New York State Electric & Gas Corporation

Border City Former Manufactured Gas Plant
Town of Waterloo, New York

FEASIBILITY STUDY

December 2008

Prepared For:
New York State Electric & Gas Corporation
Kirkwood Industrial Park
Binghamton, New York

URS Corporation - New York

FOCUSED FEASIBILITY STUDY REPORT

NYSEG – GENEVA-BORDER CITY SITE
SITE #8-50-008
TOWN OF WATERLOO, NEW YORK

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ABBREVIATIONS

AC	ammonia concentrate
amsl	above mean sea level
BBE	Blasland & Bouck Engineers
bgs	below ground surface
BP	by-product
BWA	Backwater Area
BTEX	benzene, toluene, ethylbenzene, (total) xylenes
cm/sec	centimeter per second
cPAHs	carcinogenic polycyclic aromatic hydrocarbon
COC	chemical of concern
CPC	chemical of potential concern
EM	electromagnetic
EWDA	Eastern Waste Disposal Area
FFS	Focused Feasibility Study
FMSA	Former MGP Site Area
ft^3	cubic foot
FWIA	Fish and Wildlife Impact Analysis
gpm	gallons per minute
HHEA	Human Health Exposure Assessment
IRM	interim remedial measure
ISS	in-situ solidification
kg	kilogram
MEK	methyl ethyl ketone
mg/kg	milligram per kilogram

ABBREVIATIONS (Continued)

mg/L	milligrams per liter
MGP	Manufactured Gas Plant
MNA	monitored natural attenuation
NAPL	non-aqueous phase liquid
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NYCRR	New York State Code, Rules, and Regulations
NYS	New York State
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
NYSEG	New York State Electric & Gas
OEA	Offsite Environs Area
OM&M	operation, maintenance and monitoring
Order	Order on Consent
OSHA	Occupational Safety and Health Administration
OVA	organic vapor analyzer
PAHs	polycyclic aromatic hydrocarbons
PCB	polychlorinated biphenyl
PID	photoionization detector
ppb	parts per billion
ppm	parts per million
PVC	polyvinyl chloride
RAOs	remedial action objectives
RCRA	Resource Conservation and Recovery Act
RI	Remedial Investigation

ABBREVIATIONS (Continued)

RSCO	Recommended Soil Cleanup Objective
SCGs	Standards, Criteria, and Guidelines
site	NYSEG's former MGP site in Waterloo, Seneca County, New York (Site ID 8-50-008)
SMP	Site Management Plan
SPDES	State Pollution Discharge Elimination System
SVE	soil vapor extraction
SVOC	Semi-volatile Organic Compound
TAGM	Technical and Administrative Guidance Memorandum
TAL	Target Analyte List
TCL	Target Compound List
TMV	toxicity, mobility and volume
TOC	Total Organic Carbon
TOGS	Technical and Operational Guidance Series
TRC	TRC Environmental Consultants, Inc.
µg/L	micrograms per liter
URS	URS Corporation – New York
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
UST	underground storage tank
VOC	Volatile Organic Compound
WCC	Woodward-Clyde Consultants
WPEA	Western Property Extension Area

1.0 INTRODUCTION

1.1 General

On behalf of NYSEG (New York State Electric & Gas Corporation), URS Corporation-New York (URS) is pleased to present the New York State Department of Environmental Conservation (NYSDEC) with this *Focused Feasibility Study (FFS) Report* for NYSEG's Geneva-Border City Former Manufactured Gas Plant (MGP) site in the Town of Waterloo, Seneca County, New York. The NYSDEC's identification number for the site is 8-50-008. On March 25, 1994, NYSEG entered into an Order on Consent (Order) Index Number D0-0002-9309 with the NYSDEC to investigate and remediate 33 of NYSEG's former manufactured gas plant sites. The Geneva-Border City site is covered by this Order.

The FFS was prepared by URS and is based on information and data presented in the following reports:

- Final Remedial Investigation (RI) Report, NYSEG Geneva-Border City Site, Town of Waterloo, New York, URS Corporation, August 2007.
- Focused Environmental Investigation, Blasland & Bouck Engineers (BBE), April 28, 1993.
- Task 4 Report, New York State Electric and Gas Corporation, Risk Assessment for the Former Coal Gasification Site, Geneva, New York. TRC Environmental Consultants Inc., April 4, 1989.
- Investigation of the Former Coal Gasification Site, Geneva, New York, Task 2 Report, TRC Environmental Consultants, Inc., October 1, 1987.
- Investigation of the Former Coal Gasification Site, Geneva, New York, Final Task 3 Report, TRC Environmental Consultants, Inc., September 30, 1987.
- Investigation of the Former Coal Gasification Site, Geneva, New York, Task 1 Report, Preliminary Site Investigation, TRC Environmental Consultants, Inc., May 14, 1986.
- Letter Reports, prepared by Woodward-Clyde Consultants (WCC) for NYSEG, May 18, August 18, and November 6, 1984.

1.2 Site Description

The former NYSEG MGP site is located in the Town of Waterloo, Seneca County and is two miles east of the City of Geneva (Figure 1-1). The site is within the Finger Lakes Region of New York State (NYS) and is approximately 1,500 feet north of Seneca Lake. Seneca Lake State Park and NYS Route 5 and US Route 20 are between the site and Seneca Lake. Currently, the site is used as an electrical and natural gas operations and customer service center. Maintenance and utility trucks are stored onsite and there is an office building used for accounting and customer service. A natural gas regulator and compressor station and an electric substation are located on the property. Utility poles, transformers, gas pipes, and a variety of other materials and equipment are also stored at the site.

As part of the RI, the site was divided into five investigation areas:

- Former MGP Site Area (FMSA);
- Western Property Extension Area (WPEA);
- Eastern Waste Disposal Area (EWDA);
- Offsite Environs Area (OEA); and
- Backwater Area (BWA).

Figure 1-2 depicts these areas. The majority of the site is paved, with the exception of the WPEA and the EWDA. The WPEA is covered with gravel that has been graded flat and is currently used as an open storage area for utility poles and miscellaneous electric and maintenance equipment. The EWDA was used when the MGP facility operated at the site to dispose miscellaneous MGP-related wastes and by-products. The EWDA is not currently used and is moderately vegetated with mixed trees including cottonwoods, scrub vegetation, shrubs, and grasses and weeds.

There is an operating electrical substation at the north end of the facility east of the Service Center entrance. There is a compressed natural gas vehicle refueling area on the west side of the entrance road. A Former Settling Basin is south of the site in the BWA and was previously used to treat sanitary wastes from the facility through an oxidation process. The BWA is a low-lying area situated immediately south of the facility adjacent to the abandoned railroad grade.

There are two drainageways onsite. The eastern drainageway originates in the wetlands in the eastern portion of the site; the second drainageway is in the western portion. Both flow through culverts under the railroad tracks, Routes 5 and 20, and continue overland through Seneca Lake State Park as either concrete-lined or asphalt-lined drainageways, prior to discharging into Seneca Lake. Seneca Lake is classified by the NYSDEC as a Class A surface water body, designated for drinking water supplies, culinary or food processing uses, and any other uses. The two drainageways were identified as Class "C" surface water bodies, defined as suitable for fishing and primary and secondary contact recreation. However, during the RI site reconnaissance, and as determined during the Fish and Wildlife Impact Analysis, it was determined that these drainageways are situated in poorly drained swampy marsh areas that cannot support fish or a benthic community. The drainageways are intermittent and seasonally dry.

1.3 Operational/Disposal History

From approximately 1901 through 1934, NYSEG (or its predecessor companies) used the former MGP site in Border City to manufacture gas from coal. Former MGP operations areas are identified on Figure 1-2. The Empire Coke Company constructed the original MGP plant at the site between 1901 and 1903. The original plant consisted of 31 coke ovens and 2 gas holders and produced gas as a by-product of the coking operation. In 1909, the facility was expanded and began producing blue gas. The 1909 expansion included a 100,000 cubic foot (ft^3) holder associated with the Blue Gas operation and fourteen additional coke ovens. In 1914, the plant was sold to Empire Gas and Electric Company. In 1925, New York Central Electric Corporation purchased Empire Gas and Electric Company. NYSEG has owned the property since 1932. On August 29, 1934, the gas plant was officially closed. After the gas plant closed, some of the former gas plant structures were razed and the remaining ones were converted for use as NYSEG's operations center for the Geneva area. The coke ovens were used for dry storage until they were demolished and disposed offsite as scrap in 1936. Most of the remaining steel at the site was removed as scrap during World War II.

1.4 Previous Investigations

From 1984 through 1993, NYSEG conducted six investigative phases including a risk assessment. Sample point locations for all investigation phases are shown on Figure 1-3 and Plate 1. Summaries of each individual investigation are provided below. In general, the results of the previous investigations indicate that in some areas around the facility, soil, groundwater, and sediments have been impacted by MGP-related contaminants. Cyanide complexes were detected in the soil, groundwater, surface water, and sediments. Elevated concentrations of volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs) were detected in the soil. A brief summary of the previous investigation results is provided below. Supporting investigation data for the previous studies are presented in Appendix A.

1.4.1 1984 Soil Boring Investigation

In 1984, Woodward-Clyde Consultants (WCC) conducted an investigation to evaluate subsurface conditions for a new service garage location and a sanitary sewer line connection to a new city sanitary sewer line near the central portion of the site. Twenty-one soil borings were advanced to depths ranging from 2.5 to 10.5 feet below ground surface (bgs). Boring logs indicated that odors were detected in 5 of the 21 borings at depths between 3 to 5 feet bgs. Liquid coal tar was observed in split-spoon samples collected from 2 borings (B-09 and B-10) drilled over the planned sewer line location and near a former underground storage tank (UST) that had been used for tar storage during MGP operations. According to WCC, this UST had been closed-in-place when removed from service. An open chamber was encountered in boring B-01 and was thought to be a remnant of the coke oven facility.

1.4.2 Preliminary Site Evaluation (1986)

In 1986, TRC Environmental Consultants, Inc. (TRC) conducted a Preliminary Site Evaluation to develop an understanding of the site's history, ownership, and operating procedures, as well as the regional and site geology and hydrogeology. This study was the first of four tasks performed by TRC. In addition, TRC conducted two phases of geophysical work and an air quality survey of the existing buildings. The objective of the initial phase of the geophysical investigation, which included a seismic refraction survey, was to evaluate whether there was a glacial till layer beneath the site and to evaluate the depth and nature of the bedrock surface. The objective of the second phase of geophysical work, which consisted of an electromagnetic (EM) survey, was to further evaluate and delineate potential areas of contamination identified during the initial survey work.

The seismic refraction survey indicated that bedrock lies at approximately 175 feet bgs near the eastern boundary of the site, and 200 feet bgs near the western edge of the property. Although there was no indication of the presence of till during the seismic refraction survey, till was encountered during field activities conducted in 2002 and 2003 as part of the RI. The EM survey suggested an extensive (elongated in the east-west direction) near-surface soil anomaly along the southern property boundary.

TRC's Task 1 Report states that by-products generated at the site included iron oxide purifier wastes, tars, quench water, and discharge water from cooling coils and wastewater (collected condensation) from drip boxes located underneath equipment or gas lines. The coke plant produced both solid and liquid wastes that were disposed onsite. Most solid wastes were transported by hand or by wheelbarrow to the disposal area in the EWDA. According to a former employee, topsoil was placed over the disposal areas and the surface was re-graded on a yearly basis. Materials that were reportedly disposed in the EWDA included iron-oxide purifier wastes, tars, ammonia concentrate (AC), and miscellaneous solid wastes. Iron-oxide purifier wastes were disposed onsite roughly twice a year. Tars that accumulated on the metal and wooden screens used in the by-product (BP) and AC buildings were also disposed onsite roughly twice a year. Other miscellaneous solid waste material such as construction debris was disposed onsite.

Water used to quench the hot coke was initially discharged to the nearby drainageway. After May 1923, the water was directed to a concrete-lined sludge basin along the southern fence line and allowed to separate. The upper "clean water" layer was discharged to the drainageway. The "lower liquid layer" was pumped from the basin into a bedrock injection well reportedly at the western corner of the sludge basin. The approximate locations of the sludge basin and bedrock injection well are shown on Figure 1-2. The eight-inch diameter bedrock injection well was cased into the Onondaga Formation and Camillus Shale bedrock units at 200 feet bgs and had a total depth of 336 feet bgs. The sludge that accumulated in the bottom of the basin was reportedly removed to a holder near the AC building every six months prior to being disposed onsite or hauled to the city dump at the north end of Seneca Lake. Water discharging from the cooling coils and turbines was piped through underground lines to an open holding area. Most of this water evaporated because it had a very high temperature. The remaining water was discharged to the nearby drainageway.

Based on well location data available on the United States Geological Survey (USGS) website, the former bedrock injection well is near the former purifier building. However, TRC reported the location of the former bedrock injection well is near the former sludge basin along the southern fence line. The latter of the two potential locations was investigated during the RI. Historical photographs posted in the NYSEG Geneva Service Center Building show the location of the bedrock injection well along the southern fence line, south of the former coke ovens.

1.4.3 Initial Field Investigation Program (1987)

During the 1987 Task 2 investigation, TRC excavated 43 test pits and collected soil samples from the test pits, drilled 9 soil borings, installed 6 six monitoring wells, collected air quality samples, collected 3 rounds of groundwater samples, collected 3 sediment samples during the first round of groundwater sampling, and collected 9 surface water samples from the onsite drainageways during each of the three rounds of groundwater sampling.

Six monitoring wells were installed as pairs consisting of a shallow "S" well to monitor shallow overburden groundwater quality and a deep "D" well to monitor deep overburden aquifer water quality. Monitoring well locations are shown on Figure 1-3. The "S" wells are screened from approximately 3 to 13 feet bgs. The "D" wells are screened within the sand unit beneath the first semi-confining clay layer at a depth of approximately 100 feet bgs. Well pair MW-01S/MW-01D is north and upgradient of the site. Well pair MW-02S/MW-02D is south of the site at the base of a railroad bed. Well pair MW-03S/MW-03D is southeast of the site. Shallow soil borings were drilled in the area of a proposed storage building near the southwest corner of the service building. These shallow borings were drilled to a depth of between 5 and 7 feet bgs. All samples collected during Task 2 were analyzed for purgeable aromatic VOCs, PAHs, non-chlorinated phenols, and inorganics. Supporting investigation data is presented in Appendix A.

1.4.4 Expanded Problem Definition Program (1987)

During the 1987 Task 3 investigation, TRC drilled 4 soil borings, collected 9 surface soil samples, 1 purifier waste sample, 4 sediment samples, 3 surface water samples, and 6 groundwater samples, probed Seneca Lake and drainageway sediments, and conducted an air quality survey in the crawl spaces of the former purifier building (presently the Meter Lab) and the compressor room building. Samples collected during Task 3 were analyzed for purgeable aromatic VOCs, PAHs, non-chlorinated phenols, metals, organic nitrogen, and/or cyanides (total and ferro-ferric).

The two drainageways were probed nearby where they discharge into Seneca Lake. Probing resulted in oil films floating to the surface. Sediments in the western drainageway exhibited an undifferentiated odor. Sediments in Seneca Lake were also probed approximately 250 feet east and west of both points where the drainageways enter the Lake. No oil sheens were observed during probing of the Lake sediments. Two composite Lake sediments were collected from near the eastern drainageway outlet.

An air quality survey was conducted using an organic vapor analyzer (OVA) in 2 crawl spaces that site workers occasionally enter to maintain plumbing systems. The 3-foot crawl space beneath the compressor building has a dirt floor. The crawl space beneath the former purifier building has a concrete floor and contains 3 concrete bins used during coking operations. No readings above ambient levels were detected in the former purifier building (Meter Lab) crawl space. A slight odor was noted in the crawl space of the compressor building. However, readings of only 2.0 parts per million (ppm) above ambient air were detected at only two locations in the compressor building crawl space. Supporting investigation data is presented in Appendix A.

1.4.5 Risk Assessment (1989)

The risks to public health and the environment associated with the past disposal activities at the site were assessed by TRC in Task 4. Site conditions and usage were considered in the risk assessment. The risk assessment was conducted following guidelines established by the National Academy of Sciences, the United States Environmental Protection Agency (USEPA), and previous risk assessments performed at other sites in New York. Based on the risk assessment, TRC recommended that a health and safety plan, including an air monitoring program, be developed and followed by maintenance and other workers at the site during excavation work.

1.4.6 Focused Environmental Site Investigation (1993)

In 1993, Blasland & Bouck Engineers (BBE) conducted a focused Environmental Site Investigation. During this investigation, BBE excavated 20 test pits east of the eastern onsite drainageway (opposite the identified disposal area on the west side of the drainageway) and collected 3 surface soil samples (TP-93-01 through TP-93-03) to evaluate whether there were MGP residues east of the drainageway. BBE also installed 2 overburden monitoring well pairs (MW-04S/MW-04D and MW-05S/MW-05D) near the eastern property line.

No disposal areas were identified east of the drainageway, which bisects the EWDA. The test pits were 1 to 2 feet deep and were excavated between the drainageway and the power line corridor. There was no evidence of MGP residue in any of the 20 test pits. Slag and railroad bed cinders were noted in some of the 5 test pits excavated near an old railroad spur bed. Soil samples from 3 test pits (TP-93-01 through TP-93-03) were collected and analyzed for VOCs, SVOCs, metals, and cyanide.

Well pairs MW-04S/MW-04D and MW-05S/MW-05D consisted of an intermediate overburden and a shallow overburden monitoring well. Monitoring well locations are shown on Figure 1-3. The 2 shallow overburden monitoring wells are screened in the upper 10 feet of saturated soil. The water table was encountered at approximately 2.5 feet bgs. The intermediate overburden monitoring wells screen a more permeable zone between 16 and 25 feet bgs. Supporting investigation data is presented in Appendix A.

1.4.7 Summary of Analytical Data from Previous Investigations

From 1984 through 1993, NYSEG conducted six investigative phases including a risk assessment. RI Figures 1-4 through 1-10 summarize the analytical results from these previous investigations and are provided in Appendix A of this report. RI Appendix A provides summary tables of the analytical data collected during the previous investigations and RI Appendix B provides copies of previous investigation reports for the site.

The groundwater data presented in RI Figure 1-4 shows the analytical data gathered by NYSEG on June 18-19, 2001 and represents the most current sampling event prior to the RI. VOCs and SVOCs were not detected. Only cyanide was reported in 4 of the 10 groundwater monitoring well samples during the 2001 sampling round. The highest concentration of cyanide (7.31 milligrams per liter [mg/L]) was reported for the groundwater sample collected from MW-02S, which is downgradient of the former MGP facility and coke ovens. Compounds detected during previous sampling events include 1,3-dichlorobenzene, BTEX (benzene, toluene, ethylbenzene, and xylenes), several SVOCs (mostly polycyclic aromatic hydrocarbons [PAHs]), several metals (antimony, arsenic, beryllium, copper, iron, mercury, selenium, zinc), and organic nitrogen, and sulfate.

The results of the previous surface soil analyses are summarized on RI Figure 1-5 (Appendix A). The majority of the data presented on this figure is from sampling conducted in 1986, with additional samples collected in 1993. Three samples (SS-01, SS-02, and TP-41A) exhibited total SVOC concentrations in excess of 500 milligrams per kilogram (mg/kg). Two of the samples, SS-01 and SS-02, were collected on the western side of the site from the area of a known relief holder. There were reported coal tar seeps in this area. Analytical results did not show any significant concentrations of VOCs in surface soil at the site. Reported total cyanide concentrations were elevated across the site, with the highest concentration reported for soil sample SS-06 (4,570 mg/kg). This sample was collected directly east of the former purifier building where elevated concentrations of cyanide are known to be present in the oxide boxes in the crawl space of the current building. Elevated concentrations of total cyanide were also present near the drainageway east of the property.

The results of the previous subsurface soil sampling are summarized on RI Figures 1-6 through 1-9 (Appendix A). Subsurface soil samples collected at the site exhibit similar trends to those seen in the surface soil. However, in the case of the subsurface soil, several samples exceeded the recommended soil cleanup objective Recommended Soil Cleanup Objective (RSCO) of 10 mg/kg for total VOCs from the NYSDEC Technical and Administrative Guidance Memorandum (TAGM) 4046 – Determination of Soil Cleanup Objectives and Cleanup Levels. The highest concentration of VOCs was reported for sample TP-01 (669 mg/kg), which was collected at the former relief holder on the west side of the facility. The highest concentration of PAHs was also found at sample location TP-01 (139,000 mg/kg). The highest concentration of iron cyanide was reported at TP-31, near the eastern relief holder (32,000 mg/kg) followed by TP-29 (13,000 mg/kg) and TP-32 (10,000 mg/kg), southeast of the former purifier building. The highest concentration of total cyanide was reported at TP-31 (34,000 mg/kg), near the eastern relief holder, followed by TP-32 (13,000 mg/kg) and TP-29 (13,000 mg/kg).

Previous surface water and sediment sample results are summarized on RI Figure 1-10 (Appendix A). VOCs were only detected in surface water in the western area at SW-03 (41µg/L). SVOCs were detected at relatively low levels in surface water, while elevated concentrations of

SVOCs were detected in sediment samples near the site (SD-01 through SD-03). Lower concentrations of SVOCs were detected in sediment samples south of the site. While elevated concentrations of cyanide were found in several of the sediment samples, the results of greatest significance are those from the eastern drainageway. Concentrations of cyanide were found to be highest at SD-01 nearby where the highest detected concentrations of cyanide were reported in soil samples. This sampling location is north of the former relief holder and northeast of the former purifier building. Each of the surface water samples collected had detected concentrations of cyanide. The highest concentration of cyanide in surface water was at SW-02 (23 µg/L), which is downstream of the EWDA.

1.5 Remedial Investigation Phases and Interim Remedial Measure

1.5.1 Scope of RI and RI Additional Work Phase

Initial RI field activities were conducted in 2002 and 2003. Additional RI field activities were conducted in 2005. Boring, monitoring well, Hydropunch™, air and sediment sample locations are shown on Figure 1-3. A total of 48 soil borings were drilled; fifteen of which were completed as overburden monitoring wells. Four bedrock monitoring wells were also installed. The monitoring well network was initially comprised of 21 overburden groundwater monitoring wells and 4 bedrock groundwater monitoring wells. A total of 18 Hydropunch™ samples, 21 surface soil samples, 31 subsurface soil samples, 16 surface water samples, 32 sediment samples, and 34 groundwater samples were collected for laboratory analysis. In addition, 1 water sample and 1 soil sample were collected from an oxide box (Box #3) inside the former purifier building. A geophysical investigation was conducted to try to locate the former bedrock injection well. Two test pits were dug based on the results of the geophysical investigation. However, the former injection well was not found. Indoor air quality within 3 of the main buildings onsite was evaluated. A qualitative Human Health Exposure Assessment and Fish and Wildlife Impact Analysis were also completed.

URS conducted additional RI field activities from August 24, 2005 through December 20, 2005 to: evaluate the horizontal and vertical distribution of MGP-related compounds and by-products in soil and groundwater near Interim Remedial Measure (IRM) confirmation soil sample location 458 within the WPEA; delineate the horizontal extent of subsurface pipes identified during the IRM; re-assess and evaluate bedrock flow direction and groundwater conditions; and conduct a soil vapor investigation (SVI) around the East Office Building. A total of 14 soil samples from 6 soil borings, 4 Hydropunch™ samples, and 24 groundwater samples were collected for laboratory analyses. URS supervised the excavation of 9 test pits and installed 1 additional bedrock groundwater monitoring well.

Thirteen additional exploratory soil borings were advanced to visually delineate coal tar residues in onsite shallow overburden soil (i.e., less than 8 feet bgs) just beyond the southern limit of the IRM area (i.e., no confirmatory analytical samples were collected). Five soil vapor implants were installed around the south and west perimeter of the East Office Building to assess the soil vapor. Supporting RI investigation information including summary figures are included in Appendix A on compact disc.

1.5.2 Interim Remedial Measure

NYSEG completed an Interim Remedial Measure (IRM) in the WPEA and FMSA between May and October 2004. The IRM consisted of excavating an approximately 1.7-acre area (shown on Figure 1-2) to approximately 3 feet bgs. The north end of the excavation was approximately 2.5 feet deep; the eastern end of the excavation was approximately 3.5 feet deep; and the western portion of the excavation was approximately 3 feet deep. Some areas were excavated to greater depths; the maximum depth excavated was approximately 12 feet bgs.

During the IRM, subsurface piping was encountered at three locations, the locations of which are shown in Figure 1-2 and discussed below.

A six-inch PVC waterline with no visible MGP impacts was encountered along the eastern edge of the IRM excavation area. The pipe, reportedly the water main to the nearby hydrant, was encountered at approximately 5 feet bgs. The section of water main uncovered included a 90-degree coupling trending in a northerly direction toward the garage in the WPEA and in an easterly direction toward the service center building. Since no MGP related contamination (or contamination of any other nature) was identified near the water line, its full extent was not determined.

A six-inch cast-iron pipe was encountered at approximately 5 feet bgs, trending in a north-northeast direction, and continued beneath the WPEA garage. No evidence of coal tar or

MGP related residuals or by-products were noted and the full extent of the pipe could not be determined beyond the WPEA garage.

A six-inch clay pipe was uncovered along the western edge of the IRM excavation area at approximately 5 feet bgs, trending in a west-northwest direction. Exposed sections of the pipe within the test pit contained visible coal tar and water. The pipe was delineated in a westerly direction until it was no longer observed. However, the excavation at the western extent of the pipe could only be advanced to 5 feet bgs due to the rapid infiltration of groundwater and surface obstructions (i.e., natural gas pipe storage racks).

RI Figure 1-11 (Appendix A) shows the locations of IRM confirmation soil samples. A total of 52 confirmation soil samples (401 through 444, 448 through 450, and 452, 453, 455, 456, and 458) were collected and analyzed for BTEX and PAHs. Most of the samples were collected from 5.5 feet bgs, but soil sample 422 was collected from 8 feet bgs and sample 458 was collected from 12 feet bgs. Confirmation sampling was conducted below the excavated materials. The distributions of BTEX concentrations, total PAHs, and total carcinogenic PAHs (cPAHs) in the confirmation soil samples are shown in RI Figures 1-12, 1-13, and 1-14, respectively. RI Figure 1-15 lists the compounds that were detected at concentrations that exceed NYSDEC TAGM RSCOs for each of the confirmation soil samples. RI Figures 1-12, 1-13, 1-14 and 1-15 are included in Appendix A of this report.

BTEX concentrations in the confirmation soil samples ranged from not detected at 40 sample locations to 1,204 mg/kg at location 458. As shown in RI Figures 1-12 and 1-15, BTEX was generally detected in two areas of the IRM excavation: near the former tar vessel and PVC water main found in the FMSA, and near the eight-inch clay pipe that was encountered in the WPEA. All four BTEX compounds were detected at concentrations more than one order of magnitude greater than their respective TAGM 4046 RSCOs in sample 458, which was collected at the eastern end of the clay pipe. The total BTEX concentrations were less than 2.0 mg/kg in the confirmation samples collected near the former tar vessel. Benzene was the only BTEX compound that was detected at concentrations that exceeded its RSCO (0.06 mg/kg) in the confirmation samples collected in the FMSA.

The distributions of total PAHs and total cPAHs in the confirmation soil samples are shown in RI Figures 1-13 and 1-14, respectively. The cPAHs include benzo(a)anthracene, benzo(a)pyrene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, and indeno(1,2,3-cd) pyrene. RI Figure 1-13 shows that PAHs are present within the limits and near the boundaries of the IRM excavation. PAHs detected in the soil along the northern edge of the IRM excavation within the WPEA (including the area near the cast iron piping) indicate that soil impacted by PAHs extends further north toward the storage area. Similar to BTEX, the two areas with elevated concentrations of PAHs are near the former tar vessel within the FMSA and near the eight-inch clay pipe in the WPEA. PAHs were detected at most of the confirmation soil sampling locations within the FMSA. PAH concentrations greater than 500 mg/kg were detected in the area of the former tar vessel. At confirmation soil sampling locations 401 and 424 in the FMSA, the detected total PAH concentrations were 1,055 mg/kg and 1,399 mg/kg, respectively. The total PAH concentration at confirmation soil sample location 458 in the WPEA was 8,210 mg/kg. RI Figures 1-14 and 1-15 show that, in contrast to most of the PAH impacts in the soil at the site, the PAHs detected at location 458 are non-carcinogenic PAHs.

1.5.3 Applicable Standards, Criteria, and Guidance

The overall nature and extent of contamination at the site was determined by assessing and evaluating all data collected at the site to date including results from investigations conducted prior to the RI. All analytical data from the investigations was compared to standards, criteria, and guidance values (SCGs). SCGs are cleanup standards, standards of control, and other substantive environmental protection requirements, criteria or limitations promulgated under federal or state law that specifically address a hazardous substance, pollutant, contaminant, remedial action, or location. Guidance values include non-promulgated criteria and guidelines that are not legal requirements but should be considered if determined to be applicable to the site.

SCGs are categorized as chemical-specific, location-specific, or action-specific as defined below.

Chemical-specific:	Health- or risk-based numerical values or methodologies which, when applied to site-specific conditions, result in the establishment of numerical values for the chemicals of interest. These values establish the acceptable amount or concentration of a chemical, or combinations of chemicals, that may be found in or discharged to the environment.
Location-specific:	Restrictions placed on the concentrations of hazardous substances or the conduct of activities solely because they occur in a specific location (e.g., wetland, floodplain, historic area, etc.).
Action-specific:	Technology- or activity-based requirements or limitations on actions taken with respect to hazardous waste management, site cleanup, or discharge limitations.

The following paragraphs present chemical-specific SCGs that have been identified for the Geneva-Border City Former MGP Site, and are used for the discussions on the nature and extent of contamination at the site. A comprehensive list of all site SCGs is presented in Table 1-1.

Chemical-specific SCGs pertaining to this site for soil include the recommended soil cleanup objectives (RSCOs) presented in NYSDEC Division of Hazardous Waste Remediation Technical and Administrative Guidance Memorandum (TAGM) 4046 – Determination of Soil Cleanup Objectives and Cleanup Levels.

Chemical-specific SCGs pertaining to this site for groundwater include the New York State Codes, Rules, and Regulations (NYCRR) 6 NYCRR Part 700-705, Water Quality Regulations for Surface Water and Groundwater, and NYSDEC Division of Water Technical and Operational Guidance Series (TOGS) 1.1.1 – Ambient Water Quality Standards and Groundwater Effluent Limitations. While Class GA standards were utilized, all residents nearby and downgradient of the site vicinity do not use groundwater for potable water; potable water is supplied by municipal sources. Further, the NYSDEC is aware that the bedrock aquifer has intrinsically high chloride and total dissolved solids concentrations that are consistent with Class GSB saline groundwater.

Chemical-specific SCGs pertaining to this site for surface water include the 6 NYCRR Part 700-705, Water Quality Regulations for Surface Water and Groundwater, and NYSDEC Division of Water TOGS 1.1.1 – Ambient Water Quality Standards and Groundwater Effluent Limitations for Class C streams. The best usage of Class C waters is fishing, suitable for fish propagation and survival, and recreation, although other factors may limit the use for these purposes.

Chemical-specific SCGs pertaining to this site for sediments include those determined by the NYSDEC Division of Fish and Wildlife – Technical Guidance for Screening of Contaminated Sediments. Site-specific screening criteria are calculated using sample-specific total organic carbon (TOC) values.

1.5.4 Geology and Hydrogeology

The geology at the site consists of a veneer of fill overlying glaciolacustrine overburden deposits. A layer of till separates the overburden deposits from the underlying limestone bedrock. Fill thickness varies across the site from less than 1 foot to approximately 20 feet. In general, the fill consists of mixed construction debris including refractory bricks, concrete, and miscellaneous demolition debris south of the main service center in the FMSA. In the EWDA, the fill consists of purifier wastes, tars, coal gas waste by-products, coke, demolition debris, coal, and coal slag. In the other areas of the site, the fill consists of a re-graded mixture of native soil, brick fragments, gravel, slag and cinders, and wood chips. Underlying the fill, to a depth of approximately 160 feet bgs, are alternating layers of clay and silt, silty sand, and lacustrine clay. Till was found to be approximately 40 feet thick beneath the overburden deposits and overlying the Onondaga Limestone bedrock.

Bedrock beneath the site consists of a sequence of Onondaga Limestone, Bertie Group formations, and the Salina Group. During the drilling phases of the RI, URS encountered bedrock at approximately 205 feet bgs onsite and at approximately 216 ft bgs in Seneca Lake State Park. Rock core descriptions from bedrock boreholes BR-02 and BR-03 indicate that approximately 60 to 80 feet of Onondaga limestone consisting of Devonian age limestones and shales are present beneath the site. The lower contact of the Seneca Member lies near the top of the bedrock surface. The Akron dolostone (approximately 5 to 6 feet thick) was present in rock cores collected from BR-02 and BR-03. The Bertie Group was present beneath the Akron dolostone approximately 80 feet below the top of bedrock. The geologic contact between the Bertie Group and the Salina Group could not be distinguished in the rock core samples collected from BR-02 and BR-03.

There are two water-bearing zones beneath the site: overburden and bedrock. The overburden water-bearing zone was divided into three units (shallow, intermediate, and deep) in the RI and does not appear to be directly connected to the underlying bedrock water-bearing zone. Depth to overburden groundwater onsite ranges from approximately 1 to 4 feet bgs. The water level data collected in the FMSA intermediate overburden wells indicate that the potentiometric surface in the intermediate overburden zone is slightly deeper than the water table in the shallow overburden zone. The overburden groundwater flow direction in the shallow and intermediate aquifers onsite is south-southeast. Groundwater for the deep overburden aquifer likely flows to the south.

Vertical hydraulic gradients between the intermediate and deep overburden were downward in monitoring well pairs MW-01, MW-04, and MW-05. The vertical hydraulic gradient between the shallow and deep overburden zones was essentially flat in monitoring well pair MW-02. The vertical hydraulic gradient was slightly upward in monitoring well pair MW-03 between the shallow and deep overburden zones. Hydraulic conductivities in the onsite overburden range from 1.04×10^{-2} centimeters per second (cm/sec) to 3.64×10^{-4} cm/sec. Pumping well yields from the overburden unconsolidated deposits in the region are reported to be as much as 75 gallons per minute (gpm). For the purpose of this FFS, overburden groundwater is considered a single hydrostratigraphic unit.

Bedrock groundwater generally flows east to east-southeast. The bedrock groundwater flow regime beneath the site is primarily confined by the till overlying bedrock. The uppermost (approximately 10-foot) portion of the bedrock and the interbedded glaciolacustrine silts and clays act as semi-confining units. Recharge of the bedrock occurs from the hillsides surrounding the area. The bedrock groundwater flow regime is artesian. Therefore, vertical hydraulic gradients are upward from the bedrock. This artesian condition could be seasonal or intermittent. Bedrock hydraulic conductivities range from 10^{-2} cm/sec to 10^{-5} cm/sec or less. Hydraulic conductivities were generally greater in the Onondaga Limestone and Bertie Group formations compared to that of the more competent underlying Salina Group formation.

Reportedly, previously there were several pumping wells within one mile of the site, the depths of which are generally less than 150 feet bgs. The uses of the wells included industrial, commercial, domestic, and agricultural water supply. Well yields were reported to be up to 200 gpm from the limestone formations (Bertie, Salina, Rondout, Manilius and Onondaga limestone members and Cobleskill dolomite). Regionally, well yields of up to 1,000 gpm were reported from the Camillus Shale (Mozola, 1951). The onsite bedrock injection well was cased into the Onondaga Formation and Camillus Shale bedrock units at 200 feet bgs and had a total depth of 336 feet bgs. The onsite bedrock injection well was deeper than the reported pumping wells in the area.

Groundwater in bedrock flows primarily through secondary porosity features in the rock including faults, joints, solution cavities and bedding planes. The Onondaga Limestone, Akron Dolostone, and Bertie and Salina Groups have little primary porosity so groundwater flow is controlled by the distribution of fractures within the rock. Groundwater flow within the bedrock onsite is expected to be through secondary porosity features, such as fractures and solution cavities. As indicated by production well logs in the area, the bedrock wells are capable of producing several hundred gpm.

1.5.5 Overall Nature and Extent of Contamination

1.5.5.1 Soil Quality

The RI and previous investigation surface soil analytical data indicate that benzene, PAHs, and metals are present above the NYSDEC RSCOs in the surface soil at and near the site. Table 1-2 provides a summary of previous and RI exceedances grouped by environmental media as provided in the RI (RI Table 5-1). Supporting RI investigation data is presented in Appendix A. Total recoverable phenolics and cyanides have also been detected in the surface soil. Surface soil impacted with benzene, PAHs, and total recoverable phenolics within the FMSA near the former tar storage vessel were removed as part of the IRM. Elevated concentrations of PAHs, including cPAHs, were also found in surface soil within the BWA, along the southern and eastern perimeters of WPEA, and within the EWDA. The highest concentration of metals detected in the surface soil was found within the BWA and the EWDA. Total cyanide concentrations in the surface soil within the EWDA were reported as high as 229 mg/kg from samples collected as part of previous investigations.

The soil analytical data indicates that there are BTEX, PAHs, metals, total phenolics, and cyanides in subsurface soil at and near the site. Elevated VOC concentrations were detected in subsurface soil near former MGP structures. Elevated SVOCs were detected in subsurface soil within the FMSA near the former tar storage vessel and the former blue gas building and within the EWDA. The most significant cyanide impacts were detected in subsurface soil south of the former 300,000 ft^3 holder in the FMSA.

An area of approximately 1.7 acres and 3 feet deep of MGP impacted soil was excavated from the WPEA during the 2004 IRM. Based upon additional soil testing conducted as part of the RI additional work phase, MGP impacted soil still remains in the vicinity of IRM sample 458 and south of the IRM area.

1.5.6 Air Quality

1.5.6.1 Indoor Air Quality

Indoor air quality samples were collected from within three of the main Service Center buildings. The analytical results showed no detections of BTEX, PAHs, or cyanide above the laboratory quantification limits which were below all applicable OSHA permissible exposure limits (i.e., therefore the results were all below OSHA chemical-specific permissible exposure limits). Based upon these results, it is not expected that indoor air quality is being impacted by MGP-related waste materials and no further action is required.

1.5.6.2 Soil Vapor Quality

Several VOCs were detected in the soil vapor samples collected from the soil vapor implants installed west and south of the East Office Building. Although VOCs are present in soil vapor, the concentration levels of the detected soil vapor contaminants were below OSHA Permissible Exposure Limits (for indoor air) for each compound. Therefore, even if 100% of the concentrations detected in soil vapor were to infiltrate to indoor air, applicable OSHA permissible exposure limits would not be exceeded.

1.5.7 Groundwater Quality

1.5.7.1 Overburden

The shallow overburden groundwater around the southern and eastern site perimeter has not been impacted by BTEX or PAHs and does not appear to be significantly impacted by metals or phenols. The most significant impact to the shallow overburden groundwater is the elevated level of cyanide at well MW-02S in the BWA.

Elevated concentrations of BTEX, SVOCs, and phenols were detected in the intermediate overburden groundwater at wells within the FMSA and appear to be attributed to former MGP structures. Groundwater samples collected from wells outside of the FMSA were not impacted by BTEX or SVOCs. Elevated detections of chromium, lead, and nickel were limited to the groundwater sample from overburden well OB-08 within the FMSA. During the RI additional work phase, 8 metals (antimony, chromium, iron, magnesium, manganese, nickel, sodium, and thallium) were detected in the intermediate overburden groundwater samples at concentrations that exceeded their respective NYSDEC groundwater standard. The exceedances were generally within one order of magnitude of their respective standard. The maximum detected metals concentrations were typically in the groundwater sample from well OB-09.

The deep overburden groundwater has not been significantly impacted by VOCs, SVOCs, or PCBs; however, benzene was detected in MW-03D during the RI additional work phase at a concentration exceeding the NYSDEC standard. The deep overburden groundwater exhibits minor impacts from 5 metals (antimony, arsenic, iron, magnesium, and sodium). The detected concentration of arsenic in MW-02D slightly exceeds the NYSDEC groundwater standard. The detected antimony, iron, magnesium, and sodium concentrations in the deep overburden groundwater samples were within one order of magnitude of NYSDEC groundwater standards. The detected concentrations of total recoverable phenolics in the deep overburden groundwater samples were much less than those detected in the shallow overburden groundwater samples. Phenolics are found throughout the wider area and their presence is likely not site related.

1.5.7.2 Bedrock

When comparing bedrock groundwater analytical results to SCGs, Class GA standards were used; however, the NYSDEC is aware that the bedrock aquifer has intrinsically high chloride and total dissolved solids concentrations that are consistent with Class GSB saline groundwater. VOCs, SVOCs, metals, cyanides, and total recoverable phenolics were detected in the deep bedrock groundwater samples. Elevated concentrations of VOCs detected in the bedrock groundwater included BTEX, methyl ethyl ketone (MEK), isopropyl benzene, and styrene. The diffuse concentrations of benzene and MEK in the bedrock aquifer extend off the property toward the east and east-southeast. SVOCs detected in the bedrock groundwater included PAHs and phenols. MEK is likely from an offsite source. The highest concentrations of detected compounds in the bedrock groundwater were generally detected in wells BR-02, BR-03, and BR-05. A number of organic compounds were detected above SCGs in these monitoring wells including benzene, ethylbenzene, toluene, xylenes, 2,4-dimethylphenol, 2-methylphenol, 4-methylphenol, naphthalene, phenol, and MEK. RI Figure 4-12A depicts these detections and is included in Appendix A.

1.5.8 NAPL Observations

Sheens and odors were observed in the fill materials in the subsurface soil beneath a few of the former MGP structures. Traces of coal tar were observed in soil borings (SB-05/OB-08, SB-07A, SB-07B, SB-10/OB-10, SB-11, SB-12, SB-16, SB-18, GP-25, GP-26, GP-31, GP-32, GP-34, GP-36, and GP-37) advanced in the FMSA near and beneath former MGP related structures. The traces of coal tar were typically observed near the interface of the fill and the underlying silty clay layer.

A sample of non-aqueous phase liquid (NAPL), which was encountered in a subsurface vault at SB-07A, was collected at a depth of 10 to 12 feet bgs and submitted for petroleum hydrocarbon fingerprinting. The NAPL sample was a close match for coal tar. There was no apparent NAPL observed in the bedrock during the RI. Sheens and apparent MGP odors were encountered during bedrock drilling at bedrock monitoring wells BR-02, BR-03, and BR-04 at a depth of between 245 and 275 feet bgs. No sheens or traces of NAPL were observed during well development or collection of groundwater samples from the overburden and bedrock wells. No odors or sheens were noted during the RI collection of most of the sediment or surface water samples. The exceptions were observations of apparent strong MGP odor and sheen during collection of a sediment sample from within the Former Settling Basin in the BWA and observation of diffuse sheen that could not be distinguished as MGP or petroleum-related in the western drainageway near the WPEA.

1.5.9 Surface Water and Sediment Quality

1.5.9.1 Surface Water

The surface water analytical data does not indicate significant impacts by metals or SVOCs. The metals concentrations detected in surface water samples that exceed NYSDEC surface water criteria were within one order of magnitude of the criteria and only one SVOC (bis(2-ethylhexyl)phthalate at 3.7 µg/L in SW/SED-07) was detected at a concentration above SCGs.

1.5.9.2 Sediment Quality

Sediment analytical results show that the eastern and western drainageways and the Former Settling Basin have been impacted by SVOCs. SVOC impacts immediately north of the former 300,000 ft^3 holder near the eastern border of the FMSA have also been documented. The eastern and western drainageways and Seneca Lake sediments have been impacted by PCBs. However, the low concentrations of PCBs in Seneca Lake were determined to be not related to ongoing or former activities at the site. Elevated levels of total cyanides are present in the eastern drainageway sediments. The Former Settling Basin has also been impacted by phenolics.

1.5.10 Qualitative Human Health Exposure Assessment (HHEA)

A Qualitative Human Health Exposure Assessment (HHEA) was presented in the RI. The HHEA provides a summary of potential exposure pathways and a summary of potentially toxicological effects that may result from exposure to contaminants attributable to historic activities at the site under current and potential future site conditions. The HHEA used data and information collected during the URS field investigation, together with data collected as part of previous investigations to assess human health risk in the immediate and surrounding areas. The HHEA for the Geneva-Border City site identified fifty-six chemicals of potential concern (CPCs) present in groundwater, surface and subsurface soil, and surface water and sediment as shown on Table 1-3. Seventeen of these CPCs are classified by USEPA as carcinogens.

1.5.10.1 Potentially Exposed Receptors

The previous and current use of the site is commercial. The property is surrounded by a fence and the buildings are locked (except for one door of the main customer service building used by NYSEG customers to access the customer service office). During RI field work, no evidence of trespassing or forced entry at the site was observed. There are groundwater wells used for agricultural and industrial purposes in rural areas east (cross gradient) of the site within several miles. Currently, all residents nearby and downgradient of the site obtain their potable water from municipal sources.

Under the current use scenario, potentially exposed receptors are limited to industrial workers on the site, trespassers, and recreational users of Seneca Lake State Park. NYSEG customers (i.e., non-employees) coming onto the site have restricted access to the site and are not potentially exposed. Visitors to Seneca Lake State Park may be exposed to sediments in drainageways traversing the Park and recreational users of Seneca Lake may be exposed to sediments in the Lake.

Potential future uses include continued recreational use of the State Park, and continued commercial use of the property, including possible future construction activities. Construction workers have been identified as potential receptors if construction occurs at the property in the future. Residents or site workers could be exposed through groundwater ingestion if wells were installed near the site.

1.5.10.2 Exposure Pathways

Currently, much of the site is covered with impervious macadam or crushed stone. In these areas subsurface soil is not accessible. However, in the EWDA, BWA, and portions of the OEA, only vegetation covers the soil. Trespassers or site workers could come into direct contact with surface and subsurface soil. As a result, direct contact with surface soil is considered a viable, potentially complete exposure pathway. Under the future use scenario, intrusive activities from possible construction efforts may result in direct exposure of a construction worker to subsurface soil. Therefore, direct contact to both surface and subsurface soil is considered a potential exposure pathway under the future use scenario.

Under the current use scenario, there are no exposures through the air route. Sampling performed inside site buildings indicated that MGP residues in the subsurface are not affecting air quality inside the buildings. Under future scenarios, excavation work may be conducted in areas where subsurface soil is contaminated by VOCs. Excavation work in these areas may result in construction workers being exposed to contaminated vapors.

Exposure via inhalation of soil vapor during construction or excavation activities is considered a viable, potentially complete exposure pathway under both current and future use scenarios.

Under the current use scenario, groundwater near the site is not known to be used as a potable water supply; therefore, it is not a media of concern in the current use scenario. However, under the future use scenario, groundwater is a medium of concern because it could be used for either non-potable or potable purposes.

Surface water flows from the site through drainageways traversing Seneca Lake State Park. Park users have direct access to these drainageways. Therefore, direct contact to surface water and sediments in these drainageways is considered a complete current and future use direct contact exposure route. However, it is important to note that surface water and sediment contaminant concentrations are rather low; they have been identified as contaminants of concern due to their impact on aquatic and benthic organisms that could reside in these areas. Incidental contact by Park users is not likely to result in human health impacts.

1.5.11 Fish and Wildlife Impact Analysis

A Fish and Wildlife Impact Analysis (FWIA) was performed by URS during the Remedial Investigation utilizing information collected during the URS field investigation, and data collected as part of previous investigations to assess impacts to fish and wildlife in the immediate and surrounding areas. The FWIA was conducted through to Step IIB. The results of the FWIA Step I analysis indicate that the only ecological resources associated with the site are the fish resources of nearby Seneca Lake and site wetland areas. These resources are within approximately 1,500 feet of the site and have the potential to provide recreational value. The

FWIA Step IIA analysis indicated that site-related contaminants are migrating to adjacent surface waters. The potential exists for wildlife resources in the eastern and western drainageways, and in wetlands associated with these drainageways to be exposed to site-related COCs. In a preliminary FWIA IIB analysis, it was determined that some chemicals were reported at concentrations above sediment quality standards. It appears that some of the contaminants are attributable to the site. In particular, the following were noted:

- No visible signs of stress related to chemical releases from the site were observed during several site walkovers. Areas in receipt of fill over the years are fully vegetated by disturbance-tolerant species. Natural areas exhibited no signs of stress such as dying, dead or chlorotic vegetation. No dead wildlife was observed in the project area. During the December 2003 site walkover, a small area of sheen was observed on the water surface of the western drainageway near the culvert beneath the railroad berm. The origin of the sheen could not be determined and could not be identified as natural or petroleum-related.
- The NYSDEC and the NYSDOH were contacted for information on health advisories and fish kills in Seneca Lake. The NYSDOH did not have sufficient information from Seneca Lake to include the Lake on the advisory.
- The eastern and western drainageways south of Routes 5 and 20 are lined with concrete or asphalt. These drainageways are not inhabited by fish or wildlife. A small number of aquatic invertebrates may occur here. These drainageways do not support a fish population because of the intermittent water supply. A limited invertebrate community would be expected to be present in the drainageways.
- No important ecological resources are identified on the site. Wildlife is limited to species associated with human habitation and occasional transient migratory birds as well as gulls and waterfowl associated with Seneca Lake. In addition, potential ecologic communities present onsite are limited due to impervious cover type across a large majority of the site. Therefore, contaminant pathways resulting from direct contact of plants or animals with chemicals are not considered significant.

1.6 Conceptual Site Model

The migration of contaminants from source areas to other portions of the site is controlled by the nature of the source areas, surface features, and site hydrogeologic conditions. The former MGP structures, particularly the former Blue Gas Building, the former tar vessels, and the former bedrock injection well in the FMSA, the former waste dump in the EWDA, as well as the Former Settling Basin in the BWA appear to be the primary sources of residual MGP wastes at the site.

Contamination in the overburden soil is generally limited both laterally near the potential point source areas as well as vertically to the fill layer and the fill-silty clay interface. Potential migration pathways are primarily groundwater movement in the shallow and intermediate overburden zone, and surface runoff to the eastern and western drainageways. The extent of MGP related contamination in the overburden groundwater is limited laterally by the relatively low groundwater flow gradients and vertically by the clay and silt layers beneath the fill at intermediate depths ranging from approximately 40 to 70 feet bgs. The less permeable clay layers coupled with upward vertical hydraulic gradients in the EWDA inhibit the downward vertical migration of contaminants onsite. The onsite overburden groundwater plume of MGP-related contaminants generally trend south, which is consistent with the direction of groundwater flow at the site. Overburden groundwater flow gradients onsite are relatively low, resulting in very slow plume migration. As a result, the plume in the overburden is generally limited to the site vicinity.

Contaminants found in the bedrock aquifer are likely attributed to the direct injection of quenching waste contaminants into the former injection well during previous site gas manufacturing operations. The contaminants present in the bedrock aquifer are generally limited to the upper 100 feet of bedrock (mostly Bertie and Onondaga Limestone). The diffuse concentrations of benzene in the bedrock aquifer extend off the property toward the east and east-southeast. The quenching wastes present in the bedrock aquifer do not appear to have impacted sediments or surface water in Seneca Lake.

2.0 REMEDIAL ACTION GOAL AND OBJECTIVES

2.1 Goal and Objectives

The remedial action goal for the Geneva-Border City Former MGP site is to eliminate or mitigate all significant threats to human health and/or the environment, to the extent practicable, caused by contaminants present due to former MGP activities. In order to meet this goal, remedial action objectives (RAOs) were established to protect human health and the environment, and provide the basis for selecting appropriate remedial technologies and developing remedial alternatives. RAOs were established based on contaminated media, SCGs identified for the site, and results of the qualitative human health exposure assessment and fish and wildlife impact analysis.

Indoor air quality samples were collected from within three of the main buildings used by NYSEG personnel. The analytical results showed no detections of BTEX, PAHs, or cyanide above the laboratory quantification limits, which were all below applicable OSHA chemical-specific permissible exposure limits. Based upon these results, it is not expected that indoor air quality is being impacted by MGP-related waste materials and no further action is required. Several VOCs were detected in the soil vapor samples collected from the soil vapor implants installed west and south of the East Office Building. Although VOCs were present in soil vapor, the concentration levels of the detected soil vapor contaminants were below OSHA permissible exposure limits (for indoor air) for each compound. Indoor air is therefore not considered a media of concern at the site.

To address the remedial action goal, the focused feasibility study will evaluate technologies and alternatives for contaminated soil, groundwater and sediments with respect to the following cleanup levels:

> *Source and Exposure Pathway Elimination*, which involves remediation to levels that exceed SCGs, but still create conditions that are protective of human health and the environment by reducing or eliminating the contamination source or exposure pathways. This approach recognizes that it may not be warranted or feasible to implement remedies that attain SCGs in cases where alternative approaches can be implemented that will be protective of human health and the environment.

Media-specific remedial action objectives, which are identified below.

Soil

Eliminate source and exposure pathways, to the extent practicable, by removal, containment or treatment of source material, which consists of:

- Tar or oil in any form, or
- Sheen present and TPAHs > 1,000 ppm, or
- MGP-related odor present and TPAHs > 1,000 ppm, or
- Purifier waste present with reactive cyanide > 250 ppm, or
- Purifier waste present with reactive sulfide > 500 ppm.

Attain the site-specific cleanup objective for total VOCs < 10 ppm and total SVOCs < 1,000 ppm.

Groundwater

Eliminate or reduce the potential for ingestion of overburden groundwater with contaminant levels exceeding drinking water standards.

Eliminate or reduce the potential for ingestion of bedrock groundwater with contaminant levels exceeding drinking water standards.

Sediments

Eliminate source and exposure pathways, to the extent practicable, by removal, containment or treatment of sediments, which consists of:

- Tar or oil in any form, or
- Sheen present on the water surface when the sediments are disturbed.

2.2 Remediation Areas

Based on information provided in the RI, remediation areas and volumes have been developed for soil and sediments, and groundwater was considered for monitoring.

2.2.1 Soil

Field observations, information about historical site use and analytical data were used to identify site areas exceeding remedial action objectives for soil. Figure 2-1 identifies sample locations where: tar or oil was present in any form; an MGP odor or sheen was present with TPAHs (which are the SVOC contaminants of concern) greater than 500 ppm and 1,000 ppm in surface or subsurface soil in analytical data from the RI or previous investigations; or total VOC concentrations were greater than 10 ppm in surface or subsurface soil based on analytical data from the RI or from previous investigations and confirmed by the RI sample results for that location. Two sample points (TP-22 and TP-41A) shown on Figure 2-1 indicate areas where TPAH concentrations are greater than 500 ppm as opposed to the SCG of 1,000 ppm. Since these two points are contiguous to proposed remediation areas based upon the SCG of 1,000 ppm, they are included in the remediation areas. Volumes of soil and sediments proposed for remediation are provided on the table on Figure 2-2. The maximum depth at which soil exceeded these cleanup objectives is provided on the table on Figure 2-1.

Figure 2-3 identifies the extent of the proposed remediation areas to meet individual chemical-specific SCGs and restore the site to pre-disposal conditions. Remediation areas for soil include all sample locations where SCGs were exceeded for individual contaminants. Volumes of soil and sediments proposed for remediation are provided on the table on Figure 2-3.

2.2.2 Groundwater

Elevated concentrations of MGP-related contaminants were detected in overburden and bedrock groundwater in excess of SCGs. As determined in the RI, overburden contamination is limited laterally near the potential point sources and vertically to the fill layer and the fill and silty clay interface due to the presence of clay and silt layers (from approximately 40 to 70 ft bgs) beneath the fill. These less permeable clay layers coupled with upward vertical hydraulic gradients over portions of the site inhibit downward vertical migration of contaminants. Overburden groundwater flow is generally to the south-southeast. Groundwater flow in the bedrock is to the east-southeast. Vertical hydraulic gradients are upward from the bedrock to the overburden and overburden groundwater is effectively contained by the presence of native clay material at the top of bedrock.

Groundwater onsite, in the vicinity of the site, and downgradient of the site is not utilized for potable purposes. Figure 2-4 presents the location of the public water supply lines. Currently, all residents nearby and downgradient of the site obtain their potable water from municipal sources. Figure 2-4 also provides the locations of groundwater monitoring wells at the site. NYSEG installed two additional bedrock groundwater monitoring wells (BR-06, BR-07) downgradient of the site as part of Adaptive Management in March 2008. Sampling and analysis information and updated groundwater flow data (provided in Appendix A) indicate that offsite downgradient bedrock groundwater is slightly impacted when compared to Class GA standards. The NYSDEC is aware that the bedrock aquifer has intrinsically high chloride and total dissolved solids concentrations that are consistent with Class GSB saline groundwater. BR-06 and BR-07 were decommissioned in accordance with NYSDEC policy in September 2008.

As previously indicated, the onsite bedrock injection well extended to a depth of 326 feet. Potentially impacted bedrock groundwater at this depth is within the Bertie Formation, which, as indicated in Section 1.5.4, could potentially provide well yields of up to 200 gpm or more.

2.2.3 Sediments

Figure 2-1 identifies sample locations where: tar or oil was present in any form; an MGP sheen was present on the water surface when sediments were disturbed; total SVOC concentrations were greater than 4 ppm; or where PCBs were co-located in the drainageways north of Routes 5 and 20. In addition to the immediate area of the sediment sample point, proposed sediment remediation includes areas immediately adjacent to potentially affected areas as discussed below.

Western Drainageway Area

In addition to SED-08 and SED-09 locations, the portion of the drainageway adjacent to western-most extent of the site is included in the proposed sediment remediation area as shown on Figure 2-2. Sediment contamination is assumed to be due to surface runoff from onsite surface soil previously present within the WPEA. Runoff would have affected the western-most drainageway extent only. Where there are two branches of the drainageway, only the branch closest to the site is proposed for remediation as this is the branch that would have received site runoff. Sediments from the length of the drainageway from SED-09 extending to the south where the headwall is present, and within the depression immediately upstream of the headwall are included. For estimating purposes, each of the drainageways is assumed to be approximately 5 feet wide and contain a 1-foot thickness of contaminated sediments.

Former Settling Basin and Eastern Drainageways

The area of the Former Settling Basin in the southeastern portion of the site is included in the proposed sediment remediation area shown on Figure 2-2. In addition, the drainageways immediately upgradient of the Former Settling Basin and downgradient to the headwall, and the feeder drainageway from the EWDA to the Former Settling Basin are also included. For estimating purposes, the drainageways are assumed to be 5 feet wide and contain a 1-foot thickness of contaminated sediments; the Former Settling Basin is assumed to contain a 2-foot thickness of contaminated sediments.

Seneca Lake Sediments

RI analytical data from sediments along the north shore of Seneca Lake show minor PAH and PCB SCG exceedances. These detections cannot be attributed to the site, and in all likelihood reflect multiple mixed sources over a long time period as Seneca Lake represents a massive regional depositional area. The north shore of Seneca Lake, in particular, is subject to extensive sedimentary deposition and re-deposition from wave action. Seneca Lake sediments are therefore not included in the proposed remediation areas.

2.2.4 Oxide Box Material

Three oxide boxes are present in the basement of the Meter Lab (Figure 2-2). Access to these boxes is restricted by the building construction and layout and their removal would be very difficult. Therefore, it is proposed that the contents of the boxes would be removed and disposed offsite, and the boxes would be cleaned and left in place. The boxes are approximately 20 feet wide by 24 feet long by 6 feet deep.

The contents of the oxide boxes are both aqueous and solid, and are considered to be source material. As part of the RI, one waste and one water sample were collected from one of the oxide boxes (Box #3) and analyzed for PAHs, metals, cyanide (amenable, reactive, and total), and reactive sulfide. The total concentration of PAHs detected was 50.89 mg/kg in the waste sample and 20.2 μg/L in the water sample. Metals detected above NYSDEC RSCOs in the waste sample were antimony, arsenic, chromium, mercury, selenium, and zinc. Metals detected above NYS Class GA groundwater standards were beryllium, chromium, copper, manganese, mercury, nickel, and zinc. The total cyanide concentration in the waste sample was 4,660 mg/kg. Neither amenable nor reactive cyanide or reactive sulfide was detected in the waste sample. The total cyanide concentration detected was 0.19 mg/L (below GA standards); amenable cyanide was detected at 0.12 mg/L. Neither reactive cyanide nor reactive sulfide was detected in the water sample.

2.2.5 Subsurface Vault

A subsurface concrete vault was identified during the RI soil boring program at SB-07A as shown on Figure 2-2. It is estimated to be approximately 15 feet by 15 feet square by 10 feet deep and was estimated to contain approximately 5,000 gallons of tar-like material. The contents of the subsurface vault are considered to be source material. It is proposed that the subsurface vault and its contents would be removed.

3.0 IDENTIFICATION AND INITIAL SCREENING OF REMEDIAL TECHNOLOGIES

This section consists of: identifying general response actions to satisfy the RAOs; identifying specific remedial technologies that fall within the general response categories; and screening those technologies with respect to their technical implementability in meeting the objectives for the site. The most promising technologies were retained and carried forward into the development of alternatives for the site as a whole.

3.1 General Response Actions

General response actions are broad categories of remediation capable of satisfying the RAOs for the site. Some response actions may be sufficiently broad to be able to satisfy all RAOs to cleanup levels for the site as a whole. Other response actions must be combined to satisfy RAOs for soil, groundwater, and sediments. Remedial technologies were evaluated according to the general response actions of no action, containment, source removal (excavation), and in-situ treatment for soil. Presumptive remedies of source removal (excavation) were considered for sediments, the subsurface vault, and the contents of the oxide boxes; monitoring for overburden groundwater, and either monitoring, extraction and treatment (source removal), or Adaptive Management for bedrock groundwater. A brief description of the general response actions shown on Table 3-1 follows.

- **No Action** - The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) requires that a no action alternative be evaluated as part of the Feasibility Study process as a baseline alternative. Sampling and analysis of groundwater would be conducted.
- **Adaptive Management for Bedrock Groundwater -** Groundwater sampling and analysis results would be evaluated to assess the need for additional remedial action for bedrock groundwater. A Site Management Plan would be developed as part of Adaptive Management to include deed and groundwater restrictions.
- **Containment -** Containment measures are those remedial actions whose purpose is to contain and/or isolate contaminants onsite. These measures provide protection to

human health and the environment by reducing exposure or migration of contaminants, but they do not treat or remove the contamination.

- **Source Removal -** Excavation of contaminated soil and sediments, source removal of MGP-related materials from the oxide boxes, removal of the subsurface vault and its contents, and groundwater extraction and treatment are remedial actions whose purpose is to remove contaminants from the subsurface. Combined with offsite treatment and/or disposal, excavation provides protection to human health and the environment by reducing exposure or migration of contaminants. The materials removed from the oxide boxes and subsurface vault would be disposed offsite. Treated groundwater would be discharged to the bedrock aquifer.

- **In-situ Soil Treatment** – Treatment measures include technologies whose purpose is to reduce the toxicity, mobility, or volume of contaminants by directly altering, isolating, or destroying those contaminants. Soil that is not excavated may be treated in place (in-situ). Soil treatment could potentially utilize biological, chemical/physical, solidification, or thermal processes.

3.2 Identification and Screening of Remedial Technologies for Soil

This section identifies and provides a screening of remedial technologies for contaminated soil at the site in a two-step approach. In the first step, potentially applicable remedial technologies which meet the remedial action objectives are identified. In the second step, technologies are screened with respect to their relative effectiveness, technical implementability and cost for this site. This evaluation is based on the site characterization, which includes the types and concentrations of contaminants, and geology and hydrogeology of the area. Table 3-1 provides a summary of the remedial technology identification and screening process.

3.2.1 Containment

As determined in the RI, contamination in the overburden soil is limited laterally near several potential point sources and vertically to the fill layer up to the fill/silty clay interface. The silty clay layer is laterally and vertically extensive and is found from approximately 40 to 70 feet bgs. These less permeable clay layers coupled with upward vertical hydraulic gradients over portions of the site inhibit the downward vertical contaminant migration. Vertical barriers as a containment technology are therefore not considered necessary for the site, as native soil is effectively acting as a barrier to offsite contaminant migration from overburden soil to groundwater.

Contamination in the bedrock aquifer is attributed to direct injection into the former bedrock injection well during previous site gas manufacturing operations. Because of the presence of the less permeable layers described in the previous paragraph, the upward hydraulic gradient from bedrock to overburden groundwater, and the fact that the injection well is no longer in use, bedrock groundwater is sufficiently protected from further contributions of site-related contaminants.

Capping is a potential containment technology for the site. A cap covering areas impacted by MGP contaminants, suitable to the end use of the property, eliminates the exposure pathway for direct contact with contaminated surface soil, limits infiltration from precipitation, and reduces contaminant leaching and subsequent migration. Two possible capping options for the site are an asphalt cap and a low permeability (synthetic) cap, both of which would include surface water controls for proper site drainage.

- **Asphalt Cap** – An asphalt cap consisting of properly-designed asphalt pavement could be constructed over areas impacted with MGP contaminants and graded to the existing pavement surface. Such a cap would prevent direct exposure to contaminated soil and limit precipitation infiltration. An asphalt cap may be used in conjunction with other remedial technologies at the site. Figure 3-1 provides a conceptual cap section.
- **Low Permeability Cap -** A low permeability cap (with a synthetic low permeability layer) could be constructed over impacted areas within the EWDA to eliminate potential exposure to contaminated surface soil. The low permeability cap would be more congruent with the area surrounding the EWDA, limit infiltration and reduce the leaching of contaminants from soil. Design of the low permeability cap would be suitable to the end use of the property. Figure 3-1 provides a conceptual cap section.

The benefits of capping the site are:

- Capping would be equally effective for the complete range of contaminants.
- The technology is well proven and can be readily implemented with or without additional remedial measures.
- Given that the areas impacted with MGP contaminants are isolated and discontinuous, this technology could be implemented over all, or portions of, the site.

Factors that limit the applicability and effectiveness of capping are:

- Statutory preference is given for treatment of contaminants.
- Capping would require long-term maintenance.

Effectiveness: Construction of an asphalt or low permeability cap would eliminate direct contact and limit precipitation infiltration to the subsurface. These technologies have been utilized at numerous remediation projects.

Implementability: An asphalt or low permeability cap over areas of contaminated soil would not be difficult to construct. A low permeability cap may have an impact on, and potentially limit the future use of, the EWDA.

Cost: The cost of an asphalt cap would be low; the cost of a low permeability cap would be moderate.

Conclusion: An asphalt cap is retained for consideration for site areas outside the EWDA. A low permeability cap is retained for use in the EWDA.

3.2.2 Excavation and Offsite Disposal/Treatment

Excavating contaminated soil and/or sediments is a proven and reliable technology for contaminant removal. Contaminated soil and/or sediments would be excavated by conventional equipment and transported offsite either to an appropriate treatment facility, or to a permitted disposal facility. Presumptive remedies have been considered for excavated materials at this site as discussed in Sections 3.4 (Presumptive Remedy for Sediments), Section 3.5 (Presumptive Remedy for Source Material in the Oxide Boxes), and Section 3.6 (Presumptive Remedy for the

Subsurface Vault). Excavated soil and source material would be subject to soil characterization and waste characterization testing to identify whether it would meet the requirements for re-use as daily cover or require disposal in an appropriate landfill, or need transportation to a thermal desorption facility.

The benefits of excavation and offsite disposal/treatment are:

- The technology meets NYSDEC's preference for source removal.
- Excavation and offsite disposal/treatment is applicable to the complete range of contaminants at the site.
- The technology is well proven and can be readily implemented.
- The method provides direct verification of contaminated material removal.
- The method results in lower long-term monitoring and maintenance costs as compared with containment and in-situ treatment technologies because the contaminants are removed.

Factors limiting the applicability and effectiveness of excavation and offsite disposal/treatment are:

- Statutory preference is given for treatment of contaminants.
- Prior to offsite disposal, pretreatment may be required to meet disposal requirements.
- Exposure to contaminated soil and organic vapors during excavation may increase health risks to remediation workers, site users, and potentially the community.
- Engineering controls (such as application of BioSolve™ or foam or water) may be required to mitigate vapors or fugitive dust emissions during remediation.
- Dewatering, with subsequent water treatment, may be required when excavating soil located below the water table and/or in drainageways. Drying, or the addition of soil amendments, may be necessary to achieve acceptable soil moisture content levels prior to transportation.
- Transportation of contaminated soil/sediments through populated areas may affect community acceptability of the remediation method.

- The distance from the site to the nearest permitted disposal/treatment facility will affect cost.

Effectiveness: Excavation of contaminated soil and sediments and offsite treatment at a facility would be effective in removing the source of contamination and meeting the remedial action objectives for soil/sediments.

Implementability: This technology is widely used for remediation and would be implementable at the site. Slope stability measures may have to be undertaken to excavate at depth, and dewatering and/or drying may be required for saturated soils and some sediments. Excavation in areas with subsurface utilities will require health and safety precautions.

Cost: The cost of excavating contaminated soil and sediments to an appropriate depth using proper health and safety measures, and treating/disposing the material offsite is considered to be relatively moderate.

Conclusion: Excavation and offsite treatment of contaminated soil and sediments can be an effective and implementable technology. It will be retained.

3.2.3 Excavation and Ex-Situ Treatment

Utilizing this method, contaminated soil is excavated by conventional equipment, treated onsite above ground, and then replaced on the site. Given the ongoing and active use of the property, this technology is not considered appropriate at this site.

3.2.4 In-situ Soil Treatment

In-situ treatment technologies include chemical/physical processes designed to increase the mobilization of contaminants, stabilization/solidification processes that reduce the mobility of the contaminants, or biological and thermal processes designed to destroy the contaminants. These technologies are typically combined with recovery technologies and containment systems and generally take a longer time period than excavation and ex-situ treatment or offsite disposal/treatment.

3.2.4.1 Biological Treatment

Naturally occurring microorganisms in the soil promote the breakdown and detoxification of organic contaminants. In-situ biological treatment such as bioremediation may enhance that process in soil and groundwater. Water enhanced with nutrients, oxygen, and other amendments is delivered to contaminated soil to enhance biological degradation of target contaminants. An infiltration gallery or injection wells can be utilized for the saturated and unsaturated zones.

- **Bioventing** – Oxygen is introduced into subsurface soil by forced air movement to stimulate biodegradation. While this technology has been proven to be effective on BTEX and PAHs, it would create vapor emissions which would be undesirable on the occupied site. This technology is not retained for use at this site.
- **Bioremediation** – Water, supplemented with nutrients, oxygen, and other amendments, is circulated through contaminated soil to enhance biological degradation of organics. An infiltration gallery is utilized for shallow, unsaturated soil, and injection wells are utilized for the saturated zone. Extraction wells help to promote migration pathways and re-circulation of amended water. This technology has been proven to be effective on BTEX and lower molecular weight PAHs.

The benefits of in-situ biological treatment are:

- This method satisfies NYSDEC's preference for treatment.
- The required equipment is available.
- The process does not require dewatering during remediation.
- Residual contamination is less toxic over the long term.

Factors that limit the applicability and effectiveness of in-situ biological treatment are:

- The presence of onsite buildings, piping, and subsurface heterogeneity and anisotropy may impede the subsurface flow of fluids and reduce the effectiveness of treatment.
- Bench-scale testing, pilot-scale testing and modeling are required to select the appropriate water amendments, design the well field, and establish system flow rates.

- By injecting water into the subsurface, especially given the hydrogeology of this site and underlying low permeability soil, groundwater extraction may be required.
- Biological treatment generally requires a long-term period of operation and maintenance to achieve remedial objectives.

Effectiveness: Bioremediation has been proven to be effective on lower molecular weight PAHs. However, given the volume of soil source material and the discontinuous nature of the soil source areas, implementation of an effective injection system would be difficult. Bioremediation would require a long time period to effectively remediate site soil.

Implementability: Construction of an infiltration gallery or injection wells would not be difficult given site hydrogeology. Delivery of materials should not be difficult given the site lithology.

Cost: The cost is considered to be moderate to high depending on the operation period.

Conclusion: Biological treatment is not retained.

3.2.4.2 Chemical/Physical Treatment

In-situ chemical and physical treatment processes applicable to organics are soil vapor extraction (SVE) and chemical oxidation. The processes generally involve increasing the mobility of contaminants and collecting groundwater and transporting it offsite for treatment.

- **Soil Vapor Extraction -** SVE uses a contaminant's volatility to separate it from the soil. In general, without the addition of heat, SVE is applicable only to VOCs.
- **Chemical Oxidation** – Treatment using chemical oxidation involves the delivery of a chemical oxidant by means of injection wells to contaminated media in the saturated zone to enhance the destruction of target contaminants and convert them to non-toxic compounds. The rate and extent of degradation of organics using chemical oxidation are dictated by the properties of the contaminants and their susceptibility to oxidation, but has been shown to be effective on PAHs.

The benefits of in-situ chemical/physical treatment of soil are:

- This method satisfies NYSDEC's preference for treatment.
- Construction worker and onsite user exposure to contaminated soil is minimized.
- The required equipment is available.
- The process does not require dewatering during remediation.
- Chemical treatment requires a shorter time frame than biological treatment, but treatment times can still be significant.

Factors that limit the applicability and effectiveness of in-situ chemical/physical treatment are:

- This technology is not effective in the vadose zone without the installation of an infiltration gallery.
- Subsurface heterogeneity and anisotropy, especially in the source area, may impede the subsurface flow of fluids.
- Bench-scale testing, pilot-scale testing and modeling are required to select the appropriate delivery system, design the well field, and establish system flow rates.
- By injecting water into the subsurface the potential to promote offsite migration of contaminants is increased.

Effectiveness: Chemical/physical treatment has been proven to be effective on PAHs, but may be affected by the nature of the fill material. Chemical/physical treatment would require a long time period to effectively remediate site soil.

Implementability: Construction of an infiltration gallery or injection wells would not be difficult given site hydrogeology. However, given the discontinuous nature of the soil source areas, implementation of an effective injection system would be difficult.

Cost: The cost is considered to be moderate to high depending on the operation period.

Conclusion: Chemical/physical treatment is not retained for use at this site.

3.2.4.3 Solidification

In-situ solidification (ISS) is the process of mechanical injection of a solidification mixture into the contaminated subsurface soils in order to immobilize and contain the contaminants in a low permeability monolith. The solidification mixture is typically a combination of Portland cement and ground-granulated blast furnace slag, with other additives to improve pumpability, auger lubrication, or cohesive soil shearing evaluated on a site-specific basis. Contaminants are immobilized primarily by incorporating contaminated soil into a low permeability mass, reducing groundwater flow through the soil, and binding the contaminants in a soil-cement matrix. While the overall mass of contaminants is not reduced, the mobility and the dissolution of contaminants to groundwater are largely eliminated.

ISS most commonly consists of a crane-operated auger system which pumps the grout mixture into a large diameter mixing blade that blends the grout with subsurface soil as the blade is turned. A grout batch plant is constructed onsite where the grout is formulated from dry reagents and water and delivered to the auger system. A conceptual schematic of ISS is shown on Figure 3-2. Individual mix columns are overlapped to provide complete coverage and the up and down stroke mixing provides homogenization of contaminated soil to improve the solidification process. Permeabilities of treated soil are typically less than 10^{-6} cm/sec, with the goal of achieving several orders of magnitude reduction in permeability as compared to surrounding soil. Solidified soil strengths are typically between 50 and 250 pounds per square inch (psi) unconfined compressive strength, which is capable of supporting a wide variety of post-remediation development construction, yet remains excavatable and drillable for the purpose of utility installation or support pile installation. Other methods of ISS include pressure injection and mixing using jet grouting, use of excavator blender heads, and use of excavator buckets. The choice of ISS application equipment is determined on a site-specific basis considering the depth of treatment, utilities and/or obstructions, proximity to receptors, and the risk of unknown subsurface obstructions, among others.

The benefits of using in-situ solidification at the site are:

- Exposure to contaminated soil for construction workers and site users is minimized relative to source removal (excavation).
- Contaminants are immobilized in a relatively short time frame.

- The process improves the soil bearing capacity.
- The process does not require dewatering during remediation.

The following factors may limit the applicability and effectiveness of in-situ stabilization/solidification:

- VOCs may be released to the atmosphere during treatment.
- Contaminants are not destroyed.
- A significant increase in the volume of the contaminated material may occur as a result of mixing with solidifying agents.
- Subsurface areas which consist of non-homogeneous and/or large material or subsurface utilities are not amenable to augering.
- Creation of a monolith in the subsurface may severely limit access to subsurface utilities, which may need to be permanently rerouted.
- Overhead utilities and existing buildings may preclude or limit the use of this technology in certain site areas.
- The method typically requires institutional controls (e.g., deed restrictions) and long-term monitoring to assess effectiveness.

Effectiveness: This technology would be effective in reducing source and exposure pathways and the mobility of all site-related contaminants in soil. The process improves the soil bearing capacity. Long-term monitoring is required to evaluate the effectiveness. This technology has been applied to sites nationwide. Bench-scale testing is necessary to develop a site-specific mix design.

Implementability: Dewatering and/or groundwater control would not be required. An increase in the volume of the mixture may occur requiring appropriate site grading and potentially some offsite disposal of swell material. VOCs present in the subsurface may be released to the atmosphere during treatment; however, this can be managed with an air monitoring program and engineering controls. Implementation of this technology would require the removal of any remaining subsurface abandoned MGP infrastructure within the remediation area, and existing active utilities would require relocation or alternate solidification application methods in close proximity. Remediation adjacent to existing buildings would be difficult with standard augering methods, but could be accomplished with directional drill jet grouting.

Cost: The cost is considered to be moderate depending on the operation period and the amount of clean soil which is treated incidentally if they overlie contaminated soil. Directional drill jet grouting may present a higher cost than standard ISS through augering.

Conclusion: Solidification using standard augering techniques is retained for use in the EWDA. It is anticipated that source removal in the WPEA and FMSA would be more cost-effective in areas adjacent to existing buildings with potentially active utilities. Therefore, solidification is not retained for use in the WPEA or FMSA.

3.2.4.4 Thermal Treatment

In-situ thermal treatment methods employ heat to increase the mobilization of contaminants via volatilization and viscosity reduction. Available methods include heating by the addition of steam and/or hot water, electrical resistance, and radio frequency.

- **Steam Injection and Vacuum Extraction** – Steam (or hot water) is injected into the subsurface, reducing the viscosity of the contaminants and mobilizing them. Groundwater is extracted through a series of wells along the downgradient edges of the site. Vapors are collected by applying a vacuum to the extraction wells.
- **Electrical Resistance Heating** - Electrical resistance heating employs an electrical current to heat contaminated soil. The method is typically used on less permeable soils so that trapped contaminants are vaporized and available for vacuum extraction. The technology is implemented by placing electrodes in the ground and applying sufficient voltage to produce an electric current. Heating occurs when electric current flows through the soil. Moisture in the soil is the main conduction path for the electricity.
- **Radiofrequency Heating** - Radiofrequency heating is accomplished by use of electromagnetic energy in the radiofrequency band. Energy is introduced into the soil by electrodes inserted into drilled holes. The mechanism of heat generation is similar to that of a microwave oven. A modified radio transmitter serves as the

power source, the operational frequency of which is determined from an evaluation of the dielectric properties of the soil and the extent of contamination.

- **In-situ Thermal Desorption** uses subsurface heating elements installed in a manner similar to wells to heat contaminated soil by thermal conduction. The heat induces several remedial processes that, depending on the level of heating, soil and groundwater conditions, and the nature of the wastes, can partially or fully remediate wastes. Among other processes, it can break down or volatilize organic compounds, and reduce the viscosity of the remaining product (while heated) to allow it to be more easily captured. Vacuum extraction wells are installed within the heating wells to collect any steam or contaminant vapors generated during heating. For optimal effectiveness, groundwater inflow should be minimized within the treatment area.

The benefits of using in-situ thermal treatment processes are:

- This method satisfies NYSDEC's preference for treatment.
- The required equipment is available.
- Thermal treatment requires a shorter time frame than biological or chemical treatment.
- This process may not require dewatering during remediation.

The following factors may limit the applicability and effectiveness of in-situ thermal treatment:

- Given the active use of the site, remedial activities may interfere with site use.
- In-situ thermal treatment processes have limited effectiveness on SVOCs unless high temperatures are generated. Increased energy and cost are required to create such high heat conditions, especially in the saturated zone.
- In order to be protective of human health and the environment, vaporized contaminants may have to be collected through a vapor extraction system to reduce air emissions during remediation.

- Debris or large buried objects, such as subsurface utilities and piping may cause operating difficulties.

Effectiveness: Under favorable conditions, in-situ thermal treatment technologies can remediate MGP sites to below the typical clean-up criteria. The presence of groundwater may reduce temperatures in the subsurface and limit the effectiveness of the technology. Vapor collection may be required once VOCs and PAHs are heated.

Implementability: The technology is implementable at the site assuming that adequate power sources are available. In order to increase the effectiveness of thermal treatment below the water table, groundwater containment may have to be included to reduce heat loss within the treatment zone. Off-gasses may have to be collected given the active use of the site.

Cost: The cost is estimated to be high due to power requirements.

Conclusion: In-situ thermal treatment is not retained.

3.3 Identification of Presumptive Remedies for Groundwater

This section identifies the presumptive remedies for groundwater at the site.

3.3.1 Monitored Natural Attenuation

Monitored natural attenuation (MNA) is a technology that combines natural processes to achieve remedial action objectives with a comprehensive monitoring program. According to USEPA guidance (USEPA, 1999), the most important considerations regarding the suitability of MNA as a groundwater remedy include: the stability of the groundwater contaminant plume and its potential for migration; whether the contaminants are likely to be effectively addressed by natural attenuation processes; and the potential for unacceptable risks to human health or environmental resources by the contamination.

At this site, contaminants present at low levels in the overburden are effectively contained due to the naturally-occurring soil and hydrogeologic conditions in the site vicinity. Laterally and vertically, extensive clay deposits of low permeability lie beneath the dissolved phase groundwater plume within the overburden and these deposits are expected to inhibit vertical migration to the bedrock aquifer. The lateral extent of the groundwater plume in the overburden does not extend beyond the property limits. In addition, extensive glacial till deposits lie above the bedrock and vertical hydraulic gradients are upward to the overburden.

Natural attenuation processes which would be expected to occur include physical processes such as hydrodynamic dispersion and dilution by infiltration, and microbial degradation, which transforms the contaminants into typically less toxic daughter products and, ultimately, to carbon dioxide and water. Given sufficient time, a plume undergoing natural attenuation will stabilize after reaching a size where all of the mass delivered by the source is either diluted to very low concentrations or destroyed. Further, if the source is removed or isolated from the aquifer through remediation, natural attenuation will cause the remaining plume to collapse with time, as the contaminant mass residing within the plume is diluted and destroyed, assuming no new mass is introduced. If the source of contamination remains in place, natural attenuation will limit plume migration.

Groundwater onsite and near the site is not utilized for potable purposes. Figure 2-4 presents the location of the public water supply lines in the vicinity and downgradient of the site. Currently, potable water is supplied by municipal sources to all residents in and downgradient of the site vicinity.

MNA is therefore considered suitable as a presumptive remedy for overburden groundwater at the site. MNA consists of periodic sampling of existing monitoring wells and analysis for VOCs, SVOCs and indicator parameters, such as dissolved oxygen, oxidation-reduction potential, conductivity, temperature and pH.

Effectiveness: MNA may indicate stabilization of contaminant levels in groundwater, or, if combined with source control measures, may indicate a reduction of contaminant levels.

Implementability: Sampling and analysis for contaminants and indicator parameters is easy to implement.

Cost: The annual cost for the sampling, analysis, and reporting would be relatively low. However, considering the time required to assess the effectiveness of this measure (possibly on the order of a decade or more), the present worth cost would be moderate.

Conclusion: MNA is considered as a presumptive remedy for overburden groundwater at this site.

3.3.2 Adaptive Management

All downgradient residents are supplied by municipal water. Water supply lines are shown on Figure 2-4. Based upon the additional sampling and analysis information obtained in March 2008, and updated groundwater flow data from five existing and two new bedrock monitoring wells (subsequently decommissioned in September 2008), it has been determined that offsite downgradient bedrock groundwater is slightly impacted when compared to Class GA standards. The NYSDEC is aware that the bedrock aquifer has intrinsically high chloride and total dissolved solids concentrations that are consistent with Class GSB saline groundwater. Adaptive Management could include additional monitoring and an evaluation of the need for remedial actions, and/or a petition to the NYSDEC to reclassify the aquifer to Class GSB. Adaptive Management will include at a minimum, a Site Management Plan that will identify deed restrictions and any groundwater use restrictions on groundwater as a source of potable water and require groundwater monitoring at regular intervals.

3.3.3 Collection and Onsite Treatment of Bedrock Groundwater

Bedrock groundwater could be collected within bedrock downgradient of the site between the site and the 449.5-foot groundwater elevation contour in the vicinity of BR-05 (Figure 2-4). Bedrock collection would be through a series of extraction wells within the Bertie formation, a depth of approximately 300 feet. The anticipated extraction rate within this zone is on the order of 1,000 gpm (5 extraction wells yielding up to 200 gpm each). Collected groundwater would be treated onsite in a groundwater treatment facility designed for site-specific contaminant concentrations (Figure 3-3). Discharge of treated groundwater is proposed to the bedrock aquifer considering the NYSDEC is aware that the bedrock aquifer has intrinsically high chloride and total dissolved solids concentrations that are consistent with Class GSB saline groundwater as defined in 6 NYCRR Part 700-705, Water Quality Regulations for Surface Water and Groundwater, and NYSDEC TOGS 1.1.1 (Specifically Part 701.17).

Effectiveness: Collection and treatment of bedrock groundwater would be an effective method of removing contaminants from the bedrock aquifer within the identified zone.

Implementability: Installation of extraction wells and construction of a treatment facility would be implementable at the site. Associated force mains from the wells to the onsite treatment facility would extend through offsite properties and would require access agreements.

Cost: The annual cost for operation of a treatment facility at the anticipated flow rate would be high. Continued operation, maintenance, and monitoring of the aquifer and the treatment facility would extend over decades, resulting in a high present worth cost.

Conclusion: Groundwater extraction from the bedrock aquifer with subsequent onsite treatment is considered as a presumptive remedy for bedrock groundwater at this site.

3.4 Identification of Presumptive Remedy for Sediments

The presumptive remedy for sediments from the Former Settling Basin is excavation and pretreatment by solidification prior to offsite disposal in an appropriate landfill. The presumptive remedy for sediments from the drainageways is excavation and either re-use as daily cover or offsite disposal in an appropriate landfill. A discussion of excavation and offsite disposal/treatment is provided in Section 3.2.2.

3.5 Identification of Presumptive Remedy for Source Material in Oxide Boxes

Three oxide boxes are present onsite in the basement of the Meter Lab. The presumptive remedy for source material in the oxide boxes is removal of the material, pretreatment by solidification, and offsite disposal of solidified material in an appropriate landfill. This is the preferred remedial technology for purifier wastes. The boxes themselves would be properly cleaned and left in place due to access limitations.

3.6 Identification of Presumptive Remedy for the Subsurface Vault

Analytical testing of the vault contents may be performed following removal to determine if it may be suitable for recycling or, if required, offsite thermal treatment. However, until results are available, the presumptive remedy for source material in the subsurface vault is removal and offsite thermal treatment. The vault itself will be removed and disposed offsite.

3.7 Summary of Technologies Surviving Screening

Technologies retained for use in the development of alternatives are:

- Monitored natural attenuation.
- Adaptive Management for bedrock groundwater.
- Collection and onsite treatment of bedrock groundwater.
- Asphalt cap.
- Low permeability cap in EWDA.
- Soil excavation and offsite treatment/disposal.
- In-situ solidification in EWDA.
- Sediment excavation and offsite treatment/disposal.
- Source material removal from oxide boxes.
- Removal of the subsurface vault and contents.

