UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

JUN 20 2014

REPLY TO THE ATTENTION OF:

Angela Lageson, President
Moraine Properties, LLC
5500 Wayzata Boulevard, Suite 800
Golden Valley, Minnesota 55416

Re: 40 Code of Federal Regulations (CFR) §761.61(c) Risk-Based Cleanup and On-site Disposal of Polychlorinated Biphenyl Remediation (PCB) Waste
Moraine Properties Paper Sludge Dump, City Lot 4268
Soldiers Home-West Carrollton Road, Moraine, Ohio

Dear Ms. Lageson:

The U.S. Environmental Protection Agency has completed its review of the February 2013 application for a Self-Implementing Cleanup and Risk-based Disposal of Polychlorinated Biphenyl (PCB) contaminated paper sludge at the Moraine Properties Paper Sludge Dump (site) in Moraine, Ohio. The site has been enrolled in the Ohio Environmental Protection Agency (OEPA) Voluntary Action Program's (VAP) Pay As You Go (PAYGO) Technical Assistance (TA) program since June 2012 and Moraine Properties has been conducting this remediation under the guidance of the OEPA VAP.

You provided evidence that paper sludge disposal at the site ceased by April 1977. Under 40 CFR §§761.50(b)(3)(i)(A) and (B), sites containing these wastes are presumed not to present an unreasonable risk of injury to health or the environment from exposure to PCBs; however any person responsible for PCB waste at as-found concentrations ≥ 50 ppm who decides to dispose of that waste must comply with 40 CFR §761.61. Therefore, EPA evaluated this plan under 40 CFR §761.50(b)(3)(i) and the PCB risk-based regulations (40 CFR §761.61(c)) since the remedial actions proposed for the pre-1978 materials include offsite disposal, onsite consolidation and disposal, and the installation of a cap over the paper sludge dump which contains PCB up to 580 parts per million (ppm). According to the plan, selected areas of 50 ppm or greater PCB sludge along the perimeter of the paper sludge dump will be excavated to 1 ppm for offsite disposal. Sludge, located along the perimeter of the paper sludge dump, with a PCB concentration less than 50 ppm will be consolidated for disposal within the paper sludge dump.

EPA is granting approval of this application in accordance with Toxic Substances Control Act (TSCA) Section 6(e) and the Federal PCB regulations at 40 CFR §§761.50(b)(3)(i) and 761.61(c) since there are no potable wells on the property, the disposal site is outside of the 500 year floodplain, the higher PCB concentration material (120 to 580 ppm) within the paper sludge dump is located 3 to 12 feet below ground surface (bgs), and no PCB has been detected in the

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surface water, sediments or the current well monitoring network. In addition, the PCB concentration of the consolidated sludge will not exceed 50 parts per million (ppm), the disposal site will be capped and fenced, a new groundwater monitoring program will be established once the site is capped, groundwater use will be restricted, the future use of the property will be limited to industrial or commercial ventures, the site will be inspected quarterly and a risk mitigation plan will be established for the site. This approval is subject to the following conditions:

1. You must excavate and perform off-site disposal of paper sludge from the PCB locations identified in the table in Section 6.2 and depicted in Figure 7 (areas 1-5) of your application. After excavating these areas, you must perform verification sampling in accordance with 40 CFR Subpart O of the PCB regulations to confirm that you have met the 1 ppm cleanup goal.

2. All material excavated for consolidation must be placed and contained within the limits of the existing paper sludge dump, not including the areas excavated for off-site disposal.

3. As planned, you must cover the paper sludge dump with at least 2.5 feet to 3 feet of clean fill, at least 2 feet of compacted clay and 0.5 feet of vegetated layer and install Aquablok at the designated final cover cap termination. The compacted clay layer must meet the geotechnical specifications listed in the PCB regulations at 40 CFR §761.75(b)(1)(ii -v). If you modify the cap design specified in this approval, you must seek approval from EPA before installation of the modified cap. You may include a geosynthetic clay layer (GCL) in the cap design without EPA approval.

4. If you disturb the cap and/or the paper sludge underneath the cap for any reason, you must repair the cap immediately and properly dispose of any excavated PCB sludge in accordance with 40 CFR §§761.50(b)(3)(i)(B) and 761.61. You must dispose of the sludge based on its in-situ PCB concentration established through historical data or samples taken before excavation.

5. You must label the fence with an M_L mark as depicted in 40 CFR §761.45.

6. Any decontamination water must be collected and sampled prior to disposal. Water that contains 0.5 parts per billion (ppb) PCB or less may be disposed of without restrictions (40 CFR §761.79(b)(iii)). Water that contains PCB in concentrations up to 3 ppb may be released to a treatment works or to navigable waters or in accordance with a PCB discharge limit included in a permit issued under section 307(b) or 402 of the Clean Water Act (40 CFR §761.79(b)(ii)).

7. The decontamination solids must be collected and sampled prior to their disposal. Solids with a concentration less than 50 ppm PCB may be disposed of in a municipal solid waste facility as specified in 40 CFR §761.61(a)(5)(v)(A)(i) or the other facilities described in 40 CFR §761.61(a)(5)(v)(A). Solids with a concentration of 50 ppm PCB or greater must be disposed of in a TSCA permitted chemical waste landfill or hazardous waste landfill

permitted by EPA under section 3004 of RCRA, or by a State authorized under section 3006 of RCRA (40 CFR §761.61(a)(5)(i)(B)(2)(iii)).

8. Prior to its disposal, the decontamination pad must be sampled in accordance with Subpart O of the PCB regulations. If the PCB concentration is less than 50 ppm, it may be disposed of in a municipal solid waste facility as specified in 40 CFR §761.61(a)(5)(v)(A)(i) or the other facilities described in 40 CFR §761.61(a)(5)(v)(A). If the PCB concentration is 50 ppm or greater must be disposed of in a TSCA permitted chemical waste landfill or hazardous waste landfill permitted by EPA under section 3004 of RCRA, or by a State authorized under section 3006 of RCRA (40 CFR §761.61(a)(5)(i)(B)(2)(iii)).

9. If you use sheeting as a temporary cap over the existing paper sludge dump, you must dispose of it in a TSCA permitted chemical waste landfill or hazardous waste landfill permitted by EPA under section 3004 of RCRA, or by a State authorized under section 3006 of RCRA (40 CFR §761.61(a)(5)(i)(B)(2)(iii)). The sheeting may be disposed of in a municipal solid waste facility if the sheeting is sampled and the PCB concentration determined to be less than 50 ppm.

10. In accordance with 40 CFR §761.61(a)(5)(i)(B)(2)(iv), you must provide the 15 day written notice to each off-site facility that does not have a TSCA PCB disposal approval.

11. You may pursue approval of a groundwater monitoring program, a site maintenance and inspection program, a land use restrictive covenant (environmental covenant) and a financial assurance plan through OEPA provided you submit these plans and documents to EPA for review and comment. These documents must be submitted to EPA prior to the formal submittal of the No Further Actions Letter under the OEPA VAP and within 90 days from the date of completing the remediation and closure activities at the site.

12. You must submit the Remedial and Closure Activities Report, the Post-Closure Property-Specific Risk Assessment, the Operation and Maintenance Agreement and the Risk Mitigation Plan to EPA within 90 days from the date of completing the remediation and closure activities at the site.

13. The financial plan you submit to EPA for review, must include the financial information you used to determine the maintenance and monitoring cost for the remedy required under this PCB approval.

14. You must provide proof of the financial assurance to EPA within 30 days of establishing the financial assurance funding instrument for this site.

15. Within 30 days of executing and recording the environmental covenant, you must submit a copy of the recorded covenant to EPA.

16. You must notify EPA of activities pertaining to the paper sludge dump, including but not limited to, any change of ownership of the property (excluding mortgages, liens and other non-possessory encumbrances), any planned or actual development, any application for

and/or actual changes to any land use restriction or control pertaining to the paper sludge dump, any changes in financial assurance at least 30 days before such activities take place.

This approval does not relieve the site owner from compliance with any other federal, state or local regulation and does not preclude EPA from initiating any enforcement action, including an action seeking civil penalties, suspension, or termination of the approval for any violation of federal regulations, or requiring additional cleanup should Moraine Properties fail to comply with the approval conditions. Any departure from the conditions of this approval or the provisions of the February 2013 application must receive prior written authorization from this office. All conditions of this approval and other applicable requirements of TSCA and its implementing regulations will continue to apply to the site after any transfer in ownership.

Please submit the plans and documents required by this approval to Jean Greensley, of my staff. If you have any questions, you may contact her at 312-353-1171 or greensley.jean@epa.gov.

Sincerely,

Margaret M. Guerriero
Director
Land and Chemicals Division

cc: Joe Smindak, OEPA
Steve Gross, Hull and Associates, Inc.

SELF-IMPLEMENTING CLEANUP AND RISK-BASED DISPOSAL OF THE PAPER SLUDGE DUMP

FOR THE:
CITY LOT 4268
SOLDIERS HOME-WEST CARROLLTON ROAD
MORAINE, OHIO 45439

PREPARED FOR:
MORAINE PROPERTIES, LLC
5500 WAYZATA BOULEVARD, SUITE 800
GOLDEN VALLEY, MN 55416

PREPARED BY:
HULL & ASSOCIATES, INC.
6397 EMERALD PARKWAY, SUITE 200
DUBLIN, OHIO 43016

FEBRUARY 2013

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1.0 INTRODUCTION

On behalf of Moraine Properties, LLC ("Moraine") Hull & Associates, Inc. (Hull) is submitting notification in accordance with 40 CFR 761.61 of Toxic Substances Control Act (TSCA), for the planned self-implementing clean-up and risk-based disposal approval activities at City Lot 4268 Soldiers Home-West Carrollton Road, Moraine, Ohio (Site). The location of the Site is shown on Figure 1. In January 2004 Hull completed a Phase I Environmental Site Assessment (ESA) (Hull document RAA009.300.0010), in accordance with the American Society of Testing and Materials (ASTM) Standard E1527-00 (and the precedent version E1527-97) Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process. With the exception of vegetation/tree removal activities completed in the summer of 2011 and a stream restoration and culvert maintenance project completed in September 2012, the Site has remained secure and unchanged to date. Between August 2001 and May 2012 several Phase II ESA activities have been conducted at the Site to define the nature and extent of the paper sludge and the presents of potential chemicals of concern (COC). Laboratory analysis of soil and paper sludge samples included volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), polychlorinated biphenyls (PCBs), various metals, and cyanide.

1.1 Property Description

The Site is located on City Lot # 4268, which does not have a formal street address, consisting of approximately 5.09 acres and is comprised of parcel number J442-041-15-0015. The Site is located along the east side of Soldiers Home-West Carrollton Road, approximately one mile south of Pinnacle Road, and is situated within the City of Moraine, Montgomery County, Ohio. Figure 1 provides a Site Location Map. Although the Site is situated within the City limits of Moraine, Ohio, it is in a very rural setting. As shown on Figure 2, the Site is located approximately 300 to 400 feet from Soldiers Home-West Carrollton Road. The closed Pinnacle Road Landfill is located directly northeast of the Site. A copy of the current tax map is included as Appendix A.

Based on the Phase I ESA it was determined that the Site was occupied by a rendering plant from before 1938 until approximately 1950. During the 1960s and up until early 1977, the ravine occupying much of the Site (and the location of the former rendering plant) was used for disposal of paper sludge generated from recycling carbonless paper. The paper sludge disposal occupies approximately 2.2 acres of the Site and it has been determined through the

review of the Ohio Environmental Protection Agency's (Ohio EPA's) records that placement of paper sludge material ceased on April 18, 1977 (i.e. prior to Ohio EPA's determination that the placement of paper sludge material constituted solid waste disposal). This documentation from Ohio EPA is provided in Appendix B. The Site layout including the limits of waste is provided on Figure 3. The soil boring and monitoring well locations and a blow-up of the limits of paper sludge material is provided on Figure 4.

2.0 PHYSICAL SETTING

2.1 General

Several sources including previous environmental assessment reports, public records reviews, and interviews were used to acquire information regarding the geologic, hydrogeologic, hydrologic, and topographic characteristics of the Site and surrounding area.

2.2 Water Well Log Information

Hull reviewed well information from the Ohio Department of Natural Resources (ODNR) Division of Water, within a one-half mile radius of the Site boundary. According to ODNR records, there are no potable water wells located on the Site. The well records indicated that the Miami Paper Landfill (presumed to be the Fraser Papers, Inc. landfill located approximately 600 feet to the northeast of the Site) reportedly had approximately 20 monitoring wells that were closed in 1996. Seven monitoring wells are located at the Onyx Environmental Services Waste Management site located approximately 1,400 feet west of the Site. These wells were completed between 12 and 84 feet below ground surface (bgs) in clay and gravel. The closest private wells on record with the ODNR are located approximately [redacted] to the [redacted] and [redacted] to the [redacted] There is an unlocated well record that appears to be located approximately 1,000 feet to the northwest (upgradient) from the Site. These wells were completed between 40 and 204 feet in sand and gravel. The closest private well indicates a clay hardpan to a depth of [redacted], and clay & sand from [redacted], hardpan from [redacted] bgs encountering sand and gravel from [redacted] bgs. The well was screened from [redacted] bgs. There are no large diameter production wells reported within this search radius. Copies of the well log location map and all well logs are provided in Appendix C. Other wells may be present within the search distance but may not have been identified due to inaccurate well log location descriptions (i.e., current address, parcel number, or a map associated with the well record was unknown).

2.3 Flood Insurance Data

A copy of the Flood Insurance Rate Map (FIRM) including the Site, map number 39113C0242E dated January 6, 2005 and revised on April 15, 2010, was obtained from the Federal Emergency Management Agency, Flood Insurance Rate Map (FIRM) web page.[1] The map

[1] Federal Emergency Management Agency, Flood Insurance Rate Map, http://www.fema.gov/national-flood-insurance-program-2/flood-insurance-rate-map-firm.

identifies areas that would be affected by a 100-year and 500-year flood. A 100- and 500-year flood are floods of such magnitude that the probability of such an event occurring is once every 100 or 500 years, respectively. The map identifies the Site as being within Zone X, defined as an area to be outside the 500-year (0.2% annual chance floodplain) annual change floodplain.

2.4 Regional Geology and Hydrogeology

The Site is located in Jefferson Township, in southern Montgomery County, Ohio. Montgomery County is situated in the Till Plains Section of the central Lowlands Physiographic Province. The ground surface elevation of the Site ranged from approximately 711 feet to 762 feet MSL. The topography of the Site slopes gently east-southeasterly towards the Great Miami River, located approximately 1,000 feet east of the Site.

The Soil Survey of Montgomery County, Ohio indicates the general soil type in the area is Fox silt loam (FmA). The Fox silt loam soils are characterized by well-drained soils that formed in loamy glacial outwash material. These soils are in broad stretches, gently sloping (0 to 2% slopes) on the terraces along major streams and their larger tributaries. The soils to the east of the Site, across the railroad tracks, are Ross silt loam (Rs). The Ross silt loam soils are characterized by well-drained soils formed from alluvium in flood plains (USDA & DNR, 1976).

The Ground-Water Resources of Montgomery County (map) indicates that the Site is located in an area characterized by permeable sand and gravel deposits. Based on water well logs in the area and environmental soil borings and monitoring wells completed on-Site and in the vicinity of the Site there is a varying thickness of fine grained till deposits above the sand and gravel deposits. The primary bedrock beneath the Site is limestone. The carbonate aquifer was reportedly capable of producing yields of 500 to 1,000 gpm, at depths of 85 to as much as 185 feet.

Information obtained from the Ohio EPA, Division of Drinking and Ground Water (DDAGW) included groundwater potentiometric and monitoring data for the nearby Fraser Paper Landfill located north-northeast of the Site. The information indicated that groundwater flow at the landfill was predominantly to the south towards the river that bends from an east-to-west orientation to a north-to-south direction east of the Site. The river is shown in the Site Location Map on Figure 1. Groundwater flow within the unconsolidated deposits in the immediate vicinity of the Site is to the southeast towards the Great Miami River. Figure 5 provides a

potentiometric contour map from the January 2004 Metcalf & Eddy of Ohio, Inc. (M&E) groundwater data. The groundwater flow direction and gradient is consistent with the topographic surface and relief observed on the Site. The estimated gradient, based on the January 2004 potentiometric surface is approximately 0.11 ft/ft and tends to flatten to the south and southeast corner of the Site as the topographic surface levels out.

3.0 ENVIRONMENTAL HISTORY

3.1 Previous Studies

Based on information provided to Hull, various environmental reports have been completed for City Lot 4268 Site. A summary of the environmental reports including activities completed by Hull are discussed in sections below.

3.1.1 BHE Environmental, Inc., August 2001

In August 2001, BHE Environmental, Inc. (BHE) reported the results of a limited investigation conducted to determine whether contaminants were present in the soils and groundwater at the Site. Field activities included the completion of six soil borings. Soil samples were analyzed for VOCs, SVOCs, PCBs, metals, and cyanide. Two of the samples, which were composed primarily of sludge, contained detectable concentrations of VOCs, SVOCs and metals. The samples also contained PCBs at concentrations of 550 milligrams per kilogram (mg/kg) or parts per million (ppm) and 1,200 mg/kg. BHE compared the soil results to the Ohio Voluntary Action Program (VAP) generic direct contact standards for industrial land use that were in place at the time of their investigation. At the time of the BHE investigation the industrial land use standard for PCBs was 25 mg/kg. However, the Ohio VAP rules have been updated in March 1, 2009 and the commercial/industrial land use standard for PCBs was reduced to 18 mg/kg.

Groundwater samples were collected from two of the borings and analyzed for VOCs and metals. The groundwater samples were not analyzed for SVOCs or PCBs. VOCs were reportedly not detected in the groundwater samples. BHE compared the results of the groundwater samples to the US EPA maximum contaminant levels (MCLs). Arsenic and lead were reported at concentrations exceeding MCLs. However, these samples were collected from the boring and not from a properly screened well with a sand pack and do not provide a representative samples of the groundwater. It is not uncommon for metal concentration to be artificially elevated in groundwater samples collected directly from a borehole.

3.1.2 Metcalf & Eddy of Ohio, Inc., January 2003

In January 2003, M&E reported the results of an investigation conducted to determine the extent and volume of paper sludge and the concentrations of PCBs in the sludge and soil at the Site. Approximately 108 direct push soil borings and 25 hand auger borings were installed to determine the horizontal and vertical extent of the sludge. Based on field observations, two

general types of paper sludge were found throughout the Site: light gray plastic clay in the upper six feet and a deeper blue-gray clay with a strong septic odor. The sludge was reportedly observed in the majority of the eastern portion of the Site with the greatest thicknesses along the hillside and near the bottom of the ravine. Sludge was reportedly encountered at a maximum thickness of 18.2 feet in this area. Selected soil samples were submitted for analysis of PCBs. PCB concentrations in the paper sludge ranged from non-detect to approximately 580 mg/kg. M&E estimated the areal extent of the sludge to be 83,000 square feet and the volume of sludge to be 19,550 cubic yards. A copy of the site plan sampling points, and cross-sections included in the January 2003 M&E report is provided for reference in Appendix D.

M&E was contracted to conduct Phase II Environmental Assessment activities to address the data gaps identified in Hull's January 2004 Phase I ESA. M&E conducted the assessment activities from January 6 to 25, 2004. M&E's scope of work included the installation of four groundwater monitoring wells (MW-1 through MW-4), of which three were located on the subject Site and one located on an adjacent northwestern parcel.

The monitoring well located off-Site was used to provide data to characterize up-gradient conditions. In addition, stream sediment samples (SD-1 and SD-2) and surface water samples (SW-1 and SW-2) were collected from the unnamed stream that traverses the eastern margin of the Site. These samples were collected from upstream and downstream areas within the streambed.

A total of five additional surface soil samples (HA-41 through HA-45) were collected along the former access road used by trucks to transport paper sludge from Soldiers Home–West Carrollton Road to the sludge disposal area. Surface soil samples HA-41 and HA-42 were situated on the adjacent parcel to the south, along the property line of the narrow portion of the Site. This access road adjoined the disposal area to Soldiers Home–West Carrollton Road. Surface soil samples HA-43 and HA-44 were located on the margin of paper sludge placement, and HA-45 was situated inside the southwestern boundary of the limits of the paper sludge.

M&E had prepared a letter report dated February 13, 2004 providing a summary of results of data collected from each of the environmental media sampled. Data from soil borings HA-43, HA-44, and HA-45 are included in the tabulation of Site data included as Table 1.

3.1.2.1 Surface Soil

Surface soil samples were analyzed for VOCs, SVOCs, PCBs, and Resource Conservation and Recovery Act (RCRA) 8 metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver). PCB Congener Aroclor 1248 was detected at HA-41 at 0.036 mg/kg and was non-detect (<0.033 mg/kg) at HA-42. PCB characterized as Aroclor 1248 was detected at 2.2 mg/kg and 1.8 mg/kg in samples HA-43, HA-44, respectively. PCB Aroclor 1248 was detected at 33 mg/kg at HA-45, located within the limits of sludge placement. As a point of reference, when this investigation was conducted M&E compared PCB data to the Ohio VAP generic direct contact soil single chemical standards for residential land use (1.1 mg/kg), the U.S. EPA Region IX Residential Preliminary Remedial Goal (0.22 mg/kg) now called Regional Screening Level (RSL), and the USEPA Mega Rule (currently portion of TSCA 40 CFR 761) bulk PCB remediation waste cleanup levels for high occupancy areas (1 mg/kg) and low occupancy areas (25 mg/kg). There were no concentrations of other SVOCs and VOCs in soil above the laboratory method detection limits.

M&E compared metals data the VAP Residential land use standards and Region IX Residential Preliminary Remediation Goals (PRG's) in place at the time of their assessment (January 2003). Arsenic was the only metal detected at concentrations ranging from 5.1 mg/kg to 11.1 mg/kg in the surface soil samples concentration that exceed both the VAP Residential land use standard of 6.7 mg/kg and Region IX PRG's of 0.39 mg/kg. However, these concentrations are well within the range of background concentration in soil expected for this region of Ohio. Arsenic concentrations in soils in the eastern United States have been shown to range from <0.1 mg/kg to 73 mg/kg (Shacklette and Boerngen, 1984). Soils data should be compared to the standards established for the intended land use of the site. The intended land use of Moraine Properties Site is commercial/industrial and thus these soils data should be compared to VAP commercial/industrial land use standards. The VAP commercial/industrial land use standard for Arsenic is 82 mg/kg. Arsenic concentrations detected in the paper sludge and soils on the Site are much lower than the Ohio VAP commercial/industrial land use standard and is well within the expected background range. All other metals analyzed were either below applicable regulatory standards or not detected above method detection limits.

3.1.2.2 Stream Sediment

Stream sediment samples were collected from upstream and downstream locations along the unnamed stream. These sediment samples were analyzed for VOCs, SVOCs, PCBs, and the RCRA metals. VOCs and SVOCs were not detected in the stream sediment samples. Three metals (arsenic, chromium, and lead) were detected in stream sediment at concentrations ranging from 2.1 to 2.9 mg/kg, 2.9 to 3.3 mg/kg, and 2.2 to 5.1 mg/kg, respectively. Ohio VAP sediment criteria for ecological receptors for arsenic, chromium, and lead are 9.79 mg/kg, 43.4 mg/kg, and 35.8 mg/kg, respectively. No PCBs were detected in stream sediment samples collected from Lot #4268. The Site plan completed by M&E in Appendix D provides the location of the stream sediment samples SD-1 and SD-2. Stream sediment samples SD-1 and SD-2 are also shown on Figure 4.

3.1.2.3 Surface Water

Surface water samples were collected from stream located along the eastern margin of the Site. These samples were analyzed for VOCs, PCBs and RCRA 8 metals. None of the COCs for which analyses were performed were detected in the surface water samples. The Site plan completed by M&E in Appendix D provides the location of the surface water samples SW-1 and SW-2. Surface water samples SW-1 and SW-2 are also shown on Figure 4.

3.1.2.4 Groundwater

Groundwater samples were collected from two or more of the four groundwater monitoring wells on Site in January and September 2004. MW-1 is an upgradient well and wells MW-2, MW-3, MW-3A, and MW-4 are installed within and around the limits of paper sludge placement. Figures 4 and 5 show the locations of the four groundwater monitoring wells. Well construction logs are provided in Appendix E. During the January 2004 sampling event, M&E collected groundwater samples from MW-2, MW-3, and MW-4 for VOC and PCB analysis. No VOCs were detected in the groundwater samples. PCBs were not detected in wells MW-2, and MW-4. However PCB characterized as Aroclor 1242 was detected in monitoring well MW-3 at 34 µg/L (59 µg/L in the duplicate sample). Upon review of the soil boring data and well construction details, it was determine that the screened portion of MW-3 was placed through both paper sludge material and the saturated underlying soil. Well MW-3 was properly abandoned and

replaced with well MW-3A, located a few feet adjacent to MW-3. Well MW-3A was constructed in a manner that would provide groundwater quality representative of the underlying saturated zone uninfluenced by the overlying residual paper sludge particles in the sample. Well MW-3A was double cased with an outer casing installed through the paper sludge. Once the outer casing was set in place, below the paper sludge, the boring was advanced through the inside of the outer casing into the underlying soils. The well screen was installed into the underlying saturated soils at an interval below the base of the paper sludge. Well MW-3A was developed and sampled for PCBs. PCB concentrations in the initial groundwater sample collected from well MW-3A detected Aroclor 1248 at 1.9 ug/L (5.5 ug/L in the duplicate sample). Subsequent well development and sampling of MW-3A in September 2004 for PAHs and PCBs were non-detect for both sets of parameters.

3.1.3 Hull & Associates, Inc., August through September 2004 – Additional Site Assessment Activities

Hull completed additional ESA activities to obtain additional data to better define the extent and characterization of the paper sludge material placed at the Site. Hull and STS Consultants, Ltd. (STS) were contracted by Moraine Properties to complete the work. Field activities were conducted between August 5, 2004 and September 17, 2004.

ESA activities were focused in the immediate area of sludge placement, along the eastern limits of the fill area, adjacent to the unnamed stream. Additional exploratory activities were conducted to better define the limits of sludge placement along the northern, western, and southern boundaries of the fill area. This environmental assessment and task of sludge delineation consist of the installation of direct-push borings and field sampling with a shovel to minimize the generation of waste soil cuttings. A total of 18 direct-push soil borings (HSB-1 through HSB-18) and 20 shovel sampling (SL-1 through SL-20) locations were completed to depths ranging from approximately 1.0 foot to 6.0 feet below ground surface (bgs). Boring and shovel sampling locations are shown on the Site Layout presented as Figure 3. Copies of the soil boring and well construction logs are provided in Appendix E. During the sludge/soil sampling activities, groundwater was not encountered at the Site, with the exception at boring HSB-17 where saturation soils were encountered 5.7 feet bgs. Boring HSB-17 was located immediately adjacent to the culverted stream. On September 17, 2004 groundwater samples were collected from monitoring wells MW-2 and MW-3A. Monitoring well MW-2 is located side

gradient on the north end of the paper sludge area and MW-3A is located within the limits of waste on the eastern down gradient side.

Borings HSB-1 through HSB-18 were completed on August 5 and 6, 2004 to define the lateral and vertical extent of the paper sludge material adjacent to the stream area along the eastern portion of the Site. On September 13, 2004, ten additional borings (HSB-11A through HSB-11J) were completed in the vicinity of HSB-11 and the culverted stream. The purpose for these borings was to more precisely define the vertical extent of the paper sludge material and PCB concentrations in the vicinity of HSB-11 and the stream.

All borings with the exception of HSB-7 and HSB-15 were installed, and continuously sampled, with a direct-push drilling methods by AST Environmental, Inc., under the oversight of Hull's project geologist. Borings HSB-7 and HSB-15 were installed and sampled with a stainless steel hand auger by Hull's project geologist. Soil samples obtained by direct-push drilling methods were collected using a macrocore containing disposable acetate liners measuring either 3.0 or 4.0 feet in length. Borings were advanced to depths fully penetrating the paper sludge material, where present.

All samples were collected from each distinct stratigraphic unit or at a minimum of one sample per 2.0-foot interval. Sample intervals were modified as necessary in the field due to limited sample recovery at some boring locations. The project geologist wore a clean pair of nitrile gloves while handling each sample to maintain sample integrity. A representative portion of each sample was immediately placed in clean, laboratory-supplied sample jars, and placed on ice in an insulated cooler. Another portion of each sample was placed in a re-sealable sampling bag for field headspace screening using a photoionization detector (PID). Prior to screening samples, the PID was calibrated in accordance with the manufacturer's specifications using an isobutylene gas standard. The portion of each sample collected for headspace screening was allowed to warm to ambient temperature to promote volatilization of potential VOCs. A PID probe was carefully inserted through the seal of each bag and the maximum meter response was recorded on the boring log. Soil sample PID screening results are shown on the boring logs in Attachment E.

Soil samples were selected for laboratory analysis based on the presence of the paper sludge material. Samples collected at borings HSB-1, HSB-2, HSB-4, HSB-5, HSB-8, HSB-9, HSB-10,

HSB-11 (A through J), HSB-12, HSB-17, and HSB-18 were submitted to the laboratory for PCB analysis. Samples were also analyzed for one or more of the following analyses; VOCs, PAHs and the eight RCRA metals. Soil underlying the paper sludge was samples at HSB-11J. A total of 22 sludge and soil samples were collected and submitted to the laboratory for PCB analysis, 11 samples for eight RCRA metals, VOCs and PAH analysis. Two additional samples from HSB-11J were analyzed for PCBs and arsenic. A summary of these results are included on Tables 1 through 3. All of the borings (HSB-1 through HSB-18) and shovel sampling locations (SL-1 through SL-20) were surveyed to Site coordinates. Figure 3 provides the Site Layout that shows the approximate limits of paper sludge. Figure 4 shows boring and shovel sample locations, monitoring well locations, stream and sediment sample locations and Site features including the unnamed stream that traverses the Site from north to south along the western edge of the Site.

Prior to commencing any drilling or sampling activities, a temporary equipment decontamination pad was constructed at the far north end of the disposal area to contain decontamination water generated during investigatory activities at the Site. The hand auger and drilling rods coming into contact with soil were decontaminated following each use. All waste water generated during decontamination procedures was properly captured and contained for characterization and off-Site disposal.

The paper sludge encountered in the borings completed along the unnamed stream generally consists of variable thickness of material described as soft light gray clayey silt, dry to slightly moist, with a crumbly texture (paper sludge) overlying fill material that consist of sand, gravel, fragments of glass, coal, slag, tile, and wood. At 14 of the 18 borings (HSB-1 through HSB-18) completed along the stream area, paper sludge was encountered at thickness ranging from less than 0.5 feet to a maximum depth of approximately 6.0 feet bgs. No paper sludge or other fill material was encountered at borings HSB-7, HSB-13, HSB-14, and HSB-15. Native soils underlying fill materials in the stream area consisted of sand containing variable amounts of clay, silt, and gravel. Soils encountered beneath and along the remaining perimeter of sludge placement area consist of a fine grained clay rich soil. This was observed at sample locations SL-1 through SL-20.

In addition to collecting sludge and soil samples, groundwater samples were collected from monitoring wells MW-2 and analyzed for PAHs and MW-3A and analyzed for PAHs and PCBs

on September 17, 2004. A groundwater sample could not be sampled from well MW-4 because the water table was either at or just below the base elevation of the well screen. MW-4 is screened to a total depth of 14 feet bgs. The latest groundwater data is summarized in Table 4.

3.1.4 Hull & Associates, Inc., October 2004 – Geotechnical Assessment of Paper Sludge

In October 2004, Hull completed a geotechnical assessment of the paper sludge. The purpose of the drilling, sampling and laboratory testing was to determine the composition and strength of the paper sludge and underlying material to be used in analyzing the stability of the slopes.

The field exploration consisted of four borings (B-1 through B-4), continuously sampled to depths ranging from 9.5 to 23.5 feet, and field vane shear testing in four boreholes located adjacent to and within 5 feet of the continuously sampled borings. The drilling was performed between August 23 and August 25, 2004 using a skid mounted, rotary type drill rig. The boring locations are shown on the Soil Boring and Monitoring Well Location Map, Figure 4. Soil boring logs are provided in Appendix E.

3.1.5 Hull & Associates, Inc., July 2011 - Installation of Soil Borings SB-5 through SB-15

In July 2011, Hull completed 11 additional direct push soil borings (SB-5 through SB-15) within the assumed limits of waste to further characterize the PCB concentrations and to better define the thickness of paper sludge in those areas lacking data. A total of 12 paper sludge and 12 soil samples were collected from these borings for laboratory analysis of PCBs, VOCs, PAHs, and metals. Boring SB-5 through SB-15 were continuously sampled to depths ranging from 6 to 18 feet bgs using a track mounted direct push Geoprobe ® rig. Soil borings and sampling locations are presented on Figure 4 and Figure 6. PCB data is summarized Figure 6 on in Table 1. VOCs, PAHs, and metals data are summarized on Table 2 and 3. Boring logs are included in Attachment E.

3.1.6 Hull & Associates, Inc., April 18 – 23, 2012 – Installation of Soil Borings HS-1 through HS-4 and SL-8R

In April 2012, Hull completed 5 shallow soil borings (HS-1 through HS-4 and SL-8R). Borings HS-1 through HS-4 were completed within the limits of waste to further characterize the PCB concentrations at the base of the slope near the south end of the Site and near the north end of waste placement. Sample SL-8R was collected adjacent to former sample SL-8 collected in 2004. Samples were collected at HS-1 through HS-4 using a hand auger and were completed

to better define the PCB concentration at the toe of the western slope within the limits of waste paper sludge placement. Sample SL-8R was collected immediately west of sample SL-8 to define the horizontal extent of the paper sludge and PCB concentration in soil adjacent to SL-8. In 2004, PCB Aroclor 1248 was detected near the surface at SL-8 at a concentration of 1,100 mg/kg. Sample SL-8R detected Aroclor 1248 at a concentration of 2.74 mg/kg in the soils immediately adjacent to the paper sludge to the west. Boring HS-1 through HS-4 and SL-8R were sampled to a depth of 0.5 feet bgs using a hand auger. The location of the soil borings is presented on Figure 4 and the data are summarized on Figure 6 and in Table 1. Boring logs are included in Attachment E.

3.1.7 Hull & Associates, Inc., April 2012, Surface Water Delineation Investigation

In April 2012, Hull completed a delineation of surface waters on the property between Soldiers Home-West Carrollton Road and a CSX railroad track running along the west bank of the Great Miami River south of Pinnacle Road, Jefferson township, City of Moraine, Montgomery County, Ohio. The delineated area consisted of the stream that flowed in and out of a deteriorating culvert along the eastern boundary of the Site. The delineation identified 1 (one) non-isolated Perennial stream (UT to Great Miami River) totaling 452 linear feet within the property boundary area. The stream onsite empties into the Great Miami River at river mile 70. This stream has a drainage area of 0.47 square miles and therefore was evaluated using the Primary Headwater Habitat Evaluation Index (HHEI) in addition to the Headwater Macroinvertebrate Field Evaluation Index (HMFEI). The high HHEI and HMFEI scores (58 and 22, respectively) suggest the stream should be designated as a Class III Primary Headwater Habitat (PHWH).

The assessed reach had substrate consisting primarily of gravel with lesser amounts of cobble, sand, silt and leaf pack/woody debris. Stream 1 scored highly on the HHEI because it was highly sinuous, had an average bank full width of 1.39m, a maximum pool depth greater than 30 cm, a floodplain that consisted of mature forest, and a wide riparian width. Stream 1 scored highly on the HMFEI because it had a high number of *Plecoptera* nymphs which suggest high quality water.

3.1.8 Hull & Associates, Inc., July 2012, OAC Rule 3745-27-13 & OAC 3745-27-13(H)(6) Exemption

Moraine Properties, LLC (“Moraine”) and Ethyl Corporation (“Ethyl”) retained Hull & Associates, Inc. (“Hull”) to design and implement stream restoration/culvert maintenance activities and

properly cap the existing paper sludge area located on City Lot No. 4268 owned by Moraine. Lot No. 4268. Upon completing an investigation of historic use of the Site, it was determined that the Site was used for the placement of paper sludge associated with the recycling of carbonless and other paper during the 1960s and mid-1970s. Based on discussions with Ohio EPA's Division of Materials and Waste Management (DMWM), it was determined that the paper sludge material that was placed on the Site now would meet the definition for solid waste. Review of Ohio EPA's Solid Waste Rules effective July 1968 "Solid wastes means such unwanted residual solid waste or semisolid material as results from industrial, commercial, agricultural, and community operations, excluding earth or material from construction, mining, or demolition operations and slag and other substances which are not harmful or inimical to public health and includes garbage, combustible and non-combustible, street dirt and debris". Given this determination and that the paper sludge material is now regulated as a solid waste an authorization request under Rule 3745-27-13 of the OAC is required for such activities as engaging in filling, grading, excavating, building, drilling, or mining on land where a hazardous waste facility or solid waste facility was operated. Additionally, discussions with DMWM determined that the Site is most closely described under Rule 3745-27-13 (D)(2)(a) of the OAC (an unlicensed or unpermitted solid waste landfill subject to 1976 closure requirements). As part of the authorization request under Rule 3745-27-13, Site specific information was prepared and submitted to Ohio EPA for approval as codified under 3745-27-13 (F)(1) through (14).

As discussed in the Rule 3745-27-13 request document, the Site contains and could release hazardous substances as defined under CERCLA, primarily polychlorinated biphenyls ("PCBs"). The planned activities at the Site include construction activities in the immediate vicinity of sludge placement and within the limits of paper sludge placement during the stream/culvert restoration, spring/seep mitigation, and installation of the capping system. Adjacent City Lot # 4267 (3.0 acres) and City Lot # 4269 (2.5 acres), located immediately west of City Lot # 4268, are included as part of the overall project property because portions of these lots will be used to obtain borrow soils to be used in the capping of the paper sludge area and as part of the stream restoration/culvert maintenance activities.

Since the proposed activities include filling, excavating, and grading within the limits of paper sludge placement at the Site, Ohio EPA authorization is requested. This authorization request under Rule 3745-27-13 of the OAC provides Ohio EPA with the information to demonstrate that the activities proposed in this authorization request will not create a nuisance, and are unlikely

to adversely affect public safety, health or the environment. A copy of the Final Closure Plan of City Lot # 4268 and Ohio EPA's approval authorization dated July 30, 2012 is included as Appendix F of this document. The closure plans establish the design criteria for the implementation of the selected remedies.

Stabilization of the slope face within the limits of sludge placement and the consolidation of non-PCB paper sludge adjacent to the stream restoration does not comply with Rule 3745-27-13(H)(6) which states *"No excavation of waste shall occur unless the waste is replaced within the previously existing horizontal and vertical limits of waste placement or is treated or disposed of at a licensed, permitted treatment or disposal facility".* To address this issue a Rule 3745-27-13(H)(6) exemption request was prepared and submitted to the Director of Ohio EPA for approval. A copy of the OAC 3745-27-13(H)(6) exemption request and the Ohio EPA's approval of the exemption dated August 24, 2012 is included in Appendix F.

4.0 RECENT SITE ACTIVITIES

Recent activities were completed at the Site in accordance with scope of work dated March 2011. Additional assessment activities including sampling herbaceous vegetation, shrubs/saplings, woody vines and trees; removal of vegetation and trees within the limits of paper sludge placement; and the completion of the stream restoration and culvert maintenance scope of work dated August 2012. These activities are discussed below.

4.1 Vegetation and Tree Removal

In preparation for conducting stream restoration and culvert maintenance activities along the unnamed stream that bounds the eastern margin of the Site, the brush, shrubs, and trees were removed from the approximate 2.2 acre area were the former paper sludge placement area was identified. Only the vegetation above ground was removed. All of the brush, shrubs, and trees were cut at ground surface or above and removed from the foot print of the paper sludge dump area. Because the subsurface was not disturbed at, or in the immediate vicinity of, the paper sludge dump area during these activities, it was not necessary to obtain authorization from the Ohio EPA Division of Materials and Waste Management (DMWM) under Rule 3745-27-13 of the Ohio Administrative Code (OAC). The larger trees were cut at the base and lifted out of the dump area with a back hoe or front end loader and transported to a process chipping area out side the limits of paper sludge that was established west of the dump area up on the ridge.

Based on Hull's recent research on the potential for uptake and bioaccumulation of PCBs in plant material from soil or other media, there is a positive correlation with the soil concentration and concentrations observed in stems and foliage of certain species of plants. Lower chlorinated congeners of the PCBs are more readily absorbed by the plants, due to their higher water solubility and consequently, greater mobility in the soil. Research indicates that the potential for PCB uptake by plants is influenced by the following factors:

- The concentration of PCBs in the soil;
- Differential PCB uptake between plant species, *i.e.,* some species are capable of absorbing more PCBs than others; and
- The amount of chlorination seems to have an effect on the uptake of PCBs into the plant, and the subsequent distribution of PCBs between plant tissues; those PCBs of lower chlorination and greater solubility are expected to have greater

rates of uptake and be more widely distributed throughout the tissues of vascular plants by translocation.

Based on this information, Hull sampled trees and other vegetation and analyzed for PCBs prior to conducting clearing activities. Proposed sampling efforts include conducting a survey of the vegetation within the sludge area by a Senior Ecologist to identify the population of trees and plants within the remedial area and select specific vegetation for sampling.

Prior to the removal of any vegetation, Hull completed a survey of the dominant species in each vegetative stratum within the limits of the paper sludge – herbaceous, shrubs/saplings, woody vines, and trees. Herbaceous strata included all non-woody vascular plants; shrub/sapling strata included woody stemmed species of true shrubs, brambles, and saplings of shrub and tree species; woody vine strata included all species of woody vines; and tree strata included tree species of all sizes except for saplings. Species dominance within each stratum was determined in the field by professional judgment of the Senior Ecologist.

Sample locations were flagged in the field with plastic flagging ribbon and given a unique alpha-numeric code that correlated to the collected sample. The location of vegetation that was entirely removed was marked with a lath stake and ribbon, whereas, vegetation that was sampled by removing cores or sections were field identified by tying plastic flagging ribbon around the remaining structure. Sample locations were then photographed. These locations will be located using a hand held Global Positioning System (GPS) unit capable of sub-foot accuracy. This enabled Hull to document where each sample was taken and to ensure that the area was thoroughly sampled. Vegetation was identified to the genus and species level where possible due to timing of fieldwork, and recorded in a field notebook to be correlated to each sample. Tree and shrub diameter/caliper measurements were also recorded.

Sampling occurred in the sludge area in three distinct areas in February and March 2011. To determine whether increased PCB uptake is associated with hot spots, an attempt was made to collect at least one of the three samples within a known PCB hot spot. These locations were selected based on historic PCB data from across the Site.

A total of 27 plant samples were collected from the different shrub, plant, and trees species within the sludge area in February and March 2011. These data indicated that no significant PCB uptake in the vegetation has occurred. However, because the work will be performed in an

area impacted with levels of PCBs determined to range from less than 1.0 ppm to as high as 1,500 ppm, the contractor was responsible for managing the project and following all health & safe precautions as mandated under OSHA. The following provides a summary of the samples activities for each of the different vegetation and trees sampled.

Sampling Herbaceous Vegetation

Whole plants of the dominant herbaceous species were extracted and separated into root systems and an aboveground portion (stems and leaves). Plants were ground and placed in sample jars and labeled with a unique alpha-numeric code identifying each sample by individual species and specific sample. Multiple plants of the same species from the same immediate area were composited to obtain sufficient material for analysis. A minimum of 30 grams was required for laboratory analysis. The same sampling procedure was followed at a total of three geographically separate areas.

- 1 dominant herbaceous species x 2 subsamples (roots + leaves/stems) x 3 separate geographic sampling locations = 6 samples

Sampling Shrubs/Saplings

An 8-inch section of the aboveground portion of an individual of the dominant live shrub species and the dominant live sapling species were collected and roughly equal masses of main stem and smaller stems were composited.

Three dominant shrubs and three dominant saplings from separate locations on the Site were sampled. Samples were cut or pulverized and placed in a sample jar labeled with a unique alpha-numeric code identifying each sample by individual species and specific sample.

- 2 dominant species (1 shrub + 1 sapling) x 3 individuals = 6 samples

Sampling Woody Vines

An 8-inch section of the aboveground portion of individuals of the dominant live woody vine species was cut with loppers. Samples were collected from three geographically separated plants from across the project area. Cuttings were placed in a sample jar and labeled with a unique alpha-numeric code identifying each sample by individual species and specific sample.

- 1 dominant woody vine species x 3 individuals = 3 samples

Sampling Trees

Trunks of the dominant hard-hardwood tree species (e.g., red maple, red oak) and dominant soft-hardwood species (e.g., cottonwood) were identified in the field and marked for sampling. At total of six trees (2 species (1 hard-hardwood + 1 soft-hardwood)) were identified for sampling.

Tree samples were collected using a ¾-inch diameter auger bit and a cordless drill. Cuttings/shavings were collected and placed in sampling jars and labeled with a unique alpha-numeric code identifying each sample by individual species and specific sample. In order to generate sufficient material from a selected sample interval (greater than 30 grams), individual trees were drilled multiple times until sufficient material is collected.

Two composite samples were collected from each tree selected for sampling. The first composite sample was collected from the outer 3 to 4 inches, or until the living inner bark (phloem) had been reached. This sample may have included some of the xylem, as it is difficult to tell by drilling when this area is reached due to differences between species and the sizes of individual trees. The second sample was obtained from the same holes drilled in the mature trees, but was drilled deeper to collect a composite sample of the sapwood (active xylem) and heartwood (old, inactive xylem) to the approximate center of the tree. The sapwood and heartwood material was not separated. In larger trees, augering may not have reached the heartwood.

4.2 Stream Restoration and Culvert Maintenance

Stream Restoration

A pre-construction notification (PCN) was submitted to the Department of Army Corps of Engineering in April 2012 with additional information provided in May 2012 regarding the proposed stream restoration and culvert maintenance included under this project. It was determined that the proposed stream project met the criteria for Nationwide Permits (NWP) No. 3 under the February 21, 2012 Federal Register, Reissuance of Nationwide Permits (77 FR 10184) provided compliance with all terms and conditions of the 401 Water Quality Certification (WQC) issued for the NWP by Ohio EPA on March 30, 2012. Copies of both approval letters are provided in Appendix F. The Department of the Army Corps of Engineering granted their approval June 5, 2012. After the Army Corps of Engineering granted approval, a decision was

made to remove the entire existing culvert (as opposed to only a portion). Therefore, modifications were made to the backfill and bedding detail for the new culvert.

The Department of Army Corps of Engineering was contacted on July 12 and again on July 19 to confirm that no additional information or details are required to proceed under the existing approval permit. Hugh Crowell from Hull & Associates, Inc. spoke with Denise Marmer, Department of the Army Corps of Engineering, Regulatory Project Manager, North Branch office by telephone. A verbal description was provided on the plan to remove the entire existing culvert, the stream and new culvert alignment, and modification of the backfill and bedding detail for the new culvert. Ms. Marmer's response was that these modifications fall within the NWP No.3 and that the new alignment of the stream and culvert are actually more consistent with the NWP No.3 than the approved design. The Army Corps of Engineering did not requiring any further review or re-authorization of the design modifications.

Removal of Existing 48" CMP Culvert and Reestablish Open Stream

The project included the removal and disposal of an existing 48- inch corrugated metal pipe (CMP) culvert and other incidental smaller pipes in the area of a former access/haul road, located in the northeast corner of the Site. The former earthen access/haul road was excavated and used as grading fill in the limits of waste. This culvert area removed and re-graded to form an open stream in the resulting void. The culvert and other incidental smaller pipes were removed and properly disposed of off-site. This area is outside the foot print of waste placement and no paper sludge material or other construction debris was encountered during construction activities.

Removal of Existing Concrete Headwall

The project included the removal of an existing concrete headwall at the upstream end of the existing concrete culvert. The excavated concrete headwall was broken up and stock piled on Site to be used as general fill within the limits of final landfill closure area as designated by the engineer and approved by Ohio EPA under a Rule 3745-27-13 and 3745-27-13(H)(6) exemption of the OAC. The former headwall area is located outside the foot print of waste placement therefore no paper sludge material was encountered during construction activities. However, during the removal activities a former fuel oil underground storage tank (UST) was encountered below the main footer of the headwall. Upon encountering the UST the Ohio State Fire Marshal Bureau of Underground Storage Tank Regulations (BUSTR) was contacted and the UST was

properly removed and sampled umber their inspection. Soils data collected from the base and side walls indicated that this was a pre-1950's UST and no impact was present exceeding BUSTR Tier 1 levels. The UST cavity was properly backfilled and the new headwall was installed.

Excavated concrete placed in the waste final closure area was crushed into pieces no larger than 2-foot in any direction and placed in a manner that allows for filling with smaller pieces or other grading fill materials to pack voids and provide an even subsurface for the compacted soil layer.

Removal of Existing Concrete Culvert

The project included the removal of approximately 240 linear feet of existing concrete. Approximately 71 feet of the concrete culvert was located outside the limits of waste. Culvert and surrounding materials were excavated as part of the concrete culvert removal and placed within the final waste closure area as designated by the engineer and approved by Ohio EPA under a Rule 3745-27-13 and 3745-27-13(H)(6) exemption of the OAC. Approximately 650 cubic yards of paper sludge material was excavated from around the existing culvert and consolidated within the limits of waste at a central location near the base of the existing slope. Consolidated material was directly deposited in the fill area and covered daily with a minimum of 6 inches of soil obtained from the designated borrow area or a plastic sheet to prevent leaching and run-off of the placed material. The cover shall remain in place until final cover system is constructed.

Previous environmental site assessment activities conducted on the Site prior to the construction activities determined that the PCB levels in the paper sludge and surrounding soils along the former culvert were non-detect to less than 1.0 milligram per kilogram (mg/kg) and pose no environmental risk or regulatory actions within the area of construction activities associated with the removal of the existing concrete culvert, installation of new culvert, and stream restoration.

Installation of 48" CPE Culvert, Culvert Headwall, and Endwall

The project included the installation of a 48-inch diameter corrugated polyethylene (CPE) culvert, including bedding and backfill materials. Approximately 177 feet of CPE culvert was installed south of the new headwall and outside of the final limits of waste. The project included

the installation of a new headwall and endwall between the 48-inch diameter CPE culvert. The headwall and endwall was constructed according to industry standards, and shop drawings approved by the engineer. The contractor provided the engineer details for the pre-cast concrete headwall and endwall for approval.

Stream Rock Channel Protection

The project included the installation of rock channel protection, including underlying non-woven geotextile, for the proposed re-established stream section downstream of the newly installed culvert. Rock channel protection was ODOT Type B rock.

This work included completion of enhancements activities to the stream section; including grading, widening, and reestablishment of embankments. The extent of work was as directed by the engineer.

5.0 EXTENT OF PAPER SLUDGE AND PCB CONCENTRATIONS

Based on the previous subsurface assessments conducted at the Site the extent of paper sludge placement and the associated PCB concentration have been well defined. The area covered by paper sludge includes an area approximately 2.1 acres as identified on Figure 3. The thickness of sludge varies across the Site from only a few inches to as thick as approximately 20 feet below existing grade. Paper sludge was encountered to depths of 14 to 20.5 feet at boring locations SB-8 and SB-3, respectively. These borings are located in the central portion of the Site.

PCB concentrations in the sludge range from non-detect to as great as 1,500 mg/kg. Table 1 and Figure 6 provide a summary of the PCB data and distribution across the paper sludge area. Extensive sampling was completed along the eastern portion of the Site prior to the stream restoration and culvert replacement was recently completed on the unnamed stream that traverses from north to south. It was determined by previous assessment activities that PCB concentrations in soil and paper sludge along the stream area are non-detect or less than 1.0 mg/kg with the exception of samples collected at HSB-11. PCBs were detected at 4.0 to 6.0 feet below ground surface (bgs) at a concentration of 1,500 mg/kg. PCB concentrations in the sludge above 3.0 feet are less than 1.0 mg/kg. Additional sampling conducted a few feet east in the direction of the stream indicate that PCBs are non-detect to less than 1.0 mg/kg in the sludge. Paper sludge in this area is approximately 6.0 feet deep and becomes rapidly shallower to the north, east, and south.

As part of efforts to reduce the potential for paper sludge impacting the stream, stream restoration and culvert maintenance activities were completed. The project included removal of approximately 240 linear feet of concrete culvert that has been plugged and/or degraded over time. Approximately 170 feet of the concrete culvert is located within the limits of paper sludge. Because the paper sludge in this area has been determined not to contain PCBs greater than 1.0 mg/kg the culvert and surrounding materials excavated as part of the concrete culvert removal was placed within the final waste closure area as designated by the engineer under the approval of Ohio EPA. The new limit of paper sludge is approximately 15 to 20 feet west of the new stream and culvert alignment.

Several hot spots of PCB containing paper sludge are located along the western limits of the sludge area east of the ridge line. PCB concentrations are shown on Figure 6.

6.0 DESCRIPTION OF THE ACTIVITIES PROPOSED AT THE SITE

After an evaluation of remedial alternatives, a combination of remedial actions for the management of paper sludge materials encountered at the Site was recommended.

The proposed remedial actions for addressing the presence of and release of potential hazardous substances consist of the following: institutional controls such as the establishment of land use and groundwater use restrictions; engineering controls that would include securing the Site with a 72-inch high security fence; selective PCB source removal activities to remove several locations of elevated PCB concentrations away from the perimeter of the limits of paper sludge waste; stabilization of the slope face within the limits of the paper sludge material, minimal consolidation of the paper sludge material, installation of a proper soil cover over the paper sludge area compliant to DMWM and Ohio VAP; and the implementation of a risk mitigation plan in the event of future activities that may result in short-term exposures.

A copy of the Final Closure Plan of City Lot # 4268 is included as Appendix F of this document. The closure plans establish the design criteria for the implementation of the selected remedies. Figure 7 provides a Site plan that identifies those locations where hot spot PCB removal activities are proposed.

6.1 Air Emissions, Leachate, Surface Water Run-On and Run-Off, Explosive and Toxic Gas Migration, and Protection of Groundwater Measures

The following provides a description of the manner in which the control of air emissions, control of leachate, surface water run-on and runoff, explosive and toxic gas migration, and protection of groundwater will be performed. Several contingency plans will be implemented (as necessary) during completion of the proposed closure activities in the paper sludge fill area. Contingency plans include Hull's Site-Specific Health and Safety Plan (HASP) as well as procedures for the control of air emissions, control of leachate, surface water run-on, and run-off, and protection of groundwater.

These plans are described in detail below.

6.1.1 Health and Safety Plan

Contractors, subcontractors, consultants, field personnel and any other entity involved in the project will be expected to develop, implement and maintain current, a Site-Specific Health and Safety Plan (HASP). HASPs will comply with all Occupational Health and Safety Administration (OHSA) requirements, and will be utilized for the duration of the project in all areas of the property.

The HASP at a minimum will include:

A. An acknowledgement and understanding of the Site conditions.

B. Identification of personal protective equipment needs for the various work activities.

C. Identification of monitoring equipment and procedures to be used during various work activities.

D. Directions to the Site.

E. A listing of emergency routes to the nearest hospital and emergency room.

F. Telephone numbers and location of the following:

Nearest hospital and emergency room;
Poison Control Center;
Police (both State and local);
Fire department;
Emergency Medical Service;
Contractor's Supervisory and Management personnel (work and home);
Ohio EPA Division of Solid Waste Management; and
Ohio Department of Health.

G. A plan for emergency response and notification.

H. A plan for handling suspect or hazardous materials, if encountered. This will include decontamination of equipment coming in contact with waste/suspect material.

I. Identification of Contractor's on-site Health and Safety Officer.

J. Documentation of appropriate training of the Contractor's personnel, including but not limited to, 40-hour OSHA Hazardous Waste Site Training in accordance with 29 CFR 1910.120 and current OSHA 8-Hour HAZWOPER Refresher Training.

The paper sludge waste may contain PCBs. As such, the HASP must include provisions to ensure proper precautions are taken to protect site workers and the public. Precautions may include, but not be limited to, use of respirators, poly-coated coveralls, gloves, and boot covers.

Before construction begins, it will be the contractor's responsibility to contact the Ohio Utility Protection Services (OUPS). The contractor will also take any other measures necessary to ensure utilities are appropriately marked and an assured distance is maintained for the duration of the project.

6.1.2 General Conditions

The project will include provisions for dust and odor control for all work which causes dust or unsuitable odors for the Property and any surrounding properties, as determined by the engineer. Dust control is anticipated to include regular watering of haul and access roads, as well as other exposed surfaces, as necessary. Although foul odors are not anticipated for this project, odor control as needed will be established by covering exposed excavated of reworked waste surfaces as soon as possible after completion of work at that the end of each work day.

6.1.3 Erosion and Sedimentation Control

The project will include erosion and sedimentation controls in accordance with the Site's Storm Water Pollution Prevention Plan (SWP3) that will be designed specifically for this project. Use of silt fencing and bails will be incorporated in the erosion and sedimentation control plan.

Groundwater/Storm water management will include properly restricting the accumulation of any water within the project areas, including the borrow area. The water is assumed to be a non-hazardous waste.

6.1.4 Clearing and Grubbing

The project will include clearing the project area (including the borrow area) of trees, shrubs, stumps and other vegetation as needed to complete the work. The proposed hot spot PCB removal areas are shown in on Figure 7.

6.1.5 Decontamination

The project will include the need for decontamination of all vehicles, tools, or equipment which comes into contact with waste or with a material which has been determined by the engineer to be a potentially contaminated material.

All decontamination activities shall be performed in accordance with the specifications to be included in the contractor's bid package. All decontamination water and other materials used for decontamination will be collected on property within a designated decontamination area for proper characterization and off-site disposed in accordance with specifications to be included in the contractor's bid package. All disposal and transportation activities will comply with federal and state regulations.

A decontamination pad with a sump area will be constructed on-site at the north end of waste placement. The actual location of the decontamination pad will be determined once the contractor mobilizes on-site. Decontamination of earth moving equipment and tools will be conducted by use of a high power pressure washer and scrub brushes. The decontamination water generated during the decontamination process will be collected within the bermed pad and transferred to a poly tank staged adjacent to the pad for characterization prior to proper off-Site disposal. Solids generated from the decontamination process will be containerized in 55-gallon drums for characterization and proper disposal. Any drums containing solids removed from the decontamination pad will be placed in a designated location adjacent to the decontamination pad on plastic sheeting.

6.1.6 Air Emissions Plan

Based on institutional knowledge of the Site, type of waste, age of waste, and the estimated quantity of waste disposal, there are no explosive gases anticipated at the Site. If in the future it is determined that such gases may exist, a plan will be developed to monitor, control and manage the gases.

Measures to control dust during the construction activities will be implemented by watering the area to control fugitive dust.

6.2 Hot Spot PCB/Paper Sludge Waste Material Removal

PCB concentrations vary in the paper sludge material across the paper sludge area. The higher concentrations of PCBs in paper sludge appear to be primarily located in the central portion of the sludge area at depth, at the top of the slope along the western central boundary of the sludge area near the surface, and in an isolated area in the southeast portion of the sludge area. This is presumed to be related to the deposition of the paper sludge over time. The older paper sludge material was reportedly denser, thicker and less mobile than the later placed paper sludge material. The paper sludge material deposited during the last few years of operations (late 1960s – early 1970s) was higher in water content and mobile with considerable less to no PCBs constituents existing in the sludge material. This is why paper sludge is observed along the eastern margin of the paper sludge area (at the base of the slope) with no to only trace levels of PCBs detected.

As part of the remedial activities, hot spot removal of PCB impacted paper sludge will be completed at select locations prior to initiating sludge consolidation and the construction of the final cover system. PCB impacted paper sludge encountered along the western margin of the sludge area and the in the southeast corner of the sludge area will be excavated, managed, and disposed off-Site at an appropriate TSCA landfill. The hot spot areas planned for remediation are illustrated on Figure 7 and are listed below:

Hot Spot Removal Locations	Sample Location	Sample Interval (ft)	PCB Concentration (mg/kg)	Anticipated Excavation Depth (ft)	Approximate Depth of Native Soils
1	HSB-11	4.0 - 6.0	1500	6.0	Soil expected at 6.0 feet.
2	sl 8	0.0 - 0.7	253	<1.0	Soil is encountered at 0.5 feet.
	SB-10	0.0 - 2.0	496	<3.0	Soil is encountered between 8.0 to 12.0 feet.
3	sl 13	0.0 - 0.5	1010	<1.0	Soil is encountered at 0.5 feet.
	RP-70	0.0 - 3.0	120	<3	Soil expected between 8.0 to 10.0 feet.
	SB-11	0.0 - 2.0	787	<3	Soil is encountered between 8.0 to 12.0 feet.
4	sl 15	0.0 - 1.0	140	<1.5	Soil is encountered at <0.5 to1.0 feet.
5	RP-100	0.0 - 3.0	220	<5.0	Soil expected at 6.0 feet.
	RP 101	0.0 - 1.0	250	<5.0	Soil is encountered at 3.0 feet.
	HS-1	0.0 - 0.5	107	<2.0	Soil is encountered at 1.0 to 2.0 feet.
	SB-15	0.0 - 2.0	270	<2.0	Soil expected at 6.0 feet.
	RP-38	3.0 - 6.0	160	<2.0	Soil expected at 6.0 feet.

Upon excavating the identified hot spots from the paper sludge area, confirmation samples will be collected to provide a confirmation that the PCBs have been removed from these areas. Confirmation sampling of the underlying soils, post excavation, will be conducted to confirm that the PCB impact paper sludge has been removed and PCB concentrations in the underlying soils and/or along the limits of the excavation/paper sludge limits are below a concentration of 1.0 mg/kg.

Paper sludge and any soils determined to contain PCBs greater than or equal to 50 mg/kg that are excavated will be managed by direct loading and deposed of in a hazardous waste landfill in accordance with 40 CFR 761.61 (a)(5)(i)(B)(*2*)(*iii*). Paper sludge and any soils determined to contain PCBs less than 50 mg/kg shall be disposed of in a municipal solid waste landfill in accordance with 40 CFR 761.61 (a)(5)(i)(B)(*2*)(*ii*).

The remaining few hot spots with PCB concentrations exceeding 50 mg/kg will have a soil layer placed over the paper sludge. The estimated thickness of the soil layer at these locations will be approximately 5 feet. The soil layer will be composed of approximately 2.5 to 3.0 feet of general fill (Clean soil), a compacted clay soil of at least 2.0 feet thick, and a vegetative cover soil layer (i.e., topsoil) at least 0.5 feet thick. Some areas will have greater than 2.5 to 3.0 feet of general fill in order to bring the pre-cap surface to a proper slope. These locations included the following: SB-5, SB-15, RP 22, RP 51, RP 53, RP 54, RP 55, and RP 70. Upon completing the landfill closure the area will remain fenced off, maintain a minimum of 2.5 foot point of compliance, land use restrictions, Operation & Maintenance Plan (O&M Plan), and a Risk Mitigation Plan (RMP) in place under an Environmental Covenant that will be attached and filed with the property's deed. These items will also be required under the Ohio EPA's VAP.

6.3 Final Paper Sludge Cover System

Upon completing the PCB/paper sludge hot spot removal activities around the perimeter of the paper sludge area and prior to construction of the final cover system, some paper sludge waste will be consolidated in order to reduce the final cover footprint and augment grading of the final cover slopes. Paper sludge will only be placed pursuant to approval of the OAC 3745-27-13(H)(6) exemption request, otherwise, clean hard fill materials or soils will be used. No paper sludge will be relocated or consolidated on site that exceeds a PCB concentration greater than 50 mg/kg. It is anticipated that paper sludge consolidation will take place in the central portion of the limits of paper sludge to separate distance of the limits of waste away from the existing

culvert, improve the grade across the sludge area, and reduce the final cover area to less than 2.0 acres. As discussed in 6.2, the paper sludge material deposited during the last few years of operations contain considerable less to no PCB constituents which were placed along the eastern margin of the paper sludge area (at the base of the slope). The final cover system will include grading fill, compacted soil layer, vegetative soil layer, and an AquaBlok® isolation barrier.

6.3.1 Grading Fill

In order to maintain a minimum top of final cover grade of 3% and maximum top of final cover grade of 33%, grading fill material will be necessary to achieve desired bottom of compacted soil layer grades in some areas within the waste final cover footprint. Two sources of grading fill will be used and are discussed below.

6.3.2 Grading Fill from Paper Sludge Consolidation and Various Excavations

The project will include excavation, hauling, placement, grading, and compaction of a variety of excavated materials as indicated below:

A. Paper sludge will be consolidated. No paper sludge will be relocated or consolidated on site that that exceeds a PCB concentration greater than 50 mg/kg);

B. Sediment removed from downstream of the proposed stream culvert (sediment samples collected on-Site have been determined not to contain PCBs, additional sampling will be determined necessary based on observed field conditions); and

C. Any other material excavated from the project area, excluding the borrow area material which is explained in more detail below.

6.3.3 Grading Fill from Borrow Area

The project will also include excavation, hauling, placement, grading, and compaction of soil materials from the designated grading fill subdivision of the borrow area located in an undisturbed area west of the paper sludge area and Soldiers Home-West Carrollton Road. The area to receive final cover shall be cleared of existing residual vegetation to the satisfaction of the on-site Construction Quality Assurance (CQA) representative. Soil fill material will be placed within the area of waste as needed to achieve the designed bottom of final cover grades. Soil fill material shall be placed in approximate 12-inch lifts and compacted with a sheepsfoot compactor to the satisfaction of the on-site CQA representative.

Grading fill excavations will be completed in areas as directed by the engineer. Cross-Section Drawing 5 of 7 illustrates the extent of grading fill needed to achieve bottom of compacted soil layer. The actual extent of grading fill needed to achieve bottom of compacted soil layer will be determined by the engineer during construction. Compaction will be to visual non-movement as determined by the engineer.

