

City of Hamilton's Drinking Water Systems

SUMMARY REPORT FOR MUNICIPALITIES (2016)

Safe Drinking Water Act, Ontario Regulation, 170/03, Schedule 22



Summary Report for Municipalities
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1 INTRODUCTION

This summary report for municipalities has been prepared in accordance with the Safe Drinking Water Act, Ontario Regulation, 170/03, Schedule 22. The City of Hamilton is the Owner of the following five Drinking Water Systems (DWS):

Licence Number	Drinking Water System
005-101	Hamilton DWS
005-102	Freelton DWS
005-103	Greensville DWS
005-104	Carlisle DWS
005-105	Lynden DWS

For each of the City of Hamilton's five DWSs, the following information is provided for the 2016 reporting period:

- A summary of quantities and flow rate of the water supplied
- Monthly average and maximum daily flows (in comparison to approved flow rates)
- A summary of 2016 capital upgrades, as well as those to be initiated in 2017

There were no Provincial Officer's Orders issued. All confirmed Adverse Water Quality Incidents were reported to the Ontario Ministry of Environment and Climate Change's (MOECC) Spills Action Centre (SAC) and Public Health Services (PHS) and are provided in the report. All water taking quantities and flow rates were within approved rated capacities and provincial water taking limits.

2 HAMILTON DWS, WOODWARD SUB-SYSTEM

2.1 Capital Projects Update- 2016

2.1.1 Projects Completed 2016 - Woodward Water Treatment System and Water Outstations

- Greenhill Avenue Reservoir and Valvehouse (HDR1B) Upgrades
- Woodward Avenue Water Treatment Plant - Low Lift Pumping Station Improvements Phase 2
- Kelly St Standpipe (HDT01) Fill Line Restraint
- Garth Reservoir (HDR05) Safety Barrier
- York & Valley Road Pumping Station (HD016) Upgrades
- Lee Smith Reservoir (HDR00) Isolation

The above water treatment and water station upgrades and modifications were completed at a cost of approximately \$2.1 million.

2.1.2 Projects Initiated 2016 - Woodward Water Treatment System and Water Outstations

- Ben Nevis Reservoir (HDR1C) Upgrades (Construction)
- Greenhill Avenue Reservoir (HDR1B) and Valvehouse Upgrades (Construction)
- High Priority Water Outstations - Security System Upgrades (Conceptual Design)
- Osler Pumping Station (HD011) Immediate Process Upgrades (Construction)
- Stone Church Road West and Garth Street Reservoir (HDR05) Upgrades (Design)
- Valve Chamber No. 3 (District 5) Upgrades (Construction)
- Water Distribution System Control Valves (Upgrades)
- Woodward Avenue Water Treatment Plant - Low Lift Pumping Station Improvements Phase 2 (Construction)
- Woodward Avenue Water Treatment Plant - Corrosion Control Treatment Facility (Design)
- Woodward Avenue Water Treatment Plant - High Lift Pumping Station Improvements Phase 2 (Design)
- Woodward Avenue Water Treatment Plant - Surge Tower Upgrades (Design)

The above water treatment and water station upgrades and modifications are being undertaken at a cost of approximately \$6.8 million.

2.2 Distribution System - Pipes

As part of the City's Linear Asset Management Program, the following water upgrades and rehabilitations were completed:

- Approximately 5.0 km of watermain was replaced as a stand-alone project and/or in coordination with roadwork at a cost of \$7.0 million.
- Approximately 4.2 km of watermain was rehabilitated using structural and/or cement mortar lining at a cost of \$5.5 million.

2.3 Capital Projects to be initiated in 2017

2.3.1 Woodward Water Treatment System and Water Outstations

- Ancaster Elevated Reservoir - New (Design)
- DeWitt Road and Ben Nevis Drive Pumping Station (HD08A) Upgrades (Design and Construction)
- Ferguson Avenue Pumping Station (HD002) Phase 3 Upgrades (Predesign and Construction)
- Governors Road Pumping Station (HD012A) Capacity Upgrade and Standby Power Installation (Design)
- Greenhill Avenue Pumping Stations (HD04B & HD04B) Capacity Expansion and Standby Power Upgrades (Construction)