4.0 DEVELOPMENT OF ALTERNATIVES

4.1 Development of Alternatives

This section combines the remedial technologies considered feasible for each media (soil, groundwater, sediments) into a list of remedial alternatives for the site as a whole. Remedial alternatives developed for the site, which range from the No Action alternative to restoration of the site to pre-disposal conditions, are described below:

- **Alternative 1 - No Action**
- **Alternative 2 - Capping**
- **Alternative 3 - Source Removal**
- **Alternative 4A - In-situ Solidification in the EWDA**, **Asphalt Cap** for Areas Outside the EWDA
- **Alternative 4B - In-situ Solidification in the EWDA**, **Source Removal** for Areas Outside the EWDA
- **Alternative 5 – Capping in the EWDA, Source Removal** for Areas Outside the EWDA
- **Alternative 6 – Source and Waste Removal, Bedrock Groundwater Collection and Treatment.**

Alternatives 2, 3, 4A, 4B and 5 differ in their approach to remediating soil. They all include the following common elements: source removal of material from the subsurface vault and the oxide boxes, removal of the subsurface vault, excavation of sediments, MNA for overburden groundwater, and Adaptive Management for bedrock groundwater. Alternative 6, which would restore the site to pre-disposal conditions, includes the common elements as well as source and waste removal on a greater scale than Alternative 3. Alternative 6 also includes bedrock groundwater collection and treatment.

4.1.1 Alternative 1 – No Action

Alternative 1 consists of MNA and Adaptive Management, which includes periodic sampling and analysis for VOCs, SVOCs and indicator parameters in selected overburden and bedrock monitoring wells on and downgradient of the site. MNA pertains to overburden monitoring wells; Adaptive Management pertains to bedrock monitoring wells. The list of parameters and monitoring wells may be modified following data review of monitoring results.

Size and Configuration

- Figure 4-1 identifies the monitoring wells for MNA and Adaptive Management.
- A Site Management Plan would be developed as part of Adaptive Management to include deed and groundwater restrictions.
- Annual sampling and analysis for VOCs and SVOCs, as well as dissolved oxygen, oxidation-reduction potential, pH, temperature and conductivity would be performed in monitoring wells.
- An annual report and Five-Year Review would evaluate operation, maintenance and monitoring (OM&M) activities and recommend any changes necessary to the OM&M program.

Time for Remediation

- For the purpose of this report, a 30-year period is assumed for monitoring.

Spatial Requirements

- There are no spatial requirements.

Options for Disposal

- No significant offsite disposal will be required for this alternative.

Permit Requirements

- No permits will be required for this alternative.

Limitations

- The time frame to continue monitoring is unknown at this time.

Ecological Impacts

- This alternative is not anticipated to have any significant impacts on wildlife resources.

4.1.2 Alternative 2 – Capping

Alternative 2 includes the following common elements:

- Source removal of the subsurface vault, and material from the subsurface vault and the oxide boxes,
- Excavation of sediments in the eastern and western drainageways and the Former Settling Basin;
- MNA for overburden groundwater and Adaptive Management for bedrock groundwater. MNA and Adaptive Management include periodic sampling and analysis for VOCs, SVOCs and indicator parameters in selected overburden and bedrock monitoring wells on and downgradient of the site. The list of parameters and monitoring wells may be modified following data review of monitoring results.

In addition to the common elements, Alternative 2 consists of capping the identified soil source material areas outside the EWDA with an asphalt cap, and capping the EWDA with a low permeability synthetic cap.

Size and Configuration

- Figure 4-2 identifies the areal extents of the asphalt and low permeability caps and sediment excavation, the locations of the oxide boxes and subsurface vault, and the locations of overburden monitoring wells for MNA and bedrock monitoring wells for Adaptive Management.
- A Site Management Plan would be developed as part of Adaptive Management to include deed and groundwater restrictions.
- Excavated material including asphalt, concrete, and soil would be transported offsite for treatment/disposal. Tar from the vault and purifier wastes from the oxide boxes would be disposed offsite separately.

- An asphalt cap would be constructed over proposed remediation areas where an existing cap either does not exist or is determined to be insufficient (e.g., in poor condition) to meet the RAOs (assumed to be Areas A and B only). The newly constructed asphalt cap would consist of 12 inches of stone overlain by 4 inches of binder and 2 inches of topping as shown on Figure 3-1. Remediated areas would be properly graded with the surrounding area to prevent ponding. Because Area A is currently covered with stone, a low permeability cap consisting of a 40-mil HDPE, geocomposite drainage layer and 12 inches of stone would be constructed in Area A as opposed to an asphalt cap.
- The low permeability cap in the EWDA would consist of compacted soil overlain by 6 inches of sand, a 40-mil HDPE, geocomposite drainage layer, 12 inches of clean soil, and 4 inches of topsoil as shown on Figure 3-1.
- Sediment remediation would include:
  1. Clearing and grubbing of the drainageways and Former Settling Basin area identified on Figure 4-2.
  2. Sediment excavation in the areas identified.
  3. It is assumed that excavation of sediments in the drainageways would encompass a 5-foot width and 1-foot depth along the proposed remediation length.
  4. It is assumed that excavation of sediments in the Former Settling Basin would encompass a 2-foot thickness over the areal extent of the Basin.
  5. Following sediment removal, excavated areas within the drainageways will be backfilled with clean soil, compacted and seeded.
  6. Following sediment removal in the Former Settling Basin, the area will be backfilled and compacted with soil suitable for vegetation similar to native vegetation present in the adjacent areas. A drainageway would be created within the Basin area to connect the existing drainageways.
- Annual sampling and analysis for VOCs and SVOCs as well as dissolved oxygen, oxidation-reduction potential, pH, temperature and conductivity would be performed in monitoring wells.

- Adaptive Management would be implemented as discussed in Section 3.3.2.
- An annual report and Five-Year Review would evaluate OM&M activities and recommend any necessary changes to the remediation and/or OM&M program.

Time for Remediation

- For the purpose of this report, a 30-year period is assumed for MNA.
- Remediation would require less than 6 months.

Spatial Requirements

- Onsite space would be needed for the equipment required for construction of the caps and excavation activities.
- Onsite and offsite space would be required for sediment remediation equipment.

Options for Disposal

- Presumptive remedies have been considered for offsite treatment/disposal of excavated materials at this site. Namely, material removed from the subsurface vault would be recycled or treated at a thermal facility. Material removed from the oxide boxes and the Former Settling Basin would be stabilized onsite prior to offsite disposal at an appropriate landfill. Excavated materials such as asphalt and remnant MGP structures would be disposed at an appropriate landfill. Excavated soil and drainageway sediments would be subject to waste characterization testing and either transported offsite to a thermal desorption facility or an appropriate landfill, potentially for use as daily cover.

Permit Requirements

- No permits will be required for this alternative.

Limitations

- The time frame to continue monitoring is unknown at this time.

- Soil may have to be re-consolidated within the EWDA to avoid cap construction in wet areas.

Ecological Impacts

- This alternative may have a short-term negative impact on wildlife resources near the proposed sediment remediation areas; however, remediation would be beneficial over the long-term.
- This alternative may have a short-term negative impact on wildlife resources near the EWDA; however, remediation would be beneficial over the long-term.

4.1.3 Alternative 3 – Source Removal

In addition to the common elements discussed in Section 4.1.2, Alternative 3 consists of excavation and removal of identified soil source material onsite and within the EWDA.

Size and Configuration

- Figure 4-3 identifies the areal extent of soil and sediment excavation, the locations of the oxide boxes and subsurface vault, and the locations of overburden monitoring wells for MNA and bedrock monitoring wells for Adaptive Management.
- The size and configuration of the common elements is presented in Section 4.1.2.
- Excavation of the identified soil source material areas would be to the depths identified on Figure 2-2. Estimated remediation volumes are presented on Figure 2-2. Excavated material, including asphalt, remnant MGP structures within proposed remediation areas, and soil would be transported offsite for treatment/disposal. Excavated areas would be backfilled and compacted to existing grade.

Time for Remediation

- For the purpose of this report, a 30-year period is assumed for MNA.
- Remediation would require less than 6 months.

Spatial Requirements

- Onsite space would be needed for the equipment required for excavation activities.

Options for Disposal

- Disposal options for the common elements was presented in Section 4.1.2. Excavated soil would be subject to waste characterization testing and either transported offsite to a thermal desorption facility or an appropriate landfill.

Permit Requirements

- No permits will be required for this alternative.

Limitations

- Impacts during remediation to active site users (NYSEG personnel and customers) must be considered in the development of remediation schedules and health and safety plans.

Ecological Impacts

- This alternative may have a short-term negative impact on wildlife resources in the vicinity of the EWDA; however remediation would be beneficial over the long-term.

4.1.4 Alternative 4A – In-situ Solidification in the EWDA, Asphalt Cap for Areas Outside the EWDA

In addition to the common elements presented in Section 4.1.2, Alternative 4A consists of ISS of identified soil source material areas within the EWDA and asphalt capping of identified areas outside the EWDA.

Size and Configuration

- Figure 4-4 identifies the areal extent of ISS, asphalt cap, and sediment excavation, the locations of the oxide boxes and subsurface vault, and the locations of overburden monitoring wells for MNA and bedrock monitoring wells for Adaptive Management.

- The size and configuration of the common elements is presented in Section 4.1.2.
- An asphalt cap would be constructed over proposed remediation areas where an existing cap either does not exist or is determined to be insufficient (e.g., in poor condition) to meet the RAOs (assumed to be Areas A and B only). The newly constructed asphalt cap would consist of 12 inches of stone overlain by 4 inches of binder and 2 inches of topping as shown on Figure 3-1. Remediated areas would be properly graded with the surrounding area to prevent ponding. Because Area A is currently covered with stone, a low permeability cap consisting of a 40-mil HDPE, geocomposite drainage layer and 12 inches of stone would be constructed in Area A as opposed to an asphalt cap.
- In-situ solidification would be conducted in the EWDA from the ground surface to the maximum depth of contamination meeting the definition of source material, as determined by analytical sample results, by mixing soil with a combination of cement and blast furnace slag (to add fines to the subsurface). Jet grouting methods or solidification may be required to remediate beneath non-removable structures and/or utility lines.
- Bench-scale testing would be performed to determine an appropriate ISS mixture to reduce the leachability of contaminants from site soil.

Time for Remediation

- For the purpose of this report, a 30-year period is assumed for MNA.
- Remediation would require less than 6 months.

Spatial Requirements

- Onsite space would be required for the equipment required for ISS, capping and excavation activities.

Options for Disposal

- Disposal options for the common elements were presented in Section 4.1.2.

- Offsite disposal may be required for solidified material due to the soil volume increase anticipated during ISS if a beneficial onsite use (i.e., backfill) is not identified.

Permit Requirements

- No permits will be required for this alternative.

Limitations

- Impacts during remediation to active site users (NYSEG personnel and customers) must be considered in the development of remediation schedules and health and safety plans.
- Remnant MGP structures would have to be removed prior to implementing ISS.
- ISS creates an increase in the soil volume and offsite disposal may be required if a beneficial onsite use (i.e., backfill) is not identified.

Ecological Impacts

- This alternative may have a short-term negative impact on wildlife resources near the EWDA; however, remediation would be beneficial over the long-term.

4.1.5 Alternative 4B – In-situ Solidification in the EWDA, Source Removal for Areas Outside the EWDA

In addition to the common elements presented in Section 4.1.2, Alternative 4B consists of ISS of identified soil source material areas in the EWDA and source removal of identified areas outside of the EWDA.

Size and Configuration

- Figure 4-5 identifies the areal extent of ISS and soil source removal areas outside the EWDA, and sediment excavation areas, the locations of the oxide boxes and subsurface vault, and the locations of overburden monitoring wells for MNA and bedrock monitoring wells for Adaptive Management.

- The size and configuration of the common elements is presented in Section 4.1.2.
- In-situ solidification would be conducted in the EWDA from the ground surface to the maximum depth of contamination that meets the definition of source material, as determined by analytical sampling results, by mixing soil with a combination of cement and blast furnace slag (to add fines to the subsurface). Jet grouting methods of solidification may be required to remediate beneath non-removable structures and/or utility lines.
- Bench-scale testing would be performed to determine an appropriate ISS mixture to reduce the leachability of contaminants from site soils.

Time for Remediation

- For the purpose of this report, a 30-year period is assumed for MNA.
- Remediation would require less than 6 months.

Spatial Requirements

- Onsite space would be required for the equipment required for ISS and excavation activities.

Options for Disposal

- Disposal options for the common elements were presented in Section 4.1.2.
- Offsite disposal may be required for solidified material due to the soil volume increase anticipated during ISS if a beneficial onsite use (i.e., backfill) is not identified.

Permit Requirements

- No permits will be required for this alternative.

Limitations

- Impacts during remediation to active site users (NYSEG personnel and customers) must be considered in the development of remediation schedules and health and safety plans.
- Remnant MGP structures would have to be removed prior to implementing ISS.
- ISS creates an increase in the soil volume and offsite disposal may be required if a beneficial onsite use (i.e., backfill) is not identified.

Ecological Impacts

- This alternative may have a short-term negative impact on wildlife resources near the EWDA; however, remediation would be beneficial over the long-term.

4.1.6 Alternative 5 – Capping in the EWDA, Source Removal for Areas Outside the EWDA

In addition to the common elements presented in Section 4.1.2, Alternative 5 consists of excavating the identified soil source material in areas within the FMSA and WPEA and capping identified areas in the EWDA with a low permeability synthetic cap.

Size and Configuration

- Figure 4-6 identifies the areal extent of the soil and sediment excavation areas, low permeability cap, the locations of the oxide boxes and subsurface vault, and the locations of overburden monitoring wells for MNA and bedrock monitoring wells for Adaptive Management.
- The size and configuration of the common elements is presented in Section 4.1.2.
- The low permeability cap in the EWDA would consist of compacted soil overlain by 6 inches of sand, a 40-mil HDPE, geocomposite drainage layer, 12 inches of clean soil, and 4 inches of topsoil as shown on Figure 3-1.

Time for Remediation

- For the purpose of this report, a 30-year period is assumed for MNA.
- Remediation would require less than 6 months.

Spatial Requirements

- Onsite space would be needed for the equipment required for construction of the cap and excavation activities.

Options for Disposal

- Disposal options for the common elements were presented in Section 4.1.2.

Permit Requirements

- No permits will be required for this alternative.

Limitations

- Impacts during remediation to active site users (NYSEG personnel and customers) must be considered in the development of remediation schedules and health and safety plans.
- Soil may have to be re-consolidated within the EWDA to avoid cap construction in wet areas.

Ecological Impacts

- This alternative may have a short-term negative impact on wildlife resources near the EWDA; however, remediation would be beneficial over the long-term.

4.1.7 Alternative 6 – Source and Waste Removal, Bedrock Groundwater Collection and Treatment

In addition to the common elements discussed in Section 4.1.2, Alternative 6 consists of excavation and removal of both soil exceeding chemical-specific SCG values and historical disposal areas onsite and within the EWDA, and bedrock groundwater collection with onsite treatment and discharge to the bedrock aquifer.

Size and Configuration

- Figure 4-7 identifies the areal extent of soil, waste, and sediment excavation, the locations of the oxide boxes and subsurface vault, and the locations of overburden monitoring wells for MNA and bedrock monitoring wells.
- The size and configuration of the common elements is presented in Section 4.1.2.
- Areas for soil excavation exceeding chemical-specific SCGs and historic waste disposal areas are identified on Figure 4-7. A total estimated remediation to pre-disposal conditions volume of 35,000 cy is presented on Figure 2-3. Excavated material, including asphalt, remnant MGP structures within proposed remediation areas, soil and waste would be subject to characterization testing and transported offsite for treatment/disposal. Excavated areas would be backfilled and compacted to existing grade.
- Hydraulic control would maintain an inward hydraulic gradient between the site and the apparent low bedrock groundwater elevation contour near BR-05 (Figure 4-7). Bedrock groundwater would be collected from 5 extraction wells installed within the Bertie formation. Each well is anticipated to extract 200 gpm for a total extraction rate on the order of 1,000 gpm. Collected groundwater would be conveyed across offsite properties to an onsite treatment facility. Treated groundwater would be injected into the bedrock aquifer.

  Due to the high influent flow rate, the groundwater treatment facility is anticipated to operate continuously (24 hours per day, 7 days per week). Based on the contaminants found in previous analyses of the groundwater, and on the degree of removal typically required for those contaminants, the treatment system for the groundwater is expected to consist of the following components (see Figure 3-3 for a conceptual treatment system):

  - An equalization/storage tank to collect the influent groundwater from the collection system, to equalize potentially variable influent flow rates, and to serve as temporary storage during system downtimes. The tank also may include provisions for the periodic removal of solids and sediment that may collect in the tank over time.

- A chemical feed and/or pH adjust system to aid in the filtration of solids in the groundwater, prevent fouling and scaling of the air stripper, and to adjust the pH of the water as required to meet the discharge criteria. Several separate feed systems may be required depending upon which of the adjustments / additives are needed.
- A filtration system (e.g., bag filters or sand beds) for the removal of solids prior to the air stripper.
- An air stripper for the removal of volatile organic contaminants. Due to the high groundwater flow rate and to ensure that the units achieve the VOC removal efficiency required to meet the discharge criteria, multiple units operating in parallel will likely be required
- An aqueous phase carbon adsorption system for the removal of contaminants would be used for contaminants not readily amenable to removal via air stripping. These would include the ketone compounds and the SVOC contaminants.
- An air treatment system for the removal of vapor phase contaminants from the air stripper off gas. Air treatment would consist of either vapor phase carbon adsorption or thermal treatment such as a catalytic oxidizer.
- Various storage tanks, pumps, controls, and other appurtenances as required for the efficient operation of the treatment system.

Time for Remediation

- For the purpose of this report, a 30-year period is assumed for MNA and bedrock groundwater collection and treatment.
- Remediation construction would require more than one year.

Spatial Requirements

- Significant onsite space would be needed for the equipment required for excavation activities and the treatment facility.
- Extraction wells and force mains would be constructed in offsite properties.

Options for Disposal

- Disposal options for the common elements were presented in Section 4.1.2. Excavated soil and waste would be subject to waste characterization testing and either transported offsite to a thermal desorption facility or an appropriate landfill.
- Treated groundwater would be discharged to the bedrock aquifer, which is currently identified as Class GA. The NYSDEC is aware that the bedrock aquifer has intrinsically high chloride and total dissolved solids concentrations that are consistent with Class GSB saline groundwater as defined in 6 NYCRR Part 700-705, Water Quality Regulations for Surface Water and Groundwater, and NYSDEC TOGS 1.1.1 (Specifically Part 701.17).

Permit Requirements

- A discharge permit to the bedrock aquifer would be required for this alternative.
- Access agreements will be required for long-term groundwater extraction and conveyance to the treatment facility from offsite areas, and deed notifications documenting offsite contamination may be necessary.

Limitations

- Significant impacts during remediation to active site users (NYSEG personnel and customers) must be considered in the development of remediation schedules and health and safety plans.
- Spatial requirements for construction activities identified above will have impacts on nearby property owners.

Ecological Impacts

- This alternative may have a short-term negative impact on wildlife resources during excavation activities and construction of the offsite wells and force main, and in the vicinity of the EWDA; however remediation would be beneficial over the long-term.

5.0 DETAILED ANALYSIS OF ALTERNATIVES

5.1 Description of Evaluation Criteria

Each of the alternatives is subjected to a detailed evaluation with respect to the criteria outlined in 6 NYCRR Part 375 and described below. This evaluation aids in the selection process for remedial actions in New York State.

Overall Protection of Public Health and the Environment

This criterion is an assessment of whether the alternative meets requirements that are protective of human health and the environment. The overall assessment is based on a composite of factors assessed under other evaluation criteria, particularly long-term effectiveness and performance, short-term effectiveness, and compliance with SCGs. This evaluation focuses on how a specific alternative achieves protection over time and how site risks are reduced. The analysis includes how the source of contamination is to be eliminated, reduced, or controlled.

Compliance with Standards, Criteria, and Guidance (SCGs)

This criterion determines whether or not each alternative complies with applicable environmental laws, and standards, criteria, and guidance (SCGs) pertaining to the chemicals detected in contaminated media, the location of the site, and relating to proposed technologies. A discussion is included on any necessary waivers.

Long-Term Effectiveness and Permanence

This criterion addresses the performance of a remedial action in terms of its permanence and the quantity/nature of waste or residuals remaining at the site after implementation. An evaluation is made on the extent and effectiveness of controls required to manage residuals remaining at the site and the operation and maintenance systems necessary for the remedy to remain effective. The factors that are evaluated include permanence of the remedial alternative, magnitude of the remaining risk, adequacy of controls used to manage residual contamination, and the reliability of controls used to manage residual contamination.

Reduction of Toxicity, Mobility or Volume with Treatment

This criterion assesses the remedial alternative's use of technologies that permanently and significantly reduce toxicity, mobility, or volume (TMV) of the contamination as their principal element. Preference is given to remedies that permanently and significantly reduce the toxicity, mobility, or volume of the wastes at the site.

Short-Term Effectiveness

This criterion assesses the effects of the alternative during the construction and implementation phase with respect to the effect on human health and the environment. The factors that are assessed include protection of the workers and the community during remedial action, environmental impacts that result from the remedial action, and the time required until the remedial action objectives are achieved.

Implementability

This criterion addresses the technical and administrative feasibility of implementing the alternative and the availability of various services and materials required during implementation. The evaluation includes the feasibility of construction and operation, the reliability of the technology, the ease of undertaking additional remedial action, monitoring considerations, activities needed to coordinate with regulatory agencies, availability of adequate equipment, services and materials, offsite treatment, and storage and disposal services.

Cost

Capital costs and operation, maintenance, and monitoring costs are estimated for each alternative and presented on a present worth basis based on a 5% discount rate. Cost estimates for each remedial alternative are presented in Appendix B and summarized on Table 5-1.

Community and State Acceptance

Concerns of the State and the Community will be addressed separately in accordance with the public participation program developed for this site.

5.2 Alternative 1 – No Action

5.2.1 Overall Protection of Public Health and the Environment

Although this alternative poses few short-term risks during monitoring, it does not comply with SCGs, and is not effective in the long term. This alternative would not be protective of human health or the environment.

5.2.2 Compliance with SCGs

Since contamination would remain onsite, this alternative would not meet SCGs for media at the site.

5.2.3 Long-Term Effectiveness and Permanence

Contaminant migration and potential exposure to contaminants would continue due to residual contamination. The potential risks to human health caused by contaminated soil, groundwater, and sediments onsite could be addressed through deed restrictions requiring a Site Management Plan with soil excavation protocols and prohibiting extraction of groundwater for potable purposes. However, considering the important electrical and natural gas infrastructure at the site and the potential that repairs to that infrastructure be made quickly and on an emergency basis, such restrictions would be difficult to enforce at all times. This alternative is not considered effective or permanent in the long term.

5.2.4 Reduction of Toxicity, Mobility and Volume with Treatment

Reduction of the toxicity, mobility, and volume of contaminants would occur slowly through natural attenuation. No treatment is included which would reduce toxicity, mobility or volume.

5.2.5 Short-Term Effectiveness

As there is no construction associated with this alternative, there would be minimal impact to workers or site users. Remedial action objectives would not be met.

5.2.6 Implementability

Monitoring and deed restrictions could be implemented; however, this does not meet the RAOs for the site.

5.2.7 Cost

Estimated capital and operation, maintenance, and monitoring (OM&M) costs for sampling and analysis of monitoring wells included in Alternative 1 are presented on Table 5-1.

5.3 Alternative 2 – Capping

5.3.1 Overall Protection of Public Health and the Environment

This alternative will meet RAOs and SCGs for sediments and source material in the subsurface vault and oxide boxes. It will not meet the SCGs for soil or groundwater. It relies on groundwater restrictions and the asphalt cap onsite and the low permeability cap in the EWDA to control risks posed by residual contamination and to meet RAOs and eliminate source and exposure pathways. Contaminant concentrations in downgradient groundwater will be reduced through natural attenuation processes.

5.3.2 Compliance with SCGs

Since soil contamination will remain onsite with capping, this alternative will not meet SCGs for soil or groundwater at the site. It will meet SCGs for sediments.

5.3.3 Long-term Effectiveness and Permanence

Contaminant migration from soil to groundwater could continue due to residual contamination. Potential risks caused by residual contaminated soil and groundwater will be addressed through deed restrictions requiring a Site Management Plan with soil excavation protocols and prohibiting extraction of groundwater for potable purposes. Sediment excavation and removal of the subsurface vault and the contents of the oxide boxes are considered effective and permanent in the long term. Long-term maintenance of the caps will be necessary.

5.3.4 Reduction of Toxicity, Mobility and Volume with Treatment

Capping will reduce infiltration from precipitation and potentially the mobility of contaminants. Reduction of the toxicity and volume of contaminants would occur slowly through natural attenuation. Pretreatment of Basin sediments and oxide box material will reduce contaminant mobility.

5.3.5 Short-term Effectiveness

Installation of a cap will not negatively impact human health and the environment during construction. It will however, present noise and disruption of daily traffic patterns. Sediment excavation may negatively impact the environment in the short term; however, it will be beneficial to wildlife over the long term. The time required for construction is less than 6 months. Implementation of a Site Management Plan will be necessary to meet RAOs.

5.3.6 Implementability

Construction of an asphalt cap over the remediation areas will not be difficult. Construction of a low permeability cap within the EWDA and sediment excavation will require special consideration in areas that are (intermittently) wet. Soil may have to be re-consolidated to avoid cap construction in wet areas.

5.3.7 Cost

Estimated capital and operation, maintenance, and monitoring (OM&M) costs for Alternative 2 are presented on Table 5-1.

5.4 Alternative 3 – Source Removal

5.4.1 Overall Protection of Public Health and the Environment

This alternative will meet RAOs and SCGs for soil and sediments, and source material in the subsurface vault and oxide boxes. Once the source is removed, contaminant levels in downgradient groundwater will be reduced through natural attenuation processes to SCGs over the long term.

5.4.2 Compliance with SCGs

Soil source material and sediment removal will comply with SCGs for soil and sediments. Once the source is removed, natural attenuation processes will continue to reduce contaminant levels and SCGs will eventually be reached in groundwater over the long term.

5.4.3 Long-term Effectiveness and Permanence

Excavation of source soil material will result in minimal residual contamination. Contaminant levels in downgradient groundwater will be reduced through natural attenuation processes. Sediment excavation and removal of the subsurface vault and the contents of the oxide boxes are considered effective and permanent in the long term.

5.4.4 Reduction of Toxicity, Mobility and Volume with Treatment

Source removal through soil excavation in the FMSA, WPEA and EWDA, sediment excavation, and removal of the subsurface vault and the contents of the oxide boxes will significantly reduce the volume of contaminants present at the site. Offsite disposal/treatment (e.g., thermal desorption) of excavated soil would reduce the mobility of contaminants. Pretreatment of Basin sediments and oxide box material and will reduce contaminant mobility.

5.4.5 Short-term Effectiveness

Alternative 3 includes substantial excavation of soil source material and sediments. Efforts will have to be undertaken during implementation to minimize impacts to human health and the environment with respect to air emissions, odor control, noise, dust suppression, and transportation/traffic in nearby areas. Sediment excavation may negatively impact the environment in the short term; however, it would be beneficial to wildlife over the long term. The time required for construction is less than 6 months. Once construction is complete and the Site Management Plan implemented, including groundwater use restrictions, RAOs for soil, groundwater, and sediments will be met.

5.4.6 Implementability

Excavation and offsite disposal/treatment of substantial quantities of contaminated soil source material and sediments will have to be coordinated with non-construction related site-use activities. Efforts will have to be undertaken during implementation to minimize impacts to human health and the environment with respect to air emissions, odor control, noise, dust suppression, and transportation/traffic in nearby areas. Sediment excavation may require special considerations for areas that are (intermittently) wet, or conducted during dry weather periods.

5.4.7 Cost

Estimated capital and operation, maintenance, and monitoring (OM&M) costs for Alternative 3 are presented on Table 5-1.

5.5 Alternative 4A – In-situ Solidification in the EWDA, Asphalt Cap in Areas Outside the EWDA

5.5.1 Overall Protection of Public Health and the Environment

This alternative will meet RAOs and SCGs for sediments and source material in the subsurface vault and oxide boxes. Contaminants present in soil outside the EWDA will be covered by an asphalt cap and in the EWDA immobilized through ISS to meet RAOs. This alternative will not meet SCGs for contaminated soil but relies on restrictions to control risks posed by contamination to meet RAOs and eliminate source exposure pathways. Once the source is capped in areas outside the EWDA or treated through ISS in the EWDA, contaminant levels in downgradient groundwater will decrease over time by limiting infiltration and through natural attenuation processes.

5.5.2 Compliance with SCGs

Since contaminants will remain below the cap areas and within the EWDA following ISS, this alternative will not meet SCGs for soil. Once the source is covered or treated, natural attenuation processes will continue to reduce contaminant levels and SCGs will eventually be reached in groundwater. It will meet SCGs for sediments.

5.5.3 Long-term Effectiveness and Permanence

Excavation of sediments, capping, and containment of source material in a solidified, low permeability monolith are effective and permanent remedies. Contaminant levels in downgradient groundwater will be reduced through natural attenuation processes. Sediment excavation and removal of the subsurface vault and contents of the oxide boxes are considered effective and permanent in the long term. Long-term management of the cap and solidified area will be required.

5.5.4 Reduction of Toxicity, Mobility and Volume with Treatment

Source removal through soil sediment excavation and removal of the subsurface vault and the contents of the oxide boxes will reduce the volume of contaminants present at the site. Capping will reduce infiltration from precipitation and therefore the mobility of contaminants. Solidification will reduce the mobility of contaminants in the EWDA. Pretreatment of Basin sediments and oxide box material will reduce contaminant mobility.

5.5.5 Short-term Effectiveness

Alternative 4A includes an asphalt cap in areas outside the EWDA, ISS of soil source material in the EWDA and sediment excavation. Measures will be have to be undertaken to minimize impacts to human health and the environment with respect to air emissions, odor control, noise, dust suppression and transportation/traffic in nearby areas. Air emissions during the solidification process will be monitored, and steps undertaken during implementation to minimize impacts to human health and the environment. Sediment excavation may negatively impact the environment in the short term; however, it will be beneficial to wildlife over the long term. The time required for construction and implementation is approximately 6 months; MNA would continue for 30 years. Once construction is complete and the Site Management Plan implemented including groundwater use restrictions, RAOs for soil, groundwater, and sediments will be met.

5.5.6 Implementability

Cap construction and ISS will not be difficult to implement; any MGP remnant structures and shallow obstructions will have to be removed. Bench-scale testing will be performed to determine appropriate ISS mixtures to reduce leachability. Solidification requires confirmatory analytical sampling to assess the effectiveness of the processes. Sediment excavation may require special considerations for areas, which are (intermittently) wet, or conducted during dry weather periods.

5.5.7 Cost

Estimated capital and operation, maintenance, and monitoring (OM&M) costs for Alternative 4A are presented on Table 5-1.

5.6 Alternative 4B – In-situ Solidification in the EWDA, Source Removal in Areas Outside the EWDA

5.6.1 Overall Protection of Public Health and the Environment

This alternative will meet RAOs and SCGs for sediments, for source material in the subsurface vault and oxide boxes, and for soil within the FMSA and WPEA. Contaminants present in soil in the EWDA will be immobilized to meet RAOs. Once the source was treated through solidification, contaminant levels in downgradient groundwater will be reduced through natural attenuation processes.

5.6.2 Compliance with SCGs

Since immobilized contaminants will remain following solidification, this alternative will not meet the SCGs for soil within the EWDA. Once the source is treated, natural attenuation processes will continue to reduce contaminant levels and SCGs will eventually be reached in groundwater. It will meet SCGs for sediments and soil within the FMSA and WPEA.

5.6.3 Long-term Effectiveness and Permanence

Excavation of soil source materials will result in their permanent removal. Excavation of soil and sediments, and containment of source material in the EWDA in a solidified, low permeability monolith is an effective and permanent remedy. Contaminant levels in downgradient groundwater will be reduced through natural attenuation processes. Sediment excavation and removal of the subsurface vault and contents of the oxide boxes are considered effective and permanent in the long term.

5.6.4 Reduction of Toxicity, Mobility and Volume with Treatment

Source removal through soil excavation in the FMSA and WPEA, sediment excavation, and removal of the subsurface vault and the contents of the oxide boxes will significantly reduce the volume of contaminants present at the site. Offsite disposal/treatment (e.g., thermal desorption) of excavated soil would reduce the mobility of contaminants. Solidification will reduce the mobility of contaminants in the EWDA. Pretreatment of Basin sediments and oxide box material will reduce contaminant mobility.

5.6.5 Short-term Effectiveness

Alternative 4B includes ISS of identified soil source material areas within the EWDA, source removal of identified areas outside the EWDA and excavation of sediments. Measures will be have to be undertaken to minimize impacts to human health and the environment with respect to air emissions, odor control, noise, dust suppression, and transportation/traffic in nearby areas. Air emissions during the solidification process will be monitored, and steps undertaken during implementation to minimize impacts to human health and the environment. Sediment excavation may negatively impact the environment in the short term; however, it will be beneficial to wildlife over the long term. The time required for construction and implementation is approximately 6 months; MNA will continue for 30 years. Once construction is complete and the Site Management Plan implemented including groundwater use restrictions, RAOs for soil, groundwater, and sediments will be met.

5.6.6 Implementability

Source removal and ISS will not be difficult to implement; any MGP remnant structures and shallow obstructions will have to be removed and special precautions and measures will have to be implemented during excavation adjacent to buildings. Bench-scale testing will be performed to determine appropriate ISS mixtures to reduce leachability. Solidification requires confirmatory analytical sampling to assess the effectiveness of the processes. Sediment excavation may require special considerations for areas which are (intermittently) wet, or conducted during dry weather periods.

5.6.7 Cost

Estimated capital and operation, maintenance, and monitoring (OM&M) costs for Alternative 4B are presented on Table 5-1.

5.7 Alternative 5 – Capping in the EWDA, Source Removal for Areas Outside the EWDA

5.7.1 Overall Protection of Public Health and the Environment

This alternative will meet RAOs and SCGs for sediments and source material in the subsurface vault and oxide boxes. It will meet SCGs for soil within areas within the FMSA and WPEA. It relies on groundwater restrictions and the low permeability cap in the EWDA to control risks posed by residual contamination and to meet RAOs and eliminate source and exposure pathways. Contaminant concentrations in downgradient groundwater will be reduced through natural attenuation processes.

5.7.2 Compliance with SCGs

Soil SCGs will be met within the FMSA and WPEA. SCGs for sediments will be met. Once the source is covered and/or removed, natural attenuation processes will continue to reduce contaminant levels and SCGs will eventually be reached in groundwater.

5.7.3 Long-term Effectiveness and Permanence

Sediment excavation and removal of the subsurface vault and the contents of the oxide boxes are considered effective and permanent in the long term. Excavation in the FMSA and WPEA will result in minimal residual soil contamination. Contaminant levels in downgradient groundwater will be reduced through natural attenuation processes.

5.7.4 Reduction of Toxicity, Mobility and Volume with Treatment

Source removal through soil excavation in the FMSA and WPEA, sediment excavation, and removal of the subsurface vault and the contents of the oxide boxes will significantly reduce the volume of contaminants present at the site. Offsite disposal/treatment (e.g., thermal desorption) of excavated soil would reduce the mobility of contaminants. Capping will reduce infiltration from precipitation and therefore the mobility of contaminants. Pretreatment of Basin sediments and oxide box material will reduce contaminant mobility.

5.7.5 Short-term Effectiveness

Source removal in areas outside the EWDA and capping in the EWDA will not negatively impact human health and the environment during construction, if measures are undertaken with respect to air emissions, odor control, noise, dust suppression, and transportation/traffic to minimize impacts in nearby areas. Sediment excavation may negatively impact the environment in the short term; however, it will be beneficial to wildlife over the long term. The time required for construction is less than 6 months. Implementation of a Site Management Plan will be necessary to meet RAOs.

5.7.6 Implementability

Construction of a low permeability cap within the EWDA and sediment excavation will require special consideration in areas that are (intermittently) wet, or will be conducted during dry weather periods. Soil may have to be re-consolidated to avoid cap construction in wet areas. Excavation and offsite disposal/treatment of contaminated soil source material and sediments will have to be coordinated with non-construction related site-use activities. Efforts will have to be undertaken during implementation to minimize impacts to human health and the environment with respect to air emissions, odor control, noise, dust suppression, and transportation/traffic in nearby areas.

5.7.7 Cost

Estimated capital and operation, maintenance, and monitoring (OM&M) costs for Alternative 5 are presented on Table 5-1.

5.8 Alternative 6 – Source and Waste Removal, Bedrock Groundwater Collection and Treatment

5.8.1 Overall Protection of Public Health and the Environment

This alternative will meet RAOs and SCGs for soil and sediments, and source material in the subsurface vault and oxide boxes and individual chemical-specific SCGs for soil. Once the soil source and waste material is removed and bedrock groundwater is extracted and treated, contaminant levels in downgradient groundwater will be reduced through treatment and natural processes to SCGs over the long term.

5.8.2 Compliance with SCGs

Soil source and waste material and sediment removal will comply with SCGs for soil and sediments, and individual chemical-specific SCGs for soil. Once the source is removed and bedrock groundwater is extracted and treated, natural processes will continue to reduce contaminant levels and SCGs will eventually be reached in groundwater over the long term.

5.8.3 Long-term Effectiveness and Permanence

Excavation of source soil and waste material will result in minimal residual contamination. Contaminant levels in downgradient groundwater will be reduced through extraction and treatment of bedrock groundwater and through natural processes. Sediment excavation and removal of the subsurface vault and the contents of the oxide boxes are considered effective and permanent in the long term.

5.8.4 Reduction of Toxicity, Mobility and Volume with Treatment

Source removal through soil and waste excavation in the FMSA, WPEA and EWDA, sediment excavation, and removal of the subsurface vault and the contents of the oxide boxes will significantly reduce and nearly eliminate the volume of contaminants present at the site. Offsite disposal/treatment (e.g., thermal desorption) of excavated soil would reduce the mobility of contaminants. Pretreatment of Basin sediments and oxide box material and will reduce contaminant mobility. Bedrock groundwater extraction and treatment will reduce the volume of contaminants in the bedrock aquifer.

5.8.5 Short-term Effectiveness

Alternative 6 includes substantial excavation of soil source and waste material and sediments and offsite installation of extraction wells and force mains. Efforts will have to be undertaken during implementation to minimize impacts to human health and the environment with respect to air emissions, odor control, noise, dust suppression, and transportation/traffic in nearby areas. Sediment excavation may negatively impact the environment in the short term; however, it would be beneficial to wildlife over the long term. The time required for construction may exceed one year. Once construction is complete and the Site Management Plan implemented, including groundwater use restrictions, RAOs for soil, groundwater, and sediments will be met. Over the long-term, groundwater quality will improve following groundwater extraction and treatment.

5.8.6 Implementability

Excavation and offsite disposal/treatment of substantial quantities of contaminated soil source and waste material and sediments will have to be coordinated with non-construction related site-use activities. Efforts will have to be undertaken during implementation to minimize impacts to human health and the environment with respect to air emissions, odor control, noise, dust suppression, and transportation/traffic in nearby areas. Access agreements will be necessary for offsite extraction wells and the force mains to convey extracted water to the onsite treatment facility. Discharge of treated water from the treatment facility to the bedrock aquifer is subject to approval by the NYSDEC. Sediment excavation may require special considerations for areas that are (intermittently) wet, or excavation may be conducted during dry weather periods.

5.8.7 Cost

Estimated capital and operation, maintenance, and monitoring (OM&M) costs for Alternative 6 are presented on Table 5-1.

5.9 Comparative Analysis of Alternatives

5.9.1 Overall Protection of Public Health and the Environment

All alternatives except Alternative 1 will meet RAOs for soil and sediments and source material in the subsurface vault and oxide boxes. SCGs will be met for sediments for all alternatives (except for Alternative 1). SCGs will be met for soil for Alternatives 3 and 6 and within the FMSA and WPEA for Alternatives 4B and 5. Alternative 6 will meet individual chemical-specific SCGs for soil. For all alternatives, except Alternative 1, once the source is covered, removed, or treated through ISS, contaminant levels in downgradient groundwater will be reduced through natural attenuation processes. The Site Management Plan and Adaptive Management for bedrock groundwater will meet RAOs for groundwater for Alternatives 1 through 5; however, Alternative 6, which includes bedrock groundwater extraction and treatment will meet SCGs in a shorter time frame as compared to the remaining alternatives which rely on natural attenuation.

5.9.2 Compliance with SCGs

All alternatives except Alternative 1 will meet sediment SCGs. Alternative 6, which restores the site to pre-disposal conditions, will meet individual soil chemical-specific SCGs onsite and within the EWDA. Alternative 3, which includes source removal, will meet soil SCGs to the next greatest extent followed by Alternatives 4B and 5, which include soil source removal within the FMSA and WPEA. Alternatives 2 and 4A will not meet soil SCGs. Once the source is removed or treated, natural attenuation processes will continue to reduce contaminant levels and SCGs will eventually be reached in groundwater for Alternatives 3, 4A, 4B, 5 and 6 over a shorter time period than for Alternative 2. Alternative 6, which includes bedrock groundwater extraction and treatment will meet SCGs in a shorter time frame as compared to the remaining alternatives which rely on natural attenuation.

5.9.3 Long-term Effectiveness and Permanence

Sediment remediation included in all alternatives except Alternative 1 is equally effective and permanent in the long term. Soil source removal included in Alternative 3 and soil and waste removal in Alternative 6 will be the most effective and permanent followed by Alternatives 5 and 4B. Alternative 4A will be more effective and permanent than Alternative 2. Groundwater extraction and treatment in Alternative 6 is more effective than MNA included in other alternatives.

5.9.4 Reduction of Toxicity, Mobility and Volume with Treatment

The volume of soil contamination will be significantly reduced following excavation of source areas for Alternatives 3, 4B, and 5, and the volume will be eliminated for Alternative 6. The toxicity and volume of groundwater contaminants would be reduced through treatment included for Alternative 6. Offsite disposal/treatment (e.g., thermal desorption) of excavated soil would reduce the mobility of contaminants for Alternatives 3, 4B, 5 and 6. Pretreatment of Basin sediments and oxide box material will reduce contaminant mobility. Alternatives 4A and 4B include treatment through ISS for site soil reducing contaminant mobility in the EWDA. Capping in Alternatives 5 and 4B will reduce infiltration from precipitation and the mobility of contaminants.

5.9.5 Short-term Effectiveness

All alternatives except Alternative 1 may negatively impact the environment and wildlife in the sediment remediation areas over the short term. Alternatives 3, 4A, 4B, 5 and 6 will have the greatest short-term impacts as they include disturbing large quantities of surface and subsurface soil. Alternative 2 will have the least short-term impact. Alternative 2 will require the shortest time to meet RAOs followed by Alternatives 3, 5, 4A and 4B. Alternative 6 would require the longest time for implementation. Alternative 1 does not meet RAOs.

5.9.6 Implementability

Construction activities for all alternatives except Alternative 1 will have to be coordinated with existing site-use activities. Measures will have to be undertaken to reduce odor, noise, vapors, fugitive dust and transportation/traffic in nearby areas. Alternative 1 would be the most implementable followed by Alternative 2. Alternatives 3 and 5 with excavation would be more implementable than Alternatives 4A and 4B which include ISS. Alternative 6 requires access agreements for offsite extraction wells and force mains to convey extracted water to the onsite treatment facility. Discharge of treated water from the treatment facility to the bedrock aquifer is subject to approval by the NYSDEC.

5.9.7 Cost

A review of costs for each alternative indicates that Alternative 6 has the highest capital cost followed in descending order by Alternatives 3, 4B, 5, 4A, 2, and 1. All alternatives have similar OM&M costs except Alternatives 1 and 6. (Alternatives 2 and 5 have marginally higher OM&M costs due to annual cap inspection and repair.) Alternative 6 has the highest OM&M cost.

In ascending order, the lowest total present worth cost is for Alternative 1 followed by Alternatives 2, 4A, 5, 4B, 3 and 6 which has the highest total present worth cost.

6.0 RECOMMENDED REMEDIAL ALTERNATIVE

Alternatives were developed and evaluated for remediation at the Geneva-Border City Former MGP site. The evaluation of alternatives was conducted using remedial action objectives identified for cleanup levels to provide source and exposure pathway eliminations or attain SCGs. Remediation areas and volumes were calculated for the cleanup levels identified for the site.

6.1 Basis for Recommendation

Alternative 1 was rejected because it does not provide protection to human health and the environment, does not satisfy RAOs for soil, sediments or groundwater except through site management controls and restrictions, and does not meet SCGs.

All remaining alternatives include the common elements of removal of the subsurface vault and the contents of the oxide boxes, excavation of sediments from the western and eastern drainageways and the Former Settling Basin, MNA and Adaptive Management. (Alternative 6 includes groundwater extraction and treatment instead of Adaptive Management.) These alternatives will meet RAOs and SCGs for sediments. Once the source is covered, removed, or treated through ISS, contaminant levels in downgradient groundwater will be reduced through natural attenuation processes. The Site Management Plan and Adaptive Management for bedrock groundwater will meet RAOs for groundwater; however, Alternative 6 additionally includes bedrock groundwater extraction and treatment which would meet SCGs in a shorter time frame.

Alternatives 2, 3, 4A, 4B, 5 and 6 differ in their approach to remediating soil source material as discussed below.

Alternatives 2 and 5 include capping soil source areas. Alternative 2 proposes capping soil source areas in the FMSA, WPEA and the EWDA; Alternative 5 proposes capping the EWDA soil source area. Caps are the most implementable of the proposed technologies, least costly and pose the fewest short-term impacts during construction. They require maintenance and monitoring to maintain their long-term permanence and effectiveness. Capping, along with deed restrictions, will meet RAOs for soil, but will not meet soil SCGs. Other than the No Action Alternative, Alternative 2 results in the greatest volume of residual soil contamination.

Alternatives 3 and 6 include excavation of the greatest quantity of soil source material in the FMSA, WPEA and the EWDA. Alternatives 3 and 6 will meet SCGs and RAOs for soil.

They will result in no residual soil contamination above SCGs identified for the site and be the most effective and permanent in the long term. Alternative 6 includes additional excavation of soil exceeding individual chemical-specific SCGs and historical waste disposal areas in order to restore the site to pre-disposal conditions. Alternative 6 would pose the greatest level of short-term impacts during construction and measures would have to be undertaken to reduce odor, noise, vapors fugitive dust, and traffic disruption. Alternative 6 also requires access agreements for offsite extraction wells and force mains to convey extracted water to the onsite treatment facility. Discharge of treated water from the treatment facility to the bedrock aquifer is subject to approval by the NYSDEC. Alternative 6 presents the highest total cost followed by Alternative 3.

Alternatives 4A and 4B include treatment through in-situ solidification of soil source material. Remnant MGP structures would have to be removed in remediation areas prior to ISS treatment. The feasibility and cost-effectiveness of ISS in areas adjacent to existing structures and utilities would have to be evaluated and compared to the cost of excavation in these areas. ISS would be more effective than capping, but less effective than source removal as there would be residual soil contamination. While RAOs would be met, SCGs would not be met for these alternatives. Alternatives 4A and 4B pose short-term impacts and are considered the least implementable of the proposed alternatives.

Alternative 5 includes capping in the EWDA and soil source removal in areas outside the EWDA (FMSA and WPEA). Soil source removal in areas in the FMSA and WPEA will meet SCGs and RAOs for soil. It will result in no residual soil contamination in the FMSA and WPEA, and be effective and permanent in the long term. In the EWDA, capping is the most implementable of the proposed technologies, less costly, and poses the fewest short-term impacts during construction. Capping, along with deed restrictions and Adaptive Management will meet RAOs for groundwater in the EWDA. Residual soil contamination would remain and SCGs for soil would not be met in the EWDA.

Based on the evaluation, Alternative 5 – Capping in the EWDA, source removal in areas outside the EWDA, and the common elements of removal of the subsurface vault and the contents of the oxide boxes, sediment excavation in the eastern and western drainageways and Former Settling Basin, MNA, and Adaptive Management is the recommended remedy for the site. Alternative 5 includes proven technologies that are protective of human health and the environment, poses fewer short-term impacts during construction as compared to other alternatives, results in no residual soil contamination in the FMSA and WPEA, is effective and permanent in the long-term. Along with the Site Management Plan and Adaptive Management, Alternative 5 meets RAOs for soil, sediments, and groundwater. SCGs are met for sediments and the majority of soil. Once the soil source areas were removed and the EWDA capped, groundwater SCGs would be met over the long term following natural processes.

6.2 Recommended Remedial Alternative Components

The components of Alternative 5 include:

- Deed restrictions to limit access to, and use of, portions of the site during the OM&M period of remediation.
- Adaptive Management will include at a minimum, a Site Management Plan that will identify deed restrictions and any groundwater use restrictions on groundwater as a source of potable water and require groundwater monitoring at regular intervals.
- Excavated asphalt will be disposed offsite at an appropriate landfill.
- Excavated soil (approximately 4,850 cy) will be subject to waste characterization testing and either transported offsite to a thermal desorption facility or an appropriate landfill, potentially for use as daily cover.
- The subsurface vault will be removed and tar from the subsurface vault (approximately 83 cy) will be recycled or treated at a thermal facility.
- Purifier wastes from the oxide boxes (approximately 320 cy) will be stabilized onsite prior to offsite disposal at an appropriate landfill.
- Soil may have to be re-consolidated within the EWDA to avoid cap construction in wet areas.
- The low permeability cap in the EWDA will consist of compacted soil overlain by 6 inches of sand, a 40-mil HDPE, geocomposite drainage layer, 12 inches of clean soil, and 4 inches of topsoil as shown on Figure 3-1. The areal extent of the cap is approximately 19,900 square feet.
- Sediment remediation will include:

1. Clearing, grubbing, and sediment excavation of the drainageways and Former Settling Basin area identified on Figure 4-6.
2. It is assumed that excavation of sediments in the eastern and western drainageways will encompass a 5-foot width and 1-foot depth along the proposed remediation length. Approximately 166 cy of sediments will be excavated from the drainageways and transported offsite to a thermal desorption facility or an appropriate landfill, potentially for use as daily cover.
3. It is assumed that excavation of sediments in the Former Settling Basin will encompass a 2-foot thickness over the areal extent of the Basin. An initial approximation is for 509 cy of sediments to be excavated from the Basin and stabilized onsite prior to offsite disposal at an appropriate landfill. During sediment excavation, sidewall and bottom samples will be collected within the Former Settling Basin. Sediment excavation will continue until analytical results from the sidewall and bottom samples of the excavation indicate that remaining material meets cleanup objectives of: tar or oil present in any form and an MGP sheen is present on the water surface when sediments are disturbed, and total SVOC concentrations are greater than 4 ppm, and/or where PCBs are co-located.
4. Following sediment removal, excavated areas within the drainageways will be backfilled with clean soil, compacted and seeded.
5. Following sediment removal in the Former Settling Basin, the area will be backfilled and compacted with soil suitable for vegetation similar to native vegetation present in the adjacent areas. A drainageway will be constructed within the Basin area to connect the existing drainageways.

- Once the source is removed from areas outside the EWDA and the EWDA is capped, natural attenuation will cause downgradient groundwater contamination to be reduced. Annual sampling and analysis for VOCs and SVOCs as well as dissolved oxygen, oxidation-reduction potential, pH, temperature and conductivity will be performed in the 16 (overburden and bedrock) monitoring wells identified on Figure 4-6. The list of parameters and monitoring wells may be modified following data review of monitoring results.
- The EWDA cap will be inspected and maintained over the long-term.

- An annual report and Five-Year Review will evaluate OM&M activities and recommend any necessary changes to the remediation and/or OM&M program.

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TABLES

TABLE 1-1
POTENTIALLY APPLICABLE STANDARDS, CRITERIA AND GUIDANCE

Division/ Agency	Title	Standard or Guidance	Requirements
DAR/ NYSDEC	Air Guide 1 – Guidelines for the Control of Toxic Ambient Air Contaminants	G	• Control of toxic air contaminants • Screening analysis for ambient air impacts • Toxicity classifications • Ambient standards – short term/annual
DAR/ NYSDEC	6 NYCRR Part 200 (200.6) – General Provisions	S	• Prohibits contravention of Ambient Air Quality Standards or causes of air pollution
DAR/ NYSDEC	6 NYCRR Part 201 - Permits & Certificates	S	• Prohibits construction/operation without a permit/certificate
DAR/ NYSDEC	6 NYCRR Part 211 (211.1) – General Prohibitions	S	• Prohibits emissions which are injurious to human, plant, or animal life, or causes a nuisance
DAR/ NYSDEC	6 NYCRR Part 212 – General Process Emission Sources	S	• Establishes control requirements
DAR/ NYSDEC	6 NYCRR Part 257 – Air Quality Standards	S	• Applicable air quality standards
DER/ NYSDEC	TAGM HWR-89-4031 Fugitive Dust Suppression and Particulate Monitoring Program at Inactive Hazardous Waste Sites	G	• Dust suppression during Interim Remedial Measures/Remedial Actions
DER/ NYSDEC	TAGM HWR-92-4030 Selection of Remedial Actions at Inactive Hazardous Waste Sites	G	• Remedy selection criteria/evaluations
DER/ NYSDEC	TAGM HWR-92-4042 Interim Remedial Measures	G	• Define and track Interim Remedial Measures (IRMs)
DER/ NYSDEC	TAGM 4061 – Management of Coal Tar Waste and Coal Tar Contaminated Sediment From Former Manufactured Gas Plants (MGPs)	G	• Coal tar waste and coal tar contaminated soils and sediment that exhibit the toxicity characteristic for Benzene (D018) may be conditionally exempt from 6 NYCRR Parts 370 – 374 and 376 when they are destined for permanent thermal treatment

TABLE 1-1 (Continued)

Division/ Agency	Title	Standard or Guidance	Requirements
DER/ NYSDEC	6 NYCRR Part 375 – Inactive Hazardous Waste Disposal Site Remediation Program	S	▪ Remedial program requirements ▪ Private party programs; state funded programs; state assistance to municipalities
DFW/ NYSDEC	Fish and Wildlife Impact Analysis for Inactive Hazardous Waste Sites (FWIA)	G	▪ Habitat assessments ▪ Contaminant impact assessments ▪ Ecological effects of remedies ▪ Remedial requirements ▪ Monitoring ▪ Checklist
DOW/ NYSDEC	Analytical Services Protocols (ASP)	G	▪ Analytical procedures
DOW/ NYSDEC	TOGS 1.1.2 – Groundwater Effluent Limitations	G	▪ Guidance for developing effluent limitations
DOW/ NYSDEC	TOGS 1.1.1 – Ambient Water Quality Standards and Guidance Values	G	▪ Compilation of ambient water quality standards and guidance values
DOW/ NYSDEC	TOGS 1.2.1 – Industrial SPDES Permit Drafting Strategy for Surface Waters	G	▪ Guidance for developing effluent and monitoring limits for point source releases to surface water
DOW/ NYSDEC	TOGS 1.3.8 – New Discharges to Publicly Owned Treatment Works	G	▪ Limits on new or changed discharges to POTWs; strict requirements regarding bioaccumulative and persistent substances; plus other considerations
DOW/ NYSDEC	6 NYCRR Part 702-15(a), (b), (c), (d) & (e)	S	▪ Empowers NYSDEC to apply and enforce guidance where there is no promulgated standard
DOW/ NYSDEC	6 NYCRR Part 700-705 – NYSDEC Water Quality Regulations for Surface Waters and Groundwater	S	▪ 700 – Definitions, Samples and Tests; ▪ 701 – Classifications for Surface Waters and Groundwaters; ▪ 702 – Derivation and Use of Standards and Guidance Values; ▪ 703 – Surface Water and Groundwater Quality Standards and Groundwater Effluent Standards

TABLE 1-1 (Continued)

Division/ Agency	Title	Standard or Guidance	Requirements
DOW/ NYSDEC	6 NYCRR Part 750-757 – Implementation of NPDES Program in NYS	S	▪ Regulations regarding the SPDES program
DSHM/ NYSDEC	6 NYCRR Part 364 – Waste Transporter Permits	S	▪ Regulates collection, transport, and delivery of regulated waste
DSHM/ NYSDEC	6 NYCRR Part 360 – Solid Waste Management Facilities	S	▪ Solid waste management facility requirements; landfill closures; construction & demolition (C&D) landfill requirements; used oil; medical waste; etc.
DSHM/ NYSDEC	6 NYCRR Part 370 – Hazardous Waste Management System: General	S	▪ Definitions and terms and general standards applicable to Parts 370-374 and 376
DSHM/ NYSDEC	6 NYCRR Part 371 – Identification and Listing of Hazardous Wastes	S	▪ Hazardous waste determinations
DSHM/ NYSDEC	6 NYCRR Part 372 – Hazardous Waste Manifest System and Related Standards for Generators, Transporters and Facilities	S	▪ Manifest system and record keeping; certain management standards
DSHM/ NYSDEC	6 NYCRR Part 376 – Land Disposal Restrictions	S	▪ Identifies hazardous waste restricted from land disposal
DSHM/ NYSDEC	6 NYCRR Subpart 373-1 – Hazardous Waste Treatment, Storage and Disposal Facility Permitting Requirements	S	▪ Hazardous waste permitting requirements; includes substantive requirements
DSHM/ NYSDEC	6 NYCRR Subpart 373-2 – Final Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage and Disposal Facilities	S	▪ Hazardous waste management standards such as contingency plans; releases from SWMUs; closure/post closure; container management; tank management; surface impoundments; waste piles; landfills; incinerators; etc.
DSHM/ NYSDEC	6 NYCRR subpart 373-3 – Interim Status Standards for Owners and Operators of Hazardous Waste Facilities	S	▪ Similar to 373-2

TABLE 1-1 (Continued)

Division/ Agency	Title	Standard or Guidance	Requirements
OSHA/ PESH	29 CFR Part 1910.120; Hazardous Waste Operations and Emergency Response	S	▪ Health and safety
USEPA	40 CFR Part 261 – Hazardous Waste Management System; Definition of Solid Waste; Toxicity Characteristic; Final Rule; Response to Court Order Vacating Regulatory Provisions	S	▪ TCLP may not be used for determining whether MGP waste is hazardous under RCRA

TABLE 1-2
SUMMARY OF PREVIOUS AND RI EXCEEDANCES GROUPED BY ENVIRONMENTAL MEDIA
NYSEG
GENEVA, NEW YORK

Remedial Investigation		Historical Investigations	
Surface Soil			
SVOCs (phenols and PAHs) Metals Cyanide and Cyanide Complexes	WPEA, FMSA, EWDA, OEA, BWA WPEA, FMSA, EWDA, OEA, BWA FMSA, EWDA, BWA	VOCs (benzene) SVOCs (total PAHs) Cyanide (total)	FMSA FMSA, EWDA, BWA FMSA, EWDA, BWA
Subsurface Soil			
VOCs (chlorobenzene and BTEX) SVOCs (phenols and PAHs) Metals Cyanide and Cyanide Complexes	FMSA, FMSA, EWDA, BWA, WPEA, FMSA, EWDA, OEA, BWA, FMSA, EWDA, BWA	VOCs (total) SVOCs (total PAHs) Cyanide (total)	FMSA, OEA, BWA, FMSA, EWDA, OEA, BWA, FMSA, EWDA, OEA, BWA
Surface Water			
SVOCs (phthalate compound) Metals Cyanide and Cyanide Complexes	OEA, BWA, Park OEA, BWA, Park OEA, BWA, Park	VOC (total) SVOCs (total) Cyanide (total)	OEA OEA, BWA, Park OEA, BWA, Park
Sediment			
SVOCs (phthalates) Metals PCBs	OEA, BWA, Park OEA, BWA, Park OEA, BWA, Park	SVOCs (total) Cyanides (total)	OEA, BWA OEA, BWA
Shallow Groundwater			
Metals Cyanide and Cyanide Complexes	OEA, EWDA, BWA EWDA, BWA	Cyanide (total)	EWDA, BWA
Intermediate Groundwater			
VOCs (BTEX, MEK, and styrene) SVOCs (PAHs) Metals	FMSA FMSA WPEA, FMSA, EWDA, OEA, BWA	VOCs (total) Cyanide (total)	ND ND
Deep Groundwater			
Metals	OEA, EWDA, BWA	VOCs (total) SVOCs (total) Cyanide (total)	ND ND ND
Bedrock Groundwater			
VOCs (BTEX, MEK, and styrene) SVOCs (phenols and PAHs) Metals Cyanide and Cyanide Complexes Sulfide	FMSA, OEA, Park FMSA, Park FMSA, OEA, Park FMSA FMSA	Not Applicable	

TABLE 1-3
CHEMICALS OF POTENTIAL CONCERN IN SAMPLES COLLECTED
NYSEG
GENEVA, NEW YORK

Parameter	Matrix				
	Groundwater	Surface Soil	Subsurface Soil	Surface Water	Sediment
Chlorobenzene			Yes		
Benzene	Yes	Yes	Yes		
Ethylbenzene	Yes		Yes		
Toluene	Yes		Yes		
Xylenes	Yes		Yes		
2-butanone	Yes				
Styrene	Yes				
2,4-Dinitrophenol	Yes	Yes	Yes		
2-Nitrophenol	Yes	Yes	Yes		
4-Nitrophenol	Yes	Yes	Yes		
2-Methylphenol	Yes				
4-Methylphenol	Yes				
2,4-Dimethylphenol	Yes				
2-Methylnaphthalene	Yes		Yes		
Acenaphthene	Yes		Yes		
Acenaphthylene	Yes		Yes		
Anthracene	Yes	Yes	Yes		Yes
Benzo(a)anthracene	Yes	Yes	Yes		Yes
Benzo(a)pyrene	Yes	Yes	Yes		Yes
Benzo(b)fluoranthene	Yes	Yes	Yes		Yes
Benzo(g,h,i)perylene	Yes		Yes		
Benzo(k)fluoranthene	Yes	Yes	Yes		Yes
Chrysene	Yes	Yes	Yes		Yes
Dibenz(a,h)anthracene	Yes	Yes	Yes		
Fluoranthene	Yes	Yes	Yes		
Fluorene	Yes	Yes	Yes		Yes
Indeno(1,2,3-cd)pyrene	Yes	Yes	Yes		Yes
Naphthalene	Yes	Yes	Yes		
Phenanthrene	Yes	Yes	Yes		Yes

Parameter	Matrix				
	Groundwater	Surface Soil	Subsurface Soil	Surface Water	Sediment
Pyrene	Yes	Yes	Yes		
Phenol	Yes		Yes		
Bis(2-ethylhexyl)phthalate				Yes	
Aroclor 1242					Yes
Aroclor 1254					Yes
Aroclor 1260					Yes
Aluminum				Yes	
Antimony	Yes				Yes
Arsenic	Yes	Yes	Yes		Yes
Barium	Yes	Yes			
Beryllium	Yes	Yes	Yes		
Cadmium		Yes	Yes		Yes
Chromium	Yes	Yes	Yes		
Copper	Yes	Yes	Yes	Yes	Yes
Iron	Yes	Yes	Yes	Yes	Yes
Lead	Yes			Yes	Yes
Magnesium	Yes				
Manganese	Yes			Yes	Yes
Mercury	Yes	Yes	Yes		Yes
Nickel	Yes	Yes	Yes		Yes
Selenium	Yes	Yes		Yes	
Silver	Yes		Yes		
Sodium	Yes				
Vanadium				Yes	
Zinc	Yes	Yes	Yes	Yes	Yes
Cyanide				Yes	
Cyanide complexes	Yes	Yes	Yes		

Note:
Only detected chemicals that exceeded regulatory criteria in one of the media are listed.

TABLE 3-1
SUMMARY OF REMEDIAL TECHNOLOGY SCREENING

General Response Actions	Remedial Technologies	Description	Screening Comments
No Action	Monitored Natural Attenuation	Naturally-occurring processes would continue to reduce contaminant levels. Groundwater monitoring would be performed.	Applicable, retained.
Adaptive Management for Bedrock Groundwater	Bedrock Monitoring and evaluation of results	Sampling and analysis of bedrock monitoring wells and implementation of Site Management Plan to include deed and groundwater restrictions.	Applicable, retained.
Containment	Capping	Low Permeability Cap to limit infiltration.	Retained for EWDA.
		Asphalt cap	Retained for site areas outside the EWDA.
	Vertical Barriers	Vertical barriers installed to the top of impermeable layer.	Not retained due to site-specific hydrogeology.
Source Removal	Soil and Sediment Excavation with Offsite Disposal/Treatment	Excavate contaminated soil and sediments and transport offsite for disposal/treatment.	Applicable, retained for soil and sediments
	Excavation and Ex-Situ Treatment	Excavate contaminated soil and sediments and treat onsite.	Not retained due to ongoing and active use of the site.
	Bedrock Groundwater Collection with Onsite Treatment	Bedrock groundwater extraction within identified area and conveyance to onsite treatment facility and discharge to bedrock aquifer.	Retained for bedrock groundwater.
In-situ Soil Treatment	Biological Treatment	Microorganisms, oxygen, and/or nutrients added to subsurface to reduce the toxicity of contaminants in soil.	Not retained due to implementation issues and long time frame required.
	Chemical/Physical Treatment	Soil Vapor Extraction – Soil vapors are collected through a subsurface extraction system.	Effective on VOCs. Not retained.
		Chemical Oxidation (ISCO) – oxidants are injected into the subsurface to destroy contaminants and convert them to non-toxic compounds.	Not retained due to implementation issues and long time frame required.
	Solidification	ISS - Using large augers or other injection/mixing technology, contaminated soil is mixed in-situ with binders isolating and immobilizing contaminants.	Applicable in areas where there are no subsurface obstructions. May not be cost-effective to implement near existing buildings and utilities. A volume increase would result. Retained for use in EWDA.
	Thermal Treatment	Various processes to increase temperatures of soil; off-gases are collected and treated. Groundwater control may be needed to retain heat during treatment.	Large energy requirements needed and relatively high costs to create the high heat conditions necessary to destroy PAHs. Off-gasses would have to be collected given active use of the Site. Not retained.

TABLE 5-1

SUMMARY OF REMEDIAL ALTERNATIVE COST ESTIMATES

	Alternative 1 No Action	Alternative 2 Capping	Alternative 3 Source Removal	Alternative 4A ISS EWDA, Asphalt Cap	Alternative 4B ISS EWDA, Source Removal	Alternative 5 Capping EWDA, Source Removal	Alternative 6 Source and Waste Removal, Bedrock Groundwater Collection and Treatment
Capital Cost Distinctive Elements	$0	$252,400	$2,955,600	$817,000	$2,538,700	$1,939,600	$16,016,000
Capital Cost Common Elements	$15,000	$920,600	$920,600	$924,000	$920,600	$925,200	$948,100
Total Capital Costs	$15,000	$1,173,000	$3,877,000	$1,766,000	$3,459,000	$2,865,000	$16,964,000
Annual OM&M	$15,800	$30,173	$25,073	$25,073	$25,073	$30,173	$705,773
Present Worth of OM&M	$242,900	$463,900	$385,500	$385,500	$385,500	$463,900	$10,849,900
Years of OM&M	30	30	30	30	30	30	30
Total Present Worth	$258,000	$1,637,000	$4,263,000	$2,152,000	$3,845,000	$3,329,000	$27,814,000

TABLE 5-2
COMPARATIVE ANALYSIS OF REMEDIAL ALTERNATIVES

Evaluation Criteria	Alternative 1	Alternative 2	Alternative 3	Alternative 4A	Alternative 4B	Alternative 5	Alternative 6
Overall Protection of Human Health and the Environment	Not protective.	Protective through caps in source areas and sediment removal. Restrictions for groundwater use. Long-term management required.	Protective through source removal.	Protective through treatment, excavation and containment. Long-term management required.	Protective through treatment and excavation. Long-term management required.	Protective through EWDA cap and soil, sediment removal. Restrictions for groundwater use. Long-term management required.	Protective through source and waste removal and groundwater collection and treatment.
Compliance with SCGs	SCGs would not be met.	SCGs for sediments would be met. Contaminant concentrations in downgradient groundwater will be reduced through natural attenuation processes.	SCGs for soil and sediments will be met. Groundwater SCGs will be met over the long term following source removal and natural processes.	SCGs for sediments will be met. Groundwater SCGs will be met over the long term following natural processes and treatment.	SCGs for soil and sediments will be met. Groundwater SCGs will be met over the long term following source removal, ISS and natural processes.	SCGs for sediments and soil within FMSA and WPEA would be met. Groundwater SCGs will be met over the long term following natural processes and treatment.	SCGs for soil and sediments will be met. Groundwater SCGs will be met over the long term following groundwater collection and treatment and natural processes.
Long-Term Effectiveness and Permanence	Not effective or permanent. Potential risks are addressed through deed restrictions.	Relies on deed restrictions and long-term management.	Effective and permanent. Downgradient groundwater contamination reduced through natural attenuation processes.	Effective and permanent. Long-term management required.	Effective and permanent. Long-term management required.	Effective and permanent. Relies on deed restrictions in EWDA. Downgradient groundwater contamination reduced through natural attenuation processes.	Effective and permanent. Long-term OM&M of the groundwater collection and treatment system and management required.

Evaluation Criteria	Alternative 1	Alternative 2	Alternative 3	Alternative 4A	Alternative 4B	Alternative 5	Alternative 6
Reduction of Toxicity, Mobility, and Volume with Treatment	Reduction of TMV would occur slowly through natural processes.	Cap will reduce mobility of contaminants. Pretreatment of Basin sediments and oxide box material reduce mobility.	Volume of contaminants will be reduced after excavation. Pretreatment of Basin sediments and oxide box material reduce mobility.	ISS reduces mobility through treatment. Cap will reduce mobility. Pretreatment of Basin sediments and oxide box material reduce mobility.	ISS reduces mobility through treatment. Source removal reduces volume. Pretreatment of Basin sediments and oxide box material reduce mobility.	Contaminant volume will be reduced after excavation. Cap will reduce mobility of contaminants. Pretreatment of Basin sediments and oxide box material reduce mobility.	Volume of contaminants will be reduced with groundwater treatment and soil, waste and sediment excavation. Pretreatment of Basin sediments and oxide box material reduce mobility.
Short-Term Effectiveness	Minimal short-term impacts since no construction would be performed. RAOs would not be met.	Short term impacts from sediment excavation. Site Management Plan would be implemented to meet RAOs.	Impacts during excavation. RAOs for soil and sediments would be met. RAOs for groundwater would be met with SMP.	Impacts during ISS and sediment excavation. RAOs met for soil and sediments.	Impacts during ISS and sediment excavation. RAOs met for soil and sediments.	Impacts during excavation. Soil RAOs in FMSA, WPEA and sediments would be met. SMP would be implemented to meet RAOs in EWDA and for groundwater.	Impacts during excavation. RAOs for soil and sediments would be met. RAOs for groundwater would be met with SMP and collection and treatment.
Implementability	Monitoring and deed restrictions could be implemented.	Technologies are available, reliable and feasible. Soil re-consolidation in EWDA may be necessary	Technologies are available, reliable and feasible. Would require coordination with site use activities.	Technologies are available, reliable and feasible. Bench-scale testing required for ISS.	Technologies are available, reliable and feasible. Bench-scale testing required for ISS.	Technologies are available, reliable and feasible. Soil re-consolidation in EWDA may be necessary. Would require coordination with site use activities.	Technologies are available, reliable and feasible. Would require coordination with site use activities and access to offsite properties for wells and force mains.
Cost	$258,000	$1,637,000	$4,263,000	$2,152,000	$3,845,000	$3,329,000	$27,814,000

Notes:
Alternative 1 – No Action
Alternative 2 – Capping
Alternative 3 – Source Removal
Alternative 4A – In-situ Solidification in the EWDA, Asphalt Cap in Areas Outside the EWDA
Alternative 4B – In-situ Solidification in the EWDA, Source Removal in Areas Outside the EWDA
Alternative 5 – Capping in the EWDA, Source Removal for Areas Outside the EWDA
Alternative 6 – Source and Waste Removal, Bedrock Collection and Treatment

FIGURES

Title: SITE LOCATION MAP

Location: FORMER MGP SITE
GENEVA, NEW YORK

Client: NEW YORK STATE ELECTRIC & GAS

SOURCE:
USGS 7 1/2 Minute Series Topographic Maps
Geneva North, New York 1978,
and Geneva South, New York 1978

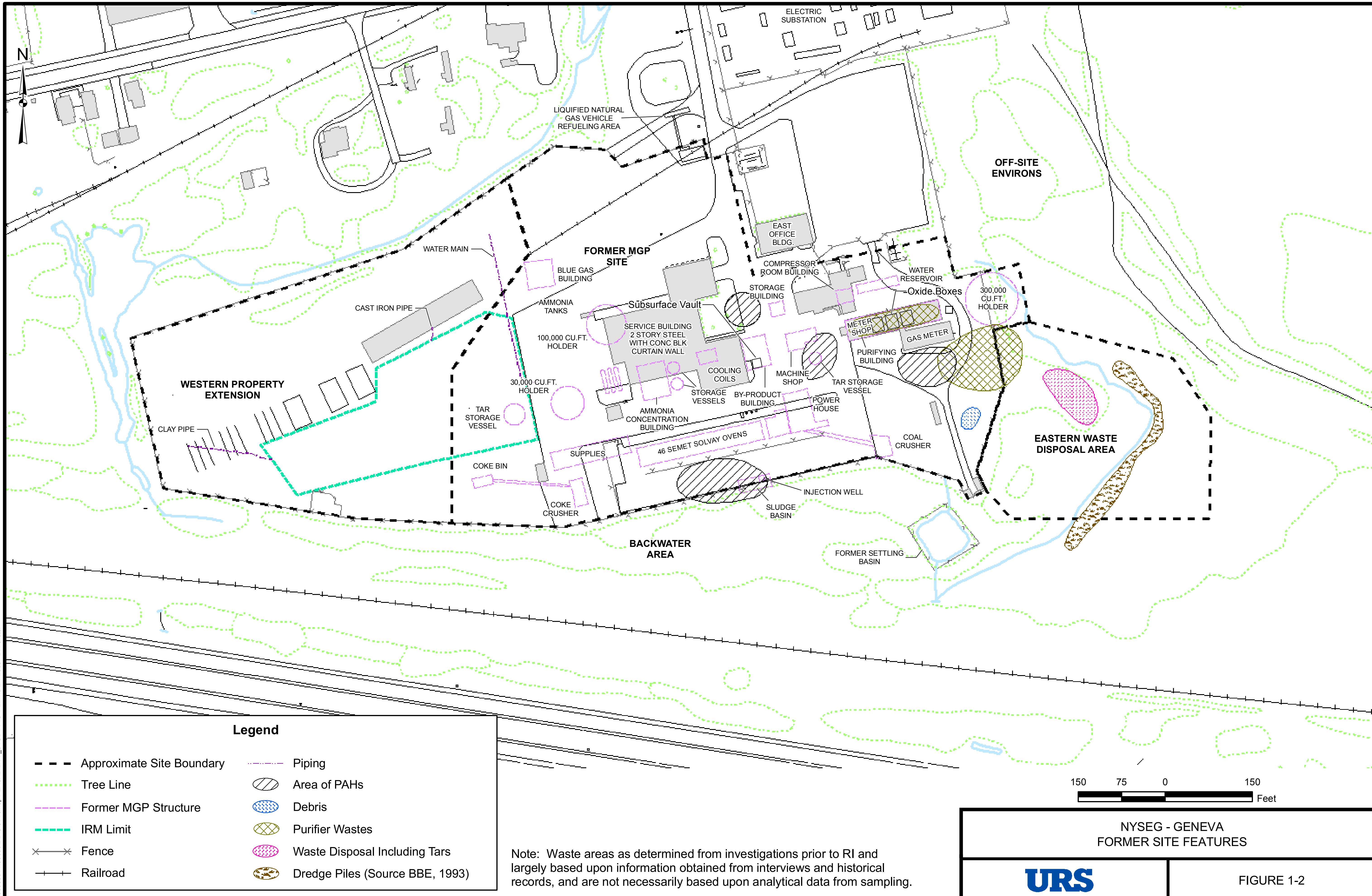
0 600 1,200
GRAPHIC SCALE IN FEET

URS
URS Corporation
28 Corporate Drive, Suite 200
Clifton Park, New York 12065

Drafter: BKG
Date: January 7, 2004
Drg. Size: 8.5 x 11
Job No.: 38393615.00000

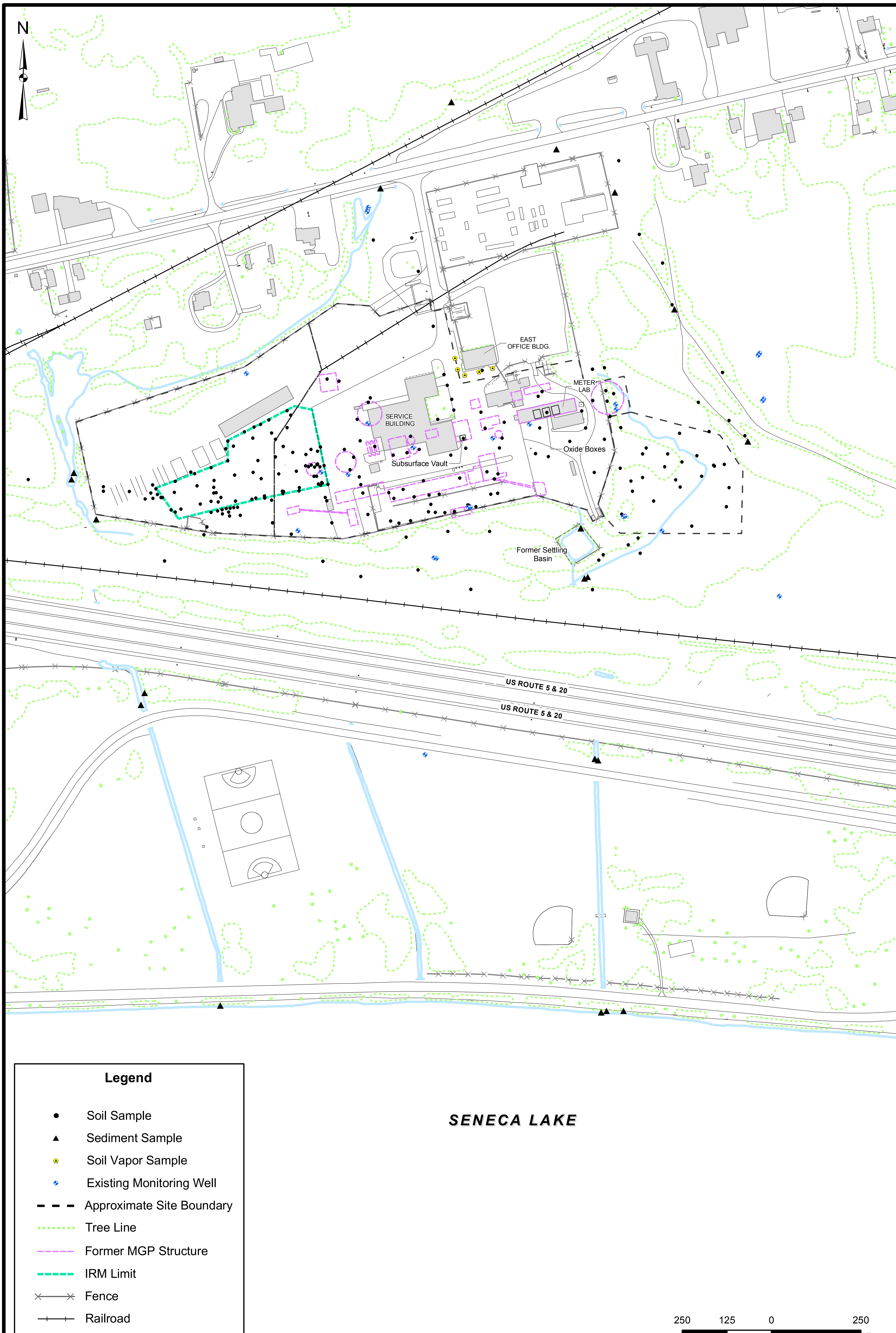
FIGURE 1-1

P:\In Progress\NYSEG\...Draft RI Report\Figures\Figure 1.ai



NYSEG - GENEVA
FORMER SITE FEATURES

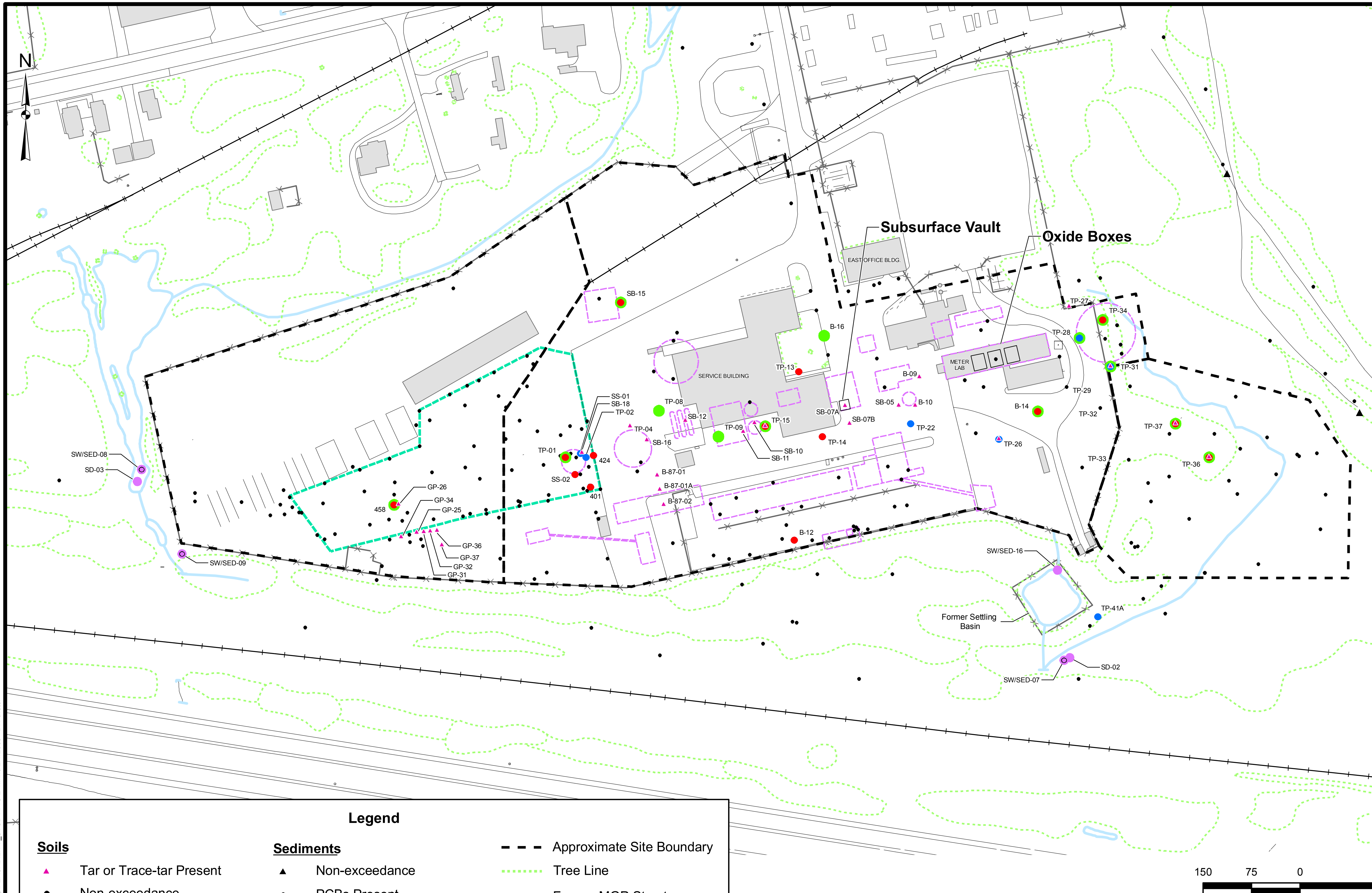
FIGURE 1-2



NOTE: SEE PLATE-1 FOR SAMPLE LOCATION IDENTIFICATION

N:\38393614.00000\DB\Gis\ArcMap\FEASABILITY_STUDY\FIG 1-3.mxd 2/1/2008 B. Farster

URS	NYSEG - GENEVA SITE LAYOUT AND SAMPLE LOCATIONS	FIGURE 1-3



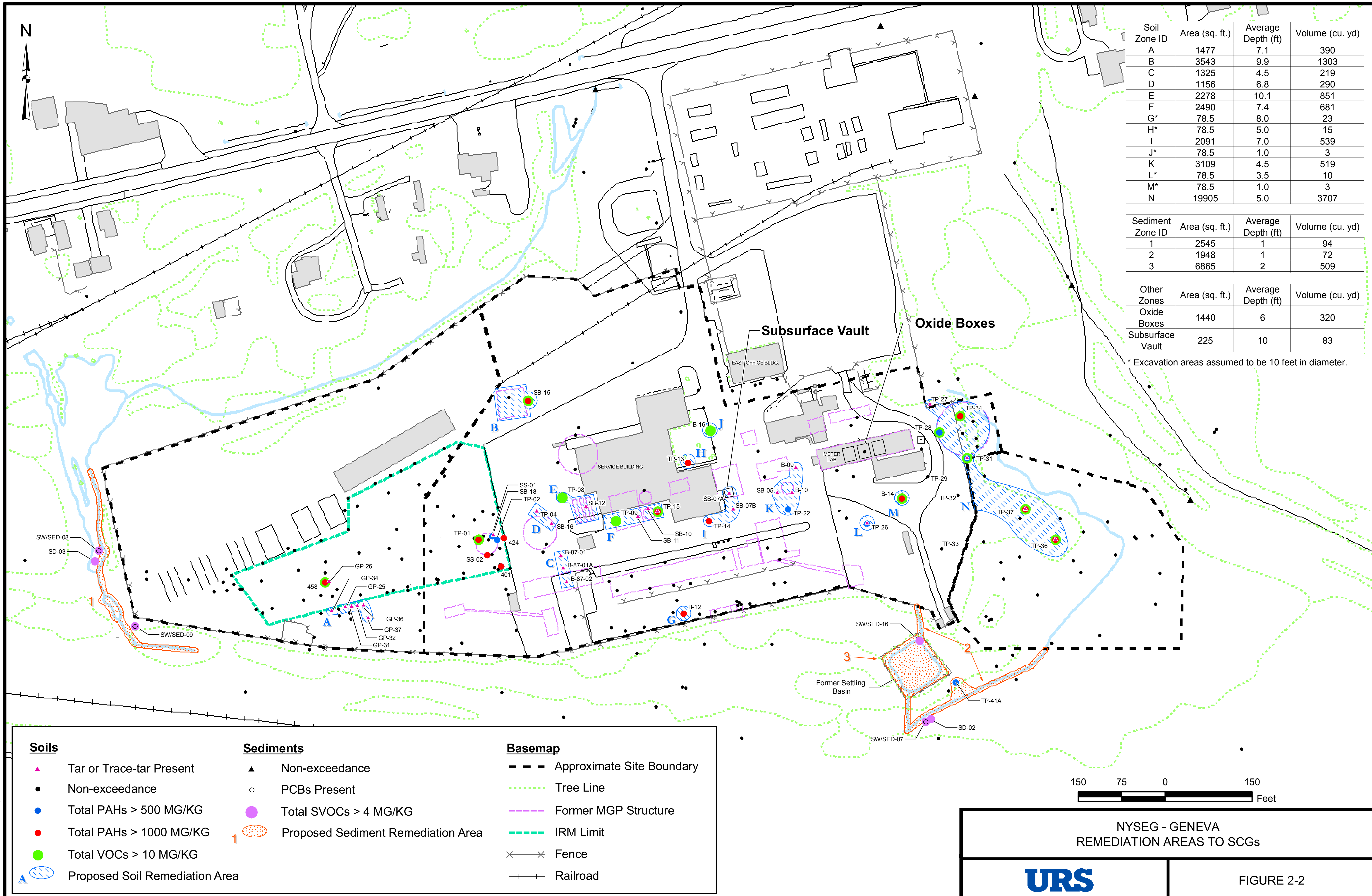
Location ID	Max. Depth (ft)
401	5.5
424	5.5
458	12
B-09	4
B-10	5.5
B-12	8
B-14	0
B-16	0
B-87-01	6
B-87-01A	5
B-87-02	2
GP-25	24
GP-26	10
GP-31	4
GP-32	8
GP-34	8
GP-36	6
GP-37	4
SB-05	4
SB-07A	10
SB-07B	6
SB-10	9.5
SB-11	12
SB-12	12
SB-15	10
SB-16	6
SB-18	4
SD-02	0
SD-03	0
SS-01	0
SS-02	0
SW/SED-07	1
SW/SED-08	1
SW/SED-09	1
SW/SED-11	1
SW/SED-13	1
SW/SED-16	1
TP-01	2
TP-02	2
TP-04	7.5
TP-08	3
TP-09	4
TP-13	5
TP-14	5
TP-15	5
TP-22	3
TP-26	3.5
TP-27	4
TP-28	2
TP-29	4
TP-31	4.5
TP-32	6
TP-33	6
TP-34	2
TP-36	8
TP-37	6
TP-41A	0.5
WC-01	0

NYSEG - GENEVA
SOIL AND SEDIMENT LOCATIONS
EXCEEDING REMEDIAL ACTION OBJECTIVES

URS

FIGURE 2-1

N:\38393614.00000\DB\Gis\ArcMap\FEASABILITY_STUDY\FIG 2-1.mxd 2/1/2008 B. Farster



Soil Zone ID	Area (sq. ft.)	Average Depth (ft)	Volume (cu. yd)
A	1477	7.1	390
B	3543	9.9	1303
C	1325	4.5	219
D	1156	6.8	290
E	2278	10.1	851
F	2490	7.4	681
G*	78.5	8.0	23
H*	78.5	5.0	15
I	2091	7.0	539
J*	78.5	1.0	3
K	3109	4.5	519
L*	78.5	3.5	10
M*	78.5	1.0	3
N	19905	5.0	3707

Sediment Zone ID	Area (sq. ft.)	Average Depth (ft)	Volume (cu. yd)
1	2545	1	94
2	1948	1	72
3	6865	2	509

Other Zones	Area (sq. ft.)	Average Depth (ft)	Volume (cu. yd)
Oxide Boxes	1440	6	320
Subsurface Vault	225	10	83

* Excavation areas assumed to be 10 feet in diameter.

