STATE OF NEW YORK
DEPARTMENT OF HEALTH

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Commissioner

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Executive Deputy Commissioner

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BUREAU OF EASTERN REMEDIAL ACTION

January 5, 2004

Mr. John Strang
New York State Department of Environmental Conservation
Division of Environmental Remediation
625 Broadway, 11th Floor
Albany, New York 12233-7015

Re: **Smithtown Groundwater Contamination Site**
Site No. 152175
Smithtown, Suffolk County

Dear Mr. Strang:

I have reviewed the December 2003 *Draft Human Health Risk Assessment* for the subject site. I have the following comment:

- As I have previously commented regarding the *Pathways Analysis Report* for this site, it would be preferable to use New York State groundwater standards and standards for public drinking water supplies (in addition to EPA risk-based screening levels) to identify chemicals of potential concern in groundwater. The method used in the report screens out the compound 1,1,1-TCA, which exceeded New York State standards in some private wells in the past.

Thank you for the opportunity to comment on this document. If you have any questions, please call me at (518) 402-7870.

Sincerely,

Rebecca Mitchell

Rebecca G. Mitchell
Assistant Sanitary Engineer
Bureau of Environmental Exposure Investigation

cc: Mr. G. Litwin/Mr. R. Fedigan/File
Mr. S. Robbins - SCDHS
Mr. W. Parish - NYSDEC Region 1

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Date: 12/29/03 3:24PM
Subject: Draft Feasibility Study Report for Smithtown

Hi All:

We have forwarded for your review and comments a copy of the Draft Feasibility Study Report (Dated December 24, 2003) for the Smithtown Groundwater Contamination Site, located in Smithtown, Long Island, NY. This document was shipped out last week and should have been delivered to each of you on Friday, December 26.

As you already know we are on a very tight schedule for finalizing the Record of Decision by March 31, 2004.

I would appreciate your comments on this report in an electronic and hard copy format by January 15, 2004.

Should you have questions on this request, please contact me at 212-637-4233

Thanks......

Syed Quadri

Syed Quadri, Remedial Project Manager
Emergency Remedial Response Division
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BUREAU OF EASTERN REMEDIAL ACTION

FINAL FEASIBILITY STUDY REPORT
SMITHTOWN GROUNDWATER CONTAMINATION SITE
SMITHTOWN, NEW YORK

Work Assignment No.: 112-RICO-02KQ

Prepared for:
U.S. Environmental Protection Agency
290 Broadway
New York, New York 10007-1866

Prepared by:
CDM Federal Programs Corporation
125 Maiden Lane - 5th Floor
New York, New York 10038

EPA Work Assignment No.	: 112-RICO-02KQ
EPA Region	: II
Contract No.	: 68-W-98-210
CDM Federal Programs Corporation	
Document No.	: 3223-112-FS-FFSR-04574
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Date Prepared	: March 25, 2004

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March 25, 2004

Mr. Syed Quadri
Remedial Project Manager
U.S. Environmental Protection Agency
290 Broadway, 20th Floor
New York, NY 10278

PROJECT:	RAC II Contract No.: 68-W-98-210 Work Assignment: 112-RICO-02KQ
DOCUMENT NO.:	3223-112-FS-FFSR-04574
SUBJECT:	Final Feasibility Study Report Smithtown Groundwater Contamination Site Smithtown, New York

Dear Mr. Quadri:

CDM Federal Programs Corporation (CDM) is pleased to submit the Final Feasibility Study Report for the Smithtown Groundwater Contamination Site, Smithtown, New York, as fulfillment of Subtask No. 12 of the Statement of Work. Per your request, CDM is mailing copies of the report to the distribution list provided.

If you have any questions on this submittal, please contact me at (212) 785-9123 or Ms. Susan Schofield at (203) 262-6633.

Very truly yours,

CDM FEDERAL PROGRAMS CORPORATION

Susan Schofield

Jeanne Litwin, REM
RAC II Technical Operations Manager

cc:
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Acronyms

ARAR	applicable or relevant and appropriate requirements
AS	air sparging
bgs	below ground surface
BTEX	benzene, toluene, ethylbenzene, xylene
CDM	CDM Federal Programs Corporation
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act of 1980
cis-1,2-DCE	cis-1,2-dichloroethene
CLP	Contract Laboratory Program
COC	Contaminant of Concern
COPC	Contaminant of Potential Concern
CWA	Clean Water Act
D	diluted
DNAPL	dense non-aqueous phase liquid
DO	dissolved oxygen
EAB	enhanced anaerobic biodegradation
EPA	United States Environmental Protection Agency
FAWQC	Federal Ambient Water Quality Criteria
FS	Feasibility Study
GAC	granular activated carbon
gpm	gallons per minute
HHRA	Human Health Risk Assessment
HI	hazard indices
HRS	Hazardous Ranking System
ISCO	in situ chemical oxidation
J	estimated value
K_d	retardation coefficient
K_{oc}	organic carbon petition coefficient
MCL	Maximum Contaminant Level
MCLG	Maximum Contaminant Level Goal
mg/kg	milligrams per kilogram
mg/l	milligrams per liter
MNA	monitored natural attenuation
MTBE	methyl tert butyl ether
mV	millivolts
MW	Monitoring Well
NCP	National Contingency Plan
NEPA	National Environmental Policy Act
NPL	National Priority List
NYSDEC	New York State Department of Environmental Conservation
NYPDES	New York Pollution Discharge Elimination System
OSHA	Occupational Safety and Health Administration
O&M	operations and maintenance

PCE	tetrachloroethene
ppb	parts per billion
PPE	personal protective equipment
PRB	permeable reactive barriers
PRG	Preliminary Remediation Goal
RAC	Response Action Contract
RAGS	Risk Assessment Guidelines for Superfund
RAO	Remedial Action Objective
RBC	Risk Based Concentrations
redox	oxidation/reduction
RCRA	Resource Conservation and Recovery Act
RI	Remedial Investigation
ROD	Record of Decision
SCDHS	Suffolk County Department of Health Services
SCWA	Suffolk County Water Authority
SLERA	Screening Level Ecological Risk Assessment
SVE	soil vapor extraction
SVOC	semi-volatile organic compound
TAL	Target Analyte List
TBC	to be considered
TCE	trichloroethene
TCL	Target Compound List
TMV	toxicity, mobility or volume
UV	ultraviolet
VC	vinyl chloride
VOC	volatile organic compound
VPW	vertical profile well
ug/Kg	microgram per kilogram
ug/L	microgram per liter
1,1-DCE	1,1-dichloroethene
1,1,1-TCA	1,1,1-trichloroethane

Executive Summary

Introduction

CDM Federal Programs Corporation (CDM) received Work Assignment 012-RICO-02KQ under the Base Period of the Response Action Contract II (RAC II) to perform a remedial investigation/feasibility study (RI/FS), a human health risk assessment (HHRA), and a screening level ecological risk assessment (SLERA) at the Smithtown Groundwater Contamination Site, located in Smithtown, Suffolk County, New York for the United States Environmental Protection Agency (EPA). The reports were completed under the Option Period of the RAC contract as work assignment 112-RICO-02KQ.

The purpose of this FS is to identify, develop, screen, and evaluate a range of remedial alternatives for contaminated groundwater so the regulatory agencies can select a feasible and cost-effective remedial alternative that protects public health and the environment from potential risks at the site.

Site Description

The site includes an area that has contaminated groundwater within the Villages of Nissequogue and Head of the Harbor, and the Hamlet of St. James, Smithtown, Suffolk County, New York. The site is situated in an approximately four-square mile predominantly residential area bounded by Stony Brook Harbor and an east-west line defined by Spring Hollow Road to the north; the Nissequogue River to the west; Edgewood Avenue and North County Road to the south; and Hitherbrook Road to the east. The site is bounded by bodies of water to the northeast (Stony Brook Harbor) and west (Nissequogue River), and residential developments to the north and east. Some homes use private wells for potable drinking water and septic systems for sanitary wastewater disposal. Some business/retail development is located in St. James, primarily along Lake Avenue and North Country Road (Route 25A).

Site History

In October 1997, EPA received a written request from the New York Department of Environmental Conservation (NYSDEC) requesting assistance in funding alternate water supplies for residences affected by contaminated groundwater. Attached to the NYDEC's request for assistance was a private well sampling survey, prepared by the Suffolk County Department of Health Services (SCDHS), which presented drinking water results from 35 private wells in the area (SCDHS 1997). Analytical data from the survey indicated that several wells were contaminated with volatile organic compounds (VOCs), primarily tetrachloroethylene (PCE). The areal extent of groundwater contamination in residential wells across the site suggests that multiple hydraulically upgradient sources were likely responsible for the discharge of chlorinated solvents to the subsurface.

SCDHS sampled the septic systems from 11 suspected source facilities from November 1997 through April 1998 (Table 1-2). Each facility utilizes a private sanitary sewerage disposal system consisting of septic tanks, cesspools/leaching pits, and/or other on-site wastewater disposal. Sample results showed detections of a number of VOCs, suggesting that several of the suspected source facilities were discharging hazardous wastes to the subsurface through their septic systems. Concentrations of PCE in liquid samples ranged from non-detect to 65,000,000 parts per billion (ppb). PCE in sludge samples ranged from non-detect to 160,000 ppb. At the direction of SCDHS, the septic systems were cleaned out subsequent to the 1997/1998 sampling. SCDHS issued letters to each property owner that clean outs were adequate and that no further action was necessary.

In July 1998, an EPA Action Memorandum was signed that authorized Removal Action activities to be conducted at the site. A Hazardous Ranking System (HRS) Report was prepared for the Smithtown Groundwater Contamination Site in August 1998. On January 19, 1999, the site was placed on the National Priorities List (NPL).

Field Investigation

The field investigation undertaken for the RI included groundwater screening surveys in the residential and potential source facilities, monitoring well and piezometer installation, sampling of residential wells and groundwater monitoring wells, surface water and sediment sampling, and sanitary system sampling from the potential source facilities. The goal of the investigations was to define the nature and extent of groundwater contamination in the residential areas of the site, identify source areas for that contamination and define the hydrogeologic framework. Sample results were compared with applicable or appropriate Federal and New York State standards and/or criteria to determine the extent of contamination.

Site Geology and Hydrogeology

The regional geology of Long Island is characterized by a southeastward-thickening wedge of unconsolidated Late Cretaceous sediments unconformably overlying a gently-dipping basement bedrock surface. The stratigraphy is briefly summarized from oldest to youngest. Six major hydrogeologic units have been identified beneath Long Island: Consolidated bedrock, Lloyd aquifer portion of the Raritan Formation, Raritan confining unit, Magothy aquifer, Smithtown Clay confining unit (when it is below the water table), and Upper Glacial aquifer.

The Upper Glacial and Magothy aquifers are the most heavily used for water supply in the vicinity of the site. Residential wells are usually completed in the Upper Glacial aquifer, while public supply wells tap both aquifers.

Groundwater at the site generally flows in a north/northwest direction, toward Long Island Sound. On a smaller scale, groundwater flow is complex because of the influence of surface water bodies such as the Nissoquogue River to the west and Stony Brook Harbor to the northeast. These water bodies act as groundwater discharge points. The depth to groundwater across the site varies from 5 feet below ground surface (bgs) near the shorelines to more than 200 feet bgs.

Nature and Extent of Contamination

The nature and extent of contamination in groundwater, surface water, sediment, wastewater, sludge, and indoor air were examined. Screening criteria were selected to evaluate contaminants detected in various media at the site. Whenever possible, established regulatory criteria, known as chemical-specific applicable or relevant and appropriate requirements (ARARs) were selected. In the absence of ARARs, non-enforceable regulatory guidance values, known as "to be considered" (TBC) were selected.

Groundwater Contamination

Three types of groundwater samples were collected at the site. Screening samples were collected at vertical profile wells (VPWs), samples were collected from monitoring wells and piezometers, and samples were collected from private residential wells. Contaminant summaries focus on VOCs, the contaminants of concern for the site.

Vertical Profile Wells

Twelve VPWs were installed in the residential areas and eleven VPWs were installed at the potential sources. Sporadic detections of chlorinated VOCs were encountered in some VPW samples at the residential areas, with levels generally below the screening criteria. PCE and 1,1,1-trichloroethane (1,1,1-TCA) exceeded the screening criteria at one location each. PCE exceeded the groundwater screening criteria at only one location at the potential source areas.

Toluene and methyl tert butyl ether (MTBE) were detected in residential and potential source area samples. Toluene is suspected to be cross-contamination from the drilling rig motor during sample collection. Toluene was detected very infrequently in other types of groundwater samples (e.g., residential wells, monitoring wells).

Monitoring Wells and Piezometers

Groundwater samples were collected from the piezometers in 2001, and from the monitoring wells and piezometers in 2002 and 2003. PCE, cis-1,2-dichloroethene (cis-1,2 DCE), 1,1-dichloroethene (1,1 DCE), 1,1,1-TCA, and TCE exceeded the screening criteria in one or more samples in the three sampling rounds. The maximum detected concentrations were: PCE 38 micrograms per liter (ug/l); cis-1,2 DCE 120 ug/l; 1,1 DCE 31 ug/l; 1,1,1 TCA 150 ug/l; and TCE 6.1 ug/l.

Residential Wells

Four rounds of groundwater samples were collected from selected residential wells from 1999 to 2003. PCE, cis-1,2 DCE, 1,1,1 TCA, TCE, and 1,1-DCA exceeded the screening criteria in one or more samples. The maximum detected concentrations and number of exceedance were: PCE 140 ug/l with 19 exceedances; cis-1,2 DCE 140 ug/l with 15 exceedances; 1,1,1 TCA 76 ug/l with 16 exceedances; TCE 12 ug/l with 5 exceedances; and 1,1 DCA 6 ug/l with 3 exceedances.

Summary of Groundwater Contamination

Groundwater contamination in the Smithtown area has been identified in isolated pockets which most likely represent slugs of contamination that were input into the groundwater in the distant past. Groundwater flow on a regional scale is generally toward the north/northwest and Long Island Sound. On a local scale, groundwater flow is complex. The two major water bodies in the area, the Nissoquogue River to the west and Stony Brook Harbor to the northeast, act as discharge points for groundwater.

Based on groundwater flow rates, contamination detected in the residential wells and/or monitoring well network was input to the groundwater many years ago. Locations of dry cleaners or other businesses that may have used chlorinated solvents may have changed over the years, but the general commercial areas upgradient of the residential areas have not changed significantly.

Because of the sporadic nature and isolated pockets of the contamination observed in the residential wells, a contiguous groundwater plume can not be mapped. The detections may represent small, isolated slugs of contamination that may have been released periodically in the past, as point sources through septic systems. The area has no large, municipal sanitary systems. Most businesses and homes in the area use individual septic systems for sanitary waste disposal. Contamination that may have been discharged to septic systems in the past would move with the groundwater as small, isolated pockets. Contamination released periodically from small-scale septic systems explains the pattern of disconnected pockets of contamination observed over the years in the many rounds of residential sampling. Wells with contamination occur in small clusters, or isolated contaminated wells surrounded by wells with no contamination. Well completion records for the residential area are incomplete, and residential wells are often completed at variable depths. Therefore, wells that produce contaminated water may tap a different depth and flow zone of the aquifer than other nearby, adjacent wells that are not contaminated.

Surface Water and Sediment Contamination

Low levels of VOCs were detected in surface water and sediment samples collected. PCE, 1,2-dichlorobenzene, and 1,1-DCE exceeded the screening criteria in one or more samples. Spring and seep surface water and sediment results indicate that groundwater with low levels of chlorinated VOC contamination is discharging along the Nissequogue River and Stony Brook Harbor. VOCs do not appear to be concentrating in sediments, although the detection limits for some sediment sample VOCs were elevated. Several detections of inorganic analytes in surface water and/or sediment were noted. These analytes are not related to Smithtown site contamination. The discharge areas along the river and harbor are subjected to twice daily tidal fluctuations, which serve to mix and disperse groundwater discharges.

Storm Drain Sediment Contamination

Storm drain sediment samples were collected to evaluate if illicit chemical dumping had occurred in the past at storm drains in the residential area. The most commonly detected VOC compound was trichlorofluoromethane, which was detected in 8 of 13 samples. Other VOCs with multiple detections (each detected twice) include 2-butanone, toluene, and xylene. VOCs with single detections include acetone, carbon disulfide, methyl acetate, chloroform, cyclohexane, methylcyclohexane, methyl tert butyl ether, ehtylbenzene, and isopropylbenzene. The types of contaminants detected in these sediments, along with the lack of detections of chlorinated VOCs, indicate that the storm drains have not been used in the recent past for illicit disposal of hazardous chemicals associated with the Smithtown site.

Sanitary/Cesspool Contamination

Wastewater and sludge samples were collected in 2003 from the potential sources of contamination identified by SCDHS in 1997. Subsequent to the sampling conducted by SCDHS, the septic systems were cleaned. The 2003 samples evaluated current levels of contamination in the septic systems. No wastewater samples exceeded the 1,000 ug/l total VOC screening criterion. Three sludge samples had limited exceedances of screening criteria. The limited exceedances of screening criteria indicate that the business waste handling practices have improved since septic systems were cleaned out in the late 1990s. These systems are not currently considered sources of contamination to the groundwater.

Human Health Risk Assessment (HHRA)

The HHRA was developed to characterize the potential human health risk based on exposures to groundwater at the Smithtown site. Standard EPA exposure models were used, coupled with reasonable maximum exposure assumptions about site conditions, to generate reasonable maximum estimates of the baseline (assuming no further remedial action) health risks associated with chemical contamination of environmental media. The assessment evaluated both cancer risks and noncancer hazards for adults and young children (1 to 6 years old) through a number of pathways.

Results of the reasonable maximum exposure scenario risk assessment indicate that the potential current/future carcinogenic health risk to on-site adults and young children from various pathways exceed EPA's risk range. The risk drivers from exposure to groundwater are PCE, TCE, chloroform, bis(2-ethylhexyl)phthalate, and arsenic; from exposure to surface water and sediment are benzo(a)pyrene, benzo(b)fluoranthene, indeno(1,2,3-cd)pyrene, and arsenic. Bis(2-ethylhexyl)phthalate, benzo(a)pyrene, benzo(b)fluoranthene, indeno(1,2,3-cd)pyrene, and arsenic are believed not to be site related. Chloroform is likely generated from the chemicals used for the cesspool treatment.

The non-cancer hazard indices (HIs) from exposure to groundwater are above 1.0. The risk drivers are chloroform, chromium, and iron. The HIs from exposure to surface water and sediment are below 1.0.

Screening Level Ecological Risk Assessment (SLERA)

Results of the screening level ecological risk assessment process indicate that the potential exists for ecological risk at the site resulting from exposure to chemicals detected in site sediment and surface water. Contaminants of potential ecological concern may present a risk to the aquatic invertebrates and receptors with food chain exposures from surface water and sediment of the seepage areas of the Nissequogue River and Stony Brook Harbor and the harbor wetland. For estuarine fish and crabs, contaminants of potential ecological concern in the surface water of the river, water discharging to the harbor (as determined from groundwater concentrations), and the harbor wetland may pose a potential risk. Primary risk contributors are metals and are not associated with site-related groundwater contamination, as discussed in Section 1.7.2. The chemicals that are responsible for the potential risk to ecological receptors are not the low levels of site-related contamination (volatile compounds in the 1 to 2 ppb range) in the groundwater that is discharging into the surface water of the Nissequogue River and Stony Brook Harbor.

Site Conceptual Model

The SCDHS collected samples from septic systems at current and former commercial/industrial users of solvents and dry cleaning agents in the area upgradient of the contaminated private wells. Numerous discharges may have occurred over the years at each of the 11 identified facilities. Septic systems were cleaned after SCDHS sampling in the late 1990s. Wastewater and sludge samples collected from these potential source areas in 2003 indicated that housekeeping practices have improved and that none are currently contributing contamination to the aquifer.

Discrete and discontinuous slugs of liquid chlorinated solvents discharged to the ground surface or very shallow vadose zone (e.g., from a septic system or leach field) would migrate downward through the unsaturated zone in a relatively linear pattern, with minimal dispersion from the discharge location. However, the Smithtown Clay may exist above the water table at some of the source areas, complicating migration. If the Smithtown Clay is present beneath the leaching fields, discharged solvents would migrate downward to the top of the clay, pool, then begin to migrate across the surface of the clay. The distance (up to two miles) separating the potential source areas and the receptors further complicates contaminant transport scenarios. Clay may exist beneath some of the facilities, but it is not known if the clay is continuous throughout the area. The unsaturated zone is approximately 120 to 140 feet thick at the potential source areas.

Once the slugs of liquid chlorinated solvent (PCE and TCE) encounter the water table (Upper Glacial aquifer), some of the solvent would dissolve in the groundwater and begin to move in the direction of groundwater flow as small, isolated pockets of contamination. Numerous slugs may exist from the upgradient areas, moving with the groundwater flow as small, separate areas of contamination. The small areas of contamination likely would not merge into a coherent, mappable groundwater plume as the discrete slugs flow downgradient into the residential areas. The observed patterns of groundwater contamination in the residential areas do not represent a mappable groundwater plume.

If the quantity of solvent reaching the water table is sufficient, some of the solvent will remain in an undissolved state as a dense non-aqueous liquid (DNAPL). No signs of DNAPL have been observed.

Chlorinated solvents such as PCE and TCE in a dissolved phase move with the groundwater flow, but generally at a slower rate than groundwater. If disposal of PCE from the southernmost upgradient area is assumed to have begun in 1970, at an estimated flow rate of 1 foot/day for the Upper Glacial aquifer, in 32 years contaminated groundwater would have migrated about 12,000 feet in the Upper Glacial aquifer to the currently affected areas. There are no known large scale pumping or supply wells in the area to alter the natural movement of groundwater.

Little degradation of PCE in the groundwater was observed (lack of degradation products) at the Smithtown site. Other natural attenuation processes (i.e., dilution, dispersion, and volatilization) played a more important role in the attenuation of PCE in the Smithtown site. The groundwater sample results indicate an overall decreasing trend for PCE and cis-1,2 DCE, which are the two major contaminants at the site. For example, the average PCE concentrations dropped from 49 ug/L to 4 ug/L. Cis-1,2 DCE has similar decreasing trends. Preliminary groundwater modeling predicts the majority of the contaminant mass would be removed (discharge to the surface water) in several years due to groundwater flushing action. It is expected the decreasing trends for contaminant concentrations will continue.

Remedial Action Objectives

Groundwater

This Feasibility Study focuses on the cleanup of groundwater at the site. The RI results indicate groundwater is contaminated with volatile organic compounds, in particular PCE and cis-1,2 DCE, and could pose risks to human health when exposed.
The remedial action objectives for the groundwater are:

- Prevent ingestion and direct contact with groundwater which has contaminants of potential concern concentrations greater than the Preliminary Remedial Goals (PRGs).
- Reduce VOC-contaminated groundwater that exceeds the PRGs.

The long-term remedy should attain the above objectives. To achieve the above remedial action objectives, cleanup criteria are developed based on compliance with ARARs and risk-based levels. For this FS, the Federal and New York Primary Drinking Water Standards and New York Groundwater Quality Standards were used to develop the PRGs.

Surface Water and Sediment

Surface water and sediment sample results indicate that groundwater with very low levels of chlorinated VOC contamination is discharging along the Nissequogue River and Stony Brook Harbor. VOCs do not appear to be concentrating in surface water and sediments. The discharge areas along the river and harbor are subjected to twice daily tidal fluctuations, which serve to mix and disperse groundwater discharges.

Because VOCs are not concentrating in the surface water and the areas are subjected to daily tidal flushes, the remedial action objective for the surface water is to verify protection from VOC contamination reaching the Nissequogue River and the Stony Brook Harbor.

Because VOCs in sediment does not pose a risk to the ecological receptors, the remedial action objective for sediment is no action.

Summary of Remedial Alternatives

Potential applicable technologies were identified for each general response action category. The technologies were screened using effectiveness, implementability, and cost as the criteria. The technologies that passed the initial screening were then assembled into three remedial alternatives, as presented below:

Alternative 1 - No Action

The No Action alternative was retained for comparison purposes as required by the National Contingency Plan (NCP). No remedial actions and costs are included in this alternative.

Alternative 2 – Alternate Water Supply/Institutional Controls/ Long-term Monitoring

Currently there are risks to human health as groundwater is being used as potable water. As part of this alternative, homes determined to be within the area recommended for public water would be connected to the public water supply for their future potable water needs. Current residential wells would be abandoned to eliminate possible risk to human health. Institutional controls such as groundwater use restrictions (through well drilling permit restrictions) would also be implemented to prevent future use of contaminated groundwater. Long-term monitoring would include groundwater and surface water sampling. Surface water will be collected in select locations along the Nissequogue River and Stony Brook Harbor. Groundwater would be sampled from selected monitoring wells to monitor the contaminant concentrations and migration over time. Additional monitoring wells would be installed as necessary to allow for effective monitoring of the contamination. Site conditions would be reviewed every five years during the 30-year evaluation period. The present worth for this alternative is $4.1 million.

Alternative 3 – Alternate Water Supply/Groundwater Extraction/Treatment/On-site Injection/Institutional Controls/Long-term Monitoring

The two objectives of this alternative are 1) to provide a potable water source to the residences that are potentially effected by the contaminated groundwater and 2) to prevent contaminated groundwater from migrating off-site by hydraulically containing the contaminant plume, and to accelerate the cleanup of contaminated groundwater in the impacted areas.

Treatment of extracted groundwater would include inorganic removal and liquid-phase carbon adsorption. Treated groundwater would be injected into the ground. During the remediation period, residences with groundwater exceeding the drinking water standards would be provided with well head treatment. Long-term groundwater and surface water monitoring would be performed to monitor changes in contaminant concentrations and distribution onsite and offsite over time. Institutional controls would be implemented to prevent exposure to contaminated groundwater. Site conditions would be reviewed every five years during the 10-year evaluation period. The present worth for this alternative is $6.9 million.

Evaluation of Remedial Alternatives

These alternatives were evaluated in detail according to the following seven EPA criteria.

Overall Protection of Human Health and the Environment

Alternative 1 would not provide protection of human health, since contamination would remain in groundwater for some time in the future, and potential exposure to contaminated groundwater would not be restricted. Currently there are risks to human health because the groundwater at the site is used as a source of drinking water. Alternatives 2 and 3 are equally protective of human health by eliminating current and future exposure to contaminated groundwater. Alternative 2 would provide a potable water source for the area; however, would not provide any active treatment but rely on natural processes to reduce contaminant mass. Alternatives 3 would provide a potable water source and utilize active treatment processes to reduce the toxicity, mobility, and volume of the contaminants, in addition to the natural processes.

Alternatives 1 and 2 would rely on natural mechanisms to reduce the groundwater contamination. Alternative 2 would monitor the conditions of groundwater and additional remedies could be implemented if necessary. Alternative 3 would provide some additional protection of the environment as the contaminant cleanup would be accelerated by active pumping.

Compliance with ARARs

All alternatives would attain the PRGs within 30 years. Alternative 3 would accelerate the cleanup time through active pumping while Alternatives 1 and 2 would rely on natural mechanisms to reduce the contaminant concentrations. Long-term groundwater monitoring is a component of Alternatives 2 and 3 to assess the degree of compliance achieved over time. All alternatives would comply with location- and action-specific ARARs.

Long-term Effectiveness and Permanence

Alternative 1 would not be effective or permanent, since the contaminants would not be destroyed and there would be no mechanism to prevent current and future exposure to contaminated groundwater. Alternatives 2 and 3 would be effective and permanent since an alternate water supply would be reliable when combined with institutional controls and long-term monitoring. Pumping and treatment under Alternative 3 would only provide marginal improvement in contaminant removal.

Reduction of Toxicity, Mobility, or Volume Through Treatment

Alternatives 1 and 2 would not reduce the VOCs through treatment as no active treatment of contaminated groundwater occurs. The toxicity and volume would eventually be reduced for Alternatives 1 and 2 due to natural processes. Alternative 3 would reduce the mobility and volume of the contaminants. This alternative also involves the treatment of the contaminated groundwater thus reducing toxicity. It is anticipated that all alternatives would meet the drinking water standards within 30 years, with Alternative 3 achieving the standards in the shortest time.

Short-term Effectiveness

For alternative 1 protection of the community and workers would not be applicable as no remedial action occurs. There will be short term inconveniences to the residents for Alternatives 2 and 3. Air monitoring, engineering controls, and appropriate worker personal protection equipment would be used to protect the community and workers for Alternatives 2 and 3.

Implementability

Alternative 1 would be easiest both technically and administratively to implement. Alternative 2 would be the second easiest to implement. Alternative 3 would be easy to implement technically but could be administratively difficult to implement because of the space limitations and the locations of the treatment plants may not be well received by the community.

Cost

Alternatives 3 is more expensive than Alternatives 2. Alternative 1 incurs no cost but also provides no protection to human health.

Section 1
Summary of Feasibility Study

CDM Federal Programs Corporation (CDM) received Work Assignment 012-RICO-02KQ under the Base Period of the Response Action Contract II (RAC II) to perform a remedial investigation/feasibility study (RI/FS), a human health risk assessment (HHRA), and a screening level ecological risk assessment (SLERA) at the Smithtown Groundwater Contamination Site (the site), located in Smithtown, Suffolk County, New York for the United States Environmental Protection Agency (EPA). The reports were completed under the Option Period of the RAC contract as work assignment 112-RICO-02KQ.

1.1 Purpose of Feasibility Study Report

The purpose of this FS is to identify, develop, screen, and evaluate a range of remedial alternatives for contaminated groundwater so the regulatory agencies can select a feasible and cost-effective remedial alternative that protects public health and the environment from potential risks at the site.

1.2 Site Description

The site includes an area that has contaminated groundwater within the Villages of Nissequogue and Head of the Harbor, and the Hamlet of St. James, Smithtown, northern Suffolk County, New York (Figures 1-1 and 1-2). The site is situated in an approximately four-square mile predominantly residential area bounded by Stony Brook Harbor to the northeast, the area south of the harbor to North Country Road, and the Nissequogue River to the west. The site is bounded by bodies of water to the northeast (Stony Brook Harbor) and west (Nissequogue River), and residential developments to the north and east. Some homes use private wells for potable drinking water and septic systems for sanitary wastewater disposal. Some business/retail development is located in St. James, primarily along Lake Avenue and North Country Road (Route 25A).

1.3 Site History

In October 1997, EPA received a written request from the New York State Department of Environmental Conservation (NYSDEC) requesting assistance in funding alternative water supplies for residences affected by contaminated groundwater. A private well sampling survey prepared by the Suffolk County Department of Health Services (SCDHS) presented drinking water results from 35 private wells in the area (SCDHS 1997). Analytical data indicated that several wells were contaminated with volatile organic compounds (VOCs), primarily tetrachloroethene (PCE).

SCDHS collected samples from approximately 150 homes throughout the area of the site. Analytical results indicated that 23 residences were contaminated with PCE at concentrations exceeding the State and federal maximum contaminant level (MCL) of 5 parts per billion (ppb). In April 1998, EPA collected 330 samples from 295 private wells to further delineate the extent of PCE contamination (Figure 1-3). A total of 35 residential wells were identified as contaminated with PCE (or its breakdown products) at concentrations above the MCLs.

In April 1998, EPA began the delivery of bottled water to the affected homes where the Removal Action Level was exceeded. In June 1998, EPA expanded water delivery to all residences where the MCLs for PCE or its breakdown products was exceeded.

In July 1998, an EPA Action Memorandum was signed, authorizing Removal Action activities to be conducted at the site. For homes where the MCL was exceeded and where public water was available, EPA provided the service connection to the public supply. For homes where the MCL was exceeded and public water was not available, EPA installed individual household granular activated carbon treatment systems or upgraded existing treatment systems installed independently by residents (Table 1-1).

A Hazard Ranking System (HRS) Report was prepared for the Smithtown Groundwater Contamination site in August 1998. On January 19, 1999, the Smithtown Groundwater site was placed on the National Priorities List.

1.4 Results of Previous Investigations

Potential Source Areas

SCDHS sampled 11 facilities from November 1997 through April 1998 (Table 1-2). Each facility utilizes a private sanitary sewerage disposal system consisting of septic tanks, cesspools/leaching pits, and/or other on-site wastewater disposal. Sample results showed detections of a number of VOCs, and suggested that several of the suspected source facilities discharged hazardous wastes to the subsurface through their septic systems. Concentrations of PCE in liquid samples ranged from non-detect to 65,000,000 ppb. PCE in sludge samples ranged from non-detect to 160,000 ppb. At the direction of SCDHS, the septic systems were cleaned out subsequent to the 1997/1998 sampling. SCDHS issued letters to each property owner that clean outs were adequate and that no further action was necessary.

SCDHS and EPA sampling indicated that 35 residential wells were contaminated with PCE (or its breakdown products) at concentrations above the MCLs.

1.5 Study Area Investigations

The field investigations undertaken for the RI included work in the residential areas of the site and work at potential sources along Lake Avenue and North Country Road. Potential sources were identified initially by SCDHS as discussed in Section 1.4. The potential sources are primarily local dry cleaning businesses and automotive repair shops that may have used chlorinated solvents as degreasers.

Residential Area Investigations
Investigations in the residential area included geophysical surveys for underground utilities; groundwater screening surveys at 12 locations; installation of 6 piezometers, 13 monitoring wells, and environmental sampling. Sampling included three rounds of piezometer samples, two rounds of monitoring well and piezometer samples, four rounds of residential well samples; and surface water/sediment samples. EPA collected air samples in basements of 12 homes in the residential area in 2003.

Potential Source Area Investigations
Investigations at each of the 11 potential source areas included geophysical surveys for underground utilities; groundwater screening surveys at all 11 locations; installation of one monitoring well where the groundwater screening sample exceeded the PCE screening criteria; and collection of septic system wastewater and sludge samples.

1.6 Physical Characteristics of the Study Area

The physical characteristics of the study area are described below.

1.6.1 Topography

The topography of the site is complex, with an altitude range of 230 feet above sea level to sea level at the edges of the Nissequogue River and Stony Brook Harbor (Figure 1-4). The site is located on the crest and north- and south-facing flanks of the Harbor Hill moraine. Deep post-glacial fluvial incision of the moraine formed Stony Brook Harbor, the Nissequogue River estuary, and the dissected hills and steep, narrow valleys on the moraine itself.

1.6.2 Drainage and Surface Water Hydrology

The site is located within the Nissequogue River watershed system, which is less than 100 feet wide at the southwestern edge of the site but widens downstream to over 2,000 feet at the northwest corner of the site. Stony Brook Harbor is a large tidal inlet which is not fed by significant surface runoff (i.e., rivers or streams). No surface water bodies are present on the site, except for a few small ponds.

The Nissequogue River and Stony Brook Harbor are influenced by semi-diurnal tidal variations in water level. Extensive mud and sand flats are exposed at low tide. Net flow direction of waters in the Nissequogue River is dominantly towards Long Island Sound, especially during ebb tides; however, a subordinate flood tide flow may retard the river's net seaward discharge. The dominant current direction within Stony Brook Harbor is controlled by tidal oscillations rather than an effluent stream flow from the land. The average tidal range (measured between mean high and low water levels) for the period 1960 to 1978 was 6.6 feet at the nearby Port Jefferson Harbor.

Groundwater discharge seeps were noted during low tide along the Nissequogue River and Stony Brook Harbor. The incised, steep-sided valleys contain ephemeral streams, which only flow during significant surface runoff events.

A small wetland (approximately one acre) is located at the southern end of Stony Brook Harbor, where a small stream enters a low-lying area next to the inlet. Vegetation and standing water indicative of perennial wetland conditions are present.

1.6.3 Geology

The site is located within the Atlantic Coastal Plain Physiographic Province. Coastal submergence and emergence spanning the Cretaceous Period resulted in significant differential erosion during the Cenozoic, and glaciation during the Quaternary is reflected in the present day regional and local geology of Long Island.

The regional geology of Long Island is characterized by a southeastward-thickening wedge of unconsolidated Late Cretaceous sediments unconformably overlying a gently-dipping basement bedrock surface (Figure 1-5). The stratigraphy is briefly summarized below and in Figure 1-6, from oldest to youngest.

- Basement - Precambrian to Early Paleozoic igneous or metamorphic bedrock
- Raritan Formation (Cretaceous) - Sedimentary sands, silts, and clay
- Magothy Formation (Late Createaceous) - Sedimentary coarse sands and gravels, sands and silts
- Glacial Deposits (Pleistocene) - Sands, silts, tills, and clays deposited by several episodes of glaciation.

1.6.4 Hydrogeology

Six major hydrogeologic units have been identified beneath Long Island, as described below.

- Consolidated bedrock
- Lloyd aquifer portion of the Raritan Formation
- Raritan confining unit
- Magothy aquifer
- Smithtown Clay localized confining unit (when it is below the water table)
- Upper Glacial aquifer

The Upper Glacial and Magothy aquifers are the most heavily used for water supply in the vicinity of the site. Residential wells are usually completed in the Upper Glacial aquifer. Monitoring wells installed at the site are completed in the Upper Glacial aquifer. Generally, the Upper Glacial and Magothy aquifers are hydraulically connected. In limited areas of the site, the Smithtown Clay acts as a confining unit within the Upper Glacial aquifer. No monitoring wells at the site penetrated the clay unit except MW-4D near Stony Brook Harbor. Figures 1-7 and 1-8 show the water table surface and the depth to groundwater, respectively.

Groundwater on the northern half of Long Island generally flows in a north/northwest direction, toward Long Island Sound. At the Smithtown site, groundwater flow is complex because of the influence of surface water bodies such as the Nissoquogue River and Stony Brook Harbor (Figure 1-9). These water bodies act as groundwater discharge points. The depth to groundwater across the site varies from 5 feet below ground surface (bgs) to more than 200 feet bgs. Groundwater flow based on water level measurements in site wells is shown on Figures 1-10 and 1-11.

1.6.5 Demography and Land Use

According to the 2000 U.S. Census, the Village of Head of the Harbor's population was 1,447, the Village of Nissequogue's population was 1,543. According to the Suffolk County Planning Commission, residential land accounted for 40% of the land area. The remaining land was described as undeveloped (30%); agricultural (10%), transportation, communication, and utilities (10%); institutional (5%); commercial (1%). Industrial and marine commercial land use was negligible. The site is heavily residential, with limited commercial development along Lake Avenue and North Country Road.

1.6.6 Ecology

The majority of the site is residential, with homes on lots generally one acre or larger. Ecological resources are primarily concentrated around the surface water bodies of Stony Brook Harbor and the Nissoquogue River.

Stony Brook Harbor is an estuarine inlet off of Smithtown Bay of Long Island Sound. The surface water is given an SA saline surface water classification by NYSDEC. The best usages for Class SA saline surface waters are shellfishing for market purposes, primary and secondary contact recreation, and fishing. Extensive mud and sand flats are exposed at low tide. The basic habitat of this intertidal zone is the salt marsh. Within this intertidal zone, the dominant vegetative species is smooth cordgrass (*Spartina alterniflora*) and the dominant wildlife species is ribbed mussel (*Guekensia demissa*).

The tidal Nissequogue River flows to Smithtown Bay of Long Island Sound. The surface water of the river in the area of the site is classified by NYSDEC as SC saline surface water. The best usage for SC saline surface waters is fishing. The State of New York designates that these waters shall be suitable for fish survival. Similarly to the shore of Stony Brook Harbor, numerous seeps discharge groundwater from the shallow unconfined aquifer to intertidal zone of the river at the site. The salt marsh, similar in appearance to that described for the harbor, is the predominant habitat of the intertidal zone. Extensive mud and sand flats are exposed at low tide.

1.7 Nature and Extent of Contamination

The nature and extent of contamination in groundwater, surface water, sediment, wastewater, sludge, and indoor air are discussed in the following sections.

1.7.1 Selection of Screening Criteria

Screening criteria were selected to evaluate contaminants detected in various media at the site. Whenever possible, established regulatory criteria, known as chemical-specific applicable or relevant and appropriate requirements (ARARs) were selected. In the absence of ARARs, non-enforceable regulatory guidance values, known as "to be considered" (TBC) were selected. The evaluated screening criteria, by media type, are shown below. The most stringent criteria were selected for screening the site data. No screening criteria are applicable to the storm drain sediment samples. Tables 1-3 through 1-6 show screening criteria for all media sampled.

Media	Screening Criteria
Groundwater	■ EPA National Primary Drinking Water Standards (web page), EPA 816-F-01-007, March 2001 ■ New York Ambient Water and Groundwater Quality Standards and Groundwater Effluent Limitations, August 4, 1999 ■ New York State Department of Health Drinking Water Standards
Surface Water	■ New York Surface Water Quality Standards and Guidance Values, August 4, 1999. Fish Propagation, Wildlife Protection, and Human Consumption of Fish (saline waters and fresh water)
Sediment	■ Technical Guidance for Screening Contaminated Sediments. New York Division of Fish, Wildlife and Marine Resources, January 25, 1999 (salt water or fresh water)
Septic System Wastewater and Sludge	■ Article 12 of the Suffolk County Sanitary Code. Standard Operating Procedure No. 9-95 - Pumpout and Soil Cleanup Criteria, January 7, 1999.

1.7.2 Determination of Site Contaminants of Potential Concern

Chlorinated VOCs were selected as site contaminants of potential concern (COPCs) for several reasons: 1) PCE and its breakdown products were detected in several residential private wells (which resulted in the site's listing on the National Priorities List [NPL]). Early samples collected by SCDHS and EPA's Removal Group only analyzed for VOCs, since PCE, with its low MCL, was of immediate concern. 2) SCDHS sample results (late 1990s) from septic systems at the 11 potential source areas indicated elevated levels of chlorinated VOCs similar to those detected in the private residential wells downgradient of the source areas. Limited inorganic analyses were performed for the wastewater and sludge samples, with detections primarily occurring in the sludge samples. The inorganics were considered much less mobile than the VOCs, which were disposed in the septic systems in liquid form. With the thick unsaturated zone in the potential source areas (approximately 120 to 140 feet) the inorganic analytes detected in the semi-solid sludge samples were considered unlikely to migrate to groundwater. Therefore, the contaminants considered site related were limited to chlorinated VOCs.

CDM compared detections of selected inorganic analytes in Smithtown groundwater with data from upgradient wells at nearby Suffolk County Superfund sites and Suffolk County Water Authority (SCWA) analyses presented in their 2002 water quality report (available at http://SCWA.com) to determine if inorganic levels are comparable and represent background for Suffolk County groundwater. The data and comparisons are in the Final RI Report as Appendix J, Tables 1 and 2. Levels of copper, iron, lead, manganese, silver, and zinc in Smithtown monitoring wells (summarized in columns 2 through 5 in RI Report Appendix J, Table 2) fall within the ranges in upgradient wells from nearby Superfund sites (column 6 in RI Report Appendix J, Table 2) or the SCWA results (columns 7 and 8 in RI Report, Appendix J, Table 2). These inorganic analytes are, therefore, not considered site contaminants of concern.

Levels of aluminum, chromium, and nickel in some Smithtown monitoring wells are above the range of the comparison wells (RI Report, Appendix J, Table 2). A review of Smithtown monitoring well results for aluminum, chromium, and nickel (RI Report, Appendix J, Table 3) show that many site wells contain levels of these analytes that are within the range of upgradient wells at other Superfund sites. For aluminum, 30 of the 39 detections are below 900 micrograms per liter (ug/L) (high end of the aluminum range in upgradient wells). For chromium, 29 of the 37 detections are below 60 ug/L (high end of the chromium range in upgradient wells). For nickel, 8 of the 37 detections are below or equal to 9 ug/L (high end of the nickel range in upgradient wells). We have reason to believe that elevated levels of these inorganic analytes result, in part, from the turbidity of monitoring well samples (RI Report, Appendix E). Although the monitoring wells were developed according to specifications, some well samples had elevated turbidity levels.

Further evidence that turbidity affects the levels of inorganic analytes was provided by SCDHS. Inorganic analytical results from 1997/1998 for numerous private wells in the Smithtown area indicate low levels of aluminum, chromium, and nickel (RI Report, Appendix J, Table 4). Since residential wells are pumped on a regular, daily basis, fine particulates are removed from the screen interval, resulting in water with low turbidity. In addition, it is unlikely that the particulates observed as high turbidity readings in some of the site monitoring wells are mobile in the groundwater. The low effective porosity of the fine grained sands acts as a natural filter that limits movement of particulates with the groundwater. The residential inorganic data, therefore, are more representative of groundwater that would discharge to surface water bodies.

The geology of the Smithtown area is a complex mix of glacial sediments, including sands, silts, and clays. As such, nickel and chromium are common components of the minerals that make up these sediments, especially the finer-grained deposits.

Based on these discussions and the knowledge that inorganics are not associated with dry cleaning operations, the inorganic analytes detected in site media are not considered to be related to the Smithtown site. Inorganics are not, therefore, site contaminants of potential concern.

1.7.3 Groundwater

Three types of groundwater samples were collected at the site. Screening samples were collected at vertical profile wells (VPWs), samples were collected from monitoring wells and piezometers, and samples were collected from private residential wells. Contaminant summaries focus on VOCs, the contaminants of concern for the site.

1.7.3.1 Vertical Profile Wells

Twelve VPWs were installed in the residential areas. Groundwater samples were collected at 10-foot intervals. Eleven VPWs were installed in the potential source areas. Groundwater samples were collected at the top of the water table and approximately 10 feet into the groundwater. All VPW samples were analyzed for low-detection limit VOCs only. Figure 1-12 and Tables 1-7 and 1-8 show VOC concentrations in VPWs.

Residential Areas

Toluene was commonly detected in the residential area samples. The frequent detections of toluene are believed to be a result of sample cross-contamination from drilling rig motor emissions during sample collection. Toluene was detected very infrequently in all other groundwater samples (e.g., residential wells, monitoring wells). Toluene was not present in related trip blanks because trip blank bottles are sealed prior to arrival at each drilling location. Trip blanks are stored in coolers to maintain the proper temperature. Therefore, they are not exposed to drill rig emissions similar to the environmental samples. Sporadic detections of chlorinated VOCs were encountered in some VPW samples, with levels generally below the screening criteria. VPW-24, located at 54 Harbor Hill Road, had the most VOC detections. PCE exceeded the 5 ug/L screening criterion in three samples: 64 - 69 feet bgs at 5.6 ug/L; 44 - 49 feet bgs at 7.3 ug/L; and 24 - 29 feet bgs at 7.5 ug/L. One additional compound, 1,1,1-trichloroethane (1,1,1-TCA) at 5.7 ug/L, exceeded the 5 ug/L screening criterion in the sample from 174 - 179 feet bgs. Numerous other chlorinated VOCs were detected, at levels below screening criteria.

Potential Sources

The groundwater screening criteria for site-related chlorinated VOCs were exceeded at only one location. PCE exceeded its screening criterion at VPW-5, with a detection at 118 - 122 feet bgs at 15 ug/L. MTBE was detected in several samples, but exceeded its screening criterion in one sample at VPW-11 (128 - 132 feet bgs). Several other chlorinated VOCs were detected, but were generally below 1 ug/L.

1.7.3.2 Monitoring Wells and Piezometers

Groundwater samples were collected from five of the six piezometers in June 2001. The 2001 piezometer samples were analyzed for low-detection limit VOCs only. Round 1 groundwater samples were collected from 13 monitoring wells and 6 piezometers in March 2002. Round 2 groundwater samples were collected from 14 monitoring wells and 6 piezometers in June 2003. The 2002 and 2003 samples were analyzed for full Target Compound List/Target Analyte List (TCL/TAL) parameters. Each round of sampling is discussed below. Figures 1-13 and 1-14 show Round 1 and Round 2 VOC concentrations, respectively. Table 1-9 shows VOC results for both rounds of sampling. Table 1-10 shows well construction details. All wells and piezometers are completed in the Upper Glacial aquifer.

2001 Piezometer Results

The screening criterion for 1,1,1-TCA was exceeded at 7.2 ug/L in MW-E. Several other piezometer samples contained several chlorinated VOCs below screening criteria.

Round 1 Sample Results

Several VOCs exceeded screening criteria, including:

- MW-3S, in the central, southern part of the residential area, contained cis-1,2-dichloroethene (cis-1,2-DCE) at 50 ug/L diluted (D) and PCE at 12 ug/L
- MW-4I, in the central part of the residential area, contained PCE at 16 ug/L
- MW-4D, in the central part of the residential area, contained PCE at 38 D ug/L
- MW-6S, in the northeastern part of the residential area, contained 1,1,1-TCA at 150 D ug/L and 1,1-dichloroethene (1,1-DCE) at 31 D ug/L
- MW-E, in the central part of the residential area, contained 1,1,1-TCA at 7.1 ug/L
- MW-F, the southern-most sampling point, contained TCE at 5.8 ug/L

Numerous other chlorinated VOCs were detected in monitoring well/piezometer samples in March 2002, at levels below screening criteria.

Round 2 Sample Results

Several VOCs exceeded screening criteria, including:

- MW-2, in the west-central part of the residential area, contained PCE at 5.6 ug/L
- MW-3S, in the central, southern part of the residential area, contained cis-1,2-DCE at 120 D ug/L, PCE at 10 ug/L, and TCE at 6.1 ug/L
- MW-3I, in the central, southern part of the residential area, contained cis-1,2-DCE at 7.5 ug/L
- MW-6S, in the northeastern part of the residential area, contained 1,1,1-TCA at 92 D ug/L and PCE at 5.7 estimated value (J) ug/L
- MW-E, in the central part of the residential area, contained 1,1,1-TCA at 8.4 ug/L
- MW-F, the southern-most sampling point, contained TCE at 6.7 ug/L

Numerous other chlorinated VOCs were detected in monitoring well/piezometer samples in June 2003, at levels below screening criteria.

1.7.3.3 Residential Wells

Table 1-11 and Figures 1-15 , 1-16, 1-17 and 1-18 indicate the chlorinated VOCs detected in residential wells sampled in 1999, 2001, 2002, and 2003, respectively. Figure 1-19 shows the highest results for all residential wells during any round of sampling; wells with no detections or detections below screening criteria in any round of sampling are also shown.

1.7.4 Spring/Seep Surface Water and Sediment

Surface water and sediment samples were collected along the Nissequogue River and Stony Brook Harbor at low tide. Surface water was collected from seeps, presumably groundwater discharging into the larger water bodies. Sediment samples were co-located with the surface water samples.

1.7.4.1 Spring/Seep Surface Water

Table 1-12 and Figure 1-20 indicate the VOCs detected in spring/seep surface water samples. For marine waters, criteria are only available for TCE and PCE. Fresh water criteria are available for 1,1-DCE, cis-1,2-DCE, and 1,1,1-TCA. VOCs were detected in 4 of the 12 samples collected; PCE at 2 ug/L in DSW-001, the sample from Dunton Spring adjacent to Stony Brook Harbor, exceeded the 1 ug/L screening criterion. Sample SWS-008, along the Nissoquogue River, was the only sample with more than one VOC detected; four were detected.

1.7.4.2 Spring/Seep Sediment

Table 1-13 indicates the VOC compounds detected in spring/seep sediment samples. Figure 1-20 shows VOCs detected in sediment samples. It should be noted that detection limits for some sediment sample VOCs were elevated above screening criteria. Two VOCs exceeded their sample-specific screening criteria: in sample SSS-001, on the western side of Stony Brook Harbor, 1,2-dichlorobenzene, detected at 11 J micrograms per kilogram (ug/Kg), exceeded its criterion of 6.528 ug/Kg. In samples SSS-010 and SSS-011, both along the Nissoquogue River, 1,1-DCE was detected at 2 J ug/Kg and 14 J ug/Kg, respectively, exceeding sample-specific screening criteria of 0.0316 ug/Kg and 0.58 ug/Kg, respectively.

1.7.5 Wetland Surface Water and Sediment

Surface water and sediment samples were collected from the wetland south of Stony Brook Harbor, behind the residence at 54 Harbor Hill Road. Sediment samples were collected from two intervals: 0 to 6 inches and 18 to 24 inches bgs. Surface water and sediment samples were co-located.

1.7.5.1 Wetland Surface Water

Table 1-12 and Figure 1-20 indicate the VOCs detected in wetland surface water samples. For marine waters, criteria are only available for TCE and PCE. Fresh water criteria are available for 1,1-DCE, cis-1,2-DCE, and 1,1,1-TCA. VOCs were detected in all nine samples collected; the PCE screening criterion of 1 ug/L was exceeded in two samples (SWW-001 at 3 ug/L and SWW-002 at 2 ug/L). 1,1,1-TCA was detected in all nine samples, while 1,1-DCE was detected in seven and 1,1-DCE was detected in five.

1.7.5.2 Wetland Sediment

No VOCs exceeded their sample-specific screening criteria. It should be noted that detection limits for some sediment sample VOCs were elevated above screening criteria. Wetland sediment data are provided in Table 1-13.

1.7.6 Storm Drain Sediment

The most commonly detected VOC compound was trichlorofluoromethane, which was detected in 8 of 13 samples. Other VOCs with multiple detections (each detected twice) include 2-butanone, toluene, and xylene. VOCs with single detections include acetone, carbon disulfide, methyl acetate, chloroform, cyclohexane, methylcyclohexane, MTBE, ehtylbenzene, and isopropylbenzene. Sample SDS-004, located on Swan Place near Stony Brook Harbor, had the most VOC compounds, with six detected. Results are presented on Table 1-14.

1.7.7 Sanitary/Cess Pool Samples

Wastewater samples were collected from 10 septic systems at 11 potential sources upgradient of the residential areas. No wastewater was present at WW-4, 617-621 Lake Avenue (Sal's Auto Body). Sludge samples were collected at 9 of the 11 locations. Sludge was too slippery to lodge in the sampling device at two locations. All samples were analyzed for TCL compounds and TAL analytes.

1.7.7.1 Wastewater Samples

Total VOCs ranged from 148 ug/L to 731 ug/L, below the 1,000 ug/L the screening criteria, as shown on Table 1-15 and Figure 1-20.

1.7.7.2 Sludge Samples

Several VOCs were detected in all samples, but only two detections of toluene exceeded the 3,000 ug/Kg screening criterion: SL-7 at 28,000 ug/Kg and SL-8 at 30,000 ug/Kg. SL-7 was collected at 400 North Country Road (Four Seasons Cesspool) and SL-8 was collected at 430-11 North Country Road (North Country Cleaners). Results are presented on Table 1-16.

1.7.8 Air Samples

EPA collected air samples on March 11-13, 2003 at 12 homes in the vicinity of the site, with air sampling canisters located in home basements. Two duplicate samples were collected. Data for VOCs were analyzed through the Contract Laboratory Program (CLP), with data validation by EPA. Results are presented in Appendix I of the Final RI Report.

Analytical results were compared to the Risk Based Concentrations (RBC) developed by EPA Region 3 (October 2003) for ambient air. For two compounds, TCE and 1,2-dibromoethane, laboratory detection limits were higher than the RBCs. No other compounds exceeded the RBCs.

Air sampling results were compared to residential groundwater results at the residences who participated in the residential well sampling activities. Seven of the 12 residences were sampled during both well sampling activities. There was no correlation between the indoor air and groundwater results. The VOCs detected in residential well water were not reflected in the air sample results. Therefore, it appears that indoor air detections are not directly linked to the groundwater contamination.

1.8 Fate and Transport Summary

The persistence of contaminants is determined by the rate of degradation, velocity of the groundwater, the geochemical conditions in the aquifer, and the retardation coefficient (K_d) of the individual compounds. The $_{KD}$ values for the site COPCs (PCE, TCE, and degradation products) range from 10^{-5} to 10^{-3} which show that they will have low adsorption to the materials in the aquifer. The chlorinated VOCs may have been introduced to the aquifer at numerous small upgradient areas, resulting in complex downgradient patterns of VOCs, with no coherent contaminant plume.

The chlorinated VOCs are mobile and biodegradable. As they move with the groundwater away for the areas where they were introduced, the concentrations are expected to decrease mainly from dispersion and dilution effects, and natural attenuation via biodegradation.

1.9 Summary of Risk Assessments

Risk assessments evaluated both human health risk and ecological risk in site media. The results are summarized below.

1.9.1 Human Health Risk Assessment

In the HHRA, contaminants in various media at the site were quantitatively evaluated for potential health threats to the following receptors:

- Current and future residential users of groundwater
- Current and future recreational users of the Nissequogue River
- Current and future recreational users of the Stony Brook Harbor and wetland area

The estimates of cancer risk and noncancer health hazard, and the greatest chemical contributors to these estimates were identified.

Chemicals of potential concern were selected based on criteria outlined in the Risk Assessment Guidelines for Superfund (RAGS) (EPA 1989), primarily through comparison to risk-based screening levels. The chemicals of potential concern include all chemicals detected above screening levels, regardless of their source. Thus, inorganic and semivolatile chemicals that are not associated with the groundwater contamination at the Smithtown site were evaluated along with site-related VOCs. The essential nutrients (i.e., calcium, magnesium, potassium, and sodium) were not quantitatively addressed as their potential toxicity is significantly lower than other inorganics at the site, and most existing toxicological data pertain to dietary intake.

Exposure routes and human receptor groups were identified and quantitative estimates of the magnitude, frequency, and duration of exposure were made. Exposure points were estimated using the minimum of the 95 percent Upper Confidence Limit (UCL) and the maximum concentration. Chronic daily intakes were calculated based on the Reasonable Maximum Exposure (RME) (the highest exposure reasonably expected to occur at a site). The intent is to estimate a conservative exposure case that is still within the range of possible exposures. Central Tendency (CT) exposure assumptions were also developed.

In the toxicity assessment, current toxicological human health data (i.e., reference doses and slope factors) were obtained from various sources and were utilized in the order as specified by RAGS (EPA 1989).

Risk characterization involved integrating the exposure and toxicity assessments into quantitative expressions of risks/health effects. Specifically, chronic daily intakes were compared with concentrations known or suspected to present health risks or hazards.

In general, the EPA recommends target values or ranges (i.e., cancer risk of 10^{-6} to 10^{-4} or hazard index of one) as threshold values for potential human health impacts (EPA 1989). These target values aid in determining whether additional response action is necessary at the site.

1.9.1.1 Summary of Site Risks

This section presents a summary of the carcinogenic risks and noncarcinogenic hazards for exposures to contaminants in various media at the Smithtown Groundwater Contamination site that were quantitatively evaluated for potential health threats.

Risks to Residential Users of Groundwater

Because all fresh groundwater in New York State is classified for use as a potable water supply, potential risks were estimated for adult and child residents assuming exposure to groundwater that is used as tap water. The total RME cancer risk for adult and child resident exposures was 4×10^{-4} (four in ten thousand), which exceeds the EPA range of 10^{-6} to 10^{-4}. This risk is primarily associated with arsenic, TCE and PCE in groundwater. When CT exposure assumptions are used, the total cancer risk for adult and child residents decreases to 1×10^{-4}, which is at the upper end of the range of 10^{-6} to 10^{-4}. Arsenic, which accounted for 51 percent of the estimated risk, is not a site-related contaminant and had a maximum concentration below State and federal drinking water standards.

The total RME hazard index (HI) for both adult and child residents exceeded the threshold of 1 for noncancer effects (HI of 4 for adults and 20 for children), indicating that noncancer health effects may occur from RME exposures to groundwater by residents. When the hazard index is broken out by target organ, the hazard index exceeded unity for effects to the liver and gastro intestinal (GI) tract for adults and to the liver, GI tract, and skin for children. Noncancer effects to the liver were primarily associated with ingestion and inhalation of chloroform (HI of 0.97 for adults and 14 for children). Noncancer effects to the GI tract were associated with ingestion of chromium (HI of 1 for adults and 2.4 for children). Noncancer effects to the skin for children were associated with ingestion of arsenic in groundwater (HI of 1.4 for children). When CT exposure assumptions (i.e., more typical exposures) are used, the hazard indices for adult and child residents still exceeded the threshold of one (i.e., 2 for adults and 6 for children).

Risks to Recreational Users of the Nissequogue River

Risks associated with recreational use of the Nissequogue River were estimated for adults and children (0 to 6 yrs), and based on incidental ingestion and dermal contact with sediment and surface water. Total excess lifetime cancer risk for adult recreational users was 2×10^{-4} (two in ten thousand) for the RME scenario, just above EPA's target risk range of 10^{-6} to 10^{-4}. But the cancer risk is within the range for the more typical CT exposures (3×10^{-5}). The total excess lifetime cancer risk for child recreational users was 1×10^{-4} for the RME scenario, which is at the upper boundary of EPA's target risk range of 10^{-6} to 10^{-4}. Cancer risk for child recreational users was within the range for the more typical CT exposures (5×10^{-5}).

These cancer risks at the Nissequogue River are due to the presence of PAHs that are likely to be associated with sources other than the VOCs in groundwater from the Smithtown site. PAHs were not detected at elevated concentrations in groundwater at the site. They may be present due to runoff from human activities such as combustion of fossil fuels, refuse burning, industrial processes and vehicle exhaust. The noncancer hazard indices for Nissequogue River users were well below the threshold of 1 at 0.04 for adults and 0.2 for children for the RME scenario.

Risks to Recreational Users of the Stony Brook Harbor

Risks associated with recreational activities at Stony Brook Harbor and wetland were estimated for adults and children (0 to 6 yrs), and based on incidental ingestion and dermal contact with sediment and surface water. Total excess lifetime cancer risk for each adult and child recreational users was 7×10^{-6} (seven in one million), within EPA's target risk range of 10^{-6} to 10^{-4}. Cancer risk is below the range for the more typical CT exposures for adult recreational users (9×10^{-7}) and within the target range for CT exposures for child recreational users (2×10^{-6}).

These cancer risks at the Stony Brook Harbor and wetland are due to the presence of PAHs that are likely to be associated with sources other than the VOCs in groundwater from the Smithtown site. PAHs were not detected at elevated concentrations in groundwater at the site. They may be present due to runoff from human activities such as combustion of fossil fuels, refuse burning, industrial processes and vehicle exhaust. The noncancer hazard indices for Stony Brook Harbor users were well below the threshold of 1 at 0.08 for adults and 0.6 for children for the RME scenario.

1.9.1.2 Summary of Uncertainties

As in any risk assessment, the estimates of potential health threats (carcinogenic risks and noncarcinogenic health effects) for the site have associated uncertainties. In general, the main areas of uncertainty include the following:

- Environmental data
- Exposure parameter assumptions
- Toxicological data
- Risk characterization

As a result of the uncertainties, the risk assessment should not be construed as presenting absolute risks or hazards. Rather, it is a conservative analysis intended to indicate the potential for adverse impacts to occur based on reasonable maximum and central tendency exposures.

1.9.2 Screening Level Ecological Risk Assessment

The potential risks to ecological receptors at the Smithtown Groundwater Contamination Site were assessed by several methods:

- Food chain risks were estimated for the food chain receptors (great blue heron, spotted sandpiper, marsh wren, and muskrat) by comparing estimated exposure levels (daily doses) with dose-based ingestion ecotoxicological benchmarks. Risks to the food chain receptors were evaluated using hazard quotients (HQs) which were determined for each contaminant of ecological concern (COEC) by dividing estimated daily contaminant doses by ingestion benchmark toxicity values.

- Risks from aquatic exposures were estimated for aquatic receptors estuarine fish and estuarine crab) by comparing surface water contaminant concentrations to aquatic toxicological benchmark values based on direct surface water exposure. Risks to these receptors were determined using HQs which were determined for each COEC by dividing the maximum contaminant concentrations by the benchmark toxicity values.

- Risks from aquatic exposures were estimated for the freshwater benthic invertebrate community by comparing surface water/sediment contaminants concentrations to surface water/sediment quality criteria/guidance values derived for the protection of benthic species.

For the estuarine fish, estuarine crab, and receptors with food chain exposures, HIs were determined by summing the COEC HQs for each ecological receptor.

Cumulative HIs were ranked in accordance with a ranking scheme that was used to evaluate potential ecological risks to individual organisms. The ranking scheme is as follows:

HI ≤ 1	no adverse effects
HI >1	possible adverse effects

It is important to note that this methodology is not a measure of, and cannot be used to determine, absolute quantitative risk. Use of this technique, however, can indicate the potential for the ecological receptor to be at risk to an adverse effect from exposure to site COECs.

1.9.2.1 Estimation of Aquatic Risk

Potential ecological risks to contaminants in the sediment and surface water of the site were assessed using direct comparisons of contaminant concentrations in sediment and surface water with criteria, guidelines, and benchmark concentration values based on aquatic ecotoxicity.

Comparisons were made between the maximum detected contaminant levels and associated values during the screening phase for COECs. This resulted in a number of COECs for surface water and for sediment. For the aquatic invertebrate community, the potential for adverse ecological risks to contaminants appears to exist in both the surface water and sediment from the following chemical parameter groups:

- Surface water - inorganics are a potential concern for aquatic invertebrates
- Sediment - volatile organic compounds (acetone, 2-butanone, carbon disulfide, and trichlorofluoromethane). Only trichlorofluormethane is potentially a site-related contaminant as only chlorinated VOCs are considered to be site-related, semivolatile organic compounds, pesticides, and inorganics are a potential concern for aquatic invertebrates.

The estuarine fish and crabs were used as a receptor species to further assess the potential ecological risks from surface water contamination. The potential risks to these receptors were assessed by direct comparisons of contaminant concentrations in surface water with saltwater fish and crab ecotoxicity benchmark values. Tables 5-1 through 5-3 in the SLERA provide the comparison for estuarine fish. Tables 5-4 through 5-6 in the SLERA provide the comparison for estuarine crabs. The potential risk from exposure to surface water for the fish and crabs can be summarized as follows by each area examined:

Nissequogue River

- The estimated hazard index for estuarine fish of approximately 36 indicates the potential for some chance of adverse effects resulting from exposure to site surface water. The primary risk contributor is copper, which contributes over 99 percent of the potential risk.

- The estimated hazard index for estuarine crab of approximately 375 indicates the potential for some adverse effects resulting from exposure to site surface water. The primary risk contributor is lead, which contributes over 99 percent of the potential risk.

Stony Brook Harbor

- The estimated hazard index for estuarine fish of less than 8 indicates the potential for adverse effects resulting from exposure to site surface water. The potential for adverse effects is relatively low and comes from copper.

- The estimated hazard index for estuarine crab of less than 1 indicates no expected adverse effects resulting from exposure to site surface water.

Harbor Wetland

- The estimated hazard index for estuarine fish of approximately 25 indicates the potential for some adverse effects resulting from exposure to site surface water. The primary risk contributor is copper, which contributes over 99 percent of the potential risk.

- The estimated hazard index for estuarine crab of approximately 374 indicates the potential for some chance of adverse effects resulting from exposure to site surface water. The primary risk contributor is lead, which contributes over 99 percent of the potential risk.

The potential risks to estuarine fish and crabs from chemicals in the surface water are not likely to be a site-related issue, as the metals presenting the potential for ecological risk are not groundwater contaminants associated with the site. A determination of background inorganic levels in groundwater is presented in Section 4.1.1.

1.9.2.2 Estimation of Food Chain Risk

Potential ecological risks to contaminant uptake through the food chain were estimated for food chain receptors: great blue heron, spotted sandpiper, marsh wren, and muskrat. Exposures to the food chain receptors were modeled, as follows:

- The great blue heron is expected to be exposed to contaminants in the sediment, surface water and in fish (exposed to the contaminated sediment and surface water).

- The spotted sandpiper and marsh wren are expected to be exposed to contaminants in the sediment, surface water and aquatic invertebrates (exposed to the contaminated sediment and surface water).

- The muskrat is expected to be exposed to contaminants in the sediment, surface water, and vegetation (exposed to the contaminated sediments and surface water).

Potential risks to the food chain receptors were assessed by comparing estimated exposure dose levels with dose-based toxicological benchmark values. Resultant HQs for each COEC and HIs (cumulative HQs) are provided in Tables D-6 through D-12 in the SLERA. Potential ecological risk results are discussed below.

Nissequogue River

Piscivorous birds

The hazard index of approximately 2 for the great blue heron indicates that there is some, small potential for ecological risks to piscivorous birds from food chain exposure to contaminants in river sediment and surface water. The primary contributors to the potential risk is lead, contributing greater than 99 percent to the potential risk.

Insectivorous birds

The hazard index of approximately 28 for the spotted sandpiper indicates that there is a potential for ecological risks to insectivorous birds from food chain exposure to contaminants in river sediment and surface water. The primary contributors are lead, alpha-chlordane, and naphthalene with contribution to the potential risk of 41, 26, and 11 percent, respectively.

Stony Brook Harbor

Piscivorous birds

The hazard index of less than 2 for the great blue heron indicates that there is some potential for ecological risks to piscivorous birds from food chain exposure to contaminants in harbor sediment and surface water. The primary contributor is lead, with a contribution to the potential risk of 97 percent .

Insectivorous birds

The hazard index of approximately 79 for the spotted sandpiper indicates that there is a potential for ecological risks to insectivorous birds from food chain exposure to contaminants in harbor sediment and surface water. The primary contributor is bis(2-ethylhexyl)phthalate, with a contribution to the potential risk of 80 percent.

Harbor Wetland

Piscivorous birds

The hazard index of approximately 20 for the great blue heron indicates that there is a potential for ecological risks to piscivorous birds from food chain exposure to contaminants in wetland sediment and surface water. The primary contributors to the potential risk are chromium and lead, with contributions to the potential risk of 52 and 29 percent, respectively.

Insectivorous birds

The hazard index of 39 for the marsh wren indicates that there is a potential for ecological risks to insectivorous birds from food chain exposure to contaminants in wetland sediment and surface water. The primary contributors to the potential risk are chromium, lead, and arsenic with a contribution to the potential risk of 15, 17, and 39 percent, respectively.

Herbivorous mammals
The hazard index of 136 for the muskrat indicates that there is a potential for ecological risks to herbivorous mammals from food chain exposure to contaminants in wetland sediment and surface water. The primary contributors are manganese, antimony, and iron with their contribution to the potential risk of 38, 35, and 18 percent, respectively.

The potential risks to ecological receptors with food chain exposures to chemicals in the surface water and sediment are not likely to be a site-related issue, as the metals presenting the potential for ecological risk are not groundwater contaminants associated with the site.

1.9.2.3 Risk Summary

Results of the screening level ecological risk assessment process indicate that the potential exists for ecological risk at the site resulting from exposure to chemicals detected in site sediment and surface water. Contaminants of potential ecological concern may present a risk to the aquatic invertebrates and receptors with food chain exposures from surface water and sediment of the seepage areas of the Nissequogue River and Stony Brook Harbor and the harbor wetland. For estuarine fish and crabs, contaminants of potential ecological concern in the surface water of the river, water discharging to the harbor (as determined from groundwater concentrations), and the harbor wetland may pose a potential risk. Primary risk contributors are metals and are not associated with site-related groundwater contamination, as discussed in Section 1.7.2. The chemicals that are responsible for the potential risk to ecological receptors are not the low levels of site-related contamination (volatile compounds in the 1 to 2 ppb range) in the groundwater that is discharging into the surface water of the Nissequogue River and Stony Brook Harbor.

1.10 Conclusions

1.10.1 Groundwater Results

Groundwater contamination in the Smithtown area has been identified in the Upper Glacial aquifer in isolated pockets which most likely represent small slugs of contamination that were input into the groundwater in the distant past. Groundwater flow on a regional scale is generally toward the north/northwest and Long Island Sound. On a local scale, groundwater flow is complex. The two major water bodies in the area, the Nissoquogue River to the west and Stony Brook Harbor to the northeast, act as discharge points for groundwater.

The RI was not able to pinpoint the sources of groundwater contamination. The groundwater model suggests the contamination observed in the residential areas may have originated in the commercially developed areas of the site. However, based on groundwater flow rates, contamination detected in the residential wells and/or monitoring well network during the RI, contamination was input to the groundwater many years ago. Locations of dry cleaners or other businesses that may have used chlorinated solvents may have changed over the years, but the general commercial areas upgradient of the residential areas have not changed significantly. The septic systems at the businesses investigated ranged from 8 to 15 feet in depth below the ground surface, with an approximate diameter of 10 feet. Leach fields vary in size, depending on the size of the associated building. The size of the septic systems indicates that contaminant releases through these systems would be limited in areal extent.

Figure 1-4, generated by the site groundwater model, shows estimated entry points of contamination to the water table. Observed contamination in residential wells was "backtracked" by moving the groundwater back toward its origin. The figure indicates that contamination may have contacted the groundwater table as much as 30 years ago. Given a 30 year time frame, contaminant entry points to the water table cannot be pinpointed to a specific location.

Because of the sporadic nature and isolated pockets of the contamination observed in the residential wells, a contiguous groundwater plume can not be mapped. The detections may represent small, isolated slugs of contamination that may have been released periodically in the past, as small point sources through septic systems. The area has no large, municipal sanitary systems. Most businesses and homes in the area use individual septic systems for sanitary waste disposal. Contamination that may have been discharged to septic systems at the businesses in the past would move with the groundwater as small, isolated pockets. Contamination released periodically from small-scale commercial septic systems explains the pattern of disconnected pockets of contamination observed over the years in the many rounds of residential sampling. Wells with contamination occur in small clusters, or isolated contaminated wells surrounded by wells with no contamination. Well completion records for the residential area are incomplete, and residential wells are often completed at variable depths. Therefore, wells that produce contaminated water may tap a different depth and flow zone of the Upper Glacial aquifer than other nearby, adjacent wells that are not contaminated. The observed patterns of groundwater contamination in the residential areas do not represent a mappable groundwater plume and no clear link was established between the residential area and ares where contaminants may have been released.

Two areas of contamination in the residential area appear to have higher levels of VOCs. Area One is near Harbor Hill Road and Stony Brook Harbor on the east side of the site. Groundwater depth ranges from approximately 5 feet to 150 feet and the thickness of contaminated groundwater is approximately 100 feet. The maximum PCE concentration is 140 ug/L.

Area Two is near the Waterford Stables and the Nature Conservancy property on the west side of the site. Groundwater is approximately 150 feet bgs and the thickness of contaminated groundwater is approximately 125 feet. The maximum PCE concentration is 63 ug/L.

These areas will be evaluated for possible groundwater remediation during the Feasibility Study for the Smithtown site.

1.10.2 Surface Water/Sediment Results

Spring and seep surface water and sediment results indicate that groundwater with low levels of chlorinated VOC contamination is discharging along the Nissequogue River and Stony Brook Harbor. VOCs do not appear to be concentrating in sediments, although the detection limits for some sediment sample VOCs were elevated (see Table 1-14 or Appendix G of the RI report). Several detections of inorganic analytes in surface water and/or sediment were noted. These analytes are not related to Smithtown site contamination. The discharge areas along the river and harbor are subjected to twice daily tidal fluctuations, which serve to mix and disperse groundwater discharges.

