LABELLA Associates, P.C.

Engineering
Architecture
Environmental

Predevelopment Subsurface Conditions Analysis Investigation Report

Location:

Development Area #1
Port of Rochester
4700 Lake Avenue
Rochester, New York

Prepared for:

City of Rochester - DES
Division of Environmental Quality
30 Church Street, Room 300B
Rochester, New York 14614

LaBella Project No. 208453

March 2009

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1.0 Introduction

LaBella Associates, P.C. (''LaBella'') was retained by the City of Rochester to conduct a Predevelopment Subsurface Conditions Analysis Investigation (PSCAI) of a parcel of land within the Port of Rochester located at 4700 Lake Avenue within the City of Rochester, Monroe County, New York (see Figure 1) hereinafter referred to as the ''Site''.

The Site is a portion of the Port of Rochester which has been targeted for redevelopment. The Site is generally located in an existing parking lot to the west of River Street, south of Corrigan Street, east of Lake Avenue, and north of Portside Drive. This area is approximately 300-feet (east-west) by 600-feet (north-south). The Site is limited to the area of land up to the sidewalk areas bordering the perimeter of the Site. Figure 2 depicts the property line of the Site in relation to the surrounding areas of the Port of Rochester.

To encourage the redevelopment of the Site, the City of Rochester has designed a potential redevelopment plan as illustrated on Figure 3. This development model sub-divides the Site into four (4) potential development parcels. The parcels, for the purposes of this PSCAI report, will be referred to as area:

- A-1 – Southeastern parcel at the Site
- A-2 – Southwestern parcel at the Site
- A-3 – Northwestern parcel at the Site
- A-4 – Northeastern parcel (greenspace) at the Site

This PSCAI Report outlines the findings of the PSCAI. In addition, the PSCAI Report provides conclusions and recommendations for potential redevelopment of the Site through consideration of the subsurface features known to exist at the Site within each of the four (4) distinct parcels identified above.

2.0 Site History

In the mid to late 1800`s, a steel mill (Charlotte Iron Works) was constructed northwest of the Site. Waste products (foundry sand and slag) generated from the steel mill's operations were used to expand the shoreline eastward toward the Genesee River and subsequently across areas of the Site. By 1924, the Corrigan-McKinney Steel Company was operating on what are now areas A-1 and A-2 of the Site. Most of the infrastructure associated with this operation appears to have been located within areas A-1 and A-2. The blast furnaces associated with the steel production also appear to mainly located on, or adjacent to, area A-2. A possible coal storage area may have been located on area A-3. Several rail spurs extended into the Site across each of the four (4) areas of the Site. The steel mill operations were terminated in the mid 1920's, and the buildings were subsequently demolished. Appendix 1 includes historic Sanborn Maps from 1892 and 1924 which show the locations of these buildings and parcels.

Based on previous environmental investigations conducted at the Port of Rochester, it has been documented that slag, cinders, foundry waste, re-worked soil, C&D, and other man-made fill has been placed as backfill within the Site boundaries. The fill materials and historical utilization of the Site represents an environmental and geotechnical concern for redevelopment of the Site. Figure 4 presents the 1924 Sanborn Map which shows the approximate locations of former structures present at the Site.

3.0 Summary of Previous Reports

Several phases of investigation have been completed in the general vicinity of the Site, at the Port of Rochester. Some of the information gathered during these previous investigations was utilized to focus the scope of work for this investigation. The following reports were relied upon for this investigation and are summarized below.

3.1 Geotechnical Site Characterization, Port of Rochester Harbor Improvement and Harbor Ferry Terminal, Rochester, New York, Haley & Aldrich, Inc., September 2000.

This geotechnical report presented the findings of a subsurface investigation in order to develop an understanding of the regional subsurface conditions, sufficient to complete initial planning efforts and preliminary engineering design.

The geotechnical report describes the general subsurface conditions at the Port of Rochester and provides some geotechnical engineering considerations for development of the Port of Rochester.

The Geotechnical Site Characterization Report concluded that,

> "…uncontrolled fill materials and relatively shallow groundwater at the Port of Rochester present variable and potentially settlement-yielding support for streets and parking lots and possibly corrosive environment for utilities. The presence of the loose fill materials and shallow groundwater should be carefully considered in the planning and execution of all utility trenching and installation.
>
> The buried slag and other waste and affected groundwater could pose threats to the long-term integrity of concrete or steel foundations. Removal and replacement or partial removal and insitu densifications of the existing fill materials and replacement with controlled fill may be appropriate for moderately loaded structures. Heavily loaded or settlement intolerant structures would most likely require deep foundations (piles or caissons) seated on or in the glacial till or bedrock.
>
> The shallow groundwater and loose fill and alluvial sediments will exert considerable horizontal loadings on temporary and permanent earth retaining structures. Chemically aggressive groundwater could pose a threat to the long-term integrity of earth retaining walls, particularly those constructed of steel. Care must be taken to assure sufficient lateral support both at the top and at or below the bottom of the excavation or below grade floor.
>
> The characterizations and geotechnical engineering considerations presented in the 2000 Haley & Aldrich Geotechnical Site Characterization Report are based, in part, upon the data obtained from previous subsurface investigations. The historic construction and uses of the Port of Rochester, together with the geotechnical information presented herein, should be carefully considered in establishing the need for additional exploration, testing, and evaluation to support the design and construction of the anticipated structures and Site improvements…."

3.2 *Phase II Environmental Site Assessment (ESA): Preliminary Site Characterization Report, LaBella Associates, P.C., Bourne Consulting Engineering, BTA Architects, Inc., Cavendish Partnership, Erdman Anthony & Associates, Haley & Aldrich, Inc., May 31, 2001.*

This Phase II ESA report presented the cumulative findings of an overburden soil and groundwater investigation conducted at the Port of Rochester. This Phase II ESA included submitting representative samples of the slag for laboratory analysis of volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), 8 United States Environmental Protection Agency (USEPA) Resource Conservation and Recovery Act (RCRA) Metals, cyanide, and Polychlorinated Biphenyls (PCBs). The analytical results indicated that the slag is not representative of hazardous waste. However, the metals arsenic, cadmium, and chromium were detected in the slag samples above laboratory detection limits. Arsenic was the only metal consistently found to exceed the United States Environmental Protection Agency (USEPA) Eastern USA Background Levels published in the New York State Department of Environmental Conservation (NYSDEC) Technical and Administrative Guidance Memorandum (TAGM) #4046. In approximately 20 percent of the soil samples submitted for laboratory analysis, the concentrations of arsenic were reported above the New York State Department of Health (NYSDOH) recommended level of 20 parts per million (ppm). The NYSDOH typically considers concentrations of arsenic found to exceed these criteria to be a health concern only in surface soils. As such, slag contained in the subsurface of the Site would not likely pose any adverse effects to human health. However, if during site grading and/or utility work, this layer of slag is disturbed, brought to ground surface for use as surface fill, or if the layer of topsoil is removed; then the elevated level of arsenic may represent a human health concern. In addition, large-scale disturbance of the slag layer will likely result in a nuisance odor problem.

3.3 Remedial Investigation Report, LaBella Associates, P.C., March 2007.

The Remedial Investigation report attempted to define the horizontal and vertical extent of Regulated Solid Waste (as defined by NYSDEC) and slag at a portion of the Port of Rochester, to evaluate for localized areas of subsurface impacts due to historic operations and/or fill materials, and to analyze and characterize the Regulated Solid Waste to identify potential constituents of environmental concern.

Although, the Remedial Investigation was not conducted specifically on the Site, the findings of this investigation are useful as the subsurface conditions encountered during this 2007 remedial investigation are similar to subsurface conditions encountered during this PSCAI at the Site. Some of the conclusions made in this remedial investigation report are as follows:

- Regulated Solid Waste is located in the subsurface of the Port of Rochester.
- Although select contaminants were encountered at concentrations exceeding soil and/or groundwater standards, if the Regulated Solid Waste is undisturbed these impacts do not appear to constitute a significant threat to the environment or human health. However, if disturbed the Regulated Solid Waste would require to be handled properly.
- Based on the relatively high hydraulic conductivity for the soils and fill material beneath the surface, any excavation work conducted below the water table should take into account the potential that large volumes of groundwater may accumulate and will require proper handling and/or treatment.

3.4 *Geothermal Test Bores and Formation Thermal Conductivity Report, Stantec Consulting Services, Inc., December 4, 2007.*

Geothermal test boring "GT-1" was advanced to approximately 400 feet BGS in the southwestern portion of area A-2. Bedrock was encountered at approximately 54 feet BGS in this location. Geologic conditions for geothermal drilling were found to be favorable for drilling deep into the bedrock formation at GT-1. No natural gas or other obvious environmental hazards were encountered. An above average thermal conductivity rating was reported in the predominately dry shale formation at this location.

A copy of this report is included as Appendix 2.

3.5 *Port of Rochester Environmental Management Plan, LaBella Associates, P.C., July 2005.*

The Environmental Management Plan (EMP) is intended to provide guidance regarding the characterization and management of subsurface impacted soil, groundwater, and man-made industrial derived fill materials generated during development activities at the Port of Rochester Site.

Solid waste layers are present throughout the Port of Rochester. The solid waste is generally present at depths immediately below the "topsoil" layer or pavement/sub-base layer, which varies in depth form 6 inches to 24 inches below the ground surface. These fill materials include:

- Slag
- Railroad ties
- Railroad ballast
- Construction and Demolition debris from industrial uses
- Ash
- Cinders
- Railroad lines
- Coal

These fill materials are considered by the NYSDEC as solid waste that cannot be treated as Construction and Demolition (C&D) solid waste, due to the nature of its origin as a solid waste derived from an industrial source. These materials may be disposed of at a New York State Part 360 permitted landfill.

The EMP applies to any owner, Planner, Developer, Contractor, utility Contractor, and municipal agency that disturb the surface at the Port of Rochester Site.

This EMP includes procedures and protocols to manage known environmental subsurface impacts at the Port of Rochester. If unknown subsurface environmental impacts are encountered, the City of Rochester Division of Environmental Quality and the Environmental Project Monitor will determine procedures and protocols to manage any additional environmental impacts.

Please refer to Figure 4 for locations of pertinent testing locations.

4.0 Geophysical Survey Results

On August 7, 2008, LaBella retained the services of Geomatrix to conduct a geophysical evaluation of the Site. Geomatrix conducted an electromagnetic survey using a Geonics EM61 unit, a high-sensitivity, high-resolution, time domain electromagnetic (TDEM) metal detector that can detect both ferrous and nonferrous metallic objects to an approximate depth of 10 feet below ground surface (BGS).

Data collected by the EM61 unit was processed and a contour map was produced based upon the measured electromagnetic response to identified potential magnetic anomalies. The contour map is displayed in colors that indicate the response of the equipment. Areas of blue indicate 'background', while areas of yellow indicate magnetic anomalies. A copy of Geomatrix's Geophysical Survey Report is included as Appendix 3.

The geophysical survey results provided by Geomatrix were overlain on the 1924 Sanborn Map as shown on Figure 4. The geophysical survey identified areas suspected to be free of buried metals in shades of blue. However, areas likely to contain buried metals are depicted in shades of dark blue through yellow on the figure. In addition, buried remnants of building foundations usually become expressed in these data sets as rectilinear anomalies. As such, areas suspected of containing intact building foundations identified during from the geophysical survey were evaluated during the subsequent test pitting investigation (refer to Section 5.0).

Based on the known history of the Site, it was anticipated that various portions of the Site would contain slag fill materials. The slag type fill typically contains enough metal content to create a response on the geophysical survey. As a result, a red line was added to Figure 4 to indicate the approximate areal extent of slag fill at the Site. Slag has been confirmed to the east of this red line. In addition, this line has been approximated based on the various other investigative activities completed at the Site referenced in Section 3.0 of this report.

5.0 Test Pitting Investigation

In order to investigate the significant magnetic anomalies observed in the geophysical data, an exploratory test pit investigation was performed at the Site. The test pit locations were selected based on the results of the geophysical survey, the 1892 and 1924 Sanbom Maps, and the results of previous investigations conducted at the Site as outlined in Section 3.0. The locations of the test pits are illustrated on Figure 4. Additionally, significant findings in the test pits are called out on Figure 4 in "text boxes".

On September 5,2008 TREC mobilized a "Kubota KX121-3 Super Series" excavator and operator to the Site, and excavated nine (9) test pits. The nine (9) test pits were excavated to depths ranging from 4.5 to 8.5-feet BGS.

In order to excavate to a greater depth, a "John Deere 690" size track-mounted excavator was mobilized to the Site by TREC on October 3,2008. An additional seven (7) test pits were excavated using this excavator. The seven (7) test pits were excavated to depths ranging from 4.5 to19.5-feet BGS.

Soils from the test pits were continuously assessed for visible impairment, both non-slag containing fill materials and slag fill materials, olfactory indications of impairment, and/or indications of detectable VOCs on a Photo-Ionization Detector (PID) total VOC meter. Positive indications from any of these screening methods were collectively referred to as "evidence of impairment."

The following table summarizes the information obtained from the LaBella test pits. [*Note: Sections 5.0 and 6.0 present the field observations as fill materials and slag fill in order to describe apparent non-native materials that were observed at the Site. Section 7.0 defines the NYSDEC term of Regulated Solid Waste and the evaluations of contours and volumes are based on slag containing and non-slag containing Regulated Solid Waste.*]

Table 1
Test Pit Summary

Test Pit ID	General Test Pit Location	Slag Fill	Other Fill Materials	Observations/Evidence of Impairment
TP-1	Center of Area A-1 on eastern side	None Present	None Present	Sandy silt, no evidence of impairment or elevated PID readings
TP-2	Northeastern corner of Area A-2	None Present	Assorted fill materials (i.e., brick, concrete, metal pieces) encountered at 1.5'-4.5' BGS	Refusal at approximately 4.5' BGS
TP-3	Northeastern corner of Area A-2	None Present	Assorted fill materials (i.e., brick fragments, cut stone, some metal objects, very loose fill) encountered at 1.5'-8.0' BGS	Sandy silt, no evidence of impairment or elevated PID readings
TP-4	Center of Area A-2	None Present	Assorted fill materials (i.e., concrete chunks ~3.0' in diameter and brick fragments) encountered at 1.5'-3.2' BGS	Sandy silt, no evidence of impairment or elevated PID readings below fill materials.
TP-5	Southeastern corner of Area A-2	None Present	None Present	Brick fragmented wall running east to west along southern end of test pit from about 2.0'-6.0' BGS
TP-6	Western edge of Area A-2	None Present	None Present	Silty sand, no fill materials, no evidence of impairment or elevated PID readings.
TP-7	Northeastern portion of Area A-1	Blue slag chunks less than 1.0' in diameter	Brick, crushed concrete, steel plates, some wood pieces from about 1.0'-8.0'-BGS.	Bottom of test pit did not reach beyond depth of slag at approximately 8.0' BGS.
TP-8	Center of Area A-2 along eastern edge	None Present	None Present	Sandy Silt, with some clay, no evidence of impairment or elevated PID readings.

Table 1 (continued)
Test Pit Summary

Test Pit ID	General Test Pit Location	Slag Fill	Other Fill Materials	Observations/Evidence of Impairment
TP-9	Center of Area A-3	None Present	None Present	Sandy silt with trace amounts of clay, no fill materials, no evidence of impairment or elevated PID readings.
TP-10	Northeastern corner of Area A-2	None Present	Assorted fill (C&D debris - concrete chunks & bricks) from 1.0'-8.0' BGS	Sandy silt, no evidence of impairment or elevated PID readings below fill materials.
TP-11	Center of Area A-2	None Present	None Present	Silty sand, no fill materials, no evidence of impairment or elevated PID readings.
TP-12	Center of Area A-3	None Present	None Present	Silty sand, no fill materials, no evidence of impairment or elevated PID readings.
TP-13	Eastern edge of Area A-4 along eastern edge	Large pieces of red slag, 6"-1.0' in diameter encountered from 1.5'-10.0' BGS	None Present	Sandy and clayey silt with some organics (roots) encountered at approximately 10.0' BGS.
TP-14	Southern edge of Area A-3	Assorted fill (i.e., blue slag, brick fragments, and concrete) encountered from about 1.0'-2.0' BGS)	None Present	A large concrete slab was encountered at approximately 7.0' BGS and excavation was unable to continue as a result.
TP-15	Center of Area A-3	None Present	None Present	24" thick concrete and stone wall running east to west encountered from 1.5'-10.0' BGS. Vertical steel support for former trestle system encountered from about 1.5'-19.5' BGS
TP-16	Center of Area A-3	None Present	None Present	24" thick concrete and stone wall running south to north encountered from 1.0'-14.5' BGS. Various steel debris encountered at 14.0' BGS

The test pits were backfilled with excavated materials and compacted with the bucket of the excavator. Test Pit Logs are included in Appendix 4.

Slag-Fill Analytical Results:

One (1) representative slag-fill sample was submitted for laboratory analysis from test pit TP-7 completed on September 5, 2008 in area A-1 of the Site as part of the PSCAI. This sample of the slag-fill was encountered in TP-7 at a depth of approximately 1.0' BGS. A representative sample of the slag was collected from around this 1.0-foot depth and submitted for laboratory analysis.

Paradigm Environmental Services, Inc. (Paradigm) in Rochester, New York analyzed the slag sample. Paradigm is a New York State Department of Health Environmental Laboratory Approval Program (NYSDOH ELAP)-certified laboratory. The sample was submitted to Paradigm for analysis of the following parameters:

- USEPA Target Compound List (TCL) and NYSDEC Spills Technology and Remediation Series (STARS)-list VOCs via USEPA Method 8260;
- USEPA TCL and NYSDEC STARS-list SVOCs via USEPA Method 8270;
- Target Analyte List (TAL) Metals via USEPA Methods 6010 and 7471; and,
- Cyanide via USEPA Method SW 9012.

The slag sample was placed in laboratory supplied bottle-ware, stored in a cooler with ice packs and transported under chain of custody procedures to Paradigm for analysis.

Metals:
A summary of the metals analytical results for the slag sample collected from area A-1 are presented in Table 2 on the following page.

Table 2
Summary of Target Analyte Metals detected in Slag Sample
All results presented in mg/Kg or parts per million (ppm)

Parameter	TP-7 Area A-1	NYSDEC TAGM #4046 Recommended Soil Cleanup Objectives	United States Environmental Protection Agency Eastern USA Background Levels	NYSDEC Subpart 375-6 Remedial Program Soil Cleanup Objectives for the Protection of Public Health - Restricted Residential Use
Aluminum	9,870	SB	33,000	N/A
Antimony	ND<6.62	SB	N/A	N/A
Arsenic	**10.9**	7.5 or SB	3.0-12.0	16
Barium	156	300 or SB	15-600	400
Beryllium	**1.39**	0.16 or SB	0-1.75	72
Cadmium	**1.83**	1 or SB	0.1-1	4.3
Calcium	54,300	SB	130-35,000	N/A
Chromium	**14.4**	10 or SB	1.5-40	110
Cobalt	6.32	30 or SB	2.5-60	N/A
Copper	17.9	25 or SB	1.0-50	270

Table 2 (continued)
Summary of Target Analyte Metals detected in Slag Sample
All results presented in mg/Kg or parts per million (ppm)

Parameter	TP-7 Area A-1	NYSDEC TAGM #4046 Recommended Soil Cleanup Objectives	United States Environmental Protection Agency Eastern USA Background Levels	NYSDEC Subpart 375-6 Remedial Program Soil Cleanup Objectives for the Protection of Public Health - Restricted Residential Use
Total Cyanide	*11,000*	***	N/A	27
Iron	**50,600**	2,000 or SB	2,000-550,000	N/A
Lead	35.9	SB ****	****	400
Magnesium	13,200	SB	100-5,000	N/A
Manganese	816	SB	50-5,000	2,000
Mercury	0.0145	0.1	0.001-0.2	0.81
Nickel	**14.3**	13 or SB	0.5-25	310
Potassium	1,510	SB	8,500-43,000 **	N/A
Selenium	ND<0.552	2 or SB	0.1-3.9	180
Silver	2.41	SB	N/A	180
Sodium	489	SB	6,000-8,000	N/A
Thallium	ND<0.0662	SB	N/A	N/A
Vanadium	25.5	150 or SB	1-300	N/A
Zinc	**111**	20 or SB	9.0-50	10,000

Notes:

ND<0.0662 denotes the compounds was not detected above the laboratory method detection limit.
***Bold type** denotes that the compound was detected at a concentration that was found to exceed its associated NYSDEC TAGM #4046 Recommended Soil Cleanup Objective.*
Highlighted type denotes that the compound was detected at a concentration that was found to exceed its associated USEPA Eastern USA Background Level.
Italicized type denotes that the compound was detected at a concentration that was found to exceed its associated NYSDEC Subpart 375-6 Remedial Program Soil Cleanup Objectives for the Protection of Public Health – Restricted Residential Use criteria.
SB denotes Site Background [Note: "Site Background" sampling was not completed as part of this investigation].
*** New York State background*
**** Some forms of Cyanide are complex and very stable while other forms are pH dependent and hence are very unstable. Site-specific form(s) of Cyanide should be taken into consideration when establishing soil cleanup objective.*

***** Background levels for lead vary widely. Average levels in undeveloped, rural areas may range from 4-61 ppm. Average background levels in metropolitan or suburban areas or near highways are much higher and typically range from 200-500 ppm.*
****** Recommended soil cleanup objectives are average background concentrations as reported in a 1984 survey of reference material by E. Carol McGovern, NYSDEC.*

As noted in Table 2, each of the TAL metals were present at detectable levels in the slag sample collected from test pit TP-7 (1.0') with the exception of antimony, selenium, and thallium. In addition the metals arsenic, beryllium, cadmium, chromium, iron, nickel, and zinc were found to exceed the NYSDE TAGM #4046 Recommended Soil Cleanup Objectives. The metals cadmium, calcium, magnesium, and zinc were found to exceed their respective USEPA Eastern USA Background Levels. Additionally, only total cyanide was found to exceed its associated NYSDEC Subpart 375-6 Remedial Program Soil Cleanup Objective for the Protection of Public Health – Restricted Residential Use criteria.

No other metals were detected in the slag sample at levels exceeding the laboratory method detection limits (MDLs).

Volatile Organic Compounds (VOCs):

The VOC m,p-Xylene was the only VOC detected above the laboratory MDL in the slag sample collected from TP-7 in area A-1. However, the concentration of m,p-Xylene (11.4 µg/Kg) was not found to exceed the NYSDEC TAGM #4046 RSCO for this constituent. No other VOCs were detected in the slag sample collected from TP-7 completed within area A-1 at concentrations above the reported laboratory MDLs.

Semi-Volatile Organic Compounds:
No SVOCs were detected in the slag sample collected from TP-7 within area A-1 at concentrations above the reported laboratory MDLs.

Copies of the laboratory analytical reports are included in Appendix 5. Additionally, copies of available analytical reports for previous environmental samples collected at the Site are included in Appendix 5. Please refer to Figures 4 & 5 for the locations of the samples with their corresponding analytical data.

6.0 Combined Geotechnical and Environmental Rotary Drill-Rig Soil Borings

LaBella and Foundation Design, P.C. of Rochester, New York (Foundation Design) collaborated to implement the geotechnical and environmental soil borings in order to gain a more thorough understanding of the subsurface characteristics of the Site. A geotechnical evaluation of the Site was completed from October 23, 2008 through October 24, 2008 and on October 27, 2008 through the advancement of eight (8) soil borings. The soil boring locations are presented in Table 3 on the following page.

Table 3
Soil Boring Summary

Parcel	Soil Boring IDs
A-1	B08-3, B08-5, B08-6, B08-7, and B08-8
A-2	No soil borings advanced here as part of the PSCAI
A-3	B08-1
A-4	B08-2/MW-1 and B08-4

As described above, the eight (8) soil borings were advanced in select areas of the Site based on existing data. The locations were intended to fill "data gaps" associated with the existing data generated from previous subsurface investigations in this area.

Soil Boring Program:

Borings for the PSCAI were advanced with a truck-mounted rotary drill. The use of rotary drilling technology allows for relatively rapid sampling, observation and characterization of discrete intervals of overburden soils. The drill rig was equipped with 4.25-inch inside diameter (ID) hollow-stem augers to penetrate the overburden and 2-inch by 2-foot split-spoon samplers. The split-spoons were driven into the soil using a 140-pound hammer allowed to freefall 30-inches in general accordance with American Society for Testing and Materials (ASTM)-D 1586-84 standard procedures. The number of blows needed to drive the sampler each 6-inches of penetration were recorded on the soil boring log sheets which are included in Appendix 4 of this report.

At each sampling location, soils were sampled continuously over the entire length of the boring. Each soil sample was visually inspected by a LaBella environmental geologist for the presence of fill layers (primarily slag), stains and monitored with a PID. Soil borings B08-1 through B08-4 were sampled continuously over the entire depth of the boring until the boring was confirmed to have penetrated at least five (5) feet into the native soil (glacial till) horizon observed beneath the Site. Soil borings B08-5 through B08-8 were sampled continuously over the entire depth of the boring until the boring was confirmed to have penetrated at least five (5) feet into the native soil horizon observed beneath the Site in order to confirm or deny the presence of fill materials. Soil samples were classified in general accordance with Unified Soil Classification System (USCS) specifications, and logged on the Soil Boring Log datasheets included in Appendix 4 of this report.

The soil borings completed at the Site were advanced to depths ranging from 14.0 to 22.0-feet BGS with all borings terminated in native soil deposits. The soil and fill materials collected from the borings were continuously assessed by a LaBella Associates' Environmental Geologist for soil type, changes in lithology, and evidence of impairment. Based on observations of the soil borings, a green line was added to Figures 4 & 5 to show the approximate limit of non-slag containing fill materials at the Site. Non-slag containing fill materials were confirmed in soil borings and/or test pits to the east of this green line.

Geology and Subsurface Fill Characterization:

- Area A-1:

Five (5) soil borings B08-3, B08-5, B08-6, B08-7, and B08-8 were advanced with area A-1. A topsoil deposit was encountered only in soil boring B08-3, as this was the only boring completed off of the asphalt parking lot in area A-1. The topsoil deposit generally consisted of dark brown SILT with some medium to fine-grained SAND and containing organic matter including roots, root traces and humus. The topsoil deposit was observed to be approximately 1.0-feet thick. Asphalt pavement, generally 0.3 to 0.4-feet thick with an underlying 0.3 to 2.6-feet layer of crushed gravel sub-base, was encountered at the ground surface at soil boring locations B08-5 through B08-8.

Soils encountered beneath either the topsoil layer or asphalt pavement/sub-base consisted of non-slag containing fill material. The fill material ranged in texture from a SILT and coarse-grained SAND to no Silt and medium to coarse-grained SAND with some coarse GRAVEL. The non-slag containing fill material was identifiable by the presence of man-made materials including cinders, foundry sand, ash, concrete fragments, asphalt, refractory sand, coal dust and fragments, brick fragments, creosote treated wood and/or glass. Non-slag containing fill material deposits within area A-1 ranged from 1.0 to approximately 3.4-feet thick with the thicker fill material deposits generally located toward the center of area A-1 near soil boring B08-7. In area A-1, blue slag was encountered in soil boring B08-3. Slag was not encountered in soil boring B08-5 through B08-8 advanced in area A-1. The layer of blue slag in B08-3 was found to extend from approximately 6.0-feet to 18.0-feet BGS.

A peat deposit was encountered within soil boring B08-3 at approximately 18-feet BGS [Note: the other borings in area A-1 did not extend to this depth]. The peat layer was observed to be approximately 1.0 foot in total thickness. Figure 6 depicts the approximate location of the early 1800's Lake Ontario shoreline and associated marsh areas. According to Figure 6, the location of B08-3 was within a former marsh area. Native soil deposits consisting of Lacustrine (beach) deposits mixed with either Alluvial (deltaic) deposits were encountered below the peat deposit. These native soil deposits generally ranged in texture from coarse to fine-grained SAND with trace to no Silt & Clay and trace to no fine-grained Gravel to Clayey SILT with trace to no very fine-grained Sand. A Glacial Till deposit was observed to underlay these Lacustrine and/or Alluvial deposits within area A-1. Based on the soil boring GT-1 completed to bedrock in area A-2, it is inferred that this Glacial Till deposit extents to the top of bedrock determined to be at approximately 54-feet BGS in area A-1.

- Area A-2:

No soil borings were advanced in area A-2 during this PSCAI. However, eight (8) test pits were excavated in A-2 during the PSCAI. Test pits TP-2, TP-3, TP-4, TP-5, TP-6, TP-8, TP-10, and TP-11 were excavated throughout area A-2 and were located based on the results of the geophysical survey and historical Site features. Based on these test pits, a topsoil deposit was encountered in each test pit with the exception of TP-4. The topsoil deposit generally consisted of dark brown SILT with some medium to fine-grained SAND and containing organic matter including roots, root traces and humus. The topsoil deposit was observed to be approximately 0.5 to 1.0-feet thick. A layer of crushed gravel was encountered at the ground surface at test pit TP-4. This crushed gravel layer was observed to be approximately 1.0-foot thick.

Soils encountered below the topsoil deposit in test pits TP-2, TP-3, TP-5, TP-8, and TP-10 and beneath the gravel layer in TP-4 consisted of non-slag containing fill material. The non-slag containing fill material ranged in texture from a SILT and coarse-grained SAND to no Silt and medium to coarse-grained SAND with some coarse GRAVEL. The non-slag containing fill material was identifiable by the presence of man-made materials including cinders, foundry sand, ash, concrete fragments, asphalt, refractory sand, coal dust and fragments, brick fragments, creosote treated wood and/or glass. Non-slag containing fill material deposits within area A-2 ranged from 1.0 to approximately 7.0-feet thick with the thicker non-slag containing fill material deposits generally located toward eastern and northern portions of A-2, toward test pits TP-8 and TP-10. Slag was not encountered in any of the other test pits excavated in area A-2.

The non-slag containing fill material observed in the test pits excavated in area A-2 were underlain by Native soil deposits consisting of Lacustrine (beach) deposits mixed with either Alluvial (deltaic) deposits. These native soil deposits generally ranged in texture from coarse to fine-grained SAND with little to no Silt & Clay and trace to no fine-grained Gravel to Clayey SILT with trace to no very fine-grained Sand. A Glacial Till deposit was observed to underlay these Lacustrine and/or Alluvial deposits within area A-2 based on the soil boring GT-1. Based on the soil boring GT-1 completed to bedrock, it is inferred that this Glacial Till deposit extents to the top of bedrock at a depth of approximately 54-feet BGS in area A-2.

- Area A-3:

One (1) soil boring B08-1was advanced with area A-3. A topsoil deposit was encountered here that generally consisted of dark brown SILT with some medium to fine-grained SAND and containing organic matter including roots, root traces and humus. The topsoil deposit was observed to be approximately 0.4-feet thick. The topsoil deposit observed in area A-3 was underlain by re-worked native soil. This native soil consisted of Lacustrine (beach) deposits mixed with either Alluvial (deltaic) deposits. These native soil deposits generally ranged in texture from coarse to fine-grained SAND with trace to no Silt & Clay and trace to no fine-grained Gravel to Clayey SILT with trace to no very fine-grained Sand. A Glacial Till deposit was observed to underlay these Lacustrine and/or Alluvial deposits within area A-3. Slag was not encountered in soil boring B08-1 advanced in area A-3.

- Area A-4:

Two (2) soil borings B08-2 and B08-4 were advanced within area A-4. A topsoil deposit was encountered in both soil borings. The topsoil deposit in boring B08-4 was encountered directly below approximately 1.0 foot of asphalt and crushed gravel sub-base. The topsoil deposit generally consisted of dark brown SILT with some medium to fine-grained SAND and containing organic matter including roots, root traces and humus. The topsoil deposit was observed to be approximately 1.0 to 1.8-feet thick.

In area A-4, blue slag was encountered in soil boring B08-2 and B08-4. The layer of blue slag in B08-2 was found to extend from approximately 2.0-feet to 13.6-feet BGS. The layer of blue slag in B08-4 was found to extend from approximately 4.0 to 6.0-feet BGS.

The blue slag observed in soil boring B08-2 was underlain by a peat deposit at approximately 13.6-feet BGS. The peat layer was observed to be approximately 5.0 foot in total thickness. Figure 6 depicts the approximate location of the early 1800's Lake Ontario shoreline and associated marsh areas. According to Figure 6, the location of B08-2 was within a former marsh area. However, boring B08-4 was not observed to contain a peat layer. Native soil deposits consisting of Lacustrine (beach) deposits mixed with either Alluvial (deltaic) deposits were encountered below the peat deposit or below the slag material in boring B08-4. These native soil deposits generally ranged in texture from coarse to fine-grained SAND with trace to no Silt & Clay and trace to no fine-grained Gravel to Clayey SILT with trace to no very fine-grained Sand. A Glacial Till deposit was observed to underlay these Lacustrine and/or Alluvial deposits within area A-4.

The depth to water on November 5, 2008 within area A-4 (greenspace) was observed at approximately 11.57-feet below the top of the well casing with a groundwater elevation of approximately 246-feet above mean sea level. Figure 5 presents elevation contours of the topography at the Site based on a survey of the Port of Rochester.

The approximate locations of the soil borings and monitoring well completed at the Site are presented on Figures 4 & 5.

Based on the test pits and soil borings completed at the Site during this PSCAI and previous investigations, an approximation of the extent of non-slag containing fill materials and slag materials has been estimated. As shown on Figures 4 & 5, the approximate extent of slag is shown with a red dashed line. The approximate extent of fill materials is shown with a green dashed line.

Overburden Well Installation:

One (1) shallow overburden groundwater monitoring well was installed within soil boring B08-2 advanced within the footprint of area A-4 (greenspace) on October 24, 2008. Monitoring well B08-2/MW-1 was installed to assess groundwater conditions in the northeast portion of the Site.

The well was constructed using 10-feet of 0.010 inch slotted; 2 inch ID Schedule 40 PVC well screen manifolded to an appropriate length of 2-inch ID Schedule 40 PVC riser pipe installed to the base of the boring. The length of the well screen was designed to intercept the top of the water table within the boring, allowing for the observation and sampling of light, non-aqueous phase liquids (LNAPL), if encountered. A filterpack consisting of 00N quartz sand was installed in the annular space surrounding the well to a height of approximately 1.0-foot above the top of the well screen. A bentonite pellet seal was then installed above the sand pack to prevent the intrusion of surface runoff. The well was completed with a locking steel "stick-up" cap completed with a concrete pad.

One (1) day after completion of the well, the well was developed by alternately surging and bailing the well using a dedicated, polyethylene bailer. No dispersing agents, acids, disinfectants, or other additives were used during development or introduced into the well at any other time. The well development included washing the entire well cap and the interior of the well casing above the water table, using only water from the well itself. Eleven days after completion of development, the well was purged of approximately three (3) well volumes and sampled using a disposable polyethylene bailer.

Paradigm in Rochester, New York analyzed the groundwater sample. Paradigm is a NYSDOH ELAP-certified laboratory. The sample was submitted to Paradigm for analysis of the following parameters:

- USEPA TCL and NYSDEC STARS-list VOCs via USEPA Method 8260;
- USEPA TCL and NYSDEC STARS-list SVOCs via USEPA Method 8270; and,
- TAL Metals via USEPA Methods 6010 and 7471.

The groundwater sample was placed in laboratory supplied bottle ware, stored in a cooler with ice packs and transported under chain of custody procedures to Paradigm for analysis.

The groundwater sampling log is presented as Appendix 4.

