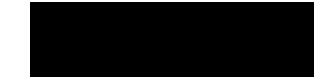


**TO:** Chair and Members of the North West Community Council

**SUBMITTED BY:**



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Cathie O'Toole, Chief Administrative Officer

**DATE:** December 7, 2023

**SUBJECT:** Bedford West Water Quality Status Update – Summer 2023

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## **INFORMATION REPORT**

### **ORIGIN**

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

### **LEGISLATIVE AUTHORITY**

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

### **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.

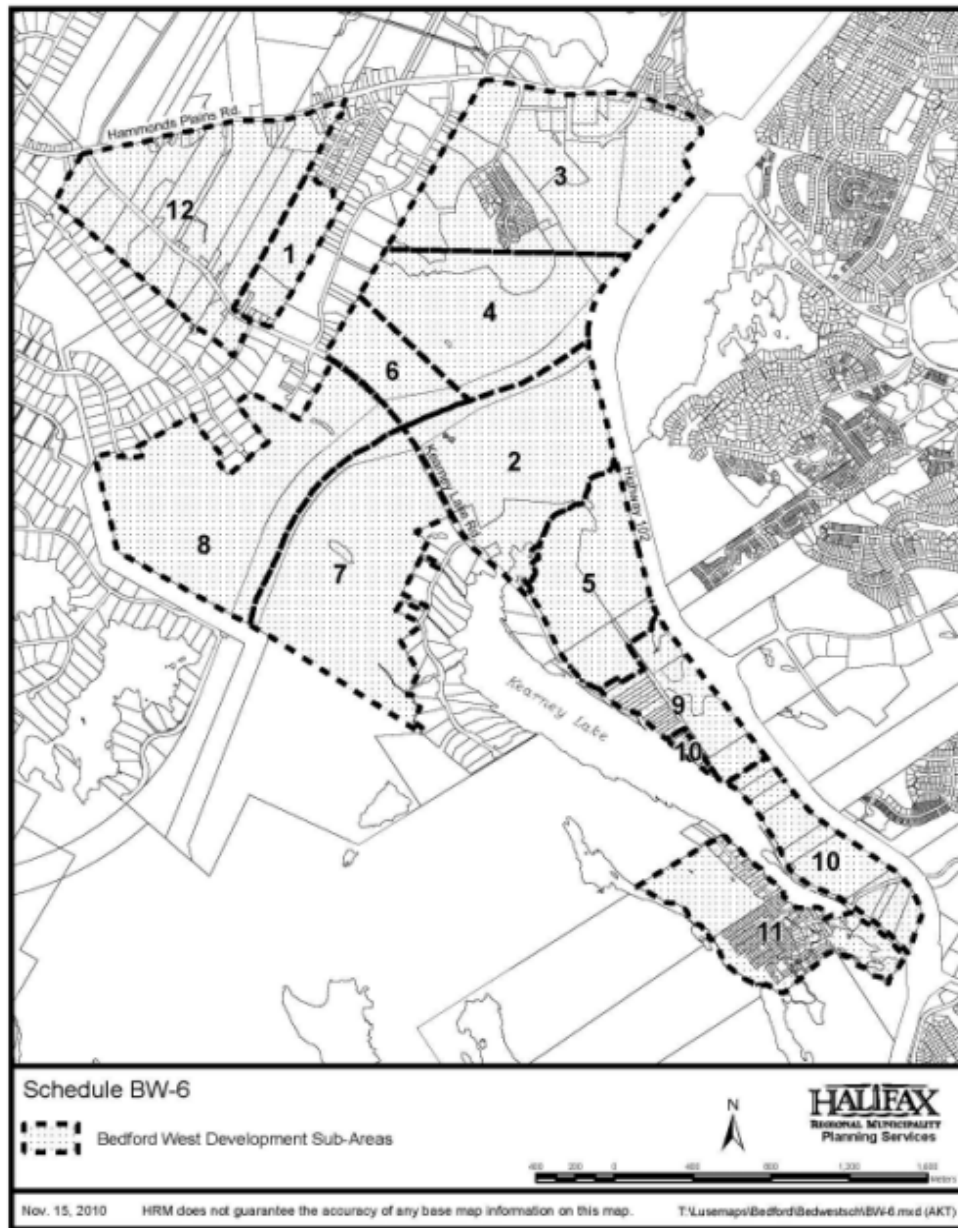


Figure 1: Sub Areas identified under the Bedford West Secondary Planning Strategy.

