



March 18, 2019

Reference No. 086822

Stephanie Mack  
Special Projects Supervisor  
Simcoe County, Solid Waste Management  
1110 Highway 26  
Midhurst, ON  
L9X 1N6

Dear Ms. Mack:

**Re: Groundwater Monitoring 2018-2019  
Environmental Resource Recovery Centre (ERRC)  
2976 Horseshoe Valley Road West, Springwater, Ontario**

This letter presents updated results of the groundwater monitoring program undertaken at the proposed Environmental Resource Recovery Centre (ERRC) located at 2976 Horseshoe Valley Road in Springwater, Ontario (the Site).

The Hydrogeological Assessment<sup>1</sup> for the Site, prepared by GHD, presented the hydrogeological data collected from August 2016 to November 2017. Subsequently, GHD completed additional monitoring from May 2018 to February 2019. The purpose of this monitoring was to collect additional baseline groundwater level data in support of the design and construction of the ERRC.

Groundwater level monitoring was undertaken from May 2018 to February 2019 at all onsite monitoring wells (5) and mini-piezometers (3) and wetland surface water monitors (3). The monitoring locations are shown on **Figure 1**. Manual groundwater level measurements were collected quarterly using a water level meter. During each monitoring event, data from the previously installed electronic water level dataloggers was downloaded. The dataloggers were installed at all monitoring locations in 2016 (and 2018 at MW15-16) for continuous water level measurements. The dataloggers provide a detailed record of the response of groundwater to climatic conditions throughout the year.

The Site is located within a significant regional groundwater recharge area, and groundwater flow is outward from the Site toward the northwest based on the monitoring well data, and is also interpreted to be to the southeast toward Matheson Creek based on the deeply incised stream valley (220 mAMSL). The groundwater table is situated within sandy soils at depths of more than 9 mBGS indicative of recharge conditions.

Manual groundwater levels measured since 2016 are summarized in **Table 1** (mAMSL) and in **Table 2** (mBGS). The groundwater elevation contours using the May 16, 2018 water elevation data for monitoring wells screened within the sand aquifer are presented on **Figure 2**. Based on the groundwater elevation

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<sup>1</sup> Updated Hydrogeological Assessment, Environmental Resource Recovery Centre (ERRC), 2976 Horseshoe Valley Road West, Springwater, Ontario. Prepared for Simcoe County. February 1, 2019.



measurements the groundwater flow direction was toward the northwest, similar to previous monitoring events.

Hydrographs of the groundwater elevations from 2016 to 2019 are presented on **Figure 3** (monitoring wells) and **Figure 4** (wetland mini-piezometers/surface water monitors). Review of **Figure 3** indicates that groundwater elevations fluctuates seasonally, with highest elevations observed in early summer and lowest elevations in late winter. Review of **Figure 4** indicates that the wetlands are generally dry from late summer to the end of fall.

The groundwater and surface water levels within the wetland area ranged from approximately 240.6 mAMSL at MP1-16 to 242.3 mAMSL at MP3-16 (**Figure 4**). These groundwater and surface water levels observed within the wetland area are well above the groundwater table at the Site, which is below an elevation of 236 mAMSL, based on the monitoring well data. The wetland provides recharge to the deeper underlying sand aquifer during the spring freshet, based on the observed shallow groundwater and surface water levels within the wetland area.

The updated groundwater data presented herein does not significantly alter the previous hydrogeologic interpretation of the Site.

Sincerely,

GHD

A handwritten signature in blue ink, appearing to read 'Sean Andreou', written in a cursive style.

Sean Andreou, MSc, P. Geo.