Groundwater Analytical Results:

One (1) groundwater sample collected from monitoring well B08-2/MW-1 which was completed within area A-4 (greenspace) was submitted for laboratory testing on October 29, 2008. The analytical results from the groundwater sample was compared to the New York State (NYS) Part 703 Groundwater Standards published in the NYSDEC Technical and Operational Guidance Series (TOGS) 1.1.1 dated June 1998. Copies of the laboratory reports are included in Appendix 5. A discussion of the groundwater sampling results is provided below.

Volatile Organic Compounds:

No VOCs were detected in the groundwater sample submitted from monitoring well B08-2/MW-1 completed within area A-4 (greenspace) at concentrations above the reported laboratory MDLs.

Semi-Volatile Organic Compounds:

No SVOCs were detected in the groundwater sample submitted from monitoring well B08-2/MW-1 completed within area A-4 (greenspace) at concentrations above the reported laboratory MDLs.

Metals:

A summary of the metals analytical results for the groundwater sample collected from area A-4 (greenspace) are presented in Table 4 on the following page.

Table 4
Summary of Target Analyte List Metals detected in Groundwater
All results presented in µg/L or parts per billion (ppb)

Parameter / Sample ID #	B08-2/MW-1	B08-2/MW-1	6 NYCRR Part 703 Groundwater Standards
	10/29/2008	2/11/2009	
Aluminum	128,000	2.78	Not Available
Antimony	ND<60	ND<0.060	0.003
Arsenic	**43**	0.01	0.025
Barium	797	0.156	1
Beryllium	6	ND<0.005	1
Cadmium	8	ND<0.005	0.01
Calcium	397	139	Not Available
Chromium	**187**	ND<0.010	0.05
Cobalt	69	ND<0.010	Not Available
Copper	187	ND<0.010	0.2
Iron	**174,000**	**9.53**	0.3
Lead	**93**	ND<0.005	0.025
Magnesium	**120,000**	**43.6**	35
Manganese	**3,940**	**1.17**	0.3
Mercury	0.2	ND<0.002	0.0007
Nickel	**145**	ND<0.040	0.1
Potassium	40,800	8.43	Not Available
Selenium	**22**	0.007	0.01
Silver	ND<10	ND<0.010	0.05
Sodium	**544,000**	**830**	20
Thallium	ND<6	ND<0.006	0.0005
Vanadium	247	ND<0.010	Not Available
Zinc	**505**	ND<0.020	2

Notes:

ND<10 denotes the compounds was not detected above the laboratory method detection limit.
***Bold type** denotes that the compound was detected at a concentration that was found to exceed its associated 6 NYCRR Part 703 Groundwater Standard.*

As noted in Table 4, the metals arsenic, chromium, iron, lead, magnesium, manganese, nickel, selenium, and sodium were present at detectable levels in the groundwater sample collected from monitoring well B08-2/MW-1 located in area A-4 (greenspace). In addition these metals were detected at concentrations that were found to exceed the NYSDEC Part 703 Groundwater Standard for each respective metal.

No other metals were detected in the groundwater sample from B08-2/MW-1 at levels exceeding their associated 6 NYCRR Part 703 Groundwater Standards.

Due to the reported concentrations of the aforementioned metals in the groundwater sample collected from B08-2/MW-1 on October 29, 2008 low-flow sampling of this monitoring well was conducted on February 11, 2009. Low-flow groundwater sampling typically provides a nearly turbid free groundwater sample. resulting in relatively significant difference in contaminant concentrations. The low flow sampling methodology, resulting in a nearly turbid free groundwater sample, indicates that heavy metals of concern such as cadmium, chromium, lead, and mercury were not present at concentrations that exceed their respective detection limits, and arsenic and barium were detected at concentrations well below their respective standards.

The low flow groundwater results suggest that metals potentially associated with slag fill materials at the Site are not leaching and impacting groundwater.

7.0 Fill Management

New York State's Solid Waste Management Regulations, Environmental Conservation Law 6 NYCRR Part 360 (Part 360) are the authority by which the State sets design standards and operational criteria for all solid waste management facilities. As such, the NYSDEC may consider the slag and some of the non-slag containing fill material observed in the subsurface (i.e., cinders, ash, coal, foundry sand, etc.) of the Site to be regulated solid waste. Regulated Solid Waste is defined by the NYSDEC as waste generated by manufacturing or industrial processes.

> " Such processes may include, but are not limited to the following: electric power generation; fertilizer/agricultural chemicals; inorganic chemicals; iron and steel manufacturing; leather and leather products; nonferrous metals manufacturing/foundries; organic chemicals; plastics and resins manufacturing; pulp and paper industry; rubber and miscellaneous plastic products; stone, glass, clay and concrete products; textile manufacturing; transportation equipment; and water treatment. The forms of such wastes are exemplified by but not limited to: liquids such as acids, alkalis, caustics, leachate, petroleum (and its derivatives), and processes or treatment wastewaters; sludges which are semi-solid substances resulting from process or treatment operations or residues from storage or use of liquids; solidified chemicals, paints or pigments; and dredge spoil generated by manufacturing or industrial processes, foundry sand, and the end or by-products of incineration or other forms of combustion. This term does not include oil or gas drilling, production, and treatment wastes (such as brines, oil, and frac fluids); overburden, spoil, or tailings resulting from mining; or solution mining brine and insoluble component wastes. "

The proper management of these Regulated Solid Waste materials will be necessary during ground intrusive development activities at the Site. The Port of Rochester Environmental Management Plan (EMP) included in Appendix 11, may be used as a model to the characterization and management of these Regulated Solid Waste materials. To better understand the subsurface conditions of the Site Figure 7 presents the approximate depths and thicknesses of both non-slag and slag containing Regulated Solid Waste materials. Figure 7 is based upon the data collected during the PSCAI and previous investigations.

The software program Surfer® 8 developed by Golden Software, Inc. of Golden, Colorado was utilized to contour the depths and thicknesses and to calculate the approximate volumes. The software program Surfer® 8 created grids of the data using the Natural Neighbor algorithm and used the Trapezoidal Rule, Simpson's Rule, and Simpson's 3/8 Rule as the scientific methods for determining volume. Appendix 6 presents the results of the software generated volumes of non-slag and slag containing Regulated Solid Waste.

The lateral extents of slag containing and non-slag containing Regulated Solid Waste materials are also shown on Figure 7. It should be noted that discrete layers of slag and non-slag Regulated Solid Waste can be located in the same area but at different vertical depths (refer to the cross sections, Figures 8 through 12). Table 5 below summarizes the volumes of slag containing, non-slag containing and total Regulated Solid Waste materials within the PSCAI Site boundaries.

Table 5
Regulated Solid Waste Volumes
(Slag and Non-Slag Containing)

Area	Regulated Solid Waste Without Slag (CY)	Regulated Solid Waste With Slag (CY)	Total Regulated Solid Waste (CY)
A-1	2,258	4,147	6,405
A-2	571	165	736
A-3	39	465	504
Remaining Portions of Site	2,660	6,494	9,154
Totals:	5,528	11,271	***16,799***

[*Note: The above volumes do not include Construction and Demolition debris (C&D, which for the purposes of this evaluation is concrete, brick and asphalt) that was not comingled with Regulated Solid Waste. C&D debris only fill exist at the Site (generally west of the Regulated Solid Waste area) and the volumes and extent of such C&D at the Site are significant.*]

C&D debris was generally observed in test pits located on the western portions of Area A-2 and A-3. Although this material is not considered regulated solid waste, it is important to consider these materials as the relatively significant amounts of C&D debris could present challenges in handling and disposal. As shown on Figure 4, portions of former foundation walls were observed in test pits TP-2, TP-3, TP-5, TP- 12, and TP-15. The C&D materials observed consisted of bricks, cut-stone, concrete, and steel. Being that this infrastructure is likely from the former steel mill that operated in this area, it is possible

that additional Regulated Solid Waste may be encountered within some of this former infrastructure. Also, it is likely that more C&D debris exists within the sub-surface in areas A-2 and A-3 than what was observed in the aforementioned test pits. As such, removal and disposal of these C&D debris should be taken in to consideration prior to redevelopment of these areas.

Geologic Cross Sections:

Figures 8 through 12 present five (5) geologic cross sections which illustrate the geology of the Site. Refer to Figure 7for the locations of the starting points and end points of each geologic cross section. Figure 8 presents a cross section of the Site looking south toward Rochester and begins at soil boring B08-3 and ends at geothermal soil boring GT-1. Figure 9 presents a cross section of the Site looking west toward Lake Avenue and begins at soil boring B08-3 and ends at soil boring B08-2/MW-1. Figure 10 presents a cross section of the Site looking north toward Lake Ontario and begins at soil boring B08-2/MW-1 and ends at soil boring B08-1. Figure 11 presents a cross section of the Site looking to the southwest and begins at soil boring B08-3 and ends at soil boring B08-1. Figure 12 presents a cross section of the Site looking to the west and begins at soil boring HA-121 and ends at soil boring B08-1. These geologic cross sections illustrate significant subsurface deposits; fill materials, and other conditions and features.

8.0 Foundation Recommendations

As part of the PSCAI, a geotechnical evaluation was conducted throughout the four (4) areas of the Site by Foundation Design, P.C. (Foundation Design) of Rochester, New York. Foundation Design collaborated with LaBella during the PSCAI to document the findings of the test pitting activities as well as the soil boring study.

The study was meant to assist in evaluating the Site for future redevelopment. Proposed structures considered by this study include wood or steel-framed residential housing buildings or steel-framed office/commercial buildings, including a potential hotel. It was assumed that the new structures would be less than 40-feet in height.

Foundation Design's findings, as well as recommendations for structural development at the Site, are presented in Foundation Design's "Pre-development Assessment" included as Appendix 7 to this report. The Foundation Design report stated the following:

"We offer the following major items for consideration during conceptual design:

- The site previously contained an old steel mill. Remnants of the old plant, including debris laden fills, old foundations, floors slabs, and waste slag by-products lie on the parcel.
- The underlying native soils consist of a thin layer of glacial lake deposits, compact to very dense glacial till, then bedrock.
- An old marsh extends into the east side of the parcel. Deeper slag fills on Lots A-1 and A-4 were placed over the peaty marsh deposits.
- Due to the fill and organic soil conditions, we suspect that a deep foundation system and structural floor slab will be required on Lots A-1 and A-4.

- It is our opinion that building on Lots A-2 and A-3 can be supported using a spread footing foundation system. We suggest designing new structures with at-grade entrances off both North River Street and Lake Avenue; much of the unsuitable material would be removed as part of the lower level excavation work. The following is a list of potential premium cost items associated with redevelopment of these parcels as compared to a 'green' site.
    - Removal of fill required for slab-on-grade/spread footing construction
    - Hoe ramming of old concrete foundations
    - Crushing concrete, brick, cobbles, boulders for structural fill
    - Importing new structural fill to develo9p building pad(s)
    - Off-site disposal of excavated materials (foundations/utility trenches)
    - Import of soil for foundation /utility trench backfill
    - Deep foundation (or caissons, micro-piles, piles) through the fill
    - Structural floor slab(s)
    - Crawl space to hang sub-floor utility systems
    - Crawl space /sub-ventilation system
    - Corrosion protection/wrapping of underground piping
    - Corrosion protection of structural steel/concrete
    - Large diameter pipes/steeper slopes for underground utilities
    - Extra stone base under utility lines
    - Thicker sidewalk sections including geogrid
    - Thicker pavement section including geogrid
    - Lots A-1, A-2, and A-4 contain debris laden fills and/or slag fills. This material is not suitable to support floors or foundations. Assess whether sorting, crushing, and reuse of the concrete, brick, and slag generated during the site grading and excavation work would be less expensive than off-site disposal.
    - We identify this parcel as having a seismic site classification of D."

[*Note: Additional details can be found in the Foundation Design report in Appendix 7. In addition, other potential considerations may be warranted based on project specific conditions.*]

9.0 Existing Utility Summary

The Site is currently serviced by numerous underground utilities, the majority of which are under paved roadways, including Lake Avenue, Portside Drive, River Street, and Corrigan Street, as seen in the *Port of Rochester Harbor and Ferry Terminal Improvements – Access Road and Infrastructure Improvements* as-built drawings included in Appendix 8. The utilities consist of:

- Monroe County Pure Water systems – Storm & Sanitary Sewers
- City of Rochester systems – Water & Street Lighting
- Rochester Gas & Electric – Gas & Electric
- Time Warner Cable – Communications
- Frontier Communications - Communications

The *City of Rochester New York Developers Guide* should be consulted for guidance regarding required permits, and is included as Appendix 9 to this report.

In addition to utility-specific permits, additional permits related to utility connection or installation may be required, such as a Street Opening Permit and an Excavation Permit, which are obtained through the City of Rochester's Department of Environmental Services (DES) Permits Office. The office is located at City Hall, 30 Church Street, Room 121B, and can be contacted at (585) 428-6848.

Based on geotechnical information provided by Foundation Design (see Appendix 7), both the fill materials and the native soil is likely to be considered corrosive to ductile iron pipe. Polyethylene encasement is recommended for any ductile iron pipe installation in areas of slag fill. In shallow fill areas, trench improvement may be accomplished by undercutting utility trenches to remove fill from under the pipe trench, and backfilling with subbase/stone for support. Wrapping the pipe and stone bedding in a geogrid (similar to Mirafi BXG 11) is recommended in the geotechnical report, to span small irregularities that may form under the pipe and cause settling in areas of deeper fill.

Based on the development model presented in Figure 3, and on the design of the Ferry Terminal building and associated retaining wall, a similar tie-back system for the marina retaining wall may have potential impacts on the Site which have not been evaluated at this time. The existing Ferry Terminal tie-back system extends approximately 75' from the sheet pile wall to the end of the tie-back. The tie back system, associated with the proposed marina, may extend into Parcel A-1, A-4, and Corrigan Street.

Municipal Utilities:

If redevelopment results in additional storm or sanitary discharge, a *Rochester Pure Waters District Permit* must be obtained from Monroe County Pure Waters for new connections to sewers. All storm and sanitary sewer piping and laterals described in this section are SDR-35 polyvinyl chloride (PVC). Unlike other areas of the City of Rochester, the Port area has separate storm and sanitary sewer mains, which discharge to separate locations. It is important to note that illicit discharges are not allowed into the storm sewer system. According to the USEPA, "an illicit discharge is defined as any discharge to the municipal separate storm sewer system that is not composed entirely of storm water, except for discharges allowed under a NPDES permit or waters used for firefighting operations."

(http://www.epa.gov/owow/nps/ordinance/discharges.htm) Examples of discharges that shall not be connected to the storm sewer include, but are not limited to: sewage flows, laundry wastewater and floor washing to shop drains.

If the development plan is constructed as shown in Figure 3, the existing River Street utilities will need to be relocated into the new River Street right-of-way and new connections will need to be made with existing utilities. The depth and size of relocated utilities is expected to be similar to the existing utilities. New laterals and services can be constructed from the relocated utilities with the capacity required for the redeveloped use at each parcel.

Sanitary sewers currently consist of 8-inch diameter lines in Corrigan Street and Portside Drive, an 8-inch line in River Street north of Hincher Street, and a 21-inch line in River Street south of Hincher Street. There are multiple laterals available for connection to each of the mains. The invert of the sanitary sewer main under Portside Drive is approximately 9.3 feet below ground surface (bgs) near Lake Avenue, and the invert is approximately 17.3 feet bgs at the manhole located at the intersection with the existing River Street. Under Corrigan Street, the invert is 8.5 feet bgs near Lake Avenue, and 6.7 feet bgs at the manhole located at the intersection with River Street. Inverts and manhole station locations are shown on as-built drawings included in Appendix 8.

The existing storm sewers were designed to capture runoff from the Site in two general locations along the east side of the Site, with a total of four inlets. Two stormwater inlets were installed with connections to the 18-inch diameter line in River Street (south of Hincher) and two were installed with connections to the 21-inch diameter line in River Street (north of Hincher). These storm sewer lines currently convey flow downstream to a Vortex unit for gravity separation of suspended stormwater pollutants with final discharge into the Genesee River.

The invert of a 12-inch storm sewer main under Portside Drive is approximately 5.5 feet bgs at the manhole near Lake Avenue, and approximately 8.6 feet bgs at the manhole located at the intersection with River Street. Under Corrigan Street, the invert of a 12-inch main is 5.5 feet bgs at the manhole near Lake Avenue, and approximately 6.7 feet bgs at the manhole located near the intersection with River Street. Inverts and manhole station locations are shown on as-built drawings included in Appendix 8.

Any water service connection(s) must be approved by the City of Rochester Water Bureau. Eight-inch (8-inch) ductile iron water mains encased in polyethylene installed during the *Port of Rochester Harbor and Ferry Terminal Improvements - Access Roads and Infrastructure Improvements* project are present underneath Corrigan Street, River Street, and Portside Drive. A water main is also present underneath Lake Avenue, located west of the centerline. The 8-inch water mains were designed and installed with the intent that the subject parcel would be developed in the future; therefore, a replacement 8-inch main (in the relocated River Street) would likely be capable of handling "domestic" and fire flow requirements at the Site. The as-built drawings include the record location of the water main, and are included in Appendix 8.

Other Utilities:

Each utility company must be contacted separately for evaluation of the existing capacity of their utility. If additional utility capacity and infrastructure are necessary, based on the specific demands of the proposed Site development, each utility will provide a cost estimate for any upgrades. If the capacity of the existing utility is adequate for the proposed demand, then arrangements should be made with each utility company for connection to the existing services available to the site. Contact information for each utility company is included below:

Utility Company	*Contact Info*
Time Warner Cable	585-756-5000
Frontier Communications	585-777-1611
Rochester Gas & Electric	585-546-1100

Time Warner record mapping indicates underground cable is present within the Site along Portside Drive, River Street, and Corrigan Street, with hand holes present. A stub is present on the Lake Avenue side of the Site, approximately 350 feet north of the intersection with Portside Drive, which would be accessible for service to Parcels A-2 and A-3. Mapping obtained from Time Warner is included in Appendix 10. The as-built drawings include the location of the underground cable, and are included in Appendix 8.

Frontier Communications record mapping indicates ducts under the western portion of Lake Avenue with two manholes present west of the Site. Service for the proposed parcels could be obtained from the existing utilities. Mapping obtained from Frontier Communications is included in Appendix 10.

Rochester Gas and Electric has multiple underground electric utility lines in the Lake Avenue ROW, adjacent to the Site, varying from twelve to sixteen 5-inch diameter PVC electrical conduits, and including stubs located on either side of the curb cut present at Lake Avenue (called out as Pedestrian Access in Figure 3). An 8-inch natural gas pipeline, which reduces to a 4-inch natural gas pipeline, is present on the west side of Lake Avenue. Within the Site, a gas pipeline and an electrical conduit are located generally under the sidewalk in the current western ROW of River Street. A 4-inch polyethylene gas pipeline is present in the ROW of Portside Drive, River Street, and Corrigan Street. The underground electrical conduit (consisting of six 5-inch diameter PVC conduits) crosses Portside Drive in two places, is present north of Portside Drive along the eastern half of the road, continues under the sidewalk along River Street as noted above, and intersects Corrigan Street as it continues north.

Existing gas pipelines and electrical conduits are present throughout the proposed Site and along Lake Avenue; however, the capacity of these utilities will require evaluation by Rochester Gas and Electric, following the development of a specific site design with estimated demand for natural gas and electric needs. Mapping obtained from Rochester Gas and Electric is included in Appendix 8 which illustrates the locations of utilities at the Site and in the vicinity of the Site. The as-built drawings include the location of the underground gas and electric utilities, and are included in Appendix 10.

10.0 Conclusions and Recommendations

LaBella was retained by the City of Rochester to conduct a Predevelopment Investigation at a parcel of land within the Port of Rochester which has been targeted for redevelopment. To encourage the redevelopment of the Site, the City of Rochester has designed a development model for the Site that breaks the Site into four (4) parcels. The subsurface of each area was investigated and documented for the purposes of gaining an understanding of what development of these areas would involve. The development considerations included in the report are 1) Environmental; 2) Geotechnical; and, 3) Underground Utilities. Each of these considerations is discussed below.

Environmental Considerations:

Historical use of the Site included steel mill operations which produced by products such as foundry sand, cinders, and slag. These materials were used to expand the shoreline in the north and east direction toward the Genesee River, and subsequently fill in the naturally occurring marsh areas between the steel mill and the Genesee River. As such, significant quantities of these fill materials, which are considered Regulated Solid Waste by NYSDEC, are known to exist at the Site.

As part of the investigation, the previously issued subsurface investigation reports were researched and pertinent information was gathered from these earlier reports. This information included depth to bedrock at the Site, Regulated Solid Waste without slag and regulated solid waste with slag, and topographic elevations of the Site.

The PSCAI included conducting a geophysical survey of the Site, excavating sixteen (16) test pits, advancing eight (8) rotary drill rig advanced soil borings, and collecting/analyzing fill and groundwater samples. The field observations conducted as part of this work were used to develop the estimated areal and vertical extent of Regulated Solid Waste (slag containing and non-slag containing). In addition, volumes of slag and of Regulated Solid Waste were also estimated.

The analytical testing of the slag material found certain heavy metals to exceed established NYSDEC TAGM #4046 RSCOs and USEPA Eastern USA Background Levels. Groundwater analytical results also reported detections of heavy metals that were found to exceed the established NYSDEC groundwater quality standards for these constituents during the initial analytical testing of the groundwater from monitoring well B08-2/MW-1. However, low-flow sampling of this monitoring well provided a groundwater sample that essentially turbid free. Laboratory analysis of this groundwater sample reported a relatively significant decrease in metals concentrations. The low flow groundwater sample results suggest that metals potentially associated with slag fill materials at the Site are not leaching and impacting groundwater.

In the event that future structures are constructed in areas of the Site where slag would remain in the subsurface, the installation of a sub-slab vapor intrusion mitigation system is recommended. Typical sulfur-like odors were observed to be associated with the slag deposits on-site. Additionally, it is likely that the New York State Department of Health (NYSDOH) and/or the Monroe County Health Department (MCHD) would require the installation of this type of system within future on-site structures.

Based on these results, the presence of cinders, coals, ash and slag (Regulated Solid Waste) on-site represents a development concern; however, proper planning and management of these materials can avoid delays in construction and provide developers the tools necessary to make informed decisions. It should also be noted that significant quantities of C&D fill are also located at the Site, generally west of the Regulated Solid Waste area.

LaBella recommends that a development specific SGMP be developed and implemented at the Site. The SGMP will guide the on-site re-use or off-site reuse and/or off-site disposal of Regulated Solid Waste during development. A SGMP would also provide direction on how to properly dewater, handle and dispose of groundwater, if needed, during development activities. Furthermore a SGMP would indicate the required monitoring and documentation to be conducted during such activities. In addition to a SGMP, a beneficial use determination (BUD) of the Regulated Solid Waste (or portions thereof, e.g., slag) materials could be applied for to NYSDEC in order to minimize off-site disposal costs. [*Note: A BUD is a designation made by the NYSDEC as to how the Part 360 Regulated Solid Waste material is to be beneficially used. Once the NYSDEC grants a BUD, the waste material ceases to be considered a solid waste (for the purposes of Part 360) when used as defined in the BUD.*] Additionally, a SGMP would assist in determining the type, or types, of structures desired to be constructed at the Site as described below.

Geotechnical Considerations:

Foundation Design collaborated with LaBella during this PSCAI to observe subsurface characteristics of the Site. Foundation Design observed the test pits and soil borings advanced and developed the document titled "Predevelopment Assessment" to provide recommendations and considerations for the design of foundations and structures at the different areas of the Site. This document is provided in Appendix 7 of this PSCAI Report. The Foundation Design report stated the following:

"We offer the following major items for consideration during conceptual design:

- The site previously contained an old steel mill. Remnants of the old plant, including debris laden fills, old foundations, floors slabs, and waste slag by-products lie on the parcel.
- The underlying native soils consist of a thin layer of glacial lake deposits, compact to very dense glacial till, then bedrock.
- An old marsh extends into the east side of the parcel. Deeper slag fills on Lots A-1 and A-4 were placed over the peaty marsh deposits.
- Due to the fill and organic soil conditions, we suspect that a deep foundation system and structural floor slab will be required on Lots A-1 and A-4.
- It is our opinion that building on Lots A-2 and A-3 can be supported using a spread footing foundation system. We suggest designing new structures with at-grade entrances off both North River Street and Lake Avenue; much of the unsuitable material would be removed as part of the lower level excavation work.
- Lots A-1, A-2, and A-4 contain debris laden fills and/or slag fills. This material is not suitable to support floors or foundations. Assess whether sorting, crushing, and reuse of the concrete, brick, and slag generated during the site grading and excavation work would be less expensive than off-site disposal.
- We identify this parcel as having a seismic site classification of D."

[Note: Additional details can be found in the Foundation Design report in Appendix 7. In addition, other potential considerations may be warranted based on project specific conditions.]

Existing Utility Considerations:

The Site is currently serviced by a variety of underground utilities. The development of the Site could warrant utility work at the Site. As such, the *City of Rochester New York Developers Guide* should be consulted for guidance regarding required permits, and is included as Appendix 9 to this report. In addition to this guide, the following should be considered by developers.

- In addition to utility-specific permits, additional permits related to utility connection or installation may be required, such as a Street Opening Permit and an Excavation Permit, which are obtained through the City of Rochester's Department of Environmental Services (DES) Permits Office. The office is located at City Hall, 30 Church Street, Room 121B, and can be contacted at (585) 428-6848.

- The fill materials and the native soil is likely to be considered corrosive to ductile iron pipe. Polyethylene encasement is recommended for any ductile iron pipe installation in areas of slag fill.

- In shallow fill areas, trench improvement may be accomplished by undercutting utility trenches to remove fill from under the pipe trench, and backfilling with subbase/stone for support. Wrapping the pipe and stone bedding in a geogrid (similar to Mirafi BXG 11) is recommended in the geotechnical report, to span small irregularities that may form under the pipe and cause settling in areas of deeper fill.

- Based on the development model presented in Figure 3, a tie-back system for the marina and associated retaining wall (similar to the Ferry Terminal building system) may be required which may have potential impacts on the Site which have not been evaluated at this time.

- If redevelopment results in additional storm or sanitary discharge, a *Rochester Pure Waters District Permit* must be obtained from Monroe County Pure Waters for new connections to sewers. The Port area has separate storm and sanitary sewer mains, which discharge to separate locations. It is important to note that illicit discharges are not allowed into the storm sewer system. There are existing sanitary and storm sewer laterals available for connection. Information on inverts of these sewers is provided in the previous sections. It should be noted that the storm sewer lines currently convey flow downstream to a Vortex unit for gravity separation of suspended stormwater pollutants with final discharge into the Genesee River. Additional stormwater flows would require designing and approval by regulatory agencies.

- If the development plan is constructed as shown in Figure 3, the existing River Street utilities will need to be relocated into the new River Street right-of-way and new connections will need to be made with existing utilities.

- Any water service connection(s) must be approved by the City of Rochester Water Bureau. Eight-inch ductile iron water mains encased in polyethylene are present underneath Corrigan Street, River Street, and Portside Drive. A water main is also present underneath Lake Avenue, located west of the centerline. The 8-inch water mains were designed and installed with the intent that the subject parcel would be developed in the future; therefore, a replacement 8-inch main (in the relocated River Street) would likely be capable of handling "domestic" and fire flow requirements at the Site.

- Other utilities (gas, electric, cable, etc.) will require contact each utility separately to arrange for connection to the existing utility services available to the site. Contact information for each utility company was included in the previous section and available record mapping is included in the pertinent appendices.

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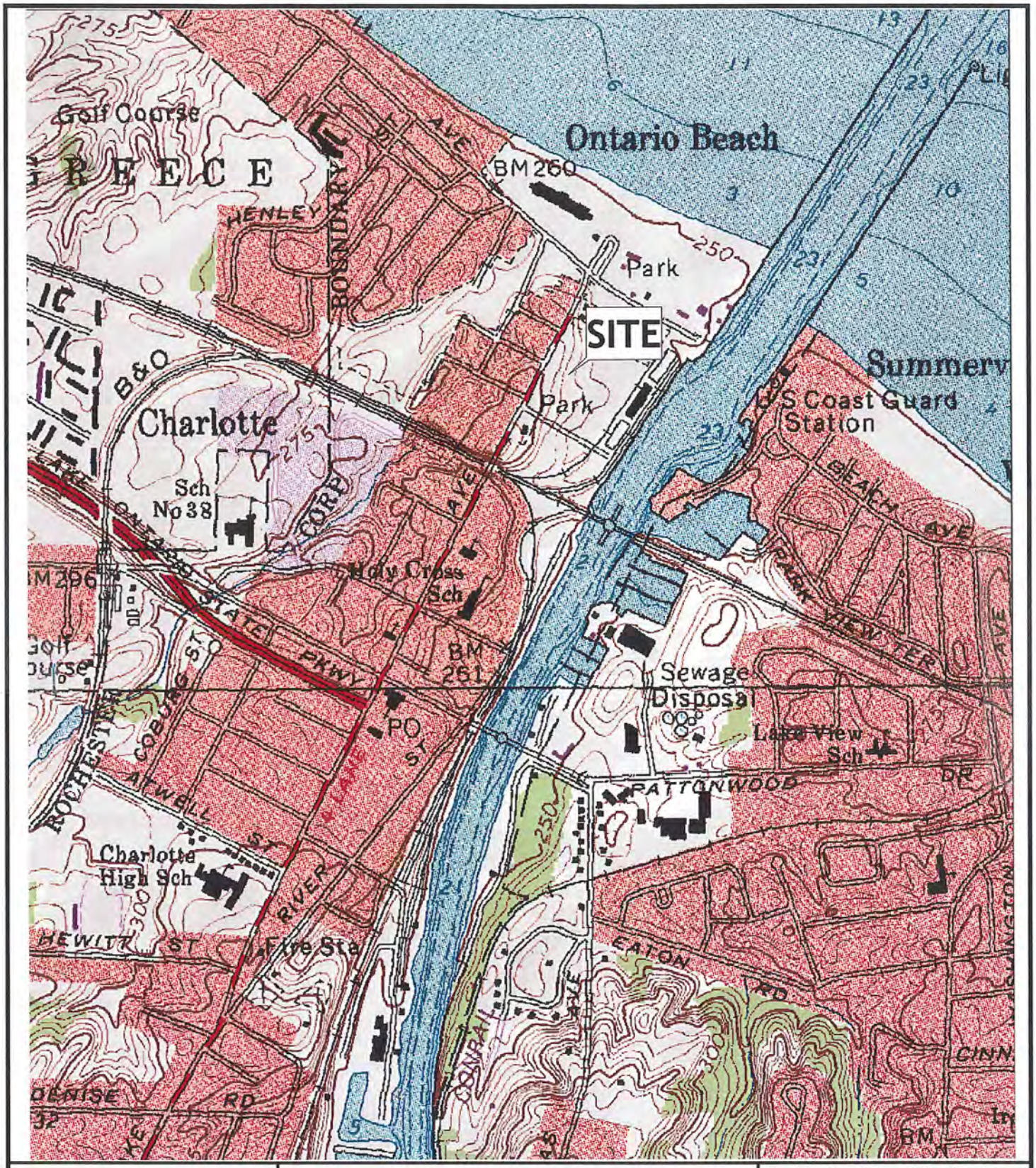
300 State Street
Rochester, New York 14614

Figures



N

SCALE: 1:12,000

FIGURE 1

SITE LOCATION MAP

Predevelopment Investigation Report

Port of Rochester

Development Area #1

Rochester, New York

LABELLA

PROJECT NO. 208453

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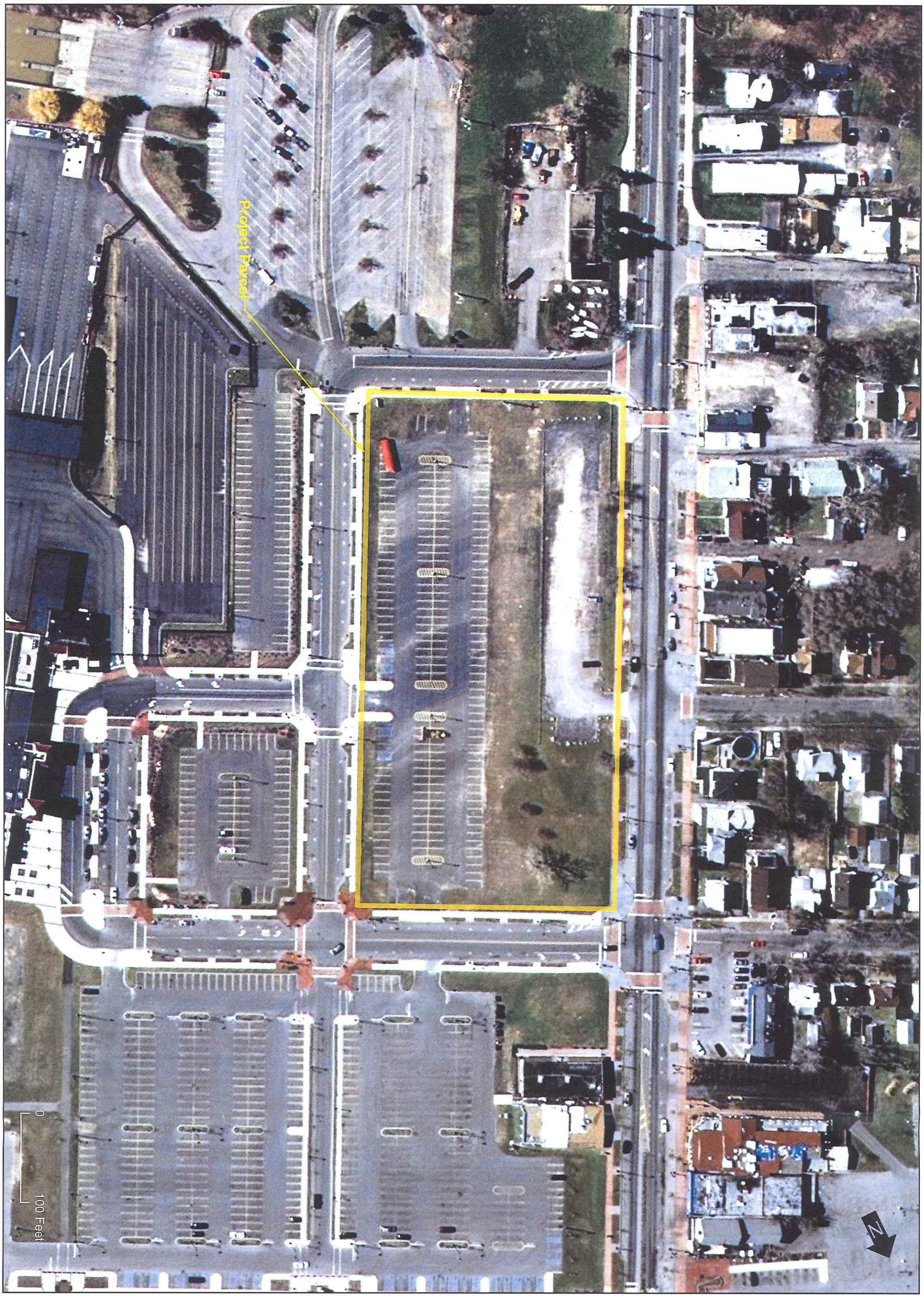

FIGURE 2

PROJECT/DRAWING NUMBER 208453

DRAWING TITLE

Site Location Map

ISSUED FOR: REVIEW
DATE: 12/2/2008
DESIGNED BY: ED
DRAWN BY: RCN
REVIEWED BY: ED

PROJECT/CLIENT

Predevelopment Investigation
Development Area 1
Port of Rochester

Rochester, New York

LABELLA Associates, P.C.
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ROCHESTER, NY 14614
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F: (585)454-3066
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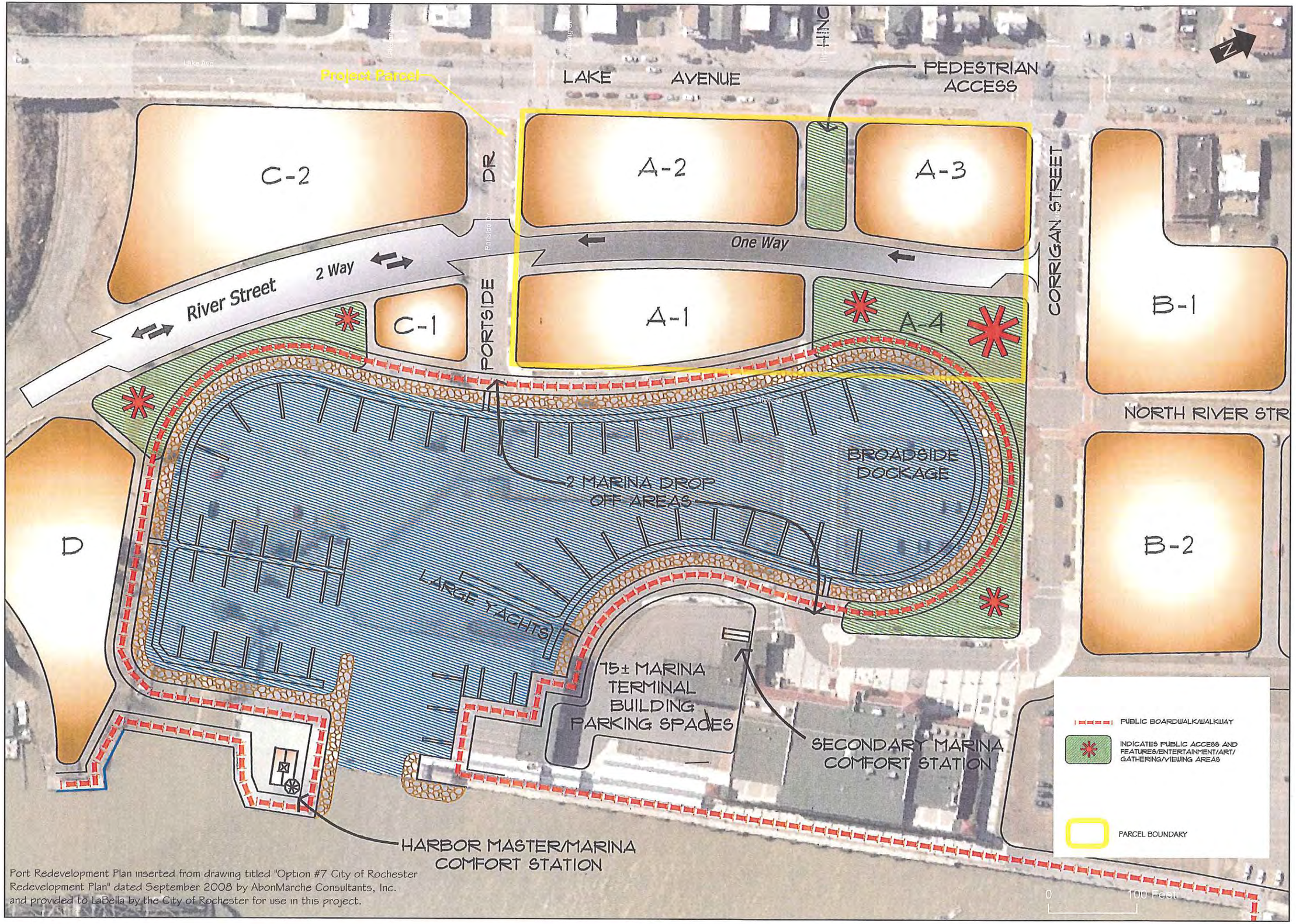

Port Redevelopment Plan inserted from drawing titled "Option #7 City of Rochester Redevelopment Plan" dated September 2008 by AbonMarche Consultants, Inc. and provided to LaBella by the City of Rochester for use in this project.

