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Strada Shelburne (Melancthon, Ont.)

ANNUAL COMPLIANCE REPORT 2024

Strada Aggregates Inc.

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Issue	Date	Description
0	February 5, 2025	Draft Report (Issued for Client Review)
1	March 17, 2025	Final Report

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1 Introduction

Tatham Engineering Limited (Tatham) was retained by Strada Aggregates Inc. (Strada) to complete the 2024 compliance monitoring and reporting for the Strada Shelburne pits comprising the Bonnefield/Prince Pits, Melancthon Pit #1, and Melancthon Pit #2, all located at Part Lot 11-14, Concession 3, in the Township of Melancthon.

1.1 SITE DESCRIPTION

The Strada Shelburne aggregate pits, hereafter referred to as the "site", are located northwest of Shelburne, north of Dufferin 17 between Line 4 and Line 3. The site is 152 ha in size and is surrounded by rural residential properties and agricultural lands with a separate aggregate operation located immediately west of the site. The site is licensed for aggregate extraction under the Ministry of the Natural Resources and Forestry (MNRF) Aggregate Resources Act (ARA) for extraction of aggregate above the water table. The Class "A" Pit Above Water Licenses are licensed to extract sand and gravel within 1.5 m of the water table. The location of the Strada Shelburne aggregate pits are shown on Figure 1.

2 Regulatory Requirements

The Strada Shelburne pits are comprised of the Bonnefield/Prince properties, Melancthon Pit #1, and Melancthon Pit #2. Each property has been integrated into one all-encompassing operation, which includes a closed loop washing facility regulated under the Melancthon Pits #2 Ontario Water Resources Act, Section 34, Permit to Take Water (PTTW) No.: 3210-AKRL9C, attached in Appendix A.

Melancthon Pit #1 is located on the West Half of Lot 13, Concession 3, and has been licensed under MNRF ARA License No. 12253 since 2004. Melancthon Pit #2 is located on the West Half of Part Lot 11 and 12, Concession 12, and has been licensed under MNRF ARA License No. 625155 since 2012.

The proposed Bonnefield and Prince properties, which are located at Part of West Half of Lots 12 and 13, Concession 3, have not yet been licensed, but the expectation is these extensions will be fully integrated with existing aggregate operations.

To monitor the groundwater and surface water conditions throughout extraction, an integrated monitoring plan was developed by Whitewater Hydrogeology (2018) to effectively identify and characterize any cumulative influences on the groundwater and surface water regimes as a result of any extraction and/or washing operations on-site. A copy of the integrated monitoring plan is provided in Appendix B.

This report has been prepared to comply with both the PTTW and integrated monitoring plan requirements.

2.1 WATER TAKING

Strada is required to monitor daily water takings in accordance with PTTW 3210-AKRL9C. This data is required to be reported every year to the Ministry's Water Taking Reporting System on or before March 31. PTTW 3210-AKRL9C allows for the taking of 4,000 L/min for a maximum of 10 hours per day while ensuring water takings do not exceed 2,400,000 L/day for a maximum of 230 days between April 1 and November 16 of each year.

The permitted water taking is for the purposes of washing gravel in a closed loop system and does not include dust suppression.

2.2 GROUNDWATER AND SURFACE WATER MONITORING REQUIREMENTS

The required groundwater and surface water monitoring program is summarized in Table 1, and the monitoring locations are shown on Figure 2.

Table 1: Monitoring Details

MONITORING LOCATION[1]	PARAMETER	FREQUENCY
INTEGRATED MONITORING PLAN REQUIREMNTS		
~~OW2A, OW2B,~~ OW3B, OW4A, OW4B, OW5A, OW5B, OW6A, OW7A, OW7C[2], OW8A, OW9A, OW10A[3], ~~OW11A, OW11B,~~ OW12A, OW13A, OW13C[2], OW14C[2], ~~OW15B,~~ OW16C[2], ~~OW17A, OW17B,~~ OW18A, OW18C[2], OW19A[3], OW19C[2], OW20C[2], OW21C[2], OW22C[2], OW23C[2]	Water Level	Continuous data logger
~~OW2A, OW2B,~~ OW3B, OW4A, OW4B, OW5A, OW5B, OW6A, OW7A, OW7C[2], OW8A, OW9A, OW10A[3], ~~OW11A, OW11B,~~ OW12A, OW13A, OW13C[2], OW14C[2], OW16C[2], OW18A, OW18C[2], OW19C[2], OW20C[2], OW21C[2], OW22C[2], OW23C[2]	pH, Conductivity, Alkalinity, Bicarbonate, Chloride, Calcium, Magnesium, Potassium, Sodium, Sulphate, Nitrate, Nitrite, Phosphorus, and dissolved Metals	Semi-Annual (spring and fall)
OW5A, OW6A, OW7A, OW8A, OW9A, OW10A[3], ~~OW11A~~ OW12A, OW14C[2], OW16C[2], OW18A, OW20C[2], OW21C	Oil and Grease, Petroleum Hydrocarbons (PHC) Fraction F1-F4, Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX)	Annual
Wetland (SW1) and Vernal Pool (SW2)	Water Level	Continuous data logger
PTTW REQUIREMENTS		
Wash Pond[4], ~~OW2A, OW2B, OW2C,~~ OW3A[3], OW3B, OW4A, OW4B, OW4C[5], OW5A, OW5B, OW5C, OW6A, OW7A, OW7C, OW8A, ~~OW8B~~, OW9A, OW10A[3], OW10B, ~~OW11A, OW11C~~, OW12A, OW13A, North Pond, South Pond	Water Level	Continuous data logger

MONITORING LOCATION[1]	PARAMETER	FREQUENCY
ADDITIONAL DUE DILIGENCE MONITORING		
North Pond, South Pond	pH, Conductivity, Alkalinity, Bicarbonate, Chloride, Calcium, Magnesium, Potassium, Sodium, Sulphate, Nitrate, Nitrite, Phosphorus, and dissolved Metals	Semi-Annual (spring and fall)
DW1, DW2, DW3, DW4, DW5	Water Levels	Continuous data logger
DW1, DW2, DW3, DW4, DW5	pH, Conductivity, Alkalinity, Bicarbonate, Chloride, Calcium, Magnesium, Potassium, Sodium, Sulphate, Nitrate, Nitrite, Phosphorus, and dissolved Metals	Semi-Annual (spring and fall)

Note:

1. OW2A, OW2B, OW2C, OW8B, OW11A, OW11B, OW15B, OW17A and OW17B have been destroyed.
2. OW7B, OW13B, OW14B, OW16B, OW18B, OW19B, OW20B, OW21C, OW22C, and OW23C are now referred to as OW7C, OW13C, OW14C, OW16C, OW18C, OW19C, OW20C, OW21C, OW22C, and OW23C, respectively.
3. Monitoring of OW3A, OW10A, OW19A, and OW20A were discontinued as the monitors were consistently dry through the summer months.
4. Monitoring of OW4C was discontinued in 2016.
5. Monitoring of OW21A was discontinued because the monitor was plugged.
6. Monitoring of OW22A and OW23A were discontinued as the deep and shallow groundwater levels were very similar. It is suspected the well seal between the deep and shallow is not sufficient.

All three of the pits have an extensive history of groundwater monitoring, which have been a part of the development of the site's integrated monitoring plan. The PTTW requires water levels to be monitored at 23 groundwater monitoring wells and two surface water locations, and the integrated monitoring plan requires water levels to be monitored at 31 groundwater monitoring wells and two surface water locations. The integrated monitoring plan also requires groundwater quality to be monitored semi-annually at 27 locations and annually at 13 locations. In addition to both the PTTW and integrated monitoring plan, water levels and semi-annual water quality is monitored in five off-Site domestic water wells and an additional two surface water locations.

Monitors labelled with an "A" as the suffix are screened at the base of the sand and gravel unit (water table aquifer). Monitors labelled with a "B" as the suffix are screened at the base of the Tavistock Till (just above the bedrock contact). Monitors labelled with a "C" as the suffix are constructed within the bedrock aquifer. Borehole records are provided in Appendix C.

The groundwater monitoring program focuses on the on-going monitoring of background conditions (upgradient locations) in both the overburden and bedrock aquifers as well as the monitoring of potential influences from the aggregate operation on down-gradient locations.

3 2024 Compliance Monitoring Results

3.1 WATER TAKING

In 2024, water was taken on 140 days between April 11 and Nov 19, 2024. The maximum reported daily taking was 2,392,380.25 L. The reported water takings for 2024 remain within the permitted volumes in accordance with PTTW 3210-AKRL9C. The 2024 daily water takings are summarized in Table 2.

3.2 GROUNDWATER MONITORING

Groundwater levels from the on-site and off-site monitoring wells were collected over the 2024 monitoring period, and the highest and lowest groundwater levels observed are summarized in Table 3. The monitoring wells are equipped with continuously recording dataloggers to allow for a detailed analysis of the groundwater conditions at the site. This is to allow for the assessment of the seasonal trends as well as the response to local precipitation events. The data logger values have been calibrated with manual measurements and the 2024 hydrographs are provided in Appendix D.

3.2.1 Overburden Groundwater Elevations (Series A)

The groundwater elevations in the vicinity of the Strada properties are strongly influenced by the bedrock topography and the buried bedrock valley system reported in the southeast portion of the study area. This feature has created a primarily downward gradient from the shallow overburden aquifer to the bedrock aquifer. As a result, the overburden is dry in the north and northwestern portion of Melancthon Pit #1 as well as beneath the Prince property. Permanent unsaturated conditions in the overburden are reported at OW3A, OW10A, OW14A, OW19A, and OW20A, where the first water-bearing zone is found beneath the bedrock contact (bedrock aquifer).

Generally, the groundwater level trends within the overburden aquifer (Series A) are seasonal, with water levels peaking in the spring and decreasing over the warmer and drier summer months. A summary graph with all Series A water levels is provided in Figure 3. The groundwater elevations on-site within the overburden aquifer ranged across the site from 499.00 to 485.11 metres above sea level (m asl), with the highest groundwater levels noted between April and May, due to the spring melt. In general, the groundwater levels observed on-site in 2024 are consistent with groundwater levels and trends historically observed on-site.

Groundwater contour maps have been prepared for the shallow aquifers, based on the April and December (spring and fall) site visits. The general groundwater flow direction appears to be towards the east central portion of the site and the southeastern corner of the site, respectively, as shown on Figures 4 and 5.

3.2.2 Bedrock/Till Contact Groundwater Elevations (Series B and C)

Like the overburden water levels, the water levels in the Till contact unit and weathered bedrock aquifer (bedrock contact) show muted seasonal trends where water level highs are reached during the spring, followed by a slight decrease during the summer, fall, and winter months. Water levels in the bedrock aquifer are less influenced by seasonal trends and remain relatively stable over the monitoring period.

The groundwater elevations on-site at the Till contact (Series B) ranged across the site from 498.11 to 487.73 m asl, and the groundwater elevations on-site within the bedrock aquifer (Series C) ranged across the site from 498.50 to 477.86 m asl, with the highest groundwater levels noted between April and May due to the spring melt. A summary graph with all Series B and C water levels are provided on Figures 6 and 7 respectively.

Groundwater contour maps have been prepared for the bedrock aquifer based on the March and September (spring and fall) site visits. The general groundwater flow direction appears to be towards the east as shown on Figures 8 and 9.

Table 2: 2024 Water Takings

DATE	TOTAL DAILY TAKING (L)	DATE	TOTAL DAILY TAKING (L)	DATE	TOTAL DAILY TAKING (L)	DATE	TOTAL DAILY TAKING (L)
4/11/2024	2,087,654.60	5/2/2024	1,586,087.54	5/23/2024	605,665.89	6/12/2024	1,071,271.53
4/16/2024	2,087,654.60	5/3/2024	991,777.89	5/24/2024	1,926,774.60	6/13/2024	1,302,181.65
4/17/2024	1,143,194.36	5/6/2024	416,395.30	5/27/2024	1,472,525.18	6/14/2024	1,483,881.42
4/18/2024	1,775,358.13	5/7/2024	1,086,413.18	5/29/2024	1,756,431.07	6/18/2024	1,432,778.36
4/19/2024	916,069.65	5/8/2024	1,256,756.71	5/30/2024	1,525,520.95	6/19/2024	1,432,778.36
4/22/2024	1,256,756.71	5/9/2024	938,782.12	5/31/2024	976,636.24	6/20/2024	1,215,117.18
4/23/2024	878,215.53	5/11/2024	859,288.47	6/3/2024	1,968,414.13	6/21/2024	1,230,258.83
4/24/2024	1,252,971.30	5/13/2024	1,457,383.54	6/4/2024	1,828,353.89	6/22/2024	878,215.53
4/25/2024	738,155.30	5/14/2024	1,449,812.71	6/5/2024	1,646,654.13	6/24/2024	1,968,414.13
4/26/2024	878,215.53	5/15/2024	1,442,241.89	6/6/2024	1,881,349.66	6/25/2024	1,858,637.19
4/27/2024	897,142.59	5/16/2024	1,090,198.59	6/7/2024	927,425.89	26-Jun-24	1,972,199.54
4/30/2024	2,055,478.60	5/17/2024	772,224.00	6/10/2024	1,748,860.24	6/27/2024	2,021,409.89
5/1/2024	1,332,464.95	5/21/2024	1,358,962.83	6/11/2024	1,896,491.30	6/28/2024	916,069.65

DATE	TOTAL DAILY TAKING (L)	DATE	TOTAL DAILY TAKING (L)	DATE	TOTAL DAILY TAKING (L)	DATE	TOTAL DAILY TAKING (L)
7/2/2024	1,938,130.83	7/22/2024	2,165,255.54	8/9/2024	711,657.42	8/29/2024	1,972,199.54
7/3/2024	2,006,268.25	7/23/2024	2,165,255.54	8/12/2024	2,364,368.19	9/4/2024	2,389,856.64
7/4/2024	2,206,895.07	7/24/2024	2,085,761.89	8/13/2024	2,364,368.19	9/5/2024	2,389,856.64
7/5/2024	1,453,598.13	7/25/2024	2,365,882.37	8/14/2024	2,364,368.19	9/6/2024	2,389,856.64
7/8/2024	2,152,385.14	7/26/2024	1,245,400.48	8/15/2024	2,364,368.19	9/9/2024	2,377,995.68
7/9/2024	2,152,385.14	7/27/2024	1,245,400.48	8/16/2024	2,364,368.19	9/10/2024	2,377,995.68
7/10/2024	2,152,385.14	7/28/2024	1,907,847.54	8/19/2024	2,272,004.15	9/11/2024	2,377,995.68
7/11/2024	2,152,385.14	7/29/2024	1,907,847.54	8/20/2024	2,272,004.15	9/12/2024	2,377,995.68
7/12/2024	2,152,385.14	7/31/2024	1,279,469.18	8/21/2024	2,272,004.15	9/13/2024	2,377,995.68
7/15/2024	1,201,868.24	8/1/2024	859,288.47	8/22/2024	2,272,004.15	9/16/2024	1,377,889.89
7/16/2024	1,587,980.24	8/2/2024	1,347,606.60	8/23/2024	2,272,004.15	9/17/2024	1,377,889.89
7/17/2024	1,877,564.24	8/6/2024	2,392,380.25	8/26/2024	2,320,457.42	9/20/2024	912,284.24
7/18/2024	1,389,246.13	8/7/2024	1,741,289.42	8/27/2024	2,127,401.42	9/24/2024	1,071,271.53
7/19/2024	1,389,246.13	8/8/2024	2,381,024.01	8/28/2024	1,972,199.54	9/25/2024	919,855.06

DATE	TOTAL DAILY TAKING (L)	DATE	TOTAL DAILY TAKING (L)	DATE	TOTAL DAILY TAKING (L)	DATE	TOTAL DAILY TAKING (L)
9/26/2024	1,400,602.36	10/29/2024	1,381,675.30				
9/27/2024	946,352.95	10/30/2024	1,510,379.30				
10/1/2024	1,135,623.54	10/31/2024	643,520.00				
10/2/2024	1,287,040.01	11/1/2024	647,305.42				
10/15/2024	1,506,593.89	11/2/2024	764,653.18				
10/16/2024	1,245,400.48	11/4/2024	1,343,821.18				
10/17/2024	757,082.36	11/5/2024	1,480,096.01			-	-
10/18/2024	1,146,979.77	11/6/2024	1,559,589.66			-	-
10/21/2024	965,280.00	11/7/2024	1,461,168.95				
10/22/2024	1,298,396.24	11/8/2024	972,850.83				
10/23/2024	1,052,344.48	11/9/2024	1,143,194.36				
10/24/2024	806,292.71	11/11/2024	1,404,387.77				
10/25/2024	401,253.65						
10/26/2024	601,880.47						

Table 3: Manual Groundwater Elevations

WELL IDENTIFICATION	LOCATION (UTM NAD83)	GROUND ELEVATION (m asl)	WELL DEPTH (m bgs)	GROUNDWATER LEVEL ELEVATION (m asl)	
				HIGH	LOW
OW3-B	17T 561273E, 4886844N	504.47	12.80	493.94	491.10
OW4-A	17T 561355E, 4886425N	505.52	7.92	498.47	497.88
OW4-B	17T 561355E, 4886425N	505.52	13.72	498.16	497.48
OW5-A	17T 561738E, 4886523N	493.51	5.70	490.42	488.93
OW5-B	17T 561738E, 4886523N	493.51	10.05	492.55	489.44
OW5-C	17T 561738E, 4886520N	493.61	13.10	492.49	489.25
OW6-A	17T 561663E, 4886939N	494.13	7.80	493.28	490.87
OW7-A	17T 561771E, 4886674N	497.18	10.05	491.33	490.21
OW7-C	17T 561773E, 4886668N	496.98	30.60	492.25	489.14
OW8-A	17T 561282E, 4887057N	504.93	12.00	497.22	497.08
OW9-A	17T 561798E, 4887451N	496.51	6.40	493.51	491.39
OW10-A	17T 561632E, 4887297N	495.45	3.0	Dry	
OW10-B	17T 561632E, 4887297N	495.45	19.20	490.48	487.73
OW12-A	17T 561882E, 4887192N	495.70	7.62	493.58	492.61
OW13-A	17T 561140E, 4887598N	506.78	14.34	499.04	492.33

WELL IDENTIFICATION	LOCATION (UTM NAD83)	GROUND ELEVATION (m asl)	WELL DEPTH (m bgs)	GROUNDWATER LEVEL ELEVATION (m asl)	
				HIGH	LOW
OW13-C	17T 561140E, 4887598N	506.78	18.94	496.31	491.96
OW14-C	17T 561763E, 4887841N	496.82	20.00	483.41	480.34
OW16-C	17T 561726E, 4887993N	497.11	27.30	481.67	477.86
OW18-A	17T 561653E, 4887685N	501.21	19.80	488.90	487.66
OW18-C	17T 561653E, 4887685N	501.21	23.70	487.11	485.11
OW19-C	17T 561036E, 4888192N	510.32	35.50	484.23	482.47
OW20-C	17T 561544E, 4888333N	509.30	26.40	485.83	485.15
OW21-C	17T 561593E, 4888680N	511.41	25.30	487.67	487.17
OW22-C	17T 561384E, 4888890N	513.66	27.50	498.50	497.29
OW23-C	17T 560938E, 4888787N	510.31	29.50	497.96	496.62
DW1	17T 562951E, 4886286N	479.67	11.60	479.17	496.70
DW2	17T 562704E, 4888248N	482.36	44.80	473.81	472.43
DW3	17T 562373E, 4887677N	493.92	-	475.20	473.20
DW4	17T 562197E, 4890008N	486.02	24.40	483.33	480.50
DW5	17T 559538E, 4889095N	517.26	-	512.24	508.50

3.2.3 Groundwater Quality

To monitor groundwater conditions, representative groundwater samples were collected for the spring event on April 24 and April 25, 2024, and the fall event on September 10 to 12, 2024. A summary of the sampled locations and parameters tested are summarized in Table 4.

Table 4: Groundwater Sampling Locations and Parameters

SAMPLING EVENT	SAMPLING TYPE	LOCATIONS SAMPLED	PARAMETERS TESTED
		On-Site Monitoring Wells	
April 24 and 25, 2024	Semi-Annual	OW3B, OW4A, OW4B, OW5A, OW5B, OW6A, OW7A, OW7C, OW8A, OW9A, OW10B, OW12A, OW13A, OW13C, OW14C, OW16C, OW18A, OW18C, OW19C, OW20C, OW21C, OW22C, OW23C	pH, Conductivity, Alkalinity, Bicarbonate, Chloride, Calcium, Magnesium, Potassium, Sodium, Sulphate, Nitrate, Nitrite, Phosphorus, and dissolved Metals
September 5, 10, 11, 2024	Semi-Annual	OW3B, OW4A, OW4B, OW5A, OW5B, OW6A, OW7A, OW7C, OW8A, OW9A, OW10B, OW12A, OW13A, OW13C, OW14C, OW16C, OW18A, OW18C, OW19C, OW20C, OW21C, OW22C, OW23C	pH, Conductivity, Alkalinity, Bicarbonate, Chloride, Calcium, Magnesium, Potassium, Sodium, Sulphate, Nitrate, Nitrite, Phosphorus, and dissolved Metals
	Annual	OW5A, OW6A, OW7A, OW8A, OW9A, OW10B, OW12A, OW14C, OW16C, OW18A OW20C, OW21C	Oil and Grease, PHC (F1-F4), BTEX
		Domestic Water Wells	
September 10, 2024	Domestic	DW1, DW2, DW3, DW4, DW5	pH, Conductivity, Alkalinity, Bicarbonate, Chloride, Calcium, Magnesium, Potassium, Sodium, Sulphate, Nitrate, Nitrite, Phosphorus, and dissolved Metals

Each sample was collected using dedicated waterra tubing and was placed directly into pre-cleaned laboratory supplied vials and bottles with analytical test group specific preservatives.

Dedicated nitrile gloves were used during sampling and non-dedicated equipment was sanitized between monitoring wells.

Samples were analyzed by Caduceon Environmental Laboratories (Caduceon), a CALA accredited lab, in Barrie. Groundwater chemistry results are included in the laboratory Certificates of Analysis provided in Appendix E.

The results were compared to the applicable Ontario Drinking Water Standards (ODWS) for due diligence purposes. Groundwater on-site generally met the applicable ODWS with the exception of:

- Hardness in the majority of the on-site monitors, which is typical for till and bedrock aquifers in southern Ontario.
- Nitrate in OW4A, 4B, 5A, 6A, and 8A, which are assumed to be a result of the neighboring agricultural activities.
- Nitrite in OW4A, 4B and 5A, which is assumed to be a result of the neighbouring agricultural activities.
- Aluminum in OW12A, 14C, and 18C, which is an ODWS Operational Guideline rather than an environmental or health related limit.
- Sodium in OW5A and 5B, which is assumed to be a result of the de-icing substances applied to County Road 17 located immediately to the south of these monitors.
- Manganese in OW5A, 7C, and 12A, which is an ODWS Aesthetic Objective rather than an environmental or health related limit.
- Iron in OW12A, which is typical for a bedrock aquifer in southern Ontario.
- Fluoride in OW5A, which are assumed to be a result of the neighboring agricultural activities.

The results from 2024 are comparable to the historical ranges in concentrations reported at the monitoring wells. Further, no PHCs were noted in any of the tested wells.

The domestic water wells were also sampled and the individual homeowner letters for both the spring and fall sampling events are provided in Appendix F. The groundwater was generally in compliance with the applicable Ontario Drinking Water Standards (ODWS) with the exception of hardness, which is considered typical for bedrock water wells in southern Ontario.

3.3 SURFACE WATER

Surface water levels at the four on-site monitoring locations were collected over the 2024 monitoring period, and the highest and lowest surface levels observed are summarized in Table 4.

The surface water locations are equipped with continuously recording dataloggers to allow for a detailed analysis of the water conditions at the site. This is to allow for the assessment of the seasonal trends as well as the response to local precipitation events. The data logger values have been calibrated with manual measurements and the 2024 hydrographs are provided in Appendix D.

Table 5: Surface Water Elevations

LOCATION	COORDINATES	WATER LEVEL DEPTH (m)	
		High	Low
North Pond	17T 561630E, 4887268N	493.45	491.51 (Dry)
South Pond	17T 561778E, 4887155N	492.50	491.30
SW1 (Wetland)	17T 561767E, 4887622N	100.43[1]	99.76[1]
SW2 (Vernal Pool)	17T 561734E, 4887538N	100.74[1]	99.83[1]

Note:

1. For SW1 and SW2 a relative elevation of 100 m asl was assumed in order to assess seasonal changes in the surface water levels.

3.3.1 North and South Ponds

The North Pond and South Pond were measured using a datalogger tied to a string and a tree. The logger was thrown into the middle of the pond, and not removed throughout the year to try and keep results consistent.

Generally, the surface water level trends within the North and South Ponds are seasonal, with water levels peaking in the spring and decreasing over the warmer and drier summer months. The surface water elevations at the North and South Ponds ranged from 493.45 to 491.30 m asl, with the highest surface water levels noted between April and May, due to the spring melt. The North Pond dried out in October, and dataloggers were removed in the late fall to limit damage to the devices. Hydrographs for the North and South Ponds are provided in Appendix D. Based on historical groundwater level monitoring it is assumed both the North and South Ponds are perched above the overburden aquifer.

In general, the surface water levels observed on-site in 2024 are consistent with surface water levels and trends historically observed on-site.

3.3.2 SW1 and SW2

SW1 and SW2 are located within the forested area approximately 100 m from the proposed extraction boundary for the Bonnefield Pit. Both features are perched above the water table and therefore isolated from the groundwater regime.

SW1 and SW2 were constructed by driving a steel, screened well point approximately 1 m into the ground. A steel pipe was attached to the top of this drive point so it could be easily located. These monitors are subject to freeze/thaw cycles and ice movement since they stay in all year round. As such, the data from year to year may vary slightly.

Generally, the surface water level trends at SW1 and SW2 are seasonal, with water levels peaking in the spring and decreasing over the warmer and drier summer months. The surface water elevations at SW1 and SW2 ranged from an elevation of 100.74 to 99.83 m, with the highest surface water levels noted between April and May, due to the spring melt. SW1 experienced high water levels from January to March, with sharp peaks and short duration. This is likely caused by rainfall or rapid snowmelt. SW1 and SW2 both dried out in the fall of 2024. Dataloggers were removed in the late fall to limit damage to the devices. Hydrographs for the North and South Ponds are provided in Appendix D.

In general, the surface water levels observed on-site in 2024 are consistent with surface water levels and trends historically observed on-site.

3.3.3 Surface Water Chemistry

To monitor surface conditions, representative surface water samples were collected from the North and South Pond on April 24 and September 10, 2024, and submitted for chemical analysis of pH, Conductivity, Alkalinity, Bicarbonate, Chloride, Calcium, Magnesium, Potassium, Sodium, Sulphate, Nitrate, Nitrite, Phosphorus, and dissolved Metals.

The samples were collected and placed directly into pre-cleaned laboratory supplied vials and bottles with analytical test group specific preservatives. Dedicated nitrile gloves were used during sampling.

Samples were analyzed by Caduceon, a CALA accredited lab, in Barrie. Surface water chemistry results are included in the laboratory Certificates of Analysis provided in Appendix E.

The results were compared to the applicable Provincial Water Quality Objectives (PWQO) for due diligence purposes. Surface water on-site generally met the applicable PWQO with the exception of phosphorous during the spring sampling round at both the North and South Pond. The 2024 water quality results are similar to previous years.

4 Conclusions

The compliance monitoring in support of the Bonnefield/Prince properties, Melancthon Pit #1 and Melancthon Pit #2 in 2024 was completed in accordance with the integrated monitoring plan developed for the aggregate operation and PTTW No. 3210-AKRL9C. The monitoring included surface and groundwater level monitoring and quality sampling at 25 groundwater monitoring wells, 4 surface water locations, and 5 domestic wells in 2024.

In addition, the daily water takings were monitored and recorded for submission to the MECP via the Ministry's Water Taking Reporting System.

The results of the 2024 monitoring program are summarized as follows:

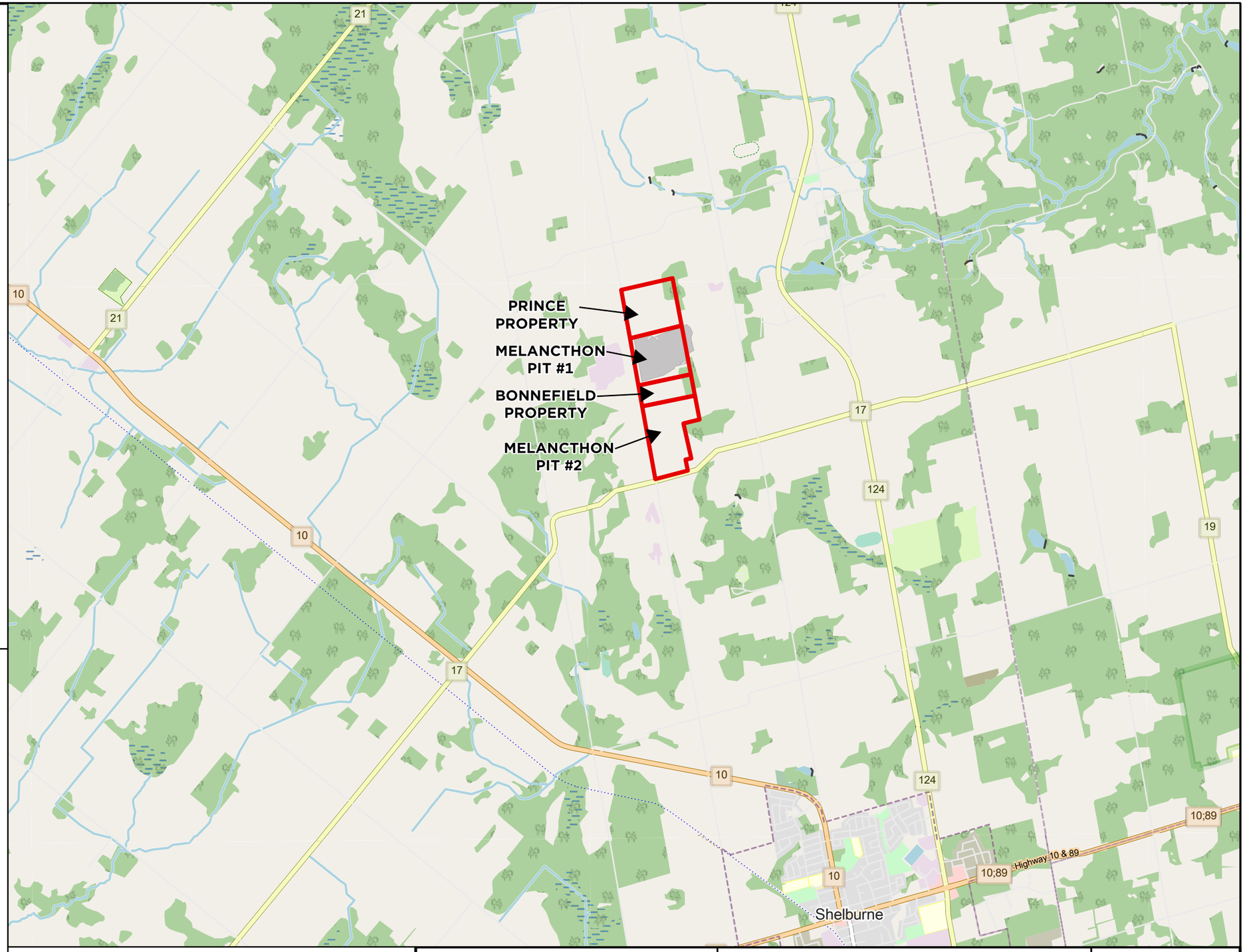
- The maximum recorded water taking was 2,392,380.25 L in 2024 and the water takings remained in compliance with the conditions of PTTW No. 3210-AKRL9C;
- The overburden groundwater elevations are seasonal, peaking in the spring and decreasing over the summer months, and the 2024 monitoring results are consistent with historic trends;
- The bedrock/till groundwater elevations show muted seasonal trends, with highs in the spring followed by slight declines through the summer, and the 2024 monitoring results are consistent with historic trends;
- The groundwater quality on-site generally met the applicable ODWQS with a few noted exceptions, however, the 2024 results are comparable to the historic trends and no PHCs were noted in any of the tested wells;
- The water levels in the north and south ponds varied seasonally over the year, with highs in the spring and drying out in the summer or fall, and the 2024 monitoring results are consistent with historic trends;
- The water levels at SW1 and SW2 varied seasonally in 2024, with highs in the spring and drying out in the fall. SW1 experienced sharp peaks in water level from January to March, likely caused by precipitation or rapid snowmelt. The 2024 monitoring results are consistent with the historic trends; and
- The surface water quality on-site generally met the applicable PWQO, with the exception of phosphorous in the north and south pond during the spring sampling round, but the results are consistent with trends.

N

NOTES:
1. COORDINATE SYSTEM: NAD 1983 UTM ZONE 17N
2.CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENSE – ONTARIO.

LEGEND

SITE



0 0.75 1.5 3 KILOMETERS

TATHAM ENGINEERING

STRADA PIT, SHELBURNE
ANNUAL COMPLIANCE REPORT
SITE LOCATION PLAN

DWG. No. **FIG-1**

SCALE: 1:50,000 | DRAWN: AO | DATE: MAR. 2025 | JOB NO. 123016

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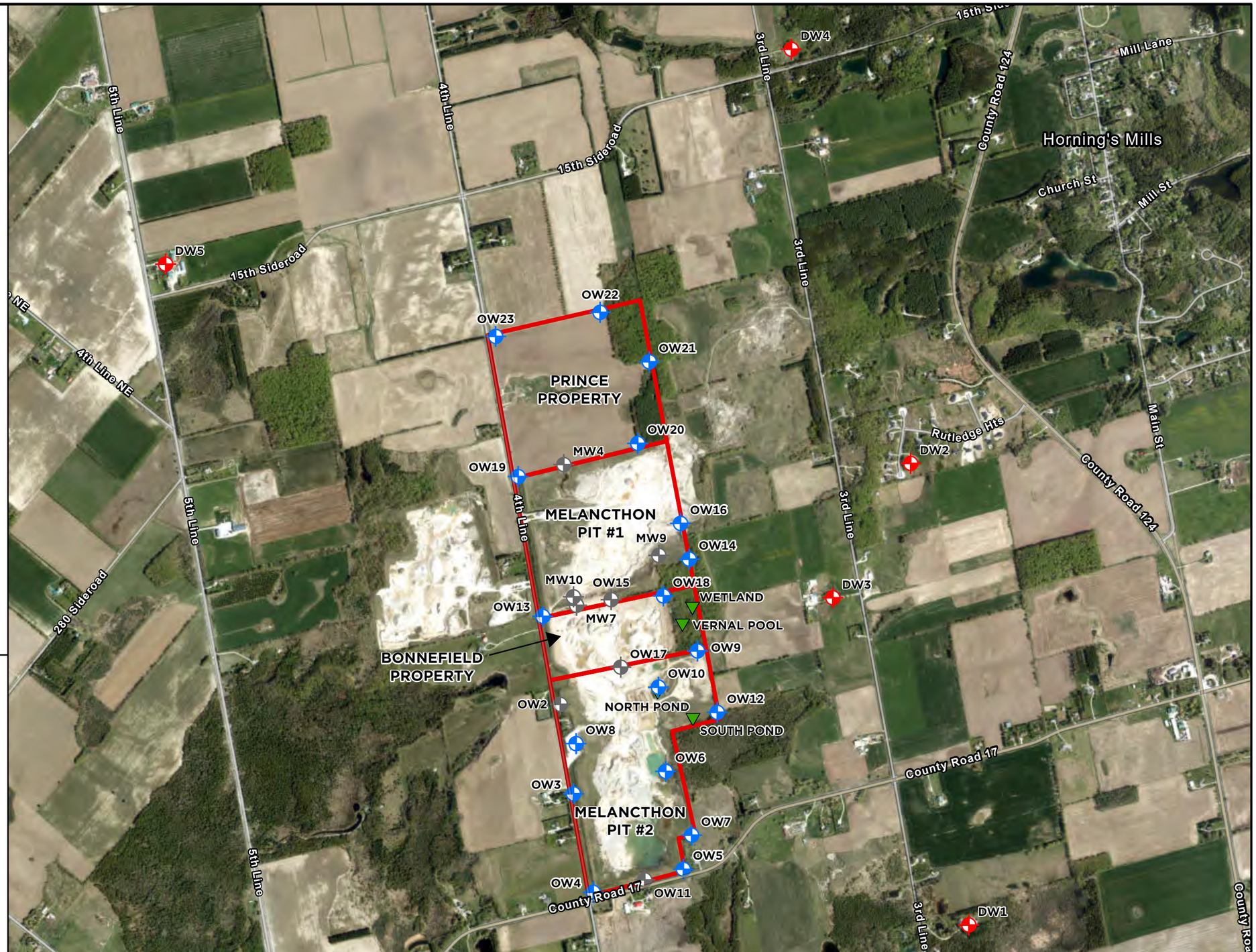
N

NOTES:
1. COORDINATE SYSTEM: NAD 1983 UTM ZONE 17N
2.CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENSE – ONTARIO.

LEGEND

- SITE
- MONITORING WELL LOCATIONS
- DOMESTIC WELLS
- DESTROYED WELLS
- SURFACE WATER LOCATIONS



0 350 700 1,400 METERS

TATHAM ENGINEERING

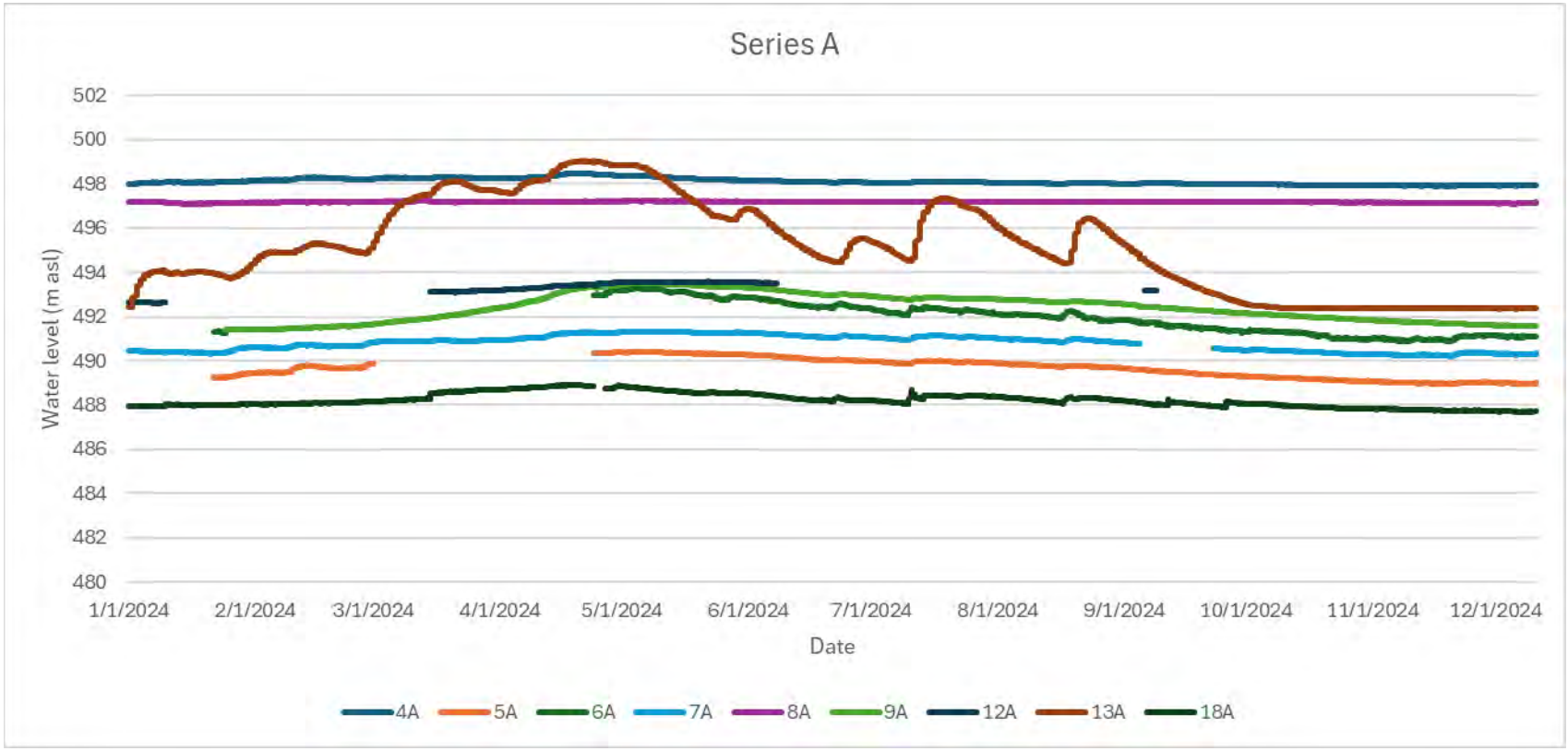
STRADA PIT, SHELBURNE
ANNUAL COMPLIANCE REPORT
GROUNDWATER AND SURFACE WATER MONITORING LOCATIONS

DWG. No. **FIG-2**

SCALE: 1:17,000 | DRAWN: AO | DATE: MAR. 2025 | JOB NO. 123016

I:\2023 Projects\123016 - Strada - Shelburne\GIS\GIS Models\123016 - Strada - Shelburne\123016 - Strada - Shelburne.aprx

Figure 3: Series A 2024 groundwater levels

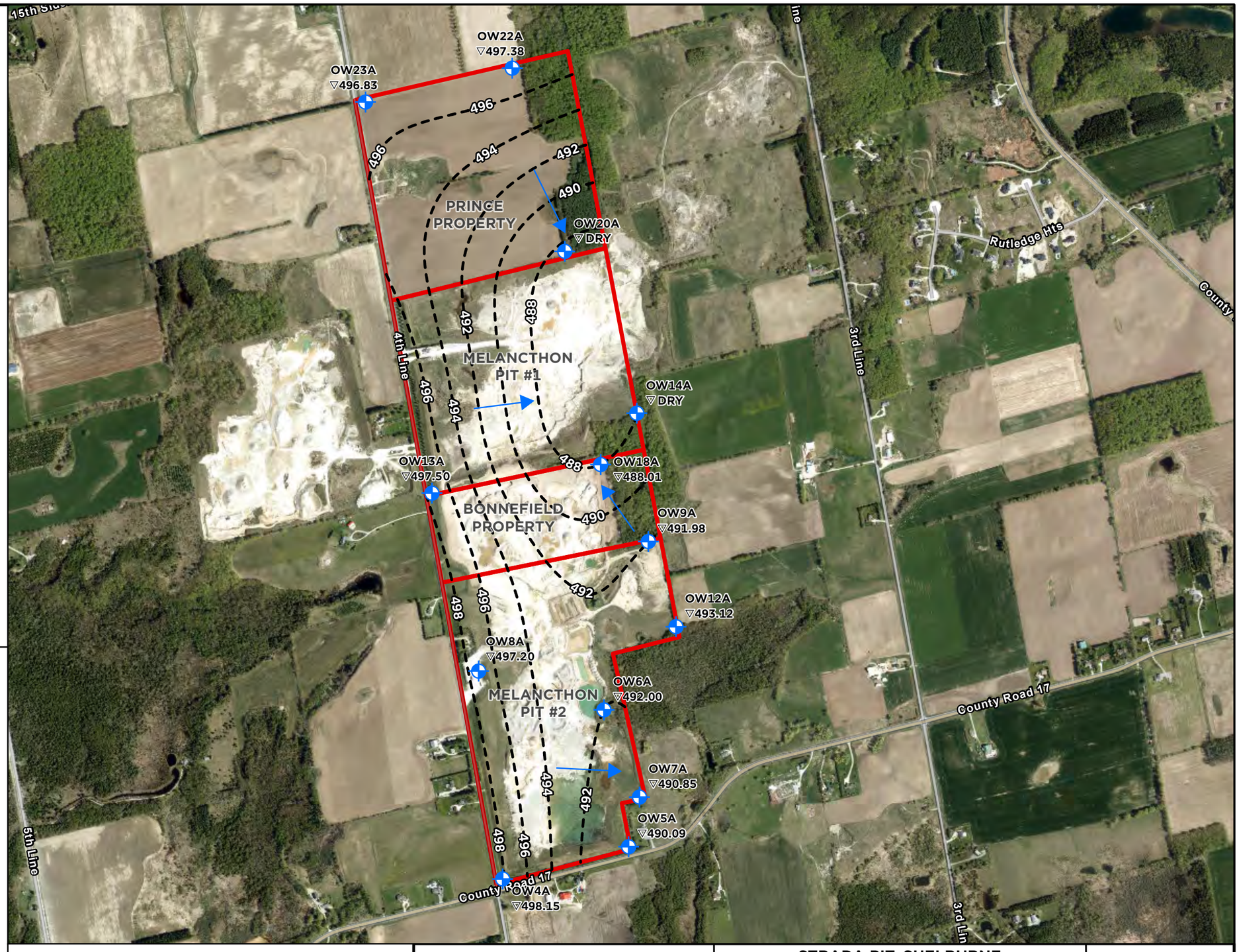


N

NOTES:
1. COORDINATE SYSTEM: NAD 1983 UTM ZONE 17N
2.CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENSE – ONTARIO.

LEGEND

- SITE
- MARCH MONITORING WELLS - SHALLOW
- GROUNDWATER CONTOUR
- GROUNDWATER FLOW DIRECTION
- GROUNDWATER ELEVATION (TAKEN MARCH 2024)



0 250 500 1,000 METERS

TATHAM ENGINEERING

STRADA PIT, SHELBURNE
ANNUAL COMPLIANCE REPORT
GROUNDWATER CONTOUR MARCH 2024
SHALLOW WELLS

DWG. No. **FIG-4**

SCALE: 1:12,000	DRAWN: AO	DATE: MAR. 2025	JOB NO. 123016

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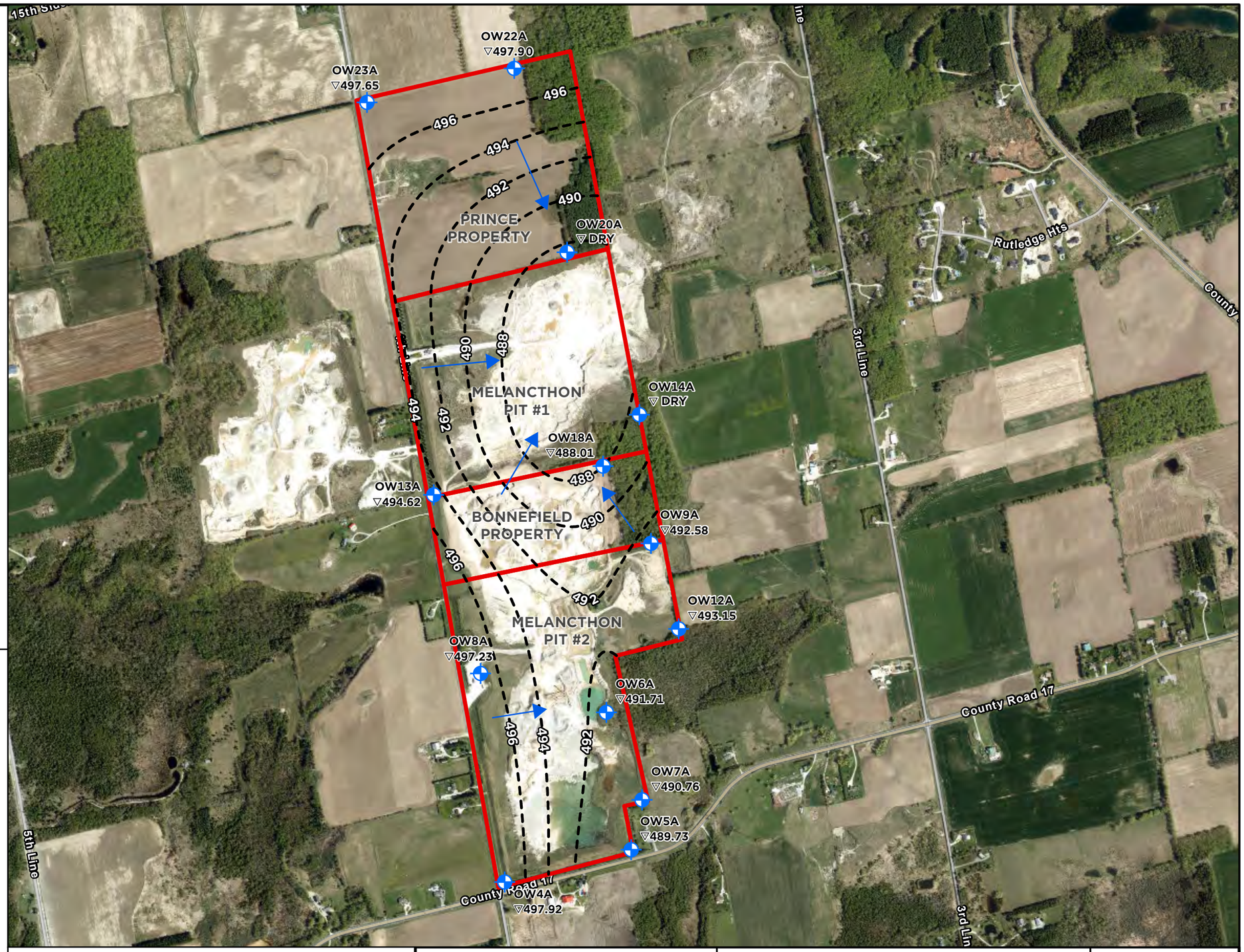
N

NOTES:
1. COORDINATE SYSTEM: NAD 1983 UTM ZONE 17N
2.CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENSE – ONTARIO.

LEGEND

- SITE
- SEPTEMBER MONITORING WELLS - SHALLOW
- GROUNDWATER CONTOUR
- GROUNDWATER FLOW DIRECTION
- GROUNDWATER ELEVATION (TAKEN SEPTEMBER 2024)



0 250 500 1,000 METERS

TATHAM ENGINEERING

STRADA PIT, SHELBURNE
ANNUAL COMPLIANCE REPORT
GROUNDWATER CONTOUR SEPTEMBER 2024
SHALLOW WELLS

DWG. No. **FIG-5**

SCALE: 1:12,000 | DRAWN: AO | DATE: MAR. 2025 | JOB NO. 123016

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Figure 6: Series B 2024 groundwater levels

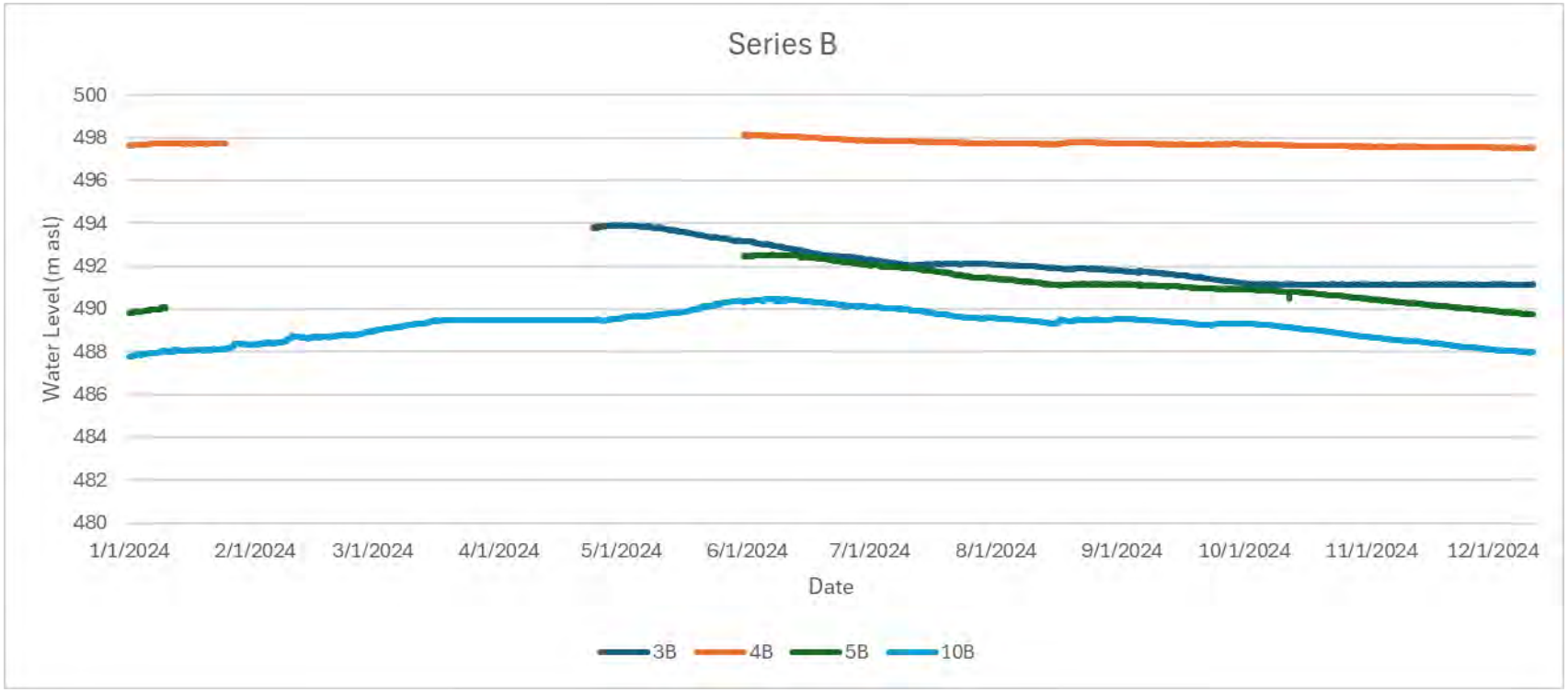
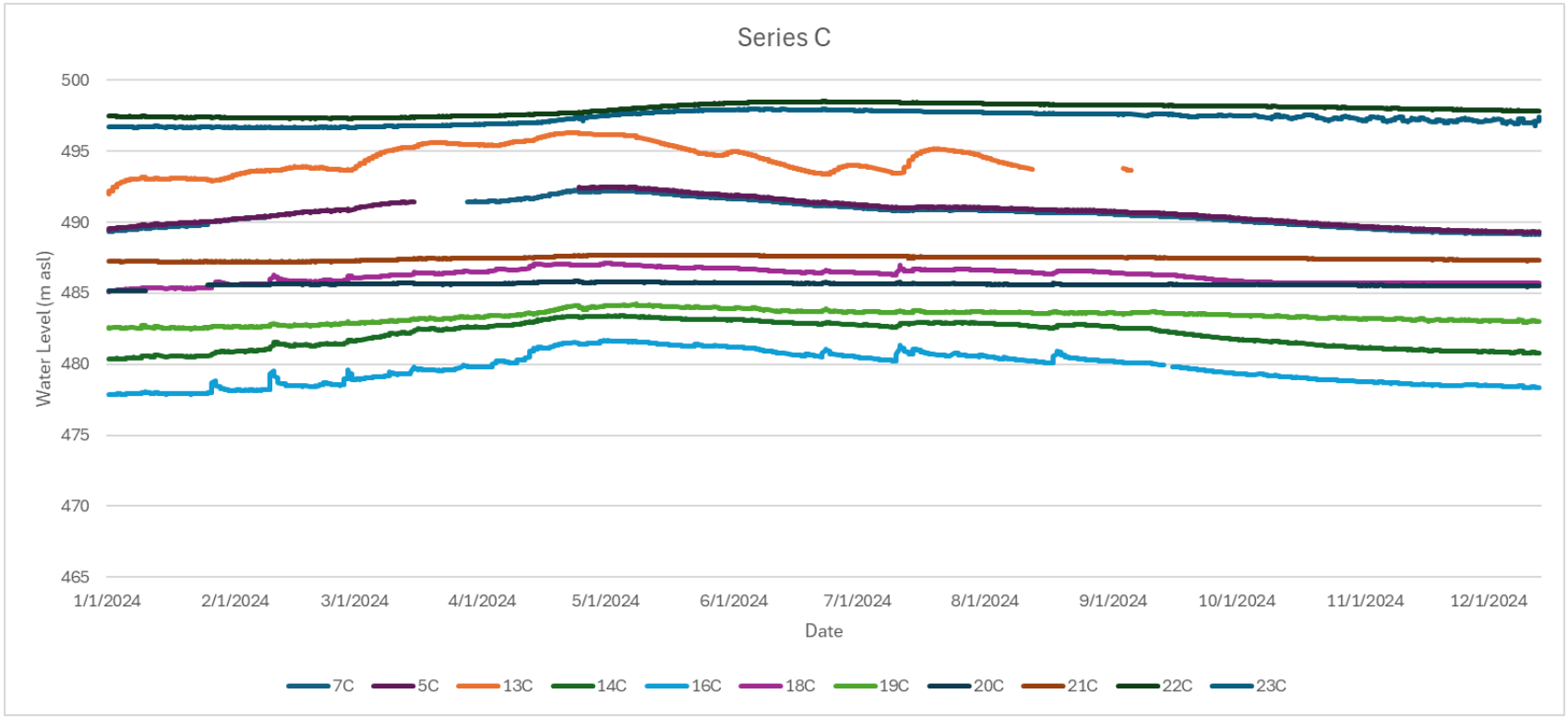


Figure 7: Series C 2024 groundwater levels

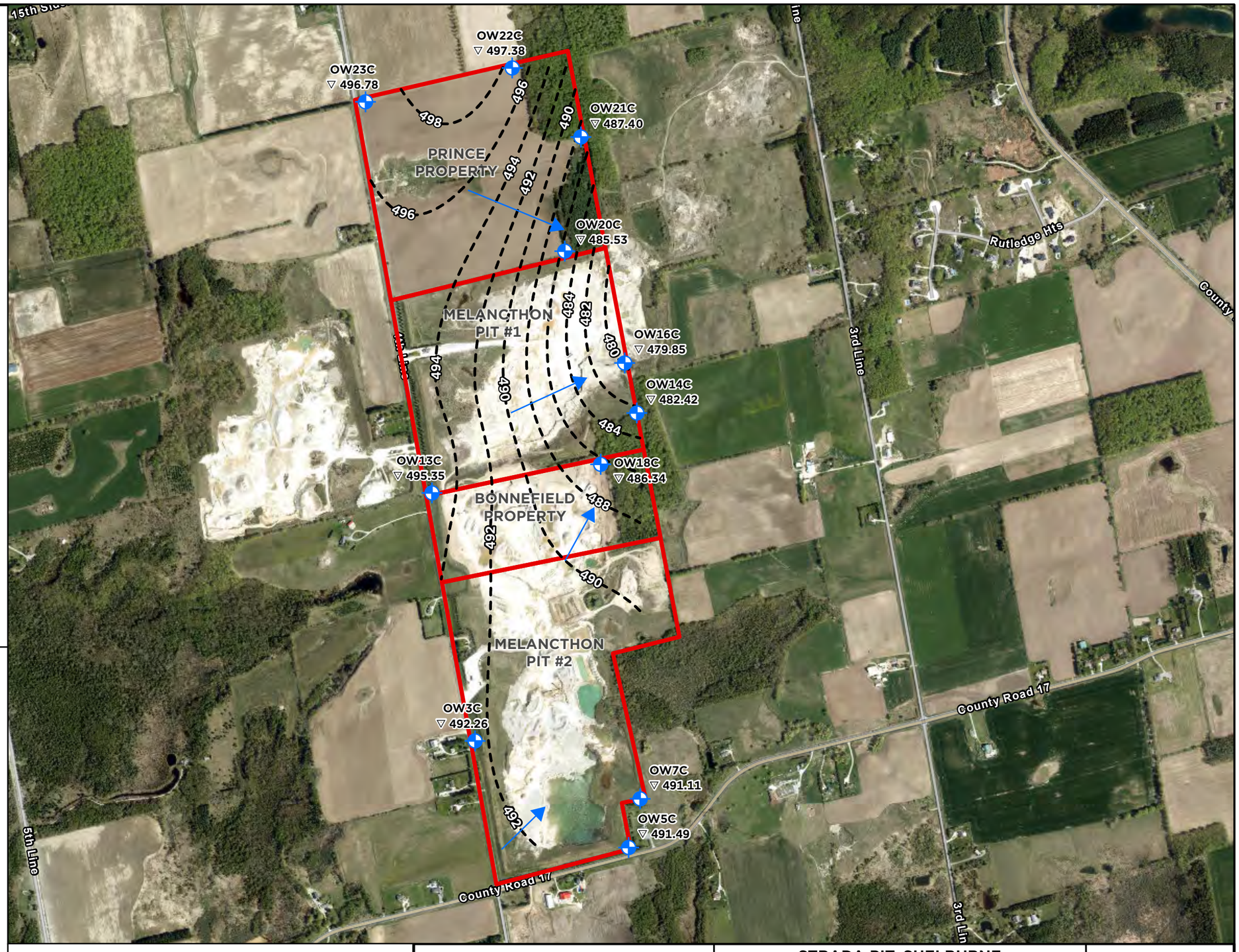


N

NOTES:
1. COORDINATE SYSTEM: NAD 1983 UTM ZONE 17N
2.CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENSE – ONTARIO.

