



October 27, 2022

Alberta Environment and Parks (AEP)
Monitoring Branch
11th Floor Oxbridge Place
9820-106 Street
Edmonton, Alberta
T5K 2J6

RE: Monthly Ambient Air Monitoring Report
September 2022
Clean Harbors Canada, Inc. Approval 10348-03-00

To whom it may concern:

Clean Harbors Canada, Inc. (Clean Harbors) is presenting this Monthly Ambient Air Monitoring Report, which was prepared by GHD (Consultant), for the reporting period of September 2022, to Alberta Environment and Parks (AEP). The Clean Harbors Ryley Industrial Waste Management Facility (Facility) is located in SE 09-050-17 W4M near Ryley, Alberta.

This ambient air monitoring program is conducted in accordance with the requirements outlined in the Facility's Environmental Protection and Enhancement Act (EPEA) Approval, Approval No. 10348-03-00 (Approval). As part of the Approval requirements, the Facility submitted a proposal for a New Ambient Air Monitoring Program, which was subsequently approved on June 24, 2009 by the AEP (formally AENV). Operating under the Approval and the approved proposal, Clean Harbors operates two ambient air monitoring stations: AEP Station ID 00010348-I-1 and AEP Station ID 00010348-C-1.

Included in this report are the following:

- Summary of the ambient air monitoring program for September 2022
- Summary of AMD Electronic Transfer System submittals
- Results for Particulate Matter ≤ 10 microns (PM_{10}) reported in $\mu\text{g}/\text{m}^3$
- Results for water-soluble cations; metal or anions if the PM_{10} results were $>50 \mu\text{g}/\text{m}^3$
- Results for Total Non-Methane Organic Compounds (TNMOC) and Volatile Organic Compounds (VOC)
- Wind frequency distribution tables, wind rose and monthly uptime



Should there be any questions and comments regarding this report, please do not hesitate to contact the undersigned.

Yours truly,

CLEAN HARBORS CANADA INC.

A handwritten signature in blue ink that reads "Stan Yuha". The signature is written in a cursive, flowing style.

Stan Yuha

Facility Manager
Ryley Facility



Alberta Environment and Parks (AEP)
Monthly Ambient Air Monitoring Report
September 2022
Report Completed on October 27, 2022

Clean Harbors Environmental Services Inc.
Approval Number: 10348-03-00
Ryley Facility, Alberta

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- Appendix B Sampling Field Sheets
- Appendix C Wind Class Frequency Distribution Graphs and Wind Rose
- Appendix D Chain of Custody Forms and Laboratory Analytical Reports

1. Introduction

The Facility operates two ambient air monitoring stations to assess ambient air quality at and around the Facility. One intermittent monitoring station, known as the Ryley Lift Station (AEP Station ID 00010348-I-1), is located on Secondary Road 854, approximately 350 metres southeast of the Facility. At this location, samples are collected and analyzed for the following: particulate matter less than or equal to 10 micrometers (μm) in diameter (PM_{10}), volatile organic compounds (VOCs), and total non-methane organic compounds (TNMOC). Additionally, PM_{10} samples that exceed 50 micrograms per cubic metre ($50 \mu\text{g}/\text{m}^3$) are analyzed for a target list of metals, anions, and cations. Sampling is conducted every 12 days as required by the Facility's Approval.

The second station, located at the Facility (AEP Station ID 00010348-C-1), is a continuous meteorological station that collects wind speed and wind direction data.

All sampling and monitoring is conducted in accordance with the Facility's Approval and the Alberta Air Monitoring Directive, 2016 (AMD).

1.1 Contact Information

As required by AMD Chapter 9, Section 2, contact information is provided for the following Facility personnel and Contractors that assisted with the performance of the Facility's Air Monitoring Program.

Name: Mr. Stan Yuha
Title: Plant Manager
Company: Clean Harbors
Responsibilities: Report Certifier/ETS Submitter
Address: PO Box 390, Ryley, AB T0B 4A0
Phone: 780-663-2509
Email: yuha.stan@cleanharbors.com

Name: Mr. Todd Webb
Title: Laboratory Chemist
Company: Clean Harbors
Responsibilities: Station Field Operator and Field Sampler
Address: PO Box 390, Ryley, AB T0B 4A0
Phone: 780-663-2513
Email: webb.todd@cleanharbors.com

Name: Mr. Pooya Shariaty
Title: Senior Air Quality Engineer/Project Manager
Company: GHD Limited
Responsibilities: Senior QA/QC
Address: 3445-114th Ave. SE, Suite 103 Calgary, AB
Phone: 403-538-7479
Email: Pooya.shariaty@ghd.com

Name: Ms. Stepheney Davey
 Title: Air Quality Engineer in Training
 Company: GHD Limited
 Responsibilities: Maintenance/Calibration Services/Report Preparer/ETS Submitter
 Address: 9426 – 51st Avenue NW, Suite 101 Edmonton, AB
 Phone: 780-229-3687
 Email: Stepheney.davey@ghd.com

Company: Innotech
 Responsibilities: Laboratory Analytical Services
 Address: PO Bag 4000, Vegreville, Alberta
 Phone: 780-632-8211
 Email: EAS.Results@albertainnovates.ca

2. Summary of Ambient Air Monitoring Activities

The following ambient air monitoring activities were conducted during the month of September 2022.

<i>Activity</i>	<i>Completed (Y/N)</i>	<i>Date(s)</i>
Wind Speed/Direction Sensor Calibration	N	March 18, 2022 ⁽¹⁾
Changes to the Wind Speed/Direction Sensor	N	-
PM ₁₀ Sampling Station Calibration	Y	September 9, 2022
Changes to the PM ₁₀ Sampling Station	N	-
PM ₁₀ Samples Collected	Y	September 8, 2022 September 20, 2022
VOC and TNMOC Samples Collected	Y	September 8, 2022 September 20, 2022
Metal Analysis Conducted	N	-
Maintenance Activities	Y	September 8, 2022 September 20, 2022
Dust Suppression Activities	N	-
<p>Note: (1) The wind speed/direction sensor was checked for calibration on March 18, 2022 and was shown to be within the allowable tolerances and was then re-installed after calibration.</p>		

3. Summary of Electronic Transfer System (ETS) Submittals

In addition to the September 2022 monthly report, the following summarized items were submitted to the ETS.

3.1 AMD XML Schema

An XML formatted Schema file was submitted to the AEP via the ETS portal. The XML Schema file contains the results from AEP Station ID 00010348-I-1 and AEP Station ID 00010348-C-1.

3.2 Ambient Air Monitoring Program Laboratory Reports

One laboratory report in PDF file format was submitted to the AEP via the ETS portal. The PDF file contains the results from AEP Station ID 00010348-I-1.

3.3 Ambient Air Monitoring Program Calibration Reports

One calibration report in PDF file format was submitted to the AEP via the ETS portal. The PDF file contains the results from AEP Station ID 00010348-C-1.

4. Calibration and Operation & Maintenance (O&M) Activities

4.1 Meteorological Station for Wind Speed and Direction (AEP Station ID 00010348-C-1)

The meteorological station was taken down and calibrated on March 18, 2022. The station was shown to be within all allowable tolerances, as required by the manufacturer. Provided in Appendix A is the calibration report and record of installation.

There were no changes to the meteorological station during September 2022.

4.2 PM₁₀ Sampling Station (AEP Station ID 00010348-I-1)

Maintenance activities for the Partisol Federal Reference Method PM₁₀ Sampler included inlet cleaning and leak checks that were conducted before each sampling event in September 2022. The pre-sampling maintenance activities are recorded in the field sampling sheets provided in Appendix B.

5. Ambient Air Monitoring Results

The following section presents the results from the ambient air monitoring program for AEP Station ID 00010348-C-1 and AEP Station ID 00010348-I-1 conducted in September 2022. Where applicable, comparisons were made to Alberta Ambient Air Quality Objectives (AAAQO) for parameters that had 24-hour average objectives. These parameters include o,m,p-xylene, hexane,

and toluene. For all other parameters, AAAQO have not been established or the limits have averaging periods other than 24-hours.

5.1 Meteorological Data for Wind Speed and Direction (AEP Station ID 00010348-C-1)

In accordance with the Approval and the AMD, the Facility is required to collect wind speed and directional data continuously when operations are occurring on site. Table 1 presents the hourly and 24-hour average wind speeds for September 2022. Table 2 presents the hourly and 24-hour average wind direction data (degrees from north) for September 2022. Table 3 presents the Wind Class Frequency Distribution for September 2022. Appendix C provides a graphical representation of the Wind Class Frequency Distribution and the Wind Roses based on Tables 1, 2 and 3.

5.1.1 Data Verification and Validation and Uptime

Based on the verification and validation process conducted for the meteorological data that was collected in September 2022, it was determined that 100 percent of the data is valid, which represents 100 percent uptime of the meteorological station. This is above the 90 percent uptime limit required for compliance, as per the Approval.

5.2 PM₁₀ Concentrations (AEP Station ID 00010348-I-1)

Table 4 presents the results of the sampling conducted for PM₁₀. Appendix B provides the field sheets completed for each sampling event. Appendix D provides the chain of custody forms and laboratory analytical reports.

AAAQO are specified for total suspended particulates (TSP) at 100 µg/m³ and PM_{2.5} at 29 µg/m³ (24-hour averaging period). There is currently no AAAQO specified for PM₁₀ for a 24-hour averaging period in Alberta. In accordance with the Facility's Approval, PM₁₀ samples that exceed 50 µg/m³ are analyzed for a target list of metals, anions, and cations.

5.3 Metal Concentrations

All of the PM₁₀ samples collected in September 2022 were below 50 µg/m³ and as such analysis for metals, anions, and cations was not conducted on those samples.

5.4 VOC and TNMOC Concentrations

Table 5 presents the VOC and TNMOC concentrations measured in September 2022. There are three VOC parameters that have corresponding AAAQO with 24-hour averaging periods including o,p,m-xylene, hexane and toluene. There were no exceedances for these parameters in September 2022. Appendix B provides the field sheets completed for each sampling event. Appendix D provides the chain of custody forms and laboratory analytical reports.

5.5 Dust Suppression

There was no dust suppression activities, which include using leachate spread on the surface of the active landfill, conducted during September 2022.

6. Conclusions

The following summarizes the Ambient Air Monitoring Program that was conducted in September 2022.

- 1 The PM₁₀ concentrations measured on September 8 and September 20, 2022 were 11.373 µg/m³ and 13.390 µg/m³, respectively.
- 2 Based on the ambient air monitoring results, no exceedances were detected for parameters with applicable AAAQO, which included o,m,p-xylene, hexane and toluene. There are no applicable AAAQO for other parameters that were monitored in September 2022.
- 3 During September 2022, the wind station operated at 100 percent uptime. Based on the data verification and validation procedure conducted, this is in compliance with the minimum 90 percent uptime required by the AMD.

Clean Harbors will continue perform their Facility's Ambient Air Monitoring Program in accordance with their Approval and the AMD and evaluate the data to determine impacts on the ambient air quality.

7. Certification

Per the requirements of AMD, Chapter 9, Section 2.3, the following certification is provided for the September 2022 Ambient Air Monitoring Report.

"I certify that I have reviewed and verified this report and that the information is complete, accurate and representative of the monitoring results, reporting timeframe and the specified analysis, summarization and reporting requirements."