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Predevelopment Investigation
Development Area 1
Port of Rochester
Rochester, New York

DRAWING TITLE

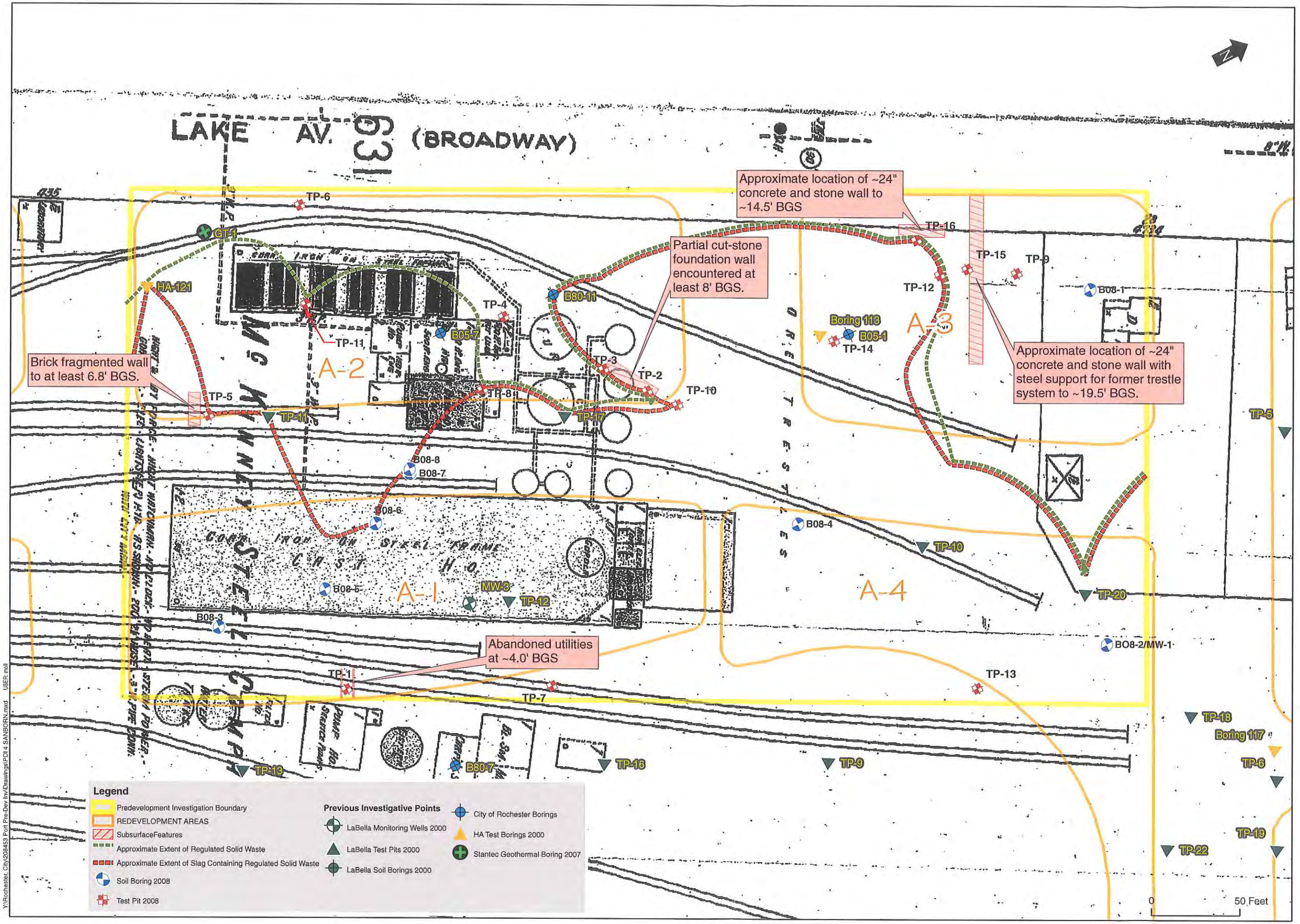
Proposed Redevelopment Plan

ISSUED FOR: REVIEW
DESIGNED BY: ED
DRAWN BY: RCN
REVIEWED BY: ED
DATE: 3/11/2009
FILE: I:\mmpeet\Projects\2008\Rochester, City\208453 Port Pre-Dev Inv \Drawings\PP3 & REDEV PLAN.mxd
USER: mxd

PROJECT/DRAWING NUMBER

208453

FIGURE 3



Y:\Rochester, City\208453 Port Pre-Dev Inv\Drawings\PDI 4 SANBORN.mxd USER: moll

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PROJECT/CLIENT
Predevelopment Investigation
Development Area 1
Port of Rochester
Rochester, New York

DRAWING TITLE
1924 Sanborn Map with Investigation Points

DESIGNED BY: ED
DRAWN BY: RCN
REVIEWED BY: ED
ISSUED FOR: REVIEW
DATE: 3/11/2009

PROJECT/DRAWING NUMBER
208453

FIGURE 4

Legend

- Predevelopment Investigation Boundary
- Approximate Extent of Regulated Solid Waste
- Approximate Extent of Slag Containing Regulated Solid Waste
- CrossSections
- Soil Boring 2008
- Test Pit 2008

Previous Investigative Points

- LaBella Monitoring Wells 2000
- LaBella Test Pits 2000
- LaBella Soil Borings 2000
- City of Rochester Borings
- Bourne Test Pits 2000
- HA Test Borings 2000
- Stantec Geothermal Boring 2007

LAKE AVENUE (99' R.O.W.)

FERRY STREET (66' R.O.W.)

CORRIGAN STREET (66' R.O.W.)

RIVER STREET WEST LOT

RIVER STREET (66' R.O.W.)

RIVER STREET EAST LOT
PAVEMENT SECTION A

HINCHER

A', E

A, B, D

B', C

C', D', E'

TP-1 TP-2 TP-3 TP-4 TP-5 TP-6 TP-7 TP-8 TP-9 TP-10 TP-11 TP-12 TP-13 TP-15 TP-16 TP-17 TP-18 TP-20 TP-22

CT-1 HA-121 B80-11 B05-7 B05-1 B08-1 B08-2/MW-2 B08-3 B08-4 B08-5 B08-6 B08-7 MW-3 Boring 113 Boring 117

END CURB R 4.5'

TYPE P SIDEWALK ACCESS, TYP.

B.O. BASIN 257.17

B.O. BASIN 253.67

T.O. BANK 259.5

RIM 259.0

T.O. BANK 256.35

RIM 255.85

SEE TYPICAL BASIN SECTION

EXTEND NEW 5" GRANITE CURB

0 50 Feet

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Predevelopment Investigation
Development Area 1
Port of Rochester

Rochester, New York

DRAWING TITLE

SITE SURVEY WITH GROUND ELEVATION CONTOURS

ISSUED FOR: REVIEW
DATE: 3/12/2009
DESIGNED BY: ED
DRAWN BY: RCN
REVIEWED BY: ED
FILE: \\rmpepc1\projects\2008\Rochester, City\208453 Port Pre-Dev\Inv \Drawing\PDI & SURVEY.mxd
USER: mxd

PROJECT/DRAWING NUMBER

208453

FIGURE 5

FIGURE 6

PROJECT/DRAWING NUMBER 208453

DRAWING TITLE

Former Shoreline and Marsh Areas Early 1800s

ISSUED FOR: REVIEW
DATE: 3/11/2009
DESIGNED BY: ED
DRAWN BY: RCN
REVIEWED BY: ED

FILE: \\mpepe1\GIS\~NY County\wide\Monroe\~Townwide\Rochester \~Site_Data\PORDEVDOCS\ROCHESTER\Port Redevelopment\PDI 5 SHORE&MARSH.mxd

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Predevelopment Investigation
Development Area 1
Port of Rochester

Rochester, New York

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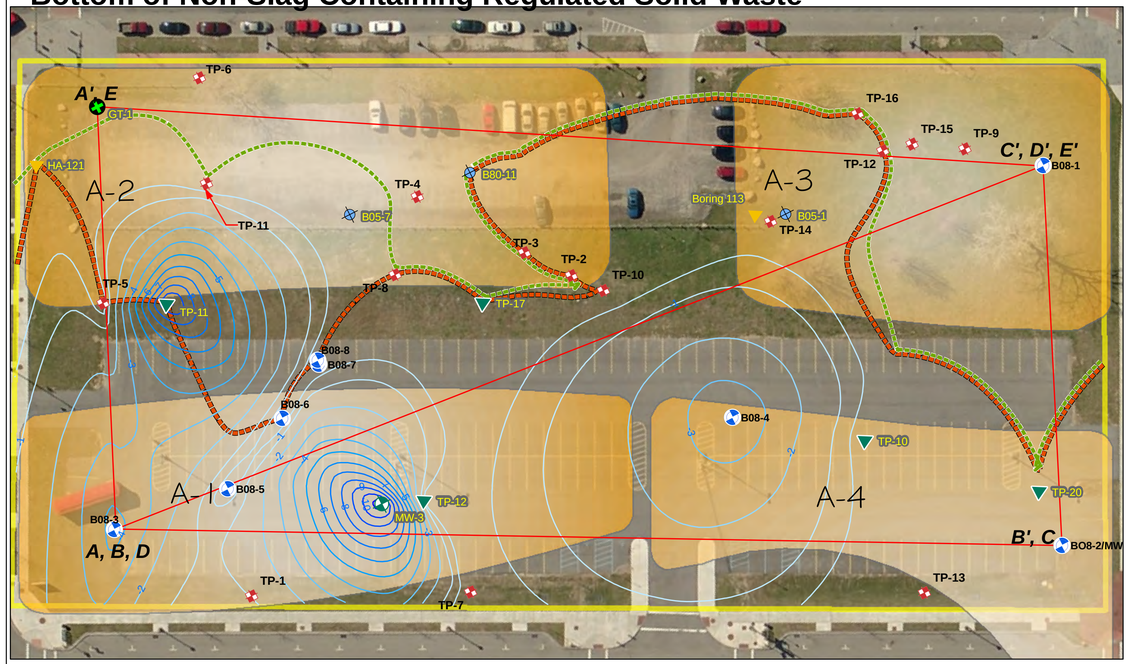
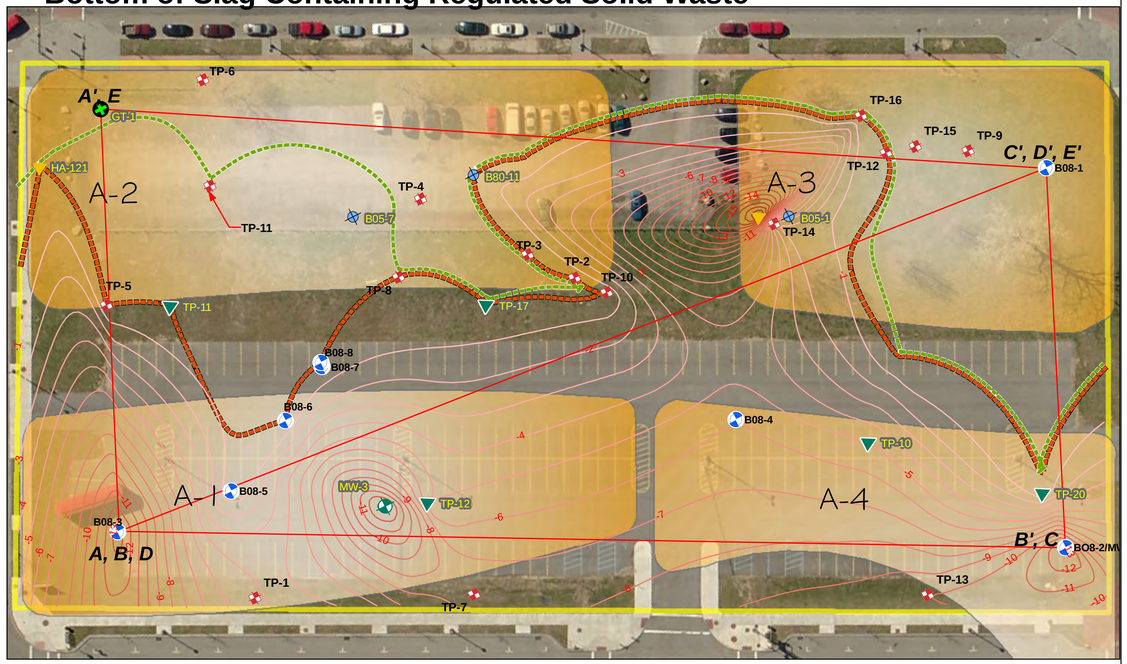
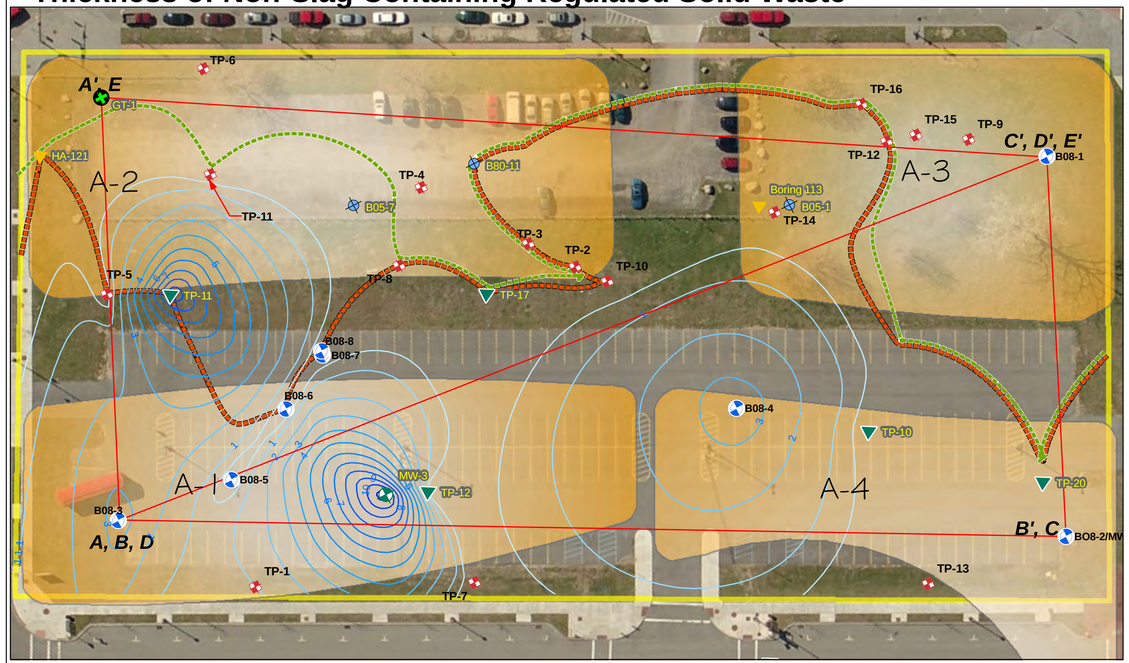
Bottom of Non-Slag Containing Regulated Solid Waste



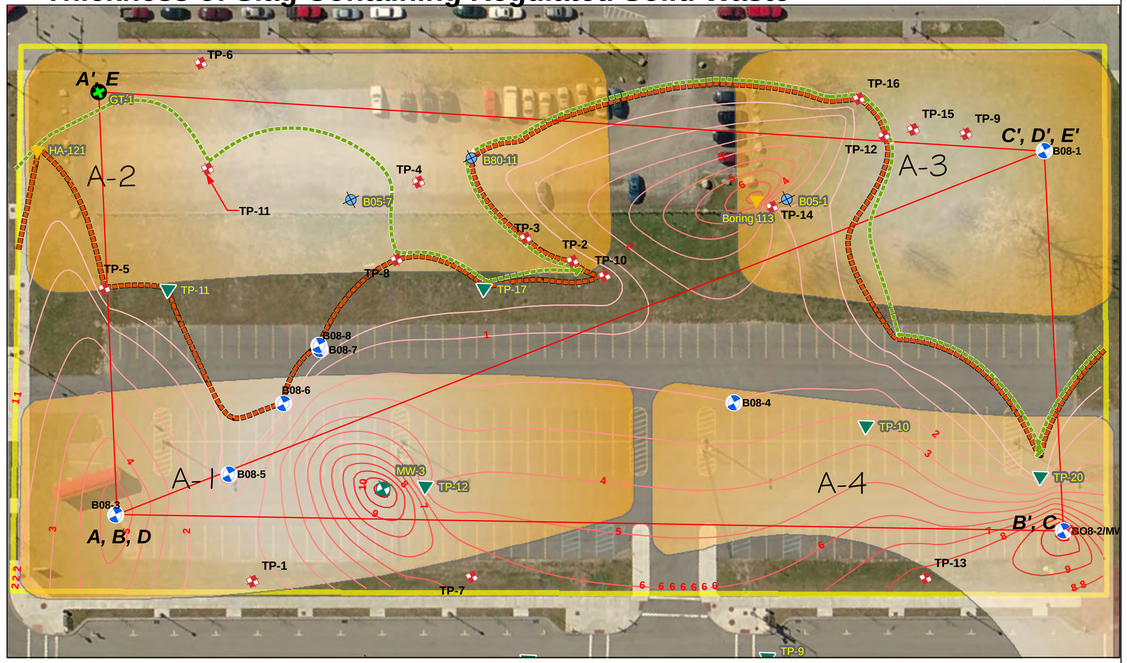
Bottom of Slag Containing Regulated Solid Waste



Thickness of Non-Slag Containing Regulated Solid Waste



Thickness of Slag Containing Regulated Solid Waste



N

0 40 Feet

Legend

- Soil Boring 2008
- Test Pit 2008

Previous Investigative Points

- LaBella Monitoring Wells 2000
- LaBella Test Pits 2000
- LaBella Soil Borings 2000
- City of Rochester Borings
- Bourne Test Pits 2000
- HA Test Borings 2000
- Stantec Geothermal Boring 2007
- Cross-Sections
- Non-Slag Containing Regulated Solid Waste Contours (ft)
- Slag Containing Regulated Solid WasteContours (ft)
- Approximate Extent of Regulated Solid Waste
- Approximate Extent of Slag Containing Regulated Solid Waste
- REDEVELOPMENT AREAS
- Predevelopment Investigation Boundary

Notes: Contours calculated using the natural neighbor gridding algorithm in Surfer 8.05 software.
Bottom contours reference an arbitrary reference datum of 0-ft at the ground surface

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Predevelopment Investigation
Development Area 1
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DRAWING TITLE
1-FT Contours of
Regulated Soldi Waste
(Slag and Non-Slag Containing)

ISSUED FOR: REVIEW
DATE: 3/12/2009
DESIGNED BY: ED
DRAWN BY: RCN
REVIEWED BY: ED
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FILE: \\mrpene1\projects2006\Rochester, City\208453 Port Pre-Dev Inv \Drawings\PDI 7 SLAG & FILL ansiD.mxd

PROJECT/DRAWING NUMBER
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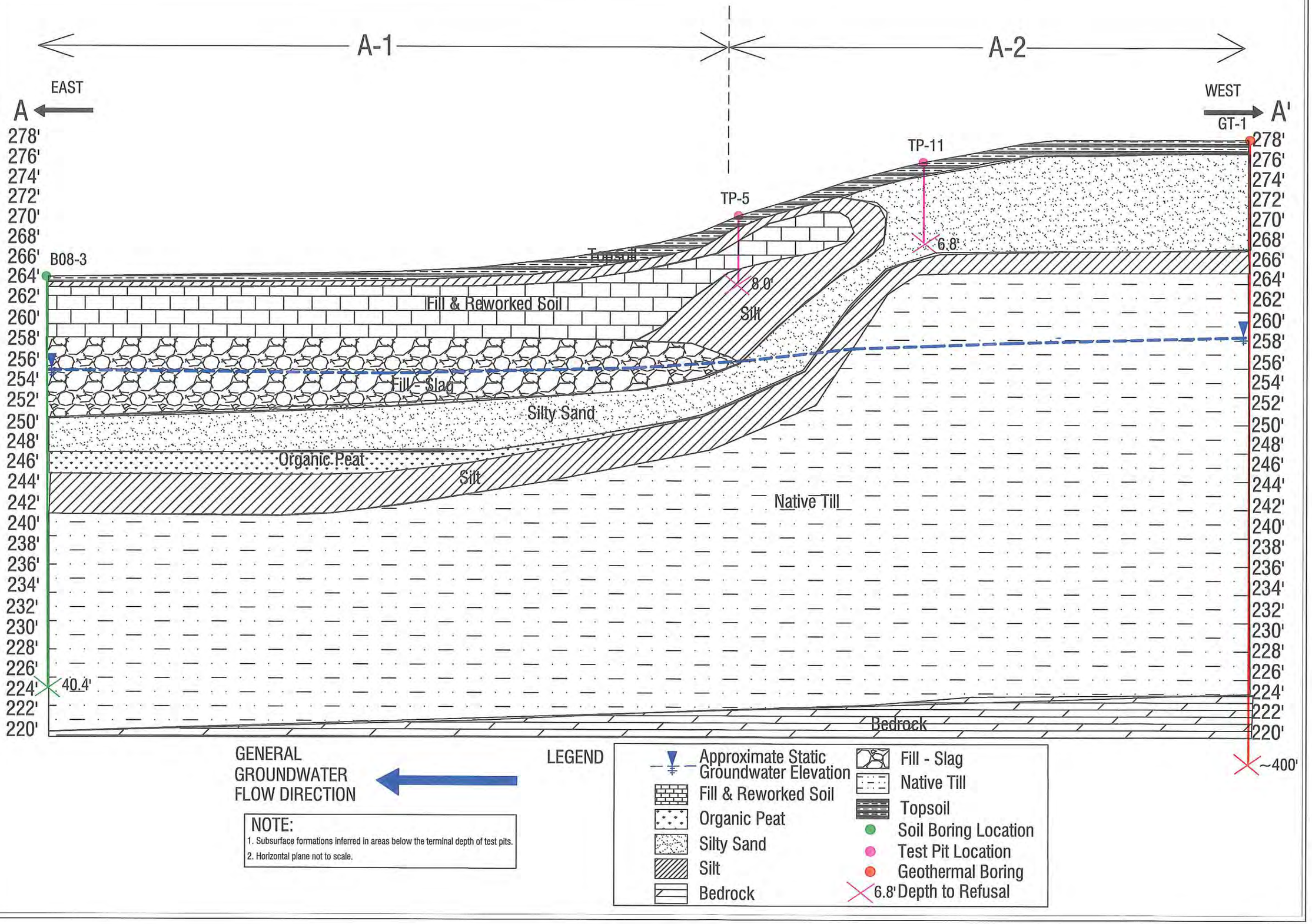
FIGURE 7



GENERAL GROUNDWATER FLOW DIRECTION

NOTE:
1. Subsurface formations inferred in areas below the terminal depth of test pits.
2. Horizontal plane not to scale.

LEGEND

- Approximate Static Groundwater Elevation
- Fill & Reworked Soil
- Organic Peat
- Silty Sand
- Silt
- Bedrock
- Fill - Slag
- Native Till
- Topsoil
- Soil Boring Location
- Test Pit Location
- Geothermal Boring
- 6.8' Depth to Refusal

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Predevelopment Investigation
Development Area #1
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DRAWING TITLE
GEOLOGIC CROSS SECTION
A-A'

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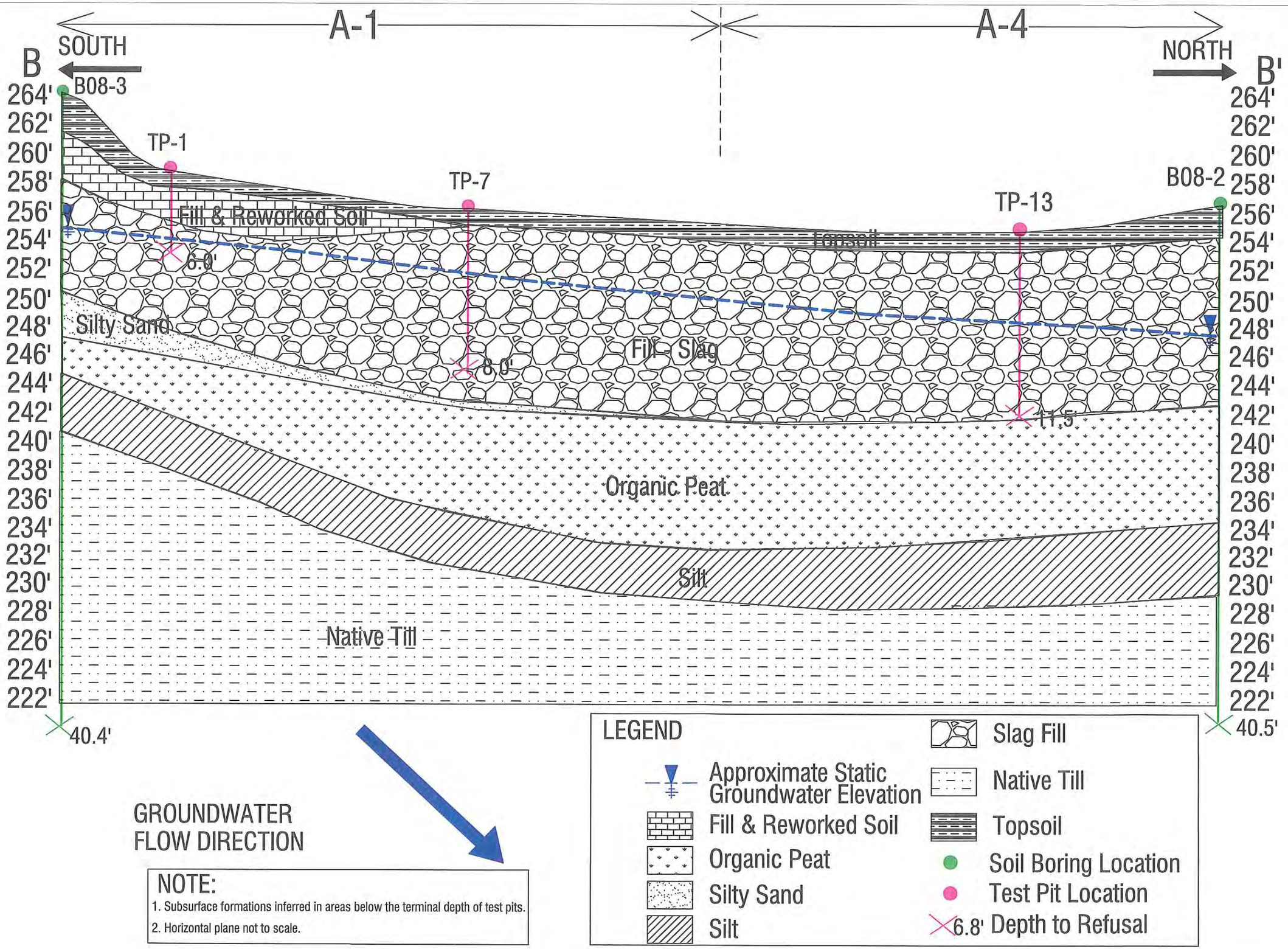
DRAWN BY: EPD
REVIEWED BY: DBP
DATE: DECEMBER 2008

PROJECT/DRAWING NUMBER
208453

FIGURE 8



GROUNDWATER FLOW DIRECTION

NOTE:
1. Subsurface formations inferred in areas below the terminal depth of test pits.
2. Horizontal plane not to scale.

LEGEND

- Approximate Static Groundwater Elevation
- Fill & Reworked Soil
- Organic Peat
- Silty Sand
- Silt
- Slag Fill
- Native Till
- Topsoil
- Soil Boring Location
- Test Pit Location
- 6.8' Depth to Refusal

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PROJECT/CLIENT
Predevelopment Investigation
Development Area #1
Port of Rochester
Rochester, New York

DRAWING TITLE
GEOLOGIC CROSS SECTION
B-B'

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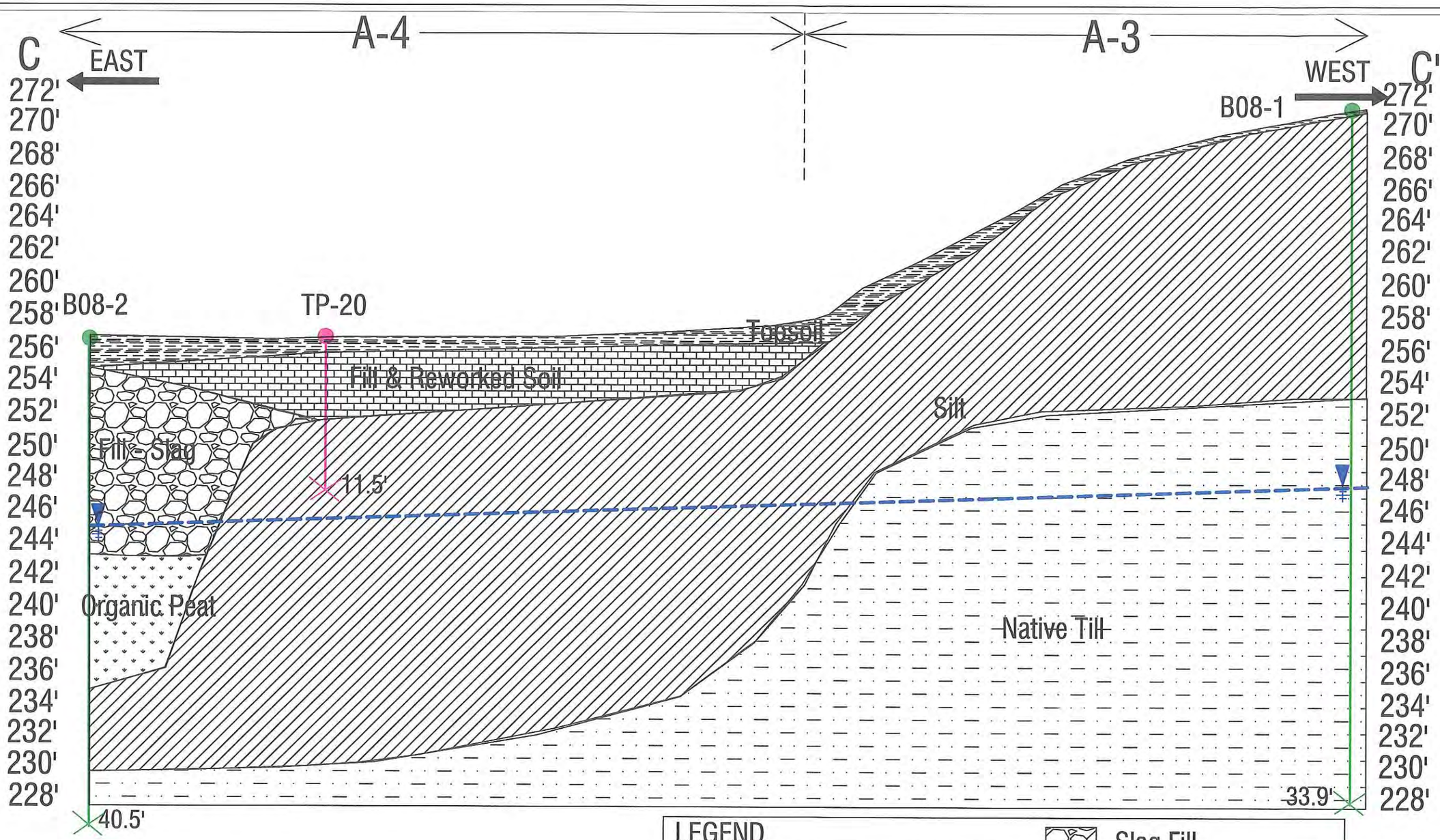
DESIGNED BY: EPD
DRAWN BY: EPD
REVIEWED BY: DEP

PROJECT/DRAWING NUMBER
208453

FIGURE 9



GROUNDWATER FLOW DIRECTION

NOTE:
1. Subsurface formations inferred in areas below the terminal depth of test pits.
2. Horizontal plane not to scale.

