Subject: 2024 Reserve Water and Wastewater Treatment Capacities

Report to: Public Works Committee

Report date: Tuesday, May 6, 2025

Recommendations

1. That Report PW 20-2025 **BE RECEIVED** for information; and

2. That Report PW 20-2025 **BE CIRCULATED** to the Ministry of the Environment, Conservation and Parks and Local Area Municipalities.

Key Facts

- The purpose of this report is to inform Council about the reserve treatment capacities at Niagara Region's Water and Wastewater Treatment Plants. This desktop analysis is required by the Ministry of Environment, Conservation and Parks (MECP).
- The data contained in this report contributes to the review of new development proposals and related servicing, as well as long-term planning for future treatment capacity.
- The results of this capacity assessment indicate that all of Niagara Region's Water Treatment Plants (WTPs) and Wastewater Treatment Plants (WWTPs) have sufficient capacity to accommodate growth beyond the minimum 10-year planning horizon.
- This conclusion is based on the Region’s current infrastructure plan, which includes the construction of the new South Niagara Wastewater Treatment Plant to expand overall capacity.
- The assessment also assumes that existing treatment facilities will be maintained or refurbished as needed to remain fully operational.
- Additionally, the analysis is based on design capacity, and does not account for the impact of wet weather flows. Peak wet weather conditions may limit sanitary sewer capacity. As such, ongoing efforts to reduce wet weather flows are critical to supporting future development.
- The Region’s Master Servicing Plan builds upon the MECP desktop analysis by incorporating relevant local factors, including wet weather impacts, to provide a more comprehensive, real-world assessment of capacity.

Financial Considerations

There are no direct financial implications related to this report.

Analysis

Annual Wastewater Treatment Capacity Report Required by MECP

The purpose of this report is to inform Council of the reserve treatment capacities at Niagara Region's Water and Wastewater Treatment Plants. This reporting is required by the Ministry of Environment, Conservation and Parks (MECP) and is intended to highlight potential capacity constraints to help municipalities plan for infrastructure projects needed to service anticipated growth.

This desktop exercise follows a specific methodology established by the MECP, which involves comparing five-year average flows to the respective MECP Environmental Compliance Approval(s), formerly known as Certificate of Approval(s) for each facility. It then incorporates 10-year growth forecasts from the most recent MSP into the analysis.

This methodology reflects the Region’s current infrastructure plan, which includes the construction of the new South Niagara Wastewater Treatment Plant to expand overall capacity. It also assumes that existing treatment facilities will be maintained or upgraded as needed to remain fully operational. Additionally, the assessment is based on design capacity and does not account for the impact of wet weather flows.

The Region’s Master Servicing Plan builds on the MECP analysis by incorporating wet weather flow impacts, as well as phasing and staging strategy work with the Region’s local municipal partners to fully define development capacity needs.

All Plants have 10 Year+ Available Design Capacity

The results of this desktop average flow capacity assessment indicate that the design capacity of all Niagara Region Water Treatment Plants (WTPs) and Wastewater Treatment Plants (WWTPs) is sufficient to accommodate growth beyond the minimum 10-year planning horizon.

Appendices 1 and 2 provide annual average daily flows and five-year average flows from 2020 to 2024 for the water and wastewater treatment plants, respectively. Appendices 3 and 4 provide a summary of Niagara’s six (6) water treatment facilities and 11 wastewater treatment facilities presenting their respective reserve capacities.

The reserve capacity calculations are based on the Region's official long-range population and employment forecasts. It is important to note that actual growth rates in recent years have exceeded these forecasts. Because higher-than-expected growth can impact the accuracy of this desktop exercise, Regional staff will review growth trends annually and adjust the forecasted growth rates used in reserve capacity calculations as needed.

Risks that Reduce Available Treatment Capacity

It is important to note that the results of this capacity assessment, calculated according to MECP requirements, do not fully reflect real-world operating conditions. The assessment assumes dry weather flows, no constraints within the conveyance system, and that all existing equipment is properly maintained.

In practice, precipitation—particularly rainwater—can reduce the available capacity of municipal wastewater systems. Because rainwater does not require the same level of treatment as sewage, it should be directed to the stormwater system. However, when rainwater enters the sanitary collection system, it consumes capacity intended for sewage and future growth. As such, ongoing efforts to reduce wet weather flows are essential to alleviating system limitations and enabling future development.

