

September 8, 2022

Ms. Cindy Koepke
Wisconsin Department of Natural Resources
3911 Fish Hatchery Road
Fitchburg, WI 53711

Re: DNR BRRTS Activity #02-33-582970
Landfill Gas Monitoring, Darlington City Historic Landfill
149 Wells Street, Darlington, WI
Monitoring Results, June through August 2022

Dear Ms. Koepke:

Ayres Associates Inc (Ayres), on behalf of the City of Darlington (City), is providing the results of monitoring landfill gas at 149 Wells Street. Monitoring was conducted for three consecutive months between June and August 2022, as requested by the Wisconsin Department of Natural Resources (WDNR), following the conversion of the passive landfill gas system to an active gas extraction system.

Results Discussion

Landfill gas monitoring was conducted at 11 sampling locations using a calibrated Landtec GEM 2000 landfill gas meter. Six of the locations are gas extraction wells designated with the GW identifier. The other five locations are soil gas probes designated with the identifier of GP. The initial sampling event was conducted on May 6, 2022. The gas extraction system had been started a few days earlier, but upon arrival at the site that day, it was noted that the blower was not operating and needed to be replaced. Soil gas monitoring was completed without the system actively running to provide a baseline of soil gas methane concentrations. These concentrations would be compared to the measurements taken after the blower was replaced and the gas extraction system became active to assess the effects of the active system on soil gas beneath the site.

The May 6, 2022, sampling event generally indicated low concentrations of methane, less than 0.3%. Soil gas probes GP-106 and GP-108 were the only two locations with methane concentrations greater than 0.3%. The concentration measured in GP-106, 12.2%, was the only concentration above the lower explosive limit of 5%.

After the blower was replaced and the active extraction system started, three monthly rounds of soil gas monitoring were conducted. The first sampling event in June did not indicate methane concentrations at any sampling location above 0.3%. The July and August sampling events indicated that two gas extraction wells, GW-14R and GW-22R, had methane concentrations above the lower explosive limit (LEL) of 5% methane by volume. During the August sampling event, another sampling point (GW-106R) indicated methane concentrations above 0.3%. However, the indicated concentration measured at GW-106R was below the LEL. The remaining eight sampling locations indicated non-detects or low-level detects below the LEL, which is consistent with previous monitoring dating back to 2012. Per NR 507.22(c), the owner or operator of a landfill must immediately notify the WDNR if stabilized gas readings in the soil outside the limits of waste exceed the LEL. However, gas concentrations within extraction wells are not representative of soil conditions because they are under vacuum and actively capture gas from within their zone of influence. It is not unexpected or unusual for gas concentrations in extraction wells to exceed the LEL; therefore, they are excluded from the notification requirements in NR 507.22(c).

The elevated methane concentrations in extraction wells GW-14R, GW-22R, and GW-106R indicate that the active system is functioning and drawing methane toward these wells and subsequently through the system and venting it to the atmosphere in a safe location. This is further substantiated by the decrease in methane concentration in vapor probes GP-106 and GP-108 after system start-up. The attached data sheets summarize the four sampling events conducted between May and August 2022. A site map is also attached, showing sampling locations and the layout of the vapor extraction system.

Indoor Air Alarms

Alarms are installed within the building at various locations to alert personnel of the presence of methane should any venting occur within the building from subsurface conditions. Three alarms are located within the Piggly Wiggly grocery, and one alarm is located in office space on the northeast end of the building currently occupied by a road construction field office. All installed alarms were operating properly when tested during the monthly monitoring events.

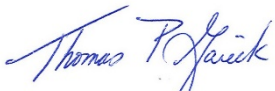
To date, no audible alarms have been noted within the building from tenants or the landlord. If any audible alarms are noted within the building, the WDNR will be notified of this event, and response actions will be taken according to the Explosive Gas Alarm Contingency Plan.

Recommendations

Ayres recommends that soil gas at the site be monitored on a semi-annual basis, as previously conducted, to assess the effectiveness of the active venting system at mitigating the accumulation of methane in the subsurface. Sampling locations, GW-14R, GW-22R, and GW-106R, indicate elevated methane concentrations which are consistent with previous monitoring rounds. The extraction well locations would be expected to have elevated methane concentrations as soil gas is drawn towards them so that methane can be extracted from the subsurface and vented to the atmosphere. The active operation of the venting system should continue. If future monitoring indicates a decreasing trend in methane concentrations in extraction wells, the active system could be shut off and soil gas concentrations monitored to assess if methane concentrations have decreased below the LEL. During semi-annual soil gas monitoring, the indoor air alarms inside the building should be checked to assess if they are functioning properly. Alarms should be maintained following the user's manual. Alarms that are not functioning properly should be replaced.

