Supplemental Remedial Investigation Work Plan
Rensselaer Non-Owned Former MGP Site
Rensselaer, New York

Prepared for
Niagara Mohawk Power Corporation
d/b/a National Grid
Syracuse, New York
September 2010

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300 Erie Boulevard West
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I James L. Marolda certify that I am currently a Qualified Environmental Professional as defined in 6 NYCRR Part 375 and that this work plan was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10).

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Section 1

Introduction

This Supplemental Remedial Investigation (RI) Work Plan describes the scope of work and procedures that will be used to conduct additional RI activities at the Rensselaer Non-owned Former Manufactured Gas Plant (MGP) Site (hereafter referred to as the "Site"). At a meeting on May 18, 2010, the New York State Departments of Environmental Conservation (NYSDEC) and Health (NYSDOH), National Grid, and Brown and Caldwell Associates (BC) discussed the results of the additional RI activities conducted in 2009-2010 (Data Summary Report, Additional RI Activities, Rensselaer Non-owned Former MGP Site, Brown and Caldwell Associates, May 2010) and concluded that the supplemental RI activities described herein are needed to further delineate the nature and extent of MGP impacts associated with the Site.

This document is a revised version of the Supplemental RI Work Plan dated July 2010. The NYSDEC and the NYSDOH commented on the July 2010 work plan in a letter dated August 2, 2010. National Grid responded to the agencies' comments in a letter dated August 6, 2010, providing approaches and recommendations for addressing each of the comments. In a letter dated August 25, 2010, the NYSDEC replied to BC's August 6, 2010 letter. The Supplemental RI Work Plan provided herein incorporates the revisions discussed in these letters.

Investigation activities at the Site are being conducted pursuant to the Voluntary Consent Order (VCO) between NYSDEC and National Grid (Order Index Number D0-0001-0011) dated January 25, 2002. This VCO primarily covers former MGPs that are situated on properties not currently owned by National Grid, but where National Grid has assumed responsibility for former MGP operations.

The specific objectives of the Supplemental RI are to:

- Further evaluate the lateral extent of non-aqueous phase liquid (NAPL) east-northeast of the Site.
- Further evaluate the extent of MGP-related constituents in soil above applicable Soil Cleanup Objectives (SCOs) as set forth in 6 NYCRR Subpart 375-6.
- Refine the understanding of shallow groundwater flow west of the Site.
- Further delineate the lateral extent of dissolved-phase, MGP-related constituents in overburden groundwater.
- Determine the generalized direction of groundwater flow within the bedrock underlying the Site.
- Assess groundwater quality within bedrock to determine if it has been impacted by MGP-related constituents.
- Determine if MGP-related NAPL is present in bedrock in areas where NAPL has been found in contact with or close to the bedrock surface.
- Provide additional data to facilitate the evaluation of remedial action alternatives that would be protective of human health and the environment, taking into account current and future use of the Site.

Section 2.0 provides a summary of the findings from previous investigations. Section 3.0 describes the scope of work and the methods and materials to be used in performing the Supplemental RI. Section 4.0 provides the anticipated schedule for completion of the Supplemental RI. Tables and figures are included in the work plan.

Section 2
Background

A summary of the physical setting of the Site and the history of Site operations was previously provided in the original RI work plan (Remedial Investigation Work Plan, Rensselaer Non-Owned Former Manufactured Gas Plant Site (V00488), 89 Washington Street, Rensselaer, New York; Brown and Caldwell Associates, November 2008). The location of the Site is shown in Figure 2-1. Provided below is a summary of the investigation findings to-date.

2.1 Summary of Previous Investigations

The findings from the Site Characterization (SC) as documented in the Site Characterization Data Summary Report (Brown and Caldwell Associates, February 2006) and subsequent RI activities as documented in the RI and additional RI Data Summary Reports (Brown and Caldwell Associates, June 2009 and May 2010) are summarized below.

- **Subsurface Deposits & Stratigraphy:** The geologic materials encountered on the site generally consist in ascending order of dark gray shale bedrock, glacial till, a sand and gravel deposit, a finer silt and sand deposit, and anthropogenic fill. Rock fragments retained in the split-spoon sampler after refusal indicate the bedrock immediately underlying the overburden is dark gray shale. The surface of the bedrock drops from approximately 0 feet NGVD east of Washington Street to 22 feet NGVD north of Huyck Stream. A subtle longitudinal depression that may extend SW-NE across the Site is apparent in the bedrock surface. Glacial till underlying the former MGP ranges in thickness from approximately 4 to 18 feet. The till generally consists of dense, poorly sorted silt, sand and gravel. It becomes thinner and less dense toward the north. In the northern part of the study area, where the till and/or bedrock surface is deeper, this surface is overlain by approximately 5-15 feet of grey, poorly sorted sand and gravel with minor amounts of silt. The overlying silt and sand deposit generally consists of mixtures of grey to brown sand and silt with occasional, relatively minor zones of fine to medium gravel. At several locations in the study area the upper 3-5 feet of the silt and sand deposit consist of silty clay or clayey silt. The silt and sand deposit generally thickens to the north. The uppermost unconsolidated material in the study area is generally anthropogenic fill composed primarily of reworked sand and silt mixed with varying amounts of brick, cinders, ash, and coal fragments. The fill varies in thickness from a few inches to more than 10 feet and is largely absent immediately adjacent to the present day channel of Huyck Stream.
- **Subsurface Former MGP Structures:** Subsurface structures related to the former MGP were identified during the SC. These included subsurface portions of both gas holders (TP-101-05, TP-102-05) and possibly a portion of the purifier room and meter room. The tar well indicated on the 1909 Sanborn map was encountered through excavation of test pit TP-105-08 during the RI activities conducted in November 2008.
- **Groundwater Occurrence and Flow:** The water table occurs in the fill and the silt and sand deposit, generally about six to eight feet below ground surface. As part of the additional RI activities, groundwater and surface water levels were measured on December 7, 2009 and December 10, 2009. Water table contours for December 10, 2009 indicate that the overburden groundwater in the vicinity of the site flows north northeast to north toward Huyck Stream. Overburden groundwater immediately north of the stream also appears to flow toward the stream. Based on the available

water level data, groundwater elevations in the shallow and deep wells on both sides of Huyck Stream are higher than the water level in the adjacent section of the stream and thus it appears overburden groundwater present beneath the site discharges to Huyck Stream.

In-situ hydraulic conductivity tests (slug tests) were performed during the initial RI and the additional RI activities on each of the Site monitoring wells. Estimated values ranged from 1.7×10^{-3} cm/sec to as low as 1.1×10^{-5} cm/sec. The greatest hydraulic conductivities were measured in wells screened primarily in loose fill (MW-111-09) or sand/gravel/loose till (MW-109D-09). The lowest hydraulic conductivities were measured in wells screened in silty clay and dense till (MW-101-05) or sand/silt and dense glacial till (MW-104-08).

- **NAPL Occurrence:** Subsurface NAPL has been identified at locations across the Site and on some off-site properties. Figure 2-2 illustrates locations where NAPL or other impacts have been observed, while Table 2-1 provides a description of these observations. In general, the NAPL has been observed as blebs within the overburden materials, coatings on coarser grained soils, or partially saturating soils. Viscous tar was observed in the former tar well during the excavation of test pit TP-105-08.

  The vertical distribution of NAPL in soil borings south of Huyck Stream (B-113-09 and B-114-09), and in borings to the south (MW-105-08 and MW-106S/D-08), suggests that DNAPL tars may have migrated downward and then laterally in a northeasterly direction from the northern gas holder and the tar well through the sand and gravel deposit. However, no evidence of NAPL or other MGP impacts was observed in the soil borings north of Huyck Stream (MW-108-09, W-109D-09). Visual and olfactory observations from the soil borings advanced east of Washington Street indicate that MGP-related NAPL has migrated eastward toward the Capital View Office Park property. Some odors associated with these observations were petroleum- or fuel-like (B-108-08, B-111-08, MW-107-08, TP-101-05), suggesting the possibility of impacts in these areas by hydrocarbons unrelated to the former MGP.

