455 Phillip Street, Unit 100A Waterloo, Ontario N2L 3X2 Canada ahd.com



Our ref: 044985

15 March 2024

Mr. Michael Parker Vice-President, Canadian Environmental Compliance Clean Harbors Canada Inc. 4090 Telfer Road Rural Route #1 Corunna, ON N0N 1G0

April to December 2023 Geotechnical Inspections and Monitoring Summary Cell 20-1, Clean Harbors Lambton Landfill Site Corunna

Dear Mr. Parker

### 1. General

The letter presents a summary of the geotechnical inspection and monitoring program for Cell 20-1 that was carried out in 2023. This monitoring program was developed on behalf of Clean Harbors by GHD Limited (GHD). The purpose of the inspection and monitoring program was to inspect the condition of the Cell 20-1 excavation side slopes on an on-going basis, and to ensure that these side slopes remained in a stable condition during 2023. A previous summary letter was prepared for the 2022 inspections.

Recommendations for the monitoring program were provided in the GHD letter title "Response to Geotechnical Peer Review and Updated Assessment- Cell 20-1 Slope Issue", dated March 2, 2022. These recommendations consisted of the following items:

- Installation of survey pins at the locations as shown on Figure 1. Survey pin coordinates (northing, easting, and elevation) are to be obtained on a weekly basis by Clean Harbors staff.
- Vibrating wire piezometric (VWP) data from the two nested VWPs are collected on a quarterly basis.
- The Geotechnical Engineer visits the site and conducts a visual inspection of the exposed slopes on a quarterly basis, starting in April or May of 2022. These visual inspections will continue until waste placement has reached an elevation where the exposed slopes are no longer a stability concern (slope stability factor of safety greater than 1.5, estimated based on the modelling presented in the March 2, 2022 letter, approximately when the waste level has reached the upper bench of 190 m asl), confirmed by visual and survey pin monitoring.
- The results of the inspection and data collection will be summarized in Clean Harbor's annual report.
- The VWPs will be decommissioned when the exposed slopes are no longer a stability concern. Decommissioning will consist of removing the data loggers, as these VWPs were installed in fully grouted boreholes.

→ The Power of Commitment

Monitoring program details were summarized in a letter to Clean Harbors dated April 19, 2022, and the monitoring program commenced in April 2022. The 2022 monitoring and inspection program for Cell 20-1 was carried out in accordance with the recommendations provided in the April 19, 2022 GHD letter.

Based on detailed slope stability modelling completed and summary reports produced by GHD, and peer review comments of these reports from Thurber Engineering Ltd., GHD and Thurber agreed that a minimum factor of safety (FS) of 1.3 should be targeted and maintained for the exposed north, east, and south slopes of the cell. The following remedial measures were to be implemented in 2022 to achieve the targeted FS:

- The North and South slopes require additional buttressing with either cement kiln dust (CKD) material or clay to achieve an FS of 1.3. The dimensions and elevations of the required buttressing were provided in the March 2, 2022 letter.
- The East slope requires raising the water level (flooding) in the base of Cell 20-1 to improve the FS to 1.3. The target water level is 185.3 m asl.

The water level in Cell 20-1 was not raised in 2022, as it was not practical to do this before the north and south buttresses were constructed.

## 2. Geotechnical Slope Inspection Summary

A senior Geotechnical Engineer inspected Cell 20-1 side slopes on April 19, June 21, September 14, and December 19, 2023. Photographic logs from the inspection dates are attached. A brief summary of our observations is provided below.

#### <u>April 19, 2023</u>

- Dry site conditions.
- All side slopes were visually stable.
- The shallow groundwater seepage zone in the southeast corner of the cell was dry.

#### <u>June 21, 2023</u>

- Dry site conditions.
- All side slopes were visually stable.
- The shallow groundwater seepage zone in the southeast corner of the cell was dry.

#### September 14, 2023

- Dry site conditions.
- All side slopes were visually stable.
- The southeast corner shows some sloughing from the top surface, but remains stable.

#### December 19, 2023

- Dry site conditions, with some surficial snow
- All side slopes were visually stable.
- Some evidence of groundwater seepage from the shallow seepage zone in the southeast corner of the cell.
- Minor shallow cracks running along the top of the east side wall, likely due to surficial sloughing and weathering of the exposed slope.

