FINAL

WORK PLAN FOR FY16 FUDS NY/NJ

FUDS Locations

New York and New Jersey

JANUARY 2017

Prepared for:

U.S. Army Corps of Engineers

New England District

Concord, Massachusetts

Prepared by:

Renova Environmental Services, LLC

Contract No.: W912WJ-16-C-0024

RENOVA environmental services

NOTICE

The United States Department of Defense, Department of Army, funded wholly or in part the preparation of this document and work described herein under Contract No. W912WJ-16-C-0024. Mention of trade names or commercial products does not constitute endorsement or recommendation for use.

Work Plan for

Aboveground and Underground Storage Tank and Transformer Removals, Geophysical Investigations, Building Demolition, Hydraulic Systems, Fall Hazard Mitigation, and Debris Removal in the States of New York and New Jersey Formerly Used Defense Sites (FUDS)

A.K.A. "FY16 FUDS NY/NJ"

FINAL

FUDS Locations
New York and New Jersey

January 2017

CERTIFICATION:

I hereby certify that the enclosed Report, shown and marked in this submittal, is that proposed to be incorporated with Contract Number W912WJ-16-C-0024. This Document has been prepared in accordance with USACE Scope of Work and is hereby submitted for Government Approval.

Reviewed by:

01/10/2017

Renova Project Manager — Date

01/09/2017

Renova Quality Assurance Manager — Date

Received by:

GRANT.SUSANNE.A.1229284270

Digitally signed by GRANT.SUSANNE.A.1229284270
DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USA, cn=GRANT.SUSANNE.A.1229284270
Date: 2017.01.11 09:33:05 -05'00'

01/11/2017

USACE Project Manager — Date

TABLE OF CONTENTS

FIGURES

TABLES

APPENDICES

ACRONYMS

48 FR 44716	48 Federal Regulation 44716: Secretary of the Interior's Professional Qualification Standards (Sept. 1988)
ACM	Asbestos Containing Materials
ACUA	Atlantic County Utilities Authority
AFB	Air Force Base
AHA	Activity Hazard Analysis
APP	Accident Prevention Plan
AST	Aboveground Storage Tank
bgs	below grade surface
C&D	Construction and Demolition
CENAE	United States Army Corps of Engineers New England District
CERCLA	Comprehensive Environmental Response, Compensation, and Liabilities Act
CFSWMA	County of Franklin Solid Waste Management Authority
CIH	Certified Industrial Hygienist
CO	Carbon Monoxide
COR	Contracting Officer's Representative
CQCP	Contractor Quality Control Plan
CSE	Confined Space Entry
DERP	Department of Defense Environmental Restoration Program
DIGWSSL	Default Impact to Groundwater Soil Screening Level
DoD	United States Department of Defense
DQO	Data Quality Objectives
ELAP	Environmental Laboratory Accreditation Program
EPA	United States Environmental Protection Agency
EPH	Extractable Petroleum Hydrocarbon
EPI	Environmental Probing Investigations of Cream Ridge, NJ
EPP	Environmental Protection Plan
FUDS	Formerly Used Defense Sites
GPR	Ground Penetrating Radar
GWQC	Groundwater Quality Criteria
H_2S	Hydrogen Sulfide
HABS/HAER	Historic American Building Survey / Historic American Engineering Record
LCC	Launch Control Center
LEL	Lower Explosive Limit

LSRP	Licensed Site Remediation Professional
NIST	National Institute of Standards and Technology
NJDEP	New Jersey Department of Environmental Protection
NOB	Non-Friable Organically Bound
NPL	National Priority List
NRDCSRS	Non-Residential Direct Contact Soil Remediation Standard
NYDOH	New York State Department of Health
NYSDEC	New York State Department of Environmental Conservation
PAH	Polycyclic Aromatic Hydrocarbons
PCB	Polychlorinated Biphenyls
PID	Photoionization Detector
PM	Project Manager
POC	Point of Contact
PPE	Personal Protective Equipment
ppm	parts per million
PQL	Practical Quantitation Level
QA/QC	Quality Assurance / Quality Control
QAPP	Quality Assurance Project Plan
RDCSRS	Residential Direct Contact Soil Remediation Standard
SCO	Soil Cleanup Objective
SIM	Selective Ion Monitoring
SMS	Strategic Missile Squadron
SOF	Summary of Findings
SOW	Scope of Work
SRRA	Site Remediation Reform Act
SVOC	Semi-Volatile Organic Compound
TAL	Target Analyte List
TCL	Target Compound List
TCLP	Toxicity Characteristic Leaching Procedure
TEM	Transmission Electron Microscopy
TIC	Tentatively Identified Compound
TOGS 1.1.1	Division of Water Technical and Operational Guidance Series 1.1.1
TPH	Total Petroleum Hydrocarbons
TWIC	Transportation Worker Identification Credential
UFP	Uniform Federal Policy

USACE	United States Army Corps of Engineers
USCG	United States Coast Guard
UST	Underground Storage Tank
VOC	Volatile Organic Compound
VPH	Volatile Petroleum Hydrocarbon

1.0 INTRODUCTION

Pursuant to the Contract #W912WJ-16-C-0024, Renova Environmental Services, LLC (Renova), on behalf of the US Army Corps of Engineers (USACE) New England District (CENAE) has prepared this Work Plan to facilitate project activities at Formerly Used Defense Sites (FUDS) across New York and New Jersey, under the United States Department of Defense (DoD) Environmental Restoration Program (DERP).

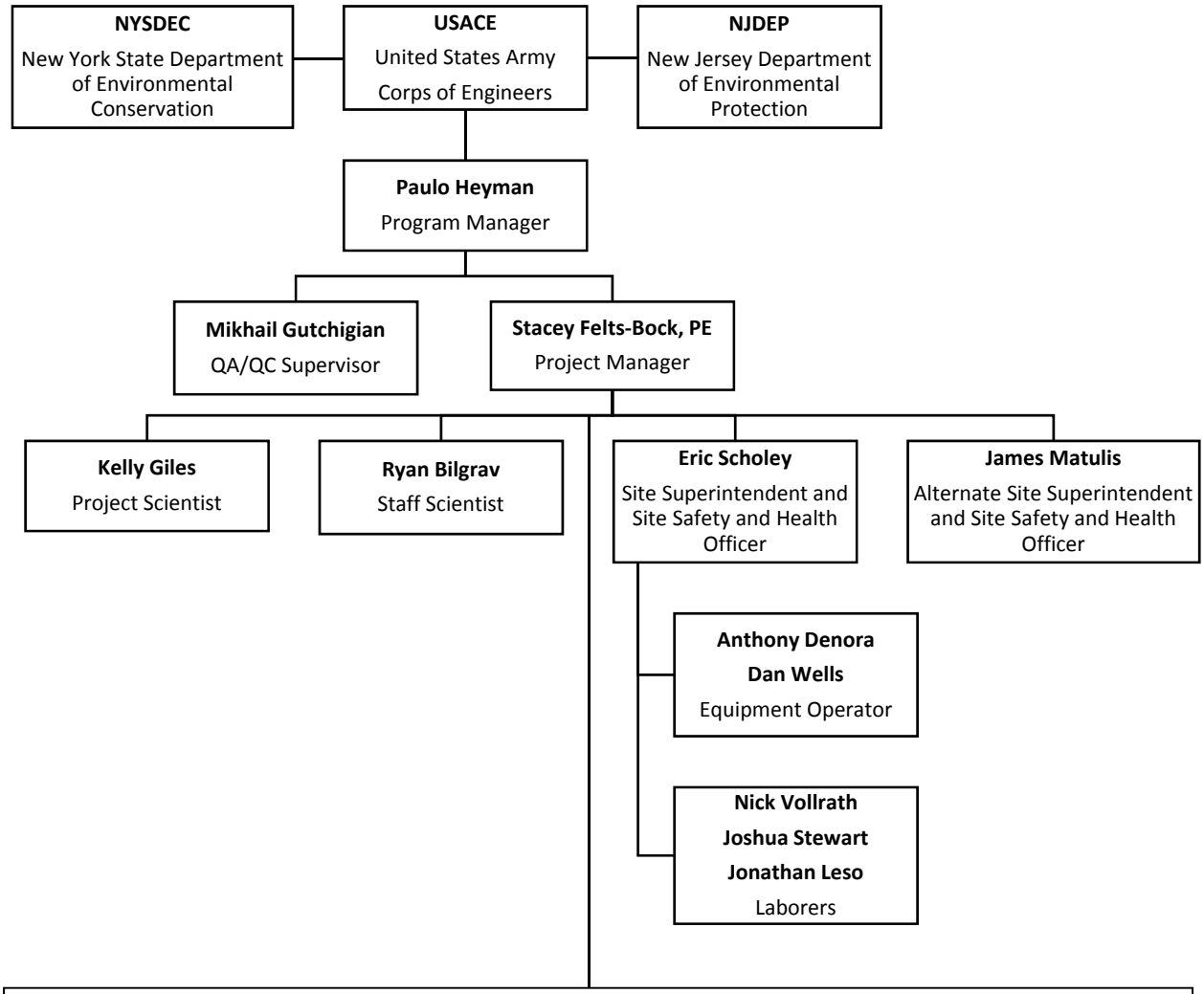
2.0 PROJECT BACKGROUND

The DoD is currently responsible for the environmental restoration of properties that were formerly owned by, leased to, or possessed by the United States under jurisdiction of the Secretary of Defense prior to October of 1986. USACE, acting as the lead agent on behalf of the DoD, is responsible for executing the FUDS Program. The FUDS Program is carried out in accordance with the Comprehensive Environmental Response, Compensation, and Liabilities Act (CERCLA) and aims to identify all eligible FUDS properties, investigate their conditions, and address any environmental concerns present as a result of DoD activities. These concerns include hazardous, toxic, and radioactive waste, building demolition and debris removal, and military munitions or unexploded ordnances.

Under Contract #W912WJ-16-C-0024, work will be conducted at six (6) FUDS sites located throughout New York and New Jersey to address potential environmental concerns. The locations of the FUDS sites are illustrated on **Figure 1.**

3.0 PROJECT TEAM AND ORGANIZATION

The Renova Project Team consists of the following individuals and entities:



SUBCONTRACTORS

Sovereign Consulting, Inc.
Subterra Locating Services
Sun Environmental Corporation
County of Franklin Solid Waste Management Authority
ST Trucking, LLC
Rafferty Sand & Gravel, LLC
Subterra Locating Services
Rob Tucher Photographic Documentation
Ecoservices, LLC
Laboratory Data Consultants, Inc.
The Vertex Companies, Inc.
Stella Contracting, Inc.
Garden State Precast, Inc.
TCI of NY, LLC
GMT Realty, LLC
Environmental Probing Investigations
Eurofins Lancaster Laboratories Environmental, LLC

4.0 PROJECT COMMUNICATION

The objective of project communication is to ensure that appropriate persons are aware of any issues or concerns that may be expressed by the various stakeholders during the construction program. For this project, a list of key project personnel is included below.

U.S. Army Corps of Engineers (USACE): Ms. Susanne Grant is the Contracting Officer's Representative (COR) and is responsible for all matters related to project planning and funding. Ms. Grant will correspond directly with the USACE Contracting Officer (Ms. Jessica M. Kidd).

Mr. Paulo Heyman will serve as the Program Manager, and is responsible for oversight of the contract. Mr. Heyman will communicate directly with the USACE, as well as the Renova Project Manager and Site Superintendents to verify that contracted work is completed in a timely manner and in accordance with the agreed upon Scope of Work and regulatory requirements. Mr. Heyman will also have responsibility for supervisory project billing review and invoicing.

Ms. Stacey Felts-Bock, PE will serve as the Project Manager (PM), and is responsible for day-to-day management and coordination of the project scope, subcontractors, field personnel schedule, and budget. Additionally, Ms. Felts-Bock will be responsible for communicating with the Site Superintendent(s) to assure that the proper project documentation procedures are followed.

Mr. Mikhail Gutchigian will serve as the Project Quality Control Managers (PCQM). He is responsible for overall quality control on this project and will work directly with Mr. Heyman, Ms. Felts-Bock, and Site Superintendents.

Table 1 presents project personnel roles and responsibilities. **Table 2** presents the Project Participant Contact List. **Table 3** presents the report deliverables, and the document distribution list is included as **Table 4**.

4.1 Project Status Updates

Monthly status updates will be provided to USACE at the conclusion of each calendar month. The status updates will detail activities completed during the prior month, project tasks to be completed during the following month, and an up-to-date version of the project schedule.

In addition, Renova proposes to conduct regular status calls to discuss the project and make updates as necessary.

5.0 PROJECT TASKS

The FUDS sites and associated primary and optional tasks included in this Scope of Work (SOW) are:

- Bangor Gap Filler Annex, Bangor, NY: Removal and disposal of aboveground storage tanks (ASTs) and completion of closure report in accordance with New York State Department of Environmental Conservation (NYSDEC) regulations. The Bangor Gap Filler Annex site is illustrated on **Figure 2** (site overview) and **Figure 3** (detailed site plan).
    - *Optional task:* Removal and disposal of contaminated soil
- Atlas S-1, Champlain, NY: Geophysical investigation at location of suspected underground storage tank (UST) and completion of summary report. The Atlas S-1 site is illustrated on **Figure 4** (site overview) and **Figure 5** (detailed site plan).
    - *Optional task:* Removal and disposal of UST and UST contents with limited soil remediation
    - *Optional task:* Removal and disposal of additional contaminated soil
- Short Beach Fire Control Station, Jones Beach, NY: Expose and remove rebar and building debris and complete summary report. The Short Beach Fire Control Station site is illustrated on **Figure 6** (site overview) and **Figure 7** (detailed site plan).
- Nike PH-58, Woolwich Township, NJ: Complete archival photographic documentation, asbestos abatement, site clearing, building and tank demolition, mitigation of fall hazards and disposal of hydraulic fluid from underground missile magazines, installation of precast concrete planks, and completion of summary report. The Nike PH-58 site is illustrated on **Figure 8** (site overview), **Figure 9** (detailed site plan of Former Launch Area), and **Figure 10** (detailed site plan of Former Control Area).
- Woodbine Municipal Airport, Woodbine, NJ: Geophysical investigation at location of suspected UST and completion of summary report. The Woodbine Municipal Airport site is illustrated on **Figure 11** (site overview) and **Figure 12** (detailed site plan).
    - *Optional task:* Removal and disposal of UST and UST contents
    - *Optional task:* Removal and disposal of contaminated soil
- Welsbach Plant NOBS #258, Gloucester City, NJ: Removal and disposal of transformers and oil switch. The Welsbach Plant site is illustrated on **Figure 13** (site overview) and **Figure 14** (detailed site plan).

Detailed site-specific work plans have been compiled for each site and are included below as **Section 11** through **Section 16**.

6.0 ACCIDENT PREVENTION PLAN

Per Section 2.1.11.1 of the Program Statement of Work (SOW), issued on 21 June 2016, a comprehensive Accident Prevention Plan (APP) (Renova, 2016a) with site-specific appendices and task-specific Activity Hazard Analyses (AHAs) has been prepared under a separate cover to specify employee training, protective equipment, medical surveillance requirements, standard operating procedures, and a contingency plan in case of emergencies.

All work will be conducted in accordance with the APP, the USACE Safety and Health Requirements Manual (EM 385-1-1, most recent edition), and all applicable federal, state, and local safety and health requirements.

7.0 QUALITY ASSURANCE PROJECT PLAN

Per Section 2.1.4 of the SOW, a Uniform Federal Policy (UFP) Quality Assurance Project Plan (QAPP) (Renova, 2016b) has been prepared under a separate cover in accordance with best engineering practices to describe the project objectives and organization, functional activities, and quality assurance/quality control (QA/QC) protocols that will be used to achieve the desired Data Quality Objectives (DQOs).

8.0 CONTRACTOR QUALITY CONTROL PLAN

Renova will ensure that quality is maintained throughout all fieldwork and will utilize experienced field personnel to perform sampling and field analysis. To this end, a Contractor Quality Control Plan (CQCP) (Renova, 2016c) for the project has been prepared under a separate cover, that includes a project management organizational chart, responsibilities, and quality assurance procedures. The plan will be updated as necessary to address any potential revisions that may be encountered during the work at all FUDS sites.

9.0 ENVIRONMENTAL PROTECTION PLAN

An Environmental Protection Plan (EPP) (Renova, 2016d), including Storm Water Management and Erosion and Sediment Control, has been prepared under separate cover to detail mitigation methods that will be implemented during all project activities. The plan will be updated as necessary to address any potential revisions that may be encountered, including placement of storm water control devices or protection of threatened or endangered species.

10.0 PROPOSED SCHEDULE

Renova has attached an approximate project schedule as **Appendix A.** This schedule will be adjusted as necessary to reflect changes in the timeframe. Updated project schedules will be provided to USACE with the submission of Monthly Status Reports.

11.0 BANGOR GAP FILLER ANNEX – BANGOR, NEW YORK

11.1 Site Background and Description

The Bangor Gap Filler Annex, identified as FUDS property number C02NY0585, is located approximately 1600 feet southwest of the intersection of Melo Drive and Perry Road in the town of Bangor, New York. The site consists of a concrete block building and former radar tower, utilized during the 1950's and 1960's to provide low-altitude radar coverage between long-range radar stations. The site is bordered by a perimeter fence with an access gate at the southern border. One (1) estimated 100-gallon AST and one (1) estimated 15-gallon AST are present inside the main building. One (1) 5,000-gallon AST is located outside of the main building on concrete cradles. Photographs and diagrams provided by USACE are included as **Appendix B.** The overall site location is illustrated on **Figure 2** and general site features are illustrated on **Figure 3.**

11.2 Site Access and Security

The site is currently used by the U.S. Department of Homeland Security, Customs and Border Protection. The primary point of contact (POC) for site access is as follows:

Name	Phone	E-mail
Stephen Fuller, U.S. Customs and Border Protection	(518) 298-7278	stephen.m.fuller@dhs.gov

Advanced notice will be given to the POC to coordinate site access. A list of participants for all FUDS sites encompassed under this contract is included as **Table 2.**

11.3 Scope of Work

Work at the Bangor Gap Filler Annex will include the following:

- Removal and disposal of one (1) 5,000-gallon AST located outside the main building on concrete cradles, one (1) estimated 100-gallon day tank AST located inside the main building, and one (1) estimated 15-gallon AST located in a small trench inside the main building floor;
- Removal and disposal of liquid contents of ASTs;
- Removal and disposal of all associated piping and appurtenances connected to the ASTs;
- Demolition and disposal of concrete cradles and slab beneath 5,000-gallon AST;
- Photographic documentation of paved access road connecting Perry Road and project site; and,
- Completion of AST Removal Action Closure Report in accordance with NYSDEC regulations.

In addition, one (1) optional task has been identified as follows and will be activated at the discretion of USACE:

- Removal and disposal of up to five hundred (500) tons of petroleum-impacted soil.

11.4 Project Schedule

Three (3) days have been allotted for completion of all site work at Bangor Gap Filler Annex. This schedule does not include the optional removal and disposal of impacted soil. The most updated project schedule is included as **Appendix A.**

11.5 Applicable Regulations

Township tank removal permits are required for removal of the three (3) ASTs onsite. Executed permits from the Town of Bangor will be acquired and attached to this Work Plan as an addendum upon township approval.

Tank closure will be completed in accordance with NYSDEC "Permanent Closure of Petroleum Storage Tanks," issued on January 20, 1987 and last modified on December 3, 2003.

Sampling and reporting for remediation services, if completed, will be conducted in accordance with NYSDEC "DER-10: Technical Guidance for Site Investigation and Remediation," issued May 3, 2010.

11.6 Mobilization and Preparation

Renova will notify New York One Call (811) to perform an underground utility markout at the property. The site will be thoroughly photographed prior to commencement of any site work.

Prior to mobilization of equipment to the site, the access road that connects the project site to Perry Road (see **Figure 2**) will be thoroughly photographed. Care will be taken to not disturb or damage the access road, as it is also utilized by neighboring properties.

Using the access road, all equipment will be mobilized to the project site and all equipment and machinery will be staged onsite throughout the duration of the project.

11.7 Tank and Piping Removal and Disposal

The tank will be cut using pneumatic non-sparking cutting instruments, and emptied of all water and diesel / heating oil contents. Prior to tank removal, all ASTs and associated product piping will be purged with a NYSDEC-permitted 2,800-gallon Turbo vacuum truck. Renova plans to use Sun Environmental Corporation of Liverpool, NY for vacuum truck services, transportation, and disposal of the liquid tank contents. It is

assumed that all tanks contain water, diesel, and/or fuel oil. A bill of lading will be prepared by Sun Environmental Corp. for disposal at a NYSDEC-permitted processing facility.

Upon removal of all liquid contents, the ASTs will be purged of all interior vapors using an intrinsically-safe blower and extension hoses. The tank interior (top and bottom) will be continually monitored for carbon monoxide (CO), hydrogen sulfide (H_2S), oxygen, and Lower Explosive Limit (LEL) using a properly-calibrated QRAE II portable multiple gas meter. Once the interior atmosphere has been approved for personnel entry, one (1) technician with Confined Space Entry (CSE) certification will enter the 5,000-gallon AST under Renova's CSE permit, wearing a Tyvek suit with rubber booties and a half-mask respirator with combination Volatile Organic Compound (VOC) and particulate filter cartridges. Any sludge remaining will be removed from the AST, containerized into a properly-labeled 55-gallon steel drum, and transported by Renova for disposal. A bill of lading will be prepared by Renova for disposal of the sludge. The AST will be wiped clean using oil-absorbent pads. All pads and spent personal protective equipment (PPE) will be collected in the drums for eventual disposal.

After all tanks and piping have been emptied have been purged of their contents, the ASTs will be wiped clean with oil-absorbent pads and loaded for recycling. Empty tanks and piping will be transported via a hauler truck for recycling as scrap metal. If it is the preference of USACE, Renova will leave the interior tanks in place to be removed during building demolition by a separate contractor.

After the 5,000-gallon AST has been cleaned and loaded for recycling, the concrete cradles and slab beneath the former tank will be demolished with an excavator and loaded into a roll-off container for disposal.

Upon completion of tank removal and demobilization from Site, the site and access road will be photographed upon departure to document final conditions.

11.8 Optional Soil Excavation

If contaminated soils are observed during tank removal (i.e. stained soils, petroleum odor, elevated Photoionization Detector (PID) readings, or observation of free product), a soil sample will be collected from the impacted area for waste classification submission to a soil disposal facility. Renova plans to utilize the County of Franklin Solid Waste Management Authority Landfill (CFSWMA) for disposal of all oil-impacted soil, for a quantity up to five hundred (500) tons. The soil sample will be submitted to Eurofins Lancaster Laboratories Environmental, LLC of Lancaster, Pennsylvania (Eurofins), certified by the DoD Environmental Laboratory Accreditation Program (DoD ELAP), New Jersey Department of Environmental Protection (NJDEP) Laboratory Certification ID #PA011, and New York State Department of Health

(NYDOH) Lab ID #10670. The sample will be analyzed for flash point/ignitability, paint filter test, and Toxicity Characteristic Leaching Procedure (TCLP) Semi-Volatile Organic Compounds (SVOCs). Waste classification requirements for CFSWMA are included as **Appendix C.**

11.8.1 Transportation and Disposal of Oil-Impacted Material

Upon approval of the waste classification soil sample, remediation at the site will begin for removal of the petroleum-impacted soil. Transfer stations for the landfill are located in Malone, Lake Clear, and Tupper Lake, New York. Soil will be transported from the site to the landfill by ST Trucking LLC of Norfolk, NY. Only oil-impacted soil that can be safety excavated without jeopardizing the structural integrity of the building, radar tower, or any other onsite structures will be removed.

11.8.2 Field Screening and Confirmatory Sampling

The soils within the open excavation will be continually screened with a properly-calibrated 10.6 eV PID. Once evidence indicates that all impacted soil has been successfully removed *or* the excavation has been advanced as close as possible to the nearby buildings, post-excavation soil samples will be collected from the open excavation. For excavations with a perimeter of between twenty (20) and 300 feet, subsurface post-excavation soil samples will be collected at a frequency of one (1) sample for every thirty (30) linear feet of sidewall, and one (1) soil sample for every 900 square feet of base area. Sidewall samples will be collected from the six-inch vertical interval that exhibits the highest field evidence of petroleum contamination. In the absence of any evidence of gross contamination, sidewall samples will either be collected from the six-inch interval directly above the observed water table, if present, or from the six-inch interval above the base of the excavation, if no groundwater is observed. Soil samples will be transported to Eurofins for analysis of SVOCs as listed in NYSDEC Policy CP-51 (Soil Cleanup Guidance) Table 3 Soil Cleanup Objectives (SCOs) for Fuel Oil Contaminated Soils.

11.8.3 Groundwater Sampling

If groundwater is observed within the excavation, approximate depth will be noted and a groundwater sample will be collected from the excavation utilizing a one-inch diameter temporary PVC well and a dedicated, disposable Teflon-lined bailer. The groundwater sample will be analyzed for SVOCs per NYSDEC CP-51 Table 3 and concentrations will be compared against the New York State Ambient Water Quality Standards and Guidance Values, as listed in the Division of Water Technical and Operational Guidance Series 1.1.1 (TOGS 1.1.1).

If the groundwater sample reports any compounds in exceedance of the applicable Water Quality Standard or Guidance Value, additional remediation of the soil and/or groundwater may be recommended.

11.8.4 Cleanup Objectives

The following cleanup objectives will only apply if the ASTs contained fuel oil or diesel. If the ASTs contained any other petroleum product or otherwise, different cleanup objectives may apply.

Soil cleanup objectives for fuel oil contaminated soil are listed in Table 3 of NYSDEC Policy CP-51. A copy of Table 3 has been included as **Appendix D.**

Groundwater cleanup objectives for fuel oil contaminated groundwater are listed in Table 1, New York State Ambient Water Quality Standards and Guidance Values, as contained within TOGS 1.1.1. A copy of Table 1 is included as **Appendix E.**

11.9 Site Backfill and Restoration

Upon completion of tank removal activities, the site will be restored to its original condition and secured upon Renova's departure. If additional soil excavation is required, all open excavations will be backfilled and compacted as soon as possible to avoid leaving open excavations onsite.

Open excavations will be backfilled with 4" minus gravel (crushed rock with fines) then topped with a layer of screened topsoil, both obtained from Rafferty Sand and Gravel, LLC of West Chazy, NY. Specifications for the backfill material are included as **Appendix F.** The excavations will be compacted in one (1) foot lifts using either the excavator bucket or a roller compactor, as decided by the site supervisor based on field conditions and the depth of the excavation.

Disturbed areas will be seeded with suitable upland seed mix to establish groundcover and prevent erosion.

11.10 Site Closure Documentation

Once all tank removal and site remediation (if required) is completed, Renova will prepare an AST Removal Action Closure Report in accordance with NYSDEC regulatory requirements. The report will document tank removal activities, site restoration, and any remediation performed, if completed. Photo-documentation of all project tasks will be included in the report.

12.0 ATLAS S-1 – CHAMPLAIN, NEW YORK

12.1 Site Background and Description

The Atlas S-1 site, identified as FUDS property number C02NY0206, is located at 67 Missile Base Road, approximately 1,900 feet from Perry Mills Road in the town of Champlain, New York. It is approximately 2,500 feet from the southern border of Canada. The site was constructed in the 1960's and was formerly used as a silo for the Series F Atlas missile, a missile type utilized by the United States between August of 1961 and June of 1981. The Atlas S-1 site was one (1) of twelve (12) missile complexes located throughout New York and Vermont assigned to the 556th Strategic Missile Squadron (SMS) at Plattsburgh Air Force Base (AFB) in Plattsburgh, New York. The site is estimated to have been deactivated in 1964.

The site surface consists of a large prefabricated corrugated steel shed, various small structures and sheds including the entrance to the Launch Control Center (LCC), and a large central entrance to the underground missile silo. The site is surrounded by perimeter fencing with an access gate at the entrance from Missile Base Road. There is a large grassy area at the surface of the site identified for a Ground Penetrating Radar (GPR) investigation, approximately 115 feet southeast of the missile silo opening. The area is suspected to contain or have contained an estimated 10,000-gallon diesel UST. A magnetometer scan was recently conducted at the suspected UST area but yielded inconclusive results.

Not visible from the surface are the LCC, a two-story underground structure approximately forty (40) feet in diameter, the underground missile silo, approximately fifty (50) feet in diameter and 185 feet deep, and an approximately forty (40) foot long underground tunnel connecting the silo and the LCC.

Photographs and diagrams provided by USACE are included as **Appendix G.** The overall site location is illustrated on **Figure 4** and general site features are illustrated on **Figure 5.**

12.2 Site Access and Security

The site is currently privately owned by Mr. Gerald "Fitz" Fitzpatrick. POC information for site access is as follows:

Name	Phone	E-mail
Mr. Gerald "Fitz" Fitzpatrick, Property Owner	(614) 517-3660	fitzfoot@gmail.com

Advanced notice will be given to the POC to coordinate site access. A complete list of participant contacts for all FUDS sites encompassed under this contract is included as **Table 2.**

12.3 Scope of Work

Site work at the Atlas S-1 site will include the following:

- Perform geophysical investigation using GPR at area of suspected 10,000-gallon diesel tank, approximately sixty (60) feet by 120 feet; and,
- Perform test pit(s) as needed at the suspected UST area to verify if the tank remains in the ground.

In addition, two (2) optional tasks have been identified as follows and will be activated at the discretion of USACE:

- Removal and disposal of one (1) estimated 10,000-gallon diesel UST with limited remediation of up to thirty (30) tons of petroleum-impacted soil; and,
- Removal and disposal of up to five hundred (500) tons of additional petroleum-impacted soil.

12.4 Project Schedule

Two (2) days have been allotted for completion of all site work at Atlas S-1. This schedule does not include the optional tank removal or the removal and disposal of additional impacted soil. The most updated project schedule is included as **Appendix A.**

12.5 Applicable Regulations

Township tank removal permits are required for removal of the suspected UST onsite. The executed permit from the Town of Champlain will be acquired and incorporated with this Work Plan as an addendum upon township approval.

Tank closure, if completed, will be completed in accordance with NYSDEC "Permanent Closure of Petroleum Storage Tanks," issued on January 20, 1987 and last modified on December 3, 2003.

Sampling and reporting for remediation services, if completed, will be conducted in accordance with NYSDEC "DER-10: Technical Guidance for Site Investigation and Remediation," issued May 3, 2010.

12.6 Mobilization and Preparation

Renova will notify New York One Call (811) to perform an underground utility markout at the property.

All equipment, machinery, and personnel will be mobilized to the site and staged at a location agreed-upon with Mr. Fitzpatrick and proximal to the suspected UST area. The site will be thoroughly photographed prior to commencement of any site work.

12.7 Ground Penetrating Radar Investigation

The GPR investigation will be conducted by Subterra Locating Services of Colchester, Vermont. The area identified by USACE, illustrated on **Figure 5**, will be thoroughly swept with the GPR device in a north-south and east-west direction. Any identified underground anomalies will be marked with spray paint by the GPR technician.

12.8 Test Pit

Renova will utilize the markings from the GPR investigation to determine the area(s) suspected to contain the 10,000-gallon UST. Using a mid-size excavator, test pit(s) will be advanced to a depth of at least six (6) feet below grade surface (bgs) to investigate the presence of a UST. Soil overburden from the test pit will be staged onsite on 6 mil poly sheeting. If no UST is identified, the test pit will be immediately backfilled using the excavator bucket and compacted in one (1) foot lifts.

If a UST is identified during the test pit, the test pit will be expanded as necessary and tank measurements will be obtained to determine tank capacity. A small section of the tank will be cut from the top using pneumatic non-sparking cutting instruments and the quantity and nature of the tank contents will be determined.

If the UST is cut open, plastic will be placed over the UST opening and sealed with duct tape and plywood to prevent any water or soil from entering the UST. The test pit will be backfilled with the soil overburden and the excavation will be secured with orange safety fencing to prevent access until tank removal is completed.

12.9 Optional Tank Removal

If a UST is identified during the geophysical investigation, Renova will remove and dispose of the estimated 10,000-gallon UST. Renova has allotted three (3) days for completion of tank removal and disposal.

The tank will be completely exposed and all overburden soil from the top of the tank will be staged on 6 mil poly sheeting.

The tank will be cut further, if needed, using pneumatic non-sparking cutting instruments, and emptied of all water and diesel / heating oil contents. Renova assumes that the tank contains or had contained diesel fuel, #2 heating oil, or water. Sun Environmental Corp. will remove a maximum of 1,500 gallons of fuel oil and water mixture liquid from the tank utilizing a 2,800-gallon Turbo vacuum truck. A bill of lading will be prepared by Sun Environmental Corp. for disposal at a NYSDEC-permitted disposal facility.

Upon removal of all liquid contents, the UST will be purged of all interior vapors using an intrinsically-safe blower and extension hoses. The tank interior (top and bottom) will be continually monitored for CO, H_2S, oxygen, and LEL using a properly-calibrated QRAE II portable multiple gas meter. Once the interior atmosphere has been approved for personnel entry, two (2) technicians with CSE certification will enter the tank under Renova's CSE permit, wearing Tyvek suits with rubber booties and a half-mask respirator with combination VOC and particulate filter cartridges. Any sludge remaining will be removed from the UST, containerized into a properly-labeled 55-gallon steel drum, and transported by Renova for disposal at Lorco Petroleum Services (Lorco) of Elizabeth, NJ. A bill of lading will be prepared by Renova for disposal of the sludge. The UST will be wiped clean using oil-absorbent pads. All pads and spent PPE will be collected in the drums for eventual disposal.

The UST will be removed from the ground and secured onto a hauler for transportation. The empty tank and piping, if present, will be transported for recycling as scrap metal.

12.9.1 Tank Closure Soil Sampling

Upon tank removal, soil samples will be collected from the top six (6) inch interval at the center base of the tank grave at a frequency of one (1) sample for every five (5) feet of tank length, one (1) sample for the initial fifteen (15) linear feet of piping length, and one (1) sample for each additional twenty (20) linear feet of piping length. Where required, piping samples will be collected at locations of potential discharges, including joints and dispenser locations. Soil samples will be transported to Eurofins for analysis of SVOCs as listed in NYSDEC Policy CP-51 (Soil Cleanup Guidance) Table 3 SCOs for Fuel Oil Contaminated Soils.

If contaminated soils are observed during tank removal (i.e. stained soils, petroleum odor, elevated Photoionization Detector (PID) readings, or observation of free product), a soil sample will be collected from the impacted area for waste classification submission to a soil disposal facility. The soil sample will be submitted to Eurofins for analysis of flash point/ignitability, paint filter test, and TCLP SVOCs. Waste classification requirements for CFSWMA are included as **Appendix C.**

12.9.2 Groundwater Sampling

If groundwater is observed within the excavation, approximate depth will be noted and a groundwater sample will be collected from the excavation utilizing a one-inch diameter temporary PVC well and a dedicated, disposable Teflon-lined bailer. The groundwater sample will be analyzed for SVOCs per NYSDEC CP-51 Table 3 and concentrations will be compared against the New York State Ambient Water Quality Standards and Guidance Values, as listed in TOGS 1.1.1.

If the groundwater sample reports any compounds in exceedance of the applicable Water Quality Standard or Guidance Value, additional remediation of the soil and/or groundwater may be recommended.

12.9.3 Limited Soil Remediation

After tank removal and all required sampling, up to thirty (30) tons of potentially contaminated soil will be removed from the UST excavation and transported to CFSWMA by ST Trucking. Soil will be screened with a properly-calibrated PID for evidence of petroleum impact. Renova will only remove oil-impacted soil that can be safety excavated without jeopardizing any of the aboveground or underground structures onsite. If the tank overburden is observed to be potentially impacted, it will be included in the disposal quantity and the remainder of the contaminated soil will be collected from the tank grave.

12.9.4 Backfill and Restoration

Upon completion of tank removal activities, the site will be restored to its original condition and secured upon Renova's departure. If additional soil excavation is required, all open excavations will be backfilled and compacted prior to demobilization. Safety fencing will be used to restrict access if excavations are required to be left open for short periods of time.

Open excavations will be backfilled with 4" minus gravel (crushed rock with fines) then topped with a layer of screened topsoil, both obtained from Rafferty Sand and Gravel, LLC of West Chazy, NY. Specifications for the backfill material are included as **Appendix F.** The excavations will be compacted using a roller compactor.

Any necessary repairs will be made to the pavement or roadbed that has sustained damage, including patching using asphalt or concrete.

12.10 Optional Soil Excavation

Renova plans to utilize the County of Franklin Solid Waste Management Authority Landfill (CFSWMA) for disposal of all oil-impacted soil, for a quantity up to five hundred (500) tons.

12.10.1 Transportation and Disposal of Oil-Impacted Material

Upon approval of the waste classification soil sample, remediation at the site will begin for removal of the petroleum-impacted soil. Soil will be transported from the site to the CFSWMA landfill by ST Trucking. Renova will only remove oil-impacted soil that can be safety excavated without jeopardizing the structural integrity of any aboveground or underground structures.

12.10.2 Field Screening and Confirmatory Sampling

The soils within the open excavation will be continually screened with a properly-calibrated 10.6 eV PID. Once evidence indicates that all impacted soil has been successfully removed *or* the excavation has been advanced as close as possible to the nearby buildings or underground structures, post-excavation soil samples will be collected from the open excavation. For excavations with a perimeter of between twenty (20) and 300 feet, subsurface post-excavation soil samples will be collected at a frequency of one (1) sample for every thirty (30) linear feet of sidewall, and one (1) soil sample for every 900 square feet of base area. Sidewall samples will be collected from the six-inch vertical interval that exhibits the highest field evidence of petroleum contamination. In the absence of any evidence of gross contamination, sidewall samples will either be collected from the six-inch interval directly above the observed water table, if present, or from the six-inch interval above the base of the excavation, if no groundwater is observed. Soil samples will be transported to IAL for analysis of SVOCs as listed in NYSDEC Policy CP-51 (Soil Cleanup Guidance) Table 3 SCOs for Fuel Oil Contaminated Soils.

12.10.3 Groundwater Sampling

If groundwater is observed within the excavation, approximate depth will be noted and a groundwater sample will be collected from the excavation utilizing a one-inch diameter temporary PVC well and a dedicated, disposable Teflon-lined bailer. The groundwater sample will be analyzed for SVOCs per NYSDEC CP-51 Table 3 and concentrations will be compared against the New York State Ambient Water Quality Standards and Guidance Values, as listed TOGS 1.1.1.

If the groundwater sample reports any compounds in exceedance of the applicable Water Quality Standard or Guidance Value, additional remediation of the soil and/or groundwater may be recommended.

12.11 Cleanup Objectives

The following cleanup objectives will only apply if the UST contained fuel oil or diesel. If the UST contained any other petroleum product or otherwise, different cleanup objectives may apply. Cleanup objectives will be applicable for both the optional tank removal and optional soil remediation.

Soil cleanup objectives for fuel oil contaminated soil are listed in Table 3 of NYSDEC Policy CP-51. A copy of Table 3 has been included as **Appendix D.**

Groundwater cleanup objectives for fuel oil contaminated groundwater are listed in Table 1, New York State Ambient Water Quality Standards and Guidance Values, as contained within TOGS 1.1.1. A copy of Table 1 is included as **Appendix E.**

12.12 Site Closure Documentation

If no UST is discovered during the GPR investigation with test pit, a Summary of Findings (SOF) report will be issued detailing the investigation of the suspect area.

If tank removal and/or site remediation (if required) is completed, Renova will prepare a UST Removal Action Closure Report in accordance with NYSDEC regulatory requirements. The report will document tank removal activities, site restoration, and any remediation performed, if completed.

13.0 SHORT BEACH FIRE CONTROL STATION – JONES BEACH, NEW YORK

13.1 Site Background and Description

The site of the former Short Beach Fire Control Station, identified as FUDS property number C02NY0698, is located at the western end of Jones Beach Island, one of the barrier islands at the southern edge of Long Island, New York. It is directly adjacent to the western edge of the United States Coast Guard (USCG) Station Jones Beach, located at 1 West End Boat Basin. The site is approximately 500 feet south of the Jones Bay and 3,600 feet north of the Atlantic Ocean.

Currently, there are no buildings at the property. The site surface is primarily sand, beach grass, and small shrubs. It is relatively mounded and serves as a dune at the northern edge of the island. The surface of the property is strewn with assorted debris including old steel beams and rebar.

Photographs and diagrams provided by USACE are included as **Appendix H.** The overall site location is illustrated on **Figure 6** and general site features are illustrated on **Figure 7.**

13.2 Site Access and Security

Site access is not restricted and there are no special requirements or restrictions for gaining access to the former Fire Control Station area.

13.3 Scope of Work

Work to be completed at the former Short Beach Fire Control Station includes the following:

- Identify and remove all exposed rebar and building debris at former Fire Control Station location;
- Transport debris offside and property dispose or recycle;
- Photograph area before and after debris clearing;
- Restore existing ground to approximate preconstruction elevations; and,
- Restore ground surface with compatible sand and beach grass plugs (*Ammophila brevilgulata)*.

13.4 Project Schedule

Six (6) days have been allotted for completion of all site work at the former Short Beach Fire Control Station. The most updated project schedule is included as **Appendix A.**

13.5 Applicable Regulations

Prior to conducting debris removal, Renova will obtain a hot work permit, issued by the Site Safety and Health Officer, for use of a blow torch assembly onsite. The hot work permit will be incorporated into this Work Plan as an addendum prior to site work.

13.6 Mobilization and Preparation

Renova will notify New York 811 to perform an underground utility markout prior to commencement of any site work. The site area will be thoroughly photographed to document preconstruction conditions.

Upon mobilization to the site, Renova personnel will utilize brightly-colored flags and spray paint to identify all visible debris scattered throughout the site location. A 10-yard scrap metal roll-off will be delivered to the site for collection and transportation of all debris. The roll-off container will be transported to an offsite metal recycling facility.

13.7 Debris Removal

A small excavator and compact track loader will be utilized to remove debris from the area. All debris will be collected in the roll-off container for eventual transportation and recycling. If the piece of debris extends more than three (3) feet bgs, it is acceptable to cut the piece of debris at 3' bgs then cover with backfill material. Debris cutting will be achieved using a propane blow torch assembly.

13.8 Site Restoration

Upon completion of all debris removal, the affected areas will be regraded to approximate preconstruction elevations with a tolerance of ± one (1) foot. Backfill material will be clean fill sand, imported and transported to the site.

All vegetated areas will be restored with the addition of six (6) inches of clean fill sand, and planted with beach grass (*Ammophila breviligulta*) plugs, spaced in a four (4) foot grid. Technical specifications for the grass plugs will be incorporated with this Work Plan as an addendum prior to commencement of site work at Jones Beach. Renova will determine the availability of the beach grass plugs at local nurseries and, if possible, will coordinate the beach grass to match that used at Coast Guard Station Jones Beach, located adjacent to the project site.

13.9 Photographic Record

After regrading and replanting, post-construction photographs will be taken of all areas addressed during debris removal.

13.10 Site Closure Documentation

Renova will prepare a Site Closure Report including a narrative of all work completed and photographic documentation of the site's preconstruction and post-construction conditions.

14.0 NIKE PH-58 – WOOLWICH TOWNSHIP, NEW JERSEY

14.1 Site Background and Description

The Nike PH-58 site, identified as FUDS property number C02NJ0044, is located along Swedesboro Paulsboro Road in Woolwich Township, New Jersey. The site is divided into the Former Launch Area and the Former Control Area, located approximately 1,750 feet apart. The Nike PH-58 Missile Base became operational in 1957 as part of the nationwide "Project Nike" self-defense program. Throughout its operation, the Base housed the Nike Ajax missile and Hercules missile in three (3) underground storage magazines. The Nike PH-58 Base was manned by the United States Army from 1957 until its eventual deactivation in 1974. Since 1974, both the Launch Area and Control Area have sat in ruin. An overview of the site with the Former Launch Area and Former Control Area is included as **Figure 8.**

The Former Launch Area consists of an area of land approximately 22.5 acres in size. The site is accessed via an entrance road off Swedesboro Paulsboro Road, approximately 0.65 miles south of the intersection with Stone Meetinghouse Road. The site surface is mostly overgrown and forested, with several paved roads running through the area to connect small buildings with the former underground missile location. The entrances to three (3) underground missile magazines are present from the surface. Features of the Former Launch Area are illustrated on **Figure 9.** Additional photographs and diagrams of the Former Launch Area, as provided by USACE, are included as **Appendix I.** Photographs and diagrams of underground missile storage magazine, as provided by USACE, are included as **Appendix J.**

The Former Control Area is approximately 15.5 acres in size and is bordered by Swedesboro Paulsboro Road to the west, open farmland to the north, and Gilchris Drive to the east and south. Like the Former Launch Area, it is heavily forested with some paved roads connecting smaller buildings, sentry boxes, pump houses, and radar towers. Features of the Former Control Area are illustrated on **Figure 10.** Additional photographs and diagrams of the Former Control Area, as provided by USACE, are included as **Appendix I.** Photographs obtained by Renova during site reconnaissance are included as **Appendix K.**

14.2 Site Access and Security

A gate on the property restricts site access to each area. Access will be coordinated with USACE to gain entry to each property. There are no special requirements or restrictions for gaining access to either the Former Launch Area or Former Control Area.

It should be noted that gunfire from local hunters has been observed in the vicinity of the project site. To be detailed in the APP/SSHP, Renova will make its presence heard to alert any hunters that may be

trespassing on the property. The crew will utilize the buddy system when moving from one area of the site to another.

14.3 Scope of Work

Work to be completed at both the Former Launch Area and the Former Control Area of the Nike PH-58 site include the following:

- Vegetation clearing to provide unencumbered access by vehicles, machinery, and personnel to buildings to be demolished;
- Building survey conducted by Certified Industrial Hygienist (CIH) to identify lead and asbestos containing materials (ACM);
- ACM abatement conducted by certified asbestos remediation contractor;
- Asbestos clearance monitoring by CIH to confirm effectiveness of ACM abatement; and,
- Photographic documentation of historic buildings consistent with the Historic American Building Survey / Historic American Engineering Record (HABS/HAER).

Area-specific tasks to be completed at the Former Launch Area and Former Control Area are described below:

14.3.1 Former Launch Area

- Demolish two (2) sentry boxes and foundations;
- Demolish guard shack and foundation;
- Demolish generator building and foundation;
- Demolish pump house and foundation;
- Fill pump chamber with clean fill;
- Fill two (2) concrete chambers with clean fill;
- Demolish pump house, slab, and piping;
- Dispose of liquid contents from small concrete tank;
- Dispose of liquid contents from large concrete tank;
- Demolish two (2) large concrete tanks and dispose of liquid contents;
- Remove stone contents of aeration tank;
- Remove and dispose of aboveground piping and equipment at water treatment facility;
- Weld cover plates on three (3) open manholes near missile magazines;
- Remove three (3) elevator platforms in underground magazines;
- Purge hydraulic systems;
- Remove and dispose of liquid contents of underground missile magazines;
- Weld magazine access doors closed;

- Install precast concrete planks over welded access doors; and,
- Complete site restoration including backfilling and revegetation across all disturbed areas.

14.3.2 Former Control Area

- Demolish sentry box and foundation;
- Demolish pump house, slab, piping, and equipment;
- Fill pump chamber with clean fill;
- Remove foundation and debris from collapsed corridor;
- Install galvanized steel plates to cover ladder rungs at three (3) radar towers;
- Remove damaged ladder at one (1) radar tower;
- Weld cover plate on one (1) open manhole; and,
- Complete site restoration including backfilling and revegetation across all disturbed areas.

14.4 Project Schedule

Thirty-two (32) days have been allotted for completion of work at both the Former Launch Area and Former Control Area. The most updated project schedule is included as **Appendix A.**

14.5 Applicable Regulations

All onsite activities will be conducted under 36 Code of Federal Regulations (CFR) 68: Secretary of the Interior's Standards for the Treatment of Historic Properties.

Historic photographic documentation will be conducted under 48 Federal Regulation (FR) 44716: Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation. Photographs will be taken in accordance with the HABS/HAER standards.

14.6 Demolition Preparation

Prior to any site work, Renova will notify New Jersey 811 to perform an underground utility markout at the property.

Prior to demolition of buildings, vegetation clearing, archival photography, and ACM/lead survey, abatement, and clearance monitoring will take place at each location. The nine (9) buildings to be demolished are as follows:

- Two (2) sentry boxes, one (1) guard shack, two (2) pump houses, and one (1) generator building at Former Launch Area; and
- One (1) sentry box, one (1) pump house, and one (1) collapsed corridor at Former Control Area.

14.6.1 Vegetation Clearing

All work sites will be cleared of trees and shrubbery to allow unencumbered access for demolition equipment. Trees will only be removed on an as-needed basis. Clearing will be conducted by Stella Contracting, Inc. of Elmer, NJ. Subcontractor contact information is listed in **Table 5.**

All clearing is to occur during the winter months when practicable. If clearing during the winter is not feasible, clearing will be conducted at another time of year, excluding the pup rearing season for the Northern Long-eared Bat between June 1 and July 31.

During clearing, trees will be sheared and clipped and roots / stumps will be extracted as necessary. All chips and stumps will be removed from the premises. Surrounding areas at the buildings to be demolished will be cleared prior to demolition.

14.6.2 Photographic Documentation of Historic Buildings

Prior to demolition, buildings to be demolished will be photographed in accordance with the HABS/HAER standards. Specifically, archival photographic documentation will include large format black and white negatives with contact prints, both of which must be archivally processed. The photographer will meet the Secretary of the Interior's Professional Qualification Standards (48 Federal Regulation (FR) 44716, Sept. 1983) for History, Architectural History, Architecture, or Historic Architecture. Rob Tucher Photographic Documentation of High Bridge, New Jersey, qualified to conduct the work in accordance with HABS/HAER and experienced as per 48 FR 44716, will perform photographic documentation of all buildings scheduled for demolition. In addition, three (3) missile elevators at the Former Launch Area will be photographed. Subcontractor contact information is listed in **Table 5.**

14.6.3 Building Survey for ACM and Lead

A survey of all buildings scheduled for demolition will be conducted by a CIH from The Vertex Companies (Vertex), Inc. of Aston, Pennsylvania. Contact information for Vertex is included in **Table 5.** Inspections will be conducted to identify which building materials contain lead and/or asbestos. Samples collected by Vertex will be analyzed by a laboratory certified by the National Institute of Standards and Technology (NIST). Upon completion, a comprehensive survey report will be provided to detail areas containing ACM or lead.

14.6.4 ACM Abatement

After identification of all ACM and lead paint, Ecoservices, LLC of Exton, PA will perform asbestos abatement at the locations of concern identified during the survey. Contact information for Ecoservices is included in **Table 5.**

14.6.5 Clearance Monitoring

Following abatement of all ACM and lead materials, Vertex will perform post-asbestos abatement air clearance sampling to confirm abatement effectiveness. Confirmatory analysis will be conducted via the Transmission Electron Microscopy (TEM) methodology of Non-Friable Organically Bound (NOB) materials. Building demolition activities will only begin after successful confirmatory post-ACM abatement testing.

14.7 Former Control Area

After completion of the above clearing, photographic documentation, and lead/ACM survey, abatement, and monitoring, activities at the Former Control Area are estimated to take one (1) day.

14.7.1 Building Demolition

Refer to **Figure 10** for locations of the buildings to be demolished at the Former Control Area. One (1) sentry box, approximately 5'x7'x8' high, will be demolished along with its foundation. In addition, one (1) pump house and associated slab, piping, and equipment will be demolished. All construction and demolition (C&D) materials will be placed into roll-off containers for transportation and disposal. The areas at each building will be backfilled to grade level with certified clean fill material. In addition, the pump chamber will be backfilled to below the level of the slab.

Where feasible, soil from the surrounding berms will be utilized as backfill material. Certified clean fill will be imported from an outside source in all other cases. Technical specifications for the backfill material will be provided and incorporated into this Work Plan as an addendum.

14.7.2 Collapsed Corridor

The foundation and associated debris will be removed from the collapsed corridor, placed into roll-off containers as discussed above, and transported for disposal as C&D debris.

14.7.3 Additional Site Renovations

The ladder rungs at three (3) radar towers (see locations illustrated on **Figure 10**) will be covered with galvanized steel plates to prevent unintended access by the public.

One (1) radar tower, illustrated on **Figure 10**, contains approximately ten (10) feet of damaged access ladder at ground level. The damaged ladder will be removed from the tower to a height of twelve (12) feet above grade surface.

One (1) open manhole is present at the southeastern corner of the property, approximately 85 feet from the southern fence line. A steel cover plate will be welded onto the open manhole.

Technical specifications for the steel plates used at both the ladders and manhole cover will be provided and incorporated into this Work Plan as an addendum.

14.7.4 Site Restoration

All backfilled areas at the locations of the demolished buildings will be backfilled and planted with an approved, native grass seed mix, as listed in "Conservation Cover (327) for Pollinators Installation Guide: New Jersey," included as **Appendix L.**

14.8 Former Launch Area

After completion of the above clearing, photographic documentation, and lead/ACM survey, abatement, and monitoring, activities at the Former Launch Area are estimated to take thirty-one (31) days.

14.8.1 Small Building Demolition

Refer to **Figure 9** for all buildings to be demolished. Two (2) sentry boxes and foundations, one (1) guard shack and foundation, and one (1) generator building and foundation will be demolished and placed into C&D roll-off containers for transport from the site and disposal. The areas at each building will be backfilled to grade level with granular certified clean fill. The pump chamber, located beneath the pump house, will be backfilled with granular certified clean fill material.

Two (2) concrete chambers, located behind a small building at the northern edge of the property, will be backfilled with granulated certified clean fill material and compacted to a depth of six (6) inches below the top of the concrete.

The second pump house will be demolished, along with the associated slab and piping. The valve pit at the pump house will be cleaned of all sludge and backfilled with granular certified clean fill material to a level of twelve (12) inches below grade surface.

The water and sludge in a small concrete tank, located adjacent to the pump house, will be sampled and tested for waste classification purposes. One (1) water sample will be collected from the tank and analyzed for ignitability, corrosivity (pH), reactive sulfide, reactive cyanide, Target Compound List (TCL) VOCs, TCLP VOCs, TCL SVOCs, TCL Polychlorinated Biphenyls (PCBs), and TCLP metals. Upon receipt of data and approval from a disposal facility, the contents of the small tank will be pumped out and transported for disposal. The interior surface of the tank will be cleaned and wiped. The railing from the top of the tank will be removed and the tank will be partially demolished to a depth of twelve (12) inches below grade. A hole will be punched through the bottom of the tank to allow for drainage. The void

created by the small concrete tank will be backfilled with granular certified clean fill material and compacted to grade level.

A large concrete tank, also located adjacent to the pump house, will be sampled and tested for waste classification purposes as detailed above, using the same parameters as the small concrete tank. Upon receipt of data and approval from a disposal facility, the contents of the large tank will be pumped out and transported for disposal.

Two (2) additional large concrete tanks, near the berm area, will be demolished along with the surrounding berms, piping, and equipment at the water treatment facility. Stone fill from the aeration tank will be spread onsite if it can be segregated from the concrete debris. If not, the stone will be collected into a roll-off container for transport and disposal with the C&D debris. Following tank demolition, the areas will be backfilled with granular certified clean fill material and compacted to grade level. All aboveground piping and equipment associated with the water treatment facility will also be dismantled, placed into a roll-off container, and transported for disposal.

14.8.2 Underground Missile Magazines

Three (3) open manholes are present at the southern edge of the concrete surrounding the missile magazines. A steel plate will be welded to the opening of each manhole to prevent future access.

The access doors to each missile magazine are currently welded shut and will be cut to allow access. Two (2) water samples will be collected from each magazine: one (1) near the top of the standing water and one (1) near the bottom. Each water sample will be analyzed for TCL VOC+15, TCL SVOC+15, SVOC Selective Ion Monitoring (SIM), Extractable Petroleum Hydrocarbons (EPH), Volatile Petroleum Hydrocarbons (VPH), pesticides, herbicides, TCL PCBs, and Target Analyte List (TAL) metals. Upon receipt of analytical results, it is acceptable to pump the aqueous contents from one magazine to the next if there is sufficient capacity and if the water sampling results are generally similar. If there is insufficient capacity or if dissimilar water sampling results indicate the contents should not be mixed, a fractionation tank will be used to store the water from the magazine prior to disposal.

Upon receipt of all data and approval by a disposal facility, transportation and disposal of the water inside the magazines will be arranged.

The platforms at each of three (3) underground elevators will be cut away and removed to ensure the platforms will not move or fall. Once all platforms have been removed, the hydraulic systems activating the elevators and door mechanisms within each magazine will be inspected and purged of all hydraulic

fluid. The hydraulic fluid will be collected in a vacuum truck staged onsite and transported to a licensed facility for disposal.

After each underground magazine has been purged and cleaned of liquid and hydraulic fluid contents, all equipment will be demobilized from the interior and each magazine access hatch will be welded shut. If necessary, steel plates will be added to achieve a strong, secure closure on each hatch. Precast concrete planks will be placed lengthwise across the short dimension of each access hatch. The planks must overlap the edge of the opening by at least eighteen (18) inches on either side and at each end, and the thickness and reinforcement must support the load of a loader or backhoe driving over it. Precast concrete planks will be created per specifications as illustrated in the drawing by Precast Concrete Sales Co., dated May 27, 2015 and included as **Appendix M**.

14.8.3 Site Restoration

All backfilled areas at the locations of the demolished buildings will be backfilled and planted with an approved, native grass seed mix, as listed in "Conservation Cover (327) for Pollinators Installation Guide: New Jersey," included as **Appendix L**.

14.9 Site Closure Documentation

Renova will prepare a Site Closure Report including a narrative of all work completed and photographic documentation of the site work.

15.0 WOODBINE MUNICIPAL AIRPORT – WOODBINE, NEW JERSEY

15.1 Site Background and Description

The Woodbine Municipal Airport site, identified as FUDS property number C02NJ0975, is located on the eastern side of Henry Decinque Boulevard in Woodbine Township, New Jersey. The site is a former boiler plant that serviced former barracks utilized by the DoD.

The site surface consists of a small former boiler plant that formerly served an approximately 10,000 square foot former barracks onsite. The buildings are situated on relatively flat land surrounded by forested areas. An area of concern, approximately sixty (60) feet by forty (40) feet, has been identified proximal to the boiler plant and will be investigated to determine if an underground tank is present.

Photographs and diagrams provided by USACE are included as **Appendix N.** The overall site location is illustrated on **Figure 11** and site features are illustrated on **Figure 12.**

15.2 Site Access and Security

Site access is not restricted and there are no special requirements or restrictions for gaining access to the site.

15.3 Scope of Work

Site work at the Woodbine Municipal Airport site will include the following:

- Perform geophysical investigation using GPR at area of suspected underground tank, approximately sixty (60) feet by forty (40) feet; and,
- Perform test pit at the suspected UST area to verify if the tank remains in the ground.

In addition, two (2) optional tasks have been identified as follows and will be activated at the discretion of USACE:

- Removal and disposal of one (1) UST; and,
- Removal and disposal of up to five hundred (500) tons of petroleum-impacted soil.

15.4 Project Schedule

The GPR investigation at the Woodbine FUDS site will take one (1) day. This schedule does not include the optional tank removal or the removal and disposal of impacted soil. The most updated project schedule is included as **Appendix A**.

15.5 Applicable Regulations

Township tank removal permits are required for the removal of the suspected UST onsite. The permit will be acquired from the Borough of Woodbine and will be incorporated as an addendum to this Work Plan upon township approval.

Tank closure will be conducted under the oversight of a Licensed Site Remediation Professional (LSRP).

In accordance with the Site Remediation Reform Act, N.J.S.A. 58:10C-1 et. Seq. (SRRA), the following regulatory citations provide applicable investigation requirements, screening and remediation standards for the expected contaminants of concern:

N.J.A.C 7:26E Technical Requirements for Site Remediation, last amended on May 7, 2012 and expiring on May 7, 2019, presents the technical requirements for site remediation.

N.J.A.C 7:26D Remediation Standards, last amended on May 7, 2012 and expiring on April 27, 2022, presents Residential Direct Contact Soil Remediation Standards (RDCSRS) and Non-Residential Direct Contact Soil Remediation Standards (NRDCSRS).

N.J.A.C 7:9C Groundwater Quality Standards, last amended on July 22, 2010 and adopted on March 4, 2014, presents Class II-A Specific Groundwater Quality Criteria (GWQC) and Practical Quantitation Levels (PQLs).

Development of Impact to Groundwater Soil Remediation Standards using the Soil Water Partition Equation (Version 2.0 – November 2013) by incorporation from *N.J.A.C 7:26D Remediation Standards*, expiring on April 27, 2022, presents Default Impact to Groundwater Soil Screening Levels (DIGWSSL).

Protocol for Addressing Extractable Petroleum Hydrocarbons (Version 5.0 – August 9, 2010) by incorporation from *N.J.A.C. 7:26D Remediation Standards*, expiring on April 27, 2022, presents EPH, naphthalene and 2-methylnaphthalane screening and remediation criteria.

15.6 Mobilization and Preparation

Renova will notify New Jersey One Call (811) to perform an underground utility markout at the property.

All equipment, machinery, and personnel will be mobilized to the site and staged at a location proximal to the suspected UST area. The site will be thoroughly photographed prior to commencement of any site work.

15.7 Ground Penetrating Radar Investigation

The GPR investigation will be conducted by Environmental Probing Investigations (EPI) of Cream Ridge, New Jersey. The area identified by USACE, illustrated on **Figure 12**, will be thoroughly swept with the GPR device in a north-south and east-west direction. Any identified underground anomalies will be marked with spray paint by the GPR technician.

15.8 Test Pit

Renova will utilize the markings from the GPR investigation to determine the area suspected to contain the UST. Using a mid-size excavator, a test pit will be advanced to a depth of at least four (4) feet bgs to investigate the presence of a UST. Soil overburden from the test pit will be staged onsite on 6 mil poly sheeting. If no UST is identified, the test pit will be immediately backfilled and compacted in one (1) foot lifts using the excavator bucket.

If a UST is identified during the test pit, the test pit will be expanded as necessary and tank measurements will be obtained to determine tank capacity. A small section of the tank will be cut from the top using pneumatic non-sparking cutting instruments and the quantity and nature of the tank contents will be determined.

When feasible, Renova will proceed with tank removal on the same day as the test pit. If the UST is cut open and will need to be left in the ground for some time, plastic will be placed over the UST opening and sealed with duct tape and plywood to prevent any water or soil from entering the UST. The test pit will be backfilled with the soil overburden and the excavation will be secured with orange safety fencing to prevent access until tank removal is completed.

15.9 Optional Tank Removal

If a UST is identified on the first day of the project, Renova will remove and dispose of the estimated UST. It is estimated that the UST has a capacity of approximately 3,000 gallons. Renova has allotted two (2) days for completion of tank removal and disposal.

The tank will be completely exposed and all overburden soil from the top of the tank will be staged on 6 mil poly sheeting.

The tank will be cut further, if needed, using pneumatic non-sparking cutting instruments, and emptied of all water and diesel / heating oil contents. Renova will remove a maximum of 500 gallons of fuel oil and water mixture liquid from the tank utilizing a vacuum truck. A bill of lading will be prepared by Renova for disposal at Lorco Petroleum Services.

Upon removal of all liquid contents, the UST will be purged of all interior vapors using an intrinsically-safe blower and extension hoses. The tank interior (top and bottom) will be continually monitored for CO, H_2S, oxygen, and LEL using a properly-calibrated QRAE II portable multiple gas meter. Once the interior atmosphere has been approved for personnel entry, one (1) technician with CSE certification will enter the tank under Renova's CSE permit, wearing a Tyvek suit with rubber booties and a half-mask respirator with combination VOC and particulate filter cartridges. Any sludge remaining will be removed from the UST, containerized into a properly-labeled 55-gallon steel drum, and transported by Renova for disposal at Lorco. A bill of lading will be prepared by Renova for disposal of the sludge. The UST will be wiped clean using oil-absorbent pads. All pads and spent PPE will be collected in the drums for eventual disposal.

The UST will be removed from the ground and secured onto a hauler for transportation. The empty tank and piping, if present, will be transported by Renova for recycling as scrap metal.

15.9.1 Tank Closure Soil Sampling

Upon removal of the tank, soil samples will be collected from the top six (6) inch interval at the center base of the tank grave at a frequency of one (1) sample for every five (5) feet of tank length, and one (1) sample for every fifteen (15) linear feet of piping length. Where required, piping samples will be collected at locations of potential discharges, including joints and dispenser locations. Sampling locations will be screened with a properly-calibrated PID to identify the areas of greatest impact. Soil samples will be transported to Eurofins for analysis of Category 1 EPH with a contingent analysis for naphthalene and 2-methylnaphthalene. It is assumed that the tank formerly contained diesel or #2 fuel oil. If it is determined that the tank contains or contained any other petroleum product, sampling requirements will be revised.

If contaminated soils are observed during tank removal (i.e. stained soils, petroleum odor, elevated PID readings, or observation of free product), a soil sample will be collected from the impacted area for waste classification submission to Atlantic County Utilities Authority (ACUA) of Egg Harbor Township, NJ. The sample will be transported to Eurofins for a full TCLP analysis, plus analysis of Total Petroleum Hydrocarbons (TPH), ignitability, reactive sulfide and reactive cyanide, and corrosivity (pH). Waste classification requirements for ACUA are included as **Appendix O.**

15.9.2 Groundwater Sampling

If groundwater is observed within the excavation, approximate depth will be noted and a groundwater sample will be collected from the excavation utilizing a one-inch diameter temporary PVC well and a dedicated, disposable Teflon-lined bailer. The groundwater sample will be transported to Eurofins for analysis of VOCs plus Tentatively Identified Compounds (TICs) and SVOCs plus TICs.

If the groundwater sample reports any compounds in exceedance of the applicable NJDEP GWQC, additional remediation of the soil and/or groundwater may be recommended.

15.9.3 Limited Soil Remediation

After the tank removal and upon completion of all required tank closure sampling, up to fifteen (15) tons of contaminated soil will be removed from the UST excavation and transported to ACUA of Egg Harbor Township, NJ via Aqua-Tex Transport of Folsom, NJ should field conditions indicate the presence of contaminated soil. Soil will be screened with a properly-calibrated PID for evidence of petroleum impact. Renova will only remove oil-impacted soil that can be safely excavated without jeopardizing any of the aboveground or underground structures onsite. If the overburden soils are observed to be impacted, they will be included in the disposal quantity and the remainder of the contaminated soil will be collected from the tank grave.

15.9.4 Backfill and Restoration

Upon completion of tank removal activities, the site will be restored to its original condition and secured upon Renova's departure. If additional soil excavation is required, all open excavations will be backfilled and compacted as soon as possible to avoid leaving open excavations onsite.

The open excavation will be backfilled with certified clean fill sand, then topped with a layer of screened topsoil. Specifications for the backfill material will be incorporated into this Work Plan as an addendum prior to the commencement of site work at Woodbine. The excavation will be compacted using a vibratory plate compactor.

