

December 9, 2022
File No. 23212007.10

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

Submitted Electronically

Subject: Village of St. Bernard Landfill
Revised Explosive Gas Monitoring Plan

Dear Ms. Lammers:

Enclosed please find a Revised Explosive Gas Monitoring Plan (EGMP) for the closed St. Bernard Landfill prepared and submitted by SCS Engineers on behalf of the Village of St. Bernard. The EGMP has been updated to in response to the Ohio EPA NOD letter of July 21, 2022 and subsequent communication with Ohio EPA.

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

Sincerely,



Randall C. Mills, P.G.
Senior Project Scientist
SCS Engineers



James J. Walsh, P.E., BCEE
Principal
SCS Engineers

RCM/JJW

cc: Nick Schapman, GHD
Tom Paul, Village of St. Bernard
Jonathan Stuchell, Village of St. Bernard
Chuck DeJonckheere, R.S., Hamilton County Public Health

Encl.



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401 East Fifth Street
Dayton, Ohio 45402-2911

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Subject: Village of St. Bernard Landfill
Revised Explosive Gas Monitoring Plan

Dear Ms. Lammers:

On Village of St. Bernard's behalf, SCS has reviewed the NODs listed in Ohio EPA's letter dated July 21, 2022 in regards to the Explosive Gas Monitoring Plan for the closed St. Bernard Landfill dated March 21, 2022. The deficiencies and our responses to the deficiencies are presented below.

1. Section 3.5, Gas Migration Pathways, is lacking a comprehensive discussion of potential gas migration to the southeast of the Facility as required by OAC Rule 3745-27-12(F)(2)(c). Please revise accordingly.

Response: A more comprehensive discussion on the barriers to potential gas migration to the southeast of the Facility has been added to Section 3.5. The east/southeast side of the landfill is bounded by a steep hillside that rises approximately 70 feet above the surface of the landfill. Numerous springs have been observed along the hillside, where groundwater is discharging to the ground surface. This intersection of the ground surface and water table is a barrier to gas migration. Based on the topographic conditions, the intersection of the water table and the ground surface, and the low level of gas generation and low pressure observed within the landfill, it is SCS's professional opinion that there are no pathways for gas migration along the southeast side of the landfill and no additional monitoring is recommended along this perimeter of the site.

2. The EGMP is missing installation procedures, quality assurance measures, and security measures for every probe and AMO. OAC Rule 3745-27-12(F)(2)(f)(viii) and (ix) requires the EGMP to include installation procedures, quality assurance measures and security measures. The EGMP is missing installation procedures, quality assurance measures, and security measures for every probe and AMO. Please include this information in the EGMP.

Response: A description of installation procedures, quality assurance measures, and security measures for the probes has been added to Section 5.6.

3. The EGMP does not denote any enclosed structures. OAC Rule 3745-27-12(F)(2)(b)(vi) requires "All on-site enclosed structures where one or more human beings may be present and all off-site enclosed structures where one or more human beings may be present located within one thousand feet of the horizontal limits of solid waste placement. The EGMP shall identify those enclosed structures that are occupied structures." Please include any enclosed structures in the topographic maps. If there are



no enclosed structures within 1,000 feet of the limits of solid waste placement or if the enclosed structures are occupied structures, please document this in the EGMP.

Response: The text has been revised to reflect that all enclosed structures are considered occupied structures.

4. Appendix A is missing new notification letters. OAC Rule 3745-27-12(F)(2)(g)(i) requires copies of letters sent to the entities in paragraph (J)(2) of OAC Rule 3745-27-12. Those entities include structure owners within 200-ft of the limits of waste placement, the appropriate Ohio EPA district office, the local board of health and the local fire department. Please revise Appendix A with copies of the new notification letters.

Response: Copies of new notification letters and one copy of the required map have been added to Appendix A, replacing the previous notification letters.

5. Appendix B is missing new notification letters, confirmatory communication, and a map. OAC Rule 3745-27-12(F)(2)(g) requires the following (a) Communications from the responsible party to the property owner of the occupied structure seeking consent to install an explosive gas alarm in the structure. (b) Confirmatory communication from the responsible party to each owner of an occupied structure that declines consent to install an explosive gas alarm in the structure. (c) A map depicting all occupied structures within two hundred feet of solid waste placement that have an explosive gas alarm installed. Please revise accordingly.

Response: Copies of new notification letters and one copy of the required map have been added to Appendix B.

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

Sincerely,



Randall C. Mills, P.G.
Senior Project Scientist
SCS Engineers
RCM/JJW



James J. Walsh, P.E., BCEE
Principal
SCS Engineers

cc: Nick Schapman, GHD
Tom Paul, Village of St. Bernard
Jonathan Stuchell, Village of St. Bernard
Dylan Dyer, Ohio EPA
Chuck DeJonckheere, R.S., Hamilton County Public Health

Encl.

EXPLOSIVE GAS MONITORING PLAN CLOSED ST. BERNARD LANDFILL

Village of St. Bernard
110 Washington Avenue
St. Bernard, Ohio 45217
(513) 242-7770

SCS ENGINEERS

23212007.09 | December 9, 2022

2060 Reading Road, Suite 200
Cincinnati, OH 45202
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APPLICATION



Explosive Gas Monitoring Plan Checklist – Application

Division of Materials and Waste Management
Tab 1 – Facility Information

| | | | |
|--|--|---|--|
| | | | |
| Facility Name: Closed St. Bernard Landfill | | | |
| Address: Ludlow Grove Park | | | |
| City: Cincinnati | | State: OH | Zip Code: 45217 |
| Contact Person: Mayor, Village of St. Bernard | | | Phone: (513) 242-7770 |
| Owner Name: Village of St. Bernard | | Operator Name: Village of St. Bernard | |
| Current Landowner or Lessee: Village of St. Bernard | | | Phone: (513) 242-7770 |
| County: Hamilton | | Township: not applicable | |
| Health District: Hamilton County | | | |
| Latitude: 39.167449 | | Longitude: -84.504519 | |
| Facility Status | Currently Operating: Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> | Closed: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> | If Closed – Date facility ceased accepting waste: 1977 Date of Certification of Closure: 1977 |
| Number of Occupied Structures | Within 200 ft. of emplaced waste: 9 | Within 1000 ft. of emplaced waste: 232 | |

A mark in a check box for any of the sections below means the EGMP includes an in-depth discussion and/or documentation of how each element within the section will be or is met by the facility.

For EPA Use Only

| |
|--|
| Date: Click or tap to enter a date. |
| Reviewer: Click or tap here to enter text. |
| District office: Click or tap here to enter text. |

Tab 2 – Explosive Gas Monitoring Network

OAC Rule 3745-27-12(F)(2)(a)

| | Applicant Use Only | Ohio EPA Use Only |
|--|---|--------------------------|
| | Mark if submitted within this application | Application Complete |
| A description of the explosive gas monitoring network that demonstrates the network conforms to paragraph (H) of this rule | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| <p>A description of the explosive gas monitoring network that demonstrates the network is capable of measuring explosive gas (methane) concentrations:</p> <ul style="list-style-type: none"> • 1.25 per cent by volume or twenty-five per cent of the LEL in occupied structures and/or • Five per cent by volume or one hundred per cent of the LEL at the facility boundary | <input checked="" type="checkbox"/> | <input type="checkbox"/> |

Tab 3 – Property Information and Records Review
OAC Rule 3745-27-12(F)(2)(b)

| | Applicant Use Only | Ohio EPA Use Only |
|--|---|--------------------------|
| | Mark if submitted within this application | Application Complete |
| Detailed topographical maps (1"= 200 feet) | | |
| A YES for this component means the map(s) contain all of the following elements (it does not have to be on one map, as multiple maps may be used as long as all the elements are contained between all the maps). | | |
| Does the map(s) include each of the following elements? | | |
| • Indication of the landfill property boundary | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| • Indication of the landfill facility boundary | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| • Indication of the horizontal limits of waste placement of the landfill | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| • Indication of a 200-foot zone from the limits of waste placement | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| • Indication of a 1000-foot zone from the limits of waste placement | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| • Indication of all property ownership within the 200-foot zone | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| • Indication of all political subdivisions within the 200-foot zone | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| • Indication of all property boundaries within the 1000-foot zone | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| • Indication of all parcel numbers within the 1000-foot zone | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| • Indication of all political subdivisions within the 1000-foot zone | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| • Indication of all structures located within the footprint of the landfill | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| • Indication of all structures located within 1000-foot zone | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| • Indication of all structures within the footprint of the landfill and within 1000-foot zone that are "enclosed" structures as defined by this rule | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| • Indication of all potential manmade explosive gas migration pathways within the 1000-foot zone? (such as; sewer, water, buried utilities, roads, railroads, mines, field tiles, pipelines) | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| • Indication of any other potential sources of explosive gas within the 1000-foot zone? (such as: oil and gas wells, other landfills, swamps, natural gas lines) | <input checked="" type="checkbox"/> | <input type="checkbox"/> |

- Indicate all man-made features that may act as a barrier to explosive gas migration or allow for venting of explosive gas



Tab 4 – Geologic Information
OAC Rule 3745-27-12(F)(2)(c)

| | Applicant Use Only Mark Yes if submitted within this application or note date when submitted during the past year | Ohio EPA Use Only Application Complete |
|--|---|--|
| Discussion and/or documentation of the groundwater surface elevation in the proximity of the solid waste placement | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Discussion and/or documentation of all fluctuations in ground water levels within the solid waste footprint | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Discussion and/or documentation of site topography within the footprint of the landfill | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Discussion and/or documentation of the topography of the surrounding area within the 1000-foot zone of the landfill | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Discussion and/or documentation of any natural site characteristics that may act as a barrier to gas migration towards occupied structures either on or within the 1000-foot zone of the landfill | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Discussion of any natural site characteristics that may allow for venting of gas and thus act to prevent migration towards occupied structures either on or within the 1000-foot zone of the landfill | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Discussion of all potential gas migration pathways and their associated gas hazard for migration or accumulation within occupied structures either on or within the 1000-foot zone of the landfill | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Discussion and identification of any other sources of gas generation or presence within the 1000-foot zone of the landfill that may potentially cause subsurface migration of gas towards occupied structures either on or within the 1000 foot zone of the landfill | <input checked="" type="checkbox"/> | <input type="checkbox"/> |

Tab 5 – Landfill Characteristics

OAC Rule 3745-27-12(F)(2)(d)

| | Applicant Use Only Mark Yes if submitted within this application or note date when submitted during the past year | Ohio EPA Use Only Application Complete |
|--|---|--|
| Discussion and/or documentation of the lowest elevation of waste placement within the footprint of the landfill | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Discussion and/or documentation of the approximate acreage of solid waste placement | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Discussion and/or documentation of the types of waste that have been disposed at or will be disposed at the solid waste landfill facility (Such as; Industrial wastes, construction and demolition and debris, yard waste, incinerator wastes, municipal solid waste – household trash) | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Discussion and/or documentation of the historical operations of the landfill, if available or applicable: | | |
| <ul style="list-style-type: none"> • Date of the initial solid waste license | <input type="checkbox"/> | <input type="checkbox"/> |
| <ul style="list-style-type: none"> • Date of any subsequent licenses | <input type="checkbox"/> | <input type="checkbox"/> |
| <ul style="list-style-type: none"> • Date of initial operations | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| <ul style="list-style-type: none"> • Date of cessation of waste acceptance | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| <ul style="list-style-type: none"> • Date closure activities were completed | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| <ul style="list-style-type: none"> • Date the closure certification report was submitted to the director | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| <ul style="list-style-type: none"> • All previous regulatory authorizations granted for the site regarding explosive gas management (Director's Final Findings and Orders, Rule 513, Enforcement actions, etc.) | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| <ul style="list-style-type: none"> • All current regulatory authorizations granted for the site regarding explosive gas management (Director's Final Findings and Orders, Rule 513, Enforcement actions, etc.) | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| <ul style="list-style-type: none"> • Names of prior owners for all of the real property within the facility boundary | <input checked="" type="checkbox"/> | <input type="checkbox"/> |

Tab 6 – Explosive Gas Investigation
OAC Rule 3745-27-12(F)(2)(e)

| | Applicant Use Only Mark Yes if submitted within this application or note date when submitted during the past year | Ohio EPA Use Only Application Complete |
|---|---|--|
| A description and evaluation of the effectiveness of the following: | | |
| <ul style="list-style-type: none"> Any existing gas monitoring system | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| <ul style="list-style-type: none"> Any existing gas extraction system | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| <ul style="list-style-type: none"> Any existing gas venting system | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Discussion and/or documentation of historical records detailing any previous explosive gas investigations (including but not limited to probe sampling results and any other type of gas sampling results) | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| A discussion of any of the following that could be attributed to current explosive gas presence: | | |
| <ul style="list-style-type: none"> Dead vegetation | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| <ul style="list-style-type: none"> Odors | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| <ul style="list-style-type: none"> Unusual snow melt | <input checked="" type="checkbox"/> | <input type="checkbox"/> |

**Tab 7 – Explosive Gas Monitoring Probes and AMDs
OAC Rule 3745-27-12(F)(2)(f)**

| | Applicant Use Only Mark Yes if submitted within this application or note date when submitted during the past year | Ohio EPA Use Only Application Complete |
|--|---|--|
| <ul style="list-style-type: none"> The schematic of the design that conforms to paragraph (G) of this rule. | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| <ul style="list-style-type: none"> The location and the geo-coordinate on a plan drawing | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| <ul style="list-style-type: none"> The total depth of the device | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| <ul style="list-style-type: none"> The total length of the screen interval, if applicable. | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| <ul style="list-style-type: none"> The identification designation | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| <ul style="list-style-type: none"> Methods of construction | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| <ul style="list-style-type: none"> Materials used in construction | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| <ul style="list-style-type: none"> Installation procedures and quality assurance measures | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| <ul style="list-style-type: none"> Security measures capable of protecting the probe or AMD from vandalism, impact damage, and weather, as applicable | <input checked="" type="checkbox"/> | <input type="checkbox"/> |

Tab 8 – Appendices
OAC Rule 3745-27-12(F)(2)(g)

| | Applicant Use Only Mark if submitted within this application | Ohio EPA Use Only Application Complete |
|--|--|--|
| Appendix A – Copies of letters sent to the entities listed in paragraph (J)(2) of this rule, which specify the location of the solid waste landfill facility and the proximity of the occupied structure. | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Appendix B Copies of letters of notification and consent to install gas alarm | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Appendix C Hydrogeologic boring logs (if available) | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Appendix D Certification reports in accordance with paragraph (G)(2) of this rule. | <input type="checkbox"/> | <input type="checkbox"/> |
| Appendix E The most recent deed for each parcel of the solid waste landfill facility property. | <input checked="" type="checkbox"/> | <input type="checkbox"/> |

1.0 INTRODUCTION

The completed application form is provided at the front of this document. It is noted throughout this document that the Village of St. Bernard was formally classified as a City prior to April 2011. Therefore, past references in this document remain attributed to the City of St. Bernard, while present day references will refer to the Village of St. Bernard.

This updated Explosive Gas Monitoring Plan (Plan) was prepared for the former City of St. Bernard (City) Landfill, now known as Ludlow Grove Park. The landfill is located at the end of Phillips Avenue in the Village of St. Bernard. The former landfill lies immediately east of Interstate I-75, and is adjacent to the Bank Avenue residential subdivision. The portion of the subdivision closest to the landfill is commonly referred to as “Phase II”. The primary use of the facility currently is as a Village park including soccer fields and associated green space. An area map depicting the site location is provided as Figure 1.

The landfill is located within an area of the Village with a significant history of industrial use. Accounts of development reflect industrial use as early as the late 1800s and continuing through the late 1970s. Industrial facilities within the immediate vicinity included those used for the production of animal hides, starch, glues, fertilizers, electrical equipment, and greenhouse products. These are documented within historical accounts of the area maintained and published by the Village.¹

In the late 1970s and early 1980s, the City (now Village) began the process of acquiring various industrial properties with the intent of converting the area outside of the solid waste landfill to a residential area. Prior to residential development, the area adjacent to the landfill was used as a soccer and baseball field. Anecdotal information suggests that the industrial structures were demolished with demolition materials used to fill what is now land occupied by residential structures. Observations within the area, both surficial and subsurface, support this account. An aerial photo of the landfill in relation to the former industrial complex is provided as Figure 2.

The precise use and history of the landfill is not well known. However, anecdotal information suggests that it was used as an ash and “by-pass” disposal facility for the former City of St. Bernard municipal solid waste incinerator, as well as disposal of construction and demolition debris generated within the City. Aerial photographic records indicate that the landfill was generally maintained as an open disposal area with limited waste volumes disposed throughout its operating history. Although the volume of waste material in-place and predominant waste composition is not known, positive detection of methane gas along the northern perimeter of the facility does suggest that at least some portion was organic and capable of generating measurable quantities of methane gas.

By letter dated May 5, 1977, Ohio EPA confirmed that the landfill was closed. Capping of the landfill was conducted during the period of 1981 through 1985. Photographic records indicate the cap was placed as early as 1981. Information obtained from the Village of St. Bernard indicates that approximately five to six feet of cover material was applied over the fill area, which was then seeded and landscaped for use as a public park. This information was supported by observations recorded in November 2010 during installation of two power poles within the footprint of the landfill cover. At

¹. Referenced from the document titled: *St. Bernard, Ohio, 1878-1978*. This document is a historical account of the area formerly known as Ludlow Grove.

least six feet of clean cohesive cover material was observed and photographed in boreholes, thereby supporting reported cover operations.

Currently, the cap is maintained in good condition. No settlement, leachate seeps, gas seeps, or other common problems associated with closed landfills have been observed on-site since routine gas monitoring was resumed in July 2000.

The implementation of monitoring and migration control are described in detail in Sections 5.4 and 5.2 respectively. The initial probes were installed and monitoring began in the early 1990s. The initial migration control system was installed in 2001. The current system was installed in 2010 and activated in 2011.

PREVIOUSLY PREPARED EXPLOSIVE GAS PLANS

Previously prepared and approved explosive gas monitoring plans and system design reports are extensively referenced throughout this revised Plan. These plans and reports are identified as follows:

- Explosive Gas Monitoring, Sampling, and Reporting Procedures, St. Bernard Landfill, October 4, 1991.
- Explosive Gas Monitoring System Design, St. Bernard Landfill, October 4, 1991.
- Explosive Gas Monitoring Plan, Former City of St. Bernard Landfill, CEC, November 18, 2011.
- Revised Explosive Gas Monitoring Plan, Former City of St. Bernard Landfill, SCS, December 5, 2014
- Revised Explosive Gas Monitoring Plan, Former City of St. Bernard Landfill, SCS, June 2015
- Revised Explosive Gas Monitoring Plan, Former City of St. Bernard Landfill, SCS, August 2018
- Revised Explosive Gas Monitoring Plan, Former City of St. Bernard Landfill, SCS, February 2020.

It is noted that various items of information presented in these documents with respect to landfill history, disposal practices, waste composition, and waste streams accepted cannot be presently verified, nor do they appear to be supported by documentation or historical data. However, these documents as a whole are nonetheless useful for the purposes of overall evaluation of explosive gas migration at the site. Various report figures, site maps, drawings, and illustrations from these previously prepared plans are also utilized throughout this updated Plan where applicable and appropriate.

2.0 TOPOGRAPHIC MAPS

OAC 3745-27-12 (F)(2)(b)

Site topography is provided on Figure 3. The information required by OAC 3745-27-12 (F)(2)(b)(i) through (ix) is presented in the following sections and/or shown on the figures described in the following sections.

Property Boundary and Facility Boundary, Horizontal Limits of Waste Placement

OAC 3745-27-12 (F)(2)(b)(i)

The landfill property is situated on several property parcels acquired by the City of St. Bernard since the early 1940s. Major revision to property boundaries occurred in the early 1940s with construction of the Mill Creek Expressway (Interstate-75), and again in the late 1970s and early 1980s with development of the Bank Avenue Subdivision. Landfill parcel boundaries and the property boundaries, property owners, and parcel identification numbers of properties within 1,000 feet of the limits of waste are provided on Figure 4. The list of parcel identification numbers and parcel ownership information for parcels within 200 feet of the limits of waste are also presented in Table 12. The limits of waste incorporate the following parcels:

- 582-007-0002-90
- 582-007-0207-90
- 582-007-0262-90
- 582-007-0287-00

An Environmental Data Resources, Inc. (EDR) Chain of Title report for the parcels listed above is presented in Appendix E. The report includes a copy of the deed for each parcel and a list of the previous owners back to approximately 1940.