Sincerely,

Ayres Associates Inc

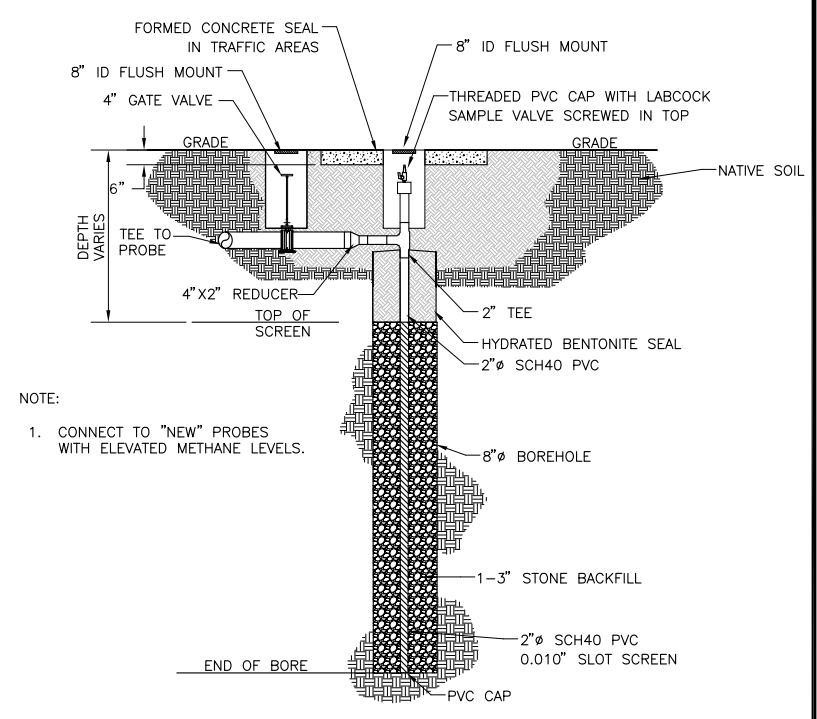
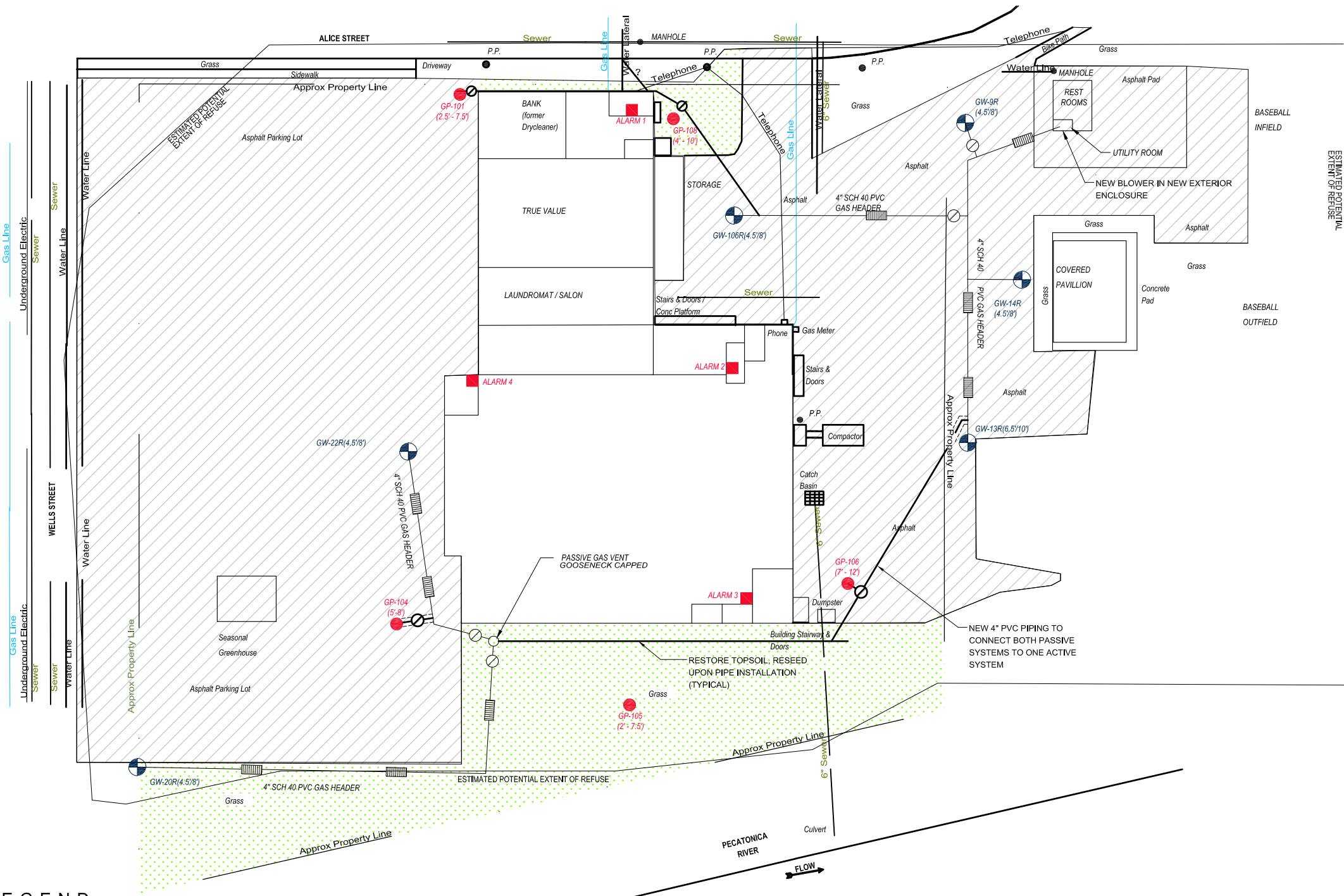


