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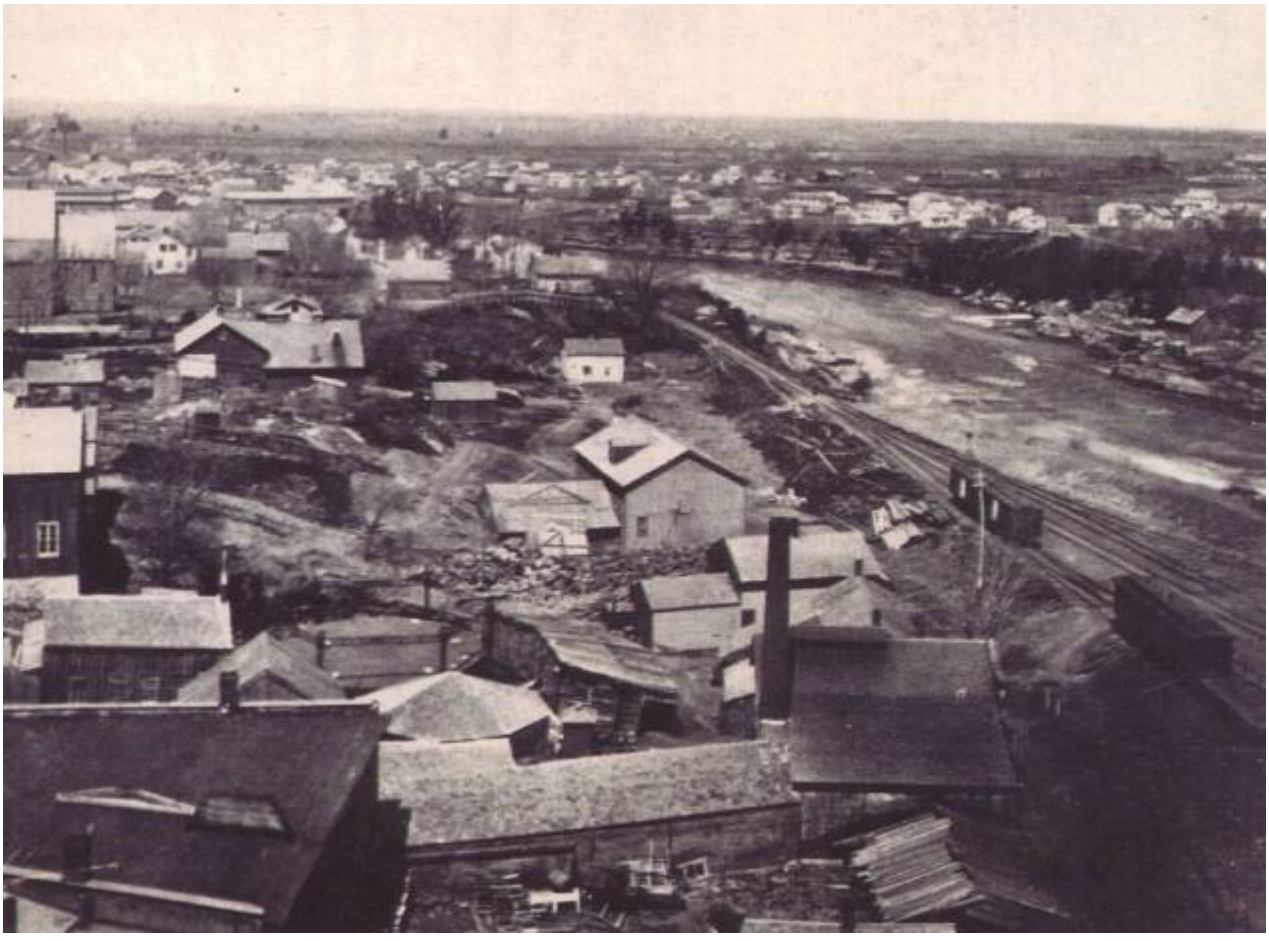
Alternatives Analysis Report

Watertown (Anthony Street) Non-Owned
Former Manufactured Gas Plant Site
Site # V00473-6
Watertown, Jefferson County, New York

January 2015



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Certification Statement

I, Terry W. Young, P.E. certify that I am currently a NYS registered professional engineer and that this *Alternatives Analysis Report* was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the Division of Environmental Remediation *Technical Guidance for Site Investigation and Remediation* (DER-10) (NYSDEC, 2010).

Date 1/15/15

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Non-Owned Former MGP
Site # V00473-6
Watertown, Jefferson County,
New York

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National Grid

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January 2015

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- January 15, 2013 letter from NYSDEC to National Grid re: Approval of the Revised Remedial Investigation Report
- May 2, 2013 e-mail from ARCADIS, on behalf of National Grid, re: AA Report Draft Outline and May 1, 2013 Teleconference Summary
- September 23, 2013 letter from National Grid to NYSDEC re: June 2013 Groundwater Sampling Results

AAR	Alternatives Analysis Report
bgs	below ground surface
BTEX	benzene, toluene, ethylbenzene and xylenes
CAMP	Community Air Monitoring Plan
COC	constituent of concern
DER	Division of Environmental Remediation
FWRIA	Fish and Wildlife Resource Impact Analysis
HHRE	Human Health Exposure Evaluation
mg/kg	milligrams per kilogram
MGP	manufactured gas plant
NAPL	nonaqueous-phase liquid
NYS	New York State
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
OMM	Operation, Maintenance and Monitoring
OSHA	Occupational Safety and Health Administration
PAH	polycyclic aromatic hydrocarbon
PPE	personal protective equipment
ppm	parts per million
RAOs	remedial action objectives

RCRA	Resource Conservation and Recovery Act
RI	remedial investigation
RI Report	Remedial Investigation Report
Sanborn maps	Sanborn Fire Insurance Maps
SC	site characterization
SCO	soil cleanup objectives
SCG	Standards, Criteria and Guidance
site	National Grid's Anthony Street Former Manufactured Gas Plant Site
SVOC	semivolatile organic compound
TCL	Target Compound List
TCLP	Toxicity Characteristic Leaching Procedure
TOC	total organic carbon
TOGS	Technical and Operational Guidance Series
USDOT	United States Department of Transportation
USEPA	United States Environmental Protection Agency
VCO	Voluntary Consent Order
VOC	volatile organic compound
µg/L	micrograms per liter
6 NYCRR	Chapter 6 of the New York Codes, Rules and Regulations

1. Introduction

This Alternatives Analysis Report (AAR) presents an analysis of potential remedial alternatives for National Grid's Anthony Street Former Manufactured Gas Plant (MGP) Site (the site) located in Watertown, New York (Figure 1). This AAR has been prepared pursuant to NYSDEC's January 15, 2013 letter which approved National Grid's December 2012 *Remedial Investigation Report* (RI Report; ARCADIS, 2012) and requested that National Grid provide an AAR (copy of NYSDEC's letter provided in Appendix A).

The overall purpose of the remedial alternatives analysis presented herein is to use information from environmental investigations associated with the site to develop, evaluate, and recommend remedial alternatives that are protective of human health and the environment, and comply with standards and criteria that are directly applicable or that are relevant and appropriate to the remedial alternatives. Consideration is also given to guidance which through application of scientific and engineering judgment is determined to be applicable to the analysis of remedial alternatives.

This AAR has been prepared by ARCADIS as follows:

- In accordance with the Voluntary Consent Order (VCO) executed between the New York State Department of Environmental Conservation (NYSDEC) and Niagara Mohawk (acquired by and now referred to as National Grid), dated January 25, 2002 (VCO Index Number D0-0001-0011). The contemplated use documented in Exhibit A of the VCO indicates non-residential use of the site.

- Consistent with discussions between the NYSDEC, National Grid, the City of Watertown, and ARCADIS as documented in a May 2, 2013 e-mail to NYSDEC from ARCADIS, on behalf of National Grid, to document key points discussed during a May 1, 2013 conference call regarding National Grid's draft AAR outline submitted to NYSDEC (copy of e-mail provided in Appendix A).

- In substantial conformance with the NYSDEC's *Division of Environmental Remediation Technical Guidance for Site Investigation and Remediation* (DER-10), dated May 2010.

1.1 Report Organization

Consistent with DER-10, paragraph 4.4(c)(3), this AAR is organized as follows:

- *Section 1 – Introduction*. Discusses the purpose, basis, and organization of the AAR.

- *Section 2 – Project Area Description and History*. Provides a description of the project area and summarizes historical information provided in NYSDEC-approved documents for this site.

- *Section 3 – Summary of the RI and Remedial Measures*. Summarizes the environmental investigations conducted (collectively referred to herein as the RI) and the remedial measures implemented.

- *Section 4 – Exposure Assessment and Remedial Action Objectives*. Identifies the remedial action objectives (RAOs) for soil, groundwater, and soil vapor using the NYSDEC's Generic RAOs available at: http://www.dec.ny.gov/regulation/67560.html

- *Section 5 – Development and Analysis of Remedial Alternatives*. Describes the remedial alternatives and presents the evaluation of the alternatives with respect to NYSDEC's remedy selection the criteria identified in DER-10, Section 4.2.

- *Section 6 – Comparative Analysis of Remedial Alternatives and Recommended Remedy*. Presents the comparative analysis of each remedial alternative using the aforementioned NYSDEC's evaluation criteria to identify the advantages and disadvantages of each alternative relative to each other and with respect to the evaluation criteria. Also presents the remedy recommended to address MGP-related impacts associated with the site.

- *Section 7 – References.* Provides a list of references used to prepare this AAR.

The text of this AAR is supported by tables and figures, as well as an appendix containing certain referenced correspondence.

2. Project Area Description and History

The site is approximately located at 121 J. B. Wise Place (formerly Anthony Street) in a commercial district of Watertown, New York (Figure 2) and was defined in the RI Report as land where manufactured gas plant (MGP) structures were once located. As detailed in the RI Report and summarized in this section, MGP related impacts were identified within the site and slightly beyond at some upland soil and groundwater sampling locations. The locations of the former MGP structures are shown on Figure 3, along with the upland MGP investigation locations.

The former MGP site and the area of upland MGP investigation locations are collectively referred to herein as the "project area". The project area is shown on Figure 2 and includes the following properties:

- Tax Parcels 701132 and 701133 (owned by Mr. Thomas Horning)
- Tax Parcels 701134 and 701135 (owned by Psychedelic Entertainment, LLC)
- J.B. Wise Place/Tax Parcel 701137 (owned by the City of Watertown)

The site is currently occupied by two commercial buildings in the west-southwest portion of the former MGP. The Empsall Plaza building (Tax Parcel 701134) is a three-story brick building located on the southern portion of the site. Most of the first floor of the Empsall Plaza building appears to be constructed as a slab-on-grade, but a boiler room/basement does exist in the western-southwestern corner of the building. The Empsall Plaza building is currently used as office space for various businesses.

A tanning salon/appliance store building (Tax Parcel 701132) is also constructed of brick. The lowermost floor of this building, however, rests on a limestone block foundation and is approximately 4 feet above grade on the front (east-northeast) side of the building.

The remaining areas of the site are covered with asphalt parking lots (owned and maintained by the City of Watertown) used for customers and employees associated with these businesses, as well as others in the area. Located in the northeastern portion of the J.B. Wise Place Parking Lot is a pavilion and restroom facility used for local events, including a farmer's market.

Readily apparent evidence of the former MGP does not exist at the ground surface of the site. Based on review of available Sanborn Fire Insurance Maps (Sanborn maps), it appears that most of the structures associated with the former MGP are overlain by the two existing on-site buildings; however, the location of the northernmost (and largest) former gas holder appears to be mostly or entirely covered by parking/driveway areas. The approximate locations of the former MGP structures from the Sanborn maps are shown on Figure 3.

The majority of the site is of general low relief and is approximately 460 feet above mean sea level (amsl), with a slight drop in elevation to the northeast, toward the Black River. However, an approximately 20-foot-high steep bank abuts the southwest sides of the two on-site buildings. As shown on Figure 3, the Black River is approximately 300 feet northeast of the site. The elevation of the Black River near the site is approximately 400 feet amsl. The Black River flows to the northwest within a steep limestone-ledged gorge.

Two streets, J.B. Wise Place and City Center Drive, are located between the Black River and the site. J.B. Wise Place sustains low-volume traffic associated with the local merchants and businesses and City Center Drive is a relatively high-volume route. On-site drainage consists of sheet flow along the top of the asphalt, which is directed toward catch basins located along J.B. Wise Place and throughout the parking area. Given the proximity to the Black River and the topography of the area, stormwater from the site is likely routed to the Black River.

Review of Sanborn maps indicates that the MGP was constructed in or before 1884 and operated for approximately 25 years. The 1884 Sanborn map shows that the MGP consisted of two gas holders, nine retorts, one gas house, one storage shed and one 2-story coal house with railroad tracks across Anthony Street to the east of the site. The site was apparently expanded in 1890 to include a purifying house, purifiers and other associated structures; and again in 1902 with a third gas holder. MGP-related operations appear to have stopped between 1902 and 1909 with other businesses (auto repair facility, drug store) occupying some of the gas plant buildings. Between 1909 and 1949, all remnants of the MGP-related structures were removed from the site. Between 1949 and 1971, Anthony Street was renamed J.B. Wise Place.

During the gas manufacturing process, several by-products, including coal tar, coal slag, cinders, ash and gas purifier wastes, were produced; however, only small quantities of these by-products appear to be present in the subsurface at the site. Coal tar and purifier wastes are typically responsible for the impacts to soil and groundwater quality at MGP sites. Coal tar is normally a dense non-aqueous phase liquid, which is heavier than water and tends to sink below the water table when present in the subsurface in sufficient quantities. Coal tar contains many organic compounds, several of which are regulated by the NYSDEC. These organic compounds include benzene, toluene, ethylbenzene and xylenes (BTEX) and a more general class of organic compounds called polycyclic aromatic hydrocarbons (PAHs). Purifier wastes often contain cyanide, which is also regulated by the NYSDEC. BTEX, PAHs and cyanide are considered the constituents of concern (COCs) at the site.

3. Summary of the RI and Remedial Measures

Between 2004 and 2011, ARCADIS conducted an RI comprised of several environmental investigations, on National Grid's behalf, in order to characterize environmental conditions at the site in compliance with the VCO. The findings of the RI were documented in the RI Report (ARCADIS, December 2012) that was approved by the NYSDEC in a letter dated January 15, 2013. The RI Report also documented the remedial measures completed at the site.

A summary of the RI and the associated results are provided below, followed by a summary of the remedial measures conducted. Details are provided in the RI Report.

3.1 RI Summary

National Grid completed the RI in order to characterize the nature and extent of site-related COCs from the site and to assess whether or not the COCs posed risks to human health and the environment. The investigation work was divided into four broad categories:

- soil, bedrock and groundwater investigations
- sewer line evaluation
- soil vapor investigation
- riverbank investigation

The work performed under these categories, and the resulting findings, are summarized below. Figures 3 through 5 show the investigation locations. The below summary also incorporates observations made during utility upgrade and reconstruction activities completed by the City of Watertown in 2011 (City's Reconstruction Project). These activities were completed within the MGP Investigation Area (Figure 4), and MGP-related impacts and non-MGP-related impacts were observed.

3.1.1 Soil, Bedrock and Groundwater Investigations

These investigations characterized the geologic and hydrogeologic setting of the site area and the nature and extent of site-related impacts to the subsurface. The results of the investigations identified the three units described below, in descending order:

- *Fill*. Uppermost unit comprising mostly artificial fill and reworked native deposits that lie on the bedrock surface. The unit is approximately 9 to 15 feet thick and contains perched water in isolated pockets. Where encountered, the perched water generally exists in a thin layer on the rock surface and leaks downward into the bedrock.

- *Rockland Limestone*. This is the uppermost bedrock unit. This unit is approximately 10 to 15 feet thick; however, only the lower approximately 1 to 2 feet of this unit is saturated. This unit is highly weathered and contains voids and solution-widened horizontal and vertical fractures (i.e., karst features). Groundwater flow in this unit is toward the Black River and occurs primarily through a network of intersecting horizontal bedding plane fractures and vertical fractures (i.e., joints). Although only a few feet of this unit is saturated, the majority of groundwater beneath the site is expected to flow through this unit given its karstic characteristics and resultant high permeability.

- *Chaumont Limestone*. This unit is approximately 25 feet thick and directly underlies Rockland Limestone. This unit is fully saturated and is distinguished from the overlying Rockland by its thick beds and lack of fracturing/weathering beneath the site. Although Chaumont Limestone is known to form karst in the Watertown region, the unit does not appear to exhibit karstic characteristics beneath the site. However, the unit does appear to have significant karstic features near the riverbank just to the northeast of the site. The lack of fracturing/weathering, observed in this unit beneath the site, combined with the thick bedding, suggests that the permeability of this unit is negligible compared to the overlying Rockland Limestone. Given the karstic features observed along the riverbank, the permeability of Chaumont Limestone is expected to significantly increase near the river.

Overburden soils which contain site-related COCs at concentrations greater than the 6 NYCRR Part 375-6 restricted use residential and/or the commercial use soil cleanup objectives (SCOs) are shown on Figure 6 and consist primarily of those soils that contained visible coal tar (i.e., at MW-5R, TP-3 and SB-1) and/or historical fill comprising incomplete combustion by-products (e.g., cinders, ash, coal, soot). Coal tar was only observed in trace quantities at three of the 27 RI investigation locations, and each of these three locations contained BTEX and/or PAHs at levels above SCOs. Coal tar and potential purifier waste were also observed in the overburden and shallow bedrock during the City's Reconstruction Project in front of the Empsall Plaza). Some soil samples without coal tar also exceeded SCOs for one or more PAH compounds. The PAH exceedances in these samples may, in part, result from the historical fill materials found throughout this area. Cyanide was not detected in any soil samples at levels above the 6 NYCRR Part 375-6 restricted use residential and/or the commercial use SCOs. A summary of the subsurface impacts observed is provided in Table 1.

Some of the COCs in coal tar and purifier wastes appear to have minimally affected the quality of groundwater, as documented in the RI Report and National Grid's September 23, 2013 letter to NYSDEC presenting the results of the June 2013 groundwater sampling event (copy of National Grid's letter provided in Appendix A). Two overburden monitoring wells (MW-1 and MW-2) and two bedrock monitoring wells (MW-4R and MW-5R) contained BTEX and/or PAHs at concentrations

above regulatory levels (Figure 7); with the exception of MW-5R, the concentrations detected in groundwater slightly exceeded regulatory levels. The slight exceedances in these wells are attributed to the presence of coal tar observed at and near MW-5R. No exceedances were detected in any of the bedrock monitoring wells located between MW-4R/MW-5R and the river. Groundwater from overburden well MW-1 was the only groundwater sample containing cyanide above regulatory levels, and as noted above, cyanide was not detected in any soil samples at levels above the 6 NYCRR Part 375-6 restricted use residential and/or the commercial use SCOs. NAPL has not been observed in any of the monitoring wells during any of the groundwater sampling events.

The extent of site-related COCs in groundwater at levels exceeding regulatory criteria appears to be constrained primarily to the immediate vicinity of the former MGP structures (gas holders). There is no groundwater usage at or in the immediate area of the site; all businesses and residences at/near the site are supplied by city water.

3.1.2 Sewer Line Evaluation

A sewer line evaluation was conducted in 2009 to assess whether or not the sewer lines present at and near the site could pose a potential collection point and/or preferential pathway for NAPL migration. The sewer invert elevations and bedrock surface elevations for the 2009 assessment demonstrated that sewer invert elevations in the vicinity of the site (including City Center Drive) are consistently higher than bedrock elevations observed in nearby borings/test pits. As such, it appears that previous sewer lines near the site were likely installed on top of bedrock or above the bedrock-overburden interface, and the bedrock was not likely removed during the installation of these utilities.

Approximately 230 feet of bedrock was excavated during the City's 2011 Reconstruction Project to facilitate the installation of sewer lines within the MGP investigation area (Figure 4). The bedrock was excavated to maintain a proper pitch of the new sewer line in front of the Empsall Plaza building. Approximately 1 to 4.5 feet of bedrock were removed in this area. Should mobile NAPL be present in the immediate vicinity of the new sewer line, then the associated bedrock trench below the sewer line could serve as a potential collection point. Mobile NAPL was not observed during the RI or the City's Reconstruction Project.

3.1.3 Soil Vapor Investigation

A soil vapor investigation was completed during the RI inside the two existing on-site buildings (Empsall Plaza building and tanning salon/appliance store building). The investigation was conducted to evaluate whether or not MGP-related volatile organic compounds (VOCs) were

present in sub-slab soil vapor beneath these buildings. The investigation found that several VOCs were present in sub-slab samples at low concentrations; however, the VOCs appeared not to be related to the MGP. National Grid and NYSDOH concluded that the sub-slab vapor is not being impacted by MGP-related constituents, and that no further evaluation or actions are needed at these properties.

3.1.4 Riverbank Investigation

A sediment and seep sampling program was conducted northeast of the site, along the southern riverbank of the Black River. The program consisted of probing sediment and collecting three sediment samples, one sample resembling roofing shingles and four seep samples for laboratory analysis (Figure 5). Results of the riverbank investigation concluded that the MGP has not affected the quality of river sediments or groundwater seeping from the riverbank adjacent to the site.

3.2 Summary of Remedial Measures

3.2.1 2008 – Underground Vessel Closure

An underground storage vessel was discovered on September 16, 2008 (during the RI) while attempting to advance the boring for monitoring well MW-4R. The initial borings for MW-4R penetrated the upper surface of the vessel and terminated on the floor of the vessel. The top of the vessel was encountered at approximately 2.8 feet bgs and the bottom of the vessel was encountered at approximately 6 feet bgs. The vessel is located approximately 40 feet east of the appliance store/tanning salon building on property owned by Mr. Thomas Horning (Figure 3).

National Grid videotaped and probed the inside of the vessel through the initial MW-4R borehole. Based on this work, the vessel appeared to be square (6 by 6 feet) and approximately 3 feet deep. Approximately 8 inches of water and 2 inches of sludge were observed in the bottom of the vessel. National Grid collected one grab sample of water from the vessel. The water analytical results indicated a total BTEX concentration of 31,063 micrograms per liter (µg/L). No other VOCs were detected. In addition, eight SVOCs (phenol, 2-methylphenol, 4-methylphenol, 2,4-dimethylphenol, naphthalene, 2-methlynaphthalene, phenanthrene and carbazole) were detected at concentrations ranging from 1.2 to 440 µg/L.

National Grid also completed four soil borings around the vessel. Each boring was positioned approximately 2 feet from the corners of the vessel and was advanced to bedrock refusal, which ranged in depth from 6.7 to 8.4 feet bgs. Soils recovered from the borings indicated only a faint coal-tar-like odor above bedrock. Based on the analytical results and observations made while

drilling the soil borings completed around the vessel, it did not appear that the contents of the vessel impacted the surrounding soils.

It was not conclusively determined if the vessel was part of the former MGP operations, however, National Grid, in order to mitigate potential groundwater impacts, contracted with Clean Harbors to complete closure of the vessel on October 1, 2008. ARCADIS provided oversight of the work performed by Clean Harbors to confirm that the work was completed in accordance with correspondence between National Grid and the NYSDEC. The vessel was pumped free of any residual water and subsequently filled with flowable fill material. The water from the tank exhibited a petroleum-like odor, but no sheens or NAPL were observed on the water. Once the fill was allowed to set up for 24 hours, an asphalt patch was installed to match the surrounding surface cover.

3.2.2 2011 – City's Reconstruction Project

During the spring/summer of 2011 the City of Watertown completed a reconstruction project of the J.B. Wise Parking Lot which included intrusive work within the MGP Investigation Area (Figure 4). The City's Reconstruction Project included:

- the installation of a new sanitary sewer
- water main improvements
- storm water quality basins
- new sidewalks and lighting
- pavement and parking lot reconstruction
- installation of numerous amenities (e.g., pavilion, landscape features, benches, bike racks, restroom facility, etc.)

The construction work within the footprint of the former MGP site generally consisted of excavating trenches down to the top of bedrock (encountered at 8 to 10 ft bgs), and at times slightly into bedrock, for the removal of old utility lines or the installation of new utilities. The width of the trenching was only as wide as necessary to facilitate removal or installation of the utility.

During the excavation activities, nine areas containing five different types of impacts were encountered within the MGP investigation area. The nine areas are depicted on Figure 4. Some of

the impacts were identified as being MGP-related, while others were identified as being non-MGP-related. The observed impacts are summarized in Table 1.

Impacted soils encountered during the intrusive work were segregated from clean soils and temporarily staged in the on-site materials management area prior to off-site treatment/ disposal. Once the terminal depth of the utility trench was reached dermal contact from remaining side wall and floor impacts were cut-off using trench boxes and clean sub-base backfill material (crushed stone). Residual odors associated with encountered impacts were neutralized using Bio-Solve® and utility workers were subsequently granted access once the air quality of the trench was checked and deemed safe.

Following installation or removal of the utility line the trench was backfilled with clean gravel and the next section of trench was advanced. Heavy equipment used to remove impacted materials was decontaminated prior to handling clean soils. Approximately 510 tons of MGP-impacted soil/debris were excavated and treated/disposed off-site during the City's Reconstruction Project. Final restoration to the surface included repaving the entire parking lot between the Empsall Plaza building and City Center Drive. The area immediately in front of the appliance store/tanning salon building was not repaved.

Further details regarding the City's Reconstruction Project are discussed in the Summary Report (National Grid's October 19, 2012 letter to NYSDEC, copy provided in Appendix C of the RI Report). NYSDEC's approval of the Summary Report was presented in a letter to National Grid dated November 21, 2012.

4. Exposure Assessment and Remedial Action Objectives

This section summarizes the exposure assessment performed during the RI and presents the RAOs developed for the site. RAOs represent medium-specific goals that are protective of public health and the environment and have been developed through consideration of the results of the RI activities, including the results of the exposure assessment. Based on these considerations, RAOs were developed consistent with the remedy selection process described in 6 NYCRR Part 375, guidance presented in *DER-10 Technical Guidance for Site Investigation and Remediation* (DER-10 2010), NYSDEC's Generic RAOs available at: http://www.dec.ny.gov/regulation/67560.html

The RAOs developed for the site are presented in the following table, and further discussed in the text that follows the table which presents a summary of the exposure assessment.

Table 4.1 Remedial Action Objectives

RAOs for Soil
1. Prevent, to the extent practicable, ingestion/direct contact with soil containing MGP-related COCs and/or MGP-related wastes (e.g., coal tar).
2. Prevent, to the extent practicable, inhalation of or exposure to MGP-related COCs volatilizing from soil.
3. Prevent, to the extent practicable, migration of MGP-related COCs that could result in impacts to groundwater.
RAOs for Groundwater
1. Prevent, to the extent practicable, ingestion of groundwater containing MGP-related COCs at concentrations exceeding NYSDEC groundwater quality standards and guidance values.
2. Prevent, to the extent practicable, contact with, or inhalation of volatiles, from groundwater containing MGP-related COCs at concentrations exceeding NYSDEC groundwater quality standards and guidance values.
3. Restore groundwater quality to pre-disposal/pre-release conditions related to the MGP, to the extent practicable.
4. Address, to the extent practicable, the source of MGP-related groundwater impacts.
RAOs for Soil Vapor
1. Mitigate, to the extent practicable, impacts to public health resulting from the potential for soil vapor intrusion of MGP-related COCs into new buildings (if any) constructed within the project area.

These RAOs are protective of public health and the environment and have been developed through consideration of the results of the RI activities, including the results of the exposure assessment. The exposure assessment conducted during the RI assessed potential risks posed to human health and the environment by site-related COCs. Potential risks posed to wildlife were evaluated by conducting a Fish and Wildlife Resource Impact Analysis (FWRIA). Potential risks

posed to human health were evaluated through a qualitative Human Heath Exposure Evaluation (HHEE). The conclusions of the FWRIA and the HHEE are summarized below.

FWRIA

The FWRIA identified the groundwater seeps located along the riverbank, and sediment within the river, as the only potentially complete ecological exposure pathways. The FWRIA determined that no ecological exposure risk exists due to the groundwater seeps based on the analytical results. These results demonstrated that neither SVOCs nor cyanide were detected in any of the seep samples. The only constituents detected in the seep samples were limited to three VOCs (bromodichloromethane [0.11J µg/L], chloroform [4.2 µg/L] and PCE [0.83 µg/L]) detected in the seep sample that was collected farthest downstream from the site. These VOC detections are below regulatory standards and not considered to be site-related.

Sediment concentrations within the Black River were all less than regulatory screening criteria except for two PAHs which slightly exceeded their associated chronic criteria, derived using a conservative default total organic carbon (TOC) concentration of 1 percent. It is likely that TOC concentrations in Black River sediments are actually higher than 1 percent; therefore these two slight exceedances of sediment screening criteria do not indicate a significant risk to ecological receptors. Moreover, the PAHs levels in the sediment samples (maximum total PAH concentration was 3.6 mg/kg) are comparable to or less than levels that are expected given the urban setting and as such, do not appear be site-related.

HHEE

The HHEE evaluated potentially complete exposure pathways to humans based on the results of the RI. The HHRE results are summarized below.

- Surface soils do not represent a complete exposure pathway due to the lack of COCs in this medium and the presence of impervious surfaces across the site. The greatest potential for exposure to COCs in soil is via direct contact with subsurface soils and groundwater that may be encountered during intrusive work by construction workers. This potential exposure could be mitigated by using properly trained personnel and personal protective equipment.

- Groundwater beneath the site is not used as a potable source and the depth to groundwater (approximately 5 to 22 feet bgs) precludes potential direct contact unless intrusive work is conducted.

- Sub slab soil vapor in the two on-site buildings is not being impacted by MGP-related constituents.

- Groundwater seeps along the riverbank do not present a significant exposure pathway because the three aforementioned VOCs detected in this medium were detected at concentrations less than regulatory standards. Additionally, as noted above and detailed in the RI Report, the VOCs detected in the seep samples are not considered to be site-related.

- Although sediments within the Black River represent a potentially complete exposure pathway for some PAHs, this was based solely on the comparison of analytical data to screening criteria derived based on a conservative default TOC concentration of 1 percent. As described above for the FWRIA, it is likely that TOC concentrations in Black River sediments are actually higher than 1 percent; therefore the exceedances of sediment screening criteria do not necessarily indicate a potential threat to human health. Additionally, because the majority of the riverbed in the portion of the Black River near the site is bedrock, sediment depositional areas are rare. Moreover, the PAHs levels in the sediment samples (maximum total PAH concentration was 3.6 mg/kg) are comparable to or less than levels that are expected given the urban setting and as such, do not appear be site-related.

In summary, the exposure assessment indicates that the greatest potential for exposure to MGP-related COCs is direct contact with subsurface soils and groundwater that may be encountered during intrusive work by construction workers within the project area. Action is required to address this potential exposure pathway. Action is also required to restrict future groundwater use (there is currently no groundwater usage at or in the immediate vicinity of the site). No further action is required for surface soils, sediments in the Black River, or the groundwater seeps along the riverbank of the Black River. Although soil vapor (sub slab in the two on-site buildings) is not being impacted by MGP-related constituents and no further action is required at this time, the potential for soil vapor intrusion may need to be re-evaluated if new buildings are constructed within the project area.

