



2018 ANNUAL REPORT

Marathon Drinking Water System



Prepared by Northern Waterworks Inc. on behalf of the Town of Marathon

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1 INTRODUCTION

1.1 Annual Reporting Requirements

This consolidated Annual Report (the Report) has been prepared in accordance with both section 11 (Annual Reports) and Schedule 22 (Summary Reports for Municipalities) of Ontario Regulation 170/03 (Drinking Water Systems Regulation). This Report is intended to inform both the public and Municipal Council on the operation of the system over the previous calendar year (January 1 to December 31, 2018).

Section 11 of O. Reg. 170/03 requires the development and adequate distribution to the public of an annual report summarizing water quality monitoring results, adverse water quality incidents, system expenses, and chemicals used in the water treatment process.

Schedule 22 of O. Reg. 170/03 requires the development and distribution to Council of an annual report summarizing incidents of regulatory non-compliance and associated corrective actions, in addition to providing flow monitoring results for the purpose of enabling the Owner to assess the capability of the system to meet existing and planned demand.

1.2 Report Availability

In accordance with section 11 of O. Reg. 170/03 this Report must be given, without charge, to every person who requests a copy. Effective steps must also be taken to advise users of water from the system that copies of the report are available, without charge, and of how a copy may be obtained. This Annual Report shall be made available for inspection by the public at the Marathon Municipal Office, on the Town of Marathon's website (marathon.ca) and on NWI's website (nwi.ca/publications).

In accordance with Schedule 22 of O. Reg. 170/03, this Annual Report must be given to the members of Municipal Council. Section 19 (Standard of care, municipal drinking-water system) of Ontario's *Safe Drinking Water Act* also places certain responsibilities upon those municipal officials who oversee an accredited operating authority or exercise decision-making authority over a system. The examination of this Report is one of the methods by which municipal officials may fulfil the obligations required by section 19 of O. Reg. 170/03.

System users and members of Council are strongly encouraged to contact a representative of NWI for assistance in interpreting this Report. Questions and comments may be directed to the local NWI Operations Manager or by email to compliance@nwi.ca.

2 SYSTEM OVERVIEW

2.1 System Description

The Marathon Drinking Water System (DWS No. 220000255) must meet extensive treatment and testing requirements in order to ensure that human health is protected. The operation and maintenance of the system is governed by Ontario's *Safe Drinking Water Act* and the regulations therein, in addition to requirements within system-specific approvals.

The Marathon Drinking Water System (DWS) is classified as a large municipal residential system and is composed of five (5) active groundwater wells (wells 2, 3, 4, 5 & 6), the Industrial Park Booster Station (IPBS), the Penn Lake Heights Reservoir & Booster Station (PLBS), and the Marathon water distribution system. As an operational subsystem, the Marathon water distribution system is owned and operated by the Corporation of the Town of Marathon. The active wells, reservoir and booster stations comprise the Marathon Well Supply System (treatment subsystem), which is owned by the Town of Marathon and is operated, maintained and managed by Northern Waterworks Inc. As a groundwater source, aquifer overburden and soil act as an effective filter that removes micro-organisms and other particles by straining and antagonistic effect, to a level where the water supply may already be potable but disinfection is required as an additional health risk barrier. All wells use free chlorine disinfection to achieve primary disinfection.

The active groundwater wells 2, 3, 4, 5 and 6 are located throughout the community of Marathon; wells 1 and 7 were previously abandoned and decommissioned in 2002 and 2003, respectively. A single multi-stage vertical turbine pump at each active well is used to draw water from the aquifer. Each well also contains a disinfectant chemical feed system, where disinfectant is injected as groundwater is pumped from the well and directed to the chlorine contact loop. The contact loops are designed to provide the necessary amount of time required to achieve primary disinfection and they are the last treatment step prior to water entering the water distribution system.

The wells are cycled alternately to supply water to the distribution system and the reservoir. The PLBS includes an in-ground storage reservoir that balances system pressure and provides water for emergency situations. The reservoir has a capacity of 4,950 m³ and is filled by all the active wells according to programmable set points. Booster pumps at the facility are used to supply water to and maintain system pressure in the Penn Lake Heights subdivision. The IPBS is located on Peninsula Road and is used to supply water to Industrial Park via booster pumps.