Stan Yuha

Plant Manager/Report Certifier

END OF REPORT

Tables

TABLE 1

Average Wind Speed (metres/second)
AEP Station ID 00010348-C-1
Clean Harbors Canada, Inc.
Monthly Ambient Air Monitoring Report
September 2022

Ryley Wind Speed Data (m/s) - Month of September 2022																								
Day/Hour	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	3.8	3.9	4.8	4.2	4.2	3.7	4.2	4.4	4.6	8.7	11.1	12.7	12.0	11.3	13.8	11.7	10.9	9.6	7.0	4.9	1.9	2.2	1.0	2.0
2	2.6	3.1	3.6	4.0	3.5	4.1	3.8	3.3	4.1	5.7	6.4	4.4	3.8	3.3	4.0	4.7	4.8	5.5	5.1	3.7	3.3	4.1	5.0	4.1
3	4.0	3.7	2.9	3.6	3.5	2.8	1.7	1.6	1.4	1.4	1.4	1.1	2.0	3.3	3.8	4.1	4.4	4.4	3.3	2.2	2.1	3.9	2.7	2.2
4	2.7	1.8	1.4	1.4	2.3	2.2	1.3	2.1	1.3	2.0	2.8	4.4	3.9	4.4	4.4	5.1	4.0	2.1	1.7	2.5	3.0	1.5	3.0	3.7
5	3.8	2.9	3.0	4.6	5.4	5.8	6.0	4.3	4.7	6.2	6.7	6.5	5.9	2.4	2.6	2.7	3.2	3.4	4.2	5.1	4.9	5.2	6.2	4.7
6	4.4	5.0	4.3	3.6	3.2	4.5	4.8	4.0	3.4	4.6	5.4	4.1	3.9	2.8	3.0	3.5	3.2	2.6	2.0	2.3	2.4	2.7	2.7	3.4
7	3.3	3.3	3.1	3.2	2.0	2.8	3.0	3.4	2.8	2.2	1.5	4.5	8.3	9.3	8.2	5.8	4.8	4.0	5.0	3.4	5.4	3.8	4.7	4.6
8	5.6	6.4	5.0	5.1	4.3	4.3	5.0	5.1	6.4	8.4	6.6	7.0	6.6	6.4	6.8	6.1	7.5	7.1	7.0	4.8	3.5	4.8	5.0	3.3
9	4.2	3.6	3.6	3.3	3.5	3.5	3.7	3.9	4.7	6.0	6.7	7.6	7.8	7.5	6.5	6.1	6.0	5.0	2.6	2.5	2.8	3.3	2.6	3.8
10	4.1	4.8	4.3	4.3	3.3	3.0	3.6	3.4	3.3	3.7	3.6	4.2	3.7	5.8	5.9	5.0	4.5	4.2	3.1	3.1	3.1	3.5	5.3	5.2
11	5.1	3.3	3.4	2.9	2.7	3.3	3.1	3.3	3.0	2.1	2.0	1.9	1.7	2.4	3.2	2.7	2.8	3.0	2.4	2.7	2.2	2.4	2.4	2.8
12	2.6	3.1	4.5	4.8	4.1	3.7	3.1	2.7	3.1	4.1	2.4	2.4	2.8	1.7	2.0	1.9	2.4	2.9	4.1	3.3	2.9	3.6	3.6	3.8
13	3.5	3.6	3.6	3.9	3.4	3.5	4.0	2.7	1.3	4.2	5.6	5.5	6.8	6.5	6.6	7.1	7.1	7.5	6.4	4.3	3.6	3.3	3.6	3.4
14	3.3	2.3	0.9	1.5	1.2	1.4	0.9	1.0	1.6	2.6	3.3	3.4	2.9	3.4	3.6	3.5	2.9	3.3	2.7	2.0	2.1	2.4	2.2	2.4
15	2.5	2.2	2.2	2.7	2.4	2.7	3.2	3.1	3.2	4.6	6.1	6.6	7.1	7.3	6.9	7.6	7.5	7.2	6.7	5.6	4.4	5.1	3.3	0.9
16	3.0	4.1	4.1	3.7	1.5	1.5	1.7	2.0	2.2	3.6	3.1	2.8	2.5	2.8	3.3	3.8	3.0	2.5	2.9	1.8	1.5	2.0	2.5	2.7
17	2.9	2.6	3.1	3.2	2.1	3.1	4.7	4.6	6.2	7.9	7.4	6.9	7.1	6.9	7.1	6.8	7.1	7.1	5.9	3.7	2.7	2.2	2.7	2.8
18	3.8	3.3	4.0	3.9	3.7	5.1	4.7	4.4	4.8	6.5	7.2	6.9	6.1	5.6	4.8	3.8	3.9	3.9	3.2	1.8	1.5	1.1	2.0	2.0
19	1.9	1.7	0.8	1.4	2.5	3.5	4.4	5.4	5.5	5.2	4.1	5.3	6.6	7.5	8.0	8.1	8.4	8.8	8.2	7.3	7.6	7.2	7.3	6.7
20	6.4	7.2	7.1	7.1	7.2	7.4	6.5	5.6	5.2	6.3	5.7	5.0	5.3	6.0	6.0	5.3	4.9	4.0	2.7	1.1	0.1	0.9	2.0	2.7
21	3.4	3.8	4.3	3.8	2.5	2.0	2.2	2.7	3.5	3.4	4.8	6.2	6.6	6.4	6.3	7.1	6.9	6.8	6.6	3.9	4.4	4.8	5.1	4.7
22	5.4	4.3	4.3	4.5	4.4	4.8	4.5	4.2	4.8	5.6	5.6	5.3	6.7	6.2	6.1	6.2	5.0	4.7	4.9	3.9	3.8	4.2	4.1	3.2
23	3.5	2.6	2.0	1.2	2.3	3.3	4.0	4.2	3.5	4.4	6.6	6.0	5.6	5.7	3.9	4.3	4.7	5.3	4.5	2.8	3.4	3.6	3.9	3.3
24	3.0	2.8	3.4	3.6	2.8	4.2	5.1	5.1	5.4	7.6	11.1	12.7	11.4	11.4	10.6	10.4	8.8	7.9	4.3	1.6	2.2	3.4	4.2	5.0
25	4.8	5.2	5.3	5.2	5.6	5.5	4.7	4.6	4.2	5.0	5.6	6.3	5.0	4.4	4.8	4.8	5.1	4.9	3.7	2.7	2.9	3.3	3.5	2.9
26	1.4	1.0	2.4	3.5	2.5	0.9	0.9	3.2	3.4	2.7	2.3	1.7	2.1	2.8	1.5	1.8	1.2	1.3	2.2	2.7	2.7	3.3	3.4	4.3
27	4.4	4.6	4.8	4.7	4.2	4.3	3.9	3.6	3.8	4.9	5.2	4.0	4.8	6.8	7.0	5.0	4.5	3.2	1.9	2.1	2.7	2.7	2.0	2.3
28	2.6	1.5	4.8	3.2	1.5	1.6	1.8	2.3	1.5	1.5	0.7	1.0	1.7	1.5	1.2	1.2	1.6	2.0	1.7	1.9	2.2	1.8	1.5	1.0
29	1.1	0.5	0.8	1.1	0.4	0.8	1.0	1.3	2.0	2.1	3.9	3.3	1.9	2.8	4.2	5.4	6.2	5.7	5.5	5.9	4.7	4.2	4.6	4.5
30	5.4	5.9	5.8	4.8	4.4	4.2	4.2	4.5	4.5	4.7	5.7	3.5	4.9	5.8	6.8	7.0	5.3	5.1	3.8	1.9	1.1	2.3	2.3	1.3

TABLE 2

Average Wind Direction (degrees from North)
AEP Station ID 00010348-C-1
Clean Harbors Canada, Inc.
Monthly Ambient Air Monitoring Report
September 2022

Ryley Wind Direction Data (degrees, blowing from) - Month of September 2022																								
Day/Hour	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	186	218	246	281	296	285	293	306	308	336	331	328	326	328	329	330	343	323	167	21	35	42	122	178
2	192	202	205	200	193	187	160	149	191	223	240	237	227	203	198	187	190	187	181	173	161	168	179	158
3	162	157	158	164	169	188	165	162	175	194	224	186	185	188	181	168	152	149	145	133	142	170	178	163
4	180	190	181	136	210	178	267	268	189	288	309	317	329	332	326	332	266	229	39	40	58	112	170	327
5	327	334	326	334	338	338	330	330	326	333	331	316	308	187	287	239	266	249	242	251	255	241	270	273
6	258	273	286	285	267	276	274	281	280	303	317	298	285	271	264	241	192	180	166	118	129	131	130	127
7	133	129	134	138	139	146	156	161	158	165	230	297	334	308	190	155	317	313	339	330	298	237	260	276
8	293	303	294	290	284	288	303	301	309	321	332	333	330	322	321	315	302	309	305	301	287	294	185	283
9	281	296	298	294	293	297	294	292	303	316	323	326	324	323	321	326	322	319	322	280	234	214	211	206
10	200	199	197	190	180	172	177	189	206	234	243	249	264	260	269	272	276	271	244	232	226	204	201	200
11	201	201	205	211	267	290	292	281	300	311	318	253	262	283	246	91	27	45	41	50	36	25	250	318
12	251	318	335	340	333	344	340	322	327	283	132	53	46	85	109	129	101	106	100	104	97	109	120	125
13	126	82	107	133	131	135	140	163	108	145	174	174	174	186	171	170	175	163	157	150	140	148	155	151
14	145	161	162	154	272	253	242	164	167	293	108	31	68	96	133	131	105	54	46	78	114	120	146	155
15	142	146	146	155	157	148	141	146	147	149	150	156	153	154	151	142	150	139	133	129	124	128	181	161
16	118	135	151	152	268	183	179	171	158	157	142	137	125	106	128	126	121	138	142	127	114	128	123	119
17	127	145	155	148	231	256	306	303	296	295	301	299	301	302	307	299	306	317	318	323	308	294	289	281
18	250	225	228	232	225	241	235	240	246	264	267	261	267	273	283	279	295	308	328	109	33	113	152	136
19	155	154	188	298	310	314	328	333	327	336	327	334	341	330	326	324	320	318	315	317	322	319	319	320
20	319	319	322	315	318	316	316	319	314	326	329	325	327	322	318	325	320	321	323	323	254	207	194	194
21	197	196	198	194	172	149	151	151	155	164	181	186	187	189	186	182	183	174	171	164	168	175	172	167
22	167	150	154	156	155	155	161	158	151	170	180	178	182	184	182	184	191	185	168	170	183	191	200	206
23	234	214	186	216	285	292	297	298	303	324	340	336	332	321	297	292	291	265	256	237	254	267	259	262
24	266	288	269	264	268	253	254	256	263	286	312	315	316	315	311	315	318	321	315	293	271	256	254	242
25	236	235	233	237	238	239	238	237	230	230	224	229	238	233	228	251	266	262	264	264	268	280	266	259
26	308	257	242	251	264	261	294	245	261	279	306	322	291	300	189	256	213	239	98	96	122	130	138	139
27	139	138	139	139	148	143	139	155	156	167	172	161	133	140	154	168	193	204	208	190	207	212	188	209
28	219	227	230	224	151	154	151	161	167	232	257	176	158	175	191	281	289	278	319	328	346	182	232	306
29	231	127	231	134	184	253	246	203	126	64	93	105	110	95	186	17	19	23	24	28	20	18	16	21
30	25	25	34	35	22	14	21	29	41	42	60	63	51	41	72	84	81	78	103	98	235	327	46	188

TABLE 3

**Wind Frequency Distribution
AEP Station ID 00010348-C-1
Clean Harbors Canada, Inc.
Monthly Ambient Air Monitoring Report
September 2022**

Frequency Distribution Report: Ryley, Alberta - September 2022									
Direction	Angle	Wind Speed (m/s) and Number of Occurrences (minutes)						%	Total Occurrences by Direction
		< 0.5	0.5 to < 1.5	1.5 to < 2.5	2.5 to < 3.5	3.5 to < 4.5	>= 4.5		
North	> 337.5 - 22.5	61	307	568	498	625	1219	7.6%	3278
Northeast	> 22.5 - 67.5	54	190	566	473	336	633	5.2%	2252
East	> 67.5 - 112.5	45	227	414	387	256	269	3.7%	1598
Southeast	> 112.5 - 157.5	46	444	1596	2117	1759	1388	17.0%	7350
South	> 157.5 - 202.5	81	512	1283	1420	1744	2724	18.0%	7764
Southwest	> 202.5 - 247.5	97	310	539	1011	1061	1420	10.3%	4438
West	> 247.5 - 292.5	88	423	627	1394	1636	1931	14.1%	6099
Northwest	> 292.5 - 337.5	80	571	913	1285	1702	5870	24.1%	10421
Missing/Invalid Hours								0.0%	0
Total Occurrences by Speed		552	2984	6506	8585	9119	15454		43200
Occurrences by %		1.3%	6.9%	15.1%	19.9%	21.1%	35.8%	100.00%	

TABLE 4

Particulate Matter PM₁₀ Results
AEP Station ID 00010348-I-1
Clean Harbors Canada, Inc.
Monthly Ambient Air Monitoring Report
September 2022

Filter ID	C9696411	C9698035
Test ID	807	808
Sample Start Date/Time	22/09/08 00:00:00	22/09/20 00:00:00
Sample End Date/Time	22/09/09 00:00:00	22/09/21 00:00:00
Sampling Time (hours)	24	24
Flow Rate (l/min)	16.7	16.7
Volume (m³)	23.3	23.6
PM₁₀ Mass (mg)	0.265	0.316
PM₁₀ Concentration (ug/m³)	11.373	13.390
Sampler Name	2000 FRM-AE / 200FB209860905	2000 FRM-AE / 200FB209860905

TABLE 5

VOC and TNMOC Analytical Results
AEP Station ID 00010348-I-1
Clean Harbors Canada, Inc.
Monthly Ambient Air Monitoring Report
September 2022

