

## SCS ENGINEERS

November 21, 2017  
File No. 23212007.05

Ms. Tracy Buchanan  
Ohio EPA Southwest District Office  
401 East Fifth Street  
Dayton, Ohio 45402-2911

Subject: Village of St. Bernard Landfill  
MP-10 Final Contingency Monitoring Report

Dear Ms. Buchanan:

Per the approved EGMP for the above referenced site and in compliance with OAC 3745-27-12 (E)(5)(g)(iii), the owner/operator will submit a report to the Ohio EPA and Hamilton County Public Health when the contingency monitoring discontinuation criteria are met. This letter serves as that report for MP-10. A site map is presented in Attachment A.

### **Analysis and Summary**

The initial exceedance of the 5 percent combustible gas threshold at MP-10 occurred on June 8, 2017 and the exceedance continued through October 31, 2017. The combustible gas concentration fell below 5 percent on November 8, 2017. Four rounds of readings with combustible gas concentrations were collected over a 2 week period. MP-10 has met the criteria for ending contingency monitoring and will return to quarterly monitoring as you were informed in our data submittal of November 17, 2017.

The results of the contingency monitoring performed to date are included in Attachment B. The most recent monitoring was performed on November 17, 2017. The lateral extent of the explosive gas concentration above the threshold limit was the immediate vicinity of MP-10. No concentrations of explosive gas were detected in MP-17, located approximately 75 feet west of MP-10, or in MP-9, which is located 55 feet east of MP-10. No explosive gas was detected at the BP-1 bar punch location, located at the southwest corner of the Kistner property, 437 Bank Avenue approximately 10 feet north northeast of MP-10.

The absence of pressure at MP-10 indicates that there is no driving force that could cause gas migration over a significant distance. The methane detected at MP-10 is likely either a localized concentration or is present due to migration driven only by a concentration gradient/diffusion. Given this condition, it is unlikely that sufficient methane to present a risk to human health and safety will reach the residences. The residences adjacent to the landfill (excluding the Schrenk residence) have gas alarms and there have been no reported detections of landfill related combustible gas, indicating that these detections of combustible gas as has occurred at MP-10 do not represent a risk to the residences. At this time, no further remedial actions are proposed.

## **Pathway Characterization**

The description of the site setting and site geology has been summarized from the EGMP. With respect to regional geology, the site is situated on the southeast edge of the Mill Creek Valley. The regional geology reflects multiple glacial advances and is consistent with a glacial outwash valley. Generally, regional geologic sequences consist of glacial valleys incised within Ordovician bedrock formations. These valley fills consist of highly variable interbedded sands, gravels, clays, silts, boulders, and cobbles.

With respect to site specific geology, the most significant feature includes a glacial till/outwash sequence which appears to form the base of the site. This unit is predominated by low permeability clays and or silts interbedded with silty sands within the areas investigated. Both oxidized and non-oxidized native materials have been found at depth, suggesting deposition in multiple sequences.

Although interbedded sands represent a potential zone of migration, those materials examined via borings were saturated and included a high percentage of silt (estimated at 40 percent or higher). As such, although classified as granular material, the potential for large scale gas transmission is seen as limited.

Along the northern perimeter of the site, the former landfill property is contiguous with several residential properties along Bank Avenue. Essentially, this area consists of a flat terrace, projecting out from the toe of the landfill slope and transitioning into the back yards of the Bank Avenue residences. This terrace was raised to its current elevation by the placement of two generations of fill. A geologic cross section along this northern perimeter is presented as Figure 2 in Attachment A. The boring logs used to prepare the cross section are presented in the EGMP. Only the log for MP-10 is included in this report in Appendix C. The fill soils, in particular the lower fill, contain hard fill and miscellaneous debris. As a result, the near surface geologic profile of this terrace is quite varied. Recent water level measurements show that the fill soil in the vicinity of MP-10 is saturated at approximately 4 feet below the ground surface. MP-10 is screened from approximately 2 to 12 feet below the ground surface, mainly across the various fill layers. The bar punch monitoring being performed at the southwest corner of the Kistner property, 437 Bank Avenue, demonstrates that the methane detected at MP-10 is not migrating toward that structure in the shallow subsurface.