6.3.4 Compacted Soil Layer

The project will include excavation, hauling, placement, grading, and compaction of soil for the minimum 2-foot thick compacted soil layer within the proposed final cover limits. Soils from the designated borrow area, located directly to the west of the final cover area, will be used for the compacted soil layer. It is important to note that in the central portion of the sludge placement area where several hot spots of PCBs will remain, the estimated thickness of soil cover will be approximately 5 feet or greater. The soil layer in these areas will be composed of approximately 2.5 to 3.0 feet of general fill, a compacted clay soil of at least 2.0 feet thick or equivalent, and a vegetative cover soil layer at least 0.5-foot thick. Some areas will have greater than 2.5 to 3.0 feet of general fill in order to bring the pre-cap surface to a proper slope. The reduced footprint of the limits of waste for the final cover after paper sludge consolidation is anticipated to be less than 2.0 acres The limits of waste pre-consolidation and limits of waste for post-consolidation are both shown on Figure 4.

Upon achieving design bottom of final cover grades (as determined by survey), final cover material shall be placed over the designated area according to the following requirements:

A. Loose lifts not to exceed 8 inches in thickness;

B. Cleared of putrescent materials, stones, cobbles, boulders or other large materials (as indicated in the Material Specifications section of the Standards for Current Construction of a 1976 Cap System) and to the satisfaction of the on-site CQA representative;

C. Compacted by sheepsfoot compactor to at least 95% of the maximum Standard Proctor density, as determined by nuclear density gauge;

D. Tested by the on-site CQA representative at a frequency of at least five tests per acre per lift; and

E. Moisture conditioned, as needed, to achieve compaction and cohesion as determined by the on-site CQA representative.

6.3.5 Vegetative Soil Layer

Upon achieving a minimum 2-foot thick compacted final cover soil layer (as determined by survey), an additional 0.5-foot minimum loose lift of soils suitable for promoting vegetative growth shall be placed, and not compacted, over the final cover layer. Suitability of the vegetative soils shall be determined by the on-site CQA representative. Vegetative soils shall come from the designated on-Site borrow area.

Upon construction of the vegetative soil layer, the completed area shall be seeded with such grasses or other vegetation as will form a complete dense cover. Seeding and mulching will be done as many times as necessary to ensure a dense cover as determined by the on-site CQA representative. Final cover construction shall not take place during weather conditions deemed by the CQA representative to be unsuitable for safe operations or for maintaining the integrity of the final cover components.

6.3.6 AquaBlok Isolation Barrier for Final Cover Termination

The project will include installation of AquaBlok® isolation barrier for final cover cap termination at locations delineated by the engineer and CQA. AquaBlok will come in the 2.0-ton bag variety. The AquaBlok® isolation barrier will be installed in controlled layers by attaching the 2.0-ton bags to a backhoe and controlling the flow of material into the desired location.

6.4 Leachate, Waste Material, and Surface Water Management

6.4.1 Leachate Control Plan

Run-on and run-off shall be controlled at all times. Appropriate management measures will be implemented to keep excavations free of water. Precautions necessary to limit the accumulation of water contact with potentially impacted material during remedial excavation and relocation/disposal activities will be taken. The construction contractor will be required to provide, operate, maintain pumping equipment, and provide water barriers as required to protect site from soil erosion. A temporary equipment decontamination pad will be constructed to contain any decontamination water generated during construction activities at the Site. All decontamination water generated will be properly captured and contained for characterization and off-Site disposal.

Leachate come upon during construction activities will be collected in temporary sumps adjacent to the encountered areas of influence and within the limits of waste. Leachate

collected in the temporary sumps will be transferred to a poly tank staged adjacent to the decontamination pad for characterization prior to proper off-site disposal to an approved waste water treatment plant.

6.4.2 Waste Material Disposal

Any waste material excavated during the stream restoration activities will be consolidated within the limits of waste in a predetermined location situated in the central portion of the waste area, near the base of the existing slope. Paper sludge will only be placed pursuant to approval of the OAC 3745-27-13(H)(6) exemption request, otherwise, the material will be properly disposed in accordance with in accordance with 40 CFR 761.61 (a)(5)(i)(B)(*2*)(*iii*) or 40 CFR 761.61 (a)(5)(i)(B)(*2*)(*ii*). Based on prior waste characterization of the paper sludge and soils in the area of proposed stream restoration excavation activities, PCB concentrations have been determined to be below 5.0 mg/kg to non-detect. Other than the PCB hot spot removal activities discussed in Section 6.2 for boring HSB-11, no waste will be relocated or consolidated on-site from areas determined to exceed a TSCA PCB level of 50 mg/kg.

During the consolidation of materials, daily cover of a minimum of 6 inches of soil obtained from the designated borrow area or temporary plastic sheeting will be placed over the waste to prevent leaching and run-off of the placed material. The cover shall remain in place until final cover system is constructed.

6.4.3 Drainage Ditch (Grass Lined)

The project will include installation of grass lined drainage. The actual line and grade of the ditches will be determined in the field by the engineer. Seeding and mulching for grass lined channel will be done as described in Section 6.5.2 below. To help control erosion, grass lined ditches will be augmented with straw bales and silt fences, strategically placed in locations to impede flow and trap sediment. Straw bales and silt fences will remain in place and be cleaned out as needed to ensure their continued effectiveness until substantial vegetative growth is established in the ditch. If it becomes apparent that additional erosion control measures are needed for any grass lined drainage ditch segments, those segments will be enhanced with erosion matting or rock lining.

6.4.4 Drainage Ditch (Erosion Mat Lined)

The project will include as the primary option for ditch fortification, installation of North American Green (or engineer approved equivalent) erosion mat lined drainage. The actual line and grade of the ditches will be determined in the field by the engineer. Seeding and mulching over erosion mat will be done as indicated below. Erosion matting is one of two options that will be considered for ditches in need of fortification.

6.4.5 Drainage Ditch (Rock Lined)

The project will include as a secondary option for ditch fortification, installation of rock lined drainage ditches. The actual line and grade of the ditches will be determined in the field by the engineer. Rock lining is one of two options that will be considered for ditches in need of fortification.

6.4.6 Cap Drainage Channels

Perimeter drainage ditches to the north, west, and south of the final cover area, and the restored stream to the east of the final cover area, are designed to capture and convey all offsite surface water. Therefore, only precipitation that originates directly within the final cover footprint traverses its surface.

Using the modified soil loss equation and site specific information for the final cover area, it was estimated that a maximum of 140 feet separation between slope channels can be used on a 3:1 slope without exceeding the 5 ton/acre/year erosion requirement as established in OAC 3745-27-06(C)(5)(j). The longest 3:1 slope length on the cap is approximately 80 feet. Accordingly, based on the size, configuration, and gradient of the final cover area, no cap channels are required.

However, the final cover system design does include an erosion mat lined drainage swale in the flatter northeast portion of the site. The swale is a result of proposed cap grading that is designed to utilize existing grade to promote the discharge of surface water from that portion of the final cover area.

6.5 Site Reclamation

6.5.1 Borrow Area Restoration

The project will include excavation, hauling, placement, spreading, and compaction of soil for restoration of the borrow area. Restoration will be done in a manner to provide positive drainage from the area and eliminate any ponding that may have resulted from excavation for final cover. Soil material to be used for restoring the borrow area will be such that it will support vegetative growth. The slopes for the restored borrow area will not exceed 4:1 and will maintain a minimum 2% grade to ensure quality drainage.

6.5.2 Seeding and Mulching

The project will include seeding and mulching of exposed areas with such grasses or other vegetation as will form a complete dense cover within the proposed final cover limits.

Seeding and mulching will also be completed in the borrow area after its restoration, and for any currently vegetated areas within and outside the project area that are disturbed during construction.

6.6 Groundwater Monitoring Well Abandonment

Prior to initiating the landfill capping activities, two groundwater monitoring wells (MW-3A and MW-4) currently located within the limits of waste will be properly abandon following the Ohio Department of Natural Recourses (ODNR) Technical Guidance for Sealing Unused Wells (1996). No other wells are located within the limits of waste. There are two existing groundwater monitoring wells (MW-1 and MW-2) located outside of the limits of waste to the north that will remain in place. These two wells will be utilized to collect additional groundwater data as part of the ongoing project being conducted under the Ohio EPA VAP, separate from the landfill closure. Figure 4, shows the locations of the four monitoring wells. Well sealing reports will be completed and filed with ODNR. In the event new groundwater monitoring wells are required as part of the ongoing Ohio VAP project, these wells will be located outside the limits of waste.

7.0 SITE CONCEPTUAL MODEL: RECEPTOR POPULATIONS AND POTENTIALLY COMPLETE EXPOSURE PATHWAYS PRE AND POST REMEDIAL MEASURES

The potential impacts of the paper sludge materials that have been disposed of at the Site posed by recognized environmental concerns (RECs) at the Site were evaluated. This evaluation included a review of the physical setting of the Site, the environmental media potentially impacted by releases of PCBs at the Site, the receptor populations reasonably assumed to be present at on-Site and off-Site locations, and any other conditions at the Site relevant for the determination of complete exposure pathways from paper sludge materials at the Site.

The environmental media potentially impacted by releases of PCBs at the Site include:

(a) the paper sludge materials disposed of at the Site;

(b) the soils underlying and surrounding the paper sludge materials;

(c) soil pore water and leachate, by partitioning of PCBs from paper sludge materials and the surrounding soils;

(d) groundwater in the upper saturated zone, by the vertical transport of pore water and leachate from surface and subsurface unsaturated soils;

(e) groundwater in the lower saturated zone, by the vertical transport from the upper saturated zone;

(f) terrestrial vegetation, by the uptake of PCBs in soil pore water;

(g) outdoor air at the Site, by particulate emissions from surface soil by wind erosion and by volatile emissions of PCBs from soil;

(h) outdoor air off the Site, by downwind migration of fugitive dust from the Site;

(i) surface water and sediments in the unnamed stream by the bulk movement of paper sludge materials from the disposal area to the stream by subsidence or erosion and deposition;

(j) surface water and sediments in the unnamed stream at the Site, through partitioning of PCBs from the paper sludge materials to sheet flow of water toward the stream;

(k) surface water and sediments in the unnamed stream off the Site, through downstream migration; and

(l) aquatic life biota in the unnamed stream, by uptake of PCBs in surface water, sediments and sediment pore water.

The Site is not currently in use. The Site's last known use was as a paper sludge disposal area. There are no structures or buildings on the Site. The Site is in an area of the City of Moraine zoned as M-2R, which is a subcategory of general industrial land use. The proposed remedial actions for addressing the presence of and release of potential hazardous substances consist of an institutional control such as the establishment of land use restriction (i.e., Industrial land use). Therefore, the Site could be used at some time in the future as an industrial facility. Thus, On-Site Industrial Workers engaged in non-invasive activities have been identified as a reasonably anticipated receptor population at the Site, in addition to On-Site Construction/Excavation Workers who may be involved in invasive, high-intensity and short-duration construction or excavation activities associated with future structures roadways, or utilities. Although the Site is fenced and posted, it has nevertheless been attractive to trespassers; therefore, On-Site Trespassers have been identified as a receptor population. Most of the tree cover has been removed during recent remedial activities, although the Site is vegetated. An unnamed stream (including approximately 177 feet of CPE culvert) runs along the eastern boundary of the Site. Terrestrial fauna and aquatic life in the unnamed stream have been identified as on-Site ecological receptor populations.

The Site Conceptual Model (SCM) provides a diagrammatic representation of the complete and potentially complete exposure pathways at the Property. The SCM for the Property, prior to the completion of remedial activities at the Site, is found in Figure 8. This figure shows that paper sludge materials have impacted surface and subsurface soils at the Site. Therefore, exposure pathways based on direct contact with surface and subsurface soils (*i.e.*, incidental soil ingestion, dermal contact with soils) are considered to be complete.

7.1 Surface and Subsurface Soils

PCBs in general are expected to partition to organic carbon and adhere to soil particles[2]. Winds may suspend soil particles in the air and distribute them to receptors at on-Site and off-Site locations, particularly in soils with minimal or poor vegetative cover. Although the Site is heavily vegetated, inhalation of particulate emissions from soil to outdoor air is considered to be a

[2] The U.S. EPA Regional Screening Levels table (May 2012) reports an organic carbon partitioning coefficient (K_{oc}) of 7.81 x 10^4 for Aroclor 1242 and 7.653 x 10^4 for Aroclor 1248. The RSL table may be accessed at: http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/index.htm

potentially complete exposure pathway for on-Site receptor populations; although the potential exposures of on-Site receptor populations through incidental ingestion and dermal contact are expected to substantially exceed the potential inhalation exposures[3]. Inhalation of particulate and volatile emissions from surface soil to outdoor air by off-Site receptor populations is considered to be a potentially complete exposure pathway with insubstantial exposure. The concentration of COCs in air resulting from particulate emissions from soil to the air decreases geometrically with increasing distance from the source; therefore, at the heavily vegetated Site, potential exposures to PCBs in soil resulting from fugitive dust (*i.e*., migration of suspended soil particles in air to remote, off-Site locations) are not expected to be significant.

Volatile emissions from soil to outdoor air are not considered to be complete exposure pathway; the most abundant congeners at the Site (those comprising Aroclor 1242 and Aroclor 1248), are not considered volatile, since they do not meet the criteria for volatility (*i.e*., a molecular weight (< 200 daltons and a Henry's Law Constant > 1×10^{-5} atm m^3 mol^{-1})[4]. Volatile emissions from soil to indoor air are not considered to be a complete exposure pathway at the Site; the Aroclors present at the Site are not volatile, and there are no habitable structures at the Site.

7.2 Terrestrial Biota

PCBs in surface and subsurface soils may partition to soil pore water and be taken up into tissue of rooted plants. Field samples were collected from tissues of four categories of vascular terrestrial vegetation, including herbaceous plants (roots; stems/leaves), shrubs and saplings (main stem and secondary stems), woody vines (stems), and trees (outer bark drill cuttings from trunk; xylem cuttings from trunk). Aroclor 1232 (at a maximum concentration of 3.51 mg/kg) and Aroclor 1248 (at a maximum concentration of 1.08 mg/kg) were each detected in both

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[3] The U.S. EPA Regional Screening Levels table (May 2012) reports a residential soil RSL of 5,800 mg/kg based on inhalation exposures to particulate emissions and the cancer endpoint for both Aroclor 1242 and Aroclor 1248. The residential soil RSL for ingestion exposures and dermal contact exposures (each evaluated with respect to the cancer endpoint) are 0.32 mg/kg and 0.72 mg/kg, respectively, for both Aroclor 1242 and Aroclor 1248, thus indicating that the expected soil exposures from incidental ingestion and dermal contact exceed the expected exposures from inhalation of particulate emissions by approximately four orders of magnitude. The RSL table may be accessed at: http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/index.htm

[4] The U.S. EPA Regional Screening Levels table (May 2012) reports a molecular weight of 291.99 dalton and a Henry's Law Constant of 1.9×10^{-4} atm m^3 mol^{-1} for Aroclor 1242, and a molecular weight of 291.99 dalton and a Henry's Law Constant of 4.4×10^{-4} atm m^3 mol^{-1} for Aroclor 1248 The RSL table may be accessed at: http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/index.htm

herbaceous plant roots and herbaceous plant stems/leaves; Aroclor 1016 was detected in tree samples (at a maximum concentration of 0.533 mg/kg). PCBs were not detected in plant samples from shrubs and saplings and woody vines. These results indicate the PCBs have been taken up into plant tissue; therefore ingestion by terrestrial fauna is considered a complete exposure pathway at the Site.

7.3 Groundwater

Groundwater underlying the paper sludge materials and soils at the Site may partition to groundwater and flow down-gradient from the Site (*i.e*., to the southeast, toward the unnamed stream and the Great Miami River). The receptor populations impacted by groundwater flow down-gradient from the Site include down-gradient receptor populations (*i.e*., the Off-Site Resident, Off-Site Commercial/Industrial Worker and Off-Site Recreator receptor populations) that may use the groundwater as a source of potable water. As discussed in Section 3.1.2.4 above, analytical results from properly-installed and developed monitoring wells (*i.e*., MW-2, MW-3A, and MW-4) indicate that groundwater at the Site has not been impacted by PCBs (*i.e*, Aroclor 1242 and Aroclor 1248); each Aroclor was reported as non-detected at a laboratory reporting limit of 0.0005 mg/L (*i.e*., the U.S. EPA Maximum Contaminant Level for PCBs[5]). Groundwater in the beneath the sludge material is typically encountered between 6 to 14 feet bgs based on the seasonal water table. Furthermore, there are no known down-gradient users of groundwater as a source of potable water or for any other purpose. Therefore, PCB exposure pathways associated with groundwater at the Site (*i.e.,* extraction of groundwater at the Site for use as a source of potable water, direct contact with groundwater in excavation trenches, discharge of groundwater to surface water) are considered to be incomplete.

7.4 Surface Water and Sediments

PCBs may be present in the surface water and sediments as a result of erosion, subsidence or partitioning to sheet flow from the soils and paper sludge materials. Once in the sediment, any PCBs, including Aroclor 1242 and Aroclor 1248, will likely adhere strongly to the organic carbon content of the sediments. From its presence in the organic carbon compartment of sediments, PCBs may partition into surface water, or be incorporated into the tissues of benthic flora and fauna. PCBs, when present in sediments and surface water, have the potential to bioaccumulate in the tissues of higher trophic-level organisms, including certain

[5] U.S. EPA Maximum Contaminant Levels may be accessed at: http://water.epa.gov/drink/contaminants/index.cfm

macroinvertebrates and fish, within the aquatic community. Sediments impacted by hazardous substances also have the potential to migrate downstream through suspension in the surface water. Any impacted macroinvertebrates and fish will feed, reproduce, and die within or beyond the Site boundaries. Thus, sediments, surface water, and biota including macroinvertebrates and fish on the Site may potentially impact Off-Site areas located down-gradient from the Site.

Analytical results from surface water and sediment sampling the unnamed stream indicate that PCBs were not detected in either surface water or sediment. Therefore, PCB exposure pathways at the Site (direct contact exposures to trespassers on the Site, downstream migration to off-Site locations, direct contact exposures to off-Site recreators, and uptake into aquatic life) are considered incomplete.

7.5 Summary of Complete and Potentially Complete Exposure Pathways Prior to Implementation of Remedial Measures

The On-Site Industrial Worker and On-Site Trespasser receptor populations may be exposed to PCBs by direct contact with paper sludge materials and surface soil (*i.e.*, incidental ingestion or dermal contact), and by inhalation of particulate emissions from soil to outdoor air. The On-Site Construction/Excavation Worker receptor population may be exposed to PCBs by direct contact (*i.e.*, incidental ingestion or dermal contact) with paper sludge materials and surface and subsurface soils, and by inhalation of particulate emissions from soils to outdoor air.

Migration of fugitive dust from the Site to off-Site locations may result in insubstantial exposures to the Off-Site Resident, Off-Site Commercial/Industrial Worker, and Off-Site Recreator receptor populations.

7.6 Summary of Complete and Potentially Complete Exposure Pathways After Implementation of Remedial Measures

The remedial measures that have been and will be implemented at the Site were described in Section 6.0, above; a revised Site Conceptual Model which incorporates the components of these remedial measures is provided in Figure 9.

Hot Spot PCB/Paper Sludge Waste Material Removal, as described in Section 6.2 above, will remove a substantial portion of the source of paper sludge and PCB-containing soil with PCB concentrations exceeding 50 mg/kg; the remaining paper sludge materials and PCB-containing

soils, including a limited number of locations at which PCB concentrations exceed 50 mg/kg, will be covered by a minimum of two feet compacted clay cover and one-half foot cover of vegetative soil layer. The soil cover layer and a perimeter fence will be maintained under an Operation and Maintenance Plan under an Environmental Covenant that runs with the property deed for the Site. The soil cover will preclude exposures of the on-Site receptor populations (*i.e.*, the On-Site Industrial Worker, the On-Site Construction/Excavation Worker and On-Site Trespasser receptor populations) to ingestion of PCBs in surface soil, dermal contact with PCBs in surface soil, and inhalation of PCBs in particulate emissions from soil to outdoor air.

The uptake and distribution of PCBs into Site flora and fauna will be precluded by the clearing and grubbing of all herbaceous and woody vegetation in the paper sludge disposal area, disposal of PCB-containing vegetation, and establishment of controlled shallow-rooted vegetation in the soil cover layer.

The potential exposures of the On-Site Construction/Excavation Worker receptor population to PCBs in subsurface soil during excavation events will be managed through the implementation of Risk Mitigation Plan under an Environmental Covenant that runs with the property deed for the Site. This Environmental Covenant will preclude any future residential or commercial use of the Site.

8.0 DESCRIPTION OF INSTITUTIONAL CONTROL THAT APPLIES TO THE SITE

There are currently no institutional controls established at the Site. No institutional controls are required for conducting the proposed closure activities. However, the entire property will remain properly secured with a 6-foot high chain link fence. Appropriate signage will be posted containing the following language "Private Property, Trespassing Illegal, Violators Will Be Prosecuted, This Industrial Facility Contains Regulated Substances and May Present Hazardous Conditions." As part of the Ohio EPA VAP, risk mitigation measures will be established once the landfill area has been properly capped. These are measures to be taken by workers involved in high contact activities with paper sludge materials and contaminated soils at the Site.

9.0 REFERENCES

A variety of technical documents and publications were referred to during the course of this project. Some of the references consulted are presented below. Referenced documents and publications may or may not have been reviewed in their entirety. The guidelines and procedures presented in the documents and publications referenced have not been strictly adhered to unless stated otherwise.

American Society for Testing and Materials. *E 1527-00 Environmental Property Assessment: Standard Practice for Environmental Property Assessments: Phase I Environmental Property Assessment Process.* 2000.

Hull & Associates, Inc. 2004. *Phase I Environmental Site Assessment, for City Lot 4268 Soldiers Home-West Carrollton Road, Moraine, Ohio.* Hull Document No. RAA009.300.0010, January 2004.

Ohio Administrative Code 3745-300-08, *Generic Numerical Standards Rule for the Voluntary Action Program*, March 2009.

Shacklette, H.T. and Boerngen, J.G. 1984. *Element Concentrations in Soils and Other Surficial Materials of the Conterminous United States*. U.S. Geological Survey Professional Paper 1270. United States Government Printing Office, Washington, DC. 105 pp.

U.S. Environmental Protection Agency, Region IX, *Regional Screening Level (RSL), Summary Table*, April 2012.

U.S. Environmental Protection Agency, Toxic Substance Control Act, 40 CFR 761.61, PCB Remediation Waste; aka part of Mega Rule.

TABLES

MORAINE PROPERTIES, LLC
MORAINE, OHIO

TABLE 1

SUMMERY of PCB CONCENTRATIONS in SOIL and PAPER SLUDGE

Sample Location	Sample Identification	Sample Depth (ft)	Sample Date	Material Sampled	Parameter	Aroclor 1016	Aroclor 1221	Aroclor 1232	Aroclor 1242	Aroclor 1248	Aroclor 1254	Aroclor 1260
					CAS Registry	12674-11-2	11104-28-2	11141-16-5	53469-21-9	12672-29-6	11097-69-1	11096-82-5
Ohio VAP Soil Direct Contact Commercial/Industrial Standards (mg/kg)[a]						18						
Ohio VAP Soil Direct Contact Construction/Excavation Standards (mg/kg)[b]						42						
HA-43	HA-43	0 - 0	1/15/2004	Soil		<0.33[c]	<0.33	<0.33	<0.33	2.2	<0.33	<0.33
HA-44	HA-44	0 - 0	1/15/2004	Soil		<0.33	<0.33	<0.33	<0.33	1.8	<0.33	<0.33
HA-45	HA-45	0 - 0	1/15/2004	Paper Sludge		<6.6	<6.6	<6.6	<6.6	**31**[d]	<6.6	<6.6
HS-1	ETH001:HS-1:S000005	0 - 0.5	4/18/2012	Paper Sludge		<0.118	<0.118	<0.118	<0.118	**107**	<0.118	<0.118
HS-2	ETH001:HS-2:S000005	0 - 0.5	4/23/2012	Paper Sludge		<0.134	<0.134	<0.134	<0.134	**61.4**	<0.134	<0.134
HS-3	ETH001:HS-3:S000005	0 - 0.5	4/23/2012	Paper Sludge		<0.135	<0.135	<0.135	<0.135	5.98	<0.135	<0.135
HS-4	ETH001:HS-4:S000005	0 - 0.5	4/23/2012	Paper Sludge		<0.129	<0.129	<0.129	<0.129	10.3	<0.129	<0.129
HSB1	RAA026:HSB-1:S003008	0.3 - 0.8	8/5/2004	Paper Sludge		<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
HSB2	RAA026:HSB-2:S002015	0.2 - 1.5	8/5/2004	Paper Sludge		<0.37	<0.37	<0.37	<0.37	<0.37	<0.37	<0.37
HSB4	RAA026:HSB-4:S000020	0 - 2	8/5/2004	Paper Sludge		<0.34	<0.34	<0.34	<0.34	0.82	<0.34	<0.34
HSB5	RAA026:HSB-5:S000024	0 - 2.4	8/6/2004	Paper Sludge		<0.36	<0.36	<0.36	<0.36	<0.36	<0.36	<0.36
HSB8	RAA026:HSB-8:S000020	0 - 2	8/5/2004	Paper Sludge		<0.35	<0.35	<0.35	<0.35	<0.35	<0.35	<0.35
HSB9	RAA026:HSB-9:S000010	0 - 1	8/5/2004	Paper Sludge		<0.36	<0.36	<0.36	<0.36	<0.36	<0.36	<0.36
HSB10	RAA026:HSB-10:S000026	0 - 2.6	8/5/2004	Paper Sludge		<0.44	<0.44	<0.44	<0.44	<0.44	<0.44	<0.44
HSB11	RAA026:HSB-11:S040060	4 - 6	8/6/2004	Paper Sludge		**<160**	**<160**	**<160**	**<160**	**1500**	**<160**	**<160**
HSB11A	RAA028:HSB-11A:S013026	1.3 - 2.6	9/13/2004	Paper Sludge		<0.34	<0.34	<0.34	<0.34	0.92	<0.34	<0.34
HSB11B	RAA028:HSB-11B:S011026	1.1 - 2.6	9/13/2004	Paper Sludge		<0.35	<0.35	<0.35	<0.35	0.63	<0.35	<0.35
HSB11C	RAA028:HSB-11C:S010026	1 - 2.6	9/13/2004	Paper Sludge		<0.36	<0.36	<0.36	<0.36	<0.36	<0.36	<0.36
HSB11C	RAA028:HSB-11C:S040062	4 - 6.2	9/13/2004	Paper Sludge		<7.6	<7.6	<7.6	<7.6	**63**	<7.6	<7.6
HSB11D	RAA028:HSB-11D:S007021	0.7 - 2.1	9/13/2004	Paper Sludge		<0.36	<0.36	<0.36	<0.36	0.53	<0.36	<0.36
HSB11J	RAA028:HSB-11J:S057073	5.7 - 7.3	9/13/2004	Soil		<0.33	<0.33	<0.33	<0.33	<0.33	<0.33	<0.33
HSB12	RAA026:HSB-12:S000010	0 - 1	8/6/2004	Paper Sludge		<0.27	<0.27	<0.27	<0.27	<0.27	<0.27	<0.27
HSB17	RAA026:HSB-17:S002020	0.2 - 2.0	8/6/2004	Paper Sludge		<0.36	<0.36	<0.36	<0.36	<0.36	<0.36	<0.36
HSB18	RAA026:HSB-18:S000024	0 - 2.4	8/6/2004	Paper Sludge		<0.35	<0.35	<0.35	<0.35	1.66	<0.35	<0.35
SB-05	ETH001:SB-05:S000020	0 - 2	6/23/2011	Paper Sludge		<0.0281	<0.0281	<0.0281	**45.4**	**33.2**	<0.0281	<0.0281
SB-05	ETH001:SB-05:S110120	11 - 12	6/23/2011	Paper Sludge		<0.0226	<0.0226	<0.0226	**24.1**	10.9	<0.0226	<0.0226
SB-06	ETH001:SB-06:S000020	0 - 2	6/23/2011	Paper Sludge		<0.0289	<0.0289	<0.0289	2.33	1.73	<0.0289	<0.0289
SB-06	ETH001:SB-06:S110120	11 - 12	6/23/2011	Soil		<0.022	<0.022	<0.022	8.3	2.5	<0.022	<0.022
SB-07	ETH001:SB-07:S000020	0 - 2	6/23/2011	Paper Sludge		<0.0276	<0.0276	<0.0276	0.651	0.681	<0.0276	<0.0276
SB-07	ETH001:SB-07:S110130	11 - 13	6/23/2011	Soil		<0.0272	<0.0272	<0.0272	2.69	<0.136	<0.0272	<0.0272
SB-08	ETH001:SB-08:S000020	0 - 2	6/23/2011	Paper Sludge		<0.0218	<0.0218	<0.0218	2.06	1.83	<0.0218	<0.0218
SB-08	ETH001:SB-08:S160180	16 - 18	6/23/2011	Soil		<0.0335	<0.0335	<0.0335	0.302	<0.168	<0.0335	<0.0335
SB-09	ETH001:SB-09:S000020	0 - 2	6/23/2011	Paper Sludge		<0.0276	<0.0276	<0.0276	2.31	2.69	<0.0276	<0.0276
SB-09	ETH001:SB-09:S030050	3 - 5	6/23/2011	Paper Sludge		<0.0335	<0.0335	<0.0335	1.31	1.19	<0.0335	<0.0335
SB-09	ETH001:SB-09:S070090	7 - 9	6/23/2011	Soil		<0.0283	<0.0283	<0.0283	1.3	<0.141	<0.0283	<0.0283
SB-10	ETH001:SB-10:S000020	0 - 2	6/24/2011	Paper Sludge		<0.0249	<0.0249	<0.0249	**284**	212	<0.0249	<0.0249
SB-10	ETH001:SB-10:S060080	6 - 8	6/24/2011	Soil		<0.0206	<0.0206	<0.0206	0.274	0.177	<0.0206	<0.0206
SB-11	ETH001:SB-11:S000020	0 - 2	6/24/2011	Paper Sludge		<0.0278	<0.0278	<0.0278	**442**	**345**	<0.0278	<0.0278
SB-11	ETH001:SB-11:S060080	6 - 8	6/24/2011	soil		<0.0287	<0.0287	<0.0287	**377**	**315**	<0.0287	<0.0287
SB-12	ETH001:SB-12:S000020	0 - 2	6/24/2011	Paper Sludge		<0.0233	<0.0233	<0.0233	0.246	0.146	<0.0233	<0.0233
SB-12	ETH001:SB-12:S050070	5 - 7	6/24/2011	Paper Sludge		<0.0222	<0.0222	<0.0222	0.0595	0.0395	<0.0222	<0.0222
SB-12	ETH001:SB-12:S070080	7 - 8	6/24/2011	Soil		<0.0281	<0.0281	<0.0281	0.138	0.0901	<0.0281	<0.0281
SB-13	ETH001:SB-13:S000020	0 - 2	6/24/2011	Soil		<0.022	<0.022	<0.022	0.0979	<0.022	<0.022	<0.022
SB-13	ETH001:SB-13:S040060	4 - 6	6/24/2011	Soil		<0.0225	<0.0225	<0.0225	<0.0225	<0.0225	<0.0225	<0.0225
SB-14	ETH001:SB-14:S000020	0 - 2	6/24/2011	Soil		<0.0243	<0.0243	<0.0243	0.0867	0.0697	<0.0243	<0.0243
SB-14	ETH001:SB-14:S040060	4 - 6	6/24/2011	Soil		<0.0216	<0.0216	<0.0216	<0.0216	<0.0216	<0.0216	<0.0216
SB-15	ETH001:SB-15:S000020	0 - 2	6/23/2011	Paper Sludge		<0.0266	<0.0266	<0.0266	**152**	**118**	<0.0266	<0.0266
SB-15	ETH001:SB-15:S060080	6 - 8	6/23/2011	Soil		<0.0225	<0.0225	<0.0225	0.86	0.573	<0.0225	<0.0225
SD-1	SD-1	0 - 0	1/25/2004	Sediment		<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033
SD-2	SD-2	0 - 0	1/25/2004	Sediment		<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033
SD-20[e]	SD-20	0 - 0	1/25/2004	Sediment		<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033
SL1	RAA028:SL-1:S040045	4 - 4.5	9/9/2004	Soil		<0.36	<0.36	<0.36	<0.36	1.1	<0.36	<0.36
SL13	RAA028:SL-13:S000005	0 - 0.5	9/10/2004	Paper Sludge		**<128**	**<128**	**<128**	**<128**	**1010**	**<128**	**<128**
SL15	RAA028:SL-15:S000010	0 - 1	9/10/2004	Paper Sludge		**<120**	**<120**	**<120**	**<120**	**140**	**<120**	**<120**
SL19	RAA028:SL-19:S000010	0 - 1	9/10/2004	Paper Sludge		<0.33	<0.33	<0.33	<0.33	0.57	<0.33	<0.33
SL3	RAA028:SL-3:S030035	3 - 3.5	9/9/2004	Paper Sludge		<0.37	<0.37	<0.37	<0.37	0.37	<0.37	<0.37
SL8	RAA028:SL-8:S000007	0 - 0.7	9/9/2004	Paper Sludge		**<135**	**<135**	**<135**	**<135**	**253**	**<135**	**<135**
SL-8R	ETH001:SL-8R:S000005	0 - 0.5	4/18/2012	Soil		<0.117	<0.117	<0.117	<0.117	2.74	<0.117	<0.117
S-1	ETH002:S-1:S000005	0 - 0.5	8/8/2012	Soil		<0.023	<0.023	<0.023	<0.023	<0.023	<0.023	<0.023
S-2	ETH002:S-2:S000005	0 - 0.5	8/8/2012	Soil		<0.0206	<0.0206	<0.0206	<0.0206	<0.0206	<0.0206	<0.0206
S-3	ETH002:S-3:S000005	0 - 0.5	8/8/2012	Soil		<0.0209	<0.0209	<0.0209	<0.0209	<0.0209	<0.0209	<0.0209
S-4	ETH002:S-4:S000005	0 - 0.5	8/8/2012	Soil		<0.0198	<0.0198	<0.0198	<0.0198	<0.0198	<0.0198	<0.0198
UST-N1	ETH002:UST-N1:S070080	7 - 8	8/27/2012	Soil		<0.117	<0.117	<0.117	<0.117	<0.117	<0.117	<0.117
UST-S1	ETH002:UST-S1:S070080	7 - 8	8/27/2012	Soil		<0.221	<0.221	<0.221	<0.221	<0.221	<0.221	<0.221
UST-W1	ETH002:UST-W1:S070080	7 - 8	8/27/2012	Soil		<0.137	<0.137	<0.137	<0.137	<0.137	<0.137	<0.137

Notes:

a. Single Chemical Generic Direct Contact Soil Standard in accordance with 3745-300-08(C)(3)(c).

b. Single Chemical Generic Direct Contact Soil Standard in accordance with 3745-300-08(C)(3)(d).

c. < - indicates less than detection limit or practical quantitation limit, as appropriate.

d. Bold and shaded indicates values detected above the applicable standards.

e. Indicated a duplicate sediment sample collected at SD-2.

MORAINE PROPERTIES, LLC
MORAINE, OHIO

TABLE 2

SUMMARY OF VOC CONCENTRATIONS IN SOIL AND PAPER SLUDGE

Parameter	CAS Number	Ohio VAP Soil Direct Contact Commercial/ Industrial Standards (mg/kg)[a]	Ohio VAP Soil Direct Contact Construction/ Excavation Standards (mg/kg)[b]	Sample Location	HSB2	HSB4	HSB5	HSB8	HSB9	HSB11	HSB11B	HSB11J	HSB12	HSB17
				Sample Identification	RAA026:HSB-2:S002015	RAA026:HSB-4:S000020	RAA026:HSB-5:S000024	RAA026:HSB-8:S000020	RAA026:HSB-9:S000010	RAA026:HSB-11:S040060	RAA028:HSB-11B:S011026	RAA028:HSB-11J:S057073	RAA026:HSB-12:S000010	RAA026:HSB-17:S002020
				Sample Depth	0.2 - 1.5 ft	0 - 2 ft	0 - 2.4 ft	0 - 2 ft	0 - 1 ft	4 - 6 ft	1.1 - 2.6 ft	5.7 - 7.3 ft	0 - 1 ft	0.2 - 2 ft
				Sample Date	8/5/2004	8/5/2004	8/6/2004	8/5/2004	8/5/2004	8/6/2004	9/13/2004	9/13/2004	8/6/2004	8/6/2004
				Material Sampled	Paper Sludge	Paper Sludge	Paper Sludge	Paper Sludge	Paper Sludge	Soil	Paper Sludge	Soil	Paper Sludge	Paper Sludge
VOCs														
1,1,1,2-Tetrachloroethane	630-20-6	81	310		<0.0075[c]	<0.0069	<0.0073	<0.0071	<0.0072	<0.078	NT	NT	<0.0055	<0.0071
1,1,1-Trichloroethane	71-55-6	1300	1300		<0.0075	<0.0069	<0.0073	<0.0071	<0.0072	<0.078	NT	NT	<0.0055	<0.0071
1,1,2,2-Tetrachloroethane	79-34-5	24	94		<0.0075	<0.0069	<0.0073	<0.0071	<0.0072	<0.078	NT	NT	<0.0055	<0.0071
1,1,2-Trichlorethane	79-00-5	55	210		<0.0075	<0.0069	<0.0073	<0.0071	<0.0072	<0.078	NT	NT	<0.0055	<0.0071
1,1-Dichloroethane	75-34-3	2300	2300		<0.0075	<0.0069	<0.0073	<0.0071	<0.0072	<0.078	NT	NT	<0.0055	<0.0071
1,1-Dichloroethene	75-35-4	610	180		<0.0075	<0.0069	<0.0073	<0.0071	<0.0072	<0.078	NT	NT	<0.0055	<0.0071
1,1-Dichloropropene	563-58-6	--	--		<0.0075	<0.0069	<0.0073	<0.0071	<0.0072	<0.078	NT	NT	<0.0055	<0.0071
1,2,3-Trichloropropane	96-18-4	28	190		<0.0075	<0.0069	<0.0073	<0.0071	<0.0072	<0.078	NT	NT	<0.0055	<0.0071
1,2,4-Trimethyl-benzene	95-63-6	120	35		<0.0075	<0.0069	<0.0073	<0.0071	<0.0072	<0.078	NT	NT	<0.0055	<0.0071
1,2-Dibromo-3-chloropropane	96-12-8	--[d]	--		<0.0075	<0.0069	<0.0073	<0.0071	<0.0072	<0.078	NT	NT	<0.0055	<0.0071
1,2-Dibromoethane	106-93-4	--	--		NT[e]	NT	NT	NT	NT	NT	NT	NT	NT	NT
1,2-Dichloroethane	107-06-2	19	75		<0.0075	<0.0069	<0.0073	<0.0071	<0.0072	<0.078	NT	NT	<0.0055	<0.0071
1,2-Dichloropropane	78-87-5	31	30		<0.0075	<0.0069	<0.0073	<0.0071	<0.0072	<0.078	NT	NT	<0.0055	<0.0071
1,3,5-Trimethylbenzene	108-67-8	95	200		<0.0075	<0.0069	<0.0073	<0.0071	<0.0072	<0.078	NT	NT	<0.0055	<0.0071
1,3-Dichloropropane	142-28-9	--	--		<0.0075	<0.0069	<0.0073	<0.0071	<0.0072	<0.078	NT	NT	<0.0055	<0.0071
2,2-Dichloropropane	594-20-7	--	--		<0.0075	<0.0069	<0.0073	<0.0071	<0.0072	<0.078	NT	NT	<0.0055	<0.0071
2-Butanone	78-93-3	100000	15000		<0.075	<0.069	<0.073	<0.071	<0.072	<0.78	NT	NT	<0.055	<0.071
2-Chlorotoluene	95-49-8	--	--		<0.0075	<0.0069	<0.0073	<0.0071	<0.0072	<0.078	NT	NT	<0.0055	<0.0071
2-Hexanone	591-78-6	--	--		<0.0745	<0.0687	<0.0728	<0.07	<0.0722	<0.78	NT	NT	<0.054	<0.0711
4-Chlorotoluene	106-43-4	--	--		<0.0075	<0.0069	<0.0073	<0.0071	<0.0072	<0.078	NT	NT	<0.0055	<0.0071
4-Isopropyltoluene	99-87-6	--	--		<0.0075	<0.0069	<0.0073	<0.0071	<0.0072	<0.078	NT	NT	<0.0055	<0.0071
4-Methyl-2-pentanone	108-10-1	16000	12000		<0.0745	<0.0687	<0.0728	<0.07	<0.0722	<0.78	NT	NT	<0.054	<0.0711
Acetone	67-64-1	100000	100000		<0.149	<0.137	<0.146	<0.142	<0.144	<1.6	NT	NT	<0.11	<0.142
Acetonitrile	75-05-8	--	--		NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Acrolein	107-02-8	--	--		NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Acrylonitrile	107-13-1	16	14		NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Allyl Chloride	107-05-1	--	--		NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Benzene	71-43-2	140	150		<0.0075	<0.0069	<0.0073	<0.0071	<0.0072	<0.078	NT	NT	<0.0055	<0.0071
Bromobenzene	108-86-1	--	--		<0.0075	<0.0069	<0.0073	<0.0071	<0.0072	<0.078	NT	NT	<0.0055	<0.0071
Bromochloromethane	74-97-5	--	--		<0.0075	<0.0069	<0.0073	<0.0071	<0.0072	<0.078	NT	NT	<0.0055	<0.0071
Bromodichloromethane	75-27-4	--	--		<0.0075	<0.0069	<0.0073	<0.0071	<0.0072	<0.078	NT	NT	<0.0055	<0.0071
Bromoform	75-25-2	--	--		<0.0075	<0.0069	<0.0073	<0.0071	<0.0072	<0.078	NT	NT	<0.0055	<0.0071
Butylbenzene	104-51-8	--	--		<0.0075	<0.0069	<0.0073	<0.0071	<0.0072	<0.078	NT	NT	<0.0055	<0.0071
Carbon Disulfide	75-15-0	1400	190		<0.0075	<0.0069	<0.0073	<0.0071	<0.0072	<0.078	NT	NT	<0.0055	<0.0071
Carbon Tetrachloride	56-23-5	8.2	24		<0.0075	<0.0069	<0.0073	<0.0071	<0.0072	<0.078	NT	NT	<0.0055	<0.0071
Chlorobenzene	108-90-7	710	740		<0.0075	<0.0069	<0.0073	<0.0071	<0.0072	<0.078	NT	NT	<0.0055	<0.0071
Chloroethane	75-00-3	2200	2200		<0.0149	<0.0137	<0.0146	<0.0142	<0.0144	<0.16	NT	NT	<0.011	<0.0142
Chloroform	67-66-3	14	55		<0.0075	<0.0069	<0.0073	<0.0071	<0.0072	<0.078	NT	NT	<0.0055	<0.0071
cis-1,2-Dichloroethene	156-59-2	2200	2200		<0.0075	<0.0069	<0.0073	<0.0071	<0.0072	<0.078	NT	NT	<0.0055	<0.0071
cis-1,3-Dichloropropene	10061-01-5	--	--		<0.0075	<0.0069	<0.0073	<0.0071	<0.0072	<0.078	NT	NT	<0.0055	<0.0071
Dibromochloromethane	124-48-1	1600	1600		<0.0075	<0.0069	<0.0073	<0.0071	<0.0072	<0.078	NT	NT	<0.0055	<0.0071
Ethylbenzene	100-41-4	230	230		<0.0075	<0.0069	<0.0073	<0.0071	<0.0072	<0.078	NT	NT	<0.0055	<0.0071
Freon-11	75-69-4	1600	1600		<0.0075	<0.0069	<0.0073	<0.0071	<0.0072	<0.078	NT	NT	<0.0055	<0.0071
Freon-12	75-71-8	520	1400		<0.0075	<0.0069	<0.0073	<0.0071	<0.0072	<0.078	NT	NT	<0.0055	<0.0071
Hexane	110-54-3	190	190		<0.0298	<0.0275	<0.0291	<0.0284	<0.0289	<0.31	NT	NT	<0.022	<0.0284
Isopropyl Benzene	98-82-8	260	260		<0.0075	<0.0069	<0.0073	<0.0071	<0.0072	<0.078	NT	NT	<0.0055	<0.0071
Methyl Bromide	74-83-9	--	--		<0.0149	<0.0137	<0.0146	<0.0142	<0.0144	<0.16	NT	NT	<0.011	<0.0142
Methyl Chloride	74-87-3	--	--		<0.0149	<0.0137	<0.0146	<0.0142	<0.0144	<0.16	NT	NT	<0.011	<0.0142
Methyl Iodide	74-88-4	--	--		NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Methylene Bromide	74-95-3	--	--		<0.0075	<0.0069	<0.0073	<0.0071	<0.0072	<0.078	NT	NT	<0.0055	<0.0071
Methylene Chloride	75-09-2	570	1500		<0.0149	<0.0137	<0.0146	<0.0142	<0.0144	<0.16	NT	NT	<0.011	<0.0142
Methyl-tert-butyl-ether	1634-04-4	1900	6700		<0.0075	<0.0069	<0.0073	<0.0071	<0.0072	<0.078	NT	NT	<0.0055	<0.0071
n-Propylbenzene	103-65-1	--	--		<0.0075	<0.0069	<0.0073	<0.0071	<0.0072	<0.078	NT	NT	<0.0055	<0.0071
o-Xylene	95-47-6	--	--		NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
sec-Butylbenzene	135-98-8	--	--		<0.0075	<0.0069	<0.0073	<0.0071	<0.0072	<0.078	NT	NT	<0.0055	<0.0071
Styrene	100-42-5	1700	1700		<0.0075	<0.0069	<0.0073	<0.0071	<0.0072	<0.078	NT	NT	<0.0055	<0.0071
tert-Butylbenzene	98-06-6	--	--		<0.0075	<0.0069	<0.0073	<0.0071	<0.0072	<0.078	NT	NT	<0.0055	<0.0071
Tetrachloroethene	127-18-4	53	220		<0.0075	<0.0069	<0.0073	<0.0071	<0.0072	<0.078	NT	NT	<0.0055	<0.0071
Toluene	108-88-3	520	520		<0.0075	<0.0069	<0.0073	<0.0071	<0.0072	<0.078	NT	NT	<0.0055	<0.0071
trans-1,2-dichloroethene	156-60-5	260	78		<0.0075	<0.0069	<0.0073	<0.0071	<0.0072	<0.078	NT	NT	<0.0055	<0.0071
trans-1,3-dichloropropene	10061-02-6	--	--		<0.0075	<0.0069	<0.0073	<0.0071	<0.0072	<0.078	NT	NT	<0.0055	<0.0071
Trichloroethene	79-01-6	150	560		<0.0075	<0.0069	<0.0073	<0.0071	<0.0072	<0.078	NT	NT	<0.0055	<0.0071
Vinyl Acetate	108-05-4	2000	100		<0.0075	<0.0069	<0.0073	<0.0071	<0.0072	<0.078	NT	NT	<0.0055	<0.0071
Vinyl Chloride	75-01-4	12	48		<0.003	<0.0027	<0.0029	<0.0028	<0.0029	<0.031	NT	NT	<0.0022	<0.0028
Xylene	1330-20-7	370	370		<0.0075	<0.0069	<0.0073	<0.0071	<0.0072	<0.078	NT	NT	<0.0055	<0.0071

Notes:

a. Single Chemical Generic Direct Contact Soil Standard in accordance with 3745-300-08(C)(3)(c).

b. Single Chemical Generic Direct Contact Soil Standard in accordance with 3745-300-08(C)(3)(d).

c. < - indicates less than detection limit or practical quantitation limit, as appropriate.

d. '--' - A VAP standard has not been established for this analyte.

e. NT - Not Tested.

MORAINE PROPERTIES, LLC
MORAINE, OHIO

TABLE 2

SUMMARY OF VOC CONCENTRATIONS IN SOIL AND PAPER SLUDGE

Parameter	CAS Number	Ohio VAP Soil Direct Contact Commercial/ Industrial Standards (mg/kg)[a]	Ohio VAP Soil Direct Contact Construction/ Excavation Standards (mg/kg)[b]	**Sample Location**	HSB18	SB-05	SB-07	SB-07	SB-11	SB-11	SB-15	UST-N1	UST-S1	UST-W1
				Sample Identification	RAA026:HSB-18:S000024	ETH001:SB-05:S000020	ETH001:SB-07:S000020	ETH001:SB-07:S110130	ETH001:SB-11:S000020	ETH001:SB-11:S060080	ETH001:SB-15:S000020	ETH002:UST-N1:S070080	ETH002:UST-S1:S070080	ETH002:UST-W1:S070080
				Sample Depth	0 - 2.4 ft	0 - 2 ft	0 - 2 ft	11 - 13 ft	0 - 2 ft	6 - 8 ft	0 - 2 ft	7 - 8 ft	7 - 8 ft	7 - 8 ft
				Sample Date	8/6/2004	6/23/2011	6/23/2011	6/23/2011	6/24/2011	6/24/2011	6/23/2011	8/27/2012	8/27/2012	8/27/2012
				Material Sampled	Paper Sludge	Paper Sludge	Paper Sludge	Soil	Paper Sludge	Paper Sludge	Paper Sludge	Soil	Soil	Soil
VOCs														
1,1,1,2-Tetrachloroethane	630-20-6	81	310		<0.007	<0.0168	NT	<0.0154	<0.0174	<0.0171	<0.0125	<0.21	<0.914	<0.422
1,1,1-Trichloroethane	71-55-6	1300	1300		<0.007	<0.0168	NT	<0.0154	<0.0174	<0.0171	<0.0125	<0.21	<0.914	<0.422
1,1,2,2-Tetrachloroethane	79-34-5	24	94		<0.007	<0.0168	NT	<0.0154	<0.0174	<0.0171	<0.0125	<0.21	<0.914	<0.422
1,1,2-Trichlorethane	79-00-5	55	210		<0.007	<0.0168	NT	<0.0154	<0.0174	<0.0171	<0.0125	<0.21	<0.914	<0.422
1,1-Dichloroethane	75-34-3	2300	2300		<0.007	<0.0168	NT	<0.0154	<0.0174	<0.0171	<0.0125	<0.21	<0.914	<0.422
1,1-Dichloroethene	75-35-4	610	180		<0.007	<0.0168	NT	<0.0154	<0.0174	<0.0171	<0.0125	<0.21	<0.914	<0.422
1,1-Dichloropropene	563-58-6	--	--		<0.007	<0.0168	NT	<0.0154	<0.0174	<0.0171	<0.0125	<0.21	<0.914	<0.422
1,2,3-Trichloropropane	96-18-4	28	190		<0.007	NT	NT	NT	NT	NT	NT	NT	NT	NT
1,2,4-Trimethyl-benzene	95-63-6	120	35		<0.007	NT	NT	NT	NT	NT	NT	NT	NT	NT
1,2-Dibromo-3-chloropropane	96-12-8	--[d]	--		<0.007	NT	NT	NT	NT	NT	NT	NT	NT	NT
1,2-Dibromoethane	106-93-4	--	--		NT	<0.0168	NT	<0.0154	<0.0174	<0.0171	<0.0125	<0.21	<0.914	<0.422
1,2-Dichloroethane	107-06-2	19	75		<0.007	<0.0168	NT	<0.0154	<0.0174	<0.0171	<0.0125	<0.21	<0.914	<0.422
1,2-Dichloropropane	78-87-5	31	30		<0.007	<0.0168	NT	<0.0154	<0.0174	<0.0171	<0.0125	<0.21	<0.914	<0.422
1,3,5-Trimethylbenzene	108-67-8	95	200		<0.007	NT	NT	NT	NT	NT	NT	NT	NT	NT
1,3-Dichloropropane	142-28-9	--	--		<0.007	<0.0168	NT	<0.0154	<0.0174	<0.0171	<0.0125	<0.21	<0.914	<0.422
2,2-Dichloropropane	594-20-7	--	--		<0.007	<0.0168	NT	<0.0154	<0.0174	<0.0171	<0.0125	<0.21	<0.914	<0.422
2-Butanone	78-93-3	100000	15000		<0.07	<0.0671	NT	<0.0615	<0.0695	<0.0684	<0.0498	<0.839	<3.65	<1.69
2-Chlorotoluene	95-49-8	--	--		<0.007	<0.0168	NT	<0.0154	<0.0174	<0.0171	<0.0125	<0.21	<0.914	<0.422
2-Hexanone	591-78-6	--	--		<0.07	<0.0671	NT	<0.0615	<0.0695	<0.0684	<0.0498	<0.839	<3.65	<1.69
4-Chlorotoluene	106-43-4	--	--		<0.007	<0.0168	NT	<0.0154	<0.0174	<0.0171	<0.0125	<0.21	<0.914	<0.422
4-Isopropyltoluene	99-87-6	--	--		<0.007	NT	NT	NT	NT	NT	NT	NT	NT	NT
4-Methyl-2-pentanone	108-10-1	16000	12000		<0.07	<0.0671	NT	<0.0615	<0.0695	<0.0684	<0.0498	<0.839	<3.65	<1.69
Acetone	67-64-1	100000	100000		<0.141	<0.168	NT	<0.154	<0.174	<0.171	<0.125	<2.1	<9.14	<4.22
Acetonitrile	75-05-8	--	--		NT	<0.134	NT	<0.123	<0.139	<0.137	<0.0996	<1.68	<7.31	<3.38
Acrolein	107-02-8	--	--		NT	<0.0671	NT	<0.0615	<0.0695	<0.0684	<0.0498	<2.1	<9.14	<4.22
Acrylonitrile	107-13-1	16	14		NT	<0.0671	NT	<0.0615	<0.0695	<0.0684	<0.0498	<0.839	<3.65	<1.69
Allyl Chloride	107-05-1	--	--		NT	<0.0335	NT	<0.0308	<0.0347	<0.0342	<0.0249	<0.42	<1.83	<0.844
Benzene	71-43-2	140	150		<0.007	<0.0168	NT	<0.0154	<0.0174	<0.0171	<0.0125	<0.21	<0.914	<0.422
Bromobenzene	108-86-1	--	--		<0.007	<0.0168	NT	<0.0154	<0.0174	<0.0171	<0.0125	<0.21	<0.914	<0.422
Bromochloromethane	74-97-5	--	--		<0.007	<0.0168	NT	<0.0154	<0.0174	<0.0171	<0.0125	<0.21	<0.914	<0.422
Bromodichloromethane	75-27-4	--	--		<0.007	<0.0168	NT	<0.0154	<0.0174	<0.0171	<0.0125	<0.21	<0.914	<0.422
Bromoform	75-25-2	--	--		<0.007	<0.0168	NT	<0.0154	<0.0174	<0.0171	<0.0125	<0.21	<0.914	<0.422
Butylbenzene	104-51-8	--	--		<0.007	NT	NT	NT	NT	NT	NT	NT	NT	NT
Carbon Disulfide	75-15-0	1400	190		<0.007	<0.0671	NT	<0.0615	<0.0695	<0.0684	<0.0498	<0.839	<3.65	<1.69
Carbon Tetrachloride	56-23-5	8.2	24		<0.007	<0.0168	NT	<0.0154	<0.0174	<0.0171	<0.0125	<0.21	<0.914	<0.422
Chlorobenzene	108-90-7	710	740		<0.007	<0.0168	NT	<0.0154	<0.0174	<0.0171	<0.0125	<0.21	<0.914	<0.422
Chloroethane	75-00-3	2200	2200		<0.0141	<0.0168	NT	<0.0154	<0.0174	<0.0171	<0.0125	<0.21	<0.914	<0.422
Chloroform	67-66-3	14	55		<0.007	<0.0168	NT	<0.0154	<0.0174	<0.0171	<0.0125	<0.21	<0.914	<0.422
cis-1,2-Dichloroethene	156-59-2	2200	2200		<0.007	<0.0168	NT	<0.0154	<0.0174	<0.0171	<0.0125	<0.21	<0.914	<0.422
cis-1,3-Dichloropropene	10061-01-5	--	--		<0.007	<0.0168	NT	<0.0154	<0.0174	<0.0171	<0.0125	<0.21	<0.914	<0.422
Dibromochloromethane	124-48-1	1600	1600		<0.007	<0.0168	NT	<0.0154	<0.0174	<0.0171	<0.0125	<0.21	<0.914	<0.422
Ethylbenzene	100-41-4	230	230		<0.007	<0.0168	NT	<0.0154	<0.0174	<0.0171	<0.0125	<0.21	<0.914	<0.422
Freon-11	75-69-4	1600	1600		<0.007	<0.0168	NT	<0.0154	<0.0174	<0.0171	<0.0125	<0.21	<0.914	<0.422
Freon-12	75-71-8	520	1400		<0.007	<0.0168	NT	<0.0154	<0.0174	<0.0171	<0.0125	<0.21	<0.914	<0.422
Hexane	110-54-3	190	190		<0.0281	<0.0168	NT	<0.0154	<0.0174	<0.0171	<0.0125	<0.21	<0.914	<0.422
Isopropyl Benzene	98-82-8	260	260		<0.007	NT	NT	NT	NT	NT	NT	NT	NT	NT
Methyl Bromide	74-83-9	--	--		<0.0141	<0.0168	NT	<0.0154	<0.0174	<0.0171	<0.0125	<0.21	<0.914	<0.422
Methyl Chloride	74-87-3	--	--		<0.0141	<0.0168	NT	<0.0154	<0.0174	<0.0171	<0.0125	<0.21	<0.914	<0.422
Methyl Iodide	74-88-4	--	--		NT	<0.0335	NT	<0.0308	<0.0347	<0.0342	<0.0249	<0.42	<1.83	<0.844
Methylene Bromide	74-95-3	--	--		<0.007	<0.0168	NT	<0.0154	<0.0174	<0.0171	<0.0125	<0.21	<0.914	<0.422
Methylene Chloride	75-09-2	570	1500		<0.0141	<0.0168	NT	<0.0154	<0.0174	<0.0171	<0.0125	<0.21	<0.914	<0.422
Methyl-tert-butyl-ether	1634-04-4	1900	6700		<0.007	<0.0335	NT	<0.0308	<0.0347	<0.0342	<0.0249	<0.42	<1.83	<0.844
n-Propylbenzene	103-65-1	--	--		<0.007	NT	NT	NT	NT	NT	NT	NT	NT	NT
o-Xylene	95-47-6	--	--		NT	<0.0168	NT	<0.0154	<0.0174	<0.0171	<0.0125	<0.21	<0.914	<0.422
sec-Butylbenzene	135-98-8	--	--		<0.007	NT	NT	NT	NT	NT	NT	NT	NT	NT
Styrene	100-42-5	1700	1700		<0.007	<0.0168	NT	<0.0154	<0.0174	<0.0171	<0.0125	<0.21	<0.914	<0.422
tert-Butylbenzene	98-06-6	--	--		<0.007	NT	NT	NT	NT	NT	NT	NT	NT	NT
Tetrachloroethene	127-18-4	53	220		<0.007	<0.0168	NT	<0.0154	<0.0174	<0.0171	<0.0125	<0.21	<0.914	<0.422
Toluene	108-88-3	520	520		<0.007	<0.0168	NT	<0.0154	<0.0174	<0.0171	<0.0125	<0.21	<0.914	<0.422
trans-1,2-dichloroethene	156-60-5	260	78		<0.007	<0.0168	NT	<0.0154	<0.0174	<0.0171	<0.0125	<0.21	<0.914	<0.422
trans-1,3-dichloropropene	10061-02-6	--	--		<0.007	<0.0168	NT	<0.0154	<0.0174	<0.0171	<0.0125	<0.21	<0.914	<0.422
Trichloroethene	79-01-6	150	560		<0.007	<0.0168	NT	<0.0154	<0.0174	<0.0171	<0.0125	<0.21	<0.914	<0.422
Vinyl Acetate	108-05-4	2000	100		<0.007	<0.0335	NT	<0.0308	<0.0347	<0.0342	<0.0249	<0.42	<1.83	<0.844
Vinyl Chloride	75-01-4	12	48		<0.0028	<0.0168	NT	<0.0154	<0.0174	<0.0171	<0.0125	<0.21	<0.914	<0.422
Xylene	1330-20-7	370	370		<0.007	<0.0335	NT	<0.0308	<0.0347	<0.0342	<0.0249	<0.42	<1.83	<0.844

Notes:

a. Single Chemical Generic Direct Contact Soil Standard in accordance with 3745-300-08(C)(3)(c).

b. Single Chemical Generic Direct Contact Soil Standard in accordance with 3745-300-08(C)(3)(d).

c. < - indicates less than detection limit or practical quantitation limit, as appropriate.

d. '--' - A VAP standard has not been established for this analyte.

e. NT - Not Tested.