The Marathon water distribution system is comprised of various sized diameter water mains consisting of cast iron, ductile iron, high density polyethylene and PVC, totalling approximately 33 km in length and including over 200 fire hydrants. Secondary disinfection requirements in the water distribution system are achieved by maintaining a free chlorine residual at all locations.

2.2 System Expenses

In accordance with section 11 of O. Reg. 170/03, this Report must describe any major expenses incurred during the reporting period to install, repair or replace required equipment. This Report also summarizes those expenses related to strengthening equipment inventories and to maintenance activities undertaken by subcontracted service providers. Major expenses incurred in 2018 are summarized in **Table 1**.

Table 1: Major expenses incurred in 2018.

Category	Description	Expense
New Equipment	CCTV security camera surveillance system at all locations	\$20,348
Repair	Well 2 pump motor	\$5,541
Maintenance	Generator servicing and load testing	\$4,060
Maintenance	Backflow prevention device testing	\$2,664
Repair	Pump 2 variable frequency drive motor controller at IPBS	\$2,561
Maintenance	Flow meter calibration verifications	\$1,927
Inventory/Replace	Chemical feed system gauge isolators and pressure gauges (5)	\$1,796
Repair	Security system for Well 3	\$1,678
New Equipment	Portable turbidimeter	\$1,655
Replace	High capacity pressure regulating valve at IPBS	\$1,583
Replace	½- inch pilot valve for automatic water control valve at PLBS	\$1,473
Inventory	½- inch pilot valve for automatic water control valve at Well 5	\$1,429
Inventory/Replace	Corporation stops with injection quills (3)	\$1,328

2.3 Water Treatment Chemicals

In accordance with section 11 of O. Reg. 170/03, this Report must include a list of all water treatment chemicals used by the system during the period covered by the report (**Table 2**). All chemicals used in the treatment process are NSF/ANSI 60 certified for use in potable water, as required by system approvals.

Table 2: Water treatment chemicals used in 2018.

Treatment Chemical	Application	Locations
sodium hypochlorite	disinfectant	Wells 2, 3, 4, 5 & 6

3 WATER QUALITY

3.1 Overview

In accordance with section 11 of O.Reg. 170/03, this Report must summarize the results of water quality tests required by regulations, approvals, and orders. The following sections use technical water quality terms, some of which the reader may not be familiar with. It is recommended that the reader refer to the *Technical Support Document for Ontario Drinking Water Standards, Objectives, and Guidelines* available at the following website:

<http://www.ontla.on.ca/library/repository/mon/14000/263450.pdf>. Within this document the reader will find information on provincial water quality standards, objectives and guidelines, rationale for monitoring, and a brief description of water quality parameters.

3.2 Operational Parameters

In accordance with Schedule 7 (Operational checks) of O. Reg. 170/03, regulated operational parameters that must be monitored include raw water turbidity and the free chlorine residuals associated with primary and secondary disinfection. The Marathon DWS employs a comprehensive monitoring program that extends beyond these regulated operational parameters to include additional tests conducted on source and treated water samples. **Table 3** summarizes water quality results for regulated and selected unregulated operational parameters. In accordance with Schedule 6 (Operational checks, sampling and testing – general) of O. Reg. 170/03, certain operational parameters are continuously monitored.

3.3 Microbiological Parameters

Microbiological analyses are performed on source, treated, and distribution system water. 574 routine water samples were collected for microbiological analysis by an accredited laboratory in 2018, as required by Schedule 10 (Microbiological sampling and testing) of O. Reg. 170/03. These water samples were collected on a weekly basis and included tests for E. coli (EC), total coliforms (TC), and heterotrophic plate counts (HPC). Results from microbiological analyses are provided in **Table 4**. All results were below the associated Ontario Drinking Water Quality Standards.

Table 3: Results summary for operational parameters.