## 3. Survey Pin Monitoring

GHD recommended specific locations for surface movement monitoring around the permitter of the cell, in our March 2, 2022 letter. Eighteen locations (SP-1 to SP-18) were recommended as shown on Figure 1. Survey pin locations SP-11, SP-15, SP-16, SP-17, and SP-18 were removed from the surveying program in 2023, as SP-11, SP, SP-15, SP-16, and SP-17 were located in the now filled western half of Cell 20-1, and SP-18 is not accessible due to waste placement.

A baseline survey reading was established for pins SP-7 to SP-18 on May 16, 2022. However, pins SP-1 to SP-5 became inaccessible at that time as waste filling commenced in early 2022 in the western portion of Cell 20-1. Subsequent survey readings for survey pins SP-6 to SP-18 were compared to the May 2022 baseline readings to determine the magnitude of the pin movements over time.

Survey pin readings were obtained by Clean Harbors staff on a generally weekly basis. The survey pin monitoring frequency was changed to once per month, beginning in March 2023, after the construction of the lower north and south side slope buttresses, as discussed in the March 14, 2022 letter regarding monitoring frequencies. Survey pin readings in 2023 continue to show stable conditions at the top of the side wall slopes. The 2023 readings are summarized in Table 1.

## 4. Piezometric Readings

VWP boreholes VWP-01 and VWP-02 were instrumented with vibrating wire piezometers (VWPs) and data loggers. These piezometers were installed to targeted depths based on the results of the geotechnical investigations completed in December 2021. The VWPs were installed in fully grouted boreholes using a cement bentonite slurry. Each piezometer has a thin wire cable that extends from the piezometer tip up to the ground surface, and each cable is connected to a data logger. The piezometers record the piezometric head at the piezometer tip depth. Data is recorded on a daily basis. The piezometers were installed at the following depths:

- VWP-01: 14.0 m, 21.6 m, and 41.5 m bgs; and
- VWP-02: 14.0 m, 29.0 m, and 41.5 m bgs.

Data plots of the piezometric surface collected to date are shown on Figures 2 and 3. The piezometric head pressures show a gradually increasing trend, due to waste placement and gradual stabilizing conditions. VWP-01 readings have shown a gradual steady increase due to the waste filling in the western half of Cell 20-1, with current piezometric reading just above elevation 199.0 m asl. The surface data logger storage box was hit by a pickup truck in the fall of 2023, causing the data loggers to become disconnected from the VWPs. GHD reconnected the data loggers in December 2023. Piezometric head readings for VWP-01 are shown on Figure 2.

VWP-02 is located on the east wall of the eastern half of Cell 20-1, which is currently being filled with waste. The lower piezometer is functioning well at VWP-02, and shows a slowly rising piezometric head of around 198.5 m asl. The upper two piezometers have shown less stable readings, but are reading slightly lower piezometric pressures than the deeper piezometer. Piezometric head for VWP-02 are shown on Figure 3.

Additional data from the piezometers will be collected on a quarterly basis in 2024, until waste placement in the eastern portion of Cell 20-1 is at about elevation 190 m amsl, in accordance with the recommendations provided in the April 19, 2022 letter.

### 5. East Side Wall Ramp Removal

Clean Harbors may want to remove the existing ramp on the east side wall of Cell 20-1 to increase the capacity of the cell during waste filling. Based on the stable side wall conditions observed during 2022 and 2023, and the modelling work completed as presented in the geotechnical reports, and the March 2, 2022 recommendations, the removal of this ramp will not impact the slope stability of the east side wall. To maintain a factor of safety of 1.3, a lower buttress should be kept in place, similar to the one constructed on the north side wall. The lower buttress should have a top elevation of 188.3 m, and should be a minimum width of 15 m across the top of the buttress.

# 6. 2023 Monitoring and Inspection Conclusions and Recommendations

The 2022 and 2023 monitoring and inspection program for Cell 20-1 has been carried out in accordance with the recommendations provided in the April 19, 2022 GHD letter. The remedial buttresses recommended in the March 2, 2022 GHD letter, for the north and south slopes, have been constructed. Landfilling commenced in the eastern half of Cell 20-1 in June 2023.

