Orange and Rockland Utilities

(WEST NYACK OPERATING CENTER)
180 WEST NYACK ROAD, WEST NYACK, NY 10994
ROCKLAND COUNTY, NEW YORK

Site Management Plan

NYSDEC Site Number: 344014

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Revisions to Final Approved Site Management Plan:

Revision #	Submitted Date	Summary of Revision	DEC Approval Date

JULY 2012

CERTIFICATION

I, Eleanor P. Vivaudou, certify that I am currently a NYS Qualified Environmental Professional as defined in 6 NYCRR Part 375 and that this SMP 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) and that all activities were performed in full accordance with the DER-approved work plan and any DER-approved modifications.

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SITE MANAGEMENT PLAN

1.0 INTRODUCTION AND DESCRIPTION OF REMEDIAL PROGRAM

1.1 INTRODUCTION

This document is required as an element of the remedial program at the West Nyack Operating Center (WNOC), hereinafter referred to as the "Site" under the New York State (NYS) Inactive Hazardous Waste Disposal Site Remedial Program, administered by New York State Department of Environmental Conservation (NYSDEC). The site was remediated in accordance with Order on Consent Index # W3-0508-93-12, Site # 344014, which was executed on August 2, 1994.

1.1.1 General

Orange and Rockland Utilities, Inc. (O&R) entered into three consent orders with the NYSDEC to investigate and remediate the site. The first order (order # W3-0508-91-02) signed in 1991, required O&R to conduct a Phase II site assessment on the property. The second order (order # W3-0508-93-12) signed in 1994, required O&R to conduct a Remedial Investigation on the property. The third order (order # W3-0508-97-10) signed in 1997, requires O&R to design and implement a remedial action for the property and manage the property's institutional and engineering controls. A figure showing the site location and boundaries of this 3-acre site is provided in Figure 1. The boundaries of the site are more fully described in the metes and bounds site description which is part of the deed restriction, recorded on June 13, 2012 (Instrument # 2012-21147). This deed restriction will run with the land requiring all future owners and operators to comply with the terms of this SMP and the deed restriction.

After completion of the remedial work described in the Remedial Action Work Plan, some contamination was left in the subsurface at this site, which is hereafter

referred to as ‘remaining contamination.” This Site Management Plan (SMP) was prepared to manage remaining contamination at the site. All reports associated with the site can be viewed by contacting the NYSDEC or its successor agency managing environmental issues in New York State.

This SMP was prepared by AECOM, on behalf of Orange & Rockland Utilities, Inc. (O&R), in accordance with the requirements in NYSDEC DER-10 Technical Guidance for Site Investigation and Remediation, dated May 3, 2010, and the guidelines provided by NYSDEC. This SMP addresses the means for implementing the Institutional Controls (ICs) and Engineering Controls (ECs) that are required by the deed restriction for the site. The FER for the site was approved in 1998, prior to NYSDEC DER-10 requirements.

1.1.2 Purpose

The site contains contamination left after completion of the remedial action. Engineering Controls have been incorporated into the site remedy to control exposure to remaining contamination during the use of the site to ensure protection of public health and the environment. A deed restriction granted to the NYSDEC, and recorded with the Rockland County Clerk, will require compliance with this SMP and all ECs and ICs placed on the site. The ICs place restrictions on site use, and mandate operation, maintenance, monitoring and reporting measures for all ECs and ICs. This SMP specifies the methods necessary ensure compliance with all ECs and ICs required by the deed restriction for contamination that remains at the site. This plan has been approved by the NYSDEC, and compliance with this plan is required by the grantor of the deed restriction and the grantor’s successors and assigns. This SMP may only be revised with the approval of the NYSDEC.

This SMP provides a detailed description of all procedures required to manage remaining contamination at the site after completion of the Remedial Action, including: (1) implementation and management of all Engineering and Institutional Controls; (2) media monitoring; (3) operation and maintenance of all treatment, collection, containment, or recovery systems; (4) performance of periodic inspections, certification of results, and submittal of Periodic Review Reports; and (5) defining criteria for termination of treatment system operations.

To address these needs, this SMP includes two plans: (1) an Engineering and Institutional Control Plan for implementation and management of EC/ICs and (2) a Monitoring Plan for implementation of Site Monitoring.

This plan also includes a description of Periodic Review Reports for the periodic submittal of data, information, recommendations, and certifications to NYSDEC.

It is important to note that:

- This SMP details the site-specific implementation procedures that are required by the deed restriction. Failure to properly implement the SMP is a violation of the deed restriction, which is grounds for revocation of the Certificate of Completion (COC);
- Failure to comply with this SMP is also a violation of Environmental Conservation Law, 6NYCRR Part 375 and the Order on Consent (Index # W3-0508-93-12; Site #344014) for the site, and thereby subject to applicable penalties.

1.1.3 Revisions

Revisions to this plan will be proposed in writing to the NYSDEC's project manager. In accordance with the deed restriction for the site, the NYSDEC will provide a notice of any approved changes to the SMP, and append these notices to the SMP that is retained in its files.

1.2 SITE BACKGROUND

1.2.1 Site Location and Description

The site is located in the West Nyack County of Rockland, New York and is identified as Block 2 and Lots 47 and 48 on the Clarkstown Tax Map. Figure 1 shows the site location. The site is an approximately 3-acre area bounded by Hackensack River to the north and east, Old Nyack Turnpike (also called West Nyack Road) to the south, and Consolidated Rail Corporation (Conrail) rail tracks and Yaboo Fence Company, Inc. to the west (Figure 2). South of the site, directly across Route 59, is the Grant Hardware Site (NYSDEC # 344031) where a Record of Decision (ROD) and a Proposed Remedial Action Plan (PRAP) were issued in 2010 based on the results of the Remedial Investigation/Feasibility Study (RI/FS) conducted to determine the extent of halogenated solvents in the groundwater migrating offsite. According to that ROD, the remedial

design for the Former Grant Hardware Facility site must ensure that the treatment and monitoring include and address the O&R properties. O&R will provide access to the WNOC site so that Grant and/or its consultants may perform treatment and/or monitoring, as necessary. The details regarding this access will be outlined in a site access agreement between the two parties.

1.2.2 Site History

The West Nyack Operating Center (WNOC) facility is currently used as a satellite service center for Orange & Rockland Utilities, Inc. (O&R) line crews with garage facilities for utility service trucks, parking space for O&R vehicles, as well as office space. From the 1920s to approximately 1981, transformers, capacitors, and other electrical equipment were stored and repaired at the facility. Two underground storage tanks (USTs) were located in the center of the site and were used to store gasoline for fueling O&R's utility vehicles. In April 1980 it was discovered that one tank was leaking. As a result, this tank was repaired and relined in 1980 and removed in 1989 after failing tightness testing. The second tank was found to be sound and remained in service for diesel fuel storage until it was removed as part of the November 1997 to April 1998 remedial action described in the June 2, 1998 Certification Report by Rust Environment & Infrastructure (Rust).

The Certification Report describes the implementation of the Remedial Plan prepared by Rust and dated September 1997 to remediate the site in accordance with the NYSDEC Record of Decision. The selected remedy included excavation of soils from an area impacted by a former leaking UST and the excavation of soils from three areas onsite that contained polychlorinated biphenyls (PCBs). Investigation of the site was performed under the requirements of an Order on Consent Index #W3-0508-93-12 dated August 4, 1994 between O&R and the NYSDEC (Rust, 1998). The Phase II Site Assessment was conducted under the 1991 Order on Consent Index #W3-0508-91-02. Additionally, remediation of the site was conducted under Order on Consent Index #W3-0508-97-10 which was signed in 1997.

The remedial objective for benzene and xylene was to attain the NYSDEC recommended cleanup objectives of 0.06 milligrams per kilogram (mg/kg) benzene and

1.2 mg/kg xylene. The remedial objective for PCBs was to attain the NYSDEC subsurface (depths greater than 1 foot below ground surface [ft bgs]) cleanup level of 10 mg/kg and surface (0 to 1 ft bgs) cleanup level of 1 mg/kg. Following implementation of the Remedial Plan, the entire site was covered by an impermeable asphalt cap upon completion of the soil intrusive remedial activities outlined in the aforementioned plan. (Rust, 1998)

Available historical reports for the site include the following:

- July 1996: Rust – Remedial Investigation Report, O&R Inactive Hazardous Waste Disposal Site (I.D. # 344014), West Nyack, NY.
- March 1997 – Rust – Feasibility Study Report, O&R Inactive Hazardous Waste Disposal Site (I.D. # 344014), West Nyack, NY, with July 2, 1997 Amendment.
- September 1997 – Rust – Remedial Plan, O&R Inactive Hazardous Waste Disposal Site (I.D. # 344014), West Nyack, NY.
- June 1998 – Rust – Certification Report, O&R Inactive Hazardous Waste Disposal Site (I.D. # 344014), West Nyack, NY.

Groundwater monitoring has been performed onsite since 2006 on a quarterly basis, with the most recent quarterly monitoring event occurring November 17-18, 2011. Quarterly groundwater sampling has indicated that concentrations of chlorinated VOCs and their breakdown products have remained generally consistent, with some decreasing or increasing trends observed at individual wells for individual compounds, with the wells showing the greatest concentrations of chlorinated VOCs being located along the southern boundary of the site, indicating an upgradient, offsite source. Since the groundwater contamination at the site is not attributable to O&R, O&R will no longer be responsible for conducting quarterly groundwater sampling at the WNOC facility.

Additionally, indoor air and soil vapor intrusion (SVI) sampling has occurred annually since March 2006, with the most recent SVI sampling event occurring on April 9, 2011. Annual SVI sampling has indicated that no action is needed and further

monitoring is not necessary, however O&R will continue to proactively monitor for potential SVI for worker safety until such monitoring is no longer warranted.

1.2.3 Geologic Conditions

1.2.3.1 Lithology

Geologic conditions in the vicinity of the site have previously been characterized by Paulus, Sokolowski and Sartor (1980), Dames and Moore (1990), and Lawler, Matusky, and Skelly (1992), and summarized in the Remedial Investigation Report (RIR) by Rust (1996). Based on those reports and data obtained during the RI (41 soil borings advanced), the geology beneath the site is generally composed of 25 to 40 feet of unconsolidated glacial and post-glacial sediments overlying Triassic-age sedimentary bedrock. The unconsolidated sediments have been grouped into four units, from the surface to bedrock: fill, organic silt and sand, undifferentiated sand and gravel, and glacial till. The following is summarized from the 1996 Rust RIR:

Fill

The fill layer ranges in thickness from 1 to 8 feet overlying native material across the majority of the site. It consists of reworked native soils, road stone (ballast), brick, gravel, and occasionally asphalt. Occasionally, electrical refuse debris was identified in the fill layer. The fill is thickest in the central and northern part of the site and is approximately 2 to 4 feet thick across the remainder of the site.

Organic silt and sand

Over the majority of the northern part of the site, a layer of black to dark brown organic silt with fine to medium-grained sand is present beneath the fill. This layer contains varying degrees of roots, wood pieces, and peat and is generally soft. The organic layer ranges in thickness from not present (in the southern half of the site) to approximately 6.5 feet. It is believed that, where present, this layer depicts the natural surface grade, prior to site development. The presence of this layer indicates that a portion of the site was most likely previously occupied by swamp or marshland, which is consistent with local geomorphology.

Undifferentiated sand and gravel

The relatively thick sequence of undifferentiated sand and gravel is present beneath the organic silt and sand, except where the organic layer is absent, when the sequence is present directly below the fill layer. This sequence ranges in thickness from about 20 to 30 feet across the site, and overall contains sand and gravel with little to no fine fraction, though minor amounts (<15%) were present in some isolated samples. Sample moisture was defined as "moist" to "damp."

Glacial till

Glacial till was identified in soil boring MW-5B from a depth of 26.2 ft bgs to the top of bedrock at 40.1 ft bgs. The samples in this sequence were compact and very dense with low moisture content, consistently containing 10 to 15% silt, as a matrix to the sand and gravel.

Bedrock

The bedrock underlying the site is composed of the Brunswick formation, consisting of red to red-gray sandstone, siltstone, and mudstone, consistent with the Geologic Map of New York. Bedrock was penetrated in 5 locations during the RI and the depth of the overburden-bedrock interface ranges from 25 to 40 ft bgs across the site. The bedrock surface slopes downward to the west/southwest at approximately 2.5°. The bedrock beneath the site is highly fractured and weathering along these fractures have produced localized zones of solution cavities.

A cross-section location map is provided as Figure 3 while two geologic cross-sections are provided as Figures 4 and 5. For a more complete description of both the site-specific and regional geology, see section 3.1 of the 1996 Rust RIR.

1.2.3.2 Hydrogeology

The WNOC facility is located on a topographically high area within the Hackensack River drainage basin. This elevation is approximately 40 feet above the river and its floodplain. The outer edges of the floodplain are bounded to the east and west by valley sides which are several hundred feet high. The peak of the local topographic high

is located near the Grant Hardware building, located approximately 0.2 miles from the site across Route 59, at an elevation of approximately 100 feet National Geodetic Vertical Datum (NGVD). The Grant Hardware building is located at an elevation of 95 feet NGVD, while the WNOC facility building is located at an elevation of 62 feet NGVD.

The Hackensack River is the primary surface water body in the region, which flows from north to south. This orientation was directly produced during the most recent period of glaciation (Wisconsinan) when the north to south-oriented ice flow deepened and widened the Hackensack Valley (Rust, 1996). In the immediate vicinity of the site, the Hackensack River flows from the northwest to the southeast (Rust, 1996). Flow of the river is regulated by a dam located approximately 4,000 feet north of the site. The river makes a bend around the site, forming the northern and eastern property boundaries. It then flows south beneath Route 59 and along the eastern side of the Grant Hardware site. A municipal water intake and drinking water treatment plant for the Village of West Nyack is located to the northeast of the site on the opposite bank of the river.

The water table at the site is generally 3 to 5 ft bgs. Data from the First Quarter 2012 groundwater monitoring event, conducted in March 2012, was used to prepare contour maps showing groundwater flow direction across the site. Figure 6 shows shallow groundwater flowing from south to north-northeast. The direction of groundwater flow for the March 2012 event is consistent with the previous groundwater monitoring events. As shown on Figure 7, the groundwater flow in the deep overburden groundwater zone flows from north to south across the site. As shown in Figure 8, the groundwater in the bedrock flows from north to south across the site.

For a more complete description of both the site-specific and regional hydrogeology, see section 3.2 of the 1996 Rust RIR.

1.3 SUMMARY OF REMEDIAL INVESTIGATION FINDINGS

A Remedial Investigation (RI), Feasibility Study (FS), and additional Supplemental Subsurface Investigation (SSI) were performed at the site to characterize the nature and extent of contamination at the site. The results of the RI, FS, and SSI are described in detail in the following reports:

- Rust Environment and Infrastructure, 1996. Remedial Investigation Report, Orange and Rockland Utilities, Inc., Inactive Hazardous Waste Disposal (I.D. # 344014), West Nyack, NY, July, 1996.
- Rust Environment and Infrastructure, 1997. Feasibility Study Report, Orange and Rockland Utilities, Inc., West Nyack, New York, Inactive Hazardous Waste Disposal Site (I.D. # 344014), March, 1997; Amended July, 1997.
- Tetra Tech EC, Inc., 2005. Supplemental Subsurface Investigation, Orange and Rockland Utilities, Inc., West Nyack Operating Center, 766 West Nyack Road, West Nyack, New York, August, 2005.

Additionally, RI activities were completed at the Former Grant Hardware Facility, located 0.2 miles from the WNOC facility site, to determine the extent of contamination at the Former Grant Hardware Facility and assess potential offsite contamination. This work was not completed by O&R. The results of those investigations are described in detail in the following reports:

- Geovation, 2004. Revised Remedial Investigation Report, Former Grant Hardware Facility, West Nyack, NY, July, 2004.
- Geovation, 2006. Remedial Investigation Report Addendum, Former Grant Hardware Facility, West Nyack, NY, July, 2006.

