

Administration

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April 24, 2020

Council Session CL 6-2020, April 23, 2020

**MINISTRY OF THE ENVIRONMENT, CONSERVATION AND PARKS
LOCAL AREA MUNICIPALITIES**

SENT ELECTRONICALLY

**RE: Report PDS 13-2020 2019 Reserve Water and Wastewater Treatment
Capacities
Minute Item 9.2 CL 6-2020, April 23, 2020**

Regional Council, at its meeting held on April 23, 2020, passed the following resolution:

That Report PDS 13-2020, dated April 23, 2020, respecting 2019 Reserve Water and Wastewater Treatment Capacities, **BE RECEIVED** and **BE CIRCULATED** to the Ministry of the Environment, Conservation and Parks, and the Niagara Area Municipalities.

A copy of Report PDS 13-2020 is attached for your information.

Yours truly,



Ann-Marie Norio
Regional Clerk

CLK-C 2020-143

cc: I. Stetic, Project Manager
R. Mostacci, Commissioner, Planning & Development Services
N. Oakes, Executive Assistant to the Commissioner, Planning & Development Services

Subject: 2019 Reserve Water and Wastewater Treatment Capacities

Report to: Regional Council

Report date: Thursday, April 23, 2020

Recommendations

1. That this report **BE RECEIVED** for information; and
2. That a copy of this report **BE CIRCULATED** to the Ministry of the Environment, Conservation and Parks and Niagara Area Municipalities.

Key Facts

- The purpose of this report is to inform Council of the reserve treatment capacities at Niagara's Water and Wastewater Treatment facilities. This reporting is required by the Ministry of Environment, Conservation and Parks (MECP).
- The data contained in this report assists in commenting on new development proposals and related servicing as well as planning for future treatment capacity.
- All of Niagara Water Treatment Plants (WTPs) and Wastewater Treatment Plants (WWTPs) are positioned to accept growth beyond the minimum 10 year horizon.

Financial Considerations

This report provides Council with historical and projected treatment capacity and flow data. There are no direct financial implications in receiving this report.

The reserve treatment capacities at the water and wastewater (W&WW) facilities are considered in commenting on new development proposals and related servicing and, as a result, could result in a financial impact related to specific future applications.

Analysis

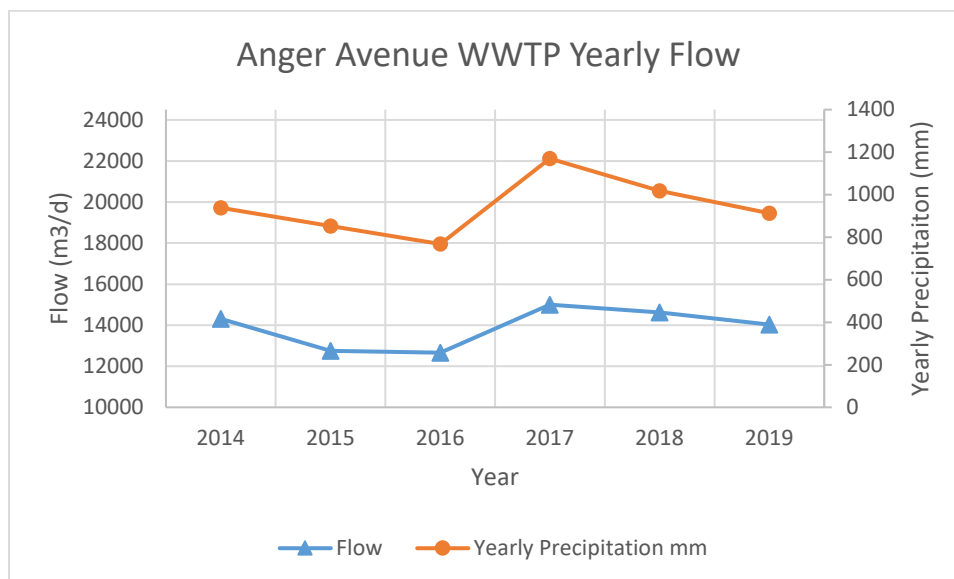
The Infrastructure Planning and Development Engineering section of Planning and Development Services Department annually reports on an assessment of the average daily W&WW flows based on the previous five years, as recorded at our various facilities compared to MECP rated capacities for the facilities. Included in the analysis are the 10-year growth projections in accordance with Niagara 2041 (*How we Grow, Flow and Go*).

A key objective of this report is to highlight potential capacity constraints and allow sufficient lead time to plan for future capacity increases through the W&WW capital programs so that development may continue unencumbered. This is a 'desktop' exercise, which compares five-year (annual) average flows to the respective MECP Environmental Compliance Approval(s), formerly known as Certificate of Approval(s) for each facility, then incorporates 10-year growth forecasts into the calculation. Ongoing phasing and staging strategy works with our local municipal partners will further refine this assessment for understanding development capacity.