Parameter	Units	Date	8-Sep-22	20-Sep-22
		Sample ID AAAQO ⁽¹⁾	807	808
Total Non-Methane Organic Carbon	ppmv	-	< 0.07	< 0.08
1,2,3-Trimethylbenzene	ppbv	-	0.19	0.20
1,2,4-Trimethylbenzene	ppbv	-	0.80	0.25
1,3,5-Trimethylbenzene	ppbv	-	0.25	< 0.05
1-Butene/Isobutylene	ppbv	-	2.29	0.75
1-Hexene/2-Methyl-1-pentene	ppbv	-	< 0.10	< 0.11
1-Pentene	ppbv	-	0.46	0.07
2,2,4-Trimethylpentane	ppbv	-	0.08	0.08
2,2-Dimethylbutane	ppbv	-	< 0.03	0.10
2,3,4-Trimethylpentane	ppbv	-	< 0.03	0.06
2,3-Dimethylbutane	ppbv	-	< 0.13	0.14
2,3-Dimethylpentane	ppbv	-	0.09	0.12
2,4-Dimethylpentane	ppbv	-	< 0.04	0.08
2-Methylheptane	ppbv	-	0.08	0.12
2-Methylhexane	ppbv	-	0.22	0.26
2-Methylpentane	ppbv	-	< 0.03	0.41
3-Methylheptane	ppbv	-	< 0.04	0.11
3-Methylhexane	ppbv	-	0.32	0.28
3-Methylpentane	ppbv	-	0.10	0.43
Benzene	ppbv	-	0.08	0.39
cis-2-Butene	ppbv	-	0.16	0.06
cis-2-Pentene	ppbv	-	< 0.03	< 0.03
Cyclohexane	ppbv	-	0.11	0.52
Cyclopentane	ppbv	-	0.08	0.24
Ethylbenzene	ppbv	-	3.03	0.82
Isobutane	ppbv	-	0.80	0.42
Isopentane	ppbv	-	1.61	1.63
Isoprene	ppbv	-	0.19	0.11
Isopropylbenzene	ppbv	-	0.14	< 0.06
m,p-Xylene	ppbv	161	14.9	2.61
m-Diethylbenzene	ppbv	-	< 0.03	< 0.03
m-Ethyltoluene	ppbv	-	0.33	0.13
Methylcyclohexane	ppbv	-	0.27	0.53
Methylcyclopentane	ppbv	-	0.10	0.45
n-Butane	ppbv	-	7.20	1.89
n-Decane	ppbv	-	0.70	0.20
n-Dodecane	ppbv	-	< 0.4	< 0.5
n-Heptane	ppbv	-	0.28	0.47
n-Hexane	ppbv	1990	0.20	1.01
n-Nonane	ppbv	-	0.54	0.17
n-Octane	ppbv	-	0.22	0.21
n-Pentane	ppbv	-	0.99	2.52
n-Propylbenzene	ppbv	-	0.20	< 0.09
n-Undecane	ppbv	-	< 0.7	< 0.8
o-Ethyltoluene	ppbv	-	0.21	0.08
o-Xylene	ppbv	161	3.27	0.93
p-Diethylbenzene	ppbv	-	0.12	0.19
p-Ethyltoluene	ppbv	-	0.53	0.08
Styrene	ppbv	-	0.32	0.74
Toluene	ppbv	106	14.6	3.13
trans-2-Butene	ppbv	-	0.40	0.13
trans-2-Pentene	ppbv	-	< 0.03	< 0.03
Total VOCs ⁽²⁾	ppbv	-	58.050	24.820

Notes:

(1) Alberta Ambient Air Quality Objectives for a 24 hour averaging period.

(2) Total VOCs are calculated under the assumption that values under the detection limit are equal to the detection limit, as per the AMD.

Appendix A

Meteorological Station Calibration Report

R. M. YOUNG COMPANY WIND SENSOR CALIBRATION CERTIFICATE

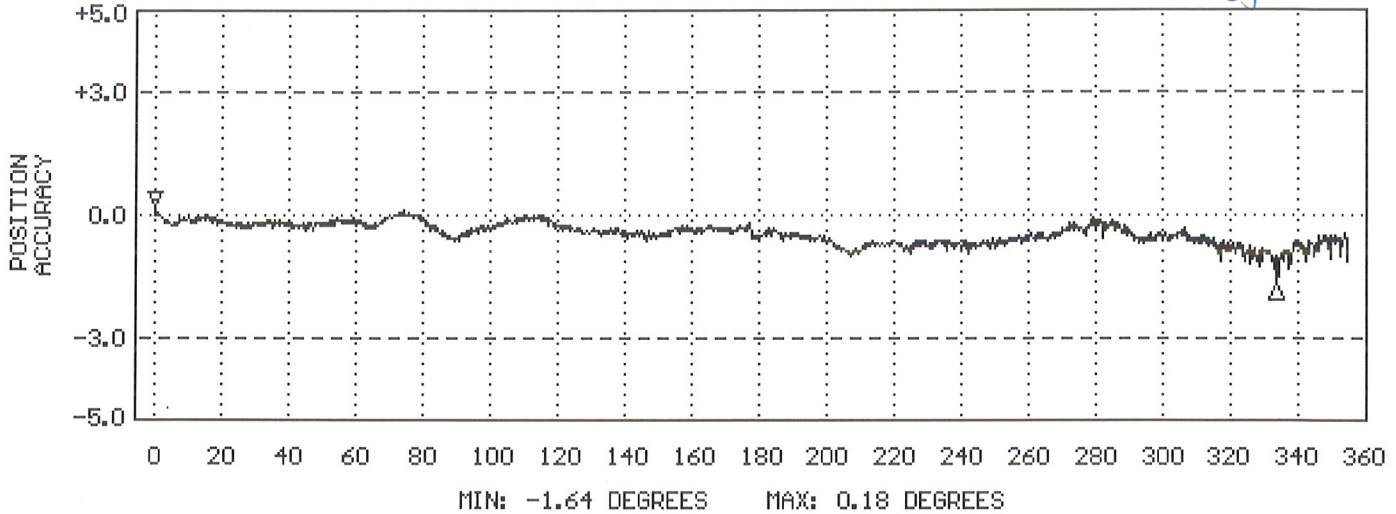
SENSOR: 05305-10A WIND MONITOR-AQ
SENSOR SERIAL NUMBER: WM149768
BEARINGS: SHIELDED/OIL LUBE
DATE: AUG 3 2016

WIND SPEED THRESHOLD TEST: PASS
LOW WIND SPEED AMPLITUDE/FREQUENCY TEST: PASS
HIGH WIND SPEED AMPLITUDE/FREQUENCY TEST: PASS
VANE TORQUE TEST: PASS
SPECIAL NOTES:
SPECIAL NOTES:

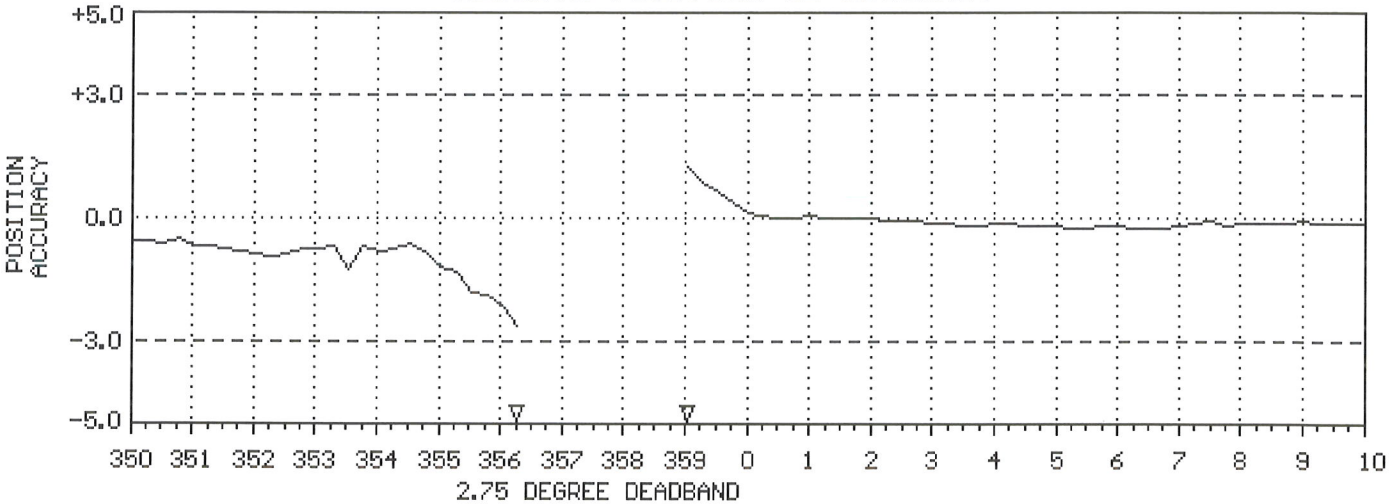
[Signature]
Insp. By

Installed Nov. 8/16
By S.Y. dy.

AZIMUTH POSITION vs ACCURACY



AZIMUTH POSITION vs ACCURACY



NOTE: Azimuth Position vs Accuracy graphs are accurate to within 0.5 degrees. The accuracy shown in the potentiometer deadband region between 355 and 0 degrees is the result of no resistance change while position changes. The gap represents the actual deadband (open circuit).



GHD Wind Calibration Form

Site and Instrument Information						
<u>Site</u>			<u>Wind Monitor</u>			
Location:	Facility		Make:	RM Young		
Calibration Date:	Mar 18, 2022		Model:	05305		
Tech.:	P. Shariaty & S. Davey		Serial #:	149768		
Instrument:	Continuous Wind Monitor		Calibration due:	Annually		
Time:	10:15 AM - 2:00 PM		Temperature:	4°C		
Pre-Calibration Inspection				Y/N		
Is the wind direction < +/- 10° from compass observation?				Y		
Is siting aligned?				Y		
Does the propeller rotate 360° with no friction?				Y		
Does the vane rotate 360° with no friction?				Y		
Calibration Information						
Direction (degrees °)			Anemometer Speed (m/s)			
Test Angle (°)	Recorded Angle (°)	Within +/- 5°? (Y/N)	Test Speed (m/s)	Recorded Speed (m/s)	Within +/- 3 (m/s)? (Y/N)	
180	181	Y	26.1	26.0	Y	
210	213	Y	20.5	20.4	Y	
240	242	Y	15.4	15.3	Y	
270	272	Y	10.2	10.2	Y	
300	303	Y	5.1	5.1	Y	
330	332	Y				
0	4	Y				
30	31	Y				
60	61	Y				
90	90	Y				
120	122	Y				
150	151	Y				
Comments				Conversion Factors		
Wind monitor (SN:149768) was removed from tower, inspected and the calibration was checked on March 18, 2022. Mechanical bearings and shaft alignment were inspected. Bearings were replaced and instrument was cleaned of any dust buildup. Alignment was in good condition. Other than the bearings and cleaning, no additional maintenance was required. It is recommended that instrument be cleaned biannually and bearings checked/replaced at the 2023 calibration interval. After calibration check, wind monitor was re-installed and sited back to original position.				m/s	RPM	
				19.456	3800	
				15.360	3000	
				12.800	2500	
				9.216	1800	
				7.680	1500	
				5.632	1100	
4.096	800					
2.560	500					
1.024	200					
Calibration Adjustment Required?: No						

Appendix B

Sampling Field Sheets

**FIELD SHEET
VOLATILE ORGANIC COMPOUNDS
CLEAN HARBORS CANADA INC
RYLEY, ALBERTA**

A) GENERAL INFORMATION

Sample Identification Number: Organic Test 807
 Sample Canister Location: Ryley Lift Station -Shed
 Sampled by: T. Webb
 Sampler Name: Test 807
 Sample Date: 22/09/08 yy/mm/dd
 Shipping Date to Laboratory: 22/09/09
 Canister Type (ie. 1 Litre/6 Litre/Other): 6L
 Canister Serial No.: 31821
 Flow Controller Serial No.: H/L578699/A0334390-5

B) SAMPLE SET UP

	Set up Conditions	Sample Retrieval
Date:	22/09/07	22/09/09
Ambient Temperature °C (inside shed):	27.0	8.4
Barometric Pressure (mm Hg):	697	706
Canister Pressure Gauge Reading (- Inches Hg):	(-)27.2	(-)4
Sample Time:	24	24

C) OBSERVATIONS

Was there significant precipitation (e.g., >1/2-inch rain) within 24 hours prior to (or during) the sampling event? No