As part of the delineation investigation performed in April 2013, a test pit, TP-7, was excavated in the vicinity of MP-10. The log for TP-7 is included in Appendix C. The unsaturated portion of the fill layers is the primary pathway. Geotechnical testing of this material as part of the delineation investigation showed that it can be classified as silty sand with gravel. Porosity of the soil matrix of the fill is considered to be moderate. The presence of large pieces of concrete debris within the fill results in the potential for isolated, unconnected open void space, depending on the location and orientation of the concrete debris.

## Potential Causes

The exceedance at MP-10 was first detected after a major rain event. A number of theories regarding how the rain could have resulted in the exceedance were considered, including:

- Higher water levels in the waste could have resulted in the increased generation of methane.
- Higher water levels in the waste forced additional landfill gas out of the waste.
- Saturated cover soil forced methane that would otherwise have vented to the atmosphere to be forced into the soil adjacent to the landfill.
- Falling water levels after the rain event reopened a pathway in the soil and allowed additional/pent up higher concentrations of methane to reach the probe, where before the methane had dissipated, maintaining lower concentrations.

There was no practical way to determine if any of the above or some other factor was the cause of the exceedance. The methane concentration at MP-10 varied widely during the time it exceeded the threshold limit. It was not possible to directly correlate those changes to any change in conditions at the site (including precipitation, lack of precipitation, barometric pressure change, etc.), in order to attempt to understand the original cause of the exceedance or the reason for its continuation. In the end, no definitive cause could be determined with any certainty.

Should you have any questions or comments, please contact the undersigned.

Sincerely,



Randall C. Mills, P.G.  
Senior Project Professional  
**SCS ENGINEERS**



James J. Walsh, P.E.  
Principal  
**SCS ENGINEERS**

cc: Chuck DeJonckheere, Hamilton County Public Health  
Nick Schapman, GHD  
John Estep, Mayor, Village of St. Bernard  
Tom Paul, Service Director, Village of St. Bernard