The RAOs developed for this site (Table 4.1) address these potential exposure pathways and provide for continued overall protection of the human health and the environment. The remedial alternatives developed in the following section to address MGP-related impacts are evaluated in Section 5 based on their ability to meet these site-specific RAOs, which is an aspect of the NYSDEC threshold criterion for remedy evaluation (overall protectiveness of human health and the environment).

5. Development and Analysis of Remedial Alternatives

In this section, three site-specific remedial alternatives are developed and evaluated with respect to NYSDEC's remedy selection the criteria identified in DER-10, Section 4.2. As agreed-upon between the NYSDEC and National Grid (May 2, 2013 e-mail to NYSDEC from ARCADIS, on behalf of National Grid; copy provided in Appendix A), the three alternatives are:

- *Alternative 1 – No Action.* Under this alternative no additional remedial activities or institutional controls would be implemented to address MGP-related impacts in soil and/or groundwater. The No Action alternative serves as the baseline for comparison of the overall effectiveness of the other remedial alternatives.

- *Alternative 2 – Institutional Controls and Groundwater Monitoring.* The components of this alternative generally include: establishing institutional controls (including administration of a SMP) to maintain protection of human health and the environment, and implementing a sampling and analysis program to monitor MGP-related COCs in groundwater.

- *Alternative 3 – Soil Excavation to Unrestricted Use SCOs, Institutional Controls and Groundwater Monitoring.* This alternative was developed at the request of NYSDEC and includes excavating MGP-impacted soil with concentrations greater than the 6 NYCRR Part 375-6 unrestricted use SCOs, as well implementation of institutional controls and a sampling and analysis program to address MGP-related COCs in groundwater.

A detailed description of each of these three remedial alternatives is provided in Section 5.2, along with an evaluation of the alternative with respect to the evaluation criteria presented in DER-10. A description of each of the evaluation criteria follows. The results of the detailed evaluation of the remedial alternatives are used in Section 6 to recommend a remedial alternative and provide the basis for the recommendation.

5.1 Description of Evaluation Criteria

Consistent with DER-10, the detailed evaluation of remedial alternatives presented in this section consists of an evaluation of each three remedial alternatives (presented in Section 5.2) against the following criteria:

- Overall Protectiveness of the Public Health and the Environment
- Conformance with Standards, Criteria, and Guidance (SCGs)
- Long-Term Effectiveness and Permanence
- Reduction of Toxicity, Mobility, or Volume of Contamination through Treatment

- Short-Term Impacts and Effectiveness
- Implementability
- Land Use
- Cost Effectiveness

Descriptions of the evaluation criteria are presented in the following sections. Additional criteria, including community acceptance, will be addressed following submittal of this AAR.

Per DER-10, sustainability and green remediation will also be considered in the remedial evaluation with the goal of minimizing ancillary environmental impacts such as greenhouse gas emissions (GHGs) during the implementation of remedial programs. The evaluation will consider the alternative's ability to minimize energy use; reduce greenhouse gas and other emissions; maximize reuse of land and recycling of materials; etc. Sustainability of the alternative and green remediation practices utilized will be discussed under the short-term impact and effectiveness criterion.

5.1.1 Overall Protectiveness of Public Health and the Environment

This criterion evaluates whether the remedial alternative provides adequate protection of public health and the environment based on the following:

- How the alternative would eliminate, reduce, or control (through removal, treatment, containment, other engineering controls, or institutional controls) any existing or potential human exposures or environmental impacts that have been identified.

- The ability of the remedial alternative to meet the site-specific RAOs.

- Assessments of other evaluation criteria, including: long-term effectiveness and permanence; short-term impact and effectiveness; and compliance with SCGs.

5.1.2 Conformance with SCGs

This criterion evaluates the remedial alternative's ability to comply with standards and criteria that are directly applicable or that are relevant and appropriate to the remedial alternative. Consideration is also given to guidance which through application of scientific and engineering judgment is determined to be applicable to the analysis of the remedial alternative. Compliance with the following items is considered during evaluation of the remedial alternative:

- *Chemical-Specific SCGs* – These SCGs are health- or risk-based numerical values or methodologies that, when applied to site-specific conditions, result in the establishment of

numerical values for each COC. These values establish the acceptable amount or concentration of chemical constituents that may be found in, or discharged to, the ambient environment.

- *Action-Specific SCGs* – These SCGs are technology- or activity-based requirements or limitations on actions taken with respect to hazardous waste management and remediation.

- *Location-Specific SCGs* – These SCGs are restrictions placed on the concentration of hazardous substances or the conduct of activities solely because they occur in specific locations.

5.1.3 Long-Term Effectiveness and Permanence

The evaluation of each remedial alternative relative to its long-term effectiveness and permanence is made by considering the risks that may remain following implementation of the remedial alternative. The following factors will be assessed in the evaluation of the alternative's long-term effectiveness and permanence:

- Potential human exposures, ecological receptors, and impacts to the environment from the remaining MGP-impacted media.

- The adequacy and reliability of institutional and/or engineering controls (if any) that will be used to manage the remaining MGP-impacted media.

5.1.4 Reduction of Toxicity, Mobility, and Volume of Contamination through Treatment

This evaluation criterion addresses the degree to which the remedial alternative will permanently reduce the toxicity, mobility, or volume of the MGP-related constituents present in the media through treatment.

5.1.5 Short-Term Impacts and Effectiveness

The short-term impacts and effectiveness criterion is used to evaluate the remedial alternative relative to its potential effect on public health and the environment during construction and/or implementation of the alternative. The evaluation of each alternative with respect to its short-term impacts and effectiveness will consider the following:

- Potential short-term adverse impacts and nuisances to which the public and environment may be exposed during implementation of the alternative.

- Potential impacts to workers during implementation of the remedial actions and the effectiveness and reliability of protective measures.

- Amount of time required to implement the remedy and the time until the remedial objectives are achieved.

- The sustainability of the alternative and use of green remediation practices during implementation of the remedy.

5.1.6 Implementability

This criterion addresses the technical and administrative feasibility of implementing the remedial alternative, including the availability of the various services and materials required for implementation. The following factors will be considered during the implementability evaluation:

- *Technical Feasibility* – This factor considers the remedial alternative's constructability, as well as the ability to monitor the effectiveness of the remedial alternative.

- *Administrative Feasibility* – This factor refers to the availability of necessary personnel and material along with potential difficulties in obtaining approvals for long-term operation of treatment systems, access agreements for construction, and acquiring necessary approvals and permits for remedial construction.

5.1.7 Land Use

This criterion evaluates the current and reasonably anticipated future use of the site relative to the cleanup objectives of the remedial alternative when unrestricted use cleanup levels would not be achieved. This evaluation considers, but is not limited to, the following land use factors: current use, local zoning, and proximity to natural resources.

5.1.8 Cost Effectiveness

This criterion evaluates the overall cost of the alternative relative to the effectiveness of the alternative (i.e., cost compared to long-term effectiveness and permanence, short-term impacts and effectiveness, and reduction of toxicity, mobility, and volume through treatment).

The estimated total cost to implement the remedial alternative is based on a present worth analysis of the sum of the direct capital costs (materials, equipment, and labor), indirect capital costs (engineering, licenses/permits, and contingency allowances), and operation, maintenance and monitoring (OM&M) costs. OM&M costs may include future site management, operating labor, energy, chemicals, and sampling and analysis. These costs will be estimated with an anticipated accuracy between -30% to +50%. A 30% contingency factor is included to cover unforeseen costs incurred during implementation of the remedial alternative. Present-worth costs are calculated for alternatives expected to last more than 2 years. A 4% discount (i.e., interest) rate and a maximum 30 year period are used to determine the present-worth costs.

5.2 Detailed Evaluation of Remedial Alternatives

This section presents the detailed analysis of each of the aforementioned alternatives.

- Alternative 1 – No Action
- Alternative 2 – Institutional Controls and Groundwater Monitoring
- Alternative 3 – Soil Excavation to Unrestricted Use SCOs, Institutional Controls and Groundwater Monitoring

Each alternative is evaluated against the evaluation criteria described above (as indicated, public acceptance will be evaluated following submittal of this AAR Report).

5.2.1 Alternative 1 – No Action

The No Action alternative serves as the baseline for comparison of the overall effectiveness of the other remedial alternatives. The No Action alternative would not involve implementation of any additional remedial activities to address MGP-related impacts beyond the remedial measures previously performed (summarized in Section 3.2). The project area would be allowed to remain in its current condition and no effort would be made to limit potential future exposures to MGP-related impacts or monitor conditions.

Overall Protection of Public Health and the Environment – Alternative 1

The No Action alternative is not an effective or a “stand alone” means of achieving the RAOs on a long-term basis. The No Action alternative does not include any additional activities to address or monitor MGP-related constituents at the project area. Therefore, the alternative would not be effective in meeting the established RAOs. However, to the extent to which current conditions are

already protective of human health and the environment, and such conditions remain in the future, aspects of the RAOs would be achieved. For instance, existing ground surface cover in the form of asphalt pavement and buildings prevents potential direct contact with, or ingestion of, MGP-impacted soil. The No Action alternative, however, would not address potential exposures to construction workers performing subsurface excavation/construction activities.

Although there are MGP-related constituents in groundwater at concentrations exceeding standards/guidance values, the RI demonstrated that the extent appears to be constrained primarily to the immediate vicinity of the former MGP structures (gas holders). Natural attenuation processes over time may reduce these concentrations in groundwater.

Existing groundwater use laws [10 NYCRR 5-1.31(b)] prohibit the installation of private wells where public water supply is available, unless approval is expressly granted by the public water authority. These laws would continue to minimize potential human exposure to MGP-related COCs in groundwater at concentrations exceeding standards/guidance values. As presented in the RI Report, there is no groundwater usage at or in the immediate area of the site; all businesses and residences at/near the site are supplied by city water.

Conformance with SCGs – Alternative 1

Chemical-Specific SCGs: Because no remedial activities would be conducted as part of this alternative, chemical-specific SCGs would not be applicable or would not be addressed by this alternative. The primary chemical-specific SCGs identified for MGP-impacted soil and groundwater are briefly summarized below.

- Restricted use residential or commercial SCOs presented in 6 NYCRR Part 375-6 are applicable based on current site zoning, which is listed by the City of Watertown as commercial and downtown core overlay districts (primarily a commercial oriented district, with upper floor housing) (City of Watertown, 2013). Because no remedial actions would be conducted as part of this alternative, RAOs that relate to these chemical-specific SCGs would not be met.

- Although groundwater in the immediate area of the site is not currently, and will not likely in the future, be used as a potable water supply, it is subject to the NYSDEC Class GA Groundwater Standards defined in 6 NYCRR Parts 700-705. The Class GA Groundwater Standards are presented in NYSDEC's *Division of Water, TOGS 1.1.1 Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations* (TOGS1.1.1; NYSDEC, reissued June 1998 and addended April 2000 and June 2004). TOGS 1.1.1 also provides a compilation of guidance values for use where there are no standards. Natural attenuation processes may

result in reduced concentrations of MGP-related constituents in groundwater, but it is unlikely that groundwater quality standards would be achieved.

Action-Specific SCGs: This alternative does not involve implementation of any remedial activities; therefore, action-specific SCGs are not applicable.

Location-Specific SCGs: Because no remedial activities would be conducted under this alternative, location-specific SCGs are not applicable.

Long-Term Effectiveness and Permanence – Alternative 1

Under the No Action alternative, the potential for exposure to MGP-related COCs in soil and groundwater would not be addressed. As a result, this alternative is not considered effective on a long-term basis. However, as noted above, to the extent to which current conditions are already protective of human health and the environment, and such conditions remain in the future, aspects of the RAOs would be achieved. For instance, existing ground surface cover in the form of asphalt pavement and buildings prevents potential direct contact with, or ingestion of, MGP-impacted soil.

The existing ground surface cover across the project area also limits infiltration of precipitation into the overburden, which reduces the migration of MGP-related COCs that could result in impacts to groundwater. Potential migration is further mitigated because groundwater in the overburden, where present, is perched in isolated pockets that generally exist in a thin layer on the bedrock surface, and leaks downward into the bedrock. Only two bedrock monitoring wells (MW-4R and MW-5R) contained MGP-related COCs at concentrations greater than regulatory levels, and both of these wells are located within the footprint of a former MGP gas holder (Figure 7). No exceedances of regulatory levels were detected in the bedrock wells located between MW-4R/MW-5R and the Black River.

Reduction of Toxicity, Mobility or Volume of Contamination through Treatment – Alternative 1

Under the No Action alternative, soil and groundwater would not be treated (other than by natural processes), recycled, or destroyed. Therefore, the toxicity, mobility, and volume of environmental media containing MGP-related impacts would not be reduced through treatment.

Short-Term Impacts and Effectiveness – Alternative 1

No additional remedial actions would be implemented. Therefore, there would be no short-term environmental impacts, nor potential risks associated with implementation of remedial activities posed to the community.

Implementability – Alternative 1

The No Action alternative does not require implementation of any remedial activities, and therefore is technically and administratively implementable.

Land Use – Alternative 1

The current zoning for the project area, as identified above, is listed by the City of Watertown as commercial and downtown core overlay districts. The foreseeable future use of the project area is the same as the current zoning - commercial, with potential for upper floor housing.

No remedial actions would be completed under this alternative and the project area would remain in its current condition. As routine activities conducted at the project area do not include exposure to MGP-related impacts in soil and groundwater, the No Action alternative would not alter the current or anticipated future use of the project area.

Cost Effectiveness – Alternative 1

The No Action alternative does not involve implementation of any additional active remedial activities, controls, or monitoring; therefore, there are no costs associated with this alternative.

5.2.2 Alternative 2 - Institutional Controls and Groundwater Monitoring

Alternative 2 would allow the project area to remain in its current condition. Institutional controls (including administration of a SMP) would be established for the properties comprising the project area to maintain the overall protection of human health and the environment established under current conditions. Additionally, a sampling and analysis program would be implemented to monitor MGP-related COCs in groundwater. These components of Alternative 2, institutional controls and groundwater monitoring, are described below.

The institutional controls for Alternative 2 would restrict future activities that could result in potential exposures to subsurface soil and groundwater containing MGP-related COCs. As identified in Section 2 and shown on Figure 2, the project area for this AAR is defined as land where MGP structures were once located and upland investigation activities were conducted. The project area includes the following properties:

- Tax Parcels 701132 and 701133 (owned by Mr. Thomas Horning)
- Tax Parcels 701134 and 701135 (owned by Psychedelic Entertainment, LLC)
- J.B. Wise Place/Tax Parcel 701137 (owned by the City of Watertown)

Institutional controls would be established for these properties, in the form of restrictive covenants (deed restrictions) and/or environmental easements, which would:

- Limit the use and development of the site to commercial use with potential for upper floor housing, which would also allow industrial uses as permitted by local zoning.
- Require compliance with a NYSDEC-approved Site Management Plan (described below).
- Restrict groundwater use.
- Require submittal of periodic certification to NYSDEC that institutional controls have been maintained and the surface of the site remains covered by pavement and/or buildings.

The Site Management Plan (SMP) would be developed to describe the MGP-impacted soil and groundwater associated with the site (i.e., within the project area) and to identify the protocols and requirements for the following activities:

- Conducting intrusive activities (e.g., excavating or drilling) that would disturb the subsurface below the existing cover pavement or buildings
- Proper handling of excavated soil and groundwater
- Evaluating the potential for soil vapor intrusion into the indoor air if new structures are built within the project area
- Conducting groundwater monitoring
- Performing periodic inspections, providing certifications, and submitting periodic review reports to NYSDEC to document that the institutional controls and surface cover pavement are maintained and remain effective

In addition to establishing institutional controls, Alternative 2 would also include collecting and analyzing samples on a periodic basis to monitor groundwater conditions. As summarized in Section 3.1.1 and detailed in the NYSDEC-approved RI Report, some of the COCs in coal tar and purifier wastes appear to have minimally affected the quality of groundwater in the immediate vicinity of the former MGP structures. For the purpose of developing a cost, it has been assumed that annual groundwater monitoring would be conducted for 30 years using the existing groundwater monitoring well network at the site. Groundwater samples would be submitted for laboratory analysis of BTEX, PAHs and cyanide. Analytical results would be used to monitor COC

concentrations in groundwater. The results of the groundwater monitoring would be presented to NYSDEC in an annual report. Based on the results of the monitoring activities, National Grid may request to modify the quantity of wells sampled or the frequency of sampling events. Specific details for the groundwater monitoring activities would be provided in the SMP and subject to NYSDEC review/approval.

Overall Protection of Public Health and the Environment – Alternative 2

Alternative 2 would not involve any additional active remedial measures to address MGP-impacted subsurface soil or groundwater at the site, beyond those previously performed (summarized in Section 3.2) However, the existing ground surface cover (i.e., asphalt pavement and buildings) would be maintained and institutional controls would be implemented. As described above, the institutional controls would include: (1) a land use restriction in the form of a deed restriction or environmental easement; and (2) a SMP. The actual land use restriction implemented under this alternative (e.g., deed restriction or environmental easement) would be determined in consultation with the NYSDEC. Periodic reports would be submitted by National Grid to the NYSDEC to demonstrate that the institutional controls are being maintained and remain effective.

Alternative 2 would prevent potential exposures (i.e., direct contact, ingestion, and inhalation) of MGP-related impacts in soil and groundwater by adhering to the institutional controls and the procedures set forth in a NYSDEC-approved SMP. Accordingly, this alternative would meet the soil, groundwater, and soil vapor RAOs related to potential direct contact, ingestion, and inhalation human health exposure pathways. The institutional controls and SMP would be kept in place unless conditions were to change and make these measures unnecessary. If changes were to occur that would require modifications to the institutional controls/SMP, such modifications would be presented to the NYSDEC for review and approval. Both the institutional controls and SMP would be apparent to possible future site owners during comprehensive due diligence activities performed in connection with property transfer, including review of the property deed.

Although there are MGP-related constituents in groundwater at concentrations exceeding standards/guidance values, the RI demonstrated that the extent appears to be constrained primarily to the immediate vicinity of the former MGP structures (gas holders). Natural attenuation processes over time may reduce these concentrations in groundwater. Maintaining the ground surface cover across the project area would continue to limit infiltration of precipitation into the overburden, which reduces the migration of MGP-related COCs that could result in impacts to groundwater. Potential migration is further mitigated because groundwater in the overburden, where present, is perched in isolated pockets that generally exist in a thin layer on the bedrock surface, and leaks downward into the bedrock. Only two bedrock monitoring wells (MW-4R and MW-5R) contained MGP-related COCs at concentrations greater than regulatory levels. Both of these wells are located within the

footprint of a former MGP gas holder, which are overlain by two existing on-site commercial buildings (Figure 7). A long-term groundwater sampling and analysis program would be performed to monitor MGP-related COCs in groundwater.

Taken together, the institutional controls (including the SMP) and groundwater monitoring would be expected to adequately and reliably provide for the overall protection of public health and the environment.

Conformance with SCGs – Alternative 2

- *Chemical-Specific SCGs*: While exceedances of certain SCOs would exist, such exceedances do not necessarily equate to a current risk to human health or the environment. Measures to address potential exposure pathways would be implemented as part of this alternative (e.g., restricting land and groundwater use, requiring adherence to provisions of the SMP).

- *Action-Specific SCGs*: Action-specific SCGs are not applicable because the Institutional Controls alternative does not involve the implementation of active remedial measures.

- *Location-Specific SCGs*: Location-specific SCGs are not applicable because the Institutional Controls alternative does not involve the implementation of active remedial measures.

Long-Term Effectiveness and Permanence – Alternative 2

Through the establishment of and adherence to institutional controls, Alternative 2 would effectively meet the RAOs related to potential direct contact, ingestion, or inhalation human health exposure pathways. The RAO related to preventing the migration of MGP-related COCs from subsurface soil to groundwater is and would continue to be addressed by the ground surface cover and the nature of the overburden groundwater (limited to isolated pockets of perched water).

Reduction of Toxicity, Mobility or Volume of Contamination through Treatment – Alternative 2

MGP-impacted subsurface soil and groundwater would be left in place and not actively treated (other than by natural processes), recycled, or destroyed. Therefore, the toxicity, mobility, and volume of environmental media containing MGP-related impacts would not be reduced through treatment.

Short-Term Impacts and Effectiveness – Alternative 2

No additional active remediation would be performed under Alternative 2 and the existing monitoring well network would be used for groundwater monitoring. Therefore, there would be no short-term

environmental impacts or risks to onsite workers or the community associated with implementation of the alternative.

Implementability – Alternative 2

This alternative would be both technically and administratively implementable. Institutional controls (including the SMP) would be established for properties within the project area, which would require coordination with NYSDEC and the property owners. Access agreements would be required to conduct the groundwater monitoring.

The institutional controls would be implemented for the long-term and a 30 year period was used for cost estimating purposes. Similarly, for the purpose of developing a cost, it has been assumed that annual groundwater monitoring would be conducted for 30 years.

Land Use – Alternative 2

The current zoning for the project area, as identified above, is listed by the City of Watertown as commercial and downtown core overlay districts. The foreseeable future use of the project area is the same as the current zoning - commercial, with potential for upper floor housing.

No additional remedial actions would be completed under this alternative and the project area would remain in its current condition. Routine activities conducted at the project area do not include exposure to MGP-related impacts in soil and groundwater. Alternative 2 would not alter current or anticipated future use of the project area.

Cost Effectiveness – Alternative 2

The estimated costs associated with Alternative 2 are presented in Table 2. The total estimated 30-year present worth cost for this alternative is approximately $1,400,000. The estimated capital cost is approximately $140,000. The estimated average annual OM&M cost is approximately $73,580, and includes $25,000 to cover costs for future intrusive work that may occur over the course of the 30-year (maximum) period used for estimating costs in this AAR.

5.2.3 Alternative 3 - Soil Excavation to Unrestricted Use SCOs, Institutional Controls and Groundwater Monitoring

Alternative 3 would include excavation of overburden soils containing MGP-related COCs at concentrations greater than 6 NYCRR Part 375-6 unrestricted use SCOs and soil that is visually-impacted with MGP-related materials (Figure 8). This alternative was developed at the request of

NYSDEC. Under this alternative, excavated soils would be transported and disposed off-site in accordance with applicable rules and regulations. The MGP-related constituents in bedrock groundwater would require implementation of institutional controls and groundwater monitoring.

The overburden soils to be excavated consist primarily of those soils that contained visible coal tar (i.e., at MW-5R, TP-3 and SB-1) and/or historical fill comprising incomplete combustion by-products (e.g., cinders, ash, coal, soot). Coal tar was only observed in trace quantities at three of the 27 RI investigation locations and at each location it was located immediately above the bedrock surface. These three locations (MW-5R, TP-3 and SB-1) also contained BTEX and/or PAHs at levels above SCOs. Coal tar and potential purifier waste were also observed in the overburden and shallow bedrock during the City's Reconstruction Project in front of the Empsall Plaza). Cyanide was not detected in any soil samples at levels above the 6 NYCRR Part 375-6 unrestricted use SCOs.

Some soil samples without coal tar also exceeded SCOs for one or more PAH compounds. The PAH exceedances in these samples may, in part, result from the historical fill materials found throughout this area. As identified in the RI Report, historical fill containing combustion byproducts were observed in nearly every boring or test pit completed during the RI.

Nevertheless this alternative includes excavation of overburden soils containing MGP-related COCs at concentrations greater than 6 NYCRR Part 375-6 unrestricted use SCOs and soil that is visually-impacted with MGP-related materials. The excavation would be completed within the project area to the top of bedrock (ranging from approximately 7 to 16 feet bgs). The approximate excavation limits are shown on Figure 9; the actual limits would be determined during the remedial design/remedial action (RD/RA). Based on these excavation limits, approximately 26,500 cy of soil would be excavated under this alternative.

The approximate excavation limits shown on Figure 9 encompass: (1) the properties where former MGP structures were once located; (2) all of the RI upland sampling locations; and (3) each of the areas where MGP impacts were observed in soil during the City of Watertown's Reconstruction Project. The MGP-impacts observed in the area closest to the entrance to J.B. Wise Place from Center City Drive is outside of these approximate excavation limits because the observed MGP-impacts were limited to stained bedrock pieces within the bedrock fractures from approximately 12 to 14.5 feet bgs. MGP-related impacts were not observed in the soil in this area.

Excavating soils from the project area would require demolition of the existing above-grade features, including the parking lots, a portion of J.B. Wise Place, and two onsite commercial buildings which are actively used for various businesses. Most of the structures associated with the former MGP, including the two gas holders, are overlain by these two buildings. To the extent

appropriate, materials from the demolition activities would be recycled or reused, with the remainder disposed in accordance with applicable rules and regulations.

The excavation would also require protection and/or relocation of numerous utilities present within and/or proximate to the project area and decommissioning of the existing monitoring well network. A pre-design investigation would be required to support the RD/RA of this alternative, including (but not limited to): geotechnical evaluations, utility surveys, and pre-demolition surveys of the onsite buildings.

Excavation activities would be conducted using conventional construction equipment such as backhoes, excavators, front-end loaders, dump trucks, etc. Conventional excavation support systems (e.g., steel sheet pile equipped with internal bracing) would be used as necessary to complete the excavation activities. Management of water within and surrounding the excavation would be conducted to limit precipitation runoff into the excavation and to manage perched groundwater within the overburden. Water generated during the remedial construction activities (including water used to decontaminate equipment) would be properly managed and for cost estimating purposes is assumed to be treated/disposed offsite.

Soil removed from the excavation would be direct-loaded for offsite disposal, to the extent possible. Waste characterization sampling would be conducted during the RD/RA to support profiling necessary for offsite disposal and facilitate direct-loading of the excavated soils. Alternatively, the soil would be stockpiled in a lined material staging area (or portion of the excavation area) for stabilization, if needed, prior to offsite disposal. Based on the results of RI and the characterization sampling performed during the City's Reconstruction Project it is anticipated that the vast majority of soil removed would be characterized as non-hazardous and that hazardous soils (if any) would be limited to those exhibiting the hazardous characteristic of toxicity for benzene which are conditionally exempt from certain hazardous waste management requirements when destined for thermal treatment (further explained below under Conformance with SCGs). For the purpose of cost estimating, the excavated soil is assumed to be non-hazardous and would be transported for offsite disposal at a permitted landfill. The costs for thermal treatment of hazardous wastes (if any) would be accounted for in the contingency costs applied to this alternative, noting that commercial facilities that thermally treat MGP-related wastes are readily available.

Given the complex nature of conducting these excavation activities proximate to structures/streets and within an active commercial/business district, the actual excavation and material handling details (e.g., excavation limits, types of excavation support system(s), water management techniques, material handling and offsite treatment/disposal details) would identified and developed as part of the RD/RA for this alternative.

A foam spray or other vapor control measures would be used to suppress odors and volatile organic vapors originating from the excavation and the excavated soil, as needed. A Community Air Monitoring Plan (CAMP) would be followed throughout the completion of these activities to document airborne particulate and volatile organic vapor concentrations surrounding the excavation area.

Restoration of the project area would be significant, requiring (at minimum) replacement of parking areas and utilities. Imported fill would be transported into the project area and used to backfill the excavation. The fill would meet the unrestricted use SCOs set-forth in 6 NYCRR Part 375 and included in Appendix 5 of DER-10. Because the overburden would be removed from the project area, Alternative 3 would not include the institutional control components associated with soil that are included under Alternatives 2. Rather, the institutional controls for Alternative 3 would restrict future activities that could result in potential exposures to bedrock groundwater containing MGP-related COCs. Specifically, institutional controls would be established for the properties within the project area, in the form of restrictive covenants (deed restrictions) and/or environmental easements, which would:

- Require compliance with a NYSDEC-approved SMP (described below)
- Restrict groundwater use
- Require submittal of periodic certification to NYSDEC that institutional controls have been maintained

The SMP for Alternative 3 would be developed to identify the protocols and requirements for the following activities:

- Conducting intrusive activities (e.g., excavating or drilling) below the top of bedrock
- Proper handling of removed bedrock materials or recovered groundwater
- Evaluating the potential for soil vapor intrusion into the indoor air if new buildings are constructed within the project area
- Conducting groundwater monitoring
- Performing periodic inspections, providing certifications, and submitting periodic review reports to NYSDEC to document that the institutional controls are maintained and remain effective

Alternative 3 would also include collecting and analyzing groundwater samples from bedrock monitoring wells on a periodic basis to monitor groundwater conditions. As summarized in Section 3.1.1 and detailed in the NYSDEC-approved RI Report, only two bedrock monitoring wells (MW-4R and MW-5R) contained MGP-related COCs at concentrations greater than regulatory levels, and both of these wells are located within the footprint of a former MGP gas holder (Figure 7).

Specific details for the groundwater monitoring activities would be provided in the SMP and subject to NYSDEC review/approval. For the purpose of developing a cost, it has been assumed that annual bedrock groundwater monitoring would be conducted for 30 years using a network of 5 bedrock monitoring wells to be installed after completion of the excavation activities. Groundwater samples would be submitted for laboratory analysis of BTEX, PAHs and cyanide. Analytical results would be used to monitor COC concentrations in bedrock groundwater. The results of the groundwater monitoring would be presented to NYSDEC in an annual report.

Overall Protection of Public Health and the Environment – Alternative 3

Alternative 3 would remove soil containing COCs at concentrations greater than 6 NYCRR Part 375-6 unrestricted use SCOs, thereby eliminating potential exposures to MGP-related impacts in soil and overburden groundwater. The MGP-related impacts identified in two bedrock monitoring wells, each located within a footprint of a former MGP gas holder, would remain and require institutional controls and a SMP to address potential future exposures.

Alternative 3 would also eliminate the migration of MGP-related COCs in soil and eliminate these as a potential source of groundwater impacts. Natural attenuation processes may overtime eventually restore bedrock groundwater quality to pre-disposal/pre-release conditions, which would be confirmed by the results of the groundwater monitoring that would be conducted following completion of remedial construction activities.

This alternative would be expected to adequately and reliably provide for the overall protection of public health and the environment.

Conformance with SCGs – Alternative 3

- *Chemical-Specific SCGs*: Potentially applicable chemical-specific SCGs for soil include 6 NYCRR Part 375-6 SCOs and 40 CFR Part 261 and 6 NYCRR Part 371 regulations for the identification and management of hazardous materials. SCGs applicable for bedrock groundwater include NYSDEC Class GA standards and guidance values. As Alternative 3 would remove the overburden soil, and the imported fill would meet the unrestricted use SCOs, the SCOs for unrestricted use would be met. These SCOs are, however, unnecessary to

support the current and foreseeable zoning of the project area (commercial, with potential for upper floor housing). The groundwater Class GA standards and guidance values in bedrock may be achieved over time.

- *Action-Specific SCGs*: Potentially applicable action-specific SCGs include health and safety requirements and regulations associated with handling impacted media. Work activities would be conducted in accordance with Occupational Safety and Health Administration (OSHA) requirements that specify general industry standards, safety equipment and procedures, and record keeping and reporting regulations. Compliance with these action-specific SCGs would be accomplished by following a site-specific HASP.

