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SCS ENGINEERS

January 9, 2017
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 4th 30-day Report
MP-9 Contingency Monitoring 1st 30-day Report

Dear Ms. Buchanan:

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

MP-10 and MP-9 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. The results presented in this report meet the criteria for discontinuing contingency monitoring at both MP-10 and MP-9.

This letter serves as the fourth 30-day report for MP-10 and the first 30-day report for MP-9. A site map is presented as Figure 1 in Attachment A. With the discontinuation of contingency monitoring at MP-10 and MP-9, this is the last 30-day report for both probes.

Analysis and Summary

The results of the contingency monitoring performed to date are summarized in the table included in Attachment B.

More than the minimum of four rounds of readings below the compliance threshold of 5 percent combustible gas by volume have been recorded over at least a two week period at both MP-10 and MP-9. This meets the criteria for terminating contingency monitoring at both MP-10 and MP-9. The monitoring schedule at both probes will return to the previous established monitoring frequency that was conducted prior to the start of contingency monitoring (i.e., quarterly).

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 logs for MP-10 and MP-9 are 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 and MP-9 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. Recent water level measurements show that the fill soil in the vicinity of MP-9 is saturated at approximately 5.5 feet below the ground surface. MP-9 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 and MP-9. Another test pit, TP-8, was excavated in the next property to the east, east of MP-9. The logs for TP-7 and TP-8 are 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 Exceedances

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.

No specific cause has been identified for the exceedance at MP-9.

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 and MP-9, specifically those monitored by EW-3S, EW-4S, and EW-5S. 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. MP-9 was also pumped for 30 minutes, at a rate of approximately 550 cc/min., using the GEM 5000 after the initial and verification monitoring during one monitoring event. Approximately 25 casing volumes were removed from MP-9. 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.

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

Sincerely,

Randall C. Mills

James J. Walsh, P.E.

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

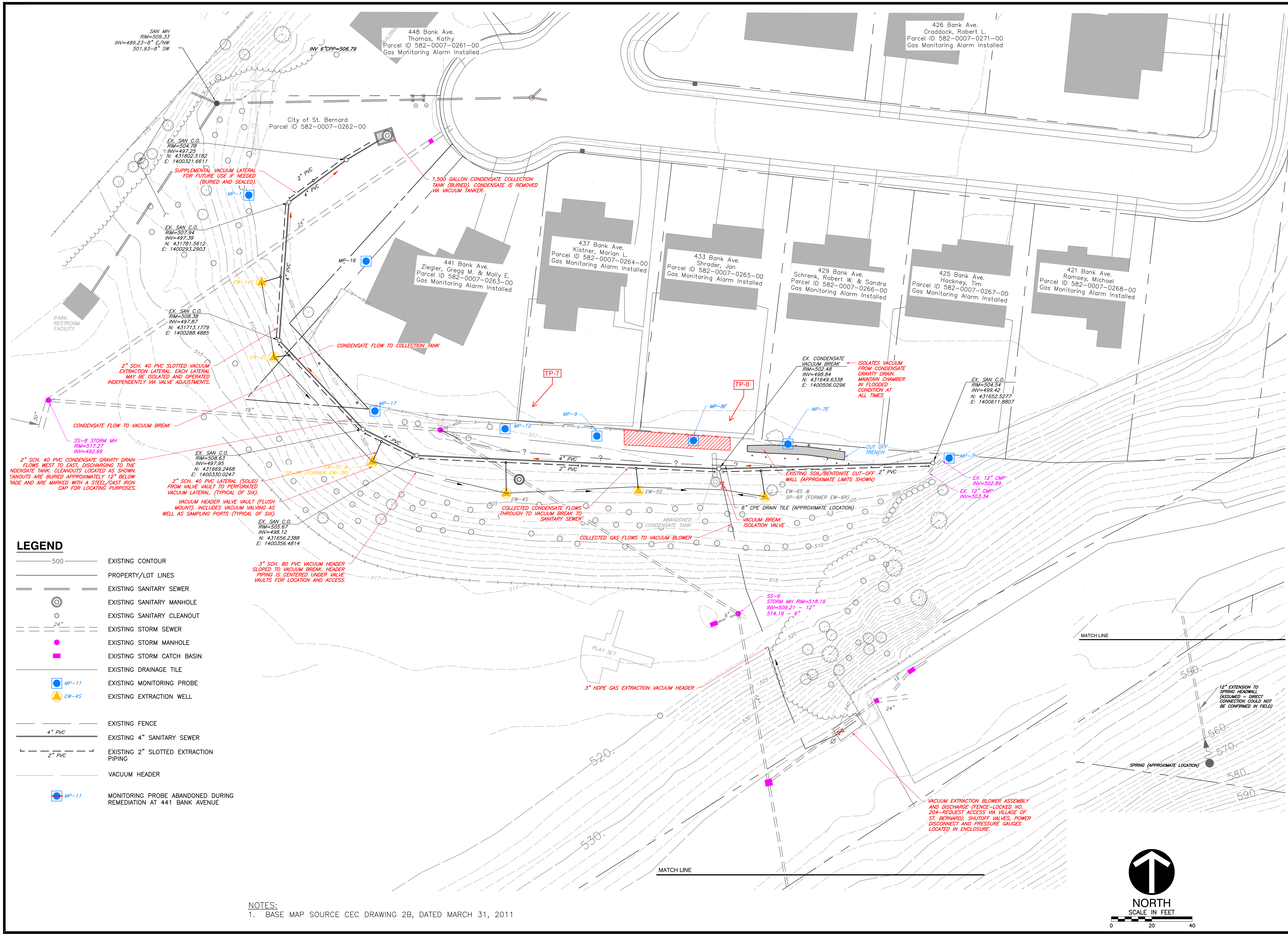
James J. Walsh, P.E.
Principal
SCS ENGINEERS