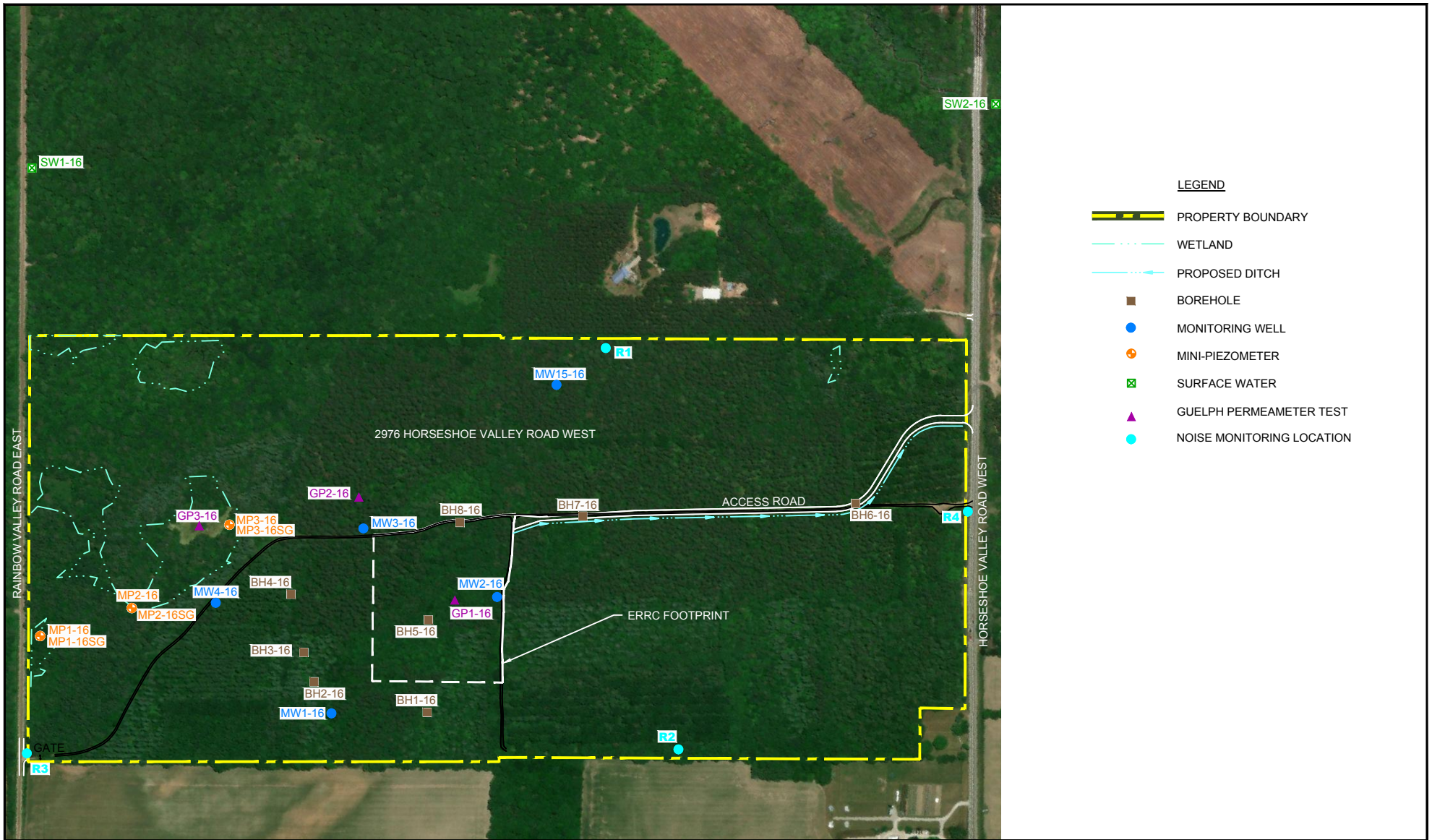
A handwritten signature in blue ink, appearing to read 'Philip Smart', written in a cursive style.

Philip Smart, M.Sc., P. Geo.

SA/ps/24

Encl.