The basis for assignment of the horizontal extent of the landfill is based upon review of historical site photos, topographic maps, and similar available documentation and the test pits performed for the Delineation Investigation. An Aerial Photographic Analysis Report dated November 1, 2012 was prepared by Environmental Research, Inc. (ERI) and detailed the development of the Landfill and surrounding areas from 1946 to 2009. There is general agreement on the extent of the landfill along its eastern, southern, and western boundaries. The eastern boundary is approximately the intersection of the flat surface of the closed landfill and the hillside slope parallel with the access road along the former canal right of way. The southern boundary is roughly parallel to the tree line on the hillside south of the landfill. The western boundary is approximately the base of the slope between the flat surface of the closed landfill and the I-75 shoulder. The Village of St. Bernard has determined that the northern boundary of the landfill limits of waste is located within the Village owned property parcel(s) which contain the landfill.

The landfill property parcel boundaries, facility boundary, and limits of waste placement are shown on Figures 3 and 4.

Two Hundred and One-Thousand Foot Offsets

OAC 3745-27-12 (F)(2)(b)(ii) & (iii)

A vicinity plan depicting the 200 and 1,000 foot offsets from the landfill limits of waste is provided on Figure 4. The property parcels boundaries, the facility boundary, and limits of waste placement are shown on Figure 4.

Property Boundaries, Property Ownership, and Political Subdivisions

OAC 3745-27-12 (F)(2)(b)(iv) & (v)

Property boundaries within 1,000 feet of the landfill are illustrated on Figure 4. Properties within 1,000 feet of the landfill are generally bounded by Ross Avenue to the North, Andalus Court to the East, and Vine Street to the South. Information of property owners within 200 ft of the limits of waste is provided on Figure 4 and Table 1. Parcel numbers for properties between 200 and 1,000 feet of the limits of waste are shown on Figure 4 and listed in Table 1.

The properties located within 1,000 feet of the landfill property are primarily within the Village of St. Bernard, with some properties to the west located in the City of Cincinnati. Political boundaries, zoning and related boundary information are referenced on Figure 4. Zoning for the landfill parcel and adjacent areas is primarily residential (R-1 and R-2). The zoning of the parcels listed in the table on Figure 4 are shown by the color of the text within the table.

On-Site and Off-Site Structures Within 1,000 Feet

OAC 3745-27-12 (F)(2)(b)(vi)

On-site and off-site enclosed and occupied structures within 1,000 feet of the landfill are depicted on Figure 4. The single on-site structure is a passively ventilated restroom facility with large, screened areas on the gable ends of the building. It is used to service the soccer fields and is not considered enclosed or occupied.

Verification of on-site and off-site structures was conducted through review of Hamilton County CAGIS and property tax data following a graphical offset of limits of waste placement.

Other sources of explosive gas are described in Section 3.6 below.

Potential Manmade Explosive Gas Migration Pathways

OAC 3745-27-12 (F)(2)(B)(vii)

Potential manmade pathways include various storm sewers, sanitary sewers, and drainage tiles. The approximate position and alignment of the storm sewers is based on a visual investigation of manholes and inlets, and is therefore an estimation of actual alignment. Other pathways include underground service utilities (water, electric, natural gas, etc.) servicing the park restroom, as well as adjoining properties. The known locations of potential manmade explosive gas migration pathways are illustrated on Figure 5. Mapping for all the pathways listed above is not available from the utilities directly or Hamilton County GIS records.

The 6-inch corrugated drain tile identified on Figure 6 was not located by survey, but was encountered during installation of vacuum piping in the vicinity of one of the 7-series wells. No record for installation of this tile was recorded by the City. The alignment of the exposed portion of the tile suggested that it roughly parallels the toe of the landfill slope. This tile discharges into the storm sewer inlet behind 441 Bank Avenue; however, no inlet structure was found. Further discussion of the tile as a migration pathway is presented in Section 3.5.

A 12-inch corrugated metal culvert was located adjacent to monitoring probe MP-7H during installation of the perimeter extraction system. The purpose or extent of this culvert is not known and initial sampling during construction activities did not indicate the presence of combustible gas.

3.0 GEOLOGIC INFORMATION

OAC 3745-27-12 (F)(2)(c)

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.

3.1 GROUNDWATER

OAC 3745-27-12 (F)(2)(c)(i)

Considerable variation in groundwater levels along the northern boundary of the landfill has been recorded through measurement of static water levels in gas monitoring probes and extraction wells. Although approximate water table elevations identified in the 1991 Design Report suggested groundwater elevations are approximately 10 to 15 feet below ground surface, measurement in the monitoring probes indicate that the groundwater table is responsive to precipitation, and varies based on location and climatic (barometric pressure, etc.) conditions. Water levels are shown for the probes depicted on the geologic cross section along the northern perimeter of the landfill presented as Figure 7.

Generally, this area of the site collects stormwater runoff from the park soccer fields, as well as hillside runoff upslope from Phillips Avenue. Anecdotal information from local residents and City (now Village) officials indicates that the area in which monitoring probes MP-7H through MP-11 (abandoned, see Figure C-1 for location) are currently located was formerly a very wet “swampy” area prior to the construction of the Bank Avenue subdivision. The addition of stormwater drainage utilities has apparently eased this condition; however, probe data suggest that groundwater elevations along this margin of the landfill are quite responsive to wet weather.

In general, wet weather and subsequent groundwater table response is anticipated to affect landfill gas movement as well as gas extraction efficiency.

3.2 SITE AND SURROUNDING TOPOGRAPHY

OAC 3745-27-12 (F)(2)(c)(ii)

The topography of the landfill and surrounding area generally consists of a series of hillside terraces transitioning to a lower flatland now developed for residential housing (Bank Avenue Subdivision). The landfill itself has been converted to a large flat terrace which is used as an athletic field. Area topography is depicted on Figure 3.

3.3 NATURAL OR MAN-MADE CHARACTERISTICS ACTING AS IMPERVIOUS BOUNDARIES OR VENTS

OAC 3745-27-12 (F)(2)(c)(iii)

The native soil underlying the fill acts as a natural barrier to gas migration. No consistent geologic trend or formation has been identified along the perimeter of the site other than this soft, saturated silty sand/sandy clay formation into which the majority of monitoring probes were advanced and terminated. The elevation of this formation varies, and may be referenced on the geologic section provided on Figure 7. Fill material and a variety of clayey soils predominate in the interval above this unit.

Generally, considering the silt content and degree of saturation observed within this unit, it represents a likely barrier to downward gas migration. The overlying fill material is likely the predominant transmissive zone, and is believed to be the primary unit of interest with respect to gas migration and control. In addition, the presence of the wood and similar organic debris recorded in monitoring probe installation logs and the Delineation Investigation test pit logs indicates that said organic content may support limited generation of methane gas.

3.4 HYDROGEOLOGIC CROSS SECTION

OAC 3745-27-12 (F)(2)(c)(iv)

A geologic cross section of the northern perimeter of the site is provided on Figure 7. This cross section depicts borehole information gathered during installation of various gas monitoring probes and other subsurface investigations. It is noted that information provided on this cross-section was developed through extrapolation of borehole information obtained at approximate 50-foot spacing. Based on the heterogeneity of the subsurface within potential transmissive zones, appropriate caution is recommended regarding strict interpretation of geology between borehole locations.

3.5 GAS MIGRATION PATHWAYS

OAC 3745-27-12 (F)(2)(c)(v)

Several potential explosive gas pathways have been identified at the former landfill. However, it is noted that the analysis of pathway risk includes consideration of the nature of the landfill, its relatively small size, and limited gas production observed to date. The gas generation potential of the landfill is further discussed in Section 1.0 above. Several pathways, while present, represent low or minimal risk to structures due to these factors. The analysis also considers the unique topography associated with the immediate area, and physical barriers or likely points of atmospheric discharge for accumulated gas that this topography provides. The focus of monitoring and data

evaluation should be focused on the northern perimeter of the site where the former landfill property limits are contiguous with several Bank Avenue residential properties. There are some pathways that exist within the landfill and potentially connect to pathways at the perimeter of the landfill (Figures 5 and 6). These pathways include the storm sewer along the western edge of the landfill that drains the landfill surface, and the water and sanitary sewer lines that serve the restroom building. A brief discussion of pathways identified along the perimeter of the landfill is presented in the following narrative.

Primary Pathways of Concern - North

The primary pathways of concern lie along the northern perimeter of the site, where the former landfill property lines are 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. 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. This fill is assumed to be the primary route for any potential gas migration along this boundary of the site. While the exact extent of fill placement beyond site property boundaries is not known, reports, City Council meeting minutes, etc. suggest that fill material was placed through the Bank Avenue development adjacent to the landfill to raise the grade for the soccer and baseball field, prior to the second fill layer to raise the grade for the later Bank Avenue development.

The fill is underlain by undisturbed geologic formations consisting of saturated silty sand and/or sandy clays. This underlying formation appears to serve as a lower bound for any gas migration. Borehole logs indicate that this underlying formation is typically very moist to wet. Blow counts suggest a normally consolidated formation, possibly indicating backwater or floodplain deposits that may have been associated with the Mill Creek Valley.

In addition to the fill, stormwater utilities are also located along this northern property boundary, and represent potential gas migration pathways. The location and description of these utilities may be referenced on Figures 5 and 6. In addition to these mapped utilities, a previously unidentified corrugated polyethylene drain tile was also located during installation of vacuum lines in the vicinity of extraction well EW-7. This 6-inch tile roughly parallels the toe of the landfill slope and also represents a potential gas migration pathway. No record of installation for the tile is known to exist. The outlet of the drain tile is located at the stormwater inlet (labeled as INV. 496.68-8"E) located between abandoned probes MP-10 and MP-11 (see Figure C-1). No defined surface inlet structure related to this drain tile has been observed or is known to exist. The tile appears to have been installed as an infiltration device to assist in removal of ponding water which accumulates along the toe of the landfill slope.

In addition to stormwater utilities located on-site along this site perimeter, off-site storm drains along Bank Avenue have previously been monitored for evidence of gas accumulations. No methane has been detected in storm drains located on Bank Avenue from June 2000 through June 2017, therefore these locations are no longer being monitored as approved by Ohio EPA. Other underground utilities are present along Bank Avenue, including sanitary sewer, electric, phone, cable, water, and natural gas, that could represent potential pathways. The locations of the sanitary and storm sewers are shown on Figure 5. Mapping for the other utilities along Bank Avenue are not readily available.

To address the identified potential for migration through subsurface utilities, the addition and/or maintenance of existing combustible gas indicators (CGIs) within structures located within 200 feet of the landfill property boundary is recommended as a component of this Plan, contingent on approval for the installation by the building owners and/or occupants.

Primary Pathways of Concern -West

The elevation of the landfill and Interstate-75 do not preclude the potential for gas migration assuming appropriate geology and adequate gas pressure is present. While geologic conditions under Interstate-75 were not evaluated for the purposes of this Plan, it is assumed that the geology immediately under Interstate-75 has undergone significant modification during roadway construction. Thus, any presumption of continuity for geologic formations that exist adjacent to the landfill may not accurately reflect the nature and extent of potential pathways under Interstate-75. While examination of geologic conditions under Interstate-75 was not undertaken as a component of this Plan, it is conservatively assumed that potential gas pathways may exist.

Assuming the presence of migration pathways, topography must then be considered in the evaluation of migration potential. Examining topography west of the landfill, it is seen that the Mill Creek channel forms a potential barrier to gas migration. Assuming prevailing groundwater table is at or near the water surface within the Creek and Creek banks provide sufficient area for discharge of gas to the atmosphere, the Creek represents a limit for gas migration west toward the Vine Street industrial corridor. Also, considering the low level of gas generation and low pressure observed within the landfill, the potential for migration under Interstate-75 and across the Mill Creek channel is considered limited.

For structures located east of the Mill Creek but west of Interstate-75, potential migration pathways were also evaluated. A series of commercial structures are located southwest of the landfill. Assuming appropriate geologic conditions exist, potential subsurface migration cannot be discounted. However, structures in this area are constructed slab-on-grade, and the ground surface profile approaches the estimated base elevation of the landfill, thus offering significant opportunities for atmospheric discharge of migrating gas. Combined with the low level of gas pressure observed at the landfill and distance to the structures, migration potential and risk to these structures is also considered low.

Based on these observations and current conditions at the landfill, no additional subsurface monitoring west of the landfill is currently recommended.

Primary Pathways of Concern – East/Southeast

The east/southeast side of the landfill is bounded by a steep hillside that rises approximately 70 feet in elevation above the surface of the landfill. This slope provides a significant opportunity for any landfill gas, if present, to vent to the surface before migrating any significant distance horizontally. Numerous springs have been observed along the hillside, where groundwater is discharging to the ground surface. The intersection of the water table and the ground surface is a boundary to gas migration. Considering the low level of gas generation and low pressure observed within the landfill, the potential for migration to the southeast is considered minimal. As can be seen on Figure 4, more than half of the area southeast of the landfill is occupied by the St. Johns German Catholic Cemetery. Based on the topographic conditions and the intersection of the water table with the ground surface and the low level of gas generation and low pressure observed within the landfill, it is SCS's professional opinion that there are no pathways for gas migration along the southeast side of the landfill and no additional monitoring is recommended along this perimeter of the site.

Based on these observations and current conditions at the landfill, no additional subsurface monitoring east/southeast of the landfill is currently recommended.

3.6 OTHER SOURCES OF EXPLOSIVE GAS

OAC 3745-27-12 (F)(2)(c)(vi)

As previously indicated, organic materials within debris fill, mainly buried wood, may be of sufficient volume to produce measurable quantities of methane gas. As part of the Delineation Investigation, an estimate of the methane potentially generated by the organic material in the soil fill was calculated using a USEPA LandGEM Model. The results of this modeling indicated that the quantity of gas generated did not represent a threat to the residential properties adjacent to the northern boundary of the landfill property. Accumulations of organic material, previously described as peat, are present in the native glacial deposits and decomposition of these materials may generate methane. Test borings have indicated that this material is not horizontally continuous in the site vicinity and, where present, its thickness is less than six inches. In addition, anecdotal reports indicate a significant portion of the site was seasonally inundated or “swampy” prior to development. Swamp deposits that were accumulated then buried during development of the residential subdivision may also represent a potential source of gas generation.

Other non-landfill related sources of explosive gas include yard waste deposits placed by the City along the northeast portion of the site (approximate area of reported disposal area is indicated on Figure 3). While it is reported by City (now Village) personnel that yard waste was accumulated along the surface of this slope and not buried (thus promoting surface discharge of accumulated gases), limited potential exists for contribution to subsurface gas migration. Prior investigation of this area including installation of a monitoring probe at the base of this hillside indicated no significant combustible gas concentrations are present. Based on the location of this area and prior investigation results, no further monitoring of this area is deemed necessary.

With respect to public utilities, natural gas supply and sanitary sewer lines serving residences are identified as a potential off-site source of explosive gas. These utilities are located in the Bank Avenue right-of-way and are not considered significant with respect to assessment of gas migration from the landfill. No other potential off-site sources of explosive gas have been identified at this time.

4.0 FACILITY INFORMATION

OAC 3745-27-12 (F)(2)(d)

Lowest Elevation of Waste Placement

OAC 3745-27-12 (F)(2)(d)(i)

No recorded information is known to exist with respect to the depth of waste or excavations associated with the former landfill. Anecdotal information from various parties contained in the 1991 Design Report suggests that the landfill was developed principally as an area fill with limited excavation, if any. Previous research regarding landfill depth and methods of disposal was described in Section 3.0 of the 1991 Foppe Thelen Design Report and is summarized below. The present top surface of the landfill varies from 516 to 520 feet in elevation. Topographic maps of the area prior to commencement of landfill activities were obtained (Hamilton County, 1914, 1959). Both the 1914 and 1959 maps indicate that the surface of the landfill area, prior to filling, was at an elevation of less than 495 feet but greater than 490 feet. This is consistent with the boreholes and

test pits mentioned previously which indicate an elevation of 491 to 493 feet (±). Therefore, the depth of the landfill is estimated to vary between 23 and 29 feet.

Approximate Acreage of Solid Waste Placement

OAC 3745-27-12 (F)(2)(d)(ii)

The approximate area of waste placement is estimated to be 3 acres based on the limits of waste shown on Figure 3.

Historical Operations

OAC 3745-27-12 (F)(2)(d)(iv)

As previously indicated, historical operating information is related primarily to anecdotal information from City (now Village) officials or residents of the area. This information was described in Section 3.3 of the 1991 Foppe Thelen Design Report and is summarized below. The land occupied by the majority of the landfill (parcel number 582-0007-0002-90) has been owned by the City of St. Bernard since 1945. The City acquired the land from E. I. DuPont Company. The City began controlled waste disposal sometime prior to 1958 as indicated by 1958 aerial photographs acquired from Hamilton County. No permits or other authorization were obtained prior to 1958. The exact date of initial operation is not known. Copies of annual operating licenses for the landfill, if any exist, are not available. The Hamilton County Health Department was contacted and had no records of any licenses for the St. Bernard Landfill. At the time the landfill operations began, the City of St. Bernard had its own health department. The Village of St. Bernard has no records of any licenses for the landfill. A summary of regulatory authorizations is presented below.

| Date | Document |
|--------------------|---|
| May 5, 1977 | Acknowledgement of Closure |
| April 14, 2003 | Director's Final Finding and Orders |
| May 18, 2004 | OAC 3745-27-13 Authorization |
| September 16, 2009 | Director's Final Finding and Orders |
| September 9, 2010 | Remedial Action Plan & Response to Comments |
| June 8, 2011 | OAC 3745-27-13 Authorization for ODOT |
| December 12, 2011 | Alteration to Approved EGMP |
| May 16, 2012 | Approval of 2 nd Revision to Explosive Gas Remediation Plan |
| November 6, 2012 | Alteration to Approved EGMP |
| November 6, 2012 | Alteration to 1 st Remediation Plan |
| December 17, 2012 | Delineation Plan |
| February 2, 2015 | Alteration to EGMP Approved |
| February 13, 2018 | Approval to abandon MP-10 |
| December 16, 2019 | Ohio EPA terminates September 2009 Director's Final Findings and Orders |

For several years, the disposed material was not graded or covered but during the later years of operation the material was graded and covered weekly with several feet of soil. Final grade was achieved by covering the landfill area with 3 to 5 feet of clay in 1981, with additional soil added later for the development of the soccer field.

The area occupied by the landfill was for years a vegetable farm and orchard. The landfill began by disposal over the outslope of the Miami and Erie Canal bench. A 1958 aerial photograph and the

1959 topographic map compiled from the photo show a small area of disposal near the southern corner of the area. The canal bench was the disposal point and the disposed material fanned out onto the flat area below. Total area covered was approximately 150 feet wide by 200 feet long. The remainder of the area was orchard and gardens. I-75 had already been constructed. The subdivision area northeast of the landfill was at this time also gardens except for the eastern 1/3 which was occupied by small warehouses and factories.

A 1973 aerial photograph shows that the landfill was actively receiving disposed material. An access road had been constructed from the canal bench down to the flat along the southwest side. Disposal was apparently still taking place over an approximately 250 foot length extending from the access road northeast along the canal bench. The remainder of this slope between the bench and the flat area is tree covered. Disposed material is seen in a band approximately 200 feet wide parallel to I-75 and running along the western side of the landfill property. This band is approximately 500 feet long, with the end near the present northern boundary of the landfill at the approximate center of the curve in the face. The warehouses and factories are still present.

By letter dated May 5, 1977, the Ohio EPA confirmed that the landfill had been closed.

A pre-1978 aerial photograph shows that the landfill had nearly assumed its present shape. The surface was apparently still receiving material for disposal, but the northern face had already been graded. The disposal area between the canal bench and the flat has already been graded over a length of approximately 350 feet and is grass covered. The undeveloped portion of the subdivision area had been graded and is occupied by a baseball/soccer field. Several of the southernmost factories/warehouses have been demolished.

By 1981, the final grading of the landfill had been completed. The slope area between the canal bench and landfill had been graded and was grass covered. The landfill surface had also been graded to its present configuration. The baseball/soccer field is still present but several more of the factories/warehouses have been demolished.

By 1986, the pine trees along the north face of the landfill were in place, as were the restrooms, storm sewers, and sanitary sewer. The subdivision had already been developed to its present configuration.

Types of Waste

OAC 3745-27-12 (F)(2)(d)(iii)

No detailed records or similar documentation regarding types of waste received at the facility are known to exist. Information pertaining to waste type was primarily obtained from interviews held with individuals familiar with landfill operations. Information gathered from these interviews is useful in terms of providing a general characterization of materials that may have been disposed. This information is summarized in Section 3.4 of the 1991 Design Report. No physical records of the material placed in the landfill were kept. However, several people familiar with the operation of the landfill were interviewed to determine waste characteristics. The following summarizes what is known about waste disposal at the landfill, based on these interviews.