  NAPL has been detected within three monitoring wells (MW-102-05, MW-106S-08, MW-106D-08) during NAPL gauging events.

- **Surface Soil Quality:** During previous RI activities, surface soil samples were collected at ten locations from the top two inches of soil after the overlying vegetation was removed. The surface soil samples were analyzed for Target Compound List (TCL) semi-volatile organic compounds (SVOCs), total cyanide, and free cyanide. The results of these analyses were compared to the NYSDEC Subpart 375 6 Soil Cleanup Objectives (SCOs) for Protection of Public Health-Residential Use, Protection of Ecological Resources, and Protection of Groundwater. Polycyclic aromatic hydrocarbons (PAHs) were detected above one or more of the SCOs in surface soil samples from four locations. These exceedances were limited to carcinogenic PAHs, which have very low SCOs for protection of public health (1 mg/kg or less). Total PAH concentrations in surface soil ranged from 1.3 to 37 mg/kg, levels that are not unexpected given the urban setting. No other SVOCs (i.e., non-PAH SVOCs) were detected in the surface soil samples above the applicable SCOs. Total cyanide was not detected above the applicable SCO at any surface soil sample.
- **Subsurface Soil Quality:** Concentrations of constituents measured in soil samples collected during SC and RI activities to date were compared to the applicable SCOs. Benzene, toluene, ethylbenzene, and xylene (BTEX) compounds and PAHs were detected at concentrations above their corresponding SCOs in soil samples collected in various areas of the Site and on the property north of Huyck Square. BTEX compounds and PAHs were also detected at concentrations above their corresponding SCOs in soil samples collected immediately east of the property boundary, along the western side of Washington Street. PAH compounds have been detected at some locations east of Washington Street at concentrations above the applicable SCOs. Samples with exceedances of the SCOs for BTEX and/or PAHs generally fall within areas impacted by NAPL.

Total cyanide was not detected above the applicable SCO in subsurface soil samples from any location.

- **Stream Sediment Analytical Results:** Stream sediment samples (approximate 0-6 inch depth interval) were collected at two locations near the south shore of the Huyck Stream. A third sediment sample was collected east of the Washington Street bridge (upstream from the former MGP) site to evaluate impacts by urban runoff and other, non-MGP substances. The sediment samples were analyzed for BTEX, total cyanide, free cyanide, and total organic carbon (TOC). The sediment samples were also analyzed for a total of 34 commonly identified PAH compounds consisting of the 18 parent (non-alkylated) PAH compounds typically targeted in SW-846 Method 8270, and 16 alkylated PAH compounds that have been generally recognized as most abundant and which are commonly measured as part of environmental monitoring.

  The results of the sediment sampling and analyses indicate that there are no site related impacts in the shallow sediments in Huyck Stream. BTEX was not detected in any sediment sample. Total cyanide was only detected in the upstream sediment sample SED-1, which was selected to be representative of background conditions. PAH concentrations in the upstream sample are slightly higher than those in the samples from the locations in the stream adjacent to the site. Overall, these PAH concentrations are relatively low, with total PAH concentrations ranging from 2.8 to 15 mg/kg. These findings indicate the PAHs in the sediment are representative of background conditions associated with an urban setting, with the PAHs being derived from storm water runoff, soot, and/or atmospheric deposition.

  As discussed in more detail in the RI Data Summary Report, the concentrations of each PAH compound (non-alkylated and alkylated) within the sediment samples indicate a predominance of higher molecular weight PAHs and a pattern within homolog groups of the parent compound having the highest concentration, with concentration decreasing with the increased number of carbons in the alkyl group (e.g., chrysene>C1-chrysenes>C2-chrysenes>C3-chrysenes). Both of these characteristics suggest a pyrogenic origin for the PAHs such as soot or urban road run off, or possibly weathered coal tar (unweathered coal tar would typically be indicated by the presence of greater concentrations of the lighter molecular weight PAHs, e.g., naphthalene). A further indicator of pyrogenic origin is that the fluoranthene:pyrene ratio is greater than 1, which has been shown to be an indicator of derivation from high temperature combustion (versus lower temperature processes, such as distillation).

- **Groundwater Quality:** During the most recent groundwater sampling event (December 2009), constituent concentrations in overburden groundwater were measured at levels above the New York State Class GA Groundwater Quality criteria (i.e., the 6 NYCRR Part 703 Standards and the guidance values from the Division of Water Technical and Operational Guidance Series [TOGS] 1.1.1) for one or more constituents in samples from four monitoring wells (MW-101-05, MW-102-05, MW-103-05, and MW-107-08). BTEX compounds were detected above the standards in monitoring wells MW-102-05, MW-103-05, and MW-107-08. Total cyanide was detected above the Class GA criterion in the sample collected from upgradient well MW-101-05. No groundwater samples were collected from MW-106S-08 or MW-106D-08 because NAPL was detected in these monitoring wells during water level measurements and NAPL gauging prior to sampling.
- **Soil Vapor Intrusion Evaluation:** A soil vapor intrusion (SVI) evaluation was conducted during the 2009 RI activities. A total of 10 samples (soil vapor and ambient air) were collected to evaluate the potential for soil vapor impacts in the vicinity of: 1) the residences located west of the former MGP; 2) the commercial buildings located south of the former MGP; and 3) the uninhabited area immediately north of the former MGP. The sampling results were provided to the property owners in a letter dated April 21, 2010 from National Grid. Based on a review of the data, MGP-related soil vapors do not appear to be a concern on the northern, western, and southern sides of the former MGP. However, further evaluation of the potential for impacts from soil vapor is required east of the former

MGP property, adjacent to the Capital View Office Park buildings. Additional SVI investigations may be conducted in this area following evaluation of subsurface soils data collected pursuant to this work plan.

Section 3

Scope of Work

The Supplemental RI activities are described below. Specific methods and procedures associated with the Supplemental RI will be conducted in accordance with the following plans:

- Generic Field Sampling Plan for Site Investigations at Non-Owned Former MGP Sites, (Foster Wheeler, November 2002) (referred to as "FSP").
- Generic Quality Assurance Project Plan for Site Investigations at Non-Owned Former MGP Sites, (Foster Wheeler, November 2002) (referred to as "QAPP").
- Generic Health & Safety Plan for Site Investigations at Non-Owned Former MGP Sites (Foster Wheeler, November 2002).
- Health and Safety Plan for Supplemental Remedial Investigation of Rensselaer Non-Owned Former MGP Site (Brown and Caldwell, November 2008; Revised September 2010) (referred to as "Health and Safety Plan"). This plan was developed consistent with the Generic Health & Safety Plan for Site Investigations at Non-Owned Former MGP Sites (Foster Wheeler, November 2002)

The scope of work for the Supplemental RI is described in the subsections below.

3.1 Preliminary Activities

3.1.1 Property Access

Prior to the SC field activities, the owner of the property that occupies the former MGP Site (City of Rensselaer Industrial Development Agency) was contacted and an access permission agreement was established allowing National Grid to conduct the investigation activities. An additional access agreement was established with the owner of the properties positioned north and east of the former MGP Site (Capital View Office Park) prior to implementing RI activities. The City of Rensselaer was contacted to obtain permission to install monitoring wells in the public rights-of-way along Washington Street, Academy Street and Huyck Square.

Prior to initiating the supplemental RI field activities, the City of Rensselaer, the City of Rensselaer Industrial Development Agency, and the Capital View Office Park will be contacted to brief them on the activities described below, including the advancement of soil borings and installation of monitoring wells on one or more properties located north of Huyck Square, east of Washington Street and on the public right of way along Huyck Square.

3.1.2 Underground Utility Evaluation

A storm sewer is located under Washington Street, adjacent to the site. The surveyed alignment and invert elevations of this subsurface utility are shown on a site plan and a geological cross-section contained in the May 2010 Data Summary Report. The City of Rensselaer's Engineering Department will be visited to obtain records for additional underground utilities that may exist in the roads surrounding the Site (e.g., water mains, gas line, sewer force main). Available drawings depicting the dimensions and

configuration of any additional utility lines will be reviewed at the office of the City Engineer. Locations of the utility lines identified during this review will then be plotted on the existing Site plan. The locations and depths of the utility lines will also be incorporated to the hydrogeologic cross-sections previously prepared for the Site.

