REMEDIAL INVESTIGATION/

INTERIM REMEDIAL MEASURE WORK PLAN

FOR
1001 MAIN STREET
(FORMER MOBIL SERVICE STATION 99-MST SITE # C915260)
CITY OF BUFFALO, ERIE COUNTY, NEW YORK

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EXECUTIVE SUMMARY

This document presents the Remedial Investigations summary and Interim Remedial Measures work plan for the Brownfield Cleanup Program site located at 979-1001 Main Street, Buffalo, NY. The project details are summarized below:

Contaminant Source and Constituents

The contamination is sourced from a petroleum release from underground storage tanks associated with a former retail gasoline station. The station operated from approximately 1950 to 1982. The site is currently used for surface parking. Constituents requiring remediation are volatile organic compounds associated with gasoline; in particular benzene, toluene, ethyl-benzene and xylenes.

Extent of Contamination

Soil and groundwater have been impacted by the release of gasoline. Soil contamination generally extends from 10 feet below grade to 40 feet below grade, increasing in depth, and decreasing in thickness with distance from the release area. The contamination extends across approximately ½ of the site.

The shallowest site-wide formation for groundwater is generally found within a coarse sand and gravel layer that ranges from ½ to 5-feet thick and is found from 32 to 35 feet below grade. This zone is the main transport layer for contamination beneath the site and is semi-confined by a fine – medium sand and silt above and silt and clay below. Light non-aqueous phase liquid (i.e. residual gasoline product) is also present in this formation in the central area of the site.

Interim Remedy

Numerous studies and remedial activities have occurred on the site over the past ten years. Soil vapor extraction and total fluids removal (high vacuum extraction) have had limited effect. To facilitate the development of the site for a large scale office building, **the project has set a goal of meeting Commercial Use Soil Cleanup Objectives** for the site. To achieve this, the project developers will complete the following interim remedial measures:

1. Installation of both permanent and temporary lag and pile steel sheeting shoring to achieve and excavation depth of up to 42 feet.

2. Removal of approximately 16,000 cu.yds. of contaminated soil for off-site disposal or treatment and a regulated facility. Removal of approximately 11,000 cu.yds. of uncontaminated urban fill/soil for offsite reuse.

3. Dewatering of the excavation area; removal of product for off-site disposal; and on-site treatment of contaminated groundwater for discharge into the sanitary sewer system (under permit from the Buffalo Sewer Authority).

4. Confirmatory soil sampling of the excavation walls (where exposed) and bottom to show compliance with the Commercial Use Soil Cleanup Objective.

1 INTRODUCTION

This Remedial Investigation/ Interim Remedial Measures ("IRM") Work Plan provides a summary of nature and extent of contamination and a description of the procedures that will be implemented for the remediation of contaminated soil and groundwater under the assigned New York State Department of Environmental Conservation ("NYSDEC") Site #C915260. This IRM has been prepared in accordance with Division of Environmental Remediation ("DER")-10 "Technical Guidance for Site Investigation and Remediation." The remedial activities described in the IRM are in accordance with accepted remedies outlined in DER-15 "Presumptive/Proven Remedial Technologies" that will protect both the environment and the health of the local community. To effectively describe the environmental conditions and remedial activities this IRM will cover the following:

- Description of the current and historic site conditions;
- Summary of contaminants of concern and the extent of the contamination;
- Description and sequence of the remedial activities;
- Quality controls and protocols for analytical sampling;
- Description of the health and safety procedures to protect site workers and the local community and
- Description of community participation activities.

C&S Engineers, Inc ("C&S") has prepared this IRM on behalf of the co-applicants of the BCP Kaleida Health, Kaleida Properties and F.L.C 50 High Street Properties. This IRM presents the remedial activities on petroleum-impacted soil, light non-aqueous phase liquids ("LNAPL"), and groundwater covered under the NYS DEC Site #C915260.

This spill is located on four parcels and a portion of a fifth parcel. The BCP applicants have submitted a subdivision application to the City of Buffalo to combine the block bounded by Main, High, Goodrich and Ellicott Streets into two parcels (1001 Main Street and 818 Ellicott Street). The western parcel (addressed as 1001 Main Street) is planned to be re-developed by F.L.C 50 High Street Properties as a medical office building ("MOB") and totals 1.4 acres.

The Brownfield Cleanup Agreement signed by the co-applicants on June 15, 2012 outlines the extent of the remedial activities to be covered under the BCP. In order to effectively remediate the spill, the area covered under the BCP, the BCP Project Area ("Site") includes the entire western parcel (1001 Main Street) and extends approximately 40 feet east onto the adjacent eastern parcel (818 Ellicott Street). Total acreage of the BCP Project Area "Site" is 1.7-acres. The intent of this IRM is to remediate the subsurface soils to meet Commercial Use Soil Cleanup Objectives ("SCO") standards as defined in NYCRR Part 375-6 and petroleum-impacted groundwater greater than 10,000 micrograms per liter ("ug/L") through excavation of soils and dewatering.

1.1 Site Description

The Site is located at 979- 1001 Main Street in the City of Buffalo, New York. The Site is primarily used as a parking lot for Buffalo General Medical Center ("BGMC"). The Site boundary is bordered by the following streets:

North-	Goodrich Street
East-	Approximately 315 ft from Ellicott Street (adjoining parking lot)
South-	High Street
West-	Main Street

The BCP boundary runs concurrently with the Site boundary to the north, south and west and totals 1.7 acres. The eastern border of the BCP boundary has been extended approximately 40 ft to the east. Figure 1-1 shows the boundaries of both the parcels and the Site.

1.2 Site History

Sanborn Maps of the area from 1889 to 1986 were reviewed for this project. From 1889 to 1986 the property has been used for numerous residential and commercial properties including:

- The University at Buffalo Medical and Dental School on the eastern portion of the property;
- A restaurant and hotel on the eastern portion of the property after the medical school left; and
- From 1950 to 1982 an Exxon-Mobil gas station was located at the southwestern corner of the property.

Petroleum releases from underground storage tanks associated with the former retail gasoline station were discovered on site in 1981. Significant site investigation, groundwater monitoring and remedial activities related to the gasoline release have been ongoing since 1996. Site remedial activities that have been implemented in the last 10 years include soil vapor extraction and total fluids removal (high vacuum extraction). These remedies have had limited effect in the overall reduction of contamination across the site.

The site is currently used for surface parking. Constituents that requiring remediation are volatile organic compounds associated with gasoline, in particular benzene, toluene, ethyl-benzene and xylenes.

2 SUMMARY OF ENVIRONMENTAL CONDITIONS

2.1 Nature and Extent of Contamination

Site fill, subsurface soil and groundwater have been impacted by petroleum hydrocarbons from the former Exxon-Mobil Service Station at the corner Main and High Streets. The nature and extent of these contaminants have been clearly defined as a result of more than 30 years of investigative and remedial activities at the Site. The majority of the data collected in the site investigations was provided in the BCP Application. Additional data collected to support the IRM approach since the submission of the IRM is summarized and provided as an attachment to this document.

2.1.1 Groundwater

Groundwater sampling has occurred quarterly or semi-annually since 1997, although a majority of the wells were installed in 2008. The sampling has shown that the dissolved BTEX contaminant plume has generally remained on-site, with the exception of VOCs present along the Goodrich Street right of way in the area of MW-02. However, sampling has also shown that since the cessation of remedial actions in 2008, the LNAPL plume has moved from the eastern side of the Site, to the central and western side of the Site (Figure 2-1).

To confirm that S ite contaminants are limited to petroleum hydrocarbons, a groundwater sampling event was completed in the fall of 2011. Groundwater samples were collected from selected monitoring wells across the Site as well as off-site along Goodrich Street. The samples were subsequently analyzed for full target compound list and target analytic list set of parameters to evaluate the potential presence for COCs other than petroleum hydrocarbons at the Site. Analytical results indicated that the Site COCs are limited to petroleum hydrocarbons.

Appendix A provides a summary of the analytical results from the fall 2011 sampling event.

The shallowest site-wide formation for groundwater is generally found within a coarse sand and gravel layer that ranges from ½ to 5-feet thick and is found from 32 to 35 feet below grade. This zone is the main transport layer for contamination beneath the site and is semi-confined by fine – medium sand and silt above and silt and clay below. LNAPL (i.e. residual gasoline product) is also present in this formation in the central area of the site.

In January – February of 2012, hydrology studies were completed for the Site to establish potential subsurface flow conditions that may affect dewatering to the site during remediation. These studies identified several conditions with the site hydrology:

1. While previous studies had established areas of saturated soil and had identified the contaminant transport zone to be in the coarse sand and gravel layer between 32 and 35 feet, deeper borings and wells established the this zone is semi confined, and that deeper zones of groundwater are present below 50 feet of depth and within the bedrock fracture system (approximately 100 feet depth). Wells screened within these discrete zones showed independent groundwater levels, indicating communication of groundwater between these zones is minimal.

2. Pumping rates within the formations both within the groundwater transport zone and below were very low. Maximum removal rates were approximately 1 quart per minute.

This indicates that while the dense sand and silt soils have porosity, its conductivity (ability to transmit water) is restricted.

Data from the 2012 hydrology studies is presented in Appendix B.

2.1.2 Soils

The extent of soil contamination has been studied over the last ten years in support of design for on-site remediation systems. The most significant data was collected during Exxon-Mobil's 2008 Supplemental Subsurface Investigation. The investigation consisted of the installation of 24 borings, 19 of which were converted to monitoring wells. This investigation provided significant data to delineate the vertical and horizontal limits of the contamination. This data was supplemented by PID screening data collected during the 2010 geotechnical investigation conducted in support of the current proposed Site development and a supplemental Commercial Cleanup Evaluation Investigation in April of 2012 (Appendix C). The data from these three investigations, along with previous studies, has resulted in the following determination of Site conditions:

1. The Site surface contains urban fill of variable thickness (two to 11 feet), which is in turn underlain by sand and a sand silt formation in the top 25 to 35 feet BGS. Below the sand and silt layers is a laterally discontinuous coarse sand and gravel lens one to five feet in thickness, which can act as a preferential pathway for groundwater flow. Beneath this coarse sand and gravel lens(s) are silt and inter-bedded sand beds to a depth of approximately 42 feet BGS.

2. An area of free product (LNAPL) is in the area of groundwater monitoring wells MW-11, MW-22, MW-26, MW-23 and MW-24.

3. The main zone of contaminated soil is in the middle of the Site. The shallowest depth of contamination is approximately 10 feet BGS, although in general the depth ranges from approximately 20 feet BGS (top of contaminated zone) to approximately 40 feet BGS (bottom of contaminated zone).