Soils

- Tar or Trace-tar Present
- Non-exceedance
- Total PAHs > 500 MG/KG
- Total PAHs > 1000 MG/KG
- Total VOCs > 10 MG/KG
- A Proposed Soil Remediation Area

Sediments

- Non-exceedance
- PCBs Present
- Total SVOCs > 4 MG/KG
- 1 Proposed Sediment Remediation Area

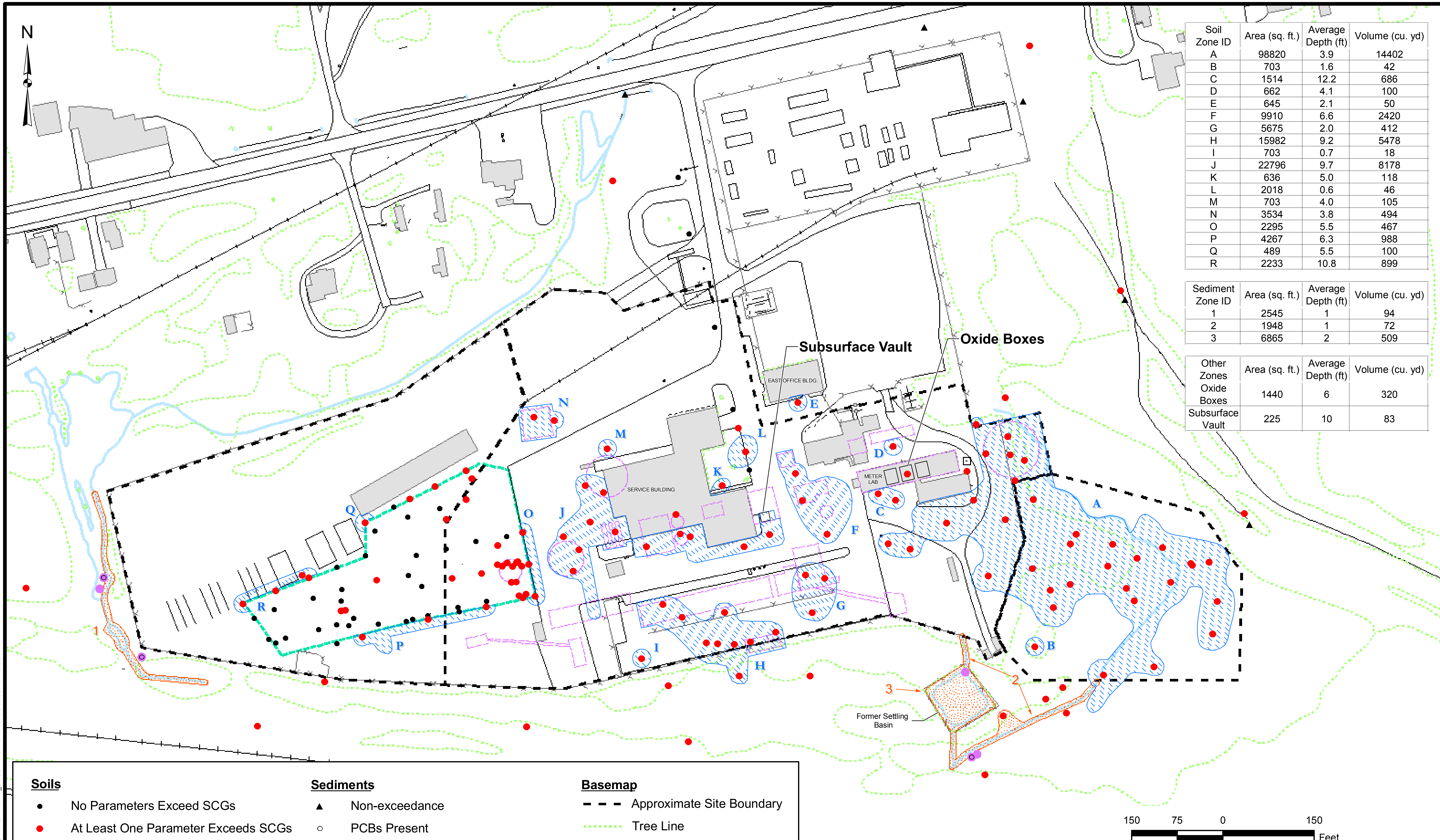
Basemap

- Approximate Site Boundary
- Tree Line
- Former MGP Structure
- IRM Limit
- Fence
- Railroad

NYSEG - GENEVA
REMEDIATION AREAS TO SCGs

URS

FIGURE 2-2



Soil Zone ID	Area (sq. ft.)	Average Depth (ft)	Volume (cu. yd)
A	98820	3.9	14402
B	703	1.6	42
C	1514	12.2	686
D	662	4.1	100
E	645	2.1	50
F	9910	6.6	2420
G	5675	2.0	412
H	15982	9.2	5478
I	703	0.7	18
J	22796	9.7	8178
K	636	5.0	118
L	2018	0.6	46
M	703	4.0	105
N	3534	3.8	494
O	2295	5.5	467
P	4267	6.3	988
Q	489	5.5	100
R	2233	10.8	899

Sediment Zone ID	Area (sq. ft.)	Average Depth (ft)	Volume (cu. yd)
1	2545	1	94
2	1948	1	72
3	6865	2	509

Other Zones	Area (sq. ft.)	Average Depth (ft)	Volume (cu. yd)
Oxide Boxes	1440	6	320
Subsurface Vault	225	10	83

Soils
- No Parameters Exceed SCGs
- At Least One Parameter Exceeds SCGs
- A Proposed Soil Remediation Area

Sediments
- Non-exceedance
- PCBs Present
- Total SVOCs > 4 MG/KG
- 1 Proposed Sediment Remediation Area

Basemap
- Approximate Site Boundary
- Tree Line
- Former MGP Structure
- IRM Limit
- Fence
- Railroad

NYSEG - GENEVA
REMEDIATION AREAS TO PRE-DISPOSAL CONDITIONS

URS

FIGURE 2-3

Legend

- Existing Overburden Monitoring Well
- Existing Bedrock Monitoring Well
- Decommissioned Bedrock Monitoring Well
- Area Boundary
- Water Main
- Groundwater Elevation Contour (FT. AMSL) (452)

-Groundwater elevation contours based on 9/2/08 bedrock groundwater elevations.

- Water supply line information was obtained from the Border City Water District in 2007 and is based on their Record Map - Border City Water District - General Plan (June 30, 1949) and the Waterloo Sewer District No. 1 General Plan (1982).

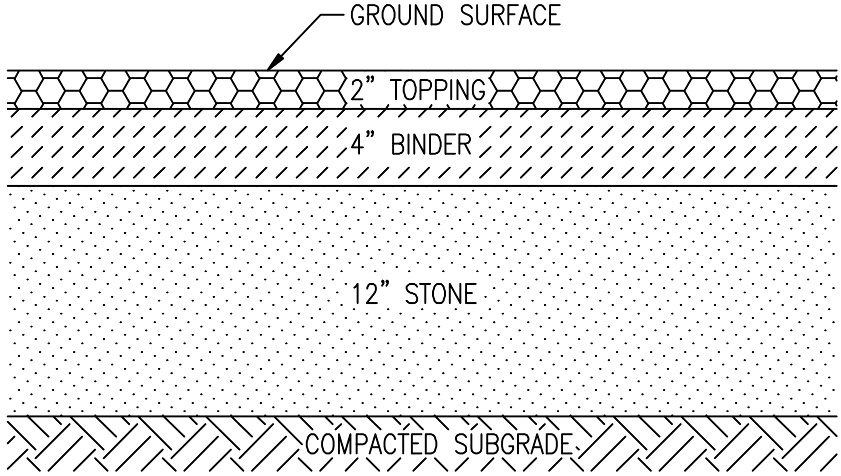
400 200 0 400 Feet

NYSEG - GENEVA
MONITORING WELLS AND PUBLIC WATER SUPPLY LINE LOCATIONS

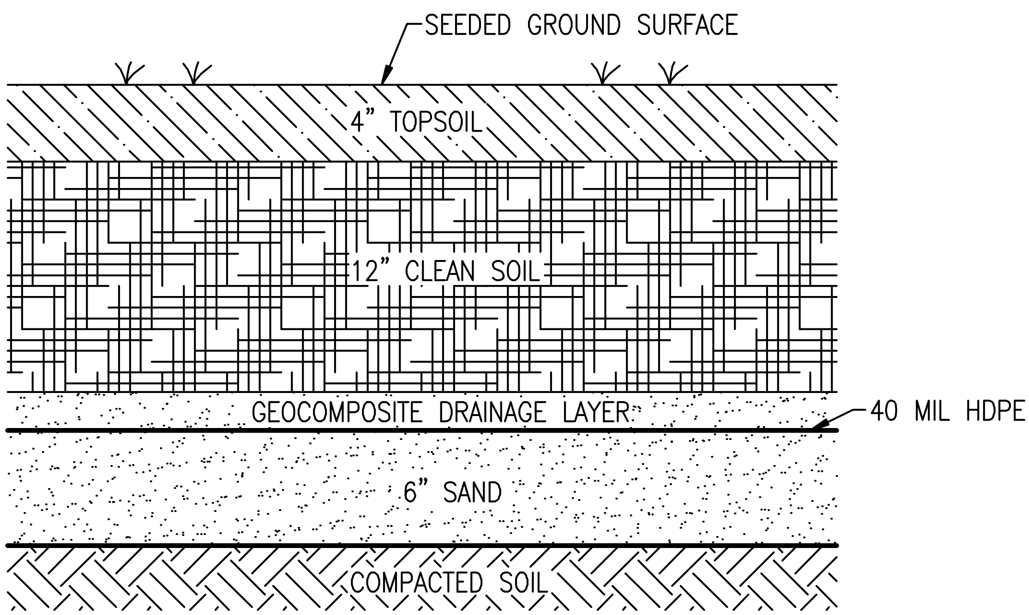
URS

FIGURE 2-4

N:\38393614.00000\DB\GisArcMap\FEASABILITY STUDY\FIG 2-4.mxd 10/8/2008 B. Farster



ASPHALT CAP



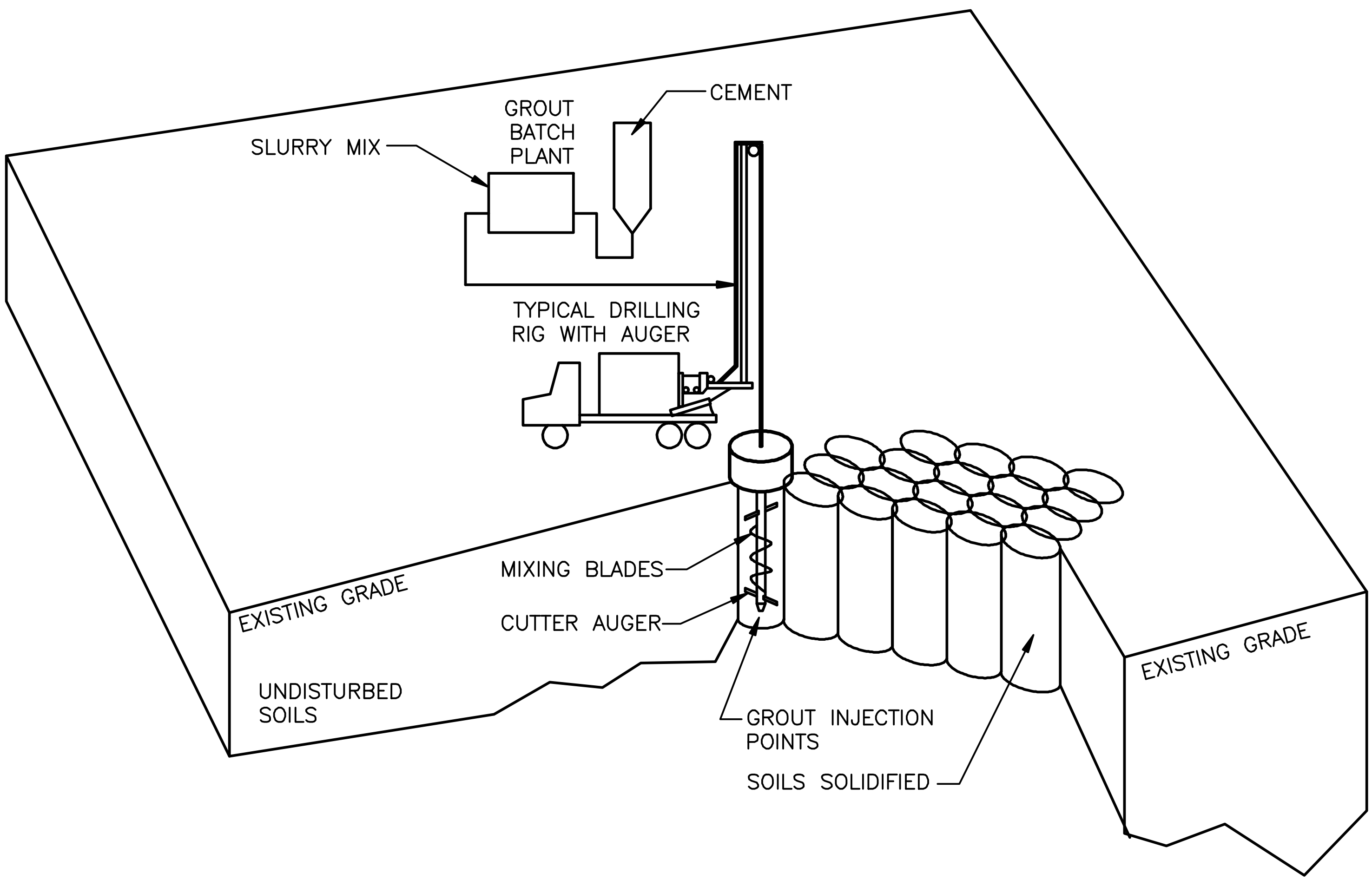
LOW PERMEABILITY CAP

NOT TO SCALE

URS	CONCEPTUAL CAP SECTIONS	FIGURE 3-1

J:\11175369.00000\CAD\DRAFT\FIGURE 3-1.dwg 1/31/08 - 2 RAL

N:\38393615.00000\CAD\DRAFT\FIGURE 3-2.dwg 1:1 2/13/08 - 3 RAL

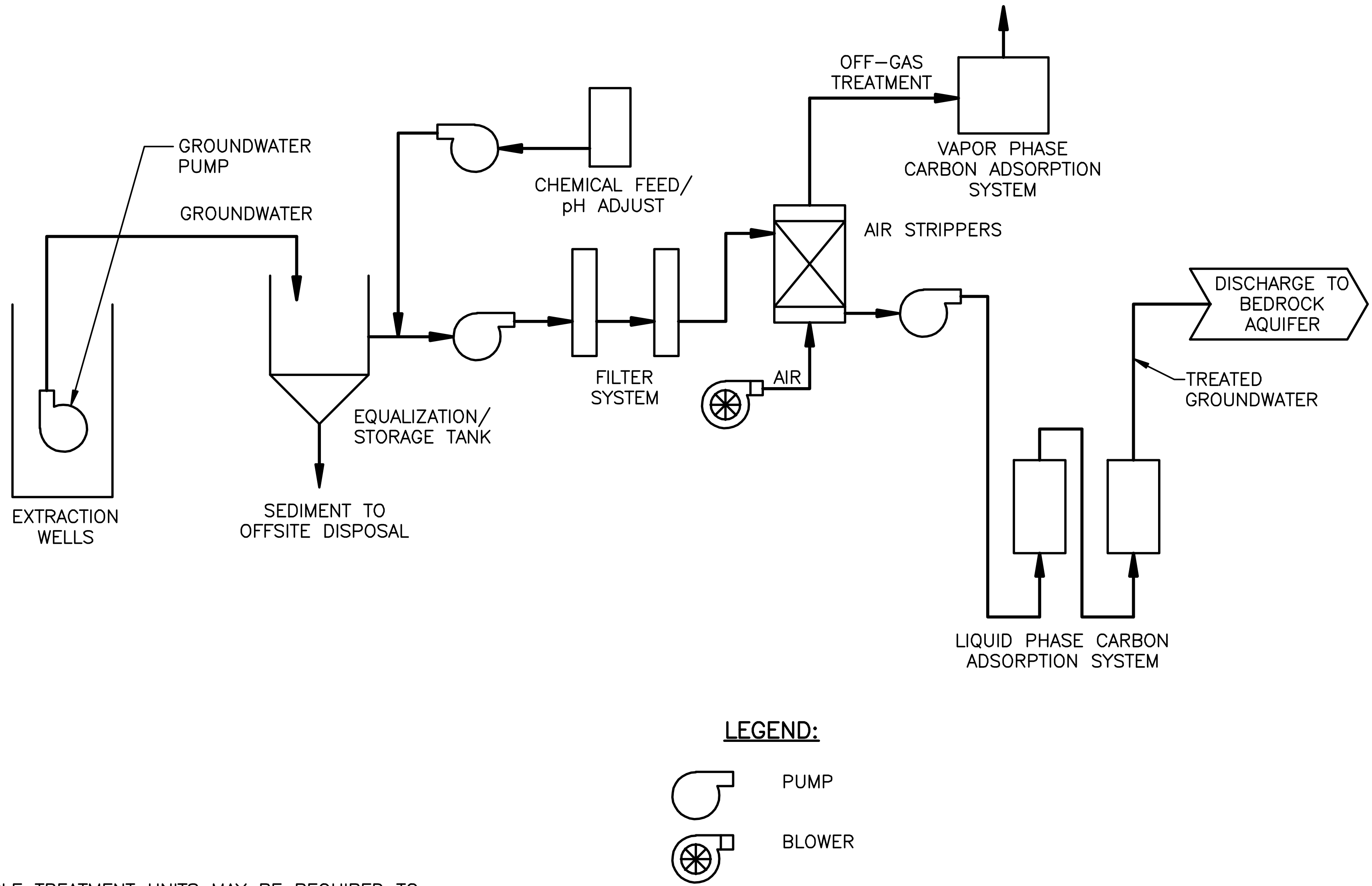


NOT TO SCALE

URS

CONCEPTUAL IN-SITU SOLIDIFICATION PROCESS

FIGURE 3-2



NOTE:

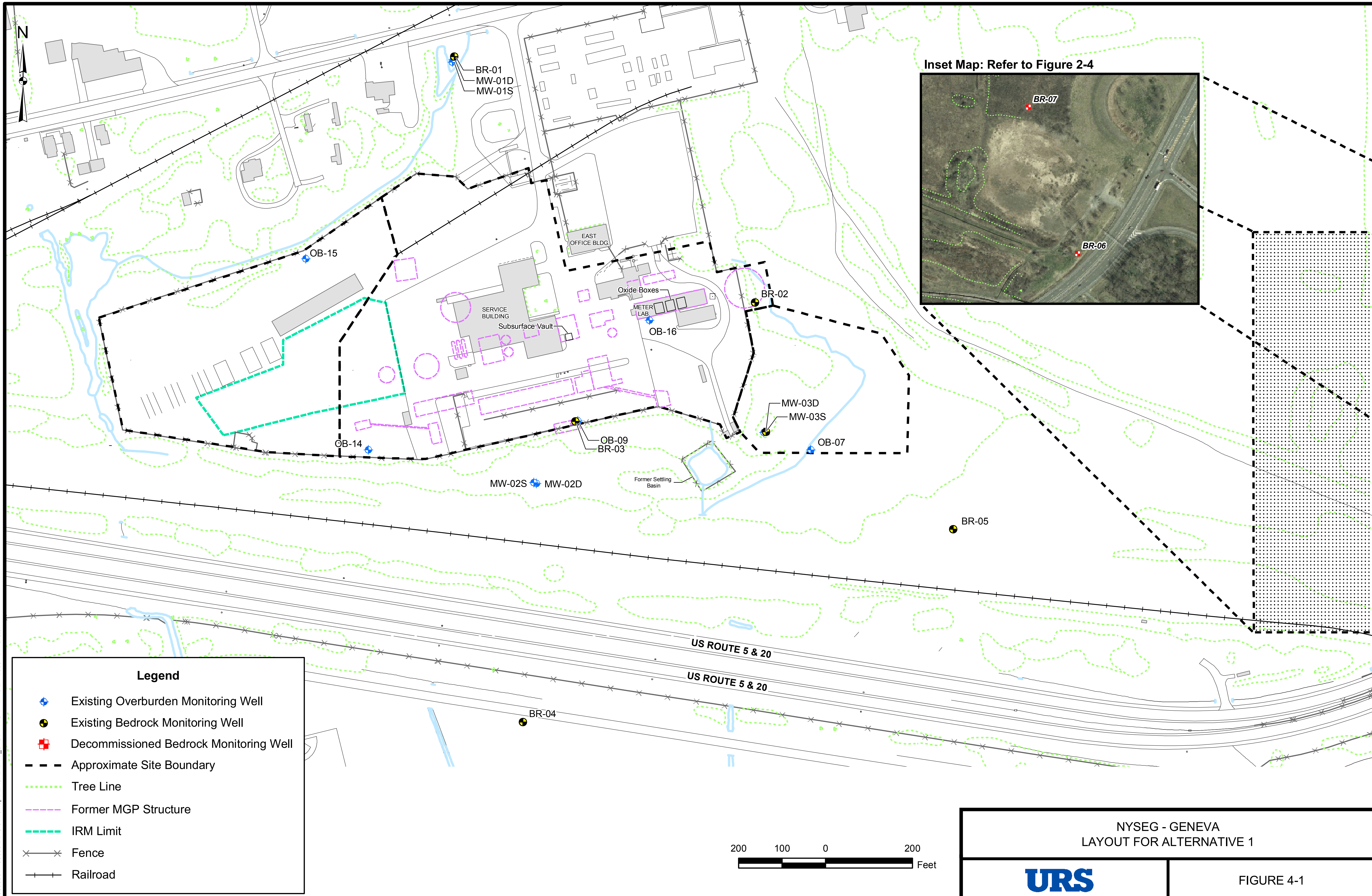
MULTIPLE TREATMENT UNITS MAY BE REQUIRED TO ACCOMMODATE THE GROUNDWATER FLOW RATE AND/OR MEET THE TREATMENT GOALS. ONLY ONE OF EACH TREATMENT UNIT IS SHOWN FOR CLARITY.

NOT TO SCALE

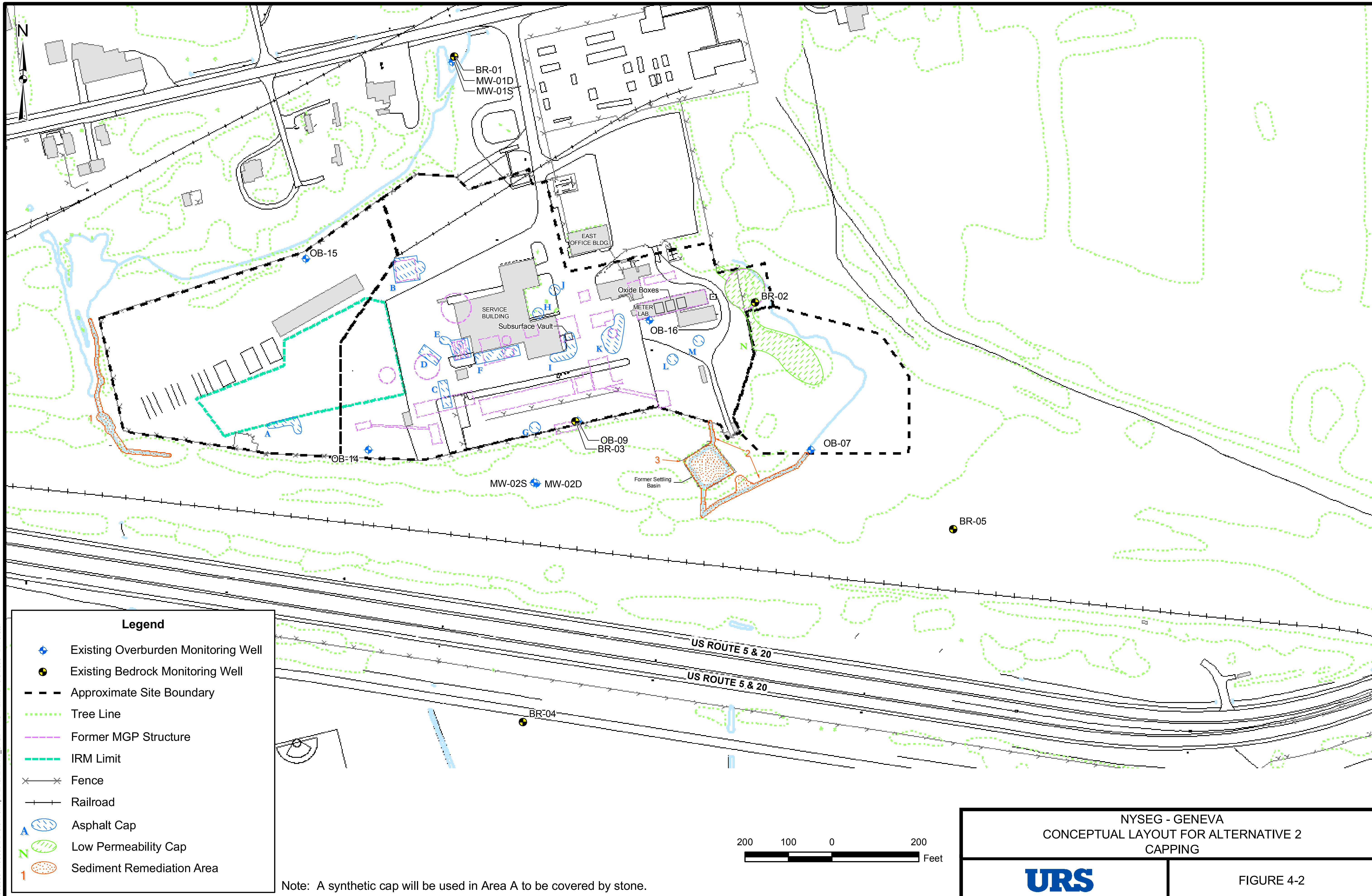
URS

NYSEG - GENEVA - BORDER CITY SITE
CONCEPTUAL GROUNDWATER EXTRACTION AND TREATMENT SYSTEM

FIGURE 3-3



N:\38393614.00000\DB\Gis\ArcMap\FEASABILITY_STUDY\FIG 4-1.mxd 2/1/2008 B. Farster



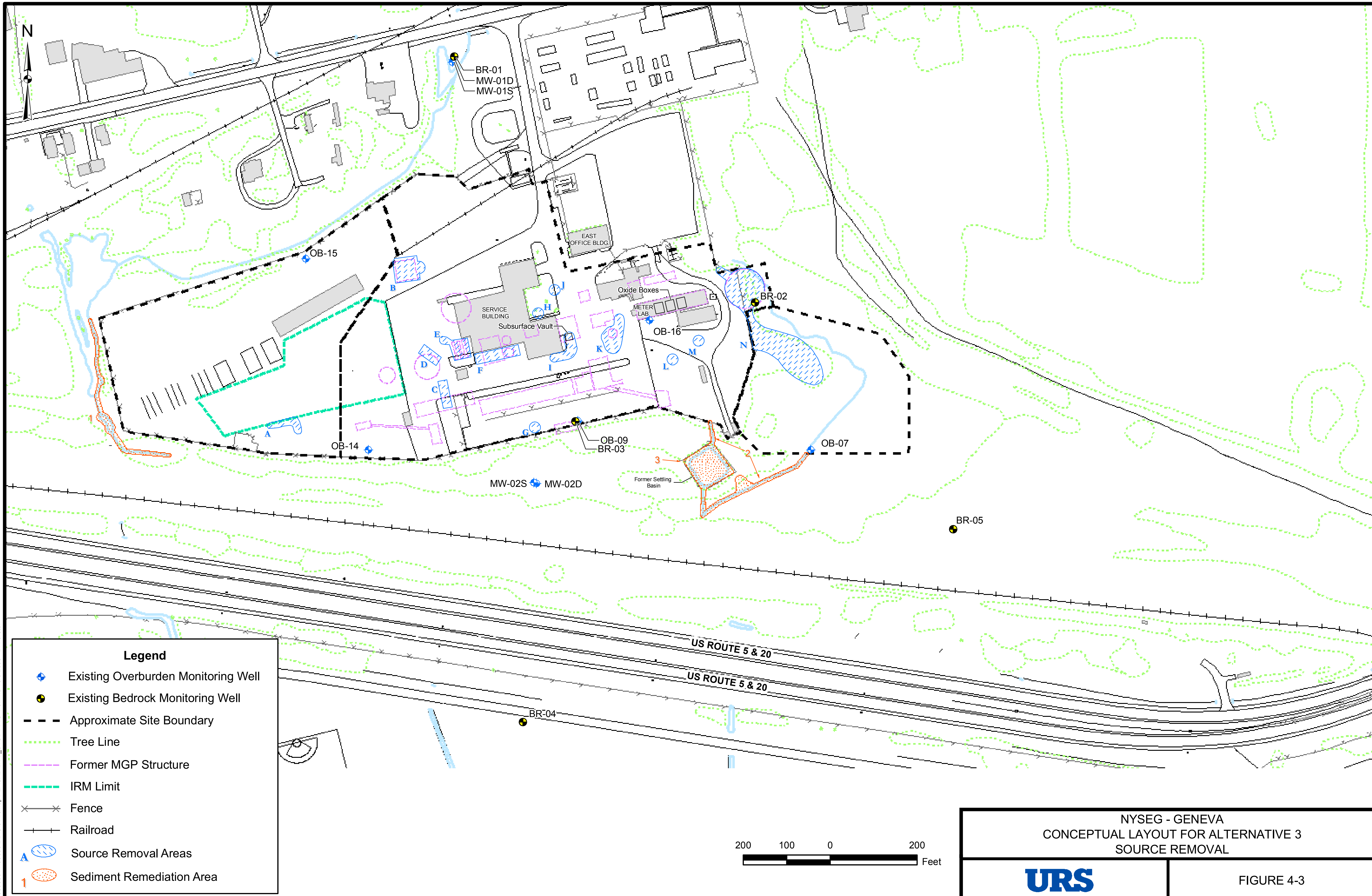
Note: A synthetic cap will be used in Area A to be covered by stone.

NYSEG - GENEVA
CONCEPTUAL LAYOUT FOR ALTERNATIVE 2
CAPPING

URS

FIGURE 4-2

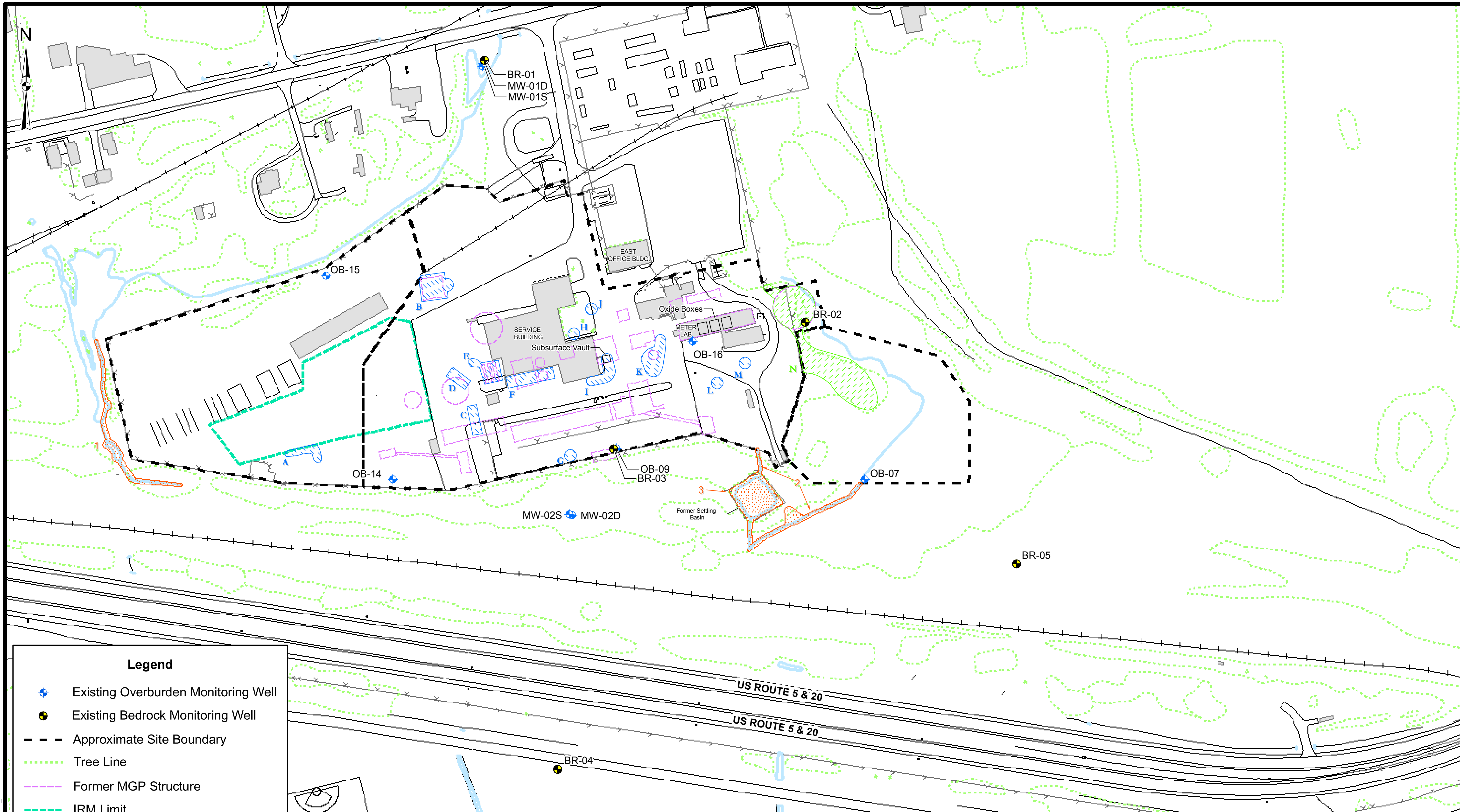
N:\38393614.00000\DB\GIS\ArcMap\FEASABILITY_STUDY\FIG 4-2.mxd 10/8/2008 B. Farster



NYSEG - GENEVA
CONCEPTUAL LAYOUT FOR ALTERNATIVE 3
SOURCE REMOVAL

FIGURE 4-3

N:\38393614.00000\DB\GisArcMap\FEASABILITY_STUDY\FIG 4-3.mxd 10/8/2008 B. Farster



Legend

- Existing Overburden Monitoring Well
- Existing Bedrock Monitoring Well
- Approximate Site Boundary
- Tree Line
- Former MGP Structure
- IRM Limit
- Fence
- Railroad
- A Asphalt Cap
- N In-Situ Solidification Area
- 1 Sediment Remediation Area

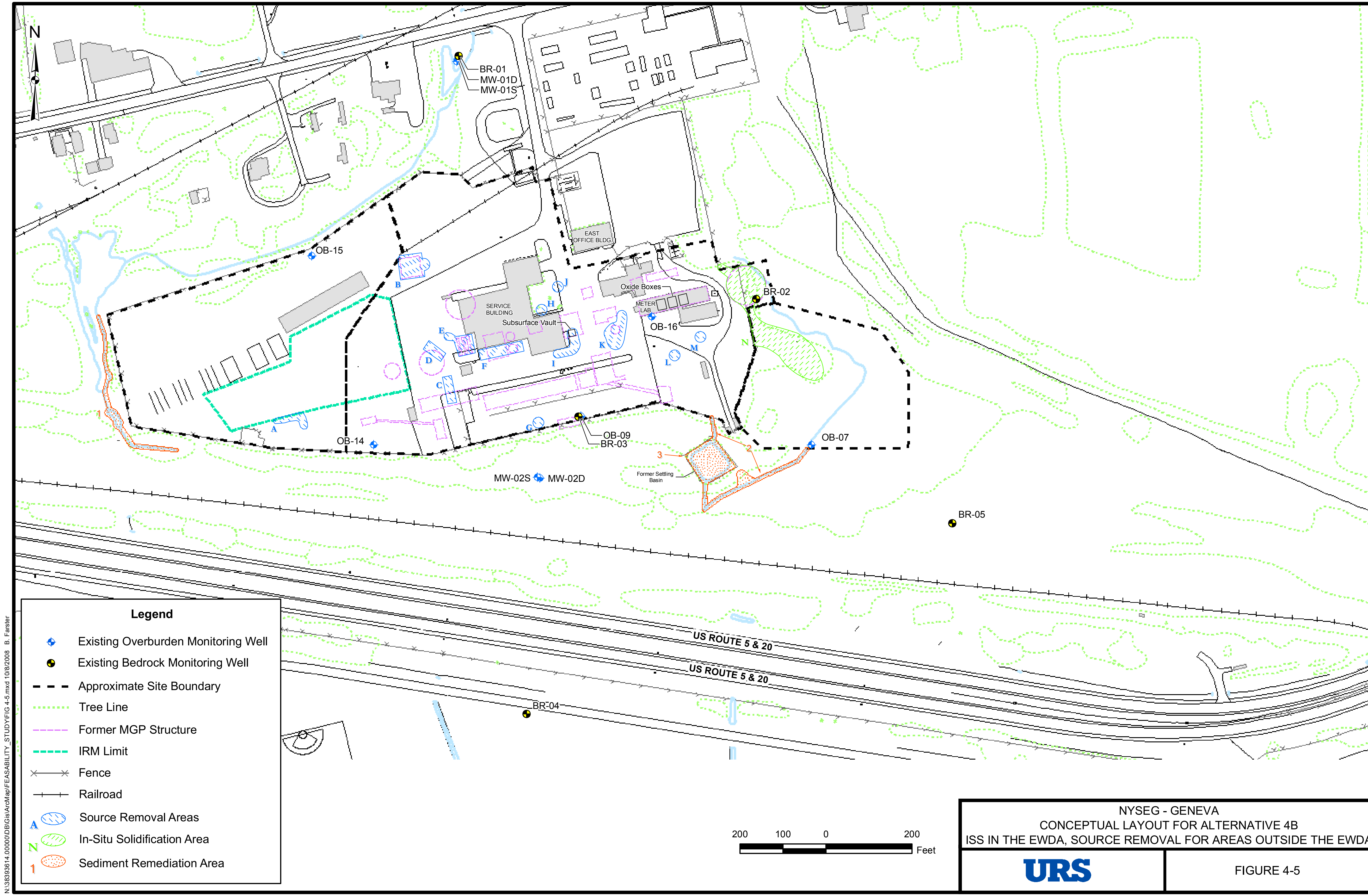
Note: A synthetic cap will be used in Area A to be covered by stone.

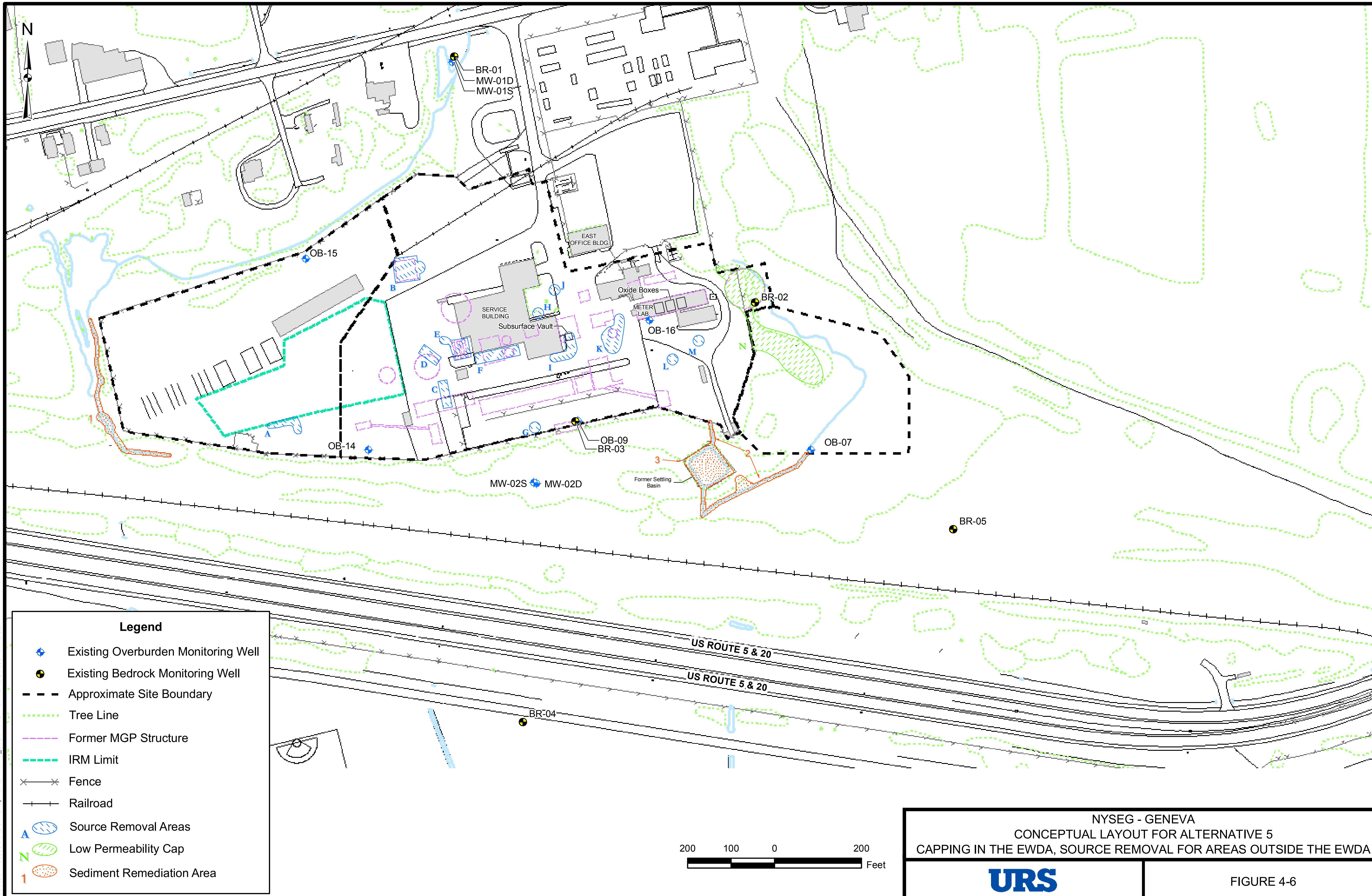
NYSEG - GENEVA
CONCEPTUAL LAYOUT FOR ALTERNATIVE 4A
ISS IN THE EWDA, ASPHALT CAP FOR AREAS OUTSIDE THE EWDA

URS

FIGURE 4-4

N:\38393614.00000\DB\GisArcMap\FEASABILITY_STUDY\FIG 4-4.mxd 10/8/2008 B. Farster

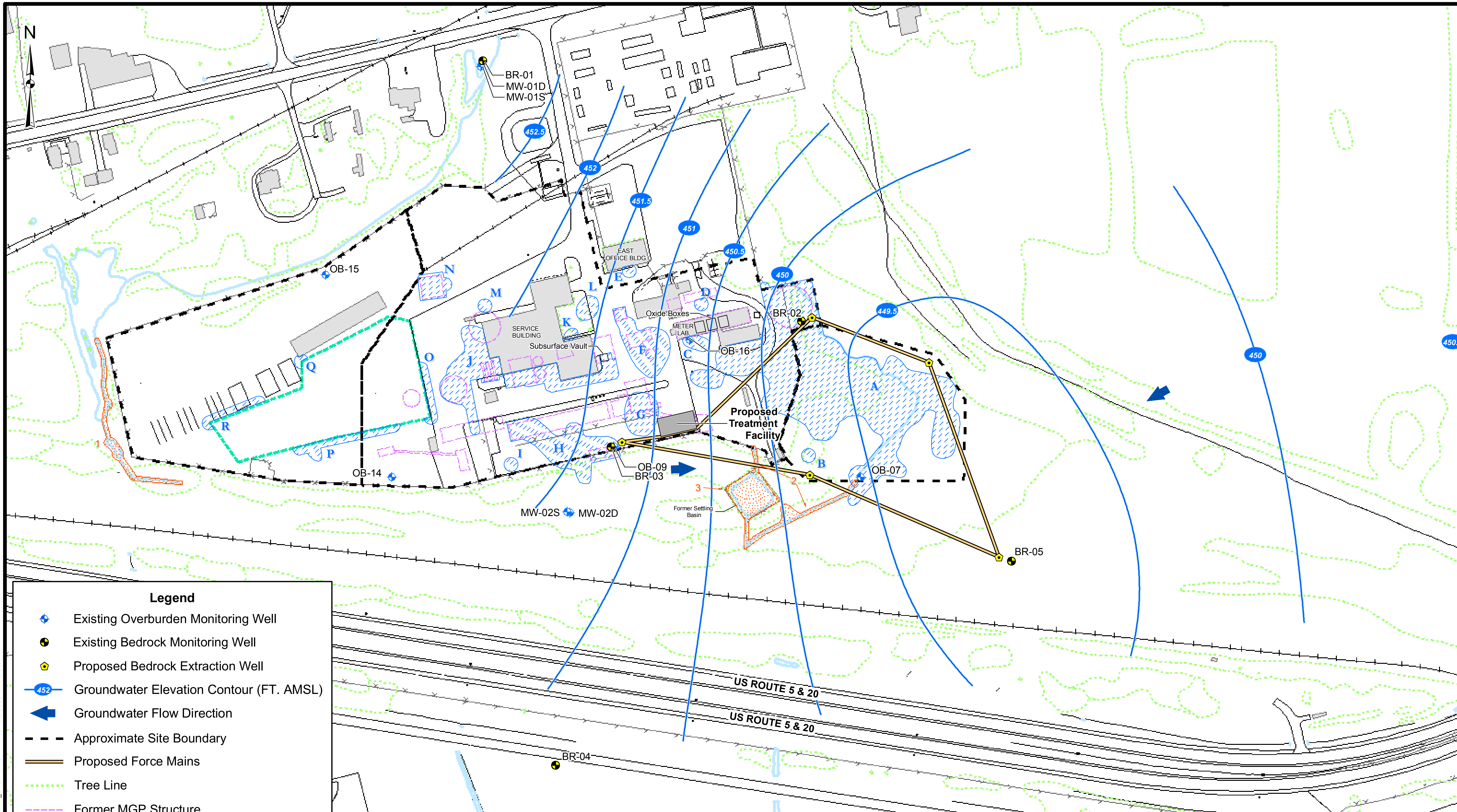

N
BR-01
MW-01D
MW-01S
OB-15
EAST OFFICE BLDG
SERVICE BUILDING
Subsurface Vault
Oxide Boxes
METER LAB
OB-16
BR-02
OB-14
OB-09
BR-03
OB-07
Former Settling Basin
MW-02S
MW-02D
BR-05
US ROUTE 5 & 20
US ROUTE 5 & 20
BR-04
Legend
Existing Overburden Monitoring Well
Existing Bedrock Monitoring Well
Approximate Site Boundary
Tree Line
Former MGP Structure
IRM Limit
Fence
Railroad
Source Removal Areas
In-Situ Solidification Area
Sediment Remediation Area
200 100 0 200
Feet
NYSEG - GENEVA
CONCEPTUAL LAYOUT FOR ALTERNATIVE 4B
ISS IN THE EWDA, SOURCE REMOVAL FOR AREAS OUTSIDE THE EWDA
URS
FIGURE 4-5
N:\38393614.00000\DB\GIs\ArcMap\FEASABILITY_STUDY\FIG 4-5.mxd 10/8/2008 B. Farster



NYSEG - GENEVA
CONCEPTUAL LAYOUT FOR ALTERNATIVE 5
CAPPING IN THE EWDA, SOURCE REMOVAL FOR AREAS OUTSIDE THE EWDA

FIGURE 4-6

N:\38393614.00000\DB\GisArcMap\FEASABILITY_STUDY\FIG 4-6.mxd 10/8/2008 B. Farster



Legend

- Existing Overburden Monitoring Well
- Existing Bedrock Monitoring Well
- Proposed Bedrock Extraction Well
- 452 Groundwater Elevation Contour (FT. AMSL)
- Groundwater Flow Direction
- Approximate Site Boundary
- Proposed Force Mains
- Tree Line
- Former MGP Structure
- IRM Limit
- Fence
- Railroad
- A Source Removal Areas
- 1 Sediment Remediation Area

NOTE: Groundwater elevation contours based on 9/2/08 bedrock groundwater elevations.

200 100 0 200 Feet

NYSEG - GENEVA
CONCEPTUAL LAYOUT FOR ALTERNATIVE 6
SOURCE AND WASTE REMOVAL, BEDROCK
GROUNDWATER COLLECTION AND TREATMENT

URS

FIGURE 4-7

N:\38393614.00000\DB\GisArcMap\FEASABILITY_STUDY\FIG 4-7.mxd 10/8/2008 B. Farster


N
EAST OFFICE BLDG
SERVICE BUILDING
METER LAB
Oxide Boxes
Subsurface Vault
Former Settling Basin
See Inset
US ROUTE 5 & 20
US ROUTE 5 & 20
SENECA LAKE
SW/SED-01
SW/SED-02
SW/SED-03
SW/SED-04
SW/SED-05
SW/SED-06
SW/SED-07
SW/SED-08
SW/SED-09
SW/SED-10
SW/SED-11
SW/SED-12
SW/SED-13
SW/SED-16
MW-01D
MW-01S
BR-01
BR-02
BR-03
BR-04
BR-05
MW-02S
MW-02D
MW-03D
MW-03S
MW-04D
MW-04S
MW-05D
MW-05S
OB-15
TP-40
SD-03
SD-02
SW-01
SD-01
Inset Map
HP-18
421
422
SS-01
424
TP-01
413
TP-02
414
SB-19
OB-13
412
SS-02
Legend
Pre-RI Sample
RI Sample
IRM Sample
Approximate Site Boundary
Tree Line
Former MGP Structure
IRM Limit
Fence
Railroad
100 50 0 100
Feet
NYSEG - GENEVA
SITE LAYOUT AND
SAMPLE LOCATION IDENTIFICATION
URS
PLATE - 1

APPENDIX A
SUPPORTING INVESTIGATION DATA

TABLE 1-1

SUMMARY OF BORING DETAILS
WOODWARD CLYDE SOIL BORING INVESTIGATION, 1984

NYSEG
GENEVA, NEW YORK

Boring ID	Total Depth (feet)	Top and Bottom of Lithologic Units (feet bgs)		Maximum OVA reading (ppm)	Target Area Investigated	Comments/ Notes
		Fill	Sand			
B-01	10.5	0-10.5	-	0.2	Former Semet/Solvay oven area.	C&D fill
B-02	8	0-3.5	3.5-8	0.4	Former Semet/Solvay oven area.	C&D fill
B-03	6	0-6	-	2.0	Former Semet/Solvay oven area.	Odor
B-04	8	0-4	4-8	1.5	Former Semet/Solvay oven area.	Swampy odor
B-05	4	0-4	-	0.4	Former Semet/Solvay oven area.	C&D fill
B-06	8	0-4.5	4.8-8	0.2	Former Semet/Solvay oven area.	C&D fill
B-07	2.5	0-2.5	-	0.1	Former Semet/Solvay oven area.	Concrete slab
B-08	8	0-8	-	0.0	Former Semet/Solvay oven area.	C&D fill
B-09	8	0-8	-	0.8	Former machine shop.	Coal tar at 4'
B-10	5.5	0-5.5	-	6.0	Former tar storage vessel.	Coal tar in hole
B-11	7	0-5.5	5.5-7	0.5	Former sludge basin.	C&D fill.
B-12	8	0-6.5	6.5-8	0.2	Former pump station.	C&D fill.
B-13	8.5	0-8.5	-	0.6	Former clear water basin.	C&D fill.
B-14	7	0-7	-	1.0	Proposed sanitary sewer excavation area.	C&D fill/ odor.
B-15	7	0-7	-	0.0	Proposed sanitary sewer excavation area.	C&D fill
B-16	5	0-5	-	0.5	Proposed sanitary sewer excavation area.	Slight odor/ coal
B-17	6.5	-	-	0.0	Proposed sanitary sewer excavation area.	Topsoil over gravel (6.5')
B-18	7	-	-	0.0	Proposed sanitary sewer excavation area.	Topsoil over gravel and clay (7')
B-19	6.5	-	-	0.0	North of FMSA.	Topsoil over gravel and clay (6.5')
B-20	8	-	-	0.0	North of FMSA.	Topsoil over silt and sand (8')
B-21	8	-	-	0.0	North of FMSA.	Topsoil over silt and clay (8')

Notes:
bgs: Below Ground Surface
OVA: Organic Vapor Analyzer
ppm: Part per Million
C&D: Construction and Demolition
FMSA: Former MGP Site Area

TABLE 1-2

SUMMARY OF TEST PIT DETAILS
TRC TASK 2 INVESTIGATION, 1987

NYSEG
GENEVA, NEW YORK

Test Pit No.	Total Depth (feet)	Top and Bottom of Lithologic Units (feet below ground surface)			Maximum Minirae PID reading (ppm)	Target Area Investigated	Comments/ Notes
		Topsoil	Fill	Clay			
TP-01	3	-	0-3	-	10	Tar storage vessel	Creosote odor/creosote (2-3')
TP-02	7.5	-	0-6.5	6.5-7.5	0	Tar storage vessel	Creosote (0.5-1.5')
TP-03	10	0-0.7	0.7-7	7-10	0	Near blue gas holder	Tar/ creosote odor in fill
TP-04	8	-	0-7.5	7.5-8	700	30,000 cubic ft holder	Sheen on water in pit/solvent odor (3-7.5')
TP-05	6	-	0-6	-	500	30,000 cubic ft holder	Slight tar odor
TP-06	5	-	0-4	4-5	1	100,000 cubic ft holder	Slight tar odor in fill
TP-07	5	-	0-5	-	0	Near holders, ammonia tanks	Diesel/gas odor and tar odor
TP-08	8	-	0-4.5	4.5-8	0	Near holders, ammonia tanks	Strong creosote odor in fill
TP-09	4	-	0-4	-	10	Near ammonia tanks	Diesel odor (pit near diesel UST)
TP-10	3	-	0-3	-	0	Semet-Solvay ovens	Hit coke oven foundation
TP-11	5	-	0-5	-	0	Sludge pit	No visible contamination or odor
TP-12	4	-	0-3.5	3.5-4	0	South of suspected contamination	Coal and coal slag (0.5-3.5')
TP-13	6	0-0.5	0.5-5	5-6	3	Near byproduct building	Bricks and C&D fill
TP-14	8	-	0-5	5-8	400	Near byproduct building	Strong tar odor (3-8') less w/depth
TP-15	5	-	0-5	-	50	Near A.C. building	Tar odor and visible tar (4-5')
TP-16	6	-	0-6	-	0	South of suspected contamination	Slight tar odor (0-2'), coal/coal slag (0-6')
TP-17	7	-	0-7	-	0	Near power house/ semet-solvay ovens	C&D fill, no odor
TP-18	6	-	0-6	-	0	Sludge pit	C&D fill, over RR bed
TP-19	7.5	0-0.5	0.5-7.5	-	0	South of suspected contamination	Coal and coal slag
TP-20	2.5	0-1	-	1-2.5	0	Adjacent to original office building	No filll or tar
TP-21	2.5	-	0-2.5	-	0	Adjacent to compressor room/ Purifier House	Fill, no odor
TP-22	3	-	0-3	-	<1,000	Holder in existing central parking area	C&D fill, tar odor
TP-23	8	-	0-7	7-8	0	Semet-Solvay ovens	C&D fill, hit coke oven foundation
TP-24	4.5	-	0-4.5	-	0	Adjacent to compressor room/ Purifier House	Fill, slight tar odor
TP-25	4	-	0-4	-	4	Adjacent to Purifier House	Slight tar odor, coal coal slag
TP-26	3.5	0-0.5	0.5-3.5	-	not taken	South of Purifier House	Fill, water with sheen in pit, tar odor
TP-27	6	-	0-4	4-6	0	Edge of large relief holder	Heavy tar (2.5-4'), tar odor

TABLE 1-2

SUMMARY OF TEST PIT DETAILS
TRC TASK 2 INVESTIGATION, 1987

NYSEG
GENEVA, NEW YORK

Test Pit No.	Total Depth (feet)	Top and Bottom of Lithologic Units (feet below ground surface)			Maximum Minirae PID reading (ppm)	Target Area Investigated	Comments/ Notes
		Topsoil	Fill	Clay			
TP-28	3.5	-	0-3.5	-	0	Waste disposal area	Tar odor, hit holder floor oil sheen on water
TP-29	4	-	0-4	-	0	Waste disposal area	Fill and purifier wastes, wood chips
TP-30	3	-	0-1	1-3	0	Edge of large relief holder	Hit holder foundation
TP-31	6.5	-	0-4.5	4.5-6.5	0	Waste disposal area	C&D fill with purifier waste
TP-32	6	-	0-6	-	not taken	Waste disposal area	C&D fill with purifier waste, tar odor
TP-33	6	-	0-6	-	0	Waste disposal area	C&D fill with purifier waste, tar odor
TP-34	2.5	-	0-2.5	-	0	Within large relief holder	Hit holder foundation
TP-35	9	0-1	1-2.5	2.5-9	0	Waste disposal area	Coal and coal slag
TP-36	10	-	0-8	8-10	8	Waste disposal area	Thick tar (5-8')
TP-37	7.5	0-4	4-6	6-7.5	0	Waste disposal area	Thick black tar (4-6')
TP-38	6	0-0.5	0.5-2	2-6	0	South of waster disposal area	Fill: coal and coal slag
TP-39	9	0-0.7	0.7-3.5	3.5-9	0	Background by North St.	No waste, C&D
TP-40	8.5	0-1	1-4.5	4.5-8.5	0	Southeast corner of property	Coal slag in fill, no tar
TP-41	4	0-1	1-3	3-4	0	Adjacent to creek- south property boundary	Coal slag
TP-41A	1.5	-	0-1	1-1.5	not taken	Adjacent to creek- south property boundary	Tar odor
TP-42	7	0-1	1-4.5	4.5-7	not taken	Waste disposal area	Tar odor

Notes:
Test pit locations are shown in Figure 1-3.
PID: Photoionization Detector
ppm: Part per Million
C&D: Construction and Demolition
A.C.: Ammonia Concentrate
UST: Underground Storage Tank

TABLE 1-3

SUMMARY OF BORING DETAILS
TRC TASK 2 INVESTIGATION, 1987

NYSEG
GENEVA, NEW YORK

Boring ID	Top and Bottom of Lithologic Units (feet below ground surface)						Maximum OVA Reading (ppm)	Target Area Investigated	Comments/ Notes
	Fill	Topsoil/ Silt	Sand/ Silt	Clay/ Some Silt	Sand	Alt. Sand and Clay			
B-87-01	0-6	-	-	6-7	-	-	30	Former coke bin/ Semet/ Solvay oven area	Black sudge at 2', coal tar to 6'
B-87-01A	0-5	-	-	-	5-6	-	-	Former coke bin/ Semet/ Solvay oven area	Fill with coal tar to 5'
B-87-02	0-2	-	-	5-7	2-5	-	3	Former coke bin/ Semet/ Solvay oven area	Oily fill with petroleum odor
B-87-03	0-1	-	-	5-7	1-5	-	3.8	Former coke bin/ Semet/ Solvay oven area	Cinders in fill
B-87-04	0-2	-	-	6-7	2-6	-	40	Former coke bin/ Semet/ Solvay oven area	Coal and cinders in fill
B-87-05	0-2.5	-	-	3.5-5	2.5-3.5	-	3	Former coke bin/ Semet/ Solvay oven area	Black coal and cinders in fill
B-87-06	0-2	-	-	7-8	2-7	-	8	Former coke bin/ Semet/ Solvay oven area	Black coal and cinders in fill
B-87-07	0-2	-	-	2-4 5-7	4-5	-	25	Former coke bin/ Semet/ Solvay oven area	Coal with cinders, coal tar odor
B-87-08	0-3	-	-	5-6	3-5	-	4	Former coke bin/ Semet/ Solvay oven area	Coal and cinders in fill
MW-01D/01S	-	0-2	2-6	6-14 44-50 54-72	14-30 72-88	30-44 50-54	-	Upgradient	Shallow/ deep well pair
MW-02D/02S	0-8	-	-	8-19 74-89	19-40 89-106	40-74	-	Downgradient-backwater area	Shallow/ deep well pair
MW-03D/03S	0-4	-	-	4-10 73-86	13-38 50-60 86-102	10-13 38-50 60-73	-	Downgradient-Eastern waste disposal area	Shallow/ deep well pair

Notes:
OVA: Organic Vapor Analyzer
ppm: Part per Million
Alt: Alternating

TABLE 1-4

SUMMARY OF BORING DETAILS
TRC TASK 3 INVESTIGATION, 1987

NYSEG
GENEVA, NEW YORK

Boring ID	Top and Bottom of Lithologic Units (feet below ground surface)						Maximum OVA Reading (ppm)	Target Area Investigated	Comments/ Notes
	Fill	Topsoil/ Silt	Sand/ Silt	Clay/ Some Silt	Sand	Alt. Sand and Clay			
TB-09	0-9	9-17.5	-	-	-	17.5-19	4	South of Semet-Solvay ovens	Coal tar odor 7-9'
TB-10	0-12	13-19	-	-	-	-	-	Semet-Solvay ovens	C&D fill to 13'
TB-11	0-13	13-19	-	-	-	-	-	Near powerhouse/ Semet-Solvay ovens	C&D fill to 13'
TB-12	0-9.5	9.5-13 17-19	-	-	-	13-17	-	South of powerhouse	Pitch/coal 5-7'

Notes:
OVA: Organic Vapor Analyzer
ppm: Part per Million
Alt: Alternating
C&D: Construction and Demolition

TABLE 2-1

SUMMARY OF GEOPROBE BORING DETAILS

NYSEG
GENEVA, NEW YORK

Boring ID	Area of Investigation	Total Depth (feet)	Lithologic Unit Encountered (feet bgs)			Maximum PID/OVA reading (ppm)	Comments/ Notes
			Fill	Silt	Clay		
GP-01	OEA	6	-	0-5	5-6	0	No fill
GP-02	OEA	6	-	0-6	-	0	No fill
GP-03	OEA	6	-	0-3	3-6	0	No fill
GP-04	OEA	6	-	0-3	3-6	0	No fill
GP-05	OEA	6	0-0.5	0.5-4.5	4.5-6	0	Thin fill
GP-06	OEA	6	0-1.25	-	1.25-6	0	Thin fill
GP-07	OEA	6	-	0-1.5	1.5-6	0	No fill
GP-08	EWDA	6	-	0-0.5	0.5-6	0	No fill
GP-09	EWDA	6	-	0-2.5	2.5-6	0	No fill
GP-10	EWDA	15	0-10.5	10.5-15	-	0	CLM (0-10.5)
GP-11	EWDA	9	0-2	2-9	-	0	CLM (1-2)
GP-12	EWDA	12	0-10.5	10.5-11	-	0	CLM (0-10.5)
GP-13	EWDA	6	-	0-1.7	1.7-6	0	No fill
GP-14	EWDA	12	0-9.5	9.5-12	-	0	CLM (0-9.5)
GP-15	EWDA	6	0-3	3-6	-	0	CLM (0-3)
GP-16	BWA	15	0-11	11-12	12-15	0	CLM (0-11)
GP-17	BWA	12	0-10	-	10-12	0	CLM/ Staining in fill
GP-18	BWA	12	0-9	-	9-12	0	CLM (0-9)
GP-19	BWA	21	0-10.5	-	10.5-21	0	CLM (0-9)
GP-20	BWA	24	0-20	-	20-24	0	CLM/ALM (0-20)
GP-21	BWA	12	0-11.5	-	11.5-12	0	CLM in fill
GP-22	BWA	9	0-3.75	-	3.75-9	0	CLM (0-3.75)

Notes:
OEA - Off-site Environs Area
EWDA - Eastern Waste Disposal Area
BWA - Backwater Area
CLM - Coal-like Material
ALM - Ash-like Material

PID - photo-ionization detector
OVA - organic vapor analyzer
ppm - parts per million
bgs - below ground surface

TABLE 2-2

SUMMARY OF SOIL BORING DETAILS

NYSEG
GENEVA, NEW YORK

Boring ID	Area of Investigation	Total Depth (feet)	Lithologic Unit Encountered (feet bgs) Topsoil	Fill	Silty Clay	Sand/ Silty seams	Maximum PID reading (ppm)	Target Area Investigated	Comments/ Notes
SB-01	FMSA	30	-	0-4	4-15	15-30	0	Former 300,000 cf holder	Concrete to 4.0'
SB-02/OB-06	FMSA	30	0-0.4	0.4-4	4-14	14-30	0	Former 300,000 cf holder	Fill 0-2', concrete 2-4', slight odor 4-6'
SB-03/OB-16	FMSA	30	-	0-8	8-16	16-30	0	Former meter shop	Fill 0-1.5', 4-6', concrete 1.5-4', 5-8'
SB-04	FMSA	30	-	0-6	6-14	14-30	0	Former water reservoir	Fill 0-2'
SB-05/OB-08	FMSA	30	-	0-6	6-18	18-30	22	Former tar storage vessel	Well 20-30' Fill 0-6', coal tar 1.5-2.0' sheen 2-4', odor 0-20'
SB-06	FMSA	32	-	0-4	4-18	18-32	7.8	Former machine shop	Fill 0-4', staining 2-4', odor 0-10'
SB-07A	FMSA	10	-	0-10	-	-	NM	Former cooling coils	Vault at 10' (waste sample), Fill 0-10' NAPL, sheen and odor in fill
SB-07B	FMSA	30	-	0-8	8-24	24-30	0	Former cooling coils	Fill 0-6.3' Tar, NAPL and odor 2-6'
SB-08	FMSA	30	-	0-10	10-27	27-30	0	Former power house	Fill 0-10' odor 8-12'
SB-09	FMSA	30	-	0-9	9-18	18-30	0	Former Semet/Solvay ovens	Fill 0-9'
SB-10/OB-10	FMSA	30	-	0-8.5	8.5-16	16-30	22	Former storage vessel	Well 20-30'. Fill 0-8.5', Odor 3.5-30' trace tar 6-9.5'
SB-11	FMSA	30	-	0-8	8-18	18-30	NM	Former ammonia concentrate building	Fill 0-8'. Odor 4-20', trace tar 8-12'
SB-12	FMSA	30	-	0-10	10-19.5	19.5-30	NM	Former ammonia tanks	Fill 0-10'. Odor 2-26', trace tar 10-12'
SB-13/OB-11	FMSA	30	-	0-8	8-17	17-30	2	Former 100,000 cf holder	Fill 0-8'
SB-14	FMSA	28	-	0-6	6-19	19-28	NM	Former 100,000 cf holder	Fill 0-6'
SB-15	FMSA	30	-	0-9	9-17.5	17.5-30	NM	Former blue gas building	Fill 0-9'. Odor 2-22'
SB-16	FMSA	28	-	0-6	6-20	20-28	245	Former 30,000 cf holder	Fill 0-6'. Coal tar 2-6', odor 2-16'
SB-17/OB-12	FMSA	28	-	0-6	6-16	16-28	26	Former western holder area	Well 18-28'. Fill 0-6'. Odor 4-14'
SB-18	FMSA	30	-	0-5	5-14.5	14.5-30	23	Former tar storage vessel	Fill 0-5'. Coal tar 0.5-4', odor 0-10.5'
SB-19/OB-13	FMSA	30	-	0-5.5	5.5-15.5	15.5-30	33	Former western tar storage area	Well 18-28'. Fill 0-5.5', odor 0.5-20'
SB-20	FMSA	30	-	0-4	4-13	13-30	NM	Near western property extention	Fill 0-4'. Odor 2-4'
SB-21/OB-14	FMSA	30	-	0-6	6-17	17-30	0	Western property extention	Well 18-28'. Fill 0-6'
SB-22	WPEA	30	-	0-4	4-12	12-30	NM	Western property extention	Fill 0-4'. Odor 2-4'
SB-23	WPEA	30	-	0-2	2-8	8-30	NM	Western property extention	Fill 0-2'
SB-24	WPEA	30	-	0-3	3-12.5	12.5-30	0	Western property extention	Fill 0-3'
SB-25	FMSA	30	-	0-6	6-13	13-30	NM	West of former powerhouse	Fill 0-6'
SB-26	FMSA	27	-	0-4	4-23.5	23.5-27	NM	Former tar storage vessel	Fill 0-4'. Odor 2-4'

Notes:
FMSA- Former MGP Site Area
WPEA- Western Property Extention Area
NM -Not measured

PID - photo-ionization detector
ppm - parts per million
bgs - below ground surface

cf - cubic feet

TABLE 2-2a

RI ADDITIONAL WORK
SUMMARY OF SOIL BORING DETAILS

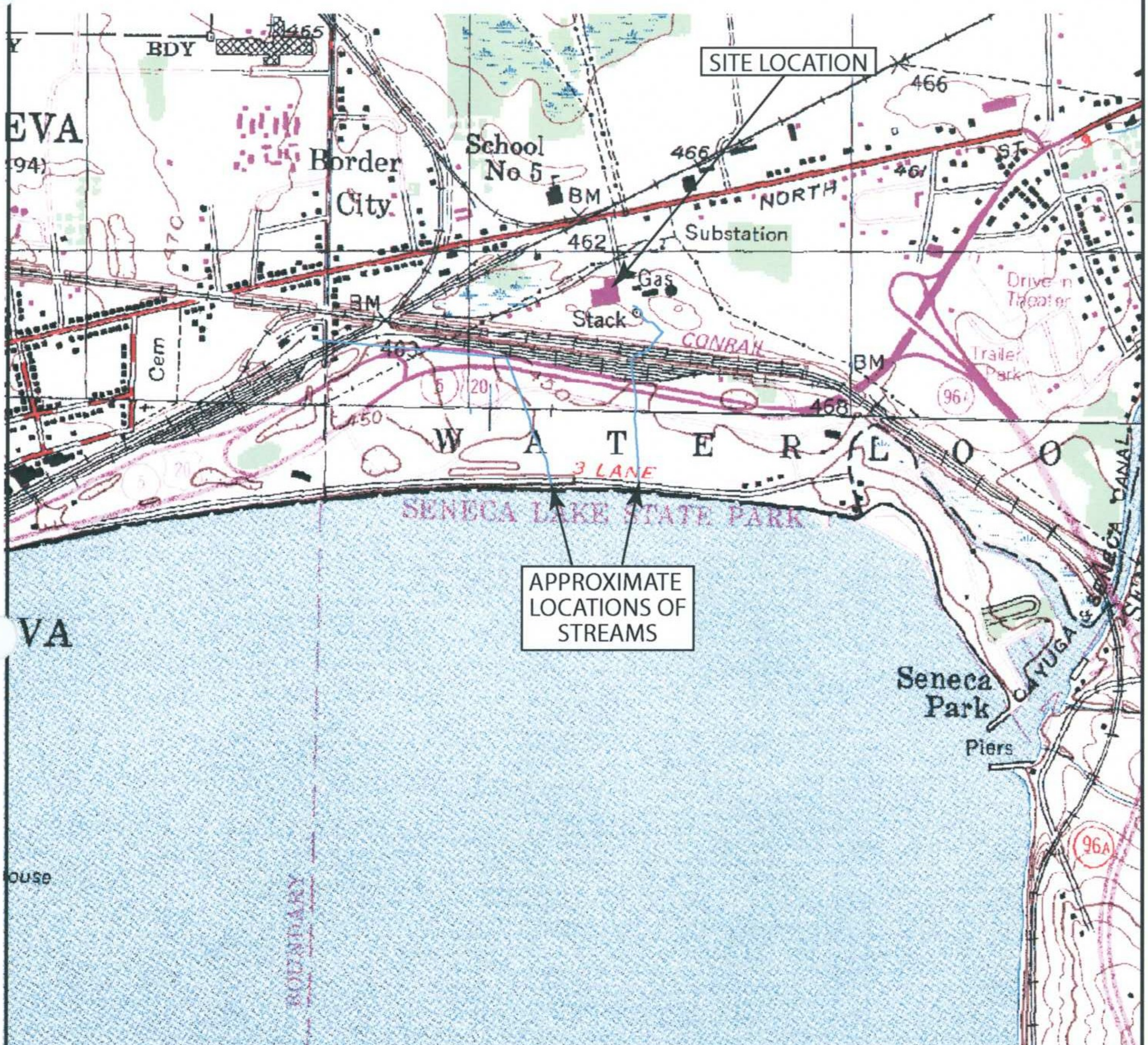
NYSEG
GENEVA, NEW YORK

Boring ID	Area of Investigation	Total Depth (feet)	Lithologic Unit Encountered (feet bgs)					Maximum PID reading (ppm)	Target Area Investigated	Comments/ Notes
			Fill	Gravel/ Sand	Clay/ Trace Silt	Sand/ Silty seams	Clay/ Trace Silt			
GP-23	WPEA	28	-	0-1	1-8	8-26	26-28	0	Western property extension	
GP-24	WPEA	28	-	0-1	1-10	10-26	26-28	0	Western property extension	Coal Fragments 0.5-1'
GP-25	WPEA	30	-	0-4	4-8	8-29	29-30	52.3	Western property extension	Trace Tar (4-24'), Odor (1-30')
GP-26	WPEA	32	-	0-10	10-11	11-28	28-32	2863	Western property extension	Odor (8-25'), Tar stains/sheen (8-10')
GP-27	WPEA	28	-	0-1	1-10	10-26	26-28	0	Western property extension	Odor (10-26')
GP-28	WPEA	32	-	0-1	1-10	10-30	30-32	0	Western property extension	
GP-30		2	0-2	-	-	-	-	NM		Tar odors (0-2')
GP-31		4	0-4	-	-	-	-	NM		Odor (0-2'), Tar (2-4')
GP-32		8	0-2	-	2-8	-	-	NM		Tar (2-8')
GP-33		6	0-0.5	-	0.5-6	-	-	NM		Slight odor (0.5-6')
GP-34		8	0-6	6-8	-	-	-	NM		Odor (2-6'), Tar (6-8')
GP-35		4	0-2	-	2-4	-	-	NM		Strong odor (0-4')
GP-36		6	0-6	-	-	-	-	NM		Fill material full of tar (4-6')
GP-37		4	0-4	-	-	-	-	NM		Tar (2-4')
GP-38		4	0-2	-	2-4	-	-	NM		
GP-40		4	0-2	-	2-4	-	-	NM		
GP-41		4	0-2.5	-	2.5-4	-	-	NM		
GP-42		6	0-2	-	2-6	-	-	NM		
GP-43		6	0-2	-	2-6	-	-	NM		

Notes:
FMSA- Former MGP Site Area
WPEA- Western Property Extention Area
NM -Not measured

PID - photo-ionization detector
ppm - parts per million
bgs - below ground surface

cf - cubic feet



Title:	SITE LOCATION MAP
Location:	FORMER MGP SITE GENEVA, NEW YORK
Client:	NYSEG — NEW YORK STATE ELECTRIC & GAS

SOURCE:

USGS 7 1/2 Minute Series Topographic Maps
Geneva North, New York 1978,
and Geneva South, New York 1978

0 600 1,200
GRAPHIC SCALE IN FEET

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Drafter: BKG	Date: January 7, 2004
Drg. Size: 8.5 x 11	Job No.: 38393615.00000

FIGURE 1-1

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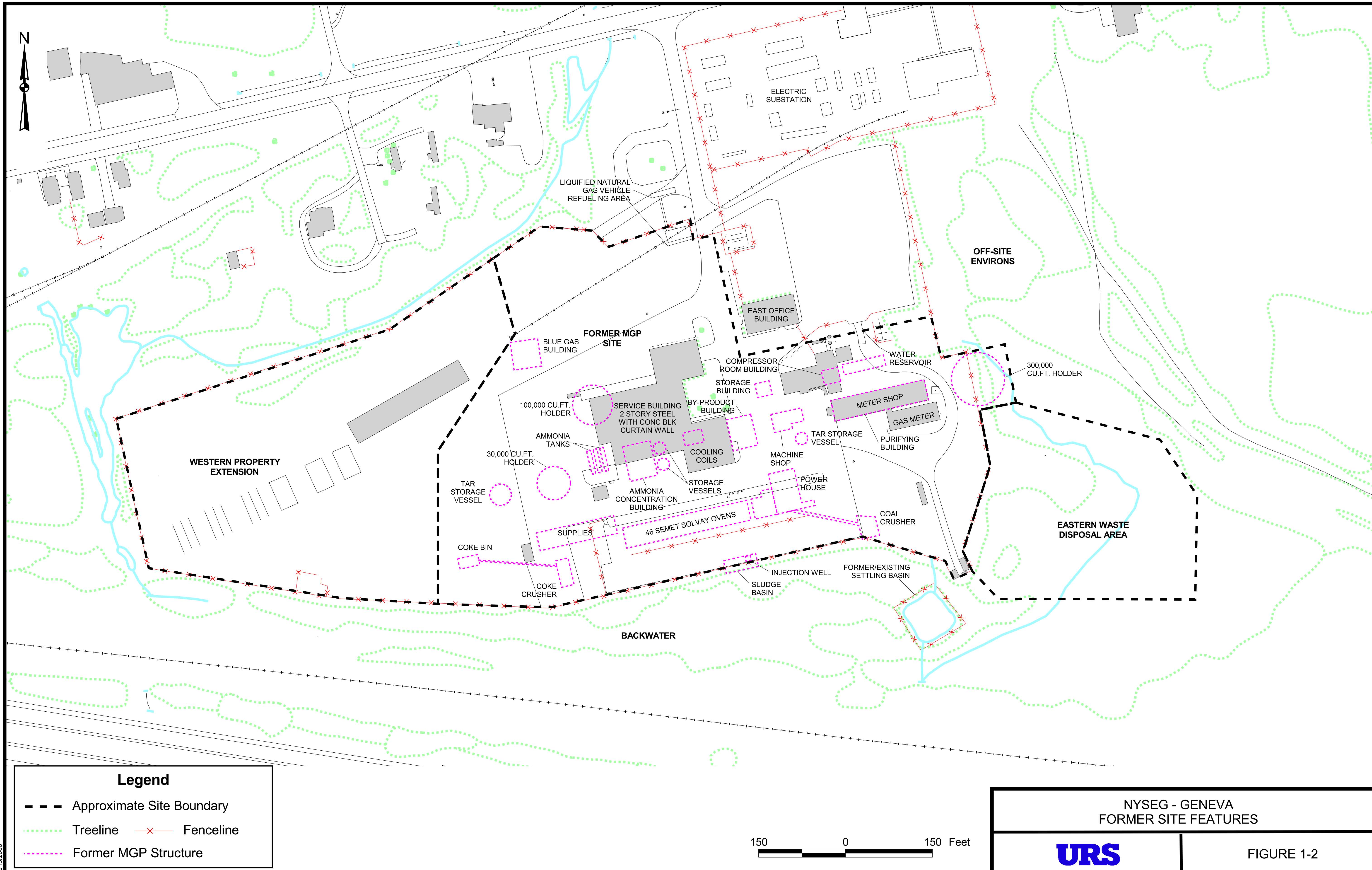

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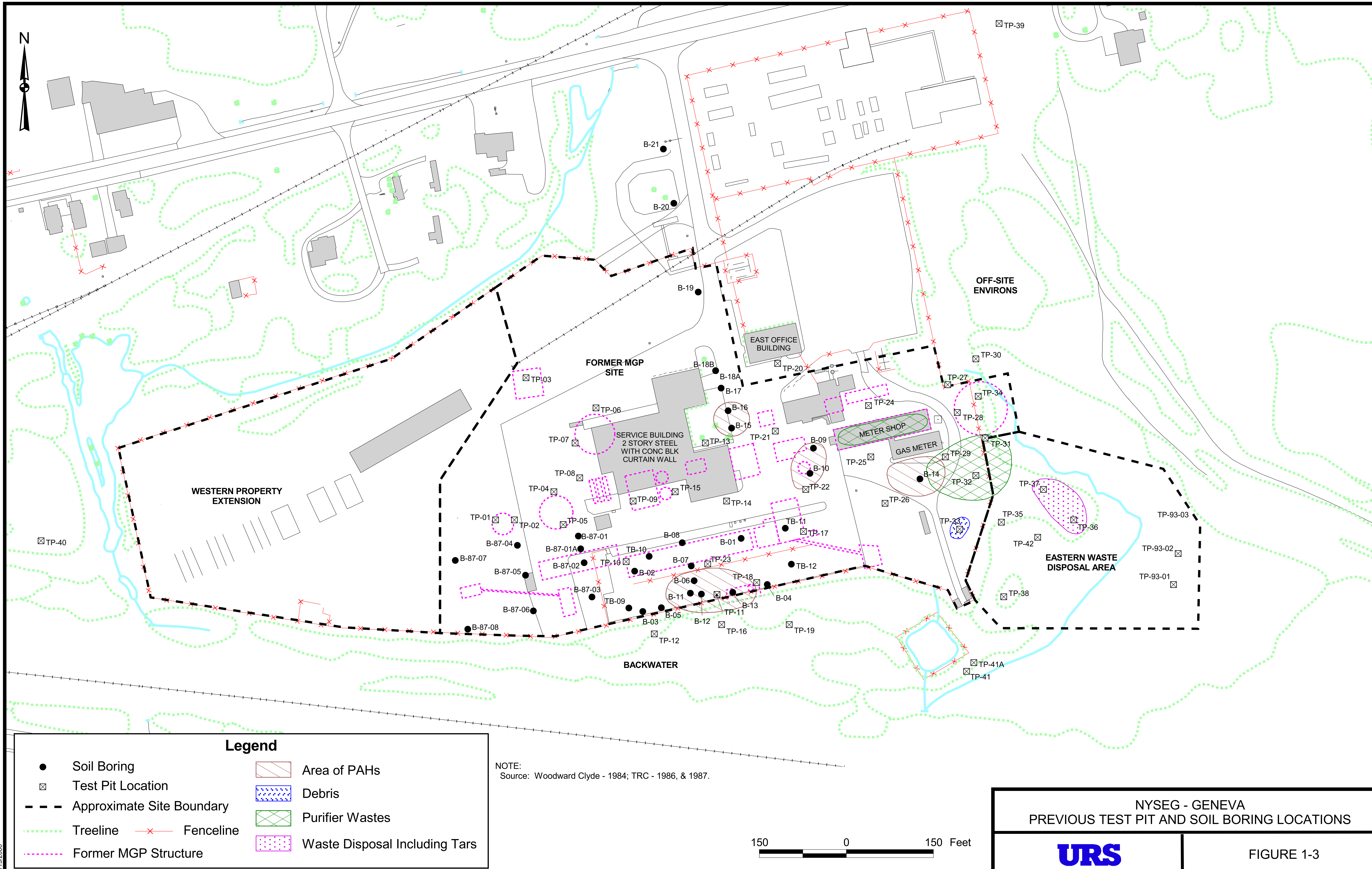

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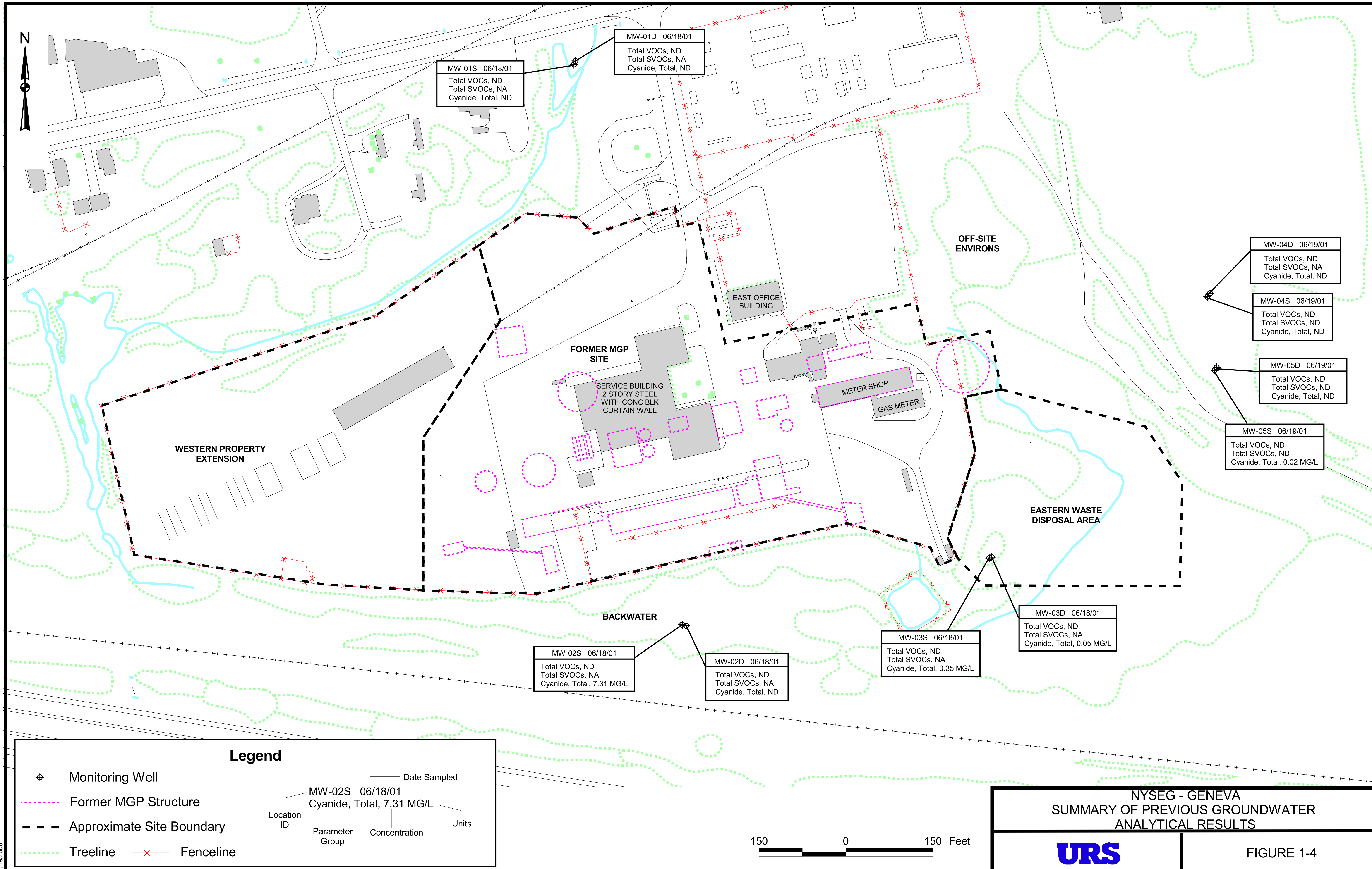
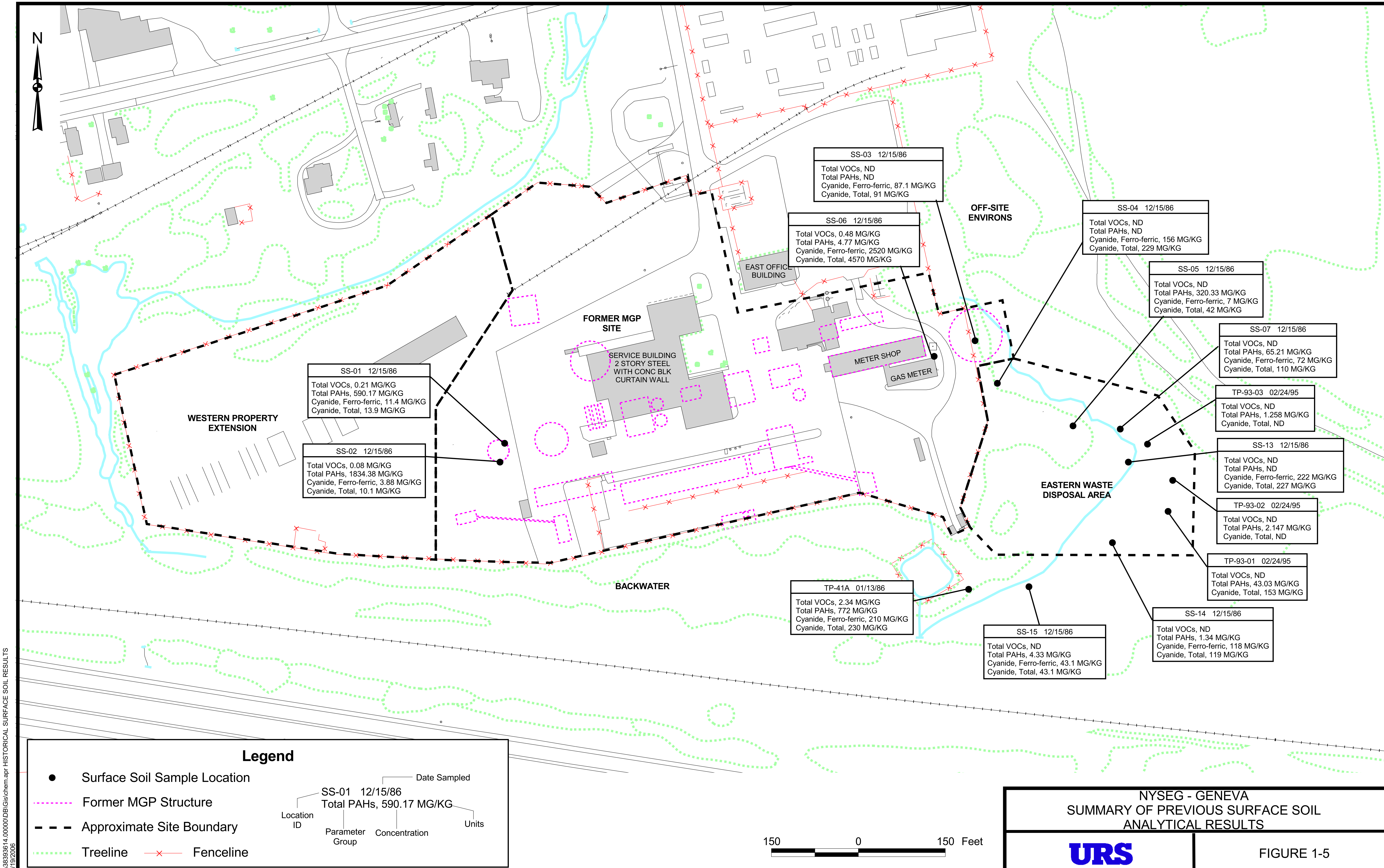