Disturbed areas will be seeded with suitable upland seed mix to establish groundcover and prevent erosion. Renova will utilize an appropriate seed mix, as specified in **Appendix L.**

Any necessary repairs will be made to the pavement or roadbed that has sustained damage, including patching using asphalt or concrete.

15.10 Optional Soil Excavation

Renova plans to utilize ACUA of Egg Harbor Township, NJ for disposal of all oil-impacted soil, for a quantity up to five hundred (500) tons. It is assumed that all soil has been contaminated with diesel or #2 fuel oil.

15.10.1 Transportation and Disposal of Oil-Impacted Material

Upon approval of the waste classification soil sample, remediation at the site will begin for removal of the petroleum-impacted soil. Soil will be transported from the site to ACUA. Renova will only remove oil-impacted soil that can be safety excavated without jeopardizing the structural integrity of any aboveground or underground structures.

15.10.2 Field Screening and Confirmatory Sampling

The soils within the open excavation will be continually screened with a properly-calibrated 10.6 eV PID. Once evidence indicates that all impacted soil has been successfully removed *or* the excavation has been advanced as close as possible to the nearby buildings or underground structures, post-excavation soil samples will be collected from the open excavation. Soil samples will be collected at a frequency of one (1) sample for every thirty (30) linear feet of sidewall, and one (1) soil sample for every 900 square feet of base area. Sidewall samples will be collected from the six-inch vertical interval that exhibits the highest field evidence of petroleum contamination. In the absence of any evidence of gross contamination, sidewall samples will either be collected from the six-inch interval directly above the observed water table, if present, or from the six-inch interval above the base of the excavation, if no groundwater is observed. Soil samples will be transported to Eurofins for analysis of Category 1 EPH with a contingent analysis for naphthalene and 2-methylnaphthalene. It is assumed that the tank formerly contained diesel or #2 fuel oil. If it is determined that the tank contains or contained any other petroleum product, sampling requirements will be revised.

15.10.3 Groundwater Sampling

If groundwater is observed within the excavation, approximate depth will be noted and a groundwater sample will be collected from the excavation utilizing a one-inch diameter temporary PVC well and a dedicated, disposable Teflon-lined bailer. The groundwater sample will be transported to Eurofins for analysis of VOCs plus TICs and SVOCs plus TICs.

If the groundwater sample reports any compounds in exceedance of the applicable NJDEP GWQC, additional remediation of the soil and/or groundwater may be recommended.

15.11 Cleanup Objectives

The following cleanup objectives will only apply if the UST contained fuel oil or diesel. If the UST contained any other petroleum product or otherwise, different cleanup objectives may apply. Cleanup objectives will be applicable for both the optional tank removal and optional soil remediation.

Soil cleanup parameters for diesel or fuel oil contaminated soil are summarized on Table 2-1 of *N.J.A.C 7:26E* and cleanup objectives are listed in the *Protocol for Addressing Extractable Petroleum Hydrocarbons (Version 5.0)*. A copy of Table 2-1 and the EPH Protocol is included as **Appendix P**.

Groundwater cleanup parameters for diesel or fuel oil contaminated soil are summarized on Table 2-1 of *N.J.A.C 7:26E* and cleanup objectives for fuel oil contaminated groundwater are listed Table 1 of *N.J.A.C. 7:9C*. A copy of Table 1 is included as **Appendix Q.**

15.12 Site Closure Documentation

If no UST is discovered during the GPR investigation with test pit, an SOF will be issued detailing the investigation of the suspect area.

If tank removal and/or site remediation is completed, Renova will prepare a UST Removal Action Closure Report in accordance with NJDEP regulatory requirements and under guidance and oversight of a NJDEP registered LSRP. The report will document tank removal activities, site restoration, and any remediation performed, if completed.

16.0 WELSBACH PLANT NOBS #258 – GLOUCESTER CITY, NEW JERSEY

16.1 Site Background and Description

Welsbach Plant NOBS #258, identified as FUDS property number C02NJ0950, is located in Gloucester City, New Jersey, adjacent to Interstate 76 and the Walt Whitman Bridge and approximately 0.3 miles from the Pennsylvanian border. A site overview is included as **Figure 13** and general site features are included as **Figure 14.**

The site is part of the Welsbach and General Gas Mantle Contamination Site, currently regulated by the U.S. Environmental Protection Agency (EPA) Superfund program. The Armstrong Building, identified on **Figure 14,** is the last remaining building from the Welsbach Company's operations. Between the 1890's and 1940's, the Welsbach Company manufactured gas mantles at the Gloucester City facility. It remained the largest manufacturer of gas mantles until the turn of the 20th century, eventually going out of business in 1940. The site was placed on the EPA Superfund Program's National Priority List (NPL) in 1996 during an effort to identify properties potentially contaminated with radiological materials. In August of 2016, Arcadis U.S., Inc. of Fair Lawn, New Jersey (Arcadis) conducted radiological testing at the property, indicating that multiple locations at the Armstrong Building may be released for unrestricted use.

There are currently thirteen (13) transformers and one (1) oil switch located in the basement of the Armstrong Building that are accessible through a loading dock, vacant building, and courtyard leading to the transformer vault. Photographs and diagrams of the transformers, including access routes through the buildings/courtyards, are provided by USACE and included as **Appendix R**. Photographs collected during site reconnaissance by Renova are included as **Appendix S.**

16.2 Site Access and Security

The site is currently owned by GMT Realty LLC. POC information for site access is as follows:

Name	Phone	E-mail
Mr. Michael Fluehr, Facilities Manager	(856) 742-3009	mfluehr@holtlogistics.com

Advanced notice will be given to the POC to coordinate site access. A complete list of participant contacts for all FUDS sites encompassed under this contract is included as **Table 2.**

A Transportation Worker Identification Credential (TWIC) card will be required for all Renova personnel onsite. Renova personnel will obtain TWIC cards prior to site access and will comply with all GMT Realty requirements for site entry.

16.3 Scope of Work

Work to be completed at the former Welsbach Plant includes the following:

- Remove and dispose of trees, shrubs, or debris present in the courtyard that may present an obstacle to basement access;
- Remove door, frame, and non-structural concrete block wall from doorway between basement and courtyard;
- Remove and properly dispose of thirteen (13) transformers and one (1) oil switch in basement of Armstrong Building; and,
- Collect and analyze concrete samples if visible staining is observed at areas from which transformers are removed.

16.4 Project Schedule

Ten (10) days have been allotted for completion of all site work at the former Welsbach Plant. The most updated project schedule is included as **Appendix A**.

16.5 Site Preparation

All trees and shrubs that are present in the courtyard and block access to the basement door will be removed, chipped, and spread onsite. Replanting of the trees and shrubs is not required.

Once the access route to the basement door has been cleared, the door, frame, and adjacent non-structural concrete block wall will be removed and all debris from the demolition will remain onsite for disposal by others. Stanchion lighting will be set up in the basement transformer vault and the access stairways, as electrical service is not available inside the Armstrong Building.

16.6 Transformer and Oil Switch Disposal

TCI of NY, LLC of Coeymans, New York (TCI) will be responsible for sampling of all transformer and oil switch contents, disposal of all contents, and disposal of transformer and oil switch debris. The contents of each transformer or oil switch will first be sampled to determine the concentration of PCBs within the unit. Contents will be segregated and disposed of according to their PCB concentration. Manifests will be generated by TCI for transportation and disposal of the transformer oil.

Transformers containing in excess of 300 gallons of fluid with a PCB concentration of greater than fifty (50) parts per million (ppm) will be drained into 55-gallon steel drums prior to transportation.

The transformers, oil switch, and their contents will be removed from the Armstrong Building and transported by TCI for disposal or recycling, dependent upon the PCB concentration.

16.7 Concrete Sampling

If visible stains are observed in the concrete below the former locations of the transformers and oil switch, a maximum of eight (8) concrete samples will be collected and transported to Eurofins for analysis of Category 2 EPH and PCBs with a contingent analysis for Polycyclic Aromatic Hydrocarbons (PAH). If EPH, PCB, or PAH contamination above the NJDEP Residential Direct Contact Soil Remediation Standard (RDCSRS) is confirmed, additional remediation of the concrete will be recommended.

16.8 Site Closure Documentation

Renova will prepare a Site Closure Report including a narrative of all work completed and photographic documentation of the site work.

17.0 REFERENCES

US Army Corps of Engineers – Formerly Used Defense Sites Program: http://www.usace.army.mil/Missions/Environmental/Formerly-Used-Defense-Sites/

Atlas F Missile Silo Renovation: http://www.killerjeanne.com

556th Strategic Missile Squadron: http://www.556sms.com/

USAF CONUS Gap-Filler Radar Sites: http://www.radomes.org/museum/acwgapfiller.php

Final Status Survey of the Armstrong Building, Operable Unit 2, Class 2 and Class 3 Survey Units (Arcadis U.S., Inc., August 2016)

NYSDEC Memorandum: Permanent Closure of Petroleum Storage Tanks (January 1987, modified July 1988 and December 2003)

NYSDEC CP-51 Soil Cleanup Guidance (October 2010)

NYSDEC DER-10 Technical Guidance for Site Investigation and Remediation (May 2010)

NYSDEC Memorandum: Division of Water Technical and Operation Guidance Series (1.1.1) Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations (June 1998)

N.J.A.C 7:9C Ground Water Quality Standards (amended July 2010, readopted March 2014)

N.J.A.C. 7:26E Technical Requirements for Site Remediation (May 2012)

N.J.A.C 7:26D Remediation Standards (May 2012)

NJDEP Protocol for Addressing Extractable Petroleum Hydrocarbons (Version 5.0, August 2010)

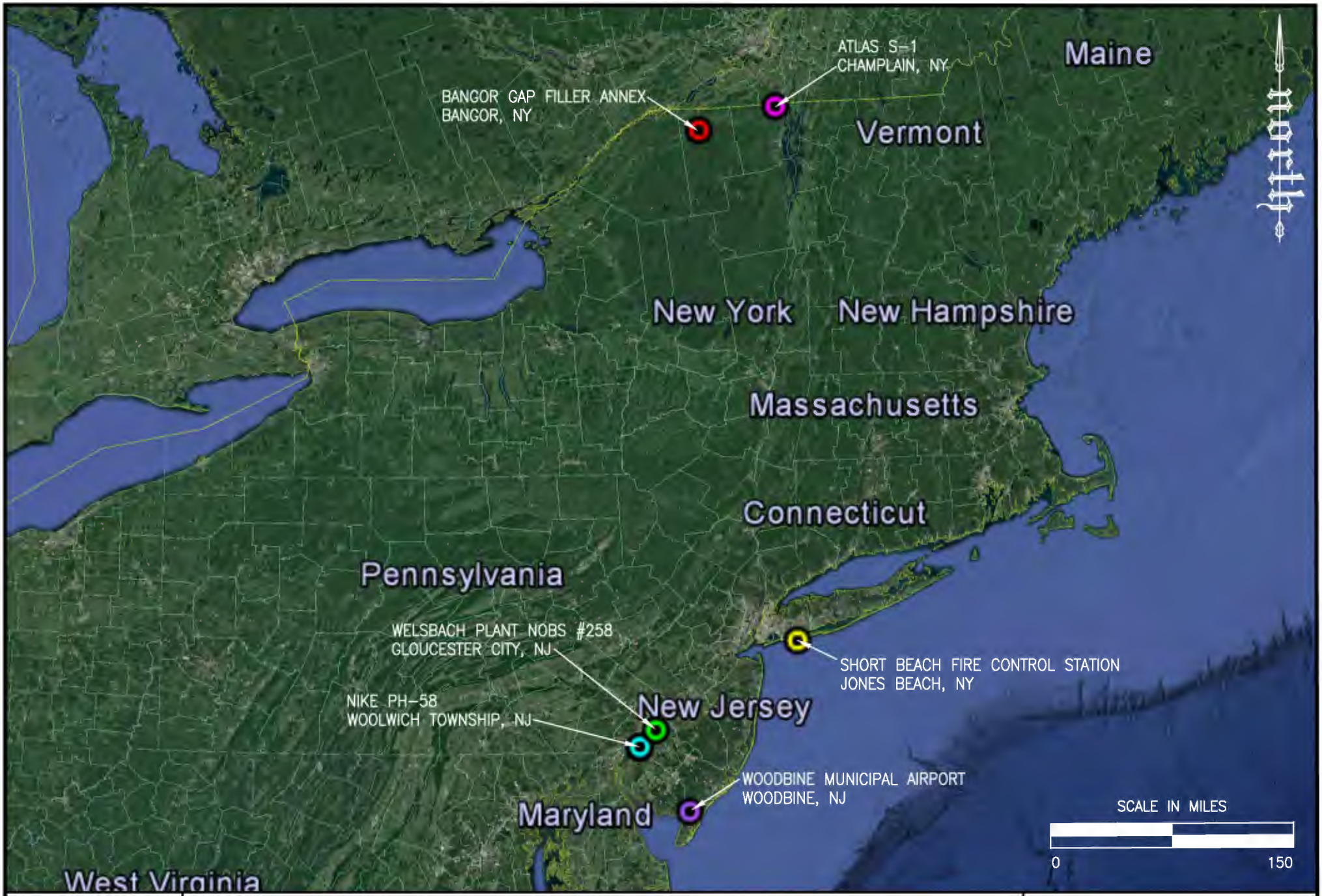
Site Safety and Health Plan and Accident Prevention Plan for FY16 FUDS NY/NJ (November 2016)

Contractor Quality Control Plan for FY16 FUDS NY/NJ (November 2016)

Environmental Protection Plan for FY16 FUDS NY/NJ (November 2016)

Quality Assurance Project Plan for FY16 FUDS NY/NJ (November 2016)

FIGURES



RENOVA
environmental services
3417 SUNSET AVENUE
OCEAN TOWNSHIP, NJ 07712
PHONE: (732) 659-1000
www.renovaenviro.com

LEGEND:

- SHORT BEACH FIRE CONTROL STATION
- WELSBACH PLANT NOBS #258
- NIKE PH-58
- WOODBINE MUNICIPAL AIRPORT
- BANGOR GAP FILLER ANNEX
- ATLAS S-1

FUDS LOCATION OVERVIEW

U.S. ARMY CORPS OF ENGINEERS FY16 FUDS NY/NJ
CONTRACT #W912WJ-16-C-0024

DATE: 11/10/2016

FIGURE # 1

RENOVA
environmental services
3417 SUNSET AVENUE
OCEAN TOWNSHIP, NJ 07712
PHONE: (732) 659-1000
www.renovaenviro.com

LEGEND:

SITE LOCATION

SCALE IN FEET

0 500

BANGOR GAP FILLER ANNEX: BANGOR, NY
SITE OVERVIEW

U.S. ARMY CORPS OF ENGINEERS FY16 FUDS NY/NJ
CONTRACT #W912WJ-16-C-0024

DATE: 11/10/2016

FIGURE # 2

* The location of silt fencing, hay bales, and staging areas, if necessary, will be determined upon completion of site reconnaissance and identification of local topography, sensitive receptors, wetlands, storm drains, etc.

RENOVA
environmental services
3417 SUNSET AVENUE
OCEAN TOWNSHIP, NJ 07712
PHONE: (732) 659-1000
www.renovaenviro.com

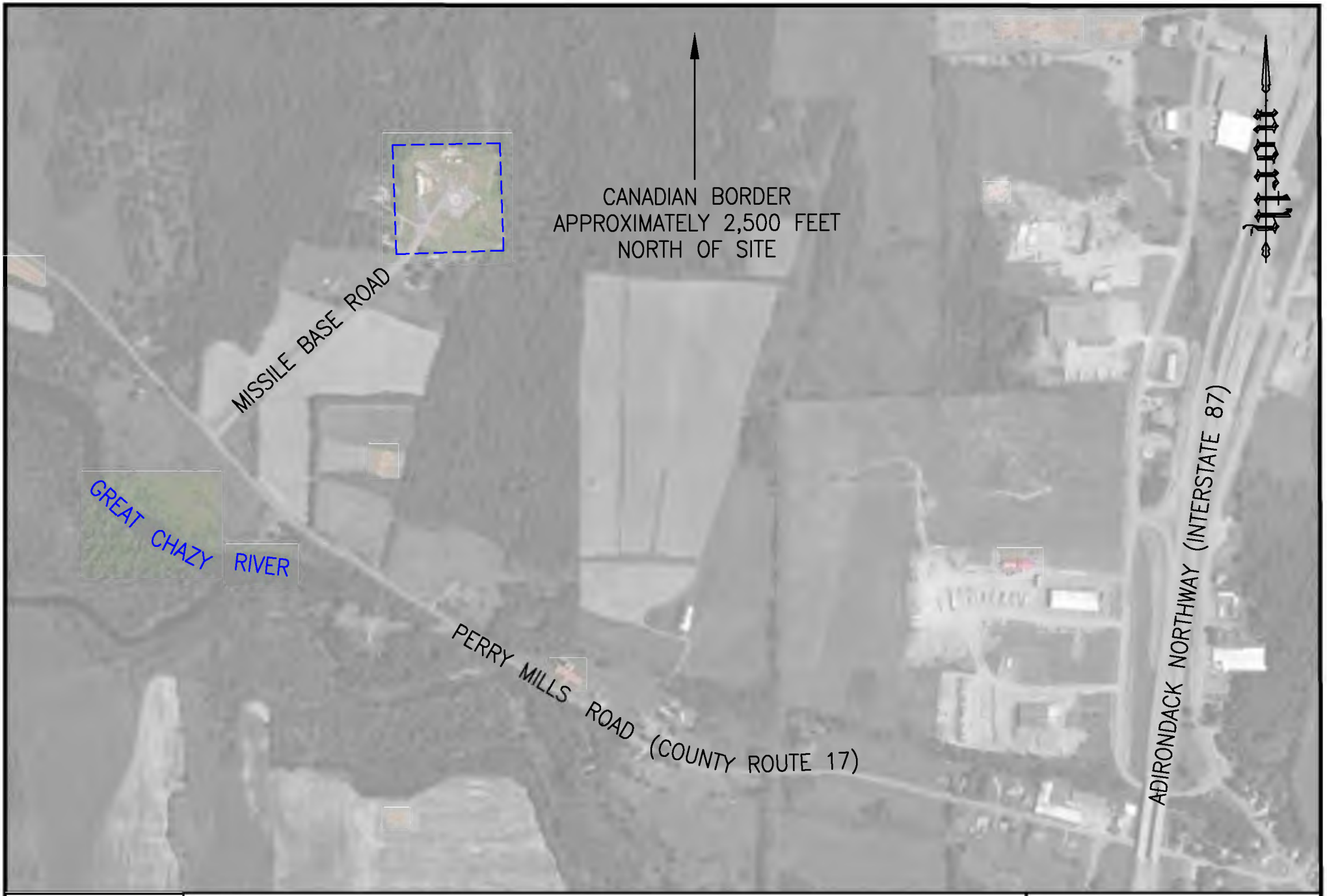
LEGEND:

- PERIMETER FENCING
- RADAR TOWER
- ABOVEGROUND STORAGE TANK (AST) LOCATIONS
- ENTRY POINT

SCALE IN FEET
0 25

BANGOR GAP FILLER ANNEX: BANGOR, NY
SITE PLAN WITH TANK LOCATIONS
U.S. ARMY CORPS OF ENGINEERS FY16 FUDS NY/NJ
CONTRACT #W912WJ-16-C-0024

DATE: 11/10/2016 | FIGURE # 3



RENOVA
environmental services
3417 SUNSET AVENUE
OCEAN TOWNSHIP, NJ 07712
PHONE: (732) 659-1000
www.renovaenviro.com

LEGEND:

SITE LOCATION

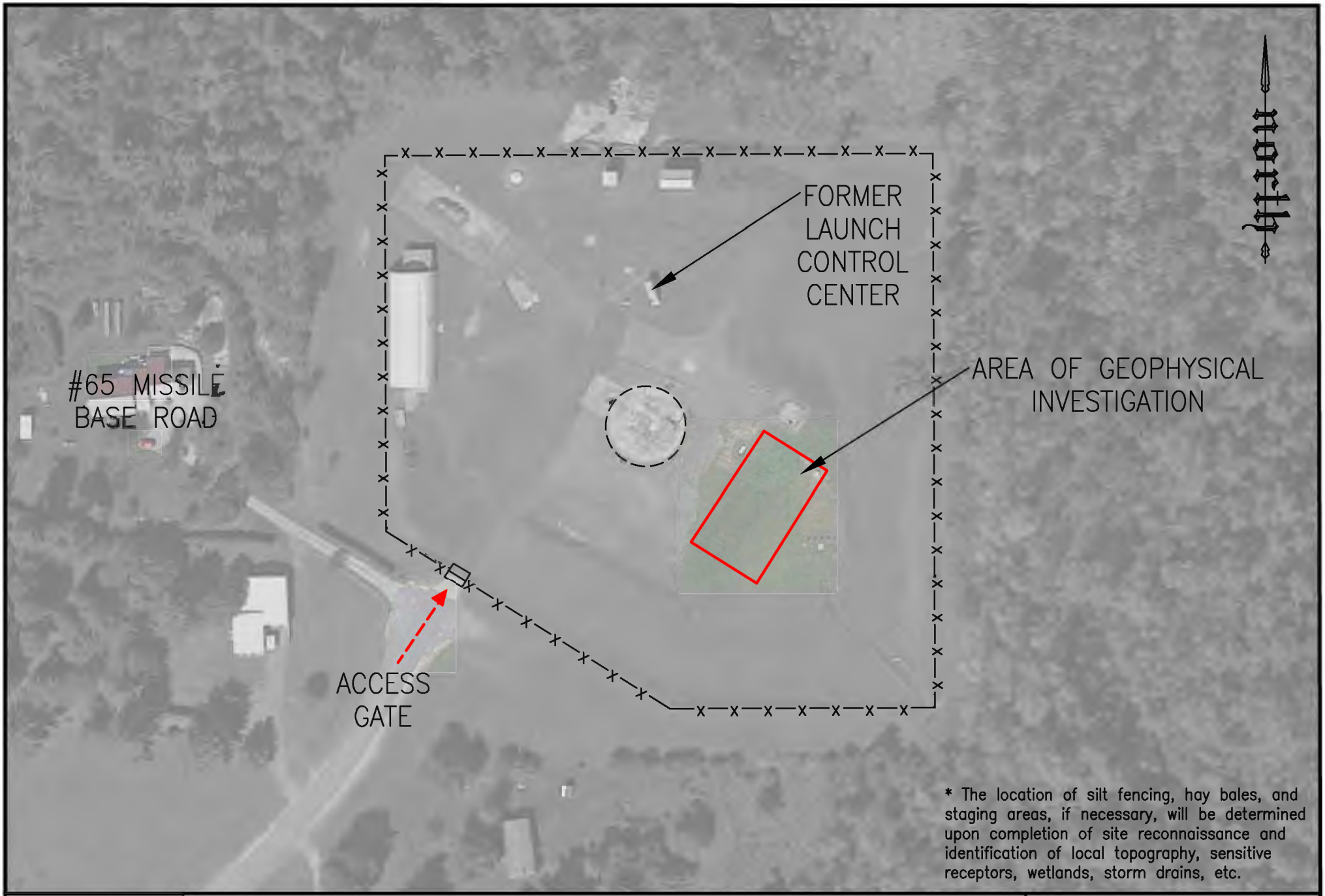
SCALE IN FEET

0 1000

ATLAS S-1: CHAMPLAIN, NY
SITE OVERVIEW
U.S. ARMY CORPS OF ENGINEERS FY16 FUDS NY/NJ
CONTRACT #W912WJ-16-C-0024

DATE: 11/10/2016

FIGURE # 4



* The location of silt fencing, hay bales, and staging areas, if necessary, will be determined upon completion of site reconnaissance and identification of local topography, sensitive receptors, wetlands, storm drains, etc.

RENOVA environmental services
3417 SUNSET AVENUE
OCEAN TOWNSHIP, NJ 07712
PHONE: (732) 659-1000
www.renovaenviro.com

LEGEND:

- PERIMETER FENCING
- FORMER MISSILE SILO
- AREA OF GEOPHYSICAL INVESTIGATION
- ENTRY POINT

SCALE IN FEET
0 100

ATLAS S-1: CHAMPLAIN, NY
SITE PLAN
U.S. ARMY CORPS OF ENGINEERS FY16 FUDS NY/NJ
CONTRACT #W912WJ-16-C-0024

DATE: 11/10/2016 | FIGURE # 5

RENOVA
environmental services
3417 SUNSET AVENUE
OCEAN TOWNSHIP, NJ 07712
PHONE: (732) 659-1000
www.renovaenviro.com

LEGEND:

SITE LOCATION

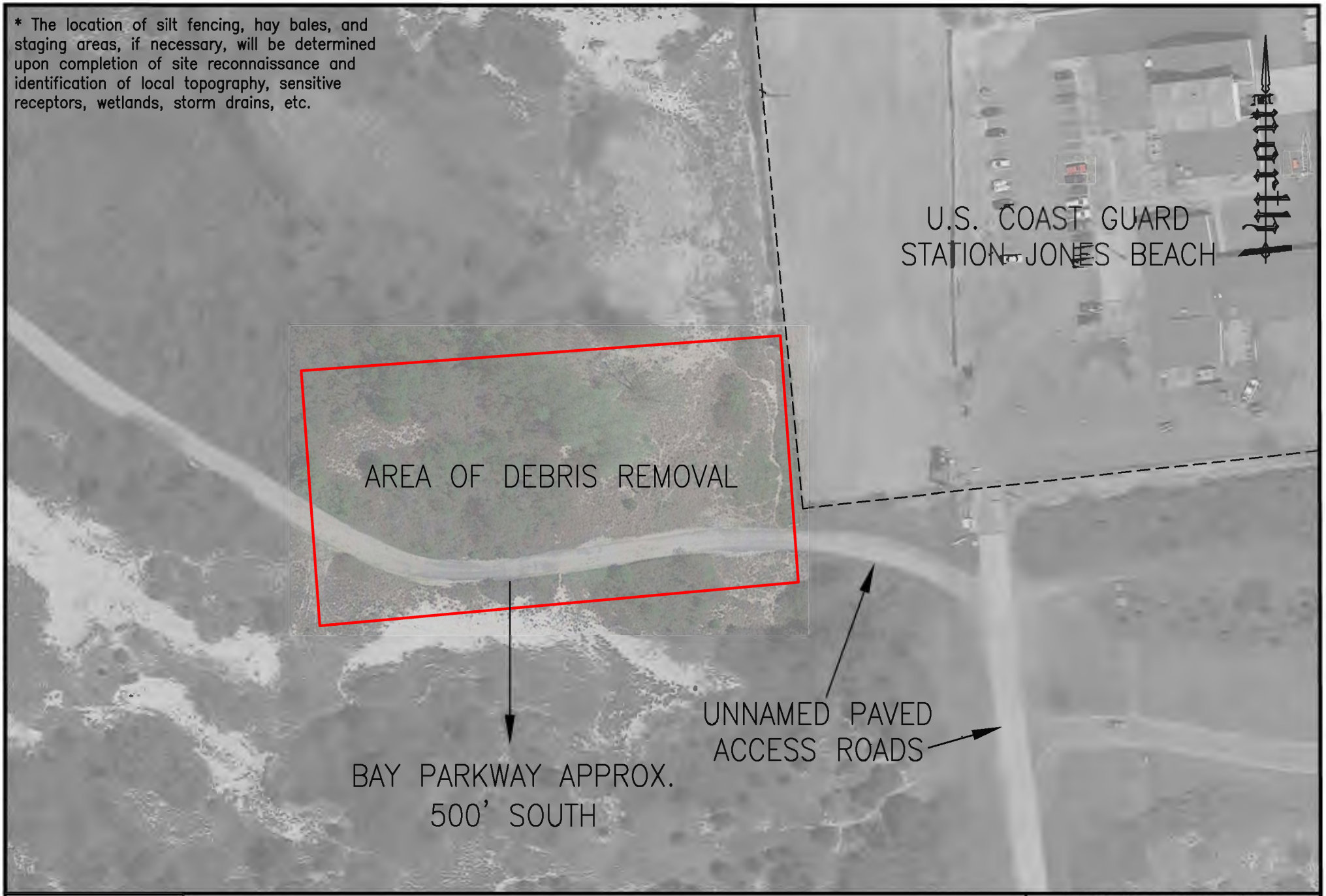
SCALE IN FEET

0 1500

SHORT BEACH FIRE CONTROL STATION:
JONES BEACH, NY
SITE OVERVIEW
U.S. ARMY CORPS OF ENGINEERS FY16 FUDS NY/NJ
CONTRACT #W912WJ-16-C-0024

DATE: 11/10/2016

FIGURE # 6



RENOVA environmental services
3417 SUNSET AVENUE
OCEAN TOWNSHIP, NJ 07712
PHONE: (732) 659-1000
www.renovaenviro.com

LEGEND:

COAST GUARD PROPERTY

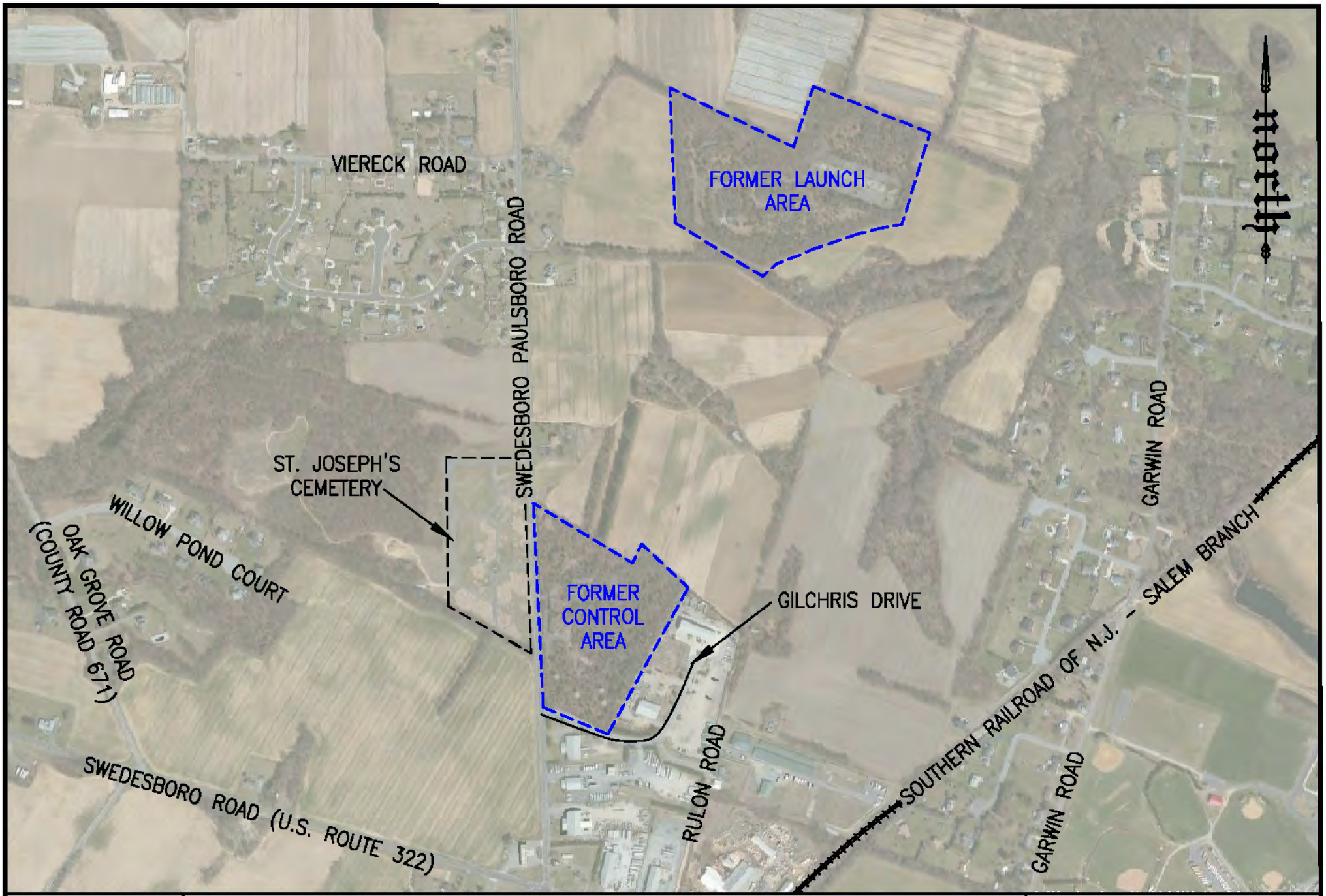
FORMER SHORT BEACH FIRE CONTROL STATION

SCALE IN FEET
0 100

SHORT BEACH FIRE CONTROL STATION:
JONES BEACH, NY
SITE PLAN
U.S. ARMY CORPS OF ENGINEERS FY16 FUDS NY/NJ
CONTRACT #W912WJ-16-C-0024

DATE: 11/10/2016

FIGURE # 7



RENOVA
environmental services
3417 SUNSET AVENUE
OCEAN TOWNSHIP, NJ 07712
PHONE: (732) 698-1000
www.renovaenviro.com

LEGEND:

SITE LOCATION

FREIGHT RAILROAD

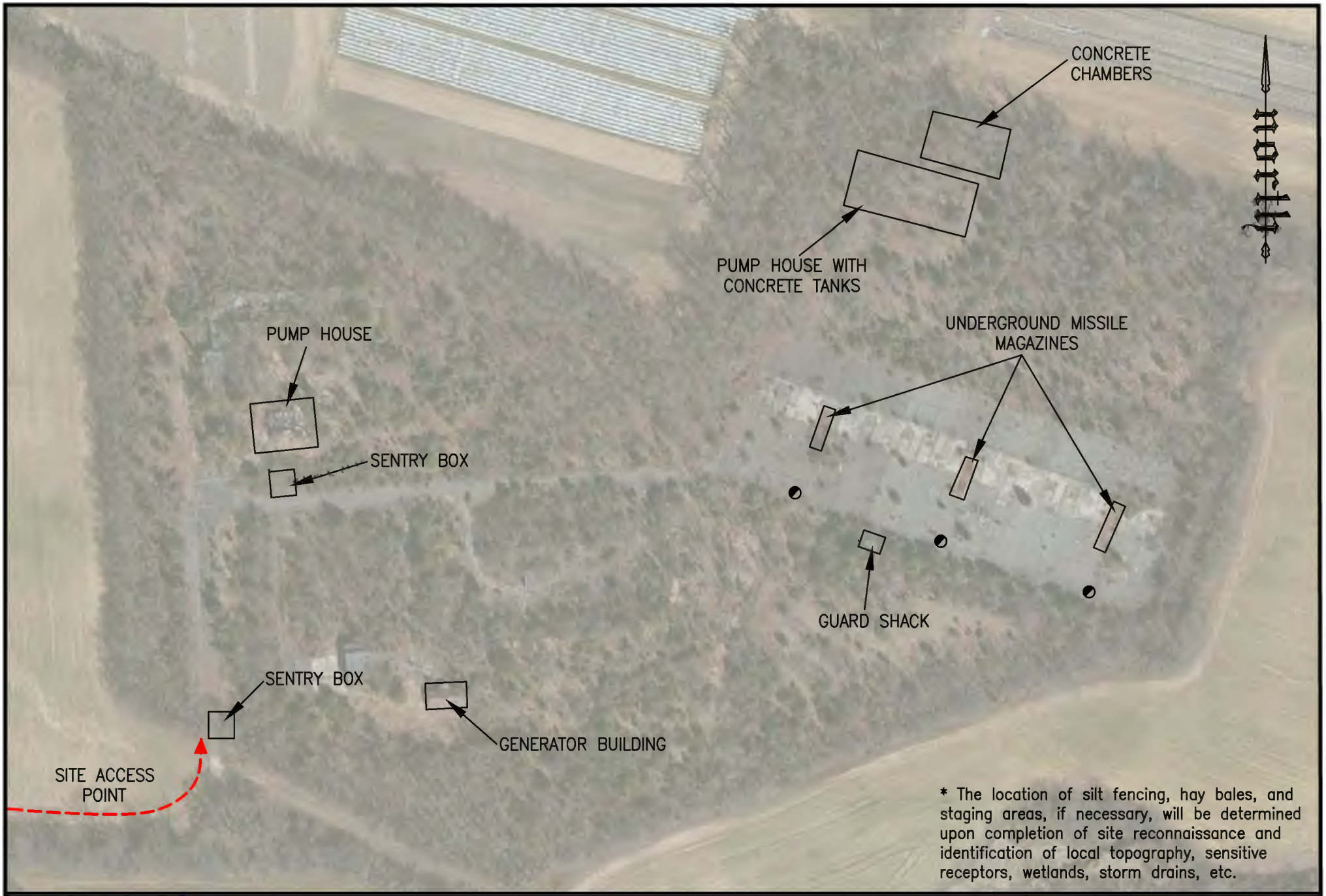
SCALE IN FEET

0 1000

NIKE PH-58: WOOLWICH TWP, NJ
SITE OVERVIEW
U.S. ARMY CORPS OF ENGINEERS FY16 FUDS NY/NJ
CONTRACT #W912WJ-16-C-0024

DATE: 11/10/2016

FIGURE # 8



* The location of silt fencing, hay bales, and staging areas, if necessary, will be determined upon completion of site reconnaissance and identification of local topography, sensitive receptors, wetlands, storm drains, etc.

RENOVA
environmental services
3417 SUNSET AVENUE
OCEAN TOWNSHIP, NJ 07712
PHONE: (732) 659-1000
www.renovaenviro.com

LEGEND:

OPEN MANHOLES

ENTRY POINT

SCALE IN FEET

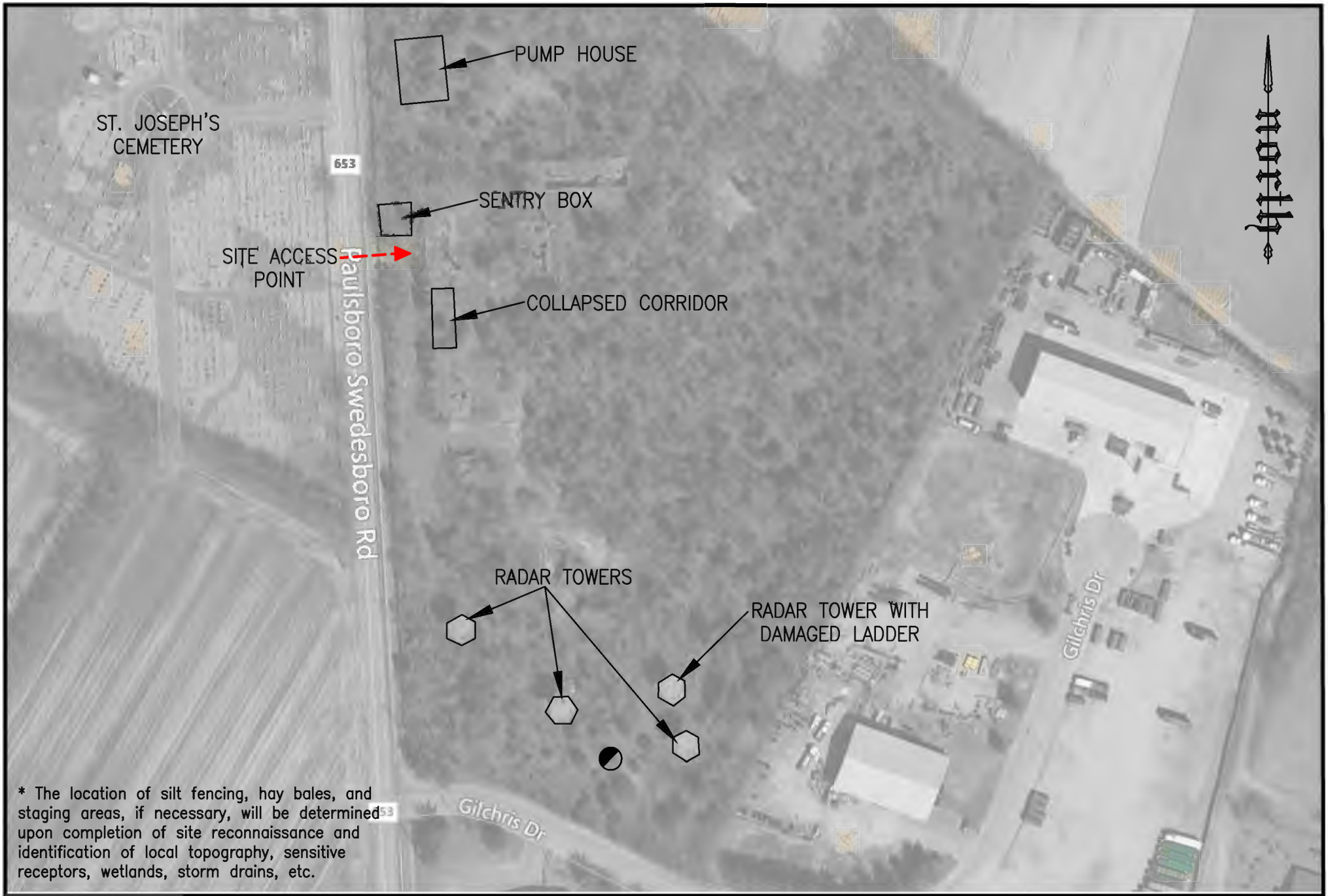
0 200

NIKE PH-58: WOOLWICH TWP, NJ
FORMER LAUNCH AREA

U.S. ARMY CORPS OF ENGINEERS FY16 FUDS NY/NJ
CONTRACT #W912WJ-16-C-0024

DATE: 11/10/2016

FIGURE # 9



RENOVA
environmental services
3417 SUNSET AVENUE
OCEAN TOWNSHIP, NJ 07712
PHONE: (732) 659-1000
www.renovaenviro.com

LEGEND:

OPEN MANHOLE

ENTRY POINT

SCALE IN FEET

0 200

NIKE PH-58: WOOLWICH TWP, NJ
FORMER CONTROL AREA

U.S. ARMY CORPS OF ENGINEERS FY16 FUDS NY/NJ
CONTRACT #W912WJ-16-C-0024

DATE: 11/10/2016

FIGURE # 10

RENOVA
environmental services
3417 SUNSET AVENUE
OCEAN TOWNSHIP, NJ 07712
PHONE: (732) 659-1000
www.renovaenviro.com

LEGEND:

SITE LOCATION

PASSENGER RAILROAD

SCALE IN FEET

0 1000

WOODBINE MUNICIPAL AIRPORT: WOODBINE, NJ
SITE OVERVIEW

U.S. ARMY CORPS OF ENGINEERS FY16 FUDS NY/NJ
CONTRACT #W912WJ-16-C-0024

DATE: 11/10/2016

FIGURE # 11

* The location of silt fencing, hay bales, and staging areas, if necessary, will be determined upon completion of site reconnaissance and identification of local topography, sensitive receptors, wetlands, storm drains, etc.

RENOVA
environmental services
3417 SUNSET AVENUE
OCEAN TOWNSHIP, NJ 07712
PHONE: (732) 659-1000
www.renovaenviro.com

LEGEND:

ENTRY POINT

AREA OF GEOPHYSICAL INVESTIGATION

SCALE IN FEET

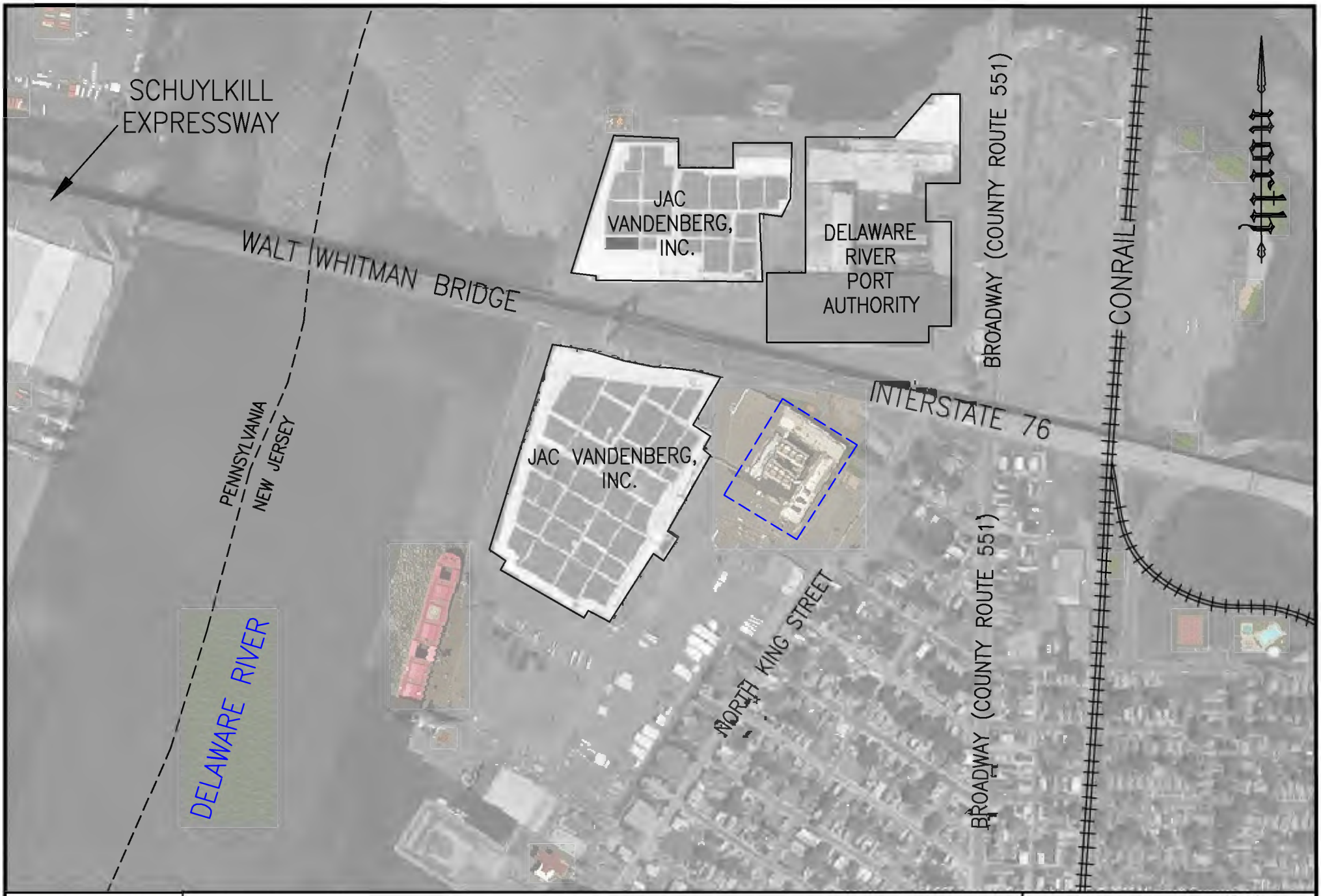
0 50

WOODBINE MUNICIPAL AIRPORT: WOODBINE, NJ
SITE PLAN

U.S. ARMY CORPS OF ENGINEERS FY16 FUDS NY/NJ
CONTRACT #W912WJ-16-C-0024

DATE: 11/10/2016

FIGURE # 12



RENOVA
environmental services
3417 SUNSET AVENUE
OCEAN TOWNSHIP, NJ 07712
PHONE: (732) 659-1000
www.renovaenviro.com

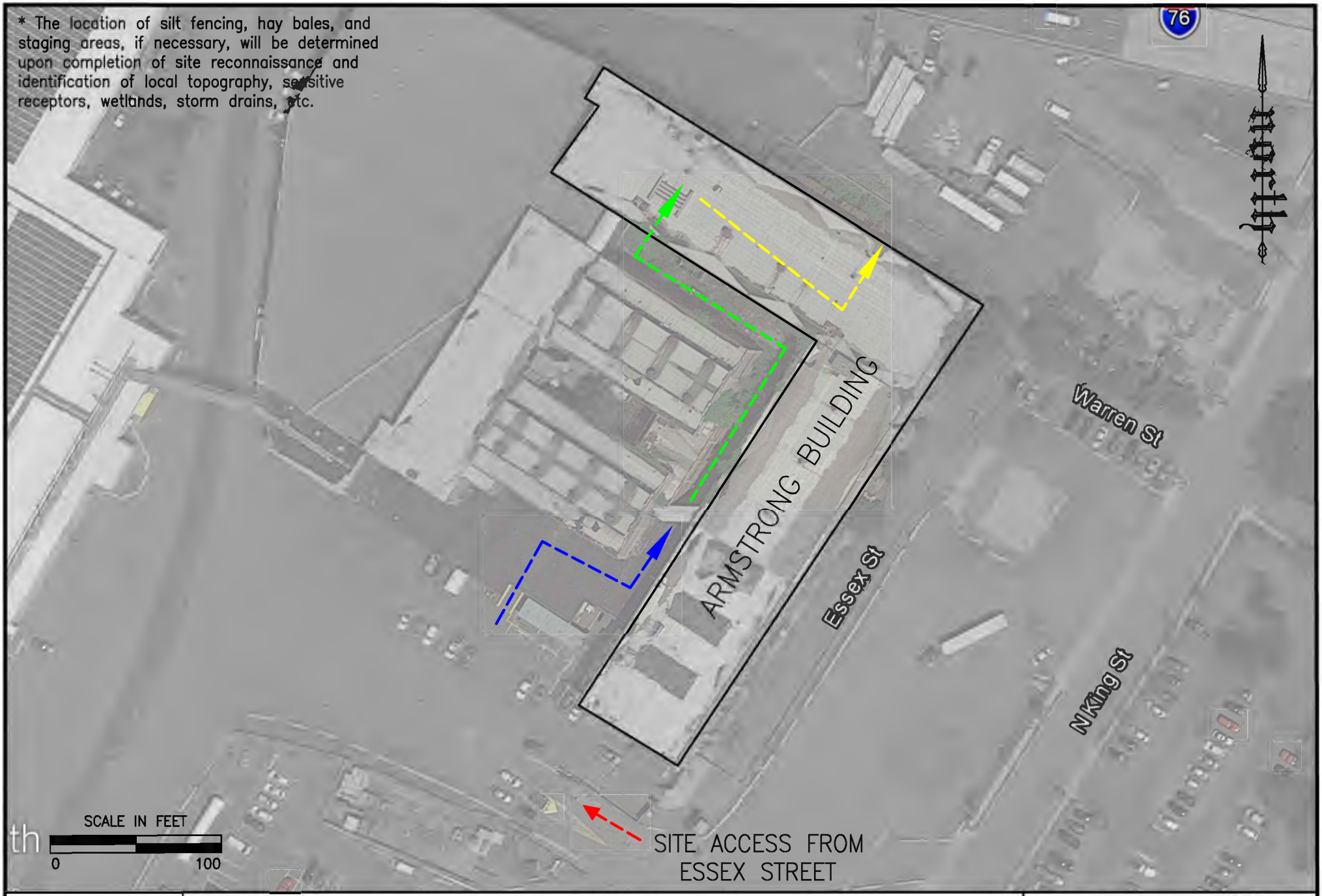
LEGEND:

- SITE LOCATION
- FREIGHT RAILROAD
- PENNSYLVANIA/ NEW JERSEY BORDER

SCALE IN FEET
0 500

WELSBACH PLANT NOBS #258:
GLOUCESTER CITY, NJ
SITE OVERVIEW
U.S. ARMY CORPS OF ENGINEERS FY16 FUDS NY/NJ
CONTRACT #W912WJ-16-C-0024

DATE: 11/10/2016 | FIGURE # 13



RENOVA
environmental services
3417 SUNSET AVENUE
OCEAN TOWNSHIP, NJ 07712
PHONE: (732) 659-1000
www.renovaenviro.com

LEGEND:

- ROUTE FROM LOADING DOCK TO COURTYARD
- ROUTE THROUGH COURTYARD TO ACCESS BASEMENT
- ROUTE THROUGH ARMSTRONG BUILDING TO TRANSFORMER VAULT
- ENTRY POINT

WELSBACH PLANT NOBS #258:
GLOUCESTER CITY, NJ
SITE PLAN
U.S. ARMY CORPS OF ENGINEERS FY16 FUDS NY/NJ
CONTRACT #W912WJ-16-C-0024

DATE: 11/10/2016

FIGURE # 14

TABLE 1

Table 1
Project Personnel Roles and Responsibilities
U.S. Army Corps of Engineers
FUDS FY16 NY/NJ
USACE Contract #W912WJ-16-C-0024

Name(s)	Title	Organizational Affiliation	Responsibilities
Susanne Grant	Contracting Officer's Representative and Project Engineer	USACE	Oversees project implementation, including scoping, document review, and data evaluation.
Paulo Heyman	Program Manager	Renova	Serves as single point of contact to USACE representatives. Manages and ensures adherence to schedule, performance milestones, and budgets. Tracks and monitors cost and schedule and issues weekly and monthly cost/schedule reports as necessary. Approves final reports.
Stacey Felts-Bock	Project Manager	Renova	Day-to-day management and coordination of project scope, subcontractors, field personnel schedule, and budget. Responsible for communicating with Site Superintendent(s) to assure proper project documentation.
Mikhail Gutchigian	QA/QC Manager	Renova	Ensures quality aspects of the project are implemented, documented, and maintained. Reviews work plans, technical reports, fact sheets, and other documents.
Eric Scholey James Matulis	Health and Safety Officer Site Superintendent	Renova	Implements the Health and Safety program for the project. Conducts safety training. Performs safety audits and implements corrective actions, as necessary. Suspends work for unsafe conditions. Approves changes to APP/SSHPs. Maintains accident and safety incident investigation reports.

TABLE 2

Table 2
Project Participant Contact List
U.S. Army Corps of Engineers
FUDS FY16 NY/NJ
USACE Contract #W912WJ-16-C-0024

Associated Site	Organizational Affiliation	Contact Name	Title or Relationship to Site	Mailing Address	Phone Number	E-mail
ALL SITES	USACE	Susanne Grant	Contracting Officer's Representative and Project Engineer	696 Virginia Road Concord, MA 01742	978-318-8354 (office) 978-831-2919 (cell)	Susanne.A.Grant@usace.army.mil
ALL SITES	Renova Environmental Services LLC	Paulo Heyman	Program Manager	3417 Sunset Avenue Ocean Township, NJ 07712	732-659-1000 (office) 609-492-4600 (cell)	pheyman@renovaenviro.com
ALL SITES	Renova Environmental Services LLC	Stacey Felts-Bock	Project Manager	3417 Sunset Avenue Ocean Township, NJ 07712	732-659-1000 (office) 973-207-1820 (cell)	stacey@renovaenviro.com
ALL SITES	Renova Environmental Services LLC	Mikhail Gutchigian	QA/QC Manager	3417 Sunset Avenue Ocean Township, NJ 07712	732-659-1000 (office) 609-489-9209 (cell)	mick@renovaenviro.com
ALL SITES	Renova Environmental Services LLC	Kelly Giles	Project Scientist	3417 Sunset Avenue Ocean Township, NJ 07712	732-659-1000 (office) 732-513-4906 (cell)	kelly@renovaenviro.com
ALL SITES	Renova Environmental Services LLC	Eric Scholey	Site Superintendent and Site Safety and Health Officer	3417 Sunset Avenue Ocean Township, NJ 07712	732-309-6503 (cell)	n/a
ALL SITES	Renova Environmental Services LLC	James Matulis	Alternate Site Superintendent and Site Safety and Health Officer	3417 Sunset Avenue Ocean Township, NJ 07712	732-600-6997 (cell)	n/a
ALL SITES	Renova Environmental Services LLC	Anthony Denora	Equipment Operator	3417 Sunset Avenue Ocean Township, NJ 07712	732-684-4990 (cell)	n/a
ALL SITES	Renova Environmental Services LLC	Jonathan Leso	Laborer	3417 Sunset Avenue Ocean Township, NJ 07712	609-290-6104 (cell)	n/a
ALL SITES	Renova Environmental Services LLC	Nick Vollrath	Laborer	3417 Sunset Avenue Ocean Township, NJ 07712	609-361-4211 (cell)	n/a
ALL SITES	Renova Environmental Services LLC	Joshua Stewart	Laborer	3417 Sunset Avenue Ocean Township, NJ 07712	908-839-8032 (cell)	n/a
ALL SITES	Renova Environmental Services LLC	Ryan Bilgrav	Staff Scientist	3417 Sunset Avenue Ocean Township, NJ 07712	732-659-1000 (office) 609-489-2076 (cell)	ryan@renovaenviro.com
ALL SITES	Renova Environmental Services LLC	Erik Charette	Staff Scientist	3417 Sunset Avenue Ocean Township, NJ 07712	732-659-1000 (office) 609-489-1913 (cell)	erik@renovaenviro.com
Bangor Gap Filler Annex	U.S. Customs and Border Protection	Stephen Fuller	Property Manager	1 Pennsylvania Plaza New York, NY 10119	518-298-7278	stephen.m.fuller@dhs.gov
Atlas S-1	n/a - Private Homeowner	Gerald "Fitz" Fitzpatrick	Property Owner	67 Missile Base Road Champlain, NY	614-517-3660	fitzfoot@gmail.com
Welsbach Plant NOBS #258	GMT Realty LLC	Michael Fluehr	Facilities Manager	101 S. King Street Gloucester City, NJ 08030	856-742-3009	mfluehr@holtlogistics.com

TABLE 3

Table 3
Deliverables
U.S. Army Corps of Engineers
FUDS FY16 NY/NJ
USACE Contract #W912WJ-16-C-0024

Deliverable	Due Date
Accident Prevention Plan ▪ Site Safety and Health Plan	*Preliminary Draft* = 10 November 2016 *Draft* = Within 14 days of receipt of USACE comments *Final* = Within 7 days of receipt of all comments
Quality Assurance Project Plan ▪ Field Sampling Plan	*Preliminary Draft* = 18 November 2016 *Draft* = Within 14 days of receipt of USACE comments *Final* = Within 7 days of receipt of all comments
Contractor Quality Control Plan	*Preliminary Draft* = 10 November 2016 *Draft* = Within 14 days of receipt of USACE comments *Final* = Within 7 days of receipt of all comments
Work Plan ▪ Environmental Protection Plan ▪ Storm Water Management Plan ▪ Erosion and Sediment Control Plan	*Preliminary Draft* = 10 November 2016 *Draft* = Within 14 days of receipt of USACE comments *Final* = Within 7 days of receipt of all comments
Bangor Gap Filler Annex Site Closure Report	*Preliminary Draft* = Within 14 days of completion of remediation task(s) *Draft* = Within 14 days of receipt of USACE comments *Final* = Within 7 days of receipt of all comments
Atlas S-1 Site Closure Report	*Preliminary Draft* = Within 14 days of completion of remediation task(s) *Draft* = Within 14 days of receipt of USACE comments *Final* = Within 7 days of receipt of all comments
Short Beach Fire Control Station Site Closure Report	*Preliminary Draft* = Within 14 days of completion of remediation task(s) *Draft* = Within 14 days of receipt of USACE comments *Final* = Within 7 days of receipt of all comments
Nike PH-58 Site Closure Report	*Preliminary Draft* = Within 14 days of completion of remediation task(s) *Draft* = Within 14 days of receipt of USACE comments *Final* = Within 7 days of receipt of all comments
Woodbine Municipal Airport Site Closure Report	*Preliminary Draft* = Within 14 days of completion of remediation task(s) *Draft* = Within 14 days of receipt of USACE comments *Final* = Within 7 days of receipt of all comments
Welsbach Plant NOBS #258 Site Closure Report	*Preliminary Draft* = Within 14 days of completion of remediation task(s) *Draft* = Within 14 days of receipt of USACE comments *Final* = Within 7 days of receipt of all comments

TABLE 4

Table 4
Document Distribution
U.S. Army Corps of Engineers
FUDS FY16 NY/NJ
USACE Contract #W912WJ-16-C-0024

List A: Internal Preliminary-Draft Documents			
Agency	*Hard Copy*	*Digital Copy (FTP or E-mail)*	*Digital Copy (CD)*
United States Army Corps of Engineers	4	1	0
New Jersey Department of Environmental Protection	0	0	0
New York State Department of Environmental Conservation	0	0	0

List B: Internal Draft Documents			
Agency	*Hard Copy*	*Digital Copy (FTP or E-mail)*	*Digital Copy (CD)*
United States Army Corps of Engineers	4	0	2
New Jersey Department of Environmental Protection	2	0	1
New York State Department of Environmental Conservation	2	0	1

List C: Final Documents			
Agency	*Hard Copy*	*Digital Copy (FTP or E-mail)*	*Digital Copy (CD)*
United States Army Corps of Engineers	4	0	2
New Jersey Department of Environmental Protection	2	0	1
New York State Department of Environmental Conservation	2	0	1

TABLE 5

Table 5
Project Subcontractors
U.S. Army Corps of Engineers
FUDS FY16 NY/NJ
USACE Contract #W912WJ-16-C-0024

Associated Site	Company or Agency	Contact Name	Trade	Mailing Address	Phone Number	E-mail
Bangor Gap Filler Annex	Sun Environmental Corporation	Sherrie Lynch	Vacuum Truck Services	4655 Crossroads Park Drive Liverpool, NY 13088	315-218-6995	
Bangor Gap Filler Annex	County of Franklin Solid Waste Management Authority	Ellen Hooker Clookey	Soil Disposal	820 County Route 20 Constable, NY 12926	518-483-8270, #1 (office) 315-244-9371 (cell)	cfswma@westelcom.com
Bangor Gap Filler Annex	ST Trucking LLC	Steve Trimm	Soil Transport	686 County Road 38 Norfolk, NY 13667	315-244-5333 (cell) 315-384-3260 (office)	
Bangor Gap Filler Annex	Rafferty Sand & Gravel LLC	Tom Rafferty	Backfill Material	2735 Military Turnpike West Chazy, NY 12992	518-563-9179 (office) 518-726-0655 (office) 518-563-9465 (cell)	tom@raffertysandandgravel.com
Bangor Gap Filler Annex	*TBD*		Scrap Metal Transport	*TBD*		
Bangor Gap Filler Annex	*TBD*		Scrap Metal Recycling	*TBD*		
Bangor Gap Filler Annex	*TBD*		Concrete Debris Transporter	*TBD*		
Bangor Gap Filler Annex	*TBD*		Concrete Debris Disposal	*TBD*		
Atlas S-1	Subterra Locating Services	Chris Ingram	GPR Investigation	77 Vermont Avenue Colchester, VT 05446	802-557-8354	info@subterravt.com
Atlas S-1	*TBD*		Scrap Metal Transport	*TBD*		
Atlas S-1	*TBD*		Scrap Metal Recycling	*TBD*		
Short Beach Fire Control Station	*TBD*		Debris Container Disposal	*TBD*		
Short Beach Fire Control Station	*TBD*		Debris Container Transporter	*TBD*		
Short Beach Fire Control Station	*TBD*		Backfill Material	*TBD*		
Short Beach Fire Control Station	*TBD*		Beach Grass Plugs	*TBD*		
Nike PH-58	Rob Tucher Photographic Documentation	Rob Tucher	Archival Photographer	6 River Road High Bridge, NJ 08829	908-310-9490	rob@tucherphoto.com
Nike PH-58	The Vertex Companies, Inc.	Russell Fitzpatrick	ACM/Lead Survey and Certified Industrial Hygieniest	700 Turner Way Aston, PA 19014	610-558-8902	rfitzpatrick@vertexeng.com
Nike PH-58	Ecoservices, LLC	Linda DeNenno	Asbestos Abatement	407 W. Lincoln Highway, Suite 500 Exton, PA 19341	484-872-8884	ldenenno@eco-pa.com
Nike PH-58	Stella Contracting, Inc.	n/a	Land Clearing	586 Rt. 40, PO Box 902 Elmer, NJ 08318	856-358-1342	info@stellacontracting.com
Nike PH-58	Garden State Precast, Inc.	Nick Papapietro	Precast Concrete Planks	1630 Wyckoff Road Wall Township, NJ 07727	732-938-4436	npapapietro@gardenstateprecast.com

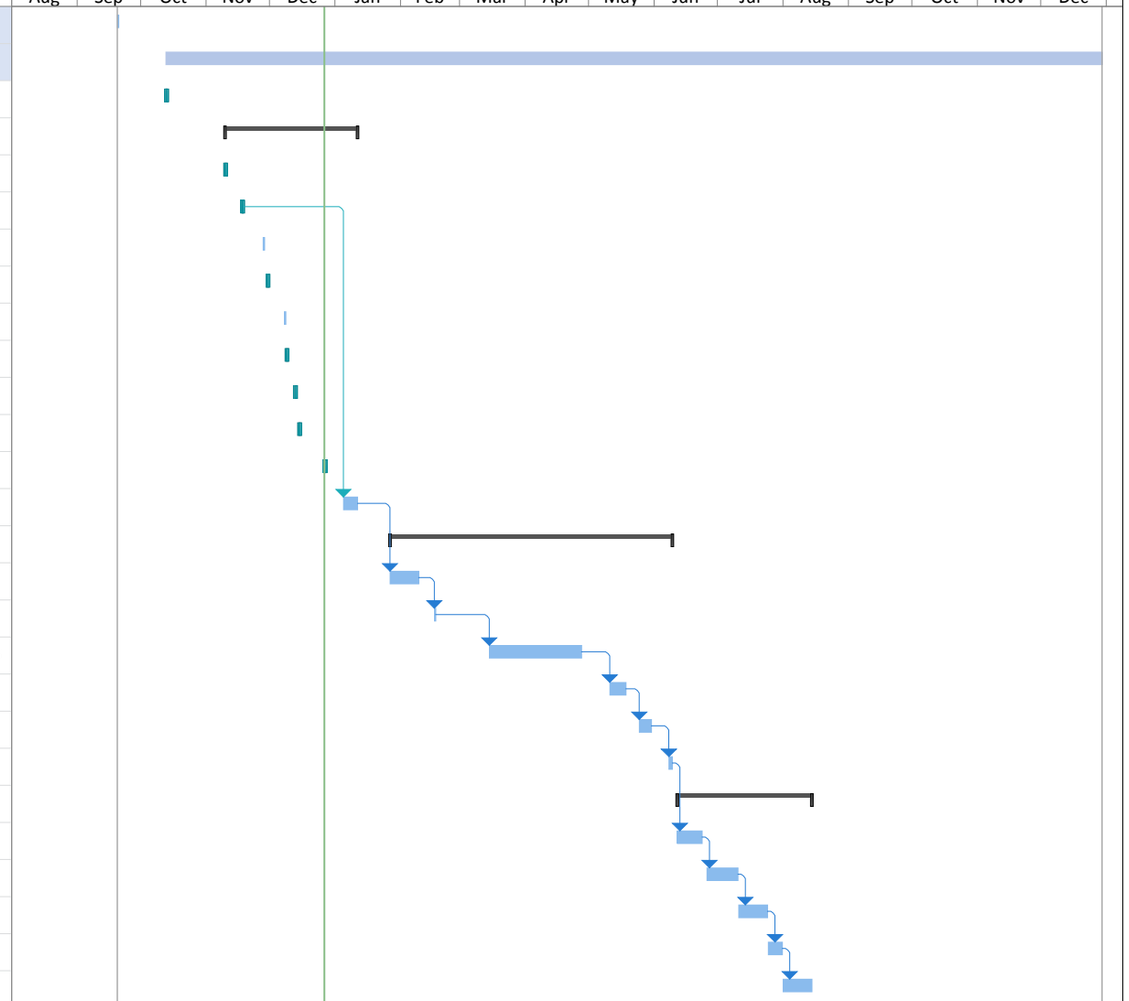
Table 5
Project Subcontractors
U.S. Army Corps of Engineers
FUDS FY16 NY/NJ
USACE Contract #W912WJ-16-C-0024

Associated Site	Company or Agency	Contact Name	Trade	Mailing Address	Phone Number	E-mail
Nike PH-58	*TBD*		Welding	*TBD*		
Nike PH-58	*TBD*		Galvanized Steel Plates	*TBD*		
Nike PH-58	*TBD*		Backfill Material	*TBD*		
Nike PH-58	*TBD*		Debris Container Disposal	*TBD*		
Nike PH-58	*TBD*		Debris Container Transporter	*TBD*		
Welsbach Plant NOBS #258	TCI of NY, LLC	Lisa Leone-Beers	Transformer Disposal	99 Coeymans Industrial Park Lane Coeymans, NY 12045	518-756-9997	tci@tci-pcb.com
Woodbine Municipal Airport	Environmental Probing Investigations	Paul McLeod	Geophysicist	833 Monmouth Road Cream Ridge, NJ 08514	609-758-9000 (office) 715-617-0072 (cell)	paul@epi-team.com
Woodbine Municipal Airport	*TBD*		Scrap Metal Recycling	*TBD*		
Woodbine Municipal Airport	*TBD*		Backfill Material	*TBD*		
Woodbine Municipal Airport	Aqua-Tex Transport	Mike Pitale	Soil Transport	1512 Mays Landing Road Folsom, NJ 08037	609-513-0976 609-839-4633	mikep@aquatextransport.com
Woodbine Municipal Airport	ACUA	n/a	Soil Disposal	PO Box 996 Pleasantville, NJ 08232	609-272-6950	n/a
ALL SITES	Eurofins Lancaster Laboratories Environmental	Laura Caulfield	Analytical Laboratory	2425 New Holland Pike Lancaster, PA 17601	717-656-2300 (main) 717-556-7354 (direct)	LauraCaulfield@eurofinsUS.com
ALL SITES	Laboratory Data Consultants, Inc.	Laura Soeten	Data Validation	2701 Loker Avenue, Suite 220 Carlsbad, CA 92010	760-827-1100	Lsoeten@lab-data.com
ALL SITES	Sovereign Consulting Inc.	Steve Passafaro	Consulting	111-A North Gold Drive Robbinsville, NJ 08691	508-339-320 ext. 258 (office) 201-317-6891 (cell)	spassafaro@sovcon.com

APPENDIX A

U.S. Army Corps of Engineers - New England District
FY16 FUDS NY/NJ
Project Schedule

ID	Task Name	Duration	Start	Finish	Predecessors
1	PROJECT AWARD	1 day	Tue 9/20/16	Tue 9/20/16	
2	PERIOD OF PERFORMANCE	304 days	Thu 10/13/16	Fri 12/29/17	
3	Receipt of Notice to Proceed	1 day	Thu 10/13/16	Thu 10/13/16	
4	**Submission of Deliverables**	**41 days**	**Thu 11/10/16**	**Wed 1/11/17**	
5	Submission of Preliminary Draft APP, CQCP, EPP, Work Plan	1 day	Thu 11/10/16	Thu 11/10/16	
6	Submission of Preliminary Draft QAPP	1 day	Fri 11/18/16	Fri 11/18/16	
7	Receipt of Comments on Preliminary Draft APP and CQCP	1 day	Mon 11/28/16	Mon 11/28/16	
8	Submission of Final CQCP	1 day	Wed 11/30/16	Wed 11/30/16	
9	Distribution of Final CQCP	1 day	Thu 12/8/16	Thu 12/8/16	
10	Receipt of Comments on Preliminary Draft EPP and Work Plan	1 day	Fri 12/9/16	Fri 12/9/16	
11	Submission of Draft APP	1 day	Tue 12/13/16	Tue 12/13/16	
12	Submission of Draft EPP and Work Plan	1 day	Thu 12/15/16	Thu 12/15/16	
13	Submission of Final QAPP	1 day	Tue 12/27/16	Tue 12/27/16	
14	Submit Remaining Final Work Plans	1 wk	Thu 1/5/17	Wed 1/11/17	6FS+6 wks
15	**Field Activities**	**94 days**	**Fri 1/27/17**	**Fri 6/9/17**	
16	Welsbach Plant NOBS #258 - Gloucester City, NJ	10 days	Fri 1/27/17	Thu 2/9/17	14FS+2 wks
17	Woodbine Municipal Airport - Woodbine, NJ	1 day	Fri 2/17/17	Fri 2/17/17	16FS+1 wk
18	Nike PH-58 - Woolwich Township, NJ	32 days	Wed 3/15/17	Thu 4/27/17	17FS+16 days
19	Short Beach Fire Control Station - Jones Beach, NY	6 days	Thu 5/11/17	Thu 5/18/17	18FS+9 days
20	Bangor Gap Filler Annex - Bangor, NY	3 days	Thu 5/25/17	Tue 5/30/17	19FS+4 days
21	Atlas S-1 - Champlain, NY	2 days	Thu 6/8/17	Fri 6/9/17	20FS+6 days
22	**Submission of Closure Report**	**45 days**	**Mon 6/12/17**	**Mon 8/14/17**	
23	Prepare Preliminary Draft Closure Report	2 wks	Mon 6/12/17	Fri 6/23/17	21
24	Receipt of USACE Comments (TBD)	2 wks	Mon 6/26/17	Mon 7/10/17	23
25	Submit Draft Closure Report	2 wks	Tue 7/11/17	Mon 7/24/17	24
26	Receipt of USACE Comments (TBD)	1 wk	Tue 7/25/17	Mon 7/31/17	25
27	Submit Final Closure Report	2 wks	Tue 8/1/17	Mon 8/14/17	26



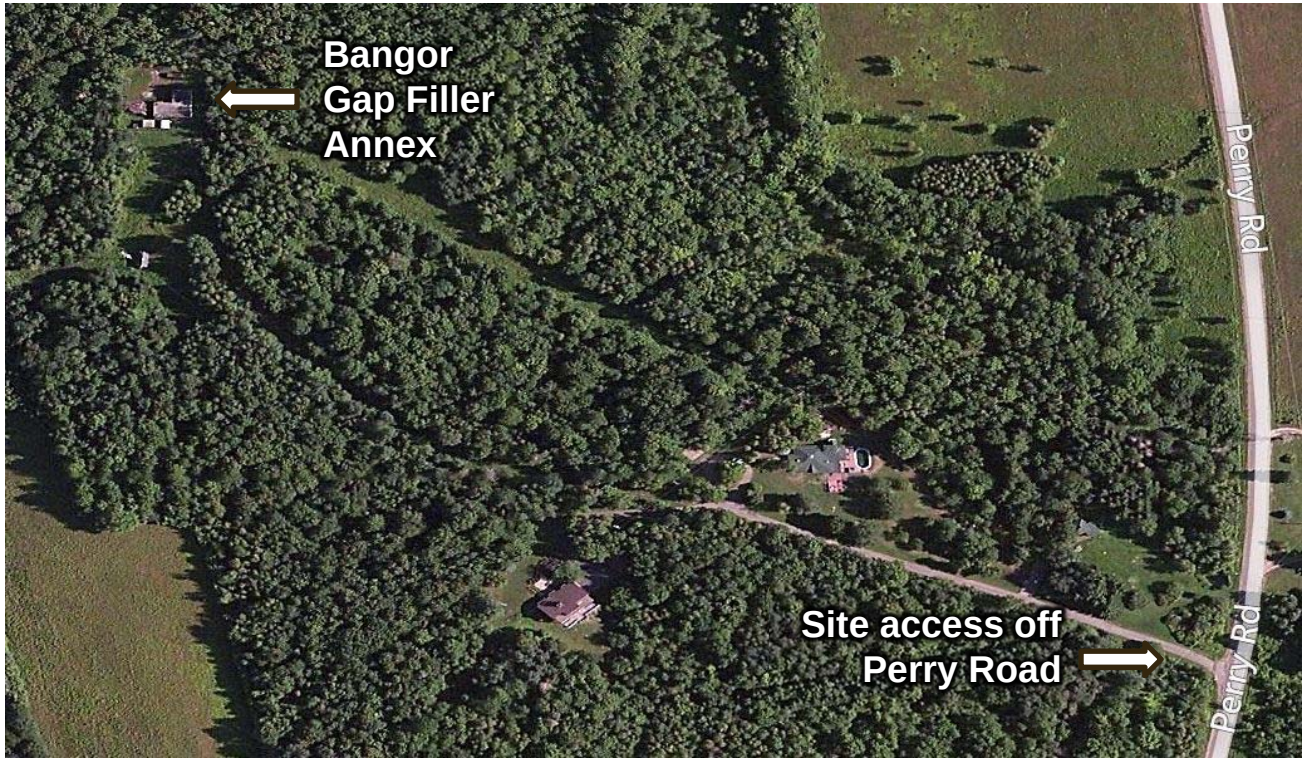
Contract #: W912WJ-16-C-0024
Date: Tue 12/27/16

Task
Split
Milestone
Summary
Project Summary
External Tasks
External Milestone
Inactive Task
Inactive Milestone
Inactive Summary
Manual Task
Duration-only
Manual Summary Rollup
Manual Summary
Start-only
Finish-only
Deadline
Progress
Manual Progress

APPENDIX B

US Army Corps
of Engineers

BANGOR GAP FILLER ANNEX
NORTH BANGOR, NEW YORK
FORMERLY USED DEFENSE SITES (FUDS) PROGRAM
ATTACHMENT 2 - LOCATION & PHOTOGRAPHS OF PROJECT SITE



View of Bangor Gap Filler Annex.