LEGEND

- SITE
- MARCH MONITORING WELLS - DEEP
- GROUNDWATER CONTOUR
- GROUNDWATER FLOW DIRECTION
- GROUNDWATER ELEVATION (TAKEN MARCH 2024)



0 250 500 1,000 METERS

TATHAM ENGINEERING

STRADA PIT, SHELBURNE
ANNUAL COMPLIANCE REPORT
GROUNDWATER CONTOUR MARCH 2024
DEEP WELLS

DWG. No. **FIG-8**

SCALE: 1:12,000 | DRAWN: AO | DATE: MAR. 2025 | JOB NO. 123016

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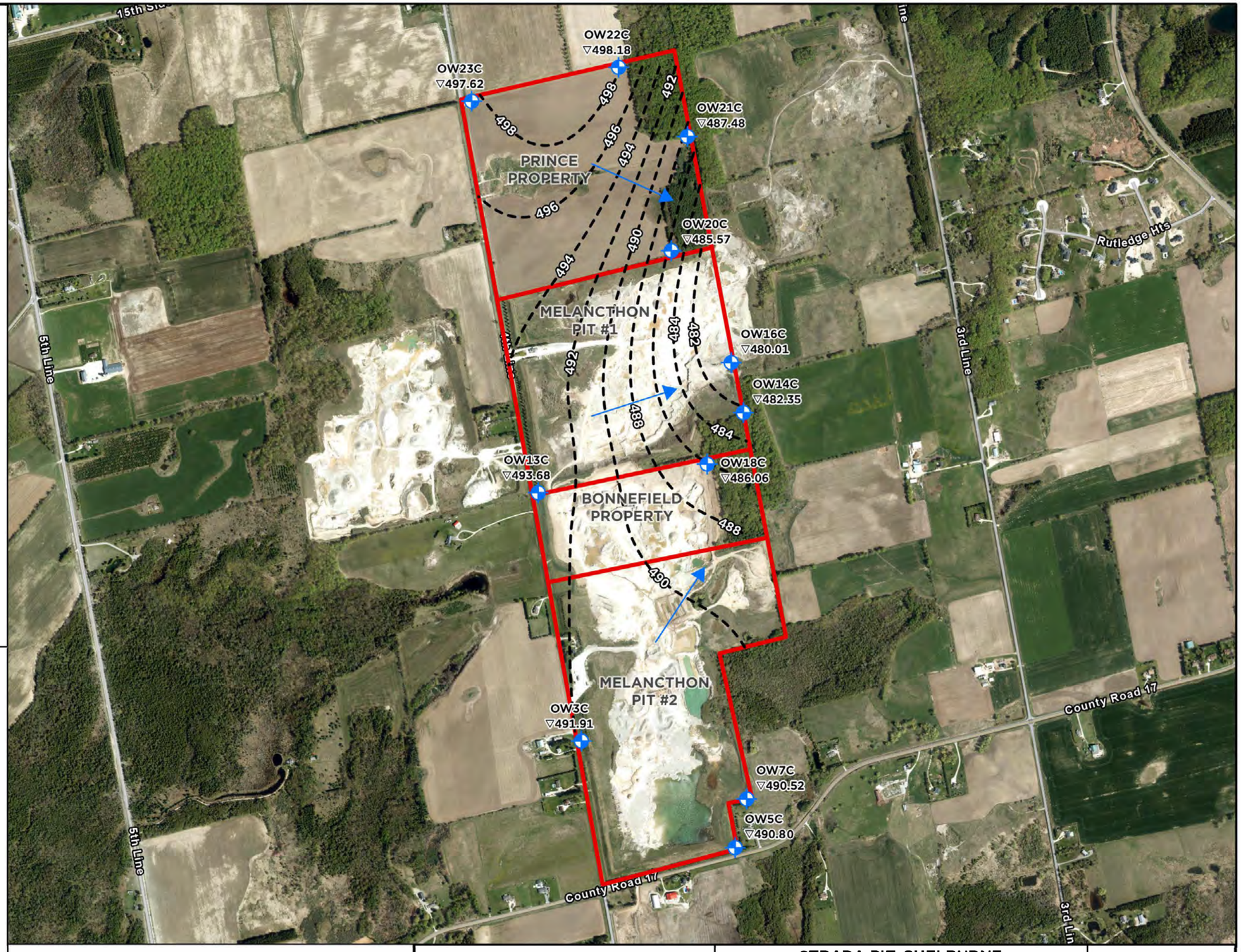
N

NOTES:
1. COORDINATE SYSTEM: NAD 1983 UTM ZONE 17N
2.CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENSE – ONTARIO.

LEGEND

- SITE
- SEPTEMBER MONITORING WELLS - DEEP
- GROUNDWATER CONTOUR
- GROUNDWATER FLOW DIRECTION
- GROUNDWATER ELEVATION (TAKEN SEPTEMBER 2024)



0 250 500 1,000 METERS

TATHAM ENGINEERING

STRADA PIT, SHELBURNE
ANNUAL COMPLIANCE REPORT
GROUNDWATER CONTOUR SEPTEMBER 2024
DEEP WELLS

DWG. No. **FIG-9**

SCALE: 1:12,000 | DRAWN: AO | DATE: MAR. 2025 | JOB NO. 123016

Appendix A: PTTW

PERMIT TO TAKE WATER
Ground Water
NUMBER 3210-AKRL9C

Pursuant to Section 34.1 of the Ontario Water Resources Act, R.S.O. 1990 this Permit To Take Water is hereby issued to:

Strada Aggregates Inc.
30 Floral Parkway
Vaughan, Ontario
L4K 4R1

For the water taking from: Shelburne South Pit - Wash Pond

Located at: Lot 11 and 12, Concession 3, Geographic Township of Melancthon
Melancthon, County of Dufferin

For the purposes of this Permit, and the terms and conditions specified below, the following definitions apply:

DEFINITIONS

(a) "Director" means any person appointed in writing as a Director pursuant to section 5 of the OWRA for the purposes of section 34.1, OWRA.

(b) "Provincial Officer" means any person designated in writing by the Minister as a Provincial Officer pursuant to section 5 of the OWRA.

(c) "Ministry" means Ontario Ministry of the Environment and Climate Change.

(d) "District Office" means the Guelph District Office.

(e) "Permit" means this Permit to Take Water No. 3210-AKRL9C including its Schedules, if any, issued in accordance with Section 34.1 of the OWRA.

(f) "Permit Holder" means Strada Aggregates Inc..

(g) "OWRA " means the *Ontario Water Resources Act*, R.S.O. 1990, c. O. 40, as amended.

You are hereby notified that this Permit is issued subject to the terms and conditions outlined below:

TERMS AND CONDITIONS

1. Compliance with Permit

1.1 Except where modified by this Permit, the water taking shall be in accordance with the application for this Permit To Take Water, dated September 18, 2016 and signed by Grant C. Horan, and all Schedules included in this Permit.

1.2 The Permit Holder shall ensure that any person authorized by the Permit Holder to take water under this Permit is provided with a copy of this Permit and shall take all reasonable measures to ensure that any such person complies with the conditions of this Permit.

1.3 Any person authorized by the Permit Holder to take water under this Permit shall comply with the conditions of this Permit.

1.4 This Permit is not transferable to another person.

1.5 This Permit provides the Permit Holder with permission to take water in accordance with the conditions of this Permit, up to the date of the expiry of this Permit. This Permit does not constitute a legal right, vested or otherwise, to a water allocation, and the issuance of this Permit does not guarantee that, upon its expiry, it will be renewed.

1.6 The Permit Holder shall keep this Permit available at all times at or near the site of the taking, and shall produce this Permit immediately for inspection by a Provincial Officer upon his or her request.

1.7 The Permit Holder shall report any changes of address to the Director within thirty days of any such change. The Permit Holder shall report any change of ownership of the property for which this Permit is issued within thirty days of any such change. A change in ownership in the property shall cause this Permit to be cancelled.

2. General Conditions and Interpretation

2.1 Inspections

The Permit Holder must forthwith, upon presentation of credentials, permit a Provincial Officer to carry out any and all inspections authorized by the OWRA, the *Environmental Protection Act* , R.S.O. 1990, the *Pesticides Act* , R.S.O. 1990, or the *Safe Drinking Water Act*, S. O. 2002.

2.2 Other Approvals

The issuance of, and compliance with this Permit, does not:

(a) relieve the Permit Holder or any other person from any obligation to comply with any other applicable legal requirements, including the provisions of the *Ontario Water Resources Act* , and the *Environmental Protection Act* , and any regulations made thereunder; or

(b) limit in any way any authority of the Ministry, a Director, or a Provincial Officer, including the authority to require certain steps be taken or to require the Permit Holder to furnish any further information related to this Permit.

2.3 Information

The receipt of any information by the Ministry, the failure of the Ministry to take any action or require any person to take any action in relation to the information, or the failure of a Provincial Officer to prosecute any person in relation to the information, shall not be construed as:

(a) an approval, waiver or justification by the Ministry of any act or omission of any person that contravenes this Permit or other legal requirement; or

(b) acceptance by the Ministry of the information's completeness or accuracy.

2.4 Rights of Action

The issuance of, and compliance with this Permit shall not be construed as precluding or limiting any legal claims or rights of action that any person, including the Crown in right of Ontario or any agency thereof, has or may have against the Permit Holder, its officers, employees, agents, and contractors.

2.5 Severability

The requirements of this Permit are severable. If any requirements of this Permit, or the application of any requirements of this Permit to any circumstance, is held invalid or unenforceable, the application of such requirements to other circumstances and the remainder of this Permit shall not be affected thereby.

2.6 Conflicts

Where there is a conflict between a provision of any submitted document referred to in this Permit, including its Schedules, and the conditions of this Permit, the conditions in this Permit shall take precedence.

3. Water Takings Authorized by This Permit

3.1 **Expiry**

This Permit expires on **March 31, 2027**. No water shall be taken under authority of this Permit after the expiry date.

3.2 Amounts of Taking Permitted

The Permit Holder shall only take water from the source, during the periods and at the rates and amounts of taking specified in Table A. Water takings are authorized only for the purposes specified in Table A.

Table A

	Source Name / Description:	Source: Type:	Taking Specific Purpose:	Taking Major Category:	Max. Taken per Minute (litres):	Max. Num. of Hrs Taken per Day:	Max. Taken per Day (litres):	Max. Num. of Days Taken per Year:	Zone/ Easting/ Northing:
1	Wash Pond	Pond Dugout	Aggregate Washing	Industrial	4,000	10	2,400,000	230	17 561589 4887164
						Total Taking:	2,400,000		

3.3 Water taking under the authorization of this Permit shall only occur to a maximum of 230 days between April 1 and November 16 of each year from date of issue to March 31, 2027.

3.4 This Permit is issued for the sole purpose of washing gravel in a closed loop system where the majority of the water is recirculated and does not include dust suppression.

3.5 Prior to taking of water under this Permit, the Permit Holder shall ensure that any and all applicable permits or authorizations are obtained from Federal and Provincial Agencies having legislative mandates in water resources management.

4. Monitoring

4.1 Under section 9 of O. Reg. 387/04, and as authorized by subsection 34(6) of the *Ontario Water Resources Act* , the Permit Holder shall, on each day water is taken under the authorization of this Permit, record the date, the volume of water taken on that date and the rate at which it was taken. The daily volume of water taken shall be measured by a flow meter or calculated in accordance with the method described in the application for this Permit, or as otherwise accepted by the Director. The Permit Holder shall keep all records required by this condition current and available at or near the site of the taking and shall produce the records immediately for inspection by a Provincial Officer upon his or her request. The Permit Holder, unless otherwise required by the Director, shall submit, on or before March 31st in every year, the records required by this condition to the ministry's Water Taking Reporting System.

4.2 The Permit Holder shall monitor water levels at the following monitoring points as described below:

Well No. /Pond Name	Water Level Elevations	
	Continuous Datalogger (4-hour intervals)	Monthly Manuals

Wash Pond (during unfrozen conditions)	X	X
OW2-A	X	X
OW2-B	X	X
OW2-C	X	X
OW3-A	X	X
OW3-B	X	X
OW4-A	X	X
OW4-B	X	X
OW4-C	X	X
OW5-A	X	X
OW5-B	X	X
OW5-C	X	X
OW6-A	X	X
OW7-A	X	X
OW7-C	X	X
OW8-A	X	X
OW8-B	X	X
OW9-A	X	X
OW10-A	X	X
OW10-B	X	X
OW11-A	X	X
OW11-C	X	X
OW12-A	X	X
OW13-A	X	X
North Pond	X	X
South Pond	X	X

4.3 The Permit Holder shall submit to the Director by March 31, 2019, a report with the monitoring data collected under Sections 4.1 and 4.2 of this Permit during the first two years of the aggregate washing operation, along with its interpretation; the report should include an assessment of the impact of the water taking, if any, on the surface water features (wetland) adjacent to the Wash Pond. The report should also include recommendations on modifications to the water taking and/or to the monitoring program as described in this Permit.

5. Impacts of the Water Taking

5.1 Notification

The Permit Holder shall immediately notify the local District Office of any complaint arising from the taking of water authorized under this Permit and shall report any action which has been taken or is proposed with regard to such complaint. The Permit Holder shall immediately notify the local District Office if the taking of water is observed to have any significant impact on the surrounding waters. After hours, calls shall be directed to the Ministry's Spills Action Centre at 1-800-268-6060.

5.2 For Groundwater Takings

If the taking of water is observed to cause any negative impact to other water supplies obtained from any adequate sources that were in use prior to initial issuance of a Permit for this water taking, the Permit Holder shall take such action necessary to make available to those affected, a supply of water equivalent in quantity and quality to their normal takings, or shall compensate such persons for their reasonable costs of so doing, or shall reduce the rate and amount of taking to prevent or alleviate the observed negative impact. Pending permanent restoration of the affected supplies, the Permit Holder shall provide, to those affected, temporary water supplies adequate to meet their normal requirements, or shall compensate such persons for their reasonable costs of doing so.

If permanent interference is caused by the water taking, the Permit Holder shall restore the water supplies of those permanently affected.

6. Director May Amend Permit

The Director may amend this Permit by letter requiring the Permit Holder to suspend or reduce the taking to an amount or threshold specified by the Director in the letter. The suspension or reduction in taking shall be effective immediately and may be revoked at any time upon notification by the Director. This condition does not affect your right to appeal the suspension or reduction in taking to the Environmental Review Tribunal under the *Ontario Water Resources Act* , Section 100 (4).

The reasons for the imposition of these terms and conditions are as follows:

1. Condition 1 is included to ensure that the conditions in this Permit are complied with and can be enforced.

2. Condition 2 is included to clarify the legal interpretation of aspects of this Permit.

3. Conditions 3 through 6 are included to protect the quality of the natural environment so as to safeguard the ecosystem and human health and foster efficient use and conservation of waters. These conditions allow for the beneficial use of waters while ensuring the fair sharing, conservation and sustainable use of the waters of Ontario. The conditions also specify the water takings that are authorized by this Permit and the scope of this Permit.

*In accordance with Section 100 of the Ontario Water Resources Act, R.S.O. 1990, you may by written notice served upon me, the Environmental Review Tribunal and the Environmental Commissioner, **Environmental Bill of Rights**, R.S.O. 1993, Chapter 28, within 15 days after receipt of this Notice, require a hearing by the Tribunal. The Environmental Commissioner will place notice of your appeal on the Environmental Registry. Section 101 of the Ontario Water Resources Act, as amended provides that the Notice requiring a hearing shall state:*

1. The portions of the Permit or each term or condition in the Permit in respect of which the hearing is required, and;
2. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

In addition to these legal requirements, the Notice should also include:

a. The name of the appellant;
b. The address of the appellant;
c. The Permit to Take Water number;
d. The date of the Permit to Take Water;
e. The name of the Director;
f. The municipality within which the works are located;

This notice must be served upon:

The Secretary
Environmental Review Tribunal
655 Bay Street, 15th Floor
Toronto ON
M5G 1E5
Fax: (416) 326-5370
Email:
ERTTribunalsecretary@ontario.ca

AND

The Environmental Commissioner
1075 Bay Street
6th Floor, Suite 605
Toronto, Ontario M5S 2W5

AND

The Director, Section 34.1,
Ministry of the Environment and Climate Change
12th Floor
119 King St W
Hamilton ON L8P 4Y7
Fax: (905) 521-7820

Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal:

by Telephone at	by Fax at	by e-mail at
(416) 212-6349	(416) 326-5370	www.ert.gov.on.ca
Toll Free 1(866) 448-2248	Toll Free 1(844) 213-3474	

*This instrument is subject to Section 38 of the **Environmental Bill of Rights** that allows residents of Ontario to seek leave to appeal the decision on this instrument. Residents of Ontario may seek to appeal for 15 days from the date this decision is placed on the Environmental Registry. By accessing the Environmental Registry, you can determine when the leave to appeal period ends.*

Dated at Hamilton this 8th day of May, 2017.

B. Koblik

Belinda Koblik
Director, Section 34.1
Ontario Water Resources Act , R.S.O. 1990

Schedule A

This Schedule “A” forms part of Permit To Take Water 3210-AKRL9C, dated May 8, 2017.

1. Hydrogeological Assessment in Support an OWRA Sec 34 PTTW, Shelburne South Pit, dated December, 2016, prepared by Whitewater Hydrogeology Ltd. for Strada Aggregates.

2. 2016 Compliance Groundwater Monitoring Report, Shelburne South Pit, dated January 2017, prepared by Whitewater Hydrogeology Ltd. for Strada Aggregates.

Appendix B:
Integrated Monitoring Plan

Strada Aggregates Melancthon Pits – Integrated Monitoring Plan
February 2018

Background

The Strada Melancthon Pits consist of:

- Pit #1 (Licence # 129167) located at West Half of Lot 13, Concession 3 O.S., licenced in 2004;
- Pit #2 (Licence # 625155) located at West Half of Part Lot 11 and 12, Concession 3 O.S., licenced in 2012; and
- The proposed Bonnefield and Prince extension lands located at Part of West Half of Lots 12 and 14, Concession 3 O.S.

The proposed Prince and Bonnefield extensions will be fully integrated with existing aggregate operations at Melancthon Pits #1 and #2. The existing operations require monitoring and annual reporting with respect to the water table, water quality and the natural environment. Hydrogeological and natural environment investigations for the proposed extension have recommended expansion of the monitoring programs to include the additional lands. The Ministry of Natural Resources and Forestry (MNRF) has requested an Integrated Monitoring Plan to consolidate the existing and proposed monitoring requirements.

Natural Environment

Amphibian Monitoring

Annual monitoring of the wetlands for the presence of breeding amphibians was originally recommended in the Level 2 Natural Environment Assessment (NEA) report for Melancthon Pit #2, as well as surface and groundwater monitoring to assess water level fluctuations (NRSI 2010). The implementation of an amphibian monitoring program was further requested by the Nottawasaga Valley Conservation Authority (NVCA) and Michalski Nielson in their review of the Level 2 NEA report.

NRSI has undertaken annual amphibian monitoring at the wetlands located adjacent to Melancthon Pit #2 since 2013. Initial amphibian call surveys were undertaken in 2009.

Of the two proposed pit areas, only the Bonnefield Pit property contains wetland habitat (outside the extraction area). Surveys completed in 2016 recorded the presence of breeding amphibians. To ensure that the proposed pit does not negatively impact the wetland and its amphibian breeding habitat function it was recommended that the existing amphibian monitoring program for Melancthon Pit #2 be expanded to include the Bonnefield Pit to maximize efficiencies, and achieve consistency in methodology and data comparability.

Annual amphibian call surveys that were initiated at Melancthon Pit #2 will continue for the duration of the lifespan of the pit, as was originally proposed. Beginning in 2018, NRSI will initiate annual monitoring of the Bonnefield property wetland which will also be undertaken for the lifespan of that pit. Annual monitoring of the Bonnefield Pit wetland will build on NRSI's 2016 amphibian call surveys on the property

to inform the NEA report. See **Map 1** for the location of the existing monitoring stations at Melancthon Pit #2 in addition to the single monitoring station at the Bonnefield Pit wetland. Since no amphibian calling activity was documented within the Bonnefield property vernal pool during 2016 surveys, despite the presence of standing water, additional long-term monitoring of the vernal pool is not included in this plan. However, if amphibian calling activity is heard within the vernal pool during future monitoring years, an additional monitoring station will be established at this location and will be monitored annually.

Proposed monitoring at the Bonnefield Pit wetland will document additional baseline data on breeding amphibian species presence and relative abundance prior to aggregate extraction, followed by multiple years of operational-stage monitoring. As has been completed for Melancthon Pit #2, long-term data will be collected to identify trends or other indicators that will be used to assess any negative occurrences to amphibian breeding activity that may be the result of pit activities. The amphibian survey data collected at the Bonnefield and Melancthon Pit #2 sites will also be compared to look for spatial trends, or any similarities or differences in survey results over time that may indicate presence of localized or widespread pit operation effects.

In accordance with survey methodology completed to date, the monitoring program will utilize the Marsh Monitoring Program methodology (BSC 2009), which records amphibian call activity during 3-minute call counts. Counts will be conducted once per month during each of April, May and June in conjunction with appropriate night time air temperatures and wind speeds. If the provincial Species of Conservation Concern Western Chorus Frog (Pseudacris triseriata) is detected during any monitoring event, additional monitoring events may be added to fully document the abundance and distribution of this species within the surveyed wetlands.

A brief summary report, combining the results collected from the Melancthon Pit #2 site with the Bonnefield Pit site, will be prepared each year which outlines the findings of the annual monitoring. This will include an assessment of the surface water and groundwater monitoring data to be collected by Whitewater Hydrogeology within both properties (Whitewater Hydrogeology 2017) as it relates to amphibian breeding conditions. Each annual report will be provided to Strada for their review, and then to the NVCA and the Township of Melancthon.

Woodland Buffer

The deciduous woodland communities within the Bonnefield and Prince extension lands will be retained outside the proposed limit of extraction. 10 metre woodland buffers have been recommended to protect these features and mitigate impacts from adjacent extraction activities. The woodland buffers will be allowed to re-naturalize and will be supplemented with targeted native species plantings.

The woodland buffers will be inspected during pit operations to ensure disturbances are not occurring. The health and survival of buffer planting will also be inspected.

Hydrogeology

Compliance groundwater and surface water monitoring has been occurring at both Melancthon Pit #1 and #2 since 2001 and 2007, respectively. In addition, baseline groundwater monitoring commenced in

2017 at the Bonnefield and Prince properties. In total, there are currently 28 groundwater well nests that monitor 52 discrete aquifer intervals in the overburden and bedrock aquifers. The Melancthon Pit #1 and #2 groundwater monitoring programs were developed to characterize the local groundwater conditions at each individual property and were based on two operating pits (two scale houses, two fuel storage areas, and multiple crushing and processing operations). The proposed licensing of the Bonnefield and Prince properties provides an opportunity to not only streamline operations by eliminating the need to operate as individual pits but to develop a revised groundwater monitoring program. The revision would remove redundancies in the monitoring network and reporting allowing for an opportunity to complete an accumulative impact assessment from the Strada properties.

The revised groundwater monitoring program is shown on **Map 2**. The revised program consists of 22 groundwater well nests that monitor 36 discrete aquifer intervals in the overburden and bedrock aquifers.

The proposed program focuses on the on going monitoring of background conditions (up gradient locations) in both the overburden and bedrock aquifers and the monitoring of potential influences from the aggregate operation on down gradient locations. The proposed groundwater monitoring program is provided in **Table 1**. Selected up gradient and down gradient wells will be sampled for water quality. The water quality parameters for the semi annual (spring and fall) and annual (spring) sampling programs are provided in **Table 2**.

Surface water elevation monitoring has been on-going at the North and South Ponds (Map 2), since 2007. Two additional surface water monitoring stations to monitor the hydro-period in the wetland and vernal pool (Map 2) will commence in 2018. This monitoring will consist of the collection of continuous water level data during non-frozen conditions. Data will be assessed in conjunction with the groundwater monitoring data as part of the annual reporting requirement.

Table 1 – Proposed Groundwater Monitoring Network

Well ID	Water Levels	Water Quality	
	Monthly Manual Water	Semi-Annual	Annual
OW2-A	X	X	
OW2-B	X	X	
OW3-B	X	X	
OW4-A	X	X	
OW4-B	X	X	
OW5-A	X	X	X
OW5-B	X	X	
OW6-A	X	X	X
OW7-A	X	X	X
OW7-B	X	X	
OW8-A	X	X	X
OW9-A	X	X	X
OW10-A	X	X	X
OW11-A	X	X	X
OW11-B	X	X	
OW12-A	X	X	X

Well ID	Water Levels	Water Quality	
	Monthly Manual Water	Semi-Annual	Annual
OW13-A	X	X	
OW13-B	X	X	
OW14-B	X	X	X
OW15-B	X		
OW16-B	X	X	X
OW17-A	X		
OW17-B	X		
OW18-A	X	X	X
OW18-B	X	X	
OW19-A	X		
OW19-B	X	X	
OW20-B	X	X	X
OW21-B	X	X	x
OW22-B	X	X	
OW23-B	X	X	

Note: the collection of continuous water levels at selected groundwater monitoring locations is recommended.

Table 2 – Proposed Water Quality Parameters

Semi-Annual Groundwater Quality Parameters	Annual Groundwater Quality Parameters
General Water Quality Parameters: pH, Conductivity, Alkalinity, Bicarbonate, Chloride, Calcium, Magnesium, Potassium, Sodium, Sulphate, Nitrate, Nitrite, Phosphorous, and Metals (dissolved).	Total Petroleum Hydrocarbons (F1-F4) BTEX, Total Oil and Grease

It is recommended that a single annual groundwater monitoring report for the Melancthon Pits #1 and 2, as well as the proposed Bonnefield and Prince Pits be prepared and submitted to the MNRF, Township of Melancthon and NVCA prior to March 31st of each year and include the monitoring data for the 12 month period ending December 31st of the previous year. The report shall include, but not be limited to, the following:

1. Monitoring data collected as per Table 1 and Table 2;
2. Data in tabulated and graphical formats;
3. Interpretation of the collected data including discussions of any observed trends in groundwater levels and groundwater quality (analytical) results;
4. Recommendations on and justification for the need for make changes to monitoring locations, monitoring frequency, type of monitoring, pumping patterns and/or the need for mitigation, and
5. Summary and documentation of any water well complaint(s) and their resolution(s).

Map 1

Melancthon #2 and Bonnefield Pits

Anuran Monitoring Stations

NATURAL RESOURCE SOLUTIONS INC.
Aquatic, Terrestrial and Wetland Biologists

Date: November 7, 2017
Project: NRSI-1748
Scale: 1:3,000
NAD83 - UTM Zone 17

Proposed Bonnefield Pit

Melanchton Pit #2

ANR-009
ANR-003
ANR-002
ANR-001
ANR-004
ANR-005
ANR-006
ANR-007a
ANR-007b
ANR-008a

561400 561500 561600 561700 561800 561900 562000

4887700 4887600 4887500 4887400 4887300 4887200 4887100 4887000 4886900 4886800 4886700 4886600

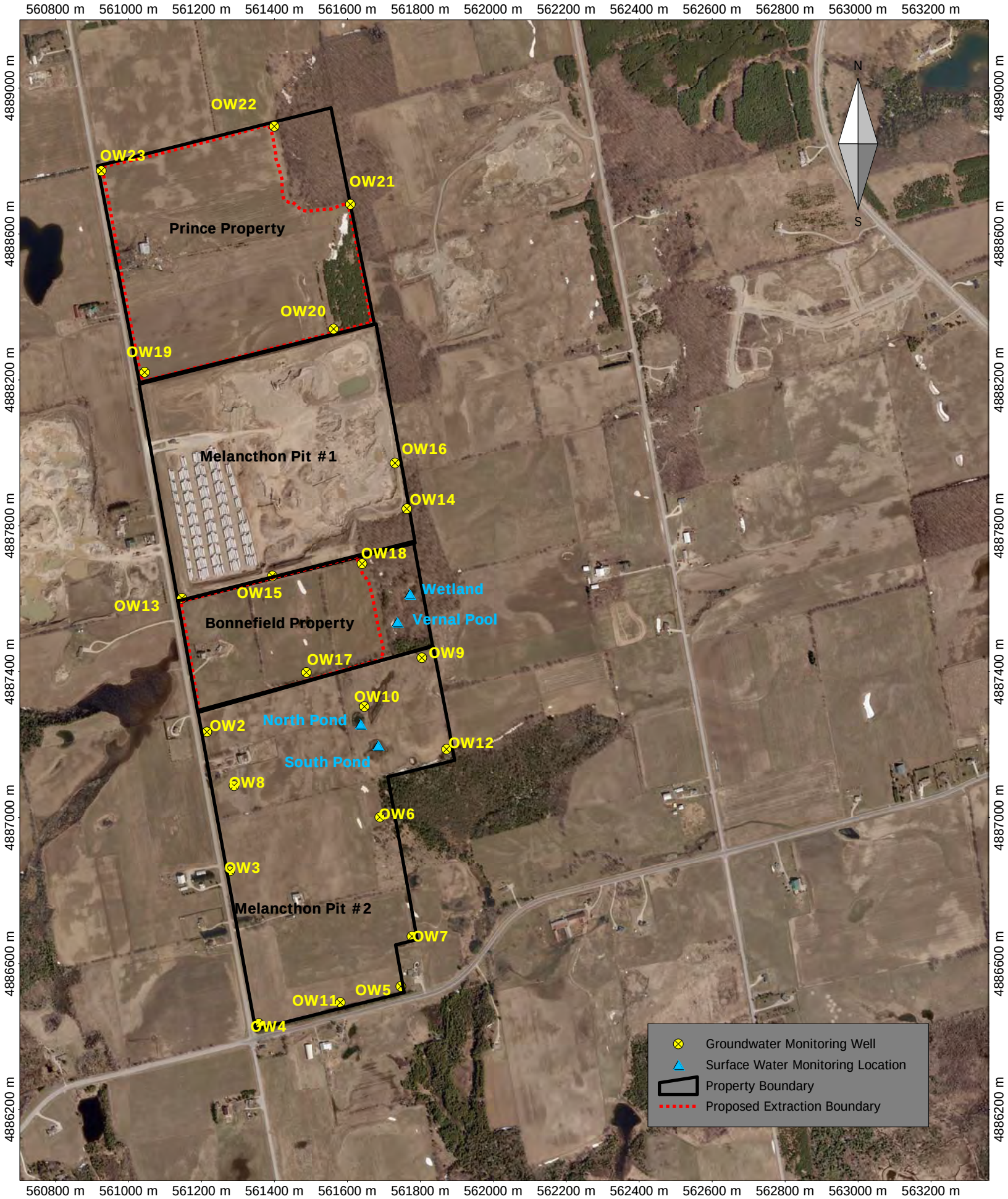
N

0 100 200 Metres

Legend

- Subject Property
- Anuran Monitoring Station (ANR)
- Direction of Survey
- Surveyed Wetland Boundary
- Wetland (Boundaries Approximate)

Path: X:\1748_PrinceGarnerPropertiesNEA\NRSI_1748_Map1_AnuranMonitoring_3K_2017_11_07_LEH.mxd


560800 m
561000 m
561200 m
561400 m
561600 m
561800 m
562000 m
562200 m
562400 m
562600 m
562800 m
563000 m
563200 m
4889000 m
4888600 m
4888200 m
4887800 m
4887400 m
4887000 m
4886600 m
4886200 m
N
S
OW22
OW23
OW21
Prince Property
OW20
OW19
Melancthon Pit #1
OW16
OW14
OW18
OW15
OW13
Wetland
Vernal Pool
Bonnefield Property
OW17
OW9
OW10
North Pond
OW2
OW12
South Pond
OW8
OW6
OW3
Melancthon Pit #2
OW7
OW5
OW11
OW4
Groundwater Monitoring Well
Surface Water Monitoring Location
Property Boundary
Proposed Extraction Boundary

Appendix C:
Borehole Logs

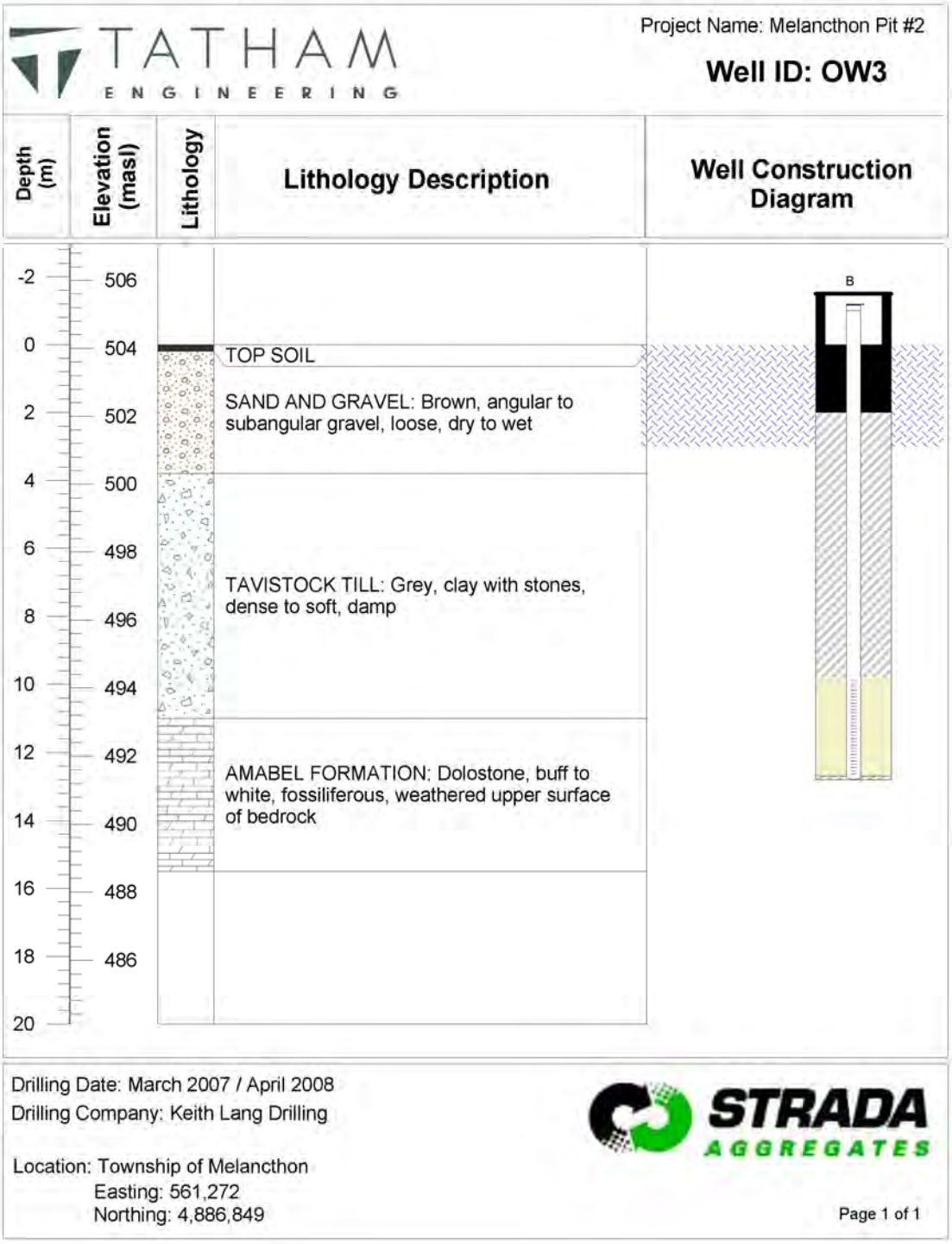


Figure A.17: New Borehole log for Well OW3.

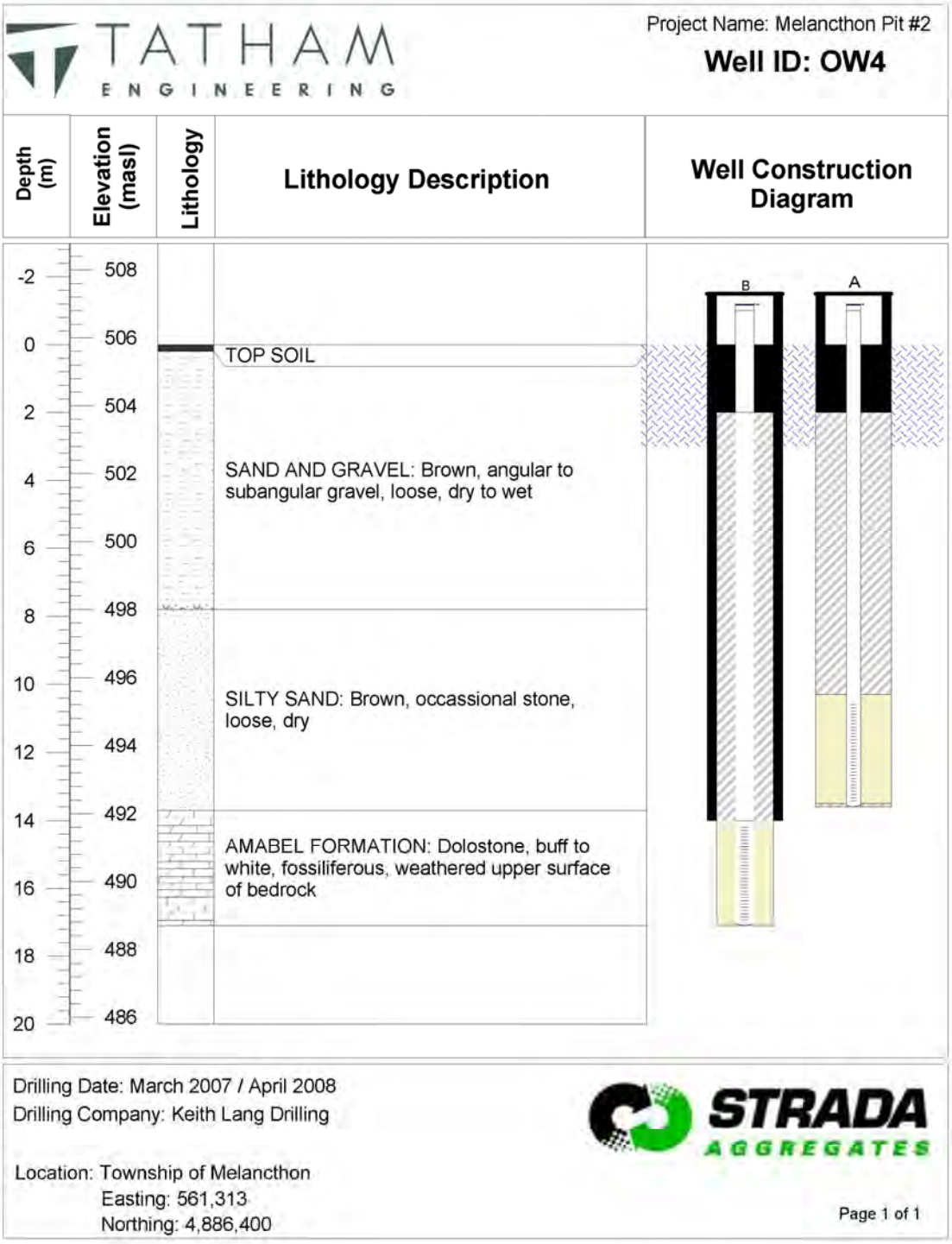


Figure A.19: New Borehole log for Well OW4.

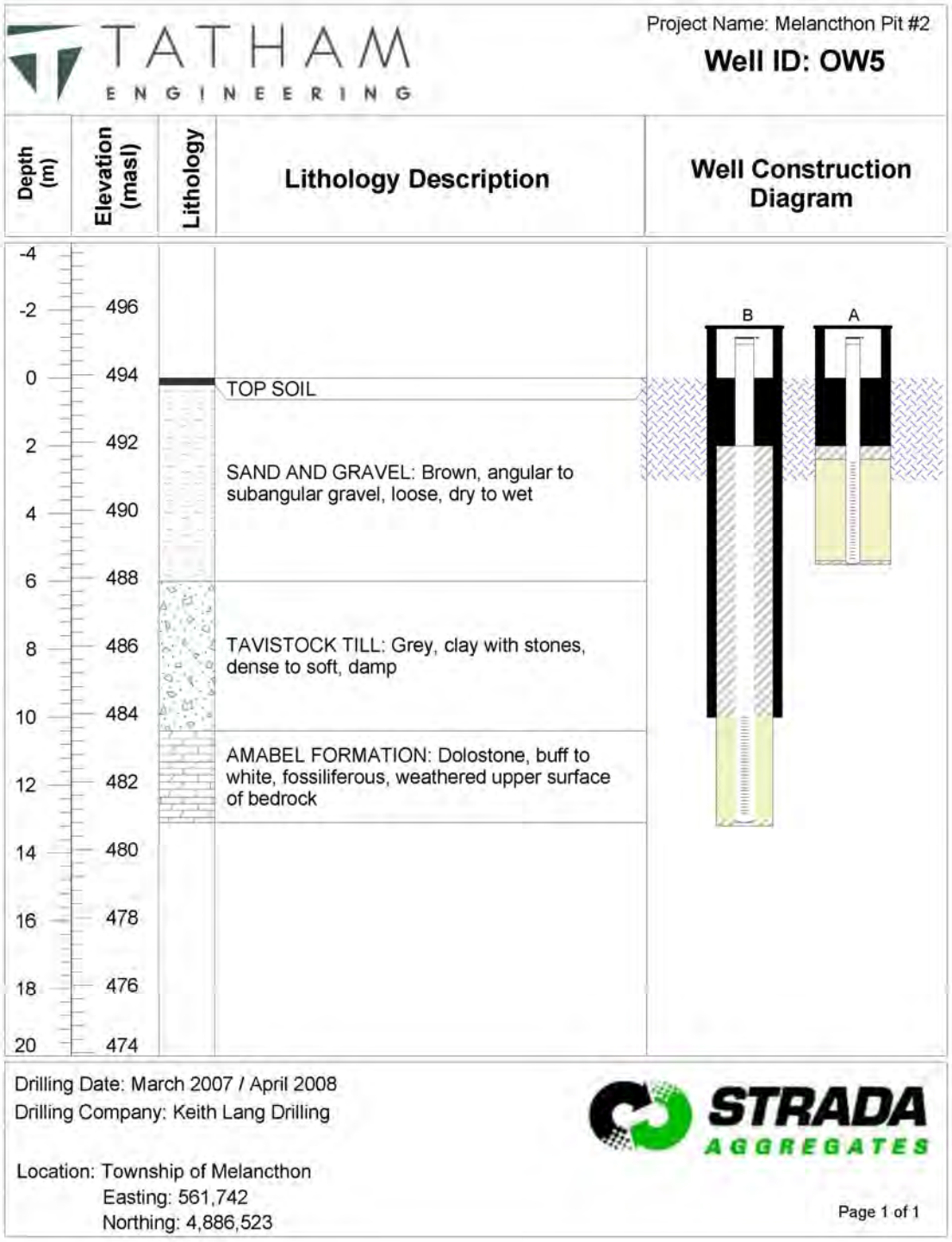


Figure A.21: Updated Borehole log for Well OW5.

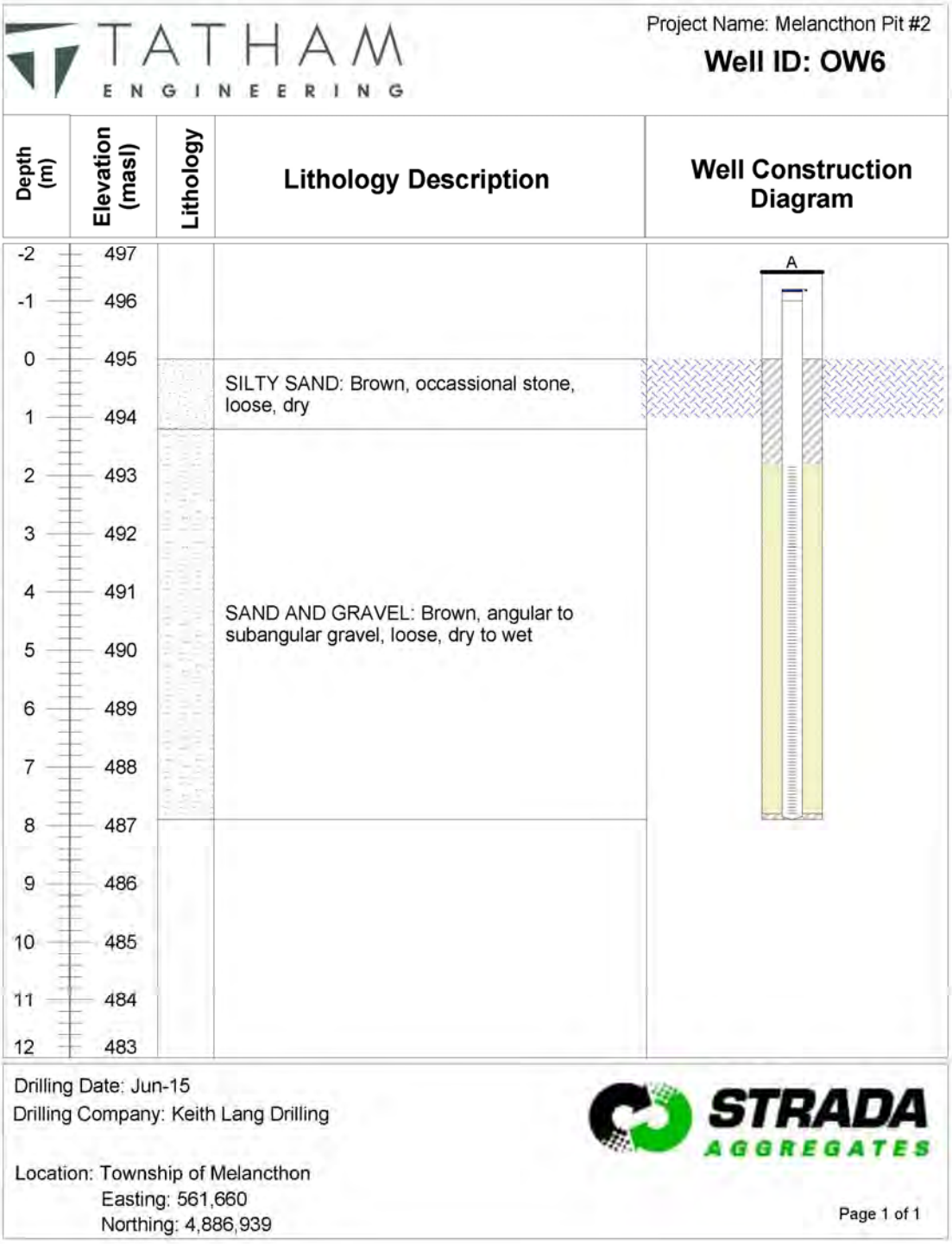


Figure A.22: Borehole log for Well OW6-A.

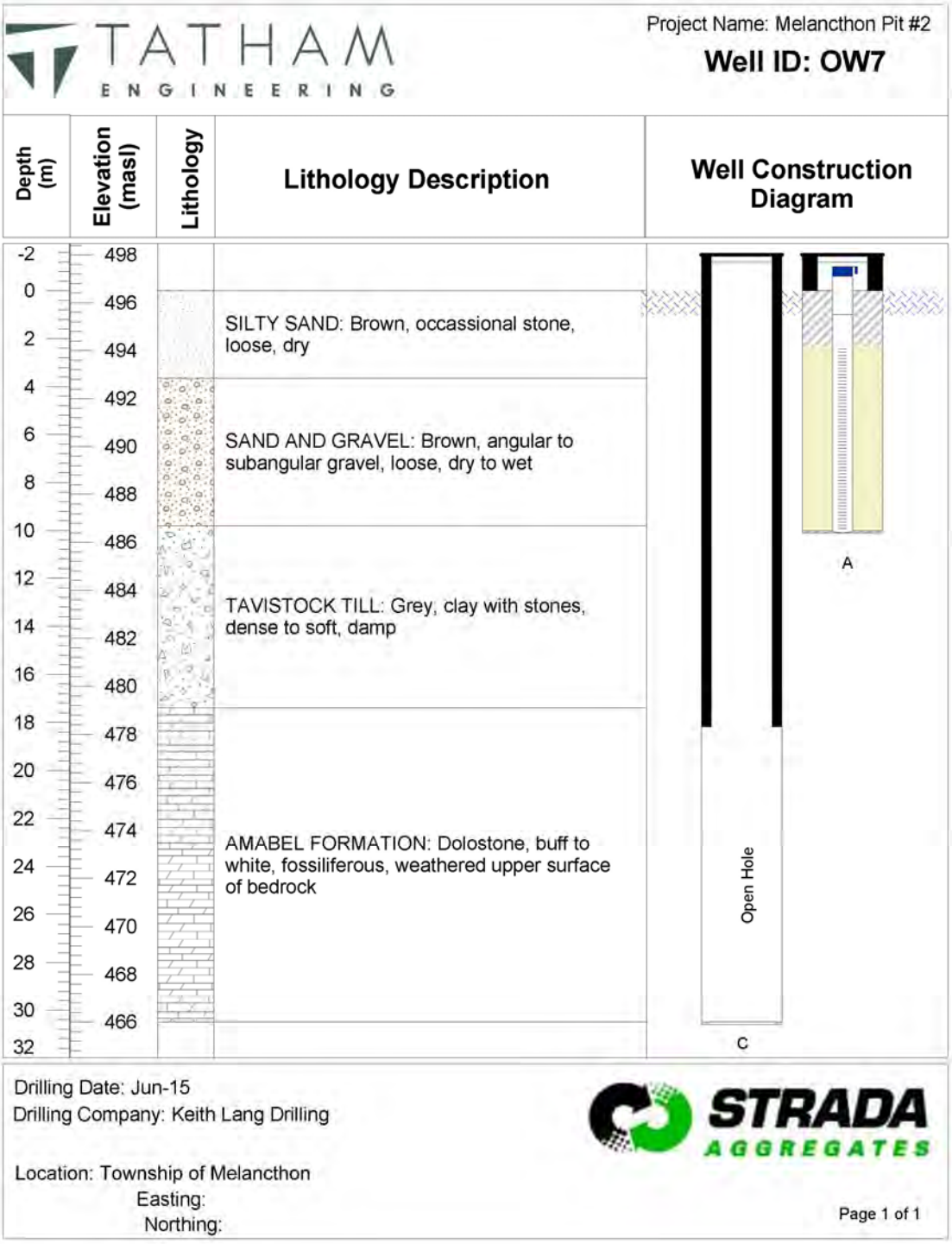


Figure A.23: Borehole log for Well OW7 A and C.

