P.O. Box 1749
Halifax, Nova Scotia
B3J 3A5 Canada

Item No. Info 2
North West Community Council
August 11, 2025

TO: Chair and Members of the North West Community Council

FROM: Brad Anguish, Commissioner of Operations

DATE: June 9, 2025

SUBJECT: Bedford West Water Quality Status Update – Spring 2025

INFORMATION REPORT

ORIGIN

Bedford Municipal Planning Strategy, Bedford West Secondary Planning Strategy, Policies BW-3, SW-4 and SW-5. Development Agreements between the Halifax Regional Municipality and West Bedford Holdings Ltd, between Halifax Regional Municipality and Cresco Ltd, and between Halifax Regional Municipality and Clayton Developments Ltd.

EXECUTIVE SUMMARY

A water quality monitoring program has been ongoing in the Bedford West Secondary Plan area since 2009, through Development Agreements executed under the Bedford West Secondary Planning Strategy. Results from the spring 2025 sampling event are presented in this report.

Spring sampling took place on April 29-30, 2025. No exceedances of the recreational *E. coli* concentration (235 CFU/100mL) were reported at this sampling event. Exceedances of the total phosphorus (TP) threshold (10 µg/L) were reported at KL-1 and HWY102-2, at concentrations of 10.5 µg/L and 10.8 µg/L, respectively. Resampling was not requested, as starting in 2025, resampling will only be requested when reported TP concentrations are ≥20 µg/L.

BACKGROUND

The Bedford West area is one of three areas designated as existing growth areas under the Regional Plan for serviced development (municipal water and wastewater systems). The Bedford West area is approximately 1,052 hectares (2,600 acres) in size and located on the west side of the Bicentennial Highway, in the vicinity of Hammonds Plains Road and Kearney Lake Road. In 2006, the Bedford West Secondary Planning Strategy (BWSPS) was adopted with the policy directive to enable new mixed-use communities while ensuring their design considered protection of the natural environment. Figure 1 illustrates the areas encompassed by the BWSPS. Sub Areas 2 to 9 have approved development agreements and are either constructed or under construction. Sub Areas 1, 10 and 12 are Special Planning Areas designated through the Province of Nova Scotia's Housing in the *Halifax Regional Municipality Act*.

Policy BW-3 of the BWSPS requires a water quality monitoring program for the Paper Mill Lake watershed to track the eutrophication process. Eutrophication is the process of nutrient enrichment in lakes. While this eutrophication can happen naturally, it is primarily caused by human activities. Policy BW-3 aims to prevent nutrient enrichment from impacts of human activities in the Paper Mill Lake watershed. Land disturbances during construction, surface hardening, the use of chemical fertilizers, stormwater inputs, in-use and historic on-site septic systems, and vegetation removal are all potential sources of nutrients in lakes. These changes can result in relatively rapid changes in trophic status, from lower trophic states (fewer nutrients) to higher trophic states (more nutrients). This rapid change in water quality leads to excessive plant growth, excessive algae growth, cyanobacteria blooms, and conditions generally resembling a poorly circulating backyard pond.

The water quality monitoring program was specified in the BWSPS in response to the Municipality's statement "that best management practices may be needed both during development and afterward to maintain water quality in the lakes" and "that a water quality monitoring program be established on lakes throughout the watershed" as published in the BWSPS in 2006.[1]

The terms of the monitoring program are specified within the Development Agreements that have been negotiated in consultation with the former Bedford Watershed Advisory Board (Sub Areas 1-9). This board was dissolved in 2013 and replaced with the broader Regional Watersheds Advisory Board (RWAB). Development agreements for the Bedford West subdivision negotiated between 2013-2022 occurred in consultation with RWAB. While the municipal planning strategy policies supporting the monitoring program remains in place, and development agreements continue to require the monitoring, there has been no referral of planning applications to advisory committees since the adoption of Bill 137 in 2022, which introduced amendments to the HRM Charter suspending the referrals for a period of three years. The adoption of Bill 68 in March 2025 further extended the suspension of referrals to advisory committees until November 25, 2026.