Describe general weather conditions during sampling event: Mostly Cloudy

Describe facility operations that may affect sampling event: None

Comments: _____

FIELD SHEET			
PM ₁₀ (Partisol Monitoring Unit)			
CLEAN HARBORS CANADA INC			
RILEY, ALBERTA			
<u>A) GENERAL INFORMATION</u>			
Filter ID:	C9696411		
PO Number:	225922		
Partisol Sampler ID/Serial Number:	2000 FRM-AE / 200FB209860905		
Test number :	Particulate Test 807		
Sample Date:	22/09/08	yy/mm/dd	
Shipping Date to Laboratory:	22/09/09		
<u>B) SAMPLING INFORMATION</u>			
SAMPLE START			
Sampling Start Date:	22/09/08		
Sampling Start Time:	00:00		
Current Instrument Date:	22/09/07		
Current Instrument Time:	15:50		
Ambient Temperature °C:	19.5		
Barometric Pressure (mm Hg):	697		
Leak Check:	Pass	(Pass/Fail)	
Clean PM10 Inlet:	Yes	(Yes/No)	
Weather Conditions Sampling date :	Mostly Cloudy		
Weather Conditions set up:	Mostly Cloudy		
SAMPLE RETRIEVAL			
Sampled by	T. Webb		
Sampling End Date:	22/09/09		
Sampling End Time:	00:00		
Current Instrument Date:	22/09/09		
Current Instrument Time:	6:50		
Run Status:	OK	(Ensure Run Status is OK)	
Total Sampling Time (Hours):	24		
Volume Sampled (m ³):	23.3		
Average Flow Rate (L/min):	16.7 L/min		
AmbT °C :	4.8		
Barometric Pressure (mm Hg) :	706		
Sample Filter Temperature °C :	4.9		
Flow Rate Coefficient of Variation (%CV):	0		
Weather Conditions :	Clear, Sunny		
Leak Check:	Pass	(Pass/Fail)	
FIELD BLANK			
Was a field blank collected	No	(Once every quarter)	
Filter ID:		(Yes/No)	
Filter Batch Number:			
Current Instrument Date:			
Current Instrument Time:			
<u>C) OBSERVATIONS</u>			
Was there significant precipitation (e.g., >1/2-inch rain) within 24 hours prior to (or during) the sampling event?	No		
Describe facility operations that may affect sampling event:			
Comments:			

FIELD SHEET
VOLATILE ORGANIC COMPOUNDS
CLEAN HARBORS CANADA INC
RYLEY, ALBERTA

A) GENERAL INFORMATION

Sample Identification Number: Organic Test 808
 Sample Canister Location: Ryley Lift Station -Shed
 Sampled by: T. Webb
 Sampler Name: Test 808
 Sample Date: 22/09/20 yy/mm/dd
 Shipping Date to Laboratory: 22/09/22
 Canister Type (ie. 1 Litre/6 Litre/Other): 6L
 Canister Serial No.: 28953
 Flow Controller Serial No.: H/L578699/A0334390-5

B) SAMPLE SET UP

	Set up Conditions	Sample Retrieval
Date:	22/09/19	22/09/21
Ambient Temperature °C (inside shed):	13.4	9.6
Barometric Pressure (mm Hg):	698	708
Canister Pressure Gauge Reading (- Inches Hg):	(-)27.3	(-)5
Sample Time:	24	24

C) OBSERVATIONS

Was there significant precipitation (e.g., >1/2-inch rain) within 24 hours prior to (or during) the sampling event? No

Describe general weather conditions during sampling event: Mostly sunny

Describe facility operations that may affect sampling event: None

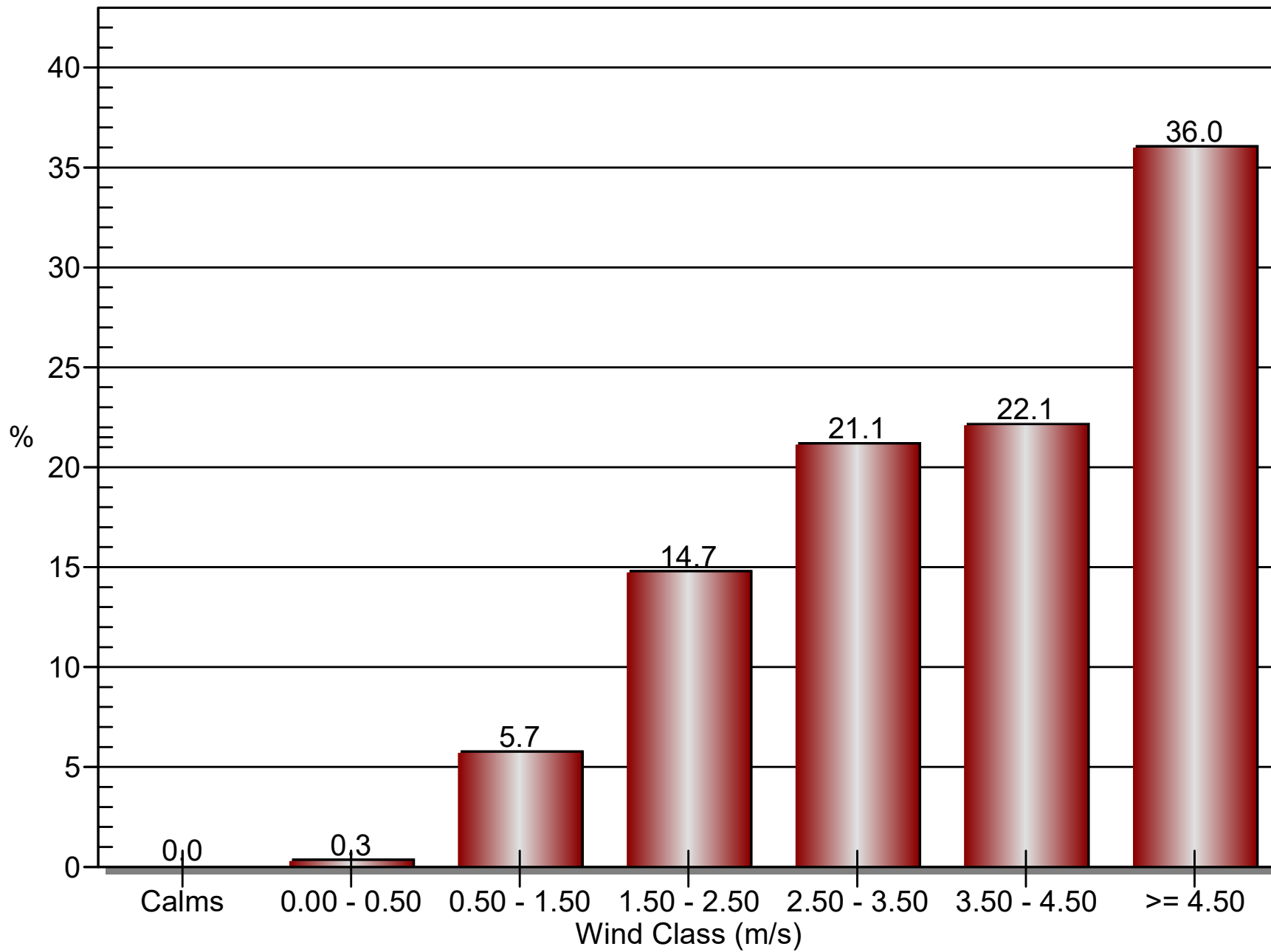
Comments: _____

FIELD SHEET			
PM ₁₀ (Partisol Monitoring Unit)			
CLEAN HARBORS CANADA INC			
RILEY, ALBERTA			
A) GENERAL INFORMATION			
Filter ID:	C9698035		
PO Number:	227988		
Partisol Sampler ID/Serial Number:	2000 FRM-AE / 200FB209860905		
Test number :	Particulate Test 808		
Sample Date:	22/09/20	yy/mm/dd	
Shipping Date to Laboratory:	22/09/22		
B) SAMPLING INFORMATION			
SAMPLE START			
Sampling Start Date:	22/09/20		
Sampling Start Time:	00:00		
Current Instrument Date:	22/09/19		
Current Instrument Time:	11:36		
Ambient Temperature °C:	11.1		
Barometric Pressure (mm Hg):	698		
Leak Check:	Pass	(Pass/Fail)	
Clean PM10 Inlet:	Yes	(Yes/No)	
Weather Conditions Sampling date :	Mostly Sunny		
Weather Conditions set up:	Cloudy		
SAMPLE RETRIEVAL			
Sampled by	T. Webb		
Sampling End Date:	22/09/21		
Sampling End Time:	00:00		
Current Instrument Date:	22/09/21		
Current Instrument Time:	6:42		
Run Status:	OK	(Ensure Run Status is OK)	
Total Sampling Time (Hours):	24		
Volume Sampled (m ³):	23.6		
Average Flow Rate (L/min):	16.7 L/min		
AmbT °C :	0.4		
Barometric Pressure (mm Hg) :	708		
Sample Filter Temperature °C :	0.5		
Flow Rate Coefficient of Variation (%CV):	0		
Weather Conditions :	Clear		
Leak Check:	Pass	(Pass/Fail)	
FIELD BLANK			
Was a field blank collected	No	(Once every quarter)	
Filter ID:		(Yes/No)	
Filter Batch Number:			
Current Instrument Date:			
Current Instrument Time:			
C) OBSERVATIONS			
Was there significant precipitation (e.g., >1/2-inch rain) within 24 hours prior to (or during) the sampling event?	No		
Describe facility operations that may affect sampling event:			
Comments:			

Appendix C

Wind Class Frequency Distribution Graphs and Wind Rose

Wind Class Frequency Distribution

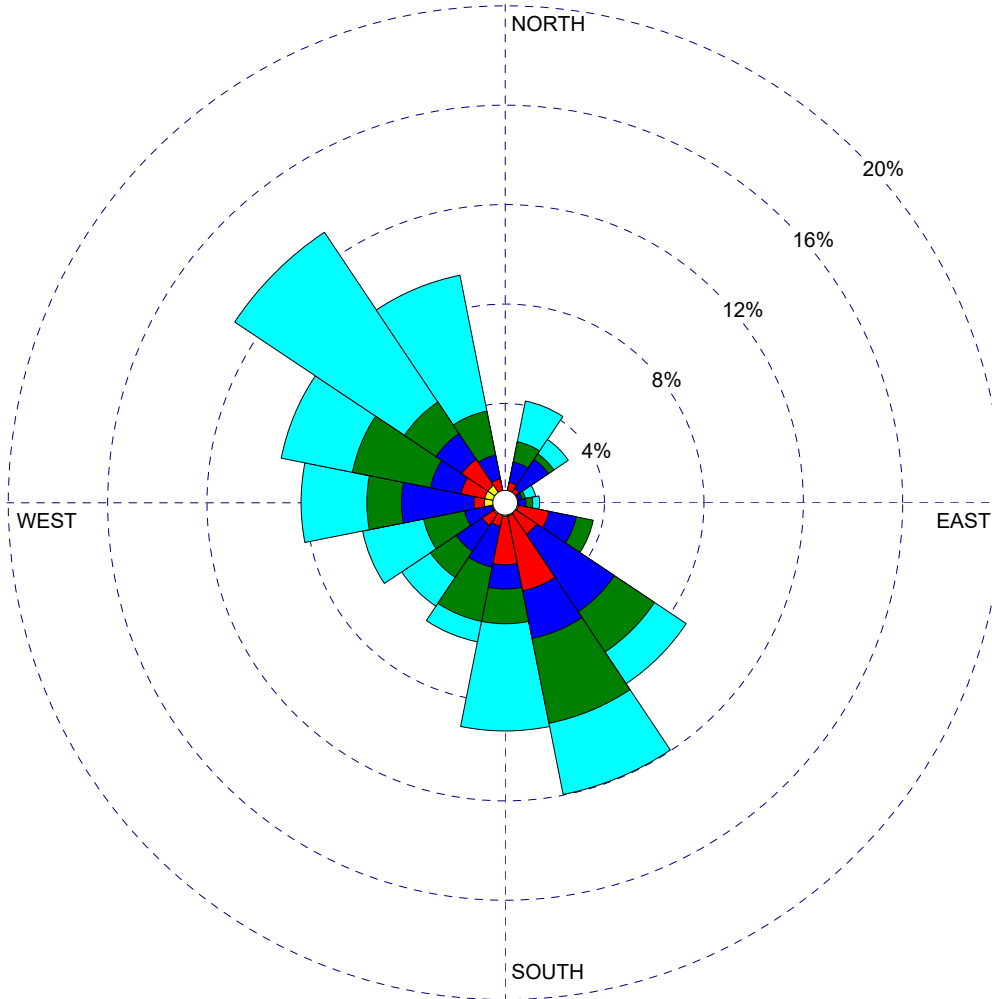


WIND ROSE PLOT:

**Wind Rose Plot - Ryley, AB
September 2022**

DISPLAY:

**Wind Speed
Direction (blowing from)**



WIND SPEED
(m/s)

- >= 4.50
- 3.50 - 4.50
- 2.50 - 3.50
- 1.50 - 2.50
- 0.50 - 1.50
- 0.00 - 0.50

Calms: 0.00%

COMMENTS:

DATA PERIOD:

**Start Date: 9/1/2022 - 00:00
End Date: 9/30/2022 - 23:00**

COMPANY NAME:

Clean Harbors

MODELER:

GHD

CALM WINDS:

0.00%

TOTAL COUNT:

719 hrs.

