

FONF EXPANSION/SABRE PARK BCP

TOWN OF NIAGARA, NEW YORK

Alternative Analysis Report

NYSDEC BCP Number: C932162

Prepared for:

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CERTIFICATION

I Joel Landes certify that I am currently a NYS registered professional engineer as defined in 6 NYCRR Part 375 and that this Alternatives Analysis Report was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10).

I certify that all information and statements in this certification are true. I understand that a false statement made herein is punishable as Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law.



NYS Professional Engineer #

10/9/13

Date

Signature

It is a violation of Article 130 of New York State Education Law for any person to alter this document in any way without the express written verification of adoption by any New York State licensed engineer in accordance with Section 7209(2), Article 130, New York State Education Law.

ALTERNATIVES ANALYSIS REPORT

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LIST OF ACRONYMS

Acronym	Definition
AAR	Alternatives Analysis Report
AOC	Area of Concern
AWQS/GV	Ambient Water Quality Standards/Guidance Values
BCA	Brownfield Cleanup Agreement
BCP	Brownfield Cleanup Program
CFR	Code of Federal Regulations
CLP	Contract Laboratory Program
COC	Contaminant of Concern
DER	Department of Environmental Remediation
EC/IC	Engineering Control / Institutional Control
EDR	Environmental Data Resources
ESA	Environmental Site Assessment
ESI	Environmental Site Investigation
ELAP	Environmental Laboratory Accreditation Program
EPA	Environmental Protection Agency
HAZWOPER	Hazardous Waste Operations Emergency Response
IHWDS	Inactive Hazardous Waste Disposal Site
IRM	Interim Remedial Measures
IRMWP	Interim Remedial Measures Work Plan
NAVD	North American Vertical Datum
NWI	National Wetlands Inventory
NYCRR	New York Codes Rules and Regulations
NYS DEC	New York State Department of Environmental Conservation
NYS DEC DER	New York State Department of Environmental Conservation Division of Environmental Remediation
NYS DOH	New York State Department of Health
O&M	Operations & Maintenance
PAHs	Polycyclic Aromatic Hydrocarbons
PCBs	Polychlorinated Biphenyls
PE	Professional Engineer
PID	Photoionization Detector

Acronym	Definition
QEP	Qualified Environmental Professional
RAOs	Remedial Action Objectives
RCRA	Resource Conservation and Recovery Act
RI	Remedial Investigation
RIR	Remedial Investigation Report
RIWP	Remedial Investigation Work Plan
SCOs	Soil Cleanup Objectives
SCGs	Standards, Criteria and Guidance
SEQR EAF	State Environmental Quality Review Environmental Assessment Form
SMP	Site Management Plan
SSDS	Sub-Slab Depressurization System
SVOCs	Semi-Volatile Organic Compounds
TCLP	Toxicity Characteristic Leaching Procedure
TOGS	Technical & Operational Guidance Series
TPH	Total Petroleum Hydrocarbons
USEPA	United States Environmental Protection Agency
VOCs	Volatile Organic Compounds
XRF	X-Ray Fluorescence

ALTERNATIVES ANALYSIS REPORT

1.0 INTRODUCTION

This Alternatives Analysis Report (AAR) was prepared by Langan Engineering, Environmental, Surveying, and Landscape Architecture, D.P.C. (Langan) on behalf of Fashion Outlets II, LLC (FO II, LLC) and Macerich-Niagara, LLC (collectively “Macerich” for the purpose of this report). Macerich has entered into the Brownfield Cleanup Program (BCP No. C932162) with the New York State Department of Environmental Conservation (NYSDEC) as a “Volunteer”, to investigate and, where necessary, remediate contaminated soil, groundwater, and soil gas encountered during expansion of the approximate 47.8-acre Fashion Outlets of Niagara Falls mall (the Site). Macerich is proposing a 225,000 square foot expansion that would include 175,000 square feet of new enclosed gross leasable area to the existing mall. The expansion would include 50 new stores and dedicated public common space, additional asphalt paved parking areas, stormwater detention ponds, and landscaped areas. The Remedial Investigation (RI) was conducted by Langan between 23 June 2013 and 3 July 2013, and the results of the investigation are described in detail in the Remedial Investigation Report (RIR) dated 16 August 2013, prepared by Langan.

The objective of this AAR is to identify one or more alternatives that address the contaminants of concern (COCs) present at the Site and evaluate the effectiveness of each with respect to Remedy Selection Evaluation Criteria identified in Section 4.2 of Guidance Document DER-10: Technical Guidance for Site Investigation and Remediation (NYSDEC 2010).

1.1 SITE LOCATION AND DESCRIPTION

The Site subject to the Brownfield Cleanup Agreement (BCA), encompasses approximately 47.8-acres within the Town of Niagara and includes the following parcels:

- \pm 34-acres former Sabre Park Mobile Home Community located at 1705 Factory Outlet Boulevard (a/k/a Fashion Outlet Boulevard, a/k/a Third Avenue Extension, a/k/a Connection Boulevard - Assessor’s Parcel Numbers 160.08-1-2, 160.08-1-6 and 160.08-1-7);
- \pm 10.35-acre parcel located on the southern portion of the larger approximately \pm 41.3-acre Fashion Outlets of Niagara Falls (Fashion Outlets) property located at 1900 Military Road, (specifically, a portion of Assessor’s Parcel Number 145.20-1-15); and,

- ± 3.45 -acres on the western side of the Site located at 1755 Factory Outlet Boulevard (a/k/a Fashion Outlet Boulevard, a/k/a Third Avenue Extension, a/k/a Connection Boulevard - Assessor's Parcel Number 160.08-1-1).

A metes and bounds description of the Site is included in Appendix A and a Site Location Map is provided as Figure 1 in Appendix B.

The Sabre Park parcel was previously occupied by 278 mobile home lots from approximately 1972 to 2013. Demolition of the trailers commenced in March 2013 and is expected to be completed by September 2013. The majority of the Site currently consists of asphalt/gravel parking areas, asphalt driveways, and vegetated areas. The Fashion Outlets parcel consists of an asphalt parking lot and associated roadways. The parcel located at 1755 Factory Outlet Boulevard is currently improved with a Secure Storage facility and associated asphalt parking.

The Site is bounded by Factory Outlet Boulevard/Route 190 to the west/northwest, the existing Fashion Outlets of Niagara Falls to the east, and National Grid power lines to the south. A site plan depicting the existing conditions is provided as Figure 2 of the RIR, included in Appendix B.

1.2 PROPOSED REDEVELOPMENT PLAN

The 225,000 square foot expansion will include 175,000 square feet of additional enclosed gross leasable area to the existing Fashion Outlets of Niagara Falls mall, which will accommodate 50 new stores and dedicated public common space. The expansion will include an additional 1,720,000 square feet of asphalt paved parking areas, 225,000 square feet of clay lined stormwater detention ponds, and 273,750 square feet of landscaping.

The Secure Storage facility currently located on the Site would be demolished and reconstructed in the southwest corner of the Site. A site plan depicting the proposed development is provided as Figure 3 of the RIR, included in Appendix B.

1.3 DESCRIPTION OF SURROUNDING PROPERTY

The Site is located in an urban setting, occupied by residential and commercial buildings. The Site is bounded to the north by the Fashion Outlets of Niagara Falls, to the east by Wal-Mart, to the west by commercial properties, followed by Factory Outlet Boulevard, Route 190, and a solid waste landfill (Allied Waste Service Niagara Falls Landfill), and to the south by the National Power Grid power lines and vacant land, followed by commercial buildings.

Based on a State Environmental Quality Review Environmental Assessment Form (SEQR EAF) prepared for the Site by Stantec Consulting Services, Inc. of Rochester, New York (Stantec), the nearest ecological receptor is a 4.3-acre NYSDEC regulated wetland located within 100 feet of

the southwestern corner of the Site and potentially down gradient.

1.4 SITE HISTORY

Numerous previous environmental reports have been completed (by Langan and others) for the Sabre Park and Fashion Outlets of Niagara Falls parcels. Historic remedial actions have also been performed at the parcels. Previous reports and historic remedial actions are discussed in detail in the 5 July 2011 Phase I Environmental Site Assessments (ESAs) prepared by Langan and will not be discussed in detail in this report; however, a brief summary is presented below.

1.4.1 Summary of Previous Environmental Investigations by Others

Sabre Park Property

According to a review of title records for the Site, Sabre Park was owned by Union Carbide Corporation from 1949 until 1969. According to the EDR Report, during expansion of the mobile home community to the south in 1978, fill with elevated level of organic chemicals was discovered; however, information regarding the source or quantity of this fill material was not provided. During a 1985 through 1986 soil sampling event conducted by the United States Environmental Protection Agency (USEPA), organic chemicals were not detected; however, the samples contained mercury. Mercury impacted soil was remediated via excavation and offsite disposal; however, elevated concentrations of mercury remain in on-site soils (maximum concentration = 766 mg/kg).

A follow-up field investigation of the extent of mercury contamination at the Sabre Park Trailer Park was conducted by NUS Corporation (NUS) in May 1988. A total of 424 soil samples were screened for total mercury using the Region 2 Fit X-Ray Fluorescence (XRF) system. In addition 125 split samples were sent to an EPA Contract Laboratory Program (CLP) for confirmation. Mercury was detected by XRF at concentrations greater than 40 mg/kg (up to 84 mg/kg) in 14 soil samples collected from the southwestern portion of the Site. Mercury was detected in 41 of 125 CLP samples at concentrations ranging from 0.14 to 54.4 mg/kg. Approximately 1,200 cubic-yards of mercury impacted soil was remediated in 1989 by excavation and off-site disposal as a D-listed (D009-mercury) hazardous waste at an off-site soil disposal facility.

During an August 1995 subsurface investigation conducted by Paragon Environmental Services (Paragon), total petroleum hydrocarbons (TPH) were detected in the soil and groundwater at concentrations ranging from 7 to 120 mg/kg in soil, and 0.4 to 0.72 mg/L in groundwater. As the NYSDEC has no criteria for TPH in subsurface media, Paragon was directed to use professional judgment to determine if the TPH concentrations posed a risk to human health or the

environment. It was Paragon's opinion that the TPH concentrations in the soil and groundwater at the Site did not pose a risk to human health and no further action was recommended on the Site.

Seven petroleum spills (heating oil, motor oil, non-PCB transformer oil, waste oil) were reported at the Sabre Park property from 1985 to 2010. These spills have all been closed according to the NYSDEC Spills Database.

Based on the historic dumping that occurred at the Sabre Park property, the NYSDEC identified the Site as an Inactive Hazardous Waste Disposal Site. Subsequent to several phases of remediation, the NYSDEC concluded that the Sabre Park property had been properly remediated and that "no further action" was required. In a letter dated March 21, 1995, the NYSDEC delisted Sabre Park from the Registry of Inactive Hazardous Waste Disposal Sites in New York State.

Fashion Outlets of Niagara Falls Property

According to the 5 July 2011 Phase I ESA conducted by Langan for the Fashion Outlets property, the 1970 and 1980 city directory listings indicate historic uses of the Fashion Outlets property may have included a dry cleaner. The exact location of the former dry cleaner has not been confirmed.

The northwestern portion of the Property (grids 1 through 7 shown in Figure 4 of the RIR, included in Appendix B) was formerly occupied by the Walter Kozdranski Construction Company. This facility had a documented release of diesel fuel oil associated with a former leaking underground storage tank which was removed in July 1988. A spill report was issued for the property in July 1988 and 5,400 gallons of liquid were reportedly removed from the Site. The spill report is unclear if the liquids were tank related or in groundwater. The spill was closed by the NYSDEC on July 12, 1988. According to the 2004 Phase II Environmental Site Investigation conducted by IVI Due Diligence Services, Inc. (IVI), concentrations of petroleum related semi-volatile organic compounds (SVOCs), including benzo(a)anthracene, chrysene, and benzo(a)pyrene were detected in three of six soil borings locations at concentrations above the applicable NYSDEC numeric criteria. As the results of this investigation were similar to the information the NYSDEC had on the Kozdranski property when they closed the spill in 1988, no further investigation was recommended by IVI.

The Fashion Outlets property received contaminated fill in the late 1960's or early 1970's. A waste area approximately 0.5-acres in size was discovered in the parking area immediately west-northwest of the outlets. In October 1985, a yellow-tan waste material was discovered during the installation of stormwater piping in the northwestern property corner and investigation of the on-site waste material was initiated. The results of the investigations revealed the presence of volatile organic compounds (VOCs), SVOCs, inorganic compounds, and pesticide compounds. Elevated concentrations of N-nitrosodiphenylamine and 1,2,4-trichlorobenzene were detected in on-site soils in October 1985. Six different types of fill were identified on-site: including a yellow-tan resinous waste, white powder-like material, construction and demolition debris, ash and slag. Based on the described fill placement location, it does not appear that this contaminated material was placed within the BCP development Site boundary.

Approximately 12,879 tons of contaminated materials and 7,300 gallons of impacted wastewater were removed from the Fashion Outlets property between January and February of 1994. The results of post-remediation soil sampling activities indicate that elevated concentrations of 2-mercaptobenzothiazole were detected in four of the twenty-four soil samples at concentrations exceeding the applicable numeric soil criteria. Several metals and pesticides were also detected in soil at concentrations below the applicable criteria. The remediation was closed with a Record of Decision in December 1994, which required the property owner to file a deed restriction/covenant prohibiting future use of certain areas of the Site for residential purposes. In January 1995, the Site was delisted from the New York State Inactive Hazardous Waste Disposal Site (IHWDS) list (No. 932103).

During construction of the mall expansion in November 1994, a white powder waste was encountered while drilling caissons for the mall's foundation. A sample of the waste was collected and analyzed for TCLP, and found to exceed regulatory limits for vinyl chloride. This material was excavated from the site between February 2 and February 11, 1995 and temporarily staged on-site. Material staged on-site was screened and separated into hazardous and non-hazardous piles. After screening the excavated materials to separate drums and construction and debris material that could not be landfilled, the remaining material no longer exceeded TCLP for vinyl chloride. This material was reused beneath an on-site parking lot.

2.0 SUMMARY OF REMEDIAL INVESTIGATION FINDINGS

Langan conducted the RI field investigation between 23 June 2013 and 3 July 2013, in accordance with the procedures set-forth in the NYSDEC Remedial Investigation Work Plan (RIWP), dated 19 April 2013 (revised 14 June 2013), and approved by NYSDEC on 18 June 2013. The RI field program consisted of the installation of 62 soil borings, excavation of 84 test pits, construction of 8 groundwater monitoring wells, and installation of 10 soil vapor probes. A complete summary of findings and analytical results can be found in the Remedial Investigation Report (RIR) dated 16 August 2013, prepared by Langan. Summary data tables from the RIR are included in Appendix B. Below is a summary of the findings and conclusions of the RI activities:

1. Subsurface conditions at the Site consisted of fill ranging in thickness from 2 to 15 feet underlain by silty sand and clay. Fill material consisted of brown to dark gray and black fine to coarse grained sands with varying levels of silt, clay, gravel, organics (roots), brick, concrete, wood, glass, rubber, slag, and miscellaneous pieces of plastic and metal. The underlying clay appeared to be continuous and was observed to be dense with increased quantities of coarse sand and fine gravel at depths of 13 to 16 feet below grade or just prior to refusal.
2. Slag is prevalent throughout the development area and is associated with historic filling and dumping at the Site. A Ludlum Geiger counter confirmed that the slag did not exhibit radioactivity.
3. VOCs, SVOCs, Polychlorinated Biphenyls (PCBs), Pesticides and metals were identified in soil throughout the Site at concentrations exceeding the Unrestricted Use Soil Cleanup Objectives (SCOs). SVOCs, metals, and PCBs were identified in soil throughout the Site at concentrations exceeding the Restricted Commercial SCOs, and are likely attributed to the site-wide historic dumping and not a localized release.
4. Based on limited chromium Toxicity Characteristic Leaching Procedure (TCLP) analysis, samples from LSB-23-A and LSB-23-S exceeded the Resource Conservation and Recovery Act (RCRA) Hazardous Waste Criteria. These two samples were collected from an anomalous material that was easily identifiable in the field from the surrounding fill material and exhibited a yellowish color. As discussed in the 16 August 2013 RIR, this material was visually delineated with a Geoprobe to determine the horizontal and vertical extents of the material. During the proposed development, this material would be excavated and disposed of in accordance with state and federal regulations, as addressed in the Materials Management Plan (MMP).

5. Overburden groundwater observed at the Site is likely perched water within the fill layer, confined by the underlying clay layer. pH in groundwater ranged from 6.29 to 12.11. Hexavalent chromium and total chromium were detected in four samples (LMW-5 through LMW-8) at concentrations exceeding the 6 New York Codes, Rules and Regulations (NYCRR) Part 703 Ambient Water Quality Standards (AWQS) of 50 ug/L. Impacts to groundwater at the Sabre Park parcel are likely a result of perched water mixing with slag and fill material. The impacted slag and elevated metal concentrations are likely causing the pH of groundwater to rise to the levels observed in the field.
6. VOC impacts in soil gas were identified at concentrations exceeding the New York State Department of Health (NYSDOH) Upper Fence Values, at locations within the footprint of the proposed expansion. A sub-slab vapor intrusion mitigation system will be incorporated into the construction of the expansion.

Soil, groundwater, and soil vapor sample locations and exceedances are shown on Figures 4 through 8, and analytical results are summarized in Tables 2 through 5 of the RIR, included as Appendix B.

2.1 HYDROGEOLOGICAL CONDITIONS

2.1.1 Topography

The elevation of the Site ranges from 571.63 feet to 575.62 feet above mean sea level, measured in accordance with the North American Vertical Datum of 1988 (NAVD 88). The topography of the Site and the surrounding area slopes gently to the south towards the Niagara River (approximately 1.5 miles away).

2.1.2 Geology

Geological surface features (e.g., rock outcroppings) were not observed at the Site. Based on the Geologic Map of New York, Niagara Sheet (1970), bedrock beneath the Site is classified as the Lockport Group, consisting primarily of dolostone with incidental amounts of limestone. Bedrock is approximately 210-ft thick and overlies the Rochester shale.

According to a Preliminary Geotechnical Report, dated January 31, 2012, prepared by Baron and Associates P.C. of Clarence, New York, surficial materials in the northern portion of the Site generally consist of 1-2 feet of granular fill, with trace amounts of brick and asphalt. Beneath the fill is a layer of sandy silt, silty clay, with trace amounts of gravel and fine to coarse sand. Glacial till was also encountered at select locations. Bedrock was encountered from approximately 10.5 to 14 feet below grade.

During the RI drilling and test pitting activities, Langan observed the following geology:

Fill Material

Fill material consisted of brown to dark gray and black fine to coarse grained sands with varying levels of silt, clay, gravel, organics (roots), brick, concrete, wood, glass, rubber, slag, and miscellaneous pieces of plastic and metal, was observed at the surface throughout the Sabre Park portion of the property, and just below surface features at the Fashion Outlet and Secure Storage facility parcels. Fill generally extends to an average depth of 5 feet below grade, with a maximum depth of approximately 15 feet below grade at limited locations to the south.

The slag was observed at over 29 locations throughout the site and generally consisted of a hard, porous, chromium rich material. At select test pit locations Langan observed pieces of slag up to 2 feet in diameter. A Ludlum Geiger counter was utilized to assess the potential radioactivity of the slag; however, no readings were observed above background (0.05 millirems/hour).

Silty Sand/Silty Clay Unit

At limited locations, Langan observed silty fine sand beneath the fill layer ranging in thickness from 2 to 4 feet below the fill. A silty/clay layer was observed underlying the fill and/or silty sand layers, encountered at depths of 2 to 12 feet and extended to 16 feet below grade or the boring/test pit termination depth.

Clay Unit

The clay was observed to vary in color from brown, gray and reddish-brown, and contained trace quantities of silt and fine sand. The clay was observed to be dense with increased quantities of coarse sand and fine gravel at depths of 13 to 16 feet below grade or just prior to refusal. Boring refusal was encountered at depths ranging from 10.3 to 15.9 feet below grade, and was generally limited to locations throughout the Fashion Outlets parking lot, Secure Storage facility, and a few locations in the northern section of Sabre Park.

2.1.3 Hydrogeology

Historic geotechnical and groundwater sampling conducted at the Site identified groundwater at depths ranging from 2 to 12 feet below grade. The overburden deposits typical to the project area can have low to moderate hydraulic conductivities. The bedrock is relatively impermeable except where concentrations of fractures, faults or joints are present. Preferential flow occurs through the more permeable zones of the overburden, such as individual sand or gravel layers, and through bedrock fractures and joints.