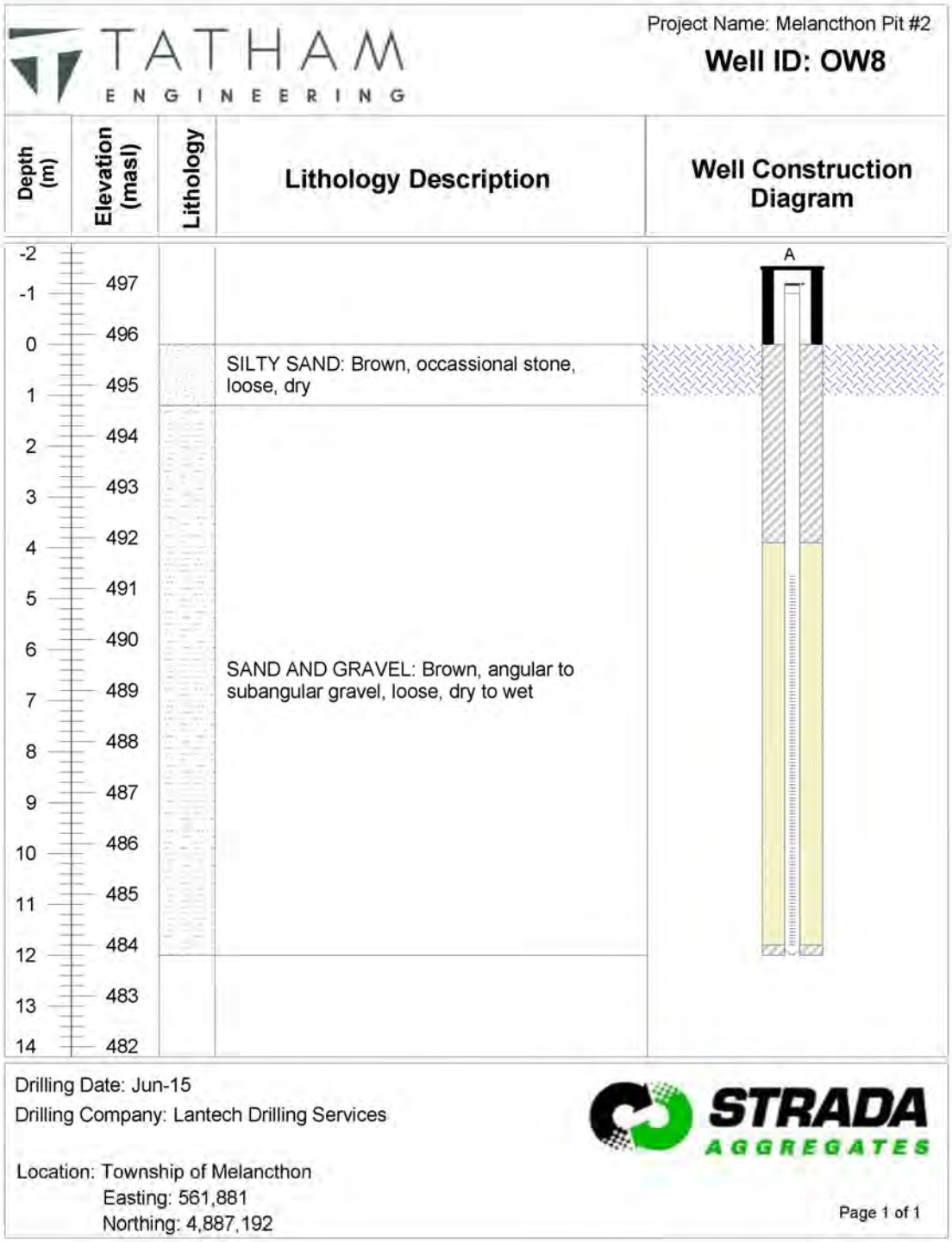


Figure A.24: Borehole log for Well OW8.

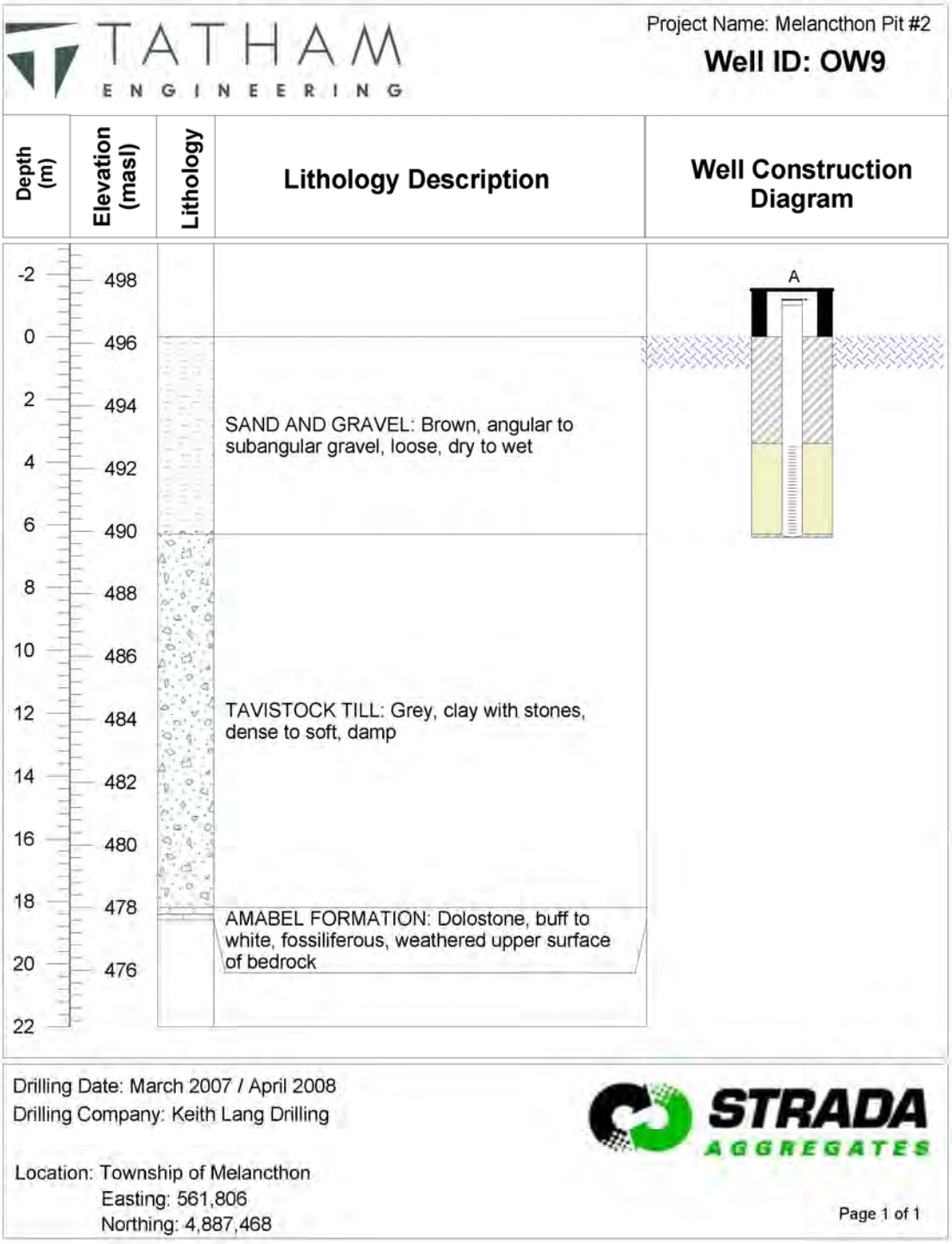


Figure A.26: New Borehole log for Well OW9-A.

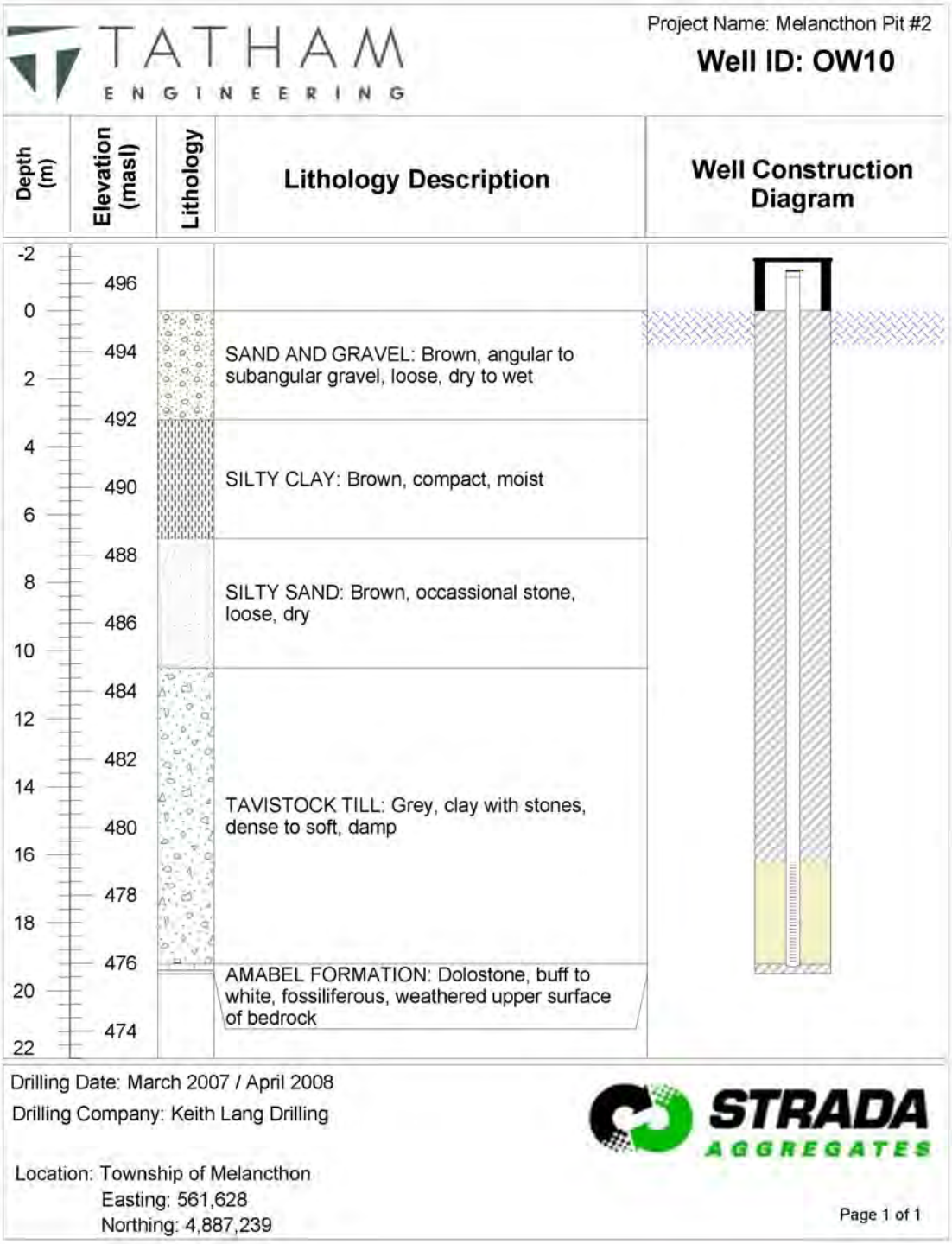


Figure A.28: New Borehole log for Well OW10.

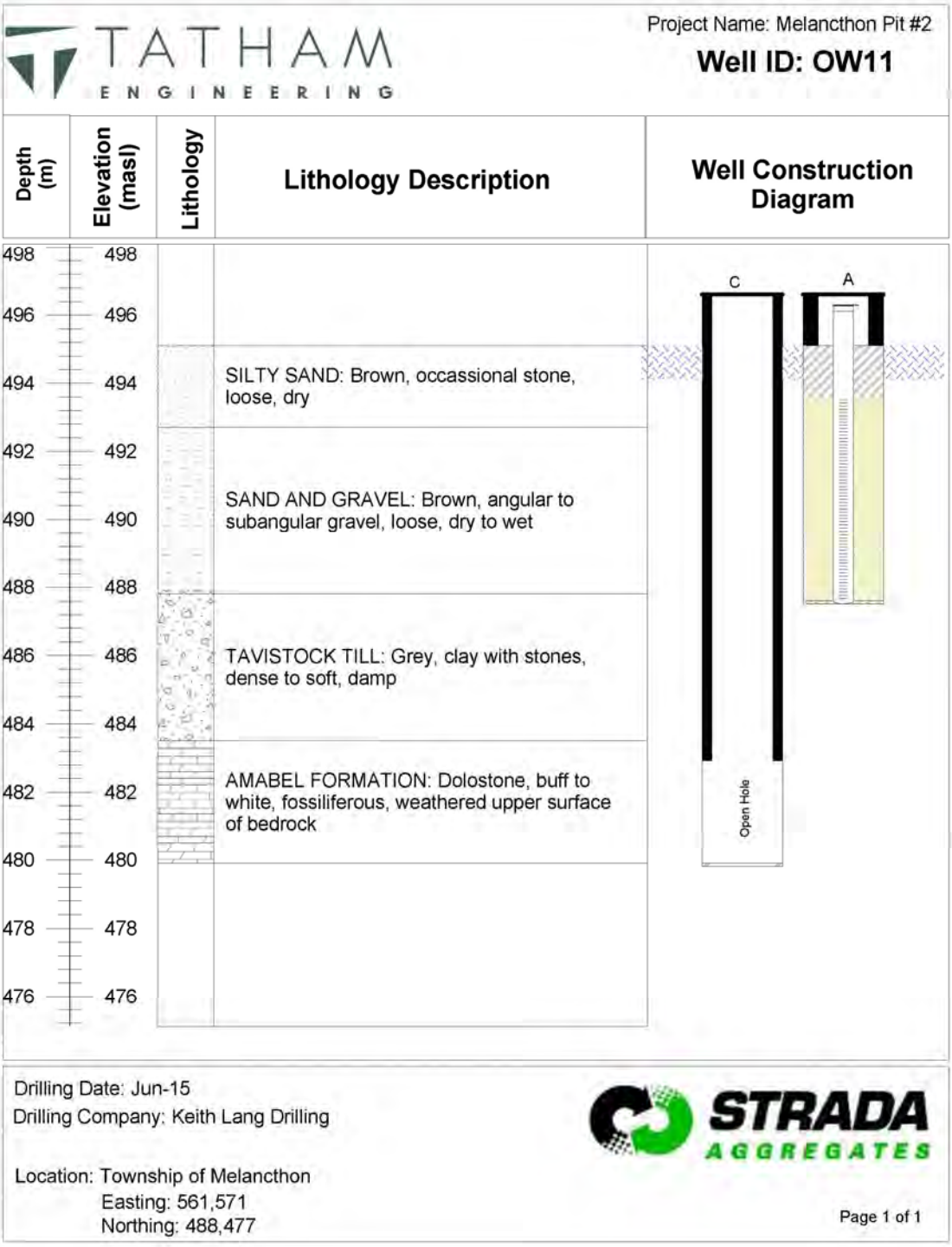
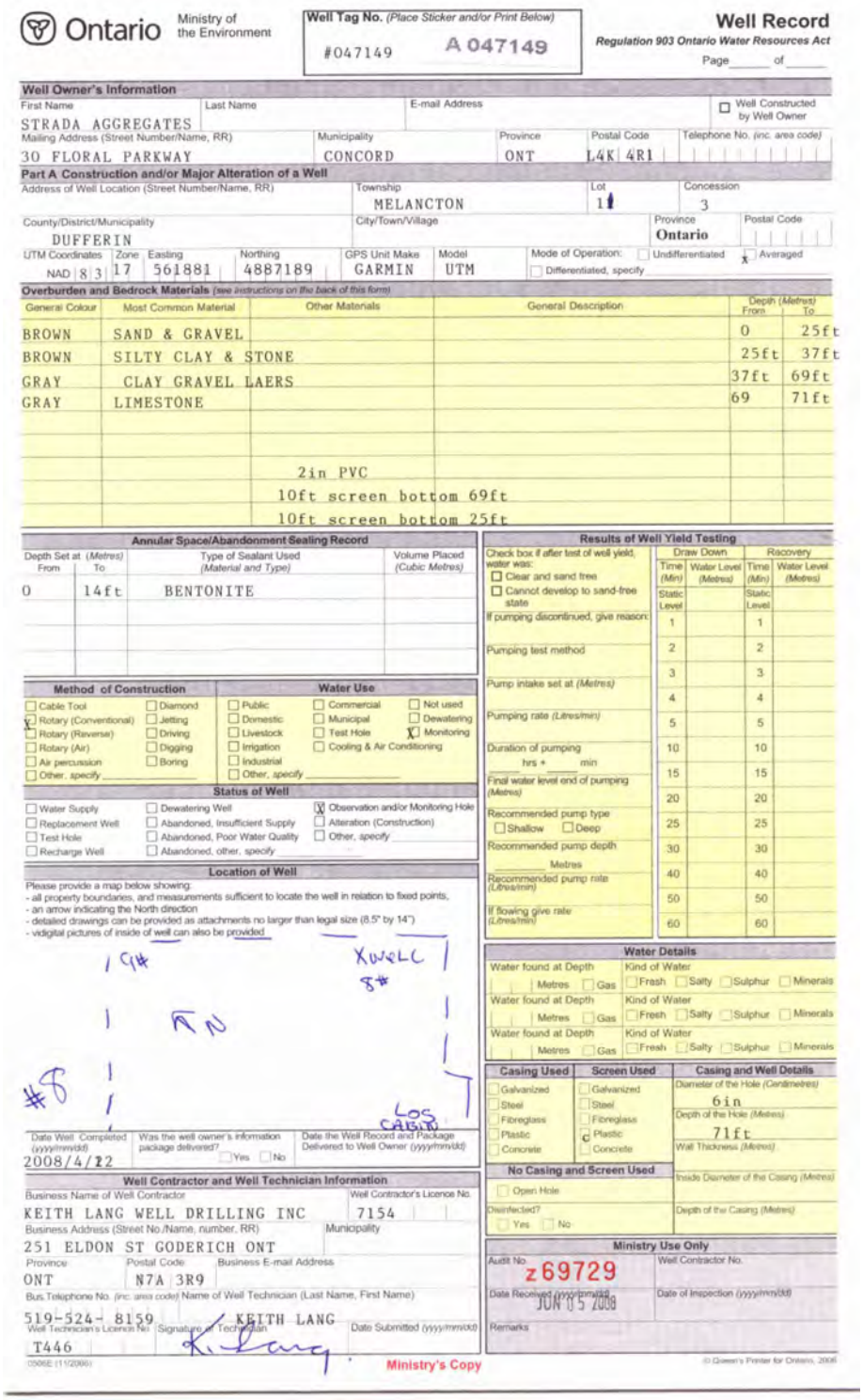


Figure A.29: Borehole log for Well OW11 A and C.



Ontario Ministry of the Environment

Well Record
Regulation 903 Ontario Water Resources Act
Page ____ of ____

Well Tag No. *(Place Sticker and/or Print Below)*: #047149 A 047149

Well Owner's Information

First Name	Last Name	E-mail Address	Well Constructed by Well Owner
STRADA AGGREGATES			☐

Mailing Address (Street Number/Name, RR)	Municipality	Province	Postal Code	Telephone No. (inc. area code)
30 FLORAL PARKWAY	CONCORD	ONT	L4K 4R1	

Part A Construction and/or Major Alteration of a Well

Address of Well Location (Street Number/Name, RR)	Township	Lot	Concession
	MELANCTON	11	3

County/District/Municipality	City/Town/Village	Province	Postal Code
DUFFERIN		Ontario	

UTM Coordinates	Zone	Easting	Northing	GPS Unit Make	Model	Mode of Operation:	
NAD 8 3	17	561881	4887189	GARMIN	UTM	☐ Differentiated, specify	☐ Undifferentiated ☒ Averaged

Overburden and Bedrock Materials *(see instructions on the back of this form)*

General Colour	Most Common Material	Other Materials	General Description	Depth (Metres) From	Depth (Metres) To
BROWN	SAND & GRAVEL			0	25ft
BROWN	SILTY CLAY & STONE			25ft	37ft
GRAY	CLAY GRAVEL LAERS			37ft	69ft
GRAY	LIMESTONE			69	71ft
		2in PVC			
		10ft screen bottom 69ft			
		10ft screen bottom 25ft			

Annular Space/Abandonment Sealing Record

Depth Set at (Metres) From	To	Type of Sealant Used (Material and Type)	Volume Placed (Cubic Metres)
0	14ft	BENTONITE	

Method of Construction
☐ Cable Tool ☐ Diamond ☒ Rotary (Conventional) ☐ Jetting ☐ Rotary (Reverse) ☐ Driving ☐ Rotary (Air) ☐ Digging ☐ Air percussion ☐ Boring ☐ Other, specify

Water Use
☐ Public ☐ Commercial ☐ Not used ☐ Domestic ☐ Municipal ☐ Dewatering ☐ Livestock ☐ Test Hole ☒ Monitoring ☐ Irrigation ☐ Cooling & Air Conditioning ☐ Industrial ☐ Other, specify

Status of Well
☐ Water Supply ☐ Dewatering Well ☒ Observation and/or Monitoring Hole ☐ Replacement Well ☐ Abandoned, Insufficient Supply ☐ Alteration (Construction) ☐ Test Hole ☐ Abandoned, Poor Water Quality ☐ Other, specify ☐ Recharge Well ☐ Abandoned, other, specify

Location of Well
Please provide a map below showing:
- all property boundaries, and measurements sufficient to locate the well in relation to fixed points,
- an arrow indicating the North direction
- detailed drawings can be provided as attachments no larger than legal size (8.5" by 14")
- vidigital pictures of inside of well can also be provided

Date Well Completed (yyyy/mm/dd)	Was the well owner's information package delivered?	Date the Well Record and Package Delivered to Well Owner (yyyy/mm/dd)
2008/4/22	☐ Yes ☐ No	

Well Contractor and Well Technician Information

Business Name of Well Contractor	Well Contractor's Licence No.
KEITH LANG WELL DRILLING INC	7154

Business Address (Street No./Name, number, RR)	Municipality	Province	Postal Code	Business E-mail Address
251 ELDON ST GODERICH ONT		ONT	N7A 3R9	

Bus. Telephone No. (inc. area code)	Name of Well Technician (Last Name, First Name)	Well Technician's Licence No.	Signature of Technician	Date Submitted (yyyy/mm/dd)
519-524- 8159	KEITH LANG	T446	K. Lang	

Ministry's Copy

Results of Well Yield Testing

Check box if after test of well yield, water was:
☐ Clear and sand free
☐ Cannot develop to sand-free state

If pumping discontinued, give reason:
Pumping test method
Pump intake set at (Metres)
Pumping rate (Litres/min)
Duration of pumping hrs + min
Final water level end of pumping (Metres)
Recommended pump type ☐ Shallow ☐ Deep
Recommended pump depth Metres
Recommended pump rate (Litres/min)
If flowing give rate (Litres/min)

	Draw Down Time (Min)	Draw Down Water Level (Metres)	Recovery Time (Min)	Recovery Water Level (Metres)
Static Level			Static Level	
1			1	
2			2	
3			3	
4			4	
5			5	
10			10	
15			15	
20			20	
25			25	
30			30	
40			40	
50			50	
60			60	

Water Details

Water found at Depth	Kind of Water
Metres ☐ Gas	☐ Fresh ☐ Salty ☐ Sulphur ☐ Minerals
Water found at Depth	Kind of Water
Metres ☐ Gas	☐ Fresh ☐ Salty ☐ Sulphur ☐ Minerals
Water found at Depth	Kind of Water
Metres ☐ Gas	☐ Fresh ☐ Salty ☐ Sulphur ☐ Minerals

Casing Used	Screen Used	Casing and Well Details
☐ Galvanized ☐ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete	☐ Galvanized ☐ Steel ☐ Fibreglass ☒ Plastic ☐ Concrete	Diameter of the Hole (Centimetres): 6in; Depth of the Hole (Metres): 71ft; Wall Thickness (Metres):

No Casing and Screen Used
☐ Open Hole

Disinfected? ☐ Yes ☐ No

Inside Diameter of the Casing (Metres)
Depth of the Casing (Metres)

Ministry Use Only

Audit No.	Well Contractor No.
z69729	
Date Received (yyyy/mm/dd) JUN 05 2008	Date of Inspection (yyyy/mm/dd)
Remarks	

0506E (11/2006) © Queen's Printer for Ontario, 2006

Figure A.30: Borehole log for Well OW12.

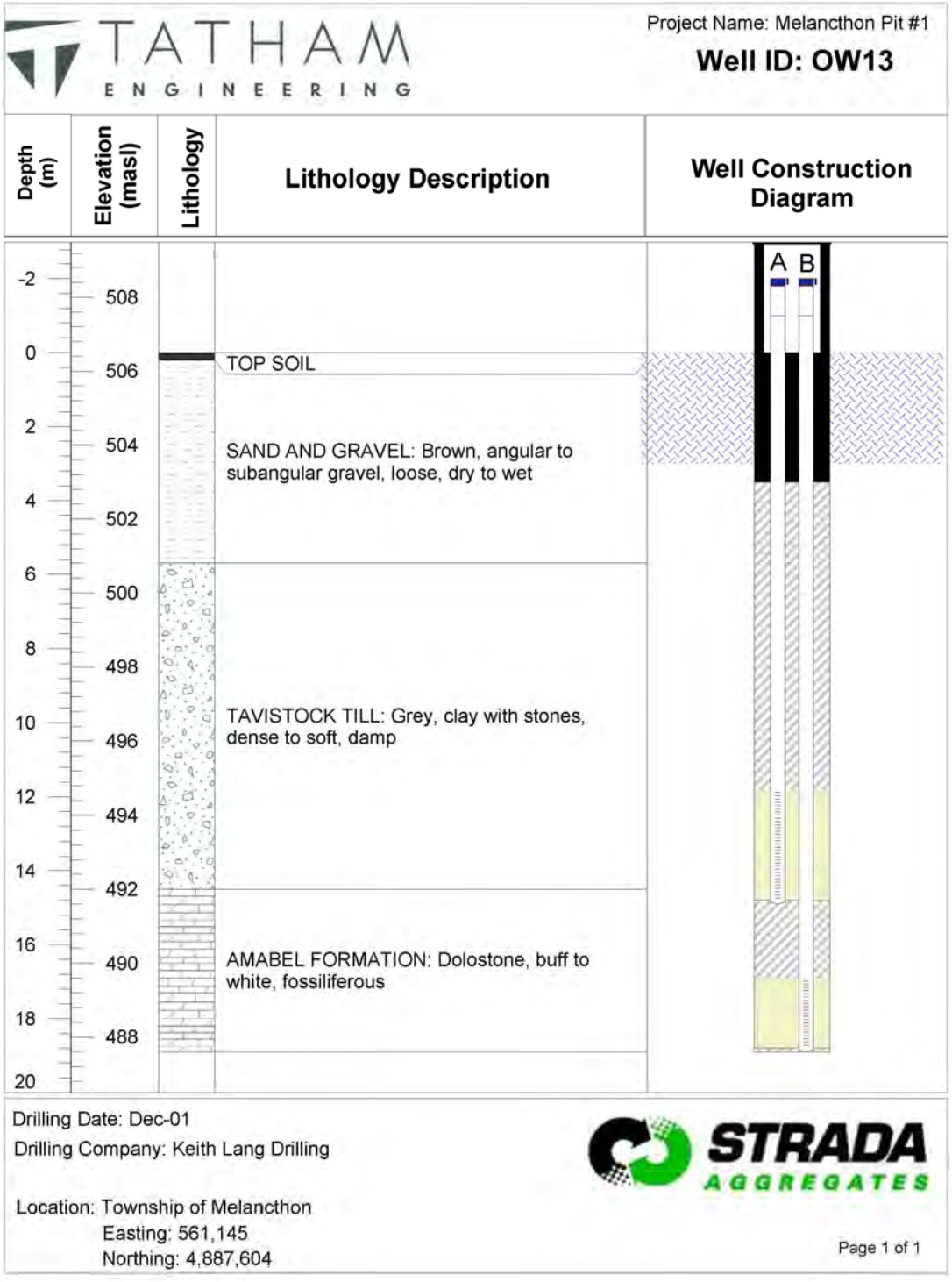


Figure A.31: Borehole log for Well OW13 A and B.

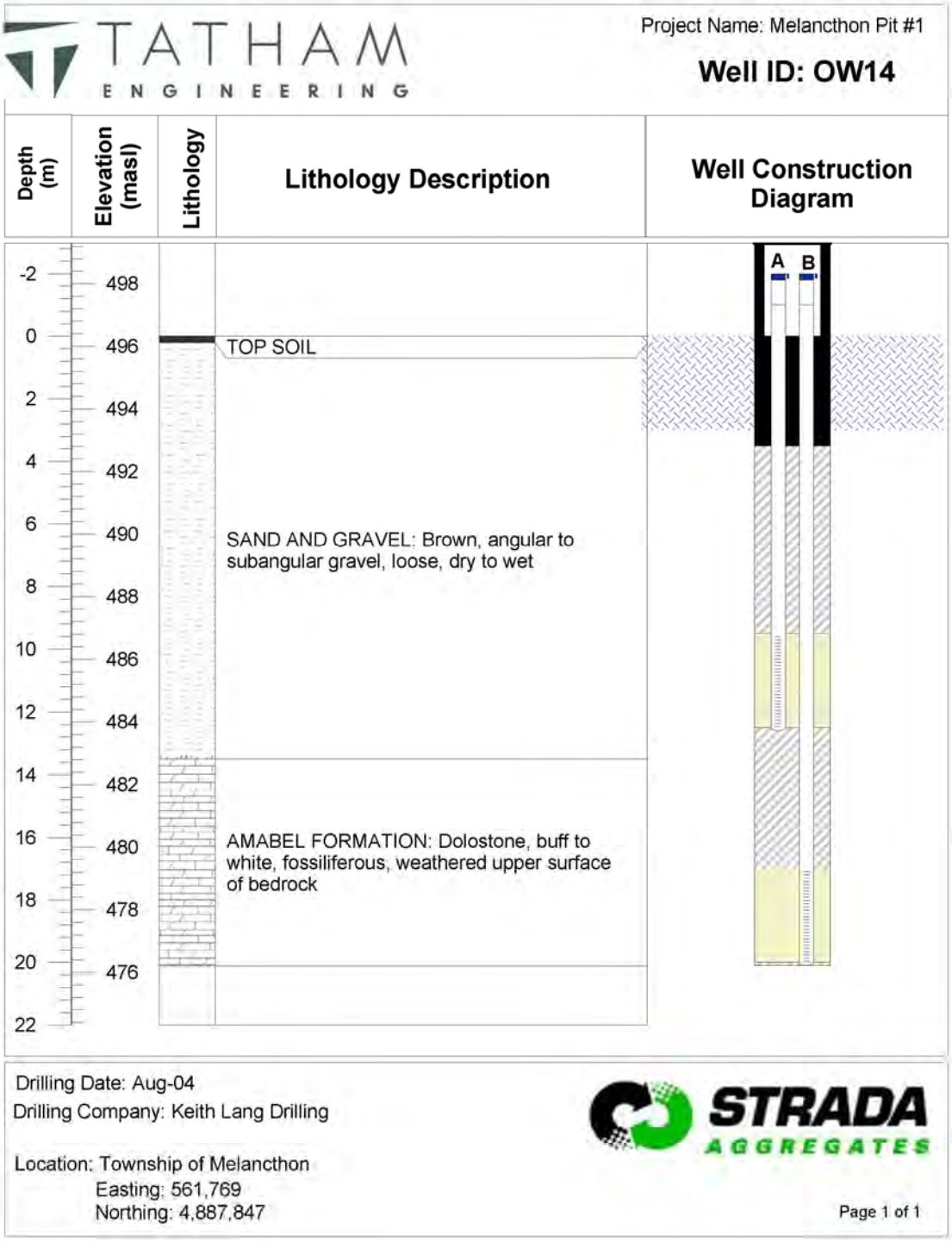


Figure A.32: Updated Borehole log for Well OW14 A and C.

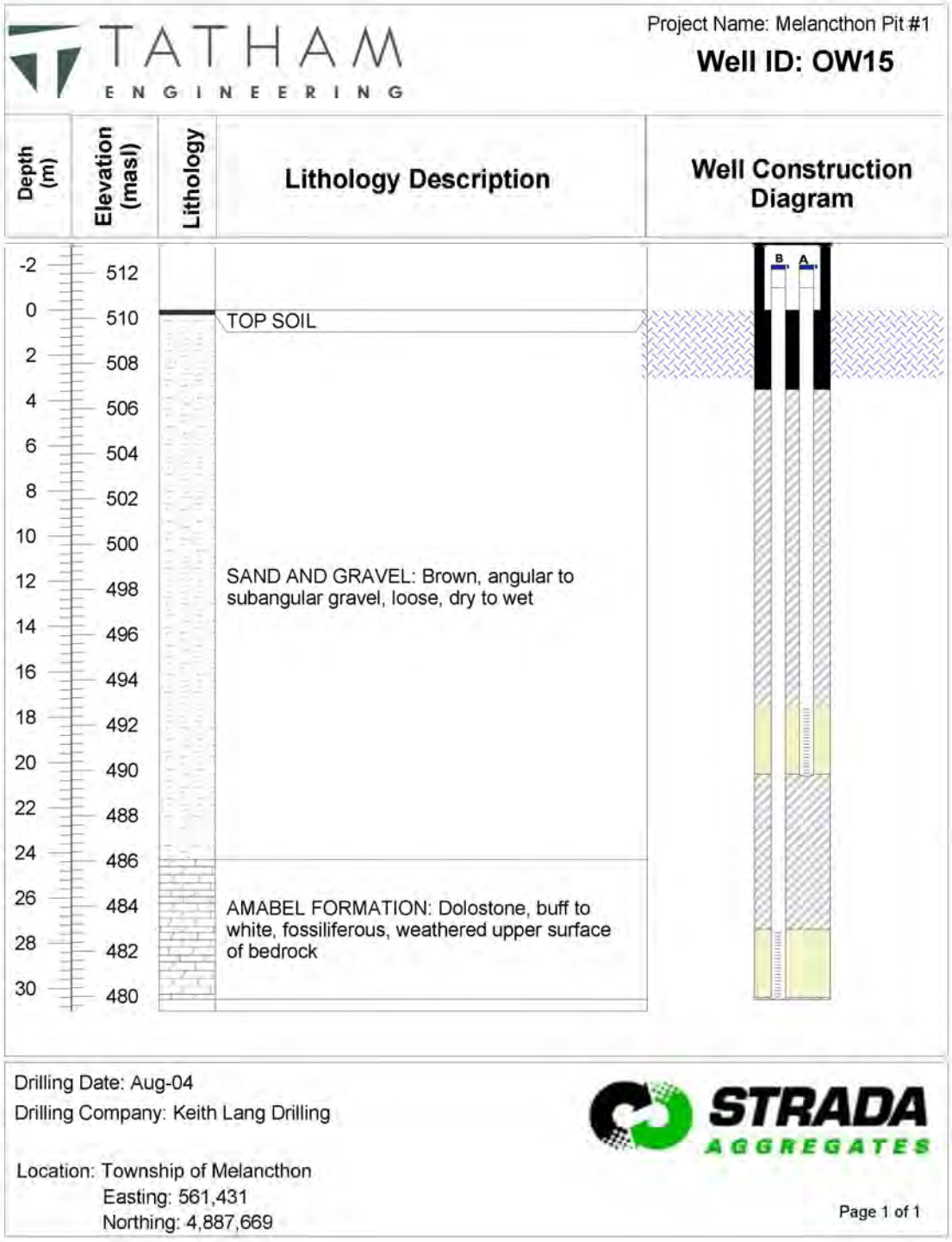
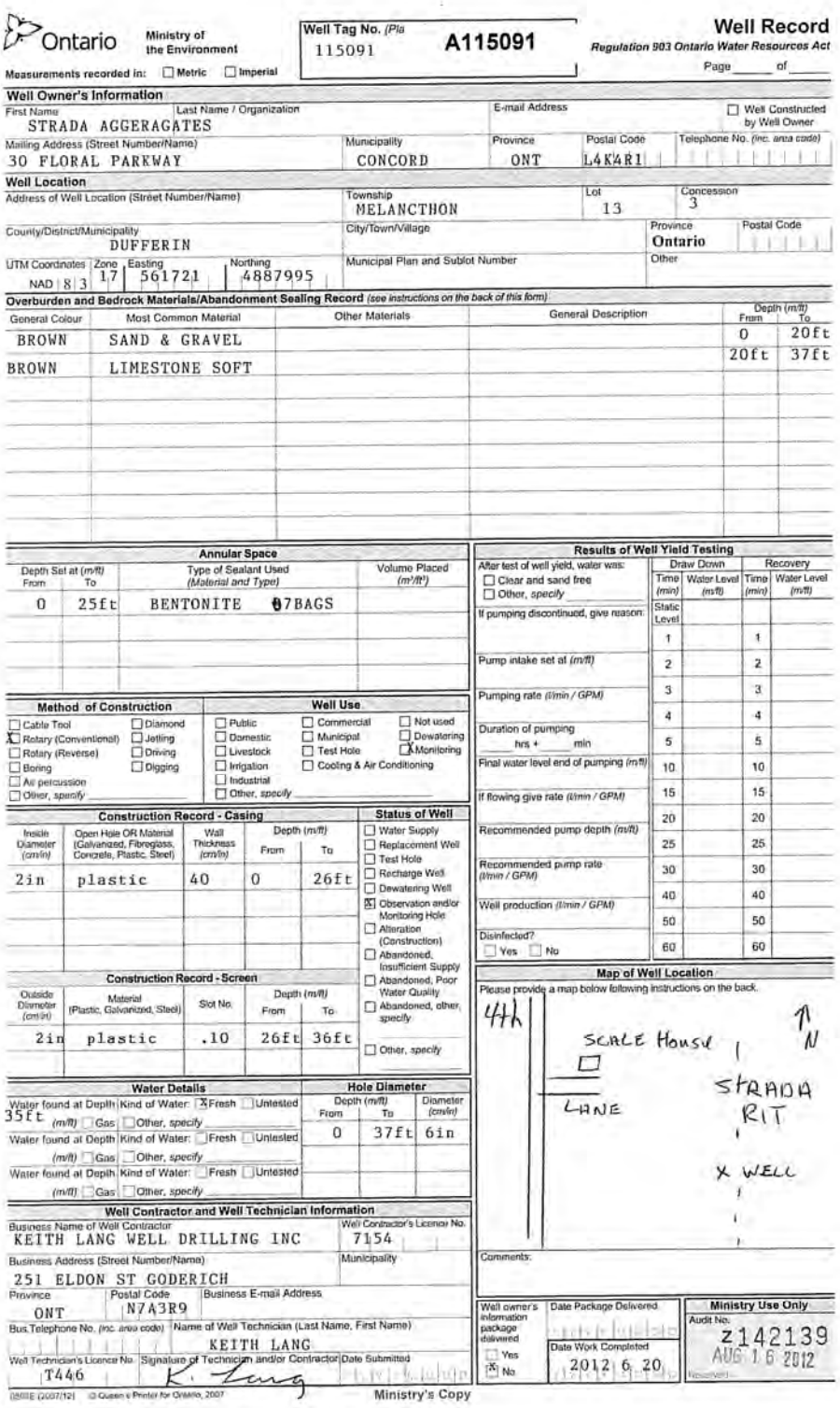


Figure A.33: Borehole log for Well OW15.



Ontario Ministry of the Environment

Well Tag No. (Pla 115091 **A115091**

Well Record
Regulation 903 Ontario Water Resources Act

Measurements recorded in: ☐ Metric ☐ Imperial

Page ____ of ____

Well Owner's Information

First Name	Last Name / Organization	E-mail Address	☐ Well Constructed by Well Owner
	STRADA AGGERAGATES		

Mailing Address (Street Number/Name)	Municipality	Province	Postal Code	Telephone No. (inc. area code)
30 FLORAL PARKWAY	CONCORD	ONT	L4K4R1	

Well Location

Address of Well Location (Street Number/Name)	Township	Lot	Concession
	MELANCTHON	13	3

County/District/Municipality	City/Town/Village	Province	Postal Code
DUFFERIN		Ontario	

UTM Coordinates	Zone	Easting	Northing	Municipal Plan and Sublot Number	Other
NAD 8 3	17	561721	4887995		

Overburden and Bedrock Materials/Abandonment Sealing Record *(see instructions on the back of this form)*

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From	Depth (m/ft) To
BROWN	SAND & GRAVEL			0	20ft
BROWN	LIMESTONE SOFT			20ft	37ft

Annular Space

Depth Set at (m/ft) From	To	Type of Sealant Used (Material and Type)	Volume Placed (m³/ft³)
0	25ft	BENTONITE 87BAGS	

Method of Construction

☐ Cable Tool ☐ Diamond
☒ Rotary (Conventional) ☐ Jetting
☐ Rotary (Reverse) ☐ Driving
☐ Boring ☐ Digging
☐ Air percussion
☐ Other, specify

Well Use

☐ Public ☐ Commercial ☐ Not used
☐ Domestic ☐ Municipal ☐ Dewatering
☐ Livestock ☐ Test Hole ☒ Monitoring
☐ Irrigation ☐ Cooling & Air Conditioning
☐ Industrial
☐ Other, specify

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft) From	Depth (m/ft) To
2in	plastic	40	0	26ft

Construction Record - Screen

Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft) From	Depth (m/ft) To
2in	plastic	.10	26ft	36ft

Status of Well

☐ Water Supply
☐ Replacement Well
☐ Test Hole
☐ Recharge Well
☐ Dewatering Well
☒ Observation and/or Monitoring Hole
☐ Alteration (Construction)
☐ Abandoned, Insufficient Supply
☐ Abandoned, Poor Water Quality
☐ Abandoned, other, specify
☐ Other, specify

Water Details

Water found at Depth	Kind of Water	Hole Diameter Depth From	Depth To	Diameter (cm/in)
35ft (m/ft)	☒ Fresh ☐ Untested ☐ Gas ☐ Other, specify	0	37ft	6in
(m/ft)	☐ Fresh ☐ Untested ☐ Gas ☐ Other, specify			
(m/ft)	☐ Fresh ☐ Untested ☐ Gas ☐ Other, specify			

Well Contractor and Well Technician Information

Business Name of Well Contractor	Well Contractor's Licence No.
KEITH LANG WELL DRILLING INC	7154

Business Address (Street Number/Name)	Municipality
251 ELDON ST GODERICH	

Province	Postal Code	Business E-mail Address
ONT	N7A3R9	

Bus. Telephone No. (inc. area code)	Name of Well Technician (Last Name, First Name)
	KEITH LANG

Well Technician's Licence No.	Signature of Technician and/or Contractor	Date Submitted
T446	K. Lang	

Ministry's Copy

Results of Well Yield Testing

After test of well yield, water was: ☐ Clear and sand free ☐ Other, specify

If pumping discontinued, give reason:

Pump intake set at (m/ft)

Pumping rate (l/min / GPM)

Duration of pumping ____ hrs + ____ min

Final water level end of pumping (m/ft)

If flowing give rate (l/min / GPM)

Recommended pump depth (m/ft)

Recommended pump rate (l/min / GPM)

Well production (l/min / GPM)

Disinfected? ☐ Yes ☐ No

	Draw Down Time (min)	Draw Down Water Level (m/ft)	Recovery Time (min)	Recovery Water Level (m/ft)
Static Level				
1			1	
2			2	
3			3	
4			4	
5			5	
10			10	
15			15	
20			20	
25			25	
30			30	
40			40	
50			50	
60			60	

Map of Well Location

Please provide a map below following instructions on the back.

Comments:

Well owner's information package delivered	Date Package Delivered	Ministry Use Only
☐ Yes ☒ No	Date Work Completed 2012 6 20	Audit No. Z142139 AUG 16 2012 Received

(2007/12) © Queen's Printer for Ontario, 2007

Figure A.34: Borehole log for Well OW16C.

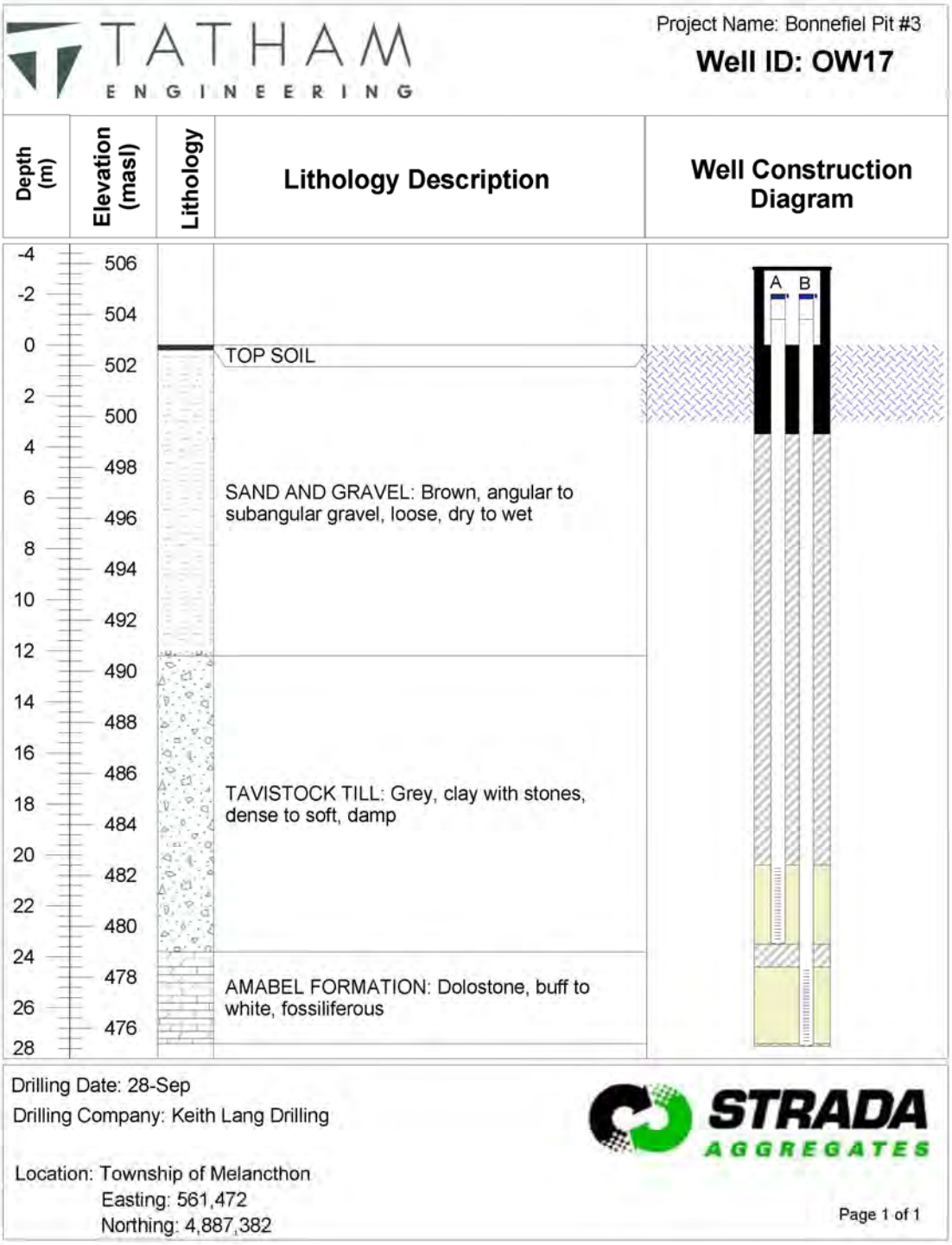


Figure A.35: Borehole log for Well OW17.

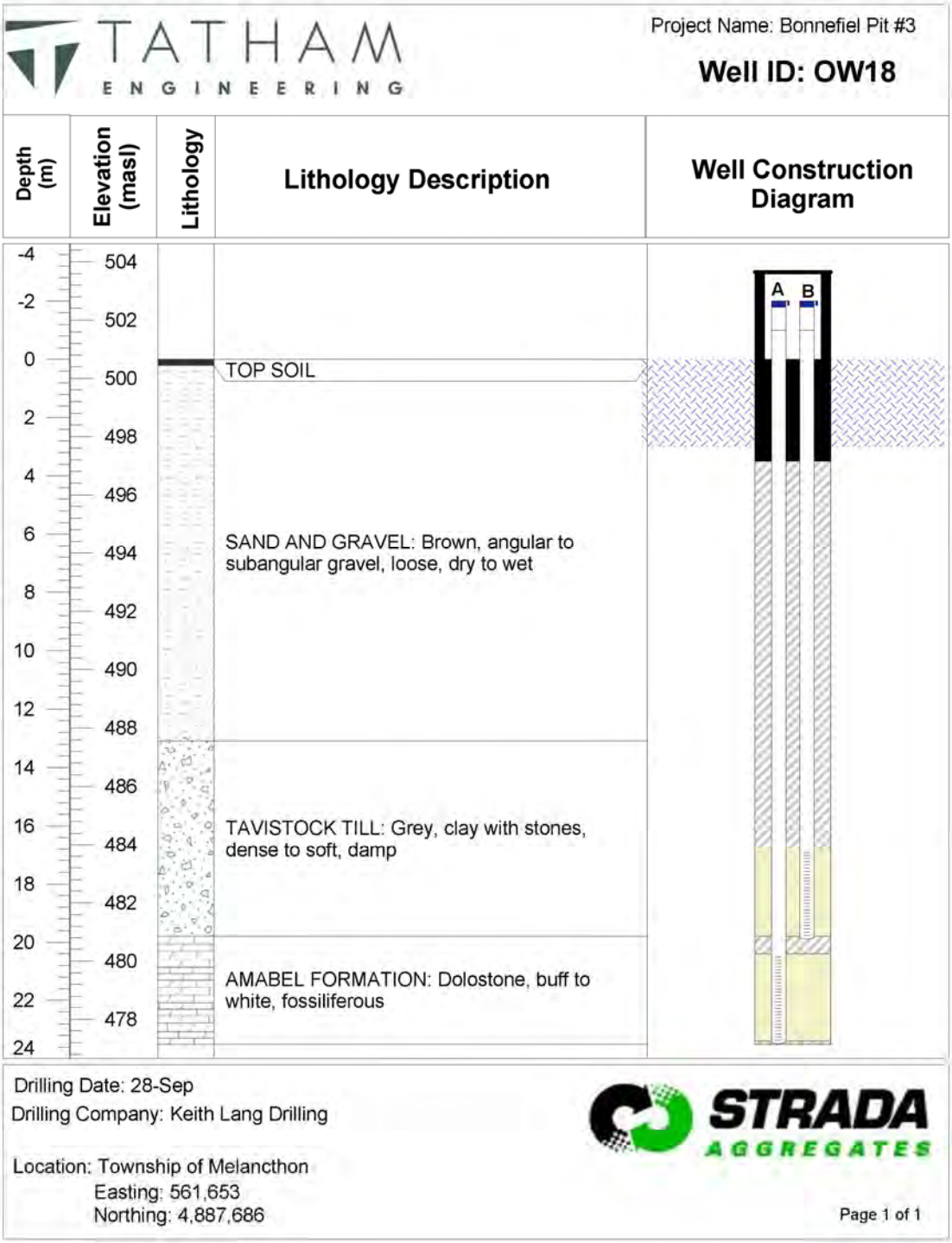


Figure A.36: Borehole log for Well OW18.

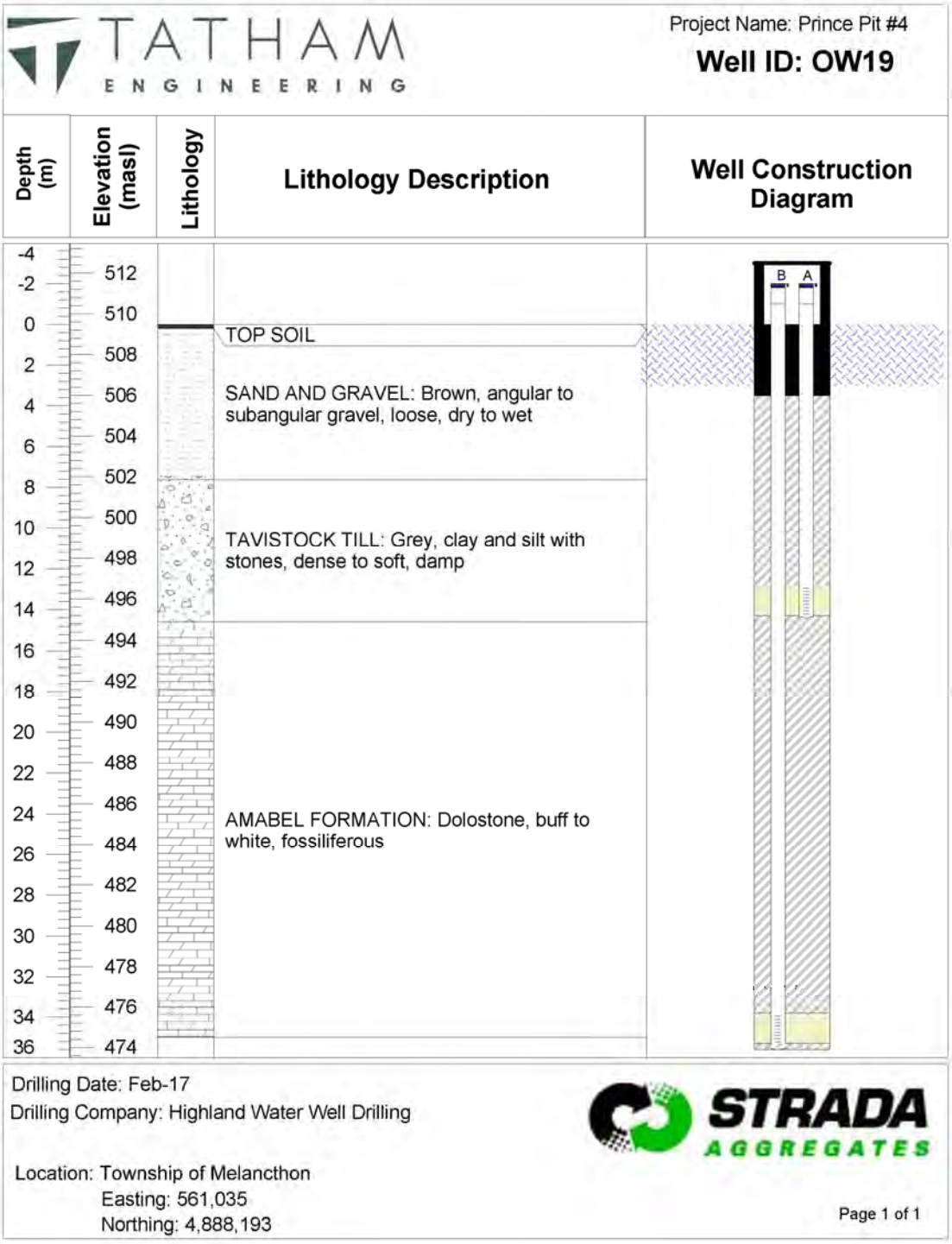


Figure A.37: Borehole log for Well OW19.

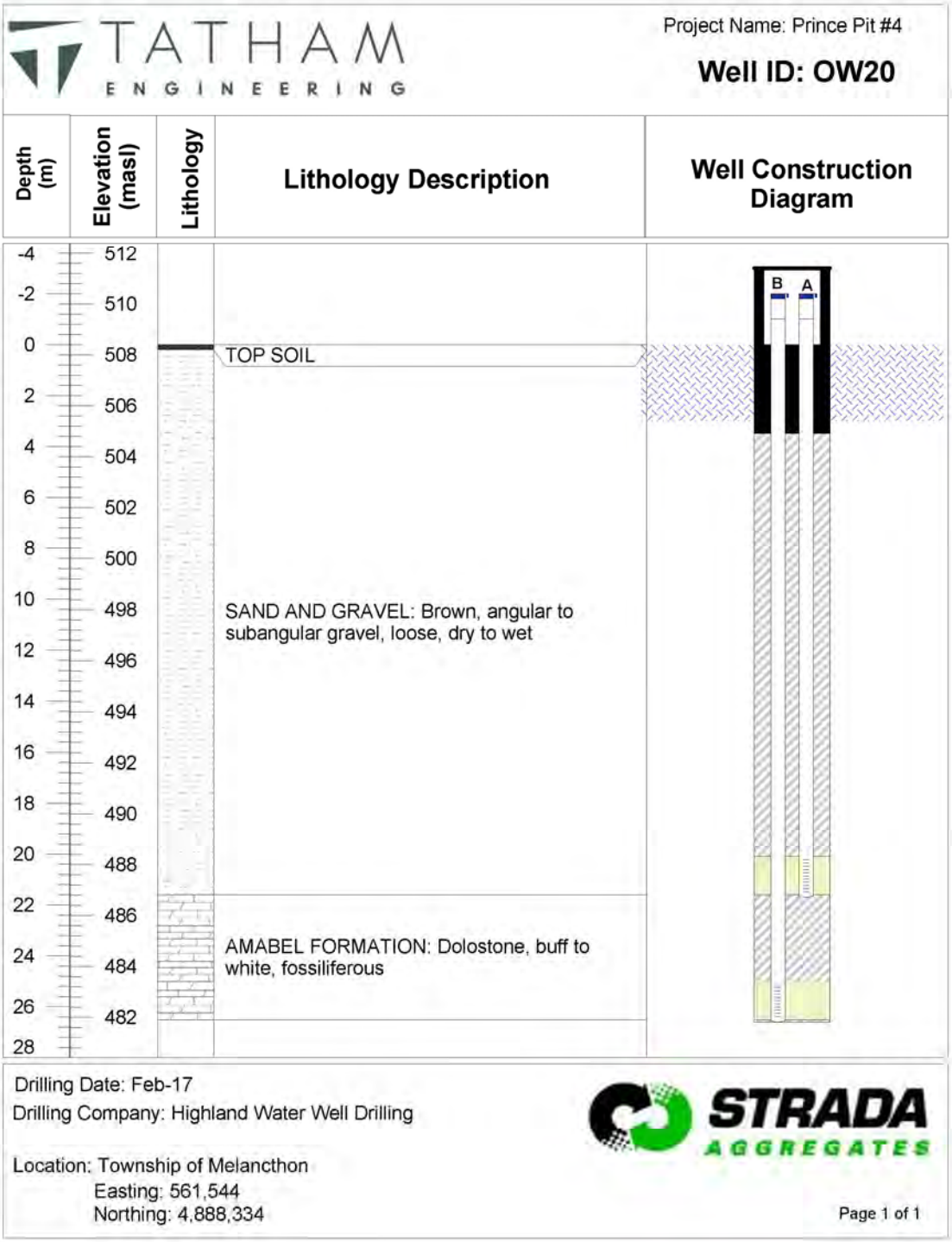


Figure A.38: Borehole log for Well OW20.