1.10.3 Storm Drain Sediment Results

Storm drain sediment samples were collected to evaluate if illicit chemical dumping had occurred in the past at storm drains in the residential area. The types of contaminants detected in these sediments, along with the lack of detections of chlorinated VOCs, indicate that the storm drains have not been used in the recent past for illicit disposal of hazardous chemicals associated with the Smithtown site.

1.10.4 Septic System Results

Wastewater and sludge samples were collected in 2003 from the same potential sources of contamination identified by SCDHS in 1997. Subsequent to the sampling conducted by SCDHS, the septic systems were cleaned. The 2003 samples evaluated current levels of contamination in the septic systems. No wastewater samples exceeded the 1,000 ug/L total VOC Suffolk County Sanitary Code screening criterion. Three sludge samples had limited exceedances of screening criteria: SL-3 exceeded the mercury criterion; SL-7 exceeded the toluene, copper, and mercury criteria; and SL-8 exceeded the toluene criterion. The limited exceedances of screening criteria indicate that the business waste handling practices have improved since septic systems were cleaned out in the late 1990s. These systems are not currently considered sources of contamination to the groundwater.

1.10.5 Air Sample Results

Air sample analytical results were compared to EPA Region 3 RBCs for ambient air. No other compounds exceeded the RBCs, although detection limits exceeded the RBC for TCE and 1,2-dibromoethane.

Air sample results from residences were compared to groundwater results where the residential well was sampled during the RI. Seven of the 12 residences were sampled during both sampling activities. There was no correlation between the indoor air and groundwater results. The VOCs detected in residential well water were not reflected in the air sample results. Therefore, it appears that indoor air detections are not directly linked to the groundwater contamination.

Section 2
Remedial Action Objectives

Remedial action objectives (RAOs) are media-specific goals for protecting human health and the environment that must be identified prior to the development of remedial alternatives. The process of identifying the RAOs follows the identification of affected media and contaminant characteristics; evaluation of exposure pathways, contaminant migration pathways and exposure limits; and the evaluation of chemical concentrations that will result in acceptable exposure. The RAOs are based on regulatory requirements which may apply to the various remedial activities being considered for the site. This section of the FS reviews the affected media and contaminant exposure pathways and identifies Federal, State, and local regulations that may affect remedial actions.

Preliminary Remediation Goals (PRGs) were selected based on applicable requirements and risk-based levels, with consideration also given to other requirements. These PRGs were then used as a benchmark for use in the technology screening, alternative development and screening, and detailed evaluation of alternatives presented in the subsequent sections of the FS report.

Section 121(d) of the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA) as amended, requires that, at a minimum, any remedial action must achieve overall protection of human health and the environment and comply with ARARs, which may be laws or regulations. Other criteria that do not meet the definition of an ARAR may also be used to develop remedial objectives and are known as To Be Considered (TBC) criteria.

This FS will evaluate remedies for the groundwater, surface water, and sediment contaminated with VOCs at the Smithtown site.

The remedial action alternatives developed in subsequent sections of this FS are required to attain applicable Federal, State of New York and local environmental requirements. Technical requirements of ARARs must be met by the remedial action alternatives; however, Section 121(d) (4) of CERCLA allows selection of remedies that will not attain all ARARs provided one of the following conditions is satisfied: 1) the remedial action is an interim measure where the final remedy will attain the ARAR upon completion; 2) compliance with all ARARs will result in greater risk to human health and the environment than other options; 3) compliance is technically impracticable; 4) the remedial action will attain the equivalent of the ARAR; 5) for State requirements, the State has not consistently applied the requirement in similar circumstances; or 6) compliance with the ARAR will not provide a balance between protecting public health, welfare, and the environment at the site and the availability of funding for response at other facilities (fund balancing).

2.1 Identification of Remedial Action Objectives

Remedial action objectives are medium-specific goals for protecting human health and the environment. The process followed in developing RAOs consists of identification of contaminants of concern (COCs), identification of potentially applicable Federal and State regulations and other guidance, identification of applicable site-specific risk-based criteria, and, finally, selection of the PRGs based on the applicable or relevant and appropriate regulatory requirements, guidance values, or risk-based values. Generally, where a chemical-specific ARAR exists, it provides the basis for the corresponding PRG; if more than one chemical-specific ARAR exists, the most stringent is generally used. The selected PRGs provide the basis for the RAOs. A detailed discussion of the PRGs development is included in Section 2.3 below.

2.1.1 Remedial Action Objectives for Groundwater

2.1.1.1 Site Conceptual Model

The SCDHS collected samples from septic systems at current and former commercial/industrial users of solvents and dry cleaning agents in the area upgradient of the contaminated private wells. Numerous discharges may have occurred over the years at each of the 11 identified facilities. Septic systems were cleaned after SCDHS sampling in the late 1990s. Wastewater and sludge samples collected from these potential source areas in 2003 indicated that housekeeping practices have improved and that none are currently contributing contamination to the aquifer.

Discrete and discontinuous slugs of liquid chlorinated solvents discharged to the ground surface or very shallow vadose zone (e.g., from a septic system or leach field) would migrate downward through the unsaturated zone in a relatively linear pattern, with minimal dispersion from the discharge location. However, the Smithtown Clay may exist above the water table at some of the source areas, complicating migration. If the Smithtown Clay is present beneath the leaching fields, discharged solvents would migrate downward to the top of the clay, pool, then begin to migrate across the surface of the clay. The distance (up to two miles) separating the potential source areas from the receptors further complicates contaminant transport scenarios. Clay may exist beneath some of the facilities, but it is not known if the clay is continuous throughout the area. The unsaturated zone is approximately 120 to 140 feet thick at the potential source areas.

Once the slugs of liquid chlorinated solvent (PCE and TCE) encounter the water table (Upper Glacial aquifer), some of the solvent would dissolve in the groundwater and begin to move in the direction of groundwater flow as small, isolated pockets of contamination. Numerous slugs may exist from the upgradient areas, moving with the groundwater flow as small, separate areas of contamination. The small areas of contamination likely would not merge into a coherent, mappable groundwater plume as the discrete slugs flow downgradient into the residential areas. The observed patterns of groundwater contamination in the residential areas do not represent a mappable groundwater plume.

If the quantity of solvent reaching the water table is sufficient, some of the solvent will remain in an undissolved state as a dense non-aqueous liquid (DNAPL). No signs of DNAPL have been observed.

Chlorinated solvents such as PCE and TCE in a dissolved phase move with the groundwater flow, but generally at a slower rate than groundwater. If disposal of PCE from the southernmost upgradient area is assumed to have begun in 1970, at an estimated flow rate of 1 foot/day for the Upper Glacial aquifer, in 32 years contaminated groundwater would have migrated about 12,000 feet in the Upper Glacial aquifer to the currently affected areas. The RI indicates that the groundwater and the contaminants eventually discharge to Stony Brook Harbor or Nissequogue River.

Little degradation of PCE in the groundwater was observed (lack of degradation products) at the Smithtown site. Cis-1,2 DCE has been detected in residential and monitoring wells. However, this degradation product was found at high concentrations in the septic systems. PCE usually break down under anaerobic conditions. However, groundwater measurements indicate close to saturated levels of oxygen in the aquifer, which would not be conducive to breakdown of chlorinated compounds. Other natural attenuation processes (i.e., dilution, dispersion, and volatilization) have played a more important role in the attenuation of PCE and other contaminants at the Smithtown site. Multiple rounds of samples were collected from some of the residential wells. Selected sample results from 1998 to 2003 for PCE and cis-1,2 DCE, the two major contaminants at the site, are summarized in Table 2-1. The groundwater sample results showed that, overall, the PCE and cis-1,2 DCE concentrations were decreasing. For example, the maximum PCE concentrations in the impacted areas dropped from 180 ug/l in 1998 to 21 ug/l in 2003; and the average PCE concentrations dropped from 49 ug/l to 4 ug/l. A similar decreasing trend is observed for cis-1,2 DCE. It is expected the decreasing trends for contaminant concentrations will continue in the future.

A preliminary groundwater modeling (Appendix A) was performed to predict the migration (flow path) of the contaminants and the attenuation of contaminant mass, with or without remediation. The model predicts the contaminant mass will decrease with time (discharge to the surface water) due to groundwater flushing action (Figure 9 of Appendix A), which is in general agreement with the sample results.

2.1.1.2 Development of Remedial Action Objectives

The remedial investigation confirms that groundwater is contaminated with VOCs, in particular PCE and cis-1,2 DCE, that exceed the drinking water standards. The groundwater contamination in the Smithtown area has been identified in isolated pockets which likely represent slugs of contamination that were input into the groundwater in the past. Because of the sporadic nature and isolated pockets of the contamination observed in the residential wells, a contiguous groundwater plume can not be mapped.

The site-specific human health risk assessment has identified selected chemicals as COPCs. The COPCs that contributed the most risks to human health include PCE, TCE, chloroform, bis(2 ethylhexyl)phthalate, arsenic, and chromium. However, phthalate, arsenic, and chromium are not site related contaminants. The upgradient suspected sources for VOCs are dry cleaners, which are not known to release heavy metals. Therefore, metals will not be included as site contaminants of concern. Bis(2 ethylhexyl)phthalate is a common laboratory contaminant and it is likely not a site contaminant based on site history.

The following RAOs have been identified for the groundwater:

- Prevent or minimize potential current and future human exposures including ingestion and dermal contact with VOC-contaminated groundwater that exceeds federal and State drinking water standards
- Restore groundwater to levels which meet federal and State drinking water standards within a reasonable time frame

2.1.2 Remedial Action Objectives for Surface Water and Sediment

Surface water and sediment sample results indicate that groundwater with very low levels of chlorinated VOC contamination is discharging along the Nissequogue River and Stony Brook Harbor. VOCs do not appear to be concentrating in surface water and sediments. The discharge areas along the river and harbor are subjected to twice daily tidal fluctuations, which serve to mix and disperse groundwater discharges.

A SLERA was performed for the Smithtown site. Results of the SLERA indicate there are potential risks for the ecological receptors from exposures to metals found in surface water and sediment. However, metals are not site related contaminants as discussed above and in Section 1.7.2. There are no potential risks for the ecological receptors from exposures to VOCs found in sediment.

Because VOCs are not concentrated in the surface water and the areas are subjected to daily tidal flushes, the remedial action objectives for the surface water is to verify that no significant impact on the surface water quality will occur from VOC contamination reaching the Nissequogue River and the Stony Brook Harbor.

Because VOCs in sediment does not pose a risk to the ecological receptors, the remedial action objective for sediment is no action.

2.2 Potential ARARs, Guidelines, and Other Criteria

Potential ARARs are broken down into three groups:

- Chemical-specific ARARs
- Location-specific ARARs
- Action-specific ARARs

Additionally, TBC criteria are also evaluated. TBC criteria are not Federally enforceable standards but may be technically or otherwise appropriate to consider in developing site- or media-specific RAOs or cleanup goals.

Each of these groups of ARARs and TBCs is described below. A summary of the potential ARARs and TBCs criteria is provided in Tables 2-2, 2-3 and 2-4.

2.2.1 Chemical-specific ARARs and TBCs

Chemical-specific ARARs are defined as those that specify achievement of a particular cleanup level for specific chemicals or classes of chemicals. These standards usually take the form of health- or risk-based numerical limits that restrict concentrations of various chemical substances to a specified level.

2.2.1.1 Federal Standards and Guidelines

Groundwater at the Smithtown site is currently used as a source of drinking water. Federal primary drinking water standards are considered to be applicable because the groundwater is a source of drinking water. Surface water is saline and is not being used as a source of drinking water downstream of the site.

Federal Drinking Water Standards and Regulations

- National Primary Drinking Water Standards (40 CFR 141). Drinking water standards (MCLs and non-zero maximum contaminant level goals [MCLGs]) for the COCs are provided in Table 2-5. Note that these MCLs and MCLGs are considered applicable for groundwater which is a current source of drinking water (CERCLA Section 300.430[e][2][i][B]).

Surface Water Criteria

- Clean Water Act Water Quality Criteria (Federal Ambient Water Quality Criteria [FAWQC] and Guidance Values [40 CFR 131.36]). The FAWQC are not promulgated criteria and are not enforceable limits. The criteria are used to set screening levels. The criteria for the COCs are included in Table 2-6.

2.2.1.2 New York Standards and Guidelines

New York State chemical-specific standards and guidelines exist for various media present at the site, including groundwater, surface water, and sediment.

Surface Water and Groundwater Standards and Regulations

- New York Surface Water and Groundwater Quality Standards and Groundwater Effluent Limitations (6 NYCRR Part 703). Used as the primarily basis (applicable ARAR) for setting numerical criteria for groundwater and surface water cleanups. The standards for the COCs in groundwater are included in Table 2-5 and the standards for the COCs in surface water are included in Table 2-6.

- New York State Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations (TOGS 1.1.1). Provides ambient water quality guidance values and groundwater effluent limitations for use where there are no standards.

Drinking Water Standards and Regulations

- New York State Department of Health Drinking Water Standards (10 NYCRR Part 5). Sets MCLs for public drinking water supplies. This is a relevant and appropriate ARAR for cleanup of the groundwater at the Smithtown site. The standards for the COCs are included in Table 2-5.

Sediment Guidance

- Technical Guidance for Screening Contaminated Sediments (Revised 1999). This provides a basis for screening of sediment contamination.

2.2.2 Location-specific ARARs

Location-specific ARARs are those which are applicable or relevant and appropriate due to the location of the site or area to be remediated. Possible applicable regulations at the site are relevant to wetlands, flood plains, historical places, archaeological significance, endangered species, and wildlife habitats.

2.2.2.1 Federal Standards and Guidelines

Coastal Zone

- Coastal Zone Management Act (16 USC 33)

Wetlands and Flood Plains Standards and Regulations

- Statement on Procedures on Flood plain Management and Wetlands Protection (40 CFR 6 Appendix A).
- Policy on Floodplains and Wetland Assessments for CERCLA Actions (OSWER Directive 9280.0-12, 1985)
- RCRA Location Standards (40 CFR 264.18)
- Flood plain Executive Order (EO 11988)
- Wetlands Executive Order (EO 11990)
- National Environmental Policy Act (NEPA) (42 United States Code [USC] 4321: 40 CFR 1500 to 1508)

- Clean Water Act (CWA) Section 404 (b)(1) Guidelines for Specification of Disposal Sites for Dredge or Fill Material; Section 404(c) Procedures; 404 Program Definitions; 404 State Program Regulations.

Historic Preservation Standards and Regulations

- National Historic Preservation Act (40 CFR 6.301)

2.2.2.2 New York Standards and Guidelines

Wetlands and Flood Plains Standards and Regulations (6 NYCRR)

- New York Wetland Laws (Articles 24-25).
- New York Freshwater Wetland Permit Requirements and Classification (Articles 663 and 664)
- Flood plain Management Regulations - Development Permits (500 ECL Article 36)

2.2.3 Action-specific ARARs and TBCs

Action-specific ARARs are those which are applicable or relevant and appropriate to particular remedial actions, technologies, or process options. These regulations do not define site cleanup levels but do affect the implementation of specific types of remediation. For example, although outdoor air has not been identified in the RI report as a contaminated medium of concern, air quality ARARs are listed below, because some potential remedial actions may result in air emissions of toxic or hazardous substances. These action-specific ARARs are considered in the screening and evaluation of various technologies and process options in subsequent sections of this report.

2.2.3.1 Federal Standards and Guidelines

General - Site Remediation

- Occupational Safety and Health Administration (OSHA) Worker Protection (29 CFR 1904, 1910, 1926).
- Resource Conservation and Recovery Act (RCRA): Identification and Listing of Hazardous Waste (40 CFR 261); Standards Applicable to Generators of Hazardous Waste (40 CFR 262); Standards Applicable to Owners and Operators of Treatment, Storage, and Disposal Facilities (40 CFR 264)

Transportation of Hazardous Waste

- Hazardous Materials Transportation Regulations (49 CFR 107, 171, 172, 177, and 179)
- Standards Applicable to Transporters of Hazardous Waste (40 CFR 263).

Disposal of Hazardous Waste

- Land Disposal Restrictions (40 CFR 268).

Discharge
- National Pollutant Discharge Elimination System (40 CFR 100 *et seq.*)
- National Emission Standards for Hazardous Air Pollutants, Subpart E - National Emission Standard for Mercury (40 CFR 61)

Off-Gas Management
- National Ambient Air Quality Standards (40 CFR 50).

2.2.3.2 New York Standards and Guidelines

New York Solid and Hazardous Waste Management Regulations (6 NYCRR)
- Hazardous Waste Management System - General (Part 370)
- Solid Waste Management Regulations (Part 360)
- Identification and Listing of Hazardous Waste (Part 371)

Transportation of Hazardous Waste (6 NYCRR)
- Hazardous Waste Manifest System and Related Standards for Generators, Transporters and Facilities (Part 372)
- Waste Transporter Permit Program (Part 364)

Disposal of Hazardous Waste (6 NYCRR)
- Standards for Universal Waste (Part 374-3)
- Land Disposal Restrictions (Part 376)

Discharge (6 NYCRR)
- The New York Pollutant Discharge Elimination System (NYPDES) (Part 750-757)

Off-Gas Management
- New York General Provisions (6 NYCRR Part 211)
- New York Air Quality Standards (6 NYCRR Part 257)
- New York State Department of Environmental Conservation (DAR-1) Air Guide 1, Guidelines for the Control of Toxic Ambient Contaminants
- New York State Department of Health Generic Community Air Monitoring Plan

2.2.3.3 Suffolk County Standards

- County of Suffolk Department of Health Services Private Water Systems Standards (Suffolk County Sanitary Code, Article 4 - Water Supply, §406.4)

2.3 Preliminary Remediation Goals

2.3.1 Preliminary Remediation Goals for Groundwater

Both Federal and State chemical-specific ARARs were identified for groundwater. New York State groundwater quality standards are considered to be applicable in the remediation of groundwater contamination at the Smithtown site. Federal and State primary drinking water regulations are considered to be relevant and appropriate for consideration in the remediation of the groundwater since the groundwater represents a source of potable water.

PRGs for groundwater contaminants are identified in Table 2-5 and are derived from the applicable State groundwater quality standards, or the State and Federal drinking water standards when the State groundwater standards are not available. Site-specific risk-based criteria were not used to develop the PRGs for groundwater since promulgated standards exist for the COCs. These PRGs for the COCs provide the basis for complying with the remedial action objectives for groundwater described above.

2.3.2 Preliminary Remediation Goals for Surface Water

Both Federal and State chemical-specific ARARs and TBCs for surface water exist. The New York surface water standards are considered applicable requirements in assessing the surface water contamination at the Smithtown site.

PRGs for surface water contaminants are identified in Table 2-6. Site-specific risk-based criteria were not used to develop the PRGs for surface water since standards or guidance values exist for the COCs. These PRGs for the COCs provide the basis for complying with the remedial action objectives for surface water described above.

2.3.3 Preliminary Remediation Goals for Sediment

There are no Federal or State chemical-specific ARARs for contaminated sediment at the site. The remedial action objective for sediment is no action. As a result, no PRGs are developed for sediment.

2.3.4 Area and Volume of Groundwater to be Remediated

Because of the sporadic nature and isolated pockets of the contamination observed in the residential wells, a contiguous groundwater plume can not be mapped. However, based on the RI residential sampling results, there seems to be two distinct areas of groundwater contamination exceeding the PRGs:

- Area One includes houses near Harbor Hill Road and the Stony Brook Harbor. The depth to groundwater table in Area One ranges from approximately five feet near the shoreline to 150 feet and the thickness of contaminated groundwater (Upper Glacial aquifer) is approximately 100 feet. The maximum PCE concentration is 140 ug/l.
- Area Two includes houses near the Waterford Stables and the Nature Conservancy property. The depth to groundwater table in Area Two is approximately 150 feet and the thickness of contaminated groundwater (Upper Glacial aquifer) is approximately 125 feet. The maximum PCE concentration is 63 ug/l.

2.4 General Response Actions

General response actions are broad categories of actions which may satisfy the RAOs and which characterize the range of remedial responses appropriate to the media of concern at the site. Following the development of general response actions, one or more remedial technologies and process options were identified for each of the general response action categories. Although an individual response action may be capable of satisfying the RAOs alone, combinations of response actions are usually required to adequately address site contamination. General response actions applicable to groundwater and surface water remediation at this site are described below.

2.4.1 No Action

The National Contingency Plan (NCP) and CERCLA require the evaluation of a No Action alternative as a basis for comparison with other remedial alternatives. Under the No Action alternative, no remedial actions are implemented and the current status of the site remains unchanged and no action would be taken to reduce the potential for exposure to contamination. While the No Action response action may include environmental monitoring to track the contamination, it does not include any actions (e.g., institutional controls) to reduce the potential for response if conditions change in the future.

2.4.2 Institutional/Engineering Controls

Institutional/Engineering Controls typically are restrictions placed to minimize access (i.e, fencing) or future use of the site (i.e, well drilling restriction). These limited measures are implemented to provide some protection of human health and the environment from exposure to site contaminants. They are also used to continue monitoring contaminant migration (i.e, long-term monitoring). Institutional/ Engineering Controls are generally used in conjunction with other remedial technologies; alone they are not effective in preventing contaminant migration or reducing contamination.

2.4.3 Monitored Natural Attenuation

Monitored Natural Attenuation (MNA) is a response action by which the volume and toxicity of contaminants are reduced by naturally occurring processes in the groundwater. Processes which reduce contamination levels in groundwater include dilution, dispersion, volatilization, adsorption, biodegradation, and chemical reactions with other subsurface constituents. Extensive site modeling and monitoring are performed as part of the MNA response action to demonstrate that contaminants do not represent significant risk and that degradation is occurring.

2.4.4 Containment

Containment response actions use physical barriers to minimize or eliminate contaminant migration. Low-permeable barrier walls are installed downgradient to control contaminant migration (e.g., slurry walls or sheet piling). If used in combination with a groundwater extraction system, the walls would also minimize the amount of pumping required to maintain hydraulic control by acting as a physical barrier, which minimizes clean groundwater inflow from side-gradient areas into the capture zone. Containment response actions minimize direct human contact. They do not, however, involve treatment to reduce the toxicity or volume of the contaminants at the site. These response actions require long-term monitoring to determine whether containment measures are performing successfully.

2.4.5 Extraction

An extraction-based response action provides reduction in mobility and volume of contaminants by removing the contaminated groundwater from the subsurface using such means as groundwater extraction wells or interceptor trenches. The extraction response action is typically combined with ex situ treatment of the extracted groundwater.

2.4.6 Treatment

Treatment response actions reduce the toxicity, mobility, and/or volume (TMV) of contaminants by physical, chemical, biological, or thermal processes. Treatment of contaminated groundwater includes both in situ and ex situ treatment technologies (e.g., chemical oxidation, air sparging/soil vapor extraction (AS/SVE), activated carbon adsorption, ultraviolet oxidation). The use of treatment technologies to achieve RAOs is favored by CERCLA, unless site conditions limit their application. Treatment technologies generally afford a higher degree of protection to public health and the environment.

2.4.7 Discharge/Disposal

Disposal response actions involve the disposal of extracted groundwater through on-site injection, on-site surface recharge or surface water discharge if treated to regulatory limits.

2.5 Identification and Screening of Remedial Technologies and Process Options

Potential technologies and process options associated with each general response action are identified and screened in this section. Representative remedial technologies and process options that have been retained for the development of alternatives are described further in Section 3.0 of this report. These representative remedial technologies and process options are intended to represent the broader range of applicable process options within a general technology type. Use of representative remedial technologies and process options simplifies the development and analysis of alternatives, while also providing greater flexibility in the final design.

The technology screening approach that was followed is based upon the procedures outlined in *Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA* (EPA 1988). The evaluation process uses three criteria: Effectiveness, Implementability, and Relative Cost. This guidance document recommends that this evaluation focus primarily on the Effectiveness criterion, with less emphasis directed at the Implementability and Relative Cost criteria. These criteria, as they apply to the screening process, are described below.

Effectiveness – This evaluation criterion focuses on the potential effectiveness of process options to handle the estimated quantity of media and meeting the remedial action goals and PRGs, the potential impacts to human health and the environment during construction and implementation, and how proven and reliable the process is with respect to the contaminants and conditions at the site.

Implementability – This evaluation criterion encompasses both the technical and administrative feasibility of the technology or process option. It includes an evaluation of pretreatment requirements, residuals management, and the relative ease or difficulty in performing the operation and maintenance requirements. Process options that are clearly ineffective or unworkable at the site are eliminated by this criteria.

Relative Cost – Cost plays a limited role in the screening process. Both capital as well as operation and maintenance costs are considered. The cost analysis is based on engineering judgement, and each process is evaluated as to whether costs are low, moderate, or high relative to the other options within the same technology type.

Based on the evaluation criteria above, technologies and process options were screened from further consideration in the FS. Remedial technologies and process options that were retained are the only options considered for the development of alternatives. All remedial technologies (both screened out and retained) are briefly described in Table 2-7. Retained technologies are indicated as such. Only remedial technologies or process options that could achieve the RAOs, either alone or in combination with other technologies and process options, were retained. Combinations of these technologies and process options are considered to constitute the reasonable alternatives which are required by the NCP.

2.5.1 No Action

The No Action alternative is not a technology. The NCP requires that a No Action alternative be considered as a basis for comparison.

Effectiveness – The No Action alternative is used as a baseline against which other technologies may be compared. It generally does not provide measures that would comply with ARARs, or otherwise meet RAOs.

Implementability – The No Action alternative is implementable given there is no action required.

Relative Cost – The No Action alternative involves no capital or operation and maintenance (O&M) costs.

Conclusion - The NCP requires that the No Action alternative be retained for further consideration.

2.5.2 Institutional/Engineering Controls

Institutional/Engineering Controls do not reduce the toxicity, mobility, or volume of contamination, but can be implemented to reduce the probability of exposure to contaminants. Institutional/engineering controls consist of administrative actions which control use of the site (e.g., well drilling restrictions), require long-term monitoring of groundwater in the area, or provide an alternate water source for the users affected by the contamination. Institutional/engineering controls are discussed below.

2.5.2.1 Well Drilling Restrictions

Well drilling restrictions are regulatory actions that are used to regulate installation of drinking water wells. Suffolk County has Private Water System Standards that require permit approval for drilling private water systems for new construction of private houses or subdivisions. Well drilling permits will not be approved if the public water supply system is available.

Effectiveness - Well drilling restrictions may effectively meet RAOs from a human health standpoint through restriction of future site uses or activities which may result in direct contact with contaminated groundwater. It is not effective for houses that already have potable wells. Also, well drilling restrictions will not reduce the migration and the associated environmental impact of the contaminated groundwater.

Implementability - Well drilling restrictions limit certain activities to within the contaminated groundwater areas. Implementation would be easy through the existing permitting process. Well drilling restrictions may be implemented, in addition to remediation activities, as a protective measure to prevent future exposure to contaminants during remediation.

Relative Cost - The cost to implement well drilling restrictions is low.

Conclusion - Well drilling restriction will be retained for further consideration.

2.5.2.2 Long-term Monitoring

Long-term monitoring includes periodic sampling and analysis of groundwater samples. This program would provide an indication of the movement of the contaminants or of the progress of remedial activities.

Effectiveness - Long-term monitoring alone would not be effective in meeting the RAOs. It would not alter the effects of the contamination on human health and the environment. Monitoring is a proven and reliable process for tracking the migration of contaminants.

Implementability - Long-term monitoring could be easily implemented. All monitoring wells are easily accessible for sample collection.

Relative Cost - Long-term monitoring involves low capital and medium O&M cost.

Conclusion - Long-term monitoring will be retained for further consideration.

2.5.2.3 Alternate Water Supplies

Providing alternate water supplies may include supplying residents with bottled water, providing service connections to the public water system, or installing a well-head treatment system. These alternate water supplies would be provided to residents whose private wells have exceeded the MCL for PCE or its breakdown products.

Effectiveness - Providing alternate water supplies to residents effectively protects human health by preventing direct contact and consumption of contaminated groundwater. Alternate water supplies will not reduce the migration and associated environmental impact of the contaminated groundwater.

Implementability - Providing alternate water supplies could be easily implemented. There are existing water mains in the affected areas. EPA has already provided treatment at the wellheads to multiple residents in the vicinity of the site.

Relative Cost - Alternate water supplies involves medium capital and low O&M cost.

Conclusion - Alternate water supply will be retained for further consideration.

2.5.3 Monitored Natural Attenuation

MNA refers to naturally occurring subsurface processes that cause a reduction in the contaminant mass and attenuate organic contaminants in the subsurface environment. The objective of the MNA remedial option is to scientifically prove that natural attenuation mechanisms will reduce contaminant concentrations to below regulatory standards before potential receptor exposure pathways are completed.

Natural attenuation processes that reduce contamination levels in groundwater include destructive (biodegradation and chemical reactions with other subsurface constituents) and nondestructive mechanisms (dilution, dispersion, volatilization, and adsorption). Biodegradation is typically the most significant destructive attenuation mechanism. Chlorinated solvents, such as PCE and TCE, attenuate by predominantly reductive processes, such as biodegradation. Reductive dechlorination, a step in the biodegradation process, requires an adequate supply of electron donors. These electron donors can include petroleum hydrocarbons or other types of anthropogenic carbon, as well as natural organic carbon. Once degradation has commenced via reductive dechlorination, reduced daughter products, such as vinyl chloride (VC) can be further degraded by direct oxidation.

The following reaction sequence depicts the primary reductive dechlorination pathway for PCE to non-toxic ethene, which is the terminal reductive dechlorination end product:

- PCE
- TCE
- cis-1,2-DCE
- VC
- Ethene

The extent and rate at which chlorinated solvents are biotransformed to less chlorinated compounds is dependent upon the oxidation/reduction (redox) potential of a site and the degree of chlorination. The microorganisms that affect the electron-accepting processes compete with each other for available organic carbon sources. Because oxygen is the most efficient electron-accepting process, oxygen-reducing microorganisms outcompete other electron-accepting processes if dissolved oxygen (DO) is present in groundwater. Once oxygen is depleted, nitrate-reducing microorganisms will predominate if nitrate is available. Similarly, ferric iron (Fe^{+3}) reduction follows nitrate reduction, sulfate reduction follows Fe^{+3} reduction, and methanogenesis follows sulfate reduction. As each of these stages take place, the local environment becomes more reducing, as evidenced by a lower redox potential.

By analyzing biogeochemistry data, distribution of electron acceptors and metabolic by-products, and the contaminant distribution and time-trend analysis, it is possible to determine whether active biotransformation of the chlorinated solvents is occurring through reductive dechlorination processes

Effectiveness - MNA is an effective remediation approach for sites that have demonstrated to utilize natural mechanisms to minimize or prevent the further migration of groundwater contamination. However, based on the review of the Smithtown RI data, it appears that biodegradation of chlorinated solvents is not occurring at the site. DO concentrations suggest aerobic conditions (above 1 milligram per liter [mg/L]), which are not conducive to reductive dechlorination of PCE, or its primary degradation product, *cis*-1,2-DCE. In an aerobic environment these compounds will tend to persist and migrate with groundwater.

Additionally, the groundwater redox potential was found to be significantly high. Typically, redox readings less than -100 millivolts (mV) are an indication that a reductive pathway is likely, while readings less than 50 mV indicate that a reductive pathway is possible (EPA 1998). The groundwater redox measurements taken at the site were significantly higher than this.

Nitrate concentrations were also found to be generally high at the site, suggesting the groundwater is not reduced beyond the level of denitrification. Additionally, methane concentrations were found to be below the detection limit. This indicates that methanogenic conditions, which are conducive to reductive dechlorination, are not present at the site.

The RI data also showed low concentrations or absence of PCE daughter products, including TCE, VC, and ethene. These data suggest that biodegradation of chlorinated solvents is not occurring at the site, and that primary attenuation processes would be nondestructive mechanisms, such as dilution, dispersion, and volatilization. Further site monitoring and modeling would need to be performed to evaluate whether these nondestructive natural attenuation processes would reduce contaminant concentrations at the site to below regulatory requirements within a reasonable time frame, compared to that offered by other remedial technologies.

Implementability - Natural attenuation is considered easily implementable. Materials and services necessary to model and monitor the contaminate dynamics are readily available. Once the MNA plan is implemented, periodic monitoring would be conducted to confirm that degradation is proceeding at rates capable of meeting RAOs. Site restrictions and/or institutional controls may be required as long-term control measures as part of the MNA alternative.

Relative Cost - MNA and modeling involves low capital cost and medium O&M cost.

Conclusion - MNA will not be retained for further consideration.

2.5.4 Containment

Low-permeable barrier walls could be installed downgradient of source areas or plumes to control contaminant migration. The walls would be constructed using slurry or sheet piling to the top of the Smithtown Clay, which is located at a variable depth, ranging from 100 to 300 feet bgs throughout the site.

Because of the variability of the groundwater table and depth of aquifer throughout the site, containment technologies would only be effective in areas of the site where a high water table, and shallow depth of the aquifer and confining clay unit are found. Within these areas, both types of barrier walls (i.e., slurry or sheet pile) would be effective for redirecting contaminated groundwater flow. If used in combination with a groundwater extraction system, the walls would also minimize the amount of pumping required to maintain hydraulic control by acting as a physical barrier, which minimizes clean groundwater inflow from side-gradient areas into the capture zone.

2.5.4.1 Slurry Walls

Slurry walls are constructed by pumping low-permeable slurry, typically consisting of either a soil-bentonite or cement-bentonite mixture, into an excavated trench. Excavation can be completed using a long-arm excavator and a clam shovel to meet the required depth. Slurry would be pumped into the hole during the course of excavation to keep the sidewalls from heaving.

Effectiveness - Slurry walls would be effective to achieve hydraulic control. Upon the completion of remedial activities, the walls would remain in place and continue to influence groundwater flow patterns on a localized scale.

Implementability - The implementability of slurry walls is low at the Smithtown site, even though construction materials and services are readily available. Typical slurry wall applications reach installation depths of about 30 to 40 feet bgs, based upon practical limitations associated with excavator trenching. Slurry walls can be installed to depths exceeding 100 feet bgs using a clam shovel at a higher unit cost. At the Smithtown site, the Smithtown Clay is located from 100 to 300 feet bgs, exceeding the practical limits of the slurry wall.

Relative Cost - Slurry walls involve high capital cost.

Conclusion - Slurry walls will not be retained for further consideration.

2.5.4.2 Sheet Pile Barriers

Sheet pile barriers are constructed by driving or vibrating sections of steel sheet piling into the ground. Each sheet pile section is interlocked at its edges, and the seams are often grouted to prevent leakage.

Effectiveness - Sheet pile walls are effective at providing hydraulic source control. Upon the completion of remedial activities, the sheet piles can be vibrated out of the ground, disassembled, and removed from the site, provided that the sheeting and joints are still of good structural integrity at the time of removal. Otherwise, the sheets would be cut off below ground surface, and the walls would continue to influence groundwater flow patterns on a localized scale.

Implementability - Sheet pile walls are not implementable at the Smithtown site, even though this technology has been widely used in the heavy construction industry, particularly for groundwater control and slope stability. Construction materials and services are readily available. Typical sheet pile wall applications reach installation depths of about 80 feet bgs, based upon practical limitations associated with installation. Sheet pile walls can be installed to depths exceeding 100 feet bgs at a higher unit cost. At the Smithtown site, the Smithtown Clay is located from 100 to 300 feet bgs, exceeding the practical limits of sheet piling.

Relative Cost - Sheet pile walls involve high capital cost.

Conclusion - Sheet pile walls will not be retained for further consideration.

2.5.5 Extraction

Collection/extraction processes include technologies for collection of contaminated groundwater for subsequent ex situ treatment and discharge.

2.5.5.1 Extraction Wells

This technology involves constructing extraction wells in specific locations determined through modeling for the best placement in order to gain hydraulic control of the plume.

Effectiveness - Extraction wells are effective in providing hydraulic control, for sites where the hydrogeology is well understood and the pumping rate necessary to maintain hydraulic control is sustainable.

Implementability - Extraction wells are implementable, and the equipment and materials are readily available. However, this technology may require a significant umber of wells at the Smithtown site because of the multiple flow directions found at the site.

Relative Cost - Extraction wells involves medium capital costs.

Conclusion - Extraction wells will be retained for further consideration.

2.5.5.2 Extraction Trenches

This technology involves construction of a trench perpendicular to the direction of groundwater flow to intercept and prevent downgradient migration of a contaminant plume. A bio-polymer slurry is used to temporarily support the sidewalls of the trench, preventing cave-in. The trench is typically backfilled with material of higher permeability than the native aquifer (e.g., gravel) to create a zone of preferential flow, and perforated piping or extraction wells are typically installed in the trench to collect the intercepted groundwater. After the piping and backfill have been installed, an additive is pumped into the trench to break down the slurry to simple sugars and water, thus reestablishing hydraulic connection to the aquifer. Extracted groundwater is then treated as necessary to meet discharge requirements.

Effectiveness -Extraction trenches are effective in capturing groundwater to provide hydraulic control. However, an extraction trench is not typically installed at depths greater than 30 feet bgs due to trenching equipment limitations.

Implementability - Extraction trenches are not implementable at the site due to the depth of groundwater, even though the equipment and materials are readily available.

Relative Cost - Extraction trenches involves medium capital cost.

Conclusion - Extraction trenches will not be retained for further consideration.

2.5.6 Onsite Ex situ Treatment

If groundwater extraction is selected as a remediation option, an ex situ treatment system would be required to remove contaminants from the groundwater before discharging either on site or off site. The primary advantage of ex situ treatment over in situ treatment is better process control (i.e., the ability to monitor and continuously mix the groundwater) which results in more uniform and effective treatment. Several ex situ treatment technologies were identified as potentially applicable at the site.

2.5.6.1 Air Stripping

Air stripping involves the mass transfer of volatile contaminants from water to air by increasing the surface area of the groundwater exposed to air. For groundwater remediation, aeration methods include diffused aeration, tray aeration, and spray aeration, and typically take place in a packed tower or aeration tank. A packed tower air stripper includes a spray nozzle at the top of the tower to distribute contaminated water over the packing in the column and a fan to force air countercurrent to the water flow. Aeration tanks strip volatile compounds by bubbling air into a tank through which contaminated water flows. A forced air blower and a distribution manifold are designed to ensure air-water contact without the need for any packing materials. A recent innovation to increase removal efficiency and reduce size is a low-profile air stripper which includes several trays packed in a small chamber to maximize air-water contact while minimizing space.

Effectiveness - Air stripping is effective in removing volatile contaminants from water. Air stripping is proven to successfully remove PCE from water, and is therefore an applicable treatment option for this site.

Implementability - The site is located in a developed residential area; therefore, finding a suitable location for the treatment plant may be difficult.

Relative Cost - Air stripping involves low capital and low O&M.

Conclusion - Air stripping will be retained for further consideration.

2.5.6.2 Liquid Phase Activated Carbon Adsorption

Carbon adsorption can be used to treat groundwater directly or off-gas generated during air stripping. In this process, groundwater or off-gas is pumped through vessel(s) containing granular activated carbon (GAC) to which contaminants are adsorbed and are, thereby, removed from the groundwater or off-gas. When the concentration of contaminants in the effluent exceeds a pre-established level (breakthrough concentration), the carbon is removed for regeneration or disposal.

Effectiveness - Carbon adsorption is effective in removing contaminants with moderate or high organic carbon partition coefficients (K_{oc}) from groundwater and off-gas. Carbon adsorption is not effective in removing vinyl chloride, a degradation product of PCE. However, vinyl chloride was not detected in the residential and monitoring well samples. The process is susceptible to biological and inorganic fouling and may require pretreatment steps such as pH adjustment and suspended solids removal.

Implementability - Activated carbon adsorption is implementable and proven, and the equipment and materials are readily available. It may be difficult to find an acceptable location (administratively) for the treatment plant.

Relative Cost - This technology involves medium capital and medium O&M.

Conclusion - Carbon adsorption will be retained for further consideration.

2.5.6.3 Ultraviolet Oxidation

During the ultraviolet (UV) oxidation process, organic contaminants in groundwater are oxidized through addition of strong oxidizers (ozone or hydrogen peroxide) and irradiated with UV light. First, the groundwater is dosed with an oxidizing agent (ozone or hydrogen peroxide) and then passed through a chamber, where it is exposed to intense UV light. Oxidation of target contaminants results from direct reaction with the oxidizers combined with UV photolysis. When complete mineralization is achieved, the final products resulting from complete VOC oxidation include water, carbon dioxide, and chloride.

Pretreatment (e.g., filtration) may be required to remove high turbidity and suspended solids which can interfere with transmission of UV light during treatment. Metals, high alkalinity, and carbonates in the groundwater may also require removal to minimize fouling of the UV oxidation equipment.

Effectiveness - UV oxidation has been demonstrated to be effective in the destruction of a wide variety of organic contaminants including chlorinated hydrocarbons (e.g., TCE, PCE, and VC). This technology can be implemented singly or in a treatment train to improve cost-effectiveness.

Implementability - UV oxidation is implementable and is proven, and UV oxidation systems are available from several commercial vendors. In addition, the reagents typically used in the UV oxidation processes (i.e., hydrogen peroxide and ozone) are available or can be generated readily. Minor administrative difficulties are anticipated for implementing this technology; discharge of unreacted ozone (if used) and volatilized contaminants not oxidized in the treatment process is required to comply with discharge standards.

Relative Cost - This technology involves high capital and high O&M. This process is cost effective for treating groundwater with high contaminate concentration and low flow rates.

Conclusion - UV oxidation will be retained for further consideration.

2.5.6.4 Biological Treatment

Ex situ biological treatment techniques are directed toward stimulating microorganisms to grow and use contaminants as a food and energy source by creating a favorable environment for the microorganisms. For the Smithtown site, this usually requires controlling the oxygen and nutrients levels, and temperature and pH. Microorganisms can also be adapted for degradation of specific contaminants and applied to enhance the process.

Effectiveness - Biological reactor treats contaminated groundwater by placing it in contact with microorganisms. Enhanced anaerobic degradation has been effective in degrading chlorinated solvents.

Implementability - Groundwater at the Smithtown site is aerobic and has high oxidation-reduction potential. As such, it would be difficult to create the anaerobic conditions in the bioreactor, which are necessary for the anaerobic dechlorination. The high extraction rates determined by the modeling that would be necessary and the low contaminant concentration levels at the site make this process difficult to implement.

Relative Cost - Biological reactor involves medium capital and medium O&M.

Conclusion - Biological reactors will not be retained for further consideration because of the aerobic conditions of the groundwater.

2.5.6.5 Vapor-Phase Activated Carbon Adsorption

Carbon adsorption can be used to treat the off-gas generated during air stripping. This process was described in Section 2.5.6.2, Activated Carbon Adsorption.

Effectiveness - Carbon adsorption is effective in removing contaminants with moderate or high organic carbon partition coefficients (K_{oc}) from off-gas.

Implementability - Activated carbon adsorption is implementable and proven, and the equipment and materials are readily available.

Relative Cost - This technology involves medium capital and medium O&M.

Conclusion - Carbon adsorption will be retained for further consideration.

2.6 In Situ Treatment Technologies

Several in situ treatment technologies were identified as potentially applicable at the site, and are discussed below.

2.6.1 Phytoremediation

Phytoremediation includes processes that use plants, and their associated rhizospheric microorganisms, to remove or degrade contaminants in groundwater. Phytoremediation is included as a biological process even though physical and chemical processes are also part of this technology. Contaminants are removed from groundwater through capture of groundwater for plant use; uptake and accumulation of contaminants; uptake and processing of contaminants through metabolization, mineralization, and transpiration; and rhizospheric degradation via microorganisms.

Effectiveness - Phytoremediation is applicable for relatively shallow groundwater (less than 10 feet bgs) and large groundwater plumes with low levels of contamination (high levels of contaminants may be toxic to the plants). The time to achieve remediation may extend over several growing seasons and is highly dependent on climatic conditions at the site.

Implementability - Phytoremediation has been used to treat chlorinated organic contaminated groundwater. Preliminary results from existing projects indicate that contaminated groundwater is contained through depression in the water table beneath the trees and the contaminants are degraded in the tissues of the trees. However, the toxicity and bioavailability of degradation products is not always known. More research is needed to define the fate of various compounds in the plant metabolic cycle to determine whether contaminants and associated degradation products can still pose a risk to human health and the environment. This technology is not applicable for the Smithtown site because contamination is found at depths greater than 10 feet bgs.

Relative Cost - This technology involves low cost and low O&M.

Conclusion - Phytoremediation will not be retained for further consideration.

2.6.2 Permeable Reactive Barriers

Permeable Reactive Barriers (PRBs) provide in situ treatment of groundwater and are designed to intercept contaminated groundwater flow. These reactive barriers differ from highly impermeable barriers, such as slurry walls, or sheet pilings, which restrict the movement of groundwater plume. PRBs can be installed as permanent, semi-permanent, or replaceable units across the contaminated groundwater flow path and act as a treatment wall. Natural hydraulic gradients transport contaminants through the strategically placed reactive media. When the contaminated groundwater passes through the reactive zone of the barrier, the contaminants are either immobilized or chemically degraded to less harmful product(s).

Effectiveness -PRBs have been effective in degrading chlorinated solvents. However, the PRBs will require periodic reactivation to retain effectiveness.

Implementability - PRBs are installed downgradient, vertically intersecting the contaminated groundwater flow. They can be installed with trenching, if the targeted portion of the aquifer is shallow and surface structures do not interfere with access. They can also be installed by well injection. Given the relatively significant depth of the contaminant zone at the site, the use of trenching would not be technically feasible. Injection through standard vertical wells is the least expensive injection option but horizontal borings could be installed beneath existing structures and would create a more uniform reactive zone. This is more difficult to achieve through vertical wells. PRBs would be difficult to implement due to the multiple flow directions and the fact that there is no consistent plume found at the Smithtown site.

Relative Cost - PRBs involves high capital and low O&M.

Conclusion - PRBs will not be retained for further consideration.

2.6.3 In Situ Chemical Oxidation

In Situ Chemical Oxidation (ISCO) is an aggressive approach that involves the injection of chemical oxidants into the subsurface to destroy organic contaminants in groundwater. Complete oxidation of contaminants results in their breakdown into less toxic compounds, such as carbon dioxide, water, and chloride. A number of factors affect the performance of this technology, including oxidant delivery to the subsurface, oxidant type, dose of oxidant, contaminant type and concentration, and non-contaminant oxidant demand.

Effectiveness - Delivery of the oxidant to appropriate locations is the primary consideration of ISCO and normally results in only limited zones of effectiveness. Oxidant type is somewhat dictated by the contaminant. ISCO is dependent upon achieving adequate contact between oxidants and contaminants, and subsurface heterogeneities can affect delivery of the oxidant. Poor application can result in large pockets of untreated contaminants and the oxidant can be consumed by other oxidizable substrates, natural organics and reduced metals.

A common limitation of the technology is that the non-specific oxidation depletes soil natural organic matrices and results in release of additional contaminant that had been bound in the soils.

Implementability -ISCO would be difficult to implement at the Smithtown site because ISCO is only able to effectively treat contamination in small radii of influence and limited thickness. Multiple injection points will be required for treating the Smithtown aquifer which is over 100-foot thick. Additionally, ISCO is more effective in treating highly contaminated groundwater than low level contamination, which is typical at the Smithtown site.

Relative Cost - ISCO involves high capital and low O&M.

Conclusion - ISCO will not be retained for further consideration.

2.6.4 In Situ Air Sparging/Soil Vapor Extraction

In situ AS is a technique in which air is injected into the groundwater for the purpose of removing organic contaminants by volatilization. It is typically used in conjunction with SVE to eliminate offsite migration of vapors. This system would employ a number of air sparging wells aligned in a grid pattern, with SVE wells placed between the sparge wells at further spacing to draw in organic contaminants. As air moves up through the groundwater, VOCs partition into the gas phase and are transported to the vadose zone.

The VOCs stripped from the groundwater would rise along with the air into the unsaturated zone where it would be captured by SVE techniques. SVE wells would be installed above the water table and a vacuum would be applied to extract the vapor containing VOCs. An off-gas treatment system using vapor phase carbon adsorption may be necessary to limit the release of contaminants to the atmosphere.

Effectiveness - AS has been shown to be effective in removing VOCs from the groundwater. This process is dependent on how well the injected air permeates into the groundwater from the injection point. The ability of the SVE wells to capture the contaminants forced into the unsaturated zone is an important component due to potential risk of VOCs migrating into the home basements located within the area of contaminated groundwater.

Implementability -Most components of AS are fairly easy to implement. The most important implementability issue to be considered would be the installation of the sparging and vapor extraction wells. AS requires a dense network of sparge wells and extraction wells. It would be administratively difficult to place a network of sparging wells and extraction wells with the associated piping within the residential properties to effectively capture the contaminants. For the Smithtown site, a consistent plume was not found and the contamination covers a fairly large area. Therefore the sparging and vapor extraction network would cover a fairly large areas.

Relative Cost - AS involves high capital and medium O&M.

Conclusion - AS will not be retained for further consideration due to implementability difficulty.

2.6.5 Enhanced Anaerobic Bioremediation

Enhanced Anaerobic Biodegradation (EAB) is a groundwater remedial technology designed to facilitate the in situ biological destruction of chlorinated VOCs over a wide range of concentrations in groundwater. EAB involves the injection of electron donor, nutrients, and potentially dechlorinating microorganisms (i.e., bioaugmentation) into the subsurface to stimulate the natural reactions of microorganisms to detoxify chlorinated solvent contamination in a low organic environment.

Effectiveness - For most sites, biological dechlorination reactions are limited by the availability of biodegradable organic carbon (i.e., electron donor) that serves as an energy source for indigenous microorganisms and/or by elevated concentrations of competing electron acceptors that maintain elevated groundwater reducing conditions competitively inhibiting the activity of the dechlorinating microbes. The addition of an electron donor as an energy source for indigenous microorganisms would stimulate the development of reduced groundwater environments that are conducive to dechlorination reactions (i.e., methanogenic conditions), and fuel the dechlorination process itself. For other sites, the extent of VOC dechlorination may be stalled at a biological intermediate such as DCE or VC due to the absence of the indigenous microorganisms capable of reductively biodegrading all source and intermediate VOCs to non-toxic compounds. Under this scenario, active dechlorinating microorganisms may be amended to the subsurface through a process termed bioaugmentation.

Some of these daughter compounds (e.g., DCE) have been detected in residential and monitoring wells. However, DCE was detected in the source materials discharged into the groundwater, and therefore it is not known if natural attenuation processes are occurring in the groundwater at this site. EAB treatment could stimulate biodegradation processes.

Implementability - The groundwater at the Smithtown site is aerobic and has high reduction-oxidation potential. Both conditions are not favorable for anaerobic degradation. It is not desirable or practical to substantially changed the groundwater conditions (i.e., from aerobic to anaerobic).

Relative Cost - EAB involves medium capital and high O&M.

Conclusion - EAB will not be retained for further consideration due to the aerobic conditions of the groundwater.

2.7 Discharge/Disposal

Once groundwater has been treated, it can be disposed on site or off site. Potential on-site and off-site disposal options for groundwater are evaluated below.

2.7.1 On-site Injection

This on-site discharge technology involves injecting treated groundwater to the subsurface using a series of wells. Injection requires that the groundwater be treated to meet applicable groundwater standards prior to disposal to the subsurface.

Effectiveness - The effectiveness of this option would rely on proper injection well design and construction, including adequate pipe sizing, proper placement of the wells, and reliable materials of construction.

Implementability - To discharge treated effluent to a series of injection wells would be easily and readily implementable, given that standard construction methods and materials would be utilized. A minimum of land space would be necessary for this option. The subsurface at this location is also suitable for the installation of injection wells for discharge to the Upper Glacial aquifer. Some implementability problems can arise during long term operation of injection wells, such as clogging of screen packs with precipitates or microbial fouling, particularly in high iron conditions. These can be overcome by proper removal of excess iron from the treated water, periodic chlorination of the injected water, and redevelopment and cycling on/off of wells.

Relative Cost - This technology involves medium capital and medium O&M.

Conclusion - This technology will be retained for further consideration.

2.7.2 On-site Surface Recharge

Treated groundwater can be disposed on site using a surface recharge system which consists of an excavated recharge basin. Recharge basins are shallow ponds that allow water to infiltrate into the ground gradually, and depending on the permeability of the soil, generally require large surface areas. As with injection wells, on-site recharge requires that the extracted groundwater be treated to meet applicable groundwater standards prior to disposal to the subsurface.

Another method of artificial groundwater recharge would be an infiltration gallery. This system would be developed as a series of perforated pipe galleries laid underground, which would receive treated groundwater from the onsite treatment plant, and disperse the flow evenly through the discharge system, down to the underlying aquifer system.

Another variation to recharge basins would be leaching basins. These are underground covered pits that are typically 5 to 10 feet wide and 10 to 20 feet deep. Although more of them may be needed to handle the flow rate, problems of safety and maintenance associated with recharge basins would be avoided, and they would not require extensive land surface, particularly important in highly developed areas such as the Smithtown site.

Effectiveness - The effectiveness of this option would rely on the proper construction of the recharge system, including adequate sizing, and use of suitable sand and gravel. The surface area required depends on the extraction rates and types of facilities.

Implementability - Surface recharge disposal is readily implementable, as standard construction methods and materials would be utilized. However, open land space is very limited at this site.

Relative Cost - A surface recharge system involves medium cost and medium O&M.

Conclusion - Surface recharge will be retained for further consideration.

2.7.3 Surface Water Discharge

Treated groundwater can be discharged to an off-site surface water body such as a nearby stream. Disposal to an off-site surface water body would require that the extracted groundwater be treated to meet applicable surface water discharge standards.

Effectiveness - Discharge to an off-site surface water body would be an effective method for disposal of treated groundwater, depending on the distance from the treatment system to the stream.

Implementability - This technology may be difficult to implement because of the distance to the nearest surface water body. A discharge monitoring program would likely be required to verify compliance with discharge standards.

Relative Cost - Discharge involves high capital and low O&M.

Conclusion - Surface water discharge of treated groundwater will be retained for further consideration.

Section 3
Development of Remedial Action Alternatives

In Section 2, potentially applicable general response actions and related technologies and process options were identified and a preliminary screening was performed. In this section, those technologies and process options retained after the preliminary screening are combined to form remedial action alternatives. Assumptions used in developing the remedial action alternatives are discussed in Section 3.1. The remedial action alternatives developed for the site groundwater are described briefly in Section 3.2.

3.1 Development of Remedial Action Alternatives

In this section, remedial alternatives developed for treating groundwater at the site are described briefly. Alternatives were developed using remedial technologies and process options retained in the screening process presented in Section 2. The retained technologies and process options include:

- No action (retained for comparison only)
- Alternate water supplies, institutional controls (i.e., well drilling restrictions), and long-term groundwater monitoring
- Extraction wells
- Ex-situ treatment, including: air stripping, liquid-phase carbon adsorption, UV oxidation, and vapor-phase carbon adsorption
- Discharge/Disposal, including: on-site injection, on-site recharge, and off-site surface water discharge

In developing remedial alternatives for the groundwater at the site, representative process options were selected from the same group of remedial technologies as appropriate:

- Liquid-phase carbon adsorption was selected as the representative treatment technology based on cost effectiveness. However, air stripping and vapor-phase carbon adsorption, and UV oxidation may still be applicable and should be considered during final remedy development.
- On-site injection was selected as the representative process option for disposal of treated water.

Rationale used to develop remedial alternatives for the site are:

- No action is retained as a baseline for comparison only
- Alternate water supplies, groundwater use restrictions, and long-term groundwater monitoring are retained as limited actions
- Groundwater extraction and treatment are considered to limit the migration and to accelerate the cleanup of contaminated groundwater, in combination with alternate water supplies for affected residences, long-term groundwater monitoring and institutional controls are retained as comprehensive actions.

3.2 Description of Remedial Action Alternatives

3.2.1 Alternative 1 - No Action

The No Action alternative was retained for comparison purposes as required by the NCP. No remedial actions would be implemented as part of the No Action alternative. The groundwater would continue to migrate and the contamination would continue to attenuate. This alternative does not include institutional controls or long-term groundwater monitoring.

3.2.2 Alternative 2 – Alternate Water Supply/Institutional Controls/Long-term Monitoring

As part of this alternative, an alternate water supply such as connection to the municipal water mains would be provided to the affected residences. Institutional controls such as groundwater use restrictions (through well drilling permit restrictions) would be implemented to prevent future use of contaminated groundwater. Long-term monitoring would include groundwater and surface water sampling. Groundwater would be sampled from selected monitoring wells to monitor the contaminant concentrations and migration over time. Additional monitoring wells would be installed as necessary to allow for effective monitoring of the contamination.

3.2.3 Alternative 3 – Alternate Water Supply/Groundwater Extraction/Treatment/On-site Injection/Institutional Controls/Long-term Monitoring

The two objectives of this alternative are 1) to provide a potable water source to the residences that are potentially effected by the contaminated groundwater and 2) to prevent contaminated groundwater from migrating off-site by hydraulically containing the contaminant plume, and to accelerate the cleanup of contaminated groundwater in the impacted areas.

An alternate water supply would be provided to residences affected by the contamination. The alternate water supply proposes that each residence within the affected areas, as identified in Figure 6 of Appendix A, would be connected to either SCWA or St. James Water District. Within this alternative, connection from the house to the water mains near the house would be provided. After the hookup to the water mains, the private wells would be properly abandoned accordingly to the New York State requirements.

In the groundwater extraction and treatment, extraction wells would be installed within the two affected areas identified in Section 2.3.4. Contaminated groundwater would be extracted and treated ex-situ. Treatment of extracted groundwater would include inorganic removal and liquid-phase carbon adsorption. Treated water would be re-injected into the ground. During the remediation period, residences with groundwater exceeding the drinking water standards would be provided with well head treatment. Long-term groundwater and surface water monitoring would be performed to monitor changes in contaminant concentrations and distribution onsite and offsite over time.

Institutional controls (well drilling permit restrictions) would be implemented to prevent exposure to contaminated groundwater during remediation.

3.3 Screening of Remedial Alternatives

Since only a limited number of remedial alternatives were developed, all alternatives will be carried forward for detailed analysis. Screening of remedial alternatives will not be performed.

Section 4
Detailed Description of Remedial Action Alternatives

4.1 Identification of Remedial Action Alternatives

Based upon the results of the screening analysis of remedial technologies presented in Section 3.0, three remedial alternatives were developed. They are as follows:

Alternative 1 -	No Action.
Alternative 2 -	Alternate Water Supply/Institutional Controls/Long-term Monitoring.
Alternative 3 -	Alternate Water Supply/Groundwater Extraction/Treatment/On-site Injection/Institutional Controls/Long-term Monitoring.

These alternatives were developed based upon the RAOs described in Section 2.0 and the procedures for developing a range of remedial action alternatives, as specified in the NCP and the EPA document *Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA* (EPA 1988).

The above alternatives are not intended to account for all possible combinations associated with the remedial technologies retained for further consideration following the screening analysis (Section 2.0). Rather, the alternatives are representative of the full range of plausible remedial action alternatives, considering variable degrees of design conservatism and cost. When more than one process option was retained, representative process options were used to develop the alternatives for evaluation and costing purposes. The selection of any particular process option will be determined during the remedial design or remedial action phase. The remedial action ultimately selected for this site is expected to be similar to one of these alternatives, but is in no way limited to them.

4.2 Detailed Description of Remedial Action Alternatives

The remedial action alternatives are described in this section with sufficient detail to complete detailed analyses, which are presented in Section 5.0. Preliminary design assumptions were developed for each alternative for the purpose of completing detailed analyses and estimating implementation costs. The design assumptions were based upon existing site data and information, and are expected to be representative of the conditions that would be encountered during the remedial action. The final configuration of the remedial action alternative selected for implementation will be determined during the remedial design phase of this project.

4.2.1 Alternative 1 – No Action

The No Action alternative was retained for comparison purposes as required by the NCP. No remedial actions would be implemented as part of the No Action alternative. This alternative does not include institutional controls or long-term groundwater monitoring.

4.2.2 Alternative 2 – Alternate Water Supply/Institutional Controls/Long-tem Monitoring

Alternative 2 consists of the following components:

- Alternate water supply
- Institutional controls
- Long-term groundwater and surface water monitoring
- Periodic site reviews

Alternate Water Supply. An alternate water supply would be provided to residences potentially affected by the contamination. The alternate water supply recommends that each residence within the affected areas, as identified in Figure 6 of Appendix A, would be connected to either SCWA or St. James Water District. The alternative would provide the connection from the house to the water mains near the house. After the hookup to the water mains, the private wells would be properly abandoned accordingly to the New York State requirements. Based on information provided by SCWA and St. James Water District, approximately 265 residences would need to be connected to the water mains. A survey would be conducted during the design phase to provide a more accurate count of residences requiring the alternate water supply.

Institutional Controls. Institutional controls would include placing groundwater use restrictions by denying well drilling permits in the affected areas (Figure 6, Appendix A). The intent is to reduce potential future exposure to contaminants by legally restricting use of potentially contaminated groundwater. Suffolk County currently has permit requirements for drilling private water supply wells. The County denies a well permit if there are existing public water supplies in the area. It is assumed that Suffolk County would continue to enforce this requirement as long as the groundwater is affected by the contaminants.

Long-term Groundwater and Surface Water Monitoring. A long-term groundwater and surface water monitoring program would be instituted to collect data on contaminant concentrations and movement at the site. Seventeen existing monitoring wells and three residential wells would be used for the long-term groundwater monitoring program. Additionally, six surface water samples would be collected from Stony Brook Harbor and Nissequogue River. Locations of existing and proposed monitoring wells and surface water samples are shown in Figure 4-1. Surface water (seep) sampling locations were determined based on the groundwater modeling projected surface water discharge locations. Groundwater and surface water (seeps observed at low tide) samples would be collected annually and analyzed for VOCs using low detection limit analytical methods.

The monitoring data collected would be evaluated and used to assess the migration and attenuation of the groundwater contamination through time and to plan for remedial action if required.

Periodic Site Reviews. A review of site conditions would be conducted every five years using data obtained through the annual groundwater and surface water sampling program. The site reviews would include an evaluation of the extent of contamination and an assessment of contaminant migration and attenuation over time. The long-term groundwater monitoring program would be modified based on the monitoring results.

Duration of Alternative. Contaminants were detected sporadically in the monitoring and residential wells. Since biodegradation of COCs is not prevalent, as discussed in Section 2.5.3, the non-destructive natural attenuation processes are the only mechanism for the reduction of contaminant concentrations. The concentrations for PCE and cis-1,2 DCE, the two major contaminants with the highest detected concentrations, were decreasing during the past several years as depicted in Table 2-1. The preliminary groundwater modeling predicts the contaminant mass will decrease over time, as groundwater and the contaminants migrate and discharge to surface water bodies. The model predicts that 70% of the contaminant mass would be removed in seven years from the groundwater flushing action (Appendix A, Figure 9). Therefore, based on the low contaminant concentrations detected and the model predictions, it is expected that the contaminant concentrations would drop to below the groundwater quality standards within the next 30 years. The long-term monitoring program would monitor the migration and reduction of the contaminants through time. For costing purpose, it is assumed the alternative would be evaluated for the 30-year FS evaluation period. Every five years, an evaluation would be performed based on the data available at that time to determine if long-term monitoring should be discontinued.

4.2.3 Alternative 3 - Alternate Water Supply/Groundwater Extraction/Treatment/On-site Injection/Institutional Controls/Long-term Monitoring

The two objectives of this alternative are 1) to provide a potable water source to the residences that are potentially effected by the contaminated groundwater and 2) to prevent contaminated groundwater from migrating off-site by hydraulically containing the contaminant plume, and to accelerate the cleanup of contaminated groundwater in the impacted areas. Alternative 3 would consist of the following components:

- Hook-up to alternate water supply
- Groundwater extraction
- Treatment
- On-site injection
- Institutional controls
- Long-term groundwater and surface water monitoring
- Periodic site reviews

Hook-up to Alternate Water Supply. An alternate water supply would be provided to residences potentially affected by the contamination. The alternate water supply recommends that each residence within the affected areas, as identified in Figure 6 of Appendix A, would be connected to either SCWA or St. James Water District. Within this alternative, connection from the house to the water mains near the house would be provided. After the hookup to the water mains, the private wells would be properly abandoned accordingly to the New York State requirements. Based on information provided by SCWA and St. James Water District, approximately 265 residences would need to be connected to the water mains. A survey would be conducted during the design phase to provide a more accurate count of residences requiring the alternate water supply.

Soil cutting resulting from the connection of the hook-ups to the water mains would be characterized for disposal. It is assumed that this material would be drummed and disposed off-site as non-hazardous waste.

Groundwater Extraction. A system of extraction wells would be constructed within and along the perimeter of each of the areas of concern in order to obtain hydraulic control, thereby preventing contaminated groundwater from migrating off-site. The contaminated groundwater would be extracted and treated ex-situ. Traditional pumping wells would be used for groundwater extraction. Based on preliminary groundwater modeling, three extraction wells at 100 gallons per minute (gpm) each would be required for Area One, and three extraction wells at 100 gpm each would be required for Area Two. The locations of the extraction wells are depicted in Figure 4-2. The locations and numbers of the extraction wells and the pumping rates are preliminary and would need to be confirmed during the remedial design.

Soil cuttings resulting from installation of the extraction wells would be characterized for disposal. It is assumed that this material would be drummed and disposed off-site as non-hazardous waste.

Groundwater Treatment. For costing purpose, liquid-phase carbon adsorption would be used as the representative process option to remove the contaminants from the extracted groundwater. During the design phase, other treatment processes, such as air stripping and vapor-phase carbon adsorption, should also be evaluated. In this process, the groundwater is pumped from a series of extraction wells to the treatment facilities. Extracted water would be filtered to remove suspended solids that may interfere with subsequent treatment processes. Currently it is assumed that precipitation to remove metals would not be required. This assumption would be confirmed during the design phase.

The next step in the groundwater treatment train would be carbon adsorption, which would involve the transfer of volatile contaminants from water to the activated carbon. GAC systems for liquid treatment typically consist of one or more vessels filled with carbon connected in series or parallel, operating under atmospheric or positive pressure. Contaminated water would be pumped through the reactor vessel(s), where contaminants would be adsorbed to the GAC and removed. The GAC would be gradually expended as it adsorbs contaminants. Once the GAC is saturated with contaminants (i.e., breakthrough is observed), the GAC would be replaced. The spent GAC would be sent off-site for reactivation, regeneration, or landfill disposal.

For costing purpose, one centralized facility is proposed for Area Two but three separate water treatment facilities are proposed for Area One because of space limitations, pipe routing restrictions, and distance between the extraction wells. Each facility would be sized to match the extraction rate for that area. The proposed locations of the treatment facilities are depicted in Figure 4-2. The facilities in Area One would be located underground in adequately sized concrete vaults to minimize impact to the residential neighborhood. The number of facilities and locations would need to be evaluated during the design phase.

Maintenance of the wells, pumps, filters, and replacement of spent GAC would be conducted, as required, during the operation of the groundwater extraction and treatment system. Periodic samples would be collected from various sample locations along the groundwater treatment train to verify the effectiveness of each treatment process. Effluent samples would be collected to verify compliance with the State Pollution Discharge Elimination System (SPDES) discharge requirements. Results from the long-term groundwater monitoring program would be used to evaluate performance and adjust operating parameters for the extraction system, as necessary.

On-site Injection. Following the treatment step, the treated groundwater would be sampled periodically to verify compliance with discharge requirements prior to disposal. For costing purposes, re-injection using injection wells are assumed. For Area One, single injection wells are located next to the treatment facilities. For Area Two, re-injection wells would be located between the extraction wells and are connected through a central header. For costing purposes, nine injection wells (three in Area One and six in Area Two) at 100-foot deep are assumed.

Institutional Controls. Institutional controls would be implemented as described under Alternative 2.

Long-term Groundwater and Surface Water Monitoring. Long-term groundwater and surface water monitoring would be implemented as described under Alternative 2.

Periodic Site Reviews. A review of site conditions would be conducted every five years using data obtained through the annual groundwater and surface water sampling program. The site reviews would include an evaluation of the extent of contamination and effectiveness of treatment. If contamination remains, the site reviews would also include an assessment of contaminant migration and attenuation over time.

Duration of Alternative. The concentrations for PCE and cis-1,2 DCE, the two major contaminants with the highest detected concentrations, were decreasing during the past several years as depicted in Table 2-1. The preliminary groundwater modeling predicts 75% of contaminant mass would be removed from the pumping and flushing actions in five years (Appendix A, Figure 9). Based on the low contaminant concentrations detected and the modeling results, and for costing purpose, the contaminant concentrations are assumed to be below the drinking water standards in 10 years. At the end of this period, a new evaluation would be performed based on the data available at that time.

Section 5
Detailed Analysis of Remedial Action Alternatives

In this section, the alternatives that were described in detail in Section 4 were evaluated using the nine evaluation criteria. The nine criteria used in the detailed analysis of alternatives are defined in Section 5.1. The detailed analysis of the alternatives is presented in Sections 5.2 and 5.3.

5.1 Introduction

The detailed analysis of each alternative consists of an evaluation against the nine criteria specified in the CERCLA FS guidance (EPA 1988).

Threshold Criteria
Threshold criteria are requirements that must be met in order for alternatives to be eligible for selection.

- Overall protection of human health and the environment
- Compliance with ARARs

Balancing Criteria
Balancing criteria are used to assess the relative effectiveness of alternatives based upon their strengths and weaknesses.

- Long-term effectiveness and permanence
- Reduction of toxicity, mobility or volume through treatment
- Short-term effectiveness
- Implementability
- Cost

Modifying Criteria
Two additional criteria, designated as modifying criteria, are also specified for assessment after the public comment period. These are:

- State acceptance
- Community acceptance

In this FS, alternatives are evaluated with respect to the first seven criteria listed above. The state acceptance criterion will be evaluated after receipt of comments on the Draft FS. The community acceptance criterion will be evaluated after the public comment period. A further definition of these criteria is presented in the following paragraphs; the definitions presented are based on the CERCLA FS guidance (EPA 1988).

5.1.1 Overall Protection of Human Health and the Environment

This criterion provides a final evaluation of each alternative to assess whether it achieves adequate protection of human health and the environment. This overall assessment is based on other evaluation criteria, especially long term effectiveness and permanence, short-term effectiveness, and compliance with ARARs.

Evaluation of alternatives against this criterion focuses on whether an alternative achieves adequate protectiveness and describes how risks through each pathway are eliminated, reduced, or controlled through treatment, engineering, or institutional controls. This criterion considers any unacceptable short-term or synergistic (e.g., cross-media) effects posed by an alternative.

5.1.2 Compliance with ARARs

This criterion is used to evaluate whether each alternative will meet the ARARs, identified in Section 2 of this FS. The detailed evaluation considers which ARARs are applicable to each of the specific alternatives, and describes how the alternative meets the ARARs. These include chemical-specific, location-specific, and action-specific ARARs. The final determination of applicable ARARs is made by the lead agency.

5.1.3 Long-term Effectiveness and Permanence

This criterion evaluates the results of a remedial alternative subsequent to its implementation in terms of the risk remaining at the site. The two main components of this are: (a) magnitude of residual risk from untreated waste or treatment residuals; and (b) adequacy and reliability of controls, if any, used to manage untreated wastes or treatment residuals.

5.1.4 Reduction of Toxicity, Mobility, or Volume Through Treatment

This criterion addresses the EPA policy preference for remedial alternatives which utilize technologies that permanently and significantly reduce the toxicity, mobility, or volume of hazardous substances as their principal element. This preference is satisfied when treatment is used to reduce the principal threats at a site through destruction of toxic contaminants, reduction of the total mass of toxic contaminants, irreversible reduction in contaminant mobility, or reduction of total volume of contaminated medium.

5.1.5 Short-term Effectiveness

This criterion evaluates the effects of the alternative during the construction and implementation phase of the alternative. The main factors addressed in this evaluation are: (a) protection of the community during remedial actions; (b) protection of workers during remedial actions; (c) potential adverse environmental impacts resulting from construction and implementation; and (d) time until remedial response objectives are met.

5.1.6 Implementability

This criterion addresses the technical and administrative feasibility of implementing the alternative, and the availability of services and materials required for its implementation. The specific components of this criterion are described below.

- Technical feasibility includes: (a) construction and operation, including technical difficulties and unknowns associated with the technologies included in the alternative; (b) reliability of the technologies; (c) ease of undertaking additional remedial actions (more significant at sites for which an interim action is being conducted); and (d) monitoring considerations.
- Administrative feasibility refers primarily to the necessary coordination with other offices and agencies to obtain, for example, discharge permits, as well as site acquisition. Availability of services and materials includes assessment of the availability of the treatment, storage, and disposal services necessary to implement the alternative; the availability of the technologies; and the availability of additional equipment or specialists. The CERCLA FS guidance (EPA 1988) also includes the potential for obtaining competitive bids as part of this criterion.

5.1.7 Cost

The cost criterion is divided into the two categories: (1) capital costs; and (2) O&M costs. Capital costs include: (a) direct capital costs such as construction, equipment, land and site development, buildings and services, and disposal costs; (b) indirect capital costs such as engineering expenses, construction management costs, license and permit costs, startup and shakedown costs; and (c) contingency allowances. O&M costs are costs associated with long-term operation of the remedy after completion of the construction include operating labor; maintenance material and labor; auxiliary materials and energy; costs for residue disposal; administrative work; and equipment rehabilitation or replacement costs. For the purposes of this FS, mobilization and demobilization costs, start-up and health and safety expenses are included as capital costs.

Analysis of costs was performed using vendor-supplied information and other references (MEANS 1998 and MEANS 2001), supplemented by CDM's experience and vendor data.

In order to compare economic costs of the various alternatives, present worth analyses were performed. For these analyses, it was assumed that the resources and activities required to perform operation and maintenance will remain constant over the period of remediation. A discount rate of 7% was assumed for the purposes of this FS. Capital costs were calculated in current year dollars and not discounted; only O&M costs incurred after the first year were discounted for the net present worth analysis. Pursuant of the EPA RI/FS guidance document (EPA 1988), the costs are expected to be within -30 to +50 percent accuracy.

5.1.8 State Acceptance

This criterion addresses technical and administrative preferences and issues that the State of New York may have regarding each alternative. Alternatives are evaluated based upon their support/acceptance by the NYSDEC and other regulatory agencies. NYSDEC comments have been incorporated into the Final FS, based upon their review of the Draft FS.