Langan installed eight (8) permanent monitoring wells throughout the site to determine groundwater depth, flow direction, and water quality. Based on the monitoring well gauging events performed on 2 July 2013 and 23 July 2013, perched groundwater was encountered at

depths ranging from 1.8 to 4.39 feet below grade (elevations 572.50 to 567.23 NAVD 88). A groundwater contour map, Figure 9 of the RIR included in Appendix B, was created based on these elevations, indicating that the perched groundwater flows to the north. Bedrock monitoring wells have not been installed at the Site.

Site groundwater is not used as a potable (drinking) water source. Area residents receive their drinking water supply from surface reservoirs located in the Niagara River.

2.1.4 Wetlands

Based on the Niagara County, New York On-Line Mapping System, NYSDEC and National Wetland Inventory (NWI), approximately 4.3-acres of NYSDEC regulated wetland areas are depicted near the southern and eastern portions of the Site. This wetland area is located on the adjacent National Grid utility corridor within 100 feet of the southwest property line.

2.2 CONTAMINATION CONDITIONS

This section describes the distribution of contaminants, on and off-Site.

2.2.1 Conceptual Model of Site Contamination

2.2.1.1 On-Site Contamination

- **Soil** – Slag is prevalent throughout the development area and is associated with historic filling/dumping at the Site. A Ludlum Geiger counter confirmed that the slag did not exhibit radioactivity. VOCs, SVOCs, PCBs, Pesticides and metals were identified in soil throughout the Site at concentrations exceeding the Unrestricted Use SCO. SVOCs, metals, and PCBs were identified in soil throughout the Site at concentrations exceeding the Restricted Commercial SCO, and are likely attributed to the result of site-wide historic dumping and not a localized release. Based on limited chromium TCLP analysis, samples from LSB-23-A and LSB-23-S exceed the RCRA Hazardous Waste Criteria. During the proposed development, this material would be handled in accordance with RCRA regulations, as addressed in the IRMWP.
- **Groundwater** – Overburden groundwater observed at the Site is likely perched water within the fill layer, confined by the underlying clay layer. pH in Groundwater ranged from 6.29 to 12.11, and is likely the result of high concentrations of dissolved metals within the fill material. Impacts to groundwater at the Sabre Park parcel are likely a result of perched water mixing with slag and fill material. The impacted slag and elevated metal concentrations are likely causing the pH of groundwater to rise to the levels observed in the field.

- **Soil Vapor** – VOC impacts in soil gas were identified at concentrations exceeding the NYSDOH Upper Fence Values, at locations within the footprint of the proposed expansion. A sub-slab vapor intrusion mitigation system will be incorporated into the construction of the expansion.

2.2.2 Description of Areas of Concern

Based on Site observations, the development history of the Site and the findings of the previous reports outlined above, the areas of concern (AOCs) investigated during the remedial investigation are as follows:

Historic Site Use – The northern portion of Site was historically owned by the Walter Kozdranski Construction Company. As indicated above, this facility had a documented release of diesel fuel oil associated with a former leaking underground storage tank removed in July 1988. During a 2004 Phase II Environmental Site Investigation (ESI) conducted by IVI, concentrations of petroleum related SVOCs, including benzo(a)anthracene, chrysene, and benzo(a)pyrene were detected in soil above the applicable NYSDEC numeric criteria:

Historic Site Use (On-site Dumping) – The northern portion of the Site received contaminated fill in late 1960's or early 1970's. A waste area approximately 0.5-acres in size was discovered in the parking area immediately west-northwest of the current outlet building. The results of the investigations revealed the presence of VOCs, SVOCs, inorganic compounds, and pesticide compounds. Elevated concentrations of N-nitrosodiphenylamine and 1,2,4-trichlorobenzene were detected in on-site soils in October 1985. Six different types of fill were identified on-site: including a yellow-tan resinous waste, white powder-like material, construction and demolition debris, ash and slag. Although identified as an on-site AOC, the proposed development plan does not incorporate this area, and therefore no RI activities were conducted in this area.

Historic Site Use (Former Sabre Park Parcel) – According to a review of title records the former Sabre Park Parcel was owned by Union Carbide Corporation. During expansion of the mobile home community to the south in 1978, fill material with elevated levels of organic chemicals was discovered. This fill material (approx. 1,200 cubic-yards) was subsequently removed from the southern portion of the property and disposed of as a D-listed (D009) hazardous waste at an offsite soil disposal facility in 1989. During a 1985/1986 soil sampling event conducted by the USEPA, organic chemicals were not detected in soil samples collected from the property; however, the samples contained elevated levels of mercury. Mercury impacted soil was remediated via excavation and offsite disposal; however, elevated concentrations of mercury remain in onsite soils (maximum concentration = 766 mg/kg).

During an August 1995 subsurface investigation conducted by Paragon, TPH was detected in the soil and groundwater beneath the Site; however, no chemical concentrations or sampling locations were provided. The NYSDEC has no criteria for TPH in subsurface media, and no further action was recommended on the Site by Paragon.

2.2.3 Identification of Standards, Criteria and Guidance

Site characterization of soils and remedy selection for soil cleanup would be accomplished under 6 NYCRR Part 375, with reference to 6 NYCRR Subpart 375-3 Brownfield Cleanup Program and Subpart 375-6 Remedial Program Soil Cleanup Objectives. The following additional Standards, Codes and Guidance (SCGs) would apply to site remediation:

- New York State Groundwater Quality Standards – 6 NYCRR Part 703;
- NYSDEC Ambient Water Quality Standards and Guidance Values – Technical & Operational Guidance Series (TOGS) 1.1.1;
- NYSDEC Draft Brownfield Cleanup Program Guide – May 2004;
- NYSDOH Generic Community Air Monitoring Plan;
- NYS Waste Transporter Permits – 6 NYCRR Part 364;
- NYS Solid Waste Management Requirements – 6 NYCRR Part 360 and Part 364;
- Department of Environmental Remediation (DER) Technical Guidance for Site Investigation and Remediation (DER-10);
- DER Presumptive/Proven Remedial Technologies (DER-15);
- CP-51 – Soil Cleanup Guidance;
- DER Citizen Participation Handbook for Remedial Programs (DER 23);
- DER Green Remediation (DER 31);
- DER Institutional Controls (DER 33).

The following SCGs would apply to the removal of hazardous lead contaminated soil:

- 29 Code of Federal Regulations (CFR) Part 1910.120 - Hazardous Waste Operations and Emergency Response (HAZWOPER);
- 29 CFR Part 1916 NYCRR Part 372 - Hazardous Waste Manifest System and Related Standards for Generators, Transporters and Facilities (November 1998);

- 6 NYCRR Part 375 – Identification and Listing of Hazardous Wastes;
- 6 NYCRR Part 376 – Land Disposal Restrictions.

Site characterization of groundwater was in accordance with TOGS 1.1.1 – Ambient Water Quality Standards & Guidance Values and Groundwater Effluent Limitations and Guidance Values for Class GA groundwater (Groundwater Quality Standards Part 703). Closure of on-site wells would be conducted in accordance with the CP-43 – Groundwater Monitoring Well Decommissioning if necessary.

Site characterization of soil vapor and soil vapor mitigation measures was implemented in accordance with the NYSDOH Guidance for Evaluating Soil Vapor Intrusion in the State of New York, dated October 2006. A list of SCGs that apply for site characterization and remedial investigation, remedy selection, underground storage tank closure, remedial action, and site management is included as Appendix C.

2.2.4 Soil/Fill Contamination

The contaminants of concern (COC) identified in soil at the Site are associated with historical dumping of fill, which extends to a depth of approximately 15 feet bgs. The COCs include SVOCs, metals (specifically chromium) and PCBs.

2.2.4.1 Summary of Soil/Fill Data and Comparison with SCGs

A summary of the findings of the soil investigation is provided below:

One or more aromatic and/or halogenated VOCs were detected in 160 of 280 soil samples collected. Of the 160 soil samples, acetone, a common laboratory contaminant was detected in 15 samples exceeding the Unrestricted Use SCO. No other VOCs were detected exceeding the Unrestricted Use SCO. No detected VOCs exceeded the Restricted Commercial SCOs;

One or more SVOCs (polycyclic aromatic hydrocarbons (PAHs) only) were detected in 162 of 295 soil samples collected. SVOCs were detected in 31 samples at concentrations exceeding the Unrestricted Use SCOs, and 16 samples at concentrations exceeding the Restricted Commercial SCOs;

One or more total metals were detected in each of the 295 soil samples collected. One or more metals were detected in 187 samples at concentrations exceeding the Unrestricted Use SCOs. One or more metals were detected in 27 samples at concentrations exceeding the Restricted Commercial SCOs. Trivalent chromium was identified in 21 of 27 samples exceeding the Restricted Commercial SCOs, at concentrations ranging from 1,500 mg/kg to 6,560 mg/kg.

Hexavalent chromium exceeded the Restricted Commercial SCOs in 2 of 27 samples, with concentrations of 486 mg/kg to 506 mg/kg;

Due to site-wide exceedances of the Restricted Commercial SCOs for chromium, select samples were analyzed for chromium using the TCLP. Chromium was detected in two samples (LSB-23-A and LSB-23-S), at concentrations exceeding the RCRA Hazardous Waste Criteria of 5 mg/L. These two samples were collected from an anomolous material that was easily identifiable in the field from the surrounding fill material and exhibited a yellowish color. As discussed in the 16 August 2013 RIR, this material was visually delineated with a Geoprobe to determine the horizontal and vertical extents of the material. This material is being considered a hot spot and would be handled and disposed of offsite in accordance with the IRMWP and requirements of the BCP;

One or more organochlorine pesticides were detected in 34 of the 295 soil samples collected. Pesticides were detected in 18 samples at concentrations exceeding the Unrestricted Use SCOs. Organochlorine pesticides were not detected at concentrations exceeding the Restricted Commercial SCOs;

The herbicide Silvex (2,4,5-TP) was detected in 1 of the 295 soil samples (LSB-32-B) at a depth of 6 to 8 ft, at a concentration of 0.0477 mg/kg, below the Unrestricted Use and Restricted Commercial SCOs; and,

One or more PCBs were detected in 43 of the 295 soil samples collected. PCBs were detected in 30 samples at concentrations exceeding the Unrestricted Use SCOs. PCBs were detected in 5 samples at concentrations exceeding the Restricted Commercial SCOs. Soil associated with a sample collected from investigation test pit, LTP-46-B, are being considered a hot spot due to elevated concentrations of PCBs (23 mg/kg) exceeding the site-specific criteria of 10 mg/kg, and will handled and disposed of offsite in accordance with the IRMWP and requirements of the BCP.

Soil sample analytical results are summarized and compared with Restricted Commercial SCOs in Table 2, and the results exceeding the SCOs are shown on Figure 6 of the RIR, both included in Appendix B.

2.2.5 On-Site and Off-Site Groundwater Contamination

2.2.5.1 Summary of Groundwater Data and Comparison with SCGs

Groundwater samples were collected for laboratory analysis from all eight newly installed

monitoring wells. A summary of the findings of the groundwater investigation is provided below:

One or more aromatic and/or halogenated VOCs were detected in all 9 groundwater samples collected. The VOCs (cis)1,2-dichloroethylene, trichloroethylene (TCE), and vinyl chloride were detected in one sample (LMW-1) at concentrations exceeding the AWQS for these compounds of 5 ug/L, 19, ug/L, and 13 ug/L, respectively. Acetone, a common laboratory contaminant was detected in all 9 groundwater samples at concentrations below all applicable criteria;

One or more SVOCs (PAHs only) were detected in all 9 groundwater samples collected. Benzo(k)fluoranthene was detected in one sample (LMW-8) at a concentration of 0.0526 ug/L, exceeding the AWQS of 0.002 ug/L;

One or more total metals were detected in all nine groundwater samples collected. Hexavalent chromium and total chromium were detected in four samples (LMW-5 through LMW-8) at concentrations exceeding the AWQS of 50 ug/L. Manganese was detected in four samples (LMW-1 through LMW-4) at concentrations exceeding the AWQS for manganese of 300 ug/L. Selenium was detected in two samples (LMW-3 and LMW-4) at concentrations exceeding the AWQS for selenium of 10 ug/L;

Pesticides and herbicides were not detected in any of the groundwater samples at concentrations above the applicable NYSDEC criteria; and,

PCBs were not detected in any of the groundwater samples at concentrations above the laboratory analytical method detection limits.

Groundwater sample analytical results are summarized and compared to SCGs in Table 3, and the results exceeding the SCOs are shown on Figure 7 of the RIR, both included in Appendix B.

2.2.6 On-Site and Off-Site Soil Vapor Contamination

2.2.6.1 Summary of Soil Vapor Data and Comparison with SCGs

Due to water infiltration into the soil gas probes, only 3 of 10 soil gas samples could be collected (LSV-2, LSV-5, and LSV-9) and analyzed for the Target Organic-15 (TO-15) list of compounds. A summary of the soil vapor samples collected during the RI is presented below:

Various chlorinated and petroleum related VOCs were detected in all three of the soil gas samples. VOCs detected in ambient air samples were generally lower than the soil gas samples.

Soil vapor sample analytical results are summarized and compared to SCGs in Table 4, and the results exceeding the SCOs are shown on Figure 8 of the RIR, both included in Appendix B.

2.3 ENVIRONMENTAL AND PUBLIC HEALTH ASSESSMENTS

2.3.1 Qualitative Human Health Exposure Assessment

An assessment of human health exposure was conducted for both current and future conditions in accordance with Appendix 3B of the NYSDEC Draft DER-10, Technical Guidance for Site Investigation and Remediation, dated May 2010. The assessment included an evaluation of potential exposure media, receptor populations, and pathways of exposure to Site-related COCs. Complete exposure pathways have the following five elements: 1) a contaminant source; 2) contaminant release and transport mechanism; 3) a point of exposure; 4) a route of exposure; and 5) a receptor population.

Conceptual Site Model

A conceptual site model has been developed based on the findings of the Site subsurface investigations. The purpose of the conceptual site model is to develop a simplified framework for understanding the distribution of impacted materials, potential migration pathways, and potentially complete exposure pathways, as discussed below.

Potential Sources of Contamination

Sources of contamination at the Site primarily include contaminants from documented historic fill material (some containing slag) which was historically placed at the Site to raise grade for development. Additional sources, such as historical releases or spills have not been identified.

Exposure Media

The media that may have been impacted by the above sources include soil, groundwater, and soil gas. Site soil may have been impacted by any of the former historical operations and/or the nature of the historic fill. Analytical data collected to date indicates that the historic fill underlying the Site is contaminated with VOCs (low-level), PAHs, PCBs, pesticides, and metals. Exceedances in groundwater and soil gas are likely attributable to on-Site source(s).

Receptor Populations

The human receptors for current Site conditions include workers, visitors, and trespassers.

Trespassers may be comprised of children, adolescents, and adults, whereas construction workers would be limited to adults. During construction and remediation activities, receptors would include construction and remediation workers. Under future conditions, receptors would likely include workers and visitors.

Potential Exposure Pathways – On-Site

Potential pathways to human receptors include direct contact (dermal absorption), ingestion, and inhalation of identified COCs. An evaluation of potential exposure pathways is provided below.

It should be noted that, the Site and surrounding areas are serviced by municipal water as required by the Town of Niagara Zoning Law Article VII, Chapter 135, Section 95 – Use of Town water required, which states that all premises within the Town requiring the use of water shall have connection with and exclusively use Town water. Use of groundwater at the Site for drinking would be further prohibited through filing of an Environmental Easement.

The proposed development plan includes the installation of stormwater sewers at depths below the observed perched groundwater table. Due to these conditions there is the potential for water to infiltrate the stormwater system and flow into the stormwater detention ponds. Although this presents a potential future exposure pathway to COCs in the perched groundwater, watertight fittings will be specified for the stormwater system in order to mitigate the potential for groundwater infiltration, therefore minimizing the exposure pathway.

Current Site Conditions

Site soil is currently covered by grass or covered by existing impervious cover (asphalt pavement and concrete). Therefore, a potential exposure pathway from COCs in soil to human receptors exists under current conditions.

The Site and surrounding areas obtain their drinking water supply from municipal sources, and not from Site groundwater. Therefore, a potential exposure pathway from groundwater to human receptors does not exist.

A potential exposure pathway from COCs in soil gas to human receptors does exist for current Site conditions.

Construction/Remediation Activities

Future construction and remediation activities at the Site would include demolition of the paved areas, and excavation and removal of some impacted soil. Therefore, the potential exists for

exposure of soil COCs to construction workers via dermal absorption, ingestion, and inhalation. The future construction activities may result in exposure to the public and construction workers of Site soil gas COCs through volatilization of vapors into the air and Site soil COCs through the generation and off-Site migration of dust. However, such exposures would be of short duration limited only to intrusive activities. Working in accordance with a Health and Safety Plan, a Soil Management Plan, and a Community Air Monitoring Plan, as well as donning personal protective equipment, and applying vapor and dust suppression measures to prevent off-Site migration of contaminants during construction would make this potential migration pathway incomplete.

Future/Post-Construction Conditions

Upon completion of the proposed construction activities, the Site would primarily be covered by buildings, parking lots, and roads. These structures would prevent direct human exposure to any contaminated materials that may be left in place. After the buildings are constructed, a complete exposure pathway via potential inhalation of subsurface soil gas should not exist as long as the existing building slabs are sealed. However, vapor intrusion to indoor air presents a low but potential exposure pathway that would be addressed by a soil vapor barrier and sub slab depressurization system.

As previously discussed, there is the potential for water to infiltrate the proposed stormwater system and flow into the stormwater detention ponds. Although this presents a potential future exposure pathway to COCs in the perched groundwater, watertight fittings will be specified for the stormwater system in order to mitigate the potential for groundwater infiltration, therefore minimizing the exposure pathway.

Potential Exposure Pathways – Off-Site

It should be noted that, the Site and surrounding areas are serviced by municipal water and the use of municipal water is required by the Town of Niagara Zoning Ordinance Chapter 135 Article VII Section 135-95 (Use of Town Water Required) and also required in the City of Niagara Falls under Local Law #4 of 2010. Therefore, current and future potential pathways for groundwater are not complete for off-site areas based on current legal restrictions of groundwater use.

Bedrock groundwater conditions have not been assessed.

Evaluation of Human Health Exposure

According to DER-10, Appendix 3B, a complete exposure pathway to human receptors requires all of the following five elements: 1) a contaminant source; 2) contaminant release and transport mechanisms; 3) a point of exposure; 4) a route of exposure; and 5) a receptor population. If any of the above five elements do not exist for current or future Site conditions, then a complete exposure pathway does not exist.

Current Conditions

The conceptual Site model identified a contaminant source (element 1) and a human receptor population (element 5). Also, a point of exposure (element 3) exists/may exist for potential exposure media for soil and groundwater COCs for current Site conditions, and a point of exposure exists for soil gas COCs in select portions of the Site.

Construction/Remediation Activities

Contaminant sources and contaminant release and transport mechanisms are those identified for the current conditions. Points of exposure during construction/remediation activities include the disturbed and exposed contaminated soil during excavation and contaminated dust and organic vapors arising from the excavation activities. Points of exposure would exist for groundwater COCs because excavation extends into groundwater (perched water). Routes of exposure include ingestion and dermal absorption of contaminated soil or groundwater, inhalation of organic vapors arising from contaminated soil and groundwater, and inhalation of dust arising from contaminated soil. The receptor population includes the construction and remediation workers and, to a lesser extent, the local population. All five elements exist; therefore, completed exposure pathways are present. However, the temporary risk would be minimized by applying appropriate health and safety measures, such as monitoring the air for organic vapors and dust, using vapor and dust suppression measures, maintaining site security, and wearing the appropriate personal protective equipment.

Future (Post-Construction) Conditions

Although post-construction conditions would be characterized by a contaminant source (element 1) and a human receptor population (element 5), a point of exposure (element 3) would not exist for potential exposure media for soil and groundwater COCs. After the structures are constructed, a complete exposure pathway via potential inhalation of subsurface vapors should not exist as long as the existing building slab is sealed and a sub-slab depressurization system is installed.

As discussed above, infiltration into the proposed stormwater system presents a potential future exposure pathway to COCs in the perched groundwater. Watertight fittings will be specified for the stormwater system in order to mitigate the potential for groundwater infiltration, minimizing the exposure pathway.