NYSEG - GENEVA
SUMMARY OF PREVIOUS GROUNDWATER ANALYTICAL RESULTS

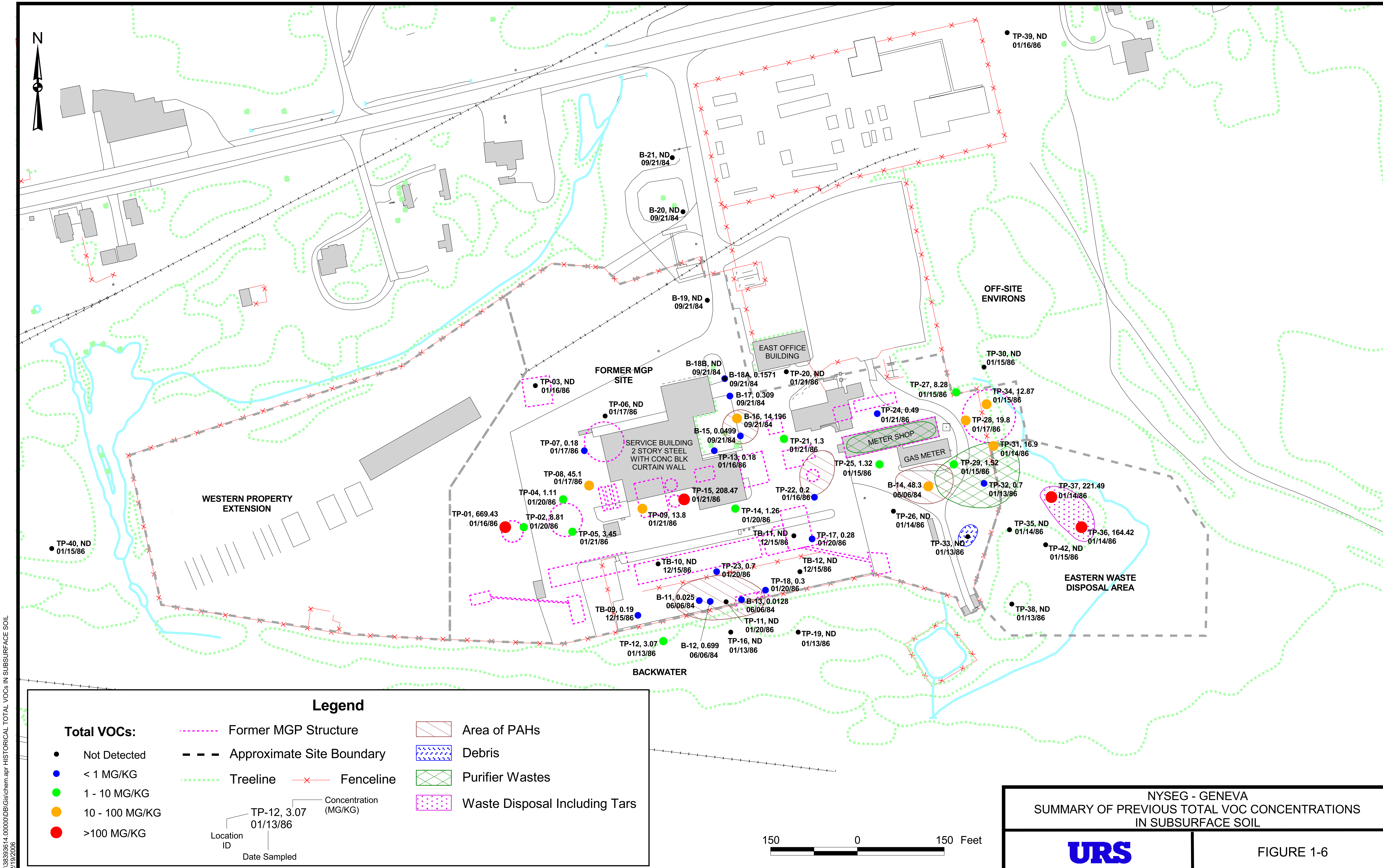
URS

FIGURE 1-4



NYSEG - GENEVA
SUMMARY OF PREVIOUS SURFACE SOIL ANALYTICAL RESULTS

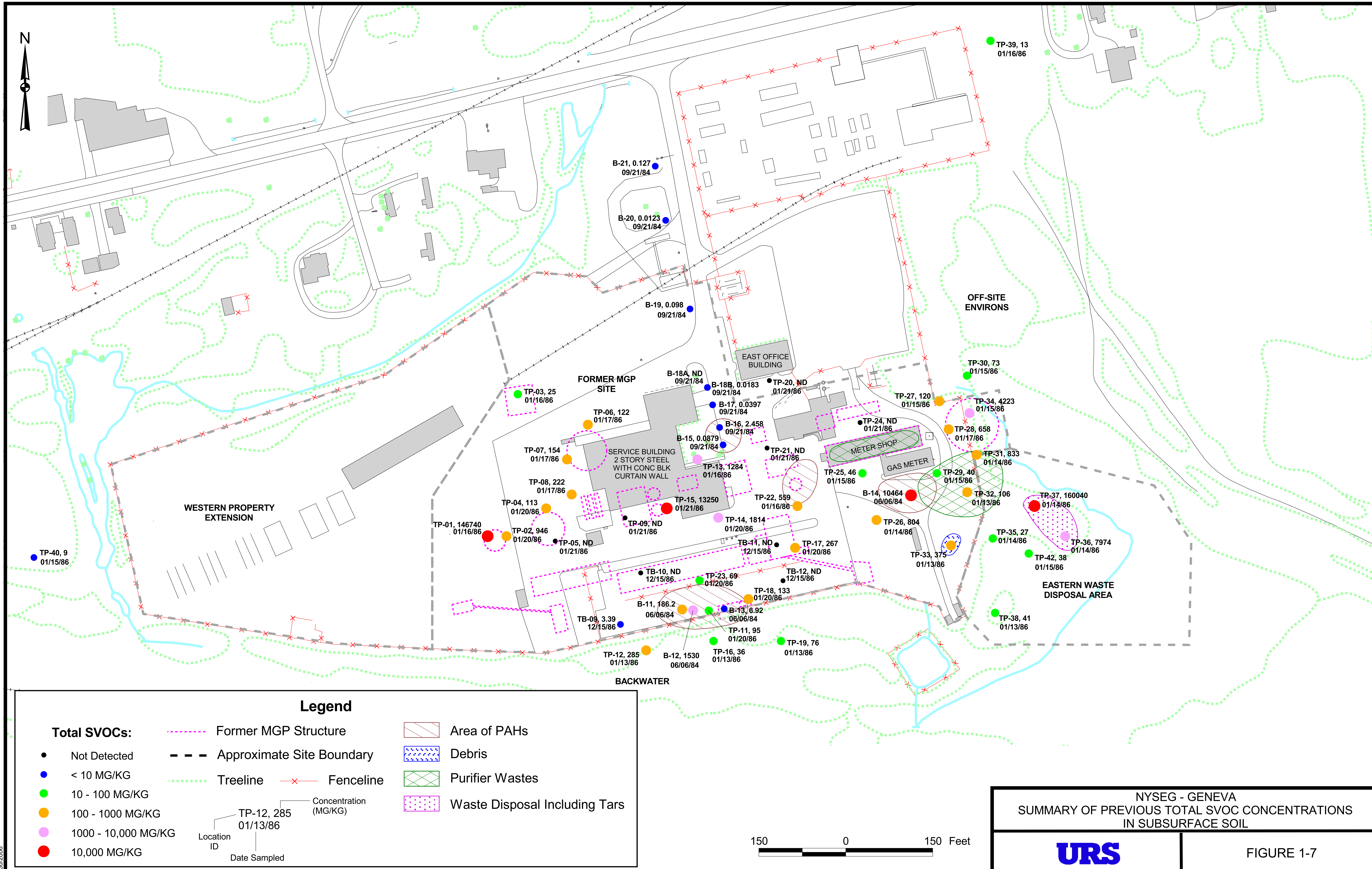
FIGURE 1-5



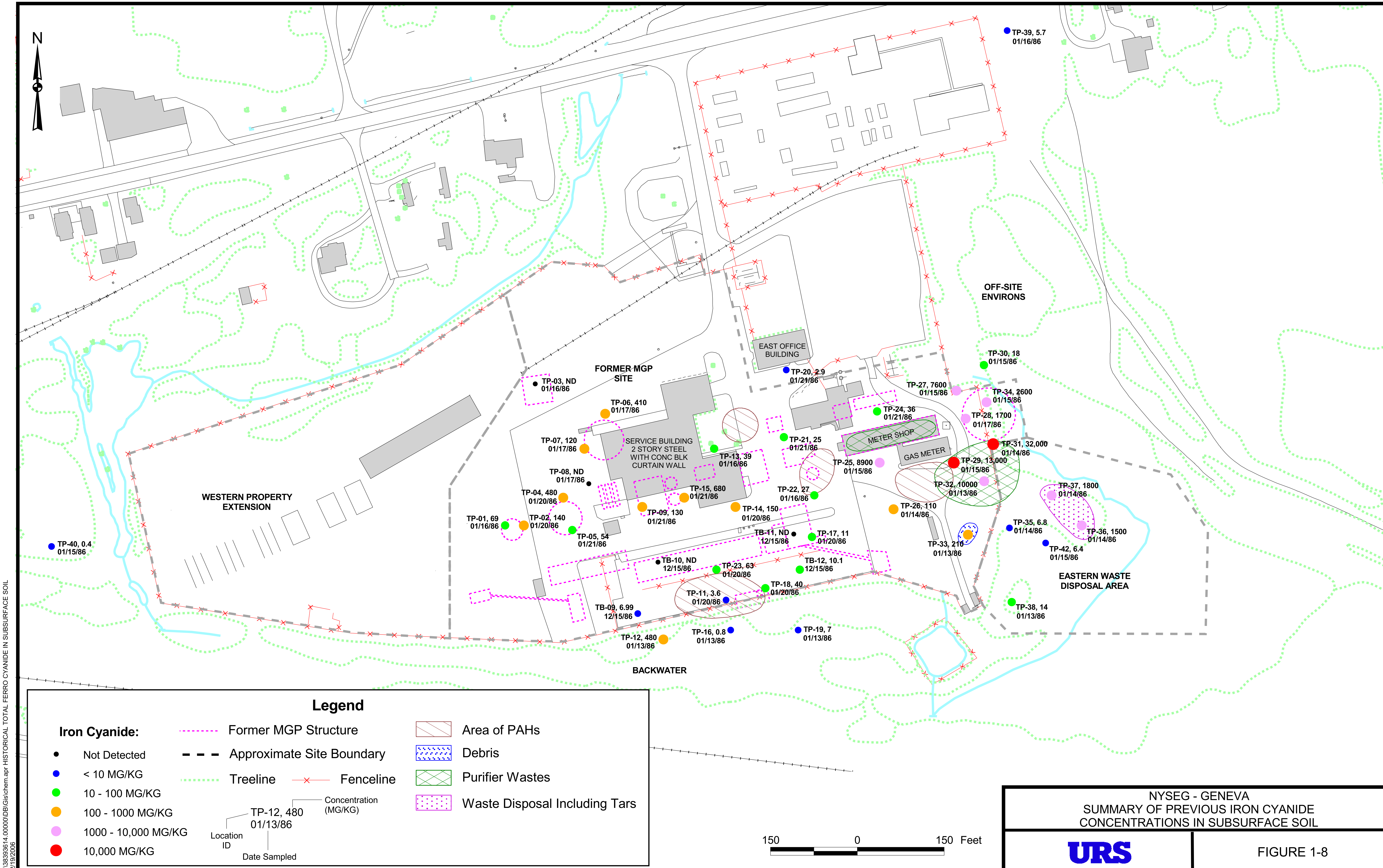
NYSEG - GENEVA
SUMMARY OF PREVIOUS TOTAL VOC CONCENTRATIONS
IN SUBSURFACE SOIL

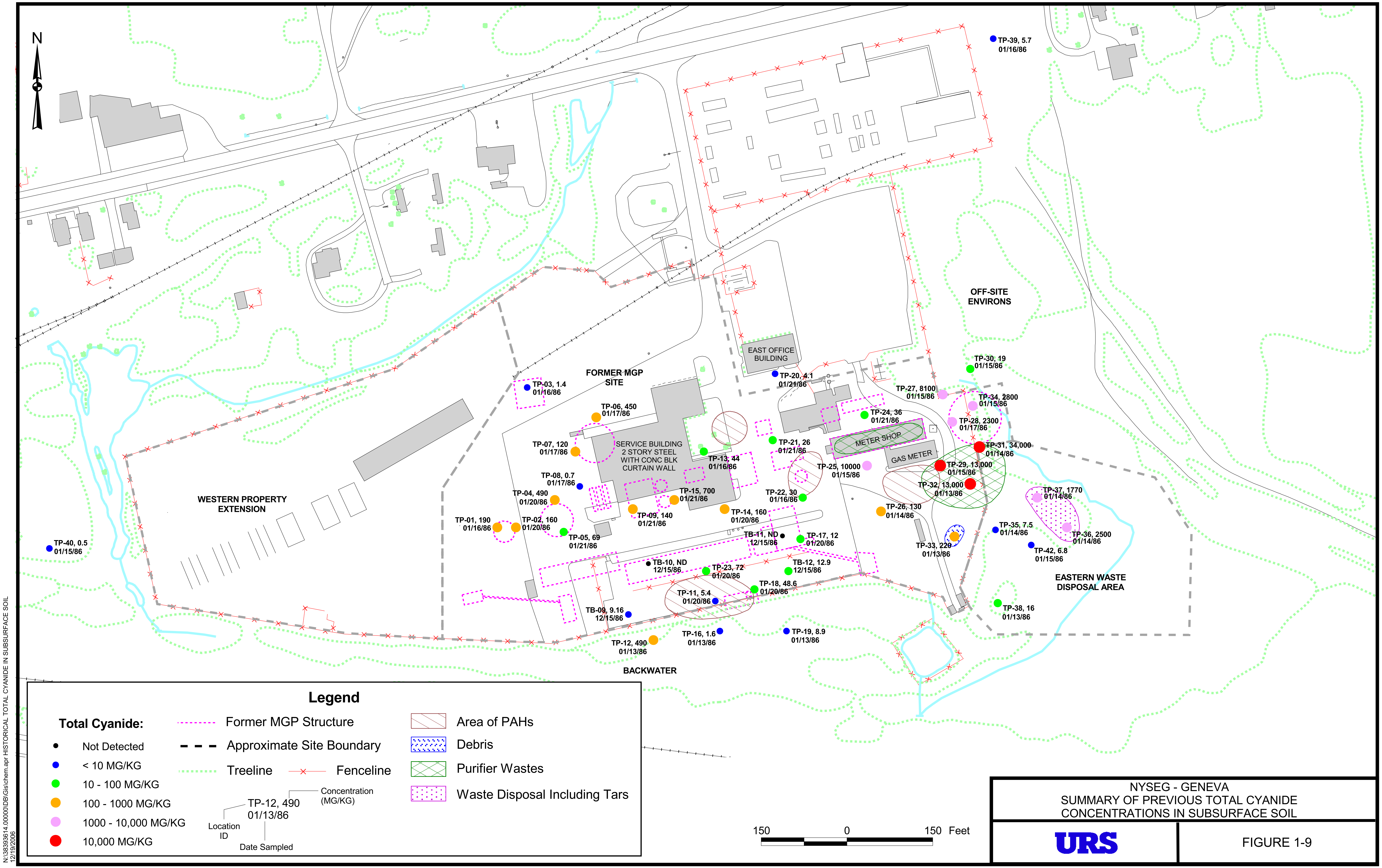
URS

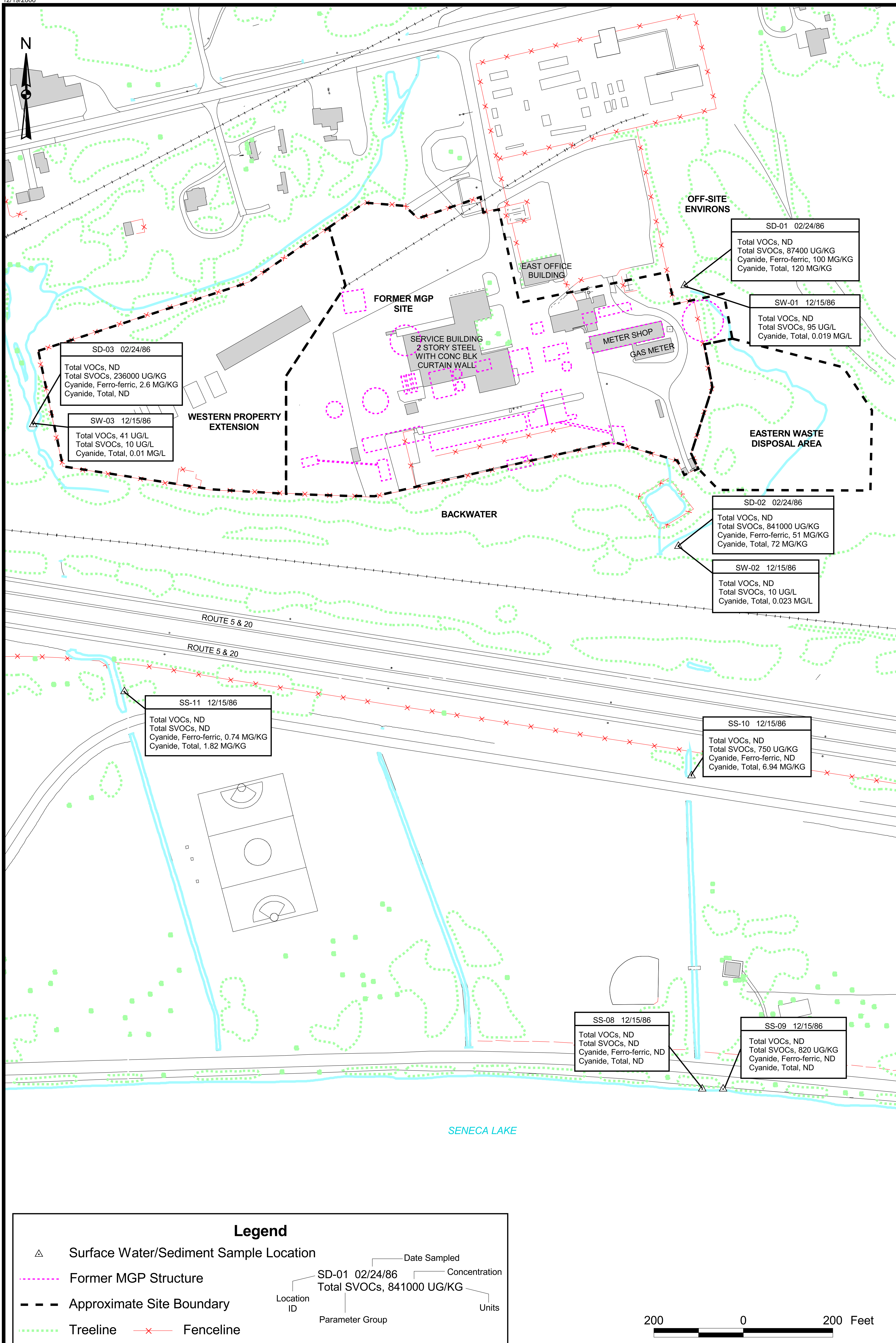
FIGURE 1-6



N:\38393614.00000\DB\Gis\chem.apr HISTORICAL TOTAL SVOCs IN SUBSURFACE SOIL
5/30/2006


N
OFF-SITE ENVIRONS
FORMER MGP SITE
WESTERN PROPERTY EXTENSION
EASTERN WASTE DISPOSAL AREA
BACKWATER
EAST OFFICE BUILDING
SERVICE BUILDING 2 STORY STEEL WITH CONC BLK CURTAIN WALL
METER SHOP
GAS METER
TP-39, 5.7 01/16/86
TP-30, 18 01/15/86
TP-27, 7600 01/15/86
TP-34, 2600 01/15/86
TP-28, 1700 01/17/86
TP-31, 32,000 01/14/86
TP-29, 13,000 01/15/86
TP-32, 10000 01/13/86
TP-37, 1800 01/14/86
TP-36, 1500 01/14/86
TP-35, 6.8 01/14/86
TP-42, 6.4 01/15/86
TP-38, 14 01/13/86
TP-33, 210 01/13/86
TP-26, 110 01/14/86
TP-25, 8900 01/15/86
TP-24, 36 01/21/86
TP-21, 25 01/21/86
TP-22, 27 01/16/86
TP-20, 2.9 01/21/86
TP-03, ND 01/16/86
TP-06, 410 01/17/86
TP-07, 120 01/17/86
TP-08, ND 01/17/86
TP-13, 39 01/16/86
TP-15, 680 01/21/86
TP-04, 480 01/20/86
TP-01, 69 01/16/86
TP-02, 140 01/20/86
TP-05, 54 01/21/86
TP-09, 130 01/21/86
TP-14, 150 01/20/86
TB-11, ND 12/15/86
TP-17, 11 01/20/86
TB-10, ND 12/15/86
TP-23, 63 01/20/86
TB-12, 10.1 12/15/86
TP-18, 40 01/20/86
TP-11, 3.6 01/20/86
TB-09, 6.99 12/15/86
TP-12, 480 01/13/86
TP-16, 0.8 01/13/86
TP-19, 7 01/13/86
TP-40, 0.4 01/15/86
Legend
Iron Cyanide:
Not Detected
< 10 MG/KG
10 - 100 MG/KG
100 - 1000 MG/KG
1000 - 10,000 MG/KG
10,000 MG/KG
Former MGP Structure
Approximate Site Boundary
Treeline
Fenceline
Area of PAHs
Debris
Purifier Wastes
Waste Disposal Including Tars
TP-12, 480 01/13/86
Concentration (MG/KG)
Location ID
Date Sampled
150 0 150 Feet
NYSEG - GENEVA
SUMMARY OF PREVIOUS IRON CYANIDE CONCENTRATIONS IN SUBSURFACE SOIL
URS
FIGURE 1-8
N:\38393614.00000\DB\Gis\chem.apr HISTORICAL TOTAL FERRO CYANIDE IN SUBSURFACE SOIL
12/19/2006

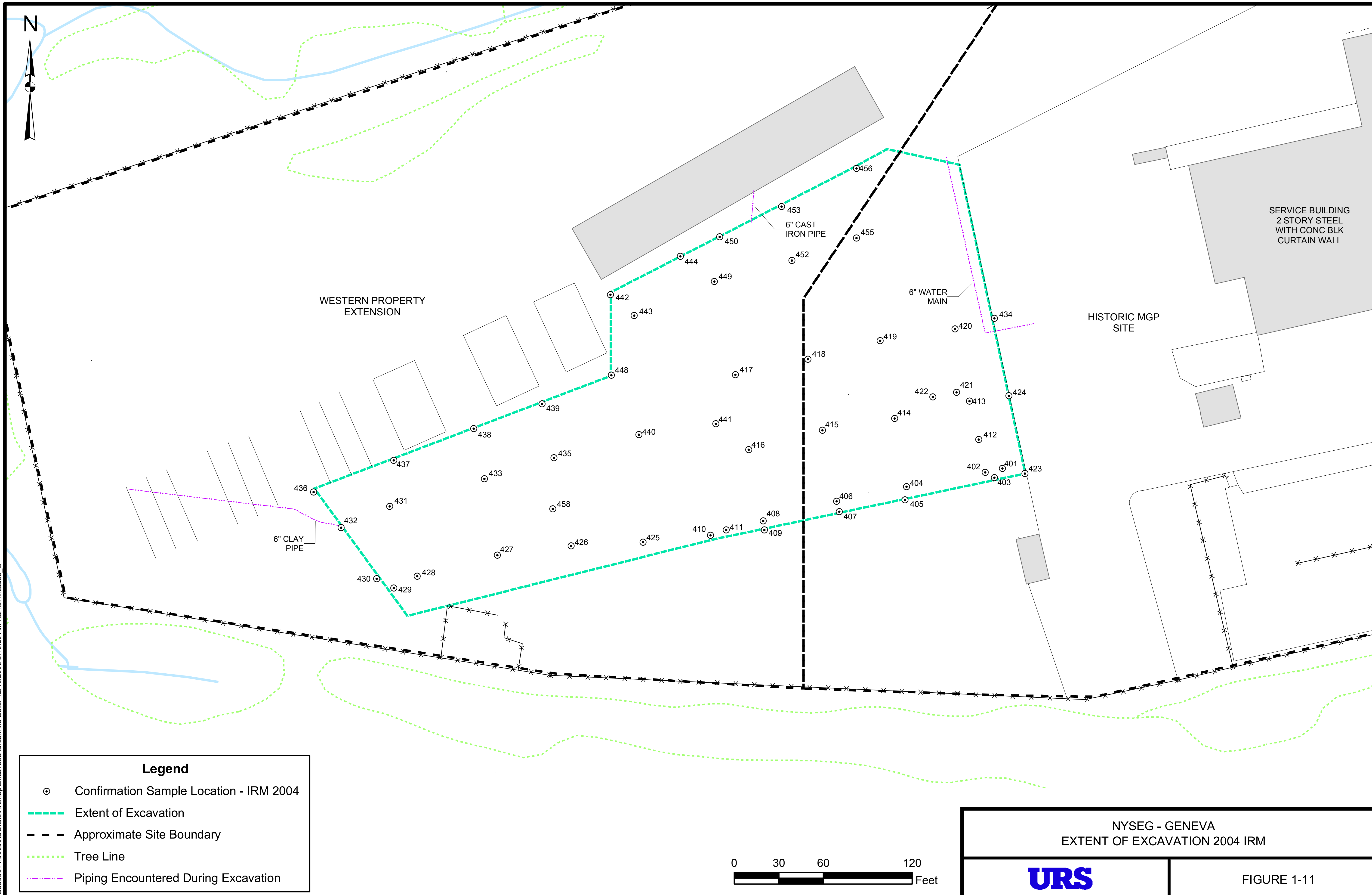

N
TP-39, 5.7 01/16/86
OFF-SITE ENVIRONS
EAST OFFICE BUILDING
FORMER MGP SITE
TP-03, 1.4 01/16/86
TP-20, 4.1 01/21/86
TP-30, 19 01/15/86
TP-27, 8100 01/15/86
TP-34, 2800 01/15/86
TP-06, 450 01/17/86
TP-24, 36 01/21/86
TP-28, 2300 01/17/86
METER SHOP
GAS METER
TP-31, 34,000 01/14/86
TP-07, 120 01/17/86
SERVICE BUILDING 2 STORY STEEL WITH CONC BLK CURTAIN WALL
TP-21, 26 01/21/86
TP-13, 44 01/16/86
TP-25, 10000 01/15/86
TP-29, 13,000 01/15/86
TP-32, 13,000 01/13/86
TP-08, 0.7 01/17/86
TP-15, 700 01/21/86
TP-22, 30 01/16/86
TP-37, 1770 01/14/86
TP-04, 490 01/20/86
WESTERN PROPERTY EXTENSION
TP-09, 140 01/21/86
TP-14, 160 01/20/86
TP-26, 130 01/14/86
TP-01, 190 01/16/86
TP-02, 160 01/20/86
TP-05, 69 01/21/86
TP-35, 7.5 01/14/86
TP-36, 2500 01/14/86
TB-11, ND 12/15/86
TP-17, 12 01/20/86
TP-33, 220 01/13/86
TP-42, 6.8 01/15/86
TP-40, 0.5 01/15/86
TB-10, ND 12/15/86
TP-23, 72 01/20/86
TB-12, 12.9 12/15/86
EASTERN WASTE DISPOSAL AREA
TP-18, 48.6 01/20/86
TP-11, 5.4 01/20/86
TB-09, 9.16 12/15/86
TP-38, 16 01/13/86
TP-16, 1.6 01/13/86
TP-19, 8.9 01/13/86
TP-12, 490 01/13/86
BACKWATER
Legend
Total Cyanide:
Not Detected
< 10 MG/KG
10 - 100 MG/KG
100 - 1000 MG/KG
1000 - 10,000 MG/KG
10,000 MG/KG
Former MGP Structure
Approximate Site Boundary
Treeline
Fenceline
Area of PAHs
Debris
Purifier Wastes
Waste Disposal Including Tars
TP-12, 490 01/13/86
Location ID
Concentration (MG/KG)
Date Sampled
150 0 150 Feet
NYSEG - GENEVA
SUMMARY OF PREVIOUS TOTAL CYANIDE CONCENTRATIONS IN SUBSURFACE SOIL
URS
FIGURE 1-9
N:\38393614.00000\DB\Gis\chem.apr HISTORICAL TOTAL CYANIDE IN SUBSURFACE SOIL 12/19/2006



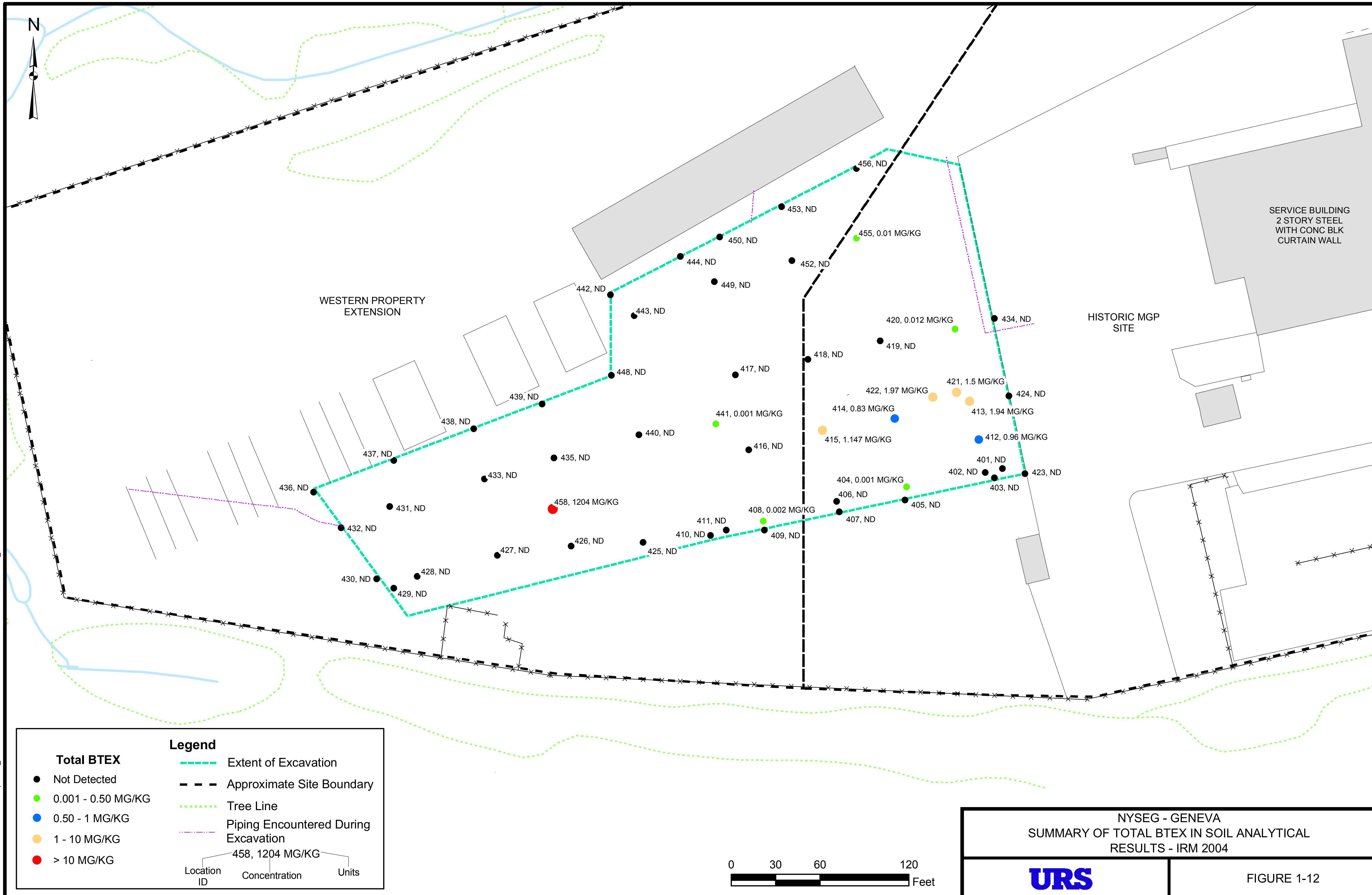
URS

NYSEG - GENEVA
SUMMARY OF PREVIOUS SURFACE WATER AND SEDIMENT ANALYTICAL RESULTS

FIGURE 1-10



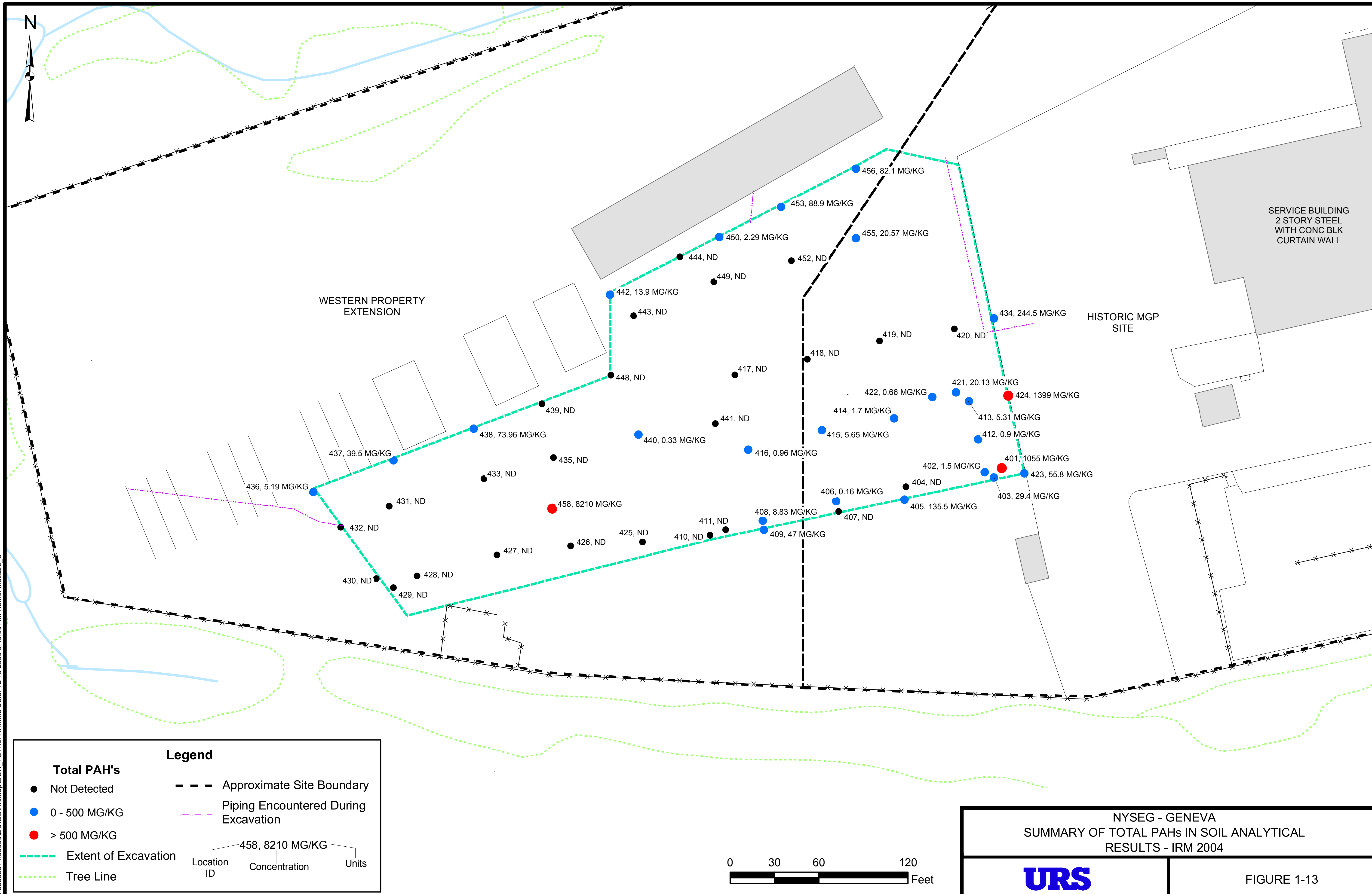
N:\38393614.00000\DB\Gis\ArcMap\Excavationarea.mxd Date: 12/19/2006 8:40:20 AM Name: Mccabe_S



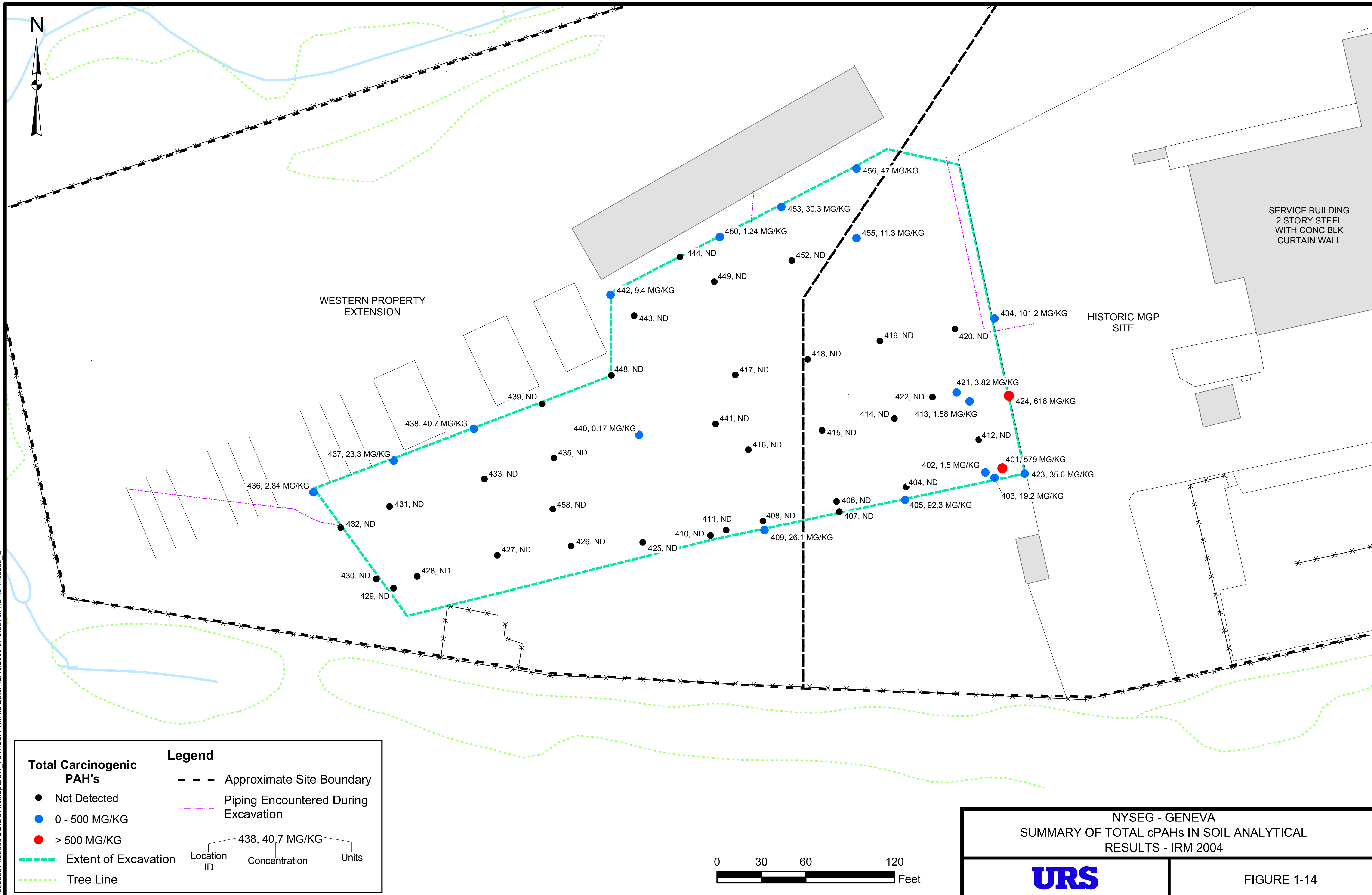
NYSEG - GENEVA
SUMMARY OF TOTAL BTEX IN SOIL ANALYTICAL RESULTS - IRM 2004

FIGURE 1-12

N:\38393614.00000\DB\Gis\ArcMap\CON_TOTALBTEX.mxd Date: 12/19/2006 8:44:43 AM Name: Mccabe_S

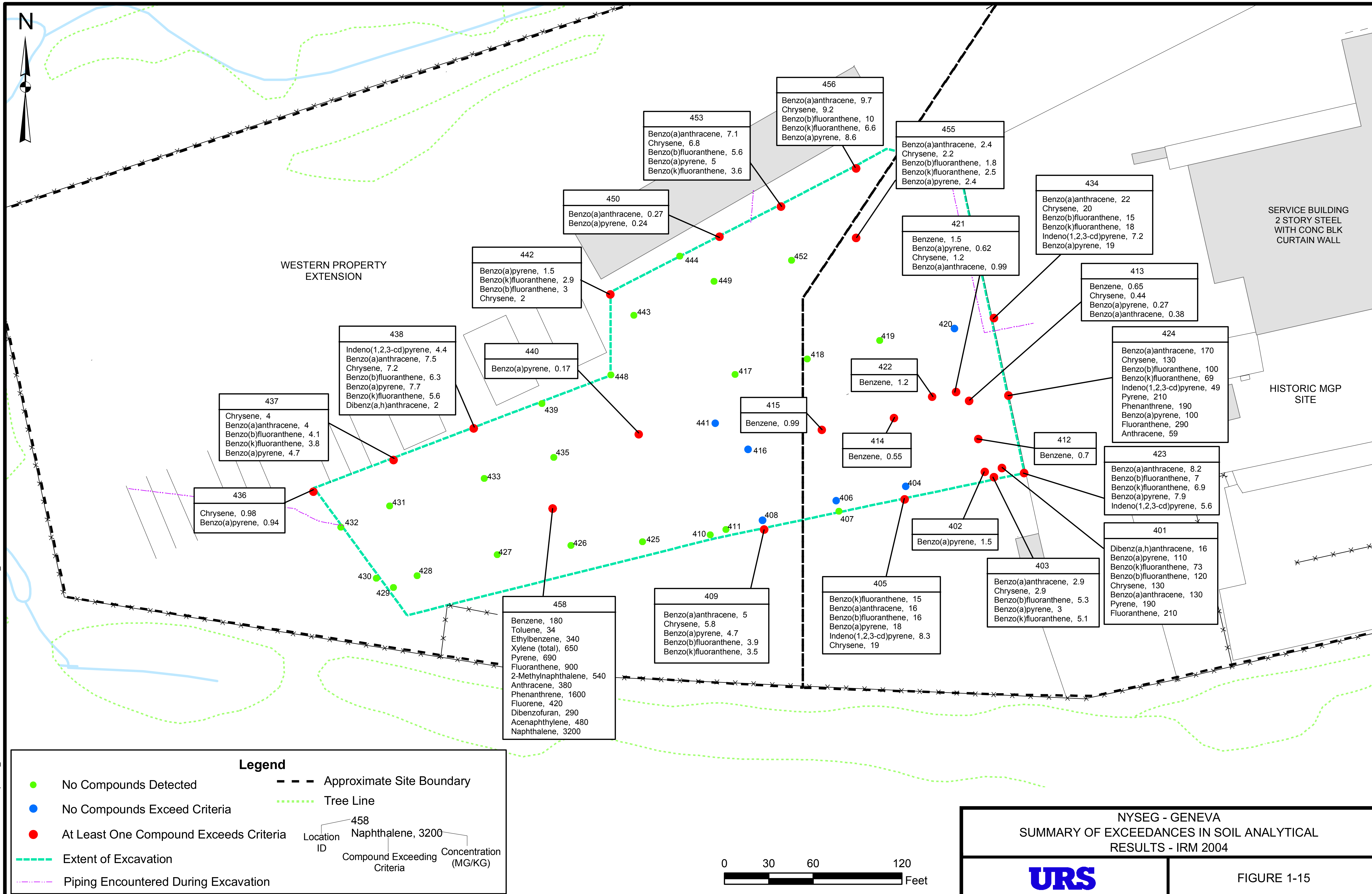


N:\38393614.00000\DB\Gis\ArcMap\CON_TOTALPAH.mxd Date: 12/19/2006 8:46:30 AM Name: Mccabe_S



NYSEG - GENEVA
SUMMARY OF TOTAL cPAHs IN SOIL ANALYTICAL RESULTS - IRM 2004

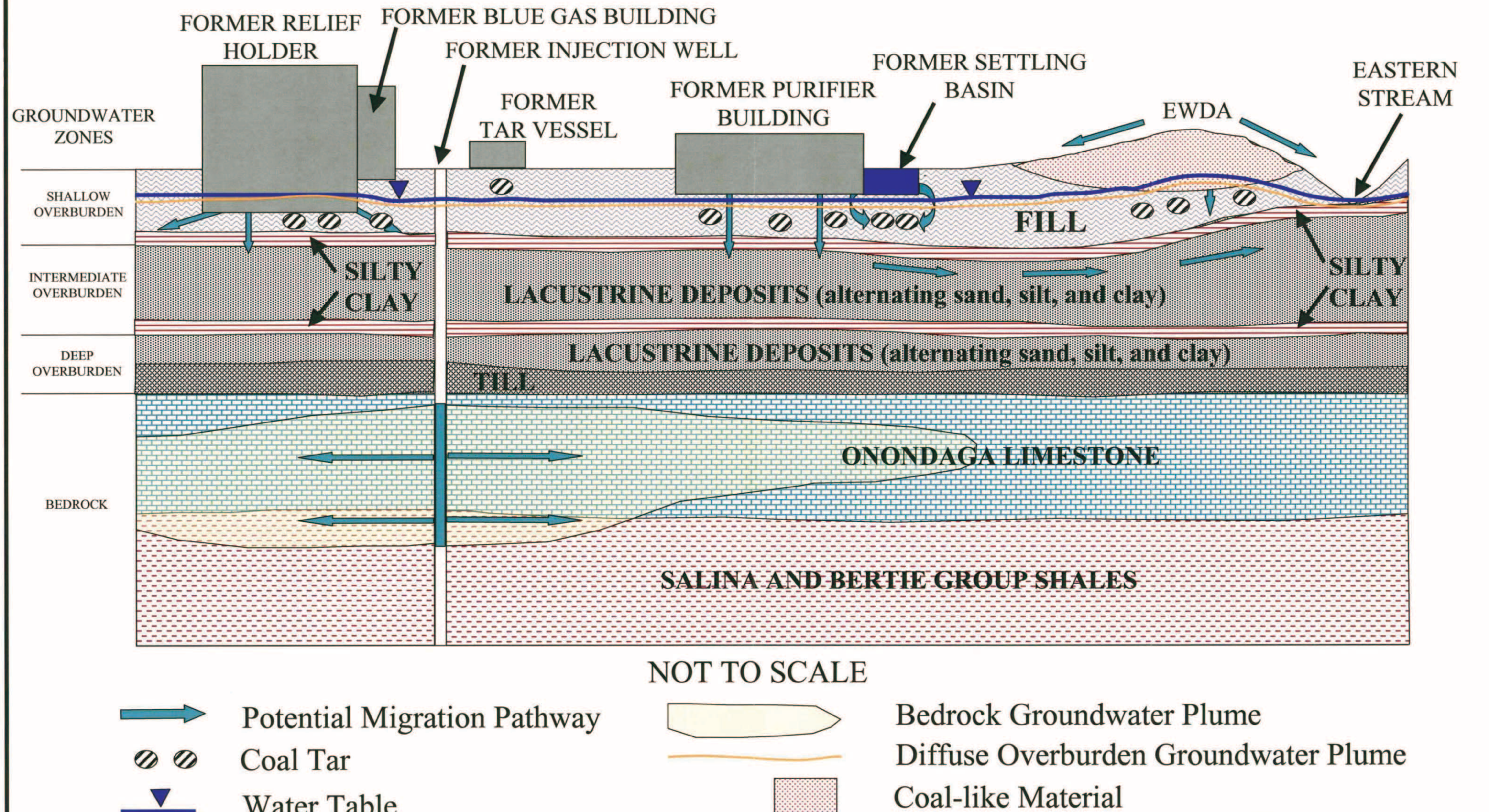
FIGURE 1-14



NYSEG - GENEVA
SUMMARY OF EXCEEDANCES IN SOIL ANALYTICAL RESULTS - IRM 2004

FIGURE 1-15

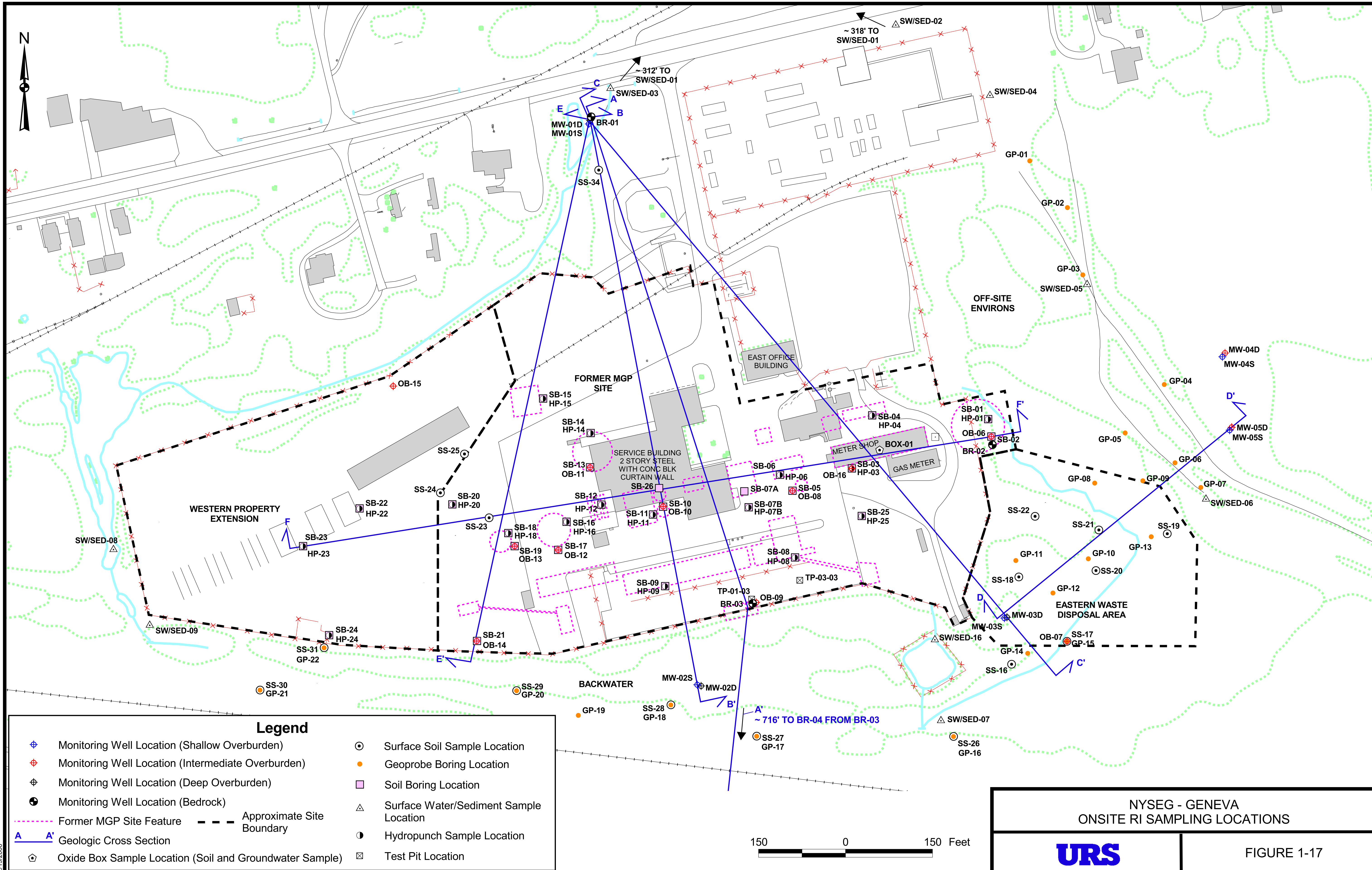
N:\38393614.00000\DB\Gis\ArcMap\CON_EXCEED.mxd Date: 12/19/2006 8:51:38 AM Name: Mccabe_S



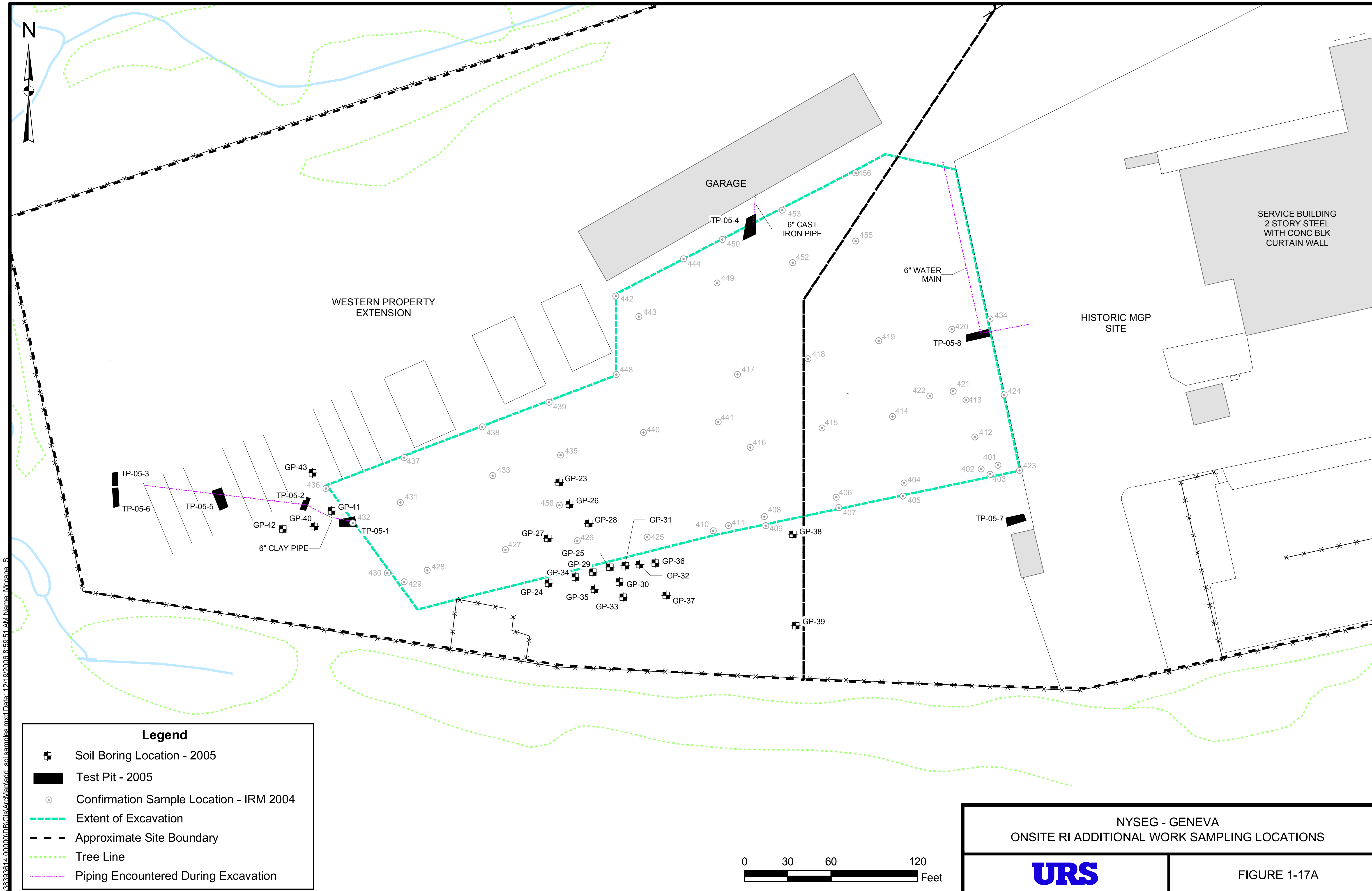
URS

NYSEG - GENEVA
CONCEPTUAL SITE MODEL

FIGURE 1-16



N:\38393614.00000\DB\Gis\geology.apr SRI - ONSITE SAMPLING LOCATIONS
12/19/2006



NYSEG - GENEVA
ONSITE RI ADDITIONAL WORK SAMPLING LOCATIONS

FIGURE 1-17A

Legend

- Monitoring Well Location (Bedrock)
- Surface Water/Sediment Sample Location
- Approximate Site Boundary

200 0 200 Feet

NYSEG - GENEVA
OFFSITE RI SAMPLING LOCATIONS

URS

FIGURE 1-18

N:\38393614.00000\DB\Gis\geology.apr SRI - OFFSITE SAMPLING LOCATIONS
12/19/2006

N:\38393614\CAD\ 1=1 1/14/04 - 0 BJG

LEGEND:

— — — APPROXIMATE SITE BOUNDARY

150' 0 150'

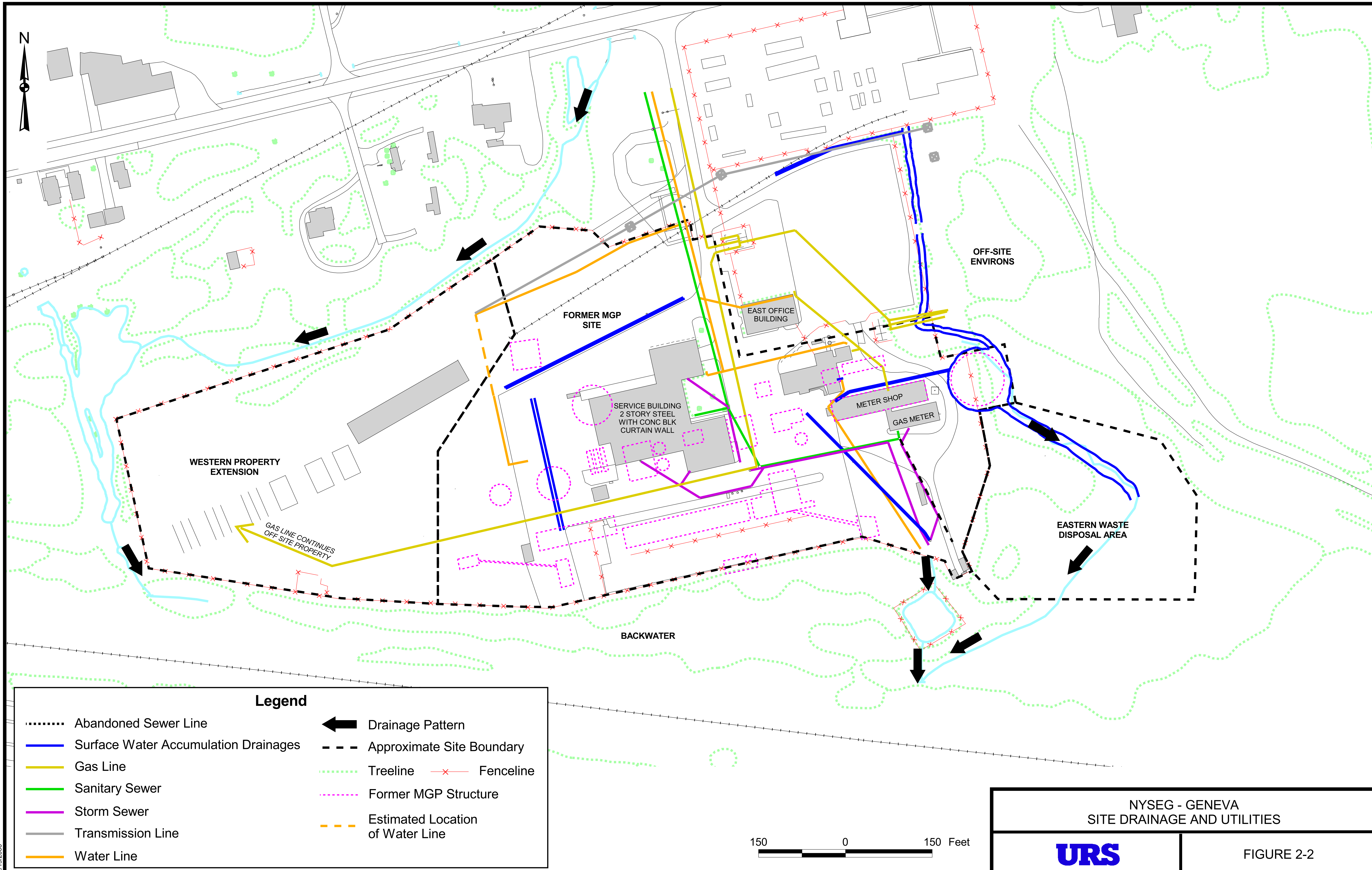
SCALE: 1"= 150'

NYSEG – GENEVA
SURFACE FEATURES

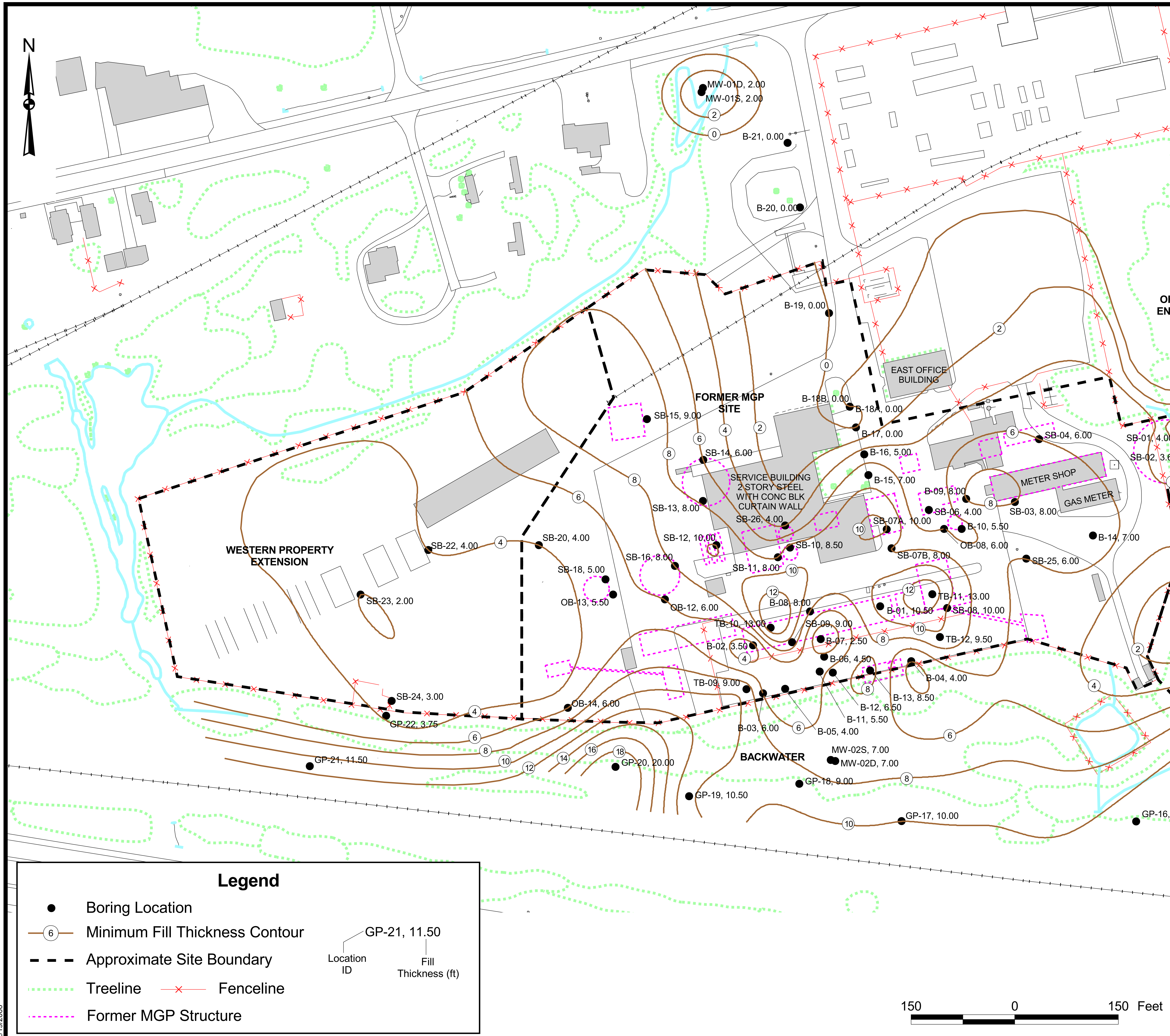
URS

FIGURE 2–1

CC–7519



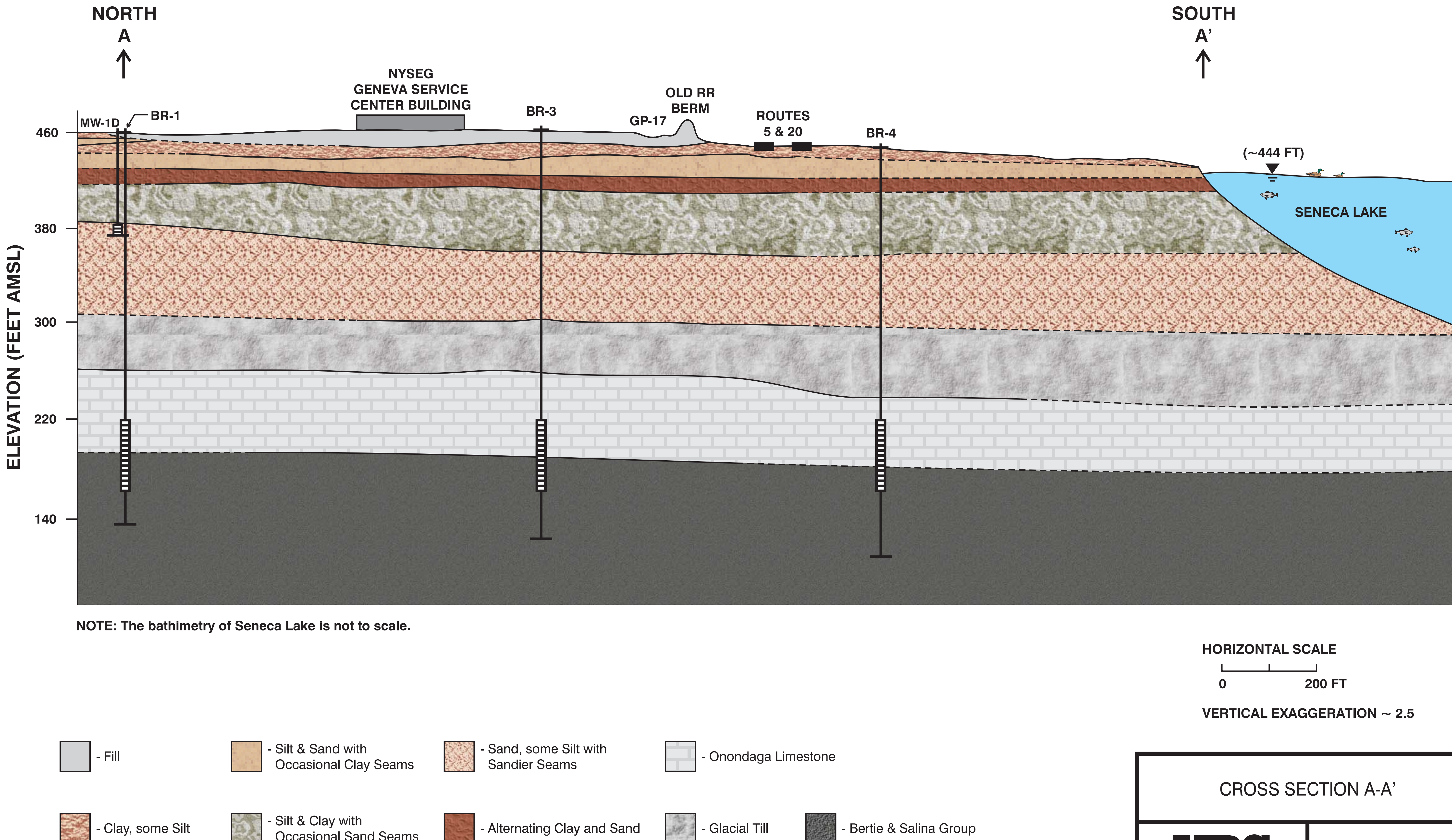
N:\38393614.00000\DB\Gis\geology.apr SITE DRAINAGE AND UTILITIES
12/19/2006



NYSEG - GENEVA
FILL THICKNESS CONTOUR MAP

FIGURE 2-3

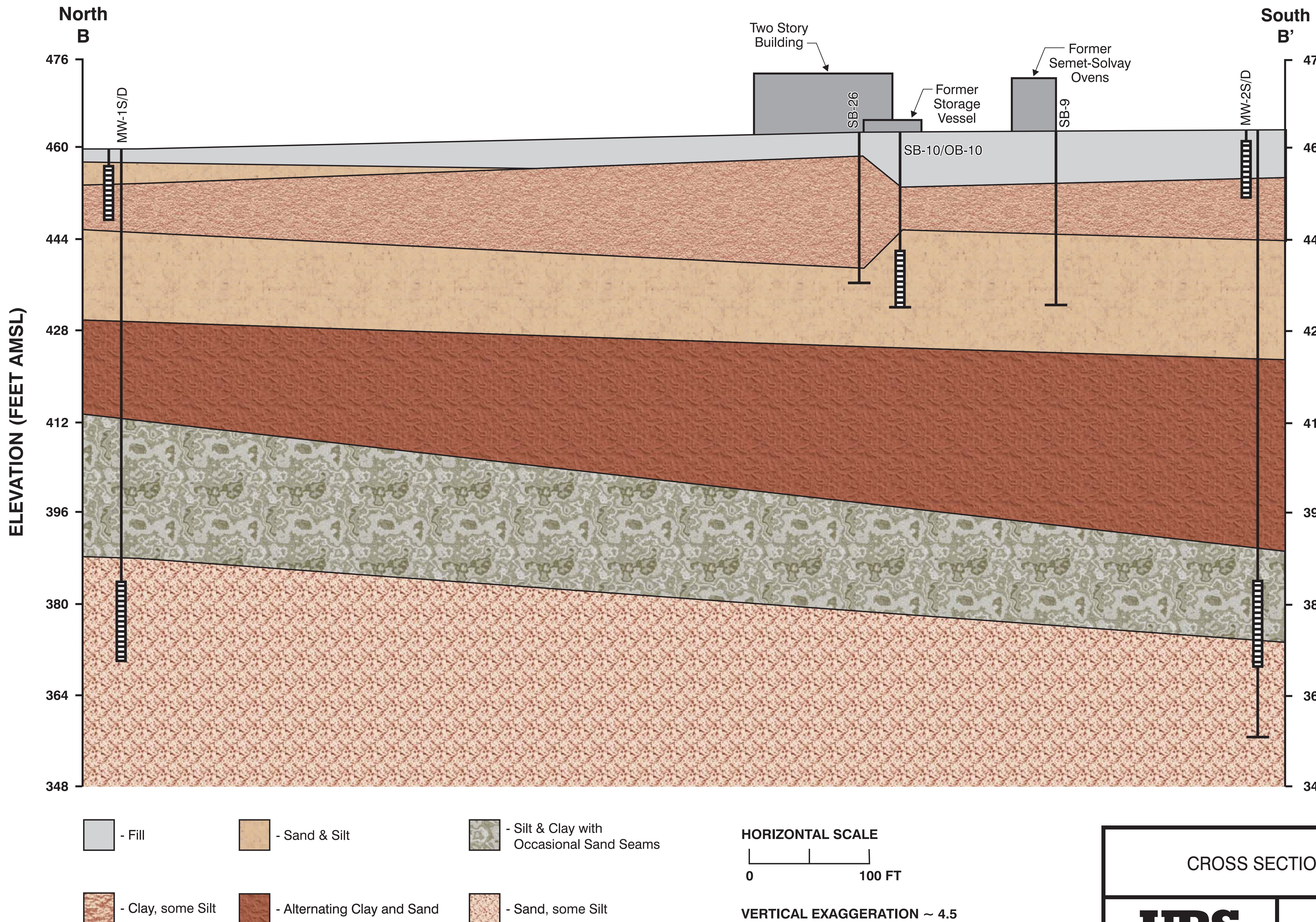
N:\38393614.00000\DB\Gis\geology.apr MINIMUM FILL THICKNESS MAP
12/19/2006



CROSS SECTION A-A'

URS

FIGURE 2-4

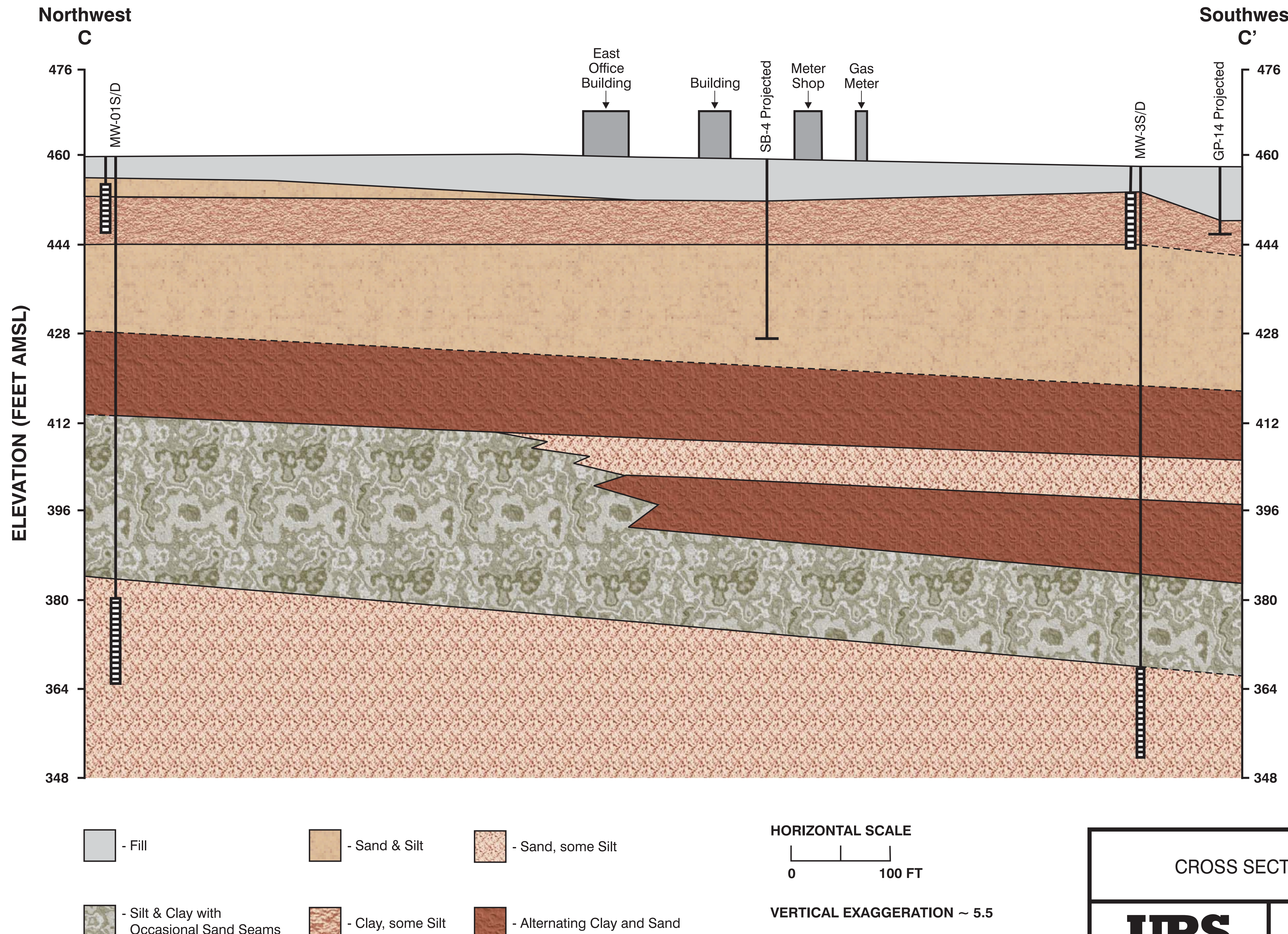


CROSS SECTION B-B'

URS

FIGURE 2-5

AG18342-38393614-010504-GCM

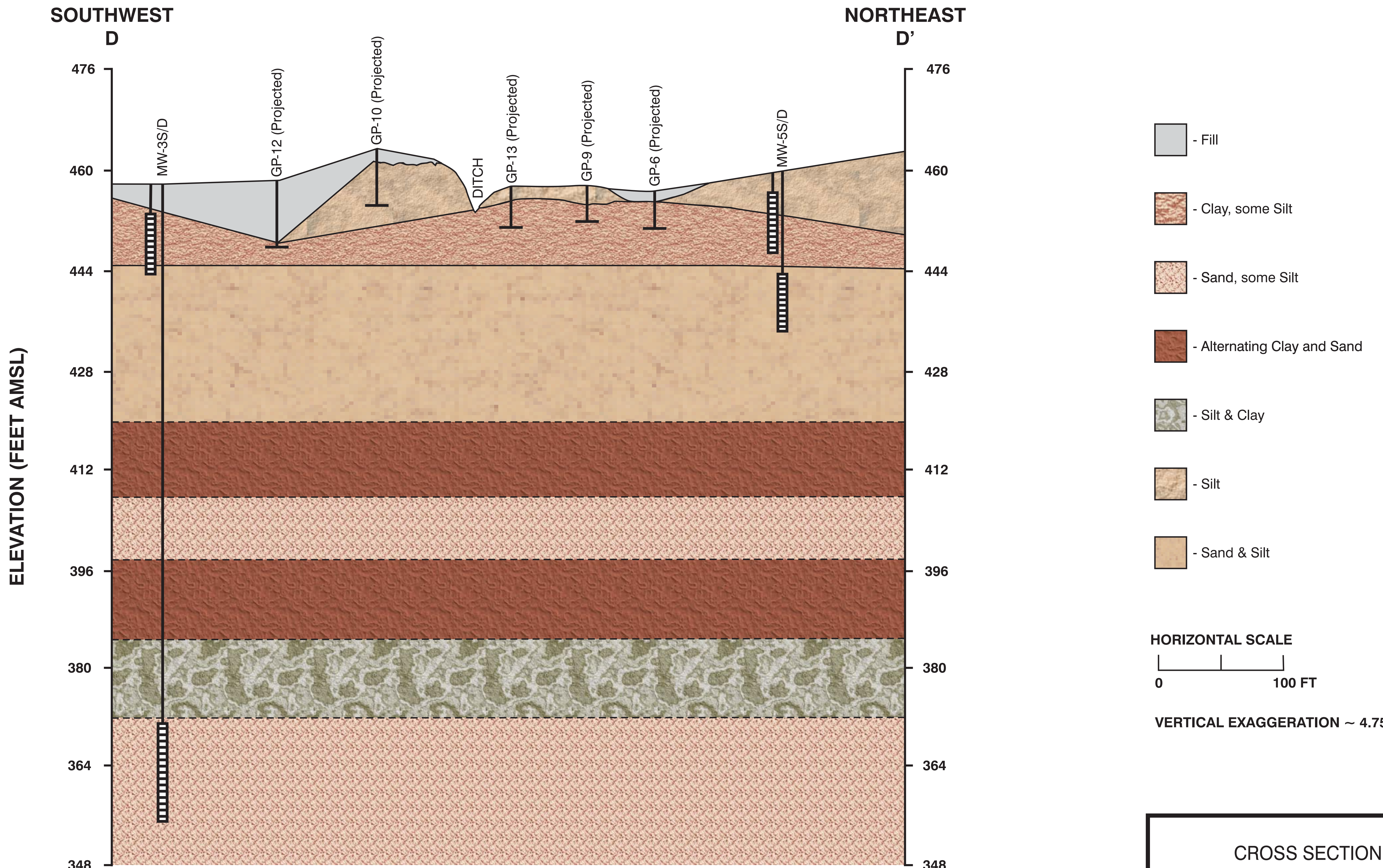


CROSS SECTION C-C'

URS

FIGURE 2-6

AG18343-38393614-010504-GCM

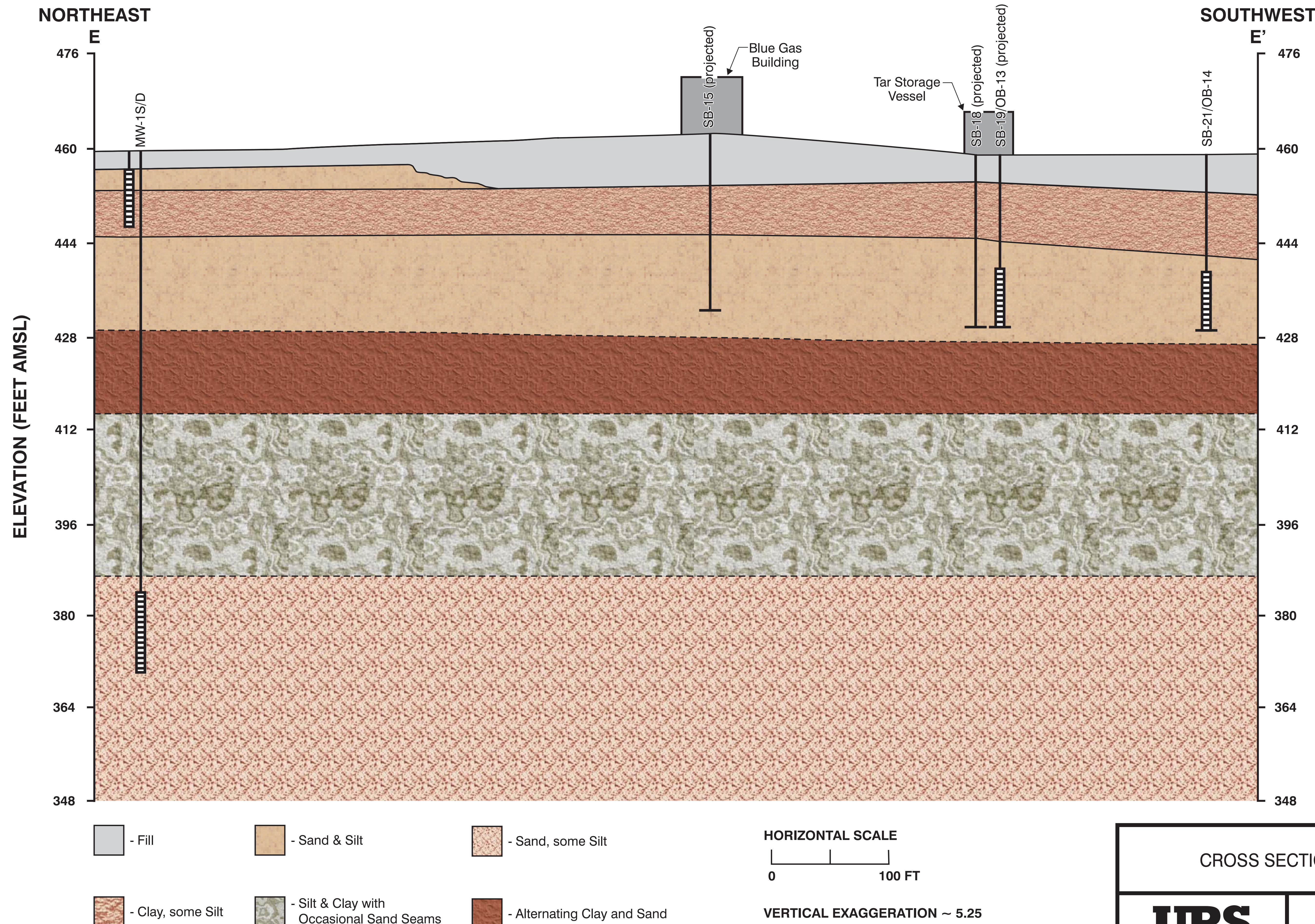


CROSS SECTION D-D'