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.<sup>1</sup>

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, with the exception of those identified as Special Planning Areas.

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 second-lowest trophic state (oligotrophic) to the next-highest trophic state (mesotrophic) per Environment Canada Criteria (Table 1).

Table 1: Summary of Canadian trophic status trigger ranges. Environment Canada (2004).

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

Threshold values for acceptable *E. coli* concentration under the terms of the Bedford West Development Agreements conform to Health Canada’s Guidelines for Canadian Recreational Water Quality.<sup>2</sup> Threshold values for other parameters monitored under the terms of the Bedford West Development Agreements conform to Canadian Council of Environment Ministers (CCME) Water Quality Guidelines for the Protection of Freshwater Aquatic Life (CCME FAL).<sup>3</sup>

In accordance with the terms for the Bedford West Development Agreements, the Municipality is required to submit test results to the Developer, the North West Community Council (NWCC), and RWAB within three months of being received from the consultant, or immediately, if TP or bacterial results exceed management thresholds identified therein.

In cases where an exceedance is noted, staff can request confirmation testing and corrective action by the developer. Further assessments and corrective actions being undertaken by staff are described in the discussion section of this report.

<sup>1</sup> The Bedford West Secondary Planning Strategy can be found online here: [THE BEDFORD WEST SECONDARY PLANNING STRATEGY.pdf \(halifax.ca\)](#)

<sup>2</sup> Health Canada’s Guidelines for Recreational Water Quality can be found online here: [Guidelines for Canadian Recreational Water Quality – Third Edition - Canada.ca](#)

<sup>3</sup> The CCME Water Quality Guidelines for the Protection of Freshwater Aquatic Life can be found online here: [Canadian Council of Ministers of the Environment | Le Conseil canadien des ministres de l'environnement \(ccme.ca\)](#)

## **DISCUSSION**

The purpose of this report is to share the results of the water quality monitoring program in the Paper Mill Lake watershed undertaken as part of the Bedford West Development Agreements on August 28, 2023. A map identifying sampling locations is included in Attachment A.

Detailed information for Bedford West 2019-2022 Water Quality results is posted publicly on the [HRM Lakes & Rivers webpage](#). An exceedance of *E. coli* was observed at KL-1, reported as >200 CFU/100mL. Resampling was not requested because of this exceedance, as *E. coli* concentrations are variable in time and space, and results were received nearly a month after initial sampling took place.

No exceedances of the 10 µg/L phosphorus were noted at this sampling event. The observed phosphorus levels are listed in *Table 2*. Accounting for the difference in sampling locations, this data correlates with phosphorus concentrations noted in the municipality's LakeWatchers baseline water quality monitoring program. LakeWatchers samples were collected in Paper Mill Lake two weeks earlier than the Bedford West samples were collected. Samples were collected in Kearney Lake the same week as the Bedford West program. Data from LakeWatchers sampling in 2022 and 2022 is listed in *Table 3*.

*Table 2: August 27, 2023 Total Phosphorus Observed Under the Beford West Program*

<b>Sampling Location</b>	<b>Acceptable Phosphorus Concentration (µg/L)</b>	<b>Total Phosphorus (µg/L)</b>
PML-1	10	7
PML-2	10	8
HWY102-1	10	7
HWY102-2	10	7
LU <sup>4</sup>	10	8
KL-1	10	8
KL-2	10	8
KL-3	10	8
KL-4	10	8
KL-5	10	8
LSD	10	8

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<sup>4</sup> This sample site is incorrectly labelled LV on the attached lab results.