- High Priority Water Outstations - Security System Upgrades (Design & Construction)
- Highland Road Reservoir (HD007) Upgrades (Design)
- Kenilworth Pumping Station (HD005) Upgrades Phase 2 (Construction)
- Osler Drive Pumping Station (HD011) Upgrades (Design and Construction)
- Rymal Road and Glancaster Road Pumping Station (HD018) Upgrades - Design
- Water Distribution System Control Valves (Construction)
- Woodward Avenue Water Treatment Plant - Chlorine Building Equipment Extended Maintenance
- Woodward Avenue Water Treatment Plant - Fluoride Building Pumps & Analyzers Process Improvements (Construction)
- Woodward Avenue Water Treatment Plant - Low Lift Pumping Station Traveling Screen Replacement (Construction)
- Woodward Avenue Water Treatment Plant - Back Flow Preventer Program (Construction)
- Woodward Avenue Water Treatment Plant - Condition and Process Improvement Upgrades (Predesign)
- Woodward Avenue Water Treatment Plant - Corrosion Control Treatment Facility (Construction)
- Woodward Avenue Water Treatment Plant - Fluoride Building HVAC (Design)
- Woodward Avenue Water Treatment Plant - Granular Activated Carbon (GAC) Filter Media Replacement (Design and Construction)
- Woodward Avenue Water Treatment Plant - High Lift Pumping Station Improvements - Phase 2 (Design and Construction)
- Woodward Avenue Water Treatment Plant - Surge Tower Upgrades
- York and Valley Road Pumping Station (HD016) Capacity Upgrade, Standby Power & Building Expansion (Design and Construction)

The above upgrades and modifications will be undertaken at a cost of approximately \$47.1 million.

2.4 Corrosion Control Program

The City of Hamilton updated the MOECC of Council's approval in January 2016 and is moving forward with the implementation of the CCP as outlined in Report 15-015.

One of the projects identified in Appendix C of Report 16-023 was the Water Treatment Plant (New Corrosion Control Building). Hamilton Water wishes to leverage the funding opportunity which supports 75% of the project cost. For this particular project that represents \$2,310,000 for a new chemical feed and storage facility in order to reduce lead concentrations in the distribution system.

To monitor the progress of the Corrosion Control Program it is required to have baseline data of the Woodward DWS. The first round of baseline sampling was

completed on September 20, 2016. The data was compiled and reviewed by staff on December 8th and after analysis determined that no data stood out as unusual. The second round of sampling is currently underway and scheduled to be completed by February 2017. Data will continue to be collected throughout the life of the corrosion control program

2.5 Adverse Water Quality Incidents (AWQI) - Hamilton DWS

The following AWQIs were reported to the MOECC SAC and PHS.

Notification Date (m-d-y)	Location of Adverse	AWQI	Resolution
09-13-2016	Hydrant HC50H022	Total Coliforms = 6 CFU/100mL	<p>'Brigadoon' AWQI:</p> <ul style="list-style-type: none"> 09/14- Resample and test- resulted in AWQI on September 15th. Adverse confirmed. 09/15- Resample and test. First set of resamples passed. 09/16- Second set of resamples resulted in AWQI on September 17th. 09/18- Resample and test - resulted in AWQI on September 19th. 09/19- Resample and test- resulted in AWQI on September 21st. Boil Water Advisory was issued on September 21st. 09/21- Resample and test. Samples taken at locations as directed by Hamilton Public Health Services. Resulted in AWQI on September 22nd. Boil Water Advisory still in effect. 09/22- Resample and test - resulted in AWQI on September 23rd. Boil Water Advisory still in effect. 09/23/24/25 - Resample and test. Samples taken at locations as directed by Hamilton Public Health Services. All results passed. Boil Water Advisory lifted September 26th, 2016. In total 38 separate samples were collected in the area throughout the event.
09-15-2016	Hydrant HC50H022	Total Coliforms = 3 CFU/100mL	
	Hydrant HC51H011	Total Coliforms = 3 CFU/100mL	
09-17-2016	Hydrant HC50H022	Total Coliforms = 1 CFU/100mL	
09-19-2016	Hydrant HC51H011	Total Coliforms = 1 CFU/100mL	
09-21-2016	Hydrant HC50H011	Total Coliforms = NDOGT E coli = NDOGT	
09-22-2016	Hydrant HC51H010	Total Coliforms = 1 CFU/100mL	
09-23-2016	Hydrant HC50H032	Total Coliforms = 1 CFU/100mL	
09-30-2016	Highlift	Sodium = 24.6 mg/L	