AVG. WIND SPEED:

4.08 m/s

DATE:

10/3/2022

PROJECT NO.:

11114644



Appendix D

Chain of Custody Forms and Laboratory Analytical Reports



PO Bag 4000
 Vegreville, Alberta
 Canada T9C 1T4
 (780) 632-8211

ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

<p>RESULTS: Todd Webb Clean Harbors Environmental PO Box 390 2 km N of Hwy 14 on Sec Road 854 50114 RR 173 Ryley AB TOB 4A0</p> <p>INVOICE: Robbi Gooding PO Box 390 2 km N of Hwy 14 on Sec Road 854 50114 RR 173 Ryley AB TOB 4A0</p>	<p style="text-align: center;">CLIENT SAMPLE ID PM10 Test # 807 - Filter # C9696411</p> <p>CANISTER ID:</p> <p>PRIORITY: Normal</p> <p>DESCRIPTION: PM10 Filter</p> <p>DATE SAMPLED: 08-Sep-22 0:00</p> <p>REPORT CREATED: 14-Oct-22</p>	<p style="text-align: center;">Matrix Air Filter</p> <p>DATE RECEIVED: 13-Sep-22</p> <p>REPORT NUMBER: 22090107</p> <p>VERSION: Version 01</p>
--	---	---

Lab ID	Parameter	Qualifier	Result Units	RDL	Method	Analysis Date
22090107-002	Particulate Weight		0.265 mg	0.004	AC-029	15-Sep-22

Report certified by: Graham Knox, Admin. & Ops. Supervisor

On behalf of: A. Prefontaine, Manager, Chemical Testing

Date: October 14, 2022

Inquiries: (780) 632 8455

E-mail: EAS.Results@innotechalberta.ca

CLIENT SAMPLE ID VOCs and TNMOC Test #: 807	CANISTER ID 31821	Matrix Ambient Air	DATE SAMPLED 08-Sep-22 0:00
DESCRIPTION: Air Canister			
REPORT NUMBER: 22090107	REPORT CREATED: 14-Oct-22		VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
22090107-001	Total Non-Methane Organic Carbon	K, T, U	< 0.07	ppmv	0.07	NA-028	13-Sep-22
22090107-001	1,2,3-Trimethylbenzene		0.19	ppbv	0.07	AC-058	14-Sep-22
22090107-001	1,2,4-Trimethylbenzene		0.80	ppbv	0.04	AC-058	14-Sep-22
22090107-001	1,3,5-Trimethylbenzene	I	0.25	ppbv	0.04	AC-058	14-Sep-22
22090107-001	1-Butene/Isobutylene		2.29	ppbv	0.09	AC-058	14-Sep-22
22090107-001	1-Hexene/2-Methyl-1-pentene	K, T, U	< 0.10	ppbv	0.10	AC-058	14-Sep-22
22090107-001	1-Pentene		0.46	ppbv	0.04	AC-058	14-Sep-22
22090107-001	2,2,4-Trimethylpentane	I	0.08	ppbv	0.03	AC-058	14-Sep-22
22090107-001	2,2-Dimethylbutane	K, T, U	< 0.03	ppbv	0.03	AC-058	14-Sep-22
22090107-001	2,3,4-Trimethylpentane	K, T, U	< 0.03	ppbv	0.03	AC-058	14-Sep-22
22090107-001	2,3-Dimethylbutane	K, T, U	< 0.13	ppbv	0.13	AC-058	14-Sep-22
22090107-001	2,3-Dimethylpentane	I	0.09	ppbv	0.03	AC-058	14-Sep-22
22090107-001	2,4-Dimethylpentane	K, T, U	< 0.04	ppbv	0.04	AC-058	14-Sep-22
22090107-001	2-Methylheptane	I	0.08	ppbv	0.03	AC-058	14-Sep-22
22090107-001	2-Methylhexane		0.22	ppbv	0.04	AC-058	14-Sep-22
22090107-001	2-Methylpentane	K, T, U	< 0.03	ppbv	0.03	AC-058	14-Sep-22
22090107-001	3-Methylheptane	K, T, U	< 0.04	ppbv	0.04	AC-058	14-Sep-22
22090107-001	3-Methylhexane		0.32	ppbv	0.03	AC-058	14-Sep-22
22090107-001	3-Methylpentane	I	0.10	ppbv	0.03	AC-058	14-Sep-22
22090107-001	Benzene	I	0.08	ppbv	0.04	AC-058	14-Sep-22
22090107-001	cis-2-Butene		0.16	ppbv	0.04	AC-058	14-Sep-22
22090107-001	cis-2-Pentene	K, T, U	< 0.03	ppbv	0.03	AC-058	14-Sep-22
22090107-001	Cyclohexane	I	0.11	ppbv	0.06	AC-058	14-Sep-22
22090107-001	Cyclopentane	I	0.08	ppbv	0.03	AC-058	14-Sep-22
22090107-001	Ethylbenzene		3.03	ppbv	0.04	AC-058	14-Sep-22

Report certified by: Graham Knox, Admin. & Ops. Supervisor

On behalf of: A. Prefontaine, Manager, Chemical Testing

Date: October 14, 2022

Inquiries: (780) 632 8455

E-mail: EAS.Results@innotechalberta.ca

CLIENT SAMPLE ID VOCs and TNMOC Test #: 807		CANISTER ID 31821	Matrix Ambient Air	DATE SAMPLED 08-Sep-22 0:00	
DESCRIPTION:	Air Canister				
REPORT NUMBER:	22090107	REPORT CREATED:	14-Oct-22	VERSION:	Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
22090107-001	Isobutane		0.80	ppbv	0.04	AC-058	14-Sep-22
22090107-001	Isopentane		1.61	ppbv	0.06	AC-058	14-Sep-22
22090107-001	Isoprene		0.19	ppbv	0.03	AC-058	14-Sep-22
22090107-001	Isopropylbenzene	I	0.14	ppbv	0.06	AC-058	14-Sep-22
22090107-001	m,p-Xylene		14.9	ppbv	0.06	AC-058	14-Sep-22
22090107-001	m-Diethylbenzene	K, T, U	< 0.03	ppbv	0.03	AC-058	14-Sep-22
22090107-001	m-Ethyltoluene		0.33	ppbv	0.04	AC-058	14-Sep-22
22090107-001	Methylcyclohexane		0.27	ppbv	0.03	AC-058	14-Sep-22
22090107-001	Methylcyclopentane	I	0.10	ppbv	0.07	AC-058	14-Sep-22
22090107-001	n-Butane		7.20	ppbv	0.03	AC-058	14-Sep-22
22090107-001	n-Decane		0.70	ppbv	0.09	AC-058	14-Sep-22
22090107-001	n-Dodecane	K, T, U	< 0.4	ppbv	0.4	AC-058	14-Sep-22
22090107-001	n-Heptane	I	0.28	ppbv	0.06	AC-058	14-Sep-22
22090107-001	n-Hexane	I	0.20	ppbv	0.04	AC-058	14-Sep-22
22090107-001	n-Octane		0.22	ppbv	0.03	AC-058	14-Sep-22
22090107-001	n-Pentane		0.99	ppbv	0.06	AC-058	14-Sep-22
22090107-001	n-Propylbenzene		0.20	ppbv	0.09	AC-058	14-Sep-22
22090107-001	n-Undecane	K, T, U	< 0.7	ppbv	0.7	AC-058	14-Sep-22
22090107-001	n-Nonane		0.54	ppbv	0.06	AC-058	14-Sep-22
22090107-001	o-Ethyltoluene		0.21	ppbv	0.03	AC-058	14-Sep-22
22090107-001	o-Xylene		3.27	ppbv	0.04	AC-058	14-Sep-22
22090107-001	p-Diethylbenzene	I	0.12	ppbv	0.03	AC-058	14-Sep-22
22090107-001	p-Ethyltoluene		0.53	ppbv	0.06	AC-058	14-Sep-22
22090107-001	Styrene		0.32	ppbv	0.06	AC-058	14-Sep-22
22090107-001	Toluene		14.6	ppbv	0.04	AC-058	14-Sep-22

Report certified by: Graham Knox, Admin. & Ops. Supervisor

On behalf of: A. Prefontaine, Manager, Chemical Testing

Date: October 14, 2022

Inquiries: (780) 632 8455

E-mail: EAS.Results@innotechalberta.ca



PO Bag 4000
 Vegreville, Alberta
 Canada T9C 1T4
 (780) 632-8211

ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

CLIENT SAMPLE ID VOCs and TNMOC Test #: 807	CANISTER ID 31821	Matrix Ambient Air	DATE SAMPLED 08-Sep-22 0:00
DESCRIPTION: Air Canister			
REPORT NUMBER: 22090107	REPORT CREATED: 14-Oct-22		VERSION: Version 01

Lab ID	Parameter	Qualifier	Result Units	RDL	Method	Analysis Date
22090107-001	trans-2-Butene		0.40 ppbv	0.04	AC-058	14-Sep-22
22090107-001	trans-2-Pentene	K, T, U	< 0.03 ppbv	0.03	AC-058	14-Sep-22

Report certified by: Graham Knox, Admin. & Ops. Supervisor

On behalf of: A. Prefontaine, Manager, Chemical Testing

Date: October 14, 2022

Inquiries: (780) 632 8455

E-mail: EAS.Results@innotechalberta.ca



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ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

Page 5 of 10

Revision History

Order ID	Ver	Date	Reason
22090107	01	14-Oct-22	Report created

Methods

Method	Description
AC-029	Procedure for the Equilibration and Weighing of Membrane Filters and PUFs on the Mettler Toledo Micro Balance
AC-058	Determination of Volatile Organic Compounds in Ambient Air by Gas Chromatography Mass Spectrometry
NA-028	Determination of Total Non-methane Hydrocarbons and Total Hydrocarbons in Ambient Air by Gas Chromatography Flame Ionization Detector

Qualifiers

Data Qualifier Translation

B	Blank contamination; Analyte detected above the method reporting limit in an associated blank
I	The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit
J1	Reported value is estimated; Surrogate recoveries limits were exceeded
J2	Reported value is estimated; No known QC criteria for this component
J3	Reported value is estimated; The value failed to meet QC criteria for either precision or accuracy
J4	Reported value is estimated; The sample matrix interfered with the analysis
K	Off-scale low. Actual value is known to be less than the value given
L	Off-scale high. Actual value is known to be greater than value given
N	Non-target analyte; Tentatively identified compound (using mass spectroscopy)
Q	Sample held beyond the accepted holding time
R	Rejected data; Not suitable for the projects intended use
T	Value reported is less than the laboratory method detection limit
U	Compound was analyzed for but not detected
V	Analyte was detected in both the sample and the associated method blank



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ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

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Order Comments

22090107

Project ID: Test 807. Send results to Stan Yuha.