MORAINE PROPERTIES, LLC
MORAINE, OHIO

TABLE 3

SUMMARY OF METALS AND SVOCS IN SOIL AND PAPER SLUDGE

Parameter	CAS Number	Ohio VAP Soil Direct Contact Commercial/ Industrial Standards (mg/kg)[a]	Ohio VAP Soil Direct Contact Construction/ Excavation Standards (mg/kg)[b]	**Sample Location**	HSB2	HSB4	HSB5	HSB8	HSB9	HSB11	HSB11B	HSB11J	HSB12	HSB17
				Sample Identification	RAA026:HSB-2:S002015	RAA026:HSB-4:S000020	RAA026:HSB-5:S000024	RAA026:HSB-8:S000020	RAA026:HSB-9:S000010	RAA026:HSB-11:S040060	RAA028:HSB-11B:S011026	RAA028:HSB-11J:S057073	RAA026:HSB-12:S000010	RAA026:HSB-17:S002020
				Sample Depth	0.2 - 1.5 ft	0 - 2 ft	0 - 2.4 ft	0 - 2 ft	0 - 1 ft	4 - 6 ft	1.1 - 2.6 ft	5.7 - 7.3 ft	0 - 1 ft	0.2 - 2 ft
				Sample Date	8/5/2004	8/5/2004	8/6/2004	8/5/2004	8/5/2004	8/6/2004	9/13/2004	9/13/2004	8/6/2004	8/6/2004
				Material Sampled	Paper Sludge	Paper Sludge	Paper Sludge	Paper Sludge	Paper Sludge	Paper Sludge	Paper Sludge	Soil	Paper Sludge	Paper Sludge
TPH/GRO/ERO/DRO														
TPH (C21-C34)					NT[c]	NT	NT	NT	NT	NT	NT	NT	NT	NT
TPH-DRO					NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Metals														
Aluminum	7429-90-5	--[d]	--		NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Antimony	7440-36-0	1200	370		NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Arsenic	7440-38-2	82	390		14	13	17.2	12	9.2	**150[f]**	12	22.9	<5.5	12
Barium	7440-39-3	370000	120000		77.8	118	139	129	92.4	1300	NT	NT	38.3	133
Beryllium	7440-41-7	5100	3100		NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Cadmium	7440-43-9	2300	1600		<2.94[e]	<2.61	<2.82	<2.71	<2.8	<30	NT	NT	<2.15	<2.8
Chromium	7440-47-3	7900	13000		15.6	19.6	19.5	21.7	19.9	230	NT	NT	7.91	22.2
Cobalt	7440-48-4	23000	4000		NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Lead	7439-92-1	1800	750		37.1	45.9	31.3	46.2	41.3	670	NT	NT	7.54	53.6
Mercury	7439-97-6	290	190		0.221	0.196	0.192	0.235	0.219	2.4	NT	NT	0.0277	0.205
Nickel	7440-02-0	44000	21000		NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Selenium	7782-49-2	15000	9700		<9.81	<8.7	<9.39	<9.04	<9.31	<99	NT	NT	<7.18	<9.36
Silver	7440-22-4	15000	9700		<0.7	<0.7	<0.7	<0.7	0.7	<8	NT	NT	<0.5	<0.7
Thallium	7440-28-0	230	1600		NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Vanadium	7440-62-2	26000	17000		NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Zinc	7440-66-6	880000	580000		NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
SVOCs														
1,2,4-Trichlorobenzene	120-82-1	--	--		<0.492	<0.453	<0.0073	<0.468	<0.476	<0.078	NT	NT	<0.0055	<0.0071
1,2-Dichlorobenzene	95-50-1	370	370		<0.0075	<0.0069	<0.0073	<0.468	<0.476	<5.2	NT	NT	<0.0055	<0.0071
1,3-Dichlorobenzene	541-73-1	--	--		<0.0075	<0.0069	<0.0073	<0.468	<0.476	<5.2	NT	NT	<0.0055	<0.0071
1,4-Dichlorobenzene	106-46-7	130	510		<0.0075	<0.0069	<0.0073	<0.468	<0.476	<5.2	NT	NT	<0.0055	<0.0071
2,4,5-Trichlorophenol	95-95-4	110000	850000		<0.492	<0.453	<0.48	<0.468	<0.476	<5.2	NT	NT	<0.362	<0.469
2,4,6-Trichlorophenol	88-06-2	4400	29000		<0.492	<0.453	<0.48	<0.468	<0.476	<5.2	NT	NT	<0.362	<0.469
2,4-Dichlorophenol	120-83-2	--	--		<0.492	<0.453	<0.48	<0.468	<0.476	<5.2	NT	NT	<0.362	<0.469
2,4-Dimethylphenol	105-67-9	22000	170000		<0.492	<0.453	<0.48	<0.468	<0.476	<5.2	NT	NT	<0.362	<0.469
2,4-Dinitrotoluene	121-14-2	98	870		<0.492	<0.453	<0.48	<0.468	<0.476	<5.2	NT	NT	<0.362	<0.469
2,6-Dinitrotoluene	606-20-2	110	880		<0.492	<0.453	<0.48	<0.468	<0.476	<5.2	NT	NT	<0.362	<0.469
2-Chloronaphthalene	91-58-7	--	--		<0.492	<0.453	<0.48	<0.468	<0.476	<5.2	NT	NT	<0.362	<0.469
2-Chlorophenol	95-57-8	--	--		<0.492	<0.453	<0.48	<0.468	<0.476	<5.2	NT	NT	<0.362	<0.469
2-Methyl-4,6-dinitrophenol	534-52-1	--	--		<0.492	<0.453	<0.48	<0.468	<0.476	<5.2	NT	NT	<0.362	<0.469
2-Methylnaphthalene	91-57-6	--	--		NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
2-Methylphenol	95-48-7	56000	430000		<0.492	<0.453	<0.48	<0.468	<0.476	<5.2	NT	NT	<0.362	<0.469
3,3-Dichlorobenzidine	91-94-1	110	730		<0.984	<0.907	<0.961	<0.936	<0.952	<10	NT	NT	<0.724	<0.939
4-Bromophenyl Phenyl Ether	101-55-3	--	--		<0.492	<0.453	<0.48	<0.468	<0.476	<5.2	NT	NT	<0.362	<0.469
4-Chloro-3-methyl Phenol	59-50-7	--	--		<0.492	<0.453	<0.48	<0.468	<0.476	<5.2	NT	NT	<0.362	<0.469
4-Chloroaniline	106-47-8	--	--		<0.492	<0.453	<0.48	<0.468	<0.476	<5.2	NT	NT	<0.362	<0.469
Acenaphthalene	208-96-8	--	--		<0.492	<0.453	<0.48	<0.468	<0.476	<5.2	NT	NT	<0.362	<0.469
Acenaphthene	83-32-9	56000	440000		<0.492	<0.453	<0.48	<0.468	<0.476	<5.2	NT	NT	<0.362	<0.469
Anthracene	120-12-7	280000	1000000		<0.492	<0.453	<0.48	<0.468	<0.476	<5.2	NT	NT	<0.362	<0.469
Benzo(a)anthracene	56-55-3	76	680		<0.492	<0.453	<0.48	<0.468	<0.476	7.6	NT	NT	<0.362	<0.469
Benzo(a)pyrene	50-32-8	7.7	69		<0.246	<0.227	<0.24	<0.234	<0.238	5.8 j	NT	NT	<0.181	<0.235
Benzo(b)fluoranthene	205-99-2	77	690		<0.492	<0.453	<0.48	<0.468	<0.476	9.4 j	NT	NT	<0.362	<0.469
Benzo(g,h,i)perylene	191-24-2	--	--		<0.492	<0.453	<0.48	<0.468	<0.476	<5.2	NT	NT	<0.362	<0.469
Benzo(k)fluoranthene	207-08-9	770	6900		<0.492	<0.453	<0.48	<0.468	<0.476	<5.2	NT	NT	<0.362	<0.469
Benzoic Acid	65-85-0	--	--		<2.46	<2.27	<2.4	<2.34	<2.38	<26	NT	NT	<1.81	<2.35
Benzyl Alcohol	100-51-6	--	--		<0.492	<0.453	<0.48	<0.468	<0.476	<5.2	NT	NT	<0.362	<0.469
Benzyl Butyl Phthalate	85-68-7	58	58		<0.492	<0.453	<0.48	<0.468	<0.476	<5.2	NT	NT	<0.362	<0.469
Bis(2-chloroethoxy) Methane	111-91-1	--	--		<0.492	<0.453	<0.48	<0.468	<0.476	<5.2	NT	NT	<0.362	<0.469
Bis(2-chloroethyl) Ether	111-44-4	--	--		<0.492	<0.453	<0.48	<0.468	<0.476	<5.2	NT	NT	<0.362	<0.469
Bis(2-cloroisopropyl) Ether	108-60-1	--	--		<0.492	<0.453	<0.48	<0.468	<0.476	<5.2	NT	NT	<0.362	<0.469
Bis(2-ethylhexyl) Phthalate	117-81-7	190	190		<0.492	<0.453	<0.48	<0.468	<0.476	<5.2	NT	NT	<0.362	<0.469
Chrysene	218-01-9	7600	69000		<0.492	<0.453	<0.48	<0.468	<0.476	6.6 j	NT	NT	<0.362	<0.469
Dibenz(a,h)anthracene	53-70-3	7.7	69		<0.246	<0.227	<0.24	<0.234	<0.238	<2.6	NT	NT	<0.181	<0.235
Dibenzofuran	132-64-9	--	--		<0.492	<0.453	<0.48	<0.468	<0.476	<5.2	NT	NT	<0.362	<0.469
Diethyl Phthalate	84-66-2	590	590		<0.492	<0.453	<0.48	<0.468	<0.476	<5.2	NT	NT	<0.362	<0.469
Dimethyl Phthalate	131-11-3	--	--		<0.492	<0.453	<0.48	<0.468	<0.476	<5.2	NT	NT	<0.362	<0.469

MORAINE PROPERTIES, LLC
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TABLE 3

SUMMARY OF METALS AND SVOCS IN SOIL AND PAPER SLUDGE

Parameter	CAS Number	Ohio VAP Soil Direct Contact Commercial/ Industrial Standards (mg/kg)[a]	Ohio VAP Soil Direct Contact Construction/ Excavation Standards (mg/kg)[b]	**Sample Location**	HSB2	HSB4	HSB5	HSB8	HSB9	HSB11	HSB11B	HSB11J	HSB12	HSB17
				Sample Identification	RAA026:HSB-2:S002015	RAA026:HSB-4:S000020	RAA026:HSB-5:S000024	RAA026:HSB-8:S000020	RAA026:HSB-9:S000010	RAA026:HSB-11:S040060	RAA028:HSB-11B:S011026	RAA028:HSB-11J:S057073	RAA026:HSB-12:S000010	RAA026:HSB-17:S002020
				Sample Depth	0.2 - 1.5 ft	0 - 2 ft	0 - 2.4 ft	0 - 2 ft	0 - 1 ft	4 - 6 ft	1.1 - 2.6 ft	5.7 - 7.3 ft	0 - 1 ft	0.2 - 2 ft
				Sample Date	8/5/2004	8/5/2004	8/6/2004	8/5/2004	8/5/2004	8/6/2004	9/13/2004	9/13/2004	8/6/2004	8/6/2004
				Material Sampled	Paper Sludge	Paper Sludge	Paper Sludge	Paper Sludge	Paper Sludge	Paper Sludge	Paper Sludge	Soil	Paper Sludge	Paper Sludge
Di-n-octyl Phthalate	117-84-0	12	12		<0.492	<0.453	<0.48	<0.468	<0.476	<5.2	NT	NT	<0.362	<0.469
Di-n-propylnitrosamine	621-64-7	--	--		<0.492	<0.453	<0.48	<0.468	<0.476	<5.2	NT	NT	<0.362	<0.469
Fluoranthene	206-44-0	37000	290000		<0.492	<0.453	<0.48	<0.468	<0.476	15 j	NT	NT	<0.362	<0.469
Fluorene	86-73-7	37000	290000		<0.492	<0.453	<0.48	<0.468	<0.476	<5.2	NT	NT	<0.362	<0.469
Hexachloro-1,3-butadiene	87-68-3	220	170		<0.0075	<0.0069	<0.0073	<0.468	<0.476	<5.2	NT	NT	<0.0055	<0.0071
Hexachlorobenzene	118-74-1	28	85		<0.492	<0.453	<0.48	<0.468	<0.476	<5.2	NT	NT	<0.362	<0.469
Hexachloroethane	67-72-1	1100	8000		<0.492	<0.453	<0.48	<0.468	<0.476	<5.2	NT	NT	<0.362	<0.469
Hexachloropentadiene	77-47-4	--	--		<0.984	<0.907	<0.961	<0.936	<0.952	<10	NT	NT	<0.724	<0.939
Indeno(1,2,3-cd)pyrene	193-39-5	77	690		<0.492	<0.453	<0.48	<0.468	<0.476	<5.2	NT	NT	<0.362	<0.469
Isophorone	78-59-1	4600	4600		<0.492	<0.453	<0.48	<0.468	<0.476	<5.2	NT	NT	<0.362	<0.469
Naphthalene	91-20-3	150	84		<0.492	<0.453	<0.48	<0.468	<0.476	<5.2	NT	NT	<0.362	<0.469
Nitrobenzene	98-95-3	170	610		<0.492	<0.453	<0.48	<0.468	<0.476	<5.2	NT	NT	<0.362	<0.469
o-Nitrophenol	88-75-5	--	--		<0.492	<0.453	<0.48	<0.468	<0.476	<5.2	NT	NT	<0.362	<0.469
Pentachlorophenol	87-86-5	280	460		<0.492	<0.453	<0.48	<0.468	<0.476	<5.2	NT	NT	<0.362	<0.469
Phenanthrene	85-01-8	--	--		<0.492	<0.453	<0.48	<0.468	<0.476	11	NT	NT	<0.362	<0.469
Phenol	108-95-2	66000	510000		<0.492	<0.453	<0.48	<0.468	<0.476	<5.2	NT	NT	<0.362	<0.469
Pyrene	129-00-0	28000	220000		<0.492	<0.453	<0.48	<0.468	<0.476	18	NT	NT	<0.362	<0.469

Notes:

a. Single Chemical Generic Direct Contact Soil Standard in accordance with 3745-300-08(C)(3)(c).

b. Single Chemical Generic Direct Contact Soil Standard in accordance with 3745-300-08(C)(3)(d).

c. NT - Not Tested.

d. '--' - A VAP standard has not been established for this analyte.

e. < - indicates less than detection limit or practical quantitation limit, as appropriate.

f. Bold and shaded indicates values detected above the applicable standards.

MORAINE PROPERTIES, LLC
MORAINE, OHIO

TABLE 3

SUMMARY OF METALS AND SVOCS IN SOIL AND PAPER SLUDGE

Parameter	CAS Number	Ohio VAP Soil Direct Contact Commercial/ Industrial Standards (mg/kg)[a]	Ohio VAP Soil Direct Contact Construction/ Excavation Standards (mg/kg)[b]	Sample Location	HSB18	SB-05	SB-07	SB-07	SB-08	SB-08	SB-11	SB-11	SB-15	UST-N1
				Sample Identification	RAA026:HSB-18:S000024	ETH001:SB-05:S000020	ETH001:SB-07:S000020	ETH001:SB-07:S110130	ETH001:SB-08:S000020	ETH001:SB-08:S160180	ETH001:SB-11:S000020	ETH001:SB-11:S060080	ETH001:SB-15:S000020	ETH002:UST-N1:S070080
				Sample Depth	0 - 2.4 ft	0 - 2 ft	0 - 2 ft	11 - 13 ft	0 - 2 ft	16 - 18 ft	0 - 2 ft	6 - 8 ft	0 - 2 ft	7 - 8 ft
				Sample Date	8/6/2004	6/23/2011	6/23/2011	6/23/2011	6/23/2011	6/23/2011	6/24/2011	6/24/2011	6/23/2011	8/27/2012
				Material Sampled	Paper Sludge	Paper Sludge	Paper Sludge	Soil	Paper Sludge	Soil	Paper Sludge	Soil	Paper Sludge	Soil
TPH/GRO/ERO/DRO														
TPH (C21-C34)					NT	NT	NT	NT	NT	NT	NT	NT	NT	<593
TPH-DRO					NT	NT	NT	NT	NT	NT	NT	NT	NT	12.9
Metals														
Aluminum	7429-90-5	--[d]	--		NT	13300	14300	2650	10300	6340	11000	9280	14400	4560
Antimony	7440-36-0	1200	370		NT	<1.23	<1.3	<1.34	<1.02	3.65	<1.44	<1.43	1.49	<1.16
Arsenic	7440-38-2	82	390		16.6	14.9	21.5	9.68	13	12.2	6.96	2.17	9.31	5.73
Barium	7440-39-3	370000	120000		124	156	181	133	93.8	239	122	94.4	172	68.3
Beryllium	7440-41-7	5100	3100		NT	0.939	1.04	<0.669	0.815	<0.771	<0.718	<0.713	0.718	<0.582
Cadmium	7440-43-9	2300	1600		<2.69	1.28	0.455	0.268	0.433	3.13	0.942	1.21	2.6	<0.582
Chromium	7440-47-3	7900	13000		17.7	33.4	18	8.86	15.6	19	28.6	56.9	32.7	10.2
Cobalt	7440-48-4	23000	4000		NT	6.66	5.28	1.66	6	4.96	7.94	5.28	9.64	3.76
Lead	7439-92-1	1800	750		33.9	100	21.9	5.26	20.2	515	101	261	102	80.2
Mercury	7439-97-6	290	190		0.394	0.463	0.184	<0.12	0.137	0.67	0.522	0.589	0.181	0.157
Nickel	7440-02-0	44000	21000		NT	14.3	12.3	5.39	13.1	13.2	12.7	5.69	19.9	11.8
Selenium	7782-49-2	15000	9700		<8.96	<6.15	<6.51	<6.69	<5.12	<7.71	<7.18	<7.13	<5.73	<5.82
Silver	7440-22-4	15000	9700		<0.7	<1.23	<1.3	<1.34	<1.02	<1.54	<1.44	<1.43	<1.15	<1.16
Thallium	7440-28-0	230	1600		NT	<6.15	<6.51	<6.69	<5.12	<7.71	<7.18	<7.13	<5.73	<5.82
Vanadium	7440-62-2	26000	17000		NT	27.5	27.9	7.5	26.4	16.2	25.7	17.1	31.2	13.3
Zinc	7440-66-6	880000	580000		NT	546	534	28.1	285	999	144	222	132	116
SVOCs														
1,2,4-Trichlorobenzene	120-82-1	--	--		<0.007	NT	NT	NT	NT	NT	NT	NT	NT	NT
1,2-Dichlorobenzene	95-50-1	370	370		<0.007	NT	NT	NT	NT	NT	NT	NT	NT	NT
1,3-Dichlorobenzene	541-73-1	--	--		<0.007	NT	NT	NT	NT	NT	NT	NT	NT	NT
1,4-Dichlorobenzene	106-46-7	130	510		<0.007	NT	NT	NT	NT	NT	NT	NT	NT	NT
2,4,5-Trichlorophenol	95-95-4	110000	850000		<0.464	NT	NT	NT	NT	NT	NT	NT	NT	NT
2,4,6-Trichlorophenol	88-06-2	4400	29000		<0.464	NT	NT	NT	NT	NT	NT	NT	NT	NT
2,4-Dichlorophenol	120-83-2	--	--		<0.464	NT	NT	NT	NT	NT	NT	NT	NT	NT
2,4-Dimethylphenol	105-67-9	22000	170000		<0.464	NT	NT	NT	NT	NT	NT	NT	NT	NT
2,4-Dinitrotoluene	121-14-2	98	870		<0.464	NT	NT	NT	NT	NT	NT	NT	NT	NT
2,6-Dinitrotoluene	606-20-2	110	880		<0.464	NT	NT	NT	NT	NT	NT	NT	NT	NT
2-Chloronaphthalene	91-58-7	--	--		<0.464	NT	NT	NT	NT	NT	NT	NT	NT	NT
2-Chlorophenol	95-57-8	--	--		<0.464	NT	NT	NT	NT	NT	NT	NT	NT	NT
2-Methyl-4,6-dinitrophenol	534-52-1	--	--		<0.464	NT	NT	NT	NT	NT	NT	NT	NT	NT
2-Methylnaphthalene	91-57-6	--	--		NT	NT	NT	NT	NT	NT	NT	NT	NT	<0.175
2-Methylphenol	95-48-7	56000	430000		<0.464	NT	NT	NT	NT	NT	NT	NT	NT	NT
3,3-Dichlorobenzidine	91-94-1	110	730		<0.928	NT	NT	NT	NT	NT	NT	NT	NT	NT
4-Bromophenyl Phenyl Ether	101-55-3	--	--		<0.464	NT	NT	NT	NT	NT	NT	NT	NT	NT
4-Chloro-3-methyl Phenol	59-50-7	--	--		<0.464	NT	NT	NT	NT	NT	NT	NT	NT	NT
4-Chloroaniline	106-47-8	--	--		<0.464	NT	NT	NT	NT	NT	NT	NT	NT	NT
Acenaphthalene	208-96-8	--	--		<0.464	NT	NT	NT	NT	NT	NT	NT	NT	<0.175
Acenaphthene	83-32-9	56000	440000		<0.464	<0.152	NT	<0.135	NT	NT	<0.137	<0.142	<0.134	<0.175
Anthracene	120-12-7	280000	1000000		<0.464	NT	NT	NT	NT	NT	NT	NT	NT	<0.175
Benzo(a)anthracene	56-55-3	76	680		<0.464	<0.152	NT	<0.135	NT	NT	<0.137	<0.142	<0.134	<0.175
Benzo(a)pyrene	50-32-8	7.7	69		<0.232	<0.152	NT	<0.135	NT	NT	<0.137	<0.142	<0.134	<0.175
Benzo(b)fluoranthene	205-99-2	77	690		<0.464	<0.152	NT	<0.135	NT	NT	<0.137	<0.142	<0.134	<0.175
Benzo(g,h,i)perylene	191-24-2	--	--		<0.464	NT	NT	NT	NT	NT	NT	NT	NT	<0.175
Benzo(k)fluoranthene	207-08-9	770	6900		<0.464	<0.152	NT	<0.135	NT	NT	<0.137	<0.142	<0.134	<0.175
Benzoic Acid	65-85-0	--	--		<2.32	NT	NT	NT	NT	NT	NT	NT	NT	NT
Benzyl Alcohol	100-51-6	--	--		<0.464	NT	NT	NT	NT	NT	NT	NT	NT	NT
Benzyl Butyl Phthalate	85-68-7	58	58		<0.464	NT	NT	NT	NT	NT	NT	NT	NT	NT
Bis(2-chloroethoxy) Methane	111-91-1	--	--		<0.464	NT	NT	NT	NT	NT	NT	NT	NT	NT
Bis(2-chloroethyl) Ether	111-44-4	--	--		<0.464	NT	NT	NT	NT	NT	NT	NT	NT	NT
Bis(2-cloroisopropyl) Ether	108-60-1	--	--		<0.464	NT	NT	NT	NT	NT	NT	NT	NT	NT
Bis(2-ethylhexyl) Phthalate	117-81-7	190	190		<0.464	NT	NT	NT	NT	NT	NT	NT	NT	NT
Chrysene	218-01-9	7600	69000		<0.464	<0.152	NT	<0.135	NT	NT	<0.137	<0.142	<0.134	<0.175
Dibenz(a,h)anthracene	53-70-3	7.7	69		<0.232	<0.152	NT	<0.135	NT	NT	<0.137	<0.142	<0.134	<0.175
Dibenzofuran	132-64-9	--	--		<0.464	NT	NT	NT	NT	NT	NT	NT	NT	NT
Diethyl Phthalate	84-66-2	590	590		<0.464	NT	NT	NT	NT	NT	NT	NT	NT	NT
Dimethyl Phthalate	131-11-3	--	--		<0.464	NT	NT	NT	NT	NT	NT	NT	NT	NT

MORAINE PROPERTIES, LLC
MORAINE, OHIO

TABLE 3

SUMMARY OF METALS AND SVOCS IN SOIL AND PAPER SLUDGE

Parameter	CAS Number	Ohio VAP Soil Direct Contact Commercial/ Industrial Standards (mg/kg)[a]	Ohio VAP Soil Direct Contact Construction/ Excavation Standards (mg/kg)[b]	**Sample Location**	HSB18	SB-05	SB-07	SB-07	SB-08	SB-08	SB-11	SB-11	SB-15	UST-N1
				Sample Identification	RAA026:HSB-18:S000024	ETH001:SB-05:S000020	ETH001:SB-07:S000020	ETH001:SB-07:S110130	ETH001:SB-08:S000020	ETH001:SB-08:S160180	ETH001:SB-11:S000020	ETH001:SB-11:S060080	ETH001:SB-15:S000020	ETH002:UST-N1:S070080
				Sample Depth	0 - 2.4 ft	0 - 2 ft	0 - 2 ft	11 - 13 ft	0 - 2 ft	16 - 18 ft	0 - 2 ft	6 - 8 ft	0 - 2 ft	7 - 8 ft
				Sample Date	8/6/2004	6/23/2011	6/23/2011	6/23/2011	6/23/2011	6/23/2011	6/24/2011	6/24/2011	6/23/2011	8/27/2012
				Material Sampled	Paper Sludge	Paper Sludge	Paper Sludge	Soil	Paper Sludge	Soil	Paper Sludge	Soil	Paper Sludge	Soil
Di-n-octyl Phthalate	117-84-0	12	12		<0.464	NT	NT	NT	NT	NT	NT	NT	NT	NT
Di-n-propylnitrosamine	621-64-7	--	--		<0.464	NT	NT	NT	NT	NT	NT	NT	NT	NT
Fluoranthene	206-44-0	37000	290000		<0.464	NT	NT	NT	NT	NT	NT	NT	NT	<0.175
Fluorene	86-73-7	37000	290000		<0.464	NT	NT	NT	NT	NT	NT	NT	NT	<0.175
Hexachloro-1,3-butadiene	87-68-3	220	170		<0.007	NT	NT	NT	NT	NT	NT	NT	NT	NT
Hexachlorobenzene	118-74-1	28	85		<0.464	NT	NT	NT	NT	NT	NT	NT	NT	NT
Hexachloroethane	67-72-1	1100	8000		<0.464	NT	NT	NT	NT	NT	NT	NT	NT	NT
Hexachloropentadiene	77-47-4	--	--		<0.928	NT	NT	NT	NT	NT	NT	NT	NT	NT
Indeno(1,2,3-cd)pyrene	193-39-5	77	690		<0.464	<0.152	NT	<0.135	NT	NT	<0.137	<0.142	<0.134	<0.175
Isophorone	78-59-1	4600	4600		<0.464	NT	NT	NT	NT	NT	NT	NT	NT	NT
Naphthalene	91-20-3	150	84		<0.464	<0.152	NT	<0.135	NT	NT	<0.137	<0.142	<0.134	<0.175
Nitrobenzene	98-95-3	170	610		<0.464	NT	NT	NT	NT	NT	NT	NT	NT	NT
o-Nitrophenol	88-75-5	--	--		<0.464	NT	NT	NT	NT	NT	NT	NT	NT	NT
Pentachlorophenol	87-86-5	280	460		<0.464	NT	NT	NT	NT	NT	NT	NT	NT	NT
Phenanthrene	85-01-8	--	--		<0.464	NT	NT	NT	NT	NT	NT	NT	NT	<0.175
Phenol	108-95-2	66000	510000		<0.464	NT	NT	NT	NT	NT	NT	NT	NT	NT
Pyrene	129-00-0	28000	220000		<0.464	<0.152	NT	<0.135	NT	NT	<0.137	<0.142	<0.134	<0.175

Notes:

a. Single Chemical Generic Direct Contact Soil Standard in accordance with 3745-300-08(C)(3)(c).

b. Single Chemical Generic Direct Contact Soil Standard in accordance with 3745-300-08(C)(3)(d).

c. NT - Not Tested.

d. '--' - A VAP standard has not been established for this analyte.

e. < - indicates less than detection limit or practical quantitation limit, as appropriate.

f. Bold and shaded indicates values detected above the applicable standards.

MORAINE PROPERTIES, LLC
MORAINE, OHIO

TABLE 3

SUMMARY OF METALS AND SVOCS IN SOIL AND PAPER SLUDGE

Parameter	CAS Number	Ohio VAP Soil Direct Contact Commercial/ Industrial Standards (mg/kg)[a]	Ohio VAP Soil Direct Contact Construction/ Excavation Standards (mg/kg)[b]	Sample Location	UST-S1	UST-W1
				Sample Identification	ETH002:UST-S1:S070080	ETH002:UST-W1:S070080
				Sample Depth	7 - 8 ft	7 - 8 ft
				Sample Date	8/27/2012	8/27/2012
				Material Sampled	Soil	Soil
TPH/GRO/ERO/DRO						
TPH (C21-C34)					<1090	<690
TPH-DRO					<21.7	20.4
Metals						
Aluminum	7429-90-5	--[d]	--		3480	2430
Antimony	7440-36-0	1200	370		3.06	6.47
Arsenic	7440-38-2	82	390		21.6	6.41
Barium	7440-39-3	370000	120000		121	19.7
Beryllium	7440-41-7	5100	3100		<1.06	<0.694
Cadmium	7440-43-9	2300	1600		<1.06	<0.694
Chromium	7440-47-3	7900	13000		14.7	6.52
Cobalt	7440-48-4	23000	4000		3.8	3.11
Lead	7439-92-1	1800	750		467	87.2
Mercury	7439-97-6	290	190		0.463	<0.141
Nickel	7440-02-0	44000	21000		18.5	10.7
Selenium	7782-49-2	15000	9700		<10.6	<6.94
Silver	7440-22-4	15000	9700		<2.12	<1.39
Thallium	7440-28-0	230	1600		<10.6	<6.94
Vanadium	7440-62-2	26000	17000		25.3	8.33
Zinc	7440-66-6	880000	580000		900	58.3
SVOCs						
1,2,4-Trichlorobenzene	120-82-1	--	--		NT	NT
1,2-Dichlorobenzene	95-50-1	370	370		NT	NT
1,3-Dichlorobenzene	541-73-1	--	--		NT	NT
1,4-Dichlorobenzene	106-46-7	130	510		NT	NT
2,4,5-Trichlorophenol	95-95-4	110000	850000		NT	NT
2,4,6-Trichlorophenol	88-06-2	4400	29000		NT	NT
2,4-Dichlorophenol	120-83-2	--	--		NT	NT
2,4-Dimethylphenol	105-67-9	22000	170000		NT	NT
2,4-Dinitrotoluene	121-14-2	98	870		NT	NT
2,6-Dinitrotoluene	606-20-2	110	880		NT	NT
2-Chloronaphthalene	91-58-7	--	--		NT	NT
2-Chlorophenol	95-57-8	--	--		NT	NT
2-Methyl-4,6-dinitrophenol	534-52-1	--	--		NT	NT
2-Methylnaphthalene	91-57-6	--	--		<0.327	<0.206
2-Methylphenol	95-48-7	56000	430000		NT	NT
3,3-Dichlorobenzidine	91-94-1	110	730		NT	NT
4-Bromophenyl Phenyl Ether	101-55-3	--	--		NT	NT
4-Chloro-3-methyl Phenol	59-50-7	--	--		NT	NT
4-Chloroaniline	106-47-8	--	--		NT	NT
Acenaphthalene	208-96-8	--	--		<0.327	<0.206
Acenaphthene	83-32-9	56000	440000		<0.327	<0.206
Anthracene	120-12-7	280000	1000000		<0.327	<0.206
Benzo(a)anthracene	56-55-3	76	680		<0.327	0.475
Benzo(a)pyrene	50-32-8	7.7	69		<0.327	0.368
Benzo(b)fluoranthene	205-99-2	77	690		<0.327	0.362
Benzo(g,h,i)perylene	191-24-2	--	--		<0.327	0.276
Benzo(k)fluoranthene	207-08-9	770	6900		<0.327	0.314
Benzoic Acid	65-85-0	--	--		NT	NT
Benzyl Alcohol	100-51-6	--	--		NT	NT
Benzyl Butyl Phthalate	85-68-7	58	58		NT	NT
Bis(2-chloroethoxy) Methane	111-91-1	--	--		NT	NT
Bis(2-chloroethyl) Ether	111-44-4	--	--		NT	NT
Bis(2-cloroisopropyl) Ether	108-60-1	--	--		NT	NT
Bis(2-ethylhexyl) Phthalate	117-81-7	190	190		NT	NT
Chrysene	218-01-9	7600	69000		<0.327	0.418
Dibenz(a,h)anthracene	53-70-3	7.7	69		<0.327	<0.206
Dibenzofuran	132-64-9	--	--		NT	NT
Diethyl Phthalate	84-66-2	590	590		NT	NT
Dimethyl Phthalate	131-11-3	--	--		NT	NT

MORAINE PROPERTIES, LLC
MORAINE, OHIO

TABLE 3

SUMMARY OF METALS AND SVOCS IN SOIL AND PAPER SLUDGE

Parameter	CAS Number	Ohio VAP Soil Direct Contact Commercial/ Industrial Standards (mg/kg)[a]	Ohio VAP Soil Direct Contact Construction/ Excavation Standards (mg/kg)[b]	**Sample Location**	UST-S1	UST-W1
				Sample Identification	ETH002:UST-S1:S070080	ETH002:UST-W1:S070080
				Sample Depth	7 - 8 ft	7 - 8 ft
				Sample Date	8/27/2012	8/27/2012
				Material Sampled	Soil	Soil
Di-n-octyl Phthalate	117-84-0	12	12		NT	NT
Di-n-propylnitrosamine	621-64-7	--	--		NT	NT
Fluoranthene	206-44-0	37000	290000		<0.327	0.489
Fluorene	86-73-7	37000	290000		<0.327	<0.206
Hexachloro-1,3-butadiene	87-68-3	220	170		NT	NT
Hexachlorobenzene	118-74-1	28	85		NT	NT
Hexachloroethane	67-72-1	1100	8000		NT	NT
Hexachloropentadiene	77-47-4	--	--		NT	NT
Indeno(1,2,3-cd)pyrene	193-39-5	77	690		<0.327	0.252
Isophorone	78-59-1	4600	4600		NT	NT
Naphthalene	91-20-3	150	84		<0.327	<0.206
Nitrobenzene	98-95-3	170	610		NT	NT
o-Nitrophenol	88-75-5	--	--		NT	NT
Pentachlorophenol	87-86-5	280	460		NT	NT
Phenanthrene	85-01-8	--	--		<0.327	<0.206
Phenol	108-95-2	66000	510000		NT	NT
Pyrene	129-00-0	28000	220000		<0.327	0.446

Notes:

a. Single Chemical Generic Direct Contact Soil Standard in accordance with 3745-300-08(C)(3)(c).

b. Single Chemical Generic Direct Contact Soil Standard in accordance with 3745-300-08(C)(3)(d).

c. NT - Not Tested.

d. '--' - A VAP standard has not been established for this analyte.

e. < - indicates less than detection limit or practical quantitation limit, as appropriate.

f. Bold and shaded indicates values detected above the applicable standards.

MORAINE PROPERTIES, LLC
MORAINE, OHIO

TABLE 4

SUMMARY OF METALS, SVOCs AND VOCs IN GROUNDWATER

Parameter	CAS Number	Ohio VAP Unrestricted Potable Use Standards (ug/L)	Sample Location	MW2	MW2	MW3A
			Sample Identification	RAA028:MW-2:G091704	RAA028:MW-2:G091704A	RAA028:MW-3A:G091704 filt
			Sample Date	9/17/2004	9/17/2004	9/17/2004
PCBs						
Aroclor 1016	12674-11-2			NT	NT	<0.0002
Aroclor 1221	11104-28-2			NT	NT	<0.0002
Aroclor 1232	11141-16-5			NT	NT	<0.0002
Aroclor 1242	53469-21-9			NT	NT	<0.0002
Aroclor 1248	12672-29-6			NT	NT	<0.0002
Aroclor 1254	11097-69-1			NT	NT	<0.0002
Aroclor 1260	11096-82-5			NT	NT	<0.0002
SVOCs						
1,2,4-Trichlorobenzene	120-82-1	70		<10[b]	<10	<10
1,2-Dichlorobenzene	95-50-1	600		<10	<10	<10
1,3-Dichlorobenzene	541-73-1	--[a]		<10	<10	<10
1,4-Dichlorobenzene	106-46-7	75		<10	<10	<10
2,4,5-Trichlorophenol	95-95-4	1600		<10	<10	<10
2,4,6-Trichlorophenol	88-06-2	120		<10	<10	<10
2,4-Dichlorophenol	120-83-2	--		<10	<10	<10
2,4-Dimethylphenol	105-67-9	310		<10	<10	<10
2,4-Dinitrotoluene	121-14-2	--		<10	<10	<10
2,6-Dinitrotoluene	606-20-2	--		<10	<10	<10
2-Chloronaphthalene	91-58-7	--		<10	<10	<10
2-Chlorophenol	95-57-8	--		<10	<10	<10
2-Methyl-4,6-dinitrophenol	534-52-1	--		<10	<10	<10
2-Methylnaphthalene	91-57-6	--		NT[c]	NT	NT
2-Methylphenol	95-48-7	790		<10	<10	<10
3,3-Dichlorobenzidine	91-94-1	--		<50	<50	<50
4-Bromophenyl Phenyl Ether	101-55-3	--		<10	<10	<10
4-Chloro-3-methyl Phenol	59-50-7	--		<10	<10	<10
4-Chloroaniline	106-47-8	--		<10	<10	<10
Acenaphthalene	208-96-8	--		<10	<10	<10
Acenaphthene	83-32-9	950		<10	<10	<10
Anthracene	120-12-7	4700		<10	<10	<10
Benzo(a)anthracene	56-55-3	0.63		**<10[d]**	**<10**	**<10**
Benzo(a)pyrene	50-32-8	0.2		**<10**	**<10**	**<10**
Benzo(b)fluoranthene	205-99-2	0.46		**<10**	**<10**	**<10**
Benzo(g,h,i)perylene	191-24-2	--		<10	<10	<10
Benzo(k)fluoranthene	207-08-9	22		<10	<10	<10
Benzoic Acid	65-85-0	--		<50	<50	<500
Benzyl Alcohol	100-51-6	--		<10	<10	<10
Benzyl Butyl Phthalate	85-68-7	110		<10	<10	<10
Bis(2-chloroethoxy) Methane	111-91-1	--		<10	<10	<10
Bis(2-chloroethyl) Ether	111-44-4	--		<10	<10	<10
Bis(2-cloroisopropyl) Ether	108-60-1	--		<10	<10	<10
Bis(2-ethylhexyl) Phthalate	117-81-7	6		**<10**	**<10**	**<10**
Chrysene	218-01-9	63		<10	<10	<10
Dibenz(a,h)anthracene	53-70-3	--		<10	<10	<10
Dibenzofuran	132-64-9	--		<10	<10	<10
Diethyl Phthalate	84-66-2	13000		<10	<10	<10
Dimethyl Phthalate	131-11-3	--		<10	<10	<10
Di-n-octyl Phthalate	117-84-0	630		<10	<10	<10
Di-n-propylnitrosamine	621-64-7	--		<10	<10	<10
Fluoranthene	206-44-0	420		<10	<10	<10
Fluorene	86-73-7	630		<10	<10	<10
Hexachloro-1,3-butadiene	87-68-3	--		<10	<10	<10
Hexachlorobenzene	118-74-1	1		**<10**	**<10**	**<10**
Hexachloroethane	67-72-1	15		<10	<10	<10
Hexachloropentadiene	77-47-4	50		<20	<20	<20
Indeno(1,2,3-cd)pyrene	193-39-5	0.34		**<10**	**<10**	**<10**
Isophorone	78-59-1	1700		<10	<10	<10
Naphthalene	91-20-3	67		<10	<10	<10
Nitrobenzene	98-95-3	--		<10	<10	<10
o-Nitrophenol	88-75-5	--		<10	<10	<10
Pentachlorophenol	87-86-5	1		**<10**	**<10**	**<10**
Phenanthrene	85-01-8	--		<10	<10	<10
Phenol	108-95-2	4700		<10	<10	164
Pyrene	129-00-0	470		<10	<10	<10

Notes:

a. '--' - A VAP standard has not been established for this analyte.

b. < - indicates less than detection limit or practical quantitation limit, as appropriate.

c. NT - indicates parameter was not tested.

d. **BOLD** and shaded values indicate reporting limit exceeds respective unrestricted potable use standard.

FIGURES

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Legend

- Site Location
- Approximate Site Boundary

Source: The topographic map was acquired through the USGS Topographic Map web service. Topo quadrangle date not provided.

The aerial photo in the inset was acquired through the Microsoft Virtual Earth Aerial Photogrpahy web service. Aerial photography date not provided.

0 500 1,000 2,000 Feet

1:24,000

N

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Self-Implementing Cleanup and Risk-Based Disposal of the Paper Sludge Dump
Moraine Properties

Site Location Map

Soldiers Home - West Carrollton Road
Moraine, Montgomery County, Ohio

Date:
February 2013

File Name:
ETH002_02_Fig01_SiteLocMap.mxd

Edited: 2/15/2013 By: cforman

Figure
1

Produced using ArcGIS 10.0 SP1

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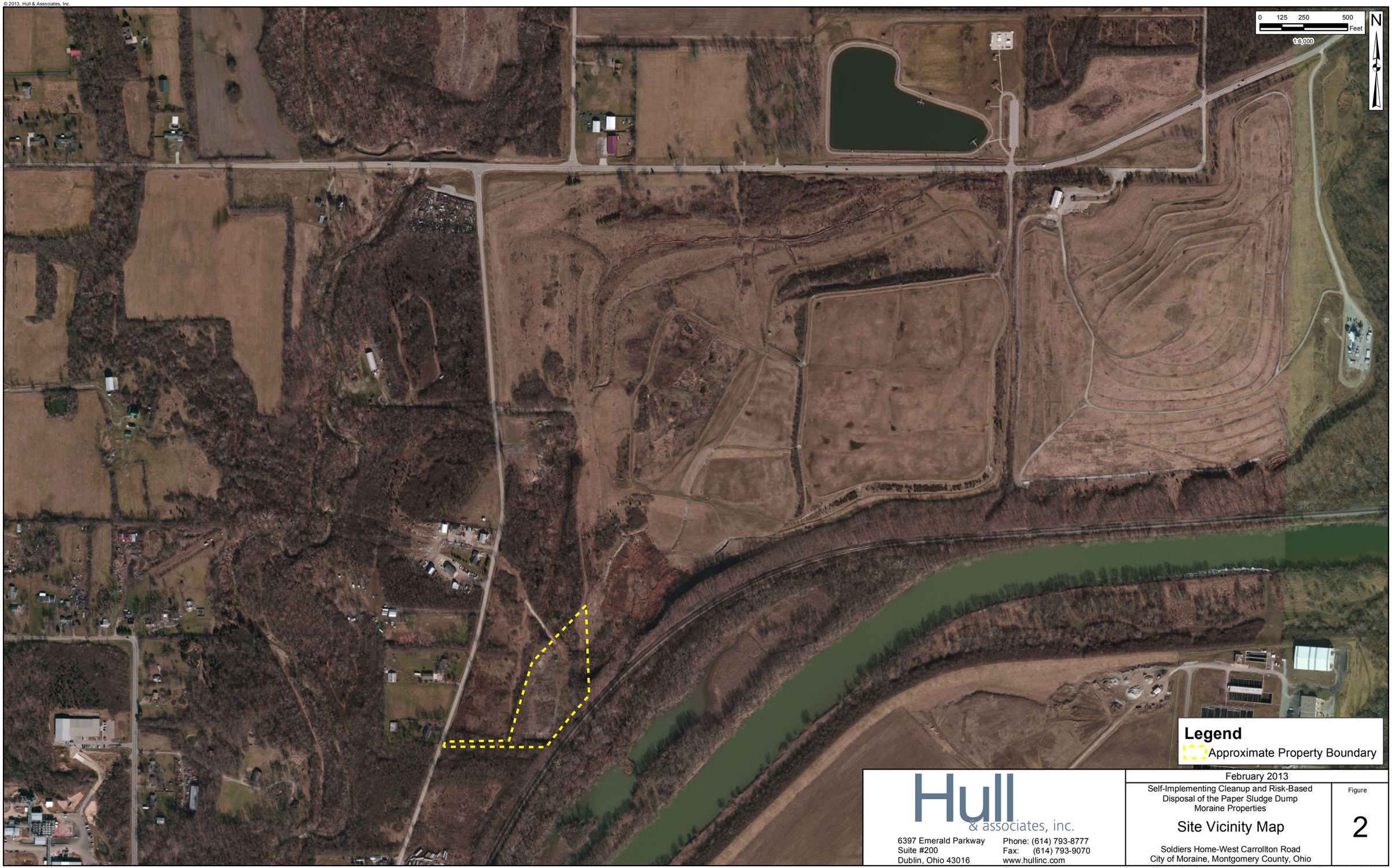

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Self-Implementing Cleanup and Risk-Based Disposal of the Paper Sludge Dump
Moraine Properties

Site Vicinity Map

Soldiers Home-West Carrollton Road
City of Moraine, Montgomery County, Ohio

Figure
2

Produced using ArcGIS 10.0 SP1

Geodatabase: ETH001.mdb

File Name: ETH002_02_Fig02_SiteVicinity.mxd

Edited: 2/15/2013 By: cforman

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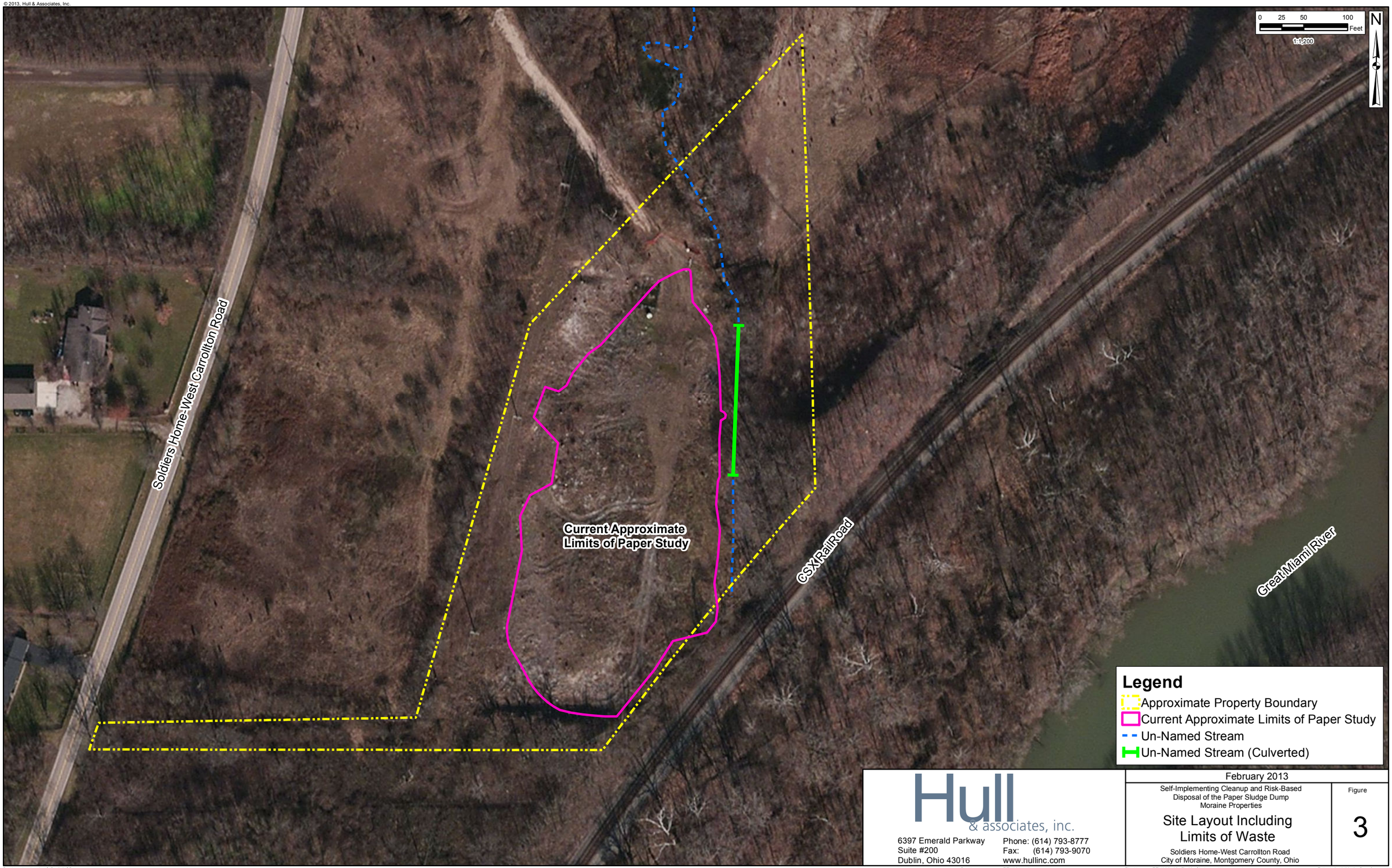

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Self-Implementing Cleanup and Risk-Based Disposal of the Paper Sludge Dump
Moraine Properties

Site Layout Including Limits of Waste

Soldiers Home-West Carrollton Road
City of Moraine, Montgomery County, Ohio

Figure 3

Produced using ArcGIS 10.0 SP1

Geodatabase: ETH001.mdb

File Name: ETH002_02_Fig03_SiteLayoutWaste.mxd

Edited: 2/15/2013 By: cforman

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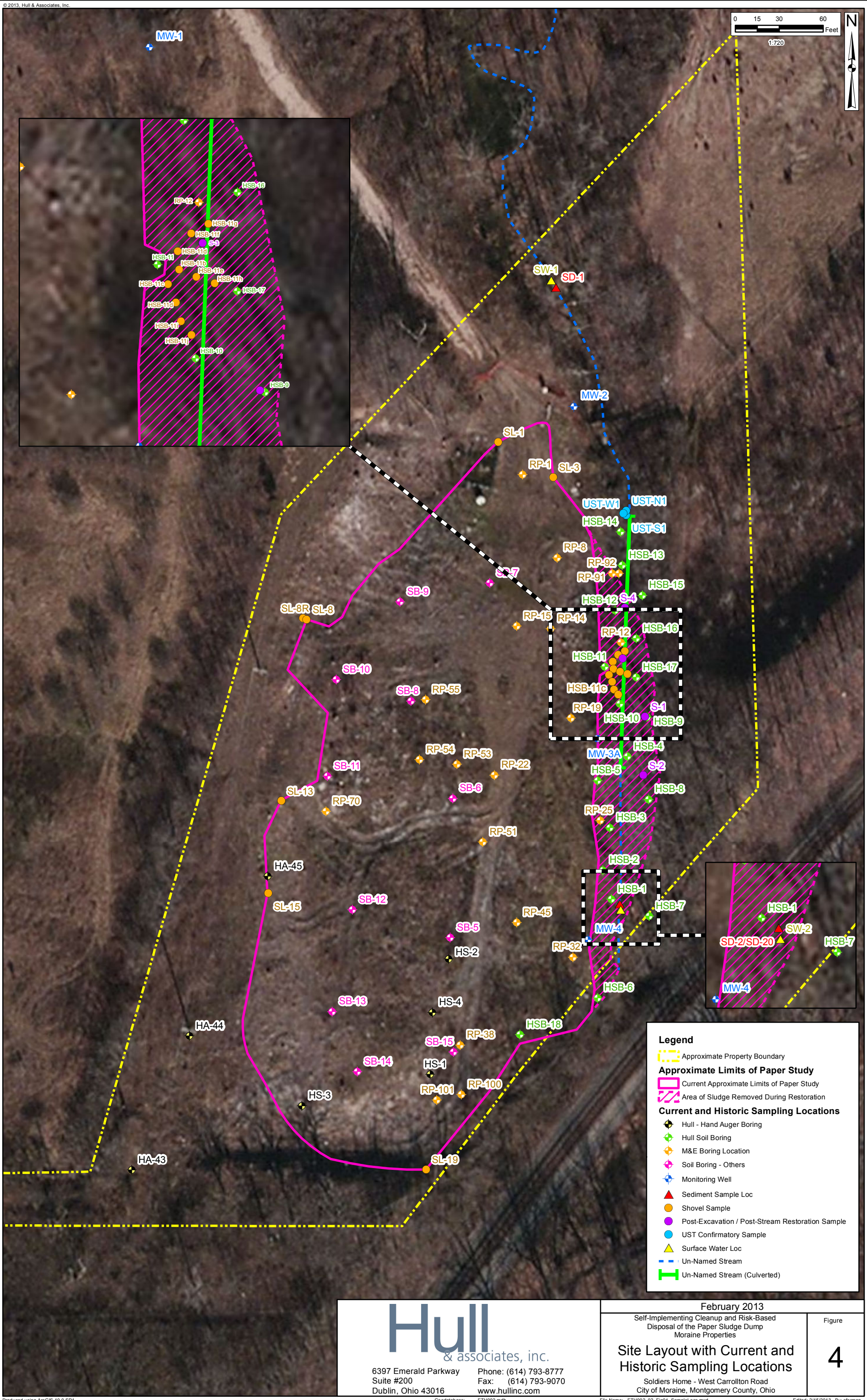

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Self-Implementing Cleanup and Risk-Based Disposal of the Paper Sludge Dump
Moraine Properties

Site Layout with Current and Historic Sampling Locations

Soldiers Home - West Carrollton Road
City of Moraine, Montgomery County, Ohio

Figure 4

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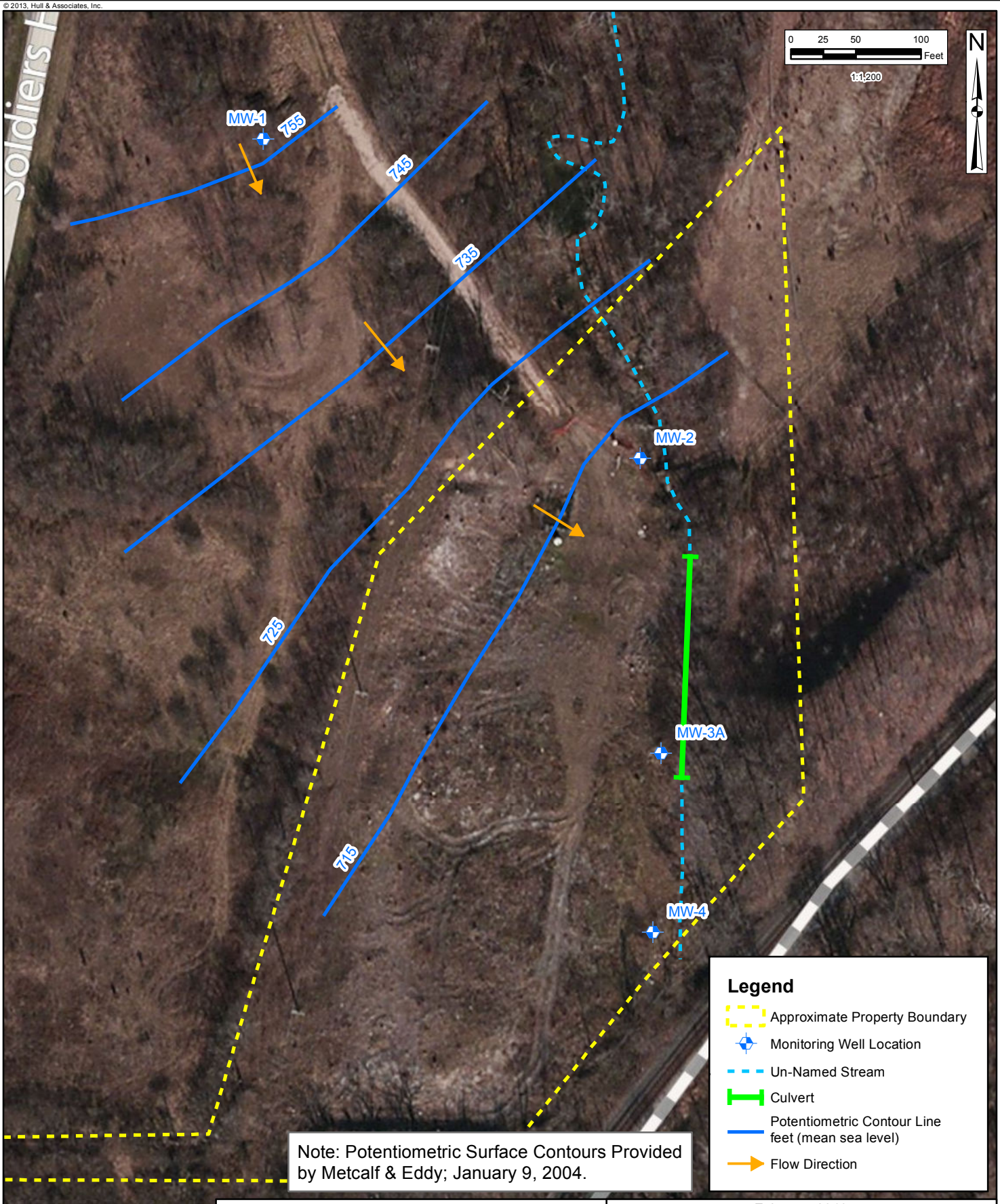

Note: Potentiometric Surface Contours Provided by Metcalf & Eddy; January 9, 2004.

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Self-Implementing Cleanup and Risk-Based Disposal of the Paper Sludge Dump
Moraine Properties

Potentiometric Surface Map (January 2004)

Soldiers Home - West Carrollton Road
City of Moraine, Montgomery County, Ohio

Figure 5

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February 2013

Self-Implementing Cleanup and Risk-Based Disposal of the Paper Sludge Dump
Moraine Properties

Site Layout with PCBs in Sediment and Soil (mg/kg)

Soldiers Home - West Carrollton Road
City of Moraine, Montgomery County, Ohio

Figure

6

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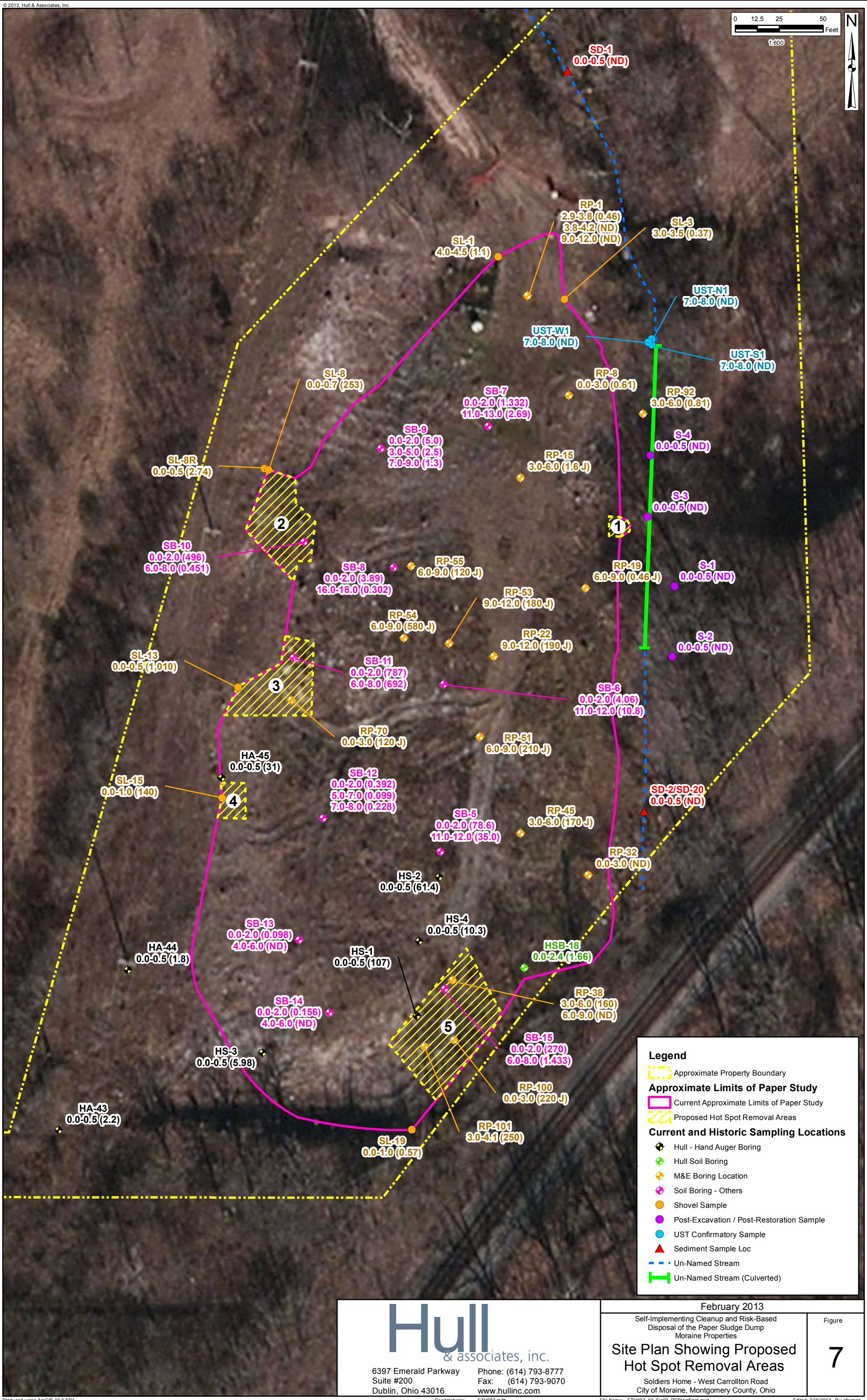

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February 2013

Self-Implementing Cleanup and Risk-Based Disposal of the Paper Sludge Dump
Moraine Properties

Site Plan Showing Proposed Hot Spot Removal Areas

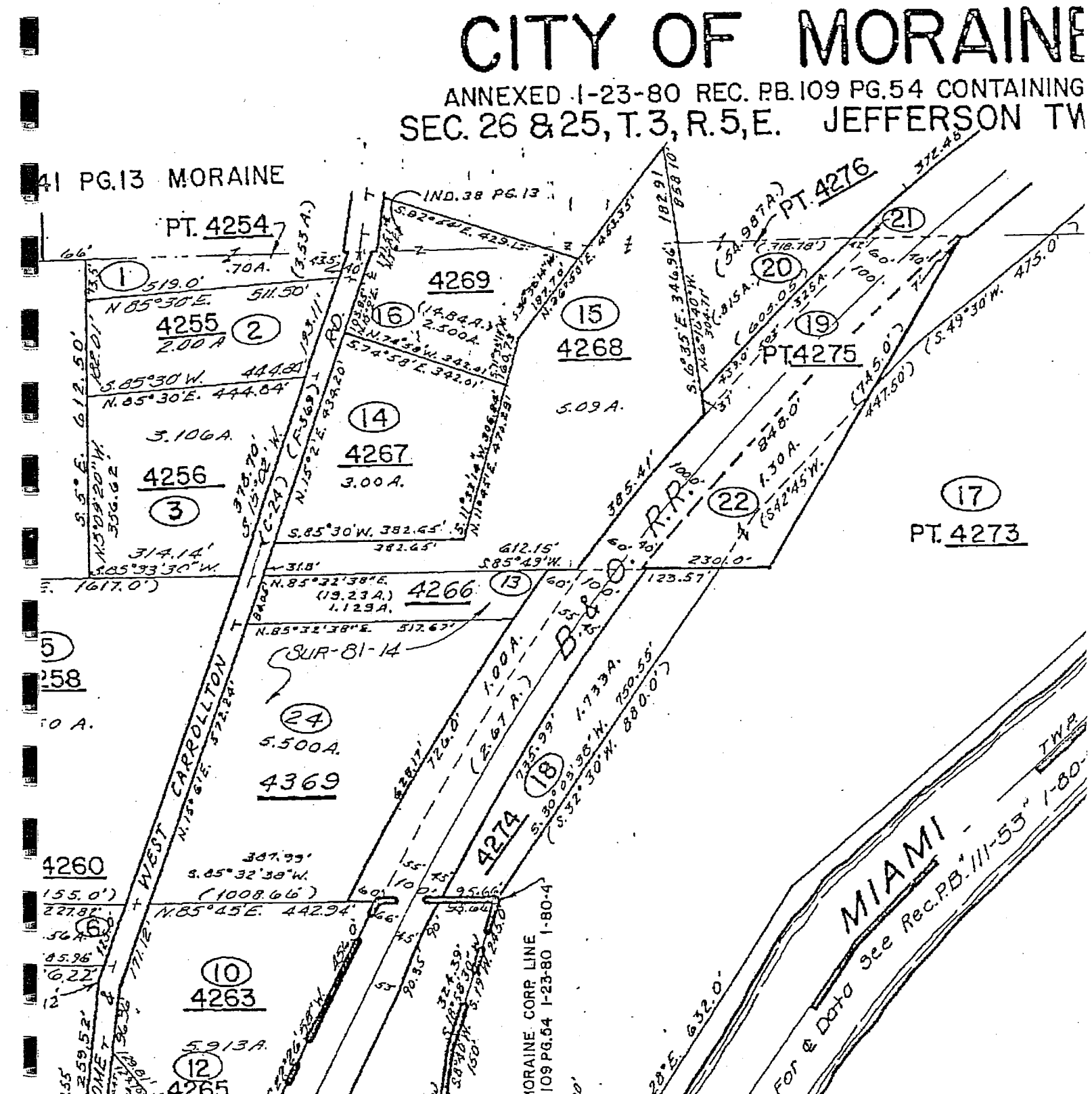
Soldiers Home - West Carrollton Road
City of Moraine, Montgomery County, Ohio

Figure 7

APPENDIX A

Current Property Tax Map

Montgomery County
Karl L.Keith, Auditor



APPENDIX B

Correspondence (Sludge Placement Termination)

April 29, 1977

Mr. Gary Bramble
Ohio EPA
Southwest District Office
7 East Fourth Street
Dayton, Ohio 45402

Dear Mr. Bramble:

During our telephone conversation on April 18, 1977 you asked us to stop hauling sludge to our secondary hauling site on Soldiers Home-West Carrollton Road until the EPA has conducted a site investigation and approved our operating plan for the use of this land. Enclosed with this letter is a request for a site inspection.

As of 6:PM on April 18, the contractor who hauls sludge for Miami Paper Corp., has stopped dumping sludge at the Soldiers Home-West Carrollton Road site and will continue not dumping there until our operating plan is approved.

Since 1974 we have hauled about ten percent of the sludge generated at our plant to the site on Soldiers Home-West Carrollton Road. Generally, we will haul to the above mentioned site when conditions, such as rain, make it impracticle to haul to the primary disposal site on Pinnacle Road.

Having the flexibility of hauling a small percentage of the sludge to a secondary site is an important factor to help transport and dump the sludge in the most efficient manner. We believe it is very important to keep the second hauling site in use.

Sincerely,

Harold G. Nelson

Harold G. Nelson
Environmental Engineer

cc: J. W. Winn
H. H. Stevens
T. H. Weisman

HGN/ff

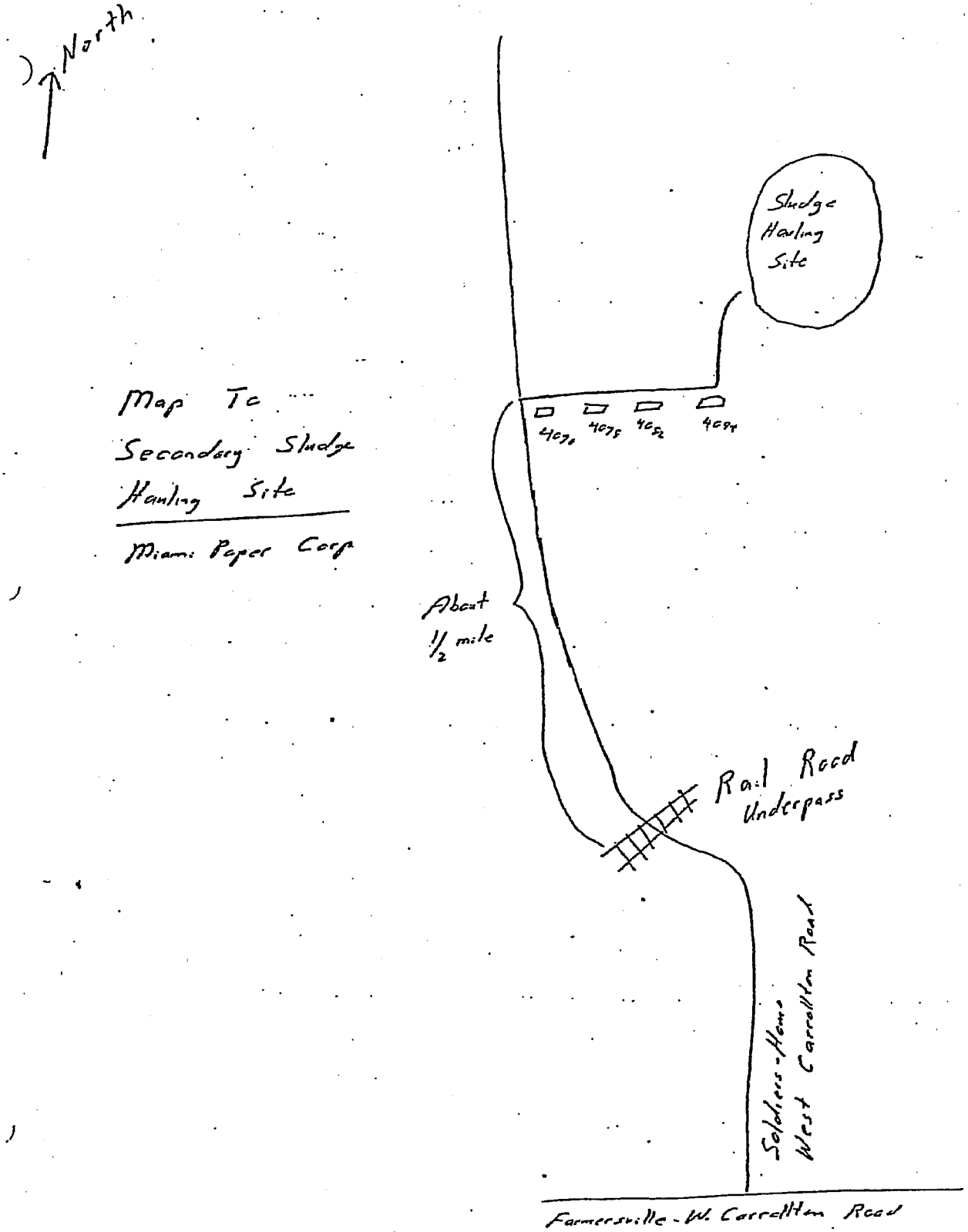
MIAMI PAPER CORPORATION
Subsidiary of Pentair Industries, Inc.