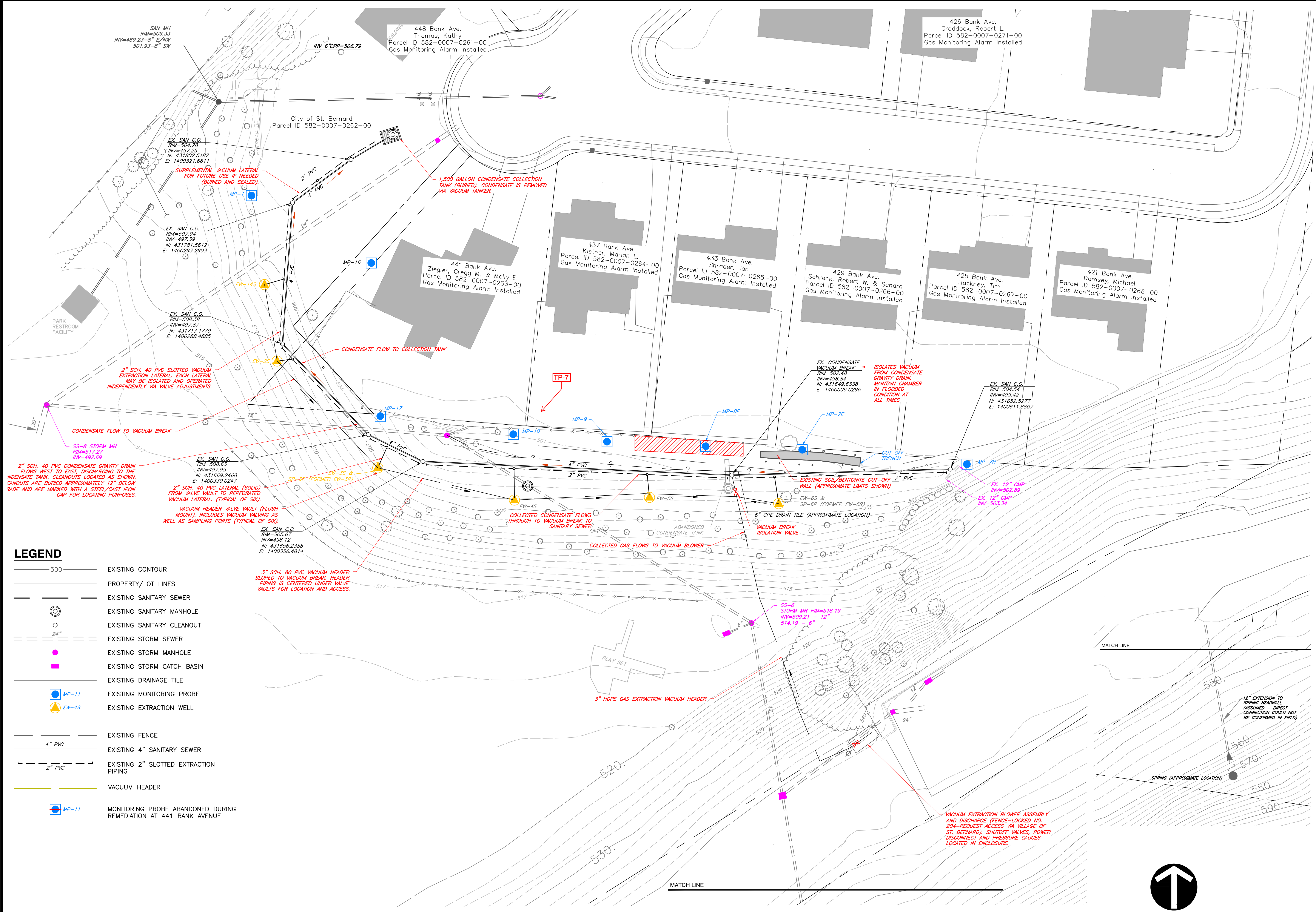
Enclosures

**ATTACHMENT A**

**FIGURES**



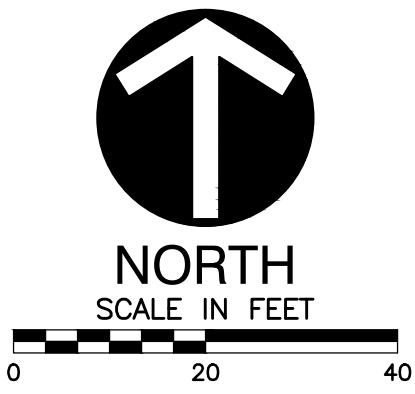
I:\PROJECT\2012 Projects\23212007.00 St. Bernard LF\Deliverables\EGMP\Sept 2014 Revised EGMP\Draft Revised EGMP\Fig 5.dwg Sep 26, 2014 - 9:01am Layout Name: FIG 5 By: 0649fab



**LEGEND**

- 500 ——— EXISTING CONTOUR
- PROPERTY/LOT LINES
- EXISTING SANITARY SEWER
- EXISTING SANITARY MANHOLE
- EXISTING SANITARY CLEANOUT
- 24" EXISTING STORM SEWER
- EXISTING STORM MANHOLE
- EXISTING STORM CATCH BASIN
- EXISTING DRAINAGE TILE
- MP-11 EXISTING MONITORING PROBE
- EW-4S EXISTING EXTRACTION WELL
- 4" PVC EXISTING FENCE
- 4" PVC EXISTING 4" SANITARY SEWER
- 2" PVC EXISTING 2" SLOTTED EXTRACTION PIPING
- VACUUM HEADER
- MP-11 MONITORING PROBE ABANDONED DURING REMEDIATION AT 441 BANK AVENUE

