

**Peats Point Subdivision
Source Protection Study
WHPA-E Zone Delineation
Addendum**

DRAFT Final Report

May 27, 2022

Submitted by

**Quinte Source Protection
Authority**

This document should be read in conjunction with the May 14, 2009, Peats Point Subdivision Source Protection Study WHPA-E Zone Delineation Final Report by Dillon Consulting Limited.

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1. INTRODUCTION

Dillon Consulting Limited (Dillon) was retained by Quinte Conservation to undertake the vulnerability assessment of the Peats Point Subdivision municipal potable water system. The study was completed in accordance with the Technical Rules: Assessment Report, issued in December 2008. As a requirement under the Technical Rules, well head vulnerability zones are to be delineated for the Peats Point Subdivision municipal water system. In March 2008, Dillon issued an interim report that identified well head protection area (WHPA) zones A, B, C and D, ~~which correspond to the~~ groundwater-based vulnerability areas. The Technical Rules require that an additional vulnerability zone be mapped for municipal wells that have been identified as Groundwater under the Direct Influence of Surface Water (GUDI) by O.Reg 170/03 under the *Safe Drinking Water Act*. The Peats Point Subdivision municipal well, which is a GUDI well, requires this additional study to assess its vulnerability to surface water contamination, identified as the well head protection area E. The new vulnerability zone is WHPA-E which is to be delineated according to the IPZ-2 rules.

5. DELINEATION OF WHPA-E ZONE

The zone known as WHPA-E was delineated according to Part VI.4 and VI.6 of the Technical Rules. The WHPA-E is composed of the following areas:

- the area within the surface water body that may contribute water to the well (or to its closest in-stream point) within 2 hours. It includes the instream portion representing the Bay of Quinte and the up-tributary portion representing small watercourses and drainage features that discharge into the Bay;
- a setback of not more than 120 m inland along the abutted land measured from the high water mark of the surface water body. The 120 m setback encompasses the area where overland flow drains into the WHPA-E.
- the area that contributes water to WHPA-E through transport pathways (i.e., tile drainage, stormwater drainage system, ditches along the roads, etc.)

5.1 Instream Delineation

In order to define the WHPA-E travel time limits based on average flow conditions within the Bay of Quinte, a one-dimensional HEC-RAS model for the Bay was used.

5.2 Wind-Driven Transport

Wind-driven surface transport velocities were determined based on historical wind records obtained for the Trenton meteorological station. Typically these transport velocities representing

contaminant movement are estimated as 3% to 5% of the wind velocity measured 10 m above ground. One-hour time series of wind speed and direction were processed to create a 2-hour time series that formed the basis of this analysis.

5.3 WHPA-E Zone 120 meter Set-Back

As required by the Technical Rules, all streams and the Bay of Quinte were buffered with a 120 metre set-back inland along the abutted land.

5.4 Transport Pathways

There were no transport pathways identified in the WHPA-E zone.

5.5 Consolidated WHPA-E limits

The Peat Point Subdivision well interacts with the surface water of the Bay of Quinte at least in three locations; therefore WHPA-Ea, WHPA-Eb and WHPA-Ec zones were delineated based on these three interaction points. Each of these zones is the result of wind/flow transport and a 120 m setback as required by the Rules. However, at the time the WHPA E was delineated, the Technical Rules do not envisage having several WHPA-E zones for one well. Therefore, a decision was made to combine WHPA-Ea, WHPA-Eb and WHPA-Ec zones into one combined WHPA-E (Figure 1).

The Technical Rules were updated in 2021, and as part of this work, Rule 89 was updated to allow one or more area vulnerability factors (that are not less than 7 and not greater than 9) shall be assigned to each area within an IPZ-2 based on the vulnerability of the area where a higher factor corresponds to a higher vulnerability. The Quinte Source Protection Committee reviewed this rule change, alongside the municipal comments from the Section 36 Workplan, and felt the single vulnerability score best represented the vulnerability of the system.