4. A thin zone of contamination extends northward across the northern property boundary, within the discontinuous coarse sand/gravel lens. This contaminant zone appears to be associated with preferential groundwater flow in that zone. The coarse sand/gravel lens ranges from ½ to five feet in thickness and ranges in depth between 32 to 35 feet BGS.

Based on the assumed remediation goal of Commercial Use, Figures 2-2 and 2-3 respectively show the horizontal limits of soil contamination, the depth of the top of excavation of contaminated soils and the depth of the bottom of excavation.

Based on the nature and extent of the soil and groundwater contamination, the following sections present the estimated volumes of contaminated soil, groundwater and free product that are likely present on-site.

2.1.3 Area and Volume of Contaminated Soil

Contaminated soil is expected to exist on-site from a depth of approximately 10 feet (15 feet above groundwater) to a depth of approximately 40 feet BGS. In the area of the Site where free product is present, contaminated soils may be present to a depth to 42 feet BGS.

Potential volume of contaminated soils that exceed Commercial Use SCOs is approximately 430,000 cubic feet; or approximately 16,000 cubic yards. The calculation is presented in the table below:

Table 2-1: Estimate of Contaminated Soil to be Removed

				TOTAL VOLUME	
CONT. THICKNESS	**MEDIAN RANGE**	**CONTAMINATED AREA (sq ft)**	**MEDIAN TOTAL DEPTH**	**VOLUME (cu ft)**	**VOLUME (cu yds)**
5-10	0	0		-	-
10-15	0	0		-	-
15-20	0	0		-	-
20-25	22.5	12,542	40	282,195	10,452
25-30	27.5	5,534	42	152,198	5,637
				434,393	16,089

2.1.4 Area and Volume of LNAPL

Data collected during the February 2012 groundwater sampling event indicates that there is an area of LNAPL free product located in the central portion of the Site. The area of the free product is approximately 0.15 acres. Assuming an overall average thickness of ½ -inch of free product within the 0.15 acres and an average soil porosity of 30% [1], approximately 586 gallons of free product is estimated to be on the Site (See Figure 2-1). The calculation is presented in the table below:

Table 2-2: Estimate of LNAPL to be Removed

				TOTAL VOLUME	
LNAPL THICKNESS (ft)[1]	**AREA (ft)[2]**	**VOLUME (cu ft)**	**AVG POROSITY[3]**	**VOLUME (cu ft)**	**VOLUME (gal)[4]**
0.04	6,534	261	30%	78	586

1: 1-inch = 0.08 feet

2: 0.15 acres = 6,534 sq ft

3: Based on average for a medium sand matrix

4: 1 cu ft LNAPL = 7.48 gal

2.1.5 Area and Volume of Contaminated Groundwater

Calculation of the volume of contaminated groundwater on-site is represented by the area on-site where BTEX contamination in groundwater exceeds 10.0 ug/L, as represented on Figure 2-1. This occurs in a total area of approximately 1.02 acres.

While the potentiometric top of the water table (25 feet BGS), the groundwater bearing zoning is generally confined in from a depth of 32-35 feet BGS, with a maximum thickness of 5 feet. Assuming a saturated zone of 5 feet, this is a volumetric area of approximately 85,000cubic feet. Using an average interstitial total porosity of 39% (for coarse sands[1]) and 7.48 gallons of water per cubic foot, approximately 635,000 gallons of contaminated groundwater exceeding 10 ug/L can be expected to be in place in this area of the Site. Using an effective porosity of 30%, approximately 147,000 gallons will remain entrained in the soil if full dewatering of the soil layer were to occur. The calculation is presented in the table below:

Table 2-3: Estimate of Contaminated Groundwater Volume

				TOTAL VOLUMES	
Water bearing Zone Thickness (ft)[1]	**AREA (ft)[2]**	**VOLUME (cu ft)**	**AVG POROSITY[3]**	**VOLUME (cu ft)**	**VOLUME (gal)[4]**
5.0	43,560	217,800	39%	84,942	635,366
5.0	43,560	217,800	30%	65,340	488,743
				Gallons Entrained	**146,623**

1: Based on coarse sand and gravel layer max. thickness

2: Area Rounded to 1 acre

3: Based on average porosity for a coarse sand matrix (39%) and effective porosity (30%)

4: 1 cu ft water = 7.48 gal

Of the remaining groundwater entrained in the soil, an area of approximately 18,076 sq. ft will be removed and disposed during remediation. With an assumed saturate thickness of 5 feet, a total of approximately 61,000 gallons of entrained contaminated water will be removed through excavation. The calculation is presented in the table below:

[1] Argonne National Laboratories (http://web.ead.anl.gov/resrad/datacoll/porosity.htm)

Table 2-4: Estimate of Contaminated Groundwater Volume in Excavated Soils

				TOTAL VOLUME	
Water bearing Zone Thickness (ft)[1]	**AREA (ft)[2]**	**VOLUME (cu ft)**	**AVG POROSITY[3]**	**VOLUME (cu ft)**	**VOLUME (gal)[4]**
5.0	18,076	90,380	9%	8,134	60,844
				Less total gal. of contaminated water entrained	146,623
				Entrained Gallons Remaining	**85,779**

1: Based on coarse sand and gravel layer max. thickness

2: Area Rounded to 1 acre

3: Based on 9% difference between porsity (39%) and effective porosity (30%) of onsite soils

4: 1 cu ft water = 7.48 gal

Of the estimated 635,000 gallons of contaminated water beneath the Site, approximately 86,000 gallons will remain after the IRM dewatering and excavation is completed.

3 IRM WORK PLAN

The remedial action will be comprised of three main tasks:

- The construction of the shoring system;
- Soil excavation and removal and
- Groundwater collection and treatment.

This remedial action has been determined to be appropriate for the cleanup of contaminated soil to achieve specific soil cleanup standards outlined in NYCRR Part 375-6.

3.1 IRM Cleanup Objectives

The remedial work planned for the Site is intended to remediate soil contamination to meet Commercial Use Soil Cleanup Objectives ("SCO") as specified in NYCRR Part 375-6. Soil contamination is variable throughout the Site. The highest concentration of contamination is located in the surrounding soils of the release source. The remedial action will target removing these soils, and associated groundwater and LNAPL, for attaining compliance with the Commercial Use SCO.

3.2 Phasing of Remedial Activities

To ensure efficient use of the resources required for the remediation of the Site, it is essential that the sequence of Site activities be well defined. The IRM work at the Site will be conducted in the following sequence:

- Waste Characterization
- Site Preparation
- Installation of shoring system
- Placement of groundwater collection and treatment system
- Excavation of petroleum contaminated soils
- Sampling and analysis of soil to confirm Commercial SCO has been completed
- Construction of sub-grade facilities

Work is proposed to begin in September of 2012. It is estimated that remedial activities will last approximately 4 months. All sampling activities will be conducted in accordance with NYSDEC quality assurance protocols outlined in **Section 5: Quality Assurance and Quality Control Protocols.** The Citizen Participation Plan ("CPP") that informs the public on the proposed remediation is included in Appendix D. The public health of the local community will be monitored during construction activities as outlined in the Community Air Monitoring Plan ("CAMP") provided in Appendix E. C&S will provide oversight, air monitoring, soil screening, GPS data and photographic and other documentation during the IRM activities. The following sections define the work required to complete each of the tasks comprising the remedial activities of the IRM.

3.2.1 Waste Characterization

Waste characterization of the soils was conducted in October, 2010. Waste characterization activities took place before construction; composite samples were collected at ten boring locations throughout the Site. Composite samples were sent to a laboratory and were analyzed for the following contaminates:

- TCLP VOCs
- TCLP SVOCs
- TCLP Metals
- PCBs
- Pesticides
- Ignitability

- Flash Point

The results of the sampling determined the soil was not a hazardous waste. A letter summarizing the results was transmitted to the NYSDEC in December 2010.

3.2.2 Site Preparation

Public Exclusion Areas

A public exclusion area will be clearly marked out around the Site by the temporary construction fencing.

To the north, fencing will be extended across Goodrich Street, and extended eastward to provide Site security and to complete the "exclusion zone". Fencing will also be installed north-south along the eastern Site boundary, except where entry in and out of the excavation will take place. Additionally, to allow for dedicated pedestrian access through this area during construction, jersey barriers will be placed along Main Street, between High and Goodrich Streets. Figure 3-1 shows the general construction layout of the site.

3.2.3 Shoring System

Site Shoring

The perimeter of the Site will be permanently shored with lag and pile sheet metal wall system. This system creates a water tight seal using overlapping, interconnected steel plates. Shoring will be installed to a depth of 40 feet BGS, in certain areas along Main Street, where excavation may be deeper to reach contamination; shoring will be installed to a depth of 50 feet.

Shoring along the perimeter will utilize tie-backs into the surrounding soil to maintain structural integrity during excavation. Where excavation does not extend all the way to the Site perimeter, excavation walls will use a combination of temporary shoring and soil benching to maintain wall integrity. Figure 3-2 shows the plan view of the shoring system, Figure 3-3 shows a typical section design of the shoring system.

3.2.4 Groundwater Collection and Treatment System

An industrial discharge permit will be secured from the Buffalo Sewer Authority ("BSA") to discharge groundwater into the sanitary sewer system. The BSA permit allows treated water to be discharged into the BSA sanitary sewer system. The discharge is limited only to periods where no rain or snow melt are occurring.

Groundwater collected as part of Site de-watering activities will be pumped into on-site settling tanks. From the tanks, it will subsequently pass through an activated carbon treatment vessel for treatment of VOCs prior to discharge to the BSA sewer system. In addition to carbon treatment, the system will also contain an oil-water separation chamber to collect LNAPL that may enter the dewatering system. Figure 3-4 shows a schematic of the treatment system.

Once excavation begins, several sumps may be utilized to maintain the water level in the excavation. In addition, in several areas where free-phase petroleum is known to exist, sumps may be used to temporarily collect product. The product will be removed by periodically vacuuming the LNAPL.

Pre- and post-treatment samples of collected water will be periodically sampled per permit requirements to verify treatment system performance. Samples will be analyzed on a 48 hour turnaround time. The flow of water through the treatment system will be monitored with a flow meter to record total volume treated and discharged to the BSA.

Treatment system operational records including daily volumes, product recovered, influent and effluent analytical results, times of operation and permit discharge monitoring reports will be kept on-site and will also be included in the final engineering report.