Thomas P. Gaieck, PG
Hydrogeologist

TPG:amc

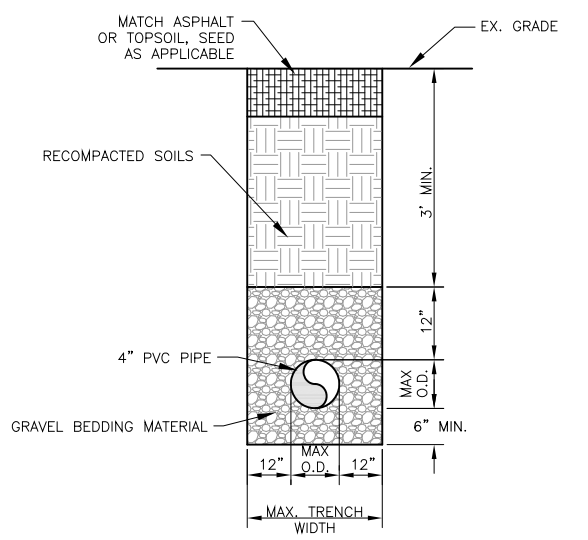
Enclosure

cc: Bryson Family Rental LLC
Mayor Mike McDermott – City of Darlington
Jeremy Williams – City of Darlington



NOTE:
1. CONNECT TO "NEW" PROBES WITH ELEVATED METHANE LEVELS.

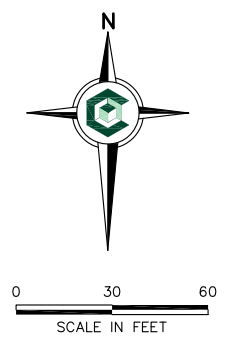
GAS PROBE
DETAIL 1
SCALE: NOT TO SCALE



TYPICAL TRENCH
DETAIL 2
SCALE: NOT TO SCALE

- LEGEND**
- GW-9R** REINSTALLED PASSIVE GAS EXTRACTION WELL WITH (SCREEN LENGTH/WELL DEPTH)
 - EXISTING VALVE
 - EXISTING ASPHALT
 - EXISTING GRASS
 - 4" PVC SLOTTED PIPE (10' LONG SECTIONS)
 - 4" PVC SOLID PIPE
 - EXPLOSIVE GAS ALARM LOCATION
 - NEW PROBE LOCATION (TOP OF SCREEN DEPTH - BOTTOM OF SCREEN / WELL BELOW GROUND SURFACE)
 - NEW VALVE
 - NEW 4" PVC SOLID PIPE

- NOTES**
1. EXISTING SYSTEM "A" INCLUDES GW-9R, 13R, 14R AND 106R.
 2. EXISTING SYSTEM "B" INCLUDES GW-20R, 22R.
 3. NEWLY INSTALLED PROBES ARE GP-101, 104, 105, 106 AND 108.