The City began disposal from the canal bench soon after acquiring the property. Materials disposed included cans, glass, burned refuse from the City's incinerator, construction debris, stoves, refrigerators, tires, empty oil drums, soap manufacturing by-products, grass clippings, tree limbs and

kitchen wastes. The oil drums were picked up by the City at local gasoline stations. They were empty and reportedly never contained anything but new oil. The empty drums were crushed with a bulldozer when they were placed in the landfill. The soap manufacturing by-products were materials from Procter & Gamble. These reportedly included soap powder, soap "sludge", and bottles of shampoo and liquid soap. The kitchen wastes also came from Procter & Gamble. These were wastes from Procter & Gamble's in-house cafeterias. There is no evidence that hazardous materials were placed in the landfill.

Landfill Construction

No specific details of landfill construction means or methods are available other than historical information gathered from aerial photos and anecdotal information, as summarized above. An Aerial Photographic Analysis Report dated November 1, 2012 was prepared by Environmental Research, Inc. (ERI) and detailed the development of the Landfill and surrounding areas from 1946 to 2009.

Prior Owners

OAC 3745-27-12 (F)(2)(d)(iv)(e)

EDR Chain of Title reports for the parcels included in the facility are presented in Appendix E. The reports include a list of the previous owners back to approximately 1940 for each parcel.

5.0 GAS MONITORING AND CONTROL

OAC 3745-27-12 (F)(2)(e)

The following sections describe the existing monitoring network and the landfill gas control system at the site.

5.1 EXISTING GAS MONITORING SYSTEM

OAC 3745-27-12 (F)(2)(e)(i)(a)

The gas monitoring system is depicted on Figure 6 and summarized in Table 2. The screened interval depths for the probes are also presented in Table 2.

Table 2. Monitoring Network, St. Bernard Landfill

| Probe | Adjacent Structure | Approximate Coordinates | | Top of Screen Depth (feet below ground surface) | Bottom of Screen Depth (feet below ground surface) |
|-------|----------------------------|-------------------------|------------|---|--|
| | | Latitude | Longitude | | |
| MP-1 | 448 Bank | 39.168186 | -84.504357 | Not known | Not known |
| MP-7E | 429 Bank | 39.167895 | -84.503022 | 3 | 14 |
| MP-7H | 425 Bank (and 421 Bank) | 39.167902 | -84.502970 | 2 | 15 |
| MP-8F | 433 Bank | 39.167883 | -84.503341 | 4 | 14 |

| Probe | Adjacent Structure | Approximate Coordinates | | Top of Screen Depth (feet below ground surface) | Bottom of Screen Depth (feet below ground surface) |
|-------|--------------------|-------------------------|------------|---|--|
| | | Latitude | Longitude | | |
| MP-9 | 437 Bank | 39.167903 | -84.503765 | 2 | 12 |
| MP-16 | 441 Bank | 39.168132 | -84.504186 | 2 | 12 |
| MP-17 | 441 Bank | 39.167927 | -84.504157 | 3 | 13 |

The construction of the probes is described in Section 5.6 below.

5.2 EXISTING GAS EXTRACTION SYSTEM

OAC 3745-27-12 (F)(2)(e)(i)(b)

The landfill does not have any active gas extraction wells or passive vents installed in the waste.

As previously indicated, various gas migration control systems have been installed and operated since October 2000 along the northern perimeter of the landfill. The current system incorporates a series of six extraction “pods” which effectively offer six independently controlled zones where subsurface vacuum may be applied. The combined system is capable of providing for continuous vacuum extraction along the perimeter of the landfill that lies adjacent to occupied residential properties.

The blower assembly is equipped with a flow meter and vacuum gauge to assist in adjustment of operating flow rate and vacuum. The migration control system layout is illustrated on Figure 6. Each pod is equipped with sampling ports facilitating measurement of applied vacuum and gas composition. The gas migration control system is not operating at the time of the submittal of this plan. The Village will: (1) leave the system off as is currently the case; (2) turn the system on and operate it; or (3) if it is operated again, turn it off and leave it off depending on future authorizations by Ohio EPA.

Condensate within extraction piping is fed via gravity to a 1,500-gallon receiving tank. Condensate collected within the tank is disposed off-site. A high level alarm, which notifies the Village police department of a high water condition in the tank, was installed on January 29, 2013.

5.3 EXISTING GAS VENTING SYSTEM

OAC 3745-27-12 (F)(2)(e)(i)(c)

No passive vents are present at the closed St. Bernard Landfill.

5.4 HISTORICAL RECORDS

OAC 3745-27-12 (F)(2)(e)(ii)

At the request of the Ohio EPA, efforts to monitor landfill gas were initiated in the early 1990s by the Village, including installation of six gas-monitoring probes along the northern margin of the landfill. These probes were originally designated MP-1 through MP-6. A figure showing the locations of probes and monitoring points no longer included in the compliance network is included in Appendix

C. The monitoring probes were proposed to be installed between the assumed limit of waste and adjacent residential structures. MP-1 appears to be located outside of previous fill limits. Former probes MP-2 (now designated SP-2) and MP-6 (now designated SP-6R) were of limited use in assessing off-site migration as they were in direct contact with (or very near) waste fill and were connected to the extraction system.

Initial sampling of these six monitoring probes was conducted by Foppe Thelen Group, Inc. during selected periods from 1991 through 1994. Sampling indicated elevated concentrations of combustible gas, and in some instances, concentrations at or in excess of the lower explosive limit (LEL) for methane. Although total combustible gas percentages were not recorded, concentrations of at least 5% by volume were measured in several probes and the potential for off-site migration of landfill gas was identified at that time.

In July 2000, the City retained Civil & Environmental Consultants, Inc. (CEC) for engineering services associated with assessment of potential risk associated with off-site gas migration. The scope of these services was initially limited to sampling of the original six monitoring probes (MP-1 through MP-6) to validate previous sampling results. Sampling results indicated combustible gas concentrations in excess of 5% in several probes. Additional work resulting from the initial sampling effort included installation of numerous additional gas probes, analytical sampling of landfill gas within the monitoring network (including analysis of toxic organic vapors), and installation of a gas extraction system.

Installation of additional probes (MP-7 through MP-13) was completed in April 2001. In addition, installation of a vacuum line that was attached to original gas probes MP-2 through MP-6 was completed in April 2001, effectively converting these probes to vacuum extraction wells. At that time, these probes were changed from compliance monitoring probes and subsequently identified as extraction wells (with an applicable "EW" designation) within subsequent monitoring reports.

Following activation of this original extraction system, gas levels continued to decline in the compliance monitoring network with the exception of probe MP-7 which continued to indicate elevated levels of combustible gas. In all other compliance probes, compliance was routinely reported after December 2001 with the exception of sporadic exceedances in probes MP-11, MP-12, and MP-13 which were corrected following extraction system adjustments (it is noted that these sporadic exceedances were ultimately traced to accumulation of groundwater in former extraction well EW-3 (now designated SP-3R)). In July 2002, two supplemental probes were installed adjacent to MP-7 (MP-7A and MP-7B) in an effort to better define gas concentrations within this area. Gas levels fluctuated in compliance probes MP-7, MP-7A and MP-7B for a period of several months. In November 2002, two additional probes, MP-7C and MP-7D were installed to further refine gas concentration data. Data from the probes was then studied for a period of several months. After the initial period of study, monitoring continued, with the data through April 2004 submitted to Ohio EPA.

In April 2004, a temporary gas probe network (T-1 through T-16) was installed on the landfill side of the MP-7 series of probes in an effort to better define gas concentrations as well as possible migration patterns in this area. The network was monitored bi-weekly for two months following installation. Analysis of data compiled during this monitoring period indicated a rather well-defined area of elevated gas concentrations within approximately 10 feet of the MP-7 series of probes (note probes MP-7C and MP-7A were used in this evaluation and have subsequently been removed along with T-1 through T-16).

As a variety of mechanical and operational adjustments to the existing gas extraction system did not satisfactorily reduce gas concentrations in this area, installation of a gas cutoff trench was selected as the next step in the mitigation effort. The intent of this installation was threefold:

1. To excavate and remove organic materials that may be contributing to gas generation immediately adjacent to the affected monitoring probes;
2. To excavate and remove large inert demolition debris which may promote migration of explosive gas; and
3. To install a low-permeability barrier such that migration pathways from the landfill to the affected probes would be disrupted to the extent practical.

The trench was excavated to a depth of 10 to 12 feet and 3 to 5 feet wide. The total length of the trench was approximately 48 feet (see Figure 6). Trench alignment was configured such that the series of temporary monitoring probes on the landfill side of the trench (T-7 through T-15) was preserved to the extent practical. Compliance probes MP-7C and MP-7D located on the residential side of the trench were replaced with probes MP-7E and MP-7F, which were installed on September 14, 2004, and have been supplemented with a third probe designated MP-7G installed in 2010.

Following installation of the trench, several important observations were noted. First, explosive gas concentrations on the residential side of the trench increased rapidly (in excess of 40% combustible gas by volume), with those on the landfill side remaining at or near 0%. This suggested that a potential source of combustible gas (i.e., putrescible material) existed outside of both the current property limits and footprint of the landfill. The presence of these materials was confirmed in December 2010 following excavation of four exploratory trenches within the rear yard of 429 Bank Avenue. Although limited in volume, these putrescible materials, which consisted principally of wood debris unrelated to waste fill, were present in sufficient volume to release limited volumes of methane. This methane was then released to, and detected within, the property line monitoring probes.

In December 2004, a temporary vacuum line was extended to MP-7E, which immediately reduced gas concentration in MP-7E and MP-7F to below the 5% compliance threshold with the exception of one isolated excursion (August 17, 2009 at 11% methane by volume). It is noted that vacuum was removed prior to any compliance sampling activity (24 hours prior) per the request of Ohio EPA.

In June 2007, elevated levels of combustible gas were observed in MP-8. These levels fluctuated through the remainder of 2007 and a supplemental probe (MP-8A) was installed in October 2007. Observed gas levels in each probe fluctuated considerably through December 2008 when a second supplemental probe (MP-8B) was installed. Over various time periods, vacuum was applied to MP-8A and MP-8B in an effort to reduce observed concentrations. These efforts proved ineffective and this series of probes continued to exhibit gas concentrations above 5% on a routine basis. The impact of the cut-off wall installation adjacent to the MP-7 series probes on the MP-8 series of probes was considered and may have contributed to the observed gas levels. Furthermore, boring data obtained immediately adjacent to MP-8A and MP-8B indicated the presence of minor quantities of organic (wood) debris which may have represented a localized and limited source of gas generation directly impacting these probes. The Delineation Investigation performed in 2013 showed that the two layers of soil fill placed to raise the ground level to the current elevation in the Bank Avenue development adjacent to the landfill contain small amounts of non-soil debris, including wood.

In November 2010, installation of a new perimeter gas extraction system was initiated. This system was completed and activated in April 2011. This system, as well as the current network of compliance probes may be referenced on Figure 6. For the period of 2012-2014, this extraction system resulted in maintenance of compliant gas levels within the majority of the monitoring network with the exception of probes MP-7E, MP-8D, MP-8F, MP-9, MP-10, and MP-16 which exhibited seasonal elevated gas levels.

In June 2012, in order to address a number of threshold limit exceedances in the 8-series probes an approximately 5-foot wide and 50-foot long trench (as shown on Figure 6) was excavated. This excavation resulted in the removal of probes MP-8, MP-8A, MP-8B, and MP-8C. The excavation was backfilled with clean granular soil fill and replacement probes MP-8D, MP-8E, MP-8F, and MP-8G were installed in the backfilled trench. The excavation removed the organic materials contained in the original soil fill that were immediately adjacent to the initial MP-8 series probes.

On August 23, 2013, the two half-horsepower blowers that supplied vacuum to the extraction system were replaced by a single one-horsepower blower. The objective of the installation of the higher capacity blower was to apply additional vacuum on the horizontal collector system.

A waste delineation investigation was performed in April 2013 on private/public properties along the north side of the St. Bernard Landfill, using test pits, to determine the presence and type of fill materials that may be traceable to St. Bernard Landfill operations.

In June 2014, the debris associated with the landfill operation that was deposited in the back yard of the 441 Bank Avenue property was removed from the property and generally 5 ft beyond the 441 Bank Avenue property line into the Landfill. In August 2014, MP-17 was installed as a replacement for these probes.

In April 2018, MP-10 was abandoned. Ohio EPA approved the abandonment of MP-10 in their letter to the Village of St. Bernard, dated February 13, 2018.

Table 3 presents a summary of gas monitoring from 2014 through 2021. This table shows that exceedances rarely occur. The current probe network is described in Section 5.1 above.

5.5 OTHER INDICATORS OF EXPLOSIVE GAS

OAC 3745-27-12 (F)(2)(e)(iii)

No incidents of odor or snow melt have been reported. No damage to the final cover has been observed. Some distressed/dying trees have been noted with the pine trees planted on the northern side slope of the landfill and trees within the back yards of some of the residences immediately north of the landfill. The impact to the pine trees on the side slopes is likely due to the shallow soil cover being unable to support large mature trees and is not due to landfill gas. Impacted pine trees are located in areas where methane has been detected in the monitoring probes and in areas where methane has not been detected in the monitoring probes. The impact on the trees in the back yards are likely due to the impact of the drought conditions that occurred two or three years ago and is not due to landfill gas.

5.6 EXISTING PROBES AND CGIs

OAC 3745-27-12 (F)(2)(f)

A summary of the monitoring locations is provided in Table 2 and the monitoring probes are shown on Figure 6. Each residence within 200 feet of the limits of waste placement (421 through 448 Bank Avenue, excluding 444 Bank Avenue where the owner declined the installation of a CGI and 429 Bank where the owner requested that the CGI be removed) has been equipped with an in-building combustible gas indicator (CGI). These monitoring locations have been established to provide a redundant level of detection. The locations of monitoring probes and in-building CGIs are illustrated on Figure 6. All of the CGIs are set to alarm at no higher than 12,500 ppm methane (1.25 percent methane by volume, the threshold limit per rule). The regulatory threshold concentration is 1.25 percent methane by volume in occupied structures.

Monitoring Probe Construction

Installation details for existing compliance monitoring probes may be referenced in Appendix C. Typical probe construction is illustrated in Figure 8.

More recent probes were installed using hollow stem rotary augers or direct push methods, with boreholes continuously sampled. The screened intervals of the existing probes are presented on the logs and in Table 2 above.

Probes constructed using hollow stem augers were typically sampled with continuous (2-ft interval) split spoon sampling. For probes installed using direct push methods, the boreholes were continuously sampled at 4 ft intervals.

Permanent monitors were typically screened from two to three feet below grade to the target depth of the permanent monitor, typically the top of the native soil beneath the soil fill. The target depths were adjusted in the field depending on the conditions encountered. For example, if the water table was encountered within the target depth, the bottom of the screened zone was raised so that the permanent monitor would not extend into the seasonal low water table. The probes are constructed of 2-inch or 1-inch I.D. schedule 40 PVC riser and machine slotted screen. The annulus around and above the screen was backfilled with coarse sand. A bentonite seal or concrete seal was placed above the sand. The remaining borehole annulus was backfilled with concrete.

For quality assurance, a person knowledgeable in drilling, installation of permanent monitors, and geology observed the installation of the later probes and kept accurate, detailed records on materials encountered and permanent monitor construction. Solvent welded joints were not used on the later probes.

The probes were designated as MP-xx and the designation were placed on the interior and exterior of the protective casing for each probe.

Security measures, include a locking steel protective casing (MP-1) or bolt down covers for flush mount protective casings (all other probes), were installed for each permanent monitor. The protective casing is required to minimize the possibility of accidental damage and vandalism. In order to minimize air infiltration during monitoring and also to obtain accurate pressure readings, the

top end of the probe risers were fitted with a PVC end cap with a sample port. The sample port will provide positive closure when not being sampled. The fitting facilitates a simple connection to the combustible gas indicator's sampling hose for gas measurement. The cap or the fitting can be removed to allow depth to water measurement.

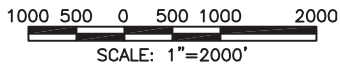
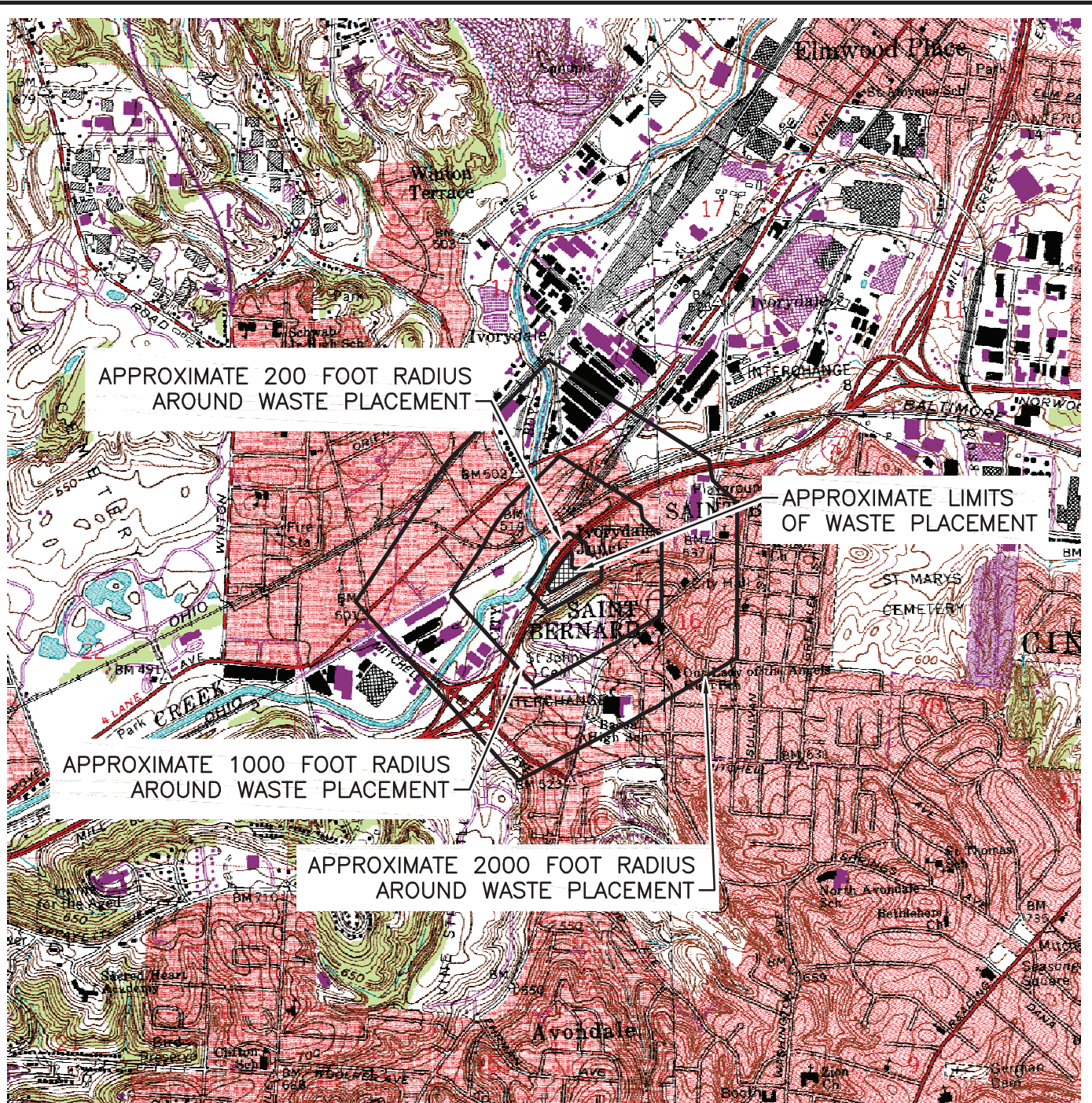
The monitoring network described above will become the network of record when this Explosive Gas Monitoring Plan (EGMP) is approved.

The existing probes meet the requirements of OAC 3745-27-12 (G)(1) in that:

- They accurately detect existing levels of explosive gas. Section 5.4 describes historical detections of explosive gas.
- Are screened to the depth of waste placement or to a barrier that prevents migration of explosive gas. The probes intersect the water table, which acts as a barrier to gas migration.
- Are designed to prevent contamination or dilution of explosive gas samples.
- Are designed to prevent contamination of groundwater. The probes do not intercept multiple water bearing units.
- Are designed to obtain liquid levels, gas pressure, and methane concentrations within the probe.