Parameter (Location) ¹	Sample Method (Frequency)	Units	Minimum Result	Maximum Result	Annual Average
Raw Water Turbidity (Well 2) ²	Grab (Weekly)	NTU	n/a	n/a	n/a
Raw Water Turbidity (Well 3)	Grab (Weekly)	NTU	0.04	0.11	0.07
Raw Water Turbidity (Well 4)	Grab (Weekly)	NTU	0.04	0.10	0.07
Raw Water Turbidity (Well 5)	Grab (Weekly)	NTU	0.04	0.10	0.07
Raw Water Turbidity (Well 6)	Grab (Weekly)	NTU	0.05	0.12	0.08
Treated Water pH (Well 2) ²	Grab (Weekly)	---	7.7	7.8	7.7
Treated Water pH (Well 3)	Grab (Weekly)	---	7.7	7.8	7.8
Treated Water pH (Well 4)	Grab (Weekly)	---	7.7	7.8	7.8
Treated Water pH (Well 5)	Grab (Weekly)	---	7.7	7.8	7.8
Treated Water pH (Well 6)	Grab (Weekly)	---	7.7	7.8	7.8
Treated Water FRC (Well 2) ²	Continuous	mg/L	0.91	1.74	1.42
Treated Water FRC (Well 3)	Continuous	mg/L	0.14	2.59	1.39
Treated Water FRC (Well 4)	Continuous	mg/L	0.02	2.07	1.46
Treated Water FRC (Well 5)	Continuous	mg/L	0.22	2.70	1.38
Treated Water FRC (Well 6)	Continuous	mg/L	0.25	1.71	1.27
Distribution Water FRC (IPBS)	Continuous	mg/L	1.09	1.59	1.30
Distribution Water FRC (PLBS)	Continuous	mg/L	0.99	1.96	1.33
Distribution Water FRC (Various) ³	Grab (Daily)	mg/L	0.74	1.93	n/a

1. FRC = Free Residual Chlorine; IPBS = Industrial Park Booster Station; PLBS = Penn Lake Reservoir & Booster Station.
2. Well 2 was not in continuous production in 2018 and no raw water samples were collected for analysis. Given the absence of water production in 2018, the Well 2 site effectively functioned as a distribution sampling station. The treated water results reported for Well 2 are indicative of water quality in the distribution system (secondary disinfection), and are not associated with actual treatment processes (primary disinfection).
3. Grab samples are collected and tested for free chlorine residual at various locations throughout the water distribution system. The free chlorine residual varies with water age and distribution system location, and for this reason an annual average cannot be provided. The values in the table pertain to the minimum and maximum result collected across all locations in the calendar year.

Table 4: Microbiological sampling results.

Sample Type (Location)	# of Samples	EC Results Range ¹ (MPN/100mL)	TC Results Range ¹ (MPN/100mL)	# of HPC Samples	HPC Results Range (CFU/mL)
Raw Water (Well 2) ²	1	absent	absent	---	---
Raw Water (Well 3)	52	absent	absent	---	---
Raw Water (Well 4)	52	absent	absent	---	---
Raw Water (Well 5)	52	absent	absent	---	---
Raw Water (Well 6)	52	absent	absent	---	---
Treated Water (Well 2) ²	1	absent	absent	1	0
Treated Water (Well 3)	52	absent	absent	52	0 to 5
Treated Water (Well 4)	52	absent	absent	52	0 to 1
Treated Water (Well 5)	52	absent	absent	52	0 to 1
Treated Water (Well 6)	52	absent	absent	52	0 to 2
Distribution	156	absent	absent	107	0 to 7
<p>1. The Ontario Drinking Water Quality Standard for E. Coli and Total Coliforms in a treated or distribution sample is 'not detectable'. The presence of either parameter in a treated or distribution sample is considered an exceedance.</p> <p>2. Well 2 was not in continuous production in 2018.</p>					

3.4 Trihalomethanes & Haloacetic Acids

Trihalomethanes (THMs) and haloacetic acids (HAAs) are required to be sampled on a quarterly basis from a distribution system location that is likely to have an elevated potential for their formation, in accordance with Schedule 13 (Chemical sampling and testing) of O. Reg. 170/03. Total THM and HAA results are summarized in **Table 5** and **Table 6**, respectively.

Compliance with the provincial standard for trihalomethane concentrations is determined by calculating a running annual average (with a Maximum Acceptable Concentration of 0.100 mg/L or 100 µg/L). In 2018, the running annual average for THMs was 5.4 µg/L. A new provincial standard for haloacetic acids, also expressed as a running annual average with a Maximum Acceptable Concentration of 0.080 mg/L or 80 µg/L, will come into effect on January 1, 2020.

Table 5: Total THM results.

Sample Date	Result (µg/L)
15-Feb-2018	<4.0
15-May-2018	<4.0
15-Aug-2018	7.6
15-Nov-2018	6.0
Regulatory Average	5.4
ODWQS (RAA)	100

Table 6: Total HAA results.

