



BURNSIDE

2023 Performance Review

**The Corporation of the Village of
Westport**



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The Corporation of the Village of Westport

**R.J. Burnside & Associates Limited
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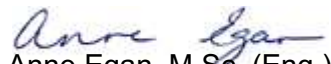
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1.0 Introduction

R.J. Burnside & Associates Limited (Burnside) was retained by The Corporation of the Village of Westport (Village of Westport) to complete the 2023 Performance Report for the Ministry of the Environment, Conservation and Parks (MECP) as outlined in Section 3.6 of the AECOM report *Westport Wastewater Treatment Facility (LSSDS): Existing Conditions and Proposed Monitoring Programs* (AECOM, October 2018). The October 2018 AECOM report was submitted to the MECP to satisfy Condition 9(5) of the Amended Environmental Compliance Approval (ECA) No. 0765-AKFPZH for sewage works, issued May 11, 2017. It is understood that the October 2018 AECOM approved monitoring program and annual performance report requirements outlined in Section 3 of the report, superseded the requirements outlined in Condition 11(4) of the current ECA. A copy of the amended ECA is attached in Appendix A.

The Village of Westport operates a sanitary sewer collection system, which utilizes a main sewage pumping station that conveys wastewater flow to the Westport Wastewater Treatment Facility (WWTF) for treatment and disposal. The treatment process at the WWTF involves facultative lagoon treatment, followed by dispersal to a large subsurface sewage disposal system (LSSDS).

The following report summarizes the data collected in 2023 and provides an assessment of the results and the conformance of the LSSDS with the MECP's Reasonable Use Guideline (RUG). Comments provided on the 2019 and 2020 Performance Report in a Memorandum prepared by Mr. Robert Holland, Hydrogeologist - Eastern Region Water Resources Unit (MECP) were considered in the preparation of this report. Comments provided on the 2021 Performance Report in a Memorandum prepared by Mrs. Sarah Young, Drinking Water and Environmental Compliance Division (MECP) were considered in the preparation of this report.

2.0 Background

Background data for the site was obtained from the report prepared by AECOM entitled *Westport Wastewater Treatment Facility (LSSDS): Existing Conditions and Proposed Monitoring Programs* (AECOM, October 2018), the memorandum prepared by Morrison Hershfield entitled *Westport Large Subsurface Disposal System (LSSDS) Monitoring Network Improvement* (Morrison Hershfield, September 2019), the 2019, 2020 and 2021 annual monitoring reports prepared by Burnside entitled *2019 Performance Review* (Burnside March 2020), *2020 Performance Review* (Burnside January 2021), *2021 Performance Review* (Burnside March 2022), *2022 Performance Review* (Burnside March 2023), and from available mapping and records obtained from the MECP.

In 2015, a Municipal Class Environmental Assessment (MCEA) was completed by AECOM for upgrading and expanding the WWTF. The design recommended by the

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MCEA involved the use of the existing facultative lagoon treatment and the implementation of a new LSSDS, which was constructed in 2017. The amended ECA No. 0765-AKFPZH was issued on May 11, 2017, which incorporated the use of the LSSDS.

In October of 2018, AECOM prepared an upgraded and expanded groundwater monitoring plan (attached in Appendix B) in a report submitted to the MECP, which satisfied Condition 9(5) of the ECA, which states:

Within ninety (90) days after Substantial Completion of the Proposed Works, the Owner shall prepare and submit to the Water Supervisor for approval, an upgraded and expanded groundwater monitoring plan that assesses the impact of the Works on all hydrostratigraphic units. The approved groundwater monitoring plan shall be implemented within ninety (90) days of approval of the monitoring plan.

As stated in the Morrison Hershfield memorandum, the AECOM monitoring plan was submitted to the MECP for review. Based on the comments from the groundwater reviewer Bob Holland at the MECP (Appendix B), the locations of Leak Detection Monitors (LD) were changed to be evenly spaced around each lagoon (at 120 degrees apart), the parameters of total phosphorus and nitrite nitrogen were also added to the groundwater sampling suite, and the existing deep and shallow groundwater monitoring wells L3 and L4 were added to the program. It is noted that the total phosphorus samples were not field filtered in 2019 based on direction from the lab, since that time, all groundwater samples for total phosphorus are field filtered, to ensure that organic phosphorus bound to sediment in the samples does not interfere with the results for the amount of phosphorus that is actually dissolved in the groundwater.

In September 2019, Morrison Hershfield completed a number of improvements on the LSSDS groundwater monitoring network, including the drilling and installation of four new monitoring wells (MW1D, MW3D, MW7D and MW8D), the drilling and installation of six Leak Detection Monitors, upgrading existing wells MW5 and MW6, and the decommissioning of MW4, all of which are outlined in the Morrison Hershfield memorandum included in Appendix C, and were required by the AECOM monitoring plan.

In August 2023, several monitoring well installations and improvements to the LSSDS groundwater monitoring network, which included the drilling and installation of seven new monitoring wells (MW-A, MW-B, MW-C, MW-D, MW-F(s), MW-F(d) and MW5-R).

From 2020 to 2023, Burnside completed the groundwater well, leak detection, private well and surface water monitoring outlined in the AECOM report, while the Village of Westport completed the influent (raw), effluent (treated) and hauled sewage monitoring associated with the ECA requirements, as well as the water level monitoring outlined in the AECOM report. It is noted that in 2020, 2021, 2022 and 2023, the Village of

Westport completed the monitoring program associated with the conditions of the ECA, and the requirements for Lagoon Contents Quality, and Raw Sewage Quality outlined in the October 2018 AECOM report.

2.1 Physical Setting

The facility encompasses approximately 36 hectares (88 acres) within Lot 10 of Concession 7, located partially within the Village of Westport and the Township of Rideau Lakes. The site is owned by The Corporation of the Village of Westport. The location of the site is shown on Figure 1.

Westport Sand Lake is approximately 1.3 km to the north of the LSSDS, while Upper Rideau Lake is approximately 1 km to the east. The site is bounded to the north, west, and south by woodlots, and to the east by a residential property and a commercial home building centre.

2.2 Physiography

The WWTF is located in the physiographic region known as the Algonquin Highlands (Chapman and Putnam, 1984). The region covers more than 40,000 km² (9,934,000 acres), and covers an area east of Georgian Bay, south of North Bay, and west of the Ottawa River. The Algonquin Highlands are characterized by granite and Precambrian rocks covered with typically shallow, stony, sandy and acidic soils (Chapman and Putnam, 1984). Frequent outcrops of bare rock do not amount to more than 5% of the total area.