  Another set of action-specific SCGs are land disposal restrictions (LDRs), which regulate land disposal of hazardous wastes. The LDRs are applicable to the disposal of hazardous waste (if any). Because MGP wastes resulted from historical operations that ended before the passage of RCRA, MGP-impacted material is only considered a hazardous waste in New York if it is removed (generated) and it exhibits a characteristic of a hazardous waste. However, if the MGP-impacted material only exhibits the hazardous characteristic of toxicity for benzene (D018), it is conditionally exempt from the hazardous waste management requirements (6 NYCRR Parts 370-374 and 376) when destined for thermal treatment in accordance with the requirements set forth in NYSDEC's TAGM 4061 titled, "Management of Coal Tar Waste and Coal Tar Contaminated Soils and Sediment from Former Manufactured Gas Plants" (NYSDEC, 2002b). If MGP-related hazardous wastes are destined for land disposal in New York, the state hazardous waste regulations apply, including LDRs and alternative LDR treatment standards for hazardous waste soil. Based on the results of RI and the characterization sampling performed during the City's Reconstruction Project it is anticipated that the vast majority of soil removed from the project area would be characterized as non-hazardous and hazardous soils (if any) would be limited to those exhibiting the hazardous characteristic of benzene which, as described above, are conditionally exempt from hazardous waste management requirements when destined for thermal treatment. Commercial thermal treatment facilities are readily available if needed.

  The United States Department of Transportation (USDOT) and New York State rules for the transport of hazardous materials are provided under 49 CFR Parts 107 and 171.1 through 172.558 and 6 NYCRR 372.3. These rules include procedures for packaging, labeling, manifesting, and transporting of hazardous materials and would potentially be applicable to the transport of hazardous materials under any remedial alternative. New York State requirements for waste transporter permits are included in 6 NYCRR Part 364, along with standards for the collection, transport, and delivery of regulated wastes within New York. The transport of waste materials offsite would need to be properly permitted.

- *Location-Specific SCGs*: Location-specific SCGs potentially applicable to this alternative include local requirements such as building permit conditions for permanent or semi-permanent facilities constructed during the remedial activities (if any), and influent requirements of the wastewater treatment plant (WWTP) if water is to be treated at the site and discharged to the WWTP. Location-specific SCGs also generally include floodplain and wetland regulations, restrictions promulgated under the Endangered Species Act, and other federal acts. However, as indicated by the FWRIA performed as part of the RI (refer to the RI Report [ARCADIS, 2012] for details), a review of NYSDEC National Wetland Inventory Maps and a field reconnaissance confirmed the absence of wetlands adjacent to site. In addition, the FWRIA indicated that there are no recorded occurrences of threatened/endangered plant or animal species in the immediate vicinity of the site. Moreover, the remedial activities under this alternative would be limited to the upland area that is a mixture of commercial and industrial properties covered by asphalt or buildings. Wildlife present generally consists of species that are adapted to urban environments (e.g., American robin, mice, and raccoon).

  Compliance with the location-specific SCGs would be achieved by conducting the remedial activities in accordance with local building/construction codes and ordinances. Local permits would be obtained as necessary prior to initiating the remedial activities.

Long-Term Effectiveness and Permanence – Alternative 3

Under Alternative 3, soil containing COCs at concentrations greater than unrestricted use SCOs would be excavated. Excavated material would be transported off-site for treatment/disposal in accordance with applicable rules and regulations.

Alternative 3 would eliminate the migration of MGP-related COCs in soil and eliminate these as a potential source of the minimal groundwater impacts documented in the RI Report. Alternative 3 may eventually restore bedrock groundwater quality to pre-disposal/pre-release conditions, which would be confirmed by the results of the groundwater monitoring to be conducted following completion of the remedial construction activities.

Reduction of Toxicity, Mobility or Volume of Contamination through Treatment – Alternative 3

Alternative 3 would include the excavation of approximately 26,500 cy of material to address soil containing COCs at concentrations greater than 6 NYCRR Part 375-6 unrestricted use SCOs. Excavated material and generated water would be transported off-site for treatment and/or disposal in accordance with applicable rules and regulations.

Short-Term Impacts and Effectiveness – Alternative 3

Implementation of this alternative could result in short-term exposure of the surrounding community and workers to MGP-related COCs as a result of excavation, material handling, and off-site transportation activities. Potential exposure mechanisms would include ingestion and dermal contact with impacted soil, and/or groundwater and inhalation of volatile organic vapors or dust containing COCs during remedial construction. Potential exposure of remedial workers would be minimized through the use of appropriately trained field personnel and PPE, as specified in a site-specific HASP that would be developed as part of the remedial design.

Additional worker safety concerns include working with and around large construction equipment, noise generated from operating construction equipment, and increased vehicle traffic associated with transportation of excavated material from the project area and delivery of fill materials. These concerns would be minimized by using engineering controls and appropriate health and safety practices. Air monitoring would be performed during implementation of this alternative to determine the need for additional engineering controls (e.g., use of water sprays/foam suppressants to suppress dust/vapors/odors following removal of cover materials, modifying the rate of construction activities, etc.) and to confirm that dust and volatilized organic vapors are within acceptable levels, as specified in the site-specific HASP and Community Air Monitoring Plan.

Community access to the project area would be restricted during implementation of the remedial activities through the use of fencing and manned security. Risks to the community would be minimized by providing fencing around the work area and implementing a CAMP to minimize the potential migration of volatile organic vapors or impacted dust from the work area. In addition, actions would be taken, if needed, to minimize potential MGP nuisance odors. Additional risks to occupants in buildings proximate to the project area or visitors to J.B. Wise Place may occur relating to noise, vibrations, and exhaust originating from equipment used for the remedial construction and building demolition activities.

The excavated soil would pose a risk while onsite and during transportation from the site to the treatment/disposal facility because it would be more accessible to human exposure. Under this alternative, traffic resulting from the transportation of approximately 26,500 cy of impacted soil for offsite disposal and for importing the same volume of clean fill materials would pose a potential nuisance to the community and increase the risk for accidents and spills. Off-site transportation of the excavated material and importation of clean fill materials alone would result in approximately 2,120 truck round trips (assuming 25 tons per truck). Additional truck traffic would result from transporting the building demolition debris and water generated during remedial construction activities to the offsite facilities permitted to accept these wastes. Alternative 3 would temporarily increase local truck traffic and disrupt use of J.B. Wise Place, requiring careful planning/

management to minimize risks to the community. Waste transport trucks would have watertight tailgates with a gasket between the box and the tailgate regardless of the designation of the load.

Alternative 3 does not employ green remediation practices and the relative carbon footprint (as compared to the other alternatives) is considered significant based on a number of factors including consumption of resources (fuel used, soil imported from borrow sources, and filling of air-space within landfills), extent of demolition and earth moving activities, waste generation, and greenhouse and other air emissions. Under this alternative approximately 26,500 cy of soil would be excavated and replaced by imported clean fill, and two commercial buildings currently used for various businesses would be demolished and the debris transported offsite for disposal or recycling. Implementation would require a significant amount of fuel for trucking and construction equipment, and create a proportionate amount of associated air emissions.

The construction components of this alternative (e.g., building demolition, soil excavation and backfilling activities, and asphalt restoration) could be completed in approximately one year. For cost estimating purposes in this AAR, remedial construction activities are assumed to be conducted in one continuous effort. Groundwater monitoring would be conducted over an assumed 30-year period for cost estimating purposes.

Implementability – Alternative 3

MGP-impacted soil removal and offsite treatment/disposal is technically feasible. Remedial contractors for the removal of the impacted soil are readily available. Difficulties associated with the excavation component of the remedial alternative include: (1) excavation in close proximity to existing roads and structures within an active commercial/business district; (2) excavation in close proximity to J.B. Wise Place entrance off of City Center Drive, a relatively high volume traffic route; (3) excavation of a portion of the J.B. Wise Place used by the local merchants and businesses; (4) relocation or protection of numerous subsurface utilities within or proximate to the project area; (5) controlling dust/odors that would potentially be generated during excavation and materials handling; (6) securing a sufficient number of waste haulers and NYSDEC-approved imported fill sources (demonstrated to meet unrestricted use SCOs) to expeditiously complete the remediation; and (7) minimizing noise and overall disruption (to the extent practicable) to the businesses and customers/visitors.

Administratively, Alternative 3 is implementable and would require coordination with NYSDEC and the property owners for the full scope of this alternative, including those ancillary activities required to excavate the MGP-impacted soil within the project area. This includes demolition of two commercial buildings that are used for various business purposes and the associated affects to these businesses, as well as demolition of portions of the City's Reconstruction Project (J.B. Wise Place, utilities, parking lots, and landscape features) completed in 2011. This alternative would disrupt use of J.B. Wise Place and

adjacent parking lots. Access agreements would be required to conduct the bedrock groundwater monitoring.

The anticipated time associated with implementation of this alternative, not including the pre-design investigation program or time to obtain necessary approvals, agreements, and permits to conduct these activities, would be approximately one year. The institutional controls and groundwater monitoring could last 30 years.

Land Use – Alternative 3

The current zoning for the project area, as identified above, is listed by the City of Watertown as commercial and downtown core overlay districts. The foreseeable future use of the project area is the same as the current zoning - commercial, with potential for upper floor housing.

The extensive soil removal required under this alternative would achieve unrestricted SCOs which are not necessary to support the current and foreseeable zoning of the project area. While this alternative does not alter the anticipated future use of the project area, it would alter the current use of two commercial buildings that would be demolished.

Cost Effectiveness – Alternative 3

The estimated costs associated with Alternative 3 are presented in Table 3. The total estimated 30-year present worth cost for this alternative is approximately $16,800,000. The estimated capital cost, including costs for conducting soil removal, building demolition, waste transport and disposal, is approximately $16,160,000.

The estimated 30-year present worth cost of OM&M activities associated with this alternative, including conducting bedrock groundwater monitoring, is approximately $640,000. The average annual OM&M cost is approximately $37,000, and includes $2,500 to cover costs for future intrusive bedrock work that may occur over the course of the 30-year (maximum) period used for estimating costs in this AAR.

6. Comparative Analysis of Alternatives and Recommended Remedy

6.1 Recommended Remedy

This section presents the comparative analysis of the remedial alternatives using the evaluation criteria identified in Section 5, to identify the advantages and disadvantages of the alternatives relative to each other. The comparative analysis provides the basis for the remedy recommended to address MGP-related impacts associated with the site.

The alternatives evaluated in Section 5 consist of the following:

- Alternative 1 – No Action
- Alternative 2 – Institutional Controls and Groundwater Monitoring
- Alternative 3 – Soil Excavation to Unrestricted Use SCOs, Institutional Controls and Groundwater Monitoring

Alternative 2 is recommended based on the results of the NYSDEC-approved RI and the evaluation of alternatives. Alternative 2, as described below, satisfies the NYSDEC's threshold criteria and provides the best balance the NYSDEC balancing criteria described in Section 5.1. This alternative addresses MGP COCs in subsurface soil and groundwater through institutional controls (including administration of a SMP) and groundwater monitoring. Institutional controls would be established to maintain the overall protection of human health and the environment established under current conditions. Additionally, a sampling and analysis program would be implemented to monitor MGP-related COCs in groundwater.

The comparative analysis of the three alternatives follows, providing the basis for recommending Alternative 2.

6.2 Comparative Analysis

Although routine activities conducted within the project area do not include intrusive activities that could result in exposure to subsurface soil and groundwater containing MGP-related impacts, Alternative 1 (No Action) does not address this potential exposure pathway. Alternative 1 does not provide overall protection of human health and will not be evaluated further.

Alternative 3, by removing soils to achieve NYSDEC's unrestricted use SCOs, meets the NYSDEC's threshold criteria of overall protection of public health and the environment and

conformance with SCGs. Alternative 2 also meets the threshold criteria to potentially a lower degree of certainty by relying on institutional controls (including administration of a SMP). Because Alternatives 2 and 3 both satisfy the threshold criteria, the remaining criteria are particularly important in selecting a final remedy for the project area.

Long-term effectiveness is best accomplished by the excavation of overburden soils (Alternative 3). Alternative 3 would result in the removal of this potential source of MGP-related groundwater impacts, but it also requires institutional controls (including administration of a SMP) and long-term monitoring to address bedrock groundwater. Alternative 2 would rely more on the institutional controls to mitigate future exposures to subsurface soil and groundwater, compared to Alternative 3. Maintaining the ground surface cover across the project area under Alternative 2 would continue to limit infiltration of precipitation into the overburden, which reduces the migration of MGP-related COCs that could result in impacts to groundwater. Potential migration is further mitigated because groundwater in the overburden, where present, is perched in isolated pockets that generally exist in a thin layer on the bedrock surface, and leaks downward into the bedrock. Only two bedrock monitoring wells (MW-4R and MW-5R) contained MGP-related COCs at concentrations greater than regulatory levels, and both of these wells are located within the footprint of a former MGP gas holder (Figure 7). A long-term groundwater sampling and analysis program would also be required under Alternative 2.

Alternative 2 would control potential exposures with institutional controls and will not offer immediate reduction in the toxicity, mobility or volume of MGP-related COCs remaining, because no additional active remediation would be performed. Alternative 3 would eliminate the MGP-related COCs in soil within the project area but no treatment would be performed for the vast majority, if not the entire volume, of excavated soil as it would be disposed offsite at a permitted landfill in accordance with applicable rules and regulations.

Alternative 2 will not have short-term impacts to remedial workers, the public, or the environment because no active remediation would be performed and the existing monitoring well network would be used. Alternative 3 includes significant excavation and material handling activities to address visually MGP-impacted soil and soil containing MGP-related COCs at concentrations greater than the unrestricted use SCOs. Alternative 3 would pose potential short-term risks to remedial workers and the public from potential exposure to impacted soil and groundwater during excavation, material handling, off-site transportation of material, and importing of backfill. Additionally, the excavation activities conducted under Alternative 3 would pose short-term risks from the operation of construction equipment, and generation of noise and dust.

Potential exposures during remedial construction of these alternatives would be mitigated, to the extent practicable, by using appropriate PPE, community and work space air monitoring,

implementation of dust control and noise mitigation measures (as appropriate and if necessary based on monitoring results), and proper planning and training of remedial workers.

Alternative 2 would have no carbon footprint. Alternative 3 would have a significant carbon footprint compared to the other alternatives. The greatest contribution to greenhouse gases would occur as a result of equipment operation during demolition, excavation, backfilling, and transportation activities. Additionally, Alternative 3 would consume significant resources including fuel, soil imported from borrow sources, and filling of air-space within landfills. Alternative 3 would be the most disruptive to the local community, has the greatest potential for exposures to remedial workers and the public, would require the longest time to implement, and has the greatest carbon footprint.

Both Alternatives 2 and 3 are technically feasible to implement. Alternative 2 is the most favorable as it is the easiest to implement. No additional remedial activities would be conducted as part of Alternative 2 and the project area would remain in its current condition.

Alternative 3 would be the most difficult to implement because it includes significant soil removal within an active commercial/business district, demolition of the reconstruction work completed by the City of Watertown in 2011 within the project area, and demolition of two commercial buildings which are currently used for various businesses. Most of the structures associated with the former MGP, including two gas holders, are overlain by these two buildings. Implementation of this alternative is the most disruptive to the public and would occur over an extended period of time. The construction components of Alternative 3 (e.g., building demolition, soil excavation and backfilling activities, and asphalt restoration) could be completed in approximately one year.

Alternatives 2 and 3 both include long-term groundwater monitoring, preparation of a SMP, and implementation of institutional controls. Administratively, establishing institutional controls would require coordination with state agencies (i.e., NYSDEC) and the property owners. Access agreements would be required. There would be comparatively less long-term term activities (i.e., limited to bedrock) for Alternative 3 because of the significant short-term activities.

The current zoning for the site, as identified above, is listed by the City of Watertown as commercial and downtown core overlay districts. The foreseeable future use of the site is the same as the current zoning - commercial, with potential for upper floor housing. Alternative 2 would not alter current or anticipated future use of the project area. Alternative 3 also would not alter the anticipated future use of the project area, but it would alter the current use of two commercial buildings that would be demolished and disturb the public for approximately one year (assumed for cost estimating purposes) while remedial construction activities are conducted. The remaining MGP impacts with Alternatives 2 and 3 would be controllable with implementation of a SMP.

The costs of the alternatives vary significantly. The following table summarizes the estimated costs associated with implementing each of the remedial alternatives.

Table 6.1 Remedial Alternatives Estimated Costs

Alternative	Estimated Capital Rounded Cost	Estimated Annual OM&M Cost	Total Estimated Present Worth Rounded Cost
Alternative 1 – No Action	$0	$0	$0
Alternative 2 – Institutional Controls and Groundwater Monitoring	$140,000	$73,580	$1,400,000
Alternative 3 – Soil Excavation to Unrestricted Use SCOs, Institutional Controls, and Groundwater Monitoring	$16,160,000	$37,050	$16,800,000

Note:
1. Estimated present worth of OM&M cost is over an assumed 30-year period.

Alternative 2 has lower capital costs but higher total OM&M costs. The estimated annual OM&M cost for Alternative 2 includes $25,000 to cover costs for future intrusive work that may occur. The estimated capital cost for Alternative 3 is more than 100 times greater than estimated for Alternative 2 because of the significant construction activities. The annual OM&M costs are almost half as much because the SMP and the institutional controls for Alternative 3 would not need to address soils. The annual OM&M cost for Alternative 3 includes $2,500 to cover costs for future intrusive bedrock work that may occur.

The capital cost to implement Alternative 3 is significantly greater relative than Alternative Additionally, Alternative 3 corresponds to the greatest disruption to the local businesses and surrounding community and has greatest potential for exposures during implementation of the alternative. Therefore, Alternative 3 is considered the least cost effective compared to the short-term effectiveness and long-term effectiveness criteria.

6.3 Summary

Based on the comparative analysis of the remedial alternatives presented above, Alternative 2 is the recommended remedy for the project area. Alternative 2 would achieve the best balance of the NYSDEC evaluation criteria, while effectively reducing the potential for future exposure to subsurface soil and groundwater containing MGP-related impacts. As identified in the NYSDEC-approved RI Report, the exposure assessment indicates that the greatest potential for exposure to MGP-related COCs is direct contact with subsurface soils and groundwater that may be encountered during intrusive work by construction workers within the project area (see Section 4).

Under Alternative 2, institutional controls would be established for the properties comprising the project area to maintain the overall protection of human health and the environment established under current conditions. Additionally, a sampling and analysis program would be implemented to monitor MGP-related COCs in groundwater.

The project area includes the following properties:

- Tax Parcels 701132 and 701133 (owned by Mr. Thomas Horning)
- Tax Parcels 701134 and 701135 (owned by Psychedelic Entertainment, LLC)
- J.B. Wise Place/Tax Parcel 701137 (owned by the City of Watertown)

Alternative 2 would require those aspects of the project area which are already protective of human health and the environment to remain in the future. For instance, existing ground surface cover in the form of asphalt pavement and buildings prevents potential direct contact with, or ingestion of, MGP-impacted soil. The cover also limits infiltration of precipitation into the overburden, which reduces the migration of MGP-related COCs that could result in impacts to groundwater. Potential migration is further mitigated because groundwater in the overburden, where present, is perched in isolated pockets that generally exist in a thin layer on the bedrock surface, and leaks downward into the bedrock. Only two bedrock monitoring wells (MW-4R and MW-5R) contained dissolved phase MGP-related COCs at concentrations greater than regulatory levels (mobile NAPL was not observed during the RI or the City's Reconstruction Project). Both of these bedrock wells are located within the footprint of a former MGP gas holder, currently overlain by two existing commercial buildings used for various businesses. Natural attenuation processes over time may reduce the concentrations of dissolved phase MGP COCs in groundwater.

Institutional controls would be established for the properties comprising the project area, in the form of restrictive covenants (deed restrictions) and/or environmental easements, which would:

- Limit the use and development of the site to commercial use with potential for upper floor housing, which would also allow industrial uses as permitted by local zoning.

- Require compliance with a NYSDEC-approved Site Management Plan (described below).

- Restrict groundwater use.

- Require submittal of periodic certification to NYSDEC that institutional controls have been maintained and the surface of the site remains covered by pavement and/or buildings.

The SMP would be subject to NYSDEC review/approval and would be developed to describe the MGP-impacted soil and groundwater associated with the site (i.e., within the project area). The SMP would identify the protocols and requirements for the activities listed below.

- Conducting intrusive activities (e.g., excavating or drilling) that would disturb the subsurface below the existing cover pavement or buildings
- Proper handling of excavated soil
- Evaluating the potential for soil vapor intrusion into the indoor air if new structures are built within the project area
- Conducting groundwater monitoring from the existing network of monitoring wells
- Performing periodic inspections, providing certifications, and submitting periodic review reports to NYSDEC to document that the institutional controls and surface cover pavement are maintained and remain effective

Alternative 2 is recommended over the other remedial alternatives based on the following key points:

- Alternative 1 (No Action) does not meet NYSDEC threshold criteria.
- Alternatives 2 and 3 both meet the NYSDEC threshold criteria.
- Remedial construction activities associated with Alternative 3 would require approximately one year, compared to Alternative 2 which does not require any remedial construction activities and is thereby significantly less disruptive to local businesses and the surrounding community.
- Alternative 3 is not a cost-effective alternative (i.e., the cost is not proportional to the overall effectiveness) given the duration of remedial construction activities, potential for exposure during remediation, and associated disruption to local businesses and the surrounding community.
- Alternative 3 requires institutional controls and groundwater monitoring even though an estimated 26,500 cy of overburden materials would be removed.
- Alternative 3 has a significant carbon footprint and would consume significant resources.

- Alternative 2 would not alter current or anticipated future use of the project area.
- Alternative 2 achieves the best balance of the NYSDEC evaluation criteria.

The estimated present worth to implement the recommended remedy, Alternative 2, is $1,400,000. The capital costs are estimated to be $140,000, and the estimated average annual cost for 30 years is $73,580.

7. References

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ARCADIS

Tables

TABLE 1
SUMMARY OF OBSERVED SUBSURFACE IMPACTS

ALTERNATIVE ANALYSIS REPORT
NATIONAL GRID
WATERTOWN (ANTHONY STREET) NON-OWNED FORMER MGP SITE
WATERTOWN, NEW YORK

Location or Area	Summary of Observed Impacts
RI Locations	
TP-3	• Trace sheen and NAPL blebs observed on groundwater. • Faint naphthalene-like odor at 7.5 feet bgs.
TP-4	• Strong petroleum-like odor observed from 6 to 8.9 feet bgs.
SB-1	• Trace black viscous tar-like material at approximately 9.4 feet bgs.
SB-2	• Slight rainbow sheen at approximately 8 feet bgs.
SB-3	• MGP-like odor from 6 to 9.2 feet bgs.
SB-5	• Degraded petroleum-like odor from 3.5 to 4 and 6 to 7.8 feet bgs.
MW-2	• Faint petroleum-like odor observed below 8.5 feet bgs. • Refusal at 8.5 feet bgs.
MW-5R	• Black oily NAPL (saturated), rainbow sheen, strong MGP-like odor from 12 to 15 feet bgs.
Buried Vessel	• Petroleum-like odor on water removed from vessel prior to filling vessel with flowable fill.
Areas Observed During City's Redevelopment Project	
1	Black stained bedrock pieces with tar and black staining in seams within the bedrock fractures from approximately 12 to 14.5 feet bgs (bottom of excavation).
1 Extension	Staining observed as described above (Area 1) and at similar depths in bedrock.
2	Blue/green staining on fill material, approximately 2.5 to 4 feet bgs.
3	Chunks of brick and concrete with hardened brittle tar. This brittle tar was also observed by itself and not attached to any fill debris. These materials were observed between approximately 1.5 to 4 feet bgs. A moderate tar-like odor accompanied the brittle tar.
4	2 to 4 inch layer of hardened tar at approximately 4 feet bgs, exhibiting a moderate tar-like odor.
5	City called in spill (NYSDEC #1102289). Gray staining and moderate to strong petroleum odors observed at 3 feet bgs.
6	Blue/green stained cinders/ash at approximately 2 to 3 feet bgs.
7	Viscous/tarry layer approximately 6 inches bgs (below two layers of newer asphalt), exhibiting a moderate to strong petroleum odor.
8	City called in spill (NYSDEC # 1102757). Degraded petroleum-like odor observed to be associated with black-stained silt with bedrock fractures and at times immediately above bedrock in medium to fine sands.
9	Moderate MGP-like odor comingling with a degraded petroleum odor. A series of shake tests indicated the presence of tar-like NAPL blebs and a viscous tar was observed in a vertical bedrock fracture.

Notes:
1. All depths are approximate.
2. Locations and areas are shown on Figures 3 and 4.
3. Appendix C of the RI Report (ARCADIS, 2012) provides an evaluation of potential sources of volatile hydrocarbons in soil samples collected from Area 5 (Catch Basin-11A area) and Area 8 (Empsall Plaza area). The evaluation was conducted using the results of forensic volatile hydrocarbon PIANO analysis (Paraffin, Isoparaffin, Aromatic, Naphthene, and Olefin compounds). Multiple lines of evidence from the forensic data were used to identify potential sources of hydrocarbons in the soil samples. There was no indication that the sample from Area 5 contains coal tar. The sample collected from Area 8 had a volatile hydrocarbon composition characteristic of coal tar material.

TABLE 2
COST ESTIMATE FOR ALTERNATIVE 2
INSTITUTIONAL CONTROLS AND GROUNDWATER MONITORING

ALTERNATIVE ANALYSIS REPORT
NATIONAL GRID
WATERTOWN (ANTHONY STREET) NON-OWNED FORMER MGP SITE
WATERTOWN, NEW YORK

Item #	Description	Estimated Quantity	Unit	Unit Price	Estimated Price
Capital Costs					
1.	Site Management Plan	1	LS	$25,000	$25,000
2.	Implementation of Institutional Controls	1	LS	$75,000	$75,000
				Subtotal Capital Costs:	$100,000
				Administration & Engineering (10%):	$10,000
				Contingency (30%):	$30,000
				Total Capital Cost:	$140,000
Annual Operation, Maintenance, and Monitoring (OM&M) for years 0 - 30					
3.	Groundwater Sampling	1	Event	$12,000	$12,000
4.	Laboratory Analysis of Groundwater Samples	1	Event	$3,600	$3,600
5.	Annual Groundwater Report to NYSDEC	1	Event	$10,000	$10,000
6.	Miscellaneous Waste Disposal	1	Event	$1,000	$1,000
7.	Implement Site Management Plan for Intrusive Work	1	LS	$25,000	$25,000
8.	Verification of Institutional Controls and Notifications to NYSDEC	1	Event	$5,000	$5,000
				Subtotal OM&M Costs:	$56,600
				Contingency (30%):	$16,980
				Total OM&M Costs:	$73,580
				Total Present Worth of OM&M (Years 0-30 @ 4%):	$1,272,300
				Total Estimated Cost:	$1,412,300
				Rounded To:	$1,400,000

General Notes:

1. Cost estimate is based on ARCADIS of New York's (ARCADIS) past experience and vendor estimates using 2013 dollars.
2. This estimate has been prepared for the purposes of comparing potential remedial alternatives. The information in this cost estimate is based on the available information regarding the site investigation and the anticipated scope of the remedial alternative. This cost estimate is expected to be within -30% to +50% of the actual project cost. Utilization of this cost estimate information beyond the stated purpose is not recommended.

Assumptions:

1. Site management plan cost estimate includes labor and materials necessary to prepare a site management plan for long-term management of the project area that will: (1) describe MGP-impacted groundwater and soil associated with the site; (2) address possible future intrusive activities that would result in the potential for contact with MGP-impacted soil or groundwater; and (3) set forth the inspection, monitoring, and reporting activities.
2. Implementation of institutional controls cost estimate includes labor and materials necessary to institute institutional controls (e.g., deed restriction, covenants and restrictions, environmental easement) that will: (1) limit the use and development of the project area to restricted residential use, which would also allow commercial and industrial uses, as permitted by local zoning; (2) require compliance with an approved site management plan; (3) restrict the use of groundwater as a source of drinking water or industrial supply without the necessary water quality treatment as determined by the New York State Department of Health; and (4) require National Grid to prepare and submit to the NYSDEC a periodic certification of institutional and engineering controls.

3 - 5. Groundwater sampling labor and expenses cost estimate includes labor, equipment, and materials necessary to conduct annual sampling events, analyze groundwater samples, and prepare an annual groundwater monitoring report to summarize the results of the groundwater monitoring activities. Estimate assumes existing monitoring well network would be used, laboratory analysis costs to be $300 per sample (VOCs, SVOCs, and Cyanide), and collection of 12 groundwater samples (including QA/QC samples) per event.

6. Miscellaneous waste disposal cost estimate includes transportation and disposal of waste generated during groundwater sampling (e.g., purge water, personal protective equipment, and disposable supplies) at a facility(ies) permitted to accept the waste.
7. Implementation of site management plan for intrusive work cost estimate includes labor, equipment, and materials necessary to address work activities associated with MGP-related impacts during future intrusive activities.
8. Annual costs associated with the institutional controls include verifying the status of institutional controls and preparing/submitting notification to the NYSDEC to demonstrate that the institutional controls are being maintained and remain effective.