5.1.9 Community Acceptance

This criterion will incorporate public comments which have been provided to federal and state agencies during the RI/FS process. The assessment of community acceptance will address those alternatives that the community formally supports or opposes. Community input on the FS Report will be solicited during the public comment period, during which time the FS Report will be available for public review. A responsiveness summary will be prepared to address comments received during the public comment period. A summary of the public comments and responses will be included in the Record of Decision (ROD). As a result, no assessment or estimate of community acceptance will be made in this FS Report.

5.2 Detailed Analysis of Remedial Alternatives

The remedial alternatives developed for the site include:

- Alternative 1 - No Action
- Alternative 2 - Alternate Water Supply/Institution Controls/Long-Term Monitoring
- Alternative 3 - Alternate Water Supply/Groundwater Extraction/Treatment/ On-site Injection/Institutional Controls/Long-Term Monitoring

The detailed analysis of remedial alternatives is discussed in detail below. The results of this analysis and the corresponding cost estimates are summarized in Tables 5-1 and 5-2, respectively.

5.2.1 Alternative 1 – No Action

Alternative 1 is described in Section 4.2.1.

5.2.1.1 Overall Protection of Human Health and the Environment

The no action alternative does not provide overall protection of human health. Currently, there is risk to human health as the groundwater is a source of potable water for the community. Because no remedial action would be implemented under this alternative, no means would be available to prevent current and future exposure.

Contaminants were detected sporadically in the monitoring and residential wells and there is no consistent plume detected at the site. This alternative would not provide protection to the environment since contamination would continue to migrate with groundwater and there would be no mechanism to monitor the migration of the contaminants.

Since biodegradation of COCs is not prevalent, as discussed in Section 2.5.3, the non-destructive natural attenuation processes are the major mechanisms for the reduction of contaminant concentrations. The sampling results, as summarized in Table 2-1 for PCE and cis-1,2 DCE, the two major contaminants with the highest detected concentrations in the impacted areas, indicate that PCE and cis-1,2 DCE concentrations were generally decreasing from 1998 to 2003. The preliminary groundwater modeling predicts that the majority of the contaminant mass would be removed in several years from the migration and discharge of the contaminants to the surface water bodies, where the contaminants eventually volatilize into the atmosphere and degrade through the photolysis process. Figure 9 in Appendix A depicts the mass reduction through time. Based on the low contaminant concentrations detected and the modeling results, it is expected that the contaminant concentrations would drop to below the groundwater quality standards within the next 30 years.

5.2.1.2 Compliance with ARARs

Due to the presence of organic COCs above the groundwater quality standards and drinking standards, this alternative would not comply with the chemical-specific ARARs for groundwater at the present time. However, most of the detected contaminant concentrations were only marginally above the groundwater quality standards and there is no continuous source, it is expected the concentrations of organic COCs would likely decrease over time. It is expected that the chemical-specific ARARs would be met in the future. The time frame to attain ARARs is within 30 years.

As this alternative involves no action, location- and action-specific ARARs are not applicable.

5.2.1.3 Long-term Effectiveness and Permanence

Magnitude of Residual Risk - No Action is not considered to be a permanent remedy. The contaminants would not be destroyed, except by gradual reductions through natural attenuation. Extensive attenuation via biodegradation would not be expected at this site, as discussed in Section 2.5.3. Since there is no continuous source, the contaminant concentrations would likely decrease over time through non-destructive attenuation processes. It is expected the chemical-specific ARARs would be met in the future.

Adequacy of Controls - Currently there is risk to human health since the groundwater is used for drinking water. This alternative would not provide adequate control of risks to human health or the environment because there are no mechanisms to prevent future exposure.

The ecological risk assessment indicates that chlorinated COCs would not have significant impact to the harbor or the river, where the groundwater discharges.

Reliability of Controls - Under this alternative there would be no mechanism in place to prevent future risk to human health; therefore, this alternative would not be considered reliable.

5.2.1.4 Reduction of Toxicity, Mobility or Volume through Treatment

The implementation of this alternative would not affect the toxicity, mobility, or volume of the contaminants. Biodegradation of chlorinated COCs would not be likely because of the aerobic nature of the groundwater. However, the toxicity and volume (mass) of contaminants in groundwater would be gradually reduced over time through non-destructive attenuation processes.

5.2.1.5 Short-term Effectiveness

This alternative would not include a remedial action. Therefore, it would have no short-term impact to workers or the community. There would be no adverse environmental impacts to habitats or vegetation as there is no remedial action under this alternative.

A time period of 30 years, the maximum specified for evaluation under EPA FS guidance, is assumed for implementation of this alternative. It is anticipated that PRGs would be met within this time period.

5.2.1.6 Implementability

This alternative is easily implemented, since no services or permit equivalency would be required.

5.2.1.7 Cost

There would be no cost under this alternative.

5.2.1.8 State Acceptance

NYSDEC reviewed the Draft FS and their comments have been incorporated into this Final FS report.

5.2.1.9 Community Acceptance

Alternatives are evaluated based upon their acceptance by the community. Community acceptance would be formally addressed after the Final FS and Proposed Plan have been issued to the public for formal review and comment, and a public meeting/availability session has been held by EPA. Community acceptance would be formally addressed in the Responsiveness Summary of the ROD, which would present EPA's responses to the public's questions and concerns regarding the FS and Proposed Plan.

5.2.2 Alternative 2 - Alternate Water Supply/Institutional Controls/ Long-term Monitoring

Alternative 2 is described in Section 4.2.2.

5.2.2.1 Overall Protection of Human Health and the Environment

Alternative 2 would be protective of human health because contaminated groundwater would no longer be utilized as the source of drinking water for the residents at the Smithtown site. Residences within the impacted areas would be hooked up to the water mains. Existing private water wells would be abandoned to eliminate future use. Use of contaminated groundwater in the future would be avoided through the well drilling permit restrictions. Therefore, this alternative would be protective of human health.

Contaminants were detected sporadically in the monitoring and residential wells. Since biodegradation of COCs is not prevalent, as discussed in Section 2.5.3, the non-destructive natural attenuation processes are the major mechanisms for the reduction of contaminant concentrations. The sampling results, as summarized in Table 2-1 for PCE and cis-1,2 DCE, the two major contaminants with the highest detected concentrations in the impacted areas, indicate that PCE and cis-1,2 DCE concentrations were generally decreasing from 1998 to 2003. The preliminary groundwater modeling predicts that the majority of the contaminant mass would be removed in several years from the migration and discharge of the contaminants to the surface water bodies, where the contaminants eventually volatilize into the atmosphere and degrade. Figure 9 in Appendix A depicts the mass reduction through time. Based on the low contaminant concentrations detected and the modeling results, it is expected that the contaminant concentrations would drop to below the groundwater quality standards within the next 30 years. The long-term monitoring program would monitor the migration and reduction of the contaminant concentration through time.

This alternative would achieve the remedial action objectives.

5.2.2.2 Compliance with ARARs

This alternative would meet the chemical-specific ARARs. Most of the detected contaminant concentrations were only marginally above the groundwater quality standards and there is no continuous source, it is expected that the contaminant concentrations will be reduced through the non-destructive attenuation processes to below the groundwater quality standards within the next 30 years.

Implementation of Alternative 2 may impact coastal resources, as a portion of the project area that would be hooked up to the municipal water supply, as delineated on Figure 6 in Appendix A, is located within the coastal zone as designated by the State of New York. A coastal zone consistency assessment would be prepared during the design phase, to evaluate the proposed remedial action for consistency with the applicable policies of the New York State Coastal Management Program, as well as the Town of Smithtown's Local Waterfront Revitalization Program.

A Stage I Cultural Resources Survey would be conducted during the design phase. This alternative would not impact wetlands and floodplains, as construction would be limited to roadways and residential properties, outside of the limits of the wetlands and floodplains. There are no known endangered species in the area. This alternative would be designed to comply with action-specific ARARs. Tables 2-2 and 2-3 summarize the requirements of the location- and action-specific ARARs and their FS considerations.

5.2.2.3 Long-term Effectiveness and Permanence

Magnitude of Residual Risk - This alternative would have long-term effectiveness and permanence. The residents would not be exposed to contaminated groundwater once their houses are connected to the municipal water supplies. Their existing private wells would be abandoned. Institutional controls would restrict drilling of new drinking water wells. Since there is no continuous source, residual contaminated groundwater would gradually decrease over time.

Long-term groundwater monitoring would be implemented to verify that the contaminant concentrations would not be increasing over time or posing an unacceptable risk to human health and the environment.

Adequacy of Controls - This alternative would provide adequate control of risk to human health. Suffolk County would need to continue enforcing a well permit program that would prevent new private drinking water wells to be drilled in this area. As part of this alternative, current wells would be abandoned to ensure that potential exposure to contaminated groundwater would be eliminated. Long-term groundwater monitoring would monitor the change in groundwater conditions. If necessary, additional remedial action could be implemented.

Reliability of Controls - Municipal water supplies are considered reliable. Institutional controls, if properly enforced, would be adequate and reliable. Additionally, current wells in use would be abandoned under this program to ensure that groundwater would not be used. Long-term groundwater monitoring would be reliable.

5.2.2.4 Reduction of Toxicity, Mobility or Volume through Treatment

This alternative has no direct effect in reducing the toxicity, mobility, or volume of residual contaminants through treatment, since no active treatment is part of this alternative. Biodegradation of chlorinated COCs would not be likely because of the aerobic nature of the groundwater. However, the toxicity and volume (mass) of contaminants in groundwater would be gradually reduced over time through non-destructive attenuation processes.

5.2.2.5 Short-term Effectiveness

This alternative would include limited site work and would have minimal and short-term impact to the communities and worker. Use of personal protective equipment (PPE) by workers during groundwater monitoring would minimize the exposure. There would be no adverse environmental impacts to habitats or vegetation due to the implementation of this alternative.

It is estimated that it would take approximately two years to connect all the residences to the water mains. A time period of 30 years, the maximum specified for evaluation under CERCLA FS guidance (EPA 1988), is assumed for the long-term monitoring of this alternative.

5.2.2.6 Implementability

This alternative would be easily implemented. Supplies and services for connections to the water mains and long-term groundwater monitoring would be readily obtainable. No problems would be forecasted for the implementation and enforcement of the institutional controls.

5.2.2.7 Cost

A summary of the capital costs, annual O&M costs, five-year review costs, and total present worth is provided in Table 5-1. The detailed cost estimates are presented in Appendix B. Total present worth for this alternative is $4.1 million over the 30-year life of the alternative.

5.2.2.8 State Acceptance

NYSDEC reviewed the Draft FS and their comments have been incorporated into this Final FS report.

5.2.2.9 Community Acceptance

Alternatives are evaluated based upon their acceptance by the community. Community acceptance would be formally addressed after the Final FS and Proposed Plan have been issued to the public for formal review and comment, and a public meeting has been held by EPA. Community acceptance would be formally addressed in the Responsiveness Summary of the ROD, which would present EPA's responses to the public's questions and concerns regarding the FS and Proposed Plan.

5.2.3 Alternative 3 – Alternate Water Supply/Groundwater Extraction/Treatment/On-site Injection/Institutional Controls/Long-term Monitoring

Alternative 3 is described in Section 4.2.3.

5.2.3.1 Overall Protection of Human Health and the Environment

Alternative 3 would be protective of human health because contaminated groundwater would no longer be utilized as the source of drinking water for the residents at the Smithtown site. Residences within the impacted areas would be hooked up to the water mains. Existing private water wells would be abandoned to eliminate future use. Use of contaminated groundwater in the future would be avoided through the well drilling permit restrictions. Therefore, this alternative would be protective of human health.

The goal of pumping groundwater is to create an inward gradient that would limit downgradient migration of the contaminants and to accelerate the cleanup of contaminated groundwater in the affected areas. Since contamination source areas are not detected and there is no consistent plume in the groundwater, it is expected that the groundwater would meet the PRGs in the near future. Table 2-1 summarizes the investigation results for PCE and cis-1,2 DCE, the two major contaminants with the highest detected concentrations in the impacted areas, from 1998 to 2003. As can be seen from the sample results, the contaminant concentrations were generally decreasing over the past several years. It is expected the decreasing trend will continue.

The preliminary groundwater modeling predicts that 75% of the contaminant mass would be removed after five years of flushing and active pumping. Figure 9 in Appendix A depicts the mass reduction through time at various pumping rates. Based on the fact that the contaminant concentrations were only marginally above the drinking water standards in the 2003 results, and the contaminant concentrations will decrease based on the modeling prediction, the groundwater quality would be within the drinking water standards in the near future. Long-term monitoring would be implement to monitor the groundwater quality during the remediation period. In addition, institutional controls (well drilling permit restrictions) would be implemented to prevent exposure to contaminated groundwater during remediation.

This alternative would be protective of human health and the environment.

5.2.3.2 Compliance with ARARs

Contaminant concentrations in the groundwater are expected to decrease over time. It is anticipated that the PRGs would be met in the near future. Long-term groundwater monitoring would be conducted to assess the degree of compliance achieved over time.

The treatment plants would be located outside of the 100-year floodplains and wetlands, as depicted on Figure 4-2. Implementation of Alternative 3 may impact coastal resources, as infrastructure associated with the implementation of this alternative (treatment wells, on-site injection wells, and treatment plants) as depicted on Figure 4-2 appears to lie within, or in close proximity to, the state designated coastal zone. A coastal zone consistency assessment would be prepared during the design phase, to evaluate the proposed remedial action for consistency with the applicable policies of the New York State Coastal Management Program, as well as the Town of Smithtown's Local Waterfront Revitalization Program. A Stage I Cultural Resources Survey would be conducted during the design phase. No other location-specific ARARs were identified. Treated water would comply with the discharge requirements. This alternative would be designed to comply with other action-specific ARARs. Tables 2-2 and 2-3 summarize the requirements of the location- and action-specific ARARs and their FS considerations.

5.2.3.3 Long-term Effectiveness and Permanence

Magnitude of Residual Risk - This alternative would have long-term effectiveness and permanence. The residents would not be exposed to contaminated groundwater once their houses are connected to the municipal water supplies. Their existing private wells would be abandoned. Institutional controls would restrict drilling of new drinking water wells.

Extraction and treatment of contaminated groundwater would limit downgradient migration of the contaminants and accelerating the cleanup of the two affected areas. It is expected that groundwater would meet the PRGs in the near future, based on the groundwater modeling results. Long-term groundwater monitoring would be implement to monitor the groundwater quality during the remediation period.

Adequacy of Controls - This alternative would provide adequate control of risk to human health. Affected residences would be hooked up to municipal water supplies. Suffolk County would need to continue enforcing a well permit program that would prevent new private drinking water wells to be drilled in this area. As part of this alternative, current wells would be abandoned to ensure that potential exposure to contaminated groundwater would be eliminated.

Pump and treat would be considered effective in removing the contaminant plume as it has been demonstrated at other sites. However, the extraction wells may not intercept some or all of the contaminant flows, thus missing the contaminants. The effectiveness of groundwater extraction is small when compared to the removal of contaminants through the groundwater flushing action. As illustrated in Figure 9 of Appendix A, pumping would only contribute to approximately 10 percent of the contaminant removal after ten years; approximately 90% of the contaminant removal would be through groundwater flushing. The effectiveness of the alternative would be confirmed through groundwater monitoring.

Reliability of Controls - Municipal water supplies are considered reliable. Institutional controls, if properly enforced, would be considered reasonably adequate and reliable for protection of human health. Additionally, current wells in use would be abandoned under the program to ensure groundwater would not be used.

The long-term effectiveness of this alternative would be assessed through routine groundwater monitoring and five-year reviews. As part of the monitoring program, groundwater would be sampled to monitor groundwater quality over time to verify that contaminant concentrations would not be increasing over time or posing an unacceptable risk to human health and the environment.

5.2.3.4 Reduction of Toxicity, Mobility or Volume through Treatment

The toxicity, mobility, and volume of the contaminants in groundwater would be reduced through pumping and treatment and natural groundwater flushing. Since pump and treat has a limited effect, only a small portion of the contaminants would be removed through groundwater extraction. The reduction of contaminants in the groundwater would mainly rely on natural flushing in the area. The contaminants collected on the carbon would be destroyed during the carbon regeneration or reactivation process where they would pose no threat to human health or the environment.

The mobility of the remaining contaminants in groundwater would be reduced as a result of the establishment of the inward gradient towards the extraction wells.

5.2.3.5 Short-term Effectiveness

Limited site work and installation of the extraction wells and groundwater treatment system would be performed without significant risk to the community. Site workers would wear appropriate PPE to minimize exposure to contamination and as protection from physical hazards.

No adverse impacts to habitats or vegetation would be anticipated from activities associated with implementation of this alternative.

The estimated period for connecting all the residents to the water mains is two years. Within the two year period, construction of the treatment facility would occur simultaneously, estimated at one year for construction (mobilization/site preparation/demobilization three months, treatment plant procurement/ installation nine months). A 10-year duration for this alternative was assumed for operation and maintenance of the pumping and treatment systems and a 30-year duration was assumed for long-term groundwater monitoring.

5.2.3.6 Implementability

This alternative is technically implementable but could be administratively difficult to implement. This alternative would be implemented using conventional construction methods and equipment. The technical feasibility of pump and treat has been established at other sites. No technical difficulties are anticipated for installation of the groundwater extraction and treatment system. Services and materials for implementation of this alternative are readily available. Competitive bids can be obtained from a number of equipment vendors and remediation contractors. No problems are forecasted for the implementation and enforcement of the institutional controls.

There is very limited space available at the site. Most of the properties are privately owned. Obtaining permission and right of way for installing the extraction wells, routing the piping and locating the treatment plants could be difficult. It is not known if the local community would be receptive to the proposed locations of the injections wells, extraction wells, and treatment plants.

The residential hook-up initiative would be easily implemented. Supplies and services for the connections to the water mains and long-term groundwater monitoring would be readily obtained.

5.2.3.7 Cost

A summary of the capital costs, annual O&M costs, five-year review costs, and total present worth is provided in Table 5-1. The details of this alternative and the associated estimated costs are presented in Appendix B. Total net present worth for this alternative is $7.1 million over the 30-year life of the alternative.

5.2.3.8 State Acceptance

NYSDEC reviewed the Draft FS and their comments have been incorporated into this Final FS report.

5.2.3.9 Community Acceptance

Alternatives are evaluated based upon their acceptance by the community. Community acceptance would be formally addressed after the Final FS and Proposed Plan have been issued to the public for formal review and comment, and a public meeting has been held by EPA. Community acceptance would be formally addressed in the Responsiveness Summary of the ROD, which would present EPA's responses to the public's questions and concerns regarding the FS and Proposed Plan.

5.3 Comparative Analysis of Alternatives

This section compares the alternatives using the nine criteria. Table 5-2 summarizes the comparison among the three alternatives.

5.3.1 Overall Protection of Human Health and the Environment

Alternative 1 would not provide protection of human health, since contamination would remain in groundwater for some time in the future, and potential exposure to contaminated groundwater would not be restricted. Currently there are risks to human health because the groundwater at the site is used as a source of drinking water. Alternatives 2 and 3 are equally protective of human health by eliminating current and future exposure to contaminated groundwater. Alternative 2 would provide a potable water source for the area; however, would not provide any active treatment but rely on natural processes to reduce contaminant mass. Alternatives 3 would provide a potable water source and utilize active treatment processes to reduce the toxicity, mobility, and volume of the contaminants, in addition to the natural processes.

Alternatives 1 and 2 would rely on natural mechanisms to reduce the groundwater contamination. Alternative 2 would monitor the conditions of groundwater and additional remedies could be implemented if necessary. Alternative 3 would provide some additional protection of the environment as the contaminant cleanup would be accelerated by active pumping.

5.3.2 Compliance with ARARs

All alternatives would attain the PRGs within 30 years. Alternative 3 would accelerate the cleanup time through active pumping while Alternatives 1 and 2 would rely on natural mechanisms to reduce the contaminant concentrations. Long-term groundwater monitoring is a component of Alternatives 2 and 3 to assess the degree of compliance achieved over time. All alternatives would comply with location- and action-specific ARARs.

5.3.3 Long-term Effectiveness and Permanence

Alternative 1 would not be effective or permanent, since the contaminants would not be destroyed and there would be no mechanism to prevent current and future exposure to contaminated groundwater. Alternatives 2 and 3 would be effective and permanent since an alternate water supply would be reliable when combined with institutional controls and long-term monitoring. Pumping and treatment under Alternative 3 would only provide marginal improvement in contaminant removal.

5.3.4 Reduction of Toxicity, Mobility, or Volume Through Treatment

Alternatives 1 and 2 would not reduce the VOCs through treatment as no active treatment of contaminated groundwater occurs. The toxicity and volume would eventually be reduced for Alternatives 1 and 2 due to natural processes. Alternative 3 would reduce the mobility and volume of the contaminants. This alternative also involves the treatment of the contaminated groundwater thus reducing toxicity.

5.3.5 Short-term Effectiveness

For alternative 1 protection of the community and workers would not be applicable as no remedial action occurs. There will be short term inconveniences to the residence for

Alternatives 2 and 3 and no major adverse impacts would be expected. Air monitoring, engineering controls, and appropriate worker PPE would be used to protect the community and workers for Alternatives 2 and 3.

5.3.6 Implementability

Alternative 1 would be easiest both technically and administratively to implement. Alternative 2 would be the second easiest to implement. Alternative 3 would be easy to implement technically but could be administratively difficult to implement because of the space limitations and community acceptance of the locations of the treatment plants may not be well received by the community.

5.3.7 Cost

A summary of the cost estimates for each alternative is presented in Table 5-1. Alternative 1 has no cost. Alternative 3 is more expensive than Alternative 2.

Section 6
References

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Table 1-1
Residences Hooked Up to Water or Provided Treatment
Smithtown Groundwater Contamination Site
Smithtown, New York

Current Address	Former Address	Type of Action
43 Branglebrink Road	Krauth/Branglebrink Road	Carbon Treatment at tap
40 Branglebrink Road	Gillison/Branglebrink Road	Water Main Connection
41 Branglebrink Road	Renna/Branglebrink Road	Water Main Connection
9 Branglebrink Road	9 Branglebrink Road	Water Main Connection
29 Branglebrink Road	29 Branglebrink Road	Water Main Connection
37 Branglebrink Road	37 Branglebrink Road	Water Main Connection
1 Carmen Lane	1 Carmen Lane	Water Main Connection
7 Carmen Lane	7 Carmen Lane	Water Main Connection
16 Carmen Lane	16 Carmen Lane	Water Main Connection
22 Carmen Lane	22 Carmen Lane	Water Main Connection
30 Cordwood Path	Greshin/Cordwood Path	Water Main Connection
26 Cordwood Path	26 Cordwood Path	Water Main Connection
22 Harbor Lane	3 Harbor Lane	Carbon Treatment at tap
25 Harbor Road	25 Harbor Road	Water Main Connection
49 Harbor Hill Road	49 Harbor Hill Road	Water Main Connection
54 Harbor Hill Road	54 Harbor Hill Road	Water Main Connection
28 Highwoods Court	28 Highwoods Court	Water Main Connection
29 Highwoods Court	29 Highwoods Court	Water Main Connection
31 Highwoods Court	31 Highwoods Court	Water Main Connection
33 Highwoods Court	33 Highwoods Court	Water Main Connection
320 Old Mill Road	245K Old Mill Road	Carbon Treatment at tap
3 Breezy Hollow Road	263J Old Mill Road	Water Main Connection
5 Old Post Lane	255 Old Post Lane	Carbon Treatment at tap
3 Pin Oak Lane	3 Pin Oak Lane	Water Main Connection
7 Pin Oak Lane	7 Pin Oak Lane	Water Main Connection

Table 1-1
Residences Hooked Up to Water or Provided Treatment
Smithtown Groundwater Contamination Site
Smithtown, New York

Current Address	Former Address	Type of Action
412 River Road	207 River Road	Water Main Connection
270 Sachem Hill Road	270 Sachem Hill Road	Water Main Connection
271 Sachem Hill Road	271 Sachem Hill Road	Water Main Connection
5 Swan Place	5 Swan Place	Water Main Connection
6 Swan Place	6 Swan Place	Water Main Connection
3 Tide Mill Lane	3 Tide Mill Lane	Carbon Treatment at tap
1 Tide Mill Road	1 Tide Mill Road	Water Main Connection
2 Tide Mill Road	2 Tide Mill Road	Water Main Connection
8 Tide Mill Road	8 Tide Mill Road	Water Main Connection
3 Watercrest Court	3 Watercrest Court	Carbon Treatment at tap
4 Watercrest Court	4 Watercrest Court	Carbon Treatment at tap
7 Watercrest Court	7 Watercrest Court	Carbon Treatment at tap
8 Watercrest Court	8 Watercrest Court	Carbon Treatment at tap

Table 1-2
Volatile Organic Compounds and Metals Results
Smithtown Groundwater Contamination Site
Smithtown, New York

LOCATION SAMPLE NO. MATRIX DATE	AVE. CLEANERS 1-WS-2-23 LIQUID 2-23-98	AVE. CLEANERS 2-WS-2-23 SLUDGE 2-23-98	FOUR SEASONS 1-WS-2-9 SLUDGE 2-9-98	FOUR SEASONS 3-WS-3-17 SLUDGE 3-17-98	GENE'S CLEANERS 1-WS-2-23 LIQUID 2-23-98	GENE'S CLEANER 2-WS-2-23 LIQUID 2-23-98	ADMIN. CENTER 1-WS-3-17 SLUDGE 3-17-98
Compounds - all units in ppb							
Acetone					130		
sec-Butylbenzene							
Chlorobenzene		1,000					
Chloroform					8		
1,2-Dichlorobenzene							
1,3-Dichlorobenzene							
1,4-Dichlorobenzene		4,200		14,000			
cis-1,2-Dichloroethene					19	1,700,000	
trans-1,2-Dichloroethene							
Ethylbenzene							690
Isopropylbenzene							
p-Ethyltoluene		240					5,100
Isopropylbenzene							
p-Isopropyltoluene		360	170	12,000			

Table 1-2
Volatile Organic Compounds and Metals Results
Smithtown Groundwater Contamination Site
Smithtown, New York

LOCATION SAMPLE NO. MATRIX DATE	AVE. CLEANERS 1-WS-2-23 LIQUID 2-23-98	AVE. CLEANERS 2-WS-2-23 SLUDGE 2-23-98	FOUR SEASONS 1-WS-2-9 SLUDGE 2-9-98	FOUR SEASONS 3-WS-3-17 SLUDGE 3-17-98	GENE'S CLEANERS 1-WS-2-23 LIQUID 2-23-98	GENE'S CLEANER 2-WS-2-23 LIQUID 2-23-98	ADMIN. CENTER 1-WS-3-17 SLUDGE 3-17-98
Methyl ethyl ketone							
Naphthalene		140		6,400			
n-Propylbenzene							
Tetrachloroethene	7				270	65,000,000	
Compounds - all units in ppb							
1,2,4,5-Tetramethylbenzene							
Toluene	44	11,000	460	38,000	82		1,300
1,2,4-Trichlorobenzene							
Trichloroethene					7	1,200,000	
1,2,4-Trimethylbenzene		250					11,000
1,3,5-Trimethylbenzene		120					5,600
Xylenes (total)				3,800			3,700
METALS							
Analytes - all units in ppm							
Barium	NA	NA	1.3	30	NA	NA	30

Table 1-2
Volatile Organic Compounds and Metals Results
Smithtown Groundwater Contamination Site
Smithtown, New York

LOCATION SAMPLE NO. MATRIX DATE	AVE. CLEANERS 1-WS-2-23 LIQUID 2-23-98	AVE. CLEANERS 2-WS-2-23 SLUDGE 2-23-98	FOUR SEASONS 1-WS-2-9 SLUDGE 2-9-98	FOUR SEASONS 3-WS-3-17 SLUDGE 3-17-98	GENE'S CLEANERS 1-WS-2-23 LIQUID 2-23-98	GENE'S CLEANER 2-WS-2-23 LIQUID 2-23-98	ADMIN. CENTER 1-WS-3-17 SLUDGE 3-17-98
Cadmium	NA	NA			NA	NA	4
Chromium	NA	NA	0.1		NA	NA	
Copper	NA	NA	7.2	160	NA	NA	790
Lead	NA	NA	0.6		NA	NA	57
Silver	NA	NA	0.25	12	NA	NA	5.1

LOCATION SAMPLE NO. MATRIX DATE	ADMIN. CENTER 2-WS-3-17 SLUDGE 3-17-98	KING BEAR 1-WS-10-27 OIL PHASE 10-27-97	KING BEAR 2-WS-10-27 SLUDGE 10-27-97	NORTH COUNTRY 1-WS-11-5 LIQUID 11-5-97	NORTH COUNTRY 2-WS-11-5 SLUDGE 11-5-97	THE CLEANERS 1-WS-11-6 LIQUID 11-6-97	THE CLEANERS 2-WS-11-6 SLUDGE 11-6-97
<u>Compounds</u> - all units ppb							
Acetone			1,600				
sec-Butylbenzene			310				
Chlorobenzene							

Table 1-2
Volatile Organic Compounds and Metals Results
Smithtown Groundwater Contamination Site
Smithtown, New York

LOCATION SAMPLE NO. MATRIX DATE	ADMIN. CENTER 2-WS-3-17 SLUDGE 3-17-98	KING BEAR 1-WS-10-27 OIL PHASE 10-27-97	KING BEAR 2-WS-10-27 SLUDGE 10-27-97	NORTH COUNTRY 1-WS-11-5 LIQUID 11-5-97	NORTH COUNTRY 2-WS-11-5 SLUDGE 11-5-97	THE CLEANERS 1-WS-11-6 LIQUID 11-6-97	THE CLEANERS 2-WS-11-6 SLUDGE 11-6-97
Chloroform							
1,2-Dichlorobenzene							
1,3-Dichlorobenzene							
1,4-Dichlorobenzene							
cis-1,2-Dichloroethene		4,900	5,600	720	28,000	61	
trans-1,2-Dichloroethene							
Ethylbenzene	2,400		470				
Isopropylbenzene							
p-Ethyltoluene	18,000	2,300	5,000	63			
Isopropylbenzene			210				
p-Isopropyltoluene		1,000			580		250
Methyl ethyl ketone							
Naphthalene		1,800	4,000				
n-Propylbenzene	3,200		700				
Tetrachloroethene		37,000	14,000	6,800	29,000	660	160,000

Table 1-2
Volatile Organic Compounds and Metals Results
Smithtown Groundwater Contamination Site
Smithtown, New York

LOCATION SAMPLE NO. MATRIX DATE	ADMIN. CENTER 2-WS-3-17 SLUDGE 3-17-98	KING BEAR 1-WS-10-27 OIL PHASE 10-27-97	KING BEAR 2-WS-10-27 SLUDGE 10-27-97	NORTH COUNTRY 1-WS-11-5 LIQUID 11-5-97	NORTH COUNTRY 2-WS-11-5 SLUDGE 11-5-97	THE CLEANERS 1-WS-11-6 LIQUID 11-6-97	THE CLEANERS 2-WS-11-6 SLUDGE 11-6-97
Compounds - all units in ppb							
1,2,4,5-Tetramethylbenzene	6,800	11,000	5,000				260
Toluene			1,600				
1,2,4-Trichlorobenzene							
Trichloroethene		11,000	25,000	140	4,300		190
1,2,4-Trimethylbenzene	32,000	4,700	7,100	72			
1,3,5-Trimethylbenzene		1,100	2,500				
Xylenes (total)	17,000		3,200				
METALS							
Analytes - all units in ppm							
Barium	30	0.15	15	0.1	20	NA	NA
Cadmium	6.5					NA	NA
Chromium					10	NA	NA
Copper	950	0.75	19	0.5	15	NA	NA

Table 1-2
Volatile Organic Compounds and Metals Results
Smithtown Groundwater Contamination Site
Smithtown, New York

LOCATION SAMPLE NO. MATRIX DATE	ADMIN. CENTER 2-WS-3-17 SLUDGE 3-17-98	KING BEAR 1-WS-10-27 OIL PHASE 10-27-97	KING BEAR 2-WS-10-27 SLUDGE 10-27-97	NORTH COUNTRY 1-WS-11-5 LIQUID 11-5-97	NORTH COUNTRY 2-WS-11-5 SLUDGE 11-5-97	THE CLEANERS 1-WS-11-6 LIQUID 11-6-97	THE CLEANERS 2-WS-11-6 SLUDGE 11-6-97
Lead	55	0.33	29	1.2	30	NA	NA
Silver	17.2			.07		NA	NA

LOCATION SAMPLE NO. MATRIX DATE	POLO CLEANER 3-WS-11-5 LIQUID 11-5-97	POLO CLEANER 4-WS-11-5 SLUDGE 11-5-97	SAL'S AUTO 1-WS-4-22 SOIL 4-22-98	S AL'S AUTO 1-WS-5-1 LIQUID 5-1-98	SAL'S AUTO 2-WS-5-1 SLUDGE 5-1-98	ST. JAMES 1-WS-3-23 LIQUID 3-23-98	ST. JAMES 2-WS-3-23 SLUDGE 3-23-98
Compounds - all units in ppb							
Acetone		1,500				930	
sec-Butylbenzene							
Chlorobenzene							
Chloroform						17	
1,2-Dichlorobenzene					1,600		
1,3-Dichlorobenzene					110		
1,4 -Dichlorobenzene					400		

Table 1-2
Volatile Organic Compounds and Metals Results
Smithtown Groundwater Contamination Site
Smithtown, New York

LOCATION SAMPLE NO. MATRIX DATE	POLO CLEANER 3-WS-11-5 LIQUID 11-5-97	POLO CLEANER 4-WS-11-5 SLUDGE 11-5-97	SAL'S AUTO 1-WS-4-22 SOIL 4-22-98	S AL'S AUTO 1-WS-5-1 LIQUID 5-1-98	SAL'S AUTO 2-WS-5-1 SLUDGE 5-1-98	ST. JAMES 1-WS-3-23 LIQUID 3-23-98	ST. JAMES 2-WS-3-23 SLUDGE 3-23-98
cis-1,2-Dichloroethene	780	4,900				9	1,000
trans-1,2-Dichloroethene						15	1,200
Ethylbenzene					1,000		
p-Ethyltoluene		1,000			760		460
Isopropylbenzene							
p-Isopropyltoluene		15,000	1,400	68	6,000		4,000
Methyl ethyl ketone						550	
Naphthalene					160		130
n-Propylbenzene		230			130		
Tetrachloroethene	880	2,100	120			120	13,000
Compounds - all units in ppb							
1,2,4,5-Tetramethylbenzene					140		
Toluene		2,400		120	38,000		250

Table 1-2
Volatile Organic Compounds and Metals Results
Smithtown Groundwater Contamination Site
Smithtown, New York

LOCATION SAMPLE NO. MATRIX DATE	POLO CLEANER 3-WS-11-5 LIQUID 11-5-97	POLO CLEANER 4-WS-11-5 SLUDGE 11-5-97	SAL'S AUTO 1-WS-4-22 SOIL 4-22-98	S AL'S AUTO 1-WS-5-1 LIQUID 5-1-98	SAL'S AUTO 2-WS-5-1 SLUDGE 5-1-98	ST. JAMES 1-WS-3-23 LIQUID 3-23-98	ST. JAMES 2-WS-3-23 SLUDGE 3-23-98
1,2,4-Trichlorobenzene					510		
Trichloroethene	290	560				26	10,000
1,2,4-Trimethylbenzene		1,000			2,200		670
1,3,5-Trimethylbenzene		450			1,000		190
Xylenes (total)		120			3,700		580
METALS							
Compounds - all units in ppm							
Barium		10	10		60	0.7	15
Cadmium							
Chromium					10	0.1	10
Copper		410			90	3.4	180
Lead		35			210	0.4	
Silver						2.5	300

Table 1-2
Volatile Organic Compounds and Metals Results
Smithtown Groundwater Contamination Site
Smithtown, New York

LOCATION SAMPLE NO. MATRIX DATE	ST. JAMES EXXON 4-WS-3-2 LIQUID 3-2-99	ST. JAMES EXXON 5-WS-3-2 SLUDGE 3-2-99	PENNEY'S GARAGE 1-WS-3-2 LIQUID 3-2-99	PENNEY'S GARAGE 2-WS-3-2 SLUDGE 3-2-99	PENNEY'S GARAGE 3-WS-3-2 SLUDGE 3-2-99
Compounds - all units in ppb					
Acetone					
sec-Butylbenzene					
Chlorobenzene					
Chloroform					
1,2-Dichlorobenzene					
1,3-Dichlorobenzene					
1,4 -Dichlorobenzene	69				
cis-1,2-Dichloroethene					
trans-1,2-Dichloroethene					
Ethylbenzene					
p-Ethyltoluene		380	150		
Isopropylbenzene					
p-Isopropyltoluene		4,500	1,000	3,200	
Methyl ethyl ketone					

Table 1-2
Volatile Organic Compounds and Metals Results
Smithtown Groundwater Contamination Site
Smithtown, New York

LOCATION SAMPLE NO. MATRIX DATE	ST. JAMES EXXON 4-WS-3-2 LIQUID 3-2-99	ST. JAMES EXXON 5-WS-3-2 SLUDGE 3-2-99	PENNEY'S GARAGE 1-WS-3-2 LIQUID 3-2-99	PENNEY'S GARAGE 2-WS-3-2 SLUDGE 3-2-99	PENNEY'S GARAGE 3-WS-3-2 SLUDGE 3-2-99
Naphthalene					
n-Propylbenzene					
Tetrachloroethene	560	1,200	150		
Compounds - all units in ppb					
1,2,4,5-Tetramethylbenzene					
Toluene	46	340	770	7,600	470
1,2,4-Trichlorobenzene					
Trichloroethene					
1,2,4-Trimethylbenzene		660	250		
1,3,5-Trimethylbenzene					
Xylenes (total)		100	82	100	
METALS					
Compounds - all units in ppm					
Barium					

Table 1-2
Volatile Organic Compounds and Metals Results
Smithtown Groundwater Contamination Site
Smithtown, New York

LOCATION SAMPLE NO. MATRIX DATE	ST. JAMES EXXON 4-WS-3-2 LIQUID 3-2-99	ST. JAMES EXXON 5-WS-3-2 SLUDGE 3-2-99	PENNEY'S GARAGE 1-WS-3-2 LIQUID 3-2-99	PENNEY'S GARAGE 2-WS-3-2 SLUDGE 3-2-99	PENNEY'S GARAGE 3-WS-3-2 SLUDGE 3-2-99
Cadmium			0.12		
Chromium					
Copper	0.1	16	3.5		
Lead			3.7		
Silver					

ppb = parts per billion; ppm = parts per million; NA = Not analyzed for metals.
Note: Organic compounds analyzed by Method 8260.
Blank cells indicate compound or analyte was not detected.
The sample results in this table identify contamination prior to cleanup at each facility.

Table 1-3
Groundwater Screening Criteria
Smithtown Groundwater Contamination Site
Smithtown, New York

Chemical Name	Unit	National Primary Drinking Water Standards (1)	NYSDEC GW Quality Standards (2)	NYSDOH Drinking Water Quality Standards (3)	Smithtown GW Screening Criteria (4)
Volatile Organic Compounds					
1,1,1-Trichloroethane	ug/l	200	5	5	5
1,1,2,2-Tetrachloroethane	ug/l	NL	5	5	5
1,1,2-Trichloro-1,2,2-trifluoroethane	ug/l	NL	5	NL	5
1,1,2-Trichloroethane	ug/l	5	1	5	1
1,1-Dichloroethane	ug/l	NL	5	5	5
1,1-Dichloroethene	ug/l	7	5	5	5
1,2,3-Trichlorobenzene	ug/l	NL	5	5	5
1,2,4-Trichlorobenzene	ug/l	70	5	5	5
1,2-Dibromo-3-chloropropane	ug/l	0.2	0.04	0.2	0.04
1,2-Dibromoethane	ug/l	0.05	0.0006	0.05	0.0006
1,2-Dichlorobenzene	ug/l	600	3	5	3
1,2-Dichloroethane	ug/l	5	0.6	5	0.6
1,2-Dichloropropane	ug/l	5	1	5	1
1,3-Dichlorobenzene	ug/l	NL	3	5	3
1,4-Dichlorobenzene	ug/l	75	3	5	3
2-Butanone	ug/l	NL	50	NL	50
2-Hexanone	ug/l	NL	50	50	50
4-Methyl-2-pentanone	ug/l	NL	NL	50	50
Acetone	ug/l	NL	50	50	50
Benzene	ug/l	5	1	5	1
Bromochloromethane	ug/l	NL	5	5	5
Bromodichloromethane	ug/l	NL	50	100	50
Bromoform	ug/l	NL	50	100	50
Bromomethane	ug/l	NL	5	5	5
Carbon Disulfide	ug/l	NL	60	50	50
Carbon Tetrachloride	ug/l	5	5	5	5
Chlorobenzene	ug/l	100	5	5	5
Chloroethane	ug/l	NL	5	5	5
Chloroform	ug/l	NL	7	100	7
Chloromethane	ug/l	NL	5	5	5

Table 1-3
Groundwater Screening Criteria
Smithtown Groundwater Contamination Site
Smithtown, New York

Chemical Name	Unit	National Primary Drinking Water Standards (1)	NYSDEC GW Quality Standards (2)		NYSDOH Drinking Water Quality Standards (3)	Smithtown GW Screening Criteria (4)
cis-1,2-Dichloroethene	ug/l	70	5		5	5
cis-1,3-Dichloropropene	ug/l	NL	0.4		5	0.4
Cyclohexane	ug/l	NL	NL		NL	NL
Dibromochloromethane	ug/l	NL	50		100	50
Dichlorodifluoromethane	ug/l	NL	5		5	5
Ethylbenzene	ug/l	700	5		5	5
Isopropylbenzene	ug/l	NL	5		5	5
Methyl Acetate	ug/l	NL	NL		NL	NL
Methyl Tert-Butyl Ether	ug/l	NL	10		NA	10
Methylcyclohexane	ug/l	NL	NL		NL	NL
Methylene Chloride	ug/l	5	5		5	5
m-Xylene	ug/l	NL	5		5	5
o-Xylene	ug/l	NL	5		5	5
p-Xylene	ug/l	NL	5		5	5
Styrene	ug/l	100	5		5	5
Tetrachloroethene	ug/l	5	5		5	5
Toluene	ug/l	1,000	5		5	5
trans-1,2-Dichloroethene	ug/l	100	5		5	5
trans-1,3-Dichloropropene	ug/l	NL	0.4		5	0.4
Trichloroethene	ug/l	5	5		5	5
Trichlorofluoromethane	ug/l	NL	5		5	5
Vinyl Chloride	ug/l	2	2		2	2
Xylenes (total)	ug/l	10,000	5		5	5
Semi-Volatile Organics						
1,1'Biphenyl	ug/l	NL	5		NL	5
2,2'-oxybis(1-Chloropropane)	ug/l	NL	5		NL	5
2,4,5-Trichlorophenol	ug/l	NL	1	X	5	1
2,4,6-Trichlorophenol	ug/l	NL	1	X	5	1
2,4-Dichlorophenol	ug/l	NL	5	X	NL	5
2,4-Dimethylphenol	ug/l	NL	50	X	50	50
2,4-Dinitrophenol	ug/l	NL	10	X	NL	10

Table 1-3
Groundwater Screening Criteria
Smithtown Groundwater Contamination Site
Smithtown, New York

Chemical Name	Unit	National Primary Drinking Water Standards (1)		NYSDEC GW Quality Standards (2)		NYSDOH Drinking Water Quality Standards (3)		Smithtown GW Screening Criteria (4)	
2,4-Dinitrotoluene	ug/l	NL		5		50		5	
2,6-Dinitrotoluene	ug/l	NL		5		50		5	
2-Chloronaphthalene	ug/l	NL		10		5		5	
2-Chlorophenol	ug/l	NL		1	X	5		1	
2-Methylnaphthalene	ug/l	NL		NL		NL		NL	
2-Methylphenol	ug/l	NL		1	X	50		1	
2-Nitroaniline	ug/l	NL		5		5		5	
2-Nitrophenol	ug/l	NL		1	X	50		1	
3,3'-Dichlorobenzidine	ug/l	NL		5		5		5	
3-Nitroaniline	ug/l	NL		5		5		5	
4,6-Dinitro-2-methylphenol	ug/l	NL		1	X	50		1	
4-Bromophenyl-phenylether	ug/l	NL		NL		50		50	
4-Chloro-3-methylphenol	ug/l	NL		1	X	5		1	
4-Chloroaniline	ug/l	NL		5		5		5	
4-Chlorophenyl-phenylether	ug/l	NL		NL		50		50	
4-Methylphenol	ug/l	NL		1	X	50		1	
4-Nitroaniline	ug/l	NL		5		5		5	
4-Nitrophenol	ug/l	NL		1	X	50		1	
Acenaphthene	ug/l	NL		20		50		20	
Acenaphthylene	ug/l	NL		NL		50		50	
Acetophenone	ug/l	NL		NL		50		50	
Anthracene	ug/l	NL		50		50		50	
Atrazine	ug/l	3		7.5		3		3	
Benzaldehyde	ug/l	NL		NL		NL		NL	
Benzo(a)anthracene	ug/l	NL		0.002		50		0.002	
Benzo(a)pyrene	ug/l	0.2		ND		0.2		0.2	
Benzo(b)fluoranthene	ug/l	NL		0.002		50		0.002	
Benzo(g,h,i)perylene	ug/l	NL		NL		50		50	
Benzo(k)fluoranthene	ug/l	NL		0.002		50		0.002	
bis(2-Chloroethoxy)methane	ug/l	NL		5		5		5	
bis(2-Chloroethyl)ether	ug/l	NL		1		5		1	

Table 1-3
Groundwater Screening Criteria
Smithtown Groundwater Contamination Site
Smithtown, New York

Chemical Name	Unit	National Primary Drinking Water Standards (1)	NYSDEC GW Quality Standards (2)		NYSDOH Drinking Water Quality Standards (3)	Smithtown GW Screening Criteria (4)
bis(2-Ethylhexyl)phthalate	ug/l	6	5		6	5
Butylbenzylphthalate	ug/l	NL	50		50	50
Caprolactam	ug/l	NL	NL		NL	NL
Carbazole	ug/l	NL	NL		50	50
Chrysene	ug/l	NL	0.002		50	0.002
Dibenz(a,h)anthracene	ug/l	NL	NL		50	50
Dibenzofuran	ug/l	NL	NL		50	50
Diethylphthalate	ug/l	NL	50		50	50
Dimethylphthalate	ug/l	NL	50		50	50
Di-n-butylphthalate	ug/l	NL	50		NL	50
Di-n-octyl phthalate	ug/l	NL	50		50	50
Fluoranthene	ug/l	NL	50		50	50
Fluorene	ug/l	NL	50		NL	50
Hexachlorobenzene	ug/l	1	0.04		1	0.04
Hexachlorobutadiene	ug/l	NL	0.5		5	0.5
Hexachlorocyclopentadiene	ug/l	50	5		5	5
Hexachloroethane	ug/l	NL	5		5	5
Indeno(1,2,3-cd)pyrene	ug/l	NL	0.002		50	0.002
Isophorone	ug/l	NL	50		50	50
Naphthalene	ug/l	NL	10		50	10
Nitrobenzene	ug/l	NL	0.4		5	0.4
N-Nitroso-di-n-propylamine	ug/l	NL	NL		50	50
N-Nitrosodiphenylamine	ug/l	NL	50		50	50
Pentachlorophenol	ug/l	1	1	X	1	1
Phenanthrene	ug/l	NL	50		50	50
Phenol	ug/l	NL	1	X	50	1
Pyrene	ug/l	NL	50		50	50
Pesticides/PCBs						
4,4'-DDD	ug/l	NL	0.3		5	0.3
4,4'-DDE	ug/l	NL	0.2		NL	0.2
4,4'-DDT	ug/l	NL	0.2		5	0.2

Table 1-3
Groundwater Screening Criteria
Smithtown Groundwater Contamination Site
Smithtown, New York

Chemical Name	Unit	National Primary Drinking Water Standards (1)		NYSDEC GW Quality Standards (2)		NYSDOH Drinking Water Quality Standards (3)	Smithtown GW Screening Criteria (4)
Aldrin	ug/l	NL		ND		5	5
Alpha-BHC	ug/l	NL		0.01		5	0.01
alpha-Chlordane	ug/l	2	##	0.05		2	0.05
Aroclor-1016	ug/l	0.5		0.09	W	0.5	0.09
Aroclor-1221	ug/l	0.5		0.09	W	0.5	0.09
Aroclor-1232	ug/l	0.5		0.09	W	0.5	0.09
Aroclor-1242	ug/l	0.5		0.09	W	0.5	0.09
Aroclor-1248	ug/l	0.5		0.09	W	0.5	0.09
Aroclor-1254	ug/l	0.5		0.09	W	0.5	0.09
Aroclor-1260	ug/l	0.5		0.09	W	0.5	0.09
Beta-BHC	ug/l	NL		0.04		5	0.04
Delta-BHC	ug/l	NL		0.04		5	0.04
Dieldrin	ug/l	NL		0.004		5	0.004
Endosulfan I	ug/l	NL		NL		50	50
Endosulfan II	ug/l	NL		NL		50	50
Endosulfan sulfate	ug/l	NL		NL		50	50
Endrin	ug/l	2		ND		2	2
Endrin aldehyde	ug/l	NL		5		5	5
Endrin ketone	ug/l	NL		5		NL	5
gamma-BHC (Lindane)	ug/l	0.2		0.05		0.2	0.05
gamma-Chlordane	ug/l	2	##	0.05		2	0.05
Heptachlor	ug/l	0.4		0.04		0.4	0.04
Heptachlor epoxide	ug/l	0.2		0.03		0.2	0.03
Methoxychlor	ug/l	40		35		40	35
Toxaphene	ug/l	3		0.06		3	0.06
Inorganic Analytes							NL
Aluminum	ug/l	NL		NL		NL	NL
Antimony	ug/l	6		3		6	3
Arsenic	ug/l	50		25		50	25
Barium	ug/l	2,000		1,000		2,000	1000
Beryllium	ug/l	4		3		4	3

Table 1-3
Groundwater Screening Criteria
Smithtown Groundwater Contamination Site
Smithtown, New York

Chemical Name	Unit	National Primary Drinking Water Standards (1)		NYSDEC GW Quality Standards (2)		NYSDOH Drinking Water Quality Standards (3)		Smithtown GW Screening Criteria (4)	
Cadmium	ug/l	5		5		5		5	
Calcium	ug/l	NL		NL		NL		NL	
Chromium	ug/l	100		50	Z	100		50	
Cobalt	ug/l	NL		NL		NL		NL	
Copper	ug/l	1,300	TT	200		1,300		200	
Cyanide	ug/l	200		200		200		200	
Iron	ug/l	NL		300	Y	300		300	
Lead	ug/l	15	TT	25		15		15	
Magnesium	ug/l	NL		35,000		NL		35000	
Manganese	ug/l	NL		300	Y	300		300	
Mercury	ug/l	2		0.7		2		0.7	
Nickel	ug/l	NL		100		NL		100	
Potassium	ug/l	NL		NL		NL		NL	
Selenium	ug/l	50		10		50		10	
Silver	ug/l	NL		50		100		50	
Sodium	ug/l	NL		20,000		NL		20000	
Sulfate	ug/l	NL		250,000		250,000		250000	
Thallium	ug/l	2		0.5		2		0.5	
Vanadium	ug/l	NL		NL		NL		NL	
Zinc	ug/l	NL		2,000		5,000		2000	

Notes:

1. EPA National Primary Drinking Water Standards (web page), EPA 816-F-01-007, March 2001
2. New York Ground Water Quality Standards, August 4, 1999
3. New York State Department of Health Drinking Water Standards
4. Smithtown Groundwater Screening Criteria is the lowest value of the EPA National Primary Drinking Water Standards, New York Ground Water Quality Standards, and the New York Department of Health Drinking Water Standards

MCL - Maximum Contaminant Level

NA - Chemical name listed but no value available
NL - Chemical name not listed or screening value of this type not listed for the chemical
ND - The criteria for this compound is below any detection limit
TT - Treatment Technique
Criteria is for Chlordane
Z Also applies to hexavalent chromium
Y The sum of iron and manganese should not exceed 500 ug/l
X This value applies to a sum of all phenolic compounds
W This value applies to a sum of all PCB compounds

Table 1-4
Surface Water Screening Criteria
Smithtown Groundwater Contamination Site
Smithtown, New York

Contaminant	Unit	NY Surface Water Quality Standards for Fish Propagation - Saline Waters (1)		NY Surface Water Quality Standards for Wildlife Protection - Saline Waters (2)		NY Surface Water Quality Standards for Human Fish Consumption - Saline Waters (3)		NY Surface Water Quality Standards for Fresh Water (4)	Smithtown Surface Water Screening Criteria (5)	
Volatile Organic Compounds										
1,1,1-Trichloroethane	ug/l	NL		NL		NL		5	5	
1,1,2,2-Tetrachloroethane	ug/l	NL		NL		NL		NL	NL	
1,1,2-Trichloroethane	ug/l	NL		NL		NL		1	1	
1,1,2-Tricholoro-1,2,2-trifluoroethane	ug/l	NL		NL		NL		5	5	
1,1-Dichloroethane	ug/l	NL		NL		NL		5	5	
1,1-Dichloroethene	ug/l	NL		NL		NL		NL	NL	
1,2,3-Trichlorobenzene	ug/l	5	D	NL		NL		NL	5	D
1,2,4-Trichlorobenzene	ug/l	5	D	NL		NL		5	5	D
1,2-Dibromo-3-chloropropane	ug/l	NL		NL		NL		0.04	NL	
1,2-Dibromoethane	ug/l	NL		NL		NL		5	NL	
1,2-Dichlorobenzene	ug/l	5	H	NL		NL		3	5	H
1,2-Dichloroethane	ug/l	NL		NL		NL		0.6	NL	
1,2-Dichloropropane	ug/l	NL		NL		NL		1	NL	
1,3-Dichlorobenzene	ug/l	5	H	NL		NL		3	5	H
1,4-Dichlorobenzene	ug/l	5	H	NL		NL		3	5	H
2-Butanone	ug/l	NL		NL		NL		NL	NL	
2-Hexanone	ug/l	NL		NL		NL		NL	NL	
4-Methyl-2-pentanone	ug/l	NL		NL		NL		NL	NL	
Acetone	ug/l	NL		NL		NL		NL	NL	
Benzene	ug/l	190		NL		10		1	10	
Bromochloromethane	ug/l	NL		NL		NL		NL	NL	
Bromodichloromethane	ug/l	NL		NL		NL		NL	NL	
Bromoform	ug/l	NL		NL		NL		NL	NL	
Bromomethane	ug/l	NL		NL		NL		5	5	
Carbon Disulfide	ug/l	NL		NL		NL		NL	NL	
Carbon Tetrachloride	ug/l	NL		NL		NL		NL	NL	
Chlorobenzene	ug/l	5		NL		400		5	5	
Chloroethane	ug/l	NL		NL		NL		NL	NL	
Chloroform	ug/l	NL		NL		NL		7	7	
Chloromethane	ug/l	NL		NL		NL		5	5	
cis-1,2-Dichloroethene	ug/l	NL		NL		NL		5	5	
cis-1,3-Dichloropropene	ug/l	NL		NL		NL		0.4	0.4	
Cyclohexane	ug/l	NL		NL		NL		NL	NL	
Dibromochloromethane	ug/l	NL		NL		NL		NL	NL	
Dichlorodifluoromethane	ug/l	NL		NL		NL		NL	NL	
Dichlorofluoromethane	ug/l	NL		NL		NL		5	5	
Ethylbenzene	ug/l	4.5		NL		NL		5	4.5	
Isopropylbenzene	ug/l	NL		NL		NL		NL	NL	
Methyl Acetate	ug/l	NL		NL		NL		NL	NL	
Methyl Tert-Butyl Ether	ug/l	NL		NL		NL		NL	NL	
Methylcyclohexane	ug/l	NL		NL		NL		NL	NL	
Methylene Chloride	ug/l	NL		NL		200		5	200	
m-Xylene	ug/l	19	I	NL		NL		5	19	I
o-Xylene	ug/l	19	I	NL		NL		5	19	I
p-Xylene	ug/l	19	I	NL		NL		5	19	I
Styrene	ug/l	NL		NL		NL		50	50	
Tetrachloroethene	ug/l	NL		NL		1		NL	1	
Toluene	ug/l	92		NL		6000		5	92	

Table 1-4
Surface Water Screening Criteria
Smithtown Groundwater Contamination Site
Smithtown, New York

Contaminant	Unit	NY Surface Water Quality Standards for Fish Propagation - Saline Waters (1)	NY Surface Water Quality Standards for Wildlife Protection - Saline Waters (2)	NY Surface Water Quality Standards for Human Fish Consumption - Saline Waters (3)	NY Surface Water Quality Standards for Fresh Water (4)	Smithtown Surface Water Screening Criteria (5)
trans-1,2-Dichloroethene	ug/l	NL	NL	NL	5	5
trans-1,3-Dichloropropene	ug/l	NL	NL	NL	0.4	0.4
Trichloroethene	ug/l	NL	NL	40	5	40
Trichlorofloromethane	ug/l	NL	NL	NL	5	5
Vinyl Chloride	ug/l	NL	NL	NL	NL	NL
Xylenes (total)	ug/l	19	NL	NL	NL	19
Semi-Volatime Organics						
1,1'-Biphenyl	ug/l	NL	NL	NL	NL	NL
2,2'-oxybis(1-Chloropropane)	ug/l	NL	NL	NL	5	5
2,4,5-Trichlorophenol	ug/l	NL	NL	NL	1	1
2,4,6-Trichlorophenol	ug/l	NL	NL	NL	1	1
2,4-Dichlorophenol	ug/l	NL	NL	NL	0.3	0.3
2,4-Dimethylphenol	ug/l	NL	NL	1000	1000	1000
2,4-Dinitrophenol	ug/l	NL	NL	400	400	400
2,4-Dinitrotoluene	ug/l	NL	NL	NL	NL	NL
2,6-Dinitrotoluene	ug/l	NL	NL	NL	NL	NL
2-Chloronaphthalene	ug/l	NL	NL	NL	10	10
2-Chlorophenol	ug/l	NL	NL	NL	1	1
2-Methylnaphthalene	ug/l	4.2	NL	NL	NL	4.2
2-Methylphenol	ug/l	NL	NL	NL	1	1
2-Nitroaniline	ug/l	NL	NL	NL	NL	NL
2-Nitrophenol	ug/l	NL	NL	NL	NL	NL
3,3'-Dichlorobenzidine	ug/l	NL	NL	NL	NL	NL
3-Nitroaniline	ug/l	NL	NL	NL	NL	NL
4,6-Dinitro-2-methylphenol	ug/l	NL	NL	NL	1	1
4-Bromophenyl-phenylether	ug/l	NL	NL	NL	5	5
4-Chloro-3-methylphenol	ug/l	NL	NL	NL	1	1
4-Chloroaniline	ug/l	NL	NL	NL	NL	NL
4-Chlorophenyl-phenylether	ug/l	NL	NL	NL	5	5
4-Methylphenol	ug/l	NL	NL	NL	1	1
4-Nitroaniline	ug/l	NL	NL	NL	NL	NL
4-Nitrophenol	ug/l	NL	NL	NL	1	1
Acenaphthene	ug/l	6.6	NL	NL	20	6.6
Acenaphthylene	ug/l	NL	NL	NL	NL	NL
Acetophenone	ug/l	NL	NL	NL	NL	NL
Anthracene	ug/l	NL	NL	NL	NL	NL
Atrazine	ug/l	NL	NL	NL	NL	NL
Benzaldehyde	ug/l	NL	NL	NL	5	5
Benzo(a)anthracene	ug/l	NL	NL	NL	NL	NL
Benzo(a)pyrene	ug/l	NL	NL	0.0006	NL	0.0006
Benzo(b)fluoranthene	ug/l	NL	NL	NL	NL	NL
Benzo(g,h,i)perylene	ug/l	NL	NL	NL	NL	NL
Benzo(k)fluoranthene	ug/l	NL	NL	NL	NL	NL
bis(2-Chloroethoxy)methane	ug/l	NL	NL	NL	NL	NL
bis(2-Chloroethyl)ether	ug/l	NL	NL	NL	NL	NL

Table 1-4
Surface Water Screening Criteria
Smithtown Groundwater Contamination Site
Smithtown, New York

Contaminant	Unit	NY Surface Water Quality Standards for Fish Propagation - Saline Waters (1)		NY Surface Water Quality Standards for Wildlife Protection - Saline Waters (2)		NY Surface Water Quality Standards for Human Fish Consumption - Saline Waters (3)		NY Surface Water Quality Standards for Fresh Water (4)	Smithtown Surface Water Screening Criteria (5)	
bis-(2-Ethylhexyl)phthalate	ug/l	NL		NL		NL		5	5	
Butylbenzylphthalate	ug/l	NL		NL		NL		NL	NL	
Caprolactam	ug/l	NL		NL		NL		NL	NL	
Carbazole	ug/l	NL		NL		NL		5	5	
Chrysene	ug/l	NL		NL		NL		NL	NL	
Dibenz(a,h)anthracene	ug/l	NL		NL		NL		NL	NL	
Dibenzofuran	ug/l	NL		NL		NL		NL	NL	
Diethylphthalate	ug/l	NL		NL		NL		NL	NL	
Dimethylphthalate	ug/l	NL		NL		NL		NL	NL	
Di-n-butylphthalate	ug/l	NL		NL		NL		NL	NL	
Di-n-octyl phthalate	ug/l	NL		NL		NL		NL	NL	
Fluoranthene	ug/l	NL		NL		NL		NL	NL	
Fluorene	ug/l	2.5		NL		NL		5	2.5	
Hexachlorobenzene	ug/l	NL		NL		0.00003		0.04	0.00003	
Hexachlorobutadiene	ug/l	0.3		NL		0.01		0.5	0.01	
Hexachlorocyclopentadiene	ug/l	0.07		NL		NL		0.45	0.07	
Hexachloroethane	ug/l	NL		NL		0.6		5	0.6	
Indeno(1,2,3-cd)pyrene	ug/l	NL		NL		NL		NL	NL	
Isophorone	ug/l	NL		NL		NL		NL	NL	
Naphthalene	ug/l	16		NL		NL		10	16	
Nitrobenzene	ug/l	NL		NL		NL		0.4	0.4	
N-Nitroso-di-n-propylamine	ug/l	NL		NL		NL		5	5	
N-Nitrosodiphenylamine	ug/l	NL		NL		NL		5	5	
Pentachlorophenol	ug/l	NL		NL		NL		NL	NL	
Phenanthrene	ug/l	1.5		NL		NL		NL	1.5	
Phenol	ug/l	NL		NL		NL		1	1	
Pyrene	ug/l	NL		NL		NL		NL	NL	
Pesticides/PCBs										
4,4'-DDD	ug/l	NL		0.000011	J	0.00008		0.3	0.000011	J
4,4'-DDE	ug/l	NL		0.000011	J	0.000007		0.2	0.000007	
4,4'-DDT	ug/l	NL		0.000011	J	0.00001		0.2	0.00001	
Aldrin	ug/l	NL		NL		0.001	A	0.001	0.001	A
alpha-BHC	ug/l	NL		NL		0.002		0.01	0.002	
alpha-Chlordane	ug/l	NL		NL		0.00002	K	0.05	0.00002	K
Aroclor-1016	ug/l	NL		0.00012	C	0.000001	C	0.09	0.000001	C
Aroclor-1221	ug/l	NL		0.00012	C	0.000001	C	0.09	0.000001	C
Aroclor-1232	ug/l	NL		0.00012	C	0.000001	C	0.09	0.000001	C
Aroclor-1242	ug/l	NL		0.00012	C	0.000001	C	0.09	0.000001	C
Aroclor-1248	ug/l	NL		0.00012	C	0.000001	C	0.09	0.000001	C
Aroclor-1254	ug/l	NL		0.00012	C	0.000001	C	0.09	0.000001	C
Aroclor-1260	ug/l	NL		0.00012	C	0.000001	C	0.09	0.000001	C
beta-BHC	ug/l	NL		NL		0.007		0.04	0.007	
delta-BHC	ug/l	NL		NL		0.008		0.04	0.008	
Dieldrin	ug/l	NL		NL		0.0000006		0.004	0.0000006	
Endosulfan I	ug/l	0.001		NL		NL		NL	0.001	
Endosulfan II	ug/l	0.001		NL		NL		NL	0.001	
Endosulfan sulfate	ug/l	NL		NL		NL		NL	NL	
Endrin	ug/l	NL		NL		0.002		0.2	0.002	
Endrin aldehyde	ug/l	NL		NL		NL		NL	NL	
Endrin ketone	ug/l	NL		NL		NL		NL	NL	

Table 1-4
Surface Water Screening Criteria
Smithtown Groundwater Contamination Site
Smithtown, New York

Contaminant	Unit	NY Surface Water Quality Standards for Fish Propagation - Saline Waters (1)		NY Surface Water Quality Standards for Wildlife Protection - Saline Waters (2)		NY Surface Water Quality Standards for Human Fish Consumption - Saline Waters (3)		NY Surface Water Quality Standards for Fresh Water (4)	Smithtown Surface Water Screening Criteria (5)	
gamma-BHC (Lindane)	ug/l	NL		NL		0.008		0.05	0.008	
gamma-Chlordane	ug/l	NL		NL		0.00002	K	0.05	0.00002	K
Heptachlor	ug/l	NL		NL		0.0002		0.04	0.0002	
Heptachlor epoxide	ug/l	NL		NL		0.0003		0.03	0.0003	
Methoxychlor	ug/l	0.03		NL		NL		0.5	0.03	
Toxaphene	ug/l	0.005		NL		0.000006		0.06	0.000006	
Inorganic Analytes										
Aluminum	ug/l	NL		NL		NL		100	100	
Antimony	ug/l	NL		NL		NL		3	3	
Arsenic	ug/l	63		NL		NL		50	63	
Barium	ug/l	NL		NL		NL		1000	1000	
Beryllium	ug/l	NL		NL		NL		NL	NL	
Cadmium	ug/l	7.7		NL		2.7		10	2.7	
Calcium	ug/l	NL		NL		NL		NL	NL	
Chromium	ug/l	54	L	NL		NL		8	54	L
Cobalt	ug/l	NL		NL		NL		5	5	
Copper	ug/l	3.4		NL		NL		2.1	3.4	
Cyanide	ug/l	1		NL		9,000		200	1	
Iron	ug/l	NL		NL		NL		300	300	
Lead	ug/l	8		NL		NL		6.4	8	
Magnesium	ug/l	NL		NL		NL		35000	35000	
Manganese	ug/l	NL		NL		NL		300	300	
Mercury	ug/l	NL		0.0026	F	0.0007	F	0.7	0.0007	F
Nickel	ug/l	8.2		NL		NL		3.5	8.2	
Potassium	ug/l	NL		NL		NL		NL	NL	
Selenium	ug/l	NL		NL		NL		10	10	
Silver	ug/l	NL		NL		NL		50	50	
Sodium	ug/l	NL		NL		NL		NL	NL	
Sulfate	ug/l	NL		NL		NL		NL	NL	
Thallium	ug/l	NL		NL		NL		8	8	
Vanadium	ug/l	NL		NL		NL		14	14	
Zinc	ug/l	66		NL		NL		110	66	

Notes:

1. New York Ambient Water Quality Standards and Guidance Values, August 4, 1999. Fish Propagation (saline waters)
2. New York Ambient Water Quality Standards and Guidance Values, August 4, 1999. Wildlife Protection (saline waters)
3. New York Ambient Water Quality Standards and Guidance Values, August 4, 1999. Human Consumption of Fish (saline waters)
4. New York Surface Water Quality Standards 6NYCRR Chapter X Part 703. 1999
5. Smithtown Surface Water Screening Criteria is the lowest New York Ambient Water Quality Standard or Guidance value.