The October 2018 AECOM report outlines that while shallow till and rock ridges are the most common physiographic landform present in the Algonquin Highlands, other landforms in proximity to the Westport WWTF include kame moraines, sand plains, drumlinized till plains, limestone plains, and clay plains (AECOM, 2018).

As outlined in the Morrison Hershfield memorandum (September 2019), the WWTF is mapped as kame moraine, and a kame or drumlin feature is mapped to the south of Lagoon #1.

2.3 Geological Setting

Regionally the surficial sediments are mapped as bedrock-drift complex in Paleozoic terrain, while the south portion of Lagoon #2 is partially mapped as organic deposits (Chapman and Putnam, 1984).

Previous investigations at the WWTF have shown that the overburden in the area is between approximately 1 to 5 m thick, increasing north to south, and described as predominately sand with variable gravel, silt and clay content (Morrison Hershfield,

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2019). The overburden in the area is underlain with a conglomerate of sandstone, shale and dolostone.

2.4 Sewage Works

A review of the most recent census data indicates that the WWTF services a population of approximately 634 residents (Statistics Canada, 2021 Census of Population).

Wastewater from the village is collected and conveyed to the WWTF site from the Main Sewage Pumping Station on Glen Street. The Influent wastewater is directed into Lagoon #1, which is the primary cell, and subsequently to Lagoon #2. Treated effluent from the facultative lagoon system is discharged to a final effluent pumping station, which pumps to a raised leaching bed facility for subsurface disposal.

3.0 ECA Terms and Conditions

The following sections of this report address the terms and conditions in Section 3.6 of the approved monitoring plan in the October 2018 AECOM report, as submitted to the MECP and required by ECA 0765-AKFPZH Condition 9(5), for the WWTF.

3.1 Approved Monitoring Program

As noted in Section 2.0, in October of 2018, AECOM prepared an upgraded and expanded groundwater monitoring plan (Appendix B) in a report submitted to the MECP, which satisfied Condition 9(5) of the ECA. The following sections outline the aspects of the approved monitoring program completed in 2021.

The work completed by Morrison Hershfield at the WWTF in 2019 (Appendix C) satisfied the requirements of the approved monitoring program outlined in the AECOM report, for Conditions 3.1.1 (New Monitoring Well Installations), 3.1.2 (Upgrading of Existing Monitoring Wells (MW5/MW6)), 3.1.3 (Monitoring Well Abandonment), and 3.1.4 (Leak Detection Monitor Installations). Based on preliminary review of the 2020 data by the MECP, the groundwater monitoring frequency was increased to every two months instead of quarterly (MECP letter dated April 23, 2021 prepared by Sarah Young, Water Compliance Inspector/Provincial Officer). A copy of the letter is attached in Appendix D. Other recommendations included:

- increase monitoring of MW5 and LDM2-1
- monitor nitrate to determine if persistent RUG non-conformance persists at MW5
- usage of Mann-Kendall Test applied to future monitoring
- cause of ammonia and elevated nitrite groundwater impacts must be discussed in future reports
- LDM data and action to address lagoon leakage
- comprehensive description and/or depiction of on-site surface water management

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- continued monitoring of the migration of the plume to the northeast and downward into bedrock
- nitrate be included in surface water sample analysis
- ditch inverts surveyed.

In 2023, seven new monitoring wells were installed on the property and surrounding limits to enhance the monitoring network. Well upgrades were completed at existing MW2 and MW5 was also decommissioned during the drilling program. Two existing nested monitoring wells were located northwest of the property limits by Westport staff in August 2023 and added to the monitoring network. A copy of the well records and construction details are outlined in Appendix E.

As noted in the previous ECA report, the existing monitoring well network was surveyed to a common datum in 2021 as per the recommendations in the 2020 Performance Review Report. An updated monitoring location plan is provided on Figure 2. We note that the inverts of the discharge ditches were not surveyed in 2023. For 2024, it is recommended that the inverts of the discharge ditches, as well LD3, LD4 and MW2A monitoring locations be surveyed to a common datum. It is also recommended that nine new monitoring wells are surveyed and tied into the existing monitoring network.

3.2 Water Quality: Groundwater, Leak Detection, Surface Water and Private Wells

In 2023, Burnside was responsible for the monitoring program details for the groundwater well and leak detection monitor quality outlined in Section 3.1.5 of the approved monitoring plan, the private well monitoring outlined in Section 3.2, and the surface water monitoring outlined in Section 3.3 of the AECOM report (Appendix B).

3.2.1 Sampling Methods

After purging a pre-determined volume of water (based on three times the current well volume), samples were collected in pre-labelled bottles provided by an accredited laboratory (ALS Environmental). Samples for total phosphorus were field-filtered as outlined in the recommendations of the 2019 Performance Report. Samples were placed in coolers containing ice packs and were delivered to ALS Environmental the same day for analysis. The groundwater and leak detection monitor wells (Table 1) were hand sampled using 5/8" high density polyethylene (HDPE) tubing and a Waterra D-25 Standard Flow Inertial Pump (footvalve). See Figure 2 for a site plan with the sampling point locations. The private well (Table 2) was hand sampled by connecting a standard hose to the hose bib of the domestic well, located in a well pit, and then allowing the pump to run for several minutes to clear the lines, before filling the appropriate sample bottles.

3.2.2 Groundwater and Leak Detection Monitor Well Quality

The groundwater and leak detection monitor (LDM) well sampling details listed below in Table 1 are in accordance with Table 3.5 of the approved monitoring plan (incorporating the amendments as required by the MECP), (Appendix B), as well as with Condition 9(4)(a) of the ECA (Appendix A). Grab samples from groundwater wells were collected by Burnside on April 13, May 30, July 25, August 22, October 18/19 and October 30/31, 2023. During each of the six site visits, where accessible, a water level was recorded for each groundwater well and leak detection monitor. Westport staff were responsible for collection of monthly water levels throughout the monitoring network in 2023. It is recommended that Westport staff obtain water levels from all the monitoring well locations in the monitoring plan to better understand the monthly groundwater fluctuations. The water level data has been provided to Burnside for inclusion in this monitoring report and is attached in tabular format (Table J-1 in Appendix J). If the well was dry or frozen at the time of the site visit, there is no water level recorded, and samples were not obtained. For this reason, there are fewer data points for MW2 and MW5, as they were frequently dry at the time of sampling.