3.2.5 Excavation

Soils within the shoring wall area will be excavated at various depths across the Site, Figures 2-2 and 2-3 show the estimated depths of excavation. Contaminated soil within the release source ranges from 10 ft BGS to 42 ft BGS; excavation will remove contaminated soils to the level required to met Commercial SCO. The following lists the type of equipment to be used during excavation (Note that this list is subject to change as needed by the contractor as excavation conditions and needs change.):

- Caterpillar 312BL Backhoe
- Komatsu PC200LC Backhoe
- John Deere 240 D LC Backhoe
- Komatsu D68 Dozer
- Komatsu WA180 Front Loader
- Dump Trucks

Soil/Fill Management

Excavation will remove both contaminated and non-contaminated soils. Excavated soils will be inspected for staining or discoloration and screened for the presence of VOCs on-site into "clean soil" and "contaminated soil" using a photo-ionization detector ("PID"). Impacted material will be directly loaded into trucks and shipped to a licensed disposal or treatment facility.

Contaminated soils removed from areas of known petroleum impacts, based on previous records of soil analytical results and PID readings, will be segregated for disposal/recycling at a NYSDEC approved facility. Excavated soils will be continuously screened with PID during remediation activities; soils that exceed 10 ppm or contain a petroleum odor will be segregated for additional testing. Sampling parameters of excavated soils will be generally based on guidance provided DER-10 Table 5.4(e)10; or in coordination with the NYSDEC field representative. Results of the excavated soil testing will be reported to the NYSDEC. Excavated soils that are below residential criteria in Appendix 5 will be sent for offsite reuse.

Once the excavation nears the target depths and horizontal limits, soil samples will be collected to assess whether the Commercial Use SCO has been met.

Soil Tracking Prevention

Trucks and equipment leaving the Site will be broom-cleaned to remove clumped soil and prevent soil tracking off-site. Standard construction protocols will be utilized, including stone aprons and periodic sweeping of the construction exit areas. Adjacent roads in the designated truck route will be inspected daily to ensure the prevention of soils migration. Roads that have any soils accumulation will be mechanically scraped rather than mechanically broom swept to reduce fugitive dust emissions. Excavation on-site will occur in a manner which minimizes the tracking of on-road haul trucks from moving through contaminated soils. On-site stone haul roads may be constructed as necessary to reduce the amount of soils tracked onto the stone apron areas. The use of water to clean truck tires will be avoided to prevent the generation of potentially impacted water.

3.2.6 Closure Sampling Plan

Soil sampling will be performed to assess whether cleanup standards have been achieved. As outlined in **Section 3.1: IRM Cleanup Objectives;** remediation will be deemed complete when soil analytical results from the excavation limits demonstrate that VOC concentration are below the Commercial Use. Samples will be taken after horizontal and vertical excavation limits have been completed. Since BTEX and related petroleum compounds have been verified as the only Site COCs, closure soil sample analysis will be limited to VOCs using EPA Method 8260B.

If requested by the NSYDEC, approximately 10% of the closure samples will be analyzed for TAL Metals, SVOC, PCB and Pesticides**.**

Prior to excavation, the Site will be divided into excavation sectors. These sectors will be used to systematically excavate the hole and provide sufficient entrance and egress. Once field monitoring indicates that remediation objectives have likely been met (based on estimated excavation limits, soil vapor readings, odor and visual concurrence), closure samples of the bottom and sidewalls of the excavation will be collected for VOC analysis on a 24-hour turnaround basis. If sampling indicates that targeted remedial goals have not been met, excavation in that area will resume and the process will be repeated. If analytical results indicate that the remedial goals have been met, the results will be transmitted to the NYSDEC and excavation will cease in that sector.

One sidewall sample will be collected for each 30 linear feet by 20 vertical feet of excavated sidewall and one sample will be collected from the bottom of each 225 square feet (15 by 15 feet) of excavated bottom. Category B deliverable package will be requested to validate analytical results by a third-party expert.

All sampling locations will be given a discrete identifying number, its depth will be recorded (based on construction surveying crew data) and its horizontal location will be recorded using a survey quality hand held GPS, with an approximate accuracy of 2 foot. Post excavation soil samples will be collected in concurrence with the NYSDEC field representative.

3.2.7 Sub-grade facilities

Once the sampling and analysis has confirmed the soil remedial objectives have been met, construction of the MOB will begin. The MOB will have two floors of sub-grade parking. The shoring system will be left in place and will become the walls for the sub-grade parking. Once the parking decks are in place, construction of the above-grade portion of the MOB will commence.

4 REMEDIAL INVESTIGATION

This section describes the activities to determine if the IRM was successful in achieving Commercial Cleanup standards.

4.1 Environmental Conditions

Site fill, subsurface soil and groundwater have been impacted by petroleum products that were released from USTs from the former Exxon-Mobil Service Station. Over thirty years of investigations on the Site has concluded that the COCs are primarily BTEX compounds. The following summarizes what is known about the extent of contamination across the Site:

1. The main contaminated zone exists in the middle of the Site where the former USTs were located. Soils within the main contaminated zone is impacted from 10 ft BGS to 40 ft BGS.

2. An area of free product (LNAPL) is in the area of groundwater monitoring wells MW-11, MW-22, MW-26, MW-23 and MW-24. These wells are within the estimated extent of the release area.

3. Groundwater exists as a semi-confined aquifer, with a coarse sand/gravel lens between 32 and 35 feet BGS and ranges between ½ to five feet in thickness. This coarse sand/gravel zone acts serves as the method contaminant transport to the north across the Site.

4. Contaminated soil has expanded from the release area northward across the northern property boundary, with preferential groundwater flow in the discontinuous coarse sand/gravel lens.

Further detail can be found in **Section 2.1 Nature and Extent of Contamination**.

4.2 Remedial Investigation Rationale

The IRM as described in the previous section (**3 IRM Work Plan**) allows for a comprehensive view of subsurface conditions. Implementing the IRM will enhance the understanding of fate and transport of contamination. The remedial investigation will follow the source removal and Site dewatering that was accomplished in the IRM. This investigation will assess the remaining conditions after the IRM has been employed.

4.2.1 Soils

Soil sampling will assess whether Commercial Cleanup SCOs have been achieved. Soil sampling will be preformed after horizontal and vertical limits have been completed. One sidewall sample will be collected for each 30 linear feet by 20 vertical feet of excavated sidewall and one sample will be collected from the bottom of each 225 square feet (15 by 15 feet) of excavated bottom. Based on these guidelines, approximately 80 bottom samples and 36 sidewall samples will be collected.

All sampling locations will be given a discrete identifying number, its depth will be recorded (based on construction surveying crew data) and its horizontal location will be recorded using a survey quality hand held GPS, with an approximate accuracy of 2 foot. Post excavation soil samples will be collected in concurrence with the NYSDEC field representative.

Closure sampling is further discussed in **Section 3.2.6 Closure Sampling Plan**.

Samples will be collected as grab samples from both the excavation floor and side walls. Samples will be collected as outlined in DER-10 for grab samples and discussed in **Section 5.1.1 Sampling Methods** in this IRM.

4.2.2 Groundwater

Post-remediation groundwater monitoring wells will be installed after the Site has been backfilled. The number and final location of the monitoring wells will be determined in concordance with the NYSDEC field representative, however it is anticipated that at least four wells will be placed on Site.

Monitoring wells will be advanced to approximately 35 ft BGS (as determined from curb elevation). Wells will be constructed using a 2-inch inside diameter flush-joint Schedule 40 PVC pipe and 0.010-inch slotted well screen. Subsequent to installation of the pipe and well screen, a sand pack will be constructed from the base of the well to one foot above the top of the well screen. A bentonite clay seal will then be installed on top of the sand pack. Installation will be completed after the wells have been grouted to ground surface or to the top of the lowest parking garage floor.

After installation, two to three rounds of sampling over six months will be conducted. Prior to sample collection, water levels will be measured and recorded from all monitoring wells. Following water level measurements, all monitoring wells will be purged using a polyethylene bailer. Samples will be taken subsequent to purging and after fresh groundwater has re-filled the wells; samples will be collected using polyethylene bailer and collected in the appropriate sample bottles provided by the analytical laboratory. Groundwater samples will be analyzed for VOCs in accordance with EPA SW-846/Method 8260 methodology. Category B deliverable package will be requested to validate analytical results by a third-party expert.

4.3 Reporting

Based on the results of the remedial investigation a Remedial Investigation / Alternative Analysis Report ("RI/AAR") will be submitted to the NYSDEC. The RI/AAR will assess the effectiveness of the IRM in comparison with other remedial options in achieving site cleanup levels.

5 QUALITY ASSURANCE AND QUALITY CONTROL PROTOCOLS

To ensure that suitable and verifiable data results are obtained from the information collected at the Site, quality assurance procedures are detailed in this section.

5.1 Sampling Methods, Analytical Procedures and Documentation

5.1.1 Sampling Methods

Sampling procedures will be conducted in accordance with the NYSDEC *Sampling Guidelines and Protocols Manual*. Collecting of representative samples will include the following procedures:

- Ensuring that the sample taken is representative of the material being sampled;
- Using proper sampling, handling and preservation techniques;
- Properly identifying the collected samples and documenting their collection in field records;
- Maintaining chain-of-custody; and
- Properly preserving samples after collection.

Soil Sampling

Soil sampling will be performed using two methods: (1) field screening using a PID and (2) grab samples.

Several discrete samples will be taken from each soil pile and placed into individual zip-lock bags. Soil samples will be allowed to sit in sealed zip-lock bag for a short period of time (minimum of five minutes). Head space measurements will then be taken from each zip-lock bag. To prevent cross contamination zip-lock bags will not be reused and will be properly disposed. Calibration of all electronic field screening equipment will be completed daily and will be done to manufacture's specifications.

Contaminates of concern during excavation are BTEX and petroleum related compounds; only analysis of VOCs will be sampled using the grab method. As detailed in the *Sampling Guidelines and Protocols Manual*, grab samples will be placed in 8oz wide mouth glass jars. Sample jars will immediately be placed on ice in a cooler.

Soil sample frequency will be based on the guidance with DER-10. Confirmatory bottom soil samples will be collected on a 15 by 15 foot square grid (225 sq ft). Based on the estimated excavation area of 18,000 sq. ft., approximately 80 confirmatory bottom samples will be collected. Confirmatory side wall samples will also be collected, because of the estimated depth of the excavation, sidewall samples will be collected on a 30 by 20 foot grid. Based on the estimated limits and depths of excavation (560 linear feet of wall to a maximum depth of 40 feet), approximately 36 side-wall samples will be collected. Note that this area does not include side-wall samples from the western property boundary that will consist of a permanent shoring

face. Final number of samples will be verified once field excavation limits are achieved. Sampling frequency will be established in concurrence with the NYSDEC field representative.