A Applies to the sum of Aldrin and Dieldrin
C Standard applied to the sum of the PCB compounds
D Standard applied to the sum of 1,2,3-, 1,2,4- and 1,3,5-trichlorobenzene
F Applies to dissolved Hg
H Applies to the sum of 1,2-, 1,3-, and 1,4-dichlorobenzene
I Applies to the sum of o-, m-, and p-xylene
J Applies to the sum of 4,4'-DDD, 4,4'-DDE, and 4,4'-DDT
K Applies to the sum of alpha- and gamma-chlordane
L Applies to the acid-soluble form of hexavalent chromium
NL - Chemical name not listed or screening value of this type not listed for the chemical

Table 1-5
Sediment Screening Criteria
Smithtown Groundwater Contamination Site
Smithtown, New York

S Number	Chemical Name	Unit	Sediment Quality Criteria - Human Health Bioaccumulation, SW (1)		Sediment Quality Criteria - Benthic Aquatic Life, Chronic Toxicity, SW (1)		Sediment Quality Criteria - Wildlife Bioaccumulation, SW (1)		Smithtown Sediment Screening Criteria (2)	
	Volatile Organic Compounds									
71-55-6	1,1,1-Trichloroethane	ug/gOC	NL		NL		NL		NL	
79-34-5	1,1,2,2-Tetrachloroethane	ug/gOC	0.3		NL		NL		0.3	
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	ug/gOC	NL		NL		NL		NL	
79-00-5	1,1,2-Trichloroethane	ug/gOC	0.6		NL		NL		0.6	
75-34-3	1,1-Dichloroethane	ug/gOC	NL		NL		NL		NL	
75-35-4	1,1-Dichloroethene	ug/gOC	0.02		NL		NL		0.02	
120-82-1	1,2,4-Trichlorobenzene	ug/gOC	NL		91	E	NL		91	E
96-12-8	1,2-Dibromo-3-chloropropane	ug/gOC	NL		NL		NL		NL	
106-93-4	1,2-Dibromoethane	ug/gOC	NL		NL		NL		NL	
95-50-1	1,2-Dichlorobenzene	ug/gOC	NL		12	D	NL		12	D
107-06-2	1,2-Dichloroethane	ug/gOC	0.7		NL		NL		0.7	
78-87-5	1,2-Dichloropropane	ug/gOC	NL		NL		NL		NL	
541-73-1	1,3-Dichlorobenzene	ug/gOC	NL		12	D	NL		12	D
106-46-7	1,4-Dichlorobenzene	ug/gOC	NL		12	D	NL		12	D
78-93-3	2-Butanone	ug/gOC	NL		NL		NL		NL	
591-78-6	2-Hexanone	ug/gOC	NL		NL		NL		NL	
108-10-1	4-Methyl-2-pentanone	ug/gOC	NL		NL		NL		NL	
67-64-1	Acetone	ug/gOC	NL		NL		NL		NL	
71-43-2	Benzene	ug/gOC	0.6		26		NL		0.6	
75-27-4	Bromodichloromethane	ug/gOC	NL		NL		NL		NL	
75-25-2	Bromoform	ug/gOC	NL		NL		NL		NL	
74-83-9	Bromomethane	ug/gOC	NL		NL		NL		NL	
75-15-0	Carbon Disulfide	ug/gOC	NL		NL		NL		NL	
56-23-5	Carbon Tetrachloride	ug/gOC	0.6		NL		NL		0.6	
0-7	Chlorobenzene	ug/gOC	NL		3.5		NL		3.5	
-3	Chloroethane	ug/gOC	NL		NL		NL		NL	
67-66-3	Chloroform	ug/gOC	NL		NL		NL		NL	
74-87-3	Chloromethane	ug/gOC	NL		NL		NL		NL	
156-59-2	cis-1,2-Dichloroethene	ug/gOC	NL		NL		NL		NL	
10061-01-5	cis-1,3-Dichloropropene	ug/gOC	NL		NL		NL		NL	
110-82-7	Cyclohexane	ug/gOC	NL		NL		NL		NL	
124-48-1	Dibromochloromethane	ug/gOC	NL		NL		NL		NL	
75-71-8	Dichlorodifluoromethane	ug/gOC	NL		NL		NL		NL	
100-41-4	Ethylbenzene	ug/gOC	NL		6.4		NL		6.4	
98-82-8	Isopropylbenzene	ug/gOC	NL		12 FW		NL		12 FW	
79-20-9	Methyl Acetate	ug/gOC	NL		NL		NL		NL	
1634-04-4	Methyl Tert-Butyl Ether	ug/gOC	NL		NL		NL		NL	
75-09-2	Methylene Chloride	ug/gOC	NL		NL		NL		NL	
108-87-2	Metylcyclohexane	ug/gOC	NL		NL		NL		NL	
100-42-5	Styrene	ug/gOC	NL		NL		NL		NL	
127-18-4	Tetrachloroethene	ug/gOC	0.8		NL		NL		0.8	
108-88-3	Toluene	ug/gOC	NL		45		NL		45	
156-60-5	trans-1,2-Dichloroethene	ug/gOC	NL		NL		NL		NL	
10061-02-6	trans-1,3-Dichloropropene	ug/gOC	NL		NL		NL		NL	
79-01-6	Trichloroethene	ug/gOC	2		NL		NL		2	
75-69-4	Trichlorofluoromethane	ug/gOC	NL		NL		NL		NL	
75-01-4	Vinyl Chloride	ug/gOC	0.07		NL		NL		0.07	
1330-20-7	Xylenes (total)	ug/gOC	NL		27	F	NL		27	F
	Semi-Volatile Organics									
92-52-4	1,1'-Biphenyl	ug/gOC	NL		NL		NL		NL	
108-60-1	2,2'-oxybis(1-Chloropropane)	ug/gOC	NL		NL		NL		NL	
95-95-4	2,4,5-Trichlorophenol	ug/gOC	NL		NL		NL		NL	
88-06-2	2,4,6-Trichlorophenol	ug/gOC	NL		NL		NL		NL	
120-83-2	2,4-Dichlorophenol	ug/gOC	NL		NL		NL		NL	
105-67-9	2,4-Dimethylphenol	ug/gOC	NL		NL		NL		NL	
5 -5	2,4-Dinitrophenol	ug/gOC	NL		NL		NL		NL	
-2	2,4-Dinitrotoluene	ug/gOC	NL		NL		NL		NL	

Table 1-5
Sediment Screening Criteria
Smithtown Groundwater Contamination Site
Smithtown, New York

S Number	Chemical Name	Unit	Sediment Quality Criteria - Human Health Bioaccumulation, SW (1)	Sediment Quality Criteria - Benthic Aquatic Life, Chronic Toxicity, SW (1)	Sediment Quality Criteria - Wildlife Bioaccumulation, SW (1)	Smithtown Sediment Screening Criteria (2)
606-20-2	2,6-Dinitrotoluene	ug/gOC	NL	NL	NL	NL
91-58-7	2-Chloronaphthalene	ug/gOC	NL	NL	NL	NL
95-57-8	2-Chlorophenol	ug/gOC	NL	NL	NL	NL
91-57-6	2-Methylnaphthalene	ug/gOC	NL	30	NL	30
95-48-7	2-Methylphenol	ug/gOC	NL	NL	NL	NL
88-74-4	2-Nitroaniline	ug/gOC	NL	NL	NL	NL
88-75-5	2-Nitrophenol	ug/gOC	NL	NL	NL	NL
91-94-1	3,3'-Dichlorobenzidine	ug/gOC	NL	NL	NL	NL
99-09-2	3-Nitroaniline	ug/gOC	NL	NL	NL	NL
534-52-1	4,6-Dinitro-2-methylphenol	ug/gOC	NL	NL	NL	NL
101-55-3	4-Bromophenyl-phenylether	ug/gOC	NL	NL	NL	NL
59-50-7	4-Chloro-3-methylphenol	ug/gOC	NL	NL	NL	NL
106-47-8	4-Chloroaniline	ug/gOC	NL	NL	NL	NL
7005-72-3	4-Chlorophenyl-phenylether	ug/gOC	NL	NL	NL	NL
106-44-5	4-Methylphenol	ug/gOC	NL	NL	NL	NL
100-01-6	4-Nitroaniline	ug/gOC	NL	NL	NL	NL
100-02-7	4-Nitrophenol	ug/gOC	NL	NL	NL	NL
83-32-9	Acenaphthene	ug/gOC	NL	240	NL	240
208-96-8	Acenaphthylene	ug/gOC	NL	NL	NL	NL
98-86-2	Acetophenone	ug/gOC	NL	NL	NL	NL
120-12-7	Anthracene	ug/gOC	NL	107	NL	107
1912-24-9	Atrazine	ug/gOC	NL	NL	NL	NL
100-52-7	Benzaldehyde	ug/gOC	NL	NL	NL	NL
56-55-3	Benzo(a)anthracene	ug/gOC	NL	12 FW	NL	12 FW
50-32-8	Benzo(a)pyrene	ug/gOC	0.7	NL	NL	0.7
99-2	Benzo(b)fluoranthene	ug/gOC	NL	NL	NL	NL
24-2	Benzo(g,h,i)perylene	ug/gOC	NL	NL	NL	NL
207-08-9	Benzo(k)fluoranthene	ug/gOC	NL	NL	NL	NL
111-91-1	bis(2-Chloroethoxy)methane	ug/gOC	NL	NL	NL	NL
111-44-4	bis(2-Chloroethyl)ether	ug/gOC	0.03	NL	NL	0.03
117-81-7	bis(2-Ethylhexyl)phthalate	ug/gOC	NL	199.5 FW	NL	199.5 FW
85-68-7	Butylbenzylphthalate	ug/gOC	NL	NL	NL	NL
105-60-2	Caprolactam	ug/gOC	NL	NL	NL	NL
86-74-8	Carbazole	ug/gOC	NL	NL	NL	NL
218-01-9	Chrysene	ug/gOC	NL	NL	NL	NL
53-70-3	Dibenz(a,h)anthracene	ug/gOC	NL	NL	NL	NL
132-64-9	Dibenzofuran	ug/gOC	NL	NL	NL	NL
84-66-2	Diethylphthalate	ug/gOC	NL	NL	NL	NL
131-11-3	Dimethylphthalate	ug/gOC	NL	NL	NL	NL
84-74-2	Di-n-butylphthalate	ug/gOC	NL	NL	NL	NL
117-84-0	Di-n-octylphthalate	ug/gOC	NL	NL	NL	NL
206-44-0	Fluoranthene	ug/gOC	NL	1340	NL	1340
86-73-7	Fluorene	ug/gOC	NL	38	NL	38
118-74-1	Hexachlorobenzene	ug/gOC	NL	NL	NL	NL
87-68-3	Hexachlorobutadiene	ug/gOC	0.3	1.6	4	0.3
77-47-4	Hexachlorocyclopentadiene	ug/gOC	NL	0.7	NL	0.7
67-72-1	Hexachloroethane	ug/gOC	NL	NL	NL	NL
193-39-5	Indeno(1,2,3-cd)pyrene	ug/gOC	NL	NL	NL	NL
78-59-1	Isophorone	ug/gOC	NL	NL	NL	NL
91-20-3	Naphthalene	ug/gOC	NL	38	NL	38
98-95-3	Nitrobenzene	ug/gOC	NL	NL	NL	NL
621-64-7	N-Nitroso-di-n-propylamine	ug/gOC	NL	NL	NL	NL
86-30-6	N-Nitrosodiphenylamine	ug/gOC	NL	NL	NL	NL
87-86-5	Pentachlorophenol	ug/gOC	NL	40 FW	NL	40 FW
85-01-8	Phenanthrene	ug/gOC	NL	160	NL	160
108-95-2	Phenol	ug/gOC	NL	0.6 FW	NL	0.6 FW
1 0-0	Pyrene	ug/gOC	NL	961	NL	961
	Pesticides/PCBs					

Table 1-5
Sediment Screening Criteria
Smithtown Groundwater Contamination Site
Smithtown, New York

S Number	Chemical Name	Unit	Sediment Quality Criteria - Human Health Bioaccumulation, SW (1)		Sediment Quality Criteria - Benthic Aquatic Life, Chronic Toxicity, SW (1)		Sediment Quality Criteria - Wildlife Bioaccumulation, SW (1)		Smithtown Sediment Screening Criteria (2)	
72-54-8	4,4'-DDD	ug/gOC	0.01	A	NL		1	A	0.01	A
72-55-9	4,4'-DDE	ug/gOC	0.01	A	NL		1	A	0.01	A
50-29-3	4,4'-DDT	ug/gOC	0.01	A	1		1	A	0.01	A
309-00-2	Aldrin	ug/gOC	0.1	B	NL		0.77	B	0.1	B
319-84-6	alpha-BHC	ug/gOC	0.06	G	0.03	G	1.5	G	0.03	G
5103-71-9	alpha-Chlordane	ug/gOC	0.001	C	0.002	C	0.006	C	0.001	C
12674-11-2	Aroclor-1016	ug/gOC	0.0008	H	41.4	H	1.4	H	0.0008	H
11104-28-2	Aroclor-1221	ug/gOC	0.0008	H	41.4	H	1.4	H	0.0008	H
11141-16-5	Aroclor-1232	ug/gOC	0.0008	H	41.4	H	1.4	H	0.0008	H
53469-21-9	Aroclor-1242	ug/gOC	0.0008	H	41.4	H	1.4	H	0.0008	H
12672-29-6	Aroclor-1248	ug/gOC	0.0008	H	41.4	H	1.4	H	0.0008	H
11097-69-1	Aroclor-1254	ug/gOC	0.0008	H	41.4	H	1.4	H	0.0008	H
11096-82-5	Aroclor-1260	ug/gOC	0.0008	H	41.4	H	1.4	H	0.0008	H
319-85-7	beta-BHC	ug/gOC	0.06	G	0.03	G	1.5	G	0.03	G
319-86-8	delta-BHC	ug/gOC	0.06	G	0.03	G	1.5	G	0.03	G
60-57-1	Dieldrin	ug/gOC	0.1	B	17		0.77	B	0.1	B
959-98-8	Endosulfan I	ug/gOC	NL		0.004		NL		0.004	
33213-65-9	Endosulfan II	ug/gOC	NL		0.004		NL		0.004	
1031-07-8	Endosulfan sulfate	ug/gOC	NL		NL		NL		NL	
72-20-8	Endrin	ug/gOC	NL		0.73		NL		0.73	
7421-93-4	Endrin aldehyde	ug/gOC	NL		NL		NL		NL	
53494-70-5	Endrin ketone	ug/gOC	NL		NL		NL		NL	
58-89-9	gamma-BHC (Lindane)	ug/gOC	0.06	G	0.03	G	1.5	G	0.03	G
5103-74-2	gamma-Chlordane	ug/gOC	0.001	C	0.002	C	0.006	C	0.001	C
76-44-8	Heptachlor	ug/gOC	0.0008	I	0.09	I	NL		0.0008	I
1-57-3	Heptachlor epoxide	ug/gOC	0.0008	I	0.09	I	NL		0.0008	I
3-5	Methoxychlor	ug/gOC	NL		0.6		NL		0.6	
8001-35-2	Toxaphene	ug/gOC	0.02		0.01		NL		0.01	
	Inorganic Analytes									
7429-90-5	Aluminum	ug/g	NL		NL		NL		NL	
7440-36-0	Antimony	ug/g	NL		2	J	NL		2	J
7440-38-2	Arsenic	ug/g	NL		6	J	NL		6	J
7440-39-3	Barium	ug/g	NL		NL		NL		NL	
7440-41-7	Beryllium	ug/g	NL		NL		NL		NL	
7440-43-9	Cadmium	ug/g	NL		0.6	J	NL		0.6	J
7440-70-2	Calcium	ug/g	NL		NL		NL		NL	
7440-47-3	Chromium	ug/g	NL		26	J	NL		26	J
7440-48-4	Cobalt	ug/g	NL		NL		NL		NL	
7440-50-8	Copper	ug/g	NL		16	J	NL		16	J
7439-89-6	Iron	ug/g	NL		20000	J	NL		20000	J
7439-92-1	Lead	ug/g	NL		31	J	NL		31	J
7439-95-4	Magnesium	ug/g	NL		NL		NL		NL	
7439-96-5	Manganese	ug/g	NL		460	J	NL		460	J
7439-97-6	Mercury	ug/g	NL		0.15	J	NL		0.15	J
7440-02-0	Nickel	ug/g	NL		16	J	NL		16	J
7440-09-7	Potassium	ug/g	NL		NL		NL		NL	
7782-49-2	Selenium	ug/g	NL		NL		NL		NL	
7440-22-4	Silver	ug/g	NL		1	J	NL		1	J
7440-23-5	Sodium	ug/g	NL		NL		NL		NL	
7440-28-0	Thallium	ug/g	NL		NL		NL		NL	
7440-62-2	Vanadium	ug/g	NL		NL		NL		NL	
7440-66-6	Zinc	ug/g	NL		120	J	NL		120	J
57-12-5	Cyanide	ug/g	NL		NL		NL		NL	

Notes:

1. Source: Technical Guidance for Screening Contaminated Sediments, Division of Fish, Wildlife and Marine Resources, January 25, 1999. Salt water sediment values used as preference. Fresh water values indicatd with FW.
2. Smithtown Sediment Screening Criteria are the lowest of the NYS screening criteria for salt water or fresh water sediment.

Table 1-5
Sediment Screening Criteria
Smithtown Groundwater Contamination Site
Smithtown, New York

S Number	Chemical Name	Unit	Sediment Quality Criteria - Human Health Bioaccumulation, SW (1)	Sediment Quality Criteria - Benthic Aquatic Life, Chronic Toxicity, SW (1)	Sediment Quality Criteria - Wildlife Bioaccumulation, SW (1)	Smithtown Sediment Screening Criteria (2)

Values shown in units of ug/gOC are calculated based on unit organic carbon concentration (1 gOC/kg). Values shown will be multiplied by the measured sample-specific organic carbon content to derive the criteria applicable to each sediment sample.

NL - Chemical name not listed or screening value of this type not listed for the chemical
A Value applies to the sum of DDD, DDE, DDT
B Value applies to the sum of aldrin and dieldrin
C Value applies to total Chlordane
D Value applies to total Dichlorobenzenes
E Value applies to total Trichlorobenzenes
F Value applies to total Xylenes
G Value applies to total BHCs (total hexachlorocyclohexanes)
H Value applies to total PCBs
I Value applies to the sum of heptaclor and heptachlor epoxide
J Value is Lowest Effect Level (LEL) for aquatic life. NYSDEC criteria do not distinguish between fresh and salt water sediment for inorganics.

Table 1-6
Septic System Wastewater and Sludge Screening Criteria
Smithtown Groundwater Contamination Site
Smithtown, New York

Chemical	Action Level	Cleanup Objective
Wastewater		
Volatile Organic Compounds	1,000 ppb total VOCs	Note 1
Metals	100 times discharge standard	Note 1
Sludge (ug/Kg)		
Acetone	**	**
Benzene	120	60
Bromobenzene	1,600	800
Bromochloromethane	400	200
Bromodichloromethane	600	300
Bromoform	1,000	500
n-Butylbenzene	6,800	3,400
sec-Butylbenzene	10,000	5,000
tert-Butylbenzene	6,800	3,400
Carbon tetrachloride	1,200	600
Chlorobenzene	3,400	1,700
Chloroethane	400	200
Chloroform	600	300
Chlorotoluene	3,600	1,800
Dibromochloromethane	600	300
1,2-Dibromo-3-chloropropane	1,000	500
1,2-dibromoethane	600	300
Dibromomethane	400	200
o-(1,2)-Dichlorobenzene	15,000	8,000
m-(1,3)-Dichlorobenzene	3,200	1,600

Table 1-6
Septic System Wastewater and Sludge Screening Criteria
Smithtown Groundwater Contamination Site
Smithtown, New York

Chemical	Action Level	Cleanup Objective
p-(1,4)-Dichlorobenzene	15,000	8,000
Dichlorodifluoromethane	600	300
1,1-Dichloroethane	400	200
1,2-Dichloroethane	200	100
1,2-Dichloroethene	800	400
cis-1,2-Dichloroethene	600	300
trans-1,2-Dichloroethene	600	300
1,2-Dichloropropane	600	300
1,3-Dichloropropane	600	300
2,2-Dichloropropane	600	300
1,1-Dichloropropene	600	300
cis-1,3-Dichloropropene	600	300
trans-1,3-Dichloropropene	600	300
p-Diethylbenzene	7,600	3,800
Ethylbenzene	11,000	5,500
p-Ethyltoluene	3,600	1,800
Hexachlorobutadiene	15,000	10,000
Isopropylbenzene	5,200	2,600
p-Isopropyltoluene	7,800	3,900
Methylene chloride	200	100
MTBE	1,200	600
Methylethylketone	600	300
Methylisobutylketone	2,000	1,000
Naphthalene	15,000	10,000
n-Propylbenzene	5,000	2,500

Table 1-6
Septic System Wastewater and Sludge Screening Criteria
Smithtown Groundwater Contamination Site
Smithtown, New York

Chemical	Action Level	Cleanup Objective
Styrene	2,000	1,000
1,1,1,2-Tetrachloroethane	600	300
1,1,2,2-Tetrachloroethane	1,200	600
Tetrachloroethene	2,800	1,400
1,2,4,5-Tetramethylbenzene	15,000	10,000
Toluene	3,000	1,500
1,2,3-Trichlorobenzene	6,800	3,400
1,2,4-Trichlorobenzene	6,800	3,400
1,1,1-Trichloroethane	1,600	800
1,1,2-Trichloroethane	600	300
Trichloroethene	1,400	700
Trichlorofluoromethane	1,600	800
1,2,3-Trichloropropane	800	400
1,2,4-Trimethylbenzene	4,800	2,400
1,3,5-Trimethylbenzene	5,200	2,600
Vinyl chloride	400	200
Xylene(s)	2,400	1,200
Acenaphthene	75,000	50,000
Anthracene	75,000	50,000
Benzo(a)anthracene	6,000*	3,000*
Benzo(b)fluoranthene	2,200*	1,100*
Benzo(k)fluoranthene	2,200*	1,100*
Benzo(g,h,i)perylene	75,000	50,000
Benzo(a)pyrene	22,000*	11,000*
Chrysene	800	400

Table 1-6
Septic System Wastewater and Sludge Screening Criteria
Smithtown Groundwater Contamination Site
Smithtown, New York

Chemical	**Action Level**	**Cleanup Objective**
Dibenzo(a,h)anthracene	75,000*	50,000*
Fluoranthene	75,000	50,000
Fluorene	75,000	50,000
Indeno(1,2,3-cd)pyrene	6,400	3,200
Phenanthrene	75,000	50,000
Pyrene	75,000	50,000
Sludge Inorganic Analytes (mg/Kg) Note 2		
Arsenic	25	7.5
Beryllium	8	1.6
Cadmium	10	1.0
Chromium	100	10
Copper	500	25
Lead	400	100
Mercury	2	0.1
Nickel	1,000	13
Silver	100	5

Source: Suffolk County Department of Health Services, Standard Operating Procedure for the Administration of Article 12 of the Suffolk County Sanitary Code. SOP No. 9-95. January 7, 1999.
Note 1: Liquid endpoint samples must be collected when groundwater is encountered during a cleanup operation. If the concentration of VOCs, or metals, in the sample meets, or exceeds 100 times the discharge standard for a specific parameter, or the total VOC concentration meets, or exceeds 1,000 ppb, a groundwater sample must be collected immediately downgradient of the point of contamination to determine if there has been an impact on the groundwater.
Note 2: Certain metals, such as aluminum, iron, and manganese, appear naturally in Long Island soils and are not considered to be significant under most conditions. Other metals will be evaluated on a case by case basis.
*: If direct human exposure from ingestion or inhalation is a concern, the human health guidance values published by EPA should be used to formulae a cleanup goal, if that value is lower than the "Cleanup Objective" listed.
**: Due to its relatively short half life in nature, if acetone is the only contaminant of concern in a sample, the primary response should be to determine and eliminate the source of the acetone discharge. The requirement to perform a remediation will be determined on a case by case basis.

Table 1-7
Selected Volatile Organic Compound Results in Residential Area Vertical Profile Samples
Smithtown Groundwater Contamination Site
Smithtown, New York

Sample Number	Depth (bgs)	Elevation (a/bmsl)	1,1-DCA	cis-1,2-DCE	1,1,1-TCA	PCE	TCE	1,1-DCE	Toluene	naphthalene	MTBE
Screening Criteria			5	5	5	5	5	5	5	10	10
VPW-12 is located at the end of the Sachem Hill Road cul-de-sac. Ground elevation = 138.36 ft amsl											
VPW-12A	250-255 ft	-111.64	ND	ND	ND	ND	ND	ND	**20 J**	R	1
VPW-12B	240-245 ft	-101.64	ND	ND	ND	ND	ND	ND	**16**	R	1.2
VPW-12C	dup of B	-101.64	ND	ND	ND	ND	ND	ND	**15**	R	1.2
VPW-12D	230-235 ft	-91.64	ND	ND	ND	ND	ND	ND	**21**	R	1
VPW-12E	220-225 ft	-81.64	ND	ND	ND	ND	ND	ND	**18**	R	1.4
VPW-12F	210-215 ft	-71.64	ND	ND	ND	ND	ND	ND	**24**	R	1
VPW-12G	200-205 ft	-61.64	ND	ND	ND	ND	ND	ND	**28**	R	1.2
VPW-12H	190-195 ft	-51.64	ND	ND	ND	ND	ND	ND	**16 J**	R	0.7 J
VPW-12I	180-185 ft	-41.64	ND	ND	ND	ND	ND	ND	**34 J**	R	0.9 J
VPW-12J	170-175 ft	-31.64	ND	ND	ND	ND	ND	ND	**20 J**	R	0.7 J
VPW-12K	160-165 ft	-21.64	0.6 J	0.7 J	ND	1.1 J	ND	ND	**9 J**	R	ND
VPW-12L	150-155 ft	-11.64	0.8 J	ND	0.7 J	ND	ND	ND	**11 J**	R	ND
VPW-12M	140-145 ft	-1.64	0.5 J	ND	0.7 J	ND	ND	ND	**17 J**	R	ND

Table 1-7
Selected Volatile Organic Compound Results in Residential Area Vertical Profile Samples
Smithtown Groundwater Contamination Site
Smithtown, New York

Sample Number	Depth (bgs)	Elevation (a/bmsl)	1,1-DCA	cis-1,2-DCE	1,1,1-TCA	PCE	TCE	1,1-DCE	Toluene	naphthalene	MTBE
Screening Criteria			5	5	5	5	5	5	5	10	10
VPW-12N	130-135 ft	8.36	ND	ND	ND	ND	ND	ND	**13 J**	R	ND
VPW-14 is located at the east end of the Highwoods Court cul-de-sac. Ground elevation = 157.28 ft amsl											
VPW-14A	245-250 ft	-87.72	ND	ND	0.6	ND	ND	ND	**15**	R	ND
VPW-14B	235-240 ft	-77.72	ND	ND	ND	ND	ND	ND	**28**	R	ND
VPW-14C	225-230 ft	-67.72	ND	ND	ND	ND	ND	ND	**38**	ND	ND
VPW-14D	215-220 ft	-57.72	ND	ND	ND	ND	ND	ND	**32**	R	ND
VPW-14E	205-210 ft	-47.72	ND	ND	ND	ND	ND	ND	**37**	R	ND
VPW-14F	195-200 ft	-37.72	ND	ND	ND	ND	ND	ND	**28**	R	ND
VPW-14G	185-190 ft	-27.72	ND	ND	ND	ND	ND	ND	**56**	ND	ND
VPW-14H	175-180 ft	-17.72	ND	ND	ND	ND	ND	ND	**54**	ND	ND
VPW-14I	165-170 ft	-7.72	ND	ND	ND	ND	ND	ND	**36**	ND	ND
VPW-14J	155-160 ft	2.28	ND	ND	ND	ND	ND	ND	**37**	ND	ND
VPW-14K	145-150 ft	12.28	ND	ND	ND	ND	ND	ND	**16**	ND	ND
VPW-15 is located at 28 Branglebrink Road. Ground elevation = 186.58 ft amsl											

Table 1-7
Selected Volatile Organic Compound Results in Residential Area Vertical Profile Samples
Smithtown Groundwater Contamination Site
Smithtown, New York

Sample Number	**Depth (bgs)**	**Elevation (a/bmsl)**	**1,1-DCA**	**cis-1,2-DCE**	**1,1,1-TCA**	**PCE**	**TCE**	**1,1-DCE**	**Tolu-ene**	**naphth alene**	**MTBE**
Screening Criteria			**5**	**5**	**5**	**5**	**5**	**5**	**5**	**10**	**10**
VPW-15A	215-220 ft	-28.42	ND	ND	ND	ND	ND	ND	**5.1 J**	ND	ND
VPW-15B	207-212 ft	-20.42	ND	ND	ND	ND	ND	ND	**7.2 J**	ND	ND
VPW-15C	197-202 ft	-10.42	ND	ND	0.8 J	ND	ND	ND	**5.7 J**	ND	0.5 J
VPW-15D	187-192 ft	-0.42	ND	ND	0.6 J	ND	ND	ND	**5.7 J**	ND	0.6 J
VPW-15E	177-182 ft	8.58	ND	ND	ND	ND	ND	ND	**5.1 J**	ND	0.9 J
VPW-15F	167-172 ft	18.58	ND	ND	ND	ND	ND	R	ND	R	0.9 J
VPW-16 is located at 23 Branglebrink Road. Ground elevation = 218.97 ft amsl											
VPW-16A	250-255 ft	-31.03	ND	ND	ND	ND	ND	ND	**6**	ND	ND
VPW-16B	240-245 ft	-21.03	4.1	ND	**5.9**	ND	1.3	1.2	**12**	ND	ND
VPW-16C	230-235 ft	-11.03	1.3	ND	3.6	ND	0.9	0.9	**6.4**	ND	ND
VPW-16D	220-225 ft	-1.03	ND	1.3	ND	2.9	ND	ND	4	ND	ND
VPW-16E	210-215 ft	8.97	ND	1.7	ND	3.5	ND	ND	3.7	ND	ND
VPW-17 is located opposite 5 Branglebrink Road. Ground elevation = 165.99 ft amsl											
VPW-17A	192-197 ft	-26.01	ND	ND	ND	ND	ND	ND	2.7	ND	ND

Table 1-7
Selected Volatile Organic Compound Results in Residential Area Vertical Profile Samples
Smithtown Groundwater Contamination Site
Smithtown, New York

Sample Number	Depth (bgs)	Elevation (a/bmsl)	1,1-DCA	cis-1,2-DCE	1,1,1-TCA	PCE	TCE	1,1-DCE	Tolu-ene	naphth alene	MTBE
Screening Criteria			**5**	**5**	**5**	**5**	**5**	**5**	**5**	**10**	**10**
VPW-17B	184-189 ft	-18.01	ND	ND	0.7	ND	ND	ND	**6.3**	ND	ND
VPW-17C	dup of B	-18.01	ND	ND	0.7	ND	ND	ND	**6.3**	ND	ND
VPW-17D	174-179 ft	-8.01	ND	ND	0.6	ND	ND	ND	3.9	ND	ND
VPW-17E	164-169 ft	1.99	ND	ND	0.5	ND	ND	ND	**7.6**	ND	ND
VPW-17F	154-159 ft	11.99	ND	ND	ND	ND	ND	ND	**5.4**	ND	ND
VPW-18 is located at 245 Old Mill Road. Ground elevation = 167.78 ft amsl											
VPW-18A	186-191 ft	-18.22	ND	0.7	ND	1.8	ND	N	**24**	ND	0.6
VPW-18B	175-180 ft	-7.22	ND	0.5	ND	1	ND	ND	**25**	ND	ND
VPW-18C	165-170 ft	2.78	ND	0.5	ND	0.9	0.6	ND	**38**	ND	ND
VPW-19 is located at 15 Quail Path. Ground elevation = 101.87 ft amsl											
VPW-19A	198-203 ft	-96.13	R	ND	ND	ND	ND	ND	0.7	2.9 J	ND
VPW-19B	188-193 ft	-86.13	R	ND	ND	ND	ND	ND	1.2	2.7 J	ND
VPW-19C	178-183 ft	-76.13	ND	ND	ND	ND	ND	ND	3.3 J	1.1 J	ND
VPW-19D	168-173 ft	-66.13	ND	ND	ND	ND	ND	ND	1.9 J	2 J	ND

Table 1-7
Selected Volatile Organic Compound Results in Residential Area Vertical Profile Samples
Smithtown Groundwater Contamination Site
Smithtown, New York

Sample Number	Depth (bgs)	Elevation (a/bmsl)	1,1-DCA	cis-1,2-DCE	1,1,1-TCA	PCE	TCE	1,1-DCE	Toluene	naphthalene	MTBE
Screening Criteria			**5**	**5**	**5**	**5**	**5**	**5**	**5**	**10**	**10**
VPW-19E	158-163 ft	-56.13	ND	ND	ND	ND	ND	ND	0.7 J	2.9 J	ND
VPW-19F	148-153 ft	-46.13	0.5 J	ND	0.8 J	ND	ND	ND	ND	0.8 J	ND
VPW-19G	138-143 ft	-36.13	ND	ND	0.6 NJ	ND	ND	ND	ND	0.5 J	ND
VPW-19H	128-133 ft	-26.13	ND	ND	ND	ND	ND	ND	0.7 J	1.6 J	ND
VPW-19I	118-123 ft	-16.13	ND	ND	ND	ND	ND	ND	1.7 J	1.4 J	ND
VPW-19J	dup of H	-16.13	ND	ND	ND	ND	ND	ND	0.8 J	1.6 J	ND
VPW-19K	108-113 ft	-6.13	0.6	R	0.6	ND	ND	ND	2	0.6 J	ND
VPW-19L	98-103 ft	3.87	ND	R	0.6	0.6	ND	ND	1.4	R	ND
VPW-19M	88-93 ft	13.87	ND	R	ND	ND	ND	ND	2.1	0.6 J	ND
VPW-20 is located at the end of the Carmen Lane cul-de-sac. Ground elevation = 90.08 ft amsl											
VPW-20A	185-190 ft	-94.92	ND	ND	ND	ND	ND	ND	**32**	ND	ND
VPW-20B	175-180 ft	-84.92	ND	ND	ND	ND	ND	ND	**11**	ND	ND
VPW-20C	165-170 ft	-74.92	ND	ND	ND	ND	ND	ND	**6.3**	ND	0.6
VPW-20D	155-160 ft	-64.92	ND	ND	ND	ND	ND	ND	**6.1**	ND	ND

Table 1-7
Selected Volatile Organic Compound Results in Residential Area Vertical Profile Samples
Smithtown Groundwater Contamination Site
Smithtown, New York

Sample Number	**Depth (bgs)**	**Elevation (a/bmsl)**	**1,1-DCA**	**cis-1,2-DCE**	**1,1,1-TCA**	**PCE**	**TCE**	**1,1-DCE**	**Tolu-ene**	**naphth alene**	**MTBE**
Screening Criteria			**5**	**5**	**5**	**5**	**5**	**5**	**5**	**10**	**10**
VPW-20E	145-150 ft	-54.92	ND	ND	ND	ND	ND	ND	**15**	ND	ND
VPW-20F	125-130 ft	-34.92	ND	ND	ND	ND	ND	ND	**28**	R	ND
VPW-20G	115-120 ft	24.92	ND	ND	ND	R	ND	ND	**15**	R	ND
VPWA-20 is located at the end of the Carmen Lane cul-de-sac. Ground elevation = 90.08 ft amsl											
VPWA-20A	173-177 ft	-82.92	ND	ND	ND	ND	ND	ND	2.4	ND	ND
VPWA-20B	161-165 ft	-70.92	ND	ND	ND	ND	ND	ND	**8.5**	ND	ND
VPWA-20C	151-155 ft	-60.92	ND	ND	ND	ND	ND	ND	**16**	ND	ND
VPWA-20D	141-145 ft	-50.92	ND	ND	ND	ND	ND	ND	**14**	ND	ND
VPWA-20E	131-135 ft	-40.92	ND	ND	ND	ND	ND	ND	**9.3**	ND	ND
VPWA-20F	121-125 ft	-30.92	ND	ND	ND	ND	ND	ND	**11**	ND	ND
VPWA-20G	111-115 ft	-20.92	ND	ND	ND	ND	ND	ND	**12**	ND	ND
VPWA-20H	101-105 ft	-10.92	ND	ND	ND	ND	ND	ND	**8.8**	ND	ND
VPWA-20I	91-95 ft	-0.92	ND	ND	ND	ND	ND	ND	**5.4**	ND	ND
VPWA-20J	81-85 ft	9.08	ND	ND	ND	ND	ND	ND	**10**	ND	ND

Table 1-7
Selected Volatile Organic Compound Results in Residential Area Vertical Profile Samples
Smithtown Groundwater Contamination Site
Smithtown, New York

Sample Number	Depth (bgs)	Elevation (a/bmsl)	1,1-DCA	cis-1,2-DCE	1,1,1-TCA	PCE	TCE	1,1-DCE	Tolu-ene	naphth alene	MTBE
Screening Criteria			5	5	5	5	5	5	5	10	10
VPW-21 is located at the end of Cordwood Path (by Stony Brook Harbor). Ground elevation = 11.95 amsl											
VPW-21A	122-127 ft	-110.05	ND	ND	ND	ND	ND	R	**11 J**	R	ND
VPW-21B	112-117 ft	-100.05	ND	ND	0.5 J	ND	ND	R	**7.5 J**	R	ND
VPWA-21 is located at the end of Cordwood Path (by Stony Brook Harbor). Ground elevation = 11.95 ft amsl											
VPWA-21A	142-147 ft	-130.05	ND	ND	ND	ND	ND	R	1	ND	ND
VPWA-21B	130-135 ft	-118.05	ND	ND	ND	ND	ND	R	**13**	ND	ND
VPWA-21C	120-125 ft	-108.05	ND	ND	ND	ND	ND	R	**14**	ND	ND
VPWA-21D	110-115 ft	-98.05	ND	ND	ND	ND	ND	R	**15**	ND	ND
VPWA-21E	100-105 ft	-88.05	ND	ND	ND	ND	ND	R	**6.4**	ND	ND
VPWA-21F	90-95 ft	-78.05	ND	ND	ND	ND	ND	R	**11 J**	ND	ND
VPWA-21G	80-85 ft	-68.05	ND	ND	ND	ND	ND	R	**15 J**	ND	ND
VPWA-21H	70-75 ft	-58.05	ND	ND	ND	ND	ND	R	**5.2 J**	ND	ND
VPWA-21I	60-65 ft	-48.05	ND	ND	ND	ND	ND	R	**5.9 J**	R	ND
VPWA-21J	50-55 ft	-38.05	ND	ND	0.5 J	ND	ND	R	**5.6 J**	R	ND

Table 1-7
Selected Volatile Organic Compound Results in Residential Area Vertical Profile Samples
Smithtown Groundwater Contamination Site
Smithtown, New York

Sample Number	Depth (bgs)	Elevation (a/bmsl)	1,1-DCA	cis-1,2-DCE	1,1,1-TCA	PCE	TCE	1,1-DCE	Toluene	naphthalene	MTBE
Screening Criteria			**5**	**5**	**5**	**5**	**5**	**5**	**5**	**10**	**10**
VPWA-21K	40-45 ft	-28.05	ND	ND	ND	ND	ND	R	**6.4 J**	R	ND
VPWA-21L	dup of K	-28.05	ND	ND	ND	ND	ND	R	**19 J**	ND	ND
VPWA-21M	30-35 ft	-18.05	ND	ND	ND	ND	ND	R	**39 J**	ND	ND
VPWA-21N	20-25	-8.05	ND	ND	ND	ND	ND	R	**45 J**	ND	ND
VPWA-21O	10-15	1.95	ND	ND	ND	ND	ND	R	**61 J**	1.2 J	ND
VPW-23 is located at the end of the Watercrest Court cul-de-sac. Ground elevation = 97.03 ft amsl											
VPW-23A	192-197 ft	-94.97	ND	ND	ND	ND	ND	ND	**5.3**	1.6	0.8
VPW-23B	184-189 ft	-86.97	ND	ND	ND	ND	ND	ND	**14**	1.4	0.9
VPW-23C	dup of B	-86.97	ND	ND	ND	ND	ND	ND	**14**	1.4	0.8
VPW-23D	174-179 ft	-76.97	ND	ND	ND	ND	ND	ND	**15**	1.1	0.6
VPW-23E	164-169 ft	-66.97	ND	ND	ND	ND	ND	ND	**16**	1.2	ND
VPW-23F	154-159 ft	-56.97	ND	ND	ND	ND	ND	ND	**19**	1.3	ND
VPW-23G	144-149 ft	-46.97	ND	ND	ND	ND	ND	ND	**19**	1.2 J	ND
VPW-23H	134-139 ft	-36.97	ND	ND	ND	ND	ND	ND	**17**	1.2 J	ND

Table 1-7
Selected Volatile Organic Compound Results in Residential Area Vertical Profile Samples
Smithtown Groundwater Contamination Site
Smithtown, New York

Sample Number	**Depth (bgs)**	**Elevation (a/bmsl)**	**1,1-DCA**	**cis-1,2-DCE**	**1,1,1-TCA**	**PCE**	**TCE**	**1,1-DCE**	**Tolu-ene**	**naphth alene**	**MTBE**
Screening Criteria			**5**	**5**	**5**	**5**	**5**	**5**	**5**	**10**	**10**
VPW-23I	124-129 ft	-26.97	ND	ND	ND	ND	ND	ND	**17**	1 J	ND
VPW-23J	114-119 ft	-16.97	ND	ND	ND	R	ND	ND	**17**	1 J	ND
VPW-23K	104-109 ft	-9.97	ND	ND	ND	R	ND	ND	**12**	0.8 J	ND
VPW-23L	94-99 ft	3.03	ND	ND	ND	R	ND	ND	**10**	0.6 J	ND
VPW-23M	84-89 ft	13.03	ND	ND	ND	R	ND	ND	**16**	0.7 J	ND
VPW-23N	74-79 ft	23.03	ND	ND	ND	R	ND	ND	**12**	0.6 J	ND
VPW-24 is located southeast of 54 Harbor Hill Road. Ground elevation = 30.86 ft amsl											
VPW-24A	200-205 ft	-169.14	1.1	ND	1.6	0.9	ND	ND	**79**	0.6 J	2.7 J
VPW-24B	193-198 ft	-162.14	0.9	ND	1.3	0.5	ND	ND	**78**	R	2.1 J
VPW-24C	184-189 ft	-153.14	1.3	ND	1.8	0.6	ND	0.5	**99**	ND	2 J
VPW-24D	174-179 ft	-143.14	4.6	ND	**5.7**	ND	1.6	2.3	**22**	ND	0.8 J
VPW-24E	164-169 ft	-133.14	3	ND	3.3	ND	1	0.9 J	**48 J**	ND	ND
VPW-24F	154-159 ft	-123.14	2.3	ND	2.7	0.5	0.9	1.1 J	**49 J**	ND	1.4
VPW-24G	144-149 ft	-113.14	2.1	ND	2.5	0.6	0.7	1 J	**71 J**	ND	1.5

Table 1-7
Selected Volatile Organic Compound Results in Residential Area Vertical Profile Samples
Smithtown Groundwater Contamination Site
Smithtown, New York

Sample Number	**Depth (bgs)**	**Elevation (a/bmsl)**	**1,1-DCA**	**cis-1,2-DCE**	**1,1,1-TCA**	**PCE**	**TCE**	**1,1-DCE**	**Tolu-ene**	**naphth alene**	**MTBE**
Screening Criteria			**5**	**5**	**5**	**5**	**5**	**5**	**5**	**10**	**10**
VPW-24H	134-139 ft	-103.14	1.8	ND	2.1	0.6	0.5	0.5 J	**68 J**	ND	1.6
VPW-24I	124-129 ft	-93.14	1.4	ND	1.8	0.7	ND	ND	**72 J**	ND	1.7
VPW-24J	114-119 ft	-83.14	1.2	ND	1.4	0.8	ND	ND	**68 J**	ND	1.6
VPW-24K	104-109 ft	-73.14	0.7	ND	1	2.5	ND	ND	**30 J**	ND	1
VPW-24L	94-99 ft	-63.14	0.7	ND	0.9	1.5	ND	ND	**45 J**	ND	1.2
VPW-24M	84-89 ft	-53.14	0.6	ND	0.8	2.1	ND	ND	**35 J**	ND	1.4
VPW-24N	74-79 ft	-43.14	0.7	ND	0.8	2.9	ND	ND	**39 J**	ND	1.2
VPW-24O	64-69 ft	-33.14	ND	ND	0.5	**5.6**	ND	ND	**21**	ND	0.8
VPW-24P	54-59 ft	-23.14	ND	ND	ND	3.6	ND	ND	**17**	ND	0.8
VPW-24Q	44-49 ft	-13.14	ND	ND	ND	**7.3**	ND	ND	**16**	ND	0.8
VPW-24R	34-39 ft	-3.14	ND	ND	0.5	3	ND	ND	**20**	R	0.9
VPW-24S	24-29 ft	6.86	ND	ND	ND	**7.5**	ND	ND	**13**	ND	0.6
VPW-24T	dup of O	-33.14	ND	ND	ND	4.5	ND	ND	**19**	R	0.9
VPW-24U	dup of Q	-13.14	ND	ND	ND	**5**	ND	ND	**14**	R	0.8

Table 1-7
Selected Volatile Organic Compound Results in Residential Area Vertical Profile Samples
Smithtown Groundwater Contamination Site
Smithtown, New York

Sample Number	Depth (bgs)	Elevation (a/bmsl)	1,1-DCA	cis-1,2-DCE	1,1,1-TCA	PCE	TCE	1,1-DCE	Toluene	naphthalene	MTBE
Screening Criteria			**5**	**5**	**5**	**5**	**5**	**5**	**5**	**10**	**10**
VPW-24V	14-19 ft	16.86	ND	ND	ND	3	ND	ND	**15**	R	0.8
VPW-25 is located northwest of 54 Harbor Hill Road. Ground elevation = 13.99 ft amsl											
VPW-25A	98-103 ft	-84.01	ND	ND	ND	ND	ND	ND	3.1	1.7	ND
VPW-25B	88-93 ft	-74.01	ND	ND	ND	ND	ND	ND	**6.1**	0.9	ND
VPW-25C	78-83 ft	-64.01	ND	ND	ND	ND	ND	ND	**12**	1.4	ND
VPW-25D	68-73 ft	-54.01	ND	ND	ND	ND	0.5	ND	**17**	1.4 J	ND
VPW-25E	58-63 ft	-44.01	ND	ND	ND	ND	ND	ND	**18**	1.4 J	ND
VPW-25F	48-53 ft	-34.01	ND	ND	ND	0.9	ND	ND	**11**	0.8 J	ND
VPW-25G	38-43 ft	-24.01	ND	ND	ND	0.7	ND	ND	**11**	0.7 J	ND
VPW-25H	28-33 ft	-14.01	ND	ND	ND	0.7	ND	ND	**17**	0.9 J	ND
VPW-25I	18-23 ft	-4.01	ND	ND	ND	0.8	ND	ND	**12**	0.8 J	ND
VPW-25J	8-13 ft	5.99	ND	ND	ND	0.9	ND	ND	**19**	0.7 J	ND

All units in micrograms/liter (ug/L)

Abbreviations: bgs = below ground surface; a/b msl = above/below mean sea level; 1,1-DCA = 1,1-dichloroethane; cis-1,2-DCE = cis-1,2-dichloroethene; 1,1,1-TCA = 1,1,1-trichloroethane; PCE = tetrachloroethene; TCE = trichloroethene; MTBE = methyl tert butyl ether; ft = feet; J = estimated value; R = data rejected

Table 1- 8
Selected Volatile Organic Compound Results in Potential Source Area Vertical Profile Samples
Smithtown Groundwater Contamination Site
Smithtown, New York

Sample Number	Depth (ft bgs)	Elevation (ft a/bmsl)	1,2-DCA	cis-1,2-DCE	1,1,1-TCA	PCE	TCE	1,1-DCE	Tolu-ene	naphth alene	MTBE
Screening Criteria			**5**	**5**	**5**	**5**	**5**	**5**	**5**	**10**	**10**
VPW-1 is located at 256 Lake Avenue (Gene's French Cleaners). Ground elevation = 161.5 ft amsl											
VPW-01-A	121-125	40.5	ND	ND	ND	ND	ND	ND	ND	ND	1.1
VPW-01-B	110-114	51.5	ND	ND	ND	ND	ND	ND	ND	ND	2.2
VPW-2 is located at 483 Lake Avenue (Avenue Cleaners). Ground Elevation = 161.3 ft. amsl											
VPW-2-A	166-170	-12	ND	ND	ND	ND	ND	ND	0.68	ND	ND
VPW-2-B	156-160	-2	ND	ND	ND	ND	ND	ND	0.82	ND	ND
VPW-3 is located at 561 Lake Avenue (St. James Cleaners). Ground elevation = 166.3 ft amsl											
VPW-03-A	140-144	26.3	ND	ND	ND	ND	ND	ND	0.36J	ND	ND
VPW-03-B	130-134	36.3	ND	ND	ND	1.8	ND	ND	ND	ND	ND
VPW-4 is located at 617-621 Lake Avenue (Sal's Auto Body). Ground elevation = 168.3 ft amsl											
VPW-04-A	140-144	28.3	ND	ND	0.41J	0.53	ND	ND	ND	ND	ND
VPW-5 is located at 556 North Country Road (Polo French Cleaners) Ground elevation = 154.2 ft amsl											
VPW-05-A	128-132	26.2	ND	0.38J	ND	1.3	ND	ND	ND	ND	1.8
VPW-05-B	118-122	36.2	ND	1.6	ND	**15**	0.33J	ND	ND	ND	1.9

Table 1- 8
Selected Volatile Organic Compound Results in Potential Source Area Vertical Profile Samples
Smithtown Groundwater Contamination Site
Smithtown, New York

Sample Number	Depth (ft bgs)	Elevation (ft a/bmsl)	1,2-DCA	cis-1,2-DCE	1,1,1-TCA	PCE	TCE	1,1-DCE	Tolu-ene	naphth alene	MTBE
Screening Criteria			5	5	5	5	5	5	5	10	10
VPW- 6 is located on Edgewood Avenue (Smiththown School District Admin. Building). Ground elevation = 153.2 ft amsl											
VPW-06-A	150-154	3.2	ND	ND	ND	ND	ND	ND	ND	ND	ND
VPW-06-B	140-144	13.2	ND	ND	ND	ND	ND	ND	ND	ND	ND
VPW-7 is located at 400 North Country Road (Four Seasons Cesspool) Ground elevation = 151.3 ft amsl											
VPW-07-A	150-154	1.3	ND	ND	ND	0.75	ND	ND	0.75	ND	ND
VPW-07-B	140-144	11.3	ND	ND	ND	0.79	0.85	ND	0.43J	ND	0.38J
VPW-07-C	130-134	21.3	ND	ND	0.33J	0.77	0.64	ND	0.4J	ND	1.7
VPW-8 is located at 430-11 North Country Road (North Country Cleaners) Ground elevation = 158.6 ft amsl											
VPW-08-A	148-152	10.6	ND	ND	ND	ND	ND	ND	0.51	ND	0.64
VPW-08-B	138-143	20.6	ND	ND	ND	ND	ND	ND	ND	ND	6.9
VPW-08-C	128-133	30.6	ND	ND	ND	ND	ND	ND	ND	ND	1.1
VPWA-9 is located at 437 North Country Road (The Cleaners) Ground elevation = 158.4 ft amsl											
VPW-09-A	138-142	20.4	ND	ND	ND	ND	ND	ND	ND	ND	7.9
VPW-09-B	133-137	25.4	ND	0.37J	ND	ND	ND	ND	0.5	ND	6.6

Table 1- 8
Selected Volatile Organic Compound Results in Potential Source Area Vertical Profile Samples
Smithtown Groundwater Contamination Site
Smithtown, New York

Sample Number	Depth (ft bgs)	Elevation (ft a/bmsl)	1,2-DCA	cis-1,2-DCE	1,1,1-TCA	PCE	TCE	1,1-DCE	Tolu-ene	naphth alene	MTBE
Screening Criteria			5	5	5	5	5	5	5	10	10
VPW-10 is located at 525 North Country Road (St. James Exxon Center) Ground elevation = 165.2 ft amsl											
VPW-10-A	150-154	15.2	ND	ND	ND	0.41J	ND	ND	0.3J	ND	ND
VPW-10-B	150-154	15.2	ND	ND	ND	0.34J	ND	ND	0.43J	ND	ND
VPW-10-C	140-144	25.2	ND	ND	ND	1.2	ND	ND	ND	ND	ND
VPW-11 is located at 545 North Country Road (Penney's St. James Garage) Ground elevation = 164.2 ft amsl											
VPW-11-A	138-142	26.2	ND	ND	ND	ND	ND	ND	0.38J	ND	1.2
VPW-11-B	138-142	26.2	ND	ND	ND	ND	ND	ND	0.47J	ND	1.2
VPW-11-C	128-132	36.2	ND	ND	ND	0.38J	ND	ND	ND	ND	**20**

All units in micrograms/liter (ug/L)

Abbreviations: ft bgs = feet below ground surface; ft a/b msl = feet above/below mean sea level; 1,2 -DCA = 1,2-dichloroethane; cis-1,2-DCE = cis-1,2-dichloroethene; 1,1,1-TCA = 1,1,1-trichloroethane; PCE = tetrachloroethene; TCE = trichloroethene; MTBE = methyl tert butyl ether; ft = feet; J = estimated value

Table 1-9
Round 1 and Round 2 Selected Volatile Organic Compound Results in Monitoring Wells
Smithtown Groundwater Contamination Site
Smithtown, New York

Sample Number	Screen Interval (ft bgs)	Elevation (a/b msl)	1,1-DCA	cis-1,2-DCE	1,1,1-TCA	PCE	TCE	1,1-DCE	chloro-form	trans 1,2-DCE	MTBE
Screening Criteria (ug/L) (1)			5	5	5	5	5	5	7	5	10
MW-1S/R1	100 to 110	3 to -7	ND	1.1	0.47 J	0.82	0.31 J	ND	0.50	ND	ND
MW-1S/R2	100 to 110	3 to -7	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-1I/R1	140 to 150	-40 to -50	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-1I/R2	140 to 150	-40 to -50	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-2/R1	180 to 190	-12 to -22	ND	1.3	1.0	4.4	0.52	ND	ND	ND	ND
MW-2/R2	180 to 190	-12 to -22	0.23 J	1.2	0.57	**5.6**	0.41 J	ND	ND	ND	ND
MW-3S/R1	167 to 177	1 to -9	ND	**50 D**	ND	**12**	ND	ND	ND	0.48 J	ND
MW-3S/R2	167 to 177	1 to -9	ND	**120 D**	ND	**10**	**6.1**	ND	ND	1.4 J	ND
MW-3I/R1	198 to 208	-30 to -40	ND	1.7	0.42 J	0.82	0.40 J	ND	ND	ND	1.2
MW-3I/R2	198 to 208	-30 to -40	ND	**7.6**	ND	0.66 J	0.35 J	ND	0.20 J	0.22 J	ND
MW-4S/R1	170 to 180	9 to -1	ND	ND	ND	2.3	ND	ND	ND	ND	ND
MW-4S/R2	170 to 180	9 to -1	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-4I/R1	200 to 210	-22 to -32	ND	2.9	0.15 J	**16**	0.68	ND	ND	ND	ND
MW-4I/R2	200 to 210	-22 to -32	ND	ND	ND	1.0	ND	ND	ND	ND	ND
MW-4D/R1	242 to 252	-63 to -73	0.56	1.4	0.58	**38 D**	0.94	ND	ND	ND	ND

Table 1-9
Round 1 and Round 2 Selected Volatile Organic Compound Results in Monitoring Wells
Smithtown Groundwater Contamination Site
Smithtown, New York

Sample Number	Screen Interval (ft bgs)	Elevation (a/b msl)	1,1-DCA	cis-1,2-DCE	1,1,1-TCA	PCE	TCE	1,1-DCE	chloro-form	trans 1,2-DCE	MTBE
Screening Criteria (ug/L) (1)			5	5	5	5	5	5	7	5	10
MW-4D/R2	242 to 252	-63 to -73	ND	ND	ND	1.4	ND	ND	ND	ND	ND
MW-5S/R1	40 to 50	-27 to -37	ND	ND	0.40 J	3.6	ND	ND	ND	ND	ND
MW-5S/R2	40 to 50	-27 to -37	ND	ND	ND	ND	ND	ND	0.62	ND	ND
MW-5I/R1	109 to 119	-95 to -105	0.20 J	0.44 J	0.37 J	1.6	1.5	ND	ND	ND	0.78
MW-5I/R2	109 to 119	-95 to -105	0.27 J	0.62	0.57	1.7	2.0	ND	0.49 J	ND	1.4
MW-5D/R1	160 to 170	-146 to -156	ND	0.37 J	0.35 J	1.0	0.90	ND	ND	ND	1.2
MW-5D/R2	160 to 170	-146 to -156	ND	0.25 J	0.32 J	0.72	0.67	ND	ND	ND	1.8
MW-6S/R1	188 to 198	-12 to -22	ND	ND	**150 D**	**5.3**	2.2	**31 D**	0.63 J	ND	ND
MW-6S/R2	188 to 198	-12 to -22	ND	ND	**92 D**	**5.7 J**	2.0 J	ND	ND	ND	1.1
MW-6I/R1	219 to 229	-43 to -53	ND	ND	0.31 J	ND	ND	ND	ND	ND	ND
MW-6I/R2	219 to 229	-43 to -53	ND	ND	0.23 J	ND	ND	ND	ND	ND	ND
MW-7/R2	124 to 134	20 to 30	ND	0.32 J	ND	4.6	0.25 J	ND	ND	ND	ND
MW-A/R1	140 to 150	-7 to -17	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-A/R2	140 to 150	-7 to -17	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-C/R1	165 to 175	-3 to -13	ND	ND	0.17 J	ND	ND	ND	ND	ND	1.3

Table 1-9
Round 1 and Round 2 Selected Volatile Organic Compound Results in Monitoring Wells
Smithtown Groundwater Contamination Site
Smithtown, New York

Sample Number	Screen Interval (ft bgs)	Elevation (a/b msl)	1,1-DCA	cis-1,2-DCE	1,1,1-TCA	PCE	TCE	1,1-DCE	chloro-form	trans 1,2-DCE	MTBE
Screening Criteria (ug/L) (1)			**5**	**5**	**5**	**5**	**5**	**5**	**7**	**5**	**10**
MW-C/R2	165 to 175	-3 to -13	ND	ND	ND	ND	ND	ND	ND	ND	0.87
MW-D/R1	185 to 195	-94 to -104	0.48 J	ND	0.74	ND	0.27 J	ND	ND	ND	ND
MW-D/R2	185 to 195	-94 to -104	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-E/R1	235 to 245	-74 to -84	3.0	ND	**7.1**	ND	1.9	1.7	ND	ND	ND
MW-E/R2	235 to 245	-74 to -84	3.7	0.43 J	**8.4**	0.17 J	3.8	ND	ND	ND	ND
MW-F/R1	187 to 197	-41 to -51	2.6	1.2	1.7	0.16 J	**5.8**	ND	0.40 J	ND	ND
MW-F/R2	187 to 197	-41 to -51	2.1	1.3	1.4	0.16 J	**6.7**	ND	ND	ND	ND
MW-G/R1	290 to 300	-129 to -139	ND	ND	0.46 J	ND	0.21 J	ND	ND	ND	ND
MW-G/R2	290 to 300	-129 to -139	ND	ND	ND	ND	ND	ND	ND	ND	ND

All values in micrograms/liter (ug/L); **bold** = exceeds screening criteria

Abbreviations: ft bgs = feet below ground surface; a/b msl = above/below mean sea level; 1,1-DCA = 1,1-dichloroethane; cis-1,2-DCE = cis-1,2-dichloroethene; 1,1,1-TCA = 1,1,1-trichloroethane; PCE = tetrachloroethene; 1,1-DCE = 1,1-dichloroethene; trans-1,2-DCE = trans-1,2-dichloroethene;MTBE = methyl tert butyl ether; ND = non-detect; J = estimated value; D = value from diluted sample

R1 = Round 1; R2 = Round 2

Note 1: Smithtown screening criteria are the lowest values of the EPA National Primary Drinking Water Standards, the New York Groundwater Quality Standards, or the New York Department of Health Drinking Water Standards

Table 1-10
Monitoring Well Construction Details
Smithtown Groundwater Contamination Site
Smithtown, New York

MW Identification Number	Total Depth (ft bgs)	Screen Interval (ft bgs)		TOC Elevation (ft amsl)	Ground Elevation (ft amsl)	Screen Elevation (ft a/b msl)		MW Diameter (in)	Cons.	Comments
		top	bottom			top	bottom			
MW-1S	110	100	110	102.75	103	3	-7	4	SS	
MW-1I	150	140	150	99.82	100	-40	-50	4	SS	
MW-2	190	180	190	167.43	168	-12	-22	4	SS	
MW-3S	177	167	177	168.17	168	1	-9	4	SS	
MW-3I	208	198	208	167.62	168	-30	-40	4	SS	
MW-4S	180	170	180	178.7	179	9	-1	4	SS	
MW-4I	210	200	210	178.15	178	-22	-32	4	SS	
MW-4D	253	243	253	178.36	179	-64	-74	4	SS	
MW-5S	50	40	50	12.84	13	-27	-37	4	SS	
MW-5I	119	109	119	13.84	14	-95	-105	4	SS	
MW-5D	170	160	170	13.31	14	-146	-156	4	SS	
MW-6S	198	188	198	175.64	176	-12	-22	4	SS	
MW-6I	229	219	229	175.45	176	-43	-53	4	SS	
MW-7	134	124	134	154.15	154	30	20	4	SS	
MW-A	150	140	150	133.58	133	-7	-17	2	PVC	
MW-C	175	165	175	161.51	162	-3	-13	2	PVC	
MW-D	195	185	195	94.17	91	-94	-104	2	PVC	Standpipe
MW-E	245	235	245	161.13	161	-74	-84	2	PVC	
MW-F	197	187	197	146.28	146	-41	-51	2	PVC	
MW-G	300	290	300	161.07	161	-129	-139	2	PVC	

Abbreviations:

ft bgs = feet below ground surface
TOC = top of casing
ft amsl = feet above mean sea level
ft a/b msl = feet above/below mean sea level
Cons. = construction material

SS = stainless steel
PVC = polyvinyl chloride

Table 1-11
Selected Chlorinated VOC Results in Residential Wells
Smithtown Groundwater Contamination Site
Smithtown, New York

Sample Code	Current Full Address	Old #	1,1-DCE	1,1-DCA	cis-1,2-DCE	trans 1,2 DCE	1,1,1-TCA	TCE	PCE	1,2-DCA	chloro ethane
Screening Criteria			5	5	5	5	5	5	5	5	5
All Rounds in micrograms per liter (ug/L)											
5-BGBK-R1	5 Branglebrink	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND
5-BGBK-R2	5 Branglebrink	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND
16-BGBK-R1	16 Branglebrink	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND
16-BGBK-R2	16 Branglebrink	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND
41-BGBK-R1	41 Branglebrink	Renna	ND	0.5J	ND	ND	ND	ND	4	ND	ND
21-BGBK-R2	21 Branglebrink	NA	2	1	ND	ND	**6**	4	ND	ND	ND
21-BGBK-R3	21 Branglebrink	NA	1.3	0.72	ND	ND	4.8	2.5	ND	ND	ND
21-BGBK-R4	21 Branglebrink	NA	ND	0.37J	ND	ND	1.1	1.1	ND	ND	ND
23-BGBK-R1	23 Branglebrink	NA	ND	ND	**14**	0.4J	1	3	4	ND	ND
23-BGBK-R2	23 Branglebrink	NA	ND	ND	**74D**	2	0.6J	**12**	**63D**	ND	ND
23-BGBK-R4	23 Branglebrink	NA	ND	ND	**6**	ND	0.48J	0.75	1.8	ND	ND
26-BGBK-R1	26 Branglebrink	NA	ND	ND	ND	ND	1	0.7J	ND	ND	ND
26-BGBK-R2	26 Branglebrink	NA	ND	ND	ND	ND	0.5J	ND	ND	ND	ND
28-BGBK-R3	28 Branglebrink	NA	ND	ND	ND	ND	0.24J	0.16J	ND	ND	ND

Table 1-11
Selected Chlorinated VOC Results in Residential Wells
Smithtown Groundwater Contamination Site
Smithtown, New York

Sample Code	Current Full Address	Old #	1,1-DCE	1,1-DCA	cis-1,2-DCE	trans 1,2 DCE	1,1,1-TCA	TCE	PCE	1,2-DCA	chloro ethane
Screening Criteria			**5**	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**5**
28-BGBK-R4	28 Branglebrink	NA	ND	ND	ND	ND	0.3J	0.24J	0.21J	ND	ND
29-BGBK-R1	29 Branglebrink	NA	ND	ND	2	ND	ND	ND	8	ND	ND
37-BGBK-R1	37 Branglebrink	NA	ND	ND	**140**	ND	ND	ND	**33**	ND	ND
37-BGBK-R2	37 Branglebrink	NA	ND	ND	**16**	0.6J	ND	0.9J	**18**	ND	ND
37-BGBK-R4	37 Branglebrink	NA	ND	ND	**47DJ**	0.36J	0.23J	**8.7J**	**21DJ**	R	ND
43-BGBK-R1	43 Branglebrink	Krauth	ND	ND	**23**	ND	1	1	**12**	ND	ND
37-BRIDLEP-R4	37 Bridle Path	9	ND	ND	ND	ND	0.26J	ND	0.15J	ND	ND
33-BRIDLEP-R4	33 Bridle Path	6	ND	ND	ND	ND	ND	ND	ND	ND	ND
40-BRIDLEP-R4	40 Bridle Path	15	ND	0.24J	ND	ND	0.51	ND	ND	ND	ND
41-BRIDLEP-R4	41 Bridle Path	12	ND	ND	ND	ND	ND	ND	ND	ND	ND
7-CARL-R1	7 Carmen Lane	NA	ND	1	ND	ND	2	1	**9**	ND	ND
7-CARL-R2	7 Carmen Lane	NA	ND	0.7J	ND	ND	1	0.6J	4	ND	ND
7-CARL-R4	7 Carmen Lane	NA	ND	0.29J	ND	ND	0.69	0.29J	1.3	ND	ND
15-CARL-R1	15 Carmen Lane	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND
15-CARL-R2	15 Carmen Lane	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND

Table 1-11
Selected Chlorinated VOC Results in Residential Wells
Smithtown Groundwater Contamination Site
Smithtown, New York

Sample Code	Current Full Address	Old #	1,1-DCE	1,1-DCA	cis-1,2-DCE	trans 1,2 DCE	1,1,1-TCA	TCE	PCE	1,2-DCA	chloro ethane
Screening Criteria			5	5	5	5	5	5	5	5	5
15-CARL-R4	15 Carmen Lane	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND
19-CARL-R1	19 Carmen Lane	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND
19-CARL-R2	19 Carmen Lane	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND
19-CARL-R4	19 Carmen Lane	NA	ND	ND	ND	ND	0.17J	0.11J	ND	ND	ND
21-CARL-R1	21 Carmen Lane	NA	ND	ND	ND	ND	ND	ND	0.6J	ND	ND
3-CORD-R1	3 Cordwood Path	NA	ND	0.3J	ND	ND	1	ND	0.9J	ND	ND
8-FELLS-R1	8 Fells Way	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND
12-FELLS-R1	12 Fells Way	NA	ND	ND	1	ND	1	ND	ND	ND	ND
12-FELLS-R2	12 Fells Way	NA	ND	ND	4	ND	1	1	2	ND	ND
1-FOXRUN-R4	1 Fox Run	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND
5-FOXR-R4	5 Fox Run	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND
6-FOXR-R4	6 Fox Run	NA	ND	0.31J	ND	ND	0.88	ND	ND	ND	ND
2-FRIENW-R1	2 Friends Way	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND
3-FRIENW-R2	3 Friends Way	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND
3-FRIENW-R4	3 Friends Way	NA	ND	ND	ND	ND	ND	ND	0.12J	ND	ND

Table 1-11
Selected Chlorinated VOC Results in Residential Wells
Smithtown Groundwater Contamination Site
Smithtown, New York

Sample Code	Current Full Address	Old #	1,1-DCE	1,1-DCA	cis-1,2-DCE	trans 1,2 DCE	1,1,1-TCA	TCE	PCE	1,2-DCA	chloro ethane
Screening Criteria			5	5	5	5	5	5	5	5	5
4-FRIENW-R2	4 Friends Way	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND
3-GATER-R2	3 Gate Road	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND
12-HARBH-R2	12 Harbor Hill Road	NA	ND	ND	ND	ND	ND	ND	1	ND	ND
28-HARBH-R1	28 Harbor Hill Road	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND
35-HARBH-R2	35 Harbor Hill Road	NA	ND	ND	ND	ND	ND	ND	2	ND	ND
42-HARBH-R1	42 Harbor Hill Road	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND
50-HARBH-R1	50 Harbor Hill Road	NA	0.6J	ND	ND	ND	**5**	ND	ND	ND	ND
21-HARBL-R1	21 Harbor Lane	1	ND	0.8J	ND	ND	ND	ND	ND	ND	ND
22-HARBL-R2	22 Harbor Lane	3	ND	0.6J	2	ND	ND	ND	**5**	ND	ND
22-HARBL-R4	22 Harbor Lane	3	ND	0.77	1.7	ND	ND	0.32J	2.6	ND	ND
24-HARBL-R1	24 Harbor Lane	1	ND	ND	ND	ND	0.7J	ND	2	ND	ND
26-HARBL-R1	26 Harbor Lane	7	ND	ND	ND	ND	0.8J	0.5J	0.6J	ND	ND
26-HARBL-R2	26 Harbor Lane	7	ND	ND	ND	ND	ND	ND	ND	ND	ND
26-HARBL-R4	26 Harbor Lane	7	ND	0.2J	ND	ND	0.54	0.26J	0.44J	0.14J	ND
28-HARBL-R1	28 Harbor Lane	8	ND	ND	ND	ND	0.4J	ND	ND	ND	ND

Table 1-11
Selected Chlorinated VOC Results in Residential Wells
Smithtown Groundwater Contamination Site
Smithtown, New York

Sample Code	Current Full Address	Old #	1,1-DCE	1,1-DCA	cis-1,2-DCE	trans 1,2 DCE	1,1,1-TCA	TCE	PCE	1,2-DCA	chloro ethane
Screening Criteria			5	5	5	5	5	5	5	5	5
31-HARBL-R1	31 Harbor Lane	11	ND	ND	ND	ND	ND	ND	ND	ND	ND
32-HARBL-R2	32 Harbor Lane	12	ND	0.6J	ND	ND	0.9J	ND	3	ND	ND
32-HARBL-R4	32 Harbor Lane	12	ND	0.43J	ND	ND	0.77	0.28J	1.9	ND	ND
3-HARBR-R1	3 Harbor Road	NA	ND	ND	ND	ND	ND	ND	2	ND	ND
3-HARBR-R2	3 Harbor Road	NA	ND	ND	ND	ND	ND	ND	3	ND	ND
3-HARBR-R4	3 Harbor Road	NA	ND	ND	ND	ND	0.22J	0.16J	**5.1**	ND	ND
8-HARBR-R1	8 Harbor Road	NA	ND	ND	ND	ND	0.7J	ND	3	ND	ND
8-HARBR-R2	8 Harbor Road	NA	ND	ND	ND	ND	ND	ND	2	ND	ND
8-HARBR-R4	8 Harbor Road	NA	ND	ND	ND	ND	0.36J	0.22J	2.7	ND	ND
12-HARBR-R1	12 Harbor Road	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND
12-HARBR-R4	12 Harbor Road	NA	ND	ND	ND	ND	0.24J	0.12J	0.85	ND	ND
18-HARBR-R1	18 Harbor Road	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND
18-HARBR-R4	18 Harbor Road	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND
20-HARBR-R1	20 Harbor Road	NA	ND	ND	ND	ND	0.7J	2	ND	ND	ND
27-HARBR-R1	27 Harbor Road	NA	ND	ND	ND	ND	0.5J	ND	ND	ND	ND

Table 1-11
Selected Chlorinated VOC Results in Residential Wells
Smithtown Groundwater Contamination Site
Smithtown, New York

Sample Code	Current Full Address	Old #	1,1-DCE	1,1-DCA	cis-1,2-DCE	trans 1,2 DCE	1,1,1-TCA	TCE	PCE	1,2-DCA	chloro ethane
Screening Criteria			5	5	5	5	5	5	5	5	5
27-HARBR-R2	27 Harbor Road	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND
27-HARBR-R4	27 Harbor Road	NA	ND	ND	ND	ND	0.39J	ND	0.1J	ND	ND
34-HARBR-R1	34 Harbor Road	NA	ND	ND	ND	ND	2	ND	ND	ND	ND
1-HIGH-R1	1 Highwoods Court	NA	ND	2	ND	ND	2	2	ND	ND	ND
9-HIGH-R1	9 Highwoods Court	NA	ND	ND	1	ND	ND	ND	1	ND	ND
9-HIGH-R2	9 Highwoods Court	NA	ND	ND	0.9J	ND	ND	ND	1	ND	ND
12-HIGH-R1	12 Highwoods Court	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND
12-HIGH-R2	12 Highwoods Court	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND
12-HIGH-R4	12 Highwoods Court	NA	ND	ND	ND	ND	ND	ND	0.21J	ND	ND
15-HIGH-R1	15 Highwoods Court	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND
15-HIGH-R2	15 Highwoods Court	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND
15-HIGH-R4	15 Highwoods Court	NA	ND	ND	ND	ND	ND	0.1J	0.41J	ND	ND
24-HIGH-R1	24 Highwoods Court	NA	ND	0.8J	ND	ND	1	ND	ND	ND	ND
27-HIGH-R1	27 Highwoods Court	NA	ND	ND	0.6J	ND	0.7J	0.6J	3	ND	ND
27-HIGH-R2	27 Highwoods Court	NA	ND	ND	ND	ND	0.6J	0.7J	1	ND	ND

Table 1-11
Selected Chlorinated VOC Results in Residential Wells
Smithtown Groundwater Contamination Site
Smithtown, New York

Sample Code	Current Full Address	Old #	1,1-DCE	1,1-DCA	cis-1,2-DCE	trans 1,2 DCE	1,1,1-TCA	TCE	PCE	1,2-DCA	chloro ethane
Screening Criteria			**5**	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**5**
27-HIGH-R4	27 Highwoods Court	NA	ND	0.34J	0.27J	ND	0.94J	2J	2.8J	ND	ND
33-HIGH-R1	33 Highwoods Court	NA	ND	ND	2	ND	4	ND	**43**	ND	ND
33-HIGH-R2	33 Highwoods Court	NA	ND	ND	0.4J	ND	0.9J	ND	**17**	ND	0.9J
16-MORI-R1	16 Moriches Road	???	0.5J	2	3	ND	3	1	3	ND	ND
538-MORI-R1	538 Moriches Road	324	ND	2	ND	ND	ND	1	ND	ND	ND
537-MORI-R1	537 Moriches Road	NA	ND	ND	ND	ND	0.6J	0.7J	ND	ND	ND
546-MORI-R2	546 Moriches Road	NA	ND	0.3J	ND	ND	0.4J	0.9J	ND		1
615-MORI-R4	615 Moriches Road	27A	ND	ND	0.38J	ND	0.24J	ND	0.18J	ND	ND
625-MORI-R3	625 Moriches Road	UNK	ND	ND	ND	ND	ND	ND	ND	ND	ND
625-MORI-R4	625 Moriches Road	UNK	ND	ND	ND	ND	ND	ND	ND	ND	ND
300-OMR-R1	300 Old Mill Road	212	ND	0.6J	ND	ND	1	0.7J	1	ND	ND
300-OMR-R2	300 Old Mill Road	212	ND	1	ND	ND	2	0.7J	1	ND	ND
300-OMR-R4	300 Old Mill Road	212	ND	0.24J	ND	ND	0.57	0.29J	0.49J	ND	ND
302-OMR-R1	302 Old Mill Road	261A	ND	0.7J	2	ND	0.9J	ND	1	ND	ND
325-OMR-R1	325 Old Mill Road	262S	1	2	**6**	ND	**6**	3	3	ND	ND

Table 1-11
Selected Chlorinated VOC Results in Residential Wells
Smithtown Groundwater Contamination Site
Smithtown, New York

Sample Code	Current Full Address	Old #	1,1-DCE	1,1-DCA	cis-1,2-DCE	trans 1,2 DCE	1,1,1-TCA	TCE	PCE	1,2-DCA	chloro ethane
Screening Criteria			**5**	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**5**
315-OMR-R1	315 Old Mill Road	262A	ND	0.6J	ND	ND	ND	ND	3	ND	ND
315-OMR-R2	315 Old Mill Road	262A	ND	ND	ND	ND	ND	ND	ND	ND	ND
315-OMR-R4	315 Old Mill Road	262A	ND	0.43J	25D	ND	0.9	4.1	1J	ND	ND
320-OMR-R1	320 Old Mill Road	245K	ND	0.6J	ND	ND	2	0.7J	4	ND	ND
320-OMR-R2	320 Old Mill Road	245K	ND	0.6J	ND	ND	2	0.5J	**5**	ND	ND
320-OMR-R4	320 Old Mill Road	245K	0.59	0.53	0.32J	ND	1.3	0.21J	**5.2**	ND	ND
322-OMR-R1	322 Old Mill Road	245	ND	4	ND	ND	**6**	2	ND	ND	ND
322-OMR-R2	322 Old Mill Road	245	ND	ND	ND	ND	ND	ND	3	ND	ND
322-OMR-R4	322 Old Mill Road	245	ND	0.11J	ND	ND	0.19J	0.21J	3.9	ND	ND
323-OMR-R3	323 Old Mill Road	262M	0.69	2.5	**5.7**	ND	3.6	1.7	2.5	ND	ND
323-OMR-R4	323 Old Mill Road	262M	ND	2	**7.2**	ND	3.8	1.9	3.3	ND	ND
326-OMR-R1	326 Old Mill Road	245A	ND	ND	ND	ND	0.6J	ND	3	ND	ND
326-OMR-R2	326 Old Mill Road	245A	2	4.9	0.54	ND	9.3	3.4	ND	ND	ND
326-OMR-R4	326 Old Mill Road	245A	ND	4.9	0.14J	ND	16J	4J	0.5J	ND	ND
327-OMR-R1	327 Old Mill Road	262B	2	3	0.9J	ND	8	2	1	ND	ND

Table 1-11
Selected Chlorinated VOC Results in Residential Wells
Smithtown Groundwater Contamination Site
Smithtown, New York

Sample Code	Current Full Address	Old #	1,1-DCE	1,1-DCA	cis-1,2-DCE	trans 1,2 DCE	1,1,1-TCA	TCE	PCE	1,2-DCA	chloro ethane
Screening Criteria			**5**	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**5**
327-OMR-R2	327 Old Mill Road	262B	1	2	2	ND	5	2	1	ND	ND
327-OMR-R4	327 Old Mill Road	262B	ND	ND	ND	ND	ND	ND	0.34J	ND	ND
329-OMR-R1	329 Old Mill Road	262J	0.5J	1	6	ND	2	2	4	ND	ND
329-OMR-R2	329 Old Mill Road	262J	ND	0.7J	20	ND	2	4	**8**	ND	ND
3-OMP-R2	3 Old Mill Path	261D	ND	0.9J	ND	ND	1	0.6J	ND	ND	ND
3-OMP-R3	3 Old Mill Path	261D	ND	0.53	ND	ND	0.75	0.3J	ND	ND	ND
3-OMP-R4	3 Old Mill Path	261D	ND	0.5	ND	ND	0.66	0.3J	ND	ND	ND
4-OMP-R1	4 Old Mill Path	261T	ND	ND	3	ND	0.7J	ND	1	ND	ND
4-OMP-R2	4 Old Mill Path	261T	ND	ND	1	ND	0.5J	ND	0.6J	ND	ND
4-OMP-R4	4 Old Mill Path	261T	ND	ND	0.23J	ND	0.62	ND	0.17J	ND	ND
5-OMP-R1	5 Old Mill Path	261R	ND	ND	ND	ND	0.6J	0.5J	ND	ND	ND
5-OMP-R2	5 Old Mill Path	261R	ND	0.7J	ND	ND	0.6J	0.6J	ND	ND	ND
5-OMP-R4	5 Old Mill Path	261R	ND	0.23J	0.59J	ND	0.49J	0.68	1.9	ND	ND
2-OPL-R1	2 Old Post Lane	259A	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-OPL-R2	2 Old Post Lane	259A	ND	2	ND	ND	4	ND	0.9J	ND	ND