Sample Date	Result (µg/L)
15-Feb-2018	3.0
15-May-2018	2.3
15-Aug-2018	3.1
15-Nov-2018	3.4
Regulatory Average	3.0
Future ODWQS (RAA)	80

3.5 Nitrate & Nitrite

Treated water from each well is tested for nitrate and nitrite concentrations on a quarterly basis in accordance with Schedule 13 (Chemical sampling and testing) of O. Reg. 170/03.

Nitrate and nitrite results are provided in **Table 7**. All results were below the Ontario Drinking Water Quality Standards.

Table 7: Nitrate and nitrite results.

Sample Date	Parameter	ODWQS (mg/L)	Well 2 (mg/L)	Well 3 (mg/L)	Well 4 (mg/L)	Well 5 (mg/L)	Well 6 (mg/L)
15-Feb-2018	Nitrate	10	---	0.783	0.517	0.834	0.949
	Nitrite	1	---	<0.010	<0.010	<0.010	<0.010
15-May-2018	Nitrate	10	---	0.682	0.602	0.904	1.22
	Nitrite	1	---	<0.010	<0.010	<0.010	<0.010
15-Aug-2018 (Wells 3 – 6) 22-Aug-2018 (Well 2)	Nitrate	10	1.07	0.692	0.551	0.951	1.27
	Nitrite	1	<0.010	<0.010	<0.010	<0.010	<0.010
15-Nov-2018	Nitrate	10	---	0.764	0.486	0.665	1.25
	Nitrite	1	---	<0.010	<0.010	<0.010	<0.010

3.6 Lead Sampling

The Marathon DWS previously qualified for reduced lead sampling and ultimately became exempt from sampling at plumbing locations, in accordance with Schedule 15.1 (Lead) of O.Reg. 170/03. Six (6) distribution samples must now be collected every year and analyzed for pH and alkalinity. Additionally, these distribution system samples must be analyzed for lead in every third 12-month period after the plumbing sample exemption was activated. **Table 8** summarizes the results of community lead sampling and related required tests. All results were below the associated Ontario Drinking Water Quality Standard for lead.

Table 8: Distribution pH, alkalinity and lead sampling results.

Sample Date	6-Feb-18	6-Feb-18	9-Feb-18	22-Aug-18	22-Aug-18	22-Aug-18
Hydrant Number	19	56	115	19	56	115
pH	7.71	7.83	8.07	7.76	7.73	7.85
Alkalinity (mg/L CaCO₃)	164	171	175	171	178	173
Lead Result¹ (µg/L)	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1. The Ontario Drinking Water Quality Standard for lead in drinking-water is 10 µg/L.						

3.7 Inorganic Parameters

Except for the parameters sodium and fluoride, inorganic parameters are sampled every three (3) years in treated water from each well in accordance with Schedules 13 (Chemical sampling and testing) and 23 (Inorganic parameters) of O. Reg. 170/03. The most recent inorganic parameter sampling results are provided in **Table 9**. Results are identical for each well unless otherwise indicated. All results were below the associated Ontario Drinking Water Quality Standards.

Sodium and fluoride are sampled every five (5) years in treated water from each well in accordance with Schedules 13 and 23 of O. Reg. 170/03. The most recent sample results are also summarized in **Table 9**. All fluoride results were below the associated Ontario Drinking Water Quality Standard. Note that the parameter sodium is not associated with an Ontario Drinking Water Quality Standard as prescribed in O. Reg 169/03, but exceedances of 20 mg/L do require reporting and corrective actions. The sodium result listed for Well 6 is associated with Adverse Water Quality Incident No. 115920. A resample collected at Well 6 on February 5, 2014, yielded a sodium result of 22.8 mg/L.

Table 9: Inorganic sampling results.