FIGURES

G:\PROJECTS\2001\210158\DWG\210158 SITE LOC.dwg DSNOK - JANUARY 29, 2004 - 07:51:41 XREFS:



SOURCE: USGS 7.5 MINUTE QUADRANGLES CINCINNATI EAST, OHIO, 1961 PHOTOREVISED 1981 AND CINCINNATI WEST, OHIO, 1961, PHOTOREVISED 1981, PHOTOINSPECTED 1986.



Civil & Environmental Consultants, Inc.

Cincinnati, OH

(513) 985-0226 (800) 759-5614

Pittsburgh, PA
Nashville, TN

Columbus, OH
Chicago, IL

Indianapolis, IN
St. Louis, MO

**SITE VICINITY MAP
FORMER BANK AVENUE LANDFILL
ST. BERNARD, OHIO
HAMILTON COUNTY**

DWN BY: MTM

SCALE:

DATE:

PROJECT NO.:

FIGURE NO.:

CHKD. BY: RH

AS NOTED

MAY 2003

210158

1



SOURCE: PORTION OF AN OHIO DEPARTMENT OF TRANSPORTATION (ODOT) AERIAL PHOTOGRAPH - APRIL 1974.

**BANK AVENUE LANDFILL - ST. BERNARD, OHIO
 BASE - APRIL 1974 ODOT AERIAL PHOTOGRAPH
 OVERLAY - CURRENT CAGIS PROPERTY
 AND TOPOGRAPHIC DATA**

SITE AND VICINITY AERIAL MAP

CEC
Civil & Environmental Consultants, Inc.
 4274 Glendale-Milford Road - Cincinnati, OH 45242
 513-985-0226 - 800-759-5614
 www.cecinc.com

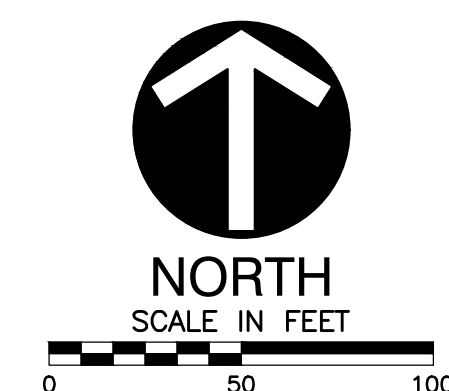
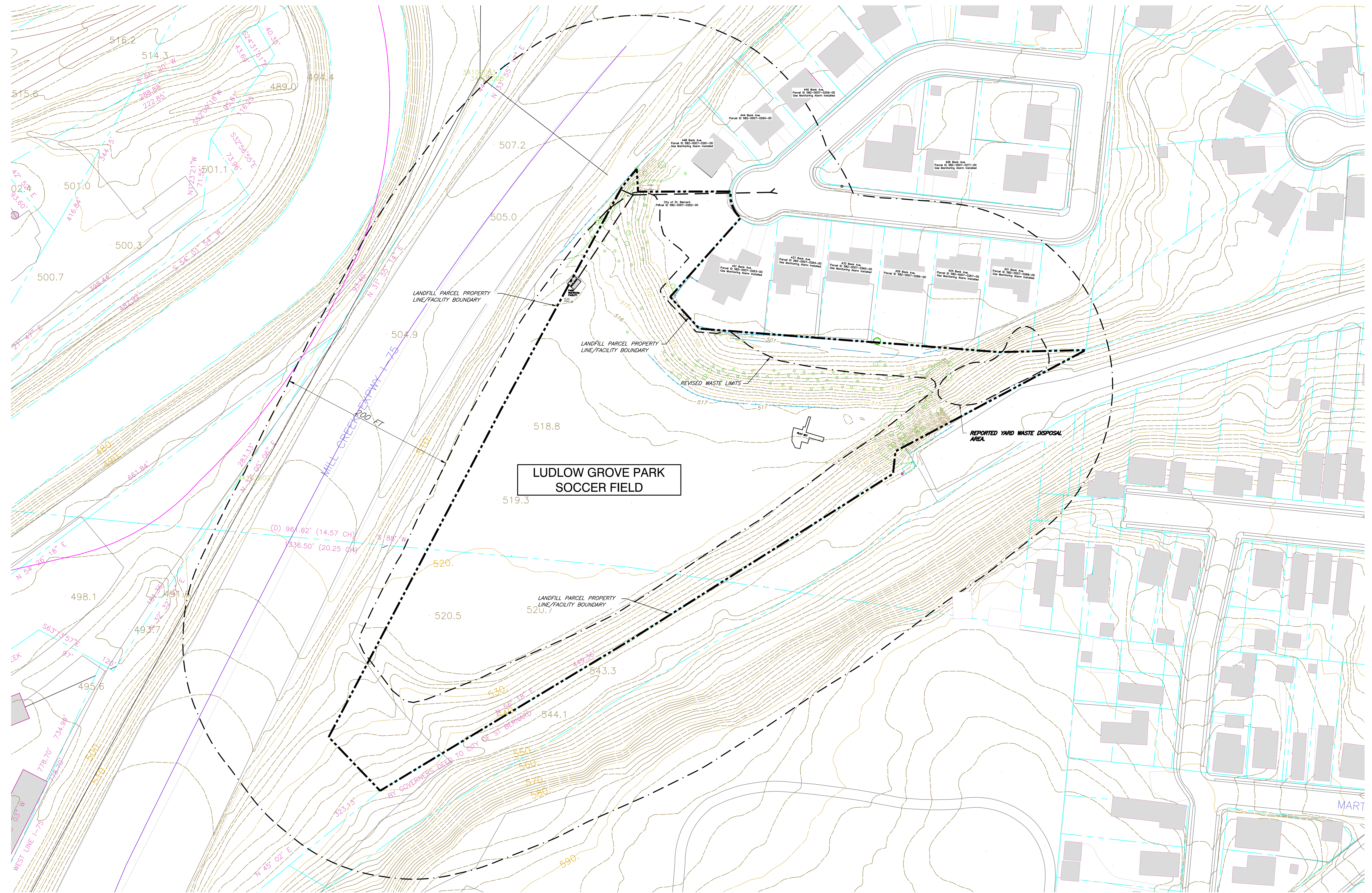
| | | | | | |
|-----------|----------------|-------------|-----------|--------------|---------|
| DRAWN BY: | MJB | CHECKED BY: | RH | FIGURE NO.: | 2 |
| DATE: | MARCH 31, 2011 | DWG SCALE: | 1" = 150' | PROJECT NO.: | 100-194 |

— CAGIS - Parcel Boundary
 — CAGIS - Edge of Pavement
 — CAGIS - 2001 Topographic Contours
 □ CAGIS - Building Footprints

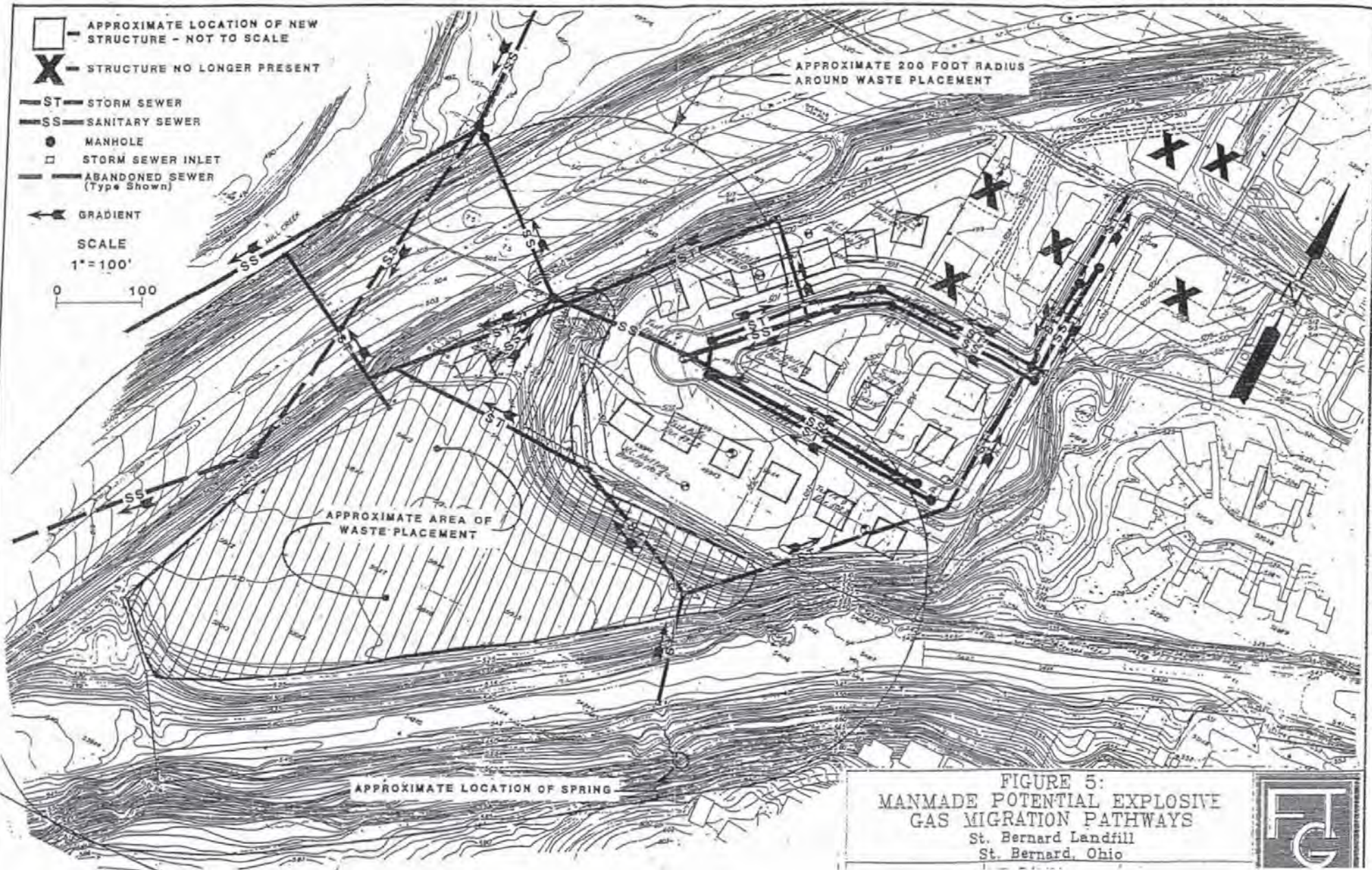
June 18, 2014. SCS incorporates this figure in full and unedited from the original source: CEC EGMP, November 2011.

Signature on File*

C:\Users\4572adf\Desktop\My Projects\Old Projects\St. Bernard\Fig 3.dwg Jul 29, 2022 - 3:51pm Layout Name: Fig 3 By: 4572adf



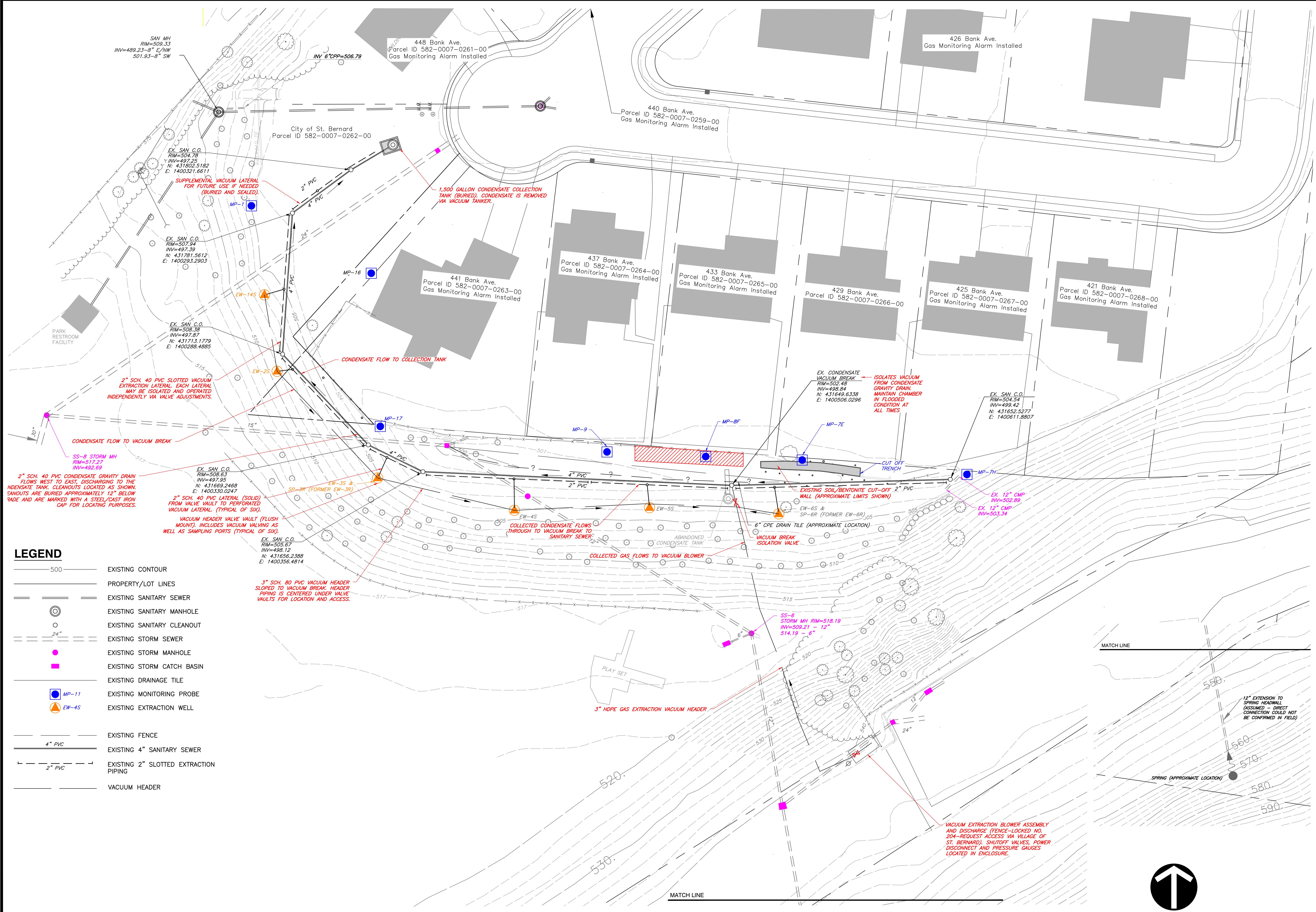
| | | |
|---------------|--|--|
| CLIENT | VILLAGE OF ST. BERNARD 110 WASHINGTON AVENUE ST. BERNARD, OHIO 45217 | |
| | SCS ENGINEERS STEARNS, CONRAD AND SCHMIDT CONSULTING ENGINEERS, INC 2060 READING ROAD, CINCINNATI, OH 45202 PH. (613) 421-5353 FAX. (613) 421-2847 | DATE: AUGUST 2021 SCALE: AS SHOWN DRAWING NO. FIG 3 |
| SHEET TITLE | SITE MAP | |
| PROJECT TITLE | ST. BERNARD LANDFILL VILLAGE OF ST. BERNARD, OHIO | |
| REV. DATE | 8/24/21 | REVISED OWNER NAMES/HOUSES |
| CK. BY | | |



June 18, 2014. SCS incorporates this figure in full and unedited from the original source: Foppe Thelen, Explosive Gas Monitoring System Design, October 1991.

FIGURE 5. MAN MADE MIGRATION PATHWAS

C:\Users\4572adf\Desktop\My Projects\Old Projects\St. Bernard\Fig 6.dwg Mar 01, 2022 - 10:33am Layout Name: FIG 6 By: 4572adf



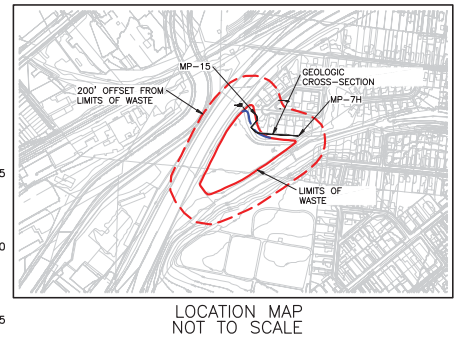
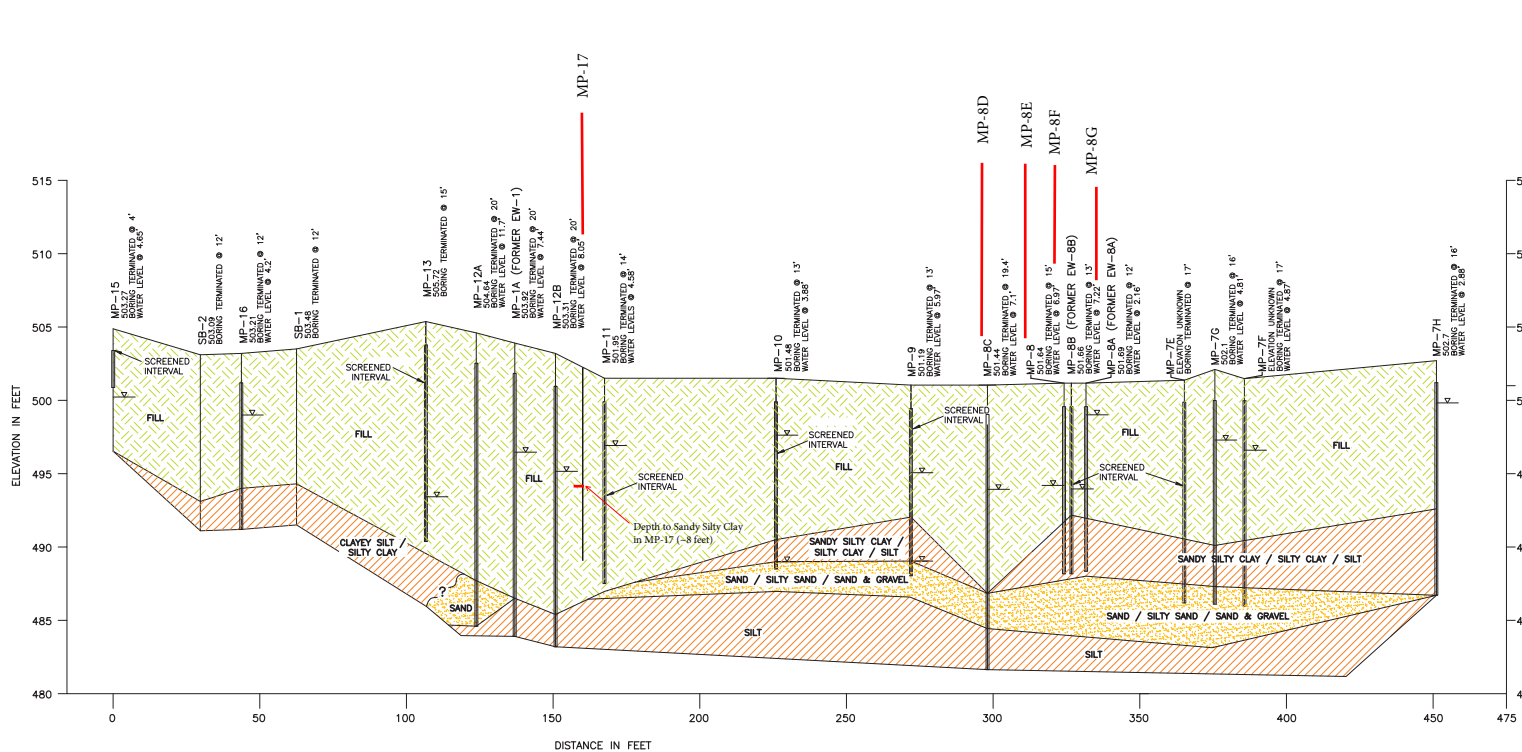
LEGEND

| | |
|--|---------------------------------------|
| | EXISTING CONTOUR |
| | PROPERTY/LOT LINES |
| | EXISTING SANITARY SEWER |
| | EXISTING SANITARY MANHOLE |
| | EXISTING SANITARY CLEANOUT |
| | EXISTING STORM SEWER |
| | EXISTING STORM MANHOLE |
| | EXISTING STORM CATCH BASIN |
| | EXISTING DRAINAGE TILE |
| | EXISTING MONITORING PROBE |
| | EXISTING EXTRACTION WELL |
| | EXISTING FENCE |
| | EXISTING 4" SANITARY SEWER |
| | EXISTING 2" SLOTTED EXTRACTION PIPING |
| | VACUUM HEADER |