TABLE 3
COST ESTIMATE FOR ALTERNATIVE 3
SOIL EXCAVATION TO UNRESTRICTED USE SCOs, INSTITUTIONAL CONTROLS AND GROUNDWATER MONITORING

ALTERNATIVE ANALYSIS REPORT
NATIONAL GRID
WATERTOWN (ANTHONY STREET) NON-OWNED FORMER MGP SITE
WATERTOWN, NEW YORK

Item #	Description	Estimated Quantity	Unit	Unit Cost	Estimated Cost
General Costs - Site Wide					
1.	Site Management Plan	1	LS	$25,000	$25,000
2.	Implementation of Institutional Controls	1	LS	$50,000	$50,000
3.	Pre-Design Investigation	1	LS	$250,000	$250,000
4.	Mobilization/Demobilization	1	LS	$395,400	$395,400
5.	Utility Markout, Protection and Relocation	1	LS	$1,000,000	$1,000,000
6.	Construction and Removal of Soil Staging and Decontamination Areas	1	LS	$50,000	$50,000
7.	Abandonment and Installation of Monitoring Wells	1	LS	$50,000	$50,000
8.	Permitting and Traffic Control Plan	1	LS	$20,000	$20,000
				Subtotal Capital Cost:	$1,840,400
				Administration and Engineering (10%):	$184,040
				Construction Management (10%):	$184,040
				Contingency (30%):	$552,120
				Total General Cost:	$2,760,600
Capital Costs for Parcel 701132					
9.	Building Demolition	25,000	SF	$11	$275,000
10.	Demolition Air Monitoring	1	LS	$4,000	$4,000
11.	Building Demolition Debris Transportation and Disposa	1,920	Ton	$55	$105,600
12.	Asphalt/Concrete Removal	3,900	SF	$1	$3,900
13.	Soil Excavation and Handling	4,500	CY	$50	$225,000
14.	Community Air Monitoring and Dust/Vapor/Odor Contro	6	Week	$3,000	$15,000
15.	Fill Importation, Placement, Compaction, and Grading	4,500	CY	$35	$157,500
16.	Soil Characterization for Offsite Treatment/Disposal	18	Sample	$600	$10,920
17.	Soil/Waste Transportation and Disposal	9,100	Ton	$75	$682,500
18.	Wastewater Storage and Disposal	6	Week	$5,000	$15,000
19.	Asphalt Restoration	146	Ton	$50	$7,300
20.	Parcel Market Value	1	LS	$302,500	$302,500
Capital Costs for Parcel 701133					
21.	Asphalt/Concrete Removal	9,700	SF	$1	$9,700
22.	Soil Excavation and Handling	3,600	CY	$50	$180,000
23.	Community Air Monitoring and Dust/Vapor/Odor Controls	5	Week	$3,000	$15,000
24.	Fill Importation, Placement, Compaction, and Grading	3,600	CY	$35	$126,000
25.	Soil Waste Characterization	15	Sample	$600	$8,400
26.	Soil /Waste Transportation and Disposal	7,400	Ton	$75	$555,000
27.	Wastewater Storage and Disposal	5	Week	$5,000	$12,500
28.	Asphalt Restoration	400	Ton	$50	$20,000
29.	Parcel Market Value	1	LS	$46,800	$46,800
Capital Costs for Parcel 701134					
30.	Building Demolition	45,500	SF	$11	$500,500
31.	Demolition Air Monitoring	1	LS	$8,000	$8,000
32.	Building Demolition Debris Transportation and Disposal	4,000	Ton	$55	$220,000
33.	Asphalt/Concrete Removal	6,700	SF	$1	$6,700
34.	Soil Excavation and Handling	8,100	CY	$50	$405,000
35.	Community Air Monitoring and Dust/Vapor/Odor Contro	12	Week	$3,000	$36,000
36.	Fill Importation, Placement, Compaction, and Grading	8,100	CY	$35	$283,500
37.	Soil Waste Characterization	33	Sample	$600	$19,200
38.	Soil/ Waste Transportation and Disposal	16,300	Ton	$75	$1,215,000
39.	Wastewater Storage and Disposal	12	Week	$5,000	$60,000
40.	Asphalt Restoration	300	Ton	$50	$15,000
41.	Parcel Market Value	1	LS	$340,900	$340,900
Capital Costs for Parcel 701135					
42.	Asphalt/Concrete Removal	6,600	SF	$1	$6,600
43.	Soil Excavation and Handling	2,400	CY	$50	$120,000
44.	Community Air Monitoring and Dust/Vapor/Odor Controls	3	Week	$3,000	$9,000
45.	Fill Importation, Placement, Compaction, and Grading	2,400	CY	$35	$84,000
46.	Soil Waste Characterization	10	Sample	$600	$6,000
47.	Soil /Waste Transportation and Disposal	4,900	Ton	$75	$367,500
48.	Wastewater Storage and Disposal	3	Week	$5,000	$7,500
50.	Asphalt Restoration	200	Ton	$50	$10,000
51.	Parcel Market Value	1	LS	$17,000	$17,000

See Notes and Assumptions on Pages 2 and 3.

TABLE 3
COST ESTIMATE FOR ALTERNATIVE 3
SOIL EXCAVATION TO UNRESTRICTED USE SCOs, INSTITUTIONAL CONTROLS AND GROUNDWATER MONITORING

ALTERNATIVE ANALYSIS REPORT
NATIONAL GRID
WATERTOWN (ANTHONY STREET) NON-OWNED FORMER MGP SITE
WATERTOWN, NEW YORK

Item #	Description	Estimated Quantity	Unit	Unit Cost	Estimated Cost
Capital Costs for JB Wise Place/Parcel 701137					
52.	Asphalt/Concrete Removal	21,300	SF	$1	$21,300
53.	Soil Excavation and Handling	7,900	CY	$50	$395,000
54.	Community Air Monitoring and Dust/Vapor/Odor Controls	11	Week	$3,000	$15,000
55.	Fill Importation, Placement, Compaction, and Grading	7,900	CY	$35	$276,500
56.	Soil Waste Characterization	39	Sample	$600	$7,800
57.	Soil/ Waste Transportation and Disposal	19,700	Ton	$75	$1,477,500
58.	Wastewater Storage and Disposal	11	Week	$5,000	$25,000
59.	Asphalt Restoration	800	Ton	$50	$40,000
60.	Parcel Market Value	1	LS	$176,100	$176,100
				Subtotal Capital Cost:	$8,949,220
				Administration and Engineering (10%):	$894,922
				Construction Management (10%):	$894,922
				Contingency (30%):	$2,684,766
				Total Capital Cost for Parcels:	$13,423,830
Annual Operation, Maintenance, and Monitoring (OM&M) for years 0 - 30					
61.	Groundwater Sampling	1	Event	$10,000	$10,000
62.	Laboratory Analysis of Groundwater Samples	1	Event	$3,000	$3,000
63.	Annual Report to NYSDEC	1	Event	$8,500	$8,500
64.	Miscellaneous Waste Disposal	1	Event	$1,000	$1,000
65.	Implement SMP for Intrusive Work Below Top of Bedrock	1	LS	$2,500	$2,500
66.	Verification of Institutional Controls and Notifications to NYSDEC	1	Event	$3,500	$3,500
				Subtotal OM&M Costs:	$28,500
				Contingency (30%):	$8,550
				Total OM&M Costs:	$37,050
				Total Present Worth of OM&M (Years 0-30 @ 4%):	$640,700.00
				Total Estimated Cost:	$16,825,130
				Rounded To:	$16,800,000

General Notes:

1. Cost estimate is based on ARCADIS of New York's (ARCADIS) past experience and vendor estimates using 2013 dollars.
2. This estimate has been prepared for the purposes of comparing potential remedial alternatives. The information in this cost estimate is based on the available information regarding the site investigation and the anticipated scope of the remedial alternative. Changes in cost elements are likely to occur as a result of new information and data collected during the engineering design of the remedial alternative. This cost estimate is expected to be within -30% to +50% of the actual project cost. Utilization of this cost estimate information beyond the stated purpose is not recommended.
3. Cost estimate assumes remedial activities are conducted in one continuous effort. As such, costs for delays or demobilization and remobilization to the site are not included.
4. Estimate assumes soil removal rate of approximately 700 CY per week.

Assumptions - General Costs Site Wide:

1. Site management plan cost estimate includes labor and materials necessary to prepare a site management plan for long-term management of the project area that will: (1) describe MGP-impacted groundwater associated with the site; (2) address possible future intrusive activities that would result in the potential for contact with MGP impacted groundwater; and (3) set forth the inspection, maintenance, and monitoring activities.
2. Implementation of institutional controls cost estimate includes labor and materials necessary to institute institutional controls (e.g., deed restriction, covenants and restrictions, environmental easement) that will: (1) limit the use and development of the project area to restricted residential use, which would also allow commercial and industrial uses, as permitted by local zoning; (2) require compliance with an approved site management plant; (3) restrict the use of groundwater as a source of drinking water or industrial supply without the necessary water quality treatment as determined by the New York State Department of Health; and (4) require National Grid to prepare and submit to the NYSDEC a periodic certification of institutional and engineering controls.
3. Pre-design investigation (PDI) cost estimate includes labor and equipment necessary to conduct PDI activities in support of the remedial design of this alternative. PDI activities may include, but are not limited to, collection of geotechnical analyses, pre-demolition survey of buildings, and evaluation of potential excavation and utility support systems.
4. Mobilization/demobilization cost estimate includes mobilization and demobilization of labor, equipment, and material necessary to perform soil excavation activities. Estimate assumes 10% of capital costs (excluding T&D costs) to be allocated for these services.
5. Utility markout, protection, and relocation cost estimate includes labor, equipment, and materials to perform utility mark-out, deactivation, relocation, and replacement.
6. Construction and removal of soil staging and decontamination areas cost estimate includes labor, equipment, and materials to construct, maintain and remove soil staging areas and decontamination pads. Estimate includes costs for more than one set-up if deemed necessary.

TABLE 3
COST ESTIMATE FOR ALTERNATIVE 3
SOIL EXCAVATION TO UNRESTRICTED USE SCOs, INSTITUTIONAL CONTROLS AND GROUNDWATER MONITORING

ALTERNATIVE ANALYSIS REPORT
NATIONAL GRID
WATERTOWN (ANTHONY STREET) NON-OWNED FORMER MGP SITE
WATERTOWN, NEW YORK

Assumptions - General Costs Site Wide (Cont.):

7. Well abandonment and installation cost estimate includes labor, equipment, and materials necessary to decommission the 5 existing bedrock wells, and upon the completion of remedial activities, install 5 new bedrock monitoring wells to be used for the groundwater monitoring program.
8. Permitting and traffic control plan cost estimate includes labor and materials to secure necessary local permits and develop a traffic control plan to manage the increase in truck traffic and construction equipment during remedy implementation.

Assumptions - Capital Costs for Parcels: Line items that are repeated throughout the different parcels were calculated using the same measures and methods as described in line items 9 - 20. For line items 21 - 60, please refer to corresponding line item within 9 -20.

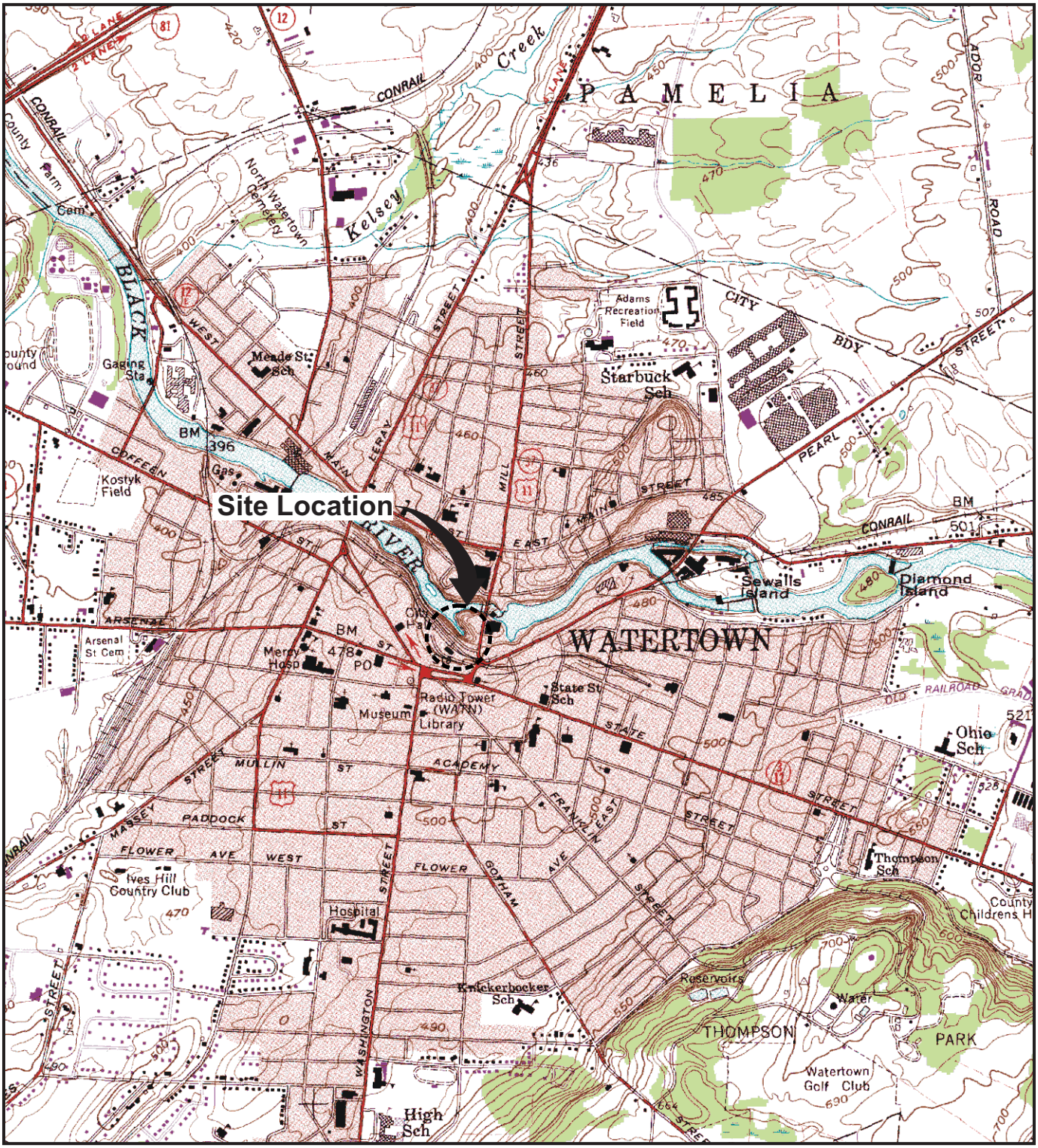
9. The building demolition cost estimate includes the labor, equipment and materials necessary to deconstruct the building located on the property. Estimate includes costs for mobilization/demobilization, environmental removal activities, asbestos containing material (ACM) removal activities, and deconstruction activities. Estimate is based on information provided in the City of Watertown's tax information database ("http://www.watertown-ny.gov/imo/search.aspx").
10. Deconstruction air monitoring estimate includes equipment and materials needed to perform air monitoring activities (e.g., dust and particulates) during the deconstruction activities.
11. The building demolition debris transportation and disposal estimate includes costs for the transportation and disposal of building waste materials such as C&D debris/waste, non-friable ACM, and universal waste. Estimate includes costs for the 2 onsite buildings located on parcels 701132 and 701134. To estimate waste tonnage, densities for brick, concrete block, roofing, etc. were obtained from the AISC Steel Construction Manual. Estimate further assumes that the buildings are generally empty and contain minimal equipment.
12. Asphalt/concrete removal cost estimate includes labor, equipment, and materials necessary to remove the existing asphalt pavement overlying the area within the limits of excavation.
13. Soil excavation and handling cost estimate includes labor, equipment, and materials necessary to excavate and manage soil exceeding the unrestricted use soil cleanup objectives as presented in 6 NYCRR Part 375-6.8. Cost estimate is based on the estimated limits of excavation shown on Figure 9 of the AAR and removal to top of bedrock (average depth of 10 feet used).
14. Community air monitoring and dust/vapor/odor control cost estimate includes labor, materials, and equipment necessary to monitor emissions during intrusive site activities and, as necessary, apply vapor/odor suppressing foam to excavated materials.
15. Fill importation, placement, compaction and grading cost estimate includes labor, equipment, and materials necessary to import, place, compact and grade general fill to replace excavated materials. Cost estimate is based on in-place soil volume.
16. Soil waste characterization cost estimate (i.e., to support profiling necessary for off-site disposal), assumes a sample frequency of one sample per 500 tons for TCLP VOCs, TCLP SVOCs, TCLP Metals, TCLP Herbicides, TCLP Pesticides, PCBs, Ignitability, Reactivity, and Corrosivity. The laboratory analytical cost of these analyses is estimated to be $600/sample for a NYSDOH Environmental Laboratory Accreditation Program (ELAP) certified laboratory.
17. Soil waste transportation and disposal cost estimate includes labor, equipment, and materials necessary to transport and dispose of excavated soils and other generated waste materials as non-hazardous waste at a permitted disposal facility. Estimate assumes a unit weight of 2 tons per cubic yard of excavated soil.
18. Wastewater storage and disposal cost estimate includes labor, equipment, and material necessary to handle water generated during decontamination procedures and excavation activities. Costs includes rental of a 20,000 gallon storage tank and associated pumps and piping, and assumes that the water will be non-hazardous and transported/disposed at a local treatment facility. The amount of groundwater generated is assumed to minimal, as the overburden groundwater is limited to isolated pockets of perched water.
19. Asphalt restoration cost estimate includes labor, equipment, and materials necessary to restore the asphalt to pre-construction conditions. Estimate assumes the density of asphalt to be 150 lb/cf and to a thickness of 6 inches.
20. Parcel market value is an amount equal to twice the full market value of the parcel as provided in the City of Watertown's tax information database ("http://www.watertown-ny.gov/imo/search.aspx"), except for the City's property. For the City's property (J.B. Wise Place/Parcel 701137), 10% of the twice the full market value of Parcel 701137 was used as this percentage is approximately equal to the estimated square footage of the City's property that is within the project area compared to the total square footage for Tax Parcel 701137. The cost included in this estimate is assumed to cover costs associated with compensating the respective property owners for the remediation activities.

Assumptions - OM&M for years 0-30:

61-63. Groundwater sampling labor and expenses (annual) cost estimate includes labor, equipment, and materials necessary to conduct annual sampling events, analyze bedrock groundwater samples, and prepare an annual groundwater monitoring report to summarize the results of the groundwater monitoring activities. Estimate assumes laboratory analysis costs to be $300 per sample (VOCs, SVOCs, and Cyanide) and collection of 10 groundwater samples per event (including QA/QC).
64. Miscellaneous waste disposal cost estimate includes transportation and disposal of waste generated during the groundwater sampling (e.g., purge water, PPE, and disposable materials) at a facility(ies) permitted to accept the waste.
65. Annual costs associated with the institutional controls include verifying the status of institutional controls and preparing/submitting notification to the NYSDEC to demonstrate that the institutional controls are being maintained and remain effective.

ARCADIS

Figures



REFERENCE: BASE MAP USGS 7.5 MIN. QUAD., WATERTOWN, N.Y. 1959, PHOTOREVISED 1982.

2000' 0 2000'

Approximate Scale: 1" = 2000'

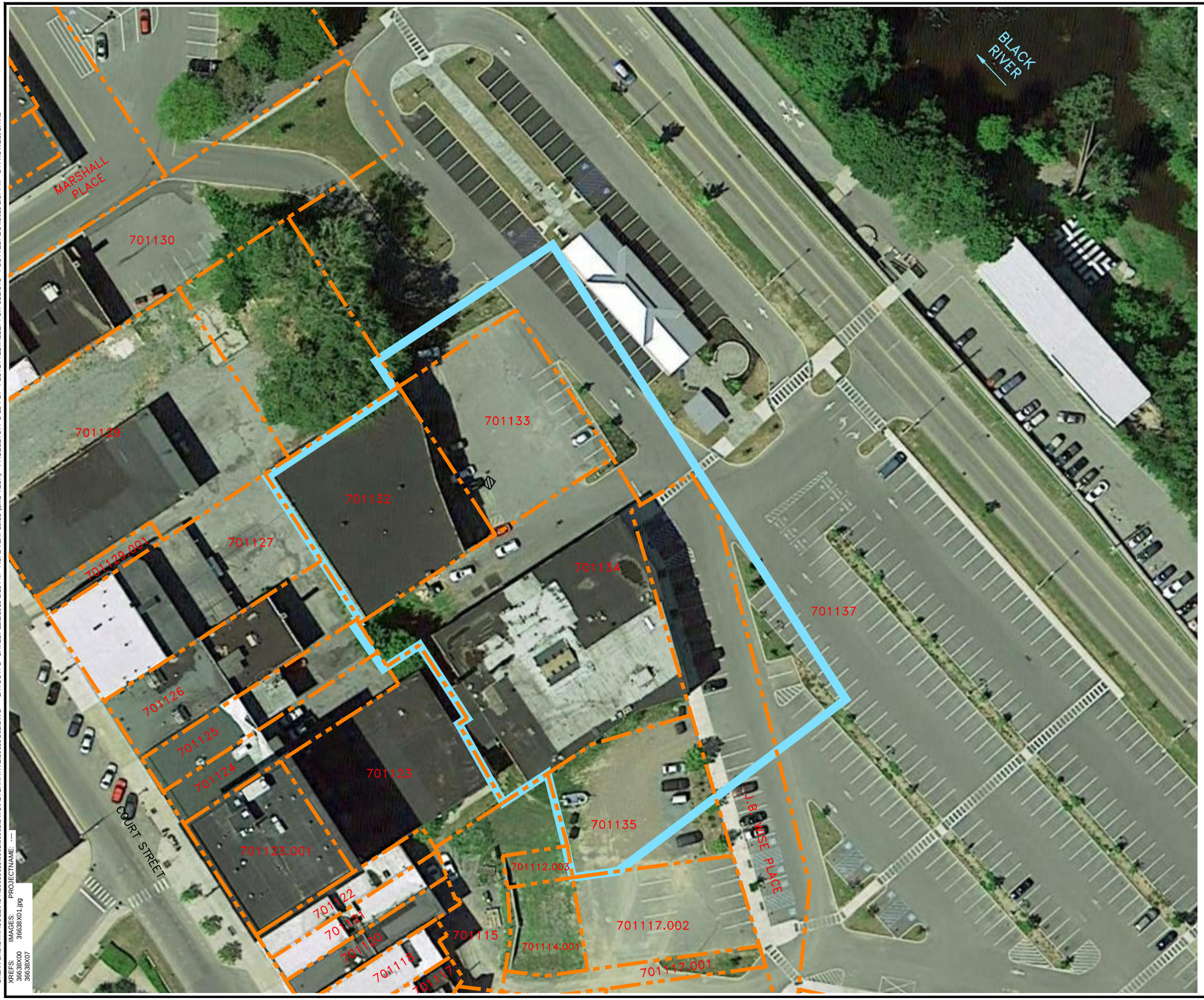
NATIONAL GRID
WATERTOWN (ANTHONY STREET) FORMER MGP SITE
ALTERNATIVE ANALYSIS REPORT

SITE LOCATION MAP

ARCADIS

FIGURE
1

11/13/2013 SYRACUSE, NY-ENV/CAD-141, DJHOWES
B0036638/0001/00002/CDR/36638N01.CDR



LEGEND:

- APPROXIMATE TAX PARCEL BOUNDARY
- 701134 TAX PARCEL ID
- PROJECT AREA FOR PURPOSES OF THIS AAR

NOTES:

1. AERIAL IMAGE OBTAINED FROM GOOGLE EARTH PRO ON NOVEMBER 11, 2013. AERIAL IMAGE DATE IS MAY 26, 2013.
2. TAX PARCEL INFORMATION DOWNLOADED FROM THE CITY OF WATERTOWN TAX MAP DATABASE "SDG IMAGE MATE" ON NOVEMBER 7, 2013.

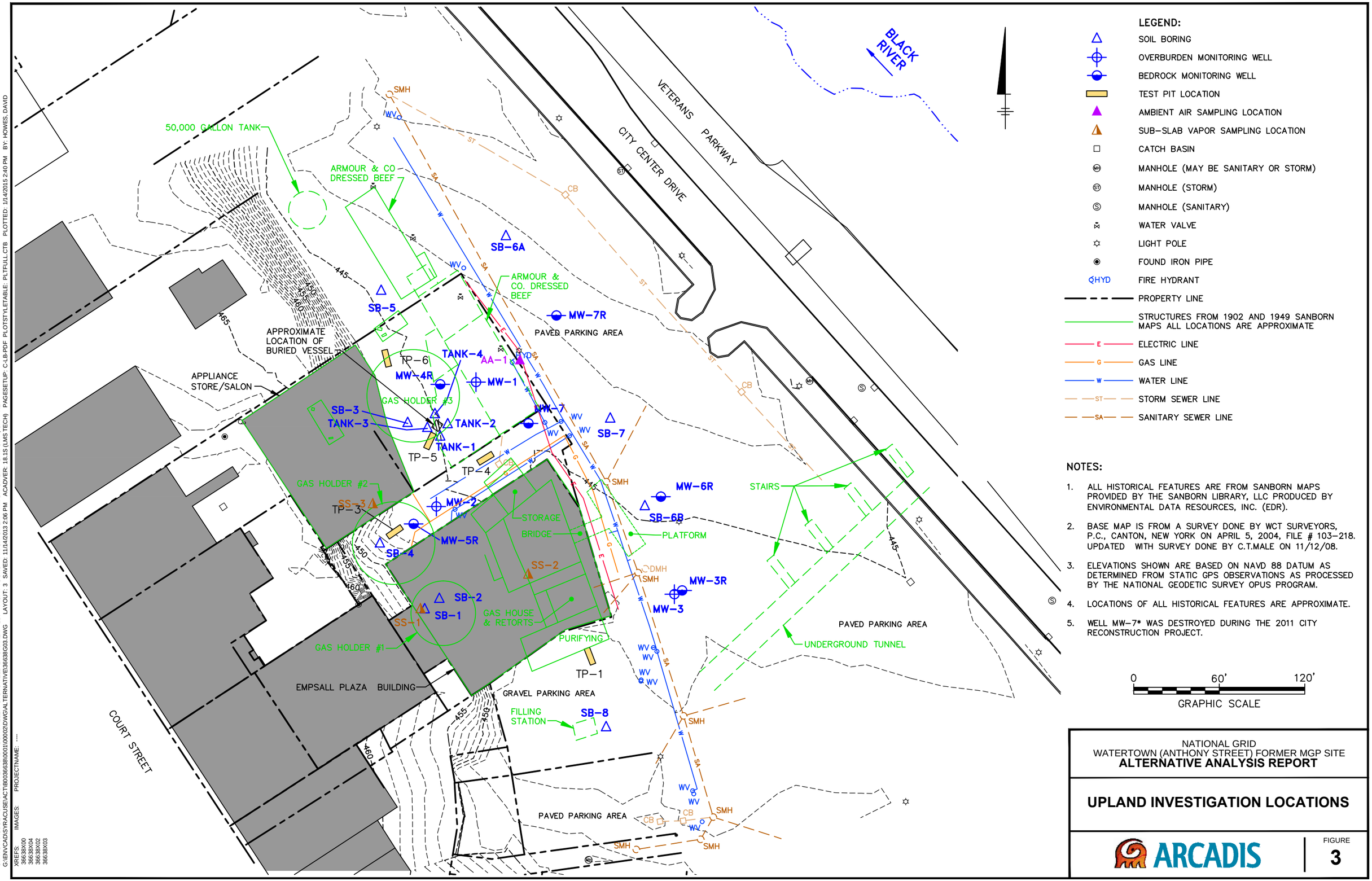
0 60' 120'
GRAPHIC SCALE

NATIONAL GRID
WATERTOWN (ANTHONY STREET) FORMER MGP SITE
ALTERNATIVE ANALYSIS REPORT

AERIAL SITE IMAGE

ARCADIS

FIGURE 2



LEGEND:

- SOIL BORING
- OVERBURDEN MONITORING WELL
- BEDROCK MONITORING WELL
- TEST PIT LOCATION
- AMBIENT AIR SAMPLING LOCATION
- SUB–SLAB VAPOR SAMPLING LOCATION
- CATCH BASIN
- MANHOLE (MAY BE SANITARY OR STORM)
- MANHOLE (STORM)
- MANHOLE (SANITARY)
- WATER VALVE
- LIGHT POLE
- FOUND IRON PIPE
- HYD FIRE HYDRANT
- PROPERTY LINE
- STRUCTURES FROM 1902 AND 1949 SANBORN MAPS ALL LOCATIONS ARE APPROXIMATE
- E — ELECTRIC LINE
- G — GAS LINE
- W — WATER LINE
- ST — STORM SEWER LINE
- SA — SANITARY SEWER LINE

NOTES:

1. ALL HISTORICAL FEATURES ARE FROM SANBORN MAPS PROVIDED BY THE SANBORN LIBRARY, LLC PRODUCED BY ENVIRONMENTAL DATA RESOURCES, INC. (EDR).
2. BASE MAP IS FROM A SURVEY DONE BY WCT SURVEYORS, P.C., CANTON, NEW YORK ON APRIL 5, 2004, FILE # 103–218. UPDATED WITH SURVEY DONE BY C.T.MALE ON 11/12/08.
3. ELEVATIONS SHOWN ARE BASED ON NAVD 88 DATUM AS DETERMINED FROM STATIC GPS OBSERVATIONS AS PROCESSED BY THE NATIONAL GEODETIC SURVEY OPUS PROGRAM.
4. LOCATIONS OF ALL HISTORICAL FEATURES ARE APPROXIMATE.
5. WELL MW–7* WAS DESTROYED DURING THE 2011 CITY RECONSTRUCTION PROJECT.

0 60' 120'

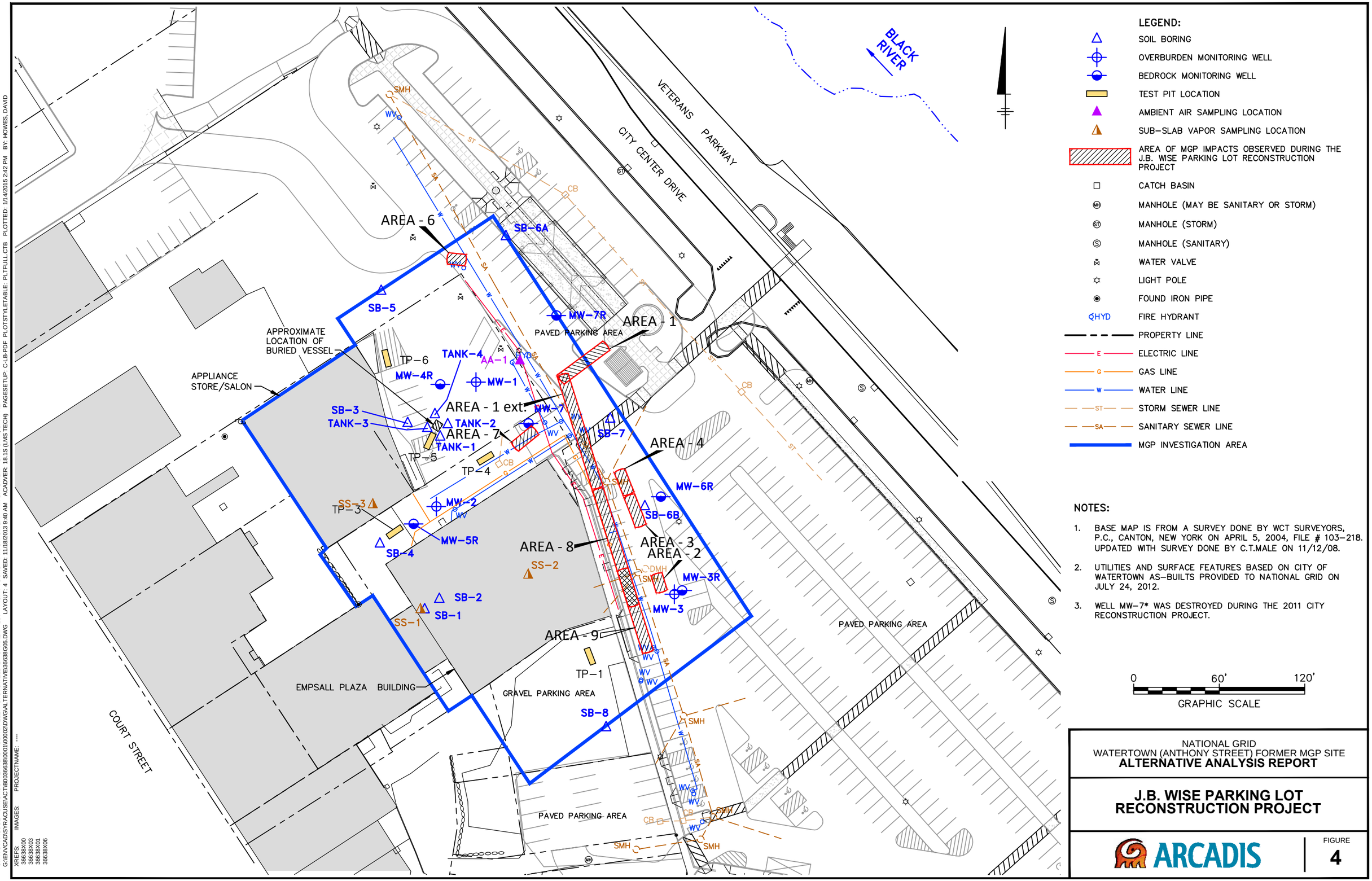
GRAPHIC SCALE

NATIONAL GRID
WATERTOWN (ANTHONY STREET) FORMER MGP SITE
ALTERNATIVE ANALYSIS REPORT

UPLAND INVESTIGATION LOCATIONS

ARCADIS

FIGURE 3



LEGEND:

- SOIL BORING
- OVERBURDEN MONITORING WELL
- BEDROCK MONITORING WELL
- TEST PIT LOCATION
- AMBIENT AIR SAMPLING LOCATION
- SUB–SLAB VAPOR SAMPLING LOCATION
- AREA OF MGP IMPACTS OBSERVED DURING THE J.B. WISE PARKING LOT RECONSTRUCTION PROJECT
- CATCH BASIN
- MANHOLE (MAY BE SANITARY OR STORM)
- MANHOLE (STORM)
- MANHOLE (SANITARY)
- WATER VALVE
- LIGHT POLE
- FOUND IRON PIPE
- FIRE HYDRANT
- PROPERTY LINE
- ELECTRIC LINE
- GAS LINE
- WATER LINE
- STORM SEWER LINE
- SANITARY SEWER LINE
- MGP INVESTIGATION AREA

NOTES:

1. BASE MAP IS FROM A SURVEY DONE BY WCT SURVEYORS, P.C., CANTON, NEW YORK ON APRIL 5, 2004, FILE # 103–218. UPDATED WITH SURVEY DONE BY C.T.MALE ON 11/12/08.
2. UTILITIES AND SURFACE FEATURES BASED ON CITY OF WATERTOWN AS–BUILTS PROVIDED TO NATIONAL GRID ON JULY 24, 2012.
3. WELL MW–7* WAS DESTROYED DURING THE 2011 CITY RECONSTRUCTION PROJECT.