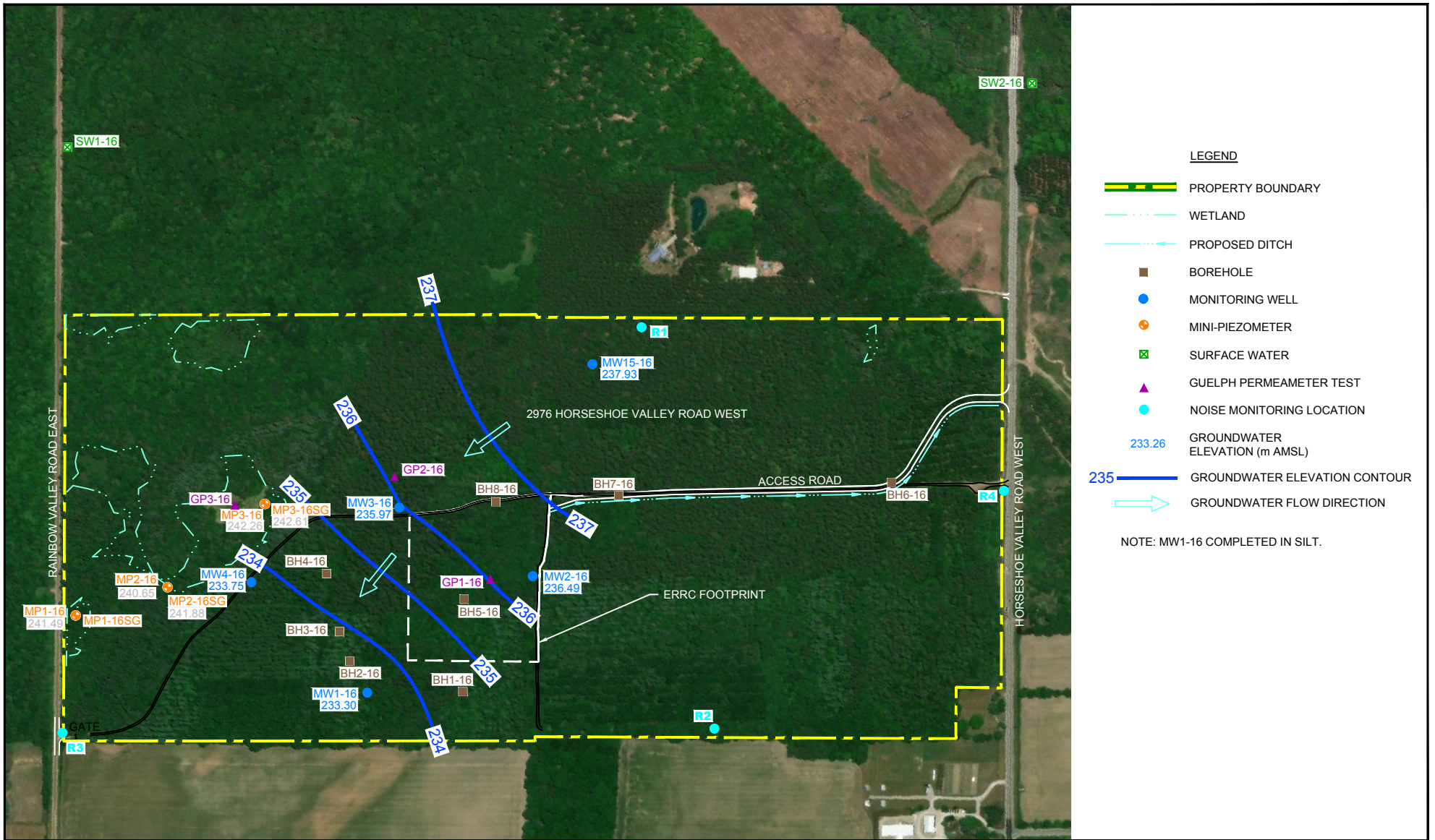
# Figures



- LEGEND**
- PROPERTY BOUNDARY
  - WETLAND
  - PROPOSED DITCH
  - BOREHOLE
  - MONITORING WELL
  - MINI-PIEZOMETER
  - SURFACE WATER
  - GUELPH PERMEAMETER TEST
  - NOISE MONITORING LOCATION