A view of the access road and outer gate.

Photograph from Bangor Gap Filler Annex.

Access gate through perimeter fence line.

View looking towards access gate from the open yard behind the building.

Photographs from Bangor Gap Filler Annex.

A view of the former radar operations building.

Photograph from Bangor Gap Filler Annex.

Two views showing the 5,000 gallon AST in relation to the former radar operations building.

Photographs from Bangor Gap Filler Annex.

Two views of the 5,000 gallon AST.

Photographs from Bangor Gap Filler Annex.

Day tank hung from ceiling. Its associated fuel piping is visible.

Photographs from Bangor Gap Filler Annex.

Day tank hung from ceiling.
Portions of the associated fuel piping are shown.

Photographs from Bangor Gap Filler Annex.

Tank located in trench in building floor. Portions of the associated fuel piping are shown.

Photographs from Bangor Gap Filler Annex.

Tank located in trench in building floor slab.
Portions of the associated fuel piping are shown.

Photographs from Bangor Gap Filler Annex.

APPENDIX C

County Of Franklin
Solid Waste Management Authority

828 County Route 20 • Constable, New York 12926

Telephone: (518) 483-8270
Fax: (518) 483-4880

SPECIAL WASTE ANALYTICAL REQUIREMENTS

Petroleum Contaminated Soils (Virgin product):

Gasoline	Acceptable Level:
Flash point/Ignitability	>100 degree Celsius Non-Ignitable
Paint Filter	ND <1.0
TCLP Benzene	<.05 mg/L
TCLP Lead	<5.0 mg/L

Kerosene, fuel, oils, etc.	Acceptable Level:
Flash point/ Ignitability	>100 degrees Celsius Non-Ignitable
Paint Filter Test	ND <1.0
TCLP Semi-Volatiles, Base Neutrals	Stars Memo #1

Waste Oils	Acceptable Level:
Full TCLP	EPA Regulatory Levels
PCB's	ND<20 ug/k (20 PPB)
Reactivity	Cyanide < 250 ug/k, Sulfide < 500 mg/k
Paint Filter	ND <1.0
Flash Point/Ignitablility	>100 degrees Celsius Non-Ignitable
Corrosivity	PH>2 or <12

NOTES:

Analytes within 70% of the MCL levels may be subject to resampling at the Authority's discretion.

PCB's must be tested at a non-detect level down to 20 PPB. (This detection level needs to be brought to the attention of the lab performing the analysis as the lab may not not be able to test down to the 20 PPB level).

A full TCLP analysis needs to be repeated on an annual basis for Municipal & Industrial sludges. Another full TLCP analysis will need to be repeated for Industrial sludges if the process changes anytime during the year.

The lab analysis needs to be done by an "ELAP" certified lab. The "ELAP" number should appear on the analysis report. The sample Number, location of waste and date should appear on each page per the NYS DOH ELAP certification manual.

Herbicides & Pesticides testing may be waived from Industrial Sludges upon request.

Franklin County
Solid Waste Management Authority
Constable, NY

Contaminated Soil Profile

THIS FORM IS FOR DISPOSAL OF NON-HAZARDOUS WASTE ONLY
(Incomplete or missing information will delay approval process)

ORIGIN OF WASTE (PHYSICAL LOCATION)

Business / Property Owner's Name:			
Address:	City	State	Zip
County:	Phone	Fax	
Contact Person	Title		

GENERATOR INFORMATION (MAY BE THE SAME AS ABOVE)

Business / Property Owner's Name:			
Address:	City	State	Zip
County:	Phone	Fax	
Contact Person	Title		

BILLING INFORMATION

Company Name:	Phone	Fax	
Mailing Address:	City	State	Zip

WASTE CHARACTERIZATION

Odor: ☐None ☐Mild ☐Strong	Is the waste stream:☐Stockpiled ☐To be excavated
Amount of contaminant released (Gals):___	Approx. amount of material to be disposed (tons):____
DEC Spill # (Required):_____	Estimated Delivery Date:_____
Type of Contamination: ☐Gasoline ☐Fuel Oil ☐Diesel ☐Kerosene ☐Waste Oil ☐Unknown ☐Other (Specify)_____	
Process that generated waste (Be Specific):	
Does this facility generate any hazardous waste ☐Yes ☐No If hazardous wastes are generated, does management feel that adequate controls are in place to control / separate waste streams? ☐Yes ☐No (If answer is no, a detailed explanation must be attached)	

Please Do Not Write Below This Line

CFSWMA Approval _____ Date_____

Authorized Hauler (Primary)

Company Name			
Address:	City	State	Zip
Contact Person	Title		
phone	Fax		
NYSDEC Waste Transporter Permit #			

Authorized Hauler (Secondary)

Company Name			
Address:	City	State	Zip
Contact Person	Title		
phone	Fax		
NYSDEC Waste Transporter Permit #			

GENERATOR'S CERTIFICATION TO SOLID WASTE MANAGEMENT FACILITY

I / We hereby certify that all the information that we have presented to the CFSWMA on this form or any attachments is an accurate representation of our waste stream.

I / We hereby certify that the laboratory can contact the CFSWMA directly to discuss our attached waste stream.

I / We hereby certify that the waste stream that we are applying for disposal at the CFSWMA is not a listed known hazardous waste. In addition, none of the components of the process, or any residue generated, are known as hazardous wastes.

I / We hereby agree that any changes in this waste stream, either in the process method or changes of any of the components, that we will notify the CFSWMA, in writing, within 24 hours of our findings. (Fax is the preferred method).

I / We agree that a representative of the CFSWMA may at any time visit the site of contamination and sample the material to be disposed.

I / We agree to indemnify, defend and hold harmless the County of Franklin Solid Waste Management Authority, its employees, affiliates, successors and assigns from and against any and all losses, liabilities, damages, claims, fines, causes of action deficiencies, costs and expenses (including reasonable attorneys' fees and other litigation expenses) based upon, arising out of or otherwise related to the disposal of our waste stream.

Name:_____ Signature:_____

Title:_____ Date:_____

County of Franklin
Solid Waste Management Authority

Certification of Representative Sample

Please Type or Print Legibly

Generator's Name:_____
Waste Name:_____
Sampler's Name:_____
Employer:_____
Sample Date:_____ Time:_____

It is mandatory that the testing laboratory receive a representative sample of the waste stream that you intend to dispose of at the CFSWMA. Sampling instructions can be obtained from your ELAP and / or other approved laboratory. Please follow the instructions carefully.

Analytical test results must be submitted with a profile. Please refer to our *Special Waste Analytical Requirements* for the required laboratory tests.

Ongoing Waste Stream

Minimum one (1) representative sample annually. Additional testing may be required depending on quantity of waste disposed.

Sample Quantities for One Time Only Approvals

1 - 1,000 Tons	One (1) Representative Sample Required
1,000 - 3,000 Tons	Two (2) Representative Samples Required
3,000 - 7,500 Tons	Three (3) Representative Samples Required
7,500 - 10,000 Tons	Four (4) Representative Samples Required

Sampler's Certification

I hereby certify that I personally collected a representative sample of the waste stream at the location, date and time as listed above.

Name:_____ Date:_____
(please print)

Signature:_____

APPENDIX D

Table 2

Soil Cleanup Levels for Gasoline Contaminated Soils

Contaminant	CAS Registry Number	Soil Cleanup Level (ppm)
Benzene	71-43-2	0.06
n-Butylbenzene	104-51-8	12.0
sec-Butylbenzene	135-98-8	11.0
Ethylbenzene	100-41-4	1.0
Isopropylbenzene	98-82-8	2.3
p-Isopropyltoluene	99-87-6	10.0
Methyl-Tert-Butyl-Ether	1634-04-4	0.93
Naphthalene	91-20-3	12.0
n-Propylbenzene	103-65-1	3.9
Tert-Butylbenzene	98-06-6	5.9
Toluene	108-88-3	0.7
1,2,4-Trimethylbenzene	95-63-6	3.6
1,3,5-Trimethylbenzene	108-67-8	8.4
Xylene (Mixed)	1330-20-7	0.26

Table 3

Soil Cleanup Levels for Fuel Oil Contaminated Soil

Contaminant	CAS Registry Number	Soil Cleanup Level (ppm)
Acenaphthene	83-32-9	20
Acenaphthylene	208-96-8	100
Anthracene	120-12-7	100
Benz(a)Anthracene	56-55-3	1.0
Dibenzo(a,h)Anthracene	53-70-3	0.33
Benzene	71-43-2	0.06
n-Butylbenzene	104-51-8	12.0
sec-Butylbenzene	135-98-8	11.0
Tert-Butylbenzene	98-06-6	5.9
Chrysene	218-01-9	1.0
Ethylbenzene	100-41-4	1.0
Fluoranthene	206-44-0	100
Benzo(b)Fluoranthene	205-99-2	1.0
Benzo(k)Fluoranthene	207-08-9	0.8
Fluorene	86-73-7	30
Isopropylbenzene	98-82-8	2.3
p-Isopropyltoluene	99-87-6	10.0
Naphthalene	91-20-3	12.0
n-Propylbenzene	103-65-1	3.9
Benzo(g,h,i)Perylene	191-24-2	100
Phenanthrene	85-01-8	100
Pyrene	129-00-0	100
Benzo(a)Pyrene	50-32-8	1.0
Indeno(1,2,3-cd)Pyrene	193-39-5	0.5
1,2,4-Trimethylbenzene	95-63-6	3.6
1,3,5-Trimethylbenzene	108-67-8	8.4
Toluene	108-88-3	0.7
Xylene (Mixed)	1330-20-7	0.26

APPENDIX E

Table 1

NEW YORK STATE AMBIENT WATER QUALITY STANDARDS AND GUIDANCE VALUES

JUNE 1998

SUBSTANCE (CAS No.)	WATER CLASSES	STANDARD (ug/L)	GUIDANCE VALUE (ug/L)	TYPE	BASIS CODE
Acenaphthene	A, A-S, AA, AA-S, B, C		5.3	A(C)	
(83-32-9)	A, A-S, AA, AA-S, B, C, D		48	A(A)	
	SA, SB, SC, I		6.6	A(C)	
	SA, SB, SC, I, SD		60	A(A)	
	A, A-S, AA, AA-S	20		E	U
	GA		20	E	U
Acetone	A, A-S, AA, AA-S		50	H(WS)	Z
(67-64-1)	GA		50	H(WS)	Z
Acrolein	A, A-S, AA, AA-S		5*	H(WS)	I
(107-02-8)	GA	**		H(WS)	J
Remarks: * This substance did not receive a review beyond determining that it is in a principal organic contaminant class and that it does not have a more stringent Specific MCL. ** The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
Acrylamide	A, A-S, AA, AA-S		5*	H(WS)	I
(79-06-1)	GA	**		H(WS)	J
Remarks: * This substance did not receive a review beyond determining that it is in a principal organic contaminant class and that it does not have a more stringent Specific MCL. ** The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
Acrylic acid	A, A-S, AA, AA-S		50	H(WS)	Z
(79-10-7)	GA		50	H(WS)	Z
Acrylonitrile	A, A-S, AA, AA-S		0.07	H(WS)	A
(107-13-1)	GA	*		H(WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
Alachlor	A, A-S, AA, AA-S	0.5		H(WS)	A
(15972-60-8)	GA	0.5		H(WS)	A
Aldicarb	A, A-S, AA, AA-S	7		H(WS)	B
(116-06-3)	GA	*		H(WS)	
Remark: * Refer to entry for "Aldicarb and Methomyl."					
Aldicarb and Methomyl (116-06-3;16752-77-5)	GA	0.35*		H(WS)	F
Remark: * Applies to the sum of these substances.					

Table 1 (Continued)

NEW YORK STATE AMBIENT WATER QUALITY STANDARDS AND GUIDANCE VALUES

JUNE 1998

SUBSTANCE (CAS No.)	WATER CLASSES	STANDARD (ug/L)	GUIDANCE VALUE (ug/L)	TYPE	BASIS CODE
Aldicarb sulfone	A, A-S, AA, AA-S		2*	H(WS)	G
(1646-88-4)	GA		2*	H(WS)	G
Remark: * This substance did not receive a review beyond determining the existence of a Specific MCL. A more in-depth review, currently underway, could lead to a more (but not less) stringent guidance value.					
Aldicarb sulfoxide	A, A-S, AA, AA-S		4*	H(WS)	G
(1646-87-3)	GA		4*	H(WS)	G
Remark: * This substance did not receive a review beyond determining the existence of a Specific MCL. A more in-depth review, currently underway, could lead to a more (but not less) stringent guidance value.					
Aldrin	A, A-S, AA, AA-S		0.002	H(WS)	A
(309-00-2)	GA	ND		H(WS)	F
	A, A-S, AA, AA-S, B, C, D	*		H(FC)	
	SA, SB, SC, SD	*		H(FC)	
	I		*	H(FC)	
Remark: * Refer to entry for "Aldrin and Dieldrin."					
Aldrin and Dieldrin	A, A-S, AA, AA-S, B, C, D	0.001*		H(FC)	
(309-00-2; 60-57-1)	SA, SB, SC, SD	0.001*		H(FC)	
	I		0.001*	H(FC)	
Remark: * Applies to the sum of these substances.					
Alkyl dimethyl benzyl	A, A-S, AA, AA-S		50	H(WS)	Z
ammonium chloride	GA		50	H(WS)	Z
(68391-01-5)	A, A-S, AA, AA-S, B, C	*		A(C)	
Remark: * Refer to entry for "Quaternary ammonium compounds."					
Alkyl diphenyl oxide sulfonates	A, A-S, AA, AA-S		50*	H(WS)	Z
(CAS No. Not Applicable)	GA		50*	H(WS)	Z
Remark: * Applies to each alkyl diphenyl oxide sulfonate individually.					
Allyl chloride	A, A-S, AA, AA-S		5*	H(WS)	I
(107-05-1)	GA	**		H(WS)	J
Remarks: * This substance did not receive a review beyond determining that it is in a principal organic contaminant class and that it does not have a more stringent Specific MCL. ** The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
Aluminum, ionic	A, A-S, AA, AA-S, B, C	100*		A(C)	
(CAS No. Not Applicable)					
Remark: * For the waters of the Great Lakes System, the Department will substitute a guidance value for the aquatic Type standard if so determined under 702.15 (c).					
Ametryn	A, A-S, AA, AA-S		50	H(WS)	Z
(834-12-8)	GA	50		H(WS)	J

Table 1 (Continued)

NEW YORK STATE AMBIENT WATER QUALITY STANDARDS AND GUIDANCE VALUES

JUNE 1998

SUBSTANCE (CAS No.)	WATER CLASSES	STANDARD (ug/L)	GUIDANCE VALUE (ug/L)	TYPE	BASIS CODE
4-Aminobiphenyl	A, A-S, AA, AA-S		5*	H(WS)	I
(92-67-1)	GA	**		H(WS)	J
Remarks: * This substance did not receive a review beyond determining that it is in a principal organic contaminant class and that it does not have a more stringent Specific MCL.					
** The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
Aminocresols	A, A-S, AA, AA-S	*		E	
(95-84-1; 2835-95-2;	GA	*		E	
2835-99-6)	A, A-S, AA, AA-S, B, C	**		E	
	D	**		E	
Remarks: * Refer to entry for "Phenolic compounds (total phenols)."					
** Refer to entry for "Phenols, total unchlorinated."					
Aminomethylene	A, A-S, AA, AA-S		50*	H(WS)	Z
phosphonic acid salts	GA		50*	H(WS)	Z
(CAS No. Not Applicable)					
Remark: * Applies to each aminomethylene phosphonic acid salt individually.					
Aminopyridines	A, A-S, AA, AA-S		1*	H(WS)	B
(462-08-8; 504-24-5;	GA		1*	H(WS)	B
504-29-0; 26445-05-6)					
Remark: * Values listed apply to sum of these substances.					
3-Aminotoluene	A, A-S, AA, AA-S		5*	H(WS)	I
(108-44-1)	GA	**		H(WS)	J
Remarks: * This substance did not receive a review beyond determining that it is in a principal organic contaminant class and that it does not have a more stringent Specific MCL.					
** The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
4-Aminotoluene	A, A-S, AA, AA-S		5*	H(WS)	I
(106-49-0)	GA	**		H(WS)	J
Remarks: * This substance did not receive a review beyond determining that it is in a principal organic contaminant class and that it does not have a more stringent Specific MCL.					
** The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					

Table 1 (Continued)

NEW YORK STATE AMBIENT WATER QUALITY STANDARDS AND GUIDANCE VALUES

JUNE 1998

SUBSTANCE (CAS No.)	WATER CLASSES	STANDARD (ug/L)	GUIDANCE VALUE (ug/L)	TYPE	BASIS CODE
Ammonia and Ammonium	A, A-S, AA, AA-S	2,000*		H(WS)	H
(7664-41-7;	GA	2,000*		H(WS)	H
CAS No. Not Applicable)	A, A-S, AA, AA-S, B, C	**		A(C)	
	D	**		A(A)	

Remarks: * $NH_3 + NH_4^+$ as N.

** Un-ionized ammonia as NH_3; tables below provide the standard in ug/L at varying pH and temperature for different classes and specifications. Linear interpolation between the listed pH values and temperatures is applicable.

Classes A,A-S, AA, AA-S, B, C with the (T) or (TS) Specification

pH	0°C	5°C	10°C	15°-30°C
6.50	0.7	0.9	1.3	1.9
6.75	1.2	1.7	2.3	3.3
7.00	2.1	2.9	4.2	5.9
7.25	3.7	5.2	7.4	11
7.50	6.6	9.3	13	19
7.75	11	15	22	31
8.0-9.0	13	18	25	35

Classes A, A-S, AA, AA-S, B, C without the (T) or (TS) Specification

pH	0°C	5°C	10°C	15°C	20°-30°C
6.50	0.7	0.9	1.3	1.9	2.6
6.75	1.2	1.7	2.3	3.3	4.7
7.00	2.1	2.9	4.2	5.9	8.3
7.25	3.7	5.2	7.4	11	15
7.50	6.6	9.3	13	19	26
7.75	11	15	22	31	43
8.0-9.0	13	18	25	35	50

Class D

pH	0°C	5°C	10°C	15°C	20°C	25°-30°C
6.50	9.1	13	18	26	36	51
6.75	15	21	30	42	59	84
7.00	23	33	46	66	93	131
7.25	34	48	68	95	140	190
7.50	45	64	91	130	180	260
7.75	56	80	110	160	220	320
8.0-9.0	65	92	130	180	260	370

Table 1 (Continued)

NEW YORK STATE AMBIENT WATER QUALITY STANDARDS AND GUIDANCE VALUES

JUNE 1998

Total Ammonia (mg/L NH_3)

Classes A, A-S, AA, AA-S, B, C with the (T) or (TS) Specification

pH	0°C	5°C	10°C	15°C	20°C	25°C	30°C
6.50	2.5	2.4	2.2	2.2	1.5	1.0	.73
6.75	2.5	2.4	2.2	2.2	1.5	1.0	.73
7.00	2.5	2.4	2.2	2.2	1.5	1.0	.74
7.25	2.5	2.4	2.2	2.2	1.5	1.0	.74
7.50	2.5	2.4	2.2	2.2	1.5	1.1	.74
7.75	2.3	2.2	2.1	2.0	1.4	.99	.71
8.00	1.5	1.4	1.4	1.3	.93	.66	.47
8.25	.87	.82	.78	.76	.54	.39	.28
8.50	.49	.47	.45	.44	.32	.23	.17
8.75	.28	.27	.26	.27	.19	.15	.11
9.00	.16	.16	.16	.16	.13	.10	.08

Classes A, A-S, AA, AA-S, B, C without the (T) or (TS) Specification

pH	0°C	5°C	10°C	15°C	20°C	25°C	30°C
6.50	2.5	2.4	2.2	2.2	2.1	1.5	1.0
6.75	2.5	2.4	2.2	2.2	2.1	1.5	1.0
7.00	2.5	2.4	2.2	2.2	2.1	1.5	1.0
7.25	2.5	2.4	2.2	2.2	2.1	1.5	1.1
7.50	2.5	2.4	2.2	2.2	2.1	1.5	1.1
7.75	2.3	2.2	2.1	2.0	1.9	1.4	1.0
8.00	1.5	1.4	1.3	1.3	1.3	.93	.67
8.25	.87	.82	.78	.76	.76	.54	.40
8.50	.49	.47	.45	.44	.45	.33	.25
8.75	.28	.27	.26	.27	.27	.21	.16
9.00	.16	.16	.16	.16	.17	.14	.11

Class D

pH	0°C	5°C	10°C	15°C	20°C	25°C	30°C
6.50	35	33	31	30	29	29	20
6.75	32	30	28	27	27	26	19
7.00	28	26	25	24	23	23	16
7.25	23	22	20	20	19	19	14
7.50	17	16	16	15	15	15	10
7.75	12	11	11	11	10	10	7.3
8.00	8.0	7.5	7.1	6.9	6.8	6.8	4.9
8.25	4.5	4.2	4.1	4.0	3.9	4.0	2.9
8.50	2.6	2.4	2.3	2.3	2.3	2.4	1.8
8.75	1.4	1.4	1.3	1.4	1.4	1.5	1.1
9.00	.86	.83	.83	.86	.91	1.0	.82

This table provides total ammonia concentrations that will contain the un-ionized ammonia concentration at the level of the standard at the respective pH and temperatures based on relationships established in USEPA 1985, Ambient Water Quality Criteria for Ammonia - 1984. Office of Water, Criteria & Standards Division, Washington, D.C. 20460. EPA 440/5-85-001. January 1985. (Cited, Thurston, R.V., R.C. Russo, and K. Emerson. 1979. Aqueous ammonia equilibrium - tabulation of percent un-ionized ammonia. EPA Ecol. Res. Ser. EPA-600/3-79-091. Environmental Research Laboratory, U.S. Environmental Protection Agency, Duluth, MN: 427 p.)

Table 1 (Continued)

NEW YORK STATE AMBIENT WATER QUALITY STANDARDS AND GUIDANCE VALUES

JUNE 1998

SUBSTANCE (CAS No.)	WATER CLASSES	STANDARD (ug/L)	GUIDANCE VALUE (ug/L)	TYPE	BASIS CODE
Aniline	A, A-S, AA, AA-S	5		H(WS)	I
(62-53-3)	GA	*		H(WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
Anthracene	A, A-S, AA, AA-S		50	H(WS)	Z
(120-12-7)	GA		50	H(WS)	Z
	A, A-S, AA, AA-S, B, C		3.8	A(C)	
	A, A-S, AA, AA-S, B, C, D		35	A(A)	
Antimony	A, A-S, AA, AA-S	3		H(WS)	B
(CAS No. Not Applicable)	GA	3		H(WS)	B
Arsenic	A, A-S, AA, AA-S	50		H(WS)	G
(CAS No. Not Applicable)	GA	25		H(WS)	F
	A, A-S, AA, AA-S, B, C	150*		A(C)	
	A, A-S, AA, AA-S, B, C, D	340*		A(A)	
	SA, SB, SC	63*		A(C)	
	I		36*	A(C)	
	SD	120*		A(A)	
Remark: * Dissolved arsenic form.					
Aryltriazoles	A, A-S, AA, AA-S		50*	H(WS)	Z
(CAS No. Not Applicable)	GA		50*	H(WS)	Z
Remark: * Applies to each aryltriazole individually.					
Asbestos	A, A-S, AA, AA-S	*		H(WS)	G
(CAS No. Not Applicable)	GA	*		H(WS)	G
Remark: * 7,000,000 fibers (longer than 10 um)/L.					
Atrazine	A, A-S, AA, AA-S		3*	H(WS)	G
(1912-24-9)	GA	7.5		H(WS)	F
Azinphosmethyl	A, A-S, AA, AA-S		0.07	H(WS)	A
(86-50-0)	GA	4.4		H(WS)	F
	A, A-S, AA, AA-S, B, C	0.005*		A(C)	
	SA, SB, SC	0.01		A(C)	
	I		0.01	A(C)	
Remark: * For the waters of the Great Lakes System, the Department will substitute a guidance value for the aquatic Type standard if so determined under 702.15 (c).					
Azobenzene	A, A-S, AA, AA-S		0.5	H(WS)	A
(103-33-3)	GA	*		H(WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
Barium	A, A-S, AA, AA-S	1,000		H(WS)	G
(CAS No. Not Applicable)	GA	1,000		H(WS)	F

Table 1 (Continued)

NEW YORK STATE AMBIENT WATER QUALITY STANDARDS AND GUIDANCE VALUES

JUNE 1998

SUBSTANCE (CAS No.)	WATER CLASSES	STANDARD (ug/L)	GUIDANCE VALUE (ug/L)	TYPE	BASIS CODE
Benefin (1861-40-1)	GA	35		H(WS)	F
Benz(a)anthracene (56-55-3)	A, A-S, AA, AA-S		0.002	H(WS)	A
	GA		0.002	H(WS)	A
	A, A-S, AA, AA-S, B, C		0.03	A(C)	
	A, A-S, AA, AA-S, B, C, D		0.23	A(A)	
Benzene (71-43-2)	A, A-S, AA, AA-S	1		H(WS)	A
	GA	1		H(WS)	A
	A, A-S, AA, AA-S, B, C, D	10		H(FC)	A
	SA, SB, SC, I, SD	10		H(FC)	A
	A, A-S, AA, AA-S, B, C		210	A(C)	
	A, A-S, AA, AA-S, B, C, D		760	A(A)	
	SA, SB, SC, I		190	A(C)	
	SA, SB, SC, I,SD		670	A(A)	
Benzidine (92-87-5)	A, A-S, AA, AA-S		0.02	H(WS)	A
	GA	*		H(WS)	J
	A, A-S, AA, AA-S, B, C	0.1**		A(C)	
	D	0.1**		A(A)	

Remarks: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.

** For the waters of the Great Lakes System, the Department will substitute a guidance value for the aquatic Type standard if so determined under 702.15 (c) and (d).

Benzisothiazole (271-61-4)	A, A-S, AA, AA-S		50	H(WS)	Z
	GA		50	H(WS)	Z
Benzo(b)fluoranthene (205-99-2)	A, A-S, AA, AA-S		0.002	H(WS)	A
	GA		0.002	H(WS)	A
Benzo(k)fluoranthene (207-08-9)	A, A-S, AA, AA-S		0.002	H(WS)	A
	GA		0.002	H(WS)	A
Benzo(a)pyrene (50-32-8)	A, A-S, AA, AA-S		0.002	H(WS)	A
	GA	ND		H(WS)	F
	A, A-S, AA, AA-S, B, C, D		0.0012	H(FC)	
	SA, SB, SC, I, SD		6×10^{-4}	H(FC)	
Beryllium (CAS No. Not Applicable)	A, A-S, AA, AA-S		3	H(WS)	B
	GA		3	H(WS)	B
	A, A-S, AA, AA-S, B, C	*		A(C)	

Remarks: * 11 ug/L, when hardness is less than or equal to 75 ppm; 1,100 ug/L when hardness is greater than 75 ppm.

* For the waters of the Great Lakes System, the Department will substitute a guidance value for the aquatic Type standard if so determined under 702.15 (c).
Aquatic Type standards apply to acid-soluble form.

Table 1 (Continued)

NEW YORK STATE AMBIENT WATER QUALITY STANDARDS AND GUIDANCE VALUES

JUNE 1998

SUBSTANCE (CAS No.)	WATER CLASSES	STANDARD (ug/L)	GUIDANCE VALUE (ug/L)	TYPE	BASIS CODE
1,1'-Biphenyl	A, A-S, AA, AA-S		5*	H(WS)	I
(92-52-4)	GA	**		H(WS)	J
Remarks: * This substance did not receive a review beyond determining that it is in a principal organic contaminant class and that it does not have a more stringent Specific MCL. ** The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
Bis(2-chloroethoxy)methane	A, A-S, AA, AA-S		5*	H(WS)	I
(111-91-1)	GA	**		H(WS)	J
Remarks: * This substance did not receive a review beyond determining that it is in a principal organic contaminant class and that it does not have a more stringent Specific MCL. ** The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
Bis(2-chloroethyl)ether	A, A-S, AA, AA-S		0.03	H(WS)	A
(111-44-4)	GA	1.0		H(WS)	F
Bis(chloromethyl)ether	A, A-S, AA, AA-S		5*	H(WS)	I
(542-88-1)	GA	**		H(WS)	J
Remarks: * This substance did not receive a review beyond determining that it is in a principal organic contaminant class and that it does not have a more stringent Specific MCL. ** The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
Bis(2-chloro-1-methylethyl)ether	A, A-S, AA, AA-S		5*	H(WS)	I
(108-60-1)	GA	**		H(WS)	J
Remarks: * This substance did not receive a review beyond determining that it is in a principal organic contaminant class and that it does not have a more stringent Specific MCL. ** The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
Bis(2-ethylhexyl)phthalate	A, A-S, AA, AA-S	5		H(WS)	A
(117-81-7)	GA	5		H(WS)	A
	A, A-S, AA, AA-S, B, C	0.6		A(C)	
Boric acid, Borates & Metaborates	A, A-S, AA, AA-S		125*	H(WS)	B
(CAS No. Not Applicable)	GA		125*	H(WS)	B
Remarks: * Applies as boron equivalents. Values listed apply to the sum of these substances.					
Boron	GA	1,000		H(WS)	H
(CAS No. Not Applicable)	A, A-S, AA, AA-S, B, C	10,000*		A(C)	
	SA, SB, SC	1,000		A(C)	
	I		1,000	A(C)	
Remark: * For the waters of the Great Lakes System, the Department will substitute a guidance value for the aquatic standard if so determined under 702.15 (c). Aquatic Type standards and guidance value apply to acid-soluble form.					

Table 1 (Continued)

NEW YORK STATE AMBIENT WATER QUALITY STANDARDS AND GUIDANCE VALUES

JUNE 1998

SUBSTANCE (CAS No.)	WATER CLASSES	STANDARD (ug/L)	GUIDANCE VALUE (ug/L)	TYPE	BASIS CODE
Bromacil (314-40-9)	GA	4.4		H(WS)	F
Bromide (CAS No. Not Applicable)	A, A-S, AA, AA-S		2,000	H(WS)	B
	GA		2,000	H(WS)	B
Bromobenzene (108-86-1)	A, A-S, AA, AA-S		5*	H(WS)	I
	GA	**		H(WS)	J
Remarks: * This substance did not receive a review beyond determining that it is in a principal organic contaminant class and that it does not have a more stringent Specific MCL. ** The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
Bromochloromethane (74-97-5)	A, A-S, AA, AA-S	5		H(WS)	I
	GA	*		H(WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
Bromodichloromethane (75-27-4)	A, A-S, AA, AA-S		50	H(WS)	Z
	GA		50	H(WS)	Z
Bromoform (75-25-2)	A, A-S, AA, AA-S		50	H(WS)	Z
	GA		50	H(WS)	Z
Bromomethane (74-83-9)	A, A-S, AA, AA-S	5		H(WS)	I
	GA	*		H(WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
Butachlor (23184-66-9)	GA	3.5		H(WS)	F
cis-2-Butenal (15798-64-8)	A, A-S, AA, AA-S		5*	H(WS)	I
	GA	**		H(WS)	J
Remarks: * This substance did not receive a review beyond determining that it is in a principal organic contaminant class and that it does not have a more stringent Specific MCL. ** The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
trans-2-Butenal (123-73-9)	A, A-S, AA, AA-S		5*	H(WS)	I
	GA	**		H(WS)	J
Remarks: * This substance did not receive a review beyond determining that it is in a principal organic contaminant class and that it does not have a more stringent Specific MCL. ** The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					

Table 1 (Continued)

NEW YORK STATE AMBIENT WATER QUALITY STANDARDS AND GUIDANCE VALUES

JUNE 1998

SUBSTANCE (CAS No.)	WATER CLASSES	STANDARD (ug/L)	GUIDANCE VALUE (ug/L)	TYPE	BASIS CODE
cis-2-Butenenitrile	A, A-S, AA, AA-S		5*	H(WS)	I
(1190-76-7)	GA	**		H(WS)	J
Remarks: * This substance did not receive a review beyond determining that it is in a principal organic contaminant class and that it does not have a more stringent Specific MCL.					
** The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
trans-2-Butenenitrile	A, A-S, AA, AA-S		5*	H(WS)	I
(627-26-9)	GA	**		H(WS)	J
Remarks: * This substance did not receive a review beyond determining that it is in a principal organic contaminant class and that it does not have a more stringent Specific MCL.					
** The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
Butoxyethoxyethanol	A, A-S, AA, AA-S		50	H(WS)	Z
(112-34-5)	GA		50	H(WS)	Z
Butoxypropanol	A, A-S, AA, AA-S		50	H(WS)	Z
(5131-66-8)	GA		50	H(WS)	Z
Butylate	A, A-S, AA, AA-S		50	H(WS)	Z
(2008-41-5)	GA	50		H(WS)	J
n-Butylbenzene	A, A-S, AA, AA-S	5		H(WS)	I
(104-51-8)	GA	*		H(WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
sec-Butylbenzene	A, A-S, AA, AA-S	5		H(WS)	I
(135-98-8)	GA	*		H(WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
tert-Butylbenzene	A, A-S, AA, AA-S	5		H(WS)	I
(98-06-6)	GA	*		H(WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
Butyl benzyl phthalate	A, A-S, AA, AA-S		50	H(WS)	Z
(85-68-7)	GA		50	H(WS)	Z
Butyl isopropyl phthalate	A, A-S, AA, AA-S		50	H(WS)	Z
(CAS No. Not Applicable)	GA		50	H(WS)	Z

Table 1 (Continued)

NEW YORK STATE AMBIENT WATER QUALITY STANDARDS AND GUIDANCE VALUES

JUNE 1998

SUBSTANCE (CAS No.)	WATER CLASSES	STANDARD (ug/L)	GUIDANCE VALUE (ug/L)	TYPE	BASIS CODE
Cadmium	A, A-S, AA, AA-S	5		H(WS)	B,G
(CAS No. Not Applicable)	GA	5		H(WS)	B,G
	SA, SB, SC, I, SD		2.7	H(FC)	
	A, A-S, AA, AA-S, B, C	*		A(C)	
	A, A-S, AA, AA-S, B, C, D	**		A(A)	
	SA, SB, SC, I	7.7		A(C)	
	SD	21		A(A)	
Remarks: * (0.85) exp(0.7852 [ln (ppm hardness)] - 2.715)					
** (0.85) exp(1.128 [ln (ppm hardness)] - 3.6867)					
Aquatic Type standards apply to dissolved form.					
Captan	GA	18		H(WS)	F
(133-06-2)					
Carbaryl	GA	29		H(WS)	F
(63-25-2)					
Carbofuran	A, A-S, AA, AA-S	15		H(WS)	B
(1563-66-2)	GA		15	H(WS)	B
	A, A-S, AA, AA-S, B, C	1.0*		A(C)	
	D	10*		A(A)	
Remark: * For the waters of the Great Lakes System, the Department will substitute a guidance value for the aquatic Type standard if so determined under 702.15 (c) and (d).					
Carbon tetrachloride	A, A-S, AA, AA-S		0.4	H(WS)	A
(56-23-5)	GA	5		H(WS)	F
Carboxin	A, A-S, AA, AA-S		50	H(WS)	Z
(5234-68-4)	GA	50		H(WS)	J
Chloramben	A, A-S, AA, AA-S		50*	H(WS)	Z
(CAS No. Not Applicable)	GA	50*		H(WS)	J
Remark: * Includes: related forms that convert to the organic acid upon acidification to a pH of 2 or less; and esters of the organic acid.					
Chloranil	A, A-S, AA, AA-S		5*	H(WS)	I
(118-75-2)	GA	**		H(WS)	J
Remarks: * This substance did not receive a review beyond determining that it is in a principal organic contaminant class and that it does not have a more stringent Specific MCL.					
** The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
Chlordane	A, A-S, AA, AA-S	0.05		H(WS)	A
(57-74-9)	GA	0.05		H(WS)	A
	A, A-S, AA, AA-S, B, C, D	2×10^{-5}		H(FC)	A
	SA, SB, SC, I, SD	2×10^{-5}		H(FC)	A
Chloride	A, A-S, AA, AA-S	250,000		H(WS)	H
(CAS No. Not Applicable)	GA	250,000		H(WS)	H

Table 1 (Continued)

NEW YORK STATE AMBIENT WATER QUALITY STANDARDS AND GUIDANCE VALUES

JUNE 1998

SUBSTANCE (CAS No.)	WATER CLASSES	STANDARD (ug/L)	GUIDANCE VALUE (ug/L)	TYPE	BASIS CODE
Chlorinated dibenzo-p-dioxins and Chlorinated dibenzofurans (CAS No. Not Applicable)	A, A-S, AA, AA-S	7×10^{-7}*		H(WS)	A
	GA	7×10^{-7}*		H(WS)	A
	A, A-S, AA, AA-S, B, C, D	6×10^{-10}*		H(FC)	A
	SA, SB, SC, I, SD	6×10^{-10}*		H(FC)	A
	A, A-S, AA, AA-S, B, C, D	3.1×10^{-9}**		W	
	SA, SB, SC, I, SD	3.1×10^{-9}**		W	

Remarks: * Value is for the total of the chlorinated dibenzo-p-dioxins and chlorinated dibenzofurans that are listed in the table below as equivalents of 2,3,7,8-tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD).

The 2,3,7,8-TCDD equivalent for a congener for the H(WS) standards is obtained by multiplying the concentration of that congener by its Toxicity Equivalency Factor (TEF) from the table below. The 2,3,7,8-TCDD equivalent for a congener for the H(FC) standards is obtained by multiplying the concentration of that congener by its TEF and its Bioaccumulation Equivalency Factor (BEF) from the table below.

** Applies only to 2,3,7,8-TCDD

CONGENER	TEF	BEF
2,3,7,8-Tetrachlorodibenzo-p-dioxin	1	1
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	0.5	0.9
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	0.1	0.3
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	0.1	0.1
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	0.1	0.1
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	0.01	0.05
Octachlorodibenzo-p-dioxin	0.001	0.01
2,3,7,8-Tetrachlorodibenzofuran	0.1	0.8
1,2,3,7,8-Pentachlorodibenzofuran	0.05	0.2
2,3,4,7,8-Pentachlorodibenzofuran	0.5	1.6
1,2,3,4,7,8-Hexachlorodibenzofuran	0.1	0.08
1,2,3,6,7,8-Hexachlorodibenzofuran	0.1	0.2
2,3,4,6,7,8-Hexachlorodibenzofuran	0.1	0.7
1,2,3,7,8,9-Hexachlorodibenzofuran	0.1	0.6
1,2,3,4,6,7,8-Heptachlorodibenzofuran	0.01	0.01
1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.01	0.4
Octachlorodibenzofuran	0.001	0.02

Chlorine, Total Residual (CAS No. Not Applicable)	A, A-S, AA, AA-S, B, C	5		A(C)	
	D	19		A(A)	
	SA, SB, SC, I	7.5		A(C)	
	SD	13		A(A)	
2-Chloroaniline (95-51-2)	A, A-S, AA, AA-S		5*	H(WS)	I
	GA	**		H(WS)	J

Remarks: * This substance did not receive a review beyond determining that it is in a principal organic contaminant class and that it does not have a more stringent Specific MCL.

** The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.

Table 1 (Continued)

NEW YORK STATE AMBIENT WATER QUALITY STANDARDS AND GUIDANCE VALUES

JUNE 1998

SUBSTANCE (CAS No.)	WATER CLASSES	STANDARD (ug/L)	GUIDANCE VALUE (ug/L)	TYPE	BASIS CODE
3-Chloroaniline	A, A-S, AA, AA-S		5*	H(WS)	I
(108-42-9)	GA	**		H(WS)	J
Remarks: * This substance did not receive a review beyond determining that it is in a principal organic contaminant class and that it does not have a more stringent Specific MCL.					
** The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
4-Chloroaniline	A, A-S, AA, AA-S		5*	H(WS)	I
(106-47-8)	GA	**		H(WS)	J
Remarks: * This substance did not receive a review beyond determining that it is in a principal organic contaminant class and that it does not have a more stringent Specific MCL.					
** The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
Chlorobenzene	A, A-S, AA, AA-S	5		H(WS)	I
(108-90-7)	GA	*		H(WS)	J
	A, A-S, AA, AA-S, B, C, D	400		H(FC)	B
	SA,SB, SC, I, SD	400		H(FC)	B
	A, A-S, AA, AA-S, B, C	5		A(C)	
	SA, SB, SC, I		5	A(C)	
	A, A-S, AA, AA-S	20		E	U
	D	50		E	V
	SD		50	E	V
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
4-Chlorobenzotrifluoride	A, A-S, AA, AA-S	5		H(WS)	I
(98-56-6)	GA	*		H(WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
1-Chlorobutane	A, A-S, AA, AA-S		5*	H(WS)	I
(109-69-3)	GA	**		H(WS)	J
Remarks: * This substance did not receive a review beyond determining that it is in a principal organic contaminant class and that it does not have a more stringent Specific MCL.					
** The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
Chloroethane	A, A-S, AA, AA-S		5*	H(WS)	I
(75-00-3)	GA	**		H(WS)	J
Remarks: * This substance did not receive a review beyond determining that it is in a principal organic contaminant class and that it does not have a more stringent Specific MCL.					
** The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
Chloroform	A, A-S, AA, AA-S	7		H(WS)	A
(67-66-3)	GA	7		H(WS)	A

Table 1 (Continued)

NEW YORK STATE AMBIENT WATER QUALITY STANDARDS AND GUIDANCE VALUES

JUNE 1998

SUBSTANCE (CAS No.)	WATER CLASSES	STANDARD (ug/L)	GUIDANCE VALUE (ug/L)	TYPE	BASIS CODE
Chloromethyl methyl ether	A, A-S, AA, AA-S		5*	H(WS)	I
(107-30-2)	GA	**		H(WS)	J
Remarks: * This substance did not receive a review beyond determining that it is in a principal organic contaminant class and that it does not have a more stringent Specific MCL.					
** The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
2-Chloronaphthalene	A, A-S, AA, AA-S	10		E	U
(91-58-7)	GA		10	E	U
2-Chloronitrobenzene	A, A-S, AA, AA-S		5*	H(WS)	I
(88-73-3)	GA	**		H(WS)	J
Remarks: * This substance did not receive a review beyond determining that it is in a principal organic contaminant class and that it does not have a more stringent Specific MCL.					
** The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
3-Chloronitrobenzene	A, A-S, AA, AA-S		5*	H(WS)	I
(121-73-3)	GA	**		H(WS)	J
Remarks: * This substance did not receive a review beyond determining that it is in a principal organic contaminant class and that it does not have a more stringent Specific MCL.					
** The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
4-Chloronitrobenzene	A, A-S, AA, AA-S		5*	H(WS)	I
(100-00-5)	GA	**		H(WS)	J
Remarks: * This substance did not receive a review beyond determining that it is in a principal organic contaminant class and that it does not have a more stringent Specific MCL.					
** The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
Chloroprene	A, A-S, AA, AA-S		5*	H(WS)	I
(126-99-8)	GA	**		H(WS)	J
Remarks: * This substance did not receive a review beyond determining that it is in a principal organic contaminant class and that it does not have a more stringent Specific MCL.					
** The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
Chlorothalonil	A, A-S, AA, AA-S		5*	H(WS)	I
(1897-45-6)	GA	**		H(WS)	J
Remarks: * This substance did not receive a review beyond determining that it is in a principal organic contaminant class and that it does not have a more stringent Specific MCL.					
** The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					

Table 1 (Continued)

NEW YORK STATE AMBIENT WATER QUALITY STANDARDS AND GUIDANCE VALUES

JUNE 1998

SUBSTANCE (CAS No.)	WATER CLASSES	STANDARD (ug/L)	GUIDANCE VALUE (ug/L)	TYPE	BASIS CODE
2-Chlorotoluene	A, A-S, AA, AA-S	5		H(WS)	I
(95-49-8)	GA	*		H(WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
3-Chlorotoluene	A, A-S, AA, AA-S	5		H(WS)	I
(108-41-8)	GA	*		H(WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
4-Chlorotoluene	A, A-S, AA, AA-S	5		H(WS)	I
(106-43-4)	GA	*		H(WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
4-Chloro-o-toluidine	A, A-S, AA, AA-S		5*	H(WS)	I
(95-69-2)	GA	**		H(WS)	J
Remarks: * This substance did not receive a review beyond determining that it is in a principal organic contaminant class and that it does not have a more stringent Specific MCL. ** The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
5-Chloro-o-toluidine	A, A-S, AA, AA-S		0.7	H(WS)	A
(95-79-4)	GA	*		H(WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
3-Chloro-1,1,1-trifluoropropane	A, A-S, AA, AA-S	5		H(WS)	I
(460-35-5)	GA	*		H(WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
Chromium	A, A-S, AA, AA-S	50		H(WS)	G
(CAS No. Not Applicable)	GA	50		H(WS)	G
	A, A-S, AA, AA-S, B, C	*		A(C)	
	A, A-S, AA, AA-S, B, C, D	**		A(A)	
Remarks: * (0.86) exp(0.819 [ln (ppm hardness)] + 0.6848) ** (0.316) exp(0.819 [ln (ppm hardness)] + 3.7256) Aquatic Type standards apply to dissolved form and do not include hexavalent chromium.					
Chromium (hexavalent)	GA	50		H(WS)	F
(CAS No. Not Applicable)	A, A-S, AA, AA-S, B, C	11*		A(C)	
	A, A-S, AA, AA-S, B, C, D	16*		A(A)	
	SA, SB, SC	54**		A(C)	
	I		50**	A(C)	
	SD	1,200**		A(A)	
Remarks: * Applies to dissolved form. ** Applies to acid-soluble form.					

Table 1 (Continued)

NEW YORK STATE AMBIENT WATER QUALITY STANDARDS AND GUIDANCE VALUES

JUNE 1998

SUBSTANCE (CAS No.)	WATER CLASSES	STANDARD (ug/L)	GUIDANCE VALUE (ug/L)	TYPE	BASIS CODE
Chrysene	A, A-S, AA, AA-S		0.002	H(WS)	A
(218-01-9)	GA		0.002	H(WS)	A
Cobalt	A, A-S, AA, AA-S, B, C	5*		A(C)	
(CAS No. Not Applicable)	D		110	A(A)	
Remark: * For the waters of the Great Lakes System, the Department will substitute a guidance value for the aquatic Type standard if so determined under 702.15 (c). Aquatic Type standards and guidance value apply to acid-soluble form.					
Copper	A, A-S, AA, AA-S	200		H(WS)	H
(CAS No. Not Applicable)	GA	200		H(WS)	H
	A, A-S, AA, AA-S, B, C	*		A(C)	
	A, A-S, AA, AA-S, B, C, D	**		A(A)	
	SA, SB, SC, I	***		A(C)	
	SA, SB, SC, I, SD	****		A(A)	
Remarks: * (0.96) exp(0.8545 [ln (ppm hardness)] - 1.702) ** (0.96) exp(0.9422 [ln (ppm hardness)] - 1.7) *** Standard is 3.4 ug/L except in New York/New Jersey Harbor where it is 5.6 ug/L. **** Standard is 4.8 ug/L except in New York/New Jersey Harbor where it is 7.9 ug/L. Aquatic Type standards apply to dissolved form.					
Cyanide	A, A-S, AA, AA-S	200		H(WS)	H
(CAS No. Not Applicable)	GA	200		H(WS)	H
	A, A-S, AA-S, B, C, D	9,000		H(FC)	B
	SA, SB, SC, I, SD	9,000		H(FC)	B
	A, A-S, AA, AA-S, B, C	5.2*		A(C)	
	A, A-S, AA, AA-S, B, C, D	22*		A(A)	
	SA, SB, SC	1.0*		A(C)	
	I		1.0*	A(C)	
	SD	1.0*		A(A)	
Remark: * As free cyanide: the sum of HCN and CN^- expressed as CN.					
Cyanogen bromide	A, A-S, AA, AA-S		5*	H(WS)	I
(506-68-3)	GA	**		H(WS)	J
Remarks: * This substance did not receive a review beyond determining that it is in a principal organic contaminant class and that it does not have a more stringent Specific MCL. ** The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
Cyanogen chloride	A, A-S, AA, AA-S		5*	H(WS)	I
(506-77-4)	GA	**		H(WS)	J
Remarks: * This substance did not receive a review beyond determining that it is in a principal organic contaminant class and that it does not have a more stringent Specific MCL. ** The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					

Table 1 (Continued)

NEW YORK STATE AMBIENT WATER QUALITY STANDARDS AND GUIDANCE VALUES

JUNE 1998

SUBSTANCE (CAS No.)	WATER CLASSES	STANDARD (ug/L)	GUIDANCE VALUE (ug/L)	TYPE	BASIS CODE
Dalapon	A, A-S, AA, AA-S		50*	H(WS)	Z
(CAS No. Not Applicable)	GA	50*		H(WS)	J
Remark: * Includes: related forms that convert to the organic acid upon acidification to a pH of 2 or less; and esters of the organic acid.					
p,p'-DDD	A, A-S, AA, AA-S	0.3		H(WS)	A
(72-54-8)	GA	0.3		H(WS)	A
	A, A-S, AA, AA-S, B, C, D	8×10^{-5}		H(FC)	A
	SA, SB, SC, I, SD	8×10^{-5}		H(FC)	A
	A, A-S, AA, AA-S, B, C, D	*		W	
	SA, SB, SC, I, SD	*		W	
Remark: * Refer to entry for "p,p'-DDT."					
p,p'-DDE	A, A-S, AA, AA-S	0.2		H(WS)	A
(72-55-9)	GA	0.2		H(WS)	A
	A, A-S, AA, AA-S, B, C, D	7×10^{-6}		H(FC)	A
	SA, SB, SC, I, SD	7×10^{-6}		H(FC)	A
	A, A-S, AA, AA-S, B, C, D	*		W	
	SA, SB, SC, I, SD	*		W	
Remark: * Refer to entry for "p,p'-DDT."					
p,p'-DDT	A, A-S, AA, AA-S	0.2		H(WS)	A
(50-29-3)	GA	0.2		H(WS)	A
	A, A-S, AA, AA-S, B, C, D	1×10^{-5}		H(FC)	A
	SA, SB, SC, I, SD	1×10^{-5}		H(FC)	A
	A, A-S, AA, AA-S, B, C, D	1.1×10^{-5}*		W	
	SA, SB, SC, I, SD	1.1×10^{-5}*		W	
Remark: * Applies to the sum of p,p'-DDD, p,p'-DDE and p,p'-DDT					
Dechlorane Plus	A, A-S, AA, AA-S	5		H(WS)	I
(13560-89-9)	GA	*		H(WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
Demeton	A, A-S, AA, AA-S, B, C	0.1*		A(C)	
(8065-48-3; 298-03-3; 126-75-0)	SA, SB, SC	0.1		A(C)	
	I		0.1	A(C)	
Remark: * Standards and guidance value apply to the sum of these substances. For the waters of the Great Lakes System, the Department will substitute a guidance value for the aquatic Type standard if so determined under 702.15 (c).					
Diazinon	GA	0.7		H(WS)	F
(333-41-5)	A, A-S, AA, AA-S, B, C	0.08*		A(C)	
Remark: * For the waters of the Great Lakes System, the Department will substitute a guidance value for the aquatic Type standard if so determined under 702.15 (c).					