LEGEND

- Approximate Static Groundwater Elevation
- Fill & Reworked Soil
- Organic Peat
- Silty Sand
- Silt
- Slag Fill
- Native Till
- Topsoil
- Soil Boring Location
- Test Pit Location
- 6.8' Depth to Refusal

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Predevelopment Investigation
Development Area #1
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Rochester, New York

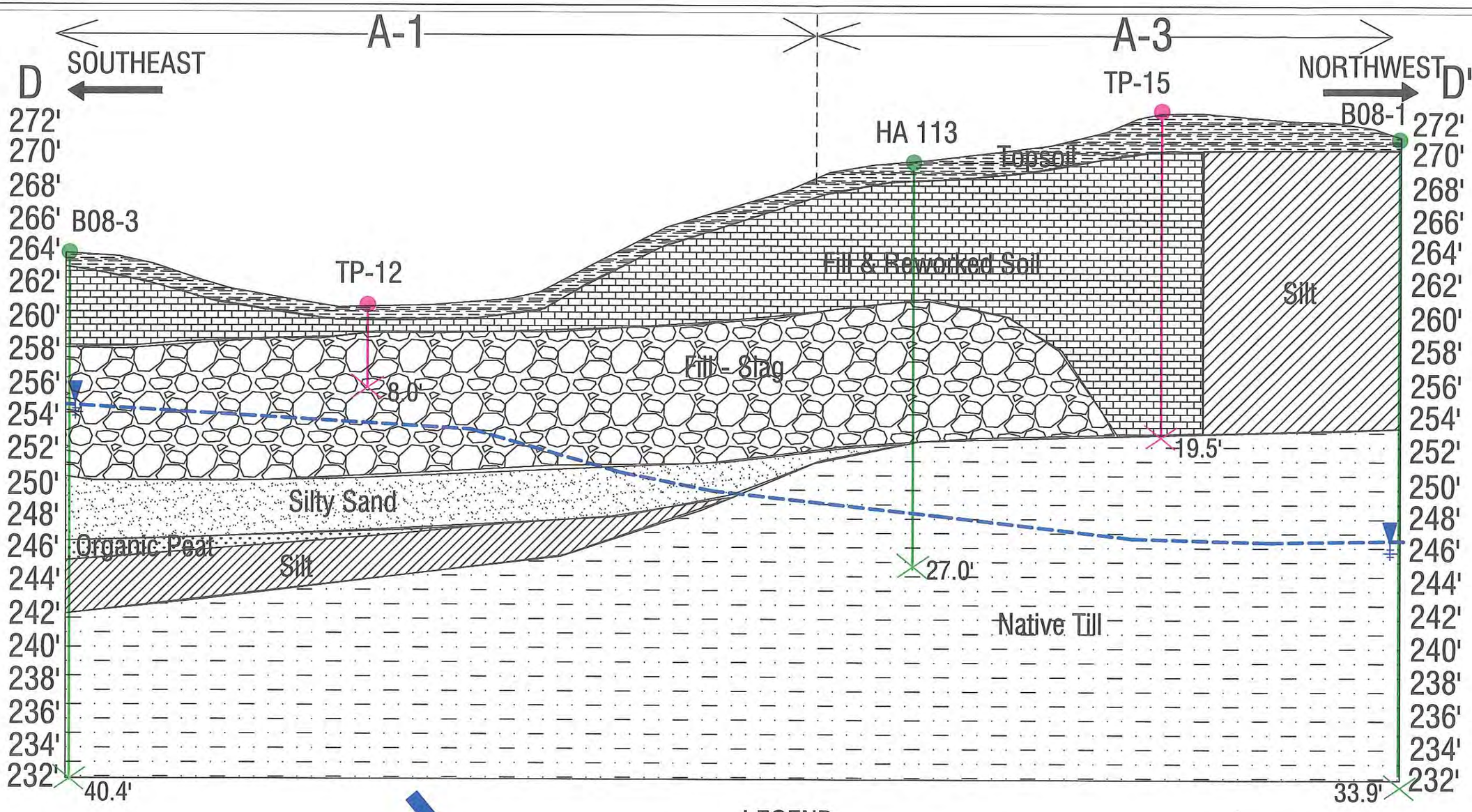
DRAWING TITLE
GEOLOGIC CROSS SECTION
C-C'

DESIGNED BY: EPD
DRAWN BY: EPD
REVIEWED BY: DEP

ISSUED FOR: REVIEW
DATE: DECEMBER 2008

PROJECT/DRAWING NUMBER
208453

FIGURE 10



GROUNDWATER FLOW DIRECTION

NOTE:

1. Subsurface formations inferred in areas below the terminal depth of test pits.
2. Horizontal plane not to scale.

LEGEND

- Approximate Static Groundwater Elevation
- Fill & Reworked Soil
- Organic Peat
- Silty Sand
- Silt
- Slag Fill
- Native Till
- Topsoil
- Soil Boring Location
- Test Pit Location
- 6.8' Depth to Refusal

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PROJECT/CLIENT
Predevelopment Investigation
Development Area #1
Port of Rochester
Rochester, New York

DRAWING TITLE
GEOLOGIC CROSS SECTION
D-D'

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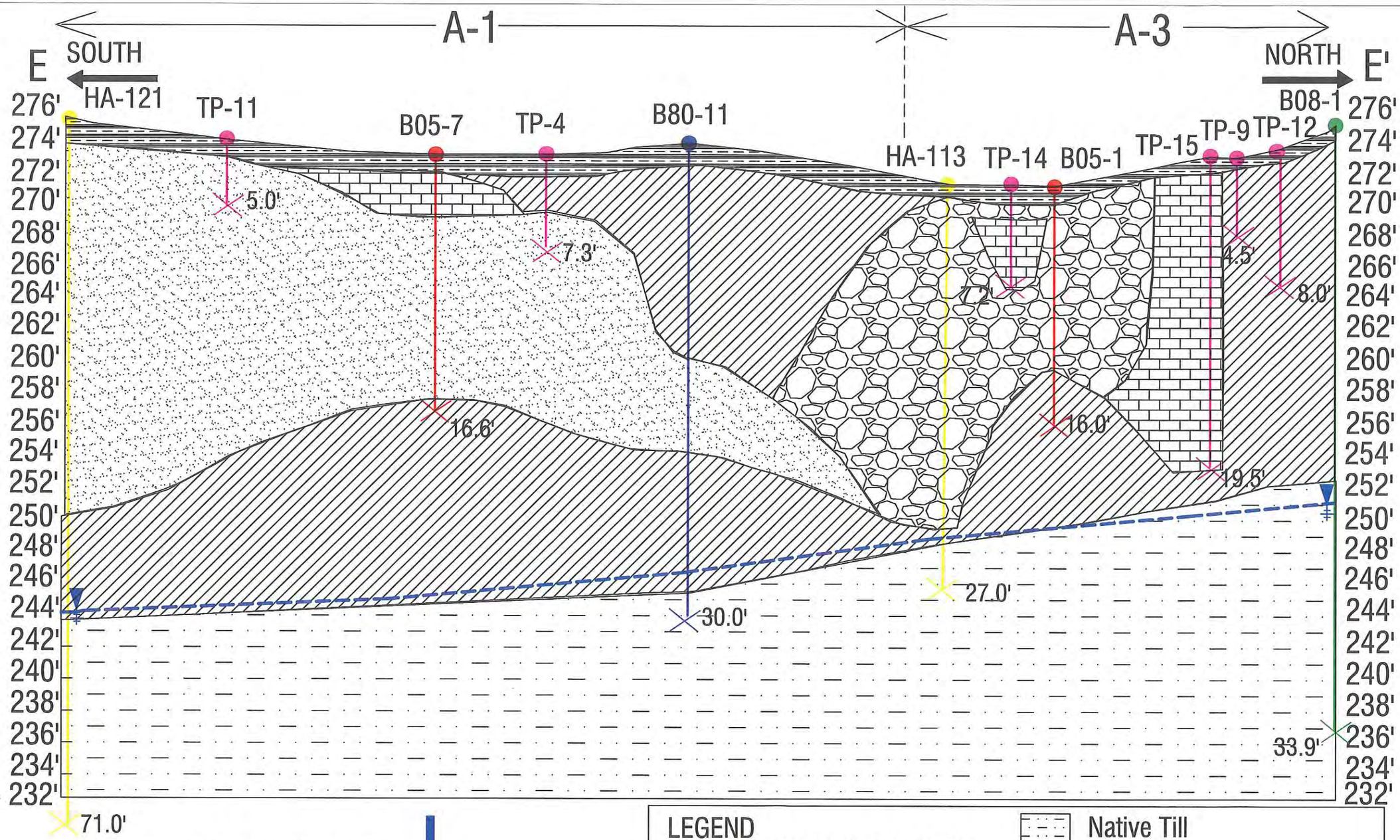
DATE: DECEMBER 2008
DESIGNED BY: EPD
DRAWN BY: EPD
REVIEWED BY: DSP

PROJECT/DRAWING NUMBER
208453

FIGURE 11



GROUNDWATER FLOW DIRECTION

NOTE:

1. Subsurface formations inferred in areas below the terminal depth of test pits.
2. Horizontal plane not to scale.

LEGEND

- Approximate Static Groundwater Elevation
- Fill & Reworked Soil
- Silty Sand
- Silt
- Slag Fill
- Native Till
- Topsoil
- Haley & Aldrich Soil Boring
- City of Rochester Soil Boring
- LaBella 2008 Soil Boring
- LaBella 2008 Test Pit
- LaBella 2005 Soil Boring
- 6.8' Depth to Refusal

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PROJECT/CLIENT
Predevelopment Investigation
Development Area #1
Port of Rochester
Rochester, New York

DRAWING TITLE
GEOLOGIC CROSS SECTION
E-E'

ISSUED FOR: REVIEW
DATE: DECEMBER 2008

DESIGNED BY: EPD
DRAWN BY: EPD
REVIEWED BY: DEP

PROJECT/DRAWING NUMBER
208453

FIGURE 12

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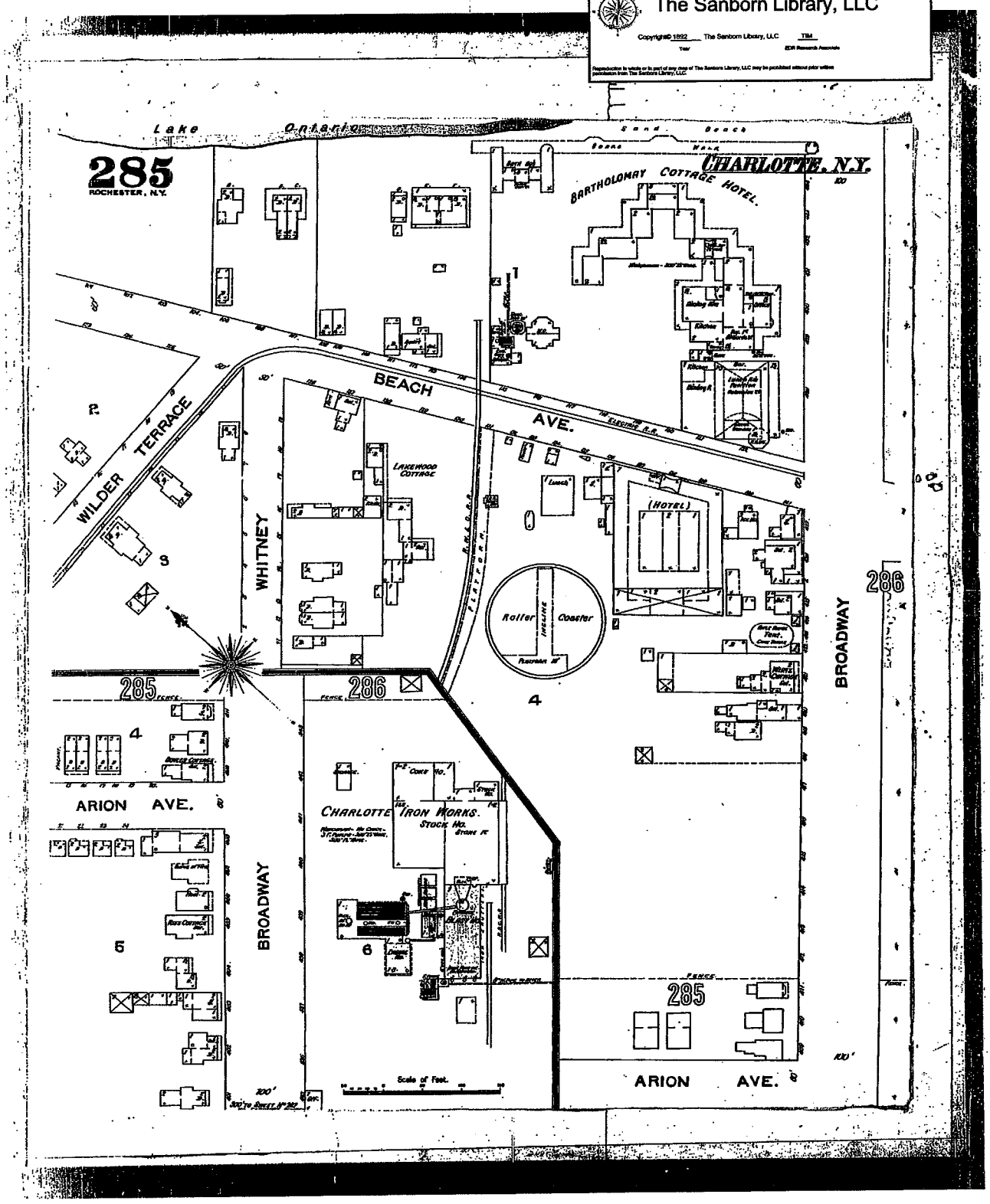
300 State Street
Rochester, New York 14614

Appendix 1

1892 & 1924 Sanborn Maps



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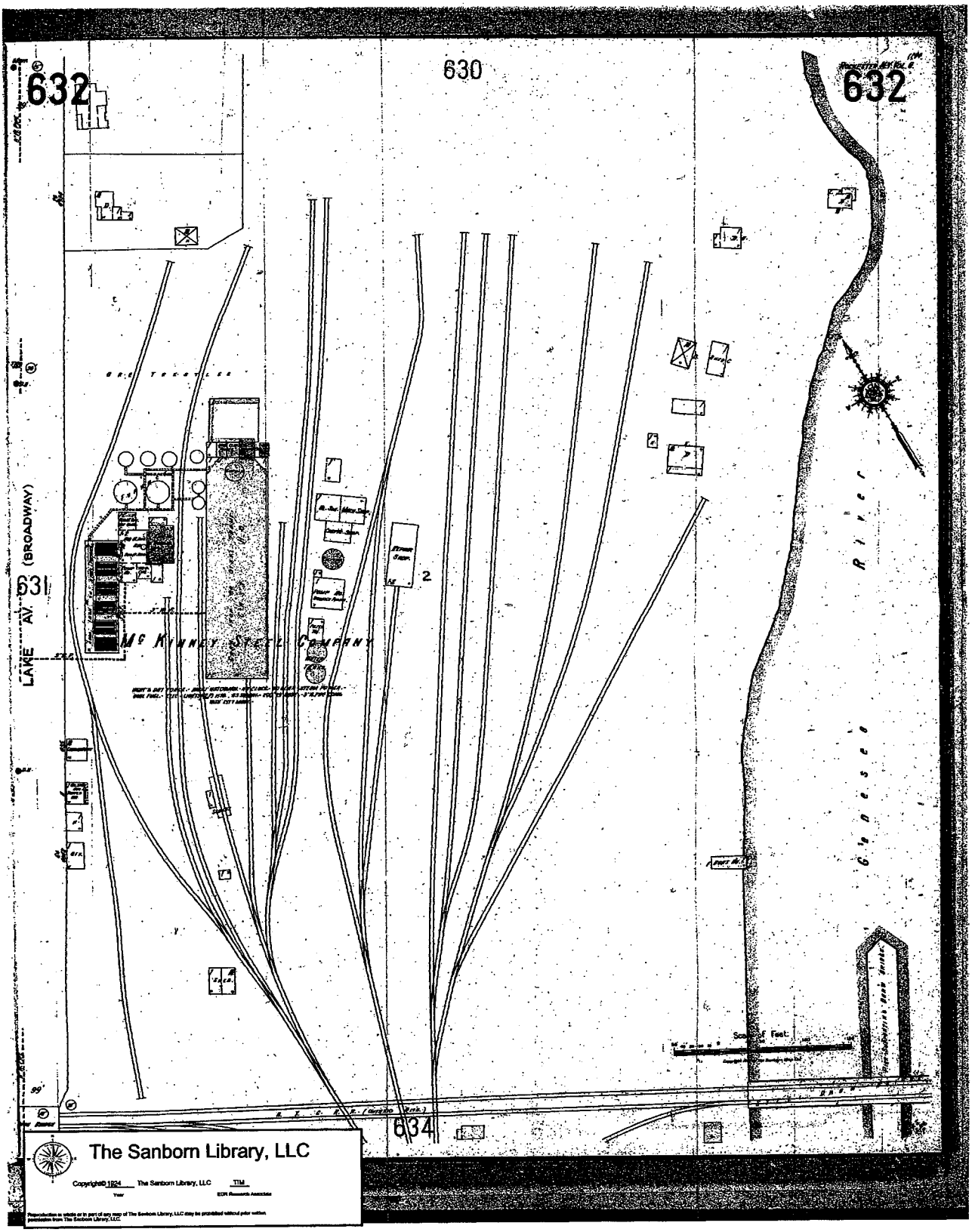
121.0989



1.427289

105.094

LABELLA
LaBella Associates, P.C.
300 State Street
Rochester, New York 14614

Appendix 2

Geothermal Test Bores and Formation Thermal Conductivity Report – Stantec Consulting, Inc., December 2007

Stantec Consulting Services Inc.
2250 Brighton-Henrietta Town Line Road
Rochester NY 14623-2706
Tel: (585) 475-1440 Fax: (585) 424-5951

stantec.com

Stantec

December 4, 2007

Mr. Joseph Biondolillo
City of Rochester
Dept. of Environmental Services
Division of Environmental Quality
City Hall – Room 300B
30 Church Street
Rochester, New York 14614

RE: Geothermal Test Bores and Formation Thermal Conductivity Report
Port of Rochester
Rochester, New York

Dear Joe:

Stantec is pleased to present this report for the installation of geothermal test bores and Formation Thermal Conductivity (FTC) testing of the above referenced property.

Geologic and Environmental Review

Due to the proximity of the proposed test bores to the Genesee River channel, there was a potential to encounter variable depths to rock during the completion of the test bores. To assess drilling conditions and the economic benefits of shallow and deep bores, test bore locations were selected to evaluate both shallow overburden and deep bedrock bores. If deep bedrock boreholes for a site are necessary, it is advantageous to have a shallow depth to rock and avoid the installation of excessive overburden casing. The cost of additional casing is apparent as projects move forward and drilling costs are considered for the entire loop field installation. Conversely, if depth to rock is known to be excessive (>100 ft.), it may be advantageous to stop at the top of rock and thereby avoid the installation of overburden casing. This second scenario may lower drilling costs and make other drilling methods possible (i.e. mud rotary).

Depth to rock was evaluated based upon data presented in "Geotechnical Site Characterization, Port of Rochester Harbor Improvement and Harbor Ferry Terminal, Rochester New York" by Haley and Aldrich (2001). Two locations were selected based upon depth to rock in areas that were available based on accessibility, utility clearance and existing environmental conditions. In the area of HA-121, depth to rock was reported to be 61.0 feet below ground surface (ft. bgs.). This area along Lake Avenue was selected for a 400 ft. borehole (GT-1) cased to the top of rock (Figure 1). In the area of HA-101, depth to rock was reported to be 113.0 ft. bgs. This area along the Genesee River was selected for a 100 ft. borehole (GT-2) to be installed without casing (Figure 1).

Borehole and Loop Installation

Prior to initiating the drilling program, the Underground Facilities Protective Organization (UFPO) was contacted to locate publicly owned utilities. Based on previous drilling programs at the Port of Rochester, the City was also able to assist in locating utilities. Boring locations are shown on Figure 1.

On August 6, 2007, GT-2 was completed by Nothnagle Drilling Services, Scottsville, NY. GT-2 was completed with 4-1/4 hollow stem augers to a total depth of 105 ft. bgs. Overburden soils consisted of saturated river alluvium and were stored on site in 55 gallon drums. At completion, a 1-inch diameter HDPE u-bend was installed to a total depth of 105 ft. bgs. The borehole was allowed to collapse from 105 to 10 ft. bgs, with bentonite grout extending from 10 ft. bgs., to the ground surface. A copy of the geothermal test bore log is presented in Appendix A.

Boring GT-1, a 400 ft. geothermal test bore, was completed by Nothnagle Drilling Services, Scottsville, NY on August 13, 2007. A temporary 7-inch steel surface casing was set to the top of rock at a depth of approximately 54 ft. bgs. A nominal 6-inch diameter open rock hole was advanced to a total depth of 400 ft. using air rotary methods. No obvious environmental hazards or natural gas were encountered.

The overburden at GT-1 was primarily silt and sand from the ground surface to approximately 30.0 ft. bgs and from 30 ft to 54.0 ft. bgs. sandy till with some gravel was encountered. Overburden soils were containerized in 55 gallon drums and stored on site. The underlying bedrock was red, dry Queenston Shale from 54 to 400 ft. bgs. The Queenston Formation is a thick sequence of marine shale and mudstone. Trace groundwater was noted throughout the bedrock profile.

On August 14, 2007, the United States Geological Survey (USGS) conducted geophysical testing on the GT-1 open rock bore. Geophysical tests included gamma, electromagnetic induction, mechanical-caliper and acoustic-televiewer log. A copy of the USGS data is provided in Appendix B. From the USGS report, it was noted that from 334 to 368 ft bgs the low gamma counts indicated a change in lithology. This noted change in lithology may correspond to a fossil-rich, shallow marine facies (Georgian Bay) noted in drill core from Orleans County (Bill Goodman, PhD, personal communication).

On August 15, 2007, a 1-1/4 inch diameter HDPE u-bend was installed to a total depth of 400 ft. bgs. The borehole was grouted from 400 ft. bgs to ground surface using tremmie methods and Barotherm thermally enhanced (1.0) grout. A copy of the geothermal test bore log is presented in Appendix A.

Formation Thermal Conductivity Testing

Formation thermal conductivity testing was performed on GT-1 and GT-2 from August 23 to August 27, 2007. However, due to an internal battery failure inside the data acquisition unit, no data were recorded and testing was subsequently rescheduled.

The formation thermal conductivity test for GT-1 and GT-2 was rescheduled by Stantec from September 29 to October 3, 2007. Geothermal Resource Technology Inc. (GRTI) testing and data acquisition units were used for conducting the test. A 25 kW diesel generator from Admar Supply

Co. was used to provide uninterrupted 240-volt single-phase power to the test equipment. Data was submitted via modem to GRTI for analysis using the "line source" method.

Formation Thermal Conductivity Results

GT-1 (400 ft.)

Based on formation thermal conductivity testing, the estimated formation thermal conductivity for GT-1 was 1.63 Btu/hr-ft-^{0}F. The formation thermal diffusivity was 1.19 ft^2/day and the static deep-earth temperature was 53.5 to 54 $^\circ$ F. A copy of the geothermal data analysis report is provided in Appendix C.

GT-2 (100 ft.)

Based on formation thermal conductivity testing, the estimated formation thermal conductivity for GT-2 was 0.95 Btu/hr-ft-^{0}F. The formation thermal diffusivity was 0.61 ft^2/day and the static deep-earth temperature was 54 $^\circ$ F. A copy of the geothermal data analysis report is provided in Appendix C.

Conclusions and Recommendations

Geologic conditions for geothermal drilling were favorable for deep bedrock drilling. The bedrock encountered was predominantly dry shale, with no natural gas or other obvious environmental hazards encountered. The formation thermal conductivity for GT-1 was 1.63 Btu/hr-ft-^{0}F, which is above average for dry shale.

The top of rock loop installed at GT-2 was completed using hollow stem augers. Given the saturated alluvial conditions, mud rotary methods would also be a viable drilling option. However, the formation thermal conductivity for GT-1 was only 0.95 Btu/hr-ft-^{0}F, which is below average for saturated alluvium. Given the low conductivity of the overburden at GT-2 and the nominal (~100 ft.) depth to rock needed to avoid entering bedrock, it is unlikely that overburden loops at 100 ft. would provide enough capacity to make them viable for a large commercial bore field.

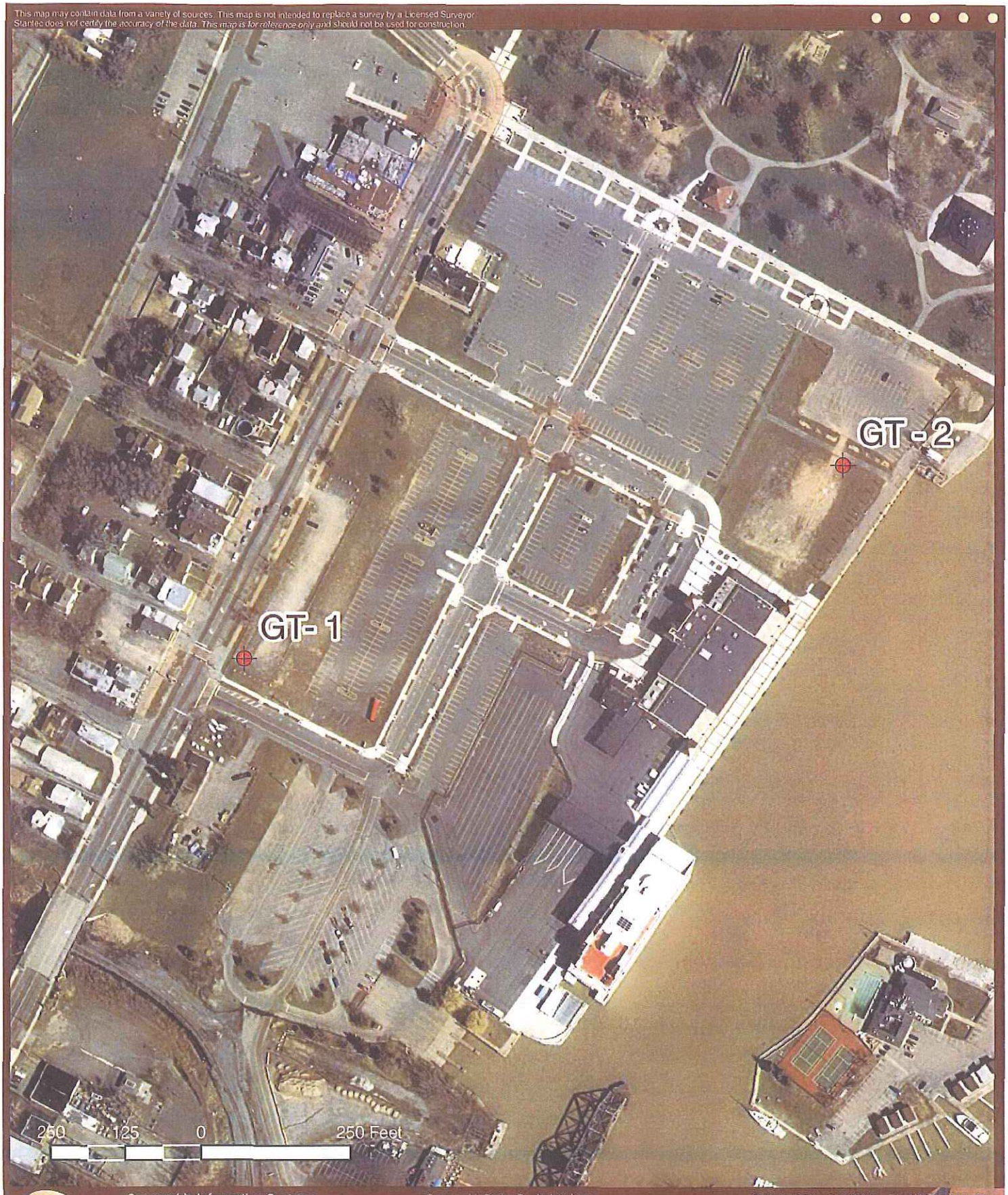
We thank you for the opportunity to work with you on this geothermal project. Should you have any questions, or require further information, please do not hesitate to me at 475-1440, x759.

Sincerely,

Peter H. Smith
Hydrogeologist
Certified Geothermal Installer

Attachments:

Figure 1	Geothermal Boring Location Map
Appendix A	Boring Logs
Appendix B	USGS Geophysical Report
Appendix C	Formation Thermal Conductivity Reports



Geographic Information Systems

Cartographic Design By: Andrew Less

Printed: 10:50am 11/26/2007 File: U:\190500387\GIS

Stantec Consulting
2250 Brighton Henrietta Townline Road
Rochester, NY 14623
Phone 585.475.1440 Fax 585.424.5951
www.stantec.com

N

Figure 1
Port of Rochester
Geothermal Borings

NOTHNAGLE *DRILLING, INC.*

1821 Scottsville-Mumford Road
Scottsville, New York 14546
(585) 538-2328
www.nothnagledrilling.com

Well Completion Report

NYS DEC Permit N/A

Job Location: Port of Rochester
Corner of Portside
and Lake Ave.
Vacant Lot

Well # GT-1

Contact: Peter Smith

Phone: 585 413-5635

Fax No.: 424-5951

E-Mail:

Well Coordinates

Start Well Date 8/13/07 Finished Well Date 8/16/07 Driller(s) Steve Belser, James Smith

Well Diameter 6" Rig # T4W New Well ✓ Deepened ____ Clean Out ____

Left Shop 7:30 A.M.

	DEPTH	DRILL LOG	PIPE TALLY
Arrived: 8:30			
Departed:			
Well Depth: 400'			
Casing Depth:	Drilled with 6.25" HSA to 54' bgs (top of Rock)		
Flow Rate:	Had trace of Water at 205' and 230' bgs.		
Static Water Level:	After well sat for >24 Hours Static Level 19' bg		
Water Zones: 205', 230'	trace water.		
Water Quality: N.	A.		
Drive Shoe: No			

NOTHNAGLE *DRILLING, INC.*

1821 Scottsville-Mumford Road
Scottsville, New York 14546
(585) 538-2328
www.nothnagledrilling.com

Well Completion Report

NYS DEC Permit N. A

Job Location: Port of Rochester. VACANT lot North of Terminal

Well # GT-2

Contact: Peter Smith

Phone: 585 413 5635

Fax No.: 424-5951

E-Mail:

Well Coordinates

Start Well Date 8/6/07 Finished Well Date 8/6/07 Driller(s) Neal Short

Well Diameter 4.25" HSA Rig # 75-1 New Well ✓ Deepened ____ Clean Out ____

Left Shop 7:00

	DEPTH	DRILL LOG	PIPE TALLY
Arrived: 8:00			
Departed:			
Well Depth:		Drilled with 4.25" HSA to 105' bgs	
Casing Depth:		- temporary hollow stem augers.	
Flow Rate:		Cuttings become moist at 12' bgs	
Static Water Level:			
Water Zones:			
Water Quality:			
Drive Shoe:			
Well Cap:			

Grouted: Installed 105' of 1" HDPE SCH 40 pipe allowed boring to collapse around piping.

Remarks: topped off loop with 40 Gallons of bentonite slurry.

USGS
science for a changing world

Company USGS **Site ID** **Station name**

Other ID **Date of log** 8/14/2007 **Start time of log**

County/State Monroe/NY **Office/logging unit** Troy

Logging operator JAA **Observer** JES

Description of log-measuring point(LMP) LAND SURFACE

Height of LMP above/below LSD 0.0 **Altitude of LMP**

Log orientation **Mag declination** **Logging direction**

Logging speed **Depth error after logging**

Logging probe manufacturer

Logging probe model

Logging probe serial number

Description of calibration/standardization

Date of calibration/standardization

Standard(Low) **Response(Low)**

Standard(High) **Response(High)**

Borehole depth/diameter/type 400ft/6in/open

Casing depth/diameter/type 54ft/6in/steel auger stem

Borehole fluid type WATER **Borehole fluid depth** 31.59

Borehole fluid res/cond 67,000 uS/cm **Borehole fluid temp**

Hydrologic conditions Ambient/pump 0.43

Remarks stickup= 1.0ft, drawdown= 11.96ft.

Geophysical Logs

The geophysical logs collected for the Lake Avenue – Geothermal Test Well in Rochester, New York, include gamma, electromagnetic induction, caliper, borehole image, fluid resistivity, temperature and well deviation. The geophysical logs used in this investigation are described briefly below. The italicized and embolden paragraph summarizes the important features shown with each log for the Lake Avenue borehole. Due to backfilling in the well, the geophysical probes were not able to get past 386 feet.

Gamma log measures the natural gamma radiation of rocks surrounding the borehole. Major natural gamma emitters are uranium, thorium, and daughter products of potassium 40. Units with relatively high natural gamma radiation include clays, shales, bentonites, and other argillaceous units. The gamma tool has a vertical resolution of 1 to 2 ft. Gamma logs collected in the open borehole was used for lithologic identification and stratigraphic correlation.

Lower gamma counts from 334ft to 368ft may indicate a change in the lithology

Mechanical -caliper log records the diameter of the borehole. Changes in borehole diameter are related to drilling and construction procedures and competency of lithologic units, fractures, and solution features. Mechanical-caliper logs were collected with a spring-loaded, three-arm averaging tool. Caliper logs were used in the delineation of fractures, solution features, and lithology; and to determine well and casing depths and diameters.

Acoustic-televiewer log records a 360-degree magnetically oriented acoustic image of the borehole wall. Acoustic-televiewer logs can be collected in clear or murky water. Features with widths greater than 0.01 ft could be identified. Acoustic-televiewer logs were used to characterize bedding and lithology, fractures, solution features, and borehole-wall rugosity.

The planer features (fracture and bedding planes) penetrated by the well are horizontal to sub- horizontal dipping to the south-south/west.

Fluid-resistivity log records the electrical resistivity of water in the borehole. Electrical resistivity is inversely related to the concentration of dissolved solids in the water. Slope changes in fluid-resistivity logs may indicate zones of inflow to or outflow from the borehole. Fluid-resistivity logs were used to delineate possible changes in borehole flow.

The ambient (blue) and pumping (red) fluid-resistivity logs indicate 3 water bearing zones, 54ft, 125ft, and 370ft. Specific conductance of this water was measured to be 67.000 uS/cm.