Table 1: Approved Groundwater Quality Monitoring Plan Details

Parameter	Sample Type	Locations	Frequency
Total Ammonia (as N)	Grab	<u>Overburden/Bedrock (Shallow)</u>	Bi-monthly (six times per year)
Nitrate (as N)	Grab	MW1, MW2, MW3A, MW6, LDM1-1,	
Nitrite (as N)	Grab	LDM1-2, LDM1-3, LDM2-1, LDM2-2,	
Total Kjeldahl Nitrogen	Grab	LDM2-3, <i>MW2A</i> ,	
Chloride	Grab	<i>LD3</i> , <i>MW-B</i> , <i>MW-C</i> ,	
Total Phosphorus	Grab	<i>MW-F(S)</i> , <i>A060429(S)</i>	
Electrical Conductivity	Grab (Field Measurement)	<u>Bedrock (Deep)</u>	
Temperature	Grab (Field Measurement)	MW1D, MW3D, MW5, MW7D, MW8D, <i>LD4</i> , <i>MW-A</i> , <i>MW-D</i> , <i>MW-F(D)</i> , <i>MW5-R</i> , <i>A060429(D)</i>	
pH	Grab (Field Measurement)		

Italic denotes the new monitoring wells installed on-site.

3.2.3 Private Well Water Quality

The private well water quality sampling details listed below are in accordance with Table 3.7 of the approved monitoring plan (Appendix B). The resident at 11 Adam

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Street, located to the east of Lagoon #1 agreed to participate in the monitoring program for 2023. Samples were collected on four occasions on May 30, July 25, August 22, October 19, 2023.

Table 2: Approved Private Well Quality Monitoring Plan Details

Parameter	Sample Type	Frequency
Total Ammonia (as N)	Grab	Quarterly (Spring, Summer, Fall, Winter)
Nitrate (as N)	Grab	
Total Kjeldahl Nitrogen	Grab	
Chloride	Grab	
Electrical Conductivity	Grab	
<i>Escherichia coli</i>	Grab	
Electrical Conductivity	Grab (Field Measurement)	
Temperature	Grab (Field Measurement)	
pH	Grab (Field Measurement)	

3.2.4 Surface Water Quality

The surface water quality sampling details listed below are in accordance with Table 3.8 of the approved monitoring plan (Appendix B). Grab samples were collected from each of the four stipulated surface water locations on April 13, May 30, July 25, August 22, October 18 and October 30, 2023, unless the locations were standing water (no flow conditions), dry, or frozen.

Table 3: Surface Water Quality Monitoring Program Details

Parameter	Sample Type	Locations	Frequency
Total Phosphorus	Grab	NW Corner, NW Underdrain, NE Corner and Discharge Ditch	Bi-monthly (six times per year)
Total Ammonia (as N)	Grab		
Chloride	Grab		
Electrical Conductivity	Grab (Field Measurement)		
Temperature	Grab (Field Measurement)		
pH	Grab (Field Measurement)		
Nitrate/Nitrite	Grab		
Un-ionized Ammonia	Calculated (PWQO Method)		

3.2.5 Surface Water Flow Velocity

The approved monitoring plan requires flow velocity to be measured quarterly at the four stipulated surface water locations (Table 3).

3.3 ECA Monitoring and Recording Conditions

As noted in Section 2.0, in 2023, the Village of Westport completed the monitoring program associated with the conditions of the ECA, and the monitoring program requirements for Lagoon Contents Quality, and Raw Sewage Quality outlined in the October 2018 AECOM report, and the April 2021 MECF letter. Staff working for the Village of Westport collected samples in accordance with the October 2018 AECOM report which requires monthly grab raw influent samples from the Main Pumping Station - Glen Street (Table 4) and the Lagoon Contents - Final Effluent (Table 5).

Staff also collected samples in accordance with ECA Condition 9(3) for the Imported Sewage from imported sewage receiving station (Table 6). Grab samples were collected on a monthly basis for the influent and effluent, and on a quarterly basis for the imported sewage, and sent to an accredited laboratory (Caduceon Environmental Laboratories) for analysis.

Table 4: Influent (Raw) - Main Pumping Station Monitoring

Parameter	Sample Type	Frequency
BOD ₅	Grab	Monthly
Total Suspended Solids	Grab	Monthly
Total Kjeldahl Nitrogen	Grab	Monthly
Total Phosphorus*	Grab	Monthly

* Denotes additional parameter added to ECA parameters.

Table 5: Final Effluent - Final Effluent Pumping Station (for Subsurface Disposal/Lagoon Contents) Monitoring

Parameter	Sample Type	Frequency
CBOD ₅	Grab	Monthly
Total Suspended Solids	Grab	Monthly
Total Kjeldahl Nitrogen	Grab	Monthly
Total Ammonia Nitrogen	Grab	Monthly
Total Phosphorus*	Grab	Monthly
Chloride	Grab	Monthly

* Denotes additional parameter added to ECA parameters.

Table 6: Imported Sewage - Imported Sewage Receiving Station Monitoring

Parameter	Sample Type	Frequency
BOD ₅	Grab	Quarterly
Total Suspended Solids	Grab	Quarterly
Total Kjeldahl Nitrogen	Grab	Quarterly

4.0 2023 Monitoring Results

The following sections outline in detail the monitoring program results collected in 2023.

4.1 Existing Groundwater and Leak Detection Wells Water Quality

In 2023, onsite groundwater wells, and leak detection monitors (Figure 2), were sampled and analyzed for total ammonia, nitrate, total Kjeldahl nitrogen (TKN), chloride, total phosphorus (TP), electrical conductivity (EC), temperature and pH, at the locations listed in Table 1. Tables F-1 and F-2 attached in Appendix F shows the 2023 monitoring results of the groundwater sampling at the nine groundwater monitoring wells and the six leak detection wells in tabular format. The laboratory certificates of analysis for 2023 are attached in Appendix G.

The leak detection monitors are compared to the relevant drinking water standards or water quality objectives where applicable. However, it should be noted that these detectors are indicative of localized conditions immediately adjacent to the lagoons and do not necessarily represent an offsite impact to groundwater quality. The down-gradient monitoring wells (MW3, MW-5R, MW6 and MW8) should be relied upon as indicators of groundwater quality.