0 60’ 120’

GRAPHIC SCALE

NATIONAL GRID
WATERTOWN (ANTHONY STREET) FORMER MGP SITE
ALTERNATIVE ANALYSIS REPORT

J.B. WISE PARKING LOT RECONSTRUCTION PROJECT

ARCADIS

FIGURE
4

CITY: SYRACUSE DIV/GROUP: ENVCAD DB: R. ALLEN G. STOWELL L. FORAKER LD: PIC: T. YOUNG PM: S. POWLIN TM: S. POWLIN LYR: ON=*; OFF=*REF*
G:\ENVCAD\SYRACUSE\ACTIVE\36638\0001\0002\DWG\ALTERNATIVE\36638G05.DWG LAYOUT: 4 SAVED: 11/18/2013 9:40 AM ACADVER: 18.1S (LMS TECH) PAGESETUP: C-LB-PDF PLOTSTYLETABLE: PLTFULL.CTB PLOTTED: 1/14/2015 2:42 PM BY: HOWES, DAVID
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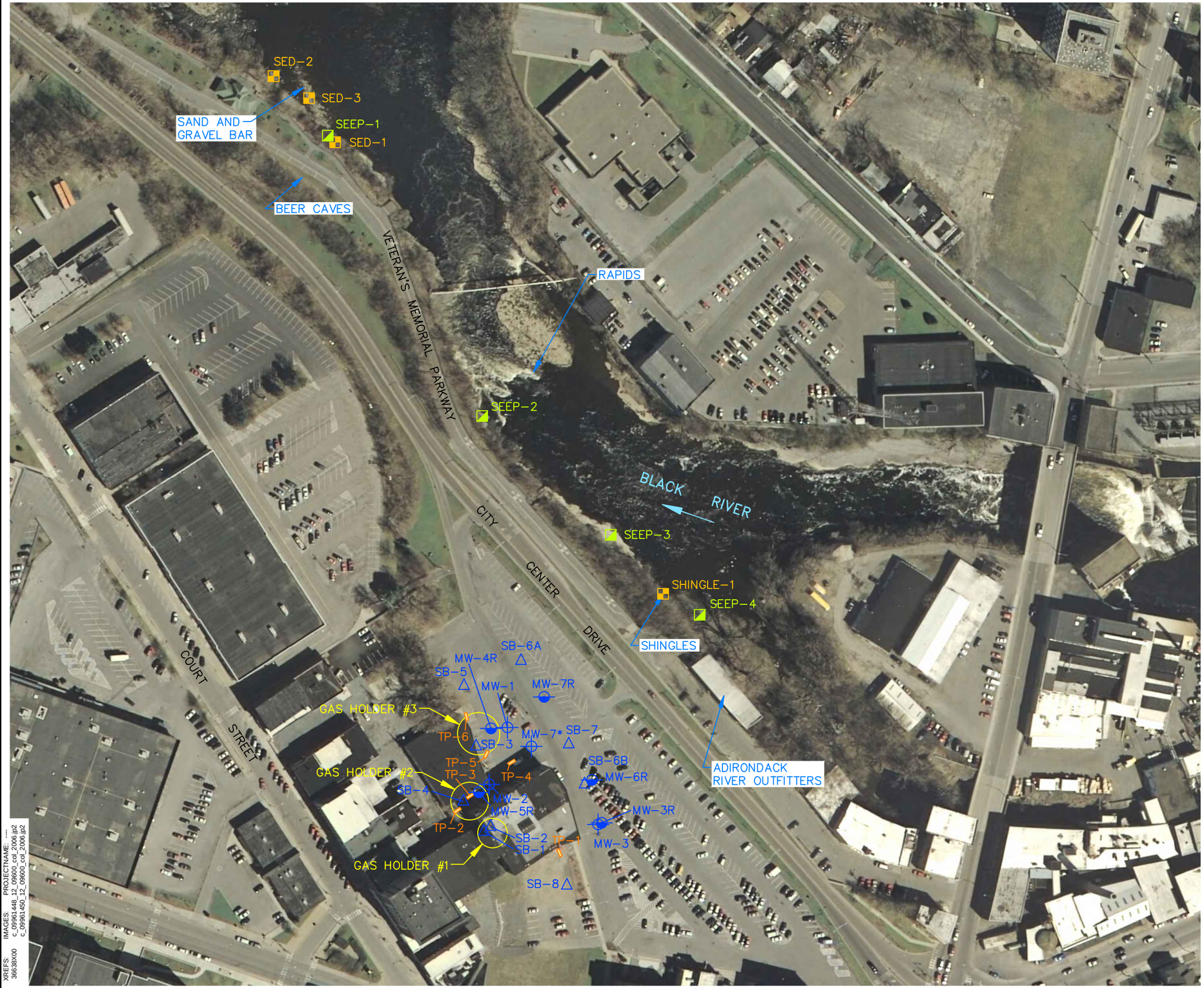
36638X03
36638X01
36638X06



LEGEND:

- SOIL BORING
- OVERBURDEN MONITORING WELL
- BEDROCK MONITORING WELL
- TEST PIT LOCATION
- SEDIMENT/SHINGLE SAMPLE
- SEEP SAMPLE

NOTES:

1. BASE MAP IS FROM A SURVEY DONE BY WCT SURVEYORS, P.C., CANTON, NEW YORK ON APRIL 5, 2004, FILE # 103-218. UPDATED WITH SURVEY DONE BY C.T.MALE ON 11/12/08.
2. LOCATIONS OF GAS HOLDERS ARE APPROXIMATE AND ARE FROM SANBORN MAPS PROVIDED BY THE SANBORN LIBRARY, LLC PRODUCED BY ENVIRONMENTAL DATA RESOURCES , INC. (EDR).
3. AERIAL DOWNLOADED FROM THE "GIS CLEARINGHOUSE SITE", IN STATE PLANE NAD 83 COORDINATE SYSTEM ON 6/24/09.
4. ALL SAMPLING LOCATIONS ARE APPROXIMATE.
5. WELL MW-7* WAS DESTROYED DURING THE 2011 CITY RECONSTRUCTION PROJECT.

0 150' 300'

GRAPHIC SCALE

NATIONAL GRID
WATERTOWN (ANTHONY STREET) FORMER MGP SITE
ALTERNATIVE ANALYSIS REPORT

SEDIMENT AND SEEP SAMPLING LOCATIONS

ARCADIS

FIGURE 5

CITY: SYRACUSE DIV/GROUP: ENVCAD DB: R. ALLEN G. STOWELL L. FORAKER LD: PIC: T. YOUNG PM: S. POWLIN TM: S. POWLIN
G:\ENVCAD\SYRACUSE\ACTIVE\003663\8000\100002\DWG\ALTERNATIVE\366380G04.DWG LAYOUT: 5 SAVED: 11/18/2013 11:00 AM ACADVER: 18.1S (LMS TECH) PAGESETUP: C-LB-PDF PLOTSTYLETABLE: PLTFULL.CTB PLOTTED: 1/14/2015 2:43 PM BY: HOWES, DAVID
XREFS: IMAGES: PROJECTNAME: ---
366380X00 c_09961448_12_09600_col_2006.jp2
c_09961450_12_09600_col_2006.jp2

TP–6	
Depth(Feet)	(6.7 – 6.9')
Date	5/12/2004
Total BTEX	ND
Total PAHs	32 J
Total Cyanide	0.661 U

TANK–4	
Depth(Feet)	(6 – 7.4')
Date	9/24/2008
Total BTEX	ND
Total PAHs	15 J
Total Cyanide	0.7 UJ
Free Cyanide	0.025 J

TANK–3	
Depth(Feet)	(6 – 7.7')
Date	9/24/2008
Total BTEX	0.0021
Total PAHs	11 J
Total Cyanide	4.7 J
Free Cyanide	0.077 U

SB–3		
Depth(Feet)	(6 – 8')	(9 – 10')
Date	9/8/2008	9/8/2008
Total BTEX	0.0034 J	1.7 J
Total PAHs	4.3 J	13 J
Total Cyanide	4.8	21
Free Cyanide	0.053 J	0.3

TANK–1	
Depth(Feet)	(6 – 8')
Date	9/24/2008
Total BTEX	0.00090 J
Total PAHs	69 J
Total Cyanide	16.3 J
Free Cyanide	0.055 J

MW–5R		
Depth(Feet)	(12 – 14')	(14 – 15.2')
Date	9/9/2008	9/9/2008
Total BTEX	150 J	170 J
Total PAHs	640 J	NA

TP–3		
Depth(Feet)	(7.5')	(9.5')
Date	5/11/2004	5/11/2004
Total BTEX	ND [ND]	ND
Total PAHs	1.5 J [25 J]	2.4 J
Total Cyanide	0.653 U [0.654 U]	0.687 U

SB–4		
Depth(Feet)	(5 – 6.3')	(8 – 8.7')
Date	9/9/2008	9/9/2008
Total BTEX	0.022 J	0.12 J
Total PAHs	6.9 J	0.75 J
Total Cyanide	NA	1.1
Free Cyanide	NA	0.069 U

SB–1		
Depth(Feet)	(4 – 8')	(8 – 10')
Date	10/17/2005	10/17/2005
Total BTEX	0.021 J	21
Total PAHs	6.2 J	1700 J
Total Cyanide	0.751 U	19

SB–5		
Depth(Feet)	(2 – 4')	(6 – 8')
Date	9/9/2008	9/9/2008
Total BTEX	ND	3.8 J
Total PAHs	13 J	11 J
Total Cyanide	6.2	0.61 U
Free Cyanide	0.072 U	0.029 J

MW–4R	
Depth(Feet)	(6 – 8')
Date	9/16/2008
Total BTEX	0.0052
Total PAHs	20 J
Total Cyanide	3.4
Free Cyanide	0.076

TANK–2	
Depth(Feet)	(6 – 8')
Date	9/24/2008
Total BTEX	0.00050 J [ND]
Total PAHs	340 J [210 J]
Total Cyanide	6.8 J [0.54 J]
Free Cyanide	0.023 J [0.014 J]

MW–7R		
Depth(Feet)	(4 – 6')	(6 – 6.7')
Date	9/10/2008	9/10/2008
Total BTEX	0.00050 J	ND
Total PAHs	NA	3.0 J

MW–7	
Depth(Feet)	(6 – 8')
Date	9/24/2008
Total BTEX	ND
Total PAHs	21 J
Total Cyanide	1.5 J
Free Cyanide	0.014 J

SB–7	
Depth(Feet)	(8 – 10.5')
Date	9/8/2008
Total BTEX	0.0091 J
Total PAHs	0.94 J
Total Cyanide	0.24 J
Free Cyanide	0.076 U

TP–4	
Depth(Feet)	(8.7')
Date	5/11/2004
Total BTEX	10
Total PAHs	4.2 J
Total Cyanide	0.597 U

MW–6R		
Depth(Feet)	(6 – 10')	(10 – 11.9')
Date	9/15/2008	9/15/2008
Total BTEX	0.00040 J [0.00090 J]	NA
Total PAHs	4.1 J [18 J]	NA
Total Cyanide	0.34 J [0.13 J]	0.1 J
Free Cyanide	0.067 UJ [0.021 J]	0.0075 J

SB–6B		
Depth(Feet)	(6 – 8')	(8.7 – 8.8')
Date	9/9/2008	9/9/2008
Total BTEX	ND	ND
Total PAHs	0.27 J	0.47 J
Total Cyanide	0.12 J	0.09 J
Free Cyanide	0.07 U	0.014 J

MW–3R		
Depth(Feet)	(2 – 4')	(8 – 9.9')
Date	9/11/2008	9/11/2008
Total BTEX	ND	0.00060 J
Total PAHs	4.4 J	0.93 J
Total Cyanide	1.5	1.2
Free Cyanide	0.064 U	0.072 U

MW–3		
Depth(Feet)	(0 – 4')	(4 – 8')
Date	10/17/2005	10/18/2005
Total BTEX	ND	ND [ND]
Total PAHs	23 J	6.4 J [5.6 J]
Total Cyanide	5.4 J	0.585 U [0.566 U]

TP–1	
Depth(Feet)	(8.5')
Date	5/10/2004
Total BTEX	ND
Total PAHs	ND
Total Cyanide	0.566 U

SB–2		
Depth(Feet)	(0 – 4')	(4 – 10')
Date	10/17/2005	10/17/2005
Total BTEX	0.011 J	0.40 J
Total PAHs	8.8 J	3.7 J
Total Cyanide	0.714 U	11

TP–5		
Depth(Feet)	(4.5 – 5.5')	(6 – 6.8')
Date	5/12/2004	5/12/2004
Total BTEX	ND	ND
Total PAHs	91 J	170 J
Total Cyanide	0.619 U	0.651 U

SB–8	
Depth(Feet)	(13 – 13.1')
Date	9/9/2008
Total BTEX	ND

BLACK RIVER

CITY CENTER DRIVE

PARKWAY

SB–6A

SB–5

MW–7R

PAVED PARKING AREA

701133

TP–6

MW–4R

TANK–4

MW–1

GAS HOLDER #3

SB–3

TANK–3

TANK–2

TANK–1

MW–7

SB–7

TP–5

TP–4

701132

GAS HOLDER #2

TP–3

MW–2

MW–5R

SB–4

701127

701134

SB–2

SB–1

GAS HOLDER #1

MW–6R

SB–6B

701137

MW–3R

MW–3

TP–1

701123

GRAVEL PARKING AREA

SB–8

J.B. WISE PLACE

701135

701112.003

701122

701121

701117

LEGEND:

- APPROXIMATE TAX PARCEL BOUNDARY
- 701134 TAXPARCEL ID
- SOIL BORING
- OVERBURDEN MONITORING WELL
- BEDROCK MONITORING WELL
- TEST PIT LOCATION
- NAPL OBSEVED AT THIS LOCATION
- E — ELECTRIC LINE
- G — GAS LINE
- W — WATER LINE
- ST — STORM SEWER LINE
- SA — SANITARY SEWER LINE

NOTES:

1. BASE MAP IS FROM A SURVEY DONE BY WCT SURVEYORS, P.C., CANTON, NEW YORK ON APRIL 5, 2004, FILE # 103–218. UPDATED WITH SURVEY DONE BY C.T.MALE ON 11/12/08.
2. LOCATIONS OF GAS HOLDERS ARE APPROXIMATE AND ARE FROM SANBORN MAPS PROVIDED BY THE SANBORN LIBRARY, LLC PRODUCED BY ENVIRONMENTAL DATA RESOURCES , INC. (EDR).
3. TAX PARCEL INFORMATION DOWNLOADED FROM THE CITY OF WATERTOWN TAX MAP DATABASE "SDG IMAGE MATE" ON NOVEMBER 7, 2013.
4. SHADING INDICATES THAT ONE OR MORE TOTAL BTEX OR TOTAL PAH CONSTITUENT COMPOUNDS WERE DETECTED AT A CONCENTRATION ABOVE THE NYSDEC RESTRICTED USE RESIDENTIAL SCO. BOLD FONT INDICATES THAT ONE OR MORE TOTAL BTEX OR TOTAL PAH CONSTITUENT COMPOUNDS WERE DETECTED AT A CONCENTRATION ABOVE THE NYSDEC RESTRICTED USE COMMERCIAL SCO. FIELD DUPLICATE SAMPLE RESULTS ARE PRESENTED IN BRACKETS.
5. RESULTS GIVEN IN mg/kg
   J = APPROXIMATE VALUE
   U = ANALYTE WAS NOT DETECTED ABOVE GIVEN DETECTION LIMIT
   ND = INDIVIDUAL CONSTITUENT WAS NOT DETECTED
   NA = NOT ANALYZED
6. WELL MW–7* WAS DESTROYED DURING THE 2011 CITY RECONSTRUCTION PROJECT.

0 60' 120'

GRAPHIC SCALE

NATIONAL GRID
WATERTOWN (ANTHONY STREET) FORMER MGP SITE
ALTERNATIVE ANALYSIS REPORT

RI SUBSURFACE SOIL RESULTS

ARCADIS

FIGURE 6

CITY: SYRACUSE DIV/GROUP: ENVCAD DB: R. ALLEN G. STOWELL L. FORAKER LD: PIC: T. YOUNG PM: S. POWLIN TM: S. POWLIN LYR: ON=*; OFF=*REF*
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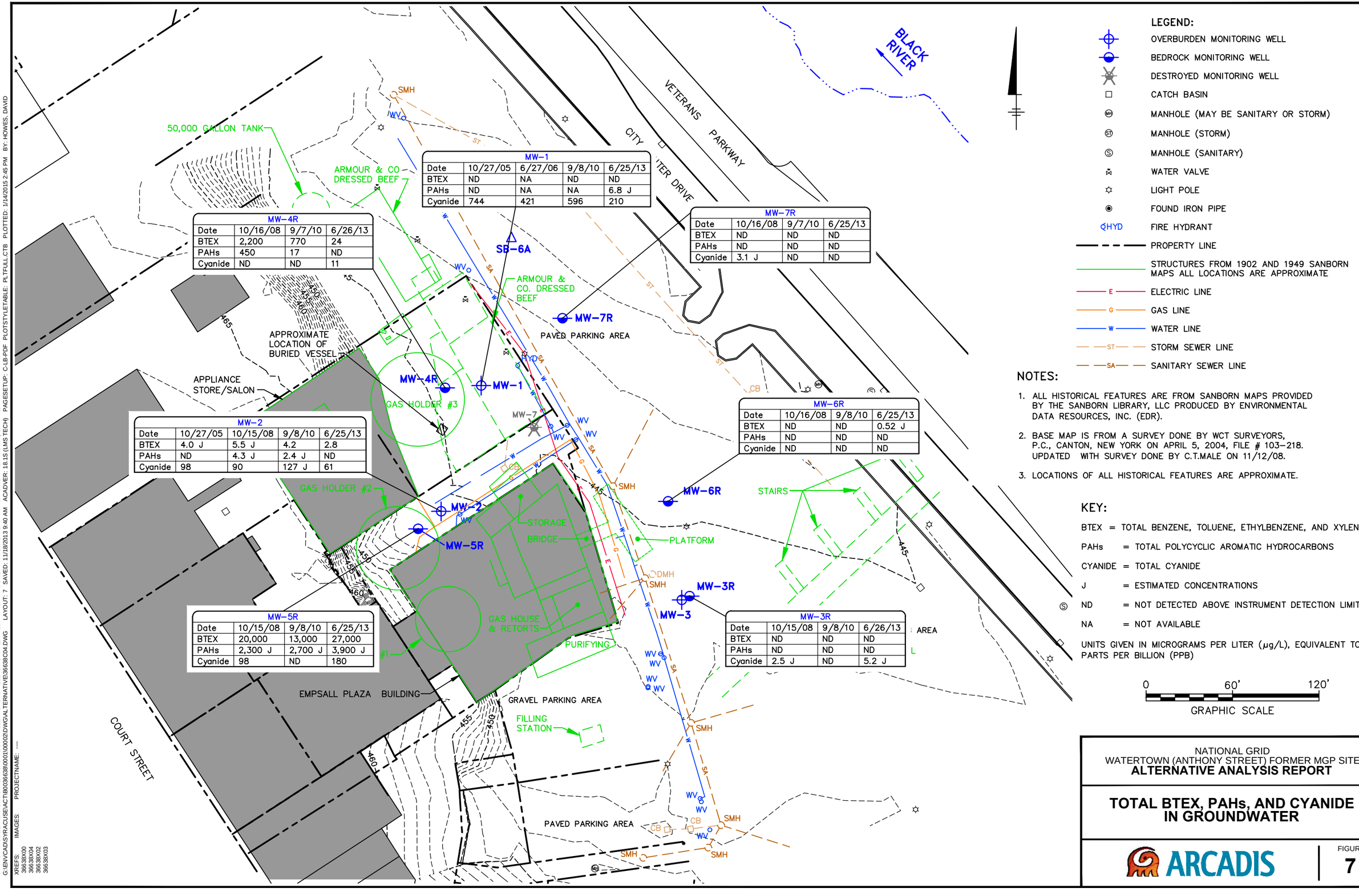
PROJECTNAME: ---
IMAGES:
XREFS:
36638X00
36638X04
36638X03



LEGEND:

- OVERBURDEN MONITORING WELL
- BEDROCK MONITORING WELL
- DESTROYED MONITORING WELL
- CATCH BASIN
- MANHOLE (MAY BE SANITARY OR STORM)
- MANHOLE (STORM)
- MANHOLE (SANITARY)
- WATER VALVE
- LIGHT POLE
- FOUND IRON PIPE
- FIRE HYDRANT
- PROPERTY LINE
- STRUCTURES FROM 1902 AND 1949 SANBORN MAPS ALL LOCATIONS ARE APPROXIMATE
- ELECTRIC LINE
- GAS LINE
- WATER LINE
- STORM SEWER LINE
- SANITARY SEWER LINE

NOTES:

1. ALL HISTORICAL FEATURES ARE FROM SANBORN MAPS PROVIDED BY THE SANBORN LIBRARY, LLC PRODUCED BY ENVIRONMENTAL DATA RESOURCES, INC. (EDR).
2. BASE MAP IS FROM A SURVEY DONE BY WCT SURVEYORS, P.C., CANTON, NEW YORK ON APRIL 5, 2004, FILE # 103-218. UPDATED WITH SURVEY DONE BY C.T.MALE ON 11/12/08.
3. LOCATIONS OF ALL HISTORICAL FEATURES ARE APPROXIMATE.

KEY:

BTEX = TOTAL BENZENE, TOLUENE, ETHYLBENZENE, AND XYLENES

PAHs = TOTAL POLYCYCLIC AROMATIC HYDROCARBONS

CYANIDE = TOTAL CYANIDE

J = ESTIMATED CONCENTRATIONS

ND = NOT DETECTED ABOVE INSTRUMENT DETECTION LIMIT

NA = NOT AVAILABLE

UNITS GIVEN IN MICROGRAMS PER LITER (µg/L), EQUIVALENT TO PARTS PER BILLION (PPB)

0 60' 120'

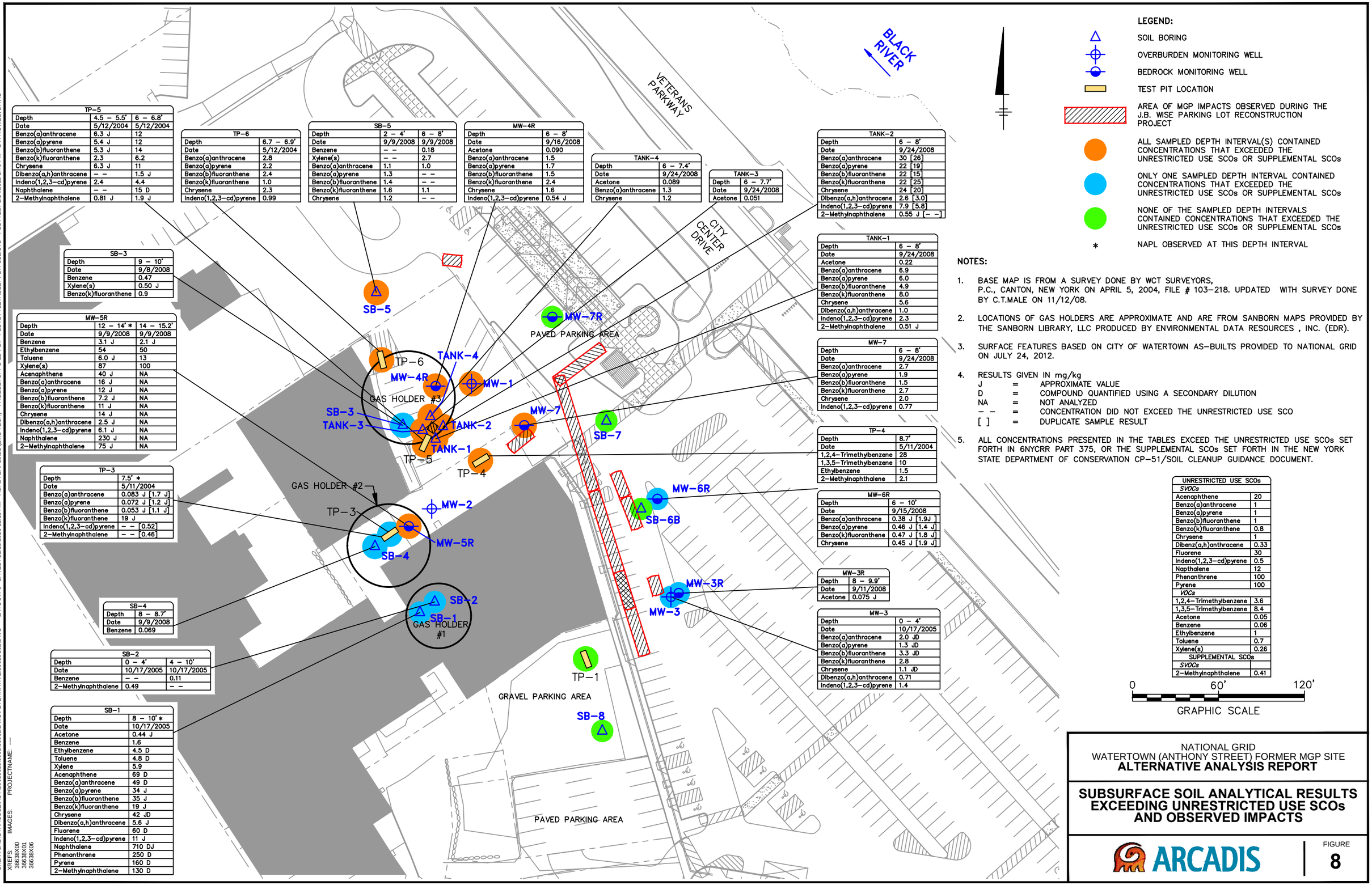
GRAPHIC SCALE

NATIONAL GRID
WATERTOWN (ANTHONY STREET) FORMER MGP SITE
ALTERNATIVE ANALYSIS REPORT

TOTAL BTEX, PAHs, AND CYANIDE IN GROUNDWATER

ARCADIS

FIGURE 7



TP-5		
Depth	4.5 – 5.5'	6 – 6.8'
Date	5/12/2004	5/12/2004
Benzo(a)anthracene	6.3 J	12
Benzo(a)pyrene	5.4 J	12
Benzo(b)fluoranthene	5.3 J	14
Benzo(k)fluoranthene	2.3	6.2
Chrysene	6.3 J	11
Dibenzo(a,h)anthracene	– –	1.5 J
Indeno(1,2,3–cd)pyrene	2.4	4.4
Naphthalene	– –	15 D
2–Methylnaphthalene	0.81 J	1.9 J

TP-6	
Depth	6.7 – 6.9'
Date	5/12/2004
Benzo(a)anthracene	2.8
Benzo(a)pyrene	2.2
Benzo(b)fluoranthene	2.4
Benzo(k)fluoranthene	1.0
Chrysene	2.3
Indeno(1,2,3–cd)pyrene	0.99

SB-5		
Depth	2 – 4'	6 – 8'
Date	9/9/2008	9/9/2008
Benzene	– –	0.18
Xylene(s)	– –	2.7
Benzo(a)anthracene	1.1	1.0
Benzo(a)pyrene	1.3	– –
Benzo(b)fluoranthene	1.4	– –
Benzo(k)fluoranthene	1.6	1.1
Chrysene	1.2	– –

MW-4R	
Depth	6 – 8'
Date	9/16/2008
Acetone	0.090
Benzo(a)anthracene	1.5
Benzo(a)pyrene	1.7
Benzo(b)fluoranthene	1.5
Benzo(k)fluoranthene	2.4
Chrysene	1.6
Indeno(1,2,3–cd)pyrene	0.54 J

TANK-4	
Depth	6 – 7.4'
Date	9/24/2008
Acetone	0.089
Benzo(a)anthracene	1.3
Chrysene	1.2

TANK-3	
Depth	6 – 7.7'
Date	9/24/2008
Acetone	0.051

TANK-2	
Depth	6 – 8'
Date	9/24/2008
Benzo(a)anthracene	30 [26]
Benzo(a)pyrene	22 [19]
Benzo(b)fluoranthene	22 [15]
Benzo(k)fluoranthene	22 [25]
Chrysene	24 [20]
Dibenzo(a,h)anthracene	2.6 [3.0]
Indeno(1,2,3–cd)pyrene	7.9 [5.8]
2–Methylnaphthalene	0.55 J [– –]

SB-3	
Depth	9 – 10'
Date	9/8/2008
Benzene	0.47
Xylene(s)	0.50 J
Benzo(k)fluoranthene	0.9

TANK-1	
Depth	6 – 8'
Date	9/24/2008
Acetone	0.22
Benzo(a)anthracene	6.9
Benzo(a)pyrene	6.0
Benzo(b)fluoranthene	4.9
Benzo(k)fluoranthene	8.0
Chrysene	5.6
Dibenzo(a,h)anthracene	1.0
Indeno(1,2,3–cd)pyrene	2.3
2–Methylnaphthalene	0.51 J

