

## SCS ENGINEERS

December 16, 2016  
File No. 23212007.04

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

Subject: Village of St. Bernard Landfill  
MP-10 Contingency Monitoring 3<sup>rd</sup> 30-day Report  
MP-9 Contingency Monitoring 7-day Report

Dear Ms. Buchanan:

This report serves as both the 30-day contingency monitoring report for MP-10 and the 7-day report for MP-9.

### **MP-10 30-Day Report**

Per the approved EGMP for the above referenced site, , the owner/operator will submit a report containing the required information to the Ohio EPA and Hamilton County Public Health every 30 days from the date of initial detection above threshold limits, until contingency monitoring plan discontinuation criteria are met.

This letter serves as the third 30-day report. A site map is presented as Figure 1 in Attachment A.

### **Analysis and Summary**

The results of the contingency monitoring performed to date are summarized in the table included in Attachment B. Following the initial and verification sampling for the three events preceding the most recent event, MP-10 has been pumped for 30 minutes, at a rate of approximately 550 cc/min., using the GEM 5000. Approximately 25 casing volumes were removed from MP-10 each time. The falling methane concentration during the 30 minute purge indicated that the elevated concentration of methane is present in a small area, i.e. only a small volume of soil gas with an elevated concentration of methane is present. Going forward, the 30 minute purge will not be performed during every event but will be performed periodically to verify that limited quantities of methane are present in the vicinity of MP-10.

The monitoring results for the last four weekly contingency monitoring events show the concentration of methane at MP-10 was increasing, but has decreased significantly with the last event. All of the subsequent concentrations have been below the peak reading observed on September 21, 2016. The absence of pressure at MP-10 indicates that there is no driving force that could cause gas migration to the nearby residents, which are also monitoring with indoor

combustible gas indicators. The methane detected at MP-10 is likely a localized concentration or is present due to migration driven by a concentration gradient/diffusion. 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 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. The log for MP-10F is included in this report in Attachment 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 varied. The fill soil matrix in the vicinity of MP-10 is a sandy silt or sandy clay. The presence of the hard fill and debris likely increases the porosity and results in a porosity that approaches that typically assumed for granular soils, i.e. 25 percent. 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.

As part of the delineation investigation conducted in 2013, a test pit, TP-7, was excavated in the vicinity of MP-10. The log for TP-7 is included in Attachment C. The unsaturated portion of the fill layer 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.

## **Possible Causes of Exceedance**

Just prior to the detection of the initial exceedance at MP-10 on September 7, 2016, the St. Bernard area experienced an extreme storm event, ranging in intensity from a 100 to a 500 year rain event. The infiltration into the landfill of significant quantities of water could have displaced methane in the landfill into the pathway monitored by MP-10. Alternatively, the additional water that infiltrated into the landfill could have resulted in an increase in the generation of methane, some of which reached MP-10.

## **Summary of the Steps Taken to Protect Human Health and the Environment**

The collection and control system was adjusted to apply additional vacuum to the segments in the vicinity of MP-10, specifically those monitored by EW-3S and EW-4S. This was done by reducing vacuum on the other segments in the system. MP-10 was, for a number of events, pumped for 30 minutes, at a rate of approximately 550 cc/min., using the GEM 5000 after the initial and verification monitoring. Approximately 25 casing volumes were removed from MP-10 each time. The falling methane concentration during the 30 minute purge indicated that the elevated concentration of methane is present in a small area, i.e. only a small volume of soil gas with an elevated concentration of methane is present. Going forward, the 30 minute purge will not be performed during every event, but will be performed periodically to verify that limited quantities of methane are present in the vicinity of MP-10.

## **MP-9 7-Day Report**

This letter is intended to meet the 7-day reporting requirements contained in OAC 3745-27-12 (E)(5)(g)(i) for MP-9. The steps taken on behalf of the Village of St. Bernard at the closed St. Bernard Landfill to protect human health and the environment include:

- The gas extraction system was checked to confirm it is working.
- The vacuum was increased in the EW-5S segment of the collection system by opening the valve to apply the maximum available system vacuum applied to this segment. The EW-5S segment is the segment immediately adjacent to MP-9. (It is not anticipated that this will result in a significant reduction in the vacuum being applied to the EW-3S and EW-4S segments that are adjacent to MW-10.)

No additional permanent monitors are proposed at this time. The adjacent residences are equipped with combustible gas alarms. The existing permanent monitors are sufficiently closely spaced that additional permanent monitors are not needed.