South Smith Street • West Carrollton, Ohio 45449 • Telephone (513) 859-5101

Privileged & Confidential
Subject to Joint Defense Agreement

Map To ...
Secondary Sludge
Hauling Site

Miami Paper Corp



REQUEST FOR A SOLID WASTE DISPOSAL SITE INVESTIGATION

Date April 29, 1977

Mr. James W. Winn, Executive Vice President and General Manager
Person(s) Legally Responsible for Operations of Proposed Site

P.O. Box 66 West Carrollton, Ohio, 45449
Mailing Address

513 - 859-5101
Phone

andowner Miami Paper Corporation

P.O. Box 66 West Carrollton, Ohio 45449
Mailing Address

513 - 859-5101
Phone

Consulting Engineer on this Project None

Mailing Address

Phone

Reg. Eng. _____ Surveyor _____

idress of Site or Facility (specify location on DOT map and attach map)

4070, 4078, 4082, 4094 Soldiers Home-West Carrollton Road, Jefferson Township, Ohio

ounty Montgomery Type of Solid Waste Operation landfill
landfill, incinerator, etc.

ypes of Materials to be Accepted and Quantities

___ Industrial _____

___ Commercial _____

___ Municipal _____

X Liquids or Sludges Sludges

Size of Site 5.09 acres

Proposed area to be served N.A.

oes this site comply with local zoning regulations? Yes

have read the above and they are true
nd accurate statements:

James W Winn

signature of persons legally responsible
for operation of the site)

OFFICE USE ONLY

D.O. Engineer _____

Date Received _____

Identification Number for Site or Facility _____

Privileged & Confidential
Subject to Joint Defense Agreement

gRB

OhioEPA

Re: Montgomery County
Paper Sludge
Solid Waste

September 22, 1977

Mr. John H. Bindeman
Supervisor
Bureau of General Services
Montgomery County Health Department
451 W. Third Street
Dayton, Ohio 45402

Dear Mr. Bindeman:

It is now official! Paper sludge has been interpreted as a solid waste by definition in the solid waste law and regulations. The attached IOC is self explanatory.

If you have any questions, please call me.

Sincerely yours,

M. Joe Moore

M. Joe Moore
Land Pollution Control Section

MJM/mlk

Permits

Privileged & Confidential
Subject to Joint Defense Agreement

P MM 612

State of Ohio Environmental Protection Agency
Southwest District Office
7 East Fourth Street, Dayton, Ohio 45402 - (513) 461-4670

James A. Rhodes, Governor
Ned E. Williams, P.E., Director

Joe Moore, Southwest District Office

August 16, 19

Bob Brown thru Dan Redman, Office of Land Pollution Control

Paper Sludge Disposal

Per your IOC on paper sludge, I have discussed the problem with Dan Redman and John Noyes. The consensus is that paper sludge is definitely a solid waste by definition in the Solid Waste Regulations. It has been our experience that leachate from paper sludge can be very high in total dissolved solids, chlorides, and BOD.

In the past, paper sludge was thought to be innocuous by many persons. It does not present the problems of blowing litter, rodents, and insects which are commonly assoc with municipal solid waste. The potential for water pollution was often overlooked.

Today, even the paper industry acknowledges that water pollution caused by leachate from paper sludge is a possibility. This was one of many factors to be considered in the disposal of paper sludge as discussed in the publication "Considerations for Land Disposal of Paper and Pulp Mill Sludge" by William M. Perpich, Tappi September 1976, Volume 59, No. 9.

In the future, land disposal of paper sludge should be handled as any other solid was a PTI and plan approval will be required.

BB/pam

RECEIVED
SEP 22 1977
OHIO ENVIRONMENTAL PROTECTION AGENCY
SOUTH WEST DISTRICT

Privileged & Confidential
Subject to Joint Defense Agreement

MIAMI PAPER CORPORATION

Subject: Secondary Sludge Disposal Site
Our Response to EPA's Recommendation

Date: September 27, 1977

File: 77-34 & 77-336

To: H. H. Stevens

From: H. G. Nelson

On September 20, I spoke to Mr. James Pennino of the OEPA about his recommendations that one to two feet of clay or soil be put over all of the sludge at our secondary sludge hauling site on Soldiers Home-West Carrollton Road.

I told Mr. Pennino that in 1972 we worked with Mr. Bindeman of the Montgomery County Board of Health, and at the time he said that our paper mill sludge could be used as a protective cover for a garbage disposal site. His exact words were, "No one can guarantee that this paper sludge will seal off rain water from creating the leachate problem. However, we feel that it is the most economical solution and has a very strong possibility of working". Because of Mr. Bindeman's statements we allowed our sludge to be used as a cover on a garbage disposal site. We allowed one entire sludge bed, about 12,000 cubic yards, to be used to cover the disposal site. During the last four years we also have hauled a small percentage of all of our sludge to our secondary site, the ravine on Soldiers Home-West Carrollton Road. Now we are told by the EPA to cover all of our sludge on the ravine with one to two feet of clay or soil. The cost of covering all of the sludge would be great and it seems to me that we are being adversely penalized by the changing goals of the EPA and Board of Health. I also told Mr. Pennino that our studies have showed that after several years most of the organic portion of the sludge on the surface of our landfill site decomposes leaving a residual clay cover. This serves the same purpose as covering the site with one foot of clay.

Mr. Pennino's response was that he wants us to put a thin layer of cover material, such as soil, over the dump site and to have a bulldozer cut a notch in the sludge so that rain water will run through the notch and off the sludge. The EPA would ultimately like to see the entire area covered with vegetation since that would eliminate any leaching problem.

HGN/mb

cc: JWW
THW

general Sanitation L.F.
3929 SH-WC Rd.

1994

Privileged & Confidential
Subject to Joint Defense Agreement

APPENDIX C

Ohio Department of Natural Resources Well Log Location Map and Well Log Records

Not Responsive

NO CARBON PAPER NECESSARY— SELF-TRANSCRIBING

WE[?] LOG AND DRILLING RE[?]RT

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
65 S. Front St., Rm. 815 Phone (614) 469-2646
Columbus, Ohio 43215

ORIGINAL

458613 18 m ✓

Not Responsive [redacted]

CONSTRUCTION DETAILS	
Casing diameter 5 5/8	Length of casing 125
Type of screen	Length of screen
Type of pump	
Capacity of pump	
Depth of pump setting	
Date of completion	

BAILING OR PUMPING TEST (Specify one by circling)	
Test Rate 5 G.P.M.	Duration of test 1 hrs.
Drawdown 80 ft.	Date Aug 3 73
Static level-depth to water 30 ft.	
Quality (clear (circled), cloudy, taste, odor)	
Pump installed by	

WELL LOG*

Formations Sandstone, shale, limestone, gravel and clay	From	To
Clay.	0 Feet	60 Ft.
Gravel.	60	60½
Clay.	60½	125
125'		

SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.

N.

Not Responsive [redacted]

Drilling Firm Clay Garrison

Address 3901 S Dixie Dr.
Dayton Ohio

Date Aug 3 73

Signed Clay B. Garrison

*If additional space is needed to complete well log, use next consecutive numbered form.

209

WELL LOG AND DRILLING REPORT

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
Fountain Square
Columbus, Ohio 43224

NO CARBON PAPER NECESSARY— SELF-TRANSCRIBING

17eC

593770

Not Responsive

[redacted]

CONSTRUCTION DETAILS

Casing diameter 4" Length of casing 13.75'

Type of screen PVC Length of screen 6'

Type of pump N.A.

Capacity of pump

Depth of pump setting

Date of completion June 1981

BAILING OR PUMPING TEST
(specify one by circling)

Test rate N.A. gpm Duration of test hrs

Drawdown ft Date

Static level (depth to water) ft

Quality (clear, cloudy, taste, odor)

Pump installed by

WELL LOG* WELL #4

Formations: sandstone, shale, limestone, gravel, clay	From	To
Top Soil	0 ft	5 ft
Sand	5	20
Clay	20	30

5412

SKETCH SHOWING LOCATION

Locate in reference to numbered state highways, street intersections, county roads, etc.

Not Responsive

[redacted]

DRILLING FIRM MOODY'S OF DAYTON, INC.

ADDRESS P.O. BOX 123, MIAMISBURG, OHIO 45342

DATE SEPTEMBER 30, 1981

SIGNED [signature]

*If additional space is needed to complete well log, use next consecutive numbered form.

ORIGINAL COPY - ODNR, DIVISION OF WATER, FOUNTAIN SQ., COLS., OHIO 43224

246

WELL LOG AND DRILLING REPORT

ORIGINAL 17 CV

NO CARBON PAPER NECESSARY - SELF-TRANSCRIBING

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Geological Survey
Fountain Square
Columbus, Ohio 43224 Phone (614) 466-5344

472248

Not Responsive

[redacted]

CONSTRUCTION DETAILS

Casing diameter 6" Length of casing 23'

Type of screen Plastic Length of screen 3'

Type of pump none

Capacity of pump

Depth of pump setting

Date of completion

BAILING OR PUMPING TEST
(specify one by circling)

Test rate None gpm Duration of test hrs

Drawdown ft Date

Static level (depth to water) 19'8" from grade ft

Quality (clear, cloudy, taste, odor)

Pump installed by

Observation Well #1 **WELL LOG***

Formations: sandstone, shale, limestone, gravel, clay	From	To
Landfill Material	0 ft	26 ft
Brown Sandy Clay	26	--

SKETCH SHOWING LOCATION

Locate in reference to numbered state highways, street intersections, county roads, etc.

Not Responsive

[redacted]

DRILLING FIRM MOODY'S OF DAYTON, INC DATE JUNE 21, 1978

ADDRESS P.O. BOX 123, MIAMISBURG, OHIO 45342 SIGNED Gary L. Bellert/jd

*If additional space is needed to complete well log, use next consecutive numbered form.

247

WELL LOG AND DRILLING REPORT

ORIGINAL

NO CARBON PAPER NECESSARY— SELF-TRANSCRIBING

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
65 S. Front St., Rm. 815 Phone (614) 469-2646
Columbus, Ohio 43215

451282

Not Responsive

[redacted]

CONSTRUCTION DETAILS

Casing diameter 5 5/8 Length of casing 170
Type of screen _____ Length of screen _____
Type of pump _____
Capacity of pump _____
Depth of pump setting _____
Date of completion _____

BAILING OR PUMPING TEST
(Specify one by circling)

Test Rate 5 G.P.M. Duration of test 1 hrs.
Drawdown 40 ft. Date April 26 73
Static level-depth to water 85 ft.
Quality (clear, cloudy, taste, odor) _____

Pump installed by _____

WELL LOG*

Formations Sandstone, shale, limestone, gravel and clay	From	To
Clay.	0 Feet	105 Ft.
rock.	105	135
1251		

SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.

N.

Not Responsive

[redacted]

Drilling Firm CLAY P. GARRISON
Address WELL CONTRACTOR
3901 S. DIXIE DRIVE
DAYTON, OHIO 45439

Date April 27 73
Signed Clay P. Garrison

*If additional space is needed to complete well log, use next consecutive numbered form.

207

WELL LOG AND DRILLING REPORT

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
1562 W. First Avenue
Columbus, Ohio

PLEASE USE PENCIL OR TYPEWRITER. DO NOT USE INK.

ORIGINAL

18N

No. 268177

Not Responsive

[redacted]

CONSTRUCTION DETAILS

Casing diameter 5 5/8 Length of casing 110

Type of screen ..... Length of screen .....

Type of pump .....

Capacity of pump .....

Depth of pump setting .....

Date of completion .....

BAILING OR PUMPING TEST

Pumping rate 3 G.P.M. Duration of test ..... hrs.

Drawdown 20 ft. Date Mar 23-63

Developed capacity 180

Static level—depth to water 80 ft.

Pump installed by .....

WELL LOG

Formations Sandstone, shale, limestone, gravel and clay	From	To
R CLAY	0 Feet	10 Ft.
B CLAY	10	45
SAND	45	48
B CLAY	48	107
GRAVEL	107	110

SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.

Not Responsive

[redacted]

Drilling Firm .....

Address .....

Date March 23-63

Signed John Brenner

208

WELL LOG AND DRILLING REPORT

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
Fountain Square
Columbus, Ohio 43224

NO CARBON PAPER NECESSARY– SELF-TRANSCRIBING

ORIGINAL

511795

Not Responsive

[redacted]

CONSTRUCTION DETAILS

Casing diameter 6 1/4" Length of casing 61

Type of screen _____ Length of screen _____

Type of pump _____

Capacity of pump _____

Depth of pump setting _____

Date of completion _____

BAILING OR PUMPING TEST
(specify one by circling)

Test rate 20 gpm Duration of test 1 hrs

Drawdown No Drawdown Date November 5, 1977

Static level (depth to water) 42 Ft ft

Quality (clear, cloudy, taste, odor) Clear

Pump installed by Others

WELL LOG*

Formations: sandstone, shale, limestone, gravel, clay	From	To
Top Soil	0 ft	3 ft
Dry Gravel	3	30
Hard Pan	30	55
Water Gravel	55	60
Hard Pan		60
	5513	

SKETCH SHOWING LOCATION

Locate in reference to numbered state highways, street intersections, county roads, etc.

N

Not Responsive

[redacted]

DRILLING FIRM Scott Well Drilling Co DATE November 5, 1977

ADDRESS 5859 Brantford Road, 45414 SIGNED Mrs. O. L. Scott

890-5771

*If additional space is needed to complete well log, use next consecutive numbered form.

202

WELL LOG AND DRILLING REPORT

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
Fountain Square
Columbus, Ohio 43224

NO CARBON PAPER NECESSARY— SELF-TRANSCRIBING

17F

593769

Not Responsive

[redacted]

CONSTRUCTION DETAILS

Casing diameter 4" Length of casing 19½'
Type of screen PVC Length of screen 6'
Type of pump
Capacity of pump
Depth of pump setting
Date of completion June 1981

BAILING OR PUMPING TEST
(specify one by circling)

Test rate N.A. gpm Duration of test hrs
Drawdown ft Date
Static level (depth to water) ft
Quality (clear, cloudy, taste, odor)
Pump installed by

WELL LOG* WELL #3

Formations: sandstone, shale, limestone, gravel, clay	From	To
Top Soil	0 ft	5 ft
Sand	5	15
Sand and Gravel	15	25
Clay	25	30

6412

SKETCH SHOWING LOCATION

Locate in reference to numbered state highways, street intersections, county roads, etc.

N

Not Responsive

[redacted]

DRILLING FIRM MOODY'S OF DAYTON, INC. DATE SEPTEMBER 30, 1981
ADDRESS P.O. BOX 123, MIAMISBURG, OH. 45342 SIGNED [signature]

*If additional space is needed to complete well log, use next consecutive numbered form.

ORIGINAL COPY - ODNR, DIVISION OF WATER, FOUNTAIN SQ., COLS., OHIO 43224

249

DNR 7802.05e

WELL LOG AND DRILLING REPORT

Ohio Department of Natural Resources
Division of Water, 2045 Morse Road, Columbus, Ohio 43229-6605
Voice (614) 265-6740 Fax (614) 265-6767

Well Log Number: 2040343

Page 1 of 1 for this record.

WELL LOCATION

County: MONTGOMERY Township: JEFFERSON

Owner/Builder: RIJAS SITE

Address of Well Location: 4634 INFIRMARY RD

City: WEST CARROLLTON Zip Code +4: 45342

Permit No.: MW-14 Section: 26 and/or Lot No.:

Use of Well: MONITOR

Coordinates of Well (Use only one of the below coordinate systems)

State Plane Coordinates

N ☐ X _____ +/- _____ ft.

S ☐ Y _____ +/- _____ ft.

Latitude, Longitude Coordinates

Latitude: 39.679242 Longitude: -84.272811

Elevation of Well in feet: _____ +/- _____ ft.

Datum Plane: ☐ NAD27 ☒ NAD83 Elevation Source: _____

Source of Coordinates: MAP-OTHERS

Well location written description:

Comments on water quality/quantity and well construction:

WELL TEST *

Pre-Pumping Static Level 27.7 ft. Date 8/24/2012

Measured from GROUND LEVEL

Pumping test method _____

Test Rate _____ gpm Duration of Test _____ hrs.

Feet of Drawdown _____ ft. Sustainable Yield _____ gpm

*(Attach a copy of the pumping test record, per section 1521.05, ORC)

Is Copy Attached? ☐ Yes ☒ No Flowing Well? ☐ Yes ☒ No

PUMP/PITLESS

Type of pump _____ Capacity _____ gpm

Pump set at _____ ft. Pitless Type _____

Pump installed by _____

I hereby certify the information given is accurate and correct to the best of my knowledge.

Drilling Firm: BOWSER-MORNER,DAYTON

Address: 4518 TAYLORSVILLE RD

City, State, Zip: DAYTON OH 45401

Signed: TIM AUGUSTINE (Filed Electronically) Date: 10/23/2012

ODH Registration Number: 003256

CONSTRUCTION DETAILS

Drilling Method: AUGER

BOREHOLE/CASING (Measured from ground surface)

1 Borehole Diameter 8 inches Depth 35 ft.
Casing Diameter 2 in. Length 28 ft. Thickness 0.154 in.

2 Borehole Diameter _____ inches Depth _____ ft.
Casing Diameter _____ in. Length _____ ft. Thickness _____ in.

Casing Height Above Ground 3 ft.

Type 1: PVC
Type 2: _____

Joints 1: Threaded
Joints 2: _____

SCREEN

Diameter 2 in. Slot Size 0.01 in. Screen Length 10 ft.

Type MACHINE SLOTTED Material PVC

Set Between 35 ft. and 25 ft.

GRAVEL PACK (Filter Pack)

Material/Size global #5 Vol/Wt. Used 200#

Method of Installation Poured (gravity)

Depth: Placed From: 35 ft. To: 22 ft.

GROUT

Material Bentonite pellets/chunks Vol/Wt. Used 500#

Method of Installation Poured (gravity)

Depth: Placed From: 22 ft. To: 3 ft.

DRILLING LOG*

FORMATIONS INCLUDE DEPTH(S) AT WHICH WATER IS ENCOUNTERED.

Color	Texture	Formation	From	To
BROWN	DRY	CLAY	0	2
BROWN	DAMP	CLAYSANDGRAVEL	2	5
GRAY-BROWN	COARSE/GRAVELLY	SAND	5	35

Aquifer Type (Formation producing the most water.) SAND

Date of Well Completion 8/24/2012 Total Depth of Well 35 ft.

Completion of this form is required by section 1521.05, Ohio Revised Code - file within 30 days after completion of drilling.
Distribute copies of this record to Customer, and Local Health Deptartment.

DNR 7802.05e

WELL LOG AND DRILLING REPORT

Ohio Department of Natural Resources
Division of Water, 2045 Morse Road, Columbus, Ohio 43229-6605
Voice (614) 265-6740 Fax (614) 265-6767

Well Log Number: 2040344

Page 1 of 1 for this record.

WELL LOCATION

County: MONTGOMERY Township: JEFFERSON

Owner/Builder: RIJAS SITE

Address of Well Location: 4634 INFIRMARY RD

City: WEST CARROLLTON Zip Code +4: 45342

Permit No.: MW-13 Section: 26 and/or Lot No.:

Use of Well: MONITOR

Coordinates of Well (Use only one of the below coordinate systems)

State Plane Coordinates

N ☐ X _____ +/- _____ ft.

S ☐ Y _____ +/- _____ ft.

Latitude, Longitude Coordinates

Latitude: 39.679192 Longitude: -84.272822

Elevation of Well in feet: _____ +/- _____ ft.

Datum Plane: ☐ NAD27 ☒ NAD83 Elevation Source _____

Source of Coordinates: MAP-OTHERS

Well location written description:

Comments on water quality/quantity and well construction:

WELL TEST *

Pre-Pumping Static Level 27.5 ft. Date 8/24/2012

Measured from GROUND LEVEL

Pumping test method _____

Test Rate _____ gpm Duration of Test _____ hrs.

Feet of Drawdown _____ ft. Sustainable Yield _____ gpm

*(Attach a copy of the pumping test record, per section 1521.05, ORC)

Is Copy Attached? ☐ Yes ☒ No Flowing Well? ☐ Yes ☒ No

PUMP/PITLESS

Type of pump _____ Capacity _____ gpm

Pump set at _____ ft. Pitless Type _____

Pump installed by _____

I hereby certify the information given is accurate and correct to the best of my knowledge.

Drilling Firm: BOWSER-MORNER,DAYTON

Address: 4518 TAYLORSVILLE RD

City, State, Zip: DAYTON OH 45401

Signed: TIM AUGUSTINE Date: 10/23/2012

(Filed Electronically)

ODH Registration Number: 003256

CONSTRUCTION DETAILS

Drilling Method: AUGER

BOREHOLE/CASING (Measured from ground surface)

1 Borehole Diameter 8 inches Depth 35 ft.
Casing Diameter 2 in. Length 28 ft. Thickness 0.154 in.

2 Borehole Diameter _____ inches Depth _____ ft.
Casing Diameter _____ in. Length _____ ft. Thickness _____ in.

Casing Height Above Ground 3 ft.

Type 1: PVC
Type 2: _____

Joints 1: Threaded
Joints 2: _____

SCREEN

Diameter 2 in. Slot Size 0.01 in. Screen Length 10 ft.

Type MACHINE SLOTTED Material PVC

Set Between 35 ft. and 25 ft.

GRAVEL PACK (Filter Pack)

Material/Size global #5 Vol/Wt. Used 200#

Method of Installation Poured (gravity)

Depth: Placed From: 35 ft. To: 22 ft.

GROUT

Material Bentonite pellets/chunks Vol/Wt. Used 500#

Method of Installation Poured (gravity)

Depth: Placed From: 22 ft. To: 3 ft.

DRILLING LOG*

FORMATIONS INCLUDE DEPTH(S) AT WHICH WATER IS ENCOUNTERED.

Color	Texture	Formation	From	To
BROWN	DRY	CLAY	0	0.8
BLACK	SILTY	CLAY	0.8	1.3
BROWN	COBBLE	CLAY	1.3	2
BROWN	DAMP	CLAY	2	3
GRAY-BROWN	COARSE/GRAVELLY	SAND	3	4
GRAY	GRAVELLY	CLAY	4	4.5
GRAY-BROWN	GRAVELLY	SAND	4.5	35

Aquifer Type (Formation producing the most water.) SAND

Date of Well Completion 8/24/2012 Total Depth of Well 35 ft.

Completion of this form is required by section 1521.05, Ohio Revised Code - file within 30 days after completion of drilling.
Distribute copies of this record to Customer, and Local Health Deptartment.

APPENDIX D

Metcalf & Eddy Site Plan, Sample Locations, and Cross-Sections

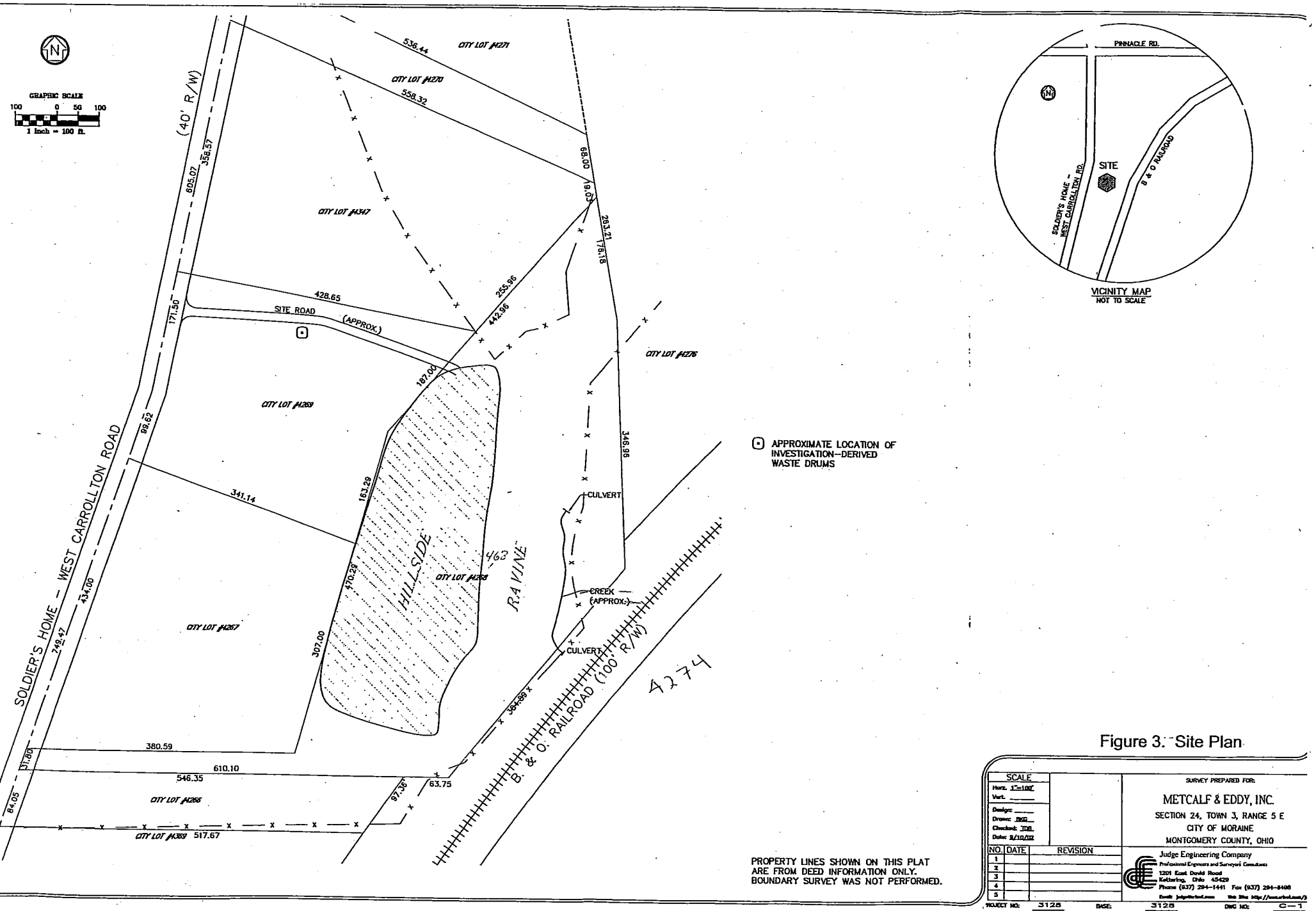
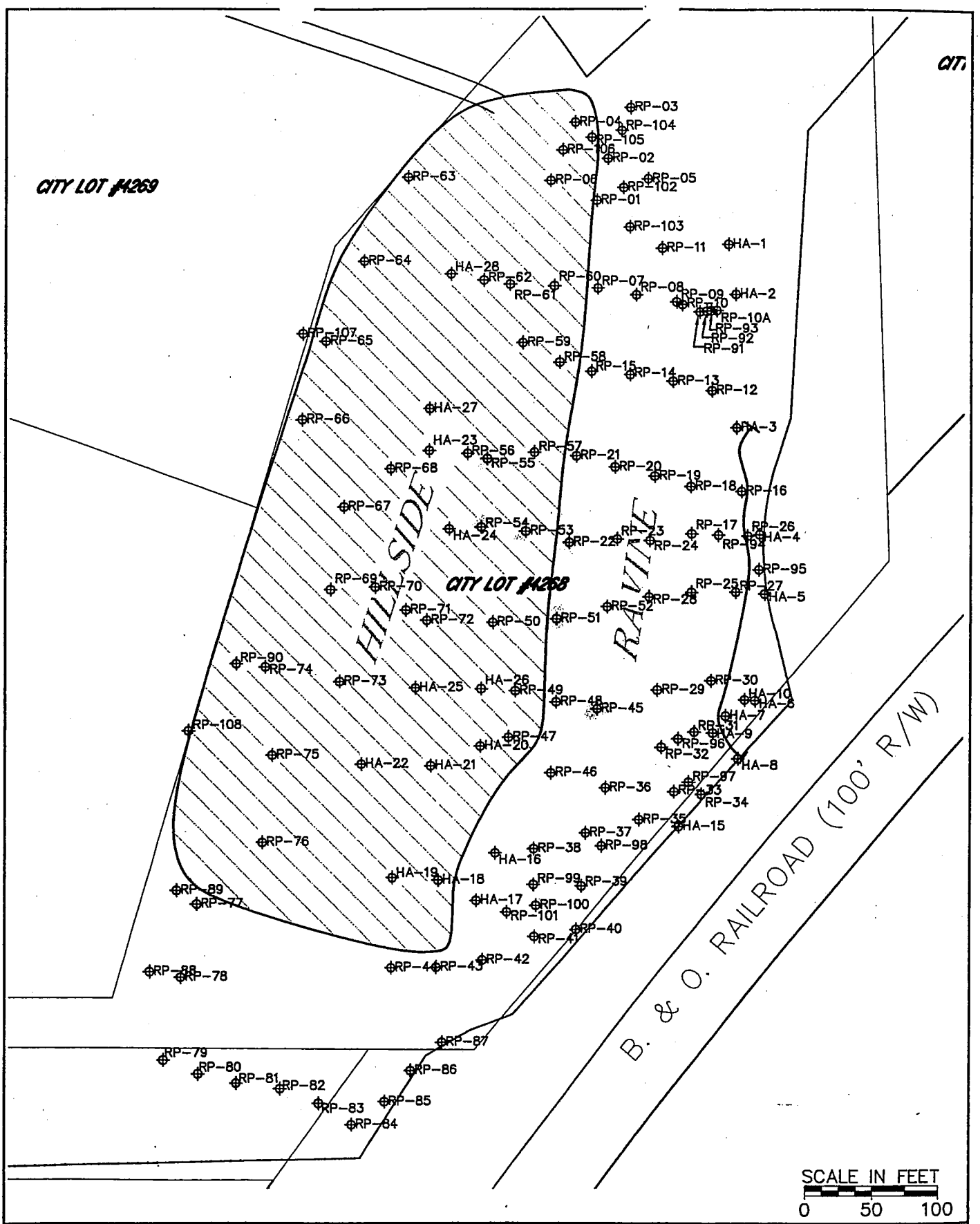


Figure 3: Site Plan



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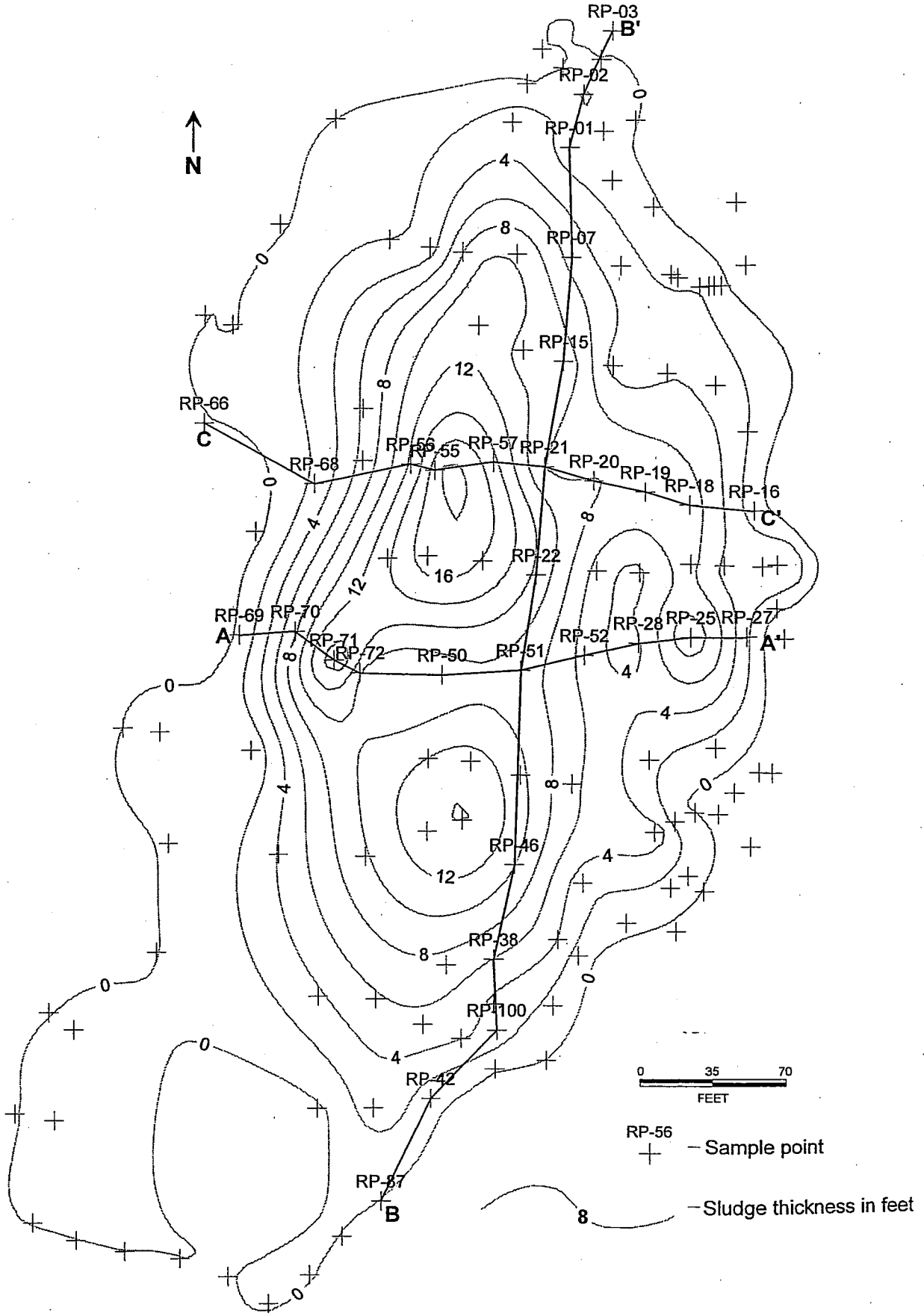
M&E Metcalf & Eddy	FRASER PAPERS LOCATIONS OF SAMPLING POINTS MORAINE, OHIO	Project Number –	
		File Name 3128	Figure 4

FRASER PAPERS, MORAINE, OHIO
RENDERING PLANT FIELD SCREENING INVESTIGATION

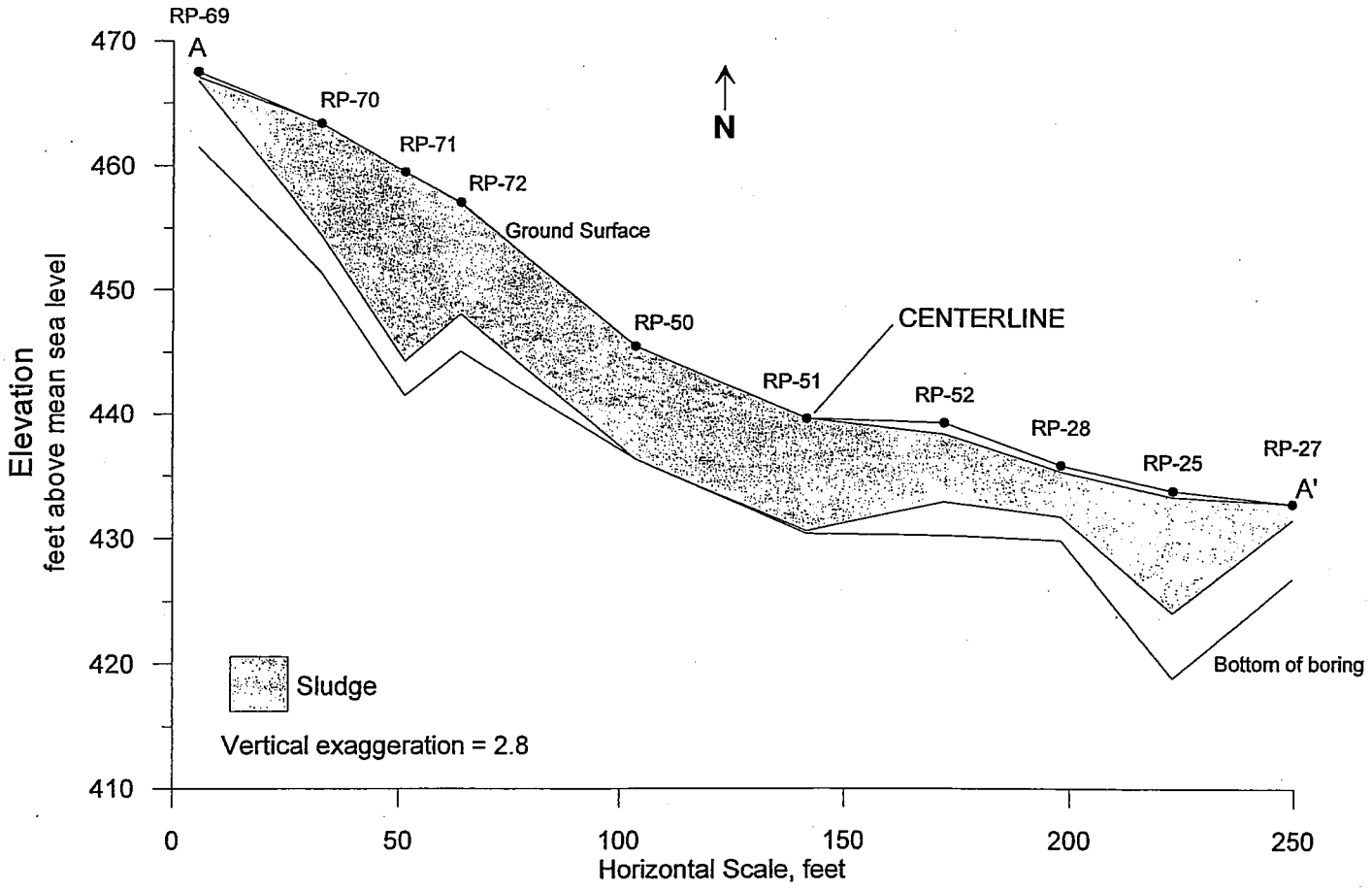
Figure 5. Sludge Thickness Isopachs and Profile Locations



FRASER PAPERS, MORAINE, OHIO
RENDERING PLANT FIELD SCREENING INVESTIGATION

Fig. 6 - 1

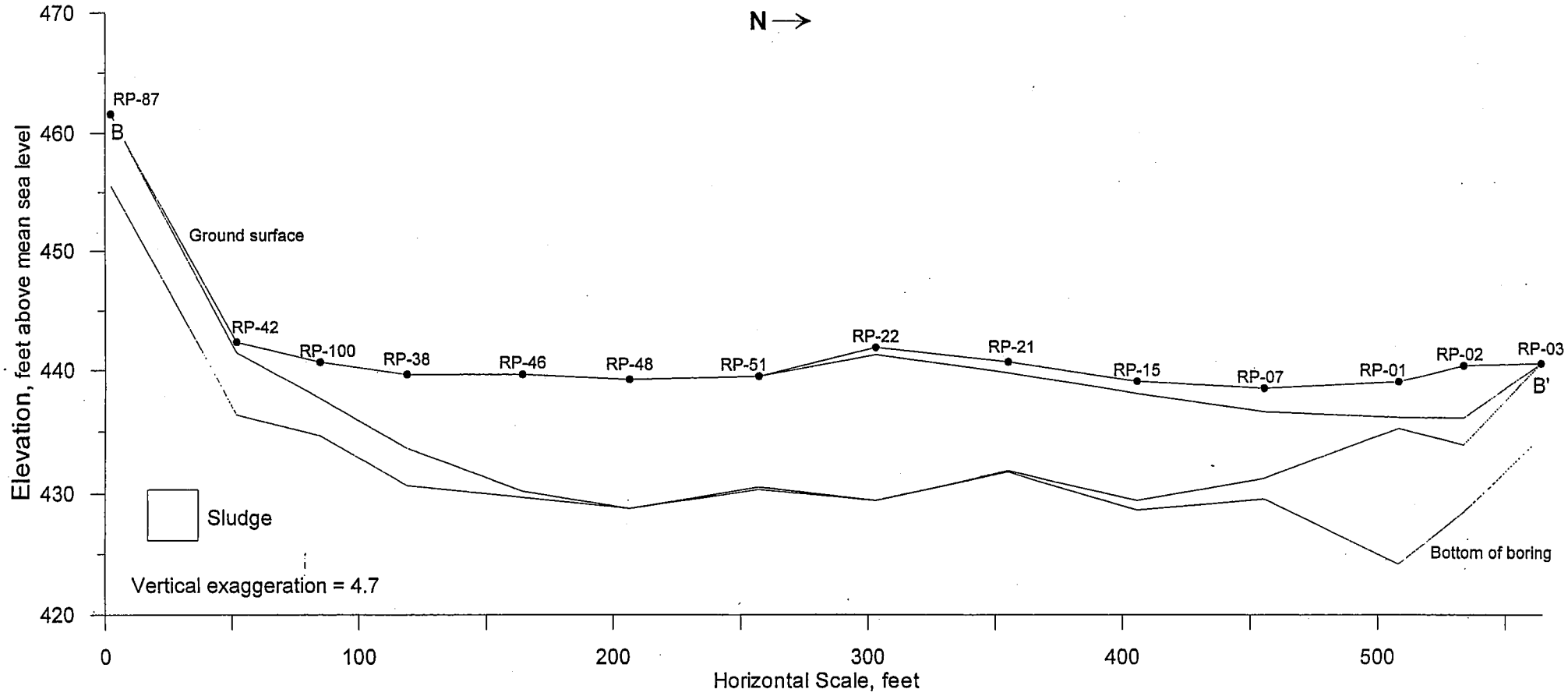
Profile A - A'



FRASER PAPERS, MORAINE, OHIO
RENDERING PLANT FIELD SCREENING INVESTIGATION

Fig. 6 - 2

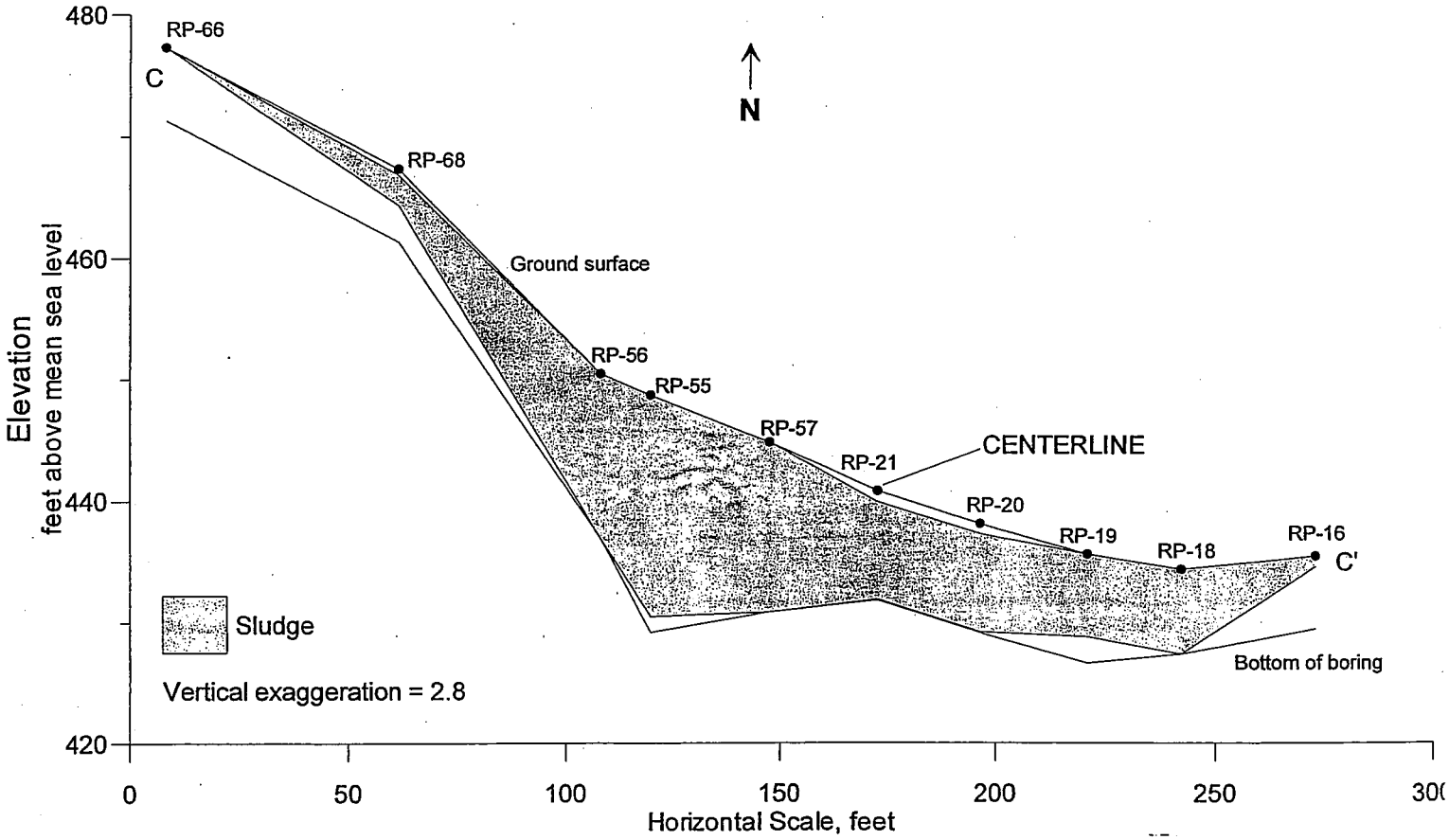
Profile B - B'
(along Site centerline)



FRASER PAPERS, MORAINE, OHIO
RENDERING PLANT FIELD SCREENING INVESTIGATION

Fig. 6 - 3

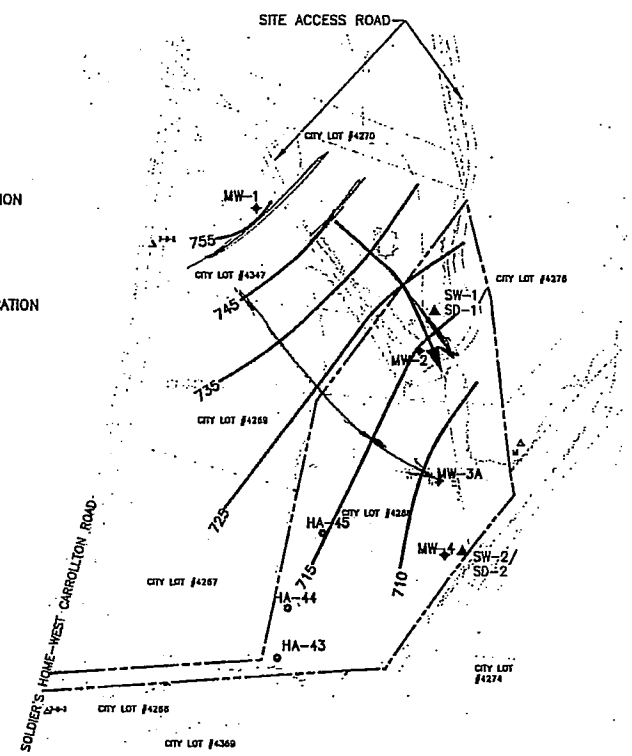
Profile C - C'



P:\PROJ\Fraser Paper\Rendering Plant\Phase II sampling and reporting\SAMPLE LOCS.dwg, 4268, 2/13/2004 11:30:30 AM

LEGEND

- MW-4 — GROUNDWATER MONITORING WELL LOCATION
- HA-34 — HAND AUGER LOCATION
- 7-B-3 — GROUND CONTROL POINT
- SURFACE WATER/SEDIMENT SAMPLE LOCATION
- 725 — POTENTIOMETRIC LINE
- FLOW LINE



NOTES:

1. BASE MAP TAKEN FROM MALCOLM PIRNIE, INC. DRAWING NO. 3730C015, DATED MARCH, 2002.
2. GRID SYSTEM SHOWN AS LOCAL GRID, SEE TABLE.
3. ELEVATIONS ARE REFERENCED TO MEAN SEA LEVEL.

LOCATION	NORTH	EAST	TPVC ELEVATION	GROUND ELEVATION
MW-1	6853.00	6309.98	776.01	772.82
MW-2	6602.12	6598.86	723.97	720.82
MW-3	6372.83	6619.81	718.80	715.96
MW-3A	N/A	N/A	N/A	N/A
MW-4	6240.67	6642.90	777.58	714.62

GROUND CONTROL COORDINATES

GROUND CONTROL POINT	NORTH	EAST	TOP OF POINT ELEV.	DESCRIPTION
4	7682.19	9017.03	792.15	IRON PIN
5	7599.20	8773.99	792.65	IRON PIN
6	7575.80	8374.67	791.15	IRON PIN
7	7433.33	8110.86	787.26	IRON PIN
7-A	7973.55	6835.04	777.58	IRON PIN
7-B	7903.09	6117.98	775.97	RAILROAD SPIKE
7-C	9094.94	5906.65	773.63	CONCRETE MONUMENT
7-D	9215.24	6185.03	787.06	IRON PIN
7-E	9337.43	6693.51	786.98	IRON PIN
7-F	9428.39	7544.94	796.57	IRON PIN
7-G	9532.88	8954.34	799.60	IRON PIN
7-B-1	7325.83	6195.81	777.56	IRON PIN
7-B-2	6789.06	6126.89	763.69	RAILROAD SPIKE
7-B-3	5981.88	5938.43	745.33	IRON PIN
10	6440.17	6777.33	756.32	IRON PIN

SCALE IN FEET
0 100 200

M&E Metcalf & Eddy

MORAINE PROPERTIES, LLC

SAMPLE LOCATIONS
CITY LOT # 4268

FILE NAME	DATE	PROJECT NO.	FIGURE
SAMPLE 4274	01/22/04	204193.1.1	2

APPENDIX E

Soil Boring Logs

METCALF & EDDY, INC.
ENGINEERS

GEOLOGIC LOG

Metcalf & Eddy

PROJECT: Moraine Properties		SHEET 1 OF 2	BORING NO: SB-1 / MW-1
SITE LOCATION: Soldier's Home - West Carrollton Road Moraine, Ohio	JOB NO. 036204193.0001.00001	GROUND ELEV: 772.8 / TOTAL DEPTH: 32.7	START: 1/8/2004
	LOCATION: Along haul road near site entrance		FINISH: 1/9/2004
DRILLING COMPANY: Midwest Environmental Drilling		DRILL RIG: CME 450 track-mounted	
DRILLER(S): Wayne Stephens & Michael Persons		METHOD: Hollow stems	
GEOLOGIST: D. Mark Jones		AUGER SIZE: 4 1/4"	
WATER ZONE ENCOUNTERED: yes	STATIC WATER LEVEL 18.43' BTOC		

DEPTH	TYPE AND NO.	SAMPLE DEPTH	SAMPLE RECOVERY	BLOW COUNT OR DRILLING TIME:	RECOVERY OR RQD:	SAMPLE DESCRIPTION	Sample Time or Other Notes
	SS-1	0.0-2.0	0.6 2.0	3-5- 5-4	30%	0.0-2.0: Firm brown silty clay, trace fine to coarse sand, trace fine gravel, moist.	Time: 1510 PID: 0.6 ppm
2	SS-2	2.0-4.0	1.4 2.0	3-5- 7-5	70%	2.0-4.0: Soft brown clayey silt, little fine to coarse sand, trace fine gravel, sand and gravel increasing with depth, moist.	Time: 0:00 PID: 0.6 ppm
4	SS-3	4.0-6.0	1.1 2.0	3-3- 5-5	55%	4.0-4.5: Loose brown sand and gravel, moist. 4.5-6.0: Firm brown and orange clayey silt, trace fine to coarse sand, moist.	Time: 1521 PID: 0.0 ppm
6	SS-4	6.0-8.0	1.8 2.0	4-5- 5-7	90%	6.0-8.0: Firm brown clayey silt, trace fine to coarse sand, moist.	Time: 1526 PID: 0.6 ppm
8	SS-5	8.0-10.0	1.0 2.0	2-2- 3-7	50%	8.0-8.7: Loose brown fine sand and silt, moist. 8.7-10.0: Firm brown clayey silt, trace fine to coarse sand, moist.	Time: 1536 PID: 1.1 ppm
10	SS-6	10.0-12.0	1.1 2.0	5-12- 18-20	55%	10.0-12.0: Dense brown fine sand, moist.	Time: 1541 PID: 0.6 ppm
12	SS-7	12.0-14..0	1.2 2.0	10-12- 20-25	60%	12.0-14.0: Medium-dense to dense brown fine to coarse sand and fine to coarse gravel, trace silt, dry to slightly moist.	Time: 1552 PID: 1.7 ppm
14	SS-8	14.0-16.0	1.5 2.0	12-22- 26-25	75%	14.0-16.0: Same as above, becoming moist.	Time: 1556 PID: 1.7 ppm
16	SS-9	16.0-18.0	1.2 2.0	10-20- 15-18	60%	16.0-18.0: Same as above, wet. Drilling ended for the day.	Time: 1610 PID: 1.1 ppm
18	SS-10	18.0-20.0	1.7 2.0	5-5- 9-11	85%	18.0-20.0: Firm brown clayey silt, little-some fine to coarse sand, trace fine gravel, moist.	Time: 0844 --
20	SS-11	20.0-22.0	2.0 2.0	4-6- 11-11	100%	20.0-22.0: Same as above.	Time: 0853 --

SAMPLE TYPES:
SS - SPLIT SPOON, ST - SHELBY TUBE, R - ROCK CORE, O - OTHER, CS - CONTINUOUS SAMPLES

NOTES:
Boring begun on 1-8-04, completed on 1-9-04.

METCALF & EDDY, INC.
ENGINEERS

GEOLOGIC LOG

Metcalf & Eddy

PROJECT: Moraine Properties		SHEET 1 OF 1	BORING NO: SB-2 / MW-2
SITE LOCATION: Soldier's Home - West Carrollton Road Moraine, Ohio	JOB NO. 036204193.0001.00001	GROUND ELEV: 720.8	TOTAL DEPTH: 20.0
	LOCATION: At bottom of hill, near ditch.	START: 1/8/2004	FINISH: 1/8/2004
DRILLING COMPANY: Midwest Environmental Drilling		DRILL RIG: CME 450 track-mounted	
DRILLER(S): Wayne Stephens & Michael Persons		METHOD: Hollow stems	
GEOLOGIST: D. Mark Jones		AUGER SIZE: 4 1/4"	
WATER ZONE ENCOUNTERED: yes	STATIC WATER LEVEL 9.23' BTOC		

DEPTH	TYPE AND NO.	SAMPLE DEPTH	SAMPLE RECOVERY	BLOW COUNT OR DRILLING TIME	RECOVERY OR RQD	SAMPLE DESCRIPTION	Sample Time or Other Notes
2	SS-1	0.0-2.0	1.9 / 2.0	15-9- / 9-7	95%	0.0-2.0: Firm to hard brown-gray clayey silt, little fine to coarse sand, trace fine gravel, dry (fill).	Time: 0941
4	SS-2	2.0-4.0	0.5 / 2.0	4-4- / 3-4	25%	2.0-4.0: Firm brown-gray clayey silt, little fine to coarse sand, slightly moist (fill).	Time: 0946
6	SS-3	4.0-6.0	1.4 / 2.0	3-2- / 2-3	70%	4.0-6.0: Firm gray clayey silt, little fine to coarse sand, moist, becoming softer with depth (fill).	Time: 0951
8	SS-4	6.0-8.0	0.5 / 2.0	2-2- / 3-3	25%	6.0-6.4: Same as above. 6.4-8.0: Loose black sand, gravel, and fragments of slag-like material, wet (fill).	Time: 1000
10	SS-5	8.0-10.0	1.9 / 2.0	2-1- / 2-2	95%	8.0-8.7: Soft black clayey fill, peat-like, with glass fragments, moist (fill). 8.7-10.0: Soft brown-gray silt, little clay, trace to little fine to medium sand, moist.	Time: 1006
12	SS-6	10.0-12.0	1.0 / 2.0	2-7- / 10-12	50%	10.0-12.0: Loose coarse sand and fine to coarse gravel, occasional cobbles, trace to little clay, wet.	Time: 1010
14	SS-7	12.0-14..0	0.6 / 2.0	3-6- / 8-10	30%	12.0-14.0: Loose fine to coarse sand, little fine to coarse gravel, trace silt, wet.	Time: 1018
16	SS-8	14.0-16.0	1.2 / 2.0	4-9- / 11-15	60%	14.0-16.0: Dense gray fine to coarse sand and fine to coarse gravel, trace silt, wet. Driller reports sands heaving to about 1.5' depth.	Time: 1027
18						Augers advanced to 16.0' and well set. Screen (PVC, 0.010 slot, 2-inch dia.) set from 16.0 - 6.0 feet. Riser (PVC, Sch. 40, 2-inch dia.) from 6.0 - surface. Sand pack from 16.0 - 4.0 feet. Bentonite (coated pellets) from 4.0 - 2.0 feet. Concrete from 2.0 - surface, finished with stick-up protective casing.	
20							

SAMPLE TYPES
SS - SPLIT SPOON, ST - SHELBY TUBE, R - ROCK CORE,
O - OTHER, CS - CONTINUOUS SAMPLES

NOTES:

METCALF & EDDY, INC.
ENGINEERS

GEOLOGIC LOG

M&E Metcalf & Eddy

PROJECT: Moraine Properties		SHEET 1 OF 1	BORING NO: SB-3 / MW-3
SITE LOCATION: Soldier's Home - West Carrollton Road, Moraine, Ohio	JOB NO. 036204193.0001.00001	GROUND ELEV: 715.9 / TOTAL DEPTH: 16.9	START: 1/6/2004
	LOCATION: At bottom of ravine		FINISH: 1/6/2004
DRILLING COMPANY: Midwest Environmental Drilling		DRILL RIG: CME 450 track-mounted	
DRILLER(S): Wayne Stephens & Michael Persons		METHOD: Hollow stems	
GEOLOGIST: D. Mark Jones		AUGER SIZE: 4 1/4"	
WATER ZONE ENCOUNTERED: yes	STATIC WATER LEVEL 10.30' BTOC		

DEPTH	TYPE AND NO.	SAMPLE DEPTH	SAMPLE RECOVERY	BLOW COUNT OR DRILLING TIME	RECOVERY OR RQD	SAMPLE DESCRIPTION	Sample Time or Other Notes
2	SS-1	0.0-2.0	1.0 2.0	1-1- 3-3	50%	0.0-2.0: Firm brown-gray clay, slightly moist (paper sludge material).	Time: 1350 PID: 4.1 ppm
4	SS-2	2.0-4.0	0.5 2.0	1-1- 4-3	25%	2.0-4.0: Firm blue-gray clay, slightly moist, iron-stained (sludge).	Time: 1358 PID: 3.6 ppm
6	SS-3	4.0-6.0	1.7 2.0	1-1- 3-4	85%	4.0-6.0: Same as above, becoming light gray about 4.6', with vein-like zones of iron-stained seepage.	Time: 1401 PID: 2.4 ppm
8	SS-4	6.0-8.0	0.2 2.0	Weight of tools over 2'	10%	6.0-8.0: Soft gray clay, slightly moist (sludge).	Time: 1407 PID: 4.1 ppm
10	SS-5	8.0-10.0	0.9 2.0	20-3- 3-5	45%	8.0-10.0: Concrete fill material grading to firm brown and black clayey silt, little fine to coarse sand, wet.	Time: 1416 PID: 4.1 ppm
12	SS-6	10.0-12.0	0.7 2.0	3-5- 6-6	35%	10.0-12.0: Loose fine to coarse sand and fine to coarse gravel, wet, occasional cobbles, wet.	Time: 1422 PID: 2.4 ppm
14	SS-7	12.0-14.0	0.6 2.0	7-10- 4-4	30%	12.0-14.0: Loose fine to coarse sand, trace fine to coarse gravel, little clay, moist to wet, occasional cobbles.	Time: PID: 1.3 ppm
16	SS-8	14.0-15.0	0.8 1.0	3-20 --	80%	14.0-15.0: Loose fine to coarse sand and fine to coarse gravel, cobbles, wet.	Time: 1437 PID: not meas.
18						Augers advanced to 15.0' and well set. Screen (PVC, 0.010 slot, 2-inch dia.) set from 15.0 - 5.0 feet. Riser (PVC, Sch. 40, 2-inch dia.) from 5.0 - surface. Sand pack from 15.0 - 4.0 feet. Bentonite (coated pellets) from 4.0 - 3.0 feet. Concrete from 2.0 - surface, finished with stick-up protective casing.	
20							

SAMPLE TYPES:
SS - SPLIT SPOON, ST - SHELBY TUBE, R - ROCK CORE, O - OTHER, CS - CONTINUOUS SAMPLES

NOTES:

METCALF & EDDY, INC.
ENGINEERS

GEOLOGIC LOG

Metcalf & Eddy

PROJECT: Moraine Properties		**SHEET** 1 **OF** 1	**BORING NO:** SB-3A/MW-3A
SITE LOCATION: Soldier's Home - West Carrollton Road Moraine, Ohio	**JOB NO.** 036204193.0001.00001	**GROUND ELEV:**	**TOTAL DEPTH:** 16.0
	LOCATION: At bottom of ravine		**START:** 2/3/2004
			FINISH: 2/4/2004
DRILLING COMPANY: Bowser-Morner		**DRILL RIG:** CME 450 track-mounted	
DRILLER(S): James Walsh, John Davis, Josh Dean		**METHOD:** Hollow stems	
GEOLOGIST: D. Mark Jones		**AUGER SIZE:** 8 1/4" (0.0'-8.0') and 4 1/4" (8.0'-16.0')	
WATER ZONE ENCOUNTERED: yes	**STATIC WATER LEVEL** 9.78' (in PVC)		

DEPTH	TYPE AND NO.	SAMPLE DEPTH	SAMPLE RECOVERY	BLOW COUNT or DRILLING TIME:	RECOVERY OR RQD:	SAMPLE DESCRIPTION	Sample Time or Other Notes
	SS-1	0.0-2.0	0.6 / 2.0	3-2- / 3-2	30%	0.0-2.0: Firm light blue-gray clay (paper sludge material), moist.	Time: 1045
2	SS-2	2.0-4.0	1.4 / 2.0	2-2- / 2-3	70%	2.0-3.0: Same as above. 3.0-4.0: Firm light gray clay, dry, iron-stained.	Time: 1053
4	SS-3	4.0-6.0	1.8 / 2.0	2-2- / 3-50	90%	4.0-5.8: Firm light gray clay, becoming soft and blue-gray with depth, strong septic odor. Spoon was difficult to drive from ~5.5'-6.0', but nothing hard was found in spoon except small piece of concrete. 5.8-6.0: Firm dark brown clayey silt, moist.	Time: 1058
6	SS-4	6.0-8.0	0.0 / 2.0	2-2- / 2-2-	0%	6.0-8.0: No recovery (spoon driven without advancing augers).	Time:
8	SS-5	8.0-10.0	1.3 / 2.0	3-5- / 8-12	65%	8.0-10.0: Loose brown and gray sand and fine to coarse gravel, trace clay, wet. (Spoon driven without advancing augers.) *12" diameter steel casing set to 8.0' and grouted in place. Grout allowed to set overnight before resuming drilling.*	Time:
10	SS-6	10.0-12.0	1.0 / 2.0	4-7- / 10-11	50%	10.0-12.0: Loose blue and gray sand and fine to coarse gravel, trace clay, wet, occasional cobbles.	Time: 0928
12	SS-7	12.0-14.0	1.6 / 2.0	7-8- / 14-16	80%	12.4-14.0: Medium dense brown sand and fine to coarse gravel, wet.	Time: 0937
14	SS-8	14.0-15.0	1.9 / 2.0	7-9- / 11-16	95%	14.0-15.5: Medium dense gray sand and fine gravel, wet. 15.5-16.0: Firm gray silty clay, trace fine to coarse ca, trace fine gravel, moist.	Time: 0941
16						Augers advanced to 16.0' and well set. Screen (PVC, 0.010 slot, 2-inch dia.) set from 16.0 - 11.0 feet. Riser (PVC, Sch. 40, 2-inch dia.) from 11.0 - surface. Steel casing (12" dia.) from 8.0 - surface; concrete pad placed around stick-up portion. Sand pack from 16.0 - 10.0 feet. Bentonite chips from 10.0 - 8.0 feet. Grout from 8.0 feet - surface. Finished with stick-up protective casing.	
18							
20							

SAMPLE TYPES
SS - SPLIT SPOON, ST - SHELBY TUBE, R - ROCK CORE, O - OTHER, CS - CONTINUOUS SAMPLES

NOTES: Drilling begun 2/3/04 with 8 1/4" augers; completed 2/4/04 with 4 1/4" augers.