All Development Agreements under the BWSPS have identified the value of 10 micrograms per litre (µg/L) of total phosphorus (TP) as a "trigger value," representing the transition point between the oligotrophic and mesotrophic states per Environment and Climate Change Canada's criteria (*Table 1*).

Table 1: Summary of Canadian trophic status triggers. Environment and Climate Change Canada (2004).

Trophic Status	Toral Phosphorus (µg/L)
Ultra-oligotrophic	<4
Oligotrophic	4-10
Mesotrophic	10-20
Meso-Eutrophic	20-35
Eutrophic	35-100
Hyper-eutrophic	>100

In accordance with the terms for the Bedford West Development Agreements, the Municipality is required to submit test results to the Developer and the North West Community Council (NWCC) within three months of being received from the consultant, or immediately, if TP or bacterial results exceed management thresholds identified therein. RWAB was dissolved by Regional Council on July 9, 2024.[2] The Environment

[1] The Bedford West Secondary Planning Strategy can be found online here: THE BEDFORD WEST SECONDARY PLANNING STRATEGY.pdf
[2] The report associated with this decision of Regional Council is available online: Governance Review – Phase 1 Implementation Plan and Advisory Committee Review - July 9/24 Regional Council | Halifax.ca

& Sustainability Standing Committee (ESSC) is the successor body to RWAB.[3] Subsequent reports submitted in compliance with the BWSPS will be sent to NWCC and ESSC.

Monitoring provisions in the DA could be seen as assuming that development activity bears relation to the test results. Research done by the Centre for Water Resource Studies (CWRS)[4] in the Paper Mill Lake Watershed has since pointed out that site-specific changes in water quality identified from lake sampling cannot be attributed to a single source and has recommended that individual developments should not be regulated based on trophic state indicators in a lake. Some reasons for this are:

1. Development-derived surface water contamination tends to originate from non-point sources, for example contamination tends to come from overland water flow across an entire site rather than from a single discharge pipe into a lake.

2. In-lake phosphorus, while easily measured, cannot be traced back to a single source. For example, phosphorus released by decomposing plant material in a lake cannot be differentiated analytically from phosphorus released by sediment flowing into a lake from a development site.

In cases where an exceedance of phosphorus is noted, staff can request confirmation testing and determine whether any corrective action by the developer is required per their sedimentation and erosion plan.

DISCUSSION

The purpose of this report is to share the results of this water quality monitoring program in the Paper Mill Lake watershed undertaken as part of the Bedford West Development Agreements at the 2025 spring sampling event. A map identifying sampling locations is included in Attachment A. Note that there are two new sampling locations as of the spring 2025 sampling event, KL-6 and KL-7. These sampling locations are associated with development agreements newly signed in Bedford West Sub-area 10.

2024 was the final year of monitoring covered under the previous contract for this program. Over the winter 2024-25, a new contract was initiated through a competitive procurement process. WSP Canada Inc. was the successful proponent and is now contracted to fulfill the water quality requirements of the BWSPS for 2025-2027 inclusive, with options to renew in 2028 and 2029.

Spring sampling took place over two days on April 29-30, 2025. Results from the spring 2025 event are posted publicly on the HRM Lakes & Rivers webpage.

No exceedances of the recreational bacteria (*E. coli*) guideline (235 colony-forming units (CFU)/100 mL) were observed in the spring sampling event. Resampling was not requested for this parameter.

Spring 2025 total phosphorus (low level) concentrations observed are listed in *Table 2*. Exceedances, shown in red in *Table 2*, of the total phosphorus (low level) threshold of 10 µg/L set out in the BWSPS were observed at sampling locations HWY102-2 and KL-1 at the spring sampling event.