3.2 Field Activities

3.2.1 Utility Mark Outs and Clearance

Prior to conducting the intrusive activities described below, the locations for these activities will be marked in the field. New York Dig Safely will be contacted to obtain utility clearance for the subscribed underground utilities, while the City of Rensselaer will be contacted to obtain clearance for utilities that they maintain (e.g., sewer and water). The owners of the properties will be requested to identify and locate known on-site private utilities.

Some of the proposed drilling and sampling locations may be adjusted to provide adequate clearance from underground utilities. The final locations of all soil borings and monitoring wells, particularly those in road side locations, will also be subject to drilling rig clearance requirements for overhead power and telephone lines.

At some locations, particularly those located within or near the City roadways, National Grid may opt to confirm clearance of subsurface utilities at a location by physical means. For example, vacuum soil extraction may be used to remove the soil at a drilling location to a depth below where utilities would be expected to be encountered.

3.2.2 Soil Borings

Direct-push soil borings will be drilled and sampled at nine locations (locations B-118-10 through B-128-10) at the approximate positions illustrated in Figure 3-1. A summary of the technical rationale for the positioning and depths of the proposed soil borings is presented on Table 3-1. The positions and objectives of the soil borings are discussed in the subsections below.

Soil borings will be advanced using direct-push technology (GeoProbe®) and continuously sampled, with a four-foot long, 3.25-inch outside diameter (O.D.) macrocore® sampler equipped with an acetate liner for sample retention. Borings B-118-10 through B-126-10 will be advanced to approximately 15 feet below ground surface (BGS) or to refusal on dense glacial till, whichever occurs first. B-127-10 and B-128-10 will be advanced to the suspected bottom of the former gas holders. Samples will be described in the field to characterize soil type, including grain-size, texture, and apparent moisture content. Soil samples will be logged in accordance with the Burmister Soil Classification System and classified using the Unified Soil Classification System (USCS) as per the FSP. The samples will also be field screened for indications of MGP-related, or other, impacts based on appearance, odor or organic vapor concentration measurements using a photoionization detector (PID). Upon completion, the soil borings will be backfilled with bentonite chips.

If NAPL is encountered in a boring and conditions in the boring are such that continued drilling may introduce NAPL into deeper stratigraphic intervals via the borehole (e.g., potentially mobile NAPL perched above a confining layer), measures will be taken to reduce this potential. Advancement of the macrocore® sampler will be suspended and consideration will be given to advancing a boring in an alternate location. Borings with potentially mobile NAPL will not be advanced through a dense till layer.

Two (2) soil samples from each of the nine soil boring locations will be submitted for analysis of Target Compound List (TCL) VOCs, TCL SVOCs, total cyanide, and free cyanide. Free cyanide will be analyzed by USEPA SW-846 Method 9016 (Free Cyanide in Water, Soils and Solid Wastes by Microdiffusion, June 2010). The interval(s) will be selected based on the results of previous borings (e.g., depth of

localized NAPL in adjacent boring) and/or results of field screening. A summary of the planned soil analyses is provided in Table 3-2. Analysis of soil samples will be conducted by a laboratory certified under the NYSDOH Environmental Laboratory Approval Program (ELAP) to provide ASP/CLP deliverables. The analytical results will be provided to the NYSDEC as an Electronic Data Deliverable (EDD) formatted to the NYSDEC's recently required specifications. This will include: 1) populating the NYSDEC EDD with the analytical data; 2) validating the EDD using the database software application EQuIS™ from EarthSoft®, Inc.; and 3) submitting the validated EDD to the NYSDEC.

3.2.2.1 On-Site Soil Borings

Three soil borings (B-118-10, B-127-10, and B-128-10) will be drilled and sampled at the locations shown on Figure 3-1. B-118-10 will be completed near the southwestern portion of the property that occupies the former MGP Site to further evaluate the horizontal extent of NAPL identified during previous RI activities and the extent of MGP-related constituents in soil at concentrations above applicable Part 375 SCOs. B-127 and B-128 will be advanced within the northern and southern gas holders, respectively, to confirm the depth of the holder bottoms and to further evaluate the contents within the former MGP structures.

3.2.2.2 Capital View Office Park Borings

Eight soil borings (B-119-10 through B-126-10) will be drilled and sampled on the Capital View Office Park property located east of the former MGP Site. The borings are intended to: 1) further evaluate the horizontal extent of NAPL identified during previous RI activities; 2) further evaluate the extent of MGP-related constituents in soil at concentrations above applicable Part 375 SCOs; and 3) facilitate a preliminary assessment of the potential for soil vapor intrusion (SVI) in the adjacent office buildings.

In the event that NAPL impacts are encountered in the Capital View Office Park borings, additional borings may be advanced along the eastern side of the buildings to further evaluate lateral extent of MGP-related impacts, if any, in this area.

As discussed above, one of the objectives for completing the Capital View Office Park borings is to facilitate a preliminary assessment of the potential for SVI in the adjacent office buildings. If appropriate, following completion of these borings, a SVI Evaluation work plan will be prepared and submitted to the NYSDEC. The work plan would include:

- A summary of MGP-related or other impacts, if any, observed in the Capital View Office park soil borings including descriptions and depth intervals of any noted impacts;
- A description of the proposed methods and procedures for conducting the SVI evaluation;
- A figure depicting the proposed SVI sampling locations; and
- A table listing the proposed analytes and reporting limits for the SVI evaluation.

3.2.3 Monitoring Wells

Monitoring wells will be installed at the eight locations illustrated on Figure 3-1. The selected locations are intended to:

1. Further delineate the lateral extent of dissolved-phase, MGP-related constituents in overburden groundwater;
2. Refine understanding of shallow groundwater flow (water table contours) west of the Site;

3. Determine the generalized direction of groundwater flow within the bedrock underlying the Site; and
4. Assess groundwater quality within bedrock to determine if it has been impacted by MGP-related constituents.

The intended purpose of each of the monitoring wells is summarized on Table 3-1. Depending on the utility mark-out, adjustments to the locations proposed in Figure 3-1 may be made. Such adjustments, if any, will be made in consultation with the NYSDEC.

Procedures related to the installation of the specific types of monitoring wells are described in the following subsections.

3.2.3.1 Overburden Monitoring Well

A single monitoring well (MW-112-10) will be installed in the overburden. This location is positioned to: 1) further delineate the lateral extent of dissolved-phase, MGP-related constituents in overburden groundwater that were measured at levels above New York State Class GA groundwater quality criteria in overburden wells sampled during previous RI activities; and 2) refine understanding of shallow groundwater flow (water table contours) west of the Site.

The overburden well will be installed with a screened interval that straddles the water table. The soil boring advanced for the purpose of installing the overburden monitoring well will be drilled using hollow-stem augers and sampled with a two-foot long, two-inch inside diameter (I.D.) split-spoon sampler from ground surface to the target depth indicated in Table 3-1. The soil samples will be described in the field to characterize soil type, including grain-size, texture, and apparent moisture content. Soil samples will be logged in accordance with the Burmister Soil Classification System and classified using the Unified Soil Classification System (USCS) as per the FSP. The samples will also be field screened for indications of MGP-related, or other, impacts based on appearance, odors or organic vapor concentration measurements using a PID. Head-space screening will be conducted using the PID by immediately transferring a representative subsample of the soil to a clean glass jar and sealing its lid with aluminum foil. To allow the sample to equilibrate, it will remain sealed for a period of time (approximately 15 minutes) and then the tip of the PID will be inserted through the foil and the maximum instrument reading will be recorded.