This assessment does not reflect specific compliance, quality, sustainability, risk, or operational deficiencies at the treatment plants or trunk conveyance/transmission systems, which may affect the Region's ability to approve new development or permit servicing extensions.

For municipal wastewater treatment, weather is the key factor that results in peak wet weather flows, which impacts the collection and trunk sewers in both local and regional systems through "Rainfall Derived Inflow and Infiltration" (RDI&I). Even though, it is expected to record higher flows due to population growth, the annual average daily flows to the WWTPs are higher due to the wet weather flows entering the systems. Just for an example, Figure 1 illustrates a direct correlation of wastewater plant flows and yearly precipitation at Anger Avenue WWTP.

Figure 1: Correlation of Wastewater Flows with Precipitation



Wet weather flows can have substantial impact on available WWTP capacities and a direct impact on the limitations of available servicing capacity for future growth.

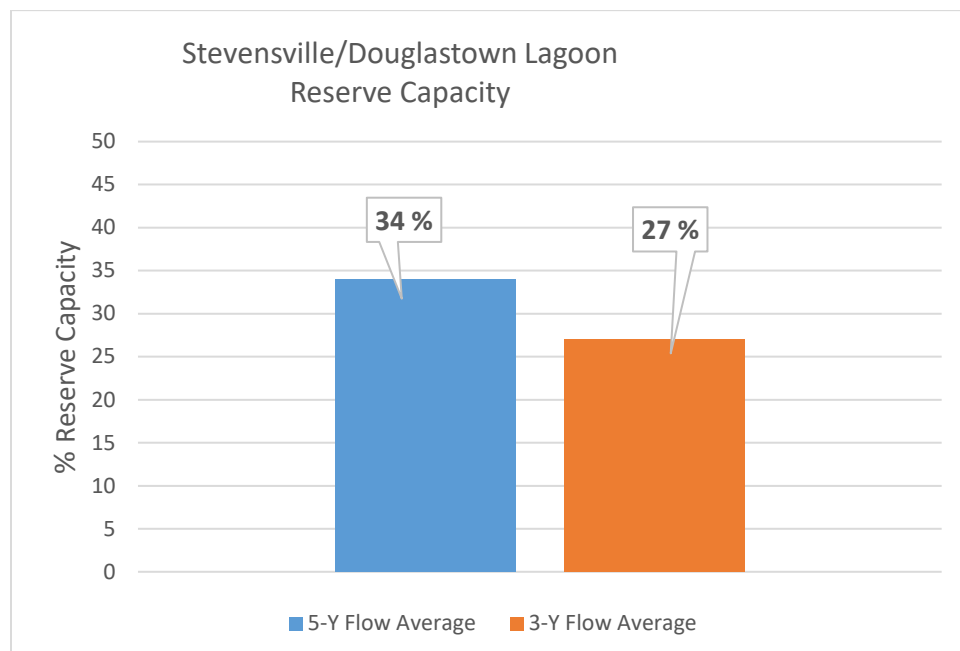
Appendix 1 and 2 provide the annual average daily flows and five year average from 2015 to 2019 for the water and wastewater treatment plants, respectively. Appendices 3 and 4 provide a summary of Niagara's six water treatment facilities and eleven wastewater treatment facilities presenting their respective reserve capacities.

It is worth noting that growth rates in recent years show a momentous increase compared to the previous trend in Niagara, which consequently may impact the way this 'desktop' exercise conducts the reserve capacity calculations.

Averaging daily flows over a five-year period versus a three-year period in calculations show a compelling difference in the resulting reserve capacities. This can create a skewed sense of a greater reserve capacity available for the future if the annual daily flows are averaged over longer period of time.

Figure 2 shows an example in a resulting reserve capacity difference for Stevensville/Douglastown Lagoon when flows are averaged over different time periods in calculations.

Figure 2: Reserve Capacity of Annual Flows Averaged over 5-Year and 3-Year



A potential change to incorporate the annual daily flows averaged over the last three-year period into the reserve capacities calculation instead of using the last five-year average presently will be discussed with the Municipal partners and the Ministry during 2020.

At present, all of Niagara's WTPs and WWTPs are positioned to accept growth beyond the minimum 10-year period (Appendix 3 and Appendix 4).