A review of the water quality results indicates that chloride exceeded the Ontario Drinking Water Quality Standards (ODWQS) aesthetic objective of 250 mg/L at LDM1-1 in April, May, August and October 2023, the average chloride concentration reported at LDM1-1 was noted to 264 mg/L. Historically, chloride concentrations have been elevated at LDM1-1, with results from 2019 to 2023 all reported at between 53 mg/L to 385 mg/L. A trend of elevated chloride concentrations reported in the fall samples at MW3A, MW3D, MW6, MW7D, MW2A and LDM1-3 is emerging. All of these wells are located in the northeast corner of the site. Nearby wells MW2 and MW5 were dry and samples could not be collected in previous years. However, in 2023 samples were collected at MW2 on April 13 with a chloride concentration of 4.34 mg/L which is noted to be below the ODWQS aesthetic objectives. Concentrations of Ammonia are also observed to be slightly elevated at LDM1-1 and LDM1-3 in 2023, ranging from 2.52 to 11.7 mg/L. The results are similar to 2019 to 2022 concentrations; no discernible upward or downward trends are evident in the data set at this time.

Total phosphorus concentrations ranged from below the detectable limit (< 0.0020 mg/L) to 0.104 mg/L in the existing groundwater and leak detection monitoring wells. Concentrations were noted to be trending downward in 2023. Similar to the previous years, it should be noted that the 2023 samples were field filtered as recommended in the 2019 Performance Report. As a result the accuracy of the total phosphorus concentrations in samples with suspended solids was impacted due to the adsorption of phosphorus to soil/sediment particles.

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In 2023, the Provincial Water Quality Objective (PWQO) of 0.03 mg/L for phosphorus was exceeded at leak detector well LDM1-1, with concentrations ranging from 0.004 mg/L (August 2023) to 0.063 mg/L (July 2023). Similarly, exceedance also occurred at groundwater wells LDM1-3, MW2, MW3D and MW7D in 2023, with phosphorus concentrations of 0.035 mg/L at MW3D (August 2023) and 0.104 mg/L at MW7D (April 2023). However, the results of the surface water monitoring indicate that although the PWQO is exceeded in some of the groundwater results, there are no discernible impacts on the surface water features as a result.

The highest concentration of nitrate was detected in LDM1-3 (2.09 mg/L) in August 2023, which is below the maximum acceptable concentration of the ODWQS but would indicate anthropogenic impacts in the northern area of the East Lagoon.

The water quality data collected in 2023 were generally consistent with the previous data collected in 2022. Slightly elevated TKN concentrations were noted at LDM1-1 with the concentrations ranging from 7.54 mg/L (April 2023) to 12 mg/L (July 2023). It should be noted that the average TKN concentrations observed at LDM1-1 is 7.68 mg/L from 2019 to 2023. This is consistent with the elevated ammonia concentrations also observed at LDM1-1. It is noted that TKN concentrations at LDM2-1 decrease in 2023, with the average concentrations going from 4.36 mg/L to 1.36 mg/L from 2022 to 2023. Additional water quality data will be required to identify and further assess longer term trends in the historical dataset for the groundwater and leak detection wells. However, the results of the other monitoring points (groundwater wells and surface water) indicate that the elevated ammonia and TKN concentrations in the leak detection monitors do not appear to be having a discernible impact on the surrounding surface water quality.

4.2 Additional Groundwater Wells Water Quality

In August 2023, seven monitoring wells were drilled and installed within the Westport property and surrounding area to enhance the monitoring network. The drilling program was completed by Canadian Environmental Drilling & Contractors Inc and supervised by Jp2g Consultants Inc in August 2023. Monitoring wells: MW-A, MW-B, MW-C, MW-D, MW-F(s), MW-F(d) and MW5-R were installed and added to the monitoring network during the August 2023 sampling round by request. It is noted that MW5-R was drilled to replace the original MW5, which was determined to be not functioning. In accordance with the Ontario Water Resource Act, Regulation 903, MW5 was decommissioned following the installation of MW5-R and upgrades were also made to MW2 to meet Ontario Well Regulation 903.

Two existing wells located near 42 Concession Street approximately 400 m northwest of the property limits by Westport staff during the drilling program. During the August 22 site visit, Burnside staff inspected the well, reviewed the borehole logs and determined that the nested wells were A0604239 (s/d). A total of nine monitoring wells were added

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to the sampling and monitoring network, the wells were sampled and analyzed for the same parameters listed in Table 1 above in Section 3.2.2.

One partial sampling round was completed during the drilling program on August 22, 2023, with samples being collected at MW-B, MW-C and A060429(S). In October 2023, two full rounds were completed to sample the monitoring wells. A review of the water quality data indicates chloride concentrations ranging from 1.61 mg/L (MW-F (S)) to 122 mg/L (MW-5R), which is noted to be below ODWQS aesthetic objective of 250 mg/L. The highest concentration of total ammonia was detected at MW-5R with a concentration of 0.755 mg/L, which is noted to be slightly elevated in comparison to the historical lab results for the deeper wells in the surrounding property. Total phosphorus concentrations exceeded the PWQO of 0.03 mg/L at MW-B, MW-D and MW-F(S) on one occasion, the average total phosphorus concentrations in the new monitoring wells were noted to have an average of 0.021 mg/L. Additional water quality data will be required to further evaluate the trends in dataset for the new groundwater wells installed on the property and surrounding area. A full copy of the lab results are tabulated in Appendix F.

4.3 Private Well Water Quality

In 2023, the private domestic well at 11 Adams Street was sampled and analyzed for total ammonia, nitrate, TKN, chloride, EC, *Escherichia coli*, temperature and pH, as listed in Table 2. Table F-3 attached in Appendix F shows the 2023 monitoring results at this private well in tabular format. The laboratory certificates of analysis are attached in Appendix G.

A review of the water quality results indicates that there were no exceedances of the Ontario Drinking Water Quality Standards (ODWQS) for nitrate or chloride, which is consistent with the previous years. *E. coli* concentrations were not detected in any of the samples collected in 2023. The highest concentration of total ammonia was detected was 0.0139 in August 2023, and the TKN ranged from 0.072 mg/L in July 2023 and 0.384 mg/L in May 2023. The concentration of chloride was analysed on one occasion in May 2023 with a detection of 91.4 mg/L, which is noted to be lower than the historical average of 123 mg/L. The EC concentrations ranged from 920 mg/L in May 2023 to 1,200 mg/L in August 2023. Water quality in this well at the time of sampling does not appear to be impacted by the LSSDS. The construction details of the private well were not known at the time of this report preparation and water level measurement was not accessible during site visits.