Monitoring well installation procedures are provided in the FSP. The overburden well will be constructed of two-inch diameter, Schedule 40 PVC well casing with 0.020-inch slot PVC screens with an appropriately-sized filter pack. A sump will be installed in the overburden monitoring well below the screen, as described in the FSP. The length of the sump will be field determined based on subsurface conditions. The base of the sump will not penetrate a low permeability layer (e.g., dense glacial till), if encountered, and will not be installed below the top of bedrock surface. The annular space between the sump and formation will be filled with bentonite, cement/bentonite grout, or other suitable, relatively low permeability material.

The well will be developed after a minimum period of 24 hours has passed following well installation to allow for the cement/bentonite grout to set. Well development will be conducted in accordance with procedures in the FSP.

3.2.3.2 Bedrock Monitoring Wells

Seven (7) bedrock monitoring wells (MW-102R-10, MW-104R-10, MW-106R-10, MW-108R-10, MW-110R-10, MW-112R-10, and MW-113R-10) will be installed. These locations are positioned at various locations in the area of investigation to evaluate the generalized direction of groundwater flow in

the bedrock and to assess groundwater quality within the bedrock. In addition to these objectives, monitoring wells MW-106R-10, MW-102R-10 and MW-113-10 are intended to assess whether or not bedrock has been impacted by MGP-related NAPL previously identified in contact with or close to the bedrock surface.

At MW-113R-10, soil samples will be collected continuously from ground surface to refusal on rock. At other locations, sufficient stratigraphic and analytical data were (or will have been) obtained from the adjacent overburden monitoring well location or soil boring and thus, continuous sampling of soil from these locations will not be conducted. Additional procedures related to the installation of bedrock monitoring wells are discussed below.

An eight-inch diameter borehole will be drilled through the overburden and approximately one to two feet into competent bedrock. Depending on the subsurface conditions, a temporary well casing may be installed to keep the borehole from collapsing and to facilitate drilling.

A four-inch diameter steel casing will then be placed in the borehole, extending from the bottom of the borehole (seated one to two feet into competent bedrock) to the ground surface to reduce the potential for the introduction of impacts from shallower zones into bedrock. The casing will then be grouted in place by filling the annular space between the casing and the borehole, from the bottom of the borehole to a few feet below ground surface, with a cement/bentonite grout by means of the tremie method or pressure grouting. The cement/bentonite grout in the annular space will be allowed to set for a minimum period of 24 hours before resuming drilling activities at the borehole location.

Bedrock drilling will resume by means of conventional or wire-line coring techniques using a nominal four inch O.D. core barrel. Cores will be collected in 5-foot intervals to a depth of approximately 20 feet below the top rock. Core samples will be described in the field to characterize rock type; bedding thicknesses; texture; fracture type, orientation and spacing; structural features in addition to fractures; and other descriptors used to identify the composition of the bedrock as per the FSP. Packer pressure testing will be conducted at five-foot intervals following each core run to evaluate changes in hydraulic conductivity versus depth and identify potential water-bearing zones. Packer testing will be conducted in accordance with the procedures specified in the FSP.

The coring and packer testing will be used to identify the uppermost water-bearing zone in bedrock. Once this zone is identified, coring and packer testing will continue in 5-foot intervals in an attempt to evaluate the thickness of the water-bearing zone, and to identify a relatively lower permeability interval directly below the water-bearing zone. Following completion of coring and packer pressure testing, geophysical logging will be conducted in the open core hole to further evaluate the bedrock conditions and the vertical position of the water-bearing zone. Specific geophysical parameters that will be recorded during the logging will include natural gamma, fluid temperature, spontaneous potential, single point resistance, and caliper. Information obtained from the bedrock core, packer test results, and geophysical data will be used as the basis for selecting the screen interval, which will target the shallowest water-bearing zone in the bedrock.

In the event that there is no indication of a water-bearing zone in the upper 20 feet of bedrock, the boring may be advanced deeper to identify transmissive zones. However, it is anticipated that a zone of increased permeability will likely be present within the upper portion of the bedrock, because secondary porosity features (i.e., weathered bedding planes, fractures) which can increase the hydraulic conductivity of the rock are often encountered within the upper 10 to 20 feet of bedrock.

Once a water-bearing zone is identified, a two-inch diameter PVC screen and riser casing will be installed inside the four-inch steel casing and nominally four-inch core hole. The bedrock wells will be constructed of two-inch diameter, Schedule 40 PVC casing with 0.020-inch slot PVC screens with an appropriately-sized filter pack as described in the FSP. A one to two-foot long sump will be installed below the screen, as described in the FSP. The annular space between the sump and formation will be filled with bentonite, cement/bentonite grout, or other suitable, relatively low permeability material.

If NAPL is encountered during the bedrock drilling, then information will be assessed to develop a plan to reduce the potential for introducing NAPL to deeper intervals during the drilling process. One option may be to install an intermediate casing to attempt to isolate the NAPL and allow advancement of the boring below the interval where NAPL was encountered. Alternatively, advancement of the boring may be terminated at the depth of the NAPL. In this case, consideration will be given to setting a well with a screen positioned adjacent to the NAPL interval.

Each bedrock well will be developed after a minimum period of 24 hours has passed following well installation to allow for the cement/bentonite grout to set. Development will be conducted in accordance with procedures in the FSP.

3.2.4 Slug Tests

In-situ hydraulic conductivity tests (i.e., slug tests) will be performed on each of the monitoring wells installed during this phase of the supplemental RI activities to evaluate the horizontal hydraulic conductivity of the adjacent formation. Rising head slug tests will be conducted in accordance with the procedures described in the FSP and the data generated will be input into AQTESOLV® software for hydraulic conductivity calculations.

3.2.5 Groundwater Monitoring and NAPL Gauging

Two (2) rounds of groundwater sampling, water level measurements, and NAPL gauging will be conducted as part of the supplemental RI field activities. At least one of the rounds will be conducted during a time when groundwater levels contrast with the previous rounds of sampling. The water levels during the December 2008, April 2009 and December 2009 sampling rounds were similar (as were the constituent concentrations). Water levels are typically lower in late summer.

In any case, the first round of groundwater sampling will be conducted no sooner than one week after well development and after water levels in the wells have stabilized. The second round will be conducted approximately three months (one quarter) after the first round, preferably in a time period where the groundwater elevation conditions that differs seasonally from the first round.

Depth to water measurements and NAPL gauging will be conducted prior to groundwater sampling. In the event that NAPL is detected in a monitoring well, a groundwater sample will not be collected from that well. Groundwater samples will be collected according to the United States Environmental Protection Agency (USEPA) low-flow sampling protocol and in accordance with procedures outlined in the FSP.

The groundwater samples will be submitted for analysis of TCL VOCs, TCL SVOCs, total cyanide, and free cyanide. Free cyanide will be analyzed by USEPA SW-846 Method 9016 (Free Cyanide in Water, Soils and Solid Wastes by Microdiffusion, June 2010). A summary of the planned groundwater sample analyses is provided in Table 3-2. Analysis of groundwater samples will be conducted by a laboratory certified under NYSDOH ELAP to provide ASP/CLP deliverables. The analytical results will be provided to the NYSDEC as an Electronic Data Deliverable (EDD) formatted to the NYSDEC's recently required specifications. This will include: 1) populating the NYSDEC EDD with the analytical data; 2) validating the EDD using the database software application EQuIS™ from EarthSoft®, Inc.; and 3) submitting the validated EDD to the NYSDEC.

3.2.6 NAPL Recovery Evaluation

The feasibility of recovering NAPL from the MW-106S/D wells (and any other wells where NAPL is encountered) will be evaluated by periodically bailing accumulated NAPL from the well sumps and measuring subsequent accumulations to assess the rate at which NAPL can enter the wells. Approximately three (3) NAPL removal events will be conducted during the course of the Supplemental RI field activities. The evacuated contents generated during the bailing activities will be containerized in a 55-gallon drum.