The monitoring and inspection program will be continued in 2024. The elements of the program will be:

- The Geotechnical Engineer will visit the site and conduct a visual inspection of the exposed slopes on a quarterly basis. These visual inspections will be continued until waste placement has reached an elevation where the exposed slopes are no longer a stability concern (FS greater than 1.5, estimated based on the modelling presented in this letter, approximately when the waste level has reached the upper bench of 190 m asl), confirmed by visual and survey pin monitoring.
- The survey pin monitoring frequency was changed to once per month, beginning in March 2023. Survey pin readings have shown stable conditions at the top of the side wall slopes. Survey pin locations SP-11, SP-15, SP-16, SP-17, and SP-18 have been removed from the surveying program in 2023.
- The vibrating wire piezometric data will continue to be collected on a quarterly basis.
- The results of the inspection and data collection will be summarized in Clean Harbor's annual report.
- The VWPs will be decommissioned when the exposed slopes are no longer a stability concern. Decommissioning will consist of removing the data loggers, as these VWPs were installed in fully grouted boreholes.
- GHD has advised Clean Harbors to restrict heavy construction equipment from using the east and south perimeter gravel road, due to the ongoing sloughing of the upper side wall slopes in this area, and the narrow perimeter road in the southeast corner.

Regards

Bruce Polan, M.A.Sc., P. Eng. Engineering Leader, Materials Technology

+1 519 340-4139 bruce.polan@ghd.com

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Bun Dam

Brian Dermody, P.Eng. Project Manager

+1 519-340-4192 brian.dermody@ghd.com Encl. Geotechnical Inspection Photo Log for 2023 Inspections Figure 1 - Survey Pin Locations Figure 2 and 3 - Vibrating Wire Piezometric Readings Table 1 - 2023 Survey Pin Measurements



Photo 1- Cell 20-1 looking south, April 19, 2023.



Photo 2- East side wall of Cell 20-1, April 19, 2023.





Photo 3- Cell 20-1 Southeast corner, April 19, 2023.



Photo 4- North side wall, April 19, 2023.





Photo 5- South side wall, April 19, 2023.



Photo 6- Cell 20-1, East side wall, April 19, 2023.





Photo 7- Cell 20-1, South side wall, June 21, 2023.



Photo 8- North side wall, start of waste placement, June 21, 2023.





Photo 9- Cell 20-1, East side wall, looking north, June 21, 2023.



Photo 10- Cell 20-1, East and North side wall, looking east, June 21, 2023.





Photo 11- Cell 20-1, looking south. September 14, 2023.



Photo 12- Cell 20-1, looking north, September 14, 2023..





Photo 13- Cell 20-1, southeast corner, September 14, 2023.

![](_page_11_Picture_2.jpeg)

Photo 14- South side wall, looking west. Side wall sloughing, but stable, September 14, 2023.

![](_page_11_Picture_4.jpeg)

![](_page_12_Picture_0.jpeg)

Photo 15- Cell 20-1, North side wall, looking west, December 19, 2023.

![](_page_12_Picture_2.jpeg)

Photo 16- Cell 20-1 Southeast corner south side wall, looking west. Some sloughing and seepage from the southeast corner, December 19, 2023

![](_page_12_Picture_4.jpeg)

![](_page_13_Picture_0.jpeg)

Photo 17- Cell 20-1 East side wall, December 19, 2023.

![](_page_13_Picture_2.jpeg)

Photo 18- Cell 20-1, East side wall, December 19, 2023.

![](_page_13_Picture_4.jpeg)

![](_page_14_Picture_0.jpeg)

Photo 19- Cell 20-1, looking north, December 19, 2023.

![](_page_14_Picture_3.jpeg)

![](_page_15_Picture_0.jpeg)

Photo 20- Cell 20-1 East side wall, looking south. Note minor cracking along the top of the slope, due to surficial sloughing, December 19, 2023

![](_page_15_Picture_2.jpeg)

![](_page_16_Picture_0.jpeg)

Filename: L'ICADidrawingsi44006s/44985/44985-LTRi44985-00(LTR038)/44985-00(LTR038)/CI-WA002.DWG Plot Date: 27 January 2023 9:26 AM

### LEGEND

- **VWP-01** VWP - VIBRATING WIRE PIEZOMETER
- **SP SURVEY PIN**  $\times$  SP1
- × SP6 WEEKLY MONITORING LOCATION

SP6, SP7, SP8, SP9, SP10, SP12, SP13, SP14, SP18

SOURCE

AERIAL DRONE PHOTO COMPLETED BY GHD AUGUST 17, 2022

CLEAN HARBORS CANADA, INC. LAMBTON COUNTY, ONTARIO

Project No. 44985 Date Jan 26, 2023

SURVEY PIN LOCATIONS

Figure 1

![](_page_17_Figure_0.jpeg)