Potential Ecological Risks

The Site is a former urban fill site located within a highly developed, urban area in the Town of Niagara. The future Site use is commercial with the majority of the Site covered by buildings, concrete sidewalks and asphalt, providing little or no wildlife habitat or food value. As such, no unacceptable ecological risks are anticipated under the current or reasonably anticipated future use scenario.

The NYSDEC's decision key contained in Appendix 3C of DER-10 (NYSDEC, 2010) was utilized to evaluate whether or not performance of a Fish and Wildlife Resources Impact Analysis was needed. The RI demonstrated that there is evidence that COPCs were released into the environment at the Site. Therefore, the Site can be considered to have been affected by one or more discharge or spill events.

The Site currently contains ecological resources consisting of grassy fields and shrubby areas. Other ecological resources may also be present.

Review of the NYSDEC's internet-based Environmental Resources Management Resource Mapper suggests that the Site and adjacent properties may contain state-regulated freshwater wetlands and rare plants and/or rare animals. However, evidence of significant on-Site ecological resources was not observed during the RI. Additionally, there is no evidence that contamination present at the Site has the potential to migrate to and impact potential off-Site ecological resources. Therefore, a Fish and Wildlife Resources Impact Analysis was not needed based on our interpretation of NYSDEC guidance (DER-10 Appendix 3C).

2.4 REMEDIAL ACTION OBJECTIVES

Based on the results of the Remedial Investigation, the following Remedial Action Objectives (RAOs) have been identified for this Site.

2.4.1 Groundwater

RAOs for Public Health Protection

- Prevent ingestion of groundwater containing contaminant levels exceeding drinking water standards; and,

- Prevent leaching of chromium from characteristically hazardous soil to groundwater.

RAOs for the Environment

- Prevent discharge of groundwater that would results in surface water contamination.

2.4.2 Soil

RAOs for Public Health Protection

- Prevent ingestion/direct contact with soil that poses a risk to public health and the environment given the current and future intended use of the Site; and,
- Prevent inhalation of or exposure to, contaminants volatilizing from contaminated soil.

RAOs for the Environment

- Prevent migration of contaminants that would results in groundwater or surface water contamination.
- Remove characteristically hazardous soil/fill

2.4.3 Soil Vapor

RAOs for Public Health Protection

- Prevent exposure to contaminants in soil vapor; and,
- Prevent migration of soil vapor into occupied structures.

2.5 DESCRIPTION AND EVALUATION OF PROPOSED REMEDIAL MEASURES

This section provides an analysis of the selected remedial approaches by media using the Remedy Selection Evaluation Criteria identified in Section 4.2 of Guidance Document DER-10: Technical Guidance for Site Investigation and Remediation (NYSDEC, 2010).

As described in Section 4.1 of the Guidance Document, “the goal of the remedy selection process in the BCP is to select a remedy for a site that is fully protective of public health and the environment, taking into account the current, intended, and reasonably anticipated future land use of the site.” In order to achieve this goal, the Guidance Document divides remedial actions into four Cleanup Tracks (Tracks 1 through 4). Each cleanup track can result in a remedy that is protective of public health and the environment, but the remedies for each track would differ in respect to extent of the cleanup, restrictions on future site use, the application of institutional and/or engineering controls, and the amount of site specific information required to support the

remedy selection process.

Track 1 Cleanup

A Track 1 cleanup would achieve a cleanup level that would allow the site to be used for any purpose without any restrictions on the use of the Site. It would also achieve a cleanup level that does not rely on the implementation of long term institutional and engineering controls (except if a groundwater use restriction is placed upon the site) The soil cleanup must achieve the 6 NYCRR Part 375 Unrestricted Use criteria at any depth above bedrock and the backfill used must meet the unrestricted use criteria.

Track 2 Cleanup

A Track 2 restricted-residential, residential, commercial, or industrial cleanup allows for the use of the generic soil criteria presented in Part 375. The remedy must address contaminants of concern in soils at any depth above bedrock to meet the appropriate restricted use criteria. The requirement to achieve the appropriate restricted use criteria for all soils above bedrock may not apply to soils at a depth greater than 15 feet below ground surface, provided that:

- The soils below 15 feet do not represent a source of contamination;
- The environmental easement for the Site requires that any contaminated soils remaining at depth would be managed along with other site soils, pursuant to a site management plan;
- Off-site groundwater does not exceed standards; and
- On-site groundwater use is restricted.

The soil portion of the remedy must meet the lowest of the relevant restricted use criteria for protection of human health or the criteria for protection of groundwater or the protection of ecological resources presented in Part 375 (unless the criteria for protection of groundwater and protection of ecological resources are determined not to apply). If offsite material is required to be imported for the remedy, it must meet requirements of Appendix 5 (Allowable Constituent Levels for Imported Fill or Soil for Commercial Use) in the NYSDEC's guidance document DER-10. The remedy may not rely on the implementation of long term institutional and engineering controls to address soil impacts. Long term institutional or engineering controls can be implemented to address contamination related to other media including, but not limited to, groundwater and soil gas.

Track 3 Cleanup

A Track 3 cleanup must satisfy the provisions for a Track 2 remedial program; however, the NYSDEC may approve the modification of one or more of the contaminant-specific soil cleanup objectives set forth in Table 375-6.8(b) based upon site-specific data. Any modification of criteria must be performed in accordance with Section 375-6.9.

Track 4 Cleanup

A Track 4 cleanup utilizes site-specific information and guidance to identify soil cleanup objectives to achieve a restricted use remedy. Track 4 allows the use of the generic soil cleanup objectives table for the particular land use scenario, or allows for the development of site-specific criteria. To achieve a Track 4 remedy, restrictions would be placed on the use of the property and upon groundwater use. Track 4 would utilize institutional/engineering controls to prevent exposure to soil contamination (capping and containment) and all other media. For commercial use, the top one foot must meet the lowest of the respective restricted use criteria for protection of human health or the criteria for protection of groundwater or the protection of ecological resources presented in Part 375 (unless the criteria for protection of groundwater and protection of ecological resources are determined not to apply). If offsite material is required in the top one foot of soil, it shall meet requirements of Appendix 5 (Allowable Constituent Levels for Imported Fill or Soil for Commercial Use) in the NYSDEC's guidance document DER-10. Consistent with the Guidance Document, the proposed remedy for the Site would be fully protective of public health and the environment, taking into account the current, intended, and potential future land use.

According to section 4.4 of DER-10, the alternatives analysis for a BCP site must develop two or more alternatives, as long as the proposal is for restricted use where:

- One alternative would achieve unrestricted use relative to soil contamination, without the use of institutional/engineering controls; and
- Such other alternatives proposed by the remedial party which would achieve the cleanup Track and intended use identified for the site.

Accordingly, the following two alternatives for the Site were evaluated:

- The first alternative would achieve unrestricted use relative to soil contamination via excavation and off-site disposal (soil exceeding Unrestricted Use criteria), without the use of institutional/engineering controls, under a Track 1 scenario;

- The second alternative would include the implementation of hot spot excavation for PCB-impacted (>10 mg/kg) soil and characteristically hazardous chromium-impacted soil, installation of a cover system consisting of one foot soil cap (below Allowable Constituent Levels for Imported Fill or Soil for Commercial Use) in landscaped areas and 6-inches of clay lining the detention ponds, an impermeable capping system consisting of asphalt pavement, building slabs and foundations, and the use of institutional/engineering controls, under a Track 4 scenario.

Detailed descriptions of these alternatives are given in Sections 2.5.1 and 2.5.2.

The remedial program will be selected based upon due consideration of the following factors listed in Section 27-1415 of the new BCP law (Article 27, Title 14 of the Environmental Conservation Law):

- Protection of human health and the environment;
- Compliance with standards, criteria, and guidance (SCGs);
- Short-term effectiveness and impacts;
- Long-term effectiveness and permanence;
- Reduction of toxicity, mobility, or volume of contamination;
- Implementability;
- Cost effectiveness;
- Community Acceptance; and,
- Land use.

Each of these factors is evaluated below for the selected remedy.

2.5.1 Unrestricted Use Alternative

An Unrestricted Use alternative would necessitate remediation of all soil/fill where concentrations exceed the unrestricted use SCO per 6 NYCRR Part 375 (see Table 1 and Figure 3 of the RIR included in Appendix B). This alternative would require the excavation and disposal all of the soil and fill located at the Site to a depth of up to 15-feet below ground surface. For Unrestricted Use scenarios, excavation and off-site disposal of impacted soil/fill is

generally regarded as the most applicable remedial measure, because institutional controls cannot be used to supplement the remedy. As such, the Unrestricted Use alternative assumes that the estimated total volume of impacted soil/fill that would be removed from these areas is approximately 310,000 cubic yards. This alternative assumes that groundwater remediation would be required during the removal of all impacted soil/fill. Due to the existing groundwater quality, all perched groundwater at the Sabre Park portion of the Site would be containerized and shipped off-site for disposal; however, the feasibility of treating the groundwater using an on-site treatment facility prior to disposal off-site or permitted discharge to the local sanitary sewer would be being evaluated.

Overall Protection of Public Health and the Environment

The Unrestricted Use alternative would be protective of public health and the environment in accordance with Part 375 SCOs, through the removal of all contaminated soil/fill from the Site. As such, future exposures to site-related contaminants would be eliminated; resulting in unrestricted future Site use and the Site RAOs would be met.

Other than the need for mitigation measures for residual soil vapors potentially generated from deep vadose zone soils, the Track 1 alternative would result in the elimination of all pathways of exposure from on-site contaminated media through complete removal of the material. The public health during remediation activities would be protected by implementing dust, odor, and organic vapor control and monitoring procedures as needed. The environment would be protected by implementing the selected soil erosion plans.

Compliance with SCGs

The Unrestricted Use alternative would meet the RAOs for the site, as well as all SCGs, as all contamination would be removed. There would be no need for engineering/institutional controls or environmental easements.

Short-Term Effectiveness

Implementation of the Unrestricted Use alternative would result in significant short-term impacts given the extensive volume of contaminated soil that would be excavated and removed from the site. Greater potential risks would occur to on-site workers for this alternative than the Track 4 Alternative, through direct contact with contaminated soil. Potential risks may occur to on-site workers and the surrounding community through exposure to dust and increased vehicular traffic in the area.

Other potential impacts to the community could include construction-related noise and construction-related vehicular traffic associated with removal of soils from the site. The soil to be excavated from the Site under this alternative would require removal of approximately 310,000 cubic yards of material. Considered together, the large truck volume would result in an increase in diesel emissions, increase in traffic and wear and tear to the local roadways.

Long-Term Effectiveness and Permanence

The Unrestricted Use alternative would achieve removal of all residual impacted soil/fill; therefore, no soil/fill exceeding the unrestricted use SCOs would remain on the Site. As such, the Unrestricted Use alternative would provide long-term effectiveness and permanence.

Reduction of Toxicity, Mobility, or Volume with Treatment

Through removal of all impacted soil/fill, the Unrestricted Use alternative would permanently and significantly reduce the toxicity, mobility, and volume of Site contamination in soil and eventually groundwater (perched water).

Implementability

This alternative can be implemented using standard construction methods and equipment (e.g., hydraulic excavators). No technical implementability issues would be encountered in construction of the Unrestricted Use alternative. However, implementation of this alternative would be extremely challenging since it involves removal of historic fill present everywhere on the Site.

The work under this alternative would likely disrupt local traffic patterns as well as commercial businesses in the area. The potential for community opposition due to the closer proximity of this remediation to the nearby residential neighbors, as well as environmental impacts exists due to the expected volume of diesel emissions, traffic congestion, and other dangers these trucks pose. These factors may lessen the probability that local approvals would be granted or could result in restrictions that could increase the cost of the remedy and/or the length of the remedy construction process.

The SSD systems design is a standard, presumptive remedy in the industry. These systems can easily be incorporated into the new building design for this alternative. The SSDS sumps require access at the surface, and may be located within the buildings outside of the retail areas (e.g., maintenance closet or corridor). The piping would be routed beneath the floor slab and joined to the roof air treatment train.

Cost

The environmental capital cost of implementing an Unrestricted Use alternative is estimated at \$73,080,000 which is the cost of the unrestricted use cleanup plus the environmental capital costs remedial measures completed.

As the site would be remediated to an unrestricted-use level under this alternative, there are no associated O&M costs, with the exception of maintaining the SSD Systems. A breakdown of costs associated with this alternative is included as Table 1.

Community Acceptance

This alternative should be acceptable to the community once the remedy is completed, because all of the on-site contaminated soil would be removed. However, this alternative would likely meet with community opposition and complaints during implementation given the extended construction time period and disruption to traffic patterns due to the significantly increased truck traffic

The AAR would be advertised and made available for public comment for a duration of 45 days. Community acceptance would be evaluated based on comments received from the public in response to Fact Sheets and other planned Citizen Participation activities.

Land Use

The following land use factors that were required to be analyzed in the BCP application materials are reproduced here. First, the current, intended, and reasonably anticipated future land use of the site and its surroundings are compatible with the selected remedy. The proposed use is commercial/retail, and the remedial alternatives are designed to meet Track 1 Unrestricted Use criteria. The reasonably anticipated future use of the site and its surroundings was documented by the applicant in the BCP application, which led to the following conclusions:

- The planned future use of the Site conforms to applicable zoning laws or maps or the reasonably anticipated future use of the Site. The Sabre Park parcel is currently zoned as property class 416 (Commercial), which is consistent with the proposed future property use.
- The proposed use conforms to the current use and historical and/or recent development patterns in the area.
- The Site is located in a mixed commercial and residential area, but the discovered

contamination is not believed to be impacting any off-site properties.

- The Site is accessible to existing infrastructure.

2.5.2 Hot Spot/Excess Contaminated Fill/Groundwater Removal and Institutional/Engineering Controls

The Track 4 approach presented below is a technical description of the proposed remedy in accordance with the BCP statute and the DER-10 draft regulations.

Short Description

- Excavation and removal of soil containing PCBs exceeding concentrations of 10 mg/kg;
- Excavation and removal of soil containing characteristically hazardous concentrations of chromium (>5 mg/L), as determined by TCLP analysis;
- Excavation and offsite disposal of upwards of approximately 8,000 cubic-yards of construction related spoils, exceeding the restricted commercial SCOs;
- Collection and offsite disposal of approximately 1,000,000-gallons of perched, contaminated groundwater exceeding Part 703 GA criteria.
- Engineering controls consisting of a cap/cover system throughout the Site, and vapor barriers with active sub-slab depressurization systems (SSDS) under the proposed Fashion Outlets expansion structure and proposed Secure Storage facility office building. The cap/cover system would eliminate the exposure risk of direct contact with impacted subsurface media, while the increase of impervious area at the Site would reduce subsurface water infiltration and contaminant migration. Installation of a vapor barrier and SSDS at each occupied structure would prevent the potential exposure to contaminants volatilizing from impacted soil and groundwater. The engineered cap/cover system would consist of the following:
 - Approximately 11.7-acres or landscaped area with a minimum of one-foot of material meeting the requirements of Appendix 5 (Allowable Constituent Levels for Imported Fill or Soil for Commercial Use) in the NYSDEC's guidance document DER-10, and a minimum of six inches of clay lining the detention ponds,
 - Approximately 28.9-acres of pavement with varying depths of subbase in the parking lots and drive aisles; and,
 - Approximately 7.2-acres of structural foundations at the proposed building

locations.

- An Institutional Controls Plan. Institutional controls at the Site would include groundwater use restrictions and a use restriction allowing commercial/industrial use of the Site, but preventing less restrictive land use (i.e., unrestricted or residential use);
- Waste characterization and off-Site disposal of excess fill/soil generated during construction activities associated with the proposed development.

Overall Protection of Public Health and the Environment

Under the Track 4 alternative, the potential for future exposure to contamination would be for utility, construction, or Site maintenance workers who could contact contaminated soil during excavation for site improvements or installation or repair of subsurface utilities. This alternative would reduce the potential for exposure of these workers through institutional controls, which would require notification of planned intrusive work to NYSDEC and monitoring and use of appropriate health and safety measures.

Although contaminated soil exceeding 6 NYCRR Part 375 Restricted Commercial SCOs would remain under this alternative, engineering controls in the form of surface barriers (e.g., buildings, soil cover, asphalt, and concrete) and installation of SSD Systems, and the implementation of institutional controls would preclude exposure to the remaining contamination.

Compliance with SCGs

The Track 4 alternative would be performed in accordance with applicable, relevant, and appropriate standards, guidance, and criteria. This alternative would include the excavation and off-site disposal of characteristically hazardous materials, PCBs in excess of 10 mg/kg, and implementation of institutional and engineering controls. The placement of impacted subsurface soils beneath a one foot soil cover, asphalt or concrete cap meets the requirements for Track 4 cleanups for commercial used sites, in accordance with Section 5.4 of the DER-10 guidance document. The Site Management Plan would include an excavation work plan to address any impacted soil/fill encountered during post-development maintenance activities, and a Site-wide inspection program to assure that the Institutional and Engineering controls placed on the Site have not been altered and remain effective.

Short-Term Effectiveness

The Track 4 alternative would be effective on a short-term basis, because only limited contaminated soil is removed from the ground, and a minimal volume would be transported off-

site. Potential short-term impacts would be associated with the excavation of contaminated soil, generation of dust, and increased truck traffic to remove excess soil from the Site.

For this alternative, potential exposures could occur to on-site workers through direct contact with contaminated soil, and to onsite workers and the surrounding community through exposure to dust. The excavated soil under this alternative would be significantly more manageable than the Track 1 alternative, and could conceivably be placed adjacent to the excavations and covered until backfilling, resulting in minimal handling of these soils, with minimal potential exposure, and minimal dust generation. The use of effective dust control measures and truck tarping would minimize short-term impacts from dust generation.

The time period for completing remedial construction for the Track 4 alternative would be significantly shorter than the Track 1 alternative, resulting in a shorter period for potential short-term impacts to occur to workers and the community.

Temporary safety construction fencing would be placed around the outer perimeter of the Site work area to distinguish the work zone and discourage trespassing. During soil/fill excavation and loading activities, dust monitoring would be performed to assure conformance with NYSDOH-approved community air monitoring action levels. The potential for chemical exposures and physical injuries would be reduced through safe work practices; proper personal protection equipment; environmental monitoring; establishment of work zones and Site control; and appropriate decontamination procedures.

Long-Term Effectiveness and Permanence

The Track 4 alternative would include the excavation and off-site disposal of characteristically hazardous materials, PCBs in excess of 10 mg/kg, and implementation of institutional and engineering controls. Post-excavation confirmatory samples would be collected to show excavation sidewalls and bottoms meet site-specific PCB and/or NYSDEC restricted commercial SCOs, and the federal Resource Conservation and Recovery Act (RCRA) Hazardous Waste Criteria, respectively. The removal of excess contaminated soil/fill generated during construction activities would further enhance remaining on-site conditions. Impacted soils remaining on-site would be placed beneath an engineered cap/cover or the proposed buildings, preventing direct contact. Impacted groundwater would be addressed by placing an institutional control on the Site, prohibiting use of groundwater. The institutional control would also restrict the property to commercial or industrial use. The Site Management Plan would include an excavation work plan to address any residual impacted soil/fill encountered during post-development maintenance activities, and a Site-wide Inspection program to assure that the Institutional controls placed on the Site are maintained.

Reduction of Toxicity, Mobility, or Volume with Treatment

The Track 4 alternative would reduce the toxicity, mobility, and volume of Site contamination through removal of PCB-impacted soil/fill exceeding the site-specific SCO (10 mg/kg) and characteristically hazardous chromium-impacted soil/fill exceeding the RCRA Hazardous Waste Criteria, off-site disposal of excess contaminated soil/fill generated during construction activities, and the off-site disposal or on-site treatment of impacted groundwater. The proposed development significantly increases the impervious surface area at the Site and incorporates detention basins that would be lined with clay, which would greatly reduce the subsurface water infiltration and contaminant mobility. However, contaminated soil would still remain on the Site (in the historic fill) through this alternative.

The presence of surface barriers throughout the Site and installation of SSD systems would permanently reduce the mobility of Site-related COCs.

Implementability

This alternative would consist mostly of limited excavation of soil with standard bucket excavators for construction purposes, on-site soil management, either re-use or off-site transport and disposal, and the backfilling, grading, paving, and construction of the cap/cover system. No technical or action-specific administrative implementability issues are associated with implementation of this alternative or the SMP. All necessary experienced labor, equipment and supplies are readily available. Permits associated with this alternative should be easily obtained. There is sufficient capacity at disposal and treatment facilities in the region to receive the limited volumes of contaminated materials removed from the Site. An Environmental Easement would be filed with the Town of Niagara documenting the controls placed on the Site.