Table 1-11
Selected Chlorinated VOC Results in Residential Wells
Smithtown Groundwater Contamination Site
Smithtown, New York

Sample Code	Current Full Address	Old #	1,1-DCE	1,1-DCA	cis-1,2-DCE	trans 1,2 DCE	1,1,1-TCA	TCE	PCE	1,2-DCA	chloro ethane
Screening Criteria			**5**	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**5**
2-OPL-R4	2 Old Post Lane	259A	ND	0.57	ND	ND	0.93J	ND	ND	R	ND
4-OPL-R1	4 Old Post Lane	259B	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-OPL-R2	4 Old Post Lane	259B	ND	ND	ND	ND	0.6J	ND	ND	ND	ND
4-OPL-R4	4 Old Post Lane	259B	ND	0.39J	ND	ND	0.58J	ND	0.12J	ND	ND
5-OPL-R1	5 Old Post Lane	255	1	**5**	ND	ND	5	7	0.6J	ND	ND
5-OPL-R2	5 Old Post Lane	255	ND	4	ND	ND	4	4	0.7J	ND	ND
5-OPL-R4	5 Old Post Lane	255	ND	2.7	ND	ND	3.3	2.3	0.5	ND	ND
3-PART-R1	3 Partridge Lane	NA	ND	0.8J	ND	ND	ND	0.7J	ND	ND	ND
8-PART-R1	8 Partridge Lane	NA	ND	0.6J	ND	ND	0.6J	0.9J	ND	ND	ND
8-PART-R2	8 Partridge Lane	NA	ND	0.3J	ND	ND	0.4J	0.4J	ND	ND	ND
8-PART-R4	8 Partridge Lane	NA	ND	0.21J	ND	ND	0.24J	0.25J	ND	ND	ND
9-PART-R1	9 Partridge Lane	NA	ND	0.7J	0.6J	ND	1	ND	0.9J	ND	ND
3-PIN-R1	3 Pin Oak Lane	NA	ND	ND	**25**	0.6J	2	4	**11**	ND	ND
7-PIN-R1	7 Pin Oak Lane	NA	16	ND	4J	ND	**76**	ND	ND	ND	ND
17-PIN-R1	17 Pin Oak Lane	NA	1	ND	ND	ND	**8**	ND	ND	ND	ND

Table 1-11
Selected Chlorinated VOC Results in Residential Wells
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Smithtown, New York

Sample Code	Current Full Address	Old #	1,1-DCE	1,1-DCA	cis-1,2-DCE	trans 1,2 DCE	1,1,1-TCA	TCE	PCE	1,2-DCA	chloro ethane
Screening Criteria			**5**	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**5**
17-PIN-R2	17 Pin Oak Lane	NA	ND	ND	ND	ND	**6.3**	ND	ND	ND	ND
17-PIN-R4	17 Pin Oak Lane	NA	ND	ND	ND	ND	**5.4**	ND	ND	ND	ND
19-PIN-R1	19 Pin Oak Lane	NA	ND	ND	ND	ND	3	ND	ND	ND	ND
31-QUAIL-R1	31 Quail Path	1	ND	0.5J	ND	ND	ND	ND	ND	ND	ND
33-QUAIL-R1	33 Quail Path	2	ND	0.8J	ND	ND	2	ND	ND	ND	ND
37-QUAIL-R1	37 Quail Path	4	ND	0.8J	ND	ND	2	ND	ND	ND	ND
41-QUAIL-R1	41 Quail Path	11	ND	0.7J	0.8J	ND	1	ND	1	ND	ND
44-QUAIL-R1	44 Quail Path	12	0.6J	2	2	ND	3	2	2	ND	ND
42-QUAIL-R1	42 Quail Path	14	ND	0.8J	2	ND	1	ND	ND	ND	ND
38-QUAIL-R1	38 Quail Path	16	ND	0.8J	ND	ND	1	ND	0.7J	ND	ND
35-QUAIL-R1	35 Quail Path	5	ND	0.6J	ND	ND	1	ND	ND	ND	ND
35-QUAIL-R2	35 Quail Path	5	ND	0.7J	ND	ND	1	0.6J	ND	ND	ND
35-QUAIL-R4	35 Quail Path	5	ND	0.41J	ND	ND	0.68	0.47J	ND	ND	ND
40-QUAIL-R1	40 Quail Path	15	ND	1	3	ND	1	0.9J	2	ND	ND
40-QUAIL-R2	40 Quail Path	15	0.6J	1	2	ND	2	0.8J	2	ND	ND

Table 1-11
Selected Chlorinated VOC Results in Residential Wells
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Smithtown, New York

Sample Code	Current Full Address	Old #	1,1-DCE	1,1-DCA	cis-1,2-DCE	trans 1,2 DCE	1,1,1-TCA	TCE	PCE	1,2-DCA	chloro ethane
Screening Criteria			5	5	5	5	5	5	5	5	5
428-RIVER-R1	428 River Road	194A	ND	ND	3	ND	0.8J	ND	2	ND	ND
419-RIVER-R1	419 River Road	198	ND	ND	ND	ND	ND	ND	ND	ND	ND
418-RIVER-R1	418 River Road	199	ND	ND	ND	ND	ND	ND	ND	ND	ND
417-RIVER-R1	417 River Road	199A	ND	ND	ND	ND	ND	ND	0.5J	ND	ND
3-RIVER-R1	3 River Road	211	ND	ND	ND	ND	0.5J	ND	0.4J	ND	ND
405-RIVER-R1	405 River Road	211A	ND	0.5J	ND	ND	1	1	ND	ND	ND
407-RIVER-R1	407 River Road	211C	ND	0.6J	ND	ND	0.7J	0.9J	ND	ND	ND
264-RIVER-R1	264 River Road	264A	ND	ND	ND	ND	ND	ND	ND	ND	ND
264-RIVER-R2	264 River Road	264A	ND	ND	ND	ND	ND	ND	ND	ND	ND
264-RIVER-R4	264 River Road	264A	ND	ND	ND	ND	R	R	R	R	ND
318-RIVER-R2	318 River Road	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND
318-RIVER-R4	318 River Road	NA	ND	R	ND	ND	ND	ND	ND	R	ND
322-RIVER-R1	322 River Road	NA	ND	ND	ND	ND	0.6J	ND	2	ND	ND
322-RIVER-R2	322 River Road	NA	ND	ND	ND	ND	0.6J	ND	2	ND	ND
322-RIVER-R4	322 River Road	NA	ND	ND	ND	ND	0.12J	ND	ND	ND	ND

Table 1-11
Selected Chlorinated VOC Results in Residential Wells
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Sample Code	Current Full Address	Old #	1,1-DCE	1,1-DCA	cis-1,2-DCE	trans 1,2 DCE	1,1,1-TCA	TCE	PCE	1,2-DCA	chloro ethane
Screening Criteria			5	5	5	5	5	5	5	5	5
326-RIVER-R1	326 River Road	NA	ND	0.3J	ND	ND	0.5J	ND	0.8J	ND	ND
337-RIVER-R1	337 River Road	NA	ND	ND	ND	ND	0.9J	ND	1	ND	ND
337-RIVER-R2	337 River Road	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND
337-RIVER-R4	337 River Road	NA	ND	0.27J	ND	ND	0.66	ND	ND	ND	ND
339-RIVER-R1	339 River Road	NA	ND	ND	ND	ND	0.6J	ND	ND	ND	ND
339-RIVER-R2	339 River Road	NA	ND	ND	ND	ND	ND	ND	0.7J	ND	ND
339-RIVER-R4	339 River Road	NA	0.27J	ND	ND	ND	0.38J	ND	0.73	0.25J	ND
343-RIVER-R1	343 River Road	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND
343-RIVER-R2	343 River Road	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND
343-RIVER-R4	343 River Road	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND
400-RIVER-R1	400 River Road	211B	ND	ND	ND	ND	ND	ND	1	ND	ND
400-RIVER-R2	400 River Road	211B	ND	ND	ND	ND	0.6J	ND	ND	ND	ND
400-RIVER-R4	400 River Road	211B	ND	0.34J	ND	ND	0.42J	ND	0.27J	ND	ND
401-RIVER-R1	401 River Road	208	ND	ND	1	ND	ND	ND	ND	ND	ND
401-RIVER -R2	401 River Road	208	ND	2	2	ND	2	1	1	ND	ND

Table 1-11
Selected Chlorinated VOC Results in Residential Wells
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Smithtown, New York

Sample Code	Current Full Address	Old #	1,1-DCE	1,1-DCA	cis-1,2-DCE	trans 1,2 DCE	1,1,1-TCA	TCE	PCE	1,2-DCA	chloro ethane
Screening Criteria			5	5	5	5	5	5	5	5	5
401-RIVER-R4	401 River Road	208	ND	0.62	2.6	ND	0.42J	0.26J	0.38J	ND	ND
414-RIVER-R1	414 River Road	201	ND	ND	ND	ND	ND	ND	ND	ND	ND
414-RIVER-R2	414 River Road	201	ND	ND	ND	ND	ND	ND	ND	ND	ND
414-RIVER-R4	414 River Road	201	ND	0.19J	ND	ND	0.2J	0.16J	0.42J	ND	ND
423-RIVER-R1	423 River Road	197S	ND	ND	ND	ND	ND	ND	ND	ND	ND
423-RIVER-R2	423 River Road	197S	ND	ND	ND	ND	ND	ND	ND	ND	ND
435-RIVER-R1	435 River Road	194B	ND	ND	ND	ND	ND	ND	ND	ND	ND
435-RIVER-R2	435 River Road	194B	ND	ND	ND	ND	ND	ND	ND	ND	ND
435-RIVER-R4	435 River Road	194B	ND	ND	ND	ND	ND	ND	ND	ND	ND
270-SACHP-R1	270 Sachem Hill Place	NA	0.7J	2	3	ND	3	0.8J	**9**	ND	ND
1-SMITHL-R4	1 Smith Lane	48	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-SMITHL-R4	2 Smith Lane	60A	ND	ND	ND	ND	ND	ND	ND	ND	ND
31-SMITHL-R4	31 Smith Lane	UNK	ND	ND	ND	ND	ND	ND	ND	ND	ND
8-SPRHILL-R3	8 Spring Hill Road	35C	ND	ND	ND	ND	ND	ND	ND	ND	ND
8-SPRHILL-R4	8 Spring Hill Road	35C	ND	ND	ND	ND	ND	ND	ND	ND	ND

Table 1-11
Selected Chlorinated VOC Results in Residential Wells
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Smithtown, New York

Sample Code	Current Full Address	Old #	1,1-DCE	1,1-DCA	cis-1,2-DCE	trans 1,2 DCE	1,1,1-TCA	TCE	PCE	1,2-DCA	chloro ethane
Screening Criteria			5	5	5	5	5	5	5	5	5
6-SPRINGH-R4	6 Spring Hollow Road	41	ND	ND	ND	ND	1.8	ND	0.52	ND	ND
7-SPRINGH-R3	7 Spring Hollow Road	32	ND	ND	ND	ND	0.41J	ND	ND	ND	ND
7-SPRINGH-R4	7 Spring Hollow Road	32	ND	ND	ND	ND	0.36J	ND	ND	ND	ND
9-SPRINGH-R4	9 Spring Hollow Road	33	ND	ND	ND	ND	ND	ND	ND	ND	ND
20-SPRINGH-R4	20 Spring Hollow Road	34	ND	ND	ND	ND	0.17J	ND	ND	ND	ND
3-STEEPB-R4	3 Steep Bank Road	205	ND	ND	ND	ND	ND	0.19J	0.64	ND	ND
15-STONE-R1	15 Stone Gate Road	246	ND	ND	ND	ND	ND	ND	ND	ND	ND
15-STONE-R2	15 Stone Gate Road	246	ND	ND	ND	ND	ND	ND	ND	ND	ND
15-STONE-R4	15 Stone Gate Road	246	ND	ND	ND	ND	ND	ND	ND	ND	ND
17-STONE-R1	17 Stone Gate Road	247	ND	2	ND	ND	2	0.8J	0.5J	ND	ND
17-STONE-R2	17 Stone Gate Road	247	ND	3	ND	ND	4	1	0.8J	ND	ND
17-STONE-R3	17 Stone Gate Road	247	0.69	1.6	ND	ND	2.5	0.71	0.61	ND	ND
17-STONE-R4	17 Stone Gate Road	247	0.79	1.2	ND	ND	1.9	0.48J	0.37J	ND	ND
11-STONE-R1	11 Stone Gate Road	246A	ND	ND	ND	ND	ND	ND	0.5J	ND	ND
19-STONE-R1	19 Stone Gate Road	247A	ND	0.9J	ND	ND	ND	0.5J	ND	ND	ND

Table 1-11
Selected Chlorinated VOC Results in Residential Wells
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Smithtown, New York

Sample Code	Current Full Address	Old #	1,1-DCE	1,1-DCA	cis-1,2-DCE	trans 1,2 DCE	1,1,1-TCA	TCE	PCE	1,2-DCA	chloro ethane
Screening Criteria			5	5	5	5	5	5	5	5	5
4-SWAN-R1	4 Swan Place	NA	0.7J	1	ND	ND	3	ND	ND	ND	ND
9-SWAN-R1	9 Swan Place	NA	ND	ND	ND	ND	1	ND	ND	ND	ND
9-SWAN-R2	9 Swan Place	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND
9-SWAN-R4	9 Swan Place	NA	ND	ND	ND	ND	0.2J	ND	ND	ND	ND
2-SWEETH-R4	2 Sweet Hollow Court	NA	ND	0.4J	ND	ND	1	ND	ND	ND	ND
3-SWEETH-R4	3 Sweet Hollow Court	NA	ND	ND	ND	ND	0.44J	ND	0.22J	ND	0.15J
3-TEAL-R2	3 Teal Way	17	0.4J	1	0.5J	ND	2	0.7J	0.8J	ND	ND
8-TEAL-R1	8 Teal Way	20	ND	1	3	ND	2	0.9J	4	ND	ND
8-TEAL-R2	8 Teal Way	20	ND	0.9J	6	ND	2	0.7J	**5**	ND	ND
8-TEAL-R4	8 Teal Way	20	ND	0.4J	3.2	ND	0.6	1.2	4.3	ND	ND
9-TEAL-R1	9 Teal Way	19	0.6J	2	0.3J	ND	3	2	0.7J	ND	ND
9-TEAL-R2	9 Teal Way	19	ND	1	ND	ND	2	1	0.8J	ND	ND
9-TEAL-R4	9 Teal Way	19	1.3	1.3	0.12J	ND	3.6	0.98	1.4	ND	ND
7-TEAL-R1	7 Teal Way	18	0.7J	2	ND	ND	2	1	ND	ND	ND
6-TEAL-R1	6 Teal Way	21	ND	2	0.7J	ND	3	2	ND	ND	ND

Table 1-11
Selected Chlorinated VOC Results in Residential Wells
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Sample Code	Current Full Address	Old #	1,1-DCE	1,1-DCA	cis-1,2-DCE	trans 1,2 DCE	1,1,1-TCA	TCE	PCE	1,2-DCA	chloro ethane
Screening Criteria			**5**	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**5**
4-TEAL-R1	4 Teal Way	22	0.6J	2	ND	ND	2	0.8J	0.6J	ND	ND
2-TEAL-R1	2 Teal Way	24	ND	0.6J	ND	ND	1	ND	0.6J	ND	ND
31-THOM-R1	31 Thompson Lane	NA	2	**5**	ND	ND	0.6J	3	ND	ND	ND
31-THOM-R2	31 Thompson Lane	NA	2	**6**	ND	ND	**8**	3	ND	ND	ND
31-THOM-R3	31 Thompson Lane	NA	0.74	4.5	ND	ND	**6.6**	2.7	0.33J	ND	ND
31-THOM-R4	31 Thompson Lane	NA	2.7	4.1	ND	ND	**8.6J**	2.5J	0.33J	ND	ND
3-TIDEL-R1	3 Tide Mill Lane	NA	ND	ND	ND	ND	0.8J	ND	4	ND	ND
3-TIDEL-R2	3 Tide Mill Lane	NA	ND	ND	ND	ND	0.7J	ND	2	ND	ND
3-TIDEL-R3	3 Tide Mill Lane	NA	ND	0.5	ND	ND	0.82J	ND	3.9	ND	ND
3-TIDEL-R4	3 Tide Mill Lane	NA	ND	0.18J	ND	ND	0.45J	ND	1.3	ND	ND
4-TIDEL-R1	4 Tide Mill Lane	NA	ND	ND	ND	ND	ND	ND	0.7J	ND	ND
5-TIDEL-R1	5 Tide Mill Lane	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND
6-TIDEL-R1	6 Tide Mill Lane	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND
6-TIDEL-R2	6 Tide Mill Lane	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND
3-TIDER-R1	3 Tide Mill Road	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND

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Sample Code	Current Full Address	Old #	1,1-DCE	1,1-DCA	cis-1,2-DCE	trans 1,2 DCE	1,1,1-TCA	TCE	PCE	1,2-DCA	chloro ethane
Screening Criteria			5	5	5	5	5	5	5	5	5
4-TIDER-R1	4 Tide Mill Road	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-TIDER-R2	4 Tide Mill Road	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-TIDER-R4	4 Tide Mill Road	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND
6-TIDER-R2	6 Tide Mill Road	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND
6-TIDER-R4	6 Tide Mill Road	NA	ND	0.13J	ND	ND	0.31J	ND	0.98	ND	ND
9-TIDER-R1	9 Tide Mill Road	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND
9-TIDER-R2	9 Tide Mill Road	NA	ND	0.3J	0.4J	ND	0.4J	ND	2	ND	1
9-TIDER-R4	9 Tide Mill Road	NA	ND	ND	ND	ND	R	R	R	R	ND
1-TRACKL-R4	1 Tracklot Road	53	ND	0.3J	ND	ND	0.26J	ND	ND	ND	ND
6-TRACKL-R4	6 Tracklot Road	57	ND	ND	ND	ND	0.4J	ND	ND	ND	ND
10-TURTCR-R2	10 Turtle Crossing Road	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND
10-TURTCR-R4	10 Turtle Crossing Road	NA	ND	ND	ND	ND	ND	ND	ND	0.1J	ND
2-WATER-R1	2 Watercrest Court	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND
3-WATER-R1	3 Watercrest Court	NA	ND	ND	ND	ND	ND	ND	140	ND	ND
5-WATER-R1	5 Watercrest Court	NA	ND	ND	ND	ND	0.4J	ND	0.3J	ND	ND

Table 1-11
Selected Chlorinated VOC Results in Residential Wells
Smithtown Groundwater Contamination Site
Smithtown, New York

Sample Code	Current Full Address	Old #	1,1-DCE	1,1-DCA	cis-1,2-DCE	trans 1,2 DCE	1,1,1-TCA	TCE	PCE	1,2-DCA	chloro ethane
Screening Criteria			**5**	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**5**
5-WATER-R2	5 Watercrest Court	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND
8-WATER-R1	8 Watercrest Court	NA	ND	0.7J	2	ND	0.9J	**6**	**8**	**7**	ND
8-WATER-R2	8 Watercrest Court	NA	ND	ND	1	ND	0.6J	**5**	0.6	6	ND
8-WATER-R4	8 Watercrest Court	NA	ND	0.23J	ND	ND	ND	ND	ND	1.7	ND
9-WATER-R1	9 Watercrest Court	NA	ND	0.5J	0.7J	ND	2	0.9J	2	ND	ND
11-WATER-R1	11 Watercrest Court	NA	ND	ND	0.5J	ND	ND	2	1	ND	ND
14-WATER-R1	14 Watercrest Court	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND
16-WATER-R1	16 Watercrest Court	NA	ND	ND	ND	ND	0.7J	2	0.7J	2	ND
16-WATER-R2	16 Watercrest Court	NA	ND	ND	ND	ND	ND	0.8J	ND	0.8J	ND
1-WETHL-R1	1 Wetherill Lane	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND
1-WETHL-R2	1 Wetherill Lane	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND
1-WETHL-R4	1 Wetherill Lane	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-WETHL-R1	4 Wetherill Lane	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-WETHL-R2	4 Wetherill Lane	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-WETHL-R4	4 Wetherill Lane	NA	ND	R	ND	ND	0.23J	R	0.12J	ND	ND

Table 1-11
Selected Chlorinated VOC Results in Residential Wells
Smithtown Groundwater Contamination Site
Smithtown, New York

Sample Code	Current Full Address	Old #	1,1-DCE	1,1-DCA	cis-1,2-DCE	trans 1,2 DCE	1,1,1-TCA	TCE	PCE	1,2-DCA	chloro ethane
Screening Criteria			5	5	5	5	5	5	5	5	5
5-WETHL-R1	5 Wetherill Lane	NA	ND	ND	ND	ND	0.4J	ND	ND	ND	ND
7-WETHL-R2	7 Wetherill Lane	NA	ND	ND	ND	ND	0.5J	ND	ND	ND	ND
7-WETHL-R4	7 Wetherill Lane	NA	ND	ND	ND	ND	0.42J	0.28J	ND	ND	ND
8-WETHL-R2	8 Wetherill Lane	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND
8-WETHL-R4	8 Wetherill Lane	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND
10-WOODCR-R4	10 Woodcrest Drive	44	ND	ND	ND	ND	ND	ND	ND	ND	ND
12-WOODCR-R4	12 Woodcrest Drive	43A	ND	ND	ND	ND	ND	ND	ND	ND	ND
16-WOODCR-R4	16 Woodcrest Drive	41	ND	ND	ND	ND	ND	ND	ND	ND	ND
22-WOODCR-R4	22 Woodcrest Drive	45	ND	ND	ND	ND	ND	ND	ND	ND	ND
11-WOODCUT-R4	11 Woodcutters Path	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND

Units in micrograms/liter (ug/L)
bold = exceeds screening criteria
Abbreviations: 1,1-DCE = 1,1-dichloroethene; 1,1-DCA = 1,1-dichloroethane; cis-1,2-DCE = cis-1,2-dichloroethene; trans1,2DCE = trans-1,2-dichloroethene; 1,1,1-TCA = 1,1,1-trichloroethane; TCE = trichloroethene; PCE = tetrachloroethene; 1,2-DCA = 1,2-dichloroethane; NA = not applicable; UNK = unknown; ND = non-detect; J = estimated value; D = diluted sample

Table 1-12
Volatile Organic Compound Results in Surface Water
Smithtown Groundwater Contamination Site
Smithtown, New York

Sample Number		**Ace-tone**	**1,1-DCE**	**1,1-DCA**	**cis-1,2-DCE**	**1,1,1-TCA**	**TCE**	**PCE**
Screening Criteria (ug/L) (1)	**Salinity (%)**	**NS**	**NS**	**5 (2)**	**5 (2)**	**5 (2)**	**40**	**1**
Spring/Seep Surface Water Samples								
Dunton Spring								
DSW-001	NA	ND	ND	ND	ND	ND	ND	**2**
Stony Brook Harbor								
SWS-001	NA	ND	ND	ND	ND	ND	ND	ND
SWS-002	NA	ND	ND	ND	ND	ND	ND	0.3 J
SWS-003	NA	ND	ND	ND	ND	ND	ND	ND
SWS-005	NA	ND	ND	ND	ND	ND	ND	ND
SWS-006	NA	ND	ND	ND	ND	ND	ND	ND
SWS-007	NA	ND	ND	ND	ND	ND	ND	ND
Nissoquogue River								
SWS-008	0	ND	ND	0.5 J	0.5 J	0.4 J	0.4 J	ND
SWS-009	0	ND	ND	ND	ND	ND	ND	ND
SWS-010	0	ND	ND	ND	ND	ND	ND	ND
SWS-011	0	9 J	ND	ND	ND	ND	ND	ND
SWS-012	0	ND	ND	ND	ND	ND	ND	ND
Wetland Surface Water Samples								
SWW-001	0.2	ND	ND	0.4 J	ND	2	ND	**3**
SWW-002	0.2	ND	ND	ND	ND	1	ND	**2**
SWW-003	0.1	15 J	ND	0.3 J	ND	2	ND	0.6 J
SWW-004	0	ND	0.5 J	0.4 J	ND	3	ND	ND

Table 1-12
Volatile Organic Compound Results in Surface Water
Smithtown Groundwater Contamination Site
Smithtown, New York

Sample Number		**Acetone**	**1,1-DCE**	**1,1-DCA**	**cis-1,2-DCE**	**1,1,1-TCA**	**TCE**	**PCE**
Screening Criteria (ug/L) (1)	**Salinity (%)**	**NS**	**NS**	**5 (2)**	**5 (2)**	**5 (2)**	**40**	**1**
SWW-005	0	ND	ND	ND	ND	1	ND	ND
SWW-006	0	ND	0.3 J	0.4 J	ND	2	ND	0.9 J
SWW-007	0	ND	0.4 J	0.4 J	ND	3	ND	ND
SWW-008	0	ND	0.5 J	0.3 J	ND	3	ND	ND
SWW-009	0	ND	1	0.4 J	ND	**5**	ND	ND

All values in micrograms/liter (ug/L)
bold = equals or exceeds screening criteria
Abbreviations:
NS = No Standard; 1,1-DCE = 1,1-dichloroethene; 1,1-DCA = 1,1,-dichloroethane; cis-1,2-DCE = cis-1,2-dichloroethene; 1,1,1-TCA = 1,1,1-trichloroethane; TCE = trichloroethene; PCE = tetrachloroethene; NA = not available; ND = non-detect; J = estimated value; DSW = Dunton Spring surface water sample; SWS = surface water seep; SWW = surface water wetland

Notes:
1: Screening criteria - New York Ambient Water Quality Standards and Guidance Values, August 4, 1999. Saline Waters
2. Fresh water criteria

Table 1-13
Sample-Specific Sediment Screening Criteria and Sediment Data
Smithtown Groundwater Contamination Site
Smithtown, New York

		Sample Code	SDW-001-A			SDW-001-B			SDW-002-A			SDW-002-B			SDW-003-A			SDW-003-B			SDW-004-A			SDW-004-B			SDW-005-A		
		Sample Name																											
		Sample Date	4/12/2001			4/12/2001			4/12/2001			4/12/2001			4/12/2001			4/12/2001			4/12/2001			4/12/2001			4/13/2001		
Cas Rn	Chemical Name	Depth	0 to 6			18 to 24			0 to 6			18 to 24			0 to 6			18 to 24			0 to 6			18 to 24			0 to 6		
TOC	Total organic carbon	gOC/kg	27.2			8.44			6.49			2.68			83.3			54.5			80			74.3			108		
TOC	Total organic carbon	%OC	2.72%			0.84%			0.65%			0.27%			8.33%			5.45%			8.00%			7.43%			10.80%		
		Screening Criteria (ug/gOC)	Screening Criteria (ug/kg)	Result (ug/kg)		Screening Criteria (ug/kg)	Result (ug/kg)		Screening Criteria (ug/kg)	Result (ug/kg)		Screening Criteria (ug/kg)	Result (ug/kg)		Screening Criteria (ug/kg)	Result (ug/kg)		Screening Criteria (ug/kg)	Result (ug/kg)		Screening Criteria (ug/kg)	Result (ug/kg)		Screening Criteria (ug/kg)	Result (ug/kg)		Screening Criteria (ug/kg)	Result (ug/kg)	
	Volatile Organic Compounds																												
71-55-6	1,1,1-Trichloroethane	NL	NL	24	UJ	NL	20	U	NL	20	U	NL	12	U	NL	43	UJ	NL	43	UJ	NL	48	UJ	NL	61	UJ	NL	74	UJ
79-34-5	1,1,2,2-Tetrachloroethane	0.3	8.16	24	UJ	2.532	20	U	1.947	20	U	0.804	12	U	24.99	43	UJ	16.35	43	UJ	24	48	UJ	22.29	61	UJ	32.4	74	UJ
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	NL	NL	24	UJ	NL	20	UJ	NL	20	UJ	NL	12	UJ	NL	43	UJ	NL	43	UJ	NL	48	UJ	NL	61	UJ	NL	74	UJ
79-00-5	1,1,2-Trichloroethane	0.6	16.32	24	UJ	5.064	20	U	3.894	20	U	1.608	12	U	49.98	43	UJ	32.7	43	UJ	48	48	UJ	44.58	61	UJ	64.8	74	UJ
75-34-3	1,1-Dichloroethane	NL	NL	24	UJ	NL	20	U	NL	20	U	NL	12	U	NL	43	UJ	NL	43	UJ	NL	48	UJ	NL	61	UJ	NL	74	UJ
75-35-4	1,1-Dichloroethene	0.02	0.544	24	UJ	0.1688	20	U	0.1298	20	U	0.0536	12	U	1.666	43	UJ	1.09	43	UJ	1.6	48	UJ	1.486	61	UJ	2.16	74	UJ
120-82-1	1,2,4-Trichlorobenzene	91	2475.2	24	UJ	768.04	20	U	590.59	20	U	243.88	12	U	7580.3	43	UJ	4959.5	43	UJ	7280	48	UJ	6761.3	61	UJ	9828	74	UJ
96-12-8	1,2-Dibromo-3-chloropropane	NL	NL	24	UJ	NL	20	U	NL	20	U	NL	12	U	NL	43	UJ	NL	43	UJ	NL	48	UJ	NL	61	UJ	NL	74	UJ
106-93-4	1,2-Dibromoethane	NL	NL	24	UJ	NL	20	U	NL	20	U	NL	12	U	NL	43	UJ	NL	43	UJ	NL	48	UJ	NL	61	UJ	NL	74	UJ
95-50-1	1,2-Dichlorobenzene	12	326.4	24	UJ	101.28	20	U	77.88	20	U	32.16	12	U	999.6	43	UJ	654	43	UJ	960	48	UJ	891.6	61	UJ	1296	74	UJ
107-06-2	1,2-Dichloroethane	0.7	19.04	24	UJ	5.908	20	U	4.543	20	U	1.876	12	U	58.31	43	UJ	38.15	43	UJ	56	48	UJ	52.01	61	UJ	75.6	74	UJ
78-87-5	1,2-Dichloropropane	NL	NL	24	UJ	NL	20	U	NL	20	U	NL	12	U	NL	43	UJ	NL	43	UJ	NL	48	UJ	NL	61	UJ	NL	74	UJ
541-73-1	1,3-Dichlorobenzene	12	326.4	24	UJ	101.28	20	U	77.88	20	U	32.16	12	U	999.6	43	UJ	654	43	UJ	960	48	UJ	891.6	61	UJ	1296	74	UJ
106-46-7	1,4-Dichlorobenzene	12	326.4	24	UJ	101.28	20	U	77.88	20	U	32.16	12	U	999.6	43	UJ	654	43	UJ	960	48	UJ	891.6	61	UJ	1296	74	UJ
78-93-3	2-Butanone	NL	NL	24	UJ	NL	20	U	NL	20	U	NL	12	U	NL	440	J	NL	160	J	NL	48	UJ	NL	61	UJ	NL	570	J
591-78-6	2-Hexanone	NL	NL	24	UJ	NL	20	U	NL	20	U	NL	12	U	NL	43	UJ	NL	43	UJ	NL	48	UJ	NL	61	UJ	NL	74	UJ
108-10-1	4-Methyl-2-pentanone	NL	NL	24	UJ	NL	20	U	NL	20	U	NL	1	J	NL	43	UJ	NL	43	UJ	NL	48	UJ	NL	61	UJ	NL	74	UJ
67-64-1	Acetone	NL	NL	25	UJ	NL	20	U	NL	20	U	NL	20	U	NL	120	UJ	NL	71	UJ	NL	48	UJ	NL	72	UJ	NL	95	UJ
71-43-2	Benzene	0.6	16.32	24	UJ	5.064	20	U	3.894	20	U	1.608	12	U	49.98	43	UJ	32.7	43	UJ	48	48	UJ	44.58	61	UJ	64.8	74	UJ
75-27-4	Bromodichloromethane	NL	NL	24	UJ	NL	20	U	NL	20	U	NL	12	U	NL	43	UJ	NL	43	UJ	NL	48	UJ	NL	61	UJ	NL	74	UJ
75-25-2	Bromoform	NL	NL	24	UJ	NL	20	U	NL	20	U	NL	12	U	NL	43	UJ	NL	43	UJ	NL	48	UJ	NL	61	UJ	NL	74	UJ
74-83-9	Bromomethane	NL	NL	24	UJ	NL	20	UJ	NL	20	UJ	NL	12	UJ	NL	43	UJ	NL	43	UJ	NL	48	UJ	NL	61	UJ	NL	74	UJ
75-15-0	Carbon Disulfide	NL	NL	24	UJ	NL	20	U	NL	20	U	NL	12	U	NL	43	UJ	NL	43	UJ	NL	48	UJ	NL	38	J	NL	74	UJ
56-23-5	Carbon Tetrachloride	0.6	16.32	24	UJ	5.064	20	UJ	3.894	20	UJ	1.608	12	UJ	49.98	43	UJ	32.7	43	UJ	48	48	UJ	44.58	61	UJ	64.8	74	UJ
108-90-7	Chlorobenzene	3.5	95.2	24	UJ	29.54	20	U	22.715	20	U	9.38	12	U	291.55	43	UJ	190.75	43	UJ	280	48	UJ	260.05	61	UJ	378	74	UJ
75-00-3	Chloroethane	NL	NL	24	UJ	NL	20	U	NL	20	U	NL	12	U	NL	43	UJ	NL	43	UJ	NL	48	UJ	NL	61	UJ	NL	74	UJ
67-66-3	Chloroform	NL	NL	24	UJ	NL	20	U	NL	20	U	NL	12	U	NL	43	UJ	NL	43	UJ	NL	48	UJ	NL	61	UJ	NL	74	UJ
74-87-3	Chloromethane	NL	NL	24	UJ	NL	20	U	NL	20	U	NL	12	U	NL	43	UJ	NL	43	UJ	NL	48	UJ	NL	61	UJ	NL	74	UJ
156-59-2	cis-1,2-Dichloroethene	NL	NL	24	UJ	NL	20	U	NL	20	U	NL	12	U	NL	43	UJ	NL	43	UJ	NL	48	UJ	NL	61	UJ	NL	74	UJ
10061-01-5	cis-1,3-Dichloropropene	NL	NL	24	UJ	NL	20	U	NL	20	U	NL	12	U	NL	43	UJ	NL	43	UJ	NL	48	UJ	NL	61	UJ	NL	74	UJ
110-82-7	Cyclohexane	NL	NL	24	UJ	NL	20	UJ	NL	20	UJ	NL	12	UJ	NL	43	UJ	NL	43	UJ	NL	48	UJ	NL	61	UJ	NL	74	UJ
124-48-1	Dibromochloromethane	NL	NL	24	UJ	NL	20	U	NL	20	U	NL	12	U	NL	43	UJ	NL	43	UJ	NL	48	UJ	NL	61	UJ	NL	74	UJ
75-71-8	Dichlorodifluoromethane	NL	NL	24	UJ	NL	20	UJ	NL	20	UJ	NL	12	UJ	NL	43	UJ	NL	43	UJ	NL	48	UJ	NL	61	UJ	NL	74	UJ
100-41-4	Ethylbenzene	6.4	174.08	24	UJ	54.016	20	U	41.536	20	U	17.152	12	U	533.12	43	UJ	348.8	43	UJ	512	48	UJ	475.52	61	UJ	691.2	74	UJ
98-82-8	Isopropylbenzene	12	326.4	24	UJ	101.28	20	U	77.88	20	U	32.16	12	U	999.6	43	UJ	654	43	UJ	960	48	UJ	891.6	61	UJ	1296	74	UJ
79-20-9	Methyl Acetate	NL	NL	24	UJ	NL	20	U	NL	20	U	NL	12	U	NL	43	UJ	NL	43	UJ	NL	48	UJ	NL	61	UJ	NL	74	UJ
1634-04-4	Methyl Tert-Butyl Ether	NL	NL	24	UJ	NL	20	U	NL	20	U	NL	12	U	NL	43	UJ	NL	43	UJ	NL	48	UJ	NL	61	UJ	NL	74	UJ
75-09-2	Methylene Chloride	NL	NL	70	UJ	NL	24	UJ	NL	20	UJ	NL	13	UJ	NL	43	UJ	NL	43	UJ	NL	48	UJ	NL	65	UJ	NL	130	UJ
108-87-2	Metylcyclohexane	NL	NL	24	UJ	NL	20	UJ	NL	20	UJ	NL	12	UJ	NL	43	UJ	NL	43	UJ	NL	48	UJ	NL	61	UJ	NL	74	UJ
100-42-5	Styrene	NL	NL	24	UJ	NL	20	U	NL	20	U	NL	12	U	NL	43	UJ	NL	43	UJ	NL	48	UJ	NL	61	UJ	NL	74	UJ
127-18-4	Tetrachloroethene	0.8	21.76	24	UJ	6.752	20	U	5.192	20	U	2.144	12	U	66.64	43	UJ	43.6	43	UJ	64	48	UJ	59.44	61	UJ	86.4	74	UJ
108-88-3	Toluene	45	1224	24	UJ	379.8	2	J	292.05	20	U	120.6	1	J	3748.5	43	UJ	2452.5	43	UJ	3600	48	UJ	3343.5	7	J	4860	74	UJ
156-60-5	trans-1,2-Dichloroethene	NL	NL	24	UJ	NL	20	U	NL	20	U	NL	12	U	NL	43	UJ	NL	43	UJ	NL	48	UJ	NL	61	UJ	NL	74	UJ
10061-02-6	trans-1,3-Dichloropropene	NL	NL	24	UJ	NL	20	U	NL	20	U	NL	12	U	NL	43	UJ	NL	43	UJ	NL	48	UJ	NL	61	UJ	NL	74	UJ
79-01-6	Trichloroethene	2	54.4	24	UJ	16.88	20	U	12.98	20	U	5.36	12	U	166.6	43	UJ	109	43	UJ	160	48	UJ	148.6	61	UJ	216	74	UJ
75-69-4	Trichlorofluoromethane	NL	NL	24	UJ	NL	20	U	NL	20	U	NL	12	U	NL	43	UJ	NL	43	UJ	NL	48	UJ	NL	61	UJ	NL	74	UJ
75-01-4	Vinyl Chloride	0.07	1.904	24	UJ	0.5908	20	U	0.4543	20	U	0.1876	12	U	5.831	43	UJ	3.815	43	UJ	5.6	48	UJ	5.201	61	UJ	7.56	74	UJ
1330-20-7	Xylenes (total)	27	734.4	24	UJ	227.88	20	U	175.23	20	U	72.36	12	U	2249.1	43	UJ	1471.5	43	UJ	2160	48	UJ	2006.1	61	UJ	2916	74	UJ
	Semi-Volatile Organics																												
92-52-4	1,1'-Biphenyl	NL	NL	2800	U	NL	2400	UJ	NL	5100	UJ	NL	450	UJ	NL	5200	UJ	NL	5000	UJ	NL	14000	UJ	NL	1900	UJ	NL	7400	UJ
108-60-1	2,2'-oxybis(1-Chloropropane)	NL	NL	2800	U	NL	2400	UJ	NL	5100	UJ	NL	450	UJ	NL	5200	UJ	NL	5000	UJ	NL	14000	UJ	NL	1900	UJ	NL	7400	UJ
95-95-4	2,4,5-Trichlorophenol	NL	NL	7000	U	NL	6000	UJ	NL	13000	UJ	NL	1100	UJ	NL	13000	UJ	NL	12000	UJ	NL	34000	UJ	NL	4800	UJ	NL	19000	UJ
88-06-2	2,4,6-Trichlorophenol	NL	NL	2800	U	NL	2400	UJ	NL	5100	UJ	NL	450	UJ	NL	5200	UJ	NL	5000	UJ	NL	14000	UJ	NL	1900	UJ	NL	7400	UJ
120-83-2	2,4-Dichlorophenol	NL	NL	2800	U	NL	2400	UJ	NL	5100	UJ	NL	450	UJ	NL	5200	UJ	NL	5000	UJ	NL	14000	UJ	NL	1900	UJ	NL	7400	UJ
105-67-9	2,4-Dimethylphenol	NL	NL	2800	U	NL	2400	UJ	NL	5100	UJ	NL	450	UJ	NL	5200	UJ	NL	5000	UJ	NL	14000	UJ	NL	1900	UJ	NL	7400	UJ
51-28-5	2,4-Dinitrophenol	NL	NL	7000	U	NL	6000	UJ	NL	13000	UJ	NL	1100	UJ	NL	13000	UJ	NL	12000	UJ	NL	34000	UJ	NL	4800	UJ	NL	19000	UJ
121-14-2	2,4-Dinitrotoluene	NL	NL	2800	U	NL	2400	UJ	NL	5100	UJ	NL	450	UJ	NL	5200	UJ	NL	5000	UJ	NL	14000	UJ	NL	1900	UJ	NL	7400	UJ
606-20-2	2,6-Dinitrotoluene	NL	NL	2800	U	NL	2400	UJ	NL	5100	UJ	NL	450	UJ	NL	5200	UJ	NL	5000	UJ	NL	14000	UJ	NL	1900	UJ	NL	7400	UJ

Table 1-13
Sample-Specific Sediment Screening Criteria and Sediment Data
Smithtown Groundwater Contamination Site
Smithtown, New York

		Sample Code	SDW-001-A		SDW-001-B		SDW-002-A		SDW-002-B		SDW-003-A		SDW-003-B		SDW-004-A		SDW-004-B		SDW-005-A	
		Sample Name																		
		Sample Date	4/12/2001		4/12/2001		4/12/2001		4/12/2001		4/12/2001		4/12/2001		4/12/2001		4/12/2001		4/13/2001	
Cas Rn	Chemical Name	Depth	0 to 6		18 to 24		0 to 6		18 to 24		0 to 6		18 to 24		0 to 6		18 to 24		0 to 6	
TOC	Total organic carbon	gOC/kg	27.2		8.44		6.49		2.68		83.3		54.5		80		74.3		108	
TOC	Total organic carbon	%OC	2.72%		0.84%		0.65%		0.27%		8.33%		5.45%		8.00%		7.43%		10.80%	
		Screening Criteria (ug/gOC)	Screening Criteria (ug/kg)	Result (ug/kg)	Screening Criteria (ug/kg)	Result (ug/kg)	Screening Criteria (ug/kg)	Result (ug/kg)	Screening Criteria (ug/kg)	Result (ug/kg)	Screening Criteria (ug/kg)	Result (ug/kg)	Screening Criteria (ug/kg)	Result (ug/kg)	Screening Criteria (ug/kg)	Result (ug/kg)	Screening Criteria (ug/kg)	Result (ug/kg)	Screening Criteria (ug/kg)	Result (ug/kg)
91-58-7	2-Chloronaphthalene	NL	NL	2800 U	NL	2400 UJ	NL	5100 UJ	NL	450 UJ	NL	5200 UJ	NL	5000 UJ	NL	14000 UJ	NL	1900 UJ	NL	7400 UJ
95-57-8	2-Chlorophenol	NL	NL	2800 U	NL	2400 UJ	NL	5100 UJ	NL	450 UJ	NL	5200 UJ	NL	5000 UJ	NL	14000 UJ	NL	1900 UJ	NL	7400 UJ
91-57-6	2-Methylnaphthalene	30	816	2800 U	253.2	2400 UJ	194.7	5100 UJ	80.4	450 UJ	2499	5200 UJ	1635	5000 UJ	2400	14000 UJ	2229	1900 UJ	3240	7400 UJ
95-48-7	2-Methylphenol	NL	NL	2800 U	NL	2400 UJ	NL	5100 UJ	NL	450 UJ	NL	5200 UJ	NL	5000 UJ	NL	14000 UJ	NL	1900 UJ	NL	7400 UJ
88-74-4	2-Nitroaniline	NL	NL	7000 U	NL	6000 UJ	NL	13000 UJ	NL	1100 UJ	NL	13000 UJ	NL	12000 UJ	NL	34000 UJ	NL	4800 UJ	NL	19000 UJ
88-75-5	2-Nitrophenol	NL	NL	2800 U	NL	2400 UJ	NL	5100 UJ	NL	450 UJ	NL	5200 UJ	NL	5000 UJ	NL	14000 UJ	NL	1900 UJ	NL	7400 UJ
91-94-1	3,3'-Dichlorobenzidine	NL	NL	2800 U	NL	2400 UJ	NL	5100 UJ	NL	450 UJ	NL	5200 UJ	NL	5000 UJ	NL	14000 UJ	NL	1900 UJ	NL	7400 UJ
99-09-2	3-Nitroaniline	NL	NL	7000 U	NL	6000 UJ	NL	13000 UJ	NL	1100 UJ	NL	13000 UJ	NL	12000 UJ	NL	34000 UJ	NL	4800 UJ	NL	19000 UJ
534-52-1	4,6-Dinitro-2-methylphenol	NL	NL	7000 U	NL	6000 UJ	NL	13000 UJ	NL	1100 UJ	NL	13000 UJ	NL	12000 UJ	NL	34000 UJ	NL	4800 UJ	NL	19000 UJ
101-55-3	4-Bromophenyl-phenylether	NL	NL	2800 U	NL	2400 UJ	NL	5100 UJ	NL	450 UJ	NL	5200 UJ	NL	5000 UJ	NL	14000 UJ	NL	1900 UJ	NL	7400 UJ
59-50-7	4-Chloro-3-methylphenol	NL	NL	2800 U	NL	2400 UJ	NL	5100 UJ	NL	450 UJ	NL	5200 UJ	NL	5000 UJ	NL	14000 UJ	NL	1900 UJ	NL	7400 UJ
106-47-8	4-Chloroaniline	NL	NL	2800 U	NL	2400 UJ	NL	5100 UJ	NL	450 UJ	NL	5200 UJ	NL	5000 UJ	NL	14000 UJ	NL	1900 UJ	NL	7400 UJ
7005-72-3	4-Chlorophenyl-phenylether	NL	NL	2800 U	NL	2400 UJ	NL	5100 UJ	NL	450 UJ	NL	5200 UJ	NL	5000 UJ	NL	14000 UJ	NL	1900 UJ	NL	7400 UJ
106-44-5	4-Methylphenol	NL	NL	2800 U	NL	2400 UJ	NL	5100 UJ	NL	450 UJ	NL	5200 UJ	NL	5000 UJ	NL	14000 UJ	NL	1900 UJ	NL	7400 UJ
100-01-6	4-Nitroaniline	NL	NL	7000 U	NL	6000 UJ	NL	13000 UJ	NL	1100 UJ	NL	13000 UJ	NL	12000 UJ	NL	34000 UJ	NL	4800 UJ	NL	19000 UJ
100-02-7	4-Nitrophenol	NL	NL	7000 U	NL	6000 UJ	NL	13000 UJ	NL	1100 UJ	NL	13000 UJ	NL	12000 UJ	NL	34000 UJ	NL	4800 UJ	NL	19000 UJ
83-32-9	Acenaphthene	240	6528	2800 U	2025.6	2400 UJ	1557.6	5100 UJ	643.2	450 UJ	19992	5200 UJ	13080	5000 UJ	19200	14000 UJ	17832	1900 UJ	25920	7400 UJ
208-96-8	Acenaphthylene	NL	NL	2800 U	NL	2400 UJ	NL	5100 UJ	NL	450 UJ	NL	5200 UJ	NL	5000 UJ	NL	14000 UJ	NL	1900 UJ	NL	7400 UJ
98-86-2	Acetophenone	NL	NL	2800 U	NL	2400 UJ	NL	5100 UJ	NL	450 UJ	NL	5200 UJ	NL	5000 UJ	NL	14000 UJ	NL	1900 UJ	NL	7400 UJ
120-12-7	Anthracene	107	2910.4	2800 U	903.08	2400 UJ	694.43	5100 UJ	286.76	450 UJ	8913.1	5200 UJ	5831.5	5000 UJ	8560	14000 UJ	7950.1	1900 UJ	11556	7400 UJ
1912-24-9	Atrazine	NL	NL	2800 UJ	NL	2400 UJ	NL	5100 UJ	NL	450 UJ	NL	5200 UJ	NL	5000 UJ	NL	14000 UJ	NL	1900 UJ	NL	7400 UJ
100-52-7	Benzaldehyde	NL	NL	690 J	NL	0 R	NL	0 R	NL	0 R	NL	0 R	NL	0 R	NL	0 R	NL	270 J	NL	1100 J
56-55-3	Benzo(a)anthracene	12	326.4	2800 U	101.28	2400 UJ	77.88	5100 UJ	32.16	450 UJ	999.6	5200 UJ	654	5000 UJ	960	14000 UJ	891.6	1900 UJ	1296	7400 UJ
50-32-8	Benzo(a)pyrene	0.7	19.04	2800 U	5.908	2400 UJ	4.543	**600** J	1.876	**56** J	58.31	5200 UJ	38.15	5000 UJ	56	14000 UJ	52.01	1900 UJ	75.6	7400 UJ
205-99-2	Benzo(b)fluoranthene	NL	NL	2800 U	NL	2400 UJ	NL	5100 UJ	NL	450 UJ	NL	5200 UJ	NL	5000 UJ	NL	14000 UJ	NL	1900 UJ	NL	7400 UJ
191-24-2	Benzo(g,h,i)perylene	NL	NL	2800 U	NL	2400 UJ	NL	5100 UJ	NL	450 UJ	NL	5200 UJ	NL	5000 UJ	NL	14000 UJ	NL	1900 UJ	NL	7400 UJ
207-08-9	Benzo(k)fluoranthene	NL	NL	2800 U	NL	2400 UJ	NL	5100 UJ	NL	450 UJ	NL	5200 UJ	NL	5000 UJ	NL	14000 UJ	NL	1900 UJ	NL	7400 UJ
111-91-1	bis(2-Chloroethoxy)methane	NL	NL	2800 U	NL	2400 UJ	NL	5100 UJ	NL	450 UJ	NL	5200 UJ	NL	5000 UJ	NL	14000 UJ	NL	1900 UJ	NL	7400 UJ
111-44-4	bis(2-Chloroethyl)ether	0.03	0.816	2800 U	0.2532	2400 UJ	0.1947	5100 UJ	0.0804	450 UJ	2.499	5200 UJ	1.635	5000 UJ	2.4	14000 UJ	2.229	1900 UJ	3.24	7400 UJ
117-81-7	bis(2-Ethylhexyl)phthalate	199.5	5426.4	2800 U	1683.78	2400 UJ	1294.755	5100 UJ	534.66	450 UJ	16618.35	5200 UJ	10872.75	5000 UJ	15960	14000 UJ	14822.85	1900 UJ	21546	7400 UJ
85-68-7	Butylbenzylphthalate	NL	NL	2800 U	NL	2400 UJ	NL	5100 UJ	NL	450 UJ	NL	5200 UJ	NL	5000 UJ	NL	14000 UJ	NL	1900 UJ	NL	7400 UJ
105-60-2	Caprolactam	NL	NL	2800 U	NL	2400 UJ	NL	5100 UJ	NL	450 UJ	NL	5200 UJ	NL	5000 UJ	NL	14000 UJ	NL	1900 UJ	NL	7400 UJ
86-74-8	Carbazole	NL	NL	2800 U	NL	2400 UJ	NL	5100 UJ	NL	450 UJ	NL	5200 UJ	NL	5000 UJ	NL	14000 UJ	NL	1900 UJ	NL	7400 UJ
218-01-9	Chrysene	NL	NL	2800 U	NL	2400 UJ	NL	560 J	NL	46 J	NL	5200 UJ	NL	5000 UJ	NL	14000 UJ	NL	1900 UJ	NL	7400 UJ
53-70-3	Dibenz(a,h)anthracene	NL	NL	2800 U	NL	2400 UJ	NL	5100 UJ	NL	450 UJ	NL	5200 UJ	NL	5000 UJ	NL	14000 UJ	NL	1900 UJ	NL	7400 UJ
132-64-9	Dibenzofuran	NL	NL	2800 U	NL	2400 UJ	NL	5100 UJ	NL	450 UJ	NL	5200 UJ	NL	5000 UJ	NL	14000 UJ	NL	1900 UJ	NL	7400 UJ
84-66-2	Diethylphthalate	NL	NL	2800 U	NL	2400 UJ	NL	5100 UJ	NL	450 UJ	NL	5200 UJ	NL	5000 UJ	NL	14000 UJ	NL	1900 UJ	NL	7400 UJ
131-11-3	Dimethylphthalate	NL	NL	2800 U	NL	2400 UJ	NL	5100 UJ	NL	450 UJ	NL	5200 UJ	NL	5000 UJ	NL	14000 UJ	NL	1900 UJ	NL	7400 UJ
84-74-2	Di-n-butylphthalate	NL	NL	2800 U	NL	2400 UJ	NL	5100 UJ	NL	450 UJ	NL	5200 UJ	NL	5000 UJ	NL	14000 UJ	NL	1900 UJ	NL	7400 UJ
117-84-0	Di-n-octylphthalate	NL	NL	2800 U	NL	2400 UJ	NL	5100 UJ	NL	450 UJ	NL	5200 UJ	NL	5000 UJ	NL	14000 UJ	NL	1900 UJ	NL	7400 UJ
206-44-0	Fluoranthene	1340	36448	2800 U	11309.6	2400 UJ	8696.6	690 J	3591.2	71 J	111622	5200 UJ	73030	5000 UJ	107200	14000 UJ	99562	1900 UJ	144720	7400 UJ
86-73-7	Fluorene	38	1033.6	2800 U	320.72	2400 UJ	246.62	5100 UJ	101.84	450 UJ	3165.4	5200 UJ	2071	5000 UJ	3040	14000 UJ	2823.4	1900 UJ	4104	7400 UJ
118-74-1	Hexachlorobenzene	NL	NL	2800 U	NL	2400 UJ	NL	5100 UJ	NL	450 UJ	NL	5200 UJ	NL	5000 UJ	NL	14000 UJ	NL	1900 UJ	NL	7400 UJ
87-68-3	Hexachlorobutadiene	0.3	8.16	2800 U	2.532	2400 UJ	1.947	5100 UJ	0.804	450 UJ	24.99	5200 UJ	16.35	5000 UJ	24	14000 UJ	22.29	1900 UJ	32.4	7400 UJ
77-47-4	Hexachlorocyclopentadiene	0.7	19.04	2800 U	5.908	2400 UJ	4.543	5100 UJ	1.876	450 UJ	58.31	5200 UJ	38.15	5000 UJ	56	14000 UJ	52.01	1900 UJ	75.6	7400 UJ
67-72-1	Hexachloroethane	NL	NL	2800 U	NL	2400 UJ	NL	5100 UJ	NL	450 UJ	NL	5200 UJ	NL	5000 UJ	NL	14000 UJ	NL	1900 UJ	NL	7400 UJ
193-39-5	Indeno(1,2,3-cd)pyrene	NL	NL	2800 U	NL	2400 UJ	NL	5100 UJ	NL	450 UJ	NL	5200 UJ	NL	5000 UJ	NL	14000 UJ	NL	1900 UJ	NL	7400 UJ
78-59-1	Isophorone	NL	NL	2800 U	NL	2400 UJ	NL	5100 UJ	NL	450 UJ	NL	5200 UJ	NL	5000 UJ	NL	14000 UJ	NL	1900 UJ	NL	7400 UJ
91-20-3	Naphthalene	38	1033.6	2800 U	320.72	2400 UJ	246.62	5100 UJ	101.84	450 UJ	3165.4	5200 UJ	2071	5000 UJ	3040	14000 UJ	2823.4	1900 UJ	4104	7400 UJ
98-95-3	Nitrobenzene	NL	NL	2800 U	NL	2400 UJ	NL	5100 UJ	NL	450 UJ	NL	5200 UJ	NL	5000 UJ	NL	14000 UJ	NL	1900 UJ	NL	7400 UJ
621-64-7	N-Nitroso-di-n-propylamine	NL	NL	2800 U	NL	2400 UJ	NL	5100 UJ	NL	450 UJ	NL	5200 UJ	NL	5000 UJ	NL	14000 UJ	NL	1900 UJ	NL	7400 UJ
86-30-6	N-Nitrosodiphenylamine	NL	NL	2800 U	NL	2400 UJ	NL	5100 UJ	NL	450 UJ	NL	5200 UJ	NL	5000 UJ	NL	14000 UJ	NL	1900 UJ	NL	7400 UJ
87-86-5	Pentachlorophenol	40	1088	7000 U	337.6	6000 UJ	259.6	13000 UJ	107.2	1100 UJ	3332	13000 UJ	2180	12000 UJ	3200	34000 UJ	2972	4800 UJ	4320	19000 UJ
85-01-8	Phenanthrene	160	4352	2800 U	1350.4	2400 UJ	1038.4	5100 UJ	428.8	450 UJ	13328	5200 UJ	8720	5000 UJ	12800	14000 UJ	11888	1900 UJ	17280	7400 UJ
108-95-2	Phenol	0.6	16.32	2800 U	5.064	2400 UJ	3.894	5100 UJ	1.608	450 UJ	49.98	5200 UJ	32.7	5000 UJ	48	14000 UJ	44.58	1900 UJ	64.8	7400 UJ
129-00-0	Pyrene	NL	NL	2800 U	NL	2400 UJ	NL	670 J	NL	58 J	NL	5200 UJ	NL	5000 UJ	NL	14000 UJ	NL	1900 UJ	NL	7400 UJ
	Pestcide/PCB Organics																			
72-54-8	4,4'-DDD	0.01	0.272	5.6 U	0.0844	4.8 UJ	0.0649	5.1 UJ	0.0268	4.5 UJ	0.833	**38** J	0.545	**180** DJ	0.8	**21** J	0.743	**95** J	1.08	15 UJ
72-55-9	4,4'-DDE	0.01	0.272	5.6 U	0.0844	4.8 UJ	0.0649	5.1 UJ	0.0268	4.5 UJ	0.833	**20** J	0.545	**63** J	0.8	**17** J	0.743	**96** J	1.08	15 UJ

Table 1-13
Sample-Specific Sediment Screening Criteria and Sediment Data
Smithtown Groundwater Contamination Site
Smithtown, New York

		Sample Code	SDW-001-A			SDW-001-B			SDW-002-A			SDW-002-B			SDW-003-A			SDW-003-B			SDW-004-A			SDW-004-B			SDW-005-A		
		Sample Name																											
		Sample Date	4/12/2001			4/12/2001			4/12/2001			4/12/2001			4/12/2001			4/12/2001			4/12/2001			4/12/2001			4/13/2001		
Cas Rn	**Chemical Name**	**Depth**	**0 to 6**			**18 to 24**			**0 to 6**			**18 to 24**			**0 to 6**			**18 to 24**			**0 to 6**			**18 to 24**			**0 to 6**		
TOC	Total organic carbon	gOC/kg	27.2			8.44			6.49			2.68			83.3			54.5			80			74.3			108		
TOC	Total organic carbon	%OC	2.72%			0.84%			0.65%			0.27%			8.33%			5.45%			8.00%			7.43%			10.80%		
		Screening Criteria (ug/gOC)	Screening Criteria (ug/kg)	Result (ug/kg)		Screening Criteria (ug/kg)	Result (ug/kg)		Screening Criteria (ug/kg)	Result (ug/kg)		Screening Criteria (ug/kg)	Result (ug/kg)		Screening Criteria (ug/kg)	Result (ug/kg)		Screening Criteria (ug/kg)	Result (ug/kg)		Screening Criteria (ug/kg)	Result (ug/kg)		Screening Criteria (ug/kg)	Result (ug/kg)		Screening Criteria (ug/kg)	Result (ug/kg)	
50-29-3	4,4'-DDT	0.01	0.272	5.6	U	0.0844	4.8	UJ	0.0649	5.1	UJ	0.0268	4.5	UJ	0.833	10	UJ	0.545	9.9	UJ	0.8	14	UJ	0.743	19	UJ	1.08	15	UJ
309-00-2	Aldrin	0.1	2.72	2.9	U	0.844	2.5	UJ	0.649	2.6	UJ	0.268	2.3	UJ	8.33	5.3	UJ	5.45	5.1	UJ	8	7.1	UJ	7.43	9.8	UJ	10.8	7.7	UJ
319-84-6	alpha-BHC	0.03	0.816	2.9	U	0.2532	2.5	UJ	0.1947	2.6	UJ	0.0804	2.3	UJ	2.499	5.3	UJ	1.635	5.1	UJ	2.4	7.1	UJ	2.229	9.8	UJ	3.24	7.7	UJ
5103-71-9	alpha-Chlordane	0.001	0.0272	2.9	U	0.00844	2.5	UJ	0.00649	2.6	UJ	0.00268	2.3	UJ	0.0833	5.3	UJ	0.0545	5.1	UJ	0.08	**7.2**		0.0743	9.8	UJ	0.108	7.7	UJ
12674-11-2	Aroclor-1016	0.0008	0.02176	56	U	0.006752	48	UJ	0.005192	51	UJ	0.002144	45	UJ	0.06664	100	UJ	0.0436	99	UJ	0.064	140	UJ	0.05944	190	UJ	0.0864	150	UJ
11104-28-2	Aroclor-1221	0.0008	0.02176	110	U	0.006752	97	UJ	0.005192	100	UJ	0.002144	92	UJ	0.06664	210	UJ	0.0436	200	UJ	0.064	280	UJ	0.05944	390	UJ	0.0864	300	UJ
11141-16-5	Aroclor-1232	0.0008	0.02176	56	U	0.006752	48	UJ	0.005192	51	UJ	0.002144	45	UJ	0.06664	100	UJ	0.0436	99	UJ	0.064	140	UJ	0.05944	190	UJ	0.0864	150	UJ
53469-21-9	Aroclor-1242	0.0008	0.02176	56	U	0.006752	48	UJ	0.005192	51	UJ	0.002144	45	UJ	0.06664	100	UJ	0.0436	99	UJ	0.064	140	UJ	0.05944	190	UJ	0.0864	150	UJ
12672-29-6	Aroclor-1248	0.0008	0.02176	56	U	0.006752	48	UJ	0.005192	51	UJ	0.002144	45	UJ	0.06664	100	UJ	0.0436	99	UJ	0.064	140	UJ	0.05944	190	UJ	0.0864	150	UJ
11097-69-1	Aroclor-1254	0.0008	0.02176	56	U	0.006752	48	UJ	0.005192	51	UJ	0.002144	45	UJ	0.06664	100	UJ	0.0436	99	UJ	0.064	140	UJ	0.05944	190	UJ	0.0864	150	UJ
11096-82-5	Aroclor-1260	0.0008	0.02176	56	U	0.006752	48	UJ	0.005192	51	UJ	0.002144	45	UJ	0.06664	100	UJ	0.0436	99	UJ	0.064	140	UJ	0.05944	190	UJ	0.0864	150	UJ
319-85-7	beta-BHC	0.03	0.816	2.9	U	0.2532	2.5	UJ	0.1947	2.6	UJ	0.0804	2.3	UJ	2.499	5.3	UJ	1.635	5.1	UJ	2.4	7.1	UJ	2.229	9.8	UJ	3.24	7.7	UJ
319-86-8	delta-BHC	0.03	0.816	2.9	U	0.2532	2.5	UJ	0.1947	2.6	UJ	0.0804	2.3	UJ	2.499	5.3	UJ	1.635	5.1	UJ	2.4	7.1	UJ	2.229	9.8	UJ	3.24	7.7	UJ
60-57-1	Dieldrin	0.1	2.72	5.6	U	0.844	4.8	UJ	0.649	5.1	UJ	0.268	4.5	UJ	8.33	10	UJ	5.45	0	R	8	14	UJ	7.43	19	UJ	10.8	15	UJ
959-98-8	Endosulfan I	0.004	0.1088	2.9	U	0.03376	2.5	UJ	0.02596	2.6	UJ	0.01072	2.3	UJ	0.3332	5.3	UJ	0.218	5.1	UJ	0.32	7.1	UJ	0.2972	9.8	UJ	0.432	7.7	UJ
33213-65-9	Endosulfan II	0.004	0.1088	5.6	U	0.03376	4.8	UJ	0.02596	5.1	UJ	0.01072	4.5	UJ	0.3332	10	UJ	0.218	9.9	UJ	0.32	14	UJ	0.2972	19	UJ	0.432	15	UJ
1031-07-8	Endosulfan sulfate	NL	NL	5.6	U	NL	4.8	UJ	NL	5.1	UJ	NL	4.5	UJ	NL	10	UJ	NL	9.9	UJ	NL	14	UJ	NL	19	UJ	NL	15	UJ
72-20-8	Endrin	0.73	19.856	5.6	U	6.1612	4.8	UJ	4.7377	5.1	UJ	1.9564	4.5	UJ	60.809	10	UJ	39.785	9.9	UJ	58.4	14	UJ	54.239	19	UJ	78.84	15	UJ
7421-93-4	Endrin aldehyde	NL	NL	5.6	U	NL	4.8	UJ	NL	5.1	UJ	NL	4.5	UJ	NL	10	UJ	NL	9.9	UJ	NL	14	UJ	NL	19	UJ	NL	15	UJ
53494-70-5	Endrin ketone	NL	NL	5.6	U	NL	4.8	UJ	NL	5.1	UJ	NL	4.5	UJ	NL	10	UJ	NL	9.9	UJ	NL	14	UJ	NL	19	UJ	NL	15	UJ
58-89-9	gamma-BHC (Lindane)	0.03	0.816	2.9	U	0.2532	2.5	UJ	0.1947	2.6	UJ	0.0804	2.3	UJ	2.499	5.3	UJ	1.635	5.1	UJ	2.4	7.1	UJ	2.229	9.8	UJ	3.24	7.7	UJ
5103-74-2	gamma-Chlordane	0.001	0.0272	2.9	U	0.00844	2.5	UJ	0.00649	2.6	UJ	0.00268	2.3	UJ	0.0833	5.3	UJ	0.0545	5.1	UJ	0.08	7.1	UJ	0.0743	9.8	UJ	0.108	7.7	UJ
76-44-8	Heptachlor	0.0008	0.02176	2.9	U	0.006752	2.5	UJ	0.005192	2.6	UJ	0.002144	2.3	UJ	0.06664	5.3	UJ	0.0436	5.1	UJ	0.064	7.1	UJ	0.05944	9.8	UJ	0.0864	7.7	UJ
1024-57-3	Heptachlor epoxide	0.0008	0.02176	2.9	U	0.006752	2.5	UJ	0.005192	2.6	UJ	0.002144	2.3	UJ	0.06664	5.3	UJ	0.0436	5.1	UJ	0.064	7.1	UJ	0.05944	9.8	UJ	0.0864	7.7	UJ
72-43-5	Methoxychlor	0.6	16.32	29	U	5.064	25	UJ	3.894	26	UJ	1.608	23	UJ	49.98	53	UJ	32.7	51	UJ	48	71	UJ	44.58	98	UJ	64.8	77	UJ
8001-35-2	Toxaphene	0.01	0.272	290	U	0.0844	250	UJ	0.0649	260	UJ	0.0268	230	UJ	0.833	530	UJ	0.545	510	UJ	0.8	710	UJ	0.743	980	UJ	1.08	770	UJ

Table 1-13
Sample-Specific Sediment Screening Criteria and Sediment Data
Smithtown Groundwater Contamination Site
Smithtown, New York