An estimated total of 120 confirmatory samples will be collected from both the walls and bottom. As stated in DER-10, if conditions warrant (discrete layers of staining, etc.), additional samples may also be collected. Table 4-1 presents a summary of the number of samples scheduled for collection.

Confirmatory samples will be collected in a timely manner, based on the following DER guidance:

- Within 24 hours of excavation, samples should be collected from the zero to six-inch depth interval;
- After 24 hours, samples should be collected at six to twelve inches depth interval at the excavation floor; and
- No water should be present in the excavation bottom where bottom samples are collected.

Water Sampling

Water sampling will be conducted on the de-watering treatment system to demonstrate compliance with the BSA temporary Industrial Discharge permit. Effluent samples will be collected as required to show that discharge limits are being met, as well as to track the effectiveness of the carbon filtration media and estimate the timing for carbon replacement. Additionally, influent samples will be collected in order to track the general VOC concentrations that are entering the treatment system, and to correlate the concentration of VOCs in groundwater remaining in the ground. It is estimated that 20 influent samples will be collected during site activities.

Samples will be collected in 40 ml glass jars and immediately placed on ice. The water will be analyzed for VOCs on a 24-hour turnaround time.

QA/QC Sampling

Duplicate samples will be collected from a minimum of 10% of the locations, selected randomly. Based on an estimate of 120 confirmatory soil samples and 20 water influent samples, 12 duplicate soil and 2 water samples will be collected .

Matrix Spike /Matrix Spike Duplicates ("MS/MSD") will also be collected on a 10% allocation. Therefore an additional 12 soil and 2 water samples will be collected for MS/MSD analysis.

Table 4-1: Summary of Estimated Sampling

Sample Type	Matrix	Est. #	Purpose
Excavation Bottom	Soil	80	Confirmatory
Excavation Wall	Soil	40	Confirmatory

Groundwater Influent	Water	20	Confirmatory
Duplicate Soil	Soil	12	QA/QC
Duplicate Influent	Water	2	QA/QC
MS/MSD –So.	Soil	12	QA/QC
MS/MSD –Aq.	Water	2	QA/QC
	Total	**168**	

5.1.2 Analytical Procedures

Laboratory Analysis

Laboratory analysis will be conducted by a third-party laboratory that is accredited by the NYSDOH Environmental Laboratory Accreditation Program ("ELAP"). Laboratory analytical methods will include the most current NYSDEC Analytical Services Protocol ("ASP").

Remedial investigations have concluded that the Site is impacted by petroleum compounds which are primarily BTEX. Soil samples sent to a certified laboratory will be tested for Total Compound List VOCs using the U.S. EPA Method 8260B. To fill in data gaps from previous investigations approximately 10% of post excavation soil samples, in addition to VOC, will be analyzed for the following contaminates:

- Target Analyte List for Metals and Cyanide (EPA Method 6010C);
- Target Compound List for Semi-volatile Compounds (EPA Method 8270);
- Target Compound List for Pesticides/Aroclors (EPA Method 8081A); and
- Polychlorinated biphenyls (EPA Method 8082)

Category B deliverable will be requested to be used in a third-party data validation.

Data Usability

Data Usability Summary Report ("DUSR") will be performed by a third-party data consultant using the most recent methods and criteria from the U.S. EPA. The DUSR will assess all sample analytical data, blanks, duplicates and laboratory control samples and evaluate the completeness of the data package.

5.1.3 Documentation

Custody Procedures

As outlined in NYSDEC *Sampling Guidelines and Protocols,* a sample is under the following conditions:

- It is in your actual possession;

- It is in your view after being in your physical possession;
- It was in your possession and then you locked or sealed it up to prevent tampering; or
- It is in a secure area

The environmental professional will maintain all chain-of-custody documents that will be completed for all samples that will leave the Site to be tested in the laboratory.

Soil Manifests

All soil being removed from the Site will be tracked by bills-of-lading forms.

Truckloads of contaminated soil will be tracked using bills-of-lading provided by the respective disposal or recycling facility.

Records of truck loads will be kept on-site during construction and recording sheets and copies of the bills of lading documenting the final total trucked tonnage will be provided in the Final Engineering Report.

Water Sampling Results

Treatment influent and effluent analytical results will be included in the Final Engineering Report. The final influent sampling results from each dewatering sump will provide documentation of the remaining groundwater conditions.

Air Monitoring Records

Air monitoring will be conducted for both community air protection and for in-hole construction activities. Air monitoring will be conducted continuously during active excavation periods. The monitoring will include particulate and VOC screening. All records will be kept on-site during construction and will be made available for regulatory inspection. A daily air monitoring log, including discrete and time-weighted average meter readings, will be maintained through the end of remedial field activities. The specifics of the air monitoring procedures and criteria are detailed in the CAMP (community perimeter monitoring) and HASP (in-hole activities).

6 HEALTH AND SAFETY

To assure the safety of the workers and the local community, monitoring practices of the work environment will be in place during all phases of IRM activities. A Health and Safety Plan ("HASP") was prepared that details procedures for maintaining safe working conditions and minimizing the potential for exposure to hazardous material. The HASP is provided in Appendix F.

Air monitoring during active construction will be conducted using PID and a aerosol particle meter. Details on air monitoring are provided in the Community Air Monitoring Plan ("CAMP"). The CAMP is provided in Appendix E.

7 REPORTING

An environmental professional from C&S will be on-site on a full-time basis to document IRM activities. Documentation will include the following parts:

- Daily reports of remedial activities;
- CAMP results; and
- Photographs and fieldwork maps.

7.1 Construction Monitoring

Reporting procedures will include a daily report. Information that may be included on the daily report includes:

- Processes and location of construction under way;
- Equipment and personnel working in the area;
- Number and type of truckloads of soil/fill removed from the Site;
- A description of off-site materials received;
- Approximate verification sampling locations and sample designations; and
- Problem identification and corrective measures.

The NYSDEC will be notified of problems requiring modifications to this IRM prior to proceeding. Photographic documentation of the IRM activities will be prepared by C&S throughout the duration of the remediation as necessary.

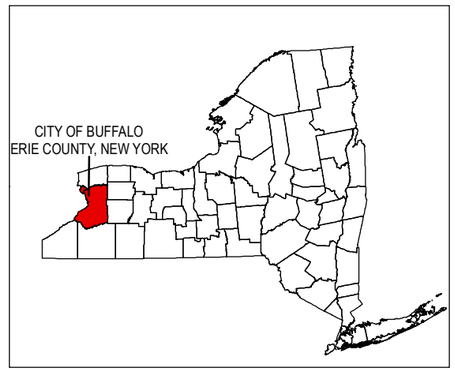
A summary of the IRM activities will be submitted to the NYSDEC as monthly progress reports and will be included in the Final Engineering Report. All data submitted to the NYSDEC will be in approved electronic data deliverable ("EDD") format.

8 SCHEDULE

It is assumed that NYSDEC will promptly review this IRM followed by a 30 day comment period. An approved IRM by mid-September would start remedial activities by mid-October, 2012. Site preparation is planned to begin in September of 2012. IRM activities are anticipated to last 4 months.

FIGURES

Location Map



Legend

- Proposed Medical Office Building Site
- Proposed BCA Boundary

Notes

1) Digital Orthophoto from NYS GIS Clearinghouse. Buffalo 2011 1 ft resolution.

2) Coordinate System: NAD 1983 StatePlane NY West FIPS 3103
Projection: Transverse Mercator
Datum: North American 1983
Units: Foot US

0 100 200 Feet

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CITY OF BUFFALO, NY

No.	DATE	REVISIONS

PROJECT NO:	K11.002.001
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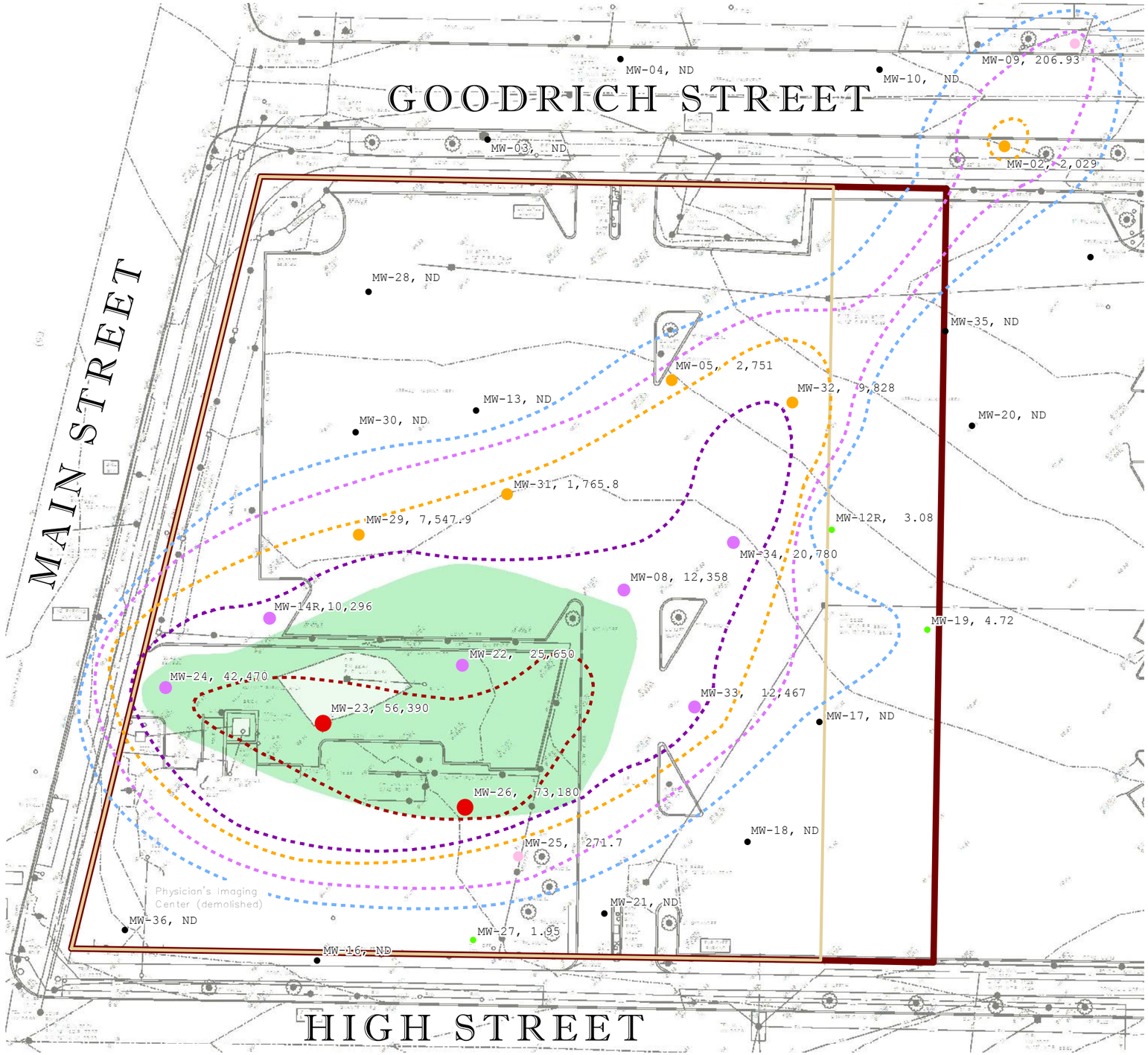
DRAWN BY:	CAM
DESIGNED BY:	CAM
CHECKED BY:	MJC