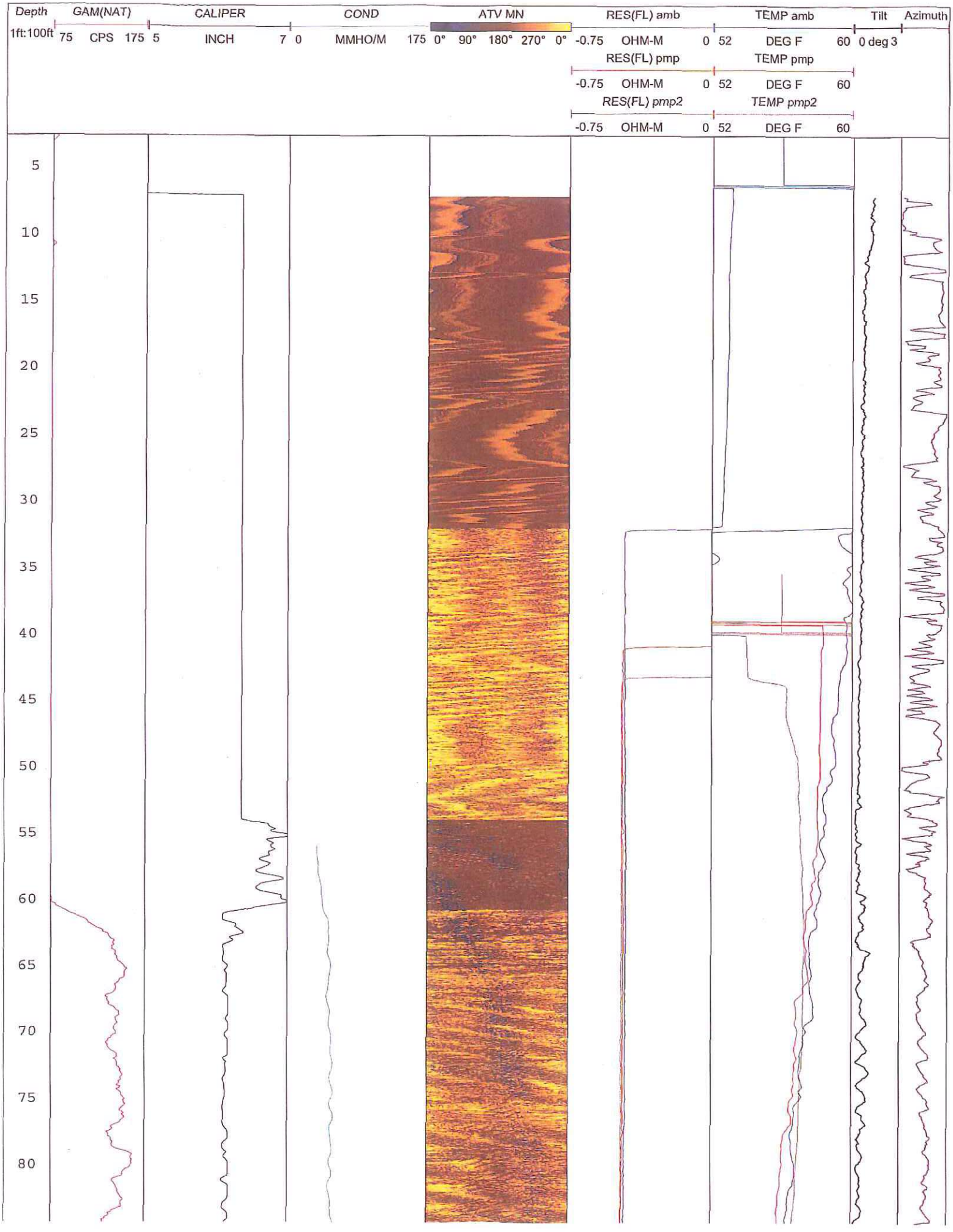
Temperature log records the temperature of air and water in the borehole. Temperature gradients smaller than the geothermal gradients may indicate intervals of borehole flow. Temperature logs were used to delineate the water level and possible changes in borehole flow.

Deviation log measures the inclination and direction of the well from vertical. Inclination generally is measured within ± 0.5 degree and direction within ± 2 degrees.

The borehole deviates slightly to the southwest. Maximum deviation from vertical is less than 3 degrees.

Electromagnetic-induction log measures the electrical conductivity of the rocks and water surrounding the borehole. Electrical conductivity measurements are affected by the argillaceous content and porosity of the rocks and by the dissolved-solids concentration of the water. The electromagnetic-induction tool has a vertical resolution of 2 ft and generally is not affected by the electrical conductivity of the water in boreholes that have a diameter less than 8 in.

A change electrical conductivity from 334ft to 368ft may indicate a change in lithology.


Depth
1ft:100ft
GAM(NAT)
75 CPS 175
CALIPER
5 INCH 7
COND
0 MMHO/M 175
ATV MN
0° 90° 180° 270° 0°
RES(FL) amb
-0.75 OHM-M 0
RES(FL) pmp
-0.75 OHM-M 0
RES(FL) pmp2
-0.75 OHM-M 0
TEMP amb
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TEMP pmp
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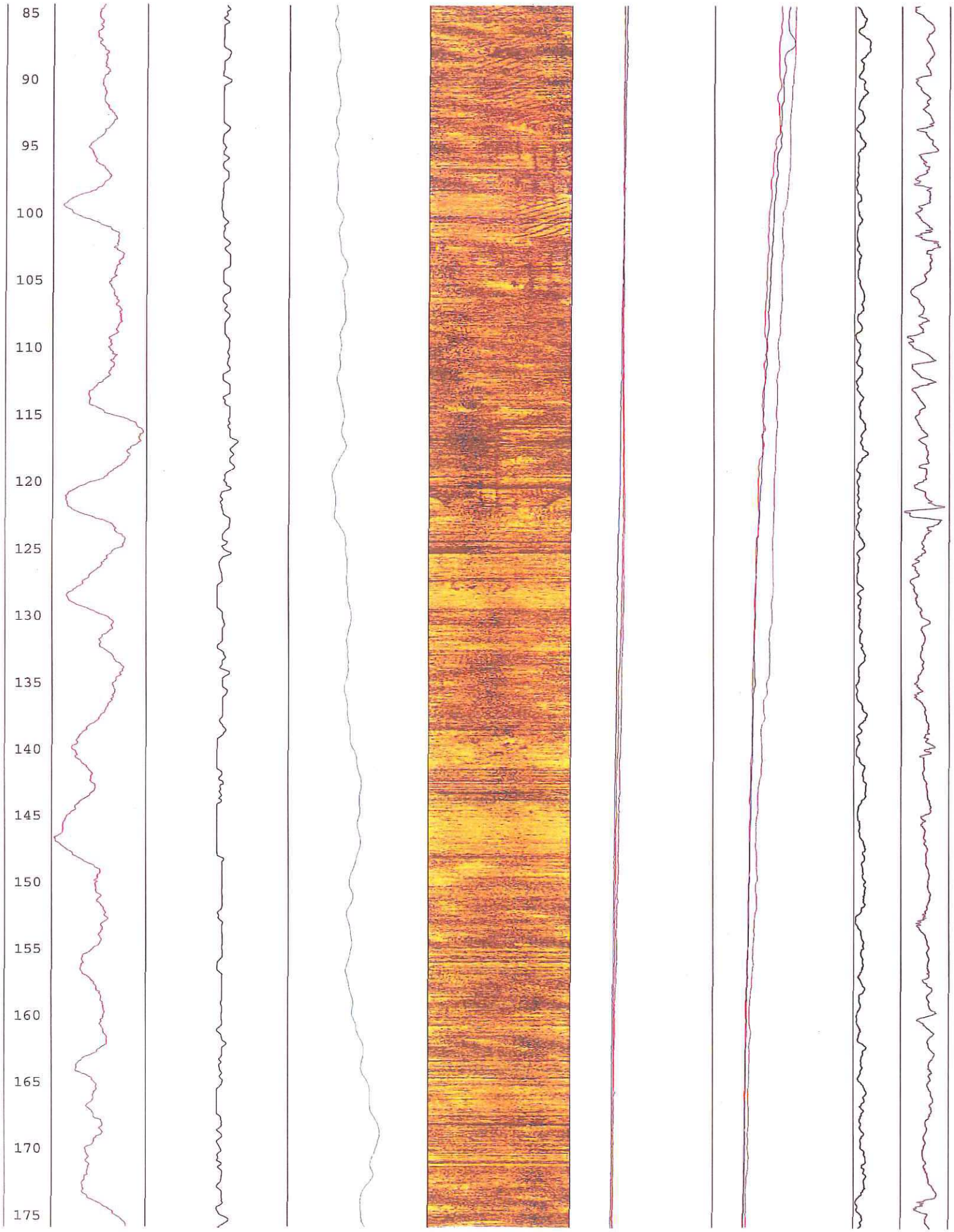
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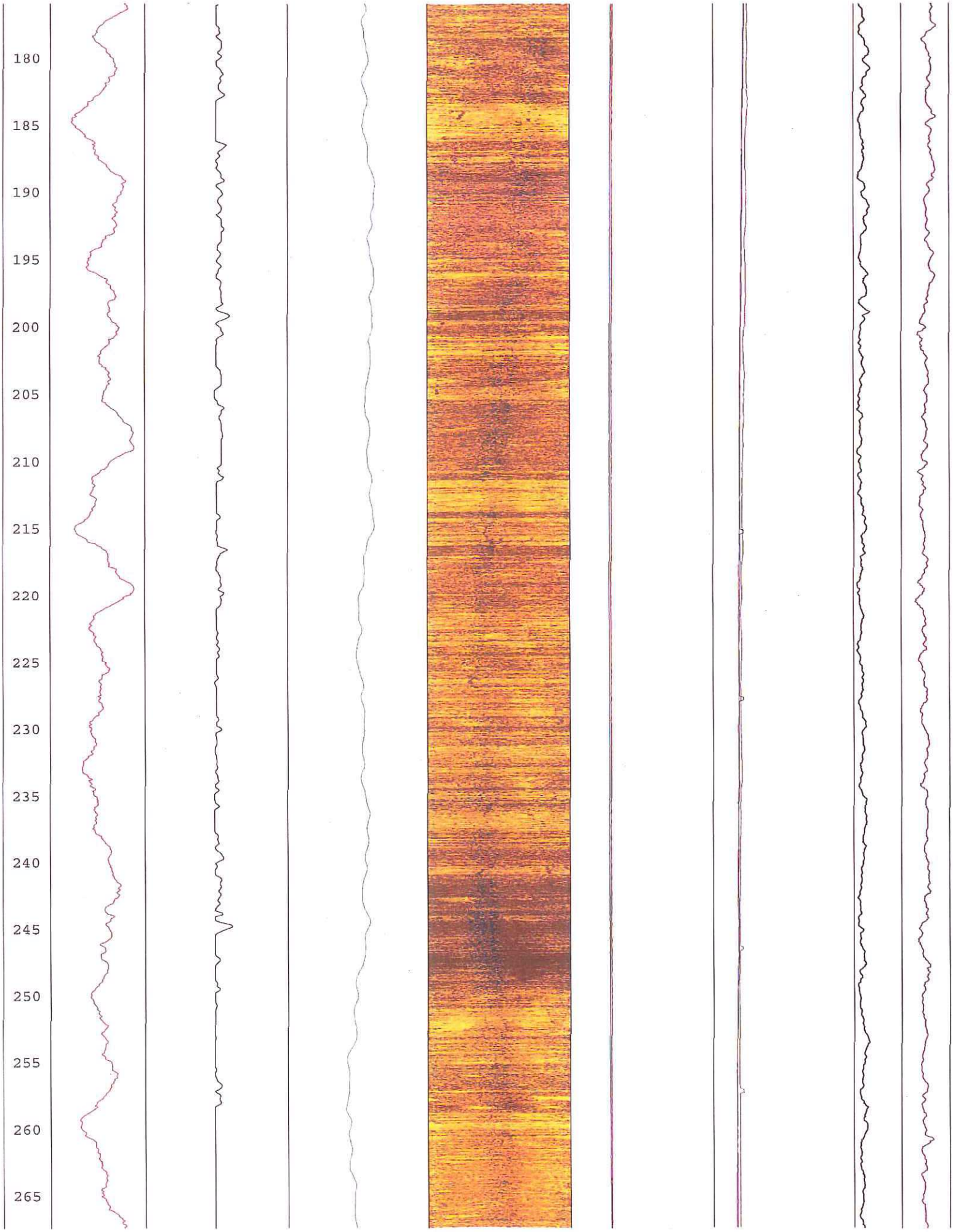
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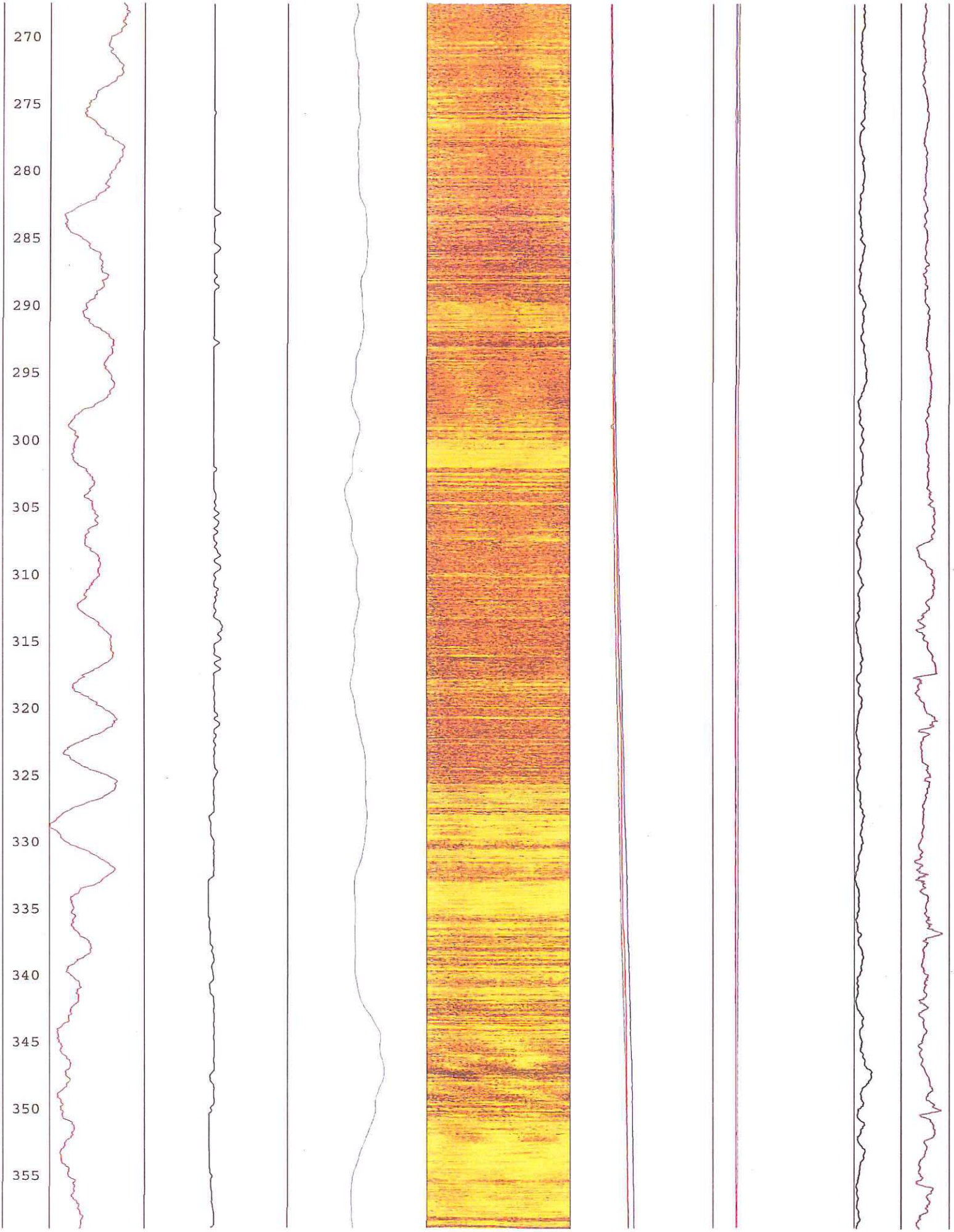
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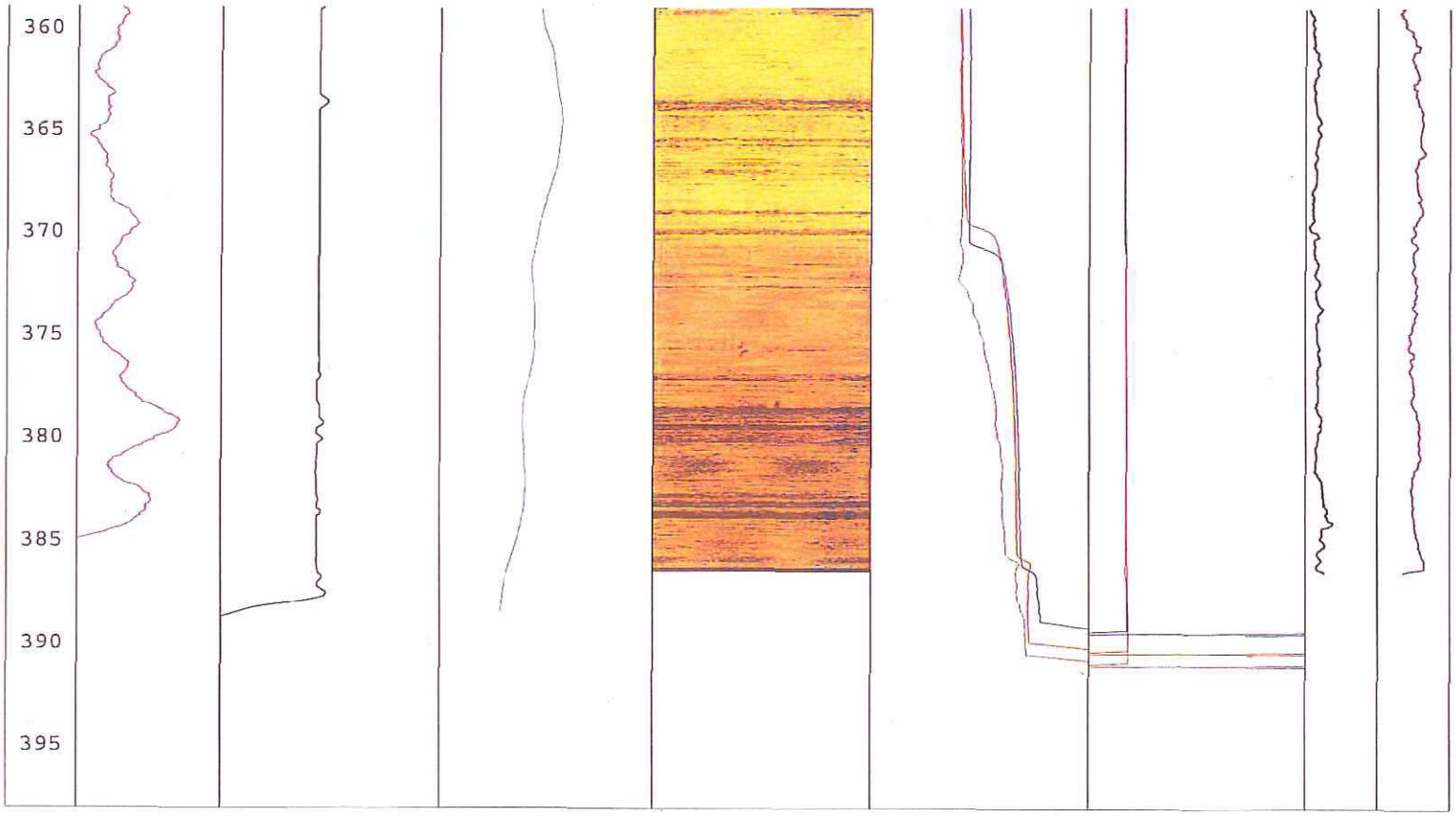
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ASHEVILLE, NC
(828) 225-9166
Fax: (828) 281-4139

WEB SITE:
www.GRTI.com

FORMATION THERMAL CONDUCTIVITY TEST AND DATA ANALYSIS

Analysis for: **Stantec**
2250 Brighton-Henrietta Town Line Road
Rochester, NY 14623-2706
Phone: (585) 413-5635
Fax: (585) 424-5951

Test location: **Port of Rochester, Bore GT-1**
Rochester, NY

Report Date: October 8, 2007

Test Performed by: **Stantec**

Executive Summary

A formation thermal conductivity test was performed on Bore GT-1 at the Port of Rochester site in Rochester, New York. The vertical bore was completed on August 16, 2007 by Nothnagle Drilling, Inc. GRTI's test unit was attached to the vertical bore on the morning of September 29, 2007. Geothermal Resource Technologies, Inc. analyzed the collected data using the "line source" method.

This report provides a general overview of the test and procedures that were used to perform the thermal conductivity test along with a plot of the data in real time and in a form used to calculate the formation thermal conductivity. The following average formation thermal conductivity was found from the data analysis.

⇒ Formation Thermal Conductivity = 1.63 Btu/hr-ft-°F

Due to the necessity of a thermal diffusivity value in the design calculation process, an estimate of the average thermal diffusivity was made for the encountered formation.

⇒ Formation Thermal Diffusivity ≈ 1.19 ft^2/day

An estimate of the undisturbed soil temperature value was determined from the initial temperature data at startup.

⇒ Undisturbed Soil Temperature ≈ 53.5-54°F

A copy of the original collected data is available either in a hard copy or an electronic format upon request.

Test Procedures

The American Society of Heating, Refrigeration, and Air-Conditioning Engineers (ASHRAE) recently adopted and published a set of recommended procedures for performing formation thermal conductivity tests for geothermal applications. GRTI is committed to adhering to ASHRAE recommendations. Some of these recommended procedures are listed below:

(1) Required Test Duration – A minimum test duration of 36 hours is recommended, with a preference toward 48 hours.

(2) Power Quality – The standard deviation of the power should be 1.5% of the average power, with maximum power variation of 10% of the average power. The heat flux rate should be 51 Btu/hr (15 W) to 85 Btu/hr (25 W) per foot of borehole depth to best simulate the expected peak loads on the u-bend.

(3) Undisturbed Soil Temperature Measurement – The undisturbed soil temperature should be determined by recording the minimum loop temperature as the water returns from the u-bend at test startup.

(4) Installation Procedures for Test Loops – The bore diameter is to be no larger than 6 inches, with 4.5 inches being the target diameter. To ensure against bridging and voids, the bore annulus is to be uniformly grouted from the bottom to the top using a tremie pipe.

(5) Time Between Loop Installation and Testing – A minimum delay of five days between loop installation and test startup is recommended if the formation is expected to have a low thermal conductivity or if low conductivity grouts (< 0.75 Btu/hr·ft·°F) are used. A minimum delay of three days is recommended for all other conditions.

GRTI's testing procedures deviate slightly from those above with regard to item (5). While item (5) bases the delay between installation and testing on the expected formation conductivity, GRTI bases its delay on the type of drilling used in the installation. When air drilling is required, a five-day delay is recommended to allow the bore to return to its undisturbed temperature. For mud rotary drilling, a minimum waiting period of two days is sufficient.

For a complete list of recommended procedures, refer to the ASHRAE 2007 HVAC Applications handbook, pages 32.12-32.13.

Data Analysis

Geothermal Resource Technologies, Inc. uses the "line source" method of data analysis. The line source equation used is not valid for early test times. Also, the line source method assumes an infinitely thin line source of heat in a continuous medium. If a u-bend grouted in a borehole is used to inject heat into the ground at a constant rate in order to determine the average formation thermal conductivity, the test must be run long enough to allow the finite dimensions of the u-bend pipes and the grout to become insignificant. Experience has shown that the amount of time required to allow early test time error and finite borehole dimension effects to become insignificant is approximately ten hours.

In order to analyze real data from a formation thermal conductivity test, the average temperature of the water entering and exiting the u-bend heat exchanger is plotted versus the natural log of time. Using the Method of Least Squares, the linear equation coefficients are then calculated that produce a line that fits the data. This procedure is normally repeated for various time intervals to ensure that variations in the power or other effects are not producing erroneous results.

Through the analysis process, the collected raw data is converted to spreadsheet format (Microsoft Excel®) for final analysis. A copy of this data can be obtained either in a hard copy or electronic copy format at any time. If desired, please contact Geothermal Resource Technologies, Inc. and provide a ship-to address or e-mail address at one of the following:

Phone: (605) 692-9069
Fax: (605) 692-2604
E-mail: gstreich@brookings.net

Formation Thermal Conductivity Test Report

Date	September 29 – October 1, 2007
Location	Rochester, NY
Undisturbed Soil Temperature	Approx. 53.5-54°F

Borehole Data – As Provided by Stantec

Borehole Diameter ..... 6 inches

Drill Log .....

Silty sand with clay and gravel	0'-54'
Soft shale with occasional sandstone interbeds	54'-400'

U-bend Size	1 1/4 inch HDPE
U-Bend Length	400 ft
Grout Type	Baroid Barotherm 1.0
Grout Solids	65.1%
Grouted Portion	Entire bore

Test Data

Test Duration	44.2 hrs.
Average Voltage	215.5 V
Average Power	5,036 W
Total Heat Input Rate	17,189 Btu/hr
Calculated Circulator Flow Rate	8.6 gpm

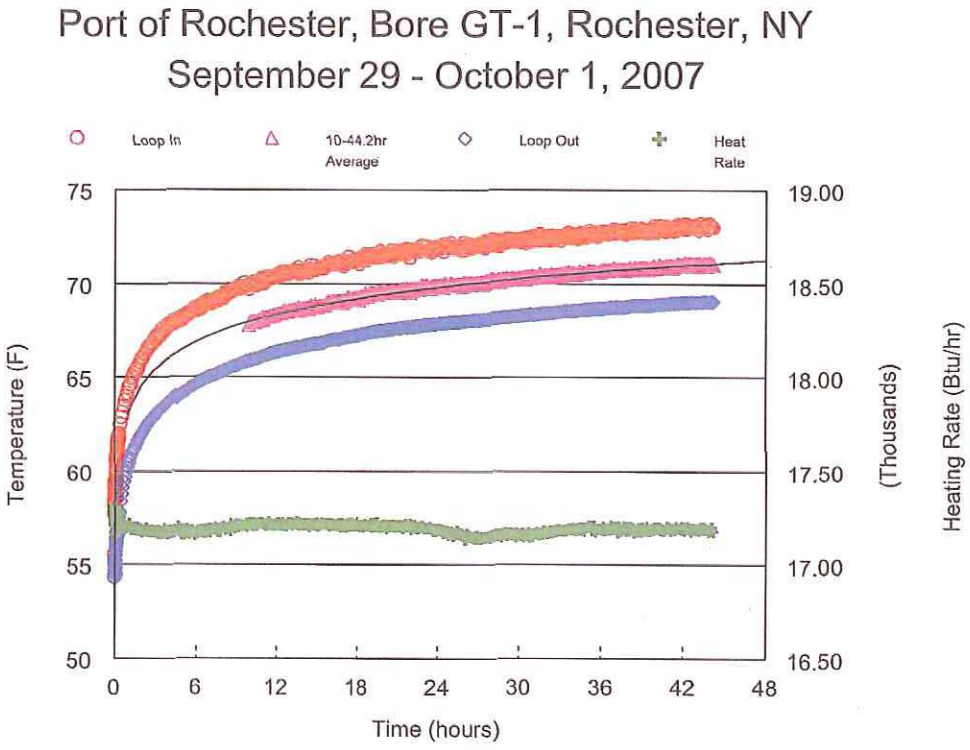

Figure 1: Temperature versus Time Data

Line Source Data Analysis

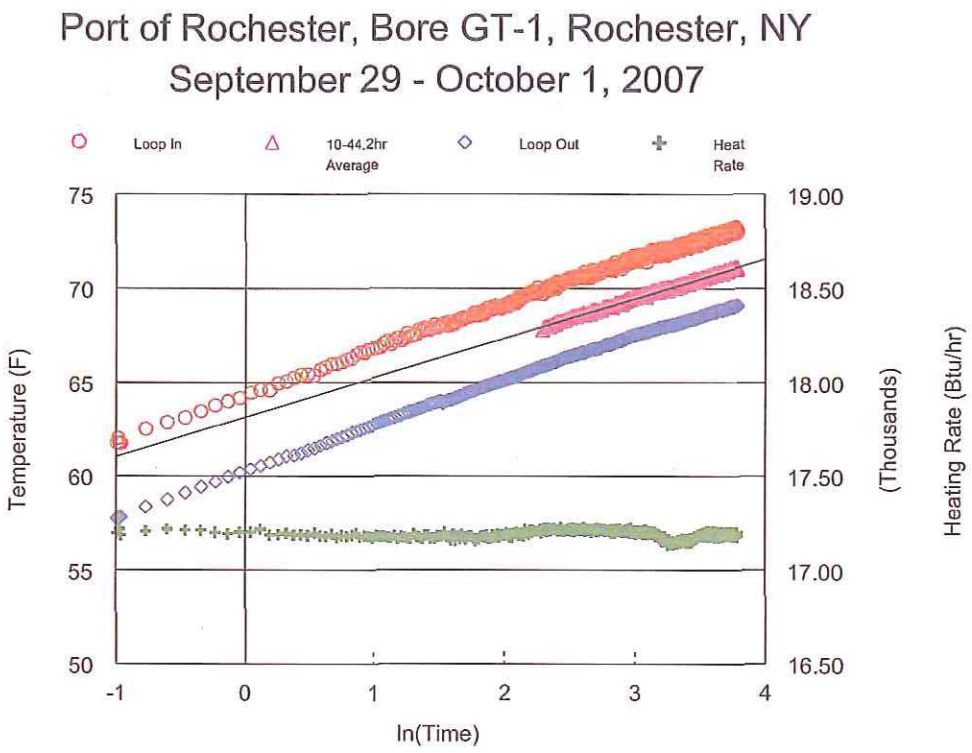

Figure 2: Temperature versus Natural Log of Time

Time Period	Slope: a_1	Average Heat Input (Btu/hr-ft)	(W/ft)	Thermal Conductivity (Btu/hr-ft-°F)
10 – 44.2 hrs	2.10	43.0	12.6	1.63

The temperature versus time data was analyzed using the line source analysis for the time period shown above. An average linear curve fit was applied to the data between 10 and 44.2 hours. The slope of the curve (a_1) was found to be 2.10. The resulting thermal conductivity was found to be 1.63 Btu/hr-ft-°F.

Estimated Thermal Diffusivity

The reported drilling log for this test borehole indicated that the formation consisted primarily of sand, shale and sandstone. A saturated moisture content was assumed for sand in order to calculate a heat capacity value. Heat capacity values for shale and sandstone were calculated from specific heat and density values listed by Kavanaugh and Rafferty (Ground-Source Heat Pumps - Design of Geothermal Systems for Commercial and Institutional Buildings, ASHRAE, 1997). A weighted average of heat capacity values based on the indicated formation was used to develop an average heat capacity for the formation. An estimated diffusivity value was then found using the calculated formation thermal conductivity and the estimated heat capacity. The thermal diffusivity for this formation was estimated to be 1.19 ft^2/day.

Est. Average Heat Capacity (Btu/ft^3 °F)	Thermal Conductivity (Btu/hr-ft-°F)	Est. Thermal Diffusivity (ft^2/day)
32.7	1.63	1.19

Frequently Asked Questions (FAQ's) Regarding FTC Testing

Q: Thermally-enhanced grout is specified for the final loop field design. The test bore was grouted with a low conductivity, 20% solids, bentonite grout. How do I adjust the thermal conductivity value to account for this?

A: While the conductivity of the grout is important for the loop field design, it is not important for determining formation thermal conductivity. We use the "line source" method to analyze data, which assumes an infinitely thin line rejecting heat at a constant rate into an infinite medium. The initial ten hours, which is influenced by the bore dimensions and grout conductivity, is ignored in the analysis. However, once the heat has penetrated into the formation, the temperature rise of the formation approaches steady-state. It is the slope of the temperature rise that is used in the analysis. Hence, no adjustment to the reported formation thermal conductivity is required.

Q: The software I use to design the loop field requires that I input a value for "soil conductivity". Is this the same as formation thermal conductivity?

A: Absolutely. Formation, soil, and ground are all used interchangeably to describe the conditions in which the u-bends will be installed. The use of the word "formation" simply implies that the installation conditions may be soil, rock, or some combination of the two.

Q: I've just received your report. I have a formation conductivity of 1.54 Btu/hr ft °F. How do I translate that into a loop length requirement, in terms of bore depth (in feet) per ton?

A: The formation thermal conductivity test provides values for three key parameters required for the ground loop design. These are the "Undisturbed Soil Temperature, Formation Thermal Conductivity, and Formation Thermal Diffusivity." These parameters, along with many others, are inputs to commercially available loop design software (e.g. GchpCalc, available at GeoKiss.com/software). The software uses all of the inputs to determine the required loop length in bore depth per ton.

Q: Is the "Undisturbed Soil Temperature" value listed in the report the temperature that I enter into my loop design software where it calls for the "Deep-Earth Temperature"?

A: Generally, yes. The "Undisturbed Soil Temperature" is the constant temperature of the formation. We attempt to determine this value by measuring the temperature of the water entering the test unit at the beginning of the test. However, the value we measure and report may be inaccurate if the test is initiated too quickly after the installation of the test bore, or if the testing operator failed to activate the data acquisition unit prior to energizing the heating elements. If you suspect the temperature we are reporting to be too high or too low, we recommend that you investigate further through other sources.

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Fax: (828) 281-4139

WEB SITE:
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FORMATION THERMAL CONDUCTIVITY TEST AND DATA ANALYSIS

Analysis for: **Stantec**
2250 Brighton-Henrietta Town Line Road
Rochester, NY 14623-2706
Phone: (585) 413-5635
Fax: (585) 424-5951

Test location: **Port of Rochester, Bore GT-2**
Rochester, NY

Report Date: October 8, 2007

Test Performed by: **Stantec**

Executive Summary

A formation thermal conductivity test was performed on Bore GT-2 at the Port of Rochester site in Rochester, New York. The vertical bore was completed on August 6, 2007 by Nothnagle Drilling, Inc. GRTI's test unit was attached to the vertical bore on the afternoon of October 1, 2007. Geothermal Resource Technologies, Inc. analyzed the collected data using the "line source" method.

This report provides a general overview of the test and procedures that were used to perform the thermal conductivity test along with a plot of the data in real time and in a form used to calculate the formation thermal conductivity. The following average formation thermal conductivity was found from the data analysis.

⇒ Formation Thermal Conductivity = 0.95 Btu/hr-ft-°F

Due to the necessity of a thermal diffusivity value in the design calculation process, an estimate of the average thermal diffusivity was made for the encountered formation.

⇒ Formation Thermal Diffusivity ≈ 0.61 ft^2/day

An estimate of the undisturbed soil temperature value was determined from the initial temperature data at startup.

⇒ Undisturbed Soil Temperature ≈ 54°F

A copy of the original collected data is available either in a hard copy or an electronic format upon request.

Test Procedures

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(3) Undisturbed Soil Temperature Measurement – The undisturbed soil temperature should be determined by recording the minimum loop temperature as the water returns from the u-bend at test startup.

(4) Installation Procedures for Test Loops – The bore diameter is to be no larger than 6 inches, with 4.5 inches being the target diameter. To ensure against bridging and voids, the bore annulus is to be uniformly grouted from the bottom to the top using a tremie pipe.

(5) Time Between Loop Installation and Testing – A minimum delay of five days between loop installation and test startup is recommended if the formation is expected to have a low thermal conductivity or if low conductivity grouts (< 0.75 Btu/hr·ft·°F) are used. A minimum delay of three days is recommended for all other conditions.