The SSD systems design is a standard, presumptive remedy in the industry. These systems can easily be incorporated into the new building design for this alternative. The SSDS sumps require access at the surface, and may be located within the buildings outside of the retail areas (e.g., maintenance closet or corridor). The piping would be routed beneath the floor slab and joined to the roof air treatment train.

Cost

The environmental capital cost of this remedial approach would be approximately \$10,410,000. O&M costs would include maintenance of the site wide composite capping/cover system and maintaining the SSD Systems. A breakdown of costs associated with this alternative is included as Table 2.

Community Acceptance

This alternative should be equally acceptable to the community because they would have minimal impacts to the community during implementation, the potential for human exposure to on-site contamination would be minimized, and the site would be redeveloped into an attractive use.

The AAR would be advertised and made available for public comment for a duration of 45 days. Community acceptance would be evaluated based on comments received from the public in response to Fact Sheets and other planned Citizen Participation activities.

Land Use

The following land use factors that were required to be analyzed in the BCP application materials are reproduced here. First, the current, intended, and reasonably anticipated future land use of the site and its surroundings are compatible with the selected remedy. The proposed use is commercial/retail, and the remedial alternatives are designed to meet Track 4 Site-specific and NYSDEC Part 375 Restricted Commercial criteria. The reasonably anticipated future use of the site and its surroundings was documented by the applicant in the application, which led to the following conclusions:

- The planned future use of the Site conforms to applicable zoning laws or maps or the reasonably anticipated future use of the Site. The Sabre Park parcel is currently zoned as property class 416 (Commercial), which is consistent with the proposed future property use.
- The proposed use conforms to the current use and historical and/or recent development patterns in the area.
- The Site is located in a mixed commercial and residential area, but the discovered contamination is not believed to be impacting any off-site properties.
- The Site is accessible to existing infrastructure.

3.0 RECOMMENDED REMEDIAL ALTERNATIVE

Based on the evaluation of the remedial alternatives described above, both alternatives would be protective of human health and the environment and meet the remedy selection criteria. Implementation of the Track 1 alternative provides for removal of all shallow on-site soil/fill contamination, and would not rely on long-term engineering or institutional controls. However,

unacceptable short-term impacts to the surrounding community would occur for this alternative, from the extended period of excavation, increased truck traffic, construction noise, and potential for exposure to contaminated dust associated with the removal of significantly greater volume of soil. Additionally, the cost for the Track 1 alternative is prohibitive compared to the Track 4 alternative.

The Track 4 alternative can be implemented in conjunction with proposed site development. A significant component of the remedy, i.e., engineering controls in the form of construction of new impermeable surface cover/cap, is already incorporated into the construction documents. The SSD systems can be operated efficiently, safely, and with little disruption to the commercial operations. The SSD systems would facilitate mitigation of the long-term source of sub-slab vapors, thereby resulting in earlier termination of the SSDS operation.

The Track 4 alternative can be implemented in a cost-effective and safe manner using established methods and providing for the long-term and short-term protection of human health and the environment.

The Track 4 alternative is the recommended remedial alternative for this Site.

TABLES

TABLE 1: REMEDIATION COST ESTIMATE
Alternative I - Unrestricted Use Alternative
Fashion Outlets of Niagara Falls

Item No.	Description	Estimated Quantity	Unit	Unit Price	Cost
1	Mobilization, Demobilization, & Permits	1	Lump Sum	\$10,000	\$10,000
2	Soil Excavation, Stockpile and Loading	310,000	Cubic Yard	\$20	\$6,200,000
3	Transport and Disposal of Contaminated, Hazardous Material	1,480	Tons	\$200	\$296,000
4	Transport and Disposal of Non-Hazardous Material	500,000	Tons	\$50	\$25,000,000
5	Endpoint Sampling	2,500	Samples	\$600	\$1,500,000
6	Dewatering / Fluid Treatment	10,325,000	Gallon	\$1.50	\$15,487,500
7	Backfill/ Compact with Gravel	310,000	Cubic Yard	\$40	\$12,400,000
Total Capital Cost					\$60,893,500
Administration, Insurance, & Engineering (20%)					\$12,178,700
Total Estimated Cost for Remediation					\$73,080,000

Line Item Notes

- 1 Includes items such as mobilization and demobilization of all labor, equipment, and materials necessary to excavate, transport, and dispose the targeted soil. Also includes any project related permit or regulation fees (excludes potential hazardous waste fees).
- 2 Soil Excavation assumes excavation/handling costs for the Niagara Falls area. Based on an average depth of excavation of 4 feet across the site (48 acres).
- 3 Contaminated, Hazardous material transport and disposal assumes union disposal costs for the Niagara Falls area. Density factor of 1.6 tons per CY. Assumed 60% of excavated material falls into this category.
- 4 Contaminated, Non-hazardous material transport and disposal assumes union disposal costs for the Niagara Falls area. Density factor of 1.6 tons per CY. Assumed 40% of excavated materials falls into this category.
- 5 Soil endpoint characterization costs includes sample collection and analysis of endpoint samples. Assume endpoint sample frequency will be 1 samples per 20 linear foot of sidewall and 1 sample per 900 square foot of excavation base plus quality control samples.
- 6 Accounts for containerizing and off-site transportation & disposal of groundwater encountered during site-wide excavation. Volume based on area side (48 acres), fill porosity of 30%, and 2 feet of water within the excavation.
- 7 Backfill import, preparation and placement with clean gravel.

TABLE 2: REMEDIATION COST ESTIMATE
Alternative II - Track 4 Remediation
Fashion Outlets of Niagara Falls

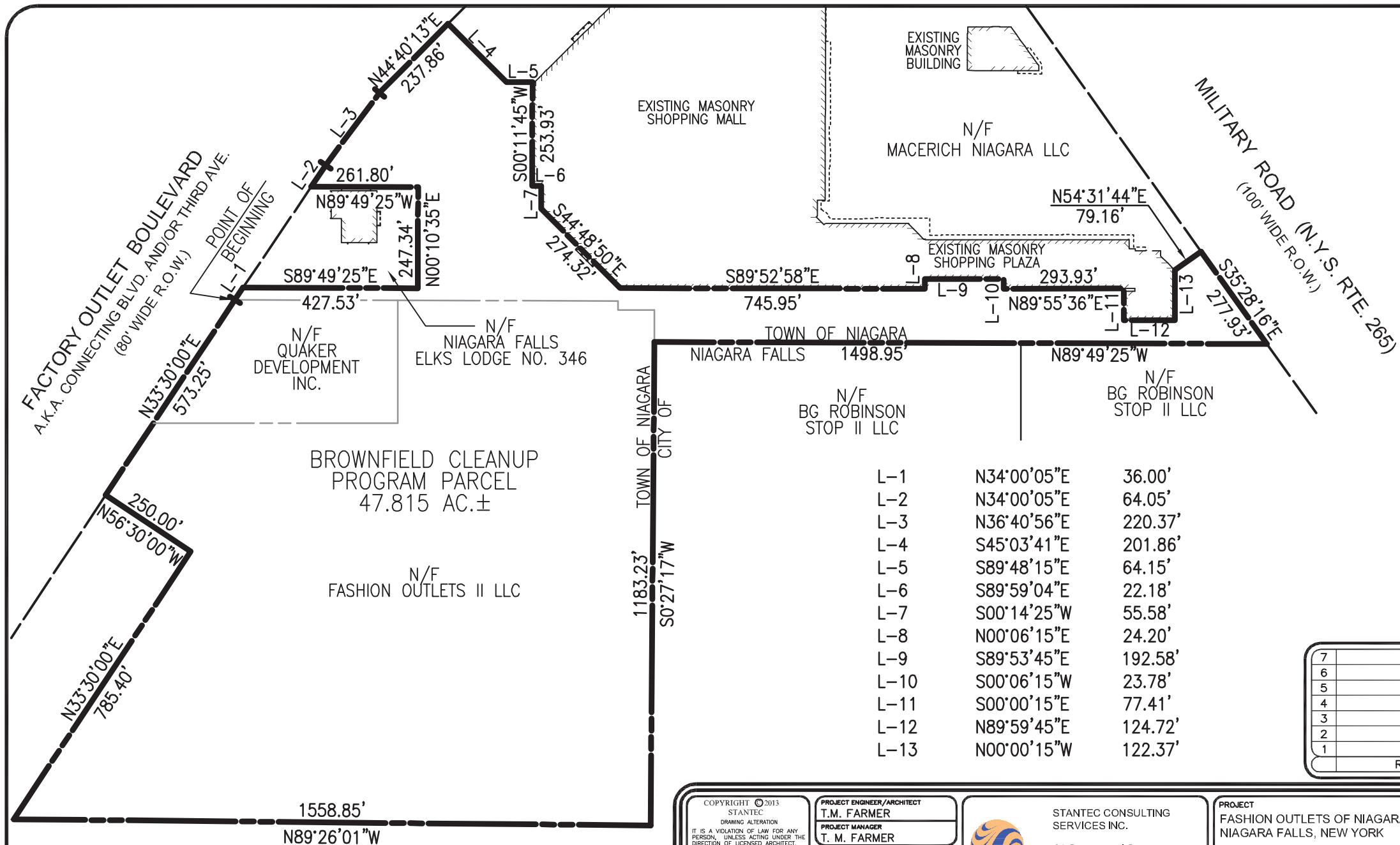
Item No.	Description	Estimated Quantity	Unit	Unit Price	Cost
1	Mobilization, Demobilization, Permits, Maintain Site	1	Lump Sum	\$50,000	\$50,000
2	Soil Excavation, Stockpile and Loading	35,000	Cubic Yard	\$20	\$700,000
3	Transport and Disposal of Hazardous Material (Chromium >5 mg/L)	1,480	Tons	\$275	\$407,000
4	Transport and Disposal of Contaminated Material (PCBs >10 mg/kg)	835	Tons	\$195	\$162,825
5	Transport and Disposal of Non-Hazardous Contaminated Soil/Fill	12,000	Tons	\$50	\$600,000
6	Endpoint Sampling	30	Samples	\$600	\$18,000
7	Waste Characterization	1	Lump Sum	\$100,000	\$100,000
8	Backfill/ Compact with Gravel	1,500	Cubic Yard	\$40	\$60,000
9	Dewatering / Fluid Treatment	1,000,000	Gallon	\$1.50	\$1,500,000
10	Vapor Barrier	1	Lump Sum	\$476,000	\$476,000
11	Subslab Depressurization Systems	1	Lump Sum	\$400,000	\$400,000
12	Composite Capping/Cover System - Concrete/Asphalt/Landscaping	1	Lump Sum	\$4,200,000	\$4,200,000
Total Capitol Cost					\$8,673,825
Administration, Insurance, & Engineering (20%)					\$1,734,765
Total Estimated Cost for Remediation					\$10,410,000

Line Item Notes

- 1 Includes items such as mobilization and demobilization of all labor, equipment, and materials necessary to excavate, transport, and dispose the targeted soil. Also includes any project related permit or regulation fees (excludes potential hazardous waste fees).
- 2 Soil Excavation assumes excavation/handling costs for the Niagara Falls area. Based on removal of PCB-impacted soil above 10mg/kg, and assumed excavation depth of 10 feet below grade and a footprint of 50 feet by 50 feet; removal of characteristically hazardous chromium-impacted soil above RCRA Hazardous Waste Criteria, and assumed excavation depth of 10 feet below grade and a footprint of 75 feet by 20 feet. Also includes surplus soil generated during construction of proposed development (upwards of approximately 8,000 CY), and additional fill/soil reuse (assumed 14,000 CY ±)
- 3 Hazardous chromium-contaminated material transport and disposal assumes union disposal costs for the Niagara Falls area. Density factor of 1.6 tons per CY.
- 4 Non-hazardous PCB-contaminated material transport and disposal assumes union disposal for the Niagara Falls area. Density factor of 1.6 tons per CY
- 5 Accounts for off-site disposal of surplus soil generated during construction of proposed development. Assumes upwards of approximately 8,000 cubic yards, and non-hazardous material. Density factor of 1.5 tons per CY
- 6 Soil endpoint characterization costs includes sample collection and analysis of endpoint samples. Assume endpoint sample frequency will be 1 samples per 20 linear foot of sidewall and 1 sample per 900 square foot of excavation base plus quality control samples.
- 7 Waste characterization sampling to support disposal or soil/fill.
- 8 Backfill import, preparation and placement with clean gravel (for hot spot excavations)
- 9 Accounts for containerizing and off-site transportation & disposal of groundwater encountered during construction. Volume based on area of ponds (225,000 square feet), fill porosity of 30%, and 3 feet of water within the fill layer.
- 10 Accounts for the installation of a vapor barrier membrane at the interface of the concrete slab and the site sub-grade materials and on all sub-grade wall. Assume 225,000 sq ft of membrane for mall expansion, and 13,000 square feet for Secure Storage facility office at \$2 per sq ft.
- 11 Accounts for installation of subslab depressurization systems (SSDS) beneath vapor barrier at mall expansion and Secure Storage facility office. Assumes \$250,000 for mall expansion SSDS, and \$150,000 for Secure Storage facility office
- 12 Estimated costs provided by contractors bidding on the project.

APPENDIX A

METES AND BOUNDS



L-1	N34°00'05"E	36.00'
L-2	N34°00'05"E	64.05'
L-3	N36°40'56"E	220.37'
L-4	S45°03'41"E	201.86'
L-5	S89°48'15"E	64.15'
L-6	S89°59'04"E	22.18'
L-7	S00°14'25"W	55.58'
L-8	N00°06'15"E	24.20'
L-9	S89°53'45"E	192.58'
L-10	S00°06'15"W	23.78'
L-11	S00°00'15"E	77.41'
L-12	N89°59'45"E	124.72'
L-13	N00°00'15"W	122.37'

7			
6			
5			
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3			
2			
1			
REVISIONS		DATE	BY

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IT IS A VIOLATION OF LAW FOR ANY
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DESCRIPTION OF THE ALTERATIONS.

PROJECT ENGINEER/ARCHITECT
T.M. FARMER
PROJECT MANAGER
T. M. FARMER

DRAWN BY
M.J. GRASSO

SCALE 1"=300'
FIRST ISSUE DATE 2013.04.16



STANTEC CONSULTING
SERVICES INC.

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Fax: (585) 272-1814
www.stantec.com

PROJECT
FASHION OUTLETS OF NIAGARA FALLS
NIAGARA FALLS, NEW YORK

FOR: MACERICH NIAGARA LLC

TITLE OF DRAWING
EXHIBIT D
BROWNFIELD CLEANUP PROGRAM PARCEL

PROJECT NO.
193500513

DRAWING NO.
V-14

EXHIBIT D

Description of Brownfield Cleanup Program Parcel

All that tract or parcel of land containing 47.815 acres, more or less, situate in the Town of Niagara, County of Niagara, State of New York, all as shown on a map entitled "Fashion Outlets of Niagara Falls, Brownfield Cleanup Program Parcel", prepared by Stantec Consulting Services, Inc. dated April 16, 2013, having drawing number 193500513 V-14, and being more particularly bounded and described as follows:

Beginning at a point of intersection of the easterly line of Factory Outlet Blvd. a.k.a. Connecting Blvd and/or Third Avenue (80 feet wide) with the northerly line of lands now or formerly of Quaker Development, Inc. said line also being the southerly line of lands of Macerich Niagara LLC; thence

1. N 34° 00' 05" E, along said easterly line of Factory Outlet Blvd., a distance of 36.00 feet to a point of intersection with the southerly line of lands now or formerly of the Niagara Falls Elks Lodge No. 346; thence
2. S 89° 49' 25" E, along the last mentioned southerly line, a distance of 427.53 feet to a point of intersection with the easterly line of said lands; thence
3. N 00° 10' 35" E, along the last mentioned easterly line a distance of 247.34 feet to the point at the northeasterly corner of said lands; thence
4. N 89° 49' 25" W, along the northerly line of said lands, a distance of 261.80 feet to a point of intersection with the aforementioned easterly line of Factory Outlet Blvd. ; thence the following three (3) courses along said easterly line
5. N 34° 00' 05" E, a distance of 64.05 feet to a point; thence
6. N 36° 40' 56" E, a distance of 220.37 feet to a point; thence
7. N 44° 40' 13" E, a distance of 237.86 feet to a point; thence the following fifteen (15) courses through said lands of Macerich Niagara LLC
8. S 45° 03' 41" E, a distance of 201.86 feet to a point; thence
9. S 89° 48' 15" E, a distance of 64.15 feet to a point; thence
10. S 00° 11' 45" W, a distance of 253.93 feet to a point; thence
11. S 89° 59' 04" E, a distance of 22.18 feet to a point; thence
12. S 00° 14' 25" W, a distance of 55.58 feet to a point; thence
13. S 44° 48' 50" E, a distance of 274.32 feet to a point; thence
14. S 89° 52' 58" E, a distance of 745.95 feet to a point; thence
15. N 00° 06' 15" E, a distance of 24.20 feet to a point; thence
16. S 89° 53' 45" E, a distance of 192.58 feet to a point; thence
17. S 00° 06' 15" W, a distance of 23.78 feet to a point; thence
18. N 89° 55' 36" E, a distance of 293.93 feet to a point; thence
19. S 00° 00' 15" E, a distance of 77.41 feet to a point; thence
20. N 89° 59' 45" E, a distance of 124.72 feet to a point; thence
21. N 00° 00' 15" W, a distance of 122.37 feet to a point; thence
22. N 54° 31' 44" E, a distance of 79.16 feet to a point of intersection with the southwesterly line of Military Road (100 feet wide); thence

23. S 35° 28' 16" E, along said southwesterly line, a distance of 277.93 feet to a point of intersection with the southerly line of the aforementioned lands of Macerich Niagara LLC; thence
24. N 89° 49' 25" W, along said southerly line, a distance of 1498.95 feet to a point of intersection with the easterly line of lands now or formerly of Fashion Outlets II LLC; thence
25. S 00° 27' 17" W, along said easterly line, a distance of 1183.23 feet to a point at the southeasterly corner of said lands; thence
26. N 89° 26' 01" W, along the southerly line of said lands, a distance of 1558.85 feet to a point; thence
27. N 33° 30' 00" E, along the westerly line of said lands, a distance of 785.40 feet to a point; thence
28. N 56° 30' 00" W, along the westerly line of said lands, a distance of 250.00 feet to a point of intersection with the aforementioned easterly line of Factory Outlet Blvd.; thence
29. N 33° 30' 00" E, along the aforementioned easterly line of Factory Outlet Blvd., a distance of 573.25 feet to the Point or Place of Beginning.

Subject to any easements or encumbrances of record.

APPENDIX B

SELECTED RI REPORT SUMMARY DATA TABLES AND FIGURES



Legend

 Proposed Brownfields Cleanup Program Site Extents

A Existing Land Use

A Street Name

A Existing Land Use

A Street Name

Notes:

1. Aerial imagery is provided through Langan's GeoAnalytics software and ArcGIS online. Source of aerial imagery is USGS/NAIP/USDA/USFS April 2011.

2. Land use data was obtained from the Zoning Map of the Town of Niagara dated December 2009 and the Schedule B Official Zoning Map for the City of Niagara Falls Ver. 11.12.15.

3. Adjacent street names are identified as provided by the Niagara County NY On-Line Mapping System.

4. The BCP boundary is based on the Topographic Survey prepared by Stantec Consulting Services, Inc. last updated on February 21, 2013 and Drawing No. W-14338d (Exhibit C) - Brownfield Cleanup Program Permit prepared by Stantec Consulting Services Inc. dated April 16, 2013.

5. The grounds for the site and all adjacent properties is 14338.

WARNING: It is a violation of the NY's Education Law Article 145 for any person, unless he is acting under the direction of a licensed professional engineer, to alter this item in any way.