Notification Date (m-d-y)	Location of Adverse	AWQI	Resolution
11-18-2016	Blowoff Valve (behind 1097 Scenic Dr.)	Combined Chlorine = 0.23 mg/L Free Chlorine = 0.04 mg/L	Watermain was flushed to restore chlorine levels. Flushing restored the combined chlorine to 1.33 mg/L.
11-23-2016	A-SS-A, Jerseyville Rd, Ancaster	Total Coliforms = 1 CFU/100mL	Resampled adverse location, one upstream and one downstream hydrant. Results passed. The adverse was not confirmed
12-05-2016	Blowoff Valve (behind 1097 Scenic Dr)	Chlorine. Duty to report other observations. City of Hamilton has been flushing a main servicing 10 homes to maintain chlorine residual. Flushing stopped Dec 5, 2016 so residual is expected to drop.	Resolution is pending. Boil Water Advisory was issued December 5th. Corrective actions include reinstatement of continual flushing, and a project to connect all of the affected properties to the City watermain for which the water quality is continually in compliance with Provincial regulations. Boil Water Advisory was lifted on December 22 nd for the majority of homes except for one house at 1097 Scenic Drive where flushing location is not accessible.
12-12-2016	Greenhill blow-off valve	Combined Chlorine = 0.03 mg/L Free Chlorine = 0.00 mg/L	This section of water main was isolated. Flushing and chlorine residual testing performed daily. On January 26, 2017, the gearbox on the valve was replaced. Chlorine residuals were taken at that time: 1.98 mg/L combined, 2.15 mg/L total. 0.17 mg/L free. The valve was then opened allowing water to be conveyed to the reservoir. The distribution system was allowed to stabilize overnight, and the distribution valves were opened on January 27, 2017
NDOGT - No Data, plate overgrown with target bacteria, total coliforms			

2.6 Water Production Reports - Summary

The following provides a summary of daily flow rates and instantaneous peak flow rates in comparison to the capacity of the water works as identified in the Permit to Take Water. This information is tabulated in the accompanying tables.

Table 2-1: Woodward Treatment Plant - 2016 Daily Production

Date	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
	ML/day	ML/day	ML/day	ML/day	ML/day	ML/day	ML/day	ML/day	ML/day	ML/day	ML/day	ML/day
1	285	154	192	186	270	242	305	286	233	274	165	171
2	274	211	183	293	140	240	251	243	236	270	189	193
3	220	199	181	278	165	235	255	198	312	182	205	283
4	157	237	201	157	156	356	246	266	307	185	175	273
5	164	289	291	168	267	273	222	246	208	198	272	185
6	196	170	279	198	128	179	282	302	234	230	278	165
7	194	166	198	215	279	167	275	341	231	210	151	197
8	162	164	201	195	245	184	259	232	206	279	188	200
9	166	250	200	276	269	206	388	232	250	233	176	200
10	387	104	198	281	156	238	393	248	291	213	209	278
11	210	203	201	198	201	296	237	256	159	160	198	267
12	197	196	289	188	218	303	225	227	276	171	241	192
13	192	287	269	195	293	219	282	306	270	227	262	163
14	189	299	173	195	273	224	236	274	166	194	107	183
15	185	196	165	195	247	245	264	119	283	285	199	197
16	290	181	202	287	159	246	328	221	193	228	216	277
17	291	186	191	279	186	249	325	249	269	222	212	275
18	189	221	162	175	195	307	244	218	233	195	198	273
19	157	216	270	185	221	342	224	220	175	198	252	184
20	158	294	305	234	220	188	232	295	190	198	274	194
21	159	289	158	186	349	261	249	297	211	220	197	197
22	166	184	205	238	262	266	252	217	241	262	165	202
23	314	184	212	278	200	267	398	194	243	246	165	201
24	323	183	197	298	187	298	383	228	259	196	182	292
25	199	188	206	208	221	389	195	229	247	171	284	286
26	190	219	293	184	234	372	246	220	199	228	277	184
27	163	290	241	205	252	186	219	294	197	153	279	187
28	198	285	170	216	394	255	242	292	195	221	105	191
29	198	191	188	186	297	263	212	200	159	262	206	205
30	284		214	287	220	249	362	199	223	267	199	204
31	295		209		220		187	203		180		283
Total	6,751	6,234	6,641	6,664	7,123	7,746	8,418	7,552	6,895	6,755	6,228	6,780
Average	218	215	214	222	230	258	272	244	230	218	208	219
Min	157	104	158	157	128	167	187	119	159	153	105	163
Max	387	299	305	298	394	389	398	341	312	285	284	292
PTTW	909	909	909	909	909	909	909	909	909	909	909	909

Note: Municipal Drinking Water Licence (005-101) Rated Capacity 926,000 m³/ day

3 HAMILTON DWS, FIFTY ROAD SUB-SYSTEM

3.1 Operational Upgrades

The Fifty Road Pumping Station and Reservoir (HD009 and HDR10) Upgrades (Construction) was initiated in 2016. The estimated cost for this project is \$600,000.

3.2 Adverse Water Quality Incidents (AWQI) - Fifty Road DWS

There were no AWQI's in 2016.

3.3 Water Production Reports - Summary

The Fifty Road DWS receives treated water from the Town of Grimsby Water Distribution System.

4 CARLISLE DWS

4.1 Operational Upgrades

In 2017, there will be well system enhancements. This work will be completed at a cost of approximately \$650,000.