Parameter	Sample Date	Units	Result	ODWQS
Antimony	17-Feb-2016	µg/L	<0.60	6
Arsenic	17-Feb-2016	µg/L	<1.0	10
Barium				
Well 2	17-Feb-2016	µg/L	16	1000
Well 3	17-Feb-2016	µg/L	23	1000
Well 4	17-Feb-2016	µg/L	20	1000
Well 5	17-Feb-2016	µg/L	22	1000
Well 6	17-Feb-2016	µg/L	18	1000
Boron	17-Feb-2016	µg/L	<50	5000
Cadmium	17-Feb-2016	µg/L	<0.10	5
Chromium	17-Feb-2016	µg/L	<1.0	50
Fluoride				
Well 2	27-Jan-2014	mg/L	0.098	1.5
Well 3	27-Jan-2014	mg/L	0.105	1.5
Well 4	27-Jan-2014	mg/L	0.101	1.5
Well 5	27-Jan-2014	mg/L	0.066	1.5
Well 6	27-Jan-2014	mg/L	0.132	1.5
Mercury	17-Feb-2016	µg/L	<0.10	1
Selenium	17-Feb-2016	µg/L	<1.0	50
Sodium				
Well 2	27-Jan-2014	mg/L	19.9	20
Well 3	27-Jan-2014	mg/L	14.7	20
Well 4	27-Jan-2014	mg/L	17.3	20
Well 5	27-Jan-2014	mg/L	14.7	20
Well 6	27-Jan-2014	mg/L	22.9	20
Uranium	17-Feb-2016	µg/L	<2.0	20

3.8 Organic Parameters

Organic parameters are sampled every three (3) years in treated water from each well in accordance with Schedules 13 (Chemical sampling and testing) and 24 (Organic parameters) of O. Reg. 170/03. These parameters include various acids, pesticides, herbicides, PCBs, volatile organics, and other organic chemicals. Organic parameter sampling results are provided in **Table 10**. Results are identical for each well unless otherwise indicated. Sampling for all organic parameters was most recently conducted on February 17, 2016. All results were below the associated Ontario Drinking Water Quality Standards.

Table 10: Organic parameter sampling results.

Parameter	Result (µg/L)	ODWQS (µg/L)	Parameter	Result (µg/L)	ODWQS (µg/L)
Alachlor	<0.10	5	Diuron	<1.0	150
Atrazine & Metabolites	<0.20	5	Glyphosate	<5.0	280
Azinphos-methyl	<0.10	20	Malathion	<0.10	190
Benzene	<0.50	1	MCPA	<0.20	100
Benzo(a)pyrene	<0.010	0.01	Metolachlor	<0.10	50
Bromoxynil	<0.20	5	Metribuzin	<0.10	80
Carbaryl	<0.20	90	Monochlorobenzene	<0.50	80
Carbofuran	<0.20	90	Paraquat	<1.0	10
Carbon Tetrachloride	<0.50	2	Pentachlorophenol	<0.50	60
Chlorpyrifos	<0.10	90	Phorate	<0.10	2
Diazinon	<0.10	20	Picloram	<0.20	190
Dicamba	<0.20	120	Total PCBs	<0.035	3
1,2-Dichlorobenzene	<0.50	200	Prometryne	<0.10	1
1,4-Dichlorobenzene	<0.50	5	Simazine	<0.10	10
1,2-Dichloroethane	<0.50	5	Terbufos	<0.20	1
1,1-Dichloroethylene	<0.50	14	Tetrachloroethylene	<0.50	10
Dichloromethane	<5.0	50	2,3,4,6-Tetrachlorophenol	<0.50	100
2,4 -Dichlorophenol	<0.30	900	Triallate	<0.10	230
2,4-D	<0.20	100	Trichloroethylene	<0.50	5
Diclofop-methyl	<0.20	9	2,4,6-Trichlorophenol	<0.50	5
Dimethoate	<0.10	20	Trifluralin	<0.10	45
Diquat	<1.0	70	Vinyl Chloride	<0.20	1

4 FLOW MONITORING

4.1 Overview

In accordance with Schedule 22 (Summary Reports for Municipalities) of O. Reg. 170/03, this Annual Report must include certain information for the purpose of enabling the Owner to assess the capability of the system to meet existing and planned uses. Specifically, this Report must include a summary of the quantities and flow rates of the water supplied during the reporting period, including monthly average and maximum daily flows. The Report must also include a comparison of flow monitoring results to the rated capacity and flow rates approved in the system's Municipal Drinking Water Licence.

4.2 2018 Flow Monitoring Results

Throughout the reporting period, the Marathon DWS operated within its rated capacity and supplied a total of 1,308,340 m³ of treated water. On an average day in 2018, 3,584 m³ of treated water was supplied to the community, which represents 33% of the rated capacity of the system (10,968.64 m³/day). The maximum daily flow in 2018 was 5,366 m³/day, which represents 49% of the rated capacity of the system. Flow monitoring results are summarized in Figure 1 and Table 11.

Figure 1: 2018 average and maximum daily treated water flows.