Rust conducted a RI for the site. The RIR was submitted on April 24, 1996. The overall objective of the RI was to determine the nature and extent of chemical impacts to site soils and groundwater and the Hackensack River surface water and sediments. Once the nature and extent of impacts was determined, the data presented in the RIR was used to prepare the Feasibility Study (FS). The FS report was submitted in March of 1997 and amended in July of 1997. The FS identifies, evaluates, and recommends a cost-effective, environmentally sound, long-term remedial action.

Generally, the RI and FS determined the following:

- Subsurface soil in the vicinity of the UST area exhibited BTEX concentrations elevated with respect to NYSDEC RSCO's, with an

estimated 6,000 cubic yards of impacted soils located above and below the groundwater table;

- Subsurface soil in the area of a suspected dry well did not represent a significant source of chlorinated VOCs;
- PCB impacted soil in the vicinity of UST SB-24 was limited to the immediate vicinity of the boring;
- No evidence of subsurface soil contamination existed in the debris disposal area located in the northeast section of the site;
- Hackensack River surface water analytical data indicated that the site has not had an impact on the surface water quality with respect to PCBs and indicated that VOCs were not detected. However, groundwater flow data indicated that BTEX compounds may not have reached the river by October 1991;
- Hackensack River sediment data indicated that the site had not had an impact on sediment quality with respect to PCBs.;
- Groundwater flow in the shallow overburden is to the north-northeast. In the deep overburden and the bedrock groundwater regimes, groundwater flow is to the south;
- Up-gradient background groundwater data indicated that the TCE and to a significant extent the 1,2-DCE is related to an off-site source;
- Overburden groundwater monitoring wells, except MW-1 and MW-5, exhibited elevated concentrations of chlorinated VOCs. Chlorinated VOC concentrations in groundwater from MW-3 had increased;
- Overburden groundwater impacted by petroleum constituents was limited to the three wells located immediately downgradient from the UST area. Groundwater from monitoring wells EXW-4 and EXW-5 at the downgradient site boundary had not been impacted by BTEX, however

groundwater flow rates indicated that BTEX compounds may not yet have reached those locations;

- Bedrock interface groundwater monitoring wells at the upgradient site boundary and the eastern and central section of the site exhibited elevated concentrations of chlorinated VOCs with the 1,1,1-TCA and associated degradation products appearing to be site related; and
- The fish and wildlife criteria specific analysis indicated that Hackensack River sediment concentrations, at a limited number of locations, exhibited concentrations exceeding the sediment criteria screening value of 0.042 mg/kg. However, the available data indicated that the areal extent of impacted sediments was limited and therefore excavation/remediation of the sediments was not warranted.

Below is a summary of site conditions, from Section 4.9 of the 1996 RIR, when the RI was initiated in November, 1995:

Shallow Subsurface Soil

The shallow subsurface soil analytical data from the five borings completed during the RI indicated that the subsurface soil at depths greater than two feet in the vicinity of borings HA-4 and HA-5 are impacted by BTEX. Shallow subsurface soil (1' to 4') in the western section of the Site (borings HA-1, HA-2, and HA-3) have not been impacted by petroleum related VOCs. Omichron field test kit data indicated that soil in the immediate vicinity of borings HA-1, HA-2, HA-3, HA-4, and HA-5 had not been impacted by PCBs. Data supporting these findings is found in Tables 4.5. 4.6, 4.7, 4.8, and 4.9 of the 1996 RIR. The 1996 RIR is provided as Appendix B.

UST Area

Field GC and laboratory analytical data indicated that the extent of impacted subsurface soil, north, west, and south of the UST area had been delineated. North of the USTs, subsurface impacted soil did not extend beyond SB-9A, SB-13A, or SB-14A to the west at SB-6 and SB-7 were not impacted, and to the south, soil at SB-22 and SB-19 were not impacted. SB-18 marked the approximate limit of impacted soil south-southeast

of the UST area. To the east and southeast, the limit of impacted soil laid between SB-16/SB-17 and SB-5/SB-5A. Northeast of the UST area, the horizontal limit of impacted soil lay between SB-25 and SB-SDA-SB-02. The depth of impacted soil ranged from 1 foot to 14 feet. Using 12 feet as an average depth of impacted soil and the areal extent as described above, there was potentially 6,000 cubic yards of soil impacted by petroleum related VOCs. Data supporting these findings is found in Tables 4.5. 4.6, 4.7, 4.8, and 4.9 of the 1996 RIR. The 1996 RIR is provided as Appendix B.

Suspected Dry Well Area

The field GC and laboratory dry well soil boring analytical data indicated that the soil in the vicinity of the borings did not represent a significant source of VOC hydrocarbons. Data supporting these findings is found in Tables 4.5. 4.6, 4.7, 4.8, and 4.9 of the 1996 RIR. The 1996 RIR is provided as Appendix B.

SB-24 Test Pits

The PCB sample analytical data from the test pits completed in the vicinity of UST SB-24 indicated that the high PCBs reported in the SB-24, 4'-4.5' sample was an isolated occurrence. The extent of subsurface soil impacted by PCBs at concentrations greater than 25 ppm was limited to the area in the immediate vicinity of SB-24. Data supporting these findings is found in Tables 4.5. 4.6, 4.7, 4.8, and 4.9 of the 1996 RIR. The 1996 RIR is provided as Appendix B.

Suspected Debris Disposal Area

The subsurface soil field GC VOC data and the laboratory VOC data from samples collected from the borings installed in the suspected debris disposal area and the PCB data indicated that the suspected disposal area did not represent a source of VOCs or PCBs. The analytical data indicated that subsurface soil in this area had not been significantly impacted by VOCs or PCBs. Data supporting these findings is found in Tables 4.5. 4.6, 4.7, 4.8, and 4.9 of the 1996 RIR. The 1996 RIR is provided as Appendix B.

Hackensack River Surface Water

The RI surface water analytical data, in conjunction with the historical surface water analytical data indicated that the site had not had an impact on surface water quality with respect to PCBs. Furthermore, the historical surface water analytical data also indicated that the site had not had an impact on Hackensack River surface water quality with respect to VOCs. However, BTEX compounds may not have reached the Hackensack River by the 1991 sampling event. Since VOCs were not detected during previous investigations, VOCs were not sampled during the RI.

Hackensack River Sediment

Review of all the available Hackensack River sediment PCB analytical data indicated that concentrations significantly greater than upstream values were limited to three isolated areas. The October 1991 SD-4 and the December 1995 SED-11 sample locations (approximately 300 feet downstream of the Nyack Water Company intake), and the small dam located near the southeastern boundary of the site and the Route 59 Bridge. The October 1991 sediment analytical data indicated that the Hackensack River sediment quality had not been impacted by VOCs. However, BTEX compounds may not have reached the Hackensack River by 1991. Data supporting these findings is found in Table 4.11 of the 1996 RIR. The 1996 RIR is provided as Appendix B.

Groundwater

The historical groundwater analytical data indicated that groundwater from monitoring wells MW-1, MW-2, MW-3, and MW-4 had exhibited BTEX compounds that had exceeded the NYSDEC groundwater standards. Historically, groundwater from monitoring wells MW-2 and MW-4 have exhibited the highest concentrations, with

comparable xylene concentrations in the MW-1 groundwater samples. The BTEX concentrations in MW-4 generally increased from July 1989 to October 1991. Chlorinated VOCs have been detected in the MW-3 groundwater samples at concentrations that exceeded the NYSDEC groundwater standards. The groundwater samples from EXW-1, EXW-4, and EXW-5 indicated that groundwater in the vicinity of these wells had not been impacted by BTEX. However, chlorinated VOCs had been consistently detected in the EXW-4 and EXW-5 samples at concentrations which exceeded the NYSDEC groundwater standards. Groundwater from weathered bedrock interface wells MW-8 and MW-6 exhibited chlorinated volatile compounds at concentrations exceeding the NYSDEC groundwater standard, the compounds detected were the same as identified in the overburden MW-3, EXW-4, and EXW-5 monitoring well samples.

The overburden groundwater analytical data indicated that BTEX concentrations had generally decreased overtime. The one exception was the BTEX concentrations in MW-2, which were higher in December 1995 than in previous samples. The EXW-1, EXW-4, EXW-5 and the MW-8S groundwater BTEX data indicated that VOC petroleum contaminants associated with the UST area had not migrated to the site boundary. However, estimated groundwater flow rates indicated that BTEX compounds potentially had not reached the EXW-4 and EXW-5 locations by December 1995.

The chlorinated VOC analytical data indicated that groundwater concentrations in the vicinity of monitoring wells MW-3 and MW-4, and to a lesser extent, EXW-4 had increased. The EXW-5 chlorinated VOC concentrations were consistent with historical values. Elevated concentrations of chlorinated VOCs were also detected in the MW-2 and MW-8S overburden monitoring wells. Existing overburden groundwater and weathered bedrock flow data indicated that the TCE and 1,2-DCE detected in the MW-2, MW-3, MW-4, EXW-4, and EXW-5 and MW-8S samples may potentially be related to an offsite source. Data supporting these findings is found in Table 4.12 of the 1996 RIR. The 1996 RIR is provided as Appendix B.

The December 1995 PCB analytical data indicated that the overburden groundwater had not been significantly impacted by PCBs. Elevated concentrations were limited to monitoring wells MW-2 and MW-3. PCBs were not detected in the downgradient site perimeter monitoring wells during either the December 1995 or November 1991 sampling events. Data supporting these findings is found in Table 4.13 of the 1996 RIR. The 1996 RIR is provided as Appendix B.

The TCE and 1,2-DCE detected in upgradient, background weathered bedrock interface wells MW-5B and MW-9B groundwater samples appeared to be related to an offsite source. The available weathered bedrock flow data indicated that the TCE and 1,2-DCE detected in the weathered bedrock MW-6 and MW-8 groundwater samples was to some extent related to an offsite source. The 1,1,1-TCA and 1,1-DCE detected in the downgradient MW-6 and MW-8 weathered bedrock interface monitoring well samples appeared to be site related. Data supporting these findings is found in Table 4.14 of the 1996 RIR. The 1996 RIR is provided as Appendix B.

No PCBs were detected in the weathered bedrock interface groundwater monitoring well samples. Data indicated that the site had not had an impact on weathered groundwater quality with respect to PCBs.

Quarterly groundwater sampling has been performed since 2006 at the site. The most recent round of groundwater sampling was conducted on November 17-18, 2011 during which 15 onsite groundwater monitoring wells were sampled, along with an upgradient and a downgradient surface water sample collected from the Hackensack River. The groundwater monitoring wells and surface water sample locations are shown on Figure 3. As during previous rounds of groundwater monitoring, groundwater flow in the shallow overburden aquifer beneath the site was generally from southwest to northeast towards the Hackensack River.

Concentrations of BTEX compounds, specifically benzene, in site groundwater have decreased over time and are now only detected in one well in low-level concentrations only slightly greater than the groundwater standard value. Chloroform was detected at concentrations below the groundwater guidance or standard value in MW-05S (23 µg/L), however it was not detected in any of the other samples during the Fourth Quarter of 2011 sampling event. The only monitoring well in which toluene was detected during the Fourth Quarter of 2011 was MW-11S, at an estimated concentration of 0.22 µg/L, which is below the guidance value.

Concentrations of chlorinated solvent compounds and their breakdown products detected at the WNOC facility have remained generally consistent, with some decreasing or increasing trends observed at individual wells for individual compounds.

1,1,1-TCA had previously been detected in two wells (MW-8S and MW-11S) in the central portion of the WNOC site at concentrations greater than the groundwater

standard value of 5 µg/L, however during the June 2011 event, 1,1,1-TCA was not detected at a concentration greater than the groundwater standard.

The wells with the greatest concentrations of chlorinated COCs continue to be located along the southern boundary of the WNOC property, indicating a likely off-site, upgradient source. Concentrations of c-1,2-DCE and TCE in the deep overburden and bedrock wells in this area showed a significant increase during the first quarterly event performed in 2008. However, these COCs have since shown a general decrease in concentration with occasional small increases, as throughout 2010 and into 2011.

Chloroform and toluene were the only compounds detected in the surface water samples during the Second Quarter 2011 sampling event, and these compounds were detected at concentrations below the guidance value.

1.4 SUMMARY OF REMEDIAL ACTIONS

The site was remediated in accordance with the NYSDEC-approved Remedial Action Work Plan (RAWP) dated September, 1997.

In accordance with the findings of a Feasibility Study (FS) [Rust, 1997], a Record of Decision (ROD) was issued in October 1997 ordering the remediation of BTEX and PCB-impacted soil at the site. The remedial action (RA) was conducted by O&R in 1997 (Rust, 1997; Rust 1998). The RA included excavation of soils from three areas on the site containing PCBs and BTEX in excess of NYSDEC recommended cleanup levels. Taken together, this area was defined as Operable Unit 1 (OU-1). Remediation consisted of the excavation and offsite removal of approximately 9,328 cubic yards of soil impacted by PCBs and BTEX, according to the waste manifests within the Certification Report. The approximate footprints of the excavated areas are shown on Figure 2.

At the time the ROD was issued in 1997, it was known that there were issues associated with possible offsite source(s) contributing to the groundwater exceedances at the site. Remediation of groundwater at the site, which was defined as Operable Unit 2 (OU-2), was therefore deferred pending the findings of further groundwater monitoring and assessment. O&R has performed a groundwater monitoring program to evaluate groundwater quality trends from 1998 to the present. Surface water sampling at two locations in the Hackensack River has also been included in the monitoring program. The following is a summary of the Remedial Actions performed at the site:

1. Excavation of soil/fill exceeding industrial;

2. Construction and maintenance of a soil cover system consisting of 12 inches of structural sub-base, 3 inches of binder course, and 1 ½ inches of wearing course placed in the excavated areas, and 3 inches of binder course and 1 ½ inches of wearing course placed over the majority of the remainder of the site. In the driveway areas which were already paved, Petro-Mats® were laid over the existing pavement and covered with approximately 1 ½ inches of wearing course. Additionally, an impermeable asphalt cap was then placed over the entire site to prevent human exposure to remaining contaminated soil/fill remaining at the site;

3. Development and implementation of a Site Management Plan for long term management of remaining contamination. When completed, the deed restriction will include plans for: (1) Institutional and Engineering Controls, (2) monitoring, and (3) reporting;

Remedial activities were completed at the site in April, 1998. Any future excavation of soils is subject to the requirements put forth in the Excavation Work Plan, included in this SMP as Appendix A. Execution and recording of deed restriction to restrict land use and prevent future exposure to any contamination remaining at the site is pending.

1.4.1 Removal of Contaminated Materials from the Site

The remedial alternative selected for the WNOC facility site consisted of the excavation and offsite disposal of contaminated soil in excess of the NYSDEC recommended cleanup levels. As detailed below, soils in an area that contained elevated BTEX concentrations (i.e. in excess of 0.06 mg/kg benzene and 1.2 mg/kg xylene) were excavated and thermally treated offsite at an appropriate, permitted facility. In three PCB areas, soils in excess of 10 mg/kg PCB at depths greater than 1' below ground surface were excavated and disposed of offsite at an appropriate, permitted facility. Near-surface soils in excess of 1 mg/kg PCBs but less than 10 mg/kg were excavated and temporarily stockpiled for reuse as backfill of the deeper portions of the excavations. Approximately 736 cubic yards (1,177.06 tons) of treated BTEX soil was returned to the facility and

used as backfill in the BTEX excavation. The treatment facility provided analytical documentation that the benzene and xylene concentrations in the treated soils were below the NYSDEC Technical and Administrative Guidance Memorandum HWR-94-4046 (January 24, 1994) Recommended Soil Cleanup Objectives (RSCO) for benzene (0.06 mg/kg) and xylenes (1.2 mg/kg total xylenes). This document is provided in Appendix B of the Certification Report, which is included as Appendix C of this SMP. Additional details of the remedial actions taken at the site are also included in Appendix C of this SMP.