LANGAN <small>Power Drive Center 1, 518 River Drive, Elmwood Park, NJ 07617-1338 T: 201.794.8900 F: 201.794.0508 www.langan.com NEW JERSEY NEW YORK VIRGINIA CALIFORNIA PENNSYLVANIA CONNECTICUT FLORIDA ALABAMA ARIZONA ARKANSAS ILLINOIS INDIANA IOWA KANSAS KENTUCKY LOUISIANA MAINE MARYLAND MASSACHUSETTS MICHIGAN MINNESOTA MISSISSIPPI MISSOURI MONTANA NEBRASKA NEVADA NEW HAMPSHIRE NEW MEXICO NEW YORK NORTH CAROLINA NORTH DAKOTA OHIO OKLAHOMA OREGON PENNSYLVANIA RHODE ISLAND SOUTH CAROLINA SOUTH DAKOTA Tennessee Texas Utah Vermont Virginia Washington West Virginia Wisconsin Wyoming LANGAN ENGINEERING & CONSTRUCTION, INC. LANGAN ENGINEERING & CONSTRUCTION, INC. d/b/a LANGAN ENGINEERING & CONSTRUCTION, INC. LANGAN ENGINEERING & CONSTRUCTION, INC. LANGAN ENGINEERING & CONSTRUCTION, INC.</small>	Project	FONF Expansion/ Sabre Park BCP TOWN OF NIAGARA	
	Project		
	Drawing Title		
	EXISTING CONDITIONS PLAN		
	Project No. 140091401		
Date	4/4/2013		
Scale	1" = 200'		
Drawn By	amf		
Last Revised	8/2/2013		
Exhibit		2	

Path: \\langan\corporate\projects\140091401\140091401.dwg Plot Date: 4/4/2013 Plot Time: 10:00 AM Plot User: amf Plot Device: HP DesignJet 5000 Series



1. **Intellectual Property:** All software, hardware, and data created by or for the parties hereto shall remain the property of the party that created it. The parties agree that the software, hardware, and data created by or for the parties hereto shall be used solely for the purposes of the project and shall not be used for any other purpose without the prior written consent of the party that created it.

100 0
SCALE IN FEET

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 NEW! NEW! NEW! NEW! NEW!
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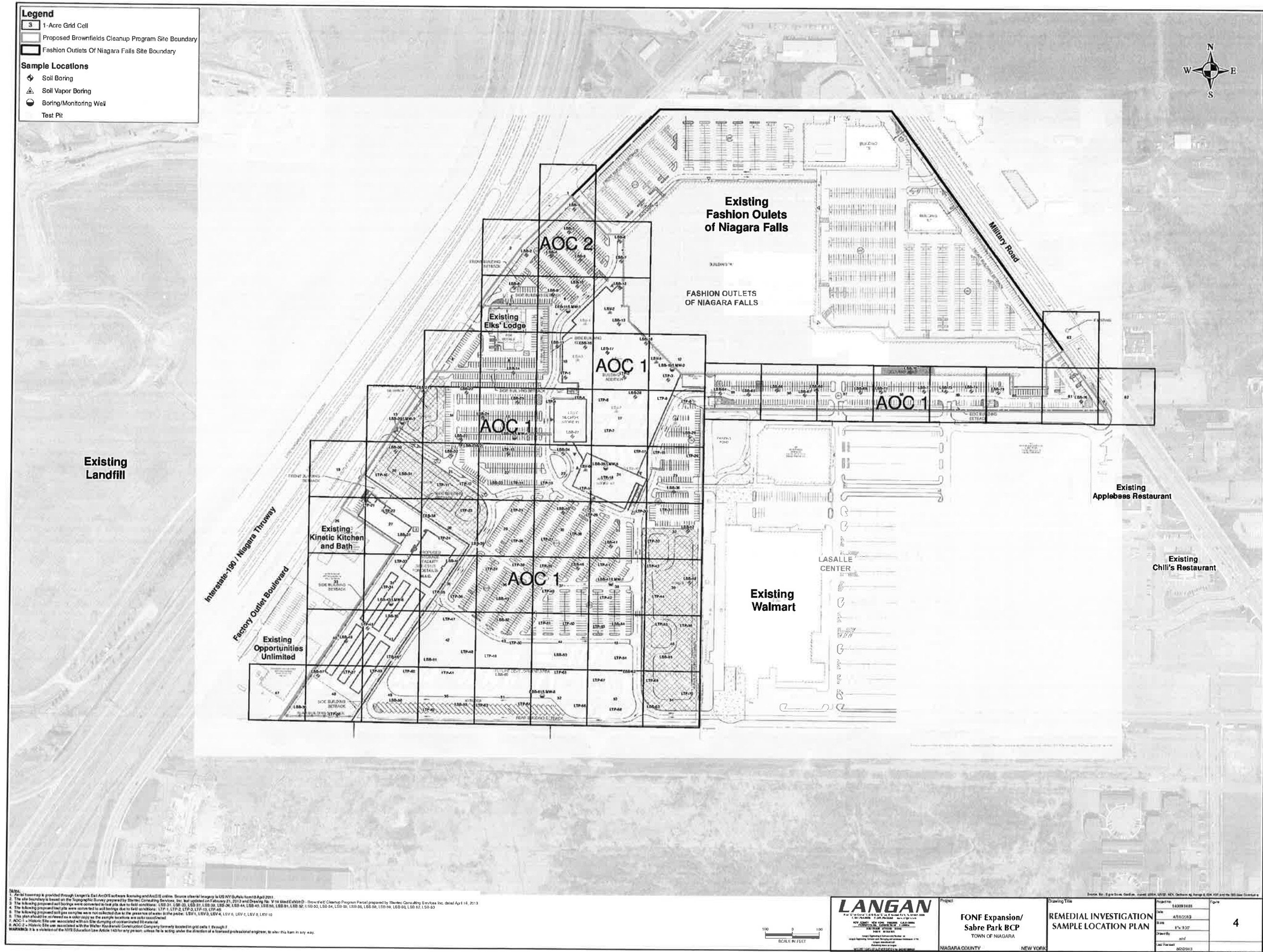
**FONF Expansion/
Sabre Park BCP**
TOWN OF NIAGARA

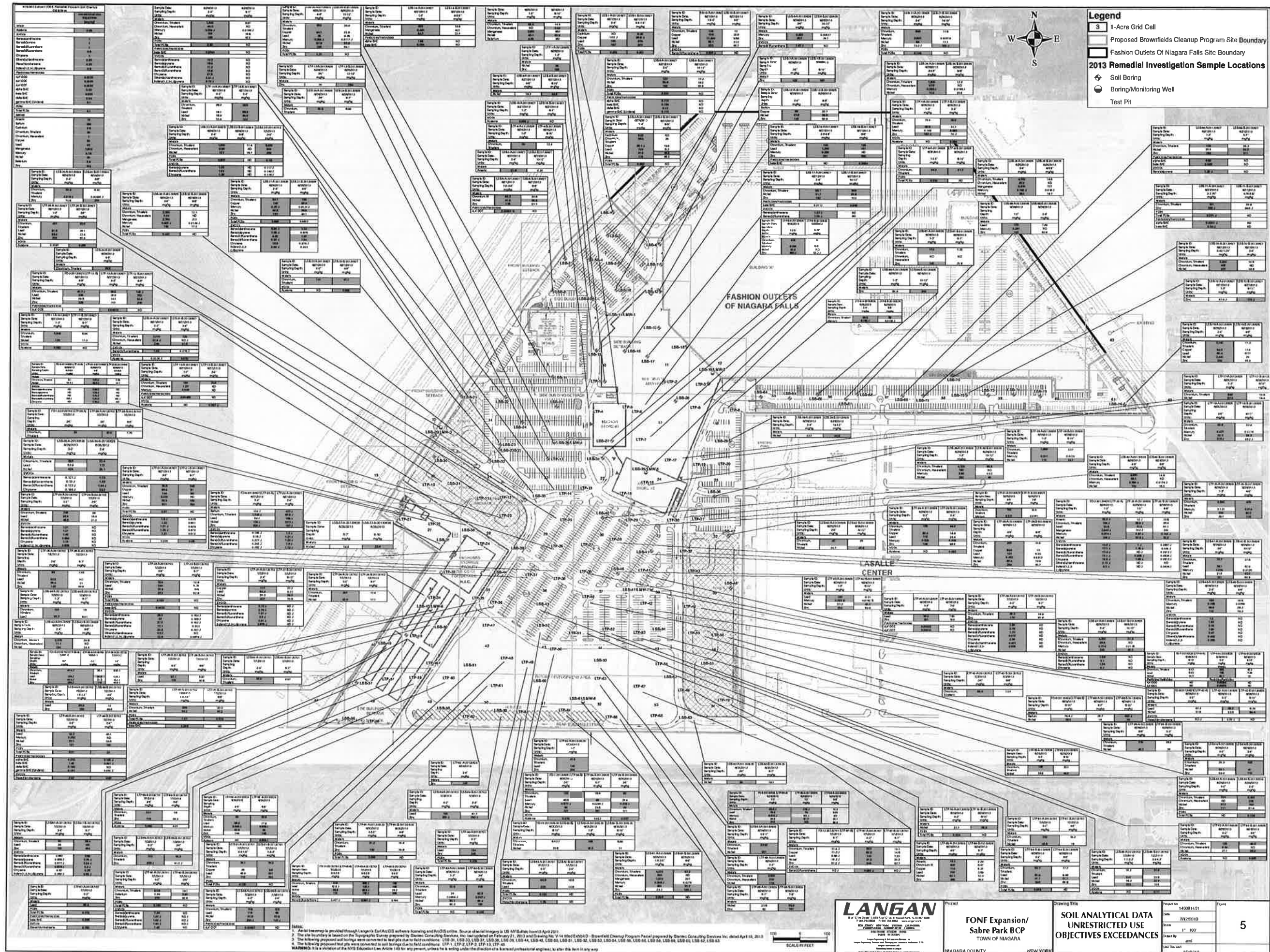
Learning Time

PROPOSED DEVELOPMENT PLAN

Project No	140091401
Date	8/19/13
Scale	1" = 100'
Drawn by	amf
Last Reviewed	

3





Legend

- 1-Acre Grid Cell
- Proposed Brownfields Cleanup Program Site Boundary
- Fashion Outlets Of Niagara Falls Site Boundary
- 2013 Remedial Investigation Sample Locations
- Soil Boring
- Boring/Monitoring Well
- Test Pit



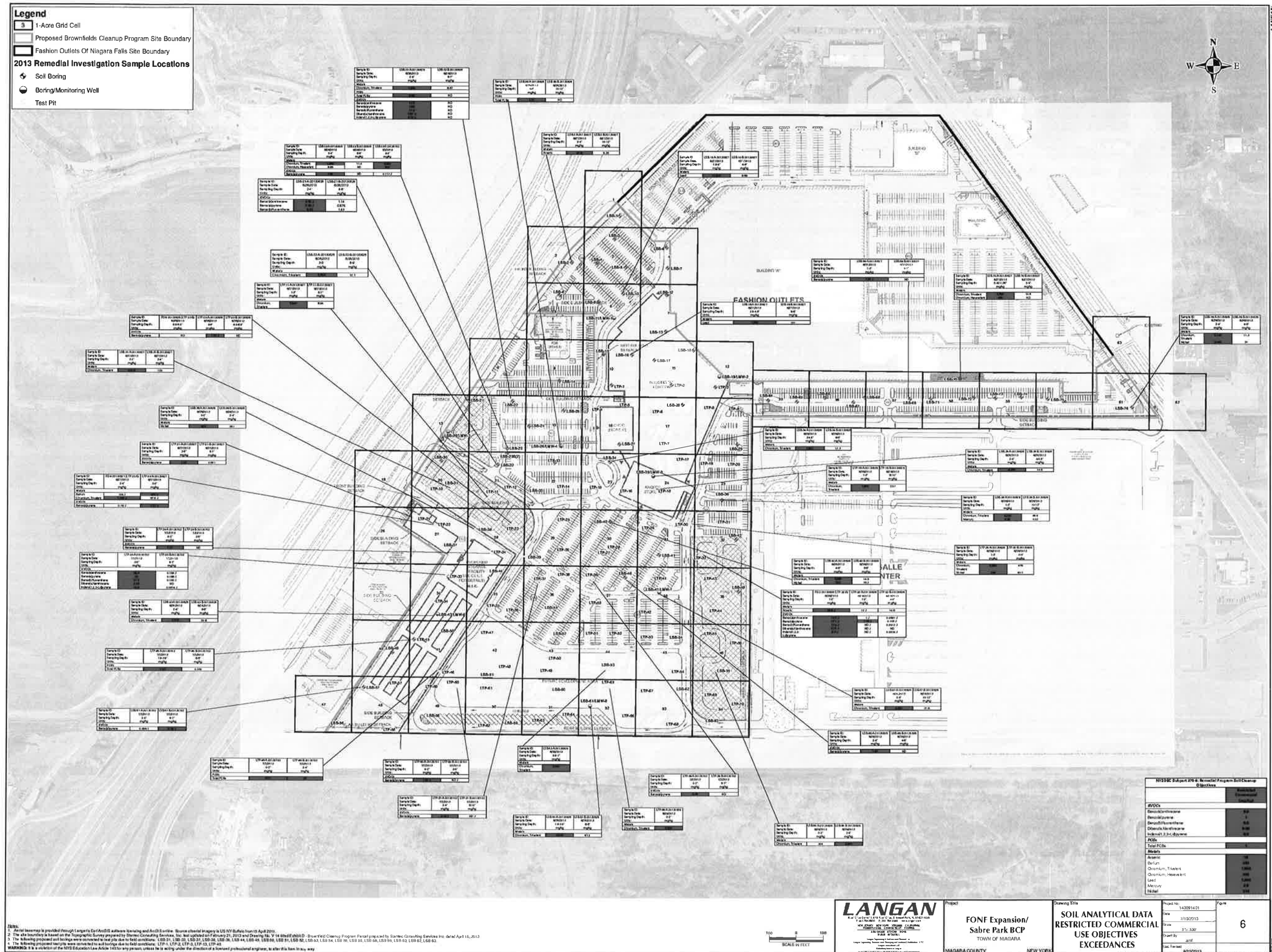
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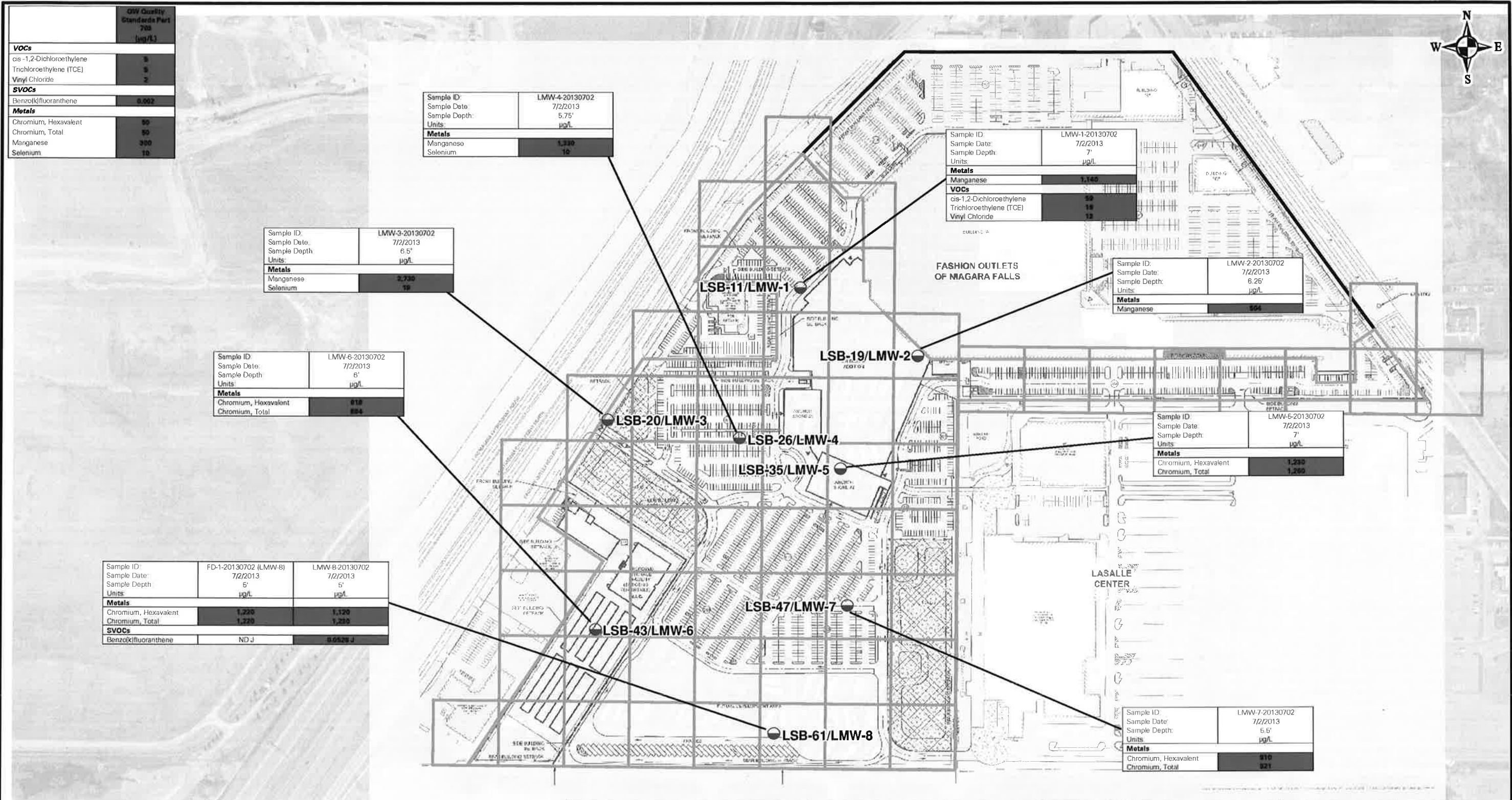
FONF Expansion/
Sabre Park BCP
TOWN OF NIAGARA

SOIL ANALYTICAL DATA
UNRESTRICTED USE
OBJECTIVES EXCEEDANCES

Project No: 14091401
Date: 03/20/19
Scale: 1" = 100'
Drawn By: [Name]
Check By: [Name]
Date: 03/20/19

5





New York State Department of Health Outdoor Vapor Upper Fence Criteria	
	Soil Gas (ug/m³)
VOCs	
1,1,1-Trichloroethane	2.5
1,1-Dichloroethane	0.4
1,3-Dichlorobenzene	0.5
2-Butanone	16
4-Methyl-2-pentanone	1.9
Benzene	13
Chlorobenzene	0.4
Chloroform	1.2
cis-1,2-Dichloroethylene	0.4
Cyclohexane	6.3
Ethyl Benzene	6.4
Methylene chloride	16
n-Heptane	18
n-Hexane	14
o-Xylene	7.1
Tetrachloroethylene (PCE)	2.5
Tetrahydrofuran	0.8
Toluene	57
Trichloroethylene (TCE)	0.5
Trichlorofluoromethane	12

NOTE: LSV-1, LSV-3, LSV-4, LSV-6, LSV-7, LSV-8,
and LSV-10 were not sampled due to the presence of
water in the probe.