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

Enclosures

ATTACHMENT A

FIGURES



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
	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

NORTH
SCALE IN FEET
0 20 40

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

SCS ENGINEERS
STEARNS, CONRAD AND SCHMIDT CONSULTING ENGINEERS, INC.
2060 READING ROAD, CINCINNATI, OH 45202
PH. (513) 421-5353 FAX. (513) 421-2847

PROJ. NO. 23212007.02 | DSN. BY: CES | DWN. BY: FDB | CHK. BY: RCM | Q/A RVW BY: JJW | APP. BY:

CADD FILE: FIG 5
DATE: SEPTEMBER 2014
SCALE: AS SHOWN
DRAWING NO. FIG 1

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

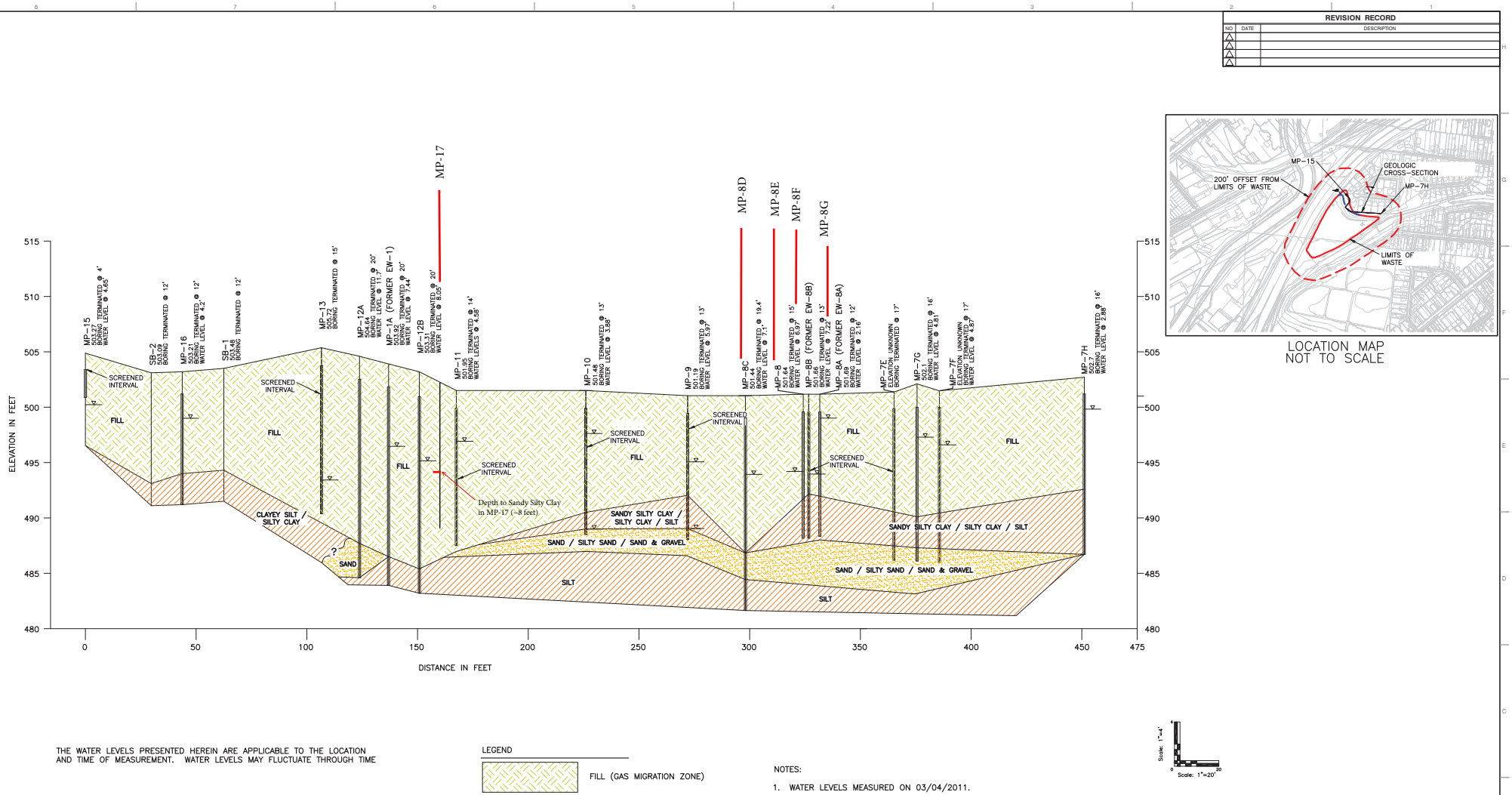