A list of the soil cleanup objectives (SCOs) for the primary contaminants of concern (COCs) and applicable land use for this site is provided in the Certification Report included as Appendix C.

A figure showing areas where excavation was performed is shown in Figure 2

1.4.2 Site-Related Treatment Systems

No long-term treatment systems were installed as part of the site remedy.

1.4.3 Remaining Contamination

Soil

Excavated areas were backfilled only following analysis of post-excavation samples indicated that cleanup objectives had been attained. Excavated soil was designed for use onsite as backfill only after analysis of samples indicated that the concentration of PCBs was less than 10 mg/kg. (Rust, 1998)

Tables and figures summarizing the results of all soils remaining at the site following completion of the Remedial Action are provided in the Certification Report (Rust, 1998) included in this SMP as Appendix B.

Groundwater

Known historic sources of potential groundwater impacts include the former USTs and PCB-containing equipment previously stored at the site, and the former chlorinated VOC storage areas at the Former Grant Hardware Facility. The known

surface and near-surface sources for these materials at the WNOC facility have been removed, as detailed in the Certification Report by Rust, dated June 1998. Based on groundwater monitoring results, no significant petroleum or PCB source materials appear to remain on the site, and monitoring of the Hackensack River bounding the site has not shown any WNOC site-related compounds detected in the surface water. The concentration of BTEX in the groundwater at the site has decreased since remediation was performed. Additionally, significant sources of BTEX and/or PCBs do not appear to be present at the neighboring Former Grant Hardware Facility site.

The concentrations of chlorinated VOCs detected at the site during recent groundwater monitoring events have been generally consistent, with no clear decreasing trend (AECOM, 2011a). The highest concentrations of chlorinated VOCs at the site are at the south-southeast side of the property, along the hydraulically upgradient side of the site. When compared with chlorinated VOC data from the Former Grant Hardware Facility site, it is apparent that the chlorinated VOC concentrations at the WNOC site are much lower and are strongly influenced by the Former Grant Hardware Facility upgradient source.

Examination of the area-wide distribution of chlorinated VOCs shows a dominant pattern: TCE, PCE, 1,1,1-TCA, and the dominant breakdown compound, cis-1,2-dichloroethene (c-1,2-DCE), have their greatest concentration along a southwest-northeast trending line which is centered on the Grant Hardware building. Figure 9 shows the core of the TCE impacts at Grant Hardware forming a distinct linear shape most likely due to structural control of groundwater flow. Note that the concentration of TCE at monitoring well MW-24R (84,700 micrograms per liter [µg/L]), located at the Hackensack River and northeast of the Grant Hardware building is nearly as great as the concentration at source area well MW-12 (91,300 µg/L). Northeast of the Grant Hardware facility, the TCE plume widens to the northwest and onto the WNOC site. O&R monitoring well MW-12D is located closest to the source of TCE and it has the highest concentration of TCE (310 µg/L) (AECOM, 2011a). The deep overburden wells at the WNOC facility site show higher concentrations of TCE than corresponding water table (shallow overburden) wells, indicating that TCE is entering the WNOC property by groundwater flow from bedrock to the overburden.

Figure 10 shows the same pattern of site-wide impacts by PCE, though at much lower concentrations than for TCE. The highest concentration was measured at Grant Hardware MW-24R, again showing strong movement from the source area to the northeast via bedrock structures. PCE concentrations at the WNOC facility site are more than an order of magnitude lower than those of TCE.

Figure 11 shows the distribution of 1,1,1-TCA. The highest concentration of this compound is found at the AOC-1 source area at the Former Grant Hardware Facility site, but at a concentration an order of magnitude lower than that of PCE, and two orders of magnitude lower than the TCE concentration. The shape of the plume is less clear as the low concentration of 1,1,1-TCA is masked at some locations by the higher concentrations of other chlorinated VOCs. As with TCE, however, the second highest concentration of this compound was measured at Grant Hardware MW-24R.

Figure 12 shows the distribution of c-1,2-DCE, which appears at the Former Grant Hardware Facility site as the primary breakdown product of TCE and PCE. The distribution of this compound strongly mimics that of TCE.

Vapor Intrusion

Due to the shallow water table and wide distribution of chlorinated VOCs in groundwater, the potential exists for vapor intrusion into commercial and residential structures in the area. The Former Grant Hardware Facility building and at least one downgradient residence have had soil vapor mitigation systems installed to prevent intrusion of chlorinated VOCs into the indoor air. Annual SVI sampling at the WNOC facility site has been conducted since March 16, 2008 and has indicated that no action is needed and further monitoring is not necessary. In correspondence dated May 24, 2012 and included as Appendix H to this Site Management Plan, NYSDEC and NYSDOH indicated that the SVI program can be discontinued.

2.0 ENGINEERING AND INSTITUTIONAL CONTROL PLAN

2.1 INTRODUCTION

2.1.1 General

Since remaining contaminated soil and groundwater exists beneath the site, Engineering Controls and Institutional Controls (EC/ICs) are required to protect human health and the environment. This Engineering and Institutional Control Plan describes the procedures for the implementation and management of all EC/ICs at the site. The EC/IC Plan is one component of the SMP and is subject to revision by NYSDEC.

2.1.2 Purpose

This plan provides:

- A description of all EC/ICs on the site;
- The basic implementation and intended role of each EC/IC;
- A description of the key components of the ICs to be set forth in the deed restriction;
- A description of the features to be evaluated during each required inspection and periodic review;
- A description of plans and procedures to be followed for implementation of EC/ICs, such as the implementation of the Excavation Work Plan (Appendix A) for the proper handling of remaining contamination that may be disturbed during maintenance or redevelopment work on the site; and
- Any other provisions necessary to identify or establish methods for implementing the EC/ICs required by the site remedy, as determined by the NYSDEC.

2.2 ENGINEERING CONTROLS

2.2.1 Engineering Control Systems

2.2.1.1 Soil Cap (Composite Cover System)

Exposure to remaining contamination in soil/fill at the site is prevented by a soil cover system placed over the site. Following remedial actions, the excavated area was backfilled with a combination of clean fill and thermally-treated soils. An impermeable asphalt cap was then placed over the entire site. This cap consists of 12 inches of structural sub-base, 3 inches of binder course, and 1 ½ inches of wearing course placed in the excavated areas, and 3 inches of binder course and 1 ½ inches of wearing course placed over the majority of the remainder of the site. In the driveway areas which were already paved, Petro-Mats® were laid over the existing pavement and covered with approximately 1 ½ inches of wearing course. Additionally, several inches of oiled stone chips were placed beneath the transmission towers in the northernmost portion of the site, as well as in the areas immediately adjacent to the rear of the building in order to protect the integrity of the asphalt cap. Security fencing was replaced around the site as well. The Excavation Work Plan that appears in Appendix A outlines the procedures required to be implemented in the event the cover system is breached, penetrated or temporarily removed, and any underlying remaining contamination is disturbed. Procedures for the inspection and maintenance of this cover are provided in the Monitoring Plan included in Section 3 of this SMP.

2.2.2 Criteria for Completion of Remediation/Termination of Remedial Systems

Generally, remedial processes are considered completed when effectiveness monitoring indicates that the remedy has achieved the remedial action objectives identified by the decision document. The framework for determining when remedial processes are complete is provided in Section 6.6 of NYSDEC DER-10.

2.2.2.1 Composite Cover System

The composite cover system is a permanent control and the quality and integrity of this system will be inspected at defined, regular intervals in perpetuity.

2.2.2.2 Monitored Natural Attenuation

Based on the Record of Decision for the Former Grant Hardware Facility site and identification of groundwater impacts on the WNOC facility site as coming from an offsite, upgradient source, it is expected that any further groundwater monitoring will be completed by the Potentially Responsible Party (PRP) for the Grant Hardware site, and therefore is not included in this document.

2.3 INSTITUTIONAL CONTROLS

A series of Institutional Controls is required by the ROD to: (1) implement, maintain and monitor Engineering Control systems; (2) prevent future exposure to remaining contamination by controlling disturbances of the subsurface contamination; and, (3) limit the use and development of the site to commercial or industrial uses only. Adherence to these Institutional Controls on the site will be required by the deed restriction and will be implemented under this Site Management Plan. These Institutional Controls are:

- Compliance with the deed restriction and this SMP by the Grantor and the Grantor's successors and assigns;
- The Engineering Control must be operated and maintained as specified in this SMP;
- The Engineering Control on the Controlled Property must be inspected at a frequency and in a manner defined in the SMP; and
- Data and information pertinent to Site Management of the Controlled Property must be reported at the frequency and in a manner defined in this SMP.

Institutional Controls identified in the deed restriction may not be discontinued without an amendment to or extinguishment of the deed restriction.

The site has a series of Institutional Controls in the form of site restrictions. Adherence to these Institutional Controls will be required by the deed restriction. Site restrictions that apply to the Controlled Property are:

- The property may only be used for industrial or commercial use provided that the long-term Engineering and Institutional Controls included in this SMP are employed;
- The property may not be used for a higher level of use, such as unrestricted or restricted residential use without additional remediation and amendment of the deed restriction, as approved by the NYSDEC;
- All future activities on the property that will disturb remaining contaminated material must be conducted in accordance with this SMP;
- The use of the groundwater underlying the property is prohibited without treatment rendering it safe for intended use;
- The potential for vapor intrusion must be evaluated for any buildings developed in the area while groundwater impacts are still present and any potential impacts that are identified must be monitored or mitigated;
- Vegetable gardens and farming on the property are prohibited; and
- The site owner or remedial party will submit to NYSDEC a written statement that certifies, under penalty of perjury, that: (1) controls employed at the Controlled Property are unchanged from the previous certification or that any changes to the controls were approved by the NYSDEC; and (2) nothing has occurred that impairs the ability of the controls to protect public health and environment or that constitute a violation or failure to comply with the SMP. NYSDEC retains the right to access such Controlled Property at any time in order to evaluate the continued maintenance of any and all controls. This certification shall be submitted annually, or an alternate period of time that NYSDEC may allow and will be made by an expert that the NYSDEC finds acceptable.

2.3.1 Excavation Work Plan

The site has been remediated for commercial or industrial use. Any future intrusive work that will penetrate the soil cap, or encounter or disturb the remaining contamination, including any modifications or repairs to the existing cover system will be performed in compliance with the Excavation Work Plan (EWP) that is attached as Appendix A to this SMP. Any work conducted pursuant to the EWP must also be conducted in accordance with the procedures defined in a Health and Safety Plan

(HASP), and Community Air Monitoring Plan (CAMP) prepared for the site. A sample HASP is attached in Appendix D to this SMP that is in current compliance with DER10, and 29CFR1910, 29 CFR 1926 and all other applicable Federal, State and local regulations. Based on future changes to State and federal health and safety requirements, and specific methods employed by future contractors, the HASP and CAMP will be updated and re-submitted with the notification provided in Section A-1 of the EWP. Any intrusive construction work will be performed in compliance with the EWP, HASP and CAMP, and will be included in the periodic inspection and certification reports submitted under the Site Management Reporting Plan (See Section 5).

The site owner and associated parties preparing the remedial documents submitted to the State, and parties performing this work, are completely responsible for the safe performance of all intrusive work, the structural integrity of excavations, proper disposal of excavation de-water, control of runoff from open excavations into remaining contamination, and for structures that may be affected by excavations (such as building foundations and bridge footings). The site owner will ensure that site development activities will not interfere with, or otherwise impair or compromise, the engineering controls described in this SMP.

2.3.2 Soil Vapor Intrusion Evaluation

Prior to the construction of any enclosed structures located over areas that contain remaining contamination and the potential for soil vapor intrusion (SVI) has been identified, an SVI evaluation will be performed to determine whether any mitigation measures are necessary to eliminate potential exposure to vapors in the proposed structure. Alternatively, an SVI mitigation system may be installed as an element of the building foundation without first conducting an investigation. This mitigation system will include a vapor barrier and passive sub-slab depressurization system (SSDS) that is capable of being converted to an active system.

Prior to conducting an SVI investigation or installing a mitigation system, a work plan will be developed and submitted to the NYSDEC and NYSDOH for approval. This work plan will be developed in accordance with the most recent NYSDOH “Guidance for Evaluating Vapor Intrusion in the State of New York”. The 2011 SVI Work Plan, along with the O&R-specific eHASP and Site-Specific HASP, are attached as Appendix E.

Measures to be employed to mitigate potential vapor intrusion will be evaluated, selected, designed, installed, and maintained based on the SVI evaluation, the NYSDOH guidance, and construction details of the proposed structure.

Preliminary (unvalidated) SVI sampling data will be forwarded to the NYSDEC and NYSDOH for initial review and interpretation. Upon validation, the final data will be transmitted to the agencies, along with a recommendation for follow-up action, such as mitigation. In the event the property is sold, validated SVI data will be transmitted to the property owner within 30 days of validation. If any indoor air test results exceed NYSDOH guidelines, relevant NYSDOH fact sheets will be provided to all tenants and occupants of the property within 15 days of receipt of validated data, in the event the property is rented out to tenants.

SVI sampling results, evaluations, and follow-up actions will also be summarized in the next Periodic Review Report.

2.4 INSPECTIONS AND NOTIFICATIONS

2.4.1 Inspections

Inspections of all remedial components installed at the site will be conducted at the frequency specified in the SMP Monitoring Plan schedule. A comprehensive site-wide inspection will be conducted annually, regardless of the frequency of the Periodic Review Report. The inspections will determine and document the following:

- Whether the Engineering Control continues to perform as designed;
- If this control continues to be protective of human health and the environment;
- Compliance with requirements of this SMP and the Deed restriction;
- Achievement of remedial performance criteria;
- Sampling and analysis of appropriate media during monitoring events;
- If site records are complete and up to date; and
- Changes, or needed changes, to the remedial or monitoring system;

Inspections will be conducted in accordance with the procedures set forth in the Monitoring Plan of this SMP (Section 3). The reporting requirements are outlined in the Periodic Review Reporting section of this plan (Section 5).

If an emergency, such as a natural disaster or an unforeseen failure of any of the ECs occurs, an inspection of the site will be conducted within 5 days of the event to verify the effectiveness of the EC/ICs implemented at the site by a qualified environmental professional as determined by NYSDEC.

2.4.2 Notifications

Notifications will be submitted by the property owner to the NYSDEC as needed for the following reasons:

- 60-day advance notice of any proposed changes in site use that are required under the terms of the Orders on Consent, 6NYCRR Part 375, and/or Environmental Conservation Law.
- 7-day advance notice of any proposed ground-intrusive activities pursuant to the Excavation Work Plan.
- Notice within 48-hours of any damage or defect to the foundations structures that reduces or has the potential to reduce the effectiveness of the Engineering Control and likewise any action to be taken to mitigate the damage or defect.
- Verbal notice by noon of the following day of any emergency, such as a fire, flood, or earthquake that reduces or has the potential to reduce the effectiveness of the Engineering Control in place at the site, with written confirmation within 7 days that includes a summary of actions taken, or to be taken, and the potential impact to the environment and the public.
- Follow-up status reports on actions taken to respond to any emergency event requiring ongoing responsive action shall be submitted to the NYSDEC within 45 days and shall describe and document actions taken to restore the effectiveness of the ECs.

Any change in the ownership of the site or the responsibility for implementing this SMP will include the following notifications:

- At least 60 days prior to the change, the NYSDEC will be notified in writing of the proposed change. This will include a certification that the prospective

purchaser has been provided with a copy of the Orders on Consent, and all approved work plans and reports, including this SMP

- Within 15 days after the transfer of all or part of the site, the new owner's name, contact representative, and contact information will be confirmed in writing.

2.5 CONTINGENCY PLAN

Emergencies may include injury to personnel, fire or explosion, environmental release, or serious weather conditions. In the event of an emergency condition impacting the Engineering Control or building, O&R will follow its existing emergency procedures and evacuation plan for this facility. In addition, a copy of the Spill Prevention, Control, and Countermeasure (SPCC) Plan for the West Nyack Operating Center is attached as Appendix F.