The results of the initial gas monitoring that exceeded five percent at MP-9 are in Attachment B.

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

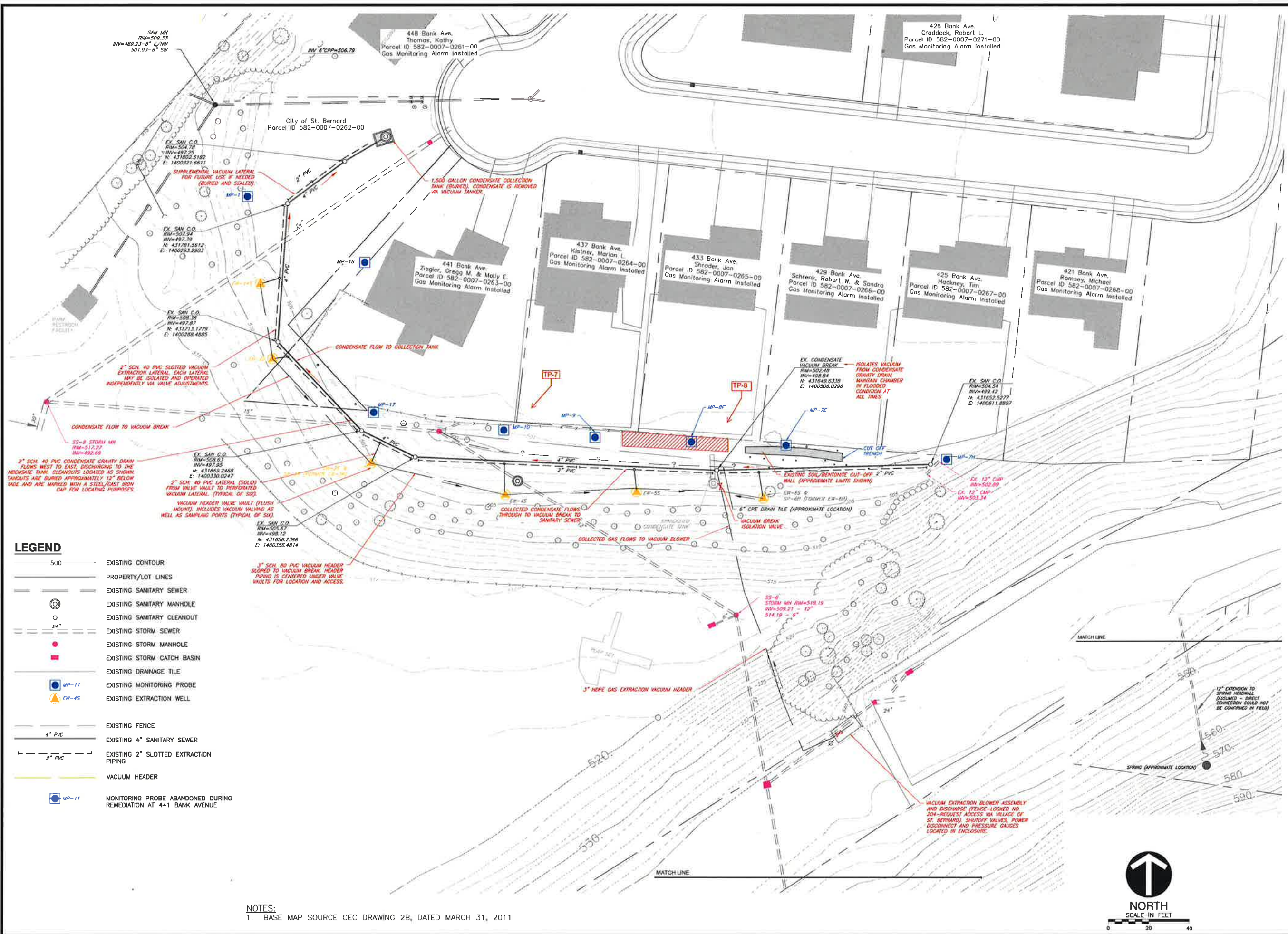
Enclosures

**ATTACHMENT A**

**FIGURES**



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



- 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-45 EXISTING EXTRACTION WELL
  - — — 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