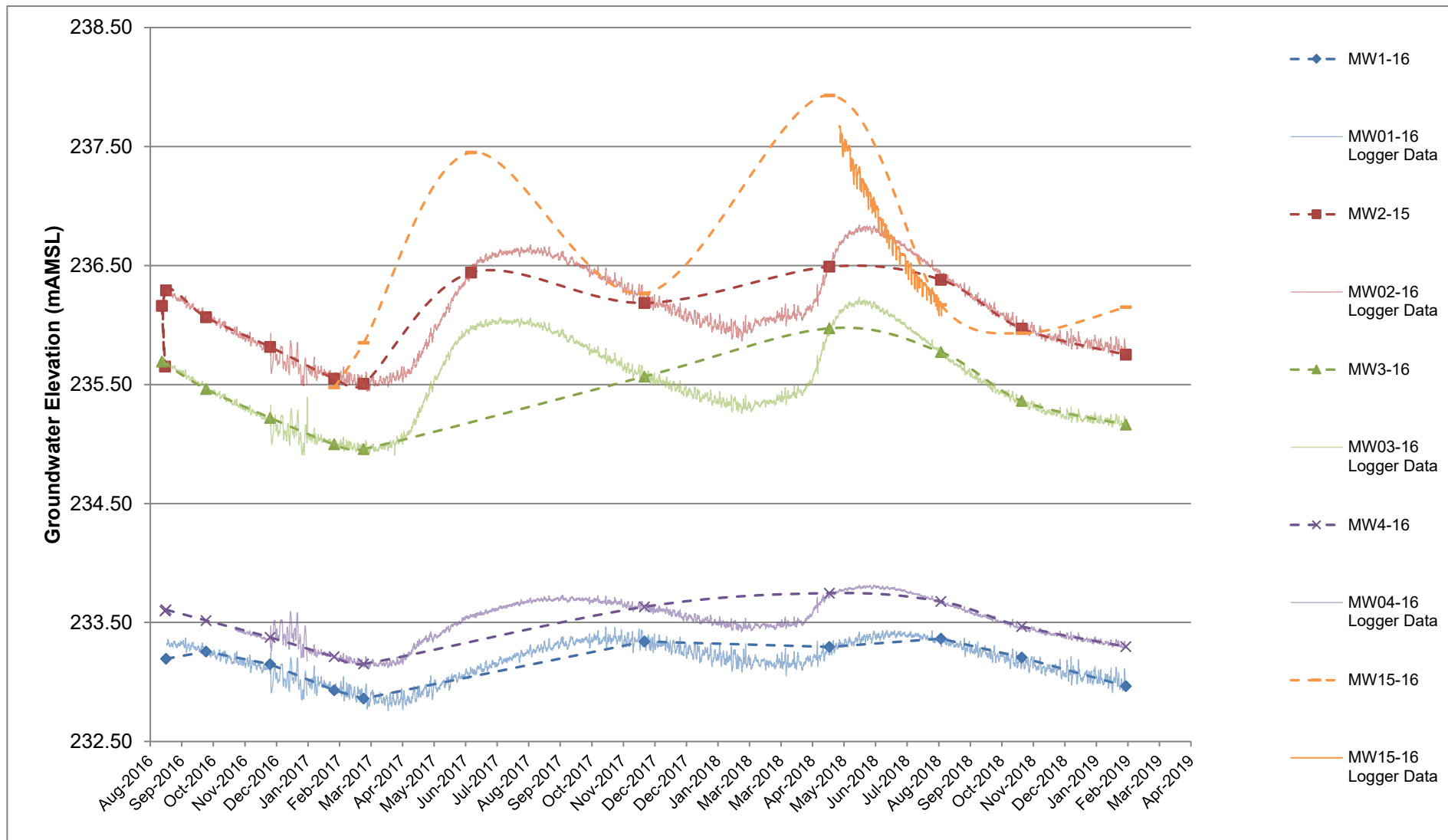
Source: Microsoft Product Screen Shot(s) Reprinted with permission from Microsoft Corporation, Acquisition Date [unknown], Accessed: 2019