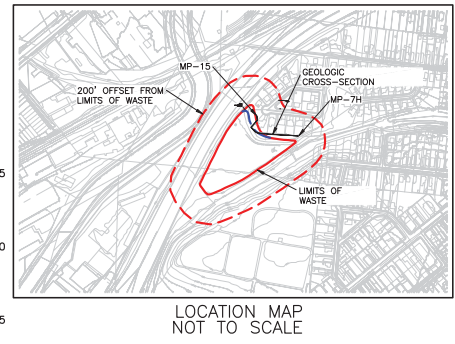
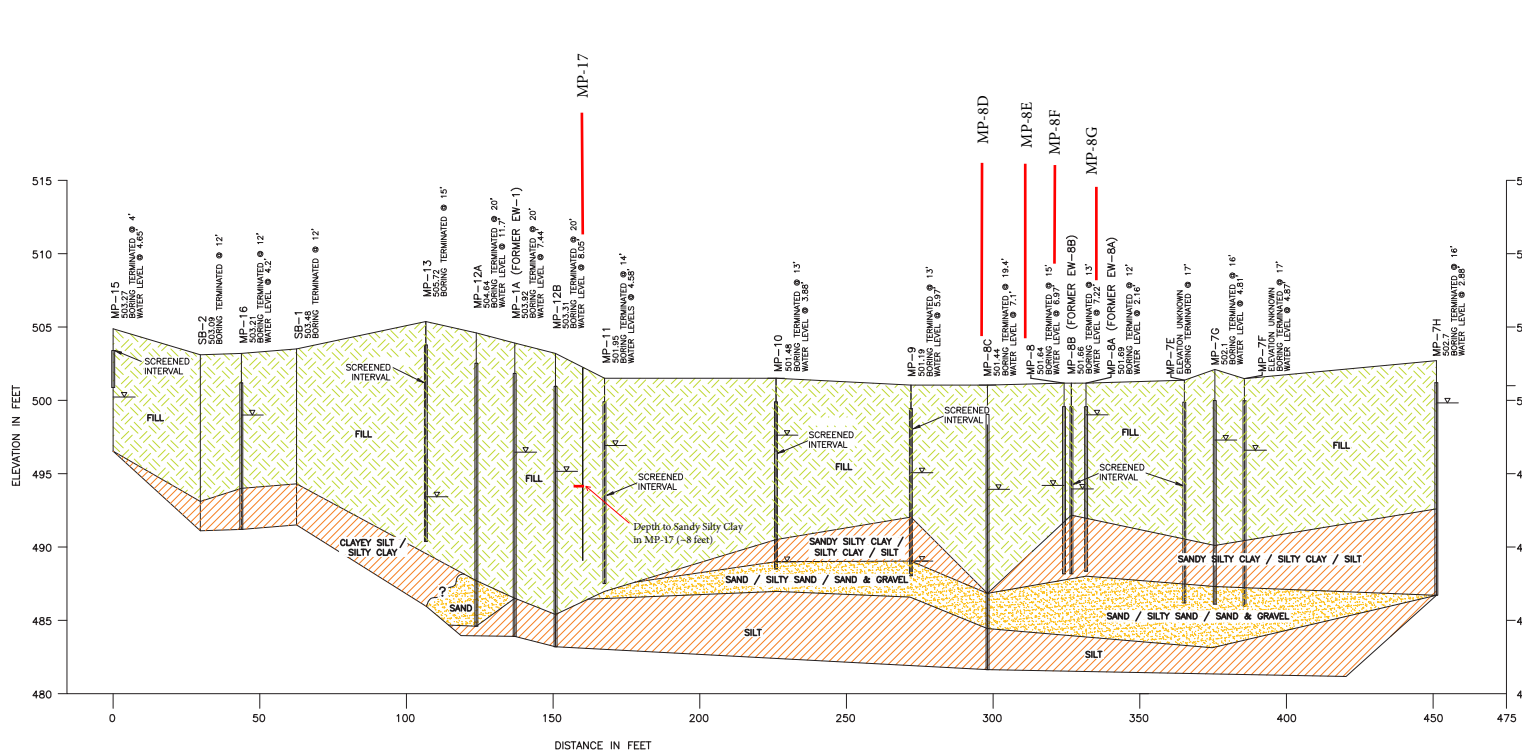
**NOTES:**  
 1. BASE MAP SOURCE CEC DRAWING 2B, DATED MARCH 31, 2011