We note that the private well at 11 Adams Street was not compliant with O.Reg 903. The private well is located in a pit, approximately 2.4 m (8 ft) deep, and there is evidence that water pools in the bottom of this pit. Neither the well pit or the shack that houses the drinking water well are vermin proof, and there is evidence that vermin have been present surrounding the well. Well upgrades are recommended to bring this well into

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compliance. It is noted that the water quality data collected in 2023 were generally consistent with the previous data collected from 2019 to 2022.

4.4 Surface Water Quality

In 2023, four surface water stations were sampled and analyzed for TP, total ammonia, chloride, EC, temperature, pH, un-ionized ammonia, nitrate and nitrite, as listed in Table 3. Table F-4 attached in Appendix F shows the 2023 monitoring results for the four surface water stations listed in tabular format. The laboratory certificates of analysis are attached in Appendix G. It should be noted that the downstream monitoring point in the swale (NE Corner) has limited data for 2023 due to the inability to obtain sufficient sample volume (due minimal flow or dry conditions).

The parameters of concern for surface water impacts are typically phosphorus (due to eutrophication impacts) and ammonia (due to the potential for impacts to aquatic life). The water quality in the stream is consistently less than the PWQO for total phosphorus (0.03 mg/L) in the upstream and downstream sample results. The highest recorded concentration of total phosphorus for 2023 was 0.024 mg/L which was measured in the upstream sample location (Discharge Ditch) in April 2023. The downstream sample location (NE Corner) had a total phosphorus concentration of 0.0054 mg/L, which was noted to have a lower concentration than the downgradient surface monitoring station. indicates that the downstream. The remainder of the year, the swale was dry, and the effluent from the leaching bed is assumed to remain in the groundwater. The down-gradient monitoring wells are not showing indications of elevated phosphorus, and the Discharge Ditch met the PWQO on this date, with a 2023 average concentration of 0.0185 mg/L, which is noted to below the Provincial Water Quality Objective (PWQO) of 0.03 mg/L. All remaining results met the PWQO for phosphorous for 2023. Based on the 2023 data set, there does not appear to be any indication of a surface water impact due to phosphorus from the sewage works, but future data should continue to be reviewed and analyzed for any signs of impact or increasing trends.

Un-ionized ammonia is calculated from the measured total ammonia using field temperature and pH measurements. All un-ionized ammonia results are well below the PWQO of 0.02 mg/L with the average concentration surrounding Lagoon #1 of <0.001 mg/L and the average concentration surrounding Lagoon #2 of 0.012 mg/L.

A review of the water quality results for the surface water stations indicates that chloride exceeded the CEQG of 120 mg/L at the Discharge Ditch location in July, August and during both October 2023 events, with the concentrations ranging from 123 mg/L (August 22, 2023) to 189 mg/L (October 30, 2023). The CCME established this guideline for the long-term protection of aquatic life in freshwater systems, and it is used as there is no PWQO developed for chloride. The downstream concentrations of chloride are generally higher than the upstream concentrations, although there could be

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other factors affecting this parameter and it is not necessarily an indicator of impact from the lagoons.

A review of the water quality results for nitrates collected at the surface water stations indicates that the highest concentration detected was 1.75 mg/L on July 25, 2023, at the Discharge Ditch. This value is approaching the CWQG (Canadian Water Quality Guideline) value of 2.9 mg/L but does not exceed. All remaining 2023 results for this location met the guideline and were consistent with 2021 and 2022 results, in the range of 1 mg/L. There are no nitrate results prior to 2021 for this sampling point, so this location should be monitored for any signs of an increasing trend. Nitrites were not detected in any of the surface water monitoring locations (ND at <0.050 mg/L) in 2023.

In reviewing the surface water quality at the Discharge Ditch, the results for the nearest leak detection point, LDM1-1 have been reviewed to evaluate whether there may be a correlation between the data sets, although it is noted that the Discharge Ditch also receives surface drainage from upstream sources that could have an impact on the overall water quality. As noted in Section 4.1, LDM1-1 shows slightly elevated ammonia concentrations, with an average of approximately 7.42 mg/L for 2023. The elevated ammonia is not evidenced in the Discharge Ditch, so there does not appear to be an ammonia impact on the receiver. There is a slightly elevated nitrate concentration in the Discharge Ditch, but the concentrations are consistent with the upstream water quality, so this is not interpreted to be a direct correlation with ammonia from LDM1-1 being nitrified in the ditch at this time.

Based on the results for other parameters being monitored, the surface water quality does not appear to be directly impacted by the effluent; however, continued monitoring is recommended to assess the potential for long-term impacts to surface water features.

Overall, the surface water results reviewed for 2023 do not indicate that the sewage system is having a significant impact on water quality.

4.5 Surface Water Velocity

Surface water velocities were measured during Burnside's six site visits in 2023, unless the locations were standing water (no flow conditions), dry, or frozen. Table 7 lists the measured velocities at each of the four surface water stations.

Table 7: Measured Surface Water Velocities in 2023

Surface Water Station	Date	Velocity (L/s)
NW Corner	13-Apr-23	< 0.5
	30-May-23	0.0 (standing water)
	25-Jul-23	0.0 (standing water)
	22-Aug-23	0.0 (standing water)
	18-Oct-23	0.0 (standing water)
	30-Oct-23	0.0 (standing water)
NW Underdrain	13-Apr-23	10.0
	30-May-23	< 0.5
	25-Jul-23	< 0.5
	22-Aug-23	< 0.5
	18-Oct-23	dry
	30-Oct-23	dry
NE Corner	13-Apr-23	0.9
	30-May-23	0.0 (standing water)
	25-Jul-23	dry
	22-Aug-23	dry
	18-Oct-23	dry
	30-Oct-23	dry
Discharge Ditch	13-Apr-23	10.4
	30-May-23	2.4
	25-Jul-23	1.6
	22-Aug-23	3.1
	18-Oct-23	0.9
	30-Oct-23	0.6

The highest flows were recorded during the April 13, 2023, site visit at the NW Underdrain and the Discharge Ditch with velocities of 10.0 L/sec and 10.4 L/sec, respectively. The Discharge Ditch was the only monitoring station that was observed to have flowing water conditions throughout the year, which is consistent with the 2019 to 2022 observations, while the NE Corner station was observed to be dry during each site visit except for May 30, 2023, which was noted to have standing water. The flows confirm the seasonal nature of the discharge through the watercourse, with the highest flows in the spring and lower to no flows in the summer months. Flow velocities should continue to be monitored to establish a baseline of flow patterns in the watercourse, which may be used in future analysis of impacts if needed.