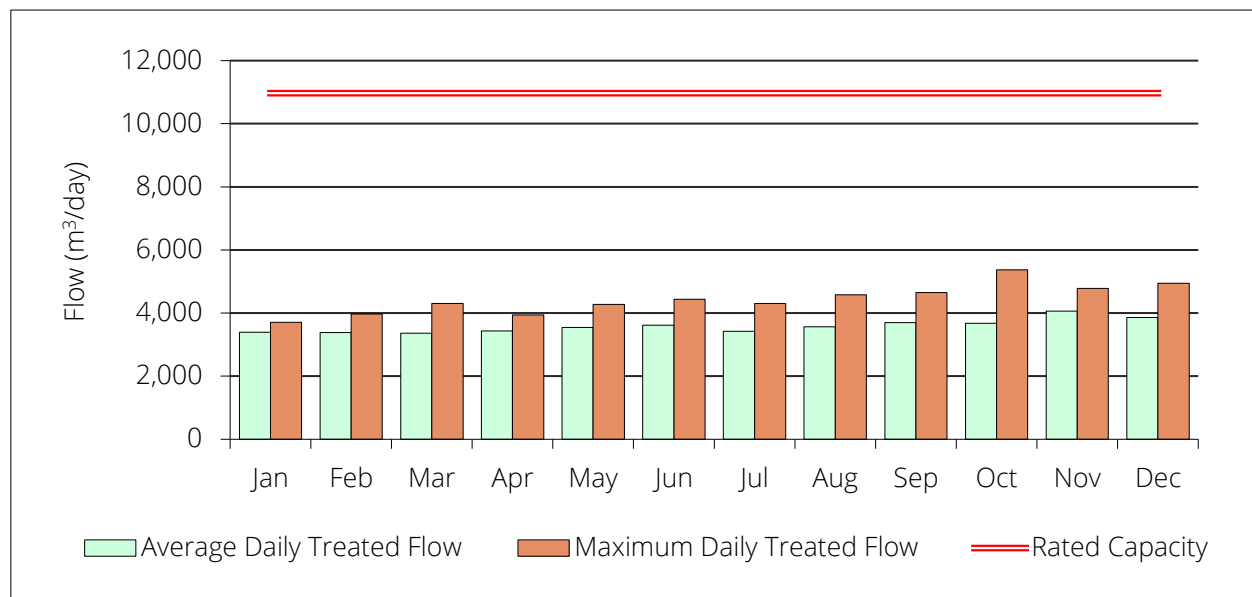


Table 11: 2018 total volumes, daily flows and capacity assessments.

Month	Total Volumes ¹ (m ³)		Daily Flows (m ³ /day)		Capacity Assessments ²	
	Raw Water	Treated Water	Average - Treated Water	Maximum - Treated Water	Average - Treated Water	Maximum - Treated Water
Jan	105,127	105,004	3,387	3,708	31%	34%
Feb	94,892	94,799	3,386	3,967	31%	36%
Mar	104,455	104,346	3,366	4,300	31%	39%
Apr	102,965	102,866	3,429	3,943	31%	36%
May	109,981	109,898	3,545	4,278	32%	39%
Jun	108,525	108,447	3,615	4,433	33%	40%
Jul	106,187	106,109	3,423	4,308	31%	39%
Aug	110,440	110,361	3,560	4,583	32%	42%
Sep	110,902	110,832	3,694	4,651	34%	42%
Oct	114,101	114,027	3,678	5,366	34%	49%
Nov	122,030	121,961	4,065	4,777	37%	44%
Dec	119,782	119,690	3,861	4,939	35%	45%
Total	1,309,387	1,308,340	---	---	---	---
Avg.	109,116	109,028	3,584	---	33%	---

1. The difference between raw water and treated water volumes corresponds to the amount of water that is automatically directed to waste at the beginning of a well production cycle. In 2018, this difference accounted for approximately 0.08% of the total amount of withdrawn groundwater.

2. Capacity assessments compare average and maximum daily treated water flows to the combined rated capacity of the system (10,968.64 m³/day), as provided within the Municipal Drinking Water Licence.