[3] The full text of Administrative Order 1 is available online here: Administrative Order One, Respecting the Procedures of Council | Halifax.ca

[4] Presentation by Rob Jamieson, Ph.D., P.Eng., entitled “Phosphorus Loading and Trophic State Assessment in the Paper Mill Lake Watershed”, North West Community Council, November 15. 2016. The presentation can be found online here: 161115nwcc1131pres.pdf

Table 2: Spring 2025 Total Phosphorus

Sampling Location	Acceptable Phosphorus Concentration (µg/L)	April 28-29 Total Phosphorus (µg/L)
PML-1	10	4.1
PML-2	10	4.6
HWY102-1	10	6.5
HWY102-2	10	10.5
LU	10	7.8
KL-1	10	10.8
KL-2	10	9.7
KL-3	10	3.3
KL-4	10	3.9
KL-5	10	6.5
KL-6	10	7.4
KL-7	10	4.6
LSD	10	9.6

Resampling to confirm concentrations was not requested by staff. This is a change from previous years, where resampling would have been requested. This change is being made as concentrations between 10-20 µg/L threshold are consistently observed through this sampling program, and as such, can be assumed to be valid. Concentrations observed above 20 µg/L will continue to trigger a resampling request.

Other water quality parameters were measured that exceeded thresholds set in the Nova Scotia Tier 1 Environmental Quality Standards for Surface Water and Groundwater Discharging to Surface Water (EQS).[5] These values are tabulated in Attachment B and are consistent with results found during other sampling events under this program, and likely reflect background conditions in the watershed based on bedrock and soil characteristics in the area. Staff are planning a further investigation into the causes of aluminum exceedances throughout the 2025 program.

Program Adaptations

As discussed in the *Bedford West Water Quality Update – Final* 2024, some operational changes were implemented for the spring 2025 sampling events. These are discussed in the following paragraphs.

The 2025 spring sampling event was completed in late April, for the second consecutive year, to better capture fully mixed conditions in the lake. Total phosphorus concentrations measured in lakes during spring mixing can be considered most representative because the water is typically too cold for plant and algal growth. When these plants are growing, they consume phosphorus, and concentrations observed in the water may appear lower than actual conditions.

While exceedances were observed at all sampling locations during the spring sampling event, the values were in line with those observed in previous springtime events. More than one year of sampling in April will be required to determine whether increasing trends in phosphorus concentrations are being observed in spring through this program. In spring 2025, as discussed above, all exceedances were below 20 µg/L. These were accepted as valid results, and resampling was not requested.

[5] These standards can be found online here: Tab 3, NS Tier I EQS Surface Water and GW discharging to SW.xlsx

Other minor changes have been implemented in the monitoring program starting in 2025, as listed below:

- Resampling will be requested when exceedances are greater than ≤20µg/L
- Total phosphorus (low level) analysis will be 'rushed' at the analytical laboratory so results can be obtained quickly.
- Resampling will be pre-scheduled as part of the overall project planning
    - In spring 2025, a resampling event was scheduled for three weeks after the original sampling date. As discussed above, resampling was not requested in spring 2025.
    - Starting in summer 2025, discrete, duplicate samples will be collected on the original sampling date. These samples will be sent to the analytical laboratory and preserved. If exceedances are observed, these samples will be analyzed and compared to the original sample results.
        - This duplicate sampling will indicate whether exceedances are representative of conditions in the water at the time of sampling and remove uncertainty surrounding potential changes to water chemistry in the watercourses between the original sampling and resampling dates.
        - Previous resampling efforts showed that fluctuations in TP are occurring in the Paper Mill Lake watershed throughout a season, likely due to a combination of factors (changes in flow, precipitation events and the degree of thermal stratification). However, due to the time interval between sampling events in previous years, resampling did not confirm whether concentrations observed were representative of conditions at the time of original sampling, as it could be up to six weeks between the original sampling date and the resampling date. This change will address that uncertainty.
- Results of water quality analysis will be reported to HRM in a format compatible with Atlantic DataStream's reporting template
    - Using this format, results can be shared with the public more quickly and in a user-friendly manner, already being used by the Nova Scotian water monitoring community.
    - This aligns with the practice used by the LakeWatchers program, which is already sharing water quality results on Atlantic DataStream.