FIGURE 2. CEC 2011 Northern Geologic Cross Section

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		
12/16/16	0.3	0.3				
12/20/16	0	0				
12/22/16	0	0				
12/28/16	0.8	0.8				
12/30/16	0.2	0.2				
01/04/17	0.2	0.2				

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		
12/16/16	1.7	5.0	5.0	4.9	4.2	1.7
12/20/16	0	0				
12/22/16	0	0				
12/28/16	0.7	0.7				
12/30/16	0.2	0.2				
01/04/17	0.2	0.2				

ATTACHMENT C

BORING & TEST PIT LOGS

Civil & Environmental Consultants, Inc.
Cincinnati, OH (513) 985-0226 • (800) 759-5614
Pittsburgh, PA (412) 921-3402 • (800) 365-2324

CITY OF ST. BERNARD

St. Bernard, Ohio

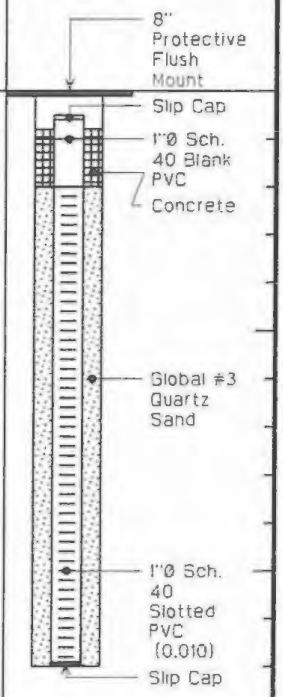
JOB NO.: 200610
LOG OF MP-9
Sheet 1 of 1