In 2015, a new Community Conservation Committee (CCC) was formed. Hamilton Water, in partnership with the CCC, is working towards the development of a new Water Conservation Plan (WCP). The plan will continue to be developed and implemented. The EA process will be revisited depending on the water conservation results achieved.

4.2 Adverse Water Quality Incidents (AWQI) - Carlisle DWS

There were no AWQI's in 2016.

4.3 Water Production Reports - Summary

The following provides a summary of daily flow rates and instantaneous peak flow rates in comparison to the capacity of the water works as identified in the Permit to Take Water. This information is tabulated in the accompanying tables.

Table 4-1: Carlisle DWS (FDC01 & FDC02) - 2016 Daily Production

Date	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
	Amount	Amount	Amount	Amount	Amount	Amount	Amount	Amount	Amount	Amount	Amount	Amount
	m ³ /day	m ³ /day	m ³ /day	m ³ /day	m ³ /day	m ³ /day	m ³ /day	m ³ /day	m ³ /day	m ³ /day	m ³ /day	m ³ /day
1	0	0	621	149	0	212	175	0	220	0	119	73
2	0	14	251	234	3	210	300	12	21	162	0	95
3	0	145	381	129	35	252	245	0	0	47	0	53
4	0	638	413	0	0	290	64	29	0	219	0	23
5	240	71	0	22	447	103	269	181	0	124	95	64
6	0	0	0	0	235	0	400	180	12	0	26	135
7	0	0	0	79	686	86	454	59	0	149	37	91
8	0	0	13	5	689	0	267	187	0	118	30	105
9	0	566	0	0	689	358	124	85	0	29	0	67
10	0	2	1	0	60	146	172	0	0	0	0	0
11	0	0	19	4	0	101	291	155	0	54	0	0
12	14	0	0	16	0	100	317	3	0	0	51	20
13	0	0	0	0	0	233	417	193	26	0	78	78
14	0	0	0	141	0	62	143	0	0	22	0	105
15	0	0	55	263	0	59	79	28	0	0	97	64
16	0	16	0	0	0	108	55	71	0	0	0	66
17	0	0	0	0	35	214	56	0	54	70	0	0
18	0	0	26	12	0	269	41	0	34	20	3	0
19	43	0	447	32	0	270	41	0	0	72	52	0
20	0	0	294	0	76	362	0	0	124	48	73	83
21	0	0	199	0	0	403	283	0	24	0	7	113
22	10	0	24	0	0	238	73	0	106	0	22	0
23	0	22	0	181	18	156	70	103	114	0	0	0
24	0	153	0	244	213	30	0	79	0	227	0	148
25	0	229	0	0	0	289	0	44	343	27	0	137
26	41	0	0	36	0	265	118	31	105	0	176	14
27	435	0	0	0	0	157	123	0	96	42	80	11
28	0	0	0	0	0	347	44	309	178	0	12	0
29	0	499	81	0	0	311	28	55	96	148	86	0
30	0		0	0	37	401	0	147	200	123	67	0
31	0		75		185		0	101		72		0
Total	784	2,354	2,900	1,547	3,408	6,034	4,647	2,051	1,754	1,772	1,111	1,544
Average	25	81	94	52	110	201	150	66	58	57	37	50
Min	0	0	0	0	0	0	0	0	0	0	0	0
Max	435	638	621	263	689	403	454	309	343	227	176	148
PTTW limit	851	851	851	851	851	851	851	851	851	851	851	851

Note: Municipal Drinking Water Licence (005-104) FDC01 and FDC02 Rated Capacity 851 m³/day