Sample ID:	FD-2-20130702 (LSV-9)	LSV-9-20130702
Sample Date:	7/2/2013	7/2/2013
Units:	ug/m³	ug/m³
VOCs		
Benzene	34	32
Chloroform	31	29
cis-1,2-Dichloroethylene	7.9	ND
Cyclohexane	34	32
Methylene chloride	16	14
n-Heptane	76	69
n-Hexane	60	55
Tetrachloroethylene (PCE)	1,300	1,100
Toluene	59	56
Trichloroethylene (TCE)	400	360
Trichlorofluoromethane	24	20

Sample ID:	LSV-2-20130701
Sample Date:	7/1/2013
Units:	ug/m³
VOCs	
1,1,1-Trichloroethane	3.7
1,1-Dichloroethane	2.2
1,3-Dichlorobenzene	15
Benzene	54
Chloroform	52
cis-1,2-Dichloroethylene	4.5
Cyclohexane	59
Ethyl Benzene	8.9
n-Heptane	130
n-Hexane	100
o-Xylene	10
Tetrachloroethylene (PCE)	170
Toluene	100
Trichloroethylene (TCE)	450
Trichlorofluoromethane	33

Sample ID:	LSV-5-20130701
Sample Date:	7/1/2013
Units:	ug/m³
VOCs	
1,1,1-Trichloroethane	3.4
1,1-Dichloroethane	2
1,3-Dichlorobenzene	14
Benzene	48
Chloroform	47
cis-1,2-Dichloroethylene	3.6
Cyclohexane	51
Ethyl Benzene	8
n-Heptane	110
n-Hexane	88
o-Xylene	9.1
Tetrachloroethylene (PCE)	93
Toluene	95
Trichloroethylene (TCE)	390
Trichlorofluoromethane	32

Legend

Soil Gas Sample Location

1-Acre Grid Cell

Brownfields Cleanup Program Site Boundary

Fashion Outlets Of Niagara Falls Site Boundary



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Langan Engineering & Environmental Services, Inc.
Langan Engineering, Environmental, Surveying and
Landscape Architecture, D.P.C.
Langan International LLC
Collectively known as Langan

NJ CERTIFICATE OF AUTHORIZATION No. 24GA27996400

Project

FONF Expansion/
Sabre Park BCP
TOWN OF NIAGARA

NIAGARA COUNTY NEW YORK

Drawing Title

SOIL GAS
ANALYTICAL RESULTS

Project No.
140091401

Date
7/14/2013

Scale
1"=300'

Drawn By
amf

Last Revised
8/2/2013

Figure
8

Legend

July 2013 Groundwater Contours

Groundwater Flow Direction

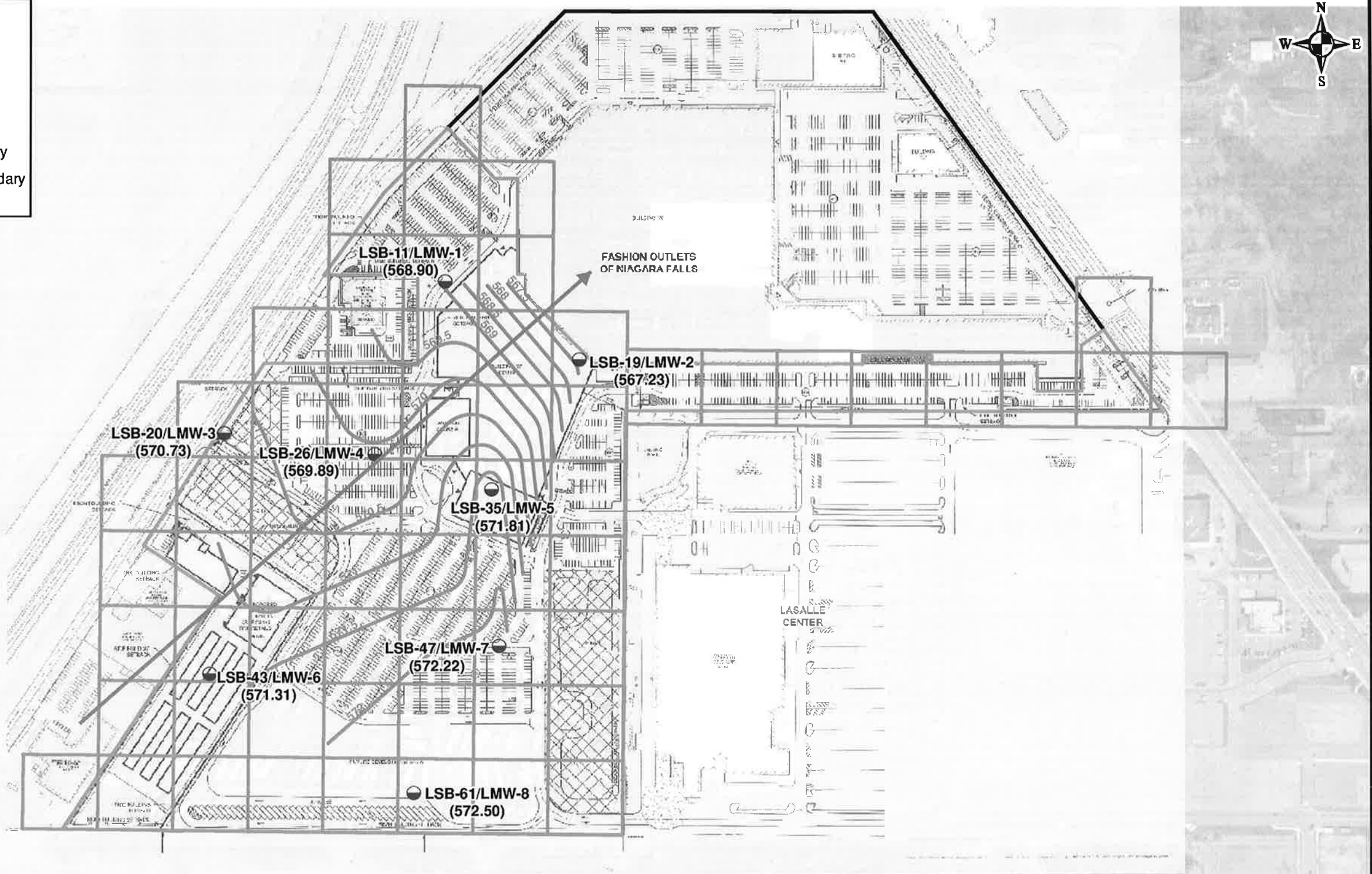
Monitoring Well

1-Acre Grid Cell

Brownfields Cleanup Program Site Boundary

Fashion Outlets Of Niagara Falls Site Boundary

(571.30) Groundwater Elevation (ft MSL)



Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community



Notes:
1. The site boundary is based on the Topographic Survey prepared by Stantec Consulting Services, Inc. last updated on February 21, 2013 and Drawing No. V-14 titled Exhibit D - Brownfield Cleanup Program Parcel prepared by Stantec Consulting Services Inc. dated April 16, 2013.
WARNING: It is a violation of the NYS Education Law Article 145 for any person, unless he is acting under the direction of a licensed professional engineer, to alter this item in any way.

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Elmwood Park, NJ 07407-1338
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Langan Engineering & Environmental Services, Inc.
Langan Engineering, Environmental, Surveying and
Landscape Architecture, D.P.C.
Langan International LLC
Collectively known as Langan

NJ CERTIFICATE OF AUTHORIZATION No. 24GA27996400

Project

FONF Expansion/
Sabre Park BCP
TOWN OF NIAGARA

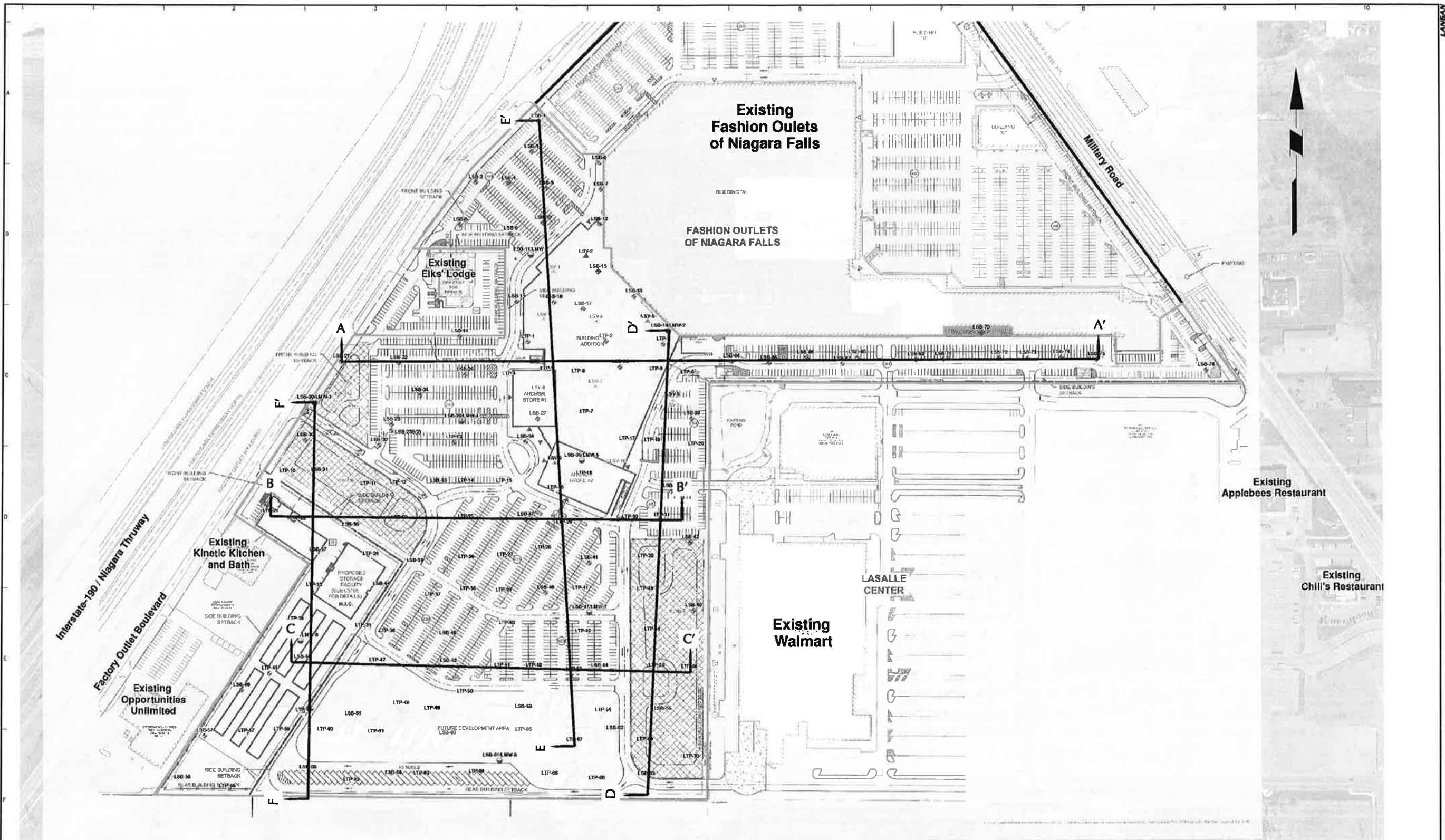
NIAGARA COUNTY

NEW YORK

Drawing Title

GROUNDWATER
ANALYTICAL RESULTS

Project No.	140091401	Figure 9
Date	7/10/2013	
Scale	1"=300'	
Drawn By	amf	
Last Revised	8/20/2013	

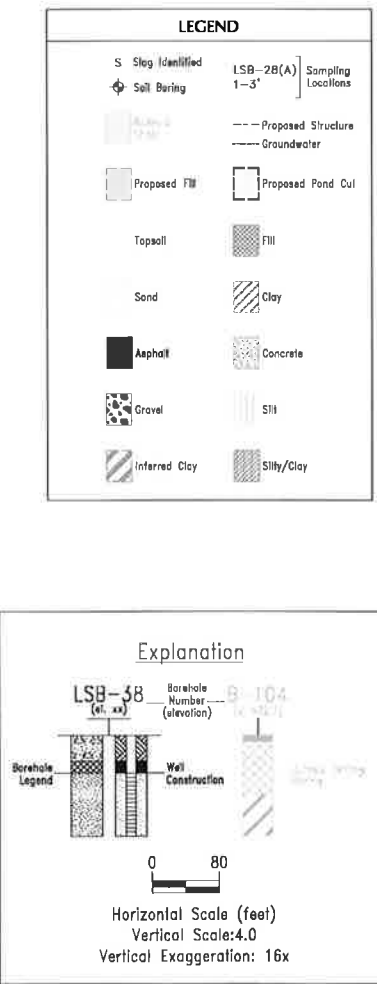
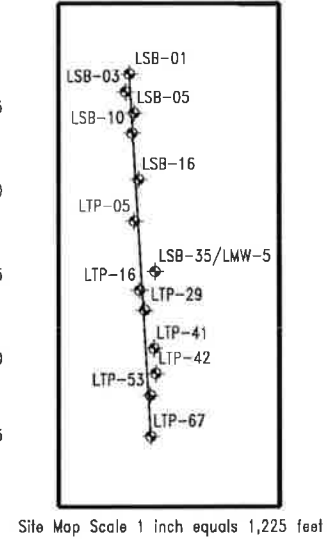
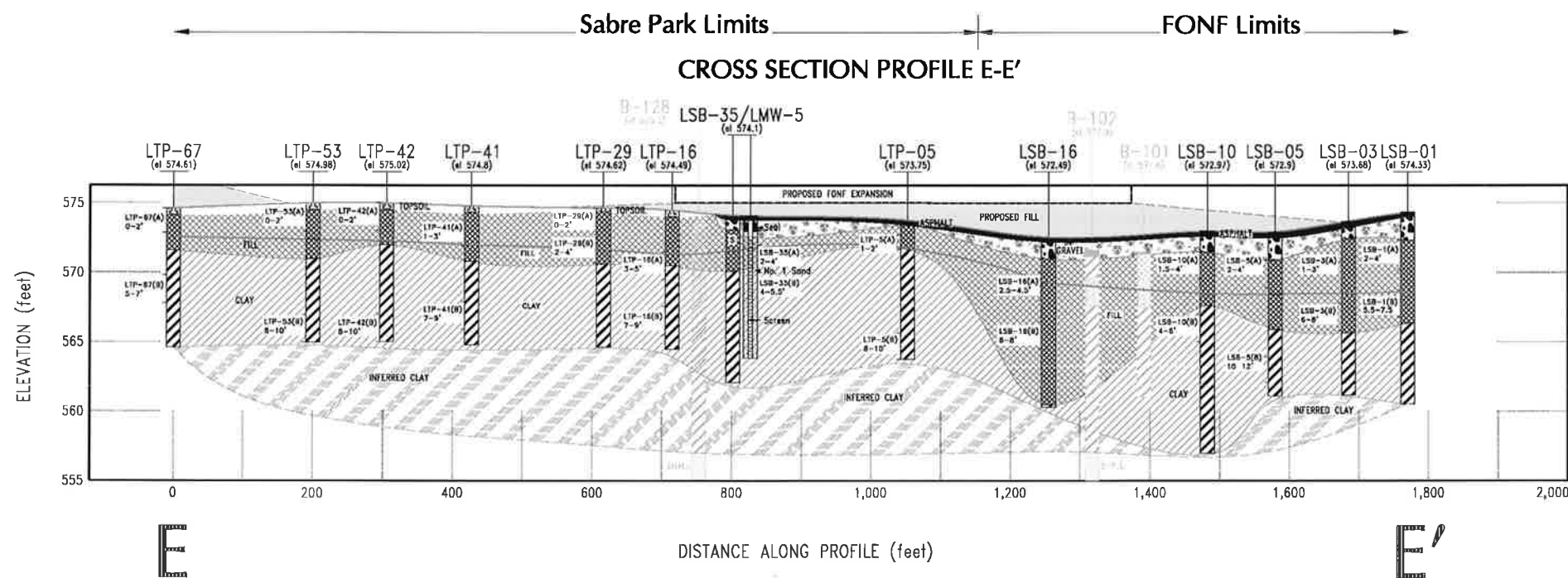
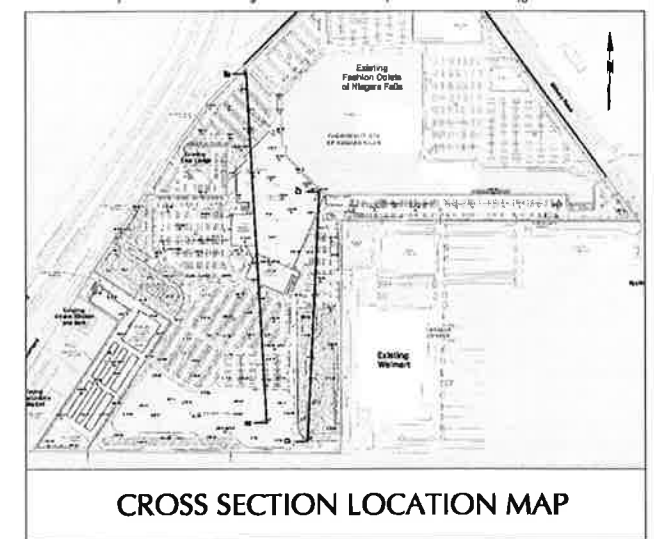
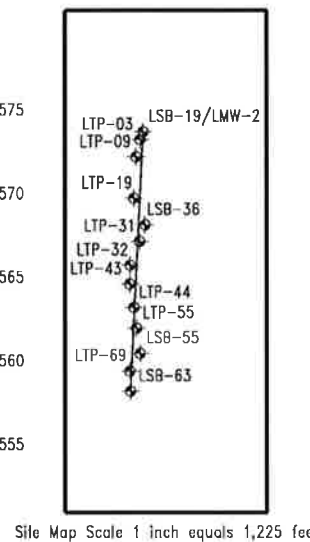
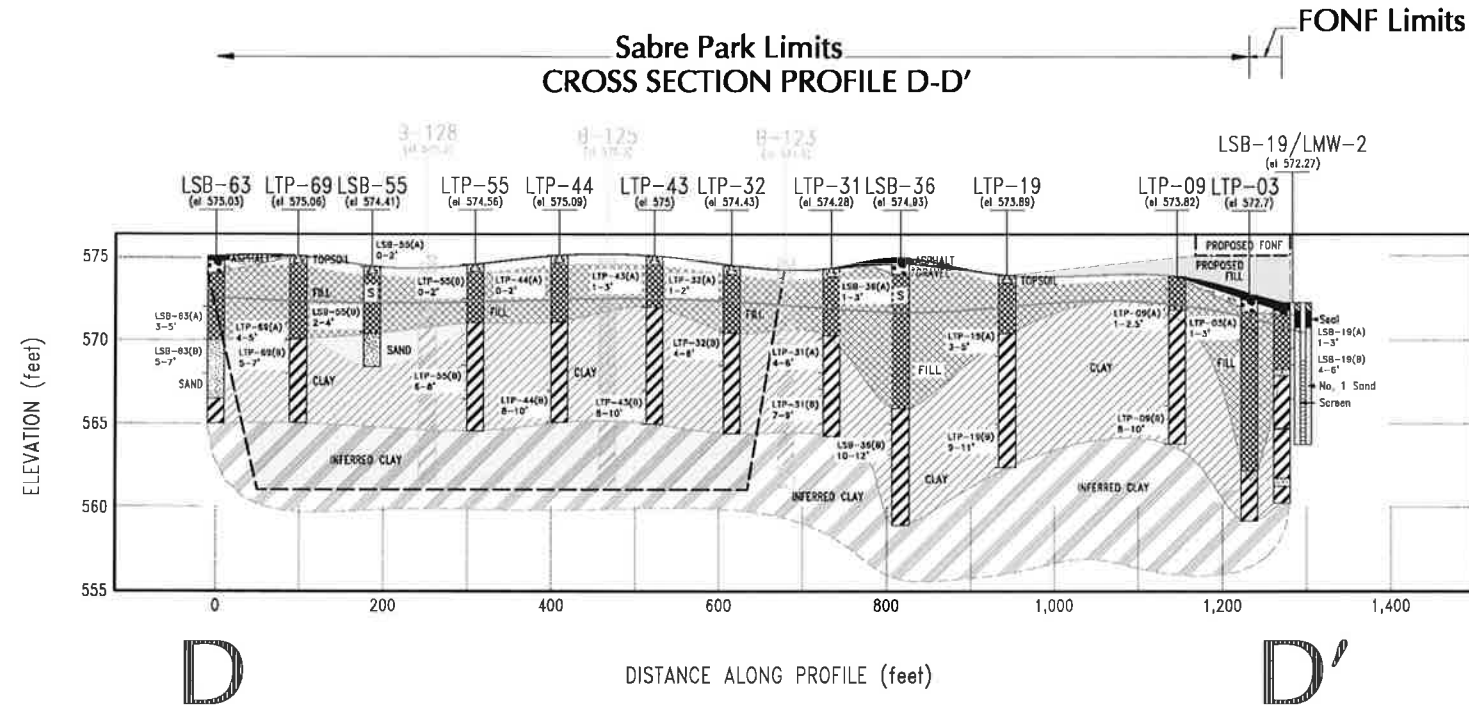


NOTES

1. BORINGS LSB-# COMPLETED BY SJB SERVICES, INC OF BUFFALO, NEW YORK IN JUNE AND JULY 2013 WITH OVERSIGHT PROVIDED BY LANGAN.
2. TEST PITS LTP-# COMPLETED BY MARK CERRONE, INC OF NIAGARA FALLS, NEW YORK IN JUNE AND JULY 2013 WITH OVERSIGHT PROVIDED BY LANGAN.
3. BORING AND TEST PIT LOCATIONS AND ELEVATIONS WERE SURVEYED BY A LANGAN REPRESENTATIVE JULY 2013 UTILIZING A TRIMBLE RTK GPS UNIT REFERENCING THE NEW YORK STATE DEPARTMENT OF TRANSPORTATION COOPERATIVE BASE STATION NETWORK. HORIZONTAL COORDINATES WERE REFERENCED BY THE WEST NAD83 DATABASE AND THE VERTICAL COORDINATES WERE REFERENCED BY THE NAVD88 DATABASE.
4. DEPICTED GROUNDWATER LEVELS ARE INFERRED BASED ON GROUNDWATER CONTOURS CREATED FROM MONITORING WELL GAUGING EVENT PERFORMED JULY 2013.
5. AREAS OF PROPOSED EXISTING GRADE CUTS ARE BASED ON STANTEC INC. DRAWING C-GRAD.
6. PROPOSED SITE MAP PROVIDED BY STANTEC INC.