<b>CK. BY</b>		<b>DESCRIPTION</b>		<b>REV. DATE</b>	
<b>SHEET TITLE</b>	<b>MONITORING NETWORK</b>				
<b>PROJECT TITLE</b>	<b>ST. BERNARD LANDFILL VILLAGE OF ST. BERNARD, OHIO</b>				
<b>CLIENT</b>	<b>VILLAGE OF ST. BERNARD 110 WASHINGTON AVENUE ST. BERNARD, OHIO 45217</b>				
<b>SCS ENGINEERS</b>	STEARNS, CONRAD AND SCHMIDT CONSULTING ENGINEERS, INC. 2060 READING ROAD, CINCINNATI, OH 45202 PH. (619) 421-5353 FAX. (613) 421-2847				
<b>CADD FILE:</b>	FIG 5				
<b>DATE:</b>	SEPTEMBER 2014				
<b>SCALE:</b>	AS SHOWN				
<b>DRAWING NO.</b>	<b>FIG 1</b>				



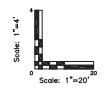
REVISION RECORD		
NO.	DATE	DESCRIPTION




THE WATER LEVELS PRESENTED HEREIN ARE APPLICABLE TO THE LOCATION AND TIME OF MEASUREMENT. WATER LEVELS MAY FLUCTUATE THROUGH TIME

LEGEND	
	FILL (GAS MIGRATION ZONE)
	CLAY / SILTY CLAY / SANDY SILTY CLAY / SILT
	SAND / SILTY SAND / SAND & GRAVEL
	INITIAL WATER LEVEL RECORDED DURING PROBE INSTALLATION

- NOTES:
1. WATER LEVELS MEASURED ON 03/04/2011.
  2. SEE DRAWING NO. 2 FOR PROBE LOCATIONS. CROSS-SECTION TRACE INTERCEPTS PROBE LOCATIONS SHOWN.
  3. FILL OR DEBRIS INDICATED IS OUTSIDE OF LIMITS OF WASTE PLACEMENT. FILL SHOWN WAS OBSERVED TO CONSIST PRIMARILY OF INERT FILL WITH INCIDENTAL QUANTITIES OF ORGANIC DEBRIS.





**Civil & Environmental Consultants, Inc.**  
 4274 Glendale-Milford Road - Cincinnati, OH 45242  
 Ph: 513.985.0226 - 800.759.5614 - Fax: 513.985.0228  
 www.cecinc.com

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**BANK AVENUE LANDFILL  
 ST. BERNARD, OHIO  
 HAMILTON COUNTY**

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DRAWN BY: MLEB	CHECKED BY: RJS	APPROVED BY: RHL
DATE: 03/31/2011	DWG. SCALE: AS SHOWN	PROJECT NO: 100-194
GEOLOGIC CROSS-SECTION		<b>4B</b>

FIGURE 2. CEC 2011 Northern Geologic Cross Section

**ATTACHMENT B**  
**CONTINGENCY MONITORING RESULTS**

**TABLE 1. SUMMARY OF CONTINGENCY MONITORING RESULTS AT MP-10  
METHANE CONCENTRATION (PERCENT BY VOLUME)**

Date	Initial Reading		Verification Reading		30-minute Evacuation Readings		Bar Punch BP-1	
	Initial	Sustained	Initial	Sustained	Initial	Sustained	Initial	Sustained
06/08/17	0.2	30.5	30.0	29.1	22.0	3.9		
06/14/17	19.5	22.2	22.0	21.5	18.0	3.1		
06/21/17	22.6	23.1	22.6	21.9	19.0	3.1		
06/27/17	2.2	2.2	--	--	--	--		
07/01/17	30.1	33.5	20.0	28.3	28.3	3.8		
07/05/17	7.3	8.1	8.3	8.4	7.9	1.4		
07/12/17	37.7	38.0	36.9	38.0	23.9	0.6		
07/19/17	39.5	39.8	39.4	39.1	33.0	2.0		
07/25/17	54.4	54.9	54.4	53.5	42.9	3.4		
08/02/17	43.3	43.4	43.1	42.1	30.5	5.6		
08/09/17	7.7	7.9	7.8	7.5	6.3	0.6		
08/16/17	35.6	34.9	34.7	33.6	30.3	4.4		
08/23/17	33.1	33.7	33.3	33.6	31.9	4.5		
08/29/17	25.4	25.9	25.6	25.0	22.8	2.6		
09/07/17	49.4	49.9	49.6	48.5	37.7	4.9		
09/12/17	12.6	23.2	23.1	6.6	6.6	4.9		
09/18/17	43.2	44.8	41.5	41.9	42.1	7.4		
09/27/17	44.9	45.4	45.0	43.7	42.2	6.6		
10/03/17	21.0	21.7	21.6	21.0	19.0	2.9		
10/11/17	42.6	42.0	43.0	42.3	40.5	0.1		
10/18/17	24.9	25.2	25.1	24.5	22.7	2.9	0	0
10/25/17	50.1	51.6	51.8	51.4	40.1	5.5	0	0
10/31/17	14.2	14.4	14.2	14.0	10.8	0.5	0	0
11/08/17	0	0					0	0
11/10/17	0	0					0	0
11/15/17	0.9	0.9					0	0
11/17/17	0.4	0.4					0	0