Table 4-3: Carlisle DWS(FDC03R) - 2016 Daily Production

Date	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
	Amount	Amount	Amount	Amount	Amount	Amount	Amount	Amount	Amount	Amount	Amount	Amount
	m ³ /day	m ³ /day	m ³ /day	m ³ /day	m ³ /day	m ³ /day	m ³ /day	m ³ /day	m ³ /day	m ³ /day	m ³ /day	m ³ /day
1	493	42	0	17	101	947	1,093	1,232	535	543	0	201
2	154	449	0	183	541	955	1,635	991	895	0	176	254
3	740	123	0	511	432	1,081	1,329	1,216	1,184	283	241	147
4	200	134	0	502	364	1,054	1,432	1,218	1,612	138	251	558
5	288	223	0	0	350	719	1,409	1,143	822	195	22	252
6	315	388	0	125	0	286	1,240	1,016	981	416	146	0
7	207	592	111	274	0	702	1,177	1,654	809	139	325	404
8	461	73	449	0	0	497	1,093	1,137	716	16	217	0
9	773	0	416	0	0	748	1,235	1,340	737	257	454	0
10	0	0	0	0	613	1,128	1,547	1,335	842	802	219	540
11	191	455	546	120	722	1,050	1,585	1,237	815	142	165	488
12	527	518	473	372	861	1,189	1,129	1,053	384	589	394	264
13	304	0	295	0	154	857	1,137	854	0	434	218	411
14	377	878	535	0	0	1,578	783	912	329	447	195	97
15	358	547	30	0	910	988	791	942	994	567	0	29
16	702	285	470	0	630	1,001	994	397	348	581	641	384
17	581	365	0	0	441	1,222	1,379	813	414	288	373	345
18	108	465	232	753	277	1,309	1,064	1,045	719	481	432	570
19	546	128	0	227	324	1,626	1,264	1,261	440	167	386	222
20	0	467	0	290	57	1,301	1,223	637	458	496	324	344
21	758	652	128	0	1,369	1,293	1,229	547	527	140	155	0
22	444	300	543	0	762	1,641	1,134	857	418	699	373	585
23	335	396	0	1	1,005	1,635	1,394	1,054	648	381	329	566
24	389	55	524	245	886	1,649	1,236	972	651	796	519	397
25	332	263	341	364	1,013	1,636	1,058	628	0	0	441	312
26	431	550	657	298	810	1,631	833	716	156	350	0	457
27	787	281	399	534	1,473	1,103	1,468	890	152	305	436	456
28	0	224	143	414	1,009	1,051	905	0	116	0	46	338
29	632	16	456	524	1,102	1,091	1,260	441	237	245	176	109
30	478	0	0	582	1,056	1,197	1,444	804	0	352	186	442
31	451	0	554	0	1,096	0	578	695	0	26	0	350
Total	12,362	8,867	7,304	6,337	18,356	34,166	37,075	29,037	16,938	10,272	7,842	9,524
Average	399	306	236	211	592	1,139	1,196	937	565	331	261	307
Min	0	0	0	0	0	286	578	0	0	0	0	0
Max	787	878	657	753	1,473	1,649	1,635	1,654	1,612	802	641	585
PTTW	2,160	2,160	2,160	2,160	2,160	2,160	2,160	2,160	2,160	2,160	2,160	2,160

Note: Municipal Drinking Water Licence (005-104) FDC03R and FDC05 Rated Capacity 3,456 m³/day

Table 4-5: Carlisle DWS (FDC05) - 2016 Daily Production

Date	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
	Amount	Amount	Amount	Amount	Amount	Amount	Amount	Amount	Amount	Amount	Amount	Amount
	m ³ /day	m ³ /day	m ³ /day	m ³ /day	m ³ /day	m ³ /day	m ³ /day	m ³ /day	m ³ /day	m ³ /day	m ³ /day	m ³ /day
1	0	22	0	0	0	601	501	445	488	0	327	112
2	0	0	0	4	60	548	506	662	296	516	131	205
3	0	22	0	0	0	734	735	718	0	16	123	80
4	24	0	0	0	0	612	689	718	0	287	156	0
5	180	0	497	23	235	410	775	615	419	209	274	28
6	0	0	402	448	154	359	718	904	262	20	101	432
7	0	0	184	264	0	205	689	202	245	370	173	0
8	0	10	0	285	0	281	556	625	0	353	105	358
9	0	0	59	519	428	356	692	697	0	146	21	201
10	0	244	0	435	0	485	562	661	21	36	109	0
11	462	0	3	71	0	562	414	719	35	235	106	0
12	0	0	60	0	0	490	500	161	588	0	81	129
13	0	0	0	613	308	439	659	47	1,024	1	120	0
14	0	0	0	44	639	384	211	108	195	0	124	341
15	0	57	155	270	0	362	97	175	210	0	287	167
16	0	0	0	334	28	476	503	300	200	0	0	220
17	0	0	202	638	0	778	179	235	169	23	0	0
18	61	0	0	15	306	711	431	145	101	0	85	0
19	0	0	0	0	682	797	746	98	140	0	83	40
20	0	0	0	190	625	798	592	3	193	0	112	0
21	0	0	225	441	0	667	552	422	252	0	17	401
22	0	79	0	747	292	442	621	172	160	0	0	0
23	0	0	0	18	416	666	752	0	358	0	0	1
24	0	0	0	129	78	359	708	263	79	385	26	0
25	208	0	214	381	338	818	589	154	626	11	26	0
26	0	0	0	40	228	706	212	124	270	156	327	21
27	427	0	0	0	333	538	453	0	298	169	0	0
28	0	0	91	0	616	604	423	997	299	463	100	0
29	0	0	0	0	725	768	97	447	226	98	97	358
30	0	0	0	0	354	677	83	134	307	0	103	0
31	0	0	0	0	355	0	213	85	0	186	0	0
Total	1,363	435	2,091	5,909	7,199	16,635	15,456	11,033	7,460	3,680	3,214	3,094
Average	44	15	67	197	232	554	499	356	249	119	107	100
Min	0	0	0	0	0	205	83	0	0	0	0	0
Max	462	244	497	747	725	818	775	997	1,024	516	327	432
PTTW	1,296	1,296	1,296	1,296	1,296	1,296	1,296	1,296	1,296	1,296	1,296	1,296