		Sample Code	SDW-005-B			SDW-006-A			SDW-006-B			SDW-007-A			SDW-007-B			SDW-008-A			SDW-008-B			SDW-009-A			SDW-009-B		
		Sample Name																											
		Sample Date	4/13/2001			4/13/2001			4/13/2001			4/16/2001			4/16/2001			4/16/2001			4/16/2001			4/17/2001			4/17/2001		
Cas Rn	Chemical Name	Depth	18 to 24			0 to 6			18 to 24			0 to 6			18 to 24			0 to 6			18 to 24			0 to 6			18 to 24		
TOC	Total organic carbon	gOC/kg	51 4			16.4			28 9			59 5			102			123			129			87 2			50.9		
TOC	Total organic carbon	%OC	5 14%			1.64%			2.89%			5.95%			10 20%			12.30%			12.90%			8.72%			5 09%		
		Screening Criteria (ug/gOC)	Screening Criteria (ug/kg)	Result (ug/kg)		Screening Criteria (ug/kg)	Result (ug/kg)		Screening Criteria (ug/kg)	Result (ug/kg)		Screening Criteria (ug/kg)	Result (ug/kg)		Screening Criteria (ug/kg)	Result (ug/kg)		Screening Criteria (ug/kg)	Result (ug/kg)		Screening Criteria (ug/kg)	Result (ug/kg)		Screening Criteria (ug/kg)	Result (ug/kg)		Screening Criteria (ug/kg)	Result (ug/kg)	
	Volatile Organic Compounds																												
71-55-6	1,1,1-Trichloroethane	NL	NL	51	UJ	NL	17	U	NL	27	U	NL	40	UJ	NL	43	UJ	NL	54	UJ	NL	45	UJ	NL	38	UJ	NL	39	UJ
79-34-5	1,1,2,2-Tetrachloroethane	0 3	15 42	51	UJ	4 92	17	U	8.67	27	U	17 85	40	UJ	30.6	43	UJ	36	54	UJ	36	45	UJ	26 16	38	UJ	15 27	39	UJ
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	NL	NL	51	UJ	NL	17	UJ	NL	27	UJ	NL	40	UJ	NL	43	UJ	NL	54	UJ	NL	45	UJ	NL	38	UJ	NL	39	UJ
79-00-5	1,1,2-Trichloroethane	0 6	30 84	51	UJ	9.84	17	U	17.34	27	U	35 7	40	UJ	61 2	43	UJ	72	54	UJ	72	45	UJ	52.32	38	UJ	30 54	39	UJ
75-34-3	1,1-Dichloroethane	NL	NL	51	UJ	NL	17	U	NL	27	U	NL	40	UJ	NL	43	UJ	NL	54	UJ	NL	45	UJ	NL	38	UJ	NL	39	UJ
75-35-4	1,1-Dichloroethene	0 02	1 028	51	UJ	0.328	17	U	0 578	27	U	1.19	40	UJ	2 04	43	UJ	2 4	54	UJ	2.4	45	UJ	1 744	38	UJ	1 018	39	UJ
120-82-1	1,2,4-Trichlorobenzene	91	4677.4	51	UJ	1492 4	17	U	2629.9	27	U	5414.5	40	UJ	9282	43	UJ	10920	54	UJ	10920	45	UJ	7935 2	38	UJ	4631.9	39	UJ
96-12-8	1,2-Dibromo-3-chloropropane	NL	NL	51	UJ	NL	17	U	NL	27	U	NL	40	UJ	NL	43	UJ	NL	54	UJ	NL	45	UJ	NL	38	UJ	NL	39	UJ
106-93-4	1,2-Dibromoethane	NL	NL	51	UJ	NL	17	U	NL	27	U	NL	40	UJ	NL	43	UJ	NL	54	UJ	NL	45	UJ	NL	38	UJ	NL	39	UJ
95-50-1	1,2-Dichlorobenzene	12	616 8	51	UJ	196.8	17	U	346.8	27	U	714	40	UJ	1224	43	UJ	1440	54	UJ	1440	45	UJ	1046.4	38	UJ	610 8	39	UJ
107-06-2	1,2-Dichloroethane	0 7	35 98	51	UJ	11 48	17	U	20 23	27	U	41.65	40	UJ	71 4	43	UJ	84	54	UJ	84	45	UJ	61 04	38	UJ	35.63	39	UJ
78-87-5	1,2-Dichloropropane	NL	NL	51	UJ	NL	17	U	NL	27	U	NL	40	UJ	NL	43	UJ	NL	54	UJ	NL	45	UJ	NL	38	UJ	NL	39	UJ
541-73-1	1,3-Dichlorobenzene	12	616 8	51	UJ	196 8	17	U	346 8	27	U	714	40	UJ	1224	43	UJ	1440	54	UJ	1440	45	UJ	1046 4	38	UJ	610.8	39	UJ
106-46-7	1,4-Dichlorobenzene	12	616 8	51	UJ	196 8	17	U	346.8	27	U	714	40	UJ	1224	43	UJ	1440	54	UJ	1440	45	UJ	1046 4	38	UJ	610.8	39	UJ
78-93-3	2-Butanone	NL	NL	290	J	NL	17	U	NL	27	UJ	NL	40	UJ	NL	43	UJ	NL	54	UJ	NL	100	J	NL	38	UJ	NL	39	UJ
591-78-6	2-Hexanone	NL	NL	51	UJ	NL	17	U	NL	27	U	NL	40	UJ	NL	43	UJ	NL	54	UJ	NL	45	UJ	NL	38	UJ	NL	39	UJ
108-10-1	4-Methyl-2-pentanone	NL	NL	51	UJ	NL	17	U	NL	27	U	NL	40	UJ	NL	43	UJ	NL	54	UJ	NL	45	UJ	NL	38	UJ	NL	39	UJ
67-64-1	Acetone	NL	NL	100	UJ	NL	23	U	NL	27	U	NL	78	UJ	NL	50	UJ	NL	170	UJ	NL	45	UJ	NL	38	UJ	NL	39	UJ
71-43-2	Benzene	0.6	30 84	51	UJ	9 84	17	U	17 34	27	U	35 7	40	UJ	61 2	43	UJ	72	54	UJ	72	45	UJ	52.32	38	UJ	30 54	39	UJ
75-27-4	Bromodichloromethane	NL	NL	51	UJ	NL	17	U	NL	27	U	NL	40	UJ	NL	43	UJ	NL	54	UJ	NL	45	UJ	NL	38	UJ	NL	39	UJ
75-25-2	Bromoform	NL	NL	51	UJ	NL	17	U	NL	27	U	NL	40	UJ	NL	43	UJ	NL	54	UJ	NL	45	UJ	NL	38	UJ	NL	39	UJ
74-83-9	Bromomethane	NL	NL	51	UJ	NL	17	UJ	NL	27	UJ	NL	40	UJ	NL	43	UJ	NL	54	UJ	NL	45	UJ	NL	38	UJ	NL	39	UJ
75-15-0	Carbon Disulfide	NL	NL	51	UJ	NL	15	J	NL	27	U	NL	40	UJ	NL	43	UJ	NL	54	UJ	NL	45	UJ	NL	38	UJ	NL	39	UJ
56-23-5	Carbon Tetrachloride	0 6	30 84	51	UJ	9 84	17	UJ	17.34	27	U	35 7	40	UJ	61 2	43	UJ	72	54	UJ	72	45	UJ	52.32	38	UJ	30 54	39	UJ
108-90-7	Chlorobenzene	3 5	179 9	51	UJ	57 4	17	U	101 15	27	U	208 25	40	UJ	357	43	UJ	420	54	UJ	420	45	UJ	305 2	38	UJ	178.15	39	UJ
75-00-3	Chloroethane	NL	NL	51	UJ	NL	17	U	NL	27	U	NL	40	UJ	NL	43	UJ	NL	54	UJ	NL	45	UJ	NL	38	UJ	NL	39	UJ
67-66-3	Chloroform	NL	NL	51	UJ	NL	17	U	NL	27	U	NL	40	UJ	NL	43	UJ	NL	54	UJ	NL	45	UJ	NL	38	UJ	NL	39	UJ
74-87-3	Chloromethane	NL	NL	51	UJ	NL	17	U	NL	27	U	NL	40	UJ	NL	43	UJ	NL	54	UJ	NL	45	UJ	NL	38	UJ	NL	39	UJ
156-59-2	cis-1,2-Dichloroethene	NL	NL	51	UJ	NL	17	U	NL	27	U	NL	40	UJ	NL	43	UJ	NL	54	UJ	NL	45	UJ	NL	38	UJ	NL	39	UJ
10061-01-5	cis-1,3-Dichloropropene	NL	NL	51	UJ	NL	17	U	NL	27	U	NL	40	UJ	NL	43	UJ	NL	54	UJ	NL	45	UJ	NL	38	UJ	NL	39	UJ
110-82-7	Cyclohexane	NL	NL	51	UJ	NL	17	UJ	NL	27	U	NL	40	UJ	NL	43	UJ	NL	54	UJ	NL	45	UJ	NL	38	UJ	NL	39	UJ
124-48-1	Dibromochloromethane	NL	NL	51	UJ	NL	17	U	NL	27	U	NL	40	UJ	NL	43	UJ	NL	54	UJ	NL	45	UJ	NL	38	UJ	NL	39	UJ
75-71-8	Dichlorodifluoromethane	NL	NL	51	UJ	NL	17	UJ	NL	27	UJ	NL	40	UJ	NL	43	UJ	NL	54	UJ	NL	45	UJ	NL	38	UJ	NL	39	UJ
100-41-4	Ethylbenzene	6 4	328 96	51	UJ	104 96	17	U	184 96	27	U	380 8	40	UJ	652.8	43	UJ	768	54	UJ	768	45	UJ	558.08	38	UJ	325 76	39	UJ
98-82-8	Isopropylbenzene	12	616.8	51	UJ	196 8	17	U	346.8	27	U	714	40	UJ	1224	43	UJ	1440	54	UJ	1440	45	UJ	1046 4	38	UJ	610 8	39	UJ
79-20-9	Methyl Acetate	NL	NL	51	UJ	NL	17	U	NL	27	U	NL	40	UJ	NL	43	UJ	NL	54	UJ	NL	45	UJ	NL	38	UJ	NL	39	UJ
1634-04-4	Methyl Tert-Butyl Ether	NL	NL	51	UJ	NL	17	U	NL	27	U	NL	40	UJ	NL	43	UJ	NL	54	UJ	NL	45	UJ	NL	38	UJ	NL	39	UJ
75-09-2	Methylene Chloride	NL	NL	89	UJ	NL	19	UJ	NL	52	UJ	NL	48	UJ	NL	52	UJ	NL	75	UJ	NL	45	UJ	NL	41	UJ	NL	57	UJ
108-87-2	Metylcyclohexane	NL	NL	51	UJ	NL	17	UJ	NL	27	U	NL	40	UJ	NL	43	UJ	NL	54	UJ	NL	45	UJ	NL	38	UJ	NL	39	UJ
100-42-5	Styrene	NL	NL	51	UJ	NL	17	U	NL	27	U	NL	40	UJ	NL	43	UJ	NL	54	UJ	NL	45	UJ	NL	38	UJ	NL	39	UJ
127-18-4	Tetrachloroethene	0 8	41 12	51	UJ	13 12	17	U	23.12	27	U	47 6	4	J	81.6	43	UJ	96	54	UJ	96	45	UJ	69 76	38	UJ	40.72	39	UJ
108-88-3	Toluene	45	2313	51	UJ	738	2	J	1300 5	3	J	2677 5	40	UJ	4590	43	UJ	5400	54	UJ	5400	45	UJ	3924	38	UJ	2290 5	39	UJ
156-60-5	trans-1,2-Dichloroethene	NL	NL	51	UJ	NL	17	U	NL	27	U	NL	40	UJ	NL	43	UJ	NL	54	UJ	NL	45	UJ	NL	38	UJ	NL	39	UJ
10061-02-6	trans-1,3-Dichloropropene	NL	NL	51	UJ	NL	17	U	NL	27	U	NL	40	UJ	NL	43	UJ	NL	54	UJ	NL	45	UJ	NL	38	UJ	NL	39	UJ
79-01-6	Trichloroethene	2	102.8	51	UJ	32 8	17	U	57 8	27	U	119	40	UJ	204	43	UJ	240	54	UJ	240	45	UJ	174.4	38	UJ	101 8	39	UJ
75-69-4	Trichlorofluoromethane	NL	NL	51	UJ	NL	17	U	NL	27	U	NL	40	UJ	NL	43	UJ	NL	54	UJ	NL	45	UJ	NL	38	UJ	NL	39	UJ
75-01-4	Vinyl Chloride	0.07	3 598	51	UJ	1.148	17	U	2 023	27	U	4 165	40	UJ	7 14	43	UJ	8 4	54	UJ	8.4	45	UJ	6 104	38	UJ	3 563	39	UJ
1330-20-7	Xylenes (total)	27	1387 8	51	UJ	442.8	17	U	780 3	27	U	1606 5	40	UJ	2754	43	UJ	3240	54	UJ	3240	45	UJ	2354 4	38	UJ	1374 3	39	UJ
	Semi-Volatile Organics																												
92-52-4	1,1'-Biphenyl	NL	NL	4500	UJ	NL	560	UJ	NL	850	UJ	NL	4200	UJ	NL	960	UJ	NL	5900	UJ	NL	5200	UJ	NL	4400	UJ	NL	860	UJ
108-60-1	2,2'-oxybis(1-Chloropropane)	NL	NL	4500	UJ	NL	560	UJ	NL	850	UJ	NL	4200	UJ	NL	960	UJ	NL	5900	UJ	NL	5200	UJ	NL	4400	UJ	NL	860	UJ
95-95-4	2,4,5-Trichlorophenol	NL	NL	11000	UJ	NL	1400	UJ	NL	2100	UJ	NL	11000	UJ	NL	2400	UJ	NL	15000	UJ	NL	13000	UJ	NL	11000	UJ	NL	2200	UJ
88-06-2	2,4,6-Trichlorophenol	NL	NL	4500	UJ	NL	560	UJ	NL	850	UJ	NL	4200	UJ	NL	960	UJ	NL	5900	UJ	NL	5200	UJ	NL	4400	UJ	NL	860	UJ
120-83-2	2,4-Dichlorophenol	NL	NL	4500	UJ	NL	560	UJ	NL	850	UJ	NL	4200	UJ	NL	960	UJ	NL	5900	UJ	NL	5200	UJ	NL	4400	UJ	NL	860	UJ
105-67-9	2,4-Dimethylphenol	NL	NL	4500	UJ	NL	560	UJ	NL	850	UJ	NL	4200	UJ	NL	960	UJ	NL	5900	UJ	NL	5200	UJ	NL	4400	UJ	NL	860	UJ
51-28-5	2,4-Dinitrophenol	NL	NL	11000	UJ	NL	1400	UJ	NL	2100	UJ	NL	11000	UJ	NL	2400	UJ	NL	15000	UJ	NL	13000	UJ	NL	11000	UJ	NL	2200	UJ
121-14-2	2,4-Dinitrotoluene	NL	NL	4500	UJ	NL	560	UJ	NL	850	UJ	NL	4200	UJ	NL	960	UJ	NL	5900	UJ	NL	5200	UJ	NL	4400	UJ	NL	860	UJ
606-20-2	2,6-Dinitrotoluene	NL	NL	4500	UJ	NL	560	UJ	NL	850	UJ	NL	4200	UJ	NL	960	UJ	NL	5900	UJ	NL	5200	UJ	NL	4400	UJ	NL	860	UJ

Table 1-13
Sample-Specific Sediment Screening Criteria and Sediment Data
Smithtown Groundwater Contamination Site
Smithtown, New York

		Sample Code	SDW-005-B			SDW-006-A			SDW-006-B			SDW-007-A			SDW-007-B			SDW-008-A			SDW-008-B			SDW-009-A			SDW-009-B		
		Sample Name																											
		Sample Date	4/13/2001			4/13/2001			4/13/2001			4/16/2001			4/16/2001			4/16/2001			4/16/2001			4/17/2001			4/17/2001		
Cas Rn	Chemical Name	Depth	18 to 24			0 to 6			18 to 24			0 to 6			18 to 24			0 to 6			18 to 24			0 to 6			18 to 24		
TOC	Total organic carbon	gOC/kg	51 4			16 4			28 9			59 5			102			123			129			87 2			50 9		
TOC	Total organic carbon	%OC	5 14%			1 64%			2.89%			5 95%			10.20%			12.30%			12.90%			8 72%			5 09%		
		Screening Criteria (ug/gOC)	Screening Criteria (ug/kg)	Result (ug/kg)		Screening Criteria (ug/kg)	Result (ug/kg)		Screening Criteria (ug/kg)	Result (ug/kg)		Screening Criteria (ug/kg)	Result (ug/kg)		Screening Criteria (ug/kg)	Result (ug/kg)		Screening Criteria (ug/kg)	Result (ug/kg)		Screening Criteria (ug/kg)	Result (ug/kg)		Screening Criteria (ug/kg)	Result (ug/kg)		Screening Criteria (ug/kg)	Result (ug/kg)	
91-58-7	2-Chloronaphthalene	NL	NL	4500	UJ	NL	560	UJ	NL	850	UJ	NL	4200	UJ	NL	960	UJ	NL	5900	UJ	NL	5200	UJ	NL	4400	UJ	NL	860	UJ
95-57-8	2-Chlorophenol	NL	NL	4500	UJ	NL	560	UJ	NL	850	UJ	NL	4200	UJ	NL	960	UJ	NL	5900	UJ	NL	5200	UJ	NL	4400	UJ	NL	860	UJ
91-57-6	2-Methylnaphthalene	30	1542	4500	UJ	492	560	UJ	867	850	UJ	1785	4200	UJ	3060	960	UJ	3600	5900	UJ	3600	5200	UJ	2616	4400	UJ	1527	860	UJ
95-48-7	2-Methylphenol	NL	NL	4500	UJ	NL	560	UJ	NL	850	UJ	NL	4200	UJ	NL	960	UJ	NL	5900	UJ	NL	5200	UJ	NL	4400	UJ	NL	860	UJ
88-74-4	2-Nitroaniline	NL	NL	11000	UJ	NL	1400	UJ	NL	2100	UJ	NL	11000	UJ	NL	2400	UJ	NL	15000	UJ	NL	13000	UJ	NL	11000	UJ	NL	2200	UJ
88-75-5	2-Nitrophenol	NL	NL	4500	UJ	NL	560	UJ	NL	850	UJ	NL	4200	UJ	NL	960	UJ	NL	5900	UJ	NL	5200	UJ	NL	4400	UJ	NL	860	UJ
91-94-1	3,3'-Dichlorobenzidine	NL	NL	4500	UJ	NL	560	UJ	NL	850	UJ	NL	4200	UJ	NL	960	UJ	NL	5900	UJ	NL	5200	UJ	NL	4400	UJ	NL	860	UJ
99-09-2	3-Nitroaniline	NL	NL	11000	UJ	NL	1400	UJ	NL	2100	UJ	NL	11000	UJ	NL	2400	UJ	NL	15000	UJ	NL	13000	UJ	NL	11000	UJ	NL	2200	UJ
534-52-1	4,6-Dinitro-2-methylphenol	NL	NL	11000	UJ	NL	1400	UJ	NL	2100	UJ	NL	11000	UJ	NL	2400	UJ	NL	15000	UJ	NL	13000	UJ	NL	11000	UJ	NL	2200	UJ
101-55-3	4-Bromophenyl-phenylether	NL	NL	4500	UJ	NL	560	UJ	NL	850	UJ	NL	4200	UJ	NL	960	UJ	NL	5900	UJ	NL	5200	UJ	NL	4400	UJ	NL	860	UJ
59-50-7	4-Chloro-3-methylphenol	NL	NL	4500	UJ	NL	560	UJ	NL	850	UJ	NL	4200	UJ	NL	960	UJ	NL	5900	UJ	NL	5200	UJ	NL	4400	UJ	NL	860	UJ
106-47-8	4-Chloroaniline	NL	NL	4500	UJ	NL	560	UJ	NL	850	UJ	NL	4200	UJ	NL	960	UJ	NL	5900	UJ	NL	5200	UJ	NL	4400	UJ	NL	860	UJ
7005-72-3	4-Chlorophenyl-phenylether	NL	NL	4500	UJ	NL	560	UJ	NL	850	UJ	NL	4200	UJ	NL	960	UJ	NL	5900	UJ	NL	5200	UJ	NL	4400	UJ	NL	860	UJ
106-44-5	4-Methylphenol	NL	NL	4500	UJ	NL	560	UJ	NL	850	UJ	NL	4200	UJ	NL	960	UJ	NL	5900	UJ	NL	5200	UJ	NL	4400	UJ	NL	860	UJ
100-01-6	4-Nitroaniline	NL	NL	11000	UJ	NL	1400	UJ	NL	2100	UJ	NL	11000	UJ	NL	2400	UJ	NL	15000	UJ	NL	13000	UJ	NL	11000	UJ	NL	2200	UJ
100-02-7	4-Nitrophenol	NL	NL	11000	UJ	NL	1400	UJ	NL	2100	UJ	NL	11000	UJ	NL	2400	UJ	NL	15000	UJ	NL	13000	UJ	NL	11000	UJ	NL	2200	UJ
83-32-9	Acenaphthene	240	12336	4500	UJ	3936	560	UJ	6936	850	UJ	14280	4200	UJ	24480	960	UJ	28800	5900	UJ	28800	5200	UJ	20928	4400	UJ	12216	860	UJ
208-96-8	Acenaphthylene	NL	NL	4500	UJ	NL	560	UJ	NL	850	UJ	NL	4200	UJ	NL	960	UJ	NL	5900	UJ	NL	5200	UJ	NL	4400	UJ	NL	860	UJ
98-86-2	Acetophenone	NL	NL	4500	UJ	NL	560	UJ	NL	850	UJ	NL	4200	UJ	NL	960	UJ	NL	5900	UJ	NL	5200	UJ	NL	4400	UJ	NL	860	UJ
120-12-7	Anthracene	107	5499 8	4500	UJ	1754.8	560	UJ	3092 3	850	UJ	6366 5	4200	UJ	10914	960	UJ	12840	5900	UJ	12840	5200	UJ	9330.4	4400	UJ	5446 3	860	UJ
1912-24-9	Atrazine	NL	NL	4500	UJ	NL	560	UJ	NL	850	UJ	NL	4200	UJ	NL	960	UJ	NL	5900	UJ	NL	5200	UJ	NL	4400	UJ	NL	860	UJ
100-52-7	Benzaldehyde	NL	NL	0	R	NL	0	R	NL	0	R	NL	730	J	NL	0	R	NL	0	R	NL	0	R	NL	4400	UJ	NL	89	J
56-55-3	Benzo(a)anthracene	12	616 8	4500	UJ	196 8	560	UJ	346 8	230	J	714	4200	UJ	1224	100	J	1440	5900	UJ	1440	5200	UJ	1046 4	4400	UJ	610 8	860	UJ
50-32-8	Benzo(a)pyrene	0.7	35 98	4500	UJ	11.48	560	UJ	20 23	**210**	J	41.65	4200	UJ	71 4	**100**	J	84	5900	UJ	84	5200	UJ	61 04	4400	UJ	35 63	860	UJ
205-99-2	Benzo(b)fluoranthene	NL	NL	4500	UJ	NL	560	UJ	NL	200	J	NL	4200	UJ	NL	140	J	NL	5900	UJ	NL	5200	UJ	NL	4400	UJ	NL	90	J
191-24-2	Benzo(g,h,i)perylene	NL	NL	4500	UJ	NL	560	UJ	NL	100	J	NL	4200	UJ	NL	960	UJ	NL	5900	UJ	NL	5200	UJ	NL	4400	UJ	NL	860	UJ
207-08-9	Benzo(k)fluoranthene	NL	NL	4500	UJ	NL	560	UJ	NL	230	J	NL	4200	UJ	NL	960	UJ	NL	5900	UJ	NL	5200	UJ	NL	4400	UJ	NL	95	J
111-91-1	bis(2-Chloroethoxy)methane	NL	NL	4500	UJ	NL	560	UJ	NL	850	UJ	NL	4200	UJ	NL	960	UJ	NL	5900	UJ	NL	5200	UJ	NL	4400	UJ	NL	860	UJ
111-44-4	bis(2-Chloroethyl)ether	0 03	1 542	4500	UJ	0 492	560	UJ	0 867	850	UJ	1 785	4200	UJ	3 06	960	UJ	3 6	5900	UJ	3 6	5200	UJ	2 616	4400	UJ	1.527	860	UJ
117-81-7	bis(2-Ethylhexyl)phthalate	199 5	10254 3	4500	UJ	3271 8	560	UJ	5765 55	850	UJ	11870 25	4200	UJ	20349	960	UJ	23940	5900	UJ	23940	5200	UJ	17396 4	4400	UJ	10154 55	860	UJ
85-68-7	Butylbenzylphthalate	NL	NL	4500	UJ	NL	560	UJ	NL	850	UJ	NL	4200	UJ	NL	960	UJ	NL	5900	UJ	NL	5200	UJ	NL	4400	UJ	NL	860	UJ
105-60-2	Caprolactam	NL	NL	4500	UJ	NL	560	UJ	NL	850	UJ	NL	4200	UJ	NL	960	UJ	NL	5900	UJ	NL	5200	UJ	NL	4400	UJ	NL	860	UJ
86-74-8	Carbazole	NL	NL	4500	UJ	NL	560	UJ	NL	850	UJ	NL	4200	UJ	NL	960	UJ	NL	5900	UJ	NL	5200	UJ	NL	4400	UJ	NL	860	UJ
218-01-9	Chrysene	NL	NL	4500	UJ	NL	560	UJ	NL	290	J	NL	4200	UJ	NL	140	J	NL	5900	UJ	NL	5200	UJ	NL	4400	UJ	NL	860	UJ
53-70-3	Dibenz(a,h)anthracene	NL	NL	4500	UJ	NL	560	UJ	NL	850	UJ	NL	4200	UJ	NL	960	UJ	NL	5900	UJ	NL	5200	UJ	NL	4400	UJ	NL	860	UJ
132-64-9	Dibenzofuran	NL	NL	4500	UJ	NL	560	UJ	NL	850	UJ	NL	4200	UJ	NL	960	UJ	NL	5900	UJ	NL	5200	UJ	NL	4400	UJ	NL	860	UJ
84-66-2	Diethylphthalate	NL	NL	4500	UJ	NL	560	UJ	NL	850	UJ	NL	4200	UJ	NL	960	UJ	NL	5900	UJ	NL	5200	UJ	NL	4400	UJ	NL	860	UJ
131-11-3	Dimethylphthalate	NL	NL	4500	UJ	NL	560	UJ	NL	850	UJ	NL	4200	UJ	NL	960	UJ	NL	5900	UJ	NL	5200	UJ	NL	4400	UJ	NL	860	UJ
84-74-2	Di-n-butylphthalate	NL	NL	4500	UJ	NL	560	UJ	NL	850	UJ	NL	4200	UJ	NL	960	UJ	NL	5900	UJ	NL	5200	UJ	NL	4400	UJ	NL	860	UJ
117-84-0	Di-n-octylphthalate	NL	NL	4500	UJ	NL	560	UJ	NL	850	UJ	NL	4200	UJ	NL	960	UJ	NL	5900	UJ	NL	5200	UJ	NL	4400	UJ	NL	860	UJ
206-44-0	Fluoranthene	1340	68876	4500	UJ	21976	560	UJ	38726	610	J	79730	4200	UJ	136680	220	J	160800	5900	UJ	160800	5200	UJ	116848	4400	UJ	68206	150	J
86-73-7	Fluorene	38	1953.2	4500	UJ	623 2	560	UJ	1098.2	850	UJ	2261	4200	UJ	3876	960	UJ	4560	5900	UJ	4560	5200	UJ	3313 6	4400	UJ	1934 2	860	UJ
118-74-1	Hexachlorobenzene	NL	NL	4500	UJ	NL	560	UJ	NL	850	UJ	NL	4200	UJ	NL	960	UJ	NL	5900	UJ	NL	5200	UJ	NL	4400	UJ	NL	860	UJ
87-68-3	Hexachlorobutadiene	0 3	15.42	4500	UJ	4 92	560	UJ	8 67	850	UJ	17.85	4200	UJ	30 6	960	UJ	36	5900	UJ	36	5200	UJ	26.16	4400	UJ	15 27	860	UJ
77-47-4	Hexachlorocyclopentadiene	0 7	35 98	4500	UJ	11 48	560	UJ	20 23	850	UJ	41 65	4200	UJ	71.4	960	UJ	84	5900	UJ	84	5200	UJ	61 04	4400	UJ	35 63	860	UJ
67-72-1	Hexachloroethane	NL	NL	4500	UJ	NL	560	UJ	NL	850	UJ	NL	4200	UJ	NL	960	UJ	NL	5900	UJ	NL	5200	UJ	NL	4400	UJ	NL	860	UJ
193-39-5	Indeno(1,2,3-cd)pyrene	NL	NL	4500	UJ	NL	560	UJ	NL	120	J	NL	4200	UJ	NL	960	UJ	NL	5900	UJ	NL	5200	UJ	NL	4400	UJ	NL	860	UJ
78-59-1	Isophorone	NL	NL	4500	UJ	NL	560	UJ	NL	850	UJ	NL	4200	UJ	NL	960	UJ	NL	5900	UJ	NL	5200	UJ	NL	4400	UJ	NL	860	UJ
91-20-3	Naphthalene	38	1953 2	4500	UJ	623.2	560	UJ	1098 2	850	UJ	2261	4200	UJ	3876	960	UJ	4560	5900	UJ	4560	5200	UJ	3313.6	4400	UJ	1934 2	860	UJ
98-95-3	Nitrobenzene	NL	NL	4500	UJ	NL	560	UJ	NL	850	UJ	NL	4200	UJ	NL	960	UJ	NL	5900	UJ	NL	5200	UJ	NL	4400	UJ	NL	860	UJ
621-64-7	N-Nitroso-di-n-propylamine	NL	NL	4500	UJ	NL	560	UJ	NL	850	UJ	NL	4200	UJ	NL	960	UJ	NL	5900	UJ	NL	5200	UJ	NL	4400	UJ	NL	860	UJ
86-30-6	N-Nitrosodiphenylamine	NL	NL	4500	UJ	NL	560	UJ	NL	850	UJ	NL	4200	UJ	NL	960	UJ	NL	5900	UJ	NL	5200	UJ	NL	4400	UJ	NL	860	UJ
87-86-5	Pentachlorophenol	40	2056	11000	UJ	656	1400	UJ	1156	2100	UJ	2380	11000	UJ	4080	2400	UJ	4800	15000	UJ	4800	13000	UJ	3488	11000	UJ	2036	2200	UJ
85-01-8	Phenanthrene	160	8224	4500	UJ	2624	560	UJ	4624	350	J	9520	4200	UJ	16320	120	J	19200	5900	UJ	19200	5200	UJ	13952	4400	UJ	8144	860	UJ
108-95-2	Phenol	0 6	30 84	4500	UJ	9 84	560	UJ	17 34	850	UJ	35 7	4200	UJ	61 2	960	UJ	72	5900	UJ	72	5200	UJ	52.32	4400	UJ	30 54	860	UJ
129-00-0	Pyrene	NL	NL	4500	UJ	NL	560	UJ	NL	460	J	NL	4200	UJ	NL	200	J	NL	5900	UJ	NL	5200	UJ	NL	4400	UJ	NL	130	J
	Pestcide/PCB Organics																												
72-54-8	4,4'-DDD	0 01	0 514	**160**	DJ	0 164	5 5	UJ	0 289	8.6	UJ	0.595	**150**	DJ	1.02	9 6	UJ	1 2	12	UJ	1 2	**96**	J	0 872	8.8	UJ	0.509	8 7	UJ
72-55-9	4,4'-DDE	0 01	0 514	**83**	J	0 164	5 5	UJ	0 289	8 6	UJ	0 595	**76**	J	1 02	9.6	UJ	1 2	**16**	J	1 2	**66**	J	0 872	8 8	UJ	0 509	8 7	UJ

Table 1-13
Sample-Specific Sediment Screening Criteria and Sediment Data
Smithtown Groundwater Contamination Site
Smithtown, New York

		Sample Code	SDW-005-B			SDW-006-A			SDW-006-B			SDW-007-A			SDW-007-B			SDW-008-A			SDW-008-B			SDW-009-A			SDW-009-B		
		Sample Name																											
		Sample Date	**4/13/2001**			**4/13/2001**			**4/13/2001**			**4/16/2001**			**4/16/2001**			**4/16/2001**			**4/16/2001**			**4/17/2001**			**4/17/2001**		
Cas Rn	**Chemical Name**	**Depth**	**18 to 24**			**0 to 6**			**18 to 24**			**0 to 6**			**18 to 24**			**0 to 6**			**18 to 24**			**0 to 6**			**18 to 24**		
TOC	Total organic carbon	gOC/kg	51.4			16.4			28.9			59.5			102			123			129			87.2			50.9		
TOC	Total organic carbon	%OC	5.14%			1.64%			2.89%			5.95%			10.20%			12.30%			12.90%			8.72%			5.09%		
		Screening Criteria (ug/gOC)	Screening Criteria (ug/kg)	Result (ug/kg)		Screening Criteria (ug/kg)	Result (ug/kg)		Screening Criteria (ug/kg)	Result (ug/kg)		Screening Criteria (ug/kg)	Result (ug/kg)		Screening Criteria (ug/kg)	Result (ug/kg)		Screening Criteria (ug/kg)	Result (ug/kg)		Screening Criteria (ug/kg)	Result (ug/kg)		Screening Criteria (ug/kg)	Result (ug/kg)		Screening Criteria (ug/kg)	Result (ug/kg)	
50-29-3	4,4'-DDT	0.01	0.514	9.2	UJ	0.164	5.5	UJ	0.289	8.6	UJ	0.595	8.4	UJ	1.02	9.6	UJ	1.2	12	UJ	1.2	16		0.872	8.8	UJ	0.509	8.7	UJ
309-00-2	Aldrin	0.1	5.14	4.7	UJ	1.64	2.9	UJ	2.89	4.4	UJ	5.95	4.3	UJ	10.2	4.9	UJ	12	6	UJ	12	5.4	UJ	8.72	4.5	UJ	5.09	4.5	UJ
319-84-6	alpha-BHC	0.03	1.542	4.7	UJ	0.492	2.9	UJ	0.867	4.4	UJ	1.785	4.3	UJ	3.06	4.9	UJ	3.6	6	UJ	3.6	5.4	UJ	2.616	4.5	UJ	1.527	4.5	UJ
5103-71-9	alpha-Chlordane	0.001	0.0514	4.7	UJ	0.0164	2.9	UJ	0.0289	4.4	UJ	0.0595	4.3	UJ	0.102	4.9	UJ	0.12	6	UJ	0.12	5.4	UJ	0.0872	4.5	UJ	0.0509	4.5	UJ
12674-11-2	Aroclor-1016	0.0008	0.04112	92	UJ	0.01312	55	UJ	0.02312	86	UJ	0.0476	84	UJ	0.0816	95	UJ	0.096	120	UJ	0.096	100	UJ	0.06976	88	UJ	0.04072	87	UJ
11104-28-2	Aroclor-1221	0.0008	0.04112	190	UJ	0.01312	110	UJ	0.02312	180	UJ	0.0476	170	UJ	0.0816	190	UJ	0.096	240	UJ	0.096	210	UJ	0.06976	180	UJ	0.04072	180	UJ
11141-16-5	Aroclor-1232	0.0008	0.04112	92	UJ	0.01312	55	UJ	0.02312	86	UJ	0.0476	84	UJ	0.0816	95	UJ	0.096	120	UJ	0.096	100	UJ	0.06976	88	UJ	0.04072	87	UJ
53469-21-9	Aroclor-1242	0.0008	0.04112	92	UJ	0.01312	55	UJ	0.02312	86	UJ	0.0476	84	UJ	0.0816	95	UJ	0.096	120	UJ	0.096	100	UJ	0.06976	88	UJ	0.04072	87	UJ
12672-29-6	Aroclor-1248	0.0008	0.04112	92	UJ	0.01312	55	UJ	0.02312	86	UJ	0.0476	84	UJ	0.0816	95	UJ	0.096	120	UJ	0.096	100	UJ	0.06976	88	UJ	0.04072	87	UJ
11097-69-1	Aroclor-1254	0.0008	0.04112	92	UJ	0.01312	55	UJ	0.02312	86	UJ	0.0476	84	UJ	0.0816	95	UJ	0.096	120	UJ	0.096	100	UJ	0.06976	88	UJ	0.04072	87	UJ
11096-82-5	Aroclor-1260	0.0008	0.04112	92	UJ	0.01312	55	UJ	0.02312	86	UJ	0.0476	84	UJ	0.0816	95	UJ	0.096	120	UJ	0.096	100	UJ	0.06976	88	UJ	0.04072	87	UJ
319-85-7	beta-BHC	0.03	1.542	4.7	UJ	0.492	2.9	UJ	0.867	4.4	UJ	1.785	4.3	UJ	3.06	4.9	UJ	3.6	6	UJ	3.6	5.4	UJ	2.616	4.5	UJ	1.527	4.5	UJ
319-86-8	delta-BHC	0.03	1.542	4.7	UJ	0.492	2.9	UJ	0.867	4.4	UJ	1.785	4.3	UJ	3.06	4.9	UJ	3.6	6	UJ	3.6	5.4	UJ	2.616	4.5	UJ	1.527	4.5	UJ
60-57-1	Dieldrin	0.1	5.14	**19**	**J**	1.64	5.5	UJ	2.89	8.6	UJ	5.95	17	J	10.2	9.6	UJ	12	12	UJ	12	**12**	**J**	8.72	8.8	UJ	5.09	8.7	UJ
959-98-8	Endosulfan I	0.004	0.2056	4.7	UJ	0.0656	2.9	UJ	0.1156	4.4	UJ	0.238	4.3	UJ	0.408	4.9	UJ	0.48	6	UJ	0.48	5.4	UJ	0.3488	4.5	UJ	0.2036	4.5	UJ
33213-65-9	Endosulfan II	0.004	0.2056	9.2	UJ	0.0656	5.5	UJ	0.1156	8.6	UJ	0.238	8.4	UJ	0.408	9.6	UJ	0.48	12	UJ	0.48	10	UJ	0.3488	8.8	UJ	0.2036	8.7	UJ
1031-07-8	Endosulfan sulfate	NL	NL	9.2	UJ	NL	5.5	UJ	NL	8.6	UJ	NL	8.4	UJ	NL	9.6	UJ	NL	12	UJ	NL	10	UJ	NL	8.8	UJ	NL	8.7	UJ
72-20-8	Endrin	0.73	37.522	9.2	UJ	11.972	5.5	UJ	21.097	8.6	UJ	43.435	8.4	UJ	74.46	9.6	UJ	87.6	12	UJ	87.6	10	UJ	63.656	8.8	UJ	37.157	8.7	UJ
7421-93-4	Endrin aldehyde	NL	NL	9.2	UJ	NL	5.5	UJ	NL	8.6	UJ	NL	8.4	UJ	NL	9.6	UJ	NL	12	UJ	NL	10	UJ	NL	8.8	UJ	NL	8.7	UJ
53494-70-5	Endrin ketone	NL	NL	9.2	UJ	NL	5.5	UJ	NL	8.6	UJ	NL	8.4	UJ	NL	9.6	UJ	NL	12	UJ	NL	10	UJ	NL	8.8	UJ	NL	8.7	UJ
58-89-9	gamma-BHC (Lindane)	0.03	1.542	4.7	UJ	0.492	2.9	UJ	0.867	4.4	UJ	1.785	4.3	UJ	3.06	4.9	UJ	3.6	**6**	**J**	3.6	5.4	UJ	2.616	4.5	UJ	1.527	4.5	UJ
5103-74-2	gamma-Chlordane	0.001	0.0514	4.7	UJ	0.0164	2.9	UJ	0.0289	4.4	UJ	0.0595	4.3	UJ	0.102	4.9	UJ	0.12	6	UJ	0.12	5.4	UJ	0.0872	4.5	UJ	0.0509	4.5	UJ
76-44-8	Heptachlor	0.0008	0.04112	4.7	UJ	0.01312	2.9	UJ	0.02312	4.4	UJ	0.0476	4.3	UJ	0.0816	4.9	UJ	0.096	6	UJ	0.096	5.4	UJ	0.06976	4.5	UJ	0.04072	4.5	UJ
1024-57-3	Heptachlor epoxide	0.0008	0.04112	4.7	UJ	0.01312	2.9	UJ	0.02312	4.4	UJ	0.0476	4.3	UJ	0.0816	4.9	UJ	0.096	6	UJ	0.096	5.4	UJ	0.06976	4.5	UJ	0.04072	4.5	UJ
72-43-5	Methoxychlor	0.6	30.84	47	UJ	9.84	29	UJ	17.34	44	UJ	35.7	43	UJ	61.2	49	UJ	72	60	UJ	72	54	UJ	52.32	45	UJ	30.54	45	UJ
8001-35-2	Toxaphene	0.01	0.514	470	UJ	0.164	290	UJ	0.289	440	UJ	0.595	430	UJ	1.02	490	UJ	1.2	600	UJ	1.2	540	UJ	0.872	450	UJ	0.509	450	UJ

Table 1-13
Sample-Specific Sediment Screening Criteria and Sediment Data
Smithtown Groundwater Contamination Site
Smithtown, New York

		Sample Code	SDW-010-A			SDW-010-B			SDW-011-A			SDW-011-B			SDW-012-A			SDW-012-B			SDW-013-A			SDW-013-B			SDW-014-A			SDW-014-B		
		Sample Name																														
		Sample Date	4/17/2001			4/17/2001			4/18/2001			4/18/2001			4/18/2001			4/18/2001			4/19/2001			4/19/2001			4/19/2001			4/19/2001		
Cas Rn	Chemical Name	Depth	0 to 6			18 to 24			0 to 6			18 to 24			0 to 6			18 to 24			0 to 6			18 to 24			0 to 6			18 to 24		
TOC	Total organic carbon	gOC/kg	152			163			118			154			40.7			47.9			152			118			201			205		
TOC	Total organic carbon	%OC	15.20%			16.30%			11.80%			15.40%			4.07%			4.79%			15.20%			11.80%			20.10%			20.50%		
		Screening Criteria (ug/gOC)	Screening Criteria (ug/kg)	Result (ug/kg)		Screening Criteria (ug/kg)	Result (ug/kg)		Screening Criteria (ug/kg)	Result (ug/kg)		Screening Criteria (ug/kg)	Result (ug/kg)		Screening Criteria (ug/kg)	Result (ug/kg)		Screening Criteria (ug/kg)	Result (ug/kg)		Screening Criteria (ug/kg)	Result (ug/kg)		Screening Criteria (ug/kg)	Result (ug/kg)		Screening Criteria (ug/kg)	Result (ug/kg)		Screening Criteria (ug/kg)	Result (ug/kg)	
	Volatile Organic Compounds																															
71-55-6	1,1,1-Trichloroethane	NL	NL	78	UJ	NL	78	UJ	NL	78	UJ	NL	68	UJ	NL	19	UJ	NL	23	UJ	NL	85	UJ	NL	81	UJ	NL	130	UJ	NL	120	UJ
79-34-5	1,1,2,2-Tetrachloroethane	0.3	36	78	UJ	36	78	UJ	35.4	78	UJ	36	68	UJ	12.21	19	UJ	14.37	23	UJ	36	85	UJ	35.4	81	UJ	36	130	UJ	36	120	UJ
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	NL	NL	78	UJ	NL	78	UJ	NL	78	UJ	NL	68	UJ	NL	19	UJ	NL	23	UJ	NL	85	UJ	NL	81	UJ	NL	130	UJ	NL	120	UJ
79-00-5	1,1,2-Trichloroethane	0.6	72	78	UJ	72	78	UJ	70.8	78	UJ	72	68	UJ	24.42	19	UJ	28.74	23	UJ	72	85	UJ	70.8	81	UJ	72	130	UJ	72	120	UJ
75-34-3	1,1-Dichloroethane	NL	NL	78	UJ	NL	78	UJ	NL	78	UJ	NL	68	UJ	NL	19	UJ	NL	23	UJ	NL	85	UJ	NL	81	UJ	NL	130	UJ	NL	120	UJ
75-35-4	1,1-Dichloroethene	0.02	2.4	78	UJ	2.4	78	UJ	2.36	78	UJ	2.4	68	UJ	0.814	19	UJ	0.958	23	UJ	2.4	85	UJ	2.36	81	UJ	2.4	130	UJ	2.4	120	UJ
120-82-1	1,2,4-Trichlorobenzene	91	10920	78	UJ	10920	78	UJ	10738	78	UJ	10920	68	UJ	3703.7	19	UJ	4358.9	23	UJ	10920	85	UJ	10738	81	UJ	10920	130	UJ	10920	120	UJ
96-12-8	1,2-Dibromo-3-chloropropane	NL	NL	78	UJ	NL	78	UJ	NL	78	UJ	NL	68	UJ	NL	19	UJ	NL	23	UJ	NL	85	UJ	NL	81	UJ	NL	130	UJ	NL	120	UJ
106-93-4	1,2-Dibromoethane	NL	NL	78	UJ	NL	78	UJ	NL	78	UJ	NL	68	UJ	NL	19	UJ	NL	23	UJ	NL	85	UJ	NL	81	UJ	NL	130	UJ	NL	120	UJ
95-50-1	1,2-Dichlorobenzene	12	1440	78	UJ	1440	78	UJ	1416	78	UJ	1440	68	UJ	488.4	19	UJ	574.8	23	UJ	1440	85	UJ	1416	81	UJ	1440	130	UJ	1440	120	UJ
107-06-2	1,2-Dichloroethane	0.7	84	78	UJ	84	78	UJ	82.6	78	UJ	84	68	UJ	28.49	19	UJ	33.53	23	UJ	84	85	UJ	82.6	81	UJ	84	130	UJ	84	120	UJ
78-87-5	1,2-Dichloropropane	NL	NL	78	UJ	NL	78	UJ	NL	78	UJ	NL	68	UJ	NL	19	UJ	NL	23	UJ	NL	85	UJ	NL	81	UJ	NL	130	UJ	NL	120	UJ
541-73-1	1,3-Dichlorobenzene	12	1440	78	UJ	1440	78	UJ	1416	78	UJ	1440	68	UJ	488.4	19	UJ	574.8	23	UJ	1440	85	UJ	1416	81	UJ	1440	130	UJ	1440	120	UJ
106-46-7	1,4-Dichlorobenzene	12	1440	78	UJ	1440	78	UJ	1416	78	UJ	1440	68	UJ	488.4	19	UJ	574.8	23	UJ	1440	85	UJ	1416	81	UJ	1440	130	UJ	1440	120	UJ
78-93-3	2-Butanone	NL	NL	78	UJ	NL	78	UJ	NL	78	UJ	NL	68	UJ	NL	19	UJ	NL	23	UJ	NL	85	UJ	NL	81	UJ	NL	130	UJ	NL	120	UJ
591-78-6	2-Hexanone	NL	NL	78	UJ	NL	78	UJ	NL	78	UJ	NL	68	UJ	NL	19	UJ	NL	23	UJ	NL	85	UJ	NL	81	UJ	NL	130	UJ	NL	120	UJ
108-10-1	4-Methyl-2-pentanone	NL	NL	78	UJ	NL	78	UJ	NL	78	UJ	NL	68	UJ	NL	19	UJ	NL	23	UJ	NL	85	UJ	NL	81	UJ	NL	130	UJ	NL	120	UJ
67-64-1	Acetone	NL	NL	78	UJ	NL	78	UJ	NL	200	UJ	NL	110	UJ	NL	38	UJ	NL	79	UJ	NL	160	J	NL	170	J	NL	270	J	NL	330	J
71-43-2	Benzene	0.6	72	78	UJ	72	78	UJ	70.8	78	UJ	72	68	UJ	24.42	19	UJ	28.74	23	UJ	72	85	UJ	70.8	81	UJ	72	130	UJ	72	120	UJ
75-27-4	Bromodichloromethane	NL	NL	78	UJ	NL	78	UJ	NL	78	UJ	NL	68	UJ	NL	19	UJ	NL	23	UJ	NL	85	UJ	NL	81	UJ	NL	130	UJ	NL	120	UJ
75-25-2	Bromoform	NL	NL	78	UJ	NL	78	UJ	NL	78	UJ	NL	68	UJ	NL	19	UJ	NL	23	UJ	NL	85	UJ	NL	81	UJ	NL	130	UJ	NL	120	UJ
74-83-9	Bromomethane	NL	NL	78	UJ	NL	78	UJ	NL	78	UJ	NL	68	UJ	NL	19	UJ	NL	23	UJ	NL	85	UJ	NL	81	UJ	NL	130	UJ	NL	120	UJ
75-15-0	Carbon Disulfide	NL	NL	78	UJ	NL	78	UJ	NL	33	J	NL	68	UJ	NL	19	UJ	NL	23	UJ	NL	85	UJ	NL	81	UJ	NL	80	J	NL	63	J
56-23-5	Carbon Tetrachloride	0.6	72	78	UJ	72	78	UJ	70.8	78	UJ	72	68	UJ	24.42	19	UJ	28.74	23	UJ	72	85	UJ	70.8	81	UJ	72	130	UJ	72	120	UJ
108-90-7	Chlorobenzene	3.5	420	78	UJ	420	78	UJ	413	78	UJ	420	68	UJ	142.45	19	UJ	167.65	23	UJ	420	85	UJ	413	81	UJ	420	130	UJ	420	120	UJ
75-00-3	Chloroethane	NL	NL	78	UJ	NL	78	UJ	NL	78	UJ	NL	68	UJ	NL	19	UJ	NL	23	UJ	NL	85	UJ	NL	81	UJ	NL	130	UJ	NL	120	UJ
67-66-3	Chloroform	NL	NL	78	UJ	NL	78	UJ	NL	78	UJ	NL	68	UJ	NL	19	UJ	NL	23	UJ	NL	85	UJ	NL	81	UJ	NL	130	UJ	NL	120	UJ
74-87-3	Chloromethane	NL	NL	78	UJ	NL	78	UJ	NL	78	UJ	NL	68	UJ	NL	19	UJ	NL	23	UJ	NL	85	UJ	NL	81	UJ	NL	130	UJ	NL	120	UJ
156-59-2	cis-1,2-Dichloroethene	NL	NL	78	UJ	NL	78	UJ	NL	78	UJ	NL	68	UJ	NL	19	UJ	NL	23	UJ	NL	85	UJ	NL	81	UJ	NL	130	UJ	NL	120	UJ
10061-01-5	cis-1,3-Dichloropropene	NL	NL	78	UJ	NL	78	UJ	NL	78	UJ	NL	68	UJ	NL	19	UJ	NL	23	UJ	NL	85	UJ	NL	81	UJ	NL	130	UJ	NL	120	UJ
110-82-7	Cyclohexane	NL	NL	78	UJ	NL	78	UJ	NL	78	UJ	NL	68	UJ	NL	19	UJ	NL	23	UJ	NL	85	UJ	NL	81	UJ	NL	130	UJ	NL	120	UJ
124-48-1	Dibromochloromethane	NL	NL	78	UJ	NL	78	UJ	NL	78	UJ	NL	68	UJ	NL	19	UJ	NL	23	UJ	NL	85	UJ	NL	81	UJ	NL	130	UJ	NL	120	UJ
75-71-8	Dichlorodifluoromethane	NL	NL	78	UJ	NL	78	UJ	NL	78	UJ	NL	68	UJ	NL	19	UJ	NL	23	UJ	NL	85	UJ	NL	81	UJ	NL	130	UJ	NL	120	UJ
100-41-4	Ethylbenzene	6.4	768	78	UJ	768	78	UJ	755.2	78	UJ	768	68	UJ	260.48	19	UJ	306.56	23	UJ	768	85	UJ	755.2	81	UJ	768	130	UJ	768	120	UJ
98-82-8	Isopropylbenzene	12	1440	78	UJ	1440	78	UJ	1416	78	UJ	1440	68	UJ	488.4	19	UJ	574.8	23	UJ	1440	85	UJ	1416	81	UJ	1440	130	UJ	1440	120	UJ
79-20-9	Methyl Acetate	NL	NL	78	UJ	NL	78	UJ	NL	78	UJ	NL	68	UJ	NL	19	UJ	NL	23	UJ	NL	85	UJ	NL	81	UJ	NL	130	UJ	NL	120	UJ
1634-04-4	Methyl Tert-Butyl Ether	NL	NL	78	UJ	NL	78	UJ	NL	78	UJ	NL	68	UJ	NL	19	UJ	NL	23	UJ	NL	85	UJ	NL	81	UJ	NL	130	UJ	NL	120	UJ
75-09-2	Methylene Chloride	NL	NL	94	UJ	NL	94	UJ	NL	150	UJ	NL	170	UJ	NL	30	UJ	NL	32	UJ	NL	160	UJ	NL	140	UJ	NL	260	J	NL	220	J
108-87-2	Metylcyclohexane	NL	NL	78	UJ	NL	78	UJ	NL	78	UJ	NL	68	UJ	NL	19	UJ	NL	23	UJ	NL	85	UJ	NL	81	UJ	NL	130	UJ	NL	120	UJ
100-42-5	Styrene	NL	NL	78	UJ	NL	78	UJ	NL	78	UJ	NL	68	UJ	NL	19	UJ	NL	23	UJ	NL	85	UJ	NL	81	UJ	NL	130	UJ	NL	120	UJ
127-18-4	Tetrachloroethene	0.8	96	78	UJ	96	78	UJ	94.4	4	J	96	25	J	32.56	19	UJ	38.32	23	UJ	96	85	UJ	94.4	81	UJ	96	130	UJ	96	120	UJ
108-88-3	Toluene	45	5400	78	UJ	5400	78	UJ	5310	2	J	5400	16	J	1831.5	19	UJ	2155.5	23	UJ	5400	85	UJ	5310	81	UJ	5400	3	UJ	5400	120	UJ
156-60-5	trans-1,2-Dichloroethene	NL	NL	78	UJ	NL	78	UJ	NL	78	UJ	NL	68	UJ	NL	19	UJ	NL	23	UJ	NL	85	UJ	NL	81	UJ	NL	130	UJ	NL	120	UJ
10061-02-6	trans-1,3-Dichloropropene	NL	NL	78	UJ	NL	78	UJ	NL	78	UJ	NL	68	UJ	NL	19	UJ	NL	23	UJ	NL	85	UJ	NL	81	UJ	NL	130	UJ	NL	120	UJ
79-01-6	Trichloroethene	2	240	78	UJ	240	78	UJ	236	78	UJ	240	18	J	81.4	19	UJ	95.8	23	UJ	240	85	UJ	236	81	UJ	240	130	UJ	240	120	UJ
75-69-4	Trichlorofluoromethane	NL	NL	78	UJ	NL	78	UJ	NL	78	UJ	NL	68	UJ	NL	19	UJ	NL	23	UJ	NL	85	UJ	NL	81	UJ	NL	130	UJ	NL	120	UJ
75-01-4	Vinyl Chloride	0.07	8.4	78	UJ	8.4	78	UJ	8.26	78	UJ	8.4	68	UJ	2.849	19	UJ	3.353	23	UJ	8.4	85	UJ	8.26	81	UJ	8.4	130	UJ	8.4	120	UJ
1330-20-7	Xylenes (total)	27	3240	78	UJ	3240	78	UJ	3186	78	UJ	3240	68	UJ	1098.9	19	UJ	1293.3	23	UJ	3240	85	UJ	3186	81	UJ	3240	130	UJ	3240	120	UJ
	Semi-Volatile Organics																															
92-52-4	1,1'-Biphenyl	NL	NL	7100	UJ	NL	1600	UJ	NL	1600	UJ	NL	1600	UJ	NL	5000	UJ	NL	3100	UJ	NL	17000	UJ	NL	16000	UJ	NL	11000	UJ	NL	13000	UJ
108-60-1	2,2'-oxybis(1-Chloropropane)	NL	NL	7100	UJ	NL	1600	UJ	NL	1600	UJ	NL	1600	UJ	NL	5000	UJ	NL	3100	UJ	NL	17000	UJ	NL	16000	UJ	NL	11000	UJ	NL	13000	UJ
95-95-4	2,4,5-Trichlorophenol	NL	NL	18000	UJ	NL	4100	UJ	NL	4100	UJ	NL	3900	UJ	NL	13000	UJ	NL	7900	UJ	NL	43000	UJ	NL	41000	UJ	NL	27000	UJ	NL	32000	UJ
88-06-2	2,4,6-Trichlorophenol	NL	NL	7100	UJ	NL	1600	UJ	NL	1600	UJ	NL	1600	UJ	NL	5000	UJ	NL	3100	UJ	NL	17000	UJ	NL	16000	UJ	NL	11000	UJ	NL	13000	UJ
120-83-2	2,4-Dichlorophenol	NL	NL	7100	UJ	NL	1600	UJ	NL	1600	UJ	NL	1600	UJ	NL	5000	UJ	NL	3100	UJ	NL	17000	UJ	NL	16000	UJ	NL	11000	UJ	NL	13000	UJ
105-67-9	2,4-Dimethylphenol	NL	NL	7100	UJ	NL	1600	UJ	NL	1600	UJ	NL	1600	UJ	NL	5000	UJ	NL	3100	UJ	NL	17000	UJ	NL	16000	UJ	NL	11000	UJ	NL	13000	UJ
51-28-5	2,4-Dinitrophenol	NL	NL	18000	UJ	NL	4100	UJ	NL	4100	UJ	NL	3900	UJ	NL	13000	UJ	NL	7900	UJ	NL	43000	UJ	NL	41000	UJ	NL	27000	UJ	NL	32000	UJ
121-14-2	2,4-Dinitrotoluene	NL	NL	7100	UJ	NL	1600	UJ	NL	1600	UJ	NL	1600	UJ	NL	5000	UJ	NL	3100	UJ	NL	17000	UJ	NL	16000	UJ	NL	11000	UJ	NL	13000	UJ
606-20-2	2,6-Dinitrotoluene	NL	NL	7100	UJ	NL	1600	UJ	NL	1600	UJ	NL	1600	UJ	NL	5000	UJ	NL	3100	UJ	NL	17000	UJ	NL	16000	UJ	NL	11000	UJ	NL	13000	UJ

Table 1-13
Sample-Specific Sediment Screening Criteria and Sediment Data
Smithtown Groundwater Contamination Site
Smithtown, New York

		Sample Code	SDW-010-A			SDW-010-B			SDW-011-A			SDW-011-B			SDW-012-A			SDW-012-B			SDW-013-A			SDW-013-B			SDW-014-A			SDW-014-B		
		Sample Name																														
		Sample Date	4/17/2001			4/17/2001			4/18/2001			4/18/2001			4/18/2001			4/18/2001			4/19/2001			4/19/2001			4/19/2001			4/19/2001		
Cas Rn	Chemical Name	Depth	0 to 6			18 to 24			0 to 6			18 to 24			0 to 6			18 to 24			0 to 6			18 to 24			0 to 6			18 to 24		
TOC	Total organic carbon	gOC/kg	152			163			118			154			40 7			47 9			152			118			201			205		
TOC	Total organic carbon	%OC	15.20%			16.30%			11.80%			15.40%			4.07%			4.79%			15.20%			11 80%			20.10%			20.50%		
		Screening Criteria (ug/gOC)	Screening Criteria (ug/kg)	Result (ug/kg)		Screening Criteria (ug/kg)	Result (ug/kg)		Screening Criteria (ug/kg)	Result (ug/kg)		Screening Criteria (ug/kg)	Result (ug/kg)		Screening Criteria (ug/kg)	Result (ug/kg)		Screening Criteria (ug/kg)	Result (ug/kg)		Screening Criteria (ug/kg)	Result (ug/kg)		Screening Criteria (ug/kg)	Result (ug/kg)		Screening Criteria (ug/kg)	Result (ug/kg)		Screening Criteria (ug/kg)	Result (ug/kg)	
91-58-7	2-Chloronaphthalene	NL	NL	7100	UJ	NL	1600	UJ	NL	1600	UJ	NL	1600	UJ	NL	5000	UJ	NL	3100	UJ	NL	17000	UJ	NL	16000	UJ	NL	11000	UJ	NL	13000	UJ
95-57-8	2-Chlorophenol	NL	NL	7100	UJ	NL	1600	UJ	NL	1600	UJ	NL	1600	UJ	NL	5000	UJ	NL	3100	UJ	NL	17000	UJ	NL	16000	UJ	NL	11000	UJ	NL	13000	UJ
91-57-6	2-Methylnaphthalene	30	3600	7100	UJ	3600	1600	UJ	3540	1600	UJ	3600	1600	UJ	1221	5000	UJ	1437	3100	UJ	3600	17000	UJ	3540	16000	UJ	3600	11000	UJ	3600	13000	UJ
95-48-7	2-Methylphenol	NL	NL	7100	UJ	NL	1600	UJ	NL	1600	UJ	NL	1600	UJ	NL	5000	UJ	NL	3100	UJ	NL	17000	UJ	NL	16000	UJ	NL	11000	UJ	NL	13000	UJ
88-74-4	2-Nitroaniline	NL	NL	18000	UJ	NL	4100	UJ	NL	4100	UJ	NL	3900	UJ	NL	13000	UJ	NL	7900	UJ	NL	43000	UJ	NL	41000	UJ	NL	27000	UJ	NL	32000	UJ
88-75-5	2-Nitrophenol	NL	NL	7100	UJ	NL	1600	UJ	NL	1600	UJ	NL	1600	UJ	NL	5000	UJ	NL	3100	UJ	NL	17000	UJ	NL	16000	UJ	NL	11000	UJ	NL	13000	UJ
91-94-1	3,3'-Dichlorobenzidine	NL	NL	7100	UJ	NL	1600	UJ	NL	1600	UJ	NL	1600	UJ	NL	5000	UJ	NL	3100	UJ	NL	17000	UJ	NL	16000	UJ	NL	11000	UJ	NL	13000	UJ
99-09-2	3-Nitroaniline	NL	NL	18000	UJ	NL	4100	UJ	NL	4100	UJ	NL	3900	UJ	NL	13000	UJ	NL	7900	UJ	NL	43000	UJ	NL	41000	UJ	NL	27000	UJ	NL	32000	UJ
534-52-1	4,6-Dinitro-2-methylphenol	NL	NL	18000	UJ	NL	4100	UJ	NL	4100	UJ	NL	3900	UJ	NL	13000	UJ	NL	7900	UJ	NL	43000	UJ	NL	41000	UJ	NL	27000	UJ	NL	32000	UJ
101-55-3	4-Bromophenyl-phenylether	NL	NL	7100	UJ	NL	1600	UJ	NL	1600	UJ	NL	1600	UJ	NL	5000	UJ	NL	3100	UJ	NL	17000	UJ	NL	16000	UJ	NL	11000	UJ	NL	13000	UJ
59-50-7	4-Chloro-3-methylphenol	NL	NL	7100	UJ	NL	1600	UJ	NL	1600	UJ	NL	1600	UJ	NL	5000	UJ	NL	3100	UJ	NL	17000	UJ	NL	16000	UJ	NL	11000	UJ	NL	13000	UJ
106-47-8	4-Chloroaniline	NL	NL	7100	UJ	NL	1600	UJ	NL	1600	UJ	NL	1600	UJ	NL	5000	UJ	NL	3100	UJ	NL	17000	UJ	NL	16000	UJ	NL	11000	UJ	NL	13000	UJ
7005-72-3	4-Chlorophenyl-phenylether	NL	NL	7100	UJ	NL	1600	UJ	NL	1600	UJ	NL	1600	UJ	NL	5000	UJ	NL	3100	UJ	NL	17000	UJ	NL	16000	UJ	NL	11000	UJ	NL	13000	UJ
106-44-5	4-Methylphenol	NL	NL	7100	UJ	NL	1600	UJ	NL	1600	UJ	NL	1600	UJ	NL	5000	UJ	NL	3100	UJ	NL	17000	UJ	NL	16000	UJ	NL	11000	UJ	NL	13000	UJ
100-01-6	4-Nitroaniline	NL	NL	18000	UJ	NL	4100	UJ	NL	4100	UJ	NL	3900	UJ	NL	13000	UJ	NL	7900	UJ	NL	43000	UJ	NL	41000	UJ	NL	27000	UJ	NL	32000	UJ
100-02-7	4-Nitrophenol	NL	NL	18000	UJ	NL	4100	UJ	NL	4100	UJ	NL	3900	UJ	NL	13000	UJ	NL	7900	UJ	NL	43000	UJ	NL	41000	UJ	NL	27000	UJ	NL	32000	UJ
83-32-9	Acenaphthene	240	28800	7100	UJ	28800	1600	UJ	28320	1600	UJ	28800	1600	UJ	9768	5000	UJ	11496	3100	UJ	28800	17000	UJ	28320	16000	UJ	28800	11000	UJ	28800	13000	UJ
208-96-8	Acenaphthylene	NL	NL	7100	UJ	NL	1600	UJ	NL	1600	UJ	NL	1600	UJ	NL	5000	UJ	NL	3100	UJ	NL	17000	UJ	NL	16000	UJ	NL	11000	UJ	NL	13000	UJ
98-86-2	Acetophenone	NL	NL	7100	UJ	NL	1600	UJ	NL	1600	UJ	NL	1600	UJ	NL	5000	UJ	NL	3100	UJ	NL	17000	UJ	NL	16000	UJ	NL	11000	UJ	NL	13000	UJ
120-12-7	Anthracene	107	12840	7100	UJ	12840	1600	UJ	12626	1600	UJ	12840	220	J	4354 9	5000	UJ	5125 3	3100	UJ	12840	17000	UJ	12626	16000	UJ	12840	11000	UJ	12840	13000	UJ
1912-24-9	Atrazine	NL	NL	7100	UJ	NL	1600	UJ	NL	1600	UJ	NL	1600	UJ	NL	5000	UJ	NL	3100	UJ	NL	17000	UJ	NL	16000	UJ	NL	11000	UJ	NL	13000	UJ
100-52-7	Benzaldehyde	NL	NL	7100	UJ	NL	960	J	NL	380	J	NL	250	J	NL	5000	UJ	NL	3100	UJ	NL	17000	UJ	NL	16000	UJ	NL	11000	UJ	NL	13000	UJ
56-55-3	Benzo(a)anthracene	12	1440	7100	UJ	1440	1600	UJ	1416	220	J	1440	380	J	488 4	5000	UJ	574 8	3100	UJ	1440	17000	UJ	1416	16000	UJ	1440	11000	UJ	1440	13000	UJ
50-32-8	Benzo(a)pyrene	0 7	84	7100	UJ	84	**170**	**J**	82 6	**180**	**J**	84	**240**	**J**	28 49	5000	UJ	33 53	3100	UJ	84	17000	UJ	82 6	16000	UJ	84	11000	UJ	84	13000	UJ
205-99-2	Benzo(b)fluoranthene	NL	NL	7100	UJ	NL	280	J	NL	220	J	NL	390	J	NL	5000	UJ	NL	3100	UJ	NL	17000	UJ	NL	16000	UJ	NL	11000	UJ	NL	13000	UJ
191-24-2	Benzo(g,h,i)perylene	NL	NL	7100	UJ	NL	1600	UJ	NL	1600	UJ	NL	1600	UJ	NL	5000	UJ	NL	3100	UJ	NL	17000	UJ	NL	16000	UJ	NL	11000	UJ	NL	13000	UJ
207-08-9	Benzo(k)fluoranthene	NL	NL	7100	UJ	NL	190	J	NL	310	J	NL	380	J	NL	5000	UJ	NL	3100	UJ	NL	17000	UJ	NL	16000	UJ	NL	11000	UJ	NL	13000	UJ
111-91-1	bis(2-Chloroethoxy)methane	NL	NL	7100	UJ	NL	1600	UJ	NL	1600	UJ	NL	1600	UJ	NL	5000	UJ	NL	3100	UJ	NL	17000	UJ	NL	16000	UJ	NL	11000	UJ	NL	13000	UJ
111-44-4	bis(2-Chloroethyl)ether	0 03	3 6	7100	UJ	3 6	1600	UJ	3.54	1600	UJ	3.6	1600	UJ	1.221	5000	UJ	1 437	3100	UJ	3 6	17000	UJ	3 54	16000	UJ	3 6	11000	UJ	3 6	13000	UJ
117-81-7	bis(2-Ethylhexyl)phthalate	199.5	23940	7100	UJ	23940	1600	UJ	23541	1600	UJ	23940	1600	UJ	8119 65	5000	UJ	9556 05	3100	UJ	23940	17000	UJ	23541	16000	UJ	23940	11000	UJ	23940	13000	UJ
85-68-7	Butylbenzylphthalate	NL	NL	7100	UJ	NL	1600	UJ	NL	1600	UJ	NL	1600	UJ	NL	5000	UJ	NL	3100	UJ	NL	17000	UJ	NL	16000	UJ	NL	11000	UJ	NL	13000	UJ
105-60-2	Caprolactam	NL	NL	7100	UJ	NL	1600	UJ	NL	1600	UJ	NL	1600	UJ	NL	5000	UJ	NL	3100	UJ	NL	17000	UJ	NL	16000	UJ	NL	11000	UJ	NL	13000	UJ
86-74-8	Carbazole	NL	NL	7100	UJ	NL	1600	UJ	NL	1600	UJ	NL	1600	UJ	NL	5000	UJ	NL	3100	UJ	NL	17000	UJ	NL	16000	UJ	NL	11000	UJ	NL	13000	UJ
218-01-9	Chrysene	NL	NL	7100	UJ	NL	200	J	NL	290	J	NL	390	J	NL	5000	UJ	NL	3100	UJ	NL	17000	UJ	NL	16000	UJ	NL	11000	UJ	NL	13000	UJ
53-70-3	Dibenz(a,h)anthracene	NL	NL	7100	UJ	NL	1600	UJ	NL	1600	UJ	NL	1600	UJ	NL	5000	UJ	NL	3100	UJ	NL	17000	UJ	NL	16000	UJ	NL	11000	UJ	NL	13000	UJ
132-64-9	Dibenzofuran	NL	NL	7100	UJ	NL	1600	UJ	NL	1600	UJ	NL	1600	UJ	NL	5000	UJ	NL	3100	UJ	NL	17000	UJ	NL	16000	UJ	NL	11000	UJ	NL	13000	UJ
84-66-2	Diethylphthalate	NL	NL	7100	UJ	NL	1600	UJ	NL	1600	UJ	NL	1600	UJ	NL	5000	UJ	NL	3100	UJ	NL	17000	UJ	NL	16000	UJ	NL	11000	UJ	NL	13000	UJ
131-11-3	Dimethylphthalate	NL	NL	7100	UJ	NL	1600	UJ	NL	1600	UJ	NL	1600	UJ	NL	5000	UJ	NL	3100	UJ	NL	17000	UJ	NL	16000	UJ	NL	11000	UJ	NL	13000	UJ
84-74-2	Di-n-butylphthalate	NL	NL	7100	UJ	NL	1600	UJ	NL	1600	UJ	NL	1600	UJ	NL	5000	UJ	NL	3100	UJ	NL	17000	UJ	NL	16000	UJ	NL	11000	UJ	NL	13000	UJ
117-84-0	Di-n-octylphthalate	NL	NL	7100	UJ	NL	1600	UJ	NL	1600	UJ	NL	1600	UJ	NL	5000	UJ	NL	3100	UJ	NL	17000	UJ	NL	16000	UJ	NL	11000	UJ	NL	13000	UJ
206-44-0	Fluoranthene	1340	160800	7100	UJ	160800	330	J	158120	600	J	160800	1800	J	54538	5000	UJ	64186	3100	UJ	160800	17000	UJ	158120	16000	UJ	160800	11000	UJ	160800	13000	UJ
86-73-7	Fluorene	38	4560	7100	UJ	4560	1600	UJ	4484	1600	UJ	4560	1600	UJ	1546 6	5000	UJ	1820 2	3100	UJ	4560	17000	UJ	4484	16000	UJ	4560	11000	UJ	4560	13000	UJ
118-74-1	Hexachlorobenzene	NL	NL	7100	UJ	NL	1600	UJ	NL	1600	UJ	NL	1600	UJ	NL	5000	UJ	NL	3100	UJ	NL	17000	UJ	NL	16000	UJ	NL	11000	UJ	NL	13000	UJ
87-68-3	Hexachlorobutadiene	0 3	36	7100	UJ	36	1600	UJ	35.4	1600	UJ	36	1600	UJ	12 21	5000	UJ	14 37	3100	UJ	36	17000	UJ	35.4	16000	UJ	36	11000	UJ	36	13000	UJ
77-47-4	Hexachlorocyclopentadiene	0 7	84	7100	UJ	84	1600	UJ	82 6	1600	UJ	84	1600	UJ	28 49	5000	UJ	33 53	3100	UJ	84	17000	UJ	82 6	16000	UJ	84	11000	UJ	84	13000	UJ
67-72-1	Hexachloroethane	NL	NL	7100	UJ	NL	1600	UJ	NL	1600	UJ	NL	1600	UJ	NL	5000	UJ	NL	3100	UJ	NL	17000	UJ	NL	16000	UJ	NL	11000	UJ	NL	13000	UJ
193-39-5	Indeno(1,2,3-cd)pyrene	NL	NL	7100	UJ	NL	1600	UJ	NL	1600	UJ	NL	1600	UJ	NL	5000	UJ	NL	3100	UJ	NL	17000	UJ	NL	16000	UJ	NL	11000	UJ	NL	13000	UJ
78-59-1	Isophorone	NL	NL	7100	UJ	NL	1600	UJ	NL	1600	UJ	NL	1600	UJ	NL	5000	UJ	NL	3100	UJ	NL	17000	UJ	NL	16000	UJ	NL	11000	UJ	NL	13000	UJ
91-20-3	Naphthalene	38	4560	7100	UJ	4560	1600	UJ	4484	1600	UJ	4560	1600	UJ	1546 6	5000	UJ	1820 2	3100	UJ	4560	17000	UJ	4484	16000	UJ	4560	11000	UJ	4560	13000	UJ
98-95-3	Nitrobenzene	NL	NL	7100	UJ	NL	1600	UJ	NL	1600	UJ	NL	1600	UJ	NL	5000	UJ	NL	3100	UJ	NL	17000	UJ	NL	16000	UJ	NL	11000	UJ	NL	13000	UJ
621-64-7	N-Nitroso-di-n-propylamine	NL	NL	7100	UJ	NL	1600	UJ	NL	1600	UJ	NL	1600	UJ	NL	5000	UJ	NL	3100	UJ	NL	17000	UJ	NL	16000	UJ	NL	11000	UJ	NL	13000	UJ
86-30-6	N-Nitrosodiphenylamine	NL	NL	7100	UJ	NL	1600	UJ	NL	1600	UJ	NL	1600	UJ	NL	5000	UJ	NL	3100	UJ	NL	17000	UJ	NL	16000	UJ	NL	11000	UJ	NL	13000	UJ
87-86-5	Pentachlorophenol	40	4800	18000	UJ	4800	4100	UJ	4720	4100	UJ	4800	3900	UJ	1628	13000	UJ	1916	7900	UJ	4800	43000	UJ	4720	41000	UJ	4800	27000	UJ	4800	32000	UJ
85-01-8	Phenanthrene	160	19200	7100	UJ	19200	1600	UJ	18880	1600	UJ	19200	1600	UJ	6512	5000	UJ	7664	3100	UJ	19200	17000	UJ	18880	16000	UJ	19200	11000	UJ	19200	13000	UJ
108-95-2	Phenol	0 6	72	7100	UJ	72	1600	UJ	70 8	1600	UJ	72	1600	UJ	24.42	5000	UJ	28 74	3100	UJ	72	17000	UJ	70.8	16000	UJ	72	11000	UJ	72	13000	UJ
129-00-0	Pyrene	NL	NL	7100	UJ	NL	290	J	NL	530	J	NL	1400	J	NL	5000	UJ	NL	3100	UJ	NL	17000	UJ	NL	16000	UJ	NL	11000	UJ	NL	13000	UJ
	Pesticide/PCB Organics																															
72-54-8	4,4'-DDD	0 01	1 2	14	UJ	1 2	16	UJ	1.18	16	UJ	1 2	**92**	**J**	0 407	**18**	**J**	0 479	6 3	UJ	1 2	**25**	**J**	1 18	**24**	**J**	1 2	22	UJ	1 2	25	UJ
72-55-9	4,4'-DDE	0 01	1 2	**17**	**J**	1.2	**23**	**J**	1 18	16	UJ	1 2	**120**	**J**	0 407	**13**	**J**	0.479	6 3	UJ	1 2	17	UJ	1.18	**18**		1 2	22	UJ	1.2	25	UJ

Table 1-13
Sample-Specific Sediment Screening Criteria and Sediment Data
Smithtown Groundwater Contamination Site
Smithtown, New York

		Sample Code	SDW-010-A			SDW-010-B			SDW-011-A			SDW-011-B			SDW-012-A			SDW-012-B			SDW-013-A			SDW-013-B			SDW-014-A			SDW-014-B		
		Sample Name																														
		Sample Date	4/17/2001			4/17/2001			4/18/2001			4/18/2001			4/18/2001			4/18/2001			4/19/2001			4/19/2001			4/19/2001			4/19/2001		
Cas Rn	Chemical Name	Depth	0 to 6			18 to 24			0 to 6			18 to 24			0 to 6			18 to 24			0 to 6			18 to 24			0 to 6			18 to 24		
TOC	Total organic carbon	gOC/kg	152			163			118			154			40.7			47.9			152			118			201			205		
TOC	Total organic carbon	%OC	15.20%			16.30%			11.80%			15.40%			4.07%			4.79%			15.20%			11.80%			20.10%			20.50%		
		Screening Criteria (ug/gOC)	Screening Criteria (ug/kg)	Result (ug/kg)		Screening Criteria (ug/kg)	Result (ug/kg)		Screening Criteria (ug/kg)	Result (ug/kg)		Screening Criteria (ug/kg)	Result (ug/kg)		Screening Criteria (ug/kg)	Result (ug/kg)		Screening Criteria (ug/kg)	Result (ug/kg)		Screening Criteria (ug/kg)	Result (ug/kg)		Screening Criteria (ug/kg)	Result (ug/kg)		Screening Criteria (ug/kg)	Result (ug/kg)		Screening Criteria (ug/kg)	Result (ug/kg)	
50-29-3	4,4'-DDT	0.01	1.2	14	UJ	1.2	16	UJ	1.18	16	UJ	1.2	16	UJ	0.407	5	UJ	0.479	6.3	UJ	1.2	17	UJ	1.18	17	UJ	1.2	22	UJ	1.2	25	UJ
309-00-2	Aldrin	0.1	12	7.3	UJ	12	8.4	UJ	11.8	8.4	UJ	12	8	UJ	4.07	2.6	UJ	4.79	3.3	UJ	12	8.8	UJ	11.8	8.5	UJ	12	11	UJ	12	13	UJ
319-84-6	alpha-BHC	0.03	3.6	7.3	UJ	3.6	8.4	UJ	3.54	8.4	UJ	3.6	8	UJ	1.221	2.6	UJ	1.437	3.3	UJ	3.6	8.8	UJ	3.54	8.5	UJ	3.6	11	UJ	3.6	13	UJ
5103-71-9	alpha-Chlordane	0.001	0.12	7.3	UJ	0.12	8.4	UJ	0.118	8.4	UJ	0.12	8	UJ	0.0407	2.6	UJ	0.0479	3.3	UJ	0.12	8.8	UJ	0.118	8.5	UJ	0.12	11	UJ	0.12	13	UJ
12674-11-2	Aroclor-1016	0.0008	0.096	140	UJ	0.096	160	UJ	0.0944	160	UJ	0.096	160	UJ	0.03256	50	UJ	0.03832	63	UJ	0.096	170	UJ	0.0944	170	UJ	0.096	220	UJ	0.096	250	UJ
11104-28-2	Aroclor-1221	0.0008	0.096	290	UJ	0.096	330	UJ	0.0944	330	UJ	0.096	320	UJ	0.03256	100	UJ	0.03832	130	UJ	0.096	350	UJ	0.0944	340	UJ	0.096	440	UJ	0.096	510	UJ
11141-16-5	Aroclor-1232	0.0008	0.096	140	UJ	0.096	160	UJ	0.0944	160	UJ	0.096	160	UJ	0.03256	50	UJ	0.03832	63	UJ	0.096	170	UJ	0.0944	170	UJ	0.096	220	UJ	0.096	250	UJ
53469-21-9	Aroclor-1242	0.0008	0.096	140	UJ	0.096	160	UJ	0.0944	160	UJ	0.096	160	UJ	0.03256	50	UJ	0.03832	63	UJ	0.096	170	UJ	0.0944	170	UJ	0.096	220	UJ	0.096	250	UJ
12672-29-6	Aroclor-1248	0.0008	0.096	140	UJ	0.096	160	UJ	0.0944	160	UJ	0.096	160	UJ	0.03256	50	UJ	0.03832	63	UJ	0.096	170	UJ	0.0944	170	UJ	0.096	220	UJ	0.096	250	UJ
11097-69-1	Aroclor-1254	0.0008	0.096	140	UJ	0.096	160	UJ	0.0944	160	UJ	0.096	160	UJ	0.03256	50	UJ	0.03832	63	UJ	0.096	170	UJ	0.0944	170	UJ	0.096	220	UJ	0.096	250	UJ
11096-82-5	Aroclor-1260	0.0008	0.096	140	UJ	0.096	160	UJ	0.0944	160	UJ	0.096	160	UJ	0.03256	50	UJ	0.03832	63	UJ	0.096	170	UJ	0.0944	170	UJ	0.096	220	UJ	0.096	250	UJ
319-85-7	beta-BHC	0.03	3.6	7.3	UJ	3.6	8.4	UJ	3.54	8.4	UJ	3.6	8	UJ	1.221	2.6	UJ	1.437	3.3	UJ	3.6	8.8	UJ	3.54	8.5	UJ	3.6	11	UJ	3.6	13	UJ
319-86-8	delta-BHC	0.03	3.6	7.3	UJ	3.6	8.4	UJ	3.54	8.4	UJ	3.6	8	UJ	1.221	2.6	UJ	1.437	3.3	UJ	3.6	8.8	UJ	3.54	8.5	UJ	3.6	11	UJ	3.6	13	UJ
60-57-1	Dieldrin	0.1	12	14	UJ	12	16	UJ	11.8	16	UJ	12	16	UJ	4.07	5	UJ	4.79	6.3	UJ	12	17	UJ	11.8	17	UJ	12	22	UJ	12	25	UJ
959-98-8	Endosulfan I	0.004	0.48	7.3	UJ	0.48	8.4	UJ	0.472	8.4	UJ	0.48	8	UJ	0.1628	2.6	UJ	0.1916	3.3	UJ	0.48	8.8	UJ	0.472	8.5	UJ	0.48	11	UJ	0.48	13	UJ
33213-65-9	Endosulfan II	0.004	0.48	14	UJ	0.48	16	UJ	0.472	16	UJ	0.48	16	UJ	0.1628	5	UJ	0.1916	6.3	UJ	0.48	17	UJ	0.472	17	UJ	0.48	22	UJ	0.48	25	UJ
1031-07-8	Endosulfan sulfate	NL	NL	14	UJ	NL	16	UJ	NL	16	UJ	NL	16	UJ	NL	5	UJ	NL	6.3	UJ	NL	17	UJ	NL	17	UJ	NL	22	UJ	NL	25	UJ
72-20-8	Endrin	0.73	87.6	14	UJ	87.6	16	UJ	86.14	16	UJ	87.6	16	UJ	29.711	5	UJ	34.967	6.3	UJ	87.6	17	UJ	86.14	17	UJ	87.6	22	UJ	87.6	25	UJ
7421-93-4	Endrin aldehyde	NL	NL	14	UJ	NL	16	UJ	NL	16	UJ	NL	16	UJ	NL	5	UJ	NL	6.3	UJ	NL	17	UJ	NL	17	UJ	NL	22	UJ	NL	25	UJ
53494-70-5	Endrin ketone	NL	NL	14	UJ	NL	16	UJ	NL	16	UJ	NL	16	UJ	NL	5	UJ	NL	6.3	UJ	NL	17	UJ	NL	17	UJ	NL	22	UJ	NL	25	UJ
58-89-9	gamma-BHC (Lindane)	0.03	3.6	7.3	UJ	3.6	8.4	UJ	3.54	8.4	UJ	3.6	8	UJ	1.221	2.6	UJ	1.437	3.3	UJ	3.6	8.8	UJ	3.54	8.5	UJ	3.6	11	UJ	3.6	13	UJ
5103-74-2	gamma-Chlordane	0.001	0.12	7.3	UJ	0.12	8.4	UJ	0.118	8.4	UJ	0.12	8	UJ	0.0407	2.6	UJ	0.0479	3.3	UJ	0.12	8.8	UJ	0.118	8.5	UJ	0.12	11	UJ	0.12	13	UJ
76-44-8	Heptachlor	0.0008	0.096	7.3	UJ	0.096	8.4	UJ	0.0944	8.4	UJ	0.096	8	UJ	0.03256	2.6	UJ	0.03832	3.3	UJ	0.096	8.8	UJ	0.0944	8.5	UJ	0.096	11	UJ	0.096	13	UJ
1024-57-3	Heptachlor epoxide	0.0008	0.096	7.3	UJ	0.096	8.4	UJ	0.0944	8.4	UJ	0.096	8	UJ	0.03256	2.6	UJ	0.03832	3.3	UJ	0.096	8.8	UJ	0.0944	8.5	UJ	0.096	11	UJ	0.096	13	UJ
72-43-5	Methoxychlor	0.6	72	73	UJ	72	84	UJ	70.8	84	UJ	72	80	UJ	24.42	26	UJ	28.74	33	UJ	72	88	UJ	70.8	85	UJ	72	110	UJ	72	130	UJ
8001-35-2	Toxaphene	0.01	1.2	730	UJ	1.2	840	UJ	1.18	840	UJ	1.2	800	UJ	0.407	260	UJ	0.479	330	UJ	1.2	880	UJ	1.18	850	UJ	1.2	1100	UJ	1.2	1300	UJ