*Table 3: Total Phosphorus Observed Under LakeWatchers*

Lake and location	RDL <sup>5</sup>	2022		2023	
		May 4, 2022	Aug 18, 2022	April 24, 2023	Aug 29, 2023
Kearney – Deep	1 µg/L	1.9 µg/L	ND	4.4 µg/L	3.4 µg/L
Kearney – Surface	1 µg/L	2.0 µg/L	ND (1)	4.6 µg/L	2.7 µg/L
Kearney – Outlet	1 µg/L	1.6 µg/L	ND (1)	2.6 µg/L	2.2 µg/L
	RDL	April 29, 2022	Aug 23, 2022	April 19, 2024	Aug 11, 2023
Papermill – Deep	1 µg/L	3.3 µg/L	ND (1)	2.2 µg/L	3.0 µg/L
Papermill – Surface	1 µg/L	2.6 µg/L	ND (1)	1.8 µg/L	3.9 µg/L
Papermill – Outlet	1 µg/L	2,5 µg/L	ND (1)	1.3 µg/L	3.1 µg/L

Other water quality parameters were measured that exceed thresholds set in the Nova Scotia Tier 1 Environmental Quality Standards for Surface Water and Groundwater Discharging to Surface Water (EQS).<sup>6</sup> These values are tabulated in Attachment B. These exceedances are consistent with results found during other sampling events under this program, and likely reflect background concentrations in the watershed. Staff has requested the consultant take increased care to avoid shoreline sediment during sampling in case this is affecting results.

**FINANCIAL IMPLICATIONS**

There are no financial implications associated with this report.

**COMMUNITY ENGAGEMENT**

No community engagement was required for this report.