4.6 Influent Quality (Main Pumping Station)

The ECA Monitoring and Recording Condition 9(3) specifies the frequency, sample type and parameters to be sampled for in the influent from the main pumping station, as shown in Table 4. Grab samples of raw sewage at the Glen Street Pumping Station

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were collected monthly in 2023, and analyzed for Biochemical Oxygen Demand (BOD₅), Total Suspended Solids (TSS) and Total Kjeldahl Nitrogen (TKN) as required by the ECA. The samples were also analyzed for total phosphorus (TP). Table 8 shows the results of the monitoring in 2023, as per the ECA conditions. The laboratory certificates of analysis are attached in Appendix G.

Table 8: 2023 Influent Water Quality Results

Date	BOD ₅ (mg/L)	TSS (mg/L)	TKN (mg/L)	TP (mg/L)
24-Jan-23	255	420	44.3	6.1
6-Feb-23	224	250	47.2	5.8
3-Mar-23	410	830	61.7	7.19
4-Apr-23	168	250	33.2	3.75
5-May-23	103	135	45.6	4.73
19-Jun-23	205	240	7.2	2.31
7-Jul-23	434	305	96	8.49
8-Aug-23	327	250	38.4	4.06
9-Sep-23	218	310	51.4	6.14
3-Oct-23	150	250	42.8	5.31
20-Nov-23	204	270	85.1	8.61
11-Dec-23	146	320	42.3	4.74
Average	237	319	49.6	5.6

The influent results are within the range of typical medium strength domestic sanitary sewage. Concentrations of BOD₅ and TSS were slightly higher on average, as compared to 2021 and 2022 results but are still within the range of expected typical values. In 2024, the Village of Westport should continue with the altered influent (raw sewage) monitoring plan to incorporate the monitoring requirements to match the approved monitoring plan, with two adjustments, as described in our 2019 recommendations and implemented in 2020. The approved monitoring plan recommends monthly grab sampling from the Village's Main (Glen Street) Pumping Station for cBOD₅, TSS, nitrate, total ammonia, TKN and chloride. It is recommended that the monitoring plan continue to analyse for BOD₅ in influent samples collected, as raw influent wastewater is typically tested for BOD₅, while cBOD₅ is typically used for final effluent. It is also recommended that nitrate continue to be excluded from the analysis of wastewater influent, as untreated sewage does not typically contain nitrate-nitrogen.

4.7 Imported Sewage

The ECA Monitoring and Recording Condition 9(3) specifies the frequency, sample type and parameters to be sampled for in the imported sewage delivered to the sewage receiving station, as shown in Table 6. Grab samples of raw sewage that was imported

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were collected quarterly in 2023, and analyzed for BOD₅, TSS and TKN as required by the ECA. The samples were also analyzed for TP. Table 9 shows the results of the monitoring in 2023, as per the ECA conditions. The laboratory certificates of analysis are attached in Appendix G.

Table 9: 2023 Imported (Hauled) Sewage Water Quality Results

Date	BOD ₅ (mg/L)	TSS (mg/L)	TKN (mg/L)	TP (mg/L)
13-March-23	543	1,140	168	15.4
26-June-23	98	275	300	24.2
14-Aug-23	349	210	176	14.9
11-Dec-23	365	2,360	214	44.0
Average	339	996	215	24.6

The results are within typical ranges and are more concentrated than the influent wastewater which is typical for hauled sewage.

4.8 Final Effluent at the Final Effluent Pumping Station for Subsurface Disposal Quality

The ECA Monitoring and Recording Condition 9(3) specifies the frequency, sample type and parameters to be sampled for in the final effluent at the pumping station at the entrances to the LSSDS, as shown in Table 5. Grab samples of treated effluent were collected monthly in 2023 and analyzed for Carbonaceous Biochemical Oxygen Demand (cBOD₅), TSS, nitrate, total ammonia, TKN, and chloride, as required by the ECA. The samples were also analyzed for total phosphorus (TP). Table 10 shows the results of the monitoring in 2023, as per the ECA conditions, which are consistent with previous years. The laboratory certificates of analysis are attached in Appendix G.

Table 10: 2023 Final Effluent Water Quality Results

Date	cBOD ₅ (mg/L)	TSS (mg/L)	Nitrate (mg/L)	Total Ammonia (mg/L)	TKN (mg/L)	Chloride (mg/L)	TP (mg/L)
<i>ECA Objective</i>	25	25	-	-	-	-	-
<i>ECA Limit</i>	30	40	-	-	-	-	-
24-Jan-23	5	11	-	11.7	19.1	-	2.52
6-Feb-23	8	20	0.07	16.4	21.2	304	2.83
3-Mar-23	11	18	<0.05	21.7	30	283	3.52
4-Apr-23	13	22	0.06	24.7	25.8	267	3.76
5-May-23	12	15	<0.4	11.9	18.4	219	2.5
19-Jun-23	9	16	<0.05	40.7	59	248	8.08
7-Jul-23	7	40	0.06	3.91	11.1	260	2.66
8-Aug-23	12	24	0.09	3.85	12.3	259	2.91

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Date	cBOD ₅ (mg/L)	TSS (mg/L)	Nitrate (mg/L)	Total Ammonia (mg/L)	TKN (mg/L)	Chloride (mg/L)	TP (mg/L)
9-Sep-23	9	30	<0.4	5.35	10.5	255	2.6
3-Oct-23	11	18	<0.4	3.9	10.9	285	2.67
20-Nov-23	4	18	<0.05	10.2	16.1	317	2.67
11-Dec-23	6	18	<0.4	15.1	20.4	302	2.65
AVERAGE	8.9	20.8	0.07	14.1	21.2	272.6	3.28

The ECA Design Objective 6(1) outlines the design objectives for both cBOD₅ and TSS in the effluent. The ECA outlines that the Owner shall use best efforts to design, construct and operate the Works such that the annual average concentration design objectives for cBOD₅ and TSS (25.0 mg/L each, respectively) are achieved in the Final Effluent from the Sewage Treatment Plant.

Compliance Limits Condition 7(1) further specifies that the annual average concentration of cBOD₅ and TSS shall not exceed the limit of 30.0 mg/L and 40.0 mg/L, respectively.

The annual average concentrations of cBOD₅ and TSS in 2023 met both the design objectives and the compliance limits outlined in the ECA. It is noted that the average cBOD₅ and TSS concentrations were 8.9 mg/L and 21.2 mg/L respectively in 2023.