URS

FIGURE 2-7

AG18344-38393614-010504-SH

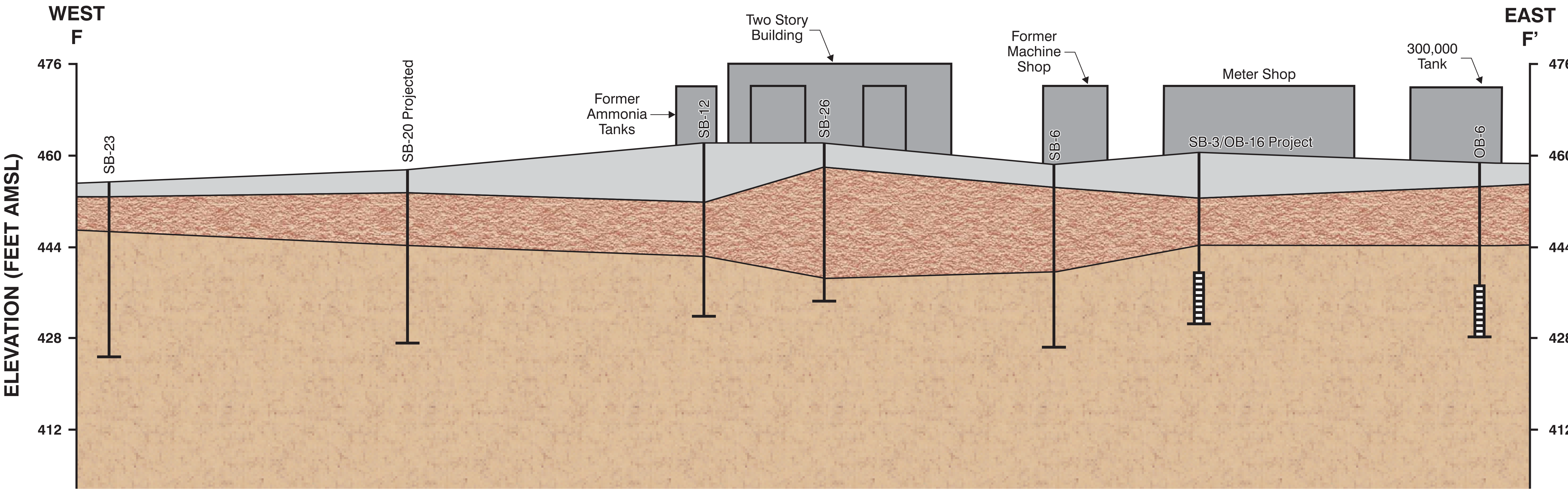


CROSS SECTION E-E'

URS

FIGURE 2-8

AG18345-38393614-010504-GCM



- Fill
- Sand & Silt
- Clay, some Silt

HORIZONTAL SCALE

0 — 100 FT

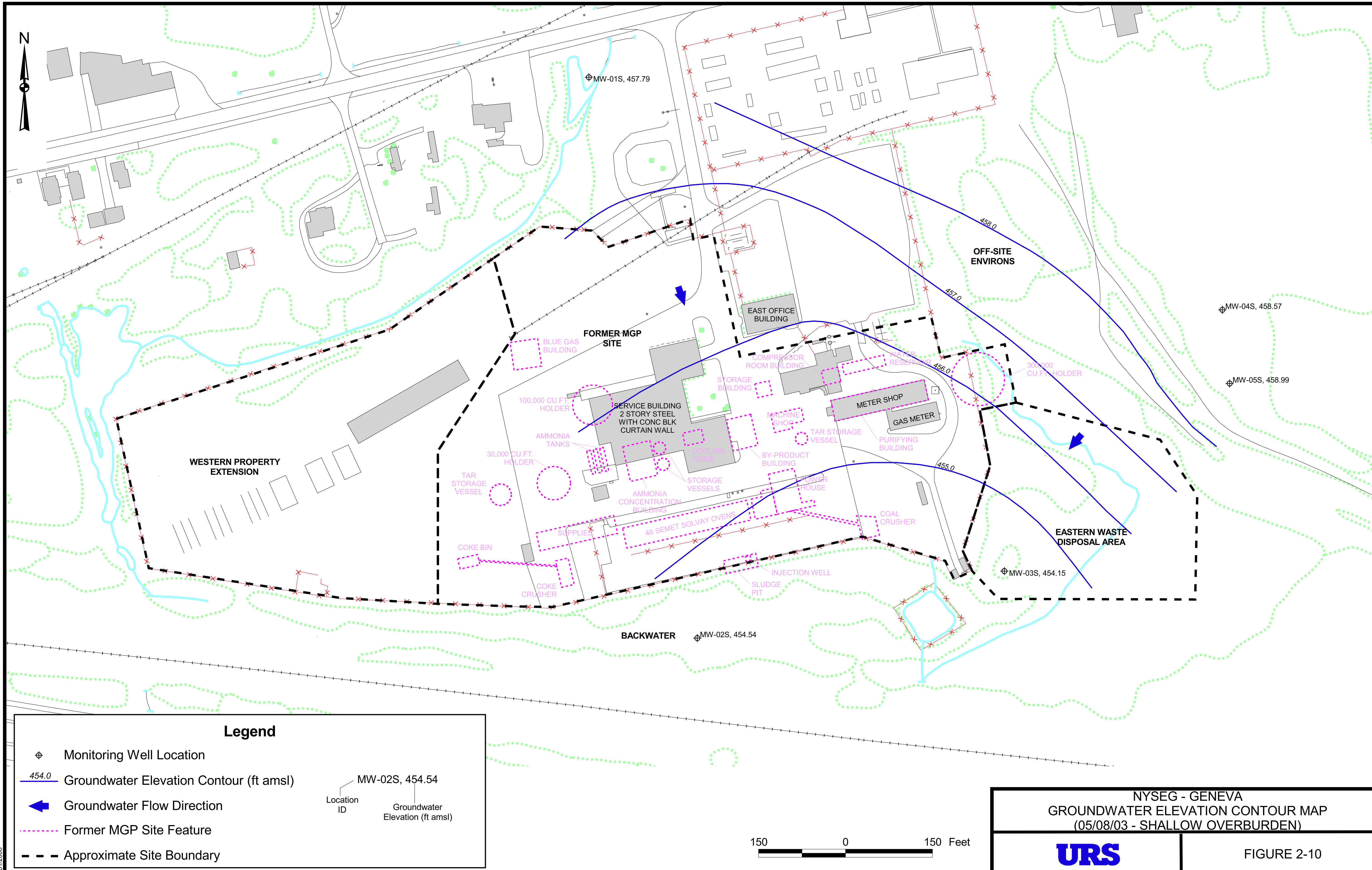
VERTICAL EXAGGERATION ~ 4.5

CROSS SECTION F-F'

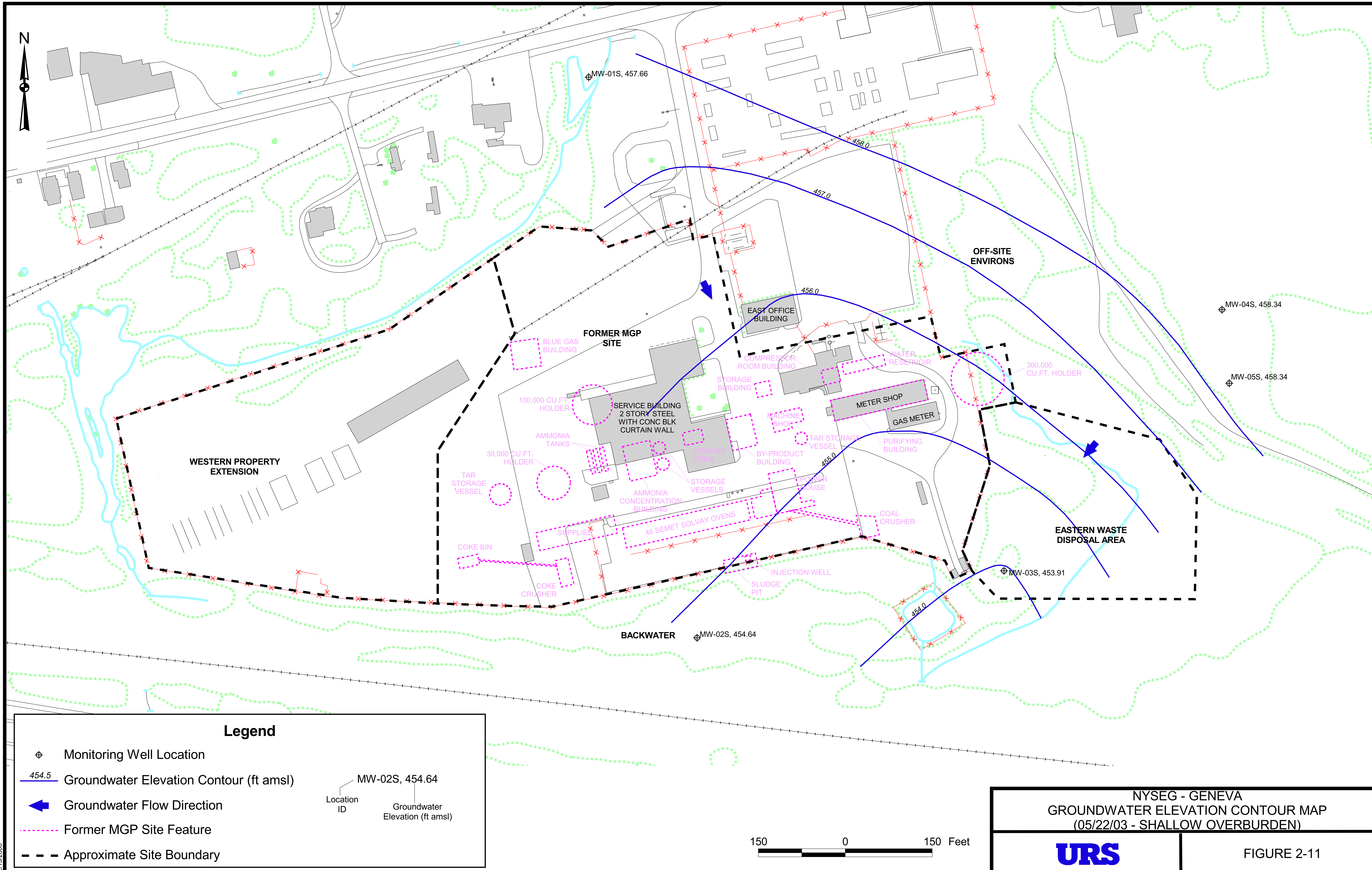
URS

FIGURE 2-9

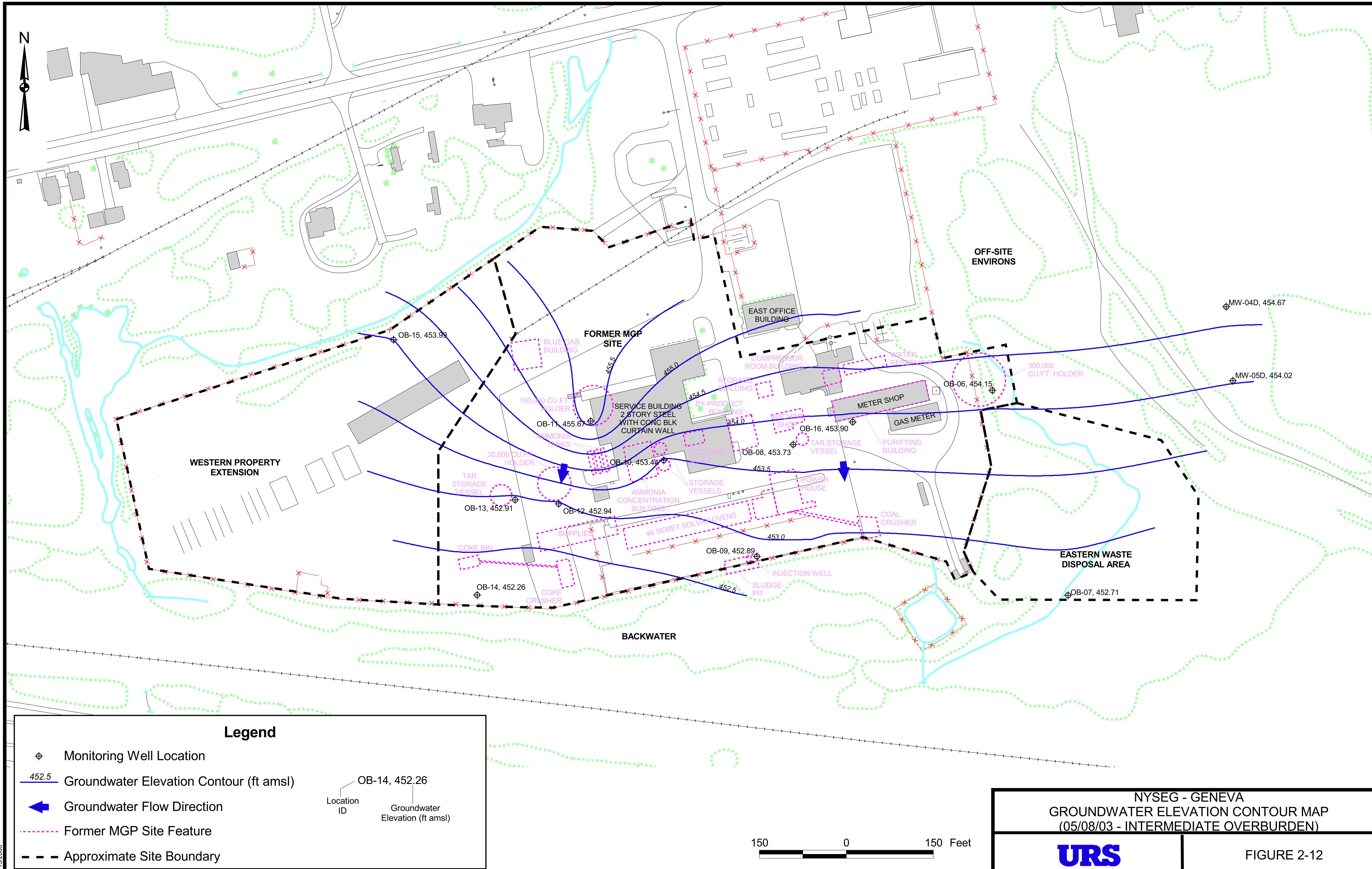
AG18346-38393614-010504-GCM



N:\38393614.00000\DB\Gis\geology.apr 05/08/03 - SHALLOW OB GROUNDWATER ELEVATIONS
5/31/2006



N:\38393614.00000\DB\Gis\geology.apr 05/22/03 - SHALLOW OB GROUNDWATER ELEVATIONS
12/19/2006

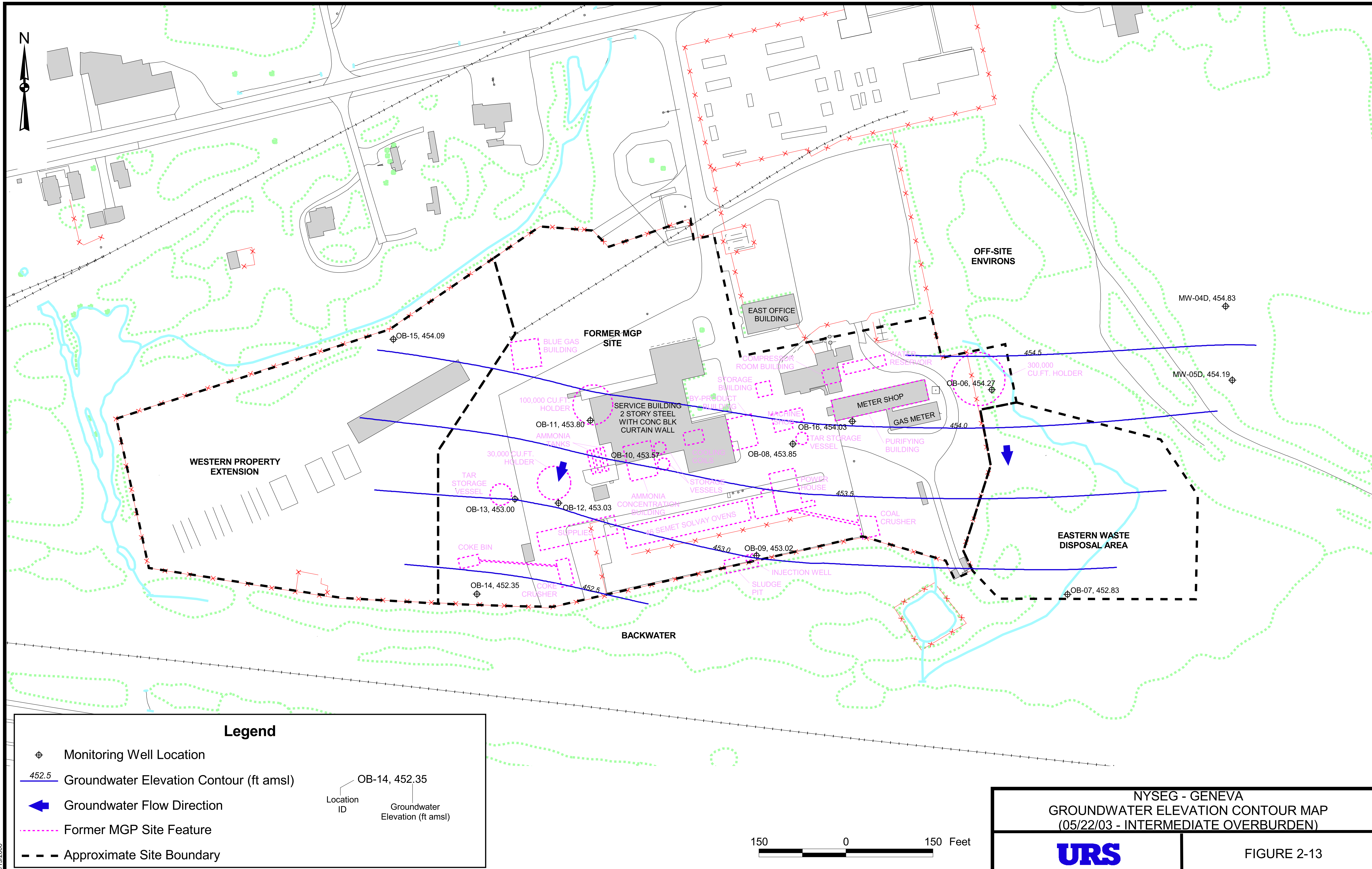


NYSEG - GENEVA
GROUNDWATER ELEVATION CONTOUR MAP
(05/08/03 - INTERMEDIATE OVERBURDEN)

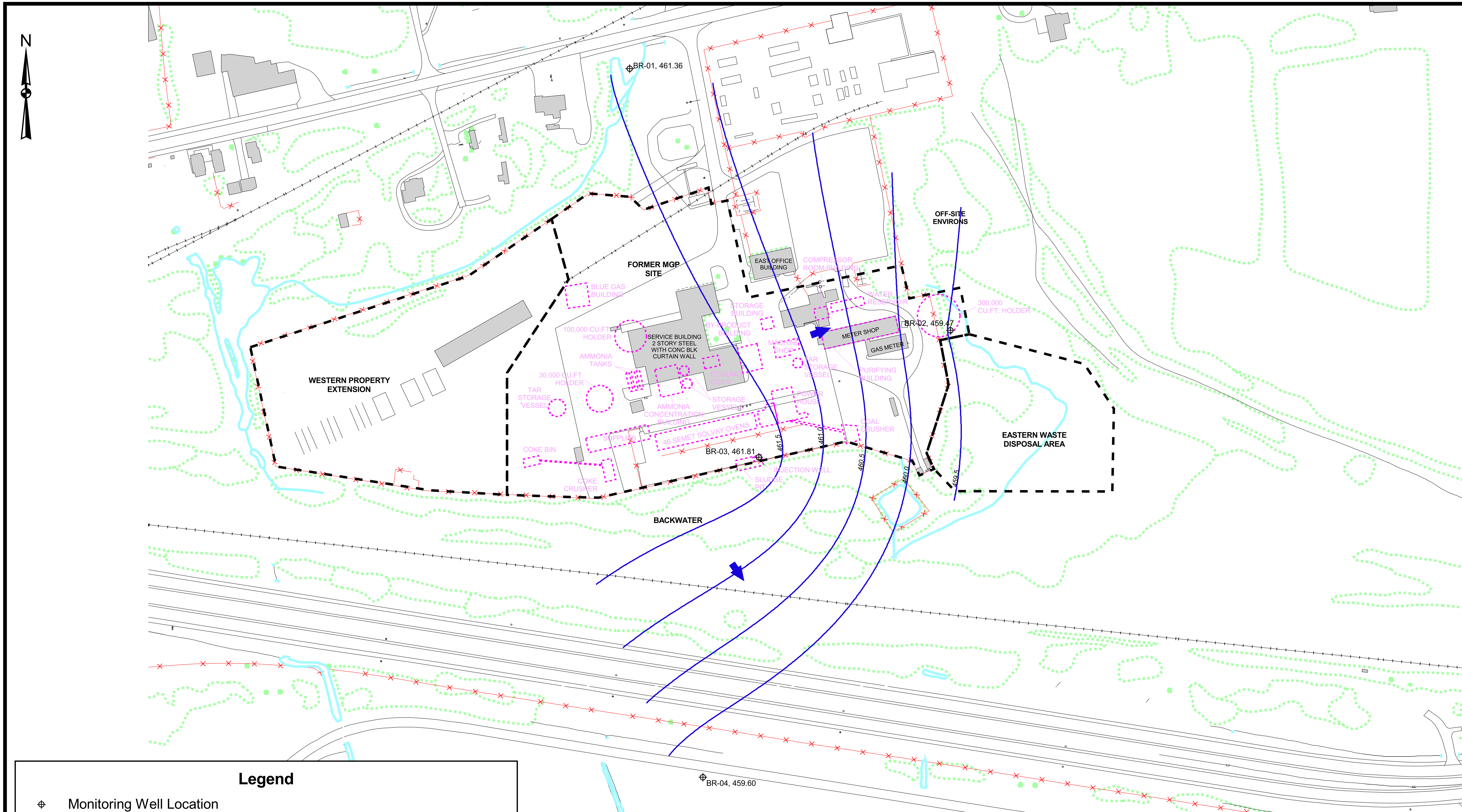
URS

FIGURE 2-12

N:\38393614.00000\DB\Gis\geology.apr 05/08/03 - INTERMEDIATE OB GROUNDWATER ELEVATIONS 12/19/2006



N:\38393614.00000\DB\Gis\geology.apr 05/22/03 - INTERMEDIATE OB GROUNDWATER ELEVATIONS
12/19/2006



Legend

- Monitoring Well Location
- 454.5 Groundwater Elevation Contour (ft amsl)
- Groundwater Flow Direction
- Former MGP Site Feature
- Approximate Site Boundary

BR-04, 459.60
Location ID
Groundwater Elevation (ft amsl)

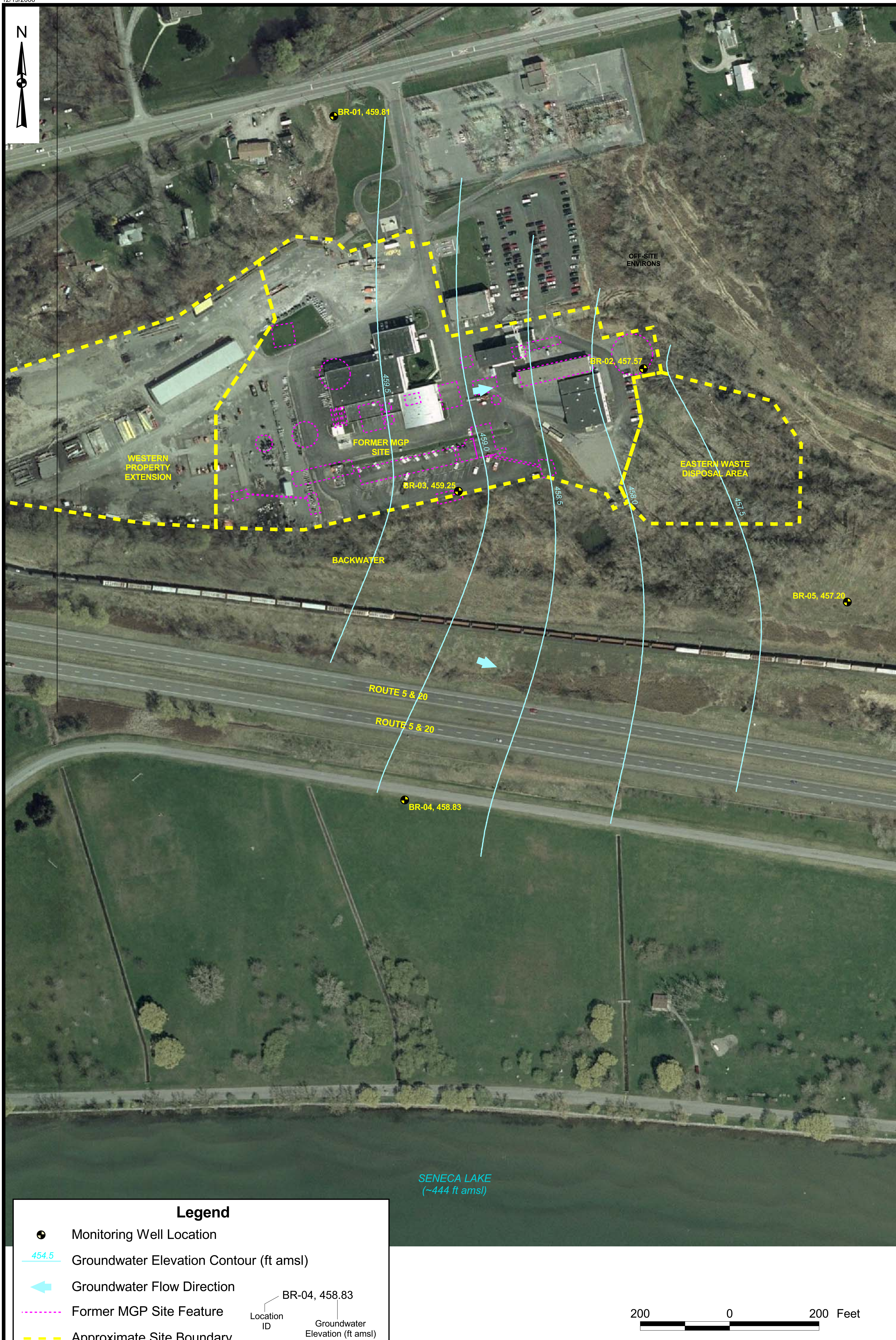
200 0 200 Feet

NYSEG - GENEVA
GROUNDWATER ELEVATION CONTOUR MAP
(05/22/03 - BEDROCK)

URS

FIGURE 2-14

N:\38393614.00000\DB\Gis\geology.apr 05/22/03 - BEDROCK GROUNDWATER ELEVATIONS
12/19/2006



URS

NYSEG - GENEVA
GROUNDWATER ELEVATION CONTOUR MAP
(12/20/05 - BEDROCK)

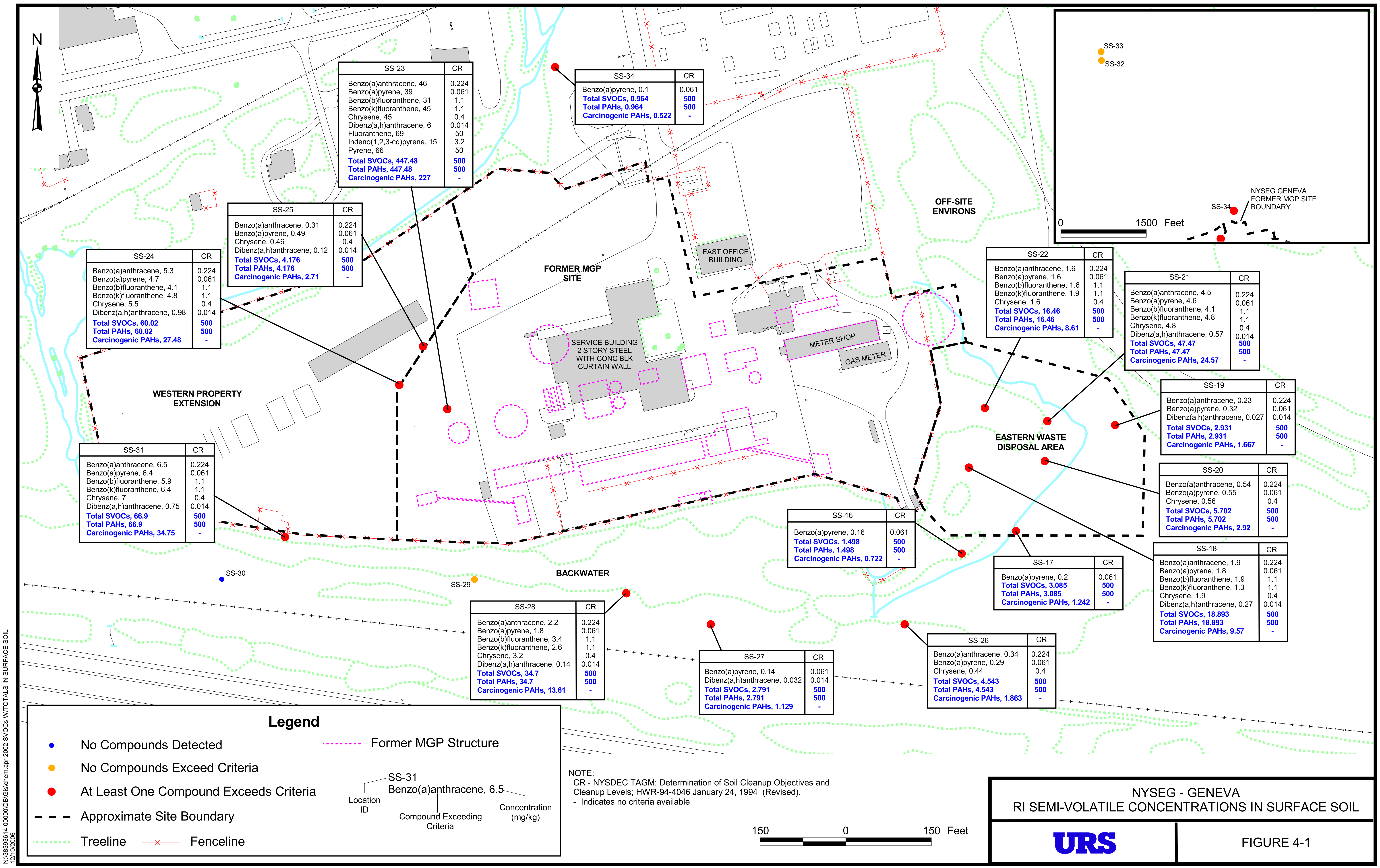
FIGURE 2-15

URS

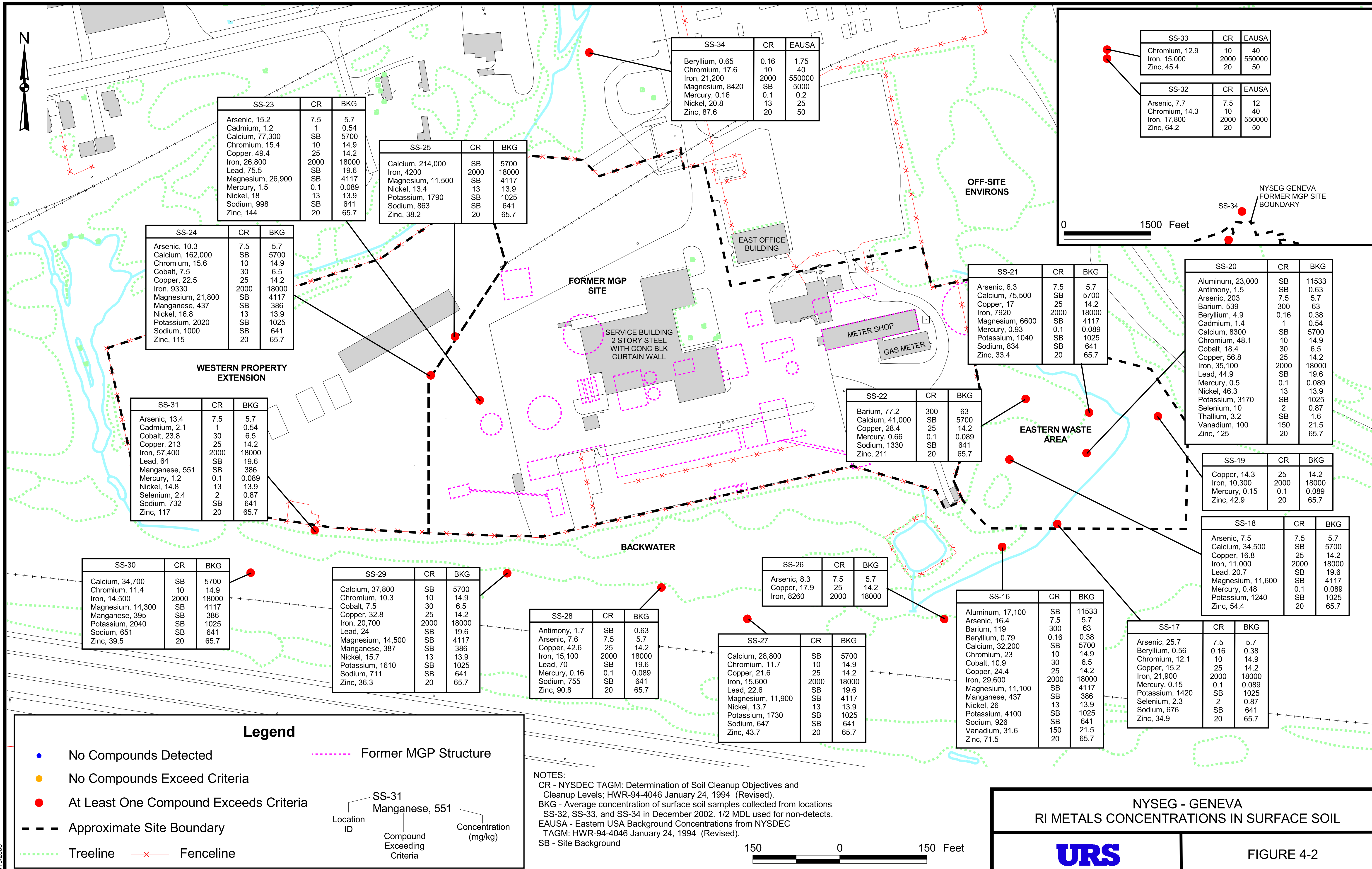
NYSEG - GENEVA
RI ADDITIONAL WORK
SOIL VAPOR IMPLANT LOCATIONS

FIGURE 3-1

N:\38393614.00000\DB\Gis\ArcMap\soilgas.mxd Date: 12/20/2006 3:37:05 PM Name: Mccabe_S



N
SS-23 | CR
Benzo(a)anthracene, 46 | 0.224
Benzo(a)pyrene, 39 | 0.061
Benzo(b)fluoranthene, 31 | 1.1
Benzo(k)fluoranthene, 45 | 1.1
Chrysene, 45 | 0.4
Dibenz(a,h)anthracene, 6 | 0.014
Fluoranthene, 69 | 50
Indeno(1,2,3-cd)pyrene, 15 | 3.2
Pyrene, 66 | 50
Total SVOCs, 447.48 | 500
Total PAHs, 447.48 | 500
Carcinogenic PAHs, 227 | -
SS-34 | CR
Benzo(a)pyrene, 0.1 | 0.061
Total SVOCs, 0.964 | 500
Total PAHs, 0.964 | 500
Carcinogenic PAHs, 0.522 | -
SS-33
SS-32
SS-34
NYSEG GENEVA FORMER MGP SITE BOUNDARY
0 1500 Feet
SS-25 | CR
Benzo(a)anthracene, 0.31 | 0.224
Benzo(a)pyrene, 0.49 | 0.061
Chrysene, 0.46 | 0.4
Dibenz(a,h)anthracene, 0.12 | 0.014
Total SVOCs, 4.176 | 500
Total PAHs, 4.176 | 500
Carcinogenic PAHs, 2.71 | -
SS-24 | CR
Benzo(a)anthracene, 5.3 | 0.224
Benzo(a)pyrene, 4.7 | 0.061
Benzo(b)fluoranthene, 4.1 | 1.1
Benzo(k)fluoranthene, 4.8 | 1.1
Chrysene, 5.5 | 0.4
Dibenz(a,h)anthracene, 0.98 | 0.014
Total SVOCs, 60.02 | 500
Total PAHs, 60.02 | 500
Carcinogenic PAHs, 27.48 | -
EAST OFFICE BUILDING
OFF-SITE ENVIRONS
FORMER MGP SITE
SERVICE BUILDING 2 STORY STEEL WITH CONC BLK CURTAIN WALL
METER SHOP
GAS METER
WESTERN PROPERTY EXTENSION
EASTERN WASTE DISPOSAL AREA
SS-22 | CR
Benzo(a)anthracene, 1.6 | 0.224
Benzo(a)pyrene, 1.6 | 0.061
Benzo(b)fluoranthene, 1.6 | 1.1
Benzo(k)fluoranthene, 1.9 | 1.1
Chrysene, 1.6 | 0.4
Total SVOCs, 16.46 | 500
Total PAHs, 16.46 | 500
Carcinogenic PAHs, 8.61 | -
SS-21 | CR
Benzo(a)anthracene, 4.5 | 0.224
Benzo(a)pyrene, 4.6 | 0.061
Benzo(b)fluoranthene, 4.1 | 1.1
Benzo(k)fluoranthene, 4.8 | 1.1
Chrysene, 4.8 | 0.4
Dibenz(a,h)anthracene, 0.57 | 0.014
Total SVOCs, 47.47 | 500
Total PAHs, 47.47 | 500
Carcinogenic PAHs, 24.57 | -
SS-19 | CR
Benzo(a)anthracene, 0.23 | 0.224
Benzo(a)pyrene, 0.32 | 0.061
Dibenz(a,h)anthracene, 0.027 | 0.014
Total SVOCs, 2.931 | 500
Total PAHs, 2.931 | 500
Carcinogenic PAHs, 1.667 | -
SS-20 | CR
Benzo(a)anthracene, 0.54 | 0.224
Benzo(a)pyrene, 0.55 | 0.061
Chrysene, 0.56 | 0.4
Total SVOCs, 5.702 | 500
Total PAHs, 5.702 | 500
Carcinogenic PAHs, 2.92 | -
SS-31 | CR
Benzo(a)anthracene, 6.5 | 0.224
Benzo(a)pyrene, 6.4 | 0.061
Benzo(b)fluoranthene, 5.9 | 1.1
Benzo(k)fluoranthene, 6.4 | 1.1
Chrysene, 7 | 0.4
Dibenz(a,h)anthracene, 0.75 | 0.014
Total SVOCs, 66.9 | 500
Total PAHs, 66.9 | 500
Carcinogenic PAHs, 34.75 | -
SS-16 | CR
Benzo(a)pyrene, 0.16 | 0.061
Total SVOCs, 1.498 | 500
Total PAHs, 1.498 | 500
Carcinogenic PAHs, 0.722 | -
SS-18 | CR
Benzo(a)anthracene, 1.9 | 0.224
Benzo(a)pyrene, 1.8 | 0.061
Benzo(b)fluoranthene, 1.9 | 1.1
Benzo(k)fluoranthene, 1.3 | 1.1
Chrysene, 1.9 | 0.4
Dibenz(a,h)anthracene, 0.27 | 0.014
Total SVOCs, 18.893 | 500
Total PAHs, 18.893 | 500
Carcinogenic PAHs, 9.57 | -
SS-17 | CR
Benzo(a)pyrene, 0.2 | 0.061
Total SVOCs, 3.085 | 500
Total PAHs, 3.085 | 500
Carcinogenic PAHs, 1.242 | -
SS-30
SS-29
BACKWATER
SS-28 | CR
Benzo(a)anthracene, 2.2 | 0.224
Benzo(a)pyrene, 1.8 | 0.061
Benzo(b)fluoranthene, 3.4 | 1.1
Benzo(k)fluoranthene, 2.6 | 1.1
Chrysene, 3.2 | 0.4
Dibenz(a,h)anthracene, 0.14 | 0.014
Total SVOCs, 34.7 | 500
Total PAHs, 34.7 | 500
Carcinogenic PAHs, 13.61 | -
SS-27 | CR
Benzo(a)pyrene, 0.14 | 0.061
Dibenz(a,h)anthracene, 0.032 | 0.014
Total SVOCs, 2.791 | 500
Total PAHs, 2.791 | 500
Carcinogenic PAHs, 1.129 | -
SS-26 | CR
Benzo(a)anthracene, 0.34 | 0.224
Benzo(a)pyrene, 0.29 | 0.061
Chrysene, 0.44 | 0.4
Total SVOCs, 4.543 | 500
Total PAHs, 4.543 | 500
Carcinogenic PAHs, 1.863 | -
Legend
No Compounds Detected
No Compounds Exceed Criteria
At Least One Compound Exceeds Criteria
Approximate Site Boundary
Treeline
Fenceline
Former MGP Structure
SS-31
Benzo(a)anthracene, 6.5
Location ID
Compound Exceeding Criteria
Concentration (mg/kg)
NOTE:
CR - NYSDEC TAGM: Determination of Soil Cleanup Objectives and Cleanup Levels; HWR-94-4046 January 24, 1994 (Revised).
- Indicates no criteria available
150 0 150 Feet
NYSEG - GENEVA
RI SEMI-VOLATILE CONCENTRATIONS IN SURFACE SOIL
URS
FIGURE 4-1
N:\38393614.00000\DB\Gis\chem.apr 2002 SVOCs W/TOTALS IN SURFACE SOIL
12/19/2006



SS-34	CR	EAUSA
Beryllium, 0.65	0.16	1.75
Chromium, 17.6	10	40
Iron, 21,200	2000	550000
Magnesium, 8420	SB	5000
Mercury, 0.16	0.1	0.2
Nickel, 20.8	13	25
Zinc, 87.6	20	50

SS-33	CR	EAUSA
Chromium, 12.9	10	40
Iron, 15,000	2000	550000
Zinc, 45.4	20	50

SS-32	CR	EAUSA
Arsenic, 7.7	7.5	12
Chromium, 14.3	10	40
Iron, 17,800	2000	550000
Zinc, 64.2	20	50

SS-23	CR	BKG
Arsenic, 15.2	7.5	5.7
Cadmium, 1.2	1	0.54
Calcium, 77,300	SB	5700
Chromium, 15.4	10	14.9
Copper, 49.4	25	14.2
Iron, 26,800	2000	18000
Lead, 75.5	SB	19.6
Magnesium, 26,900	SB	4117
Mercury, 1.5	0.1	0.089
Nickel, 18	13	13.9
Sodium, 998	SB	641
Zinc, 144	20	65.7

SS-25	CR	BKG
Calcium, 214,000	SB	5700
Iron, 4200	2000	18000
Magnesium, 11,500	SB	4117
Nickel, 13.4	13	13.9
Potassium, 1790	SB	1025
Sodium, 863	SB	641
Zinc, 38.2	20	65.7

SS-24	CR	BKG
Arsenic, 10.3	7.5	5.7
Calcium, 162,000	SB	5700
Chromium, 15.6	10	14.9
Cobalt, 7.5	30	6.5
Copper, 22.5	25	14.2
Iron, 9330	2000	18000
Magnesium, 21,800	SB	4117
Manganese, 437	SB	386
Nickel, 16.8	13	13.9
Potassium, 2020	SB	1025
Sodium, 1000	SB	641
Zinc, 115	20	65.7

SS-31	CR	BKG
Arsenic, 13.4	7.5	5.7
Cadmium, 2.1	1	0.54
Cobalt, 23.8	30	6.5
Copper, 213	25	14.2
Iron, 57,400	2000	18000
Lead, 64	SB	19.6
Manganese, 551	SB	386
Mercury, 1.2	0.1	0.089
Nickel, 14.8	13	13.9
Selenium, 2.4	2	0.87
Sodium, 732	SB	641
Zinc, 117	20	65.7

SS-21	CR	BKG
Arsenic, 6.3	7.5	5.7
Calcium, 75,500	SB	5700
Copper, 17	25	14.2
Iron, 7920	2000	18000
Magnesium, 6600	SB	4117
Mercury, 0.93	0.1	0.089
Potassium, 1040	SB	1025
Sodium, 834	SB	641
Zinc, 33.4	20	65.7

SS-20	CR	BKG
Aluminum, 23,000	SB	11533
Antimony, 1.5	SB	0.63
Arsenic, 203	7.5	5.7
Barium, 539	300	63
Beryllium, 4.9	0.16	0.38
Cadmium, 1.4	1	0.54
Calcium, 8300	SB	5700
Chromium, 48.1	10	14.9
Cobalt, 18.4	30	6.5
Copper, 56.8	25	14.2
Iron, 35,100	2000	18000
Lead, 44.9	SB	19.6
Mercury, 0.5	0.1	0.089
Nickel, 46.3	13	13.9
Potassium, 3170	SB	1025
Selenium, 10	2	0.87
Thallium, 3.2	SB	1.6
Vanadium, 100	150	21.5
Zinc, 125	20	65.7

SS-22	CR	BKG
Barium, 77.2	300	63
Calcium, 41,000	SB	5700
Copper, 28.4	25	14.2
Mercury, 0.66	0.1	0.089
Sodium, 1330	SB	641
Zinc, 211	20	65.7

SS-19	CR	BKG
Copper, 14.3	25	14.2
Iron, 10,300	2000	18000
Mercury, 0.15	0.1	0.089
Zinc, 42.9	20	65.7

SS-18	CR	BKG
Arsenic, 7.5	7.5	5.7
Calcium, 34,500	SB	5700
Copper, 16.8	25	14.2
Iron, 11,000	2000	18000
Lead, 20.7	SB	19.6
Magnesium, 11,600	SB	4117
Mercury, 0.48	0.1	0.089
Potassium, 1240	SB	1025
Zinc, 54.4	20	65.7

SS-30	CR	BKG
Calcium, 34,700	SB	5700
Chromium, 11.4	10	14.9
Iron, 14,500	2000	18000
Magnesium, 14,300	SB	4117
Manganese, 395	SB	386
Potassium, 2040	SB	1025
Sodium, 651	SB	641
Zinc, 39.5	20	65.7

SS-29	CR	BKG
Calcium, 37,800	SB	5700
Chromium, 10.3	10	14.9
Cobalt, 7.5	30	6.5
Copper, 32.8	25	14.2
Iron, 20,700	2000	18000
Lead, 24	SB	19.6
Magnesium, 14,500	SB	4117
Manganese, 387	SB	386
Nickel, 15.7	13	13.9
Potassium, 1610	SB	1025
Sodium, 711	SB	641
Zinc, 36.3	20	65.7

SS-26	CR	BKG
Arsenic, 8.3	7.5	5.7
Copper, 17.9	25	14.2
Iron, 8260	2000	18000

SS-28	CR	BKG
Antimony, 1.7	SB	0.63
Arsenic, 7.6	7.5	5.7
Copper, 42.6	25	14.2
Iron, 15,100	2000	18000
Lead, 70	SB	19.6
Mercury, 0.16	0.1	0.089
Sodium, 755	SB	641
Zinc, 90.8	20	65.7

SS-27	CR	BKG
Calcium, 28,800	SB	5700
Chromium, 11.7	10	14.9
Copper, 21.6	25	14.2
Iron, 15,600	2000	18000
Lead, 22.6	SB	19.6
Magnesium, 11,900	SB	4117
Nickel, 13.7	13	13.9
Potassium, 1730	SB	1025
Sodium, 647	SB	641
Zinc, 43.7	20	65.7

SS-16	CR	BKG
Aluminum, 17,100	SB	11533
Arsenic, 16.4	7.5	5.7
Barium, 119	300	63
Beryllium, 0.79	0.16	0.38
Calcium, 32,200	SB	5700
Chromium, 23	10	14.9
Cobalt, 10.9	30	6.5
Copper, 24.4	25	14.2
Iron, 29,600	2000	18000
Magnesium, 11,100	SB	4117
Manganese, 437	SB	386
Nickel, 26	13	13.9
Potassium, 4100	SB	1025
Sodium, 926	SB	641
Vanadium, 31.6	150	21.5
Zinc, 71.5	20	65.7

SS-17	CR	BKG
Arsenic, 25.7	7.5	5.7
Beryllium, 0.56	0.16	0.38
Chromium, 12.1	10	14.9
Copper, 15.2	25	14.2
Iron, 21,900	2000	18000
Mercury, 0.15	0.1	0.089
Potassium, 1420	SB	1025
Selenium, 2.3	2	0.87
Sodium, 676	SB	641
Zinc, 34.9	20	65.7

Legend

- No Compounds Detected
- No Compounds Exceed Criteria
- At Least One Compound Exceeds Criteria
- Approximate Site Boundary
- Treeline
- Fenceline
- Former MGP Structure

SS-31
Manganese, 551

Location ID — Compound Exceeding Criteria — Concentration (mg/kg)

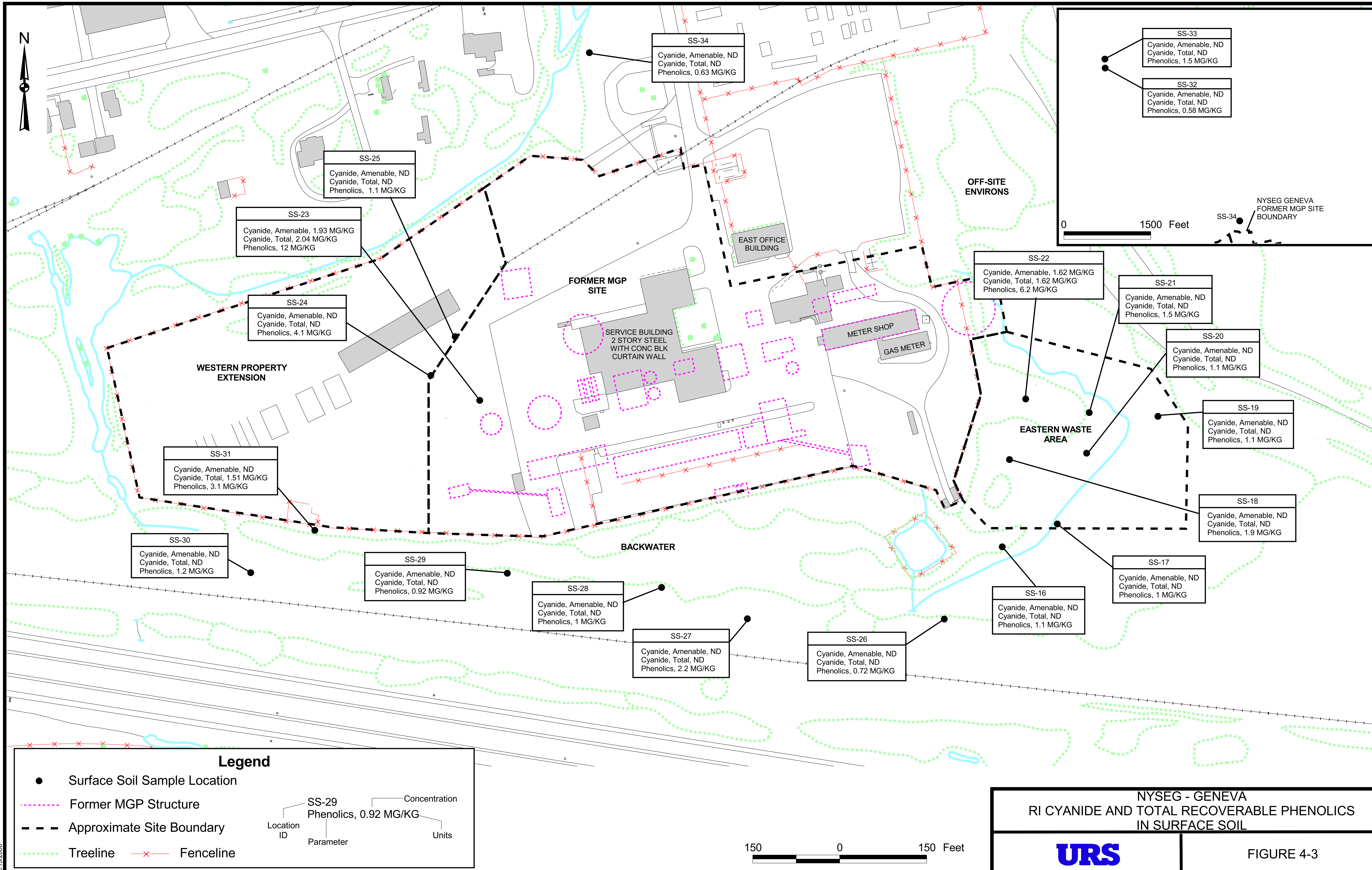
NOTES:
CR - NYSDEC TAGM: Determination of Soil Cleanup Objectives and Cleanup Levels; HWR-94-4046 January 24, 1994 (Revised).
BKG - Average concentration of surface soil samples collected from locations SS-32, SS-33, and SS-34 in December 2002. 1/2 MDL used for non-detects.
EAUSA - Eastern USA Background Concentrations from NYSDEC TAGM: HWR-94-4046 January 24, 1994 (Revised).
SB - Site Background

NYSEG - GENEVA
RI METALS CONCENTRATIONS IN SURFACE SOIL

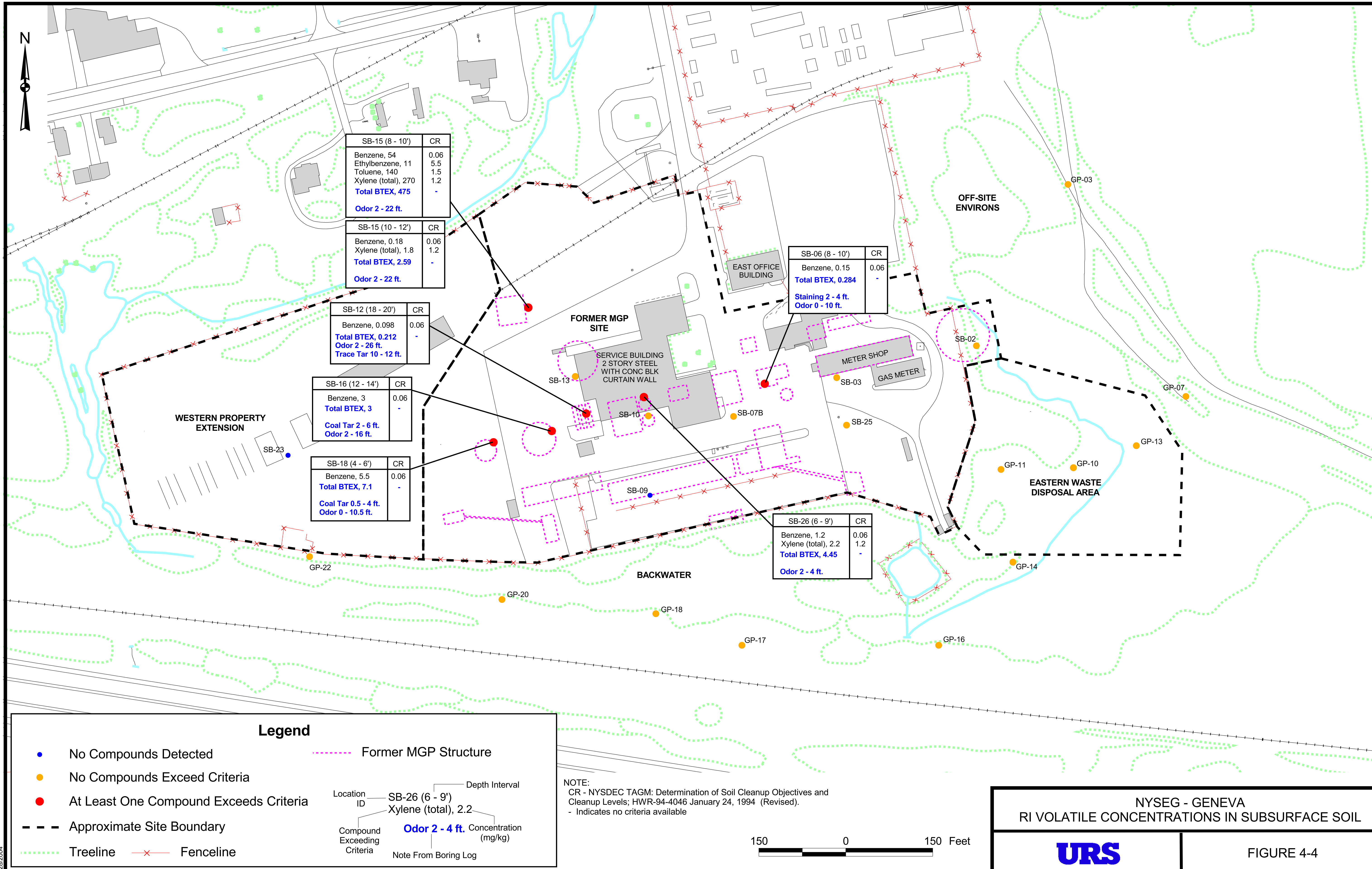
URS

FIGURE 4-2

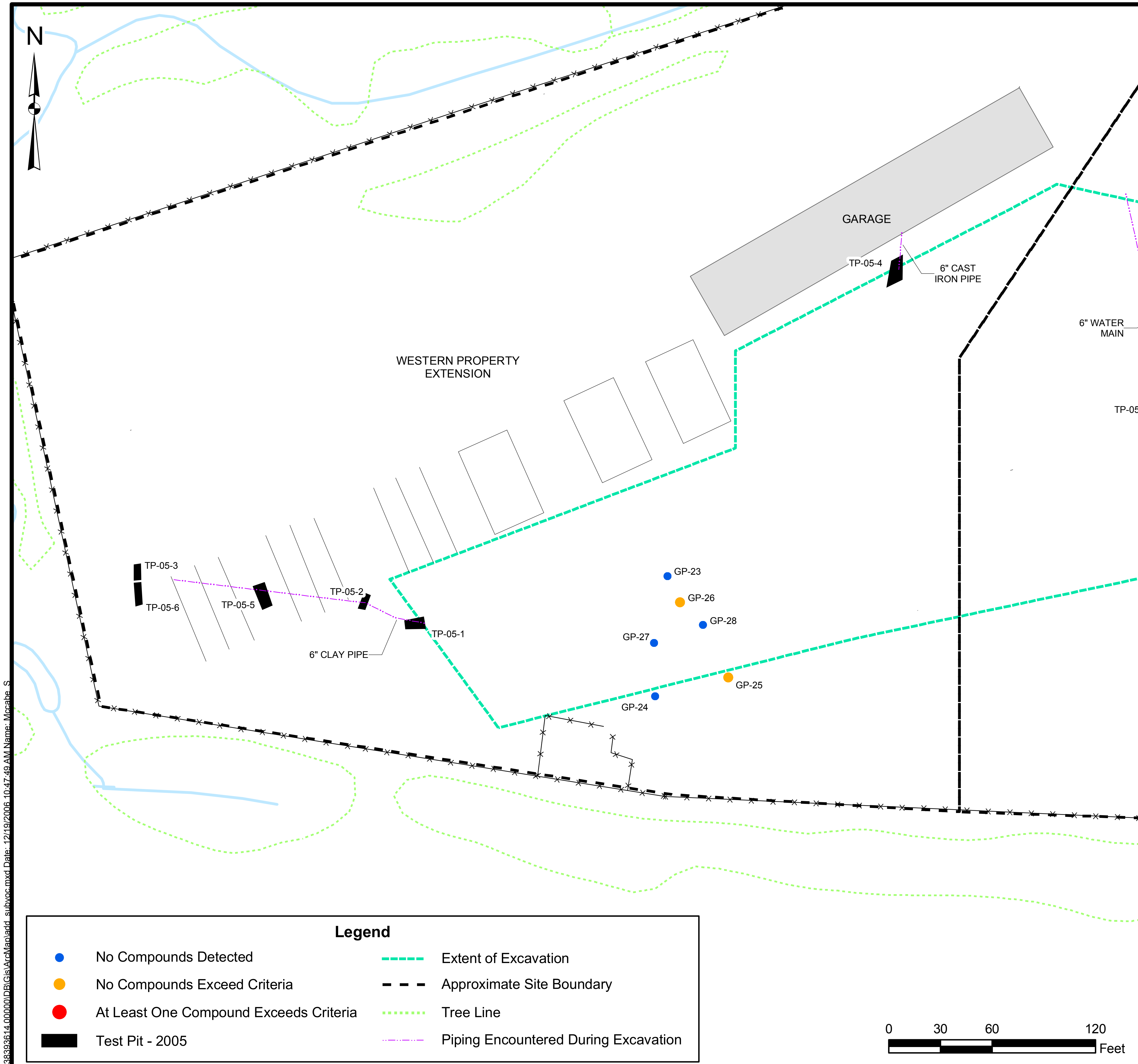
N:\38393614.00000\DB\Gis\chem.apr 2002 METALS IN SURFACE SOIL
12/19/2006



N:\38393614.00000\DB\Gis\chem.apr SURFACE SOIL - TOTAL CYANIDE & PHENOLICS
12/19/2006



N:\38393614.00000\DB\Gis\chem.apr 2002 VOCs W/TOTALS IN SUBSURFACE SOIL
1/28/2004

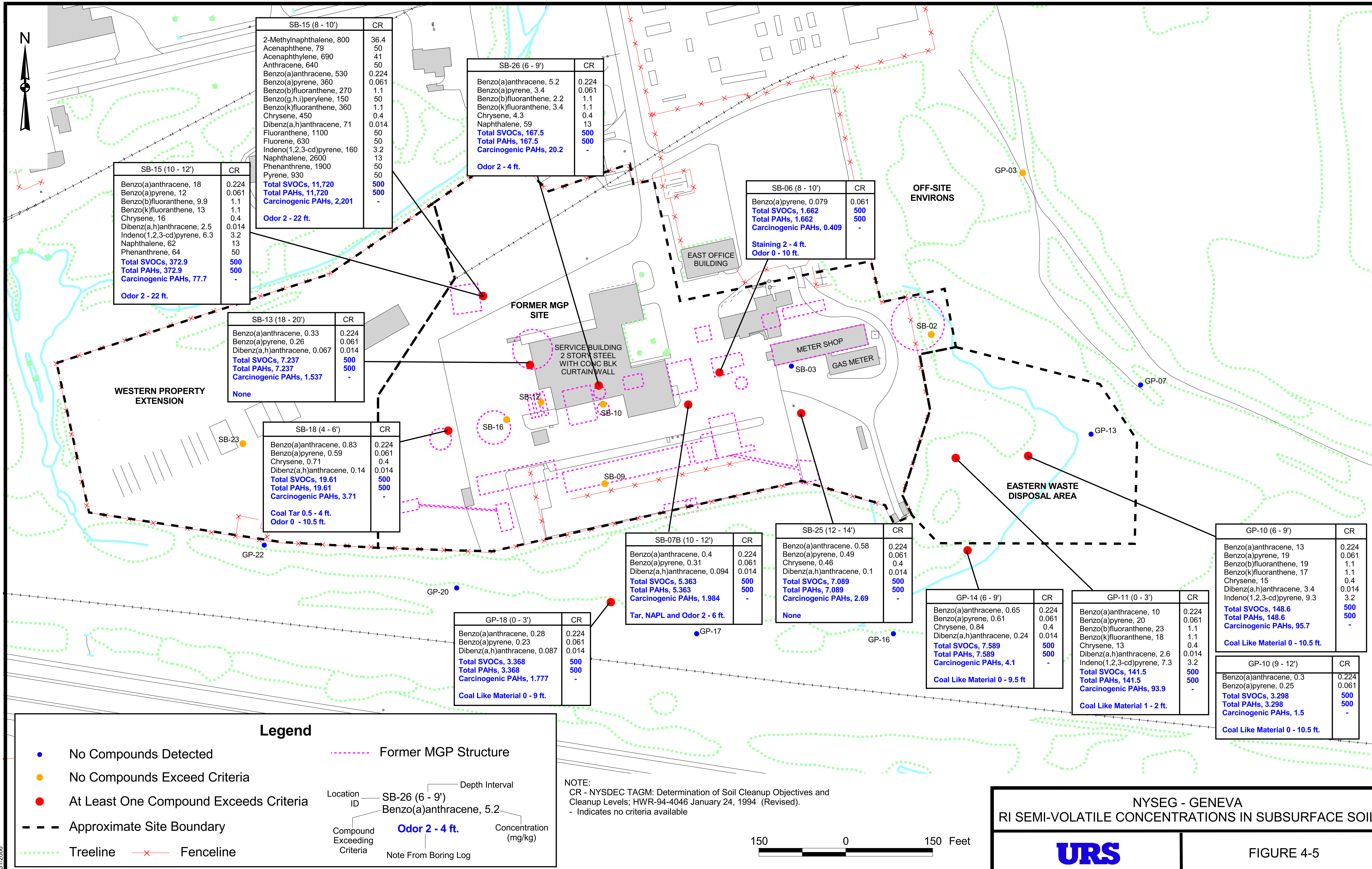


NYSEG - GENEVA
RI ADDITIONAL WORK
VOLATILE CONCENTRATIONS IN SUBSURFACE SOIL

URS

FIGURE 4-4A

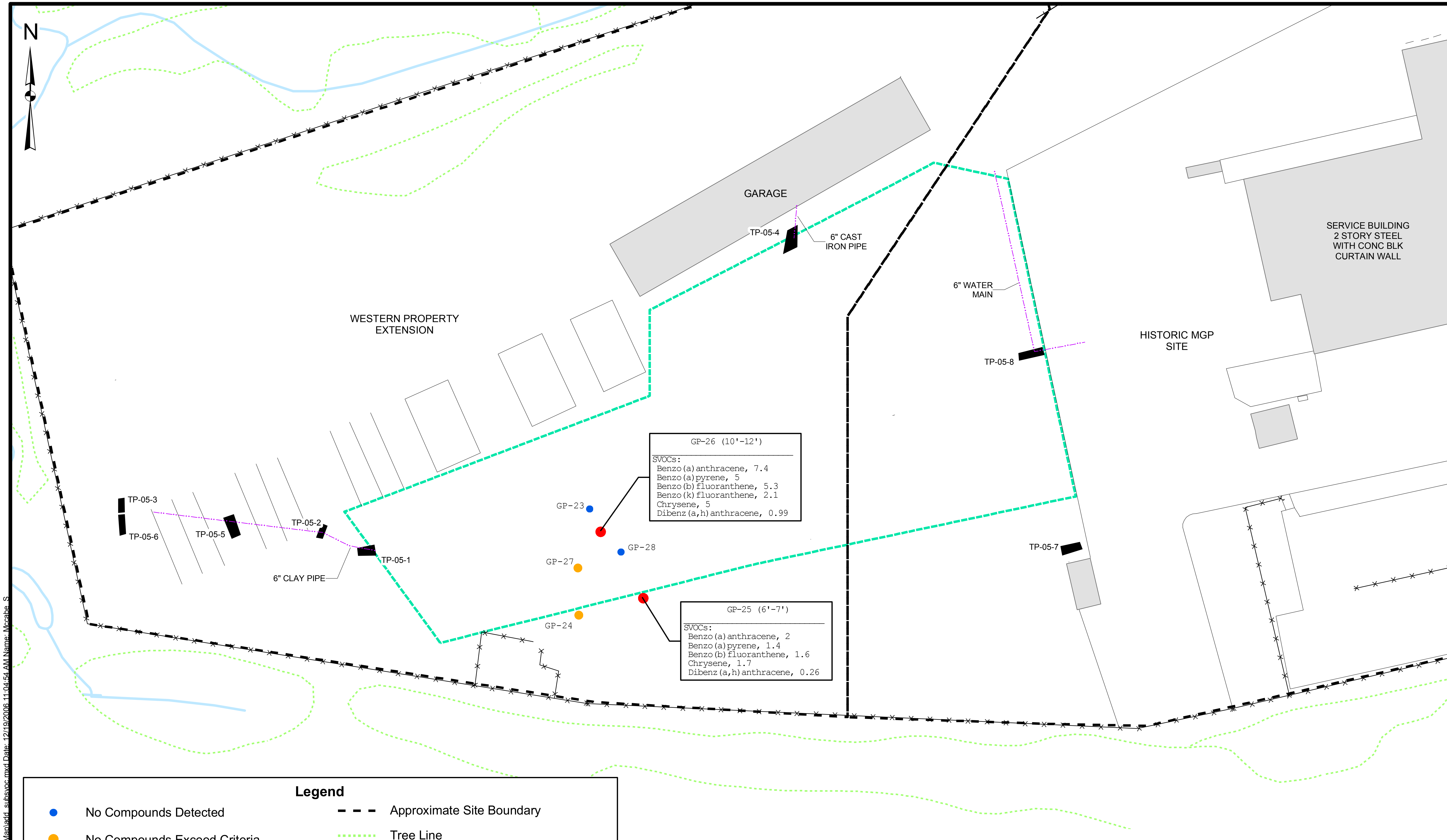
N:\38393614.00000\DB\Gis\ArcMap\add_subvoc.mxd Date: 12/19/2006 10:47:49 AM Name: Mccabe_S



NYSEG - GENEVA
RI SEMI-VOLATILE CONCENTRATIONS IN SUBSURFACE SOIL

URS

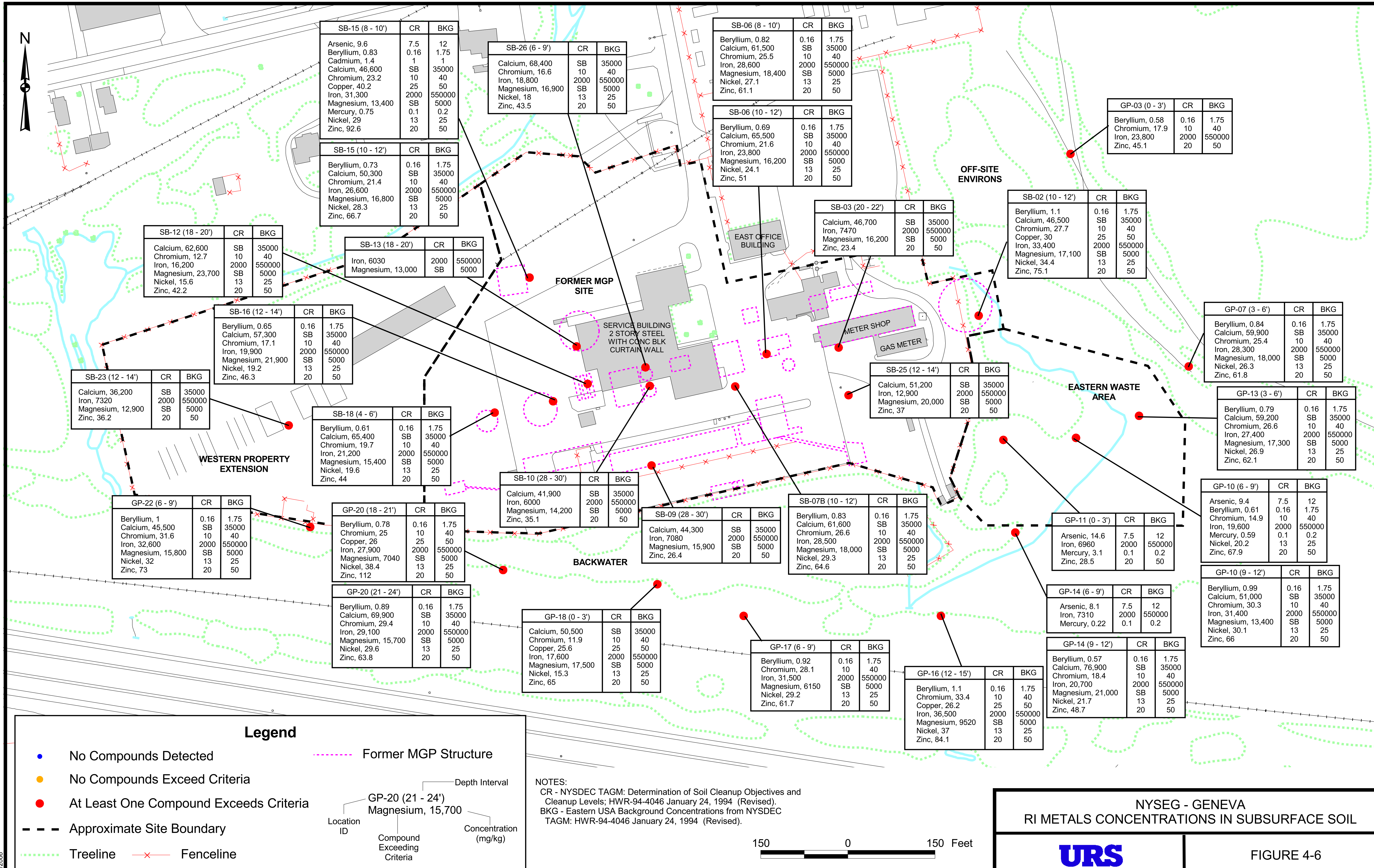
FIGURE 4-5



NYSEG - GENEVA
RI ADDITIONAL WORK
SEMI-VOLATILE CONCENTRATIONS IN SUBSURFACE SOIL

URS

FIGURE 4-5A



SB-15 (8 - 10')	CR	BKG
Arsenic, 9.6	7.5	12
Beryllium, 0.83	0.16	1.75
Cadmium, 1.4	1	1
Calcium, 46,600	SB	35000
Chromium, 23.2	10	40
Copper, 40.2	25	50
Iron, 31,300	2000	550000
Magnesium, 13,400	SB	5000
Mercury, 0.75	0.1	0.2
Nickel, 29	13	25
Zinc, 92.6	20	50

SB-15 (10 - 12')	CR	BKG
Beryllium, 0.73	0.16	1.75
Calcium, 50,300	SB	35000
Chromium, 21.4	10	40
Iron, 26,600	2000	550000
Magnesium, 16,800	SB	5000
Nickel, 28.3	13	25
Zinc, 66.7	20	50

SB-26 (6 - 9')	CR	BKG
Calcium, 68,400	SB	35000
Chromium, 16.6	10	40
Iron, 18,800	2000	550000
Magnesium, 16,900	SB	5000
Nickel, 18	13	25
Zinc, 43.5	20	50

SB-06 (8 - 10')	CR	BKG
Beryllium, 0.82	0.16	1.75
Calcium, 61,500	SB	35000
Chromium, 25.5	10	40
Iron, 28,600	2000	550000
Magnesium, 18,400	SB	5000
Nickel, 27.1	13	25
Zinc, 61.1	20	50

SB-06 (10 - 12')	CR	BKG
Beryllium, 0.69	0.16	1.75
Calcium, 65,500	SB	35000
Chromium, 21.6	10	40
Iron, 23,800	2000	550000
Magnesium, 16,200	SB	5000
Nickel, 24.1	13	25
Zinc, 51	20	50

GP-03 (0 - 3')	CR	BKG
Beryllium, 0.58	0.16	1.75
Chromium, 17.9	10	40
Iron, 23,800	2000	550000
Zinc, 45.1	20	50

SB-12 (18 - 20')	CR	BKG
Calcium, 62,600	SB	35000
Chromium, 12.7	10	40
Iron, 16,200	2000	550000
Magnesium, 23,700	SB	5000
Nickel, 15.6	13	25
Zinc, 42.2	20	50

SB-13 (18 - 20')	CR	BKG
Iron, 6030	2000	550000
Magnesium, 13,000	SB	5000

SB-03 (20 - 22')	CR	BKG
Calcium, 46,700	SB	35000
Iron, 7470	2000	550000
Magnesium, 16,200	SB	5000
Zinc, 23.4	20	50

SB-02 (10 - 12')	CR	BKG
Beryllium, 1.1	0.16	1.75
Calcium, 46,500	SB	35000
Chromium, 27.7	10	40
Copper, 30	25	50
Iron, 33,400	2000	550000
Magnesium, 17,100	SB	5000
Nickel, 34.4	13	25
Zinc, 75.1	20	50

SB-16 (12 - 14')	CR	BKG
Beryllium, 0.65	0.16	1.75
Calcium, 57,300	SB	35000
Chromium, 17.1	10	40
Iron, 19,900	2000	550000
Magnesium, 21,900	SB	5000
Nickel, 19.2	13	25
Zinc, 46.3	20	50

GP-07 (3 - 6')	CR	BKG
Beryllium, 0.84	0.16	1.75
Calcium, 59,900	SB	35000
Chromium, 25.4	10	40
Iron, 28,300	2000	550000
Magnesium, 18,000	SB	5000
Nickel, 26.3	13	25
Zinc, 61.8	20	50

SB-23 (12 - 14')	CR	BKG
Calcium, 36,200	SB	35000
Iron, 7320	2000	550000
Magnesium, 12,900	SB	5000
Zinc, 36.2	20	50

SB-25 (12 - 14')	CR	BKG
Calcium, 51,200	SB	35000
Iron, 12,900	2000	550000
Magnesium, 20,000	SB	5000
Zinc, 37	20	50

GP-13 (3 - 6')	CR	BKG
Beryllium, 0.79	0.16	1.75
Calcium, 59,200	SB	35000
Chromium, 26.6	10	40
Iron, 27,400	2000	550000
Magnesium, 17,300	SB	5000
Nickel, 26.9	13	25
Zinc, 62.1	20	50

SB-18 (4 - 6')	CR	BKG
Beryllium, 0.61	0.16	1.75
Calcium, 65,400	SB	35000
Chromium, 19.7	10	40
Iron, 21,200	2000	550000
Magnesium, 15,400	SB	5000
Nickel, 19.6	13	25
Zinc, 44	20	50

SB-10 (28 - 30')	CR	BKG
Calcium, 41,900	SB	35000
Iron, 6000	2000	550000
Magnesium, 14,200	SB	5000
Zinc, 35.1	20	50

GP-10 (6 - 9')	CR	BKG
Arsenic, 9.4	7.5	12
Beryllium, 0.61	0.16	1.75
Chromium, 14.9	10	40
Iron, 19,600	2000	550000
Mercury, 0.59	0.1	0.2
Nickel, 20.2	13	25
Zinc, 67.9	20	50

GP-22 (6 - 9')	CR	BKG
Beryllium, 1	0.16	1.75
Calcium, 45,500	SB	35000
Chromium, 31.6	10	40
Iron, 32,600	2000	550000
Magnesium, 15,800	SB	5000
Nickel, 32	13	25
Zinc, 73	20	50

GP-20 (18 - 21')	CR	BKG
Beryllium, 0.78	0.16	1.75
Chromium, 25	10	40
Copper, 26	25	50
Iron, 27,900	2000	550000
Magnesium, 7040	SB	5000
Nickel, 38.4	13	25
Zinc, 112	20	50

SB-09 (28 - 30')	CR	BKG
Calcium, 44,300	SB	35000
Iron, 7080	2000	550000
Magnesium, 15,900	SB	5000
Zinc, 26.4	20	50

SB-07B (10 - 12')	CR	BKG
Beryllium, 0.83	0.16	1.75
Calcium, 61,600	SB	35000
Chromium, 26.6	10	40
Iron, 28,500	2000	550000
Magnesium, 18,000	SB	5000
Nickel, 29.3	13	25
Zinc, 64.6	20	50

GP-11 (0 - 3')	CR	BKG
Arsenic, 14.6	7.5	12
Iron, 6960	2000	550000
Mercury, 3.1	0.1	0.2
Zinc, 28.5	20	50

GP-10 (9 - 12')	CR	BKG
Beryllium, 0.99	0.16	1.75
Calcium, 51,000	SB	35000
Chromium, 30.3	10	40
Iron, 31,400	2000	550000
Magnesium, 13,400	SB	5000
Nickel, 30.1	13	25
Zinc, 66	20	50

GP-20 (21 - 24')	CR	BKG
Beryllium, 0.89	0.16	1.75
Calcium, 69,900	SB	35000
Chromium, 29.4	10	40
Iron, 29,100	2000	550000
Magnesium, 15,700	SB	5000
Nickel, 29.6	13	25
Zinc, 63.8	20	50

GP-14 (6 - 9')	CR	BKG
Arsenic, 8.1	7.5	12
Iron, 7310	2000	550000
Mercury, 0.22	0.1	0.2

GP-18 (0 - 3')	CR	BKG
Calcium, 50,500	SB	35000
Chromium, 11.9	10	40
Copper, 25.6	25	50
Iron, 17,600	2000	550000
Magnesium, 17,500	SB	5000
Nickel, 15.3	13	25
Zinc, 65	20	50

GP-17 (6 - 9')	CR	BKG
Beryllium, 0.92	0.16	1.75
Chromium, 28.1	10	40
Iron, 31,500	2000	550000
Magnesium, 6150	SB	5000
Nickel, 29.2	13	25
Zinc, 61.7	20	50

GP-14 (9 - 12')	CR	BKG
Beryllium, 0.57	0.16	1.75
Calcium, 76,900	SB	35000
Chromium, 18.4	10	40
Iron, 20,700	2000	550000
Magnesium, 21,000	SB	5000
Nickel, 21.7	13	25
Zinc, 48.7	20	50

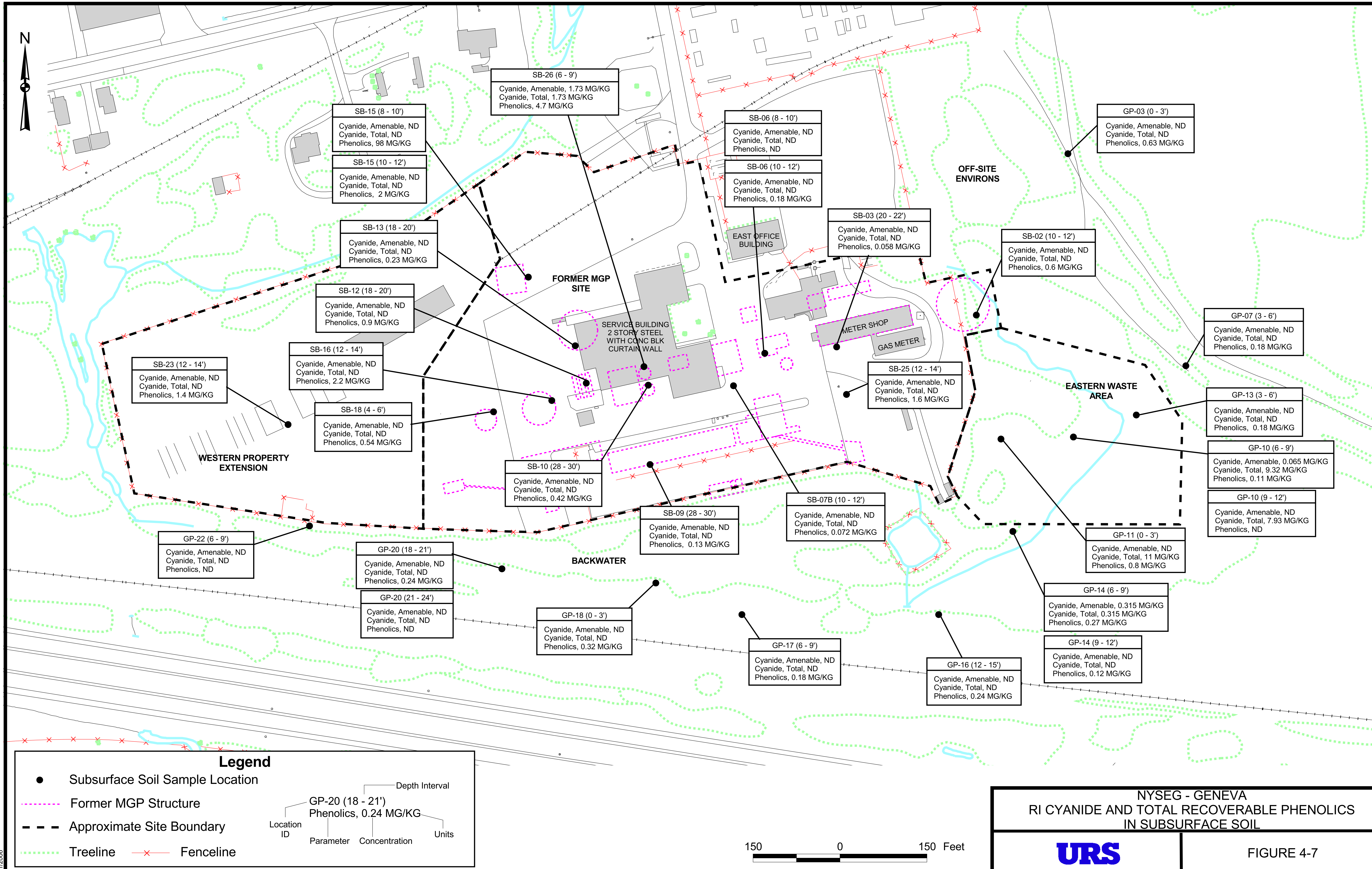
GP-16 (12 - 15')	CR	BKG
Beryllium, 1.1	0.16	1.75
Chromium, 33.4	10	40
Copper, 26.2	25	50
Iron, 36,500	2000	550000
Magnesium, 9520	SB	5000
Nickel, 37	13	25
Zinc, 84.1	20	50

NOTES:
CR - NYSDEC TAGM: Determination of Soil Cleanup Objectives and Cleanup Levels; HWR-94-4046 January 24, 1994 (Revised).
BKG - Eastern USA Background Concentrations from NYSDEC TAGM: HWR-94-4046 January 24, 1994 (Revised).