<p>Coordinate System: NAD83 UTM 17N metres</p>		<p>COUNTY OF SIMCOE 2976 HORSESHOE VALLEY ROAD WEST, SPRINGWATER, ONTARIO ENVIRONMENTAL RESOURCE RECOVERY CENTRE (ERRC)</p> <p><b>INVESTIGATIVE LOCATIONS</b></p>	<p>86822-04 Mar 15, 2019</p> <p style="text-align: right; font-weight: bold; font-size: 1.2em;">FIGURE 1</p>
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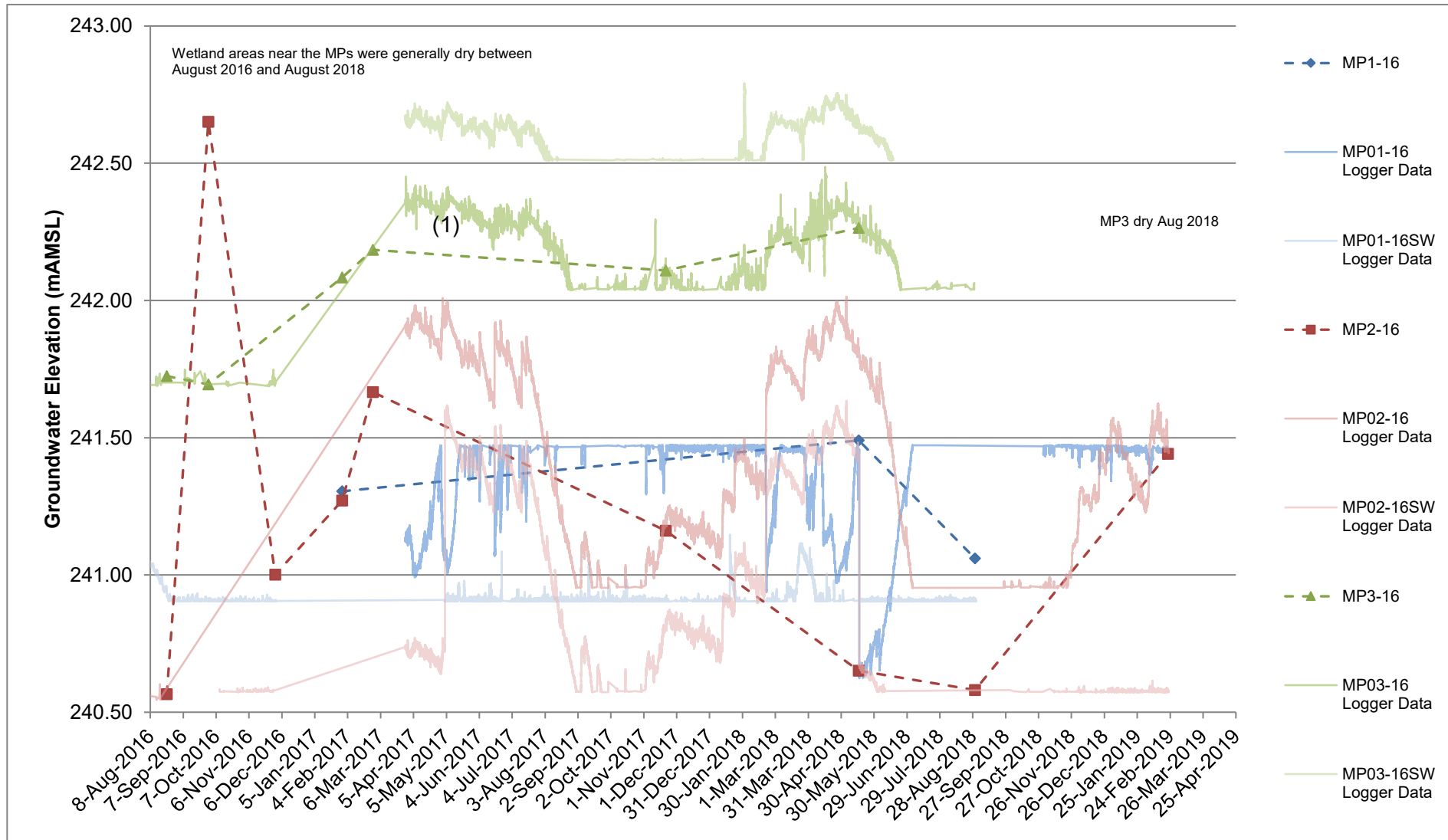
Source: Microsoft Product Screen Shot(s) Reprinted with permission from Microsoft Corporation, Acquisition Date [unknown], Accessed: 2019