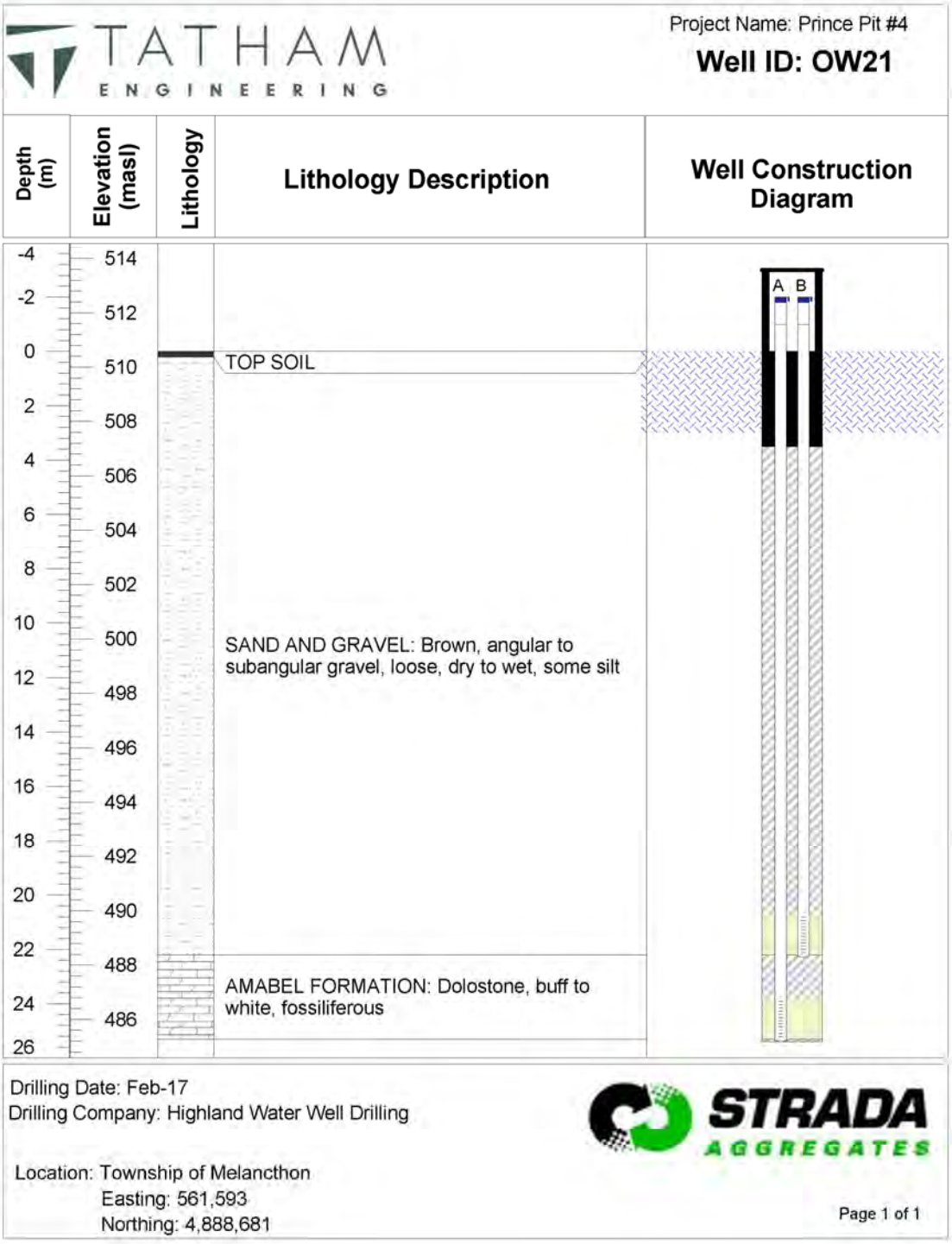


Figure A.39: Borehole log for Well OW21.

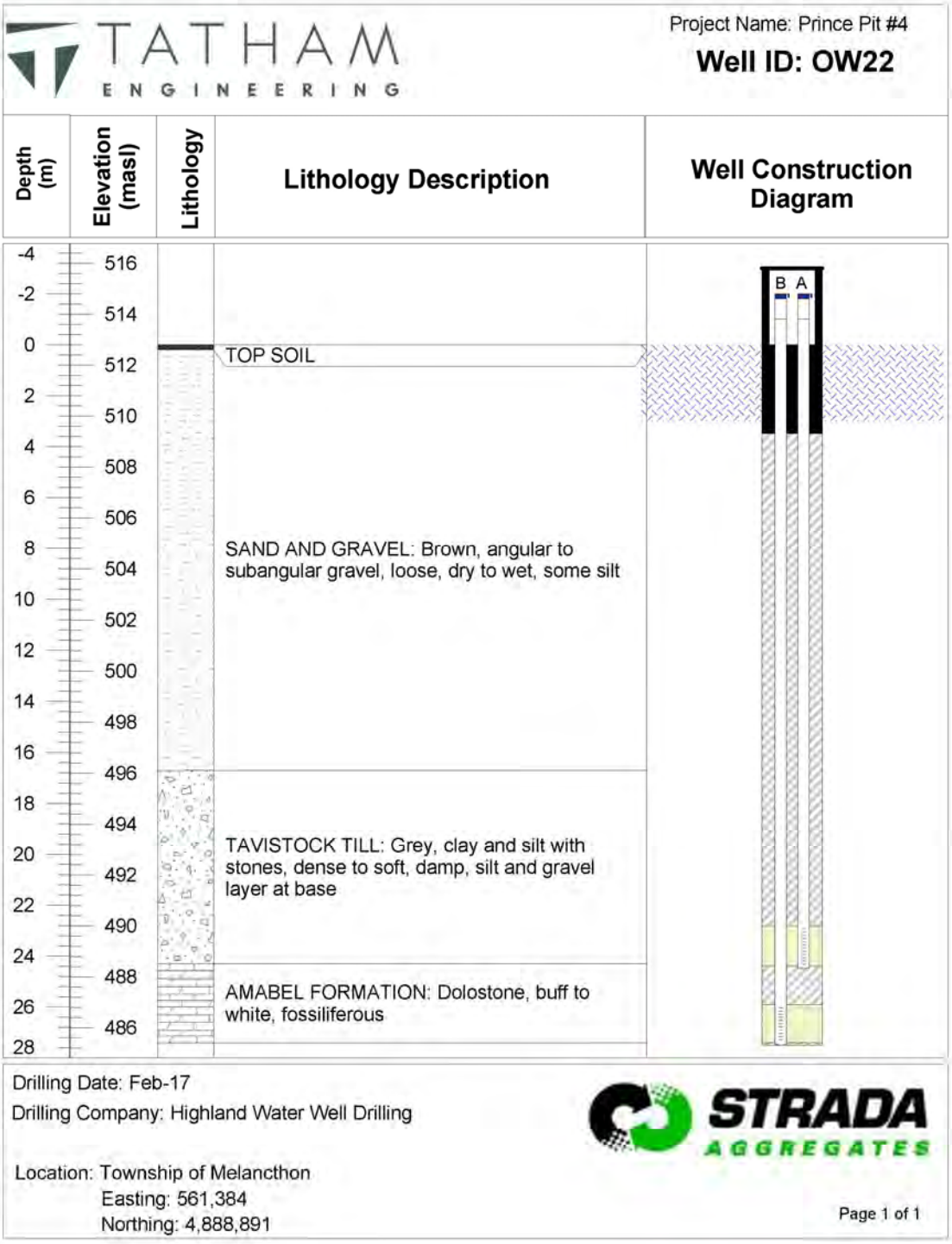


Figure A.40: Borehole log for Well OW22.

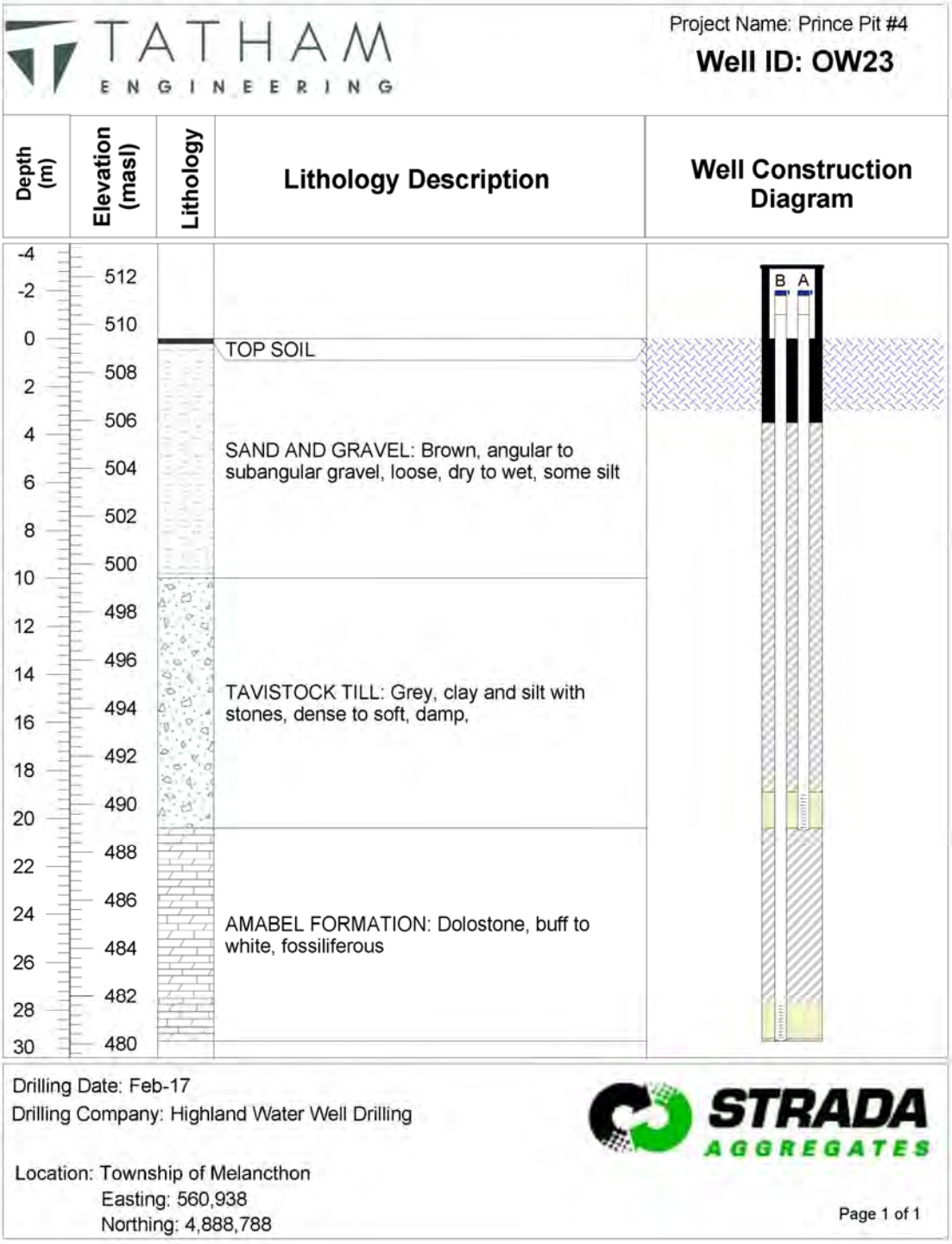
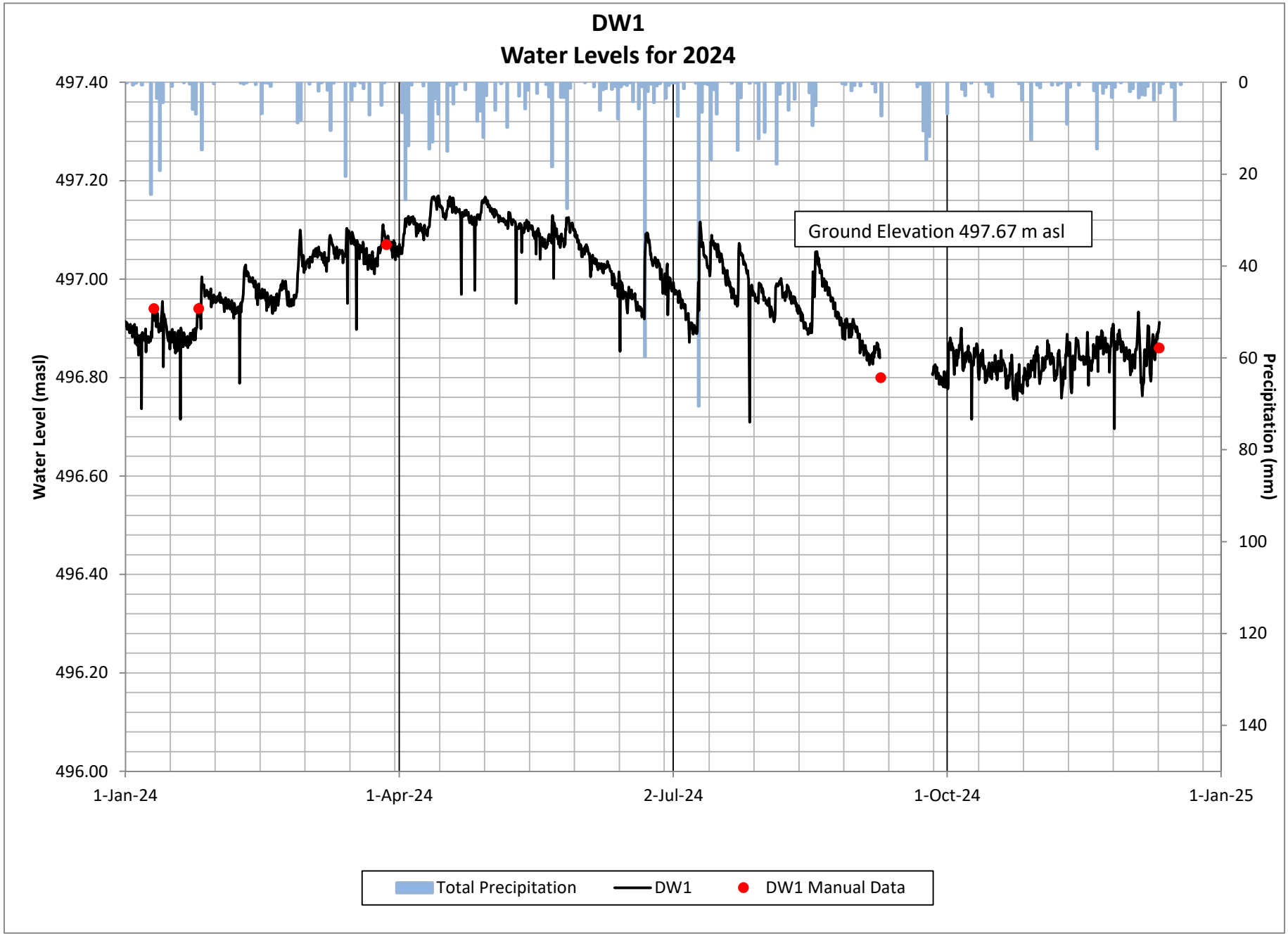
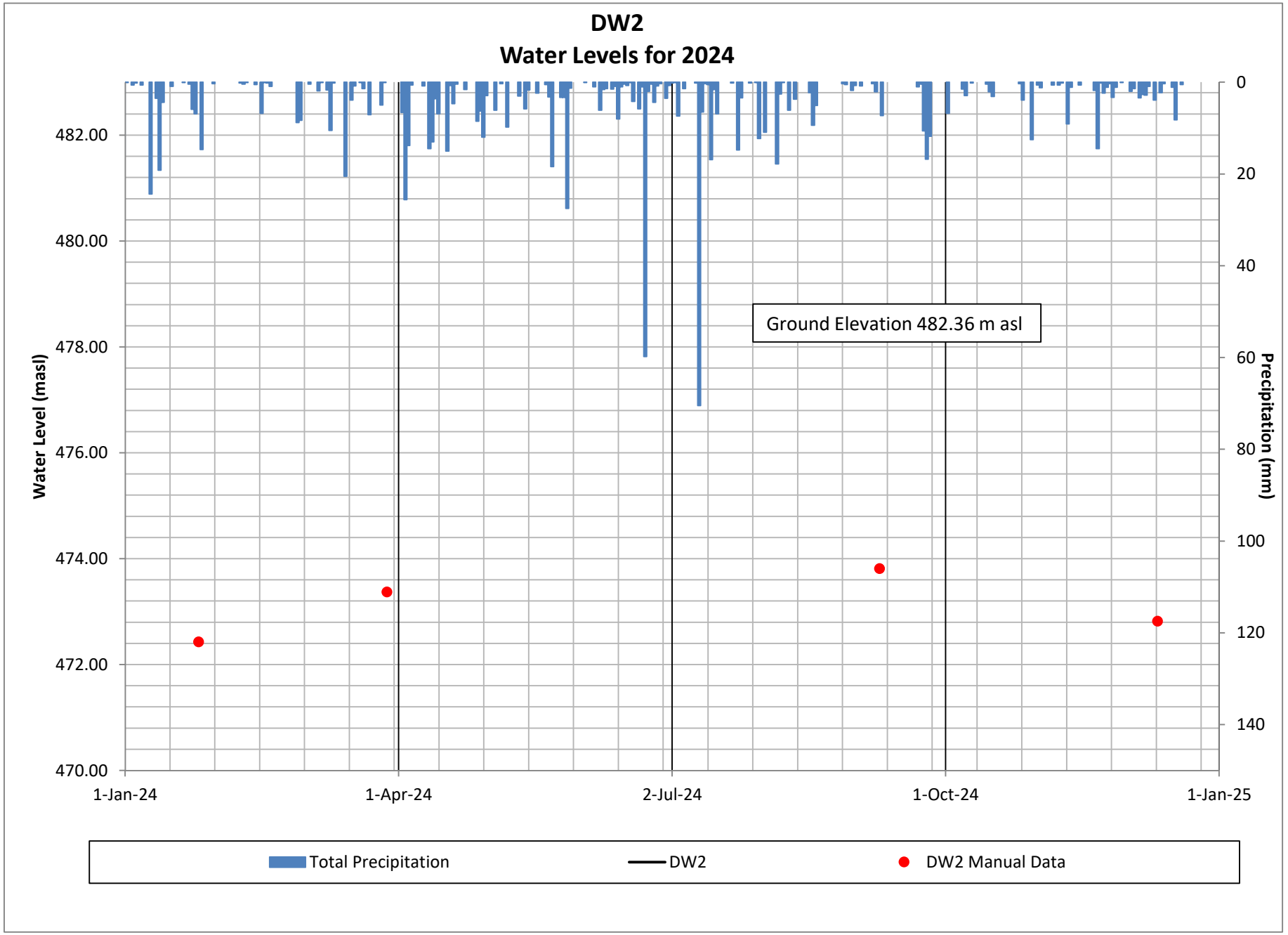
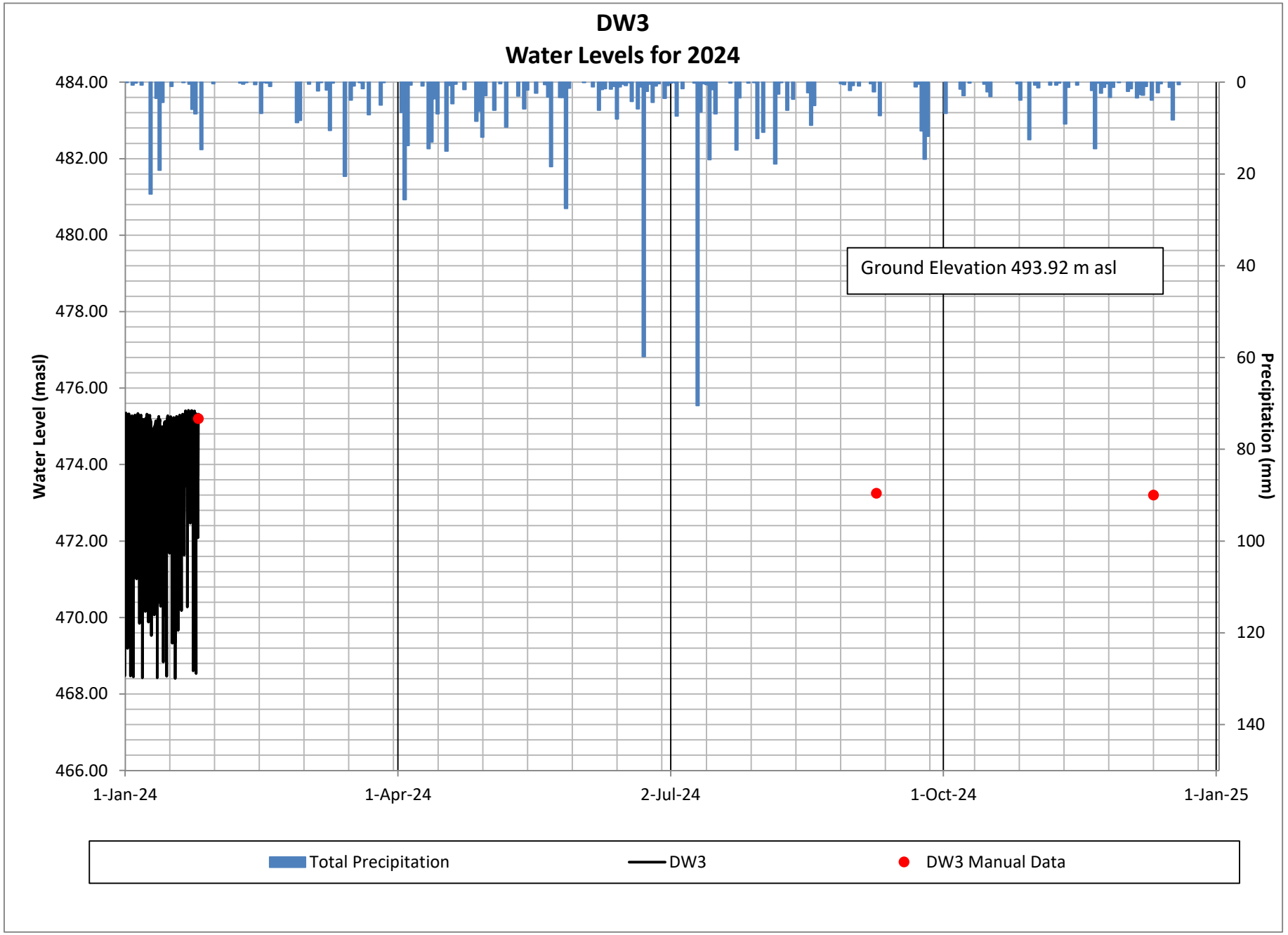


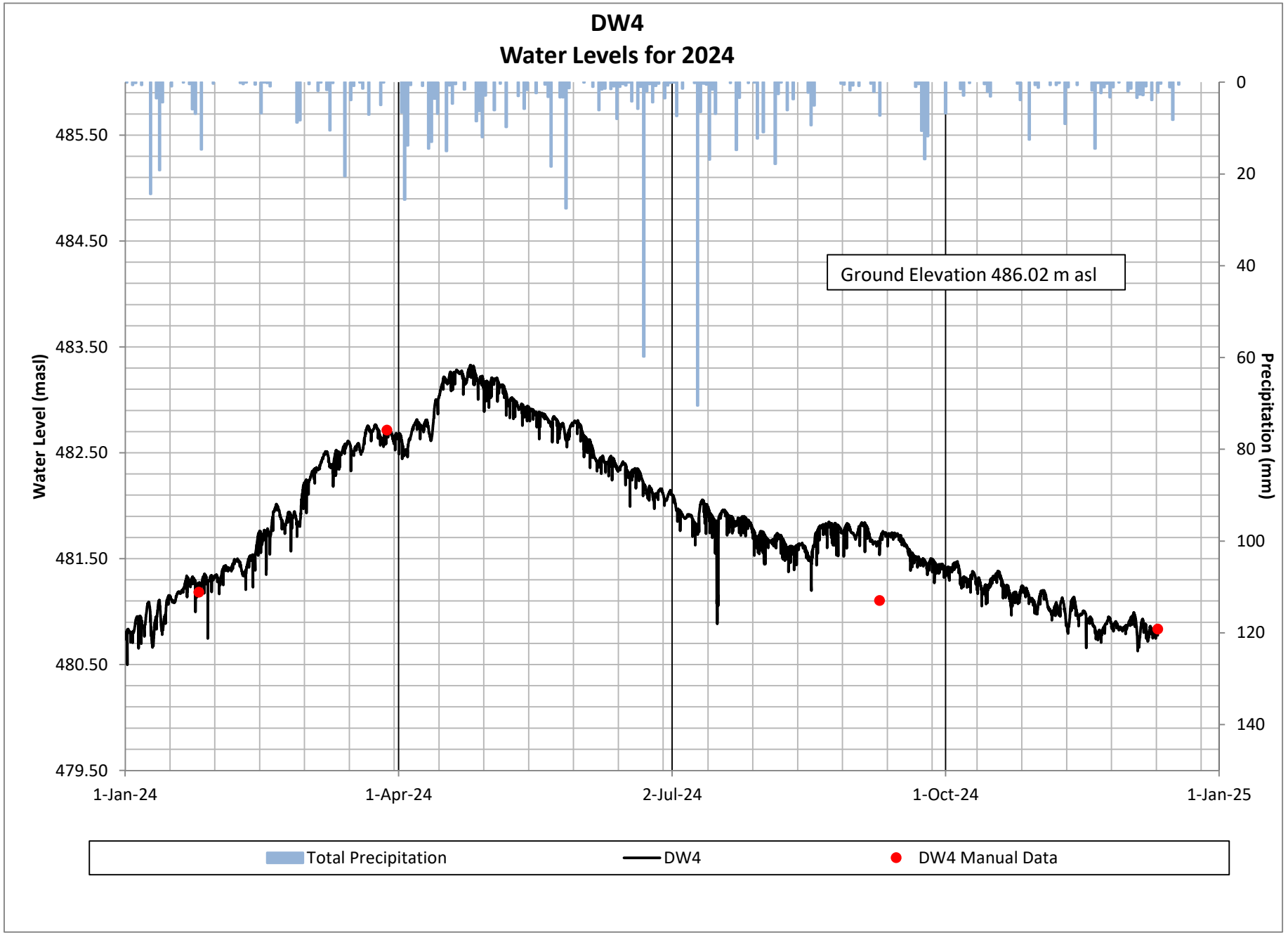
Figure A.41: Borehole log for Well OW23.

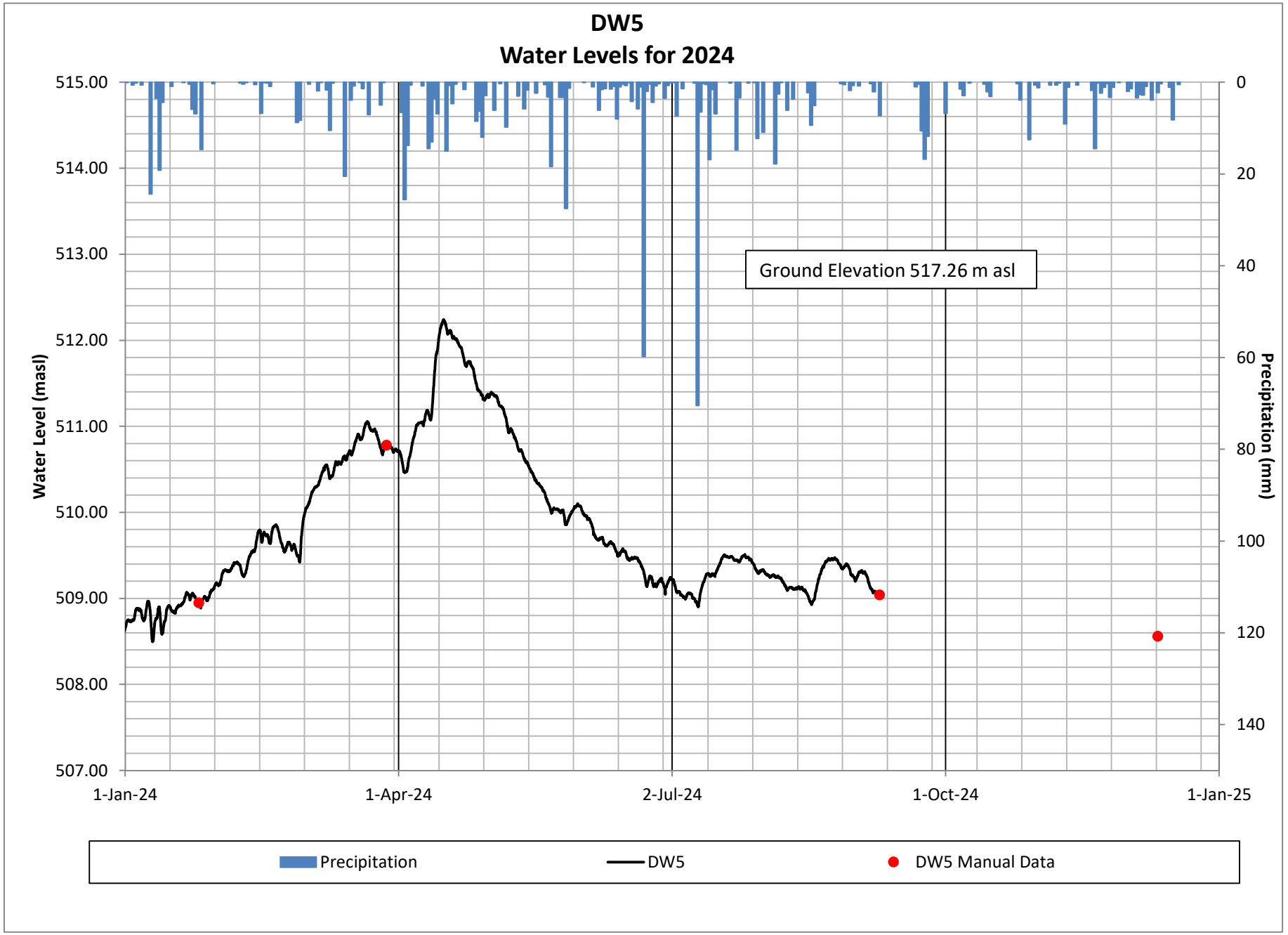
Appendix D: Hydrographs

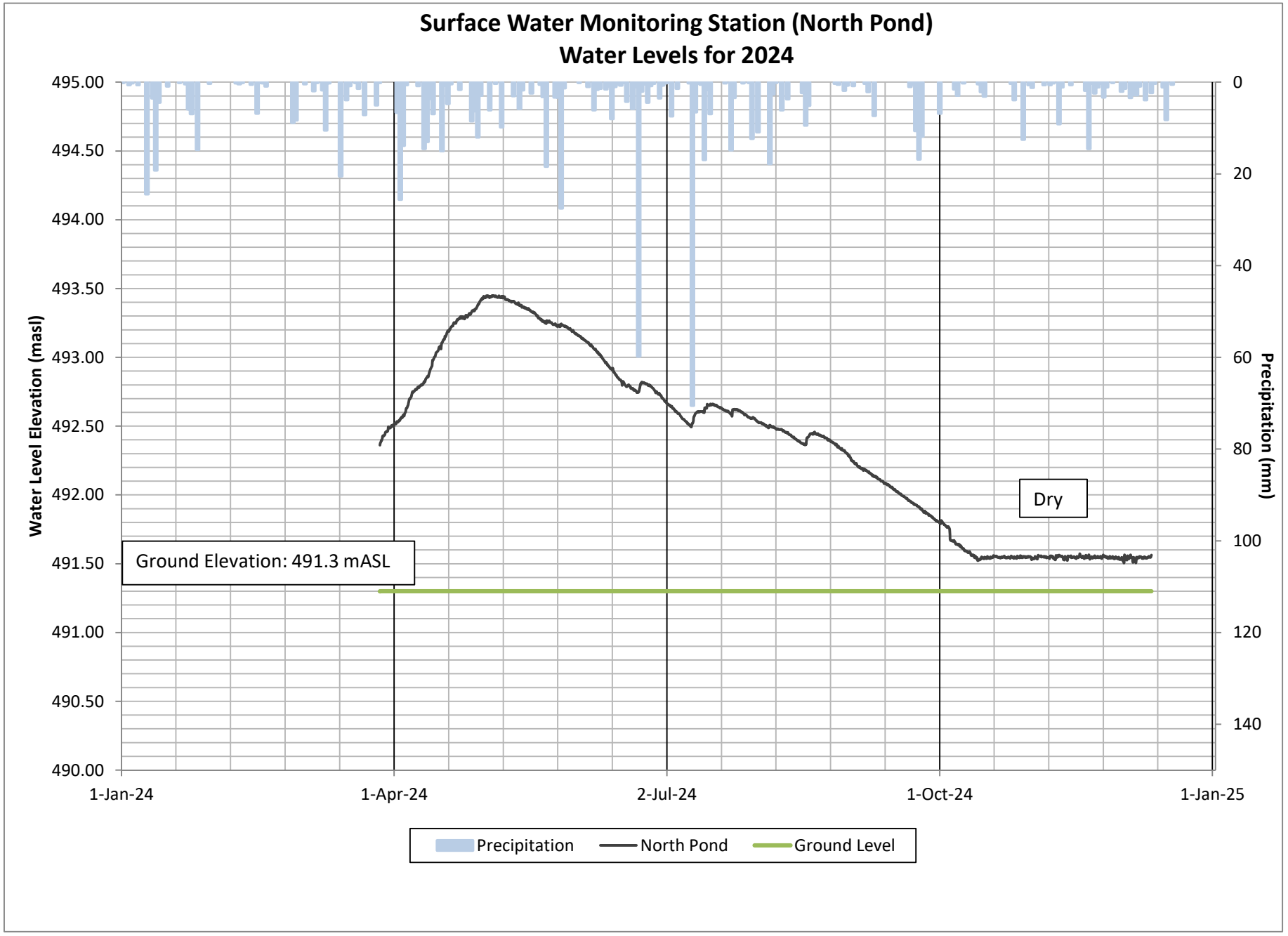

DW1
Water Levels for 2024
497.40
497.20
497.00
496.80
496.60
496.40
496.20
496.00
Water Level (masl)
0
20
40
60
80
100
120
140
Precipitation (mm)
1-Jan-24
1-Apr-24
2-Jul-24
1-Oct-24
1-Jan-25
Ground Elevation 497.67 m asl
Total Precipitation
DW1
DW1 Manual Data

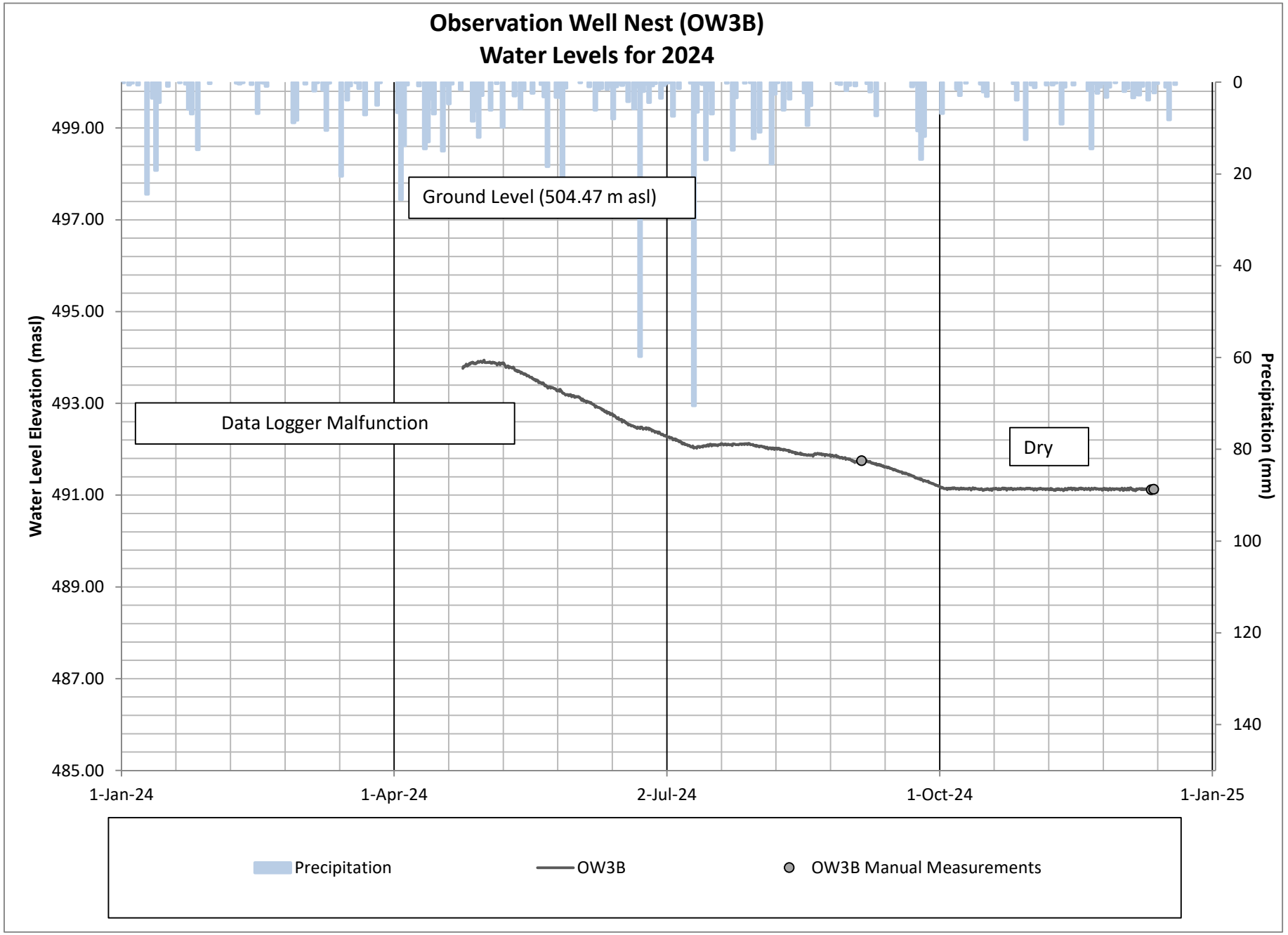

DW2
Water Levels for 2024
Water Level (masl)
482.00
480.00
478.00
476.00
474.00
472.00
470.00
Precipitation (mm)
0
20
40
60
80
100
120
140
Ground Elevation 482.36 m asl
1-Jan-24
1-Apr-24
2-Jul-24
1-Oct-24
1-Jan-25
Total Precipitation
DW2
DW2 Manual Data

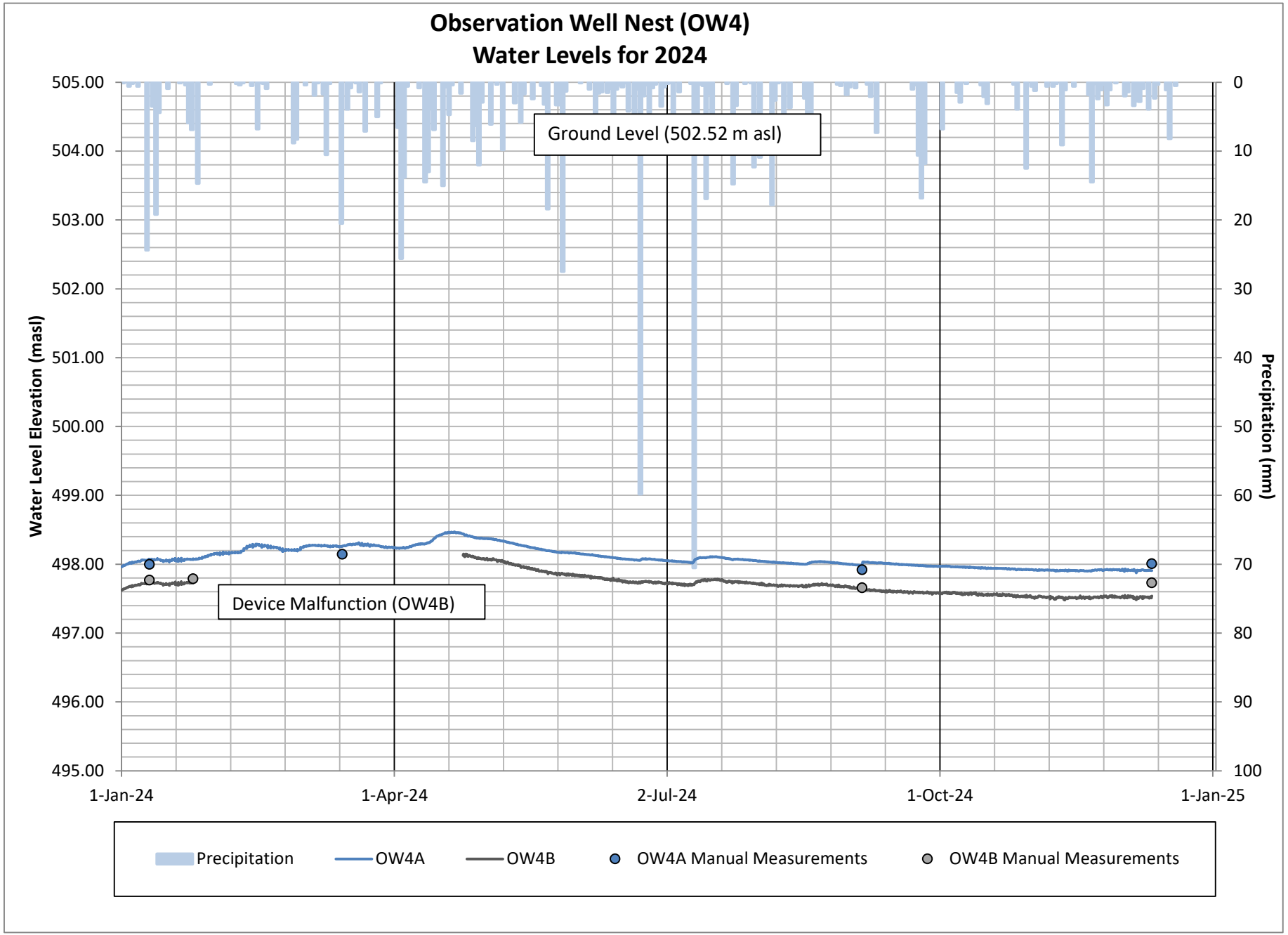

DW3
Water Levels for 2024
Water Level (masl)
Precipitation (mm)
484.00
482.00
480.00
478.00
476.00
474.00
472.00
470.00
468.00
466.00
0
20
40
60
80
100
120
140
1-Jan-24
1-Apr-24
2-Jul-24
1-Oct-24
1-Jan-25
Ground Elevation 493.92 m asl
Total Precipitation
DW3
DW3 Manual Data

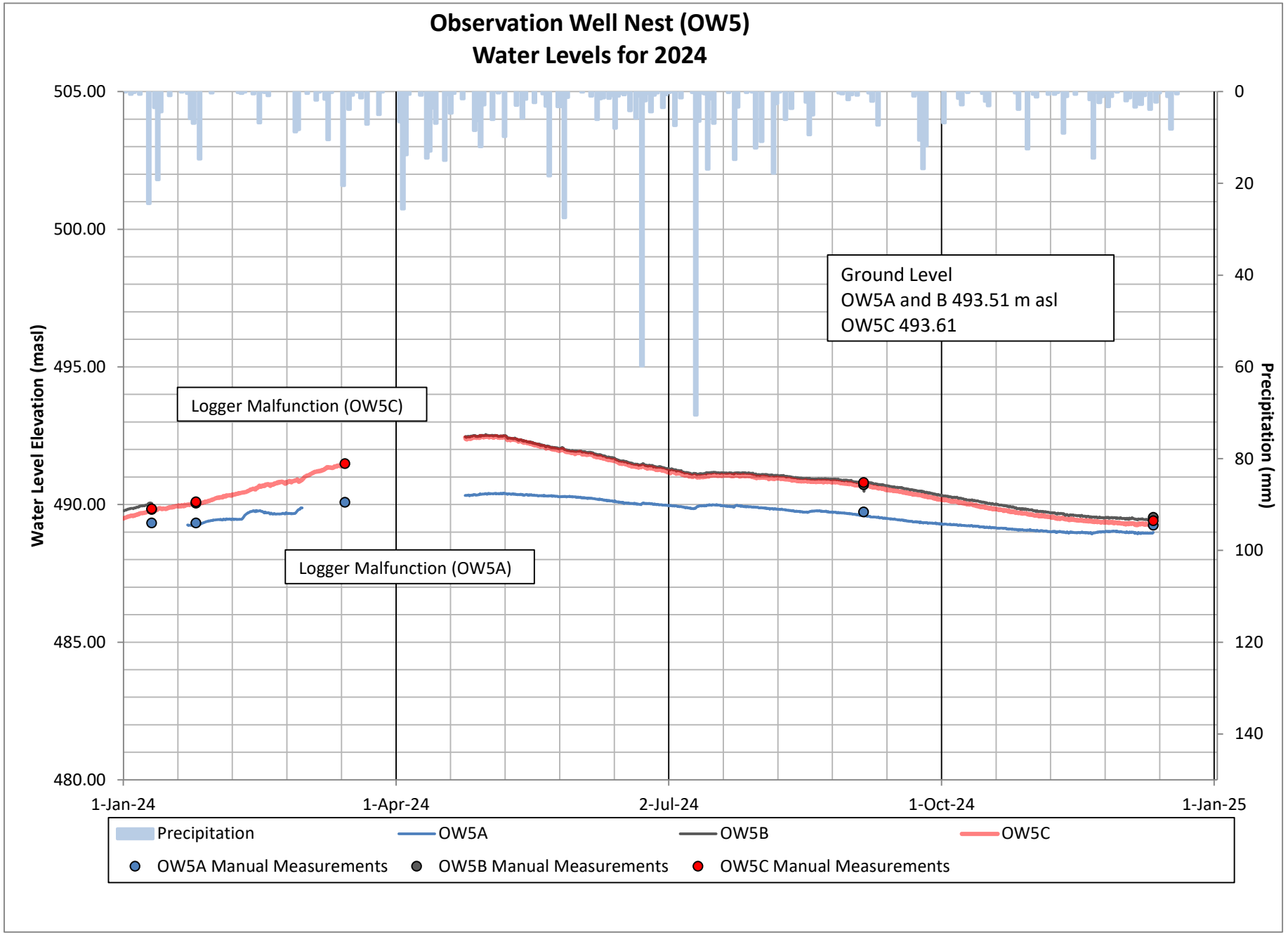

DW4
Water Levels for 2024
Ground Elevation 486.02 m asl
Water Level (masl)
Precipitation (mm)
485.50
484.50
483.50
482.50
481.50
480.50
479.50
0
20
40
60
80
100
120
140
1-Jan-24
1-Apr-24
2-Jul-24
1-Oct-24
1-Jan-25
Total Precipitation
DW4
DW4 Manual Data

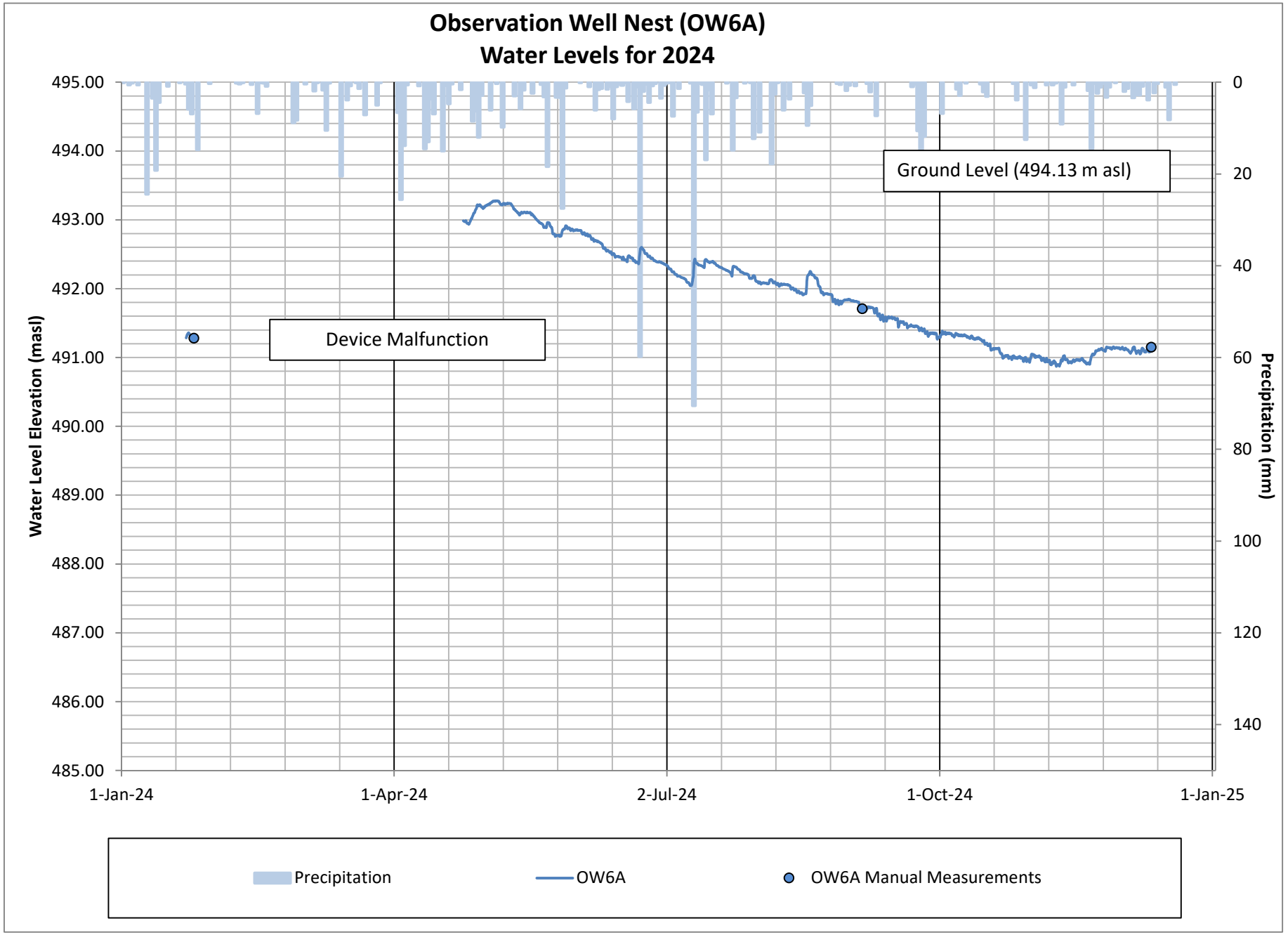

DW5
Water Levels for 2024
Ground Elevation 517.26 m asl
Water Level (masl)
Precipitation (mm)
515.00
514.00
513.00
512.00
511.00
510.00
509.00
508.00
507.00
0
20
40
60
80
100
120
140
1-Jan-24
1-Apr-24
2-Jul-24
1-Oct-24
1-Jan-25
Precipitation
DW5
DW5 Manual Data

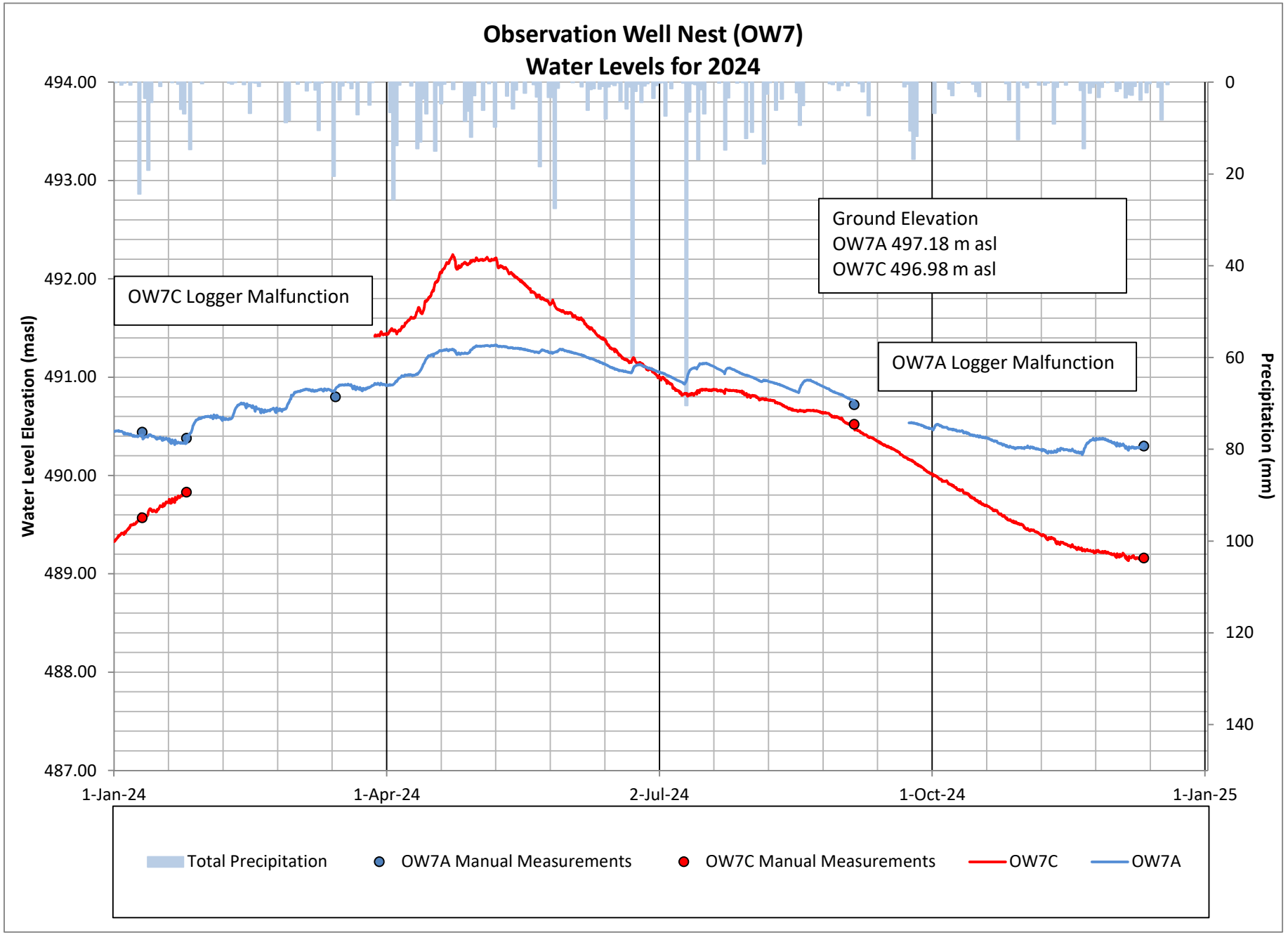

Surface Water Monitoring Station (North Pond)
Water Levels for 2024
Water Level Elevation (masl)
Precipitation (mm)
495.00
494.50
494.00
493.50
493.00
492.50
492.00
491.50
491.00
490.50
490.00
0
20
40
60
80
100
120
140
1-Jan-24
1-Apr-24
2-Jul-24
1-Oct-24
1-Jan-25
Ground Elevation: 491.3 mASL
Dry
Precipitation
North Pond
Ground Level