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ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

Page 9 of 10

Sample Comments



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ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

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Result Comments

Note:

- 1. Results relate only to items tested and apply to the sample as received.*
- 2. This report shall not be reproduced, except in full, without the explicit approval of the laboratory.*



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TEST REPORT

<p>RESULTS: Todd Webb Clean Harbors Environmental PO Box 390 2 km N of Hwy 14 on Sec Road 854 50114 RR 173 Ryley AB TOB 4A0</p> <p>INVOICE: Robbi Gooding PO Box 390 2 km N of Hwy 14 on Sec Road 854 50114 RR 173 Ryley AB TOB 4A0</p>	<p>CLIENT SAMPLE ID PM Test #: 808, C9698035</p> <p>MATRIX Air Filter</p> <p>CANISTER ID:</p> <p>PRIORITY: Normal</p> <p>DESCRIPTION: PM10 Filter</p> <p>DATE SAMPLED: 20-Sep-22 0:00 DATE RECEIVED: 22-Sep-22</p> <p>REPORT CREATED: 13-Oct-22 REPORT NUMBER: 22090259</p> <p>VERSION: Version 01</p>
--	--

Lab ID	Parameter	Qualifier	Result Units	RDL	Method	Analysis Date
22090259-002	Particulate Weight		0.316 mg	0.004	AC-029	28-Sep-22

Report certified by: Rebecca Dasilva, Account Coordinator

On behalf of: A. Prefontaine, Manager, Chemical Testing

Date: October 13, 2022

Inquiries: (780) 632 8455

E-mail: EAS.Results@innotechalberta.ca

CLIENT SAMPLE ID VOCs and TNMOC Test # 808	CANISTER ID 28953	Matrix Ambient Air	DATE SAMPLED 20-Sep-22 0:00
DESCRIPTION: Canister			
REPORT NUMBER: 22090259	REPORT CREATED: 13-Oct-22		VERSION: Version 01

Lab ID	Parameter	Qualifier	Result Units	RDL	Method	Analysis Date
22090259-001	Total Non-Methane Organic Carbon	K, T, U	< 0.08 ppmv	0.08	NA-028	23-Sep-22
22090259-001	1,2,3-Trimethylbenzene		0.20 ppbv	0.08	AC-058	30-Sep-22
22090259-001	1,2,4-Trimethylbenzene	K, T, U, I	0.25 ppbv	0.05	AC-058	30-Sep-22
22090259-001	1,3,5-Trimethylbenzene	K, T, U	< 0.05 ppbv	0.05	AC-058	30-Sep-22
22090259-001	1-Butene/Isobutylene		0.75 ppbv	0.09	AC-058	30-Sep-22
22090259-001	1-Hexene/2-Methyl-1-pentene	K, T, U	< 0.11 ppbv	0.11	AC-058	30-Sep-22
22090259-001	1-Pentene	I	0.07 ppbv	0.05	AC-058	30-Sep-22
22090259-001	2,2,4-Trimethylpentane	I	0.08 ppbv	0.03	AC-058	30-Sep-22
22090259-001	2,2-Dimethylbutane	I	0.10 ppbv	0.03	AC-058	30-Sep-22
22090259-001	2,3,4-Trimethylpentane	I	0.06 ppbv	0.03	AC-058	30-Sep-22
22090259-001	2,3-Dimethylbutane	I	0.14 ppbv	0.14	AC-058	30-Sep-22
22090259-001	2,3-Dimethylpentane	I	0.12 ppbv	0.03	AC-058	30-Sep-22
22090259-001	2,4-Dimethylpentane	I	0.08 ppbv	0.05	AC-058	30-Sep-22
22090259-001	2-Methylheptane	I	0.12 ppbv	0.03	AC-058	30-Sep-22
22090259-001	2-Methylhexane		0.26 ppbv	0.05	AC-058	30-Sep-22
22090259-001	2-Methylpentane		0.41 ppbv	0.03	AC-058	30-Sep-22
22090259-001	3-Methylheptane	I	0.11 ppbv	0.05	AC-058	30-Sep-22
22090259-001	3-Methylhexane		0.28 ppbv	0.03	AC-058	30-Sep-22
22090259-001	3-Methylpentane		0.43 ppbv	0.03	AC-058	30-Sep-22
22090259-001	Benzene		0.39 ppbv	0.05	AC-058	30-Sep-22
22090259-001	cis-2-Butene	I	0.06 ppbv	0.05	AC-058	30-Sep-22
22090259-001	cis-2-Pentene	K, T, U	< 0.03 ppbv	0.03	AC-058	30-Sep-22
22090259-001	Cyclohexane		0.52 ppbv	0.06	AC-058	30-Sep-22
22090259-001	Cyclopentane		0.24 ppbv	0.03	AC-058	30-Sep-22
22090259-001	Ethylbenzene		0.82 ppbv	0.05	AC-058	30-Sep-22

CLIENT SAMPLE ID VOCs and TNMOC Test # 808	CANISTER ID 28953	Matrix Ambient Air	DATE SAMPLED 20-Sep-22 0:00
DESCRIPTION: Canister			
REPORT NUMBER: 22090259	REPORT CREATED: 13-Oct-22		VERSION: Version 01

Lab ID	Parameter	Qualifier	Result Units	RDL	Method	Analysis Date
22090259-001	Isobutane		0.42 ppbv	0.05	AC-058	30-Sep-22
22090259-001	Isopentane		1.63 ppbv	0.06	AC-058	30-Sep-22
22090259-001	Isoprene	I	0.11 ppbv	0.03	AC-058	30-Sep-22
22090259-001	Isopropylbenzene	K, T, U	< 0.06 ppbv	0.06	AC-058	30-Sep-22
22090259-001	m,p-Xylene		2.61 ppbv	0.06	AC-058	30-Sep-22
22090259-001	m-Diethylbenzene	K, T, U	< 0.03 ppbv	0.03	AC-058	30-Sep-22
22090259-001	m-Ethyltoluene	I	0.13 ppbv	0.05	AC-058	30-Sep-22
22090259-001	Methylcyclohexane		0.53 ppbv	0.03	AC-058	30-Sep-22
22090259-001	Methylcyclopentane		0.45 ppbv	0.08	AC-058	30-Sep-22
22090259-001	n-Butane		1.89 ppbv	0.03	AC-058	30-Sep-22
22090259-001	n-Decane		0.20 ppbv	0.09	AC-058	30-Sep-22
22090259-001	n-Dodecane	K, T, U	< 0.5 ppbv	0.5	AC-058	30-Sep-22
22090259-001	n-Heptane		0.47 ppbv	0.06	AC-058	30-Sep-22
22090259-001	n-Hexane		1.01 ppbv	0.05	AC-058	30-Sep-22
22090259-001	n-Octane		0.21 ppbv	0.03	AC-058	30-Sep-22
22090259-001	n-Pentane		2.52 ppbv	0.06	AC-058	30-Sep-22
22090259-001	n-Propylbenzene	K, T, U	< 0.09 ppbv	0.09	AC-058	30-Sep-22
22090259-001	n-Undecane	K, T, U	< 0.8 ppbv	0.8	AC-058	30-Sep-22
22090259-001	n-Nonane		0.17 ppbv	0.06	AC-058	30-Sep-22
22090259-001	o-Ethyltoluene	I	0.08 ppbv	0.03	AC-058	30-Sep-22
22090259-001	o-Xylene		0.93 ppbv	0.05	AC-058	30-Sep-22
22090259-001	p-Diethylbenzene		0.19 ppbv	0.03	AC-058	30-Sep-22
22090259-001	p-Ethyltoluene	I	0.08 ppbv	0.06	AC-058	30-Sep-22
22090259-001	Styrene		0.74 ppbv	0.06	AC-058	30-Sep-22
22090259-001	Toluene		3.13 ppbv	0.05	AC-058	30-Sep-22



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ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

CLIENT SAMPLE ID VOCs and TNMOC Test # 808	CANISTER ID 28953	Matrix Ambient Air	DATE SAMPLED 20-Sep-22 0:00
DESCRIPTION: Canister			
REPORT NUMBER: 22090259	REPORT CREATED: 13-Oct-22		VERSION: Version 01

Lab ID	Parameter	Qualifier	Result Units	RDL	Method	Analysis Date
22090259-001	trans-2-Butene	I	0.13 ppbv	0.05	AC-058	30-Sep-22
22090259-001	trans-2-Pentene	K, T, U	< 0.03 ppbv	0.03	AC-058	30-Sep-22

Report certified by: Rebecca Dasilva, Account Coordinator

On behalf of: A. Prefontaine, Manager, Chemical Testing

Date: October 13, 2022

Inquiries: (780) 632 8455

E-mail: EAS.Results@innotechalberta.ca



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TEST REPORT

Revision History

Order ID	Ver	Date	Reason
22090259	01	13-Oct-22	Report created

Methods

Method	Description
AC-029	Procedure for the Equilibration and Weighing of Membrane Filters and PUFs on the Mettler Toledo Micro Balance
AC-058	Determination of Volatile Organic Compounds in Ambient Air by Gas Chromatography Mass Spectrometry
NA-028	Determination of Total Non-methane Hydrocarbons and Total Hydrocarbons in Ambient Air by Gas Chromatography Flame Ionization Detector

Qualifiers

Data Qualifier Translation

B	Blank contamination; Analyte detected above the method reporting limit in an associated blank
I	The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit
J1	Reported value is estimated; Surrogate recoveries limits were exceeded
J2	Reported value is estimated; No known QC criteria for this component
J3	Reported value is estimated; The value failed to meet QC criteria for either precision or accuracy
J4	Reported value is estimated; The sample matrix interfered with the analysis
K	Off-scale low. Actual value is known to be less than the value given
L	Off-scale high. Actual value is known to be greater than value given
N	Non-target analyte; Tentatively identified compound (using mass spectroscopy)
Q	Sample held beyond the accepted holding time
R	Rejected data; Not suitable for the projects intended use
T	Value reported is less than the laboratory method detection limit
U	Compound was analyzed for but not detected
V	Analyte was detected in both the sample and the associated method blank



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ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

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Order Comments

22090259

Report also to Stan Yuha. Project #: Test 808.



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ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

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Sample Comments

Result Comments

Note:

- 1. Results relate only to items tested and apply to the sample as received.*
- 2. This report shall not be reproduced, except in full, without the explicit approval of the laboratory.*

Sample ID: 22090107-001 Priority: Normal Chain of Custody Form

Environmental Analytical Services
Highway 16A & 75 Street
Vegreville, AB T9C 1T4

Phone: 780-632-8403
Email: EAS.Reception@innotechalberta.ca
www.innotechalberta.ca



Customer ID: Clean Harbours
Cust Samp ID: VOCs and TNMOC Test #: 807
Client reporting information

Company: Clean Harbours Canada, Inc
Address: PO Box 390, 50114 Range Road 173,
Ryley, AB T0B 4A0
Contact: Todd Webb or Stan Yuha
Phone: 780-663-2513 or 780-663-3828
Email: Webb.Todd@cleanharbours.com,
Yuha.Stan@cleanharbours.com

Client Billing Information

Contact: Robbi Gooding
Phone: 780-663-3828
Email: Gooding.Robbi@cleanharbours.com
Project ID: Test 807
PO #: 225922

Turnaround Time


X Normal (10 business days)
Rush
Note: Rush service not available for all tests.
Confirm rush requests with InnoTech Alberta.

Special Instructions/Comments

Date Received – Lab Use Only



Lab Sample No.	Client Sample ID	Sample Source/ Description	Canister Number/ Sampler ID	Date Sampled (dd/mm/yy) From / To	Time Sampled (24 hour) From / To	Analysis Requested
	VOCs and TNMOC Test Number: 807	Canister	31821	08/09/22 09/09/22	00:00 00:00	VOC PAMS & TNMOC
	PM10 Test Number: 807	PM10 filter	C9696411	08/09/22 09/09/22	00:00 00:00	FLT Particulate Weight

Client Authorization:  Laboratory Personnel: _____ (Signature)

This "Chain of Custody" form is subject to InnoTech Alberta standard terms and conditions.



Canister ID: 31821

This cleaned canister meets or exceeds TO-15 Method Specifications

Proofed by: ISO 3 on: MAY 10 2022

Evacuated: JUL 21 2022 Recertified: _____

(Use within: 3 months from evacuation or recertification date)

Laboratory Contact Number: 780-632-8403

Sample ID: Test 807

Sampled By: T. Webb

Starting Vacuum:

-27.2"Hg

End Vacuum: KG

← → "Hg/psig

Sample ID: 22090107-001 Priority: Normal



Customer ID: Clean Harbours

Cust Samp ID: VOCs and TNMOC Test #: 807



Sample ID: 22090259-001 Priority: Normal



Customer ID: Clean Harbours
Cust Samp ID: VOCs and TNMOC Test # 808

Company: Clean Harbours Canada, Inc
Address: PO Box 390, 50114 Range Road 173,
Ryley, AB T0B 4A0
Contact: Todd Webb or Stan Yuha
Phone: 780-663-2513 or 780-663-3828
Email: Webb.Todd@cleanharbours.com,
Yuha.Stan@cleanharbours.com

Client Billing Information

Contact: Robbi Gooding
Phone: 780-663-3828
Email: Gooding.Robbj@cleanharbours.com
Project ID: Test 808
PO #: 227988

Turnaround Time

X Normal (10 business days)

Rush

Note: Rush service not available for all tests.
Confirm rush requests with InnoTech Alberta.


Special Instructions/Comments

Date Received – Lab Use Only



JMP

Lab Sample No.	Client Sample ID	Sample Source/ Description	Canister Number/ Sampler ID	Date Sampled (dd/mm/yy) From / To	Time Sampled (24 hour) From / To	Analysis Requested
1	VOCs and TNMOC Test Number: 808	Canister	28953	09/20/22	00:00	VOC PAMS & TNMOC
2	PM10 Test Number: 808	PM10 filter	C9698035	09/21/22	00:00	FLT Particulate Weight

Client Authorization:  Laboratory Personnel: _____ (Signature)

This "Chain of Custody" form is subject to InnoTech Alberta standard terms and conditions.