GRTI's testing procedures deviate slightly from those above with regard to item (5). While item (5) bases the delay between installation and testing on the expected formation conductivity, GRTI bases its delay on the type of drilling used in the installation. When air drilling is required, a five-day delay is recommended to allow the bore to return to its undisturbed temperature. For mud rotary drilling, a minimum waiting period of two days is sufficient.

For a complete list of recommended procedures, refer to the ASHRAE 2007 HVAC Applications handbook, pages 32.12-32.13.

Data Analysis

Geothermal Resource Technologies, Inc. uses the "line source" method of data analysis. The line source equation used is not valid for early test times. Also, the line source method assumes an infinitely thin line source of heat in a continuous medium. If a u-bend grouted in a borehole is used to inject heat into the ground at a constant rate in order to determine the average formation thermal conductivity, the test must be run long enough to allow the finite dimensions of the u-bend pipes and the grout to become insignificant. Experience has shown that the amount of time required to allow early test time error and finite borehole dimension effects to become insignificant is approximately ten hours.

In order to analyze real data from a formation thermal conductivity test, the average temperature of the water entering and exiting the u-bend heat exchanger is plotted versus the natural log of time. Using the Method of Least Squares, the linear equation coefficients are then calculated that produce a line that fits the data. This procedure is normally repeated for various time intervals to ensure that variations in the power or other effects are not producing erroneous results.

Through the analysis process, the collected raw data is converted to spreadsheet format (Microsoft Excel®) for final analysis. A copy of this data can be obtained either in a hard copy or electronic copy format at any time. If desired, please contact Geothermal Resource Technologies, Inc. and provide a ship-to address or e-mail address at one of the following:

Phone: (605) 692-9069
Fax: (605) 692-2604
E-mail: gstreich@brookings.net

Formation Thermal Conductivity Test Report

Date	October 1-3, 2007
Location	Rochester, NY
Undisturbed Soil Temperature	Approx. 54°F

Borehole Data – As Provided by Stantec

Borehole Diameter	4 1/4 inches	
Drill Log	Saturated river alluvium, silt with little clay and sand	0'-105'
U-bend Size	1 inch HDPE	
U-Bend Length	105 ft	
Grout Type	Bore allowed to collapse around loop	
Grout Solids	NA	

Note: Bore topped with 40 gallons of bentonite slurry.

Test Data

Test Duration	42 hrs.
Average Voltage	215.9 V
Average Power	2,604 W
Total Heat Input Rate	8,887 Btu/hr
Calculated Circulator Flow Rate	9.3 gpm

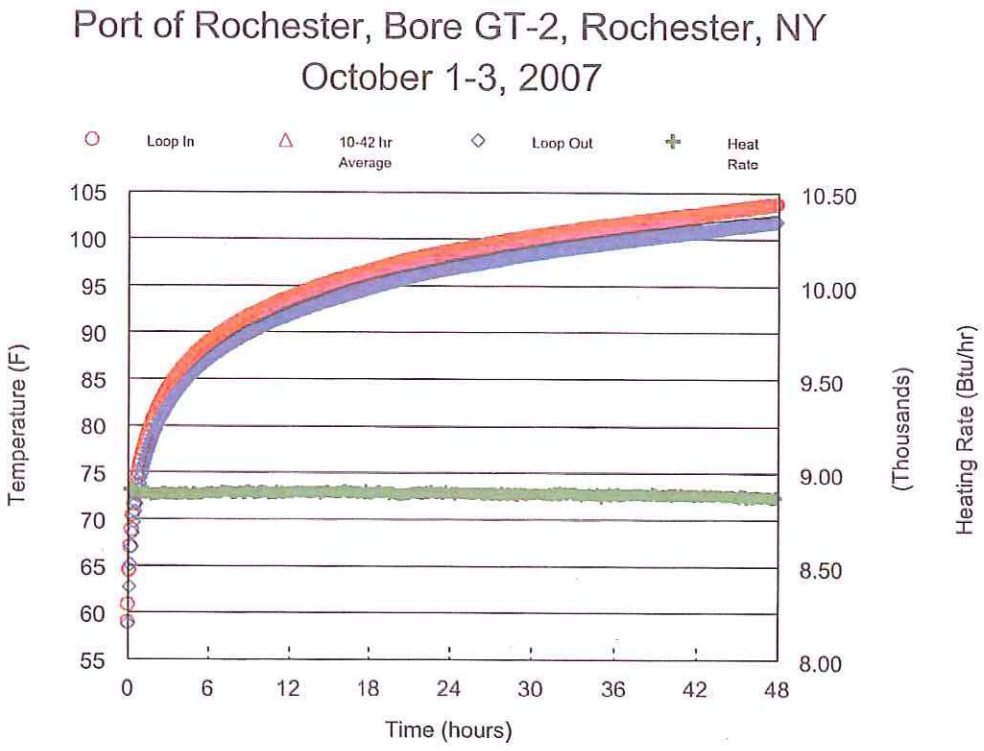


Figure 1: Temperature versus Time Data

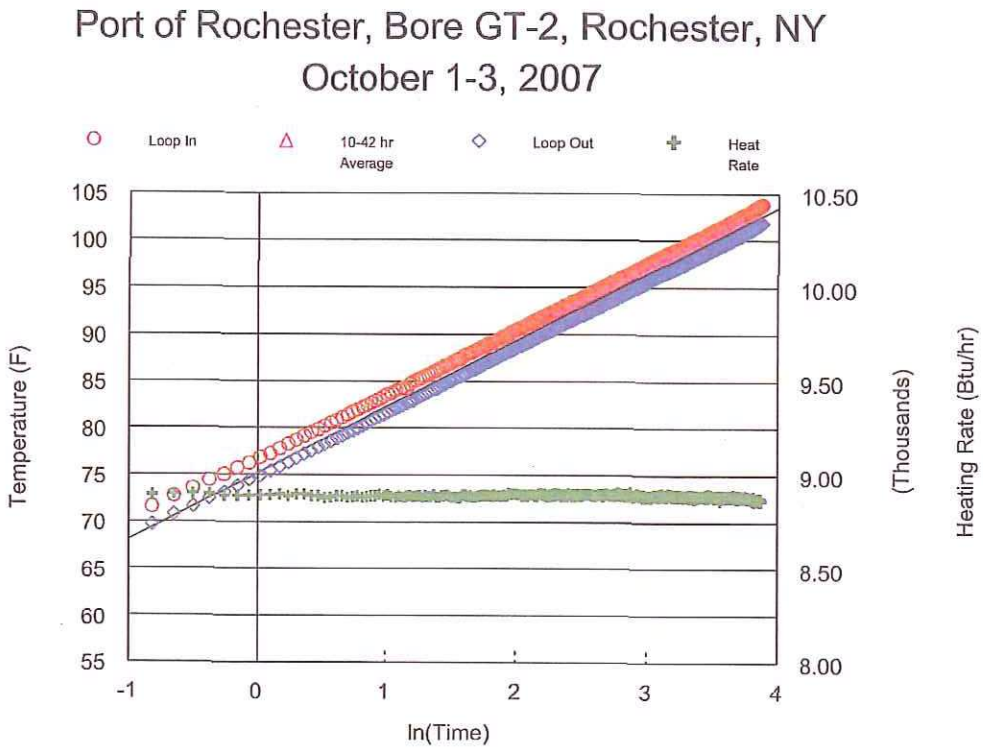


Figure 2: Temperature versus Natural Log of Time

Time Period	Slope: a_1	Average Heat Input (Btu/hr-ft)	(W/ft)	Thermal Conductivity (Btu/hr-ft-°F)
10 – 42 hrs	7.09	84.6	24.8	0.95

The temperature *versus time data was analyzed* using the line source analysis for the time period shown above. An average linear curve fit was applied to the data between 10 and 42 hours. The slope of the curve (a_1) was found to be 7.09. The resulting thermal conductivity was found to be 0.95 Btu/hr-ft-°F.

Estimated Thermal Diffusivity

The reported drilling log for this test borehole indicated that the formation consisted of saturated river alluvium. An estimated diffusivity value was found using the calculated formation thermal conductivity and the estimated heat capacity. The thermal diffusivity for this formation was estimated to be 0.61 ft^2/day.

Est. Average Heat Capacity (Btu/ft^3 °F)	Thermal Conductivity (Btu/hr-ft-°F)	Est. Thermal Diffusivity (ft^2/day)
37.4	0.95	0.61

Frequently Asked Questions (FAQ's) Regarding FTC Testing

Q: Thermally-enhanced grout is specified for the final loop field design. The test bore was grouted with a low conductivity, 20% solids, bentonite grout. How do I adjust the thermal conductivity value to account for this?

A: While the conductivity of the grout is important for the loop field design, it is not important for determining formation thermal conductivity. We use the "line source" method to analyze data, which assumes an infinitely thin line rejecting heat at a constant rate into an infinite medium. The initial ten hours, which is influenced by the bore dimensions and grout conductivity, is ignored in the analysis. However, once the heat has penetrated into the formation, the temperature rise of the formation approaches steady-state. It is the slope of the temperature rise that is used in the analysis. Hence, no adjustment to the reported formation thermal conductivity is required.

Q: The software I use to design the loop field requires that I input a value for "soil conductivity". Is this the same as formation thermal conductivity?

A: Absolutely. Formation, soil, and ground are all used interchangeably to describe the conditions in which the u-bends will be installed. The use of the word "formation" simply implies that the installation conditions may be soil, rock, or some combination of the two.

Q: I've just received your report. I have a formation conductivity of 1.54 Btu/hr ft °F. How do I translate that into a loop length requirement, in terms of bore depth (in feet) per ton?

A: The formation thermal conductivity test provides values for three key parameters required for the ground loop design. These are the "Undisturbed Soil Temperature, Formation Thermal Conductivity, and Formation Thermal Diffusivity." These parameters, along with many others, are inputs to commercially available loop design software (e.g. GchpCalc, available at GeoKiss.com/software). The software uses all of the inputs to determine the required loop length in bore depth per ton.

Q: Is the "Undisturbed Soil Temperature" value listed in the report the temperature that I enter into my loop design software where it calls for the "Deep-Earth Temperature"?

A: Generally, yes. The "Undisturbed Soil Temperature" is the constant temperature of the formation. We attempt to determine this value by measuring the temperature of the water entering the test unit at the beginning of the test. However, the value we measure and report may be inaccurate if the test is initiated too quickly after the installation of the test bore, or if the testing operator failed to activate the data acquisition unit prior to energizing the heating elements. If you suspect the temperature we are reporting to be too high or too low, we recommend that you investigate further through other sources.

LABELLA
LaBella Associates, P.C.
300 State Street
Rochester, New York 14614

Appendix 3

Geophysical Survey Report

Geomatrix

August 21, 2008

Dennis Porter
LaBella Associates, P.C.
300 State Street, Suite 201
Rochester, NY 14614

Transmitted via email to Porter, Dennis [DPorter@Labellapc.com]

Dear Mr. Porter:

Subject: Geophysical Survey Results, Port of Rochester, Rochester, NY

1.0 INTRODUCTION

This letter report presents the results of the geophysical investigation performed for LaBella Associates, P.C. in support of their environmental investigation of a portion of the Port of Rochester in Rochester, NY (the Site). The approximately 4 acre investigation area is bounded by Lake Avenue to the west and Portside Drive and Corrigan St to the south and north, respectively. The eastern portion of the site is a parking area with the western portion slightly elevated and predominantly grass covered. A second parking lot is located in the southwestern portion of the site.

The geophysical investigation was designed to geophysically characterize the subsurface and focus a follow-up intrusive investigation. The information provided herein is intended to assist LaBella with their assessment of potential environmental concerns at the Site. The objective for the geophysical survey was to identify historical site features (buried foundations, utilities, etc) and if possible define the aerial limits of the fill zones at the site. The whole Port of Rochester was once used as a former Foundry and there are significant slag-wastes buried throughout the site. Geomatrix used time domain geophysical tools (EM61) to characterize the property. Geomatrix Consultants, Inc. (Geomatrix) performed data acquisition on August 7, 2008.

2.0 METHODOLOGY

A reference grid was installed to facilitate data acquisition along lines spaced five feet apart. The grid was marked with orange and white spray paint. Grid coordinate 0N,0E was established at the southwest corner of the survey area. Grid North was taken as the direction parallel to the curb line of Lake Avenue.

The site was geophysically surveyed using the Geonics EM61. The EM61 unit is a high sensitivity, high resolution time domain electromagnetic (TDEM) metal detector that can detect both ferrous and nonferrous metallic objects. It has an approximate investigation depth of 10

feet. The processing console is contained in a backpack worn by the operator which is interfaced to a digital data logger. The transmitter and two receiver coils are located on a two-wheeled cart that is pulled by the operator.

The device's transmitter coil generates a pulsed primary EM field at a rate of 150 pulses per second, inducing eddy currents into the subsurface. The decay rates of these eddy currents are measured by two, 3.28 foot by 1.64 foot (1 meter by ½ meter) rectangular receiver coils. By taking the measurements at a relatively long time frame after termination of the primary pulse, the response is practically independent of the survey area's terrain conductivity. Specifically, the decay rates of the eddy currents are much longer for metals than for normal soils allowing the discrimination of the two.

EM61 in use (photo not from this site)

Data are collected from the EM61's two receiver coils. One of the receiver coils is located coincident to the transmitter coil. The other receiver coil is located 1.31 feet (0.4 meters) above the transmitter coil. Data from the top receiver coil are stored on Channel 1 of a digital data logger. Data from the bottom receiver coil are stored on Channel 2 of the data logger. Channel 1 and Channel 2 data are simultaneously recorded at each station location. The instrument responses are recorded in units of milliVolts (mV). Data were recorded digitally by a data logger at a rate of approximately 2 measurements per foot along the survey lines which were spaced 5 feet apart.

3.0 RESULTS

The following sections present the results from the geophysical investigation.

The EM61 data for the site are shown in Figure 1. The color bar to the right of the map indicates the colors associated with the respective measured values. Areas suspected to be free of buried metals are shown as color shades of blue. All areas exhibiting a response greater than background (0 to 15 mVolts) likely contain buried metals. These areas are depicted in shades of dark blue through yellow on the figure.

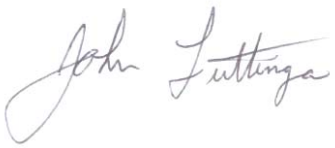
Any of the above background responses (EM61) and anomalous conductivity and inphase responses (EM31) may be significant from an environmental perspective. Buried remnants of building foundations usually express themselves in these data sets as rectilinear anomalies. There are no clear anomalies suggestive of building foundations. It is reported that portions of the site contain slag type material. The EM data indeed suggests variability in fill type. Often slag type fill has a high enough metal content to cause small EM61 anomalies. A purple line is drawn on the figure APPROXIMATELY delineating an EM response from what may be slag free (or at least metallic slag free) fill from potentially slag type fill. On one side of this line, the EM response is, with few exceptions, essentially zero. On the other side of the purple line the response exhibits broad regions of low to moderate amplitude response. This may be indicative of a change in fill type however correlation with intrusive test pit or boring data would be necessary to confirm.

4.0 LIMITATIONS

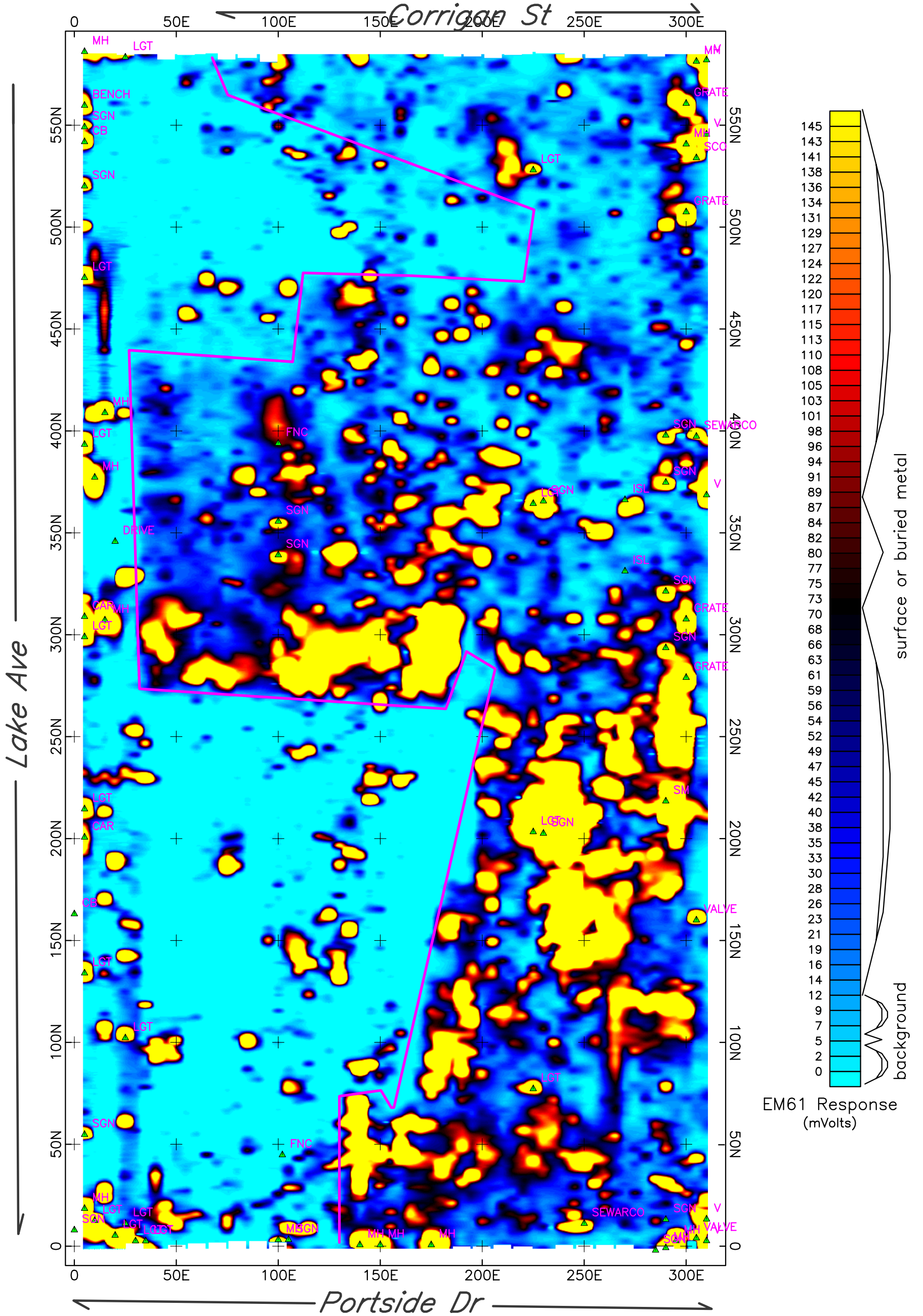
The geophysical methods used during this survey are established, indirect techniques for non-destructive subsurface reconnaissance exploration. As these instruments utilize indirect methods, they are subject to inherent limitations and ambiguities. Metallic surface features (electrical wires, scrap metal, etc.) preclude reliable non-invasive data/results beneath, and in the immediate vicinity of, the surface features. Targets such as buried drums, buried tanks, conduits, etc. are detectable only if they produce recognizable anomalies or patterns against the background geophysical data collected. As with any remote sensing technique, the anomalies identified during a geophysical survey should be further investigated by other techniques such as historical aerial photography, test pit excavation and/or test boring, if warranted.

Please do not hesitate to contact us if you have any questions or require additional information.

Sincerely yours,
AMEC GEOMATRIX, INC.



John Luttinger
Senior Geophysicist



Grid North

Approximate response boundary

25 0 25 50
(feet)

Figure 1

Geophysical Survey Results
Color Contours of EM61 Data
(mVolts)

Port of Rochester
Rochester, NY
Labella

AMEC Geomatrix (716) 565-0624

Appendix 4

Field Logs

LABELLA Associates, P.C. 300 STATE STREET, ROCHESTER, NEW YORK ENVIRONMENTAL ENGINEERING CONSULTANTS	Phase II Environmental Site Assessment Port of Rochester Rochester, New York	BORING **B08-1** SHEET 1 of 2 JOB # 208453 CHKD. BY: ED

CONTRACTOR: Target Drilling — BORING LOCATION
DRILLER Ben Saragusa — GROUND SURFACE ELEVATION — DATUM
LABELLA REPRESENTATIVE E. Dumrese — START DATE 10/24/2008 — END DATE 10/24/2008

TYPE OF DRILL RIG: Rotary Drill Rig
AUGER SIZE AND TYPE 4.25-Inch ID
OVERBURDEN SAMPLING METHOD Split Spoon
ROCK DRILLING METHOD N/A

WATER LEVEL DATA				
DATE	TIME	WATER	CASING	REMARKS

DEPTH	SAMPLE BLOWS / 6"	SAMPLE NO.	SAMPLE DEPTH (FT.)	SAMPLE N-VALUE /RQD(%)	SAMPLE RECOVERY (FEET)	DEPTH (Feet)	SAMPLE DESCRIPTION	PID READINGS	NOTES
1	0	S-1	0.0-2.0	N/A		0.0'	Topsoil	0.0	
	0						**NATIVE MATERIAL**		
	1					0.4'	Brown, SILT and m SAND, moist, No odor		
2	6								
3	9	S-2	2.0-4.0	29		2.0'	As above	0.0	
	11								
	18								
4	30								
5	19	S-3	4.0-6.0	54		4.0'	Light brown, SILT, some f Sand, some iron staining, moist, No odor	0.0	
	24								
	30								
6	33								
7	25	S-4	6.0-8.0	49		6.0'	Light brown, SILT, little m Sand, mosit, No odor	0.0	
	24								
	25								
8	26								
9	11	S-5	8.0-10.0	29		8.0'	Grey to pink, SILT, little m Sand, trace Clay, moist, No odor	0.0	
	15								
	14								
10	19								
11	NA	S-6	10.0-12.0	N/A		10.0'	As above, moist, No odor	0.0	
	NA								
	NA								
12	NA								
13	12	S-7	12.0-14.0	25		12.0'	As Above, moist, No odor	0.0	
	13								
	12					13.6'	Grey, SILT, trace f Sand and Clay, moist, No odor		
14									
15	9	S-8	14.0-16.0	70/9		14.0'	As above, moist, No odor	0.0	
	20								
	50/3								
16									

LEGEND
S - SPLIT SPOON SOIL SAMPLE
U - UNDISTURBED SOIL SAMPLE
C - ROCK CORE SAMPLE

NOTES:
Bottom of Boring = ~33.9' BGS
Groundwater Encountered @ ~24.0' BGS

GENERAL NOTES:
1) STRATIFICATION LINES REPRESENT APPROXIMATE BOUNDARY BETWEEN SOIL TYPES, TRANSITIONS MAY BE GRADUAL.
2) WATER LEVEL READINGS HAVE BEEN MADE AT TIMES AND UNDER CONDITIONS STATED, FLUCTUATIONS OF GROUNDWATER MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS WERE MADE.

LABELLA Associates, P.C. 300 STATE STREET, ROCHESTER, NEW YORK ENVIRONMENTAL ENGINEERING CONSULTANTS	Phase II Environmental Site Assessment Port of Rochester Rochester, New York	BORING **B08-1** SHEET 2 of 2 JOB # 208453 CHKD. BY: ED

CONTRACTOR: Target Drilling
DRILLER Ben Saragusa
LABELLA REPRESENTATIVE E. Dumrese
BORING LOCATION
GROUND SURFACE ELEVATION DATUM
START DATE 10/24/2008 END DATE 10/24/2008

TYPE OF DRILL RIG: Rotary Drill Rig
AUGER SIZE AND TYPE 4.25-Inch ID
OVERBURDEN SAMPLING METHOD Split Spoon
ROCK DRILLING METHOD N/A

WATER LEVEL DATA				
DATE	TIME	WATER	CASING	REMARKS

DEPTH	SAMPLE BLOWS / 6"	SAMPLE NO.	SAMPLE DEPTH (FT.)	SAMPLE N-VALUE /RQD(%)	SAMPLE RECOVERY (FEET)	DEPTH (Feet)	SAMPLE DESCRIPTION	PID READINGS	NOTES
17						16.0'	As above	0.0	
18									
19	9 20 50/3	S-9	18.0-20.0	70/9		18.6'	**GLACIAL TILL** Brown, SILT, little f to vf Sand, trace Clay, moist, No odor (Native Till)	0.0	
20						20.0'	As above	0.0	
21									
22						22.0'	As above	0.0	
23									
24						24.0'	Brown, SILT and mc SAND, saturated, No odor	0.0	
25	50/3	S-10	N/A	N/A					
26						26.0'	As above	0.0	
27									
28						28.0'	Grey, SILT, little mf Sand, moist, No odor	0.0	
29	50/3	S-11	N/A	N/A					
30						30.0'	As above	0.0	
31		S-12	N/A	N/A					
32	55/3					32.0'	As above, No odor		

LEGEND
S - SPLIT SPOON SOIL SAMPLE
U - UNDISTURBED SOIL SAMPLE
C - ROCK CORE SAMPLE

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LABELLA Associates, P.C. 300 STATE STREET, ROCHESTER, NEW YORK ENVIRONMENTAL ENGINEERING CONSULTANTS	Phase II Environmental Site Assessment Port of Rochester Rochester, New York	BORING **B08-2/MW-1** SHEET 1 of 3 JOB # 208453 CHKD. BY: ED

CONTRACTOR: Target Drilling — BORING LOCATION
DRILLER Ben Saragusa — GROUND SURFACE ELEVATION — DATUM
LABELLA REPRESENTATIVE E. Dumrese — START DATE 10/24/2008 — END DATE 10/24/2008

TYPE OF DRILL RIG: Rotary Drill Rig
AUGER SIZE AND TYPE 4.25-Inch ID
OVERBURDEN SAMPLING METHOD Split Spoon
ROCK DRILLING METHOD N/A

WATER LEVEL DATA

DATE	TIME	WATER	CASING	REMARKS
10/24/2008	930	~18.0' BGS		

DEPTH	SAMPLE BLOWS / 6"	SAMPLE NO.	SAMPLE DEPTH (FT.)	SAMPLE N-VALUE /RQD(%)	SAMPLE RECOVERY (FEET)	DEPTH (Feet)	SAMPLE DESCRIPTION	PID READINGS	NOTES
1	7, 6, 33, 24	S-1	0.0-2.0	39		0.0'	Topsoil - Brown, mf SAND and SILT, moist, No odor	0.0	
2							**FILL MATERIAL**		
						1.8'	Blue slag, sulfur odor		
3	15, 16, 16, 14	S-2	2.0-4.0	33		2.0'	Reddish to brown, SILT, some mf Sand, little Gravel, moist, slight sulfur odor some blue slag	0.0	
4									
5	23, 20, 20, 13	S-3	4.0-6.0	40		4.0'	Blue slag, sulfur odor	0.0	
6									
7	9, 10, 4, 5	S-4	6.0-8.0	19		6.0'	Brown, SILT, little mf Sand and Gravel, moist, slight sulfur odor	0.0	
						6.2'	Blue slag, slight sulfur odor		
8									
9	6, 5, 10, 8	S-5	8.0-10.0	15		8.0'	As above, wet @ ~8.5' BGS	0.0	
10									
11						10.0'	As above	0.0	
12									
13	3, 1, 2	S-6	13.6-15.0	3		12.0'	As above	0.0	
							NATIVE MATERIAL		
						13.6'	Dark brown, organic peat layer, strong organic odor	0.2	
14									
15						15.0'	As above, saturated @ ~15.0' BGS	0.0	
16									

LEGEND
S - SPLIT SPOON SOIL SAMPLE
U - UNDISTURBED SOIL SAMPLE
C - ROCK CORE SAMPLE

NOTES:
Bottom of Boring = ~40.5 BGS
Groundwater Encountered @ ~8.5' BGS
Monitoring well MW-1 installed to a total depth of ~33.0' BGS with 10' screen from ~ 23' BGS to 13' BGS

GENERAL NOTES:
1) STRATIFICATION LINES REPRESENT APPROXIMATE BOUNDARY BETWEEN SOIL TYPES, TRANSITIONS MAY BE GRADUAL.
2) WATER LEVEL READINGS HAVE BEEN MADE AT TIMES AND UNDER CONDITIONS STATED, FLUCTUATIONS OF GROUNDWATER MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS WERE MADE.

LABELLA Associates, P.C. 300 STATE STREET, ROCHESTER, NEW YORK ENVIRONMENTAL ENGINEERING CONSULTANTS	Phase II Environmental Site Assessment Port of Rochester Rochester, New York	BORING **B08-2/MW-1** SHEET 2 of 3 JOB # 208453 CHKD. BY: ED

CONTRACTOR: Target Drilling
DRILLER Ben Saragusa
LABELLA REPRESENTATIVE E. Dumrese
BORING LOCATION
GROUND SURFACE ELEVATION DATUM
START DATE 10/24/2008 END DATE 10/24/2008

TYPE OF DRILL RIG: Rotary Drill Rig
AUGER SIZE AND TYPE 4.25-Inch ID
OVERBURDEN SAMPLING METHOD Split Spoon
ROCK DRILLING METHOD N/A

WATER LEVEL DATA

DATE	TIME	WATER	CASING	REMARKS
10/24/2008	930	~18.0' BGS		

DEPTH	SAMPLE BLOWS / 6"	SAMPLE NO.	SAMPLE DEPTH (FT.)	SAMPLE N-VALUE /RQD(%)	SAMPLE RECOVERY (FEET)	DEPTH (Feet)	SAMPLE DESCRIPTION	PID READINGS	NOTES
17						16.0'	As above	0.0	
18	2								
19	3	S-7	18.6-20.0	7		18.6'	Brown to black, mc SAND and GRAVEL, saturated, organic matter and slight odor	0.2	
20	4								
21						20.0'	As above	0.0	
22									
23	2	S-8	23.6-25.0	14		22.0'	As above	0.0	
24	9 5 7					23.6'	Grey to black, SILT, little Clay and Gravel, saturated, No odor	0.1	
25						24.0'	As above	0.0	
26									
27	13	S-9	27.4-29.0	38		26.0'	As above **GLACIAL TILL**	0.0	
28	11 22					27.4'	Light brown, SILT, little mf Sand, moist to wet, No odor (Native Till)		
29						28.0'	As above	0.0	
30									
31						30.0'	As above	0.0	
32									

LEGEND
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U - UNDISTURBED SOIL SAMPLE
C - ROCK CORE SAMPLE

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LABELLA Associates, P.C. 300 STATE STREET, ROCHESTER, NEW YORK ENVIRONMENTAL ENGINEERING CONSULTANTS	Phase II Environmental Site Assessment Port of Rochester Rochester, New York	BORING **B08-2/MW-1** SHEET 3 of 3 JOB # 208453 CHKD. BY: ED

CONTRACTOR: Target Drilling
DRILLER Ben Saragusa
LABELLA REPRESENTATIVE E. Dumrese
BORING LOCATION
GROUND SURFACE ELEVATION DATUM
START DATE 10/24/2008 END DATE 10/24/2008

TYPE OF DRILL RIG: Rotary Drill Rig
AUGER SIZE AND TYPE 4.25-Inch ID
OVERBURDEN SAMPLING METHOD Split Spoon
ROCK DRILLING METHOD N/A

WATER LEVEL DATA

DATE	TIME	WATER	CASING	REMARKS
10/24/2008	930	~18.0' BGS		

DEPTH	SAMPLE BLOWS / 6"	SAMPLE NO.	SAMPLE DEPTH (FT.)	SAMPLE N-VALUE /RQD(%)	SAMPLE RECOVERY (FEET)	DEPTH (Feet)	SAMPLE DESCRIPTION	PID READINGS	NOTES
33	24	S-10	33.6-35.0	80		33.6'	Light brown, SILT, little f Sand, trace Gravel, moist, No odor	0.0	
34	36					34.0'	As above	0.0	
35									
36						36.0'	As above	0.0	
37									
38						38.0'	As above	0.0	
39									
40						40.0'	As above	0.0	
41						41.0'	*Bottom @ ~40.5' BGS*		
42									
43									
44									
45									
46									
47									
48									

LEGEND

S - SPLIT SPOON SOIL SAMPLE
U - UNDISTURBED SOIL SAMPLE
C - ROCK CORE SAMPLE

NOTES:

Bottom of Boring = ~40.5 BGS
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Monitoring well MW-1 installed to a total depth of ~33.0' BGS with 10' screen from ~ 23' BGS to 13' BGS

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LBA

BORING # **B08-2**

LABELLA Associates, P.C. 300 STATE STREET, ROCHESTER, NEW YORK ENVIRONMENTAL ENGINEERING CONSULTANTS	Phase II Environmental Site Assessment Port of Rochester Rochester, New York	BORING B08-3 SHEET 1 of 3 JOB # 208453 CHKD. BY: ED

CONTRACTOR:	Target Drilling	BORING LOCATION	
DRILLER	Ben Saragusa	GROUND SURFACE ELEVATION	DATUM
LABELLA REPRESENTATIVE	E. Dumrese	START DATE 10/23/2008	END DATE 10/23/2008

TYPE OF DRILL RIG:	Rotary Drill Rig
AUGER SIZE AND TYPE	4.25-Inch ID
OVERBURDEN SAMPLING METHOD	Split Spoon
ROCK DRILLING METHOD	N/A

WATER LEVEL DATA				
DATE	TIME	WATER	CASING	REMARKS

DEPTH	SAMPLE BLOWS / 6"	SAMPLE NO.	SAMPLE DEPTH (FT.)	SAMPLE N-VALUE /RQD(%)	SAMPLE RECOVERY (FEET)	DEPTH (Feet)	SAMPLE DESCRIPTION	PID READINGS	NOTES
1	4 14 15	S-1	0.0-2.0	29		0.0'	Dark brown, SILT, some mf Sand and Gravel, moist, no odor	0.0	
							FILL MATERIAL		
						1.0'	Large pieces of Gravel (i.e., ~1.0" in diameter)	0.0	
2	7					1.3'	Brown, SILT, little f Sand, moist, no odor		
3	10 14	S-2	2.0-4.0	24		2.0'	Dark brown, SILT and c SAND, some fill materials (cinders and coals), moist, no odor	0.0	
4	10 12							0.0	
5	6 5	S-3	4.0-6.0	10		4.0'	As above, moist, no odor	0.0	
						4.5'	Light brown to grey, SILT, some mf Sand, moist, no odor		
6	5 4							0.0	
7	6 8	S-4	6.0-8.0	17		6.0'	Blue slag (sulfur odor), some brown Silt, litle mf Sand, moist, no odor	0.0	
8	9 17							0.0	
9	30 35	S-5	8.0-10.0	68		8.0'	Dark brown, SILT, little mf Sand, moist, no odor, blue slag (sulfur odor)	0.0	
10	25 27							0.0	
11	20 23	S-6	10.0-12.0	32		10.0'	Light brown, SILT, trace Clay, blue slag, wet @ ~9.8' BGS, no odor	0.0	
12	9							0.0	
13						12.0'	As above	0.0	
							NATIVE MATERIAL		
						13.6	Light brown, SAND, some mf Sand, moist, no odor	0.0	
14						14.0'	As above	0.0	
15									
16								0.0	

LEGEND

S - SPLIT SPOON SOIL SAMPLE
U - UNDISTURBED SOIL SAMPLE
C - ROCK CORE SAMPLE

NOTES:

Bottom of Boring = ~40.4 BGS
Groundwater Encountered @ ~9.0' BGS

GENERAL NOTES:

1) STRATIFICATION LINES REPRESENT APPROXIMATE BOUNDARY BETWEEN SOIL TYPES, TRANSITIONS MAY BE GRADUAL.
2) WATER LEVEL READINGS HAVE BEEN MADE AT TIMES AND UNDER CONDITIONS STATED, FLUCTUATIONS OF GROUNDWATER MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS WERE MADE.