3.2.7 Sediment Probing Program

During the 2009 RI field activities, NAPL was encountered in borings completed approximately 20 feet south of Huyck Stream (B-113-09 and B-114-09). The NAPL was encountered at a depth of approximately 7 to 13 feet BGS. However, borings drilled to a depth of four feet BGS at three locations closer to the stream (SOIL-2-08 through SOIL-4-08) did not encounter NAPL. Further, sampling and analysis of shallow sediment at SED-2-08 and SED-3-08 indicated there were no MGP-related impacts in the upper six inches of stream sediment. To confirm that NAPL is not present in the upper several feet of sediment, a sediment probing program will be conducted along three transects. Preliminary locations of the proposed transects are shown on Figure 3-1. It is anticipated that approximately four (4) to six (6) locations along each transect will be probed for evidence of NAPL. A metal rod will be pushed several feet into the sediment at each probing location. Upon withdrawal of the rod from the stream, the rod and water will be inspected for impact indicators such as NAPL, sheen and odors.

3.2.8 Survey

Each of the new soil boring and monitoring well locations will be surveyed. The survey will include location coordinates, ground surface elevation, and in the case of the wells, top of casing elevation data. Coordinates will be referenced to the State Plane coordinate system for New York using the North American Datum of 1983 (NAD 1983) in units of feet. Elevations will be referenced to the National Geodetic Vertical Datum (NGVD) of 1929 in units of feet. The survey will be performed by a New York licensed surveyor.

3.2.9 Investigation-Derived Waste

Investigation-derived waste (IDW) generated during the Phase III RI activities will include soil and rock cuttings, drilling water, development water, equipment decontamination water, purge water, NAPL and water from bailing activities, disposable sampling equipment, and personal protective equipment (PPE). The waste will be containerized in DOT-approved, 55-gallon drums, which will be properly labeled to identify their contents. Any NAPL or NAPL/water mixtures recovered from monitoring wells will be containerized separately from other IDW. Drill water from coring may be containerized in a temporary 400-1,000 gallon polyethylene storage tank. With the exception of the water used for coring, existing waste profiles for the Site will be used for characterization. Based on prior experience, it is possible that the coring water will exhibit the RCRA characteristic of corrosivity due to elevated pH (>12.5) caused by partially cured cement. The appropriate treatment/disposal will be arranged based on the characterization of the waste streams. Treatment/disposal of the IDW will be managed by Clean Harbors Environmental Services, Inc. under contract to National Grid.

3.3 Data Evaluation and Reporting

Laboratory results for the soil and groundwater samples will be forwarded to a qualified data validator for preparation of a Data Usability Summary Report (DUSR). The DUSR will present a summary of data usability, including a discussion of qualified and rejected data and provide recommendations for resampling/reanalysis, as applicable.

A supplemental RI Data Summary Report will be provided to the NYSDEC. The supplemental RI Data Summary Report will include the following:

- Data generated during the field investigation;
- DUSR and tabular and graphic summaries of the analytical results;
- Maps of sampling locations;
- Maps of groundwater elevations and flow directions;
- Hydrogeologic cross-sections and other three-dimensional depictions of subsurface conditions.

Accompanying the supplemental RI Data Summary Report will be conclusions related to the objectives of the RI, and an assessment of whether or not the data collected to date are sufficient to meet the RI objectives. Also included will be either a recommendation that a RI Report be prepared (if the data collected to date are sufficient), or recommendations for addressing additional data needs to complete the RI, including human and ecological exposure assessments.

In the event that preparation of a RI Report is recommended and the NYSDEC concurs with this recommendation, a RI Report will be prepared to address the following:

- The identity and characteristics of the source(s) of MGP-related impacts;
- The amount, concentration, phase, location, environmental fate and transport, and other significant characteristics of any MGP-related constituents present;
- Hydrogeologic characteristics, including grain-size, hydraulic conductivity of saturated formations monitored, depth to saturated zone, nature of bedrock, hydraulic gradients, proximity to surface water, floodplains, and wetlands;
- Assess routes of exposure and potential human receptors via a qualitative human health exposure assessment in accordance with Section 3.1(C)17 and Appendix 3B of the May 2010 DER-10 Technical Guidance for Site Investigation and Remediation; and
- Steps 1 through 2b of a Fish and Wildlife Resource Impact Analysis (FWRIA), to be conducted by a qualified individual in accordance with the following NYSDEC guidance documents: 1) Fish and Wildlife Impact Analysis for Inactive Hazardous Waste Sites (FWIA); October 1, 1994 (Steps 1 through 2b); and 2) DER-10 Technical Guidance for Site Investigation and Remediation, May 2010.

The RI report will include the following:

- Pertinent information obtained throughout the implementation of this work plan and previous investigations;
- Descriptions of the work done under this work plan and the results of that completed work;
- Deviations from this work plan that result from unexpected conditions encountered during the investigation;
- Summary of the overall nature and extent of contamination referencing any exceedances of applicable State standards, criteria, and guidance;
- Summary of any ecological assessments conducted;
- Summary tables of analytical data collected;
- Soil boring logs and well construction diagrams, which will include well development data and field instrument (PID) readings;
- Groundwater elevation contour maps with flow directions specified;
- Hydrogeologic cross-sections of the Site;

- Figure depicting the elevation contours of the top of bedrock surface;
- Figures illustrating the distribution of constituent concentrations in soils and groundwater, including sample depths; and
- Conclusions which summarize the areas of concern, identify any potentially completed exposure pathways, and recommendations for any future work (e.g., none, additional investigation, or an evaluation of remedial alternatives.

Section 4

Schedule

Drilling activities will be scheduled following approval of this work plan. It is anticipated that approximately five (5) weeks will be required to conduct the field activities through completion of monitoring well installations, well development, slug testing, and the first round of groundwater sampling. As noted in Section 3.2.5, the second round of groundwater sampling will be conducted approximately three (3) months following the first round, preferably in an interval of hydrologic conditions that differs seasonally from the first round. Within approximately six (6) to eight (8) weeks of completion of the second round of groundwater sampling, the laboratory analyses and the DUSR are expected to be complete.

The supplemental RI Data Summary Report will be submitted approximately ten (10) weeks after the DUSR is received from the data validator, or approximately eight (8) to nine (9) months after the start of field work. If following NYSDEC's review of the Data Summary Report (see Section 3.3), it is determined that the RI is complete, a schedule for submitting a RI Report will be provided.

References

Brown and Caldwell Associates, May 2010. "Data Summary Report, Additional RI Activities, Rensselaer Non-Owned Former MGP Site, Rensselaer, New York".

Brown and Caldwell Associates, June 2009. "Data Summary Report, Remedial Investigation, Rensselaer Non-Owned Former MGP Site, Rensselaer, New York".

Brown and Caldwell Associates, November 2008; Revised September 2010. "Health and Safety Plan for Supplemental Remedial Investigation of Rensselaer Non-Owned Former MGP Site".

Brown and Caldwell Associates, November 2008. "Remedial Investigation Work Plan, Rensselaer Non-Owned Former Manufactured Gas Plant Site (V00488), 89 Washington Street, Rensselaer, New York".

Brown and Caldwell Associates, February 2006. "Site Characterization Data Summary Report, Rensselaer Non-Owned Former MGP Site, 89 Washington Street, Rensselaer, New York".

Foster Wheeler, November, 2002. "Generic Field Sampling Plan for Site Investigations at Non-Owned Former MGP Sites".

Foster Wheeler, November 2002. "Generic Quality Assurance Project Plan for Site Investigations at Non-Owned Former MGP Sites".

Foster Wheeler, November 2002. "Generic Health & Safety Plan for Site Investigations at Non-Owned Former MGP Sites".