Canister ID: 28953

This cleaned canister meets or exceeds TO-15 Method Specifications

Sample ID: Test 808

Proofed by: ISQ3 on: JUN 02 2022

Sampled By: T. Webb

Evacuated: JUL 25 2022 Recertified: _____

(Use within: 3 months from evacuation or recertification date)
Laboratory Contact Number: 780-632-8403

Starting Vacuum: -27.3 "Hg

End Pressure: -5 "Hg/psig *imp.*

Sample ID: 22090259-001 Priority: Normal



Customer ID: Clean Harbours
Cust Samp ID: VOCs and TNMOC Test # 808

Appendix E

September Quarterly Audit



Quarterly Audit Partisol FRM Model 2000

Clean Harbors
50114 Range Rd. 173
Ryley, Alberta T0B 4A0
Quarterly Audit Date: September 9, 2022

Clean Harbors

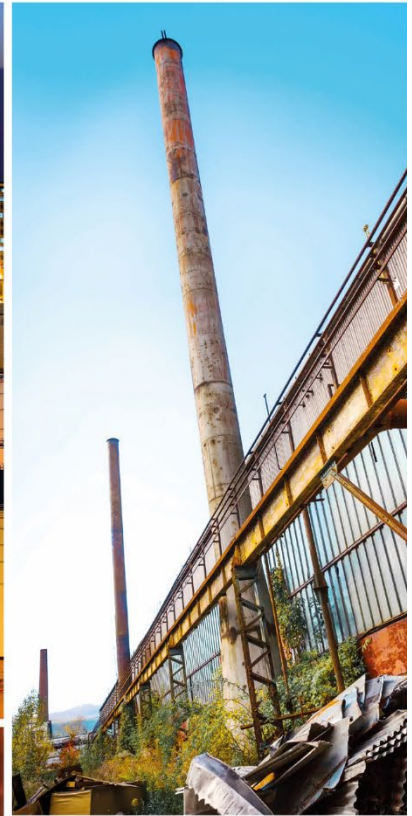
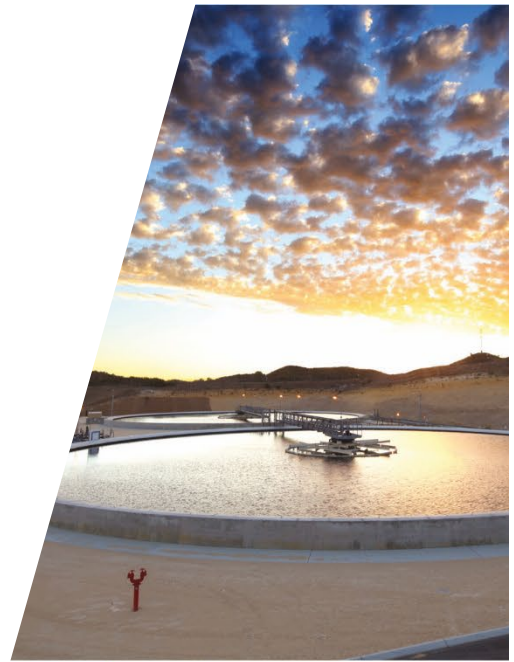




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Appendix B	Calibration Certificates



1. Introduction

GHD Limited (GHD) was retained by Clean Harbors to conduct a Quarterly Audit at 50114 Range Road 173 Ryley, Alberta (Facility) on September 9, 2022. The Quarterly Audit was conducted on the Partisol FRM 2000 Particulate Matter less than 10 microns (PM₁₀) Sampler (Partisol Sampler), located on the roof of the Ryley Lift Station (AEP Station ID 00010348-I-1), which is southeast of the Facility. The coordinates of the lift station are 53.297961, -112.416076.

2. Audit Procedure

The Partisol Sampler was audited in accordance with the instrument manual and the Alberta Air Monitoring Directive, 2016 (AMD). Siting location, ambient pressure, ambient temperature, filter temperature, leakage rate and flow rate were audited, as well as overall instrument condition to ensure compliance with the instrument manual and the AMD. Below is a summary of the tasks performed on the Partisol Sampler:

- Siting Location Audit
- Ambient Pressure Audit
- Ambient Temperature Audit
- Filter Temperature Audit
- Leakage Rate Audit
- Flow Rate Audit
- Instrument Condition and Recommendations

GHD verified all of these parameters using calibrated reference instruments. GHD reference instruments either have National Institute of Standards and Technology (NIST) Traceable Certifications, current manufacturer certification, or were verified by a primary standard. The GHD quarterly audit field form can be found in Appendix A. All calibrations and certifications can be found in Appendix B.

3. Audit Results

3.1 Siting Location Audit Results (AEP Station ID 00010348-I-1)

The siting location of the Partisol Sampler meets the requirements of Chapter 3, of the AMD. Table 3.1 of this report compares the AMD Siting Requirements for Intermittent Samplers versus the current Partisol sampler location.

- The current coordinates of the Partisol Sampler are 53.297961, -112.416076.
- The distance from the nearest roadway is 21 m.



Table 3.1 AMD Requirements vs. Current Partisol Sampler Location

Site Characteristics	AMD Requirements	Current Location	Specification
Sampler Inlet-height above ground (abg)	Minimum 2 m, Maximum 15 m	Meets Requirement	4.63 m abg
Other Requirements	a. Distance from an obstacle greater than 2.5 times the height of the obstacle above the sampler.	Meets Requirement	>2.5 times
	b. At least 2 m from any other samplers or inlets with flow rates greater than 200 litres (L) per minute,	Meets Requirement	None
	Or at least 1 m apart from any other samplers or inlets with flow rates less than or equal of 200 L per minute.	Meets Requirement	None
	c. Unrestricted air flow in three to four wind quadrants.	Meets Requirement	4/4 Unrestricted Quadrants

3.2 Pressure and Temperature Audit Results (AEP Station ID 00010348-I-1)

The pressure and temperature audit results of the Partisol Sampler meet the requirements of Chapter 4, of the AMD. Table 3.2 of this report compares the reference results versus the Partisol Sampler readings.

Table 3.2 Reference Results vs. Partisol Sampler Readings

Parameter	Partisol	Reference	Difference	Limit	Pass/Fail
Ambient Temperature (°C)	16.5	17.5	1.0	±2°C	Pass
Barometric Pressure (mmHg)	705.0	704.7	0.3	±10 mmHg	Pass
Filter Temperature (°C)	19.1	19.9	0.8	±2°C	Pass
Flow (L/min)	16.7	16.3	0.4	±1.0 L/min	Pass

3.3 Leak Check Results (AEP Station ID 00010348-I-1)

3.3.1 Automatic Leak Check

The Partisol firmware performs leak checks in automatic mode and indicates either a "pass" or "fail" based on a pressure drop threshold of 127 mmHg per minute. The Partisol Sampler passed the requirements outlined in the service manual with a pressure drop of 5 mmHg per minute during the audit.

3.3.2 External Manual Leak Check

GHD also performs an external manual leak check on the Partisol Sampler as part of the quarterly audit. The external manual leak check measures the pressure drop on a vacuum gauge located on



the sampler. The pressure drop may not exceed more than 8.5 inHg (216 mmHg) over a 30-second span. The Partisol Sampler passed the requirements of the service manual with a pressure drop of 0.16 inHg in a 30-second span.

3.4 Flow Audit (AEP Station ID 00010348-I-1)

The flow audit results of the Partisol Sampler meet the requirements of Chapter 4 of the AMD, refer to Table 3.2.

3.5 Instrument Condition and Recommendations (AEP Station ID 00010348-I-1)

The Partisol Sampler was visually and functionally inspected on the audit day. Audit recommendations and instrument conditions are listed below:

- Liquid crystal display screen is functioning.
- Filter exchange cabinet has been cleaned.
- Ventilation fan filters are clean.
- Filter exchange mechanism is operating normally.
- Filter v-seals are in good condition.
- Ambient temperature and pressure sensor wires in good condition.
- Main power connection wire in good condition.

3.5.1 Recommendations

GHD recommends opening and cleaning PM₁₀ sampling inlet prior to next sampling event.

Appendices

Appendix A

Quarterly Audit Form



GHD Quarterly Audit Form

Date	9/9/2022	Weather Cond.:	Partly Cloudy, Windy/17.52°C
Owner	Clean Harbors	Start Time:	1:40:00 PM
Station Name	Ryley Lift Station	End Time:	2:00:00 PM
Parameter	PM ₁₀	Performed By:	S. Davey

Partisol FRM Model 2000 Identification		Sampler Data	
Make/Model:	R & P Partisol FRM 2000	Temperature:	16.5°C
Unit ID:	Ryley Lift Station	Pressure:	705 mmHg
S/N:	200FB209860905	Flow Set Point:	16.7 L/min

GHD Reference Standards				
	Flow	Pressure	Temperature	Manometer
Make:	AirMetrics	TSI	Fluke	Dwyer
Model:	FRM	9565P	1551A Ex	477-1-FM
Serial Number:	FRM1218	9565P1232014	3520009	N18W
Calibration Date:	5/17/2016	9/29/2021	3/22/2022	11/16/2021

Audit Data					
	Sampler Data	Reference Data	Difference	Pass/Fail	Units
Ambient Temperature (+/- 2 °C)	16.50	17.52	1.0	Pass	°C
Barometric Pressure (+/- 10 mmHg)	705.00	704.70	0.3	Pass	mmHg
Filter Temperature (+/- 2 °C)	19.10	19.90	0.8	Pass	°C
Flow (+/- 1.0 Litres/min)	16.70	16.30	0.4	Pass	Litres/min

Leak Check					
Manual Check (-8.5 inHg)					
	Initial Pressure	Final Pressure	Pressure Drop	Pass/Fail	Units
	-14.50	-14.50	0.00	Pass	inHG
Automatic Check (-127 mmHg)					
Leak check was performed in automatic mode, sampler indicated:			7 mmHg/min	Pass	mmHg/min

As Found/As Left		Yes/No	As Found	As Left	Pass/Fail
Did the ambient temperature require adjustment?		No	16.5	16.5	Pass
Did the barometric pressure require adjustment?		No	705	705	Pass
Did the filter temperature require adjustment?		No	19.1	19.1	Pass
Did the flow audit require adjustment?		No	16.7	16.7	Pass

Comments
Partisol sampler was moderately dirty, GHD cleaned the components of the sampling inlet, inside the cabinet, all filters and wiped down all seals.

Flow Equation						
Set Point	Actual Flow (Q _{act})	Absolute Difference	Pass/Fail	Manometer (DH)	4.26 "H ₂ O	
(lpm)	(lpm)	(lpm)	(± 1 lpm)	Actual Temp (T _{act})	290.67 °K	17.5°C
16.7	16.3	0.4	Pass	Actual Pres (P _{act})	0.939 bar	
				Actual Pres (P _{act})	27.74 inHg	

FTS Linear Regression Constants

(m_{flo}) = 0.4452

(b_{flo}) = 0.4430

$$Q_{act} = m_{flo} \times \frac{\sqrt{\Delta H} \times T_{act}}{P_{act}} + b_{flo}$$

Appendix B

Calibration Certificates



TORONTO
 16975 Leslie Street
 Newmarket, ON L3Y 9A1
 Tel: (905) 952-3750
 Fax: (905) 952-3751

MONTREAL
 20800 Boul. Industriel
 Ste-Anne-de-Bellevue, QC H9X 0A1
 Tel: (514) 457-7280
 Fax: (514) 457-4329

CALGARY
 #209, 4615 112 Ave SE
 Calgary, AB T2C 5J3
 Tel: (403) 272-9332
 Fax: (403) 248-5194

VANCOUVER
 1282 Cliveden Av
 Delta, BC V3M 6G4
 Tel: (604) 254-9622
 Fax: (604) 254-3123

www.itm.com - information@itm.com

Calibration Certificate

Customer: *GHD Ltd.*

Certificate: C479807-00-01

Unit Identification

Manufacturer: Fluke
 Model: 1551A Ex
 Description: Stik Thermometer

Serial: 3520009
 Unit ID: THM-CAL-001

Calibration Date

Calibration Date: 3-Mar-2022
 Due Date: 3-Mar-2023

Calibration Conditions

Temperature: 22.8°C
 Humidity: 20 %
 Barometric Pressure: N/A

General Information

Remark: N/A

Standards Used

Unit ID	Manufacturer	Model	Cal Date	Due Date
CAL0124	Hart Scientific	1502A	20-Jun-2021	20-Jun-2022
CAL0125	Hart Scientific	5614	27-Feb-2020	27-Feb-2022
CAL0223	Ametek	RTC-158B	9-Nov-2021	9-Nov-2022

The calibration was performed using measurement standards traceable to the National Measurement Institute Standards (NMIS) part of the National Research Council of Canada (NRC) or the National Institute of Standards and Technology (NIST), or to accepted intrinsic standards or measurement, or is derived by ratio type self-calibration techniques. Measurement uncertainties given in this report are based on a coverage factor of $k=2$ corresponding to a confidence level of approximately 95%.