LABELLA Associates, P.C. 300 STATE STREET, ROCHESTER, NEW YORK ENVIRONMENTAL ENGINEERING CONSULTANTS	Phase II Environmental Site Assessment Port of Rochester Rochester, New York	BORING B08-3 SHEET 2 of 3 JOB # 208453 CHKD. BY: ED

CONTRACTOR: Target Drilling
DRILLER Ben Saragusa
LABELLA REPRESENTATIVE E. Dumrese
BORING LOCATION
GROUND SURFACE ELEVATION DATUM
START DATE 10/23/2008 END DATE 10/23/2008

TYPE OF DRILL RIG: Rotary Drill Rig
AUGER SIZE AND TYPE 4.25-Inch ID
OVERBURDEN SAMPLING METHOD Split Spoon
ROCK DRILLING METHOD N/A

WATER LEVEL DATA

DATE	TIME	WATER	CASING	REMARKS

DEPTH	SAMPLE BLOWS / 6"	SAMPLE NO.	SAMPLE DEPTH (FT.)	SAMPLE N-VALUE /RQD(%)	SAMPLE RECOVERY (FEET)	DEPTH (Feet)	SAMPLE DESCRIPTION	PID READINGS	NOTES
16						16.0'	As above	0.0	
17								0.0	
18									
19	2 3 5	S-7	18.0-20.0'	8		18.0'	Black, organic peat layer, some organic odors	0.0	
						19.0'	Grey, SILT, trace f Sand, moist, no odor	0.0	
20						20.0'	As above	0.0	
21								0.0	
22									
23		S-8	23.0-25.0'	77		22.0'	As above	0.0	
	19					23.6'	Light brown, SILT and m SAND, wet, no odor	0.0	
24	27						**GLACIAL TILL**		
25						24.0'	As above	0.0	
26								0.0	
27						26.0'	As above	0.0	
28								0.0	
29	26 52	S-9	28.0-30.0'	78		28.6'	Light brown, SILT and m SAND, wet, no odor	0.0	
30						30.0'	As above	0.0	
31								0.0	
32									

LEGEND
S - SPLIT SPOON SOIL SAMPLE
U - UNDISTURBED SOIL SAMPLE
C - ROCK CORE SAMPLE

NOTES:
Bottom of Boring = ~40.4 BGS
Groundwater Encountered @ ~9.0' BGS

GENERAL NOTES:
1) STRATIFICATION LINES REPRESENT APPROXIMATE BOUNDARY BETWEEN SOIL TYPES, TRANSITIONS MAY BE GRADUAL.
2) WATER LEVEL READINGS HAVE BEEN MADE AT TIMES AND UNDER CONDITIONS STATED, FLUCTUATIONS OF GROUNDWATER MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS WERE MADE.

LABELLA Associates, P.C. 300 STATE STREET, ROCHESTER, NEW YORK ENVIRONMENTAL ENGINEERING CONSULTANTS	Phase II Environmental Site Assessment Port of Rochester Rochester, New York	BORING **B08-3** SHEET 3 of 3 JOB # 208453 CHKD. BY: ED

CONTRACTOR: Target Drilling
DRILLER Ben Saragusa
LABELLA REPRESENTATIVE E. Dumrese
BORING LOCATION
GROUND SURFACE ELEVATION DATUM
START DATE 10/23/2008 END DATE 10/23/2008

TYPE OF DRILL RIG: Rotary Drill Rig
AUGER SIZE AND TYPE 4.25-Inch ID
OVERBURDEN SAMPLING METHOD Split Spoon
ROCK DRILLING METHOD N/A

WATER LEVEL DATA

DATE	TIME	WATER	CASING	REMARKS

DEPTH	SAMPLE BLOWS / 6"	SAMPLE NO.	SAMPLE DEPTH (FT.)	SAMPLE N-VALUE /RQD(%)	SAMPLE RECOVERY (FEET)	DEPTH (Feet)	SAMPLE DESCRIPTION	PID READINGS	NOTES
33	46	S-10	33.6-35.0'	80		33.6'	Grey, mc SAND, saturated, no odor	0.0	
34	50/4					34.0'	As above	0.0	
35									
36						36.0'	As above	0.0	
37									
38						38.0'	As above	0.0	
39									
40						40.0'	As above	0.0	
41							*Bottom @ ~40.' BGS*		
42									
43									
44									
45									
46									
47									
48									

LEGEND

S - SPLIT SPOON SOIL SAMPLE
U - UNDISTURBED SOIL SAMPLE
C - ROCK CORE SAMPLE

NOTES:

Bottom of Boring = ~40.4 BGS
Groundwater Encountered @ ~9.0' BGS

GENERAL NOTES:

1) STRATIFICATION LINES REPRESENT APPROXIMATE BOUNDARY BETWEEN SOIL TYPES, TRANSITIONS MAY BE GRADUAL.
2) WATER LEVEL READINGS HAVE BEEN MADE AT TIMES AND UNDER CONDITIONS STATED, FLUCTUATIONS OF GROUNDWATER MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS WERE MADE.

LABELLA Associates, P.C. 300 STATE STREET, ROCHESTER, NEW YORK ENVIRONMENTAL ENGINEERING CONSULTANTS	Phase II Environmental Site Assessment Port of Rochester Rochester, New York	BORING B08-4 SHEET 1 of 2 JOB # 208453 CHKD. BY: ED

CONTRACTOR: Target Drilling — BORING LOCATION
DRILLER Ben Saragusa — GROUND SURFACE ELEVATION — DATUM
LABELLA REPRESENTATIVE E. Dumrese — START DATE 10/24/2008 — END DATE 10/24/2008

TYPE OF DRILL RIG: Rotary Drill Rig
AUGER SIZE AND TYPE 4.25-Inch ID
OVERBURDEN SAMPLING METHOD Split Spoon
ROCK DRILLING METHOD N/A

WATER LEVEL DATA

DATE	TIME	WATER	CASING	REMARKS

DEPTH	SAMPLE BLOWS / 6"	NO.	DEPTH (FT.)	N-VALUE /RQD(%)	RECOVERY (FEET)	DEPTH (Feet)	SAMPLE DESCRIPTION	PID READINGS	NOTES
1				N/A		0.0'	Asphalt **FILL MATERIAL**	0.0	
						0.2'	Crushed stone		
						1.0'	Topsoil		
2								0.0	
3						2.0'	Spoon bouncing-augering through obstruction	0.0	
4								0.0	
5	2	S-2	4.0-6.0'	4		4.0'	Light brown, SILT, little vf Sand, trace Clay, moist, some blue slag, slight sulfur	0.0	
	2								
	3								
6	4						**NATIVE MATERIAL**	0.0	
7	2	S-3	6.0-8.0'	6		6.0'	Light brown, SILT, trace vf Sand, moist, no odor	0.0	
	2								
	2								
8	2							0.0	
9	2	S-4	8.0-10.0'	6		8.0'	Light brown, SILT, little Clay, trace vf Sand (some iron staining)	0.0	
	2								
	3								
10	4							0.0	
11	14	S-5	10.0-12.0'	45		10.0'	As above	0.0	
	19								
	20								
12								0.0	
13						13.5'	Brown, SILT, and m SAND, some assorted Gravel, wet, no odor	0.0	
14						14.0'	As above	0.0	
15									
16								0.0	

LEGEND
S - SPLIT SPOON SOIL SAMPLE
U - UNDISTURBED SOIL SAMPLE
C - ROCK CORE SAMPLE

NOTES:
Bottom of Boring = ~26.0 BGS
Groundwater Encountered @ ~12.5' BGS

GENERAL NOTES:
1) STRATIFICATION LINES REPRESENT APPROXIMATE BOUNDARY BETWEEN SOIL TYPES, TRANSITIONS MAY BE GRADUAL.
2) WATER LEVEL READINGS HAVE BEEN MADE AT TIMES AND UNDER CONDITIONS STATED, FLUCTUATIONS OF GROUNDWATER MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS WERE MADE.

LABELLA Associates, P.C. 300 STATE STREET, ROCHESTER, NEW YORK ENVIRONMENTAL ENGINEERING CONSULTANTS	Phase II Environmental Site Assessment Port of Rochester Rochester, New York	BORING **B08-4** SHEET 2 of 2 JOB # 208453 CHKD. BY: ED

CONTRACTOR: Target Drilling — BORING LOCATION
DRILLER Ben Saragusa — GROUND SURFACE ELEVATION — DATUM
LABELLA REPRESENTATIVE E. Dumrese — START DATE 10/23/2008 — END DATE 10/23/2008

TYPE OF DRILL RIG: Rotary Drill Rig
AUGER SIZE AND TYPE 4.25-Inch ID
OVERBURDEN SAMPLING METHOD Split Spoon
ROCK DRILLING METHOD N/A

WATER LEVEL DATA

DATE	TIME	WATER	CASING	REMARKS

DEPTH	SAMPLE BLOWS / 6"	SAMPLE NO.	SAMPLE DEPTH (FT.)	SAMPLE N-VALUE /RQD(%)	SAMPLE RECOVERY (FEET)	DEPTH (Feet)	SAMPLE DESCRIPTION	PID READINGS	NOTES
17						16.0'	As above	0.0	
18								0.0	
19	28 36	S-6	18.0-20.0'	84		18.5'	Grey, SILT, some mc Sand and assorted Gravel, wet, no odor	0.0 0.0	
20						20.0'	As above	0.0	
21								0.0	
22						22.0'	As above	0.0	
23								0.0	
24						24.0'	As above	0.0	
25		S-7	25.0-26.0'	N/A			**GLACIAL TILL**		
						25.0'	Light brown, SILT, little mf Sand, wet, no odor	0.0	
26							*Bottom @ 26.0' BGS*		
27									
28									
29									
30									
31									
32									

LEGEND
S - SPLIT SPOON SOIL SAMPLE
U - UNDISTURBED SOIL SAMPLE
C - ROCK CORE SAMPLE

NOTES:
Bottom of Boring = ~26.0 BGS
Groundwater Encountered @ ~12.5' BGS

GENERAL NOTES:
1) STRATIFICATION LINES REPRESENT APPROXIMATE BOUNDARY BETWEEN SOIL TYPES, TRANSITIONS MAY BE GRADUAL.
2) WATER LEVEL READINGS HAVE BEEN MADE AT TIMES AND UNDER CONDITIONS STATED, FLUCTUATIONS OF GROUNDWATER MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS WERE MADE.

LABELLA Associates, P.C. 300 STATE STREET, ROCHESTER, NEW YORK ENVIRONMENTAL ENGINEERING CONSULTANTS	Phase II Environmental Site Assessment Port of Rochester Rochester, New York	BORING B08-5 SHEET 1 of 1 JOB # 208453 CHKD. BY: ED

CONTRACTOR: Target Drilling
DRILLER Ben Saragusa
LABELLA REPRESENTATIVE E. Dumrese
BORING LOCATION
GROUND SURFACE ELEVATION DATUM
START DATE 10/27/2008 END DATE 10/27/2008

TYPE OF DRILL RIG: Rotary Drill Rig
AUGER SIZE AND TYPE 4.25-Inch ID
OVERBURDEN SAMPLING METHOD Split Spoon
ROCK DRILLING METHOD N/A

WATER LEVEL DATA

DATE	TIME	WATER	CASING	REMARKS

DEPTH	SAMPLE BLOWS / 6"	NO.	DEPTH (FT.)	N-VALUE /RQD(%)	RECOVERY (FEET)	DEPTH (Feet)	SAMPLE DESCRIPTION	PID READINGS	NOTES
1		S-1	0.0-2.0'	N/A		0.0'	Asphalt **FILL MATERIAL**	0.0	
						0.4'	Crushed stone, assorted fill materials (i.e., concrete, cinders, coarse gravel)		
2								0.0	
3		S-2	2.0-4.0'	N/A				0.0	
4						3.0'	Light brown, SILT, little f to vf Sand, moist, no odor	0.0	
5	10 10 13	S-3	4.0-6.0'	22		4.0'	As above, no odor	0.0	
6	15							0.0	
7	4 5	S-4	6.0-8.0'	16		6.0'	Grey, mc SAND, moist, no odor	0.0	
8	11 6						**NATIVE MATERIAL**	0.0	
9	3 4	S-5	8.0-10.0'	8		8.0'	Light brown, SILT, little Clay, trace vf Sand, moist, no odor	0.0	
10	4 5							0.0	
11				N/A		10.0'	As above, moist, no odor	0.0	
12								0.0	
13	6 7	S-7	12.0-14.0'	16		12.0'	As above, moist, no odor	0.0	
14	9					13.5'	Light brown, SILT, some Clay, moist, no odor	0.0	
15				N/A				0.0	
16							*Bottom @ 15.0' BGS*		

LEGEND
S - SPLIT SPOON SOIL SAMPLE
U - UNDISTURBED SOIL SAMPLE
C - ROCK CORE SAMPLE

NOTES:
Bottom of Boring = ~15.0 BGS
Groundwater Encountered @ ~12.5' BGS

GENERAL NOTES:
1) STRATIFICATION LINES REPRESENT APPROXIMATE BOUNDARY BETWEEN SOIL TYPES, TRANSITIONS MAY BE GRADUAL.
2) WATER LEVEL READINGS HAVE BEEN MADE AT TIMES AND UNDER CONDITIONS STATED, FLUCTUATIONS OF GROUNDWATER MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS WERE MADE.

LABELLA Associates, P.C. 300 STATE STREET, ROCHESTER, NEW YORK ENVIRONMENTAL ENGINEERING CONSULTANTS	Phase II Environmental Site Assessment Port of Rochester Rochester, New York	BORING B08-6 SHEET 1 of 1 JOB # 208453 CHKD. BY: ED

CONTRACTOR: Target Drilling
DRILLER Ben Saragusa
LABELLA REPRESENTATIVE E. Dumrese
BORING LOCATION
GROUND SURFACE ELEVATION DATUM
START DATE 10/27/2008 END DATE 10/27/2008

TYPE OF DRILL RIG: Rotary Drill Rig
AUGER SIZE AND TYPE 4.25-Inch ID
OVERBURDEN SAMPLING METHOD Split Spoon
ROCK DRILLING METHOD N/A

WATER LEVEL DATA

DATE	TIME	WATER	CASING	REMARKS

DEPTH	SAMPLE BLOWS / 6"	NO.	DEPTH (FT.)	N-VALUE /RQD(%)	RECOVERY (FEET)	DEPTH (Feet)	SAMPLE DESCRIPTION	PID READINGS	NOTES
1				N/A		0.0'	Asphalt	0.0	
						0.4'	Crushed gravel		
2							**FILL MATERIAL**	0.0	
3	8 4	S-1	2.0-4.0'	9		2.0'	Fill materials (i.e., brick, crushed stone, concrete)	0.0	
4	5 8					3.0'	Brown, SILT and m SAND, moist, no odor	0.0	
5	40 18	S-2	4.0-6.0'	22		4.0'	Fill materials (i.e., brick and concrete), brown, to grey, mc SAND, some iron staining, moist, no odor	0.0	
6	4 6							0.0	
7	6 4	S-3	6.0-8.0'	6		6.0'	As above, moist, no odor	0.0	
8	2 7							0.0	
9	12 14	S-4	8.0-10.0'	20		8.0'	No Recovery	0.0	
10	6 5						**NATIVE MATERIAL**	0.0	
11	1 2	S-5	10.0-12.0'	4		10.0'	Grey, SILT and CLAY, wet @ ~10.0' BGS	0.0	
12	2 3							0.0	
13	4 4	S-6	12.0-14.0'	7		12.0'	As above, no odor	0.0	
14	3 4							0.0	
15							*Bottom @ 14.0' BGS*		
16									

LEGEND
S - SPLIT SPOON SOIL SAMPLE
U - UNDISTURBED SOIL SAMPLE
C - ROCK CORE SAMPLE

NOTES:
Bottom of Boring = ~14.0 BGS
Groundwater Encountered @ ~10.0' BGS

GENERAL NOTES:
1) STRATIFICATION LINES REPRESENT APPROXIMATE BOUNDARY BETWEEN SOIL TYPES, TRANSITIONS MAY BE GRADUAL.
2) WATER LEVEL READINGS HAVE BEEN MADE AT TIMES AND UNDER CONDITIONS STATED, FLUCTUATIONS OF GROUNDWATER MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS WERE MADE.

LABELLA Associates, P.C.
300 STATE STREET, ROCHESTER, NEW YORK
ENVIRONMENTAL ENGINEERING CONSULTANTS

Phase II Environmental Site Assessment
Port of Rochester
Rochester, New York

BORING **B08-7**
SHEET 1 of 1
JOB # 208453
CHKD. BY: ED

CONTRACTOR: Target Drilling
DRILLER Ben Saragusa
LABELLA REPRESENTATIVE E. Dumrese
BORING LOCATION
GROUND SURFACE ELEVATION DATUM
START DATE 10/27/2008 END DATE 10/27/2008

TYPE OF DRILL RIG: Rotary Drill Rig
AUGER SIZE AND TYPE 4.25-Inch ID
OVERBURDEN SAMPLING METHOD Split Spoon
ROCK DRILLING METHOD N/A

WATER LEVEL DATA

DATE	TIME	WATER	CASING	REMARKS

DEPTH	SAMPLE BLOWS / 6"	SAMPLE NO.	SAMPLE DEPTH (FT.)	SAMPLE N-VALUE /RQD(%)	SAMPLE RECOVERY (FEET)	DEPTH (Feet)	SAMPLE DESCRIPTION	PID READINGS	NOTES
1		S-1	0.0-2.0'	N/A		0.0'	Asphalt **FILL MATERIAL**	0.0	
						0.3'	Fill materials (i.e., crushed gravel, concrete, brick)		
						0.6'	Brown, mc SAND, some c Gravel, moist, no odor		
2								0.0	
3	2	S-2	2.0-4.0'	24		2.0'	As above	0.0	
	4								
	20							0.0	
4	50/4								
5	15	S-3	4.0-5.6'			4.0'	Concrete obstruction @ ~3.8' BGS	0.0	
	69								
6							*Refusal @ ~5.6' BGS*	0.0	
7									
8									
9									
10									
11									
12									
13									
14									
15									
16									

LEGEND
S - SPLIT SPOON SOIL SAMPLE
U - UNDISTURBED SOIL SAMPLE
C - ROCK CORE SAMPLE

NOTES:
Bottom of Boring = ~5.6 BGS
Groundwater Not Encountered

GENERAL NOTES:
1) STRATIFICATION LINES REPRESENT APPROXIMATE BOUNDARY BETWEEN SOIL TYPES, TRANSITIONS MAY BE GRADUAL.
2) WATER LEVEL READINGS HAVE BEEN MADE AT TIMES AND UNDER CONDITIONS STATED, FLUCTUATIONS OF GROUNDWATER MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS WERE MADE.

LABELLA Associates, P.C. 300 STATE STREET, ROCHESTER, NEW YORK ENVIRONMENTAL ENGINEERING CONSULTANTS	Phase II Environmental Site Assessment Port of Rochester Rochester, New York	BORING **B08-8** SHEET 1 of 1 JOB # 208453 CHKD. BY: ED

CONTRACTOR: Target Drilling
DRILLER Ben Saragusa
LABELLA REPRESENTATIVE E. Dumrese
BORING LOCATION
GROUND SURFACE ELEVATION DATUM
START DATE 10/27/2008 END DATE 10/27/2008

TYPE OF DRILL RIG: Rotary Drill Rig
AUGER SIZE AND TYPE 4.25-Inch ID
OVERBURDEN SAMPLING METHOD Split Spoon
ROCK DRILLING METHOD N/A

WATER LEVEL DATA

DATE	TIME	WATER	CASING	REMARKS

DEPTH	SAMPLE BLOWS / 6"	NO.	DEPTH (FT.)	N-VALUE /RQD(%)	RECOVERY (FEET)	DEPTH (Feet)	SAMPLE DESCRIPTION	PID READINGS	NOTES
1						0.0'	Asphalt	0.0	
						0.3'	Crushed gravel		
						1.0'	Light brown, SILT, some mf Sand, moist, no odor	0.0	
2							**NATIVE MATERIAL**		
						2.0'	As above	0.0	
3									
								0.0	
4									
5						4.0'	Grey to brown, SILT, little Clay, moist, no odor	0.0	
								0.0	
6									
7						6.0'	Grey to brown, SILT, some Clay, moist, no odor	0.0	
								0.0	
8									
9							*Bottom @ 8.0' BGS*		
10									
11									
12									
13									
14									
15									
16									

LEGEND
S - SPLIT SPOON SOIL SAMPLE
U - UNDISTURBED SOIL SAMPLE
C - ROCK CORE SAMPLE

NOTES:
Bottom of Boring = ~8.0 BGS
Groundwater Not Encountered

GENERAL NOTES:
1) STRATIFICATION LINES REPRESENT APPROXIMATE BOUNDARY BETWEEN SOIL TYPES, TRANSITIONS MAY BE GRADUAL.
2) WATER LEVEL READINGS HAVE BEEN MADE AT TIMES AND UNDER CONDITIONS STATED, FLUCTUATIONS OF GROUNDWATER MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS WERE MADE.

LABELLA Associates, P.C.

300 STATE STREET, ROCHESTER, NY
ENVIRONMENTAL ENGINEERING CONSULTANTS

TEST PIT LOG

PROJECT
Phase II ESA: Test Pit Soil Sampling
Port of Rochester
Lake Avenue, Rochester, New York

BORING: TP-1
SHEET 1 OF 1
JOB: 208453
CHKD BY: ED

CONTRACTOR: TREC Environmental
EXCAVATOR: Kubota KX121-3 Super Series
LABELLA REPRESENTATIVE: E. Dumrese
TEST PIT LOCATION:
GROUND SURFACE ELEVATION: NA
START DATE: 10/3/08 END DATE: 10/3/08
TIME: 1200 TO 1300
DATUM: NA

OVERBURDEN SAMPLING METHOD: Direct Grab
OTHER:

DEPTH	SAMPLE NO. AND DEPTH	STRATA CHANGE	VISUAL CLASSIFICATION	PID FIELD SCREEN (PPM)	REMARKS
0		0.0'	Topsoil	0.0	
			NATIVE MATERIAL	0.0	
		1.0'	Light brown, SILT, little f Sand, moist, No odor		
2		2.0'	As above	0.0	
		3.0'	*4" Steel pipe running east to west	0.0	
4		4.0'	As above	0.0	
		5.5'	8' Steel abandoned water line running east-west	0.0	
6			*Bottom @ 6.0' BGS*		
8					
10					
12					

WATER LEVEL DATA			BOTTOM OF TEST PIT	GROUNDWATER ENCOUNTERED
DATE	TIME	ELAPSED TIME		
			6.0' BGS	Not encountered

NOTES:

GENERAL NOTES
1) STRATIFICATION LINES REPRESENT APPROXIMATE BOUNDARY BETWEEN SOIL TYPES. TRANSITIONS MAY BE GRADUAL.
2) WATER LEVEL READINGS HAVE BEEN MADE AT TIMES AND UNDER CONDITIONS STATED. FLUCTUATIONS OF GROUNDWATER
3) Abbreviations
and = 35 to 50 %
some = 20 to 35%
little = 10 to 20%
trace = 1 to 10%
c = coarse
m = medium
f = fine
vf = very fine
BGS = Below the Ground Surface
NA = Not Applicable

BORING: TP-1

LABELLA Associates, P.C.

300 STATE STREET, ROCHESTER, NY
ENVIRONMENTAL ENGINEERING CONSULTANTS

TEST PIT LOG

PROJECT
Phase II ESA: Test Pit Soil Sampling
Port of Rochester
Lake Avenue, Rochester, New York

BORING: TP-2
SHEET 1 OF 1
JOB: 208453
CHKD BY: ED

CONTRACTOR: TREC Environmental
EXCAVATOR: Kubota KX121-3 Super Series
LABELLA REPRESENTATIVE: E. Dumrese
TEST PIT LOCATION:
GROUND SURFACE ELEVATION: NA
START DATE: 9/5/08
END DATE: 9/5/08
TIME: 1345 TO 1430
DATUM: NA

OVERBURDEN SAMPLING METHOD: Direct Grab
OTHER:

DEPTH	SAMPLE NO. AND DEPTH	STRATA CHANGE	VISUAL CLASSIFICATION	PID FIELD SCREEN (PPM)	REMARKS
0		0.0'	Topsoil	0.0	
			FILL MATERIAL		
		1.0'	Light brown, SILT and mf SAND, dry, No odor	0.0	
		1.5'	Assorted fill materials (i.e., brick concrete, metal pieces)		
2		2.0'	As above	0.0	
		3.0'	As above	0.0	
4		4.0'	As above	0.0	
			Refusal @ 4.5' BGS		
6					
8					
10					
12					

WATER LEVEL DATA			BOTTOM OF TEST PIT	GROUNDWATER ENCOUNTERED	NOTES:
DATE	TIME	ELAPSED TIME			
			4.8' BGS	Not encountered	

GENERAL NOTES
1) STRATIFICATION LINES REPRESENT APPROXIMATE BOUNDARY BETWEEN SOIL TYPES. TRANSITIONS MAY BE GRADUAL.
2) WATER LEVEL READINGS HAVE BEEN MADE AT TIMES AND UNDER CONDITIONS STATED. FLUCTUATIONS OF GROUNDWATER
3) Abbreviations

and = 35 to 50 %	c = coarse	
some = 20 to 35%	m = medium	BGS = Below the Ground Surface
little = 10 to 20%	f = fine	NA = Not Applicable
trace = 1 to 10%	vf = very fine	

BORING: TP-2

LABELLA Associates, P.C.

300 STATE STREET, ROCHESTER, NY
ENVIRONMENTAL ENGINEERING CONSULTANTS

TEST PIT LOG

PROJECT
Phase II ESA: Test Pit Soil Sampling
Port of Rochester
Lake Avenue, Rochester, New York

BORING: TP-3
SHEET 1 OF 1
JOB: 208453
CHKD BY: ED

CONTRACTOR: TREC Environmental
EXCAVATOR: Kubota KX121-3 Super Series
LABELLA REPRESENTATIVE: E. Dumrese
TEST PIT LOCATION:
GROUND SURFACE ELEVATION: NA
START DATE: 9/5/08 END DATE: 9/5/08
TIME: 1300 TO 1345
DATUM: NA

OVERBURDEN SAMPLING METHOD: Direct Grab
OTHER:

DEPTH	SAMPLE NO. AND DEPTH	STRATA CHANGE	VISUAL CLASSIFICATION	PID FIELD SCREEN (PPM)	REMARKS
0		0.0'	Topsoil	0.0	
			FILL MATERIAL		
		1.0'	Light brown to pink, SILT, little mf Sand, trace Clay, damp, No odor	0.0	
		1.5'	Eastern end of TP-3 - Brick fragments, cut stone, some metal objects, very loose		
2		2.0'	As above	0.0	
		3.0'	As above	0.0	
4		4.0'	As above	0.0	
		5.0'	As above	0.0	
6		6.0'	As above	0.0	
		7.0'	As above	0.0	
8		8.0'	*Bottom @ 8.0' BGS*		
10					
12					

WATER LEVEL DATA			BOTTOM OF TEST PIT	GROUNDWATER ENCOUNTERED
DATE	TIME	ELAPSED TIME		
			8.0' BGS	Not encountered

NOTES:

GENERAL NOTES

1) STRATIFICATION LINES REPRESENT APPROXIMATE BOUNDARY BETWEEN SOIL TYPES. TRANSITIONS MAY BE GRADUAL.

2) WATER LEVEL READINGS HAVE BEEN MADE AT TIMES AND UNDER CONDITIONS STATED. FLUCTUATIONS OF GROUNDWATER

3) Abbreviations

and = 35 to 50 %
some = 20 to 35%
little = 10 to 20%
trace = 1 to 10%
c = coarse
m = medium
f = fine
vf = very fine
BGS = Below the Ground Surface
NA = Not Applicable

BORING: TP-3

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ENVIRONMENTAL ENGINEERING CONSULTANTS

TEST PIT LOG

PROJECT
Phase II ESA: Test Pit Soil Sampling
Port of Rochester
Lake Avenue, Rochester, New York

BORING: TP-4
SHEET 1 OF 1
JOB: 208453
CHKD BY: ED

CONTRACTOR: TREC Environmental
EXCAVATOR: Kubota KX121-3 Super Series
LABELLA REPRESENTATIVE: E. Dumrese
TEST PIT LOCATION:
GROUND SURFACE ELEVATION: NA
START DATE: 9/5/08 END DATE: 9/5/08
TIME: 1045 TO 1130
DATUM: NA

OVERBURDEN SAMPLING METHOD: Direct Grab
OTHER:

DEPTH	SAMPLE NO. AND DEPTH	STRATA CHANGE	VISUAL CLASSIFICATION	PID FIELD SCREEN (PPM)	REMARKS
0		0.0'	Crushed Gravel	0.1	
			FILL MATERIAL		
		1.0'	Light brown to grey, SILT and f SAND, moist, No odor (buried topsoil)	0.0	
		1.5'	Concrete chunk		
2		2.5'	Crushed brick and concrete fragments - concrete block ~3.0' in diameter encountered	0.0	
			NATIVE MATERIAL	0.0	
		3.2'	Light brown, mf SAND, little Silt, dry, No odor		
4		4.0'	Light brown, SILT, little mf Sand, trace Clay, moist, No odor	0.0	
		5.0'	As above	0.0	
6		6.0'	As above, No odor	0.0	
		7.3'	As above	0.0	
			Bottom @ 7.3' BGS		
8					
10					
12					

WATER LEVEL DATA			BOTTOM OF	GROUNDWATER
DATE	TIME	ELAPSED TIME	TEST PIT	ENCOUNTERED
			7.3' BGS	Not encountered

NOTES:

GENERAL NOTES
1) STRATIFICATION LINES REPRESENT APPROXIMATE BOUNDARY BETWEEN SOIL TYPES, TRANSITIONS MAY BE GRADUAL.
2) WATER LEVEL READINGS HAVE BEEN MADE AT TIMES AND UNDER CONDITIONS STATED. FLUCTUATIONS OF GROUNDWATER
3) Abbreviations

and = 35 to 50 %	c = coarse	
some = 20 to 35%	m = medium	BGS = Below the Ground Surface
little = 10 to 20%	f = fine	NA = Not Applicable
trace = 1 to 10%	vf = very fine	

BORING: TP-4

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TEST PIT LOG

PROJECT
Phase II ESA: Test Pit Soil Sampling
Port of Rochester
Lake Avenue, Rochester, New York

BORING: TP-5
SHEET 1 OF 1
JOB: 208453
CHKD BY: ED

CONTRACTOR: TREC Environmental
EXCAVATOR: Kubota KX121-3 Super Series
LABELLA REPRESENTATIVE: E. Dumrese
TEST PIT LOCATION:
GROUND SURFACE ELEVATION: NA
START DATE: 9/5/08 END DATE: 9/5/08
TIME: 1445 TO 1600
DATUM: NA

OVERBURDEN SAMPLING METHOD: Direct Grab
OTHER:

DEPTH	SAMPLE NO. AND DEPTH	STRATA CHANGE	VISUAL CLASSIFICATION	PID FIELD SCREEN (PPM)	REMARKS
0		0.0'	Topsoil	0.0	
		1.0'	Grey. SILT. trace f Sand. moist. No odor Abandoned clay sewer line running north to south	0.0	
2			**FILL MATERIAL**		
		2.0' 2.5'	Some brick fragments. asphalt pieces and crushed concrete Brick fragmented wall running east to west along southern end of test pit	0.0	
		3.0'	As above	0.0	
4					
		4.0'	As above	0.0	
		5.0'	As above	0.0	
6			**NATIVE MATERIAL**		
		6.0'	Grey. SILT. little Clay. trace f Sand. wet. No odor	0.0	
			Bottom @ 6.8' BGS		
8					
10					
12					

WATER LEVEL DATA			BOTTOM OF TEST PIT	GROUNDWATER ENCOUNTERED
DATE	TIME	ELAPSED TIME		
			6.8' BGS	6.5' BGS

NOTES:

GENERAL NOTES
1) STRATIFICATION LINES REPRESENT APPROXIMATE BOUNDARY BETWEEN SOIL TYPES. TRANSITIONS MAY BE GRADUAL.
2) WATER LEVEL READINGS HAVE BEEN MADE AT TIMES AND UNDER CONDITIONS STATED. FLUCTUATIONS OF GROUNDWATER
3) Abbreviations

and = 35 to 50 %
some = 20 to 35%
little = 10 to 20%
trace = 1 to 10%
c = coarse
m = medium
f = fine
vf = very fine
BGS = Below the Ground Surface
NA = Not Applicable

BORING: TP-5

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ENVIRONMENTAL ENGINEERING CONSULTANTS

TEST PIT LOG

PROJECT
Phase II ESA: Test Pit Soil Sampling
Port of Rochester
Lake Avenue, Rochester, New York

BORING: TP-6
SHEET 1 OF 1
JOB: 208453
CHKD BY: ED

CONTRACTOR: TREC Environmental
EXCAVATOR: Kubota KX121-3 Super Series
LABELLA REPRESENTATIVE: E. Dumrese
TEST PIT LOCATION:
GROUND SURFACE ELEVATION: NA
START DATE: 9/5/08 END DATE: 9/5/08
TIME: 930 TO 1030
DATUM: NA

OVERBURDEN SAMPLING METHOD: Direct Grab
OTHER:

DEPTH	SAMPLE NO. AND DEPTH	STRATA CHANGE	VISUAL CLASSIFICATION	PID FIELD SCREEN (PPM)	REMARKS
0		0.0'	Topsoil	0.0	
		0.5'	**NATIVE MATERIAL** Light brown, mf SAND, trace Silt, dry, No odor		
		1.5'	~3/4" steel conduit running north to south	0.0	
2		2.0'	As above	0.0	
		3.0'	As above	0.0	
4		4.0'	As above, some Silt	0.0	
		5.0'	As above	0.0	
6		6.0'	As above	0.0	
		7.0'	As above	0.0	
8			*Bottom @ 8.0' BGS*		
10					
12					

WATER LEVEL DATA			BOTTOM OF TEST PIT	GROUNDWATER ENCOUNTERED
DATE	TIME	ELAPSED TIME		
			8.0' BGS	Not encountered

NOTES:

GENERAL NOTES
1) STRATIFICATION LINES REPRESENT APPROXIMATE BOUNDARY BETWEEN SOIL TYPES. TRANSITIONS MAY BE GRADUAL.
2) WATER LEVEL READINGS HAVE BEEN MADE AT TIMES AND UNDER CONDITIONS STATED. FLUCTUATIONS OF GROUNDWATER
3) Abbreviations

and = 35 to 50 %
some = 20 to 35%
little = 10 to 20%
trace = 1 to 10%
c = coarse
m = medium
f = fine
vf = very fine
BGS = Below the Ground Surface
NA = Not Applicable

BORING: TP-6

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TEST PIT LOG

PROJECT
Phase II ESA: Test Pit Soil Sampling
Port of Rochester
Lake Avenue, Rochester, New York

BORING: TP-7
SHEET 1 OF 1
JOB: 208453
CHKD BY: ED

CONTRACTOR: TREC Environmental
EXCAVATOR: Kubota KX121-3 Super Series
LABELLA REPRESENTATIVE: E. Dumrese
TEST PIT LOCATION:
GROUND SURFACE ELEVATION: NA
START DATE: 9/5/08 END DATE: 9/5/08
TIME: 830 TO 930
DATUM: NA

