.1	1.1		0.010
	0.51	160.5	100	0.000	0.6	0.0		0.011
eoc	0.61	160.5			0.0	0.0		0.010
					3.3	3.3	**3.3**	0.061

Average Velocity	0.064	Peak Observed Velocity	0.107 m/sec
Average Active Channel Depth	100.0	Maximum Channel Depth	100 mm
Active channel width	0.4		

Note:
This flow was calculated using a velocity of 0.107 m/s for all interior panels. The standard deviation for the remaining panels was much higher than is acceptable. Based on field observations, no downstream obstructions were present. A similar velocity of flow is therefore a more reasonable assumption than was recorded