Note: Municipal Drinking Water Licence (005-104) FDC03R and FDC05 Rated Capacity 3,456 m³/day

5 FREELTON DWS

5.1 Operational Upgrades

In 2017, the design and construction of upgrades to the Freelton Tower (HDT03) will be initiated at an approximate cost of \$3.2 million.

5.2 Adverse Water Quality Incidents (AWQI) - Freelton DWS

There were no AWQI's in 2016.

5.3 Water Production Reports - Summary

The following provides a summary of daily flow rates and instantaneous peak flow rates in comparison to the capacity of the water works as identified in the Permit to Take Water. This information is tabulated in the accompanying tables.

Table 5-1: Freelton DWS (FDF01) - 2016 Daily Production

Date	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
	Amount	Amount	Amount	Amount	Amount	Amount	Amount	Amount	Amount	Amount	Amount	Amount
	m ³ /day	m ³ /day	m ³ /day	m ³ /day	m ³ /day	m ³ /day	m ³ /day	m ³ /day	m ³ /day	m ³ /day	m ³ /day	m ³ /day
1	0	10	158	0	0	340	497	515	112	167	0	0
2	428	0	539	184	488	0	8	111	0	397	0	12
3	152	117	0	342	74	643	364	342	432	22	0	0
4	53	391	0	10	0	128	427	355	232	0	542	557
5	0	0	0	124	6	289	311	0	31	11	0	35
6	22	0	325	0	310	221	257	534	396	655	0	18
7	387	0	340	0	278	238	595	258	325	65	312	0
8	27	526	12	432	0	190	0	9	270	0	154	48
9	0	0	3	70	41	2	567	513	149	0	0	550
10	27	0	0	0	581	101	375	340	0	362	0	0
11	370	0	0	102	32	556	198	0	0	139	402	0
12	143	135	361	330	0	0	669	401	391	0	110	65
13	0	657	236	92	138	440	304	249	210	0	0	576
14	0	24	12	0	442	160	0	0	0	420	389	0
15	220	27	313	0	0	0	476	433	29	131	22	9
16	218	0	0	402	10	619	122	129	673	0	20	13
17	0	183	0	283	360	183	210	0	201	13	22	415
18	95	0	0	21	88	369	449	49	8	447	342	669
19	0	15	252	301	0	647	39	496	89	117	146	352
20	502	0	274	139	188	125	465	47	474	19	0	0
21	200	467	14	196	464	338	640	0	89	22	25	0
22	0	143	0	3	0	425	680	79	0	439	349	205
23	0	0	360	0	436	141	263	662	218	67	209	664
24	198	0	81	330	598	653	394	71	327	23	0	662
25	423	0	0	255	0	378	8	0	0	0	383	97
26	0	372	0	20	137	479	280	0	123	227	25	30
27	0	139	410	6	551	238	353	638	320	331	0	0
28	0	0	700	378	0	364	0	130	161	0	99	498
29	79	9	489	118	365	179	431	35	20	0	98	669
30	657	0	0	0	401	283	261	1	7	200	334	373
31	170	0	29	0	121	0	0	264	0	358	0	0
Total	4,371	3,212	4,908	4,139	6,110	8,728	9,641	6,662	5,286	4,632	3,982	6,516
Average	141	111	158	138	197	291	311	215	176	149	133	210
Min	0	0	0	0	0	0	0	0	0	0	0	0
Max	657	657	700	432	598	653	680	662	673	655	542	669
PTTW	878	878	878	878	878	878	878	878	878	878	878	878

Note: Municipal Drinking Water Licence (005-102) FDF01 Rated Capacity 878 m³/ day