Additionally, this assessment does not account for operational deficiencies or risks related to the condition of existing assets at treatment plants or within trunk conveyance and transmission systems. While not addressed in detail in this report, infrastructure failures could significantly impact the Region's ability to support new development or permit servicing extensions.

Alternatives Reviewed

No alternatives were reviewed as this report is a requirement of the MECP.

Relationship to Council Strategic Priorities

The report aligns directly with Council's Priority of Responsible Growth and Infrastructure Planning by forecasting the reserve capacity available for growth at all Regional Water and Wastewater Treatment Facilities. By understanding reserve capacity, the Region can better plan infrastructure needed for growth.

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 16-2024, May 8, 2024, 2023 Reserve Water and Wastewater Treatment Capacities (https://pub-niagararegion.escribemeetings.com/Meeting.aspx?Id=b480eb56-6bb4-466f-982d-31237205b6be&Agenda=Merged&lang=English&Item=16&Tab=attachments)

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Appendices

Appendix 1	Annual Average Daily Flow 2020 to 2024 WTP
Appendix 2	Annual Average Daily Flow 2020 to 2024 WWTP
Appendix 3	Water Reserve Capacity Calculations for 2024
Appendix 4	Wastewater Reserve Capacity Calculations for 2024

Appendix 1: Water Treatment Plant Annual Average Daily Flow 2020 - 2024

Water Treatment Plant (WTP)	Rated Capacity (m^3/d)	2020 Average Daily Flow (m3/d)	2021 Average Daily Flow (m3/d)	2022 Average Daily Flow (m3/d)	2023 Average Daily Flow (m3/d)	2024 Average Daily Flow (m3/d)	5 Year Average 2020 / 24	3 Year Average 2022 / 24
Decew Falls WTP	227,300	53,390	50,824	52,970	52,830	56,714	53,346	52,900
Grimsby WTP	44,000	15,726	14,872	14,809	14,610	14,814	14,966	14,709
Niagara Falls WTP	145,584	40,145	40,125	42,164	43,050	43,228	41,742	42,607
Port Colborne WTP	36,000	6,870	6,387	6,953	8,310	8,014	7,307	7,631
Rosehill WTP	50,026	11,024	11,710	13,025	12,710	12,540	12,202	12,868
Welland WTP	65,000	24,670	24,675	24,162	24,100	24,860	24,493	24,131

Appendix 2: Wastewater Treatment Plant Annual Average Daily Flow 2020 - 2024

Wastewater Treatment Plant (WWTP)	Rated Capacity (m^3/d)	2020 Average Daily Flow (m3/d)	2021 Average Daily Flow (m3/d)	2022 Average Daily Flow (m3/d)	2023 Average Daily Flow (m3/d)	2024 Average Daily Flow (m3/d)	5 Year Average 2020 / 24	3 Year Average 2022 / 24
Anger Avenue WWTP	24,500	15,146	13,580	13,171	12,992	12,084	13,395	12,749
Baker Road WWTP	31,280	20,910	17,952	17,081	23,700	22,100	20,348	20,960
Crystal Beach WWTP	9,100	6,276	5,688	5,256	5,423	4,865	5,501	5,181
Niagara Falls WWTP	68,300	41,360	35,242	35,197	42,902	41,748	39,290	39,949
NOTL WWTP	8,000	5,237	5,142	5,602	6,823	6,217	5,804	6,214
Port Dalhousie WWTP	61,350	36,681	34,113	31,793	29,176	27,416	31,836	29,462
Port Weller WWTP	56,180	39,211	33,751	33,176	38,024	36,429	36,118	35,876
Queenston WWTP	500	213	135	142	225	175	178	181
Seaway WWTP	19,600	13,472	11,299	10,200	11,391	9,519	11,176	10,370
Stevensville/Douglastown	2,289	1,729	1,592	1,552	1,479	1,400	1,550	1,477
Welland WWTP	54,550	37,137	33,617	34,288	39,800	34,801	35,929	36,296