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

| | |
|---------------|--|
| CK. BY | |
| DESCRIPTION | |
| REV. DATE | |
| 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. (615) 421-5553 |
| CADD FILE: | FIG 6 |
| DATE: | MARCH 2022 |
| SCALE: | AS SHOWN |
| DRAWING NO. | FIG 6 |

| 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

BANK AVENUE LANDFILL
ST. BERNARD, OHIO
HAMILTON COUNTY

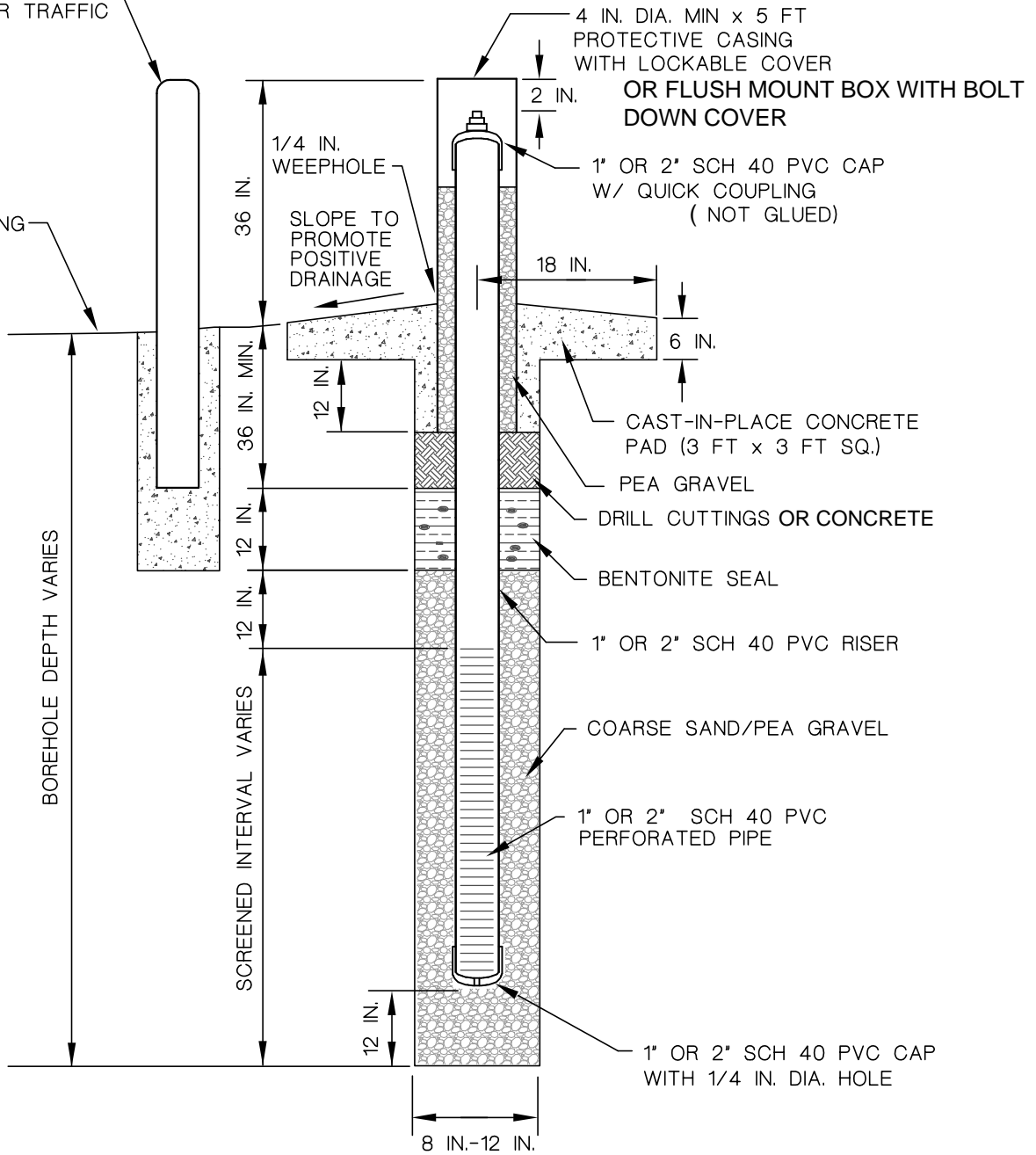
| | | |
|------------------|---------------------|---------------------|
| DRAWN BY: MLB | CHECKED BY: RJS | APPROVED BY: RHL |
| DATE: 03/31/2011 | DWG SCALE: AS SHOWN | PROJECT NO: 100-191 |

GEOLOGIC CROSS-SECTION **4B**

FIGURE 7. CEC 2011 Northern Geologic Cross Section

4" DIA. PROTECTIVE BOLLARDS (3 MIN.) IN AREAS EXPOSED TO VEHICULAR TRAFFIC

EXISTING GRADE



METHANE MONITORING PROBE

(NOT TO SCALE)

SCS ENGINEERS

CONSULTING ENGINEERS, INC.
2060 READING ROAD SUITE 200 CINCINNATI, OHIO 45202
PH. (513) 421-5353 FAX NO. (513) 421-2847

| | | | |
|--------------------------|------------------------|------------------|--------------------|
| PROJ. NO. 05203032.18 | CADD FILE: FIGURE 8 | DATE: 9/19/06 | SCALE: AS SHOWN |
|--------------------------|------------------------|------------------|--------------------|

FIGURE 8
PERMANENT MONITOR CONSTRUCTION DETAILS

EXPLOSIVE GAS MONITORING PLAN
ST. BERNARD LANDFILL
BANK AVENUE
CINCINNATI, OHIO

TABLES

**Table 3. Probe Monitoring Summary 2014 to 2021
Closed St Bernard Landfill**


| Compliance Probes | Maximum Combustible Gas Concentration (% by volume) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------------------|---|---|---|---|---|---|---|---|---|---|----|---|------|---|---|---|---|---|---|---|---|---|---|---|------|---|---|---|---|---|---|---|---|---|---|---|
| | 2014 | | | | | | | | | | | | 2015 | | | | | | | | | | | | 2016 | | | | | | | | | | | |
| | J | F | M | A | M | J | J | A | S | O | N | D | J | F | M | A | M | J | J | A | S | O | N | D | J | F | M | A | M | J | J | A | S | O | N | D |
| MP-1 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| MP-7E | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| MP-7H | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| MP-8F | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| MP-9 | - | - | - | - | - | - | - | - | - | - | 15 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| MP-16 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| MP-17 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

| Compliance Probes | 2017 | | | | | | | | | | | | 2018 | | | | | | | | | | | | 2019 | | | | | | | | | | | |
|-------------------|------|---|---|---|---|---|---|-----|---|---|---|---|------|---|---|---|---|---|---|---|---|---|---|---|------|---|---|---|---|---|---|---|---|---|---|---|
| | J | F | M | A | M | J | J | A | S | O | N | D | J | F | M | A | M | J | J | A | S | O | N | D | J | F | M | A | M | J | J | A | S | O | N | D |
| MP-1 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| MP-7E | - | - | - | - | - | - | - | 9.7 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| MP-7H | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| MP-8F | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| MP-9 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| MP-16 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| MP-17 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

| Compliance Probes | 2020 | | | | | | | | | | | | 2021 | | | | | | | | | | | |
|-------------------|------|---|---|---|---|---|---|------|---|---|---|---|------|---|---|---|---|---|---|------|------|------|---|---|
| | J | F | M | A | M | J | J | A | S | O | N | D | J | F | M | A | M | J | J | A | S | O | N | D |
| MP-1 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| MP-7E | - | - | - | - | - | - | - | 12.6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| MP-7H | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| MP-8F | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| MP-9 | - | - | - | - | - | - | - | 30.9 | - | - | - | - | - | - | - | - | - | - | - | 48.3 | 48.7 | 16.3 | - | - |
| MP-16 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| MP-17 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

- monitoring performed, result less than 5% threshold concentration.

Note: The values shown in the above table are the maximum combustible gas concentration measured in the indicated month. There may have been multiple monitoring events with results above 5% during that month, but only the maximum value is shown.



Appendix A
Notification Letters

October 19, 2022
File No. 23212007.10

Chief David Moeller
St. Bernard Fire Dept.
4200 Vine Street
St. Bernard, OH 45217

Subject: Explosive Gas Monitoring Plan Notification
St. Bernard Landfill

Dear Chief Moeller:

Pursuant to the Municipal Solid Waste Landfill Regulations and on behalf of the Village of St. Bernard, SCS Engineers is hereby notifying you that the Village of St. Bernard is submitting a revised Explosive Gas Monitoring Plan for the above referenced landfill. This letter is being sent to you per OAC 3745-27-12(F)(2)(g)(i), which states that the appropriate authorities be informed that they will be notified if there is an exceedance of the threshold concentration of explosive gas at a monitoring probe. The threshold is 100 percent of the lower explosive limit (5 percent methane by volume) in a probe at or within the facility boundary.

The landfill is located at the Ludlow Grove Park and is bounded by I-75 to the west, Bank Avenue to the north, and the extension of Phillips Avenue to the east. A drawing is attached that shows the limits of waste of the closed landfill and the location of occupied structures within 200 feet of the limits of waste.

If you have any questions pertaining to the request or the information presented herein, please contact Tom Paul at the Village of St. Bernard at (513) 242-7770.

Sincerely,



Randall C. Mills e
Senior Project Scientist
SCS Engineers

rcm/JJW



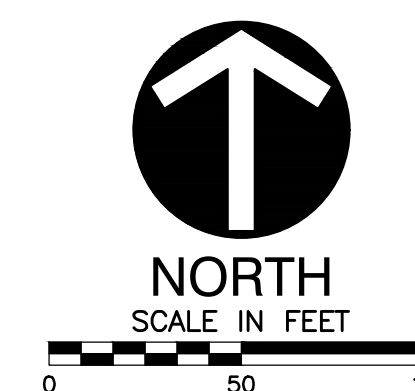
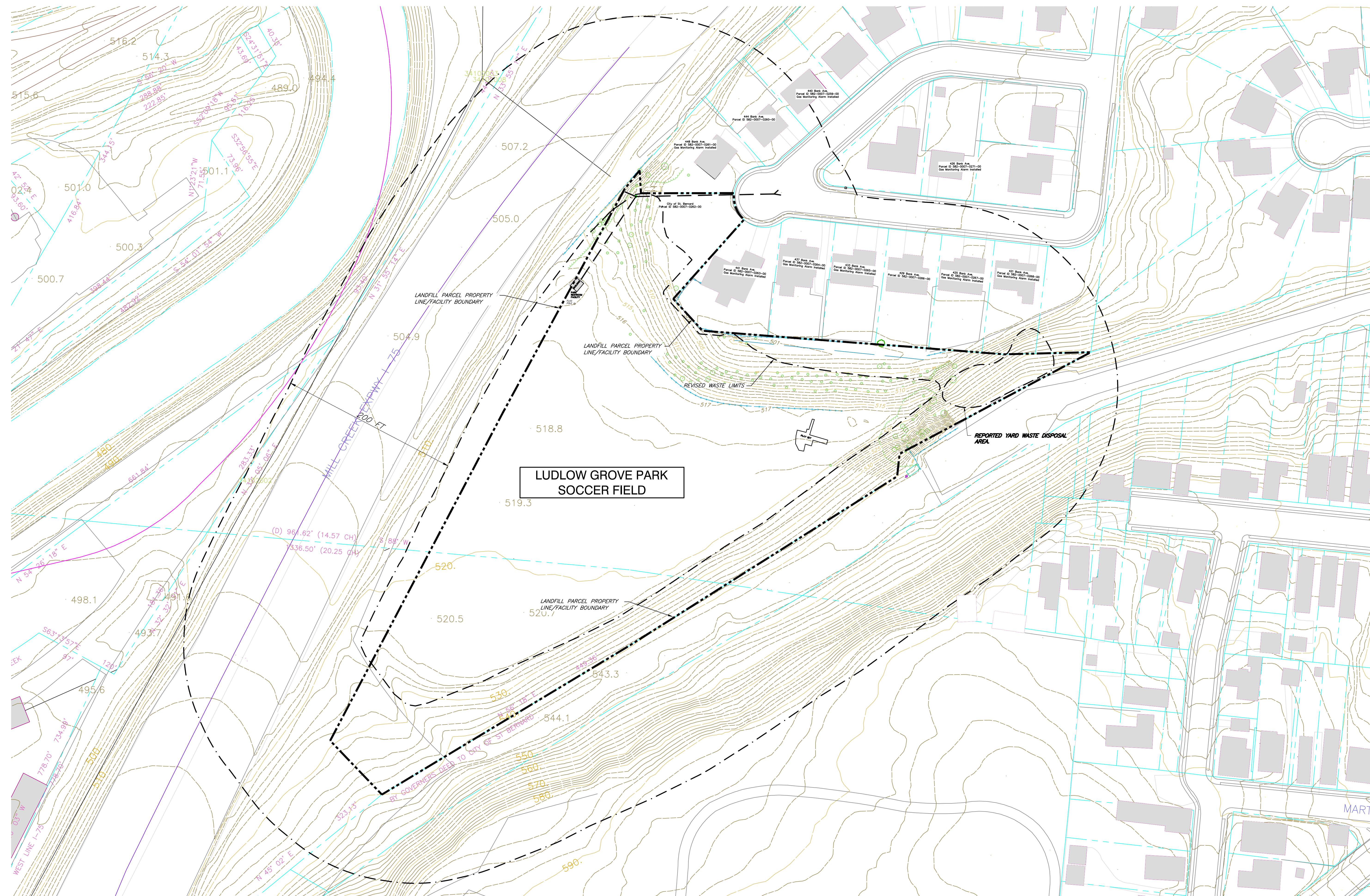
James J. Walsh, P.E.
Project Director
SCS Engineers

cc: Tom Paul, Village of St. Bernard
Jonathan Stuchell, Village of St. Bernard
Nick Schapman, GHD

Encl.



C:\Users\4572adf\Desktop\My Projects\Old Projects\St. Bernard\Fig 3.dwg Jul 29, 2022 - 3:51pm Layout Name: Fig 3 By: 4572adf



| REV. | DATE | DESCRIPTION | CK. BY |
|------|---------|----------------------------|--------|
| 1 | 8/24/21 | REMOVED OWNER NAMES/HOUSES | |
| 2 | | | |
| 3 | | | |
| 4 | | | |

SHEET TITLE
SITE MAP

PROJECT TITLE
**ST. BERNARD LANDFILL
VILLAGE OF ST. BERNARD, OHIO**

CLIENT
**VILLAGE OF ST. BERNARD
110 WASHINGTON AVENUE
ST. BERNARD, OHIO 45217**

CADD FILE:
Figure 3

DATE:
AUGUST 2021

SCALE:
AS SHOWN

DRAWING NO.
FIG 3

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

DATE: 8/24/21
DRAWN BY: ADF
CHECKED BY: [blank]
APP. BY: [blank]

October 19, 2022
File No. 23212007.10

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

Subject: Explosive Gas Monitoring Plan Notification
St. Bernard Landfill

Dear Ms. Lammers:

Pursuant to the Municipal Solid Waste Landfill Regulations and on behalf of the Village of St. Bernard, SCS Engineers is hereby notifying you that the Village of St. Bernard is submitting a revised Explosive Gas Monitoring Plan for the above referenced landfill. This letter is being sent to you per OAC 3745-27-12(F)(2)(g)(i), which states that the appropriate authorities be informed that they will be notified if there is an exceedance of the threshold concentration of explosive gas at a monitoring probe. The threshold is 100 percent of the lower explosive limit (5 percent methane by volume) in a probe at or within the facility boundary.

The landfill is located at the Ludlow Grove Park and is bounded by I-75 to the west, Bank Avenue to the north, and the extension of Phillips Avenue to the east. A drawing is attached that shows the limits of waste of the closed landfill and the location of occupied structures within 200 feet of the limits of waste.

If you have any questions pertaining to the request or the information presented herein, please contact the Tom Paul at the Village of St. Bernard at (513) 242-7770.

Sincerely,



Randall C. Mills
Senior Project Scientist
SCS Engineers



James J. Walsh, P.E.
Project Director
SCS Engineers

rcm/JJW

cc: Tom Paul, Village of St. Bernard
Jonathan Stuchell, Village of St. Bernard
Nick Schapman, GHD

Encl.



October 19, 2022
File No. 23212007.10

Mr. Chuck DeJonckheere
Hamilton County Public Health
250 William Howard Taft, 2nd Floor
Cincinnati, OH 45219

Subject: Explosive Gas Monitoring Plan Notification
St. Bernard Landfill

Dear Mr. DeJonckheere:

Pursuant to the Municipal Solid Waste Landfill Regulations and on behalf of the Village of St. Bernard, SCS Engineers is hereby notifying you that the Village of St. Bernard is submitting a revised Explosive Gas Monitoring Plan for the above referenced landfill. This letter is being sent to you per OAC 3745-27-12(F)(2)(g)(i), which states that the appropriate authorities be informed that they will be notified if there is an exceedance of the threshold concentration of explosive gas at a monitoring probe. The threshold is 100 percent of the lower explosive limit (5 percent methane by volume) in a probe at or within the facility boundary.

The landfill is located at the Ludlow Grove Park and is bounded by I-75 to the west, Bank Avenue to the north, and the extension of Phillips Avenue to the east. A drawing is attached that shows the limits of waste of the closed landfill and the location of occupied structures within 200 feet of the limits of waste.

If you have any questions pertaining to the request or the information presented herein, please contact Tom Paul at the Village of St. Bernard at (513) 242-7770.

Sincerely,



Randall C. Mills
Senior Project Scientist
SCS Engineers




James J. Walsh, P.E.
Project Director
SCS Engineers

rcm/JJW

cc: Tom Paul, Village of St. Bernard
Jonathan Stuchell, Village of St. Bernard
Nick Schapman, GHD

Encl.





Appendix B
Alarm Installation Correspondence

October 19, 2022
File No. 23212007.10

Mr. Scott Weber
421 Bank Avenue
St. Bernard, OH 45217

Subject: Explosive Gas Monitoring Plan Notification
Closed St. Bernard Landfill

Dear Mr. Webber:

Pursuant to the Municipal Solid Waste Landfill Regulations and on behalf of the Village of St. Bernard, SCS Engineers is hereby notifying you that the Village of St. Bernard will be submitting a revised Explosive Gas Monitoring Plan (EGMP) for the above referenced landfill. This letter is being sent to you per OAC 3745-27-12(F)(2)(g)(i), which states that owners of occupied structures within 200 feet of the limits of waste should receive a notification that shows the proximity of the occupied structure to the closed landfill. A copy of the revised EGMP will be posted on the Village's landfill webpage (<https://www.cityofstbernard.org/landfill-information>) once it is approved by Ohio EPA.

The closed landfill is occupied by the Ludlow Grove Park and is bounded by I-75 to the west, the properties along Bank Avenue to the north, and the extension of Phillips Avenue to the east. A drawing is attached that shows the limits of waste of the closed landfill and the location of occupied structures within 200 feet of the limits of waste. Our records indicate that you have a Combustible Gas Indicator (GCI) installed in your residence. If this is not the case and you consent to having an alarm installed, please contact Tom Paul, Service Director at the Village of St. Bernard.

If you have any questions pertaining to the information presented herein, please contact Tom Paul, Service Director at the Village of St. Bernard at (513) 242-7770.