Table 1 (Continued)

NEW YORK STATE AMBIENT WATER QUALITY STANDARDS AND GUIDANCE VALUES

JUNE 1998

SUBSTANCE (CAS No.)	WATER CLASSES	STANDARD (ug/L)	GUIDANCE VALUE (ug/L)	TYPE	BASIS CODE
1,2-Dibromobenzene	A, A-S, AA, AA-S	5		H(WS)	I
(583-53-9)	GA	*		H(WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
1,3-Dibromobenzene	A, A-S, AA, AA-S	5		H(WS)	I
(108-36-1)	GA	*		H(WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
1,4-Dibromobenzene	A, A-S, AA, AA-S	5		H(WS)	I
(106-37-6)	GA	*		H(WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
Dibromochloromethane	A, A-S, AA, AA-S		50	H(WS)	Z
(124-48-1)	GA		50	H(WS)	Z
1,2-Dibromo-3-chloropropane	A, A-S, AA, AA-S	0.04		H(WS)	A
(96-12-8)	GA	0.04		H(WS)	A
Dibromodichloromethane	A, A-S, AA, AA-S	5		H(WS)	I
(594-18-3)	GA	*		H(WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
Dibromomethane	A, A-S, AA, AA-S		5*	H(WS)	I
(74-95-3)	GA	**		H(WS)	J
Remarks: * This substance did not receive a review beyond determining that it is in a principal organic contaminant class and that it does not have a more stringent Specific MCL. ** The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
2,2-Dibromo-3-nitrilopropionamide	A, A-S, AA, AA-S		50*	H(WS)	Z
and Dibromoacetonitrile	GA		50*	H(WS)	Z
(10222-01-2; 3252-43-5)	A, A-S, AA, AA-S, B, C		20	A(C)	
	D		50	A(A)	
Remarks: Values listed apply to the sum of these substances, except as noted below. * Applies to 2,2-dibromo-3-nitrilopropionamide only.					
Di-n-butyl phthalate	A, A-S, AA, AA-S		50	H(WS)	Z
(84-74-2)	GA	50		H(WS)	J
Dicamba	GA	0.44		H(WS)	F
(1918-00-9)					

Table 1 (Continued)

NEW YORK STATE AMBIENT WATER QUALITY STANDARDS AND GUIDANCE VALUES

JUNE 1998

SUBSTANCE (CAS No.)	WATER CLASSES	STANDARD (ug/L)	GUIDANCE VALUE (ug/L)	TYPE	BASIS CODE
Dichlorobenzenes	A, A-S, AA, AA-S	3*		H(WS)	A
(95-50-1;541-73-1;106-46-7)	GA	3*		H(WS)	A
	A, A-S, AA, AA-S, B, C	5**		A(C)	
	SA, SB, SC, I		5**	A(C)	
	A, A-S, AA, AA-S	20***/30****		E	U
	D	50**		E	V
	SD		50**	E	V
Remarks: * Applies to each isomer (1,2-,1,3- and 1,4-dichlorobenzene) individually. ** Applies to the sum of 1,2-, 1,3- and 1,4-dichlorobenzene *** Applies to 1,3-dichlorobenzene only. **** Applies to 1,4-dichlorobenzene only. For the waters of the Great Lakes System, the Department will substitute a guidance value for the aquatic Type standard if so determined under 702.15 (c).					
3,3'-Dichlorobenzidine	A, A-S, AA, AA-S		5*	H(WS)	I
(91-94-1)	GA	**		H(WS)	J
Remarks: * This substance did not receive a review beyond determining that it is in a principal organic contaminant class and that it does not have a more stringent Specific MCL. ** The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
3,4-Dichlorobenzotrifluoride	A, A-S, AA, AA-S	5		H(WS)	I
(328-84-7)	GA	*		H(WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
cis-1,4-Dichloro-2-butene	A, A-S, AA, AA-S		5*	H(WS)	I
(1476-11-5)	GA	**		H(WS)	J
Remarks: * This substance did not receive a review beyond determining that it is in a principal organic contaminant class and that it does not have a more stringent Specific MCL. ** The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
trans-1,4-Dichloro-2-butene	A, A-S, AA, AA-S		5*	H(WS)	I
(110-57-6)	GA	**		H(WS)	J
Remarks: * This substance did not receive a review beyond determining that it is in a principal organic contaminant class and that it does not have a more stringent Specific MCL. ** The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
Dichlorodifluoromethane	A, A-S, AA, AA-S		5*	H(WS)	I
(75-71-8)	GA	**		H(WS)	J
Remark: * This substance did not receive a review beyond determining that it is in a principal organic contaminant class and that it does not have a more stringent Specific MCL. ** The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					

Table 1 (Continued)

NEW YORK STATE AMBIENT WATER QUALITY STANDARDS AND GUIDANCE VALUES

JUNE 1998

SUBSTANCE (CAS No.)	WATER CLASSES	STANDARD (ug/L)	GUIDANCE VALUE (ug/L)	TYPE	BASIS CODE
1,1-Dichloroethane	A, A-S, AA, AA-S	5		H(WS)	I
(75-34-3)	GA	*		H(WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
1,2-Dichloroethane	A, A-S, AA, AA-S	0.6		H(WS)	A
(107-06-2)	GA	0.6		H(WS)	A
1,1-Dichloroethene	A, A-S, AA, AA-S		0.7	H(WS)	A
(75-35-4)	GA	*		H(WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
cis-1,2-Dichloroethene	A, A-S, AA, AA-S	5		H(WS)	I
(156-59-2)	GA	*		H(WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
trans-1,2-Dichloroethene	A, A-S, AA, AA-S	5		H(WS)	I
(156-60-5)	GA	*		H(WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
Dichlorofluoromethane	A, A-S, AA, AA-S	5		H(WS)	I
(75-43-4)	GA	*		H(WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
2,4-Dichlorophenol	A, A-S, AA, AA-S		5*****	H(WS)	I
(120-83-2)	GA	****		H(WS)	J
	A, A-S, AA, AA-S	0.3*		E	U
	GA	**		E	
	A, A-S, AA, AA-S, B, C, D	***		E	
Remarks: * Also see entry for "Phenolic compounds (total phenols)."					
** Refer to entry for "Phenolic compounds (total phenols)."					
*** Refer to entry for "Phenols, total chlorinated."					
**** The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
***** This substance did not receive a review beyond determining that it is in a principal organic contaminant class and that it does not have a more stringent Specific MCL.					
2,4-Dichlorophenoxyacetic acid	A, A-S, AA, AA-S	50		H(WS)	G
(94-75-7)	GA	50		H(WS)	G
1,1-Dichloropropane	A, A-S, AA, AA-S	5		H(WS)	I
(78-99-9)	GA	*		H(WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					

Table 1 (Continued)

NEW YORK STATE AMBIENT WATER QUALITY STANDARDS AND GUIDANCE VALUES

JUNE 1998

SUBSTANCE (CAS No.)	WATER CLASSES	STANDARD (ug/L)	GUIDANCE VALUE (ug/L)	TYPE	BASIS CODE
1,2-Dichloropropane	A, A-S, AA, AA-S	1		H(WS)	A
(78-87-5)	GA	1		H(WS)	A
1,3-Dichloropropane	A, A-S, AA, AA-S	5		H(WS)	I
(142-28-9)	GA	*		H(WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
2,2-Dichloropropane	A, A-S, AA, AA-S	5		H(WS)	I
(594-20-7)	GA	*		H(WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
1,1-Dichloropropene	A, A-S, AA, AA-S		5*	H(WS)	I
(563-58-6)	GA	**		H(WS)	J
Remarks: * This substance did not receive a review beyond determining that it is in a principal organic contaminant class and that it does not have a more stringent Specific MCL. ** The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
1,3-Dichloropropene	A, A-S, AA, AA-S	0.4*		H(WS)	A
(542-75-6)	GA	0.4*		H(WS)	A
Remark: * Applies to the sum of cis- and trans-1,3-dichloropropene, CAS Nos. 10061-01-5 and 10061-02-6, respectively.					
2,3-Dichlorotoluene	A, A-S, AA, AA-S	5		H(WS)	I
(32768-54-0)	GA	*		H(WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
2,4-Dichlorotoluene	A, A-S, AA, AA-S	5		H(WS)	I
(95-73-8)	GA	*		H(WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
2,5-Dichlorotoluene	A, A-S, AA, AA-S	5		H(WS)	I
(19398-61-9)	GA	*		H(WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
2,6-Dichlorotoluene	A, A-S, AA, AA-S	5		H(WS)	I
(118-69-4)	GA	*		H(WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					

Table 1 (Continued)

NEW YORK STATE AMBIENT WATER QUALITY STANDARDS AND GUIDANCE VALUES

JUNE 1998

SUBSTANCE (CAS No.)	WATER CLASSES	STANDARD (ug/L)	GUIDANCE VALUE (ug/L)	TYPE	BASIS CODE
3,4-Dichlorotoluene	A, A-S, AA, AA-S	5		H(WS)	I
(95-75-0)	GA	*		H(WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
3,5-Dichlorotoluene	A, A-S, AA, AA-S	5		H(WS)	I
(25186-47-4)	GA	*		H(WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
Dieldrin	A, A-S, AA, AA-S	0.004		H(WS)	A
(60-57-1)	GA	0.004		H(WS)	A
	A, A-S, AA, AA-S, B, C, D	6×10^{-7}		H(FC)	A
	SA, SB, SC, I, SD	6×10^{-7}		H(FC)	A
	A, A-S, AA, AA-S, B, C	0.056		A(C)	
	A, A-S, AA, AA-S, B, C, D	0.24		A(A)	
Di(2-ethylhexyl)adipate	A, A-S, AA, AA-S	20		H(WS)	A
(103-23-1)	GA	20		H(WS)	A
Diethyl phthalate	A, A-S, AA, AA-S		50	H(WS)	Z
(84-66-2)	GA		50	H(WS)	Z
1,2-Difluoro-1,1,2,2-	A, A-S, AA, AA-S		5*	H(WS)	I
tetrachloroethane	GA	**		H(WS)	J
(76-12-0)					
Remarks: * This substance did not receive a review beyond determining that it is in a principal organic contaminant class and that it does not have a more stringent Specific MCL. ** The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
1,2-Diisopropylbenzene	A, A-S, AA, AA-S		5*	H(WS)	I
(577-55-9)	GA	**		H(WS)	J
Remarks: * This substance did not receive a review beyond determining that it is in a principal organic contaminant class and that it does not have a more stringent Specific MCL. ** The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
1,3-Diisopropylbenzene	A, A-S, AA, AA-S		5*	H(WS)	I
(99-62-7)	GA	**		H(WS)	J
Remarks: * This substance did not receive a review beyond determining that it is in a principal organic contaminant class and that it does not have a more stringent Specific MCL. ** The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					

Table 1 (Continued)

NEW YORK STATE AMBIENT WATER QUALITY STANDARDS AND GUIDANCE VALUES

JUNE 1998

SUBSTANCE (CAS No.)	WATER CLASSES	STANDARD (ug/L)	GUIDANCE VALUE (ug/L)	TYPE	BASIS CODE
1,4-Diisopropylbenzene	A, A-S, AA, AA-S		5*	H(WS)	I
(100-18-5)	GA	**		H(WS)	J
Remarks: * This substance did not receive a review beyond determining that it is in a principal organic contaminant class and that it does not have a more stringent Specific MCL.					
** The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
N,N-Dimethylaniline	A, A-S, AA, AA-S	1		H(WS)	A
(121-69-7)	GA	1		H(WS)	A
2,3-Dimethylaniline	A, A-S, AA, AA-S		5*	H(WS)	I
(87-59-2)	GA	**		H(WS)	J
Remarks: * This substance did not receive a review beyond determining that it is in a principal organic contaminant class and that it does not have a more stringent Specific MCL.					
** The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
2,4-Dimethylaniline	A, A-S, AA, AA-S		5*	H(WS)	I
(95-68-1)	GA	**		H(WS)	J
Remarks: * This substance did not receive a review beyond determining that it is in a principal organic contaminant class and that it does not have a more stringent Specific MCL.					
** The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
2,5-Dimethylaniline	A, A-S, AA, AA-S		5*	H(WS)	I
(95-78-3)	GA	**		H(WS)	J
Remarks: * This substance did not receive a review beyond determining that it is in a principal organic contaminant class and that it does not have a more stringent Specific MCL.					
** The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
2,6-Dimethylaniline	A, A-S, AA, AA-S		5*	H(WS)	I
(87-62-7)	GA	**		H(WS)	J
Remarks: * This substance did not receive a review beyond determining that it is in a principal organic contaminant class and that it does not have a more stringent Specific MCL.					
** The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
3,4-Dimethylaniline	A, A-S, AA, AA-S		5*	H(WS)	I
(95-64-7)	GA	**		H(WS)	J
Remarks: * This substance did not receive a review beyond determining that it is in a principal organic contaminant class and that it does not have a more stringent Specific MCL.					
** The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					

Table 1 (Continued)

NEW YORK STATE AMBIENT WATER QUALITY STANDARDS AND GUIDANCE VALUES

JUNE 1998

SUBSTANCE (CAS No.)	WATER CLASSES	STANDARD (ug/L)	GUIDANCE VALUE (ug/L)	TYPE	BASIS CODE
3,5-Dimethylaniline	A, A-S, AA, AA-S		5*	H(WS)	I
(108-69-0)	GA	**		H(WS)	J
Remarks: * This substance did not receive a review beyond determining that it is in a principal organic contaminant class and that it does not have a more stringent Specific MCL. ** The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
3,3'-Dimethylbenzidine	A, A-S, AA, AA-S		5*	H(WS)	I
(119-93-7)	GA	**		H(WS)	J
Remarks: * This substance did not receive a review beyond determining that it is in a principal organic contaminant class and that it does not have a more stringent Specific MCL. ** The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
4,4'-Dimethylbibenzyl	A, A-S, AA, AA-S		5*	H(WS)	I
(538-39-6)	GA	**		H(WS)	J
Remarks: * This substance did not receive a review beyond determining that it is in a principal organic contaminant class and that it does not have a more stringent Specific MCL. ** The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
4,4'-Dimethyldiphenylmethane	A, A-S, AA, AA-S		5*	H(WS)	I
(4957-14-6)	GA	**		H(WS)	J
Remarks: * This substance did not receive a review beyond determining that it is in a principal organic contaminant class and that it does not have a more stringent Specific MCL. ** The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
Dimethylformamide	A, A-S, AA, AA-S		50	H(WS)	Z
(68-12-2)	GA		50	H(WS)	Z
alpha, alpha-Dimethyl	A, A-S, AA, AA-S		5*	H(WS)	I
phenethylamine	GA	**		H(WS)	J
(122-09-8)					
Remarks: * This substance did not receive a review beyond determining that it is in a principal organic contaminant class and that it does not have a more stringent Specific MCL. ** The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
2,4-Dimethylphenol	A, A-S, AA, AA-S		50	H(WS)	Z
(105-67-9)	GA		50	H(WS)	Z
	A, A-S, AA, AA-S, B, C, D	1,000		H(FC)	B
	SA, SB, SC, I, SD	1,000		H(FC)	B
	A, A-S, AA, AA-S	*		E	
	GA	*		E	
	B, C, D	**		E	
Remarks: * Refer to entry for “Phenolic compounds (total phenols).” ** Refer to entry for “Phenols, total unchlorinated.”					

Table 1 (Continued)

NEW YORK STATE AMBIENT WATER QUALITY STANDARDS AND GUIDANCE VALUES

JUNE 1998

SUBSTANCE (CAS No.)	WATER CLASSES	STANDARD (ug/L)	GUIDANCE VALUE (ug/L)	TYPE	BASIS CODE
Dimethyl phthalate	A, A-S, AA, AA-S		50	H(WS)	Z
(131-11-3)	GA		50	H(WS)	Z
Dimethyl tetrachloroterephthalate	A, A-S, AA, AA-S		50	H(WS)	Z
(1861-32-1)	GA	50		H(WS)	J
1,3-Dinitrobenzene	A, A-S, AA, AA-S		5*	H(WS)	I
(99-65-0)	GA	**		H(WS)	J
Remarks: * This substance did not receive a review beyond determining that it is in a principal organic contaminant class and that it does not have a more stringent Specific MCL.					
** The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
2,4-Dinitrophenol	A, A-S, AA, AA-S		10	H(WS)	B
(51-28-5)	GA		10	H(WS)	B
	A, A-S, AA, AA-S, B, C, D	400		H(FC)	B
	SA, SB, SC, I, SD	400		H(FC)	B
	A, A-S, AA, AA-S	*		E	
	GA	*		E	
	B, C, D	**		E	
Remarks: * Refer to entry for “Phenolic compounds (total phenols).”					
** Refer to entry for “Phenols, total unchlorinated.”					
2,3-Dinitrotoluene	A, A-S, AA, AA-S		5*	H(WS)	I
(602-01-7)	GA	**		H(WS)	J
Remarks: * This substance did not receive a review beyond determining that it is in a principal organic contaminant class and that it does not have a more stringent Specific MCL.					
** The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
2,4-Dinitrotoluene	A, A-S, AA, AA-S		5*	H(WS)	I
(121-14-2)	GA	**		H(WS)	J
Remarks: * This substance did not receive a review beyond determining that it is in a principal organic contaminant class and that it does not have a more stringent Specific MCL.					
** The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
2,5-Dinitrotoluene	A, A-S, AA, AA-S		5*	H(WS)	I
(619-15-8)	GA	**		H(WS)	J
Remarks: * This substance did not receive a review beyond determining that it is in a principal organic contaminant class and that it does not have a more stringent Specific MCL.					
** The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
2,6-Dinitrotoluene	A, A-S, AA, AA-S		0.07	H(WS)	A
(606-20-2)	GA	*		H(WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					

Table 1 (Continued)

NEW YORK STATE AMBIENT WATER QUALITY STANDARDS AND GUIDANCE VALUES

JUNE 1998

SUBSTANCE (CAS No.)	WATER CLASSES	STANDARD (ug/L)	GUIDANCE VALUE (ug/L)	TYPE	BASIS CODE
3,4-Dinitrotoluene	A, A-S, AA, AA-S		5*	H(WS)	I
(610-39-9)	GA	**		H(WS)	J
Remarks: * This substance did not receive a review beyond determining that it is in a principal organic contaminant class and that it does not have a more stringent Specific MCL. ** The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
3,5-Dinitrotoluene	A, A-S, AA, AA-S		5*	H(WS)	I
(618-85-9)	GA	**		H(WS)	J
Remarks: * This substance did not receive a review beyond determining that it is in a principal organic contaminant class and that it does not have a more stringent Specific MCL. ** The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
Di-n-octyl phthalate	A, A-S, AA, AA-S		50	H(WS)	Z
(117-84-0)	GA		50	H(WS)	Z
Dinoseb	A, A-S, AA, AA-S	*		E	
(88-85-7)	GA	*		E	
	B, C, D	**		E	
Remarks: * Refer to entry for “Phenolic compounds (total phenols).” ** Refer to entry for “Phenols, total unchlorinated.”					
Diphenamid	A, A-S, AA, AA-S		50	H(WS)	Z
(957-51-7)	GA	50		H(WS)	J
Diphenylamine	A, A-S, AA, AA-S		5*	H(WS)	I
(122-39-4)	GA	**		H(WS)	J
Remarks: * This substance did not receive a review beyond determining that it is in a principal organic contaminant class and that it does not have a more stringent Specific MCL. ** The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
Diphenylhydrazines	A, A-S, AA, AA-S		0.05*	H(WS)	A
(122-66-7; 530-50-7)	GA	ND**		H(WS)	F
Remarks: * Applies to 1,2-diphenylhydrazine (CAS No. 122-66-7) only. ** Applies to the sum of 1,1- and 1,2-diphenylhydrazine (CAS Nos. 530-50-7 and 122-66-7, respectively).					
Diquat	A, A-S, AA, AA-S	20*		H(WS)	B
(2764-72-9)	GA	20*		H(WS)	B
Remark: * Applies to the concentration of diquat ion whether free or as an undissociated salt.					
Disulfoton	GA	*		H(WS)	
(298-04-4)					
Remark: * Refer to entry for "Phorate and Disulfoton."					

Table 1 (Continued)

NEW YORK STATE AMBIENT WATER QUALITY STANDARDS AND GUIDANCE VALUES

JUNE 1998

SUBSTANCE (CAS No.)	WATER CLASSES	STANDARD (ug/L)	GUIDANCE VALUE (ug/L)	TYPE	BASIS CODE
Dodecylguanidine acetate and	A, A-S, AA, AA-S		50*	H(WS)	B
Dodecylguanidine hydrochloride	GA		50*	H(WS)	B
(2439-10-3; 13590-97-1)					
Remark: * Applies to sum of these substances.					
Dyphylline	A, A-S, AA, AA-S	50		H(WS)	B
(479-18-5)	GA		50	H(WS)	B
Endosulfan	A, A-S, AA, AA-S, B, C	0.009		A(C)	
(115-29-7)	D	0.22*		A(A)	
	SA, SB, SC	0.001		A(C)	
	I		0.001	A(C)	
	SD	0.034		A(A)	
Remark: * For the waters of the Great Lakes System, the Department will substitute a guidance value for the aquatic Type standard if so determined under 702.15 (d).					
Endothall	A, A-S, AA, AA-S		50	H(WS)	Z
(145-73-3)	GA		50	H(WS)	Z
Endrin	A, A-S, AA, AA-S	0.2		H(WS)	G
(72-20-8)	GA	ND		H(WS)	F
	A, A-S, AA, AA-S, B, C, D	0.002		H(FC)	
	SA, SB, SC, SD	0.002		H(FC)	
	I		0.002	H(FC)	
	A, A-S, AA, AA-S, B, C	0.036		A(C)	
	A, A-S, AA, AA-S, B, C, D	0.086		A(A)	
Endrin aldehyde	A, A-S, AA, AA-S		5*	H(WS)	I
(7421-93-4)	GA	**		H(WS)	J
Remarks: * This substance did not receive a review beyond determining that it is in a principal organic contaminant class and that it does not have a more stringent Specific MCL. ** The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
Endrin ketone	A, A-S, AA, AA-S		5*	H(WS)	I
(53494-70-5)	GA	**		H(WS)	J
Remarks: * This substance did not receive a review beyond determining that it is in a principal organic contaminant class and that it does not have a more stringent Specific MCL. ** The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
Ethylbenzene	A, A-S, AA, AA-S	5		H(WS)	I
(100-41-4)	GA	*		H(WS)	J
	A, A-S, AA, AA-S, B, C		17	A(C)	
	A, A-S, AA, AA-S, B, C, D		150	A(A)	
	SA, SB, SC, I		4.5	A(C)	
	SA, SB, SC, I, SD		41	A(A)	
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					

Table 1 (Continued)

NEW YORK STATE AMBIENT WATER QUALITY STANDARDS AND GUIDANCE VALUES

JUNE 1998

SUBSTANCE (CAS No.)	WATER CLASSES	STANDARD (ug/L)	GUIDANCE VALUE (ug/L)	TYPE	BASIS CODE
Ethylene chlorohydrin	A, A-S, AA, AA-S		50	H(WS)	Z
(107-07-3)	GA		50	H(WS)	Z
Ethylene dibromide	A, A-S, AA, AA-S	6×10^{-4}		H(WS)	A
(106-93-4)	GA	6×10^{-4}		H(WS)	A
Ethylene glycol	A, A-S, AA, AA-S		50	H(WS)	Z
(107-21-1)	GA		50	H(WS)	Z
	A, A-S, AA, AA-S, B, C		500,000	A(C)	
	D		1,000,000	A(A)	
Ethylene oxide	A, A-S, AA, AA-S		0.05	H(WS)	A
(75-21-8)	GA		0.05	H(WS)	A
Ethylenethiourea	GA	ND		H(WS)	F
(96-45-7)					
Ferbam	GA	4.2		H(WS)	F
(14484-64-1)					
Fluometuron	A, A-S, AA, AA-S		50	H(WS)	Z
(2164-17-2)	GA	50		H(WS)	J
Fluoranthene	A, A-S, AA, AA-S		50	H(WS)	Z
(206-44-0)	GA		50	H(WS)	Z
Fluorene	A, A-S, AA, AA-S		50	H(WS)	Z
(86-73-7)	GA		50	H(WS)	Z
	A, A-S, AA, AA-S, B, C		0.54	A(C)	
	A, A-S, AA, AA-S, B, C, D		4.8	A(A)	
	SA, SB, SC, I		2.5	A(C)	
	SA, SB, SC, I, SD		23	A(A)	
Fluoride	A, A-S, AA, AA-S	1,500		H(WS)	H
(CAS No. Not Applicable)	GA	1,500		H(WS)	F
	A, A-S, AA, AA-S, B, C	*		A(C)	
	D	**		A(A)	
Remarks: * (0.02) exp(0.907 [ln (ppm hardness)] + 7.394)					
** (0.1) exp(0.907 [ln (ppm hardness)] + 7.394)					
For the waters of the Great Lakes System, the Department will substitute a guidance value for the aquatic Type standard if so determined under 702.15 (c) and (d).					
Foaming agents	GA	500*		E	U
(CAS No. Not Applicable)					
Remark: * Determined as methylene blue active substances (MBAS) or by other tests as specified by the Commissioner.					
Folpet	GA	50		H(WS)	J
(133-07-3)					
Glyphosate	A, A-S, AA, AA-S		50	H(WS)	Z
(1071-83-6)	GA		50	H(WS)	Z

Table 1 (Continued)

NEW YORK STATE AMBIENT WATER QUALITY STANDARDS AND GUIDANCE VALUES

JUNE 1998

SUBSTANCE (CAS No.)	WATER CLASSES	STANDARD (ug/L)	GUIDANCE VALUE (ug/L)	TYPE	BASIS CODE
Gross alpha radiation	A, A-S, AA, AA-S	*		H(WS)	G
(CAS No. Not Applicable)	GA	*		H(WS)	G
Remark: * 15 picocuries per liter, excluding radon and uranium.					
Gross beta radiation	A, AA	*		H(WS)	H
(CAS No. Not Applicable)	A-S, AA-S		*	H(WS)	H
	GA	*		H(WS)	H
Remark: * 1,000 picocuries per liter, excluding strontium-90 and alpha emitters.					
Guaifenesin	A, A-S, AA, AA-S		50	H(WS)	Z
(93-14-1)	GA		50	H(WS)	Z
Heptachlor	A, A-S, AA, AA-S	0.04		H(WS)	A
(76-44-8)	GA	0.04		H(WS)	A
	A, A-S, AA, AA-S, B, C, D	2×10^{-4}		H(FC)	A
	SA, SB, SC, I, SD	2×10^{-4}		H(FC)	A
Heptachlor epoxide	A, A-S, AA, AA-S	0.03		H(WS)	A
(1024-57-3)	GA	0.03		H(WS)	A
	A, A-S, AA, AA-S, B, C, D	3×10^{-4}		H(FC)	A
	SA, SB, SC, I, SD	3×10^{-4}		H(FC)	A
Hexachlorobenzene	A, A-S, AA, AA-S	0.04		H(WS)	A
(118-74-1)	GA	0.04		H(WS)	A
	A, A-S, AA, AA-S, B, C, D	3×10^{-5}		H(FC)	A
	SA, SB, SC, I, SD	3×10^{-5}		H(FC)	A
Hexachlorobutadiene	A, A-S, AA, AA-S	0.5		H(WS)	B
(87-68-3)	GA	0.5		H(WS)	B
	A, A-S, AA, AA-S, B, C, D	0.01		H(FC)	B
	SA, SB, SC, I, SD	0.01		H(FC)	B
	A, A-S, AA, AA-S, B, C	1.0*		A(C)	
	D	10*		A(A)	
	SA, SB, SC	0.3		A(C)	
	I		0.3	A(C)	
	SD	3.0		A(A)	
Remark: * For the waters of the Great Lakes System, the Department will substitute a guidance value for the aquatic Type standard if so determined under 702.15 (c) and (d).					
alpha-Hexachlorocyclohexane	A, A-S, AA, AA-S	0.01		H(WS)	A
(319-84-6)	GA	0.01		H(WS)	A
	A, A-S, AA, AA-S, B, C, D	0.002		H(FC)	A
	SA, SB, SC, I, SD	0.002		H(FC)	A
beta-Hexachlorocyclohexane	A, A-S, AA, AA-S	0.04		H(WS)	A
(319-85-7)	GA	0.04		H(WS)	A
	A, A-S, AA, AA-S, B, C, D	0.007		H(FC)	A
	SA, SB, SC, I, SD	0.007		H(FC)	A

Table 1 (Continued)

NEW YORK STATE AMBIENT WATER QUALITY STANDARDS AND GUIDANCE VALUES

JUNE 1998

SUBSTANCE (CAS No.)	WATER CLASSES	STANDARD (ug/L)	GUIDANCE VALUE (ug/L)	TYPE	BASIS CODE
delta-Hexachlorocyclohexane (319-86-8)	A, A-S, AA, AA-S	0.04		H(WS)	A
	GA	0.04		H(WS)	A
	A, A-S, AA, AA-S, B, C, D	0.008		H(FC)	A
	SA, SB, SC, I, SD	0.008		H(FC)	A
epsilon-Hexachlorocyclohexane (6108-10-7)	A, A-S, AA, AA-S	0.04		H(WS)	A
	GA	0.04		H(WS)	A
	A, A-S, AA, AA-S, B, C, D	0.008		H(FC)	A
	SA, SB, SC, I, SD	0.008		H(FC)	A
gamma-Hexachlorocyclohexane (58-89-9)	A, A-S, AA, AA-S	0.05		H(WS)	A
	GA	0.05		H(WS)	A
	A, A-S, AA, AA-S, B, C, D	0.008		H(FC)	A
	SA, SB, SC, I, SD	0.008		H(FC)	A
	A, A-S, AA, AA-S, B, C, D	0.95		A(A)	
Hexachlorocyclopentadiene (77-47-4)	A, A-S, AA, AA-S		5***	H(WS)	I
	GA	*		H(WS)	J
	A, A-S, AA, AA-S, B, C	0.45**		A(C)	
	D	4.5**		A(A)	
	SA, SB, SC	0.07		A(C)	
	I		0.07	A(C)	
	SD	0.7		A(A)	
	A, A-S, AA, AA-S	1.0		E	U

Remarks:
* The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.
** For the waters of the Great Lakes System, the Department will substitute a guidance value for the aquatic Type standard if so determined under 702.15 (c) and (d).
*** This substance did not receive a review beyond determining that it is in a principal organic contaminant class and that it does not have a more stringent Specific MCL.

Hexachloroethane (67-72-1)	A, A-S, AA, AA-S	5		H(WS)	A, I
	GA	*		H(WS)	J
	A, A-S, AA, AA-S, B, C, D	0.6		H(FC)	A
	SA, SB, SC, I, SD	0.6		H(FC)	A

Remark:
* The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.

Hexachlorophene (70-30-4)	A, A-S, AA, AA-S		5****	H(WS)	I
	GA	*		H(WS)	J
	A, A-S, AA, AA-S	**		E	
	GA	**		E	
	B,C,D	***		E	

Remarks:
* The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.
** Refer to entry for “Phenolic compounds (total phenols).”
*** Refer to entry for “Phenols, total chlorinated.”
**** This substance did not receive a review beyond determining that it is in a principal organic contaminant class and that it does not have a more stringent Specific MCL.

Table 1 (Continued)

NEW YORK STATE AMBIENT WATER QUALITY STANDARDS AND GUIDANCE VALUES

JUNE 1998

SUBSTANCE (CAS No.)	WATER CLASSES	STANDARD (ug/L)	GUIDANCE VALUE (ug/L)	TYPE	BASIS CODE
Hexachloropropene	A, A-S, AA, AA-S		5*	H(WS)	I
(1888-71-7)	GA	**		H(WS)	J
Remarks: * This substance did not receive a review beyond determining that it is in a principal organic contaminant class and that it does not have a more stringent Specific MCL.					
** The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance..					
2-Hexanone	A, A-S, AA, AA-S		50	H(WS)	Z
(591-78-6)	GA		50	H(WS)	Z
Hexazinone	A, A-S, AA, AA-S		50	H(WS)	Z
(51235-04-2)	GA	50		H(WS)	J
Hydrazine	A, A-S, AA, AA-S, B, C	*		A(C)	
(302-01-2)	D	**		A(A)	
Remarks: * 5 ug/L at less than 50 ppm hardness and 10 ug/L at greater than or equal to 50 ppm hardness.					
** 50 ug/L at less than 50 ppm hardness and 100 ug/L at greater than or equal to 50 ppm hardness.					
For the waters of the Great Lakes System, the Department will substitute a guidance value for the aquatic Type standard if so determined under 702.15 (c) and (d).					
Hydrogen sulfide	A, A-S, AA, AA-S, B, C	2.0*		A(C)	
(7783-06-4)	SA, SB, SC	2.0		A(C)	
	I		2.0	A(C)	
	A, A-S, AA, AA-S		**	E	
	GA		**	E	
Remarks: * For the waters of the Great Lakes System, the Department will substitute a guidance value for the aquatic Type standard if so determined under 702.15 (c).					
** Refer to entry for “Sulfides, total.”					
Aquatic Type standards and guidance value apply to undissociated form.					
Hydroquinone	A, A-S, AA, AA-S, B, C	2.2**		A(C)	
(123-31-9)	D	4.4**		A(A)	
	A, A-S, AA, AA-S	*		E	
	GA	*		E	
	B, C, D	***		E	
Remarks: * Refer to entry for "Phenolic compounds (total phenols)."					
** For the waters of the Great Lakes System, the Department will substitute a guidance value for the aquatic Type standard if so determined under 702.15 (c) and (d).					
*** Refer to entry for “Phenols, total unchlorinated.”					
1-Hydroxyethylidene-	A, A-S, AA, AA-S		50	H(WS)	Z
1,1-diphosphonic acid	GA		50	H(WS)	Z
(2809-21-4)					

Table 1 (Continued)

NEW YORK STATE AMBIENT WATER QUALITY STANDARDS AND GUIDANCE VALUES

JUNE 1998

SUBSTANCE (CAS No.)	WATER CLASSES	STANDARD (ug/L)	GUIDANCE VALUE (ug/L)	TYPE	BASIS CODE
2-(2-Hydroxy-	A, A-S, AA, AA-S		50	H(WS)	Z
3,5-di-tert-pentylphenyl)-	GA		50	H(WS)	Z
benzotriazole	A, A-S, AA, AA-S	*		E	
(25973-55-1)	GA	*		E	
	B, C, D	**		E	
Remarks: * Refer to entry for “Phenolic compounds (total phenols).”					
** Refer to entry for “Phenols, total unchlorinated.”					
Indeno (1,2,3-cd) pyrene	A, A-S, AA, AA-S		0.002	H(WS)	A
(193-39-5)	GA		0.002	H(WS)	A
Iron	A, A-S, AA, AA-S, B, C	300**		A(C)	
(CAS No. Not Applicable)	D	300**		A(A)	
	A, A-S, AA, AA-S	300		E	G
	GA	300*		E	F
Remarks: * Also see standard for "Iron and Manganese."					
** For the waters of the Great Lakes System, the Department will substitute a guidance value for the aquatic Type standard if so determined under 702.15 (c) and (d).					
Iron and Manganese	GA	500*		E	F
(CAS No. Not Applicable)					
Remark: * Applies to the sum of these substances; also see individual standards for "Iron" and "Manganese."					
Isodecyl diphenyl phosphate	A, A-S, AA, AA-S, B, C	1.7*		A(C)	
(29761-21-5)	D	22*		A(A)	
Remark: * For the waters of the Great Lakes System, the Department will substitute a guidance value for the aquatic Type standard if so determined under 702.15 (c) and (d).					
Isodrin	A, A-S, AA, AA-S		5*	H(WS)	I
(465-73-6)	GA	**		H(WS)	J
Remarks: * This substance did not receive a review beyond determining that it is in a principal organic contaminant class and that it does not have a more stringent Specific MCL.					
** The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
Isophorone	A, A-S, AA, AA-S		50	H(WS)	Z
(78-59-1)	GA		50	H(WS)	Z
Isopropalin	A, A-S, AA, AA-S		5*	H(WS)	I
(33820-53-0)	GA	**		H(WS)	J
Remarks: * This substance did not receive a review beyond determining that it is in a principal organic contaminant class and that it does not have a more stringent Specific MCL.					
** The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					

Table 1 (Continued)

NEW YORK STATE AMBIENT WATER QUALITY STANDARDS AND GUIDANCE VALUES

JUNE 1998

SUBSTANCE (CAS No.)	WATER CLASSES	STANDARD (ug/L)	GUIDANCE VALUE (ug/L)	TYPE	BASIS CODE
Isopropylbenzene	A, A-S, AA, AA-S		5*	H(WS)	I
(98-82-8)	GA	**		H(WS)	J
	A, A-S, AA, AA-S, B, C		2.6	A(C)	
	A, A-S, AA, AA-S, B, C, D		23	A(A)	
Remarks: * This substance did not receive a review beyond determining that it is in a principal organic contaminant class and that it does not have a more stringent Specific MCL.					
** The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
2-Isopropyltoluene	A, A-S, AA, AA-S	5		H(WS)	I
(527-84-4)	GA	*		H(WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
3-Isopropyltoluene	A, A-S, AA, AA-S	5		H(WS)	I
(535-77-3)	GA	*		H(WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
4-Isopropyltoluene	A, A-S, AA, AA-S	5		H(WS)	I
(99-87-6)	GA	*		H(WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
Isothiazolones, total (isothiazolinones) (includes 5-chloro-2-methyl-4-isothiazolin-3-one & 2-methyl-4-isothiazolin-3-one) (CAS No. Not Applicable)	A, A-S, AA, AA-S, B, C	1*		A(C)	
	D	10*		A(A)	
Remark: * For the waters of the Great Lakes System, the Department will substitute a guidance value for the aquatic Type standard if so determined under 702.15 (c) and (d). Standards apply to the sum of these substances.					
Kepone	GA	ND		H(WS)	F
(143-50-0)					
Lead	A, A-S, AA, AA-S	50		H(WS)	G
(CAS No. Not Applicable)	GA	25		H(WS)	F
	A, A-S, AA, AA-S, B, C	*		A(C)	
	A, A-S, AA, AA-S, B, C, D	**		A(A)	
	SA, SB, SC, I	8		A(C)	
	SA, SB, SC, I, SD	204		A(A)	
Remarks: * {1.46203 - [ln (hardness) (0.145712)]} exp (1.273 [ln (hardness)] - 4.297)					
** {1.46203 - [ln (hardness) (0.145712)]} exp (1.273 [ln (hardness)] - 1.052) Aquatic Type standards apply to dissolved form.					

Table 1 (Continued)

NEW YORK STATE AMBIENT WATER QUALITY STANDARDS AND GUIDANCE VALUES

JUNE 1998

SUBSTANCE (CAS No.)	WATER CLASSES	STANDARD (ug/L)	GUIDANCE VALUE (ug/L)	TYPE	BASIS CODE
Linear alkyl benzene sulfonates (LAS) (CAS No. Not Applicable)	A, A-S, AA, AA-S, B, C	40*		A(C)	
Remarks: * LAS with side chains greater than 13 carbons only; applies to the sum of these substances. * For the waters of the Great Lakes System, the Department will substitute a guidance value for the aquatic Type standard if so determined under 702.15 (c).					
Magnesium	A, A-S, AA, AA-S	35,000		H(WS)	B
(CAS No. Not Applicable)	GA		35,000	H(WS)	B
Malathion	GA	7.0		H(WS)	F
(121-75-5)	A, A-S, AA, AA-S, B, C	0.1*		A(C)	
	SA, SB, SC	0.1		A(C)	
	I		0.1	A(C)	
Remark: * For the waters of the Great Lakes System, the Department will substitute a guidance value for the aquatic Type standard if so determined under 702.15 (c).					
Mancozeb (8018-01-7)	GA	1.8		H(WS)	F
Maneb (12427-38-2)	GA	1.8		H(WS)	F
Manganese	A, A-S, AA, AA-S	300		E	G
(CAS No. Not Applicable)	GA	300*		E	F
Remark: * Also see entry for "Iron and Manganese."					
Mercaptobenzothiazole	A, A-S, AA, AA-S		50	H(WS)	Z
(149-30-4)	GA		50	H(WS)	Z
Mercury	A, A-S, AA, AA-S	0.7		H(WS)	B
(CAS No. Not Applicable)	GA	0.7		H(WS)	B
	A, A-S, AA, AA-S, B, C, D	7×10^{-4}*		H(FC)	B
	SA, SB, SC, I, SD	7×10^{-4}*		H(FC)	B
	A, A-S, AA, AA-S, B, C	0.77*		A(C)	
	A, A-S, AA, AA-S, B, C, D	1.4*		A(A)	
	A, A-S, AA, AA-S, B, C, D	0.0026*		W	
	SA, SB, SC, I, SD	0.0026*		W	
Remark * Applies to dissolved form.					
Methacrylic acid	A, A-S, AA, AA-S		50	H(WS)	Z
(79-41-4)	GA		50	H(WS)	Z
Methacrylonitrile	A, A-S, AA, AA-S		5*	H(WS)	I
(126-98-7)	GA	**		H(WS)	J
Remarks: * This substance did not receive a review beyond determining that it is in a principal organic contaminant class and that it does not have a more stringent Specific MCL. ** The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					

Table 1 (Continued)

NEW YORK STATE AMBIENT WATER QUALITY STANDARDS AND GUIDANCE VALUES

JUNE 1998

SUBSTANCE (CAS No.)	WATER CLASSES	STANDARD (ug/L)	GUIDANCE VALUE (ug/L)	TYPE	BASIS CODE
Methomyl (16752-77-5)	GA	*		H(WS)	
Remark: * Refer to entry for "Aldicarb and Methomyl."					
Methoxychlor (72-43-5)	A, A-S, AA, AA-S	35		H(WS)	H
	GA	35		H(WS)	F
	A, A-S, AA, AA-S, B, C	0.03*		A(C)	
	SA, SB, SC	0.03		A(C)	
	I		0.03	A(C)	
Remark: * For the waters of the Great Lakes System, the Department will substitute a guidance value for the aquatic Type standard if so determined under 702.15 (c).					
(1-Methoxyethyl) benzene (4013-34-7)	A, A-S, AA, AA-S		50	H(WS)	Z
	GA		50	H(WS)	Z
(2-Methoxyethyl) benzene (3558-60-9)	A, A-S, AA, AA-S		50	H(WS)	Z
	GA		50	H(WS)	Z
N-Methylaniline (100-61-8)	A, A-S, AA, AA-S	5		H(WS)	I
	GA	*		H(WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
Methylbenz(a)anthracenes (CAS No. Not Applicable)	A, A-S, AA, AA-S		0.002*	H(WS)	A
	GA		0.002*	H(WS)	A
Remark: * Applies to the sum of these substances.					
Methyl chloride (74-87-3)	A, A-S, AA, AA-S	5		H(WS)	I
	GA	*		H(WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
2-Methyl-4-chlorophenoxyacetic acid (94-74-6)	GA	0.44		H(WS)	F
4,4'-Methylene-bis-(2-chloroaniline) (101-14-4)	A, A-S, AA, AA-S		5*	H(WS)	I
	GA	**		H(WS)	J
Remarks: * This substance did not receive a review beyond determining that it is in a principal organic contaminant class and that it does not have a more stringent Specific MCL.					
** The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					

Table 1 (Continued)

NEW YORK STATE AMBIENT WATER QUALITY STANDARDS AND GUIDANCE VALUES

JUNE 1998

SUBSTANCE (CAS No.)	WATER CLASSES	STANDARD (ug/L)	GUIDANCE VALUE (ug/L)	TYPE	BASIS CODE
4,4'-Methylene-bis-(N-methyl)-aniline (1807-55-2)	A, A-S, AA, AA-S		5*	H(WS)	I
	GA	**		H(WS)	J
Remarks: * This substance did not receive a review beyond determining that it is in a principal organic contaminant class and that it does not have a more stringent Specific MCL. ** The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
4,4'-Methylene-bis-(N,N'-dimethyl) aniline (101-61-1)	A, A-S, AA, AA-S		5*	H(WS)	I
	GA	**		H(WS)	J
Remarks: * This substance did not receive a review beyond determining that it is in a principal organic contaminant class and that it does not have a more stringent Specific MCL. ** The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
Methylene bisthiocyanate (6317-18-6)	A, A-S, AA, AA-S		50	H(WS)	Z
	GA		50	H(WS)	Z
	A, A-S, AA, AA-S, B, C	1.0*		A(C)	
Remark: * For the waters of the Great Lakes System, the Department will substitute a guidance value for the aquatic Type standard if so determined under 702.15 (c).					
Methylene chloride (75-09-2)	A, A-S, AA, AA-S	5		H(WS)	I
	GA	*		H(WS)	J
	A, A-S, AA, AA-S, B, C, D	200		H(FC)	A
	SA,SB, SC, I, SD	200		H(FC)	A
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
4-(1-Methylethoxy)-1-butanol (31600-69-8)	A, A-S, AA, AA-S		50	H(WS)	Z
	GA		50	H(WS)	Z
2-Methylethyl-1,3-dioxolane (126-39-6)	A, A-S, AA, AA-S		50	H(WS)	Z
	GA		50	H(WS)	Z
Methyl ethyl ketone (78-93-3)	A, A-S, AA, AA-S		50	H(WS)	Z
	GA		50	H(WS)	Z
Methyl iodide (74-88-4)	A, A-S, AA, AA-S		5*	H(WS)	I
	GA	**		H(WS)	J
Remarks: * This substance did not receive a review beyond determining that it is in a principal organic contaminant class and that it does not have a more stringent Specific MCL. ** The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
Methyl methacrylate (80-62-6)	GA	50		H(WS)	J

Table 1 (Continued)

NEW YORK STATE AMBIENT WATER QUALITY STANDARDS AND GUIDANCE VALUES

JUNE 1998

SUBSTANCE (CAS No.)	WATER CLASSES	STANDARD (ug/L)	GUIDANCE VALUE (ug/L)	TYPE	BASIS CODE
2-Methylnaphthalene	A, A-S, AA, AA-S, B, C		4.7	A(C)	
(91-57-6)	A, A-S, AA, AA-S, B, C, D		42	A(A)	
	SA, SB, SC, I		4.2	A(C)	
	SA, SB, SC, I, SD		38	A(A)	
Methyl parathion	GA	*		H(WS)	
(298-00-0)	A, A-S, AA, AA-S, B, C	*		A(C)	
Remark: * Refer to entry for "Parathion and Methyl parathion."					
alpha-Methylstyrene	A, A-S, AA, AA-S	5		H(WS)	I
(98-83-9)	GA	*		H(WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
2-Methylstyrene	A, A-S, AA, AA-S	5		H(WS)	I
(611-15-4)	GA	*		H(WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
3-Methylstyrene	A, A-S, AA, AA-S	5		H(WS)	I
(100-80-1)	GA	*		H(WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
4-Methylstyrene	A, A-S, AA, AA-S	5		H(WS)	I
(622-97-9)	GA	*		H(WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
Metribuzin	A, A-S, AA, AA-S		50	H(WS)	Z
(21087-64-9)	GA	50		H(WS)	J
Mirex	A, A-S, AA, AA-S	0.03		H(WS)	A
(2385-85-5)	GA	0.03		H(WS)	A
	A, A-S, AA, AA-S, B, C, D	1×10^{-6}		H(FC)	A
	SA, SB, SC, I, SD	1×10^{-6}		H(FC)	A
	A, A-S, AA, AA-S, B, C	0.001*		A(C)	
	D	0.001*		A(A)	
	SA, SB, SC	0.001		A(C)	
	I		0.001	A(C)	
	SD		0.001	A(A)	
Remark: * For the waters of the Great Lakes System, the Department will substitute a guidance value for the aquatic Type standard if so determined under 702.15 (c) and (d).					
Nabam	GA	1.8		H(WS)	F
(142-59-6)					

Table 1 (Continued)

NEW YORK STATE AMBIENT WATER QUALITY STANDARDS AND GUIDANCE VALUES

JUNE 1998

SUBSTANCE (CAS No.)	WATER CLASSES	STANDARD (ug/L)	GUIDANCE VALUE (ug/L)	TYPE	BASIS CODE
Naphthalene	A, A-S, AA, AA-S, B, C		13	A(C)	
(91-20-3)	A, A-S, AA, AA-S, B, C, D		110	A(A)	
	SA, SB, SC, I		16	A(C)	
	SA, SB, SC, I, SD		140	A(A)	
	A, A-S, AA, AA-S	10		E	U
	GA		10	E	U
Niacinamide	A, A-S, AA, AA-S	500		H(WS)	B
(98-92-0)	GA		500	H(WS)	B
Nickel	A, A-S, AA, AA-S	100		H(WS)	B
(CAS No. Not Applicable)	GA	100		H(WS)	B
	A, A-S, AA, AA-S, B, C	*		A(C)	
	A, A-S, AA, AA-S, B, C, D	**		A(A)	
	SA, SB, SC, I	8.2		A(C)	
	SA, SB, SC, I, SD	74		A(A)	
Remarks: * (0.997) exp (0.846 [ln (hardness)] + 0.0584)					
** (0.998) exp (0.846 [ln (hardness)] + 2.255)					
Aquatic Type standards apply to dissolved form.					
Nitralin	GA	35		H(WS)	F
(4726-14-1)					
Nitrate (expressed as N)	A, A-S, AA, AA-S	10,000*		H(WS)	G
(CAS No. Not Applicable)	GA	10,000*		H(WS)	G
Remark: * Also see entry for "Nitrate and Nitrite."					
Nitrate and Nitrite	A, A-S, AA, AA-S	10,000*		H(WS)	G
(expressed as N)	GA	10,000*		H(WS)	G
(CAS No. Not Applicable)					
Remark: * Applies to the sum of these substances; also see individual standards for "Nitrate" and "Nitrite."					
Nitrilotriacetic acid	A, A-S, AA, AA-S	3*		H(WS)	A
(CAS No. Not Applicable)	GA	3*		H(WS)	A
	A, A-S, AA, AA-S, B, C	5,000**		A(C)	
Remarks: * Includes related forms that convert to nitrilotriacetic acid upon acidification to a pH of 2.3 or less.					
** Applies to nitrilotriacetate.					
** For the waters of the Great Lakes System, the Department will substitute a guidance value for the aquatic Type standard if so determined under 702.15 (c).					
Nitrite (expressed as N)	A, A-S, AA, AA-S	1,000*		H(WS)	G
(CAS No. Not Applicable)	GA	1,000*		H(WS)	G
	A, A-S, AA, AA-S, B, C	**		A(C)	
Remarks: * Also see entry for "Nitrate and Nitrite."					
** Standard is 100 ug/L for warm water fishery waters and 20 ug/L for cold water fishery waters.					
** For the waters of the Great Lakes System, the Department will substitute a guidance value for the aquatic Type standard if so determined under 702.15 (c).					

Table 1 (Continued)

NEW YORK STATE AMBIENT WATER QUALITY STANDARDS AND GUIDANCE VALUES

JUNE 1998

SUBSTANCE (CAS No.)	WATER CLASSES	STANDARD (ug/L)	GUIDANCE VALUE (ug/L)	TYPE	BASIS CODE
2-Nitroaniline	A, A-S, AA, AA-S		5*	H(WS)	I
(88-74-4)	GA	**		H(WS)	J
Remarks: * This substance did not receive a review beyond determining that it is in a principal organic contaminant class and that it does not have a more stringent Specific MCL.					
** The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
3-Nitroaniline	A, A-S, AA, AA-S		5*	H(WS)	I
(99-09-2)	GA	**		H(WS)	J
Remarks: * This substance did not receive a review beyond determining that it is in a principal organic contaminant class and that it does not have a more stringent Specific MCL.					
** The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
4-Nitroaniline	A, A-S, AA, AA-S		5*	H(WS)	I
(100-01-6)	GA	**		H(WS)	J
Remarks: * This substance did not receive a review beyond determining that it is in a principal organic contaminant class and that it does not have a more stringent Specific MCL.					
** The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
Nitrobenzene	A, A-S, AA, AA-S	0.4		H(WS)	A
(98-95-3)	GA	0.4		H(WS)	A
	A, A-S, AA, AA-S	30		E	U
N-Nitrosodiphenylamine	A, A-S, AA, AA-S		50	H(WS)	Z
(86-30-6)	GA		50	H(WS)	Z
2-Nitrotoluene	A, A-S, AA, AA-S		5*	H(WS)	I
(88-72-2)	GA	**		H(WS)	J
Remarks: * This substance did not receive a review beyond determining that it is in a principal organic contaminant class and that it does not have a more stringent Specific MCL.					
** The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
3-Nitrotoluene	A, A-S, AA, AA-S		5*	H(WS)	I
(99-08-1)	GA	**		H(WS)	J
Remarks: * This substance did not receive a review beyond determining that it is in a principal organic contaminant class and that it does not have a more stringent Specific MCL.					
** The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
4-Nitrotoluene	A, A-S, AA, AA-S		5*	H(WS)	I
(99-99-0)	GA	**		H(WS)	J
Remarks: * This substance did not receive a review beyond determining that it is in a principal organic contaminant class and that it does not have a more stringent Specific MCL.					
** The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					

Table 1 (Continued)

NEW YORK STATE AMBIENT WATER QUALITY STANDARDS AND GUIDANCE VALUES

JUNE 1998

SUBSTANCE (CAS No.)	WATER CLASSES	STANDARD (ug/L)	GUIDANCE VALUE (ug/L)	TYPE	BASIS CODE
5-Nitro-o-toluidine	A, A-S, AA, AA-S		5*	H(WS)	I
(99-55-8)	GA	**		H(WS)	J
Remarks: * This substance did not receive a review beyond determining that it is in a principal organic contaminant class and that it does not have a more stringent Specific MCL. ** The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
Octachlorostyrene	A, A-S, AA, AA-S	0.2		H(WS)	B
(29082-74-4)	GA	0.2		H(WS)	B
	A, A-S, AA, AA-S, B, C, D	6×10^{-6}		H(FC)	B
	SA, SB, SC, I, SD	6×10^{-6}		H(FC)	B
Oxamyl	A, A-S, AA, AA-S		50	H(WS)	Z
(23135-22-0)	GA	50		H(WS)	J
Paraquat	GA	3.0		H(WS)	F
(4685-14-7)					
Parathion	GA	*		H(WS)	
(56-38-2)	A, A-S, AA, AA-S, B, C	*		A(C)	
	A, A-S, AA, AA-S, B, C, D	0.065		A(A)	
Remark: * Refer to entry for "Parathion and Methyl parathion."					
Parathion and Methyl parathion	GA	1.5*		H(WS)	F
(56-38-2; 298-00-0)	A, A-S, AA, AA-S, B, C	0.008**		A(C)	
Remarks: * Applies to the sum of these substances. ** Applies to the sum of these substances. For the waters of the Great Lakes System, the Department will substitute a guidance value for the aquatic Type standard if so determined under 702.15 (c).					
Pendimethalin	A, A-S, AA, AA-S		5*	H(WS)	I
(40487-42-1)	GA	**		H(WS)	J
Remarks: * This substance did not receive a review beyond determining that it is in a principal organic contaminant class and that it does not have a more stringent Specific MCL. ** The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
Pentachlorobenzene	A, A-S, AA, AA-S		5*	H(WS)	I
(608-93-5)	GA	**		H(WS)	J
Remarks: * This substance did not receive a review beyond determining that it is in a principal organic contaminant class and that it does not have a more stringent Specific MCL. ** The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					

Table 1 (Continued)

NEW YORK STATE AMBIENT WATER QUALITY STANDARDS AND GUIDANCE VALUES

JUNE 1998

SUBSTANCE (CAS No.)	WATER CLASSES	STANDARD (ug/L)	GUIDANCE VALUE (ug/L)	TYPE	BASIS CODE
Pentachloroethane	A, A-S, AA, AA-S		5*	H(WS)	I
(76-01-7)	GA	**		H(WS)	J
Remarks: * This substance did not receive a review beyond determining that it is in a principal organic contaminant class and that it does not have a more stringent Specific MCL.					
** The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
Pentachloronitrobenzene	GA	ND		H(WS)	F
(82-68-8)					
Pentachlorophenol	A, A-S, AA, AA-S, B, C	*		A(C)	
(87-86-5)	A, A-S, AA, AA-S, B, C, D	**		A(A)	
	A, A-S, AA, AA-S	***		E	
	GA	***		E	
	B, C, D	****		E	
Remarks: * exp [1.005 (pH) - 5.134]					
** exp [1.005 (pH) - 4.869]					
*** Refer to entry for "Phenolic compounds (total phenols)."					
**** Refer to entry for "Phenols, total chlorinated."					
Phenanthrene	A, A-S, AA, AA-S		50	H(WS)	Z
(85-01-8)	GA		50	H(WS)	Z
	A, A-S, AA, AA-S, B, C		5.0	A(C)	
	A, A-S, AA, AA-S, B, C, D		45	A(A)	
	SA, SB, SC, I		1.5	A(C)	
	SA, SB, SC, I, SD		14	A(A)	
Phenol	A, A-S, AA, AA-S	*		E	
(108-95-2)	GA	*		E	
	B, C, D	**		E	
Remarks: * Refer to entry for "Phenolic compounds (total phenols)."					
** Refer to entry for "Phenols, total unchlorinated."					
Phenolic compounds	A, A-S, AA, AA-S	1*		E	U
(total phenols)	GA	1*		E	U
(CAS No. Not Applicable)					
Remark: * Applies to the sum of these substances.					
Phenols, total chlorinated	A, A-S, AA, AA-S	*		E	
(CAS No. Not Applicable)	GA	*		E	
	A, A-S, AA, AA-S, B, C, D	1.0**		E	V
Remarks: * Refer to entry for "Phenolic compounds (total phenols)."					
** Applies to the sum of these substances.					
Phenols, total unchlorinated	A, A-S, AA, AA-S	*		E	
(CAS No. Not Applicable)	GA	*		E	
	A, A-S, AA, AA-S, B, C, D	5.0**		E	V
Remarks: * Refer to entry for "Phenolic compounds (total phenols)."					
** Applies to the sum of these substances.					

Table 1 (Continued)

NEW YORK STATE AMBIENT WATER QUALITY STANDARDS AND GUIDANCE VALUES

JUNE 1998

SUBSTANCE (CAS No.)	WATER CLASSES	STANDARD (ug/L)	GUIDANCE VALUE (ug/L)	TYPE	BASIS CODE
1,2-Phenylenediamine	A, A-S, AA, AA-S		5*	H(WS)	I
(95-54-5)	GA	**		H(WS)	J
Remarks: * This substance did not receive a review beyond determining that it is in a principal organic contaminant class and that it does not have a more stringent Specific MCL. ** The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
1,3-Phenylenediamine	A, A-S, AA, AA-S		5*	H(WS)	I
(108-45-2)	GA	**		H(WS)	J
Remarks: * This substance did not receive a review beyond determining that it is in a principal organic contaminant class and that it does not have a more stringent Specific MCL. ** The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
1,4-Phenylenediamine	A, A-S, AA, AA-S		5*	H(WS)	I
(106-50-3)	GA	**		H(WS)	J
Remarks: * This substance did not receive a review beyond determining that it is in a principal organic contaminant class and that it does not have a more stringent Specific MCL. ** The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
Phenyl ether	A, A-S, AA, AA-S	10		E	U
(101-84-8)	GA		10	E	U
Phenylhydrazine	A, A-S, AA, AA-S		5*	H(WS)	I
(100-63-0)	GA	**		H(WS)	J
Remarks: * This substance did not receive a review beyond determining that it is in a principal organic contaminant class and that it does not have a more stringent Specific MCL. ** The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
Phenylpropanolamine	A, A-S, AA, AA-S		50	H(WS)	Z
(14838-15-4)	GA		50	H(WS)	Z
3-Phenyl-1-propene	A, A-S, AA, AA-S	5		H(WS)	I
(637-50-3)	GA	*		H(WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
cis-1-Phenyl-1-propene	A, A-S, AA, AA-S	5		H(WS)	I
(766-90-5)	GA	*		H(WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
trans-1-Phenyl-1-propene	A, A-S, AA, AA-S	5		H(WS)	I
(873-66-5)	GA	*		H(WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					

Table 1 (Continued)

NEW YORK STATE AMBIENT WATER QUALITY STANDARDS AND GUIDANCE VALUES

JUNE 1998

SUBSTANCE (CAS No.)	WATER CLASSES	STANDARD (ug/L)	GUIDANCE VALUE (ug/L)	TYPE	BASIS CODE
Phorate (298-02-2)	GA	*		H(WS)	
Remark: * Refer to entry for "Phorate and Disulfoton."					
Phorate and Disulfoton (298-02-2; 298-04-4)	GA	ND*		H(WS)	F
Remark: * Applies to sum of these substances.					
Phosphorus (CAS No. Not Applicable)	A, A-S, AA, AA-S, B		20*	**	**
Remarks: * Applies only where the letter "P" (ponds, lakes and reservoirs) appears in the Water Index Number, excluding Lake Champlain. The department is considering site-specific values for Lake Champlain and for Lake Ontario and Lake Erie, both of which do not have the letter "P" designation. ** Based on aesthetic effects for primary and secondary contact recreation.					
Picloram (CAS No. Not Applicable)	A, A-S, AA, AA-S		50*	H(WS)	Z
	GA	50*		H(WS)	J
Remark: * Includes: related forms that convert to the organic acid upon acidification to a pH of 2 or less; and esters of the organic acid.					
Polybrominated biphenyls (CAS No. Not Applicable)	A, A-S, AA, AA-S		5*	H(WS)	I
	GA	**		H(WS)	J
Remarks: * This substance did not receive a review beyond determining that it is in a principal organic contaminant class and that it does not have a more stringent Specific MCL. Value applies to each congener individually. ** The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to each congener individually.					
Polychlorinated biphenyls (CAS No. Not Applicable)	A, A-S, AA, AA-S	0.09*		H(WS)	A
	GA	0.09*		H(WS)	A
	A, A-S, AA, AA-S, B, C, D	1×10^{-6}*		H(FC)	A
	SA, SB, SC, I, SD	1×10^{-6}*		H(FC)	A
	A, A-S, AA, AA-S, B, C, D	1.2×10^{-4}*		W	
	SA, SB, SC, I, SD	1.2×10^{-4}*		W	
Remark: * Applies to the sum of these substances.					

Table 1 (Continued)

NEW YORK STATE AMBIENT WATER QUALITY STANDARDS AND GUIDANCE VALUES

JUNE 1998

SUBSTANCE (CAS No.)	WATER CLASSES	STANDARD (ug/L)	GUIDANCE VALUE (ug/L)	TYPE	BASIS CODE
Principal organic contaminant (CAS No. Not Applicable)	GA	5		H(WS)	J
Remarks: This standard applies to any and every individual substance, whether listed in this Table or not, that is in one of the principal organic contaminant classes as defined in 6 NYCRR 700.1 except any substance that has a H(WS) Type standard for class GA waters (other than 5 ug/L with Basis Code J) listed elsewhere in this Table. For the convenience of the reader, the principal organic contaminant standard of 5 ug/L (Basis Code J), is listed in this Table for some (but not all) substances regulated by this standard. A less stringent guidance value for an individual substance may be substituted for this standard if so determined by the Commissioner of the New York State Department of Health.					
Prometon (1610-18-0)	A, A-S, AA, AA-S		50	H(WS)	Z
	GA	50		H(WS)	J
Propachlor (1918-16-7)	GA	35		H(WS)	F
Propanil (709-98-8)	GA	7.0		H(WS)	F
Propazine (139-40-2)	GA	16		H(WS)	F
Propham (122-42-9)	A, A-S, AA, AA-S		50	H(WS)	Z
	GA	50		H(WS)	J
n-Propylbenzene (103-65-1)	A, A-S, AA, AA-S	5		H(WS)	I
	GA	*		H(WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
Pyrene (129-00-0)	A, A-S, AA, AA-S		50	H(WS)	Z
	GA		50	H(WS)	Z
	A, A-S, AA, AA-S, B, C		4.6	A(C)	
	A, A-S, AA, AA-S, B, C, D		42	A(A)	
Pyridine (110-86-1)	A, A-S, AA, AA-S		50	H(WS)	Z
	GA		50	H(WS	Z
Quaternary ammonium compounds (including dimethyl benzyl ammonium chloride & dimethyl ethyl benzyl ammonium chloride) (CAS No. Not Applicable)	A, A-S, AA, AA-S, B, C	10*		A(C)	
Remarks: * Applies to the sum of these substances. * For the waters of the Great Lakes System, the Department will substitute a guidance value for the aquatic Type standard if so determined under 702.15 (c).					

Table 1 (Continued)

NEW YORK STATE AMBIENT WATER QUALITY STANDARDS AND GUIDANCE VALUES

JUNE 1998

SUBSTANCE (CAS No.)	WATER CLASSES	STANDARD (ug/L)	GUIDANCE VALUE (ug/L)	TYPE	BASIS CODE
Radium 226	A, AA	*		H(WS)	H
(CAS No. Not Applicable)	A-S, AA-S		*	H(WS)	H
	GA	*		H(WS)	H
Remark: * 3 picocuries per liter; also see entry for "Radium 226 and Radium 228."					
Radium 226 and Radium 228	A, A-S, AA, AA-S	*		H(WS)	G
(CAS No. Not Applicable)	GA	*		H(WS)	G
Remark: * 5 picocuries per liter; Applies to the sum of these substances.					
Radium 228	A, A-S, AA, AA-S	*		H(WS)	
(CAS No. Not Applicable)	GA	*		H(WS)	
Remark: * Refer to entry for "Radium 226 and Radium 228."					
Selenium	A, A-S, AA, AA-S	10		H(WS)	G
(CAS No. Not Applicable)	GA	10		H(WS)	G
	A, A-S, AA, AA-S, B, C	4.6*		A(C)	
Remark: * Aquatic Type standard applies to dissolved form.					
Silver	A, A-S, AA, AA-S	50		H(WS)	G
(CAS No. Not Applicable)	GA	50		H(WS)	F
	A, A-S, AA, AA-S, B, C	0.1*		A(C)	
	D	**		A(A)	
	SD	2.3		A(A)	
Remarks: * Applies to ionic silver. ** exp (1.72 [ln (ppm hardness)] - 6.52) Standards for D and SD Classes apply to acid-soluble form. For the waters of the Great Lakes System, the Department will substitute a guidance value for the aquatic Type standard if so determined under 702.15 (c) and (d).					
Simazine	A, A-S, AA, AA-S	0.5		H(WS)	A
(122-34-9)	GA	0.5		H(WS)	A
Sodium	GA	20,000		H(WS)	H
(CAS No. Not Applicable)					
Strontium 90	A, A-S, AA, AA-S	*		H(WS)	G
(CAS No. Not Applicable)					
Remarks: * 8 picocuries per liter. If two or more radionuclides are present, the sum of their doses shall not exceed an annual potential dose of 4 millirems per year.					
Styrene	A, A-S, AA, AA-S		5*	H(WS)	I
(100-42-5)	GA	**		H(WS)	J
	A, A-S, AA, AA-S	50		E	U
Remarks: * This substance did not receive a review beyond determining that it is in a principal organic contaminant class and that it does not have a more stringent Specific MCL. ** The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					

Table 1 (Continued)

NEW YORK STATE AMBIENT WATER QUALITY STANDARDS AND GUIDANCE VALUES

JUNE 1998

SUBSTANCE (CAS No.)	WATER CLASSES	STANDARD (ug/L)	GUIDANCE VALUE (ug/L)	TYPE	BASIS CODE
Sulfate	A, A-S, AA, AA-S	250,000		H(WS)	G
(CAS No. Not Applicable)	GA	250,000		H(WS)	F
Sulfides, total	A, A-S, AA, AA-S, B, C	**		A(C)	
(CAS No. Not Applicable)	SA, SB, SC	**		A(C)	
	I		**	A(C)	
	A, A-S, AA, AA-S		50*	E	U
	GA		50*	E	U
Remarks: Values listed apply to sum of these substances. * Expressed as hydrogen sulfide. ** Refer to entry for “Hydrogen Sulfide.”					
Sulfite	A, A-S, AA, AA-S, B, C	200*		A(C)	
(CAS No. Not Applicable)					
Remark: * For the waters of the Great Lakes System, the Department will substitute a guidance value for the aquatic Type standard if so determined under 702.15 (c).					
Tebuthiuron	A, A-S, AA, AA-S		50	H(WS)	Z
(34014-18-1)	GA	50		H(WS)	J
Terbacil	GA	50		H(WS)	J
(5902-51-2)					
Terbufos	A, A-S, AA, AA-S		0.09	H(WS)	B
(13071-79-9)	GA		0.09	H(WS)	B
Tetrachlorobenzenes	A, A-S, AA, AA-S		5***	H(WS)	I
(634-66-2; 634-90-2; 95-94-3;	GA	*		H(WS)	J
12408-10-5)	A, A-S, AA, AA-S	10**		E	U
	GA		10**	E	U
Remarks: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to each isomer (1,2,3,4-, 1,2,3,5-, and 1,2,4,5-tetrachlorobenzene) individually. ** Applies to the sum of 1,2,3,4-, 1,2,3,5- and 1,2,4,5-tetrachlorobenzene. *** This substance did not receive a review beyond determining that it is in a principal organic contaminant class and that it does not have a more stringent specific MCL. Value applies to each isomer individually.					
1,1,1,2-Tetrachloroethane	A, A-S, AA, AA-S	5		H(WS)	I
(630-20-6)	GA	*		H(WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
1,1,2,2-Tetrachloroethane	A, A-S, AA, AA-S		0.2	H(WS)	A
(79-34-5)	GA	*		H(WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					

Table 1 (Continued)

NEW YORK STATE AMBIENT WATER QUALITY STANDARDS AND GUIDANCE VALUES

JUNE 1998

SUBSTANCE (CAS No.)	WATER CLASSES	STANDARD (ug/L)	GUIDANCE VALUE (ug/L)	TYPE	BASIS CODE
Tetrachloroethene	A, A-S, AA, AA-S		0.7	H(WS)	A
(127-18-4)	GA	*		H(WS)	J
	A, A-S, AA, AA-S, B, C, D		1	H(FC)	
	SA, SB, SC, I, SD		1	H(FC)	
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
Tetrachloroterephthalic acid	GA	50		H(WS)	J
(2136-79-0)					
alpha, alpha, alpha, 4-Tetrachloro-	A, A-S, AA, AA-S		5*	H(WS)	I
toluene	GA	**		H(WS)	J
(5216-25-1)					
Remarks: * This substance did not receive a review beyond determining that it is in a principal organic contaminant class and that it does not have a more stringent Specific MCL.					
** The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
Tetrahydrofuran	A, A-S, AA, AA-S		50	H(WS)	Z
(109-99-9)	GA		50	H(WS)	Z
1,2,3,4-Tetramethylbenzene	A, A-S, AA, AA-S		5*	H(WS)	I
(488-23-3)	GA	**		H(WS)	J
Remarks: * This substance did not receive a review beyond determining that it is in a principal organic contaminant class and that it does not have a more stringent Specific MCL.					
** The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
1,2,3,5-Tetramethylbenzene	A, A-S, AA, AA-S		5*	H(WS)	I
(527-53-7)	GA	**		H(WS)	J
Remarks: * This substance did not receive a review beyond determining that it is in a principal organic contaminant class and that it does not have a more stringent Specific MCL.					
** The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance..					
1,2,4,5-Tetramethylbenzene	A, A-S, AA, AA-S		5*	H(WS)	I
(95-93-2)	GA	**		H(WS)	J
Remarks: * This substance did not receive a review beyond determining that it is in a principal organic contaminant class and that it does not have a more stringent Specific MCL.					
** The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance..					
Thallium	A, A-S, AA, AA-S		0.5	H(WS)	B
(CAS No. Not Applicable)	GA		0.5	H(WS)	B
	A, A-S, AA, AA-S, B, C	8*		A(C)	
	D	20		A(A)	
Remark: * For the waters of the Great Lakes System, the Department will substitute a guidance value for the aquatic Type standard if so determined under 702.15 (c). Aquatic Type standards apply to acid-soluble form.					