<p>0 80 160 240m</p> <p>Coordinate System: NAD83 UTM 17N metres</p>			<p>COUNTY OF SIMCOE 2976 HORSESHOE VALLEY ROAD WEST, SPRINGWATER, ONTARIO ENVIRONMENTAL RESOURCE RECOVERY CENTRE (ERRC)</p> <p style="font-size: 1.2em; font-weight: bold;">GROUNDWATER ELEVATION CONTOURS (MAY 16, 2018)</p>	<p>86822-04 Mar 15, 2019</p>	<p style="font-size: 1.2em; font-weight: bold;">FIGURE 2</p>
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Simcoe County  
 Environmental Resource Recovery Centre (ERRC)  
 Hydrogeological Assessment  
 2976 Horseshoe Valley Road, Springwater, Ontario  
**GROUNDWATER ELEVATION HYDROGRAPHS**

**Figure 3**



Simcoe County  
 Environmental Resource Recovery Centre (ERRC)  
 Hydrogeological Assessment  
 2976 Horseshoe Valley Road, Springwater, Ontario

**MINIPIEZOMETER GROUNDWATER ELEVATION HYDROGRAPHS**

**Figure 4**

# Tables



**Table 1**

**Summary of Groundwater Levels (m AMSL)  
Hydrogeological Monitoring  
Environmental Resource Recovery Centre (ERRC)  
2976 Horseshoe Valley Road, Springwater  
Simcoe County**

	<b>MW1-16</b>	<b>MW2-15</b>	<b>MW3-16</b>	<b>MW4-16</b>	<b>MW15-16</b>	<b>MP1-16</b>	<b>MP2-16</b>	<b>MP3-16</b>
Ground Elevation (mAMSL)	259.10	252.45	246.14	242.86	247.33	241.80	241.71	242.86
Reference Elevation (mAMSL) <sup>(1)</sup>	260.00	253.35	246.99	243.67	248.11	243.24	242.72	243.86
<i>20-Jul-2016</i>	-	-	-	-	-	-	-	-
<i>19-Aug-2016</i>	-	236.16	235.69	-	-	-	-	-
<i>22-Aug-2016</i>	-	235.65	-	233.60	-	-	-	-
<i>23-Aug-2016</i>	233.20	236.29	-	233.61	-	-	-	-
<i>30-Sep-2016</i>	233.26	236.07	235.46	233.52	-	-	242.65	241.69
<i>30-Nov-2016</i>	233.15	235.82	235.22	233.38	-	-	241.00	-
<i>30-Jan-2017</i>	232.93	235.55	235.00	233.21	235.48	241.31	241.27	242.08
<i>27-Feb-2017</i>	232.86	235.51	234.96	233.15	235.85	-	241.67	242.18
<i>9-Jun-2017</i>	-	236.44	-	-	237.45	-	-	-
<i>21-Nov-2017</i>	233.34	236.19	235.57	233.63	236.27	-	241.16	242.11
<i>16-May-2018</i>	233.30	236.49	235.97	233.75	237.93	241.49	240.65	242.26
<i>30-Aug-2018</i>	233.37	236.38	235.77	233.68	236.17	241.06	240.58	-
<i>15-Nov-2018</i>	233.21	235.97	235.36	233.47	235.93	-	-	-
<i>22-Feb-2019</i>	232.97	235.75	235.16	233.30	236.15	-	241.44	-

**Notes:**

(1) Reference elevation taken from top of riser pipe.

mAMSL metres Above Mean Sea Level

mBGS metres Below Ground Surface.

mBTOR metres Below Top of Riser.