Sincerely,



Randall C. Mills
Senior Project Scientist
SCS Engineers



James J. Walsh, P.E.
Project Director
SCS Engineers

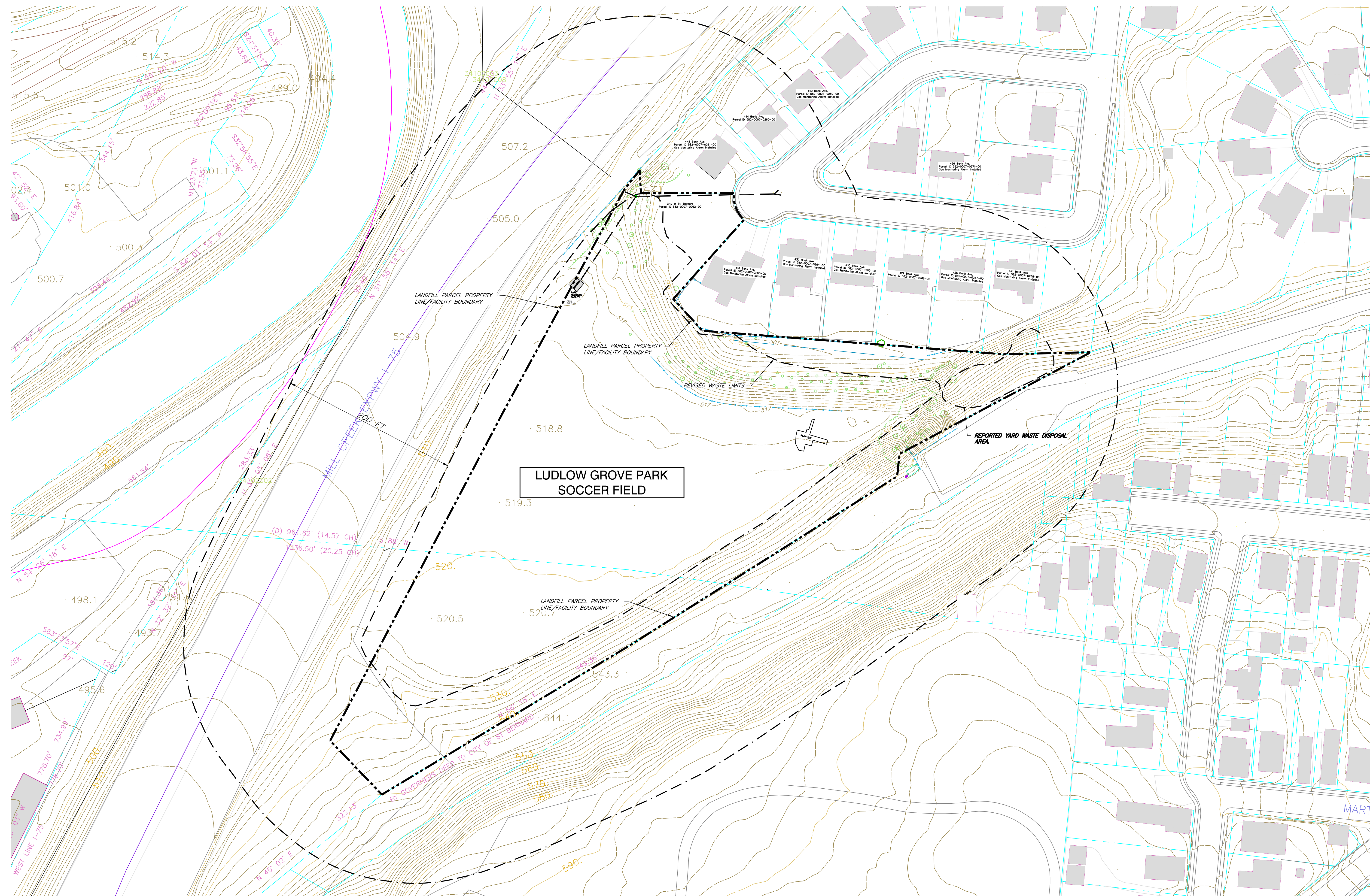
RCM/JJW

cc: Tom Paul, Village of St. Bernard
Jonathan Stuchell, Village of St. Bernard
Nick Schapman, GHD

Encl.



C:\Users\4572adf\Desktop\My Projects\Old Projects\St. Bernard\Fig 3.dwg Jul 29, 2022 - 3:51pm Layout Name: Fig 3 By: 4572adf



| REV. | DATE | DESCRIPTION | CK. BY |
|------|---------|----------------------------|--------|
| 1 | 8/24/21 | REMOVED OWNER NAMES/HOUSES | |
| 2 | | | |
| 3 | | | |

SHEET TITLE
SITE MAP

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

DATE: 8/24/21
DRAWN BY: ADF
CHECKED BY: [blank]
APP. BY: [blank]

CADD FILE:
Figure 3

DATE:
AUGUST 2021

SCALE:
AS SHOWN

DRAWING NO.

FIG 3

October 19, 2022
File No. 23212007.10

Mr. Adam Haney
425 Bank Avenue
St. Bernard, OH 45217

Subject: Explosive Gas Monitoring Plan Notification
Closed St. Bernard Landfill

Dear Mr. Webber:

Pursuant to the Municipal Solid Waste Landfill Regulations and on behalf of the Village of St. Bernard, SCS Engineers is hereby notifying you that the Village of St. Bernard will be submitting a revised Explosive Gas Monitoring Plan (EGMP) for the above referenced landfill. This letter is being sent to you per OAC 3745-27-12(F)(2)(g)(i), which states that owners of occupied structures within 200 feet of the limits of waste should receive a notification that shows the proximity of the occupied structure to the closed landfill. A copy of the revised EGMP will be posted on the Village's landfill webpage (<https://www.cityofstbernard.org/landfill-information>) once it is approved by Ohio EPA.

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If you have any questions pertaining to the information presented herein, please contact Tom Paul, Service Director at the Village of St. Bernard at (513) 242-7770.

Sincerely,



Randall C. Mills
Senior Project Scientist
SCS Engineers



James J. Walsh, P.E.
Project Director
SCS Engineers

RCM/JJW

cc: Tom Paul, Village of St. Bernard
Jonathan Stuchell, Village of St. Bernard
Nick Schapman, GHD

Encl.



October 19, 2022
File No. 23212007.10

Mr. Bob Schrenk
429 Bank Avenue,
St. Bernard, OH 45217

Subject: Explosive Gas Monitoring Plan Notification
Closed St. Bernard Landfill

Dear Mr. Schrenk:

Pursuant to the Municipal Solid Waste Landfill Regulations and on behalf of the Village of St. Bernard, SCS Engineers is hereby notifying you that the Village of St. Bernard will be submitting a revised Explosive Gas Monitoring Plan for the above referenced landfill. This letter is being sent to you per OAC 3745-27-12(F)(2)(g)(i), which states that owners of occupied structures within 200 feet of the limits of waste should receive a notification that shows the proximity of the occupied structure to the closed landfill. A copy of the revised EGMP will be posted on the Village's landfill webpage (<https://www.cityofstbernard.org/landfill-information>) once it is approved by Ohio EPA.

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If you have any questions pertaining to the information presented herein, please contact Tom Paul, Service Director, at the Village of St. Bernard at (513) 242-7770.

Sincerely,



Randall C. Mills
Senior Project Scientist
SCS Engineers



James J. Walsh, P.E.
Project Director
SCS Engineers

RCM/JJW

cc: Tom Paul, Village of St. Bernard
Jonathan Stuchell, Village of St. Bernard
Nick Schapman, GHD

Encl.



October 19, 2022
File No. 23212007.10

Ms. Jackie Shrader
433 Bank Avenue
St. Bernard, OH 45217

Subject: Explosive Gas Monitoring Plan Notification
Closed St. Bernard Landfill

Dear Ms. Shrader:

Pursuant to the Municipal Solid Waste Landfill Regulations and on behalf of the Village of St. Bernard, SCS Engineers is hereby notifying you that the Village of St. Bernard will be submitting a revised Explosive Gas Monitoring Plan (EGMP) for the above referenced landfill. This letter is being sent to you per OAC 3745-27-12(F)(2)(g)(i), which states that owners of occupied structures within 200 feet of the limits of waste should receive a notification that shows the proximity of the occupied structure to the closed landfill. A copy of the revised EGMP will be posted on the Village's landfill webpage (<https://www.cityofstbernard.org/landfill-information>) once it is approved by Ohio EPA.

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Sincerely,



Randall C. Mills
Senior Project Scientist
SCS Engineers



James J. Walsh, P.E.
Project Director
SCS Engineers

RCM/JJW

cc: Tom Paul, Village of St. Bernard
Jonathan Stuchell, Village of St. Bernard
Nick Schapman, GHD

Encl.



October 19, 2022
File No. 23212007.10

Ms. Jessica Carson
437 Bank Avenue
St. Bernard, OH 45217

Subject: Explosive Gas Monitoring Plan Notification
Closed St. Bernard Landfill

Dear Ms. Carson:

Pursuant to the Municipal Solid Waste Landfill Regulations and on behalf of the Village of St. Bernard, SCS Engineers is hereby notifying you that the Village of St. Bernard will be submitting a revised Explosive Gas Monitoring Plan (EGMP) for the above referenced landfill. This letter is being sent to you per OAC 3745-27-12(F)(2)(g)(i), which states that owners of occupied structures within 200 feet of the limits of waste should receive a notification that shows the proximity of the occupied structure to the closed landfill. A copy of the revised EGMP will be posted on the Village's landfill webpage (<https://www.cityofstbernard.org/landfill-information>) once it is approved by Ohio EPA.

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Sincerely,



Randall C. Mills
Senior Project Scientist
SCS Engineers



James J. Walsh, P.E.
Project Director
SCS Engineers

RCM/JJW

cc: Tom Paul, Village of St. Bernard
Jonathan Stuchell, Village of St. Bernard
Nick Schapman, GHD

Encl.



October 19, 2022
File No. 23212007.10

Mrs. Ed Morgan
440 Bank Avenue
St. Bernard, OH 45217

Subject: Explosive Gas Monitoring Plan Notification
Closed St. Bernard Landfill

Dear Mrs. Morgan:

Pursuant to the Municipal Solid Waste Landfill Regulations and on behalf of the Village of St. Bernard, SCS Engineers is hereby notifying you that the Village of St. Bernard will be submitting a revised Explosive Gas Monitoring Plan (EGMP) for the above referenced landfill. This letter is being sent to you per OAC 3745-27-12(F)(2)(g)(i), which states that owners of occupied structures within 200 feet of the limits of waste should receive a notification that shows the proximity of the occupied structure to the closed landfill. A copy of the revised EGMP will be posted on the Village's landfill webpage (<https://www.cityofstbernard.org/landfill-information>) once it is approved by Ohio EPA.

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Sincerely,



Randall C. Mills
Senior Project Scientist
SCS Engineers



James J. Walsh, P.E.
Project Director
SCS Engineers

RCM/JJW

cc: Tom Paul, Village of St. Bernard
Jonathan Stuchell, Village of St. Bernard
Nick Schapman, GHD

Encl.



October 19, 2022
File No. 23212007.10

Mr. Alex Zeigler
441 Bank Avenue
St. Bernard, OH 45217

Subject: Explosive Gas Monitoring Plan Notification
Closed St. Bernard Landfill

Dear Mr. Zeigler:

Pursuant to the Municipal Solid Waste Landfill Regulations and on behalf of the Village of St. Bernard, SCS Engineers is hereby notifying you that the Village of St. Bernard will be submitting a revised Explosive Gas Monitoring Plan (EGMP) for the above referenced landfill. This letter is being sent to you per OAC 3745-27-12(F)(2)(g)(i), which states that owners of occupied structures within 200 feet of the limits of waste should receive a notification that shows the proximity of the occupied structure to the closed landfill. A copy of the revised EGMP will be posted on the Village's landfill webpage (<https://www.cityofstbernard.org/landfill-information>) once it is approved by Ohio EPA.

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Sincerely,



Randall C. Mills
Senior Project Scientist
SCS Engineers



James J. Walsh, P.E.
Project Director
SCS Engineers

RCM/JJW

cc: Tom Paul, Village of St. Bernard
Jonathan Stuchell, Village of St. Bernard
Nick Schapman, GHD

Encl.



October 19, 2022
File No. 23212007.10

Mr. Tim Hackney
218 Jefferson Avenue,
Cincinnati, OH 45217

Subject: Explosive Gas Monitoring Plan Notification for 444 Bank Avenue
Closed St. Bernard Landfill

Dear Mr. Hackney:

Pursuant to the Municipal Solid Waste Landfill Regulations and on behalf of the Village of St. Bernard, SCS Engineers is hereby notifying you that the Village of St. Bernard will be submitting a revised Explosive Gas Monitoring Plan for the above referenced landfill. This letter is being sent to you per OAC 3745-27-12(F)(2)(g)(i), which states that owners of occupied structures within 200 feet of the limits of waste should receive a notification that shows the proximity of the occupied structure to the closed landfill. A copy of the revised EGMP will be posted on the Village's landfill webpage (<https://www.cityofstbernard.org/landfill-information>) once it is approved by Ohio EPA.

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Randall C. Mills
Senior Project Scientist
SCS Engineers



James J. Walsh, P.E.
Project Director
SCS Engineers

RCM/JJW

cc: Tom Paul, Village of St. Bernard
Jonathan Stuchell, Village of St. Bernard
Nick Schapman, GHD

Encl.



October 19, 2022
File No. 23212007.10

Ms. Kathy Thomas
448 Bank Avenue
St. Bernard, OH 45217

Subject: Explosive Gas Monitoring Plan Notification
Closed St. Bernard Landfill

Dear Ms. Thomas:

Pursuant to the Municipal Solid Waste Landfill Regulations and on behalf of the Village of St. Bernard, SCS Engineers is hereby notifying you that the Village of St. Bernard will be submitting a revised Explosive Gas Monitoring Plan (EGMP) for the above referenced landfill. This letter is being sent to you per OAC 3745-27-12(F)(2)(g)(i), which states that owners of occupied structures within 200 feet of the limits of waste should receive a notification that shows the proximity of the occupied structure to the closed landfill. A copy of the revised EGMP will be posted on the Village's landfill webpage (<https://www.cityofstbernard.org/landfill-information>) once it is approved by Ohio EPA.

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Senior Project Scientist
SCS Engineers




James J. Walsh, P.E.
Project Director
SCS Engineers

RCM/JJW

cc: Tom Paul, Village of St. Bernard
Jonathan Stuchell, Village of St. Bernard
Nick Schapman, GHD

Encl.

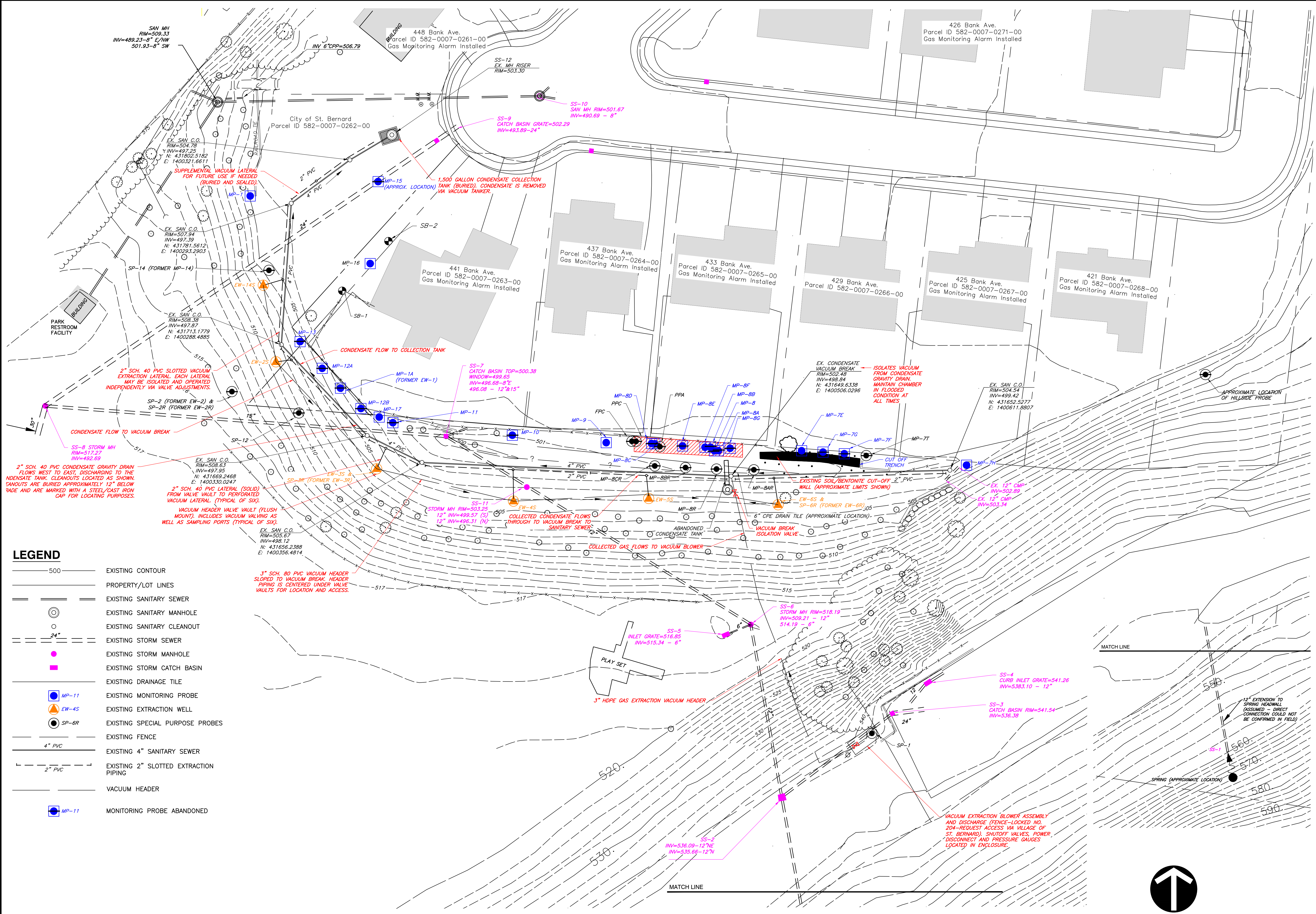




Appendix C

Hydrogeologic Boring Logs

C:\Users\4572adef\Desktop\pdrf\St. Bernard\Fig C-1.dwg Sep 02, 2021 - 5:56pm Layout Name: FIG C-1 By: 4572adef



LEGEND

- 500 ——— EXISTING CONTOUR
- PROPERTY/LOT LINES
- EXISTING SANITARY SEWER
- EXISTING SANITARY MANHOLE
- EXISTING SANITARY CLEANOUT
- ==== EXISTING STORM SEWER
- EXISTING STORM MANHOLE
- EXISTING STORM CATCH BASIN
- EXISTING DRAINAGE TILE
- MP-11 EXISTING MONITORING PROBE
- EW-4S EXISTING EXTRACTION WELL
- SP-6R EXISTING SPECIAL PURPOSE PROBES
- 4" PVC EXISTING FENCE
- 2" PVC EXISTING 2" SLOTTED EXTRACTION PIPING
- VACUUM HEADER
- MP-11 MONITORING PROBE ABANDONED

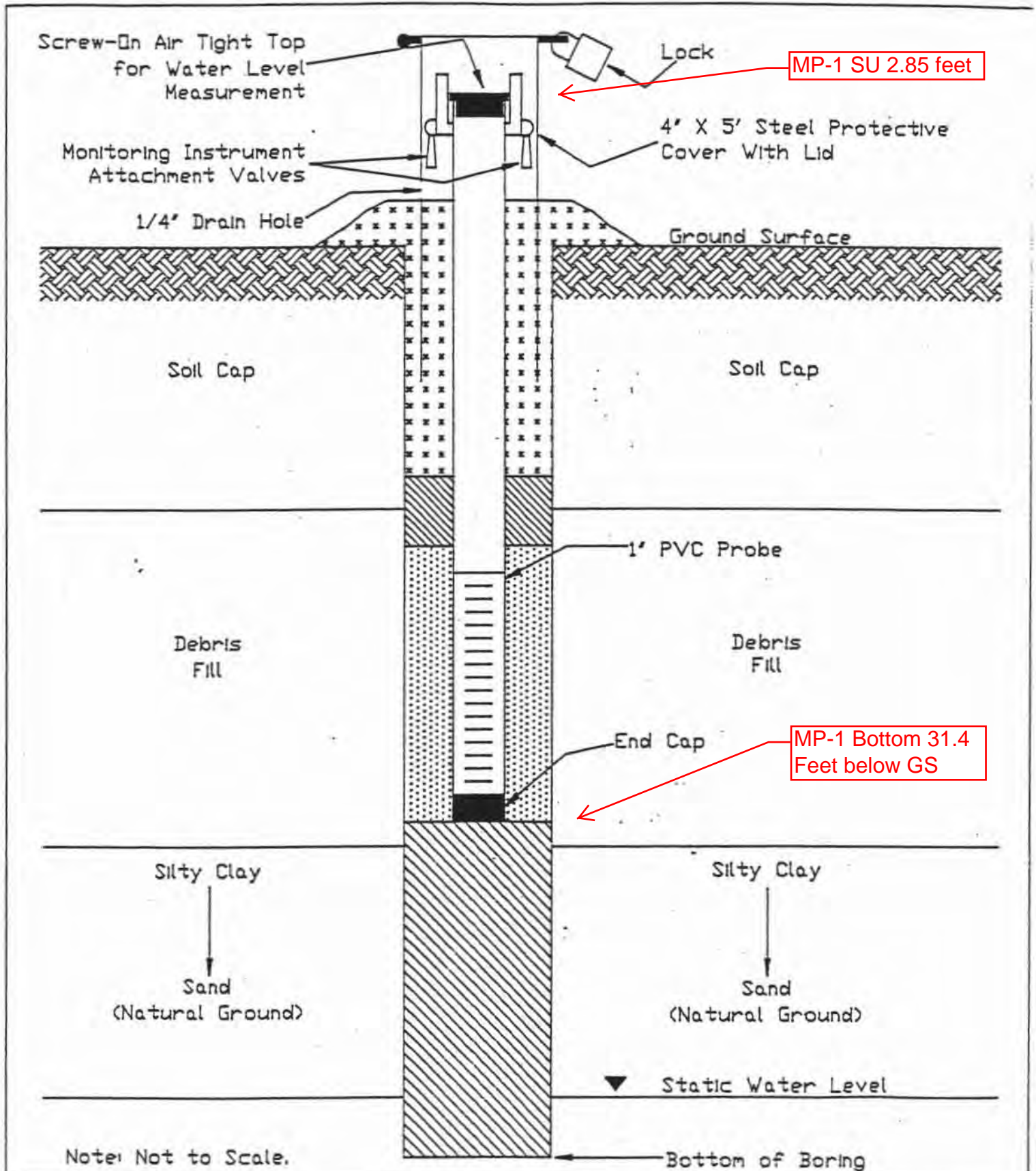
NOTES:
 1. BASE MAP SOURCE CEC DRAWING 2B, DATED MARCH 31, 2011

| | | | | | |
|---------------|---|-----------|---|---|---|
| CK. BY | DESCRIPTION | REV. DATE | FORMER MONITORING NETWORK | SHEET TITLE VILLAGE OF ST. BERNARD MONITORING NETWORK | PROJECT TITLE ST. BERNARD LANDFILL VILLAGE OF ST. BERNARD, OHIO |
| RCM | MP-17, SHOW MP-1A, MP-11, MP-12, MP-12B, MP-13 AS REMOVED | 8/28/14 | ADD MP-17, SHOW MP-1A, MP-11, MP-12, MP-12B, MP-13 AS REMOVED | | |
| RCM | MP-12, MP-12B, MP-13 AS REMOVED | 8/24/21 | REMOVED OWNER NAMES | | |
| 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. (615) 421-5553 | | | | |
| CADD FILE: | FIG C-1 | | | | |
| DATE: | AUGUST 2021 | | | | |
| SCALE: | AS SHOWN | | | | |
| DRAWING NO. | FIG C-1 | | | | |

Note: Boring logs do not exist for the following probes:

- MP-1 & SP-2: Installed by Foppe Thelen. Boring logs were not provided in the Foppe Thelen produced reports.
- MP-7E, MP-7F, MP-8A and MP-8B: These probes were installed by direct push methods in close vicinity to existing probes and as such, soil was not removed in order to log the geologic profile.