Table 1 (Continued)

NEW YORK STATE AMBIENT WATER QUALITY STANDARDS AND GUIDANCE VALUES

JUNE 1998

SUBSTANCE (CAS No.)	WATER CLASSES	STANDARD (ug/L)	GUIDANCE VALUE (ug/L)	TYPE	BASIS CODE
Theophylline	A, A-S, AA, AA-S	40		H(WS)	B
(58-55-9)	GA		40	H(WS)	B
Thiram	GA	1.8		H(WS)	F
(137-26-8)					
Toluene	A, A-S, AA, AA-S	5		H(WS)	I
(108-88-3)	GA	*		H(WS)	J
	A, A-S, AA, AA-S, B, C, D	6,000		H(FC)	B
	SA, SB, SC, I, SD	6,000		H(FC)	B
	A, A-S, AA, AA-S, B, C		100	A(C)	
	A, A-S, AA, AA-S, B, C, D		480	A(A)	
	SA, SB, SC, I		92	A(C)	
	SA, SB, SC, I, SD		430	A(A)	
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
Toluene-2,4-diamine	A, A-S, AA, AA-S		5*	H(WS)	I
(95-80-7)	GA	**		H(WS)	J
Remarks: * This substance did not receive a review beyond determining that it is in a principal organic contaminant class and that it does not have a more stringent Specific MCL. ** The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
Toluene-2,5-diamine	A, A-S, AA, AA-S		5*	H(WS)	I
(95-70-5)	GA	**		H(WS)	J
Remarks: * This substance did not receive a review beyond determining that it is in a principal organic contaminant class and that it does not have a more stringent Specific MCL. ** The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
Toluene-2,6-diamine	A, A-S, AA, AA-S		5*	H(WS)	I
(823-40-5)	GA	**		H(WS)	J
Remarks: * This substance did not receive a review beyond determining that it is in a principal organic contaminant class and that it does not have a more stringent Specific MCL. ** The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
o-Toluidine	A, A-S, AA, AA-S		0.6	H(WS)	A
(95-53-4)	GA	*		H(WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
Tolyltriazole	A, A-S, AA, AA-S		50	H(WS)	Z
(29385-43-1)	GA		50	H(WS)	Z

Table 1 (Continued)

NEW YORK STATE AMBIENT WATER QUALITY STANDARDS AND GUIDANCE VALUES

JUNE 1998

SUBSTANCE (CAS No.)	WATER CLASSES	STANDARD (ug/L)	GUIDANCE VALUE (ug/L)	TYPE	BASIS CODE
Toxaphene	A, A-S, AA, AA-S	0.06		H(WS)	A
(8001-35-2)	GA	0.06		H(WS)	A
	A, A-S, AA, AA-S, B, C, D	6×10^{-6}		H(FC)	A
	SA, SB, SC, I, SD	6×10^{-6}		H(FC)	A
	A, A-S, AA, AA-S, B, C	0.005		A(C)	
	D	1.6*		A(A)	
	SA, SB, SC	0.005		A(C)	
	I		0.005	A(C)	
	SD		0.07	A(A)	
Remark: * For the waters of the Great Lakes System, the Department will substitute a guidance value for the aquatic standard if so determined under 702.15 (d).					
1,2,4-Tribromobenzene	A, A-S, AA, AA-S	5		H(WS)	I
(615-54-3)	GA	*		H(WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
Tributyltin oxide	A, A-S, AA, AA-S		50	H(WS)	Z
(56-35-9)	GA		50	H(WS)	Z
2,4,6-Trichloroaniline	A, A-S, AA, AA-S		5*	H(WS)	I
(634-93-5)	GA	**		H(WS)	J
Remarks: * This substance did not receive a review beyond determining that it is in a principal organic contaminant class and that it does not have a more stringent Specific MCL. ** The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
Trichlorobenzenes	A, A-S, AA, AA-S		5***	H(WS)	I
(87-61-6; 120-82-1; 108-70-3;	GA	*		H(WS)	J
12002-48-1)	A, A-S, AA, AA-S, B, C	5**		A(C)	
	SA, SB, SC	5**		A(C)	
	I		5**	A(C)	
	A, A-S, AA, AA-S	10**		E	U
	GA		10**	E	U
	D	50**		E	V
	SD	50**		E	V
Remarks: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to each isomer (1,2,3-, 1,2,4- and 1,3,5-trichlorobenzene) individually. ** Applies to the sum of 1,2,3-, 1,2,4- and 1,3,5-trichlorobenzene. For the waters of the Great Lakes System, the Department will substitute a guidance value for the aquatic Type standard if so determined under 702.15 (c). *** This substance did not receive a review beyond determining that it is in a principal organic contaminant class and that it does not have a more stringent Specific MCL. Value applies to each isomer individually.					
1,1,1-Trichloroethane	A, A-S, AA, AA-S	5		H(WS)	I
(71-55-6)	GA	*		H(WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					

Table 1 (Continued)

NEW YORK STATE AMBIENT WATER QUALITY STANDARDS AND GUIDANCE VALUES

JUNE 1998

SUBSTANCE (CAS No.)	WATER CLASSES	STANDARD (ug/L)	GUIDANCE VALUE (ug/L)	TYPE	BASIS CODE
1,1,2-Trichloroethane	A, A-S, AA, AA-S	1		H(WS)	A
(79-00-5)	GA	1		H(WS)	A
Trichloroethene	A, A-S, AA, AA-S	5		H(WS)	I
(79-01-6)	GA	*		H(WS)	J
	A, A-S, AA, AA-S, B, C, D	40		H(FC)	A
	SA, SB, SC, I, SD	40		H(FC)	A
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
Trichlorofluoromethane	A, A-S, AA, AA-S	5		H(WS)	I
(75-69-4)	GA	*		H(WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
2,4,5-Trichlorophenoxyacetic acid (93-76-5)	GA	35		H(WS)	F
2,4,5-Trichlorophenoxypropionic acid	A, A-S, AA, AA-S	10		H(WS)	G
	GA	0.26		H(WS)	F
(93-72-1)					
1,1,2-Trichloropropane	A, A-S, AA, AA-S	5		H(WS)	I
(598-77-6)	GA	*		H(WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
1,2,3-Trichloropropane	A, A-S, AA, AA-S	0.04		H(WS)	A
(96-18-4)	GA	0.04		H(WS)	A
cis-1,2,3-Trichloropropene	A, A-S, AA, AA-S	5		H(WS)	I
(13116-57-9)	GA	*		H(WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
trans-1,2,3-Trichloropropene	A, A-S, AA, AA-S	5		H(WS)	I
(13116-58-0)	GA	*		H(WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
alpha,2,4-Trichlorotoluene	A, A-S, AA, AA-S	5		H(WS)	I
(94-99-5)	GA	*		H(WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
alpha,2,6-Trichlorotoluene	A, A-S, AA, AA-S	5		H(WS)	I
(2014-83-7)	GA	*		H(WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					

Table 1 (Continued)

NEW YORK STATE AMBIENT WATER QUALITY STANDARDS AND GUIDANCE VALUES

JUNE 1998

SUBSTANCE (CAS No.)	WATER CLASSES	STANDARD (ug/L)	GUIDANCE VALUE (ug/L)	TYPE	BASIS CODE
alpha,3,4-Trichlorotoluene (102-47-6)	A, A-S, AA, AA-S	5		H(WS)	I
	GA	*		H(WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
alpha,alpha,2-Trichlorotoluene (88-66-4)	A, A-S, AA, AA-S	5		H(WS)	I
	GA	*		H(WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
alpha,alpha,4-Trichlorotoluene (13940-94-8)	A, A-S, AA, AA-S	5		H(WS)	I
	GA	*		H(WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
2,3,4-Trichlorotoluene (7359-72-0)	A, A-S, AA, AA-S		0.34	H(WS)	B
	GA	*		H(WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
2,3,5-Trichlorotoluene (56961-86-5)	A, A-S, AA, AA-S		0.34	H(WS)	B
	GA	*		H(WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
2,3,6-Trichlorotoluene (2077-46-5)	A, A-S, AA, AA-S		0.34	H(WS)	B
	GA	*		H(WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
2,4,5-Trichlorotoluene (6639-30-1)	A, A-S, AA, AA-S		0.34	H(WS)	B
	GA	*		H(WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
2,4,6-Trichlorotoluene (23749-65-7)	A, A-S, AA, AA-S		0.34	H(WS)	B
	GA	*		H(WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
1,1,1-Trichloro-2,2,2-trifluoroethane (354-58-5)	A, A-S, AA, AA-S	5		H(WS)	I
	GA	*		H(WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					

Table 1 (Continued)

NEW YORK STATE AMBIENT WATER QUALITY STANDARDS AND GUIDANCE VALUES

JUNE 1998

SUBSTANCE (CAS No.)	WATER CLASSES	STANDARD (ug/L)	GUIDANCE VALUE (ug/L)	TYPE	BASIS CODE
1,1,2-Trichloro-1,2,2-trifluoroethane (76-13-1)	A, A-S, AA, AA-S	5		H(WS)	I
	GA	*		H(WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
Trifluralin (1582-09-8)	GA	35		H(WS)	F
1,2,3-Trimethylbenzene (526-73-8)	A, A-S, AA, AA-S	5		H(WS)	I
	GA	*		H(WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
1,2,4-Trimethylbenzene (95-63-6)	A, A-S, AA, AA-S	5		H(WS)	I
	GA	*		H(WS)	J
	A, A-S, AA, AA-S, B, C		33	A(C)	
	A, A-S, AA, AA-S, B, C, D		290	A(A)	
	SA, SB, SC, I		19	A(C)	
	SA, SB, SC, I, SD		170	A(A)	
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
1,3,5-Trimethylbenzene (108-67-8)	A, A-S, AA- AA-S	5		H(WS)	I
	GA	*		H(WS)	J
Remark: * The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
2,3,6-Trimethylpyridine (1462-84-6)	A, A-S, AA, AA-S		50	H(WS)	Z
	GA		50	H(WS)	Z
2,4,6-Trimethylpyridine (108-75-8)	A, A-S, AA, AA-S		50	H(WS)	Z
	GA		50	H(WS)	Z
sym-Trinitrobenzene (99-35-4)	A, A-S, AA, AA-S		5*	H(WS)	I
	GA	**		H(WS)	J
Remarks: * This substance did not receive a review beyond determining that it is in a principal organic contaminant class and that it does not have a more stringent Specific MCL. ** The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
2,3,4-Trinitrotoluene (602-29-9)	A, A-S, AA, AA-S		5*	H(WS)	I
	GA	**		H(WS)	J
Remarks: * This substance did not receive a review beyond determining that it is in a principal organic contaminant class and that it does not have a more stringent Specific MCL. ** The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					

Table 1 (Continued)

NEW YORK STATE AMBIENT WATER QUALITY STANDARDS AND GUIDANCE VALUES

JUNE 1998

SUBSTANCE (CAS No.)	WATER CLASSES	STANDARD (ug/L)	GUIDANCE VALUE (ug/L)	TYPE	BASIS CODE
2,3,6-Trinitrotoluene	A, A-S, AA, AA-S		5*	H(WS)	I
(18292-97-2)	GA	**		H(WS)	J
Remarks: * This substance did not receive a review beyond determining that it is in a principal organic contaminant class and that it does not have a more stringent Specific MCL.					
** The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
2,4,5-Trinitrotoluene	A, A-S, AA, AA-S		5*	H(WS)	I
(610-25-3)	GA	**		H(WS)	J
Remarks: * This substance did not receive a review beyond determining that it is in a principal organic contaminant class and that it does not have a more stringent Specific MCL.					
** The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
2,4,6-Trinitrotoluene	A, A-S, AA, AA-S		5*	H(WS)	I
(118-96-7)	GA	**		H(WS)	J
Remarks: * This substance did not receive a review beyond determining that it is in a principal organic contaminant class and that it does not have a more stringent Specific MCL.					
** The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
3,4,5-Trinitrotoluene	A, A-S, AA, AA-S		5*	H(WS)	I
(603-15-6)	GA	**		H(WS)	J
Remarks: * This substance did not receive a review beyond determining that it is in a principal organic contaminant class and that it does not have a more stringent Specific MCL.					
** The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.					
Triphenyl phosphate	A, A-S, AA, AA-S		50	H(WS)	Z
(115-86-6)	GA		50	H(WS)	Z
	A, A-S, AA, AA-S, B, C	4*		A(C)	
	D	40*		A(A)	
Remark: * For the waters of the Great Lakes System, the Department will substitute a guidance value for the aquatic Type standard if so determined under 702.15 (c) and (d).					
Tritium	A, A-S, AA, AA-S	*		H(WS)	G
(CAS No. Not Applicable)					
Remark: * 20,000 picocuries per liter; if two or more radionuclides are present, the sum of their annual dose equivalent to the total body or any organ shall not exceed 4 millirems per year.					
Uranyl ion	GA	5,000		H(WS)	H
(CAS No. Not Applicable)					
Vanadium	A, A-S, AA, AA-S, B, C	14*		A(C)	
(CAS No. Not Applicable)	D	190*		A(A)	
Remark: * For the waters of the Great Lakes System, the Department will substitute a guidance value for the aquatic Type standard if so determined under 702.15 (c) and (d). Aquatic Type standards apply to acid-soluble form.					

Table 1 (Continued)

NEW YORK STATE AMBIENT WATER QUALITY STANDARDS AND GUIDANCE VALUES

JUNE 1998

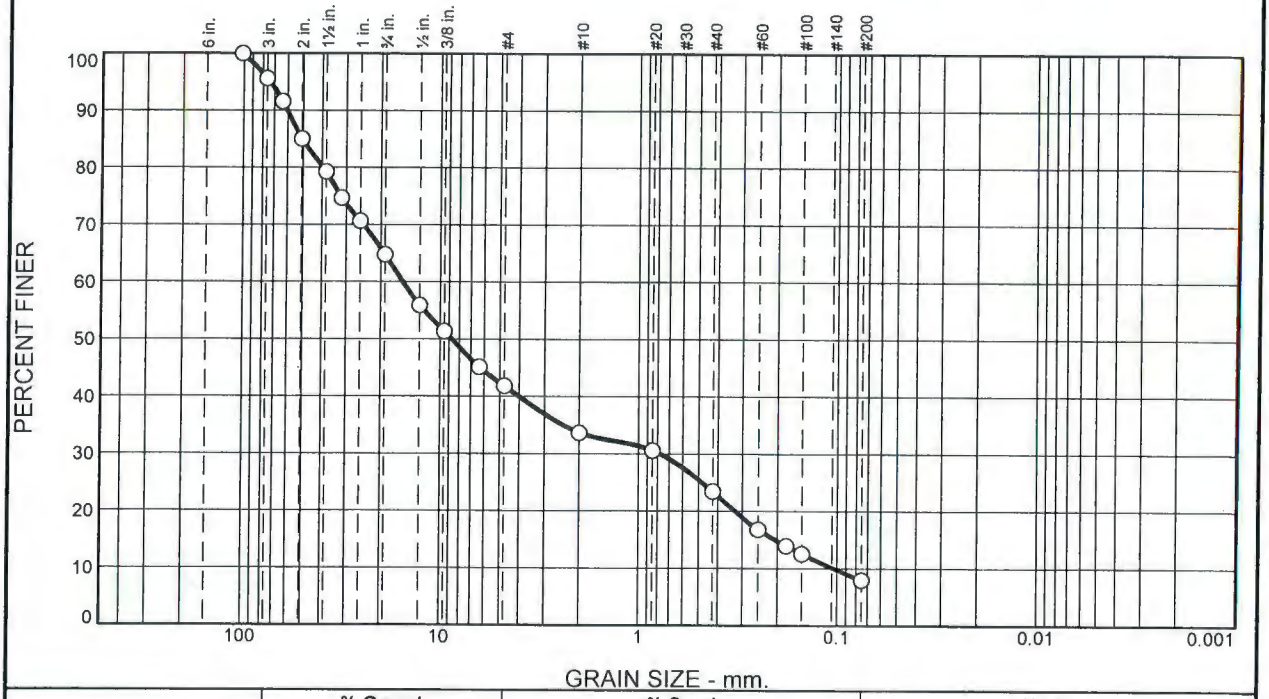
SUBSTANCE (CAS No.)	WATER CLASSES	STANDARD (ug/L)	GUIDANCE VALUE (ug/L)	TYPE	BASIS CODE
Vinyl chloride	A, A-S, AA, AA-S		0.3	H(WS)	A
(75-01-4)	GA	2		H(WS)	G
1,2-Xylene	A, A-S, AA, AA-S	5		H(WS)	I
(95-47-6)	GA	*		H(WS)	J
	A, A-S, AA, AA-S, B, C		**	A(C)	
	A, A-S, AA, AA-S, B, C, D		**	A(A)	
	SA, SB, SC, I		**	A(C)	
	SA, SB, SC, I, SD		**	A(A)	
Remarks: *	The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
**	Refer to entry for "1,4-Xylene."				
1,3-Xylene	A, A-S, AA, AA-S	5		H(WS)	I
(108-38-3)	GA	*		H(WS)	J
	A, A-S, AA, AA-S, B, C		**	A(C)	
	A, A-S, AA, AA-S, B, C, D		**	A(A)	
	SA, SB, SC, I		**	A(C)	
	SA, SB, SC, I, SD		**	A(A)	
Remarks: *	The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
**	Refer to entry for "1,4-Xylene."				
1,4-Xylene	A, A-S, AA, AA-S	5		H(WS)	I
(106-42-3)	GA	*		H(WS)	J
	A, A-S, AA, AA-S, B, C		65**	A(C)	
	A, A-S, AA, AA-S, B, C, D		590**	A(A)	
	SA, SB, SC, I		19**	A(C)	
	SA, SB, SC, I, SD		170**	A(A)	
Remarks: *	The principal organic contaminant standard for groundwater of 5 ug/L (described elsewhere in this Table) applies to this substance.				
**	Applies to the sum of 1,2-, 1,3- and 1,4-xylene.				
Zinc	A, A-S, AA, AA-S		2,000	H(WS)	B
(CAS No. Not Applicable)	GA		2,000	H(WS)	B
	A, A-S, AA, AA-S, B, C	*		A(C)	
	A, A-S, AA, AA-S, B, C, D	**		A(A)	
	SA, SB, SC, I	66		A(C)	
	SD	95		A(A)	
	A, A-S, AA, AA-S		5,000	E	U
	GA		5,000	E	U
Remarks:	Aquatic Type standards apply to dissolved form.				
*	exp(0.85 [ln(ppm hardness)] + 0.50)				
**	0.978 exp(0.8473 [ln(ppm hardness)] + 0.884)				
Zineb (12122-67-7)	GA	1.8		H(WS)	F
Ziram (137-30-4)	GA	4.2		H(WS)	F

APPENDIX F

ATLANTIC TESTING LABORATORIES

WBE certified company

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
4	31	23	8	10	16	8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	OUT OF SPEC (X)
4	100		
3	96		
2-1/2	92		
2	85		
1-1/2	79		
1-1/4	75		
1	71		
3/4	65		
1/2	56		
3/8	51		
1/4	45		
#4	42		
#10	34		
#20	31		
#40	24		
#60	17		
#80	14		
#100	13		
#200	8.0		

* (no specification provided)

Soil Description

Brown 4" Minus Granular Fill

Atterberg Limits

PL= --- LL= --- PI= ---

Coefficients

D_{85}= 50.7203 D_{60}= 15.4572 D_{50}= 8.7107
D_{30}= 0.7767 D_{15}= 0.2041 D_{10}= 0.1034
C_u= 149.56 C_c= 0.38

Classification

USCS= --- AASHTO= ---

Remarks

Sampled by Client.
Delivered by Client on 06-20-16.
ASTM D 422 (without Hydrometer)

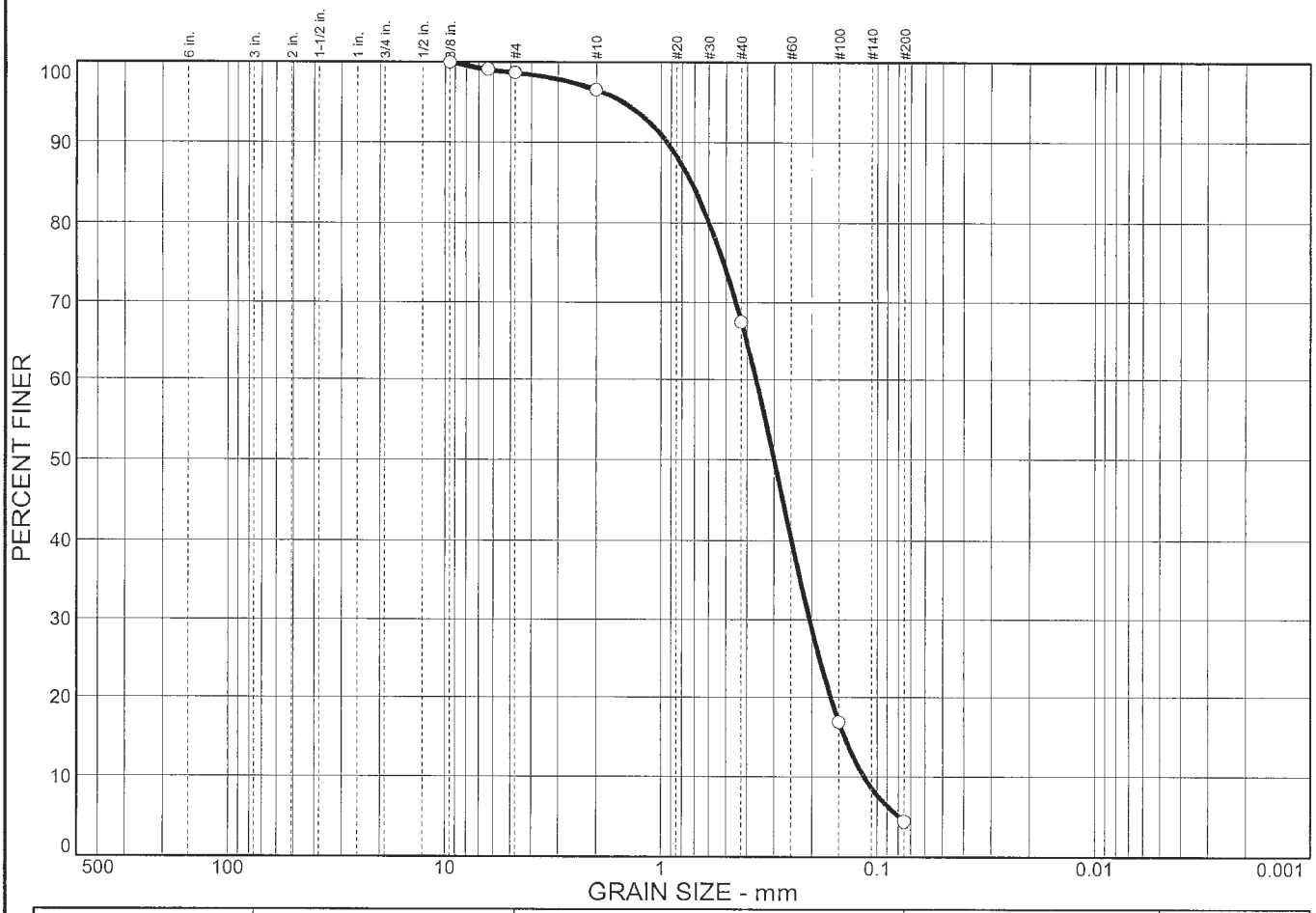
Sample No.: PL1027S7 **Source of Sample:** Rafferty Sand and Gravel - La Plante Road
Location: Stockpile **Elev./Depth:** ---

ATLANTIC TESTING LABORATORIES, LIMITED
Plattsburgh, New York

Client: Steven E. Fuller Excavating, Inc.
Project: Misc. Lab Testing
Report No: PL1027SL-07-06-16 **Date:** 06-22-16

Reviewed by: _____ Date: 06-24-16

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	1.3	94.3	4.4	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/8 in.	100.0		
1/4 in.	99.1		
#4	98.7		
#10	96.5		
#40	67.4		
#100	16.8		
#200	4.4		

* (no specification provided)

Soil Description

Fine to coarse SAND, trace gravel and silt

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 0.725 D_{60}= 0.363 D_{50}= 0.300
D_{30}= 0.205 D_{15}= 0.142 D_{10}= 0.115
C_u= 3.16 C_c= 1.01

Classification

USCS= AASHTO=

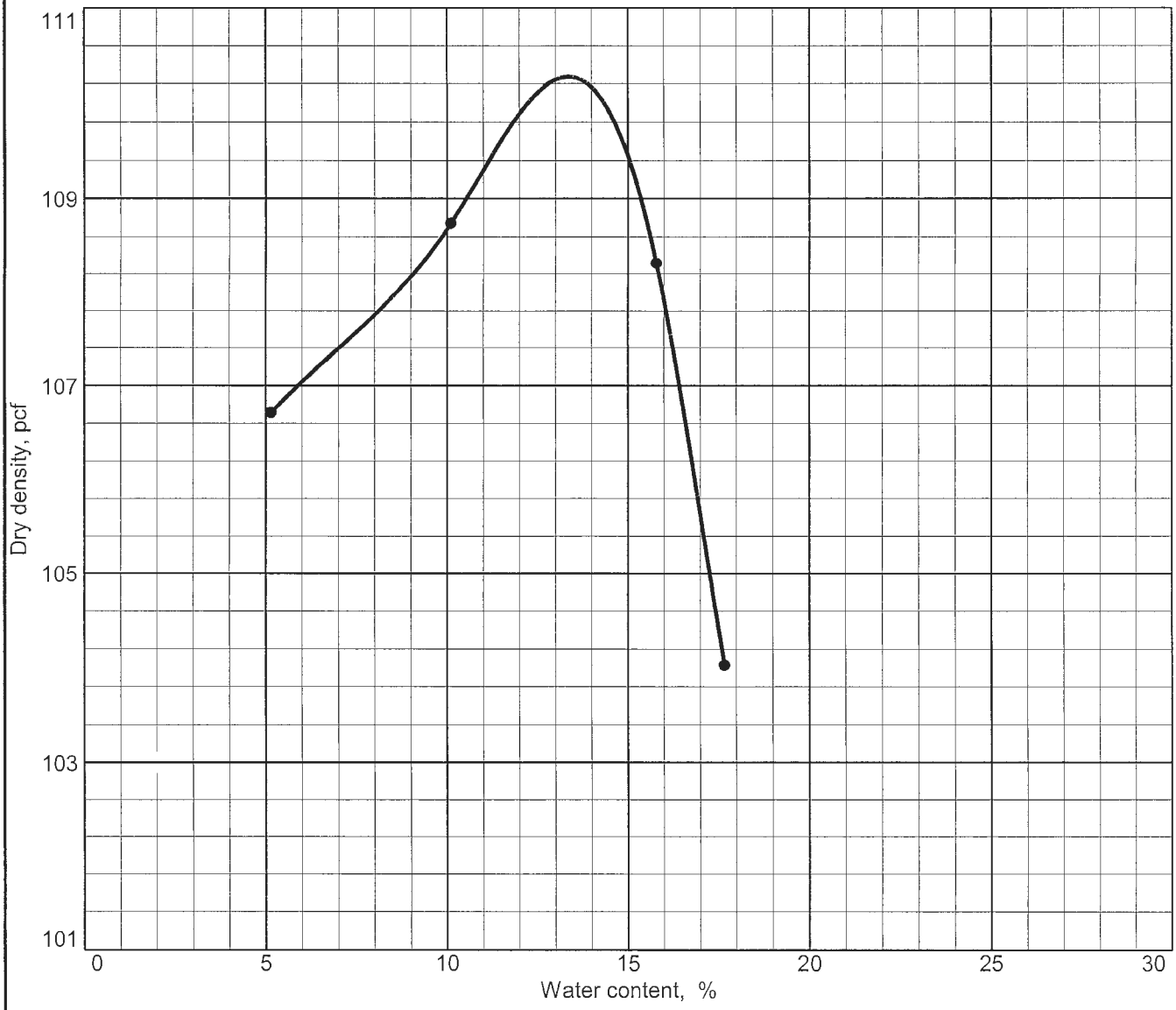
Remarks

Sample No.: 6-098 **Source of Sample:** **Date:**
Location: Run of Bank Sand - Rafferty Sand and Gravel **Elev./Depth:**

SJB SERVICES, INC.

Client: EAS Professionals
Project: Dollar General
Chazy, NY
Project No: AT-16-017 **Plate**

COMPACTION TEST REPORT



Test specification: ASTM D 698-78 Method A Standard

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > No.4	% < No.200
	USCS	AASHTO						
							0.0	4.4

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 110.3 pcf Optimum moisture = 13.4 %	Fine to coarse SAND, trace gravel and silt

Project No. AT-16-017 **Client:** EAS Professionals

Project: Dollar General

Chazy, NY

● **Location:** Run of Bank Sand - Rafferty Sand and Gravel

Remarks:

COMPACTION TEST REPORT

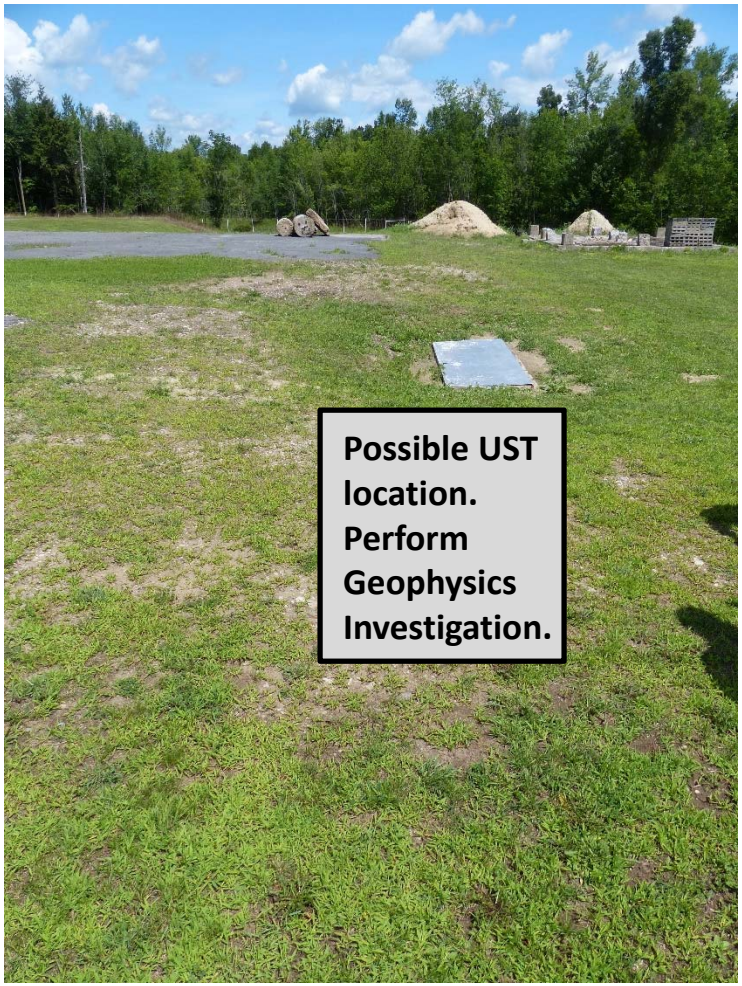
SJB SERVICES, INC.

Plate

APPENDIX G

US Army Corps
of Engineers

ATLAS-1
CHAMPLAIN, NEW YORK
FORMERLY USED DEFENSE SITES (FUDS) PROGRAM
ATTACHMENT 3 - LOCATION & PHOTOGRAPHS OF PROJECT SITE



View of Investigation Area

Old connection at bottom of tank leading to possible UST.

Relocated tank placed in approximate original position.

Site View from Geophysics Investigation location.

APPENDIX H

US Army Corps
of Engineers

SHORT BEACH FIRE CONTROL STATION
JONES BEACH STATE PARK, NEW YORK
FORMERLY USED DEFENSE SITES (FUDS) PROGRAM
ATTACHMENT 4 - LOCATION & PHOTOGRAPHS OF PROJECT SITE

Former Short Beach Fire Control Station

Work area adjacent to U.S. Coast Guard Station

Access road to old fire control station.

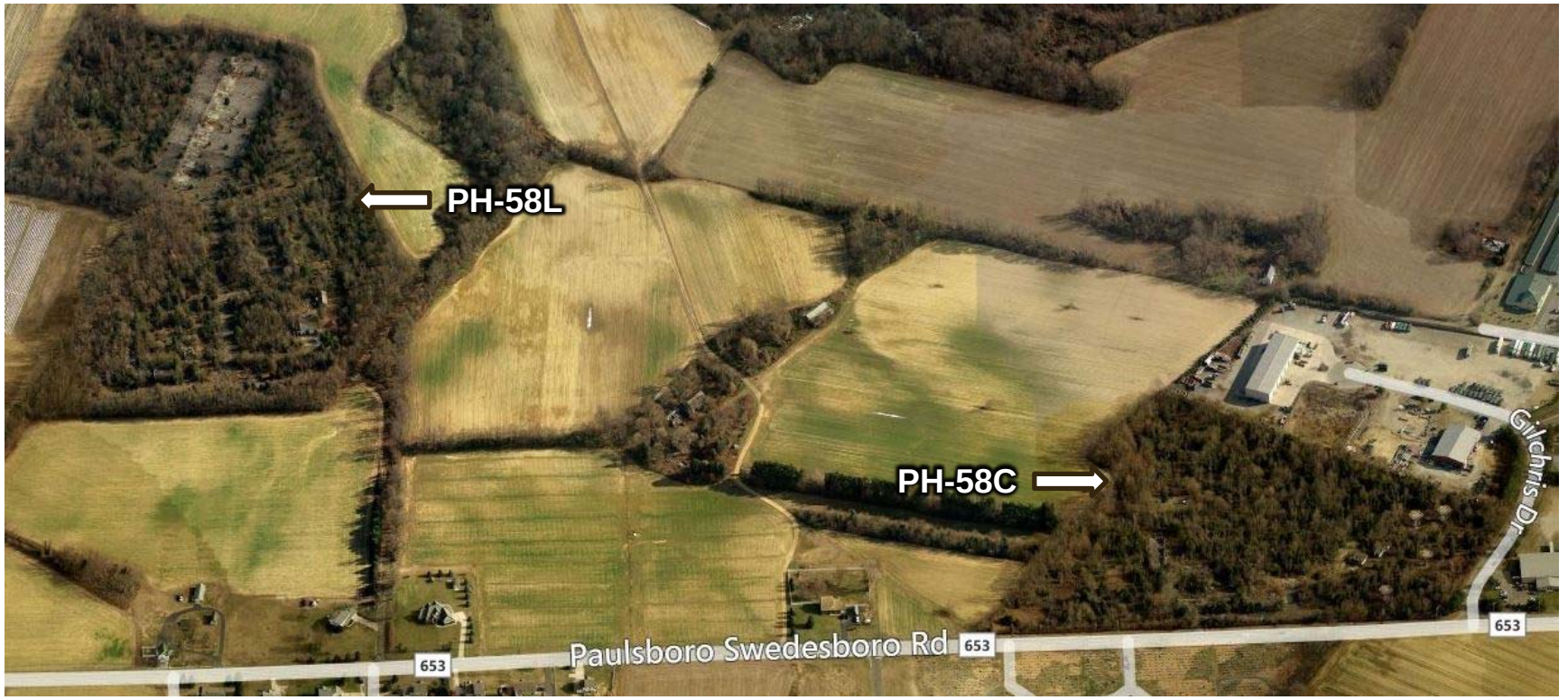
Remnants of old fire control station.

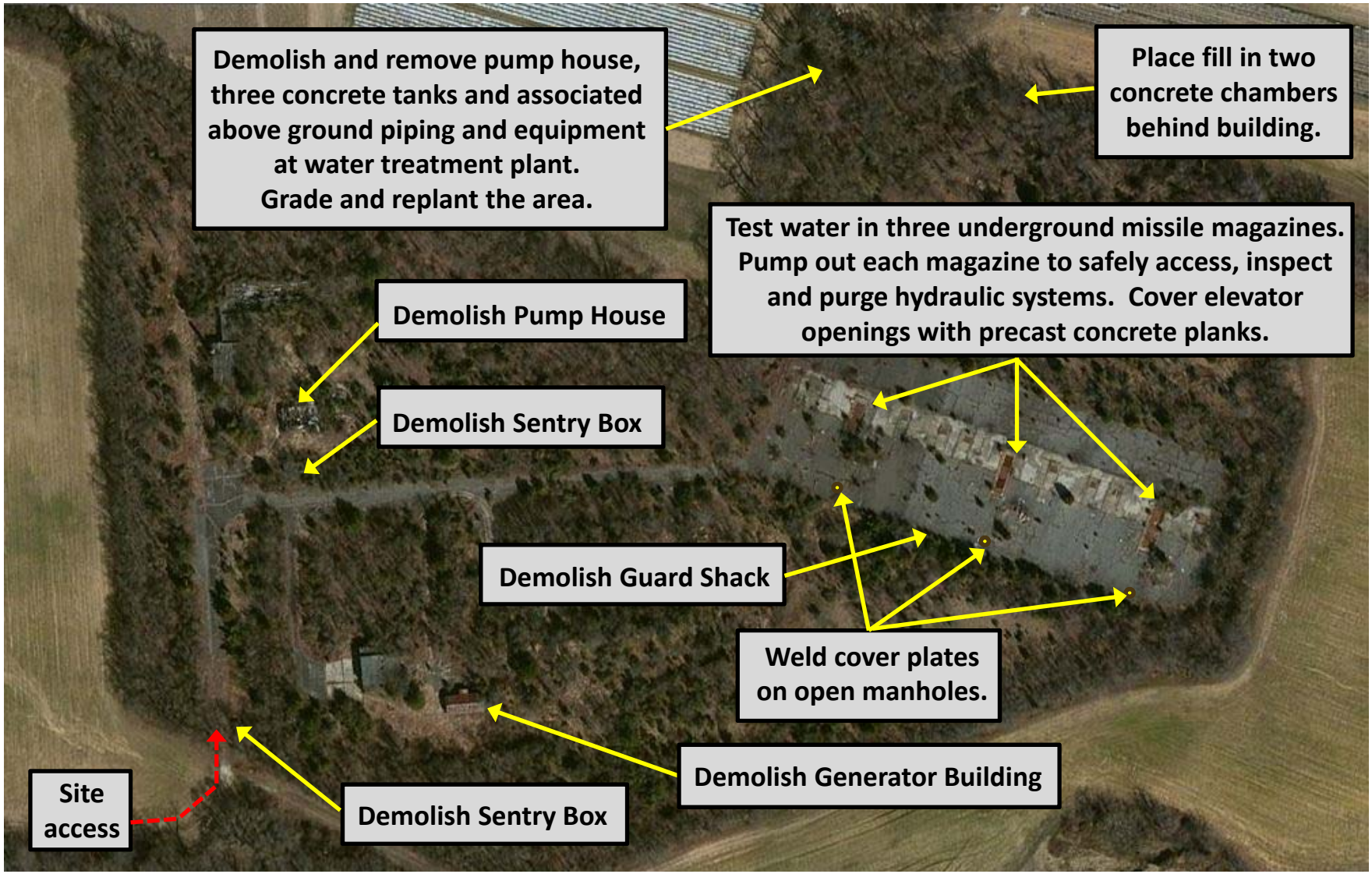
Remnants of old fire control station.

APPENDIX I

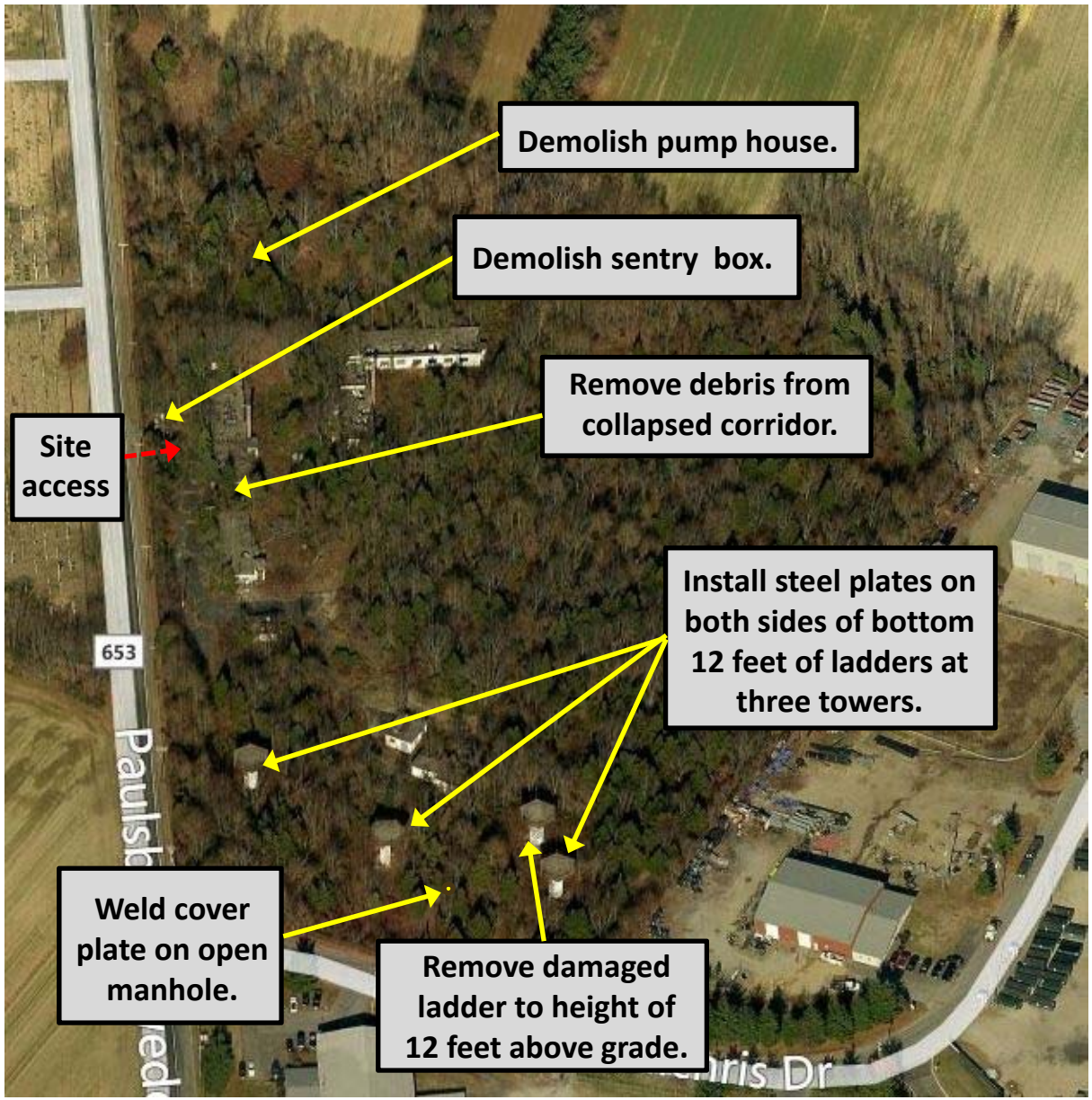
US Army Corps
of Engineers

NIKE PH-58
WOOLWICH TOWNSHIP, NEW JERSEY
FORMERLY USED DEFENSE SITES (FUDS) PROGRAM
ATTACHMENT 6 - LOCATION & PHOTOGRAPHS OF PROJECT SITE

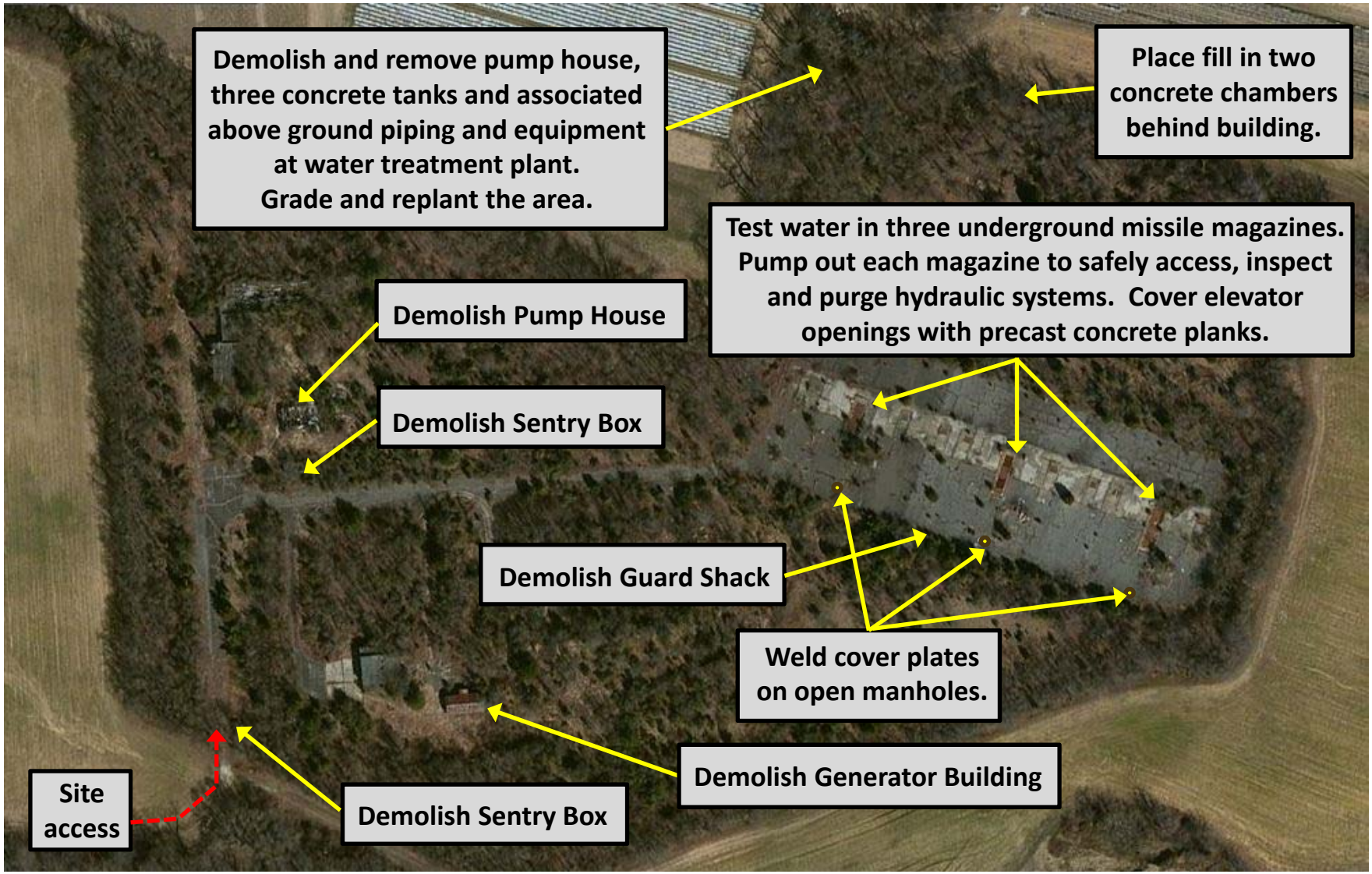




View of PH-58 Launch Area.

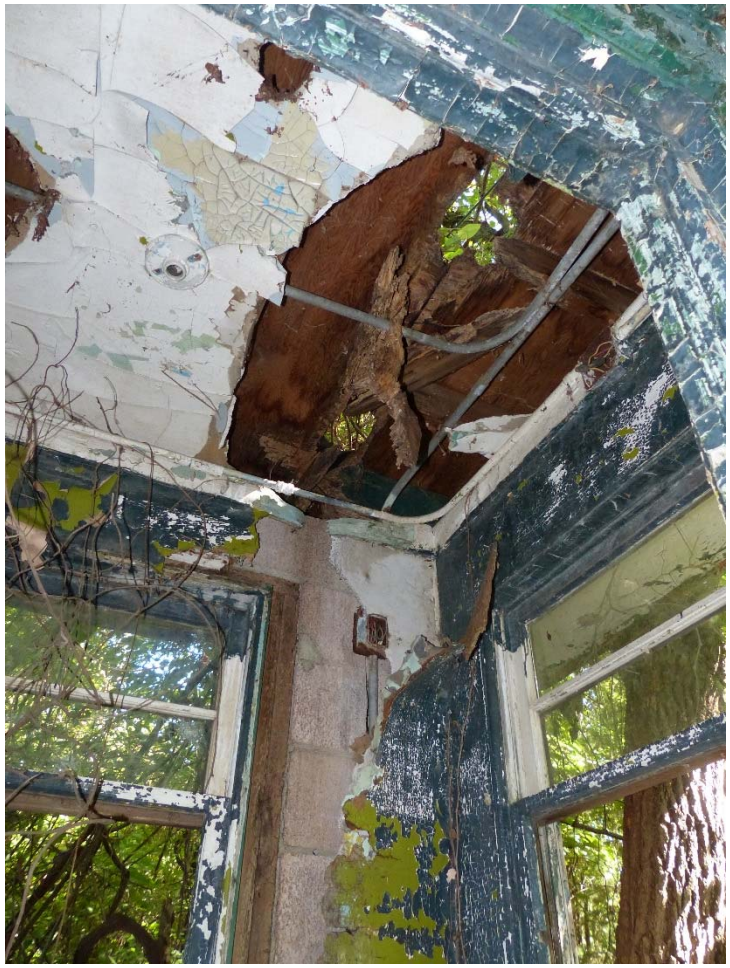


View of PH-58 Control Area.



PH-58 Launch Area Work Summary – Slides 4-22.

Sentry Box near site entrance gate.



Interior view of Sentry Box shows condition and type of construction.

Photographs from PH-58 Launch Area.

Sentry Box has partially collapsed.

Photographs from PH-58 Launch Area.

Demolish Guard Shack near missile magazines.

Interior view of Guard Shack shows condition and type of construction.

Photographs from PH-58 Launch Area.

Demolish Generator Building

Interior view of Generator Building shows condition and type of construction.

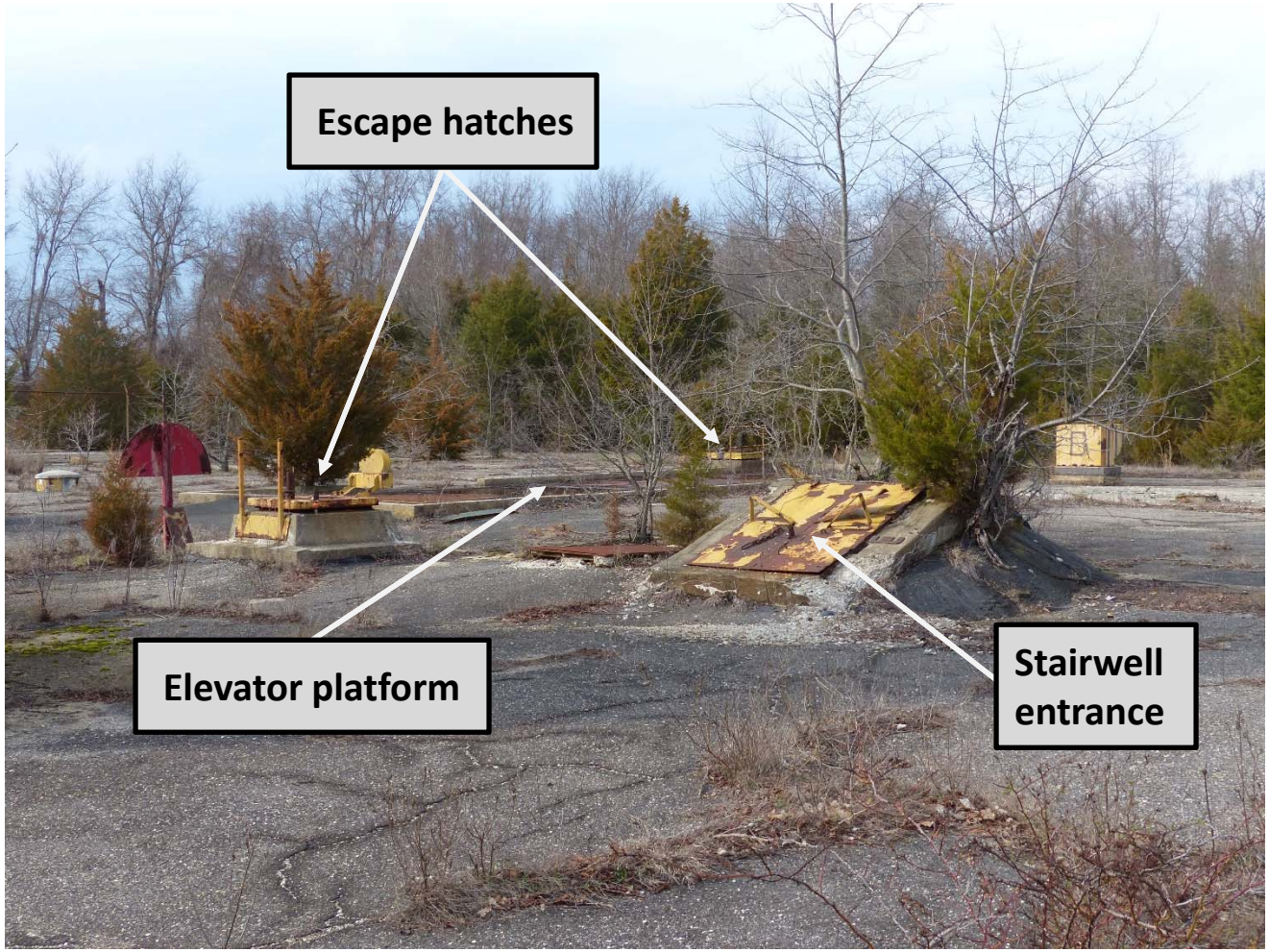
Photographs from PH-58 Launch Area.

Pump House near site entrance gate.

Place clean fill in Pump House chamber to fill completely to grade.

Interior view of Pump House shows pump and much of the remaining piping.

Photographs from PH-58 Launch Area.



A view showing typical topside features of underground missile magazine.

Photograph from PH-58 Launch Area.

Two views of underground missile magazine with elevator in raised position.

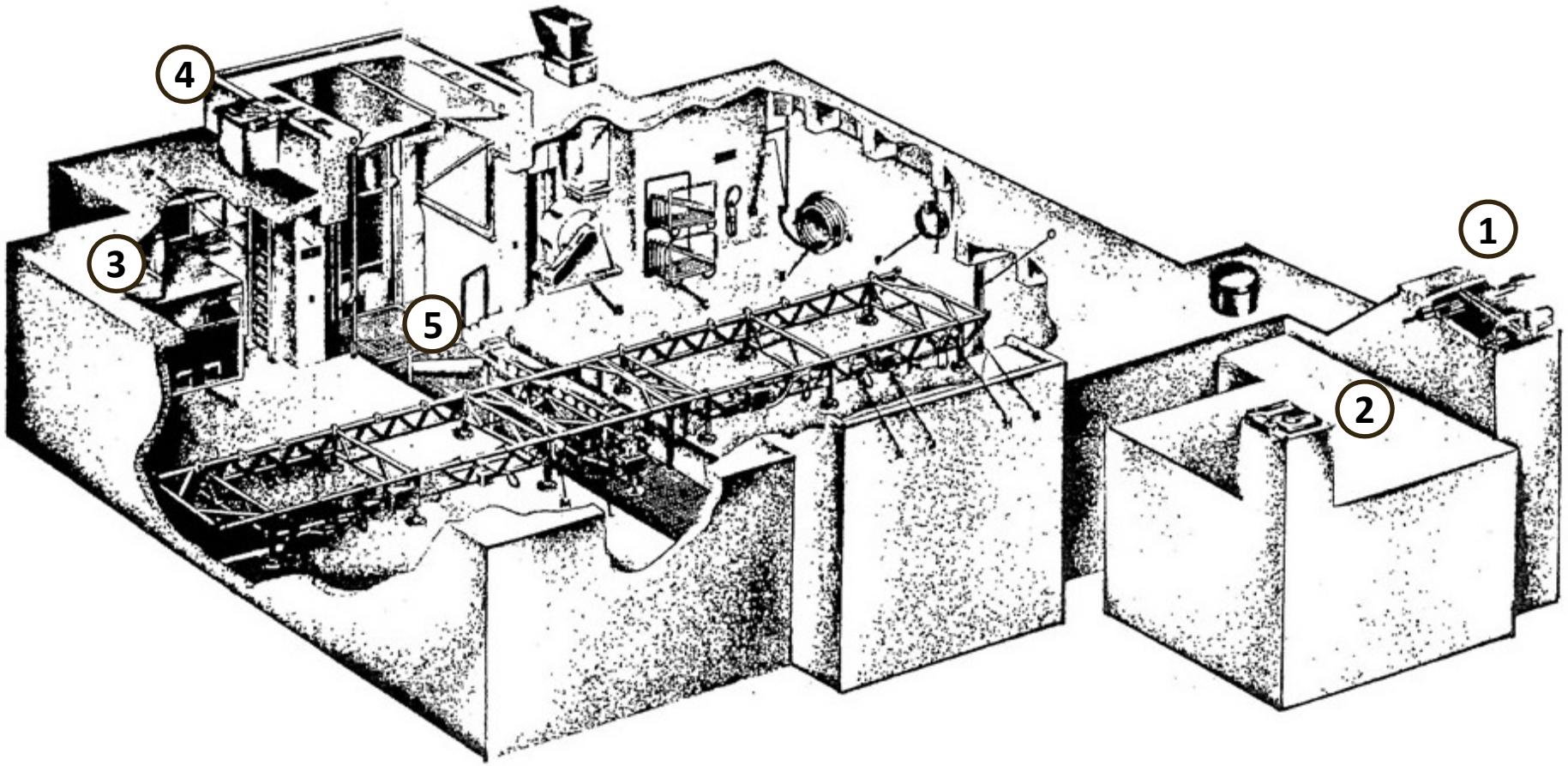
- **Locked and/or welded hatches and stairwell must be opened.**
- **Contractor shall sample water, if any, according to the specifications.**
- **Water shall be removed from each magazine and stored, if necessary, in adjacent magazines or other proper means of confinement.**

Photographs from PH-58 Launch Area.

Access to underground missile magazines can be gained by opening locked or welded doors.

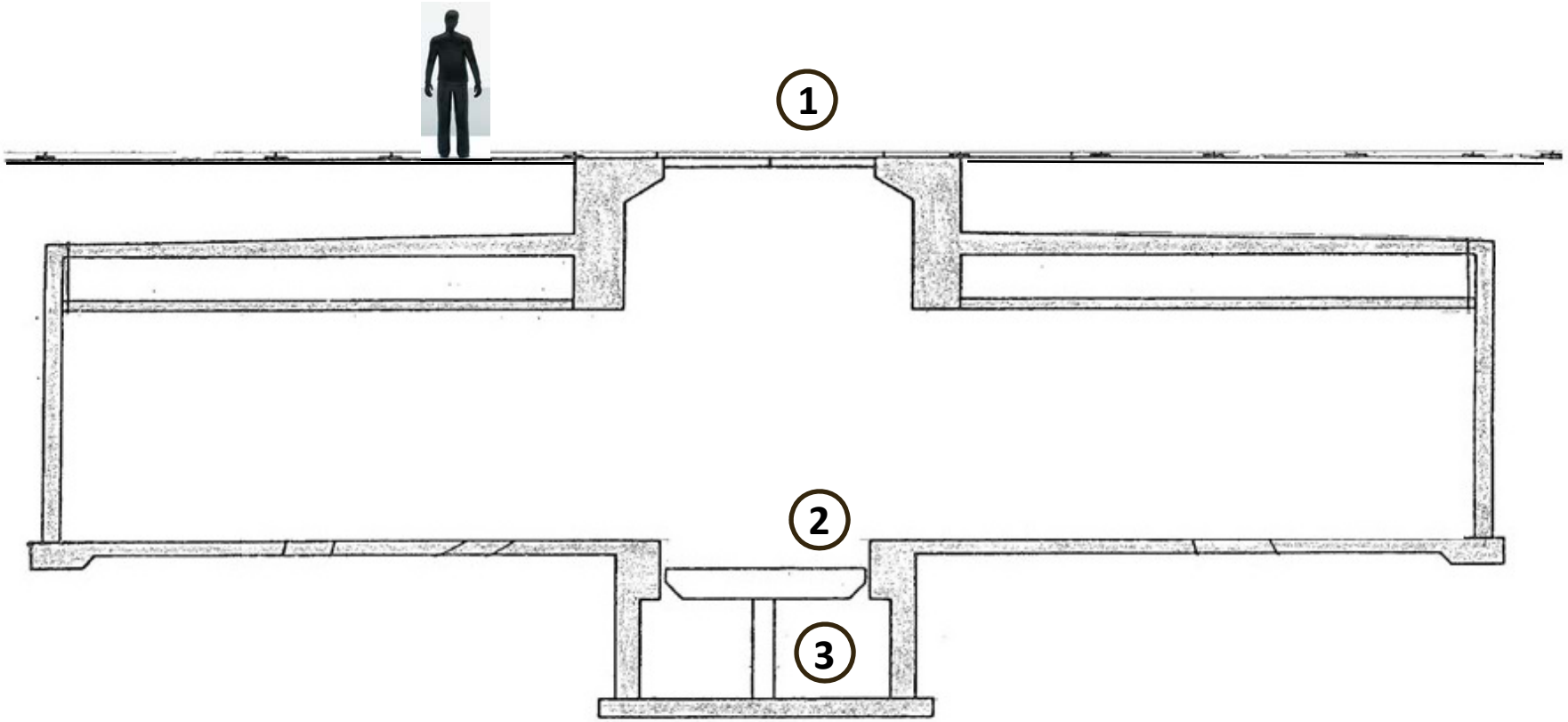
Access to underground missile magazines can be gained by opening locked or welded hatches.

Photographs from PH-58 Launch Area.



1 Access Bulkhead to Stairwell	4 Access Hatchway to Ladder
2 Access Hatchway to Ladder	5 Elevator Platform and Pit
3 Hydraulic Power Unit with Reservoir Tank	

General Arrangement of Underground Missile Magazine at PH-58 Launch Area.



1. Magazine Doors (shown in closed position)
2. Elevator Platform (shown in lowered position)
3. Elevator Pit and Hydraulic Cylinder

Simplified cross section of Underground Missile Magazine at PH-58 Launch Area.

A manhole is located just south of each underground magazine.

Provide a steel plate sized to fit over inner edge of the manhole frame and weld it to the frame to cover the opening.

Photograph from PH-58 Launch Area.

Demolish Pump House at water treatment facility.

Interior view of Pump House at water treatment facility.

Photographs from PH-58 Launch Area.

Test and pump contents of small concrete tank. Remove railing and break the concrete tank down to a depth of 12 inches below grade.

Clean out valve pit chamber behind Pump House and break in down to a depth of 12 inches below grade. Place clean fill up to level of grade.

Photographs from PH-58 Launch Area.

Remove above-ground piping and valves associated with water treatment facility.
Remove above-ground piping over surface of sand filter.

Photographs from PH-58 Launch Area.

Demolish perched settling tank at water treatment facility. Regrade area.

Photographs from PH-58 Launch Area.

Three views of perched settling tank at water treatment facility.
The tank is approx. 25 feet in diameter.
Outer wall thickness is approx. 12 inches.
Inner wall thickness is approx. 7 inches.

Photographs from PH-58 Launch Area.

The aeration tank has two 8-foot deep chambers 180 degrees apart.

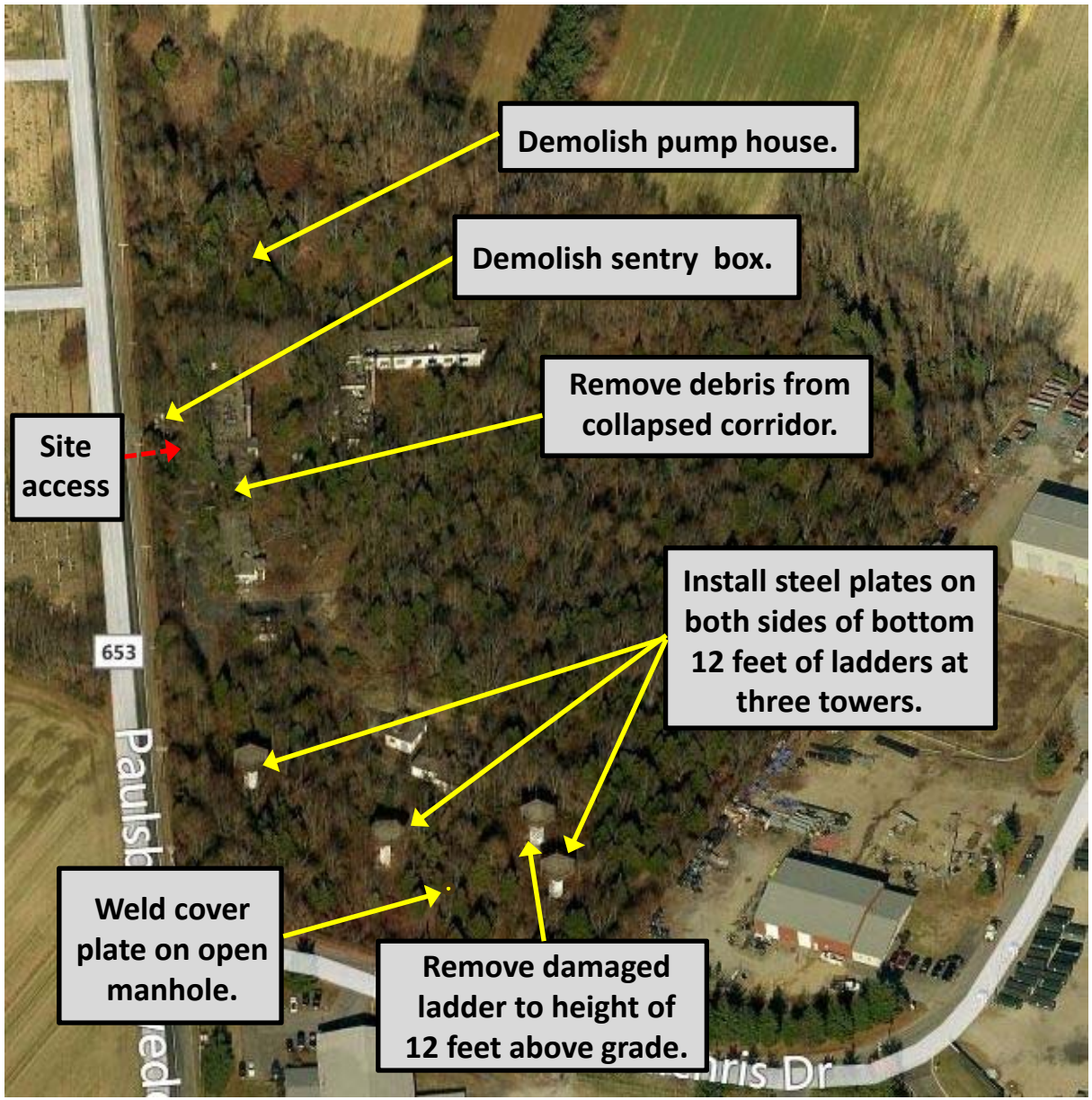
Demolish perched aeration tank at water treatment facility. Tank is approx. 21.5 feet in diameter with 7 inch thick walls. It appears to be stone-filled.

Photographs from PH-58 Launch Area.