2.5.1 Emergency Telephone Numbers

In the event of any environmentally related situation or unplanned occurrence requiring assistance the Owner or Owner's representative(s) should contact the appropriate party from the contact list below. For emergencies, appropriate emergency response personnel should be contacted. Prompt contact should also be made to O&R Project Manager, Maribeth McCormick. These emergency contact lists must be maintained in an easily accessible location at the site.

Emergency Contact Numbers

Medical, Fire, and Police:	911
One Call Center:	(800) 272-4480 (3 day notice required for utility markout)
Poison Control Center:	(800) 222-1222
Pollution Toxic Chemical Oil Spills:	(800) 424-8802
NYSDEC Spills Hotline	(800) 457-7362

Project Contact Information

Maribeth McCormick – O&R Project Manager	Office: 845-783-5534 Mobile: 914-557-1361
Randy Whitcher – NYSDEC Project Manager	NYSDEC Division of Environmental Remediation 625 Broadway, 11th Floor Albany, NY 12233-7014 Office: (518) 402-9662 Email: rjwhitch@gw.dec.state.ny.us

* Note: Contact numbers subject to change and should be updated as necessary

2.5.2 Map and Directions to Nearest Health Facility

Site Location: Orange & Rockland Utilities, Inc., West Nyack Operating Center – 766 West Nyack Road, West Nyack, NY 10994

Nearest Hospital Name: Nyack Hospital

Hospital Location: 160 North Midland Avenue, Nyack, NY

Hospital Telephone: (845) 348-2000

Directions to the Hospital:

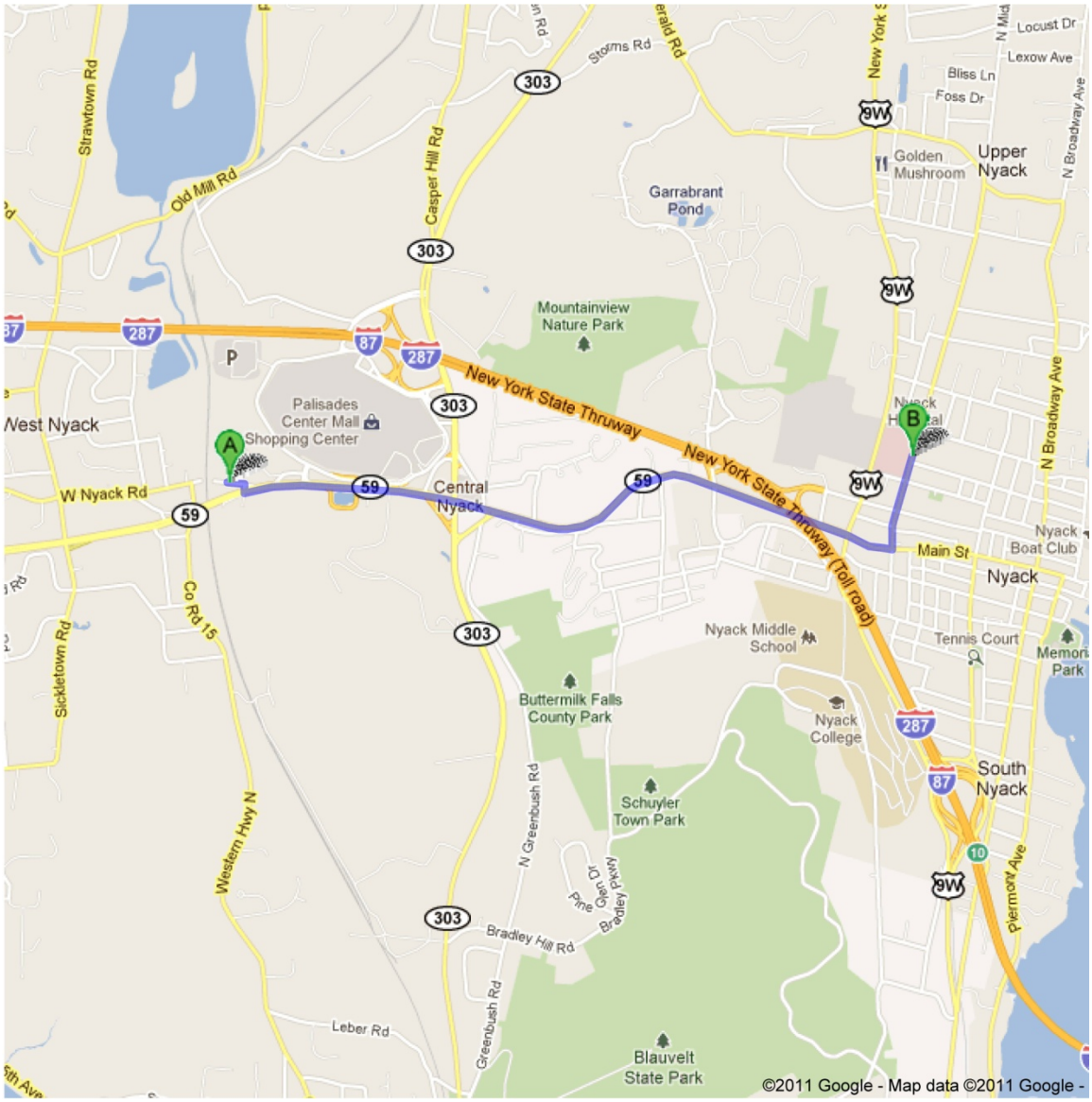
1. Head east on West Nyack Road (253 ft)
2. Take the 1st right onto High Street (79 ft)
3. Take the 1st left onto NY-59 East (1.8 mi)
4. Continue onto Main Street (0.1 mi)
5. Turn left onto North Midland Avenue (0.3 mi)

Nyack Hospital will be on the Left.

Total Distance: 2.3 miles

Total Estimated Time: 7 minutes

Map Showing Route from the Site to the Hospital:



2.5.3 Response Procedures

As appropriate, the fire department and other emergency response group will be notified immediately by telephone of the emergency. The emergency telephone number list is found at the beginning of this Contingency Plan. The list will also be posted prominently at the site and made readily available to all personnel at all times. Amendments to the Contingency Plan shall be made when site use changes or when future intrusive activities require updates to the current plan.

3.0 SITE MONITORING PLAN

3.1 INTRODUCTION

3.1.1 General

The Monitoring Plan describes the measures for evaluating the soil cover system at the site. This Monitoring Plan may only be revised with the approval of NYSDEC.

3.1.2 Purpose and Schedule

This Monitoring Plan describes the methods to be used for:

- Evaluating site information periodically to confirm that the remedy (i.e., the soil cover system) continues to be well maintained and thereby effective in protecting public health and the environment; and
- Preparing the necessary reports for the soil cover system maintenance evaluation.

To adequately address these issues, this Monitoring Plan provides information on:

- Reporting requirements;
- Inspection and maintenance requirements for soil cover system; and
- Annual inspection and periodic certification.

SVI monitoring will be completed for employee safety voluntarily by O&R until monitoring is no longer warranted or until responsibility for monitoring is shifted to the PRP for the former Grant Hardware site. No other media monitoring will be completed by O&R.

Monitoring Program	Frequency*	Matrix	Analysis
Composite Cover System (Soil Cap)	Annually	Visual Observation	Integrity Analysis

3.2 SOIL COVER SYSTEM MONITORING

A visual inspection of the complete soil cover system will be conducted on an annual basis concurrently with the Site-Wide Inspection (Section 3.4). Components of the soil cover system will be inspected for the following:

- Integrity of asphalt covered roads;
- Integrity of sidewalks;
- Integrity of concrete building slabs; and
- Integrity of "clean soil cover/cap."

If any of the components of the composite cover system are not functioning as designed, maintenance and repair are required immediately to restore the integrity of the soil cap. Results of the inspection will be provided to the NYSDEC on an annual or periodic basis as designated by the NYSDEC.

3.3 MEDIA MONITORING PROGRAM

3.3.1 Groundwater Monitoring

Groundwater sampling will not be conducted by O&R, as any site impacts are the result of contamination at an upgradient, offsite source (Former Grant Hardware Facility Site). The ROD for the Former Grant Hardware Facility Site is included in this SMP as Appendix G.

The network of monitoring wells has been installed to monitor both up-gradient and down-gradient groundwater conditions at the site. Site access will be provided to the PRP for the former Grant Hardware site and their representatives to complete any required groundwater sampling. The details regarding this access will be outlined in a site access agreement between the two parties.

3.3.1.1 Sampling Protocol

The PRP for the former Grant Hardware site and their representatives will be responsible for providing groundwater sampling protocol and subsequent data and reports to the NYSDEC.

3.3.1.2 Monitoring Well Repairs, Replacement, and Decommissioning

If biofouling or silt accumulation occurs in the on-site and/or off-site monitoring wells, the wells will be physically agitated/surged and redeveloped. Additionally, monitoring wells will be properly decommissioned and replaced (as per the Monitoring Plan), if an event renders the wells unusable.

Repairs and/or replacement of wells in the monitoring well network will be performed based on assessments of structural integrity and overall performance.

The NYSDEC will be notified prior to any repair or decommissioning of monitoring wells for the purpose of replacement, and the repair or decommissioning and replacement process will be documented in the subsequent periodic report. Well decommissioning without replacement will be done only with the prior approval of NYSDEC. Well abandonment will be performed in accordance with NYSDEC's "Groundwater Monitoring Well Decommissioning Procedures." Monitoring wells that are decommissioned because they have been rendered unusable will be reinstalled in the nearest available location, unless otherwise approved by the NYSDEC.

3.3.2 Soil Vapor Intrusion Monitoring

Annual soil vapor intrusion (SVI) sampling has indicated that no action is needed and further monitoring is not necessary. As per the letter from NYSDEC dated May 24, 2012, the review of the 2012 SVI report and past reports has shown a decreasing trend in the concentration of the chlorinated volatile organic compounds (CVOCS). The Department and NYSDOH suggest halting the current soil vapor intrusion (SVI) sampling program at this time. In the event concentrations of CVOCs increase in groundwater at the site, further SVI sampling may be requested. The May 24, 2012 letter is included as Appendix H.

3.4 SITE-WIDE INSPECTION

Site-wide inspections will be performed on a regular schedule at a minimum of once a year. Site-wide inspections will also be performed after all severe weather conditions that may affect the Engineering Control. During these inspections, an

inspection form will be completed. The form will compile sufficient information to assess the following:

- Compliance with all ICs, including site usage;
- An evaluation of the condition and continued effectiveness of EC;
- General site conditions at the time of the inspection;
- The site management activities being conducted including, where appropriate, confirmation sampling and a health and safety inspection; and
- Confirm that site records are up to date.

3.5 MONITORING QUALITY ASSURANCE/QUALITY CONTROL

All sampling and analyses will be performed in accordance with the requirements of the Quality Assurance Project Plan (QAPP) prepared for the site. Main Components of the QAPP include:

- QA/QC Objectives for Data Measurement;
- Sampling Program:
    - Sample containers will be properly washed, decontaminated, and appropriate preservative will be added (if applicable) prior to their use by the analytical laboratory. Containers with preservative will be tagged as such.
    - Sample holding times will be in accordance with the NYSDEC ASP requirements.
    - Field QC samples (e.g., trip blanks, coded field duplicates, and matrix spike/matrix spike duplicates) will be collected as necessary.
- Sample Tracking and Custody;
- Calibration Procedures:
    - All field analytical equipment will be calibrated immediately prior to each day's use. Calibration procedures will conform to manufacturer's standard instructions.

    - The laboratory will follow all calibration procedures and schedules as specified in USEPA SW-846 and subsequent updates that apply to the instruments used for the analytical methods.

- Analytical Procedures;
- Preparation of a Data Usability Summary Report (DUSR), which will present the results of data validation, including a summary assessment of laboratory data packages, sample preservation and chain of custody procedures, and a summary assessment of precision, accuracy, representativeness, comparability, and completeness for each analytical method.
- Internal QC and Checks;
- QA Performance and System Audits;
- Preventative Maintenance Procedures and Schedules;
- Corrective Action Measures.

3.6 MONITORING REPORTING REQUIREMENTS

Forms and any other information generated during regular monitoring events and inspections will be kept on file on-site. All forms, and other relevant reporting formats used during the monitoring/inspection events, will be (1) subject to approval by NYSDEC and (2) submitted at the time of the Periodic Review Report, as specified in the Reporting Plan of this SMP.

All monitoring results will be reported to NYSDEC on a periodic basis in the Periodic Review Report. A letter report will also be prepared, subsequent to each sampling event. The report (or letter) will include, at a minimum:

- Date of event;
- Personnel conducting sampling;
- Description of the activities performed;
- Type of samples collected (e.g., sub-slab vapor, indoor air, outdoor air, etc);
- Copies of all field forms completed (e.g., well sampling logs, chain-of-custody documentation, etc.);

- Sampling results in comparison to appropriate standards/criteria;
- A figure illustrating sample type and sampling locations;
- Copies of all laboratory data sheets and the required laboratory data deliverables required for all points sampled (or be submitted electronically in the NYSDEC-identified format);
- Any observations, conclusions, or recommendations; and
- A determination as to whether SVI conditions have changed since the last reporting event.

Data will be reported in hard copy or digital format as determined by NYSDEC.

A summary of the monitoring program deliverables are summarized below.

Schedule of Monitoring/Inspection Reports

Task	Reporting Frequency*
Site-Wide Inspection	Annually
Composite Cover System (Soil Cap)	Annually

* The frequency of events will be conducted as specified until otherwise approved by NYSDEC

4.0 OPERATION AND MAINTENANCE PLAN

4.1 INTRODUCTION

The site remedy does not rely on any mechanical systems, such as sub-slab depressurization systems or air sparge/ soil vapor extraction systems to protect public health and the environment. Therefore, the operation and maintenance of such components is not included in this SMP, however information on the non-mechanical Engineering Control (i.e., soil cover system) is provided in Section 3, above.

5. INSPECTIONS, REPORTING AND CERTIFICATIONS

5.1 SITE INSPECTIONS

5.1.1 Inspection Frequency

All inspections will be conducted at the frequency specified in the schedules provided in Section 3 Monitoring Plan of this SMP. At a minimum, a site-wide inspection will be conducted annually. Inspections of remedial components will also be conducted whenever a severe condition has taken place, such as an erosion or flooding event that may affect the ECs.

5.1.2 Inspection Forms, Sampling Data, and Maintenance Reports

All inspections and monitoring events will be recorded on the appropriate forms. Additionally, a general site-wide inspection form will be completed during the site-wide inspection. These forms are subject to NYSDEC revision.

All applicable inspection forms and other records, including all media sampling data and system maintenance reports, generated for the site during the reporting period will be provided in electronic format in the Periodic Review Report.

5.1.3 Evaluation of Records and Reporting

The results of the inspection and site monitoring data will be evaluated as part of the EC/IC certification to confirm that the:

- EC/ICs are in place, are performing properly, and remain effective;
- The Monitoring Plan is being implemented;
- The site remedy continues to be protective of public health and the environment and is performing as designed in the RAWP and FER.

5.2 CERTIFICATION OF ENGINEERING AND INSTITUTIONAL CONTROLS

After the last inspection of the reporting period, a qualified environmental professional or Professional Engineer licensed to practice in New York State will prepare the following certification:

For each institutional or engineering control identified for the site, I certify that all of the following statements are true:

- The inspection of the site to confirm the effectiveness of the institutional and engineering controls required by the remedial program was performed under my direction;
- The institutional control and/or engineering control employed at this site is unchanged from the date the control was put in place, or last approved by the Department;
- Nothing has occurred that would impair the ability of the control to protect the public health and environment;
- Nothing has occurred that would constitute a violation or failure to comply with any site management plan for this control;
- Access to the site will continue to be provided to the Department to evaluate the remedy, including access to evaluate the continued maintenance of this control;
- Use of the site is compliant with the deed restriction;
- The engineering control system is performing as designed and is effective;
- To the best of my knowledge and belief, the work and conclusions described in this certification are in accordance with the requirements of the site remedial program and generally accepted engineering practices; and
- The information presented in this report is accurate and complete.
- I certify that all information and statements in this certification form are true. I understand that a false statement made herein is punishable as a Class “A” misdemeanor, pursuant to Section 210.45 of the Penal Law. I, [name], of [business address], am certifying as [Owner or Owner’s Designated Site Representative] for the site.