5.0 Effluent Quality – Nitrogen and Phosphorus

Although there are no objectives or limits associated with nitrogen and phosphorus, the influent and effluent are monitored for these parameters, and the results have been reviewed as an indicator of overall system performance. Based on an average annual influent TKN concentration of 49.6 mg/L, and an average annual effluent ammonia concentration of 14.1 mg/L, the lagoons are nitrifying relatively well, and at a rate expected of typical facultative lagoons. There is little to no nitrate nitrogen in the lagoon effluent, indicating that some denitrification is occurring. The lagoons were not designed specifically for denitrification, but they do provide some opportunity for anoxic conditions that encourage nitrate removal. Based on the resulting surface and groundwater monitoring results, the leaching bed appears to be providing conversion of any residual ammonia, and some denitrification to polish the effluent prior to the final down-gradient boundary/receiver.

The annual average influent phosphorus concentration was 5.6 mg/L which is at the low end of the range for typical domestic wastewater and could indicate some dilution through the collection network (i.e., inflow and infiltration). The average annual effluent total phosphorus concentration was 3.3 mg/L, indicating approximately 41.4% removal within the lagoons, which is typical for this type of facility without chemical precipitation. As is the case with the nitrogen species, the leaching bed would provide additional effluent polishing in the form of adsorption and precipitation in the soil particles. Based

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on the surface water quality results, it does not appear that the sewage system is having an impact on surface water quality. These findings are in general agreement with the findings from 2019 to 2022.

6.0 Operation Problems, Calibration, Maintenance and Record of Complaints

Peter Evans, Manager of Public Works for the Village of Westport, confirmed that no complaints regarding the WWTF operation were received and no operating problems were encountered, and no corrective actions were required in 2023.

The reporting Condition 11(4) of the ECA requires that the following information is required to be provided in the annual performance report. For ease of reference, we have provided a copy of the conditions followed by the required information.

- (a) *A summary and interpretation of all monitoring data and a comparison to the effluent limits outlined in Condition 7, including an overview of the success and adequacy of the Works.*

The details of the monitoring data and interpretation are included wholly within this report.

- (b) *A description of any operating problems encountered and corrective actions taken.*

Information provided by Peter Evans, Manager of Public Works for the Village of Westport confirmed that there were no operating problems were encountered and as such no corrective actions were required.

- (c) *A summary of all maintenance carried out on any major structure, equipment, apparatus, mechanism or thing forming part of the Works.*

The following information was provided by Information by Peter Evans, Manager of Public Works for the Village of Westport:

- This is a relatively passive system, as such, maintenance requirements are limited.
- The Generator was replaced in 2023 with a new Cummins Spark-Ignited 60 KW Propane Generator.

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- (d) *A summary of any effluent quality assurance or control measures undertaken in the reporting period.*

The lagoon effluent met the effluent limits as specified in the ECA and there were no exceedances. It is noted that the Village of Westport has increased the sampling frequency to better assess the system performance and potential for impacts. Staff from the Village of Westport provide regular oversight of lagoon water levels to ensure they are maintained with regular operating range. No quality control measures beyond the operation of the two-cell facultative lagoon were undertaken. It is also noted that Burnside completes monitoring at the site in accordance with the MECP document Practices for the Collection and Handling of Drinking Water Samples (MECP, 2009), as well as Burnside's Standard Operating Procedures (SOP) for the water quality sampling at all wells within the monitoring program.

- (e) *A summary of the calibration and maintenance carried out on all effluent monitoring equipment.*

A copy of the Annual Flow Meter Calibrations/Verifications, prepared by Franklin Empire is provided in Appendix H.

- (f) *A description of efforts made and results achieved in meeting the Design Objectives of Condition 6 and an assessment of the impact of the Works on groundwater and conformance with Guideline B-7.*

The results achieved and an assessment of the impacts of the works are specifically discussed in Section 8.0 below.

- (g) *As estimate of the sludge volumes in the lagoon cells. Sludge volume is to be measured every five (5) years but may be estimated in the interim years. A summary of disposal locations and volumes of sludge disposed of must also be provided if sludge was disposed of during the reporting period.*

The sludge volumes in the lagoon cells were not measured in 2023, however a visual assessment was completed by Westport staff and the sludge thickness was estimated to be approximately the same depth as 2021.

- (h) *A summary of any complaints received during the reporting period and any steps taken to address the complaints.*

No complaints regarding the WWTF operation were received in 2023.

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(i) *A summary of all By-pass, spill or abnormal discharge events.*

No By-pass, spills or abnormal events occurred in 2023.

(j) *A copy of all Notice of Modifications submitted to the Water Supervisor as a result of Section B, Section 3.*

No modifications were made which required notices to the water manager.

(k) *A report summarizing all modifications completed as a result of Schedule B, Section 3.*

See note above.

(l) *Any other information the Water Supervisor requires from time to time.*

No other information is required at this time.

7.0 Municipal Utility Monitoring Program (MUMP)

Copies of the monthly data sheets submitted to the MECP under the Municipal Utility Monitoring Program are attached in Appendix H. These data sheets summarize the monthly flows into the lagoon, bypass volumes (if applicable), raw sewage quality results, final effluent volumes and quality, and final disinfection volumes. A review of the quantity data indicates that the annual average daily flow is within the limits of the ECA. The average daily flow of raw sewage influent and treated sewage was 189 m³ and 193.9 m³ respectively, which is noted to be within the approved WWTF rated capacity of 350 m³/day.

8.0 Assessment of Potential Impact of Operation of the LSSDS on Groundwater and Compliance with MECP Guideline B-7

According to previous hydrogeological studies, the interpreted direction of groundwater flow is toward the northeast. In 2021, the monitoring wells were surveyed to a common datum to allow the water level readings to be used to confirm groundwater elevations, and subsequently, the direction of flow. Based on the survey data, MW3, MW5 (decommissioned), MW6, and MW8 are down-gradient monitoring wells, MW1, MW2 and MW4 (decommissioned) are confirmed to be up-gradient wells. The new wells installed in August 2023 will need to be surveyed into the monitoring network to confirm gradient.