MP-1 (Typical)



| Legend | |
|--------|----------------|
| | Cement |
| | Sand Pack |
| | Bentonite Seal |

FIGURE 11:
GENERALIZED MONITORING PROBE

St. Bernard Landfill
St. Bernard, Ohio

PROJECT NO. 910261

DATE: 5/13/91

ENGINEER: LEF





Civil & Environmental Consultants, Inc.
4274 Glendale Milford Road
Cincinnati, Ohio 45242

| | |
|--|--|
| CLIENT <u>St. Bernard</u> | PROJECT NAME <u>MP Install</u> |
| CEC PROJECT NUMBER <u>100-194</u> | PROJECT LOCATION <u>Former St. Bernard Landfill</u> |
| DATE STARTED <u>5/27/10</u> COMPLETED <u>5/27/10</u> | GROUND ELEVATION <u>NA</u> HOLE SIZE <u>4 inch</u> |
| DRILLING CONTRACTOR <u>Jersey West</u> | GROUND WATER LEVELS: |
| DRILLING METHOD <u>Direct Push</u> | AT TIME OF DRILLING <u>None</u> |
| LOGGED BY <u>MJM</u> CHECKED BY <u>RH</u> | AT END OF DRILLING <u>---</u> |
| LOCATION <u>See Map</u> | AFTER DRILLING <u>DTW 8.75 feet bgs</u> |

| ELEVATION (ft) | GRAPHIC LOG | MATERIAL DESCRIPTION | DEPTH (ft) | SAMPLE TYPE NUMBER | RECOVERY % (RQD) | BLOW COUNTS (N VALUE) | POCKET PEN. (tsf) T=Torvane | ▲ SPT N VALUE ▲ | | | | | | |
|----------------|---|----------------------|------------|--------------------|------------------|-----------------------|--------------------------------|-----------------|----|----|----|--|--|--|
| | | | | | | | | 20 | 40 | 60 | 80 | | | |
| 0 | Topsoil | | 0.0 | | | | | | | | | | | |
| 0 | Brownish-orange silty SAND, trace gravel, slightly moist, loose | | | | | | | | | | | | | |
| 0 | Grayish-green clayey SILT, moist, stiff | | | DP 1 | 85 | | | | | | | | | |
| 0 | Dark brown and black clayey SILT, trace gravel, trace brick, glass, and wood pieces, very moist becoming wet, medium stiff | | | | | | | | | | | | | |
| 0 | Dark brown and black clayey SILT, trace gravel, trace wood pieces, noted two concrete pieces separated by soft clayey silt, noted odor, moist | | 5.0 | | | | | | | | | | | |
| 0 | Dark brown to dark green clayey SILT, trace coarse sand, piece of wood noted at approximately 8.0', noted black coating from overlying soil particularly from 12' to 12.8', moist, medium stiff | | | DP 2 | 43 | | | | | | | | | |
| 0 | Dark brown to dark green clayey SILT, trace coarse sand, piece of wood noted at approximately 8.0', noted black coating from overlying soil particularly from 12' to 12.8', moist, medium stiff | | 10.0 | DP 3 | 60 | | | | | | | | | |
| 0 | Dark gray and black SAND and GRAVEL, wet, loose | | | DP 4 | 53 | | | | | | | | | |
| 0 | Gray SILT, wet, stiff | | | DP 5 | 60 | | | | | | | | | |
| 0 | Bottom of hole at 20.0 feet. | | 20.0 | | | | | | | | | | | |

CEC CUSTOM LOG 100-194 ST BERNARD MP INSTALL.GPJ GOOD TEMPLATE.GDT 7/8/10



Civil & Environmental Consultants, Inc.
4274 Glendale Milford Road
Cincinnati, Ohio 45242

BORING NUMBER EW-2

CLIENT St. Bernard **PROJECT NAME** MP Install
CEC PROJECT NUMBER 100-194 **PROJECT LOCATION** Former St. Bernard Landfill
DATE STARTED 6/2/10 **COMPLETED** 6/2/10 **GROUND ELEVATION** NA **HOLE SIZE** 4 inch
DRILLING CONTRACTOR Jersey West **GROUND WATER LEVELS:**
DRILLING METHOD Direct Push **AT TIME OF DRILLING** None
LOGGED BY MJM **CHECKED BY** RH **AT END OF DRILLING** ---
LOCATION See Map **AFTER DRILLING** ---

| ELEVATION (ft) | GRAPHIC LOG | MATERIAL DESCRIPTION | DEPTH (ft) | SAMPLE TYPE NUMBER | RECOVERY % (RQD) | BLOW COUNTS (N VALUE) | POCKET PEN. (tsf) T=Torvane | ▲ SPT N VALUE ▲ | | | | | | | |
|----------------|-------------|--|------------|--------------------|------------------|-----------------------|--------------------------------|-----------------|----|----|----|--|--|--|--|
| | | | | | | | | 20 | 40 | 60 | 80 | | | | |
| 0 | | Bentonite | 0.0 | | | | | | | | | | | | |
| 0 | | Brown silty CLAY, trace coarse sand below 2.6' and increased silt and gray mottling, noted iron staining, moist, medium stiff | | DP 1 | 88 | | | | | | | | | | |
| 0 | | Brown becoming gray silty CLAY, few brick fragments at 4.5', noted iron staining, moist, stiff | 5.0 | | | | | | | | | | | | |
| 0 | | Black clayey SILT, trace gravel, few concrete fragments, moist, medium stiff | | DP 2 | 65 | | | | | | | | | | |
| 0 | | Black clayey SILT, trace gravel, few cinders and wood fragments, moist, medium stiff | | | | | | | | | | | | | |
| 0 | | Brown and gray silty CLAY, moist, stiff | | | | | | | | | | | | | |
| 0 | | Black clayey SILT, some coarse sand, trace gravel, few brick and wood fragments, moist to very moist, soft to medium stiff | 10.0 | DP 3 | 63 | | | | | | | | | | |
| 0 | | Black clayey SILT, some coarse sand, trace gravel, noted sheet plastic, moist to very moist and wet at bottom, soft to medium stiff | | DP 4 | 50 | | | | | | | | | | |
| 0 | | Black clayey SILT, some coarse sand, trace gravel, noted large wood fragment at about 18.0', very moist to wet, soft to medium stiff | 15.0 | | | | | | | | | | | | |
| 0 | | Black clayey SILT, some coarse sand, trace gravel, noted large wood fragment at about 18.0', very moist to wet, soft to medium stiff | | DP 5 | 80 | | | | | | | | | | |
| 0 | | Silty clay, noted large piece of wood and rubber, noted sand present in the shoe | 20.0 | DP 6 | 23 | | | | | | | | | | |
| 0 | | | | DP 7 | 20 | | | | | | | | | | |
| 0 | | Bottom of hole at 24.0 feet. | | | | | | | | | | | | | |

CEC CUSTOM LOG 100-194 ST BERNARD MP INSTALL.GPJ GOOD TEMPLATE.GDT 7/8/10



Civil & Environmental Consultants, Inc.
4274 Glendale Milford Road
Cincinnati, Ohio 45242

BORING NUMBER EW-3

| | |
|--|--|
| CLIENT <u>St. Bernard</u> | PROJECT NAME <u>MP Install</u> |
| CEC PROJECT NUMBER <u>100-194</u> | PROJECT LOCATION <u>Former St. Bernard Landfill</u> |
| DATE STARTED <u>6/2/10</u> COMPLETED <u>6/2/10</u> | GROUND ELEVATION <u>NA</u> HOLE SIZE <u>4 inch</u> |
| DRILLING CONTRACTOR <u>Jersey West</u> | GROUND WATER LEVELS: |
| DRILLING METHOD <u>Direct Push</u> | AT TIME OF DRILLING <u>None</u> |
| LOGGED BY <u>MJM</u> CHECKED BY <u>RH</u> | AT END OF DRILLING <u>---</u> |
| LOCATION <u>See Map</u> | AFTER DRILLING <u>---</u> |

| ELEVATION (ft) | GRAPHIC LOG | MATERIAL DESCRIPTION | DEPTH (ft) | SAMPLE TYPE NUMBER | RECOVERY % (RQD) | BLOW COUNTS (N VALUE) | POCKET PEN. (tsf) T=Torvane | ▲ SPT N VALUE ▲ | | | | | |
|----------------|-------------|---|------------|--------------------|------------------|-----------------------|--------------------------------|-----------------|----|----|----|--|--|
| | | | | | | | | 20 | 40 | 60 | 80 | | |
| 0 | | Bentonite | 0.0 | | | | | | | | | | |
| 0 | | Gray and green silty CLAY, trace coarse sand, trace gravel, noted silt and sand partings at 2.0', 2.2', and 2.4', moist, medium stiff | | DP 1 | 85 | | | | | | | | |
| 0 | | Black clayey SILT, few wood and glass fragments, moist, soft | | | | | | | | | | | |
| 0 | | Black clayey SILT, few wood and concrete fragments, noted odor, noted wet silt interval from 4.8' to 5.3', moist, soft | 5.0 | DP 2 | 50 | | | | | | | | |
| 0 | | Black clayey SILT, few wood and concrete fragments, wet, soft | | | | | | | | | | | |
| 0 | | Gray silty CLAY, noted black staining at top, moist, medium stiff | 10.0 | DP 3 | 60 | | | | | | | | |
| 0 | | Bottom of hole at 12.0 feet. | | | | | | | | | | | |

CEC CUSTOM LOG 100-194 ST BERNARD MP INSTALL.GPJ GOOD TEMPLATE.GDT 7/8/10



Civil & Environmental Consultants, Inc.
4274 Glendale Milford Road
Cincinnati, Ohio 45242

BORING NUMBER EW-6

| | |
|--|--|
| CLIENT <u>St. Bernard</u> | PROJECT NAME <u>MP Install</u> |
| CEC PROJECT NUMBER <u>100-194</u> | PROJECT LOCATION <u>Former St. Bernard Landfill</u> |
| DATE STARTED <u>6/2/10</u> COMPLETED <u>6/2/10</u> | GROUND ELEVATION <u>NA</u> HOLE SIZE <u>4 inch</u> |
| DRILLING CONTRACTOR <u>Jersey West</u> | GROUND WATER LEVELS: |
| DRILLING METHOD <u>Direct Push</u> | AT TIME OF DRILLING <u>None</u> |
| LOGGED BY <u>MJM</u> CHECKED BY <u>RH</u> | AT END OF DRILLING <u>---</u> |
| LOCATION <u>See Map</u> | AFTER DRILLING <u>---</u> |

| ELEVATION (ft) | GRAPHIC LOG | MATERIAL DESCRIPTION | DEPTH (ft) | SAMPLE TYPE NUMBER | RECOVERY % (RQD) | BLOW COUNTS (N VALUE) | POCKET PEN. (tsf) T=Torvane | ▲ SPT N VALUE ▲ | | | | | | |
|----------------|---------------------|--|------------|--------------------|------------------|-----------------------|--------------------------------|-----------------|----|----|----|--|--|--|
| | | | | | | | | 20 | 40 | 60 | 80 | | | |
| 0 | [Hexagonal pattern] | Bentonite | 0.0 | | | | | | | | | | | |
| 0 | [Diagonal hatching] | Brown silty CLAY, trace coarse sand, trace gravel, few cinders and wood fragments, noted iron staining, noted clayey sand in shoe, moist, medium stiff | | DP 1 | 90 | | | | | | | | | |
| 0 | [Diagonal hatching] | Brown silty CLAY, trace coarse sand, trace gravel, noted charred wood, noted iron staining, noted clayey sand in shoe, moist, medium stiff | 5.0 | | | | | | | | | | | |
| 0 | [Dotted pattern] | Gray clayey SAND, trace coarse sand, moist, medium dense | | DP 2 | 90 | | | | | | | | | |
| 0 | [Dotted pattern] | Brown fine and medium SAND, moist, loose | | | | | | | | | | | | |
| 0 | [Dotted pattern] | Gray clayey SAND, trace wood, moist, medium dense | | | | | | | | | | | | |
| 0 | [Dotted pattern] | Gray CLAY, trace silt, noted black mottling, moist, soft | | | | | | | | | | | | |
| 0 | [Dotted pattern] | Gray fine and medium SAND, loose, wet | | | | | | | | | | | | |
| 0 | [Vertical lines] | Gray clayey SILT, trace wood pieces, noted medium sand parting at 10.5', moist, soft | 10.0 | DP 3 | 85 | | | | | | | | | |
| 0 | [Vertical lines] | Gray clayey SILT, transitioning to silty clay, moist, soft | | | | | | | | | | | | |
| 0 | [Diagonal hatching] | Gray silty CLAY, noted plastic and black mottling, moist, soft | | | | | | | | | | | | |
| 0 | | Bottom of hole at 12.0 feet. | | | | | | | | | | | | |

CEC CUSTOM LOG 100-194 ST BERNARD MP INSTALL.GPJ GOOD TEMPLATE.GDT 7/8/10



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CITY OF ST. BERNARD

JOB NO.: 200610

LOG OF MP-7

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: 14.5 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 |
|-----------|----------------|--------------|----------------|-------------|-------------|---|-----------------|
| | | | | | | No sample | |
| | 24 | 3-4 2-1 | | 5 | | Brown to gray silty fine SAND, wet, loose (FILL) | |
| | 24 | 2-1 2-3 | | 10 | | Dark brown to gray fine sandy silty CLAY w/ wood, moist, medium stiff (FILL) Same as above, soft | |
| | 24 | 1-2 2-2 | | 12 | | Same as above, stiff | |
| | 24 | 2-3 6-10 | | 15 | | Gray silty fine SAND w/ trace clay, wet, loose Fine gravel, wet, medium dense | |
| | 10 | 10-17 8-5 | | 17 | | Boring terminated at 17 feet | |
| | | | | 20 | | | |
| | | | | 25 | | | |



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City of St. Bernard
 St. Bernard Landfill

St. Bernard, Ohio

JOB NO.: 210158

LOG OF MW-7A

Sheet 1 of 1

| | | |
|-------------------------------|---------------------------|----------------|
| LOGGED BY: BHI | GROUND SURFACE ELEVATION: | |
| DRILLER: Jersey West Drilling | TOP OF CASING ELEVATION: | |
| DATE DRILLED: 07/09/02 | INITIAL WATER LEVEL: 10 | DATE: 07/09/02 |
| DRILL METHOD: 4 1/4" HSA | STATIC WATER LEVEL: | DATE: |

| HNU (ppm) | Recovery | Blow Counts | Elevation | Depth (ft.) | Graphic Log | Materials Description | Well Completion |
|-----------|----------|-------------|-----------|-------------|-------------|--|-----------------|
| | | | | 0 | | Brown silty CLAY with sand, moist | |
| | | | | 5 | | Gray silty medium well graded SAND (SM) with some gravel, moist | |
| | | | | 10 | | Olive brown silty fine well graded SAND (SM), wet | |
| | 24 | | | 13 | | Gray SILT and CLAY (CL) with organic material, soft, moist | |
| | 18 | | | 14 | | Gray clayey SILT (ML) with fine sand, moist | |
| | | | | 16 | | Brown poorly sorted SAND (SP) with angular and loose gravel, wet | |
| | | | | 17 | | Boring terminated at 17 feet. | |
| | | | | 20 | | | |
| | | | | 25 | | | |



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City of St. Bernard
St. Bernard Landfill

JOB NO.: 210158

LOG OF MW-7B

Sheet 1 of 1

St. Bernard, Ohio

LOGGED BY: BHI

GROUND SURFACE ELEVATION:

DRILLER: Jersey West Drilling

TOP OF CASING ELEVATION:

DATE DRILLED: 07/09/02

INITIAL WATER LEVEL: 7

DATE: 07/09/02

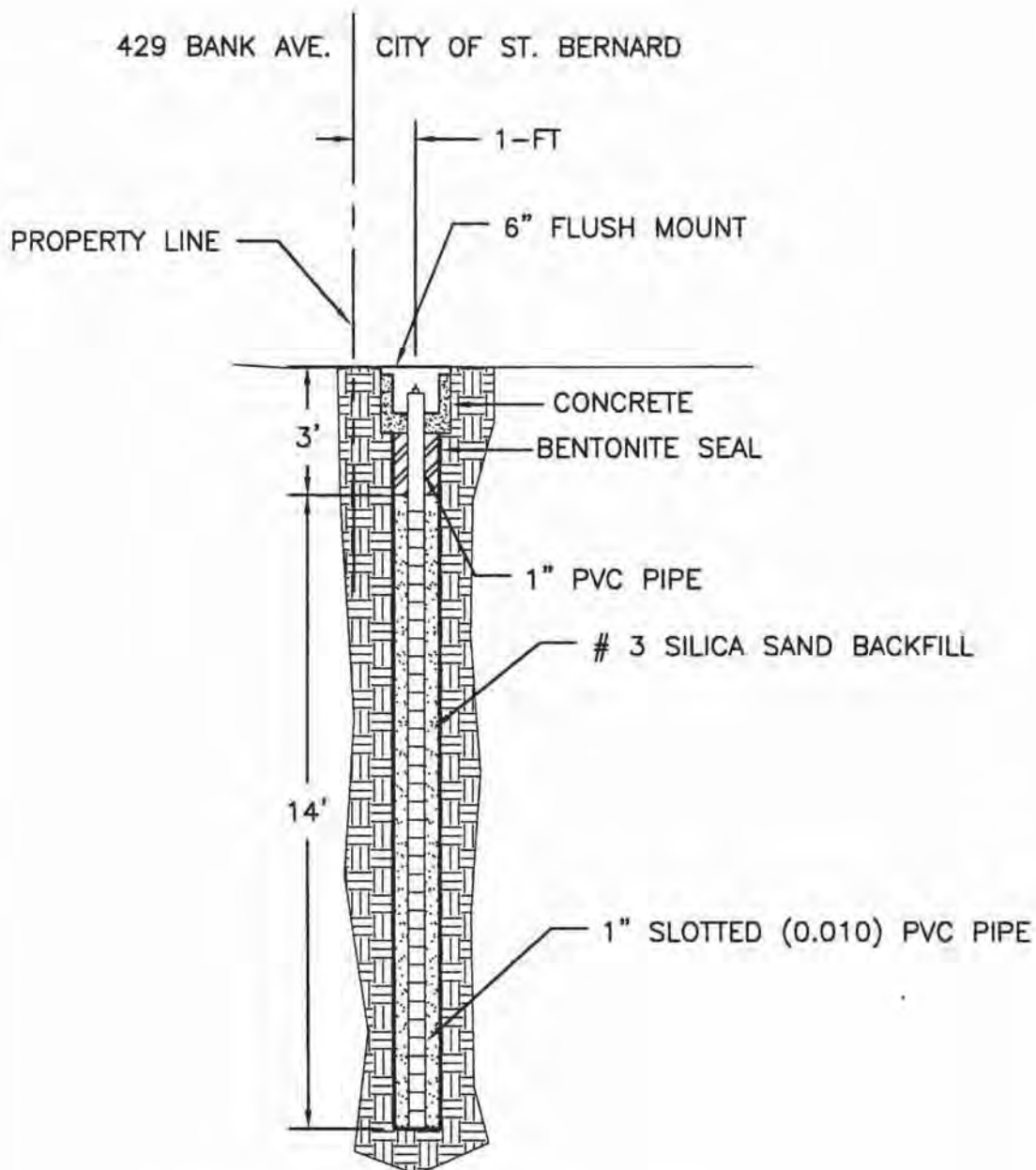
DRILL METHOD: 4 1/4" HSA

STATIC WATER LEVEL:

DATE:

| HNU (ppm) | Recovery | Blow Counts | Elevation | Depth (ft.) | Graphic Log | Materials Description | Well Completion |
|-----------|----------|-------------|-----------|-------------|-------------|---|--------------------------------|
| | | | | 0 | | | Sip Cap |
| | | | | 0-5 | | Brown silty CLAY, moist | 1" Sch. 40 Blank PVC |
| | | | | 5-10 | | Dark gray silty CLAY with sand and gravel, moist, brick fragments, fill | Concrete Bentonite Seal |
| | | | | 10-12 | | wood fragment | |
| | | | | 12-15 | | Brown silty fine SAND (SC) with clay, moist to wet | Sand Pack (70% S) |
| | 24 | 1-1-1-4 | | 15-16 | | Gray silty well graded fine SAND (SC) with clay, moist | |
| | 12 | 2-4-5-5 | | 16-17 | | Dark grayish brown poorly graded SAND (SM) with silt, loose, wet | 1" Sch. 40 Slotted PVC (0.075) |
| | | | | 17 | | Boring terminated at 17 feet. | Sip Cap |
| | | | | 20 | | | |
| | | | | 25 | | | |

G:\Projects\2001\210158\dwg\7E-7F detail Sept 2004.dwg, Layout2, 10/27/2004 4:17:47 PM, dsnook



MP-7E

NTS



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 Cincinnati, OH
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 Pittsburgh, PA Columbus, OH Indianapolis, IN
 Nashville, TN Chicago, IL St. Louis, MO

**FORMER ST. BERNARD LANDFILL
 MONITORING PROBE INSTALLATION
 MP-7E & MP-7F
 HAMILTON COUNTY, OHIO**

| | | | | |
|---------------------|------------------------|-------------------------|----------------------------|----------------------|
| DWN. BY: DGS | SCALE: AS NOTED | DATE: SEPT. 2004 | PROJECT NO.: 210158 | FIGURE NO.: 3 |
| CHKD. BY: RH | | | | |



Civil & Environmental Consultants, Inc.
 4274 Glendale Milford Road
 Cincinnati, Ohio 45242

BORING NUMBER MP-7G

CLIENT St. Bernard **PROJECT NAME** MP Install
CEC PROJECT NUMBER 100-194 **PROJECT LOCATION** Former St. Bernard Landfill
DATE STARTED 5/27/10 **COMPLETED** 5/27/10 **GROUND ELEVATION** NA **HOLE SIZE** 4 inch
DRILLING CONTRACTOR Jersey West **GROUND WATER LEVELS:**
DRILLING METHOD Direct Push **AT TIME OF DRILLING** None
LOGGED BY MJM **CHECKED BY** RH **AT END OF DRILLING** ---
LOCATION See Map **AFTER DRILLING** DTW 6.17 feet bgs

| ELEVATION (ft) | GRAPHIC LOG | MATERIAL DESCRIPTION | DEPTH (ft) | SAMPLE TYPE NUMBER | RECOVERY % (RQD) | BLOW COUNTS (N VALUE) | POCKET PEN. (tsf) T=Torvane | ▲ SPT N VALUE ▲ | | | | | | |
|----------------|-------------|--|------------|--------------------|------------------|-----------------------|--------------------------------|-----------------|----|----|----|--|--|--|
| | | | | | | | | 20 | 40 | 60 | 80 | | | |
| 0 | | Topsoil | 0.0 | | | | | | | | | | | |
| 0 | | Mottled brown and gray clayey SILT, few medium to coarse sand, trace brick and charred wood pieces, very moist, soft | | DP 1 | 38 | | | | | | | | | |
| 0 | | Brown to gray clayey SILT, trace coarse sand, trace gravel, trace brick and wood pieces, moist, medium stiff | 5.0 | | | | | | | | | | | |
| 0 | | Brown medium SAND, moist, loose | | DP 2 | 70 | | | | | | | | | |
| 0 | | Gray medium SAND, wet, loose | | | | | | | | | | | | |
| 0 | | Gray SILT, trace becoming some clay, trace roots and wood pieces; moist, soft | 10.0 | DP 3 | 95 | | | | | | | | | |
| 0 | | Gray clayey SILT, moist, medium stiff | | DP 4 | 95 | | | | | | | | | |
| 0 | | Gray fine and medium SAND, trace gravel, moist becoming wet below 15.3', loose | 15.0 | | | | | | | | | | | |
| 0 | | Bottom of hole at 16.0 feet. | | | | | | | | | | | | |

CEC CUSTOM LOG 100-194 ST BERNARD MP INSTALL.GPJ GOOD TEMPLATE.GDT 7/8/10



Civil & Environmental Consultants, Inc.
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 Cincinnati, Ohio 45242

BORING NUMBER MP-7H

CLIENT St. Bernard **PROJECT NAME** MP Install
CEC PROJECT NUMBER 100-194 **PROJECT LOCATION** Former St. Bernard Landfill
DATE STARTED 5/27/10 **COMPLETED** 5/27/10 **GROUND ELEVATION** NA **HOLE SIZE** 4 inch
DRILLING CONTRACTOR Jersey West **GROUND WATER LEVELS:**
DRILLING METHOD Direct Push **AT TIME OF DRILLING** None
LOGGED BY MJM **CHECKED BY** RH **AT END OF DRILLING** ---
LOCATION See Map **AFTER DRILLING** DTW 4.00 feet bgs

| ELEVATION (ft) | GRAPHIC LOG | MATERIAL DESCRIPTION | DEPTH (ft) | SAMPLE TYPE NUMBER | RECOVERY % (RQD) | BLOW COUNTS (N VALUE) | POCKET PEN. (tsf) T=Torvane | ▲ SPT N VALUE ▲ | | | | | | |
|----------------|-------------|--|------------|--------------------|------------------|-----------------------|--------------------------------|-----------------|----|----|-----------------------|--|--|--|
| | | | | | | | | PL | MC | LL | □ FINES CONTENT (%) □ | | | |
| 0 | | Topsoil | 0.0 | | | | | | | | | | | |
| 0 | | Mottled brown and gray clayey SILT, medium stiff, noted iron staining, moist, medium stiff | | DP 1 | 83 | | | | | | | | | |
| 0 | | Brown SILT, moist, loose | | | | | | | | | | | | |
| 0 | | Brown clayey SAND, medium, trace gravel, moist, medium stiff | | | | | | | | | | | | |
| 0 | | Fine and medium SAND, moist, loose | | | | | | | | | | | | |
| 0 | | Mottled brown and gray clayey SILT, noted wet silt partings approximately 0.4' apart, medium stiff | 5.0 | DP 2 | 88 | | | | | | | | | |
| 0 | | Brown clayey SAND, moist, soft | | | | | | | | | | | | |
| 0 | | Dark gray clayey SILT, moist, medium stiff | | | | | | | | | | | | |
| 0 | | Dark gray clayey SILT, transitioning to silt, trace medium sand at top, moist, medium stiff | | | | | | | | | | | | |
| 0 | | Gray SILT, very moist, medium stiff | 10.0 | DP 3 | 80 | | | | | | | | | |
| 0 | | | | | | | | | | | | | | |
| 0 | | Gray SILT, wet, loose to medium dense | | | | | | | | | | | | |
| 0 | | | 15.0 | DP 4 | 100 | | | | | | | | | |
| 0 | | Bottom of hole at 16.0 feet. | | | | | | | | | | | | |

CEC CUSTOM LOG 100-194 ST BERNARD MP INSTALL.GPJ GOOD TEMPLATE.GDT 7/8/10



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CITY OF ST. BERNARD

JOB NO.: 200610

LOG OF MP-8

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: 9 ft. BGS

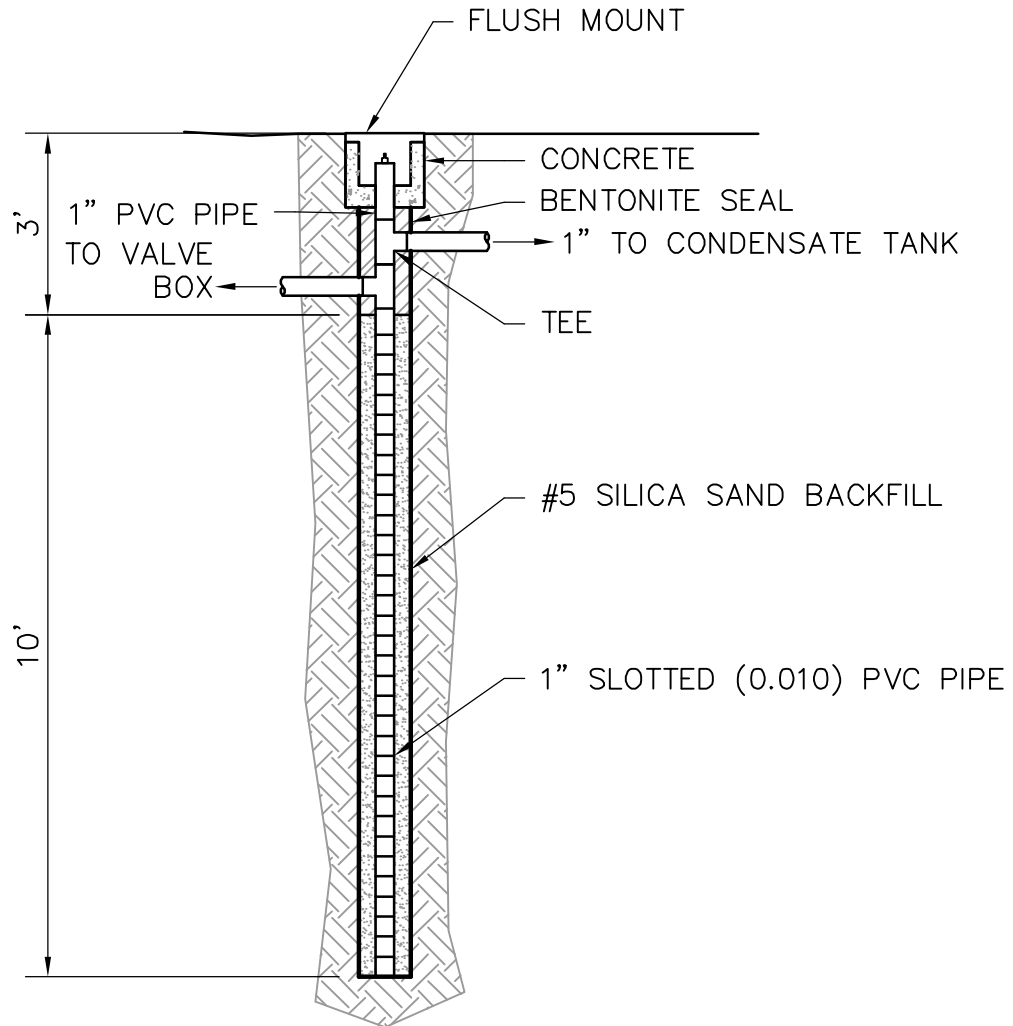
DATE: 08/14/00

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 |
|-----------|----------------|--------------|----------------|-------------|-------------|--|-----------------|
| | | | | | | No sample | |
| | 21 | 5-8 12-15 | | 5 | + | Dark brown to gray silty CLAY w/ fine to medium sand, moist, very stiff (FILL) | |
| | | | | | + | Light brown fine SAND, moist, medium dense (FILL) | |
| | N/A | 4-3 4-3 | | | | Dark brown to gray silty CLAY w/ fine to medium sand, concrete, wood, brick, plastic, and rubber, moist, very stiff (FILL) | |
| | | | | | | No recovery | |
| | 18 | 1-1 1-1 | | 10 | /// | Dark brown to gray sandy silty CLAY, wet, very soft | |
| | 18 | 0-1 1-1 | | | | Brown oxidized seam at 12.5 feet | |
| | | | | | | Boring terminated at 13 feet | |
| | | | | 15 | | | |
| | | | | 20 | | | |
| | | | | 25 | | | |



NOTE:
 1. INSTALLED ON 10/15/07
 2. ASSUMED LOCATION OF TEES.



Civil & Environmental Consultants, Inc.

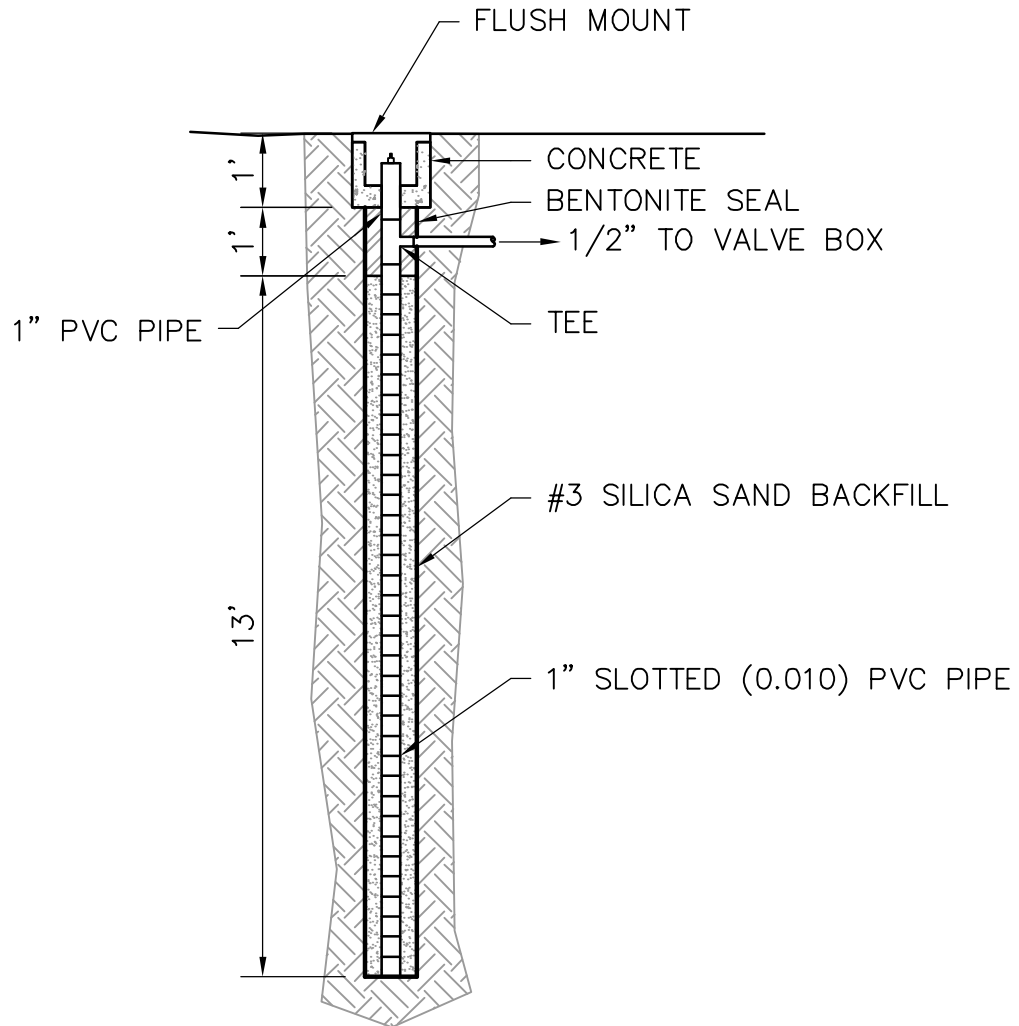
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CITY OF ST. BERNARD
 ST. BERNARD LANDFILL
 LANDFILL GAS ABATEMENT
 HAMILTON COUNTY, OHIO
**EXTRACTION WELL INSTALLATION
 EW-8A**

| | | | | | |
|-----------|------------|-------------|-----|--------------|--------------|
| DRAWN BY: | DAR | CHECKED BY: | RH | APPROVED BY: | FIGURE NO.: |
| DATE: | MARCH 2009 | DWG SCALE: | NTS | PROJECT NO: | 210-158-AW00 |

B-1

G:\PROJECTS\2007\210158\DWG\210158 EW-8A&B.DWG(EW-8A) (DRUDY) - MAR 18, 2009 - 10:51:0



NOTE: INSTALLED BY JERSEY WEST DRILLING ON 12/30/08



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CITY OF ST. BERNARD
ST. BERNARD LANDFILL
LANDFILL GAS ABATEMENT
HAMILTON COUNTY, OHIO

MONITORING PROBE INSTALLATION
EW-8B

| | | | | | |
|-----------|------------|-------------|-----|--------------|--------------|
| DRAWN BY: | DAR | CHECKED BY: | RH | APPROVED BY: | FIGURE NO.: |
| DATE: | MARCH 2009 | DWG SCALE: | NTS | PROJECT NO: | 210-158-AW00 |
| | | | | | B-2 |

G:\PROJECTS\2007\210158\DWG\210158_EW-8A&B.DWG(EW-8B) (DRUDY) - MAR 18, 2009 - 10:51:39



Civil & Environmental Consultants, Inc.
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 Cincinnati, Ohio 45242

BORING NUMBER MP-8C

| | |
|--|--|
| CLIENT <u>St. Bernard</u> | PROJECT NAME <u>MP Install</u> |
| CEC PROJECT NUMBER <u>100-194</u> | PROJECT LOCATION <u>Former St. Bernard Landfill</u> |
| DATE STARTED <u>5/27/10</u> COMPLETED <u>5/27/10</u> | GROUND ELEVATION <u>NA</u> HOLE SIZE <u>4 inch</u> |
| DRILLING CONTRACTOR <u>Jersey West</u> | GROUND WATER LEVELS: |
| DRILLING METHOD <u>Direct Push</u> | AT TIME OF DRILLING <u>None</u> |
| LOGGED BY <u>MJM</u> CHECKED BY <u>RH</u> | AT END OF DRILLING <u>---</u> |
| LOCATION <u>See Map</u> | AFTER DRILLING <u>---</u> |

| ELEVATION (ft) | GRAPHIC LOG | MATERIAL DESCRIPTION | DEPTH (ft) | SAMPLE TYPE NUMBER | RECOVERY % (RQD) | BLOW COUNTS (N VALUE) | POCKET PEN. (tsf) T=Torvane | ▲ SPT N VALUE ▲ | | | | | | |
|----------------|-------------|--|------------|--------------------|------------------|-----------------------|--------------------------------|-----------------|----|----|----|--|--|--|
| | | | | | | | | 20 | 40 | 60 | 80 | | | |
| 0 | | Topsoil | 0.0 | | | | | | | | | | | |
| 0 | | Brown clayey SILT, trace gravel, trace coarse sand, few brick, charred wood, and concrete fragments, moist, medium stiff | | DP 1 | 100 | | | | | | | | | |
| 0 | | Gray clayey SILT, trace gravel, trace coarse sand, many brick, wood, and concrete fragments, noted wet granular pocket at 7.9' with brick fragments, moist, medium stiff | 5.0 | DP 2 | 98 | | | | | | | | | |
| 0 | | Gray fine and medium SAND, moist, loose | | | | | | | | | | | | |
| 0 | | Gray and green clayey SILT, trace plant material, moist, medium stiff | 10.0 | DP 3 | 100 | | | | | | | | | |
| 0 | | Gray SAND and GRAVEL, wet, loose | 15.0 | DP 4 | 78 | | | | | | | | | |
| 0 | | Gray SILT, wet, stiff | | DP 5 | 100 | | | | | | | | | |
| 0 | | Bottom of hole at 19.4 feet. | | | | | | | | | | | | |

CEC CUSTOM LOG 100-194 ST BERNARD MP INSTALL.GPJ GOOD TEMPLATE.GDT 7/8/10