Wet Weather Management

In order to accommodate the anticipated growth from Niagara 2041, the 2016 W&WW Master Servicing Plan (MSP) investigated capacity upgrades (upgrades to trunk sewers, pumping station capacities, etc.), upstream management (storage, peak shaving, diversion), and peak flow management (flow reduction, Inflow & infiltration (I&I) reduction projects) for every wastewater system. Based on this review, there are wet weather projects listed with identified areas for targeted I&I removal to offset the requirement to upgrade and expand more expensive infrastructure all the way to the WWTPs. It is crucial to achieve the I&I reductions in order to offset the capacity needs from growth, to protect the environment, and mitigate potential basement flooding.

The Region and Area Municipalities are continuing to work collaboratively to facilitate ongoing development throughout the region and provide the requisite servicing and capacity allocation in a responsible way to service the communities. In addition, the Region has been aiding Area Municipalities by funding the CSO Control program under the Wet Weather Management Program to support various I&I related projects and programs on the municipal side. This program has been reducing the impacts of I&I and has been a benefit to both, the Region and the Area Municipalities.

The Wet Weather Management team is working with the Development Industry including Public Works Officials, Building Officials, Developers, Consultants and Contractors to raise awareness on the wet weather management issues and potential upcoming changes to address this.

Alternatives Reviewed

No alternatives were studied.

Relationship to Council Strategic Priorities

The report aligns with Council's Priority of Responsible Growth and Infrastructure Planning by highlighting the reserve capacity available to growth at all Regional Water and Wastewater Treatment Facilities.

The report also provides MECP and local municipal partners operational summary and reserve capacity projections for Region's Water and Wastewater Treatment facilities.

Other Pertinent Reports

- PDS 29-2019, August 7, 2019, 2018 Reserve Water and Wastewater Treatment Capacities
- PW 22-2017, May 30, 2017, 2016 Water and Wastewater Master Servicing Plan Update

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Project Manager
Planning and Economic Development

Recommended by:

Rino Mostacci, MCIP, RPP
Commissioner
Planning and Economic Development

Submitted by:

Ron Tripp, P.Eng.
Acting Chief Administrative Officer

This report was prepared in consultation with Phill Lambert, Director Planning and Development Services, John Brunet, AD Water Operations and Staff Development and Jason Oatley, Manager WW Quality & Compliance.

Appendices

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APPENDIX 1

ANNUAL AVERAGE DAILY FLOW 2015 TO 2019 WATER TREATMENT PLANTS

Water Treatment Facility Location	Rated Capacity (m ³ /d)	Average Daily Flow (m ³ /d) 2015	Average Daily Flow (m ³ /d) 2016	Average Daily Flow (m ³ /d) 2017	Average Daily Flow (m ³ /d) 2018	Average Daily Flow (m ³ /d) 2019	5 Year Average Daily Flow (m ³ /d) 2015 to 2019
Decew Falls WTP	227,300	53,723	54,903	54,321	56,090	53,303	54,468
Grimsby WTP	44,000	16,652	15,699	14,020	14,866	14,029	15,053
Niagara Falls WTP	145,584	45,186	47,350	45,192	44,780	43,400	45,182
Port Colborne WTP	36,000	8,908	7,719	8,735	8,864	7,282	8,302
Rosehill WTP	50,026	13,182	13,148	12,388	12,862	11,188	12,554
Welland WTP	65,000	20,164	21,858	21,590	22,538	22,579	21,746

Note 1: Welland WTP rated capacity changed from 102,300 m³/d to 65,000 m³/d due to Operational constraints.

APPENDIX 2

ANNUAL AVERAGE DAILY FLOW 2015 TO 2019 WASTEWATER TREATMENT PLANTS

	Rated	Average	Average	Average	Average	Average	5 year
	Capacity	Daily Flow	Daily Flow	Daily Flow	Daily Flow	Daily Flow	Average
Wastewater Treatment	(m ³ /d)	(m ³ /d)	(m ³ /d)	(m ³ /d)	(m ³ /d)	(m ³ /d)	Daily Flow
Facility Location							(m ³ /d)
		2015	2016	2017	2018	2019	2015 to 2019
Anger Avenue WWTP	24,500	12,755	12,661	15,000	14,624	15,146	14,037
Baker Road WWTP	31,280	17,549	16,999	20,897	19,975	20,910	19,266
Crystal Beach WWTP	9,100	5,005	4,676	5,915	5,874	6,276	5,549
Niagara Falls WWTP	68,300	40,782	35,880	44,684	41,489	41,360	40,839
NOTL WWTP	8,000	3,911	4,021	4,561	4,687	5,237	4,483
Port Dalhousie WWTP	61,350	30,091	29,616	34,823	35,095	36,681	33,261
Port Weller WWTP	56,180	30,856	29,650	32,090	36,881	39,211	33,738
Queenston WWTP	500	234	278	234	198	213	231
Seaway WWTP	19,600	11,064	9,103	12,082	12,580	13,472	11,660
Stevensville/Douglastown Lagoon	2,289	1,192	1,314	1,635	1,670	1,729	1,508
Welland WWTP	54,550	32,164	29,728	35,407	34,643	37,137	33,816