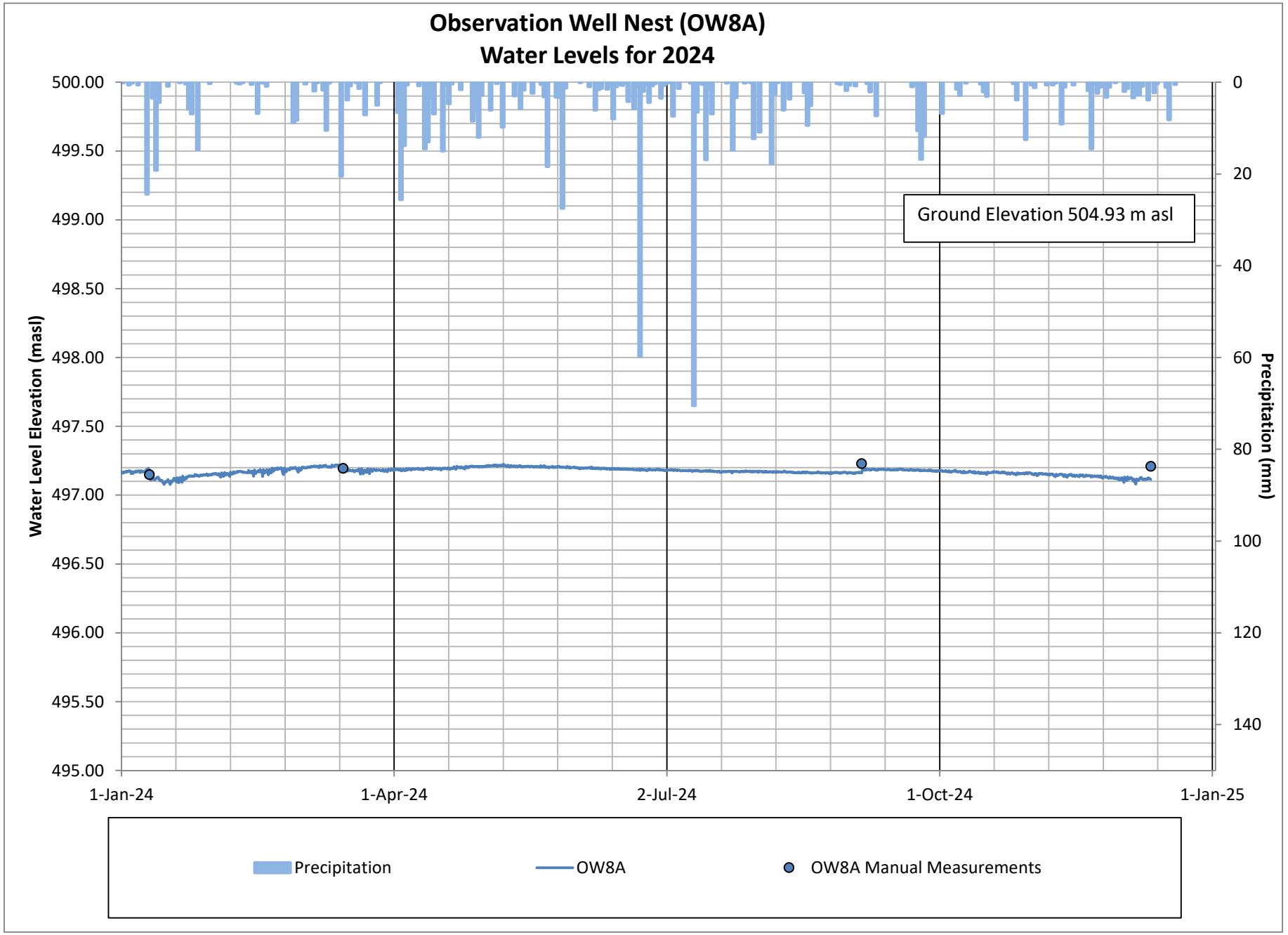

Observation Well Nest (OW3B)
Water Levels for 2024
Water Level Elevation (masl)
Precipitation (mm)
499.00
497.00
495.00
493.00
491.00
489.00
487.00
485.00
0
20
40
60
80
100
120
140
1-Jan-24
1-Apr-24
2-Jul-24
1-Oct-24
1-Jan-25
Ground Level (504.47 m asl)
Data Logger Malfunction
Dry
Precipitation
OW3B
OW3B Manual Measurements

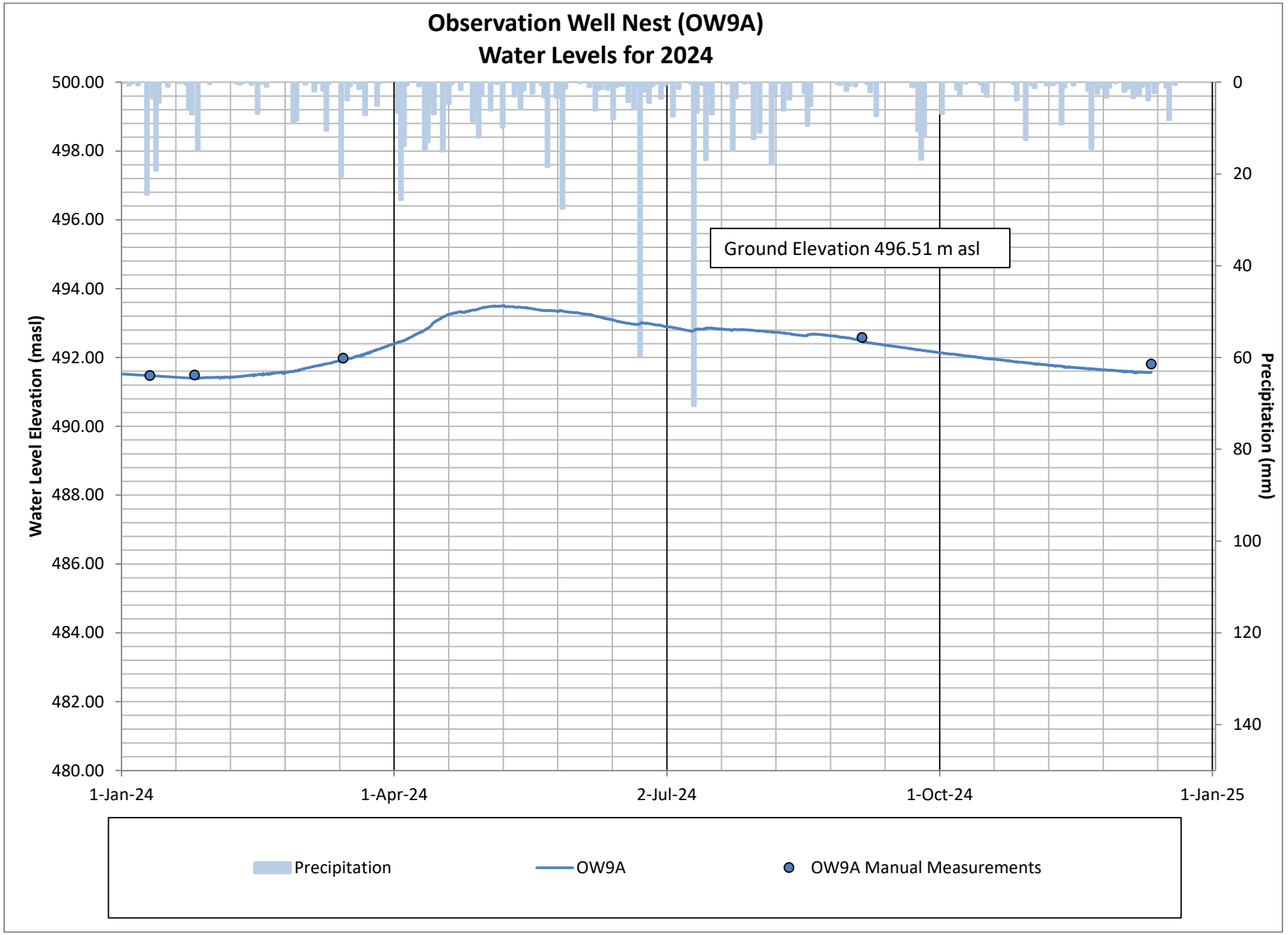

Observation Well Nest (OW4)
Water Levels for 2024
Water Level Elevation (masl)
Precipitation (mm)
505.00
504.00
503.00
502.00
501.00
500.00
499.00
498.00
497.00
496.00
495.00
0
10
20
30
40
50
60
70
80
90
100
1-Jan-24
1-Apr-24
2-Jul-24
1-Oct-24
1-Jan-25
Ground Level (502.52 m asl)
Device Malfunction (OW4B)
Precipitation
OW4A
OW4B
OW4A Manual Measurements
OW4B Manual Measurements

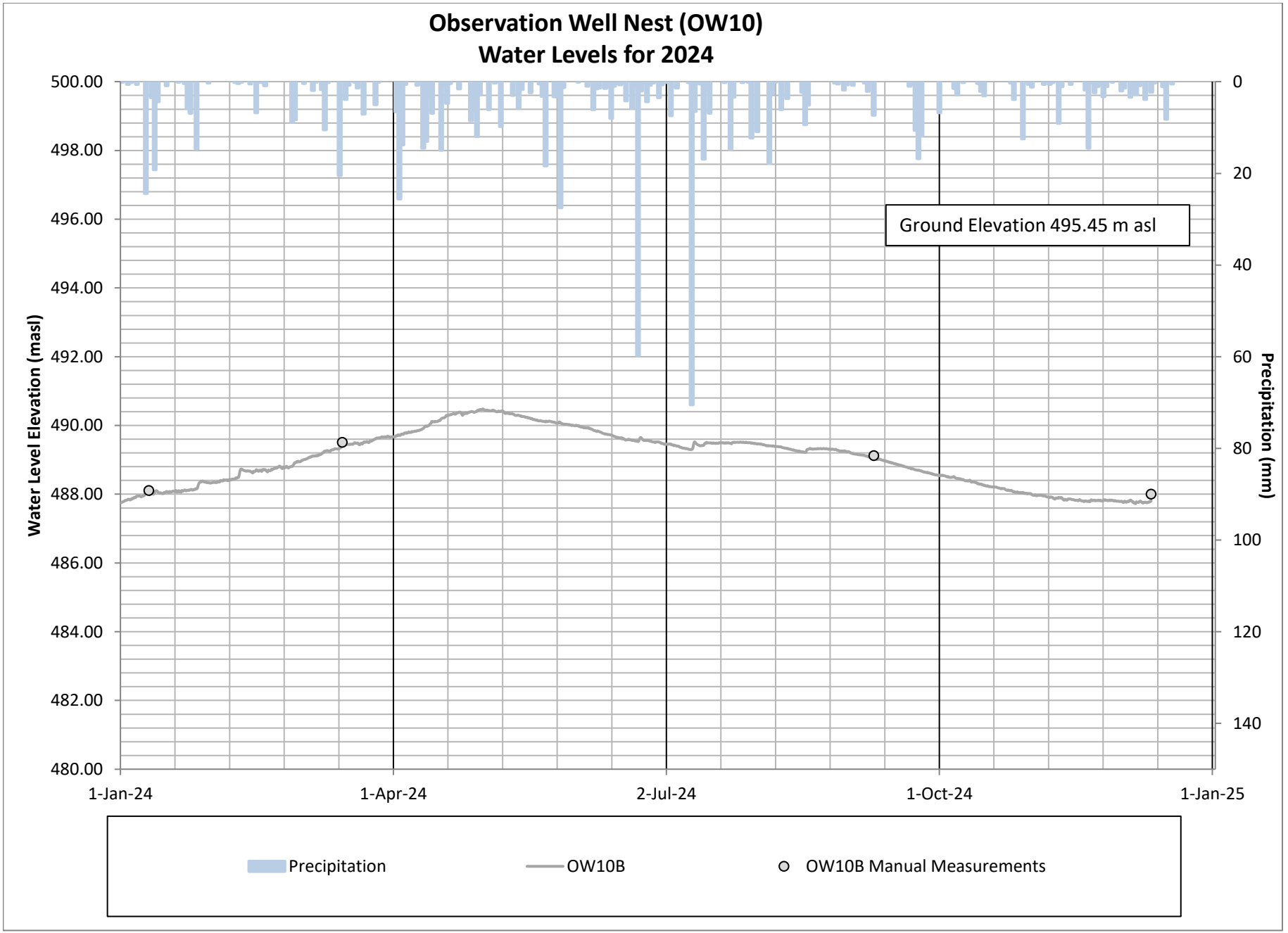

Observation Well Nest (OW5)
Water Levels for 2024
Water Level Elevation (masl)
Precipitation (mm)
505.00
500.00
495.00
490.00
485.00
480.00
0
20
40
60
80
100
120
140
1-Jan-24
1-Apr-24
2-Jul-24
1-Oct-24
1-Jan-25
Ground Level
OW5A and B 493.51 m asl
OW5C 493.61
Logger Malfunction (OW5C)
Logger Malfunction (OW5A)
Precipitation
OW5A
OW5B
OW5C
OW5A Manual Measurements
OW5B Manual Measurements
OW5C Manual Measurements

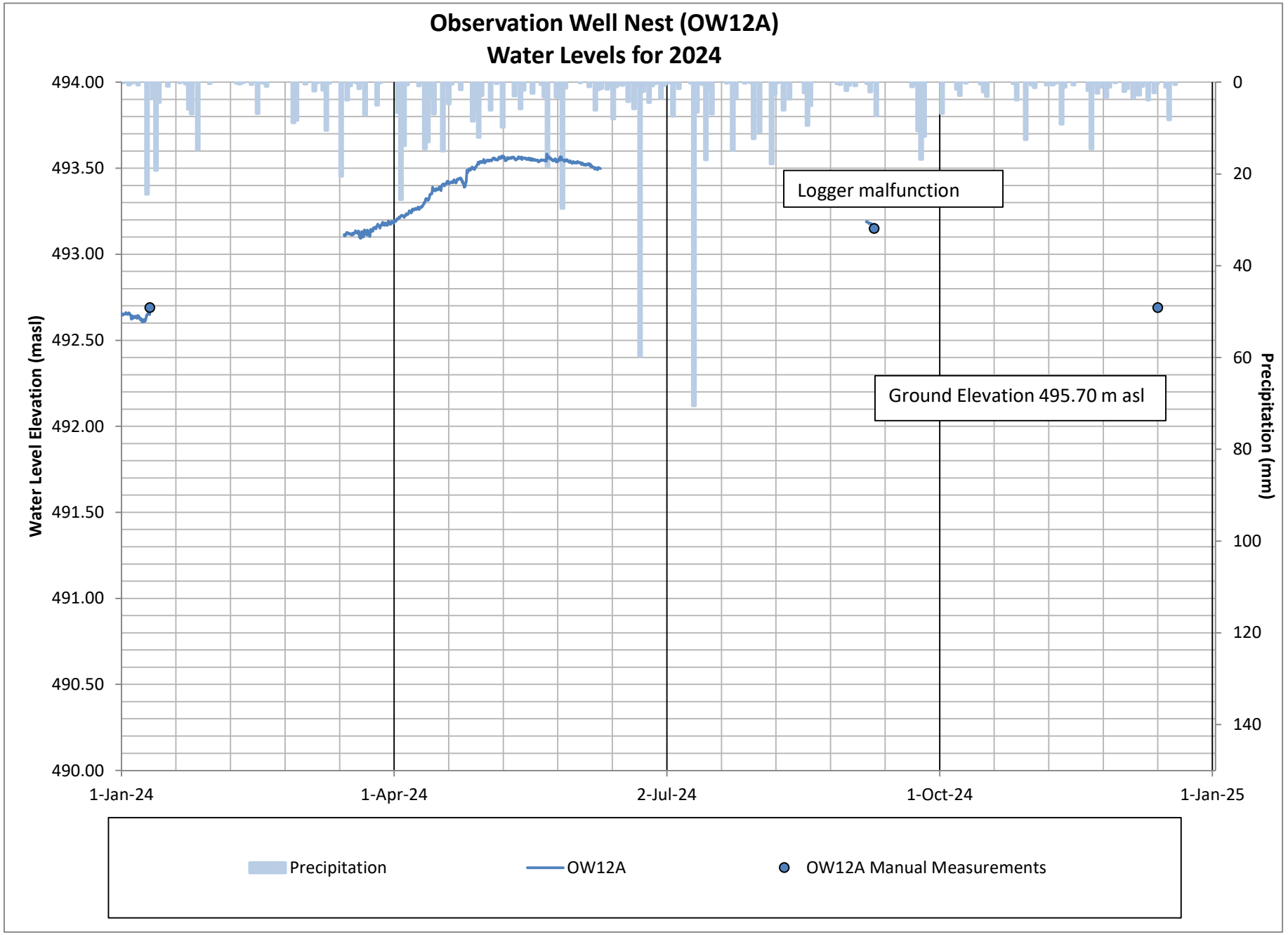

Observation Well Nest (OW6A)
Water Levels for 2024
Water Level Elevation (masl)
Precipitation (mm)
495.00
494.00
493.00
492.00
491.00
490.00
489.00
488.00
487.00
486.00
485.00
0
20
40
60
80
100
120
140
1-Jan-24
1-Apr-24
2-Jul-24
1-Oct-24
1-Jan-25
Ground Level (494.13 m asl)
Device Malfunction
Precipitation
OW6A
OW6A Manual Measurements

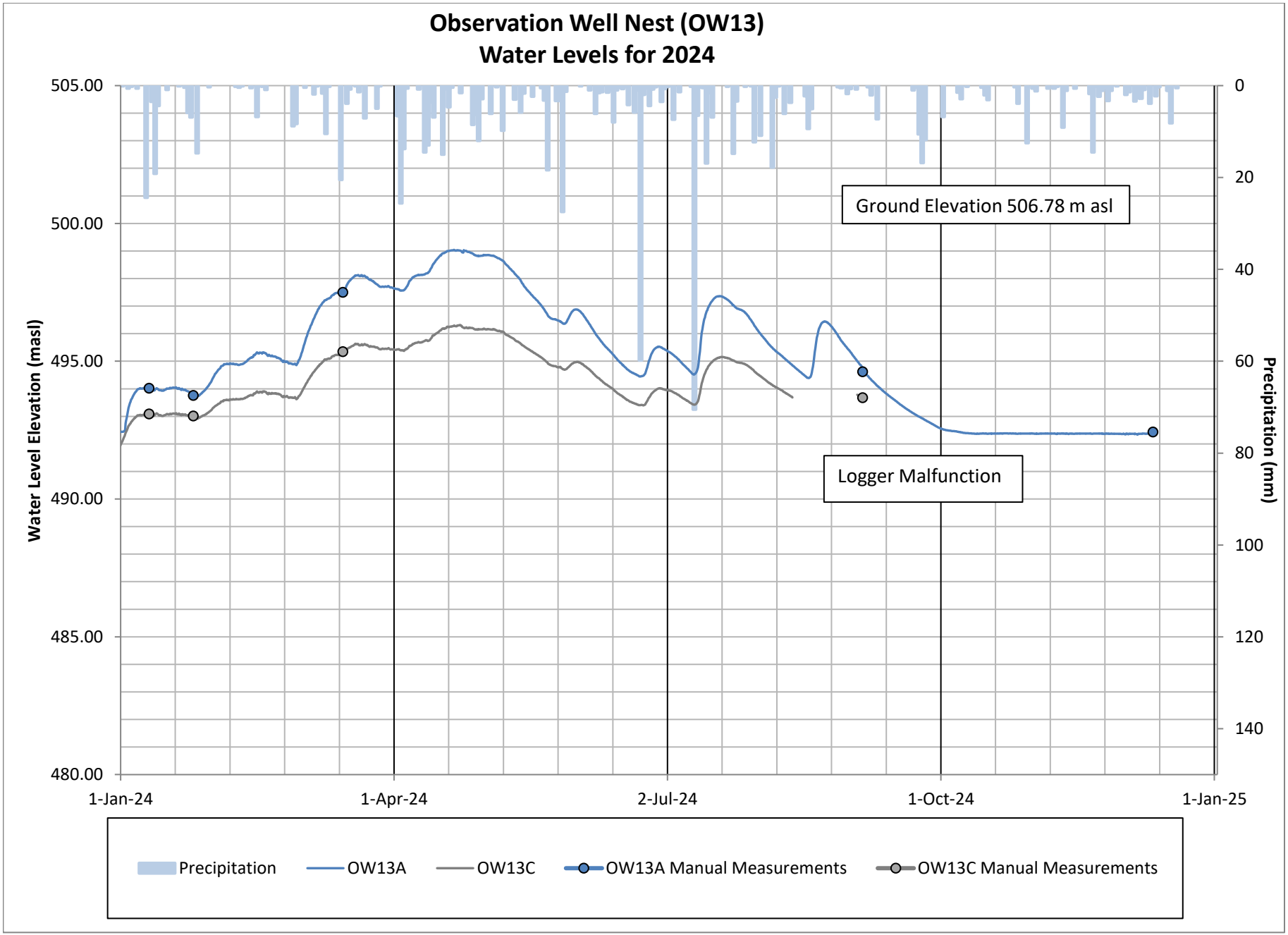

Observation Well Nest (OW7)
Water Levels for 2024
Water Level Elevation (masl)
Precipitation (mm)
494.00
493.00
492.00
491.00
490.00
489.00
488.00
487.00
0
20
40
60
80
100
120
140
1-Jan-24
1-Apr-24
2-Jul-24
1-Oct-24
1-Jan-25
OW7C Logger Malfunction
Ground Elevation
OW7A 497.18 m asl
OW7C 496.98 m asl
OW7A Logger Malfunction
Total Precipitation
OW7A Manual Measurements
OW7C Manual Measurements
OW7C
OW7A

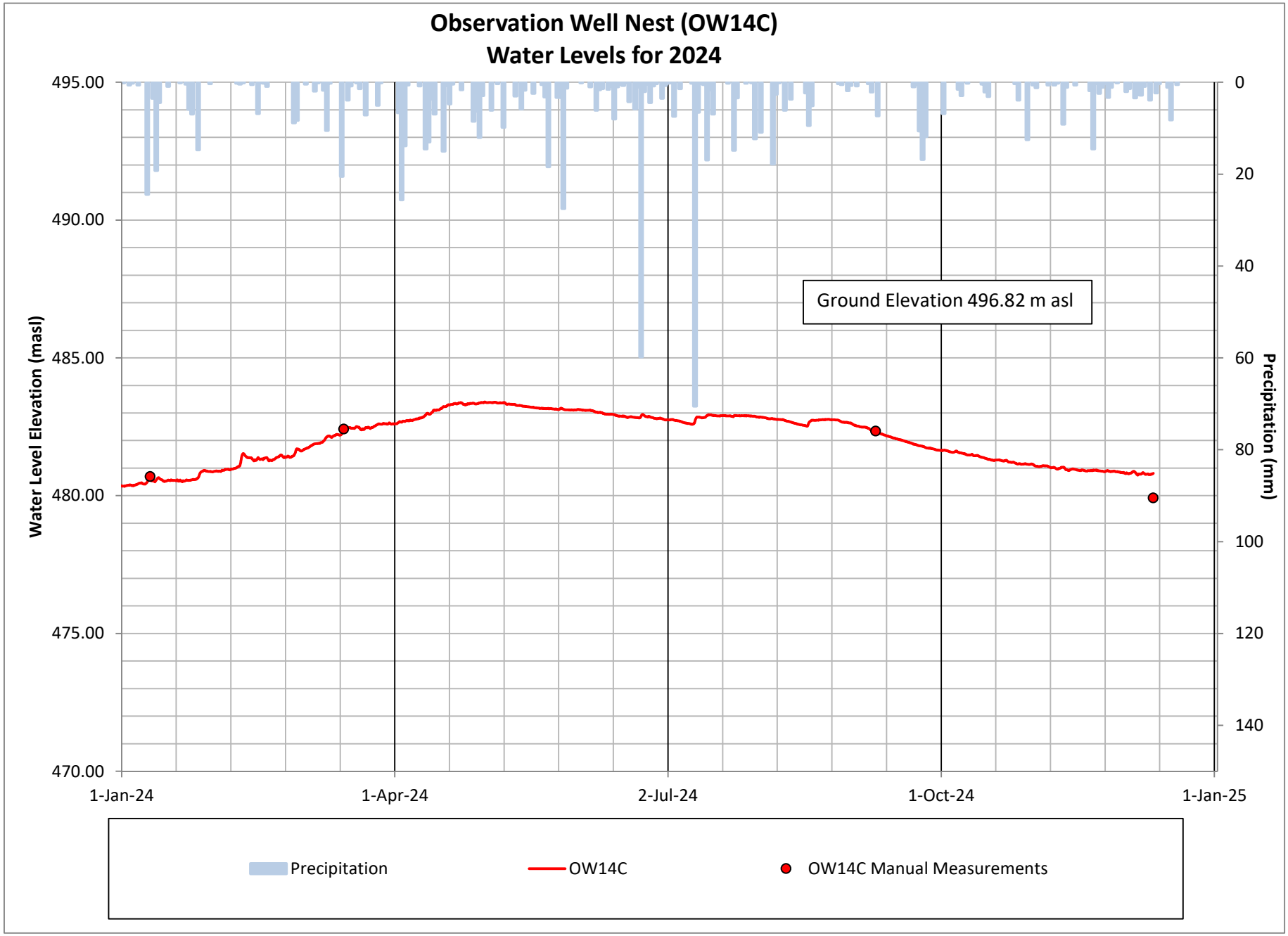

Observation Well Nest (OW8A)
Water Levels for 2024
Water Level Elevation (masl)
Precipitation (mm)
500.00
499.50
499.00
498.50
498.00
497.50
497.00
496.50
496.00
495.50
495.00
0
20
40
60
80
100
120
140
1-Jan-24
1-Apr-24
2-Jul-24
1-Oct-24
1-Jan-25
Ground Elevation 504.93 m asl
Precipitation
OW8A
OW8A Manual Measurements

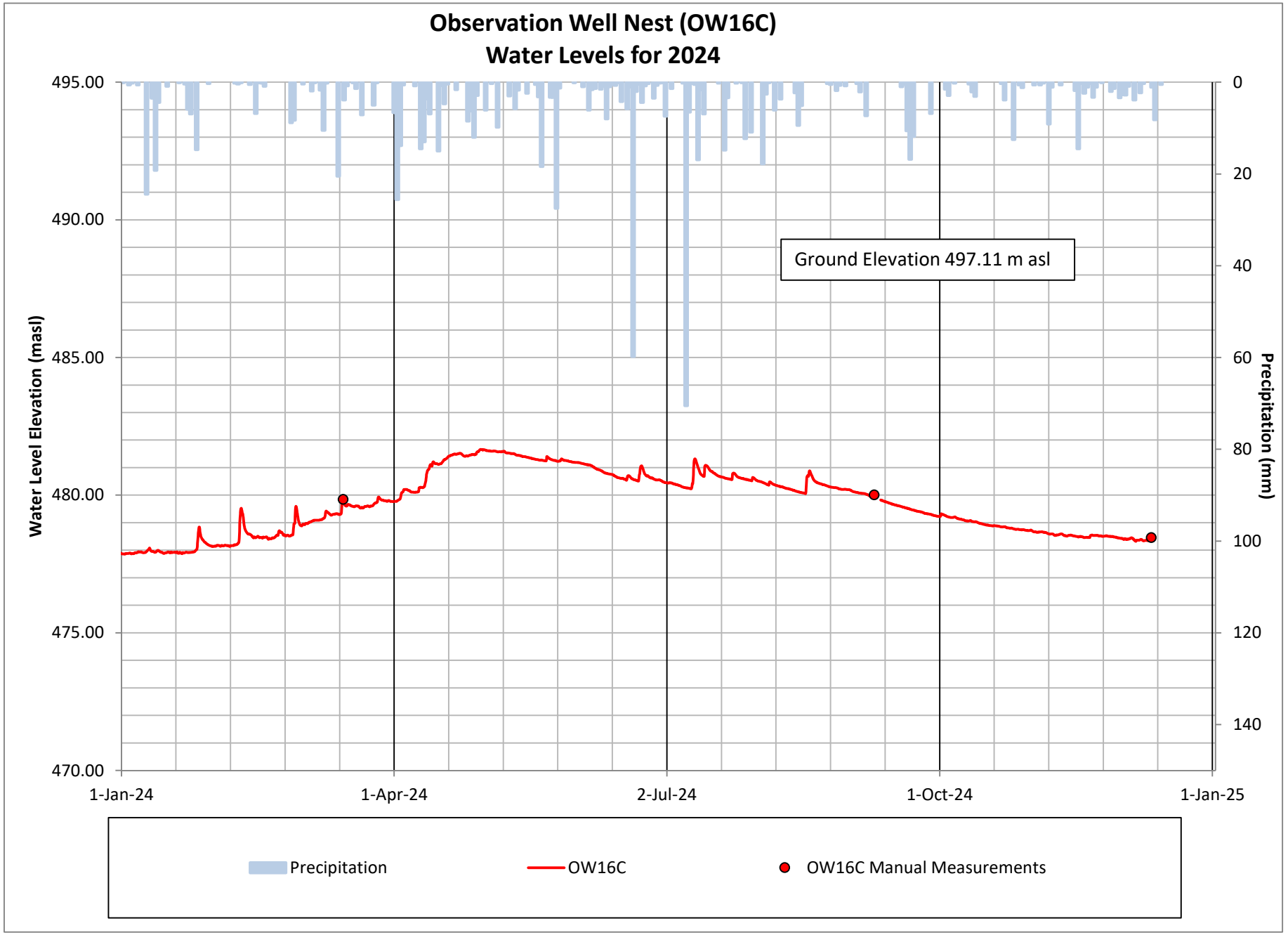

Observation Well Nest (OW9A)
Water Levels for 2024
Water Level Elevation (masl)
Precipitation (mm)
500.00
498.00
496.00
494.00
492.00
490.00
488.00
486.00
484.00
482.00
480.00
0
20
40
60
80
100
120
140
1-Jan-24
1-Apr-24
2-Jul-24
1-Oct-24
1-Jan-25
Ground Elevation 496.51 m asl
Precipitation
OW9A
OW9A Manual Measurements

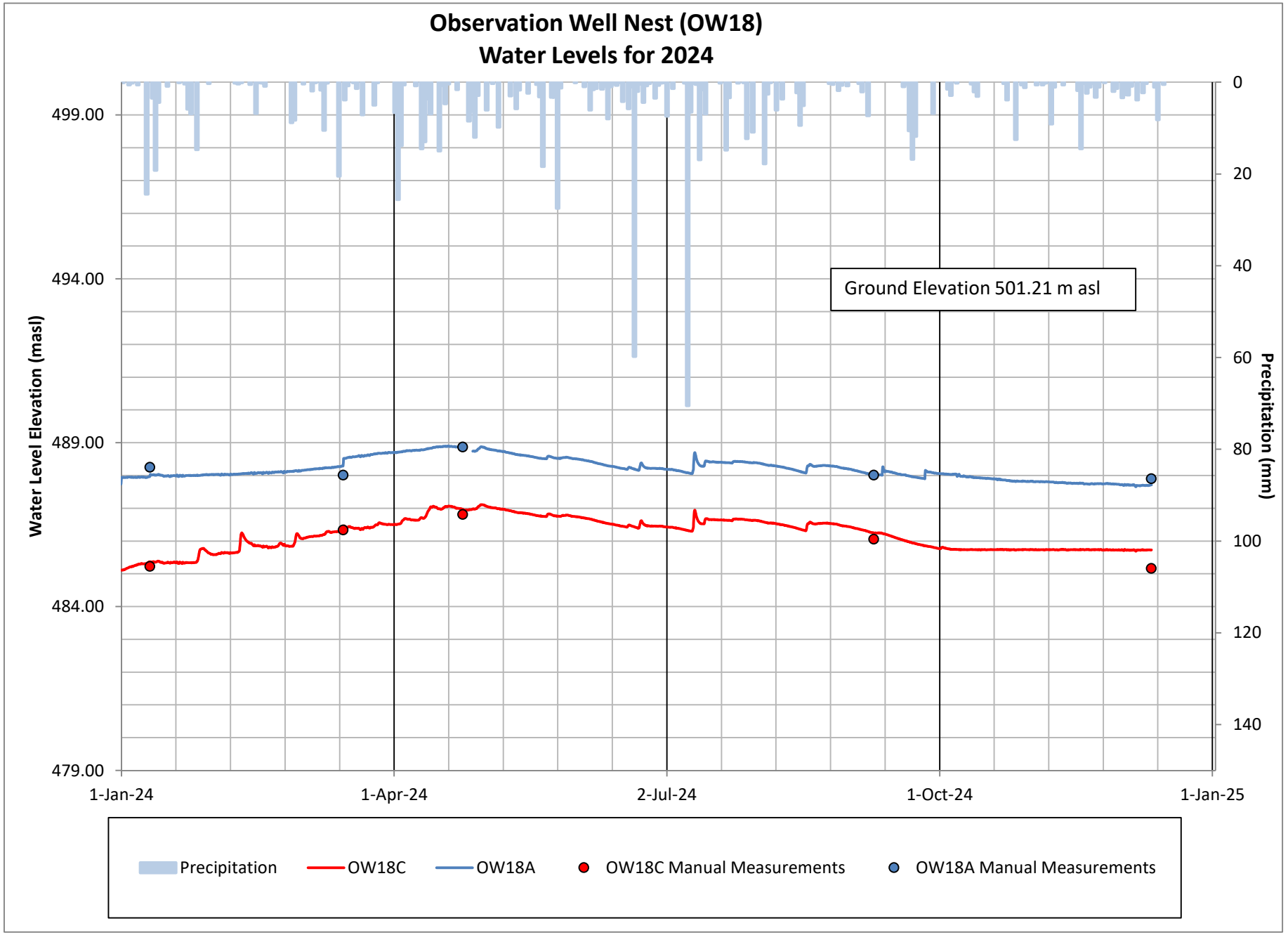

Observation Well Nest (OW10)
Water Levels for 2024
Water Level Elevation (masl)
Precipitation (mm)
500.00
498.00
496.00
494.00
492.00
490.00
488.00
486.00
484.00
482.00
480.00
0
20
40
60
80
100
120
140
1-Jan-24
1-Apr-24
2-Jul-24
1-Oct-24
1-Jan-25
Ground Elevation 495.45 m asl
Precipitation
OW10B
OW10B Manual Measurements

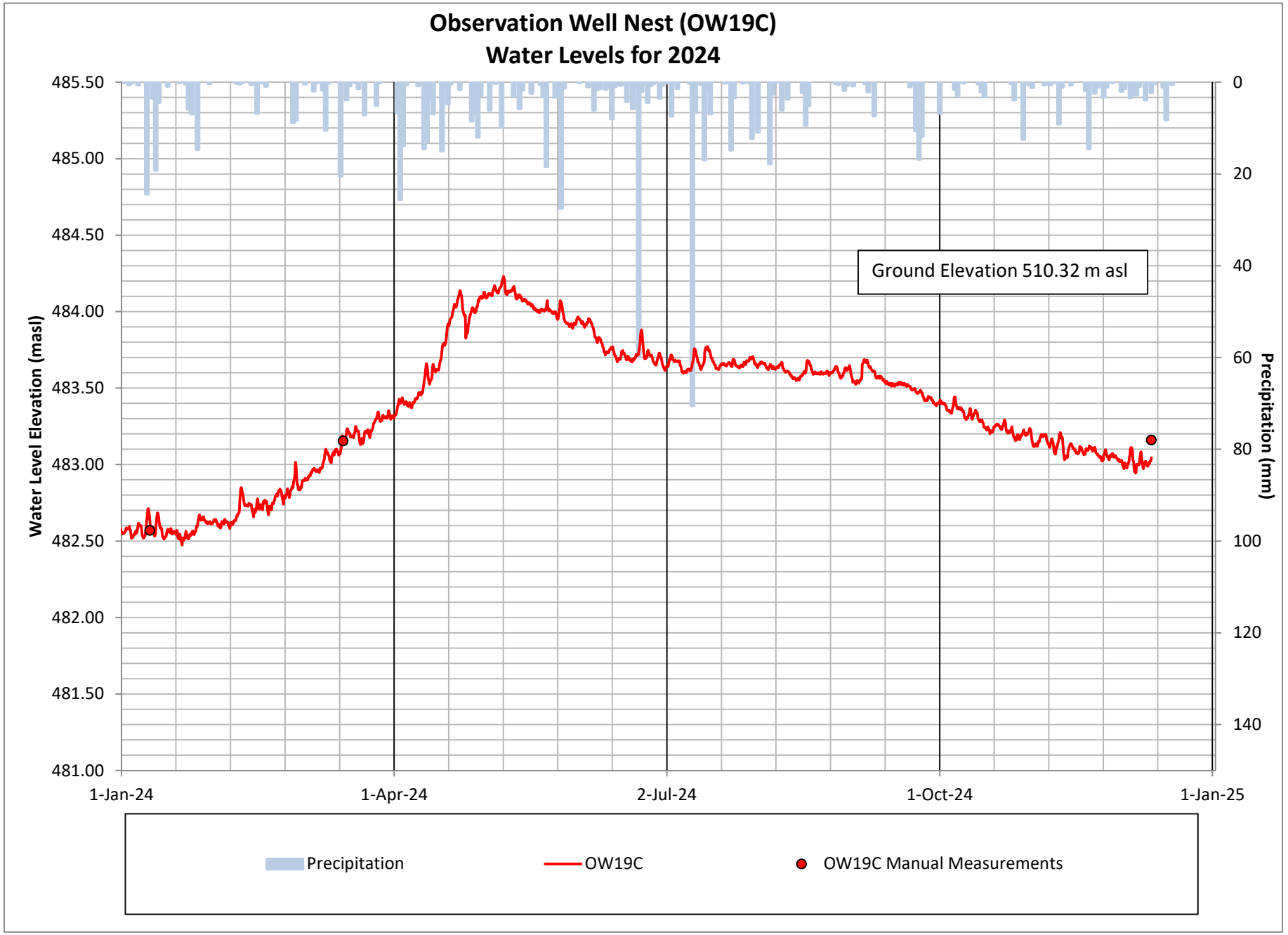

Observation Well Nest (OW12A)
Water Levels for 2024
Water Level Elevation (masl)
Precipitation (mm)
494.00
493.50
493.00
492.50
492.00
491.50
491.00
490.50
490.00
0
20
40
60
80
100
120
140
1-Jan-24
1-Apr-24
2-Jul-24
1-Oct-24
1-Jan-25
Logger malfunction
Ground Elevation 495.70 m asl
Precipitation
OW12A
OW12A Manual Measurements

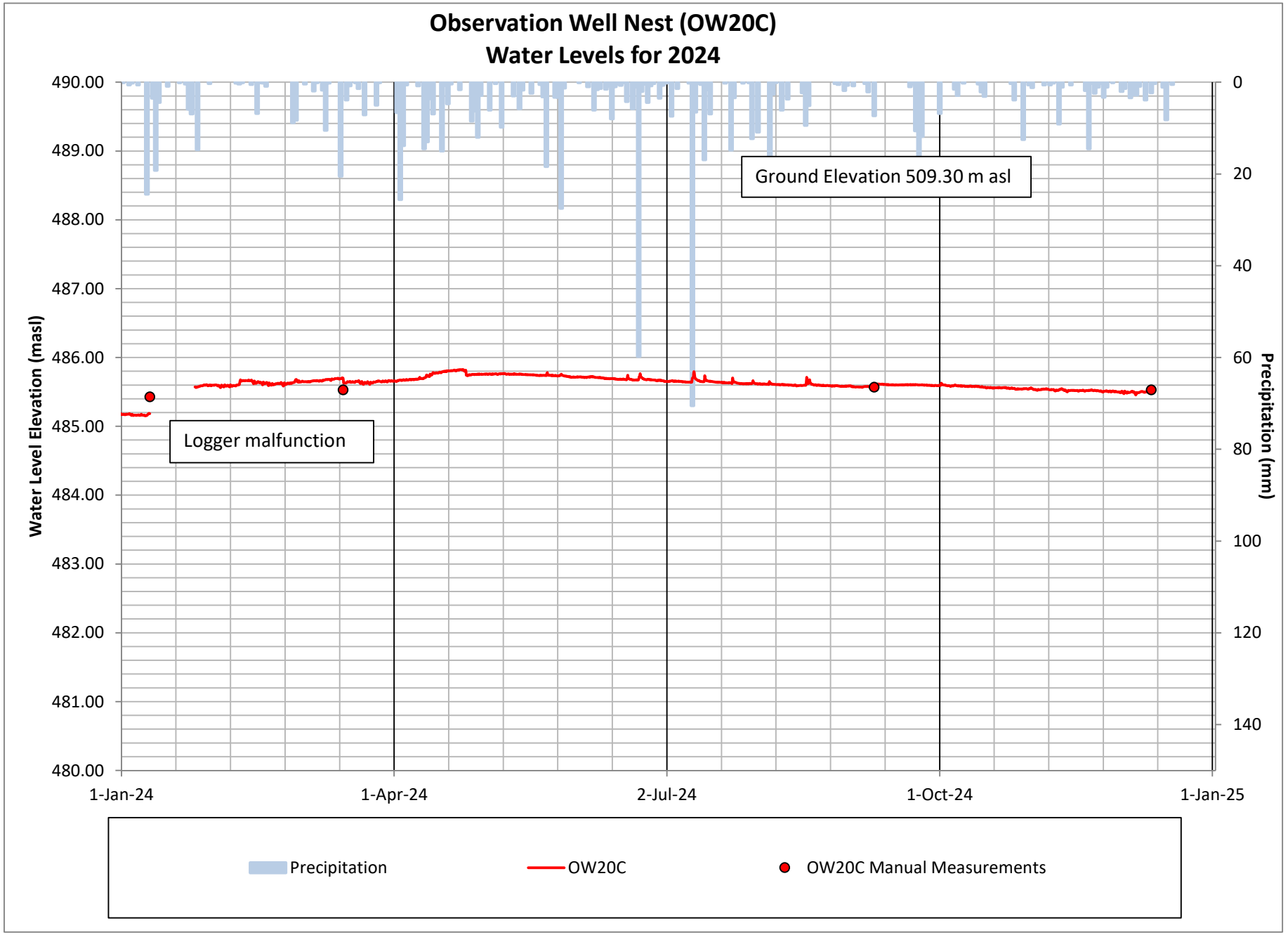

Observation Well Nest (OW13)
Water Levels for 2024
Water Level Elevation (masl)
Precipitation (mm)
505.00
500.00
495.00
490.00
485.00
480.00
0
20
40
60
80
100
120
140
1-Jan-24
1-Apr-24
2-Jul-24
1-Oct-24
1-Jan-25
Ground Elevation 506.78 m asl
Logger Malfunction
Precipitation
OW13A
OW13C
OW13A Manual Measurements
OW13C Manual Measurements

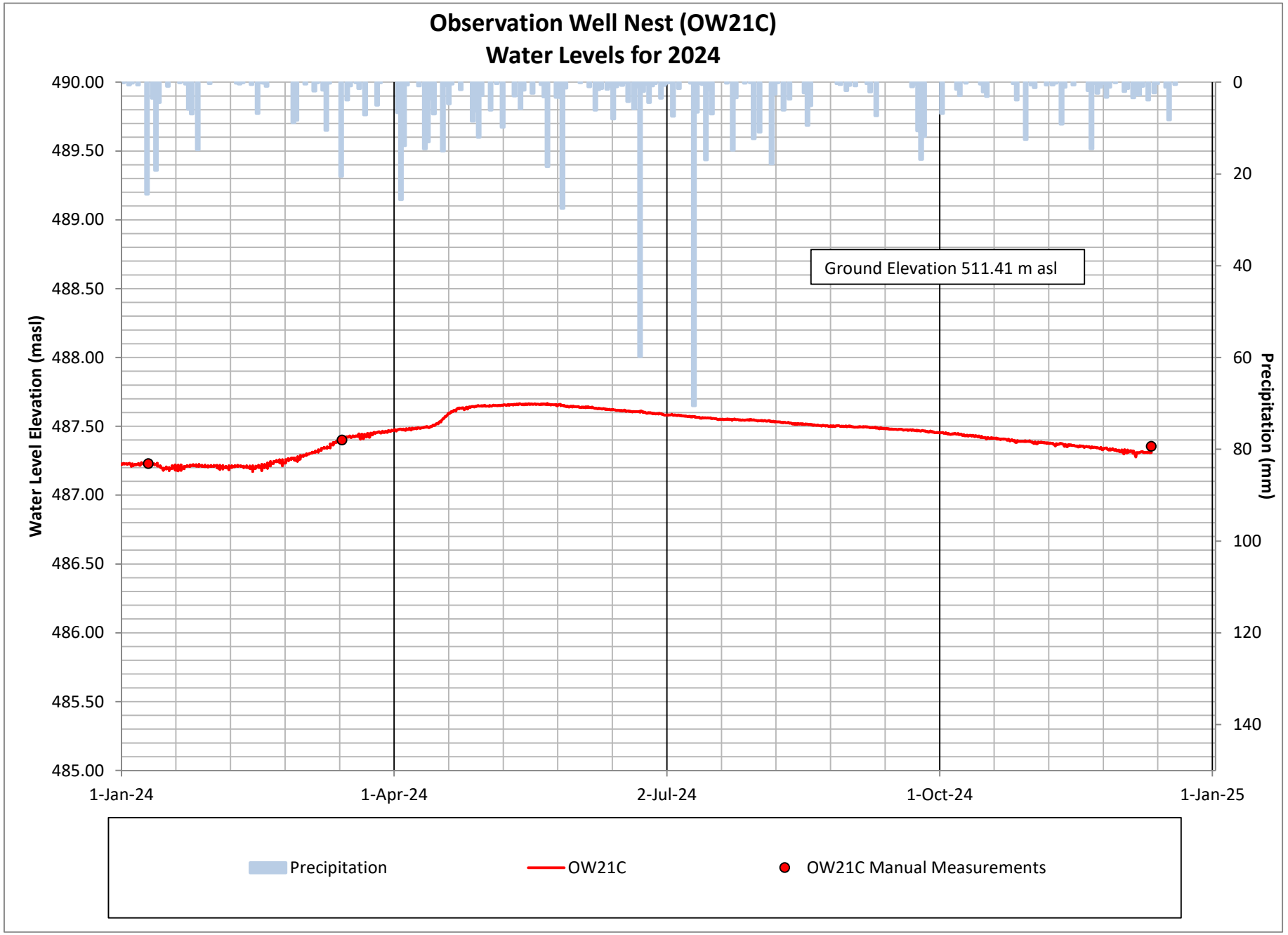

Observation Well Nest (OW14C)
Water Levels for 2024
Water Level Elevation (masl)
Precipitation (mm)
495.00
490.00
485.00
480.00
475.00
470.00
0
20
40
60
80
100
120
140
1-Jan-24
1-Apr-24
2-Jul-24
1-Oct-24
1-Jan-25
Ground Elevation 496.82 m asl
Precipitation
OW14C
OW14C Manual Measurements

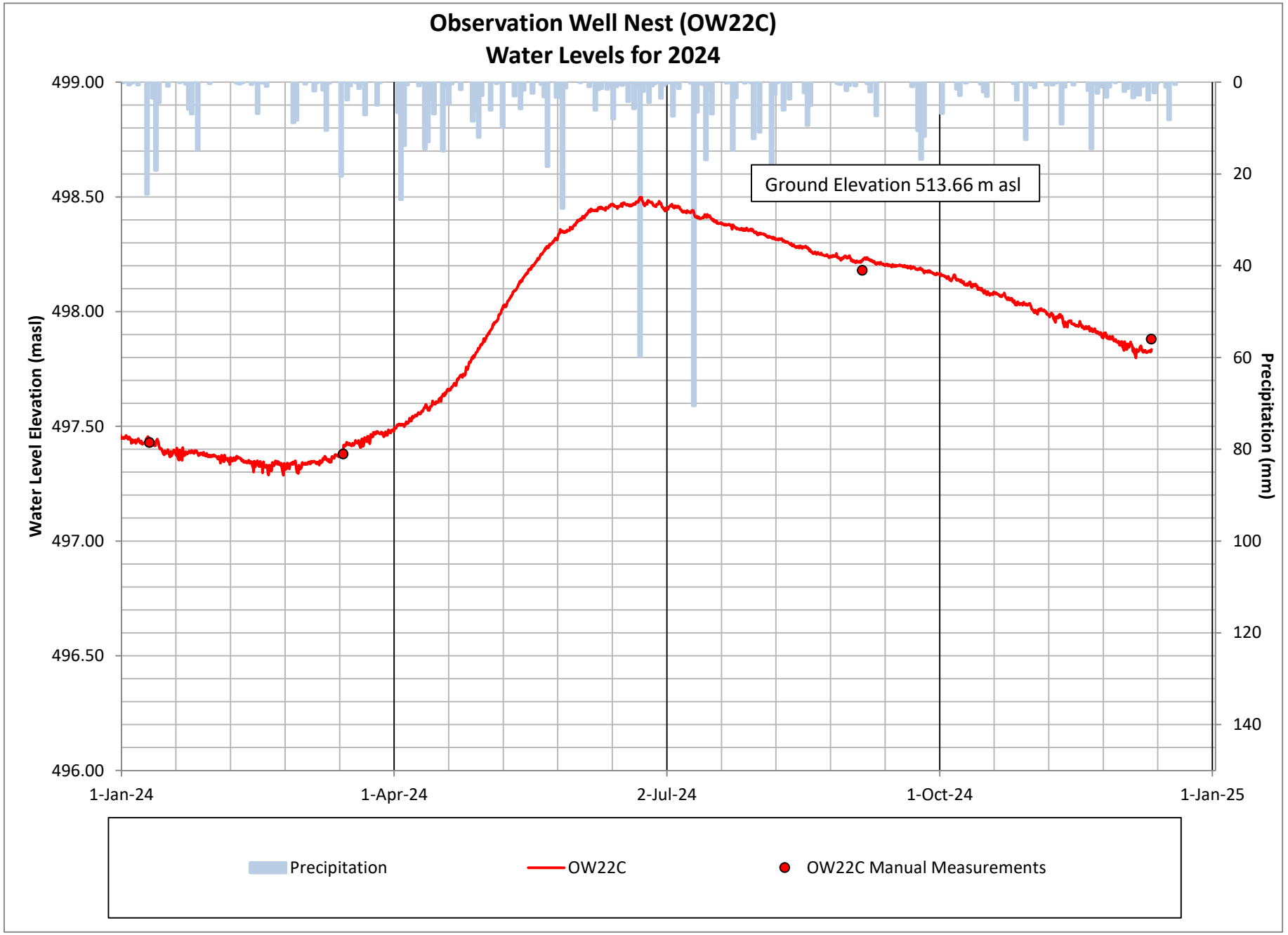

Observation Well Nest (OW16C)
Water Levels for 2024
Water Level Elevation (masl)
Precipitation (mm)
495.00
490.00
485.00
480.00
475.00
470.00
0
20
40
60
80
100
120
140
1-Jan-24
1-Apr-24
2-Jul-24
1-Oct-24
1-Jan-25
Ground Elevation 497.11 m asl
Precipitation
OW16C
OW16C Manual Measurements

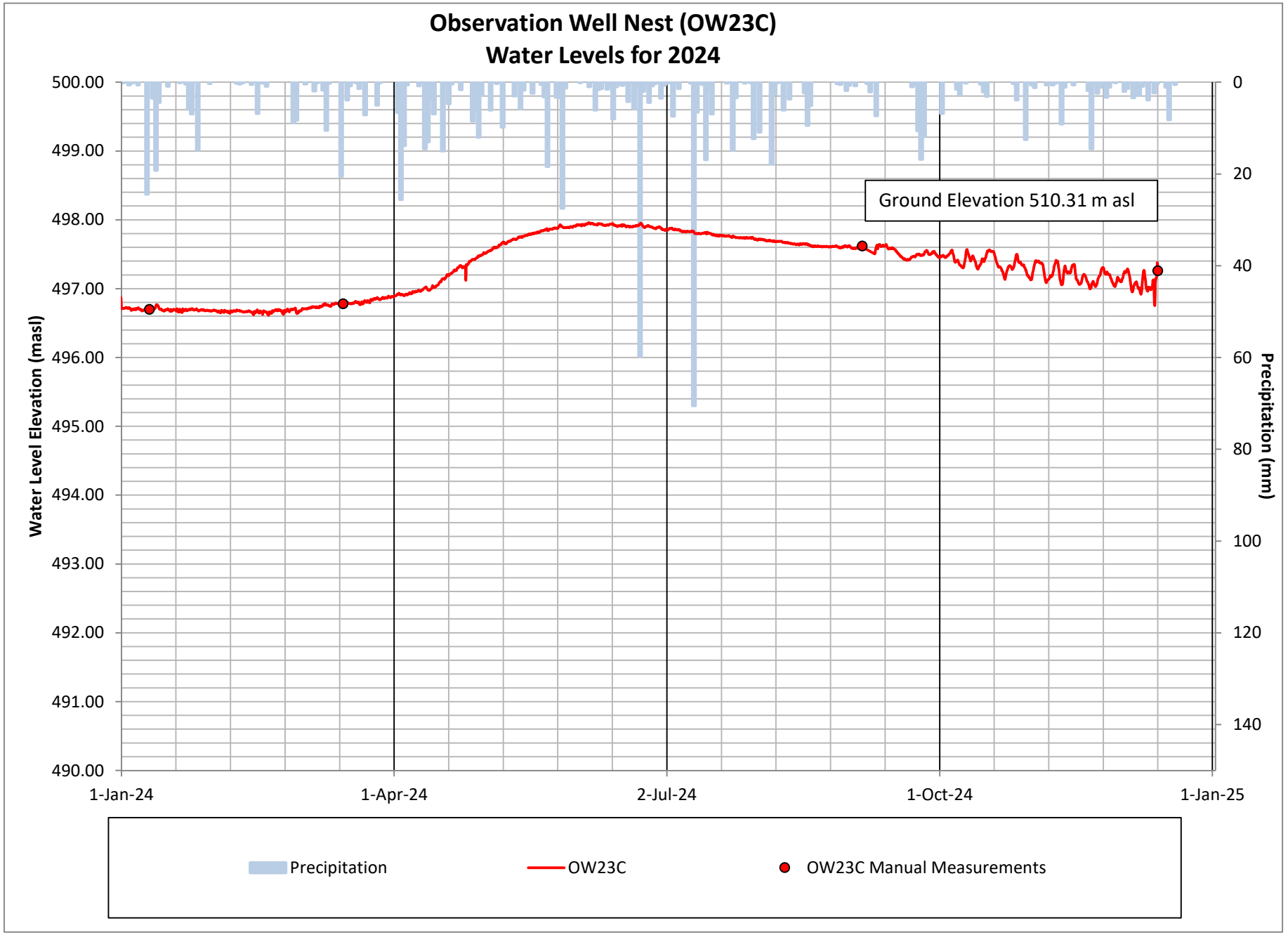

Observation Well Nest (OW18)
Water Levels for 2024
Water Level Elevation (masl)
Precipitation (mm)
499.00
494.00
489.00
484.00
479.00
0
20
40
60
80
100
120
140
1-Jan-24
1-Apr-24
2-Jul-24
1-Oct-24
1-Jan-25
Ground Elevation 501.21 m asl
Precipitation
OW18C
OW18A
OW18C Manual Measurements
OW18A Manual Measurements

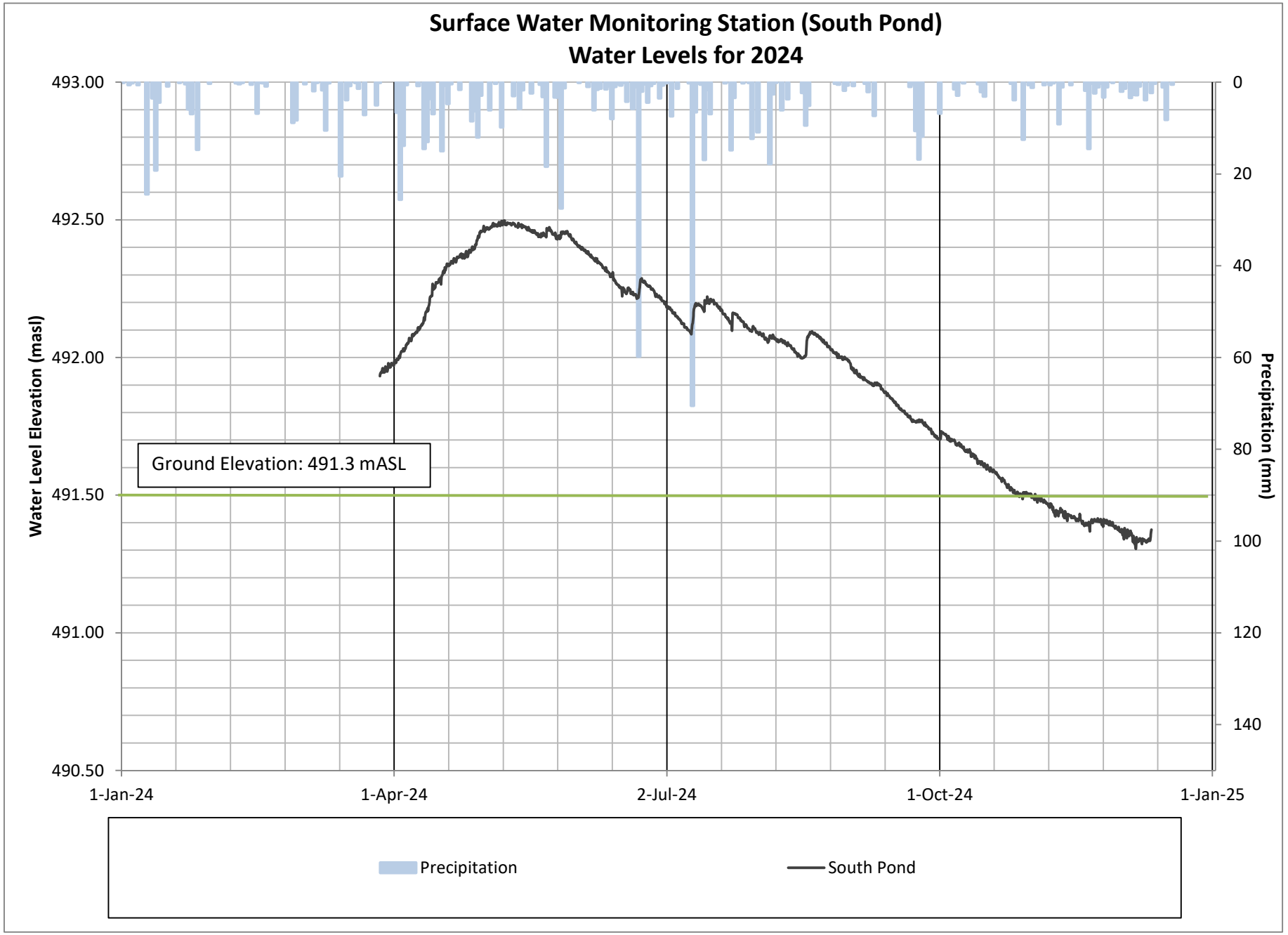

Observation Well Nest (OW19C)
Water Levels for 2024
Water Level Elevation (masl)
Precipitation (mm)
485.50
485.00
484.50
484.00
483.50
483.00
482.50
482.00
481.50
481.00
0
20
40
60
80
100
120
140
1-Jan-24
1-Apr-24
2-Jul-24
1-Oct-24
1-Jan-25
Ground Elevation 510.32 m asl
Precipitation
OW19C
OW19C Manual Measurements