Calibrated by: *D. Gano*

Approved by:

Certificate: C479807-00-01
 Asset: ITM0003733

Calibration Certificate

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TORONTO 16975 Leslie Street Newmarket, ON L3Y 9A1 Tel: (905) 952-3750 Fax: (905) 952-3751	MONTRÉAL 20800 Boul. Industriel Ste-Anne-de-Bellevue, QC H9X 0A1 Tel: (514) 457-7280 Fax: (514) 457-4329	CALGARY #209, 4615 112 Ave SE Calgary, AB T2C 5J3 Tel: (403) 272-9332 Fax: (403) 248-5194	VANCOUVER 1282 Cliveden Av Delta, BC V3M 6G4 Tel: (604) 254-9622 Fax: (604) 254-3123
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www.itm.com - information@itm.com

Test Results

Procedure: Fluke Stik Thermometer /RTC-158B,1502,PRT Rev: 1.0

Data Type: As Found Results: Pass

<u>Test Description</u>	<u>True Value</u>	<u>Reading</u>	<u>Lower Limit</u>	<u>Upper Limit</u>	<u>Test Status</u>	<u>Exp Uncert</u>
0.020 °C		0.00 °C	-0.03 °C	0.07 °C	Pass	8.3e-003 °C
24.979 °C		24.98 °C	24.93 °C	25.03 °C	Pass	8.8e-003 °C
100.023 °C		100.02 °C	99.97 °C	100.07 °C	Pass	1.0e-002 °C
150.125 °C		150.09 °C	150.07 °C	150.18 °C	Pass	1.2e-002 °C

NIST Traceable Transfer Standard Calibration

Calibration Date: 05/17/2016
 Ambient Temp, °K: 295.5
 Amb Press, Atm: 1.0000

Orifice # FRM1218-
 Pri Std # LFE774300
 Manometer # FRM1218

By:
 Chk:

Std ΔH (inH ₂ O)	Manometer ΔH (inH ₂ O)	Actual Flow (alpm)	Calc Flow (alpm)	Difference* (%diff)
6.67	6.67	20.179	20.209	-0.15
5.86	5.86	18.988	18.970	0.09
5.10	5.10	17.733	17.727	0.03
4.39	4.39	16.490	16.479	0.07
3.73	3.73	15.233	15.224	0.06
3.12	3.12	13.964	13.962	0.02
2.56	2.56	12.683	12.688	-0.04
2.05	2.05	11.390	11.401	-0.10

**Manometer ΔH vs Act Flow
 Linear Regression Results:**
 m_{flo} = 0.4452
 b_{flo} = 0.4430
 r² = 1.0000

* all points must be within ± 2%

The MiniFlo calibration is performed with an NIST-traceable standard. Each unit has a unique pair of calibration constants derived from the calibration which are used to calculate the actual air flow rate at all ambient conditions. The unit's calibration should be recertified annually.

The actual flow rate is a function of the pressure drop across the device, the ambient temperature, and the ambient pressure. The relationship of these variables and the unique calibration constants ("m" and "b") for each device is presented in the following equation (Eq.A):

$$Q_{act} = m_{flo} \times \sqrt{\frac{\Delta H \times T_{act}}{P_{act}}} + b_{flo}$$

Q_{act} = actual flowrate, liters per min
 ΔH = manometer reading, inches of water
 T_{act} = ambient temperature, °K
 P_{act} = ambient pressure, atmospheres

CAUTION: The weather service, most airports, etc, reduce the atmospheric pressure to a common reference (sea level). The equation above requires the atmospheric pressure at the location where the MiniFlo is being used.

The equation below may be used to estimate the ambient atmospheric pressure at any elevation if the sea level pressure is known.

$$P_{act} = P_{sea} \times \left(1 - \frac{E}{145300} \right)^{5.25}$$

P_{act} = Ambient Atmospheric Pressure
 P_{sea} = Sea Level Atmospheric Pressure
 E = Site elevation, feet

Airmetrics

1940 Don St., Suite 300
 Springfield, OR 97477
 (541) 683-5420



INSTRUMENT CALIBRATION REPORT

Pine Environmental Services LLC

4911-99 Street NW
Edmonton, AB T6E 4Y1
Office: 780-643-2680
Fax: 780-468-3050

Pine Environmental Services, Inc.

Instrument ID 42944
Description TSI 964 Probe
Calibrated 9/7/2022 2:21:34PM

Manufacturer Tsi	State Certified
Model Number 964	Status Pass
Serial Number/ Lot Number P18250012	Temp °C 21
Location Edmonton	Humidity % 20
Department	

Calibration Specifications

Group # 1
Group Name Functional Test
Test Performed: Yes **As Found Result:** Pass **As Left Result:** Pass

Test Instruments Used During the Calibration

(As Of Cal Entry Date)

<u>Test Standard ID</u>	<u>Description</u>	<u>Manufacturer</u>	<u>Model Number</u>	<u>Serial Number / Lot Number</u>	<u>Next Cal Date / Expiration Date / Opened Date</u>

Notes about this calibration

Calibration Result Calibration Successful
Who Calibrated Mateo Pipe

All instruments are calibrated by Pine Environmental Services LLC according to the manufacturer's specifications, but it is the customer's responsibility to calibrate and maintain this unit in accordance with the manufacturer's specifications and/or the customer's own specific needs.

Notify Pine Environmental Services LLC of any defect within 24 hours of receipt of equipment
Please call 800-301-9663 for Technical Assistance



INSTRUMENT CALIBRATION REPORT

Pine Environmental Services LLC

4911-99 Street NW
Edmonton, AB T6E 4Y1
Office: 780-643-2680
Fax: 780-468-3050

Pine Environmental Services, Inc.

Instrument ID 19822
Description TSI 9565 VelociCalc Display
Calibrated 9/7/2022 2:20:56PM

Manufacturer Tsi	State Certified
Model Number 9565P	Status Pass
Serial Number/ Lot Number 9565P1232014	Temp °C 21
Location Edmonton	Humidity % 20
Department	

Calibration Specifications

Group # 1
Group Name Functional, Pressure Test and Download
Test Performed: Yes **As Found Result: Pass** **As Left Result: Pass**

Test Instruments Used During the Calibration

<u>Test Standard ID</u>	<u>Description</u>	<u>Manufacturer</u>	<u>Model Number</u>	<u>Serial Number / Lot Number</u>	<u>(As Of Cal Entry Date)</u> <u>Next Cal Date / Expiration Date</u> <u>Last Cal Date/ Opened Date</u>
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Notes about this calibration

Calibration Result Calibration Successful
Who Calibrated Mateo Pipe

All instruments are calibrated by Pine Environmental Services LLC according to the manufacturer's specifications, but it is the customer's responsibility to calibrate and maintain this unit in accordance with the manufacturer's specifications and/or the customer's own specific needs.

Notify Pine Environmental Services LLC of any defect within 24 hours of receipt of equipment
Please call 800-301-9663 for Technical Assistance

INSTRUMENT CALIBRATION REPORT



Advanced Labs, Inc.

Pine Environmental Services, Inc

Instrument ID 19822
 Description TSI 9565P VelociCalc
 Calibrated 9/29/2021

Manufacturer TSI	Classification
Model Number 9565P	Status pass
Serial Number 9565P1232014	Frequency Yearly
Location New Jersey	Department Lab
Temp 80	Humidity 24

Calibration Specifications

Group # 1	Range Acc % 0.0000						
Group Name Barometric Pressure	Reading Acc % 2.0000						
Stated Accy Pct of Reading	Plus/Minus 0.000						
<u>Nom In Val / In Val</u>	<u>In Type</u>	<u>Out Val</u>	<u>Out Type</u>	<u>Fnd As</u>	<u>Lft As</u>	<u>Dev%</u>	<u>Pass/Fail</u>
30.000 / 29.710	inHg	29.710	inHg	29.690	29.710	0.00%	Pass

Group # 2	Range Acc % 0.0000						
Group Name Differential Pressure	Reading Acc % 1.0000						
Stated Accy Pct of Reading	Plus/Minus 0.000						
<u>Nom In Val / In Val</u>	<u>In Type</u>	<u>Out Val</u>	<u>Out Type</u>	<u>Fnd As</u>	<u>Lft As</u>	<u>Dev%</u>	<u>Pass/Fail</u>
-4.000 / -4.000	inH2O	-4.000	inH2O	-4.030	-4.030	0.75%	Pass
4.000 / 4.000	inH2O	4.000	inH2O	4.040	4.040	1.00%	Pass
8.000 / 8.000	inH2O	8.000	inH2O	8.060	8.060	0.75%	Pass
12.000 / 12.000	inH2O	12.000	inH2O	12.050	12.050	0.42%	Pass

Test Instruments Used During the Calibration

<u>Test Instrument ID</u>	<u>Description</u>	<u>Manufacturer</u>	<u>Serial Number</u>	<u>(As Of Cal Entry Date)</u>	
				<u>Last Cal Date</u>	<u>Next Cal Date</u>
DWYER	Dwyer 477AV-1 Digital	Dwyer	005PM2	10/12/2020	10/12/2021
477AV-1	Manometer				
OMEGA	Omega HX93AC/DP25-E	Omega Engineering	1010368 035025	11/25/2020	11/25/2022
HX93AC/DP25-E			035026		

Notes about this calibration

Calibration Result Calibration Successful
 Who Calibrated David Galego

Advanced Labs, Inc. hereby certifies that this instrument is calibrated and functions to meet the manufacture's specifications using NIST traceable standards, or is derived from accepted values of physical constants.



INSTRUMENT CALIBRATION REPORT

Pine Environmental Services LLC

4911-99 Street NW
Edmonton, AB T6E 4Y1
Office: 780-643-2680
Fax: 780-468-3050

Pine Environmental Services, Inc.

Instrument ID 18493
Description Manometer 477
Calibrated 9/7/2022 11:52:15AM

Manufacturer Dwyer	State Certified
Model Number 477-1-FM	Status Pass
Serial Number/ Lot Number N18W	Temp °C 21
Location Edmonton	Humidity % 20
Department	

Calibration Specifications

Group # 1
Group Name Functional Test
Test Performed: Yes **As Found Result: Pass** **As Left Result: Pass**

Test Instruments Used During the Calibration

(As Of Cal Entry Date)

<u>Test Standard ID</u>	<u>Description</u>	<u>Manufacturer</u>	<u>Model Number</u>	<u>Serial Number / Lot Number</u>	<u>Next Cal Date / Expiration Date</u>
-------------------------	--------------------	---------------------	---------------------	-----------------------------------	--

Last Cal Date/ Opened Date

Notes about this calibration

Calibration Result Calibration Successful
Who Calibrated Mateo Pipe

All instruments are calibrated by Pine Environmental Services LLC according to the manufacturer's specifications, but it is the customer's responsibility to calibrate and maintain this unit in accordance with the manufacturer's specifications and/or the customer's own specific needs.

Notify Pine Environmental Services LLC of any defect within 24 hours of receipt of equipment
Please call 800-301-9663 for Technical Assistance

INSTRUMENT CALIBRATION REPORT



Advanced Labs, Inc.

Pine Environmental Services, Inc

Instrument ID 18493
 Description Dwyer 477-1-FM Digital Manometer
 Calibrated 11/16/2021

Manufacturer Dwyer Instruments, Inc. Model Number 477-1-FM Serial Number N18W Location New Jersey Temp 73	Classification Status pass Frequency Yearly Department Lab Humidity 21
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Calibration Specifications

Group # 1	Range Acc % 0.0000
Group Name Differential Pressure	Reading Acc % 1.0000
Stated Accy Pct of Reading	Plus/Minus 0.00

Nom In Val / In Val	In Type	Out Val	Out Type	Fnd As	Lft As	Dev%	Pass/Fail
-4.00 / -4.00	inH2O	-4.00	inH2O	-3.99	-3.99	-0.25%	Pass
4.00 / 4.00	inH2O	4.00	inH2O	3.98	3.98	-0.50%	Pass
8.00 / 8.00	inH2O	8.00	inH2O	7.98	7.98	-0.25%	Pass
12.00 / 12.00	inH2O	12.00	inH2O	11.97	11.97	-0.25%	Pass

Test Instruments Used During the Calibration

Test Instrument ID	Description	Manufacturer	Serial Number	(As Of Cal Entry Date)	
				Last Cal Date	Next Cal Date
DWYER 477AV-1	Dwyer 477AV-1 Digital Manometer	Dwyer	005PM2	10/25/2021	10/25/2022

Notes about this calibration

Calibration Result Calibration Successful
 Who Calibrated David Galego

Advanced Labs, Inc. hereby certifies that this instrument is calibrated and functions to meet the manufacture's specifications using NIST traceable standards, or is derived from accepted values of physical constants.



about GHD

GHD is one of the world's leading professional services companies operating in the global markets of water, energy and resources, environment, property and buildings, and transportation. We provide engineering, environmental, and construction services to private and public sector clients.

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