APPENDIX 3

Regional Water Treatment Facilities Reserve Capacity Calculation for 2019

Treatment Facility	Permit To Take Water (1) (ML/D)	Rated Treatment Capacity (ML/D)	Peaking Factor (2)	Theoretical Average Day Capacity (ML/D)	90% of Average Day Capacity (3) (ML/D)	5-Year Average Day Flow (ML/D)	% of Total Capacity Used	Reserve Treatment Capacity (Based on 90%) (ML/D)	Design Flow Rate (275 l/c/d)	Reserve Serviceable Population (Equivalents)	10-Year Forecast For Population (Residential & Employment)	Surplus Population Over 10-Year Projection
DeCew Falls WTP	227.0	227.3	1.496	151.9	136.7	54.5	36%	82.2	275	298,909	30,398	268,511
Grimsby WTP	44.0	44.0	1.587	27.7	24.9	15.1	54%	9.9	275	36,000	14,771	21,229
Niagara Falls WTP	145.5	145.5	1.577	92.3	83.1	45.2	49%	37.9	275	137,818	23,782	114,036
Port Colborne WTP	45.5	36.0	1.640	22.0	19.8	8.3	38%	11.5	275	41,818	1,552	40,266
Rosehill WTP	78.0	50.0	1.482	33.7	30.3	12.6	37%	17.8	275	64,727	6,375	58,352
Welland WTP	110.0	65.0	1.486	43.7	39.3	21.7	50%	17.6	275	64,000	12,292	51,708

(1) Original MOE approved quantity of raw water permitted (Permit To Take Water).

(2) The peaking factors used are based on an average of actual flow rates of maximum day versus average day flows over the past three years at each facility.

(3) Region's W&WW MSP (GM BluePlan, 2017) requires planning process for expansion when plant capacity exceeds 80%, and expansion should be completed when capacity exceeds 90%.

APPENDIX 4

Regional Wastewater Treatment Facilities Reserve Capacity Calculation for 2019

Treatment Facility	MOE Plant Rated Capacity (m ³ /day)	90 % of Plant Capacity (1) (m ³ /day)	5-Year Average Daily Flow (m ³ /day)	% of Total Capacity Used	Reserve Treatment Capacity (Based on 90%) (m ³ /day)	Design Flow Rate (4) (365 L/c/d)	Reserve Serviceable Population (Equivalents)	10-Year Forecast For Population (Residential & Employment)	Surplus Population Over 10-Year Projection
Anger Avenue (Fort Erie) WWTP	24,500	22,050	14,037	57%	8,013	365	21,953	4,277	17,676
Baker Road (Grimsby) WWTP	31,280	28,152	19,266	62%	8,886	365	24,346	16,791	7,555
Crystal Beach (Fort Erie) WWTP	9,100	8,190	5,549	61%	2,641	365	7,236	1,443	5,793
Niagara Falls WWTP	68,300	61,470	40,839	60%	20,631	365	56,523	19,980	36,543
NOTL WWTP	8,000	7,200	4,483	56%	2,717	365	7,443	2,644	4,799
Port Dalhousie (St. Catharines) WWTP	61,350	55,215	33,261	54%	21,954	365	60,148	15,005	45,143
Port Weller (St. Catharines) WWTP	56,180	50,562	33,738	60%	16,824	365	46,094	10,052	36,042
Queenston (NOTL) WWTP (3)	500	450	231	46%	219	365	599	99	500
Seaway (Port Colborne) WWTP	19,600	17,640	11,660	59%	5,980	365	16,383	1,622	14,761
Stevensville/Douglastown Lagoon	2,289	2,060	1,508	66%	552	365	1,512	795	717
Welland WWTP	54,550	49,095	33,816	62%	15,279	365	41,860	12,912	28,948

(1) Region's W&WW MSP (GM BluePlan, 2017) requires planning process for expansion when plant capacity exceeds 80%, and expansion should be completed when capacity exceeds 90%.

(2) The Niagara Falls WWTP assessment includes the sewage flows from the St. David's area of Niagara-on-the-Lake.

(3) The Queenston WWTP in Niagara-on-the-Lake has a unique capacity commitment of 226 m³/d for the following properties: Niagara Parks Commission (75 m³/d), Niagara Falls Bridge Commission (63 m³/d), Shalamar Campground (38 m³/d) and Ontario Power Generation (50 m³/d). Due to these commitments and limited UAB, limited residential growth is expected within the next 10 year period within the tributary area.

(4) Design Flow Rate incorporated 90 L/c/d of extraneous flow allowance