Table 5-3: Freelton DWS (FDF03) - 2016 Daily Production

Date	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
	Amount	Amount	Amount	Amount	Amount	Amount	Amount	Amount	Amount	Amount	Amount	Amount
	m ³ /day	m ³ /day	m ³ /day	m ³ /day	m ³ /day	m ³ /day	m ³ /day	m ³ /day	m ³ /day	m ³ /day	m ³ /day	m ³ /day
1	0	13	212	0	0	354	480	521	94	164	18	0
2	400	14	234	184	483	0	0	111	0	407	0	16
3	161	121	0	359	180	662	367	346	404	48	0	0
4	0	415	0	0	0	133	677	348	212	76	547	572
5	93	8	0	76	0	273	310	0	0	6	0	31
6	31	0	334	28	304	142	339	541	306	645	0	74
7	685	0	190	113	287	375	612	540	288	60	283	0
8	49	550	207	435	0	236	0	4	208	0	177	48
9	0	53	0	73	3	2	566	502	315	0	25	480
10	27	0	0	0	583	101	187	383	0	334	0	0
11	364	0	0	0	5	563	98	0	0	154	353	0
12	252	206	347	417	0	0	690	431	317	0	114	0
13	0	221	250	107	135	430	201	250	354	0	0	492
14	0	0	0	0	446	241	0	0	0	416	360	0
15	296	0	327	5	0	0	482	357	27	132	42	16
16	231	345	0	390	0	620	122	230	377	0	0	77
17	0	329	0	73	496	182	214	0	35	14	21	30
18	0	0	0	10	90	371	688	60	45	442	327	0
19	25	8	264	335	0	643	43	614	0	119	149	0
20	285	0	297	143	159	104	324	46	467	0	0	5
21	206	462	0	199	492	346	0	0	91	27	0	0
22	0	109	20	0	0	429	325	25	0	424	338	0
23	0	70	331	0	394	140	302	665	213	69	210	0
24	207	0	85	313	251	669	500	67	349	0	0	0
25	245	0	0	291	1	371	0	0	0	61	372	0
26	110	394	0	18	149	476	293	0	0	219	29	0
27	0	150	0	0	576	233	449	637	340	334	0	5
28	0	0	0	339	0	374	0	132	373	0	231	0
29	78	0	57	152	383	464	429	10	10	0	162	0
30	229	36	0	422	272	266	266	284	0	198	342	0
31	0	0	0	346	0	346	0	672	0	362	0	0
Total	3,974	3,466	3,191	4,061	6,183	9,206	8,966	7,779	4,826	4,711	4,100	1,844
Average	128	120	103	135	199	307	289	251	161	152	137	59
Min	0	0	0	0	0	0	0	0	0	0	0	0
Max	685	550	347	435	583	669	690	672	467	645	547	572
PTTW	1,607	1,607	1,607	1,607	1,607	1,607	1,607	1,607	1,607	1,607	1,607	1,607

Note: Municipal Drinking Water Licence (005-102) FDF03 Rated Capacity 1,607 m³/day

6 GREENSVILLE DWS

6.1 Operational Upgrades

In 2017, the Municipal Class Environmental Assessment, Schedule C for the New Greensville Well will be conducted. Recommendations of the study will be presented to Council in 2018.

6.2 Adverse Water Quality Incidents (AWQI) - Greensville DWS

There were no AWQI's in 2016.

6.3 Water Production Reports - Summary

The following provides a summary of daily flow rates and instantaneous peak flow rates in comparison to the capacity of the water works as identified in the Permit to Take Water. This information is tabulated in the accompanying tables.

Table 6-1: Greenville DWS (FDG01) - 2016 Daily Production

Date	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
	Amount	Amount	Amount	Amount	Amount	Amount	Amount	Amount	Amount	Amount	Amount	Amount
	m ³ /day	m ³ /day	m ³ /day	m ³ /day	m ³ /day	m ³ /day	m ³ /day	m ³ /day	m ³ /day	m ³ /day	m ³ /day	m ³ /day
1	38	24	26	25	34	54	48	59	54	33	38	30
2	41	24	26	30	29	77	41	65	67	35	40	29
3	35	24	24	33	28	63	55	68	67	29	30	29
4	32	24	24	28	30	48	92	73	59	29	31	32
5	24	22	31	29	29	35	95	47	61	30	32	28
6	27	28	35	25	32	31	73	42	51	34	36	28
7	31	28	26	27	31	58	59	68	50	28	29	30
8	24	24	25	28	34	41	48	49	47	43	29	30
9	29	27	26	30	32	28	64	54	36	37	30	30
10	29	23	25	31	31	44	77	54	35	47	35	34
11	26	23	27	29	36	56	64	49	39	30	27	45
12	26	22	29	27	29	73	82	38	32	40	33	34
13	25	34	30	27	29	54	75	37	27	29	35	29
14	24	28	27	30	32	69	47	44	30	29	29	32
15	23	28	27	29	36	46	38	36	31	34	33	29
16	28	22	25	31	32	35	63	39	35	33	27	26
17	33	22	25	39	31	41	76	41	32	30	29	31
18	29	22	27	32	29	90	75	40	37	35	29	32
19	24	22	29	35	31	87	60	54	32	29	30	34
20	23	28	29	35	39	54	66	42	36	30	32	28
21	27	32	29	25	38	42	57	41	41	29	29	27
22	23	28	27	26	35	61	66	50	35	30	29	31
23	29	24	25	35	62	66	74	45	40	34	29	30
24	30	22	28	41	48	78	90	62	37	28	29	35
25	27	24	33	37	49	60	41	43	54	35	29	34
26	25	23	29	38	54	86	50	41	28	29	33	35
27	24	27	38	35	40	61	78	44	29	28	34	48
28	24	28	29	35	69	77	54	47	31	27	30	33
29	23	25	27	34	68	82	42	44	39	34	29	32
30	25		25	32	52	62	58	47	29	32	29	32
31	28		27		47		51	51		28		36
Total	856	734	859	937	1,193	1,761	1,960	1,517	1,222	995	931	994
Average	28	25	28	31	38	59	63	49	41	32	31	32
Min	23	22	24	25	28	28	38	36	27	27	27	26
Max	41	34	38	41	69	90	95	73	67	47	40	48
PTTW limit	197	197	197	197	197	197	197	197	197	197	197	197