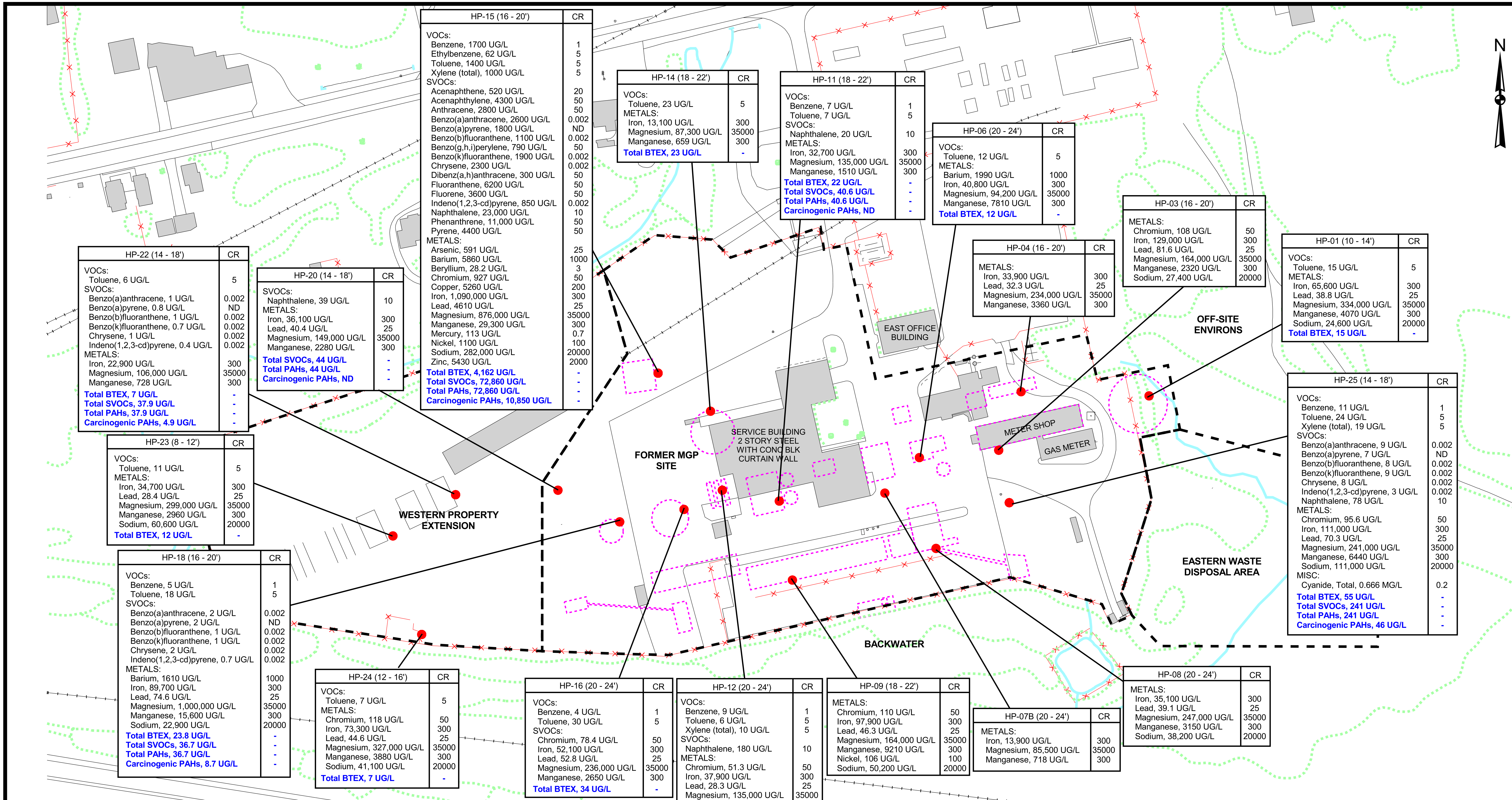
NYSEG - GENEVA
RI METALS CONCENTRATIONS IN SUBSURFACE SOIL

URS

FIGURE 4-6



N:\38393614.00000\DB\Gis\chem.apr SUBSURFACE SOIL - TOTAL CYANIDE & PHENOLICS
6/1/2006



Legend

- No Compounds Detected
- No Compounds Exceed Criteria
- At Least One Compound Exceeds Criteria
- Approximate Site Boundary
- Treeline
- Fenceline
- Former MGP Structure

HP-16 (20 - 24') — Location ID; Depth Interval (ft)
Benzene, 4 UG/L — Compound Exceeding Criteria; Concentration; Units

NOTE:
CR - NYSDEC TOGS (1.1.1), Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations. April 2000, Class GA.
- Indicates no criteria available

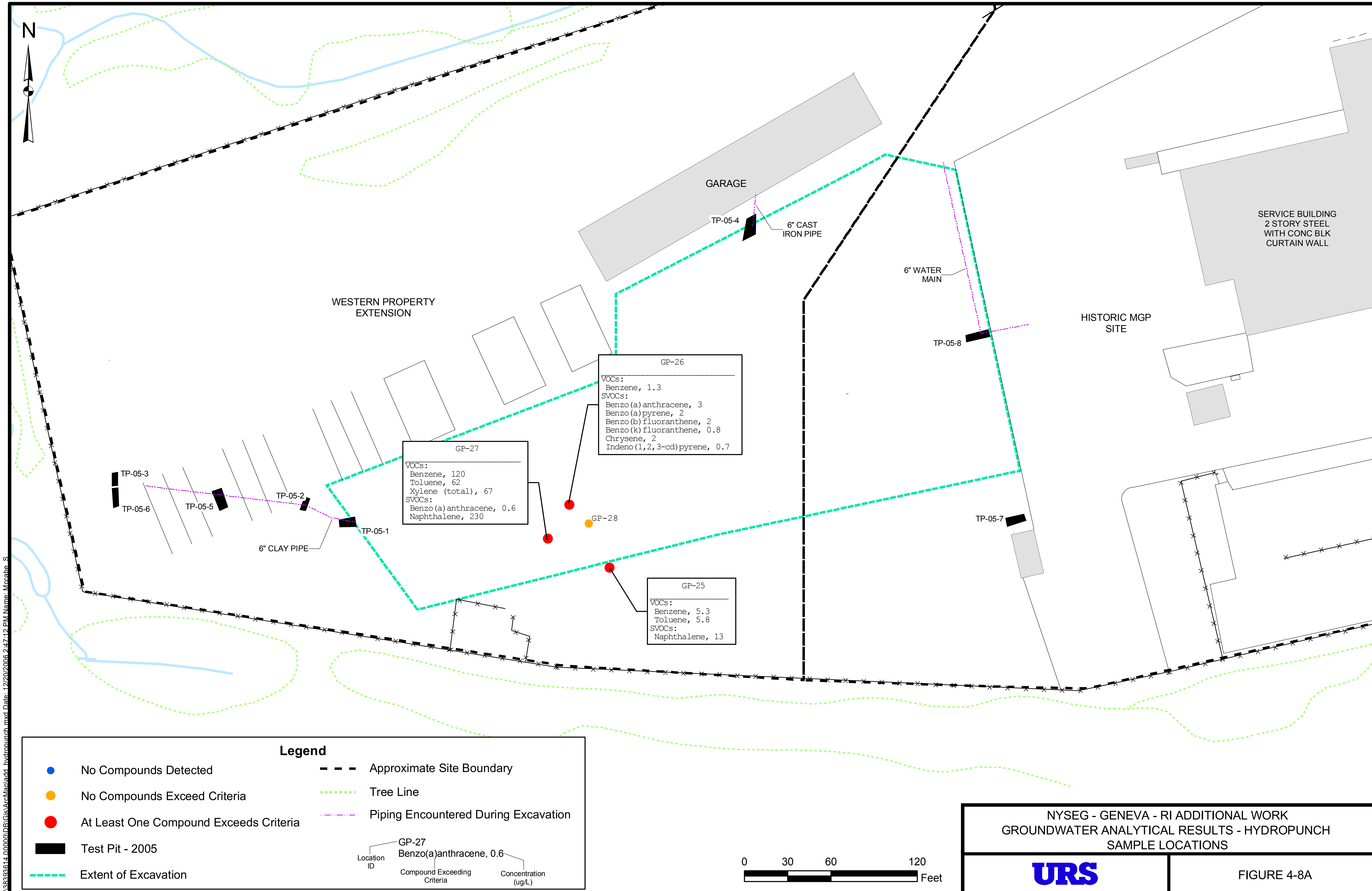
150 0 150 Feet

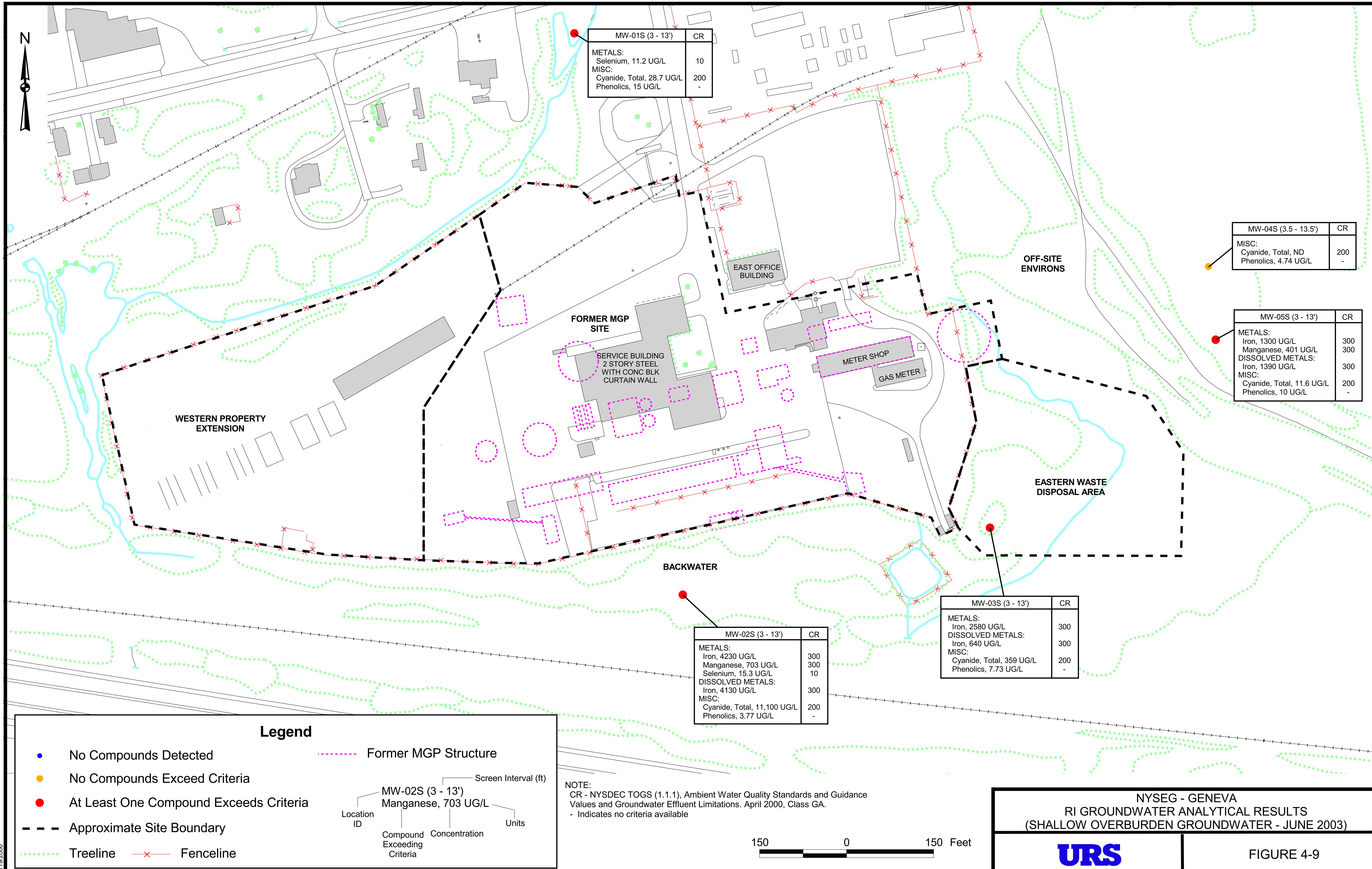
NYSEG - GENEVA
RI GROUNDWATER ANALYTICAL RESULTS
(HYDROPUNCH SAMPLE LOCATIONS)

URS

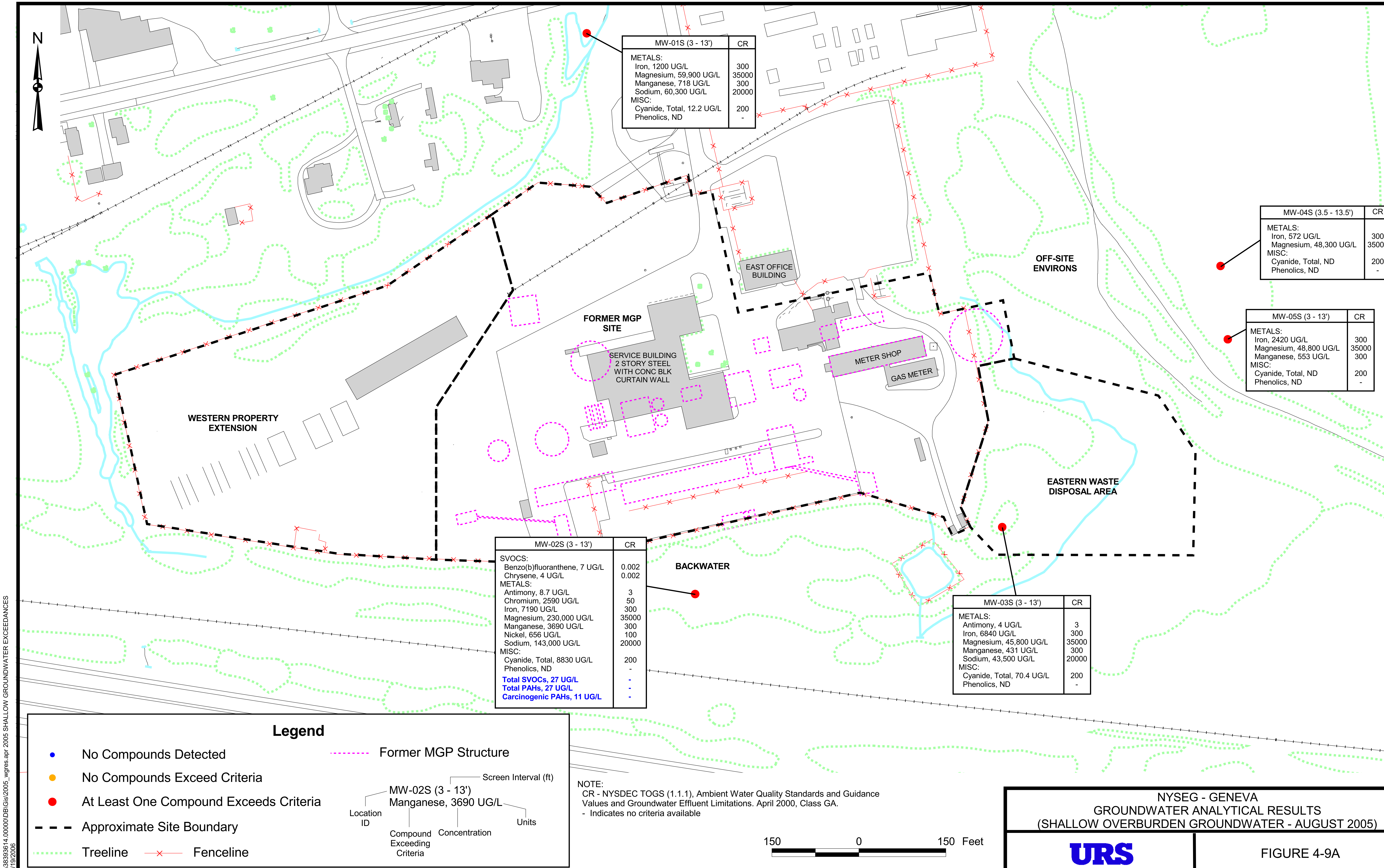
FIGURE 4-8

N:\38393614.00000\DB\GIS\chem.apr HYDROPUNCH GROUNDWATER ANALYTICAL RESULTS
6/1/2006


N
GARAGE
TP-05-4
6" CAST IRON PIPE
WESTERN PROPERTY EXTENSION
6" WATER MAIN
SERVICE BUILDING 2 STORY STEEL WITH CONC BLK CURTAIN WALL
HISTORIC MGP SITE
TP-05-8
GP-26
VOCs:
Benzene, 1.3
SVOCs:
Benzo(a)anthracene, 3
Benzo(a)pyrene, 2
Benzo(b)fluoranthene, 2
Benzo(k)fluoranthene, 0.8
Chrysene, 2
Indeno(1,2,3-cd)pyrene, 0.7
GP-27
VOCs:
Benzene, 120
Toluene, 62
Xylene (total), 67
SVOCs:
Benzo(a)anthracene, 0.6
Naphthalene, 230
TP-05-3
TP-05-6
TP-05-5
TP-05-2
TP-05-1
6" CLAY PIPE
GP-28
TP-05-7
GP-25
VOCs:
Benzene, 5.3
Toluene, 5.8
SVOCs:
Naphthalene, 13
Legend
No Compounds Detected
No Compounds Exceed Criteria
At Least One Compound Exceeds Criteria
Test Pit - 2005
Extent of Excavation
Approximate Site Boundary
Tree Line
Piping Encountered During Excavation
GP-27
Benzo(a)anthracene, 0.6
Location ID
Compound Exceeding Criteria
Concentration (ug/L)
0
30
60
120
Feet
NYSEG - GENEVA - RI ADDITIONAL WORK
GROUNDWATER ANALYTICAL RESULTS - HYDROPUNCH SAMPLE LOCATIONS
URS
FIGURE 4-8A



N:\38393614.00000\DB\Gis\chem.apr 2003 SHALLOW GROUNDWATER EXCEEDANCES
12/19/2006

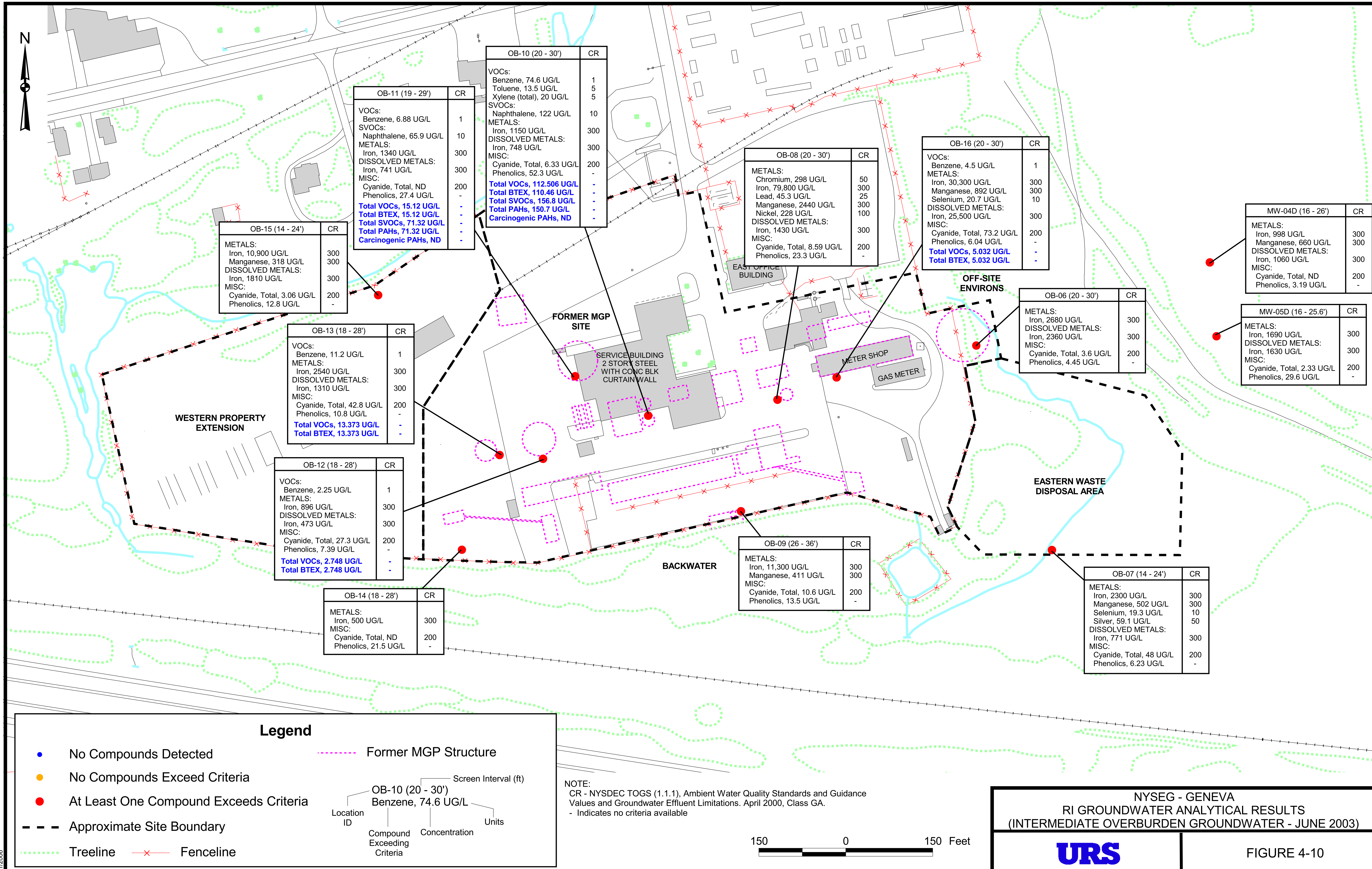


NOTE:
CR - NYSDEC TOGS (1.1.1), Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations. April 2000, Class GA.
- Indicates no criteria available

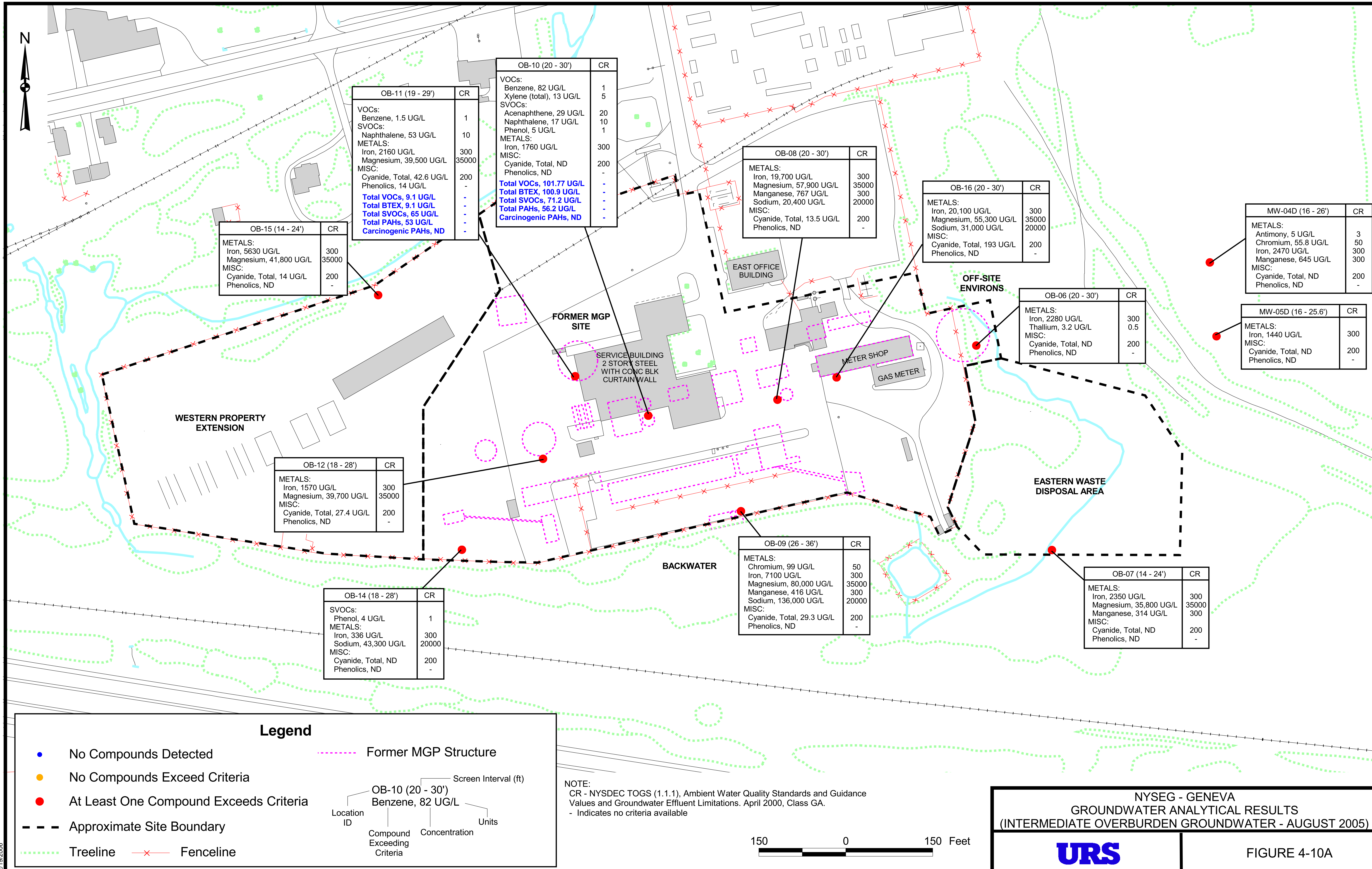
NYSEG - GENEVA
GROUNDWATER ANALYTICAL RESULTS
(SHALLOW OVERBURDEN GROUNDWATER - AUGUST 2005)

URS

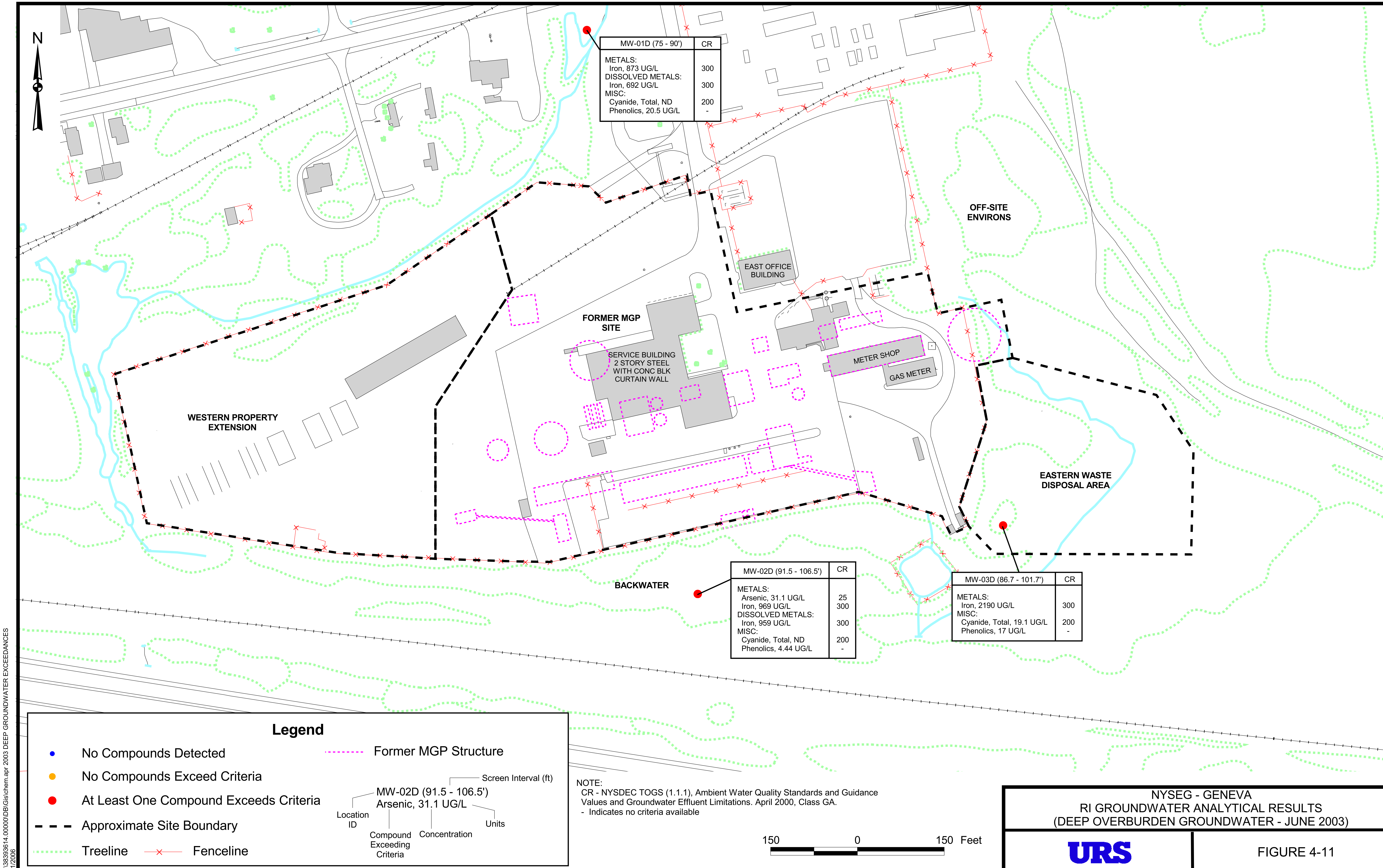
FIGURE 4-9A



N:\38393614.00000\DB\Gis\chem.apr 2003 INTERMEDIATE GROUNDWATER EXCEEDANCES
6/1/2006



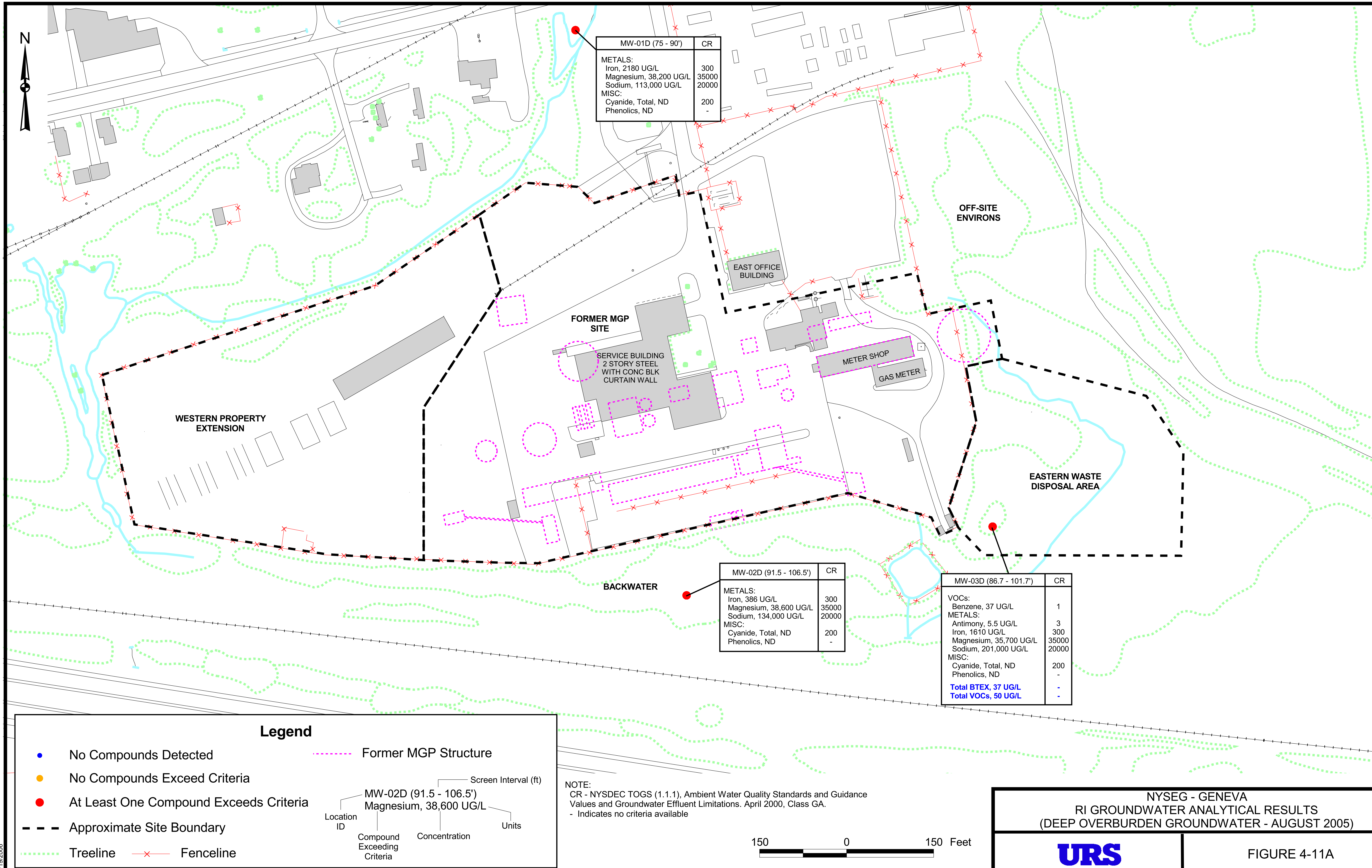
N:\38393614.00000\DB\Gis\2005_wgres.apr 2005 INTERMEDIATE GROUNDWATER EXCEEDANCES
12/19/2006



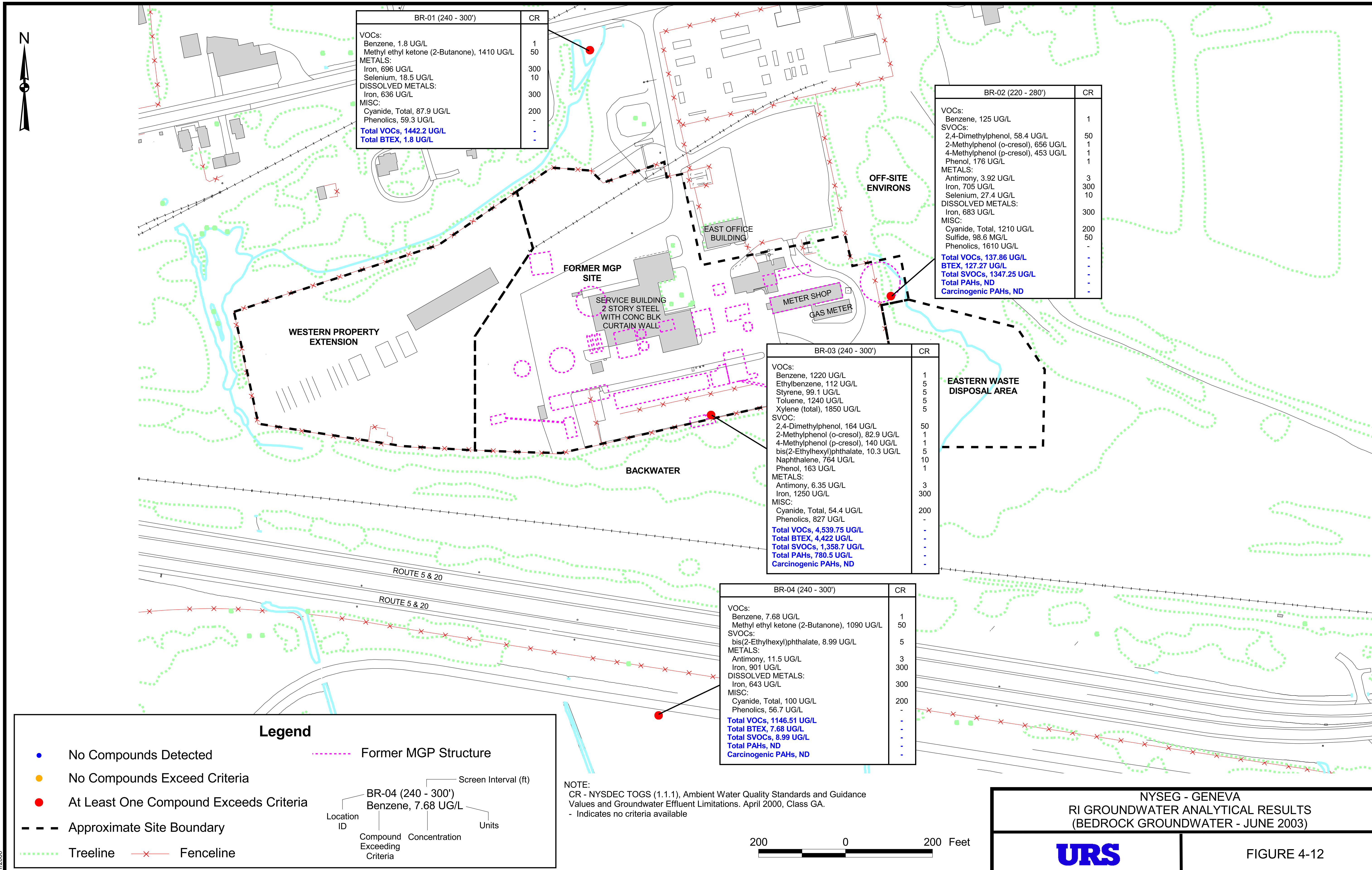
NYSEG - GENEVA
RI GROUNDWATER ANALYTICAL RESULTS
(DEEP OVERBURDEN GROUNDWATER - JUNE 2003)

URS

FIGURE 4-11



N:\38393614.00000\DB\Gis\2005_wgres.apr 2005 DEEP GROUNDWATER EXCEEDANCES
12/19/2006



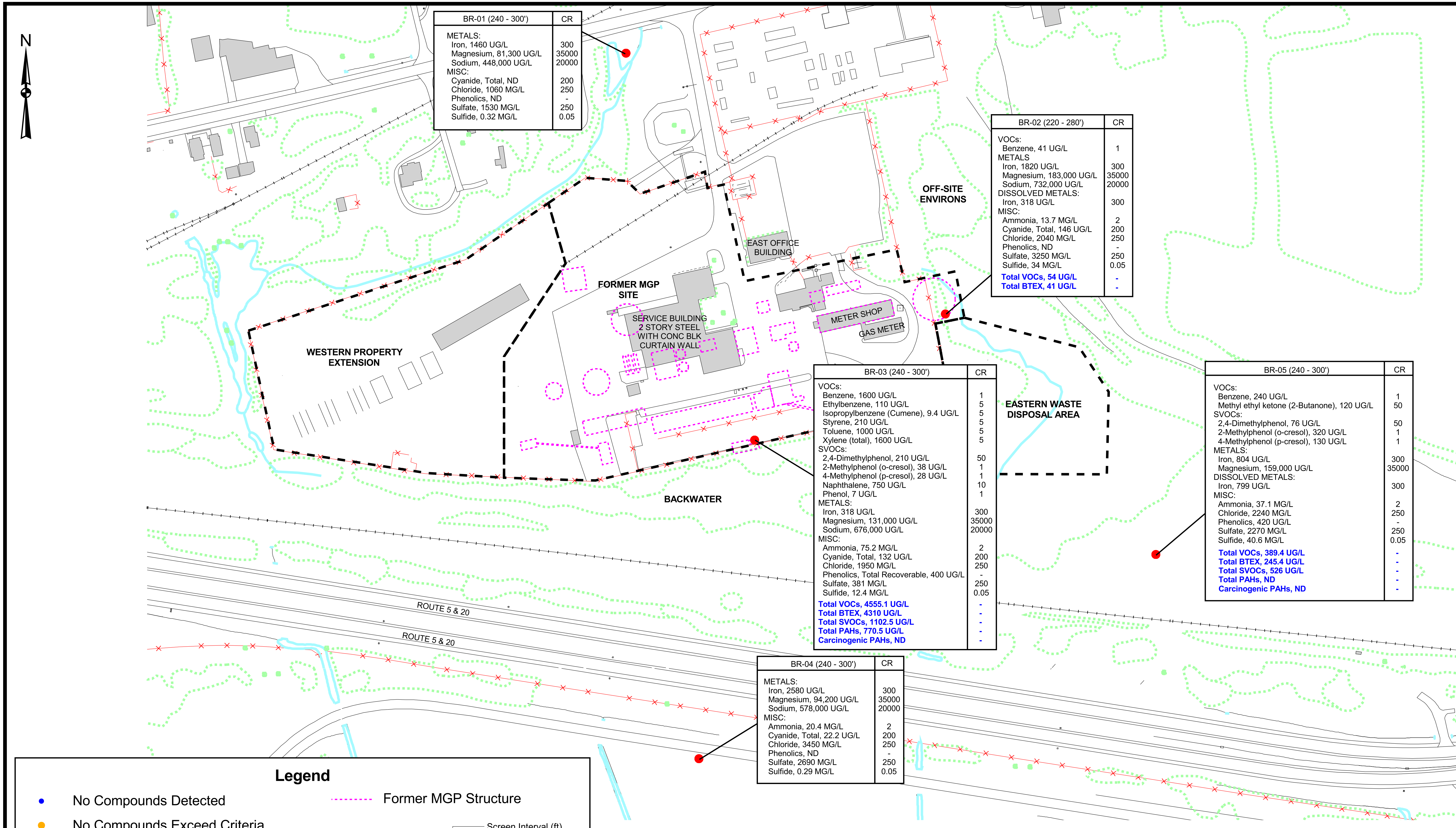
NOTE:
CR - NYSDEC TOGS (1.1.1), Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations. April 2000, Class GA.
- Indicates no criteria available

NYSEG - GENEVA
RI GROUNDWATER ANALYTICAL RESULTS
(BEDROCK GROUNDWATER - JUNE 2003)

URS

FIGURE 4-12

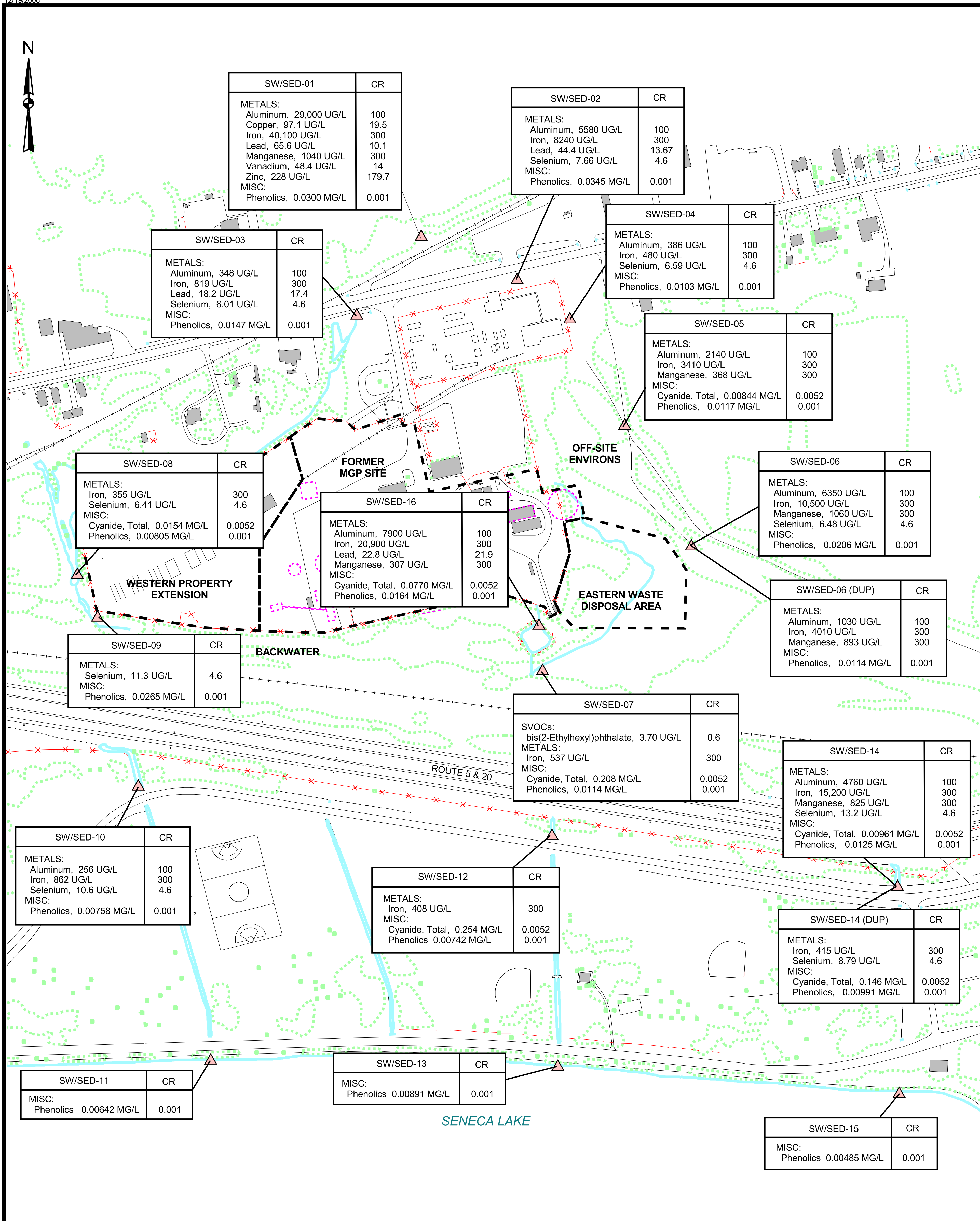
N:\38393614.00000\DB\Gis\chem.apr 2003 BEDROCK GROUNDWATER EXCEEDANCES
6/1/2006



NYSEG - GENEVA
RI GROUNDWATER ANALYTICAL RESULTS
(BEDROCK GROUNDWATER - AUGUST AND DECEMBER 2005)

URS

FIGURE 4-12A



Legend

- △ Surface Water Sample Location
- △ No Compounds Detected
- △ At Least One Compound Detected
- △ At Least One Compound Exceeds Criteria

SW/SED-10 — Location ID
Phenolics, 0.00758 MG/L — Compound Exceeding Criteria; Concentration; Units

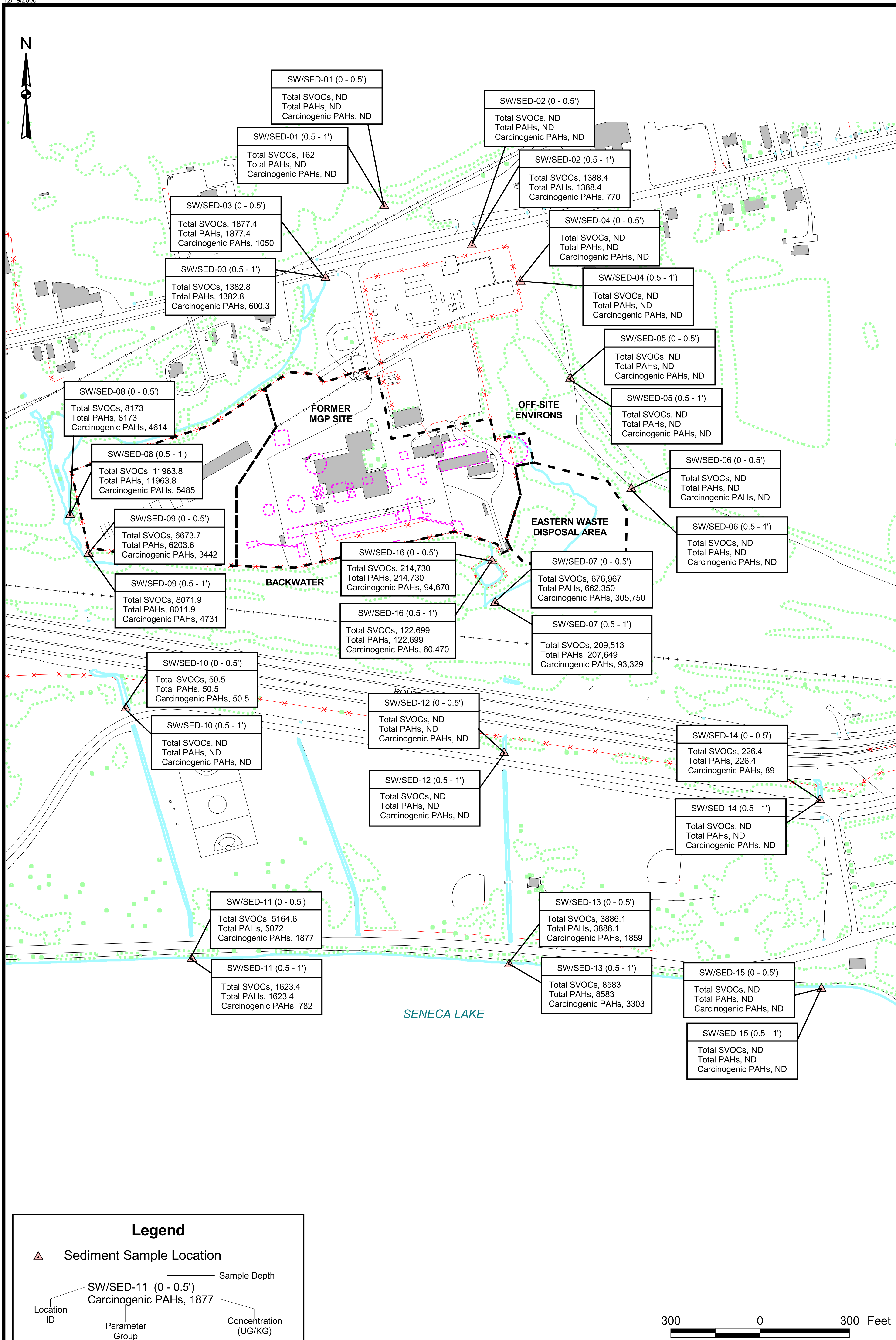
NOTE:
CR - For Locations SW/SED-11, SW/SED-13 and SW/SED-15; NYSDEC Class A Surface Water Criteria.
All other Locations; NYSDEC Class C Surface Water Criteria.

300 0 300 Feet

URS

NYSEG - GENEVA
RI SURFACE WATER ANALYTICAL RESULTS

FIGURE 4-13

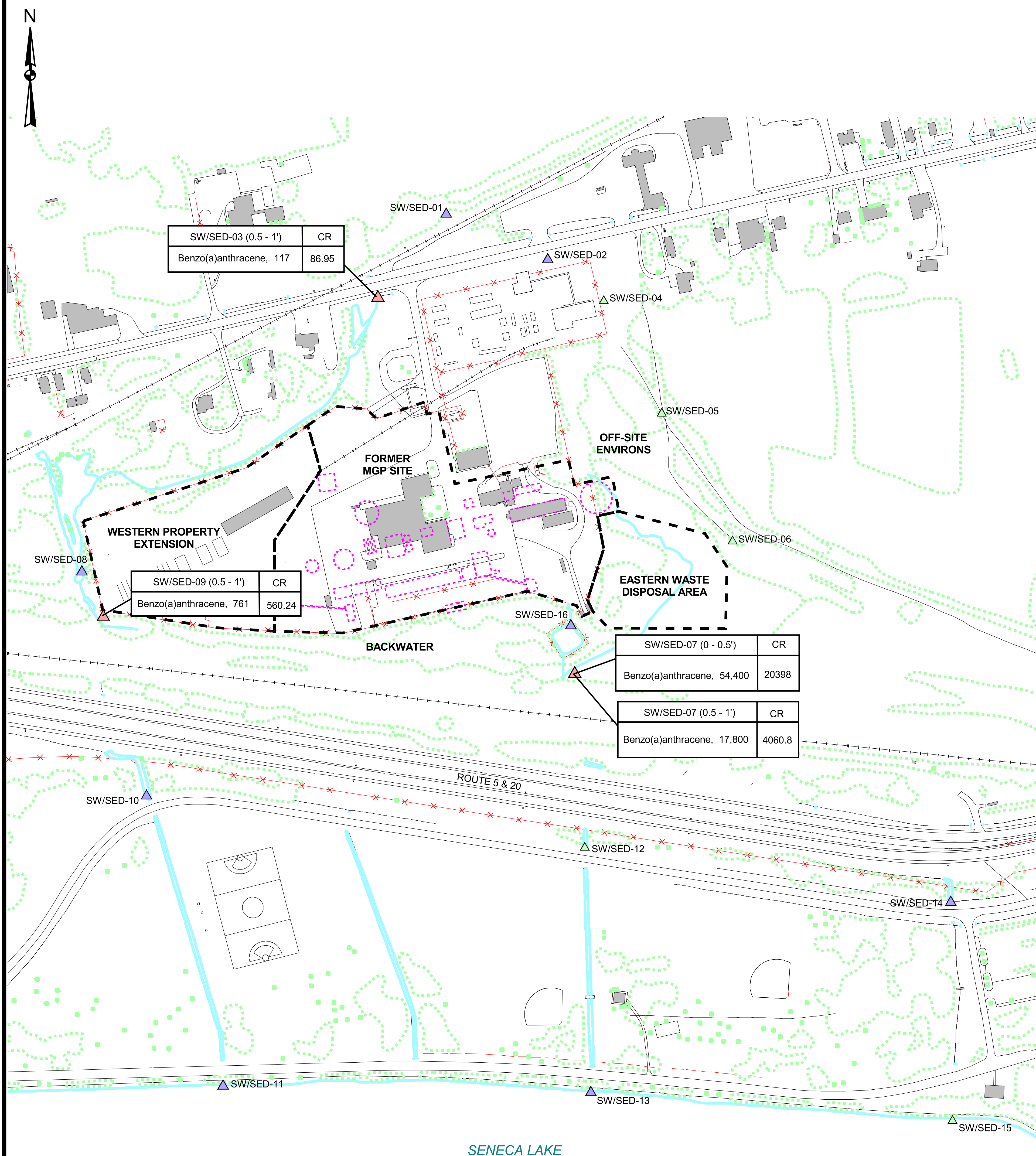


URS

NYSEG - GENEVA
RI SUMMARY OF TOTAL PAHs, CARCINOGENIC PAHs AND SVOCs IN SEDIMENT

FIGURE 4-14

N:\38393614.00000\DB\Gis\sediment.apr SVOCs - BENTHIC ACUTE
12/19/2006



Legend

- △ Sediment Sample Location
- △ No Compounds Detected
- △ At Least One Compound Detected
- △ At Least One Compound Exceeds Criteria

SW/SED-07 (0 - 0.5') — Sample Depth
Benzo(a)anthracene, 54,400

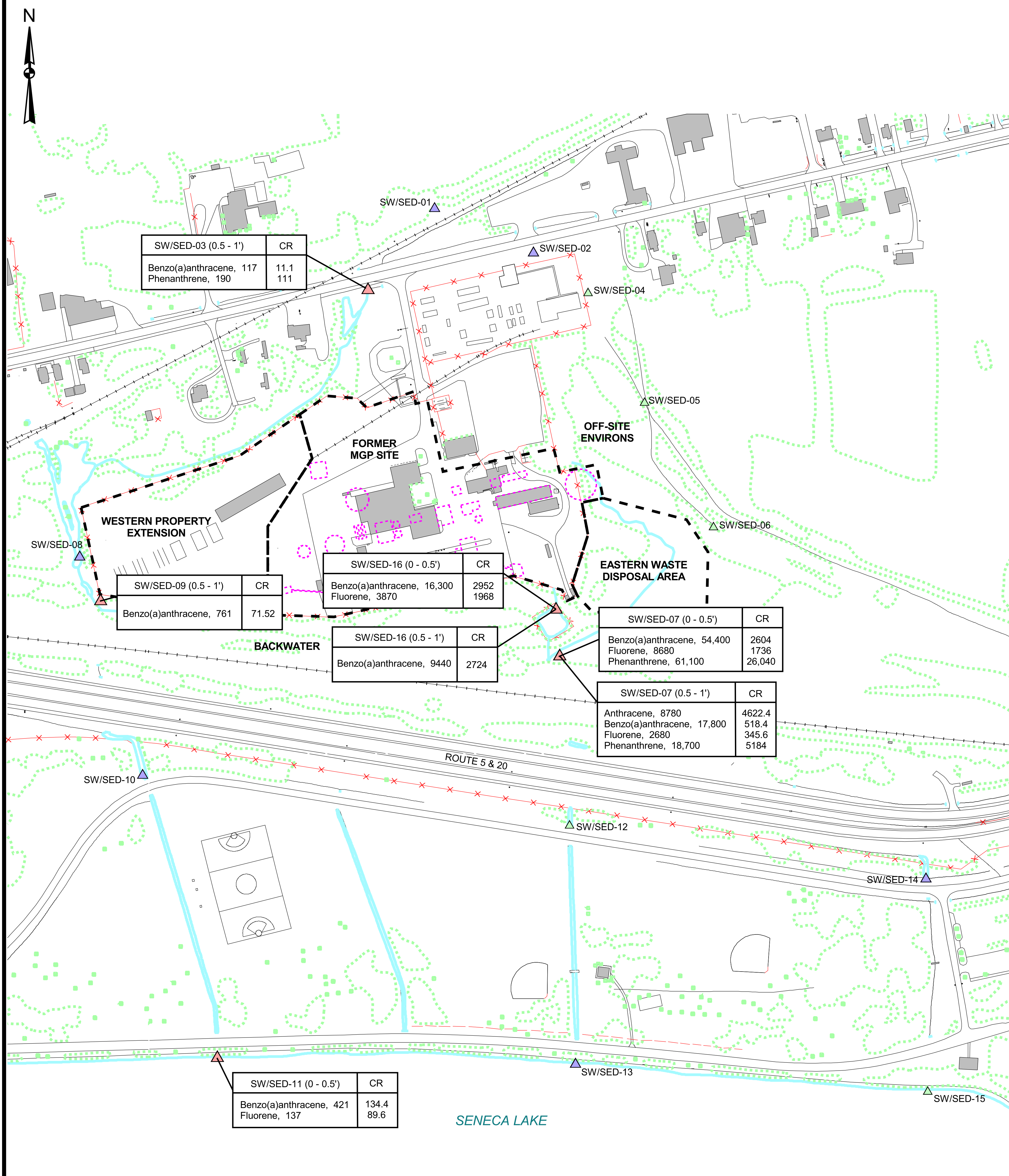
Location ID — Compound Exceeding Criteria — Concentration (UG/KG)

NOTE:
CR - NYSDEC Technical Guidance for Screening Contaminated Sediments, Benthic Acute Toxicity, January 25, 1999.

300 0 300 Feet

URS	NYSEG - GENEVA RI SEDIMENT SVOC ANALYTICAL RESULTS THAT EXCEED BENTHIC AQUATIC LIFE ACUTE TOXICITY TO BE CONSIDERED CRITERIA	FIGURE 4-15

N:\38393614.00000\DB\Gis\sediment.apr SVOCs - BENTHIC CHRONIC
12/19/2006



Legend

- △ Sediment Sample Location
- △ No Compounds Detected
- △ At Least One Compound Detected
- △ At Least One Compound Exceeds Criteria

SW/SED-07 (0 - 0.5') — Sample Depth
Benzo(a)anthracene, 54,400 — Concentration (UG/KG)
Location ID; Compound Exceeding Criteria

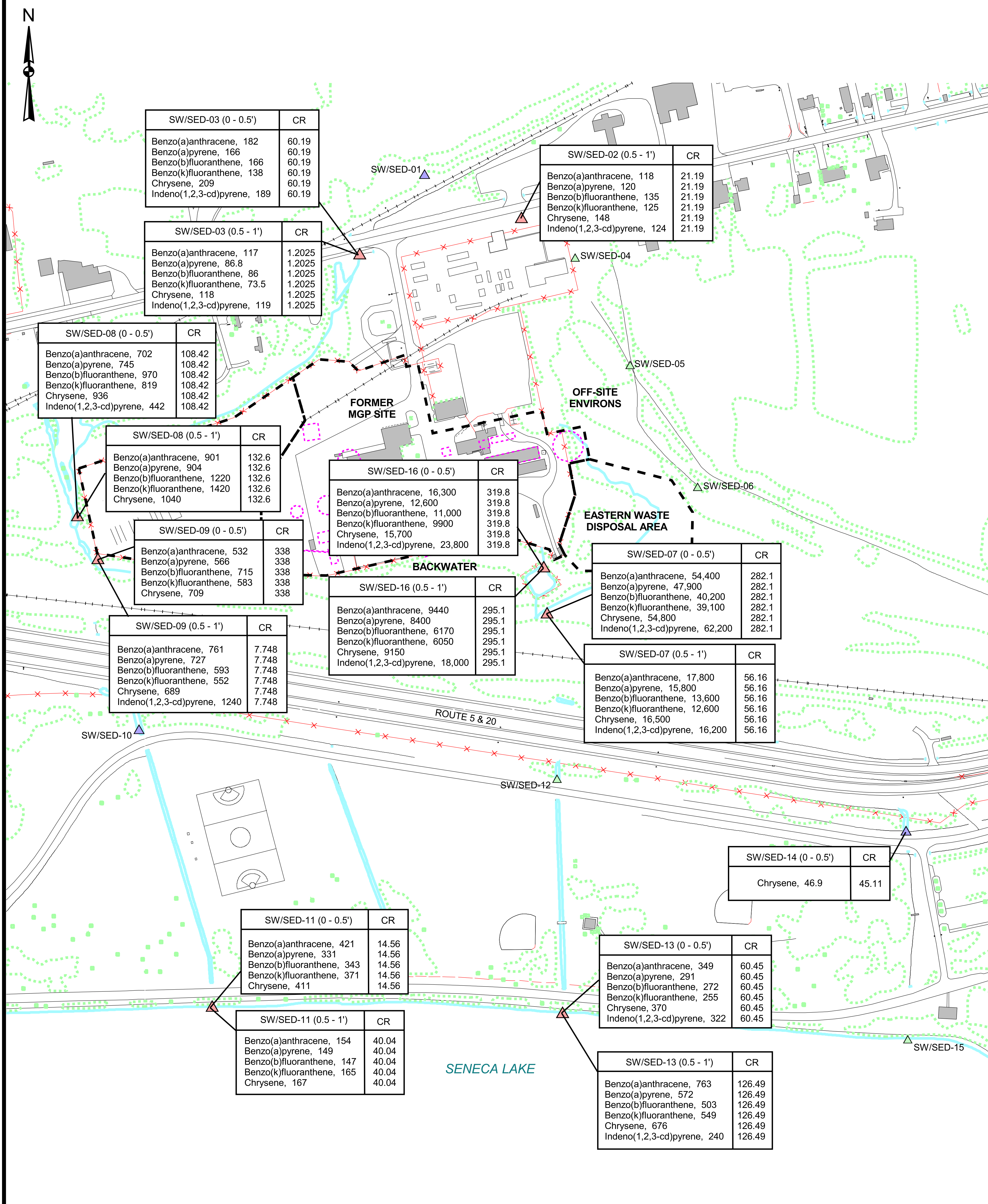
NOTE:
CR - NYSDEC Technical Guidance for Screening Contaminated Sediments, Benthic Chronic Toxicity, January 25, 1999.

300 0 300 Feet

URS

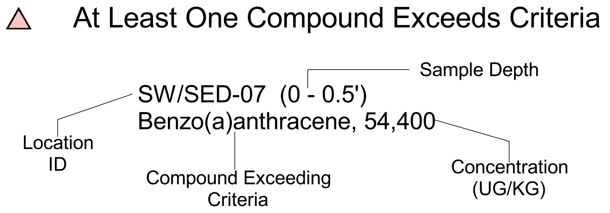
NYSEG - GENEVA
RI SEDIMENT SVOC ANALYTICAL RESULTS THAT EXCEED BENTHIC AQUATIC LIFE CHRONIC TOXICITY TO BE CONSIDERED CRITERIA

FIGURE 4-16



Legend

- △ Sediment Sample Location
- △ No Compounds Detected
- △ At Least One Compound Detected
- △ At Least One Compound Exceeds Criteria

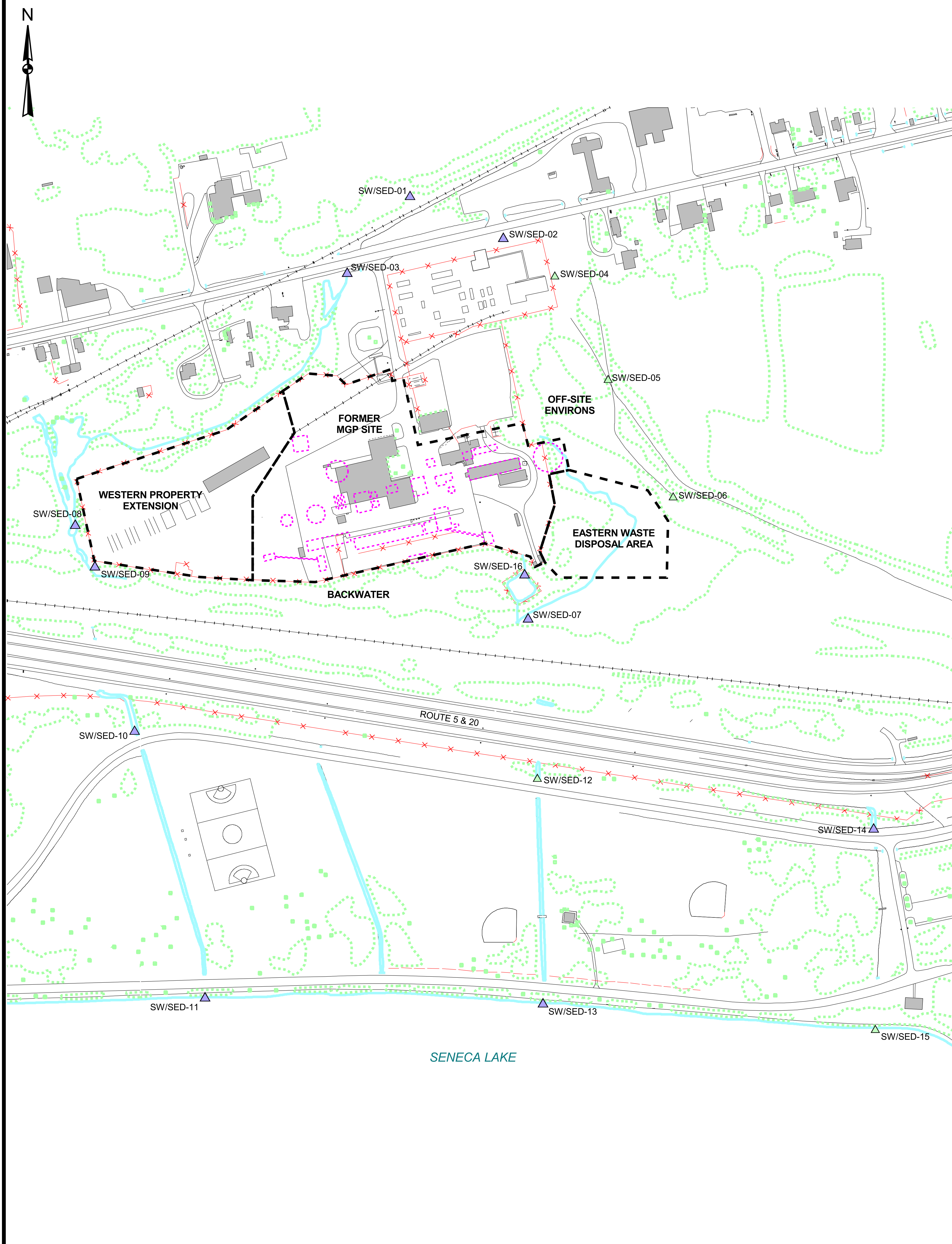


NOTE:
CR - NYSDEC Technical Guidance for Screening Contaminated Sediments, Human Health Bioaccumulation, January 25, 1999.

300 0 300 Feet

URS	NYSEG - GENEVA RI SEDIMENT SVOC ANALYTICAL RESULTS THAT EXCEED HUMAN HEALTH BIOACCUMULATION TO BE CONSIDERED CRITERIA	FIGURE 4-17

N:\38393614.00000\DB\Gis\sediment.apr SVOCs - WILDLIFE BIO
12/19/2006

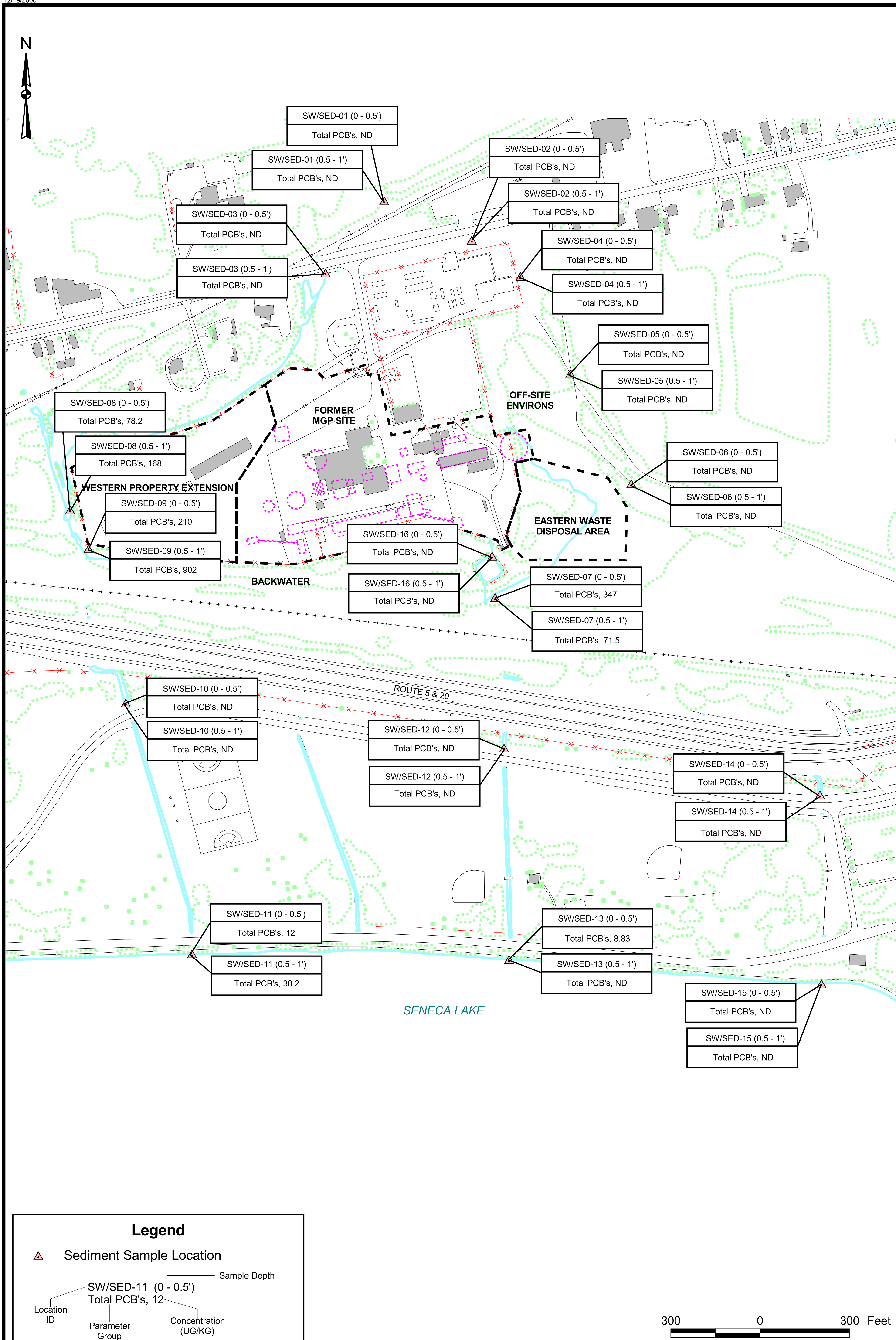


Legend

- △ Sediment Sample Location
- △ No Compounds Detected
- △ At Least One Compound Detected
- △ At Least One Compound Exceeds Criteria

URS	NYSEG - GENEVA RI SEDIMENT SVOC ANALYTICAL RESULTS THAT EXCEED WILDLIFE BIOACCUMULATION TO BE CONSIDERED CRITERIA	FIGURE 4-18

N:\38393614.00000\DB\Gis\sediment.apr TOTAL PCBs IN SEDIMENT
12/19/2006

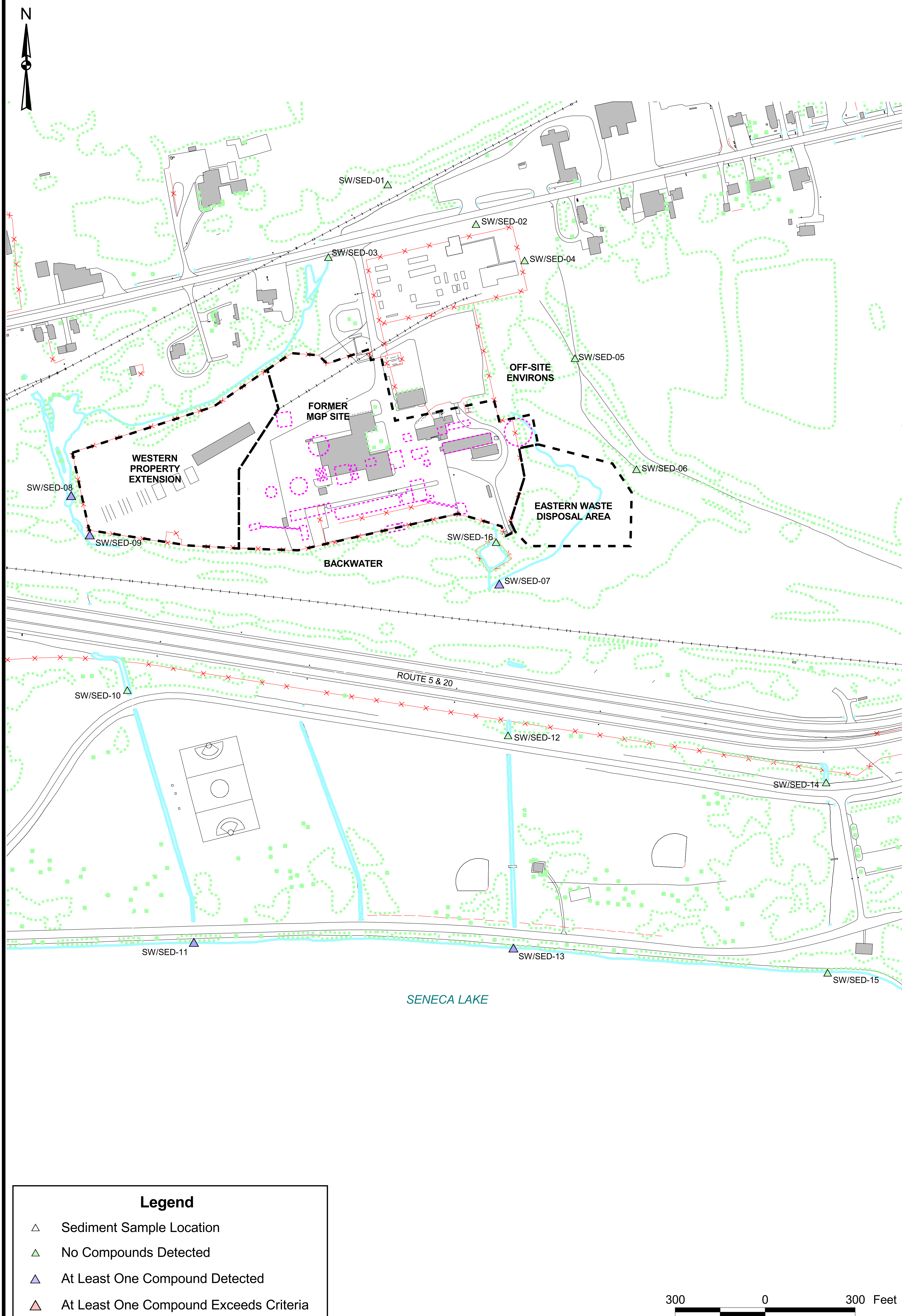


URS

NYSEG - GENEVA
RI SUMMARY OF TOTAL PCB IN SEDIMENT

FIGURE 4-19

N:\38393614.00000\DB\Gis\sediment.apr PCBs - BENTHIC ACUTE
12/19/2006

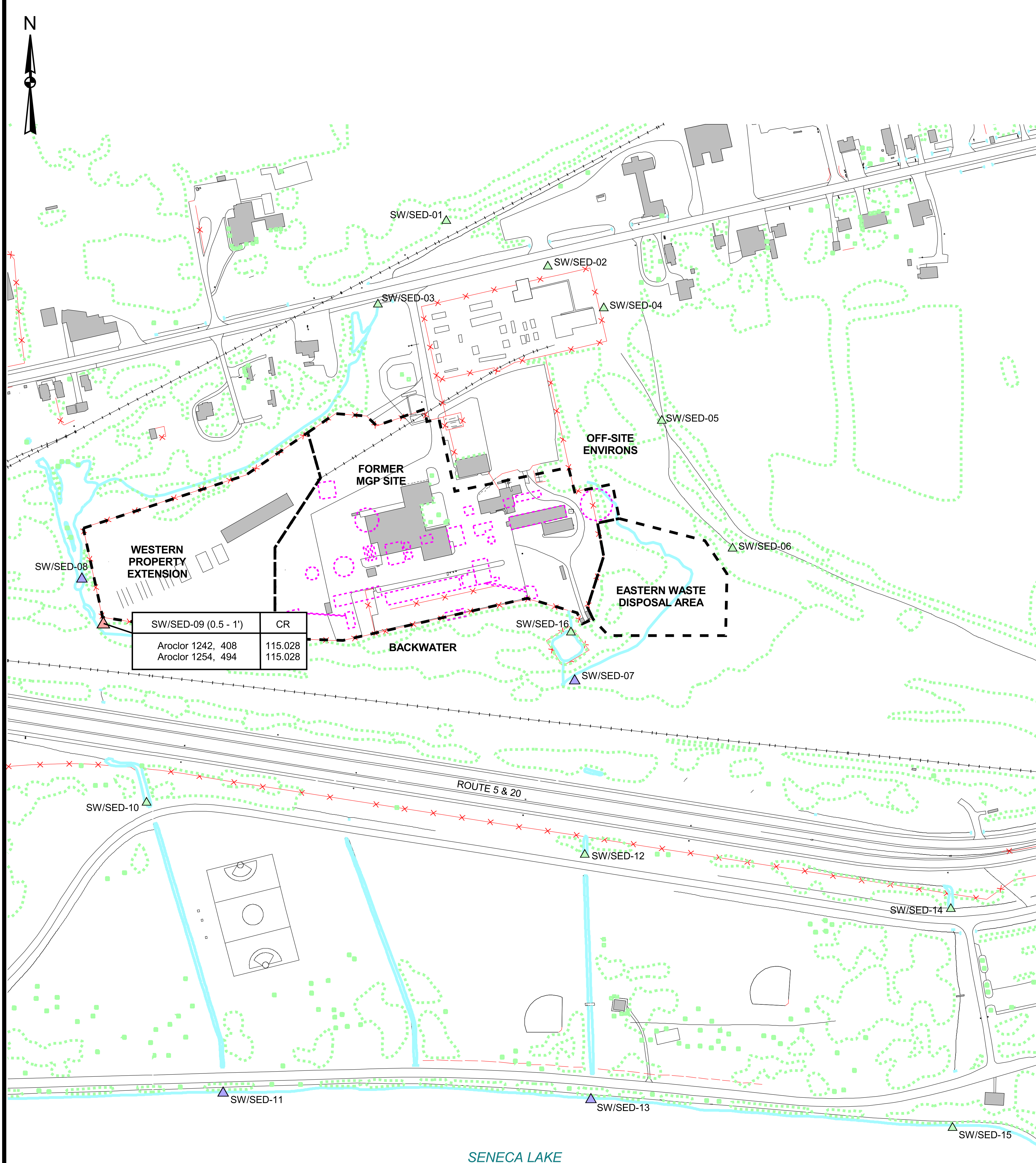


URS

NYSEG - GENEVA
RI SEDIMENT PCB ANALYTICAL RESULTS THAT EXCEED BENTHIC AQUATIC LIFE ACUTE TOXICITY TO BE CONSIDERED CRITERIA

FIGURE 4-20

N:\38393614.00000\DB\Gis\sediment.apr PCBs - BENTHIC CHRONIC
12/19/2006



Legend

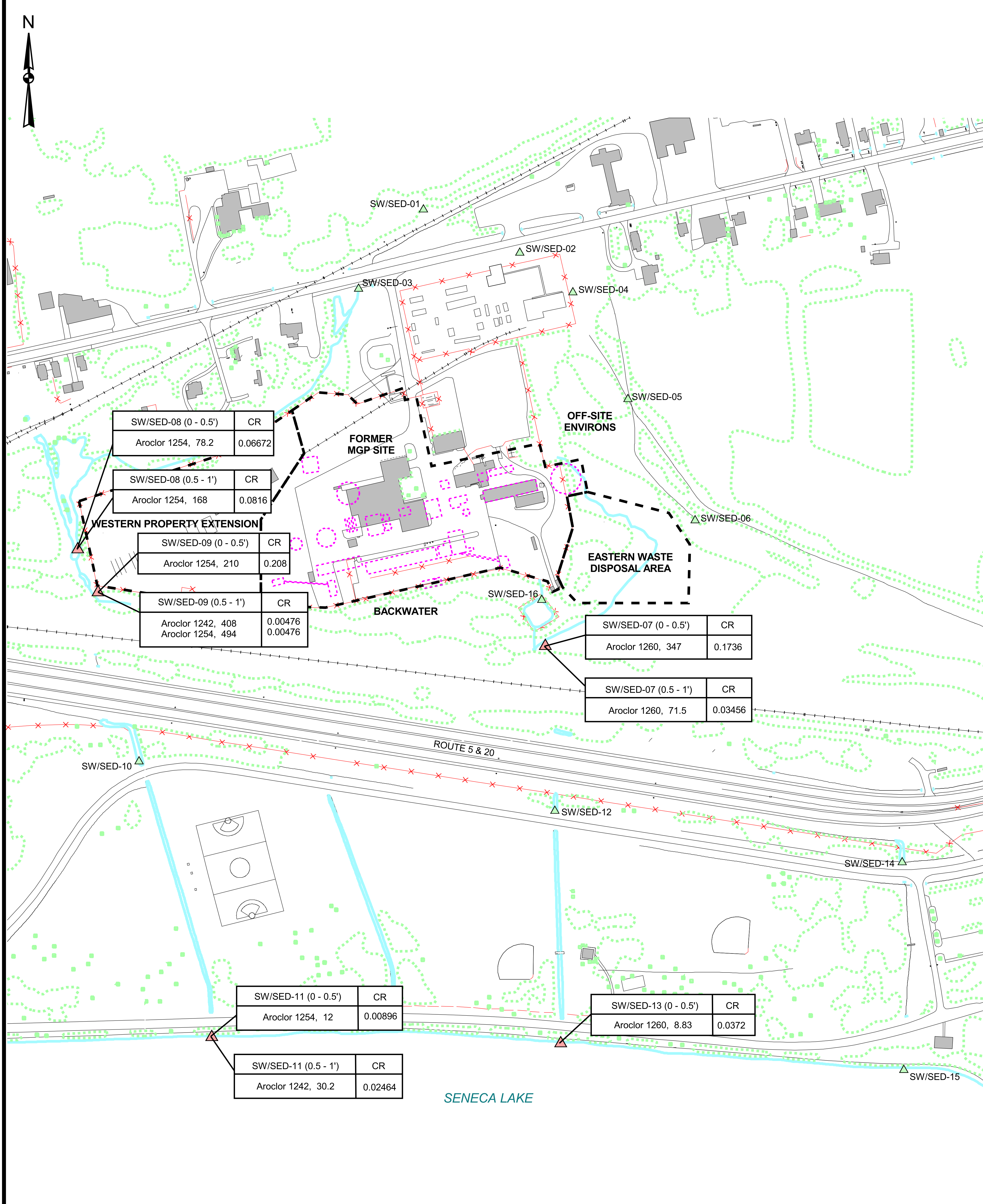
- △ Sediment Sample Location
- △ No Compounds Detected
- △ At Least One Compound Detected
- △ At Least One Compound Exceeds Criteria

SW/SED-09 (0.5 - 1') — Location ID; Sample Depth
Aroclor 1242, 408 — Compound Exceeding Criteria; Concentration (UG/KG)

NOTE:
CR - NYSDEC Technical Guidance for Screening Contaminated Sediments, Benthic Chronic Toxicity, January 25, 1999.

300 0 300 Feet

URS	NYSEG - GENEVA RI SEDIMENT PCB ANALYTICAL RESULTS THAT EXCEED BENTHIC CHRONIC LIFE CHRONIC TOXICITY TO BE CONSIDERED CRITERIA	FIGURE 4-21



Legend

- △ Sediment Sample Location
- △ No Compounds Detected
- △ At Least One Compound Detected
- △ At Least One Compound Exceeds Criteria

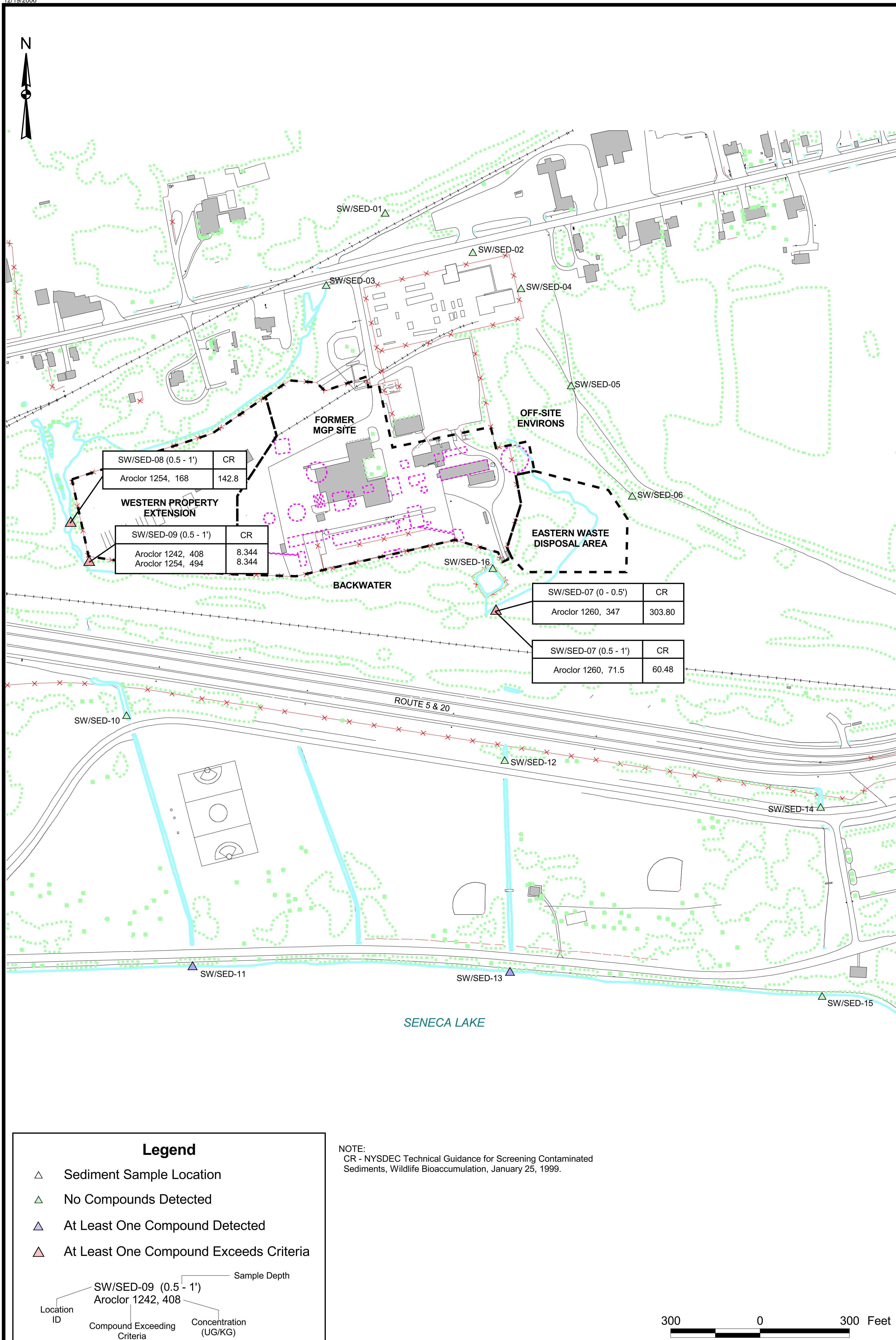
SW/SED-09 (0.5 - 1') — Location ID; Sample Depth
Aroclor 1242, 408 — Compound Exceeding Criteria; Concentration (UG/KG)

NOTE:
CR - NYSDEC Technical Guidance for Screening Contaminated Sediments, Human Health Bioaccumulation, January 25, 1999.