The groundwater quality results support that the direction of the plume is generally northeast, in that MW3, MW5 and MW6 reported slightly elevated concentrations of nitrate and chloride as compared to the up-gradient wells. Previously, the highest

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reported nitrate concentration was 3.6 mg/L in MW5 in 2019, which is the deepest monitoring well at 15 m, suggesting that there could be some downward movement of the effluent plume in the bedrock. In 2023, the highest reported nitrate concentration was 3.69 mg/L (July 2023) in MW2A. It is noted that MW2A is approximately 300 m away from the bed and drilled to a depth of 7 m below ground surface. The average nitrate concentration at MW2A was 2.04 mg/L in 2023, which suggest that there could be a downwards trend into the bedrock. Additional water quality data will be required to further access and confirm trends at MW2A.

MECP guidelines provide a methodology for the predictive assessment to evaluate potential impacts from the LSSDS on groundwater quality. The parameter of concern for potential impacts to groundwater quality is nitrate nitrogen. The evaluation relies on dilution from infiltration over the area of the bed and the down-gradient plume, using a mass balance approach. The average effluent total nitrogen concentration over the 2023 monitoring period is approximately 21.3 mg/L (i.e., TKN plus nitrate and nitrite). Following the typical methodology with a down-gradient area of approximately 12 ha, 250 mm of infiltration over that area, and an average effluent concentration of 21.3 mg/L, the assessment would predict a down-gradient concentration of approximately 14.9 mg/L, which is slightly higher than the 11.9 mg/L calculated using in the 2021 report. The highest reported nitrate concentration in the down-gradient wells is 3.69 mg/L in MW2A.

In 2023, MW5 was decommissioned, and a replacement monitoring well (MW-5R) was drilled to the exact same well/screen depth as MW5. It is noted that samples at MW-5R were collected on two occasions in October with nitrate concentrations ranging from not detected to 0.45 mg/L. Previous results for MW5 reported a high of 3.6 mg/L of nitrate in 2019. Additional water quality testing at MW-5R is recommended to assess the potential impacts at the down-gradient boundary. In 2023, MW2A had a nitrate concentration of 3.69 mg/L in July. MW2A is within the site, and the data from MW3, MW3A, MW6 and MW7, which are all in the down-gradient direction from the leaching bed, were less than this value, and therefore met the Reasonable Use criteria of 2.5 mg/L at the down-gradient boundary. This suggests that the area down-gradient of the leaching bed has significant natural attenuation capacity for nitrate that is not accounted for in the predictive model. The 2023 results are generally consistent with the lab results collected in the 2019 to 2022 programs. The available data confirms that the site is complying with Reasonable Use requirements for nitrate at the down-gradient boundary. As noted throughout this report, additional data and ongoing trend analysis should continue for confirmation of this assessment.

Based on the limited data available, it does not appear that there is a significant impact on down-gradient groundwater quality; however, monitoring should be continued in order to evaluate a larger data set over a longer period of time to identify any possible trends. We do note that there are elevated concentrations of some parameters in the immediate

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vicinity of the east lagoon, based on the leak detection monitors. LDM1-1 shows elevated total ammonia and chloride concentrations, while LDM1-3 shows elevated chloride, and slightly elevated nitrate and nitrite. The ammonia concentrations in LDM1-1 ranged from 2.52 mg/L to 11.7 mg/L over the 2023 season, which indicates there could be a potential impact in this area of the site. The average ammonia concentration in LDM1-1 was 7.42 mg/L in 2023, as compared to 4.26 mg/L for 2022, suggesting there has been a slight trend upwards this year in ammonia concentrations. The newly installed monitoring well MW-C would be considered down-gradient of the LDM1-1 location and future data from this location will provide information as to whether the elevated ammonia at LDM1-1 is localized only, and can be attenuated on site. Preliminary data from MW-C in August and October 2023 suggest that ammonia and nitrate are attenuated between these two locations.

To better understand the surface water and groundwater interaction and the potential for impacts, the monitoring at the site will continue at a bi-monthly sampling frequency (six total sampling events annually) in 2024. The monitoring and sampling program should also include the seven wells drilled in August 2023, as well as the nested monitoring wells (A060429) found at 42 Concession Street. The additional monitoring wells will provide additional information regarding the migration of the plume beyond the site boundaries and the potential for impacts to offsite groundwater and surface water resources.

Comments on the 2020 Performance Report were provided by MECP Technical Support Staff, suggesting the use of a Mann-Kendall (MK) test to evaluate whether there are any increasing or decreasing trends in the data set. A basic MK test was completed using Excel, for the nitrate and total phosphorus data sets for each of the groundwater and leak detection wells installed on-site, and no trends were evident in the data. Additional data points are required to be able to complete a more thorough MK analysis on the complete data set, but initial indications are that there are no significant trends upward or downward at this time. This will continue to be monitored with additional data in future reports.

9.0 Conclusions and Recommendations

Based on the findings in this report, Burnside provides the following conclusions and recommendations:

- Based on the 2023 data, the lagoon system is operating within its rated capacity, and is functioning adequately to provide an appropriate level of treatment that meets the required effluent objectives and limits.
- The available groundwater and surface water data do not indicate that the sewage works is having a discernible impact on water quality in the receivers. Early indicators of sampling at LDM1-1 suggest a localized developing impact that does

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not appear to be impacting surface water quality but should continue to be monitored.

- The frequency of the groundwater and surface water monitoring was increased to bimonthly (once every two months) in 2021 and will continue at this frequency in 2024.
- Continue sampling the groundwater wells, LDMs, private well and surface water stations for the parameters outlined in the approved monitoring plan. The new wells drilled in August will also be incorporated into the monitoring and sampling program in 2024 to further assess the groundwater quality and potential impacts.
- Ensure that all future groundwater wells and leak detection monitor samples for total phosphorus are field filtered.
- In 2021, the existing monitoring well network was surveyed to a common datum to allow interpretation of water level data. Using the survey data, the direction of groundwater flow was interpreted to be flow towards the northeast.
- In 2024, it is recommended that the inverts of the discharge ditches, as well LD3, LD4 and MW2A get surveyed into the monitoring network, and an updated topographic site survey prepared to assist with characterizing the surface water management on the site. The new wells drilled in August 2023 should be surveyed and tied into the monitoring network.
- Raw sewage quality monitoring for 2024 should continue to include the following parameters (which differ from the AECOM report): BOD5 (not cBOD5), TSS, Total Ammonia (as N), TKN and chloride. Nitrate as N should not be monitored in the raw sewage as there should not be any nitrate in the raw sewage.
- Upon completion of the 2024 monitoring, further evaluate whether there is adequate data to use the Mann-Kendall test to monitor data trends. Additional data points are required to be able to complete a more thorough MK analysis on the complete data set.