![](_page_17_Picture_1.jpeg)

Figure 2 – VWP-1 Piezometric Elevation Readings Cell 20-1

![](_page_18_Figure_0.jpeg)

![](_page_18_Picture_1.jpeg)

Figure 3 – VWP-2 Piezometric Elevation Readings Cell 20-1

![](_page_19_Picture_0.jpeg)

#### Table 1 2023 Survey Pin Measurements Cell 20-1 Clean Harbors Lambton Facility Corunna, Ontario

						Januar	y 9, 2023			January 17, 2023							January 24, 2023							
	2023 Baseline Readings				Changes from Baseline Readings						Changes from Baseline Readings						Changes from Baseline Readings							
SULVEY PIN	Northing	Easting	Top of Stake (masl)	Northing	Easting	Top of Stake (masl)	Northing Net Change (m)	Easting Net Change (m)	Elevation Net Change (m)	Northing	Easting	Top of Stake (masl)	Northing Net Change (m)	Easting Net Change (m)	Elevation Net Change (m)	Northing	Easting	Top of Stake (masl)	Northing Net Change (m)	Easting Net Change (m)	Elevation Net Change (m)			
SP-6	4747712.72	394291.102	200.647	4747712.743	394291.029	200.633	0.023	-0.073	-0.014	4747712.714	394291.059	200.648	-0.006	-0.043	0.001	4747712.673	394291.07	200.639	-0.047	-0.032	-0.008			
SP-7	4747914.83	394277.124	201.578	4747914.723	394276.988	201.559	-0.107	-0.136	-0.019	4747914.78	394277.014	201.551	-0.050	-0.110	-0.027	4747914.764	394277.046	201.55	-0.066	-0.078	-0.028			
SP-8	4747810.202	394339.018	200.684	Survey Pin Dama	ged					Survey Pin Damag	jed					Survey Pin Damag	jed							
SP-9	4747905.076	394341.078	200.784	4747905.099	394341.007	200.822	0.023	-0.071	0.038	4747905.15	394341.021	200.801	0.074	-0.057	0.017	4747905.131	394340.97	200.793	0.055	-0.108	0.009			
SP-10	4747725.924	394336.102	200.523	4747725.935	394336.055	200.512	0.011	-0.047	-0.011	4747725.877	394336.074	200.545	-0.047	-0.028	0.022	4747725.944	394336.076	200.539	0.020	-0.026	0.016			
SP-11	4747714.162	394198.887	201.213	Removed from Su	Irvey Program					Removed from Su	rvey Program					Removed from Su	rvey Program							
SP-12	4747863.589	394340.941	201.118	4747863.577	394340.898	201.123	-0.012	-0.043	0.005	4747863.583	394340.906	201.122	-0.006	-0.035	0.004	4747863.635	394340.852	201.122	0.046	-0.089	0.004			
SP-13	4747764.461	394337.198	200.623	4747764.519	394337.16	200.609	0.058	-0.038	-0.014	4747764.528	394337.23	200.627	0.067	0.032	0.004	4747764.574	394337.275	200.63	0.113	0.077	0.007			
SP-14	4747713.000	394273.760	200.306	4747712.823	394273.645	200.306	-0.177	-0.115	0.000	4747712.954	394273.647	200.309	-0.046	-0.113	0.003	4747712.968	394273.61	200.312	-0.032	-0.150	0.006			
SP-15	4747856.264	394238.582	192.698	Removed from SL	irvey Program					Removed from Su	rvey Program					Removed from Su	rvey Program							
SP-16	4747819.478	394241.499	192.491	Removed from Su	Irvey Program					Removed from Su	rvey Program					Removed from Su	rvey Program							
SP-17	4747770.751	394246.636	192.669	Removed from Su	Irvey Program					Removed from Su	rvey Program			1		Removed from Su	rvey Program	1						
SP-18	4747729.431	394300.66	191.677	4747729.449	394300.622	191.671	0.018	-0.038	-0.006	Not Surveyed- cou	Id not access					Not Surveyed- cou	Id not access							