SITE PLAN

FIGURE 1-1

Path: F:\Project\K11-Kaleida Health\K11.002.001 - MOB Brownfield Cleanup Program\Environmental-study\CADD-GIS\GIS\Projects\IRM_FIGURE_1-1_SITE_LOCATION.mxd



Legend

- Proposed Medical Office Building Site
- Proposed BCA Boundary
- Separate Phase Hydrocarbon Plume ("Free Product Zone") February 2012

Total BTEX Concentration (ug/L) February 2012

- Not Detected
- <10
- 10 - 100
- 100 - 1,000
- 1,000 - 10,000
- 10,000 - 50,000
- >50,000

Location Identifier — Concentration ug/L
MW-24, 42,470
ND = Not Detected

Total BTEX Isoconcentration Contours (ug/L) February 2012

- <10
- 100 - 1,000
- 1,000 - 10,000
- 10,000 - 50,000
- >50, 000

Notes

1) Survey data from McIntosh & McIntosh P.C. "Topographical Map of Part of Lot-29, TWP.-11, R.-8, Holland Purchase" Job No. 7669-B(2) September 24, 2008.

2) The underground utilities shown have been located from field survey information and existing drawings. The surveyor makes no guarantees that the underground utilities shown comprise all such utilities, either in service or abandoned. The surveyor has not physically located the underground utilities.

3) Groundwater sampling results from February 16, 2012 GES Monitoring Report.

4) Coordinate System: NAD 1983 StatePlane NY West FIPS 3103
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0 40 80 Feet

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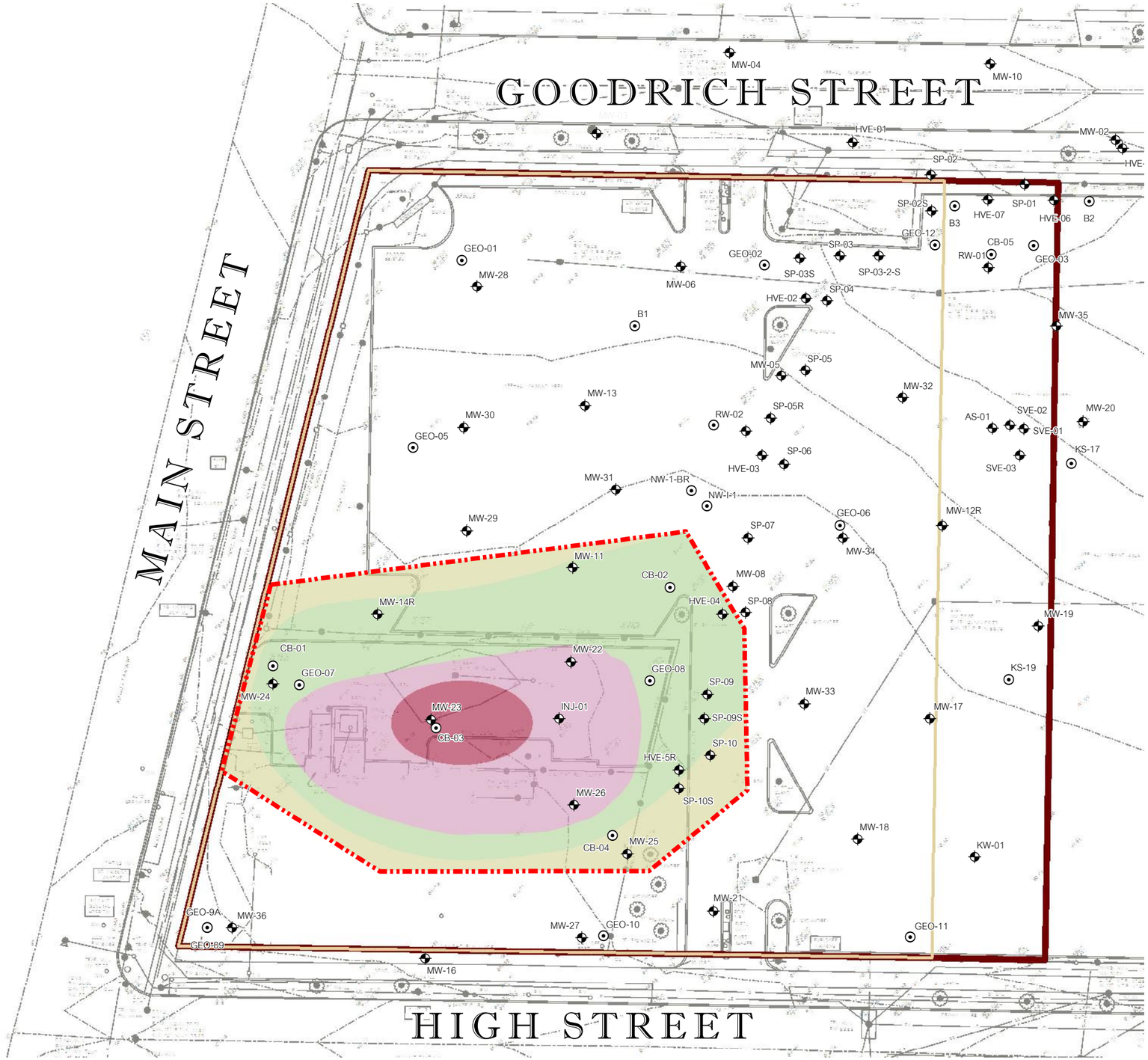
GROUNDWATER CONTAMINANT PLUME

FIGURE 2-1

Path: F:\Project\K11-Kaleida Health\K11.002.001 - MOB Brownfield Cleanup Program\Environmental-study\CADD-GIS\GIS\Projects\IRM_FIGURE_2-1_GW_CONTAMINATION.mxd



Legend

- Monitoring Well
- Soil Boring
- Proposed Medical Office Building Site
- Proposed BCA Boundary
- Proposed Limits of Excavation

Top of Contaminated Soil - Feet Below Ground Surface ("ftbgs")

- 10 ftbgs
- 15 ftbgs
- 20 ftbgs
- 30 ftbgs

Notes

1) Survey data from McIntosh & McIntosh P.C. "Topographical Map of Part of Lot-29, TWP.-11, R.-8, Holland Purchase" Job No. 7669-B(2) September 24, 2008.

2) The underground utilities shown have been located from field survey information and existing drawings. The surveyor makes no guarantees that the underground utilities shown comprise all such utilities, either in service or abandoned. The surveyor has not physically located the underground utilities.

3) Groundwater sampling results from March 23, 2012 GES Monitoring Report.

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SOIL EXCAVATION LIMTS
TOP OF CONTAMINATION

FIGURE 2-2

Path: F:\Project\K11-Kaleida Health\K11.002.001 - MOB Brownfield Cleanup Program\Environmental-study\CADD-GIS\GIS\Projects\IRM_FIGURE_2-2_TOP_CONTAMINATION.mxd

Legend

- Monitoring Well
- Soil Boring
- Proposed Medical Office Building Site
- Proposed BCA Boundary
- Proposed Limits of Excavation

Bottom of Contaminated Soil - Feet Below Ground Surface ("ftbgs")

- 35 ftbgs
- 40 ftbgs

Notes

1) Survey data from McIntosh & McIntosh P.C. "Topographical Map of Part of Lot-29, TWP.-11, R.-8, Holland Purchase" Job No. 7669-B(2) September 24, 2008.

2) The underground utilities shown have been located from field survey information and existing drawings. The surveyor makes no guarantees that the underground utilities shown comprise all such utilities, either in service or abandoned. The surveyor has not physically located the underground utilities.