Table 1-13
Sample-Specific Sediment Screening Criteria and Sediment Data
Smithtown Groundwater Contamination Site
Smithtown, New York

		Sample Code	SDW-015-A		SDW-015-B		SDW-003-B-DUP		SDW-011-B-DUP		SSS-001		SSS-002		SSS-003		SSS-004		SSS-005		SSS-006	
		Sample Name					SDW-020-B		SDW-021-B													
		Sample Date	4/19/2001		4/19/2001		4/12/2001		4/18/2001		4/10/2001		4/9/2001		4/9/2001		4/9/2001		4/11/2001		4/11/2001	
Cas Rn	Chemical Name	Depth	0 to 6		18 to 24		18 to 24		18 to 24													
TOC	Total organic carbon	gOC/kg	140		168		54		110		0.544		0.283		0.34		1.25		61.1		1.34	
TOC	Total organic carbon	%OC	14.00%		16.80%		5.40%		11.00%		0.05%		0.03%		0.03%		0.13%		6.11%		0.13%	
		Screening Criteria (ug/gOC)	Screening Criteria (ug/kg)	Result (ug/kg)	Screening Criteria (ug/kg)	Result (ug/kg)	Screening Criteria (ug/kg)	Result (ug/kg)	Screening Criteria (ug/kg)	Result (ug/kg)	Screening Criteria (ug/kg)	Result (ug/kg)	Screening Criteria (ug/kg)	Result (ug/kg)	Screening Criteria (ug/kg)	Result (ug/kg)	Screening Criteria (ug/kg)	Result (ug/kg)	Screening Criteria (ug/kg)	Result (ug/kg)	Screening Criteria (ug/kg)	Result (ug/kg)
	Volatile Organic Compounds																					
71-55-6	1,1,1-Trichloroethane	NL	NL	70 UJ	NL	90 UJ	NL	50 UJ	NL	75 UJ	NL	12 UJ	NL	10 UJ	NL	11 UJ	NL	12 UJ	NL	23 UJ	NL	11 UJ
79-34-5	1,1,2,2-Tetrachloroethane	0.3	36	70 UJ	36	90 UJ	16.2	50 UJ	33	75 UJ	0.1632	12 U	0.0849	10 U	0.102	11 U	0.375	12 U	18.33	23 UJ	0.402	11 U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	NL	NL	70 UJ	NL	90 UJ	NL	50 UJ	NL	75 UJ	NL	12 U	NL	10 U	NL	11 U	NL	12 U	NL	23 UJ	NL	11 U
79-00-5	1,1,2-Trichloroethane	0.6	72	70 UJ	72	90 UJ	32.4	50 UJ	66	75 UJ	0.3264	12 UJ	0.1698	10 UJ	0.204	11 UJ	0.75	12 UJ	36.66	23 UJ	0.804	11 UJ
75-34-3	1,1-Dichloroethane	NL	NL	70 UJ	NL	90 UJ	NL	50 UJ	NL	75 UJ	NL	12 U	NL	10 U	NL	11 U	NL	12 U	NL	23 UJ	NL	11 U
75-35-4	1,1-Dichloroethene	0.02	2.4	70 UJ	2.4	90 UJ	1.08	50 UJ	2.2	75 UJ	0.01088	12 U	0.00566	10 U	0.0068	11 U	0.025	12 U	1.222	23 UJ	0.0268	11 U
120-82-1	1,2,4-Trichlorobenzene	91	10920	70 UJ	10920	90 UJ	4914	50 UJ	10010	75 UJ	49.504	12 U	25.753	10 U	30.94	11 U	113.75	12 U	5560.1	23 UJ	121.94	11 U
96-12-8	1,2-Dibromo-3-chloropropane	NL	NL	70 UJ	NL	90 UJ	NL	50 UJ	NL	75 UJ	NL	12 UJ	NL	10 UJ	NL	11 UJ	NL	12 UJ	NL	23 UJ	NL	11 U
106-93-4	1,2-Dibromoethane	NL	NL	70 UJ	NL	90 UJ	NL	50 UJ	NL	75 UJ	NL	35 U	NL	21 U	NL	21 U	NL	38 U	NL	23 UJ	NL	35 UJ
95-50-1	1,2-Dichlorobenzene	12	1440	70 UJ	1440	90 UJ	648	50 UJ	1320	75 UJ	6.528	**11 J**	3.396	10 U	4.08	11 U	15	12 U	733.2	23 UJ	16.08	11 U
107-06-2	1,2-Dichloroethane	0.7	84	70 UJ	84	90 UJ	37.8	50 UJ	77	75 UJ	0.3808	12 U	0.1981	10 U	0.238	11 U	0.875	12 U	42.77	23 UJ	0.938	11 U
78-87-5	1,2-Dichloropropane	NL	NL	70 UJ	NL	90 UJ	NL	50 UJ	NL	75 UJ	NL	20 UJ	NL	19 UJ	NL	21 UJ	NL	22 UJ	NL	65 UJ	NL	52 UJ
541-73-1	1,3-Dichlorobenzene	12	1440	70 UJ	1440	90 UJ	648	50 UJ	1320	75 UJ	6.528	12 U	3.396	10 U	4.08	11 U	15	12 U	733.2	23 UJ	16.08	11 U
106-46-7	1,4-Dichlorobenzene	12	1440	70 UJ	1440	90 UJ	648	50 UJ	1320	75 UJ	6.528	12 U	3.396	10 U	4.08	11 U	15	12 U	733.2	23 UJ	16.08	11 U
78-93-3	2-Butanone	NL	NL	70 UJ	NL	90 UJ	NL	170 J	NL	75 UJ	NL	12 U	NL	10 U	NL	11 U	NL	12 U	NL	23 UJ	NL	11 U
591-78-6	2-Hexanone	NL	NL	70 UJ	NL	90 UJ	NL	50 UJ	NL	75 UJ	NL	12 U	NL	10 U	NL	11 U	NL	12 U	NL	23 UJ	NL	11 U
108-10-1	4-Methyl-2-pentanone	NL	NL	70 UJ	NL	90 UJ	NL	50 UJ	NL	75 UJ	NL	12 U	NL	10 U	NL	11 U	NL	12 U	NL	23 UJ	NL	11 UJ
67-64-1	Acetone	NL	NL	140 J	NL	110 J	NL	100 UJ	NL	150 UJ	NL	12 U	NL	10 U	NL	11 U	NL	12 U	NL	23 UJ	NL	11 U
71-43-2	Benzene	0.6	72	70 UJ	72	90 UJ	32.4	50 UJ	66	75 UJ	0.3264	12 U	0.1698	10 U	0.204	11 U	0.75	12 U	36.66	23 UJ	0.804	11 U
75-27-4	Bromodichloromethane	NL	NL	70 UJ	NL	90 UJ	NL	50 UJ	NL	75 UJ	NL	12 UJ	NL	10 UJ	NL	11 UJ	NL	12 UJ	NL	23 UJ	NL	11 U
75-25-2	Bromoform	NL	NL	70 UJ	NL	90 UJ	NL	50 UJ	NL	75 UJ	NL	12 UJ	NL	10 UJ	NL	11 UJ	NL	12 UJ	NL	23 UJ	NL	11 U
74-83-9	Bromomethane	NL	NL	70 UJ	NL	90 UJ	NL	50 UJ	NL	75 UJ	NL	12 U	NL	10 U	NL	11 U	NL	12 U	NL	23 UJ	NL	11 U
75-15-0	Carbon Disulfide	NL	NL	70 UJ	NL	90 UJ	NL	50 UJ	NL	75 UJ	NL	12 U	NL	10 U	NL	11 U	NL	12 U	NL	23 UJ	NL	11 U
56-23-5	Carbon Tetrachloride	0.6	72	70 UJ	72	90 UJ	32.4	50 UJ	66	75 UJ	0.3264	12 U	0.1698	10 U	0.204	11 U	0.75	12 U	36.66	23 UJ	0.804	11 U
108-90-7	Chlorobenzene	3.5	420	70 UJ	420	90 UJ	189	50 UJ	385	75 UJ	1.904	12 UJ	0.9905	10 UJ	1.19	11 UJ	4.375	12 UJ	213.85	23 UJ	4.69	11 U
75-00-3	Chloroethane	NL	NL	70 UJ	NL	90 UJ	NL	50 UJ	NL	75 UJ	NL	12 U	NL	10 U	NL	11 U	NL	12 U	NL	23 UJ	NL	11 U
67-66-3	Chloroform	NL	NL	70 UJ	NL	90 UJ	NL	50 UJ	NL	75 UJ	NL	12 U	NL	10 U	NL	11 U	NL	12 U	NL	23 UJ	NL	11 U
74-87-3	Chloromethane	NL	NL	70 UJ	NL	90 UJ	NL	50 UJ	NL	75 UJ	NL	12 U	NL	10 U	NL	11 U	NL	12 U	NL	23 UJ	NL	11 U
156-59-2	cis-1,2-Dichloroethene	NL	NL	70 UJ	NL	90 UJ	NL	50 UJ	NL	75 UJ	NL	12 U	NL	10 U	NL	11 U	NL	12 U	NL	23 UJ	NL	11 U
10061-01-5	cis-1,3-Dichloropropene	NL	NL	70 UJ	NL	90 UJ	NL	50 UJ	NL	75 UJ	NL	12 U	NL	10 U	NL	11 U	NL	12 U	NL	23 UJ	NL	11 U
110-82-7	Cyclohexane	NL	NL	70 UJ	NL	90 UJ	NL	50 UJ	NL	75 UJ	NL	12 U	NL	10 U	NL	11 U	NL	12 U	NL	23 UJ	NL	11 U
124-48-1	Dibromochloromethane	NL	NL	70 UJ	NL	90 UJ	NL	50 UJ	NL	75 UJ	NL	12 U	NL	10 U	NL	11 U	NL	12 U	NL	23 UJ	NL	11 U
75-71-8	Dichlorodifluoromethane	NL	NL	70 UJ	NL	90 UJ	NL	50 UJ	NL	75 UJ	NL	12 U	NL	10 U	NL	11 U	NL	12 U	NL	23 UJ	NL	11 U
100-41-4	Ethylbenzene	6.4	768	70 UJ	768	90 UJ	345.6	50 UJ	704	75 UJ	3.4816	12 U	1.8112	10 U	2.176	11 U	8	12 U	391.04	23 UJ	8.576	11 U
98-82-8	Isopropylbenzene	12	1440	70 UJ	1440	90 UJ	648	50 UJ	1320	75 UJ	6.528	12 U	3.396	10 U	4.08	11 U	15	12 U	733.2	23 UJ	16.08	11 U
79-20-9	Methyl Acetate	NL	NL	70 UJ	NL	90 UJ	NL	50 UJ	NL	75 UJ	NL	12 U	NL	10 U	NL	11 U	NL	12 U	NL	23 UJ	NL	11 U
1634-04-4	Methyl Tert-Butyl Ether	NL	NL	70 UJ	NL	90 UJ	NL	50 UJ	NL	75 UJ	NL	12 U	NL	10 U	NL	11 U	NL	12 U	NL	23 UJ	NL	11 U
75-09-2	Methylene Chloride	NL	NL	130 UJ	NL	190 J	NL	50 UJ	NL	160 J	NL	12 U	NL	10 U	NL	11 U	NL	12 U	NL	23 UJ	NL	11 U
108-87-2	Metylcyclohexane	NL	NL	70 UJ	NL	90 UJ	NL	50 UJ	NL	75 UJ	NL	12 U	NL	10 U	NL	11 U	NL	12 U	NL	23 UJ	NL	11 U
100-42-5	Styrene	NL	NL	70 UJ	NL	90 UJ	NL	50 UJ	NL	75 UJ	NL	12 U	NL	10 U	NL	11 U	NL	12 U	NL	23 UJ	NL	11 U
127-18-4	Tetrachloroethene	0.8	96	70 UJ	96	90 UJ	43.2	50 UJ	88	26 J	0.4352	12 U	0.2264	10 U	0.272	11 U	1	12 U	48.88	23 UJ	1.072	11 U
108-88-3	Toluene	45	5400	2 J	5400	90 UJ	2430	50 UJ	4950	5 J	24.48	12 U	12.735	10 U	15.3	11 U	56.25	12 U	2749.5	23 UJ	60.3	11 U
156-60-5	trans-1,2-Dichloroethene	NL	NL	70 UJ	NL	90 UJ	NL	50 UJ	NL	75 UJ	NL	12 U	NL	10 U	NL	11 U	NL	12 U	NL	23 UJ	NL	11 U
10061-02-6	trans-1,3-Dichloropropene	NL	NL	70 UJ	NL	90 UJ	NL	50 UJ	NL	75 UJ	NL	12 U	NL	10 U	NL	11 U	NL	12 U	NL	23 UJ	NL	11 U
79-01-6	Trichloroethene	2	240	70 UJ	240	90 UJ	108	50 UJ	220	20 J	1.088	12 U	0.566	10 U	0.68	11 U	2.5	12 U	122.2	23 UJ	2.68	11 U
75-69-4	Trichlorofluoromethane	NL	NL	70 UJ	NL	90 UJ	NL	50 UJ	NL	75 UJ	NL	12 U	NL	10 U	NL	11 U	NL	12 U	NL	23 UJ	NL	11 U
75-01-4	Vinyl Chloride	0.07	8.4	70 UJ	8.4	90 UJ	3.78	50 UJ	7.7	75 UJ	0.03808	12 U	0.01981	10 U	0.0238	11 U	0.0875	12 U	4.277	23 UJ	0.0938	11 U
1330-20-7	Xylenes (total)	27	3240	70 UJ	3240	90 UJ	1458	50 UJ	2970	75 UJ	14.688	12 U	7.641	10 U	9.18	11 U	33.75	12 U	1649.7	23 UJ	36.18	11 U
	Semi-Volatile Organics																					
92-52-4	1,1'-Biphenyl	NL	NL	7800 UJ	NL	9100 UJ	NL	6900 UJ	NL	1700 UJ	NL	430 UJ	NL	400 UJ	NL	420 UJ	NL	120 J	NL	6600 UJ	NL	470 UJ
108-60-1	2,2'-oxybis(1-Chloropropane)	NL	NL	7800 UJ	NL	9100 UJ	NL	6900 UJ	NL	1700 UJ	NL	430 UJ	NL	400 UJ	NL	420 UJ	NL	420 UJ	NL	6600 UJ	NL	470 UJ
95-95-4	2,4,5-Trichlorophenol	NL	NL	20000 UJ	NL	23000 UJ	NL	17000 UJ	NL	4400 UJ	NL	430 UJ	NL	400 UJ	NL	420 UJ	NL	420 UJ	NL	6600 UJ	NL	470 UJ
88-06-2	2,4,6-Trichlorophenol	NL	NL	7800 UJ	NL	9100 UJ	NL	6900 UJ	NL	1700 UJ	NL	430 UJ	NL	400 UJ	NL	420 UJ	NL	420 UJ	NL	6600 UJ	NL	470 UJ
120-83-2	2,4-Dichlorophenol	NL	NL	7800 UJ	NL	9100 UJ	NL	6900 UJ	NL	1700 UJ	NL	430 UJ	NL	400 UJ	NL	420 UJ	NL	420 UJ	NL	6600 UJ	NL	470 UJ
105-67-9	2,4-Dimethylphenol	NL	NL	7800 UJ	NL	9100 UJ	NL	6900 UJ	NL	1700 UJ	NL	430 UJ	NL	400 UJ	NL	420 UJ	NL	420 UJ	NL	6600 UJ	NL	470 UJ
51-28-5	2,4-Dinitrophenol	NL	NL	20000 UJ	NL	23000 UJ	NL	17000 UJ	NL	4400 UJ	NL	1100 UJ	NL	1000 UJ	NL	1100 UJ	NL	1100 UJ	NL	16000 UJ	NL	1200 UJ
121-14-2	2,4-Dinitrotoluene	NL	NL	7800 UJ	NL	9100 UJ	NL	6900 UJ	NL	1700 UJ	NL	1100 UJ	NL	1000 UJ	NL	1100 UJ	NL	1100 UJ	NL	16000 UJ	NL	1200 UJ
606-20-2	2,6-Dinitrotoluene	NL	NL	7800 UJ	NL	9100 UJ	NL	6900 UJ	NL	1700 UJ	NL	430 UJ	NL	400 UJ	NL	420 UJ	NL	420 UJ	NL	6600 UJ	NL	470 UJ

Table 1-13
Sample-Specific Sediment Screening Criteria and Sediment Data
Smithtown Groundwater Contamination Site
Smithtown, New York

		Sample Code	SDW-015-A			SDW-015-B			SDW-003-B-DUP			SDW-011-B-DUP			SSS-001			SSS-002			SSS-003			SSS-004			SSS-005			SSS-006		
		Sample Name							SDW-020-B			SDW-021-B																				
		Sample Date	4/19/2001			4/19/2001			4/12/2001			4/18/2001			4/10/2001			4/9/2001			4/9/2001			4/9/2001			4/11/2001			4/11/2001		
Cas Rn	Chemical Name	Depth	0 to 6			18 to 24			18 to 24			18 to 24																				
TOC	Total organic carbon	gOC/kg	140			168			54			110			0.544			0.283			0.34			1.25			61.1			1.34		
TOC	Total organic carbon	%OC	14.00%			16.80%			5.40%			11.00%			0.05%			0.03%			0.03%			0.13%			6.11%			0.13%		
		Screening Criteria (ug/gOC)	Screening Criteria (ug/kg)	Result (ug/kg)		Screening Criteria (ug/kg)	Result (ug/kg)		Screening Criteria (ug/kg)	Result (ug/kg)		Screening Criteria (ug/kg)	Result (ug/kg)		Screening Criteria (ug/kg)	Result (ug/kg)		Screening Criteria (ug/kg)	Result (ug/kg)		Screening Criteria (ug/kg)	Result (ug/kg)		Screening Criteria (ug/kg)	Result (ug/kg)		Screening Criteria (ug/kg)	Result (ug/kg)		Screening Criteria (ug/kg)	Result (ug/kg)	
91-58-7	2-Chloronaphthalene	NL	NL	7800	UJ	NL	9100	UJ	NL	6900	UJ	NL	1700	UJ	NL	430	UJ	NL	400	UJ	NL	420	UJ	NL	420	UJ	NL	6600	UJ	NL	470	UJ
95-57-8	2-Chlorophenol	NL	NL	7800	UJ	NL	9100	UJ	NL	6900	UJ	NL	1700	UJ	NL	430	UJ	NL	400	UJ	NL	420	UJ	NL	420	UJ	NL	6600	UJ	NL	470	UJ
91-57-6	2-Methylnaphthalene	30	3600	7800	UJ	3600	9100	UJ	1620	6900	UJ	3300	1700	UJ	16.32	430	UJ	8.49	400	UJ	10.2	420	UJ	37.5	420	UJ	1833	6600	UJ	40.2	470	UJ
95-48-7	2-Methylphenol	NL	NL	7800	UJ	NL	9100	UJ	NL	6900	UJ	NL	1700	UJ	NL	430	UJ	NL	400	UJ	NL	420	UJ	NL	420	UJ	NL	6600	UJ	NL	470	UJ
88-74-4	2-Nitroaniline	NL	NL	20000	UJ	NL	23000	UJ	NL	17000	UJ	NL	4400	UJ	NL	430	UJ	NL	400	UJ	NL	420	UJ	NL	420	UJ	NL	6600	UJ	NL	470	UJ
88-75-5	2-Nitrophenol	NL	NL	7800	UJ	NL	9100	UJ	NL	6900	UJ	NL	1700	UJ	NL	430	UJ	NL	400	UJ	NL	420	UJ	NL	420	UJ	NL	6600	UJ	NL	470	UJ
91-94-1	3,3'-Dichlorobenzidine	NL	NL	7800	UJ	NL	9100	UJ	NL	6900	UJ	NL	1700	UJ	NL	430	UJ	NL	400	UJ	NL	420	UJ	NL	420	UJ	NL	6600	UJ	NL	470	UJ
99-09-2	3-Nitroaniline	NL	NL	20000	UJ	NL	23000	UJ	NL	17000	UJ	NL	4400	UJ	NL	430	UJ	NL	400	UJ	NL	420	UJ	NL	420	UJ	NL	6600	UJ	NL	470	UJ
534-52-1	4,6-Dinitro-2-methylphenol	NL	NL	20000	UJ	NL	23000	UJ	NL	17000	UJ	NL	4400	UJ	NL	430	UJ	NL	400	UJ	NL	420	UJ	NL	420	UJ	NL	6600	UJ	NL	470	UJ
101-55-3	4-Bromophenyl-phenylether	NL	NL	7800	UJ	NL	9100	UJ	NL	6900	UJ	NL	1700	UJ	NL	430	UJ	NL	400	UJ	NL	420	UJ	NL	420	UJ	NL	6600	UJ	NL	470	UJ
59-50-7	4-Chloro-3-methylphenol	NL	NL	7800	UJ	NL	9100	UJ	NL	6900	UJ	NL	1700	UJ	NL	430	UJ	NL	400	UJ	NL	420	UJ	NL	420	UJ	NL	6600	UJ	NL	470	UJ
106-47-8	4-Chloroaniline	NL	NL	7800	UJ	NL	9100	UJ	NL	6900	UJ	NL	1700	UJ	NL	430	UJ	NL	400	UJ	NL	420	UJ	NL	420	UJ	NL	6600	UJ	NL	470	UJ
7005-72-3	4-Chlorophenyl-phenylether	NL	NL	7800	UJ	NL	9100	UJ	NL	6900	UJ	NL	1700	UJ	NL	430	UJ	NL	400	UJ	NL	420	UJ	NL	420	UJ	NL	6600	UJ	NL	470	UJ
106-44-5	4-Methylphenol	NL	NL	7800	UJ	NL	9100	UJ	NL	6900	UJ	NL	1700	UJ	NL	430	UJ	NL	400	UJ	NL	420	UJ	NL	420	UJ	NL	6600	UJ	NL	470	UJ
100-01-6	4-Nitroaniline	NL	NL	20000	UJ	NL	23000	UJ	NL	17000	UJ	NL	4400	UJ	NL	430	UJ	NL	400	UJ	NL	420	UJ	NL	420	UJ	NL	6600	UJ	NL	470	UJ
100-02-7	4-Nitrophenol	NL	NL	20000	UJ	NL	23000	UJ	NL	17000	UJ	NL	4400	UJ	NL	1100	UJ	NL	1000	UJ	NL	1100	UJ	NL	1100	UJ	NL	16000	UJ	NL	1200	UJ
83-32-9	Acenaphthene	240	28800	7800	UJ	28800	9100	UJ	12960	6900	UJ	26400	1700	UJ	130.56	430	UJ	67.92	400	UJ	81.6	420	UJ	300	420	UJ	14664	6600	UJ	321.6	470	UJ
208-96-8	Acenaphthylene	NL	NL	7800	UJ	NL	9100	UJ	NL	6900	UJ	NL	1700	UJ	NL	430	UJ	NL	400	UJ	NL	420	UJ	NL	420	UJ	NL	6600	UJ	NL	470	UJ
98-86-2	Acetophenone	NL	NL	7800	UJ	NL	9100	UJ	NL	6900	UJ	NL	1700	UJ	NL	430	UJ	NL	400	UJ	NL	420	UJ	NL	420	UJ	NL	6600	UJ	NL	470	UJ
120-12-7	Anthracene	107	12840	7800	UJ	12840	9100	UJ	5778	6900	UJ	11770	1700	UJ	58.208	1100	UJ	30.281	1000	UJ	36.38	1100	UJ	133.75	1100	UJ	6537.7	16000	UJ	143.38	1200	UJ
1912-24-9	Atrazine	NL	NL	7800	UJ	NL	9100	UJ	NL	6900	UJ	NL	1700	UJ	NL	430	UJ	NL	400	UJ	NL	420	UJ	NL	420	UJ	NL	6600	UJ	NL	470	UJ
100-52-7	Benzaldehyde	NL	NL	7800	UJ	NL	9100	UJ	NL	0	R	NL	280	J	NL	430	UJ	NL	400	UJ	NL	420	UJ	NL	420	UJ	NL	6600	UJ	NL	470	UJ
56-55-3	Benzo(a)anthracene	12	1440	7800	UJ	1440	9100	UJ	648	6900	UJ	1320	240	J	6.528	430	UJ	3.396	400	UJ	4.08	420	UJ	15	420	UJ	733.2	6600	UJ	16.08	470	UJ
50-32-8	Benzo(a)pyrene	0.7	84	7800	UJ	84	9100	UJ	37.8	6900	UJ	77	1700	UJ	0.3808	430	UJ	0.1981	400	UJ	0.238	420	UJ	0.875	420	UJ	42.77	6600	UJ	0.938	470	UJ
205-99-2	Benzo(b)fluoranthene	NL	NL	7800	UJ	NL	9100	UJ	NL	6900	UJ	NL	350	J	NL	430	UJ	NL	400	UJ	NL	420	UJ	NL	420	UJ	NL	6600	UJ	NL	470	UJ
191-24-2	Benzo(g,h,i)perylene	NL	NL	7800	UJ	NL	9100	UJ	NL	6900	UJ	NL	1700	UJ	NL	1100	UJ	NL	1000	UJ	NL	1100	UJ	NL	1100	UJ	NL	16000	UJ	NL	1200	UJ
207-08-9	Benzo(k)fluoranthene	NL	NL	7800	UJ	NL	9100	UJ	NL	6900	UJ	NL	1700	UJ	NL	48	J	NL	400	UJ	NL	420	UJ	NL	420	UJ	NL	6600	UJ	NL	470	UJ
111-91-1	bis(2-Chloroethoxy)methane	NL	NL	7800	UJ	NL	9100	UJ	NL	6900	UJ	NL	1700	UJ	NL	430	UJ	NL	400	UJ	NL	420	UJ	NL	420	UJ	NL	6600	UJ	NL	470	UJ
111-44-4	bis(2-Chloroethyl)ether	0.03	3.6	7800	UJ	3.6	9100	UJ	1.62	6900	UJ	3.3	1700	UJ	0.01632	430	UJ	0.00849	400	UJ	0.0102	420	UJ	0.0375	420	UJ	1.833	6600	UJ	0.0402	470	UJ
117-81-7	bis(2-Ethylhexyl)phthalate	199.5	23940	7800	UJ	23940	9100	UJ	10773	6900	UJ	21945	1700	UJ	108.528	430	UJ	56.4585	400	UJ	67.83	420	UJ	249.375	420	UJ	12189.45	6600	UJ	267.33	470	UJ
85-68-7	Butylbenzylphthalate	NL	NL	7800	UJ	NL	9100	UJ	NL	6900	UJ	NL	1700	UJ	NL	430	UJ	NL	400	UJ	NL	420	UJ	NL	420	UJ	NL	6600	UJ	NL	470	UJ
105-60-2	Caprolactam	NL	NL	7800	UJ	NL	9100	UJ	NL	6900	UJ	NL	1700	UJ	NL	430	UJ	NL	400	UJ	NL	420	UJ	NL	420	UJ	NL	6600	UJ	NL	470	UJ
86-74-8	Carbazole	NL	NL	7800	UJ	NL	9100	UJ	NL	6900	UJ	NL	1700	UJ	NL	430	UJ	NL	400	UJ	NL	420	UJ	NL	420	UJ	NL	6600	UJ	NL	470	UJ
218-01-9	Chrysene	NL	NL	7800	UJ	NL	9100	UJ	NL	6900	UJ	NL	290	J	NL	69	J	NL	400	UJ	NL	420	UJ	NL	79	J	NL	6600	UJ	NL	470	UJ
53-70-3	Dibenz(a,h)anthracene	NL	NL	7800	UJ	NL	9100	UJ	NL	6900	UJ	NL	1700	UJ	NL	51	J	NL	400	UJ	NL	420	UJ	NL	70	J	NL	6600	UJ	NL	470	UJ
132-64-9	Dibenzofuran	NL	NL	7800	UJ	NL	9100	UJ	NL	6900	UJ	NL	1700	UJ	NL	430	UJ	NL	400	UJ	NL	420	UJ	NL	420	UJ	NL	6600	UJ	NL	470	UJ
84-66-2	Diethylphthalate	NL	NL	7800	UJ	NL	9100	UJ	NL	6900	UJ	NL	1700	UJ	NL	430	UJ	NL	400	UJ	NL	420	UJ	NL	420	UJ	NL	6600	UJ	NL	470	UJ
131-11-3	Dimethylphthalate	NL	NL	7800	UJ	NL	9100	UJ	NL	6900	UJ	NL	1700	UJ	NL	1100	UJ	NL	1000	UJ	NL	1100	UJ	NL	1100	UJ	NL	16000	UJ	NL	1200	UJ
84-74-2	Di-n-butylphthalate	NL	NL	7800	UJ	NL	9100	UJ	NL	6900	UJ	NL	1700	UJ	NL	430	UJ	NL	400	UJ	NL	420	UJ	NL	53	J	NL	6600	UJ	NL	470	UJ
117-84-0	Di-n-octylphthalate	NL	NL	7800	UJ	NL	9100	UJ	NL	6900	UJ	NL	1700	UJ	NL	430	UJ	NL	400	UJ	NL	420	UJ	NL	66	J	NL	6600	UJ	NL	470	UJ
206-44-0	Fluoranthene	1340	160800	7800	UJ	160800	9100	UJ	72360	6900	UJ	147400	990	J	728.96	430	UJ	379.22	400	UJ	455.6	420	UJ	1675	420	UJ	81874	6600	UJ	1795.6	470	UJ
86-73-7	Fluorene	38	4560	7800	UJ	4560	9100	UJ	2052	6900	UJ	4180	1700	UJ	20.672	430	UJ	10.754	400	UJ	12.92	420	UJ	47.5	420	UJ	2321.8	6600	UJ	50.92	470	UJ
118-74-1	Hexachlorobenzene	NL	NL	7800	UJ	NL	9100	UJ	NL	6900	UJ	NL	1700	UJ	NL	430	UJ	NL	400	UJ	NL	420	UJ	NL	52	J	NL	6600	UJ	NL	470	UJ
87-68-3	Hexachlorobutadiene	0.3	36	7800	UJ	36	9100	UJ	16.2	6900	UJ	33	1700	UJ	0.1632	430	UJ	0.0849	400	UJ	0.102	420	UJ	0.375	420	UJ	18.33	6600	UJ	0.402	470	UJ
77-47-4	Hexachlorocyclopentadiene	0.7	84	7800	UJ	84	9100	UJ	37.8	6900	UJ	77	1700	UJ	0.3808	430	UJ	0.1981	400	UJ	0.238	420	UJ	0.875	420	UJ	42.77	6600	UJ	0.938	470	UJ
67-72-1	Hexachloroethane	NL	NL	7800	UJ	NL	9100	UJ	NL	6900	UJ	NL	1700	UJ	NL	1100	UJ	NL	1000	UJ	NL	1100	UJ	NL	1100	UJ	NL	16000	UJ	NL	1200	UJ
193-39-5	Indeno(1,2,3-cd)pyrene	NL	NL	7800	UJ	NL	9100	UJ	NL	6900	UJ	NL	1700	UJ	NL	430	UJ	NL	400	UJ	NL	420	UJ	NL	44	J	NL	6600	UJ	NL	470	UJ
78-59-1	Isophorone	NL	NL	7800	UJ	NL	9100	UJ	NL	6900	UJ	NL	1700	UJ	NL	430	UJ	NL	400	UJ	NL	420	UJ	NL	420	UJ	NL	6600	UJ	NL	470	UJ
91-20-3	Naphthalene	38	4560	7800	UJ	4560	9100	UJ	2052	6900	UJ	4180	1700	UJ	20.672	430	UJ	10.754	400	UJ	12.92	420	UJ	47.5	420	UJ	2321.8	6600	UJ	50.92	470	UJ
98-95-3	Nitrobenzene	NL	NL	7800	UJ	NL	9100	UJ	NL	6900	UJ	NL	1700	UJ	NL	430	UJ	NL	400	UJ	NL	420	UJ	NL	420	UJ	NL	6600	UJ	NL	470	UJ
621-64-7	N-Nitroso-di-n-propylamine	NL	NL	7800	UJ	NL	9100	UJ	NL	6900	UJ	NL	1700	UJ	NL	1100	UJ	NL	1000	UJ	NL	1100	UJ	NL	1100	UJ	NL	16000	UJ	NL	1200	UJ
86-30-6	N-Nitrosodiphenylamine	NL	NL	7800	UJ	NL	9100	UJ	NL	6900	UJ	NL	1700	UJ	NL	430	UJ	NL	400	UJ	NL	420	UJ	NL	47	J	NL	6600	UJ	NL	470	UJ
87-86-5	Pentachlorophenol	40	4800	20000	UJ	4800	23000	UJ	2160	17000	UJ	4400	4400	UJ	21.76	430	UJ	11.32	400	UJ	13.6	420	UJ	50	420	UJ	2444	6600	UJ	53.6	470	UJ
85-01-8	Phenanthrene	160	19200	7800	UJ	19200	9100	UJ	8640	6900	UJ	17600	1700	UJ	87.04	430	UJ	45.28	400	UJ	54.4	420	UJ	200	420	UJ	9776	6600	UJ	214.4	470	UJ
108-95-2	Phenol	0.6	72	7800	UJ	72	9100	UJ	32.4	6900	UJ	66	1700	UJ	0.3264	430	UJ	0.1698	400	UJ	0.204	420	UJ	0.75	420	UJ	36.66	6600	UJ	0.804	470	UJ
129-00-0	Pyrene	NL	NL	7800	UJ	NL	9100	UJ	NL	6900	UJ	NL	810	J	NL	430	UJ	NL	400	UJ	NL	420	UJ	NL	420	UJ	NL	6600	UJ	NL	470	UJ
	Pestcide/PCB Organics																															
72-54-8	4,4'-DDD	0.01	1.2	**17**	**J**	1.2	**24**	**J**	0.54	**300**		1.1	**29**	**J**	0.00544	2.2	UJ	0.00283	2	UJ	0.0034	2.2	UJ	0.0125	2.2	UJ	0.611	3.4	UJ	0.0134	2.4	UJ
72-55-9	4,4'-DDE	0.01	1.2	**23**	**J**	1.2	**24**	**J**	0.54	**100**	**J**	1.1	**32**	**J**	0.00544	2.2	UJ	0.00283	2	UJ	0.0034	2.2	UJ	0.0125	2.2	UJ	0.611	3.4	UJ	0.0134	2.4	UJ

Table 1-13
Sample-Specific Sediment Screening Criteria and Sediment Data
Smithtown Groundwater Contamination Site
Smithtown, New York

		Sample Code	SDW-015-A			SDW-015-B			SDW-003-B-DUP			SDW-011-B-DUP		
		Sample Name							SDW-020-B			SDW-021-B		
		Sample Date	4/19/2001			4/19/2001			4/12/2001			4/18/2001		
Cas Rn	Chemical Name	Depth	0 to 6			18 to 24			18 to 24			18 to 24		
TOC	Total organic carbon	gOC/kg	140			168			54			110		
TOC	Total organic carbon	%OC	14.00%			16.80%			5.40%			11.00%		
		Screening Criteria (ug/gOC)	Screening Criteria (ug/kg)	Result (ug/kg)		Screening Criteria (ug/kg)	Result (ug/kg)		Screening Criteria (ug/kg)	Result (ug/kg)		Screening Criteria (ug/kg)	Result (ug/kg)	
50-29-3	4,4'-DDT	0.01	1.2	16	UJ	1.2	18	UJ	0.54	14	UJ	1.1	17	UJ
309-00-2	Aldrin	0.1	12	8	UJ	12	9.3	UJ	5.4	7.1	UJ	11	9	UJ
319-84-6	alpha-BHC	0.03	3.6	8	UJ	3.6	9.3	UJ	1.62	7.1	UJ	3.3	9	UJ
5103-71-9	alpha-Chlordane	0.001	0.12	8	UJ	0.12	9.3	UJ	0.054	7.1	UJ	0.11	9	UJ
12674-11-2	Aroclor-1016	0.0008	0.096	160	UJ	0.096	180	UJ	0.0432	140	UJ	0.088	170	UJ
11104-28-2	Aroclor-1221	0.0008	0.096	320	UJ	0.096	370	UJ	0.0432	280	UJ	0.088	350	UJ
11141-16-5	Aroclor-1232	0.0008	0.096	160	UJ	0.096	180	UJ	0.0432	140	UJ	0.088	170	UJ
53469-21-9	Aroclor-1242	0.0008	0.096	160	UJ	0.096	180	UJ	0.0432	140	UJ	0.088	170	UJ
12672-29-6	Aroclor-1248	0.0008	0.096	160	UJ	0.096	180	UJ	0.0432	140	UJ	0.088	170	UJ
11097-69-1	Aroclor-1254	0.0008	0.096	160	UJ	0.096	180	UJ	0.0432	140	UJ	0.088	170	UJ
11096-82-5	Aroclor-1260	0.0008	0.096	160	UJ	0.096	180	UJ	0.0432	140	UJ	0.088	170	UJ
319-85-7	beta-BHC	0.03	3.6	8	UJ	3.6	9.3	UJ	1.62	7.1	UJ	3.3	9	UJ
319-86-8	delta-BHC	0.03	3.6	8	UJ	3.6	9.3	UJ	1.62	7.1	UJ	3.3	9	UJ
60-57-1	Dieldrin	0.1	12	16	UJ	12	18	UJ	5.4	0	R	11	17	UJ
959-98-8	Endosulfan I	0.004	0.48	8	UJ	0.48	9.3	UJ	0.216	7.1	UJ	0.44	9	UJ
33213-65-9	Endosulfan II	0.004	0.48	16	UJ	0.48	18	UJ	0.216	14	UJ	0.44	17	UJ
1031-07-8	Endosulfan sulfate	NL	NL	16	UJ	NL	18	UJ	NL	14	UJ	NL	17	UJ
72-20-8	Endrin	0.73	87.6	16	UJ	87.6	18	UJ	39.42	14	UJ	80.3	17	UJ
7421-93-4	Endrin aldehyde	NL	NL	16	UJ	NL	18	UJ	NL	14	UJ	NL	17	UJ
53494-70-5	Endrin ketone	NL	NL	16	UJ	NL	18	UJ	NL	14	UJ	NL	17	UJ
58-89-9	gamma-BHC (Lindane)	0.03	3.6	8	UJ	3.6	9.3	UJ	1.62	7.1	UJ	3.3	9	UJ
5103-74-2	gamma-Chlordane	0.001	0.12	8	UJ	0.12	9.3	UJ	0.054	7.1	UJ	0.11	9	UJ
76-44-8	Heptachlor	0.0008	0.096	8	UJ	0.096	9.3	UJ	0.0432	7.1	UJ	0.088	9	UJ
1024-57-3	Heptachlor epoxide	0.0008	0.096	8	UJ	0.096	9.3	UJ	0.0432	7.1	UJ	0.088	9	UJ
72-43-5	Methoxychlor	0.6	72	80	UJ	72	93	UJ	32.4	71	UJ	66	89	UJ
8001-35-2	Toxaphene	0.01	1.2	800	UJ	1.2	930	UJ	0.54	710	UJ	1.1	890	UJ

		Sample Code	SSS-001			SSS-002			SSS-003			SSS-004			SSS-005			SSS-006		
		Sample Name																		
		Sample Date	4/10/2001			4/9/2001			4/9/2001			4/9/2001			4/11/2001			4/11/2001		
Cas Rn	Chemical Name	Depth																		
TOC	Total organic carbon	gOC/kg	0.544			0.283			0.34			1.25			61.1			1.34		
TOC	Total organic carbon	%OC	0.05%			0.03%			0.03%			0.13%			6.11%			0.13%		
		Screening Criteria (ug/gOC)	Screening Criteria (ug/kg)	Result (ug/kg)		Screening Criteria (ug/kg)	Result (ug/kg)		Screening Criteria (ug/kg)	Result (ug/kg)		Screening Criteria (ug/kg)	Result (ug/kg)		Screening Criteria (ug/kg)	Result (ug/kg)		Screening Criteria (ug/kg)	Result (ug/kg)	
50-29-3	4,4'-DDT	0.01	0.00544	2.2	UJ	0.00283	2	UJ	0.0034	2.2	UJ	0.0125	2.2	UJ	0.611	3.4	UJ	0.0134	2.4	UJ
309-00-2	Aldrin	0.1	0.0544	2.2	UJ	0.0283	2	UJ	0.034	2.2	UJ	0.125	2.2	UJ	6.11	3.4	UJ	0.134	2.4	UJ
319-84-6	alpha-BHC	0.03	0.01632	2.2	UJ	0.00849	2	UJ	0.0102	2.2	UJ	0.0375	2.2	UJ	1.833	3.4	UJ	0.0402	2.4	UJ
5103-71-9	alpha-Chlordane	0.001	0.000544	2.2	UJ	0.000283	2	UJ	0.00034	2.2	UJ	0.00125	2.2	UJ	0.0611	3.4	UJ	0.00134	2.4	UJ
12674-11-2	Aroclor-1016	0.0008	0.0004352	2.2	UJ	0.0002264	2	UJ	0.000272	2.2	UJ	0.001	2.2	UJ	0.04888	3.4	UJ	0.001072	2.4	UJ
11104-28-2	Aroclor-1221	0.0008	0.0004352	2.2	UJ	0.0002264	2	UJ	0.000272	2.2	UJ	0.001	2.2	UJ	0.04888	3.4	UJ	0.001072	2.4	UJ
11141-16-5	Aroclor-1232	0.0008	0.0004352	4.3	UJ	0.0002264	4	UJ	0.000272	4.2	UJ	0.001	4.2	UJ	0.04888	6.6	UJ	0.001072	4.7	UJ
53469-21-9	Aroclor-1242	0.0008	0.0004352	4.3	UJ	0.0002264	4	UJ	0.000272	4.2	UJ	0.001	4.2	UJ	0.04888	**7.3**	**J**	0.001072	4.7	UJ
12672-29-6	Aroclor-1248	0.0008	0.0004352	4.3	UJ	0.0002264	4	UJ	0.000272	4.2	UJ	0.001	4.2	UJ	0.04888	6.6	UJ	0.001072	4.7	UJ
11097-69-1	Aroclor-1254	0.0008	0.0004352	4.3	UJ	0.0002264	4	UJ	0.000272	4.2	UJ	0.001	4.2	UJ	0.04888	6.6	UJ	0.001072	4.7	UJ
11096-82-5	Aroclor-1260	0.0008	0.0004352	4.3	UJ	0.0002264	4	UJ	0.000272	4.2	UJ	0.001	4.2	UJ	0.04888	6.6	UJ	0.001072	4.7	UJ
319-85-7	beta-BHC	0.03	0.01632	4.3	UJ	0.00849	4	UJ	0.0102	4.2	UJ	0.0375	4.2	UJ	1.833	6.6	UJ	0.0402	4.7	UJ
319-86-8	delta-BHC	0.03	0.01632	4.3	UJ	0.00849	4	UJ	0.0102	4.2	UJ	0.0375	4.2	UJ	1.833	**12**	**J**	0.0402	4.7	UJ
60-57-1	Dieldrin	0.1	0.0544	22	UJ	0.0283	20	UJ	0.034	22	UJ	0.125	22	UJ	6.11	34	UJ	0.134	24	UJ
959-98-8	Endosulfan I	0.004	0.002176	4.3	UJ	0.001132	4	UJ	0.00136	4.2	UJ	0.005	4.2	UJ	0.2444	6.6	UJ	0.00536	4.7	UJ
33213-65-9	Endosulfan II	0.004	0.002176	4.3	UJ	0.001132	4	UJ	0.00136	4.2	UJ	0.005	4.2	UJ	0.2444	6.6	UJ	0.00536	4.7	UJ
1031-07-8	Endosulfan sulfate	NL	NL	2.2	UJ	NL	2	UJ	NL	2.2	UJ	NL	2.2	UJ	NL	7.6	J	NL	2.4	UJ
72-20-8	Endrin	0.73	0.39712	2.2	UJ	0.20659	2	UJ	0.2482	2.2	UJ	0.9125	2.2	UJ	44.603	5.8	J	0.9782	2.4	UJ
7421-93-4	Endrin aldehyde	NL	NL	220	UJ	NL	200	UJ	NL	220	UJ	NL	220	UJ	NL	340	UJ	NL	240	UJ
53494-70-5	Endrin ketone	NL	NL	43	UJ	NL	40	UJ	NL	42	UJ	NL	42	UJ	NL	66	UJ	NL	47	UJ
58-89-9	gamma-BHC (Lindane)	0.03	0.01632	88	UJ	0.00849	80	UJ	0.0102	85	UJ	0.0375	86	UJ	1.833	130	UJ	0.0402	95	UJ
5103-74-2	gamma-Chlordane	0.001	0.000544	43	UJ	0.000283	40	UJ	0.00034	42	UJ	0.00125	42	UJ	0.0611	66	UJ	0.00134	47	UJ
76-44-8	Heptachlor	0.0008	0.0004352	43	UJ	0.0002264	40	UJ	0.000272	42	UJ	0.001	42	UJ	0.04888	66	UJ	0.001072	47	UJ
1024-57-3	Heptachlor epoxide	0.0008	0.0004352	43	UJ	0.0002264	40	UJ	0.000272	42	UJ	0.001	42	UJ	0.04888	66	UJ	0.001072	47	UJ
72-43-5	Methoxychlor	0.6	0.3264	43	UJ	0.1698	40	UJ	0.204	42	UJ	0.75	42	UJ	36.66	66	UJ	0.804	47	UJ
8001-35-2	Toxaphene	0.01	0.00544	43	UJ	0.00283	40	UJ	0.0034	42	UJ	0.0125	42	UJ	0.611	66	UJ	0.0134	47	UJ

Table 1-13
Sample-Specific Sediment Screening Criteria and Sediment Data
Smithtown Groundwater Contamination Site
Smithtown, New York

		Sample Code	SSS-007			SSS-008			SSS-009			SSS-010			SSS-011			SSS-012			SSS-001-DUP		
		Sample Name																			SSS-020		
		Sample Date	4/12/2001			4/23/2001			4/23/2001			4/24/2001			4/26/2001			4/24/2001			4/10/2001		
Cas Rn	Chemical Name	Depth																					
TOC	Total organic carbon	gOC/kg	3.36			4 32			17 9			1 58			29			6.56			0 467		
TOC	Total organic carbon	%OC	0 34%			0.43%			1.79%			0.16%			2.90%			0.66%			0.05%		
		Screening Criteria (ug/gOC)	Screening Criteria (ug/kg)	Result (ug/kg)		Screening Criteria (ug/kg)	Result (ug/kg)		Screening Criteria (ug/kg)	Result (ug/kg)		Screening Criteria (ug/kg)	Result (ug/kg)		Screening Criteria (ug/kg)	Result (ug/kg)		Screening Criteria (ug/kg)	Result (ug/kg)		Screening Criteria (ug/kg)	Result (ug/kg)	
	Volatile Organic Compounds																						
71-55-6	1,1,1-Trichloroethane	NL	NL	13	UJ	NL	13	U	NL	12	U	NL	13	U	NL	35	UJ	NL	12	U	NL	13	UJ
79-34-5	1,1,2,2-Tetrachloroethane	0.3	1 008	13	U	1 296	13	U	5 37	12	U	0 474	13	U	8 7	35	UJ	1 968	12	U	0 1401	13	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	NL	NL	13	U	NL	13	U	NL	12	U	NL	13	U	NL	35	UJ	NL	12	U	NL	13	U
79-00-5	1,1,2-Trichloroethane	0 6	2 016	13	UJ	2.592	13	U	10.74	12	U	0 948	13	U	17.4	35	UJ	3 936	12	U	0.2802	13	UJ
75-34-3	1,1-Dichloroethane	NL	NL	13	U	NL	13	U	NL	12	U	NL	13	U	NL	35	UJ	NL	12	U	NL	13	U
75-35-4	1,1-Dichloroethene	0 02	0 0672	13	U	0 0864	13	U	0 358	12	U	0 0316	**2**	**J**	0.58	**14**	**J**	0 1312	12	UJ	0 00934	13	U
120-82-1	1,2,4-Trichlorobenzene	91	305 76	13	U	393 12	13	U	1628 9	12	U	143 78	13	U	2639	35	UJ	596.96	12	U	42 497	13	U
96-12-8	1,2-Dibromo-3-chloropropane	NL	NL	13	U	NL	13	U	NL	12	U	NL	13	U	NL	35	UJ	NL	12	U	NL	13	UJ
106-93-4	1,2-Dibromoethane	NL	NL	17	UJ	NL	13	UJ	NL	12	UJ	NL	13	UJ	NL	10	J	NL	12	UJ	NL	29	U
95-50-1	1,2-Dichlorobenzene	12	40 32	13	U	51.84	13	U	214 8	12	U	18 96	13	U	348	35	UJ	78 72	12	U	5 604	**10**	**J**
107-06-2	1,2-Dichloroethane	0 7	2 352	13	U	3.024	13	U	12 53	12	U	1.106	13	U	20 3	35	UJ	4 592	12	U	0 3269	13	U
78-87-5	1,2-Dichloropropane	NL	NL	52	UJ	NL	13	U	NL	12	U	NL	14	U	NL	35	UJ	NL	12	U	NL	28	UJ
541-73-1	1,3-Dichlorobenzene	12	40 32	13	U	51 84	13	U	214.8	12	U	18.96	13	U	348	35	UJ	78 72	12	U	5 604	13	U
106-46-7	1,4-Dichlorobenzene	12	40 32	13	U	51 84	13	U	214 8	12	U	18 96	13	U	348	35	UJ	78 72	12	U	5 604	13	U
78-93-3	2-Butanone	NL	NL	13	U	NL	13	U	NL	12	U	NL	13	U	NL	35	UJ	NL	12	U	NL	13	U
591-78-6	2-Hexanone	NL	NL	13	U	NL	13	U	NL	12	U	NL	13	U	NL	35	UJ	NL	12	U	NL	13	U
108-10-1	4-Methyl-2-pentanone	NL	NL	13	UJ	NL	13	UJ	NL	12	UJ	NL	13	UJ	NL	35	UJ	NL	12	UJ	NL	13	U
67-64-1	Acetone	NL	NL	13	U	NL	1	J	NL	12	U	NL	13	U	NL	35	UJ	NL	12	U	NL	13	U
71-43-2	Benzene	0.6	2 016	13	U	2 592	2	J	10 74	12	U	0.948	13	U	17 4	35	UJ	3 936	12	U	0 2802	13	U
75-27-4	Bromodichloromethane	NL	NL	13	U	NL	13	U	NL	12	U	NL	13	U	NL	35	UJ	NL	12	U	NL	13	UJ
75-25-2	Bromoform	NL	NL	13	U	NL	13	U	NL	12	U	NL	13	U	NL	35	UJ	NL	12	U	NL	13	UJ
74-83-9	Bromomethane	NL	NL	13	U	NL	13	U	NL	12	U	NL	13	U	NL	35	UJ	NL	12	U	NL	13	U
75-15-0	Carbon Disulfide	NL	NL	13	U	NL	13	U	NL	12	U	NL	13	U	NL	35	UJ	NL	12	U	NL	13	U
56-23-5	Carbon Tetrachloride	0 6	2 016	13	U	2 592	13	U	10.74	12	U	0 948	13	U	17 4	35	UJ	3 936	12	U	0 2802	13	U
108-90-7	Chlorobenzene	3 5	11.76	13	U	15.12	13	U	62.65	12	U	5 53	13	U	101 5	35	UJ	22 96	12	U	1 6345	13	UJ
75-00-3	Chloroethane	NL	NL	13	U	NL	13	U	NL	12	U	NL	13	U	NL	35	UJ	NL	12	U	NL	13	U
67-66-3	Chloroform	NL	NL	13	U	NL	13	U	NL	12	U	NL	13	U	NL	35	UJ	NL	12	U	NL	13	U
74-87-3	Chloromethane	NL	NL	13	U	NL	13	U	NL	12	U	NL	13	U	NL	35	UJ	NL	12	U	NL	13	U
156-59-2	cis-1,2-Dichloroethene	NL	NL	13	U	NL	13	U	NL	12	U	NL	13	U	NL	35	UJ	NL	12	U	NL	13	U
10061-01-5	cis-1,3-Dichloropropene	NL	NL	13	U	NL	13	U	NL	12	U	NL	13	U	NL	35	UJ	NL	12	U	NL	13	U
110-82-7	Cyclohexane	NL	NL	13	U	NL	13	U	NL	12	U	NL	13	U	NL	35	UJ	NL	12	U	NL	13	U
124-48-1	Dibromochloromethane	NL	NL	13	U	NL	13	U	NL	12	U	NL	13	U	NL	35	UJ	NL	12	U	NL	13	U
75-71-8	Dichlorodifluoromethane	NL	NL	13	U	NL	13	U	NL	12	U	NL	13	U	NL	35	UJ	NL	12	U	NL	13	U
100-41-4	Ethylbenzene	6 4	21 504	13	U	27.648	13	U	114.56	12	U	10 112	13	U	185 6	35	UJ	41 984	12	U	2 9888	13	U
98-82-8	Isopropylbenzene	12	40 32	13	U	51.84	13	U	214 8	12	U	18 96	13	U	348	35	UJ	78.72	12	U	5 604	13	U
79-20-9	Methyl Acetate	NL	NL	13	U	NL	13	U	NL	12	U	NL	13	U	NL	35	UJ	NL	12	U	NL	13	U
1634-04-4	Methyl Tert-Butyl Ether	NL	NL	13	U	NL	13	U	NL	12	U	NL	13	U	NL	35	UJ	NL	12	U	NL	13	U
75-09-2	Methylene Chloride	NL	NL	13	U	NL	13	U	NL	12	U	NL	13	U	NL	35	UJ	NL	12	U	NL	13	U
108-87-2	Metylcyclohexane	NL	NL	13	U	NL	13	U	NL	12	U	NL	13	U	NL	35	UJ	NL	12	U	NL	13	U
100-42-5	Styrene	NL	NL	13	U	NL	13	U	NL	12	U	NL	13	U	NL	35	UJ	NL	12	U	NL	13	U
127-18-4	Tetrachloroethene	0.8	2 688	13	U	3 456	13	U	14 32	12	U	1 264	13	U	23 2	35	UJ	5.248	12	U	0 3736	13	U
108-88-3	Toluene	45	151 2	13	U	194.4	13	U	805.5	12	U	71.1	13	U	1305	35	UJ	295 2	12	U	21 015	13	U
156-60-5	trans-1,2-Dichloroethene	NL	NL	13	U	NL	13	U	NL	12	U	NL	13	U	NL	35	UJ	NL	12	U	NL	13	U
10061-02-6	trans-1,3-Dichloropropene	NL	NL	13	U	NL	13	U	NL	12	U	NL	13	U	NL	35	UJ	NL	12	U	NL	13	U
79-01-6	Trichloroethene	2	6.72	13	U	8 64	13	U	35.8	12	U	3 16	13	U	58	35	UJ	13.12	12	U	0 934	13	U
75-69-4	Trichlorofluoromethane	NL	NL	13	U	NL	13	U	NL	12	U	NL	13	U	NL	35	UJ	NL	12	U	NL	13	U
75-01-4	Vinyl Chloride	0 07	0 2352	13	U	0 3024	13	U	1.253	12	U	0.1106	13	U	2 03	35	UJ	0 4592	12	U	0.03269	13	U
1330-20-7	Xylenes (total)	27	90 72	13	U	116.64	13	U	483 3	12	U	42 66	13	U	783	35	UJ	177 12	12	U	12.609	13	U
	Semi-Volatile Organics																						
92-52-4	1,1'-Biphenyl	NL	NL	440	UJ	NL	410	UJ	NL	400	UJ	NL	380	UJ	NL	1800	UJ	NL	420	UJ	NL	440	UJ
108-60-1	2,2'-oxybis(1-Chloropropane)	NL	NL	440	U	NL	410	U	NL	400	U	NL	380	U	NL	1800	UJ	NL	420	U	NL	440	UJ
95-95-4	2,4,5-Trichlorophenol	NL	NL	440	U	NL	410	U	NL	400	U	NL	380	U	NL	1800	UJ	NL	420	U	NL	440	UJ
88-06-2	2,4,6-Trichlorophenol	NL	NL	440	U	NL	410	U	NL	400	U	NL	380	U	NL	1800	UJ	NL	420	U	NL	440	UJ
120-83-2	2,4-Dichlorophenol	NL	NL	440	U	NL	410	U	NL	400	U	NL	380	U	NL	1800	UJ	NL	420	U	NL	440	UJ
105-67-9	2,4-Dimethylphenol	NL	NL	440	U	NL	410	U	NL	400	U	NL	380	U	NL	1800	UJ	NL	420	U	NL	440	UJ
51-28-5	2,4-Dinitrophenol	NL	NL	1100	U	NL	1000	U	NL	1000	U	NL	950	U	NL	4600	UJ	NL	1000	U	NL	1100	UJ
121-14-2	2,4-Dinitrotoluene	NL	NL	1100	U	NL	1000	U	NL	1000	U	NL	950	U	NL	4600	UJ	NL	1000	U	NL	1100	UJ
606-20-2	2,6-Dinitrotoluene	NL	NL	440	U	NL	410	U	NL	400	U	NL	380	U	NL	1800	UJ	NL	420	U	NL	440	UJ

Table 1-13
Sample-Specific Sediment Screening Criteria and Sediment Data
Smithtown Groundwater Contamination Site
Smithtown, New York

		Sample Code	SSS-007			SSS-008			SSS-009			SSS-010			SSS-011			SSS-012			SSS-001-DUP		
		Sample Name																			SSS-020		
		Sample Date	4/12/2001			4/23/2001			4/23/2001			4/24/2001			4/26/2001			4/24/2001			4/10/2001		
Cas Rn	Chemical Name	Depth																					
TOC	Total organic carbon	gOC/kg	3.36			4.32			17.9			1.58			29			6.56			0.467		
TOC	Total organic carbon	%OC	0.34%			0.43%			1.79%			0.16%			2.90%			0.66%			0.05%		
		Screening Criteria (ug/gOC)	Screening Criteria (ug/kg)	Result (ug/kg)		Screening Criteria (ug/kg)	Result (ug/kg)		Screening Criteria (ug/kg)	Result (ug/kg)		Screening Criteria (ug/kg)	Result (ug/kg)		Screening Criteria (ug/kg)	Result (ug/kg)		Screening Criteria (ug/kg)	Result (ug/kg)		Screening Criteria (ug/kg)	Result (ug/kg)	
91-58-7	2-Chloronaphthalene	NL	NL	440	U	NL	410	U	NL	400	U	NL	380	U	NL	110	J	NL	84	J	NL	440	UJ
95-57-8	2-Chlorophenol	NL	NL	440	U	NL	410	U	NL	400	U	NL	380	U	NL	1800	UJ	NL	420	U	NL	440	UJ
91-57-6	2-Methylnaphthalene	30	100.8	440	U	129.6	410	U	537	400	U	47.4	380	U	870	1800	UJ	196.8	420	U	14.01	440	UJ
95-48-7	2-Methylphenol	NL	NL	440	U	NL	410	U	NL	400	U	NL	380	U	NL	1800	UJ	NL	420	U	NL	440	UJ
88-74-4	2-Nitroaniline	NL	NL	440	U	NL	410	U	NL	400	U	NL	380	U	NL	1800	UJ	NL	420	U	NL	440	UJ
88-75-5	2-Nitrophenol	NL	NL	440	U	NL	410	U	NL	400	U	NL	380	U	NL	1800	UJ	NL	420	U	NL	440	UJ
91-94-1	3,3'-Dichlorobenzidine	NL	NL	440	U	NL	53	J	NL	400	U	NL	380	U	NL	1800	UJ	NL	420	U	NL	440	UJ
99-09-2	3-Nitroaniline	NL	NL	440	U	NL	410	U	NL	400	U	NL	380	U	NL	1800	UJ	NL	420	U	NL	440	UJ
534-52-1	4,6-Dinitro-2-methylphenol	NL	NL	440	U	NL	410	U	NL	400	U	NL	380	U	NL	1800	UJ	NL	420	U	NL	440	UJ
101-55-3	4-Bromophenyl-phenylether	NL	NL	440	U	NL	410	U	NL	400	U	NL	380	U	NL	1800	UJ	NL	420	U	NL	440	UJ
59-50-7	4-Chloro-3-methylphenol	NL	NL	440	U	NL	410	U	NL	400	U	NL	380	U	NL	1800	UJ	NL	420	U	NL	440	UJ
106-47-8	4-Chloroaniline	NL	NL	440	U	NL	410	U	NL	400	U	NL	380	U	NL	1800	UJ	NL	420	U	NL	440	UJ
7005-72-3	4-Chlorophenyl-phenylether	NL	NL	440	U	NL	130	J	NL	400	U	NL	380	U	NL	120	J	NL	420	U	NL	440	UJ
106-44-5	4-Methylphenol	NL	NL	440	U	NL	410	U	NL	400	U	NL	380	U	NL	180	J	NL	21	J	NL	440	UJ
100-01-6	4-Nitroaniline	NL	NL	440	U	NL	410	U	NL	400	U	NL	380	U	NL	1800	UJ	NL	420	U	NL	440	UJ
100-02-7	4-Nitrophenol	NL	NL	1100	U	NL	1000	U	NL	1000	U	NL	950	U	NL	4600	UJ	NL	1000	U	NL	1100	UJ
83-32-9	Acenaphthene	240	806.4	440	U	1036.8	410	U	4296	400	U	379.2	380	U	6960	0	R	1574.4	420	U	112.08	440	UJ
208-96-8	Acenaphthylene	NL	NL	440	U	NL	410	U	NL	400	U	NL	380	U	NL	1800	UJ	NL	420	U	NL	440	UJ
98-86-2	Acetophenone	NL	NL	440	U	NL	410	U	NL	400	U	NL	380	U	NL	1800	UJ	NL	420	U	NL	440	UJ
120-12-7	Anthracene	107	359.52	1100	U	462.24	1000	U	1915.3	1000	U	169.06	950	U	3103	4600	UJ	701.92	1000	U	49.969	1100	UJ
1912-24-9	Atrazine	NL	NL	440	U	NL	410	U	NL	400	U	NL	380	U	NL	1800	UJ	NL	420	U	NL	440	UJ
100-52-7	Benzaldehyde	NL	NL	440	U	NL	410	U	NL	400	U	NL	380	U	NL	1800	UJ	NL	420	U	NL	440	UJ
56-55-3	Benzo(a)anthracene	12	40.32	440	U	51.84	410	U	214.8	400	U	18.96	380	U	348	1800	UJ	78.72	420	U	5.604	440	UJ
50-32-8	Benzo(a)pyrene	0.7	2.352	440	U	3.024	410	U	12.53	400	U	1.106	380	U	20.3	1800	UJ	4.592	420	U	0.3269	440	UJ
205-99-2	Benzo(b)fluoranthene	NL	NL	440	UJ	NL	410	U	NL	400	U	NL	380	U	NL	1800	UJ	NL	420	U	NL	440	UJ
191-24-2	Benzo(g,h,i)perylene	NL	NL	1100	U	NL	1000	U	NL	1000	U	NL	950	U	NL	4600	UJ	NL	1000	U	NL	1100	UJ
207-08-9	Benzo(k)fluoranthene	NL	NL	440	U	NL	1200		NL	400	U	NL	380	U	NL	340	J	NL	31	J	NL	440	UJ
111-91-1	bis(2-Chloroethoxy)methane	NL	NL	440	U	NL	410	U	NL	400	U	NL	380	U	NL	160	J	NL	420	U	NL	440	UJ
111-44-4	bis(2-Chloroethyl)ether	0.03	0.1008	440	U	0.1296	410	UJ	0.537	400	UJ	0.0474	380	UJ	0.87	1800	UJ	0.1968	420	UJ	0.01401	440	UJ
117-81-7	bis(2-Ethylhexyl)phthalate	199.5	670.32	440	U	861.84	240	J	3571.05	400	U	315.21	380	U	5785.5	220	J	1308.72	420	U	93.1665	440	UJ
85-68-7	Butylbenzylphthalate	NL	NL	440	U	NL	110	J	NL	400	U	NL	380	U	NL	1800	UJ	NL	420	U	NL	440	UJ
105-60-2	Caprolactam	NL	NL	440	U	NL	410	U	NL	400	U	NL	380	U	NL	1800	UJ	NL	420	U	NL	440	UJ
86-74-8	Carbazole	NL	NL	440	U	NL	50	J	NL	400	U	NL	38	J	NL	1800	UJ	NL	37	J	NL	440	UJ
218-01-9	Chrysene	NL	NL	440	U	NL	1900		NL	400	U	NL	380	U	NL	370	J	NL	65	J	NL	440	UJ
53-70-3	Dibenz(a,h)anthracene	NL	NL	440	U	NL	1700		NL	400	U	NL	380	U	NL	350	J	NL	65	J	NL	440	UJ
132-64-9	Dibenzofuran	NL	NL	440	U	NL	410	UJ	NL	400	UJ	NL	380	UJ	NL	1800	UJ	NL	420	UJ	NL	440	UJ
84-66-2	Diethylphthalate	NL	NL	440	U	NL	410	U	NL	400	U	NL	380	U	NL	1800	UJ	NL	420	U	NL	440	UJ
131-11-3	Dimethylphthalate	NL	NL	1100	U	NL	1000	U	NL	1000	U	NL	950	U	NL	4600	UJ	NL	1000	U	NL	1100	UJ
84-74-2	Di-n-butylphthalate	NL	NL	440	U	NL	810		NL	400	U	NL	380	U	NL	210	J	NL	33	J	NL	440	UJ
117-84-0	Di-n-octylphthalate	NL	NL	440	U	NL	860		NL	400	U	NL	380	U	NL	190	J	NL	47	J	NL	440	UJ
206-44-0	Fluoranthene	1340	4502.4	1600		5788.8	74	J	23986	400	U	2117.2	380	U	38860	1800	UJ	8790.4	51	J	625.78	440	UJ
86-73-7	Fluorene	38	127.68	440	U	164.16	410	U	680.2	400	U	60.04	380	U	1102	1800	UJ	249.28	420	U	17.746	440	UJ
118-74-1	Hexachlorobenzene	NL	NL	440	U	NL	600		NL	400	U	NL	380	U	NL	130	J	NL	60	J	NL	440	UJ
87-68-3	Hexachlorobutadiene	0.3	1.008	440	U	1.296	410	U	5.37	400	U	0.474	380	U	8.7	1800	UJ	1.968	420	U	0.1401	440	UJ
77-47-4	Hexachlorocyclopentadiene	0.7	2.352	440	U	3.024	410	U	12.53	400	U	1.106	380	U	20.3	1800	UJ	4.592	420	U	0.3269	440	UJ
67-72-1	Hexachlorcethane	NL	NL	1100	U	NL	1000	U	NL	1000	U	NL	950	U	NL	4600	UJ	NL	1000	U	NL	1100	UJ
193-39-5	Indeno(1,2,3-cd)pyrene	NL	NL	440	U	NL	750		NL	400	U	NL	380	U	NL	130	J	NL	420	U	NL	440	UJ
78-59-1	Isophorone	NL	NL	440	U	NL	410	U	NL	400	U	NL	380	U	NL	1800	UJ	NL	420	U	NL	440	UJ
91-20-3	Naphthalene	38	127.68	440	U	164.16	410	U	680.2	400	U	60.04	380	U	1102	1800	UJ	249.28	420	U	17.746	440	UJ
98-95-3	Nitrobenzene	NL	NL	440	U	NL	410	U	NL	400	U	NL	380	U	NL	200	J	NL	420	U	NL	440	UJ
621-64-7	N-Nitroso-di-n-propylamine	NL	NL	1100	U	NL	1000	U	NL	1000	U	NL	950	U	NL	4600	UJ	NL	1000	U	NL	1100	UJ
86-30-6	N-Nitrosodiphenylamine	NL	NL	440	U	NL	740		NL	400	U	NL	380	U	NL	150	J	NL	32	J	NL	440	UJ
87-86-5	Pentachlorophenol	40	134.4	440	U	172.8	480		716	400	U	63.2	380	U	1160	100	J	262.4	420	U	18.68	440	UJ
85-01-8	Phenanthrene	160	537.6	440	U	691.2	200	J	2864	400	U	252.8	380	U	4640	1800	UJ	1049.6	420	U	74.72	440	UJ
108-95-2	Phenol	0.6	2.016	440	U	2.592	100	J	10.74	400	U	0.948	380	U	17.4	1800	UJ	3.936	420	U	0.2802	440	UJ
129-00-0	Pyrene	NL	NL	440	U	NL	600		NL	400	U	NL	380	U	NL	100	J	NL	26	J	NL	440	UJ
	Pestcide/PCB Organics																						
72-54-8	4,4'-DDD	0.01	0.0336	2.3	U	0.0432	2.1	UJ	0.179	2.1	UJ	0.0158	1.9	UJ	0.29	4.7	UJ	0.0656	2.1	UJ	0.00467	2.3	UJ
72-55-9	4,4'-DDE	0.01	0.0336	2.3	U	0.0432	2.1	UJ	0.179	2.1	UJ	0.0158	1.9	UJ	0.29	4.7	UJ	0.0656	2.1	UJ	0.00467	2.3	UJ

Table 1-13
Sample-Specific Sediment Screening Criteria and Sediment Data
Smithtown Groundwater Contamination Site
Smithtown, New York