MONITORING NETWORK	
SHEET TITLE	MONITORING NETWORK
PROJECT TITLE	ST. BERNARD LANDFILL VILLAGE OF ST. BERNARD, OHIO
CLIENT	VILLAGE OF ST. BERNARD 110 WASHINGTON AVENUE ST. BERNARD, OHIO 45217
CADD FILE:	FIG 5
DATE:	SEPTEMBER 2014
SCALE:	AS SHOWN
DRAWING NO.	<b>FIG 1</b>



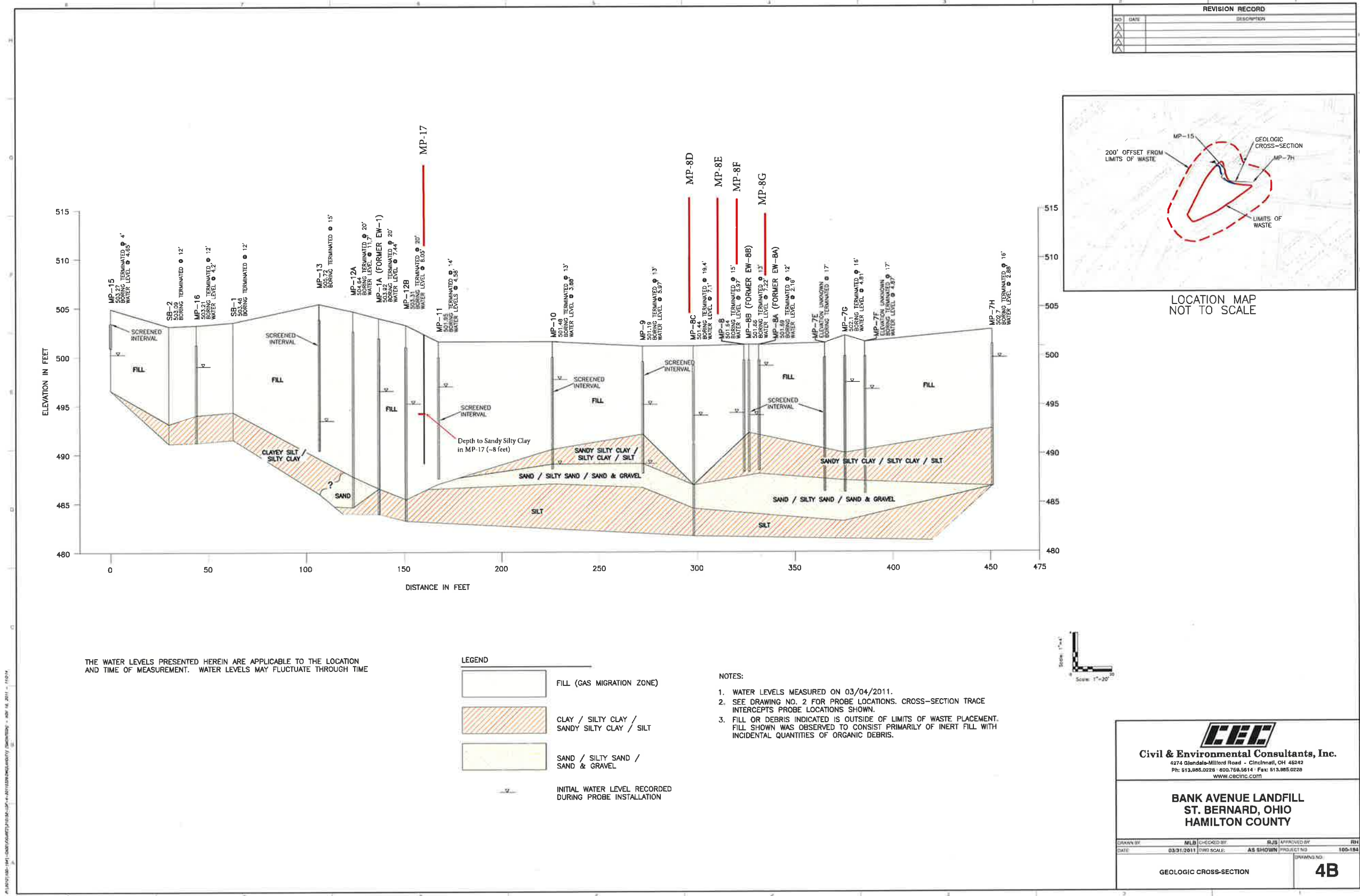


FIGURE 2. CEC 2011 Northern Geologic Cross Section

**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	
	Initial	Sustained	Initial	Sustained	Initial	Sustained
09/07/16	46.6	46.8	36.3	41.8		
09/14/16	48.2	48.4	37.3	43.0		
09/21/16	55.8	56.3	45.9	49.3		
09/29/16	10.8	23.3	6.5	15.9		
10/04/16	48.1	49.5	38.8	43.0		
10/13/16	44.3	46.8	41.4	39.2		
10/19/16	44.3	42.0	35.0	46.6	19.5	22.0
10/27/16	39.2	39.9	39.2	38.6	28.5	5.8
11/02/16	28.3	28.7	20.7	27.1	27.0	3.8
11/09/16	5.1	5.8	5.8	5.7	4.8	0.7
11/14/16	18.2	19.8	20.1	19.8	18.1	3.2
11/22/16	33.3	34.2	34.0	33.2	27.7	6.2
12/01/16	44.4	45.3	45.1	44.9	36.4	5.8
12/08/16	5.7	6.4	6.7	6.3		

**TABLE 2. SUMMARY OF CONTINGENCY MONITORING RESULTS AT MP-9  
METHANE CONCENTRATION (PERCENT BY VOLUME)**

Date	Initial Reading		Verification Reading		30-minute Evacuation Readings	
	Initial	Sustained	Initial	Sustained	Initial	Sustained
12/08/16	5.7	6.4	6.7	6.3		

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



**Civil & Environmental Consultants, Inc.**  
 Cincinnati, OH      Pittsburgh, PA  
 (513) 985-0228 • (800) 758-5614      (412) 921-3402 • (800) 385-2324

**CITY OF ST. BERNARD**

JOB NO.: 200610

LOG OF MP-10

Sheet 1 of 1

St. Bernard, Ohio

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	
						Boring terminated at 13 feet	
				15			
				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.
1--				1.5	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.
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.
6--				0.4	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.





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**CITY OF ST. BERNARD**

JOB NO.: 200610

LOG OF MP-9

Sheet 1 of 1

St. Bernard, Ohio

LOGGED BY: PCS

GROUND SURFACE ELEVATION:

DRILLER: Jersey West Drilling

TOP OF CASING ELEVATION:

DATE DRILLED: 08/14/00

INITIAL WATER LEVEL: 12 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
5.3						No sample, Vapor reading from open bore hole	
4.9	3	50/3		5	Concrete		
0.0	3	14-6 4-4			Gray silty CLAY w/ fine sand, moist, trace concrete and metal, moist, stiff (FILL)		
0.0	18	2-2 2-2		10	Olive gray silty CLAY w/ fine sand and brown oxidized areas through sample, moist, soft		
0.0	21	1-1 1-1			Very soft		
					Gray silty fine SAND, wet, very loose		
				15		Boring terminated at 13 feet	
				20			
				25			

**Test Pit No.: 8 & "T"**

Project Name: St. Bernard Landfill	SCS Project Number: 23212007.01
Project Location: St. Bernard, Ohio	Date Started: 4/16/2013
Logged By: R. Mills	Date Completed: 4/16/2013
Excavated By: Petro	GW Depth: 8.5
Excavation Method: Cat 308E	Sampling Method:
Backfill: excavated and off-site soil	Weather:
Total Test Pit Depth:	

Depth (ft.)	Sample No.	Methane Reading (%vol)	PID Scan (ppm)	PID Headspace (ppm)*	Description
0--					
1--				1	Approximately 12 inch landscaping mound adjacent to fence. Brown to tan soil fill: CLAY & SILT, little Sand, little Gravel, moist Less than 5% non-soil debris.
2--					At 1.5 feet becoming grey brown SILT & CLAY, and Sand, little Gravel with brick fragments, piece of clay tile, wood.
3--				2.6	
4--		0	0.4		Amount of debris increased to 5 to 10 % below 4 feet, mostly concrete.
5--					
6--					At 6 to 7 feet, olive grey Clayey SILT, little fine Sand. Debris included tire, tire tube, and conveyor belt roller.
7--					At 7.5 feet, native soil: olive grey Clayey SILT, little to some fine Sand, moist, some organic material. Water coming into pit at bottom.
8--					
9--					Bottom of test pit at 8.5 feet.
10--					TP-8 "T" extended to depth of 8 feet where further excavation blocked by large concrete slab. No in place native material encountered, but native soil mixed with debris was encountered. Headspace readings from TP-8 "T", 0.2 and 0.1 ppm.
11--					

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