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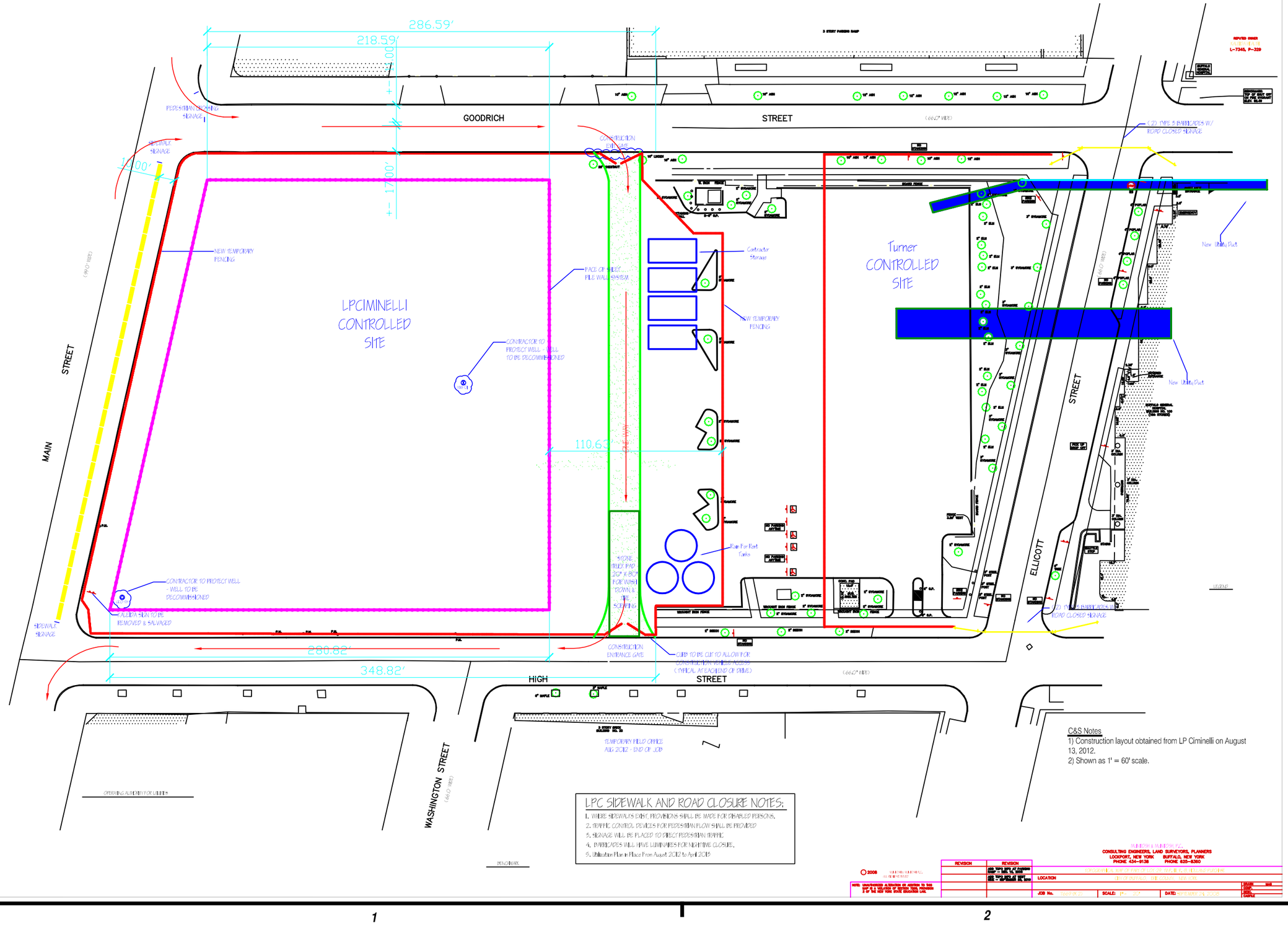
SOIL EXCAVATION LIMTS
BOTTOM OF CONTAMINATION

FIGURE 2-3

Path: F:\Project\K11-Kaleida Health\K11.002.001 - MOB Brownfield Cleanup Program\Environmental-study\CADD-GIS\GIS\Projects\IRM_FIGURE_2-3_BOTTOM_CONTAMINATION.mxd



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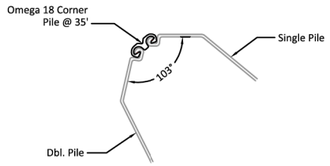
DESIGNED BY:	LP Ciminelli
CHECKED BY:	

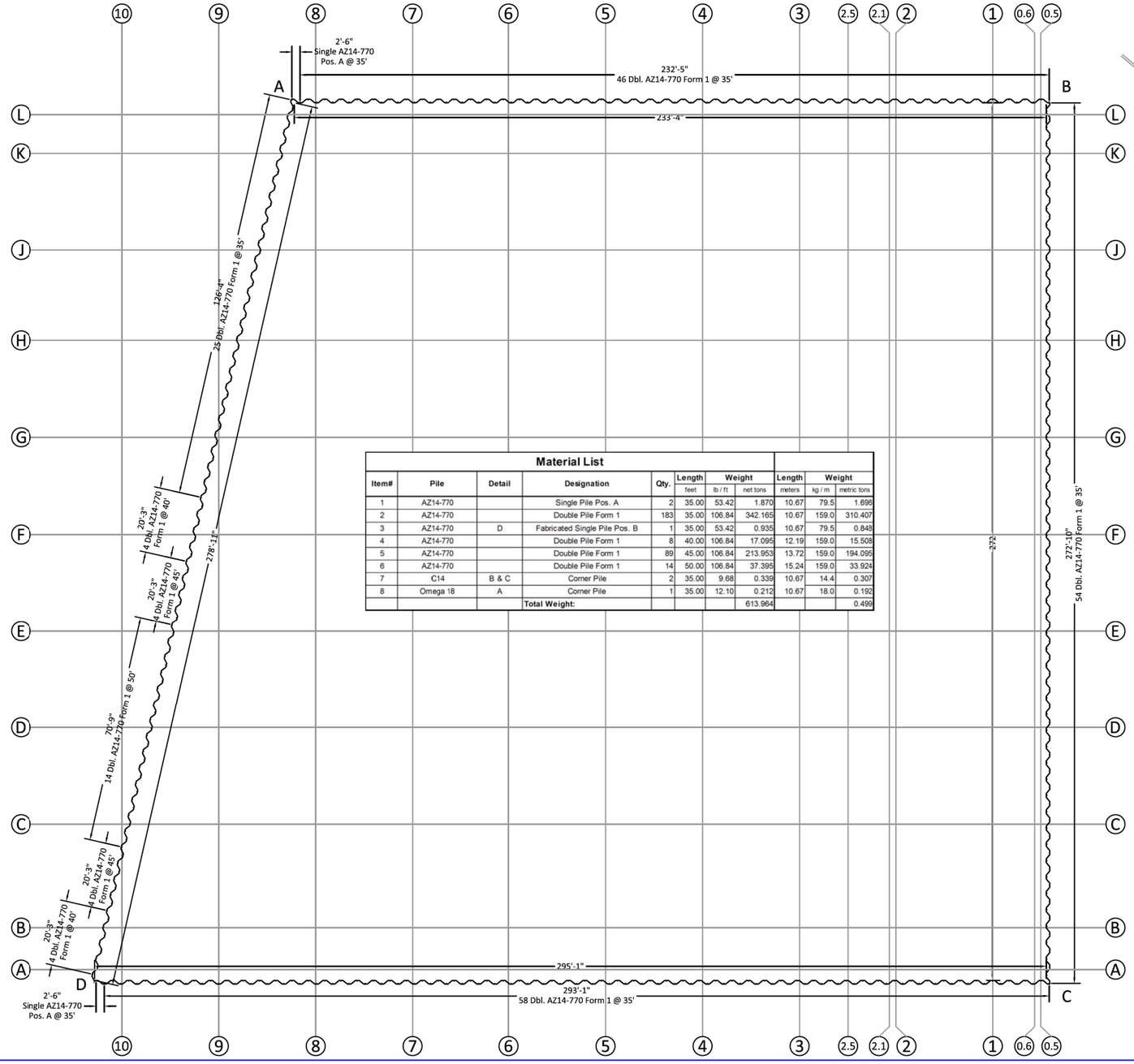
GENERAL CONSTRUCTION LAYOUT

FIGURE 3-1

Preliminary

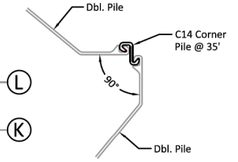


Detail A

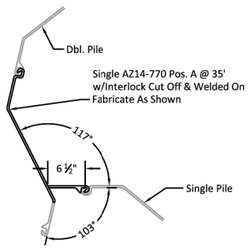


Material List

Item#	Pile	Detail	Designation	Qty.	Length feet	Weight lb / ft	Weight net tons	Length meters	Weight kg / m	Weight metric tons
1	AZ14-770		Single Pile Pos. A	2	35.00	53.42	1.870	10.67	79.5	1.695
2	AZ14-770		Double Pile Form 1	183	35.00	106.84	342.165	10.67	159.0	310.407
3	AZ14-770	D	Fabricated Single Pile Pos. B	1	35.00	53.42	0.935	10.67	79.5	0.848
4	AZ14-770		Double Pile Form 1	8	40.00	106.84	17.095	12.19	159.0	15.508
5	AZ14-770		Double Pile Form 1	89	45.00	106.84	213.953	13.72	159.0	194.095
6	AZ14-770		Double Pile Form 1	14	50.00	106.84	37.395	15.24	159.0	33.924
7	C14	B & C	Corner Pile	2	35.00	9.68	0.339	10.67	14.4	0.307
8	Omega 18	A	Corner Pile	1	35.00	12.10	0.212	10.67	18.0	0.192
			Total Weight:				613.964			0.499



Detail B



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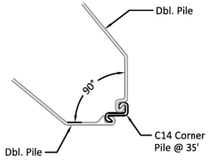

Detail C

skylinesteelI
ArcelorMittal
8 WOODHOLLOW RD, PARSIPPANY, NJ 07054 TEL: (973) 428-6100 FAX: (973) 428-7399

REV.	DESCRIPTION	Date	CAD By
1	Released For Approval	06-18-12	
0	Released For Approval	06-15-12	

PROJECT: 1001 Main Street MOB Garage, Buffalo, New York
CONTRACTOR: H. F. Darling