A specific management plan for Kearney Lake, one of two primary lakes sampled under this program, was requested by Regional Council. A report recommending remediation actions was presented to Regional Council on August 23, 2022,[6] and the recommendations put forward by staff in the report were accepted by Regional Council at that time. Staff are currently working to complete the recommended remediation. The CWRS and municipal staff, through a research partnership, have received funding to install an array of floating treatment wetlands in Kearney Lake beginning in 2026. The project will test various wetland configurations and plant species to test treatment efficiency and maintenance requirements, and aims to determine if larger deployment of these treatment wetlands will have an impact on water quality in the municipality's urban lakes.

Next Steps

To address the requirements of BWSPS Policy BW-5[7] moving forward, staff are taking a combination of approaches to monitoring and managing development impacts on water systems. Water quality data collected under this program and through other programs underway in the area, subject to the Bedford West Development Agreements, are being considered collectively to assess current watershed health and

[6] Report is available online here: Kearney Lake and Little Kearney Lake Management Plan - Aug 23/22 Regional Council | Halifax.ca

[7] Policy BW-5 states: In the event that water quality threshold levels, as specified under clause (c) of Policy BW-3, for Paper Mill Lake of Kearney Lake are reached, the Municipality shall undertake an assessment and determine an appropriate course of action respecting watershed management and future land use development in the area. An assessment shall consider the CCME guidelines. Water quality thresholds and any assessment reports shall be made available to the public.

lake trophic status. Staff are using this information to inform future development approvals and to develop a watershed management framework for the entire municipality.

Development with the potential to affect lakes is being monitored as part of the LakeWatchers baseline water quality monitoring program. This program samples over 70 lake basins in the municipality semi-annually and reports the results against CCME thresholds. An example of this is the development underway at the former Penhorn Mall, upslope from Penhorn Lake.

In addition, on August 20, 2024, Regional Council accepted a draft framework for watershed management for implementation by staff.[8] In coordination with the Halifax Green Network Plan and Regional Plan, this framework will support the proactive protection of aquatic ecosystems and establish water quality targets for managing land-based activities that impact water quality, aquatic and riparian ecosystems, and water resources. This framework aims to manage collective land-use impacts on a watershed scale, in alignment with the terms of Policy BW-5, as quoted above. This work has begun, with results anticipated to return to Regional Council in 2027.

The Kearney Run watershed was recommended for the second round of watershed plan development, expected to begin in 2027.

FINANCIAL IMPLICATIONS

There are no financial implications associated with this report.

COMMUNITY ENGAGEMENT

No community engagement was required for this report.

LEGISLATIVE AUTHORITY

The Halifax Regional Municipality Charter, Part VIII, Planning and Development, Section 240, Development Agreements.