**ATTACHMENT C**  
**BORING & TEST PIT LOGS**



**Civil & Environmental Consultants, Inc.**  
 Cincinnati, OH Pittsburgh, PA  
 (513) 985-0226 • (800) 759-5814 (412) 921-3402 • (800) 365-2324

**CITY OF ST. BERNARD**

**JOB NO.: 200610**

**LOG OF MP-10**

**St. Bernard, Ohio**

**Sheet 1 of 1**

**LOGGED BY: PCS**

**GROUND SURFACE ELEVATION:**

**DRILLER: Jersey West Drilling**

**TOP OF CASING ELEVATION:**

**DATE DRILLED: 08/14/00**

**INITIAL WATER LEVEL: 12.5 ft. BGS**

**DATE: 08/14/00**

**DRILL METHOD: 4 1/4 IN. HSA**

**STATIC WATER LEVEL:**

**DATE:**

HNu (ppm)	Recovery (in.)	Blow Counts	Elevation, MSL	Depth (ft.)	Graphic Log	Materials Description	Well Completion
1.8						No sample, Vapor reading from soil cuttings	
1.2	17	5-18 5-5		5	+	Gray silty CLAY w/ fine to medium sand, glass, concrete, metal, rubber, and fine gravel, wet in concrete fragments at 6.7 to 7 feet, very stiff (FILL)	
0	18	1-3 4-4			+	Gray silty CLAY w/ roots and black organic stains, moist, medium stiff (FILL)	
						Soft	
1.0	22	1-1 2-1		10	+	Gray fine sandy silty CLAY w/ medium sand, moist, very soft	
1.9	16	1-1 1-2			+	Gray fine SAND, wet, very loose	
				15		Boring terminated at 13 feet	
				20			
				25			

Project Name: St. Bernard Landfill	SCS Project Number: 23212007.01	<b>Test Pit No.: 7 &amp; "L"</b>		
Project Location: St. Bernard, Ohio	Date Started: 4/16/2013	Page 1 of 1		
Logged By: R. Mills	Date Completed: 4/16/2013	GW Depth (ft)	Date	Time
Excavated By: Petro	Sampling Method:			
Excavation Method: Cat 308E	Weather:			
Backfill: excavated and off-site soil				
Total Test Pit Depth: 8 feet				

Depth (ft.)	Sample No.	Methane Reading (% vol)	PID Scan (ppm)	PID Headspace (ppm)*	Description
0--					Approximately 0.5 feet topsoil.
--					Tan soil fill: CLAY & SILT, little Sand, little Gravel, moist, with occasional brick fragments and small pieces of metal. Less than 5% non-soil debris.
1--				1.5	
--					
2--					
--		0	0.4		At approximately 2.5 feet, grey soil fill: SILT & CLAY, some to little Sand, little Gravel, moist, with glass fragments, brick fragments, slight petroleum odor.
3--					Tire encountered at 3 feet. 5 to 10% non-soil debris.
--					
4--					
--					
5--				8	Fill includes slabs of concrete, small pieces of rusted metal, metal tubing, road sign, car mirror.
--				0.4	
6--					2nd tire and inner tube in initial test pit.
--					
7--					Approximately 6 foot square slab of concrete in west end of "L" at 7.5 feet.
--					
8--					At 8 feet, native soil: olive grey Clayey SILT, some fine Sand, some organic matter.
--					
9--					Bottom of test pit at 8.5 feet.
--					
10--					
--					
11--					

\* Unless otherwise indicated, headspace samples were collected from excavated soil fill stockpile prior to backfilling.