DATE:	06-15-12
SCALE:	N.T.S.
DRAWN BY:	J. Austro
PROJECT NO:	041-3132
SHEET:	L–1
REV.	1

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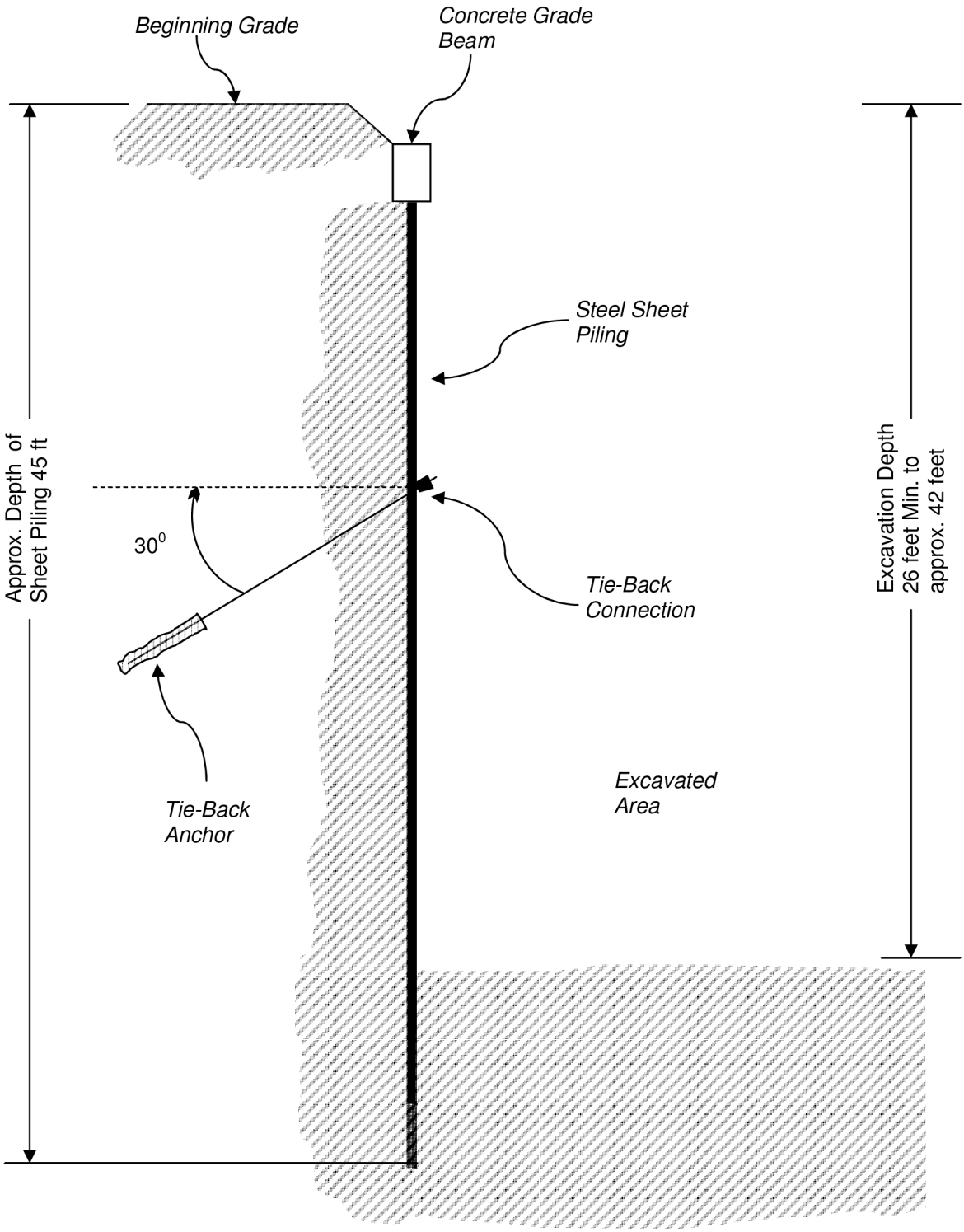
DESIGNED BY:	
CHECKED BY:	

PLAN LAYOUT SHORING DESIGN

FIGURE 3-2

F:\Project\KH-Kaleida Health\KH.002.001 - MOB Brownfield Cleanup Program\Environmental-study\CADD-GIS\CAD



TITLE:

TYPICAL SHORING DESIGN SECTION

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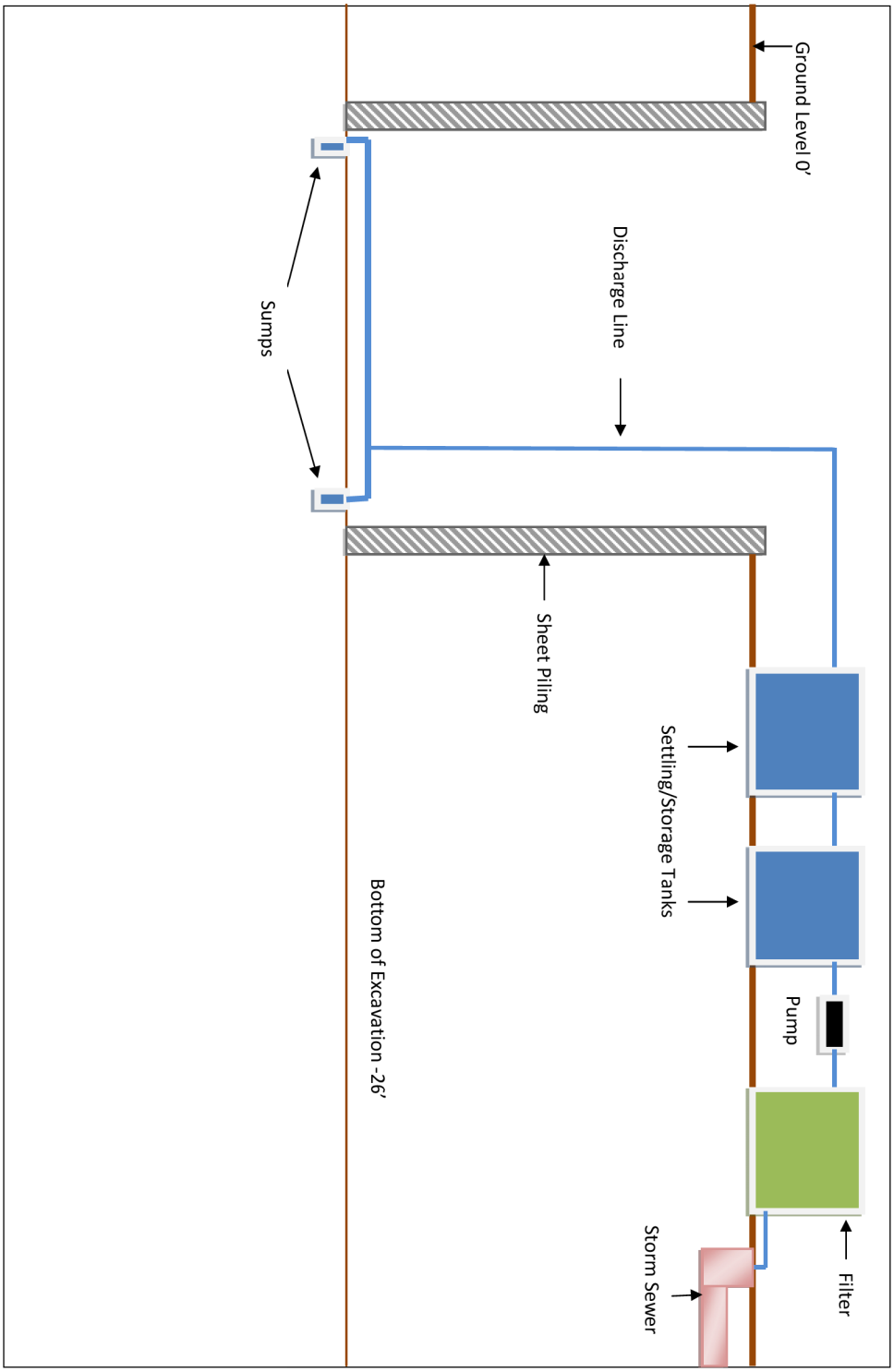
FIGURE 3-3



TITLE:

DEWATERING SCHEMATIC

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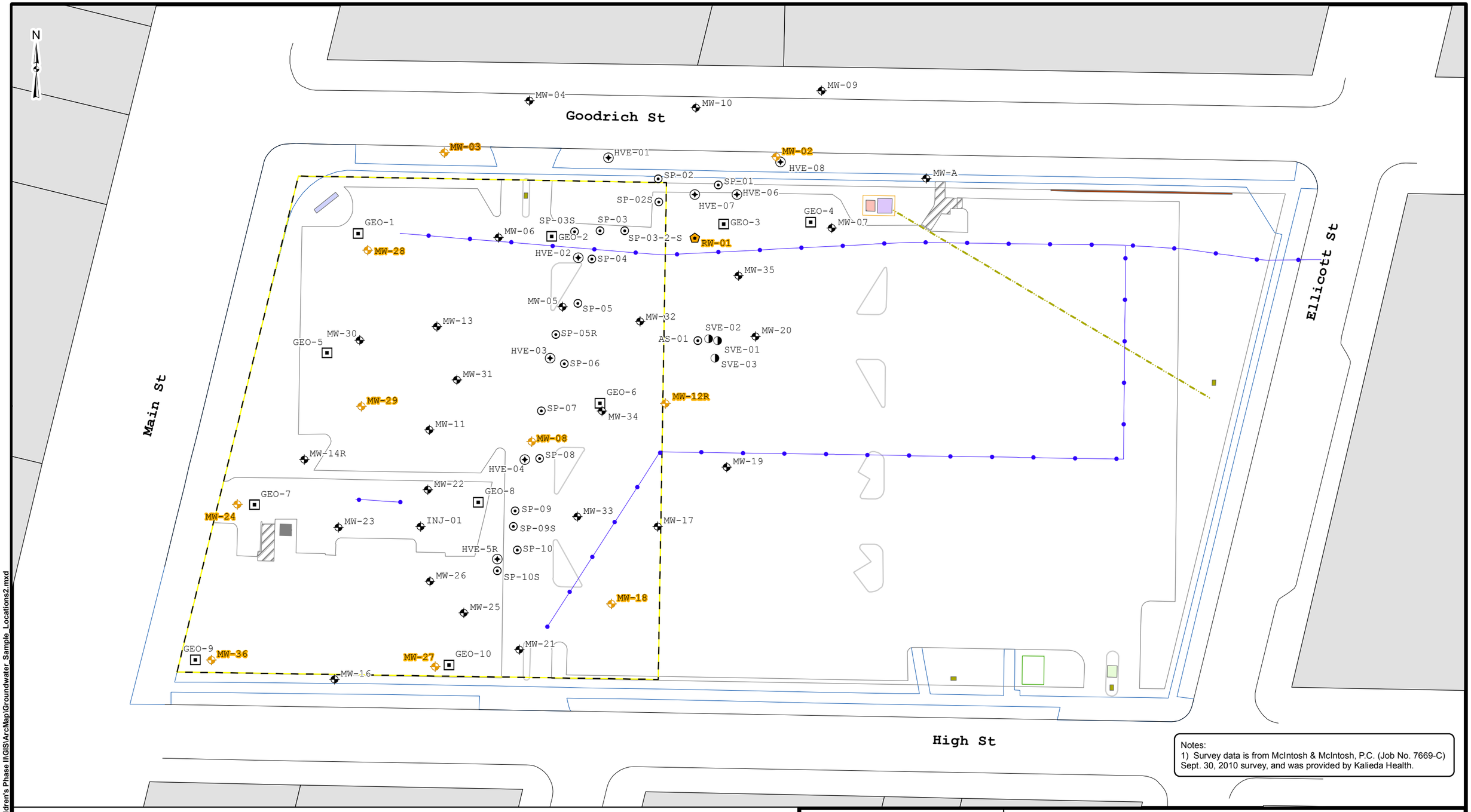
FIGURE 3-4

APPENDICIES

APPENDIX A
SUMMARY OF FALL 2011 GROUNDWATER SAMPLING EVENT

APPENDIX A
Summary of Fall 2011 Groundwater Sampling Event

Sample Location Map



Notes:
1) Survey data is from McIntosh & McIntosh, P.C. (Job No. 7669-C) Sept. 30, 2010 survey, and was provided by Kalieda Health.