	1		Febru	ary 10, 2023					March 3	0, 2023					April 27	2023			May 29, 2023						
	Changes from Baseline Readings							Changes from Baseline Readings						Changes from Baseline Readings						Changes from Baseline Readings					
Survey Pin	Northing	Easting	Top of Stake (masl)	Northing Net Change (m)	Easting Net Change (m)	Elevation Net Change (m)	Northing	Easting	Top of Stake (masi)	Northing Net Change (m)	Easting Net Change (m)	Elevation Net Change (m)	Northing	Easting	Top of Stake (masl)	Northing Net Change (m)	Easting Net Change (m)	Elevation Net Change (m)	Northing	Easting	Top of Stake (masi)	Northing Net Change (m)	Easting Net Change (m)	Elevation Net Change (m)	
SP-6	4747712.554	394291.056	200.63	-0.166	-0.046	-0.017	4747712.754	394291.127	200.625	0.034	0.025	-0.022	4747712.791	394291.059	200.636	0.071	-0.043	-0.011	4747712.727	394290.987	200.647	0.007	-0.115	0.000	
SP-7	4747914.734	394277.019	201.543	-0.096	-0.105	-0.035	4747914.713	394277.005	201.567	-0.117	-0.119	-0.011	4747914.727	394277.028	201.567	-0.103	-0.096	-0.011	4747914.652	394276.962	201.563	-0.178	-0.162	-0.015	
SP-8	4747824.754	394338.769	200.821	Survey Pin Dama	aged		4747824.724	394338.804	200.866	SP-8 Reset. Nev	Baseline Readin	g,	4747824.684	394338.764	200.859	-0.040	-0.040	-0.007	4747824.837	394338.758	200.856	0.113	-0.046	-0.010	
SP-9	4747905.213	394340.878	200.797	0.137	-0.200	0.013	4747905.324	394340.76	200.848	0.248	-0.318	0.064	4747905.038	394341.029	200.759	SP-9 Reset. Nev	v Baseline Readin	ig,	4747905.063	394341.007	200.76	0.025	-0.022	0.001	
SP-10	4747726.035	394336.021	200.53	0.111	-0.081	0.007	4747725.941	394336.034	200.536	0.017	-0.068	0.013	4747725.894	394336.053	200.511	-0.030	-0.049	-0.012	4747725.970	394336.078	200.531	0.046	-0.024	0.008	
SP-11	Removed from	Survey Program					Removed from SL	rvey Program					Removed from Su	rvey Program					Removed from Su	rvey Program					
SP-12	4747863.578	394340.838	201.131	-0.011	-0.103	0.013	4747863.665	394340.853	201.138	0.076	-0.088	0.020	4747863.570	394340.958	201.141	-0.019	0.017	0.023	4747863.663	394340.893	201.123	0.074	-0.048	0.005	
SP-13	4747764.566	394337.099	200.638	0.105	-0.099	0.015	4747764.537	394337.052	200.643	0.076	-0.146	0.020	4747764.478	394337.112	200.634	0.017	-0.086	0.011	4747764.538	394337.161	200.644	0.077	-0.037	0.021	
SP-14	4747712.973	394273.586	200.299	-0.027	-0.174	-0.007	4747712.915	394273.674	200.307	-0.085	-0.086	0.001	4747712.959	394273.577	200.294	-0.041	-0.183	-0.012	4747712.994	394273.656	200.293	-0.006	-0.104	-0.013	
SP-15	Removed from Survey Program			Removed from Su	rvey Program					Removed from Su	rvey Program					Removed from Survey Program									
SP-16	Removed from Survey Program					Removed from Survey Program					Removed from Survey Program						Removed from Survey Program								
SP-17	Removed from Survey Program					Removed from Survey Program						Removed from Survey Program					Removed from Survey Program								
SP-18	Not Surveyed- could not access						Not Surveyed- cor	uld not access					Not Surveyed- could not access						Not Surveyed- could not access						