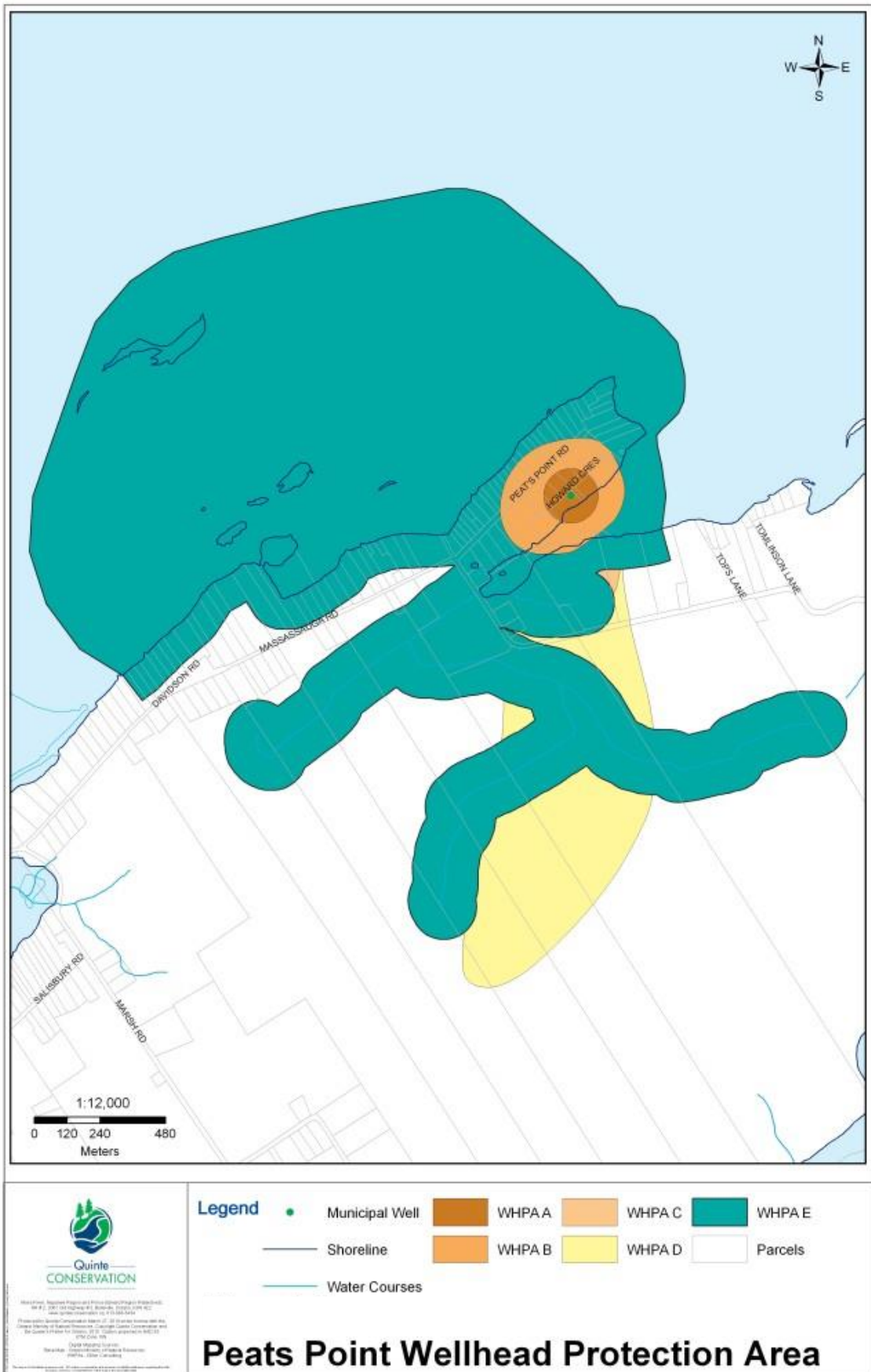


Figure 1: Peats Point Wellhead Protection Areas

5.6 Refinement of WHPA -E limits

During negotiations of risk management plans and through field investigations, Risk Management Officials reported one portion of the Peats Point Wellhead Protection Area E where a watercourse, identified through Geographical Information Systems (GIS) mapping, did not drain into the vulnerable area. This watercourse variance did affect the delineation of the WHPA-E and therefore maps in the Assessment Report and Source Protection Plan required updates.

Source Protection Authority staff used 2013 South Central Ontario Orthophotography (SCOOP) digital elevation model (DEM) to confirm the field observations of the Risk Management Officials.