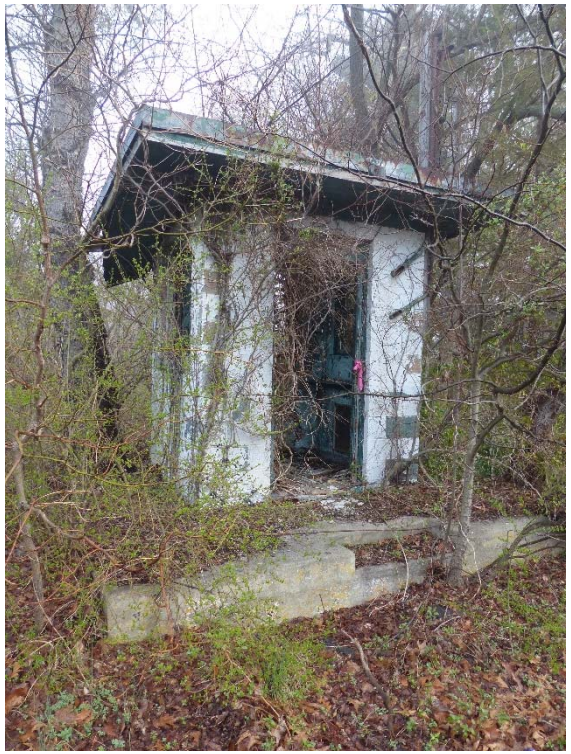
Place fill in two flow chambers.

Place clean, compacted fill in the two chambers to a depth of 6” below top of concrete. Each chamber measures approx. 7 feet long, 3 feet wide and 6 feet deep.

Photographs from PH-58 Launch Area.



PH-58 Control Area Work Summary – Slides 23-30.

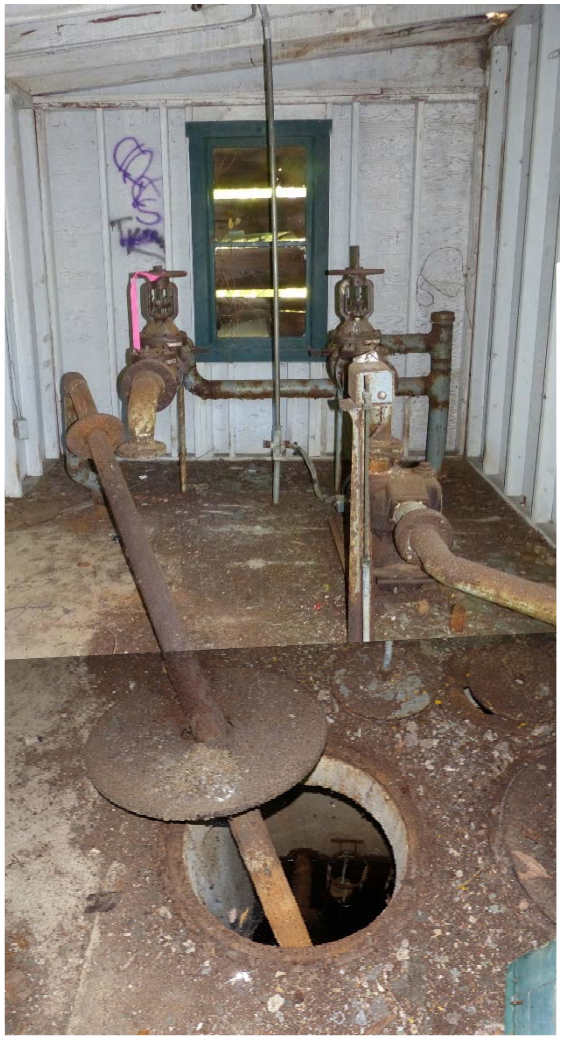


Demolish Sentry Box near site entrance gate.

Interior view of Sentry Box shows condition and type of construction.

Photographs from PH-58 Control Area.

Demolish Pump House.
Two views of exterior.



Interior view of Pump House.
Place clean fill in Pump House chamber to fill completely to grade.

Photographs from PH-58 Control Area.

Two views of collapsed corridor between former Administration Building and Mess Hall. Demolish concrete block foundation and remove all debris and building materials.

Photographs from PH-58 Control Area.

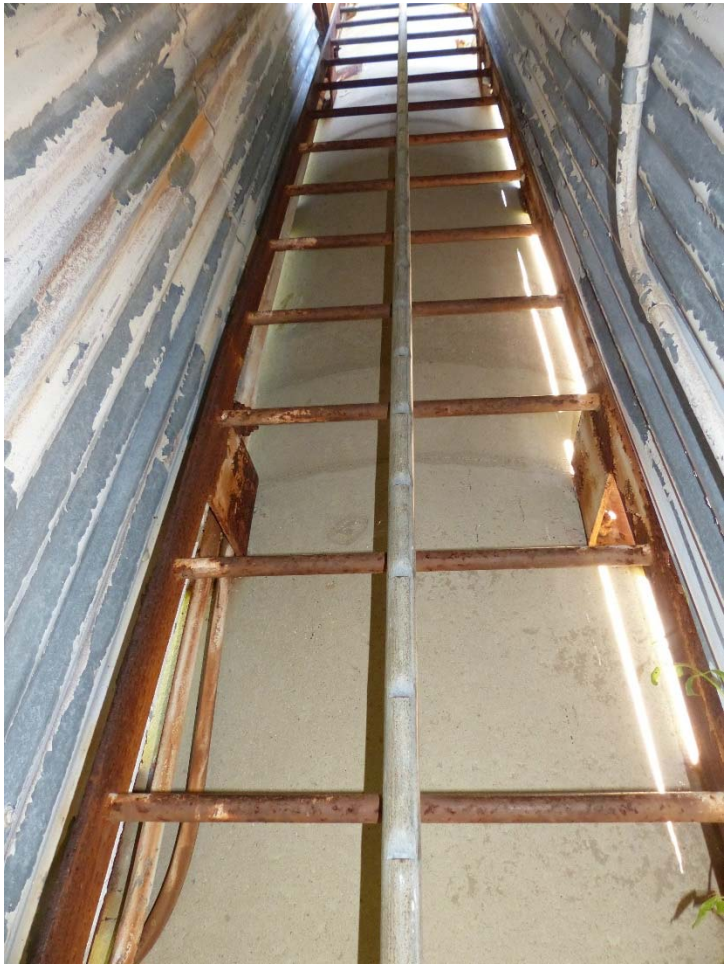
Two views of collapsed corridor between former Administration Building and Mess Hall. Demolish concrete block foundation and remove all debris and building materials.

Photographs from PH-58 Control Area.

Radar Tower access ladder (typical for four towers).

Radar Tower access ladder (typical for four towers).

Photographs from PH-58 Control Area.



Bolt steel plate across bottom ten feet of tower access ladder. (typical for three towers)

Remove bottom ten feet of damaged tower access ladder. (one tower only)

Photographs from PH-58 Control Area.

An open manhole is located approximately 85 feet from the fence line at the south end of the property.

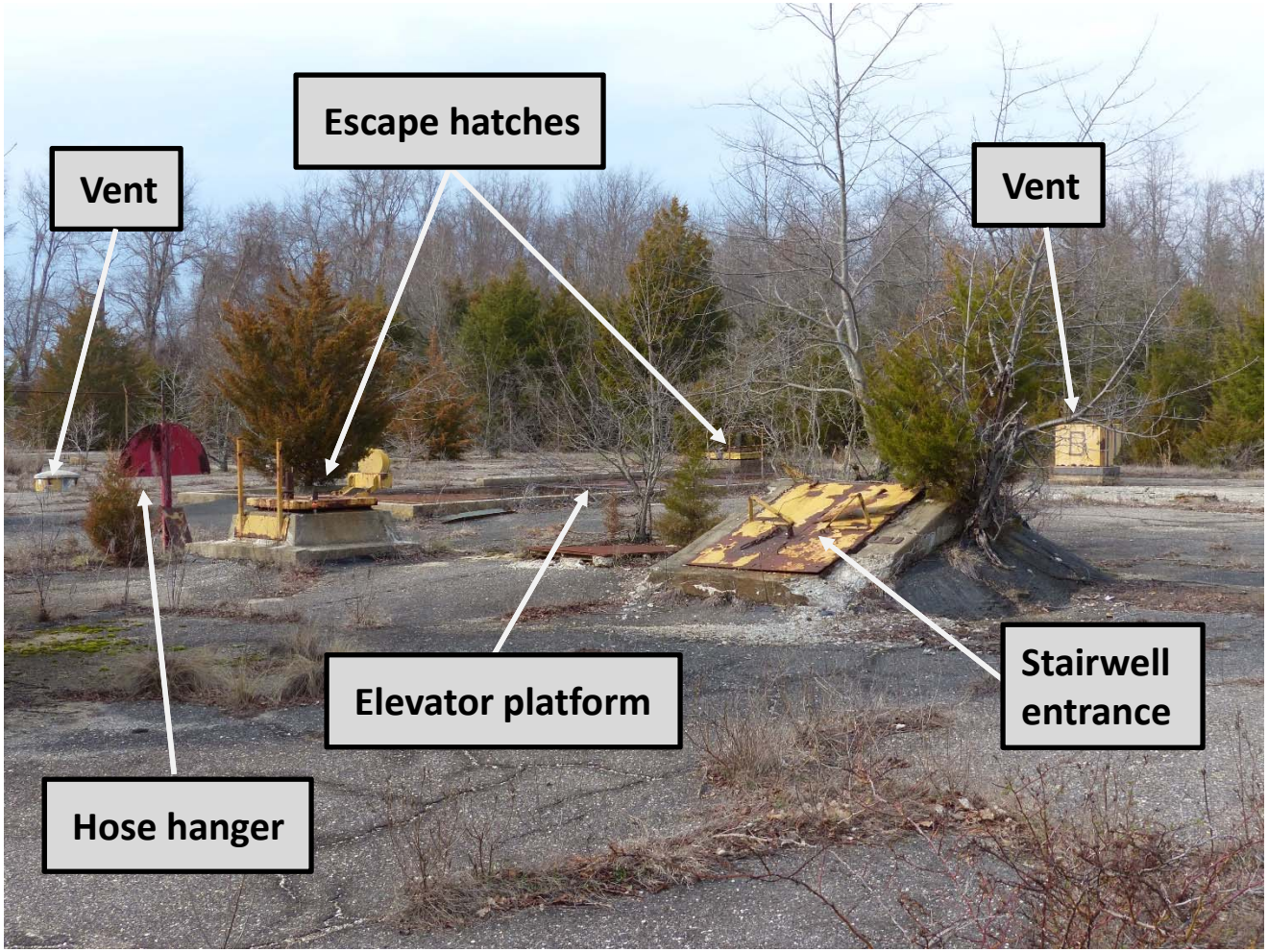
Provide a steel plate sized to fit over inner edge of the manhole frame and weld it to the frame to cover the opening.

Photographs from PH-58 Control Area.

APPENDIX J

Typical Underground Missile Storage Magazine at Nike Launch Area

Configuration of common B, C pits



A view showing typical topside features of underground missile magazine.

Typical Underground Missile Storage Magazine at Nike Launch Area

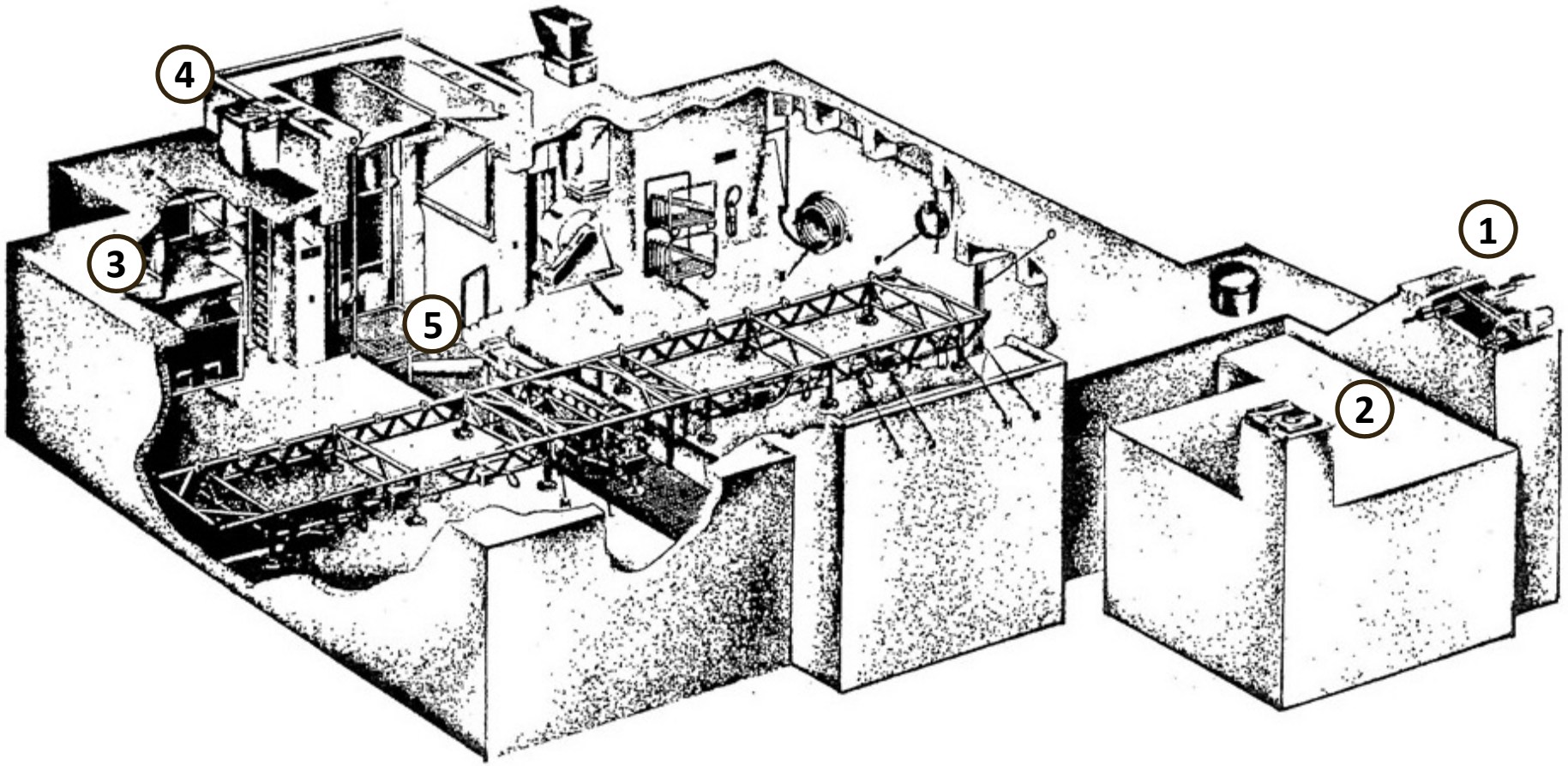
Two views of underground missile magazine with elevator in raised position.
Doors were unlatched and dropped ninety degrees before elevator platform could rise.
Elevator & hydraulics were provided by the Wayne Pump Company of St. Louis, Missouri.

Typical Underground Missile Storage Magazine at Nike Launch Area

Access to underground missile magazines can be gained by opening locked or welded doors.

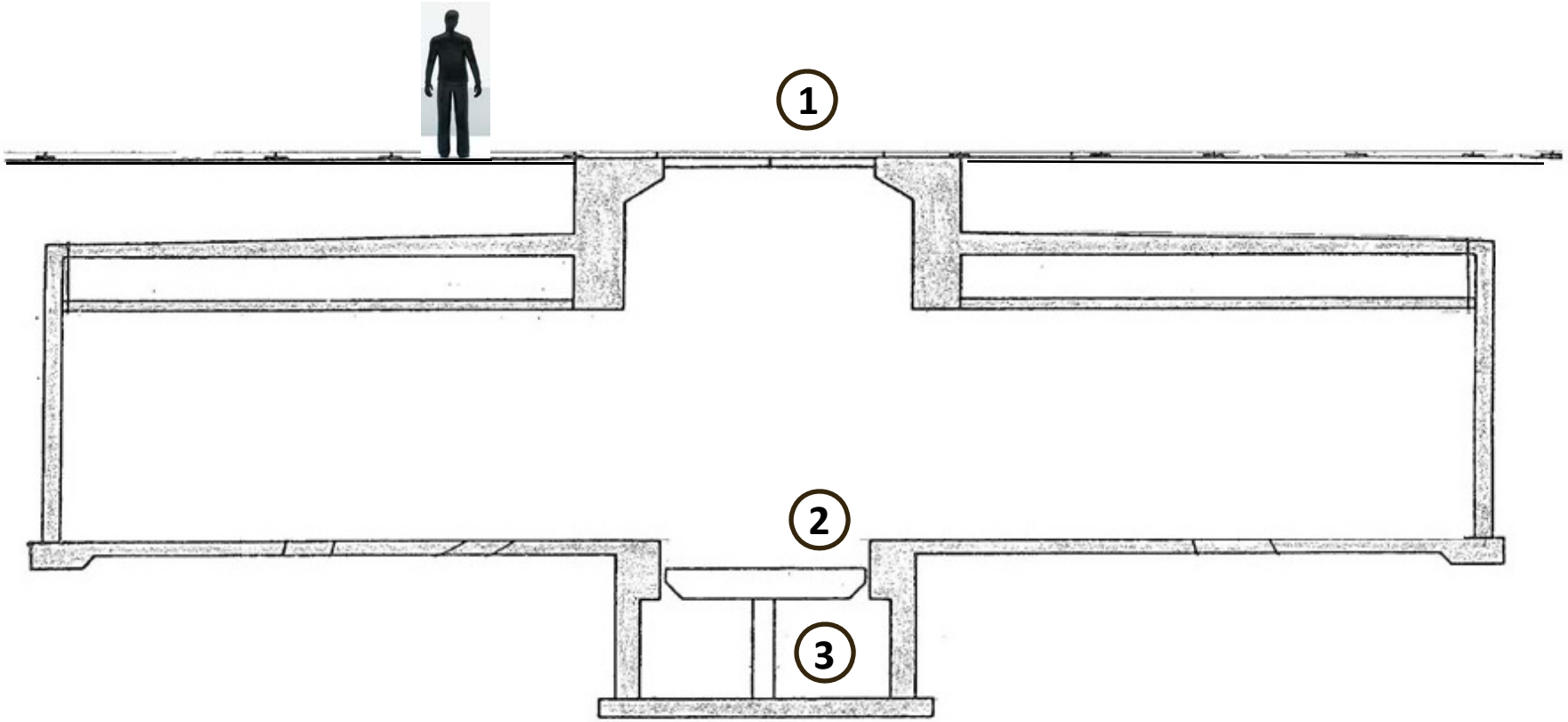
Access to underground missile magazines can be gained by opening locked or welded hatches.

Typical Underground Missile Storage Magazine at Nike Launch Area



1. Access Bulkhead to Stairwell
2. Access Hatchway to Ladder
3. Hydraulic Power Unit with Reservoir Tank
4. Access Hatchway to Ladder
5. Elevator Platform and Pit

General Arrangement of Underground Missile Magazine



1. Magazine Doors (shown in closed position)
2. Elevator Platform (shown in lowered position)
3. Elevator Pit and Hydraulic Cylinder

Simplified cross section of Underground Missile Magazine

Restored magazine, view 1

Typical Underground Missile Storage Magazine at Nike Launch Area

Restored magazine, view 2

Typical Underground Missile Storage Magazine at Nike Launch Area

Restored magazine, view 3

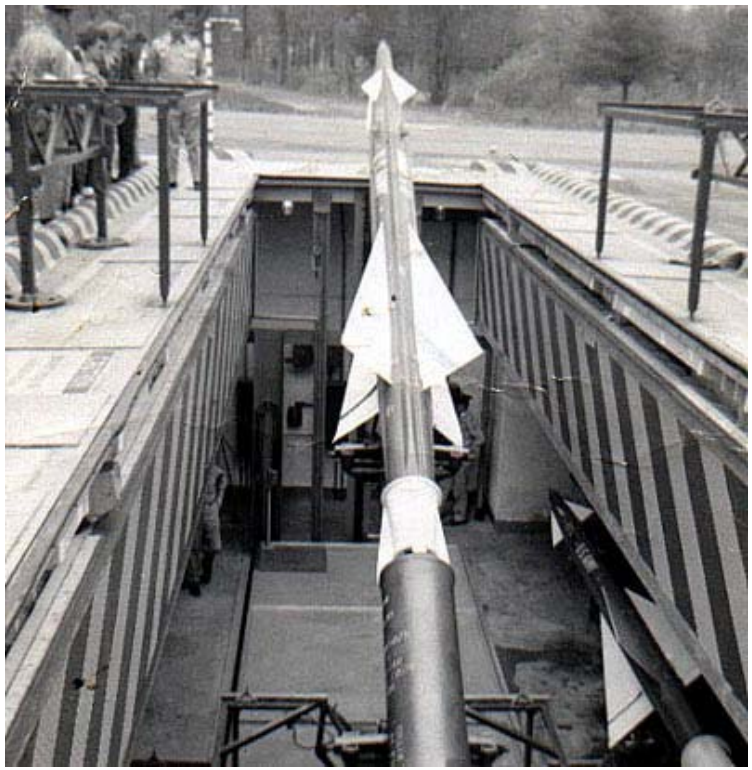
Typical Underground Missile Storage Magazine at Nike Launch Area

Restored magazine, view 4

Typical Underground Missile Storage Magazine at Nike Launch Area

Interior view with doors closed and platform down.

Typical Underground Missile Storage Magazine at Nike Launch Area



Two views of Ajax missile on elevator platform.

Typical Underground Missile Storage Magazine at Nike Launch Area

APPENDIX K

Sentry box

Sentry box interior

Pump house near site entrance

Pump chamber hatch

Missile magazine doors

Missile magazine access hatch

Open manhole

Open concrete tank with liquid for disposal

Generator building

Interior of generator building

Interior of generator building

Bottom ladder rungs

APPENDIX L

The Xerces Society for Invertebrate Conservation

NRCS Natural Resources Conservation Service

Plant Materials Program

USDA United States Department of Agriculture

Rutgers The State University of New Jersey

Conservation Cover (327) for Pollinators

New Jersey

Installation Guide and Job Sheet

Photo: Bumble bee on Virginia Spiderwort, Jolie Goldenetz Dollar, Xerces Society

September 2013

The Xerces Society for Invertebrate Conservation

www.xerces.org

Acknowledgements

This guide was written by Mace Vaughan, Eric Mader, Jessa Guisse, Jolie Goldenetz-Dollar, Brianna Borders, and Kelly Gill of the Xerces Society for Invertebrate Conservation and Rachael Winfree and Molly MacLeod of Rutgers University Department of Ecology, Evolution and Natural Resources. The authors would like to thank Hank Henry (USDA NRCS East National Technology Support Center) and Paul Salon (NRCS Big Flats Plant Materials Center). We also thank Tim Dunne, Betsy Clarke, Evan Madlinger, and Chris Miller for their review of this document and support of pollinator conservation work in New Jersey. Please contact Mace Vaughan (mace@xerces.org) to improve this publication.

Financial support to the Xerces Society for the development of this guide was provided by an NRCS Conservation Innovation Grant awarded to Rutgers University, the CS Fund, the Turner Foundation, the Disney Worldwide Conservation Fund, the Aveda Earth Fund, the Sarah K. de Coizart Article TENTH Perpetual Charitable Trust, the SeaWorld and Busch Gardens Conservation Fund, the Wildwood Foundation, and Xerces Society members.

(Photo: Mace Vaughan, Xerces Society)

The Xerces Society for Invertebrate Conservation

628 NE Broadway Suite 200, Portland, OR 97232 ◦ 866-232 6639 ◦ www.xerces.org

The Xerces Society is a nonprofit organization that protects wildlife through the conservation of invertebrates and their habitat. Established in 1971, the Society is at the forefront of invertebrate protection worldwide.

The Xerces Society is an equal opportunity employer.

Conservation Cover for Pollinators: New Jersey

Installation Guide

Purpose

These instructions provide in-depth guidance on how to install nectar and pollen habitat for bees in the form of wildflower meadow plantings. To plan a specific project, use this guide with the Practice Installation Job Sheet found at the end of this document.

Client Conservation Objectives

Depending on landowner objectives and project design, pollinator habitat may also provide food and cover for other wildlife, reduce soil erosion, protect water quality, and attract other beneficial insects such as predators and parasitoids of crop pests.

Key Site Characteristics

Site selection for pollinator habitat should take the following into consideration:

- **Pesticide Drift:** Habitat must be protected from pesticides (especially insecticides and bee-toxic fungicides and herbicides). Only sites with no to very low risk for pesticide drift should be established as new habitat. This includes some pesticides approved for use on organic farms.
- **Accessibility:** New habitat should be accessible to equipment for planting and maintenance operations.
- **Sunlight:** Most wildflowers and native shrubs grow best in full sunlight.
- **Slope:** Steep or highly erodible sites should not be disturbed. For re-vegetating such sites, consider Critical Area Planting (342) or other suitable Practice Standards.
- **Weed Pressure:** Areas with high weed pressure will take more time and effort to prepare for planting. It is also important to note the primary weed species composition. Knowing the most abundant weed species on site, their reproductive methods, and whether they are grass or broadleaf, perennial or annual, and woody or herbaceous will help significantly in planning for site preparation and follow up weed management during establishment.
- **Site History:** Factors such as past plant cover (e.g., weeds, crops, grass sod, and/or native plants), use of pre-emergent herbicides or other chemicals, and soil compaction can affect plant establishment. It is also important to know if sites may have poor drainage, or may flood, as such conditions make habitat establishment more difficult and require a plant mix adapted to the site.
- **Soils and Habitat:** Most plants listed in the Appendix of this guide are tolerant of many soil conditions and types, however all plants establish better when matched with appropriate conditions.
- **Irrigation:** To establish plants from plugs, pots, or bare root will require irrigation. Irrigation is generally not needed for plantings established from seed.
- **Other Functions:** The site may offer opportunities to serve other functions, such as run-off prevention, stream bank stabilization, wildlife habitat, or windbreaks. Those factors can influence plant choice and/or design.

Plant Selection

Native Plants: Plant species selection should be limited to plants providing pollen- and nectar-rich forage resources for bees. The inclusion of warm-season bunch grasses is appropriate at a low percentage of the mix by seed per square foot (e.g., 25% or less), but may limit options for use of grass selective herbicides if grass weeds are a primary concern. The Appendix provides example seed mixes for dry and wet sites, and a master list of acceptable plants for various locations and/or environments in New Jersey.

If you are designing a custom plant list, individual species should be chosen so that there are consistent and adequate floral resources throughout the seasons. In order to achieve this goal, a minimum of three species from each blooming period (early, mid and late season), should be included. Plant mix composition (i.e., percent of each species) can be designed to complement adjacent crop bloom time or other abundant species in the landscape, with more plants blooming immediately before and after adjacent crops.

Non-Native Plants: Plant selection should focus on pollen and nectar rich native plants, but non-invasive, non-native plants may be used when cost and/or availability are limiting factors. Please see the Appendix for acceptable non-native plants. Non-native plants such as buckwheat or clover, may be planted as part of a crop rotation or in a perennial crop understory using the Cover Crop Practice Standard (340), to increase the value of crop fields to pollinators.

Alternate Pest or Disease Hosts: In most cases, native pollinator plants do not serve as alternate hosts for crop pests

or diseases, but selected plants should be cross-referenced for specific crop pest or disease associations. Research indicates that weedy borders harbor more pests than are found in diverse native plantings.

Site Preparation

Site preparation is **one of the most important** and often inadequately addressed components of project success. It is also a process that may require more than one season of effort to reduce competition from invasive, noxious, or undesirable non-native plants prior to planting. *In particular, site preparation should focus on the removal of perennial weeds* (there are more options to address annual or biennial weeds after planting). Regardless of whether the objective is to establish herbaceous or woody vegetation, more effort and time spent eradicating undesirable plants prior to planting will result in higher success rates in establishing the targeted plant community. Site preparation methods and instructions are provided in **Table 1**.

Note: If weed pressure is high, then the weed abatement strategies detailed in **Table 1** should be repeated for an additional growing season. High weed pressure conditions are characterized by:

- Persistent year-round cover of undesirable plants (covering the entire surface of the site);
- Sites where weeds have been actively growing (and producing seed) for multiple years;
- Sites dominated by introduced sod-forming grasses and rhizomatous forbs (e.g., Canada thistle).

Previous cropped lands (those that have been cultivated for several years) are generally lower in weed pressure.

(Photos: Brianna Borders, Xerces Society)

Figure 1. The site on the left was prepared with a single glyphosate treatment, leaving a significant stubble layer and un-killed weedy grasses. It is not ready for planting. The site on the right was treated for an entire growing season with repeated glyphosate treatments (applied whenever new weeds appeared). The stubble has been removed with a flail mower and it is ready for planting. Neither site has been cultivated.

Table 1. Site Preparation Methods

METHOD: NON-SELECTIVE (NON-PERSISTENT) HERBICIDE

Where to Use

- Conventional farms and organic farms*
- Areas with a low risk of erosion
- Areas accessible to sprayer

Timing

- Total time: 6+ months
- Begin: Early spring after the first weed growth
- Plant: fall

Basic Instructions:

1. Mow existing thatch as needed before beginning herbicide treatments to expose new weed growth to the herbicide spray.
2. Apply a non-selective, non-persistent herbicide as per label as soon as weeds are actively growing in the early spring.
3. Repeat herbicide applications throughout the spring, summer, and early fall, as needed (whenever emerging weed seedlings reach 4 – 6 inches).
4. For any herbicide-resistant weeds, mow the area to prevent flowering and seed development as necessary. Spot-treat resistant weeds with a more effective herbicide, if available.
5. Plant pollinator seed mix (and any transplants) in the fall, waiting at least 72 hours after the last herbicide treatment. Refer to the Planting Methods section of this document for specific recommendations.

NOTE: Do not till. Avoid any ground disturbance that may bring up additional weed seed. An additional year of site preparation is recommended if weed pressure is particularly high. Avoid use of herbicides that are bee-toxic (e.g., Paraquat and Gramoxone).

****Choice of herbicide must be acceptable to OMRI for organic operations or, if not, used outside of certified ground AND approved by an organic certifier.***

METHOD: SOLARIZATION

Where to Use

- Organic and conventional farms
- Areas with a low risk of erosion
- Areas accessible to mowing equipment
- Locations with full sun

Timing

- Total time: 6+ months
- Begin: spring
- Plant: fall

Basic Instructions:

1. Mow, rake or lightly harrow and smooth the site in the spring (raking off debris, if necessary).
2. After smoothing the site, lay UV stabilized plastic (such as high tunnel plastic) burying the edges to prevent airflow between the plastic and the ground. Weigh down the center of the plastic if necessary to prevent the wind from lifting it. Use greenhouse repair tape for any rips that occur during the season.
3. Remove the plastic in early-fall before the weather cools and the area beneath the plastic is recolonized by nearby rhizomatous weeds.
4. Immediately plant the pollinator seed mix. Refer to Planting Methods section of this document for specific bed preparation recommendations.

NOTE: Solarization may not be as effective in years when summer sun or high temperatures are limited. Do not till. Avoid any ground disturbance that may bring up additional weed seed. An additional year of site preparation is recommended if weed pressure is particularly high.

Planting Methods

Recommended planting methods are site-specific. Pre-project site conditions, especially weed competition, may affect planting success and should be addressed prior to planting. Factors such as equipment availability, weed pressure, and cost should be taken into consideration when choosing a planting method. Installing and maintaining habitat should fit into general farm-management practices as much as possible.

Seeding Wildflowers: Planting seeds, rather than plugs, can be a less expensive way to establish wildflowers. Seeding requires **excellent** site preparation to reduce weed pressure because weed control options are limited when the wildflowers start to germinate. **Seed of most native perennial wildflowers are best planted in late fall.**

If possible, seed should be ordered in individual lots, not as a mix. Individual lots help ensure that all species are accounted for and, because size of wildflower seed varies dramatically, seed separated by species gives you the greatest flexibility in planting method. For example, native seed drills have hoppers to accommodate seed of different sizes, and even when broadcasting seed it is useful to divide the seed into batches of small and large seed.

Grain drills, unlike native seed drills, are usually not designed to handle the wide variation in wildflower seed size. However, with simple modifications most types of grass-seed planters or granulated fertilizer spreaders can be used with good results, especially if you plant small seeds at one setting (gate opening) and large seeds at another. **Table 2** outlines several possible seeding methods, including broadcast seeding, drills and the use of transplants.

Newly planted areas should be clearly marked to protect them from herbicides or other disturbances.

Table 2. Methods for Planting Wildflower Seed

METHOD: BROADCAST SEEDERS OR HAND BROADCASTING (THROWING SEED)	
Pros • Inexpensive • Easy to use • Can often accommodate poorly cleaned seed • Many models and sizes of broadcasters are commonly available, including hand-held crank and larger tractor or ATV-mounted models	**Cons** • Requires a smooth seed bed • Seed should be pressed into the soil after planting • Difficult to calibrate • Some models of broadcast seeders cannot accommodate large seeds

Basic Instructions:

Remove as much stubble as possible prior to seeding, creating a smooth, lightly-packed seedbed. The soil surface can be **lightly** hand-raked or harrowed to break-up crusted surfaces, but **do not cultivate the site (cultivation will bring up additional weed seed).**

Seeds of similar sizes can be mixed together and bulked up with an inert carrier ingredient such as sand, fine-grained vermiculite, clay-based kitty litter, gypsum, or polenta (fine cornmeal). Use two to three parts bulking agent for each part seed by volume. These inert carriers ensure even seed distribution in the mix, visual feedback on where seed has been thrown, and make calibration easier.

The broadcast seeding equipment used should have a flow gate that closes down small enough to provide a slow, steady flow of your smallest wildflower seed. Models with an internal agitator are also preferred. Planting should begin with the flow gate set to the narrowest opening, to allow at least two perpendicular passes over the seed bed for even distribution. Very large seed can be planted separately with the flow gate set to a wider opening.

For small sites (e.g. less than 1 to 2 acres), seed can also be hand broadcast (similar to scattering poultry feed). When hand broadcasting, divide the seed into at least two batches, bulk the seed mix with an inert carrier, and sow each batch separately (scatter the first batch evenly over the site while walking in perpendicular passes across the site, and then walk in passes perpendicular to the previous passes to scatter the second batch) to ensure seed is evenly distributed.

Regardless of how it is broadcast, do not cover the seed with soil after planting. A water-filled turf grass roller (available for rent at most hardware stores) or a cultipacker should be used to press the seed into the soil surface. Natural precipitation or light overhead irrigation can also help ensure good seed-soil contact. Floating row-cover can be used if necessary to protect seeds and small seedlings against predation.

Table 2. Methods for Planting Wildflower Seed (Cont.)

METHOD: DROP SEEDERS OR FERTILIZER SPREADERS (DROPPING SEED)

Pros

- Inexpensive
- Easy to use
- Even seed dispersal
- Can accommodate both large and small seed
- Many models and sizes are commonly available (hand-powered turf grass seeders are most common, but larger tractor-drawn "pasture-seeder" models also exist)

Cons

- Requires a smooth, level seed bed
- Seed should be pressed into the soil after planting
- Hand-powered models are time consuming for large areas (over ½ acre)
- Calibration requires trial and error

Basic Instructions:

Remove as much stubble as possible prior to seeding, creating a smooth, lightly-packed seedbed. The soil surface can be **lightly** hand-raked or harrowed to break-up crusted surfaces, but **do not cultivate the site (cultivation will bring up additional weed seed).**

Seed of similar sizes can be mixed together and bulked up with an inert carrier ingredient such as sand, fine-grained vermiculite, clay-based kitty litter, gypsum, or polenta (fine cornmeal). Use two to three parts bulking agent for each part seed by volume. These inert carriers ensure even seed distribution in the mix, visual feedback on where seed has been thrown, and make calibration easier. Planting should begin with the drop gate set to the narrowest opening, to allow at least two perpendicular passes over the seed bed for even distribution. Very large seed can be planted separately with the drop gate set to a wider opening.

Do not cover the seed after planting. A water-filled turf grass roller (available for rent at most hardware stores) or a cultipacker should be used to press the seed into the soil surface. Natural precipitation or light overhead irrigation can also help ensure good seed-soil contact. Floating row-cover can be used if necessary to protect seeds and small seedlings against predation.

METHOD: NATIVE SEED DRILLS (DRILLING SEED)

Pros

- Convenient for planting large areas
- Seed box agitators and depth controls are designed specifically for planting small and fluffy native seeds at optimal rate and depth
- Can plant into a light stubble layer
- Seeds are planted in even rows, allowing for easier seedling recognition
- Does not require seed to be pressed into soil surface after planting (e.g., cultipacking)

Cons

- Expensive and not readily available in some areas
- Difficult to calibrate for small areas (less than 1 acre)
- Requires a tractor and **an experienced operator** to set planting controls
- Seed with a lot of chaff can clog delivery tubes

Basic Instructions:

Plant only when the soil is dry enough to prevent sticking to the coulters. Under wet conditions, small seed is likely to stick to mud-caked parts of the drill, rather than the ground.

Keep seed separated by species until ready to plant. Prior to planting, seed should be organized into batches of large smooth seed, small smooth seed, and tufted seed that does not flow easily. Loosely fill seed boxes (do not compact seed into them) with the appropriate seed batch for each box. Seed quantities that do not cover the agitator should be planted using some other method, since the drill is difficult to calibrate for small volumes of seed.

As a general rule, the planting depth for a particular seed should be no more than 1.5x its diameter. To achieve this for most wildflower seed, set the depth controls to plant no deeper than ¼ inch (consult with the seed vendor for specific guidelines on very sandy soils). Small wildflower seed should be planted on the soil surface. Stop periodically to check planting depth.

Table 2. Methods for Planting Wildflower Seed (Cont.)

Operate the drill at less than 5 mph, stopping to check periodically for any clogging of planting tubes (usually observed as a seedbox that is remaining full). Clogging is most common with fluffy seed, or seed with a lot of chaff. Avoid backing up the drill as it will likely cause clogging.

For information on native seed drill calibration, see NRCS publication:
http://www.plant-materials.nrcs.usda.gov/pubs/mipmctn10591.pdf

METHOD: TRANSPLANTING FORBS AND WOODY PLANTS

Pros

- Provides mature nectar and pollen resources more quickly
- Does not require specialized planting equipment (except for large trees)
- Preferred for plants with limited seed availability, which are expensive or difficult to establish from seed
- Transplants can be established more easily in weedy sites with adequate mulching

Cons

- Expensive and time consuming for large areas
- Transplants typically require irrigation during establishment

Basic Instructions:

Regular shovels are adequate for transplanting most container stock. However, dibble sticks or mechanical transplanters are sometimes helpful for plug-planting. Power augers and mechanical tree spades can be helpful for larger plants.

Plant size at maturity should be considered when planting. Most woody shrubs can be spaced on 4' – 10' centers (depending upon size at maturity), with most herbaceous plants spaced closer on 2' – 3' centers. It is helpful to measure the planting areas prior to purchasing transplants, and to stage the transplants in the planting area prior to installing them in the ground.

Transplanting can occur any time the ground can be worked, but should be timed to avoid prolonged periods of hot, dry, or windy weather. Regardless of when planting occurs however, the transplants should be irrigated thoroughly immediately after planting. Holes for plants can be dug and pre-irrigated prior to planting as well. Follow-up irrigation is dependent upon weather and specific site conditions, but generally even native and drought tolerant plants should be irrigated with at least 1" of water per week (except during natural rain events), for the first two years after establishment. Long, deep watering is best to encourage deep root system development and shallow irrigation should be avoided. Drip irrigation is useful, and other methods that allow for deep watering can be successful. It is advisable to irrigate at the base of plants and avoid overhead irrigation that would encourage weed growth. Once plants are established, irrigation should be removed or greatly decreased. Non-native plants may require more frequent irrigation, and may still require supplemental irrigation once established.

Most of the plants in the Appendix are adapted to a variety of soil conditions and do not need any specific amendments. However, in areas where the soil is compacted, degraded, or depleted, compost should be used during planting. Compost should be free from weed seeds, aged properly, and mixed thoroughly with soil in the holes during planting.

In cases where rodent damage may occur, below ground wire cages are recommended. Similarly, plant guards may be needed to protect plants from above ground browsing or antler damage by deer. **Newly planted areas should be clearly marked to protect them from herbicides or other disturbances.**

Mulching is recommended to reduce weed competition and to retain moisture during the establishment phase. Recommended materials include wood chips, bark dust, weed-free straw (e.g., rice straw), nut shells, grape-seed pumice, or other regionally appropriate mulch materials that contain **no** viable seeds.

Planting Method Photos

(Photos: Brianna Borders, Xerces Society)

Figure 2. For broadcast seeding, seed of **similar size** is mixed together (left). Sand or another inert carrier is added (at a ratio of at least 2:1) and then mixed (middle left), and the mix is divided into separate batches (middle right) for broadcasting in perpendicular passes over the planting site. When hand-broadcasting seed, walk in perpendicular passes over the entire planting area (right).

(Photos: Brianna Borders, Xerces Society) *(Photo: Regina Hirsch, University of Wisconsin)*

Figure 3. Native wildflower seed should be planted directly on the soil surface (left). After broadcasting, roll the site with a cultipacker (middle) or turf roller (right).

(Photos: New Hampshire NRCS)

Figure 4. Hand-crank "belly grinder" type seeders (left) are low cost and can broadcast seed more evenly than hand-scattering on larger sites. Similarly, lawn fertilizer spreaders (right) are another commonly available tool for broadcasting seed. In both cases, models with internal agitators are preferred to prevent clogging. For best results divide the seed into separate batches, grouping seed of similar sizes for planting together with the flow gate adjusted accordingly. It can be difficult to plant very large and very small seed together in a single seed mix using mechanical broadcasters. Use an inert carrier (such as sand) and walk in at least two perpendicular paths to ensure the most even seed distribution possible.

Planting Method Photos

(Photo: Eric Mader, Xerces Society)

Figure 5. Native seed drills are the ideal tool for large planting sites (5+ acres). Typical models can plant in a light stubble layer, have depth controls for optimal seed placement, and have separate seed boxes for different sizes of seed. **Such drills need an experienced operator and careful calibration.**

Maintenance During Establishment (Short-Term)

Weed control is critical in the first and second years after planting. If the site is well prepared, then less effort will be required for weeding after project installation. Maintenance practices must be adequate to control noxious and invasive species and may involve tools such as mowing, burning, hand hoeing, or spot spraying with herbicides.

Weeds should be prevented from going to seed in, or adjacent to, the project area during the first two years (and possibly three) after planting to help ensure long-term success. Familiarity with the life cycle of weeds will facilitate appropriate timing of management activities. Since young wildflower and weed seedlings may look alike, care should be taken to properly identify weeds before removal.

Common weed-management strategies include:

Mowing / String Trimming: Mowing or string trimming can be utilized to keep weedy species from shading out other plants, and to prevent them from going to seed. Mowing is especially useful when establishing wildflower plots of perennial species. When planted with perennial seed mixes, sites can be mowed **occasionally (ideally at 8 inches or higher)** during the first year after planting to prevent annual and biennial weeds from flowering and producing seed. Perennial wildflowers are slow to establish from seed, and are usually not harmed by incidental mowing in the first year after planting. Mowing can also be used on plots of reseeding annuals at the end of the growing season to help shatter wildflower seedpods, and to reduce woody plant encroachment. Mowing and string trimming can also be useful around woody transplants to manage nearby weeds.

Spot Spraying: Spot spraying with herbicides can be effective, relatively inexpensive, and require minimal labor, even on larger project areas. Ensure that herbicides do not drift or drip onto desirable plant species. Spot spraying is usually performed with backpack spraying, or occasionally with rope-wick implements (when weed growth is substantially taller than newly established wildflowers).

Selective Herbicides: Grass-selective herbicides can be used to control weedy grasses in broadleaf plantings. Contact a local crop advisor or Extension specialist for appropriate herbicide selection and timing.

Managing Irrigation: Most wildflowers established from seed thrive with little or no supplemental irrigation. Keeping irrigation to a minimum helps native wildflowers out-compete non-native weedy species that sometimes have higher soil moisture requirements. Similarly, when irrigation is needed for transplants, it should be supplied at the base of the transplant when possible (through drip irrigation, for example) to avoid watering nearby weeds.

Hand Weeding: Hand-weeding (including hoeing) can be effective in small areas with moderate weed pressure. Hand-weeding will likely be necessary in forb plots to eliminate broadleaf weeds during the first few seasons.

(Photos: Eric Mader, Xerces Society)

Figure 6. *Short Term***:** In the first spring after seeding the previous fall, this planting site is dominated by annual and biennial weeds like wild radish (left). Mowing the site periodically during the first year (ideally at 8 inches or higher) will prevent these short-lived weeds from producing more seed, and allow sunlight to reach the slower-growing natives (right), which are generally unharmed by the occasional mowing.

(Photo: Don Keirstead, New Hampshire NRCS)

Figure 7. *Long Term:* Flourishing wildflowers and pollinator habitat in year 2 after planting.

Operations and Maintenance (Long-Term)

Control herbivores as needed, but remove tree guards or other materials that could impede plant growth as soon as possible after establishment. In most cases, irrigation can be removed from transplants by the end of the second year after planting. Continue to protect habitat from pesticides and herbicides except when necessary to control noxious or invasive plants. On-going herbicide use (spot-treatment) or occasional hand weeding may be necessary to control noxious weeds. Maintain the long-term plant diversity of pollinator habitat by re-seeding or re-planting as necessary.

Wildflower plantings generally need to be managed over time to maintain open, early successional characteristics. The actual management will depend on the size and location of the habitat. Possible management tools/techniques include mowing or burning. If mowing is used, be sure all equipment is clean and free of weed seed. Do not mow or burn during critical wildlife nesting seasons (consult your state wildlife biologist for specific guidance). After establishment, no more than 30% of the habitat area should be mowed or burned in any one year to ensure sufficient undisturbed refuge areas for pollinators and other wildlife.

Finally, note that some common farm-management practices can cause harm to bees and other beneficial insects. Insecticides are especially problematic, including some insecticides approved for organic farms. Therefore, if insecticide spraying is to occur on the farm, it is critical that the Conservation Cover planting area is outside of the sprayed area and/or protected from application and drift.

Figure 8. Newly planted areas should be clearly marked to protect them from herbicides or other disturbances. Using signs such as the one on the above can be a useful tool to designate protected pollinator habitat.

Appendix: Example Seed Mixes, Plant Lists, and Resources

The following example seed mixes are formulated for a 1-acre planting area. For larger areas, increase the rate accordingly. To create custom seed mixes, see recommended species master list on page 14 and the references section for a downloadable seed mix calculator. The following factors were considered when compiling these seed mixes: 1) benefits to pollinators, 2) price, and 3) commercial availability. Therefore, some plants which greatly benefit pollinators are listed in low amounts (due to high price for seed) or are not listed at all (due to lack of availability). Please see pages 14-16 for a complete list of plants which benefit pollinators.

Table 3. New Jersey Wetland Seed Mix

COMMON NAME	SCIENTIFIC NAME	% OF MIX	SEEDS / FT^2	LBS / ACRE	PRICE* / LB	TOTAL* PRICE	BLOOM TIME
Blackeyed Susan**	*Rudbeckia hirta*	1.0%	0.60	0.02	$24.00	$0.40	Early Bloom
Golden Alexanders	*Zizia aurea*	1.0%	0.60	0.15	$180.00	$27.35	Early Bloom
Tall White Beardtongue	*Penstemon digitalis*	2.5%	1.50	0.16	$108.00	$17.64	Early Bloom
Common Boneset	*Eupatorium perfoliatum*	10.0%	6.00	0.09	$220.00	$19.97	Mid Bloom
Common Milkweed**	*Asclepias syriaca*	0.5%	0.30	0.19	$180.00	$33.60	Mid Bloom
Culver's Root	*Veronicastrum virginicum*	10.0%	6.00	0.03	$640.00	$21.55	Mid Bloom
Dense Blazing Star	*Liatris spicata*	1.0%	0.60	0.26	$180.00	$47.04	Mid Bloom
Great Blue Lobelia**	*Lobelia siphilitica*	10.0%	6.00	0.03	$280.00	$9.43	Mid Bloom
Spotted Joe Pye Weed**	*Eupatorium maculatum*	4.0%	2.40	0.07	$240.00	$17.42	Mid Bloom
Narrowleaf Mountain Mint**	*Pycnanthemum tenuifolium*	12.0%	7.20	0.05	$200.00	$10.45	Mid Bloom
Swamp Milkweed**	*Asclepias incarnata*	1.0%	0.60	0.37	$280.00	$104.54	Mid Bloom
Wild Bergamot	*Monarda fistulosa*	10.0%	6.00	0.21	$240.00	$49.29	Mid Bloom
Blue Vervain**	*Verbena hastata*	10.0%	6.00	0.18	$60.00	$10.54	Late Bloom
Common Sneezeweed	*Helenium autumnale*	7.0%	4.20	0.12	$160.00	$19.99	Late Bloom
New England Aster**	*Symphyotrichum novae-angliae*	4.0%	2.40	0.10	$280.00	$26.61	Late Bloom
New York Ironweed	*Verona noveboracensis*	1.0%	0.60	0.09	$220.00	$19.17	Late Bloom
Wingstem	*Verbesina alternifolia*	2.0%	1.20	0.29	$180.00	$52.27	Late Bloom
Wrinkleleaf Goldenrod	*Solidago rugosa*	3.0%	1.80	0.18	$320.00	$25.09	Late Bloom
Fox Sedge	*Carex vulpinoidea*	5.0%	3.00	0.10	$18.00	$1.81	
Canada Bluejoint	*Calamagrostis canadensis*	5.0%	3.00	0.03	$232.00	$7.90	-
TOTALS	**TOTALS**	**100%**	**60**	**2.81**		**$522.06**	

* Costs may vary by season and seed producer

** Species recommended by The Winfree Lab of Rutgers University (http://winfreelab.rutgers.edu)

Table 4. Coastal Plain Upland Seed Mix

COMMON NAME	SCIENTIFIC NAME	% OF MIX	SEEDS / FT^2	LBS / ACRE	PRICE / LB*	TOTAL PRICE*	BLOOM TIME
Blackeyed Susan**	*Rudbeckia hirta*	2.0%	1.20	0.03	$24.00	$0.80	Early Bloom
Hairy Beardtongue**	*Penstemon hirsutus*	6.0%	3.60	0.08	$210.00	$16.47	Early Bloom
Yellow Wild Indigo	*Baptisia tinctoria*	0.5%	0.30	0.16	$440.00	$71.87	Early Bloom
Butterfly Milkweed**	*Asclepias tuberosa*	0.5%	0.30	0.19	$320.00	$59.74	Mid Bloom
Common Milkweed	*Asclepias syriaca*	0.5%	0.30	0.19	$180.00	$33.60	Mid Bloom
Culver's Root	*Veronicastrum virginicum*	5.0%	3.00	0.02	$640.00	$10.78	Mid Bloom
Dotted Mint	*Monarda punctata*	12.0%	7.20	0.21	$180.00	$38.35	Mid Bloom
Lavender Hyssop	*Agastache foeniculum*	8.0%	4.80	0.14	$172.00	$23.38	Mid Bloom
Partridge Pea	*Chamaecrista fasciculata*	10.0%	6.00	4.02	$10.00	$40.21	Mid Bloom
Rattlesnake Master	*Eryngium yuccifolium*	0.5%	0.30	0.11	$180.00	$18.97	Mid Bloom
Virginia Mountain Mint	*Pycnanthemum virginianum*	10.0%	6.00	0.07	$480.00	$32.40	Mid Bloom
Wild Bergamot	*Monarda fistulosa*	10.0%	6.00	0.21	$240.00	$49.29	Mid Bloom

Table 4. Coastal Plain Upland Seed Mix (Cont.)

COMMON NAME	SCIENTIFIC NAME	% OF MIX	SEEDS / FT^2	LBS / ACRE	PRICE / LB*	TOTAL PRICE*	BLOOM TIME
Maximilian's Sunflower	*Helianthus maximiliani*	8.0%	4.80	0.97	$36.00	$34.80	Mid Bloom
New England Aster**	*Symphyotrichum novae-angliae*	8.0%	4.80	0.19	$280.00	$53.22	Late Bloom
Seaside Goldenrod	*Solidago sempervirens*	4.0%	2.40	0.15	n/a˜	n/a˜	Late Bloom
Showy Goldenrod	*Solidago speciosa*	5.0%	3.00	0.10	$160.00	$15.60	Late Bloom
Little Bluestem	*Schizachyrium scoparium*	10.0%	6.00	1.31	$25.00	$32.67	-
TOTALS		**100%**	**60**	**8.13**		**$532.21**	

˜ n/a (This information not available at time of this writing. Cape May NRCS PMC release of Seaside Goldenrod is in production at Ernst Conservation Seed.)

Table 5. Piedmont / Northern Region Upland Seed Mix

COMMON NAME	SCIENTIFIC NAME	% OF MIX	SEEDS / FT^2	LBS / ACRE	PRICE / LB	TOTAL PRICE	BLOOM TIME
Lance Leaved Coreopsis	*Coreopsis lanceolata*	15.0%	9.00	1.77	$14.00	$24.84	Early Bloom
Ohio Spiderwort	*Tradescantia ohiensis*	1.0%	0.60	0.02	$160.00	$32.67	Early Bloom
Common Milkweed	*Asclepias syriaca*	1.0%	0.60	0.37	$180.0.0	$67.21	Mid Bloom
Culver's Root	*Veronicastrum virginicum*	10.0%	6.00	0.03	$640.00	$21.55	Mid Bloom
Giant Sunflower	*Helianthus giganteus*	1.0%	0.60	0.16	$300.00	$46.67	Mid Bloom
Joe Pye Weed	*Eupatorium purpureum*	4.0%	2.40	0.16	$240.00	$37.34	Mid Bloom
Lavender Hyssop	*Agastache foeniculum*	8.0%	4.80	0.14	$172.00	$23.38	Mid Bloom
Partridge Pea	*Chamaecrista fasciculata*	10.0%	6.00	4.02	$10.00	$40.21	Mid Bloom
Purple Coneflower	*Echinacea purpurea*	4.0%	2.40	0.90	$28.00	$25.23	Mid Bloom
Virginia Mountain Mint	*Pycnanthemum virginianum*	10.0%	6.00	0.07	$480.00	$32.40	Mid Bloom
Wild Bergamot	*Monarda fistulosa*	9.0%	5.40	0.18	$240.00	$44.36	Mid Bloom
New England Aster**	*Symphyotrichum novae-angliae*	5.0%	3.00	0.12	$280.00	$33.26	Late Bloom
New York Ironweed	*Vernonia noveboracensis*	2.0%	1.20	0.71	$220.00	$38.33	Late Bloom
Showy Goldenrod	*Solidago speciosa*	10.0%	6.00	0.20	$160.00	$31.21	Late Bloom
Little Bluestem	*Schizachyrium scoparium*	10.0%	6.00	1.31	$25.00	$32.67	-
TOTALS		**100%**	**60**	**9.80**		**$531.34**	

Master Plant Lists

Recommended Native Wildflowers for Pollinators

COMMON NAME	SCIENTIFIC NAME	LIFE † CYCLE	MATURE HEIGHT	WATER NEEDS	BLOOM COLOR	NOTES
Early Season Blooming Species						
Golden Alexanders	*Zizia aurea*	P	3 ft	High	Yellow	Adapted to disturbance; spreads by rhizomes
Yellow Wild Indigo	*Baptisia tinctoria*	P	5 ft	Medium	Yellow	
Wild Lupine	*Lupinus perennis*	P	2 ft	Low	Blue to Pink	Prefers sandy soil; host for Karner blue butterfly
Early to Mid Season Blooming Species						
Ohio Spiderwort	*Tradescantia ohiensis*	P	4 ft	Medium	Purple to Blue	
Golden Tickseed	*Coreopsis tinctoria*	P	3 ft	High	Yellow	
Smooth Penstemon	*Penstemon digitalis*	P	2 ft	Medium	Purple to Pink	Establishes quickly
Virginia Spiderwort	*Tradescantia virginiana*	P	2 ft	Medium	Purple to Blue	
Hairy Beardtongue**	*Penstemon hirsutus*	P	2 ft	Low	Pink to White	

† Life Cycle abbreviations: P = perennial, A = annual, B = biennial

Recommended Native Wildflowers for Pollinators (Cont.)

COMMON NAME	SCIENTIFIC NAME	LIFE † CYCLE	MATURE HEIGHT	WATER NEEDS	BLOOM COLOR	NOTES
Mid Season Blooming Species						
Blue Lobelia**	*Lobelia siphilitica*	P	3 ft	High	Purple to Blue	Prefers part shade and fertile soil
Butterfly Milkweed**	*Asclepias tuberosa*	P	3 ft	Low	Red	Prefers sandy soil; host plant for monarch butterfly
Common Milkweed	*Asclepias syriaca*	P	6 ft	Medium	Pink	Host plant for monarch butterfly
Culver's Root	*Veronicastrum virginicum*	P	6 ft	High	Purple to White	
Dotted Mint	*Monarda punctata*	P	3 ft	Medium	Yellow & Purple spots	Prefers sandy soil; establishes quickly
Lavender Hyssop	*Agastache foeniculum*	P	5 ft	Medium	Purple to Pink	Establishes quickly
Blackeyed Susan**	*Rudbeckia hirta*	P	3 ft	Medium	Yellow	
Joe Pye Weed	*Eupatorium purpureum*	P	6 ft	High	Pink	Prefers part shade and fertile soil
Marsh Blazingstar	*Liatris spicata*	P	5 ft	Medium	Purple	
Narrowleaf Mountainmint**	*Pycnanthemum tenuifolium*	P	3 ft	Medium	White	
Partridge Pea	*Chamaecrista fasciculata*	A	2 ft	Low	Yellow	Favors disturbed sites
Purple Coneflower	*Echinacea purpurea*	P	3 ft	Medium	Purple to Pink	Establishes quickly
Rattlesnake Master	*Eryngium yuccifolium*	P	6 ft	Low	White to Green	
Smooth Oxeye	*Heliopsis helianthoides*	P	5 ft	Low	Yellow	
Swamp Milkweed**	*Asclepias incarnata*	P	5 ft	High	Pink	Host plant for monarch butterfly
Virginia Mountain Mint	*Pycnanthemum virginianum*	P	3 ft	Medium	White	
Wild Bergamot	*Monarda fistulosa*	P	4 ft	Medium	Purple to Pink	Establishes quickly
Mid to Late Season Blooming Species						
Boneset	*Eupatorium perfoliatum*	P	5 ft	High	White	Prefers fertile soil
Bottle Gentian	*Gentiana andrewsii*	P	2 ft	Medium	Purple to Blue	Not drought tolerant; difficult to establish from seed, establish from transplants
Giant Sunflower	*Helianthus giganteus*	P	10 ft	Medium	Yellow	
Purple Giant Hyssop	*Agastache scrophulariifolia*	P	5 ft	Low	Pink to Purple	
Field Thistle	*Cirsium discolor*	P	6 ft	Medium	Pink	Short-lived; not aggressive
Mistflower	*Conoclinium coelostinum*	P	2 ft	Medium	Light purple	
Spotted Joe Pye Weed**	*Eupatorium maculatum*	P	7 ft	High	Pink to Purple	
Yarrow	*Achillea millefolium*	P	2 ft	Low	White	Very aggressive
Late Season Blooming Species						
Blue Vervain**	*Verbena hastata*	P	5 ft	High	Purple to Blue	
Calico Aster	*Symphyotrichum lateriflorum*	P	4 ft	Medium	White	Prefers part-shade
Common sunflower	*Helianthus annus*	A	9 ft	Medium	Yellow	
Cutleaf Coneflower**	*Rudbeckia laciniata*	P	8 ft	Low	Yellow	
Gray Goldenrod	*Solidago nemoralis*	P	2 ft	Medium	Yellow	
New England Aster**	*Symphyotrichum novae-angliae*	P	4 ft	Medium	Purple	
Showy Goldenrod	*Solidago speciosa*	P	4 ft	Medium	Yellow	
Sneezeweed	*Helenium autumnale*	P	3 ft	High	Yellow	Prefers fertile soil; toxic to livestock
Stiff Goldenrod**	*Oligoneuron rigidum*	P	5 ft	Medium	Yellow	

Native Grasses and Sedges for Pollinator Seed Mixes

Note: Grasses and sedges should ideally comprise no more than 25% of seed mixes on pollinator sites.

COMMON NAME	SCIENTIFIC NAME	LIFE † CYCLE	MATURE HEIGHT	WATER NEEDS	NOTES
Big Bluestem	*Andropogon gerardii*	P	8 ft	Medium	Can be aggressive at high seeding rates
Fox Sedge	*Carex vulpinoidea*	P	3 ft	High	Tolerates occasional flooding
Indian Grass	*Sorghastrum nutans*	P	7 ft	Medium	Can be aggressive at high seeding rates
Little Bluestem	*Schizachyrium scoparium*	P	3 ft	Low	Considered a weed in cranberry bogs
Pennsylvania Sedge	*Carex pensyvanica*	P	1.5 ft	Medium	Prefers part shade
Tussock Sedge	*Carex stricta*	P	4 ft	High	Tolerates occasional flooding

Non-Native Plants for Insectary Meadows and Cover Crops

COMMON NAME	SCIENTIFIC NAME	LIFE † CYCLE	MATURE HEIGHT	WATER NEEDS	NOTES
Early Season Blooming Species					
Alsike Clover	*Trifolium hybridum*	A	2 ft	High	
Crimson Clover	*Trifolium incarnatam*	A	1.5 ft	Medium	Not freeze tolerant, spring seeded in cold climates
Hairy Vetch	*Vicia villosa*	A	1.5 ft	Medium	Fall seeded, aggressive at high seeding rates
Lacy Phacelia	*Phacelia tanacetifolia*	A	2 ft	Low	Not freeze tolerant, spring seeded in cold climates
Early to Mid Season Blooming Species					
Blue Flax	*Linum perenne*	P	2 ft	Medium	Blue Flax
Lanceleaf Coreopsis	*Coreopsis lanceolata*	P	2 ft	Medium	
Red Clover	*Trifolium repens*	P	1 ft	Medium	Aggressive at high seeding rates

Non-Native Plants for Insectary Meadows and Cover Crops

COMMON NAME	SCIENTIFIC NAME	LIFE CYCLE	MATURE HEIGHT	WATER NEEDS	NOTES
Mid Season Blooming Species					
Alfalfa	*Medicago sativa*	P	2 ft	Medium	Susceptible to frost heaving
Blanketflower	*Gaillardia aristata*	P	2 ft	Low	
Borage	*Borage officinalis*	A	1.5 ft	Medium	Not freeze tolerant, spring seeded in cold climates
Buckwheat	*Fagopyrum esculentum*	A	2 ft	Medium	
Yellow Sweet Clover	*Melilotus officinalis*	B	5 ft	Medium	
Mid Season Blooming Species					
Cosmos	*Cosmos bipinnatus*	A	5 ft	Medium	

Regional Native Seed Vendors and Native Plant Nurseries

Inclusion on this list does not constitute an endorsement or a recommendation. Other vendors not listed below may also have suitable plant materials. Before ordering, ensure that all plants or seeds purchased for pollinator habitat are **NOT** treated with systemic insecticides.

Ernst Conservation Seed (Seed and Transplants) ● Meadville, PA ● 800-873-3321 ● www.ernstseed.com

Cicconi Perennial Farm (Transplants Only) ● Jackson, NJ ● 732-363-1420 ● http://www.cicconifarms.com/

New Moon Nursery (Transplants Only) ● Bridgeton, NJ ● 888-998-1951 ● http://www.newmoonnursery.com/

North Creek Nurseries (Transplants Only) ●Landenberg, PA ● 610-225-0100 ● http://www.northcreeknurseries.com/

Pinelands Nursery (Transplants Only) ● Columbus, NJ ● 609-291-9486 ● http://www.pinelandsnursery.com/

Rare Find Nursery (Transplants Only) ● Jackson, NJ ● 732-833-0613 ● http://www.rarefindnursery.com/

Redbud Native Plant Nursery (Transplants Only) ● Glen Mills, PA ● 610-358-4300 ● http://www.redbudnativeplantnursery.com/

Toadshade Wildflower Farm (Seeds and Transplants) ● Frenchtown, NJ ● 908-996-7500 ● http://www.toadshade.com/

Resources

New Jersey NRCS Pollinator Conservation Web Portal
You can find more information on the pollinator conservation work of New Jersery NRCS at http://www.nj.nrcs.usda.gov/programs/whip/Pollinators.html.

Xerces Society Seed Mix Calculator
Develop your own pollinator conservation seed mix using this seed rate calculator. http://www.xerces.org/wp-content/uploads/2009/11/XERCES-SEED-MIX-CALCULATOR.xls

USDA-NRCS Seedling ID Guide for Native Prairie Plants
Many of the plant species recommended in this guide are featured in a series of seedling photos in this downloadable resource. http://www.plant-materials.nrcs.usda.gov/pubs/mopmcpu6313.pdf

Bonestroo Prairie Seedling and Seeding Evaluation Guide
Many of the plant species recommended in this guide are featured in a series of seedling photos in this downloadable resource from the Midwest. The publication also includes guidelines for assessing establishment success of seeded native grass and wildflower plots.

Weeds of the Northeast
This PLANTS database collection highlights key weeds of the Northeast with species-level PLANTS profiles. Inclusion on the list is based upon references in multiple weed science publications. www.plants.usda.gov/java/invasiveOne?pubID=NEAST

Directory for Invasive Weeds of the Northeast
This database, compiled by the Penn State Department of Crops and Soil Sciences features links to multi-agency fact sheets and management guidelines for major region weed species. http://extension.psu.edu/weeds/extension-info/invasive-plants#misc-dicots

Soil Solarization: A Nonpesticidal Method for Controlling Diseases, Nematodes, and Weeds
This fact sheet, produced by the University of California Cooperative Extension discusses the solarization process, including plastic selection, installation, removal, and underlying principles. http://vric.ucdavis.edu/pdf/soil_solarization.pdf

Seed Quality, Seed Technology, and Drill Calibration
This Washington NRCS Plant Materials Technical Note (no. 7. 2005) features extensive information on calibrating native seed drills, and the use of inert carriers. www.plant-materials.**nrcs**.usda.gov/pubs/wapmctn6331.pdf

Attracting Native Pollinators: Protecting North America's Bees and Butterflies
This comprehensive book on pollinator conservation includes information about pollinator ecology, guides for identifying common bees, and habitat designs for multiple landscapes. www.xerces.org/announcing-the-publication-of-attracting-native-pollinators/

Pollinator Conservation Resource Center
For additional information on pollinator plant lists, conservation guides, pesticide protection and more. www.xerces.org/pollinator-resource-center

Aerial Sketch of Farm Conservation Plan:

Notes:

Notes:

Conservation Cover (327) for Pollinators: New Jersey

Practice Installation Job Sheet

Client:	**Farm #:**	**Date:**
Field(s):	**Tract #:**	**Planned By:**
Client Conservation Objectives:		

Purpose

This Practice Installation Job Sheet documents the process of establishing nectar and pollen habitat for bees in the form of wildflower meadow plantings. Other natural resources may also benefit, depending on your conservation objectives and the integration of this habitat with other conservation practices. Installation shall be in accordance with these requirements and any attached drawings. **No changes are to be made without prior approval from the technical specialist who approved the installation plan.**

For detailed instructions on each step in this Job Sheet, please see the *Conservation Cover (327) for Pollinators Installation Guide: New Jersey.*

Key Site Characteristics

Risk of pesticide drift on site? ☐ Low to high ☐ Very low to none

Weeds: weed pressure, and primary weed species of concern:

Site history: historic and current plant cover, past use of land, pre-emergent herbicide use, compaction, etc.:

Soils and habitat: soil texture (coarse to fine), drainage, and moisture level:

Irrigation: availability and method (necessary if transplants are to be used):

Other concerns or conservation goals that may affect plant choice or site preparation and planting:

Plant Selection: Wildflower Seed Mix

See the Appendix in the Installation Guide

☐ Coastal Plain Seed Mix ☐ Piedmont Seed Mix ☐ Wetland Seed Mix ☐ Custom Seed Mix

Note any species substitutions here or attach copy of custom seed mix:

Transplants may be preferred when seed is not available, weed pressure is high, or a particular species is difficult to establish by seed. Transplanting can be most cost-effective when using plug plants. Conservation Cover can also include woody plants. See *Hedgerow Planting for Pollinators Installation Guide and Job Sheet: New Jersey* for suggested woody plants.