Tables

TABLE 2-1
SUMMARY OF VISUAL/OLFACTORY FIELD OBSERVATIONS IN SOIL FROM SC AND RI ACTIVITIES
RENSSELAER NON-OWNED FORMER MGP SITE
RENSSELAER, NEW YORK

Location	Depth (ft., BGS)	Description
SOIL BORINGS		
B-104-05	4-6	Tar-like odor.
	6-8	Strong tar-like odor.
	8-10	Saturated with water and tar, strong tar-like odor, sheen observed on soils.
B-105-05	4.3-4.5	Strong tar-like odor.
B-106-05	6.2-8	Tar-like odor, very faint sheen .
	8-10.2	Tar-like odor, pockets of sheen.
	10.2-10.3	Pockets of brown tar.
	10.3-12	Tar-like odor, pockets of sheen.
	12-15	Faint tar-like odor.
B-107-08		No observations or odor indicative of MGP-related materials.
B-108-08	4.4	Strong tar-like odor.
	6.4	Strong fuel-like odor.
	8.3	Strong fuel-like odor in gravel zone.
	8.7	Moderate hydrocarbon odor.
B-109-08	14-16	Sheen observed on outside of spoon, but not within soils when broken apart. Slight tar-like odor.
B-110-08	8.2	Slight sheen observed on soils.
	13	Partially saturated with NAPL/tar in gravelly zone.
	14-14.9	Sheen observed throughout, NAPL/tar on outside of spoon.
	16.4	Gravel seam coated with NAPL.
	16.9	Moderate tar-like odor.
	18	Strong tar-like odor.
	19	Sheen observed on soil.
B-111-08	8.5	Slight fuel-like odor.
	10	Slight fuel-like odor.
	13.5	NAPL coating on gravel grains, moderate tar-like odor throughout.
	14.2	NAPL coating coarser sand grains.
	15.2	NAPL coating coarser sand grains.
	16.7	Sheen observed on soils.
	17	Sheen observed on soils, slight tar-like odor.
	18.7	NAPL blebs on coarser material.
B-112-08	8-12	Strong hydrocarbon odor.
B-113-09	5.2-5.8	Slight hydrocarbon odor
	5.8-7.8	Strong tar-like odor.
	7.1-7.8	Blebs of red-black NAPL.
	7.8-8.0	Saturated with groundwater and red-brown NAPL, strong tar-like odor.
	8.0-9.3	Strong tar-like odor.

TABLE 2-1
SUMMARY OF VISUAL/OLFACTORY FIELD OBSERVATIONS IN SOIL FROM SC AND RI ACTIVITIES
RENSSELAER NON-OWNED FORMER MGP SITE
RENSSELAER, NEW YORK

Location	Depth (ft., BGS)	Description
B-114-09	6.5-7.2	Sheen present, tar-like odor
	8.8-9.6	Strong tar-like odor.
	9.6-9.8	Brown NAPL blebs found throughout, strong tar-like odor.
	12.0-12.7	Brown NAPL blebs found throughout, strong tar-like odor.
B-115-09	10.0-11.3	Scattered sheen on water, slight tar-like odor.
	16.0-16.9	Faint tar-like odor.
B-116-09	10.9-11.4	Scattered sheen and trace NAPL blebs, tar-like odor
	12.0-12.9	Scattered sheen on grains, tar-like odor
	13.2-13.6	Soils partially saturated in red-black NAPL, tar-like odor
B-117-09		No observations or odor indicative of MGP-related materials.
SOIL BORINGS AT MONITORING WELL LOCATIONS		
MW-101-05		No observations or odor indicative of MGP-related materials.
MW-102-05	3.8-4	Tar-like odor
	8-10	Blebs of light-colored NAPL, petroleum-like odor. Few blebs of tar around gravel, intermittent sheen.
	10-12	Blebs of brown-red tar, strong tar-like odor.
	12-13.5	Tar around gravel
	14-18	Occasional tar on gravel, moderate sheen, strong tar-like odor.
	18-20	Frequent brown-red tar throughout, heavy sheen, very strong tar-like odor.
	21.4	String of tar.
MW-103-05	12-14	Tar coats gravel in veins throughout soil, strong tar-like odor
	14-19	Saturated with water and tar, strong tar-like odor, sheen observed on soils.
	19-20	Occasional tar near gravel, tar-like odor, sheen.
	20-21.5	Sheen observed on outside of soils, but not within soils when broken apart.
MW-104-08	9-11	Slight hydrocarbon odor.
	13-15	Sheen observed on outside of spoon.
MW-105-08	10.9-11.3	Sheen observed on soils.
	11.1	Sporadic blebs of NAPL and sheen observed on coarse sand and gravel, moderate tar-like odor.
	15	Slight tar-like odor.
	20.4	Very slight hydrocarbon odor.
MW-106D-08	12.5	Slight tar-like and organic odor.
	14.6	Abundant sheen, red-black NAPL bleb.
	16	Moderate tar-like odor.
	18	Sheen on cobble.
	20	Moderate to strong tar-like odor.
	22	Sheen, tar-like odor.
	24	Abundant sheen with occasional red-brown NAPL blebs.

TABLE 2-1
SUMMARY OF VISUAL/OLFACTORY FIELD OBSERVATIONS IN SOIL FROM SC AND RI ACTIVITIES
RENSSELAER NON-OWNED FORMER MGP SITE
RENSSELAER, NEW YORK

Location	Depth (ft., BGS)	Description
MW-106S-08	16-18	Sheen observed on soils and in water in spoon, tar-like odor.
	18.25	Sheen observed on soils, tar-like odor.
	20	Tar-like odor, very slight sheen.
	22.9-25.6	Coarse grains soils partially saturated with NAPL, tar-like odor.
	24	Partially saturated with NAPL, NAPL blebs on outside of spoon.
MW-107-08	5.2	Very slight hydrocarbon odor.
	7-9	Slight fuel-like odor.
	9-11	Abundant sheen observed on coarser grained soils, sparse blebs of black-red NAPL. Moderate tar-like odor.
	11-13	Strong fuel-like/hydrocarbon odor, occasional slight sheen.
	13-15	Slight hydrocarbon odor.
MW-108-09		No observations or odor indicative of MGP-related materials.
MW-109S-09		Refer to observations recorded for MW-109D-09
MW-109D-09		No observations or odor indicative of MGP-related materials.
MW-110-09	18-20	PID reading of 92 ppm from soils in interval
MW-111-09	10.0-10.6	Sheen on water inside spoon. Trace red-brown-black NAPL blebs, slight tar-like odor.
	10.6-11.2	Slight tar-like odor.
	14.0-14.3	Occasional sheen on water inside spoon. Slight tar-like odor.
TEST PITS		
TP-101-05	4.1-7.8	Petroleum-like odor.
TP-102-05	2.4-4.2	Strong tar-like odor and sheen.
	7-7.1	NAPL blebs.
TP-103-05	2.8-4.9	Slight sulfur-like odor, potential purifier waste material.
	10.4	NAPL blebs.
TP-104-05	7-8.4	NAPL blebs.
	8.4	NAPL seep.
	8.4-9.3	NAPL blebs.
TP-105-08	5-10	Viscous black NAPL/tar, strong tar-like odor.

TABLE 2-1
SUMMARY OF VISUAL/OLFACTORY FIELD OBSERVATIONS IN SOIL FROM SC AND RI ACTIVITIES
RENSSELAER NON-OWNED FORMER MGP SITE
RENSSELAER, NEW YORK

Location	Depth (ft., BGS)	Description
SOIL VAPOR PROBES		
SV-1-09		No observations or odor indicative of MGP-related materials.
SV-2-09		No observations or odor indicative of MGP-related materials.
SV-3-09		No observations or odor indicative of MGP-related materials.
SV-4-09		No observations or odor indicative of MGP-related materials.
SV-5-09		No observations or odor indicative of MGP-related materials.