300 0 300 Feet

URS	NYSEG - GENEVA RI SEDIMENT PCB ANALYTICAL RESULTS THAT EXCEED HUMAN HEALTH BIOACCUMULATION TO BE CONSIDERED CRITERIA	FIGURE 4-22

N:\38393614.00000\DB\Gis\sediment.apr PCBs - WILDLIFE BIO
12/19/2006

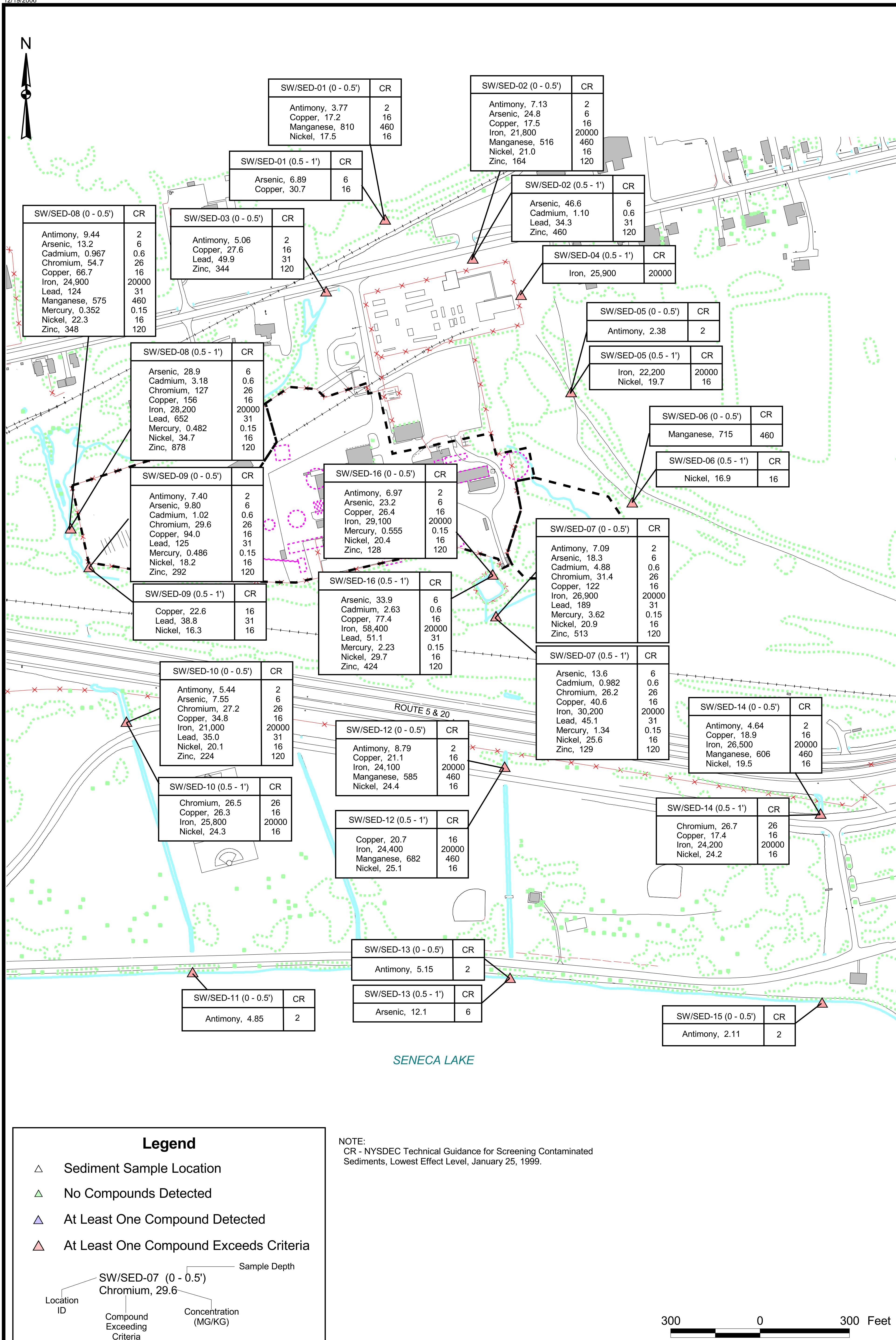


URS

NYSEG - GENEVA
RI SEDIMENT PCB ANALYTICAL RESULTS THAT EXCEED WILDLIFE BIOACCUMULATION TO BE CONSIDERED CRITERIA

FIGURE 4-23

N:\38393614.00000\DB\Gis\sediment.apr METALS - LOWEST EFFECT LEVEL
12/19/2006



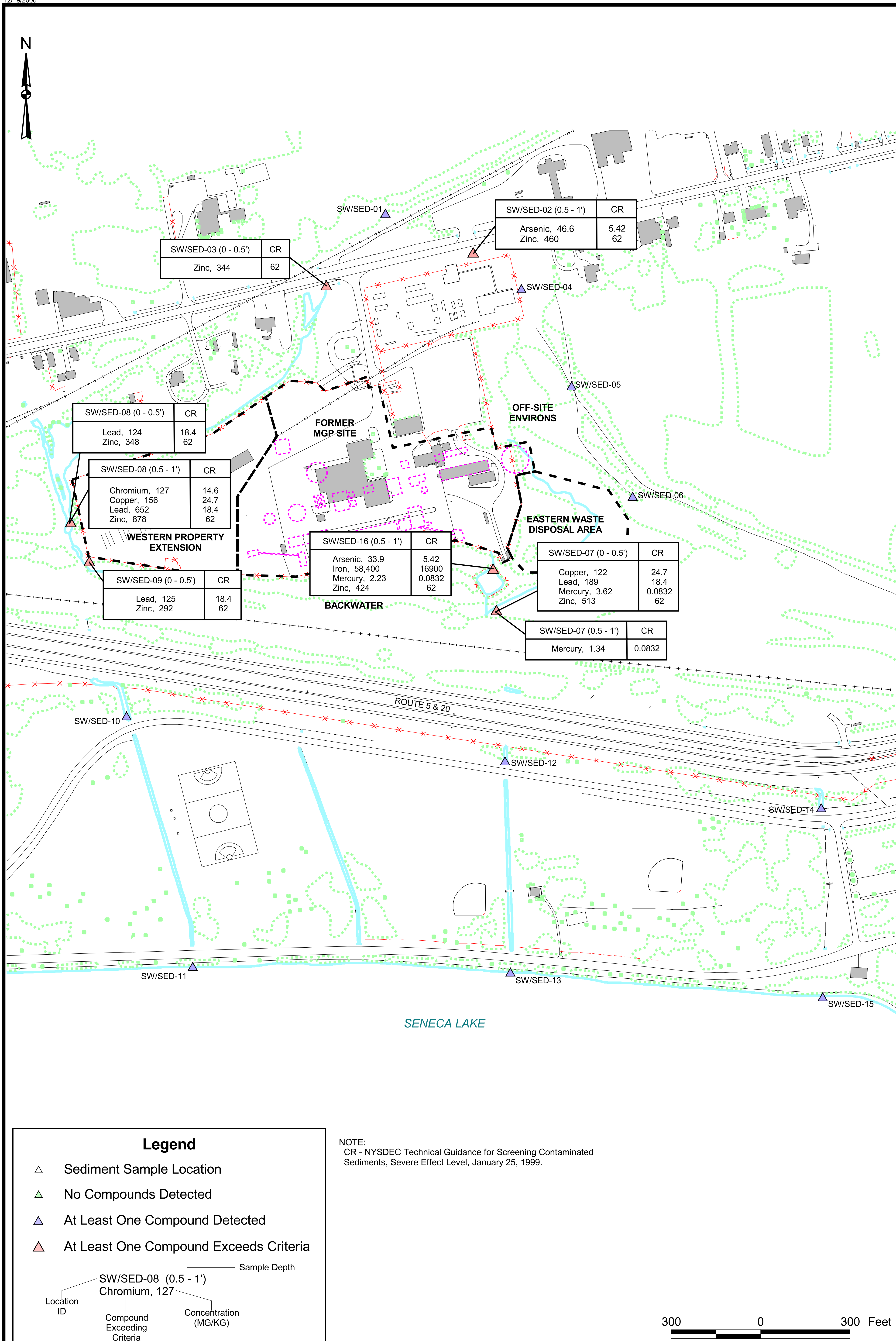
NOTE:
CR - NYSDEC Technical Guidance for Screening Contaminated Sediments, Lowest Effect Level, January 25, 1999.

URS

NYSEG - GENEVA
RI SEDIMENT METAL ANALYTICAL RESULTS THAT EXCEED LOWEST EFFECT LEVEL

FIGURE 4-24

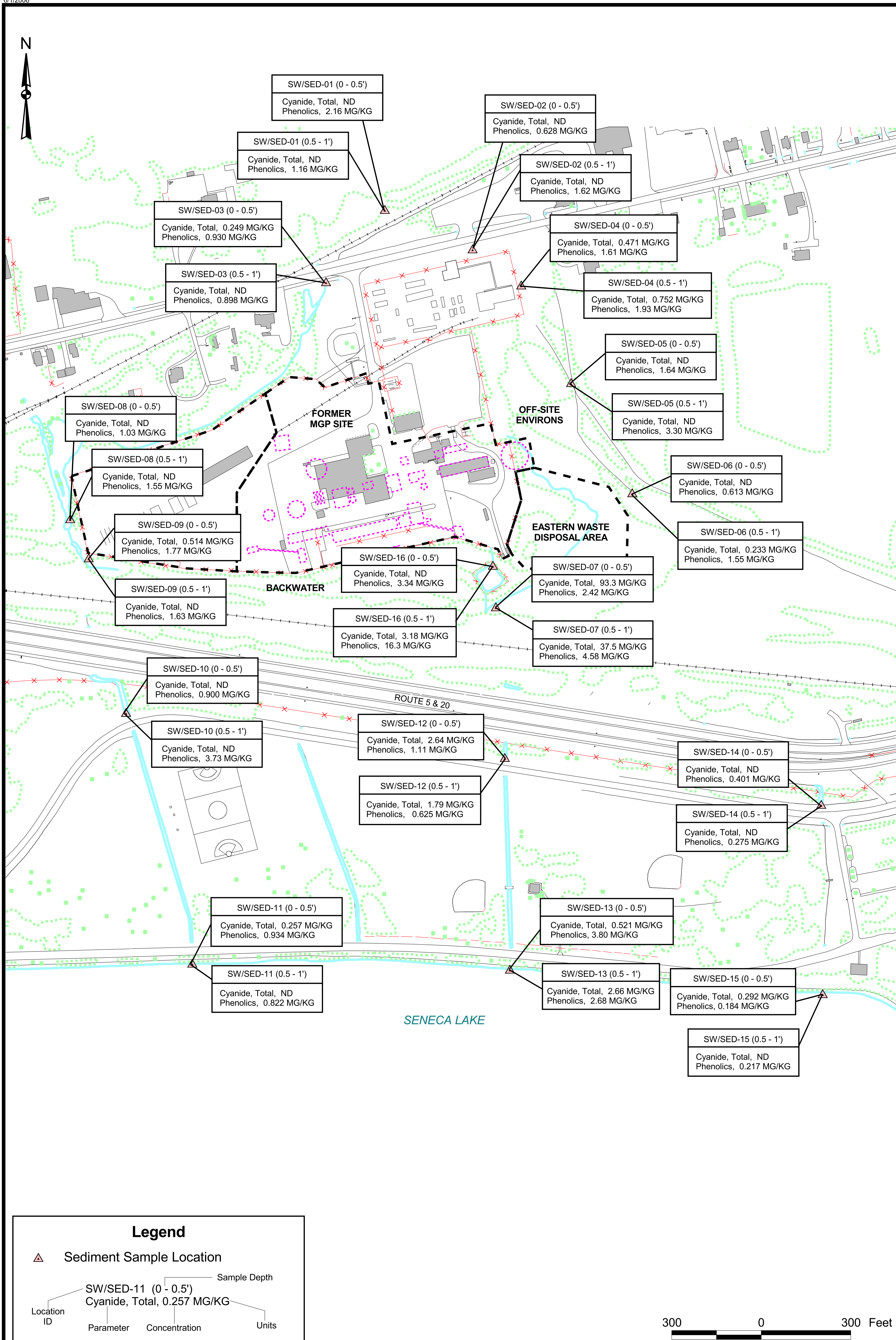
N:\38393614.00000\DB\Gis\sediment.apr METALS - SEVERE EFFECT LEVEL
12/19/2006



URS

NYSEG - GENEVA
RI SEDIMENT METAL ANALYTICAL RESULTS THAT EXCEED SEVERE EFFECT LEVEL

FIGURE 4-25



URS

NYSEG - GENEVA
RI TOTAL CYANIDE AND TOTAL RECOVERABLE PHENOLICS IN SEDIMENT

FIGURE 4-26

APPENDIX B
COST ESTIMATES

TABLE B-1

SUMMARY OF ESTIMATED COSTS
GENEVA-BORDER CITY FORMER MGP SITE

Cost Component	Alt. 1	Alt. 2	Alt. 3	Alt. 4A	Alt. 4B	Alt. 5	Alt. 6
Captial Costs							
Capital Costs -Distinctive Alt. Elements	$0	$252,400	$2,955,600	$817,000	$2,538,700	$1,939,600	$16,016,000
Capital Costs -Common Alt. Elements	$15,000	$920,600	$920,600	$924,000	$920,600	$925,200	$948,100
Total Capital Costs	**$15,000**	**$1,173,000**	**$3,877,000**	**$1,766,000**	**$3,459,000**	**$2,865,000**	**$16,964,000**
Annual OM&M Costs							
Annual Operation, Maintenance & Monitoring Costs	**$15,800**	**$30,173**	**$25,073**	**$25,073**	**$25,073**	**$30,173**	**$705,773**
Present Worth OM&M Costs	**$242,900**	**$463,900**	**$385,500**	**$385,500**	**$385,500**	**$463,900**	**$10,849,900**
Years of Monitoring	30	30	30	30	30	30	30
Total Cost	**$258,000**	**$1,637,000**	**$4,263,000**	**$2,152,000**	**$3,845,000**	**$3,329,000**	**$27,814,000**

NEW YORK STATE ELECTRIC AND GAS CORPORATION
GENEVA-BORDER CITY FORMER MGP SITE - SITE NO. 8-50-008
FEASIBILITY STUDY

Client:	NYSEG	Project Number:	11175369		
Project:	Geneva-Border City Former MGP Site	Calculated By:	Patrick Baker	Date:	15-Feb-08
Description:	Alternative 1	Checked By:	JS	Date:	15-Feb-08

DESCRIPTION	ESTIMATED COST
Institutional Controls	$10,000
	$10,000

STANDARD SUPPLEMENTAL PROJECT COSTS

Overhead and Profit 20.00%	**$2,000**
SUBTOTAL - CONSTRUCTION COSTS	**$12,000**
Contingency 25.00%	**$3,000**
TOTAL	**$15,000**
BUDGET GRAND TOTAL	**$15,000**

URS CORPORATION
ENGINEER'S COST ESTIMATE
ESTIMATED UNIT COST

Client: NYSEG	Project Number: 11175369		
Project: Geneva-Border City Former MGP Site	Calculated By: Patrick Baker	Date: 15-Feb-08	
Title: Alternative 1 - Institutional Controls	Checked By: JS	Date: 15-Feb-08	

ITEM	DESCRIPTION	QTY.	UNITS	UNIT COST	TOTAL COST
1	**Institutional Controls**				
2	Deed Restrictions	1	ls	$10,000.00	$10,000
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
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17					
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21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
	TOTAL COST:				**$10,000**

URS CORPORATION
ENGINEER'S COST ESTIMATE
ESTIMATED UNIT COST

Client:	NYSEG	Project Number:	11175369		
Project:	Geneva-Border City Former MGP Site	Calculated By:	Patrick Baker	Date:	15-Feb-08
Title:	Alternative 1 - Annual Operation and Maintenance	Checked By:	JS	Date:	15-Feb-08

ITEM	DESCRIPTION	QTY.	UNITS	UNIT COST	TOTAL COST
1	Labor, equip, shipping	2	days	$1,050.00	$2,100
2	Sampling - Analysis: Annual **	16	each	$700.00	$11,200
3	Reports***	1	ls	$2,500.00	$2,500
4					
5					
6	Reference:				
7					
8	** Vendor Quote				
9	*** Engineer's previous project experience				
10					
11					
12	Labor (2 people) $800/day * 2 days				
13	H&S Equip $100/day * 2 days				
14	Shipping/misc $150				
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
31					
	TOTAL COST:				**$15,800**

NEW YORK STATE ELECTRIC AND GAS CORPORATION

GENEVA-BORDER CITY FORMER MGP SITE - SITE NO. 8-50-008
FEASIBILITY STUDY

Client:	NYSEG	Project Number:	11175369		
Project:	Geneva-Border City Former MGP Site	Calculated By:	Patrick Baker	Date:	17-Sep-08
Description:	Alternative 2 - Containment	Checked By:	JS/AM	Date:	18-Sep-08

SUMMARY

DESCRIPTION	ESTIMATED COST
Institutional Controls	$10,000
Mobilization / Demobilization	$33,050
Cap Onsite Zones A & B	$23,435
EWDA Synthetic Cap	$144,823
Oxide Box Remediation	$132,796
Western Drainageway Sediment Removal	$46,374
Eastern Drainageway Sediment Removal	$32,110
Subsurface Vault Removal	$94,775
Former Settling Basin Sediment Removal	$264,563
	$781,925

STANDARD SUPPLEMENTAL PROJECT COSTS

Overhead and Profit 20.00%	**$156,385**
SUBTOTAL	**$938,310**
Contingency 25.00%	**$234,578**
TOTAL	**$1,172,888**
BUDGET TOTAL	**$1,173,000**

URS CORPORATION
ENGINEER'S COST ESTIMATE
ESTIMATED UNIT COST

Client:	NYSEG	Project Number:	11175369		
Project:	Geneva-Border City Former MGP Site	Calculated By:	Patrick Baker	Date:	15-Feb-08
Title:	Alternative 2 - Institutional Controls	Checked By:	JS	Date:	15-Feb-08

ITEM	DESCRIPTION	QTY.	UNITS	UNIT COST	TOTAL COST
1	**Institutional Controls**				
2	Deed Restrictions	1	ls	$10,000.00	$10,000
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
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27					
28					
29					
30					
	TOTAL COST:				**$10,000**

URS CORPORATION
ENGINEER'S COST ESTIMATE
ESTIMATED UNIT COST

Client:	NYSEG	Project Number:	11175369		
Project:	Geneva-Border City Former MGP Site	Calculated By:	Patrick Baker	Date:	15-Feb-08
Title:	Alternative 2 -Mobilization / Demobilization and Construction Support Facilities	Checked By:	JS	Date:	15-Feb-08

ITEM	DESCRIPTION	QTY.	UNITS	UNIT COST	TOTAL COST
1	Submittals				
2	Health and Safety Plan***	1	ls	$1,200.00	$1,200
3	Sediment and Erosion Control Plan***	1	ls	$1,200.00	$1,200
4	Schedules***	1	ls	$3,000.00	$3,000
5	Record Drawings***	1	ls	$2,500.00	$2,500
6	Survey/Layout*	5	day	$800.00	$4,000
7	Mobe/Demob Support Equipment: Allowance***	1	ls	$5,000.00	$5,000
8	Temporary Utilities Installation: Allowance***	1	ls	$5,000.00	$5,000
9	Permits: Allowance***	1	ls	$5,000.00	$5,000
10	Trailers (2)*	3	mo	$1,000.00	$3,000
11	Portable Toilets (1)***	3	mo	$250.00	$750
12	Utilities (consumption)***	3	mo	$800.00	$2,400
13					
14					
15	Reference:				
16	* RS Means Cost Data - 2007				
17	*** Engineer's Previous Project Experience				
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
31					
32					
33					
34					
35					
36					
37					
38					
	TOTAL COST:				**$33,050**

URS CORPORATION
CONSTRUCTION COST ESTIMATE
ESTIMATED UNIT COST

Client:	NYSEG	Project Number:	11175369	
Project:	Geneva-Border City Former MGP Site	Calculated By:	Patrick Baker	Date: 15-Feb-08
Title:	Alternative 2 -Cap Onsite Waste Zones A & B	Checked By:	JS	Date: 15-Feb-08

ITEM	DESCRIPTION	QTY.	UNITS	UNIT COST	TOTAL COST
1	**Zone B**				
2	Clear and Grub*	0.2	acre	$3,860.00	$772
3	Grading, dozer, common earth*	394	sy	$0.41	$162
4	Compact subgrade - 95% proctor, 12" depth, cohesive soil*	394	sy	$0.30	$118
5	Base Course - 1-1/2" stone, compacted, 12" deep*	394	sy	$10.81	$4,259
6	Binder Course, 4" thick*	394	sy	$11.67	$4,598
7	Wearing Course - 2" thick*	394	sy	$6.00	$2,364
8	Hauling from mix plant* (20 mile round trip, 12 cy dump)	75	cy	$19.65	$1,474
9					
10	**Zone A - Impermeable Synthetic Cap**				
11	Excavate / Stockpile 12" of existing Stone Cover	55	cy	$8.00	$440
12	Synthetic Cap - 40 mil	1477	sf	$1.45	$2,142
13	Geocomposite Drainage Layer	165	sy	$1.86	$307
14	Restore Stone Cover (12")	55	cy	$10.00	$550
15					
16	Air Monitoring**	0.25	month	$25,000.00	$6,250
17					
18					
19	Reference:				
20	* RS Means Cost Data - 2007				
21	** Cortland/Homer FS				
22					
23					
24					
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29					
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31					
32					
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34					
35					
36					
37					
38					
39					
40					
	TOTAL COST:				**$23,435**

URS CORPORATION
ENGINEER'S COST ESTIMATE
ESTIMATED UNIT COST

Client:	NYSEG	Project Number:	11175369	
Project:	Geneva-Border City Former MGP Site	Calculated By:	Patrick Baker	Date: 17-Sep-08
Title:	Alternative 2 - Low Permeability Synthetic Cap on EWDA	Checked By:	JS/AM	Date: 18-Sep-08

ITEM	DESCRIPTION	QTY.	UNITS	UNIT COST	TOTAL COST
1	Clear and Grub*	0.5	acre	$3,860.00	$1,930
2	Grading*	2,212	sy	$2.50	$5,530
3	Sand Cushion - 6"	369	cy	$19.00	$7,011
4	Synthetic Cap - 80 mil****	19,905	sf	$3.96	$78,824
5	Geocomposite Drainage Layer***	2,212	sy	$1.86	$4,114
6	Clean Earth Fill -12" - Placed and graded*	738	cy	$20.00	$14,760
7	Topsoil - 4" spread and raked*	251	cy	$30.00	$7,530
8	Seeding*	19.9	msf	$41.40	$824
9	Synthetic cap welded seam testing/ reporting and as-built drawings **	1	ls	$10,000.00	$10,000
10	Air Monitoring***	0.5	month	$25,000.00	$12,500
11	Material: Level "C" PPE for grading/re-grading	10	man/day	$180.00	$1,800
12					
13					
14					
15					
16					
17					
18					
19					
20	Reference:				
21	* RS Means Cost Data - 2007				
22	** Engineer's Previous Project Experience				
23	*** Cortland/Homer FS				
24	**** National Estimator				
25					
26					
27					
	TOTAL COST:				$144,823

URS CORPORATION
CONSTRUCTION COST ESTIMATE
ESTIMATED UNIT COST

Client:	NYSEG	Project Number:	11175369		
Project:	Geneva-Border City Former MGP Site	Calculated By:	Patrick Baker	Date:	15-Feb-08
Title:	Alternative 2 - Oxide Box Remediation	Checked By:	JS	Date:	15-Feb-08

ITEM	DESCRIPTION	QTY.	UNITS	UNIT COST	TOTAL COST
1	**Remove Box Contents**				
2	Labor: Labor foreman	40	hr	$49.83	$1,993
3	Laborer (2 men)	80	hr	$47.83	$3,826
4	Vac. Operator(1 man)	40	hr	$47.83	$1,913
5	Equipment: Vacuum loader	40	hr	$110.00	$4,400
6	(Vendor Quote: National Vacuum)				
7					
8	**Transport and Disposal**				
	Aqueous Phase				
9	Transportation (Geneva, NY - Baltimore, MD)	9	loads	$2,590.00	$23,310
10	Water Treatment Disposal (Clean Harbors, Baltimore, MD)	43,100	gal	$0.40	$17,240
11	**Solid Phase**				
12	Transportation (Geneva, NY - Sarnia, Ont., Canada)	4	loads	$2,250.00	$9,000
13	Stabilization and Landfill Disposal (Clean Harbors, Sarnia, Ontario, Canada)	160	ton	$350.00	$56,000
14					
15	**Pressure Wash Oxide Box Interior**				
16	Labor: Labor foreman	16	hr	$49.83	$797
17	Laborer (2 men)	32	hr	$47.83	$1,531
18	Pressure Washer Operator(1 man)	16	hr	$47.83	$765
19	Equipment: 10,000 psi High Pressure Washer w/ 3D Spin Nozzle	16	hr	$95.00	$1,520
20	(Vendor Quote: National Vacuum)				
21	Confined Space Entry Equipment	5	day	$250.00	$1,250
22					
23	**PPE/Monitoring**				
24	Material: level "B" PPE	10	manday	$300.00	$3,000
25	Air Monitoring*	0.25	month	$25,000.00	$6,250
26					
27					
28					
29	Reference				
30	* Cortland/Homer FS				
31					
32	**Estimating Assumptions:**				
33	The oxide box waste does not contain PCB's above TSCA regulated limit.				
34	The oxide boxes can be readily accessed horizontally from outside the building				
35	Work will be performed during normal business hours.				
36	Waste materials will be acceptable for disposal at the estimated facilities.				
37	Assume: volume is 2/3 aqueous, 1/3 solids				
38	Assume: solids, 1 cy = 1 ton.				
39					
40					
	TOTAL COST:				**$132,796**

URS CORPORATION
CONSTRUCTION COST ESTIMATE
ESTIMATED UNIT COST

Client: NYSEG	Project Number: 11175369		
Project: Geneva-Border City Former MGP Site	Calculated By: Patrick Baker	Date: 15-Feb-08	
Title: Alternative 2 - Western Drainageway Sedment Removal; Sediment Zone 1	Checked By: JS	Date: 15-Feb-08	

ITEM	DESCRIPTION	QTY.	UNITS	UNIT COST	TOTAL COST
1					
2	**Survey / Layout**				
3	Labor: Surveyor (1 man)	8	hr	$51.16	$409
4	Material: - allow	1	ls	$100.00	$100
5					
6	**Clear and Grub ***	0.3	acre	$3,860.00	$1,158
7					
8					
9	**Excavate Stream Bed**				
10	Labor: Foreman	32	hr	$49.83	$1,595
11	Laborer (2 men)	64	hr	$47.83	$3,061
12	Equip. Operator (2 men)	64	hr	$57.44	$3,676
13	Equipment: tractor loader, wheel 1-1/2 CY bucket	32	hr	$70.28	$2,249
14					
16	**Backfill / Compact Stream Bed**				
17	Labor: Labor foreman	24	hr	$49.83	$1,196
18	Laborer (2 men)	48	hr	$47.83	$2,296
19	Equip. Operator(1 man)	24	hr	$57.44	$1,379
20	Equipment: tractor loader, wheel 1-1/2 CY bucket *	24	hr	$70.28	$1,687
21	Compactor - manually guided, 2 drum, vibratory *	24	hr	$24.35	$584
22	Material: Unclassified clean soil fill - allow	94	cy	$15.00	$1,410
23					
24	**PPE/Monitoring**				
25	Material: level "C" PPE	15	man/day	$180.00	$2,700
26	Air Monitoring**	0.25	month	$25,000.00	$6,250
27					
28	**Transport and Disposal**				
29	Transportation				
30	Landfill disposal (CWM Model City, NY)	141	ton	$115.00	$16,215
31					
32	**Restoration**				
33	Seeding - push spreader *	10.4	msf	$39.35	$409
34					
35					
36	Reference:				
37	* RS Means Cost Data - 2007				
38	** Cortland/Homer FS				
39	**Estimating Assumptions:**				
40	Excavated stream sediment weighs 1.5 tons per cy.				
41	Work will be performed when the stream is seasonally dry.				
42	By-pass pumping will not be required.				
43	Stabilization to meet landfill paint filter test is not required.				
44	The sediment is a not RCRA hazardous waste.				
	TOTAL COST:				**$46,374**

URS CORPORATION
CONSTRUCTION COST ESTIMATE
ESTIMATED UNIT COST

Client:	NYSEG	Project Number:	11175369		
Project:	Geneva-Border City Former MGP Site	Calculated By:	Patrick Baker	Date:	15-Feb-08
Title:	Alternative 2 - Eastern Drainageway Sediment Removal; Sediment Zone 2	Checked By:	JS	Date:	15-Feb-08

ITEM	DESCRIPTION	QTY.	UNITS	UNIT COST	TOTAL COST
1					
2	**Survey / Layout**				
3	Labor: Surveyor (1 man)	8	hr	$51.16	$409
4	Material: - allow	1	ls	$100.00	$100
5					
6	**Clear and Grub** *	0.2	acre	$3,860.00	$772
7					
8					
9	**Excavate Stream Bed**				
10	Labor: Labor foreman	16	hr	$49.83	$797
11	Laborer (2 men)	32	hr	$47.83	$1,531
12	Equip. Operator(2 men)	32	hr	$57.44	$1,838
13	Equipment: tractor loader, wheel 1-1/2 CY bucket	16	hr	$70.28	$1,124
14					
15	**Backfill / Compact Stream Bed**				
16	Labor: Labor foreman	16	hr	$49.83	$797
17	Laborer (2 men)	32	hr	$47.83	$1,531
18	Equip. Operator(1 man)	16	hr	$57.44	$919
19	Equipment: tractor loader, wheel 1-1/2 CY bucket *	16	hr	$70.28	$1,124
20	Compactor - manually guided, 2 drum, vibratory *	16	hr	$24.35	$390
21	Material: Unclassified clean soil fill - allow	72	cy	$15.00	$1,080
22					
23	**PPE/Monitoring**				
24	Material: level "C" PPE	4	man/day	$180.00	$720
25	Air Monitoring**	0.25	month	$25,000.00	$6,250
26					
27	**Transport and Disposal**				
28	Transportation				
29	Landfill disposal (CWM Model City, NY)	108	ton	$115.00	$12,420
30					
31	**Restoration**				
32	Seeding - push spreader *	7.8	msf	$39.35	$307
33					
34					
35					
36	Reference:				
37	* RS Means Cost Data - 2007				
38	** Cortland/Homer FS				
39	**Estimating Assumptions:**				
40	Excavated stream sediment weighs 1.5 tons per cy.				
41	Work will be performed when the stream is seasonally dry.				
42	By-pass pumping will not be required.				
43	Stabilization to meet landfill paint filter test is not required.				
44	The sediment is a not RCRA hazardous waste.				
	TOTAL COST:				**$32,110**

URS CORPORATION
CONSTRUCTION COST ESTIMATE
ESTIMATED UNIT COST

Client: NYSEG	Project Number: 11175369		
Project: Geneva-Border City Former MGP Site	Calculated By: Patrick Baker	Date: 17-Sep-08	
Title: Alternative 2 - Subsurface Vault Cleaning and Removal	Checked By: JS/AM	Date: 18-Sep-08	

ITEM	DESCRIPTION	QTY.	UNITS	UNIT COST	TOTAL COST
1	**Remove Vault Contents**				
2					
3	Labor: Labor foreman	8	hr	$49.83	$399
4	Laborer (1 man)	8	hr	$47.83	$383
5	Equipment: Vacuum tank truck (5500 gal)	3	load	$7,500.00	$22,500
6	(Vendor Quote: Clean Harbors)				
7	**Disposal - 16000 gal. (83cy) Pumpable Tar (@ 8 lb. Per gal.)**				
8	Incineration disposal - Deer Park, TX	128,000	lb	$0.35	$44,800
9	(Vendor Quote: Clean Harbors)				
10					
11	**Demolish/Excavate Concrete Vault**				
12	Saw Cut Asphalt Pavement (100 lf)				
13	Labor: Labor (1 man)	4	hr	$47.83	$191
14	Equipment:Concrete Saw (walk behind)	4	hr	$35.00	$140
15	Demolish Concrete Vault				
16	Labor: Labor foreman	16	hr	$49.83	$797
17	Laborer (1 man)	16	hr	$47.83	$765
18	Equip. Operator (1 man)	16	hr	$57.44	$919
19	Equipment: Excavator, track mtd., 1 cy w/ Hyd. Hammer	16	hr	$125.78	$2,012
20	(Means 01 54 33 20-0150)				
21	Steam Clean Vault (interior)				
22	Labor: Laborer (1 man)	8	hr	$47.83	$383
23	Equipment: Portable HP steam cleaner	8	hr	$48.00	$384
24	**Transport and Disposal**				
25	Transportation				
26	Landfill disposal (CWM Model City, NY)	83	ton	$115.00	$9,545
27					
28	**Backfill / Compaction**				
29	Labor: Labor foreman	8	hr	$49.83	$399
30	Laborer (2 men)	16	hr	$47.83	$765
31	Equip. Operator(1 man)	8	hr	$57.44	$460
32	Equipment: tractor loader, wheel 1-1/2 CY bucket	8	hr	$70.28	$562
33	(Means 01 54 33 20 4450)				
34	Compactor - manually guided, 2 drum, vibratory	8	hr	$24.35	$195
35	(Means 01 54 33 20 1200)				
36	Material: Unclassified clean soil fill - allow	55	cy	$15.00	$825
37					
38	**Restoration**				
39	Base Course - crushed 3/4" stone, compacted, 12" deep	25	sy	$5.72	$143
40	(Means 31 11 23.23 - 0300)				
41	Binder Course - 3" thick	25	sy	$8.88	$222
42	(Means 32 12 16.13-0160)				
43	Wearing Course - 1-1/2" thick	25	sy	$4.66	$117
44	(Means 32 12 16.13-0340)				
45	**PPE/Monitoring**				
46	Material: level "C" PPE	9	man/day	$180.00	$1,620
47	Air Monitoring*	0.25	month	$25,000.00	$6,250
48	Reference - * Cortland/Homer FS				
49	**Estimating Assumptions:**				
50	Assume 1 cy equals 1 ton for disposal purposes.				
51	Tars will be readily pumpable by a vacuum tank truck.				
52					
	TOTAL COST:				$94,775

URS CORPORATION
CONSTRUCTION COST ESTIMATE
ESTIMATED UNIT COST

Client:	NYSEG	Project Number:	11175369		
Project:	Geneva-Border City Former MGP Site	Calculated By:	Patrick Baker	Date:	15-Feb-08
Title:	Alternative 2 - Former Settling Basin - Sediment Removal, Sediment Zone 3	Checked By:	JS	Date:	15-Feb-08

ITEM	DESCRIPTION	QTY.	UNITS	UNIT COST	TOTAL COST
1					
2	**Clear and Grub**	0.2	acre	$3,860.00	$772
3	(Means 31 11 10.10)				
4					
5	**Remove Fence**	400	lf	$2.25	$900
6	(Means 02 41 13.60)				
7					
8	**Excavate Sediment**				
9	Labor: Labor foreman	96	hr	$49.83	$4,784
10	Laborer (2 men)	192	hr	$47.83	$9,183
11	Equip. Operator (3 men)	288	hr	$57.44	$16,543
12	Equipment:				
13	Track excavator - 40 ft reach - 2 cy	2.5	week	$5,728.00	$14,320
14	(Hertz Rental Equipment)				
15	Tractor Loader - wheel 4-1/2 CY	2.5	week	$1,970.00	$4,925
16	(Means 01 54 33 20 4730)				
17					
18	**Stabilize Excavated Sediment**				
19	Labor: Laborer (1 man)	96	hr	$47.83	$4,592
20	Equip. Operator(1 man)	96	hr	$57.44	$5,514
21	Equipment:				
22	Track Excavator - 1 CY	2.5	week	$2,445.00	$6,113
23	(Means 01 54 33 20 0150)				
24	Material:				
25	Portland Cement - 94 lb. Bag (2% mix ratio by volume)	400	bag	22.97	$9,188
26					
27	**Load / Transport / Dispose of Stabilized Sediments**				
28	Labor: Labor foreman	80	hr	$49.83	$3,986
29	Laborer (2 men)	160	hr	$47.83	$7,653
30	Equip. Operator(3 men)	80	hr	$57.44	$4,595
31	Equipment:				
32	Tractor Loader - wheel 4-1/2 CY	2.5	week	$1,970.00	$4,925
33	(Means 01 54 33 20 4730)				
34	Subcontractor:				
35	Transportation				
36	Landfill disposal (CWM Model City, NY)	764	ton	$115.00	$87,860
37				**Subtotal**	**$185,853**

URS CORPORATION
CONSTRUCTION COST ESTIMATE
ESTIMATED UNIT COST

Client: NYSEG
Project: Geneva-Border City Former MGP Site
Title: Alternative 2 - Former Settling Basin - Sediment Removal, Sediment Zone 3

Project Number: 11175369
Calculated By: Patrick Baker Date: 15-Feb-08
Checked By: JS Date: 15-Feb-08

38	**Backfill / Compact / Grade to Match North / South Stream Bed**				
39	Labor: Labor foreman	32	hr	$49.83	$1,595
40	Laborer (2 men)	128	hr	$47.83	$6,122
41	Equip. Operator(2 men)	128	hr	$57.44	$7,352
42	Equipment: tractor loader, wheel 1-1/2 CY bucket	32	hr	$70.28	$2,249
43	(Means 01 54 33 20 4450)				
44	Bull dozer - 105 H.P.	32	hr	$86.23	$2,759
45	(Means 01 54 33 20 4150)				
46	Compactor - manually guided, 2 drum, vibratory	32	hr	$24.35	$779
47	(Means 01 54 33 20 1200)				
48	Material: Unclassified clean soil fill - allow	1300	cy	$15.00	$19,500
49					
50	**Restoration**				
51	Seeding - push spreader	10	msf	$39.35	$394
52	(Means 32 92 19.14-4400)				
53					
54	**PPE / Monitoring**				
55	Material: Level "C" PPE	72	man/day	$180.00	$12,960
56	Air Monitoring*	1	month	$25,000.00	$25,000
57				**Subtotal**	**$78,710**
58					
59					
60					
61					
62					
63					
64					
65	Reference - *Cortland/Homer FS				
66					
67	**Estimating Assumptions:**				
68	Stabilized pond sediment weighs 1.5 tons per cy.				
69	Work will be performed when the pond is seasonally dry.				
70	By-pass pumping will not be required.				
71	Stabilization, by addition of 2% portland cement, by volume, is included.				
72	The stabilized sediment is a RCRA hazardous waste.				
73					
	TOTAL COST:				**$264,563**

URS CORPORATION
ENGINEER'S COST ESTIMATE
ESTIMATED UNIT COST

Client:	NYSEG	Project Number:	11175369		
Project:	Geneva-Border City Former MGP Site	Calculated By:	Patrick Baker	Date:	22-Aug-08
Title:	Alternative 2 - Annual Operation and Maintenance	Checked By:	AM	Date:	22-Sep-08

ITEM	DESCRIPTION	QTY.	UNITS	UNIT COST	TOTAL COST
1	Labor, equip, shipping	2	days	$1,050.00	$2,100
2	Sampling - Analysis: Annual **	16	each	$700.00	$11,200
3	Reports***	1	ls	$2,500.00	$2,500
4	Grass Mowing - Allow: 5 months x twice per month**	199	msf	$4.60	$915
5	Inspect and repair erosion of topsoil and vegetation	2	days	$800.00	$1,600
6	Allowance for topsoil and seed	1	ls	$200.00	$200
7	Testing, inspection and repair of geosynthetics	2	days	$800.00	$1,600
8					
9	Reference:				
10	* R.S.Means Cost Data - 2007				
11	** Vendor Quote				
12	*** Engineer's previous project experience				
13					
14					
15	Labor (2 people) $800/day * 2 days				
16	H&S Equip $100/day * 2 days				
17	Shipping/misc $150				
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30				**Subtotal**	**$20,115**
31	**Contractors Overhead and Profit**			**20%**	**$4,023**
32				**Subtotal**	**$24,138**
33	**Contingency**			**25%**	**$6,035**
34					
35					
36					
37					
	TOTAL COST:				**$30,173**

NEW YORK STATE ELECTRIC AND GAS CORPORATION
GENEVA-BORDER CITY FORMER MGP SITE - SITE NO. 8-50-008
FEASIBILITY STUDY

Client:	NYSEG	Project Number:	11175369		
Project:	Geneva-Border City Former MGP Site	Calculated By:	Patrick Baker	Date:	17-Sep-08
Description:	Alternative 3 - Source Removal	Checked By:	JS/AM	Date:	18-Sep-08

SUMMARY

DESCRIPTION	ESTIMATED COST
Institutional Controls	$10,000
Mobilization/Demobilization	$33,050
Source Excavation, Transportation and Disposal	$1,970,356
Oxide Box Remediation	$132,796
Western Drainageway Sediment Removal	$46,374
Eastern Drainageway Sediment Removal	$32,110
Subsurface Vault Removal	$94,775
Former Settling Basin Sediment Removal	$264,563
	$2,584,023

STANDARD SUPPLEMENTAL PROJECT COSTS

Overhead and Profit 20.00%	**$516,805**
SUBTOTAL - CONSTRUCTION COSTS	**$3,100,828**
Contingency 25.00%	**$775,207**
TOTAL	**$3,876,034**
BUDGET GRAND TOTAL	**$3,877,000**

URS CORPORATION
ENGINEER'S COST ESTIMATE
ESTIMATED UNIT COST

Client:	NYSEG	Project Number:	11175369		
Project:	Geneva-Border City Former MGP Site	Calculated By:	Patrick Baker	Date:	15-Feb-08
Title:	Alternative 3 - Institutional Controls	Checked By:	JS	Date:	15-Feb-08

ITEM	DESCRIPTION	QTY.	UNITS	UNIT COST	TOTAL COST
1	**Institutional Controls**				
2	Deed Restrictions	1	ls	$10,000.00	$10,000
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30					
	TOTAL COST:				**$10,000**

URS CORPORATION
ENGINEER'S COST ESTIMATE
ESTIMATED UNIT COST

Client: NYSEG
Project: Geneva-Border City Former MGP Site
Title: Alternative 3 -Mobilization / Demobilization and Construction Support Facilities

Project Number: 11175369
Calculated By: Patrick Baker Date: 15-Feb-08
Checked By: JS Date: 15-Feb-08

ITEM	DESCRIPTION	QTY.	UNITS	UNIT COST	TOTAL COST
1	Submittals				
2	Health and Safety Plan***	1	ls	$1,200.00	$1,200
3	Sediment and Erosion Control Plan***	1	ls	$1,200.00	$1,200
4	Schedules***	1	ls	$3,000.00	$3,000
5	Record Drawings***	1	ls	$2,500.00	$2,500
6	Survey/Layout*	5	day	$800.00	$4,000
7	Mobe/Demob Support Equipment: Allowance***	1	ls	$5,000.00	$5,000
8	Temporary Utilities Installation: Allowance***	1	ls	$5,000.00	$5,000
9	Permits: Allowance***	1	ls	$5,000.00	$5,000
10	Trailers (2)*	3	mo	$1,000.00	$3,000
11	Portable Toilets (1)***	3	mo	$250.00	$750
12	Utilities (consumption)***	3	mo	$800.00	$2,400
13					
14					
15	Reference:				
16	* RS Means Cost Data - 2007				
17					
18	*** Engineer's Previous Project Experience				
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38					
	TOTAL COST:				**$33,050**

URS CORPORATION
CONSTRUCTION COST ESTIMATE
ESTIMATED UNIT COST

Client:	NYSEG	Project Number:	11175369		
Project:	Geneva-Border City Former MGP Site	Calculated By:	Patrick Baker	Date:	15-Feb-08
Title:	Alternative 3 -Excavation, Transportation and Disposal - Onsite Waste Zones and EWDA	Checked By:	JS/AM	Date:	15-Feb-08

ITEM	DESCRIPTION	QTY.	UNITS	UNIT COST	TOTAL COST
1	Clear and Grub*	0.5	acre	$3,860.00	$1,930
2	**Excavate Soil Waste**				
3	Labor: Labor foreman	200	hr	$49.83	$9,966
4	Laborer (2 men)	400	hr	$47.83	$19,132
5	Equip. Operator(2 men)	400	hr	$57.44	$22,976
6	Equipment:				
7	Track excavator - 2 cy	5	week	$5,728.00	$28,640
8	(Hertz Rental Equipment)				
9	Tractor Loader - wheel 4-1/2 CY	5	week	$1,970.00	$9,850
10	(Means 01 54 33 20 4730)				
11	**Load / Transport / Dispose of Soil Waste**				
12	Laborer (2 men)	400	hr	$47.83	$19,132
13	Equip. Operator(1 man)	200	hr	$57.44	$11,488
14	Equipment:				
15	Tractor Loader - wheel 4-1/2 CY	5	week	$1,970.00	$9,850
16	(Means 01 54 33 20 4730)				
17	Subcontractor:				
18	Transportation (assume 30 loads/day)				
19	Landfill disposal (CWM Model City, NY)	12830	ton	$115.00	$1,475,450
20	**Backfill / Compaction**				
21	Labor: Labor foreman	200	hr	$49.83	$9,966
22	Laborer (2 men)	400	hr	$47.83	$19,132
23	Equip. Operator(1 man)	200	hr	$57.44	$11,488
24	Equipment: tractor loader, wheel 1-1/2 CY bucket	200	hr	$70.28	$14,056
25	(Means 01 54 33 20 4450)				
26	Compactor - manually guided, 2 drum, vibratory	200	hr	$24.35	$4,870
27	(Means 01 54 33 20 1200)				
28	Material: Unclassified clean soil fill - allow	9228	cy	$15.00	$138,420
29	**Restoration -Crushed Stone (Soil Zone A, B)**				
30	Stone- 1-1/2" , compacted, 12" deep*	558	sy	$10.81	$6,032
31	**Restoration - Grass (Soil Zone N)**				
32	Seeding - push spreader	19.9	msf	$39.35	$783
33	(Means 32 92 19.14-4400)				
34	**Restoration - Paving (Soil Zone C,D,E,F,G,H, I)**				
35	Grading, dozer, common earth*	1427	sy	$0.41	$585
36	Compact subgrade - 95% proctor, 12" depth, cohesive soil*	1427	sy	$0.30	$428
37	Base Course - 1-1/2" stone, compacted, 12" deep*	1427	sy	$10.81	$15,426
38	Binder Course, 4" thick*	1427	sy	$11.67	$16,653
39	Wearing Course - 2" thick*	1427	sy	$6.00	$8,562
40	Hauling from mix plant* (20 mile round trip, 12 cy dump)	1427	sy	$19.65	$28,041
41	**PPE/Monitoring**				
42	Material: Level "C" PPE	200	man/day	$300.00	$60,000
43	Air Monitoring**	1.1	month	$25,000.00	$27,500
44					
45	Reference:				
46	* RS Means Cost Data - 2007				
47	** Cortland/Homer FS				
	TOTAL COST:				**$1,970,356**

URS CORPORATION
CONSTRUCTION COST ESTIMATE
ESTIMATED UNIT COST

Client: NYSEG	Project Number: 11175369		
Project: Geneva-Border City Former MGP Site	Calculated By: Patrick Baker	Date: 15-Feb-08	
Title: Alternative 3 - Oxide Box Remediation	Checked By: JS	Date: 15-Feb-08	

ITEM	DESCRIPTION	QTY.	UNITS	UNIT COST	TOTAL COST
1	**Remove Box Contents**				
2	Labor: Labor foreman	40	hr	$49.83	$1,993
3	Laborer (2 men)	80	hr	$47.83	$3,826
4	Vac. Operator(1 mn)	40	hr	$47.83	$1,913
5	Equipment: Vacuum loader	40	hr	$110.00	$4,400
6	(Vendor Quote: National Vacuum)				
7					
8	**Transport and Disposal**				
9	**Aqueous Phase**				
10	Transportation (Geneva, NY - Baltimore, MD)	9	loads	$2,590.00	$23,310
11	Water Treatment Disposal (Clean Harbors, Baltimore, MD)	43,100	gal	$0.40	$17,240
12	**Solid Phase**				
13	Transportation (Geneva, NY - Sarnia, Ont., Canada)	4	loads	$2,250.00	$9,000
14	Stabilization and Landfill Disposal (Clean Harbors, Sarnia, Ontario, Canada)	160	ton	$350.00	$56,000
15					
16	**Pressure Wash Oxide Box Interior**				
17	Labor: Labor foreman	16	hr	$49.83	$797
18	Laborer (2 men)	32	hr	$47.83	$1,531
19	Pressure Washer Operator(1 man)	16	hr	$47.83	$765
20	Equipment: 10,000 psi High Pressure Washer w/ 3D Spin Nozzle	16	hr	$95.00	$1,520
21	(Vendor Quote: National Vacuum)				
22	Confined Space Entry Equipment	5	day	$250.00	$1,250
23					
24	**PPE / Monitoring**				
25	Material: level "B" PPE	10	manday	$300.00	$3,000
26	Air Monitoring*	0.25	month	$25,000.00	$6,250
27					
28					
29	Reference				
30	* Cortland/Homer FS				
31					
32					
33	**Estimating Assumptions:**				
34	The oxide box waste does not contain PCB's above TSCA regulated limit.				
35	The oxide boxes can be readily accessed horizontally from outside the building				
36	Work will be performed during normal business hours.				
37	Waste materials will be acceptable for disposal at the estimated facilities.				
38	Assume: volume is 2/3 aqueous, 1/3 solids				
39	Assume: solids, 1 cy = 1 ton.				
40					
41					
	TOTAL COST:				**$132,796**

URS CORPORATION
CONSTRUCTION COST ESTIMATE
ESTIMATED UNIT COST

Client: NYSEG	Project Number: 11175369		
Project: Geneva-Border City Former MGP Site	Calculated By: Patrick Baker	Date: 15-Feb-08	
Title: Alternative 3 - Western Drainageway Sediment Removal; Sediment Zone 1	Checked By: JS	Date: 15-Feb-08	

ITEM	DESCRIPTION	QTY.	UNITS	UNIT COST	TOTAL COST
1					
2	**Survey / Layout**				
3	Labor: Surveyor (1 man)	8	hr	$51.16	$409
4	Material: - allow	1	ls	$100.00	$100
5					
6	**Clear and Grub**	0.3	acre	$3,860.00	$1,158
7	(Means 31 11 10.10)				
8					
9	**Excavate Stream Bed**				
10	Labor: Foreman	32	hr	$49.83	$1,595
11	Laborer (2 men)	64	hr	$47.83	$3,061
12	Equip. Operator (2 men)	64	hr	$57.44	$3,676
13	Equipment: tractor loader, wheel 1-1/2 CY bucket	32	hr	$70.28	$2,249
14					
16	**Backfill / Compact Stream Bed**				
17	Labor: Labor foreman	24	hr	$49.83	$1,196
18	Laborer (2 men)	48	hr	$47.83	$2,296
19	Equip. Operator(1 man)	24	hr	$57.44	$1,379
20	Equipment: tractor loader, wheel 1-1/2 CY bucket	24	hr	$70.28	$1,687
21	(Means 01 54 33 20 4450)				
22	Compactor - manually guided, 2 drum, vibratory	24	hr	$24.35	$584
23	(Means 01 54 33 20 1200)				
24	Material: Unclassified clean soil fill - allow	94	cy	$15.00	$1,410
25					
26	**PPE/Monitoring**				
27	Material: level "C" PPE	15	man/day	$180.00	$2,700
28	Air Monitoring*	0.25	month	$25,000.00	$6,250
29					
30	**Transport and Disposal**				
31	Transportation				
32	Landfill disposal (CWM Model City, NY)	141	ton	$115.00	$16,215
33					
34	**Restoration**				
35	Seeding - push spreader	10.4	msf	$39.35	$409
36	(Means 32 92 19.14-4400)				
37					
38	Reference- * Cortland/Homer FS				
39	**Estimating Assumptions:**				
40	Excavated stream sediment weighs 1.5 tons per cy.				
41	Work will be performed when the stream is seasonally dry.				
42	By-pass pumping will not be required.				
43	Stabilization to meet landfill paint filter test is not required.				
44	The sediment is a not RCRA hazardous waste.				
	TOTAL COST:				**$46,374**

URS CORPORATION
CONSTRUCTION COST ESTIMATE
ESTIMATED UNIT COST

Client:	NYSEG	Project Number:	11175369		
Project:	Geneva-Border City Former MGP Site	Calculated By:	Patrick Baker	Date:	15-Feb-08
Title:	Alternative 3 - Eastern Drainageway Sedment Removal; Sediment Zone 2	Checked By:	JS	Date:	15-Feb-08

ITEM	DESCRIPTION	QTY.	UNITS	UNIT COST	TOTAL COST
1					
2	**Survey / Layout**				
3	Labor: Surveyor (1 man)	8	hr	$51.16	$409
4	Material: - Allow	1	ls	$100.00	$100
5					
6	**Clear and Grub**	0.2	acre	$3,860.00	$772
7	(Means 31 11 10.10)				
8					
9	**Excavate Stream Bed**				
10	Labor: Labor foreman	16	hr	$49.83	$797
11	Laborer (2 men)	32	hr	$47.83	$1,531
12	Equip. Operator(2 men)	32	hr	$57.44	$1,838
13	Equipment: tractor loader, wheel 1-1/2 CY bucket	16	hr	$70.28	$1,124
14					
16	**Backfill / Compact Stream Bed**				
17	Labor:Foreman	16	hr	$49.83	$797
18	Laborer (2 men)	32	hr	$47.83	$1,531
19	Equip. Operator(1 man)	16	hr	$57.44	$919
20	Equipment: tractor loader, wheel 1-1/2 CY bucket	16	hr	$70.28	$1,124
21	(Means 01 54 33 20 4450)				
22	Compactor - manually guided, 2 drum, vibratory	16	hr	$24.35	$390
23	(Means 01 54 33 20 1200)				
24	Material: Unclassified clean soil fill - Allow	72	cy	$15.00	$1,080
25					
26	**PPE/Monitoring**				
27	Material: level "C" PPE	4	man/day	$180.00	$720
28	Air Monitoring*	0.25	month	$25,000.00	$6,250
29					
30	**Transport and Disposal**				
31	Transportation				
32	Landfill disposal (CWM Model City, NY)	108	ton	$115.00	$12,420
33					
34	**Restoration**				
35	Seeding - push spreader	7.8	msf	$39.35	$307
36	(Means 32 92 19.14-4400)				
37					
38	Reference - * Cortland/Homer FS				
39	**Estimating Assumptions:**				
40	Excavated stream sediment weighs 1.5 tons per cy.				
41	Work will be performed when the stream is seasonally dry.				
42	By-pass pumping will not be required.				
43	Stabilization to meet landfill paint filter test is not required.				
44	The sediment is a not RCRA hazardous waste.				
	TOTAL COST:				**$32,110**

URS CORPORATION
CONSTRUCTION COST ESTIMATE
ESTIMATED UNIT COST

Client:	NYSEG	Project Number:	11175369		
Project:	Geneva-Border City Former MGP Site	Calculated By:	Patrick Baker	Date:	17-Sep-08
Title:	Alternative 3 - Subsurface Vault Cleaning and Removal	Checked By:	JS/AM	Date:	18-Sep-08

ITEM	DESCRIPTION	QTY.	UNITS	UNIT COST	TOTAL COST
1	**Remove Vault Contents**				
2					
3	Labor: Labor foreman	8	hr	$49.83	$399
4	Laborer (1 man)	8	hr	$47.83	$383
5	Equipment: Vacuum tank truck (5500 gal)	3	load	$7,500.00	$22,500
6	(Vendor Quote: Clean Harbors)				
7	**Disposal - 16000 gal. (83cy) Pumpable Tar (@ 8 lb. Per gal.)**				
8	Incineration disposal - Deer Park, TX	128,000	lb	$0.35	$44,800
9	(Vendor Quote: Clean Harbors)				
10					
11	**Demolish/Excavate Concrete Vault**				
12	Saw Cut Asphalt Pavement (100 lf)				
13	Labor: Labor (1 man)	4	hr	$47.83	$191
14	Equipment:Concrete Saw (walk behind)	4	hr	$35.00	$140
15	Demolish Concrete Vault				
16	Labor: Labor foreman	16	hr	$49.83	$797
17	Laborer (1 man)	16	hr	$47.83	$765
18	Equip. Operator (1 man)	16	hr	$57.44	$919
19	Equipment: Excavator, track mtd., 1 cy w/ Hyd. Hammer	16	hr	$125.78	$2,012
20	(Means 01 54 33 20-0150)				
21	Steam Clean Vault (interior)				
22	Labor: Laborer (1 man)	8	hr	$47.83	$383
23	Equipment: Portable HP steam cleaner	8	hr	$48.00	$384
24	**Transport and Disposal**				
25	Transportation				
26	Landfill disposal (CWM Model City, NY)	83	ton	$115.00	$9,545
27					
28	**Backfill / Compaction**				
29	Labor: Labor foreman	8	hr	$49.83	$399
30	Laborer (2 men)	16	hr	$47.83	$765
31	Equip. Operator(1 man)	8	hr	$57.44	$460
32	Equipment: tractor loader, wheel 1-1/2 CY bucket	8	hr	$70.28	$562
33	(Means 01 54 33 20 4450)				
34	Compactor - manually guided, 2 drum, vibratory	8	hr	$24.35	$195
35	(Means 01 54 33 20 1200)				
36	Material: Unclassified clean soil fill - allow	55	cy	$15.00	$825
37					
38	**Restoration**				
39	Base Course - crushed 3/4" stone, compacted, 12" deep	25	sy	$5.72	$143
40	(Means 31 11 23.23 - 0300)				
41	Binder Course - 3" thick	25	sy	$8.88	$222
42	(Means 32 12 16.13-0160)				
43	Wearing Course - 1-1/2" thick	25	sy	$4.66	$117
44	(Means 32 12 16.13-0340)				
45	**PPE/Monitoring**				
46	Material: level "C" PPE	9	man/day	$180.00	$1,620
47	Air Monitoring*	0.25	month	$25,000.00	$6,250
48	Reference - * Cortland/Homer FS				
49	**Estimating Assumptions:**				
50	Assume 1 cy equals 1 ton for disposal purposes.				
51	Tars will be readily pumpable by a vacuum tank truck.				
52					
	TOTAL COST:				**$94,775**

URS CORPORATION
CONSTRUCTION COST ESTIMATE
ESTIMATED UNIT COST

Client: NYSEG	Project Number: 11175369		
Project: Geneva-Border City Former MGP Site	Calculated By: Patrick Baker	Date:	15-Feb-08
Title: Alternative 3 - Former Settling Basin - Sediment Zone 3	Checked By: JS	Date:	15-Feb-08

ITEM	DESCRIPTION	QTY.	UNITS	UNIT COST	TOTAL COST
1					
2	**Clear and Grub**	0.2	acre	$3,860.00	$772
3	(Means 31 11 10.10)				
4					
5	**Remove Fence**	400	lf	$2.25	$900
6	(Means 02 41 13.60)				
7					
8	**Excavate Sediment**				
9	Labor: Labor foreman	96	hr	$49.83	$4,784
10	Laborer (2 men)	192	hr	$47.83	$9,183
11	Equip. Operator(3 men)	288	hr	$57.44	$16,543
12	Equipment:				
13	Track excavator - 40 ft reach - 2 cy	2.5	week	$5,728.00	$14,320
14	(Hertz Rental Equipment)				
15	Tractor Loader - wheel 4-1/2 CY	2.5	week	$1,970.00	$4,925
16	(Means 01 54 33 20 4730)				
17					
18	**Stabilize Excavated Sediment**				
19	Labor: Laborer (1 man)	96	hr	$47.83	$4,592
20	Equip. Operator(1 man)	96	hr	$57.44	$5,514
21	Equipment:				
22	Track Excavator - 1 CY	2.5	week	$2,445.00	$6,113
23	(Means 01 54 33 20 0150)				
24	Material:				
25	Portland Cement - 94 lb. Bag (2% mix ratio by volume)	400	bag	22.97	$9,188
26					
27	**Load / Transport / Dispose of Stabilized Sediments**				
28	Labor: Labor foreman	80	hr	$49.83	$3,986
29	Laborer (2 men)	160	hr	$47.83	$7,653
30	Equip. Operator(3 men)	80	hr	$57.44	$4,595
31	Equipment:				
32	Tractor Loader - wheel 4-1/2 CY	2.5	week	$1,970.00	$4,925
33	(Means 01 54 33 20 4730)				
34	Subcontractor:				
35	Transportation				
36	Landfill disposal (CWM Model City, NY)	764	ton	$115.00	$87,860
37				**Subtotal**	**$185,853**

URS CORPORATION
CONSTRUCTION COST ESTIMATE
ESTIMATED UNIT COST

Client: NYSEG
Project: Geneva-Border City Former MGP Site
Title: Former Settling Basin - Sediment Zone 3

Project Number: 11175369
Calculated By: Patrick Baker   Date: 15-Feb-08
Checked By: JS   Date: 15-Feb-08

38	**Backfill / Compact / Grade to Match North / South Stream Bed**				
39	Labor: Labor foreman	32	hr	$49.83	$1,595
40	Laborer (2 men)	128	hr	$47.83	$6,122
41	Equip. Operator(2 men)	128	hr	$57.44	$7,352
42	Equipment: tractor loader, wheel 1-1/2 CY bucket	32	hr	$70.28	$2,249
43	(Means 01 54 33 20 4450)				
44	Bull dozer - 105 H.P.	32	hr	$86.23	$2,759
45	(Means 01 54 33 20 4150)				
46	Compactor - manually guided, 2 drum, vibratory	32	hr	$24.35	$779
47	(Means 01 54 33 20 1200)				
48	Material: Unclassified clean soil fill - allow	1300	cy	$15.00	$19,500
49					
50	**Restoration**				
51	Seeding - push spreader	10	msf	$39.35	$394
52	(Means 32 92 19.14-4400)				
53					
54	**PPE/Monitoring**				
55	Material: Level "C" PPE	72	man/day	$180.00	$12,960
56	Air Monitoring*	1	month	$25,000.00	$25,000
57				**Subtotal**	**$78,710**
58					
59					
60					
61					
62					
63					
64					
65					
66					
67					
68	Reference - *Cortland/Homer FS				
69					
70	**Estimating Assumptions:**				
71	Stabilized pond sediment weighs 1.5 tons per cy.				
72	Work will be performed when the pond is seasonally dry.				
73	By-pass pumping will not be required.				
74	Stabilization, by addition of 2% portland cement, by volume, is included.				
75	The stabilized sediment is a RCRA hazardous waste.				
76					
	TOTAL COST:				**$264,563**

URS CORPORATION
ENGINEER'S COST ESTIMATE
ESTIMATED UNIT COST

Client: NYSEG
Project: Geneva-Border City Former MGP Site
Title: Alternative 3 - Annual Operation and Maintenance

Project Number: 11175369
Calculated By: Patrick Baker   Date: 15-Feb-08
Checked By: JS/AM   Date: 15-Feb-08

ITEM	DESCRIPTION	QTY.	UNITS	UNIT COST	TOTAL COST
1	Labor, equip, shipping	2	days	$1,050.00	$2,100
2	Sampling - Analysis: Annual **	16	each	$700.00	$11,200
3	Reports***	1	ls	$2,500.00	$2,500
4	Grass Mowing - Allow: 5 months x twice per month**	199	msf	$4.60	$915
5					
6	Reference:				
7					
8	** Vendor Quote				
9	*** Engineer's previous project experience				
10					
11					
12	Labor (2 people) $800/day * 2 days				
13	H&S Equip $100/day * 2 days				
14	Shipping/misc $150				
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27				**Subtotal**	**$16,715**
28	**Contractors Overhead and Profit**			**20%**	**$3,343**
29				**Subtotal**	**$20,058**
30	**Contingency**			**25%**	**$5,015**
31					
32					
33					
34					
	TOTAL COST:				**$25,073**

NEW YORK STATE ELECTRIC AND GAS CORPORATION

GENEVA-BORDER CITY FORMER MGP SITE - SITE NO. 8-50-008
FEASIBILITY STUDY

Client:	NYSEG	Project Number:	11175369		
Project:	Geneva-Border City Former MGP Site	Calculated By:	Patrick Baker	Date:	17-Sep-08
Description:	Alternative 4A: In-situ Solidification EWDA, Asphalt Cap	Checked By:	JS/AM	Date:	18-Sep-08

SUMMARY

DESCRIPTION	ESTIMATED COST
Institutional Controls	$10,000
Mobilization / Demobilization	$35,100
In-situ Soil Solidification	$544,044
Asphalt Cap Onsite Zones	$17,185
Oxide Box Remediation	$132,796
Western Drainageway Sediment Removal	$46,374
Eastern Drainageway Sediment Removal	$32,110
Subsurface Vault Removal	$94,775
Former Settling Basin Sediment Removal	$264,563
	$1,176,946

STANDARD SUPPLEMENTAL PROJECT COSTS

Overhead and Profit 20.00%	**$235,389**
SUBTOTAL	**$1,412,336**
Contingency 25.00%	**$353,084**
TOTAL	**$1,765,419**
BUDGET TOTAL	**$1,766,000**

URS CORPORATION
ENGINEER'S COST ESTIMATE
ESTIMATED UNIT COST

Client:	NYSEG	Project Number:	11175369		
Project:	Geneva-Border City Former MGP Site	Calculated By:	Patrick Baker	Date:	15-Feb-08
Title:	Alternative 4A - Institutional Controls	Checked By:	JS	Date:	15-Feb-08

ITEM	DESCRIPTION	QTY.	UNITS	UNIT COST	TOTAL COST
1	**Institutional Controls**				
2	Deed Restrictions	1	ls	$10,000.00	$10,000
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	TOTAL COST:				**$10,000**

URS CORPORATION
ENGINEER'S COST ESTIMATE
ESTIMATED UNIT COST

Client:	NYSEG	Project Number:	11175369		
Project:	Geneva-Border City Former MGP Site	Calculated By:	Patrick Baker	Date:	15-Feb-08
Title:	Alternative 4A -Mobilization / Demobilization and Construction Support Facilities	Checked By:	JS	Date:	15-Feb-08

ITEM	DESCRIPTION	QTY.	UNITS	UNIT COST	TOTAL COST
1	Submittals				
2	Health and Safety Plan***	1	ls	$1,200.00	$1,200
3	Sediment and Erosion Control Plan***	1	ls	$1,200.00	$1,200
4	Schedules***	1	ls	$3,000.00	$3,000
5	Record Drawings***	1	ls	$2,500.00	$2,500
6	Survey/Layout*	5	day	$800.00	$4,000
7	Mobe/Demob Support Equipment: Allowance***	1	ls	$5,000.00	$5,000
8	Temporary Utilities Installation: Allowance***	1	ls	$5,000.00	$5,000
9	Permits: Allowance***	1	ls	$5,000.00	$5,000
10	Trailers (2)*	4	mo	$1,000.00	$4,000
11	Portable Toilets (1)***	4	mo	$250.00	$1,000
12	Utilities (consumption)***	4	mo	$800.00	$3,200.00
13					
14					
15	Reference:				
16	* RS Means Cost Data - 2007				
17	*** Engineer's Previous Project Experience				
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38					
	TOTAL COST:				**$35,100**

URS CORPORATION
ENGINEER'S COST ESTIMATE
ESTIMATED UNIT COST

Client:	NYSEG	Project Number:	11175369		
Project:	Geneva-Border City Former MGP Site	Calculated By:	Patrick Baker	Date:	15-Feb-08
Title:	Alternative 4A - Onsite Treatment - In-situ Solidification	Checked By:	JS/AM	Date:	15-Feb-08

ITEM	DESCRIPTION	QTY.	UNITS	UNIT COST	TOTAL COST
1	Mobilize/Demobilize Solidification Equipment***	1	ls	$12,000.00	$12,000
2	Temporary Equipment Decontamination Pad***	1	ls	$6,500.00	$6,500
3	Air monitoring**	2	mo	$25,000.00	$50,000
4	Health and Safety***	2	mo	$5,000.00	$10,000
5	Temporary Water Treatment System (Decon. Water)***	0.25	mo	$12,000.00	$3,000
6	Clear and Grub*	0.5	acre	$3,860.00	$1,930
7	Demolish and Loadout Gas Holder Foundation (Allow: 250 cy)	250.0	cy	$25.00	$6,250
8	Transportation and Disposal of Non-Haz. Concrete Rubble (1.9 ton per cy)	475.0	ton	$115.00	$54,625
9	Bench-Scale Pre-construction testing***	1.0	ls	$30,000.00	$30,000
10	Onsite In-Situ Solidification ***	3,707	cy	$95.00	$352,165
11	Site Restoration: Onsite (0.5 acres)				
12	Topsoil - 4" spread and raked*	250	cy	$30.00	$7,500
13	Seeding*	19.9	msf	$41.40	$824
14	Verification Sampling and Analysis	25	each	$270.00	$6,750
15	Report***	1	ls	$2,500.00	$2,500
16	Note:				
17	ISS mixing @ $25/cy				
18	Reagent addition $4 to $5 / cy				
19	at 10% ratio - $40 to $50/cy				
20	at 20% ratio - $80 to $100/cy				
21	Range = $65 to $125/cy				
22	Assume 15% mix at $4.50 = $92.50/cy, use $95/cy				
23					
24					
25	Reference:				
26	* RS Means Cost Data - 2007				
27	*** Engineer's Previous Project Experience				
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	TOTAL COST:				**$544,044**

URS CORPORATION
CONSTRUCTION COST ESTIMATE
ESTIMATED UNIT COST

Client:	NYSEG	Project Number:	11175369		
Project:	Geneva-Border City Former MGP Site	Calculated By:	Patrick Baker	Date:	15-Feb-08
Title:	Alternative 4A -Cap Onsite Waste Zones A & B	Checked By:	JS	Date:	11-Aug-08

ITEM	DESCRIPTION	QTY.	UNITS	UNIT COST	TOTAL COST
	Zone B - Asphalt Cap				
1	Clear and Grub*	0.2	acre	$3,860.00	$772
2	Grading, dozer, common earth*	394	sy	$0.41	$162
3	Compact subgrade - 95% proctor, 12" depth, cohesive soil*	394	sy	$0.30	$118
4	Base Course - 1-1/2" stone, compacted, 12" deep*	394	sy	$10.81	$4,259
5	Binder Course, 4" thick*	394	sy	$11.67	$4,598
6	Wearing Course - 2" thick*	394	sy	$6.00	$2,364
7	Hauling from mix plant* (20 mile round trip, 12 cy dump)	75	cy	$19.65	$1,474
8					
9	**Zone A - Impermeable Synthetic Cap**				
10	Excavate / Stockpile 12" of existing Stone Cover	55	cy	$8.00	$440
11	Synthetic Cap - 40 mil	1477	sf	$1.45	$2,142
12	Geocomposite Drainage Layer	165	sy	$1.86	$307
13	Restore Stone Cover	55	cy	$10.00	$550
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36					
	TOTAL COST:				**$17,185**

URS CORPORATION
CONSTRUCTION COST ESTIMATE
ESTIMATED UNIT COST

Client: NYSEG	Project Number: 11175369		
Project: Geneva-Border City Former MGP Site	Calculated By: Patrick Baker	Date: 15-Feb-08	
Title: Alternative 4A - Oxide Box Remediation	Checked By: JS	Date: 15-Feb-08	

ITEM	DESCRIPTION	QTY.	UNITS	UNIT COST	TOTAL COST
1	**Remove Box Contents**				
2	Labor: Labor foreman	40	hr	$49.83	$1,993
3	Laborer (2 men)	80	hr	$47.83	$3,826
4	Vac. Operator(1 man)	40	hr	$47.83	$1,913
5	Equipment: Vacuum loader	40	hr	$110.00	$4,400
6	(Vendor Quote: National Vacuum)				
7					
8	**Transport and Disposal**				
9	**Aqueous Phase**				
10	Transportation (Geneva, NY - Baltimore, MD)	9	loads	$2,590.00	$23,310
11	Water Treatment Disposal (Clean Harbors, Baltimore, MD)	43,100	gal	$0.40	$17,240
12	**Solid Phase**				
13	Transportation (Geneva, NY - Sarnia, Ont., Canada)	4	loads	$2,250.00	$9,000
14	Stabilization and Landfill Disposal (Clean Harbors, Sarnia, Ontario, Canada)	160	ton	$350.00	$56,000
15					
16	**Pressure Wash Oxide Box Interior**				
17	Labor: Labor foreman	16	hr	$49.83	$797
18	Laborer (2 men)	32	hr	$47.83	$1,531
19	Pressure Washer Operator(1 man)	16	hr	$47.83	$765
20	Equipment: 10,000 psi High Pressure Washer w/ 3D Spin Nozzle	16	hr	$95.00	$1,520
21	(Vendor Quote: National Vacuum)				
22	Confined Space Entry Equipment	5	day	$250.00	$1,250
23					
24	**PPE/Monitoring**				
25	Material: level "B" PPE	10	manday	$300.00	$3,000
26	Air Monitoring*	0.25	month	$25,000.00	$6,250
27					
28					
29					
30	Reference				
31	* Cortland/Homer FS				
32					
33	**Estimating Assumptions:**				
34	The oxide box waste does not contain PCB's above TSCA regulated limit.				
35	The oxide boxes can be readily accessed horizontally from outside the building				
36	Work will be performed during normal business hours.				
37	Waste materials will be acceptable for disposal at the estimated facilities.				
38	Assume: volume is 2/3 aqueous, 1/3 solids				
39	Assume: solids, 1 cy = 1 ton.				
40					
41					
	TOTAL COST:				**$132,796**

URS CORPORATION
CONSTRUCTION COST ESTIMATE
ESTIMATED UNIT COST

Client:	NYSEG	Project Number:	11175369		
Project:	Geneva-Border City Former MGP Site	Calculated By:	Patrick Baker	Date:	15-Feb-08
Title:	Alternative 4A - Western Drainageway Sedment Removal; Sediment Zone 1	Checked By:	JS	Date:	15-Feb-08

ITEM	DESCRIPTION	QTY.	UNITS	UNIT COST	TOTAL COST
1					
2	**Survey / Layout**				
3	Labor: Surveyor (1 man)	8	hr	$51.16	$409
4	Material: - allow	1	ls	$100.00	$100
5					
6	**Clear and Grub**	0.3	acre	$3,860.00	$1,158
7	(Means 31 11 10.10)				
8					
9	**Excavate Stream Bed**				
10	Labor: Labor foreman	32	hr	$49.83	$1,595
11	Laborer (2 men)	64	hr	$47.83	$3,061
12	Equip. Operator(2 men)	64	hr	$57.44	$3,676
13	Equipment: tractor loader, wheel 1-1/2 CY bucket	32	hr	$70.28	$2,249
14					
16	**Backfill / Compact Stream Bed**				
17	Labor: Labor foreman	24	hr	$49.83	$1,196
18	Laborer (2 men)	48	hr	$47.83	$2,296
19	Equip. Operator(1 man)	24	hr	$57.44	$1,379
20	Equipment: tractor loader, wheel 1-1/2 CY bucket	24	hr	$70.28	$1,687
21	(Means 01 54 33 20 4450)				
22	Compactor - manually guided, 2 drum, vibratory	24	hr	$24.35	$584
23	(Means 01 54 33 20 1200)				
24	Material: Unclassified clean soil fill - allow	94	cy	$15.00	$1,410
25					
26	**PPE/Monitoring**				
27	Material: level "C" PPE	15	man/day	$180.00	$2,700
28	Air Monitoring*	0.25	month	$25,000.00	$6,250
29					
30	**Transport and Disposal**				
31	Transportation				
32	Landfill disposal (CWM Model City, NY)	141	ton	$115.00	$16,215
33					
34	**Restoration**				
35	Seeding - push spreader	10.4	msf	$39.35	$409
36	(Means 32 92 19.14-4400)				
37					
38	Reference - *Cortland/Homer FS				
39	**Estimating Assumptions:**				
40	Excavated stream sediment weighs 1.5 tons per cy.				
41	Work will be performed when the stream is seasonally dry.				
42	By-pass pumping will not be required.				
43	Stabilization to meet landfill paint filter test is not required.				
44	The sediment is a not RCRA hazardous waste.				
	TOTAL COST:				**$46,374**

URS CORPORATION
CONSTRUCTION COST ESTIMATE
ESTIMATED UNIT COST

Client:	NYSEG	Project Number:	11175369		
Project:	Geneva-Border City Former MGP Site	Calculated By:	Patrick Baker	Date:	15-Feb-08
Title:	Alternative 4A - Eastern Drainageway Sediment Removal; Sediment Zone 2	Checked By:	JS	Date:	15-Feb-08

ITEM	DESCRIPTION	QTY.	UNITS	UNIT COST	TOTAL COST
1					
2	**Survey / Layout**				
3	Labor: Surveyor (1 man)	8	hr	$51.16	$409
4	Material: - allow	1	ls	$100.00	$100
5					
6	**Clear and Grub**	0.2	acre	$3,860.00	$772
7	(Means 31 11 10.10)				
8					
9	**Excavate Stream Bed**				
10	Labor: Labor foreman	16	hr	$49.83	$797
11	Laborer (2 men)	32	hr	$47.83	$1,531
12	Equip. Operator(2 men)	32	hr	$57.44	$1,838
13	Equipment: tractor loader, wheel 1-1/2 CY bucket	16	hr	$70.28	$1,124
14					
16	**Backfill / Compact Stream Bed**				
17	Labor: Labor foreman	16	hr	$49.83	$797
18	Laborer (2 men)	32	hr	$47.83	$1,531
19	Equip. Operator(1 man)	16	hr	$57.44	$919
20	Equipment: tractor loader, wheel 1-1/2 CY bucket	16	hr	$70.28	$1,124
21	(Means 01 54 33 20 4450)				
22	Compactor - manually guided, 2 drum, vibratory	16	hr	$24.35	$390
23	(Means 01 54 33 20 1200)				
24	Material: Unclassified clean soil fill - allow	72	cy	$15.00	$1,080
25					
26	**PPE/Monitoring**				
27	Material: level "C" PPE	4	man/day	$180.00	$720
28	Air Monitoring*	0.25	month	$25,000.00	$6,250
29					
30	**Transport and Disposal**				
31	Transportation				
32	Landfill disposal (CWM Model City, NY)	108	ton	$115.00	$12,420
33					
34	**Restoration**				
35	Seeding - push spreader	7.8	msf	$39.35	$307
36	(Means 32 92 19.14-4400)				
37					
38	Reference - *Cortland/Homer FS				
39					
40	**Estimating Assumptions:**				
41	Excavated stream sediment weighs 1.5 tons per cy.				
42	Work will be performed when the stream is seasonally dry.				
43	By-pass pumping will not be required.				
44	Stabilization to meet landfill paint filter test is not required.				
45	The sediment is a not RCRA hazardous waste.				
	TOTAL COST:				**$32,110**

URS CORPORATION
CONSTRUCTION COST ESTIMATE
ESTIMATED UNIT COST

Client:	NYSEG	Project Number:	11175369		
Project:	Geneva-Border City Former MGP Site	Calculated By:	Patrick Baker	Date:	17-Sep-08
Title:	Alternative 4A - Subsurface Vault Cleaning and Removal	Checked By:	JS/AM	Date:	18-Sep-08

ITEM	DESCRIPTION	QTY.	UNITS	UNIT COST	TOTAL COST
1	**Remove Vault Contents**				
2					
3	Labor: Labor foreman	8	hr	$49.83	$399
4	Laborer (1 man)	8	hr	$47.83	$383
5	Equipment: Vacuum tank truck (5500 gal)	3	load	$7,500.00	$22,500
6	(Vendor Quote: Clean Harbors)				
7	**Disposal - 16000 gal. (83cy) Pumpable Tar (@ 8 lb. Per gal.)**				
8	Incineration disposal - Deer Park, TX	128,000	lb	$0.35	$44,800
9	(Vendor Quote: Clean Harbors)				
10					
11	**Demolish/Excavate Concrete Vault**				
12	Saw Cut Asphalt Pavement (100 lf)				
13	Labor: Labor (1 man)	4	hr	$47.83	$191
14	Equipment:Concrete Saw (walk behind)	4	hr	$35.00	$140
15	Demolish Concrete Vault				
16	Labor: Labor foreman	16	hr	$49.83	$797
17	Laborer (1 man)	16	hr	$47.83	$765
18	Equip. Operator (1 man)	16	hr	$57.44	$919
19	Equipment: Excavator, track mtd., 1 cy w/ Hyd. Hammer	16	hr	$125.78	$2,012
20	(Means 01 54 33 20-0150)				
21	Steam Clean Vault (interior)				
22	Labor: Laborer (1 man)	8	hr	$47.83	$383
23	Equipment: Portable HP steam cleaner	8	hr	$48.00	$384
24	**Transport and Disposal**				
25	Transportation				
26	Landfill disposal (CWM Model City, NY)	83	ton	$115.00	$9,545
27					
28	**Backfill / Compaction**				
29	Labor: Labor foreman	8	hr	$49.83	$399
30	Laborer (2 men)	16	hr	$47.83	$765
31	Equip. Operator(1 man)	8	hr	$57.44	$460
32	Equipment: tractor loader, wheel 1-1/2 CY bucket	8	hr	$70.28	$562
33	(Means 01 54 33 20 4450)				
34	Compactor - manually guided, 2 drum, vibratory	8	hr	$24.35	$195
35	(Means 01 54 33 20 1200)				
36	Material: Unclassified clean soil fill - allow	55	cy	$15.00	$825
37					
38	**Restoration**				
39	Base Course - crushed 3/4" stone, compacted, 12" deep	25	sy	$5.72	$143
40	(Means 31 11 23.23 - 0300)				
41	Binder Course - 3" thick	25	sy	$8.88	$222
42	(Means 32 12 16.13-0160)				
43	Wearing Course - 1-1/2" thick	25	sy	$4.66	$117
44	(Means 32 12 16.13-0340)				
45	**PPE/Monitoring**				
46	Material: level "C" PPE	9	man/day	$180.00	$1,620
47	Air Monitoring*	0.25	month	$25,000.00	$6,250
48	Reference - * Cortland/Homer FS				
49	**Estimating Assumptions:**				
50	Assume 1 cy equals 1 ton for disposal purposes.				
51	Tars will be readily pumpable by a vacuum tank truck.				
52					
	TOTAL COST:				**$94,775**

URS CORPORATION
CONSTRUCTION COST ESTIMATE
ESTIMATED UNIT COST

Client: NYSEG
Project: Geneva-Border City Former MGP Site
Title: Alternative 4A - Former Settling Basin - Sediment Zone 3

Project Number: 11175369
Calculated By: Patrick Baker Date: 15-Feb-08
Checked By: JS Date: 15-Feb-08

ITEM	DESCRIPTION	QTY.	UNITS	UNIT COST	TOTAL COST
1					
2	**Clear and Grub**	0.2	acre	$3,860.00	$772
3	(Means 31 11 10.10)				
4					
5	**Remove Fence**	400	lf	$2.25	$900
6	(Means 02 41 13.60)				
7					
8	**Excavate Sediment**				
9	Labor: Labor foreman	96	hr	$49.83	$4,784
10	Laborer (2 men)	192	hr	$47.83	$9,183
11	Equip. Operator(3 men)	288	hr	$57.44	$16,543
12	Equipment:				
13	Track excavator - 40 ft reach - 2 cy	2.5	week	$5,728.00	$14,320
14	(Hertz Rental Equipment)				
15	Tractor Loader - wheel 4-1/2 CY	2.5	week	$1,970.00	$4,925
16	(Means 01 54 33 20 4730)				
17					
18	**Stabilize Excavated Sediment**				
19	Labor: Laborer (1 man)	96	hr	$47.83	$4,592
20	Equip. Operator(1 man)	96	hr	$57.44	$5,514
21	Equipment:				
22	Track Excavator - 1 CY	2.5	week	$2,445.00	$6,113
23	(Means 01 54 33 20 0150)				
24	Material:				
25	Portland Cement - 94 lb. Bag (2% mix ratio by volume)	400	bag	22.97	$9,188
26					
27	**Load / Transport / Dispose of Stabilized Sediments**				
28	Labor: Labor foreman	80	hr	$49.83	$3,986
29	Laborer (2 men)	160	hr	$47.83	$7,653
30	Equip. Operator(3 men)	80	hr	$57.44	$4,595
31	Equipment:				
32	Tractor Loader - wheel 4-1/2 CY	2.5	week	$1,970.00	$4,925
33	(Means 01 54 33 20 4730)				
34	Subcontractor:				
35	Transportation				
36	Landfill disposal (CWM Model City, NY)	764	ton	$115.00	$87,860
37				**Subtotal**	**$185,853**

URS CORPORATION
CONSTRUCTION COST ESTIMATE
ESTIMATED UNIT COST

Client: NYSEG
Project: Geneva-Border City Former MGP Site
Title: Former Settling Basin - Sediment Zone 3

Project Number: 11175369
Calculated By: Patrick Baker — Date: 15-Feb-08
Checked By: JS — Date: 15-Feb-08

38					
39	**Backfill / Compact / Grade to Match North / South Stream Bed**				
40	Labor: Labor foreman	32	hr	$49.83	$1,595
41	Laborer (2 men)	128	hr	$47.83	$6,122
42	Equip. Operator(2 men)	128	hr	$57.44	$7,352
43	Equipment: tractor loader, wheel 1-1/2 CY bucket	32	hr	$70.28	$2,249
44	(Means 01 54 33 20 4450)				
45	Bull dozer - 105 H.P.	32	hr	$86.23	$2,759
46	(Means 01 54 33 20 4150)				
47	Compactor - manually guided, 2 drum, vibratory	32	hr	$24.35	$779
48	(Means 01 54 33 20 1200)				
49	Material: Unclassified clean soil fill - allow	1300	cy	$15.00	$19,500
50					
51	**Restoration**				
52	Seeding - push spreader	10	msf	$39.35	$394
53	(Means 32 92 19.14-4400)				
54					
55	**PPE/Monitoring**				
56	Material: Level "C" PPE	72	man/day	$180.00	$12,960
57	Air Monitoring*	1	month	$25,000.00	$25,000
58				**Subtotal**	**$78,710**
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68					
69	Reference - *Cortland/Homer FS				
70					
71	**Estimating Assumptions:**				
72	Stabilized pond sediment weighs 1.5 tons per cy.				
73	Work will be performed when the pond is seasonally dry.				
74	By-pass pumping will not be required.				
75	Stabilization, by addition of 2% portland cement, by volume, is included.				
76	The stabilized sediment is a RCRA hazardous waste.				
77					
	TOTAL COST:				**$264,563**

URS CORPORATION
ENGINEER'S COST ESTIMATE
ESTIMATED UNIT COST

Client: NYSEG
Project: Geneva-Border City Former MGP Site
Title: Alternative 4A - Annual Operation and Maintenance

Project Number: 11175369
Calculated By: Patrick Baker   Date: 15-Feb-08
Checked By: JS/AM   Date: 15-Feb-08

ITEM	DESCRIPTION	QTY.	UNITS	UNIT COST	TOTAL COST
1	Labor, equip, shipping	2	days	$1,050.00	$2,100
2	Sampling - Analysis: Annual **	16	each	$700.00	$11,200
3	Reports***	1	ls	$2,500.00	$2,500
4	Grass Mowing - Allow: 5 months x twice per month**	199.0	msf	$4.60	$915
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10	Reference:				
11	* * RS Means Cost Data - 2007 adjusted				
12	*** Engineer's Previous Project Experience				
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27				**Subtotal**	**$16,715**
28	**Contractors Overhead and Profit**			**20%**	**$3,343**
29				**Subtotal**	**$20,058**
30	**Contingency**			**25%**	**$5,015**
31					
32					
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34					
	TOTAL COST:				**$25,073**

NEW YORK STATE ELECTRIC AND GAS CORPORATION

GENEVA-BORDER CITY FORMER MGP SITE - SITE NO. 8-50-008
FEASIBILITY STUDY

Client:	NYSEG	Project Number:	11175369		
Project:	Geneva-Border City Former MGP Site	Calculated By:	Patrick Baker	Date:	17-Sep-08
Description:	Alternative 4B: In-situ Solidification Treatment; Source Removal	Checked By:	JS/AM	Date:	18-Sep-08

SUMMARY

DESCRIPTION	ESTIMATED COST
Institutional Controls	$10,000
Mobilization / Demobilization	$33,050
In-situ Soil Solidification	$544,044
Source Excavation, Transportation and Disposal	$1,148,388
Oxide Box Remediation	$132,796
Western Drainageway Sediment Removal	$46,374
Eastern Drainageway Sediment Removal	$32,110
Subsurface Vault Removal	$94,775
Former Settling Basin Sediment Removal	$264,563
	$2,306,100

STANDARD SUPPLEMENTAL PROJECT COSTS

Overhead and Profit 20.00%	**$461,220**
SUBTOTAL	**$2,767,319**
Contingency 25.00%	**$691,830**
TOTAL	**$3,459,149**
BUDGET TOTAL	**$3,460,000**

URS CORPORATION
ENGINEER'S COST ESTIMATE
ESTIMATED UNIT COST

Client:	NYSEG	Project Number:	11175369
Project:	Geneva-Border City Former MGP Site	Calculated By:	Patrick Baker	Date: 15-Feb-08
Title:	Alternative 4B - Institutional Controls	Checked By:	JS	Date: 15-Feb-08

ITEM	DESCRIPTION	QTY.	UNITS	UNIT COST	TOTAL COST
1	**Institutional Controls**				
2	Deed Restrictions	1	ls	$10,000.00	$10,000
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	TOTAL COST:				**$10,000**

URS CORPORATION
ENGINEER'S COST ESTIMATE
ESTIMATED UNIT COST

Client: NYSEG
Project: Geneva-Border City Former MGP Site
Title: Alternative 4B -Mobilization / Demobilization and Construction Support Facilities

Project Number: 11175369
Calculated By: Patrick Baker   Date: 15-Feb-08
Checked By: JS   Date: 15-Feb-08

ITEM	DESCRIPTION	QTY.	UNITS	UNIT COST	TOTAL COST
1	Submittals				
2	Health and Safety Plan***	1	ls	$1,200.00	$1,200
3	Sediment and Erosion Control Plan***	1	ls	$1,200.00	$1,200
4	Schedules***	1	ls	$3,000.00	$3,000
5	Record Drawings***	1	ls	$2,500.00	$2,500
6	Survey/Layout*	5	day	$800.00	$4,000
7	Mobe/Demob Support Equipment: Allowance***	1	ls	$5,000.00	$5,000
8	Temporary Utilities Installation: Allowance***	1	ls	$5,000.00	$5,000
9	Permits: Allowance***	1	ls	$5,000.00	$5,000
10	Trailers (2)*	3	mo	$1,000.00	$3,000
11	Portable Toilets (1)***	3	mo	$250.00	$750
12	Utilities (consumption)***	3	mo	$800.00	$2,400.00
13					
14					
15	Reference:				
16	* RS Means Cost Data - 2007				
17	** Vendor Quote				
18	*** Engineer's Previous Project Experience				
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	TOTAL COST:				$33,050