Note any woody or herbaceous species established from transplants here:

Site Preparation Method

Choose all options that apply and note any adjustments.

☐ Herbicide ☐ Solarization ☐ Severe weed pressure?*

* If so, an additional year of site prep or the use of transplants should be considered. See the *Installation Guide*.

Adjustments:

Planting Method

Choose all options that apply and note any adjustments.

☐ Broadcasting: by machine or hand

☐ Drop seeding

☐ Native seed drill

☐ Transplants

Adjustments:

Maintenance During Establishment

Choose all options that apply and note any adjustments.

☐ Mowing / string-trimming

☐ Spot spraying weeds with herbicide

☐ Grass Specific or other selective herbicide

☐ Managing irrigation

☐ Hand weeding and/or hoeing

☐ Other:_____

Adjustments:

Long Term Site Operations and Maintenance

Control herbivores as needed, but remove plant guards or other materials that could impede plant growth as soon as possible after establishment. In most cases, irrigation of transplants is no longer required by the end of the second growing season after planting. Maintain the long-term plant diversity of pollinator habitat by re-seeding or re-planting as necessary.

Finally, after establishment, no more than 30% of the habitat area should be mowed, grazed or burned in any one year to ensure sufficient undisturbed areas for pollinators and other wildlife. Do not mow or burn during critical wildlife nesting seasons (consult your state wildlife biologist for specific guidance). Continue to protect habitat from pesticide applications and drift (especially insecticides and bee-toxic fungicides). Herbicide spot-treatments and hand weeding may be used to control noxious or invasive plants.

Practice Checkout

Amount completed: _____units. Mark as-built location on plan map and attach photos.

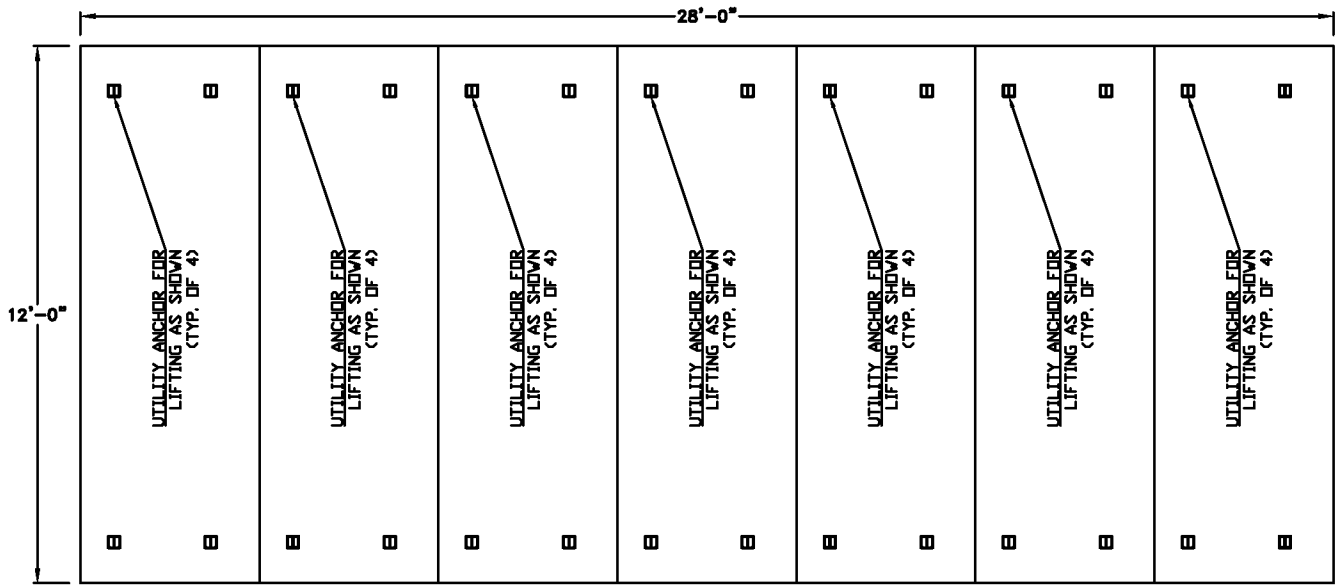
Remarks_____

This practice meets NRCS standards and specifications □ Yes □ No

Check out completed by: _____ Date: _____

Certified by:_____ Date:_____

APPENDIX M



NOTES:

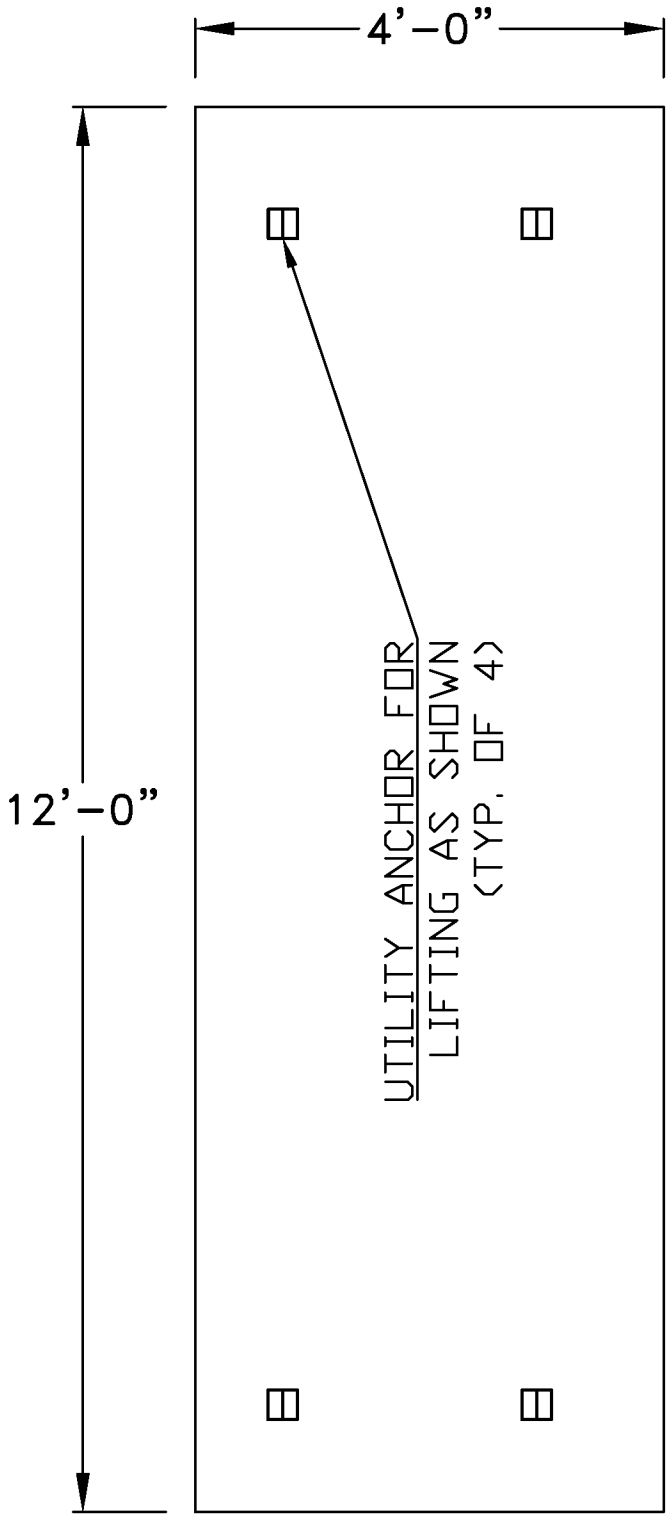
1. CONCRETE TO TEST MIN. 5000 PSI @ 28 DAYS.
2. REINFORCING GRADE 60, #5 BARS @ 6" O.C./E.W.
3. MAXIMUM PICK UP WEIGHT =3,600 LBS

Precast Concrete Sales Co.
123 Route 303 Valley Cottage , N.Y. 10989
Tel. (845) 268-4949 – Fax (845) 268-4376

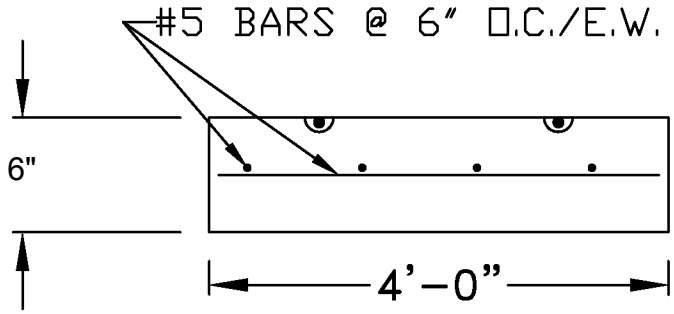
CONTR:	TANTARA CORPORATION
JOB:	USACE HART ISLAND– CITY ISLAND, NY

PRECAST CONCRETE PAD 12'-0" X 4'-0" X 6"

Struc. #	Job #		Dwg #
			100-02
Date:	Drwn By:	Salesman:	Rev #
05/27/2015	C.L.	B.V.	



PLAN



ELEVATION

NOTES:

1. CONCRETE TO TEST MIN. 5000 PSI @ 28 DAYS.
2. REINFORCING GRADE 60, #5 BARS @ 6" O.C./E.W.
3. MAXIMUM PICK UP WEIGHT = 3,600 LBS

Precast Concrete Sales Co.
123 Route 303 Valley Cottage , N.Y. 10989
Tel. (845) 268-4949 – Fax (845) 268-4376

CONTR:	TANTARA CORPORATION
JOB:	USACE HART ISLAND– CITY ISLAND, NY

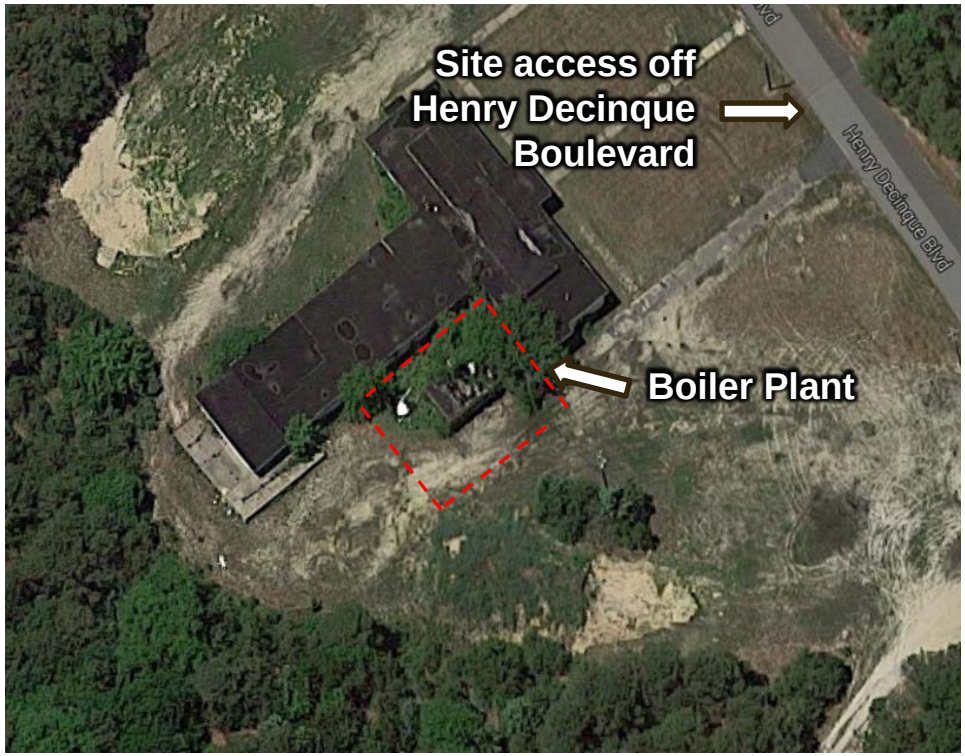
PRECAST CONCRETE PAD 12'-0" X 4'-0" X 6"

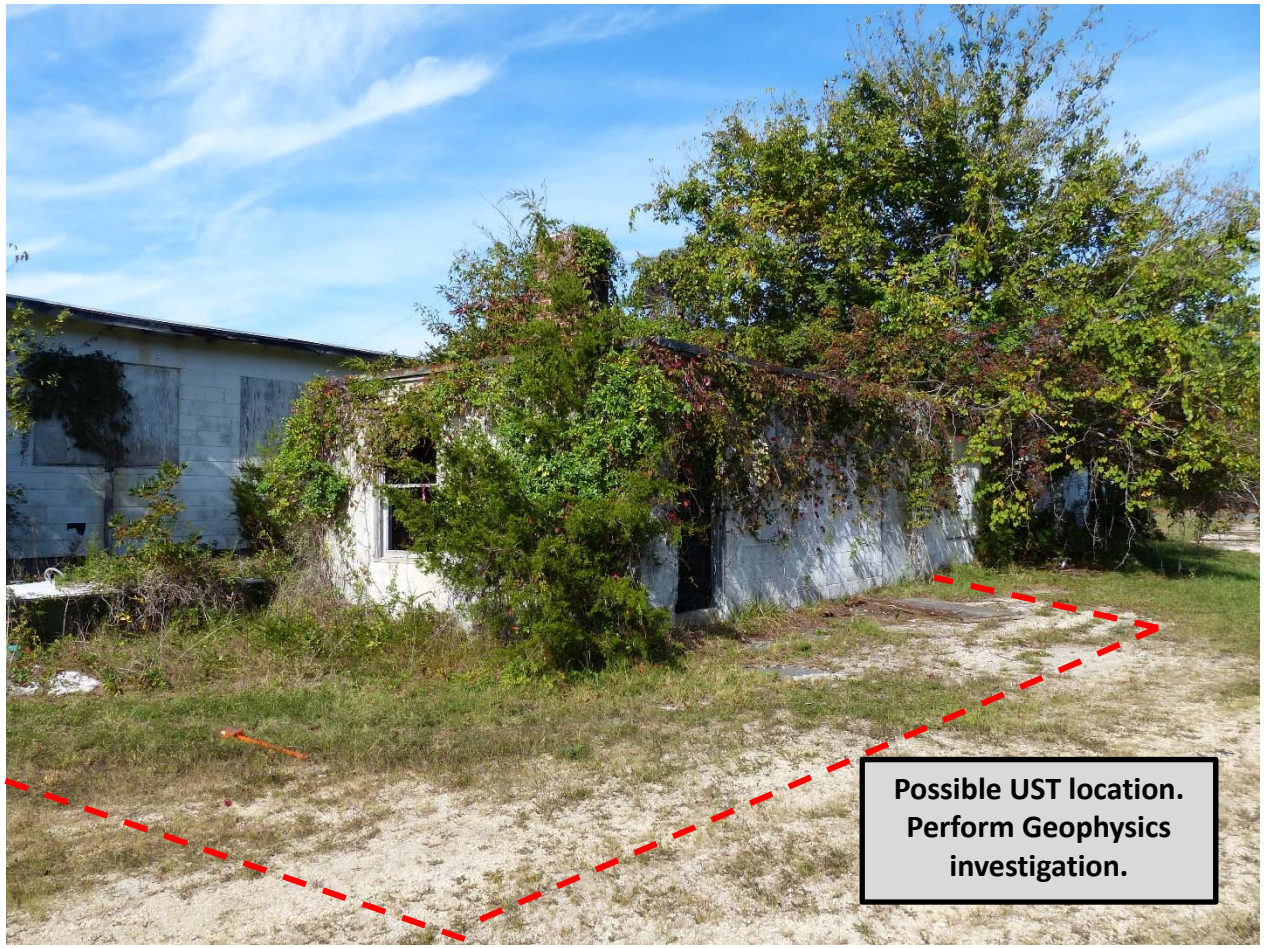
Struc. #	Job #		Dwg #
			100-01
Date:	Drwn By:	Salesman:	Rev #
05/27/2015	C.L.	B.V.	

APPENDIX N

US Army Corps
of Engineers

WOODBINE MUNICIPAL AIRPORT
WOODBINE, NEW JERSEY
FORMERLY USED DEFENSE SITES (FUDS) PROGRAM
ATTACHMENT 7 - LOCATION & PHOTOGRAPHS OF PROJECT SITE





View of Geophysics Investigation Area adjacent to Boiler Plant

View of Barracks that the Boiler Plant served.

APPENDIX O

Atlantic County Utilities Authority

(/home)

CONTAMINATED SOIL

Contaminated soil is Waste Type Identification Number 27 and by definition is a Special Handling Waste. Anyone needing to dispose of contaminated soil is asked to contact ACUA by calling (609) 272-6950.

Contaminated soil is a portion of solid waste consisting of contaminated earth or fill, typically generated due to spill or leak. Contaminated soil is a Special Handling Waste. For Special Handling Waste ACUA requires the Transporter and or Generator to contact ACUA **prior** to delivering the waste for disposal by calling (609) 272-6950. For additional requirements and procedures for the disposal of contaminated soil please see below.

Procedures for Accepting Contaminated Soils

Contractors seeking to use ACUA facilities for the disposal/recycling of contaminated soils must submit a complete TCLP (Toxicity Characteristic Leaching Procedure) method analysis, including lab results for the following factors:

- Ignitability
- Corrosivity
- Reactive Sulfide
- Reactive Cyanide

  along with any other parameter that may be requested by ACUA. Disposal of soils that can be verified as home owner exempt with TPH (Total Petroleum Hydrocarbons) under 5000 ppm (parts per million) are usually approved without TCLP testing.

All loads of Contaminated Soil will be weighed at the Scale House and then will be directed by the Scale Master to the Landfill for inspection and off loading.

For disposal rates and hours of operation, click here (/content.aspx?id=248).

SEARCH OUR DIRECTORY A (/ABOUT-US/A-Z-INDEX/#A) B (/ABOUT-US/A-Z-INDEX/#B) C (/ABOUT-US/A-Z-INDEX/#C) D (/ABOUT-US/A-Z-INDEX/#D) E (/ABOUT-US/A-Z-INDEX/#E) F (/ABOUT-US/A-Z-INDEX/#F) G (/ABOUT-US/A-Z-INDEX/#G) H (/ABOUT-US/A-Z-INDEX/#H) I (/ABOUT-US/A-Z-INDEX/#I) J (/ABOUT-US/A-Z-INDEX/#J) K (/ABOUT-US/A-Z-INDEX/#K) L (/ABOUT-US/A-Z-INDEX/#L) M (/ABOUT-US/A-Z-INDEX/#M) N (/ABOUT-US/A-Z-INDEX/#N) O (/ABOUT-US/A-Z-INDEX/#O) P (/ABOUT-US/A-Z-INDEX/#P) Q (/ABOUT-US/A-Z-INDEX/#Q) R (/ABOUT-US/A-Z-INDEX/#R) S (/ABOUT-US/A-Z-INDEX/#S) T (/ABOUT-US/A-Z-INDEX/#T) U (/ABOUT-US/A-Z-INDEX/#U) V (/ABOUT-US/A-Z-INDEX/#V) W (/ABOUT-US/A-Z-INDEX/#W) X (/ABOUT-US/A-Z-INDEX/#X) Y (/ABOUT-US/A-Z-INDEX/#Y) Z (/ABOUT-US/A-Z-INDEX/#Z)

ACUA Environmental Park

Attention: if you are a resident or are not a registered hauler, you are only required to fill out the highlighted areas on the form below (name, phone number, license plate number, municipality, signature, date and waste type – waste type explanations are available on last page).

Atención: si usted es un residente del condado o no está registrado como transportador, usted solo tiene que llenar los espacios resaltados abajo: nombre, teléfono, placa, municipalidad, firma, fecha y tipo de basura - los diferentes tipos de basura se explican en la última hoja de esta forma)

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION-DIVISION OF SOLID AND HAZARDOUS WASTE

SOLID WASTE ORIGIN AND DISPOSAL FORM

A. Transporter Section *(To be completed by the Transporter **prior** to transport to the disposal site)*

1. Name of Registered Transporter: _____ Phone No. _____ 2. NJDEP Registration No.: _____

3. Type of Transporter Registration: (Check One) ☐ A-901 Licensed ☐ Registered self-generator ☐ Registration Exempt 4. Waste Self- Generated: (Check One) ☐ YES ☐ NO

5. Name of LESSOR if the solid waste vehicle is leased: _____

6. Decal No.	Type	License Plate No.	Capacity	Leased – Yes or No
_____	Cab or Single Unit	_____	_____	_____
_____	Container	N/A	_____	_____
_____	Trailer	_____	_____	_____

7. A. Waste Types (Please circle)
ID 10 ID 13 ID 13C ID 23
ID 25 ID 27 ID 27A ID 27I
Other: _____

B. Source Separated Recyclables: (Please circle)
Paper / Corrugated / Glass / Metal / Plastics
Concrete / Asphalt / Wood / Yard Material
Other: _____

8. Transporter to complete waste origin information.

Municipality (ies)	County(ies)	State	% of Total Load
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

* Sending Facility: *(If solid waste is transported from a solid waste intermodal, transfer, or material recovery facility, list the facility name in the Municipality column, ID # in the County column and the State in which the sending facility is located in the State column.)*

9. Date Waste Collected: _____

10. Transporter's Certification: *I CERTIFY THAT THE INFORMATION PROVIDED ON THIS FORM IS TRUE TO THE BEST OF MY KNOWLEDGE.*

_____ _____ _____
PRINT DRIVER'S NAME **SIGNATURE** **DATE**

B. Disposal Destinations

11. Final Disposal Facility Name & State (Transporter Completes 11 & 12): _____

12. Non Hazardous Manifest # or Bill of Lading # or Pull Ticket #: _____

13. In State weigh location (Weigh master completes 13 through 16): _____

14. GROSS WT.: _____ NET WT. *(IN STATE DISPOSAL ONLY)*: _____ 15. SCALE TICKET No. *(IN STATE DISPOSAL ONLY)*: _____

16. Weigh master's Certification: *I CERTIFY THAT THIS FORM HAS BEEN COMPLETED BY THE REGISTERED TRANSPORTER IDENTIFIED ABOVE, AND THAT THE GROSS WEIGHT FIGURE IS TRUE AND ACCURATE FOR LOADS GOING OUT OF STATE.*

SIGNATURE: _____ **DATE**: _____

***C.* In State Disposal Facility Section** *(To be completed by facility operator for loads disposed of in State only)*

17. New Jersey Receiving Facility Operator Certification: *I CERTIFY THAT THIS FORM HAS BEEN COMPLETED BY THE REGISTERED TRANSPORTER IDENTIFIED ABOVE, AND THAT THE WASTE AS IDENTIFIED BY THE TRANSPORTER IS PERMITTED TO BE DISPOSED OF AT THIS FACILITY*

Receiving Facility Permit or ID#.: 143393 **DATE**_____ **TIME**_____ **OPERATOR'S STAMP OR SIGNATURE**_____

Instructions for completing NJDEP Solid Waste Origin And Disposal Form

1. **Name of Registered Transporter and Phone Number:** The transporter must use the registered trade name of the transporter as identified on the NJDEP Solid Waste Transporter Registration along with the appropriate telephone number (including area code) of the company. Nicknames, aliases and abbreviations are not acceptable.
2. **NJDEP registration No.:** The correct NJDEP Solid Waste Transporter Registration Number must be filled out. This number appears on the registration certificate which must be carried with the vehicle.
3. **Type of Transporter Registration:** The appropriate box must be checked depending on whether the transporter is licensed, is a self generator exempted from licensing requirements, or the vehicle is not subject to NJDEP registration requirements.
4. **Waste Self Generated:** The appropriate box must be checked to disclose whether the waste was self generated by the entity performing the transportation.
5. **Name of LESSOR if the solid waste vehicle is leased:** The name of the lessor as indicated on the lease must be filled in if the vehicle is leased. The lease must be carried in the registered vehicle.
6. **Decal No., Type, License Plate No., Capacity, and Leased**: The decal number must be filled in for the appropriate type of registered equipment (i.e. container, trailer, cab, etc.). The License plate must also be filled in for the appropriate equipment along with the capacity (i.e. 30 cubic yard container). Yes or No must be filled in next to the appropriate type of equipment to indicate if it is leased.
7. **Waste Types and Source Separated Recyclables**: The transporter must indicate the type(s) of waste being transported by circling the appropriate waste types. An example of "other" would be non hazardous bulk liquid (type 72) for example. If a load consists of source separated recyclables the transporter must circle the appropriate material. If the load consists of more than one co-mingled type of recyclable, "co-mingled" must be indicated under the "Other" section along with the approximate percentages (i.e. co-mingled paper 25%, metal 50%, plastics 25%)
8. **Municipality, County State, % of Load**: The transporter must identify the waste origin by municipality, county, and state along with the respective percentage of each waste origin. In the event waste is transported from one solid waste facility to another (for example from a transfer station to a landfill for disposal) the transporter must indicate the sending facility's name in the municipality column, the facility permit # in the County column, and the State in which the sending facility is located in the State column, in addition to the waste origin(s). The percentage of waste sent from a single solid waste facility such as a transfer station should be recorded as 100%.
9. **Date Waste Collected**: The transporter must fill in the actual date the solid waste was collected.
10. **Transporter's Certification**: The driver representing the transporter must print and sign his/her name and date to certify the information in the Transporter Section was completed accurately.
11. **Final Disposal Facility Name & State**: The transporter must fill in the final disposal facility name and State in which the facility is located.
12. **Non Hazardous Manifest # or Bill of Lading # or Pull Ticket #**: The transporter must identify the appropriate manifest or bill of lading number for loads being transported for out of State disposal. The pull ticket number must be recorded for all loads where such a document is generated.
13. **In State weigh location**: The weigh master must complete the location of the weighing facility. For most instances of in State disposal this is the same location as the disposal facility, however in cases involving loads being transported out of State, the weigh location may be designated to be a location other than a disposal facility.
14. **Gross Wt. And Net Wt.**: The weigh master must complete the gross weight for all vehicles transporting waste and recyclables into solid waste facilities within this State. The gross weight must also be completed for all loads destined for out of State waste disposal facilities. The net weight must be recorded for all loads being disposed of in this State.
15. **Scale ticket #.** The weigh master must record the appropriate scale ticket # generated for loads received for disposal within this State.
16. **Weigh master's Certification**: The weigh master must certify the information he or she recorded is accurate.
17. **New Jersey Receiving Facility Operator Certification**: The person responsible for recording information for loads received at New Jersey solid waste facilities must fill in the facility number the date and time and stamp or sign the the form to certify the form was completed by the transporter and that the waste identified by the transporter is permitted to be accepted at the facility for disposal.

Failure to carefully follow these instructions in accurately completing the Solid Waste Origin and Disposal Form can lead to enforcement action including penalties.

Waste Type ID 10 = municipal solid waste
Waste Type ID 13 = bulky solid waste
Waste Type ID 13C = construction & demolition debris
Waste Type ID 23 = vegetative waste
Waste Type ID 25 = animal and food processing waste
Waste Type ID 27 = dry industrial waste
Waste Type ID 27A = asbestos containing waste
Waste Type ID 27I = incinerator ash

APPENDIX P

4. Based on sampling conducted pursuant to (c)1 through 3 above, the person responsible for conducting the remediation may, during future sampling events, sample for fewer contaminants than for which the person initially sampled. The person responsible for conducting the remediation shall include the technical rationale for the reduced list in the applicable remedial phase report submitted to the Department.

(d) The person responsible for conducting the remediation shall analyze samples for petroleum hydrocarbons contamination as follows:

1. For all petroleum storage and discharge areas, analyze all samples pursuant to the requirements in Table 2-1;

2. For contaminants, where Table 2-1 indicates that additional analytical parameters are required, conduct the additional analyses on sample(s) with the highest EPH concentration(s), with a minimum of one sample; and

3. For all matrices where sheen or odor indicates the potential presence of EPH from an unknown source, analyze all samples as unknown EPH pursuant to the requirements in Table 2-1.

(e) If tentatively identified compounds or unknown compounds are detected, the TIC or unknown compound shall be evaluated.

TABLE 2-1

ANALYTICAL REQUIREMENTS FOR PETROLEUM STORAGE AND DISCHARGE AREAS

Petroleum Product	Soil/Sediment	Water
Leaded Gasoline, Aviation Gasoline	VO+TICs[1] including 1,2-dibromoethane and 1,2-dichloroethane, Lead	VO+TICs[1], including 1,2-dibromoethane and 1,2-dichloroethane
Unleaded Gasoline	VO+TICs[2], Tertiary butyl alcohol	VO+TICs[2], Tertiary butyl alcohol
Light Petroleum Distillates (Naphtha, Stoddard Solvent, Paint Thinner, etc.)	VO+TICs[2]	VO+TICs[2]
Kerosene, Jet Fuel	VO+TICs[2], Naphthalene, 2-Methyl Naphthalene	VO+TICs[2], SVO+TICs[3]

TABLE 2-1

ANALYTICAL REQUIREMENTS FOR PETROLEUM STORAGE AND DISCHARGE AREAS

Petroleum Product	Soil/Sediment	Water
Fuel Oil No. 2, Diesel Fuel	EPH[4]. Analyze 25 percent of samples where EPH is detected over 1,000 mg/kg for 2-Methyl Naphthalene and Naphthalene[8]	VO+TICs[2], SVO+TICs[3]
Fuel Oil Nos. 4 & 6, Hydraulic Oil, Cutting Oil, Lubricating Oil	EPH[4]. Analyze 25 percent of samples where EPH is detected over 100 mg/kg for PAH[5,8]	VO+TICs[2], SVO+TICs[3]
Crude Oil	EPH[4], VO+TICs[2], SVO+TICs[3], TAL Metals[6]	VO+TICs[2], SVO+TICs[3], TAL Metals[6], Ammonia (Total)
Waste Oil, Unknown Petroleum Hydrocarbons	EPH[4]. Analyze 25 percent of samples where EPH is detected for VO+TICs[2], SVO+TICs[3], PCBs, TAL Metals[6,8]	VO+TICs[2], SVO+TICs[3], TAL Metals[6]
Waste Vehicular Crankcase Oil	EPH[4]. Analyze 25 percent of the samples where EPH is detected for VO+TICs[2], SVO+TICs[3], PCBs, and Lead[8]	VO+TICs[2], SVO+TICs[3], Lead
Mineral Oil	EPH[4]	EPH[4]
Dielectric Fluid, Dielectric Mineral Oil, Transformer Oil	EPH[4] and PCBs. Analyze 25 percent of those samples where EPH is detected for PAH[5,8]	EPH[4] and PCBs

TABLE 2-1

ANALYTICAL REQUIREMENTS FOR PETROLEUM STORAGE AND DISCHARGE AREAS

Petroleum Product	Soil/Sediment	Water
Manufactured Gas Plant (MGP) Sites	EPH[4], VO+TICs[2], PAH[5], TAL Metals[6], Cyanide, Phenolics[7]	EPH[4], VO+TICs[2], PAH[5], TAL Metals[6], Ammonia (Total), Cyanide, Phenolics[7]

Footnotes

1. EPA Target Compound List volatile organic compounds excluding 1,2-Dibromo-3-chloropropane and 1,4-Dioxane with a library search of the 15 highest TICs.

Tentatively Identified Compounds (TICs) for volatiles - Identify up to 15 organic compounds of greatest concentration which are not surrogates, internal standards, individual alkanes, or targeted compounds listed under TCL. Alkane concentrations attributed to the petroleum product contamination will be summed and reported as total alkanes. For purposes of TIC identification, the total alkanes are treated as one compound.

2. EPA Target Compound List volatile organic compounds excluding 1,2-Dibromo-3-chloropropane, 1,2-Dibromoethane, and 1,4-Dioxane with a library search of the 15 highest TICs.

Tentatively Identified Compounds (TICs) for volatiles - Identify up to 15 organic compounds of greatest concentration which are not surrogates, internal standards, individual alkanes, or targeted compounds listed under TCL. Alkane concentrations attributed to the petroleum product contamination will be summed and reported as total alkanes. For purposes of TIC identification, the total alkanes are treated as one compound.

3. EPA Target Compound List semivolatile organic compounds excluding phenol and substituted phenols with a library search of the 15 highest TICs that are not alkanes unless otherwise specified by analytical protocol.

Tentatively Identified Compounds (TICs) for semivolatiles - Identify up to 15 organic compounds of greatest concentration which are not surrogates, internal standards, individual alkanes, or targeted compounds listed under TCL. Alkane concentrations attributed to the petroleum product contamination will be summed and reported as total alkanes. For purposes of TIC identification, the total alkanes are treated as one compound.

4. Extractable Petroleum Hydrocarbons.

5. EPA Target Compound List Polynuclear Aromatic Hydrocarbons.

New Jersey Department of Environmental Protection
Site Remediation Program

Protocol For Addressing Extractable Petroleum Hydrocarbons

(Version 5.0, August 9, 2010)

DISCLAIMER

This New Jersey Department of Environmental Protection (Department) guidance is written based upon the method "*Analysis of Extractable Petroleum Hydrocarbon Compounds (EPH) in Aqueous and Soil/Sediment/Sludge Matrices*" (NJDEP EPH Method Revision 3).

The Department has implemented a phase-in period of six months for the use of this guidance which is similar in approach the phase-in periods used in the past by the SRP. For additional information regarding the phase-in, refer to the document "Phase-in for the implementation of the 'Protocol for Addressing Extractable Petroleum Hydrocarbons' and the associated analytical method 'Analysis of Extractable Petroleum Hydrocarbon Compounds (EPH) in Aqueous and Soil/Sediment/Sludge Matrices'" (http://www.nj.gov/dep/srp/guidance/srra/eph_phasein.pdf).

INTRODUCTION

This New Jersey Department of Environmental Protection (Department) guidance document will provide direction on how to address petroleum hydrocarbon mixture discharges except for those that originate from the more volatile petroleum hydrocarbon mixtures (i.e., gasoline, kerosene, jet fuel, and mineral spirits). Volatile petroleum hydrocarbon mixtures are to be investigated pursuant to the Technical Requirements for Site Remediation (TRSR). Analytical requirements remain as defined pursuant to Table 2-1 (http://www.nj.gov/dep/srp/regs/techrule/techrule.pdf). Historically, the Department has used a value of 10,000 mg/kg, which was based on the field capacity to remediate total petroleum hydrocarbon discharges. The Department is mandated by N.J.S.A. 58:10B-12 to employ a health-based approach when developing remediation standards. This guidance document provides a health-based approach to accomplish the remediation of petroleum hydrocarbon mixtures.

It should be noted that this guidance document does not preclude compliance with any other Site Remediation Program policies, including the sheen policy (http://www.nj.gov/dep/srp/guidance/sheen/). In addition, the person responsible for conducting the remediation shall also comply with the TRSR including, but not limited to, the requirements to remove and/or treat free and/or residual product (N.J.A.C. 7:26E-6.1(d), http://www.nj.gov/dep/srp/regs/techrule/techrule.pdf). Furthermore, the Department is establishing an ecological screening value of 1,700 mg/kg (established at "Health Based and Ecological Screening Criteria for Petroleum Hydrocarbons - Frequently Asked Questions," Question #3"; http://www.nj.gov/dep/srp/guidance/rs/eph_faq.htm) that is applicable to all petroleum hydrocarbon discharges if and only if a sensitive environmental resource is potentially impacted by petroleum hydrocarbon contamination as determined by a baseline ecological evaluation (N.J.A.C. 7:26E-3.11). In these situations, an ecological risk assessment shall be conducted pursuant to N.J.A.C. 7:26E-4.7 in order to establish a site-specific ecological criterion. Note that pursuant to the TRSR, a baseline ecological evaluation is not required at an area of concern that consists of an underground storage tank storing heating oil for on-site consumption in a one to four family residential building (N.J.A.C. 7:26E-3.11(a); http://www.nj.gov/dep/srp/regs/techrule/techrule.pdf).

PROTOCOL

The initial task in the protocol is to determine the current and historical petroleum hydrocarbon mixtures stored and potentially discharged at the area of concern being investigated, and based on this information, to determine the appropriate Category of discharge being investigated. As noted above, this guidance document does not apply to the more volatile organic compound mixtures:

Category 1 consists of discharges of only Number 2 (No. 2) fuel oil and/or diesel fuel.

Category 2 consists of discharges of petroleum hydrocarbon mixtures other than No. 2 fuel oil and/or diesel fuel (i.e., Number 4 fuel oil, Number 6 fuel oil, hydraulic oils, cutting oils, crude oil, lubricating oil, waste oil, waste vehicular crankcase oil, and waste mineral oil).

For those situations where multiple petroleum hydrocarbon mixtures are involved, the evaluation must address all the types known to be present. For those situations where the product type is unknown, sampling and analytical parameters for waste oil shall be applied.

The method "*Analysis of extractable petroleum hydrocarbon (EPH) compounds in non-aqueous and aqueous matrices*" (NJDEP EPH Method Revision 3) will be used as the principal evaluation tool when investigating areas of concern involving both Category 1 and Category 2 discharges. The results of this method will be termed extractable petroleum hydrocarbons (EPH).

The second task in the protocol is to determine the human health based EPH remedial goal. For sites with residential exposure scenarios where a Category 1 discharge has occurred, the EPH human health value has already been calculated to be 5,100 mg EPH/kg (see "Frequently Asked Questions for Petroleum Hydrocarbons," Question #1 for a discussion on the derivation of 5,100 mg/kg;

http://www.nj.gov/dep/srp/guidance/rs/eph_faq.htm). In order to perform this calculation, the Department conducted a field study to determine a typical chemical composition for No. 2 fuel oil. Using this average composition, appropriate toxicity information, and current USEPA risk assessment equations, the health-based criterion was developed. For Category 1 discharges at sites with non-residential exposure scenarios, the EPH human health value has already been calculated to be 54,000 mg EPH/kg (see "Frequently Asked Questions for Petroleum Hydrocarbons," Question #1 for a discussion on the derivation of 54,000 mg/kg; http://www.nj.gov/dep/srp/guidance/rs/eph_faq.htm). The person responsible for conducting the remediation shall apply the 54,000 mg EPH/kg criterion as part of the EPH Protocol.

The Department has made a policy determination that compliance for Category 1 discharges will use these fixed EPH values, rather than calculated sample-specific values. This decision was reached after consultation with the Department units directly involved with the use and implementation of these criteria.

The user should be aware that the Department will continue to evaluate this policy in the future. For Category 2 discharges at sites with both residential and non-residential exposure scenarios, the calculation of the EPH human health value will be accomplished using the spreadsheet provided by the Department at http://www.nj.gov/dep/srp/guidance/srra/EPHCalculator.xls. Step by step guidance for the completion of the process will be provided for each of these Category/Exposure Scenario situations following the descriptions of the tasks in the protocol.

The third task in the protocol is to address any contingency analysis requirements. For Category 1 discharges, analytical requirements for all contingency samples are restricted to only 2-methylnaphthalene and naphthalene. For No. 2 fuel and/or diesel this contingency testing is required if the post-remediation EPH concentrations to remain at the site exceed 1,000 mg EPH/kg. Based on the results of the field study, it was determined that 2-methylnaphthalene and naphthalene, as well as other contaminants, were not of regulatory concern when EPH concentrations were below 1,000 mg/kg. For Category 2 discharges, analytical requirements pursuant to the TRSR, Table 2-1 ("Analytical Requirements for Petroleum Storage and Discharge Areas," http://www.nj.gov/dep/srp/regs/techrule/techrule.pdf) apply. This completes the EPH and/or compound specific human health value evaluations.

The final task in the protocol is to evaluate the calculated human health based value against the residual product/free product value; comply with the sheen policy; and apply the ecological values (if appropriate). The final remedial goal will be the applicable value or action that addresses all of the concerns just noted, whether the value or action is EPH based or otherwise.

A tabular summary of the protocol is provided as Appendix 1. The user shall be aware that deviations from this protocol require Department approval. The Department will consider technical impracticability as a basis for not completing the remediation pursuant to this protocol.

CATEGORY 1 - Discharges of only Number 2 (No. 2) fuel oil or diesel fuel for a residential exposure scenario

The following assumes that for a Category 1 discharge an unrestricted use is the endpoint of the remedial activities at a residential site.

STEP 1. Evaluate all EPH sample results relative to the 5,100 mg EPH/kg soil remediation standard:

A. All EPH sample results are less than or equal to 5,100 mg EPH/kg. **Remediation is complete for EPH. Go to Step 2 to determine whether contingency analyses are required. If remediation is not complete, then go to Step 1.B.**

B. One or more EPH sample results are greater than 5,100 mg EPH/kg. **Conduct additional soil remediation (excavate/treat contaminated soil) and return to Step 1.A. Alternatively, consider conditional remediation closure** (i.e., implementation of institutional and engineering controls) as well as address any other relevant rules, policies, and /or requirements. **Go to Step 2 to determine whether contingency analyses required.**

STEP 2. Evaluate all EPH sample results relative to 1,000 mg EPH/kg contingency analysis trigger:

A. All EPH sample results are less than or equal to 1,000 mg EPH/kg. **Remediation is complete for 2-methylnaphthalene and naphthalene. Go to Step 7. If remediation is not complete, then go to Step 2.B.**

B. If one or more EPH sample results are greater than 1,000 mg EPH/kg, then contingency analyses for 2-methylnaphthalene and naphthalene are required. **Go to Step 3**.

STEP 3. Determine the number of contingency samples:

# Samples >1,000 mg EPH/kg	# Contingency Samples
1-4	1
5-8	2
9-12	3

Pursuant to the Technical Requirements for Site Remediation, Table 2-1 ("Analytical Requirements for Petroleum Storage and Discharge Areas," http://www.nj.gov/dep/srp/regs/techrule/techrule.pdf), contingency samples shall be those with the greatest EPH concentration(s).

Go to Step 4.

STEP 4. Evaluate whether any measured 2-methylnaphthalene concentration exceeds the impact to ground water exposure pathway screening level of 5 mg/kg or any measured naphthalene concentration exceeds the inhalation exposure pathway residential direct contact criterion of 6 mg/kg.

A. If there are no exceedances for both 2-methylnaphthalene and naphthalene for all contingency samples, then **remediation is complete for 2-methylnaphthalene and naphthalene. Go to Step 7. If remediation is not complete, then go to Step 4.B.**

B. If there is an exceedance for 2-methylnaphthalene for any contingency sample, then **go to Step 5.** If there is an exceedance for naphthalene for any contingency sample, then **go to Step 6**. If there is an exceedance for both 2-methylnaphthalene and naphthalene for any contingency sample, then **go to both Step 5 and Step 6.**

STEP 5. Options for 2-methylnaphthalene contingency sample exceedances:

A. Excavate/treat contaminated soils until they are confirmed to be less than or equal to 1,000 mg EPH/kg. **Remediation is complete for 2-methylnaphthalene. Go to Step 7. If remediation is not complete or Step 5.A is not implemented, then go to Step 5.B.**

B. Excavate/treat contaminated soils until they are confirmed to be less than or equal to 5 mg 2-methylnaphthalene/kg. **Remediation is complete for 2-methylnaphthalene and go to Step 7. If remediation is not complete or Step 5.B is not implemented, then go to Step 5.C.**

C. Conduct the Synthetic Precipitation Leachate Procedure (SPLP) as outlined below.

NOTE: The Class II ground water 2-methylnaphthalene leachate criterion (LC) equals 390 micrograms per liter (ug/L), calculated as follows:

Ground water quality standard (GWQS) = 30 ug/L
Dilution attenuation factor (DAF) = 13

LC = GWQS x DAF = 30 x 13 = 390 ug/L

NOTE: The following protocol departs from the protocol found in "Guidance for the Use of the Synthetic Precipitation Leaching Procedure to Develop Site-Specific Impact to Ground Water Remediation Standards" (http://www.nj.gov/dep/srp/guidance/rs/splp_guidance.pdf) and is applicable only under the circumstances specified here.

i. If one or two of the contingency samples analyzed exceed 5 mg 2-methylnaphthalene/kg, then conduct SPLP analysis on those samples.

a. All sample leachate concentrations are less than or equal to 390 ug/L. **Remediation is complete for 2-methylnaphthalene. Go to Step 7. If remediation is not complete, then go to Step 5.C.i.b.**

b. For samples with leachate concentrations greater than 390 ug/L, **conduct additional soil remediation (excavate/treat contaminated soil) and return to Step 5.A, 5.B, or 5.C**, as well as address any other relevant rules, policies, and /or requirements. **Alternatively, other options for addressing impacts to ground water from 2-methylnaphthalene are available** at http://www.nj.gov/dep/srp/guidance/rs/igw_intro.htm. **Perform remediation as required and then go to Step 7.**

ii. If three or more of the contingency samples analyzed exceed 5 mg 2-methylnaphthalene/kg, then conduct SPLP analysis pursuant to "Guidance for the Use of the Synthetic Precipitation Leaching Procedure to Develop Site-Specific Impact to Ground Water Remediation Standards" (http://www.nj.gov/dep/srp/guidance/rs/splp_guidance.pdf). Evaluate data using the Department "SPLP Spreadsheet" (http://www.nj.gov/dep/srp/guidance/rs/splp_spreadsheet.xls).

a. All 2-methylnaphthalene concentrations are below the greatest remediation standard determined by the SPLP Spreadsheet. **Remediation is complete for 2-methylnaphthalene. Go to Step 7. If remediation is not complete, then go to Step 5.C.ii.b.**

b. If any 2-methylnaphthalene concentration exceeds greatest remediation standard determined by the SPLP Spreadsheet, then **conduct additional soil remediation (excavate/treat contaminated soil) and return to Step 5.A, 5.B, or 5.C,** as well as address any other relevant rules, policies, and /or requirements. **Alternatively, other options for addressing impacts to ground water from 2-methylnaphthalene are available** at http://www.nj.gov/dep/srp/guidance/rs/igw_intro.htm. **Perform remediation as required and then go to Step 7.**

STEP 6. Options for naphthalene exceedances:

A. Excavate/treat contaminated soils until they are confirmed to be less than or equal to 1,000 mg EPH/kg. **Remediation is complete for naphthalene. Go to Step 7. If remediation is not complete or Step 6.A is not implemented, then go to Step 6.B.**

B. Excavate/treat contaminated soils until they are confirmed to be less than or equal to 6 mg naphthalene/kg. **Remediation is complete for naphthalene. Go to Step 7. If remediation is not complete or Step 6.B is not implemented, then go to Step 6.C.**

C. Perform compliance averaging using "Guidance Document for Implementing the Inhalation Exposure Pathway Soil Remediation Standards" (http://www.nj.gov/dep/srp/guidance/rs/compl_ars_inhalation.pdf) and appropriate analytical data.

i. Actual analytical data for naphthalene must be used. These may include naphthalene results from samples with less than 1,000 mg EPH/kg if sample selection is consistent with the TRSR (N.J.A.C. 7:26E; http://www.nj.gov/dep/srp/regs/techrule/techrule.pdf) and the "Guidance Document for Implementing the Inhalation Exposure Pathway Soil Remediation Standards" (http://www.nj.gov/dep/srp/guidance/rs/compl_ars_inhalation.pdf).

ii. Compliance requirements satisfied: **Remediation is complete for naphthalene. Go to Step 7**. **If remediation is not complete, then go to Step 6.C.iii.**

iii. Failure to achieve compliance: **Conduct additional soil remediation (excavate/treat contaminated soil) and return to Step 6.A, Step 6.B, or Step 6.C. Alternatively, consider conditional remediation closure** (i.e., implementation of institutional and engineering controls) as well as address any other relevant rules, policies, and /or requirements and then **go to Step 7**.

STEP 7. Determine whether any measured EPH concentration is greater than the residual product/free product limit. EPH cannot exceed the residual product/free product limit of 8,000 mg EPH/kg for No. 2 fuel and/or diesel fuel (see Appendix 2 for a discussion of the derivation of the residual product/free product concentration).

A. All measured EPH concentrations are less than 5,100 mg/kg and therefore are also less than 8,000 mg EPH/kg. **Remediation is complete for residual product/free product. Go to Step 8. If remediation is not complete, then go to Step 7.B.**

B. If any measured EPH concentration is greater than 8,000 mg EPH/kg, then additional remediation is required for EPH to achieve the 8,000 mg EPH/kg residual product/free product limit. Following additional remediation, **go to Step 8.** Note that both an institutional control (i.e., Deed Notice) and engineering control(s) must be established for all areas exceeding 5,100 mg EPH/kg.

STEP 8. If applicable, evaluate for the presence of sheen pursuant to the Department policy (http://www.nj.gov/dep/srp/guidance/sheen/). If not applicable, then **go to Step 9.**

A. Sheen that needs to be addressed pursuant to the sheen policy is not present. Therefore, there is no need to remediate sheen, **go to Step 9. Otherwise, go to Step 8.B.**

B. Sheen is present that needs to be addressed pursuant to the sheen policy. Take the necessary corrective actions. **Go to Step 9.**

STEP 9. Evaluate for ecological concern:

A. There are no EPH values exceeding 1,700 mg EPH/kg (see "Frequently Asked Questions for Petroleum Hydrocarbons," Question #3 for derivation; http://www.nj.gov/dep/srp/guidance/rs/eph_faq.htm). **The entire remediation is complete. If remediation is not complete, then go to Step 9.B.**

B. Determine whether a Baseline Ecological Evaluation (BEE) is appropriate. A BEE is appropriate at all areas of concern excluding those that consist of an underground storage tank storing heating oil for on-site consumption in a one to four family residential building (TRSR, N.J.A.C. 7:26E-3.11(a)). If a BEE is not appropriate, then **the entire remediation is complete. If remediation is not complete, then go to Step 9.C.**

C. A BEE is appropriate:

i. If there is no contaminant of concern or no potential pathway or no sensitive ecological resource present based on the BEE, then **the entire remediation is complete. If remediation is not complete, then go to Step 9.C.ii.**

ii. If the BEE finds that a potential contaminant of concern has a potential pathway to a sensitive ecological resource, then take the necessary actions and address the ecological concern. **The entire remediation is complete.**

- Note that if the EPH concentration does not exceed 1,700 mg/kg measured at the sensitive ecological resource, the ecological remediation is considered complete.

- Be advised that the maximum ecological remediation goal has been set at 4,000 mg EPH/kg measured at the sensitive ecological resource. This value applies only to the terrestrial environment. For other environments (e.g., benthic), the TRSR are to be followed to determine the appropriate remediation.

CATEGORY 1 - Discharges of only Number 2 (No. 2) fuel oil or diesel fuel for a non-residential exposure scenario

The following assumes that for a Category 1 discharge that a non-residential use is the endpoint of the remedial activities at the non-residential site. This will require an institutional control (i.e., Deed Notice) if any contaminant concentrations remaining at the site exceed their respective residential exposure scenario soil remediation standards.

STEP 1. Determine EPH compliance by following the steps below:

A. Use the EPH analytical method to determine the EPH concentration for each sample. **Then go to Step 1.B.**

B. Use 54,000 mg EPH/kg as the EPH compliance value. **Go to Step 1.C.**

C. All EPH sample results are less than or equal to 54,000 mg EPH/kg. **Remediation is complete for EPH. Go to Step 2 to determine whether contingency analyses are required. If remediation is not complete, then go to Step 1.D.**

D. One or more EPH sample results are greater than 54,000 mg EPH/kg. **Conduct additional soil remediation (excavate/treat contaminated soil) and return to Step 1.A. If no additional soil remediation is conducted, then go to Step 1.E. The user is cautioned that the residual product/free product evaluation in Step 7 will require remediation for all areas above 8,000 mg EPH/kg.**

E. **Alternatively, consider conditional remediation closure** (i.e., implementation of institutional and engineering controls) as well as address any other relevant rules, policies, and /or requirements. **Go to Step 2 to determine whether contingency analyses required.**

STEP 2. Evaluate all EPH sample results relative to 1,000 mg EPH/kg contingency analysis trigger:

A. All EPH sample results are less than or equal to 1,000 mg EPH/kg **Remediation is complete for 2-methylnaphthalene and naphthalene. Go to Step 7. If remediation is not complete, then go to Step 2.B.**

B. If one or more EPH sample results are greater than 1,000 mg EPH/kg, then contingency analyses for 2-methylnaphthalene and naphthalene are required. **Go to Step 3**.

STEP 3. Determine the number of contingency samples:

# Samples >1,000 mg EPH/kg	# Contingency Samples
1-4	1
5-8	2
9-12	3

Pursuant to the Technical Requirements for Site Remediation, Table 2-1 ("Analytical Requirements for Petroleum Storage and Discharge Areas," http://www.nj.gov/dep/srp/regs/techrule/techrule.pdf), contingency samples shall be those with the greatest EPH concentration(s).

Go to Step 4.

STEP 4. Evaluate whether any measured 2-methylnaphthalene concentration exceeds the impact to ground water exposure pathway screening level of 5 mg/kg or any measured naphthalene

concentration exceeds the impact to ground water exposure pathway screening level of 16 mg/kg.

A. If there are no exceedances for both 2-methylnaphthalene and naphthalene for all contingency samples, **then remediation is complete for 2-methylnaphthalene and naphthalene. Go to Step 7. If remediation is not complete, then go to Step 4.B.**

B. If there is an exceedance for 2-methylnaphthalene for any contingency sample, then **go to Step 5.** If there is an exceedance for naphthalene for any contingency sample, then **go to Step 6**. If there is an exceedance for both 2-methylnaphthalene and naphthalene for any contingency sample, then **go to both Step 5 and Step 6.**

STEP 5. Options for 2-methylnaphthalene contingency sample exceedances:

A. Excavate/treat contaminated soils until they are confirmed to be less than or equal to 1,000 mg EPH/kg. **Remediation is complete for 2-methylnaphthalene. Go to Step 7. If remediation is not complete or Step 5.A is not implemented, then go to Step 5.B.**

B. Excavate/treat contaminated soils until they are confirmed to be less than or equal to 5 mg 2-methylnaphthalene/kg. **Remediation is complete for 2-methylnaphthalene and go to Step 7. If remediation is not complete or Step 5.B is not implemented, then go to Step 5.C.**

C. Conduct the Synthetic Precipitation Leachate Procedure (SPLP) as outlined below.

NOTE: The Class II ground water 2-methylnaphthalene leachate criterion (LC) equals 390 micrograms per liter (ug/L), as follows:

Ground water quality standard (GWQS) = 30 ug/L
Dilution attenuation factor (DAF) = 13

LC = GWQS x DAF = 30 x 13 = 390 ug/L

NOTE: The following protocol departs from the protocol found in "Guidance for the Use of the Synthetic Precipitation Leaching Procedure to Develop Site-Specific Impact to Ground Water Remediation Standards" (http://www.nj.gov/dep/srp/guidance/rs/splp_guidance.pdf) and is applicable only under the circumstances specified here.

i. If one or two of the contingency samples analyzed exceed 5 mg 2-methylnaphthalene/kg, then conduct SPLP analysis on those samples.

a. All sample leachate concentrations are less than or equal to 390 ug/L. **Remediation is complete for 2-methylnaphthalene. Go to Step 7. If remediation is not complete, then go to Step 5.C.i.b.**

b. For samples with leachate concentrations greater than 390 ug/L, **conduct additional soil remediation (excavate/treat contaminated soil) and return to Step 5.A, 5.B, or 5.C**, as well as address any other relevant rules, policies, and /or requirements. **Alternatively, other options for addressing impacts to ground water from 2-methylnaphthalene are available** at http://www.nj.gov/dep/srp/guidance/rs/igw_intro.htm. **Perform remediation as required and then go to Step 7.**

ii. If three or more of the contingency samples analyzed exceed 5 mg 2-methylnaphthalene/kg, then conduct SPLP analysis pursuant to "Guidance for the

Use of the Synthetic Precipitation Leaching Procedure to Develop Site-Specific Impact to Ground Water Remediation Standards" (http://www.nj.gov/dep/srp/guidance/rs/splp_guidance.pdf). Evaluate data using the Department "SPLP Spreadsheet" (http://www.nj.gov/dep/srp/guidance/rs/splp_spreadsheet.xls).

a. All 2-methylnaphthalene concentrations are below greatest remediation standard determined by the SPLP Spreadsheet. **Remediation is complete for 2-methylnaphthalene. Go to Step 7. If remediation is not complete, then go to Step 5.C.ii.b.**

b. If any 2-methylnaphthalene concentration exceeds greatest remediation standard determined by the SPLP Spreadsheet, then **conduct additional soil remediation (excavate/treat contaminated soil) and return to Step 5.A, 5.B, or 5.C,** as well as address any other relevant rules, policies, and/or requirements. **Alternatively, other options for addressing impacts to ground water from 2-methylnaphthalene are available** at http://www.nj.gov/dep/srp/guidance/rs/igw_intro.htm. **Perform remediation as required and then go to Step 7.**

STEP 6. Options for naphthalene exceedances:

A. Excavate/treat contaminated soils until they are confirmed to be less than or equal to 1,000 mg EPH/kg. **Remediation is complete for naphthalene. Go to Step 7. If remediation is not complete or Step 6.A is not implemented, then go to Step 6.B.**

B. Excavate/treat contaminated soils until they are confirmed to be less than or equal to 16 mg naphthalene/kg (impact to ground water exposure pathway screening level). **Remediation is complete for naphthalene. Go to Step 7. If remediation is not complete or Step 6.B is not implemented, then go to Step 6.C.**

C. Conduct the Synthetic Precipitation Leachate Procedure (SPLP) as outlined below.

NOTE: The Class II ground water naphthalene leachate criterion (LC) equals 3,900 micrograms per liter (ug/L), calculated as follows:

Ground water quality standard (GWQS) = 300 ug/L
Dilution attenuation factor (DAF) = 13

LC = GWQS x DAF = 300 x 13 = 3,900 ug/L

NOTE: The following protocol departs from the protocol found in "Guidance for the Use of the Synthetic Precipitation Leaching Procedure to Develop Site-Specific Impact to Ground Water Remediation Standards" (http://www.nj.gov/dep/srp/guidance/rs/splp_guidance.pdf) and is applicable only under the circumstances specified here.

i. If one or two of the contingency samples analyzed exceed 16 mg naphthalene/kg, then conduct SPLP analysis on those samples.

a. All sample leachate concentrations are less than or equal to 3,900 ug/L. **Remediation is complete for naphthalene. Go to Step 6.D. If remediation is not complete, then go to Step 6.C.i.b.**

b. For samples with leachate concentrations greater than 3,900 ug/L, **conduct additional soil remediation (excavate/treat contaminated soil) and return to**

Step 6.A, 6.B, or 6.C, as well as address any other relevant rules, policies, and /or requirements. **Alternatively, other options for addressing impacts to ground water from naphthalene are available** at http://www.nj.gov/dep/srp/guidance/rs/igw_intro.htm. **Perform remediation as required and then go to Step 7.**

ii. If three or more of the contingency samples analyzed exceed 16 mg naphthalene/kg, then conduct SPLP analysis pursuant to "Guidance for the Use of the Synthetic Precipitation Leaching Procedure to Develop Site-Specific Impact to Ground Water Remediation Standards" (http://www.nj.gov/dep/srp/guidance/rs/splp_guidance.pdf). Evaluate data using the Department "SPLP Spreadsheet" (http://www.nj.gov/dep/srp/guidance/rs/splp_spreadsheet.xls).

a. All naphthalene concentrations are below the greatest remediation standard determined by the SPLP Spreadsheet. **Remediation is complete for naphthalene. Go to Step 6.D. If remediation is not complete, then go to Step 6.C.ii.b.**

b. If any naphthalene concentration exceeds greatest remediation standard determined by the SPLP Spreadsheet, then **conduct additional soil remediation (excavate/treat contaminated soil) and return to Step 6.A, 6.B, or 6.C,** as well as address any other relevant rules, policies, and /or requirements. **Alternatively, other options for addressing impacts to ground water from naphthalene are available** at http://www.nj.gov/dep/srp/guidance/rs/igw_intro.htm. **Perform remediation as required. If all remaining naphthalene concentrations are less than or equal to 17 mg/kg, then go to Step 7. Otherwise go to Step 6.D.**

D. If naphthalene concentrations exceed 17 mg/kg, then perform compliance averaging using "Guidance Document for Implementing the Inhalation Exposure Pathway Soil Remediation Standards" (http://www.nj.gov/dep/srp/guidance/rs/compl_ars_inhalation.pdf) and appropriate analytical data.

i. Actual analytical data for naphthalene must be used. These may include naphthalene results from samples with less than 1,000 mg EPH/kg if sample selection is consistent with the TRSR (N.J.A.C. 7:26E; http://www.nj.gov/dep/srp/regs/techrule/techrule.pdf) and the "Guidance Document for Implementing the Inhalation Exposure Pathway Soil Remediation Standards" (http://www.nj.gov/dep/srp/guidance/rs/compl_ars_inhalation.pdf).

ii. Compliance requirements satisfied: **Remediation is complete for naphthalene. Go to Step 7**. **If remediation is not complete, then go to Step 6.D.iii.**

iii. Failure to achieve compliance: **Conduct additional soil remediation (excavate/treat contaminated soil) and return to Step 6.A, Step 6.B, or Step 6.D. Alternatively, consider conditional remediation closure** (i.e., implementation of institutional and engineering controls) as well as address any other relevant rules, policies, and /or requirements and then **go to Step 7**.

STEP 7. Determine whether any measured EPH concentration is greater than the residual product/free product limit. EPH cannot exceed the residual product/free product limit of 8,000 mg EPH/kg for No. 2 fuel and/or diesel fuel (see Appendix 2 for a discussion of the derivation of the residual product/free product concentration).

A. All measured EPH concentrations are less than the 54,000 mg EPH/kg remediation criterion and are also less than 8,000 mg EPH/kg. **Remediation is complete for residual product/free product. Go to Step 8. If remediation is not complete, then go to Step 7.B.** Note that at a minimum, an institutional control (i.e., Deed Notice) must be established for all areas exceeding 5,100 mg EPH/kg.

B. If any measured EPH concentration is less than the 54,000 mg EPH/kg remediation criterion but is greater than 8,000 mg EPH/kg, then additional remediation is required for EPH to achieve the 8,000 mg EPH/kg residual product/free product limit. Following additional remediation, **go to Step 8.** Note that at a minimum, an institutional control (i.e., Deed Notice) must be established for all areas exceeding 5,100 mg EPH/kg.

STEP 8. If applicable, evaluate for the presence of sheen pursuant to the Department policy (http://www.nj.gov/dep/srp/guidance/sheen/). If not applicable, then **go to Step 9.**

A. Sheen that needs to be addressed pursuant to the sheen policy is not present. Therefore, there is no need to remediate sheen, **go to Step 9. Otherwise, go to Step 8.B.**

B. Sheen is present that needs to be addressed pursuant to the sheen policy. Take the necessary corrective actions. **Go to Step 9.**

STEP 9. Evaluate for ecological concern:

A. There are no EPH values exceeding 1,700 mg EPH/kg (see "Frequently Asked Questions for Petroleum Hydrocarbons," Question #3 for derivation; http://www.nj.gov/dep/srp/guidance/rs/eph_faq.htm). **The entire remediation is complete. If remediation is not complete, go to then Step 9.B.**

B. A BEE is appropriate:

i. If there is no contaminant of concern or no potential pathway or no sensitive ecological resource present based on the BEE, then **the entire remediation is complete. If remediation is not complete, then go to Step 9.B.ii.**

ii. If the BEE finds that a potential contaminant of concern has a potential pathway to a sensitive ecological resource, then take the necessary actions and address the ecological concern. **The entire remediation is complete.**

- Note that if the EPH concentration does not exceed 1,700 mg/kg measured at the sensitive ecological resource, the ecological remediation is considered complete.

- Be advised that the maximum ecological remediation goal has been set at 4,000 mg EPH/kg measured at the sensitive ecological resource. This value applies only to the terrestrial environment. For other environments (e.g., benthic), the TRSR are to be followed to determine the appropriate remediation.

CATEGORY 2 - Discharges of petroleum hydrocarbon mixtures other than No. 2 fuel oil and/or diesel fuel, including: Number 4 and 6 Fuel Oils, Hydraulic Oils, Cutting Oils, Crude Oil, Lubricating Oil, Waste Oil, Waste Vehicular Crankcase Oil, and Waste Mineral Oil for both the residential and non-residential exposure scenarios

The following assumes that for a Category 2 discharge an unrestricted use is the endpoint of the remedial activities at sites where the residential exposure scenario applies. For sites where the non-residential exposure scenario applies, non-residential use is assumed to be the goal. The use of a non-residential exposure scenario based value will require an institutional control (i.e., deed notice) to ensure the protectiveness of this value. This assumes contaminant concentrations remaining at the site will exceed their respective most stringent direct contact soil remediation standards. The calculated EPH human health value will be different depending on the exposure scenario (residential or non-residential) inputted into the provided spreadsheet calculator. The remaining Steps are the same for both exposure scenarios.

STEP 1. Determine EPH compliance by following the steps below:

A. Use the EPH analytical method to determine the EPH concentration for each sample:

i. If the person responsible for conducting the remediation has reason to believe that the EPH concentration in a sample is below 1,700 mg EPH/kg, the person responsible for conducting the remediation has the choice of using the non-fractionation option of NJDEP EPH Method Revision 3. If the EPH concentration determined by this option is less than or equal to 1,700 mg EPH/kg, then it is not necessary to analyze the sample using the fractionation option of NJDEP EPH Method Revision 3, nor is it necessary to determine the sample-specific health-based soil remediation criterion using the EPH Calculator. **Then go to Step 2.**

ii. If the person responsible for conducting the remediation has reason to believe that the EPH concentration in a sample is above 1,700 mg EPH/kg, or if the result of the non-fractionation option of the NJDEP EPH Method Revision 3 is greater than 1,700 mg EPH/kg, then it is necessary to analyze the sample using the fractionation option of the NJDEP EPH Method Revision 3 and to determine the sample-specific health-based soil remediation criterion using the EPH Calculator. **Then go to Step 1.B.**

See "Frequently Asked Questions for Petroleum Hydrocarbons," Question #18 for a discussion on the derivation of this 1,700 mg EPH/kg value (http://www.nj.gov/dep/srp/guidance/rs/eph_faq.htm).