TABLE 3-1
RATIONALE FOR SOIL BORING AND MONITORING WELL LOCATIONS
REMEDIAL INVESTIGATION
RENSSELAER NON-OWNED FORMER MGP SITE
RENSSELAER, NEW YORK

Location ID	Purpose	Target Depth
SOIL BORINGS		
B-118-10	Assess southern extent of NAPL identified in soil at B-106-05.	Approximately 15 feet below grade or to Geoprobe refusal on dense glacial till, whichever occurs first.
B-119-10	Assess eastern-northeastern extent of NAPL identified in soil at MW-111-09 and eastern-northeastern extent of PAHs in soils above applicable SCOs observed in soil sample from MW-111-09.	Approximately 15 feet below grade or to Geoprobe refusal on dense glacial till, whichever occurs first.
B-120-10	Assess eastern extent of NAPL identified in soil at MW-111-09 and eastern extent of PAHs in soils above applicable SCOs observed in soil sample from MW-111-09.	Approximately 15 feet below grade or to Geoprobe refusal on dense glacial till, whichever occurs first.
B-121-10	Assess southern extent of NAPL identified in soil at MW-111-09 and southern extent of PAHs in soils above applicable SCOs observed in soil sample from MW-111-09.	Approximately 15 feet below grade or to Geoprobe refusal on dense glacial till, whichever occurs first.
B-122-10	Assess eastern-northeastern extent of NAPL identified in soil at B-116-09 and eastern-northeastern extent of PAHs in soils above applicable SCOs observed in soil sample from B-116-09.	Approximately 15 feet below grade or to Geoprobe refusal on dense glacial till, whichever occurs first.
B-123-10	Assess eastern-northeastern extent of NAPL identified in soil at B-116-09 and eastern-northeastern extent of PAHs in soils above applicable SCOs observed in soil sample from B-116-09.	Approximately 15 feet below grade or to Geoprobe refusal on dense glacial till, whichever occurs first.
B-124-10	Assess eastern-northeastern extent of NAPL identified in soil at B-116-09 and eastern-northeastern extent of PAHs in soils above applicable SCOs observed in soil sample from B-116-09.	Approximately 15 feet below grade or to Geoprobe refusal on dense glacial till, whichever occurs first.
B-125-10	Assess southern extent of NAPL identified in soil at B-116-09.	Approximately 15 feet below grade or to Geoprobe refusal on dense glacial till, whichever occurs first.
B-126-10	Assess southern extent of NAPL identified in soil at B-116-09.	Approximately 15 feet below grade or to Geoprobe refusal on dense glacial till, whichever occurs first.
B-127-10	Confirm depth of southern holder bottom.	Geoprobe refusal on presumed gas holder bottom.
B-128-10	Confirm depth of northern holder bottom.	Geoprobe refusal on presumed gas holder bottom.
MONITORING WELLS		
MW-102R-10	Evaluate the generalized direction of groundwater flow in bedrock and assess groundwater quality within the bedrock. Assess whether or not bedrock has been impacted by MGP-related NAPL previously identified in overlying soil.	Straddle shallowest encountered water-bearing zone in bedrock with screen. Total depth of well is anticipated to be less than 20 feet below the top of bedrock surface or approximately 45 feet below grade.
MW-104R-10	Presumed side- or downgradient location. Evaluate the generalized direction of groundwater flow in bedrock and assess groundwater quality within the bedrock.	Straddle shallowest encountered water-bearing zone in bedrock with screen. Total depth of well is anticipated to be less than 20 feet below the top of bedrock surface or approximately 45 feet below grade.

TABLE 3-1
RATIONALE FOR SOIL BORING AND MONITORING WELL LOCATIONS
REMEDIAL INVESTIGATION
RENSSELAER NON-OWNED FORMER MGP SITE
RENSSELAER, NEW YORK

Location ID	Purpose	Target Depth
MW-106R-10	Evaluate the generalized direction of groundwater flow in bedrock underlying MGP site and assess groundwater quality within the bedrock. Assess vertical extent of NAPL observed at overburden monitoring well locations MW-106S-08 and MW-106D-08.	Straddle shallowest encountered water-bearing zone in bedrock with screen. Total depth of well is anticipated to be less than 20 feet below the top of bedrock surface or approximately 45 feet below grade.
MW-108R-10	Presumed side- or downgradient location. Evaluate the generalized direction of groundwater flow in bedrock underlying MGP site and to assess groundwater quality within the bedrock.	Straddle shallowest encountered water-bearing zone in bedrock with screen. Total depth of well is anticipated to be less than 20 feet below the top of bedrock surface or approximately 55 feet below grade.
MW-110R-10	Presumed upgradient location. Evaluate the generalized direction of groundwater flow in bedrock underlying MGP site and to assess groundwater quality within the bedrock.	Straddle shallowest encountered water-bearing zone in bedrock with screen. Total depth of well is anticipated to be less than 20 feet below the top of bedrock surface or approximately 43 feet below grade.
MW-112-10	Further delineate the lateral extent of dissolved-phase, MGP related constituents in overburden groundwater. Refine understanding of shallow overburden groundwater flow west of Site.	*Soil Boring* - advance and continuously sample to top of bedrock surface (approximately 21--23 feet below grade). *Well* - straddle water table with screen
MW-112R-10	Presumed downgradient location. Evlauate the generalized direction of groundwater flow in bedrock underlying MGP site and to assess groundwater quality within the bedrock.	Straddle shallowest encountered water-bearing zone in bedrock with screen. Total depth of well is anticipated to be less than 20 feet below the top of bedrock surface or approximately 43 feet below grade.
MW-113R-10	Presumed upgradient location. Evaluate the generalized direction of groundwater flow in bedrock underlying MGP site and assess groundwater quality within the bedrock.	Overburden: Log soils continuously to refusal. Monitoring well: Straddle shallowest encountered water-bearing zone in bedrock with screen. Total depth of well is anticipated to be less than 20 feet below the top of bedrock surface or approximately 43 feet below grade.

TABLE 3-2
SUMMARY OF LABORATORY ANALYSES FOR SOIL AND GROUNDWATER
SUPPLEMENTAL REMEDIAL INVESTIGATION
RENSSELAER NON-OWNED FORMER MGP SITE
RENSSELAER, NEW YORK

Media and Sample Type	TCL VOCs Method 8260	TCL SVOCs Method 8270	Total Cyanide Method 9012A	Free Cyanide ASTM 4282-95
SOIL				
Soil Boring Samples (10 borings, 2 samples each)	20	20	20	20
Duplicate[1]	1	1	1	1
MS/MSD[1]	1	1	1	1
Trip Blank[2]	--	--	--	--
Equipment Blank[1]	1	1	1	1
Groundwater (21 wells, 2 events) [3]				
Samples (1 per well)	42	42	42	42
Duplicate [1]	4	4	4	4
MS/MSD [1]	4	4	4	4
Trip Blank [2]	±4	--	--	--
Equipment Blank [1]	4	4	4	4

Notes:
(1) - Per the QAPP, one duplicate sample, one MS/MSD pair, and one equipment blank will be submitted and analyzed for every Sample Deliver Group (maximum 20 samples).
(2) - Per the QAPP, one trip blank will be included in every shipment of water samples to be analyzed for VOCs, and subsequently analyzed.
(3) - If NAPL is identified in well, groundwater samples will not be analyzed.