OVERBURDEN SAMPLING METHOD: Direct Grab
OTHER:

DEPTH	SAMPLE NO. AND DEPTH	STRATA CHANGE	VISUAL CLASSIFICATION	PID FIELD SCREEN (PPM)	REMARKS
0		0.0'	Topsoil	0.0	
			FILL MATERIAL		
	S-1 1.5'	1.0'	Blue slag encountered - large chunks (i.e. <1' in diameter Fill materials: Brick, crushed concrete, steel plates, some wood pieces to 8.0' BGS	0.0	
2		2.0'	As above	0.0	
		3.0'	As above	0.0	
4		4.0'	As above	0.0	
		5.0'	As above	0.0	
6		6.0'	As above	0.0	
		7.0'	As above	0.0	
8			*Bottom @ 8.0' BGS*		
10					
12					

WATER LEVEL DATA			BOTTOM OF TEST PIT	GROUNDWATER ENCOUNTERED
DATE	TIME	ELAPSED TIME		
			8.0' BGS	Not encountered

NOTES:

GENERAL NOTES
1) STRATIFICATION LINES REPRESENT APPROXIMATE BOUNDARY BETWEEN SOIL TYPES. TRANSITIONS MAY BE GRADUAL.
2) WATER LEVEL READINGS HAVE BEEN MADE AT TIMES AND UNDER CONDITIONS STATED. FLUCTUATIONS OF GROUNDWATER
3) Abbreviations
and = 35 to 50 %
some = 20 to 35%
little = 10 to 20%
trace = 1 to 10%
c = coarse
m = medium
f = fine
vf = very fine
BGS = Below the Ground Surface
NA = Not Applicable

BORING: TP-7

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TEST PIT LOG

PROJECT
Phase II ESA: Test Pit Soil Sampling
Port of Rochester
Lake Avenue, Rochester, New York

BORING: TP-8
SHEET 1 OF 1
JOB: 208453
CHKD BY: ED

CONTRACTOR: TREC Environmental
EXCAVATOR: Kubota KX121-3 Super Series
LABELLA REPRESENTATIVE: E. Dumrese
TEST PIT LOCATION:
GROUND SURFACE ELEVATION: NA
START DATE: 9/5/08 END DATE: 9/5/08
TIME: 1330 TO 1400
DATUM: NA

OVERBURDEN SAMPLING METHOD: Direct Grab
OTHER:

DEPTH	SAMPLE NO. AND DEPTH	STRATA CHANGE	VISUAL CLASSIFICATION	PID FIELD SCREEN (PPM)	REMARKS
0		0.0'	Topsoil	0.0	
			NATIVE MATERIAL		
		1.0'	Light brown, SILT, some mf Sand, dry, No odor	0.0	
2		2.0'	As above	0.0	
		3.0'	As above	0.0	
4		4.0'	Brown to grey, SILT, some Clay, moist, No odor	0.0	
			Bottom @ 5.0' BGS		
6					
8					
10					
12					

WATER LEVEL DATA			BOTTOM OF	GROUNDWATER
DATE	TIME	ELAPSED TIME	TEST PIT	ENCOUNTERED
			5.0' BGS	Not encountered

NOTES:

GENERAL NOTES
1) STRATIFICATION LINES REPRESENT APPROXIMATE BOUNDARY BETWEEN SOIL TYPES. TRANSITIONS MAY BE GRADUAL.
2) WATER LEVEL READINGS HAVE BEEN MADE AT TIMES AND UNDER CONDITIONS STATED. FLUCTUATIONS OF GROUNDWATER
3) Abbreviations
and = 35 to 50 %
some = 20 to 35%
little = 10 to 20%
trace = 1 to 10%
c = coarse
m = medium
f = fine
vf = very fine
BGS = Below the Ground Surface
NA = Not Applicable

BORING: TP-8

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TEST PIT LOG

PROJECT
Phase II ESA: Test Pit Soil Sampling
Port of Rochester
Lake Avenue, Rochester, New York

BORING: TP-9
SHEET 1 OF 1
JOB: 208453
CHKD BY: ED

CONTRACTOR: TREC Environmental
EXCAVATOR: Kubota KX121-3 Super Series
LABELLA REPRESENTATIVE: E. Dumrese
TEST PIT LOCATION:
GROUND SURFACE ELEVATION: NA
START DATE: 10/3/08/2008 END DATE: 10/3/08
TIME: TO
DATUM: NA

OVERBURDEN SAMPLING METHOD: Direct Grab
OTHER:

DEPTH	SAMPLE NO. AND DEPTH	STRATA CHANGE	VISUAL CLASSIFICATION	PID FIELD SCREEN (PPM)	REMARKS
0		0.0'	Topsoil **NATIVE MATERIAL**	0.0	
		0.8'	Light brown, SILT, trace f Sand and Clay		
		1.0'	As above	0.0	
2		2.0'	As above	0.0	
		3.0'	As above	0.0	
4		4.0'	As above	0.0	
			Bottom @ 4.5' BGS		
6					
8					
10					
12					

WATER LEVEL DATA			BOTTOM OF TEST PIT	GROUNDWATER ENCOUNTERED	NOTES:
DATE	TIME	ELAPSED TIME			
			4.5' BGS	Not encountered	

GENERAL NOTES
1) STRATIFICATION LINES REPRESENT APPROXIMATE BOUNDARY BETWEEN SOIL TYPES. TRANSITIONS MAY BE GRADUAL.
2) WATER LEVEL READINGS HAVE BEEN MADE AT TIMES AND UNDER CONDITIONS STATED. FLUCTUATIONS OF GROUNDWATER
3) Abbreviations

and = 35 to 50 %	c = coarse	
some = 20 to 35%	m = medium	BGS = Below the Ground Surface
little = 10 to 20%	f = fine	NA = Not Applicable
trace = 1 to 10%	vf = very fine	

BORING: TP-9

LABELLA Associates, P.C.

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ENVIRONMENTAL ENGINEERING CONSULTANTS

TEST PIT LOG

PROJECT
Phase II ESA: Test Pit Soil Sampling
Port of Rochester
Lake Avenue, Rochester, New York

BORING: TP-10
SHEET 1 OF 1
JOB: 208453
CHKD BY: ED

CONTRACTOR: TREC Environmental
EXCAVATOR: Kubota KX121-3 Super Series
LABELLA REPRESENTATIVE: E. Dumrese
TEST PIT LOCATION:
GROUND SURFACE ELEVATION: NA
START DATE: 10/3/08/2008
END DATE: 10/3/08
TIME: TO
DATUM: NA

OVERBURDEN SAMPLING METHOD: Direct Grab
OTHER:

DEPTH	SAMPLE NO. AND DEPTH	STRATA CHANGE	VISUAL CLASSIFICATION	PID FIELD SCREEN (PPM)	REMARKS
0		0.0'	Topsoil	0.0	
			FILL MATERIAL		
		1.0'	Assorted fill (C&D debris - concrete chunks, bricks, etc.)	0.0	
2		2.0'	As above	0.0	
		3.0'	As above	0.0	
4		4.0'	As above	0.0	
		5.0'	As above	0.0	
6		6.0'	As above	0.0	
		7.0'	As above	0.0	
8			**NATIVE MATERIAL**		
		8.0'	Light brown, SILT, trace f Sand, moist, No odor	0.0	
		9.5'	As above, wet @ 8.8' BGS	0.0	
10		10.0'	As above	0.0	
			Bottom @ 10.6' BGS		
12					

WATER LEVEL DATA			BOTTOM OF TEST PIT	GROUNDWATER ENCOUNTERED
DATE	TIME	ELAPSED TIME		
			10.6' BGS	8.8' BGS

NOTES:

GENERAL NOTES
1) STRATIFICATION LINES REPRESENT APPROXIMATE BOUNDARY BETWEEN SOIL TYPES. TRANSITIONS MAY BE GRADUAL.
2) WATER LEVEL READINGS HAVE BEEN MADE AT TIMES AND UNDER CONDITIONS STATED. FLUCTUATIONS OF GROUNDWATER
3) Abbreviations

and = 35 to 50 %	c = coarse	
some = 20 to 35%	m = medium	BGS = Below the Ground Surface
little = 10 to 20%	f = fine	NA = Not Applicable
trace = 1 to 10%	vf = very fine	

BORING: TP-10

LABELLA Associates, P.C.

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ENVIRONMENTAL ENGINEERING CONSULTANTS

TEST PIT LOG

PROJECT
Phase II ESA: Test Pit Soil Sampling
Port of Rochester
Lake Avenue, Rochester, New York

BORING: TP-11
SHEET 1 OF 1
JOB: 208453
CHKD BY: ED

CONTRACTOR: TREC Environmental
EXCAVATOR: Kubota KX121-3 Super Series
LABELLA REPRESENTATIVE: E. Dumrese
TEST PIT LOCATION:
GROUND SURFACE ELEVATION: NA
START DATE: 9/5/08
END DATE: 9/5/08
TIME: TO
DATUM: NA

OVERBURDEN SAMPLING METHOD: Direct Grab
OTHER:

DEPTH	SAMPLE NO. AND DEPTH	STRATA CHANGE	VISUAL CLASSIFICATION	PID FIELD SCREEN (PPM)	REMARKS
0		0.0'	Topsoil	0.0	
			NATIVE MATERIAL		
		1.0'	Light brown, mf SAND, little Silt, dry, No odor	0.0	
2		2.0'	As above, No odor	0.0	
		3.0'	As above	0.0	
4		4.0'	As above, No odor	0.0	
		5.0'	As above	0.0	
6		6.0'	As above, No odor	0.0	
		7.0'	As above	0.0	
8		8.0'	As above	0.0	
			Bottom @ 8.5' BGS		
10					
12					

WATER LEVEL DATA			BOTTOM OF TEST PIT	GROUNDWATER ENCOUNTERED
DATE	TIME	ELAPSED TIME		
			8.5' BGS	Not Encountered

NOTES:

GENERAL NOTES
1) STRATIFICATION LINES REPRESENT APPROXIMATE BOUNDARY BETWEEN SOIL TYPES. TRANSITIONS MAY BE GRADUAL.
2) WATER LEVEL READINGS HAVE BEEN MADE AT TIMES AND UNDER CONDITIONS STATED. FLUCTUATIONS OF GROUNDWATER
3) Abbreviations

and = 35 to 50 %	c = coarse	
some = 20 to 35%	m = medium	BGS = Below the Ground Surface
little = 10 to 20%	f = fine	NA = Not Applicable
trace = 1 to 10%	vf = very fine	

BORING: TP-11

LABELLA Associates, P.C.

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ENVIRONMENTAL ENGINEERING CONSULTANTS

TEST PIT LOG

PROJECT
Phase II ESA: Test Pit Soil Sampling
Port of Rochester
Lake Avenue, Rochester, New York

BORING: TP-12
SHEET 1 OF 1
JOB: 208453
CHKD BY: ED

CONTRACTOR: TREC Environmental
EXCAVATOR: Kubota KX121-3 Super Series
LABELLA REPRESENTATIVE: E. Dumrese
TEST PIT LOCATION:
GROUND SURFACE ELEVATION: NA
START DATE: 9/5/08 END DATE: 9/5/08
TIME: TO
DATUM: NA

OVERBURDEN SAMPLING METHOD: Direct Grab
OTHER:

DEPTH	SAMPLE NO. AND DEPTH	STRATA CHANGE	VISUAL CLASSIFICATION	PID FIELD SCREEN (PPM)	REMARKS
0		0.0'	Topsoil	0.0	
			NATIVE MATERIAL		
		1.0'	Light brown, SILT, little mf Sand, moist, No odor	0.0	
2		2.0'	As above, No odor	0.0	
		3.0'	As above	0.0	
4		4.0'	As above, No odor	0.0	
		5.0'	As above	0.0	
6		6.0'	As above, No odor	0.0	
		7.0'	As above	0.0	
8			*Bottom @ 8.0' BGS*		
10					
12					

WATER LEVEL DATA			BOTTOM OF	GROUNDWATER
DATE	TIME	ELAPSED TIME	TEST PIT	ENCOUNTERED
			8.5' BGS	Not Encountered

NOTES:

GENERAL NOTES
1) STRATIFICATION LINES REPRESENT APPROXIMATE BOUNDARY BETWEEN SOIL TYPES. TRANSITIONS MAY BE GRADUAL.
2) WATER LEVEL READINGS HAVE BEEN MADE AT TIMES AND UNDER CONDITIONS STATED. FLUCTUATIONS OF GROUNDWATER
3) Abbreviations

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trace = 1 to 10%	vf = very fine	

BORING: TP-12

LABELLA Associates, P.C.

300 STATE STREET, ROCHESTER, NY
ENVIRONMENTAL ENGINEERING CONSULTANTS

TEST PIT LOG

PROJECT
Phase II ESA: Test Pit Soil Sampling
Port of Rochester
Lake Avenue, Rochester, New York

BORING: TP-13
SHEET 1 OF 1
JOB: 208453
CHKD BY: ED

CONTRACTOR: TREC Environmental
EXCAVATOR: Kubota KX121-3 Super Series
LABELLA REPRESENTATIVE: E. Dumrese
TEST PIT LOCATION:
GROUND SURFACE ELEVATION: NA
START DATE: 10/3/08 END DATE: 10/3/08
TIME: TO
DATUM: NA

OVERBURDEN SAMPLING METHOD: Direct Grab
OTHER:

DEPTH	SAMPLE NO. AND DEPTH	STRATA CHANGE	VISUAL CLASSIFICATION	PID FIELD SCREEN (PPM)	REMARKS
0		0.0'	Topsoil	0.0	
			FILL MATERIAL		
		1.0'	Reddish to brown, mc SAND and SILT, moist. No odor	0.1	
		1.5'	Red slag (large pieces, > 6" in diameter, but < 1' in diameter) - Sulfur odor		
2		2.0'	As above	0.0	
		3.0'	As above	0.0	
4		4.0'	As above	0.0	
		5.0'	As above	0.0	
6		6.0'	As above	0.0	
		7.0'	As above	0.0	
8		8.0'	As above	0.0	
		9.3'	As above, wet @ ~9.3' BGS	0.0	
10			**NATIVE MATERIAL**		
		10.0'	Dark brown to black, SILT, trace f Sand and Clay, some organics (roots), saturated, sulfur odor	0.1	
		11.0'	As above	0.0	
			Bottom @ 11.5' BGS		
12					

WATER LEVEL DATA			BOTTOM OF	GROUNDWATER
DATE	TIME	ELAPSED TIME	TEST PIT	ENCOUNTERED
			11.5' BGS	9.3' BGS

NOTES:

GENERAL NOTES
1) STRATIFICATION LINES REPRESENT APPROXIMATE BOUNDARY BETWEEN SOIL TYPES. TRANSITIONS MAY BE GRADUAL.
2) WATER LEVEL READINGS HAVE BEEN MADE AT TIMES AND UNDER CONDITIONS STATED. FLUCTUATIONS OF GROUNDWATER
3) Abbreviations

and = 35 to 50 %
some = 20 to 35%
little = 10 to 20%
trace = 1 to 10%
c = coarse
m = medium
f = fine
vf = very fine
BGS = Below the Ground Surface
NA = Not Applicable

BORING: TP-13

LABELLA Associates, P.C.
300 STATE STREET, ROCHESTER, NY
ENVIRONMENTAL ENGINEERING CONSULTANTS

TEST PIT LOG

PROJECT
Phase II ESA: Test Pit Soil Sampling
Port of Rochester
Lake Avenue, Rochester, New York

BORING: TP-14
SHEET 1 OF 1
JOB: 208453
CHKD BY: ED

CONTRACTOR: TREC Environmental
EXCAVATOR: Kubota KX121-3 Super Series
LABELLA REPRESENTATIVE: E. Dumrese
TEST PIT LOCATION:
GROUND SURFACE ELEVATION: NA
START DATE: 10/3/08 END DATE: 10/3/08
TIME: TO
DATUM: NA

OVERBURDEN SAMPLING METHOD: Direct Grab
OTHER:

DEPTH	SAMPLE NO. AND DEPTH	STRATA CHANGE	VISUAL CLASSIFICATION	PID FIELD SCREEN (PPM)	REMARKS
0		0.0'	Topsoil	0.0	
			FILL MATERIAL		
		1.0'	Assorted fill (i.e. brick fragments, concrete, blue slag)	0.0	
2			**NATIVE MATERIAL**		
		2.0'	Light tan, SILT, trace f Sand, moist, No odor	0.0	
		3.0'	As above	0.0	
4					
		4.0'	As above, No odor	0.0	
		5.0'	As above	0.0	
6					
		6.0'	As above, No odor	0.0	
		7.0'	Large concrete slab, unable to excavate beneath	0.0	
			Refusal @ 7.2' BGS		
8					
10					
12					

WATER LEVEL DATA			BOTTOM OF TEST PIT	GROUNDWATER ENCOUNTERED	NOTES:
DATE	TIME	ELAPSED TIME			
			7.2' BGS	Not Encountered	

GENERAL NOTES
1) STRATIFICATION LINES REPRESENT APPROXIMATE BOUNDARY BETWEEN SOIL TYPES. TRANSITIONS MAY BE GRADUAL.
2) WATER LEVEL READINGS HAVE BEEN MADE AT TIMES AND UNDER CONDITIONS STATED. FLUCTUATIONS OF GROUNDWATER
3) Abbreviations
and = 35 to 50 %
some = 20 to 35%
little = 10 to 20%
trace = 1 to 10%
c = coarse
m = medium
f = fine
vf = very fine
BGS = Below the Ground Surface
NA = Not Applicable

BORING: TP-14

LABELLA Associates, P.C.

300 STATE STREET, ROCHESTER, NY
ENVIRONMENTAL ENGINEERING CONSULTANTS

TEST PIT LOG

PROJECT
Phase II ESA: Test Pit Soil Sampling
Port of Rochester
Lake Avenue, Rochester, New York

BORING: TP-15
SHEET 1 OF 2
JOB: 208453
CHKD BY: ED

CONTRACTOR: TREC Environmental
EXCAVATOR: Kubota KX121-3 Super Series
LABELLA REPRESENTATIVE: E. Dumrese
TEST PIT LOCATION:
GROUND SURFACE ELEVATION: NA
START DATE: 10/3/08 END DATE: 10/3/08
TIME: TO
DATUM: NA

OVERBURDEN SAMPLING METHOD: Direct Grab
OTHER:

DEPTH	SAMPLE NO. AND DEPTH	STRATA CHANGE	VISUAL CLASSIFICATION	PID FIELD SCREEN (PPM)	REMARKS
0		0.0'	Topsoil	0.0	
			NATIVE MATERIAL		
		1.0'	Light brown. SILT. trace f Sand. moist. No odor	0.0	
		1.5'	Broken steel I-beams encountered - 24" thick concrete and stone wall running east to west along northern side of test pit		
2			- Vertical steel support for former trestle system encountered. depth to top of concrete pilon ~10.0' BGS	0.0	
		2.0'	As above		
		3.0'	As above	0.0	
4		4.0'	As above. No odor	0.0	
		5.0'	As above	0.0	
6		6.0'	As above. No odor	0.0	
		7.0'	As above	0.0	
8		8.0'	As above. No odor	0.0	
		9.0'	As above	0.0	
10		10.0'	Pink to reddish brown. SANDSTONE. some mc Sand. moist. No odor	0.0	
		11.0'	As above	0.0	
12		12.0'	As above. No odor	0.0	

WATER LEVEL DATA			BOTTOM OF TEST PIT	GROUNDWATER ENCOUNTERED
DATE	TIME	ELAPSED TIME		
			19.5' BGS	Not Encountered

NOTES:

GENERAL NOTES
1) STRATIFICATION LINES REPRESENT APPROXIMATE BOUNDARY BETWEEN SOIL TYPES. TRANSITIONS MAY BE GRADUAL.
2) WATER LEVEL READINGS HAVE BEEN MADE AT TIMES AND UNDER CONDITIONS STATED. FLUCTUATIONS OF GROUNDWATER
3) Abbreviations

and = 35 to 50 %	c = coarse	
some = 20 to 35%	m = medium	BGS = Below the Ground Surface
little = 10 to 20%	f = fine	NA = Not Applicable
trace = 1 to 10%	vf = very fine	

BORING: TP-15

LABELLA Associates, P.C.

300 STATE STREET, ROCHESTER, NY
ENVIRONMENTAL ENGINEERING CONSULTANTS

TEST PIT LOG

PROJECT
Phase II ESA: Test Pit Soil Sampling
Port of Rochester
Lake Avenue, Rochester, New York

BORING: TP-15
SHEET 2 OF 2
JOB: 208453
CHKD BY: ED

CONTRACTOR: TREC Environmental
EXCAVATOR: Kubota KX121-3 Super Series
LABELLA REPRESENTATIVE: E. Dumrese
TEST PIT LOCATION:
GROUND SURFACE ELEVATION: NA
START DATE: 10/3/08 END DATE: 10/3/08
TIME: TO
DATUM: NA

OVERBURDEN SAMPLING METHOD: Direct Grab
OTHER:

DEPTH	SAMPLE NO. AND DEPTH	STRATA CHANGE	VISUAL CLASSIFICATION	PID FIELD SCREEN (PPM)	REMARKS
14		14'	As above. No odor	0.0	
		15'	As above	0.0	
16		16'	As above. No odor	0.0	
		17'	As above	0.0	
18		18'	As above. No odor	0.0	
		19'	Concrete Slab encountered @ ~19.5' BGS *Refusal @ 19.5' BGS*	0.0	
20					
22					
24					
26					

WATER LEVEL DATA			BOTTOM OF TEST PIT	GROUNDWATER ENCOUNTERED
DATE	TIME	ELAPSED TIME		
			19.5' BGS	Not Encountered

NOTES:

GENERAL NOTES
1) STRATIFICATION LINES REPRESENT APPROXIMATE BOUNDARY BETWEEN SOIL TYPES. TRANSITIONS MAY BE GRADUAL.
2) WATER LEVEL READINGS HAVE BEEN MADE AT TIMES AND UNDER CONDITIONS STATED. FLUCTUATIONS OF GROUNDWATER
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BORING: TP-15

LABELLA Associates, P.C.

300 STATE STREET, ROCHESTER, NY
ENVIRONMENTAL ENGINEERING CONSULTANTS

TEST PIT LOG

PROJECT
Phase II ESA: Test Pit Soil Sampling
Port of Rochester
Lake Avenue, Rochester, New York

BORING: TP-16
SHEET 1 OF 2
JOB: 208453
CHKD BY: ED

CONTRACTOR: TREC Environmental
EXCAVATOR: Kubota KX121-3 Super Series
LABELLA REPRESENTATIVE: E. Dumrese
TEST PIT LOCATION:
GROUND SURFACE ELEVATION: NA
START DATE: 10/3/08
END DATE: 10/3/08
TIME: TO
DATUM: NA

OVERBURDEN SAMPLING METHOD: Direct Grab
OTHER:

DEPTH	SAMPLE NO. AND DEPTH	STRATA CHANGE	VISUAL CLASSIFICATION	PID FIELD SCREEN (PPM)	REMARKS
0		0.0'	Topsoil - Concrete wall ~24" thick running north to south **NATIVE MATERIAL**	0.0	
		1.0'	Light brown, SILT, trace f Sand, moist, No odor	0.0	
2		2.0'	As above, No odor	0.0	
		3.0'	As above	0.0	
4		4.0'	As above, No odor	0.0	
		5.0'	As above	0.0	
6		6.0'	As above, No odor	0.0	
		7.0'	As above	0.0	
8		8.0'	As above, No odor	0.0	
		9.0'	As above	0.0	
10		10.0'	As above, No odor	0.0	
		11.0'	As above	0.0	
12		12.0'	As above, No odor	0.0	

WATER LEVEL DATA			BOTTOM OF TEST PIT	GROUNDWATER ENCOUNTERED
DATE	TIME	ELAPSED TIME		
			14.5' BGS	Not Encountered

NOTES:

GENERAL NOTES
1) STRATIFICATION LINES REPRESENT APPROXIMATE BOUNDARY BETWEEN SOIL TYPES. TRANSITIONS MAY BE GRADUAL.
2) WATER LEVEL READINGS HAVE BEEN MADE AT TIMES AND UNDER CONDITIONS STATED. FLUCTUATIONS OF GROUNDWATER
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BGS = Below the Ground Surface
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BORING: TP-16

LABELLA Associates, P.C.

300 STATE STREET, ROCHESTER, NY
ENVIRONMENTAL ENGINEERING CONSULTANTS

TEST PIT LOG

PROJECT
Phase II ESA: Test Pit Soil Sampling
Port of Rochester
Lake Avenue, Rochester, New York

BORING: TP-16
SHEET 2 OF 2
JOB: 208453
CHKD BY: ED

CONTRACTOR: TREC Environmental
EXCAVATOR: Kubota KX121-3 Super Series
LABELLA REPRESENTATIVE: E. Dumrese
TEST PIT LOCATION:
GROUND SURFACE ELEVATION: NA
START DATE: 10/3/08
END DATE: 10/3/08
TIME: TO
DATUM: NA

OVERBURDEN SAMPLING METHOD: Direct Grab
OTHER:

DEPTH	SAMPLE NO. AND DEPTH	SAMPLE STRATA CHANGE	VISUAL CLASSIFICATION	PID FIELD SCREEN (PPM)	REMARKS
14		14'	Various steel debris	0.0	
		14.5'	Concrete slab @ ~14.5' BGS		
			Refusal @ 14.5' BGS		
16					
18					
20					
22					
24					
26					

WATER LEVEL DATA			BOTTOM OF TEST PIT	GROUNDWATER ENCOUNTERED
DATE	TIME	ELAPSED TIME		
			14.5' BGS	Not Encountered

NOTES:

GENERAL NOTES
1) STRATIFICATION LINES REPRESENT APPROXIMATE BOUNDARY BETWEEN SOIL TYPES. TRANSITIONS MAY BE GRADUAL.
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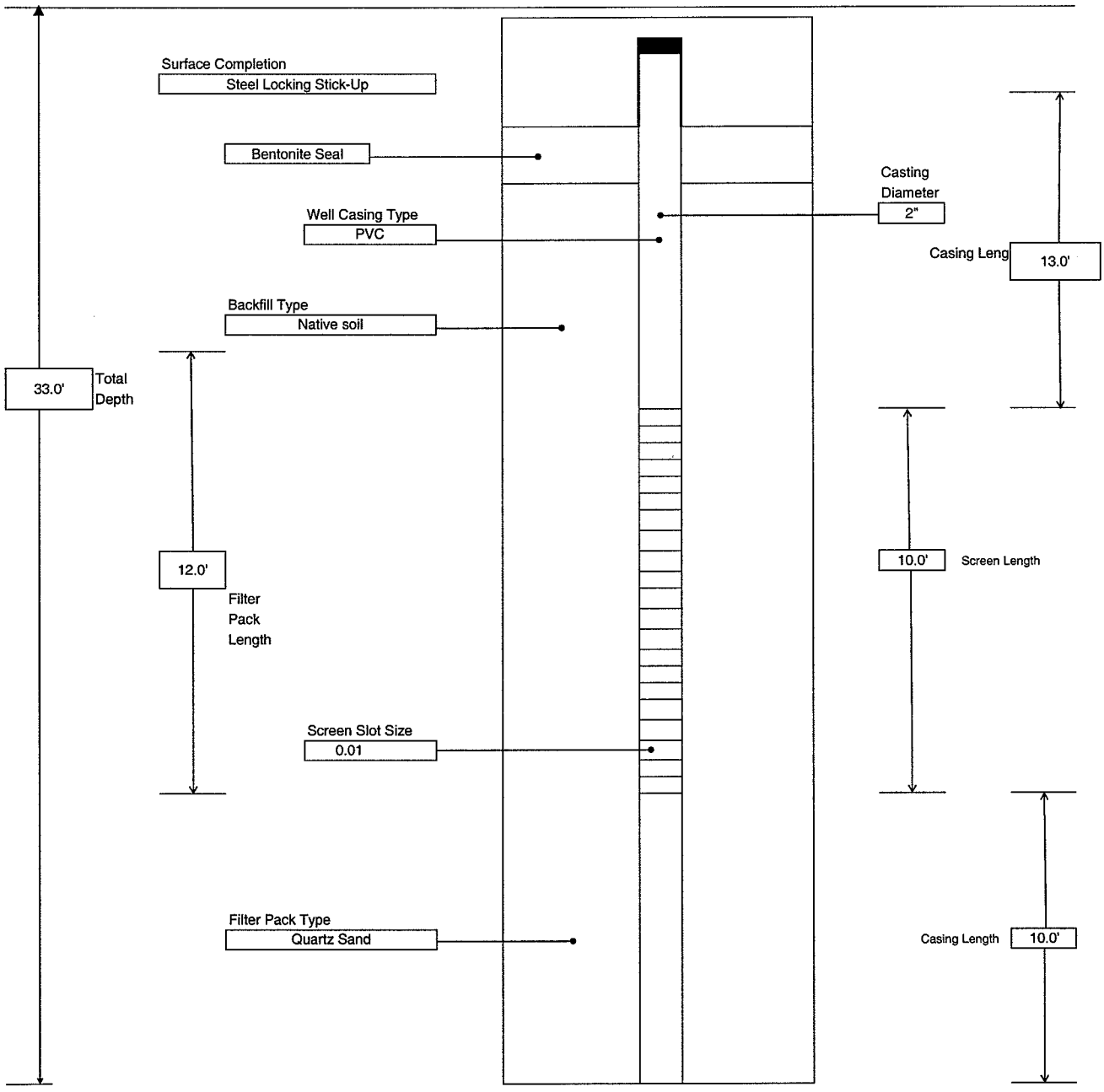
BGS = Below the Ground Surface
NA = Not Applicable

BORING: TP-16

LABELLA Associates, P.C. 300 STATE STREET, ROCHESTER, NEW YORK ENVIRONMENTAL ENGINEERING CONSULTANTS	PROJECT Port of Rochester - Port Redevelopment 4700 Lake Avenue Rochester, New York	BORING: B08-2/MW-1 SHEET 1 OF 1 JOB # 208453 CHKD. BY: ED

CONTRACTOR: Target Drilling, Inc.
DRILLER: B. Saragusa
LABELLA REPRESENTATIVE: Evan Dumrese
BORING LOCATION: Area A-4
GROUND SURFACE ELEVATION: N/A DATUM: N/A
START DATE: 10/24/2008 END DATE: 10/25/2008
TYPE OF DRILL RIG: Rotary Drill Rig
AUGER SIZE AND TYPE: N/A
OVERBURDEN SAMPLING METHOD: Hollow Stem Auger
ROCK DRILLING METHOD: N/A

WATER LEVEL DATA				
DATE	TIME	WATER	CASING	REMARKS
10/25/2008	930	~18.0'		



NOTE: NOT TO SCALE
ALL DIMENSIONS IN FEET UNLESS OTHERWISE INDICATED

GENERAL NOTES:
1) STRATIFICATION LINES REPRESENT APPROXIMATE BOUNDARY BETWEEN SOIL TYPES, TRANSITIONS MAY BE GRADUAL
2) WATER LEVEL READINGS HAVE BEEN MADE AT TIMES AND UNDER CONDITIONS STATED, FLUCTUATIONS OF GROUNDWATER MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS WERE MADE.

LABELLA Associates, P.C.

300 STATE STREET, ROCHESTER, NY
PH: (585) 454-6110 FAX: (585) 454-3066

GROUNDWATER SAMPLING FORM

WELL I.D. B08-2/MW-1

Project Name: Port of Rocheter - Pre Development Assessment Project No.: 208763
Location: 4700 Lake Avenue, Rochester, NY
Sampled By: E. Dumrese Date: 11/5/2008
Weather: Partly Cloudy and Cold ~34 Degrees F.

PURGE VOLUME CALCULATION

Well Diameter: 1.0 -Inch Static Water Level: 11.57 -Feet
Depth of Well: 35.31 -Feet Single Well Volume: 3.90 -Gallons

PURGE & SAMPLING METHOD

[X] Bailer - Type: Disposable Bailer [ ] Pump - Type
Sampling Device: Disposable Bailer Pump Rate:

FIELD PARAMETER MEASUREMENTS

Time	Gallons Purged	pH	Temp (oC)	Conductivity (mS/cm)	Turbidity (NTU)		Comments
							Color =
							LNAPL or DNAPL observed = No

Total ~3.0 Gallons Purged Purge Start Time: 1410 Purge End Time: 1450

WELL SAMPLING

Sample I.D. MW-1 Sample Time: 1500
No. of Containers: 4 Sample Preservation: HCl/HNO3

Sampled For: VOCs - 8260B TCL + STARS; SVOCs - 8270C STARS; PCBs; 8 RCRA-Dissolved TAL Metals

OBSERVATIONS:

Well Volume (1" well) = 0.0408-gal/ft.	Well Volume (4" well) = 0.65-gal/ft.
Well Volume (2" well) = 0.163-gal/ft.	

LABELLA Associates, P.C.
300 State Street
Rochester, New York 14614
Telephone: (585) 454-6110
Facsimile: (585) 454-3066

WELL I.D.: B08-2/MW-1

Project Name: Predevelopment Subsurface Conditions Analysis Investigation
Location: Port of Rochester, Development Area #1, Rochester, New York
Project No.: 208453
Sampled By: E. Dumrese
Date: 2/11/09
Weather: Partly Cloudy, ~50 degrees F.

WELL SAMPLING INFORMATION

Well Diameter:	2"	Static Water Level:	~10.38'
Depth of Well:	~34.37'	Length of Well Screen:	10.0' (13.0' – 23.0' BGS)
Measuring Point:	Top of PVC	Depth to Top of Pump:	~20.0'
Pump Type:	QED Sample Pro – Low Flow Pump	Tubing Type:	¼" O.D. Polyethylene Tubing

FIELD PARAMETER MEASUREMENT

Time	Pump Rate	Gallons Purged	pH	Temp °C	Conductivity (µS/cm)	Turbidity (NTU)	Dissolved O_2 (mg/L)	Depth to Water (Feet)	Comments
			+/- 0.1	+/-3%	+/- 3%	+/-10%	+ 10%	+/- 0.3	
915	<500 mL/min.	0.10	6.54	11.11	5.15	403.0	8.87	10.62	
920	<500 mL/min.	0.20	6.58	11.05	5.15	399.0	9.82	10.98	
925	<500 mL/min.	0.25	6.71	10.99	5.14	444.0	9.54	10.97	
930	<500 mL/min.	0.30	6.77	11.11	5.15	439.0	9.11	10.98	
935	<500 mL/min.	0.40	6.81	11.24	5.15	356.0	8.61	10.99	
940	<500 mL/min.	0.50	6.83	11.28	5.14	340.0	8.32	10.98	
945	<500 mL/min.	0.60	6.86	11.33	5.14	347.0	8.15	10.99	
950	<500 mL/min.	0.70	6.89	11.35	5.13	350.0	7.90	10.98	
955	<500 mL/min.	0.80	6.91	11.37	5.11	336.0	7.09	10.99	
1000	<500 mL/min.	0.90	6.94	11.34	5.08	265.0	6.98	10.99	
1005	<500 mL/min.	1.05	6.96	11.36	5.06	270.0	6.89	10.99	
1010	<500 mL/min.	1.25	6.98	11.37	5.03	287.0	6.76	10.98	

Total ~1.50 Gallons Purged

Purge Time Start: 915 Purge Time End: 1012 Final Static Water Level: 10.99'

OBSERVATIONS

Notes:
- Sample Time = 1015