The signed certification will be included in the Periodic Review Report described below.

5.3 PERIODIC REVIEW REPORT

A Periodic Review Report will be submitted to the Department every fifth year, beginning eighteen months after the Certificate of Completion or Satisfactory Completion Letter is issued. In the event that the site is subdivided into separate parcels with different ownership, a single Periodic Review Report will be prepared that addresses the site described in the deed restriction (Metes and Bounds). The report will be prepared in accordance with NYSDEC DER-10 and submitted within 45 days of the end of each certification period. Media sampling results will also incorporated into the Periodic Review Report. The report will include:

- Identification, assessment and certification of all ECs/ICs required by the remedy for the site;
- Results of the required annual site inspections and severe condition inspections, if applicable;
- All applicable inspection forms and other records generated for the site during the reporting period in electronic format;
- A summary of any discharge monitoring data and/or information generated during the reporting period with comments and conclusions;
- Data summary tables and graphical representations of contaminants of concern by media (groundwater, soil vapor), which include a listing of all compounds analyzed, along with the applicable standards, with all exceedances highlighted. These will include a presentation of past data as part of an evaluation of contaminant concentration trends;
- Results of all analyses, copies of all laboratory data sheets, and the required laboratory data deliverables for all samples collected during the reporting period will be submitted electronically in a NYSDEC-approved format;
- A site evaluation, which includes the following:

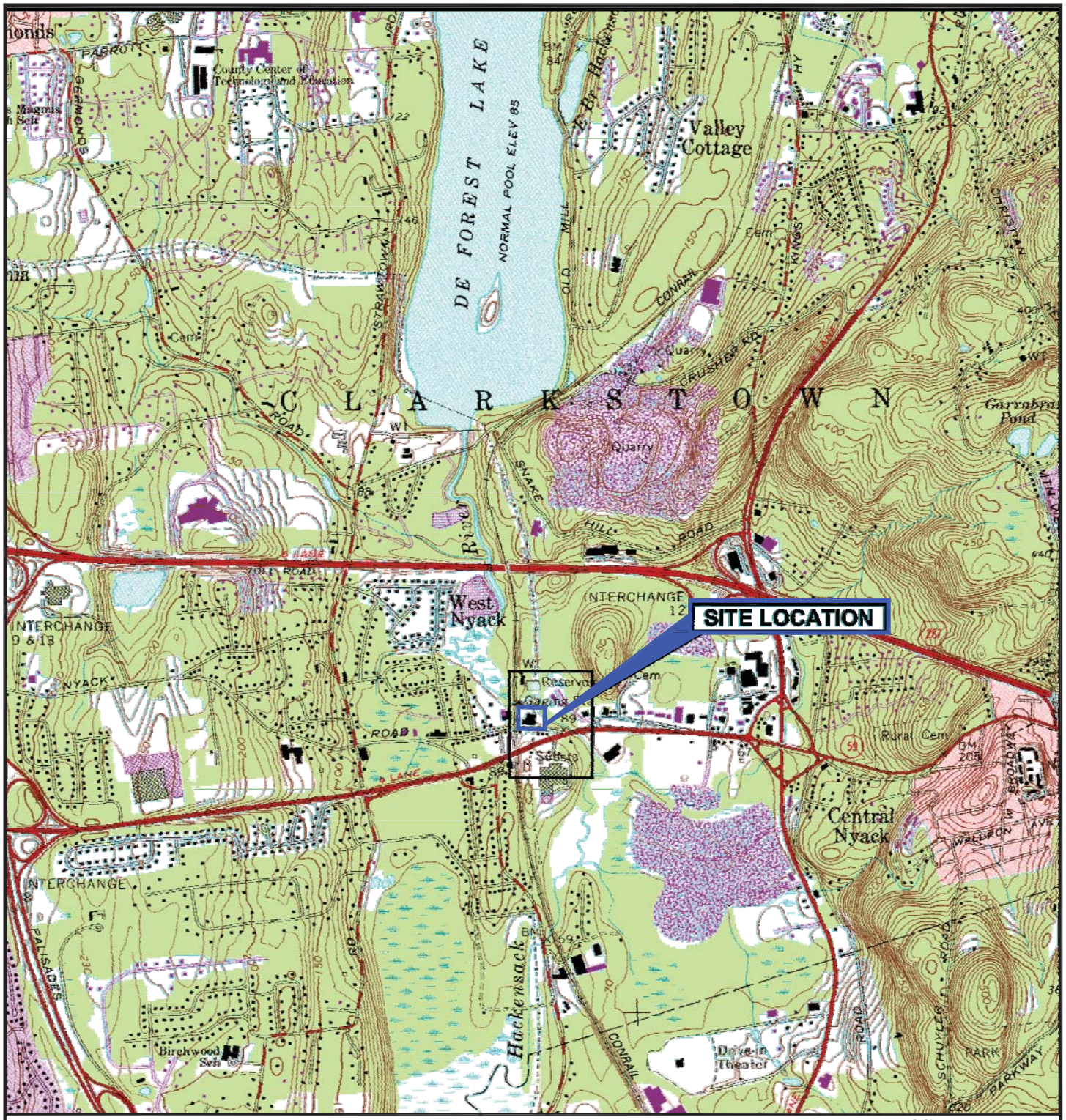
- The compliance of the remedy with the requirements of the site-specific RAWP, ROD or Decision Document;
- Any new conclusions or observations regarding site contamination based on inspections or data generated by the Monitoring Plan for the media being monitored;
- Recommendations regarding any necessary changes to the remedy and/or Monitoring Plan; and
- The overall performance and effectiveness of the remedy.

The Periodic Review Report will be submitted, in hard-copy format, to the NYSDEC Central Office and Regional Office in which the site is located, and in electronic format to NYSDEC Central Office, Regional Office and the NYSDOH Bureau of Environmental Exposure Investigation.

5.4 CORRECTIVE MEASURES PLAN

If any component of the remedy is found to have failed, or if the periodic certification cannot be provided due to the failure of an institutional or engineering control, a corrective measures plan will be submitted to the NYSDEC for approval. This plan will explain the failure and provide the details and schedule for performing work necessary to correct the failure. Unless an emergency condition exists, no ground-intrusive work will be performed pursuant to the corrective measures plan until it is approved by the NYSDEC.

FIGURES



SOURCE:
USGS 7.5' TOPOGRAPHIC QUADRANGLE FOR NYACK NY, NJ (1967 PHOTOREVISED 1979)

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ENVIRONMENT
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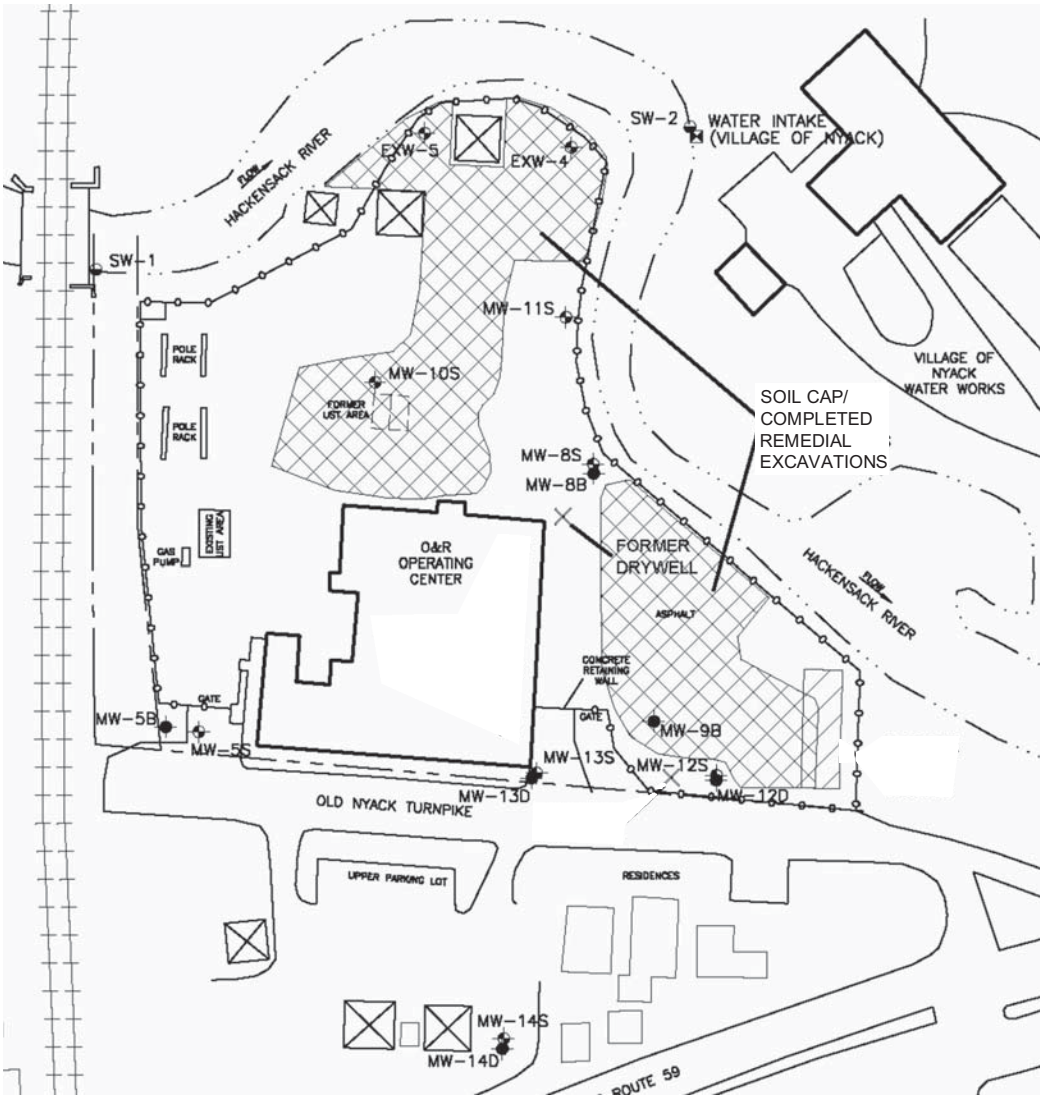
Suite 520
Piscataway, NJ 08854
Phone: 732.564.3600

ORANGE AND ROCKLAND UTILITIES
WEST NYACK OPERATING CENTER

SITE LOCATION MAP

PROJECT NO.	DRAWN BY:	DATE:	
60218324.100	/jk	11/29/2011	FIGURE 1



LEGEND

- EXISTING STRUCTURES
- TRANSMISSION TOWER
- FENCE/SITE BOUNDARY
- APPROXIMATE PROPERTY BOUNDARY
- RAILROAD TRACKS
- APPROXIMATE RIVER BANK
- MW-8S — MONITORING WELL SHALLOW (WATER TABLE)
- MW-14D — MONITORING WELL DEEP (OVERBURDEN OR WEATHERED BEDROCK)
- MW-24R — BEDROCK WELL
- SW-2 — SURFACE WATER SAMPLE LOCATION
- SOIL CAP/ COMPLETED REMEDIAL EXCAVATIONS

NOTES
1. THE SITE INCLUDES THE AREA NORTH OF OLD NYACK TURNPIKE TO THE HACKENSACK RIVER AND EAST TO THE RAILROAD.

2. THE REMAINDER OF THE AREA INSIDE OF THE FENCE LINE/SITE BOUNDARY THAT HAS NOT BEEN REMEDIATED WITH THE SOIL CAP IS PAVED.

SOURCE:
TRACED FROM AERIAL PHOTO

0 60 120 240
Scale in Feet

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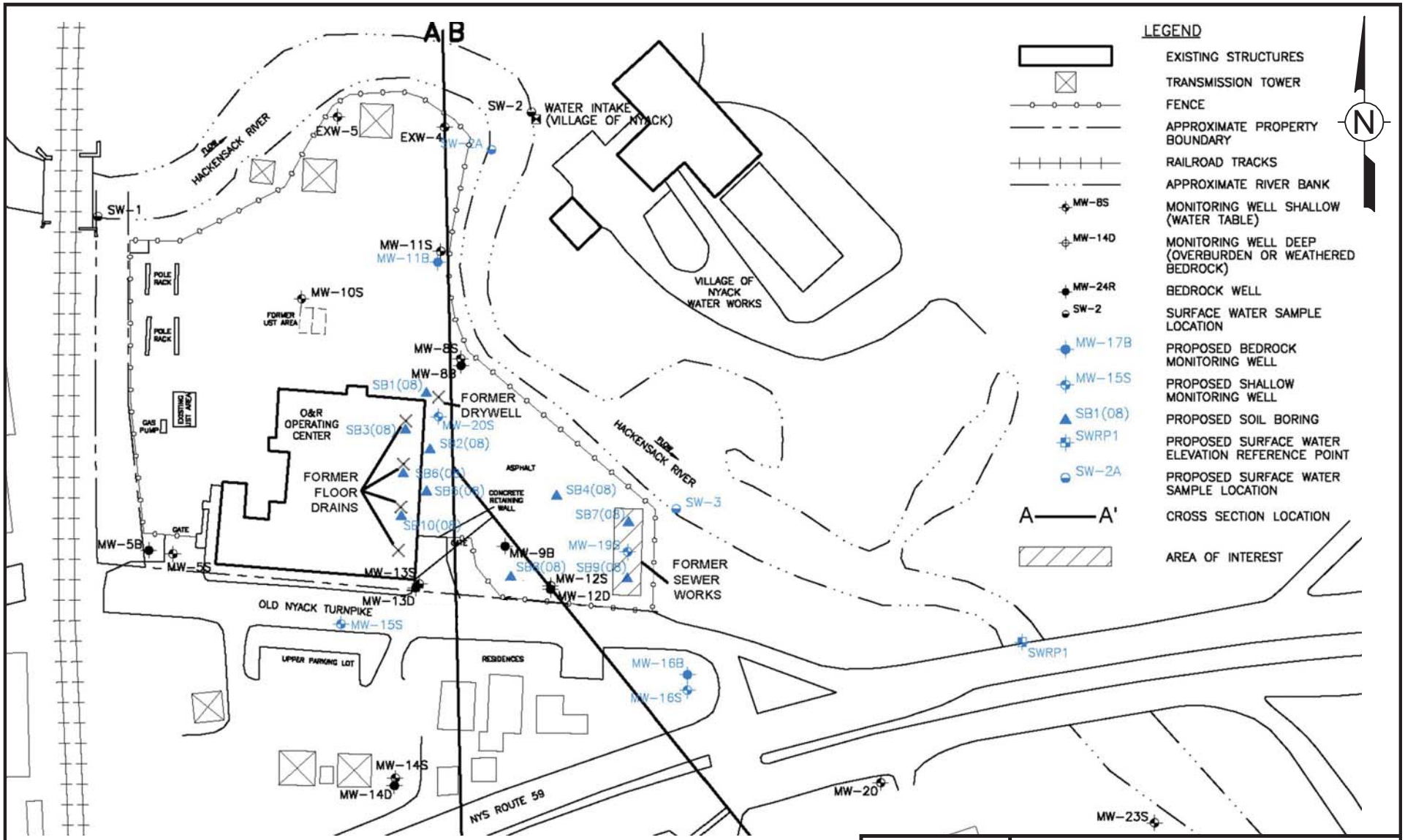
Orange and Rockland Utilities
West Nyack Operating Center

SITE LAYOUT

PROJECT NO.	DRAWN BY:	DATE:	
60218324.100	jk	02-15-2012	FIGURE 2



SOURCE:
TRACED FROM AERIAL PHOTO

NOTE:
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0 60 120 240
Scale in Feet