Note: Municipal Drinking Water Licence (005-103) FDG01 Rated Capacity 199 m³/day

7 LYNDEN DWS

7.1 Operational Upgrades

In 2016, the project to upgrade the chlorine electrical systems at the Pumping Station (HD05B) was initiated. These upgrades will be complete in 2017 at a cost of \$300,000.

A new location for a municipal well has been identified on the same property where the existing production well and treatment building reside. In 2017, the design for the new well pumping station and treatment facility will be initiated at a cost of \$350,000.

7.2 Adverse Water Quality Incidents (AWQI) - Lynden DWS

No AWQI's in 2016.

7.3 Water Production Reports - Summary

The following provides a summary of daily flow rates and instantaneous peak flow rates in comparison to the capacity of the water works as identified in the Permit to Take Water. This information is tabulated in the accompanying tables.

Table 7-1: Lynden DWS (FDL01) - 2016 Daily Production

Date	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
	Amount	Amount	Amount	Amount	Amount	Amount	Amount	Amount	Amount	Amount	Amount	Amount
	m ³ /day	m ³ /day	m ³ /day	m ³ /day	m ³ /day	m ³ /day	m ³ /day	m ³ /day	m ³ /day	m ³ /day	m ³ /day	m ³ /day
1	74	75	69	68	104	105	104	105	73	73	95	70
2	98	73	73	85	73	76	113	90	84	121	92	69
3	85	91	77	80	69	120	133	98	75	92	79	84
4	76	74	69	71	72	111	96	98	83	98	73	86
5	72	73	98	79	88	105	110	69	107	96	80	73
6	80	97	86	78	73	73	114	95	76	129	79	70
7	83	83	75	71	97	80	101	104	79	125	68	75
8	71	76	71	94	87	94	95	89	86	72	74	75
9	82	78	76	90	85	81	99	93	73	81	69	72
10	79	73	72	101	81	107	112	79	86	91	73	84
11	75	89	74	76	75	105	91	85	79	67	72	80
12	73	72	93	83	70	109	118	73	86	67	82	75
13	73	80	80	80	70	98	105	94	69	66	90	77
14	73	91	67	77	79	99	97	81	75	68	79	80
15	70	86	85	81	71	110	73	70	73	81	72	78
16	105	72	68	106	88	73	115	73	84	90	67	77
17	103	71	65	98	69	97	98	73	75	75	74	88
18	89	92	86	79	73	132	117	78	73	75	73	85
19	86	69	83	77	78	122	109	71	89	76	83	78
20	86	107	82	75	106	95	106	92	73	71	81	82
21	86	86	73	86	82	99	96	89	98	66	74	77
22	99	77	75	118	77	116	117	86	65	81	70	84
23	109	73	74	154	126	99	120	67	86	85	55	87
24	102	76	79	166	100	109	102	93	77	73	87	78
25	88	74	84	109	101	119	69	67	79	72	69	90
26	106	76	85	73	101	119	90	67	86	74	79	83
27	104	102	81	78	105	111	98	79	79	93	79	93
28	73	84	76	75	121	82	68	91	79	88	70	85
29	71	89	73	73	130	92	76	92	65	101	72	88
30	102		73	87	108	119	68	79	61	99	76	89
31	83		73		112		79	89		98		88
Total	2,655	2,359	2,394	2,669	2,771	3,060	3,088	2,609	2,373	2,643	2,285	2,500
Average	86	81	77	89	89	102	100	84	79	85	76	81
Min	70	69	65	68	69	73	68	67	61	66	55	69
Max	109	107	98	166	130	132	133	105	107	129	95	93
PTTW	327	327	327	327	327	327	327	327	327	327	327	327

Note: Municipal Drinking Water Licence (005-105) FDL01 Rated Capacity 327 m3/ day