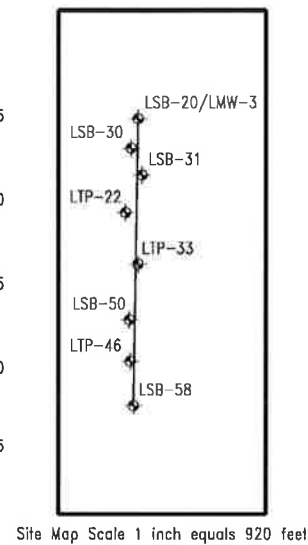
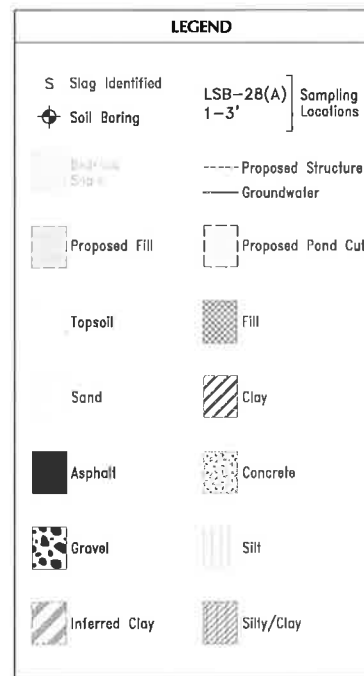
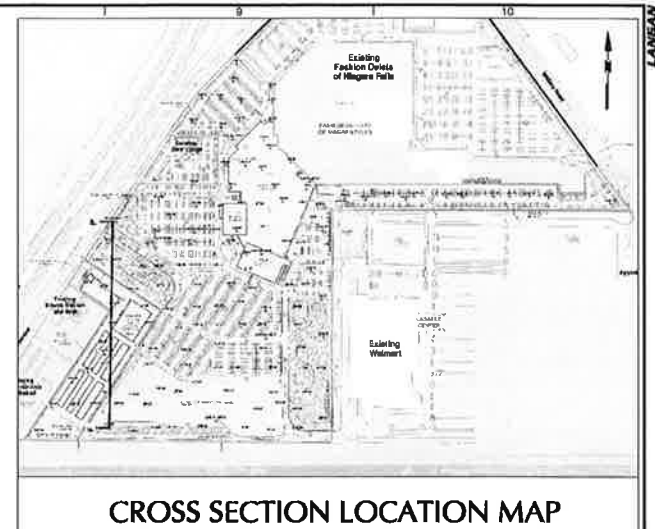
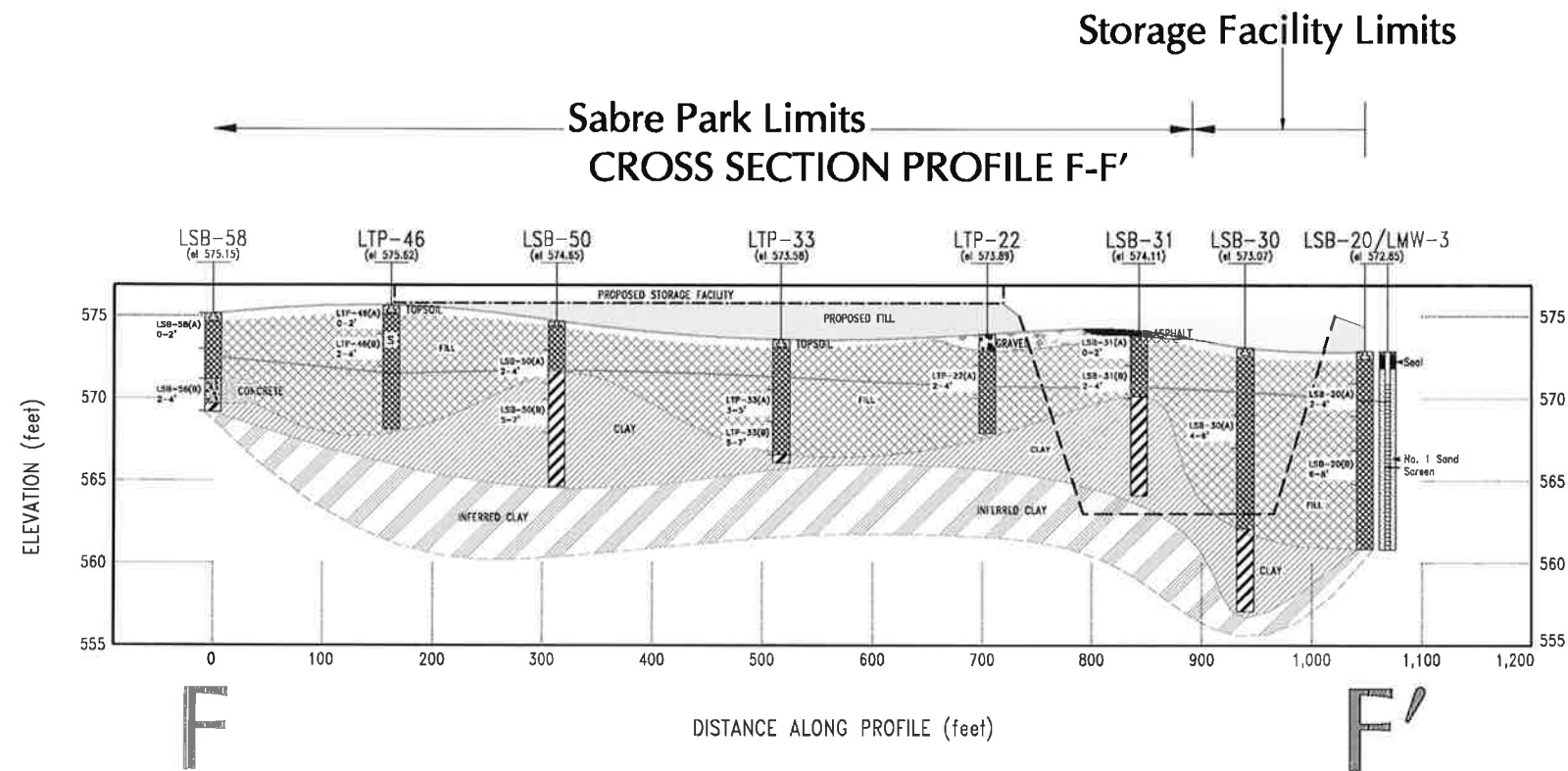
LANGAN 200 Longfellow Drive, Suite 100, Niagara Falls, NY 14301 T: 716.285.5511 F: 716.285.5512 www.langan.com NEW YORK, NEW JERSEY, CALIFORNIA, PENNSYLVANIA, CONNECTICUT, ALABAMA, AND SEVERAL OTHER STATES Langan Engineering, Architecture, Planning and Construction, Inc. a wholly owned subsidiary of Langan Group, Inc. Langan Group, Inc. is an Equal Opportunity Employer.	Project FONF Expansion/ Sabre Park BCP TOWN OF NIAGARA FALLS	Drawing Title PROFILE LOCATION PLAN	Project No. 140091401 Date 02/2013 Scale 1" = 100' Drawn By jph Submission Date 02/2013	Drawing No. 10a
	NIAGARA COUNTY NEW YORK			



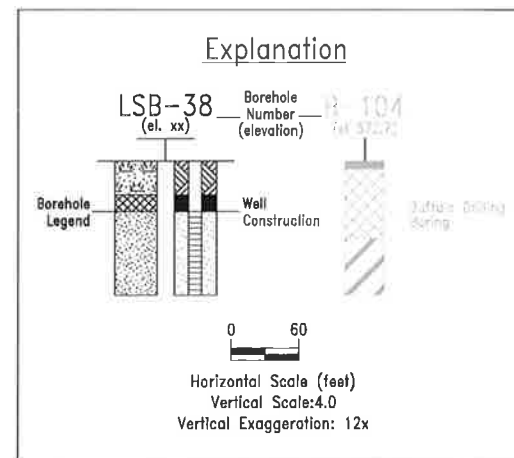
NOTES

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5. AREAS OF PROPOSED EXISTING GRADE CUTS ARE BASED ON STANTEC INC. DRAWING C-GRAD.
6. BORINGS B-102 AND B-101 ARE TAKEN FROM BARRON & ASSOCIATES, P.C. PRELIMINARY GEOTECHNICAL ENGINEERING REPORT DATED 31 JANUARY 2012, AND ARE USED AS A REFERENCE.

<p>350 Long Wharf Drive, New Haven, CT 06511 T: 203.342.3771 F: 203.342.3712 www.langan.com</p> <p>NEW JERSEY NEW YORK VIRGINIA CALIFORNIA CONNECTIONS INTERNATIONAL FLORIDA NEW MEXICO ARIZONA TEXAS LOUISIANA MISSISSIPPI ALABAMA SOUTH CAROLINA GEORGIA</p> <p>Langan Corporation, Subsidiaries, Engineers and Landscape Architects, P.C. Langan Engineering and Consulting, Inc. Langan Construction, Inc.</p>	Project FONF Expansion/ Sabre Park BCP TOWN OF NIAGARA	Drawing Title PROFILE D-D' & E-E'	Project No. 140091401	Drawing No. 10d
	Date 8/2/2013	Scale 1"=100'	Drawn By JPH	Submission Date 8/2/2013
	Niagara County NEW YORK	Drawing Date 8/2/2013	Drawing Date 8/2/2013	Drawing Date 8/2/2013
	Project FONF Expansion/ Sabre Park BCP TOWN OF NIAGARA	Drawing Title PROFILE D-D' & E-E'	Project No. 140091401	Drawing No. 10d



- NOTES**
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Legend

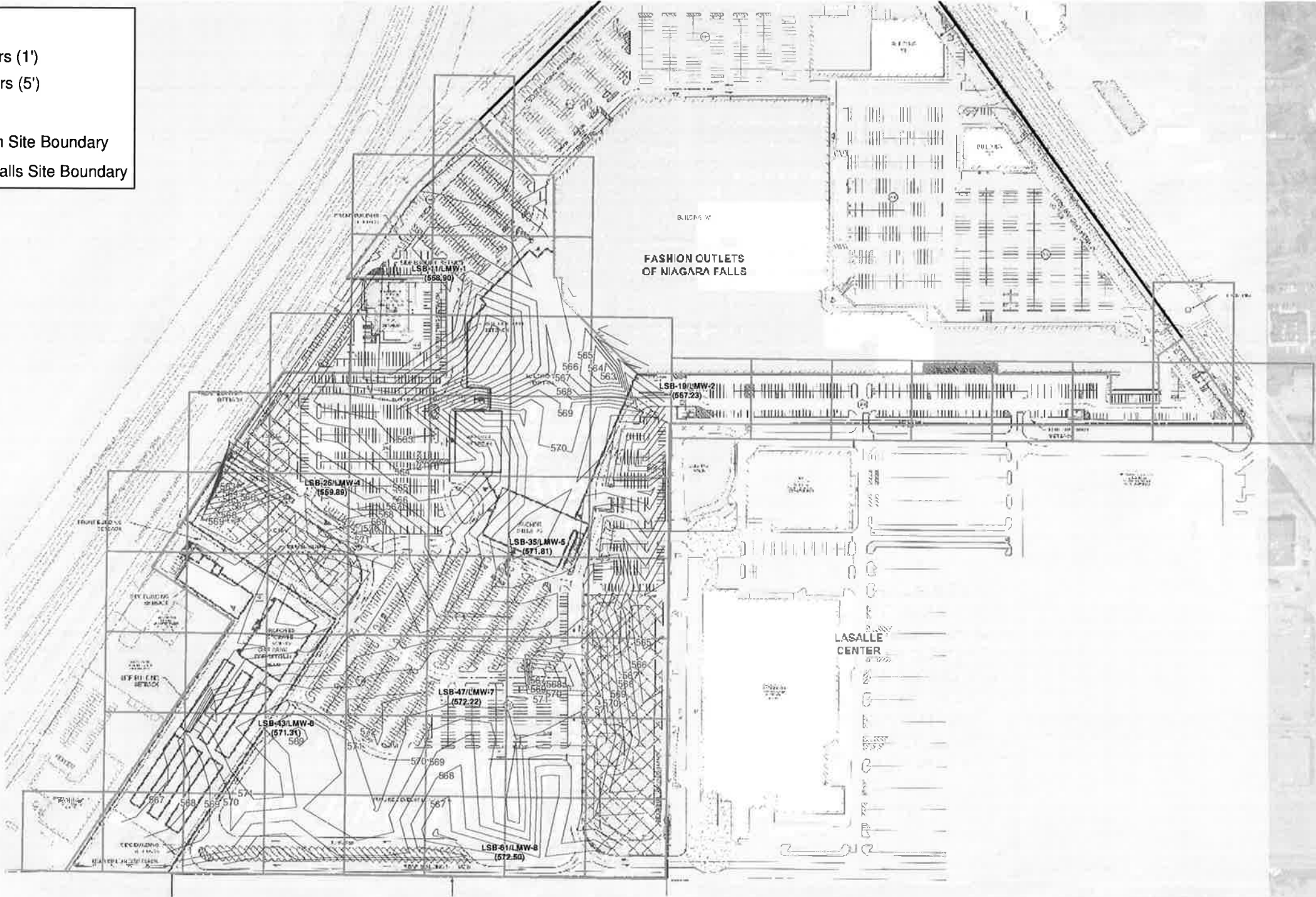
July 2013 Minor Clay Contours (1')

July 2013 Major Clay Contours (5')

1-Acre Grid Cell

Brownfields Cleanup Program Site Boundary

Fashion Outlets Of Niagara Falls Site Boundary



Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aergrid, IGN, IGP, and the GIS User Community



Notes:
1. The site boundary is based on the Topographic Survey prepared by Stantec Consulting Services, Inc. last updated on February 21, 2013 and Drawing No. V-14 titled Exhibit D - Brownfield Cleanup Program Parcel prepared by Stantec Consulting Services Inc. dated April 16, 2013.
WARNING: It is a violation of the NYS Education Law Article 145 for any person, unless he is acting under the direction of a licensed professional engineer, to alter this item in any way.

LANGAN

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Langan Engineering & Environmental Services, Inc.
Langan Engineering, Environmental, Surveying and
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Collectively known as Langan

NJ CERTIFICATE OF AUTHORIZATION No. 24GA27996400

Project

**FONF Expansion/
Sabre Park BCP**
TOWN OF NIAGARA

NIAGARA COUNTY

NEW YORK

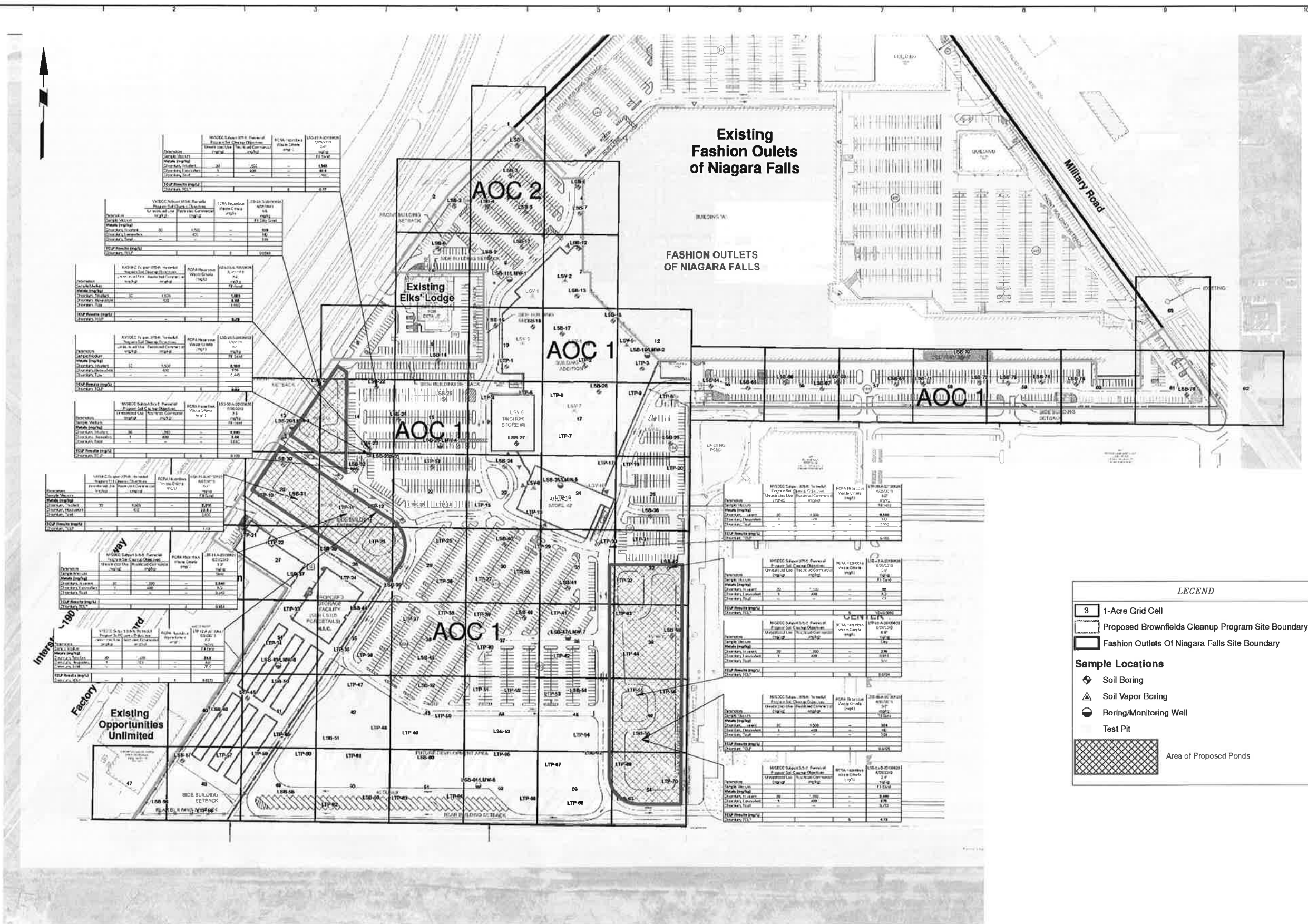
Drawing Title

**SUBSURFACE CLAY
CONTOUR MAP**

Project No.
140091401
Date
7/10/2013
Scale
1"=300'
Drawn By
dvg
Last Revised
8/20/2013