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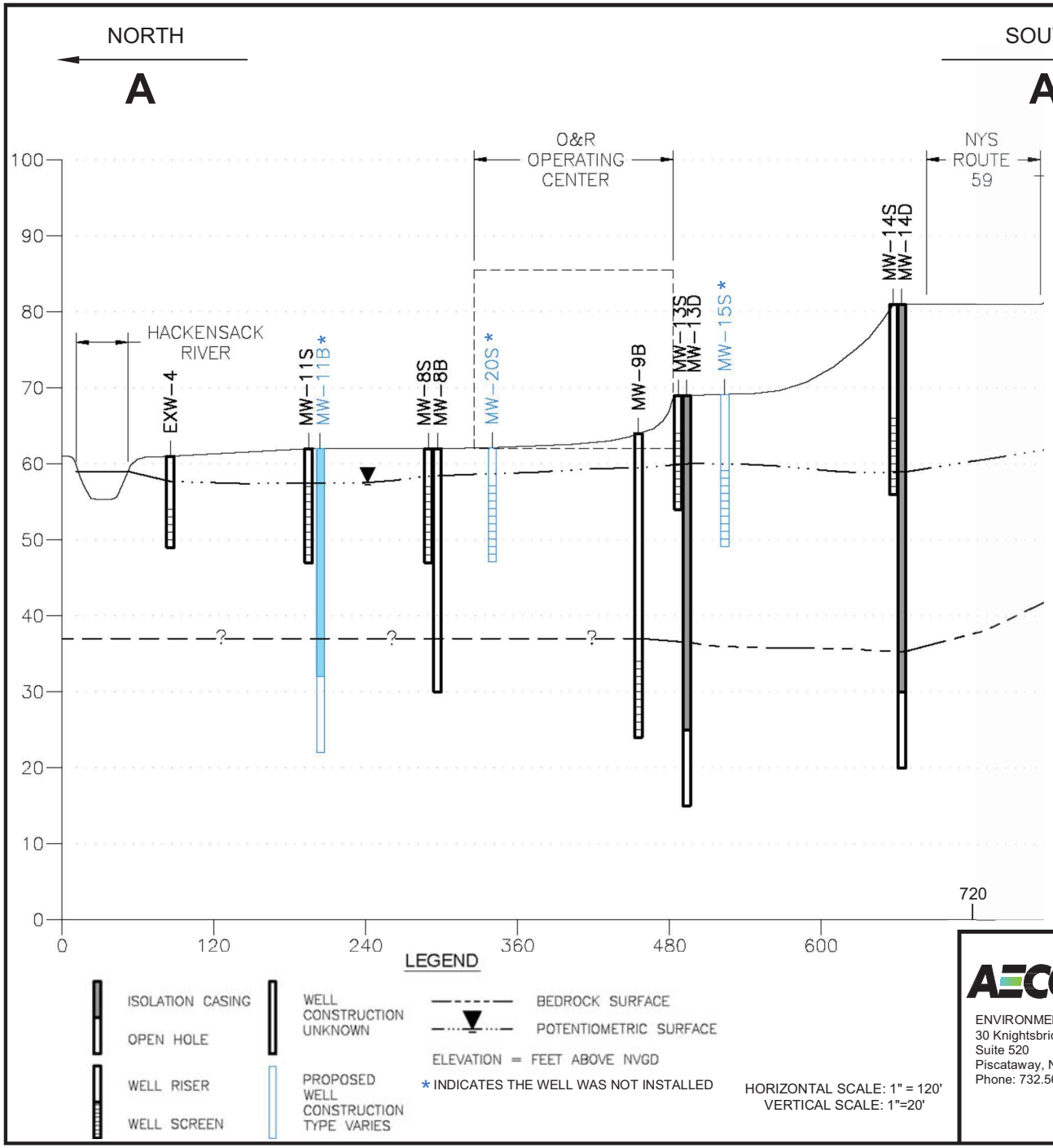
ORANGE AND ROCKLAND UTILITIES
WEST NYACK OPERATING CENTER

CROSS SECTION LOCATION MAP

PROJECT NO.	DRAWN BY:	DATE:	FIGURE: 3
60218324	/jk	07-13-2011	



NOTES:
1. THE WATER TABLE ELEVATION SHOWN IS APPROXIMATE. ELEVATIONS FROM O&R DATA ARE FROM DECEMBER 2006 SAMPLING EVENT.

2. BORING AND WELL LOCATIONS PROJECTED ONTO CROSS-SECTION LINES.

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ORANGE AND ROCKLAND UTILITIES
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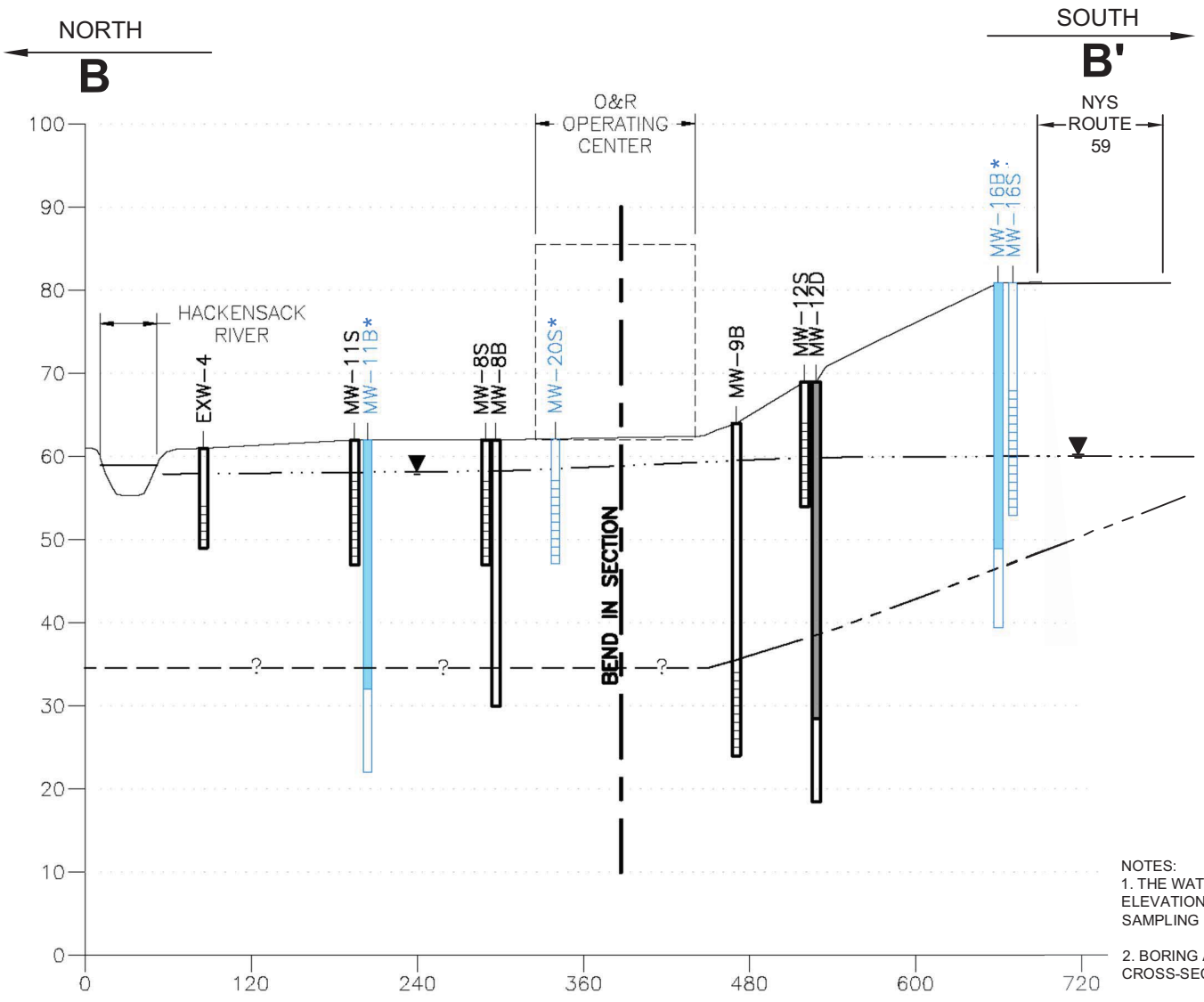
CROSS SECTION
A - A'

PROJECT NO.	DRAWN BY:	DATE:	FIGURE: 4
60218324	/jk	07-13-2011	



NOTES:
1. THE WATER TABLE ELEVATION SHOWN IS APPROXIMATE. ELEVATIONS FROM O&R DATA ARE FROM DECEMBER 2006 SAMPLING EVENT.

2. BORING AND WELL LOCATIONS PROJECTED ONTO CROSS-SECTION LINES.

LEGEND

ISOLATION CASING
OPEN HOLE
WELL RISER
WELL SCREEN
WELL CONSTRUCTION UNKNOWN
PROPOSED WELL CONSTRUCTION TYPE VARIES
BEDROCK SURFACE
POTENTIOMETRIC SURFACE
ELEVATION = FEET ABOVE NVGD

* INDICATES THE WELL WAS NOT INSTALLED

HORIZONTAL SCALE: 1" = 120'
VERTICAL SCALE: 1"=20'

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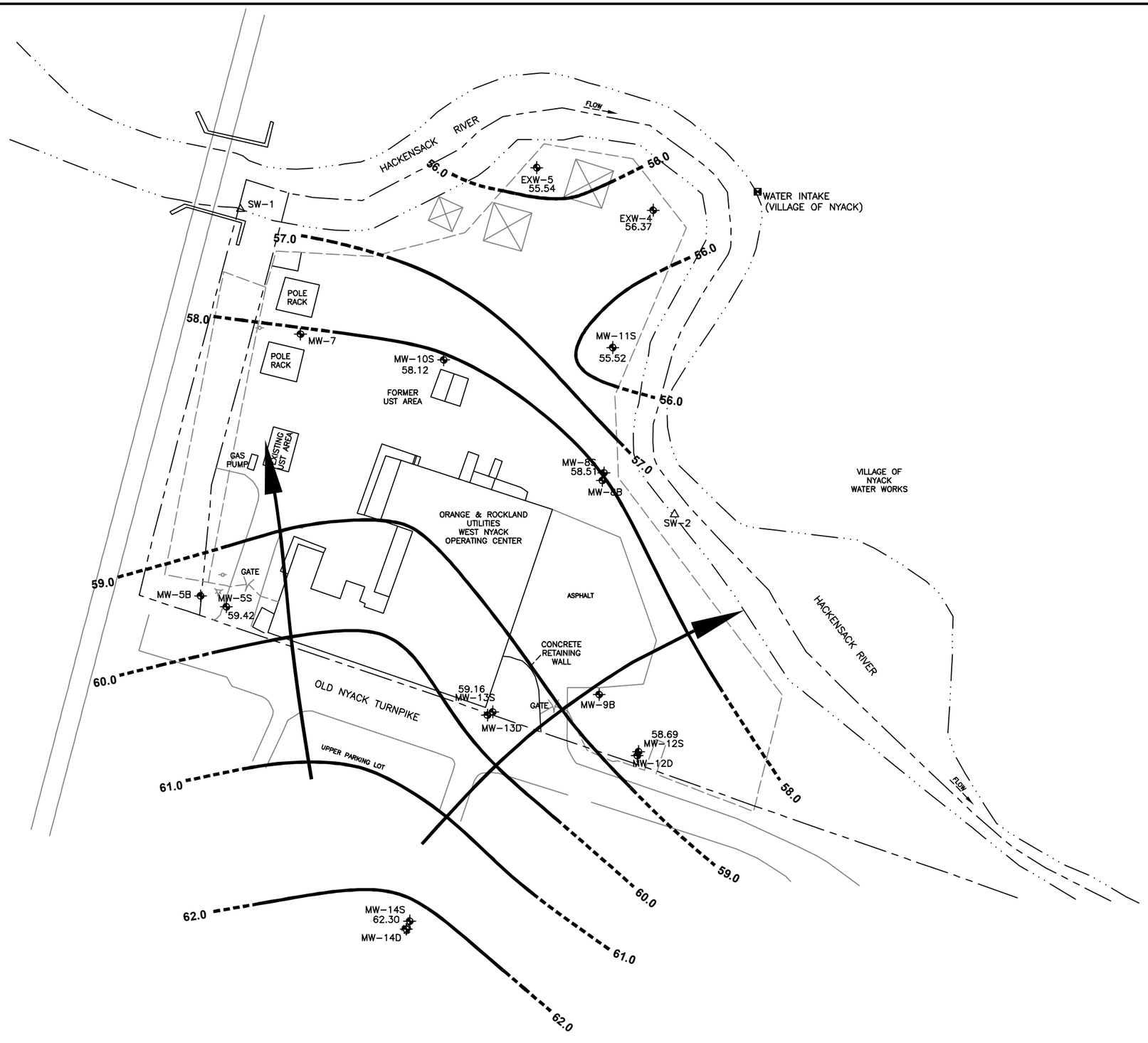
CROSS SECTION B-B'

PROJECT NO.	DRAWN BY:	DATE:	FIGURE: 5
60218324	/jk	07-13-2011	



LEGEND

- EXISTING STRUCTURES
- TRANSMISSION TOWER
- FENCE
- PROPERTY BOUNDARY
- RAILROAD TRACKS
- APPROXIMATE RIVER BANK
- MW-8S — SHALLOW OVERBURDEN WELL
- MW-14D — DEEP OVERBURDEN WELL
- MW-9B — BEDROCK WELL
- SW-2 — SURFACE WATER SAMPLE LOCATION
- 62.30 — ELEVATION (ft NAVD88)
- 62.0 — GROUNDWATER ELEVATION CONTOUR (ft. NAVD88) (DASHED WHERE INFERRED)
- CONTOUR INTERVAL: 1'
- INFERRED DIRECTION OF SHALLOW GROUNDWATER FLOW

0 40 80 160

Scale in Feet

MAP SOURCE TETRA TECH EC, INC.