METCALF & EDDY, INC.
ENGINEERS

GEOLOGIC LOG

M&E Metcalf & Eddy

PROJECT: Moraine Properties		SHEET 1 OF 1	BORING NO: SB-4 / MW-4
SITE LOCATION: Soldier's Home - West Carrollton Road, Moraine, Ohio	JOB NO. 036204193.0001.00001	GROUND ELEV: 717.9 / TOTAL DEPTH: 16.9	START: 1/6/2004
	LOCATION: At bottom of ravine, near RR tracks		FINISH: 1/6/2004
DRILLING COMPANY: Midwest Environmental Drilling		DRILL RIG: CME 450 track-mounted	
DRILLER(S): Wayne Stephens & Michael Persons		METHOD: Hollow stems	
GEOLOGIST: D. Mark Jones		AUGER SIZE: 4 1/4"	
WATER ZONE ENCOUNTERED: yes	STATIC WATER LEVEL 10.39' BTOC		

DEPTH	TYPE AND NO.	SAMPLE DEPTH	SAMPLE RECOVERY	BLOW COUNT OR DRILLING TIME:	RECOVERY OR RQD:	SAMPLE DESCRIPTION	Sample Time or Other Notes
	SS-1	0.0-2.0	0.6 / 2.0	1-3- / 5-5	30%	0.0-2.0: Firm brown silty clay, little fine to coarse sand, little fine gravel, moist.	Time: 1055 PID: 0.1 ppm
2	SS-2	2.0-2.6	0.4 / 0.6	3-50/3"	67%	2.0-2.4: Firm gray clay, moist (paper sludge material). 2.4-2.9: Concrete (remains of building foundation, logged from cuttings).	Time: 1106 PID: 0.7 ppm
4	SS-3	4.0-6.0	0.2 / 2.0	1-1- / 1-1	10%	2.9-6.0: Very loose mixed fill (brick, slag, concrete, etc.), wet.	Time: 1122 PID: 0.7 ppm
6	SS-4	6.0-8.0	0.3 / 2.0	2-2- / 1-1	15%	6.0-6.3: Same as above.	Time: 1126 PID: 0.7 ppm
8	SS-5	8.0-10.0	0.9 / 2.0	4-4- / 3-2	45%	6.3-8.6: Soft brown silty clay, trace to little fine sand, wet. 8.6-10.0: Loose brown fine sand, well-graded, wet.	Time: 1133 PID: not meas.
10	SS-6	10.0-12.0	1.0 / 2.0	3-3- / 1-1	50%	10.0-12.0: Very loose brown fine sand and clay, wet.	Time: 1143 PID: 0.1 ppm
12	SS-7	12.0-14.0	1.0 / 2.0	3-3- / 2-1	50%	12.0-13.7: Very loose brown fine to coarse sand and clay, some fine to coarse gravel, wet. 13.7-14.0: Firm gray clayey silt, some fine sand, moist.	Time: 1200 PID: 0.1 ppm
14						Augers advanced to 14.0' and well set. Screen (PVC, 0.010 slot, 2-inch dia.) set from 14.0 - 4.0 feet. Riser (PVC, Sch. 40, 2-inch dia.) from 4.0 - surface. Sand pack from 14.0 - ~ 3.5 feet. Bentonite (coated pellets) from 3.0 - 1.5 feet. Concrete from 1.5 - surface, finished with stick-up protective casing.	
16							
18							
20							

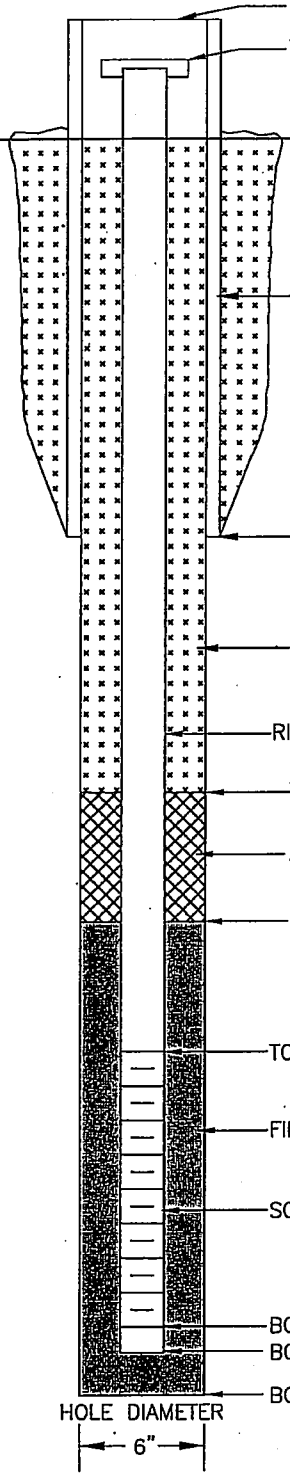
SAMPLE TYPES
SS - SPLIT SPOON, ST - SHELBY TUBE, R - ROCK CORE, O - OTHER, CS - CONTINUOUS SAMPLES

NOTES:

MONITORING WELL CONSTRUCTION	PROJECT: Moraine Properties JOB NO. 204193.1.1	WELL NO.: MW-1
DRILLING CONTRACTOR: Midwest Env. Drilling	COORDINATES:	

BEGUN: 1/8/04	SUPERVISOR: D. Mark Jones	WELL SITE:	WATER LEVEL:	DEPTH/ELEV.
FINISHED:1/9/04	DRILLER: Wayne Stephens	Near site road	STATIC	18.43/757.57

REFERENCE POINT & ELEVATION:



		DEPTH	ELEV.
TOP OF SURFACE CASING:			
TOP OF RISER CASING:			776.0
GROUND SURFACE:		0	772.8
SURFACE CASING	DIAMETER: 6" TYPE: Steel		
BOTTOM OF SURFACE CASING		~1.5	
BACKFILL:	TYPE: bentonite grout		
RISER CASING:	DIAMETER: 2" TYPE: Schedule 40 PVC		
TOP OF SEAL		15.5	
ANNULAR SEAL:	TYPE: bentonite pellets (coated)		
BOTTOM OF SEAL		17.5	
TOP OF SCREEN		19.5	
FILTER MATERIAL:	TYPE: silica sand		
SCREEN: DIAMETER: 2" OPENING WIDTH: (0.010)	TYPE: Schedule 40 TYPE: PVC		
BOTTOM OF SCREEN		29.5	
BOTTOM OF HOLE		29.5	
BOTTOM OF HOLE		29.5	

METHOD DRILLED: 4 1/4" hollow stem augers

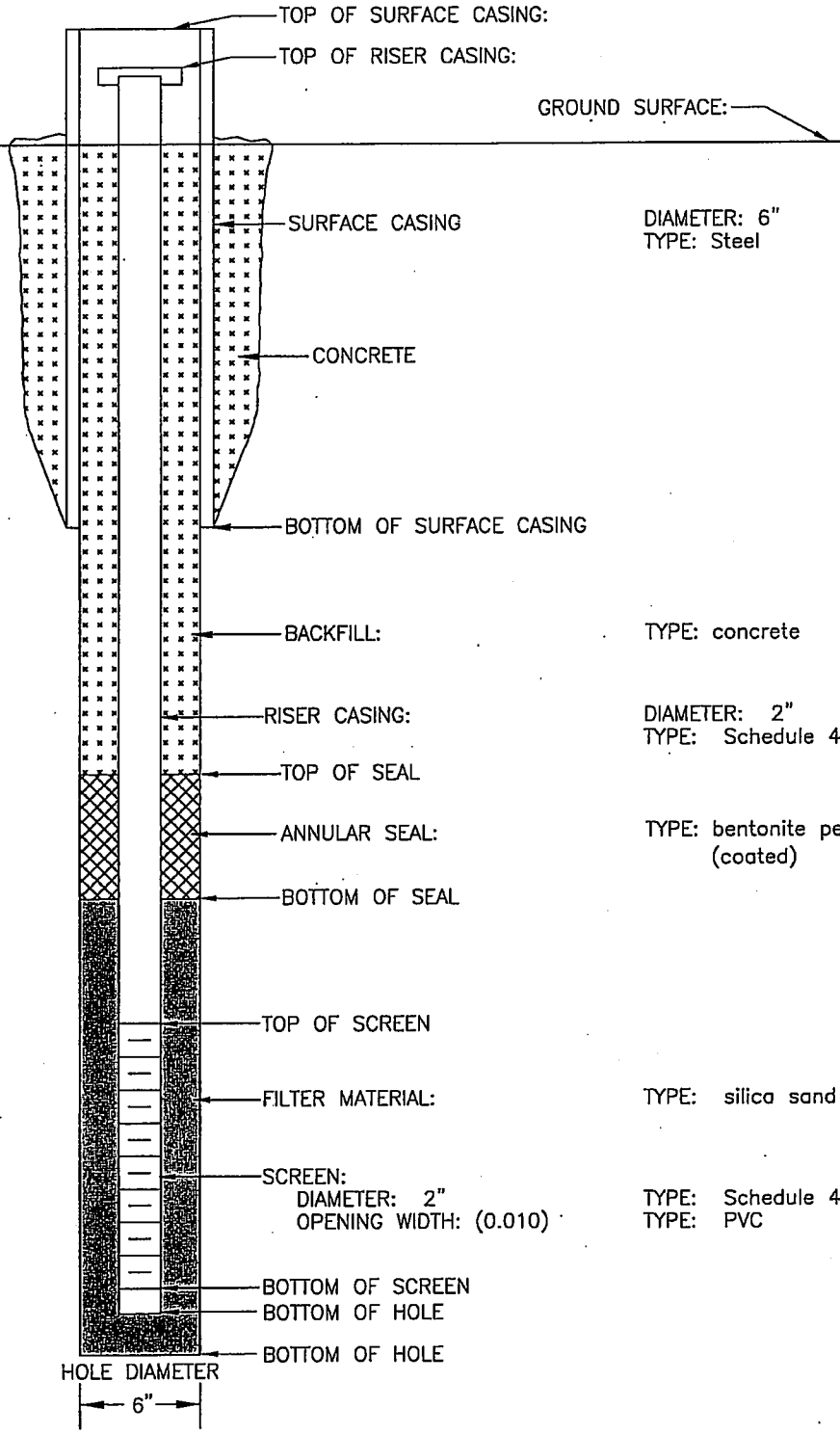
COMMENTS:

M&E
Metcalf & Eddy

MONITORING WELL CONSTRUCTION	PROJECT: Moraine Properties JOB NO. 204193.1.1	WELL NO.: MW-2
DRILLING CONTRACTOR: Midwest Env. Drilling	COORDINATES:	

BEGUN: 1/8/04	SUPERVISOR: D. Mark Jones	WELL SITE: At bottom of hill, near access road to landfill	WATER LEVEL:	DEPTH/ELEV.
FINISHED:1/8/04	DRILLER: Wayne Stephens		STATIC	9:23/714.67

REFERENCE POINT & ELEVATION:



DEPTH	ELEV.
	723.9
0	720.8
~1.5	
2.9	
4.9	
6.9	
16.9	
16.9	
16.9	

METHOD DRILLED: 4 1/4" hollow stem augers

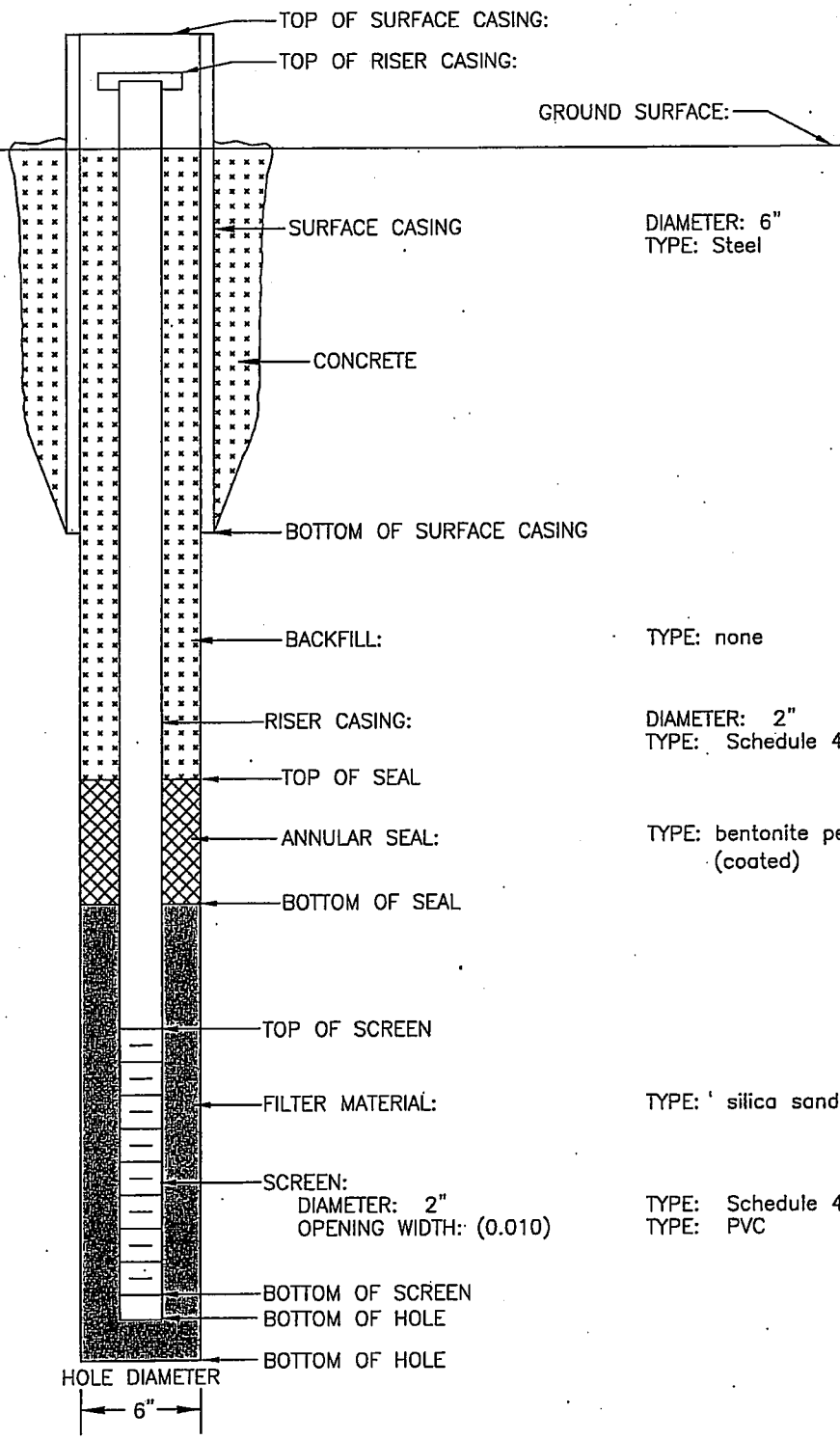
COMMENTS:
Sand pack includes ~1.5 feet of natural formation collapse.

M&E Metcalf & Eddy

MONITORING WELL CONSTRUCTION	PROJECT: Moraine Properties JOB NO. 204193.1.1	WELL NO.: MW-3
DRILLING CONTRACTOR: Midwest Env. Drilling	COORDINATES:	

BEGUN: 1/6/04	SUPERVISOR: D. Mark Jones	WELL SITE:	WATER LEVEL:	DEPTH/ELEV.
FINISHED:1/6/04	DRILLER: Wayne Stephens	At bottom of ravine	STATIC	10.30/708.5

REFERENCE POINT & ELEVATION:



	DEPTH	ELEV.
TOP OF SURFACE CASING:		
TOP OF RISER CASING:		718.8
GROUND SURFACE:	0	716.0
BOTTOM OF SURFACE CASING	~1.5	
TOP OF SEAL	2.0	
BOTTOM OF SEAL	3.0	
TOP OF SCREEN	4.1	
BOTTOM OF SCREEN	14.1	
BOTTOM OF HOLE	14.1	
BOTTOM OF HOLE	14.1	

METHOD DRILLED: 4 1/4" hollow stem augers

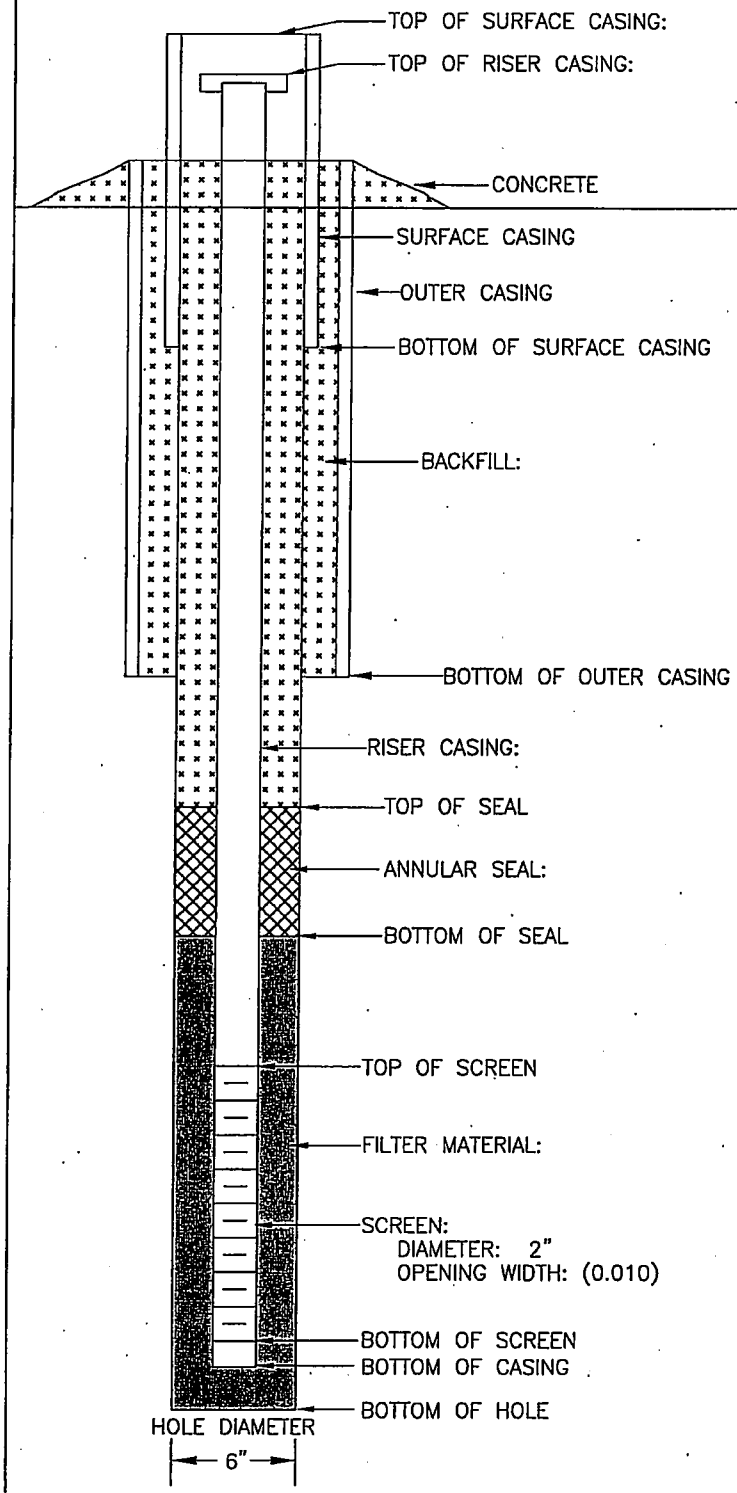
COMMENTS:

M&E Metcalf & Eddy

MONITORING WELL CONSTRUCTION	PROJECT: Moraine Properties JOB NO. 204193.1.1	WELL #: MW-3A
DRILLING CONTRACTOR: Bowser-Morner	COORDINATES:	

BEGUN: 2/3/04	SUPERVISOR: D. Mark Jones	WELL SITE:	WATER LEVEL:	DEPTH/ELEV.
FINISHED: 2/4/04	DRILLER: James Walsh	At bottom of ravine	STATIC	9.78/

REFERENCE POINT & ELEVATION:



	DEPTH	ELEV.
GROUND SURFACE:	0	
DIAMETER: 6"; TYPE: Steel		
DIAMETER: 12"; TYPE: Steel		
TYPE: bentonite/portland grout		
DIAMETER: 2" TYPE: Schedule 40 PVC		
TYPE: bentonite chips		
TYPE: silica sand		
TYPE: Schedule 40 TYPE: PVC		

METHOD DRILLED: 0' – 8.0' : 8 1/4" hollow stem augers
8.0' – 16.0' : 4 1/4" hollow stem augers

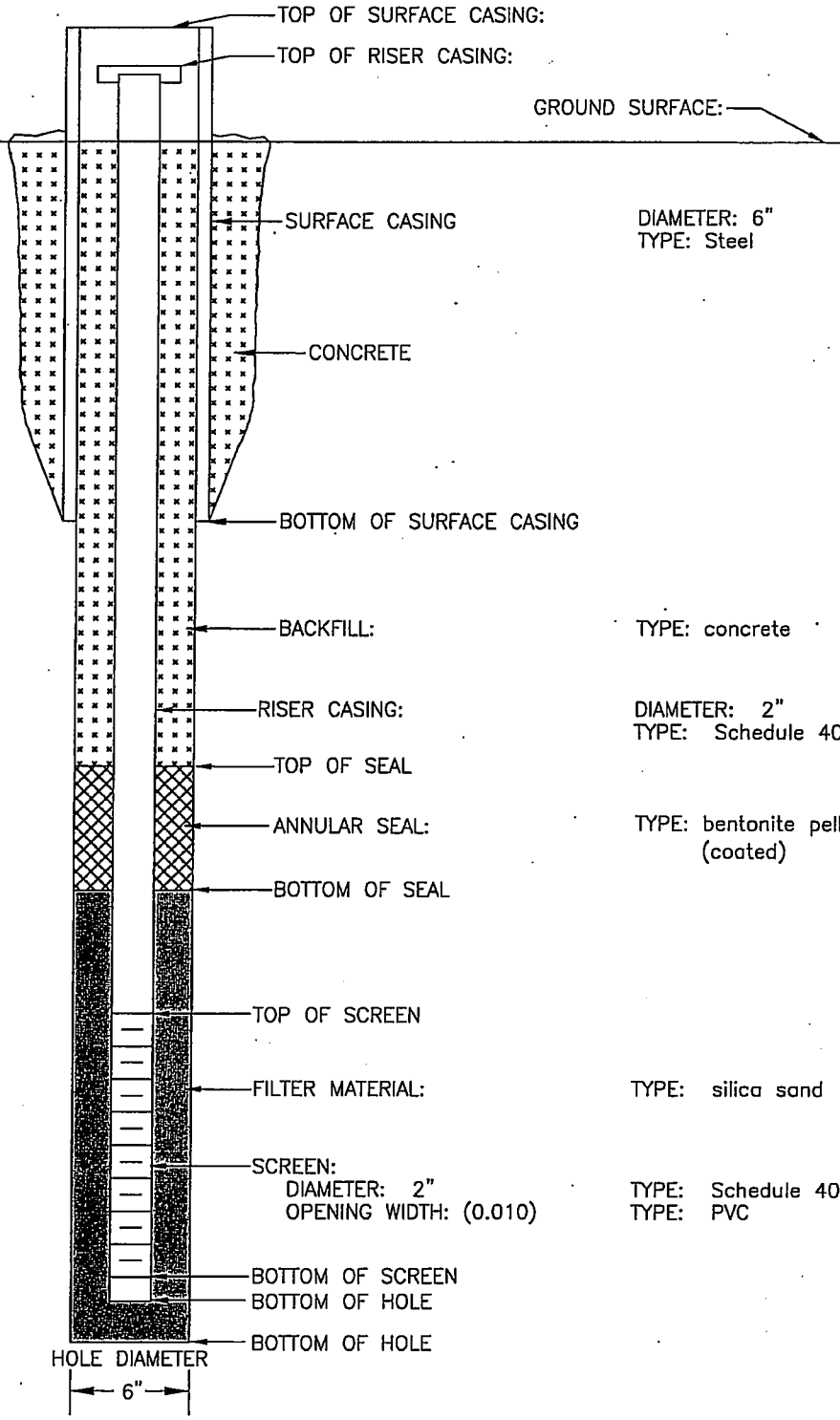
COMMENTS:

M&E Metcalf & Eddy

MONITORING WELL CONSTRUCTION	PROJECT: Moraine Properties JOB NO. 204193.1.1	WELL NO.: MW-4
DRILLING CONTRACTOR: Midwest Env. Drilling	COORDINATES:	

BEGUN: 1/6/04	SUPERVISOR: D. Mark Jones	WELL SITE:	WATER LEVEL:	DEPTH/ELEV.
FINISHED:1/6/04	DRILLER: Wayne Stephens	At bottom of ravine	STATIC	10.69/707.31

REFERENCE POINT & ELEVATION:



DEPTH	ELEV.
	718.0
0	714.6
~1.5	
1.5	
3.0	
3.5	
13.5	
13.5	
13.5	

METHOD DRILLED: 4 1/4" hollow stem augers

COMMENTS:

M&E Metcalf & Eddy

Hull & associates, inc.

Moraine Properties, LLC
Soldiers Home Road (Lot 4268
West Carrolton, Ohio

RAA026

Environmental Assessment

Date Started	: 08/05/04
Date Completed	: 08/05/04
Logged by	: Tim Brown
Reviewed by	: Steve Gross
Drilling Contractor	: AST
Drilling Method	: Geoprobe 54 LT
Sampling Method	: Direct Push/4' macrocore
Total Depth (ft.)	: 6.0
S. Water Level Date	:
S. Water Level (ft.)	:

LOG OF BORING HSB-1

G. Elev. (ft. USGS)	:
PID/FID Model	: MSA Passport
PID/FID Calibration	: 100 ppm isobutylene
Drum Label ID	:

Soil Samples
- Sample Intervals
- Sample Sent to Lab

Water Levels
- Static
- During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	Blow Count (6"-12"-6")	PID/FID (ppm)	Sample	Water Level	GRAPHIC	DESCRIPTION
0	3.0/1.0	MC-1 / SS-1 0.0 - 1.0		0.0				0.0 to 0.3 - Firm medium to dark gray clayey SILT, trace sand, moist, rootlets. 0.3 to 0.8 - Firm light gray clayey SILT, very slightly moist, paper sludge.
1								0.8 to 1.0 - Loose medium gray to black silty SAND, slightly moist.
2								
3	3.0/2.9	MC-2 / SS-2 3.0 - 4.9		0.0				3.0 to 3.8 - Loose dark gray to balck sandy GRAVEL, slightly moist.
4								3.8 to 4.0 - Loose buff SAND, dry. 4.0 to 4.9 - Loose medium brown to black gravelly SAND, slightly moist.
5								End of boring at 6.0 feet.
6								
7								
8								
9								
10								
11								
12								

COMMENTS:
Samples submitted for analysis:
RAA026:HSB-1:S003008@1414

Hull & associates, inc.

Moraine Properties, LLC
Soldiers Home Road (Lot 4268
West Carrolton, Ohio

RAA026

Environmental Assessment

Date Started	: 08/05/04
Date Completed	: 08/05/04
Logged by	: Tim Brown
Reviewed by	: Steve Gross
Drilling Contractor	: AST
Drilling Method	: Geoprobe 54 LT
Sampling Method	: Direct Push/4' macrocore
Total Depth (ft.)	: 6.0
S. Water Level Date	:
S. Water Level (ft.)	:

LOG OF BORING HSB-2

G. Elev. (ft. USGS)	:
PID/FID Model	: MSA Passport
PID/FID Calibration	: 100 ppm isobutylene
Drum Label ID	:

Soil Samples
- Sample Intervals
- Sample Sent to Lab

Water Levels
- Static
- During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	Blow Count (6"-12"-6")	PID/FID (ppm)	Sample	Water Level	GRAPHIC	DESCRIPTION
0	3.0/1.9	MC-1 / SS-1 0.0 - 1.9		0.0				0.0 to 0.2 - Soft medium grayish brown clayey SILT, moist. 0.2 to 1.5 - Soft light gray clayey SILT, slgihtly moist, crumbly, paper sludge.
1								
2								1.5 to 1.9 - Loose light to medium gray silty SAND, little gravel, moist.
3	3.0/1.0	MC-2 / SS-2 3.0 - 4.0		0.0				3.0 to 4.0 - Same as above.
4								
5								
6								End of boring at 6.0 feet.
7								
8								
9								
10								
11								
12								

COMMENTS:
Samples submitted for analysis:
RAA026:HSB-2:S002015@1451

Hull & associates, inc.

Moraine Properties, LLC
Soldiers Home Road (Lot 4268
West Carrolton, Ohio

RAA026

Environmental Assessment

Date Started	: 08/05/04
Date Completed	: 08/05/04
Logged by	: Tim Brown
Reviewed by	: Steve Gross
Drilling Contractor	: AST
Drilling Method	: Geoprobe 54 LT
Sampling Method	: Direct Push/4' macrocore
Total Depth (ft.)	: 6.0
S. Water Level Date	:
S. Water Level (ft.)	:

LOG OF BORING HSB-3

G. Elev. (ft. USGS)	:
PID/FID Model	: MSA Passport
PID/FID Calibration	: 100 ppm isobutylene
Drum Label ID	:

Soil Samples
- Sample Intervals
- Sample Sent to Lab

Water Levels
- Static
- During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	Blow Count (6"-12"-6")	PID/FID (ppm)	Sample	Water Level	GRAPHIC	DESCRIPTION
0	3.0/1.7	MC-1 / SS-1 0.0 - 1.7		0.0				0.0 to 0.4 - Soft medium brownish-gray clayey SILT, moist. 0.4 to 1.3 - Soft light gray clayey SILT, slightly moist, crumbly, paper sludge.
1								1.3 to 1.7 - Loose medium gray to black sandy GRAVEL, slightly moist, glass fragments.
2								
3	3.0/1.7	MC-2 / SS-2 3.0 - 4.7		0.0				3.0 to 4.7 - Loose black and medium brown sandy gravel FILL, slightly moist, tile fragments.
4								
5								End of boring at 6.0 feet.
6								
7								
8								
9								
10								
11								
12								

COMMENTS:

Hull & associates, inc.

Moraine Properties, LLC
Soldiers Home Road (Lot 4268
West Carrolton, Ohio

RAA026

Environmental Assessment

Date Started	: 08/05/04
Date Completed	: 08/05/04
Logged by	: Tim Brown
Reviewed by	: Steve Gross
Drilling Contractor	: AST
Drilling Method	: Geoprobe 54 LT
Sampling Method	: Direct Push/4' macrocore
Total Depth (ft.)	: 5.0
S. Water Level Date	:
S. Water Level (ft.)	:

LOG OF BORING HSB-4

G. Elev. (ft. USGS)	:
PID/FID Model	: MSA Passport
PID/FID Calibration	: 100 ppm isobutylene
Drum Label ID	:

Soil Samples
- Sample Intervals
- Sample Sent to Lab

Water Levels
- Static
- During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	Blow Count (6"-12"-6")	PID/FID (ppm)	Sample	Water Level	GRAPHIC	DESCRIPTION
0	4.0/2.2	MC-1 / SS-1 0.0 - 2.0		0.0				0.0 to 2.0 - Soft light gray clayey SILT, dry crumbly, paper sludge.
1								
2		SS-2 2.0 - 2.2		0.0				2.0 to 2.2 - Loose black SAND, trace gravel, dry.
3								
4	1.0/1.0	MC-2 / SS-3 4.0 - 5.0		0.0				4.0 to 5.0 - Dense dark brown and dark black gravelly sand FILL, slightly moist, glass fragments. End of boring at 5.0 feet.
5								
6								
7								
8								
9								
10								
11								
12								

COMMENTS:

Hull & associates, inc.

Moraine Properties, LLC
Soldiers Home Road (Lot 4268
West Carrolton, Ohio

RAA026

Environmental Assessment

Date Started	: 08/06/04
Date Completed	: 08/06/04
Logged by	: Tim Brown
Reviewed by	: Steve Gross
Drilling Contractor	: AST
Drilling Method	: Geoprobe 54 LT
Sampling Method	: Direct Push/4' macrocore
Total Depth (ft.)	: 4.5
S. Water Level Date	:
S. Water Level (ft.)	:

LOG OF BORING HSB-5

G. Elev. (ft. USGS)	:
PID/FID Model	: MSA Passport
PID/FID Calibration	: 100 ppm isobutylene
Drum Label ID	:

Soil Samples
- Sample Intervals
- Sample Sent to Lab

Water Levels
- Static
- During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	Blow Count (6"-12"-6")	PID/FID (ppm)	Sample	Water Level	GRAPHIC	DESCRIPTION
0	4.0/2.4	MC-1 / SS-1 0.0 - 2.4		1.1				0.0 to 2.4 - Soft light gray clayey SILT, dry, crumbly, paper sludge.
1								
2								
3								
4	0.5/0.5	MC-2 / SS-2 4.0 - 4.5		2.3				4.0 to 4.4 - Same as above.
								4.4 to 4.5 - Loose light gray and black gravelly sand FILL, dry, slag fragments. End of boring, refusal at 4.5 feet.
5								
6								
7								
8								
9								
10								
11								
12								

COMMENTS:
Samples submitted for analysis:
RAA026:HSB-5:S000024@947

Hull & associates, inc.

Moraine Properties, LLC
Soldiers Home Road (Lot 4268
West Carrolton, Ohio

RAA026

Environmental Assessment

Date Started	: 08/06/04
Date Completed	: 08/06/04
Logged by	: Tim Brown
Reviewed by	: Steve Gross
Drilling Contractor	: AST
Drilling Method	: Geoprobe 54 LT
Sampling Method	: Direct Push/4' macrocore
Total Depth (ft.)	: 4.0
S. Water Level Date	:
S. Water Level (ft.)	:

LOG OF BORING HSB-6

G. Elev. (ft. USGS)	:
PID/FID Model	: MSA Passport
PID/FID Calibration	: 100 ppm isobutylene
Drum Label ID	:

Soil Samples
- Sample Intervals
- Sample Sent to Lab

Water Levels
- Static
- During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	Blow Count (6"-12"-6")	PID/FID (ppm)	Sample	Water Level	GRAPHIC	DESCRIPTION
0	4.0/2.8	MC-1 / SS-1 0.0 - 2.0		2.3				0.0 to 0.8 - Soft light gray clayey SILT, dry, crumbly, paper sludge.
1								0.8 to 2.8 - Loose medium gray to black gravelly sand fill, slightly moist, coal fragments, some iron oxidation.
2		SS-2 2.0 - 2.8		1.8				
3								
4								End of boring, refusal at 4.0 feet.
5								
6								
7								
8								
9								
10								
11								
12								

COMMENTS:

Hull & associates, inc.

Moraine Properties, LLC
Soldiers Home Road (Lot 4268
West Carrolton, Ohio

RAA026

Environmental Assessment

Date Started	: 08/06/04
Date Completed	: 08/06/04
Logged by	: Tim Brown
Reviewed by	: Steve Gross
Drilling Contractor	: AST
Drilling Method	: Hand Auger
Sampling Method	: Hand Auger
Total Depth (ft.)	: 2.0
S. Water Level Date	:
S. Water Level (ft.)	:

LOG OF BORING HSB-7

G. Elev. (ft. USGS)	:
PID/FID Model	: MSA Passport
PID/FID Calibration	: 100 ppm isobutylene
Drum Label ID	:

Soil Samples
- Sample Intervals
- Sample Sent to Lab

Water Levels
- Static
- During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	Blow Count (6"-12"-6")	PID/FID (ppm)	Sample	Water Level	GRAPHIC	DESCRIPTION
0	2.0/2.0	HA-1 / SS-1 0.0 - 2.0		0.0				0.0 to 1.0 - Loose medium brownish-gray fine SAND, moist.
1								1.0 to 2.0 - Loose medum brownish-gray SAND, little silt and gravel, moist.
2								End of boring at 2.0 feet.
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								

COMMENTS:

Hull & associates, inc.

Moraine Properties, LLC
Soldiers Home Road (Lot 4268
West Carrolton, Ohio

RAA026

Environmental Assessment

Date Started	: 08/05/04
Date Completed	: 08/05/04
Logged by	: Tim Brown
Reviewed by	: Steve Gross
Drilling Contractor	: AST
Drilling Method	: Geoprobe 54 LT
Sampling Method	: Direct Push/4' macrocore
Total Depth (ft.)	: 6.0
S. Water Level Date	:
S. Water Level (ft.)	:

LOG OF BORING HSB-8

G. Elev. (ft. USGS)	:
PID/FID Model	: MSA Passport
PID/FID Calibration	: 100 ppm isobutylene
Drum Label ID	:

Soil Samples
- Sample Intervals
- Sample Sent to Lab

Water Levels
- Static
- During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	Blow Count (6"-12"-6")	PID/FID (ppm)	Sample	Water Level	GRAPHIC	DESCRIPTION
0	3.0/3.0	MC-1 / SS-1 0.0 - 3.0		0.0				0.0 to 2.0 - Soft light gray clayey SILT, dry-crumbly, paper sludge.
1								
2								2.0 to 2.3 - Wood fragments.
								2.3 to 3.0 - Loose dark gray silty SAND, some gravel, dry.
3	3.0/1.5	MC-2 / SS-2 3.0 - 4.5		7.0				3.0 to 4.5 - Same as above.
4								
5								End of boring at 6.0 feet.
6								
7								
8								
9								
10								
11								
12								

COMMENTS:
Samples submitted for analysis:
RAA026:HSB-8:S000020@1732

01-24-2013 F:\Clients\RAA\RAA026\Soil Borings\HSB-8.bor

Hull & associates, inc.

Moraine Properties, LLC
Soldiers Home Road (Lot 4268
West Carrolton, Ohio

RAA026

Environmental Assessment

Date Started	: 08/05/04
Date Completed	: 08/05/04
Logged by	: Tim Brown
Reviewed by	: Steve Gross
Drilling Contractor	: AST
Drilling Method	: Geoprobe 54 LT
Sampling Method	: Direct Push/4' macrocore
Total Depth (ft.)	: 4.0
S. Water Level Date	:
S. Water Level (ft.)	:

LOG OF BORING HSB-9

G. Elev. (ft. USGS)	:
PID/FID Model	: MSA Passport
PID/FID Calibration	: 100 ppm isobutylene
Drum Label ID	:

Soil Samples
- Sample Intervals
- Sample Sent to Lab

Water Levels
- Static
- During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	Blow Count (6"-12"-6")	PID/FID (ppm)	Sample	Water Level	GRAPHIC	DESCRIPTION
0	4.0/2.2	MC-1 / SS-1 0.0 - 1.0		1.0				0.0 to 1.0 - Soft light gray clayey SILT, dry, crumbly, paper sludge.
1		SS-2 1.0 - 2.2		0.0				1.0 to 2.2 - Dense light to medium gray gravelly SAND, very slightly moist.
2								
3								End of boring at 4.0 feet.
4								
5								
6								
7								
8								
9								
10								
11								
12								

COMMENTS:
Samples submitted for analysis:
RAA026:HSB-9:S000010@1822

Hull & associates, inc.

Moraine Properties, LLC
Soldiers Home Road (Lot 4268
West Carrolton, Ohio

RAA026

Environmental Assessment

Date Started	: 08/05/04
Date Completed	: 08/05/04
Logged by	: Tim Brown
Reviewed by	: Steve Gross
Drilling Contractor	: AST
Drilling Method	: Geoprobe 54 LT
Sampling Method	: Direct Push/4' macrocore
Total Depth (ft.)	: 8.0
S. Water Level Date	:
S. Water Level (ft.)	:

LOG OF BORING HSB-10

G. Elev. (ft. USGS)	:
PID/FID Model	: MSA Passport
PID/FID Calibration	: 100 ppm isobutylene
Drum Label ID	:

Soil Samples: Sample Intervals; Sample Sent to Lab

Water Levels: Static; During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sample Type/ Sample Number	Blow Count (6"-12"-6")	PID/FID (ppm)	Sample	Water Level	GRAPHIC	DESCRIPTION
0	4.0/2.6	MC-1 / SS-1 0.0 - 2.6		0.0	■			0.0 to 2.6 - Soft light gray clayey SILT, dry, crumbly, little medium brown mottling, paper sludge.
1								
2								
3								
4	4.0/1.7	MC-2 / SS-2 4.0 - 5.7		0.0	■			4.0 to 4.1 - Same as above.
								4.1 to 4.2 - Loose buff COBBLE and GRAVEL.
								4.2 to 5.7 - Loose dark brown to black silty SAND, some gravel, moist.
5								
6								
7								
8								End of boring at 8.0 feet.
9								
10								
11								
12								

COMMENTS:
Samples submitted for analysis:
RAA026:HSB-10:S000026@1842

Hull & associates, inc.

Moraine Properties, LLC
Soldiers Home Road (Lot 4268
West Carrolton, Ohio

RAA026

Environmental Assessment

Date Started	: 08/06/04
Date Completed	: 08/06/04
Logged by	: Tim Brown
Reviewed by	: Steve Gross
Drilling Contractor	: AST
Drilling Method	: Geoprobe 54 LT
Sampling Method	: Direct Push/4' macrocore
Total Depth (ft.)	: 8.0
S. Water Level Date	:
S. Water Level (ft.)	:

LOG OF BORING HSB-11

G. Elev. (ft. USGS)	:
PID/FID Model	: MSA Passport
PID/FID Calibration	: 100 ppm isobutylene
Drum Label ID	:

Soil Samples: Sample Intervals; Sample Sent to Lab

Water Levels: Static; During Drilling

Depth in Feet	Sampler Interval / Sample Recovery	Sample Type / Sample Number	Blow Count (6"-12"-6")	PID/FID (ppm)	Sample	Water Level	GRAPHIC	DESCRIPTION
0	4.0/1.5	MC-1 / SS-1 0.0 - 1.5		5.3				0.0 to 0.8 - Soft medium brownish-gray clayey SILT, little sand and gravel, moist. 0.8 to 1.5 - Soft light gray clayey SILT, slightly moist, trace dark brown mottling, paper sludge.
1								
2								
3								
4	4.0/2.7	MC-2 / SS-2 4.0 - 6.0		3.2				4.0 to 6.0 - Same as above, trace gravel, wood fragments.
5								
6		SS-3 6.0 - 6.7		3.2				6.0 to 6.4 - Loose black SAND, moist. 6.4 to 6.6 - Loose tan SAND, moist. 6.6 to 6.7 - Loose black SAND, moist.
7								
8								End of boring at 8.0 feet.
9								
10								
11								
12								

COMMENTS:
Samples submitted for analysis:
RAA026:HSB-11:S040060@1205

Hull & associates, inc.

Monraine Property
Soilders Home Road (Lot 4268)
Moraine, Ohio

RAA028

Environmental Assessment

Date Started	: 09/13/04
Date Completed	: 09/13/04
Logged by	: Tim Brown
Reviewed by	: Steve Gross
Drilling Contractor	: AST
Drilling Method	: Direct Push
Sampling Method	: 4' long macrocore
Total Depth (ft.)	: 6.0
S. Water Level Date	:
S. Water Level (ft.)	:

LOG OF BORING HSB-11A

G. Elev. (ft. USGS)	:
PID/ FID Model	: MSA Passport
PID/ FID Calibration	: 100 ppm Isobutylene

Soil Samples
- Sampled Interval
- Samples Sent to Lab

Water Levels
- Static
- During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	PID / FID (ppm)	Sample	GRAPHIC	DESCRIPTION
0	4.0 / 2.6	MC-1 / SS-1 0.0 - 1.3	0.0			0.0 to 0.8 - Medium brownish-gray clayey SILT, little sand and gravel; moist.
1						0.8 to 1.3 - Loose light gray concrete fragments; dry.
		SS-2 1.3 - 2.6	0.0			1.3 to 2.6 - Soft light gray clayey SILT (paper sludge); dry-crumbly; trace light brown mottling.
2						
3						
4	2.0 / 1.3	MC-2 / SS-3 4.0 - 4.7	0.0			4.0 to 4.7 - Same as above.
		SS-4 4.7 - 5.3	0.5			4.7 to 5.3 - Loose medium to dark gray sand FILL; slightly moist.
5						End of boring, refusal at 6.0 feet.
6						
7						
8						
9						
10						
11						
12						

REMARKS:
Samples submitted for analysis:
RAA028:HSB-11A:S013026

Hull & associates, inc.

Monraine Property
Soilders Home Road (Lot 4268)
Moraine, Ohio

RAA028

Environmental Assessment

Date Started	: 09/13/04
Date Completed	: 09/13/04
Logged by	: Tim Brown
Reviewed by	: Steve Gross
Drilling Contractor	: AST
Drilling Method	: Direct Push
Sampling Method	: 4' long macrocore
Total Depth (ft.)	: 5.9
S. Water Level Date	:
S. Water Level (ft.)	:

LOG OF BORING HSB-11B

G. Elev. (ft. USGS)	:
PID/ FID Model	: MSA Passport
PID/ FID Calibration	: 100 ppm Isobutylene

Soil Samples
- Sampled Interval
- Samples Sent to Lab

Water Levels
- Static
- During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	PID / FID (ppm)	Sample	GRAPHIC	DESCRIPTION
0	4.0 / 2.6	MC-1 / SS-1 0.0 - 1.1	0.0			0.0 to 1.1 - Firm medium brownish-gray clayey silt FILL, some sand and gravel, gravel dry and crumbly; limestone cobble at 1.1 feet.
1		SS-2 1.1 - 2.6	0.0			1.1 to 2.6 - Soft light gray clayey SILT; dry - crumbly; trace medium brown mottling, paper sludge.
2						
3						
4	1.9 / 1.3	MC-2 / SS-3 4.0 - 5.0	0.1			4.0 to 5.0 - Same as above.
5		SS-4 5.0 - 5.3	0.1			5.0 to 5.3 - Loose dark gray sand FILL, trace gravel; dry.
						End of boring, refusal at 5.9 feet.
6						
7						
8						
9						
10						
11						
12						

REMARKS:
Samples submitted for analysis:
RAA028:HSB-11B:S011026

Hull & associates, inc.

Monraine Property
Soilders Home Road (Lot 4268)
Moraine, Ohio

RAA028

Environmental Assessment

Date Started	: 09/13/04
Date Completed	: 09/13/04
Logged by	: Tim Brown
Reviewed by	: Steve Gross
Drilling Contractor	: AST
Drilling Method	: Direct Push
Sampling Method	: 4' long macrocore
Total Depth (ft.)	: 8.0
S. Water Level Date	:
S. Water Level (ft.)	:

LOG OF BORING HSB-11C

G. Elev. (ft. USGS)	:
PID/ FID Model	: MSA Passport
PID/ FID Calibration	: 100 ppm Isobutylene

Soil Samples
- Sampled Interval
- Samples Sent to Lab

Water Levels
- Static
- During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	PID / FID (ppm)	Sample	GRAPHIC	DESCRIPTION
0	4.0 / 2.6	MC-1 / SS-1 0.0 - 1.0	1.5			0.0 to 1.0 - Firm medium brownish-gray clayey silt FILL, little sand, some gravel; moist; wood fragments 0.8 to 1.0 feet.
1		SS-2 1.0 - 2.6	0.9			1.1 to 2.6 - Soft light gray clayey SILT; slightly moist; trace light brown mottling; paper sludge.
2						
3						
4	4.0 / 2.9	MC-2 / SS-3 4.0 - 6.2	1.2			4.0 to 6.2 - Same as above, color becoming white 5.2 to 6.2 feet; at 6.2 feet, red flaky material over plastic sheet.
5						
6		SS-4 6.2 - 6.9	1.2			6.2 to 6.9 - Soft dark gray to black silty SAND, little gravel; very moist.
7						
8						End of boring at 8.0 feet.
9						
10						
11						
12						

REMARKS:
Samples submitted for analysis:
RAA028:HSB-11C:S010026
RAA028:HSB-11C:S040062

Hull & associates, inc.

Monraine Property
Soilders Home Road (Lot 4268)
Moraine, Ohio

RAA028

Environmental Assessment

Date Started	: 09/13/04
Date Completed	: 09/13/04
Logged by	: Tim Brown
Reviewed by	: Steve Gross
Drilling Contractor	: AST
Drilling Method	: Direct Push
Sampling Method	: 4' long macrocore
Total Depth (ft.)	: 5.9
S. Water Level Date	:
S. Water Level (ft.)	:

LOG OF BORING HSB-11D

G. Elev. (ft. USGS)	:
PID/ FID Model	: MSA Passport
PID/ FID Calibration	: 100 ppm Isobutylene

Soil Samples
- Sampled Interval
- Samples Sent to Lab

Water Levels
- Static
- During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	PID / FID (ppm)	Sample	GRAPHIC	DESCRIPTION
0	4.0 / 2.1	MC-1 / SS-1 0.0 - 0.7	1.9			0.0 to 0.7 - Firm medium brownish-gray clayey silt FILL, little sand and gravel; roots; moist.
		SS-2 0.7 - 2.1	1.5			0.7 to 2.1 - Soft light gray clayey SILT; slightly moist; crumbly; little medium brown mottling; paper sludge.
1						
2						
3						
4	1.9 / 1.4	MC-2 / SS-3 4.0 - 5.2	1.0			4.0 to 5.2 - Same as above.
5		SS-4 5.2 - 5.4	1.4			5.2 to 5.4 - Loose dark gray sand FILL, trace gravel and silt; slightly moist. End of boring, refusal at 5.9 feet.
6						
7						
8						
9						
10						
11						
12						

REMARKS:

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Hull & associates, inc.

Monraine Property
Soilders Home Road (Lot 4268)
Moraine, Ohio

RAA028

Environmental Assessment

Date Started	: 09/13/04
Date Completed	: 09/13/04
Logged by	: Tim Brown
Reviewed by	: Steve Gross
Drilling Contractor	: AST
Drilling Method	: Direct Push
Sampling Method	: 4' long macrocore
Total Depth (ft.)	: 8.0
S. Water Level Date	:
S. Water Level (ft.)	:

LOG OF BORING HSB-11E

G. Elev. (ft. USGS)	:
PID/ FID Model	: MSA Passport
PID/ FID Calibration	: 100 ppm Isobutylene

Soil Samples
- Sampled Interval
- Samples Sent to Lab

Water Levels
- Static
- During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	PID / FID (ppm)	Sample	GRAPHIC	DESCRIPTION
0	4.0 / 3.0	MC-1 / SS-1 0.0 - 0.9	0.0			0.0 to 0.9 - Firm medium brownish-gray clayey SILT, some sand and gravel; slightly moist to dry.
1		SS-2 0.9 - 3.0	0.0			0.9 to 3.0 - Soft light gray clayey SILT; slightly moist - crumbly (paper sludge).
2						
3						
4	4.0 / 3.0	MC-2 / SS-3 4.0 - 4.6	0.0			4.0 to 4.6 - Same as above.
		SS-4 4.6 - 5.4	0.8			4.6 to 5.4 - Loose light and medium gray, and dark brown sand FILL, some gravel; slightly moist.
5		SS-5 5.4 - 7.0	1.2			5.4 to 7.0 - Firm medium gray silty GRAVEL, little sand; moist; becoming a silty sand at 6.5 to 7.0 feet.
6						
7						
8						End of boring at 8.0 feet.
9						
10						
11						
12						

REMARKS:

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Hull & associates, inc.

Monraine Property
Soilders Home Road (Lot 4268)
Moraine, Ohio

RAA028

Environmental Assessment

Date Started	: 09/13/04
Date Completed	: 09/13/04
Logged by	: Tim Brown
Reviewed by	: Steve Gross
Drilling Contractor	: AST
Drilling Method	: Direct Push
Sampling Method	: 4' long macrocore
Total Depth (ft.)	: 8.0
S. Water Level Date	:
S. Water Level (ft.)	:

LOG OF BORING HSB-11F

G. Elev. (ft. USGS)	:
PID/ FID Model	: MSA Passport
PID/ FID Calibration	: 100 ppm Isobutylene

Soil Samples
- Sampled Interval
- Samples Sent to Lab

Water Levels
- Static
- During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	PID / FID (ppm)	Sample	GRAPHIC	DESCRIPTION
0	4.0 / 3.0	MC-1 / SS-1 0.0 - 1.6	0.0			0.0 to 1.6 - Firm medium brownish-gray silty clay FILL, some sand and gravel; dry-crumbly; rootlets.
1						
		SS-2 1.6 - 3.0	0.0			1.6 to 3.0 - Soft light gray clayey SILT; dry-crumbly; trace brick fragments; trace light brown mottling; paper sludge.
2						
3						
4	4.0 / 3.2	MC-2 / SS-3 4.0 - 4.8	0.0			4.0 to 4.8 - Same as above.
		SS-4 4.8 - 6.3	0.0			4.8 to 5.5 - Loose light gray, light brown and medium gray sand FILL, some gravel.
5						5.5 to 6.3 - Loose dark brown to black silty sand FILL, little gravel; slightly moist; coal fragments; rootlets.
6		SS-5 6.3 - 7.2	0.0			6.3 to 7.1 - Firm light brownish-gray sandy SILT, little gravel; moist.
7						7.1 to 7.2 - Dense light brown sandy GRAVEL; very moist.
8						End of boring at 8.0 feet.
9						
10						
11						
12						

REMARKS:

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Hull & associates, inc.

Monraine Property
Soilders Home Road (Lot 4268)
Moraine, Ohio

RAA028

Environmental Assessment

Date Started	: 09/13/04
Date Completed	: 09/13/04
Logged by	: Tim Brown
Reviewed by	: Steve Gross
Drilling Contractor	: AST
Drilling Method	: Direct Push
Sampling Method	: 4' long macrocore
Total Depth (ft.)	: 8.0
S. Water Level Date	:
S. Water Level (ft.)	:

LOG OF BORING HSB-11G

(Page 1 of 1)

G. Elev. (ft. USGS)	:
PID/ FID Model	: MSA Passport
PID/ FID Calibration	: 100 ppm Isobutylene

Soil Samples
- Sampled Interval
- Samples Sent to Lab

Water Levels
- Static
- During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	PID / FID (ppm)	Sample	GRAPHIC	DESCRIPTION
0	4.0 / 3.0	MC-1 / SS-1 0.0 - 2.0	0.0			0.0 to 2.0 - Medium brownish-gray clayey SILT, little sand and gravel; slightly moist; rootlets.
1						
2		SS-2 2.0 - 3.0	0.0			2.0 to 3.0 - Light gray clayey SILT; very slightly moist to dry; little light brown mottling; paper sludge.
3						
4	4.0 / 3.5	MC-2 / SS-3 4.0 - 4.5	0.0			4.0 to 4.5 - Same as above.
		SS-4 4.5 - 7.5	0.0			4.5 to 5.2 - Loose light and medium gray and light brown sand FILL, some gravel; slightly moist.
5						5.2 to 5.5 - Loose dark brown sandy SILT; moist; rootlets.
6						5.5 to 6.9 - Firm light gray sandy SILT, little gravel; moist.
7						6.9 to 7.5 - Dense light grayish-brown sandy GRAVEL; very moist.
8						End of boring at 8.0 feet.
9						
10						
11						
12						

REMARKS:

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Hull & associates, inc.

Monraine Property
Soilders Home Road (Lot 4268)
Moraine, Ohio

RAA028

Environmental Assessment

Date Started	: 09/13/04
Date Completed	: 09/13/04
Logged by	: Tim Brown
Reviewed by	: Steve Gross
Drilling Contractor	: AST
Drilling Method	: Direct Push
Sampling Method	: 4' long macrocore
Total Depth (ft.)	: 4.0
S. Water Level Date	:
S. Water Level (ft.)	:

LOG OF BORING HSB-11H

G. Elev. (ft. USGS)	:
PID/ FID Model	: MSA Passport
PID/ FID Calibration	: 100 ppm Isobutylene

Soil Samples
- Sampled Interval
- Samples Sent to Lab

Water Levels
- Static
- During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	PID / FID (ppm)	Sample	GRAPHIC	DESCRIPTION
0	4.0 / 2.7	MC-1 / SS-1 0.0 - 0.3	0.0			0.0 to 0.3 - Soft tan clayey SILT; dry-crumbly; rootlets.
		SS-2 0.3 - 2.2	0.0			0.3 to 2.2 - Soft light gray clayey SILT; dry-crumbly; trace tan mottling; paper sludge.
1						
2		SS-3 2.2 - 2.7	0.9			2.2 to 2.7 - Loose dark brown to black sand FILL; dry.
3						
4						End of boring at 4.0 feet.
5						
6						
7						
8						
9						
10						
11						
12						

REMARKS:

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Hull & associates, inc.

Monraine Property
Soilders Home Road (Lot 4268)
Moraine, Ohio

RAA028

Environmental Assessment

Date Started	: 09/13/04
Date Completed	: 09/13/04
Logged by	: Tim Brown
Reviewed by	: Steve Gross
Drilling Contractor	: AST
Drilling Method	: Direct Push
Sampling Method	: 4' long macrocore
Total Depth (ft.)	: 8.0
S. Water Level Date	:
S. Water Level (ft.)	:

LOG OF BORING HSB-11I

(Page 1 of 1)

G. Elev. (ft. USGS)	:
PID/ FID Model	: MSA Passport
PID/ FID Calibration	: 100 ppm Isobutylene

Soil Samples
- Sampled Interval
- Samples Sent to Lab

Water Levels
- Static
- During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	PID / FID (ppm)	Sample	GRAPHIC	DESCRIPTION
0	4.0 / 2.8	MC-1 / SS-1 0.0 - 2.8	1.3			0.0 to 2.8 - Soft light gray clayey SILT; slightly moist; trace light brown mottling; paper sludge.
1						
2						
3						
4	4.0 / 1.6	MC-2 / SS-2 4.0 - 5.1	2.5			4.0 to 5.1 - Same as above, becoming very moist with depth
5		SS-3 5.1 - 5.6	1.2			5.2 to 5.6 - Soft dark gray to black sandy SILT; very moist; coal fragments.
6						
7						
8						End of boring at 8.0 feet.
9						
10						
11						
12						

REMARKS:

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Hull & associates, inc.

Moraine Property
Soilders Home Road
Moraine, Ohio

ETH001

Environmental Assessment

Date Started	: 09/13/04
Date Completed	: 09/13/04
Logged by	: Nate Hull
Reviewed by	: Steve Gross
Drilling Contractor	: AST
Drilling Method	: Direct Push
Sampling Method	: 4' long macrocore
Total Depth (ft.)	: 8.0
S. Water Level Date	:
S. Water Level (ft.)	:

LOG OF BORING HSB-11J

(Page 1 of 1)

G. Elev. (ft. USGS)	:
PID/ FID Model	: MSA Passport
PID/ FID Calibration	: 100 ppm Isobutylene

Soil Samples
- Sampled Interval
- Samples Sent to Lab

Water Levels
- Static
- During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	PID / FID (ppm)	Sample	GRAPHIC	DESCRIPTION
0	4.0 / 3.0	MC-1 / SS-1 0.0 - 1.4	0.0			0.0 to 6.0 - Medium gray to light gray, Clay, little silt, trace to no sand and gravel, dry-damp.
1						
2		SS-2 1.4 - 3.0	0.9			
3						
4	4.0 / 3.3	MC-2 / SS-3 4.0 - 5.7	0.6			
5						
6		SS-4 5.7 - 7.3	0.3			5.7 to 6.1 - Loose dark gray to black sand FILL, little silt; slightly moist. 6.1 to 6.7 - Loose buff to cream colored concrete fragments and sand, some brick fragments; slightly moist. 6.7 to 7.3 - Loose black gravelly sand FILL, trace silt; very moist; coal fragments.
7						
8						End of boring at 8.0 feet.
9						
10						
11						
12						

REMARKS:
Samples submitted for analysis:
RAA028:HSB-11J:S057073

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Hull & associates, inc.

Moraine Properties, LLC
Soldiers Home Road (Lot 4268
West Carrolton, Ohio

RAA026

Environmental Assessment

Date Started	: 08/06/04
Date Completed	: 08/06/04
Logged by	: Tim Brown
Reviewed by	: Steve Gross
Drilling Contractor	: AST
Drilling Method	: Geoprobe 54 LT
Sampling Method	: Direct Push/4' macrocore
Total Depth (ft.)	: 4.0
S. Water Level Date	:
S. Water Level (ft.)	:

LOG OF BORING HSB-12

G. Elev. (ft. USGS)	:
PID/FID Model	: MSA Passport
PID/FID Calibration	: 100 ppm isobutylene
Drum Label ID	:

Soil Samples
- Sample Intervals
- Sample Sent to Lab

Water Levels
- Static
- During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sample Type/ Sample Number	Blow Count (6"-12"-6")	PID/FID (ppm)	Sample	Water Level	GRAPHIC	DESCRIPTION
0	4.0/1.9	MC-1 / SS-1 0.0 - 1.9		1.5				0.0 to 1.0 - Soft medium brownish-gray clayey SILT, little gravel, moist, paper sludge.
1								1.0 to 1.9 - Loose light to medium gray gravelly SAND, moist, mixed with concrete fragments 1.0 to 1.5 feet.
2								
3								
4								End of boring at 4.0 feet.
5								
6								
7								
8								
9								
10								
11								
12								

COMMENTS:
Samples submitted for analysis:
RAA026:HSB-12:S000010@1110

Hull & associates, inc.

Moraine Properties, LLC
Soldiers Home Road (Lot 4268
West Carrolton, Ohio

RAA026

Environmental Assessment

Date Started	: 08/06/04
Date Completed	: 08/06/04
Logged by	: Tim Brown
Reviewed by	: Steve Gross
Drilling Contractor	: AST
Drilling Method	: Geoprobe 54 LT
Sampling Method	: Direct Push/4' macrocore
Total Depth (ft.)	: 4.0
S. Water Level Date	:
S. Water Level (ft.)	:

LOG OF BORING HSB-13

G. Elev. (ft. USGS)	:
PID/FID Model	: MSA Passport
PID/FID Calibration	: 100 ppm isobutylene
Drum Label ID	:

Soil Samples
- Sample Intervals
- Sample Sent to Lab

Water Levels
- Static
- During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sample Type/ Sample Number	Blow Count (6"-12"-6")	PID/FID (ppm)	Sample	Water Level	GRAPHIC	DESCRIPTION
0	4.0/2.4	MC-1 / SS-1 0.0 - 2.4		1.3				0.0 to 0.6 - Stiff medium brownish-gray clayey SILT, little sand, moist.
								0.6 to 1.0 - Stiff medium brownish-gray silty SAND, little gravel, moist.
1								1.0 to 2.4 - Dense light gray SAND, little gravel, moist.
2								
3								
4								End of boring at 4.0 feet.
5								
6								
7								
8								
9								
10								
11								
12								

COMMENTS:

Hull & associates, inc.

Moraine Properties, LLC
Soldiers Home Road (Lot 4268
West Carrolton, Ohio

RAA026

Environmental Assessment

Date Started	: 08/06/04
Date Completed	: 08/06/04
Logged by	: Tim Brown
Reviewed by	: Steve Gross
Drilling Contractor	: AST
Drilling Method	: Geoprobe 54 LT
Sampling Method	: Direct Push/4' macrocore
Total Depth (ft.)	: 8.0
S. Water Level Date	:
S. Water Level (ft.)	:

LOG OF BORING HSB-14

(Page 1 of 1)

G. Elev. (ft. USGS)	:
PID/FID Model	: MSA Passport
PID/FID Calibration	: 100 ppm isobutylene
Drum Label ID	:

Soil Samples
- Sample Intervals
- Sample Sent to Lab

Water Levels
- Static
- During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sample Type/ Sample Number	Blow Count (6"-12"-6")	PID/FID (ppm)	Sample	Water Level	GRAPHIC	DESCRIPTION
0	4.0/1.6	MC-1 / SS-1 0.0 - 1.6		0.3				0.0 to 1.1 - Firm medium gray sandy SILT, some subrounded gravel, moist.
1								1.1 to 1.2 - Soft light grayish brown fine SAND, moist.
								1.2 to 1.6 - Soft dark gray sandy SILT, little subrounded gravel, moist.
2								
3								
4	4.0/0.2	MC-2 / SS-2 4.0 - 4.2		NM				4.0 to 4.1 - Very soft fine SAND, very moist.
								4.1 to 4.2 - Cobble lodged in shoe.
5								
6								
7								
8								End of boring at 8.0 feet.
9								
10								
11								
12								

COMMENTS:

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Hull & associates, inc.

Moraine Properties, LLC
Soldiers Home Road (Lot 4268
West Carrolton, Ohio

RAA026

Environmental Assessment

Date Started	: 08/06/04
Date Completed	: 08/06/04
Logged by	: Tim Brown
Reviewed by	: Steve Gross
Drilling Contractor	: AST
Drilling Method	: Hand Auger
Sampling Method	: Hand Auger
Total Depth (ft.)	: 1.8
S. Water Level Date	:
S. Water Level (ft.)	:

LOG OF BORING HSB-15

G. Elev. (ft. USGS)	:
PID/FID Model	: MSA Passport
PID/FID Calibration	: 100 ppm isobutylene
Drum Label ID	:

Soil Samples
- Sample Intervals
- Sample Sent to Lab

Water Levels
- Static
- During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sample Type/ Sample Number	Blow Count (6"-12"-6")	PID/FID (ppm)	Sample	Water Level	GRAPHIC	DESCRIPTION
0	1.8/1.8	MC-1 / SS-1 0.0 - 1.8		0.3				0.0 to 1.8 - Soft dark grayish brown clayey SILT, little sand, slightly moist, moisture decreasing with depth.
1								End of boring at 1.8 feet.
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								

COMMENTS:

Hull & associates, inc.

Moraine Properties, LLC
Soldiers Home Road (Lot 4268
West Carrolton, Ohio

RAA026

Environmental Assessment

Date Started	: 08/06/04
Date Completed	: 08/06/04
Logged by	: Tim Brown
Reviewed by	: Steve Gross
Drilling Contractor	: AST
Drilling Method	: Geoprobe 54 LT
Sampling Method	: Direct Push/4' macrocore
Total Depth (ft.)	: 8.0
S. Water Level Date	:
S. Water Level (ft.)	:

LOG OF BORING HSB-16

G. Elev. (ft. USGS)	:
PID/FID Model	: MSA Passport
PID/FID Calibration	: 100 ppm isobutylene
Drum Label ID	:

Soil Samples
- Sample Intervals
- Sample Sent to Lab

Water Levels
- Static
- During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sample Type/ Sample Number	Blow Count (6"-12"-6")	PID/FID (ppm)	Sample	Water Level	GRAPHIC	DESCRIPTION
0	4.0/1.5	MC-1 / SS-1 0.0 - 1.5		0.0				0.0 to 0.8 - Soft medium brownish gray clayey SILT, little sand, moist.
1								0.8 to 1.4 - Soft light gray clayey SILT, dry crumbly, trace medium brown mottling.
								1.4 to 1.5 - Loose medium to dark gray sandy gravel.
2								
3								
4	4.0/2.0	MC-2 / SS-2 4.0 - 6.0		0.0				4.0 to 4.1 - Same as above.
								4.1 to 4.4 - Loose light to medium gray LIMESTONE fragments, dry.
5								4.4 to 6.0 - Firm medium gray sandy SILT, little clay and gravel, slightly moist, becoming moist with depth.
6								
7								
8								End of boring at 8.0 feet.
9								
10								
11								
12								

COMMENTS:

Hull & associates, inc.