Throughout the reporting period, Wells 3, 4, 5 and 6 contributed approximately 20.5%, 31.5%, 31.7%, and 16.3% to overall water production, respectively. Well 2 was not in continuous production in 2018. With the exception of Well 3, all treatment stations operated within their respective capacity limits. The water supplied to Industrial Park accounted for approximately 1% of the total amount of water produced; water supplied to the Penn Lake Heights subdivision accounted for approximately 2% of the total amount of water produced. **Table 12** summarizes flow monitoring results by location.

Table 12: 2018 total volumes, daily flows, and capacity assessments – results by location.

Location	Total Volumes (m ³)		Daily Flows (m ³ /day)			Capacity Assessments	
	Treated Water	% of Total	Rated Capacity	Average - Treated Water	Maximum - Treated Water	Average - Treated Water	Maximum - Treated Water
Treatment Stations							
Well 2	54	0.004%	1,962.28	0.1	21	0.01%	1%
Well 3	268,496	20.5%	1,662.36	736	1,942	44%	117% ¹
Well 4	412,159	31.5%	2,289.60	1,129	1,862	49%	81%
Well 5	414,888	31.7%	2,289.60	1,137	1,456	50%	64%
Well 6	212,743	16.3%	2,764.80	583	2,384	21%	86%
All Wells	1,308,340	100%	10,968.64	3,584	5,366	33%	49%
Distribution Stations							
IPBS	11,352	1%	---	31	82	---	---
PLBS	23,582	2%	---	65	147	---	---
1. Well 3 exceeded daily its rated capacity on four (4) occasions in 2018: December 25, 28, 29 & 31.							

4.3 Recent Historical Flows

Table 13 summarizes recent historical flow monitoring results for the Marathon Drinking Water System. There were appreciable increases in the amounts of source water withdrawn and treated water supplied in 2018 when compared to 2017. Flows have increased for five consecutive years, and average daily flows have approximately doubled since 2013 (a 94.5% overall increase in flows between 2013 and 2018). Total annual volumes of treated water supplied in the near future may be expected to be between 1,000,000 m³ and 1,600,000 m³, which represents approximately 25% to 40% of the rated capacity of the Marathon DWS.

Table 13: Recent historical flow monitoring results.

Year	Total Annual Treated Water Volumes (m ³)						Annual % Change
	Well 2	Well 3	Well 4	Well 5	Well 6	All Wells	
2013	127,933	125,120	150,560	145,715	123,256	672,584	---
2014	166,272	147,011	229,080	253,109	85,861	881,333	+31.0%
2015	187,933	234,863	277,281	289,556	113,690	1,103,323	+25.2%
2016	204,114	227,848	288,739	310,427	106,411	1,137,539	+3.1%
2017	97,027	244,123	332,163	335,481	153,259	1,162,053	+2.2%
2018	54	268,496	412,159	414,888	212,743	1,308,340	+12.6%

5 COMPLIANCE

5.1 Overview

Northern Waterworks Inc. and the Town of Marathon employ an operational strategy that is committed to achieving the following goals:

- 1) Providing a safe and reliable supply of drinking water to the community of Marathon;
- 2) Meeting or exceeding all applicable legislative and regulatory requirements; and,
- 3) Maintaining and continually improving the operation and maintenance of the system.

The following sections will summarize incidents of regulatory noncompliance and adverse water quality that occurred during the reporting period. NWI is committed to employing timely and effective corrective actions to prevent recurrence of all identified incidents of noncompliance and adverse water quality.

5.2 Regulatory Compliance

In accordance with Schedule 22 (Summary Reports for Municipalities) of O. Reg. 170/03, this Report must list any requirements of the *Act*, the regulations, the system's approval, drinking water works permit, municipal drinking water licence, and any orders applicable to the system that were not met at any time during the period covered by the report (i.e. an incident of regulatory noncompliance). Additionally, this Report must specify the duration of the failure and the measures that were taken to correct the failure.

No incidents of regulatory noncompliance were identified during the most recent inspection initiated on May 31, 2018 by Ontario's Ministry of the Environment, Conservation and Parks.

5.3 Adverse Water Quality Incidents

In accordance with section 11 (Annual Reports) of O. Reg. 170/03, this Report must summarize any reports made to the Ministry under subsection 18(1) (Duty to report adverse test results) of *the Act* or section 16-4 (Duty to report other observations) of Schedule 16 of O. Reg. 170/03. Additionally, this Report must describe any corrective actions taken under Schedule 17 of O. Reg. 170/03 during the period covered by the report.

There were no adverse water quality incidents during the reporting period for the Marathon Drinking Water System.