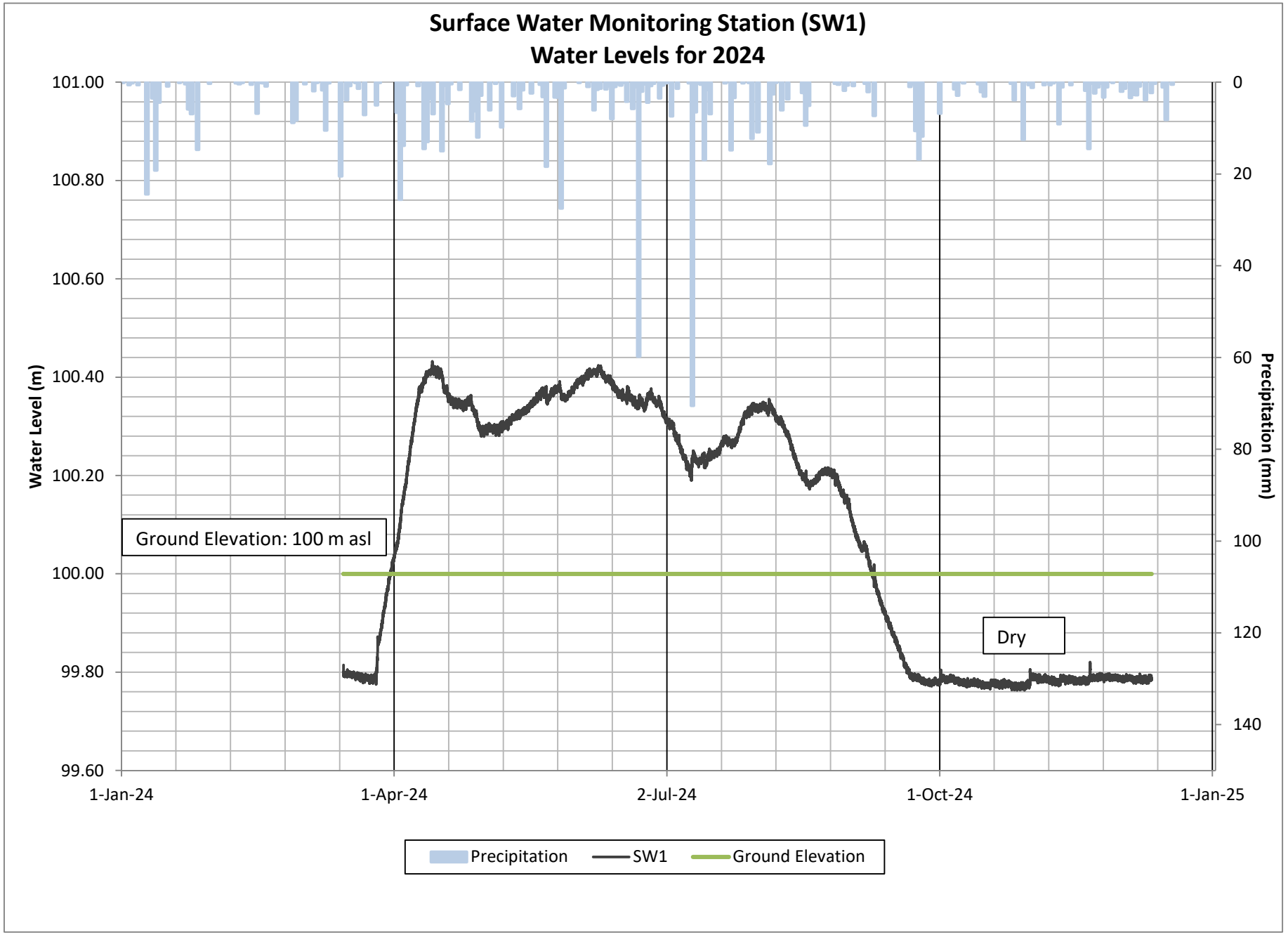

Observation Well Nest (OW20C)
Water Levels for 2024
Water Level Elevation (masl)
Precipitation (mm)
490.00
489.00
488.00
487.00
486.00
485.00
484.00
483.00
482.00
481.00
480.00
0
20
40
60
80
100
120
140
1-Jan-24
1-Apr-24
2-Jul-24
1-Oct-24
1-Jan-25
Ground Elevation 509.30 m asl
Logger malfunction
Precipitation
OW20C
OW20C Manual Measurements

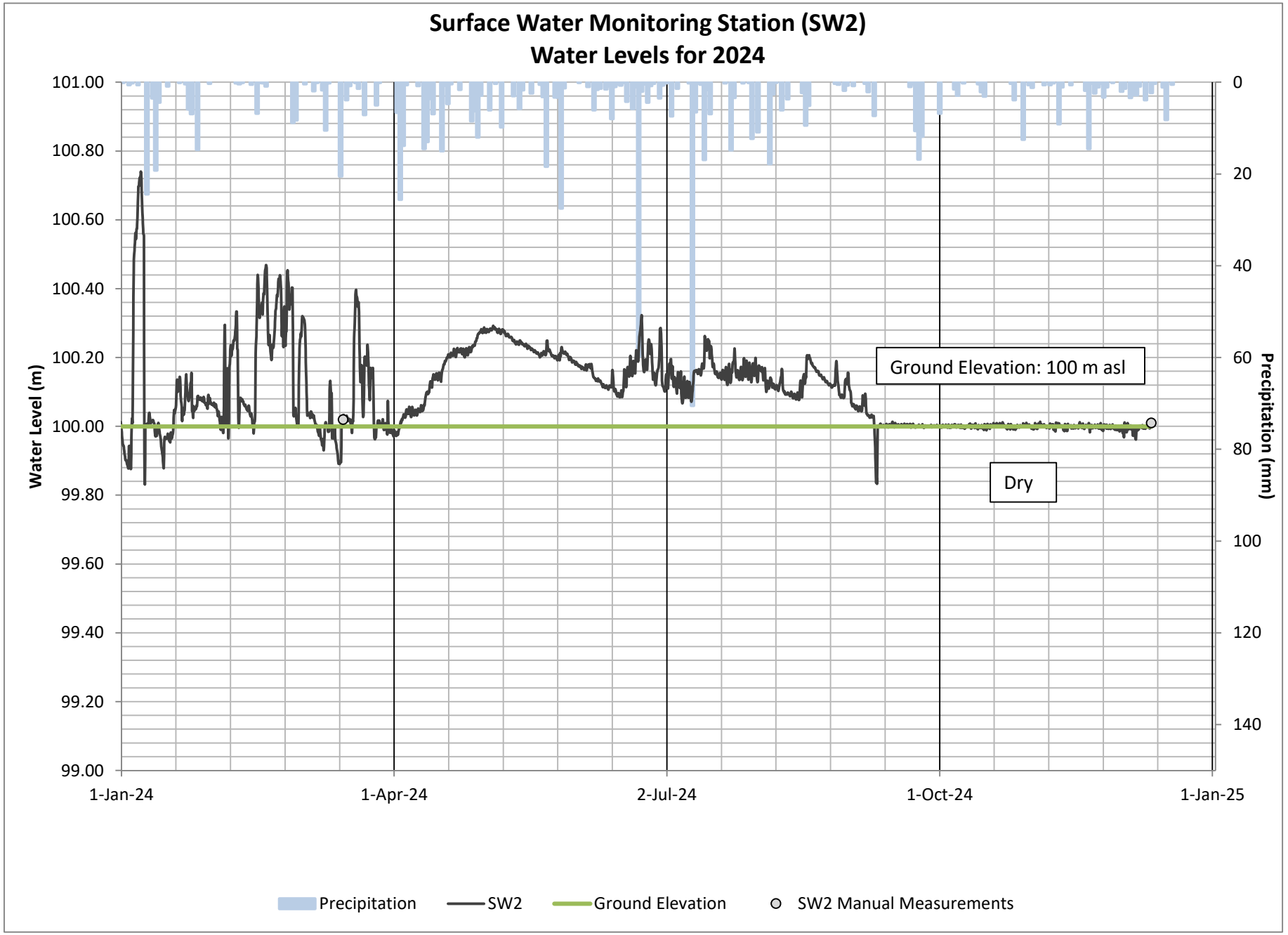

Observation Well Nest (OW21C)
Water Levels for 2024
Water Level Elevation (masl)
Precipitation (mm)
490.00
489.50
489.00
488.50
488.00
487.50
487.00
486.50
486.00
485.50
485.00
0
20
40
60
80
100
120
140
Ground Elevation 511.41 m asl
1-Jan-24
1-Apr-24
2-Jul-24
1-Oct-24
1-Jan-25
Precipitation
OW21C
OW21C Manual Measurements


Observation Well Nest (OW22C)
Water Levels for 2024
Ground Elevation 513.66 m asl
Water Level Elevation (masl)
Precipitation (mm)
499.00
498.50
498.00
497.50
497.00
496.50
496.00
0
20
40
60
80
100
120
140
1-Jan-24
1-Apr-24
2-Jul-24
1-Oct-24
1-Jan-25
Precipitation
OW22C
OW22C Manual Measurements


Observation Well Nest (OW23C)
Water Levels for 2024
Water Level Elevation (masl)
Precipitation (mm)
500.00
499.00
498.00
497.00
496.00
495.00
494.00
493.00
492.00
491.00
490.00
0
20
40
60
80
100
120
140
1-Jan-24
1-Apr-24
2-Jul-24
1-Oct-24
1-Jan-25
Ground Elevation 510.31 m asl
Precipitation
OW23C
OW23C Manual Measurements


Surface Water Monitoring Station (South Pond)
Water Levels for 2024
Water Level Elevation (masl)
Precipitation (mm)
493.00
492.50
492.00
491.50
491.00
490.50
0
20
40
60
80
100
120
140
1-Jan-24
1-Apr-24
2-Jul-24
1-Oct-24
1-Jan-25
Ground Elevation: 491.3 mASL
Precipitation
South Pond


Surface Water Monitoring Station (SW1)
Water Levels for 2024
Water Level (m)
Precipitation (mm)
101.00
100.80
100.60
100.40
100.20
100.00
99.80
99.60
0
20
40
60
80
100
120
140
1-Jan-24
1-Apr-24
2-Jul-24
1-Oct-24
1-Jan-25
Ground Elevation: 100 m asl
Dry
Precipitation
SW1
Ground Elevation


Surface Water Monitoring Station (SW2)
Water Levels for 2024
Water Level (m)
Precipitation (mm)
101.00
100.80
100.60
100.40
100.20
100.00
99.80
99.60
99.40
99.20
99.00
0
20
40
60
80
100
120
140
1-Jan-24
1-Apr-24
2-Jul-24
1-Oct-24
1-Jan-25
Ground Elevation: 100 m asl
Dry
Precipitation
SW2
Ground Elevation
SW2 Manual Measurements

Appendix E:
Water Quality Results

CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G114941 **REPORT No: 24-011538 - Rev. 0**

Report To:
Tatham Engineering
115 Sandford Fleming Drive
Suite 200
Collingwood, ON L9Y 5A6

Attention: Scott Patrick

CADUCEON Environmental Laboratories
112 Commerce Park Dr Unit L
Barrie, ON L4N 8W8

DATE RECEIVED: 2024-Apr-26
DATE REPORTED: 2024-May-02
SAMPLE MATRIX: Surface Water

CUSTOMER PROJECT: 123016
P.O. NUMBER:

Analyses	Qty	Site Analyzed	Authorized	Date Analyzed	Lab Method	Reference Method
Anions (Liquid)	2	OTTAWA	PCURIEL	2024-Apr-29	A-IC-01	SM 4110B
Cond/pH/Alk Auto (Liquid)	2	OTTAWA	SBOUDREAU	2024-Apr-30	COND-02/PH-02/ALK-02	SM 2510B/4500H/2320B
ICP/MS Total (Liquid)	2	OTTAWA	AOZKAYMAK	2024-May-01	D-ICPMS-01	EPA 6020
ICP/OES Total (Liquid)	2	OTTAWA	APRUDYVUS	2024-Apr-30	D-ICP-01	SM 3120B
TP & TKN (Liquid)	2	KINGSTON	KDIBBITS	2024-May-02	TPTKN-001	MECP E3516.2

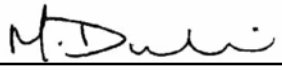
R.L. = Reporting Limit
NC = Not Calculated
Test methods may be modified from specified reference method unless indicated by an *

Michelle Dubien
Data Specialist

Parameter	Units	R.L.	Limits		Client I.D. North Pond	Client I.D. South Pond
				Sample I.D.	24-011538-1	24-011538-2
				Date Collected	2024-Apr-24	2024-Apr-24
					-	-
Alkalinity(CaCO3) to pH4.5	mg/L	5			242	198
Bicarbonate (as CaCO3)	mg/L	5			242	198
Conductivity @25°C	uS/cm	1			495	378
pH @25°C	pH units	-	8.5	PWQO	8.03	7.86
Chloride	mg/L	0.5			6.0	1.3
Nitrate (N)	mg/L	0.05			<0.05	<0.05
Nitrite (N)	mg/L	0.05			<0.05	<0.05
Sulphate	mg/L	1			9	<1
Phosphorus (Total)	µg/L	10	10	INTERIM	20	60
Hardness (as CaCO3)	mg/L as CaCO3	-			256	194
Aluminum (Total)	µg/L	10			30	40
Barium (Total)	µg/L	1			35	9
Bismuth (Total)	µg/L	20			<20	<20
Boron (Total)	µg/L	5	200	INTERIM	11	10
Calcium (Total)	µg/L	20			80200	67000
Iron (Total)	µg/L	5	300	PWQO	137	149
Lithium (Total)	µg/L	5			<5	<5
Magnesium (Total)	µg/L	20			13500	6380
Manganese (Total)	µg/L	1			76	71
Phosphorus (Total)	µg/L	100			<100	<100
Potassium (Total)	µg/L	100			2600	2400

Michelle Dubien
Data Specialist

Parameter	Units	R.L.	Limits		Client I.D.	North Pond	South Pond
					Sample I.D.	24-011538-1	24-011538-2
					Date Collected	2024-Apr-24	2024-Apr-24
						-	-
Silicon (Total)	µg/L	10				2660	460
Silica (Total)	µg/L	20				5690	990
Sodium (Total)	µg/L	200				2800	1200
Strontium (Total)	µg/L	1				119	93
Tin (Total)	µg/L	50				<50	<50
Tungsten (Total)	µg/L	10	30	INTERIM		20	<10
Zinc (Total)	µg/L	5	20, 30	INTERIM, PWQO		6	8
Zirconium (Total)	µg/L	3	4	INTERIM		<3	<3
Antimony (Total)	µg/L	0.1	20	INTERIM		<0.1	<0.1
Arsenic (Total)	µg/L	0.1	5, 5	INTERIM, PWQO		0.5	0.5
Beryllium (Total)	µg/L	0.1	11	PWQO		<0.1	<0.1
Cadmium (Total)	µg/L	0.015	0.1, 0.2	INTERIM, PWQO		0.041	0.053
Chromium (Total)	µg/L	1				<1	<1
Cobalt (Total)	µg/L	0.1	0.9	INTERIM		0.2	0.2
Copper (Total)	µg/L	0.1	5	INTERIM		1.6	1.4
Lead (Total)	µg/L	0.02	1, 5	INTERIM, PWQO		0.10	0.17
Molybdenum (Total)	µg/L	0.1	40	INTERIM		0.2	0.1
Nickel (Total)	µg/L	0.2	25	PWQO		0.6	1.0
Selenium (Total)	µg/L	1	100	PWQO		<1	<1
Silver (Total)	µg/L	0.1	0.1	PWQO		<0.1	<0.1
Thallium (Total)	µg/L	0.05	0.3, 0.3	INTERIM, PWQO		<0.05	<0.05

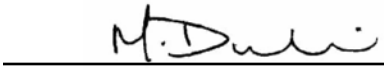


Michelle Dubien
Data Specialist

Parameter	Units	R.L.	Limits		Client I.D.	North Pond	South Pond
					Sample I.D.	24-011538-1	24-011538-2
					Date Collected	2024-Apr-24	2024-Apr-24
						-	-
Uranium (Total)	µg/L	0.05	5	INTERIM		0.53	0.37
Vanadium (Total)	µg/L	0.1	6	INTERIM		<0.1	0.1

: PWQO Limits
INTERIM: Interim PWQO
PWQO: PWQO

Summary of Exceedances		
Interim PWQO		
North Pond	**Found Value**	**Limit**
Phosphorus (Total)	20	10
South Pond	**Found Value**	**Limit**
Phosphorus (Total)	60	10



Michelle Dubien
Data Specialist

CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G114950, G114940 **REPORT No: 24-011547 - Rev. 1**

Report To:
Tatham Engineering
115 Sandford Fleming Drive
Suite 200
Collingwood, ON L9Y 5A6

Attention: Scott Patrick

CADUCEON Environmental Laboratories
112 Commerce Park Dr Unit L
Barrie, ON L4N 8W8

DATE RECEIVED: 2024-Apr-26
DATE REPORTED: 2025-Jan-29
SAMPLE MATRIX: Ground Water

CUSTOMER PROJECT: 123016
P.O. NUMBER:

Analyses	Qty	Site Analyzed	Authorized	Date Analyzed	Lab Method	Reference Method
Anions (Liquid)	13	OTTAWA	PCURIEL	2024-Apr-29	A-IC-01	SM 4110B
Cond/pH/Alk Auto (Liquid)	13	OTTAWA	SBOUDREAU	2024-Apr-30	COND-02/PH-02/ALK-02	SM 2510B/4500H/2320B
ICP/MS (Liquid)	13	OTTAWA	AOZKAYMAK	2024-May-01	D-ICPMS-01	EPA 200.8
ICP/OES (Liquid)	13	OTTAWA	APRUDYVUS	2024-Apr-30	D-ICP-01	SM 3120B

R.L. = Reporting Limit
NC = Not Calculated
Test methods may be modified from specified reference method unless indicated by an *

Christine Burke
Laboratory Manager

Final Report

REPORT No: 24-011547 - Rev. 1

Parameter	Units	R.L.	Limits	DWG	Client I.D.	OW4A	OW5A	OW9A	OW5B
					Sample I.D.	24-011547-1	24-011547-2	24-011547-3	24-011547-4
					Date Collected	2024-Apr-24	2024-Apr-24	2024-Apr-24	2024-Apr-24
						-	-	-	-
Alkalinity(CaCO3) to pH4.5	mg/L	5	500	OG		387	261	292	283
Bicarbonate (as CaCO3)	mg/L	5				387	261	292	283
Conductivity @25°C	uS/cm	1				909	712	636	793
pH @25°C	pH units	-	8.5	OG		7.84	7.75	7.72	7.73
Chloride	mg/L	0.5	250	AO		15.7	51.4	10.9	66.7
Nitrate (N)	mg/L	0.05	10.0	MAC		17.0	3.36	5.25	3.91
Nitrite (N)	mg/L	0.05	1.0	MAC		<0.05	<0.05	<0.05	<0.05
Sulphate	mg/L	1	500	AO		11	20	9	15
Hardness (as CaCO3)	mg/L as CaCO3	0.02	100	OG		423	266	299	299
Aluminum	mg/L	0.01	0.1	OG		0.05	0.03	0.04	0.03
Barium	mg/L	0.001	1	MAC		0.048	0.036	0.050	0.037
Bismuth	mg/L	0.02				<0.02	<0.02	<0.02	<0.02
Boron	mg/L	0.005	5	MAC		0.010	0.010	0.008	0.010
Calcium	mg/L	0.02				125	76.1	92.5	84.3
Iron	mg/L	0.005	0.3	AO		<0.005	<0.005	<0.005	<0.005
Lithium	mg/L	0.005				<0.005	<0.005	<0.005	<0.005
Magnesium	mg/L	0.02				26.6	18.4	16.4	21.6
Manganese	mg/L	0.001	0.05	AO		0.001	0.002	0.004	<0.001
Phosphorus	mg/L	0.1				<0.1	<0.1	<0.1	<0.1
Potassium	mg/L	0.1				1.4	2.2	0.7	2.1
Silicon	mg/L	0.01				4.29	3.15	4.25	3.49

Christine Burke
Laboratory Manager

Parameter	Units	R.L.	Limits	DWG	Client I.D.	OW4A	OW5A	OW9A	OW5B
					Sample I.D.	24-011547-1	24-011547-2	24-011547-3	24-011547-4
					Date Collected	2024-Apr-24	2024-Apr-24	2024-Apr-24	2024-Apr-24
						-	-	-	-
Silica	mg/L	0.02				9.18	6.74	9.10	7.47
Sodium	mg/L	0.2	200, 20, 20	AO, WL, MAC		10.0	**23.4**	2.2	**33.6**
Strontium	mg/L	0.001				0.235	0.129	0.151	0.145
Tin	mg/L	0.05				<0.05	<0.05	<0.05	<0.05
Titanium	mg/L	0.005				<0.005	<0.005	<0.005	<0.005
Tungsten	mg/L	0.01				<0.01	<0.01	<0.01	<0.01
Zinc	mg/L	0.005	5	AO		<0.005	<0.005	<0.005	0.023
Zirconium	mg/L	0.003				<0.003	<0.003	<0.003	<0.003
Antimony	mg/L	0.0001	0.006	MAC		<0.0001	<0.0001	<0.0001	<0.0001
Arsenic	mg/L	0.0001	0.01	MAC		0.0001	<0.0001	<0.0001	0.0001
Beryllium	mg/L	0.0001				<0.0001	<0.0001	<0.0001	<0.0001
Cadmium	mg/L	0.000015	0.005	MAC		<0.000015	<0.000015	<0.000015	0.000042
Chromium	mg/L	0.001	0.05	MAC		<0.001	<0.001	<0.001	<0.001
Cobalt	mg/L	0.0001				0.0002	0.0001	0.0002	0.0001
Copper	mg/L	0.0001	1	AO		0.0045	0.0013	0.0014	0.0014
Lead	mg/L	0.00002	0.010	MAC		0.00004	<0.00002	<0.00002	0.00014
Molybdenum	mg/L	0.0001				<0.0001	0.0002	<0.0001	0.0002
Nickel	mg/L	0.0002				<0.0002	0.0007	0.0008	0.0009
Selenium	mg/L	0.001	0.05	MAC		<0.001	<0.001	<0.001	<0.001
Silver	mg/L	0.0001				<0.0001	<0.0001	<0.0001	<0.0001
Thallium	mg/L	0.00005				<0.00005	<0.00005	<0.00005	<0.00005

Christine Burke
Laboratory Manager

Parameter	Units	R.L.	Limits	DWG	Client I.D.	Sample I.D.	Date Collected	
					OW4A	24-011547-1	2024-Apr-24	-
					OW5A	24-011547-2	2024-Apr-24	-
					OW9A	24-011547-3	2024-Apr-24	-
					OW5B	24-011547-4	2024-Apr-24	-
Uranium	mg/L	0.00005	0.02	MAC	0.00023	0.00037	0.00011	0.00043
Vanadium	mg/L	0.0001			0.0001	<0.0001	0.0001	0.0001

Christine Burke
Laboratory Manager

Parameter	Units	R.L.	Limits	DWG	Client I.D.	OW13C	OW3B	OW10B	OW7C
					Sample I.D.	24-011547-5	24-011547-6	24-011547-7	24-011547-8
					Date Collected	2024-Apr-24	2024-Apr-24	2024-Apr-24	2024-Apr-24
						-	-	-	-
Alkalinity(CaCO3) to pH4.5	mg/L	5	500	OG		283	283	215	80
Bicarbonate (as CaCO3)	mg/L	5				283	283	215	80
Conductivity @25°C	uS/cm	1				576	767	489	153
pH @25°C	pH units	-	8.5	OG		7.93	7.82	7.83	7.79
Chloride	mg/L	0.5	250	AO		9.6	44.8	11.0	3.1
Nitrate (N)	mg/L	0.05	10.0	MAC		1.68	9.57	2.33	0.07
Nitrite (N)	mg/L	0.05	1.0	MAC		<0.05	<0.05	<0.05	<0.05
Sulphate	mg/L	1	500	AO		7	12	17	<1
Hardness (as CaCO3)	mg/L as CaCO3	0.02	100	OG		273	331	244	69.4
Aluminum	mg/L	0.01	0.1	OG		0.06	0.03	0.02	<0.01
Barium	mg/L	0.001	1	MAC		0.034	0.057	0.057	0.001
Bismuth	mg/L	0.02				<0.02	<0.02	<0.02	<0.02
Boron	mg/L	0.005	5	MAC		0.009	0.010	0.013	0.011
Calcium	mg/L	0.02				76.0	97.0	67.4	5.30
Iron	mg/L	0.005	0.3	AO		0.016	<0.005	<0.005	0.007
Lithium	mg/L	0.005				<0.005	<0.005	<0.005	<0.005
Magnesium	mg/L	0.02				20.3	21.6	18.3	13.7
Manganese	mg/L	0.001	0.05	AO		<0.001	<0.001	0.011	0.045
Phosphorus	mg/L	0.1				<0.1	<0.1	<0.1	<0.1
Potassium	mg/L	0.1				1.2	1.6	1.3	0.8
Silicon	mg/L	0.01				3.47	4.02	3.65	0.10

Christine Burke
Laboratory Manager

Parameter	Units	R.L.	Limits	DWG	Client I.D.	OW13C	OW3B	OW10B	OW7C
					Sample I.D.	24-011547-5	24-011547-6	24-011547-7	24-011547-8
					Date Collected	2024-Apr-24	2024-Apr-24	2024-Apr-24	2024-Apr-24
						-	-	-	-
Silica	mg/L	0.02				7.43	8.61	7.81	0.22
Sodium	mg/L	0.2	200, 20, 20	AO, WL, MAC		6.1	14.1	4.3	2.1
Strontium	mg/L	0.001				0.115	0.178	0.132	0.009
Tin	mg/L	0.05				<0.05	<0.05	<0.05	<0.05
Titanium	mg/L	0.005				<0.005	<0.005	<0.005	<0.005
Tungsten	mg/L	0.01				<0.01	<0.01	<0.01	<0.01
Zinc	mg/L	0.005	5	AO		0.013	<0.005	0.029	<0.005
Zirconium	mg/L	0.003				<0.003	<0.003	<0.003	<0.003
Antimony	mg/L	0.0001	0.006	MAC		<0.0001	<0.0001	0.0004	<0.0001
Arsenic	mg/L	0.0001	0.01	MAC		0.0002	<0.0001	0.0003	<0.0001
Beryllium	mg/L	0.0001				<0.0001	<0.0001	<0.0001	<0.0001
Cadmium	mg/L	0.000015	0.005	MAC		<0.000015	<0.000015	0.000025	<0.000015
Chromium	mg/L	0.001	0.05	MAC		<0.001	<0.001	<0.001	<0.001
Cobalt	mg/L	0.0001				0.0001	0.0002	0.0001	<0.0001
Copper	mg/L	0.0001	1	AO		0.0042	0.0009	0.0008	0.0007
Lead	mg/L	0.00002	0.010	MAC		0.00008	<0.00002	0.00005	<0.00002
Molybdenum	mg/L	0.0001				<0.0001	<0.0001	0.0003	0.0032
Nickel	mg/L	0.0002				0.0008	0.0009	0.0010	0.0004
Selenium	mg/L	0.001	0.05	MAC		<0.001	<0.001	<0.001	<0.001
Silver	mg/L	0.0001				<0.0001	<0.0001	<0.0001	<0.0001
Thallium	mg/L	0.00005				<0.00005	<0.00005	<0.00005	<0.00005

Christine Burke
Laboratory Manager

Parameter	Units	R.L.	Limits	DWG	Client I.D.	Sample I.D.	Date Collected	
					OW13C	24-011547-5	2024-Apr-24	-
Uranium	mg/L	0.00005	0.02	MAC	0.00018			
Vanadium	mg/L	0.0001			0.0001			

Parameter	Units	R.L.	Limits	DWG	Client I.D.	Sample I.D.	Date Collected	
					OW3B	24-011547-6	2024-Apr-24	-
Uranium	mg/L	0.00005	0.02	MAC	0.00019			
Vanadium	mg/L	0.0001			<0.0001			

Parameter	Units	R.L.	Limits	DWG	Client I.D.	Sample I.D.	Date Collected	
					OW10B	24-011547-7	2024-Apr-24	-
Uranium	mg/L	0.00005	0.02	MAC	0.00039			
Vanadium	mg/L	0.0001			<0.0001			

Parameter	Units	R.L.	Limits	DWG	Client I.D.	Sample I.D.	Date Collected	
					OW7C	24-011547-8	2024-Apr-24	-
Uranium	mg/L	0.00005	0.02	MAC	<0.00005			
Vanadium	mg/L	0.0001			<0.0001			

Christine Burke
Laboratory Manager

Parameter	Units	R.L.	Limits	DWG	Client I.D.	OW13A	OW8A	OW4B	OW7A
					Sample I.D.	24-011547-9	24-011547-10	24-011547-11	24-011547-12
					Date Collected	2024-Apr-24	2024-Apr-24	2024-Apr-24	2024-Apr-24
						-	-	-	-
Alkalinity(CaCO3) to pH4.5	mg/L	5	500	OG		261	284	367	273
Bicarbonate (as CaCO3)	mg/L	5				261	284	367	273
Conductivity @25°C	uS/cm	1				548	791	852	635
pH @25°C	pH units	-	8.5	OG		7.84	7.92	7.87	7.92
Chloride	mg/L	0.5	250	AO		8.2	41.0	25.2	21.6
Nitrate (N)	mg/L	0.05	10.0	MAC		1.47	16.0	10.4	1.97
Nitrite (N)	mg/L	0.05	1.0	MAC		<0.05	<0.05	<0.05	<0.05
Sulphate	mg/L	1	500	AO		11	9	13	24
Hardness (as CaCO3)	mg/L as CaCO3	0.02	100	OG		248	385	382	293
Aluminum	mg/L	0.01	0.1	OG		0.02	0.03	0.04	0.03
Barium	mg/L	0.001	1	MAC		0.028	0.106	0.065	0.064
Bismuth	mg/L	0.02				<0.02	<0.02	<0.02	<0.02
Boron	mg/L	0.005	5	MAC		0.009	0.007	0.009	0.012
Calcium	mg/L	0.02				69.3	96.8	111	87.0
Iron	mg/L	0.005	0.3	AO		<0.005	<0.005	<0.005	<0.005
Lithium	mg/L	0.005				<0.005	<0.005	<0.005	<0.005
Magnesium	mg/L	0.02				18.3	34.9	25.6	18.4
Manganese	mg/L	0.001	0.05	AO		<0.001	<0.001	<0.001	<0.001
Phosphorus	mg/L	0.1				<0.1	<0.1	<0.1	<0.1
Potassium	mg/L	0.1				1.1	1.2	0.7	1.6
Silicon	mg/L	0.01				3.22	5.50	4.11	3.25

Christine Burke
Laboratory Manager

Parameter	Units	R.L.	Limits	DWG	Client I.D.	OW13A	OW8A	OW4B	OW7A
					Sample I.D.	24-011547-9	24-011547-10	24-011547-11	24-011547-12
					Date Collected	2024-Apr-24	2024-Apr-24	2024-Apr-24	2024-Apr-24
						-	-	-	-
Silica	mg/L	0.02				6.90	11.8	8.80	6.96
Sodium	mg/L	0.2	200, 20, 20	AO, WL, MAC		6.3	11.3	13.4	5.6
Strontium	mg/L	0.001				0.109	0.197	0.184	0.150
Tin	mg/L	0.05				<0.05	<0.05	<0.05	<0.05
Titanium	mg/L	0.005				<0.005	<0.005	<0.005	<0.005
Tungsten	mg/L	0.01				<0.01	<0.01	<0.01	<0.01
Zinc	mg/L	0.005	5	AO		<0.005	<0.005	<0.005	<0.005
Zirconium	mg/L	0.003				<0.003	<0.003	<0.003	<0.003
Antimony	mg/L	0.0001	0.006	MAC		<0.0001	<0.0001	0.0001	<0.0001
Arsenic	mg/L	0.0001	0.01	MAC		0.0003	<0.0001	0.0001	<0.0001
Beryllium	mg/L	0.0001				<0.0001	<0.0001	<0.0001	<0.0001
Cadmium	mg/L	0.000015	0.005	MAC		<0.000015	<0.000015	<0.000015	<0.000015
Chromium	mg/L	0.001	0.05	MAC		<0.001	0.001	<0.001	<0.001
Cobalt	mg/L	0.0001				0.0001	0.0002	0.0002	0.0001
Copper	mg/L	0.0001	1	AO		0.0020	0.0007	0.0012	0.0011
Lead	mg/L	0.00002	0.010	MAC		0.00003	<0.00002	<0.00002	<0.00002
Molybdenum	mg/L	0.0001				0.0002	<0.0001	<0.0001	<0.0001
Nickel	mg/L	0.0002				0.0007	0.0009	<0.0002	0.0008
Selenium	mg/L	0.001	0.05	MAC		<0.001	<0.001	<0.001	<0.001
Silver	mg/L	0.0001				<0.0001	<0.0001	<0.0001	<0.0001
Thallium	mg/L	0.00005				<0.00005	<0.00005	<0.00005	<0.00005

Christine Burke
Laboratory Manager

				Client I.D.	OW13A	OW8A	OW4B	OW7A
				Sample I.D.	24-011547-9	24-011547-10	24-011547-11	24-011547-12
				Date Collected	2024-Apr-24	2024-Apr-24	2024-Apr-24	2024-Apr-24
Parameter	Units	R.L.	Limits	DWG	-	-	-	-
Uranium	mg/L	0.00005	0.02	MAC	0.00021	0.00022	0.00016	0.00030
Vanadium	mg/L	0.0001			0.0001	0.0001	<0.0001	<0.0001

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Laboratory Manager

Parameter	Units	R.L.	Limits	DWG	Client I.D.: OW6A Sample I.D.: 24-011547-13 Date Collected: 2024-Apr-24
					-
Alkalinity(CaCO3) to pH4.5	mg/L	5	500	OG	121
Bicarbonate (as CaCO3)	mg/L	5			121
Conductivity @25°C	uS/cm	1			346
pH @25°C	pH units	-	8.5	OG	7.56
Chloride	mg/L	0.5	250	AO	190
Nitrate (N)	mg/L	0.05	10.0	MAC	10.7
Nitrite (N)	mg/L	0.05	1.0	MAC	<0.40
Sulphate	mg/L	1	500	AO	229
Hardness (as CaCO3)	mg/L as CaCO3	0.02	100	OG	141
Aluminum	mg/L	0.01	0.1	OG	0.01
Barium	mg/L	0.001	1	MAC	0.030
Bismuth	mg/L	0.02			<0.02
Boron	mg/L	0.005	5	MAC	0.015
Calcium	mg/L	0.02			38.0
Iron	mg/L	0.005	0.3	AO	<0.005
Lithium	mg/L	0.005			<0.005
Magnesium	mg/L	0.02			11.2
Manganese	mg/L	0.001	0.05	AO	<0.001
Phosphorus	mg/L	0.1			<0.1
Potassium	mg/L	0.1			1.5
Silicon	mg/L	0.01			1.52

Christine Burke
Laboratory Manager

Parameter	Units	R.L.	Limits	DWG	Client I.D. OW6A Sample I.D. 24-011547-13 Date Collected 2024-Apr-24
					-
Silica	mg/L	0.02			3.26
Sodium	mg/L	0.2	200, 20, 20	AO, WL, MAC	5.4
Strontium	mg/L	0.001			0.100
Tin	mg/L	0.05			<0.05
Titanium	mg/L	0.005			<0.005
Tungsten	mg/L	0.01			<0.01
Zinc	mg/L	0.005	5	AO	<0.005
Zirconium	mg/L	0.003			<0.003
Antimony	mg/L	0.0001	0.006	MAC	<0.0001
Arsenic	mg/L	0.0001	0.01	MAC	<0.0001
Beryllium	mg/L	0.0001			<0.0001
Cadmium	mg/L	0.000015	0.005	MAC	<0.000015
Chromium	mg/L	0.001	0.05	MAC	<0.001
Cobalt	mg/L	0.0001			<0.0001
Copper	mg/L	0.0001	1	AO	0.0010
Lead	mg/L	0.00002	0.010	MAC	<0.00002
Molybdenum	mg/L	0.0001			0.0004
Nickel	mg/L	0.0002			0.0004
Selenium	mg/L	0.001	0.05	MAC	<0.001
Silver	mg/L	0.0001			<0.0001
Thallium	mg/L	0.00005			<0.00005

Christine Burke
Laboratory Manager

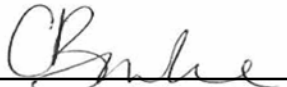
				Client I.D.	OW6A
				Sample I.D.	24-011547-13
				Date Collected	2024-Apr-24
Parameter	Units	R.L.	Limits	DWG	-
Uranium	mg/L	0.00005	0.02	MAC	0.00012
Vanadium	mg/L	0.0001			<0.0001

Sample #7 filtered from unpreserved for metals analysis due to sediment in metals bottle.
Revised report to update sample ID as per client request

DWG - Drinking Water Guidelines
ODWS - Ontario Drinking Water Standards
AO - Aesthetic Objectives
IMAC - Interim Maximum Acceptable Concentration
MAC - Maximum Acceptable Concentration
ODWO - D-5-5 Objective
OG - Operational Guidelines
WL - Warning Level - Sodium Restricted Diets

Christine Burke
Laboratory Manager

Summary of Exceedances		
Maximum Acceptable Concentration		
OW4A	**Found Value**	**Limit**
Nitrate (N)	16.4	10.0
Nitrate (N)	17.0	10.0
OW5A	**Found Value**	**Limit**
Sodium	23.4	20
OW5B	**Found Value**	**Limit**
Sodium	33.6	20
OW8A	**Found Value**	**Limit**
Nitrate (N)	16.0	10.0
OW4B	**Found Value**	**Limit**
Nitrate (N)	10.1	10.0
Nitrate (N)	10.4	10.0
OW6A	**Found Value**	**Limit**
Nitrate (N)	10.7	10.0
Operational Guidelines		
OW4A	**Found Value**	**Limit**
Hardness (as CaCO3)	423	100
OW5A	**Found Value**	**Limit**
Hardness (as CaCO3)	266	100
OW9A	**Found Value**	**Limit**
Hardness (as CaCO3)	299	100
OW5B	**Found Value**	**Limit**
Hardness (as CaCO3)	299	100
OW13C	**Found Value**	**Limit**
Hardness (as CaCO3)	273	100
OW3B	**Found Value**	**Limit**
Hardness (as CaCO3)	331	100
OW10B	**Found Value**	**Limit**
Hardness (as CaCO3)	244	100
OW13A	**Found Value**	**Limit**
Hardness (as CaCO3)	248	100
OW8A	**Found Value**	**Limit**
Hardness (as CaCO3)	385	100
OW4B	**Found Value**	**Limit**
Hardness (as CaCO3)	382	100
OW7A	**Found Value**	**Limit**
Hardness (as CaCO3)	293	100



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OW6A	Found Value	Limit
Hardness (as CaCO3)	141	100
Warning Level - Sodium Restricted Diets		
OW5A	**Found Value**	**Limit**
Sodium	23.4	20
OW5B	**Found Value**	**Limit**
Sodium	33.6	20

Christine Burke
Laboratory Manager

CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G114937 **REPORT No: 24-011608 - Rev. 0**

Report To:
Tatham Engineering
115 Sandford Fleming Drive
Suite 200
Collingwood, ON L9Y 5A6

Attention: Noah Trembley

CADUCEON Environmental Laboratories
112 Commerce Park Dr Unit L
Barrie, ON L4N 8W8

DATE RECEIVED: 2024-Apr-26
DATE REPORTED: 2024-May-02
SAMPLE MATRIX: Ground Water

CUSTOMER PROJECT: 123016
P.O. NUMBER:

Analyses	Qty	Site Analyzed	Authorized	Date Analyzed	Lab Method	Reference Method
Anions (Liquid)	10	OTTAWA	PCURIEL	2024-Apr-29	A-IC-01	SM 4110B
Cond/pH/Alk Auto (Liquid)	10	OTTAWA	SBOUDREAU	2024-Apr-30	COND-02/PH-02/ALK-02	SM 2510B/4500H/2320B
ICP/MS (Liquid)	10	OTTAWA	AOZKAYMAK	2024-May-01	D-ICPMS-01	EPA 200.8
ICP/OES (Liquid)	10	OTTAWA	APRUDYVUS	2024-Apr-30	D-ICP-01	SM 3120B

R.L. = Reporting Limit
NC = Not Calculated
Test methods may be modified from specified reference method unless indicated by an *

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Data Specialist

Final Report

REPORT No: 24-011608 - Rev. 0

				Client I.D.	OW 14-C	OW 16-C	OW 18-A	OW 18-C
				Sample I.D.	24-011608-1	24-011608-2	24-011608-3	24-011608-4
				Date Collected	2024-Apr-25	2024-Apr-25	2024-Apr-25	2024-Apr-25
Parameter	**Units**	**R.L.**	**Limits**	**DWG**	-	-	-	-
Alkalinity(CaCO3) to pH4.5	mg/L	5	500	OG	462	205	194	192
Bicarbonate (as CaCO3)	mg/L	5			462	205	194	192
Conductivity @25°C	uS/cm	1			897	432	404	397
pH @25°C	pH units	-	8.5	OG	7.77	7.81	7.92	7.91
Chloride	mg/L	0.5	250	AO	2.8	7.1	6.2	5.7
Nitrate (N)	mg/L	0.05	10.0	MAC	5.24	1.30	1.35	1.35
Nitrite (N)	mg/L	0.05	1.0	MAC	<0.05	<0.05	<0.05	<0.05
Sulphate	mg/L	1	500	AO	7	8	9	7
Hardness (as CaCO3)	mg/L as CaCO3	0.02	100	OG	**497**	**201**	**201**	**190**
Aluminum	mg/L	0.01	0.1	OG	**0.14**	0.02	0.02	**0.34**
Barium	mg/L	0.001	1	MAC	0.101	0.030	0.036	0.021
Bismuth	mg/L	0.02			<0.02	<0.02	<0.02	<0.02
Boron	mg/L	0.005	5	MAC	0.010	0.007	0.008	0.006
Calcium	mg/L	0.02			134	55.7	58.1	53.6
Iron	mg/L	0.005	0.3	AO	0.106	<0.005	<0.005	0.174
Lithium	mg/L	0.005			<0.005	<0.005	<0.005	<0.005
Magnesium	mg/L	0.02			39.2	14.9	13.5	13.7
Manganese	mg/L	0.001	0.05	AO	0.014	<0.001	<0.001	0.006
Phosphorus	mg/L	0.1			<0.1	<0.1	<0.1	<0.1
Potassium	mg/L	0.1			0.9	0.8	0.8	0.8
Silicon	mg/L	0.01			5.31	2.72	2.99	3.11

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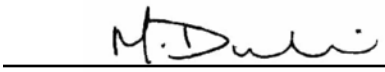
				Client I.D.	OW 14-C	OW 16-C	OW 18-A	OW 18-C
				Sample I.D.	24-011608-1	24-011608-2	24-011608-3	24-011608-4
				Date Collected	2024-Apr-25	2024-Apr-25	2024-Apr-25	2024-Apr-25
Parameter	Units	R.L.	Limits	DWG	-	-	-	-
Silica	mg/L	0.02			11.4	5.81	6.40	6.66
Sodium	mg/L	0.2	200, 20, 20	AO, WL, MAC	2.8	3.7	2.2	1.8
Strontium	mg/L	0.001			0.213	0.091	0.085	0.077
Tin	mg/L	0.05			<0.05	<0.05	<0.05	<0.05
Titanium	mg/L	0.005			<0.005	<0.005	<0.005	0.009
Tungsten	mg/L	0.01			<0.01	<0.01	<0.01	<0.01
Zinc	mg/L	0.005	5	AO	0.098	0.006	<0.005	0.016
Zirconium	mg/L	0.003			<0.003	<0.003	<0.003	<0.003
Antimony	mg/L	0.0001	0.006	MAC	<0.0001	<0.0001	0.0002	<0.0001
Arsenic	mg/L	0.0001	0.01	MAC	0.0001	0.0001	<0.0001	0.0002
Beryllium	mg/L	0.0001			<0.0001	<0.0001	<0.0001	<0.0001
Cadmium	mg/L	0.000015	0.005	MAC	0.000105	0.000027	<0.000015	<0.000015
Chromium	mg/L	0.001	0.05	MAC	<0.001	<0.001	<0.001	<0.001
Cobalt	mg/L	0.0001			0.0003	<0.0001	<0.0001	0.0002
Copper	mg/L	0.0001	1	AO	0.0009	0.0010	0.0007	0.0011
Lead	mg/L	0.00002	0.010	MAC	0.00068	0.00014	<0.00002	0.00050
Molybdenum	mg/L	0.0001			<0.0001	0.0001	0.0002	0.0001
Nickel	mg/L	0.0002			0.0005	0.0006	0.0006	0.0007
Selenium	mg/L	0.001	0.05	MAC	<0.001	<0.001	<0.001	<0.001
Silver	mg/L	0.0001			<0.0001	<0.0001	<0.0001	<0.0001
Thallium	mg/L	0.00005			<0.00005	<0.00005	<0.00005	<0.00005



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				Client I.D.	OW 14-C	OW 16-C	OW 18-A	OW 18-C
				Sample I.D.	24-011608-1	24-011608-2	24-011608-3	24-011608-4
				Date Collected	2024-Apr-25	2024-Apr-25	2024-Apr-25	2024-Apr-25
Parameter	Units	R.L.	Limits	DWG	-	-	-	-
Uranium	mg/L	0.00005	0.02	MAC	0.00023	0.00015	0.00021	0.00013
Vanadium	mg/L	0.0001			0.0002	<0.0001	0.0001	0.0002

Michelle Dubien
Data Specialist

Parameter	Units	R.L.	Limits	DWG	Client I.D.	OW 19-C	OW 20-C	OW 21-C	OW 22-C
					Sample I.D.	24-011608-5	24-011608-6	24-011608-7	24-011608-8
					Date Collected	2024-Apr-25	2024-Apr-25	2024-Apr-25	2024-Apr-25
					DWG	-	-	-	-
Alkalinity(CaCO3) to pH4.5	mg/L	5	500	OG		296	217	254	253
Bicarbonate (as CaCO3)	mg/L	5				296	217	254	253
Conductivity @25°C	uS/cm	1				696	521	507	647
pH @25°C	pH units	-	8.5	OG		7.90	8.04	8.11	8.03
Chloride	mg/L	0.5	250	AO		13.6	4.5	3.1	15.3
Nitrate (N)	mg/L	0.05	10.0	MAC		8.77	9.89	0.39	9.05
Nitrite (N)	mg/L	0.05	1.0	MAC		<0.05	<0.05	<0.05	<0.05
Sulphate	mg/L	1	500	AO		19	12	14	35
Hardness (as CaCO3)	mg/L as CaCO3	0.02	100	OG		327	243	244	310
Aluminum	mg/L	0.01	0.1	OG		0.10	0.02	0.03	0.03
Barium	mg/L	0.001	1	MAC		0.130	0.061	0.052	0.070
Bismuth	mg/L	0.02				<0.02	<0.02	<0.02	<0.02
Boron	mg/L	0.005	5	MAC		0.016	0.014	0.006	0.008
Calcium	mg/L	0.02				86.4	63.3	61.4	74.3
Iron	mg/L	0.005	0.3	AO		0.095	<0.005	<0.005	<0.005
Lithium	mg/L	0.005				<0.005	<0.005	<0.005	<0.005
Magnesium	mg/L	0.02				27.0	20.7	22.0	30.1
Manganese	mg/L	0.001	0.05	AO		0.013	<0.001	<0.001	<0.001
Phosphorus	mg/L	0.1				<0.1	<0.1	<0.1	<0.1
Potassium	mg/L	0.1				5.8	0.6	0.6	0.9
Silicon	mg/L	0.01				4.30	3.64	4.03	4.74

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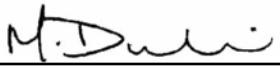
Parameter	Units	R.L.	Limits	DWG	Client I.D.	OW 19-C	OW 20-C	OW 21-C	OW 22-C
					Sample I.D.	24-011608-5	24-011608-6	24-011608-7	24-011608-8
					Date Collected	2024-Apr-25	2024-Apr-25	2024-Apr-25	2024-Apr-25
						-	-	-	-
Silica	mg/L	0.02				9.20	7.78	8.62	10.2
Sodium	mg/L	0.2	200, 20, 20	AO, WL, MAC		3.6	1.4	3.2	3.3
Strontium	mg/L	0.001				0.157	0.110	0.113	0.158
Tin	mg/L	0.05				<0.05	<0.05	<0.05	<0.05
Titanium	mg/L	0.005				<0.005	<0.005	<0.005	<0.005
Tungsten	mg/L	0.01				<0.01	<0.01	<0.01	<0.01
Zinc	mg/L	0.005	5	AO		0.019	<0.005	<0.005	<0.005
Zirconium	mg/L	0.003				<0.003	<0.003	<0.003	<0.003
Antimony	mg/L	0.0001	0.006	MAC		<0.0001	<0.0001	<0.0001	<0.0001
Arsenic	mg/L	0.0001	0.01	MAC		0.0002	<0.0001	<0.0001	0.0001
Beryllium	mg/L	0.0001				<0.0001	<0.0001	<0.0001	<0.0001
Cadmium	mg/L	0.000015	0.005	MAC		0.000022	<0.000015	0.000015	<0.000015
Chromium	mg/L	0.001	0.05	MAC		<0.001	<0.001	<0.001	<0.001
Cobalt	mg/L	0.0001				0.0003	0.0001	0.0001	0.0001
Copper	mg/L	0.0001	1	AO		0.0012	0.0003	0.0007	0.0008
Lead	mg/L	0.00002	0.010	MAC		0.00253	<0.00002	0.00013	0.00003
Molybdenum	mg/L	0.0001				<0.0001	<0.0001	<0.0001	0.0001
Nickel	mg/L	0.0002				0.0004	0.0006	0.0006	0.0008
Selenium	mg/L	0.001	0.05	MAC		<0.001	<0.001	<0.001	<0.001
Silver	mg/L	0.0001				<0.0001	<0.0001	<0.0001	<0.0001
Thallium	mg/L	0.00005				<0.00005	<0.00005	<0.00005	<0.00005



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Data Specialist

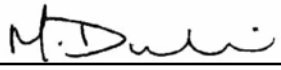
Final Report

REPORT No: 24-011608 - Rev. 0

				Client I.D.	OW 19-C	OW 20-C	OW 21-C	OW 22-C
				Sample I.D.	24-011608-5	24-011608-6	24-011608-7	24-011608-8
				Date Collected	2024-Apr-25	2024-Apr-25	2024-Apr-25	2024-Apr-25
Parameter	**Units**	**R.L.**	**Limits**	**DWG**	-	-	-	-
Uranium	mg/L	0.00005	0.02	MAC	0.00034	0.00019	0.00023	0.00043
Vanadium	mg/L	0.0001			0.0002	0.0001	<0.0001	0.0001

Michelle Dubien
Data Specialist

Parameter	Units	R.L.	Limits	DWG	Client I.D.	OW 23-C	OW 12-A
					Sample I.D.	24-011608-9	24-011608-10
					Date Collected	2024-Apr-25	2024-Apr-25
					DWG	-	-
Alkalinity(CaCO3) to pH4.5	mg/L	5	500	OG		254	156
Bicarbonate (as CaCO3)	mg/L	5				254	156
Conductivity @25°C	uS/cm	1				615	291
pH @25°C	pH units	-	8.5	OG		8.00	7.89
Chloride	mg/L	0.5	250	AO		15.5	0.9
Nitrate (N)	mg/L	0.05	10.0	MAC		8.00	0.26
Nitrite (N)	mg/L	0.05	1.0	MAC		<0.05	<0.05
Sulphate	mg/L	1	500	AO		19	<1
Hardness (as CaCO3)	mg/L as CaCO3	0.02	100	OG		**289**	**186**
Aluminum	mg/L	0.01	0.1	OG		0.03	**0.31**
Barium	mg/L	0.001	1	MAC		0.021	0.008
Bismuth	mg/L	0.02				<0.02	<0.02
Boron	mg/L	0.005	5	MAC		0.008	<0.005
Calcium	mg/L	0.02				69.5	64.6
Iron	mg/L	0.005	0.3	AO		<0.005	**0.422**
Lithium	mg/L	0.005				<0.005	<0.005
Magnesium	mg/L	0.02				28.2	6.02
Manganese	mg/L	0.001	0.05	AO		0.002	**0.117**
Phosphorus	mg/L	0.1				<0.1	<0.1
Potassium	mg/L	0.1				1.2	0.4
Silicon	mg/L	0.01				3.84	2.19



Michelle Dubien
Data Specialist

Parameter	Units	R.L.	Limits	DWG	Client I.D.	OW 23-C	OW 12-A
					Sample I.D.	24-011608-9	24-011608-10
					Date Collected	2024-Apr-25	2024-Apr-25
						-	-
Silica	mg/L	0.02				8.22	4.69
Sodium	mg/L	0.2	200, 20, 20	AO, WL, MAC		3.2	1.6
Strontium	mg/L	0.001				0.102	0.120
Tin	mg/L	0.05				<0.05	<0.05
Titanium	mg/L	0.005				<0.005	<0.005
Tungsten	mg/L	0.01				<0.01	<0.01
Zinc	mg/L	0.005	5	AO		<0.005	<0.005
Zirconium	mg/L	0.003				<0.003	<0.003
Antimony	mg/L	0.0001	0.006	MAC		<0.0001	<0.0001
Arsenic	mg/L	0.0001	0.01	MAC		0.0004	0.0003
Beryllium	mg/L	0.0001				<0.0001	<0.0001
Cadmium	mg/L	0.000015	0.005	MAC		<0.000015	0.000020
Chromium	mg/L	0.001	0.05	MAC		<0.001	0.001
Cobalt	mg/L	0.0001				0.0001	0.0015
Copper	mg/L	0.0001	1	AO		0.0005	0.0069
Lead	mg/L	0.00002	0.010	MAC		<0.00002	0.00277
Molybdenum	mg/L	0.0001				0.0003	<0.0001
Nickel	mg/L	0.0002				0.0010	0.0022
Selenium	mg/L	0.001	0.05	MAC		<0.001	<0.001
Silver	mg/L	0.0001				<0.0001	<0.0001
Thallium	mg/L	0.00005				<0.00005	<0.00005

Michelle Dubien
Data Specialist

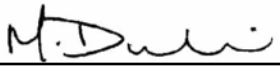
				Client I.D.	OW 23-C	OW 12-A
				Sample I.D.	24-011608-9	24-011608-10
				Date Collected	2024-Apr-25	2024-Apr-25
Parameter	Units	R.L.	Limits	DWG	-	-
Uranium	mg/L	0.00005	0.02	MAC	0.00032	0.00011
Vanadium	mg/L	0.0001			<0.0001	0.0011

Sample #3 filtered from unpreserved for metals analysis due to sediment in metals bottle.