Appendix 3: Water Treatment Plant Reserve Capacities for 2024

Water Treatment Plant (WTP)	Permit to Take Water [1] m^3/d	Rated Treatment Capacity m^3/d	Theoretical Ave Day Capacity m^3/d	90% of Ave Day Capacity [2] m^3/d	5-Year Ave Day Flow m^3/d	Peaking Factor	Total Capacity Used	Reserve Treatment Capacity 90% m^3/d	Design Flow Rate [3] 246 Lcd	Reserve Serviceable Population Equivalents	10-Year Forecast Population Res & Emp	Surplus Population 10-Year Projection
DeCew Falls	227,000	227,300	152,040	136,836	53,346	1.495	35%	83,491	246	339,393	30,223	309,170
Grimsby	44,000	44,000	26,699	24,029	14,966	1.648	56%	9,063	246	36,841	17,037	19,804
Niagara Falls	145,500	145,584	97,511	87,760	41,742	1.493	43%	46,018	246	187,063	28,700	158,363
Port Colborne	45,500	36,000	21,858	19,672	7,307	1.647	33%	12,365	246	50,265	2,032	48,233
Rosehill	78,000	50,026	32,089	28,879	12,202	1.559	38%	16,678	246	67,796	7,151	60,645
Welland	110,000	65,000	43,218	38,896	24,493	1.504	57%	14,403	246	58,548	18,388	40,160

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

Note 2: Region's 2021 W&WW MSP requires planning process for expansion when plant capacity exceeds 80%, and expansion should be completed when capacity exceeds 90%.

Note 3: Region's 2021 W&WW MSP new design criteria calls for 240 Lcd residential consumption and 270 Led employment consumption. This is equivalent to 246 Lcd for both, using the 79% and 21% residential and employment share, respectively.

Appendix 4: Wastewater Treatment Plant Reserve Capacity for 2024

Wastewater Treatment Plant (WWTP)	MECP Rated Capacity m^3/d	90% of Plant Capacity[1] m^3/d	5-Year Average Daily Flow m^3/d	Total Capacity Used	Reserve Treatment 90% Capacity m^3/d	Design Flow Rate [2] 356 Lcd	Reserve Serviceable Population Equivalents	10-Year Forecast Population Res & Emp	Surplus Population 10-Year Projection
Anger Avenue (Fort Erie)	24,500	22,050	13,395	55%	8,655	356	24,312	4,730	19,582
Baker Road (Grimsby)	31,280	28,152	20,348	65%	7,804	356	21,920	20,442	1,478
Crystal Beach (Fort Erie)	9,100	8,190	5,501	60%	2,689	356	7,552	1,081	6,471
Niagara Falls [3]	68,300	61,470	39,290	58%	22,180	356	62,305	22,309	39,996
NOTL	8,000	7,200	5,804	73%	1,396	356	3,920	1,036	2,884
Port Dalhousie (St. Catharines)	61,350	55,215	31,836	52%	23,379	356	65,672	13,784	51,888
Port Weller (St. Catharines)	56,180	50,562	36,118	64%	14,444	356	40,572	9,392	31,180
Queenston (NOTL) [4]	500	450	178	36%	272	356	764	34	730
Seaway (Port Colborne)	19,600	17,640	11,176	57%	6,464	356	18,157	2,008	16,149
Stevensville/Douglastown	2,289	2,060	1,550	68%	510	356	1,432	994	438
Welland	54,550	49,095	35,929	66%	13,166	356	36,984	18,235	18,749

Note 1: Region's 2021 W&WW MSP requires planning process for expansion when plant capacity exceeds 80%, and expansion should be completed when capacity exceeds 90%.

Note 2: Region's 2021 W&WW MSP new design criteria calls for 255 Lcd residential and 310 Led employment generation rate including 90 Lcd of extraneous flow allowance. An equivalent of 356 Lcd is applied using 80% and 20% for residential and employment growth share, respectively.

Note 3: The Niagara Falls WWTP assessment includes the sewage flows from the St. David's area of Niagara-on-the-Lake.

Note 4: The Queenston WWTP in Niagara-on-the-Lake has a unique capacity commitment of 226 m^3/d for the following properties: Niagara Parks Commission (75 m^3/d), Niagara Falls Bridge Commission (63 m^3/d), Shalamar Campground (38 m^3/d) and Ontario Power Generation (50 m^3/d). Due to these commitments and limited UAB, limited residential growth is expected within the next 10 years within the tributary area.