Figures

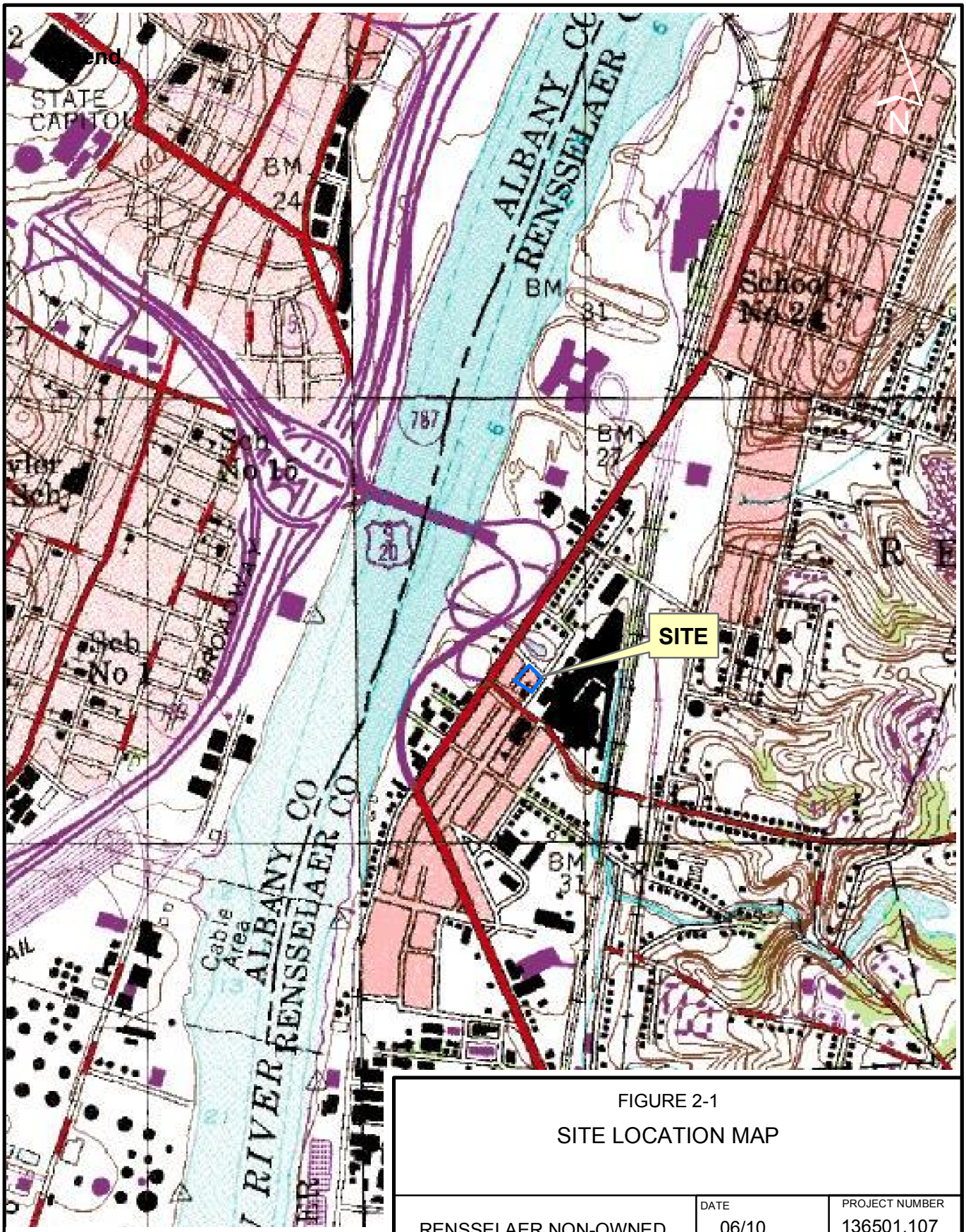

FIGURE 2-1

SITE LOCATION MAP

RENSSELAER NON-OWNED FORMER MGP SITE
RENSSELAER, NEW YORK

DATE
06/10

PROJECT NUMBER
136501.107

Brown AND Caldwell
Associates

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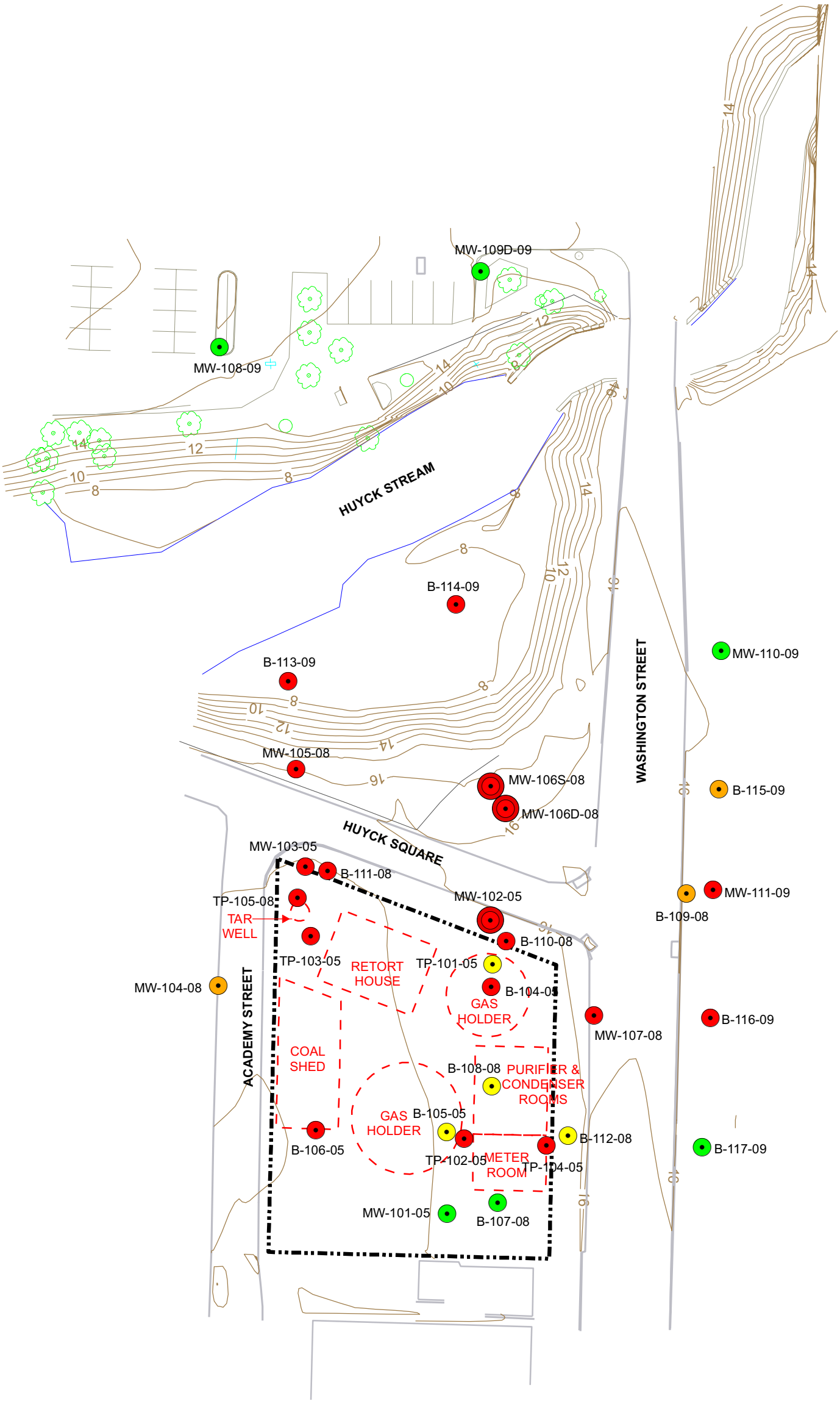

Legend

- Ground Surface Elevation Contour (ft., NGVD)
- Property Line
- Pavement Edge
- Water
- Former MGP Structure Location.
- No impacts observed in soil boring
- Hydrocarbon odors observed in soil boring
- Sheens and hydrocarbon odors observed in soil boring
- NAPL/Tar observed in soil boring
- NAPL/Tar observed in soil boring and in monitoring well during gauging events

Note:
Refer to Table 2-1 for descriptions and depth intervals of NAPL observations.

0 25 50 100
Feet

FIGURE 2-2

VISUAL/OLFACTORY OBERVATIONS

RENSSELAER NON-OWNED FORMER MGP SITE
RENSSELAER, NEW YORK

DATE 06/16/10

PROJECT NUMBER 136501.107

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Associates

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Legend

- Monitoring Well
- Soil Boring
- Sediment Sample
- Soil Sample
- Test Pit
- Soil Vapor Probe
- Staff Gauge
- Former MGP Structure Location.
- Proposed Overburden Monitoring Well
- Proposed Bedrock Monitoring Well
- Proposed On-Site Soil Boring
- Proposed Capital View Office Park Boring
- Proposed Sediment Probing Transect
- Ground Surface Elevation Contour (ft., NGVD)
- Property Line
- Pavement Edge
- Water

FIGURE 3-1

PROPOSED SRI LOCATIONS

RENSSELAER NON-OWNED FORMER MGP SITE
RENSSELAER, NEW YORK

DATE 9/10/10

PROJECT NUMBER 136501.107

Brown AND Caldwell

Associates

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