DWG - Drinking Water Guidelines
ODWS - Ontario Drinking Water Standards
AO - Aesthetic Objectives
IMAC - Interim Maximum Acceptable Concentration
MAC - Maximum Acceptable Concentration
ODWO - D-5-5 Objective
OG - Operational Guidelines
WL - Warning Level - Sodium Restricted Diets

Michelle Dubien
Data Specialist

Summary of Exceedances		
Aesthetic Objectives		
OW 12-A	**Found Value**	**Limit**
Iron	0.422	0.3
Manganese	0.117	0.05
Operational Guidelines		
OW 14-C	**Found Value**	**Limit**
Hardness (as CaCO3)	497	100
Aluminum	0.14	0.1
OW 16-C	**Found Value**	**Limit**
Hardness (as CaCO3)	201	100
OW 18-A	**Found Value**	**Limit**
Hardness (as CaCO3)	201	100
OW 18-C	**Found Value**	**Limit**
Hardness (as CaCO3)	190	100
Aluminum	0.34	0.1
OW 19-C	**Found Value**	**Limit**
Hardness (as CaCO3)	327	100
OW 20-C	**Found Value**	**Limit**
Hardness (as CaCO3)	243	100
OW 21-C	**Found Value**	**Limit**
Hardness (as CaCO3)	244	100
OW 22-C	**Found Value**	**Limit**
Hardness (as CaCO3)	310	100
OW 23-C	**Found Value**	**Limit**
Hardness (as CaCO3)	289	100
OW 12-A	**Found Value**	**Limit**
Hardness (as CaCO3)	186	100
Aluminum	0.31	0.1



Michelle Dubien
Data Specialist

CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: -

REPORT No: 24-027597 - Rev. 0

Report To:
Tatham Engineering
115 Sandford Fleming Drive
Suite 200
Collingwood, ON L9Y 5A6

Attention: Alicia Kimberley

CADUCEON Environmental Laboratories
112 Commerce Park Dr Unit L
Barrie, ON L4N 8W8

DATE RECEIVED: 2024-Sep-06
DATE REPORTED: 2024-Sep-16
SAMPLE MATRIX: Ground Water

CUSTOMER PROJECT: 123016
P.O. NUMBER:

Analyses	Qty	Site Analyzed	Authorized	Date Analyzed	Lab Method	Reference Method
Anions (Liquid)	12	OTTAWA	LMACGREGOR	2024-Sep-09	A-IC-01	SM 4110B
Cond/pH/Alk Auto (Liquid)	12	OTTAWA	SBOUDREAU	2024-Sep-09	COND-02/PH-02/ALK-02	SM 2510B/4500H/2320B
ICP/MS (Liquid)	12	OTTAWA	AOZKAYMAK	2024-Sep-11	D-ICPMS-01	EPA 200.8
ICP/OES (Liquid)	12	OTTAWA	APRUDYVUS	2024-Sep-09	D-ICP-01	SM 3120B
Oil & Grease (Liquid)	3	KINGSTON	DCHAUDHARI	2024-Sep-09	O&G-001	SM 5520
PHC F1 (Liquid)	3	RICHMOND_HILL	FLENA	2024-Sep-10	C-VPHW-01	MECP E3421
PHC F2-4 (Liquid)	3	KINGSTON	STHOMPSON	2024-Sep-10	PHC-W-001	MECP E3421
VOC-Volatiles Full (Water)	3	RICHMOND_HILL	FLENA	2024-Sep-10	C-VOC-02	EPA 8260

µg/g = micrograms per gram (parts per million) and is equal to mg/Kg
F1 C6-C10 hydrocarbons in µg/g, (F1-btex if requested)
F2 C10-C16 hydrocarbons in µg/g, (F2-napth if requested)
F3 C16-C34 hydrocarbons in µg/g, (F3-pah if requested)
F4 C34-C50 hydrocarbons in µg/g
This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.
Any deviations from the method are noted and reported for any particular sample.
nC6 and nC10 response factor is within 30% of response factor for toluene:
nC10,nC16 and nC34 response factors within 10% of each other:
C50 response factors within 70% of nC10+nC16+nC34 average:
Linearity is within 15%:
All results expressed on a dry weight basis.
Unless otherwise noted all chromatograms returned to baseline by the retention time of nC50.

R.L. = Reporting Limit
NC = Not Calculated
Test methods may be modified from specified reference method unless indicated by an *

Unless otherwise noted all extraction, analysis, QC requirements and limits for holding time were met.
If analyzed for F4 and F4G they are not to be summed but the greater of the two numbers are to be used in application to the CWS PHC
QC will be made available upon request.

Christine Burke
Laboratory Manager

Parameter	Units	R.L.	Limits	DWG	Client I.D.	OW7A	OW13C	OW23C	OW22C
					Sample I.D.	24-027597-1	24-027597-2	24-027597-3	24-027597-4
					Date Collected	2024-Sep-05	2024-Sep-05	2024-Sep-05	2024-Sep-05
						-	-	-	-
Alkalinity(CaCO3) to pH4.5	mg/L	5	500	OG		247	296	255	258
Bicarbonate (as CaCO3)	mg/L	5				247	296	255	258
Carbonate (as CaCO3)	mg/L	5				<5	<5	<5	<5
TDS (Calc. from Cond.)	mg/L	3	500	AO		285	301	313	339
Conductivity @25°C	uS/cm	1				549	580	604	652
pH @25°C	pH units	-	8.5	OG		7.99	7.97	7.98	7.99
Bromide	mg/L	0.4				0.4	<0.4	<0.4	<0.4
Fluoride	mg/L	0.1	1.5	MAC		<0.1	<0.1	<0.1	<0.1
Chloride	mg/L	0.5	250	AO		19.4	11.1	16.0	16.2
Nitrate (N)	mg/L	0.05	10.0	MAC		1.99	1.90	8.19	8.82
Nitrite (N)	mg/L	0.05	1.0	MAC		<0.05	<0.05	<0.05	<0.05
Sulphate	mg/L	1	500	AO		22	8	19	35
Hardness (as CaCO3)	mg/L as CaCO3	0.02	100	OG		303	326	338	369
Aluminum	mg/L	0.01	0.1	OG		0.03	0.03	0.03	0.03
Barium	mg/L	0.001	1	MAC		0.067	0.044	0.027	0.089
Bismuth	mg/L	0.02				<0.02	<0.02	<0.02	<0.02
Boron	mg/L	0.005	5	MAC		0.013	0.007	0.008	0.007
Calcium	mg/L	0.02				92.1	94.8	85.6	93.4
Iron	mg/L	0.005	0.3	AO		<0.005	<0.005	<0.005	<0.005
Lithium	mg/L	0.005				<0.005	<0.005	<0.005	<0.005
Magnesium	mg/L	0.02				17.7	21.7	30.3	32.9

Christine Burke
Laboratory Manager

				Client I.D.	OW7A	OW13C	OW23C	OW22C
				Sample I.D.	24-027597-1	24-027597-2	24-027597-3	24-027597-4
				Date Collected	2024-Sep-05	2024-Sep-05	2024-Sep-05	2024-Sep-05
Parameter	Units	R.L.	Limits	DWG	-	-	-	-
Manganese	mg/L	0.001	0.05	AO	<0.001	<0.001	<0.001	<0.001
Phosphorus	mg/L	0.1			<0.1	<0.1	<0.1	<0.1
Potassium	mg/L	0.1			1.6	1.2	1.3	0.9
Silicon	mg/L	0.01			3.28	3.68	4.15	5.03
Silica	mg/L	0.02			7.02	7.86	8.87	10.8
Sodium	mg/L	0.2	200, 20, 20	AO, WL, MAC	6.2	6.9	3.6	3.7
Strontium	mg/L	0.001			0.140	0.124	0.110	0.164
Tin	mg/L	0.05			<0.05	<0.05	<0.05	<0.05
Titanium	mg/L	0.005			<0.005	<0.005	<0.005	<0.005
Tungsten	mg/L	0.01			<0.01	<0.01	<0.01	<0.01
Zinc	mg/L	0.005	5	AO	<0.005	0.015	<0.005	<0.005
Zirconium	mg/L	0.003			<0.003	<0.003	<0.003	<0.003
Antimony	mg/L	0.0001	0.006	MAC	<0.0001	<0.0001	<0.0001	<0.0001
Arsenic	mg/L	0.0001	0.01	MAC	<0.0001	0.0001	0.0004	0.0001
Beryllium	mg/L	0.0001			<0.0001	<0.0001	<0.0001	<0.0001
Cadmium	mg/L	0.000015	0.005	MAC	<0.000015	<0.000015	<0.000015	<0.000015
Chromium	mg/L	0.001	0.05	MAC	<0.001	<0.001	<0.001	<0.001
Cobalt	mg/L	0.0001			0.0005	0.0005	0.0005	0.0005
Copper	mg/L	0.0001	1	AO	0.0008	0.0006	0.0003	0.0003
Lead	mg/L	0.00002	0.010	MAC	<0.00002	<0.00002	<0.00002	<0.00002
Molybdenum	mg/L	0.0001			0.0001	0.0001	0.0003	0.0002

Christine Burke
Laboratory Manager

Parameter	Units	R.L.	Limits	DWG	Client I.D.	OW7A	OW13C	OW23C	OW22C
					Sample I.D.	24-027597-1	24-027597-2	24-027597-3	24-027597-4
					Date Collected	2024-Sep-05	2024-Sep-05	2024-Sep-05	2024-Sep-05
						-	-	-	-
Nickel	mg/L	0.0002				0.0008	0.0007	0.0009	0.0008
Selenium	mg/L	0.001	0.05	MAC		<0.001	<0.001	<0.001	<0.001
Silver	mg/L	0.0001				<0.0001	<0.0001	<0.0001	<0.0001
Thallium	mg/L	0.00005				<0.00005	<0.00005	<0.00005	<0.00005
Uranium	mg/L	0.00005	0.02	MAC		0.00036	0.00018	0.00033	0.00041
Vanadium	mg/L	0.0001				<0.0001	<0.0001	<0.0001	0.0001

Christine Burke
Laboratory Manager

Parameter	Units	R.L.	Limits	DWG	Client I.D.	OW7C	OW13A	OW4A	OW3B
					Sample I.D.	24-027597-5	24-027597-6	24-027597-7	24-027597-8
					Date Collected	2024-Sep-05	2024-Sep-05	2024-Sep-05	2024-Sep-05
						-	-	-	-
Alkalinity(CaCO3) to pH4.5	mg/L	5	500	OG		86	277	342	276
Bicarbonate (as CaCO3)	mg/L	5				86	277	342	276
Carbonate (as CaCO3)	mg/L	5				<5	<5	<5	<5
TDS (Calc. from Cond.)	mg/L	3	500	AO		88	295	433	343
Conductivity @25°C	uS/cm	1				174	569	822	661
pH @25°C	pH units	-	8.5	OG		7.77	8.04	7.98	7.96
Bromide	mg/L	0.4				<0.4	<0.4	<0.4	<0.4
Fluoride	mg/L	0.1	1.5	MAC		<0.1	<0.1	<0.1	<0.1
Chloride	mg/L	0.5	250	AO		3.8	9.7	19.2	31.8
Nitrate (N)	mg/L	0.05	10.0	MAC		<0.05	1.14	16.3	6.13
Nitrite (N)	mg/L	0.05	1.0	MAC		<0.05	<0.05	<0.05	<0.05
Sulphate	mg/L	1	500	AO		1	20	13	12
Hardness (as CaCO3)	mg/L as CaCO3	0.02	100	OG		90.7	328	457	351
Aluminum	mg/L	0.01	0.1	OG		<0.01	0.03	0.06	0.03
Barium	mg/L	0.001	1	MAC		0.002	0.038	0.058	0.055
Bismuth	mg/L	0.02				<0.02	<0.02	<0.02	<0.02
Boron	mg/L	0.005	5	MAC		0.011	0.010	0.009	0.011
Calcium	mg/L	0.02				8.12	92.8	139	105
Iron	mg/L	0.005	0.3	AO		0.180	<0.005	<0.005	<0.005
Lithium	mg/L	0.005				<0.005	<0.005	<0.005	<0.005
Magnesium	mg/L	0.02				17.1	23.2	26.5	21.4

Christine Burke
Laboratory Manager

Parameter	Units	R.L.	Limits	DWG	Client I.D.	OW7C	OW13A	OW4A	OW3B
					Sample I.D.	24-027597-5	24-027597-6	24-027597-7	24-027597-8
					Date Collected	2024-Sep-05	2024-Sep-05	2024-Sep-05	2024-Sep-05
						-	-	-	-
Manganese	mg/L	0.001	0.05	AO		0.094	<0.001	0.001	<0.001
Phosphorus	mg/L	0.1				<0.1	<0.1	<0.1	<0.1
Potassium	mg/L	0.1				0.9	1.2	1.5	2.5
Silicon	mg/L	0.01				0.37	3.80	4.41	3.90
Silica	mg/L	0.02				0.79	8.13	9.43	8.34
Sodium	mg/L	0.2	200, 20, 20	AO, WL, MAC		2.3	6.9	9.9	10.0
Strontium	mg/L	0.001				0.010	0.129	0.234	0.160
Tin	mg/L	0.05				<0.05	<0.05	<0.05	<0.05
Titanium	mg/L	0.005				<0.005	<0.005	<0.005	<0.005
Tungsten	mg/L	0.01				<0.01	<0.01	<0.01	<0.01
Zinc	mg/L	0.005	5	AO		<0.005	<0.005	<0.005	<0.005
Zirconium	mg/L	0.003				<0.003	<0.003	<0.003	<0.003
Antimony	mg/L	0.0001	0.006	MAC		<0.0001	<0.0001	<0.0001	<0.0001
Arsenic	mg/L	0.0001	0.01	MAC		<0.0001	0.0002	<0.0001	<0.0001
Beryllium	mg/L	0.0001				<0.0001	<0.0001	<0.0001	<0.0001
Cadmium	mg/L	0.000015	0.005	MAC		<0.000015	<0.000015	<0.000015	<0.000015
Chromium	mg/L	0.001	0.05	MAC		<0.001	<0.001	<0.001	<0.001
Cobalt	mg/L	0.0001				0.0004	0.0005	0.0005	0.0005
Copper	mg/L	0.0001	1	AO		<0.0001	0.0009	0.0007	0.0004
Lead	mg/L	0.00002	0.010	MAC		<0.00002	0.00002	<0.00002	<0.00002
Molybdenum	mg/L	0.0001				0.0028	0.0002	<0.0001	<0.0001

Christine Burke
Laboratory Manager

Parameter	Units	R.L.	Limits	DWG	Client I.D.	OW7C	OW13A	OW4A	OW3B
					Sample I.D.	24-027597-5	24-027597-6	24-027597-7	24-027597-8
					Date Collected	2024-Sep-05	2024-Sep-05	2024-Sep-05	2024-Sep-05
						-	-	-	-
Nickel	mg/L	0.0002				0.0007	0.0007	0.0010	0.0007
Selenium	mg/L	0.001	0.05	MAC		<0.001	<0.001	<0.001	<0.001
Silver	mg/L	0.0001				<0.0001	<0.0001	<0.0001	<0.0001
Thallium	mg/L	0.00005				<0.00005	<0.00005	<0.00005	<0.00005
Uranium	mg/L	0.00005	0.02	MAC		<0.00005	0.00031	0.00016	0.00020
Vanadium	mg/L	0.0001				<0.0001	0.0001	<0.0001	<0.0001

Christine Burke
Laboratory Manager

Parameter	Units	R.L.	Limits	DWG	Client I.D.	OW8A	OW5A	OW4B	OW5B
					Sample I.D.	24-027597-9	24-027597-10	24-027597-11	24-027597-12
					Date Collected	2024-Sep-05	2024-Sep-05	2024-Sep-05	2024-Sep-05
						-	-	-	-
Alkalinity(CaCO3) to pH4.5	mg/L	5	500	OG		288	282	381	290
Bicarbonate (as CaCO3)	mg/L	5				288	282	381	290
Carbonate (as CaCO3)	mg/L	5				<5	<5	<5	<5
TDS (Calc. from Cond.)	mg/L	3	500	AO		404	381	467	395
Conductivity @25°C	uS/cm	1				772	730	883	755
pH @25°C	pH units	-	8.5	OG		7.96	7.94	7.92	7.98
Bromide	mg/L	0.4				<0.4	31.5	<0.4	<0.4
Fluoride	mg/L	0.1	1.5	MAC		<0.1	7.7	<0.1	<0.1
Chloride	mg/L	0.5	250	AO		43.9	81.5	32.3	59.5
Nitrate (N)	mg/L	0.05	10.0	MAC		13.1	15.9	12.1	4.12
Nitrite (N)	mg/L	0.05	1.0	MAC		<0.05	3.99	<0.05	<0.05
Sulphate	mg/L	1	500	AO		10	80	11	15
Hardness (as CaCO3)	mg/L as CaCO3	0.02	100	OG		412	351	480	354
Aluminum	mg/L	0.01	0.1	OG		0.03	0.04	0.05	0.03
Barium	mg/L	0.001	1	MAC		0.119	0.051	0.080	0.044
Bismuth	mg/L	0.02				<0.02	<0.02	<0.02	<0.02
Boron	mg/L	0.005	5	MAC		0.006	0.009	0.008	0.008
Calcium	mg/L	0.02				109	102	145	102
Iron	mg/L	0.005	0.3	AO		<0.005	0.129	<0.005	<0.005
Lithium	mg/L	0.005				<0.005	<0.005	<0.005	<0.005
Magnesium	mg/L	0.02				34.2	23.4	28.4	24.0

Christine Burke
Laboratory Manager

Parameter	Units	R.L.	Limits	DWG	Client I.D.	OW8A	OW5A	OW4B	OW5B
					Sample I.D.	24-027597-9	24-027597-10	24-027597-11	24-027597-12
					Date Collected	2024-Sep-05	2024-Sep-05	2024-Sep-05	2024-Sep-05
						-	-	-	-
Manganese	mg/L	0.001	0.05	AO		<0.001	**0.114**	<0.001	<0.001
Phosphorus	mg/L	0.1				<0.1	<0.1	<0.1	<0.1
Potassium	mg/L	0.1				1.2	2.5	0.9	2.3
Silicon	mg/L	0.01				5.79	3.74	4.33	3.68
Silica	mg/L	0.02				12.4	8.01	9.27	7.88
Sodium	mg/L	0.2	200, 20, 20	AO, WL, MAC		13.3	**31.0**	17.7	**32.4**
Strontium	mg/L	0.001				0.194	0.155	0.215	0.155
Tin	mg/L	0.05				<0.05	<0.05	<0.05	<0.05
Titanium	mg/L	0.005				<0.005	<0.005	<0.005	<0.005
Tungsten	mg/L	0.01				<0.01	<0.01	<0.01	<0.01
Zinc	mg/L	0.005	5	AO		<0.005	<0.005	<0.005	0.028
Zirconium	mg/L	0.003				<0.003	<0.003	<0.003	<0.003
Antimony	mg/L	0.0001	0.006	MAC		<0.0001	<0.0001	<0.0001	<0.0001
Arsenic	mg/L	0.0001	0.01	MAC		<0.0001	0.0001	<0.0001	0.0001
Beryllium	mg/L	0.0001				<0.0001	<0.0001	<0.0001	<0.0001
Cadmium	mg/L	0.000015	0.005	MAC		<0.000015	<0.000015	<0.000015	0.000037
Chromium	mg/L	0.001	0.05	MAC		0.001	<0.001	<0.001	<0.001
Cobalt	mg/L	0.0001				0.0005	0.0006	0.0005	0.0001
Copper	mg/L	0.0001	1	AO		0.0003	0.0007	0.0008	0.0008
Lead	mg/L	0.00002	0.010	MAC		<0.00002	<0.00002	<0.00002	0.00017
Molybdenum	mg/L	0.0001				<0.0001	0.0002	<0.0001	0.0003

Christine Burke
Laboratory Manager

Parameter	Units	R.L.	Limits	DWG	Client I.D.	OW8A	OW5A	OW4B	OW5B
					Sample I.D.	24-027597-9	24-027597-10	24-027597-11	24-027597-12
					Date Collected	2024-Sep-05	2024-Sep-05	2024-Sep-05	2024-Sep-05
						-	-	-	-
Nickel	mg/L	0.0002				0.0007	0.0009	0.0007	0.0009
Selenium	mg/L	0.001	0.05	MAC		<0.001	<0.001	<0.001	<0.001
Silver	mg/L	0.0001				<0.0001	<0.0001	<0.0001	<0.0001
Thallium	mg/L	0.00005				<0.00005	<0.00005	<0.00005	<0.00005
Uranium	mg/L	0.00005	0.02	MAC		0.00022	0.00043	0.00015	0.00045
Vanadium	mg/L	0.0001				0.0001	<0.0001	<0.0001	0.0001

Parameter	Units	R.L.	Limits	DWG	Client I.D.	OW7A	OW8A	OW5A
					Sample I.D.	24-027597-1	24-027597-9	24-027597-10
					Date Collected	2024-Sep-05	2024-Sep-05	2024-Sep-05
						-	-	-
Benzene	µg/L	0.5	1	MAC		<0.5	<0.5	<0.5
Ethylbenzene	µg/L	0.5	140, 1.6	MAC, AO		<0.5	<0.5	<0.5
Toluene	µg/L	0.5	60	MAC		<0.5	0.5	<0.5
Xylene, m,p-	µg/L	1				<1	<1	<1
Xylene, m,p,o-	µg/L	1.1	90, 20	MAC, AO		<1.1	<1.1	<1.1
Xylene, o-	µg/L	0.5				<0.5	<0.5	<0.5
PHC F1 (C6-C10)	µg/L	25				<25	<25	<25
PHC F2 (>C10-C16)	µg/L	50				<50	<50	<50
PHC F3 (>C16-C34)	µg/L	400				<400	<400	<400
PHC F4 (>C34-C50)	µg/L	400				<400	<400	<400
Oil & Grease (Total)	mg/L	1.0				<1.0	<1.0	<1.0

Revised report to change guidelines as per client request

Christine Burke
Laboratory Manager

DWG - Drinking Water Guidelines

ODWS - Ontario Drinking Water Standards
AO - Aesthetic Objectives
IMAC - Interim Maximum Acceptable Concentration
MAC - Maximum Acceptable Concentration
ODWO - D-5-5 Objective
OG - Operational Guidelines
WL - Warning Level - Sodium Restricted Diets

Christine Burke
Laboratory Manager

Summary of Exceedances		
Aesthetic Objectives		
OW7C	**Found Value**	**Limit**
Manganese	0.094	0.05
OW5A	**Found Value**	**Limit**
Manganese	0.114	0.05
Maximum Acceptable Concentration		
OW4A	**Found Value**	**Limit**
Nitrate (N)	16.3	10.0
OW8A	**Found Value**	**Limit**
Nitrate (N)	13.1	10.0
OW5A	**Found Value**	**Limit**
Fluoride	7.7	1.5
Nitrate (N)	15.9	10.0
Nitrite (N)	3.99	1.0
Sodium	31.0	20
OW4B	**Found Value**	**Limit**
Nitrate (N)	12.1	10.0
OW5B	**Found Value**	**Limit**
Sodium	32.4	20
Operational Guidelines		
OW7A	**Found Value**	**Limit**
Hardness (as CaCO3)	303	100
OW13C	**Found Value**	**Limit**
Hardness (as CaCO3)	326	100
OW23C	**Found Value**	**Limit**
Hardness (as CaCO3)	338	100
OW22C	**Found Value**	**Limit**
Hardness (as CaCO3)	369	100
OW13A	**Found Value**	**Limit**
Hardness (as CaCO3)	328	100
OW4A	**Found Value**	**Limit**
Hardness (as CaCO3)	457	100
OW3B	**Found Value**	**Limit**
Hardness (as CaCO3)	351	100
OW8A	**Found Value**	**Limit**
Hardness (as CaCO3)	412	100
OW5A	**Found Value**	**Limit**
Hardness (as CaCO3)	351	100

Christine Burke
Laboratory Manager

OW4B	Found Value	Limit
Hardness (as CaCO3)	480	100
OW5B	**Found Value**	**Limit**
Hardness (as CaCO3)	354	100
Warning Level - Sodium Restricted Diets		
OW5A	**Found Value**	**Limit**
Sodium	31.0	20
OW5B	**Found Value**	**Limit**
Sodium	32.4	20

Christine Burke
Laboratory Manager

CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: -

REPORT No: 24-028228 - Rev. 0

Report To:
Tatham Engineering
115 Sandford Fleming Drive
Suite 200
Collingwood, ON L9Y 5A6

Attention: Alicia Kimberley

CADUCEON Environmental Laboratories
112 Commerce Park Dr Unit L
Barrie, ON L4N 8W8

DATE RECEIVED: 2024-Sep-11
DATE REPORTED: 2024-Sep-13
SAMPLE MATRIX: Surface Water

CUSTOMER PROJECT: 123016
P.O. NUMBER:

Analyses	Qty	Site Analyzed	Authorized	Date Analyzed	Lab Method	Reference Method
Anions (Liquid)	2	OTTAWA	PCURIEL	2024-Sep-13	A-IC-01	SM 4110B
Cond/pH/Alk Auto (Liquid)	2	OTTAWA	SBOUDREAU	2024-Sep-12	COND-02/PH-02/ALK-02	SM 2510B/4500H/2320B
ICP/MS Total (Liquid)	2	OTTAWA	AOZKAYMAK	2024-Sep-13	D-ICPMS-01	EPA 6020
ICP/OES Total (Liquid)	2	OTTAWA	APRUDYVUS	2024-Sep-13	D-ICP-01	SM 3120B

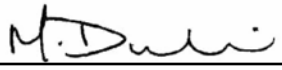
R.L. = Reporting Limit
NC = Not Calculated
Test methods may be modified from specified reference method unless indicated by an *

Michelle Dubien
Data Specialist

					Client I.D.	North Pond	South Pond
					Sample I.D.	24-028228-1	24-028228-2
					Date Collected	2024-Sep-10	2024-Sep-10
Parameter	**Units**	**R.L.**	**Limits**			-	-
Alkalinity(CaCO3) to pH4.5	mg/L	5				212	160
Bicarbonate (as CaCO3)	mg/L	5				212	160
Conductivity @25°C	uS/cm	1				408	318
pH @25°C	pH units	-	8.5	PWQO		8.05	7.95
Chloride	mg/L	0.5				6.7	1.7
Nitrate (N)	mg/L	0.05				<0.05	<0.05
Nitrite (N)	mg/L	0.05				<0.05	<0.05
Sulphate	mg/L	1				4	<1
Hardness (as CaCO3)	mg/L as CaCO3	0.02				218	162
Aluminum (Total)	µg/L	10				30	20
Barium (Total)	µg/L	1				25	16
Bismuth (Total)	µg/L	20				<20	<20
Boron (Total)	µg/L	5	200	INTERIM		14	13
Calcium (Total)	µg/L	20				66000	55300
Iron (Total)	µg/L	5	300	PWQO		240	188
Lithium (Total)	µg/L	5				<5	<5
Magnesium (Total)	µg/L	20				12800	5700
Manganese (Total)	µg/L	1				34	61
Phosphorus (Total)	µg/L	100				<100	<100
Potassium (Total)	µg/L	100				3000	2500
Silicon (Total)	µg/L	10				3620	1430

Michelle Dubien
Data Specialist

Parameter	Units	R.L.	Limits		Client I.D.	North Pond	South Pond
					Sample I.D.	24-028228-1	24-028228-2
					Date Collected	2024-Sep-10	2024-Sep-10
						-	-
Silica (Total)	µg/L	20				7750	3070
Sodium (Total)	µg/L	200				2700	1100
Strontium (Total)	µg/L	1				105	100
Tin (Total)	µg/L	50				<50	<50
Titanium (Total)	µg/L	5				<5	<5
Tungsten (Total)	µg/L	10	30	INTERIM		20	30
Zinc (Total)	µg/L	5	20, 30	INTERIM, PWQO		10	13
Zirconium (Total)	µg/L	3	4	INTERIM		<3	<3
Antimony (Total)	µg/L	0.1	20	INTERIM		0.1	0.4
Arsenic (Total)	µg/L	0.1	5, 5	INTERIM, PWQO		0.6	0.4
Beryllium (Total)	µg/L	0.1	11	PWQO		<0.1	<0.1
Cadmium (Total)	µg/L	0.015	0.1, 0.2	INTERIM, PWQO		<0.015	0.017
Chromium (Total)	µg/L	1				<1	<1
Cobalt (Total)	µg/L	0.1	0.9	INTERIM		0.2	0.2
Copper (Total)	µg/L	0.1	5	INTERIM		0.2	0.3
Lead (Total)	µg/L	0.02	1, 5	INTERIM, PWQO		0.02	0.02
Molybdenum (Total)	µg/L	0.1	40	INTERIM		<0.1	<0.1
Nickel (Total)	µg/L	0.2	25	PWQO		0.8	0.5
Selenium (Total)	µg/L	1	100	PWQO		<1	<1
Silver (Total)	µg/L	0.1	0.1	PWQO		<0.1	<0.1
Thallium (Total)	µg/L	0.05	0.3, 0.3	INTERIM, PWQO		<0.05	<0.05



Michelle Dubien
Data Specialist

				Client I.D.	North Pond	South Pond
				Sample I.D.	24-028228-1	24-028228-2
				Date Collected	2024-Sep-10	2024-Sep-10
Parameter	**Units**	**R.L.**	**Limits**		-	-
Uranium (Total)	µg/L	0.05	5	INTERIM	0.23	0.12
Vanadium (Total)	µg/L	0.1	6	INTERIM	<0.1	<0.1

TP / TKN not required as per previous submissions

: PWQO Limits
INTERIM: Interim PWQO
PWQO: PWQO

Michelle Dubien
Data Specialist

CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: -

REPORT No: 24-028235 - Rev. 1

Report To:
Tatham Engineering
115 Sandford Fleming Drive
Suite 200
Collingwood, ON L9Y 5A6

Attention: Alicia Kimberley

CADUCEON Environmental Laboratories
112 Commerce Park Dr Unit L
Barrie, ON L4N 8W8

DATE RECEIVED: 2024-Sep-11
DATE REPORTED: 2025-Jan-29
SAMPLE MATRIX: Ground Water

CUSTOMER PROJECT: 123016
P.O. NUMBER:

Analyses	Qty	Site Analyzed	Authorized	Date Analyzed	Lab Method	Reference Method
Anions (Liquid)	5	OTTAWA	PCURIEL	2024-Sep-12	A-IC-01	SM 4110B
Cond/pH/Alk Auto (Liquid)	5	OTTAWA	SBOUDREAU	2024-Sep-12	COND-02/PH-02/ALK-02	SM 2510B/4500H/2320B
ICP/MS (Liquid)	5	OTTAWA	AOZKAYMAK	2024-Sep-13	D-ICPMS-01	EPA 200.8
ICP/OES (Liquid)	5	OTTAWA	APRUDYVUS	2024-Sep-13	D-ICP-01	SM 3120B
Oil & Grease (Liquid)	5	KINGSTON	DCHAUDHARI	2024-Sep-12	O&G-001	SM 5520
PHC F1 (Liquid)	5	RICHMOND_HILL	FLENA	2024-Sep-14	C-VPHW-01	MECP E3421
PHC F2-4 (Liquid)	5	KINGSTON	STHOMPSON	2024-Sep-13	PHC-W-001	MECP E3421
VOC-Volatiles Full (Water)	5	RICHMOND_HILL	FLENA	2024-Sep-14	C-VOC-02	EPA 8260

µg/g = micrograms per gram (parts per million) and is equal to mg/Kg
F1 C6-C10 hydrocarbons in µg/g, (F1-btex if requested)
F2 C10-C16 hydrocarbons in µg/g, (F2-napth if requested)
F3 C16-C34 hydrocarbons in µg/g, (F3-pah if requested)
F4 C34-C50 hydrocarbons in µg/g
This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.
Any deviations from the method are noted and reported for any particular sample.
nC6 and nC10 response factor is within 30% of response factor for toluene:
nC10,nC16 and nC34 response factors within 10% of each other:
C50 response factors within 70% of nC10+nC16+nC34 average:
Linearity is within 15%:
All results expressed on a dry weight basis.
Unless otherwise noted all chromatograms returned to baseline by the retention time of nC50.

R.L. = Reporting Limit
NC = Not Calculated
Test methods may be modified from specified reference method unless indicated by an *

Unless otherwise noted all extraction, analysis, QC requirements and limits for holding time were met.
If analyzed for F4 and F4G they are not to be summed but the greater of the two numbers are to be used in application to the CWS PHC
QC will be made available upon request.

Christine Burke
Laboratory Manager

Final Report

REPORT No: 24-028235 - Rev. 1

Parameter	Units	R.L.	Limits	DWG	Client I.D.	OW14C	OW20C	OW6A	OW10B
					Sample I.D.	24-028235-1	24-028235-2	24-028235-3	24-028235-4
					Date Collected	2024-Sep-10	2024-Sep-10	2024-Sep-10	2024-Sep-10
						-	-	-	-
Alkalinity(CaCO3) to pH4.5	mg/L	5	500	OG		485	229	160	219
Bicarbonate (as CaCO3)	mg/L	5				485	229	160	219
Conductivity @25°C	uS/cm	1				876	533	424	467
pH @25°C	pH units	-	8.5	OG		7.87	7.98	7.95	7.99
Chloride	mg/L	0.5	250	AO		2.8	6.3	24.4	9.7
Nitrate (N)	mg/L	0.05	10.0	MAC		2.48	9.72	0.97	1.90
Nitrite (N)	mg/L	0.05	1.0	MAC		<0.05	<0.05	<0.05	<0.05
Sulphate	mg/L	1	500	AO		7	12	21	15
Hardness (as CaCO3)	mg/L as CaCO3	0.02	100	OG		550	299	219	268
Aluminum	mg/L	0.01	0.1	OG		0.04	0.02	0.02	0.02
Barium	mg/L	0.001	1	MAC		0.126	0.080	0.060	0.057
Bismuth	mg/L	0.02				<0.02	<0.02	<0.02	<0.02
Boron	mg/L	0.005	5	MAC		0.008	0.012	0.024	0.010
Calcium	mg/L	0.02				155	81.4	62.3	77.8
Iron	mg/L	0.005	0.3	AO		<0.005	<0.005	<0.005	<0.005
Lithium	mg/L	0.005				<0.005	<0.005	<0.005	<0.005
Magnesium	mg/L	0.02				39.5	23.2	15.3	17.8
Manganese	mg/L	0.001	0.05	AO		<0.001	0.001	<0.001	<0.001
Phosphorus	mg/L	0.1				<0.1	<0.1	<0.1	<0.1
Potassium	mg/L	0.1				1.0	0.7	2.7	1.3
Silicon	mg/L	0.01				5.53	3.95	2.52	3.38

Christine Burke
Laboratory Manager

Parameter	Units	R.L.	Limits	DWG	Client I.D.	OW14C	OW20C	OW6A	OW10B
					Sample I.D.	24-028235-1	24-028235-2	24-028235-3	24-028235-4
					Date Collected	2024-Sep-10	2024-Sep-10	2024-Sep-10	2024-Sep-10
						-	-	-	-
Silica	mg/L	0.02				11.8	8.46	5.39	7.22
Sodium	mg/L	0.2	200, 20, 20	AO, WL, MAC		2.4	2.7	6.0	3.7
Strontium	mg/L	0.001				0.216	0.117	0.149	0.119
Tin	mg/L	0.05				<0.05	<0.05	<0.05	<0.05
Titanium	mg/L	0.005				<0.005	<0.005	<0.005	<0.005
Tungsten	mg/L	0.01				0.03	0.02	0.03	0.02
Zinc	mg/L	0.005	5	AO		0.054	<0.005	<0.005	0.053
Zirconium	mg/L	0.003				<0.003	<0.003	<0.003	<0.003
Antimony	mg/L	0.0001	0.006	MAC		<0.0001	<0.0001	<0.0001	<0.0001
Arsenic	mg/L	0.0001	0.01	MAC		0.0002	<0.0001	<0.0001	0.0003
Beryllium	mg/L	0.0001				<0.0001	<0.0001	<0.0001	<0.0001
Cadmium	mg/L	0.000015	0.005	MAC		0.000060	<0.000015	<0.000015	0.000038
Chromium	mg/L	0.001	0.05	MAC		<0.001	<0.001	<0.001	<0.001
Cobalt	mg/L	0.0001				0.0002	0.0001	0.0004	0.0001
Copper	mg/L	0.0001	1	AO		0.0002	0.0003	0.0005	0.0002
Lead	mg/L	0.00002	0.010	MAC		0.00010	<0.00002	<0.00002	0.00006
Molybdenum	mg/L	0.0001				<0.0001	0.0002	0.0004	0.0002
Nickel	mg/L	0.0002				0.0003	0.0006	0.0007	0.0007
Selenium	mg/L	0.001	0.05	MAC		<0.001	<0.001	<0.001	<0.001
Silver	mg/L	0.0001				<0.0001	<0.0001	<0.0001	<0.0001
Thallium	mg/L	0.00005				<0.00005	<0.00005	<0.00005	<0.00005

Christine Burke
Laboratory Manager

				Client I.D.	OW14C	OW20C	OW6A	OW10B
				Sample I.D.	24-028235-1	24-028235-2	24-028235-3	24-028235-4
				Date Collected	2024-Sep-10	2024-Sep-10	2024-Sep-10	2024-Sep-10
Parameter	**Units**	**R.L.**	**Limits**	**DWG**	-	-	-	-
Uranium	mg/L	0.00005	0.02	MAC	0.00020	0.00032	0.00017	0.00034
Vanadium	mg/L	0.0001			0.0001	0.0001	<0.0001	<0.0001

Christine Burke
Laboratory Manager

Parameter	Units	R.L.	Limits	DWG	Client I.D.: OW21C Sample I.D.: 24-028235-5 Date Collected: 2024-Sep-10
					-
Alkalinity(CaCO3) to pH4.5	mg/L	5	500	OG	262
Bicarbonate (as CaCO3)	mg/L	5			262
Conductivity @25°C	uS/cm	1			494
pH @25°C	pH units	-	8.5	OG	8.03
Chloride	mg/L	0.5	250	AO	2.6
Nitrate (N)	mg/L	0.05	10.0	MAC	0.52
Nitrite (N)	mg/L	0.05	1.0	MAC	<0.05
Sulphate	mg/L	1	500	AO	11
Hardness (as CaCO3)	mg/L as CaCO3	0.02	100	OG	**292**
Aluminum	mg/L	0.01	0.1	OG	0.02
Barium	mg/L	0.001	1	MAC	0.066
Bismuth	mg/L	0.02			<0.02
Boron	mg/L	0.005	5	MAC	0.006
Calcium	mg/L	0.02			77.7
Iron	mg/L	0.005	0.3	AO	<0.005
Lithium	mg/L	0.005			<0.005
Magnesium	mg/L	0.02			23.9
Manganese	mg/L	0.001	0.05	AO	<0.001
Phosphorus	mg/L	0.1			<0.1
Potassium	mg/L	0.1			0.6
Silicon	mg/L	0.01			4.26

Christine Burke
Laboratory Manager

Parameter	Units	R.L.	Limits	DWG	Client I.D.: OW21C Sample I.D.: 24-028235-5 Date Collected: 2024-Sep-10 -
Silica	mg/L	0.02			9.11
Sodium	mg/L	0.2	200, 20, 20	AO, WL, MAC	2.2
Strontium	mg/L	0.001			0.118
Tin	mg/L	0.05			<0.05
Titanium	mg/L	0.005			<0.005
Tungsten	mg/L	0.01			0.03
Zinc	mg/L	0.005	5	AO	<0.005
Zirconium	mg/L	0.003			<0.003
Antimony	mg/L	0.0001	0.006	MAC	<0.0001
Arsenic	mg/L	0.0001	0.01	MAC	<0.0001
Beryllium	mg/L	0.0001			<0.0001
Cadmium	mg/L	0.000015	0.005	MAC	<0.000015
Chromium	mg/L	0.001	0.05	MAC	<0.001
Cobalt	mg/L	0.0001			0.0001
Copper	mg/L	0.0001	1	AO	0.0002
Lead	mg/L	0.00002	0.010	MAC	0.00007
Molybdenum	mg/L	0.0001			<0.0001
Nickel	mg/L	0.0002			0.0006
Selenium	mg/L	0.001	0.05	MAC	<0.001
Silver	mg/L	0.0001			<0.0001
Thallium	mg/L	0.00005			<0.00005

Christine Burke
Laboratory Manager

Parameter	Units	R.L.	Limits	DWG	Client I.D.	Sample I.D.	Date Collected
					OW21C	24-028235-5	2024-Sep-10
Uranium	mg/L	0.00005	0.02	MAC	0.00021		
Vanadium	mg/L	0.0001			<0.0001		

Parameter	Units	R.L.	Limits	DWG	Client I.D.	Sample I.D.	Date Collected
					OW14C	24-028235-1	2024-Sep-10
Benzene	µg/L	0.5	1	MAC	<0.5		
Ethylbenzene	µg/L	0.5	140, 1.6	MAC, AO	<0.5		
Toluene	µg/L	0.5	60	MAC	<0.5		
Xylene, m,p-	µg/L	1			<1		
Xylene, m,p,o-	µg/L	1.1	90, 20	MAC, AO	<1.1		
Xylene, o-	µg/L	0.5			<0.5		
PHC F1 (C6-C10)	µg/L	25			<25		
PHC F2 (>C10-C16)	µg/L	50			<50		
PHC F3 (>C16-C34)	µg/L	400			<400		
PHC F4 (>C34-C50)	µg/L	400			<400		
Oil & Grease (Total)	mg/L	1.0			1.5		

Parameter	Units	R.L.	Limits	DWG	Client I.D.	Sample I.D.	Date Collected
					OW20C	24-028235-2	2024-Sep-10
Benzene	µg/L	0.5	1	MAC	<0.5		
Ethylbenzene	µg/L	0.5	140, 1.6	MAC, AO	<0.5		
Toluene	µg/L	0.5	60	MAC	0.6		
Xylene, m,p-	µg/L	1			<1		
Xylene, m,p,o-	µg/L	1.1	90, 20	MAC, AO	<1.1		
Xylene, o-	µg/L	0.5			<0.5		
PHC F1 (C6-C10)	µg/L	25			<25		
PHC F2 (>C10-C16)	µg/L	50			<50		
PHC F3 (>C16-C34)	µg/L	400			<400		
PHC F4 (>C34-C50)	µg/L	400			<400		
Oil & Grease (Total)	mg/L	1.0			2.9		

Parameter	Units	R.L.	Limits	DWG	Client I.D.	Sample I.D.	Date Collected
					OW6A	24-028235-3	2024-Sep-10
Benzene	µg/L	0.5	1	MAC	<0.5		
Ethylbenzene	µg/L	0.5	140, 1.6	MAC, AO	<0.5		
Toluene	µg/L	0.5	60	MAC	<0.5		
Xylene, m,p-	µg/L	1			<1		
Xylene, m,p,o-	µg/L	1.1	90, 20	MAC, AO	<1.1		
Xylene, o-	µg/L	0.5			<0.5		
PHC F1 (C6-C10)	µg/L	25			<25		
PHC F2 (>C10-C16)	µg/L	50			<50		
PHC F3 (>C16-C34)	µg/L	400			<400		
PHC F4 (>C34-C50)	µg/L	400			<400		
Oil & Grease (Total)	mg/L	1.0			2.9		

Parameter	Units	R.L.	Limits	DWG	Client I.D.	Sample I.D.	Date Collected
					OW10B	24-028235-4	2024-Sep-10
Benzene	µg/L	0.5	1	MAC	<0.5		
Ethylbenzene	µg/L	0.5	140, 1.6	MAC, AO	<0.5		
Toluene	µg/L	0.5	60	MAC	<0.5		
Xylene, m,p-	µg/L	1			<1		
Xylene, m,p,o-	µg/L	1.1	90, 20	MAC, AO	<1.1		
Xylene, o-	µg/L	0.5			<0.5		
PHC F1 (C6-C10)	µg/L	25			<25		
PHC F2 (>C10-C16)	µg/L	50			<50		
PHC F3 (>C16-C34)	µg/L	400			<400		
PHC F4 (>C34-C50)	µg/L	400			<400		
Oil & Grease (Total)	mg/L	1.0			2.6		

Christine Burke
Laboratory Manager

Parameter	Units	R.L.	Limits	DWG	Client I.D.: OW21C Sample I.D.: 24-028235-5 Date Collected: 2024-Sep-10
					-
Benzene	µg/L	0.5	1	MAC	<0.5
Ethylbenzene	µg/L	0.5	140, 1.6	MAC, AO	<0.5
Toluene	µg/L	0.5	60	MAC	<0.5
Xylene, m,p-	µg/L	1			<1
Xylene, m,p,o-	µg/L	1.1	90, 20	MAC, AO	<1.1
Xylene, o-	µg/L	0.5			<0.5
PHC F1 (C6-C10)	µg/L	25			<25
PHC F2 (>C10-C16)	µg/L	50			<50
PHC F3 (>C16-C34)	µg/L	400			<400
PHC F4 (>C34-C50)	µg/L	400			<400
Oil & Grease (Total)	mg/L	1.0			3.0

Revised report to update sample ID as per client request

DWG - Drinking Water Guidelines
ODWS - Ontario Drinking Water Standards
AO - Aesthetic Objectives
IMAC - Interim Maximum Acceptable Concentration
MAC - Maximum Acceptable Concentration
ODWO - D-5-5 Objective
OG - Operational Guidelines
WL - Warning Level - Sodium Restricted Diets

Christine Burke
Laboratory Manager

Summary of Exceedances		
Operational Guidelines		
OW14C	**Found Value**	**Limit**
Hardness (as CaCO3)	550	100
OW20C	**Found Value**	**Limit**
Hardness (as CaCO3)	299	100
OW6A	**Found Value**	**Limit**
Hardness (as CaCO3)	219	100
OW10B	**Found Value**	**Limit**
Hardness (as CaCO3)	268	100
OW21C	**Found Value**	**Limit**
Hardness (as CaCO3)	292	100

Christine Burke
Laboratory Manager

CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: -

REPORT No: 24-028368 - Rev. 0

Report To:
Tatham Engineering
115 Sandford Fleming Drive
Suite 200
Collingwood, ON L9Y 5A6

Attention: Alicia Kimberley

CADUCEON Environmental Laboratories
112 Commerce Park Dr Unit L
Barrie, ON L4N 8W8

DATE RECEIVED: 2024-Sep-12
DATE REPORTED: 2024-Sep-17
SAMPLE MATRIX: Ground Water

CUSTOMER PROJECT: 123016
P.O. NUMBER:

Analyses	Qty	Site Analyzed	Authorized	Date Analyzed	Lab Method	Reference Method
Anions (Liquid)	5	OTTAWA	PCURIEL	2024-Sep-13	A-IC-01	SM 4110B
Cond/pH/Alk Auto (Liquid)	5	OTTAWA	SBOUDREAU	2024-Sep-13	COND-02/PH-02/ALK-02	SM 2510B/4500H/2320B
ICP/MS (Liquid)	5	OTTAWA	AOZKAYMAK	2024-Sep-17	D-ICPMS-01	EPA 200.8
ICP/OES (Liquid)	5	OTTAWA	NHOGAN	2024-Sep-16	D-ICP-01	SM 3120B
Oil & Grease (Liquid)	4	KINGSTON	DCHAUDHARI	2024-Sep-13	O&G-001	SM 5520
PHC F1 (Liquid)	4	RICHMOND_HILL	FLENA	2024-Sep-14	C-VPHW-01	MECP E3421
PHC F2-4 (Liquid)	4	KINGSTON	STHOMPSON	2024-Sep-14	PHC-W-001	MECP E3421
VOC-Volatiles Full (Water)	4	RICHMOND_HILL	FLENA	2024-Sep-14	C-VOC-02	EPA 8260

µg/g = micrograms per gram (parts per million) and is equal to mg/Kg
F1 C6-C10 hydrocarbons in µg/g, (F1-btex if requested)
F2 C10-C16 hydrocarbons in µg/g, (F2-napth if requested)
F3 C16-C34 hydrocarbons in µg/g, (F3-pah if requested)
F4 C34-C50 hydrocarbons in µg/g
This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.
Any deviations from the method are noted and reported for any particular sample.
nC6 and nC10 response factor is within 30% of response factor for toluene:
nC10,nC16 and nC34 response factors within 10% of each other:
C50 response factors within 70% of nC10+nC16+nC34 average:
Linearity is within 15%:
All results expressed on a dry weight basis.
Unless otherwise noted all chromatograms returned to baseline by the retention time of nC50.

R.L. = Reporting Limit
NC = Not Calculated
Test methods may be modified from specified reference method unless indicated by an *

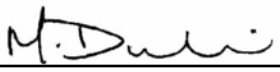
Unless otherwise noted all extraction, analysis, QC requirements and limits for holding time were met.
If analyzed for F4 and F4G they are not to be summed but the greater of the two numbers are to be used in application to the CWS PHC
QC will be made available upon request.

Michelle Dubien
Data Specialist

Parameter	Units	R.L.	Limits	DWG	Client I.D.	OW9A	OW12A	OW16C	OW18A
					Sample I.D.	24-028368-1	24-028368-2	24-028368-3	24-028368-4
					Date Collected	2024-Sep-11	2024-Sep-11	2024-Sep-11	2024-Sep-11
						-	-	-	-
Alkalinity(CaCO3) to pH4.5	mg/L	5	500	OG		344	160	262	178
Bicarbonate (as CaCO3)	mg/L	5				344	160	262	178
Conductivity @25°C	uS/cm	1				696	333	517	369
pH @25°C	pH units	-	8.5	OG		7.91	7.93	8.02	7.98
Chloride	mg/L	0.5	250	AO		10.2	4.5	5.6	6.5
Nitrate (N)	mg/L	0.05	10.0	MAC		5.66	2.50	1.60	1.22
Nitrite (N)	mg/L	0.05	1.0	MAC		<0.05	<0.05	<0.05	<0.05
Sulphate	mg/L	1	500	AO		8	5	9	7
Hardness (as CaCO3)	mg/L as CaCO3	0.02	100	OG		386	182	279	197
Aluminum	mg/L	0.01	0.1	OG		0.07	0.04	0.04	0.04
Barium	mg/L	0.001	1	MAC		0.069	0.005	0.050	0.038
Bismuth	mg/L	0.02				<0.02	<0.02	<0.02	<0.02
Boron	mg/L	0.005	5	MAC		<0.005	<0.005	0.005	<0.005
Calcium	mg/L	0.02				127	64.4	83.5	61.7
Iron	mg/L	0.005	0.3	AO		<0.005	<0.005	<0.005	<0.005
Lithium	mg/L	0.005				<0.005	<0.005	<0.005	<0.005
Magnesium	mg/L	0.02				16.7	5.14	17.0	10.5
Manganese	mg/L	0.001	0.05	AO		0.015	<0.001	<0.001	<0.001
Phosphorus	mg/L	0.1				<0.1	<0.1	<0.1	<0.1
Potassium	mg/L	0.1				0.5	1.0	0.6	0.3
Silicon	mg/L	0.01				4.11	2.52	3.34	2.37

Michelle Dubien
Data Specialist

Parameter	Units	R.L.	Limits	DWG	Client I.D.	OW9A	OW12A	OW16C	OW18A
					Sample I.D.	24-028368-1	24-028368-2	24-028368-3	24-028368-4
					Date Collected	2024-Sep-11	2024-Sep-11	2024-Sep-11	2024-Sep-11
						-	-	-	-
Silica	mg/L	0.02				8.80	5.39	7.15	5.07
Sodium	mg/L	0.2	200, 20, 20	AO, WL, MAC		2.6	0.8	3.0	2.0
Strontium	mg/L	0.001				0.145	0.120	0.105	0.066
Tin	mg/L	0.05				<0.05	<0.05	<0.05	<0.05
Titanium	mg/L	0.005				<0.005	<0.005	<0.005	<0.005
Tungsten	mg/L	0.01				<0.01	<0.01	<0.01	<0.01
Zinc	mg/L	0.005	5	AO		<0.005	<0.005	0.028	<0.005
Zirconium	mg/L	0.003				<0.003	<0.003	<0.003	<0.003
Antimony	mg/L	0.0001	0.006	MAC		<0.0001	<0.0001	<0.0001	<0.0001
Arsenic	mg/L	0.0001	0.01	MAC		<0.0001	<0.0001	<0.0001	<0.0001
Beryllium	mg/L	0.0001				<0.0001	<0.0001	<0.0001	<0.0001
Cadmium	mg/L	0.000015	0.005	MAC		<0.000015	<0.000015	0.000039	<0.000015
Chromium	mg/L	0.001	0.05	MAC		<0.001	<0.001	<0.001	<0.001
Cobalt	mg/L	0.0001				0.0003	0.0003	0.0002	0.0002
Copper	mg/L	0.0001	1	AO		0.0004	0.0005	0.0004	0.0005
Lead	mg/L	0.00002	0.010	MAC		<0.00002	<0.00002	<0.00002	<0.00002
Molybdenum	mg/L	0.0001				<0.0001	<0.0001	0.0002	0.0001
Nickel	mg/L	0.0002				0.0003	0.0004	0.0004	0.0003
Selenium	mg/L	0.001	0.05	MAC		<0.001	<0.001	<0.001	<0.001
Silver	mg/L	0.0001				<0.0001	<0.0001	<0.0001	<0.0001
Thallium	mg/L	0.00005				<0.00005	<0.00005	<0.00005	<0.00005

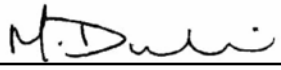


Michelle Dubien
Data Specialist

				Client I.D.	OW9A	OW12A	OW16C	OW18A
				Sample I.D.	24-028368-1	24-028368-2	24-028368-3	24-028368-4
				Date Collected	2024-Sep-11	2024-Sep-11	2024-Sep-11	2024-Sep-11
Parameter	**Units**	**R.L.**	**Limits**	**DWG**	-	-	-	-
Uranium	mg/L	0.00005	0.02	MAC	0.00012	0.00006	0.00023	0.00014
Vanadium	mg/L	0.0001			<0.0001	0.0002	<0.0001	0.0001

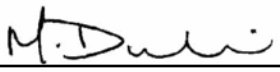
Michelle Dubien
Data Specialist

Parameter	Units	R.L.	Limits	DWG	Client I.D.: OW18C Sample I.D.: 24-028368-5 Date Collected: 2024-Sep-11
					-
Alkalinity(CaCO3) to pH4.5	mg/L	5	500	OG	221
Bicarbonate (as CaCO3)	mg/L	5			221
Conductivity @25°C	uS/cm	1			438
pH @25°C	pH units	-	8.5	OG	8.01
Chloride	mg/L	0.5	250	AO	6.3
Nitrate (N)	mg/L	0.05	10.0	MAC	0.98
Nitrite (N)	mg/L	0.05	1.0	MAC	<0.05
Sulphate	mg/L	1	500	AO	6
Hardness (as CaCO3)	mg/L as CaCO3	0.02	100	OG	231
Aluminum	mg/L	0.01	0.1	OG	0.04
Barium	mg/L	0.001	1	MAC	0.029
Bismuth	mg/L	0.02			<0.02
Boron	mg/L	0.005	5	MAC	0.009
Calcium	mg/L	0.02			71.1
Iron	mg/L	0.005	0.3	AO	<0.005
Lithium	mg/L	0.005			<0.005
Magnesium	mg/L	0.02			13.0
Manganese	mg/L	0.001	0.05	AO	<0.001
Phosphorus	mg/L	0.1			<0.1
Potassium	mg/L	0.1			0.5
Silicon	mg/L	0.01			2.67



Michelle Dubien
Data Specialist

Parameter	Units	R.L.	Limits	DWG	Client I.D.: OW18C Sample I.D.: 24-028368-5 Date Collected: 2024-Sep-11 -
Silica	mg/L	0.02			5.71
Sodium	mg/L	0.2	200, 20, 20	AO, WL, MAC	1.9
Strontium	mg/L	0.001			0.072
Tin	mg/L	0.05			<0.05
Titanium	mg/L	0.005			<0.005
Tungsten	mg/L	0.01			<0.01
Zinc	mg/L	0.005	5	AO	0.012
Zirconium	mg/L	0.003			<0.003
Antimony	mg/L	0.0001	0.006	MAC	<0.0001
Arsenic	mg/L	0.0001	0.01	MAC	0.0001
Beryllium	mg/L	0.0001			<0.0001
Cadmium	mg/L	0.000015	0.005	MAC	<0.000015
Chromium	mg/L	0.001	0.05	MAC	<0.001
Cobalt	mg/L	0.0001			0.0002
Copper	mg/L	0.0001	1	AO	0.0011
Lead	mg/L	0.00002	0.010	MAC	0.00003
Molybdenum	mg/L	0.0001			0.0001
Nickel	mg/L	0.0002			0.0004
Selenium	mg/L	0.001	0.05	MAC	<0.001
Silver	mg/L	0.0001			<0.0001
Thallium	mg/L	0.00005			<0.00005



Michelle Dubien
Data Specialist

Parameter	Units	R.L.	Limits	DWG	Client I.D.	Sample I.D.	Date Collected
					OW18C	24-028368-5	2024-Sep-11
Uranium	mg/L	0.00005	0.02	MAC	0.00012		
Vanadium	mg/L	0.0001			<0.0001		

Parameter	Units	R.L.	Limits	DWG	Client I.D.	Sample I.D.	Date Collected
					OW9A	24-028368-1	2024-Sep-11
Benzene	µg/L	0.5	1	MAC	<0.5		
Ethylbenzene	µg/L	0.5	140, 1.6	MAC, AO	<0.5		
Toluene	µg/L	0.5	60	MAC	<0.5		
Xylene, m,p-	µg/L	1			<1		
Xylene, m,p,o-	µg/L	1.1	90, 20	MAC, AO	<1.1		
Xylene, o-	µg/L	0.5			<0.5		
PHC F1 (C6-C10)	µg/L	25			<25		
PHC F2 (>C10-C16)	µg/L	50			<50		
PHC F3 (>C16-C34)	µg/L	400			<400		
PHC F4 (>C34-C50)	µg/L	400			<400		
Oil & Grease (Total)	mg/L	1.0			2.2		

Parameter	Units	R.L.	Limits	DWG	Client I.D.	Sample I.D.	Date Collected
					OW12A	24-028368-2	2024-Sep-11
Benzene	µg/L	0.5	1	MAC	<0.5		
Ethylbenzene	µg/L	0.5	140, 1.6	MAC, AO	<0.5		
Toluene	µg/L	0.5	60	MAC	<0.5		
Xylene, m,p-	µg/L	1			<1		
Xylene, m,p,o-	µg/L	1.1	90, 20	MAC, AO	<1.1		
Xylene, o-	µg/L	0.5			<0.5		
PHC F1 (C6-C10)	µg/L	25			<25		
PHC F2 (>C10-C16)	µg/L	50			<50		
PHC F3 (>C16-C34)	µg/L	400			<400		
PHC F4 (>C34-C50)	µg/L	400			<400		
Oil & Grease (Total)	mg/L	1.0			1.0		

Parameter	Units	R.L.	Limits	DWG	Client I.D.	Sample I.D.	Date Collected
					OW16C	24-028368-3	2024-Sep-11
Benzene	µg/L	0.5	1	MAC	<0.5		
Ethylbenzene	µg/L	0.5	140, 1.6	MAC, AO	<0.5		
Toluene	µg/L	0.5	60	MAC	<0.5		
Xylene, m,p-	µg/L	1			<1		
Xylene, m,p,o-	µg/L	1.1	90, 20	MAC, AO	<1.1		
Xylene, o-	µg/L	0.5			<0.5		
PHC F1 (C6-C10)	µg/L	25			<25		
PHC F2 (>C10-C16)	µg/L	50			<50		
PHC F3 (>C16-C34)	µg/L	400			<400		
PHC F4 (>C34-C50)	µg/L	400			<400		
Oil & Grease (Total)	mg/L	1.0			1.4		

Parameter	Units	R.L.	Limits	DWG	Client I.D.	Sample I.D.	Date Collected
					OW18A	24-028368-4	2024-Sep-11
Benzene	µg/L	0.5	1	MAC	<0.5		
Ethylbenzene	µg/L	0.5	140, 1.6	MAC, AO	<0.5		
Toluene	µg/L	0.5	60	MAC	<0.5		
Xylene, m,p-	µg/L	1			<1		
Xylene, m,p,o-	µg/L	1.1	90, 20	MAC, AO	<1.1		
Xylene, o-	µg/L	0.5			<0.5		
PHC F1 (C6-C10)	µg/L	25			<25		
PHC F2 (>C10-C16)	µg/L	50			<50		
PHC F3 (>C16-C34)	µg/L	400			<400		
PHC F4 (>C34-C50)	µg/L	400			<400		
Oil & Grease (Total)	mg/L	1.0			4.1		

DWG - Drinking Water Guidelines
ODWS - Ontario Drinking Water Standards
AO - Aesthetic Objectives
IMAC - Interim Maximum Acceptable Concentration
MAC - Maximum Acceptable Concentration
ODWO - D-5-5 Objective
OG - Operational Guidelines
WL - Warning Level - Sodium Restricted Diets

Michelle Dubien
Data Specialist

Summary of Exceedances		
Operational Guidelines		
OW9A	**Found Value**	**Limit**
Hardness (as CaCO3)	386	100
OW12A	**Found Value**	**Limit**
Hardness (as CaCO3)	182	100
OW16C	**Found Value**	**Limit**
Hardness (as CaCO3)	279	100
OW18A	**Found Value**	**Limit**
Hardness (as CaCO3)	197	100
OW18C	**Found Value**	**Limit**
Hardness (as CaCO3)	231	100

Michelle Dubien
Data Specialist

Appendix F: Domestic Water Monitoring Program Results

TATHAM ENGINEERING

115 Sandford Fleming Drive, Suite 200
Collingwood, Ontario L9Y 5A6

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E info@tathameng.com
tathameng.com

File 123016

December 23, 2024

Dan and Jennifer Robertson
1 Ashlea Lane,
Melancthon Township, Ontario, L9V 3M9
Robertsond24@gmail.com jenharkness@hotmail.com

Re: Strada Aggregates, Shelburne Quarry
Domestic Well Monitoring Program 2024

Dear Mr. and Mrs. Robertson:

Tatham Engineering Limited (Tatham) was retained by Strada Aggregates to continue a domestic water well monitoring program as part of the on-going domestic water well monitoring program for the Shelburne Quarry.