Legend

- Proposed Groundwater Sampling
- Subject Property
- Monitoring Well
- Sparge Well
- Extraction Well
- Recovery Well
- Soil Vapor Extraction Well
- Geotechnical Boring
- Concrete Walk
- Electric
- Storm Sewer

0 25 50 100 Feet

Path: F:\PROJECT\511NY059 Children's Phase II\GIS\ArcMap\Groundwater Sample_Locations2.mxd

PROPOSED GROUNDWATER SAMPLING WELLS

American Consulting Professionals of New York, PLLC

MEDICAL OFFICE BUILDING

FIGURE X

APPENDIX A
Summary of Fall 2011 Groundwater Sampling Event

Tabulated Analytical Results

TABLE 1
SUMMARY OF DETECTED GROUNDWATER ANALYTICAL RESULTS
OCTOBER 2011

Location Identifier			MW-02	MW-03	MW-08	MW-12R	MW-18
Field Sample Identifier			MW-02	MW-03	MW-08	MW-12R	MW-18
Sample Matrix			Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)			-	-	-	-	-
Sample Date			10/20/11	10/20/11	10/20/11	10/20/11	10/20/11
Parameter	**Units**	**Criteria***					
Volatile Organic Compounds							
Acetone	UG/L	50	293 B	10.0 U	876 JB	10.0 U	10.0 U
Benzene	UG/L	1	7.00 U	0.700 U	1,290	55.5	0.700 U
Ethylbenzene	UG/L	5	178	2.00 U	2,020	5.20	2.00 U
Methyl ethyl ketone (2-Butanone)	UG/L	50	98.5 J	10.0 U	1,000 U	10.0 U	10.0 U
Toluene	UG/L	5	20.0 U	2.00 U	2,340	2.00 U	2.00 U
Xylene (total)	UG/L	5	1,802	2.00 U	21,200	2.00 U	2.00 U
Semivolatile Organic Compounds							
2,4-Dimethylphenol	UG/L	50	50.0 U	10.0 U	65.7 J	10.0 U	10.0 U
2-Methylnaphthalene	UG/L	-	403	10.0 U	618	10.0 U	10.0 U
Naphthalene	UG/L	10	283	10.0 U	954	10.0 U	10.0 U
Pesticide Organic Compounds							
alpha-BHC	UG/L	-	0.0911 JC	0.100 U	0.177 C	0.100 U	0.100 U
delta-BHC	UG/L	-	0.101	0.443 C	0.128 C	0.100 U	0.0942 J
Metals							
Aluminum	UG/L	-	174 J	296	1,110	2,050	1,310
Arsenic	UG/L	25	10 U	10 U	10	10 U	10 U
Barium	UG/L	1000	328	321	354	97 J	176
Calcium	UG/L	-	205,000	174,000	166,000	419,000	307,000
Chromium	UG/L	50	10 U	10 U	10 U	5 J	6 J

*Criteria- NYSDEC TOGS (1.1.1), Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations. April 2000, Class GA.

The flags shown were assigned during chemistry validation.

Concentration Exceeds Criteria

U - Not detected above the reported quantitation limit.

J - The reported concentration is an estimated value.

B - The reported concentration is above the method detection limit but below the quantitation limit.

Only detected analytical results are reported.

NOTE: Detection limits shown are MDL.

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TABLE 1
SUMMARY OF DETECTED GROUNDWATER ANALYTICAL RESULTS
OCTOBER 2011

Location Identifier			MW-02	MW-03	MW-08	MW-12R	MW-18
Field Sample Identifier			MW-02	MW-03	MW-08	MW-12R	MW-18
Sample Matrix			Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)			-	-	-	-	-
Sample Date			10/20/11	10/20/11	10/20/11	10/20/11	10/20/11
Parameter	**Units**	**Criteria***					
Metals							
Copper	*UG/L*	200	25 U	25 U	14 J	25 U	25 U
Iron	*UG/L*	300	1,960	400	14,300	13,700	2,630
Lead	*UG/L*	25	73	10 U	58	5 J	6 J
Magnesium	*UG/L*	35000	38,400	50,400	43,400	197,000	56,700
Manganese	*UG/L*	300	649	12 J	198	783	63
Potassium	*UG/L*	-	54,700	10,200	7,660	23,300	50,300
Sodium	*UG/L*	20000	1,810,000	1,720,000	481,000	1,290,000	2,040,000
Vanadium	*UG/L*	-	25 U	25 U	25 U	25 U	25 U
Zinc	*UG/L*	2000	60 U	60 U	34 J	50 J	76
Miscellaneous Parameters							
Cyanide	*MG/L*	-	0.01 U	0.01 U	0.01 U	0.01 U	0.02

*Criteria- NYSDEC TOGS (1.1.1), Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations. April 2000, Class GA.

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TABLE 1
SUMMARY OF DETECTED GROUNDWATER ANALYTICAL RESULTS
OCTOBER 2011

Location Identifier			MW-27	MW-28	MW-29	MW-35	MW-36
Field Sample Identifier			MW-27	MW-28	MW-29	MW-35	DUP10-20-11-1
Sample Matrix			Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)			-	-	-	-	-
Sample Date			10/20/11	10/20/11	10/20/11	10/20/11	10/20/11
Parameter	**Units**	**Criteria***					Field Duplicate
Volatile Organic Compounds							
Acetone	UG/L	50	10.0 U	10.0 U	10.0 U	5.73 JB	10.0 U
Benzene	UG/L	1	3.00	0.700 U	0.700 U	0.700 U	0.700 U
Ethylbenzene	UG/L	5	2.00 U	2.00 U	2.00 U	2.00 U	2.00 U
Methyl ethyl ketone (2-Butanone)	UG/L	50	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U
Toluene	UG/L	5	1.15 J	2.00 U	1.09 J	2.00 U	2.00 U
Xylene (total)	UG/L	5	2.32	2.00 U	8.73	2.00 U	2.00 U
Semivolatile Organic Compounds							
2,4-Dimethylphenol	UG/L	50	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U
2-Methylnaphthalene	UG/L	-	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U
Naphthalene	UG/L	10	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U
Pesticide Organic Compounds							
alpha-BHC	UG/L	-	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U
delta-BHC	UG/L	-	0.111 C	0.159 C	0.533 C	0.138 C	0.0967 J
Metals							
Aluminum	UG/L	-	5,220	208	1,190	174 J	5,820
Arsenic	UG/L	25	10 U	10 U	10 U	10 U	10 U
Barium	UG/L	1000	150	252	100 U	100 U	155
Calcium	UG/L	-	268,000	168,000	14,700	60,000	162,000
Chromium	UG/L	50	8 J	6 J	8 J	10 U	5 J

*Criteria- NYSDEC TOGS (1.1.1), Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations. April 2000, Class GA.

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TABLE 1
SUMMARY OF DETECTED GROUNDWATER ANALYTICAL RESULTS
OCTOBER 2011

Location Identifier			MW-27	MW-28	MW-29	MW-35	MW-36
Field Sample Identifier			MW-27	MW-28	MW-29	MW-35	DUP10-20-11-1
Sample Matrix			Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Depth Interval (ft)			-	-	-	-	-
Sample Date			10/20/11	10/20/11	10/20/11	10/20/11	10/20/11
Parameter	**Units**	**Criteria***					Field Duplicate
Metals							
Copper	*UG/L*	200	25 U	25 U	25 U	25 U	25 U
Iron	*UG/L*	300	8,720	544	1,600	280	6,880
Lead	*UG/L*	25	13	10 U	10 U	10 U	7 J
Magnesium	*UG/L*	35000	85,400	37,300	2,520	22,100	51,000
Manganese	*UG/L*	300	633	33	35	26	518
Potassium	*UG/L*	-	10,000	6,720	1,590 J	3,170	11,200
Sodium	*UG/L*	20000	442,000	757,000	1,380 J	91,500	1,050,000
Vanadium	*UG/L*	-	13 J	25 U	25 U	25 U	25 U
Zinc	*UG/L*	2000	81	73	56 J	141	62
Miscellaneous Parameters							
Cyanide	*MG/L*	-	0.01 U	0.01	0.01 U	0.01 U	0.01 U

*Criteria- NYSDEC TOGS (1.1.1), Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations. April 2000, Class GA.

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TABLE 1
SUMMARY OF DETECTED GROUNDWATER ANALYTICAL RESULTS
OCTOBER 2011

Location Identifier			MW-36
Field Sample Identifier			MW-36
Sample Matrix			Groundwater
Depth Interval (ft)			-
Sample Date			10/20/11
Parameter	**Units**	**Criteria***	
Volatile Organic Compounds			
Acetone	UG/L	50	6.68 JB
Benzene	UG/L	1	0.370 J
Ethylbenzene	UG/L	5	2.00 U
Methyl ethyl ketone (2-Butanone)	UG/L	50	10.0 U
Toluene	UG/L	5	2.00 U
Xylene (total)	UG/L	5	2.00 U
Semivolatile Organic Compounds			
2,4-Dimethylphenol	UG/L	50	10.0 U
2-Methylnaphthalene	UG/L	-	10.0 U
Naphthalene	UG/L	10	10.0 U
Pesticide Organic Compounds			
alpha-BHC	UG/L	-	0.100 U
delta-BHC	UG/L	-	0.132
Metals			
Aluminum	UG/L	-	15,900
Arsenic	UG/L	25	6 J
Barium	UG/L	1000	305
Calcium	UG/L	-	198,000
Chromium	UG/L	50	16

*Criteria- NYSDEC TOGS (1.1.1), Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations. April 2000, Class GA.

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TABLE 1
SUMMARY OF DETECTED GROUNDWATER ANALYTICAL RESULTS
OCTOBER 2011

Location Identifier			MW-36
Field Sample Identifier			MW-36
Sample Matrix			Groundwater
Depth Interval (ft)			-
Sample Date			10/20/11
Parameter	**Units**	**Criteria***	
Metals			
Copper	*UG/L*	200	27
Iron	*UG/L*	300	18,400
Lead	*UG/L*	25	26
Magnesium	*UG/L*	35000	66,900
Manganese	*UG/L*	300	743
Potassium	*UG/L*	-	15,300
Sodium	*UG/L*	20000	1,100,000
Vanadium	*UG/L*	-	25 U
Zinc	*UG/L*	2000	170
Miscellaneous Parameters			
Cyanide	*MG/L*	-	0.01 U

*Criteria- NYSDEC TOGS (1.1.1), Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations. April 2000, Class GA.

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