URS CORPORATION
ENGINEER'S COST ESTIMATE
ESTIMATED UNIT COST

Client: NYSEG	Project Number: 11175369		
Project: Geneva-Border City Former MGP Site	Calculated By: Patrick Baker	Date: 15-Feb-08	
Title: Alternative 4B- Onsite Treatment - In-situ Solidification	Checked By: JS/AM	Date: 15-Feb-08	

ITEM	DESCRIPTION	QTY.	UNITS	UNIT COST	TOTAL COST
1	Mobilize/Demobilize Solidification Equipment***	1	ls	$12,000.00	$12,000
2	Temporary Equipment Decontamination Pad***	1	ls	$6,500.00	$6,500
3	Air monitoring**	2	mo	$25,000.00	$50,000
4	Health and Safety***	2	mo	$5,000.00	$10,000
5	Temporary Water Treatment System (Decon. Water)***	0.25	mo	$12,000.00	$3,000
6	Clear and Grub*	0.5	acre	$3,860.00	$1,930
7	Demolish and Loadout Gas Holder Foundation (Allow: 250 cy)	250.0	cy	$25.00	$6,250
8	Transportation and Disposal of Non-Haz. Concrete Rubble (1.9 ton per cy)	475.0	ton	$115.00	$54,625
9	Bench-Scale Pre-construction testing***	1.0	ls	$30,000.00	$30,000
10	Onsite In-Situ Solidification ***	3,707	cy	$95.00	$352,165
11	Site Restoration: Onsite (1.9 acres)				
12	Topsoil - 4" spread and raked*	250	cy	$30.00	$7,500
13	Seeding*	19.9	msf	$41.40	$824
14	Verification Sampling and Analysis	25	each	$270.00	$6,750
15	Report***	1	ls	$2,500.00	$2,500
16	Note:				
17	ISS mixing @ $25/cy				
18	Reagent addition $4 to $5 / cy				
19	at 10% ratio - $40 to $50/cy				
20	at 20% ratio - $80 to $100/cy				
21	Range = $65 to $125/cy				
22	Assume 15% mix at $4.50 = $92.50/cy, use $95/cy				
23					
24					
25	Reference:				
26	* RS Means Cost Data - 2007				
27	*** Engineer's Previous Project Experience				
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46					
	TOTAL COST:				$544,044

URS CORPORATION
CONSTRUCTION COST ESTIMATE
ESTIMATED UNIT COST

Client:	NYSEG	Project Number:	11175369		
Project:	Geneva-Border City Former MGP Site	Calculated By:	Patrick Baker	Date:	15-Feb-08
Title:	Alternative 4B -Excavation, Transportation and Disposal - Onsite Waste Zones A - M	Checked By:	JS	Date:	15-Feb-08

ITEM	DESCRIPTION	QTY.	UNITS	UNIT COST	TOTAL COST
1	Clear and Grub*	0.2	acre	$3,860.00	$772
2	**Excavate Soil Waste**				
3	Labor: Labor foreman	100	hr	$49.83	$4,983
4	Laborer (2 men)	200	hr	$47.83	$9,566
5	Equip. Operator(2 men)	200	hr	$57.44	$11,488
6	Equipment:				
7	Track excavator - 2 cy	2.5	week	$5,728.00	$14,320
8	(Hertz Rental Equipment)				
9	Tractor Loader - wheel 4-1/2 CY	2.5	week	$1,970.00	$4,925
10	(Means 01 54 33 20 4730)				
11	**Load / Transport / Dispose of Soil Waste**				
12	Labor: Labor foreman	100	hr	$49.83	$4,983
13	Laborer (2 men)	200	hr	$47.83	$9,566
14	Equip. Operator(1 man)	100	hr	$57.44	$5,744
15	Equipment:				
16	Tractor Loader - wheel 4-1/2 CY	2	week	$1,970.00	$3,940
17	(Means 01 54 33 20 4730)				
18	Subcontractor:				
19	Transportation				
20	Landfill disposal (CWM Model City, NY)	7275	ton	$115.00	$836,625
21	**Backfill / Compaction**				
22	Labor: Labor foreman	80	hr	$49.83	$3,986
23	Laborer (2 men)	160	hr	$47.83	$7,653
24	Equip. Operator(1 man)	80	hr	$57.44	$4,595
25	Equipment: tractor loader, wheel 1-1/2 CY bucket	80	hr	$70.28	$5,622
26	(Means 01 54 33 20 4450)				
27	Compactor - manually guided, 2 drum, vibratory	80	hr	$24.35	$1,948
28	(Means 01 54 33 20 1200)				
29	Material: Unclassified clean soil fill - allow	4850	cy	$15.00	$72,750
30	**Restoration -Crushed Stone**				
31	Stone- 1-1/2" , compacted, 12" deep*	558	sy	$10.81	$6,032
32	(Asphalt cap Restoration per Alt 3)	1428	sy	$48.13	$68,730
33	**PPE/Monitoring**	112	man/day	$180.00	$20,160
34	Material: Level "C" PPE	2	month.	$25,000.00	$50,000
35	Air Monintoring**				
36					
37	Reference:				
38	* RS Means Cost Data - 2007				
39	** Cortland/Homer FS				
40					
41					
	TOTAL COST:				**$1,148,388**

URS CORPORATION
CONSTRUCTION COST ESTIMATE
ESTIMATED UNIT COST

Client:	NYSEG	Project Number:	11175369		
Project:	Geneva-Border City Former MGP Site	Calculated By:	Patrick Baker	Date:	15-Feb-08
Title:	Alternative 4B - Oxide Box Remediation	Checked By:	JS	Date:	15-Feb-08

ITEM	DESCRIPTION	QTY.	UNITS	UNIT COST	TOTAL COST
1	**Remove Box Contents**				
2	Labor: Labor foreman	40	hr	$49.83	$1,993
3	Laborer (2 men)	80	hr	$47.83	$3,826
4	Vac. Operator(1 man)	40	hr	$47.83	$1,913
5	Equipment: Vacuum loader	40	hr	$110.00	$4,400
6	(Vendor Quote: National Vacuum)				
7					
8	**Transport and Disposal**				
	Aqueous Phase				
9	Transportation (Geneva, NY - Baltimore, MD)	9	loads	$2,590.00	$23,310
10	Water Treatment Disposal (Clean Harbors, Baltimore, MD)	43,100	gal	$0.40	$17,240
11	**Solid Phase**				
12	Transportation (Geneva, NY - Sarnia, Ont., Canada)	4	loads	$2,250.00	$9,000
13	Stabilization and Landfill Disposal (Clean Harbors, Sarnia, Ontario, Canada)	160	ton	$350.00	$56,000
14					
15	**Pressure Wash Oxide Box Interior**				
16	Labor: Labor foreman	16	hr	$49.83	$797
17	Laborer (2 men)	32	hr	$47.83	$1,531
18	Pressure Washer Operator(1 man)	16	hr	$47.83	$765
19	Equipment: 10,000 psi High Pressure Washer w/ 3D Spin Nozzle	16	hr	$95.00	$1,520
20	(Vendor Quote: National Vacuum)				
21	Confined Space Entry Equipment	5	day	$250.00	$1,250
22					
23	**PPE/Monitoring**				
24	Material: level "B" PPE	10	manday	$300.00	$3,000
25	Air Monitoring*	0.25	month	$25,000.00	$6,250
26					
27					
28					
29					
30	Reference - *Cortland/Homer FS				
31					
32	**Estimating Assumptions:**				
33	The oxide box waste does not contain PCB's above TSCA regulated limit.				
34	The oxide boxes can be readily accessed horizontally from outside the building				
35	Work will be performed during normal business hours.				
36	Waste materials will be acceptable for disposal at the estimated facilities.				
37	Assume: volume is 2/3 aqueous, 1/3 solids				
38	Assume: solids, 1 cy = 1 ton.				
39					
40					
	TOTAL COST:				**$132,796**

URS CORPORATION
CONSTRUCTION COST ESTIMATE
ESTIMATED UNIT COST

Client:	NYSEG	Project Number:	11175369		
Project:	Geneva-Border City Former MGP Site	Calculated By:	Patrick Baker	Date:	15-Feb-08
Title:	Alternative 4B - Western Drainageway Sedment Removal; Sediment Zone 1	Checked By:	JS	Date:	15-Feb-08

ITEM	DESCRIPTION	QTY.	UNITS	UNIT COST	TOTAL COST
1					
2					
3	**Survey / Layout**				
4	Labor: Surveyor (1 man)	8	hr	$51.16	$409
5	Material: - allow	1	ls	$100.00	$100
6					
7	**Clear and Grub**	0.3	acre	$3,860.00	$1,158
8	(Means 31 11 10.10)				
9					
10	**Excavate Stream Bed**				
11	Labor: Labor foreman	32	hr	$49.83	$1,595
12	Laborer (2 men)	64	hr	$47.83	$3,061
13	Equip. Operator(2 men)	64	hr	$57.44	$3,676
14	Equipment: tractor loader, wheel 1-1/2 CY bucket	32	hr	$70.28	$2,249
15					
16	**Backfill / Compact Stream Bed**				
17	Labor: Labor foreman	24	hr	$49.83	$1,196
18	Laborer (2 men)	48	hr	$47.83	$2,296
19	Equip. Operator(1 man)	24	hr	$57.44	$1,379
20	Equipment: tractor loader, wheel 1-1/2 CY bucket	24	hr	$70.28	$1,687
21	(Means 01 54 33 20 4450)				
22	Compactor - manually guided, 2 drum, vibratory	24	hr	$24.35	$584
23	(Means 01 54 33 20 1200)				
24	Material: Unclassified clean soil fill - allow	94	cy	$15.00	$1,410
25					
26	**PPE/Monitoring**				
27	Material: level "C" PPE	15	man/day	$180.00	$2,700
28	Air Monitoring*	0.25	month	$25,000.00	$6,250
29					
30	**Transport and Disposal**				
31	Transportation				
32	Landfill disposal (CWM Model City, NY)	141	ton	$115.00	$16,215
33					
34	**Restoration**				
35	Seeding - push spreader	10.4	msf	$39.35	$409
36	(Means 32 92 19.14-4400)				
37					
38	Reference - *Cortland/Homer FS				
39					
40	**Estimating Assumptions:**				
41	Excavated stream sediment weighs 1.5 tons per cy.				
42	Work will be performed when the stream is seasonally dry.				
43	By-pass pumping will not be required.				
44	Stabilization to meet landfill paint filter test is not required.				
45	The sediment is a not RCRA hazardous waste.				
	TOTAL COST:				**$46,374**

URS CORPORATION
CONSTRUCTION COST ESTIMATE
ESTIMATED UNIT COST

Client:	NYSEG	Project Number:	11175369		
Project:	Geneva-Border City Former MGP Site	Calculated By:	Patrick Baker	Date:	15-Feb-08
Title:	Alternative 4B - Eastern Drainageway Sediment Removal; Sediment Zone 2	Checked By:	JS	Date:	15-Feb-08

ITEM	DESCRIPTION	QTY.	UNITS	UNIT COST	TOTAL COST
1					
2	**Survey / Layout**				
3	Labor: Surveyor (1 man)	8	hr	$51.16	$409
4	Material: - allow	1	ls	$100.00	$100
5					
6	**Clear and Grub**	0.2	acre	$3,860.00	$772
7	(Means 31 11 10.10)				
8					
9	**Excavate Stream Bed**				
10	Labor: Labor foreman	16	hr	$49.83	$797
11	Laborer (2 men)	32	hr	$47.83	$1,531
12	Equip. Operator(2 men)	32	hr	$57.44	$1,838
13	Equipment: tractor loader, wheel 1-1/2 CY bucket	16	hr	$70.28	$1,124
14					
16	**Backfill / Compact Stream Bed**				
17	Labor: Labor foreman	16	hr	$49.83	$797
18	Laborer (2 men)	32	hr	$47.83	$1,531
19	Equip. Operator(1 man)	16	hr	$57.44	$919
20	Equipment: tractor loader, wheel 1-1/2 CY bucket	16	hr	$70.28	$1,124
21	(Means 01 54 33 20 4450)				
22	Compactor - manually guided, 2 drum, vibratory	16	hr	$24.35	$390
23	(Means 01 54 33 20 1200)				
24	Material: Unclassified clean soil fill - allow	72	cy	$15.00	$1,080
25					
26	**PPE/Monitoring**				
27	Material: level "C" PPE	4	man/day	$180.00	$720
28	Air Monitoring*	0.25	month	$25,000.00	$6,250
28					
29	**Transport and Disposal**				
30	Transportation				
31	Landfill disposal (CWM Model City, NY)	108	ton	$115.00	$12,420
32					
33	**Restoration**				
34	Seeding - push spreader	7.8	msf	$39.35	$307
35	(Means 32 92 19.14-4400)				
36					
37					
38	Reference - *Cortland/Homer FS				
39					
40	**Estimating Assumptions:**				
41	Excavated stream sediment weighs 1.5 tons per cy.				
42	Work will be performed when the stream is seasonally dry.				
43	By-pass pumping will not be required.				
44	Stabilization to meet landfill paint filter test is not required.				
45	The sediment is a not RCRA hazardous waste.				
	TOTAL COST:				**$32,110**

URS CORPORATION
CONSTRUCTION COST ESTIMATE
ESTIMATED UNIT COST

Client:	NYSEG	Project Number:	11175369		
Project:	Geneva-Border City Former MGP Site	Calculated By:	Patrick Baker	Date:	17-Sep-08
Title:	Alternative 4B - Subsurface Vault Cleaning and Removal	Checked By:	JS/AM	Date:	18-Sep-08

ITEM	DESCRIPTION	QTY.	UNITS	UNIT COST	TOTAL COST
1	**Remove Vault Contents**				
2					
3	Labor: Labor foreman	8	hr	$49.83	$399
4	Laborer (1 man)	8	hr	$47.83	$383
5	Equipment: Vacuum tank truck (5500 gal)	3	load	$7,500.00	$22,500
6	(Vendor Quote: Clean Harbors)				
7	**Disposal - 16000 gal. (83cy) Pumpable Tar (@ 8 lb. Per gal.)**				
8	Incineration disposal - Deer Park, TX	128,000	lb	$0.35	$44,800
9	(Vendor Quote: Clean Harbors)				
10					
11	**Demolish/Excavate Concrete Vault**				
12	Saw Cut Asphalt Pavement (100 lf)				
13	Labor: Labor (1 man)	4	hr	$47.83	$191
14	Equipment:Concrete Saw (walk behind)	4	hr	$35.00	$140
15	Demolish Concrete Vault				
16	Labor: Labor foreman	16	hr	$49.83	$797
17	Laborer (1 man)	16	hr	$47.83	$765
18	Equip. Operator (1 man)	16	hr	$57.44	$919
19	Equipment: Excavator, track mtd., 1 cy w/ Hyd. Hammer	16	hr	$125.78	$2,012
20	(Means 01 54 33 20-0150)				
21	Steam Clean Vault (interior)				
22	Labor: Laborer (1 man)	8	hr	$47.83	$383
23	Equipment: Portable HP steam cleaner	8	hr	$48.00	$384
24	**Transport and Disposal**				
25	Transportation				
26	Landfill disposal (CWM Model City, NY)	83	ton	$115.00	$9,545
27					
28	**Backfill / Compaction**				
29	Labor: Labor foreman	8	hr	$49.83	$399
30	Laborer (2 men)	16	hr	$47.83	$765
31	Equip. Operator(1 man)	8	hr	$57.44	$460
32	Equipment: tractor loader, wheel 1-1/2 CY bucket	8	hr	$70.28	$562
33	(Means 01 54 33 20 4450)				
34	Compactor - manually guided, 2 drum, vibratory	8	hr	$24.35	$195
35	(Means 01 54 33 20 1200)				
36	Material: Unclassified clean soil fill - allow	55	cy	$15.00	$825
37					
38	**Restoration**				
39	Base Course - crushed 3/4" stone, compacted, 12" deep	25	sy	$5.72	$143
40	(Means 31 11 23.23 - 0300)				
41	Binder Course - 3" thick	25	sy	$8.88	$222
42	(Means 32 12 16.13-0160)				
43	Wearing Course - 1-1/2" thick	25	sy	$4.66	$117
44	(Means 32 12 16.13-0340)				
45	**PPE/Monitoring**				
46	Material: level "C" PPE	9	man/day	$180.00	$1,620
47	Air Monitoring*	0.25	month	$25,000.00	$6,250
48	Reference - * Cortland/Homer FS				
49	**Estimating Assumptions:**				
50	Assume 1 cy equals 1 ton for disposal purposes.				
51	Tars will be readily pumpable by a vacuum tank truck.				
52					
	TOTAL COST:				$94,775

URS CORPORATION
CONSTRUCTION COST ESTIMATE
ESTIMATED UNIT COST

Client: NYSEG
Project: Geneva-Border City Former MGP Site
Title: Alternative 4B - Former Settling Basin - Sediment Zone 3

Project Number: 11175369
Calculated By: Patrick Baker — Date: 15-Feb-08
Checked By: JS — Date: 15-Feb-08

ITEM	DESCRIPTION	QTY.	UNITS	UNIT COST	TOTAL COST
1					
2	**Clear and Grub**	0.2	acre	$3,860.00	$772
3	(Means 31 11 10.10)				
4					
5	**Remove Fence**	400	lf	$2.25	$900
6	(Means 02 41 13.60)				
7					
8	**Excavate Sediment**				
9	Labor: Labor foreman	96	hr	$49.83	$4,784
10	Laborer (2 men)	192	hr	$47.83	$9,183
11	Equip. Operator(3 men)	288	hr	$57.44	$16,543
12	Equipment:				
13	Track excavator - 40 ft reach - 2 cy	2.5	week	$5,728.00	$14,320
14	(Hertz Rental Equipment)				
15	Tractor Loader - wheel 4-1/2 CY	2.5	week	$1,970.00	$4,925
16	(Means 01 54 33 20 4730)				
17					
18	**Stabilize Excavated Sediment**				
19	Labor: Laborer (1 man)	96	hr	$47.83	$4,592
20	Equip. Operator(1 man)	96	hr	$57.44	$5,514
21	Equipment:				
22	Track Excavator - 1 CY	2.5	week	$2,445.00	$6,113
23	(Means 01 54 33 20 0150)				
24	Material:				
25	Portland Cement - 94 lb. Bag (2% mix ratio by volume)	400	bag	22.97	$9,188
26					
27	**Load / Transport / Dispose of Stabilized Sediments**				
28	Labor: Labor foreman	80	hr	$49.83	$3,986
29	Laborer (2 men)	160	hr	$47.83	$7,653
30	Equip. Operator(3 men)	80	hr	$57.44	$4,595
31	Equipment:				
32	Tractor Loader - wheel 4-1/2 CY	2.5	week	$1,970.00	$4,925
33	(Means 01 54 33 20 4730)				
34	Subcontractor:				
35	Transportation				
36	Landfill disposal (CWM Model City, NY)	764	ton	$115.00	$87,860
37				**Subtotal**	**$185,853**

URS CORPORATION
CONSTRUCTION COST ESTIMATE
ESTIMATED UNIT COST

Client: NYSEG | Project Number: 11175369
Project: Geneva-Border City Former MGP Site | Calculated By: Patrick Baker | Date: 15-Feb-08
Title: Former Settling Basin - Sediment Zone 3 | Checked By: JS | Date: 15-Feb-08

38					
39	**Backfill / Compact / Grade to Match North / South Stream Bed**				
40	Labor: Labor foreman	32	hr	$49.83	$1,595
41	Laborer (2 men)	128	hr	$47.83	$6,122
42	Equip. Operator(2 men)	128	hr	$57.44	$7,352
43	Equipment: tractor loader, wheel 1-1/2 CY bucket	32	hr	$70.28	$2,249
44	(Means 01 54 33 20 4450)				
45	Bull dozer - 105 H.P.	32	hr	$86.23	$2,759
46	(Means 01 54 33 20 4150)				
47	Compactor - manually guided, 2 drum, vibratory	32	hr	$24.35	$779
48	(Means 01 54 33 20 1200)				
49	Material: Unclassified clean soil fill - allow	1300	cy	$15.00	$19,500
50					
51	**Restoration**				
52	Seeding - push spreader	10	msf	$39.35	$394
53	(Means 32 92 19.14-4400)				
54					
55	**PPE/Monitoring**				
56	Material: Level "C" PPE	72	man/day	$180.00	$12,960
57	Air Monitoring*	1	month	$25,000.00	$25,000
58				**Subtotal**	**$78,710**
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66					
67					
68					
69	Reference - *Cortland/Homer FS				
70					
71	**Estimating Assumptions:**				
72	Stabilized pond sediment weighs 1.5 tons per cy.				
73	Work will be performed when the pond is seasonally dry.				
74	By-pass pumping will not be required.				
75	Stabilization, by addition of 2% portland cement, by volume, is included.				
76	The stabilized sediment is a RCRA hazardous waste.				
77					
	TOTAL COST:				**$264,563**

URS CORPORATION
ENGINEER'S COST ESTIMATE
ESTIMATED UNIT COST

Client: NYSEG	Project Number: 11175369		
Project: Geneva-Border City Former MGP Site	Calculated By: Patrick Baker	Date: 15-Feb-08	
Title: Alternative 4B - Annual Operation and Maintenance	Checked By: JS/AM	Date: 15-Feb-08	

ITEM	DESCRIPTION	QTY.	UNITS	UNIT COST	TOTAL COST
1	Labor, equip, shipping	2	days	$1,050.00	$2,100
2	Sampling - Analysis: Annual **	16	each	$700.00	$11,200
3	Reports***	1	ls	$2,500.00	$2,500
4	Grass Mowing - Allow: 5 months x twice per month***	199	msf	$4.60	$915
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9					
10	Reference:				
11	* RS Means Cost Data - 2007				
12	** Vendor Quote				
13	*** Engineer's Previous Project Experience				
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26					
27				**Subtotal**	**$16,715**
28	**Contractors Overhead and Profit**			**20%**	**$3,343**
29				**Subtotal**	**$20,058**
30	**Contingency**			**25%**	**$5,015**
31					
32					
33					
34					
	TOTAL COST:				**$25,073**

NEW YORK STATE ELECTRIC AND GAS CORPORATION

GENEVA-BORDER CITY FORMER MGP SITE - SITE NO. 8-50-008
FEASIBILITY STUDY

Client:	NYSEG	Project Number:	11175369		
Project:	Geneva-Border City Former MGP Site	Calculated By:	Patrick Baker	Date:	17-Sep-08
Description:	Alternative 5: Low permeability cap EWDA, Source Removal	Checked By:	JS/AM	Date:	18-Sep-08

SUMMARY

DESCRIPTION	ESTIMATED COST
Institutional Controls	$10,000
Mobilization / Demobilization	$36,125
Low permeability Cap EWDA	$144,636
Source Removal	$1,148,388
Oxide Box Remediation	$132,796
Western Drainageway Sediment Removal	$46,374
Eastern Drainageway Sediment Removal	$32,110
Subsurface Vault Removal	$94,775
Former Settling Basin Sediment Removal	$264,563
	$1,909,766

STANDARD SUPPLEMENTAL PROJECT COSTS

Overhead and Profit 20.00%	**$381,953**
SUBTOTAL	**$2,291,720**
Contingency 25.00%	**$572,930**
TOTAL	**$2,864,649**
BUDGET TOTAL	**$2,865,000**

URS CORPORATION
ENGINEER'S COST ESTIMATE
ESTIMATED UNIT COST

Client: NYSEG	Project Number: 11175369		
Project: Geneva-Border City Former MGP Site	Calculated By: Patrick Baker	Date: 15-Feb-08	
Title: Alternative 5 - Institutional Controls	Checked By: JS	Date: 15-Feb-08	

ITEM	DESCRIPTION	QTY.	UNITS	UNIT COST	TOTAL COST
1	**Institutional Controls**				
2	Deed Restrictions	1	ls	$10,000.00	$10,000
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	TOTAL COST:				**$10,000**

URS CORPORATION
ENGINEER'S COST ESTIMATE
ESTIMATED UNIT COST

Client: NYSEG	Project Number: 11175369		
Project: Geneva-Border City Former MGP Site	Calculated By: Patrick Baker	Date: 15-Feb-08	
Title: Alternative 5 -Mobilization / Demobilization and Construction Support Facilities	Checked By: JS	Date: 15-Feb-08	

ITEM	DESCRIPTION	QTY.	UNITS	UNIT COST	TOTAL COST
1	Submittals				
2	Health and Safety Plan***	1	ls	$1,200.00	$1,200
3	Sediment and Erosion Control Plan***	1	ls	$1,200.00	$1,200
4	Schedules***	1	ls	$3,000.00	$3,000
5	Record Drawings***	1	ls	$2,500.00	$2,500
6	Survey/Layout*	5	day	$800.00	$4,000
7	Mobe/Demob Support Equipment: Allowance***	1	ls	$5,000.00	$5,000
8	Temporary Utilities Installation: Allowance***	1	ls	$5,000.00	$5,000
9	Permits: Allowance***	1	ls	$5,000.00	$5,000
10	Trailers (2)*	4.5	mo	$1,000.00	$4,500
11	Portable Toilets (1)***	4.5	mo	$250.00	$1,125
12	Utilities (consumption)***	4.5	mo	$800.00	$3,600.00
13					
14					
15	Reference:				
16	* RS Means Cost Data - 2007				
17	** Vendor Quote				
18	*** Engineer's Previous Project Experience				
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38					
	TOTAL COST:				$36,125

URS CORPORATION
ENGINEER'S COST ESTIMATE
ESTIMATED UNIT COST

Client:	NYSEG	Project Number:	11175369		
Project:	Geneva-Border City Former MGP Site	Calculated By:	Patrick Baker	Date:	11-Aug-08
Title:	Alternative 5 - Low Permeability Synthetic Cap on EWDA	Checked By:	JS/AM	Date:	11-Aug-08

ITEM	DESCRIPTION	QTY.	UNITS	UNIT COST	TOTAL COST
1	Clear and Grub*	0.5	acre	$3,860.00	$1,930
2	Grading*	2,212	sy	$2.50	$5,530
3	Sand Cushion - 6"	369	cy	$19.00	$7,011
4	Synthetic Cap - 80 mil PVC - textured ****	19,905	sf	$3.96	$78,824
5	Geocomposite Drainage Layer****	2,122	sy	$1.86	$3,947
6	Clean Earth Fill -12" - Placed and graded*	737	cy	$20.00	$14,740
7	Topsoil - 4" spread and raked*	251	cy	$30.00	$7,530
8	Seeding*	19.9	msf	$41.40	$824
9	Synthetic cap welded seam testing / reporting and as-built drawings**	1	ls	$10,000.00	$10,000
10	Air Monitoring***	0.5	month	$25,000.00	$12,500
11	Material: Level "C" PPE for grading/re-grading	10	man/day	$180.00	$1,800
12					
13					
14					
15					
16					
17					
18					
19					
20	Reference:				
21	* RS Means Cost Data - 2007 * (adjusted for project size)				
22	** Engineer's Previous Project Experience				
23	*** Cortland/Homer FS				
24	**** National Estimator				
25					
26					
27					
	TOTAL COST:				**$144,636**

URS CORPORATION
CONSTRUCTION COST ESTIMATE
ESTIMATED UNIT COST

Client:	NYSEG	Project Number:	11175369		
Project:	Geneva-Border City Former MGP Site	Calculated By:	Patrick Baker	Date:	15-Feb-08
Title:	Alternative 5 -Excavation, Transportation and Disposal - Onsite Waste Zones A - M	Checked By:	JS	Date:	15-Feb-08

ITEM	DESCRIPTION	QTY.	UNITS	UNIT COST	TOTAL COST
1	Clear and Grub*	0.2	acre	$3,860.00	$772
2	**Excavate Soil Waste**				
3	Labor: Labor foreman	100	hr	$49.83	$4,983
4	Laborer (2 men)	200	hr	$47.83	$9,566
5	Equip. Operator(2 men)	200	hr	$57.44	$11,488
6	Equipment:				
7	Track excavator - 2 cy	2.5	week	$5,728.00	$14,320
8	(Hertz Rental Equipment)				
9	Tractor Loader - wheel 4-1/2 CY	2.5	week	$1,970.00	$4,925
10	(Means 01 54 33 20 4730)				
11	**Load / Transport / Dispose of Soil Waste**				
12	Labor: Labor foreman	100	hr	$49.83	$4,983
13	Laborer (2 men)	200	hr	$47.83	$9,566
14	Equip. Operator(1 man)	100	hr	$57.44	$5,744
15	Equipment:				
16	Tractor Loader - wheel 4-1/2 CY	2	week	$1,970.00	$3,940
17	(Means 01 54 33 20 4730)				
18	Subcontractor:				
19	Transportation				
20	Landfill disposal (CWM Model City, NY)	7275	ton	$115.00	$836,625
21	**Backfill / Compaction**				
22	Labor: Labor foreman	80	hr	$49.83	$3,986
23	Laborer (2 men)	160	hr	$47.83	$7,653
24	Equip. Operator(1 man)	80	hr	$57.44	$4,595
25	Equipment: tractor loader, wheel 1-1/2 CY bucket	80	hr	$70.28	$5,622
26	(Means 01 54 33 20 4450)				
27	Compactor - manually guided, 2 drum, vibratory	80	hr	$24.35	$1,948
28	(Means 01 54 33 20 1200)				
29	Material: Unclassified clean soil fill - allow	4850	cy	$15.00	$72,750
30	**Restoration -Crushed Stone**				
31	Stone- 1-1/2" , compacted, 12" deep*	558	sy	$10.81	$6,032
32	(Asphalt cap Restoration per Alt 3)	1428	sy	$48.13	$68,730
33	**PPE/Monitoring**				
34	Material: Level "C" PPE	112	man/day	$180.00	$20,160
35	Air Monintoring**	2	month	$25,000.00	$50,000
36					
37	Reference:				
38	* RS Means Cost Data - 2007				
39	** Cortland/Homer FS				
40					
41					
	TOTAL COST:				**$1,148,388**

URS CORPORATION
CONSTRUCTION COST ESTIMATE
ESTIMATED UNIT COST

Client:	NYSEG	Project Number:	11175369	
Project:	Geneva-Border City Former MGP Site	Calculated By:	Patrick Baker	Date: 15-Feb-08
Title:	Alternative 5 - Oxide Box Remediation	Checked By:	JS	Date: 15-Feb-08

ITEM	DESCRIPTION	QTY.	UNITS	UNIT COST	TOTAL COST
1	**Remove Box Contents**				
2	Labor: Labor foreman	40	hr	$49.83	$1,993
3	Laborer (2 men)	80	hr	$47.83	$3,826
4	Vac. Operator(1 man)	40	hr	$47.83	$1,913
5	Equipment: Vacuum loader	40	hr	$110.00	$4,400
6	(Vendor Quote: National Vacuum)				
7					
8	**Transport and Disposal**				
9	**Aqueous Phase**				
10	Transportation (Geneva, NY - Baltimore, MD)	9	loads	$2,590.00	$23,310
11	Water Treatment Disposal (Clean Harbors, Baltimore, MD)	43,100	gal	$0.40	$17,240
12	**Solid Phase**				
13	Transportation (Geneva, NY - Sarnia, Ont., Canada)	4	loads	$2,250.00	$9,000
14	Stabilization and Landfill Disposal (Clean Harbors, Sarnia, Ontario, Canada)	160	ton	$350.00	$56,000
15					
16	**Pressure Wash Oxide Box Interior**				
17	Labor: Labor foreman	16	hr	$49.83	$797
18	Laborer (2 men)	32	hr	$47.83	$1,531
19	Pressure Washer Operator(1 man)	16	hr	$47.83	$765
20	Equipment: 10,000 psi High Pressure Washer w/ 3D Spin Nozzle	16	hr	$95.00	$1,520
21	(Vendor Quote: National Vacuum)				
22	Confined Space Entry Equipment	5	day	$250.00	$1,250
23					
24	**PPE/Monitoring**				
25	Material: level "B" PPE	10	manday	$300.00	$3,000
26	Air Monitoring*	0.25	month	$25,000.00	$6,250
27					
28					
29					
30	Reference				
31	* Cortland/Homer FS				
32					
33	**Estimating Assumptions:**				
34	The oxide box waste does not contain PCB's above TSCA regulated limit.				
35	The oxide boxes can be readily accessed horizontally from outside the building				
36	Work will be performed during normal business hours.				
37	Waste materials will be acceptable for disposal at the estimated facilities.				
38	Assume: volume is 2/3 aqueous, 1/3 solids				
39	Assume: solids, 1 cy = 1 ton.				
40					
41					
	TOTAL COST:				**$132,796**

URS CORPORATION
CONSTRUCTION COST ESTIMATE
ESTIMATED UNIT COST

Client:	NYSEG	Project Number:	11175369		
Project:	Geneva-Border City Former MGP Site	Calculated By:	Patrick Baker	Date:	15-Feb-08
Title:	Alternative 5 - Western Drainageway Sediment Removal; Sediment Zone 1	Checked By:	JS	Date:	15-Feb-08

ITEM	DESCRIPTION	QTY.	UNITS	UNIT COST	TOTAL COST
1					
2					
3	**Survey / Layout**				
4	Labor: Surveyor (1 man)	8	hr	$51.16	$409
5	Material: - allow	1	ls	$100.00	$100
6					
7	**Clear and Grub**	0.3	acre	$3,860.00	$1,158
8	(Means 31 11 10.10)				
9					
10	**Excavate Stream Bed**				
11	Labor: Labor foreman	32	hr	$49.83	$1,595
12	Laborer (2 men)	64	hr	$47.83	$3,061
13	Equip. Operator(2 men)	64	hr	$57.44	$3,676
14	Equipment: tractor loader, wheel 1-1/2 CY bucket	32	hr	$70.28	$2,249
15					
16	**Backfill / Compact Stream Bed**				
17	Labor: Labor foreman	24	hr	$49.83	$1,196
18	Laborer (2 men)	48	hr	$47.83	$2,296
19	Equip. Operator(1 man)	24	hr	$57.44	$1,379
20	Equipment: tractor loader, wheel 1-1/2 CY bucket	24	hr	$70.28	$1,687
21	(Means 01 54 33 20 4450)				
22	Compactor - manually guided, 2 drum, vibratory	24	hr	$24.35	$584
23	(Means 01 54 33 20 1200)				
24	Material: Unclassified clean soil fill - allow	94	cy	$15.00	$1,410
25					
26	**PPE/Monitoring**				
27	Material: level "C" PPE	15	man/day	$180.00	$2,700
28	Air Monitoring*	0.25	month	$25,000.00	$6,250
29					
30	**Transport and Disposal**				
31	Transportation				
32	Landfill disposal (CWM Model City, NY)	141	ton	$115.00	$16,215
33					
34	**Restoration**				
35	Seeding - push spreader	10.4	msf	$39.35	$409
36	(Means 32 92 19.14-4400)				
37					
38	Reference - *Cortland/Homer FS				
39					
40	**Estimating Assumptions:**				
41	Excavated stream sediment weighs 1.5 tons per cy.				
42	Work will be performed when the stream is seasonally dry.				
43	By-pass pumping will not be required.				
44	Stabilization to meet landfill paint filter test is not required.				
45	The sediment is a not RCRA hazardous waste.				
	TOTAL COST:				**$46,374**

URS CORPORATION
CONSTRUCTION COST ESTIMATE
ESTIMATED UNIT COST

Client:	NYSEG	Project Number:	11175369		
Project:	Geneva-Border City Former MGP Site	Calculated By:	Patrick Baker	Date:	2/15/0/8
Title:	Alternative 5 - Eastern Drainageway Sediment Removal; Sediment Zone 2	Checked By:	JS	Date:	15-Feb-08

ITEM	DESCRIPTION	QTY.	UNITS	UNIT COST	TOTAL COST
1					
2	**Survey / Layout**				
3	Labor: Surveyor (1 man)	8	hr	$51.16	$409
4	Material: - allow	1	ls	$100.00	$100
5					
6	**Clear and Grub**	0.2	acre	$3,860.00	$772
7	(Means 31 11 10.10)				
8					
9	**Excavate Stream Bed**				
10	Labor: Labor foreman	16	hr	$49.83	$797
11	Laborer (2 men)	32	hr	$47.83	$1,531
12	Equip. Operator(2 men)	32	hr	$57.44	$1,838
13	Equipment: tractor loader, wheel 1-1/2 CY bucket	16	hr	$70.28	$1,124
14					
16	**Backfill / Compact Stream Bed**				
17	Labor: Labor foreman	16	hr	$49.83	$797
18	Laborer (2 men)	32	hr	$47.83	$1,531
19	Equip. Operator(1 man)	16	hr	$57.44	$919
20	Equipment: tractor loader, wheel 1-1/2 CY bucket	16	hr	$70.28	$1,124
21	(Means 01 54 33 20 4450)				
22	Compactor - manually guided, 2 drum, vibratory	16	hr	$24.35	$390
23	(Means 01 54 33 20 1200)				
24	Material: Unclassified clean soil fill - allow	72	cy	$15.00	$1,080
25					
26	**PPE/Monitoring**				
27	Material: level "C" PPE	4	man/day	$180.00	$720
28	Air Monitoring*	0.25	month	$25,000.00	$6,250
28					
29	**Transport and Disposal**				
30	Transportation				
31	Landfill disposal (CWM Model City, NY)	108	ton	$115.00	$12,420
32					
33	**Restoration**				
34	Seeding - push spreader	7.8	msf	$39.35	$307
35	(Means 32 92 19.14-4400)				
36					
37					
38	Reference - *Cortland/Homer FS				
39					
40	**Estimating Assumptions:**				
41	Excavated stream sediment weighs 1.5 tons per cy.				
42	Work will be performed when the stream is seasonally dry.				
43	By-pass pumping will not be required.				
44	Stabilization to meet landfill paint filter test is not required.				
45	The sediment is a not RCRA hazardous waste.				
	TOTAL COST:				**$32,110**

URS CORPORATION
CONSTRUCTION COST ESTIMATE
ESTIMATED UNIT COST

Client:	NYSEG	Project Number:	11175369		
Project:	Geneva-Border City Former MGP Site	Calculated By:	Patrick Baker	Date:	17-Sep-08
Title:	Alternative 5 - Subsurface Vault Cleaning and Removal	Checked By:	JS/AM	Date:	18-Sep-08

ITEM	DESCRIPTION	QTY.	UNITS	UNIT COST	TOTAL COST
1	**Remove Vault Contents**				
2					
3	Labor: Labor foreman	8	hr	$49.83	$399
4	Laborer (1 man)	8	hr	$47.83	$383
5	Equipment: Vacuum tank truck (5500 gal)	3	load	$7,500.00	$22,500
6	(Vendor Quote: Clean Harbors)				
7	**Disposal - 16000 gal. (83cy) Pumpable Tar (@ 8 lb. Per gal.)**				
8	Incineration disposal - Deer Park, TX	128,000	lb	$0.35	$44,800
9	(Vendor Quote: Clean Harbors)				
10					
11	**Demolish/Excavate Concrete Vault**				
12	Saw Cut Asphalt Pavement (100 lf)				
13	Labor: Labor (1 man)	4	hr	$47.83	$191
14	Equipment:Concrete Saw (walk behind)	4	hr	$35.00	$140
15	Demolish Concrete Vault				
16	Labor: Labor foreman	16	hr	$49.83	$797
17	Laborer (1 man)	16	hr	$47.83	$765
18	Equip. Operator (1 man)	16	hr	$57.44	$919
19	Equipment: Excavator, track mtd., 1 cy w/ Hyd. Hammer	16	hr	$125.78	$2,012
20	(Means 01 54 33 20-0150)				
21	Steam Clean Vault (interior)				
22	Labor: Laborer (1 man)	8	hr	$47.83	$383
23	Equipment: Portable HP steam cleaner	8	hr	$48.00	$384
24	**Transport and Disposal**				
25	Transportation				
26	Landfill disposal (CWM Model City, NY)	83	ton	$115.00	$9,545
27					
28	**Backfill / Compaction**				
29	Labor: Labor foreman	8	hr	$49.83	$399
30	Laborer (2 men)	16	hr	$47.83	$765
31	Equip. Operator(1 man)	8	hr	$57.44	$460
32	Equipment: tractor loader, wheel 1-1/2 CY bucket	8	hr	$70.28	$562
33	(Means 01 54 33 20 4450)				
34	Compactor - manually guided, 2 drum, vibratory	8	hr	$24.35	$195
35	(Means 01 54 33 20 1200)				
36	Material: Unclassified clean soil fill - allow	55	cy	$15.00	$825
37					
38	**Restoration**				
39	Base Course - crushed 3/4" stone, compacted, 12" deep	25	sy	$5.72	$143
40	(Means 31 11 23.23 - 0300)				
41	Binder Course - 3" thick	25	sy	$8.88	$222
42	(Means 32 12 16.13-0160)				
43	Wearing Course - 1-1/2" thick	25	sy	$4.66	$117
44	(Means 32 12 16.13-0340)				
45	**PPE/Monitoring**				
46	Material: level "C" PPE	9	man/day	$180.00	$1,620
47	Air Monitoring*	0.25	month	$25,000.00	$6,250
48	Reference - * Cortland/Homer FS				
49	**Estimating Assumptions:**				
50	Assume 1 cy equals 1 ton for disposal purposes.				
51	Tars will be readily pumpable by a vacuum tank truck.				
52					
	TOTAL COST:				**$94,775**

URS CORPORATION
CONSTRUCTION COST ESTIMATE
ESTIMATED UNIT COST

Client: NYSEG	Project Number: 11175369		
Project: Geneva-Border City Former MGP Site	Calculated By: Patrick Baker	Date: 15-Feb-08	
Title: Alternative 5 - Former Settling Basin - Sediment Removal, sediment Zone 3	Checked By: JS	Date: 15-Feb-08	

ITEM	DESCRIPTION	QTY.	UNITS	UNIT COST	TOTAL COST
1					
2	**Clear and Grub**	0.2	acre	$3,860.00	$772
3	(Means 31 11 10.10)				
4					
5	**Remove Fence**	400	lf	$2.25	$900
6	(Means 02 41 13.60)				
7					
8	**Excavate Sediment**				
9	Labor: Labor foreman	96	hr	$49.83	$4,784
10	Laborer (2 men)	192	hr	$47.83	$9,183
11	Equip. Operator(3 men)	288	hr	$57.44	$16,543
12	Equipment:				
13	Track excavator - 40 ft reach - 2 cy	2.5	week	$5,728.00	$14,320
14	(Hertz Rental Equipment)				
15	Tractor Loader - wheel 4-1/2 CY	2.5	week	$1,970.00	$4,925
16	(Means 01 54 33 20 4730)				
17					
18	**Stabilize Excavated Sediment**				
19	Labor: Laborer (1 man)	96	hr	$47.83	$4,592
20	Equip. Operator(1 man)	96	hr	$57.44	$5,514
21	Equipment:				
22	Track Excavator - 1 CY	2.5	week	$2,445.00	$6,113
23	(Means 01 54 33 20 0150)				
24	Material:				
25	Portland Cement - 94 lb. Bag (2% mix ratio by volume)	400	bag	22.97	$9,188
26					
27	**Load / Transport / Dispose of Stabilized Sediments**				
28	Labor: Labor foreman	80	hr	$49.83	$3,986
29	Laborer (2 men)	160	hr	$47.83	$7,653
30	Equip. Operator(3 men)	80	hr	$57.44	$4,595
31	Equipment:				
32	Tractor Loader - wheel 4-1/2 CY	2.5	week	$1,970.00	$4,925
33	(Means 01 54 33 20 4730)				
34	Subcontractor:				
35	Transportation				
36	Landfill disposal (CWM Model City, NY)	764	ton	$115.00	$87,860
37				**Subtotal**	**$185,853**

URS CORPORATION
CONSTRUCTION COST ESTIMATE
ESTIMATED UNIT COST

Client: NYSEG
Project: Geneva-Border City Former MGP Site
Title: Former Settling Basin - Sediment Zone 3

Project Number: 11175369
Calculated By: Patrick Baker — Date: 15-Feb-08
Checked By: JS — Date: 15-Feb-08

38					
39	**Backfill / Compact / Grade to Match North / South Stream Bed**				
40	Labor: Labor foreman	32	hr	$49.83	$1,595
41	Laborer (2 men)	128	hr	$47.83	$6,122
42	Equip. Operator(2 men)	128	hr	$57.44	$7,352
43	Equipment: tractor loader, wheel 1-1/2 CY bucket	32	hr	$70.28	$2,249
44	(Means 01 54 33 20 4450)				
45	Bull dozer - 105 H.P.	32	hr	$86.23	$2,759
46	(Means 01 54 33 20 4150)				
47	Compactor - manually guided, 2 drum, vibratory	32	hr	$24.35	$779
48	(Means 01 54 33 20 1200)				
49	Material: Unclassified clean soil fill - allow	1300	cy	$15.00	$19,500
50					
51	**Restoration**				
52	Seeding - push spreader	10	msf	$39.35	$394
53	(Means 32 92 19.14-4400)				
54					
55	**PPE/Monitoring**				
56	Material: Level "C" PPE	72	man/day	$180.00	$12,960
57	Air Monitoring*	1	month	$25,000.00	$25,000
58				**Subtotal**	**$78,710**
59					
60					
61					
62					
63					
64					
65					
66					
67					
68					
69	Reference - *Cortland/Homer FS				
70					
71	**Estimating Assumptions:**				
72	Stabilized pond sediment weighs 1.5 tons per cy.				
73	Work will be performed when the pond is seasonally dry.				
74	By-pass pumping will not be required.				
75	Stabilization, by addition of 2% portland cement, by volume, is included.				
76	The stabilized sediment is a RCRA hazardous waste.				
77					
	TOTAL COST:				**$264,563**

URS CORPORATION
ENGINEER'S COST ESTIMATE
ESTIMATED UNIT COST

Client:	NYSEG	Project Number:	11175369	
Project:	Geneva-Border City Former MGP Site	Calculated By:	Patrick Baker	Date: 22-Sep-08
Title:	Alternative 5 - Annual Operation and Maintenance	Checked By:	JS/AM	Date: 22-Sep-08

ITEM	DESCRIPTION	QTY.	UNITS	UNIT COST	TOTAL COST
1	Labor, equip, shipping	2	days	$1,050.00	$2,100
2	Sampling - Analysis: Annual **	16	each	$700.00	$11,200
3	Reports***	1	ls	$2,500.00	$2,500
4	Grass Mowing - Allow: 5 months x twice per month***	199.0	msf	$4.60	$915
5	Inspect and repair erosion of topsoil and vegetation	2	days	$800.00	$1,600
6	Allowance for topsoil and seed	1	ls	$200.00	$200
7	Testing, inspection and repair of geosynthetics	2	days	$800.00	$1,600
8					
9					
10	Reference:				
11					
12	** Vendor Quote				
13	*** Engineer's Previous Project Experience				
14	Labor (2 people) $800/day * 2 days				
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27				Subtotal	$20,115
28	Contractors Overhead and Profit			20%	$4,023
29				Subtotal	$24,138
30	Contingency			25%	$6,035
31					
32					
33					
34					
	TOTAL COST:				$30,173

NEW YORK STATE ELECTRIC AND GAS CORPORATION

GENEVA-BORDER CITY FORMER MGP SITE - SITE NO. 8-50-008
FEASIBILITY STUDY

Client:	NYSEG	Project Number:	11175369		
Project:	Geneva-Border City Former MGP Site	Calculated By:	Patrick Baker	Date:	17-Sep-08
Description:	Alternative 6 - Source Removal and Groundwater Collection and Treatment	Checked By:	JS/AM	Date:	8-Oct-08

SUMMARY

DESCRIPTION	ESTIMATED COST
Institutional Controls	$10,000
Mobilization/Demobilization	$51,400
Groundwater Well and Pumping System	$719,939
Groundwater Treatment System	$1,657,113
Source Excavation, Transportation and Disposal	$8,299,724
Oxide Box Remediation	$132,796
Western Drainageway Sediment Removal	$46,374
Eastern Drainageway Sediment Removal	$32,110
Subsurface Vault Removal	$94,775
Former Settling Basin Sediment Removal	$264,563
	$11,308,793

STANDARD SUPPLEMENTAL PROJECT COSTS

Overhead and Profit 20.00%	**$2,261,759**
SUBTOTAL - CONSTRUCTION COSTS	**$13,570,552**
Contingency 25.00%	**$3,392,638**
TOTAL	**$16,963,190**
BUDGET GRAND TOTAL	**$16,964,000**

URS CORPORATION
ENGINEER'S COST ESTIMATE
ESTIMATED UNIT COST

Client: NYSEG
Project: Geneva-Border City Former MGP Site
Title: Alternative 6 - Institutional Controls

Project Number: 11175369
Calculated By: Patrick Baker — Date: 17-Sep-08
Checked By: JS — Date: 18-Sep-08

ITEM	DESCRIPTION	QTY.	UNITS	UNIT COST	TOTAL COST
1	**Institutional Controls**				
2	Deed Restrictions	1	ls	$10,000.00	$10,000
3					
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30					
	TOTAL COST:				**$10,000**

URS CORPORATION
ENGINEER'S COST ESTIMATE
ESTIMATED UNIT COST

Client: NYSEG
Project: Geneva-Border City Former MGP Site
Title: Alternative 6 -Mobilization / Demobilization and Construction Support Facilities

Project Number: 11175369
Calculated By: Patrick Baker — Date: 17-Sep-08
Checked By: JS — Date: 8-Oct-08

ITEM	DESCRIPTION	QTY.	UNITS	UNIT COST	TOTAL COST
1	Submittals				
2	Health and Safety Plan***	1	ls	$1,200.00	$1,200
3	Sediment and Erosion Control Plan***	1	ls	$1,200.00	$1,200
4	Schedules***	1	ls	$3,000.00	$3,000
5	Record Drawings***	1	ls	$2,500.00	$2,500
6	Survey/Layout*	10	day	$800.00	$8,000
7	Mobe/Demob Support Equipment: Allowance***	1	ls	$5,000.00	$5,000
8	Temporary Utilities Installation: Allowance***	1	ls	$5,000.00	$5,000
9	Permits: Allowance***	1	ls	$5,000.00	$5,000
10	Trailers (2)*	10	mo	$1,000.00	$10,000
11	Portable Toilets (1)***	10	mo	$250.00	$2,500
12	Utilities (consumption)***	10	mo	$800.00	$8,000
13					
14					
15	Reference:				
16	* RS Means Cost Data - 2007				
17					
18	*** Engineer's Previous Project Experience				
19					
20					
21					
22					
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38					
	TOTAL COST:				**$51,400**

URS CORPORATION

CONSTRUCTION COST ESTIMATE

ESTIMATED UNIT COST

Client:	NYSEG	Project Number:	11175369		
Project:	Geneva-Border City Former MGP Site	Calculated By:	Patrick Baker	Date:	18-Sep-08
Title:	Alternative 6 -Excavation, Transportation and Disposal - Onsite Waste Zones and EWDA	Checked By:	JS/AM	Date:	8-Oct-08

ITEM	DESCRIPTION	QTY.	UNITS	UNIT COST	TOTAL COST
1	Clear and Grub*	1.5	acre	$3,860.00	$5,838
2	**Excavate Soil Waste**				
3	Labor: Labor foreman	800	hr	$49.83	$39,864
4	Laborer (2 men)	1600	hr	$47.83	$76,528
5	Equip. Operator(2 men)	1600	hr	$57.44	$91,904
6	Equipment:				
7	Track excavator - 2 cy	20	week	$5,728.00	$114,560
8	(Hertz Rental Equipment)				
9	Tractor Loader - wheel 4-1/2 CY	20	week	$1,970.00	$39,400
10	(Means 01 54 33 20 4730)				
11	**Load / Transport / Dispose of Soil Waste**				
12	Laborer (2 men)	1600	hr	$47.83	$76,528
13	Equip. Operator(1 man)	800	hr	$57.44	$45,952
14	Equipment:				
15	Tractor Loader - wheel 4-1/2 CY	20	week	$1,970.00	$39,400
16	(Means 01 54 33 20 4730)				
17	Subcontractor:				
18	Transportation (assume 30 loads/day)				
19	Landfill disposal (CWM Model City, NY)	52505	ton	$115.00	$6,038,074
20	**Backfill / Compaction**				
21	Labor: Labor foreman	800	hr	$49.83	$39,864
22	Laborer (2 men)	1600	hr	$47.83	$76,528
23	Equip. Operator(1 man)	1600	hr	$57.44	$91,904
24	Equipment: tractor loader, wheel 1-1/2 CY bucket	800	hr	$70.28	$56,224
25	(Means 01 54 33 20 4450)				
26	Compactor - manually guided, 2 drum, vibratory	800	hr	$24.35	$19,480
27	(Means 01 54 33 20 1200)				
28	Material: Unclassified clean soil fill - allow	35000	cy	$15.00	$525,000
29	**Restoration -Crushed Stone (Zone N,O,P,Q,R)**				
30	Stone- 1-1/2", compacted, 12" deep*	1424	sy	$10.81	$15,396
31	**Restoration - Grass (Majority of Zone A)**				
32	Seeding - push spreader	60	msf	$39.35	$2,361
33	(Means 32 92 19.14-4400)				
34	**Restoration - Paving (Zone (partial)A, B-M)**				
35	Grading, dozer, common earth*	10543	sy	$0.41	$4,323
36	Compact subgrade - 95% proctor, 12" depth, cohesive soil*	10543	sy	$0.30	$3,163
37	Base Course - 1-1/2" stone, compacted, 12" deep*	10543	sy	$10.81	$113,970
38	Binder Course, 4" thick*	10543	sy	$11.67	$123,037
39	Wearing Course - 2" thick*	10543	sy	$6.00	$63,258
40	Hauling from mix plant* (20 mile round trip, 12 cy dump)	10543	sy	$19.65	$207,170
41	**PPE/Monitoring**				
42	Material: Level "C" PPE	800	man/day	$300.00	$240,000
43	Air Monitoring**	6	month	$25,000.00	$150,000
44					
45	Reference:				
46	* RS Means Cost Data - 2007				
47	** Cortland/Homer FS				
	TOTAL COST:				**$8,299,724**

URS CORPORATION
CONSTRUCTION COST ESTIMATE
ESTIMATED UNIT COST

Client: NYSEG
Project: Geneva-Border City Former MGP Site
Title: Alternative 6 - Oxide Box Remediation

Project Number: 11175369
Calculated By: Patrick Baker — Date: 17-Sep-08
Checked By: JS — Date: 18-Sep-08

ITEM	DESCRIPTION	QTY.	UNITS	UNIT COST	TOTAL COST
1	**Remove Box Contents**				
2	Labor: Labor foreman	40	hr	$49.83	$1,993
3	Laborer (2 men)	80	hr	$47.83	$3,826
4	Vac. Operator(1 mn)	40	hr	$47.83	$1,913
5	Equipment: Vacuum loader	40	hr	$110.00	$4,400
6	(Vendor Quote: National Vacuum)				
7					
8	**Transport and Disposal**				
9	**Aqueous Phase**				
10	Transportation (Geneva, NY - Baltimore, MD)	9	loads	$2,590.00	$23,310
11	Water Treatment Disposal (Clean Harbors, Baltimore, MD)	43,100	gal	$0.40	$17,240
12	**Solid Phase**				
13	Transportation (Geneva, NY - Sarnia, Ont., Canada)	4	loads	$2,250.00	$9,000
14	Stabilization and Landfill Disposal (Clean Harbors, Sarnia, Ontario, Canada)	160	ton	$350.00	$56,000
15					
16	**Pressure Wash Oxide Box Interior**				
17	Labor: Labor foreman	16	hr	$49.83	$797
18	Laborer (2 men)	32	hr	$47.83	$1,531
19	Pressure Washer Operator(1 man)	16	hr	$47.83	$765
20	Equipment: 10,000 psi High Pressure Washer w/ 3D Spin Nozzle	16	hr	$95.00	$1,520
21	(Vendor Quote: National Vacuum)				
22	Confined Space Entry Equipment	5	day	$250.00	$1,250
23					
24	**PPE / Monitoring**				
25	Material: level "B" PPE	10	manday	$300.00	$3,000
26	Air Monitoring*	0.25	month	$25,000.00	$6,250
27					
28					
29	Reference				
30	* Cortland/Homer FS				
31					
32					
33	**Estimating Assumptions:**				
34	The oxide box waste does not contain PCB's above TSCA regulated limit.				
35	The oxide boxes can be readily accessed horizontally from outside the building				
36	Work will be performed during normal business hours.				
37	Waste materials will be acceptable for disposal at the estimated facilities.				
38	Assume: volume is 2/3 aqueous, 1/3 solids				
39	Assume: solids, 1 cy = 1 ton.				
40					
41					
	TOTAL COST:				**$132,796**

URS CORPORATION
CONSTRUCTION COST ESTIMATE
ESTIMATED UNIT COST

Client:	NYSEG	Project Number:	11175369		
Project:	Geneva-Border City Former MGP Site	Calculated By:	Patrick Baker	Date:	17-Sep-08
Title:	Alternative 6 - Western Drainageway Sedment Removal; Sediment Zone 1	Checked By:	JS	Date:	18-Sep-08

ITEM	DESCRIPTION	QTY.	UNITS	UNIT COST	TOTAL COST
1					
2	**Survey / Layout**				
3	Labor: Surveyor (1 man)	8	hr	$51.16	$409
4	Material: - allow	1	ls	$100.00	$100
5					
6	**Clear and Grub**	0.3	acre	$3,860.00	$1,158
7	(Means 31 11 10.10)				
8					
9	**Excavate Stream Bed**				
10	Labor: Foreman	32	hr	$49.83	$1,595
11	Laborer (2 men)	64	hr	$47.83	$3,061
12	Equip. Operator (2 men)	64	hr	$57.44	$3,676
13	Equipment: tractor loader, wheel 1-1/2 CY bucket	32	hr	$70.28	$2,249
14					
16	**Backfill / Compact Stream Bed**				
17	Labor: Labor foreman	24	hr	$49.83	$1,196
18	Laborer (2 men)	48	hr	$47.83	$2,296
19	Equip. Operator(1 man)	24	hr	$57.44	$1,379
20	Equipment: tractor loader, wheel 1-1/2 CY bucket	24	hr	$70.28	$1,687
21	(Means 01 54 33 20 4450)				
22	Compactor - manually guided, 2 drum, vibratory	24	hr	$24.35	$584
23	(Means 01 54 33 20 1200)				
24	Material: Unclassified clean soil fill - allow	94	cy	$15.00	$1,410
25					
26	**PPE/Monitoring**				
27	Material: level "C" PPE	15	man/day	$180.00	$2,700
28	Air Monitoring*	0.25	month	$25,000.00	$6,250
29					
30	**Transport and Disposal**				
31	Transportation				
32	Landfill disposal (CWM Model City, NY)	141	ton	$115.00	$16,215
33					
34	**Restoration**				
35	Seeding - push spreader	10.4	msf	$39.35	$409
36	(Means 32 92 19.14-4400)				
37					
38	Reference- * Cortland/Homer FS				
39	**Estimating Assumptions:**				
40	Excavated stream sediment weighs 1.5 tons per cy.				
41	Work will be performed when the stream is seasonally dry.				
42	By-pass pumping will not be required.				
43	Stabilization to meet landfill paint filter test is not required.				
44	The sediment is a not RCRA hazardous waste.				
	TOTAL COST:				**$46,374**

URS CORPORATION
CONSTRUCTION COST ESTIMATE
ESTIMATED UNIT COST

Client:	NYSEG	Project Number:	11175369		
Project:	Geneva-Border City Former MGP Site	Calculated By:	Patrick Baker	Date:	17-Sep-08
Title:	Alternative 6 - Eastern Drainageway Sediment Removal; Sediment Zone 2	Checked By:	JS	Date:	18-Sep-08

ITEM	DESCRIPTION	QTY.	UNITS	UNIT COST	TOTAL COST
1					
2	**Survey / Layout**				
3	Labor: Surveyor (1 man)	8	hr	$51.16	$409
4	Material: - Allow	1	ls	$100.00	$100
5					
6	**Clear and Grub**	0.2	acre	$3,860.00	$772
7	(Means 31 11 10.10)				
8					
9	**Excavate Stream Bed**				
10	Labor: Labor foreman	16	hr	$49.83	$797
11	Laborer (2 men)	32	hr	$47.83	$1,531
12	Equip. Operator(2 men)	32	hr	$57.44	$1,838
13	Equipment: tractor loader, wheel 1-1/2 CY bucket	16	hr	$70.28	$1,124
14					
16	**Backfill / Compact Stream Bed**				
17	Labor:Foreman	16	hr	$49.83	$797
18	Laborer (2 men)	32	hr	$47.83	$1,531
19	Equip. Operator(1 man)	16	hr	$57.44	$919
20	Equipment: tractor loader, wheel 1-1/2 CY bucket	16	hr	$70.28	$1,124
21	(Means 01 54 33 20 4450)				
22	Compactor - manually guided, 2 drum, vibratory	16	hr	$24.35	$390
23	(Means 01 54 33 20 1200)				
24	Material: Unclassified clean soil fill - Allow	72	cy	$15.00	$1,080
25					
26	**PPE/Monitoring**				
27	Material: level "C" PPE	4	man/day	$180.00	$720
28	Air Monitoring*	0.25	month	$25,000.00	$6,250
29					
30	**Transport and Disposal**				
31	Transportation				
32	Landfill disposal (CWM Model City, NY)	108	ton	$115.00	$12,420
33					
34	**Restoration**				
35	Seeding - push spreader	7.8	msf	$39.35	$307
36	(Means 32 92 19.14-4400)				
37					
38	Reference - * Cortland/Homer FS				
39	**Estimating Assumptions:**				
40	Excavated stream sediment weighs 1.5 tons per cy.				
41	Work will be performed when the stream is seasonally dry.				
42	By-pass pumping will not be required.				
43	Stabilization to meet landfill paint filter test is not required.				
44	The sediment is a not RCRA hazardous waste.				
	TOTAL COST:				**$32,110**

URS CORPORATION
CONSTRUCTION COST ESTIMATE
ESTIMATED UNIT COST

Client: NYSEG	Project Number: 11175369		
Project: Geneva-Border City Former MGP Site	Calculated By: Patrick Baker	Date: 17-Sep-08	
Title: Alternative 6 - Subsurface Vault Cleaning and Removal	Checked By: JS/AM	Date: 18-Sep-08	

ITEM	DESCRIPTION	QTY.	UNITS	UNIT COST	TOTAL COST
1	**Remove Vault Contents**				
2					
3	Labor: Labor foreman	8	hr	$49.83	$399
4	Laborer (1 man)	8	hr	$47.83	$383
5	Equipment: Vacuum tank truck (5500 gal)	3	load	$7,500.00	$22,500
6	(Vendor Quote: Clean Harbors)				
7	**Disposal - 16000 gal. (83cy) Pumpable Tar (@ 8 lb. Per gal.)**				
8	Incineration disposal - Deer Park, TX	128,000	lb	$0.35	$44,800
9	(Vendor Quote: Clean Harbors)				
10					
11	**Demolish/Excavate Concrete Vault**				
12	Saw Cut Asphalt Pavement (100 lf)				
13	Labor: Labor (1 man)	4	hr	$47.83	$191
14	Equipment:Concrete Saw (walk behind)	4	hr	$35.00	$140
15	Demolish Concrete Vault				
16	Labor: Labor foreman	16	hr	$49.83	$797
17	Laborer (1 man)	16	hr	$47.83	$765
18	Equip. Operator (1 man)	16	hr	$57.44	$919
19	Equipment: Excavator, track mtd., 1 cy w/ Hyd. Hammer	16	hr	$125.78	$2,012
20	(Means 01 54 33 20-0150)				
21	Steam Clean Vault (interior)				
22	Labor: Laborer (1 man)	8	hr	$47.83	$383
23	Equipment: Portable HP steam cleaner	8	hr	$48.00	$384
24	**Transport and Disposal**				
25	Transportation				
26	Landfill disposal (CWM Model City, NY)	83	ton	$115.00	$9,545
27					
28	**Backfill / Compaction**				
29	Labor: Labor foreman	8	hr	$49.83	$399
30	Laborer (2 men)	16	hr	$47.83	$765
31	Equip. Operator(1 man)	8	hr	$57.44	$460
32	Equipment: tractor loader, wheel 1-1/2 CY bucket	8	hr	$70.28	$562
33	(Means 01 54 33 20 4450)				
34	Compactor - manually guided, 2 drum, vibratory	8	hr	$24.35	$195
35	(Means 01 54 33 20 1200)				
36	Material: Unclassified clean soil fill - allow	55	cy	$15.00	$825
37					
38	**Restoration**				
39	Base Course - crushed 3/4" stone, compacted, 12" deep	25	sy	$5.72	$143
40	(Means 31 11 23.23 - 0300)				
41	Binder Course - 3" thick	25	sy	$8.88	$222
42	(Means 32 12 16.13-0160)				
43	Wearing Course - 1-1/2" thick	25	sy	$4.66	$117
44	(Means 32 12 16.13-0340)				
45	**PPE/Monitoring**				
46	Material: level "C" PPE	9	man/day	$180.00	$1,620
47	Air Monitoring*	0.25	month	$25,000.00	$6,250
48	Reference - * Cortland/Homer FS				
49	**Estimating Assumptions:**				
50	Assume 1 cy equals 1 ton for disposal purposes.				
51	Tars will be readily pumpable by a vacuum tank truck.				
52					
	TOTAL COST:				**$94,775**

URS CORPORATION
CONSTRUCTION COST ESTIMATE
ESTIMATED UNIT COST

Client: NYSEG
Project: Geneva-Border City Former MGP Site
Title: Alternative 6 - Former Settling Basin - Sediment Zone 3

Project Number: 11175369
Calculated By: Patrick Baker   Date: 17-Sep-08
Checked By: JS   Date: 18-Sep-08

ITEM	DESCRIPTION	QTY.	UNITS	UNIT COST	TOTAL COST
1					
2	**Clear and Grub**	0.2	acre	$3,860.00	$772
3	(Means 31 11 10.10)				
4					
5	**Remove Fence**	400	lf	$2.25	$900
6	(Means 02 41 13.60)				
7					
8	**Excavate Sediment**				
9	Labor: Labor foreman	96	hr	$49.83	$4,784
10	Laborer (2 men)	192	hr	$47.83	$9,183
11	Equip. Operator(3 men)	288	hr	$57.44	$16,543
12	Equipment:				
13	Track excavator - 40 ft reach - 2 cy	2.5	week	$5,728.00	$14,320
14	(Hertz Rental Equipment)				
15	Tractor Loader - wheel 4-1/2 CY	2.5	week	$1,970.00	$4,925
16	(Means 01 54 33 20 4730)				
17					
18	**Stabilize Excavated Sediment**				
19	Labor: Laborer (1 man)	96	hr	$47.83	$4,592
20	Equip. Operator(1 man)	96	hr	$57.44	$5,514
21	Equipment:				
22	Track Excavator - 1 CY	2.5	week	$2,445.00	$6,113
23	(Means 01 54 33 20 0150)				
24	Material:				
25	Portland Cement - 94 lb. Bag (2% mix ratio by volume)	400	bag	22.97	$9,188
26					
27	**Load / Transport / Dispose of Stabilized Sediments**				
28	Labor: Labor foreman	80	hr	$49.83	$3,986
29	Laborer (2 men)	160	hr	$47.83	$7,653
30	Equip. Operator(3 men)	80	hr	$57.44	$4,595
31	Equipment:				
32	Tractor Loader - wheel 4-1/2 CY	2.5	week	$1,970.00	$4,925
33	(Means 01 54 33 20 4730)				
34	Subcontractor:				
35	Transportation				
36	Landfill disposal (CWM Model City, NY)	764	ton	$115.00	$87,860
37				Subtotal	$185,853

URS CORPORATION
CONSTRUCTION COST ESTIMATE
ESTIMATED UNIT COST

Client: NYSEG
Project: Geneva-Border City Former MGP Site
Title: Former Settling Basin - Sediment Zone 3

Project Number: 11175369
Calculated By: Patrick Baker Date: 14-Aug-08
Checked By: JS Date: 14-Aug-08

38	**Backfill / Compact / Grade to Match North / South Stream Bed**				
39	Labor: Labor foreman	32	hr	$49.83	$1,595
40	Laborer (2 men)	128	hr	$47.83	$6,122
41	Equip. Operator(2 men)	128	hr	$57.44	$7,352
42	Equipment: tractor loader, wheel 1-1/2 CY bucket	32	hr	$70.28	$2,249
43	(Means 01 54 33 20 4450)				
44	Bull dozer - 105 H.P.	32	hr	$86.23	$2,759
45	(Means 01 54 33 20 4150)				
46	Compactor - manually guided, 2 drum, vibratory	32	hr	$24.35	$779
47	(Means 01 54 33 20 1200)				
48	Material: Unclassified clean soil fill - allow	1300	cy	$15.00	$19,500
49					
50	**Restoration**				
51	Seeding - push spreader	10	msf	$39.35	$394
52	(Means 32 92 19.14-4400)				
53					
54	**PPE/Monitoring**				
55	Material: Level "C" PPE	72	man/day	$180.00	$12,960
56	Air Monitoring*	1	month	$25,000.00	$25,000
57				**Subtotal**	**$78,710**
58					
59					
60					
61					
62					
63					
64					
65					
66					
67					
68	Reference - *Cortland/Homer FS				
69					
70	**Estimating Assumptions:**				
71	Stabilized pond sediment weighs 1.5 tons per cy.				
72	Work will be performed when the pond is seasonally dry.				
73	By-pass pumping will not be required.				
74	Stabilization, by addition of 2% portland cement, by volume, is included.				
75	The stabilized sediment is a RCRA hazardous waste.				
76					
	TOTAL COST:				**$264,563**

URS CORPORATION
ENGINEER'S COST ESTIMATE
ESTIMATED UNIT COST

Client:	NYSEG	Project Number:	11175369		
Project:	Geneva-Border City Former MGP Site	Calculated By:	DMC	Date:	22-Sep-08
Title:	On-site Groundwater Treatment - 1,000 gpm	Checked By:	CWP	Date:	23-Sep-08

ITEM	DESCRIPTION	QTY.	UNITS	UNIT COST	TOTAL COST
1	Treatment Chemicals	12	month	$2,000.00	$24,000
2	Vapor Phase Carbon (lb/year)	35,000	lbs	$2.50	$87,500
3	Liquid Phase Carbon (lbs/year)	29,000	lbs	$2.50	$72,500
4	Contaminated Debris (bags, PPE, etc.) Transport and Disposal	6	containers	$600.00	$3,600
5	Electricity Consumption	12	month	$8,600.00	$103,200
6	Operator, 1 full time person, 40 hr/week	2080	hours	$50.00	$104,000
7	Sampling & Analtyical - discharge and operational	12	month	$2,000.00	$24,000
8	System & Extraction Pump Repair / Replacement	1	year	$15,000	$15,000
9	Reporting, admin, etc.	1	year	$20,000	$20,000
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
31					
32					
	TOTAL COST:				$453,800

URS CORPORATION
ENGINEER'S COST ESTIMATE
ESTIMATED UNIT COST

Client:	NYSEG	Project Number:	11175369
Project:	Geneva-Border City Former MGP Site	Calculated By: PB	Date: 10-Sep-08
Title:	Groundwater Treatment - Well System Installation	Checked By: CWP	Date: 23-Sep-08

ITEM	DESCRIPTION	QTY.	UNITS	UNIT COST	TOTAL COST
1	**Ground Water Well Installation**				
	Mobilize drill rig and materials**	1	ls	$5,000	$5,000
2	Drilling 8" diameter x 300' depth per well consolidated soils**	1,500	lf	$89	$133,500
3	8" diameter carbon steel casing/screen***	1,500	lf	$78	$117,000
4	Bentonite and grout seals*	5	ea	$850	$4,250
5	Manholes - precast concrete w/ring and cover**	5	ea	$5,000	$25,000
6	6" Submersible pump, 201-410 GPM,<= 150 ' head, 15 hp, w/ controls*	5	ea	$9,800	$49,000
7	Submersible pump installation - plumbing **	5	ea	$8,000	$40,000
8					
9	**Piping**				
10	8" diameter HDPE discharge pipe***	2,500	lf	$22	$55,000
11	8" diameter HDPE Cleanouts	13	ea	$1,500	$19,500
12	Trench excavation - 2000 lf x 2lf W x 5.5lf D**	815	cy	$6	$4,889
13	Pipe Bedding**	333	ton	$18	$6,000
14	Backfill/compaction**	600	cy	$3	$1,800
15					
16	Electrical				
17	230 V power drop to Panel - Allow**	1	ls	$16,000	$16,000
18	Power distribution to well heads - cable (same trench as discharge pipe)***	100	clf	$240	$24,000
19	Conduit 2 1/2" PVC*** (no encasement)	2200	lf	$15	$33,000
20	Grounding - Allow**	1	ls	$10,000	$10,000
21	Controls -switches and breakers - Allow**	1	ls	$25,000	$25,000
22	Pre-engineered mtl building enclosure - 20' x 30' **	600	sf	$85	$51,000
23					
24	Miscellaneous - Allow**	1	ls	$100,000	$100,000
25					
26					
27	Reference:				
28	*RS Means Environmental Remediation Cost Data - 2005 (adjusted to 2008)				
29	** Engineer's Estimate				
30	*** RS Means "Cost Works" - 2008				
31					
	TOTAL COST:				**$719,939**

URS CORPORATION
ENGINEER'S COST ESTIMATE
ESTIMATED UNIT COST

Client: NYSEG	Project Number: 11175369		
Project: Geneva-Border City Former MGP Site	Calculated By: DMC	Date: 22-Sep-08	
Title: On-site Groundwater Treatment - 1,000 gpm	Checked By: CWP	Date: 23-Sep-08	

ITEM	DESCRIPTION	QTY.	UNITS	UNIT COST	TOTAL COST
1	**Equipment - 1,000 gpm System**				
2	Equalization / Storage Tank - 50,000 gallon	2	each	$34,000	$68,000
3	Tank Foundation & appurtenances	2	each	$13,000	$26,000
4	Transfer Pumps - 1000 gpm (1 + spare)	2	each	$7,400	$14,800
5	pH Adjust System	1	each	$3,900	$3,900
6	Chemical Feed System	1	each	$3,900	$3,900
7	Filter System - 250 gpm, 8'diameter pressure filter	4	each	$32,500	$130,000
8	Air Stripper Package w/Blower & Pump - 500 gpm	2	each	$109,000	$218,000
9	Vapor Phase Carbon Adsorption System - 5,000 scfm	1	each	$58,900	$58,900
10	Liquid Phase Carbon Adsorption System - 1,000 gpm	1	each	$386,000	$386,000
11	**Subtotal Equipment**				$909,500
12					
13	Piping	1	ls	20%	$181,900
14	Instrumentation and Controls	1	ls	15%	$136,425
15	Electrical	1	ls	10%	$90,950
16	Other Utilities	1	ls	10%	$90,950
17	Equipment Installation	1	ls	20%	$181,900
18					
19	**Building**				
20	Building - 40' x 80'	3200	sf	$11.09	$35,488
21	Foundation, Utilities and Improvements	1	ls	$30,000	$30,000
22					
23					
24					
25					
26					
27	Reference:				
28	*-RS Means Environmental Remediation Cost Data - 2003 (adjusted to 2008) @30%				
29	Vendor Quotes				
30					
31					
	TOTAL COST:				**$1,657,113**

URS CORPORATION
ENGINEER'S COST ESTIMATE
ESTIMATED UNIT COST

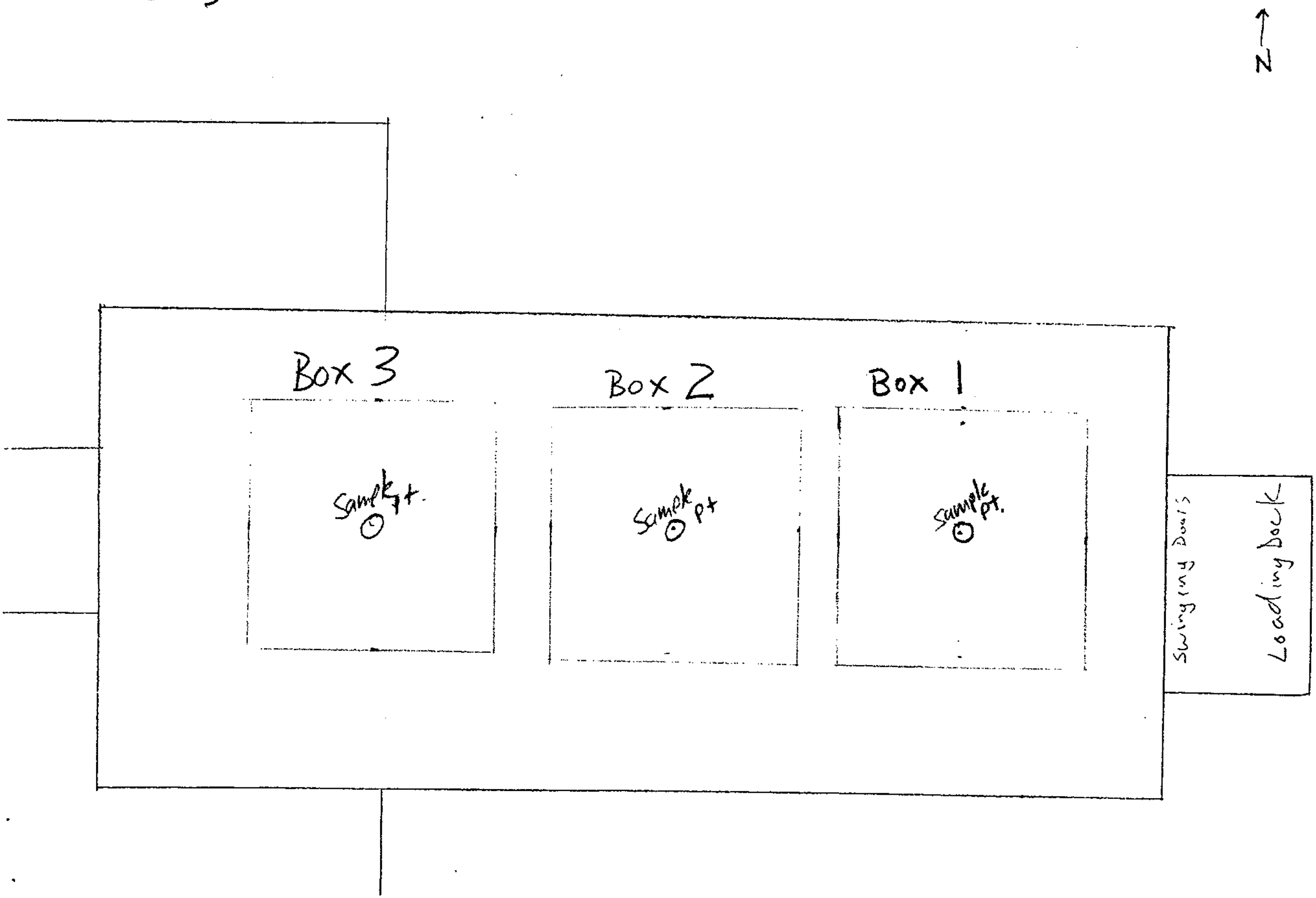
Client: NYSEG
Project: Geneva-Border City Former MGP Site
Title: Alternative 6 - Annual Operation and Maintenance

Project Number: 11175369
Calculated By: Patrick Baker   Date: 22-Sep-08
Checked By: AM   Date: 22-Sep-08

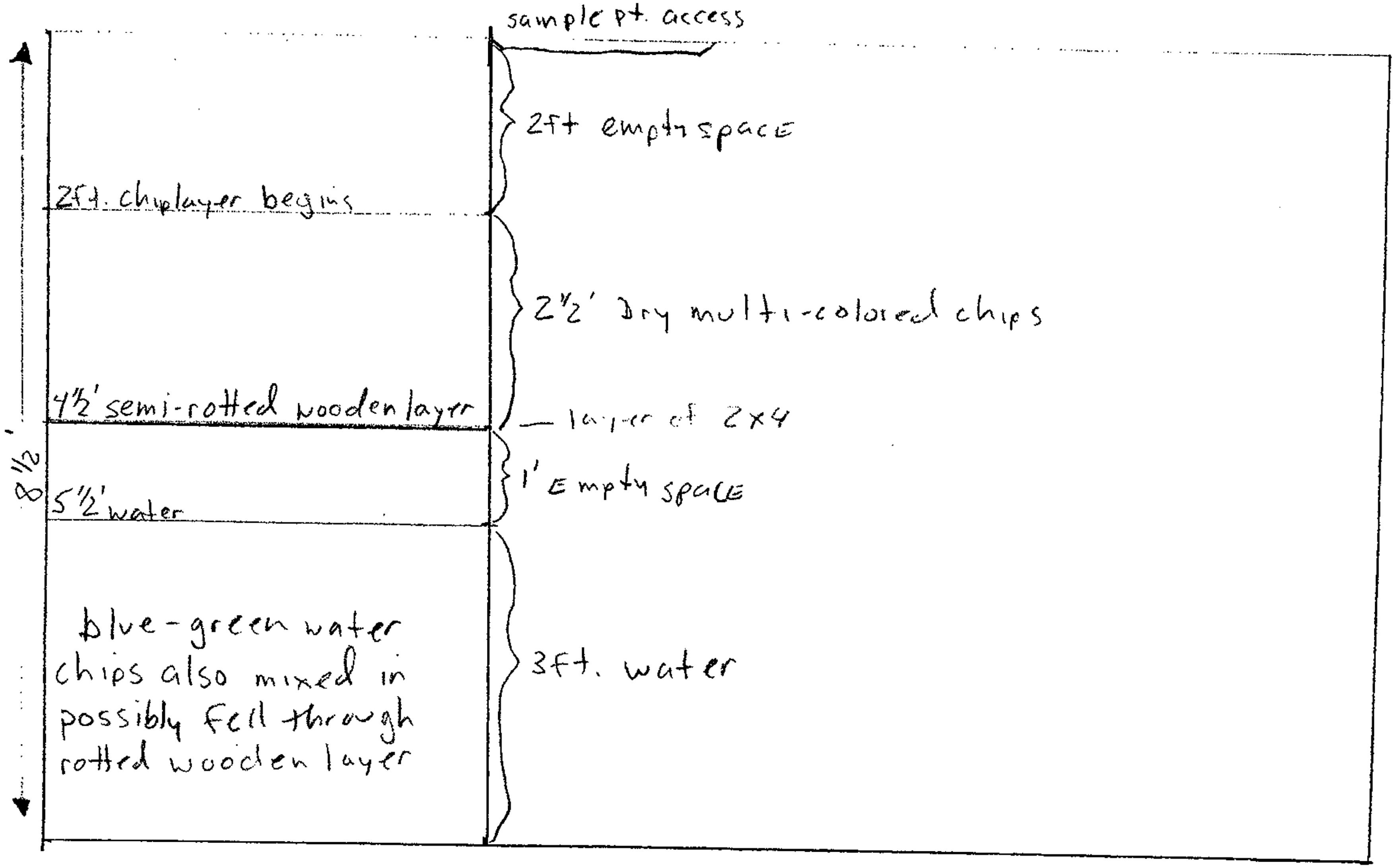
ITEM	DESCRIPTION	QTY.	UNITS	UNIT COST	TOTAL COST
1	Labor, equip, shipping	2	days	$1,050.00	$2,100
2	Sampling - Analysis: Annual **	16	each	$700.00	$11,200
3	Reports***	1	ls	$2,500.00	$2,500
4	Grass Mowing - Allow: 5 months x twice per month**	199	msf	$4.60	$915
7					
8	Annual Groundwater Treatment from previous sheet				$453,800
9					
10	Reference:				
11	** Vendor Quote				
12	*** Engineer's previous project experience				
13					
14					
15	Labor (2 people) $800/day * 2 days				
16	H&S Equip $100/day * 2 days				
17	Shipping/misc $150				
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
31				**Subtotal**	**$470,515**
32	**Contractors Overhead and Profit**			**20%**	**$94,103**
33				**Subtotal**	**$564,618**
34	**Contingency**			**25%**	**$141,155**
35					
36					
37					
	TOTAL COST:				**$705,773**

Geneva Oxide Box sampling 4-29-93

Due to access limitations, unable to determine length or width of boxes (approx. 20'x20')

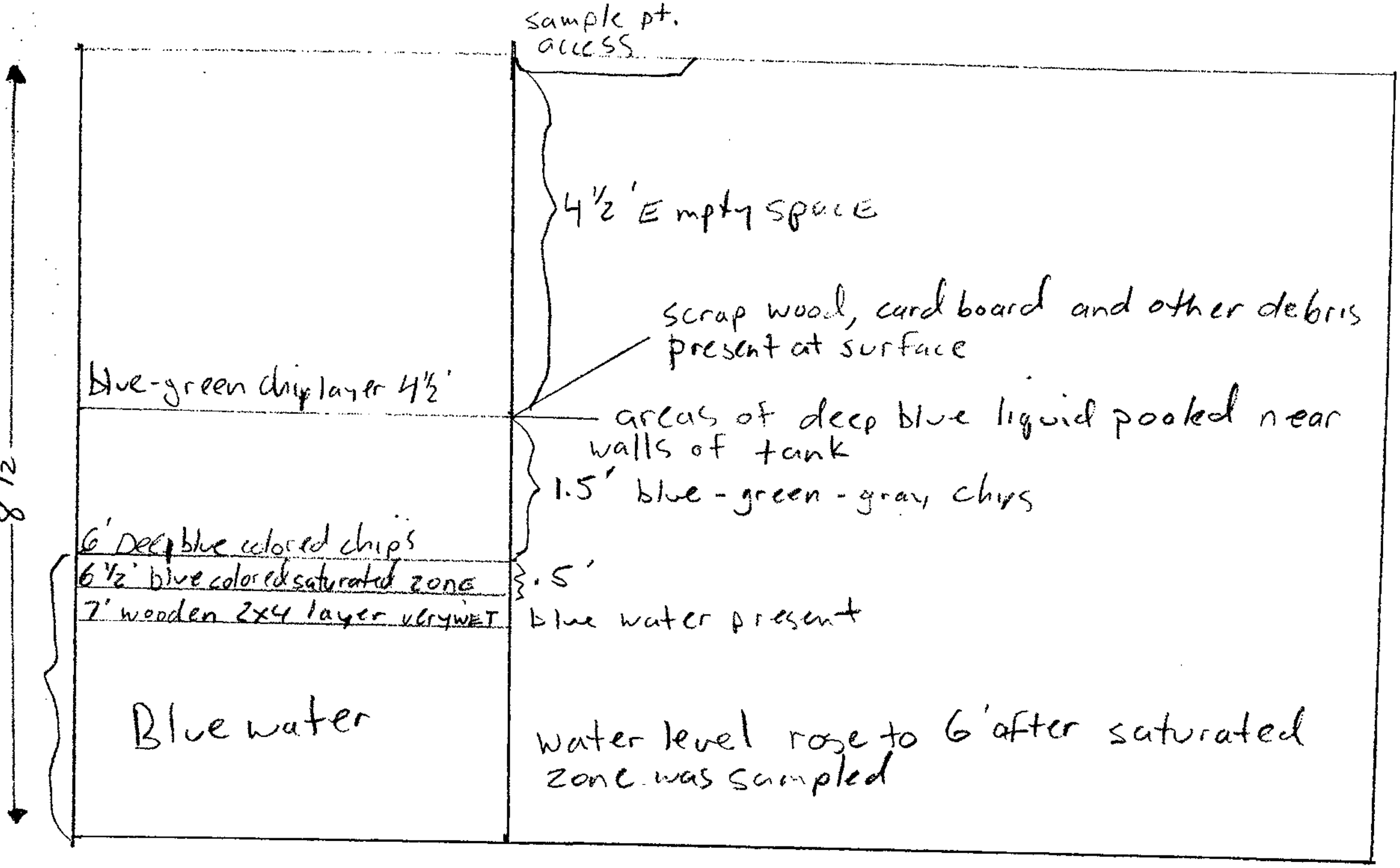


Box #1 vertical Profile observations
Collected 2 jars chips (Dry)
1 jar water



Box #2 Vertical Profile observations

Collected 1 Jar chips + Sludge
1 Jar water



Box #3 Vertical profile observations
collected 2 jars chips + sludge
1 jar water