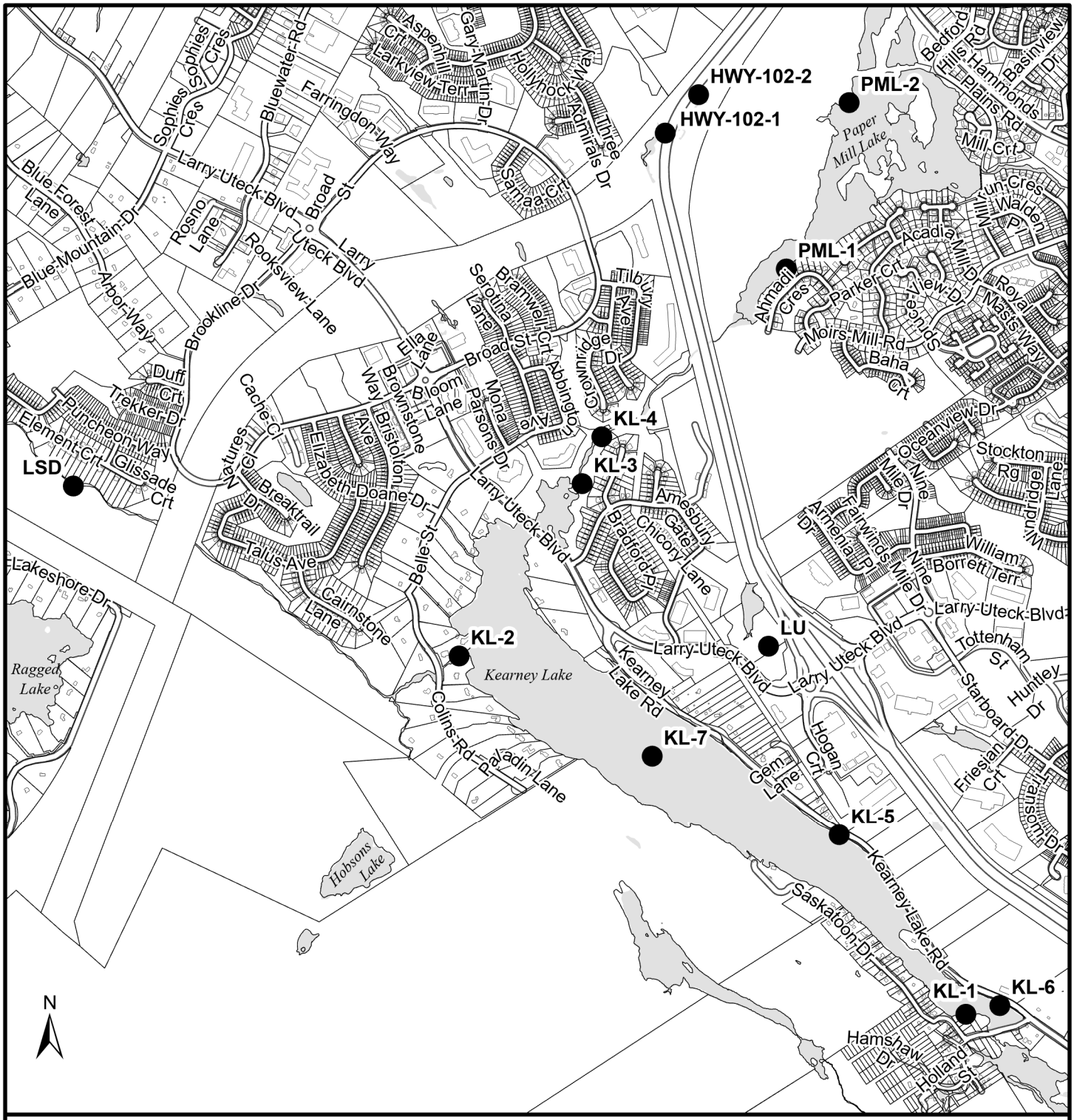
ATTACHMENTS

Attachment A Bedford West Water Quality Monitoring Program Sampling Locations
Attachment B Tier 1 Environmental Quality Standards Exceedances, Spring 2025

Report Prepared by: Elizabeth Montgomery / Environment & Climate Change / Property, Fleet & Environment / 902.943.1954

[8] The staff report can be accessed online: Municipal Watershed Management Framework - Aug 20/24 Regional Council | Halifax.ca

Attachment A - Bedford West Water Quality Monitoring Program Sampling Locations



Bedford West Sampling Locations

HALIFAX

● Sampling location

0 140 280 420 560 700 m

The accuracy of any representation on this plan is not guaranteed.

4 June 2025

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Attachment B – Tier 1 Environmental Quality Standards Exceedances, Spring 2025

Water Quality Parameter	Aluminum (µg/L)	Zinc (µg/L)
Threshold Value	**pH <6.5 - 5 µg/L pH >6.5 - 100 µg/L**	**7 µg/L**
KL-1	294 (6.78)	
Kl-2	358 (6.62)	
KL-3	130 (6.77)	
KL-4	129 (6.75)	
KL-5	141 (6.81)	
KL-6	160 (6.87)	
KL-7	131 (6.69)	
HWY102-1	80 (6.58)	
HWY102-2	134 (6.33)	
LU	103 (6.90)	27.1
LSD	136 (6.85)	
PML-1	118 (6.81)	
PML-2	120 (6.75)	

Acceptable aluminum concentrations under this guideline at pH dependent. Lab-measured pH is noted in brackets next to the measured aluminum concentration in this table.