Moraine Properties, LLC
Soldiers Home Road (Lot 4268
West Carrolton, Ohio

RAA026

Environmental Assessment

Date Started	: 08/06/04
Date Completed	: 08/06/04
Logged by	: Tim Brown
Reviewed by	: Steve Gross
Drilling Contractor	: AST
Drilling Method	: Geoprobe 54 LT
Sampling Method	: Direct Push/4' macrocore
Total Depth (ft.)	: 8.0
S. Water Level Date	:
S. Water Level (ft.)	:

LOG OF BORING HSB-17

G. Elev. (ft. USGS)	:
PID/FID Model	: MSA Passport
PID/FID Calibration	: 100 ppm isobutylene
Drum Label ID	:

Soil Samples
- Sample Intervals
- Sample Sent to Lab

Water Levels
- Static
- During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sample Type/ Sample Number	Blow Count (6"-12"-6")	PID/FID (ppm)	Sample	Water Level	GRAPHIC	DESCRIPTION
0	4.0/2.4	MC-1 / SS-1 0.0 - 2.4		0.0				0.0 to 0.2 - Loose light to medium brown silty SAND, moist.
								0.2 to 2.0 - Soft light gray clayey SILT, very slightly moist, crumbly, trace medium brown mottling.
2								2.0 to 2.4 - Loose dark brown silty SAND, slightly moist.
4	4.0/3.5	MC-2 / SS-2 4.0 - 7.5		1.0				4.0 to 5.1 - Same as above.
5								5.1 to 6.8 - Dense light to medium gray gravelly SAND, wet at 5.7 feet.
7								6.8 to 7.5 - Dense medium gray SAND, wet.
								End of boring at 8.0 feet.
8								(Rod broke in boring, had to be fished out)
9								
10								
11								
12								

COMMENTS:
Samples submitted for analysis:
RAA026:HSB-17:S002020@1221

Hull & associates, inc.

Moraine Properties, LLC
Soldiers Home Road (Lot 4268
West Carrolton, Ohio

RAA026

Environmental Assessment

Date Started	: 08/06/04
Date Completed	: 08/06/04
Logged by	: Tim Brown
Reviewed by	: Steve Gross
Drilling Contractor	: AST
Drilling Method	: Geoprobe 54 LT
Sampling Method	: Direct Push/4' macrocore
Total Depth (ft.)	: 8.0
S. Water Level Date	:
S. Water Level (ft.)	:

LOG OF BORING HSB-18

(Page 1 of 1)

G. Elev. (ft. USGS)	:
PID/FID Model	: MSA Passport
PID/FID Calibration	: 100 ppm isobutylene
Drum Label ID	:

Soil Samples
- Sample Intervals
- Sample Sent to Lab

Water Levels
- Static
- During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sample Type/ Sample Number	Blow Count (6"-12"-6")	PID/FID (ppm)	Sample	Water Level	GRAPHIC	DESCRIPTION
0	4.0/2.4	MC-1 / SS-1 0.0 - 2.4		1.2				0.0 to 2.4 - Soft light gray clayey SILT, dry, crumbly, medium brown clay present 1.8 to 1.9 feet.
1								
2								
3								
4	4.0/4.0	MC-2 / SS-2 4.0 - 8.0		2.3				4.0 to 4.1 - Same as above.
								4.1 to 4.4 - Loose black SAND, dry.
								4.4 to 8.0 - Dense medium grayish brown SAND, little gravel, trace silt, slightly moist, coal fragments at 6.5 feet.
5								
6								
7								
8								End of boring at 8.0 feet.
9								
10								
11								
12								

COMMENTS:
Samples submitted for analysis:
RAA026:HSB-18:S000024@1343

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Hull & associates, inc.

Lot 4268
Former Rendering Plan

RAA028

Date Started	: 08/23/04
Date Completed	: 08/23/04
Logged by	: Ye Zhuang
Reviewed by	:
Drilling Contractor	: Double J Drilling
Drilling Method	:
Sampling Method	: Shelby Tube & Split Spoon
Total Depth (ft.)	: 12.0
S. Water Level Date	: NA
S. Water Level (ft.)	: None

LOG OF BORING B-1

G. Elev. (ft. USGS)	:
PID/ FID Model	: MSA Passport
PID/ FID Calibration	: 100 ppm Isobutylene

Soil Samples: Sampled Interval

Water Levels: Static; During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	Moisture Content (%)	Blow Count (6"-6"-6")	Sample	GRAPHIC	DESCRIPTION
0	24 / 24	ST-1 0.0 - 2.0	39.9	–			Stiff brown lean clay FILL, little sand and gravel, hairroots, organics, brick fragments, damp.
1							Hard light gray clayey paper sludge, little gravel, trace silt roots organics damp. HP > 4.5 tsf
2	24 / 24	ST-2 2.0 - 4.0	35.0	–			
3							
4	24 / 24	ST-3 4.0 - 6.0	40.7	–			Hard brownish light gray clayey paper sludge, trace gravel, roots, damp. HP = 4.0 tsp
5							
6	24 / 24	ST-4 6.0 - 8.0	54.9	–			Stiff to medium stiff light gray to chalky paper sludge, moist.
7							Soft gray fibrous paper sludge, wet. HP = 0.25 tsf LL = 62, PL = 34, PI = 28
8	24 / 17	ST-5 8.0 - 10.0	76.9	–			
9							
10	24 / 11.5	ST-6 10.0 - 11.5	111.9	–			Soft black topsoil, burned wood, hightly organic, wet. Soft dark gray fibrous paper sludge, wet.
11		SP-1		50/3			Tube refusal at 11.5 feet.
12							Hard brown lean clay FILL, little sand & gravel, concrete debris. Split spoon refusal. End of boring at 12.0 feet.

REMARKS:
HP = Hand penetrometer reading in tons per square foot.
PID reading ranged from 1.0 to 4.3 ppm.

01-24-2013 F:\Clients\RAA\RAA028\Soil Boring\B-1.bor

Hull & associates, inc.

Lot 4268
Former Rendering Plan

RAA028

Date Started	: 08/24/04
Date Completed	: 08/24/04
Logged by	: Ye Zhuang
Reviewed by	:
Drilling Contractor	: Double J Drilling
Drilling Method	: Hollow Stem Auger
Sampling Method	: Split Spoon
Total Depth (ft.)	: 14.0
S. Water Level Date	: NA
S. Water Level (ft.)	: NA

LOG OF BORING B-1A

G. Elev. (ft. USGS)	:
PID/ FID Model	: MSA Passport
PID/ FID Calibration	: 100 ppm Isobutylene

Soil Samples: Sampled Interval

Water Levels: Static; During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	Moisture Content (%)	Blow Count (6"-6"-6")	Sample	Graphic	Water Level	Description
0								
1								
2								Vane Shear Test Hole.
3								0.0 to 7.5 - No vane shear test was performed due to the high stiffness of the material. Very stiff to medium stiff light gray clayey paper sludge, damp to moist.
4								
5								
6								
7		SP-1		NA				Dense brown SAND and GRAVEL, possible fill, damp.
8								
9								
10								
11								
12								

REMARKS:
PID reading ranged from 1.0 to 4.3 ppm.

Hull & associates, inc.

Lot 4268
Former Rendering Plan

RAA028

Date Started	: 08/24/04
Date Completed	: 08/24/04
Logged by	: Ye Zhuang
Reviewed by	:
Drilling Contractor	: Double J Drilling
Drilling Method	: Hollow Stem Auger
Sampling Method	: Split Spoon
Total Depth (ft.)	: 14.0
S. Water Level Date	: NA
S. Water Level (ft.)	: NA

LOG OF BORING B-1A

G. Elev. (ft. USGS)	:
PID/ FID Model	: MSA Passport
PID/ FID Calibration	: 100 ppm Isobutylene

Soil Samples: Sampled Interval

Water Levels: Static; During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	Moisture Content (%)	Blow Count (6"-6"-6")	Sample	Graphic	Water Level	Description
12		SP-2		NA				Loose to medium dense brown to dark gray medium to coarse SAND, some gravel, wet.
13							▽	
14								End of boring at 14.0 feet.
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								

REMARKS:
PID reading ranged from 1.0 to 4.3 ppm.

Hull & associates, inc.

Lot 4268
Former Rendering Plan

RAA028

Date Started	: 08/24/04
Date Completed	: 08/24/04
Logged by	: Ye Zhuang
Reviewed by	:
Drilling Contractor	: Double J Drilling
Drilling Method	: Hollow Stem Auger
Sampling Method	: Split Spoon
Total Depth (ft.)	: 14.0
S. Water Level Date	: NA
S. Water Level (ft.)	: NA

LOG OF BORING B-1B

G. Elev. (ft. USGS)	:
PID/ FID Model	: MSA Passport
PID/ FID Calibration	: 100 ppm Isobutylene

Soil Samples: Sampled Interval

Water Levels: Static; During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	Moisture Content (%)	Blow Count (6"-6"-6")	Sample	Graphic	Water Level	Description
0								
1								
2								Vane Shear Test Hole.
3								0.0 to 8.5 - No vane shear test was performed.
4								
5								
6								
7								
8								
9								Vane shear test performed every 6 inches from 8.5 to 11.3 feet, total 5 tests.
10								
11								End of boring, vane refusal at 11.3 feet.
12								

REMARKS:
PID reading ranged from 1.0 to 4.3 ppm.

Hull & associates, inc.

Lot 4268
Former Rendering Plan

RAA028

Date Started	: 08/25/04
Date Completed	: 08/25/04
Logged by	: Ye Zhuang
Reviewed by	:
Drilling Contractor	: Double J Drilling
Drilling Method	:
Sampling Method	: Shelby Tube & Split Spoon
Total Depth (ft.)	: 15.6
S. Water Level Date	: NA
S. Water Level (ft.)	: None

LOG OF BORING B-2

G. Elev. (ft. USGS)	:
PID/ FID Model	: MSA Passport
PID/ FID Calibration	: 100 ppm Isobutylene

Soil Samples: Sampled Interval

Water Levels: Static; During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	Moisture Content (%)	Blow Count (6"-6"-6")	Sample	GRAPHIC	DESCRIPTION
0	24 / 16	ST-1 0.0 - 2.0	43.0	–			Loose crumbly light gray clayey paper sludge, some silt, little organics, damp.
1							Black pavement debris.
							Hard light gray clayey paper sludge, damp. HP > 4.5 tsf.
2	24 / 15.5	ST-2 2.0 - 4.0	42.1	–			Medium stiff to hard, crumbly gray and little brown lean clay FILL and clayey paper sludge, little sand, gravel, trace roots. HP > 4.5 tsf.
3							
4		SP-1 4.0 - 6.0		11-12-12-15			Stiff light gray clayey paper sludge, little clay, brick debris, moist.
5							
6							
7		SP-2 6.5 - 8.0		3-4-4			
8	24 / 14	ST-3 8.0 - 10.0	77.0	–			Soft mottle dark and light gray clayey paper sludge, wet. HP = 0.25 tsf.
9							
10	24 / 18	ST-4 10.0 - 12.0	109.0	–			Soft dark gray fibrous paper sludge, wet. HP = 0.5 tsf.
11							
12							

REMARKS:
HP = Hand penetrometer reading in tons per square foot.
PID reading ranged from 1.0 to 4.3 ppm.

Hull & associates, inc.

Lot 4268
Former Rendering Plan

RAA028

Date Started	: 08/25/04
Date Completed	: 08/25/04
Logged by	: Ye Zhuang
Reviewed by	:
Drilling Contractor	: Double J Drilling
Drilling Method	:
Sampling Method	: Shelby Tube & Split Spoon
Total Depth (ft.)	: 15.6
S. Water Level Date	: NA
S. Water Level (ft.)	: None

LOG OF BORING B-2

G. Elev. (ft. USGS)	:
PID/ FID Model	: MSA Passport
PID/ FID Calibration	: 100 ppm Isobutylene

Soil Samples: Sampled Interval

Water Levels: Static; During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	Moisture Content (%)	Blow Count (6"-6"-6")	Sample	GRAPHIC	DESCRIPTION
12	24 / 19	ST-5 12.0 - 14.0	98.7	–			Same as above. HP = 0.25 tsf.
13							
14	24 / 16	ST-6 14.0 - 15.5	111.7	–			Same as above. HP = 0.25 tsf.
15		SP-3		50/1			Shelby tube refusal at 15.5 feet.
							Topsoil, gravel, organics, little concrete debris. Split spoon refusal. End of boring at 15.6 feet.
16							
17							
18							
19							
20							
21							
22							
23							
24							

REMARKS:
HP = Hand penetrometer reading in tons per square foot.
PID reading ranged from 1.0 to 4.3 ppm.

Hull & associates, inc.

Lot 4268
Former Rendering Plan

RAA028

Date Started	: 08/25/04
Date Completed	: 08/25/04
Logged by	: Ye Zhuang
Reviewed by	:
Drilling Contractor	: Double J Drilling
Drilling Method	: Hollow Stem Auger
Sampling Method	: Split Spoon
Total Depth (ft.)	: 15.6
S. Water Level Date	: NA
S. Water Level (ft.)	: NA

LOG OF BORING B-2A

G. Elev. (ft. USGS)	:
PID/ FID Model	: MSA Passport
PID/ FID Calibration	: 100 ppm Isobutylene

Soil Samples
Sampled Interval

Water Levels
Static
During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	Moisture Content (%)	Blow Count (6"-6"-6")	Sample	Graphic	Water Level	Description
0								
1								
2								Vane Shear Test Hole.
3								0.0 to 10.0 - No vane shear test was performed due to the high stiffness of the material.
4								
5								
6								
7								
8								
9								
10								Vane shear test performed every 1 foot from 10.0 to 15.5 feet, total of 5 tests.
11								
12								

REMARKS:
PID reading ranged from 1.0 to 4.3 ppm.

Hull & associates, inc.

Lot 4268
Former Rendering Plan

RAA028

Date Started	: 08/25/04
Date Completed	: 08/25/04
Logged by	: Ye Zhuang
Reviewed by	:
Drilling Contractor	: Double J Drilling
Drilling Method	: Hollow Stem Auger
Sampling Method	: Split Spoon
Total Depth (ft.)	: 15.6
S. Water Level Date	: NA
S. Water Level (ft.)	: NA

LOG OF BORING B-2A

G. Elev. (ft. USGS)	:
PID/ FID Model	: MSA Passport
PID/ FID Calibration	: 100 ppm Isobutylene

Soil Samples: Sampled Interval

Water Levels: Static; During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	Moisture Content (%)	Blow Count (6"-6"-6")	Sample	Graphic	Water Level	Description
12								
13								
14								
15	1.0 / 0.0	SP-1		50/1				Vane refusual at 15.5 feet.
								Split spoon refusal. End of boring at 15.6 feet.
16								
17								
18								
19								
20								
21								
22								
23								
24								

REMARKS:
PID reading ranged from 1.0 to 4.3 ppm.

Hull & associates, inc.

Lot 4268
Former Rendering Plan

RAA028

Date Started	: 08/25/04
Date Completed	: 08/25/04
Logged by	: Ye Zhuang
Reviewed by	:
Drilling Contractor	: Double J Drilling
Drilling Method	:
Sampling Method	: Shelby Tube & Split Spoon
Total Depth (ft.)	: 23.5
S. Water Level Date	: NA
S. Water Level (ft.)	: None

LOG OF BORING B-3

G. Elev. (ft. USGS)	:
PID/ FID Model	: MSA Passport
PID/ FID Calibration	: 100 ppm Isobutylene

Soil Samples: ⊠ Sampled Interval

Water Levels: ▼ Static; ▽ During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	Moisture Content (%)	Blow Count (6"-6"-6")	Sample	GRAPHIC	DESCRIPTION
0	24 / 15.5	ST-1 0.0 - 2.0	40.7	–	X		Medium stiff brownish light gray clayey paper sludge, moist. HP = 2.0 tsf
1							
2	24 / 17	ST-2 2.0 - 4.0	55.1	–	X		Medium stiff light gray clayey paper sludge, little gravel, moist.
3							
4	24 / 24	ST-3 4.0 - 6.0	34.0	–	X		
5							Medium stiff brownish light gray clayey paper sludge, little gravel, trace coal, wood,moist. HP = 1.5 tsf
6	24 / 23	ST-4 6.0 - 8.0	58.2	–	X		
7							Medium stiff light gray to chalky crumbly clayey paper sludge, moist. LL = 71, PL = 40, PI = 31
							Medium stiff to soft gray clayey paper sludge, wet.
8	24 / 17	ST-5 8.0 - 10.0	100.0	–	X		
9							Soft to medium stiff mottled light and dark gray fibrous paper sludge, wet. HP = 0.25 tsf
10	24 / 14	ST-6 10.0 - 12.0	101.9	–	X		
11							Same as above. HP = 0.75 tsf
12							

REMARKS:
HP = Hand penetrometer reading in tons per square foot.
PID reading ranged from 1.0 to 4.3 ppm.

Hull & associates, inc.

Lot 4268
Former Rendering Plan

RAA028

Date Started	: 08/25/04
Date Completed	: 08/25/04
Logged by	: Ye Zhuang
Reviewed by	:
Drilling Contractor	: Double J Drilling
Drilling Method	:
Sampling Method	: Shelby Tube & Split Spoon
Total Depth (ft.)	: 23.5
S. Water Level Date	: NA
S. Water Level (ft.)	: None

LOG OF BORING B-3

G. Elev. (ft. USGS)	:
PID/ FID Model	: MSA Passport
PID/ FID Calibration	: 100 ppm Isobutylene

Soil Samples: Sampled Interval

Water Levels: Static; During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	Moisture Content (%)	Blow Count (6"-6"-6")	Sample	GRAPHIC	DESCRIPTION
12	12 / 12	ST-7 12.0 - 13.0	82.3	--			Same as above. Tube refusal at 13.0 feet.
13		SP-1 13.0 - 15.0		4-3-3-3			1 inch plywood, poor recovery.
14							
15	24 / 24	ST-8 15.0 - 17.0	87.6	--			Soft to medium stiff dark gray fibrous paper sludge, moist to wet. HP = 0.5 tsf
16							
17	24 / 24	ST-9 17.0 - 19.0	70.3	--			
18							
19	24 / 24	ST-10 19.0 - 21.0	76.2	--			
20							
21		SP-2 21.0 - 23.0		4-4-5-9			Black to dark brown highly organic topsoil trace gravel, rock, glass, moist.
22							
23		SP-3 23.0 -23.5		50/6			Very dense brown medium to coarse SAND, some gravel, moist. Split spoon refusal. End of boring at 23.5 feet.
24							

REMARKS:
HP = Hand penetrometer reading in tons per square foot.
PID reading ranged from 1.0 to 4.3 ppm.

Hull & associates, inc.

Lot 4268
Former Rendering Plan

RAA028

Date Started	: 08/25/04
Date Completed	: 08/25/04
Logged by	: Ye Zhuang
Reviewed by	:
Drilling Contractor	: Double J Drilling
Drilling Method	: Hollow Stem Auger
Sampling Method	: Split Spoon
Total Depth (ft.)	: 17.5
S. Water Level Date	: NA
S. Water Level (ft.)	: NA

LOG OF BORING B-3A

G. Elev. (ft. USGS)	:
PID/ FID Model	: MSA Passport
PID/ FID Calibration	: 100 ppm Isobutylene

Soil Samples
Sampled Interval

Water Levels
Static
During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	Moisture Content (%)	Blow Count (6"-6"-6")	Sample	Graphic	Water Level	Description
0								
1								
2								Vane Shear Test Hole.
3								0.0 to 8.0 - No vane shear test was performed.
4								
5								
6								
7								
8								Vane shear test performed every 1 foot from 8.0 to 17.5 feet, total of 9 tests.
9								
10								
11								
12								

REMARKS:
PID reading ranged from 1.0 to 4.3 ppm.

Hull & associates, inc.

Lot 4268
Former Rendering Plan

RAA028

Date Started	: 08/25/04
Date Completed	: 08/25/04
Logged by	: Ye Zhuang
Reviewed by	:
Drilling Contractor	: Double J Drilling
Drilling Method	: Hollow Stem Auger
Sampling Method	: Split Spoon
Total Depth (ft.)	: 17.5
S. Water Level Date	: NA
S. Water Level (ft.)	: NA

LOG OF BORING B-3A

G. Elev. (ft. USGS)	:
PID/ FID Model	: MSA Passport
PID/ FID Calibration	: 100 ppm Isobutylene

Soil Samples
Sampled Interval

Water Levels
Static
During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	Moisture Content (%)	Blow Count (6"-6"-6"-6")	Sample	Graphic	Water Level	Description
12								
13								
14								
15								
16								
17								Vane refusual at 17.5 feet.
18								
19								
20								
21								
22								
23								
24								

REMARKS:
PID reading ranged from 1.0 to 4.3 ppm.

Hull & associates, inc.

Lot 4268
Former Rendering Plan

RAA028

Date Started	: 08/25/04
Date Completed	: 08/25/04
Logged by	: Ye Zhuang
Reviewed by	:
Drilling Contractor	: Double J Drilling
Drilling Method	:
Sampling Method	: Shelby Tube & Split Spoon
Total Depth (ft.)	: 9.5
S. Water Level Date	: NA
S. Water Level (ft.)	: None

LOG OF BORING B-4

G. Elev. (ft. USGS)	:
PID/ FID Model	: MSA Passport
PID/ FID Calibration	: 100 ppm Isobutylene

Soil Samples: Sampled Interval

Water Levels: Static; During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	Moisture Content (%)	Blow Count (6"-6"-6")	Sample	GRAPHIC	DESCRIPTION
0	24 / 22	ST-1 0.0 - 2.0	28.0	–			Stiff to hard light gray clayey paper sludge, trace gravel and roots, damp. HP > 4.5 tsf
1							
2	24 / 24	ST-2 2.0 - 4.0	24.0	–			
3							
4	18 / 18	ST-3 4.0 - 5.5	26.9	–			Crumbly light gray and brown paper sludge and lean clay, little gravel, trace roots, topsoil at bottom.
5							Tube refusal at 5.5 feet.
		SP-1 5.5 - 6.5		23-50/6			Medium to very dense dark gray to brown fine to medium SAND (SW), little gravel, damp.
6		SP-3 6.5 - 8.0		40-25-15			
7							
8		SP-4 8.0 - 9.5		14-12-13			
9							End of boring at 9.5 feet.
10							
11							
12							

REMARKS:
HP = Hand penetrometer reading in tons per square foot.
No vane shear test was performed at B-4 location.
PID reading ranged from 1.0 to 4.3 ppm.

Hull & associates, inc.

Moraine Property
Soilders Home Road
Moraine, Ohio

ETH001

Environmental Assessment

Date Started	: 06/23/2011
Date Completed	: 06/23/2011
Logged by	: Nate Hull
Reviewed by	: Steve Gross
Drilling Contractor	: EnviroCore
Drilling Method	: Direct Push
Sampling Method	: 4' long macrocore
Total Depth (ft.)	: 12.0
S. Water Level Date	:
S. Water Level (ft.)	:

LOG OF BORING SB-5

G. Elev. (ft. USGS)	:
PID/ FID Model	: MSA Passport
PID/ FID Calibration	: 100 ppm Isobutylene

Soil Samples
- Sampled Interval
- Samples Sent to Lab

Water Levels
- Static
- During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	PID / FID (ppm)	Sample	GRAPHIC	DESCRIPTION
0	4.0 / 4.0	MC-1 / SS-1 0.0 - 2.0	0.0			0.0 to 6.0 - Firm medium gray to light gray, CLAY, little silt, trace to no sand and gravel, dry-damp, paper sludge.
1						
2		SS-2 2.0 - 4.0	0.9			
3						
4	4.0 / 4.0	MC-2 / SS-3 4.0 - 6.0	0.6			
5						
6		SS-4 6.0 - 8.0	0.3			6.0 to 7.0 - Firm light gray, SILTY CLAY, trace to no sand and gravel, moist.
7						7.0 to 9.0 - Soft grayish brown then dark red, CLAYEY SILT, trace fine sand and gravel subrounded, moist.
8	4.0 / 4.0	MC-3 / SS-5 8.0 - 10.0	0.0			
9						9.0 to 12.0 - Soft dark gray, CLAY, with silt, little to trace fine sand and gravel, moist.
10		SS-6 10.0 - 12.0	0.1			
11						
12						End of boring at 12.0 feet.
13						
14						
15						
16						
17						
18						

REMARKS:
Samples submitted for analysis:
ETH001:SB-05:S000020
ETH001:SB-05:S110120

Hull & associates, inc.

Moraine Property
Soilders Home Road
Moraine, Ohio

ETH001

Environmental Assessment

Date Started	: 06/23/2011
Date Completed	: 06/23/2011
Logged by	: Nate Hull
Reviewed by	: Steve Gross
Drilling Contractor	: EnviroCore
Drilling Method	: Direct Push
Sampling Method	: 4' long macrocore
Total Depth (ft.)	: 12.0
S. Water Level Date	:
S. Water Level (ft.)	:

LOG OF BORING SB-6

G. Elev. (ft. USGS)	:
PID/ FID Model	: MSA Passport
PID/ FID Calibration	: 100 ppm Isobutylene

Soil Samples
- Sampled Interval
- Samples Sent to Lab

Water Levels
- Static
- During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	PID / FID (ppm)	Sample	GRAPHIC	DESCRIPTION
0	4.0 / 4.0	MC-1 / SS-1 0.0 - 2.0	0.3			0.0 to 4.0 - Gray, CLAY, little silt, trace to no sand and gravel, a few slag/metal fragments, dry-damp, paper sludge.
1						
2		SS-2 2.0 - 4.0	0.1			
3						
4	4.0 / 4.0	MC-2 / SS-3 4.0 - 6.0	0.4			4.0 to 7.0 - SAA only light gray.
5						
6		SS-4 6.0 - 8.0	0.2			
7						7.0 to 12.0 - Dark gray, SILTY CLAY, trace to no sand and gravel, light gray mottling, very moist to wet. No signs of paper sludge.
8	4.0 / 4.0	MC-3 / SS-5 8.0 - 10.0	0.2			
9						
10		SS-6 10.0 - 11.0	0.1			
11		SS-7 11.0 - 12.0	0.2			
12						End of boring at 12.0 feet.
13						
14						
15						
16						
17						
18						

REMARKS:
Samples submitted for analysis:
ETH001:SB-05:S000020
ETH001:SB-05:S110120

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Hull & associates, inc.

Moraine Property
Soilders Home Road
Moraine, Ohio

ETH001

Environmental Assessment

Date Started	: 06/23/2011
Date Completed	: 06/23/2011
Logged by	: Nate Hull
Reviewed by	: Steve Gross
Drilling Contractor	: EnviroCore
Drilling Method	: Direct Push
Sampling Method	: 4' long macrocore
Total Depth (ft.)	: 14.0
S. Water Level Date	:
S. Water Level (ft.)	:

LOG OF BORING SB-7

G. Elev. (ft. USGS)	:
PID/ FID Model	: MSA Passport
PID/ FID Calibration	: 100 ppm Isobutylene

Soil Samples
- Sampled Interval
- Samples Sent to Lab

Water Levels
- Static
- During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	PID / FID (ppm)	Sample	GRAPHIC	DESCRIPTION
0	4.0 / 4.0	MC-1 / SS-1 0.0 - 2.0	0.1			0.0 to 0.5 - Brown, SILTY CLAY, little F-M sand and gravel.
1						0.5 to 4.0 - Firm gray, CLAY, trace silt and sand, dry & crumbly, paper sludge.
2		SS-2 2.0 - 4.0	0.0			
3						
4	4.0 / 4.0	MC-2 / SS-3 4.0 - 6.0	0.0			4.0 to 9.5 - Gray, CLAY, little silt, trace to no sand and gravel, subrounded, moist, paper sludge.
5						
6		SS-4 6.0 - 8.0	0.2			
7						
8	4.0 / 4.0	MC-3 / SS-5 8.0 - 10.0	0.1			
9						
10		SS-6 10.0 - 12.0	0.4			9.5 to 13.5 - Dark brown, CLAY, with silt, trace F-M sand and gravel. Topsoil located @ 11.4 - original ground surface, wood fragments, moist.
11						
12	2.0 / 2.0	MC-4 / SS-7 12.0 - 14.0	0.0			
13						
14						13.5 to 14.0 - SAA silt and moisture % increasing with depth.
						End of boring at 14.0 feet.
15						
16						
17						
18						

REMARKS:
Samples submitted for analysis:
ETH001:SB-07:S000020
ETH001:SB-07:S110130

Hull & associates, inc.

Moraine Property
Soilders Home Road
Moraine, Ohio

ETH001

Environmental Assessment

Date Started	: 06/23/2011
Date Completed	: 06/23/2011
Logged by	: Nate Hull
Reviewed by	: Steve Gross
Drilling Contractor	: EnviroCore
Drilling Method	: Direct Push
Sampling Method	: 4' long macrocore
Total Depth (ft.)	: 18.0
S. Water Level Date	:
S. Water Level (ft.)	:

LOG OF BORING SB-8

G. Elev. (ft. USGS)	:
PID/ FID Model	: MSA Passport
PID/ FID Calibration	: 100 ppm Isobutylene

Soil Samples
- Sampled Interval
- Samples Sent to Lab

Water Levels
- Static
- During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	PID / FID (ppm)	Sample	GRAPHIC	DESCRIPTION
0	4.0 / 4.0	MC-1 / SS-1 0.0 - 2.0	0.2			0.0 to 4.0 - Gray, SILTY CLAY, litlle F-M sand and gravel, light gray and dark red mottling, moist.
2		SS-2 2.0 - 4.0	0.1			
4	4.0 / 4.0	MC-2 / SS-3 4.0 - 6.0	0.0			4.0 to 8.0 - Gray, CLAY, with silt, little F-M sand and gravel, moist, paper sludge.
6		SS-4 6.0 - 8.0	0.0			
8	4.0 / 4.0	MC-3 / SS-5 8.0 - 10.0	0.2			8.0 to 9.5 - SAA with black mottles.
10		SS-6 10.0 - 12.0	0.0			9.5 to 14.0 - Gray, CLAY, little silt, trace F-M sand and gravel. Paper pulp sludge, fiberous, moist.
12	4.0 / 4.0	MC-4 / SS-7 12.0 - 14.0	0.0			
14		SS-8 14.0 - 16.0	0.0			14.0 to 18.0 - Gray and black, CLAY, little silt, little to trace F-M sand and gravel, very moist, no paper fiber/sludge.
16	2.0 / 2.0	MC-5 / SS-9 16.0 - 18.0	0.1			
18						End of boring at 18.0 feet.
19						
20						

REMARKS:
Samples submitted for analysis:
ETH001:SB-08:S000020
ETH001:SB-08:S160180

Hull & associates, inc.

Moraine Property
Soilders Home Road
Moraine, Ohio

ETH001

Environmental Assessment

Date Started	: 06/23/2011
Date Completed	: 06/23/2011
Logged by	: Nate Hull
Reviewed by	: Steve Gross
Drilling Contractor	: EnviroCore
Drilling Method	: Direct Push
Sampling Method	: 4' long macrocore
Total Depth (ft.)	: 9.0
S. Water Level Date	:
S. Water Level (ft.)	:

LOG OF BORING SB-9

G. Elev. (ft. USGS)	:
PID/ FID Model	: MSA Passport
PID/ FID Calibration	: 100 ppm Isobutylene

Soil Samples
- Sampled Interval
- Samples Sent to Lab

Water Levels
- Static
- During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	PID / FID (ppm)	Sample	GRAPHIC	DESCRIPTION
0	4.0 / 4.0	MC-1 / SS-1 0.0 - 2.0	0.0			0.0 to 0.8 - Soft dark brown to gray, SILTY CLAY, trace to no sand and gravel (fine), high organic content - wood fragments and leaf litter, moist.
1						0.8 to 3.5 Firm gray, CLAY, little silt, no sand and gravel, paper sludge, moist.
2		SS-2 2.0 - 3.0	0.1	X		
3						
4	4.0 / 4.0	MC-2 / SS-3 3.0 - 5.0	0.1			3.5 to 7.0 - Firm dark gray, SAA, some brown mottling, paper sludge moist to wet..
5		SS-4 5.0 - 7.0	0.1	X		
6						
7						7.0 to 8.5 - Soft brown and black, CLAY, with silt, little fine to medium sand and gravel, topsoil, some wood fragments, moist.
8	4.0 / 1.0	MC-3 / SS-5 7.0 - 9.0	0.2			8.5 to 9.0 - Soft brown, SANDY CLAY, moist.
9						End of boring at 9.0 feet.
10						
11						
12						

REMARKS:
Samples submitted for analysis:
ETH001:SB-09:S000020
ETH001:SB-09:S030050
ETH001:SB-09:S070090

Hull & associates, inc.

Moraine Property
Soilders Home Road
Moraine, Ohio

ETH001

Environmental Assessment

Date Started	: 06/23/2011
Date Completed	: 06/23/2011
Logged by	: Nate Hull
Reviewed by	: Steve Gross
Drilling Contractor	: EnviroCore
Drilling Method	: Direct Push
Sampling Method	: 4' long macrocore
Total Depth (ft.)	: 8.0
S. Water Level Date	:
S. Water Level (ft.)	:

LOG OF BORING SB-10

G. Elev. (ft. USGS)	:
PID/ FID Model	: MSA Passport
PID/ FID Calibration	: 100 ppm Isobutylene

Soil Samples
- Sampled Interval
- Samples Sent to Lab

Water Levels
- Static
- During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	PID / FID (ppm)	Sample	GRAPHIC	DESCRIPTION
0	4.0 / 4.0	MC-1 / SS-1 0.0 - 2.0	0.3			0.0 to 0.5 - Soft dark brown-black, CLAY, with silt, some fine to coarse sand and gravel, subrounded, topsoil, plant/vegetation fragments, moist-wet.
1						0.5 to 4.5 - Soft gray, CLAY, trace silt and sand, paper sludge, dry & crumbly.
2		SS-2 2.0 - 4.0	0.2			
3						
4	4.0 / 4.0	MC-2 / SS-3 4.0 - 6.0	0.1			
5						4.5 to 8.0 - Soft brown, SANDY CLAY, some silt and fine to medium gravel, dry-damp.
6		SS-4 6.0 - 8.0	0.3			
7						
8						End of boring at 8.0 feet.
9						
10						
11						
12						

REMARKS:
Samples submitted for analysis:
ETH001:SB-10:S000020
ETH001:SB-10:S060080

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Hull & associates, inc.

Moraine Property
Soilders Home Road
Moraine, Ohio

ETH001

Environmental Assessment

Date Started	: 06/23/2011
Date Completed	: 06/23/2011
Logged by	: Nate Hull
Reviewed by	: Steve Gross
Drilling Contractor	: EnviroCore
Drilling Method	: Direct Push
Sampling Method	: 4' long macrocore
Total Depth (ft.)	: 16.0
S. Water Level Date	:
S. Water Level (ft.)	:

LOG OF BORING SB-11

G. Elev. (ft. USGS)	:
PID/ FID Model	: MSA Passport
PID/ FID Calibration	: 100 ppm Isobutylene

Soil Samples
- Sampled Interval
- Samples Sent to Lab

Water Levels
- Static
- During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	PID / FID (ppm)	Sample	GRAPHIC	DESCRIPTION
0	4.0 / 4.0	MC-1 / SS-1 0.0 - 2.0	0.2			0.0 to 0.8 - Gray, CLAY, trace silt, trace to no sand and gravel, paper sludge, moist.
1						0.8 to 12.0 - Gray, CLAY, some silt, little to trace sand and gravel, coal fragments, moist.
2		SS-2 2.0 - 4.0	0.1			
3						
4	4.0 / 4.0	MC-2 / SS-3 4.0 - 6.0	0.1			
5						
6		SS-4 6.0 - 8.0	0.0			
7						
8	4.0 / 4.0	MC-3 / SS-5 8.0 - 10.0	0.2			
9						
10		SS-6 10.0 - 12.0	0.2			
11						
12	2.0 / 2.0	MC-4 / SS-7 12.0 - 14.0	0.0			12.0 to 12.5 - Black, FILL, coal waste, some wood and brick fragmets, dry.
13						12.5 to 16.0 - Brown, SILTY CLAY, little F-M sand and gravel, subrounded, very moist.
14		SS-8 14.0 - 16.0	0.0			
15						
16						End of boring at 16.0 feet.
17						
18						
19						
20						

REMARKS:
Samples submitted for analysis:
ETH001:SB-11:S000020
ETH001:SB-11:S060080

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Hull & associates, inc.

Moraine Property
Soilders Home Road
Moraine, Ohio

ETH001

Environmental Assessment

Date Started	: 06/23/2011
Date Completed	: 06/23/2011
Logged by	: Nate Hull
Reviewed by	: Steve Gross
Drilling Contractor	: EnviroCore
Drilling Method	: Direct Push
Sampling Method	: 4' long macrocore
Total Depth (ft.)	: 8.0
S. Water Level Date	:
S. Water Level (ft.)	:

LOG OF BORING SB-12

G. Elev. (ft. USGS)	:
PID/ FID Model	: MSA Passport
PID/ FID Calibration	: 100 ppm Isobutylene

Soil Samples
- Sampled Interval
- Samples Sent to Lab

Water Levels
- Static
- During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	PID / FID (ppm)	Sample	GRAPHIC	DESCRIPTION
0	4.0 / 4.0	MC-1 / SS-1 0.0 - 2.0	0.2			0.0 to 0.8 - Loose black then dark brown, SILTY SAND, trace gravel.
1						0.8 to 2.0 - SAA with brick fragments.
2		SS-2 2.0 - 4.0	0.1			2.0 to 7.0 - Soft gray, CLAY, with silt, trace fine to medium sand and gravel, paper sludge, moist.
3						
4	4.0 / 4.0	MC-2 / SS-3 4.0 - 5.0	0.0			
5						
6		SS-4 5.0 -7.0	0.1			
7		SS-5 7.0 - 8.0	0.1			7.0 to 8.0 - Soft brown and black, SILTY CLAY, with sand, little gravel, moist.
8						End of boring at 8.0 feet.
9						
10						
11						
12						

REMARKS:
Samples submitted for analysis:
ETH001:SB-12:S000020
ETH001:SB-12:S050070
ETH001:SB-12:S070080

Hull & associates, inc.

Moraine Property
Soilders Home Road
Moraine, Ohio

ETH001

Environmental Assessment

Date Started	: 06/23/2011
Date Completed	: 06/23/2011
Logged by	: Nate Hull
Reviewed by	: Steve Gross
Drilling Contractor	: EnviroCore
Drilling Method	: Direct Push
Sampling Method	: 4' long macrocore
Total Depth (ft.)	: 6.0
S. Water Level Date	:
S. Water Level (ft.)	:

LOG OF BORING SB-13

G. Elev. (ft. USGS)	:
PID/ FID Model	: MSA Passport
PID/ FID Calibration	: 100 ppm Isobutylene

Soil Samples
- Sampled Interval
- Samples Sent to Lab

Water Levels
- Static
- During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	PID / FID (ppm)	Sample	GRAPHIC	DESCRIPTION
0	4.0 / 4.0	MC-1 / SS-1 0.0 - 2.0	0.1			0.0 to 6.0 - Brown to dark brown/black, CLAY, with silt, trace F-M sand and gravel, moist. No signs of fill/sludge or any disturbance.
1						
2		SS-2 2.0 - 4.0	0.0			
3						
4	2.0 / 2.0	MC-2 / SS-3 4.0 - 6.0	0.0			
5						
6						End of boring at 6.0 feet.
7						
8						
9						
10						
11						
12						

REMARKS:
Samples submitted for analysis:
ETH001:SB-13:S000020
ETH001:SB-13:S040060

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Hull & associates, inc.

Moraine Property
Soilders Home Road
Moraine, Ohio

ETH001

Environmental Assessment

Date Started	: 06/23/2011
Date Completed	: 06/23/2011
Logged by	: Nate Hull
Reviewed by	: Steve Gross
Drilling Contractor	: EnviroCore
Drilling Method	: Direct Push
Sampling Method	: 4' long macrocore
Total Depth (ft.)	: 6.0
S. Water Level Date	:
S. Water Level (ft.)	:

LOG OF BORING SB-14

G. Elev. (ft. USGS)	:
PID/ FID Model	: MSA Passport
PID/ FID Calibration	: 100 ppm Isobutylene

Soil Samples
- Sampled Interval
- Samples Sent to Lab

Water Levels
- Static
- During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	PID / FID (ppm)	Sample	GRAPHIC	DESCRIPTION
0	4.0 / 4.0	MC-1 / SS-1 0.0 - 2.0	0.1			0.0 to 2.0 - Brown to black, SILTY CLAY, little F-M sand and gravel, some misc. fill debris, wood fragments, moist.
1						
2		SS-2 2.0 - 4.0	0.0			2.0 to 6.0 - Brown, CLAY, some silt, little to trace F sand and gravel, moist. No sign of any paper sludge.
3						
4	2.0 / 2.0	MC-2 / SS-3 4.0 - 6.0	0.0			
5						
6						End of boring at 6.0 feet.
7						
8						
9						
10						
11						
12						

REMARKS:
Samples submitted for analysis:
ETH001:SB-14:S000020
ETH001:SB-14:S040060

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Hull & associates, inc.

Moraine Property
Soilders Home Road
Moraine, Ohio

ETH001

Environmental Assessment

Date Started	: 06/23/2011
Date Completed	: 06/23/2011
Logged by	: Nate Hull
Reviewed by	: Steve Gross
Drilling Contractor	: EnviroCore
Drilling Method	: Direct Push
Sampling Method	: 4' long macrocore
Total Depth (ft.)	: 8.0
S. Water Level Date	:
S. Water Level (ft.)	:

LOG OF BORING SB-15

G. Elev. (ft. USGS)	:
PID/ FID Model	: MSA Passport
PID/ FID Calibration	: 100 ppm Isobutylene

Soil Samples
- Sampled Interval
- Samples Sent to Lab

Water Levels
- Static
- During Drilling

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	PID / FID (ppm)	Sample	GRAPHIC	DESCRIPTION
0	4.0 / 4.0	MC-1 / SS-1 0.0 - 2.0	0.2			0.0 to 2.0 - Firm gray, CLAY, little silt, trace sand and gravel, some brown mottles, plant/vegetation fragments.
1						
2		SS-2 2.0 - 4.0	0.3			2.0 to 6.0 - Firm gray, CLAY, with silt, trace fine to medium sand and gravel, paper sludge, moist.
3						
4	4.0 / 4.0	MC-2 / SS-3 4.0 - 6.0	0.1			
5						
6		SS-4 6.0 - 8.0	0.2			6.0 to 8.0 - Loose brown and black, SANDY SILT, with gravel, little clay, plant and wood fragments, moist.
7						
8						End of boring at 8.0 feet.
9						
10						
11						
12						

REMARKS:
Samples submitted for analysis:
ETH001:SB-15:S000020
ETH001:SB-15:S060080

01-24-2013 F:\Clients\ETH\ETH001\Soil Borings\SB-15.bor

APPENDIX F

Agencies Correspondence & Final Closure Plan City Lot #4268 – Moraine, Ohio

DEPARTMENT OF THE ARMY
HUNTINGTON DISTRICT, CORPS OF ENGINEERS
502 EIGHTH STREET
HUNTINGTON, WEST VIRGINIA 25701-2070

REPLY TO
ATTENTION OF

June 5, 2012

Regulatory Division
North Branch
LRH-2012-300-GMR-unnamed tributary to Great Miami River

APPROVED JURISDICTIONAL DETERMINATION
AND NATIONWIDE PERMIT NO.3 VERIFICATION

Mr. Angela Lageson, President
Moraine Properties, LLC
c/o Pentair Inc.
5500 Wayzata Blvd., Suite 800
Golden Valley, MN 55416

Dear Ms. Lageson:

I refer to the pre-construction notification (PCN) that was submitted on your behalf by Hull & Associates, Inc. and which was received in this office on April 20, 2012, with additional information received May 25, 2012, concerning the proposal to replace two existing, failing culverts and head wall in association with an Ohio Environmental Protection Agency (Ohio EPA) Voluntary Action Program (VAP) project. The proposed project is located in an unnamed tributary of the Great Miami River near Soldiers Home-West Carrollton Road in Moraine, Montgomery County, Ohio. The unnamed stream is a perennial tributary to the Great Miami River, a traditional navigable water (TNW) of the United States.

The United States Army Corps of Engineers (Corps) authority to regulate waters of the United States is based on the definitions and limits of jurisdiction contained in 33 CFR 328 and 33 CFR 329. Section 404 of the Clean Water Act requires that a Department of the Army (DA) permit be obtained prior to placing dredged or fill material into waters of the United States, including wetlands. Section 10 of the Rivers and Harbors Act of 1899 requires that a DA permit be obtained for any work in, on, over or under a navigable water.

The Corps' review of the jurisdictional determination is based on the information provided and other information available to us, and it has been determined your project site contains no wetlands and one stream. The unnamed tributary of the Great Miami River (approximately 452 linear feet) which is a perennial, relatively permanent water (RPW) is a direct tributary to the Great Miami River, a TNW. Therefore, the unnamed tributary of the Great Miami River is a water of the United States, subject to regulation under Section 404 of the Clean Water Act.

Printed on Recycled Paper

This jurisdictional verification is valid for a period of five years from the date of this letter unless new information warrants revision of the delineation prior to the expiration date. This letter contains an approved jurisdictional determination for the subject site. If you object to this determination, you may request an administrative appeal under Corps regulations at 33 CFR Part 331. Enclosed you will find a Notification of Appeal Process (NAP) fact sheet and Request for Appeal (RFA) form. If you request to appeal this determination you must submit a completed RFA form to the Great Lakes and Ohio River Division Office at the following address:

Appeals Review Officer
Great Lakes and Ohio River Division
550 Main Street, Room 10524
Cincinnati, Ohio 45202-3222
Phone: (513) 684-7261 Fax: (513) 684-2460

In order for an RFA to be accepted by the Corps, the Corps must determine that it is complete, that it meets the criteria for appeal under 33 CFR Part 331.5, and that it has been received by the Division Office within 60 days of the date of the NAP. Should you decide to submit an RFA form, it must be received at the above address by August 5, 2012. It is not necessary to submit an RFA form to the Division office if you do not object to the determination in this letter

In the PCN materials received in this office on April 20 and May 25, 2012, you have requested authorization to discharge approximately 85 cubic yards of dredged or fill material, below the ordinary high water mark in approximately 240 linear feet of the unnamed tributary of the Great Miami River in order to install a new culvert, associated headwall and rock channel protection to replace two existing, failing culverts and head wall. Additionally, the proposal includes the complete removal of an existing access road culvert (approximately 25 linear feet) to create an open channel in this location and the removal of sediment deposits from the inlet of an existing culvert, near the railroad, to restore the free flowing nature of the culvert system. The proposed work will be done as proposed in the PCN and attached plans.

Based on the provided information, it has been determined the proposed project meets the criteria for Nationwide Permit (NWP) No. 3 (attached) under the February 21, 2012 Federal Register, Reissuance of Nationwide Permits (77 FR 10184) provided you comply with all terms and conditions of the enclosed material and the attached 401 Water Quality Certification (WQC) issued for this NWP by the Ohio Environmental Protection Agency (OEPA) on March 30, 2012. The NWPs expire on March 18, 2017.

In view of the above, your proposed project is permitted subject to the terms and conditions of the enclosed material. It is your responsibility to ensure that your work conforms to all of the conditions listed within the enclosed material. Please be aware this NWP verification does not obviate the requirement to obtain any state or local assent required by law for the activities. As indicated above, OEPA issued 401 WQC for this NWP on March 30, 2012. Enclosed is a copy of the NWP and 401 WQC to be kept at the project site during construction.

Upon completion of the work, the attached certification must be signed and returned to this office at 10557 McKelvey Road, Cincinnati, Ohio 45420. If you have any questions concerning the above, please contact Ms. Laurie Moore at the Cincinnati Field Office at (513) 825-1901.

Sincerely,

Denise M. Marmer
Regulatory Project Manager
North Branch

Enclosures

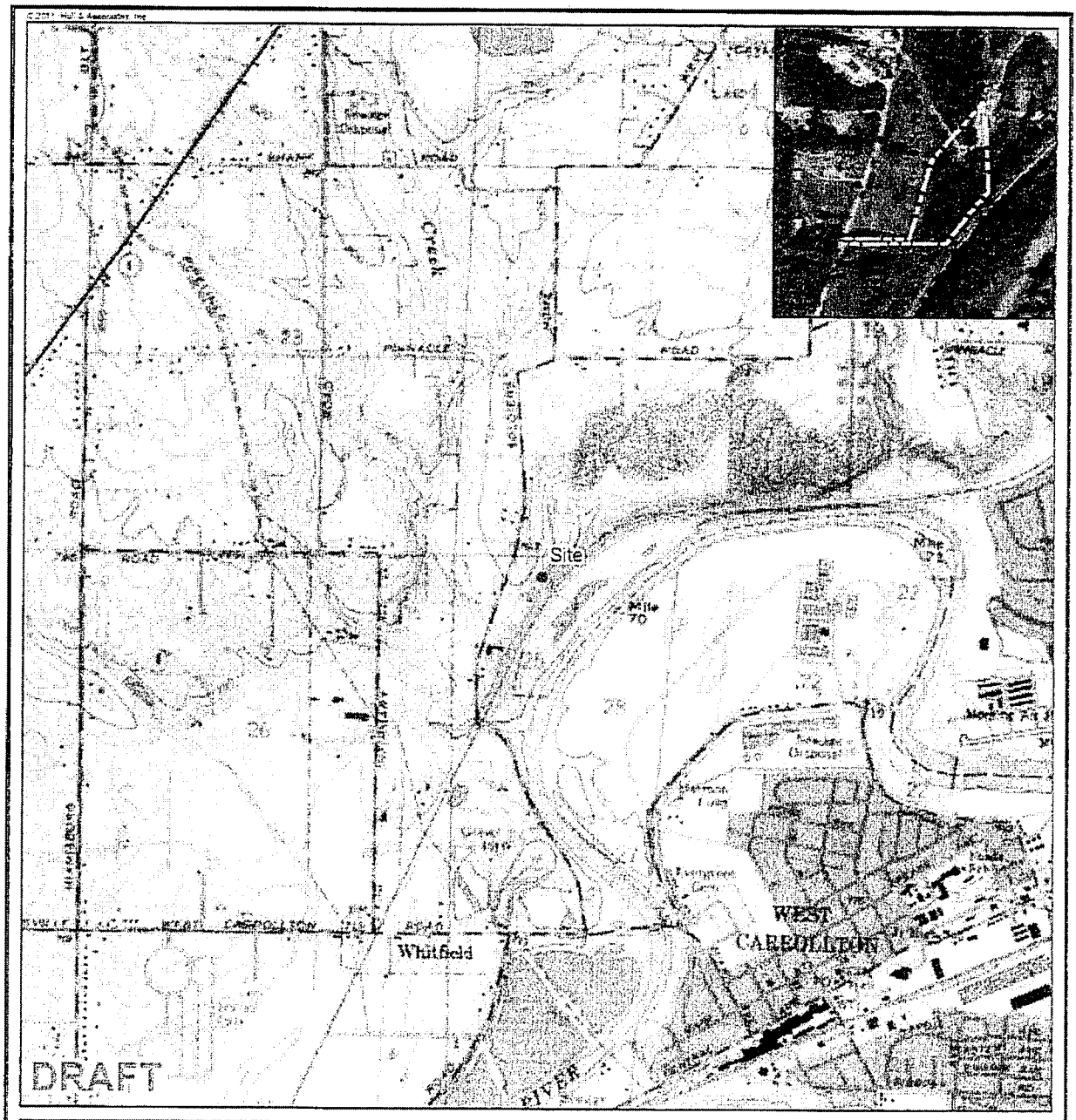
Copies furnished:

Mr. Hugh Crowell, Hull & Associates–via email
Ric Queen, Ohio EPA – via email
Joe Smindak, Ohio EPA – via email

SPECIAL CONDITIONS FOR THE NATIONWIDE PERMIT NO. 3 LRH-2012-300-GMR, MORAINE PROPERTIES CULVERT REPLACEMENT PROJECT

1. Activities shall not occur during the Ohio Department of Natural Resources (ODNR) in water work restricted period of April 15-June 30 for Class 3 primary headwater habitat streams, unless a waiver is granted by the aforementioned agency and provided to this office, in writing, prior to the commencement of construction activities.

2. Paper sludge and dredged material free of polycyclic biphenyls (PCBs) removed from the unnamed tributary of the Great Miami River shall be disposed of within the paper sludge containment area, as depicted in the pre-construction notification, and shall be adequately contained to preclude reentry into waters of the United States



Legend

- Site Location
- Approximate Site Boundaries

Source: The topographic map was acquired through the USGS Topographic Map web service. Topo quadrangle date not provided.

The aerial photo in the inset was acquired through the Microsoft Virtual Earth Aerial Photography web service. Aerial photography date not provided.

0 500 1,000 2,000 Feet

1:24,000

N

Hull & Associates, Inc.

6337 Emerald Parkway
Suite #200
Dublin, Ohio 43016

Phone: (614) 793-8777
Fax: (614) 793-9070
www.hullinc.com

Moraine Paper Sludge Capping

Site Vicinity Map

Montgomery County, Ohio

Date:

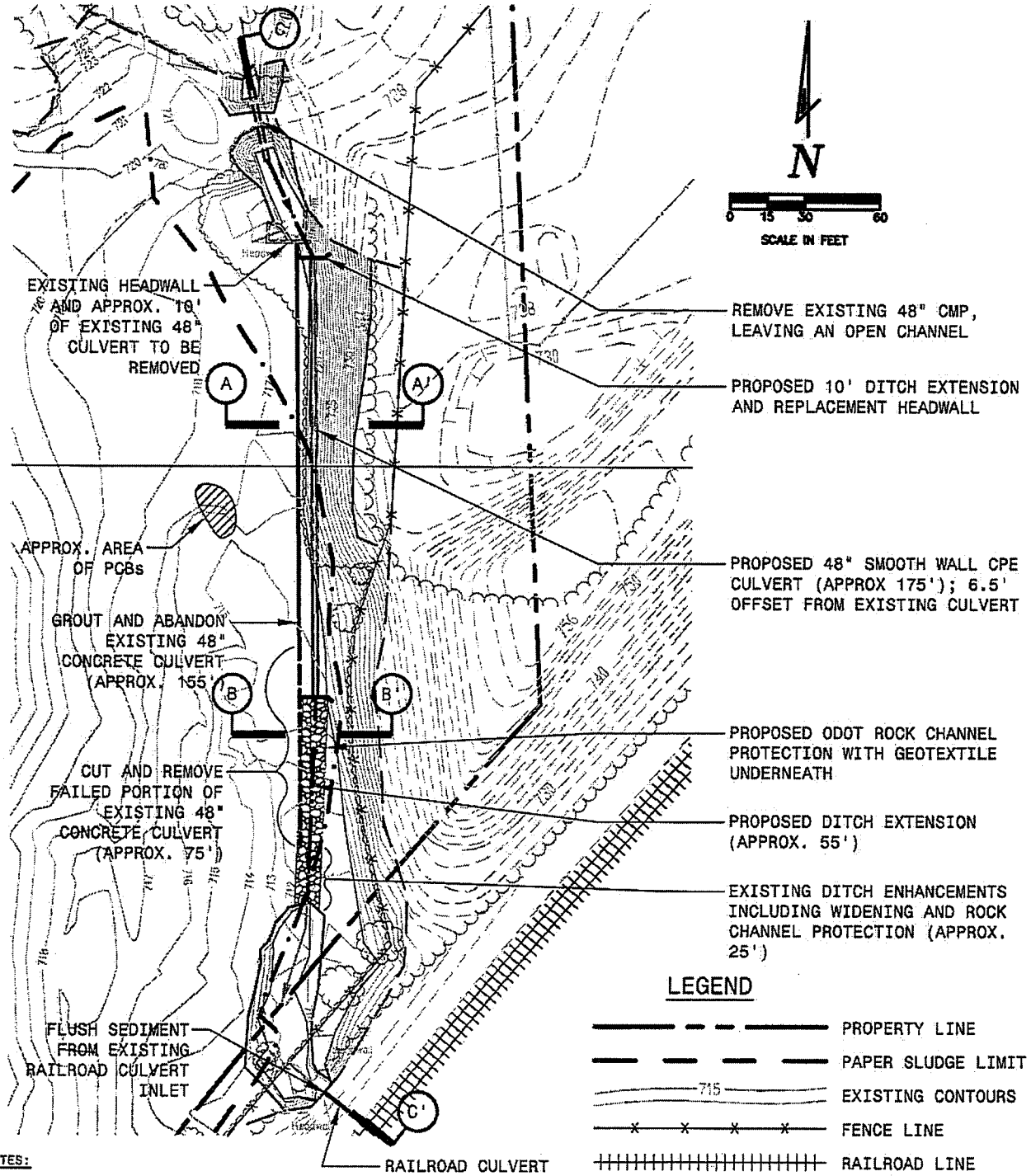
April 2012

File Name:
ETH001_01_01_SiteVicinity.mxd

Edited: 4/3/2012 By: lesauchette

Figure

1



NOTES:

1. EXISTING TOPOGRAPHY OUTLINED WAS CREATED USING SURVEYED GROUND SHOTS. SITE FEATURES AND TOPOGRAPHY WAS SURVEYED BY BERDING SURVEYING DATED: 9/2/11.

2. BASE MAP OUTSIDE SURVEYED AREA TAKEN FROM MALCOLM PIRNIE, INC. DRAWING NO. 3730C015, DATED 3/02.

Hull & associates, inc.
ENGINEERS | GEOLOGISTS | SCIENTISTS | PLANNERS

6397 EMERALD PARKWAY
SUITE 200
DUBLIN, OHIO 43016

PHONE: (614) 793-8777
FAX: (614) 793-9070
www.hullinc.com

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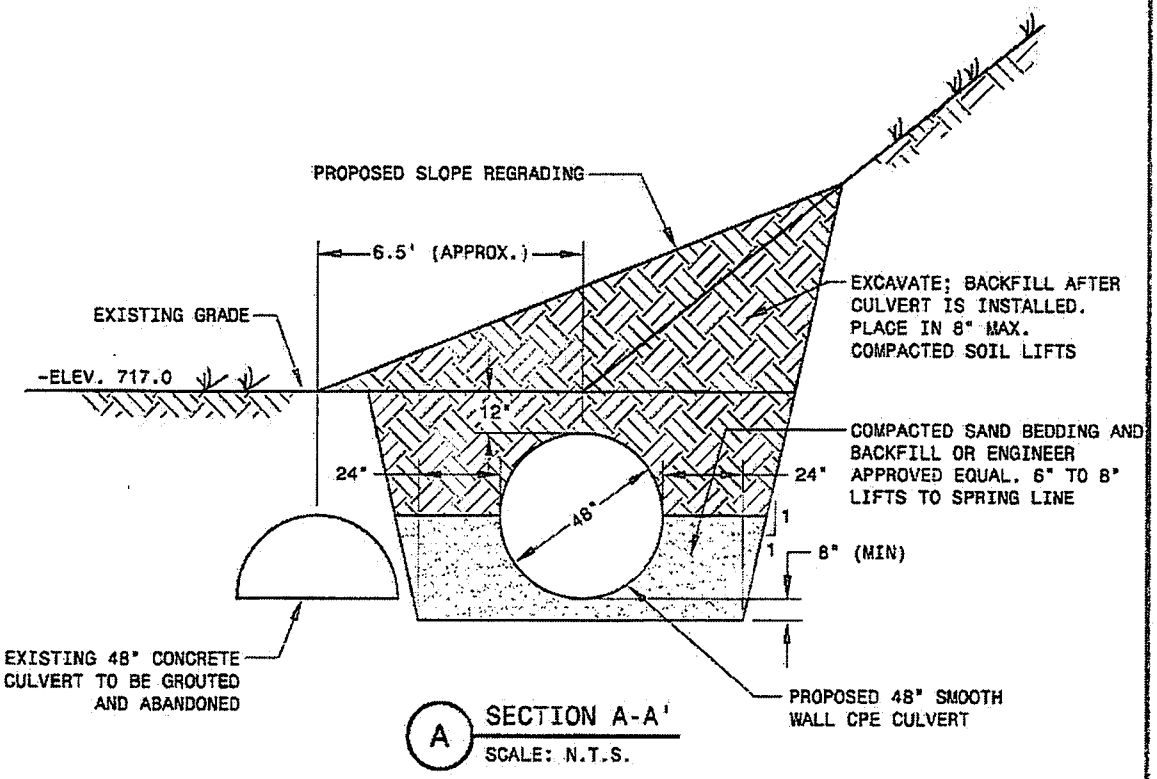
MORAINE PAPER SLUDGE CAPPING

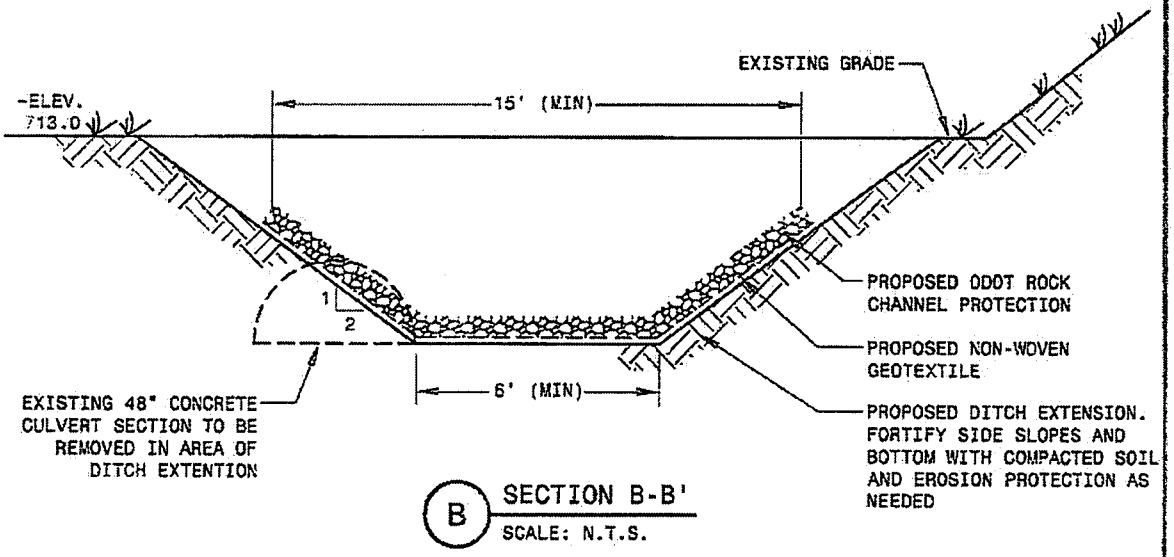
FIGURE 2
PLAN VIEW

MONTGOMERY COUNTY, OHIO

PROJECT NO.:	ETH001	SUBMITTAL DATE:	MAY 2012
CAD DWG FILE:	ETH001.200.0003	PLOT DATE:	5/22/12



A SECTION A-A'
SCALE: N.T.S.



B SECTION B-B'
SCALE: N.T.S.

Hull & associates, inc.
ENGINEERS | GEOLOGISTS | SCIENTISTS | PLANNERS
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DUBLIN, OHIO 43016
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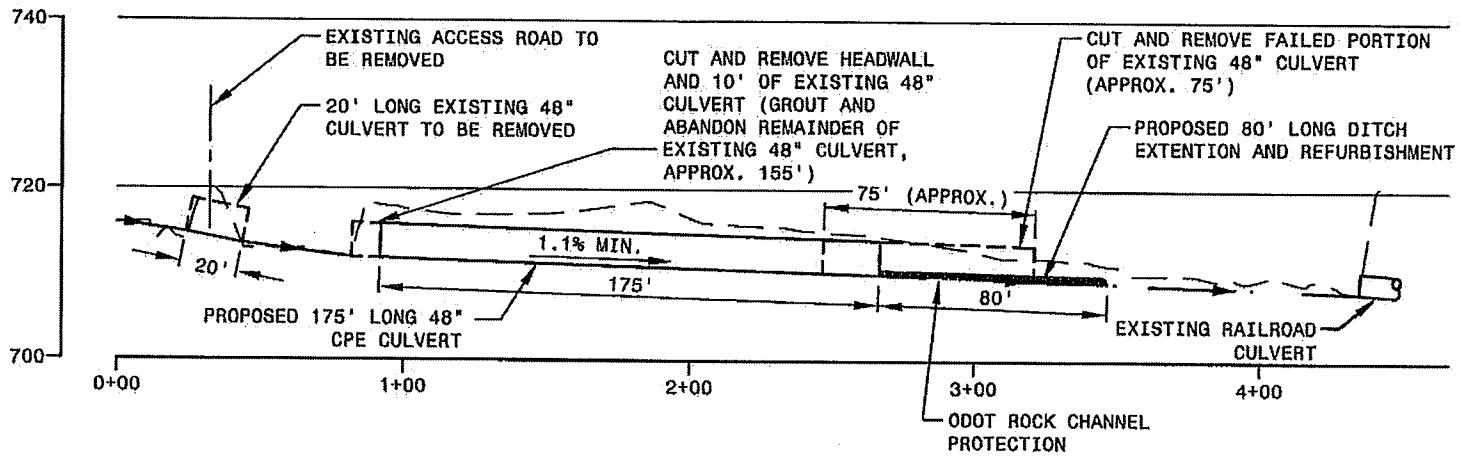
MORAINE PAPER SLUDGE CAPPING

FIGURE 3
CROSS-SECTIONS A AND B

MONTGOMERY COUNTY, OHIO

PROJECT NO.:	ETH001	SUBMITTAL DATE:	APRIL 2012
CAD DWG FILE:	ETH001.200.0003	PLOT DATE:	4/11/12



(C) DITCH/CULVERT PROFILE C-C'

SCALE: H-1"=60'
V-1"=20'

NOTE:
EXISTING CULVERT SECTIONS TO BE REMOVED SHOWN AS DASHED AND BEHIND PROPOSED CULVERT.