Figure

11



Location	Sample ID	Depth (ft)	Result (ppm)
LSB-1	1	1.0	0.05
LSB-2	2	1.0	0.05
LSB-3	3	1.0	0.05
LSB-4	4	1.0	0.05
LSB-5	5	1.0	0.05
LSB-6	6	1.0	0.05
LSB-7	7	1.0	0.05
LSB-8	8	1.0	0.05
LSB-9	9	1.0	0.05
LSB-10	10	1.0	0.05
LSB-11	11	1.0	0.05
LSB-12	12	1.0	0.05
LSB-13	13	1.0	0.05
LSB-14	14	1.0	0.05
LSB-15	15	1.0	0.05
LSB-16	16	1.0	0.05
LSB-17	17	1.0	0.05
LSB-18	18	1.0	0.05
LSB-19	19	1.0	0.05
LSB-20	20	1.0	0.05
LSB-21	21	1.0	0.05
LSB-22	22	1.0	0.05
LSB-23	23	1.0	0.05
LSB-24	24	1.0	0.05
LSB-25	25	1.0	0.05
LSB-26	26	1.0	0.05
LSB-27	27	1.0	0.05
LSB-28	28	1.0	0.05
LSB-29	29	1.0	0.05
LSB-30	30	1.0	0.05
LSB-31	31	1.0	0.05
LSB-32	32	1.0	0.05
LSB-33	33	1.0	0.05
LSB-34	34	1.0	0.05
LSB-35	35	1.0	0.05
LSB-36	36	1.0	0.05
LSB-37	37	1.0	0.05
LSB-38	38	1.0	0.05
LSB-39	39	1.0	0.05
LSB-40	40	1.0	0.05
LSB-41	41	1.0	0.05
LSB-42	42	1.0	0.05
LSB-43	43	1.0	0.05
LSB-44	44	1.0	0.05
LSB-45	45	1.0	0.05
LSB-46	46	1.0	0.05
LSB-47	47	1.0	0.05
LSB-48	48	1.0	0.05
LSB-49	49	1.0	0.05
LSB-50	50	1.0	0.05
LSB-51	51	1.0	0.05
LSB-52	52	1.0	0.05
LSB-53	53	1.0	0.05
LSB-54	54	1.0	0.05
LSB-55	55	1.0	0.05
LSB-56	56	1.0	0.05
LSB-57	57	1.0	0.05
LSB-58	58	1.0	0.05
LSB-59	59	1.0	0.05
LSB-60	60	1.0	0.05
LSB-61	61	1.0	0.05
LSB-62	62	1.0	0.05
LSB-63	63	1.0	0.05
LSB-64	64	1.0	0.05
LSB-65	65	1.0	0.05
LSB-66	66	1.0	0.05
LSB-67	67	1.0	0.05
LSB-68	68	1.0	0.05
LSB-69	69	1.0	0.05
LSB-70	70	1.0	0.05
LSB-71	71	1.0	0.05
LSB-72	72	1.0	0.05
LSB-73	73	1.0	0.05
LSB-74	74	1.0	0.05
LSB-75	75	1.0	0.05
LSB-76	76	1.0	0.05
LSB-77	77	1.0	0.05
LSB-78	78	1.0	0.05
LSB-79	79	1.0	0.05
LSB-80	80	1.0	0.05
LSB-81	81	1.0	0.05
LSB-82	82	1.0	0.05
LSB-83	83	1.0	0.05
LSB-84	84	1.0	0.05
LSB-85	85	1.0	0.05
LSB-86	86	1.0	0.05
LSB-87	87	1.0	0.05
LSB-88	88	1.0	0.05
LSB-89	89	1.0	0.05
LSB-90	90	1.0	0.05
LSB-91	91	1.0	0.05
LSB-92	92	1.0	0.05
LSB-93	93	1.0	0.05
LSB-94	94	1.0	0.05
LSB-95	95	1.0	0.05
LSB-96	96	1.0	0.05
LSB-97	97	1.0	0.05
LSB-98	98	1.0	0.05
LSB-99	99	1.0	0.05
LSB-100	100	1.0	0.05

Location	Sample ID	Depth (ft)	Result (ppm)
LSB-101	101	1.0	0.05
LSB-102	102	1.0	0.05
LSB-103	103	1.0	0.05
LSB-104	104	1.0	0.05
LSB-105	105	1.0	0.05
LSB-106	106	1.0	0.05
LSB-107	107	1.0	0.05
LSB-108	108	1.0	0.05
LSB-109	109	1.0	0.05
LSB-110	110	1.0	0.05
LSB-111	111	1.0	0.05
LSB-112	112	1.0	0.05
LSB-113	113	1.0	0.05
LSB-114	114	1.0	0.05
LSB-115	115	1.0	0.05
LSB-116	116	1.0	0.05
LSB-117	117	1.0	0.05
LSB-118	118	1.0	0.05
LSB-119	119	1.0	0.05
LSB-120	120	1.0	0.05
LSB-121	121	1.0	0.05
LSB-122	122	1.0	0.05
LSB-123	123	1.0	0.05
LSB-124	124	1.0	0.05
LSB-125	125	1.0	0.05
LSB-126	126	1.0	0.05
LSB-127	127	1.0	0.05
LSB-128	128	1.0	0.05
LSB-129	129	1.0	0.05
LSB-130	130	1.0	0.05
LSB-131	131	1.0	0.05
LSB-132	132	1.0	0.05
LSB-133	133	1.0	0.05
LSB-134	134	1.0	0.05
LSB-135	135	1.0	0.05
LSB-136	136	1.0	0.05
LSB-137	137	1.0	0.05
LSB-138	138	1.0	0.05
LSB-139	139	1.0	0.05
LSB-140	140	1.0	0.05
LSB-141	141	1.0	0.05
LSB-142	142	1.0	0.05
LSB-143	143	1.0	0.05
LSB-144	144	1.0	0.05
LSB-145	145	1.0	0.05
LSB-146	146	1.0	0.05
LSB-147	147	1.0	0.05
LSB-148	148	1.0	0.05
LSB-149	149	1.0	0.05
LSB-150	150	1.0	0.05
LSB-151	151	1.0	0.05
LSB-152	152	1.0	0.05
LSB-153	153	1.0	0.05
LSB-154	154	1.0	0.05
LSB-155	155	1.0	0.05
LSB-156	156	1.0	0.05
LSB-157	157	1.0	0.05
LSB-158	158	1.0	0.05
LSB-159	159	1.0	0.05
LSB-160	160	1.0	0.05
LSB-161	161	1.0	0.05
LSB-162	162	1.0	0.05
LSB-163	163	1.0	0.05
LSB-164	164	1.0	0.05
LSB-165	165	1.0	0.05
LSB-166	166	1.0	0.05
LSB-167	167	1.0	0.05
LSB-168	168	1.0	0.05
LSB-169	169	1.0	0.05
LSB-170	170	1.0	0.05
LSB-171	171	1.0	0.05
LSB-172	172	1.0	0.05
LSB-173	173	1.0	0.05
LSB-174	174	1.0	0.05
LSB-175	175	1.0	0.05
LSB-176	176	1.0	0.05
LSB-177	177	1.0	0.05
LSB-178	178	1.0	0.05
LSB-179	179	1.0	0.05
LSB-180	180	1.0	0.05
LSB-181	181	1.0	0.05
LSB-182	182	1.0	0.05
LSB-183	183	1.0	0.05
LSB-184	184	1.0	0.05
LSB-185	185	1.0	0.05
LSB-186	186	1.0	0.05
LSB-187	187	1.0	0.05
LSB-188	188	1.0	0.05
LSB-189	189	1.0	0.05
LSB-190	190	1.0	0.05
LSB-191	191	1.0	0.05
LSB-192	192	1.0	0.05
LSB-193	193	1.0	0.05
LSB-194	194	1.0	0.05
LSB-195	195	1.0	0.05
LSB-196	196	1.0	0.05
LSB-197	197	1.0	0.05
LSB-198	198	1.0	0.05
LSB-199	199	1.0	0.05
LSB-200	200	1.0	0.05

Location	Sample ID	Depth (ft)	Result (ppm)
LSB-201	201	1.0	0.05
LSB-202	202	1.0	0.05
LSB-203	203	1.0	0.05
LSB-204	204	1.0	0.05
LSB-205	205	1.0	0.05
LSB-206	206	1.0	0.05
LSB-207	207	1.0	0.05
LSB-208	208	1.0	0.05
LSB-209	209	1.0	0.05
LSB-210	210	1.0	0.05
LSB-211	211	1.0	0.05
LSB-212	212	1.0	0.05
LSB-213	213	1.0	0.05
LSB-214	214	1.0	0.05
LSB-215	215	1.0	0.05
LSB-216	216	1.0	0.05
LSB-217	217	1.0	0.05
LSB-218	218	1.0	0.05
LSB-219	219	1.0	0.05
LSB-220	220	1.0	0.05
LSB-221	221	1.0	0.05
LSB-222	222	1.0	0.05
LSB-223	223	1.0	0.05
LSB-224	224	1.0	0.05
LSB-225	225	1.0	0.05
LSB-226	226	1.0	0.05
LSB-227	227	1.0	0.05
LSB-228	228	1.0	0.05
LSB-229	229	1.0	0.05
LSB-230	230	1.0	0.05
LSB-231	231	1.0	0.05
LSB-232	232	1.0	0.05
LSB-233	233	1.0	0.05
LSB-234	234	1.0	0.05
LSB-235	235	1.0	0.05
LSB-236	236	1.0	0.05
LSB-237	237	1.0	0.05
LSB-238	238	1.0	0.05
LSB-239	239	1.0	0.05
LSB-240	240	1.0	0.05
LSB-241	241	1.0	0.05
LSB-242	242	1.0	0.05
LSB-243	243	1.0	0.05
LSB-244	244	1.0	0.05
LSB-245	245	1.0	0.05
LSB-246	246	1.0	0.05
LSB-247	247	1.0	0.05
LSB-248	248	1.0	0.05
LSB-249	249	1.0	0.05
LSB-250	250	1.0	0.05
LSB-251	251	1.0	0.05
LSB-252	252	1.0	0.05
LSB-253	253	1.0	0.05
LSB-254	254	1.0	0.05
LSB-255	255	1.0	0.05
LSB-256	256	1.0	0.05
LSB-257	257	1.0	0.05
LSB-258	258	1.0	0.05
LSB-259	259	1.0	0.05
LSB-260	260	1.0	0.05
LSB-261	261	1.0	0.05
LSB-262	262	1.0	0.05
LSB-263	263	1.0	0.05
LSB-264	264	1.0	0.05
LSB-265	265	1.0	0.05
LSB-266	266	1.0	0.05
LSB-267	267	1.0	0.05
LSB-268	268	1.0	0.05
LSB-269	269	1.0	0.05
LSB-270	270	1.0	0.05
LSB-271	271	1.0	0.05
LSB-272	272	1.0	0.05
LSB-273	273	1.0	0.05
LSB-274	274	1.0	0.05
LSB-275	275	1.0	0.05
LSB-276	276	1.0	0.05
LSB-277	277	1.0	0.05
LSB-278	278	1.0	0.05
LSB-279	279	1.0	0.05
LSB-280	280	1.0	0.05
LSB-281	281	1.0	0.05
LSB-282	282	1.0	0.05
LSB-283	283	1.0	0.05
LSB-284	284	1.0	0.05
LSB-285	285	1.0	0.05
LSB-286	286	1.0	0.05
LSB-287	287	1.0	0.05
LSB-288	288	1.0	0.05
LSB-289	289	1.0	0.05
LSB-290	290	1.0	0.05
LSB-291	291	1.0	0.05
LSB-292	292	1.0	0.05
LSB-293	293	1.0	0.05
LSB-294	294	1.0	0.05
LSB-295	295	1.0	0.05
LSB-296	296	1.0	0.05
LSB-297	297	1.0	0.05
LSB-298	298	1.0	0.05
LSB-299	299	1.0	0.05
LSB-300	300	1.0	0.05

Location	Sample ID	Depth (ft)	Result (ppm)
LSB-301	301	1.0	0.05
LSB-302	302	1.0	0.05
LSB-303	303	1.0	0.05
LSB-304	304	1.0	0.05

APPENDIX C

SITE SCGs

APPENDIX C

1.0 SCG's for site characterization and remedial investigation

The following standards and criteria typically will apply to Site Characterizations and Remedial Investigations conducted in New York State:

- 6 NYCRR Part 371 - Identification and Listing of Hazardous Wastes
- 6 NYCRR Part 375 - Inactive Hazardous Waste Disposal Sites
- 6 NYCRR Parts 700-706 - Water Quality Standards (June 1998)
- 6 NYCRR Part 182 - Endangered & Threatened Species of Fish & Wildlife
- 6 NYCRR Part 608 - Use and Protection of Waters
- 6 NYCRR Part 661 - Tidal Wetlands - Land Use Regulations
- 6 NYCRR Part 663 - Freshwater Wetlands Maps and Classification
- 6 NYCRR Parts 700-706 - Water Quality Standards (June 1998)
- 6 NYCRR Part 257 - Air Quality Standards
- 10 NYCRR Part 5 of the State Sanitary Code - Drinking Water Supplies (May 1998)
- 29 CFR Part 1910.120 - Hazardous Waste Operations and Emergency Response
- 6 NYCRR Part 175 - Special Licenses and Permits--Definitions and Uniform Procedures

The following guidance typically applies to Site Characterizations and Remedial Investigations conducted in New York State:

- TAGM 4046 - Determination of Soil Cleanup Objectives and Cleanup Levels (January 1994)
- STARS #1 - Petroleum-Contaminated Soil Guidance Policy
- SPOTS #14 - Site Assessments at Bulk Storage Facilities (August 1994)

- TOGS 1.1.1 - Ambient Water Quality Standards & Guidance Values and Groundwater Effluent Limitations
- Fish and Wildlife Impact Analysis for Inactive Hazardous Waste Sites (October 1994)
- Technical Guidance for Screening Contaminated Sediments (January 1999)
- Niagara River Biota Contamination Project: Fish Flesh Criteria for Piscivorous Wildlife (July 1987)
- Wildlife Toxicity Assessment for Cadmium in Soils (May 1999)
- Air Guide 1 - Guidelines for the Control of Toxic Ambient Air Contaminants
- The 10 ppt Health Advisory Guideline for 2,3,7,8-TCDD in Sportfish Flesh
- The 1 ppm Health Advisory Guideline for Cadmium in Sportfish Flesh
- Criteria for the Development of Health Advisories for Sportfish Consumption
- NYSDOH Indoor Air Sampling & Analysis Guidance (August 8, 2001 or subsequent update)
- NYSDOH Guidance for Evaluating Soil Vapor Intrusion in the State of New York (draft October 2004 or subsequent final draft)
- DER Interim Strategy for Groundwater Remediation at Contaminated Sites in New York State

2.0 SCGs for remedy selection

The following standards and criteria typically apply to the remedy selection process conducted in New York State:

- 6 NYCRR Part 375 - Inactive Hazardous Waste Disposal Sites
- 6 NYCRR Part 376 - Land Disposal Restrictions
- 6 NYCRR Part 608 - Use and Protection of Waters
- 6 NYCRR Part 661 - Tidal Wetlands - Land Use Regulations
- 6 NYCRR Part 663 - Freshwater Wetlands - Permit Requirements
- 6 NYCRR Parts 700-706 - Water Quality Standards (June 1998)

- 19 NYCRR Part 600 - Waterfront Revitalization and Coastal Resources

The following guidance typically applies to the remedy selection process conducted in New York State:

- TAGM 4044 - Accelerated Remedial Actions at Class 2, Non-RCRA Regulated Landfills (March 1992)
- TAGM 4051 - Early Design Strategy (August 1993)
- Citizen Participation in New York's Hazardous Waste Site Remediation Program: A Guidebook (June 1998)
- TAGM 3028 - "Contained In" Criteria for Environmental Media: Soil Action Levels (August 1997)
- Freshwater Wetlands Regulations - Guidelines on Compensatory Mitigation (October 1993)
- Air Guide 1 - Guidelines for the Control of Toxic Ambient Air Contaminants
- Technical Guidance for Screening Contaminated Sediments (January 1999)
- USEPA Office of Solid Waste and Emergency Response Directive 9355.047FS Presumptive Remedies: Policy and Procedures (September 1993)
- USEPA Office of Solid Waste and Emergency Response Directive 9355.048FS Presumptive Remedies:
- Site Characterization and Technology Selection for CERCLA sites with Volatile Organic Compounds in Soils (September 1993)
- USEPA Office of Solid Waste and Emergency Response Directive 9355.049FS Presumptive Remedy for CERCLA Municipal Landfills (September 1993)

3.0 SCGs for underground storage tank closure

The following standards and criteria typically apply to UST closures conducted in New York State:

- 6 NYCRR Part 612 - Registration of Petroleum Storage Facilities (February 1992)
- 6 NYCRR Part 613 - Handling and Storage of Petroleum (February 1992)

- 6 NYCRR Part 614 - Standards for New and Substantially Modified Petroleum Storage Tanks (February 1992)
- 6 NYCRR Part 371 - Identification and Listing of Hazardous Wastes (November 1998)
- 6 NYCRR Subpart 374-2 - Standards for the Management of Used Oil (November 1998)
- 6 NYCRR Parts 700-706 - Water Quality Standards (June 1998)
- 40 CFR Part 280 - Technical Standards and Corrective Action Requirements for Owners and Operators of Underground Storage Tanks

The following guidance typically applies to UST closures conducted in New York State:

- STARS #1 - Petroleum-Contaminated Soil Guidance Policy
- STARS #2 - Biocell and Biopile Designs for Small-Scale Petroleum-Contaminated Soil Projects
- SPOTS #14 - Site Assessments at Bulk Storage Facilities (August 1994)
- Spill Response Guidance Manual
- Permanent Closure of Petroleum Storage Tanks (July 1988)
- TAGM 3028 - "Contained In" Criteria for Environmental Media: Soil Action Levels (August 1997)
- TOGS 1.1.1 - Ambient Water Quality Standards & Guidance Values and Groundwater Effluent Limitations
- Air Guide 1 - Guidelines for the Control of Toxic Ambient Air Contaminants
- NYSDOH Environmental Health Manual CSFP-530 - "Individual Water Supplies - Activated Carbon Treatment Systems"

4.0 SCGs for remedial action

The following standards and criteria typically apply to Remedial Actions conducted in New York State:

- 29 CFR Part 1910.120 - Hazardous Waste Operations and Emergency Response
- 40 CFR Part 144 - Underground Injection Control Program
- 10 NYCRR Part 67 – Lead
- 12 NYCRR Part 56 - Industrial Code Rule 56 (Asbestos)
- 6 NYCRR Part 175 - Special Licenses and Permits--Definitions and Uniform Procedures
- 6 NYCRR Part 361 - Siting of Industrial Hazardous Waste Facilities
- 6 NYCRR Part 371 - Identification and Listing of Hazardous Wastes (November 1998)
- 6 NYCRR Part 372 - Hazardous Waste Manifest System and Related Standards for Generators, Transporters and Facilities (November 1998)
- 6 NYCRR Subpart 373-4 - Facility Standards for the Collection of Household Hazardous Waste and Hazardous Waste from Conditionally Exempt Small Quantity Generators (November 1998)
- 6 NYCRR Subpart 374-1 - Standards for the Management of Specific Hazardous Wastes and Specific Types of Hazardous Waste Management Facilities (November 1998)
- 6 NYCRR Subpart 374-3 - Standards for Universal Waste (November 1998)
- 6 NYCRR Part 375 - Inactive Hazardous Waste Disposal Sites (as amended January 1998)
- 6 NYCRR Part 376 - Land Disposal Restrictions
- 19 NYCRR Part 600 - Waterfront Revitalization and Coastal Resources
- 6 NYCRR Part 608 - Use and Protection of Waters
- 6 NYCRR Part 661 - Tidal Wetlands - Land Use Regulations
- 6 NYCRR Part 663 - Freshwater Wetlands - Permit Requirements

- 6 NYCRR Parts 700-706 - Water Quality Standards (June 1998)
- 6 NYCRR Part 750 through 758 - Implementation of NPDES Program in NYS (“SPDES Regulations”)
- Technical Guidance for Screening Contaminated Sediments (January 1999)

The following guidance typically applies to Remedial Actions conducted in New York State:

- TAGM 4013 - Emergency Hazardous Waste Drum Removal/ Surficial Cleanup Procedures (March 1996)
- TAGM 4046 - Determination of Soil Cleanup Objectives and Cleanup Levels (January 1994)
- TAGM 4059 - Making Changes To Selected Remedies (May 1998)
- STARS #1 - Petroleum-Contaminated Soil Guidance Policy
- STARS #2 - Biocell and Biopile Designs for Small-Scale Petroleum-Contaminated Soil Projects
- TAGM 3028 - "Contained In" Criteria for Environmental Media: Soil Action Levels (August 1997)
- Citizen Participation in New York’s Hazardous Waste Site Remediation Program: A Guidebook (June 1998)
- TOGS 1.1.1 - Ambient Water Quality Standards & Guidance Values and Groundwater Effluent Limitations
- TOGS 1.3.8 - New Discharges to Publicly Owned Treatment Works
- TOGS 2.1.2 - Underground Injection/Recirculation (UIR) at Groundwater Remediation Sites
- Air Guide 1 - Guidelines for the Control of Toxic Ambient Air Contaminants
- State Coastal Management Policies
- OSWER Directive 9200.4-17 - Use of Monitored Natural Attenuation at Superfund, RCRA Corrective Action, and Underground Storage Tank Sites (November 1997)

- NYSDOH Environmental Health Manual CSFP-530 - “Individual Water Supplies - Activated Carbon Treatment Systems”

5.0 SCGs for site management

The following standards and criteria typically apply to Site Management activities conducted in New York State:

- 6 NYCRR Part 175 - Special Licenses and Permits--Definitions and Uniform Procedures

The following guidance typically applies to Site Management activities conducted in New York State:

- Groundwater Monitoring Well Decommissioning Procedures (May 1995)
- The activity is a component of a program selected by a process complying with the public participation requirements of section 1.10, to the extent applicable.
- NYSDOH Environmental Health Manual CSFP-530 - “Individual Water Supplies - Activated Carbon Treatment Systems”