LOGGED BY: PCS
DRILLER: Jersey West Drilling
DATE DRILLED: 08/14/00
DRILL METHOD: 4 1/4 IN. HSA

GROUND SURFACE ELEVATION:
TOP OF CASING ELEVATION:
INITIAL WATER LEVEL: 12 ft. BGS **DATE:** 08/14/00
STATIC WATER LEVEL: **DATE:**

HNu (ppm)	Recovery (in.)	Blow Counts	Elevation, MSL	Depth (ft.)	Graphic Log	Materials Description
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		

Well Completion



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CITY OF ST. BERNARD

St. Bernard, Ohio

JOB NO.: 200610

LOG OF MP-10

Sheet 1 of 1

LOGGED BY: PCS

DRILLER: Jersey West Drilling

DATE DRILLED: 08/14/00

DRILL METHOD: 4 1/4 IN. HSA

GROUND SURFACE ELEVATION:

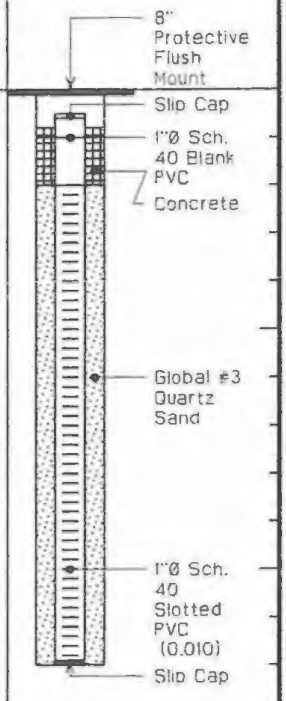
TOP OF CASING ELEVATION:

INITIAL WATER LEVEL: 12.5 ft. BGS DATE: 08/14/00

STATIC WATER LEVEL: DATE:

HNu (ppm)	Recovery (in.)	Blow Counts	Elevation, MSL	Depth (ft.)	Graphic Log	Materials Description
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 conrete 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)
1.0	22	1-1 2-1		10		Soft
1.9	16	1-1 1-2				Gray fine sandy silty CLAY w/ medium sand, moist, very soft Gray fine SAND, wet, very loose
				15		Boring terminated at 13 feet
				20		
				25		

Well Completion



Project Name: St. Bernard Landfill	SCS Project Number: 23212007.01	**Test Pit No.: 7 & "L"**	
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
1--				1.5	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,
3--					moist, with glass fragments, brick fragments, slight petroleum odor.
--					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,
--				0.4	car mirror.
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.

Project Name: St. Bernard Landfill	SCS Project Number: 23212007.01			**Test Pit No.: 8 & "T"**	
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	Date	Time	
Excavated By: Petro	Sampling Method:	8.5	4/16/13		
Excavation Method: Cat 308E	Weather:				
Backfill: excavated and off-site soil					
Total Test Pit Depth:					

Depth (ft.)	Sample No.	Methane Reading (%vol)	PID Scan (ppm)	PID Headspace (ppm)*	Description
0--					Approximately 12 inch landscaping mound adjacent to fence.
--					Brown to tan soil fill: CLAY & SILT, little Sand, little Gravel, moist
1--				1	Less than 5% non-soil debris.
--					At 1.5 feet becoming grey brown SILT & CLAY, and Sand, little Gravel with brick
2--					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
8--					organic material. Water coming into pit at bottom.
--					
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
11--					encountered. Headspace readings from TP-8"T", 0.2 and 0.1 ppm.

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