			Jun	e 21, 2023			July 28, 2023						August 29, 2023							September 28, 2023						
	Changes from Baseline Readings							Changes from Baseline Readings						Changes from Baseline Readings						Changes from Baseline Readings						
Survey Pin	Northing	Easting	Top of Stake (masi)	Northing Net Change (m)	Easting Net Change (m)	Elevation Net Change (m)	Northing	Easting	Top of Stake (masl)	Northing Net Change (m)	Easting Net Change (m)	Elevation Net Change (m)	Northing	Easting	Top of Stake (masl)	Northing Net Change (m)	Easting Net Change (m)	Elevation Net Change (m)	Northing	Easting	Top of Stake (masl)	Northing Net Change (m)	Easting Net Change (m)	Elevation Net Change (m)		
SP-6	4747712.618	394290.902	200.646	-0.102	-0.200	-0.001	4747712.780	394290.922	200.642	0.060	-0.180	-0.005	4747712.701	394290.832	200.608	-0.019	-0.270	-0.039	4747712.808	394291.024	200.641	0.088	-0.078	-0.006		
SP-7	4747914.820	394276.992	201.568	-0.010	-0.132	-0.010	4747914.657	394277.039	201.564	-0.173	-0.085	-0.014	4747914.621	394277.105	201.544	-0.209	-0.019	-0.034	Stake Damaged							
SP-8	4747824.739	394338.755	200.869	0.015	-0.049	0.003	4747824.699	394338.752	200.863	-0.025	-0.052	-0.003	4747824.673	394338.868	200.859	-0.051	0.064	-0.007	4747824.77	394338.741	200.862	0.046	-0.063	-0.004		
SP-9	4747905.051	394341.048	200.755	0.013	0.019	-0.004	4747905.029	394340.935	200.748	-0.009	-0.094	-0.011	4747905.015	394341.067	200.722	-0.023	0.038	-0.037	4747905.034	394340.995	200.761	-0.004	-0.034	0.002		
SP-10	4747725.915	394336.056	200.543	-0.009	-0.046	0.020	4747725.892	394336.024	200.560	-0.032	-0.078	0.037	4747725.838	394336.059	200.548	-0.086	-0.043	0.025	4747725.933	394335.992	200.551	0.009	-0.110	0.028		
SP-11	Removed from	Survey Program	1				Removed from Su	rvey Program					Removed from Su	Irvey Program					Removed from Sur	vey Program						
SP-12	4747863.541	394340.909	201.153	-0.048	-0.032	0.035	4747863.576	394340.934	201.149	-0.013	-0.007	0.031	4747863.502	394340.913	201.123	-0.087	-0.028	0.005	4747863.602	394340.838	201.151	0.013	-0.103	0.033		
SP-13	4747764.487	394337.12	200.653	0.026	-0.078	0.030	4747764.393	394337.199	200.657	-0.068	0.001	0.034	4747764.394	394337.225	200.628	-0.067	0.027	0.005	4747764.537	394337.076	200.637	0.076	-0.122	0.014		
SP-14	4747712.958	394273.633	200.321	-0.042	-0.127	0.015	4747712.925	394273.637	200.311	-0.075	-0.123	0.005	4747712.935	394273.644	200.280	-0.065	-0.116	-0.026	4747712.963	394273.64	200.320	-0.037	-0.120	0.014		
SP-15	Removed from	Survey Program	1				Removed from Su	rvey Program					Removed from Su	Irvey Program					Removed from Sur	vey Program						
SP-16	Removed from Survey Program						Removed from Survey Program						Removed from Survey Program						Removed from Sur	vey Program						
SP-17	Removed from Survey Program						Removed from Survey Program					-	Removed from Survey Program F					Removed from Sur	vey Program		-					
SP-18	Not Accessible						Not Accessible N						Not Accessible No						Not Accessible							

GHD 44985 Table 1 and 2- 2023 and 2024 CH Survey Pin Results xisx

![](_page_20_Picture_0.jpeg)