Manual groundwater levels were measured on January 25, March 28, September 9, and December 11, 2024 and a hydrograph illustrating the manual groundwater levels in your well is provided for reference.

On September 9, 2024, a water sample was taken from your outside faucet, as this typically bypasses any filtration that you may have. Results from this sample have been compared against Ontario Drinking Water Quality Standards (ODWQS) for both health and aesthetic maximums. The results of this test are appended.

The water sample indicated compliance with the ODWQS for the parameters tested with the exception of hardness with a measured concentration of 323 mg/L compared to a ODWQS Operational Guideline of 80 to 100 mg/L.

The operational guideline for hardness is set between 80 to 100 mg/L (ODWQS, 2006). Hardness is caused by dissolved calcium and magnesium and is expressed as the equivalent quantity of calcium carbonate. When heated, hard water tends to form scale deposits and can form excessive scum with regular soaps. However, there are certain detergents, which are largely unaffected by hardness. Conversely, water too soft may result in accelerated corrosion of water pipes. Hardness levels between 80 and 100 mg/L as calcium carbonate ($CaCO_3$) is considered an acceptable balance between corrosion and incrustation. Water supplies with hardness greater then 200 mg/L are considered poor but tolerable. Hardness more than 500 mg/L in drinking water is unacceptable for most domestic purposes.

Please keep this information on file for your reference. Tatham will be providing a similar letter report to update you annually (or more frequently, if requested).

If you have any questions, feel free to call or email at any time.

Yours truly,

Tatham Engineering Limited

Shane Mariner, B.Sc.Env.
Geoscience Intern

Alicia Kimberley, MSc., P.Geo.
Manager – Hydrogeology & Geoenvironmental

SM/AK:ha

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CADUCEON ENVIRONMENTAL LABORATORIES
Client committed. Quality assured.

REPORT NO: 24-028220

COC #: DWTE240911

Report To:
Tatham Engineering
115 Sandford Fleming Drive
Collingwood, ON L9Y 5A6
Attention: Alicia Kimberley

CADUCEON Environmental Laboratories
112 Commerce Park Dr Unit L
Barrie, ON L4N 8W8
Tel: 705-252-5743

DATE SUBMITTED:	11-Sep-24	CUSTOMER PROJECT:	123016
DATE REPORTED:	16-Sep-24	P.O. NUMBER:	
SAMPLE MATRIX:	Drinking Water	WATERWORKS NO:	

	Client ID:		DW2
	Sample ID:		24-028220-2
	Date Collected:		10-Sep-24
Parameter	**Units**	**R.L.**	
Alkalinity(CaCO3) to pH4.5	mg/L	5	265
Bicarbonate (as CaCO3)	mg/L	5	265
Conductivity @25°C	uS/cm	1	555
pH @25°C	pH units		7.99
Chloride	mg/L	0.5	10.9
Nitrate (N)	mg/L	0.05	3.77
Nitrite (N)	mg/L	0.05	<0.05
Sulphate	mg/L	1	11
Hardness (as CaCO3)	mg/L as CaCO3	0.02	323
Aluminum	mg/L	0.01	0.02
Barium	mg/L	0.001	0.038
Bismuth	mg/L	0.02	<0.02
Boron	mg/L	0.005	0.011
Calcium	mg/L	0.02	92.3
Iron	mg/L	0.005	<0.005
Lithium	mg/L	0.005	<0.005
Magnesium	mg/L	0.02	22.3
Manganese	mg/L	0.001	<0.001
Potassium	mg/L	0.1	1.3
Silicon	mg/L	0.01	3.66
Silica	mg/L	2	8
Sodium	mg/L	0.2	4.5
Strontium	mg/L	0.001	0.118
Tin	mg/L	0.05	<0.05
Titanium	mg/L	0.005	<0.005
Tungsten	mg/L	0.01	0.03
Zinc	mg/L	0.005	0.023
Zirconium	mg/L	0.003	<0.003
Antimony	mg/L	0.0001	<0.0001
Arsenic	mg/L	0.0001	0.0001
Beryllium	mg/L	0.0001	<0.0001
Cadmium	mg/L	0.000015	0.000034
Chromium	mg/L	0.001	<0.0010
Cobalt	mg/L	0.0001	0.0001
Copper	mg/L	0.0001	0.0018
Lead	mg/L	0.00002	0.0002
Molybdenum	mg/L	0.0001	0.0001
Nickel	mg/L	0.0002	<0.0002

CADUCEON ENVIRONMENTAL LABORATORIES
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REPORT NO: 24-028220

COC #: DWTE240911

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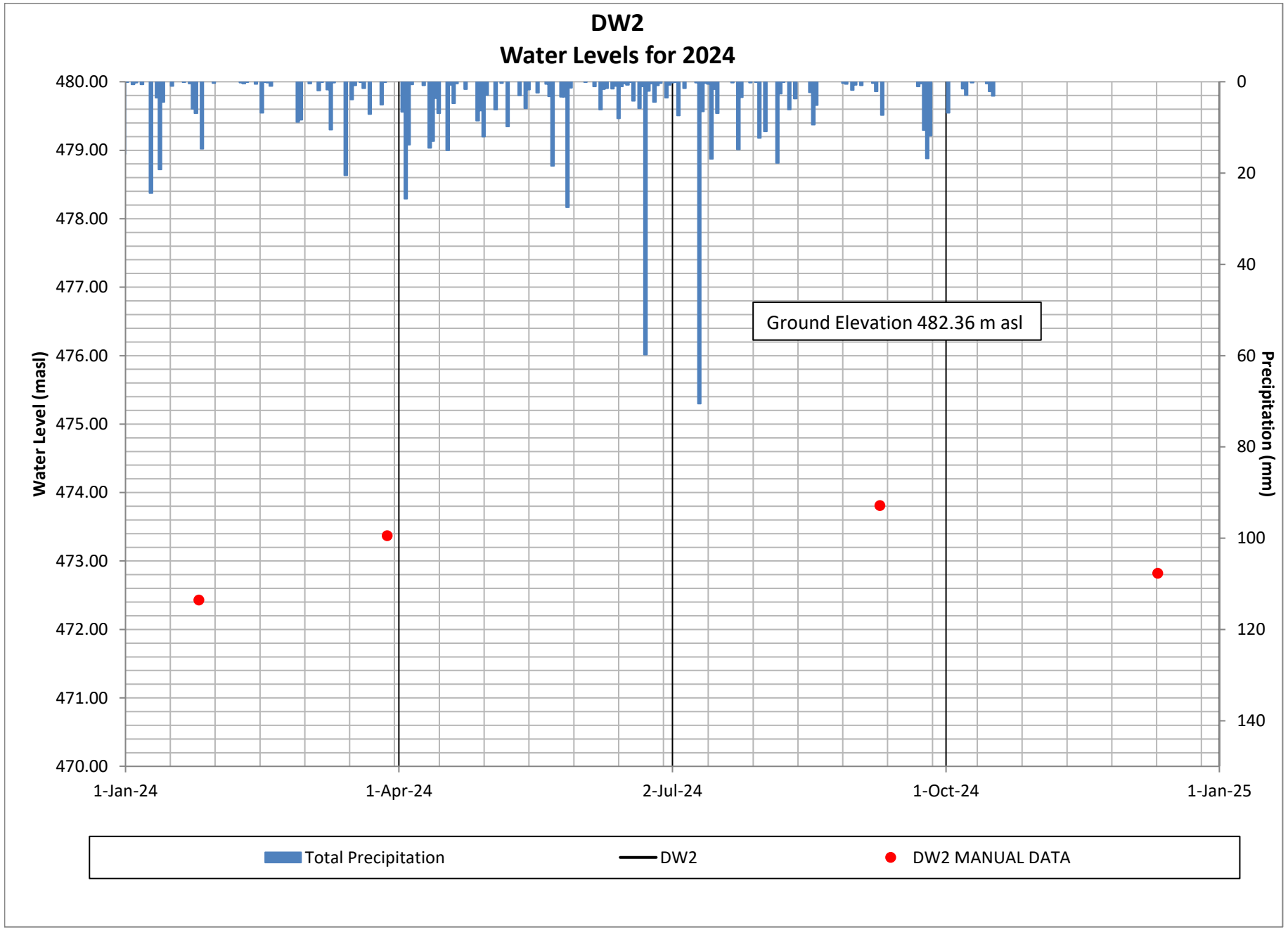
Tatham Engineering
115 Sandford Fleming Drive
Collingwood, ON L9Y 5A6
Attention: Alicia Kimberley

CADUCEON Environmental Laboratories
112 Commerce Park Dr Unit L
Barrie, ON L4N 8W8
Tel: 705-252-5743

DATE SUBMITTED:	11-Sep-24	CUSTOMER PROJECT:	123016
DATE REPORTED:	16-Sep-24	P.O. NUMBER:	
SAMPLE MATRIX:	Drinking Water	WATERWORKS NO:	

	Client ID:		DW2
	Sample ID:		24-028220-2
	Date Collected:		10-Sep-24
Selenium	mg/L	0.001	<0.001
Silver	mg/L	0.0001	<0.0001
Thallium	mg/L	0.00005	<0.00005
Uranium	mg/L	0.00005	0.00021
Vanadium	mg/L	0.0001	<0.0001

R.L. = Reporting Limit


DW2
Water Levels for 2024
480.00
479.00
478.00
477.00
476.00
475.00
474.00
473.00
472.00
471.00
470.00
Water Level (masl)
0
20
40
60
80
100
120
140
Precipitation (mm)
Ground Elevation 482.36 m asl
1-Jan-24
1-Apr-24
2-Jul-24
1-Oct-24
1-Jan-25
Total Precipitation
DW2
DW2 MANUAL DATA

TATHAM ENGINEERING

115 Sandford Fleming Drive, Suite 200
Collingwood, Ontario L9Y 5A6

T 705-444-2565
E info@tathameng.com
tathameng.com

File 123016

December 23, 2024

Troy and Laura Allen
476537 3rd Line
Melancthon Township, Ontario, L9V 1T4
troy@troysgarage.com

Re: Strada Aggregates, Shelburne Quarry
Domestic Well Monitoring Program 2024

Dear Mr. and Mrs. Allen:

Tatham Engineering Limited (Tatham) was retained by Strada Aggregates to continue a domestic water well monitoring program as part of the on-going domestic water well monitoring program for the Shelburne Quarry.

Tatham installed an automatic water level datalogger in your drilled well in 2023 after you expressed interest in the monitoring program. A water level datalogger is an instrument used to automatically and continuously records fluctuations in water level. Water level data logs are stored in the datalogger's memory and are downloaded for analysis. A hydrograph illustrating the continuous groundwater levels in your well over the course of a year of monitoring is provided for reference. The downward spikes illustrate typical household water usage.

On September 9, 2024, a water sample was taken from your outside faucet, as this typically bypasses any filtration you may have. Results from this sample have been compared against Ontario Drinking Water Quality Standards (ODWQS) for both health and aesthetic maximums. The results of this test are appended.

The water sample indicated compliance with the ODWQS for the parameters tested with the exception of hardness with a measured concentration of 336 mg/L compared to a ODWQS Operational Guideline of 80 to 100 mg/L.

The operational guideline for hardness is set between 80 to 100 mg/L (ODWQS, 2006). Hardness is caused by dissolved calcium and magnesium and is expressed as the equivalent quantity of calcium carbonate. When heated, hard water tends to form scale deposits and can form excessive scum with regular soaps. However, there are certain detergents, which are largely unaffected by hardness. Conversely, water too soft may result in accelerated corrosion of water pipes. Hardness levels between 80 and 100 mg/L as calcium carbonate ($CaCO_3$) is considered an acceptable balance between corrosion and incrustation.

Water supplies with hardness greater then 200 mg/L are considered poor but tolerable. Hardness more than 500 mg/L in drinking water is unacceptable for most domestic purposes.

Please keep this information on file for your reference. Tatham will be providing a similar letter report to update you annually (or more frequently, if requested).

If you have any questions, feel free to call or email at any time.

Yours truly,
Tatham Engineering Limited

Shane Mariner, B.Sc.Env.
Geoscience Intern
SM/AK:ha

Alicia Kimberley, MSc., P.Geo.
Manager – Hydrogeology & Geoenvironmental

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REPORT NO: 24-028220

COC #: DWTE240911

Report To:
Tatham Engineering
115 Sandford Fleming Drive
Collingwood, ON L9Y 5A6
Attention: Alicia Kimberley

CADUCEON Environmental Laboratories
112 Commerce Park Dr Unit L
Barrie, ON L4N 8W8
Tel: 705-252-5743

DATE SUBMITTED:	11-Sep-24	CUSTOMER PROJECT:	123016
DATE REPORTED:	16-Sep-24	P.O. NUMBER:	
SAMPLE MATRIX:	Drinking Water	WATERWORKS NO:	

	Client ID:		DW1
	Sample ID:		24-028220-1
	Date Collected:		10-Sep-24
Parameter	**Units**	**R.L.**	
Alkalinity(CaCO3) to pH4.5	mg/L	5	275
Bicarbonate (as CaCO3)	mg/L	5	275
Conductivity @25°C	uS/cm	1	644
pH @25°C	pH units		7.96
Chloride	mg/L	0.5	31.1
Nitrate (N)	mg/L	0.05	2.4
Nitrite (N)	mg/L	0.05	<0.05
Sulphate	mg/L	1	17
Hardness (as CaCO3)	mg/L as CaCO3	0.02	336
Aluminum	mg/L	0.01	0.03
Barium	mg/L	0.001	0.048
Bismuth	mg/L	0.02	<0.02
Boron	mg/L	0.005	0.011
Calcium	mg/L	0.02	96.5
Iron	mg/L	0.005	0.106
Lithium	mg/L	0.005	<0.005
Magnesium	mg/L	0.02	23
Manganese	mg/L	0.001	0.006
Potassium	mg/L	0.1	1.9
Silicon	mg/L	0.01	3.85
Silica	mg/L	2	8
Sodium	mg/L	0.2	16.4
Strontium	mg/L	0.001	0.147
Tin	mg/L	0.05	<0.05
Titanium	mg/L	0.005	<0.005
Tungsten	mg/L	0.01	0.03
Zinc	mg/L	0.005	0.088
Zirconium	mg/L	0.003	<0.003
Antimony	mg/L	0.0001	<0.0001
Arsenic	mg/L	0.0001	0.0002
Beryllium	mg/L	0.0001	<0.0001
Cadmium	mg/L	0.000015	0.000075
Chromium	mg/L	0.001	<0.0010
Cobalt	mg/L	0.0001	0.0001
Copper	mg/L	0.0001	0.0103
Lead	mg/L	0.00002	0.00145
Molybdenum	mg/L	0.0001	0.0005
Nickel	mg/L	0.0002	0.0005

CADUCEON ENVIRONMENTAL LABORATORIES
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REPORT NO: 24-028220

COC #: DWTE240911

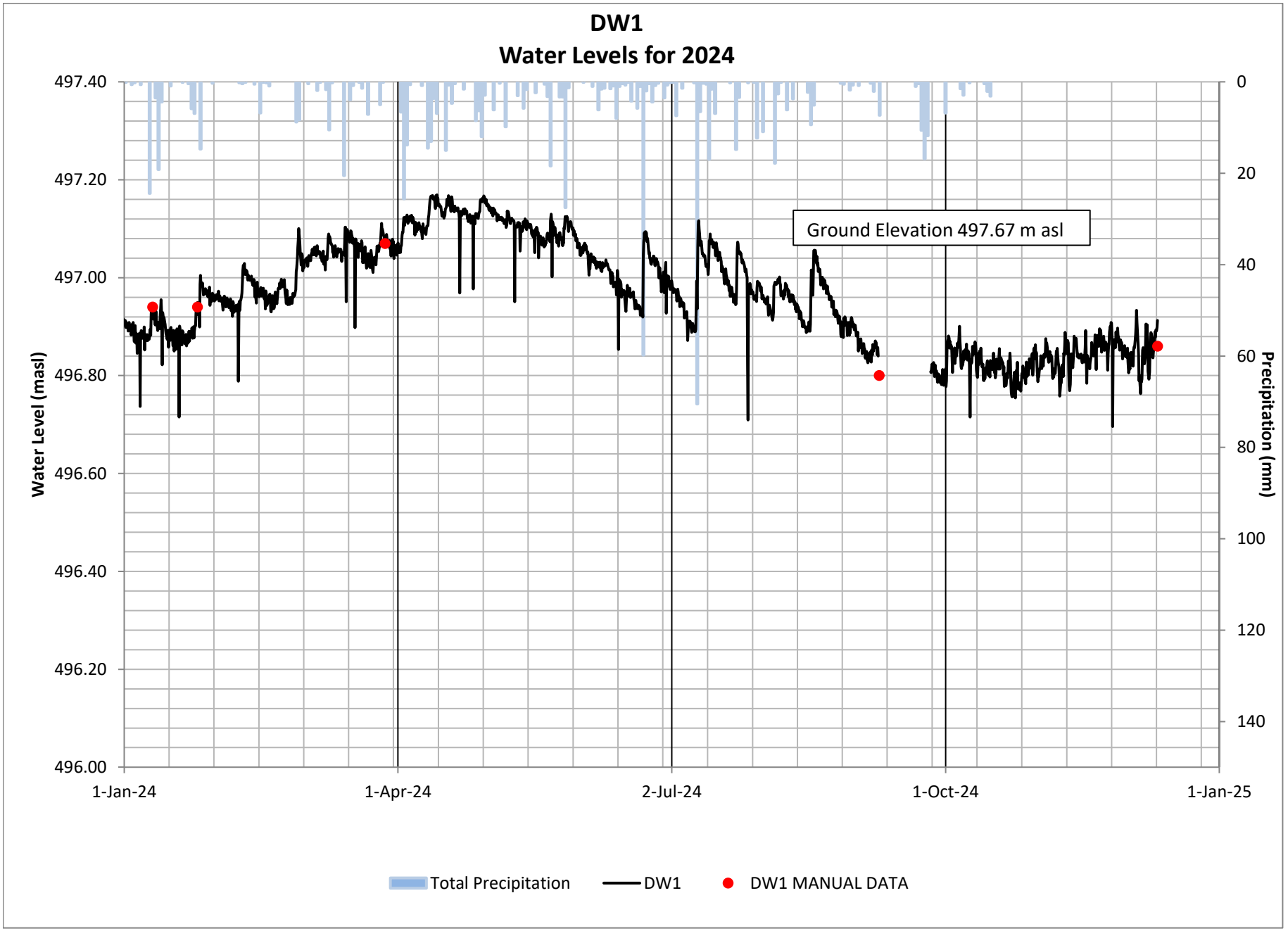
Report To:
Tatham Engineering
115 Sandford Fleming Drive
Collingwood, ON L9Y 5A6
Attention: Alicia Kimberley

CADUCEON Environmental Laboratories
112 Commerce Park Dr Unit L
Barrie, ON L4N 8W8
Tel: 705-252-5743

DATE SUBMITTED:	11-Sep-24	CUSTOMER PROJECT:	123016
DATE REPORTED:	16-Sep-24	P.O. NUMBER:	
SAMPLE MATRIX:	Drinking Water	WATERWORKS NO:	

	Client ID:		DW1
	Sample ID:		24-028220-1
	Date Collected:		10-Sep-24
Selenium	mg/L	0.001	<0.001
Silver	mg/L	0.0001	<0.0001
Thallium	mg/L	0.00005	<0.00005
Uranium	mg/L	0.00005	0.00062
Vanadium	mg/L	0.0001	<0.0001

R.L. = Reporting Limit


DW1
Water Levels for 2024
Water Level (masl)
Precipitation (mm)
497.40
497.20
497.00
496.80
496.60
496.40
496.20
496.00
0
20
40
60
80
100
120
140
1-Jan-24
1-Apr-24
2-Jul-24
1-Oct-24
1-Jan-25
Ground Elevation 497.67 m asl
Total Precipitation
DW1
DW1 MANUAL DATA

TATHAM ENGINEERING

115 Sandford Fleming Drive, Suite 200
Collingwood, Ontario L9Y 5A6

T 705-444-2565
E info@tathameng.com
tathameng.com

File 123016

December 23, 2024

Kevin McGriskin
477084 3rd Line
Melancthon Township, Ontario, L9V 1S6
kevinmcgriskin@hotmail.com

Re: Strada Aggregates, Shelburne Quarry
Domestic Well Monitoring Program 2024

Tatham Engineering Limited (Tatham) was retained by Strada Aggregates to continue a domestic water well monitoring program as part of the on-going domestic water well monitoring program for the Shelburne Quarry.

Tatham installed an automatic water level datalogger in your drilled well in 2023 after you expressed interest in the monitoring program. A water level datalogger is an instrument used to automatically and continuously records fluctuations in water level. Water level data logs are stored in the datalogger's memory and are downloaded for analysis. A hydrograph illustrating the continuous groundwater levels in your well over the course of a year of monitoring is provided for reference. The downward spikes illustrate typical household water usage. It is noted that the graph only has continuous data from January 1 to 25, 2024, and manual readings from January 25, September 9, and December 11, 2024. When the well was visited on September 9, 2024, the logger was missing.

On September 9, 2024, a water sample was taken from your outside faucet, as this typically bypasses any filtration that you may have. Results from this sample have been compared against Ontario Drinking Water Quality Standards (ODWQS) for both health and aesthetic maximums. The results of this test are appended.

The water sample indicated compliance with the ODWQS for the parameters tested with the exception of hardness with a measured concentration of 329 mg/L compared to the ODWQS Operational Guideline for hardness set at 80 to 100 mg/L.

The operational guideline for hardness is set between 80 to 100 mg/L (ODWQS, 2006). Hardness is caused by dissolved calcium and magnesium and is expressed as the equivalent quantity of calcium carbonate. When heated, hard water tends to form scale deposits and can form excessive scum with regular soaps. However, there are certain detergents, which are largely unaffected by hardness. Conversely, water too soft may result in accelerated corrosion of water pipes. Hardness levels between 80 and 100 mg/L as calcium carbonate ($CaCO_3$) is considered an acceptable balance between corrosion and incrustation.

Water supplies with hardness greater then 200 mg/L are considered poor but tolerable. Hardness more than 500 mg/L in drinking water is unacceptable for most domestic purposes.

Please keep this information on file for your reference. Tatham will be providing a similar letter report to update you annually (or more frequently, if requested).

If you have any questions, feel free to call or email at any time.

Yours truly,
Tatham Engineering Limited

Shane Mariner, B.Sc.Env.
Geoscience Intern

Alicia Kimberley, MSc., P.Geo.
Manager – Hydrogeology & Geoenvironmental

SM/AK:ha

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CADUCEON ENVIRONMENTAL LABORATORIES
Client committed. Quality assured.

REPORT NO: 24-028220

COC #: DWTE240911

Report To:
Tatham Engineering
115 Sandford Fleming Drive
Collingwood, ON L9Y 5A6
Attention: Alicia Kimberley

CADUCEON Environmental Laboratories
112 Commerce Park Dr Unit L
Barrie, ON L4N 8W8
Tel: 705-252-5743

DATE SUBMITTED:	11-Sep-24	CUSTOMER PROJECT:	123016
DATE REPORTED:	16-Sep-24	P.O. NUMBER:	
SAMPLE MATRIX:	Drinking Water	WATERWORKS NO:	

	Client ID:		DW3
	Sample ID:		24-028220-3
	Date Collected:		10-Sep-24
Parameter	**Units**	**R.L.**	
Alkalinity(CaCO3) to pH4.5	mg/L	5	246
Bicarbonate (as CaCO3)	mg/L	5	246
Conductivity @25°C	uS/cm	1	601
pH @25°C	pH units		7.97
Chloride	mg/L	0.5	14.1
Nitrate (N)	mg/L	0.05	8.97
Nitrite (N)	mg/L	0.05	<0.05
Sulphate	mg/L	1	24
Hardness (as CaCO3)	mg/L as CaCO3	0.02	329
Aluminum	mg/L	0.01	0.02
Barium	mg/L	0.001	0.072
Bismuth	mg/L	0.02	<0.02
Boron	mg/L	0.005	0.009
Calcium	mg/L	0.02	90.5
Iron	mg/L	0.005	<0.005
Lithium	mg/L	0.005	<0.005
Magnesium	mg/L	0.02	25
Manganese	mg/L	0.001	0.009
Potassium	mg/L	0.1	2.7
Silicon	mg/L	0.01	4.2
Silica	mg/L	2	9
Sodium	mg/L	0.2	4.6
Strontium	mg/L	0.001	0.182
Tin	mg/L	0.05	<0.05
Titanium	mg/L	0.005	<0.005
Tungsten	mg/L	0.01	0.01
Zinc	mg/L	0.005	0.035
Zirconium	mg/L	0.003	<0.003
Antimony	mg/L	0.0001	<0.0001
Arsenic	mg/L	0.0001	0.0002
Beryllium	mg/L	0.0001	<0.0001
Cadmium	mg/L	0.000015	0.000031
Chromium	mg/L	0.001	<0.0010
Cobalt	mg/L	0.0001	0.0002
Copper	mg/L	0.0001	0.0015
Lead	mg/L	0.00002	0.00077
Molybdenum	mg/L	0.0001	0.0006
Nickel	mg/L	0.0002	0.0003

CADUCEON ENVIRONMENTAL LABORATORIES
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REPORT NO: 24-028220

COC #: DWTE240911

Report To:
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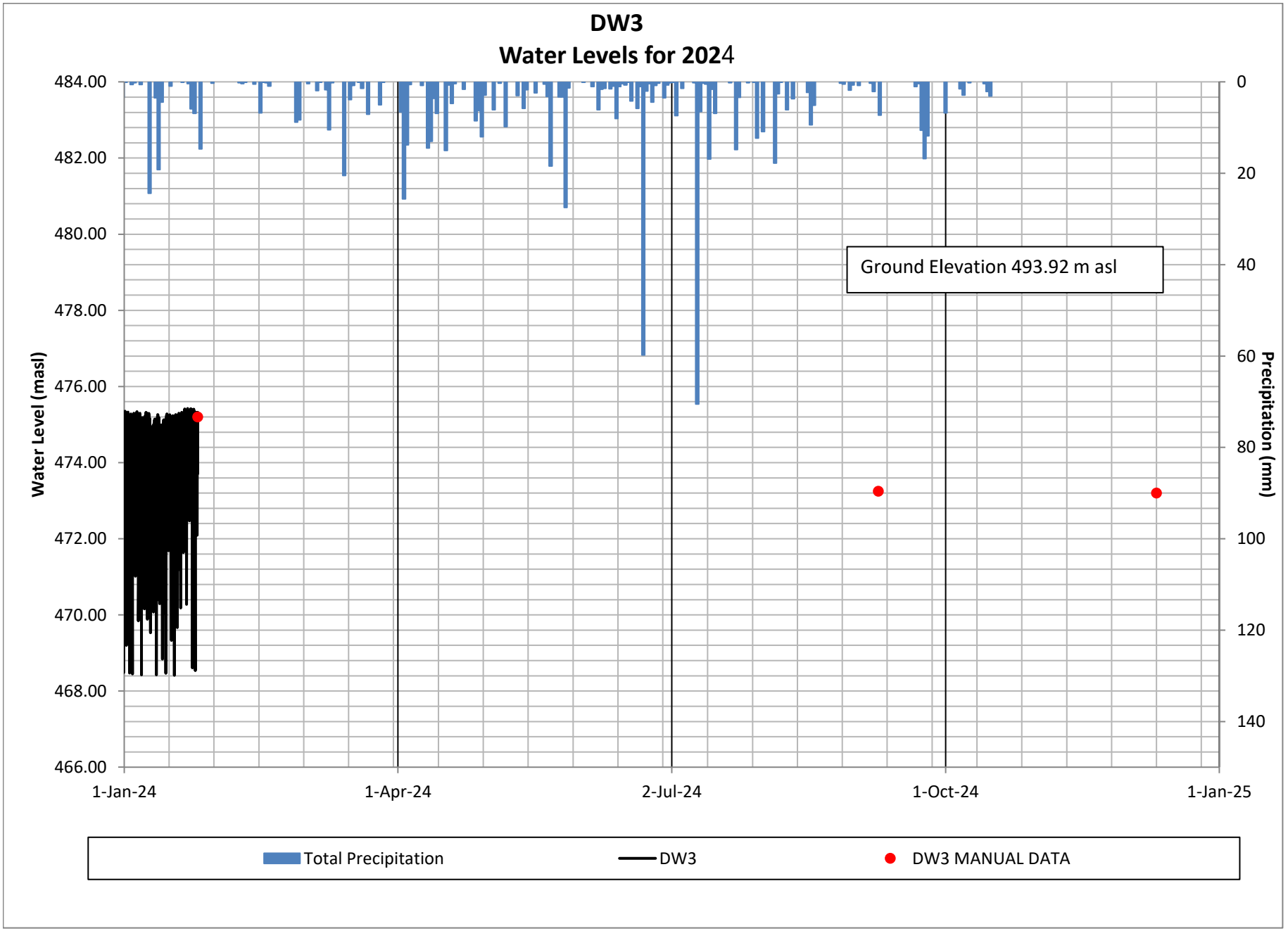
115 Sandford Fleming Drive
Collingwood, ON L9Y 5A6
Attention: Alicia Kimberley

CADUCEON Environmental Laboratories
112 Commerce Park Dr Unit L
Barrie, ON L4N 8W8
Tel: 705-252-5743

DATE SUBMITTED:	11-Sep-24	CUSTOMER PROJECT:	123016
DATE REPORTED:	16-Sep-24	P.O. NUMBER:	
SAMPLE MATRIX:	Drinking Water	WATERWORKS NO:	

	Client ID:		DW3
	Sample ID:		24-028220-3
	Date Collected:		10-Sep-24
Selenium	mg/L	0.001	<0.001
Silver	mg/L	0.0001	<0.0001
Thallium	mg/L	0.00005	<0.00005
Uranium	mg/L	0.00005	0.00049
Vanadium	mg/L	0.0001	<0.0001

R.L. = Reporting Limit


DW3
Water Levels for 2024
Water Level (masl)
Precipitation (mm)
484.00
482.00
480.00
478.00
476.00
474.00
472.00
470.00
468.00
466.00
0
20
40
60
80
100
120
140
1-Jan-24
1-Apr-24
2-Jul-24
1-Oct-24
1-Jan-25
Ground Elevation 493.92 m asl
Total Precipitation
DW3
DW3 MANUAL DATA

TATHAM ENGINEERING

115 Sandford Fleming Drive, Suite 200
Collingwood, Ontario L9Y 5A6

T 705-444-2565
E info@tathameng.com
tathameng.com

File 123016

December 23, 2024

Rick Wallace
635007 Side Road 15
Melancthon Township, Ontario, L0N 1S6

Re: Strada Aggregates, Shelburne Quarry
Domestic Well Monitoring Program 2024
Rwallace65@sympatico.ca

Dear Mr. Wallace:

Tatham Engineering Limited (Tatham) was retained by Strada Aggregates to continue a domestic water well monitoring program as part of the on-going domestic water well monitoring program for the Shelburne Quarry.

Tatham installed an automatic water level datalogger in your drilled well in 2023 after you expressed interest in the monitoring program. A water level datalogger is an instrument used to automatically and continuously records fluctuations in water level. Water level data logs are stored in the datalogger's memory and are downloaded for analysis. A hydrograph illustrating the continuous groundwater levels in your well over the course of a year of monitoring is provided for reference. The downward spikes illustrate typical household water usage.

On September 9, 2024, a water sample was taken from your outside faucet, as this typically bypasses any filtration that you may have. Results from this sample have been compared against Ontario Drinking Water Quality Standards (ODWQS) for both health and aesthetic maximums. The results of this test are appended.

The water sample indicated compliance with the ODWQS for the parameters tested with the exception of hardness with a measured concentration of 396 mg/L compared to a ODWQS Operational Guideline of 80 to 100 mg/L.

The operational guideline for hardness is set between 80 to 100 mg/L (ODWQS, 2006). Hardness is caused by dissolved calcium and magnesium and is expressed as the equivalent quantity of calcium carbonate. When heated, hard water tends to form scale deposits and can form excessive scum with regular soaps. However, there are certain detergents, which are largely unaffected by hardness. Conversely, water too soft may result in accelerated corrosion of water pipes. Hardness levels between 80 and 100 mg/L as calcium carbonate ($CaCO_3$) is considered an acceptable balance between corrosion and incrustation.

Water supplies with hardness greater then 200 mg/L are considered poor but tolerable. Hardness more than 500 mg/L in drinking water is unacceptable for most domestic purposes.

Please keep this information on file for your reference. Tatham will be providing a similar letter report to update you annually (or more frequently, if requested).

If you have any questions, feel free to call or email at any time.

Yours truly,
Tatham Engineering Limited

Shane Mariner, B.Sc.Env.
Geoscience Intern
SM/AK:ha

Alicia Kimberley, MSc., P.Geo.
Manager – Hydrogeology & Geoenvironmental

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CADUCEON ENVIRONMENTAL LABORATORIES
Client committed. Quality assured.

REPORT NO: 24-028220

COC #: DWTE240911

Report To:
Tatham Engineering
115 Sandford Fleming Drive
Collingwood, ON L9Y 5A6
Attention: Alicia Kimberley

CADUCEON Environmental Laboratories
112 Commerce Park Dr Unit L
Barrie, ON L4N 8W8
Tel: 705-252-5743

DATE SUBMITTED:	11-Sep-24	CUSTOMER PROJECT:	123016
DATE REPORTED:	16-Sep-24	P.O. NUMBER:	
SAMPLE MATRIX:	Drinking Water	WATERWORKS NO:	

	Client ID:		DW5
	Sample ID:		24-028220-5
	Date Collected:		10-Sep-24
Parameter	**Units**	**R.L.**	
Alkalinity(CaCO3) to pH4.5	mg/L	5	287
Bicarbonate (as CaCO3)	mg/L	5	287
Conductivity @25°C	uS/cm	1	722
pH @25°C	pH units		7.96
Chloride	mg/L	0.5	34.1
Nitrate (N)	mg/L	0.05	10
Nitrite (N)	mg/L	0.05	<0.05
Sulphate	mg/L	1	18
Hardness (as CaCO3)	mg/L as CaCO3	0.02	396
Aluminum	mg/L	0.01	0.02
Barium	mg/L	0.001	0.034
Bismuth	mg/L	0.02	<0.02
Boron	mg/L	0.005	0.02
Calcium	mg/L	0.02	106
Iron	mg/L	0.005	0.015
Lithium	mg/L	0.005	<0.005
Magnesium	mg/L	0.02	32.1
Manganese	mg/L	0.001	<0.001
Potassium	mg/L	0.1	5.8
Silicon	mg/L	0.01	2.96
Silica	mg/L	2	6
Sodium	mg/L	0.2	10.1
Strontium	mg/L	0.001	0.102
Tin	mg/L	0.05	<0.05
Titanium	mg/L	0.005	<0.005
Tungsten	mg/L	0.01	0.02
Zinc	mg/L	0.005	<0.005
Zirconium	mg/L	0.003	<0.003
Antimony	mg/L	0.0001	<0.0001
Arsenic	mg/L	0.0001	0.0003
Beryllium	mg/L	0.0001	<0.0001
Cadmium	mg/L	0.000015	<0.000015
Chromium	mg/L	0.001	<0.0010
Cobalt	mg/L	0.0001	0.0002
Copper	mg/L	0.0001	0.0027
Lead	mg/L	0.00002	0.00024
Molybdenum	mg/L	0.0001	<0.0001
Nickel	mg/L	0.0002	<0.0002

CADUCEON ENVIRONMENTAL LABORATORIES
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REPORT NO: 24-028220

COC #: DWTE240911

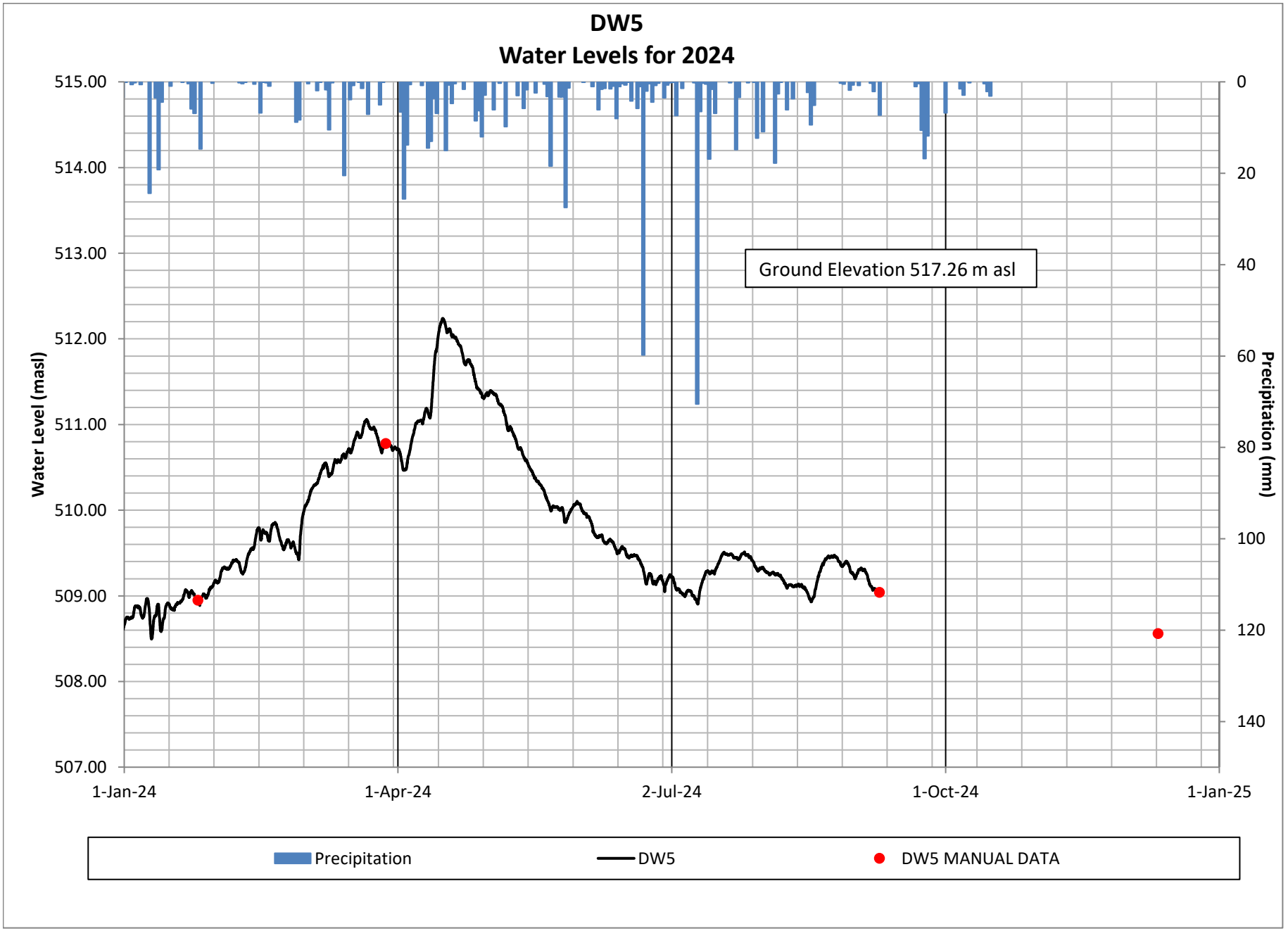
Report To:
Tatham Engineering
115 Sandford Fleming Drive
Collingwood, ON L9Y 5A6
Attention: Alicia Kimberley

CADUCEON Environmental Laboratories
112 Commerce Park Dr Unit L
Barrie, ON L4N 8W8
Tel: 705-252-5743

DATE SUBMITTED:	11-Sep-24	CUSTOMER PROJECT:	123016
DATE REPORTED:	16-Sep-24	P.O. NUMBER:	
SAMPLE MATRIX:	Drinking Water	WATERWORKS NO:	

	Client ID:		DW5
	Sample ID:		24-028220-5
	Date Collected:		10-Sep-24
Selenium	mg/L	0.001	<0.001
Silver	mg/L	0.0001	<0.0001
Thallium	mg/L	0.00005	<0.00005
Uranium	mg/L	0.00005	0.00023
Vanadium	mg/L	0.0001	0.0002

R.L. = Reporting Limit


DW5
Water Levels for 2024
Water Level (masl)
Precipitation (mm)
515.00
514.00
513.00
512.00
511.00
510.00
509.00
508.00
507.00
0
20
40
60
80
100
120
140
1-Jan-24
1-Apr-24
2-Jul-24
1-Oct-24
1-Jan-25
Ground Elevation 517.26 m asl
Precipitation
DW5
DW5 MANUAL DATA

TATHAM ENGINEERING

115 Sandford Fleming Drive, Suite 200
Collingwood, Ontario L9Y 5A6

T 705-444-2565
E info@tathameng.com
tathameng.com

File 123016

December 23, 2024

Debbie Fawcett
625293 15th Side Road
Melancthon Township, Ontario, L0N 1S6
Debbie.fawcett@sympatico.ca

Re: Strada Aggregates, Shelburne Quarry
Domestic Well Monitoring Program 2024

Dear Mrs. Fawcett:

Tatham Engineering Limited (Tatham) was retained by Strada Aggregates to continue a domestic water well monitoring program as part of the on-going domestic water well monitoring program for the Shelburne Quarry.

Tatham installed an automatic water level datalogger in your drilled well in 2023 after you expressed interest in the monitoring program. A water level datalogger is an instrument used to automatically and continuously records fluctuations in water level. Water level data logs are stored in the datalogger's memory and are downloaded for analysis. A hydrograph illustrating the continuous groundwater levels in your well over the course of a year of monitoring is provided for reference. The downward spikes illustrate typical household water usage.

On September 9, 2024, a water sample was taken from your outside faucet, as this typically bypasses any filtration that you may have. Results from this sample have been compared against Ontario Drinking Water Quality Standards (ODWQS) for both health and aesthetic maximums. The results of this test are appended.

The water sample indicated compliance with the ODWQS for the parameters tested with the exception of hardness with a measured concentration of 351 mg/L compared to a ODWQS Operational Guideline of 80 to 100 mg/L.

The operational guideline for hardness is set between 80 to 100 mg/L (ODWQS, 2006). Hardness is caused by dissolved calcium and magnesium and is expressed as the equivalent quantity of calcium carbonate. When heated, hard water tends to form scale deposits and can form excessive scum with regular soaps. However, there are certain detergents, which are largely unaffected by hardness. Conversely, water too soft may result in accelerated corrosion of water pipes. Hardness levels between 80 and 100 mg/L as calcium carbonate ($CaCO_3$) is considered an acceptable balance between corrosion and incrustation.

Water supplies with hardness greater then 200 mg/L are considered poor but tolerable. Hardness more than 500 mg/L in drinking water is unacceptable for most domestic purposes.

Please keep this information on file for your reference. Tatham will be providing a similar letter report to update you annually (or more frequently, if requested).

If you have any questions, feel free to call or email at any time.

Yours truly,
Tatham Engineering Limited

Shane Mariner, B.Sc.Env.
Geoscience Intern
SM/AK:ha

Alicia Kimberley, MSc., P.Geo.
Manager – Hydrogeology & Geoenvironmental

I:\2023 Projects\123016 - Strada - Shelburne\04 - ARA Submission\Documents\Reports\Domestic Well Reports\2024 Letters\DW4 625293 15th Side Rd\L - 625293 15th Side Rd - DW Monitoring Program Letter.docx

CADUCEON ENVIRONMENTAL LABORATORIES
Client committed. Quality assured.

REPORT NO: 24-028220

COC #: DWTE240911

Report To:
Tatham Engineering
115 Sandford Fleming Drive
Collingwood, ON L9Y 5A6
Attention: Alicia Kimberley

CADUCEON Environmental Laboratories
112 Commerce Park Dr Unit L
Barrie, ON L4N 8W8
Tel: 705-252-5743

DATE SUBMITTED:	11-Sep-24	CUSTOMER PROJECT:	123016
DATE REPORTED:	16-Sep-24	P.O. NUMBER:	
SAMPLE MATRIX:	Drinking Water	WATERWORKS NO:	

	Client ID:		DW4
	Sample ID:		24-028220-4
	Date Collected:		10-Sep-24
Parameter	**Units**	**R.L.**	
Alkalinity(CaCO3) to pH4.5	mg/L	5	261
Bicarbonate (as CaCO3)	mg/L	5	261
Conductivity @25°C	uS/cm	1	639
pH @25°C	pH units		7.93
Chloride	mg/L	0.5	15.3
Nitrate (N)	mg/L	0.05	9.32
Nitrite (N)	mg/L	0.05	<0.05
Sulphate	mg/L	1	25
Hardness (as CaCO3)	mg/L as CaCO3	0.02	351
Aluminum	mg/L	0.01	0.03
Barium	mg/L	0.001	0.05
Bismuth	mg/L	0.02	<0.02
Boron	mg/L	0.005	0.024
Calcium	mg/L	0.02	95.2
Iron	mg/L	0.005	0.055
Lithium	mg/L	0.005	<0.005
Magnesium	mg/L	0.02	27.5
Manganese	mg/L	0.001	0.005
Potassium	mg/L	0.1	2.6
Silicon	mg/L	0.01	3.26
Silica	mg/L	2	7
Sodium	mg/L	0.2	3.8
Strontium	mg/L	0.001	0.12
Tin	mg/L	0.05	<0.05
Titanium	mg/L	0.005	<0.005
Tungsten	mg/L	0.01	0.03
Zinc	mg/L	0.005	0.069
Zirconium	mg/L	0.003	<0.003
Antimony	mg/L	0.0001	<0.0001
Arsenic	mg/L	0.0001	0.0001
Beryllium	mg/L	0.0001	<0.0001
Cadmium	mg/L	0.000015	0.000052
Chromium	mg/L	0.001	<0.0010
Cobalt	mg/L	0.0001	0.0001
Copper	mg/L	0.0001	0.0022
Lead	mg/L	0.00002	0.00048
Molybdenum	mg/L	0.0001	0.0007
Nickel	mg/L	0.0002	0.0006

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REPORT NO: 24-028220

COC #: DWTE240911

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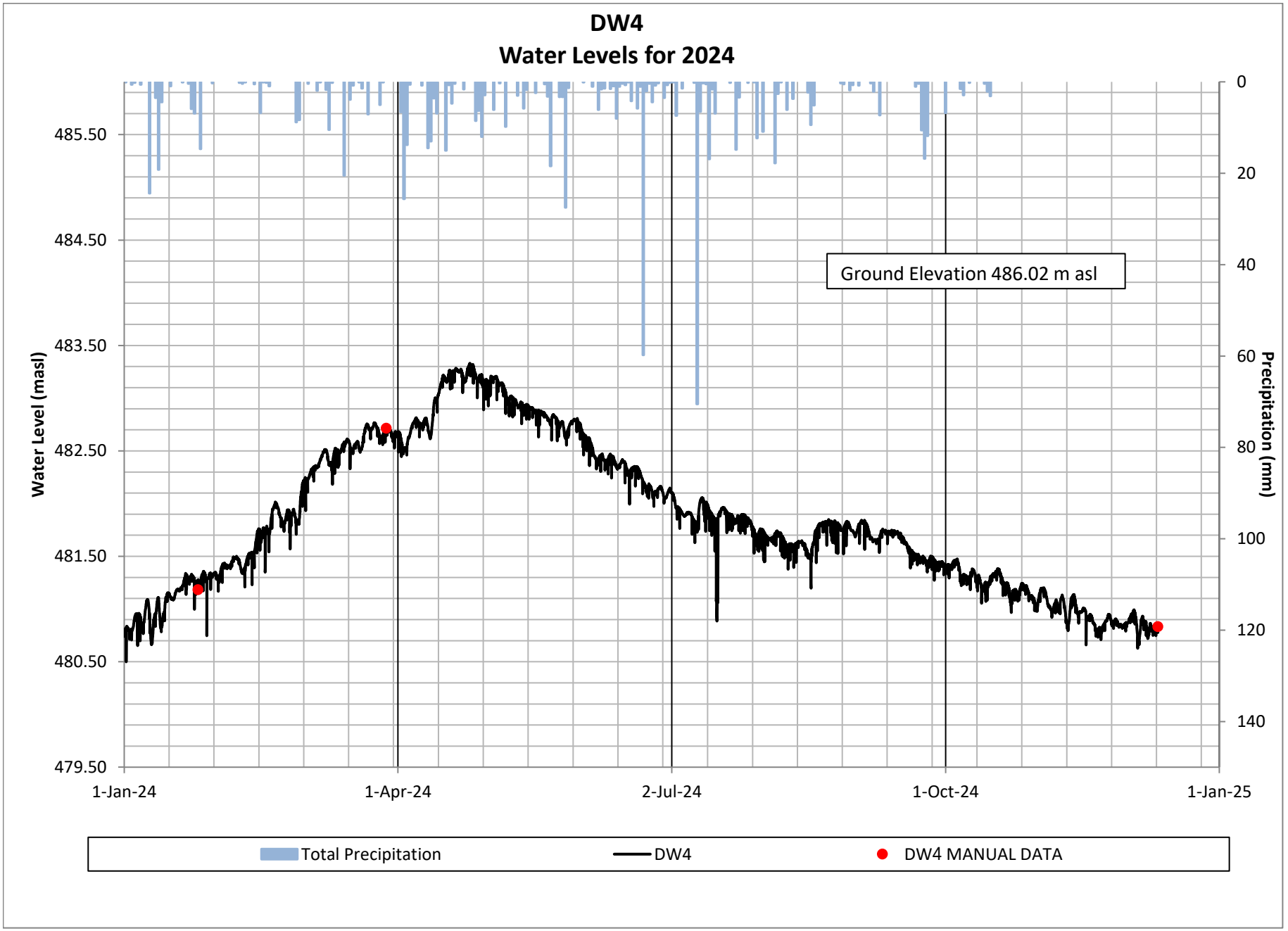
DATE SUBMITTED:	11-Sep-24	CUSTOMER PROJECT:	123016
DATE REPORTED:	16-Sep-24	P.O. NUMBER:	
SAMPLE MATRIX:	Drinking Water	WATERWORKS NO:	

	Client ID:		DW4
	Sample ID:		24-028220-4
	Date Collected:		10-Sep-24
Selenium	mg/L	0.001	<0.001
Silver	mg/L	0.0001	<0.0001
Thallium	mg/L	0.00005	<0.00005
Uranium	mg/L	0.00005	0.0004
Vanadium	mg/L	0.0001	<0.0001

R.L. = Reporting Limit


DW4
Water Levels for 2024
Water Level (masl)
Precipitation (mm)
485.50
484.50
483.50
482.50
481.50
480.50
479.50
0
20
40
60
80
100
120
140
1-Jan-24
1-Apr-24
2-Jul-24
1-Oct-24
1-Jan-25
Ground Elevation 486.02 m asl
Total Precipitation
DW4
DW4 MANUAL DATA