MW-5R		
Depth	12 – 14' *	14 – 15.2'
Date	9/9/2008	9/9/2008
Benzene	3.1 J	2.1 J
Ethylbenzene	54	50
Toluene	6.0 J	13
Xylene(s)	87	100
Acenaphthene	40 J	NA
Benzo(a)anthracene	16 J	NA
Benzo(a)pyrene	12 J	NA
Benzo(b)fluoranthene	7.2 J	NA
Benzo(k)fluoranthene	11 J	NA
Chrysene	14 J	NA
Dibenzo(a,h)anthracene	2.5 J	NA
Indeno(1,2,3–cd)pyrene	6.1 J	NA
Naphthalene	230 J	NA
2–Methylnaphthalene	75 J	NA

MW-7	
Depth	6 – 8'
Date	9/24/2008
Benzo(a)anthracene	2.7
Benzo(a)pyrene	1.9
Benzo(b)fluoranthene	1.5
Benzo(k)fluoranthene	2.7
Chrysene	2.0
Indeno(1,2,3–cd)pyrene	0.77

TP-4	
Depth	8.7'
Date	5/11/2004
1,2,4–Trimethylbenzene	28
1,3,5–Trimethylbenzene	10
Ethylbenzene	1.5
2–Methylnaphthalene	2.1

TP-3	
Depth	7.5' *
Date	5/11/2004
Benzo(a)anthracene	0.083 J [1.7 J]
Benzo(a)pyrene	0.072 J [1.2 J]
Benzo(b)fluoranthene	0.053 J [1.1 J]
Benzo(k)fluoranthene	19 J
Indeno(1,2,3–cd)pyrene	– – [0.52]
2–Methylnaphthalene	– – [0.46]

MW-6R	
Depth	6 – 10'
Date	9/15/2008
Benzo(a)anthracene	0.38 J [1.9J]
Benzo(a)pyrene	0.46 J [1.4 J]
Benzo(k)fluoranthene	0.47 J [1.8 J]
Chrysene	0.45 J [1.9 J]

MW-3R	
Depth	8 – 9.9'
Date	9/11/2008
Acetone	0.075 J

SB-4	
Depth	8 – 8.7'
Date	9/9/2008
Benzene	0.069

MW-3	
Depth	0 – 4'
Date	10/17/2005
Benzo(a)anthracene	2.0 JD
Benzo(a)pyrene	1.3 JD
Benzo(b)fluoranthene	3.3 JD
Benzo(k)fluoranthene	2.8
Chrysene	1.1 JD
Dibenzo(a,h)anthracene	0.71
Indeno(1,2,3–cd)pyrene	1.4

SB-2		
Depth	0 – 4'	4 – 10'
Date	10/17/2005	10/17/2005
Benzene	– –	0.11
2–Methylnaphthalene	0.49	– –

SB-1	
Depth	8 – 10' *
Date	10/17/2005
Acetone	0.44 J
Benzene	1.6
Ethylbenzene	4.5 D
Toluene	4.8 D
Xylene	5.9
Acenaphthene	69 D
Benzo(a)anthracene	49 D
Benzo(a)pyrene	34 J
Benzo(b)fluoranthene	35 J
Benzo(k)fluoranthene	19 J
Chrysene	42 JD
Dibenzo(a,h)anthracene	5.6 J
Fluorene	60 D
Indeno(1,2,3–cd)pyrene	11 J
Naphthalene	710 DJ
Phenanthrene	250 D
Pyrene	160 D
2–Methylnaphthalene	130 D

LEGEND:

- SOIL BORING
- OVERBURDEN MONITORING WELL
- BEDROCK MONITORING WELL
- TEST PIT LOCATION
- AREA OF MGP IMPACTS OBSERVED DURING THE J.B. WISE PARKING LOT RECONSTRUCTION PROJECT
- ALL SAMPLED DEPTH INTERVAL(S) CONTAINED CONCENTRATIONS THAT EXCEEDED THE UNRESTRICTED USE SCOs OR SUPPLEMENTAL SCOs
- ONLY ONE SAMPLED DEPTH INTERVAL CONTAINED CONCENTRATIONS THAT EXCEEDED THE UNRESTRICTED USE SCOs OR SUPPLEMENTAL SCOs
- NONE OF THE SAMPLED DEPTH INTERVALS CONTAINED CONCENTRATIONS THAT EXCEEDED THE UNRESTRICTED USE SCOs OR SUPPLEMENTAL SCOs
- * NAPL OBSERVED AT THIS DEPTH INTERVAL

NOTES:

1. BASE MAP IS FROM A SURVEY DONE BY WCT SURVEYORS, P.C., CANTON, NEW YORK ON APRIL 5, 2004, FILE # 103–218. UPDATED WITH SURVEY DONE BY C.T.MALE ON 11/12/08.
2. LOCATIONS OF GAS HOLDERS ARE APPROXIMATE AND ARE FROM SANBORN MAPS PROVIDED BY THE SANBORN LIBRARY, LLC PRODUCED BY ENVIRONMENTAL DATA RESOURCES , INC. (EDR).
3. SURFACE FEATURES BASED ON CITY OF WATERTOWN AS–BUILTS PROVIDED TO NATIONAL GRID ON JULY 24, 2012.
4. RESULTS GIVEN IN mg/kg
   J = APPROXIMATE VALUE
   D = COMPOUND QUANTIFIED USING A SECONDARY DILUTION
   NA = NOT ANALYZED
   – – = CONCENTRATION DID NOT EXCEED THE UNRESTRICTED USE SCO
   [ ] = DUPLICATE SAMPLE RESULT
5. ALL CONCENTRATIONS PRESENTED IN THE TABLES EXCEED THE UNRESTRICTED USE SCOs SET FORTH IN 6NYCRR PART 375, OR THE SUPPLEMENTAL SCOs SET FORTH IN THE NEW YORK STATE DEPARTMENT OF CONSERVATION CP–51/SOIL CLEANUP GUIDANCE DOCUMENT.

UNRESTRICTED USE SCOs	
SVOCs	
Acenaphthene	20
Benzo(a)anthracene	1
Benzo(a)pyrene	1
Benzo(b)fluoranthene	1
Benzo(k)fluoranthene	0.8
Chrysene	1
Dibenz(a,h)anthracene	0.33
Fluorene	30
Indeno(1,2,3–cd)pyrene	0.5
Napthalene	12
Phenanthrene	100
Pyrene	100
VOCs	
1,2,4–Trimethylbenzene	3.6
1,3,5–Trimethylbenzene	8.4
Acetone	0.05
Benzene	0.06
Ethylbenzene	1
Toluene	0.7
Xylene(s)	0.26
SUPPLEMENTAL SCOs	
SVOCs	
2–Methylnaphthalene	0.41

0 60' 120'

GRAPHIC SCALE

NATIONAL GRID
WATERTOWN (ANTHONY STREET) FORMER MGP SITE
ALTERNATIVE ANALYSIS REPORT

SUBSURFACE SOIL ANALYTICAL RESULTS EXCEEDING UNRESTRICTED USE SCOs AND OBSERVED IMPACTS

ARCADIS

FIGURE 8

CITY: SYRACUSE DIV/GROUP: ENVCAD DB: R. ALLEN G. STOWELL L. FORAKER LD: PIC: T. YOUNG PM: S. POWLIN TM: S. POWLIN LYR: S. POWLIN LYR: ON=*; OFF=*REF*
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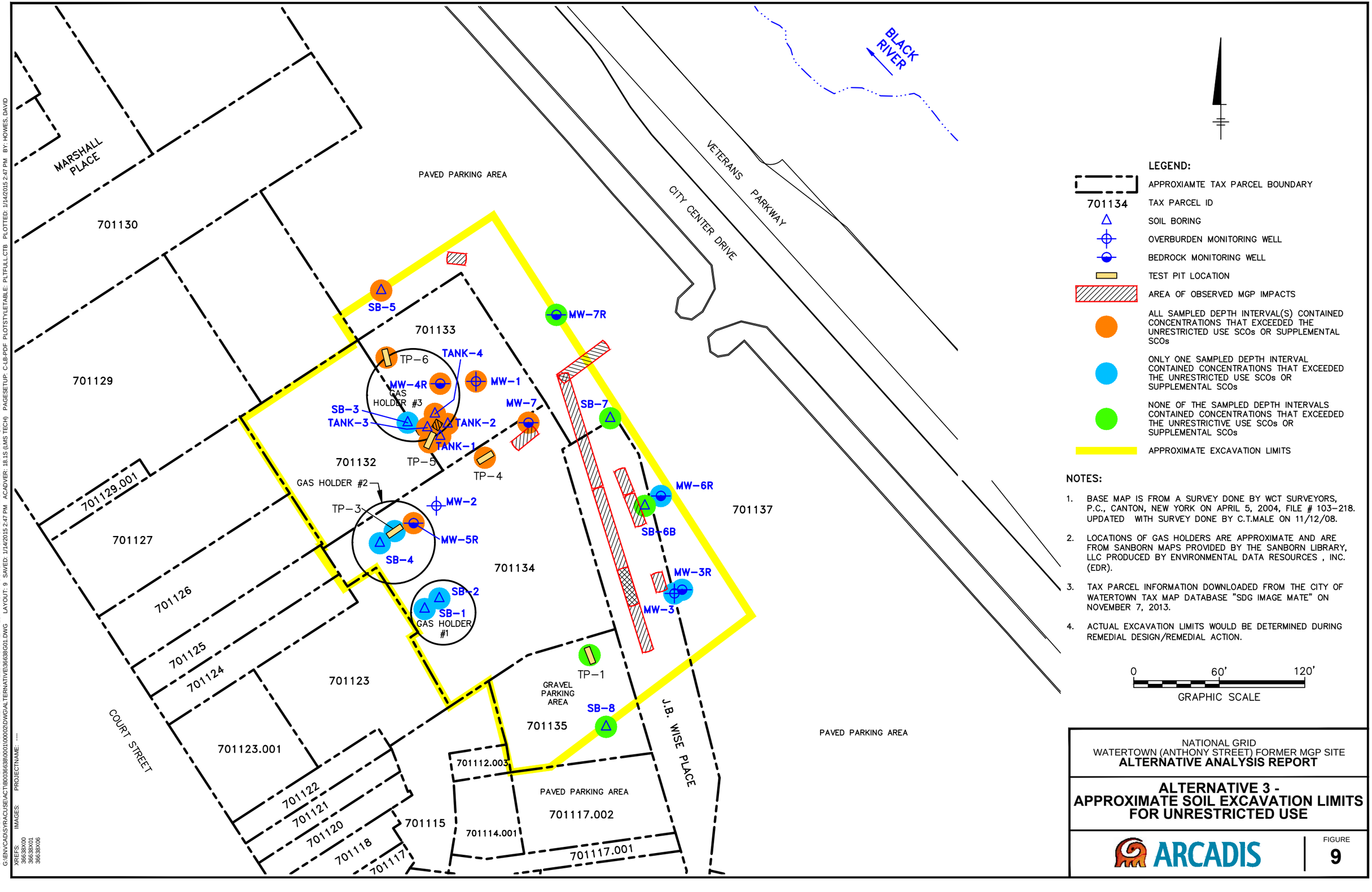

LEGEND:

- APPROXIAMTE TAX PARCEL BOUNDARY
- 701134 — TAX PARCEL ID
- SOIL BORING
- OVERBURDEN MONITORING WELL
- BEDROCK MONITORING WELL
- TEST PIT LOCATION
- AREA OF OBSERVED MGP IMPACTS
- ALL SAMPLED DEPTH INTERVAL(S) CONTAINED CONCENTRATIONS THAT EXCEEDED THE UNRESTRICTED USE SCOs OR SUPPLEMENTAL SCOs
- ONLY ONE SAMPLED DEPTH INTERVAL CONTAINED CONCENTRATIONS THAT EXCEEDED THE UNRESTRICTED USE SCOs OR SUPPLEMENTAL SCOs
- NONE OF THE SAMPLED DEPTH INTERVALS CONTAINED CONCENTRATIONS THAT EXCEEDED THE UNRESTRICTIVE USE SCOs OR SUPPLEMENTAL SCOs
- APPROXIMATE EXCAVATION LIMITS

NOTES:

1. BASE MAP IS FROM A SURVEY DONE BY WCT SURVEYORS, P.C., CANTON, NEW YORK ON APRIL 5, 2004, FILE # 103–218. UPDATED WITH SURVEY DONE BY C.T.MALE ON 11/12/08.
2. LOCATIONS OF GAS HOLDERS ARE APPROXIMATE AND ARE FROM SANBORN MAPS PROVIDED BY THE SANBORN LIBRARY, LLC PRODUCED BY ENVIRONMENTAL DATA RESOURCES , INC. (EDR).
3. TAX PARCEL INFORMATION DOWNLOADED FROM THE CITY OF WATERTOWN TAX MAP DATABASE "SDG IMAGE MATE" ON NOVEMBER 7, 2013.
4. ACTUAL EXCAVATION LIMITS WOULD BE DETERMINED DURING REMEDIAL DESIGN/REMEDIAL ACTION.

0 60' 120'

GRAPHIC SCALE

NATIONAL GRID
WATERTOWN (ANTHONY STREET) FORMER MGP SITE
ALTERNATIVE ANALYSIS REPORT

ALTERNATIVE 3 - APPROXIMATE SOIL EXCAVATION LIMITS FOR UNRESTRICTED USE

ARCADIS

FIGURE 9

CITY: SYRACUSE DIV/GROUP: ENVCAD DB: R. ALLEN G. STOWELL L. FORAKER LD: PIC: T. YOUNG PM: S. POWLIN TM: S. POWLIN LYR: ON=*; OFF=*REF*
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XREFS: 366638X00 366638X01 366638X06 IMAGES: PROJECTNAME: ----

Appendix A

Referenced Correspondence

January 15, 2013 Letter from NYSDEC to National Grid re: Approval of the Revised Remedial Investigation Report

New York State Department of Environmental Conservation
Division of Environmental Remediation
Remedial Bureau C, 11th Floor
625 Broadway, Albany, New York 12233-7014
Phone: (518) 402-9662 • **Fax:** (518) 402-9679
Website: www.dec.ny.gov

Joe Martens
Commissioner

January 15, 2013

Mr. Steven Stucker
Environmental Department
National Grid Company
300 Erie Boulevard West
Syracuse, NY 13202

Dear Mr. Stucker:

Re: Watertown (Anthony St.), Jefferson County
Non-Owned Former MGP Site
Site #V00473-6
Revised Remedial Investigation Report

The New York State Departments of Environmental Conservation and Health (Departments) have reviewed National Grid's December 2012 Revised Remedial Investigation Report and is hereby approved with modifications:

- Figure 3 - J.B. Wise Parking Lot Reconstruction Project was inserted, but the related text was not appropriately revised. Please correct text as needed.

Please provide an Alternatives Analysis Report in advance of or as part of a Remedial Action Work Plan.

Please contact me at 518-402-9662 if you have any questions.

Sincerely,

Bernard Franklin

Bernard Franklin
Environmental Engineer
Remedial Bureau C

Ec: T. Young, S. Powlin, Arcadis
I. Ushe, DOH
P. Taylor, NYSDEC, Region 6

May 2, 2013 E-mail from ARCADIS, on behalf of National Grid re: AA Report Draft Outline and May 1, 2013 Teleconference Summary

From: Geraci, Catherine
Sent: Thursday, May 02, 2013 10:14 AM
To: Bernie Franklin ; Hauk, Kurt; Ian Ushe; Wendy S. Kuehner
Cc: Stucker, Steven P.; Young, Terry W; Powlin, Scott
Subject: Watertown (Anthony St.) AA Report draft outline teleconference summary
Attachments: Alternatives Analysis Report Draft Outline 3_29_13.pdf

On behalf of Steve Stucker, a summary of the key points discussed during our 5/1/13 teleconference is provided below. The purpose of the call was to discuss National Grid's AA Report draft outline submitted to NYSDEC (copy attached). Follow-up received subsequent to the call is also provided below.

Thank you for participating in the call and please let Steve know if any changes are needed to the summary.

Teleconference Participants

Bernie Franklin, NYSDEC

Ian Ushe and Wendy Kuehner, NYSDOH

Kurt Hauk, City of Watertown

Steve Stucker, National Grid

Scott Powlin and Cathy Geraci, ARCADIS

Summary of Key Points Discussed

1. NYSDEC/NYSDOH requested and National Grid agreed to conduct a groundwater sampling event prior to submitting the AA Report and to use those results in the development of the AA Report. National Grid will present the proposed details for the groundwater sampling event in a work plan (letter) to be submitted to NYSDEC for approval. **Follow-up:** National Grid will submit the groundwater sampling work plan to NYSDEC by May 10, 2013. The work plan will identify (at minimum) the existing monitoring wells to be sampled, laboratory analysis to be performed, proposed deliverables, and proposed schedule.
2. NYSDEC/NYSDOH agreed that National Grid's recommended remedy (in the attached outline) is appropriate; however, Bernie Franklin mentioned that he needs to determine if a project review is needed. **Follow-up from Bernie Franklin:** a project review is needed and will be completed by NYSDEC after receiving the AA Report from National Grid.
3. Consistent with DER-10, National Grid proposed (in the attached outline) to identify one alternative in the AA Report and to evaluate that alternative with respect to the criteria specified in DER-10. **Follow-up from Bernie Franklin and Steve Stucker:** NYSDEC requests that the AA Report include a minimum of three alternatives and, as discussed with National Grid, the three alternatives to be included in the AA Report are: no action; the recommended remedy presented in the attached outline; and an alternative that achieves NYSDEC's unrestricted soil cleanup objectives.
4. Discussed institutional controls - what type would work on the City's property? Kurt Hauk will look into this question for the Anthony Street Site, and will also check on the status and type of institutional controls for the Engine Street Site (another National Grid MGP site located on the property owned by the City of Watertown).

Follow-up from Kurt Hauk: Kurt confirmed with the City's attorney that the City's process to limit development on the Anthony Street Site would be to insert the required restrictions into a new deed that the City will then deed to itself and file with the County Clerk. Kurt is looking into the status of the restrictions for the Engine Street Site where the DPW Bus Garage is located and will inform Steve of his findings.

From: Geraci, Catherine
Sent: Friday, March 29, 2013 3:48 PM
To: Bernie Franklin
Cc: 'Hauk, Kurt'; 'Stucker, Steven P.'; Young, Terry W; Powlin, Scott
Subject: Watertown (Anthony St.) AA draft outline submittal

Hello Bernie,

On behalf of National Grid, the draft outline for the Alternatives Analysis Report is attached for your review. The outline was reviewed by the City of Watertown (Kurt Hauk) and the comments received have been addressed.

As identified in Steve's email below, National Grid anticipates submitting the AA Report within four weeks of concurrence.

Hope that you are well and have a wonderful weekend!

Best regards,
Cathy

From: Bernard Franklin [mailto:bcfrankl@gw.dec.state.ny.us]
Sent: Tuesday, March 05, 2013 10:16 AM
To: Stucker, Steven P.
Cc: Amen Omorogbe; ziu01@health.state.ny.us
Subject: Re: Watertown (Engine St.) RI and AA submittal

This is Anthony St. Ian and I both want hard copies. The schedule is OK.

>>> "Stucker, Steven P." <Steven.Stucker@nationalgrid.com> 3/4/2013 9:39 AM >>>

Bernie,

Pursuant to NYSDEC's January 15, 2012 approval of the Revised Remedial Investigation (RI) Report that was received by National Grid on February 25, 2013, the next steps for this project are outlined below.

1. Submit the Final Revised RI Report - National Grid will finalize the Revised RI Report by addressing the sole comment in NYSDEC's January 15, 2013 approval letter, and accepting all the changes that were shown in the draft Revised RI Report submitted to NYSDEC on December 17, 2012. We will submit the Final Revised RI Report to NYSDEC by March 15, 2013. We will also transmit a hard copy to the Roswell P. Flower Memorial Library (project repository) and copy you on the transmittal. This copy of the RI Report will replace the copy currently on file at the library that was delivered in March 2011. Please let us know how many hard copies of the Final Revised RI Report that NYSDEC/NYSDOH would like (if any) and National Grid will transmit those by March 15th.

2. Prepare Alternatives Analysis (AA) Report - As identified in NYSDEC's January 15, 2013 letter, National Grid will submit an Alternatives Analysis Report (AA Report) to NYSDEC in advance of the Remedial Action Work Plan (RAWP). To facilitate completion of the AA Report, National Grid proposes to submit a draft, annotated outline of the AA Report to NYSDEC by March 29th, 2013. National Grid will then schedule a conference call to discuss/agree-upon the outline and anticipates

submitting the AA Report within four weeks of concurrence by all parties, especially the City of Watertown. Given that the majority of the former MGP is located on City property, it is imperative that they agree with the proposed conceptual approach.

3. Prepare Remedial Action Work Plan - National Grid anticipates submitting the RAWP within 60 days of receiving NYSDEC's approval of the AA Report.

Note that the actual submittal dates for the AA Report and the RAWP will be determined in conjunction with the NYSDEC as the project progresses. Please let me know if these next steps are acceptable to NYSDEC and how many hard copies of the Final Revised RI Report are needed. Thanks.

Steven P. Stucker
Project Manager
National Grid
Environmental Dept., A-3
300 Erie Blvd. West
Syracuse, NY 13202
315.428.5652 (Office)
315.247.6490 (Cell)

September 23, 2013 letter from National Grid to NYSDEC re: June 2013 Groundwater Sampling Results

nationalgrid

Steven P. Stucker, C.P.G.
Lead Engineer
Environmental Department

September 23, 2013

Mr. Bernard Franklin
New York State Department of Environmental Conservation
Division of Environmental Remediation
Remedial Bureau C
625 Broadway
Albany, NY 12233-7014

Re: Revised Report of June 2013 Groundwater Sampling Results
Watertown (Anthony Street) Non-Owned Former MGP Site
Watertown, New York
Site # V00473-6

Dear Mr. Franklin:

This letter presents groundwater analytical results for samples collected on June 25 and 26, 2013 at the Watertown (Anthony Street) Former Manufactured Gas Plant (MGP) site. This letter updates the version submitted to the New York State Department of Environmental Conservation (NYSDEC) on August 19, 2013 and incorporates changes that were requested by the NYSDEC in an August 23, 2013 letter to National Grid. A copy of the NYSDEC's August 23, 2013 letter is provided in Attachment A for reference. In that letter, the NYSDEC provided approval for National Grid to proceed with the Alternatives Analysis Report (AAR) and also requested that National Grid update the letter report of groundwater sampling results with a figure showing total BTEX (benzene, toluene, ethylbenzene, and xylenes), total PAH (polycyclic aromatic hydrocarbon), and total cyanide concentrations in groundwater samples. This letter incorporates that information on Figure 1.

Representatives from the NYSDEC and NYS Department of Health (NYSDOH) observed the sampling activities on June 25, 2013. The sampling was conducted in accordance with the NYSDEC-approved letter work plan dated May 15, 2013. The NYSDEC and NYSDOH requested that National Grid collect one additional round of groundwater samples from site monitoring wells prior to preparing the AAR to confirm that groundwater quality at the site has not significantly changed from the previous sampling rounds.

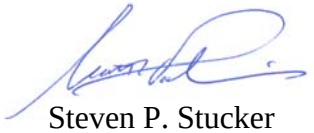
Samples were collected from seven existing site monitoring wells: MW-1, MW-2, MW-3R, MW-4R, MW-5R, MW-6R, and MW-7R. Please refer to Figure 1 for the locations of the monitoring wells and the historical results for samples collected from the wells. Note that monitoring well MW-3, an overburden monitoring well, was dry during the sampling event, and as such, a groundwater sample could not be collected from this well. It should be noted that a groundwater sample has never been collected from this well because the well is always observed to be dry during sampling events.

Consistent with the previous sampling rounds, groundwater samples were collected from monitoring wells using low-flow sampling techniques, and samples were analyzed for Target Compound List (TCL) volatile organic compounds (VOCs), TCL semi-VOCs (SVOCs), and total cyanide. Each well was checked for the presence/absence of non-aqueous phase liquid (NAPL) prior to sampling. NAPL was not observed in any wells during the event. Sampling was performed in general accordance with the procedures described in the NYSDEC-approved *Generic Site Characterization/IRM Work Plan for Site Investigations at Non-Owned Former MGP Sites* and supporting appendices (Field Sampling Plan [FSP] Quality Assurance Project Plan [QAPP]), dated November 2002. Sample analyses were performed by Test America Laboratories of Buffalo, New York, an Environmental Laboratory Accreditation Program- (ELAP-) certified laboratory. Samples were analyzed in accordance with the most recent version of the NYSDEC's Analytical Services Protocol (ASP). Sampling results were validated and a Data Usability Summary Report (DUSR) was prepared. The results of the data validation are incorporated into the attached Table 1. A copy of the DUSR can be provided upon request.

As shown in Table 1, the concentrations of BTEX, PAHs, and total cyanide detected in groundwater during the June 2013 sampling event are generally consistent with the results of previous sampling rounds. The results provided in Table 1 are compared with the NYSDEC's Division of Water Technical Operational Guidance Series (TOGS) Memorandum 1.1.1 Standards and Guidance Values. Any exceedances of these values are shaded in the table.

We appreciate the NYSDEC's and NYSDOH's continued assistance on this project. Please feel free to contact me by phone at 315-428-5652 or by email at Steven.Stucker@nationalgrid.com if you have any questions.

Sincerely,


, for

Steven P. Stucker
Environmental Department

Attachments

cc: Ian Ushe, NYSDOH
Kurt Hauk, City of Watertown
Cathy Geraci, ARCADIS
Scott Powlin, ARCADIS

Environmental Department, 300 Erie Boulevard West, Syracuse, New York 13202
T: (315) 428-5652 ■ F: (315) 460-8805 ■ steven.stucker@us.ngrid.com ■ www.nationalgrid.com

TABLE 1
GROUNDWATER ANALYTICAL RESULTS

NATIONAL GRID
WATERTOWN (ANTHONY STREET) NON-OWNED FORMER MGP SITE
WATERTOWN, NEW YORK

Location ID: / Date Collected:	NYSDEC TOGS 1.1.1 Water Standards and Guidance Values[1]	Units	MW-1 10/27/05	MW-1-CU 06/27/06	MW-1-STL 06/27/06	MW-1 09/08/10	MW-1 06/25/13	MW-2 10/27/05	MW-2 10/15/08	MW-2 09/08/10	MW-2 06/25/13	MW-3R 10/15/08	MW-3R 09/08/10
Volatile Organics													
1,1,1,2-Tetrachloroethane	- -	ug/L	NA	NA	NA	1.0 U	NA	NA	NA	1.0 U	NA	NA	1.0 U [1.0 U]
1,1,1-Trichloroethane	5	ug/L	10 U	NA	NA	1.0 U	1.0 U	10 U [10 UJ]	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U	1.0 U [1.0 U]
1,1,2,2-Tetrachloroethane	5	ug/L	10 U	NA	NA	1.0 U	1.0 U	10 U [10 UJ]	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U	1.0 U [1.0 U]
1,1,2-trichloro-1,2,2-trifluoroethane	5	ug/L	10 U	NA	NA	NA	1.0 U	10 U [10 UJ]	NA	NA	1.0 U [1.0 U]	NA	NA
1,1,2-Trichloroethane	1	ug/L	10 U	NA	NA	1.0 U	1.0 U	10 U [10 UJ]	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U	1.0 U [1.0 U]
1,1-Dichloroethane	5	ug/L	10 U	NA	NA	1.0 U	1.0 U	10 U [10 UJ]	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U	1.0 U [1.0 U]
1,1-Dichloroethene	5	ug/L	10 U	NA	NA	1.0 U	1.0 U	10 U [10 UJ]	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U	1.0 U [1.0 U]
1,2,3-Trichloropropane	- -	ug/L	NA	NA	NA	1.0 U	NA	NA	NA	1.0 U	NA	NA	1.0 U [1.0 U]
1,2,4-Trichlorobenzene	5	ug/L	10 U	NA	NA	NA	1.0 U	10 U [10 UJ]	1.0 U	NA	1.0 U [1.0 U]	1.0 U	NA
1,2-Dibromo-3-chloropropane	0.04	ug/L	10 U	NA	NA	1.0 U	1.0 U	10 U [10 UJ]	NA	1.0 U	1.0 U [1.0 U]	NA	1.0 U [1.0 U]
1,2-Dibromoethane	- -	ug/L	10 U	NA	NA	1.0 U	1.0 U	10 U [10 UJ]	NA	1.0 U	1.0 U [1.0 U]	NA	1.0 U [1.0 U]
1,2-Dichlorobenzene	3	ug/L	10 U	NA	NA	1.0 U	1.0 U	10 U [10 UJ]	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U	1.0 U [1.0 U]
1,2-Dichloroethane	0.6	ug/L	10 U	NA	NA	1.0 U	1.0 U	10 U [10 UJ]	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U	1.0 U [1.0 U]
1,2-Dichloropropane	1	ug/L	10 U	NA	NA	1.0 U	1.0 U	10 U [10 UJ]	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U	1.0 U [1.0 U]
1,3-Dichlorobenzene	3	ug/L	10 U	NA	NA	1.0 U	1.0 U	10 U [10 UJ]	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U	1.0 U [1.0 U]
1,4-Dichlorobenzene	3	ug/L	10 U	NA	NA	1.0 U	1.0 U	10 U [10 UJ]	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U	1.0 U [1.0 U]
2-Butanone	- -	ug/L	50 U	NA	NA	10 U	10 U	50 U [50 UJ]	1.0 U	10 U	10 U [10 U]	1.0 U	10 U [10 U]
2-Chloroethylvinylether	- -	ug/L	NA	NA	NA	R	NA	NA	NA	R	NA	NA	R [R]
2-Hexanone	50	ug/L	50 U	NA	NA	5.0 U	5.0 U	50 U [50 UJ]	1.0 U	5.0 U	5.0 U [5.0 U]	1.0 U	5.0 U [5.0 U]
4-Methyl-2-pentanone	- -	ug/L	50 U	NA	NA	5.0 U	5.0 U	50 U [50 UJ]	1.0 U	5.0 U	5.0 U [5.0 U]	1.0 U	5.0 U [5.0 U]
Acetone	50	ug/L	50 UJ	NA	NA	**4.8 J**	10 U	50 UJ [50 UJ]	5.0 U	10 U	10 U [10 U]	5.0 U	**5.4 J [4.5 J]**
Acrylonitrile	- -	ug/L	NA	NA	NA	5.0 U	NA	NA	NA	5.0 U	NA	NA	5.0 U [5.0 U]
Benzene	1	ug/L	10 U	NA	NA	1.0 U	1.0 U	**4.0 J [4.0 J]**	**4.3**	**2.4**	**2.8 [2.7]**	1.0 U	1.0 U [1.0 U]
Bromobenzene	- -	ug/L	NA	NA	NA	1.0 U	NA	NA	NA	1.0 U	NA	NA	1.0 U [1.0 U]
Bromochloromethane	- -	ug/L	NA	NA	NA	1.0 U	NA	NA	NA	1.0 U	NA	NA	1.0 U [1.0 U]
Bromodichloromethane	50	ug/L	10 U	NA	NA	1.0 U	1.0 U	10 U [10 UJ]	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U	1.0 U [1.0 U]
Bromoform	50	ug/L	10 U	NA	NA	1.0 U	1.0 U	10 U [10 UJ]	1.0 U	1.0 UJ	1.0 U [1.0 U]	1.0 U	1.0 U [1.0 U]
Bromomethane	5	ug/L	10 UJ	NA	NA	1.0 U	1.0 UJ	10 UJ [10 UJ]	1.0 U	1.0 U	1.0 UJ [1.0 UJ]	1.0 U	1.0 U [1.0 U]
Carbon Disulfide	- -	ug/L	10 U	NA	NA	1.0 U	1.0 U	10 U [10 UJ]	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U	1.0 U [1.0 U]
Carbon Tetrachloride	5	ug/L	10 U	NA	NA	1.0 U	1.0 U	10 U [10 UJ]	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U	1.0 U [1.0 U]
Chlorobenzene	5	ug/L	10 U	NA	NA	1.0 U	1.0 U	10 U [10 UJ]	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U	1.0 U [1.0 U]
Chloroethane	5	ug/L	10 UJ	NA	NA	1.0 U	1.0 U	10 UJ [10 UJ]	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U	1.0 U [1.0 U]
Chloroform	7	ug/L	10 U	NA	NA	1.0 U	1.0 U	10 U [10 UJ]	1.0 U	1.0 U	1.0 U [1.0 U]	**20**	**1.4 [1.3]**
Chloromethane	- -	ug/L	10 U	NA	NA	1.0 U	1.0 U	10 U [10 UJ]	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U	1.0 U [1.0 U]
cis-1,2-Dichloroethene	5	ug/L	10 U	NA	NA	1.0 U	1.0 U	10 U [10 UJ]	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U	1.0 U [1.0 U]
cis-1,3-Dichloropropene	0.4	ug/L	10 U	NA	NA	1.0 U	1.0 U	10 U [10 UJ]	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U	1.0 U [1.0 U]
Cyclohexane	- -	ug/L	10 U	NA	NA	NA	1.0 U	10 U [10 UJ]	NA	NA	1.0 U [1.0 U]	NA	NA
Dibromochloromethane	50	ug/L	10 U	NA	NA	1.0 U	1.0 U	10 U [10 UJ]	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U	1.0 U [1.0 U]
Dichlorodifluoromethane	5	ug/L	10 UJ	NA	NA	NA	1.0 U	10 UJ [10 UJ]	NA	NA	1.0 U [1.0 U]	NA	NA
Ethylbenzene	5	ug/L	10 U	NA	NA	1.0 U	1.0 U	10 U [10 UJ]	**0.90 J**	1.0 U	1.0 U [1.0 U]	1.0 U	1.0 U [1.0 U]
Iodomethane	- -	ug/L	NA	NA	NA	1.0 U	NA	NA	NA	1.0 U	NA	NA	1.0 U [1.0 U]
Isopropylbenzene	5	ug/L	10 U	NA	NA	NA	1.0 U	10 U [10 UJ]	NA	NA	1.0 U [1.0 U]	NA	NA
Methyl acetate	- -	ug/L	10 UJ	NA	NA	NA	1.0 U	10 UJ [10 UJ]	NA	NA	1.0 U [1.0 U]	NA	NA
Methyl tert-butyl ether	- -	ug/L	10 U	NA	NA	NA	1.0 U	10 U [10 UJ]	NA	NA	1.0 U [1.0 U]	NA	NA
Methylcyclohexane	- -	ug/L	10 U	NA	NA	NA	1.0 U	10 U [10 UJ]	NA	NA	1.0 U [1.0 U]	NA	NA
Methylene Chloride	5	ug/L	10 U	NA	NA	1.0 U	1.0 U	10 U [10 UJ]	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U	1.0 U [1.0 U]
m-Xylene & p-Xylene	- -	ug/L	10 U	NA	NA	NA	NA	0.50 U [10 UJ]	NA	NA	NA	NA	NA

See Notes on Page 7.