2023 Survey Pin Measurements Cell 20-1 Clean Harbors Lambton Facility Corunna, Ontario

			Octol	oer 25, 2023					Novembe	r 30, 2023			December 19, 2023							January 29, 2024						
	Changes from Baseline Readings								Changes from Baseline Readings					Changes from Baseline Readings						Changes from Baseline Readings						
Survey Pin	Northing	Easting	Top of Stake (masl)	Northing Net Change (m)	Easting Net Change (m)	Elevation Net Change (m)	Northing	Easting	Top of Stake (masi)	Northing Net Change (m)	Easting Net Change (m)	Elevation Net Change (m)	Northing	Easting	Top of Stake (masl)	Northing Net Change (m)	Easting Net Change (m)	Elevation Net Change (m)	Northing	Easting	Top of Stake (masl)	Northing Net Change (m)	Easting Net Change (m)	Elevation Net Change (m)		
SP-6	4747712.798	394291.045	200.637	0.078	-0.057	-0.010	4747712.694	394290.998	200.652	-0.026	-0.104	0.005	4747712.725	394290.911	200.634	0.005	-0.191	-0.013	4747712.636	394290.896	200.644	-0.084	-0.206	-0.003		
SP-7	Stake Damaged						Stake Damaged						4747914.692	394277.033	201.534	SP-7 Reset on D	ec 19, 2023		4747914.665	394276.987	201.542	-0.027	-0.046	0.008		
SP-8	4747824.772	394338.764	200.870	0.048	-0.040	0.004	4747824.723	394339.017	200.858	-0.001	0.213	-0.008	4747824.756	394338.758	200.885	0.032	-0.046	0.019	4747824.739	394338.838	200.896	0.015	0.034	0.030		
SP-9	4747905.047	394341.011	200.754	0.009	-0.018	-0.005	4747905.055	394341.004	200.752	0.017	-0.025	-0.007	4747905.044	394341.011	200.729	0.006	-0.018	-0.030	4747905.031	394341.026	200.755	-0.007	-0.003	-0.004		
SP-10	4747725.903	394335.975	200.539	-0.021	-0.127	0.016	4747725.896	394336.022	200.527	-0.028	-0.080	0.004	4747725.935	394335.969	200.555	0.011	-0.133	0.032	4747725.914	394335.946	200.539	-0.010	-0.156	0.016		
SP-11	Removed from S	Survey Program	1				Removed from Sur	rvey Program					Removed from Su	rvey Program					Removed from Su	rvey Program						
SP-12	4747863.597	394340.857	201.144	0.008	-0.084	0.026	4747863.536	394340.901	201.14	-0.053	-0.040	0.022	4747863.644	394340.936	201.143	0.055	-0.005	0.025	4747863.635	394340.928	201.142	0.046	-0.013	0.024		
SP-13	4747764.464	394337.153	200.644	0.003	-0.045	0.021	4747764.488	394337.194	200.646	0.027	-0.004	0.023	4747764.438	394337.156	200.642	-0.023	-0.042	0.019	4747764.438	394337.111	200.643	-0.023	-0.087	0.020		
SP-14	4747712.930	394273.663	200.308	-0.070	-0.097	0.002	4747712.896	394273.618	200.311	-0.104	-0.142	0.005	4747712.951	394273.611	200.298	-0.049	-0.149	-0.008	4747712.944	394273.688	200.306	-0.056	-0.072	0.000		
SP-15	Removed from S	Survey Program	1				Removed from Sur	rvey Program					Removed from Su	rvey Program					Removed from Su	rvey Program						
SP-16	Removed from S	Survey Program	1				Removed from Sur	rvey Program					Removed from Su	rvey Program					Removed from Su	rvey Program						
SP-17	Removed from S	Survey Program	n				Removed from Sur	rvey Program					Removed from Su	rvey Program					Removed from Su	rvey Program						
SP-18	Not Accessible						Not Accessible						Not Accessible						Not Accessible							

			Febru	ary 15, 2024											
		Changes from Baseline Readings													
Survey Pin	Northing	Easting	Top of Stake (masl)	Northing Net Change (m)	Easting Net Change (m)	Elevation Net Change (m)									
SP-6	4747712.693	394290.873	200.630	-0.027	-0.229	-0.017									
SP-7	4747914.797	394277.149	201.545	0.105	0.116	0.011									
SP-8	4747824.758	394338.828	200.917	0.034	0.024	0.051									
SP-9	4747904.954	394340.988	200.756	-0.084	-0.041	-0.003									
SP-10	4747725.937	394335.979	200.552	0.013	-0.123	0.029									
SP-11	Removed from S	Survey Program													
SP-12	4747863.565	394340.871	201.149	-0.024	-0.070	0.031									
SP-13	4747764.439	394337.141	200.621	-0.022	-0.057	-0.002									
SP-14	4747712.941	394273.626	200.302	-0.059	-0.134	-0.004									
SP-15	Removed from S	urvey Program													
SP-16	Removed from S	Survey Program													
SP-17	Removed from S	Survey Program													
SP-18	Not Accessible														