REV	DATE	DESCRIPTION	DWN BY	DES BY	CHK BY	APP BY

CORNERSTONE
Environmental Group, LLC

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CITY OF DARLINGTON LANDFILL
DARLINGTON, WISCONSIN

AS-BUILT GAS PIPING MODIFICATIONS

SHEET NO.
1
PROJECT NO.
100207

Darlington
6-May-22

Table 1: Methane Gas Monitoring Results

ID	Sampler	Time	CH4 %	CO2 %	O2 %	Balance Gas	Barometric Pressure (inHg)	Barometric Trend	Relative Humidity	Wind Speed / Direction	Air Temp. (°F)	Cloud Cover	Precipitation	Valve Open (%)	Comments
GW-9R	TG	11:20	0.0	0.1	10.5	79.2	29.90	Steady	60%	10mph/east	60	80%	0.0	100%	
GW-13R	TG	11:30	0.3	2.4	11.4	85.5	29.90	Steady	60%	10mph/east	60	80%	0.0	100%	
GW-14R	TG	11:25	0.0	2.2	16.3	81.4	29.90	Steady	60%	10mph/east	60	80%	0.0	100%	
GW-106R	TG	12:08	0.2	0.1	20.7	78.6	29.90	Steady	60%	10mph/east	60	80%	0.0	100%	
GW-20R	TG	11:52	0.1	0.8	18.7	81.0	29.90	Steady	60%	10mph/east	60	80%	0.0	100%	
GW-22R	TG	11:57	0.2	3.6	15	81.2	29.90	Steady	60%	10mph/east	60	80%	0.0	100%	
GP-101	TG	12:00	0.2	0.9	19.5	79.4	29.90	Steady	60%	10mph/east	60	80%	0.0	100%	
GP-104	TG	11:55	0.1	1.0	18.6	80.7	29.90	Steady	60%	10mph/east	60	80%	0.0	100%	
GP-105	TG	11:29	0.0	2.3	18.3	79.2	29.90	Steady	60%	10mph/east	60	80%	0.0	100%	
GP-106	TG	11:35	12.2	1.2	0.2	86.4	29.90	Steady	60%	10mph/east	60	80%	0.0	100%	
GP-108	TG	12:06	1.6	2.3	1	95.1	29.90	Steady	60%	10mph/east	60	80%	0.0	100%	
BLOWER Port	TG	12:10	0.2	0.9	20.9	79.0	29.90	Steady	60%	10mph/east	60	80%	0.0	100%	

Darlington
23-Jun-22

Table 1: Methane Gas Monitoring Results

ID	Sampler	Time	CH4 %	CO2 %	O2 %	Balance Gas	Barometric Pressure (inHg)	Barometric Trend	Relative Humidity	Wind Speed / Direction	Air Temp. (°F)	Cloud Cover	Precipitation	Valve Open (%)	Comments
GW-9R	TG	10:12	0.0	0.2	20.1	79.7	29.90	Steady	50%	10mph/west	85	10%	0.0	100%	
GW-13R	TG	10:35	0.0	0.1	19.4	80.3	29.90	Steady	50%	10mph/west	85	10%	0.0	100%	
GW-14R	TG	10:09	0.3	5.4	11.8	82.3	29.90	Steady	50%	10mph/west	85	10%	0.0	100%	
GW-106R	TG	10:26	0.3	0.0	20.2	79.6	29.90	Steady	50%	10mph/west	85	10%	0.0	100%	
GW-20R	TG	12:01	0.2	0.5	18.9	80.4	29.90	Steady	50%	10mph/west	85	10%	0.0	100%	
GW-22R	TG	11:08	0.3	0.7	18.4	80.6	29.90	Steady	50%	10mph/west	85	10%	0.0	100%	
GP-101	TG	11:35	0.3	0.0	20.3	79.4	29.90	Steady	50%	10mph/west	85	10%	0.0	100%	
GP-104	TG	11:19	0.2	0.0	19.5	80.2	29.90	Steady	50%	10mph/west	85	10%	0.0	100%	
GP-105	TG	10:55	0.2	2.8	16.3	80.2	29.90	Steady	50%	10mph/west	85	10%	0.0	100%	
GP-106	TG	10:46	0.3	1.0	18.2	80.0	29.90	Steady	50%	10mph/west	85	10%	0.0	100%	
GP-108	TG	11:54	0.3	0.0	19.9	79.7	29.90	Steady	50%	10mph/west	85	10%	0.0	100%	
BLOWER Port	TG	10:04	0.2	0.4	20	79.4	29.90	Steady	50%	10mph/west	85	10%	0.0	100%	