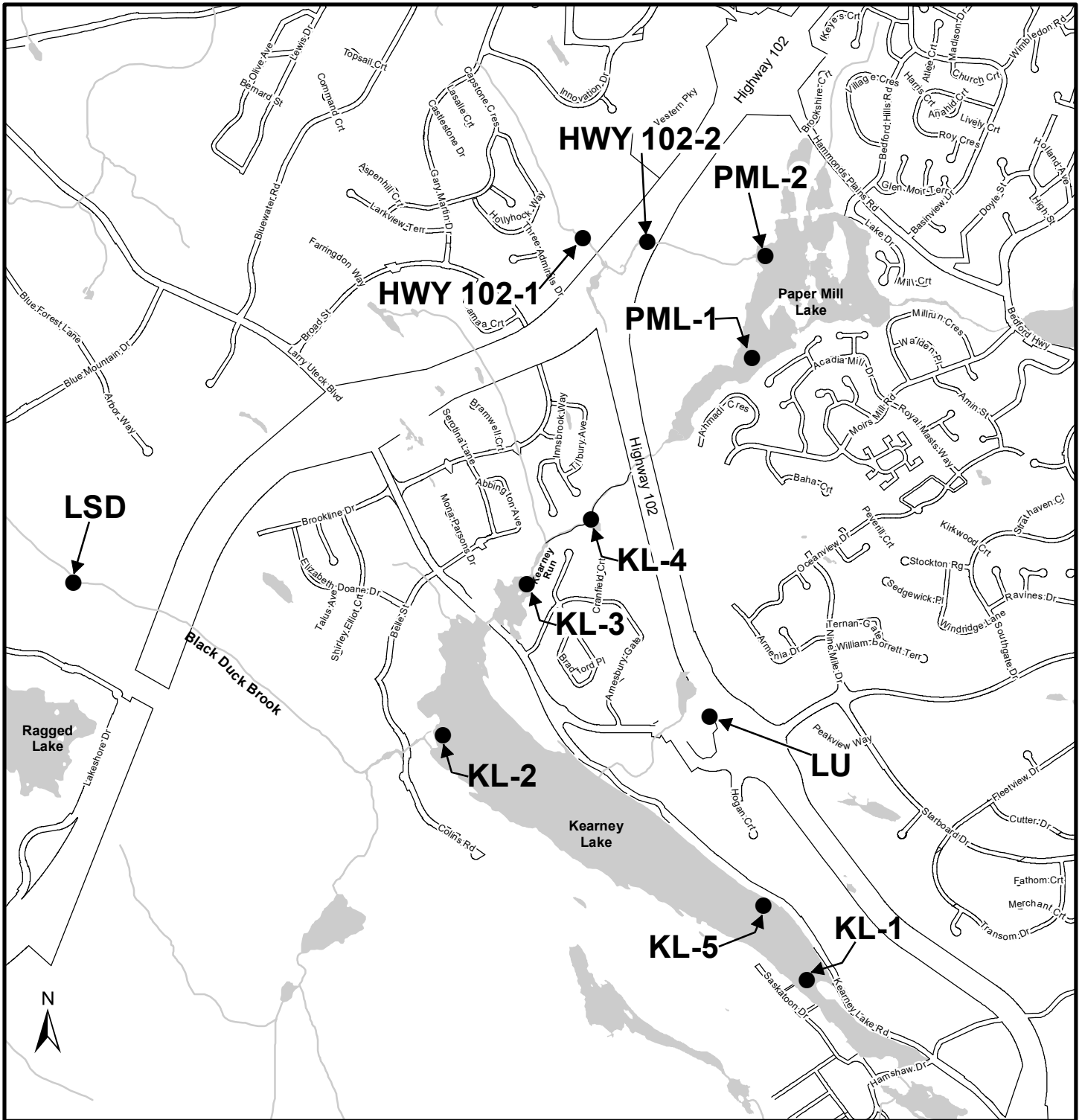
**ATTACHMENTS**

- Attachment A. Bedford West Water Quality Monitoring Program Sampling Locations
- Attachment B. Summer 2023 Exceedances

A copy of this report can be obtained online at [halifax.ca](http://halifax.ca) or by contacting the Office of the Municipal Clerk at 902.490.4210.

Report Prepared by: Elizabeth Montgomery, Water Resources Specialist. Property, Fleet & Environment  
 902.943.1954

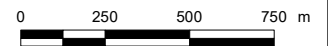
<sup>5</sup> RDL = Reported Detection Limit. This is the minimum amount detectable by the equipment used for analysis.  
<sup>6</sup> These standards can be found online here: [Tab 3, NS Tier I EQS Surface Water and GW discharging to SW.xlsx \(novascotia.ca\)](#)



Station Map 2020 - Bedford West Water Quality Monitoring Program

**HALIFAX**

● Water Quality Monitoring test Location



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

**ATTACHMENT B**

**Nova Scotia Tier 1 Environmental Quality Standards Exceedences Observed - Spring 2023**

	<i>E. coli</i> (CFU/100mL)	Aluminum (µg/L)	Copper (µg/L)	Zinc (µg/L)	pH	Iron (µg/L)
<b>Threshold Value</b>	<b>200 CFU/100mL</b>	<b>100</b>	<b>2</b>	<b>7</b>	<b>6.5-9</b>	<b>300</b>
<b>KL1</b>	>200	285		15	6.39	
<b>KL2</b>		412		12		512
<b>KL3</b>		197		8	6.33	318
<b>KL4</b>		186		26	6.35	
<b>KL5</b>		195			6.34	
<b>HWY-102-1</b>		157				
<b>HWY-102-2</b>		258			6.47	1950
<b>LSD</b>		199			6.47	387
<b>LU</b>		600	9	36	6.47	621
<b>PML-1</b>		189		15	6.41	
<b>PML-2</b>		137			6.46	