Elevations referenced with respect to a geodetic benchmark - Steel rod with brass cap bench mark on east site of highway 27, 8.6 km south of the junction of highway 27 and 92 in Elmvale, 9.6 km North of the junctions of highway 26 and 27 at Midhurst, 0.4 km south of Flos Town concession 3 rd and 18.1m east of centerline of highway 27. Benchmark is 39.2m North of the south end of east right of way fence at the north side of a reforestation area on the east side of highway 27, 45cm west of east right of way fence and is marked by a steel marker set 40cm north of bench mark

**Table 2**

**Summary of Groundwater Levels (m BGS)  
Hydrogeological Monitoring  
Environmental Resource Recovery Centre (ERRC)  
2976 Horseshoe Valley Road, Springwater  
Simcoe County**

	<b>MW1-16</b>	<b>MW2-15</b>	<b>MW3-16</b>	<b>MW4-16</b>	<b>MW15-16</b>	<b>MP1-16</b>	<b>MP2-16</b>	<b>MP3-16</b>
Ground Elevation (mAMSL)	259.10	252.45	246.14	242.86	247.33	241.80	241.71	242.86
Reference Elevation (mAMSL) <sup>(1)</sup>	260.00	253.35	246.99	243.67	248.11	243.24	242.72	243.86
<i>20-Jul-2016</i>	-	-	-	-	-	-	-	-
<i>19-Aug-2016</i>	-	16.29	10.45	-	-	-	-	-
<i>22-Aug-2016</i>	-	16.80	-	9.27	-	-	-	-
<i>23-Aug-2016</i>	25.90	16.16	-	9.26	-	-	-	-
<i>30-Sep-2016</i>	25.84	16.38	10.68	9.35	-	-	-0.94	1.17
<i>30-Nov-2016</i>	25.95	16.63	10.92	9.49	-	-	0.71	-
<i>30-Jan-2017</i>	26.17	16.90	11.15	9.65	11.86	0.49	0.44	0.78
<i>27-Feb-2017</i>	26.24	16.94	11.19	9.71	11.48	-	0.05	0.68
<i>9-Jun-2017</i>	-	16.01	-	-	9.88	-	-	-
<i>21-Nov-2017</i>	25.76	16.26	10.58	9.23	11.07	-	0.55	0.76
<i>16-May-2018</i>	25.80	15.96	10.17	9.12	9.40	0.31	1.06	0.60
<i>30-Aug-2018</i>	25.73	16.07	10.37	9.19	11.16	0.74	1.13	-
<i>15-Nov-2018</i>	25.89	16.48	10.78	9.40	11.40	-	-	-
<i>22-Feb-2019</i>	26.13	16.70	10.98	9.57	11.18	-	0.27	-

**Notes:**

- <sup>(1)</sup> Reference elevation taken from top of riser pipe.
  - mAMSL metres Above Mean Sea Level
  - mBGS metres Below Ground Surface.
  - mBTOR metres Below Top of Riser.
- Elevations referenced with respect to a geodetic benchmark - Steel rod with brass cap bench mark on east site of highway 27, 8.6 km south of the junction of highway 27 and 92 in Elmvale, 9.6 km North of the junctions of highway 26 and 27 at Midhurst, 0.4 km south of Flos Town concession 3 rd and 18.1m east of centerline of highway 27. Benchmark is 39.2m North of the south end of east right of way fence at the north side of a reforestation area on the east side of highway 27, 45cm west of east right of way fence and is marked by a steel marker set 40cm north of bench mark