TABLE 1
GROUNDWATER ANALYTICAL RESULTS

NATIONAL GRID
WATERTOWN (ANTHONY STREET) NON-OWNED FORMER MGP SITE
WATERTOWN, NEW YORK

Location ID: / Date Collected:	NYSDEC TOGS 1.1.1 Water Standards and Guidance Values[1]	Units	MW-1 10/27/05	MW-1-CU 06/27/06	MW-1-STL 06/27/06	MW-1 09/08/10	MW-1 06/25/13	MW-2 10/27/05	MW-2 10/15/08	MW-2 09/08/10	MW-2 06/25/13	MW-3R 10/15/08	MW-3R 09/08/10
Volatile Organics (Cont.)													
o-Xylene	- -	ug/L	10 U	NA	NA	NA	NA	10 U [10 UJ]	NA	NA	NA	NA	NA
Styrene	5	ug/L	10 U	NA	NA	1.0 U	1.0 U	10 U [10 UJ]	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U	1.0 U [1.0 U]
Tetrachloroethene	5	ug/L	10 U	NA	NA	1.0 U	1.0 U	10 U [10 UJ]	1.0 U	1.0 U	1.0 U [1.0 U]	**15**	**4.4 [5.0]**
Toluene	5	ug/L	10 U	NA	NA	1.0 U	1.0 U	10 U [10 UJ]	1.0 U	**1.8**	1.0 U [1.0 U]	1.0 U	1.0 U [1.0 U]
trans-1,2-Dichloroethene	5	ug/L	10 U	NA	NA	**2.4**	1.0 U	10 U [10 UJ]	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U	1.0 U [1.0 U]
trans-1,3-Dichloropropene	0.4	ug/L	10 U	NA	NA	1.0 U	1.0 U	10 U [10 UJ]	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U	1.0 U [1.0 U]
trans-1,4-Dichloro-2-butene	- -	ug/L	NA	NA	NA	5.0 U	NA	NA	NA	5.0 U	NA	NA	5.0 U [5.0 U]
Trichloroethene	5	ug/L	10 U	NA	NA	1.0 U	1.0 U	10 U [10 UJ]	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U	1.0 U [1.0 U]
Trichlorofluoromethane	5	ug/L	10 U	NA	NA	1.0 U	1.0 U	10 U [10 UJ]	NA	1.0 U	1.0 U [1.0 U]	NA	1.0 U [1.0 U]
Vinyl Acetate	- -	ug/L	NA	NA	NA	5.0 U	NA	NA	NA	5.0 U	NA	NA	5.0 U [5.0 U]
Vinyl Chloride	2	ug/L	10 U	NA	NA	1.0 U	1.0 U	10 U [10 UJ]	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U	1.0 U [1.0 U]
Xylenes (total)	5	ug/L	20 U	NA	NA	2.0 U	2.0 U	20 U [20 UJ]	**0.30 J**	2.0 U	2.0 U [2.0 U]	1.0 U	2.0 U [2.0 U]
Total BTEX	- -	ug/L	ND	NA	NA	ND	ND	**4.0 J [4.0 J]**	**5.5 J**	**4.2**	**2.8 [2.7]**	ND	ND [ND]
Total VOCs	- -	ug/L	ND	NA	NA	**7.2 J**	ND	**4.0 J [4.0 J]**	**5.5 J**	**4.2**	**2.8 [2.7]**	**35**	**11 J [11 J]**
Semivolatile Organics													
1,2,4-Trichlorobenzene	5	ug/L	NA	NA	NA	NA	NA	NA	NA	9.5 U	NA	NA	9.4 U [9.8 U]
1,2-Dichlorobenzene	3	ug/L	NA	NA	NA	NA	NA	NA	NA	9.5 U	NA	NA	9.4 U [9.8 U]
1,3-Dichlorobenzene	3	ug/L	NA	NA	NA	NA	NA	NA	NA	9.5 U	NA	NA	9.4 U [9.8 U]
1,4-Dichlorobenzene	3	ug/L	NA	NA	NA	NA	NA	NA	NA	9.5 U	NA	NA	9.4 U [9.8 U]
2,4,5-Trichlorophenol	1	ug/L	10 U	NA	NA	NA	5.1 U	10 U [10 U]	10 U	4.7 U	4.6 U [4.6 U]	10 U	4.7 U [4.9 U]
2,4,6-Trichlorophenol	1	ug/L	10 U	NA	NA	NA	5.1 U	10 U [10 U]	10 U	4.7 U	4.6 U [4.6 U]	10 U	4.7 U [4.9 U]
2,4-Dichlorophenol	5	ug/L	10 U	NA	NA	NA	5.1 U	10 U [10 U]	10 U	4.7 U	4.6 U [4.6 U]	10 U	4.7 U [4.9 U]
2,4-Dimethylphenol	50	ug/L	10 U	NA	NA	NA	5.1 U	10 U [10 U]	10 U	4.7 U	4.6 U [4.6 U]	10 U	4.7 U [4.9 U]
2,4-Dinitrophenol	10	ug/L	20 UJ	NA	NA	NA	10 U	21 UJ [20 UJ]	30 U	9.5 UJ	9.2 U [9.3 U]	30 U	9.4 UJ [9.8 UJ]
2,4-Dinitrotoluene	5	ug/L	10 U	NA	NA	NA	5.1 U	10 U [10 U]	2.0 U	4.7 U	4.6 U [4.6 U]	2.0 U	4.7 U [4.9 U]
2,6-Dinitrotoluene	5	ug/L	10 U	NA	NA	NA	5.1 U	10 U [10 U]	2.0 U	4.7 U	4.6 U [4.6 U]	2.0 U	4.7 U [4.9 U]
2-Chloronaphthalene	10	ug/L	10 U	NA	NA	NA	5.1 U	10 U [1.8 U]	10 U	4.7 U	4.6 U [4.6 U]	10 U	4.7 U [4.9 U]
2-Chlorophenol	1	ug/L	10 U	NA	NA	NA	5.1 U	10 U [10 U]	10 U	4.7 U	4.6 U [4.6 U]	10 U	4.7 U [4.9 U]
2-Methylnaphthalene	- -	ug/L	10 UJ	NA	NA	NA	5.1 U	10 UJ [10 UJ]	10 U	4.7 U	4.6 U [4.6 U]	10 U	4.7 U [4.9 U]
2-Methylphenol	- -	ug/L	10 U	NA	NA	NA	5.1 U	10 U [10 U]	10 U	4.7 U	4.6 U [4.6 U]	10 U	4.7 U [4.9 U]
2-Nitroaniline	5	ug/L	10 U	NA	NA	NA	10 U	10 U [10 U]	20 U	9.5 U	9.2 U [9.3 U]	20 U	9.4 U [9.8 U]
2-Nitrophenol	- -	ug/L	10 U	NA	NA	NA	5.1 U	10 U [10 U]	10 U	4.7 U	4.6 U [4.6 U]	10 U	4.7 U [4.9 U]
3,3'-Dichlorobenzidine	5	ug/L	20 UJ	NA	NA	NA	5.1 U	21 UJ [20 UJ]	20 U	4.7 U	4.6 U [4.6 U]	20 U	4.7 U [4.9 U]
3-Nitroaniline	5	ug/L	10 U	NA	NA	NA	10 UJ	10 U [10 U]	20 U	9.5 U	9.2 UJ [9.3 UJ]	20 U	9.4 U [9.8 U]
4,6-Dinitro-2-methylphenol	- -	ug/L	20 UJ	NA	NA	NA	10 U	21 UJ [20 UJ]	30 U	9.5 U	9.2 U [9.3 U]	30 U	9.4 U [9.8 U]
4-Bromophenyl-phenylether	- -	ug/L	10 U	NA	NA	NA	5.1 U	10 U [10 U]	10 U	4.7 U	4.6 U [4.6 U]	10 U	4.7 U [4.9 U]
4-Chloro-3-Methylphenol	- -	ug/L	10 U	NA	NA	NA	5.1 U	10 U [10 U]	10 U	4.7 U	4.6 U [4.6 U]	10 U	4.7 U [4.9 U]
4-Chloroaniline	5	ug/L	10 U	NA	NA	NA	5.1 UJ	10 U [10 U]	10 U	4.7 U	4.6 UJ [4.6 UJ]	10 U	4.7 U [4.9 U]
4-Chlorophenyl-phenylether	- -	ug/L	10 U	NA	NA	NA	5.1 U	10 U [10 U]	10 U	4.7 U	4.6 U [4.6 U]	10 U	4.7 U [4.9 U]
4-Methylphenol	- -	ug/L	10 UJ	NA	NA	NA	10 U	10 UJ [10 UJ]	10 U	9.5 U	9.2 U [9.3 U]	10 U	9.4 U [9.8 U]
4-Nitroaniline	5	ug/L	10 U	NA	NA	NA	10 U	10 U [10 U]	20 U	9.5 U	9.2 U [9.3 U]	20 U	9.4 U [9.8 U]
4-Nitrophenol	- -	ug/L	20 U	NA	NA	NA	10 U	21 U [20 U]	30 U	9.5 U	9.2 U [9.3 U]	30 U	9.4 U [9.8 U]
Acenaphthene	20	ug/L	10 U	NA	NA	NA	5.1 U	10 U [10 U]	10 U	4.7 U	4.6 U [4.6 U]	10 U	4.7 U [4.9 U]
Acenaphthylene	- -	ug/L	10 U	NA	NA	NA	5.1 U	10 U [10 U]	10 U	4.7 U	4.6 U [4.6 U]	10 U	4.7 U [4.9 U]
Acetophenone	- -	ug/L	10 U	NA	NA	NA	5.1 U	10 U [10 U]	NA	NA	4.6 U [4.6 U]	NA	NA
Anthracene	50	ug/L	10 UJ	NA	NA	NA	5.1 U	10 UJ [10 UJ]	10 U	4.7 U	4.6 U [4.6 U]	10 U	4.7 U [4.9 U]
Atrazine	- -	ug/L	10 U	NA	NA	NA	5.1 U	10 U [10 U]	NA	NA	4.6 U [4.6 U]	NA	NA

See Notes on Page 7.

TABLE 1
GROUNDWATER ANALYTICAL RESULTS

NATIONAL GRID
WATERTOWN (ANTHONY STREET) NON-OWNED FORMER MGP SITE
WATERTOWN, NEW YORK

Location ID: / Date Collected:	NYSDEC TOGS 1.1.1 Water Standards and Guidance Values[1]	Units	MW-1 10/27/05	MW-1-CU 06/27/06	MW-1-STL 06/27/06	MW-1 09/08/10	MW-1 06/25/13	MW-2 10/27/05	MW-2 10/15/08	MW-2 09/08/10	MW-2 06/25/13	MW-3R 10/15/08	MW-3R 09/08/10
Semivolatile Organics (Cont.)													
Benzaldehyde	- -	ug/L	10 UJ	NA	NA	NA	5.1 UJ	10 UJ [10 UJ]	NA	NA	4.6 UJ [4.6 UJ]	NA	NA
Benzo(a)anthracene	0.002	ug/L	10 U	NA	NA	NA	**0.86 J**	10 U [10 U]	1.0 U	4.7 U	4.6 U [4.6 U]	1.0 U	4.7 U [4.9 U]
Benzo(a)pyrene	- -	ug/L	10 UJ	NA	NA	NA	**0.79 J**	10 U [10 UJ]	1.0 U	4.7 U	4.6 U [4.6 U]	1.0 U	4.7 U [4.9 U]
Benzo(b)fluoranthene	0.002	ug/L	10 UJ	NA	NA	NA	**1.1 J**	10 UJ [10 UJ]	1.0 U	4.7 U	4.6 U [4.6 U]	1.0 U	4.7 U [4.9 U]
Benzo(g,h,i)perylene	- -	ug/L	10 U	NA	NA	NA	5.1 U	10 U [10 U]	10 U	4.7 U	4.6 U [4.6 U]	10 U	4.7 U [4.9 U]
Benzo(k)fluoranthene	0.002	ug/L	10 UJ	NA	NA	NA	5.1 U	10 UJ [10 UJ]	1.0 U	4.7 UJ	4.6 U [4.6 U]	1.0 U	4.7 UJ [4.9 UJ]
Benzyl Alcohol	- -	ug/L	NA	NA	NA	NA	NA	NA	NA	19 U	NA	NA	19 U [20 U]
Biphenyl	- -	ug/L	10 U	NA	NA	NA	5.1 U	10 U [10 U]	NA	NA	4.6 U [4.6 U]	NA	NA
bis(2-Chloroethoxy)methane	5	ug/L	10 U	NA	NA	NA	5.1 U	10 U [1.3 U]	10 U	4.7 U	4.6 U [4.6 U]	10 U	4.7 U [4.9 U]
bis(2-Chloroethyl)ether	1	ug/L	10 U	NA	NA	NA	5.1 U	10 U [10 U]	1.0 U	4.7 U	4.6 U [4.6 U]	1.0 U	4.7 U [4.9 U]
bis(2-Chloroisopropyl)ether	- -	ug/L	10 U	NA	NA	NA	5.1 U	10 U [10 U]	10 U	4.7 U	4.6 U [4.6 U]	10 U	4.7 U [4.9 U]
bis(2-Ethylhexyl)phthalate	5	ug/L	10 U	NA	NA	NA	5.1 U	**1.9 J [10 U]**	10 U	4.7 U	4.6 U [4.6 U]	10 U	4.7 U [4.9 U]
Butylbenzylphthalate	50	ug/L	10 U	NA	NA	NA	5.1 U	10 U [10 U]	10 U	4.7 U	4.6 U [4.6 U]	10 U	4.7 U [4.9 U]
Caprolactam	- -	ug/L	10 U	NA	NA	NA	5.1 UJ	10 U [10 U]	NA	NA	4.6 UJ [4.6 UJ]	NA	NA
Carbazole	- -	ug/L	10 U	NA	NA	NA	5.1 U	**0.85 [10 U]**	10 U	NA	4.6 U [4.6 U]	10 U	NA
Chrysene	0.002	ug/L	10 U	NA	NA	NA	**0.78 J**	10 U [10 U]	10 U	4.7 U	4.6 U [4.6 U]	10 U	4.7 U [4.9 U]
Dibenzo(a,h)anthracene	- -	ug/L	10 UJ	NA	NA	NA	5.1 U	10 UJ [10 UJ]	1.0 U	4.7 U	4.6 U [4.6 U]	1.0 U	4.7 U [4.9 U]
Dibenzofuran	- -	ug/L	10 U	NA	NA	NA	10 U	10 U [10 U]	10 U	9.5 U	9.2 U [9.3 U]	10 U	9.4 U [9.8 U]
Diethylphthalate	50	ug/L	10 U	NA	NA	NA	5.1 U	10 U [10 U]	10 U	**0.52 J**	4.6 U [4.6 U]	10 U	4.7 U [4.9 U]
Dimethylphthalate	50	ug/L	10 U	NA	NA	NA	5.1 U	10 U [10 U]	10 U	4.7 U	4.6 U [4.6 U]	10 U	4.7 U [4.9 U]
Di-n-Butylphthalate	50	ug/L	10 UJ	NA	NA	NA	5.1 UB	**1.6 J [10 UJ]**	10 U	4.7 U	4.6 UB [4.6 UB]	10 U	4.7 U [4.9 U]
Di-n-Octylphthalate	50	ug/L	10 UJ	NA	NA	NA	5.1 U	10 UJ [10 UJ]	10 U	4.7 U	4.6 U [4.6 U]	10 U	4.7 U [4.9 U]
Fluoranthene	50	ug/L	10 UJ	NA	NA	NA	**1.3 J**	10 UJ [10 UJ]	10 U	4.7 U	4.6 U [4.6 U]	10 U	4.7 U [4.9 U]
Fluorene	50	ug/L	10 UJ	NA	NA	NA	5.1 U	10 UJ [10 UJ]	10 U	4.7 U	4.6 U [4.6 U]	10 U	4.7 U [4.9 U]
Hexachlorobenzene	0.04	ug/L	10 U	NA	NA	NA	5.1 U	10 U [10 U]	1.0 U	4.7 U	4.6 U [4.6 U]	1.0 U	4.7 U [4.9 U]
Hexachlorobutadiene	0.5	ug/L	10 U	NA	NA	NA	5.1 U	10 U [10 U]	2.0 U	4.7 U	4.6 U [4.6 U]	2.0 U	4.7 U [4.9 U]
Hexachlorocyclopentadiene	5	ug/L	10 UJ	NA	NA	NA	5.1 U	10 UJ [10 UJ]	10 U	4.7 U	4.6 U [4.6 U]	10 U	4.7 U [4.9 U]
Hexachloroethane	5	ug/L	10 U	NA	NA	NA	5.1 U	10 U [10 U]	1.0 U	4.7 U	4.6 U [4.6 U]	1.0 U	4.7 U [4.9 U]
Indeno(1,2,3-cd)pyrene	0.002	ug/L	10 UJ	NA	NA	NA	5.1 U	10 UJ [10 UJ]	1.0 U	4.7 U	4.6 U [4.6 U]	1.0 U	4.7 U [4.9 U]
Isophorone	50	ug/L	10 U	NA	NA	NA	5.1 U	10 U [10 U]	10 U	4.7 U	4.6 U [4.6 U]	10 U	4.7 U [4.9 U]
Naphthalene	10	ug/L	10 U	NA	NA	NA	5.1 U	10 U [10 U]	**4.3 J**	**2.4 J**	4.6 U [4.6 U]	10 U	4.7 U [4.9 U]
Nitrobenzene	0.4	ug/L	10 U	NA	NA	NA	5.1 U	10 U [10 U]	1.0 U	4.7 U	4.6 U [4.6 U]	1.0 U	4.7 U [4.9 U]
N-Nitroso-di-n-propylamine	- -	ug/L	10 U	NA	NA	NA	5.1 U	10 U [10 U]	1.0 U	4.7 U	4.6 U [4.6 U]	1.0 U	4.7 U [4.9 U]
N-Nitrosodiphenylamine	50	ug/L	10 UJ	NA	NA	NA	5.1 U	10 UJ [10 U]	10 U	4.7 U	4.6 U [4.6 U]	10 U	4.7 U [4.9 U]
N-Nitrosomethylethylamine	- -	ug/L	NA	NA	NA	NA	NA	NA	NA	9.5 U	NA	NA	9.4 U [9.8 U]
Pentachlorophenol	- -	ug/L	20 UJ	NA	NA	NA	10 U	21 UJ [20 UJ]	30 U	9.5 U	9.2 U [9.3 U]	30 U	9.4 U [9.8 U]
Phenanthrene	50	ug/L	10 UJ	NA	NA	NA	**0.77 J**	10 UJ [10 UJ]	10 U	4.7 U	4.6 U [4.6 U]	10 U	4.7 U [4.9 U]
Phenol	1	ug/L	10 U	NA	NA	NA	5.1 U	10 U [10 U]	10 UJ	4.7 U	4.6 U [4.6 U]	10 UJ	4.7 U [4.9 U]
Pyrene	50	ug/L	10 U	NA	NA	NA	**1.2 J**	10 U [10 U]	10 U	4.7 U	4.6 U [4.6 U]	10 U	4.7 U [4.9 U]
Total PAHs	- -	ug/L	ND	NA	NA	NA	**6.8 J**	ND [ND]	**4.3 J**	**2.4 J**	ND [ND]	ND	ND [ND]
Total SVOCs	- -	ug/L	ND	NA	NA	NA	**6.8 J**	**4.4 J [ND]**	**4.3 J**	**2.9 J**	ND [ND]	ND	ND [ND]
Miscellaneous													
Free Cyanide	- -	ug/L	NA	**4.6 [5.2]**	NA	NA	NA	NA	**5 J**	NA	NA	10 U	NA
Total Cyanide	200	ug/L	**744**	**406 [421]**	**350 [370]**	**596**	**210**	**98 [91]**	**90**	**127 J**	**61 [57]**	**2.5 J**	10 U [10 U]

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TABLE 1
GROUNDWATER ANALYTICAL RESULTS

NATIONAL GRID
WATERTOWN (ANTHONY STREET) NON-OWNED FORMER MGP SITE
WATERTOWN, NEW YORK

Location ID: / Date Collected:	NYSDEC TOGS 1.1.1 Water Standards and Guidance Values[1]	Units	MW-3R 06/26/13	MW-4R 10/16/08	MW-4R 09/07/10	MW-4R 06/26/13	MW-5R 10/15/08	MW-5R 09/08/10	MW-5R 06/25/13	MW-6R 10/16/08	MW-6R 09/08/10	MW-6R 06/25/13	MW-7R 10/16/08	MW-7R 09/07/10	MW-7R 06/25/13
Volatile Organics															
1,1,1,2-Tetrachloroethane	- -	ug/L	NA	NA	1.0 U	NA	NA	1.0 U	NA	NA	1.0 U	NA	NA	1.0 U	NA
1,1,1-Trichloroethane	5	ug/L	1.0 U	10 U	1.0 U	1.0 U	100 U	1.0 U	4.0 U	1.0 U	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U	1.0 U
1,1,2,2-Tetrachloroethane	5	ug/L	1.0 U	10 U	1.0 U	1.0 U	100 U	1.0 U	4.0 U	1.0 U	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U	1.0 U
1,1,2-trichloro-1,2,2-trifluoroethane	5	ug/L	1.0 U	NA	NA	1.0 U	NA	NA	4.0 U	NA	NA	1.0 U	NA	NA	1.0 U
1,1,2-Trichloroethane	1	ug/L	1.0 U	10 U	1.0 U	1.0 U	100 U	1.0 U	4.0 U	1.0 U	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U	1.0 U
1,1-Dichloroethane	5	ug/L	1.0 U	10 U	1.0 U	1.0 U	100 U	1.0 U	4.0 U	1.0 U	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U	1.0 U
1,1-Dichloroethene	5	ug/L	1.0 U	10 U	1.0 U	1.0 U	100 U	1.0 U	4.0 U	1.0 U	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U	1.0 U
1,2,3-Trichloropropane	- -	ug/L	NA	NA	1.0 U	NA	NA	1.0 U	NA	NA	1.0 U	NA	NA	1.0 U	NA
1,2,4-Trichlorobenzene	5	ug/L	1.0 U	10 U	NA	1.0 U	100 U	NA	4.0 U	1.0 U	NA	1.0 U	1.0 U [1.0 U]	NA	1.0 U
1,2-Dibromo-3-chloropropane	0.04	ug/L	1.0 U	NA	1.0 U	1.0 U	NA	1.0 U	4.0 U	NA	1.0 U	1.0 U	NA	1.0 U	1.0 U
1,2-Dibromoethane	- -	ug/L	1.0 U	NA	1.0 U	1.0 U	NA	1.0 U	4.0 U	NA	1.0 U	1.0 U	NA	1.0 U	1.0 U
1,2-Dichlorobenzene	3	ug/L	1.0 U	10 U	1.0 U	1.0 U	100 U	1.0 U	4.0 U	1.0 U	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U	1.0 U
1,2-Dichloroethane	0.6	ug/L	1.0 U	10 U	1.0 U	1.0 U	100 U	1.0 U	4.0 U	1.0 U	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U	1.0 U
1,2-Dichloropropane	1	ug/L	1.0 U	10 U	1.0 U	1.0 U	100 U	1.0 U	4.0 U	1.0 U	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U	1.0 U
1,3-Dichlorobenzene	3	ug/L	1.0 U	10 U	1.0 U	1.0 U	100 U	1.0 U	4.0 U	1.0 U	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U	1.0 U
1,4-Dichlorobenzene	3	ug/L	1.0 U	10 U	1.0 U	1.0 U	100 U	1.0 U	4.0 U	1.0 U	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U	1.0 U
2-Butanone	- -	ug/L	10 U	10 U	10 U	10 U	100 U	10 U	40 U	1.0 U	10 U	10 U	1.0 U [1.0 U]	10 U	10 U
2-Chloroethylvinylether	- -	ug/L	NA	NA	R	NA	NA	R	NA	NA	R	NA	NA	R	NA
2-Hexanone	50	ug/L	5.0 U	10 U	5.0 U	5.0 U	100 U	5.0 U	20 U	1.0 U	5.0 U	5.0 U	1.0 U [1.0 U]	5.0 U	5.0 U
4-Methyl-2-pentanone	- -	ug/L	5.0 U	10 U	5.0 U	5.0 U	100 U	5.0 U	20 U	1.0 U	5.0 U	5.0 U	1.0 U [1.0 U]	5.0 U	5.0 U
Acetone	50	ug/L	10 U	50 U	10 U	10 U	500 U	10 U	40 U	5.0 U	10 U	10 U	5.0 U [5.0 U]	10 U	10 U
Acrylonitrile	- -	ug/L	NA	NA	5.0 U	NA	NA	5.0 U	NA	NA	5.0 U	NA	NA	5.0 U	NA
Benzene	1	ug/L	1.0 U	**1,200**	**670 D**	**22**	**3,800**	**4,200 D**	**6,600 D**	1.0 U	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U	1.0 U
Bromobenzene	- -	ug/L	NA	NA	1.0 U	NA	NA	1.0 U	NA	NA	1.0 U	NA	NA	1.0 U	NA
Bromochloromethane	- -	ug/L	NA	NA	1.0 U	NA	NA	1.0 U	NA	NA	1.0 U	NA	NA	1.0 U	NA
Bromodichloromethane	50	ug/L	1.0 U	10 U	1.0 U	1.0 U	100 U	1.0 U	4.0 U	1.0 U	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U	1.0 U
Bromoform	50	ug/L	1.0 U	10 U	1.0 U	1.0 U	100 U	1.0 UJ	4.0 U	1.0 U	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U	1.0 U
Bromomethane	5	ug/L	1.0 U	10 U	1.0 UJ	1.0 UJ	100 U	1.0 U	4.0 U	1.0 U	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U	1.0 UJ
Carbon Disulfide	- -	ug/L	1.0 U	10 U	**3.1**	1.0 U	100 U	1.0 U	4.0 U	1.0 U	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U	1.0 U
Carbon Tetrachloride	5	ug/L	1.0 U	10 U	1.0 U	1.0 U	100 U	1.0 U	4.0 U	1.0 U	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U	1.0 U
Chlorobenzene	5	ug/L	1.0 U	10 U	1.0 U	1.0 U	100 U	1.0 U	4.0 U	1.0 U	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U	1.0 U
Chloroethane	5	ug/L	1.0 U	10 U	1.0 U	1.0 U	100 U	1.0 U	4.0 U	1.0 U	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U	1.0 U
Chloroform	7	ug/L	**1.8**	**2.4 J**	1.0 U	1.0 U	100 U	1.0 U	4.0 U	**13**	**1.3**	**1.9**	**12 [12]**	**2.6**	1.0 U
Chloromethane	- -	ug/L	1.0 U	10 U	**1.7**	1.0 U	100 U	1.0 U	4.0 U	1.0 U	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U	1.0 U
cis-1,2-Dichloroethene	5	ug/L	1.0 U	10 U	1.0 U	1.0 U	100 U	1.0 U	4.0 U	1.0 U	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U	1.0 U
cis-1,3-Dichloropropene	0.4	ug/L	1.0 U	10 U	1.0 U	1.0 U	100 U	1.0 U	4.0 U	1.0 U	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U	1.0 U
Cyclohexane	- -	ug/L	1.0 U	NA	NA	1.0 U	NA	NA	**2.7 J**	NA	NA	1.0 U	NA	NA	1.0 U
Dibromochloromethane	50	ug/L	1.0 U	10 U	1.0 U	1.0 U	100 U	1.0 U	4.0 U	1.0 U	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U	1.0 U
Dichlorodifluoromethane	5	ug/L	1.0 U	NA	NA	1.0 U	NA	NA	4.0 U	NA	NA	1.0 U	NA	NA	1.0 U
Ethylbenzene	5	ug/L	1.0 U	**510**	**51**	**1.8**	**2,000**	**2,100 D**	**3,500 D**	1.0 U	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U	1.0 U
Iodomethane	- -	ug/L	NA	NA	1.0 U	NA	NA	1.0 U	NA	NA	1.0 U	NA	NA	1.0 U	NA
Isopropylbenzene	5	ug/L	1.0 U	NA	NA	1.0 U	NA	NA	**70**	NA	NA	1.0 U	NA	NA	1.0 U
Methyl acetate	- -	ug/L	1.0 U	NA	NA	1.0 U	NA	NA	4.0 U	NA	NA	1.0 U	NA	NA	1.0 U
Methyl tert-butyl ether	- -	ug/L	1.0 U	NA	NA	1.0 U	NA	NA	4.0 U	NA	NA	1.0 U	NA	NA	1.0 U
Methylcyclohexane	- -	ug/L	1.0 U	NA	NA	1.0 U	NA	NA	**2.8 J**	NA	NA	1.0 U	NA	NA	1.0 U
Methylene Chloride	5	ug/L	1.0 U	10 U	1.0 U	1.0 U	100 U	1.0 U	4.0 U	1.0 U	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U	1.0 U
m-Xylene & p-Xylene	- -	ug/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

See Notes on Page 7.