B. Use the Department provided spreadsheet to calculate the sample-specific, human health-based EPH Soil Remediation Criterion (EPH SRC) for each sample, taking into account the applicable exposure scenario (i.e., residential or non-residential). **Then go to Step 1.C.**

C. Each EPH sample result is less than or equal to its associated calculated EPH SRC.

i. If the residential exposure scenario applies, then the **remediation is complete for EPH. Go to Step 2 to determine whether contingency analyses are required**. **If remediation is not complete, then go to Step 1.D.**

ii. If the non-residential exposure scenario applies, then the **remediation is complete for EPH, but an institutional control is required if the residential EPH SRC is exceeded. Go to Step 2 to determine whether contingency analyses are required**. **If remediation is not complete, then go to Step 1.D.**

D. One or more EPH sample results are greater than its associated calculated EPH SRC. **Conduct additional soil remediation (excavate/treat contaminated soil) and return to Step 1.A. If no additional soil remediation is conducted, then go to Step 1.E.**

E. **Alternatively, consider conditional remediation closure** (i.e., implementation of institutional and engineering controls) as well as address any other relevant rules, policies, and /or requirements. **Go to Step 2 to determine whether contingency analyses required.**

STEP 2. Determine contingency analysis requirements by addressing the following:

Required additional analyses depend upon the petroleum hydrocarbon mixture discharged. These requirements are detailed in the TRSR, Table 2-1 ("Analytical Requirements for Petroleum Storage and Discharge Areas," http://www.nj.gov/dep/srp/regs/techrule/techrule.pdf). Address all additional analyses that apply.

The user should always consult the most up-to-date version of the TRSR to ensure that the correct contingency analyses are performed.

Go to Step 3.

STEP 3. Perform the required contingency analysis. **If a remedial action is required, perform it, or consider conditional remediation closure** (i.e., implementation of institutional and engineering controls [excluding impact to ground water and free/residual product issues]) as well as address any other relevant rules, policies, and/or requirements. **Go to Step 4.**

STEP 4. Address all impact to ground water concerns for the identified contaminants related to the discharge as per the guidance provided at http://www.nj.gov/dep/srp/guidance/rs/igw_intro.htm (**note**: exceptions to the SPLP analytical protocol for Category 1 discharges are not to be used for Category 2 discharges). **Go to Step 5.**

STEP 5. Determine whether any measured EPH concentration is greater than the residual product/free product limit. EPH cannot exceed the residual product/free product limit of 17,000 mg EPH/kg for petroleum hydrocarbon mixtures heavier than No, 2 fuel oil and diesel (see Appendix 2 for a discussion of the derivation of the residual product/free product concentration).

A. All measured EPH concentrations are less than the calculated EPH SRC and are also less than 17,000 mg EPH/kg. **Remediation is complete for residual product/free product. Go to Step 6. If remediation is not complete, then go to Step 5.B.** Note that if the non-residential exposure scenario applies, at a minimum, an institutional control (i.e., Deed Notice) must be established for all areas exceeding the residential EPH SRC.

B. If any measured EPH concentration is less than its calculated EPH SRC but is greater than 17,000 mg EPH/kg, then additional remediation is required for EPH to achieve 17,000 mg EPH/kg residual product/free product limit. Following additional remediation, **Go to Step 6.** Note that if the non-residential exposure scenario applies, at a minimum, an institutional control (i.e., Deed Notice) must be established for all areas exceeding the residential EPH SRC.

STEP 6. If applicable, evaluate for the presence of sheen pursuant to the Department policy (http://www.nj.gov/dep/srp/guidance/sheen/). If not applicable, then **go to Step 7.**

A. Sheen that needs to be addressed pursuant to the sheen policy is not present. Therefore, there is no need to remediate sheen, **go to Step 7. Otherwise, go to Step 6.B.**

B. Sheen is present that needs to be addressed pursuant to the sheen policy. Take the necessary corrective actions. **Go to Step 7.**

STEP 7. Evaluate for ecological concern:

A. There are no EPH values exceeding 1,700 mg EPH/kg (see "Frequently Asked Questions for Petroleum Hydrocarbons," Question #3 for derivation; http://www.nj.gov/dep/srp/guidance/rs/eph_faq.htm). **The entire remediation is complete. If remediation is not complete, then go to Step 7.B.**

B. A BEE is appropriate:

i. If there is no contaminant of concern or no potential pathway or no sensitive ecological resource present based on the BEE, then **the entire remediation is complete. If remediation is not complete, then go to Step 7.B.ii.**

ii. If the BEE finds that a potential contaminant of concern has a potential pathway to a sensitive ecological resource, then take the necessary actions and address the ecological concern. **The entire remediation is complete.**

- Note that if the EPH concentration does not exceed 1,700 mg/kg measured at the sensitive ecological resource, the ecological remediation is considered complete.

- Be advised that the maximum ecological remediation goal has been set at 4,000 mg EPH/kg measured at the sensitive ecological resource. This value applies only to the terrestrial environment. For other environments (e.g., benthic), the TRSR are to be followed to determine the appropriate remediation

APPENDIX 1

EPH Protocol Summary

Type	Category 1		Category 2	
Exposure scenario	Residential	Non-residential	Residential	Non-residential
EPH Soil Remediation Criterion	5,100 mg/kg	54,000 mg/kg	Calculated	Calculated
EPH Trigger Concentration for Contingency Analyses	1,000 mg/kg	1,000 mg/kg	Pursuant to Technical Requirements for Site Remediation (TRSR), Table 2-1	Pursuant to TRSR, Table 2-1
Contingency Analyses (if required)	2-methylnaphthalene and naphthalene	2-methylnaphthalene and naphthalene	Pursuant to TRSR, Table 2-1	Pursuant to TRSR, Table 2-1
EPH Product Determination	8,000 mg/kg or greater	8,000 mg/kg or greater	17,000 mg/kg or greater	17,000 mg/kg or greater
Sheen Evaluation	Pursuant to Department "Sheen Remediation Policy Initiative" (http://www.nj.gov/dep/srp/guidance/sheen/)	Pursuant to Department Policy	Pursuant to Department Policy	Pursuant to Department Policy
Ecological Screening Criterion*	1,700 mg/kg	1,700 mg/kg	1,700 mg/kg	1,700 mg/kg

* Ecological evaluation not required at most homeowner sites or where there is no significant ecological receptor

APPENDIX 2

Residual saturation values for No. 2 fuel oil, diesel, and heavier TPH products

Paul Sanders, Ph.D.
Research Scientist

Bureau of Environmental Evaluation and Risk Assessment
Division of Remediation Management and Response
New Jersey Dept. of Environmental Protection

November 2009

Health-based screening levels for No. 2 fuel oil, diesel fuel, other fuel oils, and lubricating oils may be very high under certain conditions (e.g., non-residential scenarios). For this reason, it is necessary to develop maximum allowed concentrations for total petroleum hydrocarbons in soil to protect against other undesired effects of these contaminants when present at high levels. The presence of nonaqueous phase liquid (NAPL) when the soil saturation limit (C_{sat}) is exceeded is one parameter that has been used as an upper limit on individual contaminant concentrations in soil (USEPA, 1996; New Jersey Soil Remediation Standards: New Jersey Administrative Code 7:26D, accessed 2009). However, for petroleum products, this concentration has been calculated to be quite low, and far below health-based screening levels. For example, a C_{sat} concentration of 18 mg/kg has been estimated for diesel, compared to the NJDEP residential health-based concentration of 5,100 mg/kg (Brost and DeVaull, 2000). Thus, the C_{sat} concentration is not a useful parameter to use as an upper limit concentration for petroleum hydrocarbon products. A more practical parameter, the residual saturation point, has been defined as the concentration below which NAPL becomes discontinuous and is immobilized by capillary forces within the soil (Mercer and Cohen, 1990). This is analogous to the field capacity parameter for soil moisture. Above this concentration, NAPL may become mobile and be subject to downward drainage due to the effects of gravity. The fraction of the NAPL above the residual saturation point has been termed "free product," or "flowable product," and is generally not allowed by the NJDEP to remain in soil after remedial action is taken. The residual saturation concentration is therefore suitable as an upper limit for petroleum product concentrations in soil when the health-based screening criterion is very high. This parameter has also been utilized by Washington State [Washington Administrative Code 173-340-747, accessed 2009], Ohio [Ohio Administrative Code C 3745-300-09, accessed 2009] and Alaska (Alaska Statement of Cooperation Working Group, 2006).

The American Petroleum Institute recently reviewed available measurements of residual saturation points of various petroleum fuels as a function of soil type (Brost and DeVaull, 2000). This review includes the work of Cohen and Mercer (1990), Fussell et al. (1981), Hoag and Marley (1986), API (1980), and others. The residual saturation point is dependent on contaminant properties (especially viscosity) and upon soil properties (particularly soil texture). Low viscosity fuels, such as gasoline, have lower residual saturation points, while higher viscosity fuels, such as No. 2 heating oil, have higher values. Residual fuels, such as No. 6 fuel oil, are high viscosity products and may have residual saturation points many times higher than gasoline. Finer soil textures (such as silt) exhibit higher residual saturation points than coarser textures (such as sand).

The compiled data from Brost and DeVaull indicate that residual saturation concentrations for "middle distillates" (i.e., No. 2 fuel oil and diesel) ranged from 2,300-23,000 mg/kg as soil texture ranged from coarse gravel to silt (data from Fussell et al.). API (1980) reports a value for residual saturation diesel in "soil" as 34,000 (moisture content unknown). Sand was selected by the NJDEP as a reasonably conservative soil texture for determination of a default upper limit concentration for No. 2 fuel oil and diesel based on the residual saturation point. The results of Fussell et al. indicate that the residual saturation point for "medium sand" ranged from of 8,000-13,000 mg/kg. The soil moisture in these measurements was approximately 0.04 (v/v), which is in between median values for the wilt point (~0.02) and the field capacity (~0.06) for subsurface sand (Carsel et al., 1988). Since infiltrating petroleum would

likely displace some of the soil moisture being held at field capacity, this soil moisture content was felt to be appropriate.

As is discussed in Brost and DeVaull, the residual saturation concentrations from the study of Fussell et al. tend to be lower than those from other studies. This is illustrated by comparing the range of residual saturation points of gasoline in medium sand by Fussell et al. (3,000-6,000 mg/kg), with a range of 20,000-44,000 mg/kg reported for medium sand under similar moisture contents (Hoag and Marley, 1986). Thus, the residual saturation points of Fussell et al. appear to be conservative relative to other studies. Based on this assessment, Brost and DeVaull recommend a residual saturation concentration of 8,000 mg/kg for medium sand soil and middle distillates (i.e., diesel and No. 2 fuel oil). The NJDEP concurs that this value appears reasonable as a generic concentration to use as an upper limit for these fuel types in order to prevent the occurrence of mobile free product.

Using a similar analysis for "fuel oils" (i.e., fuel oils heavier than diesel and No. 2 fuel oil), the compiled data from Brost and DeVaull indicate that residual saturation concentrations for heavier fuel oil ranged from 5,000-51,000 mg/kg as soil texture ranged from coarse gravel to silt (data from Fussell et al.). API (1980) reports a value for residual saturation fuel oil and lubricating oil in "soil" as 53,000 (moisture content unknown). Again, looking at the results for medium sand from Fussell et al., where soil moistures were judged to be appropriate, the residual saturation point was estimated to be in the range of 17,000-30,000 mg/kg, and the recommended value for residual saturation for fuel oils heavier than diesel is 17,000 mg/kg. The NJDEP concurs with this assessment.

Data for lubricating oils other than mineral oil, as reported in Brost and DeVaull, is scarce. Furthermore, many of the reported results either do not include soil moisture contents or were inappropriately run on dry soil. For this reason, Brost and DeVaull do not recommend a residual saturation concentration for lubricating oils. However, review of the Brost and DeVaull report yields residual saturation values for mineral oil in glacial till and alluvium with water contents of 0.02 and 0.03, respectively. The reported residual saturation values are 11,000-19,000 mg/kg for glacial till and 61,000 mg/kg for alluvium. Both of these materials may vary widely in soil texture, but glacial till is more likely to be similar to sandy soils than alluvial material. Given that the residual saturation value selected for heavier fuel oils lies within the range reported for mineral oil in glacial till, it is judged by the NJDEP that the value of 17,000 mg/kg used for heavier fuel oil is also adequately protective for lubricating oils.

References

Alaska Statement of Cooperation Working Group (2006). Maximum allowable concentration, residual saturation, and free-product mobility: Technical background document and recommendations. Prepared by Geosphere/CH2MHILL. http://www.dec.state.ak.us/SPAR/csp/soc.htm#papers, accessed 2009.

API (1980). Underground spill cleanup manual. American Petroleum Institute, Washington, DC. Publication No. 1628.

Brost, J.B. and DeVaull, G.E. Non-aqueous phase liquid (NAPL) mobility limits in soil. American Petroleum Institute, Soil & Groundwater Research Bulletin, June 2000, No. 9.

Carsel, R.F., Parrish, R.S., Jones, R.L., Hansen, J.L. and Lamb, R.L. (1988). Characterizing the uncertainty of pesticide leaching in agricultural soils. *J. Contaminant Hydrol.*, *2*: 111-124.

Fussell, D.R., Godjen, H., Hayward, P., Lilie, R.H., Macro, A. and Panisi, C. (1981). Revised inland oil spill clean-up manual. Conservation of Clean Air and Water – Europe, Den Haag, The Netherlands. CONCAWE Report No. 3/79.

Hoag, G.E. and Marely, M.C. (1986). Gasoline residual saturation in unsaturated uniform aquifer materials. *J. Environ. Engineering*, *112*(3): 586-604.

Mercer, J.W. and R.M. Cohen (1990). A review of immiscible fluids in the subsurface: properties, models, characterization and remediation. *J. Contamin. Hydrol. 6*, 107-163.

USEPA (1996). Soil Screening Guidance: Technical Background Document. United States Environmental Protection Agency, Office of Emergency and Remedial Response, Washington, DC. EPA/540/R-95/128.

APPENDIX Q

Appendix Table 1 - Specific Ground Water Quality Criteria

Specific Ground Water Quality Criteria - Class IIA and Practical Quantitation Levels

Constituent	CASRN	Ground Water Quality Criterion*	Practical Quantitation Level (PQL)*	Higher of PQL and Ground Water Quality Criterion (µg/L)*
Acenaphthene	83-32-9	400	10	400
Acetone	67-64-1	6,000	10	6,000
Acetophenone	98-86-2	700	10	700
Acrolein	107-02-8	4	5	5
Acrylamide	79-06-1	0.008	0.2	0.2
Acrylonitrile	107-13-1	0.06	2	2
Adipates (Di(2-ethylhexyl)adipate) (DEHA)	103-23-1	30	3	30
Alachlor	15972-60-8	0.4	0.1	0.4
Aldicarb sulfone	1646-88-4	7	0.3	7
Aldrin	309-00-2	0.002	0.04	0.04
Aluminum	7429-90-5	200	30	200
Ammonia (Total)	7664-41-7	3,000	200	3,000
Aniline	62-53-3	6	2	6
Anthracene	120-12-7	2,000	10	2,000
Antimony (Total)	7440-36-0	6	3	6
Arsenic (Total)	7440-38-2	0.02	3	3
Asbestos	1332-21-4	$7X10^6$f/L>10um[a]	10^6f/L>10um[a]	$7X10^6$f/L>10um[a]
Atrazine	1912-24-9	3	0.1	3
Barium**	7440-39-3	6,000	200	6,000
Benz(a)anthracene	56-55-3	0.05	0.1	0.1
Benzene	71-43-2	0.2	1	1
Benzidine	92-87-5	0.0002	20	20
Benzo(a)pyrene (BaP)	50-32-8	0.005	0.1	0.1
Benzo(b)fluoranthene (3,4-Benzofluoranthene)	205-99-2	0.05	0.2	0.2
Benzo(k)fluoranthene	207-08-9	0.5	0.3	0.5
Benzoic acid	65-85-0	30,000	50	30,000
Benzyl alcohol	100-51-6	2,000	20	2,000
Beryllium	7440-41-7	1	1	1
alpha-BHC- (alpha-HCH)	319-84-6	0.006	0.02	0.02
beta-BHC (beta-HCH)	319-85-7	0.02	0.04	0.04
gamma-BHC (gamma-HCH/Lindane)	58-89-9	0.03	0.02	0.03
1,1-Biphenyl	92-52-4	400	10	400
Bis(2-chloroethyl) ether	111-44-4	0.03	7	7
Bis(2-chloroisopropyl) ether	108-60-1	300	10	300
Bis(2-ethylhexyl) phthalate (DEHP)	117-81-7	2	3	3
Bromodichloromethane (Dichlorobromomethane)	75-27-4	0.6	1	1
Bromoform	75-25-2	4	0.8	4
n-Butanol (n-Butyl alcohol)	71-36-3	700	20	700
tertiary-Butyl alcohol (TBA)	75-65-0	100	2	100
Butylbenzyl phthalate	85-68-7	100	1	100
Cadmium	7440-43-9	4	0.5	4
Camphor	76-22-2	1,000	0.5	1,000
Carbofuran	1563-66-2	40	0.5	40
Carbon disulfide	75-15-0	700	1	700
Carbon tetrachloride	56-23-5	0.4	1	1

Constituent	CASRN	Ground Water Quality Criterion*	Practical Quantitation Level (PQL)*	Higher of PQL and Ground Water Quality Criterion (µg/L)*
Chlordane	57-74-9	0.01	0.5	0.5
Chloride	16887-00-6	250,000	2,000	250,000
4-Chloroaniline (p-Chloroaniline)	106-47-8	30	10	30
Chlorobenzene (Monochlorobenzene)	108-90-7	50	1	50
Chloroform	67-66-3	70	1	70
2-Chloronaphthalene	91-58-7	600	10	600
2-Chlorophenol	95-57-8	40	20	40
Chlorpyrifos	2921-88-2	20	0.1	20
Chromium (Total)	7440-47-3	70	1	70
Chrysene	218-01-9	5	0.2	5
Color		10 CU	5 CU	10 CU
Copper	7440-50-8	1,300	4	1,300
Cumene (Isopropyl benzene)	98-82-8	700	1	700
Cyanide (free Cyanide)	57-12-5	100	6	100
2,4-D (2,4-Dichlorophenoxyacetic acid)	94-75-7	70	2	70
Dalapon (2,2-Dichloropropionic acid)	75-99-0	200	0.1	200
4,4'-DDD (p,p'-TDE)	72-54-8	0.1	0.02	0.1
4,4'-DDE	72-55-9	0.1	0.01	0.1
4,4'-DDT	50-29-3	0.1	0.1	0.1
Demeton	8065-48-3	0.3	1	1
Dibenz(a,h)anthracene	53-70-3	0.005	0.3	0.3
Dibromochloromethane (Chlorodibromomethane)	124-48-1	0.4	1	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	0.02	0.02	0.02
Di-n-butyl phthalate	84-74-2	700	1	700
1,2-Dichlorobenzene (ortho)	95-50-1	600	5	600
1,3-Dichlorobenzene (meta)	541-73-1	600	5	600
1,4-Dichlorobenzene (para)	106-46-7	75	5	75
3,3-Dichlorobenzidine	91-94-1	0.08	30	30
Dichlorodifluoromethane (Freon 12)	75-71-8	1,000	2	1,000
1,1-Dichloroethane (1,1-DCA)	75-34-3	50	1	50
1,2-Dichloroethane	107-06-2	0.3	2	2
1,1-Dichloroethylene (1,1-DCE)	75-35-4	1	1	1
cis-1,2-Dichloroethylene	156-59-2	70	1	70
trans-1,2-Dichloroethylene	156-60-5	100	1	100
2,4-Dichlorophenol (DCP)	120-83-2	20	10	20
1,2-Dichloropropane	78-87-5	0.5	1	1
1,3-Dichloropropene (cis and trans)	542-75-6	0.4	1	1
Dieldrin	60-57-1	0.002	0.03	0.03
Diethyl phthalate	84-66-2	6,000	1	6,000
Diisodecyl phthalate (DIDP)	26761-40-0	100	3	100
Diisopropyl ether (DIPE)	108-20-3	20,000	5	20,000
2,4-Dimethyl phenol	105-67-9	100	20	100
2,4-Dinitrophenol	51-28-5	10	40	40
2,4-Dinitrotoluene/2,6-Dinitrotoluene Mix	25321-14-6	0.05	10	10
Di-n-octyl phthalate	117-84-0	100	10	100
Dinoseb	88-85-7	7	2	7
Diphenylamine	122-39-4	200	20	200
1,2-Diphenylhydrazine	122-66-7	0.04	20	20
Diquat	85-00-7	20	2	20
Endosulfan (alpha and beta)	115-29-7	40	0.1	40

Constituent	CASRN	Ground Water Quality Criterion*	Practical Quantitation Level (PQL)*	Higher of PQL and Ground Water Quality Criterion (µg/L)*
alpha-Endosulfan (Endosulfan I)	959-98-8	40	0.02	40
beta-Endosulfan (Endosulfan II)	33213-65-9	40	0.04	40
Endosulfan sulfate	1031-07-8	40	0.02	40
Endothall	145-73-3	100	60	100
Endrin	72-20-8	2	0.03	2
Epichlorohydrin	106-89-8	4	5	5
Ethion	563-12-2	4	0.5	4
Ethyl acetate	141-78-6	6,000	10	6,000
Ethylbenzene	100-41-4	700	2	700
Ethylene dibromide (1,2-Dibromoethane)	106-93-4	0.0004	0.03	0.03
Ethylene glycol	107-21-1	300	200	300
Ethylene glycol monomethyl ether	109-86-4	7	20,000	20,000
Ethyl ether	60-29-7	1,000	50	1,000
Fluoranthene	206-44-0	300	10	300
Fluorene	86-73-7	300	1	300
Fluoride	7782-41-4	2,000	500	2,000
Foaming agents (ABS/LAS)		500	0.5	500
Formaldehyde	50-00-0	100	30	100
Glyphosate	1071-83-6	700	30	700
Hardness (as CaCO3)		250,000	10,000	250,000
Heptachlor	76-44-8	0.008	0.05	0.05
Heptachlor epoxide	1024-57-3	0.004	0.2	0.2
Hexachlorobenzene	118-74-1	0.02	0.02	0.02
Hexachlorobutadiene	87-68-3	0.4	1	1
Hexachlorocyclopentadiene	77-47-4	40	0.5	40
Hexachloroethane	67-72-1	2	7	7
Hexane (n-Hexane)	110-54-3	30	5	30
Indeno (1,2,3-cd)pyrene	193-39-5	0.05	0.2	0.2
Iron	7439-89-6	300	20	300
Isophorone	78-59-1	40	10	40
Lead (Total)	7439-92-1	5	5	5
Malathion	121-75-5	100	0.6	100
Manganese	7439-96-5	50	0.4	50
Mercury (Total)	7439-97-6	2	0.05	2
Methanol	67-56-1	4,000	70	4,000
Methoxychlor	72-43-5	40	0.1	40
Methyl acetate	79-20-9	7,000	0.5	7,000
Methyl bromide (Bromomethane)	74-83-9	10	1	10
Methylene chloride	75-09-2	3	1	3
Methyl ethyl ketone (2-Butanone) (MEK)	78-93-3	300	2	300
Methyl Salicylate	119-36-8	4,000	50	4,000
Methyl tertiary butyl ether (MTBE)	1634-04-4	70	1	70
Mirex	2385-85-5	0.1	0.08	0.1
Molybdenum	7439-98-7	40	2	40
Naphthalene	91-20-3	300	2	300
Nickel (Soluble salts)	7440-02-0	100	4	100
Nitrate	14797-55-8	10,000	100	10,000
Nitrite	14797-65-0	1,000	10	1,000
Nitrate and Nitrite		10,000	10	10,000
Nitrobenzene	98-95-3	4	6	6

Constituent	**CASRN**	**Ground Water Quality Criterion***	**Practical Quantitation Level (PQL)***	**Higher of PQL and Ground Water Quality Criterion (µg/L)***
N-Nitrosodimethylamine	62-75-9	0.0007	0.8	0.8
N-Nitrosodiphenylamine	86-30-6	7	10	10
N-Nitrosodi-n-propylamine (Di-n-propylnitrosamine)	621-64-7	0.005	10	10
Odor		3[b]	NA	3[b]
Oil & Grease & Petroleum Hydrocarbons		None Noticeable	NA	None Noticeable
Oxamyl	23135-22-0	200	1	200
Parathion	56-38-2	4	0.08	4
PBBs (Polybrominated biphenyls)	67774-32-7	0.004	0.001	0.004
PCBs (Polychlorinated biphenyls)	1336-36-3	0.02	0.5	0.5
Pentachlorophenol	87-86-5	0.3	0.1	0.3
pH		6.5-8.5	NA	6.5-8.5
Phenol	108-95-2	2,000	10	2,000
Picloram	1918-02-1	500	1	500
Pyrene	129-00-0	200	0.1	200
Salicylic acid	69-72-7	80	30	80
Selenium (Total)	7782-49-2	40	4	40
Silver	7440-22-4	40	1	40
Simazine	122-34-9	0.3	0.8	0.8
Sodium	7440-23-5	50,000	400	50,000
Styrene	100-42-5	100	2	100
Sulfate	14808-79-8	250,000	5,000	250,000
Taste		None Objectionable	NA	None Objectionable
TDS (Total dissolved solids)		500,000	10,000	500,000
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	1746-01-6	0.0000002	0.00001	0.00001
1,1,1,2-Tetrachloroethane	630-20-6	1	1	1
1,1,2,2-Tetrachloroethane	79-34-5	1	1	1
Tetrachloroethylene (PCE)	127-18-4	0.4	1	1
2,3,4,6-Tetrachlorophenol	58-90-2	200	3	200
Tetrahydrofuran	109-99-9	10	10	10
Thallium	7440-28-0	0.5	2	2
Toluene**	108-88-3	600	1	600
Toxaphene	8001-35-2	0.03	2	2
2,4,5-TP (2-(2,4,5-Trichlorophenoxy)propionic acid)	93-72-1	60	0.6	60
1,2,4-Trichlorobenzene	120-82-1	9	1	9
1,1,1-Trichloroethane (TCA)	71-55-6	30	1	30
1,1,2-Trichloroethane	79-00-5	3	2	3
Trichloroethene (TCE)	79-01-6	1	1	1
Trichlorofluoromethane (Freon 11)	75-69-4	2,000	1	2,000
2,4,5-Trichlorophenol	95-95-4	700	10	700
2,4,6-Trichlorophenol	88-06-2	1	20	20
1,2,3-Trichloropropane	96-18-4	0.005	0.03	0.03
Vanadium pentoxide	1314-62-1	60	1	60
Vinyl acetate	108-05-4	7,000	5	7,000
Vinyl chloride	75-01-4	0.08	1	1
Xylenes (Total)	1330-20-7	1,000	2	1,000
Zinc	7440-66-6	2,000	10	2,000
Microbiological criteria[m], Radionuclides & Turbidity	Standards promulgated in the Safe Drinking Water Act Regulations (N.J.A.C. 7:10-1 et seq.)			

Explanation of Terms:

* = Ground water quality criteria and PQLs are expressed as micrograms per liter (*u*g/L) unless otherwise noted. Table 1 criteria are all maximum values unless clearly indicated as a range for which the minimum value is to the left and the maximum value is to the right.

* * = revised via administrative change (see 39 N.J.R. 3538(a)).

PQL = Practical quantitation level as defined in N.J.A.C. 7:9C-1.4

CASRN = Chemical Abstracts System Registration Number

NA = not available for this constituent.

a = Asbestos criterion is measured in terms of fibers/L longer than 10 micrometers (f/L > 10 um)

*u*g = micrograms, L = liter, f = fibers, CU= Standard Cobalt Units

b = Odor Threshold Number, mg = milligrams, H = Hardness

(Total) means the concentration of metal in an unfiltered sample following treatment with hot dilute mineral acid (as defined in "Methods for Chemical Analysis of Water & Wastes", USEPA-600/4-79-020, March 1979) or other digestion defined by the analytical method. However samples that contain less than 1 nephelometric turbidity unit (NTU) and are properly preserved, may be directly analyzed without digestion.

m = Pursuant to prevailing Safe Drinking Water Act Regulations any positive result for fecal coliform is in violation of the MCL and is therefore an exceedance of the ground water quality criteria.

Appendix Table 2 - Interim Generic Ground Water Quality Criteria

Interim Generic Criteria--Synthetic Organic Chemicals (SOC)

Constituent	Criteria
SOCs defined as carcinogens in N.J.A.C. 7:9C-1.4 lacking specific or interim specific criteria	5 ug/l each 25 ug/l total
SOCs defined as non-carcinogens in N.J.A.C. 7:9C-1.4 lacking specific or interim specific criteria	100 ug/l each 500 ug/ l total

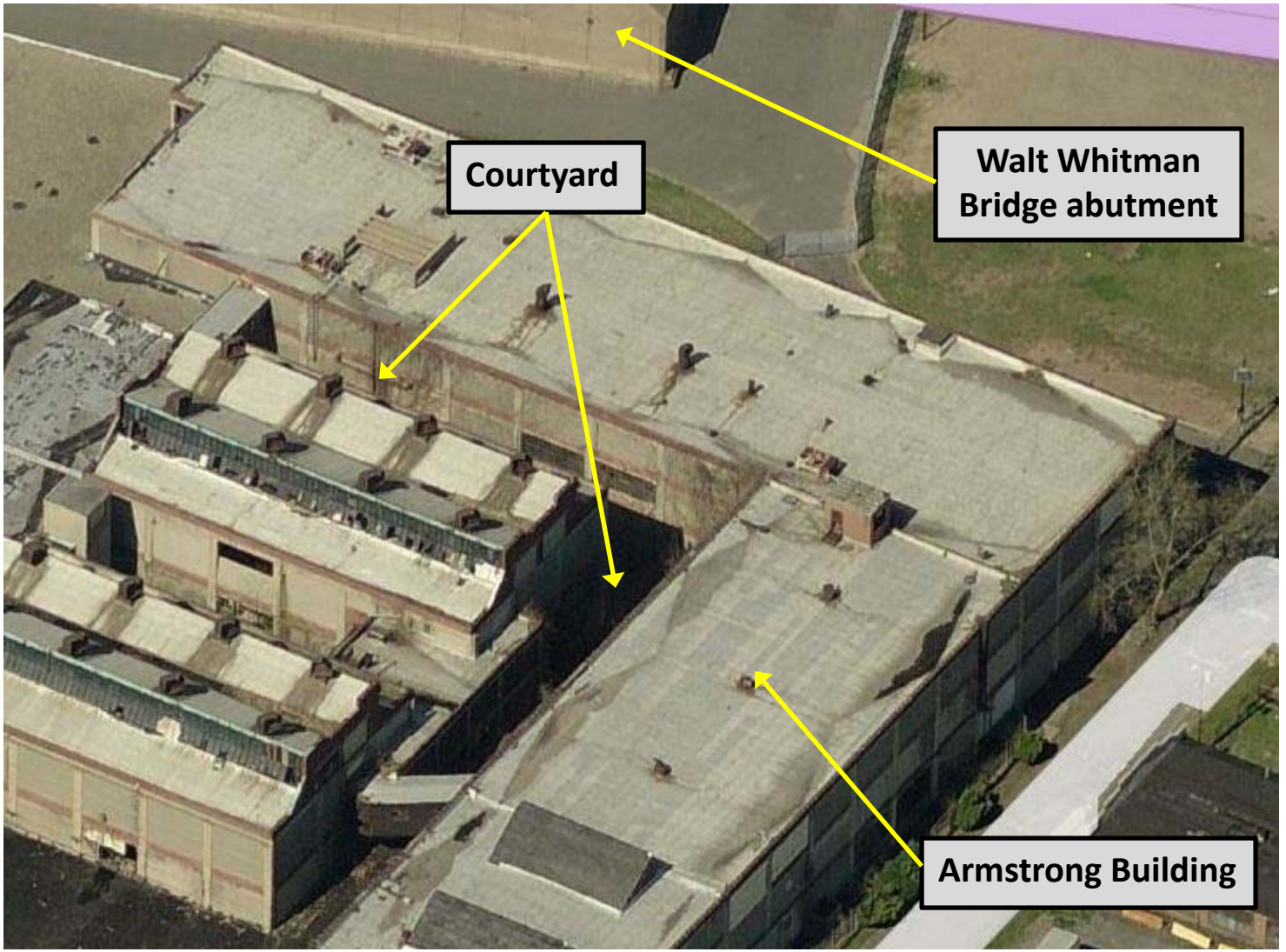
Figures 1 through 5 - Classification System Maps

APPENDIX R

US Army Corps
of Engineers

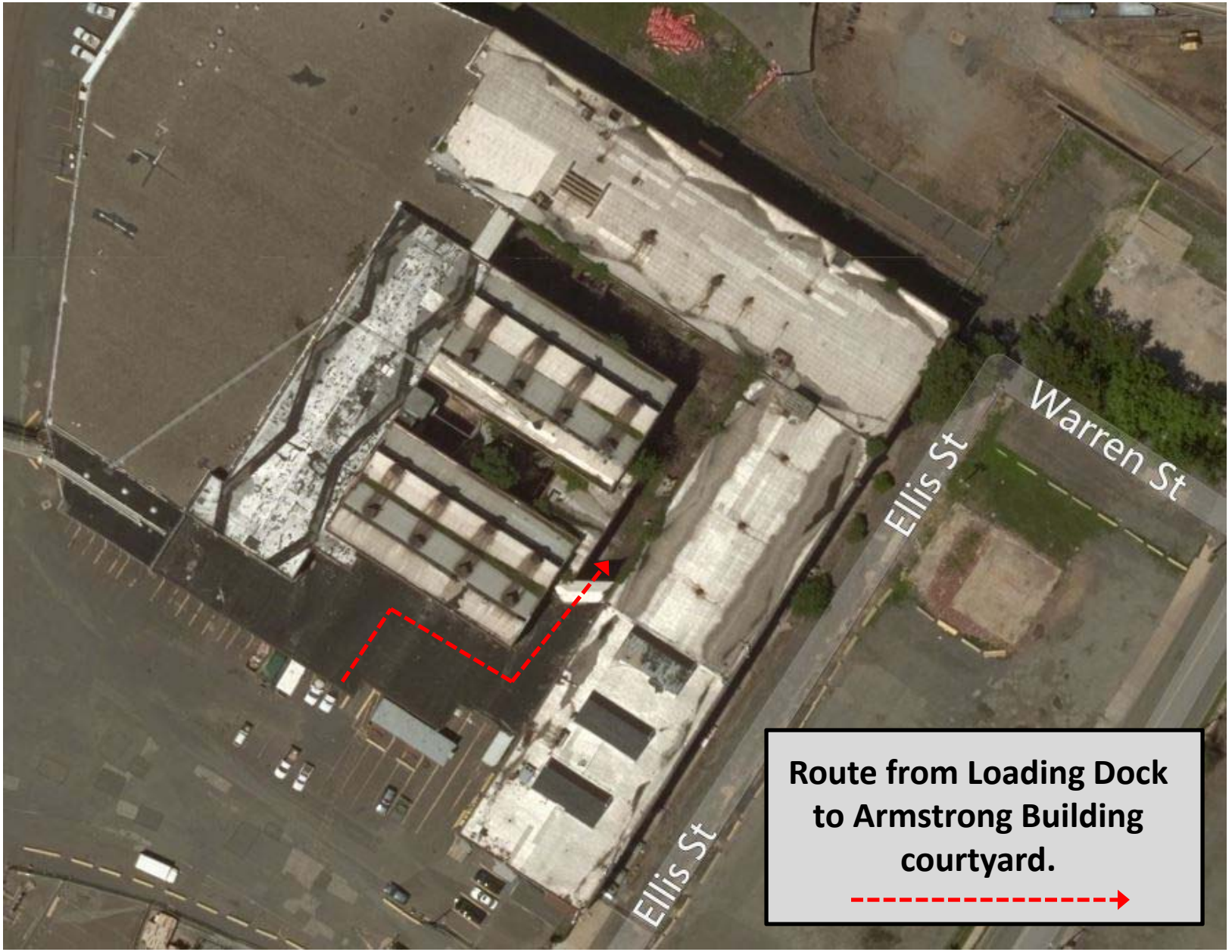
WELSBACH PLANT NOBS 258
GLOUCESTER CITY, NEW JERSEY
FORMERLY USED DEFENSE SITES (FUDS) PROGRAM
ATTACHMENT 5 - LOCATION & PHOTOGRAPHS OF PROJECT SITE

View of Armstrong Building (foreground) with courtyard visible.

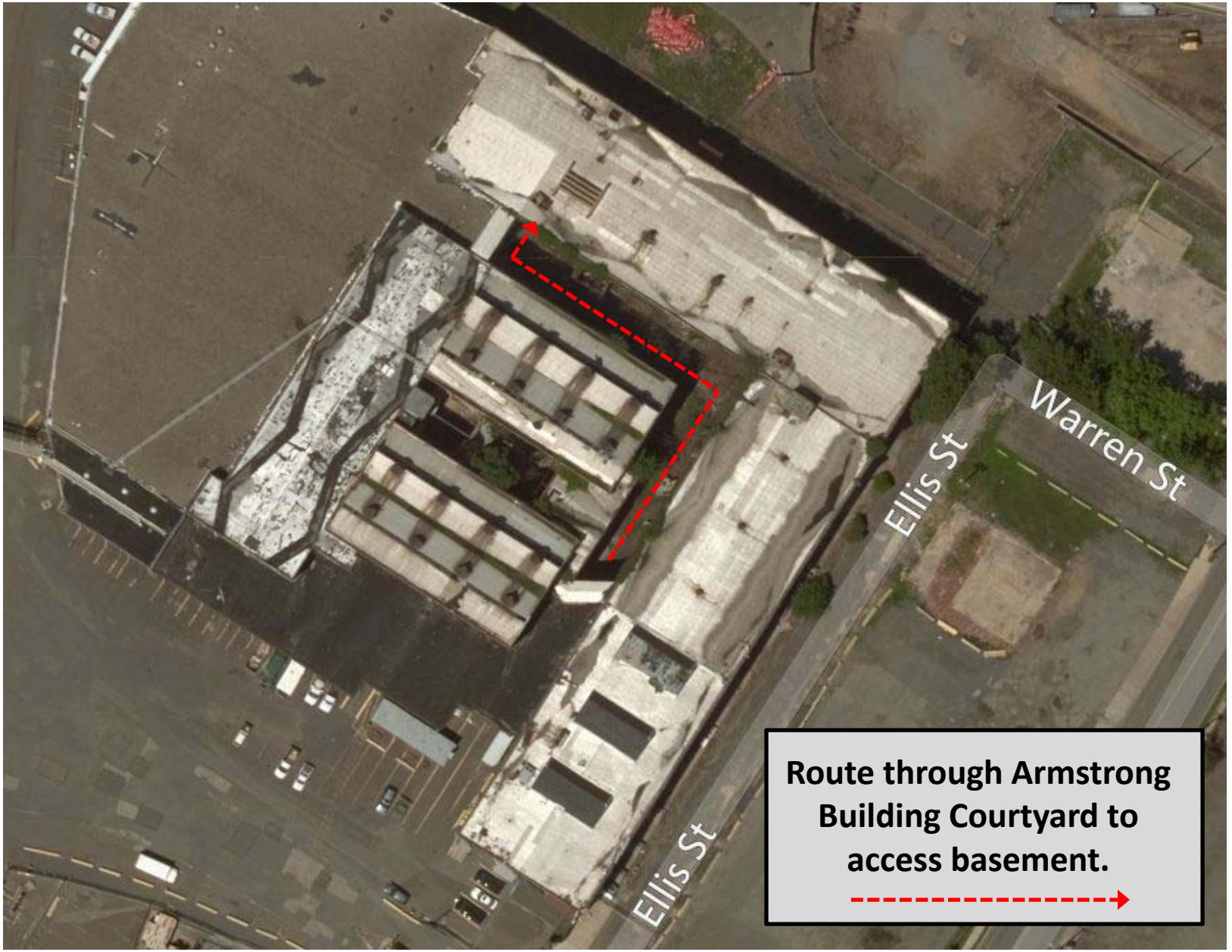


View looking North

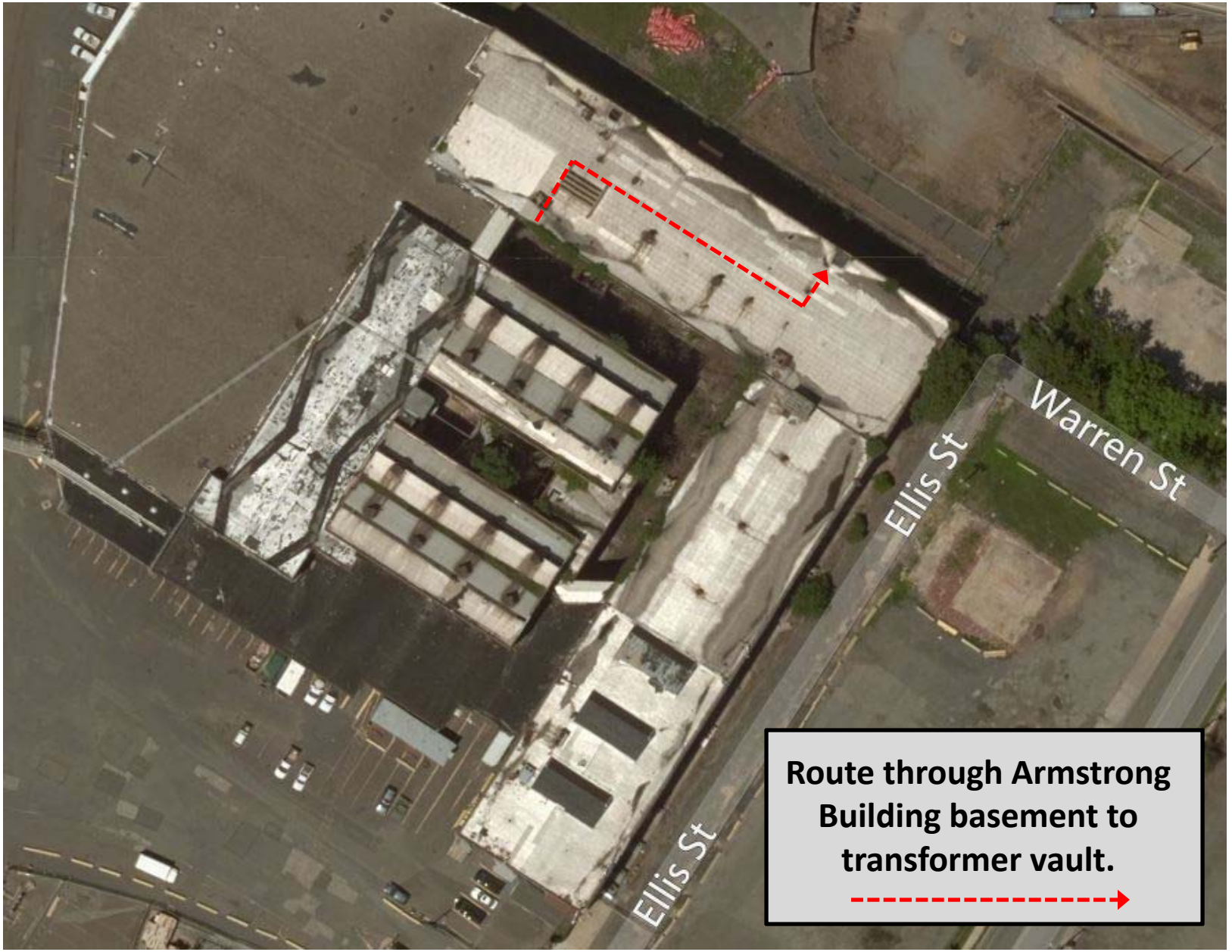
Welsbach Plant NOBS 258, C02NJ0950



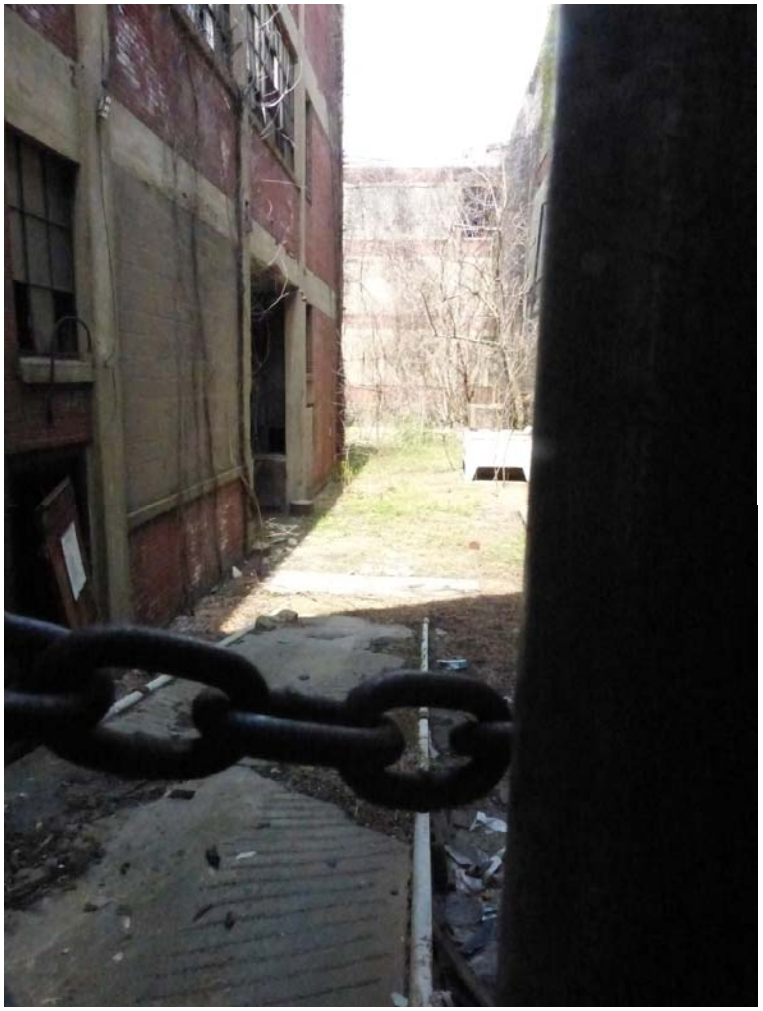
Welsbach Plant NOBS 258, C02NJ0950



Welsbach Plant NOBS 258, C02NJ0950



Welsbach Plant NOBS 258, C02NJ0950



Looking into the Armstrong Building Courtyard from the top of the access ramp leading down from the warehouse/loading dock .

Looking into the Courtyard from 2nd floor above the end of the Courtyard.

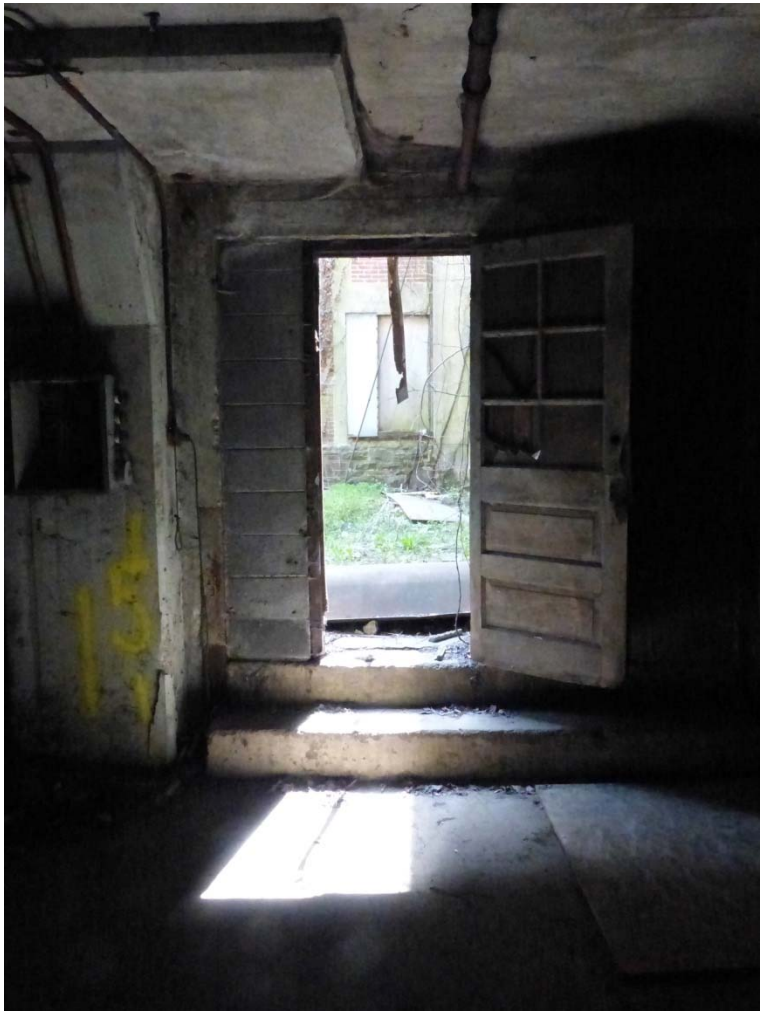
Welsbach Plant NOBS 258, C02NJ0950

Looking at basement doorway at the end of the Courtyard from 2nd floor.

Basement doorway opening must be enlarged and debris cleared to facilitate removal of the transformers.

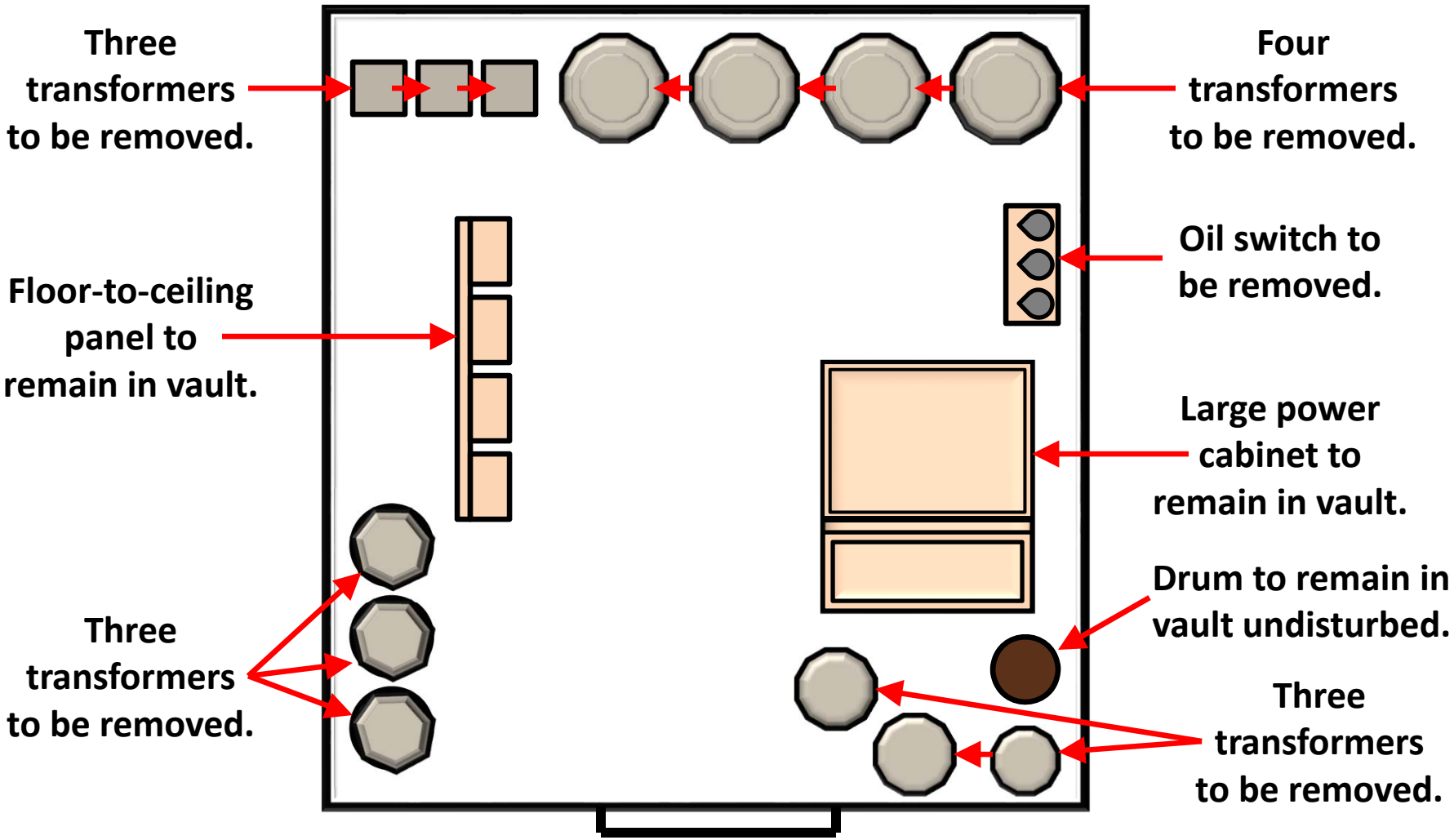
Welsbach Plant NOBS 258, C02NJ0950

Looking at basement doorway to the Courtyard of the Armstrong Building.



Close up of the basement doorway showing concrete block next to frame.

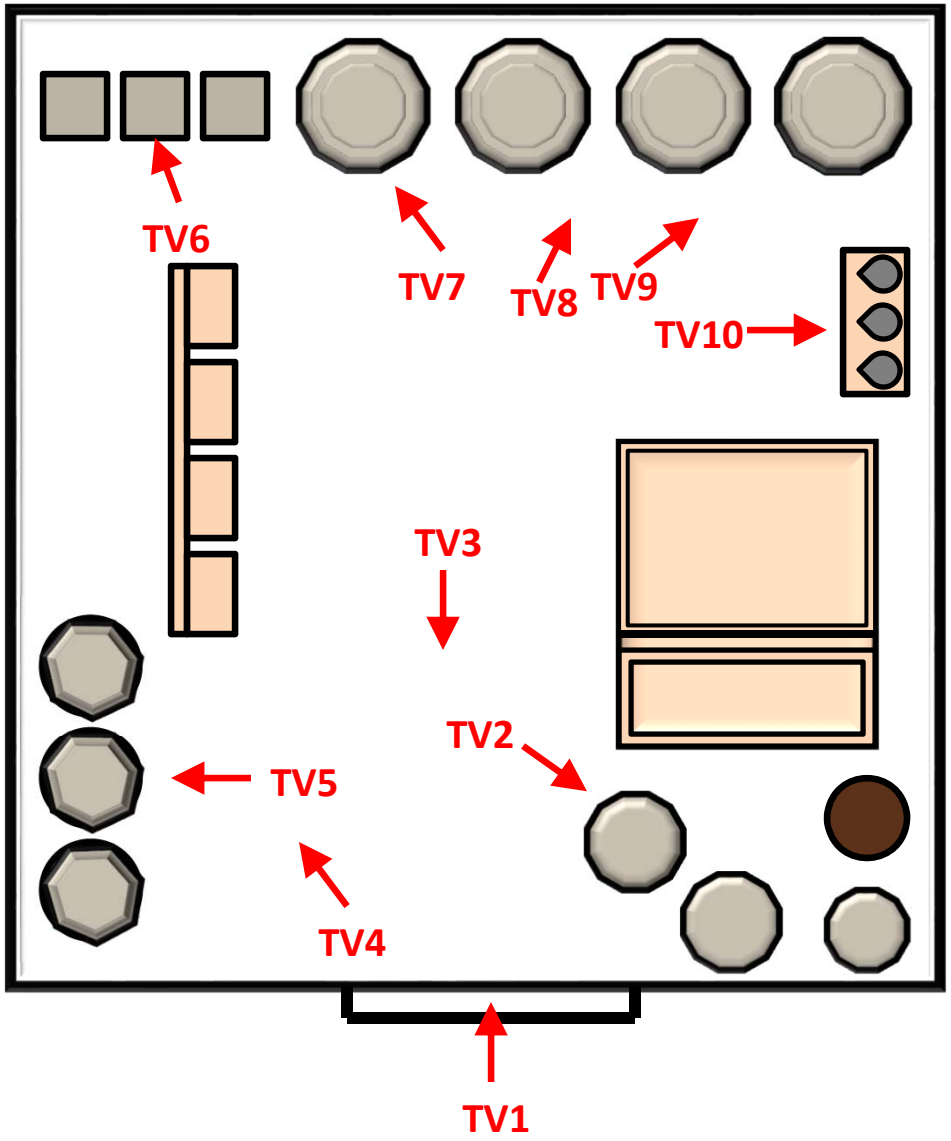
Welsbach Plant NOBS 258, C02NJ0950



General Plan of Transformer Vault

NOT TO SCALE

Welsbach Plant NOBS 258, C02NJ0950



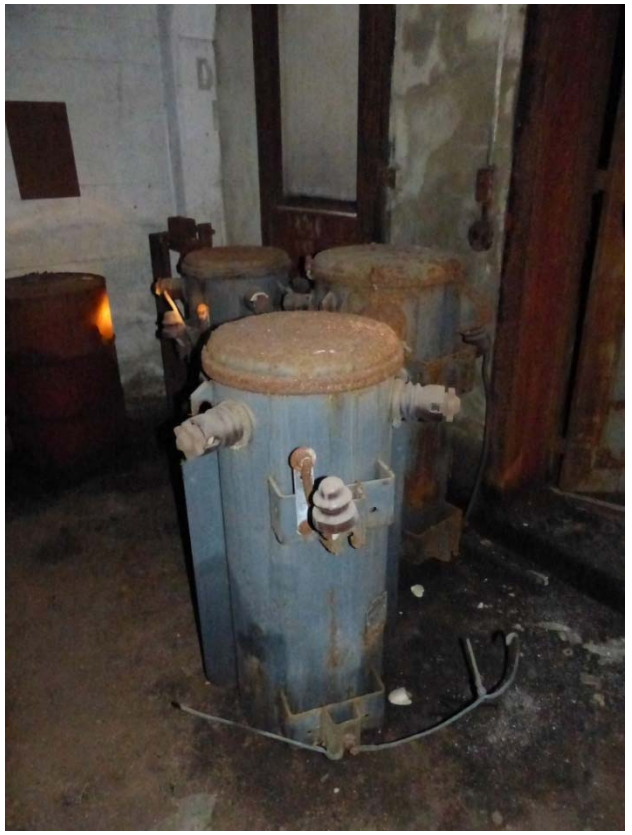
Thirteen transformers and oil switch to be removed.

Key to Photographs of Transformer Vault

NOT TO SCALE

Welsbach Plant NOBS 258, C02NJ0950

TV1



TV2

Photographs of the Transformer Vault

Welsbach Plant NOBS 258, C02NJ0950

TV3

TV4

Photographs of the Transformer Vault

Welsbach Plant NOBS 258, C02NJ0950

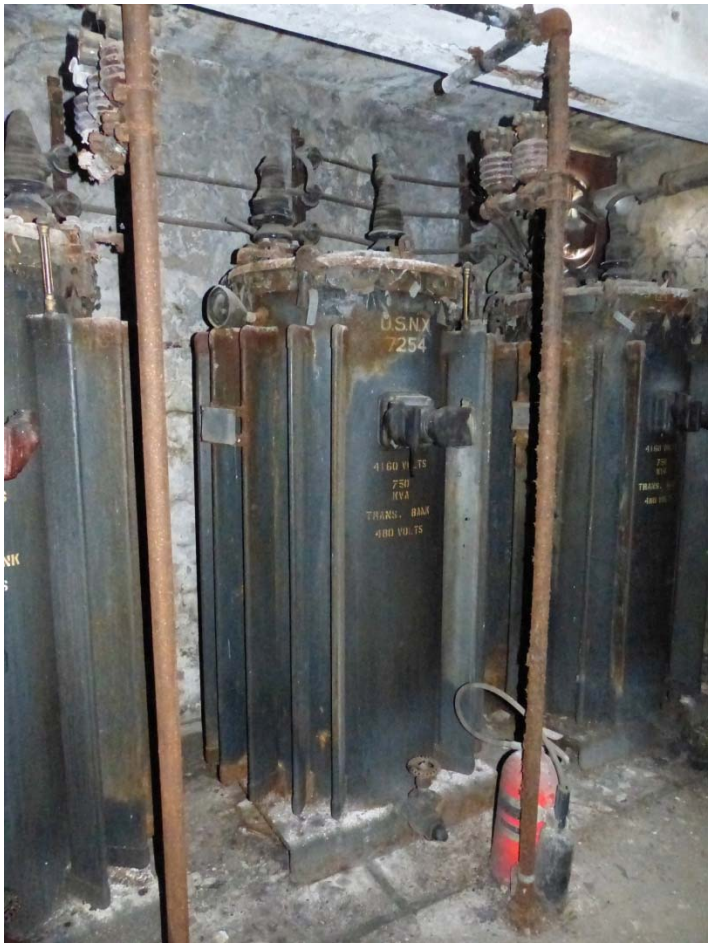
TV5

TV6

Photographs of the Transformer Vault

Welsbach Plant NOBS 258, C02NJ0950

TV7



TV8

Photographs of the Transformer Vault

Welsbach Plant NOBS 258, C02NJ0950

TV9

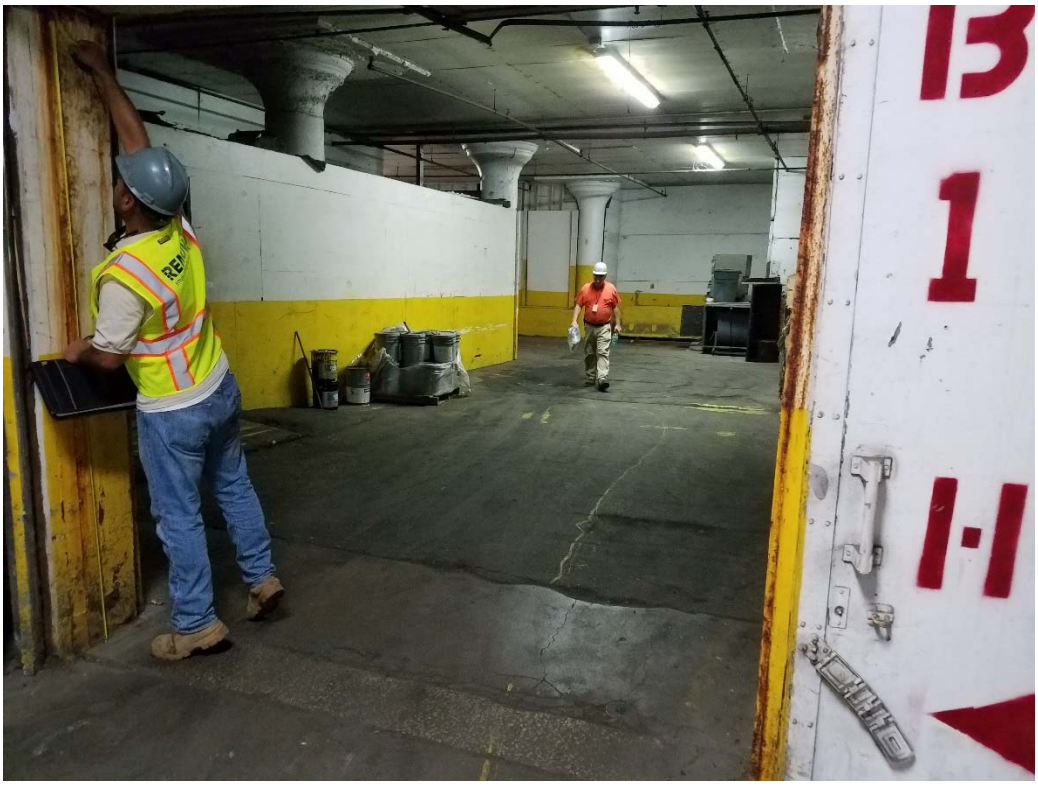
TV10

Photographs of the Transformer Vault

APPENDIX S

Entrance to Armstrong Building

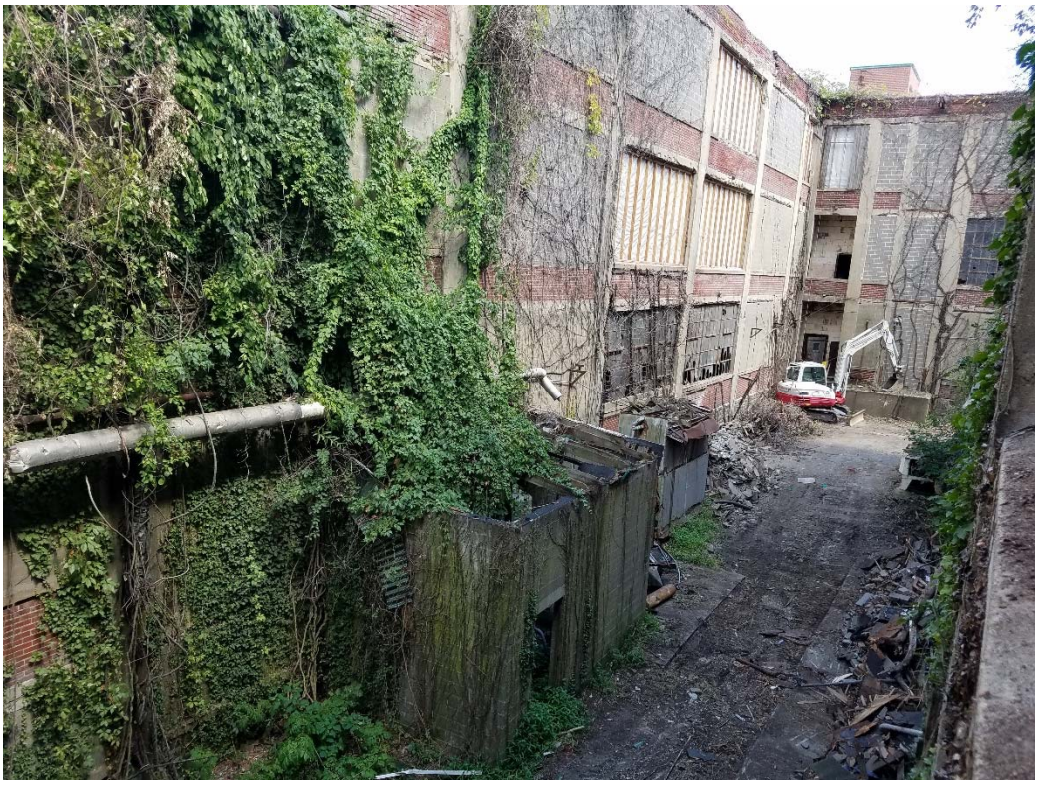
Entrance to Armstrong Building with ramp



Interior of Armstrong Building

Interior of Armstrong Building

Corridor next to Armstrong Building



Corridor next to Armstrong Building

Basement door opening to be enlarged and cleared

Transformers

Transformers

Oil switch

Transformer placard (typical)


Transformers

Exterior view of Armstrong Building