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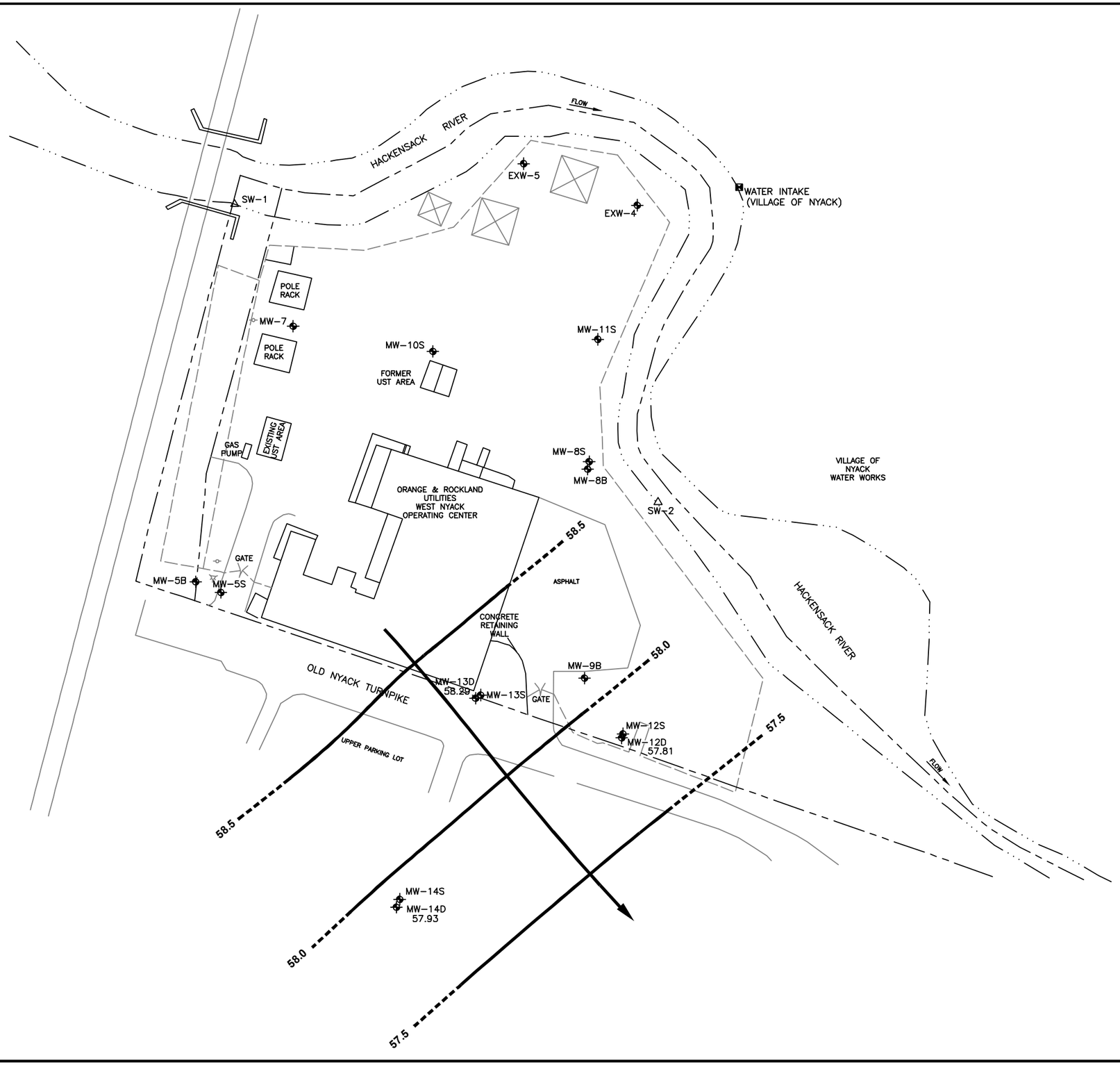
ORANGE & ROCKLAND UTILITIES
WEST NYACK OPERATING CENTER

SHALLOW GROUNDWATER FLOW FLOW DIRECTION MAP MARCH 28-29, 2012 WEST NYACK, NEW YORK

PROJECT NO.	DRAWN BY:	DATE:	
60250257.1201	jk	04/19/2012	FIGURE 6



LEGEND

- EXISTING STRUCTURES
- TRANSMISSION TOWER
- FENCE
- PROPERTY BOUNDARY
- RAILROAD TRACKS
- APPROXIMATE RIVER BANK
- MW-8S — SHALLOW OVERBURDEN WELL
- MW-14D — DEEP OVERBURDEN WELL
- MW-9B — BEDROCK WELL
- SW-2 — SURFACE WATER SAMPLE LOCATION
- 57.98 — ELEVATION (ft NAVD88)
- 58.00 — GROUNDWATER ELEVATION CONTOUR (ft. NAVD88) (DASHED WHERE INFERRED)
- CONTOUR INTERVAL: 0.5'
- INFERRED DIRECTION OF SHALLOW GROUNDWATER FLOW

0 40 80 160

Scale in Feet

MAP SOURCE TETRA TECH EC, INC.

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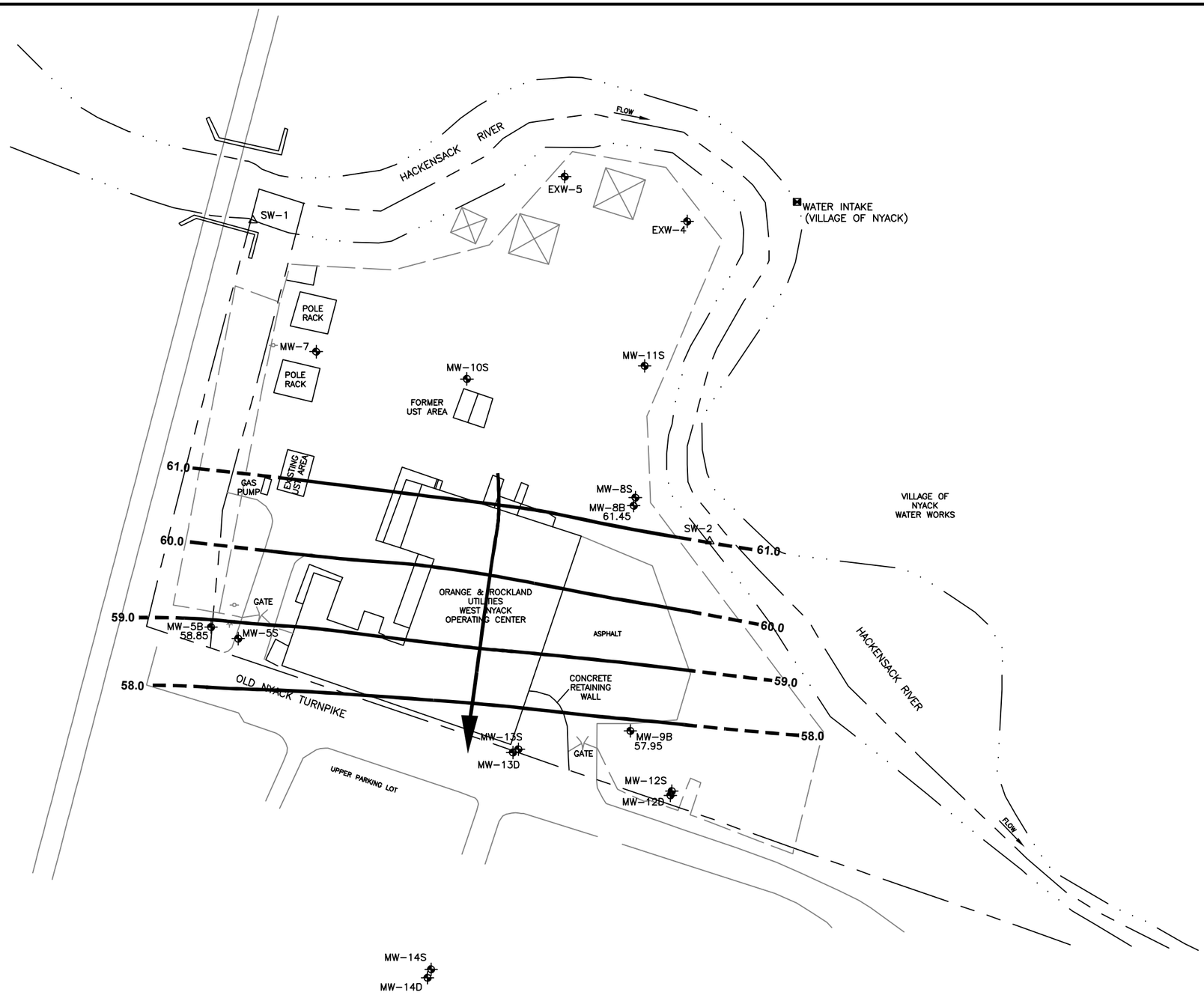
ORANGE & ROCKLAND UTILITIES
WEST NYACK OPERATING CENTER

DEEP GROUNDWATER FLOW FLOW DIRECTION MAP MARCH 28-29, 2012 WEST NYACK, NEW YORK

PROJECT NO.	DRAWN BY:	DATE:	
60250257.1201	jk	04/19/2012	FIGURE 7



LEGEND

- EXISTING STRUCTURES
- TRANSMISSION TOWER
- FENCE
- PROPERTY BOUNDARY
- RAILROAD TRACKS
- APPROXIMATE RIVER BANK
- MW-8S — SHALLOW OVERBURDEN WELL
- MW-14D — DEEP OVERBURDEN WELL
- MW-9B — BEDROCK WELL
- SW-2 — SURFACE WATER SAMPLE LOCATION
- 58.85 — ELEVATION (ft NAVD88)
- 58.0 — GROUNDWATER ELEVATION CONTOUR (ft. NAVD88) (DASHED WHERE INFERRED)
- CONTOUR INTERVAL: 1'
- INFERRED DIRECTION OF SHALLOW GROUNDWATER FLOW

0 40 80 160

Scale in Feet

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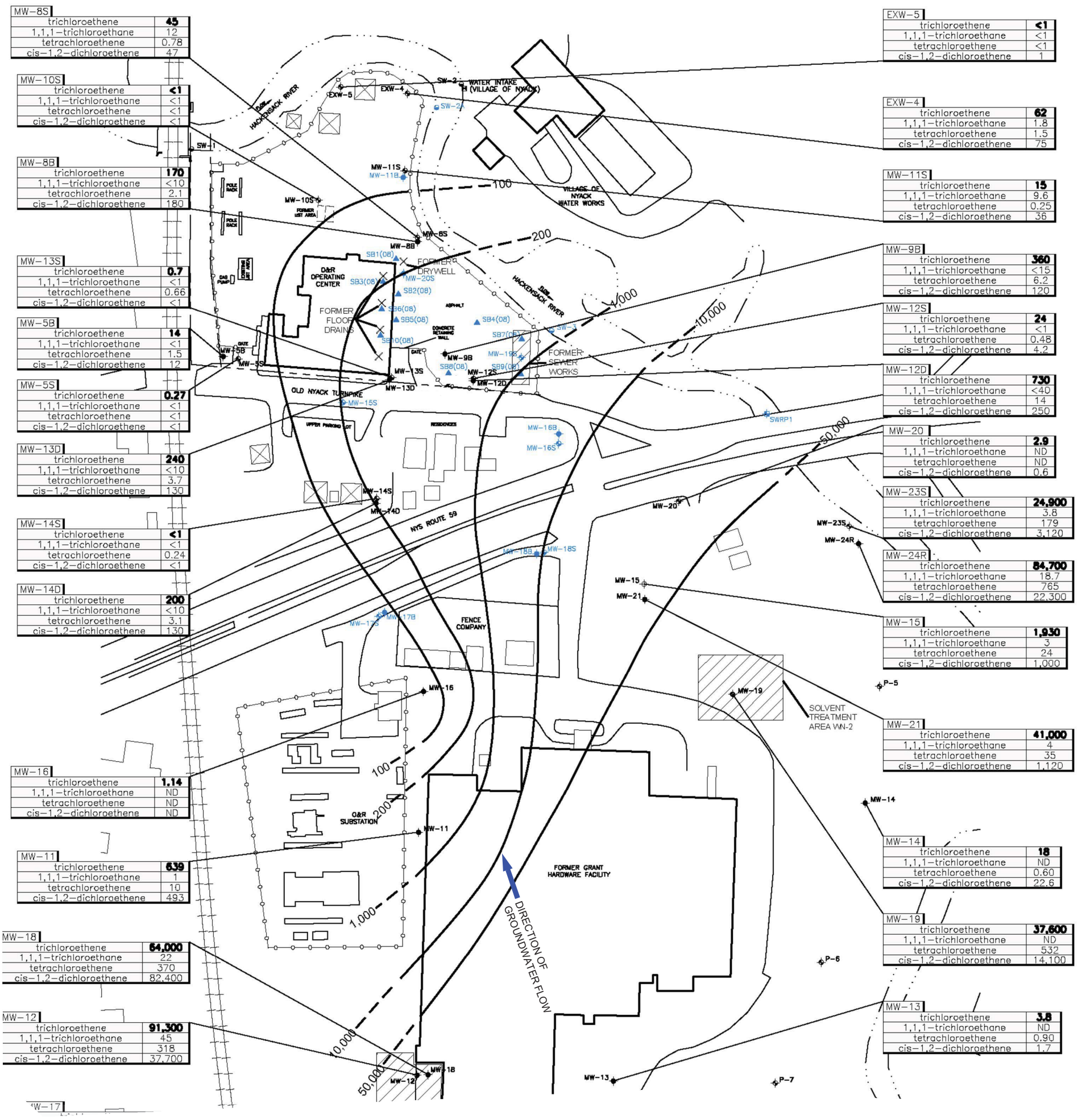
ORANGE & ROCKLAND UTILITIES
WEST NYACK OPERATING CENTER

BEDROCK GROUNDWATER FLOW FLOW DIRECTION MAP MARCH 28-29, 2012 WEST NYACK, NEW YORK

PROJECT NO.	DRAWN BY:	DATE:	
60250257.1201	jk	04/20/2012	FIGURE 8



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2. O & R DATA FROM DECEMBER 2006.

3. GRANT HARDWARE DATA FROM APRIL 2006.

4. RESULTS SHOWN **BOLD** EXCEED NYSGWQS

5. ALL RESULTS SHOWN ARE IN ug/L

MAP SOURCE TETRA TECH EC, INC.

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ORANGE AND ROCKLAND UTILITIES
WEST NYACK OPERATING CENTER

TRICHLOROETHENE (TCE) IMPACTS FROM GRANT HARDWARE SITE

PROJECT NO.	DRAWN BY:	DATE:	FIGURE: 9
60218324	/jk	07/13/2011	

MW-8S	
trichloroethene	45
1,1,1-trichloroethane	12
tetrachloroethene	**0.78**
cis-1,2-dichloroethene	47

MW-10S	
trichloroethene	<1
1,1,1-trichloroethane	<1
tetrachloroethene	**<1**
cis-1,2-dichloroethene	<1

MW-8B	
trichloroethene	170
1,1,1-trichloroethane	<10
tetrachloroethene	**2.1**
cis-1,2-dichloroethene	180

MW-13S	
trichloroethene	0.7
1,1,1-trichloroethane	<1
tetrachloroethene	**0.66**
cis-1,2-dichloroethene	<1

MW-5B	
trichloroethene	14
1,1,1-trichloroethane	<1
tetrachloroethene	**1.5**
cis-1,2-dichloroethene	12

MW-5S	
trichloroethene	0.27
1,1,1-trichloroethane	<1
tetrachloroethene	**<1**
cis-1,2-dichloroethene	<1

MW-13D	
trichloroethene	240
1,1,1-trichloroethane	<10
tetrachloroethene	**3.7**
cis-1,2-dichloroethene	130

MW-14S	
trichloroethene	<1
1,1,1-trichloroethane	<1
tetrachloroethene	**0.24**
cis-1,2-dichloroethene	<1

MW-14D	
trichloroethene	200
1,1,1-trichloroethane	<10
tetrachloroethene	**3.1**
cis-1,2-dichloroethene	130

MW-16	
trichloroethene	1.14
1,1,1-trichloroethane	ND
tetrachloroethene	**ND**
cis-1,2-dichloroethene	ND

MW-11	
trichloroethene	639
1,1,1-trichloroethane	1
tetrachloroethene	**10**
cis-1,2-dichloroethene	493

MW-18	
trichloroethene	64,000
1,1,1-trichloroethane	22
tetrachloroethene	**370**
cis-1,2-dichloroethene	82,400

MW-12	
trichloroethene	91,300
1,1,1-trichloroethane	45
tetrachloroethene	**318**
cis-1,2-dichloroethene	37,700

MW-17	
trichloroethene	25
1,1,1-trichloroethane	ND
tetrachloroethene	**ND**
cis-1,2-dichloroethene	51

MW-22	
trichloroethene	18
1,1,1-trichloroethane	0.80
tetrachloroethene	**ND**
cis-1,2-dichloroethene	9

EXW-5	
trichloroethene	<1
1,1,1-trichloroethane	<1
tetrachloroethene	**<1**
cis-1,2-dichloroethene	1

EXW-4	
trichloroethene	62
1,1,1-trichloroethane	1.8
tetrachloroethene	**1.5**
cis-1,2-dichloroethene	75

MW-11S	
trichloroethene	15
1,1,1-trichloroethane	9.6
tetrachloroethene	**0.25**
cis-1,2-dichloroethene	36

MW-9B	
trichloroethene	360
1,1,1-trichloroethane	<15
tetrachloroethene	**6.2**
cis-1,2-dichloroethene	120

MW-12S	
trichloroethene	24
1,1,1-trichloroethane	<1
tetrachloroethene	**0.48**
cis-1,2-dichloroethene	4.2