Once confirmed, staff used Arc Hydro to determine and update the local water course dataset, and divided the section of the WHPA -E at the highest elevation point while maintaining the 120 meter buffer on the land. This resulted in the removal of approximately 500 meters of eastern tributary (Figure 2).

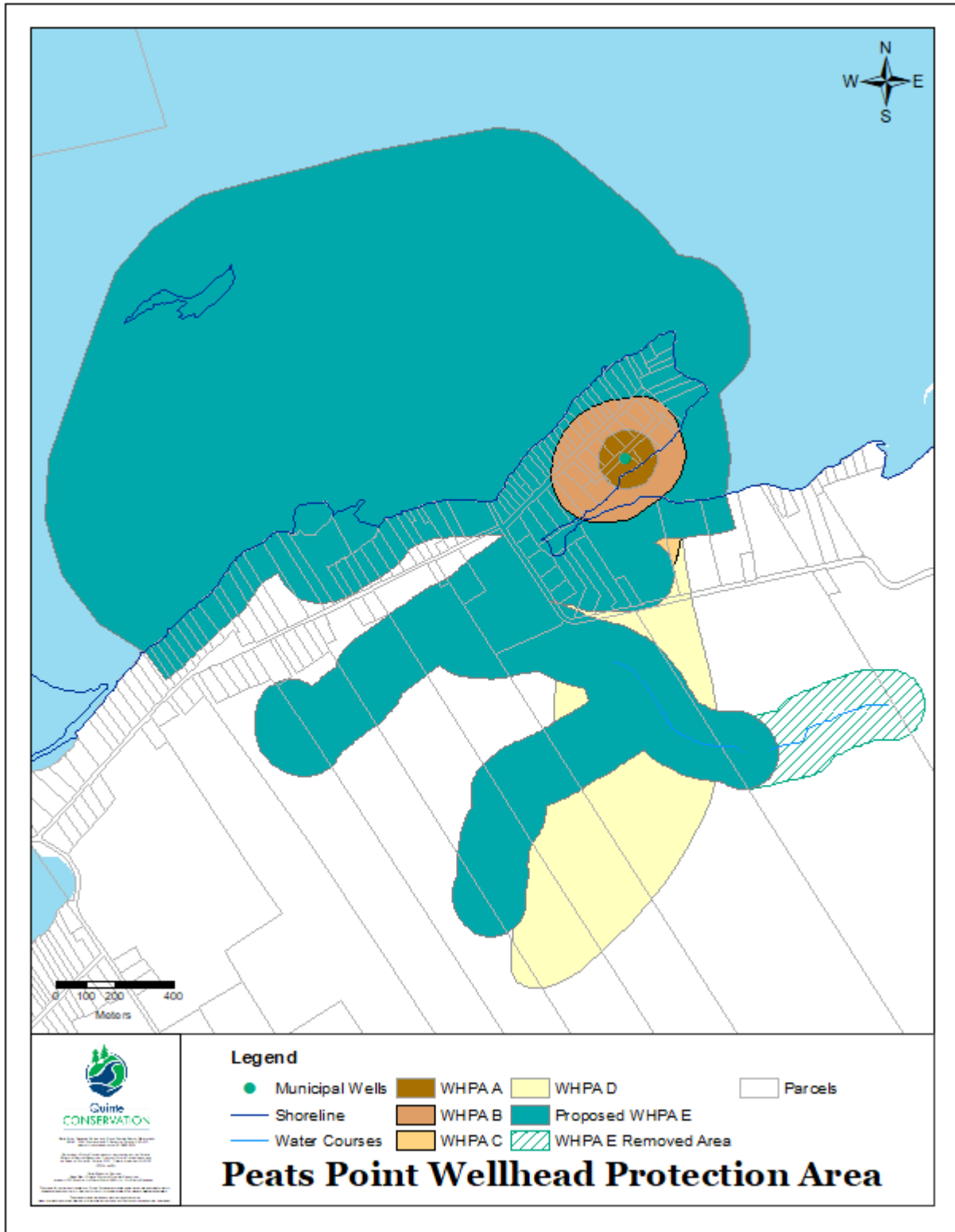


Figure 2: Updated Wellhead Protection Areas in Peats Point.

8. REFERENCES

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6. Quinte Source Protection Authority, 2019. Quinte Region Source Protection Plan, September, 2019.