TABLE 1
GROUNDWATER ANALYTICAL RESULTS

NATIONAL GRID
WATERTOWN (ANTHONY STREET) NON-OWNED FORMER MGP SITE
WATERTOWN, NEW YORK

Location ID: / Date Collected:	NYSDEC TOGS 1.1.1 Water Standards and Guidance Values[1]	Units	MW-3R 06/26/13	MW-4R 10/16/08	MW-4R 09/07/10	MW-4R 06/26/13	MW-5R 10/15/08	MW-5R 09/08/10	MW-5R 06/25/13	MW-6R 10/16/08	MW-6R 09/08/10	MW-6R 06/25/13	MW-7R 10/16/08	MW-7R 09/07/10	MW-7R 06/25/13
Volatile Organics (Cont.)															
o-Xylene	- -	ug/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Styrene	5	ug/L	1.0 U	10 U	1.0 U	1.0 U	**1,700**	**91**	**1,100 D**	1.0 U	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U	1.0 U
Tetrachloroethene	5	ug/L	**4.7**	10 U	1.0 U	1.0 U	100 U	1.0 U	4.0 U	**9.8**	**5.5**	**4.5**	**5.4 [5.4]**	**4.2 J**	**0.78 J**
Toluene	5	ug/L	1.0 U	**49**	**6.6**	1.0 U	**9,700**	**3,600 D**	**11,000 D**	1.0 U	1.0 U	**0.52 J**	1.0 U [1.0 U]	1.0 U	1.0 U
trans-1,2-Dichloroethene	5	ug/L	1.0 U	10 U	1.0 U	1.0 U	100 U	1.0 U	4.0 U	1.0 U	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U	1.0 U
trans-1,3-Dichloropropene	0.4	ug/L	1.0 U	10 U	1.0 U	1.0 U	100 U	1.0 U	4.0 U	1.0 U	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U	1.0 U
trans-1,4-Dichloro-2-butene	- -	ug/L	NA	NA	5.0 UJ	NA	NA	5.0 U	NA	NA	5.0 U	NA	NA	5.0 U	NA
Trichloroethene	5	ug/L	1.0 U	10 U	1.0 U	1.0 U	100 U	1.0 U	4.0 U	1.0 U	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U	1.0 U
Trichlorofluoromethane	5	ug/L	1.0 U	NA	1.0 U	1.0 U	NA	1.0 U	4.0 U	NA	1.0 U	1.0 U	NA	1.0 U	1.0 U
Vinyl Acetate	- -	ug/L	NA	NA	5.0 U	NA	NA	5.0 U	NA	NA	5.0 U	NA	NA	5.0 U	NA
Vinyl Chloride	2	ug/L	1.0 U	10 U	1.0 U	1.0 U	100 U	1.0 U	4.0 U	1.0 U	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U	1.0 U
Xylenes (total)	5	ug/L	2.0 U	**480**	**41**	2.0 U	**4,800**	**2,900 D**	**6,000 D**	1.0 U	2.0 U	2.0 U	1.0 U [1.0 U]	2.0 U	2.0 U
Total BTEX	- -	ug/L	ND	**2,200**	**770**	**24**	**20,000**	**13,000**	**27,000**	ND	ND	**0.52 J**	ND [ND]	ND	ND
Total VOCs	- -	ug/L	**6.5**	**2,200 J**	**770**	**24**	**22,000**	**13,000**	**28,000 J**	**23**	**6.8**	**6.9 J**	**17 [17]**	**6.8 J**	**0.78 J**
Semivolatile Organics															
1,2,4-Trichlorobenzene	5	ug/L	NA	NA	9.4 U	NA	NA	9.5 U	NA	NA	9.5 U	NA	NA	9.4 U	NA
1,2-Dichlorobenzene	3	ug/L	NA	NA	9.4 U	NA	NA	9.5 U	NA	NA	9.5 U	NA	NA	9.4 U	NA
1,3-Dichlorobenzene	3	ug/L	NA	NA	9.4 U	NA	NA	9.5 U	NA	NA	9.5 U	NA	NA	9.4 U	NA
1,4-Dichlorobenzene	3	ug/L	NA	NA	9.4 U	NA	NA	9.5 U	NA	NA	9.5 U	NA	NA	9.4 U	NA
2,4,5-Trichlorophenol	1	ug/L	4.8 U	20 U	4.7 U	8.9 UJ	100 U	4.7 U	R	10 U	4.7 U	4.6 U	10 U [10 U]	4.7 U	4.7 U
2,4,6-Trichlorophenol	1	ug/L	4.8 U	20 U	4.7 U	8.9 UJ	100 U	4.7 U	R	10 U	4.7 U	4.6 U	10 U [10 U]	4.7 U	4.7 U
2,4-Dichlorophenol	5	ug/L	4.8 U	20 U	4.7 U	8.9 UJ	100 U	4.7 U	R	10 U	4.7 U	4.6 U	10 U [10 U]	4.7 U	4.7 U
2,4-Dimethylphenol	50	ug/L	4.8 U	20 U	4.7 U	8.9 UJ	**23 J**	**14**	**26 J**	10 U	4.7 U	4.6 U	10 U [10 U]	4.7 U	4.7 U
2,4-Dinitrophenol	10	ug/L	9.5 U	61 U	9.4 UJ	18 UJ	300 U	9.5 UJ	R	30 U	9.5 UJ	9.3 U	32 U [30 U]	9.4 UJ	9.4 U
2,4-Dinitrotoluene	5	ug/L	4.8 U	4.0 U	4.7 U	8.9 UJ	20 U	4.7 U	24 U	2.0 U	4.7 U	4.6 U	2.1 U [2.0 U]	4.7 U	4.7 U
2,6-Dinitrotoluene	5	ug/L	4.8 U	4.0 U	4.7 U	8.9 UJ	20 U	4.7 U	24 U	2.0 U	4.7 U	4.6 U	2.1 U [2.0 U]	4.7 U	4.7 U
2-Chloronaphthalene	10	ug/L	4.8 U	20 U	4.7 U	8.9 UJ	100 U	4.7 U	24 U	10 U	4.7 U	4.6 U	10 U [10 U]	4.7 U	4.7 U
2-Chlorophenol	1	ug/L	4.8 U	20 U	4.7 U	8.9 UJ	100 U	4.7 U	R	10 U	4.7 U	4.6 U	10 U [10 U]	4.7 U	4.7 U
2-Methylnaphthalene	- -	ug/L	4.8 U	**9.6 J**	4.7 U	8.9 UJ	**340**	**230 D**	**270 J**	10 U	4.7 U	4.6 U	10 U [10 U]	4.7 U	4.7 U
2-Methylphenol	- -	ug/L	4.8 U	20 U	4.7 U	8.9 UJ	100 U	**2.5 J**	**13 J**	10 U	4.7 U	4.6 U	10 U [10 U]	4.7 U	4.7 U
2-Nitroaniline	5	ug/L	9.5 U	40 U	9.4 U	18 UJ	200 U	9.5 U	47 U	20 U	9.5 U	9.3 U	21 U [20 U]	9.4 U	9.4 U
2-Nitrophenol	- -	ug/L	4.8 U	20 U	4.7 U	8.9 UJ	100 U	4.7 U	R	10 U	4.7 U	4.6 U	10 U [10 U]	4.7 U	4.7 U
3,3'-Dichlorobenzidine	5	ug/L	4.8 U	40 U	4.7 U	8.9 UJ	200 U	4.7 U	R	20 U	4.7 U	4.6 U	21 U [20 U]	4.7 U	4.7 U
3-Nitroaniline	5	ug/L	9.5 UJ	40 U	9.4 U	18 UJ	200 U	9.5 U	47 UJ	20 U	9.5 U	9.3 UJ	21 U [20 U]	9.4 U	9.4 UJ
4,6-Dinitro-2-methylphenol	- -	ug/L	9.5 U	61 U	9.4 U	18 UJ	300 U	9.5 U	R	30 U	9.5 U	9.3 U	32 U [30 U]	9.4 U	9.4 U
4-Bromophenyl-phenylether	- -	ug/L	4.8 U	20 U	4.7 U	8.9 UJ	100 U	4.7 U	24 U	10 U	4.7 U	4.6 U	10 U [10 U]	4.7 U	4.7 U
4-Chloro-3-Methylphenol	- -	ug/L	4.8 U	20 U	4.7 U	8.9 UJ	100 U	4.7 U	R	10 U	4.7 U	4.6 U	10 U [10 U]	4.7 U	4.7 U
4-Chloroaniline	5	ug/L	4.8 UJ	20 U	4.7 U	8.9 UJ	100 U	4.7 U	R	10 U	4.7 U	4.6 UJ	10 U [10 U]	4.7 U	4.7 UJ
4-Chlorophenyl-phenylether	- -	ug/L	4.8 U	20 U	4.7 U	8.9 UJ	100 U	4.7 U	24 U	10 U	4.7 U	4.6 U	10 U [10 U]	4.7 U	4.7 U
4-Methylphenol	- -	ug/L	9.5 U	20 U	9.4 U	18 UJ	**17 J**	**5.2 J**	**41 J**	10 U	9.5 U	9.3 U	10 U [10 U]	9.4 U	9.4 U
4-Nitroaniline	5	ug/L	9.5 U	40 U	9.4 U	18 UJ	200 U	9.5 U	47 UJ	20 U	9.5 U	9.3 U	21 U [20 U]	9.4 U	9.4 U
4-Nitrophenol	- -	ug/L	9.5 U	61 U	9.4 U	18 UJ	300 U	9.5 U	R	30 U	9.5 U	9.3 U	32 U [30 U]	9.4 U	9.4 U
Acenaphthene	20	ug/L	4.8 U	**4.3 J**	4.7 U	8.9 UJ	**70 J**	**74**	**74 J**	10 U	4.7 U	4.6 U	10 U [10 U]	4.7 U	4.7 U
Acenaphthylene	- -	ug/L	4.8 U	20 U	4.7 U	8.9 UJ	**69 J**	**26**	**56 J**	10 U	4.7 U	4.6 U	10 U [10 U]	4.7 U	4.7 U
Acetophenone	- -	ug/L	4.8 U	NA	NA	8.9 UJ	NA	NA	**15 J**	NA	NA	4.6 U	NA	NA	4.7 U
Anthracene	50	ug/L	4.8 U	20 U	4.7 U	8.9 UJ	**11 J**	**4.7**	**5.5 J**	10 U	4.7 U	4.6 U	10 U [10 U]	4.7 U	4.7 U
Atrazine	- -	ug/L	4.8 U	NA	NA	8.9 UJ	NA	NA	24 UJ	NA	NA	4.6 U	NA	NA	4.7 U

See Notes on Page 7.

TABLE 1
GROUNDWATER ANALYTICAL RESULTS

NATIONAL GRID
WATERTOWN (ANTHONY STREET) NON-OWNED FORMER MGP SITE
WATERTOWN, NEW YORK

Location ID: / Date Collected:	NYSDEC TOGS 1.1.1 Water Standards and Guidance Values[1]	Units	MW-3R 06/26/13	MW-4R 10/16/08	MW-4R 09/07/10	MW-4R 06/26/13	MW-5R 10/15/08	MW-5R 09/08/10	MW-5R 06/25/13	MW-6R 10/16/08	MW-6R 09/08/10	MW-6R 06/25/13	MW-7R 10/16/08	MW-7R 09/07/10	MW-7R 06/25/13
Semivolatile Organics (Cont.)															
Benzaldehyde	- -	ug/L	4.8 UJ	NA	NA	8.9 UBJ	NA	NA	**95 J**	NA	NA	4.6 UJ	NA	NA	4.7 UJ
Benzo(a)anthracene	0.002	ug/L	4.8 U	2.0 U	4.7 U	8.9 UJ	10 U	4.7 U	24 UJ	1.0 U	4.7 U	4.6 U	1.0 U [1.0 U]	4.7 U	4.7 U
Benzo(a)pyrene	- -	ug/L	4.8 U	2.0 U	4.7 U	8.9 UJ	10 U	4.7 U	24 UJ	1.0 U	4.7 U	4.6 U	1.0 U [1.0 U]	4.7 U	4.7 U
Benzo(b)fluoranthene	0.002	ug/L	4.8 U	2.0 U	4.7 U	8.9 UJ	10 U	4.7 U	24 UJ	1.0 U	4.7 U	4.6 U	1.0 U [1.0 U]	4.7 U	4.7 U
Benzo(g,h,i)perylene	- -	ug/L	4.8 U	20 U	4.7 U	8.9 UJ	100 U	4.7 U	24 UJ	10 U	4.7 U	4.6 U	10 U [10 U]	4.7 U	4.7 U
Benzo(k)fluoranthene	0.002	ug/L	4.8 U	2.0 U	4.7 U	8.9 UJ	10 U	4.7 UJ	24 UJ	1.0 U	4.7 UJ	4.6 U	1.0 U [1.0 U]	4.7 UJ	4.7 U
Benzyl Alcohol	- -	ug/L	NA	NA	19 U	NA	NA	19 U	NA	NA	19 U	NA	NA	19 U	NA
Biphenyl	- -	ug/L	4.8 U	NA	NA	8.9 UJ	NA	NA	**29**	NA	NA	4.6 U	NA	NA	4.7 U
bis(2-Chloroethoxy)methane	5	ug/L	4.8 U	20 U	4.7 U	8.9 UJ	100 U	4.7 U	R	10 U	4.7 U	4.6 U	10 U [10 U]	4.7 U	4.7 U
bis(2-Chloroethyl)ether	1	ug/L	4.8 U	2.0 U	4.7 U	8.9 UJ	10 U	4.7 U	24 U	1.0 U	4.7 U	4.6 U	1.0 U [1.0 U]	4.7 U	4.7 U
bis(2-Chloroisopropyl)ether	- -	ug/L	4.8 U	20 U	4.7 U	8.9 UJ	100 U	4.7 U	R	10 U	4.7 U	4.6 U	10 U [10 U]	4.7 U	4.7 U
bis(2-Ethylhexyl)phthalate	5	ug/L	4.8 U	20 U	4.7 U	8.9 UJ	100 U	4.7 U	24 UJ	10 U	4.7 U	4.6 U	10 U [10 U]	4.7 UJ	4.7 U
Butylbenzylphthalate	50	ug/L	4.8 U	20 U	4.7 U	8.9 UJ	100 U	4.7 U	24 U	10 U	4.7 U	4.6 U	10 U [10 U]	4.7 U	4.7 U
Caprolactam	- -	ug/L	4.8 UJ	NA	NA	8.9 UJ	NA	NA	24 UJ	NA	NA	4.6 UJ	NA	NA	4.7 UJ
Carbazole	- -	ug/L	4.8 U	**3.6 J**	NA	8.9 UJ	**100 J**	NA	**65**	10 U	NA	4.6 U	10 U [10 U]	NA	4.7 U
Chrysene	0.002	ug/L	4.8 U	20 U	4.7 U	8.9 UJ	100 U	4.7 U	24 U	10 U	4.7 U	4.6 U	10 U [10 U]	4.7 U	4.7 U
Dibenzo(a,h)anthracene	- -	ug/L	4.8 U	2.0 U	4.7 U	8.9 UJ	10 U	4.7 U	24 UJ	1.0 U	4.7 U	4.6 U	1.0 U [1.0 U]	4.7 U	4.7 U
Dibenzofuran	- -	ug/L	9.5 U	20 U	9.4 U	18 UJ	**20 J**	**16**	**17 J**	10 U	9.5 U	9.3 U	10 U [10 U]	9.4 U	9.4 U
Diethylphthalate	50	ug/L	4.8 U	20 U	4.7 U	8.9 UJ	100 U	4.7 U	24 U	10 U	4.7 U	4.6 U	10 U [10 U]	**0.29 J**	4.7 U
Dimethylphthalate	50	ug/L	4.8 U	20 U	4.7 U	8.9 UJ	100 U	4.7 U	24 U	10 U	4.7 U	4.6 U	10 U [10 U]	4.7 U	4.7 U
Di-n-Butylphthalate	50	ug/L	4.8 UB	20 U	4.7 U	8.9 UJ	100 U	4.7 U	24 U	10 U	4.7 U	4.6 UB	10 U [10 U]	4.7 U	4.7 UB
Di-n-Octylphthalate	50	ug/L	4.8 U	20 U	4.7 U	8.9 UJ	100 U	4.7 U	24 U	10 U	4.7 U	4.6 U	10 U [10 U]	4.7 U	4.7 U
Fluoranthene	50	ug/L	4.8 U	20 U	4.7 U	8.9 UJ	100 U	**1.0 J**	24 U	10 U	4.7 U	4.6 U	10 U [10 U]	4.7 U	4.7 U
Fluorene	50	ug/L	4.8 U	**1.3 J**	4.7 U	8.9 UJ	**41 J**	**29**	**32 J**	10 U	4.7 U	4.6 U	10 U [10 U]	4.7 U	4.7 U
Hexachlorobenzene	0.04	ug/L	4.8 U	2.0 U	4.7 U	8.9 UJ	10 U	4.7 U	24 U	1.0 U	4.7 U	4.6 U	1.0 U [1.0 U]	4.7 U	4.7 U
Hexachlorobutadiene	0.5	ug/L	4.8 U	4.0 U	4.7 U	8.9 UJ	20 U	4.7 U	R	2.0 U	4.7 U	4.6 U	2.1 U [2.0 U]	4.7 U	4.7 U
Hexachlorocyclopentadiene	5	ug/L	4.8 U	20 U	4.7 U	8.9 UJ	100 U	4.7 U	R	10 U	4.7 U	4.6 U	10 U [10 U]	4.7 U	4.7 U
Hexachloroethane	5	ug/L	4.8 U	2.0 U	4.7 U	8.9 UJ	10 U	4.7 U	24 U	1.0 U	4.7 U	4.6 U	1.0 U [1.0 U]	4.7 U	4.7 U
Indeno(1,2,3-cd)pyrene	0.002	ug/L	4.8 U	2.0 U	4.7 U	8.9 UJ	10 U	4.7 U	24 UJ	1.0 U	4.7 U	4.6 U	1.0 U [1.0 U]	4.7 U	4.7 U
Isophorone	50	ug/L	4.8 U	20 U	4.7 U	8.9 UJ	100 U	4.7 U	24 UJ	10 U	4.7 U	4.6 U	10 U [10 U]	4.7 U	4.7 U
Naphthalene	10	ug/L	4.8 U	**430**	**16**	8.9 UJ	**1,700**	**2,300 D**	**3,400 D**	10 U	4.7 U	4.6 UB	10 U [10 U]	4.7 U	4.7 U
Nitrobenzene	0.4	ug/L	4.8 U	2.0 U	4.7 U	8.9 UJ	10 U	4.7 U	24 UJ	1.0 U	4.7 U	4.6 U	1.0 U [1.0 U]	4.7 U	4.7 U
N-Nitroso-di-n-propylamine	- -	ug/L	4.8 U	2.0 U	4.7 U	8.9 UJ	10 U	4.7 U	24 U	1.0 U	4.7 U	4.6 U	1.0 U [1.0 U]	4.7 U	4.7 U
N-Nitrosodiphenylamine	50	ug/L	4.8 U	20 U	4.7 U	8.9 UJ	100 U	4.7 U	24 U	10 U	4.7 U	4.6 U	10 U [10 U]	4.7 U	4.7 U
N-Nitrosomethylethylamine	- -	ug/L	NA	NA	9.4 U	NA	NA	9.5 U	NA	NA	9.5 U	NA	NA	9.4 U	NA
Pentachlorophenol	- -	ug/L	9.5 U	61 U	9.4 U	18 UJ	300 U	9.5 U	R	30 U	9.5 U	9.3 U	32 U [30 U]	9.4 U	9.4 U
Phenanthrene	50	ug/L	4.8 U	**6.9 J**	**0.89 J**	8.9 UJ	**36 J**	**26**	**30 J**	10 U	4.7 U	4.6 U	10 U [10 U]	4.7 U	4.7 U
Phenol	1	ug/L	4.8 U	**2.3 J**	**1.7 J**	8.9 UJ	100 UJ	**2.6 J**	**12 J**	10 UJ	4.7 U	4.6 U	10 UJ [10 UJ]	4.7 U	4.7 U
Pyrene	50	ug/L	4.8 U	20 U	4.7 U	8.9 UJ	100 U	**0.71 J**	24 U	10 U	4.7 U	4.6 U	10 U [10 U]	4.7 U	4.7 U
Total PAHs	- -	ug/L	ND	**450 J**	**17 J**	ND	**2,300 J**	**2,700 J**	**3,900 J**	ND	ND	ND	ND [ND]	ND	ND
Total SVOCs	- -	ug/L	ND	**460 J**	**19 J**	ND	**2,400 J**	**2,700 J**	**4,200 J**	ND	ND	ND	ND [ND]	**0.29 J**	ND
Miscellaneous															
Free Cyanide	- -	ug/L	NA	10 U	NA	NA	**3 J**	NA	NA	**2 J**	NA	NA	**10 U [2 J]**	NA	NA
Total Cyanide	200	ug/L	**5.2 J**	10 U	10 U	**11**	**98**	10 U	**180**	10 U	10 U	10 U	**3.1 J [3.1 J]**	10 U	10 U

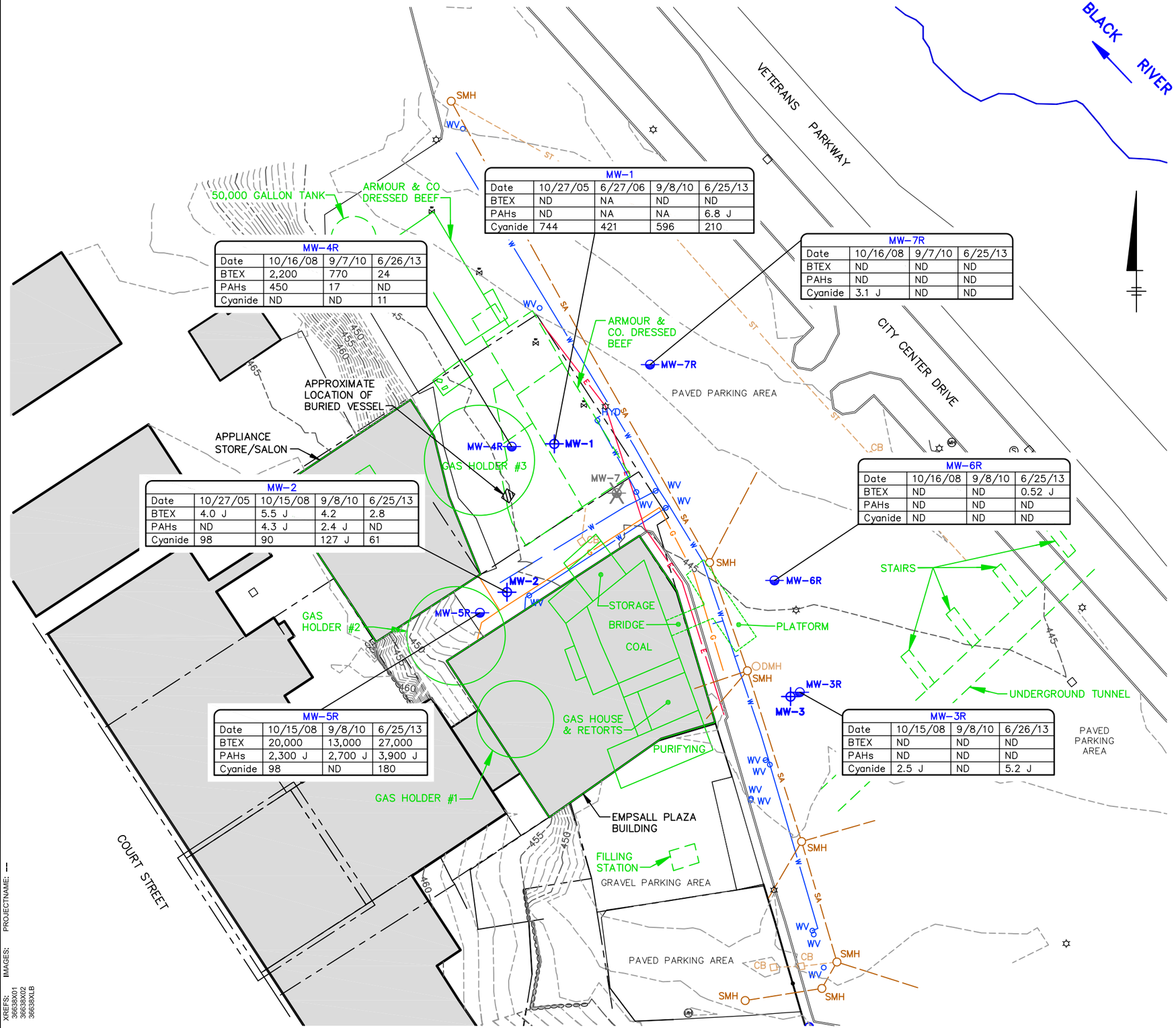
See Notes on Page 7.

TABLE 1
GROUNDWATER ANALYTICAL RESULTS

NATIONAL GRID
WATERTOWN (ANTHONY STREET) NON-OWNED FORMER MGP SITE
WATERTOWN, NEW YORK

Qualifier Type	Lab Qualifiers	Definition
Inorganic	J	Analyte detected at a level less than the Reporting Limit (RL) and greater than or equal to the Method Detection Limit (MDL). Concentrations within this range are estimated.
Inorganic	U	The compound was analyzed for but not detected. The associated value is the compound quantitation limit.
Organic	D	Compound quantitated using a secondary dilution.
Organic	J	Analyte detected at a level less than the Reporting Limit (RL) and greater than or equal to the Method Detection Limit (MDL). Concentrations within this range are estimated.
Organic	ND	None detected.
Organic	R	Rejected.
Organic	U	The compound was analyzed for but not detected. The associated value is the compound quantitation limit.

Notes:
[1] Source: New York State Division of Water Technical and Operational Guidance Series (TOGS 1.1.1), Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations (June 1998).
-- = No available standard/guidance value.
NA = Not analyzed.
ug/L = micrograms per liter.
Detects are in bold.
Shaded and bold values indicate the result exceeds New York State Technical and Operational Guidance Series (1.1.1) Standards or Guidance Values.
Samples MW-1-CU and MW-1-STL were collected to evaluate the presence of free cyanide in groundwater.



LEGEND:

- OVERBURDEN MONITORING WELL
- BEDROCK MONITORING WELL
- DESTROYED MONITORING WELL
- CATCH BASIN
- MANHOLE (MAY BE SANITARY OR STORM)
- MANHOLE (STORM)
- MANHOLE (SANITARY)
- WATER VALVE
- LIGHT POLE
- FOUND IRON PIPE
- FIRE HYDRANT
- PROPERTY LINE
- STRUCTURES FROM 1902 AND 1949 SANBORN MAPS ALL LOCATIONS ARE APPROXIMATE
- E — ELECTRIC LINE
- G — GAS LINE
- W — WATER LINE
- ST — STORM SEWER LINE
- SA — SANITARY SEWER LINE

NOTES:

1. ALL HISTORICAL FEATURES ARE FROM SANBORN MAPS PROVIDED BY THE SANBORN LIBRARY, LLC PRODUCED BY ENVIRONMENTAL DATA RESOURCES, INC. (EDR).
2. BASE MAP IS FROM A SURVEY DONE BY WCT SURVEYORS, P.C., CANTON, NEW YORK ON APRIL 5, 2004, FILE # 103–218. UPDATED WITH SURVEY DONE BY C.T.MALE ON 11/12/08.
3. LOCATIONS OF ALL HISTORICAL FEATURES ARE APPROXIMATE.

KEY:

BTEX = TOTAL BENZENE, TOLUENE, ETHYLBENZENE, AND XYLENES

PAHs = TOTAL POLYCYCLIC AROMATIC HYDROCARBONS

CYANIDE = TOTAL CYANIDE

J = ESTIMATED CONCENTRATIONS

ND = NOT DETECTED ABOVE INSTRUMENT DETECTION LIMIT

NA = NOT AVAILABLE

UNITS GIVEN IN MICROGRAMS PER LITER (µg/L), EQUIVALENT TO PARTS PER BILLION (PPB)

0 60' 120'

GRAPHIC SCALE

NATIONAL GRID
WATERTOWN (ANTHONY STREET) FORMER MGP SITE

TOTAL BTEX, PAHs, AND CYANIDE IN GROUNDWATER

ARCADIS

FIGURE 1

ARCADIS

Attachment A

New York State Department of Environmental Conservation
Division of Environmental Remediation
Remedial Bureau C, 11th Floor
625 Broadway, Albany, New York 12233-7014
Phone: (518) 402-9662 • **Fax:** (518) 402-9679
Website: www.dec.ny.gov

Joe Martens
Commissioner

August 23, 2013

Mr. Steven Stucker
Environmental Department
National Grid Company
300 Erie Boulevard West
Syracuse, NY 13202

Dear Mr. Stucker:

Re: Watertown (Anthony St.), Jefferson County
Non-Owned Former MGP Site
Site #V00473-6
June 2013 Groundwater Sampling Results Report

The New York State Departments of Environmental Conservation and Health (Departments) have reviewed National Grid's June 2013 Groundwater Sampling Results Report dated August 14, 2013 and it is hereby approved with the following modification:

- Figure 1 – Please revise the figure to include total BTEX, total PAH's and total Cyanide results for those wells sampled.

Please proceed to develop the Alternatives Analysis Report.

Please contact me at 518-402-9662 if you have any questions.

Sincerely,

Bernard Franklin

Bernard Franklin
Environmental Engineer
Remedial Bureau C

Ec: S. Powlin, Arcadis
I. Ushe, DOH
P. Taylor, NYSDEC, Region 6