Darlington
29-Jul-22

Table 1: Methane Gas Monitoring Results

ID	Sampler	Time	CH4 %	CO2 %	O2 %	Balance Gas	Barometric Pressure (inHg)	Barometric Trend	Relative Humidity	Wind Speed / Direction	Air Temp. (°F)	Cloud Cover	Precipitation	Valve Open (%)	Comments
GW-9R	TG	10:27	0.2	0.0	20.2	79.6	30.00	Steady	60%	10 mph/west	75	5%	0.0	100%	
GW-13R	TG	10:44	0.2	0.1	20	79.7	30.00	Steady	60%	10 mph/west	75	5%	0.0	100%	
GW-14R	TG	10:33	6.3	3.3	14.2	76.2	30.00	Steady	60%	10 mph/west	75	5%	0.0	100%	
GW-106R	TG	10:54	0.2	0.0	20.3	79.4	30.00	Steady	60%	10 mph/west	75	5%	0.0	100%	
GW-20R	TG	11:12	0.2	3.3	10.1	86.3	30.00	Steady	60%	10 mph/west	75	5%	0.0	100%	
GW-22R	TG	11:15	11.6	4.3	8.9	75.4	30.00	Steady	60%	10 mph/west	75	5%	0.0	100%	
GP-101	TG	11:20	0.3	0.2	20.1	80.1	30.00	Steady	60%	10 mph/west	75	5%	0.0	100%	
GP-104	TG	11:27	0.2	0.8	18.8	80.1	30.00	Steady	60%	10 mph/west	75	5%	0.0	100%	
GP-105	TG	11:22	0.2	3.6	17	79.2	30.00	Steady	60%	10 mph/west	75	5%	0.0	100%	
GP-106	TG	11:48	0.2	0.0	20.2	79.2		Steady	60%	10 mph/west		5%	0.0	100%	
GP-108	TG	11:53	0.2	0.2	20.1	80.2	30.00	Steady	60%	10 mph/west	75	5%	0.0	100%	
BLOWER Port	TG	11:55	0.3	0.6	18.3	80.2	30.00	Steady	60%	10 mph/west	75	5%	0.0	100%	

Darlington
25-Aug-22

Table 1: Methane Gas Monitoring Results

ID	Sampler	Time	CH4 %	CO2 %	O2 %	Balance Gas	Barometric Pressure (inHg)	Barometric Trend	Relative Humidity	Wind Speed / Direction	Air Temp. (°F)	Cloud Cover	Precipitation	Valve Open (%)	Comments
GW-9R	TG	10:05	0.2	0.3	19.6	80.0	30.00	Steady	75%	10mph/west	75	80%	0.0	100%	
GW-13R	TG	10:09	0.3	0.2	19.6	79.9	30.00	Steady	75%	10mph/west	75	80%	0.0	100%	
GW-14R	TG	10:09	7.0	8.6	5.2	79.3	30.00	Steady	75%	10mph/west	75	80%	0.0	100%	
GW-106R	TG	11:09	2.8	1.2	17.3	78.5	30.00	Steady	75%	10mph/west	75	80%	0.0	100%	
GW-20R	TG	10:42	0.2	2.2	12.3	85.3	30.00	Steady	75%	10mph/west	75	80%	0.0	100%	
GW-22R	TG	10:57	12.3	4.2	9.1	74.4	30.00	Steady	75%	10mph/west	75	80%	0.0	100%	
GP-101	TG	10:48	0.3	0.2	19.9	79.6	30.00	Steady	75%	10mph/west	75	80%	0.0	100%	
GP-104	TG	10:36	0.3	2.7	15.2	81.8	30.00	Steady	75%	10mph/west	75	80%	0.0	100%	
GP-105	TG	10:21	0.2	4.2	14.9	80.7	30.00	Steady	75%	10mph/west	75	80%	0.0	100%	
GP-106	TG														No Sample-Submerged from previous days rain
GP-108	TG	11:01	0.3	0.2	19.8	79.7	30.00	Steady	75%	10mph/west	75	80%	0.0	100%	
BLOWER Port	TG	11:12	0.3	0.7	18.1	80.1	30.00	Steady	75%	10mph/west	75	80%	0.0	100%	