Hull & associates, inc.
ENGINEERS | GEOLOGISTS | SCIENTISTS | PLANNERS
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DUBLIN, OHIO 43016
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FAX: (614) 793-9070
www.hullinc.com

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MORAINE PAPER SLUDGE CAPPING

FIGURE 4
PROFILE OF DITCH/CULVERT

MONTGOMERY COUNTY, OHIO

PROJECT NO.:	ETH001	SUBMITTAL DATE:	MAY 2012
CAD DWG FILE:	ETH001.200.0003	PLOT DATE:	5/25/12

CELRH-RD-N-CIN

Permit Number: Unnamed tributary to the Great Miami River– LRH-2012-300-GMR

Name of Permittee: Moraine Properties, LLC

Date of Issuance: June 5, 2012

Upon completion of the activity authorized by this permit and any mitigation required by the permit, sign this certification and return it to the following address:

U.S. Army Corps of Engineers – Huntington District
Regulatory Division, Cincinnati Field Office
10557 McKelvey Road
Cincinnati, Ohio 45240

Please note that your permitted activity is subject to a compliance inspection by an U.S. Army Corps of Engineers representative. If you fail to comply with this permit you are subject to permit suspension, modification, or revocation.

I hereby certify that the work authorized by the above referenced permit has been completed in accordance with the terms and conditions of the said permit, and required mitigation was completed in accordance with the permit conditions.

_____ _____

Signature of Permittee **Date**

NOTIFICATION OF ADMINISTRATIVE APPEAL OPTIONS AND PROCESS AND REQUEST FOR APPEAL

Applicant: Moraine Properties, LLC	File Number: LRH-2012-300-GMR	Date: 06/ 5 /2012
Attached is:		See Section below
	INITIAL PROFFERED PERMIT (Standard Permit or Letter of permission)	A
	PROFFERED PERMIT (Standard Permit or Letter of permission)	B
	PERMIT DENIAL	C
X	APPROVED JURISDICTIONAL DETERMINATION	D
	PRELIMINARY JURISDICTIONAL DETERMINATION	E

SECTION I - The following identifies your rights and options regarding an administrative appeal of the above decision. Additional information may be found at http://www.usace.army.mil/CECW/Pages/reg_materials.aspx or Corps regulations at 33 CFR Part 331.

A: INITIAL PROFFERED PERMIT: You may accept or object to the permit.

- ACCEPT: If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.
- OBJECT: If you object to the permit (Standard or LOP) because of certain terms and conditions therein, you may request that the permit be modified accordingly. You must complete Section II of this form and return the form to the district engineer. Your objections must be received by the district engineer within 60 days of the date of this notice, or you will forfeit your right to appeal the permit in the future. Upon receipt of your letter, the district engineer will evaluate your objections and may: (a) modify the permit to address all of your concerns, (b) modify the permit to address some of your objections, or (c) not modify the permit having determined that the permit should be issued as previously written. After evaluating your objections, the district engineer will send you a proffered permit for your reconsideration, as indicated in Section B below.

B: PROFFERED PERMIT: You may accept or appeal the permit

- ACCEPT: If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.
- APPEAL: If you choose to decline the proffered permit (Standard or LOP) because of certain terms and conditions therein, you may appeal the declined permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

C: PERMIT DENIAL: You may appeal the denial of a permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

D: APPROVED JURISDICTIONAL DETERMINATION: You may accept or appeal the approved JD or provide new information.

- ACCEPT: You do not need to notify the Corps to accept an approved JD. Failure to notify the Corps within 60 days of the date of this notice, means that you accept the approved JD in its entirety, and waive all rights to appeal the approved JD.
- APPEAL: If you disagree with the approved JD, you may appeal the approved JD under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

E: PRELIMINARY JURISDICTIONAL DETERMINATION: You do not need to respond to the Corps regarding the preliminary JD. The Preliminary JD is not appealable. If you wish, you may request an approved JD (which may be appealed), by contacting the Corps district for further instruction. Also you may provide new information for further consideration by the Corps to reevaluate the JD.

SECTION II - REQUEST FOR APPEAL or OBJECTIONS TO AN INITIAL PROFFERED PERMIT

REASONS FOR APPEAL OR OBJECTIONS: (Describe your reasons for appealing the decision or your objections to an initial proffered permit in clear concise statements. You may attach additional information to this form to clarify where your reasons or objections are addressed in the administrative record.)

ADDITIONAL INFORMATION: The appeal is limited to a review of the administrative record, the Corps memorandum for the record of the appeal conference or meeting, and any supplemental information that the review officer has determined is needed to clarify the administrative record. Neither the appellant nor the Corps may add new information or analyses to the record. However, you may provide additional information to clarify the location of information that is already in the administrative record.

POINT OF CONTACT FOR QUESTIONS OR INFORMATION:

If you have questions regarding this decision and/or the appeal process you may contact:
Ginger Mullins, Chief, Regulatory Division, 304-399-5710
Susan Fields, Acting Chief, North Regulatory Branch, 304-399-5210
Mark Taylor, Chief, Energy Resource Branch, 304-399-5610
LuAnne Conley, Chief, South/Transportation Regulatory Branch, 304-399-5710
Address: U.S. Army Corps of Engineers
Regulatory Division
502 8th Street
Huntington, WV 25701

If you only have questions regarding the appeal process you may also contact:
Appeals Officer
U.S. Army Corps of Engineers
Great Lakes and Ohio River Division
550 Main Street, Room 10-524
Cincinnati, OH 45202-3222
TEL (513) 684-6212; FAX (513) 684-2460

RIGHT OF ENTRY: Your signature below grants the right of entry to Corps of Engineers personnel, and any government consultants, to conduct investigations of the project site during the course of the appeal process. You will be provided a 15 day notice of any site investigation, and will have the opportunity to participate in all site investigations.

_____ Signature of appellant or agent.	Date:	Telephone number:

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Ecological Services
4625 Morse Road, Suite 104
Columbus, Ohio 43230
(614) 416-8993 / FAX (614) 416-8994

May 9, 2012

Hull & Associates
Attn: Kyla Hershey
6397 Emerald Parkway, Suite 200
Dublin, OH 43016

TAILS: 03E15000-2012-TA-0708

Re: Moraine Properties
Proposed Culvert Replacement
West Carrollton, Montgomery County, Ohio

Dear Ms. Hershey:

This is in response to your April 16, 2012 letter requesting consultation on potential impacts to federally listed threatened and endangered species within the vicinity of the above referenced project location. The project involves replacement of a culvert on an unnamed tributary to the Great Miami River. This project is part of a larger project to stabilize and contain a paper sludge dump.

There are no Federal wildlife refuges, wilderness areas, or Critical Habitat within the vicinity of this site.

The U.S. Fish and Wildlife Service recommends that proposed activities minimize water quality impacts and impacts to quality fish and wildlife habitat, such as forests, streams, and wetlands. Riparian zone habitat should be preserved wherever possible. Vegetated areas along streams and rivers stabilize the banks, provide fish and wildlife habitat, filter pollutants and excess nutrients, store excess water during storm events, and minimize sedimentation. Best Management Practices (BMP's) should be utilized to minimize sedimentation and erosion. All disturbed areas should be mulched and revegetated with native woody and herbaceous species.

ENDANGERED SPECIES COMMENTS: The proposed project lies within the range of the **Indiana bat** (*Myotis sodalis*), a federally listed endangered species. Since first listed as endangered in 1967, their population has declined by nearly 60%. Several factors have contributed to the decline of the Indiana bat, including the loss and degradation of suitable hibernacula, human disturbance during hibernation, pesticides, and the loss and degradation of forested habitat, particularly stands of large, mature trees. Fragmentation of forest habitat may also contribute to declines. During winter, Indiana bats hibernate in caves and abandoned mines. Summer habitat requirements for the species are not well defined but the following are considered important:

(1) dead or live trees and snags with peeling or exfoliating bark, split tree trunk and/or branches, or cavities, which may be used as maternity roost areas;
(2) live trees (such as shagbark hickory and oaks) which have exfoliating bark;
(3) stream corridors, riparian areas, and upland woodlots which provide forage sites.

In your April 30, 2012 e-mail, you indicated that no tree clearing is required to complete the proposed culvert replacement. However, should the larger paper sludge dump stabilization project have the

potential to impact trees exhibiting the characteristics listed above, further coordination with this office is requested to determine if surveys are warranted. Any survey should be designed and conducted in coordination with the Endangered Species Coordinator for this office. Surveyors must have a valid Federal permit. Please note that summer surveys must be conducted between May 15 and August 15.

The proposed project lies within the range of the **rayed bean** (*Villosa fabalis*), a federally endangered freshwater mussel. The rayed bean is generally known from smaller, headwater creeks, but records exist in larger rivers. They are usually found in or near shoal or riffle areas, and in the shallow, wave-washed areas of lakes. Substrates typically include gravel and sand, and they are often associated with, and buried under the roots of, vegetation, including water willow (*Justicia americana*) and water milfoil (*Myriophyllum* sp.). Should the proposed project directly or indirectly impact any of the habitat types described above, we recommend that a survey be conducted to determine the presence or probable absence of rayed bean mussels in the vicinity of the proposed sites. Any survey should be designed and conducted in coordination with the Endangered Species Coordinator for this office.

The project lies within the range of the **eastern massasauga** (*Sistrurus catenatus*), a small, docile rattlesnake that is currently a federal candidate species. The projects also lie within the range of the **snuffbox** (*Epioblasma triquetra*), a federally endangered freshwater mussel. Due to the project type, locations, and onsite habitat, these species would not be expected within the project area, and no impacts to these species are expected.

MIGRATORY BIRD COMMENTS: The project lies within the range of the **bald eagle** (*Haliaeetus leucocephalus*), a species protected under the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act. Due to the project type, location, and onsite habitat, this species would not be expected within the project area, and no impact to this species is expected. Relative to this species, this precludes the need for further action on this project as required by the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act.

Should additional information on listed or proposed species or their critical habitat become available or if new information reveals effects of the action that were not previously considered, our comments and recommendations may be reconsidered. These comments have been prepared under the authority of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.), the Endangered Species Act of 1973 (ESA), as amended, and are consistent with the intent of the National Environmental Policy Act of 1969 and the U. S. Fish and Wildlife Service's Mitigation Policy. If you have questions, or if we may be of further assistance in this matter, please contact David Henry at extension 27 in this office.

Sincerely,

Mary Knapp

Mary Knapp, Ph.D.
Field Supervisor

cc: ODNR, DOW, SCEA Unit, Columbus, OH

Hull & associates, inc.

April 16, 2012

Mary Knapp, Ph.D.
Supervisor
Division of Ecological Services
U.S. Fish & Wildlife Service
4625 Morse Rd. Suite 104
Columbus, Ohio 43230

RE: Data Request for a Proposed Culvert Replacement for Moraine Properties, Montgomery County, Ohio; ETH001.300.0017.

Dear Dr. Knapp:

Hull & Associates, Inc. (Hull) is providing environmental assessment and permitting for a Site in Jefferson Township, Montgomery County, Ohio (Site; see Figure 1). No federally listed threatened or endangered species were observed during an Ecological Survey completed by Hull in February, 2011. One perennial stream (unnamed tributary to Great Miami River) was identified within the project area.

The Site shown on Figure 1 is located approximately at the following coordinates: 39.686945°N and 80.26700°W (Miamisburg, Ohio USGS Quadrangle). The proposed project involves a culvert replacement.

Hull requests from the USFWS information on all documented threatened and endangered species occurring within the Site and the vicinity of the Site, including specific information on location, if available. If such information exists, please inform us if the proposed project has the potential to impact protected species. Please also include any information you may have on Bald Eagle nest sites within one-square mile of the project Site.

Thank you in advance for your attention to this request. Should you require any additional information or have any questions concerning this request, please feel free to contact me at the number listed below or by e-mail at khershey@hullinc.com.

Sincerely,

Kyla M. Hershey

Kyla M. Hershey
Scientist I

Attachment

ct: Hugh Crowell, Hull & Associates, Inc.

6397 Emerald Parkway, Suite 200, Dublin, Ohio 43016
614.793.8777 fax 614.793.9070 www.hullinc.com

© 2011, Hull & Associates, Inc.

Ohio

Legend

● Site Location

Source: The topographic map was acquired through the USGS Topographic Map web service. Topo quadrangle date not provided.

The aerial photo in the inset was acquired through the Microsoft Virtual Earth Aerial Photogrpahy web service. Aerial photography date not provided.

0 500 1,000 2,000 Feet

1:24,000

N

Hull & associates, inc.

6397 Emerald Parkway
Suite #200
Dublin, Ohio 43016

Phone: (614) 793-8777
Fax: (614) 793-9070
www.hullinc.com

Moraine Properties Data Request

Site Vicinity Map

Montgomery County, Ohio

Date: April 2012

File Name: ETH001_02_01_SiteVicinity.mxd

Edited: 4/13/2012 By: lpeluchette

Figure 1

Produced using ArcGIS 10.0 SP1

Ohio | Environmental Protection Agency

John R. Kasich, Governor
Mary Taylor, Lt. Governor
Scott J. Nally, Director

July 30, 2012 **CERTIFIED MAIL**

Steven M. Gross, CP
Hull & Associates, Inc.
6397 Emerald Parkway, Suite 200
Dublin, Ohio 43016

RE: Moraine Properties, LLC, City Lot 4268, Soldiers Home-West Carrollton Rd., Moraine, Ohio, Montgomery County
Ohio Administrative Code (OAC) Rule 3745-27-13 Authorization

Dear Mr. Gross:

On July 23, 2012, the Ohio Environmental Protection Agency (Ohio EPA), Division of Materials and Waste Management (DMWM), Southwest District Office (SWDO), received a request from Hull & Associates, Inc. on behalf of Moraine Properties, LLC titled Authorization Request Under OAC 3745-27-13 for the Stream Restoration/Culvert Maintenance and Capping of the Paper Sludge Dump (Request). Moraine Properties, LLC requested authorization to conduct construction activities, including activities associated with stream restoration/culvert maintenance and the closure of a historic paper sludge disposal area to improve the surface water management of the paper sludge landfill and to properly mitigate and cap the paper sludge disposal area. The Request was submitted pursuant to OAC Rule 3745-27-13. Also contained within the submittal, located in Appendix B of the document, is an exemption request pursuant to OAC Rule 3745-27-03(B) and Ohio Revised Code (ORC) Section 3734.02(G). The exemption request will be reviewed separately and addressed in a separate letter.

Based upon a review of the Request, Ohio EPA has determined that the proposed activities will not result in violation of applicable laws or regulations, will not create a nuisance, and are unlikely to adversely affect public safety or health or the environment. Therefore, Moraine Properties, LLC is hereby authorized to conduct construction, excavation, grading, and maintenance activities in accordance with the Request. All activities must be conducted in strict accordance with the plans, specifications, and information submitted as part of this Request. There may be no deviation from the approved plans without prior written authorization from Ohio EPA. Any future activities may require additional Ohio EPA approval.

Southwest District Office
401 East Fifth Street
Dayton, OH 45402-2911

937 | 285 6357
937 | 285 6249 (fax)
www.epa.ohio.gov

Please be aware that you are subject to the requirements outlined in OAC Rule 3745-27-13(H)(2) and (H)(4) through (H)(10). Please submit a certification report to Ohio EPA within sixty days of completion of the activities at City Lot 4268.The certification report should include documentation that material specifications have been met, adequate thickness of cap has been placed, and that appropriate testing has been performed at the minimum specified frequencies.

This authorization shall terminate within three (3) years of the issuance date, in accordance with OAC Rule 3745-27-13(M).

Nothing in this letter shall be construed to authorize any waiver from any requirements of applicable state solid waste laws or regulations. This letter shall not be interpreted to release Moraine Properties, LLC from responsibility under ORC Chapters 3704, 3714, 3734, or 6111; under the Federal Clean Water Act, the Resource Conservation and Recovery Act, or the Comprehensive Environmental Response, Compensation and Liability Act; or from other applicable requirements for remedying conditions resulting from any release of contaminants to the environment.

If you have any questions regarding this letter, please contact Tracy Buchanan of Ohio EPA, SWDO at (937) 285-6357.

Sincerely,

Betty Arthungal
Environmental Specialist
Division of Materials and Waste Mgmt.

Joleen Cook
Environmental Specialist
Division of Materials and Waste Mgmt.

BA/tf

cc: Paul Stuart, Public Health, Dayton & Montgomery County
Joe Smindak, DERR, SWDO
Tracy Buchanan, DMWM, SWDO

Ohio | Environmental Protection Agency
John R. Kasich, **Governor**
Mary Taylor, **Lt. Governor**
Scott J. Nally, **Director**

August 24, 2012

CERTIFIED MAIL

Moraine Properties, LLC
Paper Sludge Disposal Site
5500 Wayzata Blvd., Suite 800
Golden Valley, MN 55416

Re: Director's Final Findings and Orders
Moraine Properties, LLC
City Lot 4268, Soldiers Home-West Carrollton Road
Moraine, Ohio 45439

Dear Sir or Madam:

Transmitted herewith are Final Findings & Orders of the Director concerning the matter indicated.

You are hereby notified that this action of the Director is final and may be appealed to the Environmental Review Appeals Commission pursuant to Section 3745.04 of the Ohio Revised Code. The appeal must be in writing and set forth the action complained of and the grounds upon which the appeal is based. The appeal must be filed with the Commission within thirty (30) days after notice of the Director's action. The appeal must be accompanied by a filing fee of $70.00, made payable to "Treasurer, State of Ohio ". The Commission, in its discretion, may reduce if by affidavit you demonstrate that payment of the full amount of the fee would cause extreme hardship. Notice of the filing of the appeal shall be filed with the Director within three (3) days of filing with the Commission. Ohio EPA requests that a copy of the appeal be served upon the Ohio Attorney General's Office, Environmental Enforcement Section. An appeal may be filed with the Environmental Review Appeals Commission at the following address:

Environmental Review Appeals Commission
77 South High Street, 17th Floor
Columbus, OH 43215

Sincerely,

Georgia Frakes, Management Analust
Division of Materials and Waste Management

Enclosure: Director's Final Findings and Orders

cc: Scott Hester, DMWM, CO
Paul Stuart, Public Health of Dayton/Montgomery Co.
Tracy Buchanan, DMWM, SWDO
Betty Arthungal, DMWM, SWDO
Kathy Jackson, DMWM, SWDO

I certify this to be a true and accurate copy of the official documents as filed in the records of the Ohio Environmental Protection Agency.

By: Jerry Lasseter Date: 8-24-12

Issuance Date: August 24, 2012

Effective Date: August 24, 2012

BEFORE THE
OHIO ENVIRONMENTAL PROTECTION AGENCY

OHIO E.P.A.
AUG 24 2012
ENTERED DIRECTOR'S JOURNAL

IN THE MATTER OF

Moraine Properties, LLC
5500 Wayzata Blvd, Suite 800
Golden Valley, MN 55416

Director's Final Findings and Orders

I. JURISDICTION

These Director's Final Findings and Orders ("Orders") are issued to Moraine Properties, LLC pursuant to the authority vested in the Director of the Ohio Environmental Protection Agency ("Ohio EPA") under Ohio Revised Code ("ORC") Section 3734.02(G) and Ohio Administrative Code ("OAC") Rule 3745-27-03(B).

II. PARTIES BOUND

These Orders shall apply to and be binding upon Moraine Properties, LLC and successors in interest liable under Ohio law. No change in ownership of Moraine Properties, LLC or of the Site, as hereinafter defined, shall in any way alter Moraine Properties, LLC's obligations under these Orders.

III. DEFINITIONS

Unless otherwise stated, all terms used in these Orders shall have the same meaning as defined in ORC Chapter 3734 and the rules promulgated thereunder.

IV. FINDINGS

The Director of Ohio EPA ("Director") has determined the following findings:

1. Moraine Properties, LLC is the owner and operator of City Lot 4268 ("Site"), located on Soldiers Home-West Carrollton Road in Moraine, Ohio.

2. In the 1960's and 1970's, the Site was used for the placement of paper sludge associated with the recycling of carbonless paper and various other paper products. The Site was never licensed or permitted.

3. Due to the nature of the paper that was recycled, some of the sludge has been found to contain low levels of PCBs. Due to the nature of this waste, a remedial action plan has been developed to close the Site under the Voluntary Action Program (VAP) rules as codified under OAC Rule 3745-27-300.

4. On July 20, 2012, Moraine Properties, LLC submitted a request pursuant to OAC Rule 3745-27-13(D)(2) for authorization to "engage in filling, grading, excavating, building, drilling, or mining on land where a hazardous waste facility or solid waste facility was operated". Ohio EPA, Southwest District Office (SWDO), Division of Materials & Waste Management (DMWM) concurred with the request on July 30, 2012.

5. Pursuant to OAC Rule 3745-27-13(H)(6), "no excavation of waste shall occur unless the excavated waste is replaced within previously existing horizontal and vertical limits of waste placement or is treated or disposed of at a licensed, permitted treatment or disposal facility, in accordance with Chapter 3734. of the Revised Code and the regulations promulgated thereunder".

6. Contained within the OAC Rule 3745-27-13 request received on July 20, 2012 was a request for an exemption from OAC Rule 3745-27-13(H)(6), submitted pursuant to OAC Rule 3745-27-03(B). The exemption is requested for purposes of consolidation of the paper sludge waste on-site, to accommodate cap construction, and to facilitate proper grading for the cap slopes.

7. Pursuant to ORC Section 3734.02(G) and OAC Rule 3745-27-03(B), the Director, by order, "may exempt any person generating, collecting, storing, treating, disposing of, or transporting solid wastes in such quantities or under such circumstances that, in the determination of the Director, are unlikely to adversely affect the public health or safety or the environment from any requirement to obtain a permit or license or comply with other requirements of ORC Chapter 3734 and any rules adopted thereunder".

8. Pursuant to ORC Section 3734.02(G), issuance of an exemption relieving Moraine Properties, LLC from the requirement to place waste within previously existing horizontal and vertical limits of waste placement at the Site pursuant to OAC Rule 3745-27-13(H)(6) in order to minimize the size of the disposal area, to accommodate cap construction, and to facilitate proper grading for the cap slopes, is unlikely to adversely affect the public health or safety or the environment.

V. ORDERS

1. Pursuant to ORC Section 3734.02(G) and OAC Rule 3745-27-03(B), Moraine Properties, LLC is hereby granted an exemption from the requirement in OAC Rule 3745-27-13(H)(6) that all excavated waste be replaced within the previously existing horizontal and vertical limits of waste placement in order to consolidate the overall size of the disposal area, to accommodate cap construction, and to facilitate proper grading for the cap slopes. The exemption granted herein for the Moraine Properties, LLC applies solely to the property owners and is not transferable to future owners of the property.

2. Moraine Properties, LLC shall provide Ohio EPA with a certification report in accordance with OAC Rule 3745-27-13(H)(10) within sixty days of completion of the filling, grading, excavating, building, drilling or mining activities.

3. Any deviation from the planned activities, as described in the OAC Rule 3745-27-13 request received by Ohio EPA on July 20, 2012, shall not occur without concurrence from Ohio EPA, SWDO.

4. Moraine Properties, LLC shall strictly comply with all requirements required by OAC Rule 2745-27-13(H) and shall conduct all activities at the Site in accordance with the OAC Rule 3745-27-13(D)(2) request received by Ohio EPA on July 20, 2012.

5. These Orders shall not be construed to release Moraine Properties, LLC from their responsibilities under ORC Chapter 3734 and OAC Chapter 3745-27 as an owner or operator of a property containing hazardous and/or solid waste, except as specified herein.

VI. OTHER CLAIMS

Nothing in these Orders shall constitute or be construed as a release from any claim, cause of action, or demand in law or equity against any person, firm, partnership, or corporation, not a party to these Orders, for any liability arising from, or related to, the property owners and/or related to the Site.

VII. OTHER APPLICABLE LAWS

All actions required to be taken pursuant to these Orders shall be undertaken in accordance with the requirements of all applicable local, state, and federal laws and regulations. These Orders do not waive or compromise the applicability and enforcement of any other statutes or regulations applicable to the property owners and/or Moraine Properties, LLC.

VIII. RESERVATION OF RIGHTS

Nothing contained herein shall be construed to prevent Ohio EPA from seeking legal or equitable relief to enforce the terms of these Orders or from taking other administrative, legal, or equitable action as deemed appropriate and necessary for noncompliance with these Orders. Nothing contained herein shall be construed to prevent Ohio EPA from exercising its lawful authority to require the property owners to perform additional activities pursuant to ORC Chapter 3734 or any other applicable law in the future. Nothing herein shall restrict the right of the property owners to raise any administrative, legal, or equitable claim or defense with respect to such further actions that Ohio EPA may seek to require of the property owners. Nothing in these Orders shall be construed to limit the authority of Ohio EPA to seek relief for violations which may occur at the Site.

IT IS SO ORDERED:

Ohio Environmental Protection Agency

Scott J. Nally
Director

Table 5. Groundwater Sampling PAH and PCB Data
Moraine Properties, Lot # 4268

PAH Parameters	Standard	MW-2: G091704	MW-2: G091704A	MW-3A: G091704	MW-3A: G091704 filtered
ACENAPHTHENE	680	<10	<10	<10	--
ACENAPHTHYLENE		<10	<10	<10	--
ANTHRACENE	2600	<10	<10	<10	--
BENZO(A)ANTHRACENE		<10	<10	<10	--
BENZO(A)PYRENE	0.2	<10	<10	<10	--
BENZO(B)FLUORANTHENE		<10	<10	<10	--
BENZO(GHI)PERYLENE		<10	<10	<10	--
BENZO(K)FLUORANTHENE		<10	<10	<10	--
CHRYSENE	47	<10	<10	<10	--
DIBENZ(A,H)ANTHRACENE		<10	<10	<10	--
FLUORANTHENE	370	<10	<10	<10	--
FLUORENE	500	<10	<10	<10	--
INDENO(1,2,3-CD)PYRENE		<10	<10	<10	--
NAPHTHALENE	140	<10	<10	<10	--
PHENANTHRENE		<10	<10	<10	--
PYRENE	280	<10	<10	<10	--
AROCLOR 1016		--	--	<0.0002	<0.0002
AROCLOR 1221		--	--	<0.0002	<0.0002
AROCLOR 1232		--	--	<0.0002	<0.0002
AROCLOR 1242		--	--	<0.0002	<0.0002
AROCLOR 1248		--	--	<0.0002	<0.0002
AROCLOR 1254		--	--	<0.0002	<0.0002
AROCLOR 1260		--	--	<0.0002	<0.0002

Units are in ppm (mg/L)
Standard property is Ohio VAP Unrestricted Potable Use Stamdards (UPUS)
-- indicated not analyzed
PCB Standard is 0.5 mg/L for total PCBs

AUTHORIZATION REQUEST UNDER OAC 3745-27-13 FOR THE STREAM RESTORATION/ CULVERT MAINTENANCE AND CAPPING OF THE PAPER SLUDGE DUMP

FOR THE:
CITY LOT 4268
SOLDIERS HOME-WEST CARROLLTON ROAD
MORAINE, OHIO 45439

PREPARED FOR:
MORAINE PROPERTIES, LLC
5500 WAYZATA BOULEVARD, SUITE 800
GOLDEN VALLEY, MN 55416

PREPARED BY:
HULL & ASSOCIATES, INC.
3401 GLENDALE AVENUE, SUITE 300
TOLEDO, OHIO 43614

JULY 2012

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Appendix E Signature Page

1.0 INTRODUCTION

Moraine Properties, LLC ("Moraine") and Ethyl Corporation ("Ethyl") retained Hull & Associates, Inc. ("Hull") to design and implement stream restoration/culvert maintenance activities and properly cap the existing paper sludge area located on City Lot No. 4268 owned by Moraine. Lot No. 4268 is located in the City of Moraine, Montgomery County, Ohio ("Site"). Figure 1 provides a Site Vicinity Map. Upon completing an investigation of historic use of the Site, it has been determined that the Site was used for the placement of paper sludge associated with the recycling of carbonless and other paper during the 1960s and mid-1970s. Based on discussions with Ohio Environmental Protection Agency's (Ohio EPA's) Division of Materials and Waste Management (DMWM), it was determined that the paper sludge placed on the Site meets the definition for solid waste. Review of Ohio EPA's Solid Waste Rules effective July 1968 "Solid wastes means such unwanted residual solid waste or semisolid material as results from industrial, commercial, agricultural, and community operations, excluding earth or material from construction, mining, or demolition operations and slag and other substances which are not harmful or inimical to public health and includes garbage, combustible and non-combustible, street dirt and debris". Given this determination, the paper sludge will be regulated as a solid waste and an authorization request under Rule 3745-27-13 of the OAC is required for such activities as engaging in filling, grading, excavating, building, drilling, or mining on land where a hazardous waste facility or solid waste facility was operated. Additionally, discussions with DMWM as determined that the Site is most closely described under Rule 3745-27-13 (D)(2)(a) of the OAC (an unlicensed or unpermitted solid waste landfill that ceased acceptance of waste prior to July 29, 1976). As part of the authorization request under Rule 3745-27-13, Site specific information as codified under 3745-27-13 (F)(1) through (14).

As discussed in the remainder of this document, the Site contains and could release hazardous substances as defined under CERCLA, primarily polychlorinated biphenyls ("PCBs"). The planned activities at the Site include construction activities in the immediate vicinity of sludge placement and within the limits of paper sludge placement during the stream/culvert restoration, spring/seep mitigation, and installation of the capping system. Adjacent City Lot # 4267 (3.0 acres) and City Lot # 4269 (2.5 acres), located immediately west of City Lot # 4268, are included as part of the overall project property because portions of these lots will be used to obtain borrow soils to be used in the capping of the paper sludge area and as part of the stream restoration/culvert maintenance activities.

Since the proposed activities include filling, excavating, and grading within the limits of paper sludge placement at the Site, Ohio EPA authorization is requested. This authorization request under Rule 3745-27-13 of the OAC provides Ohio EPA with the information to demonstrate that the activities proposed in this authorization request will not create a nuisance, and are unlikely to adversely affect public safety, health or the environment. Following this brief introduction, the remainder of this authorization request responds to the information requirements Paragraphs (F)(1) through (F)(14) of Rule 3745-27-13 of the OAC.

2.0 INFORMATION REQUIRED UNDER OAC 3745-27-13 (F)

OAC 3745-27-13 (F)(1): *Name of the facility, if any, and type of facility.*

The Site has been identified as City Lot 4268, Moraine Properties, LLC and is also known as the Former Rendering Plant. The type of facility is most closely described in Paragraph (D)(2)(a) of Rule OAC 3745-27-13 of the OAC, "an unlicensed or unpermitted solid waste landfill that ceased acceptance of waste prior to July 29, 1976."

OAC 3745-27-13 (F)(2): *Address of the site.*

City Lot 4268, Soldiers Home-West Carrollton Road, Moraine, OH 45439 (no numerical street address).

OAC 3745-27-13 (F)(3): *County and township in which the site is located.*

Montgomery County, City of Moraine, Jefferson Township.

OAC 3745-27-13 (F)(4): *Name, address, and telephone number of person to contact for additional information regarding the activities at the site.*

Steven M. Gross or Mohammad "Mo" Finy, Hull & Associates, Inc., 6397 Emerald Parkway, Suite 200, Dublin, Ohio 43016. (614) 793-8777.

OAC 3745-27-13 (F)(5): Size *of the site.*

City Lot 6248 is approximately 5.09-acres in size and the limit of paper sludge placement includes approximately 2.2 acres. A Site Plan is provided on Figure 2.

OAC 3745-27-13 (F)(6)*: Identification of the type and amount of waste present at the site, including a description of the process that created the waste and the time period of waste disposal.*

The volume of material is estimated to be approximately 19,550 cubic yards of paper sludge, distributed over approximately 2.2 acres of the Site. Based on the current data the approximate thickness of the paper sludge material ranges from less than a few inches to as thick as 18 feet. The paper sludge materials were generated as a result of process related to recycling paper, including the de-inking of carbonless copy paper.

OAC 3745-27-13 (F)(7): *Description of the activities proposed at the site.*

After an evaluation of remedial alternatives, a combination of remedial actions for the management of paper sludge materials encountered at the Site was recommended.

The proposed remedial actions for addressing the presence of and release of potential hazardous substances consist of the following: institutional controls such as the establishment of land use and groundwater use restrictions; engineering controls that would include securing the Site with a security fence; selective source removal to create a zone of separation between the limits of paper sludge disposal area and the on-Site unnamed stream; complete stream restoration and culvert maintenance; stabilization of the slope face within the limits of the paper sludge material, minimal consolidation of the paper sludge material, installation of a proper soil cover over the paper sludge area compliant to DMWM and VAP; and the implementation of a risk mitigation plan in the event of future activities that may result in short-term exposures.

A copy of the Final Closure Plan of City Lot # 4268 is included as Appendix A of this document. The closure plans establish the design criteria for the implementation of the selected remedies.

Stabilization of the slope face within the limits of sludge placement and the consolidation of non-PCB paper sludge adjacent to the stream restoration does not comply with Rule 3745-27-13(H)(6) which states *"No excavation of waste shall occur unless the waste is replaced within the previously existing horizontal and vertical limits of waste placement or is treated or disposed of at a licensed, permitted treatment or disposal facility". To address this issue* a Rule 3745-27-13(H)(6) exemption request has been prepared and is provided under separate cover. A copy of the OAC 3745-27-13(H)(6) exemption request is included in Appendix B. Paper sludge will only be placed pursuant to approval of the exemption request, otherwise, clean hard fill materials or soils will be used.

Pursuant to Paragraph (H)(2) of OAC 3745-27-13, the proposed activities will commence no sooner than 31 days following submittal of this authorization request to the Ohio EPA DMWM. In the event the DMWM approves the authorization request and 3745-27-(13)(H)(6) exemption sooner than the 31 days following submittal, field activities may commence immediately upon receipt of the authorization. Because of the project schedule, 2012 construction schedule, and limited disturbance of the sludge/soil material, Moraine and Ethyl requests that Ohio EPA provide an expedited review authorization request. It is anticipated that the stream restoration

portion of the remediation project will commence in July 2012. The completion of the landfill cap over the paper sludge area is anticipated in the August of 2012.

The following provides a description of the proposed activities:

STREAM RESTORATION

A pre-construction notification (PCN) was submitted to the Department of Army Corps of Engineering in April 2012 with additional information provided in May 2012 regarding the proposed stream restoration and culvert maintenance included under this project. It has been determined that the proposed stream project meets the criteria for Nationwide Permits (NWP) No. 3 under the February 21, 2012 Federal Register, Reissuance of Nationwide Permits (77 FR 10184) provided compliance with all terms and conditions of the 401 Water Quality Certification (WQC) issued for the NWP by Ohio EPA on March 30, 2012. The Department of the Army Corps of Engineering granted their approval June 5, 2012. Since approval of the PCN a decision was made to remove the entire existing culvert (as opposed to only a portion), and a modification was made to the backfill and bedding detail for the new culvert.

The Department of Army Corps of Engineering was contacted on July 12 and again on July 19 to confirm that no additional information or details are required to proceed under the existing approval permit. Hugh Crowell from Hull & Associates, Inc. spoke with Denise Marmer, Department of the Army Corps of Engineering, Regulatory Project Manager, North Branch office by telephone. A verbal description was provided on the plan to remove the entire existing culvert, the stream and new culvert alignment, and modification of the backfill and bedding detail for the new culvert. Ms. Marmer's response was that these modifications fall within the NWP No.3 and that the new alignment of the stream and culvert are actually more consistent with the NWP No.3 than the approved design. The Army Corps of Engineering is not requiring any further review or re-authorization of the design modifications.

- ***Remove Existing 48" CMP Culvert and Reestablish Open Stream***
  The project will include removal and disposal of an existing 48- inch corrugated metal pipe (CMP) culvert and other incidental smaller pipes in the area of a former access/haul road, currently unused (see Drawing 3 of 7). The former earthen access/haul road will be excavated and used as grading fill in the waste final closure area. The area of culvert removal will be re-graded to form an open stream in the resulting void. The culvert and other incidental smaller pipes will be removed and properly disposed of off-site. This area is outside the foot print of

waste placement and no paper sludge material should be encountered during construction activities.

- ***Remove Existing Concrete Headwall***
  The project will include removal of an existing concrete headwall at the upstream end of the existing concrete culvert as shown on Drawing 3 of 7. The excavated concrete headwall will be broken up and used as general fill within the limits of final waste closure area as designated by the engineer. This area is outside the foot print of waste placement and no paper sludge material should be encountered during construction activities.

  Excavated concrete placed in the waste final closure area will be broken down to pieces no larger than 2-foot in any direction and placed in a manner that allows for filling with smaller pieces or other grading fill materials to pack voids and provide an even subsurface for the compacted soil layer.

- ***Remove Existing Concrete Culvert***
  The project will include removal of approximately 240 linier feet of existing concrete culvert as shown on Drawing 3 of 7. Approximately 71 feet of the concrete culvert is located outside the limits of waste. Culvert and surrounding materials excavated as part of the concrete culvert removal will be placed within the final waste closure area as designated by the engineer. It is anticipated that approximately 658 cubic yards of paper sludge material will be excavated from around the existing culvert and consolidated within the limits of waste at a central location near the base of the existing slope. Consolidated materials will be directly deposited in the fill area and covered daily with a minimum of 6 inches of soil obtained from the designated borrow area or a plastic sheet to prevent leaching and run-off of the placed material. The cover shall remain in place until final cover system is constructed.

  Previous environmental site assessment activities conducted on the site has determined that the PCB levels in the paper sludge and surrounding soils are less than 1.0 milligram per kilogram (mg/kg) to non-detect and pose no environmental risk or regulatory actions within the area of proposed construction activities associated with the removal of the existing concrete culvert, installation of proposed culvert, and stream restoration.

  Excavated concrete placed in the waste final closure area will be broken down to pieces no larger than 2-foot in any direction and placed in a manner that allows for filling with smaller pieces or other grading fill materials to pack voids and provide an even subsurface for the compacted soil layer.

  To complete the consolidation of non-PCB paper sludge waste and concrete debris within the existing limits of waste, an exemption from OAC 3745-27-13(H)(6) pursuant to OAC 3745-27-03(B) and ORC 3734.02(G) has been prepared under separate cover and is provided in Appendix B. OAC 3745-27-13(H)(6) states that "No excavation of waste shall occur unless the excavated waste is replaced within previously existing horizontal and vertical limits of waste placement or is treated or disposed of at a licensed, permitted treatment or

disposal facility". Paper sludge will only be placed pursuant to approval of the exemption request, otherwise, clean hard fill materials or soils will be used.

- ***Install 48" CPE Culvert***
  The project will include installation of a 48-inch diameter corrugated polyethylene (CPE) culvert, including bedding and backfill materials as shown in plan view on Drawing 3 of 7, and Detail 1, Drawing 6 of 7. It is anticipated that approximately 170 feet of CPE culvert will be installed south of a new headwall and will be located outside of the final limits of waste.

- ***Install CPE Culvert Headwall and Endwall***
  The project will include installation of a new headwall and the installation of an endwall for the new 48-inch diameter CPE culvert. The headwall and endwall will be constructed according to industry standards, and shop drawings approved by the engineer. The contractor is to provide the engineer details for the pre-cast concrete headwall and endwall for approval.

- ***Stream Rock Channel Protection***
  The project will include installation of rock channel protection, including underlying non-woven geotextile, for the proposed re-established stream section downstream of the proposed culvert as delineated on Drawing 3 of 7 and shown on Detail 2 on Drawing 6 of 7. Rock channel protection will be ODOT Type B.

  This work will also include as incidental, completion of any enhancements to the stream section; include grading, widening, and reestablishment of embankments. The extent of work will be as directed by the engineer.

UNDERDRAIN SYSTEM

The project will include installation of an underdrain system to intercept a groundwater seep located on the northwest corner of the site. The underdrain system will include installation of 4-inch diameter perforated (collection) and solid (conveyance) HDPE pipe, including bedding and backfill materials, and AquaBlok isolation barrier as delineated on Drawing 3 of 7 and shown on Detail 4 and 5 on Drawing 6 of 7. Approximately 10 to 15 yards of paper sludge waste may be disturbed during the installation of the underdrain to control the seep. Any waste material and soil excavated during the underdrain installation will be consolidated within the limits of waste. Paper sludge will only be placed pursuant to approval of the exemption request, otherwise, the material will be properly disposed in accordance with OAC 3745-27-13(H)(6). In order to lessen steep grades within the limits of waste prior to final cover placement, the relocated waste and soil material will be placed near the base of the existing slope and graded to help create a final cover subgrade with gradient no steeper than 3:1. Consolidated materials will be covered daily with a minimum of 6 inches of soil obtained from the designated borrow area or a plastic sheet to prevent leaching and run-off of the placed material. The cover shall remain in place until final cover system is constructed.

In order to prevent any future discharge of groundwater into the waste area, AquaBlok; a bentonite containing and engineered sealer product, will be used to provide an impermeable barrier and enable the groundwater to be collected via the perforated pipe section for discharge to outside the limit of waste.

The actual extent of underdrain system to be installed will be determined by the engineer in the field during construction activities. Installation will also include a minimum two foot long AquaBlok plug for the trench cross-sectional area, at the transition from perforated collection pipe to solid conveyance pipe as shown on Detail 6 on Drawing 6 of 7. Any excess material generated as part of underdrain system installation will be placed within the waste final closure area as designated by the engineer.

FINAL COVER SYSTEM

Prior to construction of the final cover system, some paper sludge waste will be consolidated in order to reduce the final cover footprint and augment grading of the final cover slopes. Paper sludge will only be placed pursuant to approval of the OAC 3745-27-13(H)(6) exemption request, otherwise, clean hard fill materials or soils will be used. As shown in Drawing 2 of 7, the current waste area is approximately 2.2 acres. Consolidation of paper sludge waste from portions of the footprint perimeter could reduce the final cover area to less than 2.0 acres. The final cover system will include Grading Fill, Compacted Soil Layer, Vegetative Soil Layer, and an AquaBlok Isolation Barrier. These components are described below:

- ***Grading Fill***
  In order to maintain a minimum top of final cover grade of 3% and maximum top of final cover grade of 33%, grading fill material will be necessary to achieve desired bottom of compacted soil layer grades in some areas within the waste final cover footprint. Two sources of grading fill will be used and are discussed below.

  - ***Grading Fill from Paper Sludge Consolidation and Various Excavations***
    The project will include excavation, hauling, placement, grading, and compaction of a variety of excavated materials as indicated below:

    A. Paper sludge to be consolidated;

    B. Sediment removed from downstream of the proposed stream culvert; and

C. Any other material excavated from the project area, excluding the borrow area material which is explained in more detail below.

- ***Grading Fill from Borrow Area***
  The project will also include excavation, hauling, placement, grading, and compaction of soil materials from the designated grading fill subdivision of the borrow area as depicted on Drawing 4 of 7. Compaction will be to visual non-movement as determined by the engineer. The area to receive final cover shall be cleared of existing residual vegetation to the satisfaction of the on-site Construction Quality Assurance (CQA) representative. Soil fill material will be placed within the area of waste as needed to achieve the designed bottom of final cover grades. Soil fill material shall be placed in approximate 12-inch lifts and compacted with a sheepsfoot compactor to the satisfaction of the on-site CQA representative.

  Grading fill excavations will be completed in areas delineated on Drawing 3 and 4 of 7 and/or as directed by the engineer. Cross-Section Drawing 5 of 7 illustrates the extent of grading fill needed to achieve bottom of compacted soil layer. The actual extent will need to be determined by the engineer during construction. Compaction will be to visual non-movement as determined by the engineer.

- ***Compacted Soil Layer***
  The project will include excavation, hauling, placement, grading, and compaction of soil for the minimum 2-foot thick compacted soil layer within the proposed final cover limits. Soil from the designated borrow area, located directly to the west of the final cover area (as shown on Drawing 4 of 7), will be used for the compacted soil layer. The reduced footprint for the final cover after paper sludge consolidation is anticipated to be less than 2.0 acres. Various cap termination scenarios, including the compacted soil layer, are depicted as Details 1, 2, and 3 on Drawing 6 of 7.

  Upon achieving design bottom of final cover grades (as determined by survey), final cover material shall be placed over the designated area according to the following requirements:

  A. Loose lifts not to exceed 8 inches in thickness;

  B. Cleared of putrescent materials, stones, cobbles, boulders or other large materials (as indicated in the Material Specifications section of the Standards for Current Construction of a 1976 Cap System) and to the satisfaction of the on-site CQA representative;

  C. Compacted by sheepsfoot compactor to at least 95% of the maximum Standard Proctor density, as determined by nuclear density gauge;

D. Tested by the on-site CQA representative at a frequency of at least five tests per acre per lift;

E. Moisture conditioned, as needed, to achieve compaction and cohesion as determined by the on-site CQA representative; and

- ***Vegetative Soil Layer***
  Upon achieving a minimum 2-foot thick final cover layer (as determined by survey), an additional 6-inch minimum loose lift of soils suitable for promoting vegetative growth shall be placed, but not compacted, over the final cover layer as delineated on Drawing 4 of 7. Suitability of the vegetative soils shall be determined by the on-site CQA representative. Vegetative soils shall come from the designated borrow area. Various cap termination scenarios, including the vegetative soil layer, are depicted as Details 1, 2, and 3 on Drawing 6 of 7.

  Upon construction of the vegetative soil layer, the completed area shall be seeded with such grasses or other vegetation as will form a complete dense cover. Seeding and mulching will be done as many times as necessary to ensure a dense cover as determined by the on-site CQA representative. Final cover construction shall not take place during weather conditions deemed by the CQA Engineer to be unsuitable for safe operations or for maintaining the integrity of the final cover components.

- ***AquaBlok Isolation Barrier for Final Cover Termination***
  The project will include installation of AquaBlok isolation barrier for final cover cap termination as shown on Details 1 and 2 on Drawing 6 of 7, and at locations delineated by the engineer. AquaBlok will come in the 2.0-ton bag variety. The AquaBlok isolation barrier will be installed in controlled layers by attaching the 2.0-ton bags to a backhoe and controlling the flow of material into the desired location.

LEACHATE, WASTE MATERIAL, AND SURFACE WATER MANAGEMENT

- **Leachate Control Plan**
  Run-on and run-off shall be controlled at all times. Appropriate management measures will be implemented to keep excavations free of water. Precautions necessary to limit the accumulation of water contact with potentially impacted material during remedial excavation and relocation/disposal activities will be taken. The construction contractor will be required to provide, operate, maintain pumping equipment, and provide water barriers as required to protect site from soil erosion. A temporary equipment decontamination pad will be constructed to contain any decontamination water generated during construction activities at the Site. All decontamination water generated will be properly captured and contained for characterization and off-Site disposal.

  Leachate come upon during construction activities will be collected in temporary sumps adjacent to the encountered areas of influence and within the limits of waste. Leachate collected in the temporary sumps will be transferred to a poly tank staged adjacent to the decontamination pad for characterization prior to proper off-site disposal to an approved waste water treatment plant.

- **Waste Material Disposal**
  Any waste material excavated during the stream restoration and/or the underdrain installation activities will be consolidated within the limits of waste in a predetermined location situated in the central portion of the waste area, near the base of the existing slope. Paper sludge will only be placed pursuant to approval of the OAC 3745-27-13(H)(6) exemption request, otherwise, the material will be properly disposed in accordance with OAC 3745-27-13(H)(6). Based on prior waste characterization of the paper sludge and soils in the area of proposed excavation activities, PCB concentrations have been determined to be below 5.0 mg/kg to non-detect. No waste will be relocated or consolidated on-site from areas determined to exceed a Toxic Substances Control Act (TSCA) PCB level of 50 mg/kg.

  During the consolidation of materials, daily cover of a minimum of 6 inches of soil obtained from the designated borrow area or temporary plastic sheeting will be placed over the waste to prevent leaching and run-off of the placed material. The cover shall remain in place until final cover system is constructed.

- ***Drainage Ditch (Grass Lined)***
  The project will include installation of grass lined drainage ditches as delineated on the Drawing 4 of 7, and according to Detail 9 on Drawing 6 of 7. The actual line and grade of the ditches will be determined in the field by the engineer. Seeding and mulching for grass lined channel will be done as indicated below. To help control erosion, grass lined ditches will be augmented with straw bales and silt fences, strategically placed in locations to impede flow and trap sediment. Straw bales and silt fences will remain in place and be cleaned out as needed to ensure their continued effectiveness until substantial vegetative growth is established in the ditch. If it becomes apparent that additional erosion control measures are needed for any grass lined drainage ditch segments, those segments will enhanced with erosion matting or rock lining.

- ***Drainage Ditch (Erosion Mat Lined)***
  The project will include as the primary option for ditch fortification, installation of North American Green (or engineer approved equivalent) erosion mat lined drainage ditches as delineated on the Drawing 4 of 7, and according to Detail 10 on Drawing 6 of 7. The actual line and grade of the ditches will be determined in the field by the engineer. Seeding and mulching over erosion mat will be done as indicated below. Erosion matting is one of two options that will be considered for ditches in need of fortification.

- ***Drainage Ditch (Rock Lined)***
  The project will include as a secondary option for ditch fortification, installation of rock lined drainage ditches as delineated on the Drawing 4 of 7, and according to Detail 10 on Drawing 6 of 7. The actual line and grade of the ditches will be determined in the field by the engineer. Rock lining is one of two options that will be considered for ditches in need of fortification.

- ***Cap Drainage Channels***
  Perimeter drainage ditches to the north, west, and south of the final cover area, and the restored stream to the east of the final cover area, are designed to

capture and convey all offsite surface water. Therefore, only precipitation that originates directly within the final cover footprint traverses its surface.

Using the modified soil loss equation and site specific information for the final cover area, it was estimated that a maximum of 140 feet separation between slope channels can be used on a 3:1 slope without exceeding the 5 ton/acre/year erosion requirement as established in OAC 3745-27-06(C)(5)(j). The longest 3:1 slope length on the cap is approximately 80 feet. Accordingly, based on the size, configuration, and gradient of the final cover area, no cap channels are required.

However, the final cover system design does include an erosion mat lined drainage swale in the flatter northeast portion of the site. The swale is a result of proposed cap grading that is designed to utilize existing grade to promote the discharge of surface water from that portion of the final cover area.

RECLAMATION

- ***Borrow Area Restoration***
  The project will include excavation, hauling, placement, spreading, and compaction of soil for restoration of the borrow area. Restoration will be done in a manner to provide positive drainage from the area and eliminate any ponding that may have resulted from excavation for final cover. Soil material to be used for restoring the borrow area will be such that it will support vegetative growth. The slopes for the restored borrow area will not exceed 4:1 and will maintain a minimum 2% grade to ensure quality drainage.

- ***Seeding and Mulching***
  The project will include seeding and mulching of exposed areas with such grasses or other vegetation as will form a complete dense cover within the proposed final cover limits.

  Seeding and mulching will also be completed in the borrow area after its restoration, and for any currently vegetated areas within and outside the project area that are disturbed during construction.

GROUNDWATER MONITORING WELL ABANDONMENT

Prior to initiating the landfill capping activities, two groundwater monitoring wells (MW-3A and MW-4) currently located within the limits of waste will be properly abandon following the Ohio Department of Natural Recourses (ODNR) Technical Guidance for Sealing Unused Wells (1996). No other wells are located within the limits of waste. There are two existing groundwater monitoring wells (MW-1 and MW-2) located outside of the limits of waste to the north that will remain in place. These two wells will be utilized to collect additional groundwater data as part of the ongoing project being conducted under the Ohio EPA Voluntary Action Program, separate from the landfill closure. Drawing 2 of 7, Existing Conditions shows the locations of the four monitoring wells. Well sealing reports will be completed and filed with

ODNR. In the event new groundwater monitoring wells are required as part of the ongoing Ohio VAP project, these wells will be located outside the limits of waste.

OAC 3745-27-13 (F)(8): ***Description of any institutional control that applies to the site.***

There are currently no institutional controls established at the Site. No institutional controls are required for conducting the proposed closure activities. However, the entire property will remain properly secured with a 6-foot high chain link fence. Appropriate signage will be posted containing the following language "Private Property, Trespassing Illegal, Violators Will Be Prosecuted, This Industrial Facility Contains Regulated Substances and May Present Hazardous Conditions." As part of the Ohio EPA Voluntary Action Program, risk mitigation measures will be established once the landfill area has been properly capped. These are measures to be taken by workers involved in high contact activities with paper sludge materials and contaminated soils at the Site

OAC 3745-27-13 (F)(9): ***Description of the manner in which the control of air emissions, control of leachate, surface water run-on and runoff, explosive and toxic gas migration, and protection of groundwater will be performed.***

Several contingency plans will be implemented (as necessary) during completion of the proposed investigative activities in the paper sludge fill area. Contingency plans include Hull's Site-Specific Health and Safety Plan (HASP) as well as procedures for the control of air emissions, control of leachate, surface water run-on, and run-off, and protection of groundwater.

These plans are described in detail below.

- **Health and Safety Plan**

  Contractors, subcontractors, consultants, field personnel and any other entity involved in the project will be expected to develop, implement and maintain current, a Site-Specific Health and Safety Plan (HASP). HASPs will comply with all Occupational Health and Safety Administration (OHSA) requirements, and will be utilized for the duration of the project in all areas of the property.

  The HASP will at a minimum the Contractor's Health and Safety Plan will include:

  A. An acknowledgement and understanding of the Site conditions.

  B. Identification of personal protective equipment needs for the various work activities.

C. Identification of monitoring equipment and procedures to be used during various work activities.

D. Directions to the Site.

E. A listing of emergency routes to the nearest hospital and emergency room.

F. Telephone numbers and location of the following:

Nearest hospital and emergency room;
Poison Control Center;
Police (both State and local);
Fire department;
Emergency Medical Service;
Contractor's Supervisory and Management personnel (work and home);
Ohio EPA Division of Solid Waste Management; and
Ohio Department of Health.

G. A plan for emergency response and notification.

H. A plan for handling suspect or hazardous materials, if encountered. This will include decontamination of equipment coming in contact with waste/suspect material.

I. Identification of Contractor's on-site Health and Safety Officer.

J. Documentation of appropriate training of the Contractor's personnel, including but not limited to, 40-hour OSHA Hazardous Waste Site Training in accordance with 29 CFR 1910.120 and current OSHA 8-Hour HAZWOPER Refresher Training.

The paper sludge waste may contain PCBs. As such, the HASP must include provisions to ensure proper precautions are taken to protect site workers and the public. Precautions may include, but not be limited to, use of respirators, poly-coated coveralls, gloves, and boot covers.

Before construction begins, it will be the contractor's responsibility to contact the Ohio Utility Protection Services (OUPS). The contractor will also take any other measures necessary to ensure utilities are appropriately marked and an assured distance is maintained for the duration of the project.

- ***General Conditions***

The project will include provisions for dust and odor control for all work which causes dust or unsuitable odors for the Property and any surrounding properties, as determined by the engineer. Dust control is anticipated to include regular watering of haul and access roads, as well as other exposed surfaces, as necessary. Although foul odors are not anticipated for this project, odor control as needed will be established by covering exposed excavated of reworked waste surfaces as soon as possible after completion of work at that the end of each work day.

- ***Erosion and Sedimentation Control***
  The project will include erosion and sedimentation controls in accordance with the site's Storm Water Pollution Prevention Plan (SWP3) that will be designed specifically for this project. Use of silt fencing and bails will be incorporated in the erosion and sedimentation control plan.

  Groundwater/Stormwater management will include properly restricting the accumulation of any water within the project areas, including the borrow area. The water is assumed to be a non-hazardous waste.

- ***Clearing and Grubbing***
  The project will include clearing the project area (including the borrow area) of trees, shrubs, stumps and other vegetation as needed to complete the work. The project area is shown in plan view on Drawings 2 through 4 of 7.

- ***Decontamination***
  The project will include the need for decontamination of all vehicles, tools, or equipment which comes into contact with waste or with a material which has been determined by the engineer to be a potentially contaminated material.

  All decontamination activities shall be performed in accordance with the specifications to be included in the contractor's bid package. All decontamination water and other materials used for decontamination will be collected on property within a designated decontamination area for proper characterization and off-site disposed in accordance with specifications to be included in the contractor's bid package. All disposal and transportation activities will comply with federal and state regulations.

  A decontamination pad with a sump area will be constructed on-site at the north end of waste placement. The actual location of the decontamination pad will be determined once the contractor mobilizes on-site. Decontamination of earth moving equipment and tools will be conducted by use of a high power pressure washer and scrub brushes. The decontamination water generated during the decontamination process will be collected within the bermed pad and transferred to a poly tank staged adjacent to the pad for characterization prior to proper off-site disposal. Solids generated from the decontamination process will be containerized in 55-gallon drums for characterization and proper disposal. Any drums containing solids removed from the decontamination pad will be placed in a designated location adjacent to the decontamination pad on plastic sheeting.

- **Air Emissions Plan**
  Based on institutional knowledge of the site, type of waste, age of waste, and the estimated quantity of waste disposal, there are no explosive gases anticipated at the Site. If in the future it is determined that such gases may exist, a plan will be developed to monitor, control and manage the gases.

  Measures to control dust during the construction activities will be implemented by watering the area to control fugitive dust.

OAC 3745-27-13 (F)(10)*: Letters of acknowledgement from the owners of all parcels of land to which the authorization pertains.*

Information obtained from the Montgomery County Office of the Auditor indicates that Moraine Properties, LLC, owns the parcel indicated on the figure in Appendix C. Moraine and Ethyl are working to gather as Co-Volunteers under the VAP. As the property owner Moraine has authorized the submittal of this Rule 13 authorization request. A letter of acknowledgement from Moraine Properties, LLC, is provided in Appendix D.

OAC 3745-27-13 (F)(11): *A statement that the requirements contained in paragraphs (H)(2) to (H)(6) of this rule will be followed.*

Moraine Properties, LLC (*i.e.*, the owner of the site) hereby states that the requirements contained in Paragraphs (H)(2) to (H)(6) of Rule 3745-27-13 of the OAC will be followed as applicable.

OAC 3745-27-13 (F)(12): *A statement that the applicable requirements contained in Chapter 3734 of the revised code will be followed by the applicant.*

Moraine Properties, LLC (*i.e.*, the owner of the Site) hereby states that the requirements contained in Chapter 3734 of the ORC will be followed as applicable.

OAC 3745-27-13(F)(13): *An affidavit affirming that the assertions made in this application are true.*

An affidavit by Moraine Properties, LLC (*i.e.*, the owner of the Site) affirming that the assertions made in this application are true is found in Appendix E.

OAC 3745-27-13(F)(14): *A signature as described in paragraph (I) of this rule.*

A signature from Angela Lageson (President of Moraine Properties, LLC), as described in Paragraph (I) of Rule 3745-27-13 of the OAC, is found in Appendix E.

APPENDIX A

Final Closure Plan for City Lot # 4268 – Moraine, Ohio

FINAL CLOSURE PLAN FOR CITY LOT 4268-MORAINE, OHIO

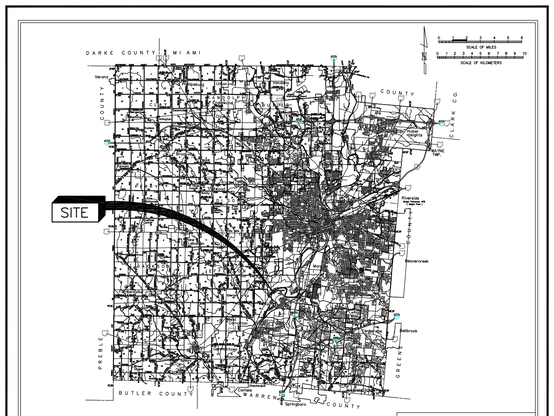
2012

MORAINE PROPERTIES, LLC

MORAINE, MONTGOMERY COUNTY, OHIO

LOCATION MAP

1 MILE 1/2 0 1 MILE



VICINITY MAP

OWNER/OPERATOR:

MORAINE PROPERTIES, LLC
CITY LOT 4268
SOLDIERS HOME-WEST CARROLLTON ROAD
MORAINE, OHIO 45439

ENGINEERING PLANS PREPARED BY:

HULL & ASSOCIATES, INC.
6397 EMERALD PARKWAY
SUITE 200
DUBLIN, OHIO 43016
(614)793-8777

INDEX TO SHEETS

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EXISTING CONDITIONS	2
STREAM RESTORATION	3
FINAL COVER SYSTEM	4
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DETAILS	6
SPECIFICATIONS	7

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FAX: (614) 793-9070
www.hullinc.com

Professional Seal:

Name:

Date:

Project Title:

FINAL CLOSURE PLAN FOR
CITY LOT 4268-MORAINE, OHIO

Owner:

MORAINE
PROPERTIES, LL(

CITY LOT 4268
SOLDIERS HOME-WEST CARROLLTON ROA
MORAINE, OHIO 45439

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Mark	Description	Date

Project No.:	ETH001
CAD DWG File:	ETH001.200.0020
Plot Date:	7/10/2012
Layout By:	TAM
Drawn By:	DAB
Check By:	MSF
Scale:	AS NOTED
Issue Date:	JULY 2012

Sheet Title:

TITLE SHEET

Sheet Number: 1 of 7

LEGEND

- PROJECT LIMITS
- PAPER SLUDGE LIMIT
- EXISTING CONTOURS
- FENCE LINE
- RAILROAD LINE
- STREAM LINE
- OVERHEAD UTILITY
- 2011 SURVEYED LIMIT
- MW-3A MONITORING WELL

NOTES:

1. EXISTING TOPOGRAPHY OUTLINED WAS CREATED USING SURVEYED GROUND SHOTS. SITE FEATURES AND TOPOGRAPHY WAS SURVEYED BY BERDING SURVEYING DATED: 9/2/11.
2. BASE MAP OUTSIDE SURVEYED AREA TAKEN FROM MALCOLM PIRNIE, INC. DRAWING NO. 3730C015, DATED 3/02.

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FINAL CLOSURE PLAN FOR CITY LOT 4268-MORAINE, OHIO

Owner:

MORAINE PROPERTIES, LL(

CITY LOT 4268
SOLDIERS HOME-WEST CARROLLTON ROA
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Mark	Description	Date

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CAD DWG File:	ETH001.200.0021
Plot Date:	7/19/2012
Layout By:	TAM
Drawn By:	DAB
Check By:	MSF
Scale:	1"=40'
Issue Date:	JULY 2012

Sheet Title:

EXISTING CONDITIONS

Sheet Number: 2 of 7

TASK DESCRIPTIONS:

REMOVE EXISTING 48" CMP CULVERT AND REESTABLISH OPEN STREAM

THIS TASK WILL INCLUDE REMOVAL AND DISPOSAL OF AN EXISTING 48" CMP CULVERT AND OTHER INCIDENTAL SMALLER PIPES IN THE AREA OF A CURRENTLY UNUSED FORMER ACCESS/HAUL ROAD. THE FORMER EARTHEN ACCESS/HAUL ROAD WILL BE EXCAVATED AND USED AS GRADING FILL IN THE WASTE FINAL CLOSURE AREA. THE AREA OF CULVERT REMOVAL WILL BE RE-GRADED TO FORM AN OPEN STREAM IN THE RESULTING VOID. THE CULVERT AND OTHER INCIDENTAL SMALLER PIPES WILL BE REMOVED AND PROPERLY DISPOSED OF OFF-SITE.

REMOVE EXISTING CONCRETE HEADWALL

THIS TASK WILL INCLUDE REMOVAL OF AN EXISTING CONCRETE HEADWALL AT THE UPSTREAM END OF THE EXISTING CONCRETE CULVERT. THE EXCAVATED CONCRETE HEADWALL WILL BE DISPOSED OF IN THE WASTE FINAL CLOSURE AREA AS DESIGNATED BY THE ENGINEER.

EXCAVATED CONCRETE DISPOSED IN THE WASTE FINAL CLOSURE AREA WILL BE BROKEN DOWN TO PIECES NO LARGER THAN 2-FOOT IN ANY DIRECTION AND PLACED IN A MANNER THAT ALLOWS FOR FILLING WITH SMALLER PIECES OR OTHER GRADING FILL MATERIALS TO PACK VOIDS AND PROVIDE AN EVEN SUBSURFACE FOR THE COMPACTED SOIL LAYER.

REMOVE EXISTING CONCRETE CULVERT

THIS TASK WILL INCLUDE REMOVAL OF AN EXISTING CONCRETE CULVERT. CULVERT AND SURROUNDING MATERIALS EXCAVATED AS PART OF CONCRETE CULVERT REMOVAL WILL BE DISPOSED OF IN THE WASTE FINAL CLOSURE AREA AS DESIGNATED BY THE ENGINEER.

EXCAVATED CONCRETE DISPOSED IN THE WASTE FINAL CLOSURE AREA WILL BE BROKEN DOWN TO PIECES NO LARGER THAN 2-FOOT IN ANY DIRECTION AND PLACED IN A MANNER THAT ALLOWS FOR FILLING WITH SMALLER PIECES OR OTHER GRADING FILL MATERIALS TO PACK VOIDS AND PROVIDE AN EVEN SUBSURFACE FOR THE COMPACTED SOIL LAYER.

AS PART OF CULVERT REMOVAL, SOME PAPER SLUDGE WILL BE EXCAVATED AND ONLY BE DISPOSED OF WITHIN THE FINAL COVER AREA LIMITS PURSUANT TO APPROVAL OF THE OAC 3745-27-13(H)(6) EXEMPTION REQUEST, OTHERWISE, THE MATERIAL WILL BE PROPERLY DISPOSED IN ACCORDANCE WITH OAC 3745-27-13(H)(6).

INSTALL 48" CPE CULVERT

THIS TASK WILL INCLUDE INSTALLATION OF A 48" DIAMETER CPE CULVERT, INCLUDING BEDDING AND BACKFILL MATERIALS AS SHOWN IN DETAIL 1, DRAWING 6 OF 7.