MW-12D	
trichloroethene	730
1,1,1-trichloroethane	<40
tetrachloroethene	**14**
cis-1,2-dichloroethene	250

MW-20	
trichloroethene	2.9
1,1,1-trichloroethane	ND
tetrachloroethene	**ND**
cis-1,2-dichloroethene	0.6

MW-23S	
trichloroethene	24,900
1,1,1-trichloroethane	3.8
tetrachloroethene	**179**
cis-1,2-dichloroethene	3,120

MW-24R	
trichloroethene	84,700
1,1,1-trichloroethane	18.7
tetrachloroethene	**765**
cis-1,2-dichloroethene	22,300

MW-15	
trichloroethene	1,930
1,1,1-trichloroethane	3
tetrachloroethene	**24**
cis-1,2-dichloroethene	1,000

MW-21	
trichloroethene	41,000
1,1,1-trichloroethane	4
tetrachloroethene	**35**
cis-1,2-dichloroethene	1,120

MW-14	
trichloroethene	18
1,1,1-trichloroethane	ND
tetrachloroethene	**0.60**
cis-1,2-dichloroethene	22.6

MW-19	
trichloroethene	37,600
1,1,1-trichloroethane	ND
tetrachloroethene	**532**
cis-1,2-dichloroethene	14,100

MW-13	
trichloroethene	3.8
1,1,1-trichloroethane	ND
tetrachloroethene	**0.90**
cis-1,2-dichloroethene	1.7

MW-8R	
trichloroethene	ND
1,1,1-trichloroethane	ND
tetrachloroethene	**4.35**
cis-1,2-dichloroethene	1.11

LEGEND

- EXISTING STRUCTURES
- TRANSMISSION TOWER
- FENCE
- APPROXIMATE PROPERTY BOUNDARY
- RAILROAD TRACKS
- APPROXIMATE RIVER BANK
- 100 — PCE CONCENTRATION (DASHED WHERE INFERRED)
- MW-8S — MONITORING WELL SHALLOW (WATER TABLE)
- MW-14D — MONITORING WELL DEEP (OVERBURDEN OR WEATHERED BEDROCK)
- MW-24R — BEDROCK WELL
- SW-2 — SURFACE WATER SAMPLE LOCATION
- MW-17B — PROPOSED BEDROCK MONITORING WELL
- MW-15S — PROPOSED SHALLOW MONITORING WELL
- SB1(08) — PROPOSED SOIL BORING
- SWRP1 — PROPOSED SURFACE WATER ELEVATION REFERENCE POINT
- SW-2A — PROPOSED SURFACE WATER SAMPLE LOCATION

0 75 150 300

Scale in Feet

NOTES:
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3. GRANT HARDWARE DATA FROM APRIL 2006.

4. RESULTS SHOWN **BOLD** EXCEED NYSGWQS

5. ALL RESULTS SHOWN ARE IN ug/L

MAP SOURCE TETRA TECH EC, INC.

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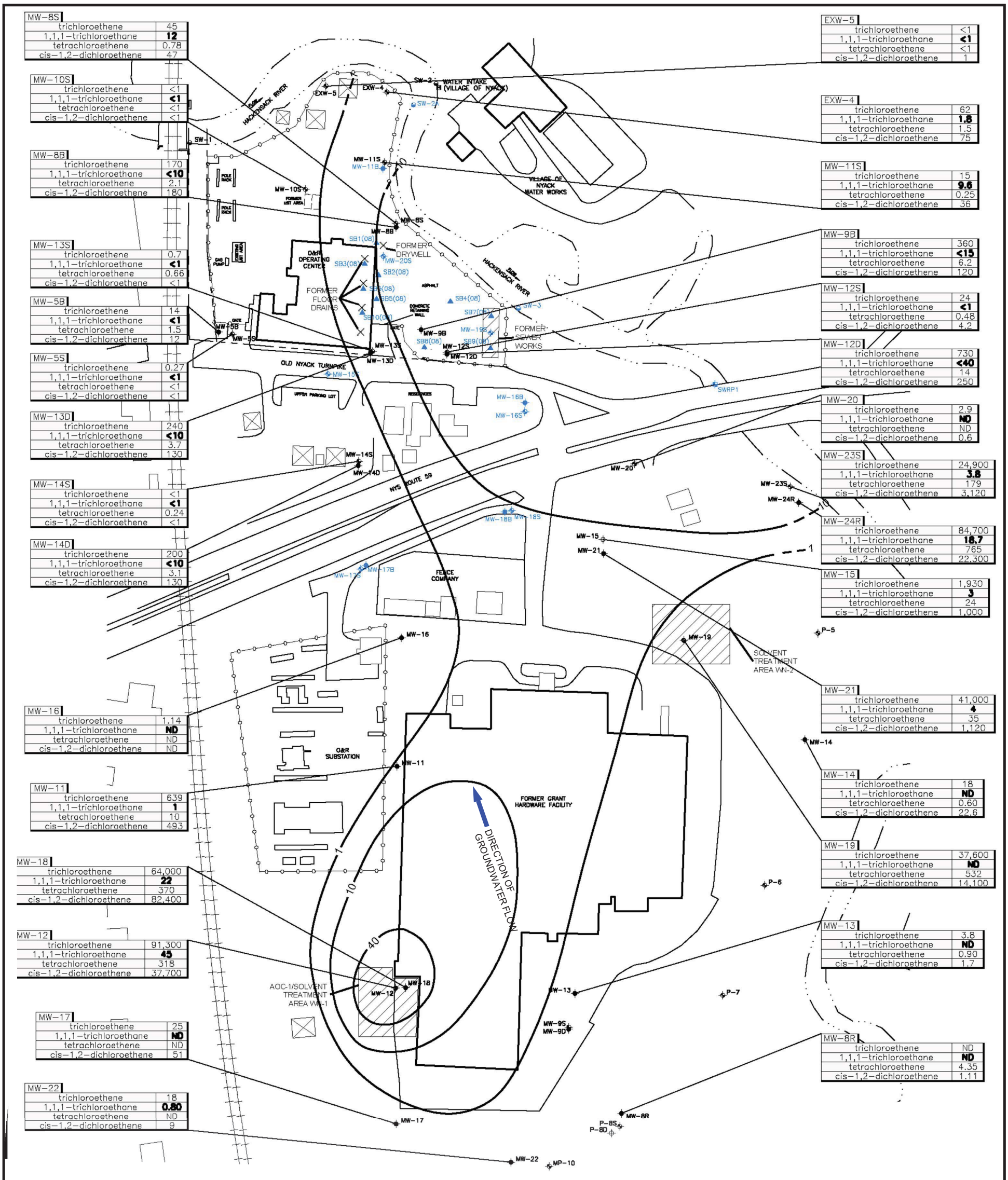
ORANGE AND ROCKLAND UTILITIES
WEST NYACK OPERATING CENTER

TETRACHLOROETHENE (PCE) IMPACTS FROM GRANT HARDWARE SITE

PROJECT NO.	DRAWN BY:	DATE:	
60218324	/jk	07/13/2011	**FIGURE: 10**



MW-8S	
trichloroethene	45
1,1,1-trichloroethane	12
tetrachloroethene	0.78
cis-1,2-dichloroethene	**47**

MW-10S	
trichloroethene	<1
1,1,1-trichloroethane	<1
tetrachloroethene	<1
cis-1,2-dichloroethene	**<1**

MW-8B	
trichloroethene	170
1,1,1-trichloroethane	<10
tetrachloroethene	2.1
cis-1,2-dichloroethene	**180**

MW-13S	
trichloroethene	0.7
1,1,1-trichloroethane	<1
tetrachloroethene	0.66
cis-1,2-dichloroethene	**<1**

MW-5B	
trichloroethene	14
1,1,1-trichloroethane	<1
tetrachloroethene	1.5
cis-1,2-dichloroethene	**12**

MW-5S	
trichloroethene	0.27
1,1,1-trichloroethane	<1
tetrachloroethene	<1
cis-1,2-dichloroethene	**<1**

MW-13D	
trichloroethene	240
1,1,1-trichloroethane	<10
tetrachloroethene	3.7
cis-1,2-dichloroethene	**130**

MW-14S	
trichloroethene	<1
1,1,1-trichloroethane	<1
tetrachloroethene	0.24
cis-1,2-dichloroethene	**<1**

MW-14D	
trichloroethene	200
1,1,1-trichloroethane	<10
tetrachloroethene	3.1
cis-1,2-dichloroethene	**130**

MW-16	
trichloroethene	1.14
1,1,1-trichloroethane	ND
tetrachloroethene	ND
cis-1,2-dichloroethene	**ND**

MW-11	
trichloroethene	639
1,1,1-trichloroethane	1
tetrachloroethene	10
cis-1,2-dichloroethene	**493**

MW-18	
trichloroethene	64,000
1,1,1-trichloroethane	22
tetrachloroethene	370
cis-1,2-dichloroethene	**82,400**

MW-12	
trichloroethene	91,300
1,1,1-trichloroethane	45
tetrachloroethene	318
cis-1,2-dichloroethene	**37,700**

MW-17	
trichloroethene	25
1,1,1-trichloroethane	ND
tetrachloroethene	ND
cis-1,2-dichloroethene	**51**

MW-22	
trichloroethene	18
1,1,1-trichloroethane	0.80
tetrachloroethene	ND
cis-1,2-dichloroethene	**9**

EXW-5	
trichloroethene	<1
1,1,1-trichloroethane	<1
tetrachloroethene	<1
cis-1,2-dichloroethene	**1**

EXW-4	
trichloroethene	62
1,1,1-trichloroethane	1.8
tetrachloroethene	1.5
cis-1,2-dichloroethene	**75**

MW-11S	
trichloroethene	15
1,1,1-trichloroethane	9.6
tetrachloroethene	0.25
cis-1,2-dichloroethene	**36**

MW-9B	
trichloroethene	360
1,1,1-trichloroethane	<15
tetrachloroethene	6.2
cis-1,2-dichloroethene	**120**

MW-12S	
trichloroethene	24
1,1,1-trichloroethane	<1
tetrachloroethene	0.48
cis-1,2-dichloroethene	**4.2**

MW-12D	
trichloroethene	730
1,1,1-trichloroethane	<40
tetrachloroethene	14
cis-1,2-dichloroethene	**250**

MW-20	
trichloroethene	2.9
1,1,1-trichloroethane	ND
tetrachloroethene	ND
cis-1,2-dichloroethene	**0.6**

MW-23S	
trichloroethene	24,900
1,1,1-trichloroethane	3.8
tetrachloroethene	179
cis-1,2-dichloroethene	**3,120**

MW-24R	
trichloroethene	84,700
1,1,1-trichloroethane	18.7
tetrachloroethene	765
cis-1,2-dichloroethene	**22,300**

MW-15	
trichloroethene	1,930
1,1,1-trichloroethane	3
tetrachloroethene	24
cis-1,2-dichloroethene	**1,000**

MW-21	
trichloroethene	41,000
1,1,1-trichloroethane	4
tetrachloroethene	35
cis-1,2-dichloroethene	**1,120**

MW-14	
trichloroethene	18
1,1,1-trichloroethane	ND
tetrachloroethene	0.60
cis-1,2-dichloroethene	**22.6**

MW-19	
trichloroethene	37,600
1,1,1-trichloroethane	ND
tetrachloroethene	532
cis-1,2-dichloroethene	**14,100**

MW-13	
trichloroethene	3.8
1,1,1-trichloroethane	ND
tetrachloroethene	0.90
cis-1,2-dichloroethene	**1.7**

MW-8R	
trichloroethene	ND
1,1,1-trichloroethane	ND
tetrachloroethene	4.35
cis-1,2-dichloroethene	**1.11**

HACKENSACK RIVER
SW-1
SW-2 WATER INTAKE (VILLAGE OF NYACK)
SW-2A
SW-3
EXW-5
EXW-4
MW-10S
MW-11S
MW-11B
VILLAGE OF NYACK WATER WORKS
MW-8S
MW-8B
SB1(08)
SB2(08)
SB3(08)
SB4(08)
SB5(08)
SB6(08)
SB7(08)
SB8(08)
SB9(08)
SB10(08)
FORMER DRYWELL
MW-20S
D&R OPERATING CENTER
FORMER FLOOR DRAINS
ASPHALT
CONCRETE RETAINING WALL
GATE
MW-5B
MW-5S
MW-9B
MW-19S
MW-13S
MW-12S
MW-12D
MW-13D
FORMER SEWER WORKS
OLD NYACK TURNPIKE
MW-15S
UPPER PARKING LOT
RESIDENCES
MW-16B
MW-16S
SWRP1
MW-14S
MW-14D
NYS ROUTE 59
MW-18S
MW-18B
MW-17S
MW-17B
FENCE COMPANY
MW-20
MW-23S
MW-24R
MW-15
MW-21
MW-19
SOLVENT TREATMENT AREA WN-2
P-5
P-6
P-7
P-8S
P-8D
MW-16
MW-14
O&R SUBSTATION
MW-11
FORMER GRANT HARDWARE FACILITY
DIRECTION OF GROUNDWATER FLOW
AOC-1/SOLVENT TREATMENT AREA WN-1
MW-18
MW-12
MW-13
MW-9S
MW-9D
MW-17
MW-22
MP-10
100
1,000
10,000
20,000
90,000

LEGEND

- EXISTING STRUCTURES
- TRANSMISSION TOWER
- FENCE
- APPROXIMATE PROPERTY BOUNDARY
- RAILROAD TRACKS
- APPROXIMATE RIVER BANK
- 100 — DCE CONCENTRATION (DASHED WHERE INFERRED)
- MW-8S — MONITORING WELL SHALLOW (WATER TABLE)
- MW-14D — MONITORING WELL DEEP (OVERBURDEN OR WEATHERED BEDROCK)
- MW-24R — BEDROCK WELL
- SW-2 — SURFACE WATER SAMPLE LOCATION
- MW-17B — PROPOSED BEDROCK MONITORING WELL
- MW-15S — PROPOSED SHALLOW MONITORING WELL
- SB1(08) — PROPOSED SOIL BORING
- SWRP1 — PROPOSED SURFACE WATER ELEVATION REFERENCE POINT
- SW-2A — PROPOSED SURFACE WATER SAMPLE LOCATION

0 75 150 300

Scale in Feet

NOTES:
1. THIS PLAN IS COMPLETED FROM AVAILABLE EXISTING INFORMATION AND IS FOR CONCEPTUAL PLANNING ONLY. THE DATA SHOWN IS NOT TO BE CONSTRUED AS HAVING BEEN OBTAINED AS THE RESULT OF A PROFESSIONAL SURVEY, AND IS SUBJECT TO SUCH CHANGE AS AN ACCURATE FIELD SURVEY MAY DISCLOSE.
2. O & R DATA FROM DECEMBER 2006.
3. GRANT HARDWARE DATA FROM APRIL 2006.
4. ALL RESULTS SHOWN ARE IN ug/L
5. ND=NOT DETECTED

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ORANGE AND ROCKLAND UTILITIES
WEST NYACK OPERATING CENTER

CIS-1,2-DICHLOROETHENE (CIS-1,2-DCE) IMPACTS FROM GRANT HARDWARE SITE

PROJECT NO.	DRAWN BY:	DATE:	
60218324	/jk	07/13/2011	**FIGURE: 12**

APPENDICES

INCLUDED AS SEPARATE FILES:

APPENDIX A – EXCAVATION WORK PLAN

APPENDIX B – REPORT.HW344014.1996-07-01.RIR

- INCLUDED AS 4 PDFS

APPENDIX C – REPORT.HW344014.1998-06-01.CERTIFICATIONREPORT

APPENDIX D – O&R EHASP TEMPLATE

APPENDIX E – SVI WORKPLAN AND HASPS

APPENDIX F – WNOC SPCC PLAN

APPENDIX G – GRANT HARDWARE FACILITY ROD

APPENDIX H – NYSDEC SVI LETTER 24MAY2012