INSTALL CPE CULVERT HEADWALL AND ENDWALL

THIS TASK WILL INCLUDE INSTALLATION OF A HEADWALL AND ENDWALL FOR THE NEW 48" DIAMETER CPE CULVERT AS SHOWN ON DETAIL 8, DRAWING 6 OF 7. THE HEADWALL AND ENDWALL WILL BE CONSTRUCTED ACCORDING TO INDUSTRY STANDARDS, AND SHOP DRAWINGS APPROVED BY THE ENGINEER.

INSTALL STREAM ROCK CHANNEL PROTECTION

THIS TASK WILL INCLUDE INSTALLATION OF ROCK CHANNEL PROTECTION, INCLUDING UNDERLYING NON-WOVEN GEOTEXTILE, FOR THE PROPOSED RE-ESTABLISHED STREAM SECTION DOWNSTREAM OF THE PROPOSED CULVERT AS SHOWN IN DETAIL 2, DRAWING 6 OF 7. ROCK CHANNEL PROTECTION WILL BE ODOT TYPE B.

THIS TASK WILL ALSO INCLUDE AS INCIDENTAL, COMPLETION OF ANY ENHANCEMENTS TO THE STREAM SECTION; INCLUDE GRADING, WIDENING, AND REESTABLISHMENT OF EMBANKMENTS. THE EXTENT OF WORK WILL BE AS DIRECTED BY THE ENGINEER.

LEGEND

- PROJECT LIMITS
- PAPER SLUDGE LIMIT
- APPROXIMATE LIMITS OF SOIL BORROW AREA FOR STREAM RESTORATION
- 715 EXISTING CONTOURS
- FENCE LINE
- RAILROAD LINE
- STREAM LINE
- PROPOSED STREAM EXTENSION
- PROPOSED CULVERT
- OH OVERHEAD UTILITY
- AREA OF ANTICIPATED SLUDGE EXCAVATION

NOTES:

1. EXISTING TOPOGRAPHY OUTLINED WAS CREATED USING SURVEYED GROUND SHOTS. SITE FEATURES AND TOPOGRAPHY WAS SURVEYED BY BERDING SURVEYING DATED: 9/2/11.
2. BASE MAP OUTSIDE SURVEYED AREA TAKEN FROM MALCOLM PIRNIE, INC. DRAWING NO. 3730C015, DATED 3/02.

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Professional Seal:

Name:

Date:

Project Title:

FINAL CLOSURE PLAN FOR CITY LOT 4268-MORAINE, OHIO

Owner:

MORAINE PROPERTIES, LL(

CITY LOT 4268
SOLDIERS HOME-WEST CARROLLTON ROA
MORAINE, OHIO 45439

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Mark	Description	Date
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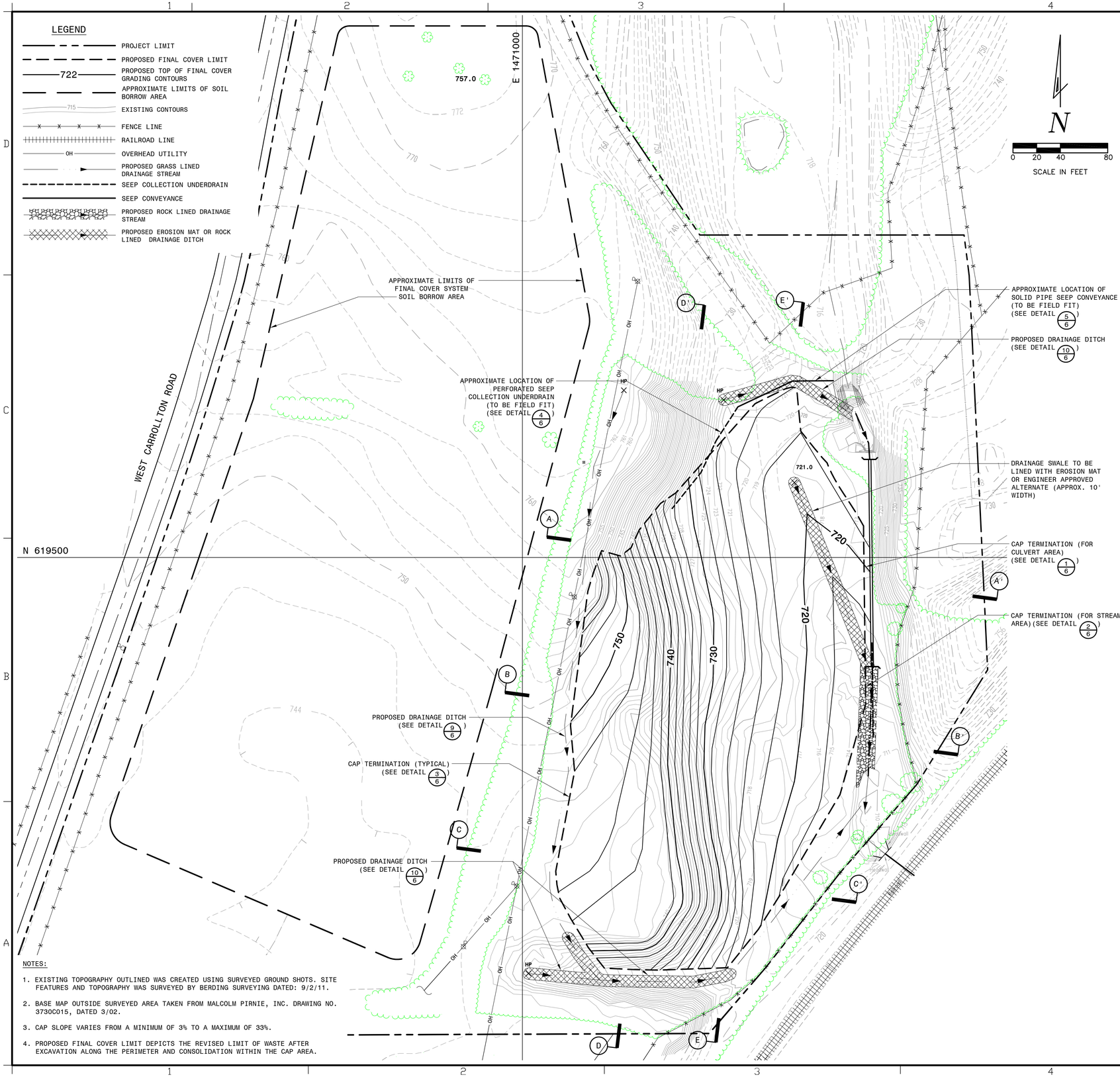
Project No.:	ETH001
CAD DWG File:	ETH001.200.0022
Plot Date:	7/26/2012
Layout By:	TAM
Drawn By:	DAB
Check By:	MSF
Scale:	1"=40'
Issue Date:	JULY 2012

Sheet Title:

STREAM RESTORATION

Sheet Number: 3 of 7



NOTES:

1. EXISTING TOPOGRAPHY OUTLINED WAS CREATED USING SURVEYED GROUND SHOTS. SITE FEATURES AND TOPOGRAPHY WAS SURVEYED BY BERDING SURVEYING DATED: 9/2/11.
2. BASE MAP OUTSIDE SURVEYED AREA TAKEN FROM MALCOLM PIRNIE, INC. DRAWING NO. 3730C015, DATED 3/02.
3. CAP SLOPE VARIES FROM A MINIMUM OF 3% TO A MAXIMUM OF 33%.
4. PROPOSED FINAL COVER LIMIT DEPICTS THE REVISED LIMIT OF WASTE AFTER EXCAVATION ALONG THE PERIMETER AND CONSOLIDATION WITHIN THE CAP AREA.

TASK DESCRIPTIONS:

INSTALL UNDERDRAIN SYSTEM

THIS TASK WILL INCLUDE INSTALLATION OF AN UNDERDRAIN SYSTEM TO INTERCEPT A GROUNDWATER SEEP LOCATED ON THE NORTHWEST CORNER OF THE SITE. THE UNDERDRAIN SYSTEM WILL INCLUDE INSTALLATION OF 4" DIAMETER PERFORATED (COLLECTION) AND SOLID (CONVEYANCE) HDPE PIPE, INCLUDING BEDDING AND BACKFILL MATERIALS, AND AQUABLOK ISOLATION BARRIER AS SHOWN IN DETAILS 4 AND 5 ON DRAWING 6 OF 7.

IN ORDER TO PREVENT ANY FUTURE DISCHARGE OF GROUNDWATER INTO THE WASTE AREA, AQUABLOK; A BENTONITE CONTAINING AND ENGINEERED SEALER PRODUCT, WILL BE USED TO PROVIDE AN IMPERMEABLE BARRIER AND ENABLE THE GROUNDWATER TO BE COLLECTED VIA THE PERFORATED PIPE SECTION FOR DISCHARGE TO OUTSIDE THE LIMIT OF WASTE.

THE ACTUAL EXTENT OF UNDERDRAIN SYSTEM TO BE INSTALLED WILL BE DETERMINED BY THE ENGINEER IN THE FIELD DURING CONSTRUCTION ACTIVITIES. INSTALLATION WILL ALSO INCLUDE A MINIMUM TWO FOOT LONG AQUABLOK PLUG FOR THE TRENCH CROSS-SECTIONAL AREA, AT THE TRANSITION FROM PERFORATED COLLECTION PIPE TO SOLID CONVEYANCE PIPE AS SHOWN IN DETAIL 6 ON DRAWING 6 OF 7. ANY EXCESS MATERIAL GENERATED AS PART OF UNDERDRAIN SYSTEM INSTALLATION WILL BE DISPOSED WITHIN THE WASTE FINAL CLOSURE AREA AS DESIGNATED BY THE ENGINEER. PAPER SLUDGE WILL ONLY BE PLACED PURSUANT TO APPROVAL OF OAC 3745-27-13(H)(6) EXEMPTION REQUEST. OTHERWISE, THE MATERIAL WILL BE PROPERLY DISPOSED IN ACCORDANCE WITH OAC 3745-27-13(H)(6).

CONSTRUCT FINAL COVER SYSTEM

PRIOR TO CONSTRUCTION OF THE FINAL COVER SYSTEM, SOME PAPER SLUDGE WASTE MAY BE CONSOLIDATED IN ORDER TO REDUCE THE FINAL COVER FOOTPRINT AND AUGMENT GRADING OF THE FINAL COVER SLOPES. THE PAPER SLUDGE WILL ONLY BE CONSOLIDATED PURSUANT TO APPROVAL OF OAC 6745-27-13(H)(6) EXEMPTION REQUEST, OTHERWISE, THE MATERIAL WILL BE PROPERLY DISPOSED IN ACCORDANCE WITH OAC 3745-27-13(H)(6). AS SHOWN IN DRAWING 2 OF 7, THE CURRENT WASTE AREA IS APPROXIMATELY 2.2 ACRES. EXCAVATION OF PAPER SLUDGE WASTE FROM PORTIONS OF THE FOOTPRINT PERIMETER COULD REDUCE THE FINAL COVER AREA TO LESS THAN 2.0 ACRES. THE FINAL COVER SYSTEM WILL INCLUDE THE FOLLOWING COMPONENTS DESCRIBED BELOW:

- GRADING FILL
- COMPACTED SOIL LAYER
- VEGETATIVE SOIL LAYER
- AQUABLOK ISOLATION BARRIER

GRADING FILL

IN ORDER TO MAINTAIN A MINIMUM TOP OF FINAL COVER GRADE OF 3% AND MAXIMUM TOP OF FINAL COVER GRADE OF 33%, GRADING FILL MATERIAL WILL BE NECESSARY TO ACHIEVE DESIRED BOTTOM OF COMPACTED SOIL LAYER GRADES IN SOME AREAS WITHIN THE WASTE FINAL COVER FOOTPRINT. TWO SOURCES OF GRADING FILL WILL BE USED AND ARE DISCUSSED BELOW.

GRADING FILL FROM VARIOUS EXCAVATIONS

THIS TASK WILL INCLUDE EXCAVATION, HAULING, PLACEMENT, GRADING, AND COMPACTION OF A VARIETY OF EXCAVATED MATERIALS AS INDICATED BELOW:

- PAPER SLUDGE TO BE CONSOLIDATED PURSUANT TO APPROVAL OF THE QAC 3745-27-13(H)(6) EXEMPTION REQUEST.
- SEDIMENT REMOVED FROM DOWNSTREAM OF THE PROPOSED STREAM CULVERT
- ANY OTHER MATERIAL EXCAVATED FROM THE PROJECT AREA, EXCLUDING THE BORROW AREA.

GRADING FILL FROM BORROW AREA

THIS TASK WILL ALSO INCLUDE EXCAVATION, HAULING, PLACEMENT, GRADING, AND COMPACTION OF SOIL MATERIALS FROM THE DESIGNATED GRADING FILL SUBDIVISION OF THE BORROW AREA. COMPACTION WILL BE TO VISUAL NON-MOVEMENT AS DETERMINED BY THE ENGINEER.

GRADING FILL EXCAVATIONS WILL BE COMPLETED IN THE AREAS DELINEATED AND/OR AS DIRECTED BY THE ENGINEER. CROSS-SECTION DRAWING 5 OF 7 ILLUSTRATES THE EXTENT OF GRADING FILL NEEDED TO ACHIEVE BOTTOM OF COMPACTED SOIL LAYER. THE ACTUAL EXTENT WILL NEED TO BE DETERMINED BY THE ENGINEER DURING CONSTRUCTION. COMPACTION WILL BE TO VISUAL NON-MOVEMENT AS DETERMINED BY THE ENGINEER.

COMPACTED SOIL LAYER

THIS TASK WILL INCLUDE EXCAVATION, HAULING, PLACEMENT, GRADING, AND COMPACTION OF SOIL FOR THE MINIMUM TWO-FOOT THICK COMPACTED SOIL LAYER WITHIN THE PROPOSED FINAL COVER LIMITS. SOIL FROM THE DESIGNATED BORROW AREA WILL BE USED FOR THE COMPACTED SOIL LAYER. THE REDUCED FOOTPRINT FOR THE FINAL COVER AFTER PAPER SLUDGE CONSOLIDATION IS ANTICIPATED TO BE LESS THAN TWO ACRES. VARIOUS CAP TERMINATION SCENARIOS, INCLUDING THE COMPACTED SOIL LAYER, ARE DEPICTED AS DETAILS 1, 2, AND 3 ON DRAWING 6 OF 7.

VEGETATIVE SOIL LAYER

THIS TASK WILL INCLUDE EXCAVATION, HAULING, PLACEMENT, AND SPREADING OF VEGETATIVE SOIL FOR A MINIMUM SIX-INCH LOOSE VEGETATIVE SOIL LAYER WITHIN THE PROPOSED FINAL COVER LIMITS. SOIL FROM THE DESIGNATED BORROW AREA WILL BE USED FOR THE VEGETATIVE SOIL LAYER. VARIOUS CAP TERMINATION SCENARIOS, INCLUDING THE VEGETATIVE SOIL LAYER, ARE DEPICTED AS DETAILS 1, 2, AND 3 ON DRAWING 6 OF 7.

AQUABLOK ISOLATION BARRIER FOR FINAL COVER TERMINATION

THIS TASK WILL INCLUDE INSTALLATION OF AQUABLOK ISOLATION BARRIER FOR FINAL COVER CAP TERMINATION AS SHOWN ON DETAILS 1 AND 2 ON DRAWING 6 OF 7, AND AT LOCATIONS DELINEATED BY THE ENGINEER. AQUABLOK WILL COME IN THE TWO-TON BAG VARIETY.

INSTALL SURFACE WATER MANAGEMENT SYSTEM

DRAINAGE DITCH (GRASS LINED)

THIS TASK WILL INCLUDE INSTALLATION OF GRASS LINED DRAINAGE DITCHES ACCORDING TO DETAIL 9 ON DRAWING 6 OF 7. THE ACTUAL LINE AND GRADE OF THE DITCHES WILL BE DETERMINED IN THE FIELD BY THE ENGINEER. SEEDING AND MULCHING FOR GRASS LINED CHANNEL WILL BE DONE AS INDICATED BELOW.

DRAINAGE DITCH (EROSION MAT LINED)

THIS TASK WILL INCLUDE, AS THE PRIMARY OPTION FOR DITCH FORTIFICATION, INSTALLATION OF NORTH AMARICAN GREEN (OR ENGINEER APPROVED EQUIVALENT) EROSION MAT LINED DRAINAGE DITCHES ACCORDING TO DETAIL 10 ON DRAWING 6 OF 7. THE ACTUAL LINE AND GRADE OF THE DITCHES WILL BE DETERMINED IN THE FIELD BY THE ENGINEER. SEEDING AND MULCHING OVER EROSION MAT WILL BE DONE AS INDICATED BELOW. EROSION MATTING IS ONE OF TWO OPTIONS THAT WILL BE CONSIDERED FOR DITCHES IN NEED OF FORTIFICATION.

DRAINAGE DITCH (ROCK LINED)

THIS TASK WILL INCLUDE, AS A SECONDARY OPTION FOR DITCH FORTIFICATION, INSTALLATION OF ROCK LINED DRAINAGE DITCHES ACCORDING TO DETAIL 10 ON DRAWING 6 OF 7. THE ACTUAL LINE AND GRADE OF THE DITCHES WILL BE DETERMINED IN THE FIELD BY THE ENGINEER. ROCK LINING IS ONE OF TWO OPTIONS THAT WILL BE CONSIDERED FOR DITCHES IN NEED OF FORTIFICATION.

RECLAMATION

BORROW AREA RESTORATION

THIS TASK WILL INCLUDE EXCAVATION, HAULING, PLACEMENT, SPREADING, AND COMPACTION OF SOIL FOR RESTORATION OF THE BORROW AREA. RESTORATION WILL BE DONE IN A MANNER TO PROVIDE POSITIVE DRAINAGE FROM THE AREA AND ELIMINATE ANY PONDING THAT MAY HAVE RESULTED FROM EXCAVATION FOR FINAL COVER. SOIL MATERIAL TO BE USED FOR RESTORING THE BORROW AREA WILL BE SUCH THAT IT WILL SUPPORT VEGETATIVE GROWTH.

SEEDING AND MULCHING

THE PROJECT WILL INCLUDE SEEDING AND MULCHING OF EXPOSED AREAS WITH SUCH GRASSES OR OTHER VEGETATION AS WILL FORM A COMPLETE DENSE COVER WITHIN THE PROPOSED FINAL COVER LIMITS.

SEEDING AND MULCHING WILL ALSO BE COMPLETED IN THE BORROW AREA AFTER ITS RESTORATION, AND FOR ANY CURRENTLY VEGETATED AREAS WITHIN AND OUTSIDE THE PROJECT AREA THAT ARE DISTURBED DURING CONSTRUCTION.

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DUBLIN, OHIO 43016
PHONE: (614) 793-87
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Professional Seal:

Name:

Date:

Project Title:

FINAL CLOSURE PLAN FOR CITY LOT 4268-MORAINE, OHIO

Owner:

MORAINE PROPERTIES, LL(

CITY LOT 4268
SOLDIERS HOME-WEST CARROLLTON ROA
MORAINE, OHIO 45439

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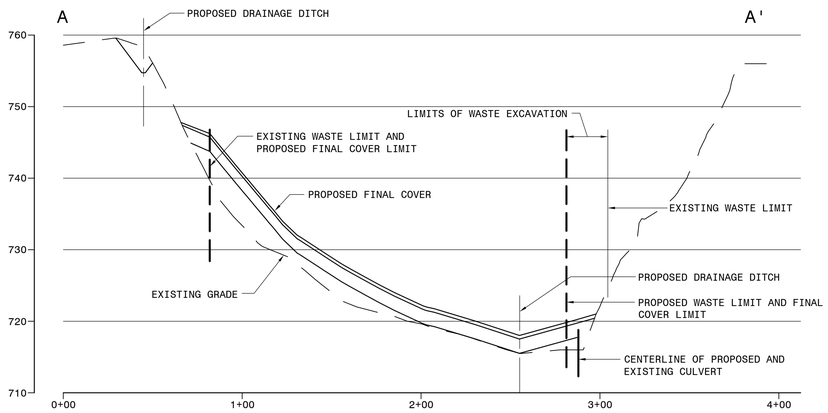
Mark	Description	Date

Project No.:	ETH001
CAD DWG File:	ETH001.200.0023
Plot Date:	7/27/2012
Layout By:	TAM
Drawn By:	DAB/GAC
Check By:	MSF
Scale:	1"=40'
Issue Date:	JULY 2012

Sheet Title:

FINAL COVER SYSTEM

Sheet Number: 4 of 7



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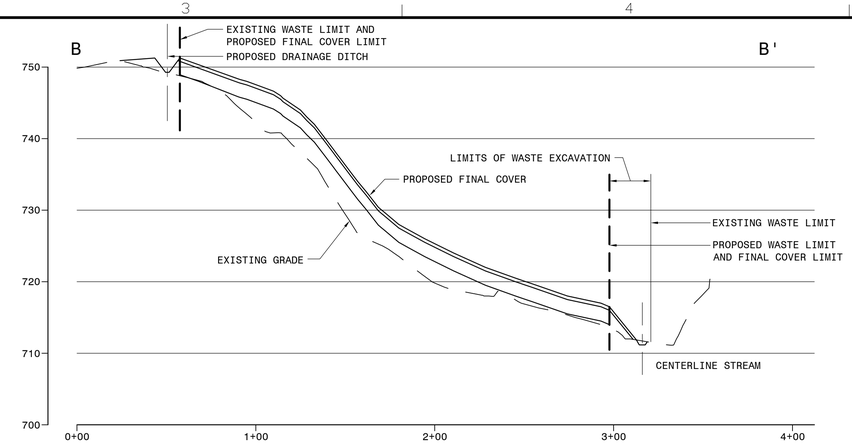

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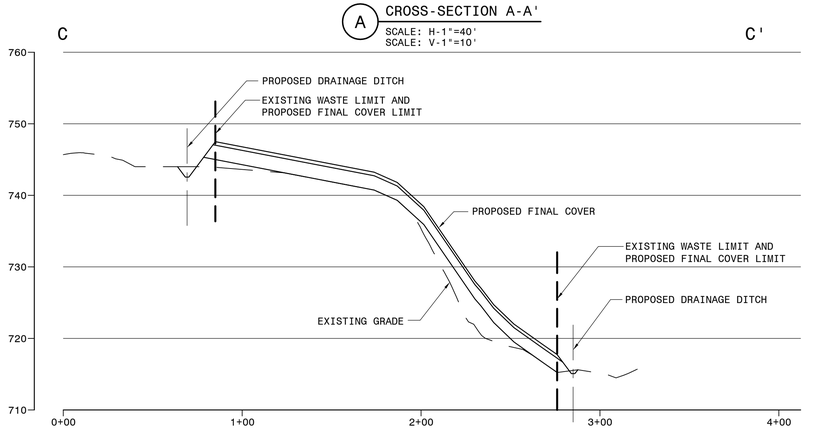

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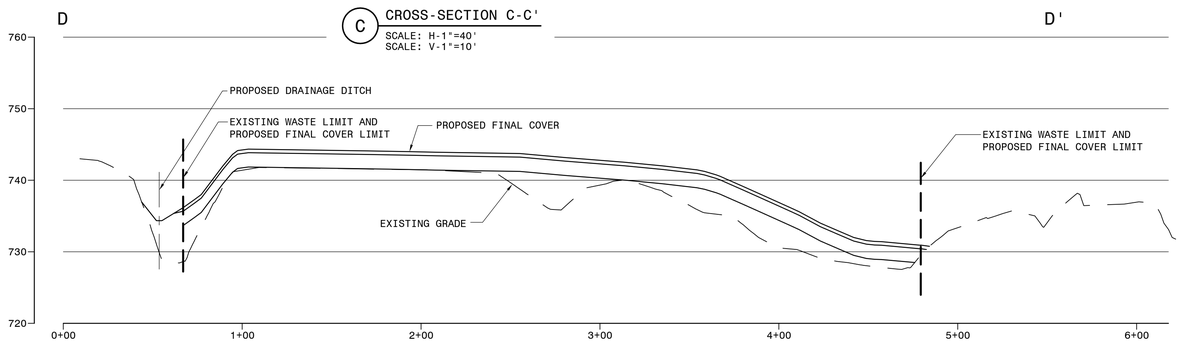

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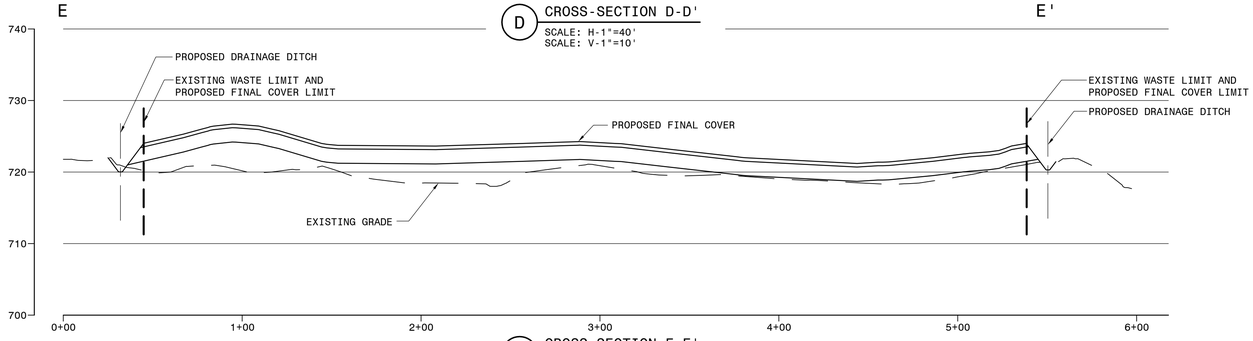

E CROSS-SECTION E-E'
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FINAL CLOSURE PLAN FOR CITY LOT 4268-MORAINE, OHIO

Owner:

MORAINE PROPERTIES, LL(

CITY LOT 4268
SOLDIERS HOME-WEST CARROLLTON ROA
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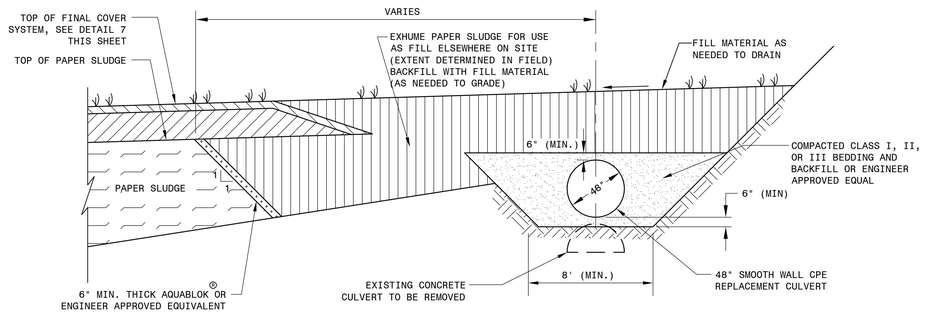
Mark	Description	Date

Project No.:	ETH001
CAD DWG File:	ETH001.200.0024
Plot Date:	7/13/2012
Layout By:	TAM
Drawn By:	DAB
Check By:	MSF
Scale:	AS NOTED
Issue Date:	JULY 2012

Sheet Title:

CROSS-SECTIONS

Sheet Number: 5 of 7



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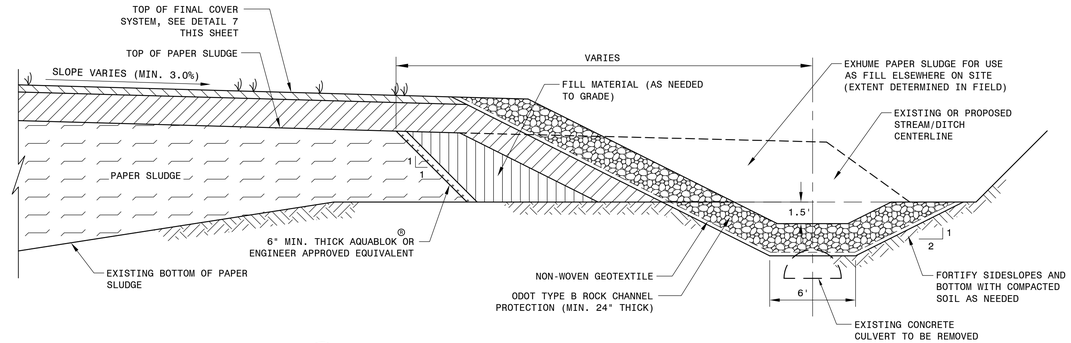

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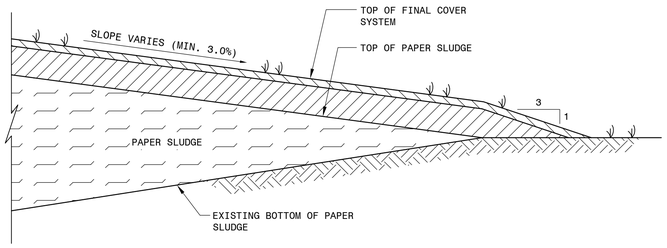
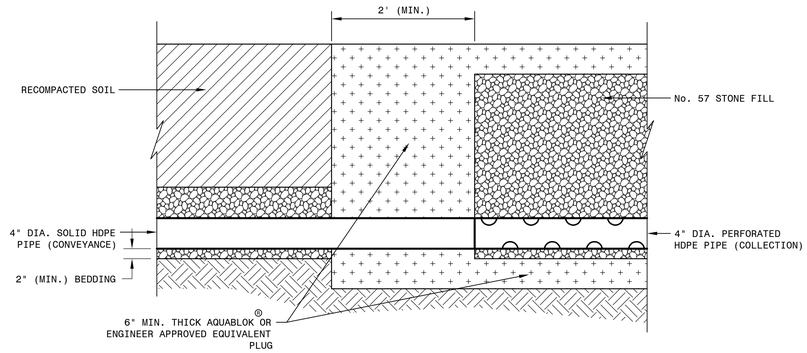
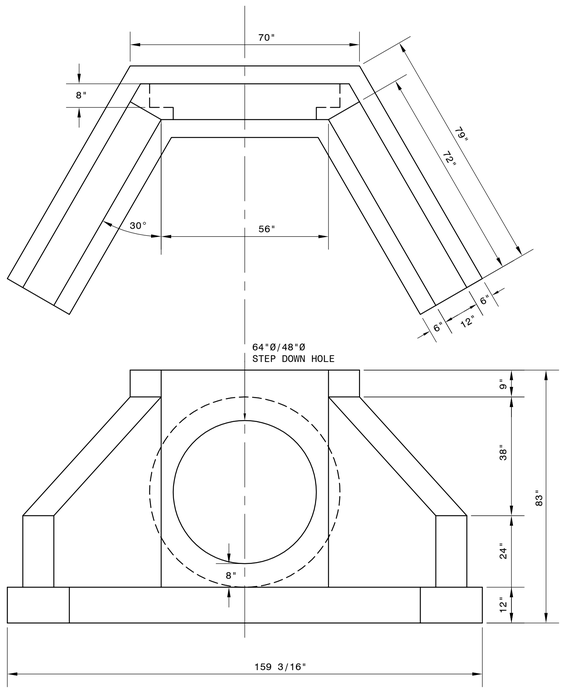


3 TYPICAL CAP TERMINATION
SCALE: N.T.S.



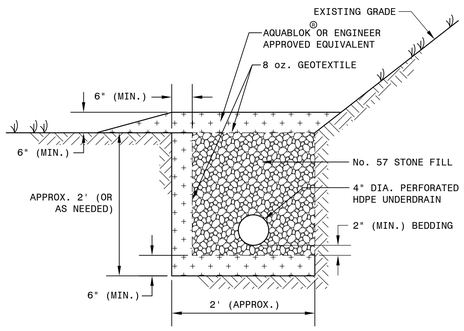
6 SEEP COLLECTION/CONVEYANCE TRANSITION
SCALE: N.T.S.

NOTE:
AQUABLOK PLUG TO SURROUND PIPE COMPLETELY

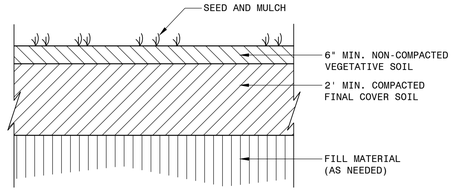


8 TYPICAL HEADWALL/ENDWALL FOR 48" PIPE
SCALE: N.T.S.

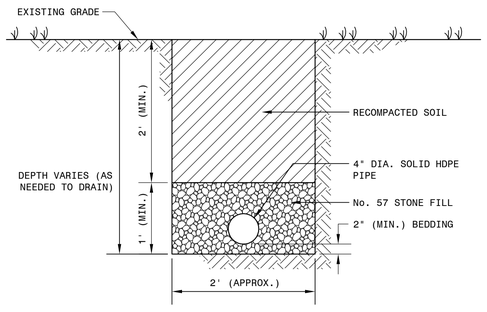
NOTE:
CONTRACTOR TO PROVIDE SHOP DRAWINGS FOR ENGINEER APPROVAL.



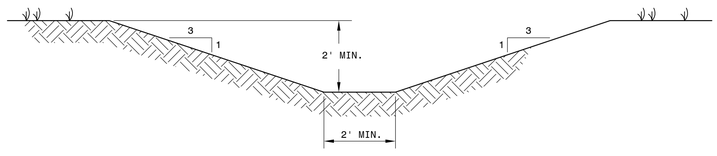
4 SEEP COLLECTION UNDERDRAIN
SCALE: N.T.S.



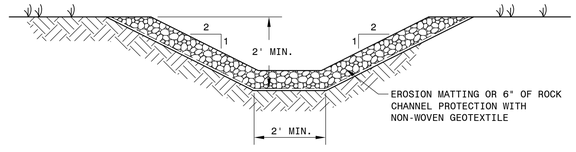
7 FINAL COVER SYSTEM
SCALE: N.T.S.



5 SEEP CONVEYANCE
SCALE: N.T.S.



9 GRASS LINED DITCH
SCALE: N.T.S.



10 EROSION MAT OR ROCK LINED DITCH
SCALE: N.T.S.

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FAX: (614) 793-9070
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Professional Seal:

Name:

Date:

Project Title:

FINAL CLOSURE PLAN FOR CITY LOT 4268-MORAINE, OHIO

Owner:

MORAINE PROPERTIES, LL(

CITY LOT 4268
SOLDIERS HOME-WEST CARROLLTON ROA
MORAINE, OHIO 45439

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Mark	Description	Date

Project No.:	ETH001
CAD DWG File:	ETH001.200.0024
Plot Date:	7/13/2012
Layout By:	TAM
Drawn By:	DAB
Check By:	MSF
Scale:	AS NOTED
Issue Date:	JULY 2012

Sheet Title:

DETAILS

Sheet Number: 6 of 7

GENERAL PROJECT REQUIREMENTS

HEALTH AND SAFETY PLAN

CONTRACTORS, SUBCONTRACTORS, CONSULTANTS, FIELD PERSONNEL AND ANY OTHER ENTITY INVOLVED IN THE PROJECT WILL BE EXPECTED TO DEVELOP, IMPLEMENT AND MAINTAIN CURRENT, A SITE-SPECIFIC HEALTH AND SAFETY PLAN (HASP). HASPS WILL COMPLY WITH ALL OCCUPATIONAL HEALTH AND SAFETY ADMINISTRATION (OHSA) REQUIREMENTS, AND WILL BE UTILIZED FOR THE DURATION OF THE PROJECT IN ALL AREAS OF THE PROPERTY

THE PAPER SLUDGE WASTE MAY CONTAIN PCBS. AS SUCH, THE HASP MUST INCLUDE PROVISIONS TO ENSURE PROPER PRECAUTIONS ARE TAKEN TO PROTECT SITE WORKERS AND THE PUBLIC. PRECAUTIONS MAY INCLUDE, BUT NOT BE LIMITED TO, USE OF RESPIRATORS, GLOVES, AND BOOT COVERS.

BEFORE CONSTRUCTION BEGINS, IT WILL BE THE CONTRACTOR'S RESPONSIBILITY TO CONTACT THE OHIO UTILITY PROTECTION SERVICES (OUPS). THE CONTRACTOR WILL ALSO TAKE ANY OTHER MEASURES NECESSARY TO ENSURE UTILITIES ARE APPROPRIATELY MARKED AND AN ASSURED DISTANCE IS MAINTAINED FOR THE DURATION OF THE PROJECT.

GENERAL CONDITIONS

THE PROJECT WILL INCLUDE PROVISIONS FOR DUST AND ODOR CONTROL FOR ALL WORK WHICH CAUSES DUST OR UNSUITABLE ODORS FOR THE PROPERTY AND ANY SURROUNDING PROPERTIES, AS DETERMINED BY THE ENGINEER. DUST CONTROL IS ANTICIPATED TO INCLUDE REGULAR WATERING OF HAUL AND ACCESS ROADS, AS WELL AS OTHER EXPOSED SURFACES, AS NECESSARY. ALTHOUGH FOUL ODORS ARE NOT ANTICIPATED FOR THIS PROJECT, ODOR CONTROL AS NEEDED WILL BE ESTABLISHED BY COVERING EXPOSED EXCAVATED OF REWORKED WASTE SURFACES AS SOON AS POSSIBLE AFTER COMPLETION OF WORK AT THE END OF EACH WORK DAY.

EROSION AND SEDIMENTATION CONTROL

THE PROJECT WILL INCLUDE EROSION AND SEDIMENTATION CONTROLS IN ACCORDANCE WITH THE SITE'S STORM WATER POLLUTION PREVENTION PLAN (SWP3).

GROUNDWATER/STORMWATER MANAGEMENT WILL INCLUDE PROPERLY RESTRICTING THE ACCUMULATION OF ANY WATER WITHIN THE PROJECT AREAS, INCLUDING THE BORROW AREA. THE WATER IS ASSUMED TO BE A NON-HAZARDOUS WASTE.

CLEARING AND GRUBBING

THE PROJECT WILL INCLUDE CLEARING THE PROJECT AREA (INCLUDING THE BORROW AREA) OF TREES, SHRUBS, STUMPS AND OTHER VEGETATION AS NEEDED TO COMPLETE THE WORK. THE PROJECT AREA IS SHOWN IN PLAN VIEW ON DRAWINGS 2 THROUGH 4 OF 7.

DECONTAMINATION

THE PROJECT WILL INCLUDE THE NEED FOR DECONTAMINATION OF ALL VEHICLES, TOOLS, OR EQUIPMENT WHICH COMES INTO CONTACT WITH WASTE OR WITH A MATERIAL WHICH HAS BEEN DETERMINED BY THE ENGINEER TO BE A CONTAMINATED MATERIAL.

ALL DECONTAMINATION ACTIVITIES SHALL BE PERFORMED IN ACCORDANCE WITH THE SPECIFICATIONS TO BE INCLUDED IN THE CONTRACTOR'S BID PACKAGE. ALL DECONTAMINATION WATER AND OTHER MATERIALS USED FOR DECONTAMINATION WILL BE DISPOSED IN ACCORDANCE WITH SPECIFICATIONS TO BE INCLUDED IN THE CONTRACTOR'S BID PACKAGE.

SPECIFICATIONS

GRADING FILL MATERIAL

GRADING FILL MATERIAL SHALL BE USED WITHIN LOW AREAS TO RAISE EXISTING GRADES TO DESIGN BOTTOM OF FINAL COVER GRADES. GRADING FILL MATERIAL SHALL COME FROM THE DESIGNATED BORROW AREA OR FROM OTHER PROJECT RELATED EXCAVATIONS AS DIRECTED BY THE ENGINEER. THE AREAS WHERE GRADING FILL MATERIAL IS TO BE PLACED SHALL BE STRIPPED OF ALL TOPSOIL AND PROOF_ROLLED. IN AREAS THAT REQUIRE GRADING FILL MATERIAL TO ESTABLISH DESIGN GRADES, THE FILL SHALL BE PLACED ON THE PROOF_ROLLED SURFACE AND IN A MANNER TO PREVENT VOIDS OR BRIDGING.

GRADING FILL MATERIAL SHALL BE PLACED OVER THE DESIGNATED AREA ACCORDING TO THE FOLLOWING REQUIREMENTS:

- CLEARED OF MATERIALS DEEMED UNSUITABLE FOR USE AS GRADING FILL MATERIAL AS DETERMINED BY, AND TO THE SATISFACTION OF, THE ON-SITE CQA REPRESENTATIVE;
- LOOSE LIFTS NOT TO EXCEED 12 INCHES IN THICKNESS;
- COMPACTED BY SHEEPSFOOT COMPACTOR TO VISUAL NON-MOVEMENT, AS DETERMINED BY THE ENGINEER;

FINAL COVER RECOMPACTED SOIL LAYER

SOIL MATERIAL

FINAL COVER COMPACTED SOIL LAYER (CSL) MATERIAL SHALL CONSIST OF NON-PUTRESCENT MATERIALS, EXHIBITING GOOD COMPACTABILITY, COHESIVENESS, AND RELATIVE UNIFORM TEXTURE. CSL MATERIAL SHALL NOT CONTAIN STONES, COBBLES, BOULDERS, OR OTHER LARGE OBJECTS THAT MAY INTERFERE WITH ITS APPLICATION AND INTENDED PURPOSE. 100% OF THE MATERIAL SHALL PASS THE 10" SCREEN, 90% SHALL PASS A 3" SCREEN, AND 70% SHALL PASS THE #10 SIEVE. CSL MATERIAL THAT PASSES THE #10 SIEVE SHALL BE CLASSIFIED USING THE USDA TEXTURAL CLASSIFICATION CHART. SUITABLE MATERIAL FOR CSL SHALL INCLUDE, BUT MAY NOT BE LIMITED TO, LOAM, SANDY LOAM, SILTY LOAM, CLAY LOAM, SILTY CLAY, AND SANDY CLAY. CSL MATERIAL SHALL EXHIBIT A LABORATORY PERMEABILITY OF NO GREATER THAN 1 X 10-5 CM/SEC. OTHER SOIL CLASSIFICATIONS MAY BE USED IF IT CAN BE DEMONSTRATED TO THE SATISFACTION OF THE OHIO EPA THAT SUCH OTHER SOIL CLASSIFICATION MEETS THE REQUIREMENTS LISTED ABOVE.

SOILS LABORATORY TESTING

TO SATISFY THE MATERIAL EVALUATION REQUIREMENT OF ONE SAMPLE FOR EVERY 3,000 C.Y. OF MATERIAL USED, REPRESENTATIVE SAMPLES OF POTENTIAL CSL MATERIAL SHALL BE COLLECTED FROM A DESIGNATED BORROW SOURCE. POTENTIAL CSL MATERIAL SAMPLES SHALL BE TESTED AT A GEOTECHNICAL SOILS LABORATORY FOR GRAIN SIZE ANALYSIS, USDA CLASSIFICATION, STANDARD PROCTOR, AND PERMEABILITY, AT A MINIMUM. RESULTS OF MATERIAL TESTING SHALL BE SUBMITTED TO OHIO EPA SWDO AT LEAST SEVEN DAYS PRIOR TO ITS INTENDED USE IN CAP CONSTRUCTION.

CONSTRUCTION

THE AREA TO RECEIVE CSL SHALL BE CLEARED OF EXISTING RESIDUAL VEGETATION TO THE SATISFACTION OF THE ON-SITE CQA REPRESENTATIVE. GRADING FILL MATERIAL SHALL BE PLACED IN THE AREA OF WASTE AS NEEDED TO ACHIEVE THE DESIGNED BOTTOM OF FINAL COVER GRADES (SEE GRADING FILL MATERIAL SPECIFICATION). GRADING FILL MATERIAL SHALL BE PLACED IN APPROXIMATE 12" LIFTS AND COMPACTED WITH A SHEEPSFOOT COMPACTOR TO THE SATISFACTION OF THE ENGINEER. UPON ACHIEVING DESIGN BOTTOM OF CSL GRADES (AS DETERMINED BY SURVEY), CSL MATERIAL SHALL BE PLACED OVER THE DESIGNATED AREA ACCORDING TO THE FOLLOWING REQUIREMENTS:

- LOOSE LIFTS NOT TO EXCEED 8 INCHES IN THICKNESS;
- COMPACTED BY SHEEPSFOOT COMPACTOR TO AT LEAST 95% OF THE MAXIMUM STANDARD PROCTOR DENSITY, AS DETERMINED BY NUCLEAR DENSITY GAUGE;
- TESTED BY THE ENGINEER AT A FREQUENCY OF AT LEAST FIVE TESTS PER ACRE PER LIFT;
- MOISTURE CONDITIONED, AS NEEDED, TO ACHIEVE COMPACTION AND COHESION AS DETERMINED BY THE ENGINEER;
- CLEARED OF PUTRESCENT MATERIALS, STONES, COBBLES, BOULDERS OR OTHER LARGE MATERIALS AS DETERMINED BY, AND TO THE SATISFACTION OF, THE ENGINEER.

CSL MATERIAL SHALL COME FROM ON-SITE OR OFF-SITE BORROW SOURCES PREDETERMINED BY THE ENGINEER TO CONTAIN A SUFFICIENT QUALITY AND QUANTITY OF CSL MATERIAL. CSL CONSTRUCTION SHALL NOT TAKE PLACE DURING WEATHER CONDITIONS DEEMED BY THE ENGINEER TO BE UNSUITABLE FOR SAFE OPERATIONS OR FOR MAINTAINING THE INTEGRITY OF THE FINAL COVER SYSTEM

FINAL COVER VEGETATIVE SOIL LAYER

UPON ACHIEVING A MINIMUM 2-FOOT THICK CSL (AS DETERMINED BY SURVEY AND/OR FIELD MEASUREMENTS), AN ADDITIONAL 6" MINIMUM LOOSE LIFT OF SOILS SUITABLE FOR PROMOTING VEGETATIVE GROWTH SHALL BE PLACED, BUT NOT COMPACTED, OVER THE CSL. VEGETATIVE SOILS SHALL COME FROM THE DESIGNATED BORROW AREA.

FINAL COVER VEGETATION

UPON CONSTRUCTION OF THE VEGETATIVE SOIL LAYER, THE COMPLETED AREA SHALL BE SEEDED WITH SUCH GRASSES OR OTHER VEGETATION AS WILL FORM A COMPLETE DENSE COVER. SEEDING AND MULCHING SHALL BE DONE AS MANY TIMES AS NECESSARY TO ENSURE A DENSE COVER IS ESTABLISHED.

AQUABLOK ISOLATION BARRIER

AQUABLOK ISOLATION BARRIER OR AN ENGINEER APPROVED ISOLATION BARRIER SHALL BE USED TO PROVIDE AN ADDED BARRICADE BETWEEN PAPER SLUDGE AND IN-SITU OR FILL SOILS IN DESIGNATED AREAS AS DELINEATED ON THE DRAWINGS AND/OR AS NEEDED. AQUABLOK IS A PATENTED COMPOSITE-AGGREGATE TECHNOLOGY USED TO PROVIDE A LOW PERMEABILITY, EROSION RESISTANCE ENGINEERED "REACTIVE" BARRIER THAT BOTH ISOLATES AND IMPROVES CONTAMINATED SEDIMENT.

AQUABLOK SHALL BE PLACED FROM TWO-TON BAGS SUSPENDED FROM AN EXCAVATOR BUCKET OR OTHER SUITABLE EQUIPMENT. THE BAGS ARE FORMED WITH A FUNNELED OPENNING FOR EASY APPLICATION OF THE PRODUCT.

SEEP UNDERDRAIN SYSTEM

MATERIALS

PIPE MATERIAL SHALL BE 4-INCH DIAMETER CORRUGATED HIGH DENSITY POLYETHYLENE (HDPE) DRAINAGE TUBING, OR ENGINEER APPROVED PIPING, WITH FITTINGS AS NEEDED. PERFORATED PIPE SHALL BE USED IN THE SEEP COLLECTION AREA. SOLID WALL PIPE SHALL BE USED IN THE SEEP CONVEYANCE AREA. AGGREGATE BEDDING SHALL BE ODOT NO. 57 STONE FILL OR ENGINEER APPROVED EQUIVALENT. AQUABLOK OR AN ENGINEER APPROVED EQUIVALENT ISOLATION BARRIER SHALL BE USED IN THE SEEP COLLECTION PORTION OF THE SYSTEM. AN 8 OZ. NON-WOVEN GEOTEXTILE FILTER FABRIC SHALL BE USED TO SEGREGATE VARIOUS MATERIALS WHERE APPLICABLE, AS DESIGNATED ON THE DRAWINGS.

CONSTRUCTION

THE TRENCH CUT, EXCAVATED BASE SHALL BE VERIFIED TO ENSURE THAT IT IS READY TO RECEIVE WORK AND DIMENSIONS ARE AS INDICATED ON THE DRAWINGS. UNDERDRAIN LINES, GRADES, AND OVEREXCAVATION (AS NEEDED) SHALL BE DETERMINED IN THE FIELD BY THE ENGINEER. LARGE STONES OR OTHER HARD MATTER WHICH COULD DAMAGE DRAINAGE PIPING OR IMPEDE CONSISTENT BACKFILLING OR COMPACTION SHALL BE REMOVED.

PIPE AND PIPE FITTINGS SHALL BE INSTALLED IN ACCORDANCE WITH PIPE MANUFACTURER'S INSTRUCTIONS. DRAINAGE PIPE SHALL BE PLACED ON CLEAN CUT SUBSOIL. PIPE SHALL BE INSTALLED IN A MANNER THAT PROMOTES POSITIVE DRAINAGE AS DETERMINED BY SURVEY. PIPE SHALL BE PLACED WITH PERFORATIONS FACING DOWN. DAYLIGHT THE SEEP CONVEYANCE PIPE AT THE EXISTING STREAM AS DIRECTED BY THE ENGINEER. PIPE AND AGGREGATE COVER SHALL BE PROTECTED FROM DAMAGE OR DISPLACEMENT DURING INSTALLATION.

CULVERT

CULVERT SHALL BE INSTALLED IN ACORDANCE WITH ASTM D2321, "STANDARD PRACTICE FOR UNDERGROUND INSTALLATION OF THERMOPLASTIC PIPE FOR SEWERS AND OTHER GRAVITY FLOW APPLICATIONS". MEASURES SHALL BE TAKEN TO PREVENT MIGRATION OF NATIVE FINES INTO BACKFILL MATERIAL. WHERE THE TRENCH BOTTOM IS UNSTABLE, THE AREA SHALL BE EXCAVATED TO A DEPTH AS REQUIRED BY THE ENGINEER AND REPLACED WITH SUITABLE MATERIAL OR ALTERNATIVE GEOTEXTILE MATERIAL STABILIZER AS SPECIFIED BY THE ENGINEER.

SUITABLE MATERIAL FOR CULVERT BEDDING SHALL BE CLASS I, II, OR III MATERIAL, AND HAVE A MINIMUM THICKNESS OF 6 INCHES. SUITABLE MATERIAL FOR CULVERT BACKFILLING SHALL BE CLASS I, II, OR III MATERIAL AND EXTEND NOT LESS THAN 6 INCHES ABOVE THE CROWN OF THE PIPE. DOCUMENTATION FOR THE MATERIAL SPECIFICATIONS SHALL BE PROVIDED TO THE ENGINEER. BEDDING AND BACKFILL MATERIAL SHALL BE PLACED IN MAXIMUM 8 INCH LOOSE LIFTS AND COMPACTED IN ACCORDANCE WITH ASTM D2341. CULVERT SHALL BE INSTALLED WITH APPROPRIATE INLET AND OUTLET STRUCTURES AS APPROVED BY THE ENGINEER.

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PHONE: (614) 793-87
FAX: (614) 793-9070
www.hullinc.com

Professional Seal:

Name:

Date:

Project Title:

FINAL CLOSURE PLAN FOR
CITY LOT 4268-MORAINE, OHIO

Owner:

MORAINE PROPERTIES, LL(

CITY LOT 4268
SOLDIERS HOME-WEST CARROLLTON ROA
MORAINE, OHIO 45439

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Mark	Description	Date

Project No.:	ETH001
CAD DWG File:	ETH001.200.0024
Plot Date:	7/20/2012
Layout By:	TAM
Drawn By:	DAB
Check By:	MSF
Scale:	AS NOTED
Issue Date:	JULY 2012

Sheet Title:

SPECIFICATIONS

Sheet Number: 7 of 7

APPENDIX B

OAC 3745-27-13(H)(6) Exemption Request

Hull & associates, inc.

July 20, 2012

Mr. Scott Nally, Director
Ohio EPA-DSIWM
Southwest District Office
401 East Fifth Street
Dayton, Ohio 45402-2911

RE: OAC 3745-27-13(H)(6) Exemption Request for the Moraine Properties LLC Paper Sludge Closure Plan; ETH001.300.0022.

Dear Director Nally:

Moraine Properties, LLC ("Moraine") and Ethyl Corporation ("Ethyl") retained Hull & Associates, Inc. ("Hull") to design and implement stream restoration/culvert maintenance activities and properly cap the existing paper sludge area located in the City of Moraine, Montgomery County, Ohio ("Site"). In order to complete the activities associated with these environmental improvements for the Site, it will be necessary for some of the waste to be excavated and consolidated. This request has been prepared for your review and approval to grant us authorization for waste excavation and consolidation as described in the following details and procedures.

BACKGROUND

The Site is City Lot No. 4268 – Moraine, Ohio located on Soldiers Home – West Carrolton Road. Upon completing an investigation of historic use of the Site, it was determined that the Site was used for the placement of paper sludge associated with the recycling of carbonless and other paper during the 1960s and early 1970s. The Site was never licensed or permitted. Based on discussions with Ohio EPA's Division of Materials and Waste Management (DMWM), it was determined that the paper sludge placed on the Site meets the definition for solid waste.

An Ohio Administrative Code (OAC) 3745-27-13 request was submitted to Ohio EPA/SWDO on July 20, 2012. All work proposed for this project will be conducted in accordance with the approval and any conditions contained therein.

PROPOSED ENVIRONMENTAL IMPROVEMENT WORK

The environmental improvement work to be performed at the Site is designed for proper closure of the Site and to minimize long term care. The work will include culvert replacement/stream restoration, installation of an underdrain system, and construction of a final soil cover system. The construction and implementation of this work consists of the following tasks:

1. Replacement of an existing culvert and stream restoration;

2. Waste excavation and consolidation;

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614.793.8777 fax 614.793.9070 www.hullinc.com

3. Construction of a groundwater seep underdrain piping system;

4. Placement of minimum of 2.5 foot thick soil cover;
5. Construction of surface water management system; and

6. Seeding and mulching of the final cover and any areas disturbed as part of construction.

This improvement to the Site will enhance management of the surface water, stream water quality, and will close the Site in accordance with OAC 3745-27.

OAC 3745-27-13(H)(6) Exemption

We would like to request an exemption from OAC 3745-27-13(H)(6) pursuant to OAC 3745-27-03(B) and ORC 3734.02(G). OAC 3745-27-13(H)(6) states that "No excavation of waste shall occur unless the excavated waste is replaced within previously existing horizontal and vertical limits of waste placement or is treated or disposed of at a licensed, permitted treatment or disposal facility".

In order to accomplish the objectives of this project by constructing an environmentally sound final cap and properly constructing other components, it is necessary to excavate and consolidate some of the waste within the foot print of the existing waste disposal area. The excavation and consolidation of waste is needed:

1. To fill some of the areas within the existing waste limits to provide proper grading for construction of the final cap,

2. To be able to replace the existing culvert and perform stream restoration, and

3. To construct and install a groundwater underdrain system to protect integrity of the final cap.

The excavation and consolidation of the waste within the existing limit of waste will result in reduced horizontal waste limit and increased vertical grades for the waste.

We believe the proposed environmental improvement will enhance the quality of the proposed cap and minimize maintenance during long term post closure care of the Site. Furthermore, the proposed environmental improvement approval will not cause a risk to human health or safety or to the environment. Moreover, the proposed environmental improvement will provide additional protection to human health, safety, and the environment as the cap will significantly diminish any further contamination of the environment and prevent human contact.

Prior to initiating design for the project, Hull reviewed current TSCA Regulations and Ohio EPA VAP eligibility requirements/regulations as they relate to the development of a remediation plan to address the Polychlorinated Biphenyl (PCB) contaminated paper sludge encountered. As a

result we developed a remedial action plan for closing the Site under the Ohio EPA VAP rules as codified under OAC 3745-300.

We appreciate your prompt consideration of this request and if we can provide any additional information please let us know.

Sincerely,

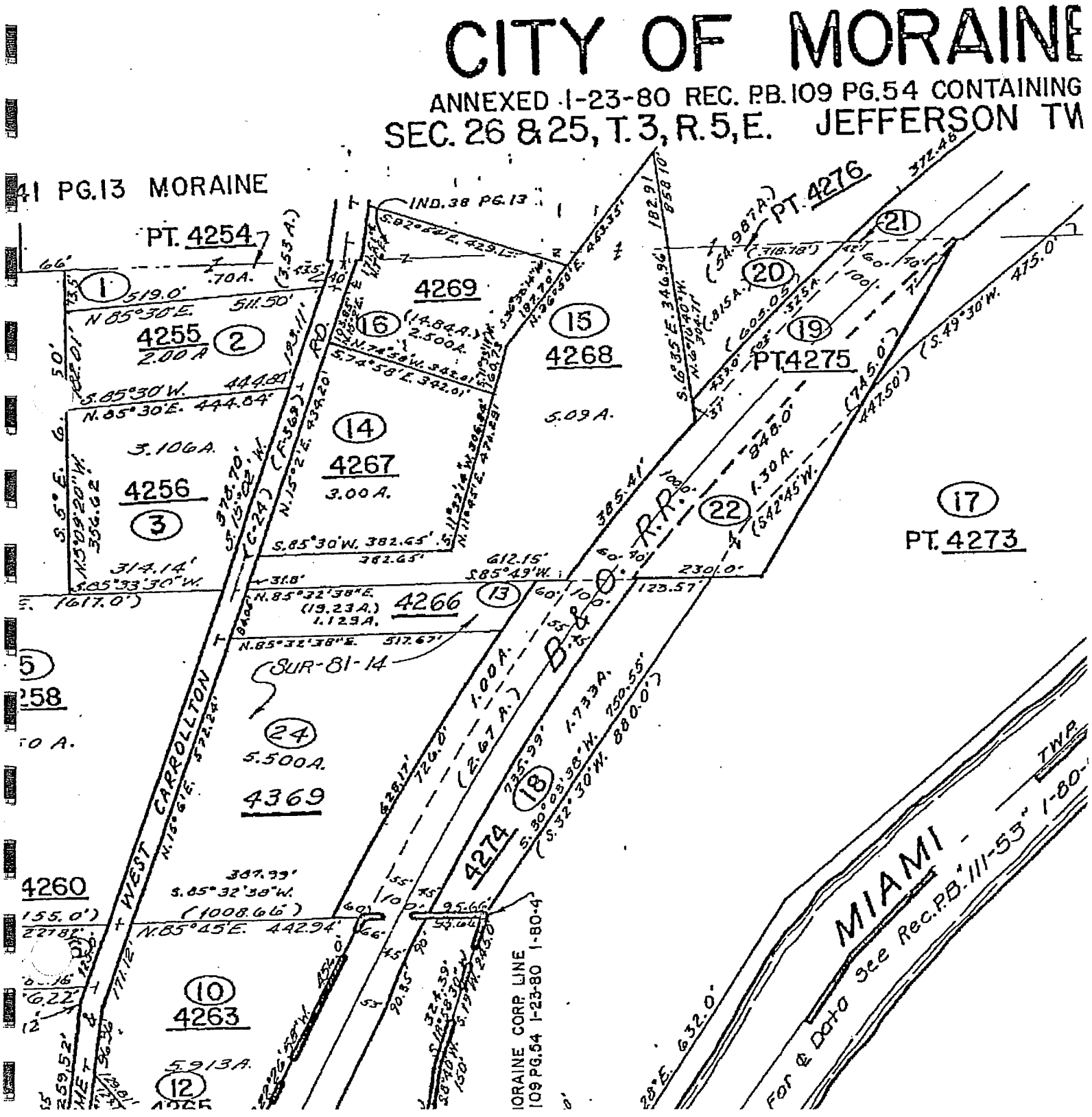
Steven M. Gross, CP
Sr. Project Manager

cc: Tracy L. Buchanan, Ohio EPA SWDO, DMWM
Joleen Cook, Ohio EPA SWDO, DMWM
Mo Finy, Hull & Associates, Inc.
Louis L. Ainsworth, Faegre Baker Daniels LLP
Allan Crider, Pentair, Inc
Kindra Kirkeby, NewMarket Services Corporation
John Street, Ethyl Corporation

APPENDIX C

Montgomery County Auditor Parcel Map

Montgomery County
Karl L.Keith, Auditor



APPENDIX D

Letters of Acknowledgement

Hull & associates, inc.

July 20, 2012

Mr. Tony Wenzler
Building Administrator
4200 Dryden Road
Moraine, Ohio 45439

RE: Authorization Request Under OAC 3745-27-13 for Conducting Investigation Activities at the Paper Sludge Disposal Area at City Lot No. 4268 located in the City of Moraine, Montgomery County, Ohio; ETH001.300.0006.

Dear Mr. Wenzler:

On behalf of Moraine Properties, LLC ("Moraine") Hull & Associates, Inc. is sending this letter of notice in accordance with the Ohio Solid Waste Regulations 3745-27-13 of the Ohio Administrative Code (OAC) for construction activities at a paper sludge disposal area located on City Lot # 4268 in the City of Moraine, Montgomery County, Ohio. Moraine will be conducting construction activities to improve the surface water flow in the vicinity of the paper sludge disposal area and to properly cap the paper sludge landfill. The submittal for construction activities under Rule 3745-27-13 of the OAC will be submitted for review and approval to the Ohio Environmental Protection Agency Southwest District Division of Materials and Waste Management (DMWM).

If you should have any questions or need additional information, please contact either Mo Finy or Steven Gross with Hull & Associates, Inc. at (614) 793-8777.
Respectfully,

Steven M. Gross
Senior Project Manager

cc: Allan Crider, Pentair, Inc.
Louis L. Ainsworth, Faegre & Benson LLP
Mo Finy, Hull & Associates, Inc.

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614.793.8777 614.793.9070 fax www.hullinc.com

Hull & associates, inc.

July 20, 2012

Mr. David Hicks
City Manager
4200 Dryden Road
Moraine, Ohio 45439

RE: Authorization Request Under OAC 3745-27-13 for Conducting Investigation Activities at the Paper Sludge Disposal Area at City Lot No. 4268 located in the City of Moraine, Montgomery County, Ohio; ETH001.300.0006.

Dear Mr. Hicks:

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If you should have any questions or need additional information, please contact either Mo Finy or Steven Gross with Hull & Associates, Inc. at (614) 793-8777.

Respectfully,

Steven M. Gross
Senior Project Manager

cc: Allan Crider, Pentair, Inc.
Louis L. Ainsworth, Faegre & Benson LLP
Mo Finy, Hull & Associates, Inc.

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614.793.8777 614.793.9070 fax www.hullinc.com

Hull & associates, inc.

July 20, 2012

Chief Anthony Trick
City of Moraine Fire Division
4200 Dryden Road
Moraine, Ohio 45439

RE: Authorization Request Under OAC 3745-27-13 for Conducting Investigation Activities at the Paper Sludge Disposal Area at City Lot No. 4268 located in the City of Moraine, Montgomery County, Ohio; ETH001.300.0006.

Dear Chief Trick:

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Respectfully,

Steven M. Gross
Senior Project Manager

cc: Allan Crider, Pentair, Inc.
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Mo Finy, Hull & Associates, Inc.

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614.793.8777 614.793.9070 fax www.hullinc.com

Hull & associates, inc.

July 20, 2012

Mr. Dan Foley
Montgomery County Commissioner
451 W. Third Street, 11th Floor
P.O. Box 972
Dayton, OH 45422-1110

RE: Authorization Request Under OAC 3745-27-13 for Conducting Investigation Activities at the Paper Sludge Disposal Area at City Lot No. 4268 located in the City of Moraine, Montgomery County, Ohio; ETH001.300.0006.

Dear Mr. Foley:

On behalf of Moraine Properties, LLC ("Moraine") Hull & Associates, Inc. is sending this letter of notice in accordance with the Ohio Solid Waste Regulations 3745-27-13 of the Ohio Administrative Code (OAC) for construction activities at a paper sludge disposal area located on City Lot # 4268 in the City of Moraine, Montgomery County, Ohio. Moraine will be conducting construction activities to improve the surface water flow in the vicinity of the paper sludge disposal area and to properly cap the paper sludge landfill. The submittal for construction activities under Rule 3745-27-13 of the OAC will be submitted for review and approval to the Ohio Environmental Protection Agency Southwest District Division of Materials and Waste Management (DMWM).

If you should have any questions or need additional information, please contact either Mo Finy or Steven Gross with Hull & Associates, Inc. at (614) 793-8777.

Respectfully,

Steven M. Gross
Senior Project Manager

cc: Allan Crider, Pentair, Inc.
Louis L. Ainsworth, Faegre & Benson LLP
Mo Finy, Hull & Associates, Inc.

6397 Emerald Parkway, Suite 200, Dublin, Ohio 43016
614.793.8777 614.793.9070 fax www.hullinc.com

Hull & associates, inc.

July 20, 2012

Mr. Jim Gross
Health Commissioner
Reibold Building
117 South Main Street
Dayton, OH 45402

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APPENDIX E

Signature Page

SIGNATURE
OAC 3745-27-13(E)(13)

OAC 3745-27-13(E)(13): A signature as described in paragraph (I) of this rule.

As required by the above rule, the signature below has been included stating, that all statements or assertions of fact made in the application are true and complete and comply fully with applicable state requirements, and shall subject the signatory to liability under applicable state laws forbidding false or misleading statements, and has been notarized.

The information, data, documents, and reports submitted are true, accurate and complete. All statements or assertions of fact made in the application are true complete and comply fully with applicable state requirements.

Further affidavit sayeth naught.

Signature of Affidavit

Sworn to before me this 20 day of July, 2012.

JEANEANE JONES
Notary Public
State of Minnesota
My Commission Expires
January 31, 2016

Notary Public