		Sample Code	SSS-007			SSS-008			SSS-009			SSS-010			SSS-011			SSS-012			SSS-001-DUP		
		Sample Name																			SSS-020		
		Sample Date	4/12/2001			4/23/2001			4/23/2001			4/24/2001			4/26/2001			4/24/2001			4/10/2001		
Cas Rn	**Chemical Name**	**Depth**																					
TOC	Total organic carbon	gOC/kg	3.36			4.32			17.9			1.58			29			6.56			0.467		
TOC	Total organic carbon	%OC	0.34%			0.43%			1.79%			0.16%			2.90%			0.66%			0.05%		
		Screening Criteria (ug/gOC)	Screening Criteria (ug/kg)	Result (ug/kg)		Screening Criteria (ug/kg)	Result (ug/kg)		Screening Criteria (ug/kg)	Result (ug/kg)		Screening Criteria (ug/kg)	Result (ug/kg)		Screening Criteria (ug/kg)	Result (ug/kg)		Screening Criteria (ug/kg)	Result (ug/kg)		Screening Criteria (ug/kg)	Result (ug/kg)	
50-29-3	4,4'-DDT	0.01	0.0336	2.3	U	0.0432	2.1	UJ	0.179	2.1	UJ	0.0158	1.9	UJ	0.29	4.7	UJ	0.0656	2.1	UJ	0.00467	2.3	UJ
309-00-2	Aldrin	0.1	0.336	2.3	U	0.432	2.1	UJ	1.79	2.1	UJ	0.158	1.9	UJ	2.9	4.7	UJ	0.656	2.1	UJ	0.0467	2.3	UJ
319-84-6	alpha-BHC	0.03	0.1008	2.3	U	0.1296	2.5	UJ	0.537	2.1	UJ	0.0474	1.9	UJ	0.87	**8.4**	**J**	0.1968	2.1	UJ	0.01401	2.3	UJ
5103-71-9	alpha-Chlordane	0.001	0.00336	2.3	U	0.00432	2.1	UJ	0.0179	2.1	UJ	0.00158	1.9	UJ	0.029	4.7	UJ	0.00656	2.1	UJ	0.000467	2.3	UJ
12674-11-2	Aroclor-1016	0.0008	0.002688	2.3	U	0.003456	2.1	UJ	0.01432	2.1	UJ	0.001264	1.9	UJ	0.0232	4.7	UJ	0.005248	2.1	UJ	0.0003736	2.3	UJ
11104-28-2	Aroclor-1221	0.0008	0.002688	2.3	U	0.003456	2.1	UJ	0.01432	2.1	UJ	0.001264	1.9	UJ	0.0232	4.7	UJ	0.005248	2.1	UJ	0.0003736	2.3	UJ
11141-16-5	Aroclor-1232	0.0008	0.002688	4.4	U	0.003456	4.2	UJ	0.01432	4	UJ	0.001264	3.8	UJ	0.0232	9.1	UJ	0.005248	4.1	UJ	0.0003736	4.5	UJ
53469-21-9	Aroclor-1242	0.0008	0.002688	4.4	U	0.003456	**1.2**	**J**	0.01432	4	UJ	0.001264	3.8	UJ	0.0232	9.1	UJ	0.005248	4.1	UJ	0.0003736	4.5	UJ
12672-29-6	Aroclor-1248	0.0008	0.002688	4.4	U	0.003456	4.1	UJ	0.01432	4	UJ	0.001264	3.8	UJ	0.0232	9.1	UJ	0.005248	4.1	UJ	0.0003736	4.5	UJ
11097-69-1	Aroclor-1254	0.0008	0.002688	4.4	U	0.003456	4.1	UJ	0.01432	4	UJ	0.001264	3.8	UJ	0.0232	9.1	UJ	0.005248	4.1	UJ	0.0003736	4.5	UJ
11096-82-5	Aroclor-1260	0.0008	0.002688	4.4	U	0.003456	**1.3**	**J**	0.01432	4	UJ	0.001264	3.8	UJ	0.0232	9.1	UJ	0.005248	4.1	UJ	0.0003736	4.5	UJ
319-85-7	beta-BHC	0.03	0.1008	4.4	U	0.1296	4.1	UJ	0.537	4	UJ	0.0474	3.8	UJ	0.87	9.1	UJ	0.1968	4.1	UJ	0.01401	4.5	UJ
319-86-8	delta-BHC	0.03	0.1008	4.4	U	0.1296	**3.2**	**J**	0.537	4	UJ	0.0474	3.8	UJ	0.87	9.1	UJ	0.1968	4.1	UJ	0.01401	4.5	UJ
60-57-1	Dieldrin	0.1	0.336	23	U	0.432	21	UJ	1.79	21	UJ	0.158	19	UJ	2.9	47	UJ	0.656	21	UJ	0.0467	23	UJ
959-98-8	Endosulfan I	0.004	0.01344	4.4	U	0.01728	4.1	UJ	0.0716	4	UJ	0.00632	3.8	UJ	0.116	9.1	UJ	0.02624	4.1	UJ	0.001868	4.5	UJ
33213-65-9	Endosulfan II	0.004	0.01344	4.4	U	0.01728	4.1	UJ	0.0716	4	UJ	0.00632	3.8	UJ	0.116	9.1	UJ	0.02624	4.1	UJ	0.001868	4.5	UJ
1031-07-8	Endosulfan sulfate	NL	NL	2.3	U	NL	5.1	NJ	NL	2.1	UJ	NL	1.9	UJ	NL	4.7	UJ	NL	2.1	UJ	NL	2.3	UJ
72-20-8	Endrin	0.73	2.4528	2.3	U	3.1536	**6.5**	**J**	13.067	2.1	UJ	1.1534	1.9	UJ	21.17	5	NJ	4.7888	2.1	UJ	0.34091	2.3	UJ
7421-93-4	Endrin aldehyde	NL	NL	230	U	NL	210	UJ	NL	210	UJ	NL	190	UJ	NL	470	UJ	NL	210	UJ	NL	230	UJ
53494-70-5	Endrin ketone	NL	NL	44	U	NL	41	UJ	NL	40	UJ	NL	38	UJ	NL	91	UJ	NL	41	UJ	NL	45	UJ
58-89-9	gamma-BHC (Lindane)	0.03	0.1008	89	U	0.1296	84	UJ	0.537	81	UJ	0.0474	77	UJ	0.87	180	UJ	0.1968	84	UJ	0.01401	91	UJ
5103-74-2	gamma-Chlordane	0.001	0.00336	44	U	0.00432	41	UJ	0.0179	40	UJ	0.00158	38	UJ	0.029	91	UJ	0.00656	41	UJ	0.000467	45	UJ
76-44-8	Heptachlor	0.0008	0.002688	44	U	0.003456	41	UJ	0.01432	40	UJ	0.001264	38	UJ	0.0232	91	UJ	0.005248	41	UJ	0.0003736	45	UJ
1024-57-3	Heptachlor epoxide	0.0008	0.002688	44	U	0.003456	41	UJ	0.01432	40	UJ	0.001264	38	UJ	0.0232	91	UJ	0.005248	41	UJ	0.0003736	45	UJ
72-43-5	Methoxychlor	0.6	2.016	44	U	2.592	41	UJ	10.74	40	UJ	0.948	38	UJ	17.4	91	UJ	3.936	41	UJ	0.2802	45	UJ
8001-35-2	Toxaphene	0.01	0.0336	44	U	0.0432	41	UJ	0.179	40	UJ	0.0158	38	UJ	0.29	91	UJ	0.0656	41	UJ	0.00467	45	UJ

Table 1-14
Compound and Analyte Results in Storm Drain Sediment Samples
Smithtown Groundwater Contamination Site
Smithtown, New York

Compound/Analyte	SDS 001	SDS 002	SDS 003	SDS 004	SDS 005	SDS 006	SDS 007	SDS 008	SDS 009	SDS 010	SDS 011	SDS 012	SDS 013
Volatile Organic Compounds													
Trichlorofluoromethane	ND	ND	ND	ND	1 J	4 J	6 J	4 J	2 J	8 J	9 J	1 J	ND
Acetone	ND	ND	ND	ND	ND	ND	6 J	ND	ND	ND	ND	ND	ND
Carbon disulfide	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	3 J
Methyl acetate	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	10 J	ND
Chloroform	2 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Butanone	ND	ND	ND	ND	ND	ND	ND	ND	ND	20 J	ND	ND	7 J
Cyclohexane	ND	ND	ND	26	ND	ND	ND	ND	ND	ND	ND	ND	ND
Metylcyclohexane	ND	ND	ND	64	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	7 J	ND	100
Methyl tert butyl ether	ND	ND	ND	73	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	ND	ND	ND	110	ND	ND	ND	ND	ND	ND	ND	ND	ND
Xylenes (total)	ND	ND	ND	320	2 J	ND	ND	ND	ND	ND	ND	ND	ND
Isopropylbenzene	ND	ND	ND	8 J	ND	ND	ND	ND	ND	ND	ND	ND	ND
Semi-Volatile Organic Compounds													
Benzaldehyde	1200J	ND	520J	ND	120J	260J	700J	190J	ND	ND	ND	ND	ND
4-Methylphenol	ND	ND	ND	160J	100J	ND	ND	ND	ND	ND	ND	20J	ND

Table 1-14
Compound and Analyte Results in Storm Drain Sediment Samples
Smithtown Groundwater Contamination Site
Smithtown, New York

Compound/Analyte	SDS 001	SDS 002	SDS 003	SDS 004	SDS 005	SDS 006	SDS 007	SDS 008	SDS 009	SDS 010	SDS 011	SDS 012	SDS 013
Naphthalene	130J	190J	410J	5300	ND	190J	47J	ND	ND	ND	ND	24J	ND
2-Methylnaphthalene	ND	180J	730J	5900	ND	180J	52J	ND	ND	ND	ND	57J	ND
1,1'-Biphenyl	ND	ND	240J	100J	ND	55J	ND	ND	ND	ND	ND	29J	ND
Acenaphthylene	ND	150J	ND	ND	ND	44J	81J	ND	ND	390J	ND	ND	ND
Acenaphthene	240J	49J	2200J	50J	ND	570J	230J	150J	67J	1200J	1000J	210J	270J
Dibenzofuran	ND	ND	1300J	ND	ND	390J	160J	81J	45J	720J	670J	110J	160 J
Fluorene	250J	150J	2400J	83J	ND	690J	300J	ND	97J	1900J	1300J	230J	390J
Phenanthrene	3700	430J	19000	340J	170J	4600	4300	2200	1300	23000J	10000J	1900	3500
Anthracene	580J	250J	3700	72J	ND	880	620J	430J	170J	4300J	1500J	340J	550J
Carbazole	460J	100J	3100	57J	ND	700J	730J	240J	180J	3000J	950J	240J	500J
Fluoranthene	7500	360J	23000D	650J	230J	5600	7800D	3700	2100	40000J D	14000J	2100	4900
Pyrene	6000	340J	17000	560J	200J	4400	6400	3200	1700	35000J	11000J	1700	3800
Benzo(a)anthracene	2900	160J	8900	250J	89J	2100	2800	1700	800	17000J	4800J	770	1600J
Chrysene	3300	190J	10000	370J	150J	2400	3700	1900	1100	20000J	6800J	830	2000J
bis(2-ethylnexyl)phthalat	ND	ND	ND	ND	ND	ND	ND	ND	ND	2200J	1600J	50J	230J
Benzo(b)fluoranthene	3300	160J	7600	330J	98J	3800	3200	1400	1100	21000J	5900J	780	1900J
Benzo(k)fluoranthene	2300J	100J	8100	210J	91J	ND	2700	1300	650J	16000J	4600J	530	1300 J
Benzo(a)pyrene	2900	130J	8600	270J	90J	2100	3100	1500	870	16000J	4700J	640	1500J

Table 1-14
Compound and Analyte Results in Storm Drain Sediment Samples
Smithtown Groundwater Contamination Site
Smithtown, New York

Compound/Analyte	SDS 001	SDS 002	SDS 003	SDS 004	SDS 005	SDS 006	SDS 007	SDS 008	SDS 009	SDS 010	SDS 011	SDS 012	SDS 013
Indeno(1,2,3-cd)pyrene	2100J	83J	5600	180J	60J	1400	1900	980	590J	11000J	3200J	440	1000J
Dibenz(a,h)anthracene	910J	ND	2400J	69J	ND	620J	840J	480J	280J	5200J	1500J	230J	540J
Benzo(g,h,i)perylene	2400J	95J	6400	220J	86J	1500	2200	970	620J	12000J	3300J	490	1100J
Pesticides/PCBs													
Heptachlor epoxide	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	13J	ND	ND
Dieldrin	3.7J	ND	ND	ND	ND	ND	ND	ND	ND	20J	13J	ND	ND
4,4'DDE	110DE	ND	ND	ND	ND	ND	ND	ND	ND	71J	90J	4.7J	5.4J
Endrin	ND	ND	ND	2.3J	ND	ND	2J	1.5J	ND	ND	ND	4.5J	ND
Endosulfan II	ND	ND	ND	ND	ND	ND	ND	ND	2.4J	ND	ND	ND	ND
4,4'DDD	90J	ND	ND	ND	ND	ND	ND	ND	ND	71J	15J	5.8	22J
Endosulfan sulfate	ND	ND	ND	ND	ND	ND	ND	ND	1.7J	ND	ND	ND	ND
4,4'DDT	550DJ	17J	ND	ND	ND	ND	ND	ND	ND	ND	ND	4.6J	ND
Methoxychlor	ND	ND	ND	20J	ND	ND	ND	ND	ND	ND	ND	ND	ND
Endrin ketone	ND	ND	ND	4.8J	ND	ND	ND	ND	ND	ND	ND	12	ND
Endrin aldehyde	ND	ND	ND	ND	ND	ND	ND	ND	ND	6.5J	4.4J	ND	ND
alpha-Chlordane	ND	ND	ND	ND	ND	ND	ND	ND	ND	80J	11J	ND	ND
gamma Chlordane	ND	ND	ND	ND	ND	ND	ND	ND	ND	70J	ND	12	13
Aroclor-1248	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	210J	ND	ND

Table 1-14
Compound and Analyte Results in Storm Drain Sediment Samples
Smithtown Groundwater Contamination Site
Smithtown, New York

Compound/Analyte	**SDS 001**	**SDS 002**	**SDS 003**	**SDS 004**	**SDS 005**	**SDS 006**	**SDS 007**	**SDS 008**	**SDS 009**	**SDS 010**	**SDS 011**	**SDS 012**	**SDS 013**
Aroclor-1254	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	360J	ND	ND
Inorganic Analytes													
Aluminum	7880	1040	2690	2420	1380	2000	3600	1750	1240	9950J	10500J	581	2410
Arsenic	**8**	1.9B	3.5	1.6B	2.3B	ND	2.3B	1.6B	1.5B	5.8J	6.6BJ	ND	2.2B
Barium	46B	4.9B	21B	10.1B	8B	10B	17.2B	7.2B	5.3B	54.3BJ	41.3BJ	2.6B	9.4B
Beryllium	0.45B	0.1B	0.16B	0.14B	0.09B	0.09B	0.21B	0.1B	0.09B	0.58BJ	0.51BJ	0.02B	0.1B
Cadmium	0.44B	ND	0.23B	ND	ND	ND	0.31B	ND	ND	0.7BJ	1BJ	ND	ND
Calcium	11400	18700	16100	14600	1590	15300	18300	15800	31200	17400J	21100J	1560	1750
Chromium	39.6J	3.3J	6.4J	7.2J	7.3J	3.7J	6.6J	4.6J	2.4J	17.4J	24.1J	2.5J	2.6B
Cobalt	6.4B	1.7B	2.9B	2B	1.5B	1.2B	3.1B	1.2B	1.5B	6.3BJ	6.3BJ	0.48B	2.9B
Copper	30.7	6	15.8	10.7	9.9	6.4	12.8	5.2B	5.4B	76.4J	38.7J	5.6B	39.6
Iron	13800	2670	5590	3440	2630	2920	6360	3740	3110	12500J	10000J	1450	6190
Lead	86.4	3.7	20.6	44.1	4.9	8.8	67	5.6	6	76.2J	110J	5.8	10.5
Magnesium	5050	11400	9210	8730	765B	4230	10600	9270	18900	8650J	11700J	920B	1080B
Manganese	904	125	730	5103	50.2	111	475	99.7	116	434J	228J	34.7	57.1
Nickel	20	2.8B	8.1B	5.6B	4.9B	3.7B	12.6	3.3B	2.9B	23.2J	26.8BJ	1.4B	4.1B
Potassium	623BE	150BE	262BE	249BE	133BE	186BE	361BE	175BE	190BE	604BE J	739BE J	53.1BE	181BE
Selenium	ND	ND	ND	ND	ND	ND	2.1	ND	ND	ND	ND	ND	ND

Table 1-14
Compound and Analyte Results in Storm Drain Sediment Samples
Smithtown Groundwater Contamination Site
Smithtown, New York

Compound/Analyte	SDS 001	SDS 002	SDS 003	SDS 004	SDS 005	SDS 006	SDS 007	SDS 008	SDS 009	SDS 010	SDS 011	SDS 012	SDS 013
Sodium	101B	58B	183B	ND	110B	98.6B	78.3B	87.9B	66.6B	283BJ	326BJ	ND	320B
Vanadium	49.3	3.3B	16.9	13.7B	7.6B	9.1B	28.6	7.5B	8.9B	53.1J	71.2J	4.2B	14.7
Zinc	126	ND	204	51.8	38.1	50	91	26.7	21.4	228J	318J	15.5	36.3
Cyanide	ND	ND	ND	0.69B	ND	ND	ND	ND	ND	ND	2J	3	ND

Units: VOCs/SVOCs/Pesticides/PCBs - micrograms/kilogram (ug/Kg); Inorganic Analytes - milligrams/kilogram (mg/Kg)
Abbreviations: ND = non-detect; B = detected between contract required detection limit and instrument detection limit; J = estimated value; D = diluted sample; R = rejected data; E = data is estimated due to the presence of interference

Table 1-15
Compound and Analyte Results in Sanitary System Wastewater Samples
Smithtown Groundwater Contamination Site
Smithtown, New York

Compound/Analyte	WW-1	WW-2	WW-3	WW-5	WW-6	WW-7	WW-8	WW-9	WW-10	WW-11
Volatile Organic Compounds (ug/L) **Screening Criteria - 1,000 ug/L total VOCs**										
Chloromethane	20	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane	10	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Disulfide	5 J	ND	ND	ND	ND	3 J	ND	ND	3 J	2 J
Acetone	43	35	130	140	7 J	44	340	82	23	130
Methylene chloride	2 J	ND	ND	ND	ND	ND	5 J	ND	ND	ND
2-Butanone	14	9 J	15	5 J	3 J	9 J	11	ND	4 J	3 J
Chloroform	26	ND	ND	3 J	ND	ND	24	ND	ND	ND
Toluene	320	32	7 J	5 J	30	180	85	ND	58	120
Tetrachloroethene	5	ND	ND	12	ND	ND	47	ND	5 J	52
Vinyl chloride	ND	ND	ND	4 J	ND	ND	ND	ND	ND	ND
Cis-1,2-dichloroethene	ND	ND	ND	140	ND	ND	29	170	ND	ND
Trichloroethene	ND	ND	ND	9 J	ND	ND	190	12	ND	ND
Methyl-Tert-Butyl-Ether	ND	ND	ND	ND	61	ND	ND	ND	75	ND
Cyclohexane	ND	ND	ND	ND	3 J	ND	ND	ND	3 J	ND
Methylcyclohexane	ND	ND	ND	ND	3 J	ND	ND	ND	4 J	ND
ethylbenzene	ND	ND	ND	ND	5 J	ND	ND	ND	ND	11

Table 1-15
Compound and Analyte Results in Sanitary System Wastewater Samples
Smithtown Groundwater Contamination Site
Smithtown, New York

Compound/Analyte	WW-1	WW-2	WW-3	WW-5	WW-6	WW-7	WW-8	WW-9	WW-10	WW-11
m,p-xylene	ND	ND	ND	ND	25	ND	ND	ND	10	41
o-xylene	ND	ND	ND	ND	11	ND	ND	ND	7	11
1,4-Dichlorobenzene	ND	ND	ND	ND	ND	5 J	ND	ND	ND	ND
Total VOCs	445	76	152	318	148	241	731	264	192	370
Semi-Volatile Organic Compounds										
Benzaldehyde	21	9J	ND	4.8	ND	62	ND	4J	ND	ND
Phenol	18J	27	6.5	11	22	51	37	8.3	79	20J
4-Methylphenol	220	ND	69	29	94	580	200	12	340	220
Diethylphthalate	5J	12J	5.9	50	ND	17J	6.7	13	ND	5.4
Di-n-butylphthalate	ND	ND	4	4J	ND	ND	4.6	ND	ND	2J
Fluoranthene	ND	ND	1J	ND	ND	ND	ND	ND	ND	ND
Butylbenzylphthalate	ND	ND	4J	14	ND	ND	2J	ND	ND	ND
Bis(2-ethylhexyl)phthalate	66	26	12	28	9J	ND	20	7.8	12J	8.4
Di-n-octylphthalate	ND	ND	ND	4J	ND	ND	ND	ND	ND	ND
Pesticides/PCBs - None Detected										
Inorganic Analytes (ug/L)										
Aluminum	220J	410J	242J	684J	378J	4450J	604J	376J	213J	194BJ
Antimony	ND	ND	ND	ND	ND	ND	8.9B	ND	ND	ND
Barium	6.7B	6.5B	4.9B	6.5B	7.4B	82.3B	16.7B	11.7B	25B	10.1B

Table 1-15
Compound and Analyte Results in Sanitary System Wastewater Samples
Smithtown Groundwater Contamination Site
Smithtown, New York

Compound/Analyte	WW-1	WW-2	WW-3	WW-5	WW-6	WW-7	WW-8	WW-9	WW-10	WW-11
Beryllium	ND	ND	ND	ND	ND	0.2B	0.37B	ND	ND	ND
Cadmium	ND	ND	ND	ND	ND	0.47B	0.74B	ND	0.66B	0.37B
Calcium	23,100	18,800	19,800	20,700	19,800	57,500	22300	18000	28800	20800
Chromium	1.7B	3.6B	1.1B	3.9B	3.3B	42J	7.1B	0.73B	1.5B	2.4B
Cobalt	ND	ND	ND	ND	ND	1.6B	6.2B	ND	ND	ND
Copper	183	92.7	33.9	44.9	88.5	157	44.6	56.6	90.9	50.8
Iron	433J	2200J	400J	355J	628J	6770J	700J	443J	476J	354J
Lead	ND	3	ND	ND	11.8	17	2.9B	ND	ND	6
Magnesium	5520	4770B	4670B	5130	5800	8330	7230	4930B	7090	4840B
Manganese	25.5EJ	18.6EJ	18.3EJ	13.6BE	19.2EJ	136EJ	30.5EJ	26.4EJ	42.9EJ	19.6EJ
Mercury	ND	0.15BJ	0.31J	ND	ND	0.56	0.13BJ	ND	ND	ND
Nickel	ND	4.3B	ND	2B	1.5B	11.7B	6.9B	ND	ND	1.7B
Potassium	13800EJ	8,510EJ	7,250EJ	9,880EJ	19100EJ	20300EJ	12100EJ	5990EJ	37300EJ	18300EJ
Silver	ND	ND	1.1B	ND	ND	1.2B	7.2B	ND	ND	ND
Sodium	68000EJ	26500EJ	49600EJ	63700EJ	29800EJ	53000EJ	63200EJ	14600EJ	65600EJ	42900EJ
Vanadium	ND	ND	ND	ND	ND	ND	7.5B	0.95B	0.75B	ND
Zinc	57.6	75.8	24J	34.9	93.4	1250	42.9	20.2	90.8	66
Cyanide	R	R	R	R	R	R	R	R	R	R

Table 1-15
Compound and Analyte Results in Sanitary System Wastewater Samples
Smithtown Groundwater Contamination Site
Smithtown, New York

Abbreviations: ug/L = micrograms per liter; VOC = volatile organic compounds; ND = non-detect; J = estimated value; E = Estimated value because of interference; R = rejected data

Locations:
WW-1 - 256 Lake Avenue (Gene's French Cleaners)
WW-2 - 483 Lake Avenue (Avenue Cleaners)
WW-3 - 561 Lake Avenue (St. James Cleaners)
WW-4 - No wastewater present, so no sample was collected at 617-621 Lake Avenue (Sal's Auto Body)
WW-5 - 556 North Country Road (Polo French Cleaners)
WW-6 - Edgewood Avenue (Smithtown School District Administration Building)
WW-7 - 400 North Country Road (Four Seasons Cesspool)
WW-8 - 430-11 North Country Road (North Country Cleaners)
WW-9 - 437 North Country Road (The Cleaners)
WW-10 - 525 North Country Road (St. James Exxon Center)
WW-11 - 545 North Country Road (Penney's St. James Garage)

Table 1-16
Compound and Analyte Results in Sanitary System Sludge Samples
Smithtown Groundwater Contamination Site
Smithtown, New York

Compound/Analyte	Screening Criteria	SL-1	SL-3	SL-4	SL-5	SL-6	SL-7	SL-8	SL-10	SL-11
Volatile Organic Compounds (ug/Kg)										
Acetone	**	470	160	14	280	34	2,800	2,600	43	62
2-Butanone	NS	110J	18	3 J	98	3 J	1,200	320	11 J	16 J
Toluene	3,000	1,500	7 J	5 J	730	11 J	**28,000**	**30,000**	220	110
Tetrachloroethene	2,800	29 J	ND	440	15 J	ND	48 J	1,100	ND	41
Carbon disulfide	NS	ND	5 J	ND	750	ND	ND	ND	13 J	17 J
Methyl acetate	NS	ND	4 J	ND	ND	ND	160,000	ND	ND	5 J
Trichloroethene	1,400	ND	ND	3 J	ND	ND	ND	440	ND	ND
Cis-1,2-dichloroethene	600	ND	ND	ND	200	ND	ND	490	ND	15 J
1,4-Dichlorobenzene	15,000	ND	ND	ND	3,400	ND	2,100	1,600	ND	ND
Methyl-Tert-Butyl-Ether	1,200	ND	ND	ND	ND	15	ND	ND	29	ND
Ethylbenzene	11,000	ND	ND	ND	ND	5 J	160 J	110 J	110	10 J
m,p-xylene	2,400*	ND	ND	ND	ND	25	230	290	470	42
o-xylene	2,400*	ND	ND	ND	ND	11 J	91 J	290	190	ND
1,1,1-Trichloroethane	1,600	ND	ND	ND	ND	ND	72 J	ND	ND	ND
Chloroform	600	ND	ND	ND	ND	ND	110 J	250 J	ND	ND
Methylcyclohexane	NS	ND	ND	ND	ND	ND	ND	160 J	15	5 J

Table 1-16
Compound and Analyte Results in Sanitary System Sludge Samples
Smithtown Groundwater Contamination Site
Smithtown, New York

Compound/Analyte	Screening Criteria	SL-1	SL-3	SL-4	SL-5	SL-6	SL-7	SL-8	SL-10	SL-11
Chlorobenzene	3,400	ND	ND	ND	ND	ND	ND	63 J	ND	ND
Isopropylbenzene	5,200	ND	ND	ND	ND	ND	ND	500	8 J	ND
Cyclohexane	NS	ND	ND	ND	ND	ND	ND	ND	8 J	ND
Semi-Volatile Organic Compounds (ug/Kg)										
Benzaldehyde	NS	2,800J	ND	ND	ND	ND	ND	ND	ND	ND
4-Methylphenol	NS	ND	ND	ND	ND	ND	45,000	ND	ND	7,000J
4-Chloroaniline	NS	ND	ND	ND	ND	ND	62,000J	ND	ND	ND
Diethylphthalate	NS	ND	280J	220J	ND	260J	18,000J	ND	ND	ND
Di-n-butylphthalate	NS	ND	240J	270J	ND	300J	9,100J	ND	ND	ND
Butylbenzylphthalate	NS	ND	ND	ND	ND	ND	25,000J	ND	ND	ND
Bis(2-ethylhexyl)phthalate	NS	45,000	ND	ND	ND	ND	ND	ND	ND	ND
Pesticides/PCBs (ug/Kg)										
Dieldrin	NS	ND	ND	8.6J	ND	ND	ND	ND	ND	ND
4,4'DDE	NS	ND	ND	130	ND	ND	ND	ND	ND	ND
4,4'DDD	NS	ND	ND	430	ND	ND	ND	ND	ND	ND
4,4'DDT	NS	ND	ND	430	ND	ND	ND	ND	ND	ND
alpha-Chlordane	NS	ND	ND	3.7	ND	ND	ND	ND	ND	ND
Inorganic Analytes (mg/Kg)										

Table 1-16
Compound and Analyte Results in Sanitary System Sludge Samples
Smithtown Groundwater Contamination Site
Smithtown, New York

Compound/Analyte	Screening Criteria	SL-1	SL-3	SL-4	SL-5	SL-6	SL-7	SL-8	SL-10	SL-11
Aluminum	NS	3040J	694	1730	3480	697	1500J	346J	2400	244J
Antimony	NS	1.4BJ	ND	ND	ND	ND	4BJ	ND	ND	ND
Arsenic	25	ND	ND	ND	1.9B	ND	ND	ND	ND	ND
Barium	NS	24BJ	4.1B	15.9B	22.7B	1.7B	219J	168BJ	9.4B	2.8B
Beryllium	8	0.08BJ	0.05B	0.09B	0.06B	0.04B	ND	ND	0.11B	ND
Cadmium	10	0.38BJ	ND	0.11B	1.3B	ND	1.6BJ	0.88BJ	0.12B	0.09B
Calcium	NS	1950BJ	297BJ	6740J	21000J	108BJ	1010BJ	1090BJ	897BJ	181BJ
Chromium	100	9.6J	2.8	6.9	6.1	1.6B	13.9J	5.5BJ	3.3	1.3B
Cobalt	NS	1.5BJ	0.36B	1.1B	1B	0.51B	ND	ND	0.9B	ND
Copper	500	442EJ	12.7EJ	8.9EJ	95EJ	7.9EJ	**659EJ**	411EJ	16.1EJ	8.6EJ
Iron	NS	8540J	1910	3700	3260	2500	1600J	379J	2940	584
Lead	400	21J	2.5	12.2J	11.7J	1.7	61.6J	30.5J	7.6J	2.8J
Magnesium	NS	711BJ	243BJ	3720J	12500J	203BJ	285BJ	226BJ	601BJ	74.8BJ
Manganese	NS	28NJ	5.6NJ	45.4NJ	24NJ	29.1NJ	11.9NJ	3.8BNJ	25NJ	3.4BNJ
Mercury	2	0.14BJ	**4.1**	ND	0.24	ND	**2.1J**	0.94J	ND	ND
Nickel	1,000	5BJ	0.99B	3B	3.7B	1.2B	6.4BJ	3.8BJ	2.2B	0.6B
Potassium	NS	292BJ	129B	155B	200B	126B	278BJ	299BJ	192B	130B
Selenium	NS	ND	ND	ND	ND	ND	6.6J	ND	ND	ND

Table 1-16
Compound and Analyte Results in Sanitary System Sludge Samples
Smithtown Groundwater Contamination Site
Smithtown, New York

Compound/Analyte	Screening Criteria	SL-1	SL-3	SL-4	SL-5	SL-6	SL-7	SL-8	SL-10	SL-11
Silver	100	0.61BJ	1.7B	0.21B	0.41B	0.14B	4.5BJ	8.1BJ	ND	ND
Sodium	NS	685BJ	323B	236B	403B	257B	1130BJ	1810BJ	314B	355B
Vanadium	NS	11.9BJ	3.5B	4.9B	5.4B	2.2B	4.2BJ	1.5BJ	4.8B	1.1B
Zinc	NS	208J	17.1	32	51.4	9.3	310J	74.7J	20.4	16.9J

Abbreviations: NS = no standard; ug/Kg = micrograms per kilogram; mg/Kg = milligrams per kilogram; ND = non-detect; J = estimated value; B = result between instrument detection limit and contract required detection limit; E = data estimated due to interference

Locations:
SL-1 - 256 Lake Avenue (Gene's French Cleaners)
SL-2 - No sample collected at 483 Lake Avenue (Avenue Cleaners)
SL-3 - 561 Lake Avenue (St. James Cleaners)
SL-4 - No wastewater present, so no sample was collected at 617-621 Lake Avenue (Sal's Auto Body)
SL-5 - 556 North Country Road (Polo French Cleaners)
SL-6 - Edgewood Avenue (Smiththown School District Administration Building)
SL-7 - 400 North Country Road (Four Seasons Cesspool)
SL-8 - 430-11 North Country Road (North Country Cleaners)
SL-9 - No sample collected at 437 North Country Road (The Cleaners)
SL-10 - 525 North Country Road (St. James Exxon Center)
SL-11 - 545 North Country Road (Penney's St. James Garage)

Table 2-1
Trends of Selected Contaminants of Concern
Smithtown Groundwater Contamination Site
Smithtown, New York

	PCE concentration					DCE concentration				
	1998*	1999	2001	2002	2003	1998*	1999	2001	2002	2003
Sample ID	Weston	R1	R2	R3	R4	Weston	R1	R2	R3	R4
	(ug/L)	(ug/L)	(ug/L)	(ug/L)	(ug/L)	(ug/L)	(ug/L)	(ug/L)	(ug/L)	(ug/L)
23-BGBK		4	63		1.8		14	74		6
37-BGBK	14	33	18		21	110	140	16		47
43-BGBK	11	12				10	23			
7-CARL		9	4		1.3		ND	ND		ND
22-HARBL			5		2.6			2		1.7
3-HARBR	9	2	3		5.1	2.6	ND	ND		ND
33-HIGH	33	43	17			7.1	2	0.4		
315-OMR		3	ND		1		ND	ND		25
320-OMR-R1		4	5		5.2		ND	ND		0.32
322-OMR		ND	3		3.9		ND	ND		ND
323-OMR				2.5	3.3		5.7	7.2		
326-OMR		3	ND		0.5		ND	0.54		0.14
327-OMR		1	1		0.34		0.9	2		ND
329-OMR		4	8				6	20		
5-OPL		0.6	0.7		0.5		ND	ND		ND
8-TEAL		4	5		4.3		3	6		3.2
9-TEAL		0.7	0.8		1.4		0.3	ND		0.12
31-THOM		ND	ND	0.33	0.33		ND	ND	ND	ND
3-WATER	180	140				1.2	ND			
Average Concentration	49	18	10	1	4	26	22	14		10
Maximum Concentration	180	140	63	2.5	21	110	140	74		47

Notes:

Blank space indicates sample was not collected.

ND = Not Detected

*1998 data was sampled and reported by Roy F. Weston, Inc. All other data rounds were sampled and reported by CDM.

Table 2-2

Chemical-specific ARARs, Criteria, and Guidance
Smithtown Groundwater Contamination Site
Smithtown, New York

Regulatory Level	ARAR Identification	Status	Requirement Synopsis	FS Consideration
Federal	National Primary Drinking Water Standards-Maximum Contaminant Levels (MCLs) and Maximum Contaminant Level Goals (MCLGs)	Relevant and Appropriate	Establishes health-based standards for public drinking water systems. Also establishes drinking water quality goals set at levels at which no adverse health effects are anticipated, with an adequate margin of safety.	The MCLs and MCLGs will be considered in the development of the PRGs if there are no applicable standards.
Federal	Clean Water Act Water Quality Criteria (Federal Ambient Water Quality Criteria [FAWQC] and Guidance Values [40 CFR 131.36])	To Be Considered	Establishes criteria for surface water quality based on toxicity to aquatic organisms and human health.	The criteria will be considered in the development of the PRGs if there are no applicable standards.
State	New York Surface Water and Groundwater Quality Standards and Groundwater Effluent Limitations (6NYCRR Part 703)	Applicable	Establish numerical criteria for groundwater and surface water cleanups.	The standards will be used to develop the PRGs.
State	New York State Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations (TOGS 1.1.1)	Relevant and Appropriate	Provides ambient water quality guidance values and groundwater effluent limitations for use where there are no standards.	The guidance values will be considered in the development of the PRGs if there are no applicable standards.
State	New York State Department of Health Drinking Water Standards (10NYCRR Part 5)	Relevant and Appropriate	Sets maximum contaminant levels (MCLs) for public drinking water supplies.	The standards will be considered in the development of the PRGs if there are no applicable standards.

Table 2-2

Chemical-specific ARARs, Criteria, and Guidance
Smithtown Groundwater Contamination Site
Smithtown, New York

Regulatory Level	ARAR Identification	Status	Requirement Synopsis	FS Consideration
State	New York Technical Guidance for Screening contaminated Sediments (Revised 1999)	To Be Considered	This guidance provides a basis for screening of sediment contamination.	The guidance values will be considered in the development of the PRGs.

Table 2-3

Location-specific ARARs, Criteria, and Guidance
Smithtown Groundwater Contamination Site
Smithtown, New York

Regulatory Level	ARARs	Status	Requirement Synopsis	Action to be Taken to Attain ARARs
Federal	Coastal Zone Management Act (16 USC 33)	Applicable	The Act encourages states/tribes to preserve, protect, develop, and where possible, restore or enhance valuable natural coastal resources.	Evaluate proposed remedial action for consistency with the New York State Coastal Management Program and Smithtown Local Waterfront Revitalization Program.
Federal	Statement on Procedures on Floodplain Management and Wetlands protection (40 CFR 6 Appendix A)	Applicable	This Statement of Procedures sets forth Agency policy and guidance for carrying out the provisions of Executive Orders 11988 and 11990.	Alternatives will take into consideration floodplain management and wetland protection.
Federal	Policy on Floodplains and Wetland Assessments for CERCLA Actions (OSWER Directive 9280.0-12, 1985)	To Be Considered	Superfund actions must meet the substantive requirements of E.O. 11988, E.O. 11990, and 40 CFR part 6, Appendix A.	Alternatives will take into consideration floodplain management and wetland protection.
Federal	RCRA Location Standards (40 CFR 264.18)	Applicable	This regulation outlines the requirements for constructing a RCRA facility on a 100-year floodplain.	A facility located on a 100-year floodplain must be designed, constructed, operated, and maintained to prevent washout of any hazardous waste by a 100-year flood, unless waste can be removed safely before floodwater can reach the facility or no adverse effects on human health or the environment would result if washout occurred.
Federal (Non-Regulatory)	Floodplains Executive Order (EO 11988)	To Be Considered	Federal agencies are required to reduce the risk of flood loss, to minimize impact of floods, and to restore and preserve the natural and beneficial values of floodplains.	The potential effects of any action will be evaluated to ensure that the planning and decision making reflect consideration of flood hazards and floodplains management, including restoration and preservation of natural undeveloped floodplains.

Table 2-3

Location-specific ARARs, Criteria, and Guidance
Smithtown Groundwater Contamination Site
Smithtown, New York

Regulatory Level	ARARs	Status	Requirement Synopsis	Action to be Taken to Attain ARARs
Federal (Non-Regulatory)	Wetlands Executive Order (EO 11990)	To Be Considered	Federal agencies are required to minimize the destruction, loss, or degradation of wetlands and to preserve and enhance natural and beneficial values of wetlands.	Remedial alternatives that involve construction must include all practicable means of minimizing harm to wetlands. Wetlands protection considerations must be incorporated into the planning and decision making of remedial alternatives.
Federal	National Environmental Policy Act (NEPA) (42 USC 4321; 40 CFR 1500 to 1508)	To Be Considered	This requirement sets forth EPA policy for carrying out the provisions of the Wetlands Executive Order (EO 11990) and Floodplain Executive Order (EO 11988).	This requirement will be considered during the development of alternatives.
Federal	Clean Water Act (CWA) Section 404 (40 CFR 404)	Applicable	Under this requirement, no activity that adversely affects a wetland is permitted if a practicable alternative that does not affect wetlands is available. If no other practicable alternative exists, impacts on wetlands must be mitigated.	The effects on wetlands will be evaluated during the identification, screening, and evaluation of alternatives. Permits may be required for some alternatives.
General	National Historic Preservation Act (40 CFR 6.301)	To Be Considered	This requirement establishes procedures to provide for preservation of historical and archeological data that might be destroyed through alteration of terrain as a result of a federal construction project or a federally licensed activity or program.	The effects on historical and archeological data will be evaluated during the identification, screening, and evaluation of alternatives.

Table 2-4

Action-specific ARARs for Site Remediation
Smithtown Groundwater Contamination Site
Smithtown, New York

ARARs	Status	Requirement Synopsis	Action to be Taken to Attain ARARs
Common to All Alternatives			
OSHA—Record keeping, Reporting, and Related Regulations (29 CFR 1904)	Applicable	This regulation outlines the record keeping and reporting requirements for an employer under OSHA.	These regulations apply to the company(ies) contracted to implement the remedy. All applicable requirements will be met.
OSHA—General Industry Standards (29 CFR 1910)	Applicable	These regulations specify an 8-hour time-weighted average concentration for worker exposure to various organic compounds. Training requirements for workers at hazardous waste operations are specified in 29 CFR 1910.120.	Proper respiratory equipment will be worn if it is not possible to maintain the work atmosphere below the 8-hour time-weighted average at these specified concentrations.
OSHA—Construction Industry Standards (29 CFR 1926)	Applicable	This regulation specifies the type of safety equipment and procedures to be followed during site remediation.	All appropriate safety equipment will be on site, and appropriate procedures will be followed during remediation activities.
RCRA Identification and Listing of Hazardous Wastes (40 CFR 261)	Applicable	Describes methods for identifying hazardous wastes and lists known hazardous wastes.	Applicable to the identification of hazardous wastes that are generated, treated, stored, or disposed during remedial activities.
RCRA Identification and Listing of Hazardous Wastes (40 CFR 262)	Applicable	Describes standards applicable to generators of hazardous wastes.	Standards will be followed if any hazardous wastes are generated onsite.
RCRA—Standards for Owners/Operators of Permitted Hazardous Waste Facilities (40 CFR 264.10–164.18)	Relevant and Appropriate	This regulation lists general facility requirements including general waste analysis, security measures, inspections, and training requirements.	Facility will be designed, constructed, and operated in accordance with this requirement. All workers will be properly trained.
RCRA—Preparedness and Prevention (40 CFR 264.30–264.31)	Relevant and Appropriate	This regulation outlines the requirements for safety equipment and spill control.	Safety and communication equipment will be installed at the site. Local authorities will be familiarized with the site.

Table 2-4

Action-specific ARARs for Site Remediation
Smithtown Groundwater Contamination Site
Smithtown, New York

ARARs	Status	Requirement Synopsis	Action to be Taken to Attain ARARs
RCRA—Contingency Plan and Emergency Procedures (40 CFR 264.50–264.56)	Relevant and Appropriate	This regulation outlines the requirements for emergency procedures to be used following explosions, fires, etc.	Emergency Procedure Plans will be developed and implemented during remedial design. Copies of the plans will be kept on site.
New York Hazardous Waste Management System – General (6 NYCRR Part 370)	Applicable	This regulation provides definition of terms and general standards applicable to hazardous wastes management system.	The regulations will be applied to any hazardous waste operation during remediation of the site.
New York Solid Waste Management Regulations (6 NYCRR 360)	Relevant and Appropriate	Sets standards and criteria for all solid waste management facilities, including design, construction, operation, and closure requirements for the municipal solid waste landfills.	All applicable solid waste management regulation requirements will be considered during design and solid waste generated during remediation will be disposed in regulated municipal solid waste landfills.
New York Identification and Listing of Hazardous Waste (6 NYCRR Part 371	Applicable	Describes methods for identifying hazardous wastes and lists known hazardous wastes.	Applicable to the identification of hazardous wastes that are generated, treated, stored, or disposed during remedial activities.
Off-Site Disposal			
Waste Transportation			
Department of Transportation (DOT) Rules for Transportation of Hazardous Materials (49 CFR Parts 107, 171, 172, 177, 179)	Applicable	This regulation outlines procedures for the packaging, labeling, manifesting, and transporting hazardous materials.	Any company contracted to transport hazardous material from the site will be required to comply with this regulation.
RCRA Standards Applicable to Transporters of Hazardous Waste (40 CFR 263)	Applicable	Establishes standards for hazardous waste transporters.	Any company contracted to transport hazardous material from the site will be required to comply with this regulation.
New York Hazardous Waste Manifest System and Related Standards for Generators, Transporters and Facilities (6 NYCRR Part 372)	Applicable	Establishes record keeping requirements and standards related to the manifest system for hazardous wastes.	Any company contracted to transport hazardous material from the site will be required to comply with this regulation.

Table 2-4

Action-specific ARARs for Site Remediation
Smithtown Groundwater Contamination Site
Smithtown, New York

ARARs	Status	Requirement Synopsis	Action to be Taken to Attain ARARs
New York Waste Transporter Permit Program (6 NYCRR Part 364)	Applicable	Establishes permit requirements for transportations of regulated waste.	Must use permitted waste transporters when shipping wastes.
Discharge			
Clean Water Act (CWA [40 CFR 100 *et seq.*])	Relevant and Appropriate	National Pollutant Discharge Elimination System (NPDES) permit requirements for point source discharges must be met, including the NPDES Best Management Practice Program. These regulations include, but are not limited to, requirements for compliance with water quality standards, a discharge monitoring system, and records maintenance.	Project will meet NPDES permit requirements for point source discharges.
New York Regulations on State Pollution Discharge Elimination System (SPDES) (6 NYCRR parts 750-757)	Applicable	This permit governs the discharge of any wastes into or adjacent to State waters that may alter the physical, chemical, or biological properties of State waters, except as authorized pursuant to a NPDES or State permit.	Project will meet NPDES permit requirements for surface discharges of any wastes. Monitoring of discharges will be conducted as required.
Disposal			
RCRA Land Disposal Restrictions (40 CFR 268)	Relevant and Appropriate	This regulation identifies hazardous wastes restricted from land disposal and provides treatment standards under which an otherwise prohibited waste may be land disposed.	Hazardous wastes will be treated to meet disposal requirements.

Table 2-4

Action-specific ARARs for Site Remediation
Smithtown Groundwater Contamination Site
Smithtown, New York

ARARs	Status	Requirement Synopsis	Action to be Taken to Attain ARARs
New York Standards for Universal Waste (6 NYCRR Part 374-3) and Land Disposal Restrictions (6 NYCRR Part 376)	Applicable	These regulations establish standards for treatment and disposal of hazardous wastes.	Hazardous wastes must comply with the treatment and disposal standards.
		Off-Gas Management	
Clean Air Act (CAA)—National Ambient Air Quality Standards (NAAQs) (40 CFR 50)	Applicable	These provide air quality standards for particulate matter, lead, NO_2, SO_2, CO, and volatile organic matter.	During excavation, treatment, and/or stabilization, air emissions will be properly controlled and monitored to comply with these standards.
RCRA National Emission Standards for Hazardous Air Pollutants, Subpart E-National Emission Standard for Mercury (40 CFR 61).	Relevant and Appropriate	This regulation provides the national emission standard for mercury.	This regulation provides emissions limits listed in section 61.52 which are relevant and appropriate.
New York General Prohibitions (6 NYCRR Part 211)	Applicable	Prohibition applies to any particulate, fume, gas, mist, odor, smoke, vapor, pollen, toxic or deleterious emissions.	Proper dust suppression methods and monitoring will be required when implementing excavation, decontamination, and/or stabilization actions to prevent particulate matter from becoming airborne.
New York Air Quality Standards (6 NYCRR Part 257)	Applicable	This regulation requires that maximum 24-hour concentrations for particulate matter not be exceeded more than once per year. Fugitive dust emissions from site excavation activities must be maintained below 250 micrograms per cubic meter ($\mu g/m^3$).	Proper dust suppression methods, such as water spray, will be specified when implementing excavation and/or solidification/stabilization actions.
		Well Permit Requirements	
Suffolk County Private Water System Standards (Suffolk County Sanitary Code, Article 4 - Water Supply, §406.4)	Applicable	Require permit approval for drilling private water systems for new construction of private houses or subdivisions. Permit will not be approved if public water supply system is available.	Will establish groundwater use restrictions utilizing this requirement.

Table 2-5
Preliminary Remediation Goals (PRGs) for Groundwater
Smithtown Groundwater Contamination Site
Smithtown, New York

Contaminants of Concern	National Primary Drinking Water Standards[1] (ug/L)	NYS Groundwater Quality Standards[2] (ug/L)	NYSDOH Drinking Water Quality Standards[3] (ug/L)	PRGs[4] (ug/L)	Maximum Detected Concentrations (ug/L)
Organic COCs*					
Acetone	NA	50	50	50	**110**
Chloroform	NA	7	100	7	2.6
cis-1,2-Dichloroethene	70	5	5	5	**140**
Methyl Tert-Butyl Ether	NA	10	NA	10	**24**
Tetrachloroethene	5	5	5	5	**140**
Trichloroethene	5	5	5	5	**12**

Notes:

1. EPA National Primary Drinking Water Standards (web page), EPA 816-F-01-007, March 2001
2. New York Surface Water and Ground Water Quality Standards (6NYCRR Part 703), August 4, 1999
3. New York State Department of Health Drinking Water Standards (TOGS 1.1.1)
4. The PRGs are selected based on NYS Groundwater Quality Standards, or drinking water standards when groundwater quality standards are not available.

Bold figures indicate detected concentrations exceed PRGs.

NA = Not Available

*List from Human Health Risk Assessment (HHRA)

Table 2-6
Preliminary Remediation Goals (PRGs) for Surface Water
Smithtown Groundwater Contamination Site
Smithtown, New York

Contaminants of Concern	**Federal Ambient Water Quality Criteria[1]** **(Organism Consumption)** (ug/L)	**NYS Surface Water Quality Standards[2]** **(Fish Consumption)** (ug/L)	**NYS Ambient Water Quality Guidance Values[3]** **(Fish Consumption)** (ug/L)	**PRGs[4]** (ug/L)	**Maximum Detected Concentrations** (ug/L)
Organic COCs					
Tetrachloroethene	3.3	NA	1	1	**2.5**
Trichloroethene	30	40	NA	40	0.4

Notes:

1. Clean Water Act Water Quality Criteria (40 CFR 131.36)
2. New York Surface Water and Ground Water Quality Standards (6NYCRR Part 703), August 4, 1999
3. NYS Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations (TOGS 1.1.1)
4. The PRGs are selected based on NYS surface water Quality Standards, or ambient water quality criteria/guidance values when surface water quality standards are not available.

Bold figures indicate detected concentrations exceed PRGs.

NA = Not Available

Table 2-7
Contamination Treatment Technology Evaluation
Smithtown Groundwater Contamination Site
Smithtown, New York

General Response Action	Remedial Technology	Process Options	Description	Effectiveness	Implementability	Cost	Retained
No Action	None	Not Applicable	No remedial actions are implemented. The No Action alternative may include environmental monitoring to track contamination.	Does not meet remedial action objectives. No Action alternative retained as baseline for comparison with other alternatives as required by NCP.	Implementable. No significant administrative difficulties anticipated	No capital, operation, or maintenance costs. Would require some long- term costs for periodic re-assessment.	Yes
Institutional/Engineering Controls	Well Drilling Restrictions	Not Applicable	These regulatory actions are used to regulate the installation of drinking water wells. Suffolk County has Private Water System Standards that require permit approval for drilling private water systems for new construction of private houses or subdivisions. A permit will not be approved if public water supply system is available.	These restrictions may be effective in restricting future site uses or activities which may result in direct contact with contaminated groundwater. It is not effective for houses that already have potable wells. Also, this will not reduce the migration and the associated environmental impact of the contaminated groundwater.	Implementable. Restrictions would be easy through existing permitting process.	Low costs. Would require some long-term costs for periodic re-assessment.	Yes
	Long-term Monitoring	Not Applicable	Long-term monitoring includes periodic sampling and analysis of groundwater samples. This would provide an indication of the movement of the contaminants or of the progress of remedial activities.	Long-term monitoring would not alter the effects of the contamination on human health risk and the environment. Monitoring is only reliable for tracking the migration of contaminants.	Implementable. Would be easy to monitor since all wells are accessible.	Low capital costs. Medium operation and maintenance costs. Some long-term costs for periodic reassessment.	Yes
	Alternate Water Supplies	Not Applicable	May include supplying residents with bottled water, providing service connections to the public water system, or installing a well-head treatment system. These alternative water supplies would be provided to residents whose private wells have exceeded the MCL for PCE or its degradation byproducts.	Effective in protection of human health by preventing direct contact and consumption of contaminated groundwater. Alternative water supply will not reduce the migration and associated environmental impact of the groundwater.	Implementable. EPA has already provided connections to the water main to multiple residents in the area.	Medium capital cost. Low operation and maintenance cost.	Yes
Monitored Natural Attenuation	None	Not Applicable	Natural subsurface processes (e.g., dilution, volatilization, biodegradation, adsorption, and reaction with subsurface materials) reduce contaminant concentrations to acceptable levels. Concentrations of contaminants, degradation byproducts and indicator parameters (e.g., oxidation/reduction potential) are monitored to verify effectiveness of natural attenuation.	Review of the data indicates that biodegredation of chlorinated solvents is not occurring at the Smithtown Site. DO concentrations suggests aerobic conditions (above 1 mg/L), which are not conducive to reductive dechlorination of PCE, or its primary degradation byproduct, cis-1,2-DCE. In an aerobic environment these compounds will tend to persist and migrate with the groundwater.	Implementable. Periodic monitoring would be conducted to confirm that degradation is processing at rates capable of meeting RAOs.	Low capital costs. Medium operation and maintenance costs. Would also include modeling, long-term monitoring, and periodic re-assessment costs.	No
Containment	Vertical Barrier	Slurry Walls	A slurry wall is a subsurface barrier consisting of a vertically excavated trench filled with a slurry. The slurry (typically either a soil/bentonite/water mixture or a cement/bentonite/water mixture) shores the trench to prevent collapse and provides a physical barrier to groundwater flow.	Effective to achieve hydraulic control. The walls could deteriorate over time due to the presence of chlorinated VOCs. Upon the completion of remedial activities, the walls would remain in place and continue to influence groundwater flow patterns on a localized scale.	Not implementable. Typical slurry wall applications reach installation depths of about 30 to 40 feet bgs, based upon practical limitations associated with excavator trenching. Slurry walls can be installed to depths exceeding 100 feet bgs using a clam shovel at a higher unit cost. At the Smithtown Site, the clay unit is located from 100 to 300 feet bgs, exceeding the practical limits of the slurry wall.	High capital costs.	No
		Sheet Pile Barriers	Sheet pile barriers (e.g, walls) are constructed by driving or vibrating sections of steel sheet piling into the ground. Each sheet pile section is interlocked at its edges, and the seams are often grouted to prevent leakage.	Effective at providing hydraulic source control. Sheet pile barriers may deteriorate over time under acidic or alkaline conditions, or in the presence of chlorinated VOCs, such as PCE, that exist at this site. Upon completion of the remedial activities, the sheet piles can be removed from the Smithtown Site, provided that the sheeting and joints are still of good structural integrity at the time of removal. Otherwise, the sheets would remain in the ground surface and continue to influence groundwater flow patterns on a localized scale.	Not implementable. Typical sheet pile wall applications reach installation depths of about 80 feet bgs, based upon practical limitations associated with installation. Sheet pile walls can be installed to depths exceeding 100 feet bgs at a higher unit cost. At the Smithtown Site, the clay unit is located from 100 to 300 feet bgs, exceeding the practical limits of sheet piling.	High capital costs.	No
Extraction	Groundwater Extraction	Extraction Wells	This involves constructing extraction wells in specific locations determined through modeling for the best placement in order to gain hydraulic control of the plume.	Effective in providing hydraulic control, for sites where the hydrogeology is well understood and the pumping rate necessary to maintain hydraulic control is sustainable.	Implementable. However, technology may be difficult to implement at the Smithtown Site because of the multiple flow directions found at the site.	Medium capital costs.	Yes
		Extraction Trenches	Construction of a trench perpendicular to the direction of groundwater flow to intercept and prevent downgradient migration of a contaminant plume. The trench is typically backfilled with material of higher permeability than the native aquifer (e.g., gravel) to create a zone of preferential flow, and perforated piping or extraction wells are typically installed in the trench to collect the intercepted groundwater. After piping and backfill have been installed, an additive is pumped into the trench to breakdown the slurry to simple sugars and water, thus reestablishing hydraulic connection to the aquifer.	Effective in capturing groundwater to provide hydraulic control. Extraction trench is not typically installed at depths greater than 30 feet bgs due to trenching equipment limitations. Would not be effective at the due to the depth of groundwater at the Smithtown Site.	Implementable but not applicable for the site due to the depth of groundwater.	Medium capital costs.	No

Table 2-7
Contamination Treatment Technology Evaluation
Smithtown Groundwater Contamination Site
Smithtown, New York

General Response Action	Remedial Technology	Process Options	Description	Effectiveness	Implementability	Cost	Retained
Onsite Ex Situ Treatment		Air Stripping	Air stripping involves the mass transfer of volatile contaminants from water to air by increasing the surface area of the groundwater exposed to air. For groundwater remediation, aeration methods include packed towers, diffused aeration, tray aeration, and spray aeration.	Air stripping is effective in removing VOCs from groundwater. Off gas may require treatment prior to discharge. Not efficient in the removal of SVOCs.	Implementable. Minor administrative difficulties anticipated for implementation of air stripping system. May require permit for discharge of VOCs to the atmosphere. Alternatively, off-gas may require treatment (i.e., vapor phase carbon) prior to discharge.	Low capital cost. Low operation and maintenance cost.	Yes
		Liquid-Phase Activated Carbon Adsorption	Liquid phase carbon may be used to treat groundwater. Contaminants are adsorbed on to activated carbon by passing the extracted groundwater through a series of reactor vessels containing activated carbon. Spent carbon must be reactivated or replaced periodically.	Carbon adsorption is not effective in removing VC, a degradation byproduct of PCE. However, VC was not detected in the residential and monitoring well samples at the Smithtown Site.	Implementable. Technology can treat groundwater and off-gas. No administrative difficulties anticipated for implementation of a carbon adsorption system.	Medium capital costs. Medium operation and maintenance costs.	Yes
		Ultraviolet (UV) Oxidation	Contaminated groundwater is transferred to a reactor where it is combined with ozone and/or hydrogen peroxide and irradiated with UV light. Organic contaminants are destroyed as a result of the synergistic action of the oxidant with the UV light System may require off-gas treatment to destroy unreacted ozone, if used, and volatilized contaminants.	UV oxidation is effective in the destruction of a wide variety of organic contaminants including petroleum hydrocarbons (e.g., benzene, toluene, and xylene), chlorinated hydrocarbons (e.g., TCE, PCE, and vinyl chloride), and PAHs. Aqueous stream must have good transmissivity; high turbidity causes interference.	Implementable. Minor administrative difficulties anticipated for implementation of a UV oxidation system; may require permit for discharge of unreacted ozone and volatilized VOC. Alternatively, treatment of off-gas may be required.	High capital costs. High operation and maintenance costs.	Yes
		Biological Treatment	Ex situ biological treatment techniques are directed toward stimulating microorganisms to grow and use contaminants as a food and energy source by creating a favorable environment for the microorganisms. For the Smithtown Site, controlling the oxygen and nutrients levels, and temperature and pH are factors in proper treatment.	Enhanced anaerobic degradation has been effective in degrading chlorinated solvents. Low temperatures significantly decreases the rate of biodegradation resulting in longer cleanup times or increased cost of heating.	Implementable but not applicable. Effort is required to maintain the microorganisms in an anaerobic environment.	Medium capital cost. Medium maintenance costs.	No
		Vapor-Phase Activated Carbon Adsorption	Carbon adsorption can be used to treat the off-gas generated during air stripping. Activated carbon is not effective in the removal of VC, an additional treatment method would be required for sites with significant concentrations of VC. However, VC was not detected at this site.	Effective in removing contaminants with moderate or high organic carbon partition coefficients (K_{oc}) from off-gas.	This technology is implementable and proven.	Medium capital cost. Medium operation and maintenance costs.	Yes
In Situ Treatment Technologies		Phytoremediation	Phytoremediation uses plants and their associated rhizospheric microorganisms to remove and/or degrade contaminants in groundwater. Contaminants are removed through: capture of groundwater; uptake of contaminants and accumulation or processing of contaminants via metabolization, mineralization, and transpiration; and rhizospheric degradation via microorganisms.	Phytoremediation is applicable for relatively shallow groundwater (less than 10 feet bgs) and large groundwater plumes with low levels of contamination since high levels of contaminants may be toxic to the plants.	Not implementable for the Smithtown Site because contamination is found at depths greater than 10 feet bgs.	Low capital costs. Low operation and maintenance costs. Expected to be less expensive than technologies which utilize large-scale, energy consuming equipment.	No
		Permeable Reactive Barrier (PRB)	A PRB is constructed perpendicular to the flow path of a contaminant plume. Contaminants are removed through reaction with the permeable reactive medium. Barriers may be permanent or replaceable units and are typically constructed using conventional trenching techniques. Barriers can be placed at greater depth using injection methods in which a reactive medium is injected directly into the subsurface.	PRBs constructed of zero-valent iron filings are effective in the treatment of some chlorinated VOCs to below detection limits. Reactive medium for treating PAHs has not been demonstrated.	Implementable. Time to achieve groundwater remediation is dependent on the rate of groundwater flow through the reactive zone. Installation at depth and in bedrock may not be possible.	High capital costs compared to other in situ treatment technologies considered. Low operation and maintenance costs for groundwater monitoring; these costs may be significant if replacement of reactive medium is necessary.	No
		In Situ Chemical Oxidation (ISCO)	ISCO involves the injection of chemical oxidants into the subsurface to destroy organic contaminants in groundwater. Complete oxidation of contaminants results in their breakdown into less toxic compounds, such as carbon dioxide, water, and minerals.	ISCO is dependent upon achieving adequate contact between oxidants and contaminants, and subsurface heterogeneities can affect delivery of the oxidant. Poor application can result in large pockets of untreated contaminants and the oxidant can be consumed by other oxidizable substrates, natural organics and reduced metals.	Difficult to implement at the Smithtown Site because ISCO is only able to effectively treat contamination in small radii of influence and limited thickness.	High capital cost. Low operation and maintenance cost.	No
		Air Sparging (AS) with Soil Vapor Extraction (SVE)	Air is injected into the saturated matrix to strip the contaminants from the groundwater via volatilization. The contaminant-containing air is removed from the subsurface using an SVE system and treated.	Air sparging with SVE is effective in removal of VOCs from groundwater. This process is dependent on how well the injected air permeates into the groundwater from the injection point	Not implementable. A consistent plume was not found at the Smithtown Site. It would be administratively difficult to place the sparging wells and extraction wells within the residential area.	High capital cost. Medium operation and maintenance costs.	No
		Enhanced Anaerobic Bioremediation (EAB)	EAB is a groundwater remedial technology designed to facilitate the in situ biological destruction of chlorinated VOCs over a wide range of concentrations in groundwater. EAB involves the injection of electron donor, nutrients, and potentially dechlorinating microorganisms into the subsurface to stimulate the natural reactions of microorganisms to detoxify chlorinated solvent contamination in a low organic environment.	Biological dechlorination reactions are limited by the availability of biodegradable organic carbon (i.e., electron donor) that serves as an energy source for indigenous microorganisms. The addition of an electron donor as an energy source for indigenous microorganisms would stimulate the development of reduced groundwater environments that are conducive to dechlorination reactions (i.e., methanogenic conditions), and fuel the dechlorination process itself.	Not implementable. The groundwater at the Smithtown Site is aerobic and has high oxidation-reduction potential. Both conditions are not favorable for anaerobic degradation.	Medium capital cost. High operation and maintenance costs.	No

Table 2-7
Contamination Treatment Technology Evaluation
Smithtown Groundwater Contamination Site
Smithtown, New York

General Response Action	Remedial Technology	Process Options	Description	Effectiveness	Implementability	Cost	Retained
Discharge/ Disposal	On-site Disposal	On-site Injection	Treated groundwater is discharged on site to the subsurface through a series of injection wells.	Groundwater must be treated to meet discharge requirements. Effectiveness of reinjection is dependent on physical properties of the subsurface (e.g., hydraulic conductivity and aquifer capacity).	Implementable Minor administrative difficulties anticipated for groundwater reinjection; discharge permit may be required for injection to the subsurface.	Medium capital costs. Medium operation and maintenance costs.	Yes
		On-site Surface Recharge	Treated groundwater can be disposed on-site using a surface recharge system which consists of an excavated recharge basin. Recharge basins are shallow ponds that allow water to infiltrate into the ground gradually, and depending on the permeability of the soil, generally require large surface areas.	Effectiveness of this option would rely on the proper construction of the recharge system, including adequate sizing, and use of suitable sand and gravel.	Implementable, as standard construction methods and materials would be utilized However, open land space is very limited at this site.	Medium capital costs. Medium operation and maintenance costs.	Yes
	Off-site Disposal	Surface Water Discharge	Treated groundwater is discharged to an off-site surface water body such as a near by stream.	Discharge to an off-site surface water body would be an effective method for disposal of treated groundwater, depending on the distance from the treatment system to the stream.	Difficult to implement because of the distance to the nearest surface water body. Permits and a discharge monitoring program would likely be required to verify compliance with permit conditions.	High capital costs. Low operation and maintenance costs.	Yes

Table 5-1
Cost Estimate Summary for Alternatives 2 and 3
Smithtown Groundwater Contamination Site
Smithtown, New York

Item No.	Item Description	Alternative 2	Alternative 3
CAPITAL COSTS			
1	Work Plans/HASP/CQCP	$ 35,300	$ 35,300
2	Mobilization/Demobilization	$ 36,000	$ 36,000
3	Construction Management	$ 203,343	$ 317,843
4	Alternative Water Supply	$ 2,033,427	$ 2,033,427
5	Pump and Treat Systems	---	$ 1,145,001
	SUBTOTAL CONSTRUCTION COSTS	**$ 2,308,070**	**$ 3,567,571**
	General contractor Fee (10% construction)	$ 230,807	$ 356,757
	Design Engineering (20% construction)	$ 230,807	$ 713,514
	Resident Engineering/Inspection (10% construction)	$ 461,614	$ 356,757
	Contingency (20%)	$ 461,614	$ 713,514
	TOTAL CAPITAL COSTS	**$ 1,384,842**	**$ 2,140,543**
ANNUAL O&M COSTS			
5	Project Planning and Organizing	$ 2,400	$ 2,400
6	Field Sampling Labor	$ 17,820	$ 17,820
7	Sampling Equipment, Shipping, Consumable Supplies	$ 7,700	$ 7,700
8	Sample Analysis and Data Validation	$ 8,400	$ 8,400
9	Data Evaluation and Reporting	$ 10,500	$ 10,500
10	Groundwater Treatment Plant O&M	---	$ 120,099
	TOTAL ANNUAL O&M COST	**$ 46,820**	**$ 166,919**
CARBON REPLACEMENT			
11	Carbon Change Out at Year 5	---	**$ 28,200**
FIVE YEAR REVIEW			
12	Five Year Review Report	$ 8,400	$ 8,400
PRESENT WORTH OF COSTS			
13	Total Capital Costs	$ 3,462,104	$ 5,708,114
14	Annual O&M Costs (30/10 year duration)	$ 580,989	$ 1,172,370
15	Carbon Replacement at Year 5	---	$ 20,107
16	Five Year Review Costs (30/10 year duration)	$ 18,126	$ 13,745
	TOTAL PRESENT WORTH	**$ 4,061,219**	**$ 6,914,336**

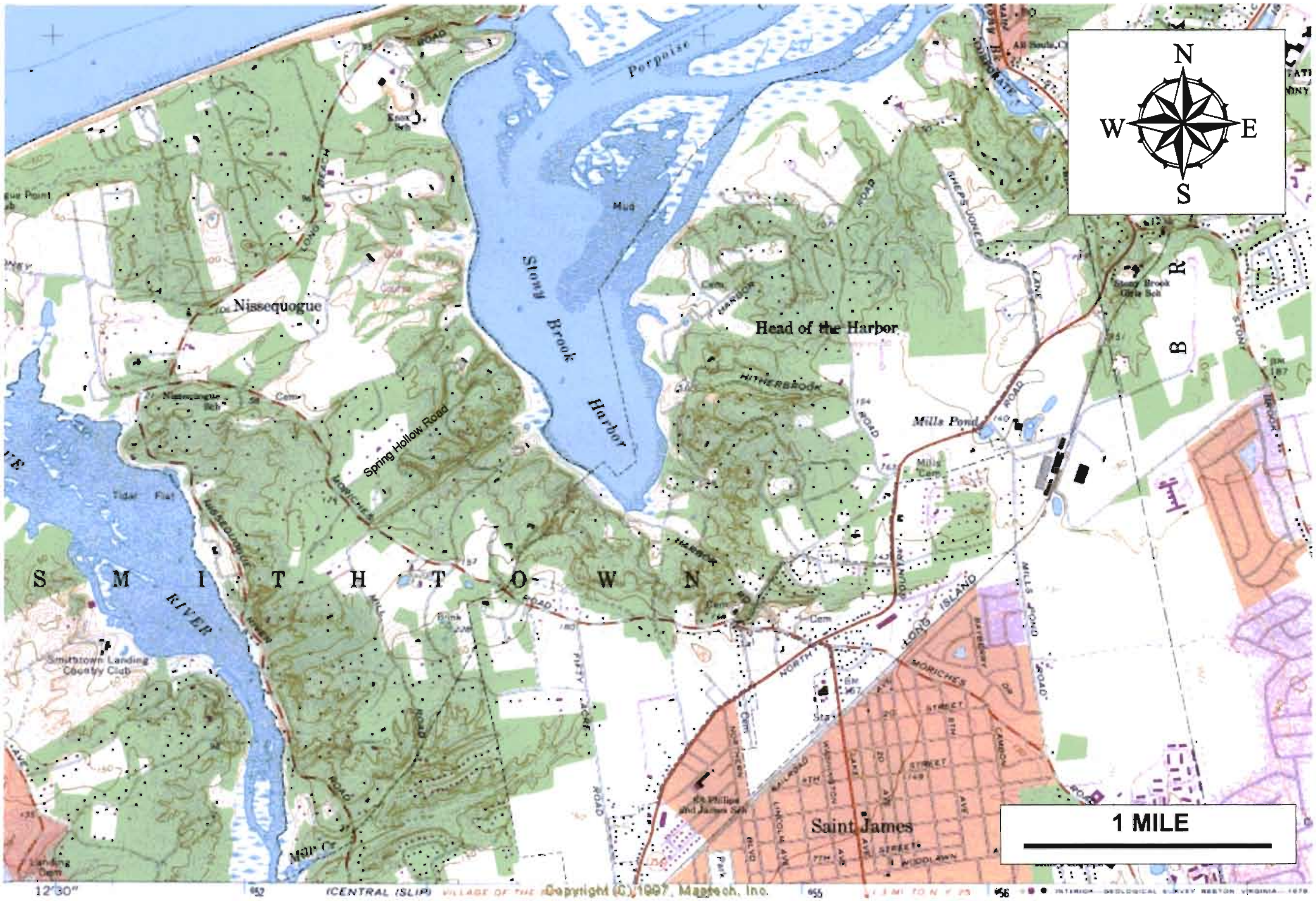
Table 5-2
Summary of Comparative Analysis of Remedial Alternatives
Smithtown Groundwater Contamination Site
Smithtown, New York

EVALUATION CRITERION	ALTERNATIVE 1	ALTERNATIVE 2	ALTERNATIVE 3
Summary of Components	• No action	• Alternate water supply • Institutional controls • Long-term groundwater and surface water monitoring • Periodic site reviews	• Alternate water supply • Groundwater extraction • Groundwater treatment • On-site injection • Institutional controls • Long-term groundwater and surface water monitoring • Periodic site reviews
Overall Protection of Human Health and the Environment	Does not provide overall protection of human health and the environment because no remedial action would be implemented under this alternative, no means would be available to prevent current and future exposure.	Would be protective of human health because contaminated ground water would no longer be utilized as the source of drinking water for the residents at the Smithtown Site. Residences within the impacted areas would be hooked up to the water mains. Existing private water wells would be abandoned to eliminate future use. Use of contaminated groundwater in the future would be avoided through the well drilling permit restrictions. The contaminant concentrations is expected to naturally attenuate to below the PRGs in 30 years; therefore, would achieve the protection of the environment. Monitoring would monitor the migration and reduction of contaminant concentrations through time.	Would be protective of human health because contaminated groundwater would no longer be utilized as the source of drinking water for the residents at the Smithtown site. Residences within the impacted areas would be hooked up to the water mains. Existing private water wells would be abandoned to eliminate future use. Use of contaminated groundwater in the future would be avoided through the well drilling permit restrictions. The goal of pumping is to create an inward gradient that would limit downgradient migration of the contaminants and to accelerate the cleanup of contaminated groundwater in the affected areas. Therefore, this alternative would be protective of human health and the environment.
Compliance with ARAR	Would comply with the chemical-specific ARARs for groundwater within 30 years as the contaminants degrade through natural attenuation to below the groundwater quality standards and drinking standards.	Would meet the chemical-specific ARARs within 30 years as contaminant concentrations in groundwater would decrease to below the groundwater quality standards through natural attenuation.	Contaminant concentrations in the groundwater are expected to decrease over time. It is anticipated that the PRGs would be met in the near future.
Long-term Effectiveness and Permanence	Not effective in the long term as there is no mechanism to monitor contaminant migration and degradation, to prevent current and future exposure.	Effective in the long-term as residents would not be exposed to contaminated groundwater once their houses are connected to the municipal water supplies. Their existing private wells would be abandoned. Institutional controls would restrict drilling of new drinking water wells.	Residents would not be exposed to contaminated groundwater once their houses are connected to the municipal water supplies. Their existing private wells would be abandoned. Institutional controls would restrict drilling of new drinking water wells. Extraction and treatment of contaminated groundwater would create an inward gradient that would limit downgradient migration of the contaminants and also accelerate the cleanup of the two affected areas. It is expected that groundwater would meet the PRGs in the near future.
Reduction of Toxicity, Mobility, and Volume (TMV)	No reduction in TMV.	No reduction in TMV through active treatment. Contaminant concentrations would decrease slowly through natural attenuation.	Reduction of TMV of the contaminants in groundwater through treatment. The contaminants would be removed through groundwater extraction. The contaminants collected on the carbon would be destroyed during the carbon regeneration process.
Short-term Effectiveness	There is no short-term impact to workers or the community as there is no remedial activity under this alternative.	Limited site work and would have minimal and short-term impact to the communities and worker. Use of PPE by workers during groundwater monitoring would minimize the exposure.	Some short-term, minor risks to remediation workers and the community during construction. Operational controls, with air monitoring, would be established to minimize the impact. Use of PPE by workers would minimize exposure.
Implementability	Could be implemented easily.	Could be implemented.	Technically implementable but could be administratively difficult. Very limited space is available at the site. Obtaining permission and right of way for installing the extraction wells, routing the piping and locating the treatment plants could be difficult. It is not known if the local community would be receptive to the proposed locations of the treatment plants.
Cost	$0	$4.1 million	$7.1 million

adapted from NYSDEC Interactive Mapping Gateway: http://www.nysgis.state.ny.us/gateway/index.html

CDM

Figure 1-1
Site Location Map
Remedial Investigation/Feasibility Study
Smithtown Groundwater Contamination Site
Smithtown, New York



from USGS Saint James 7.5 minute Quadrangle, New York, dated 1967

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Figure 1-2
Site Map

Remedial Investigation/Feasibility Study
Smithtown Groundwater Contamination Site
Smithtown, New York

CDM

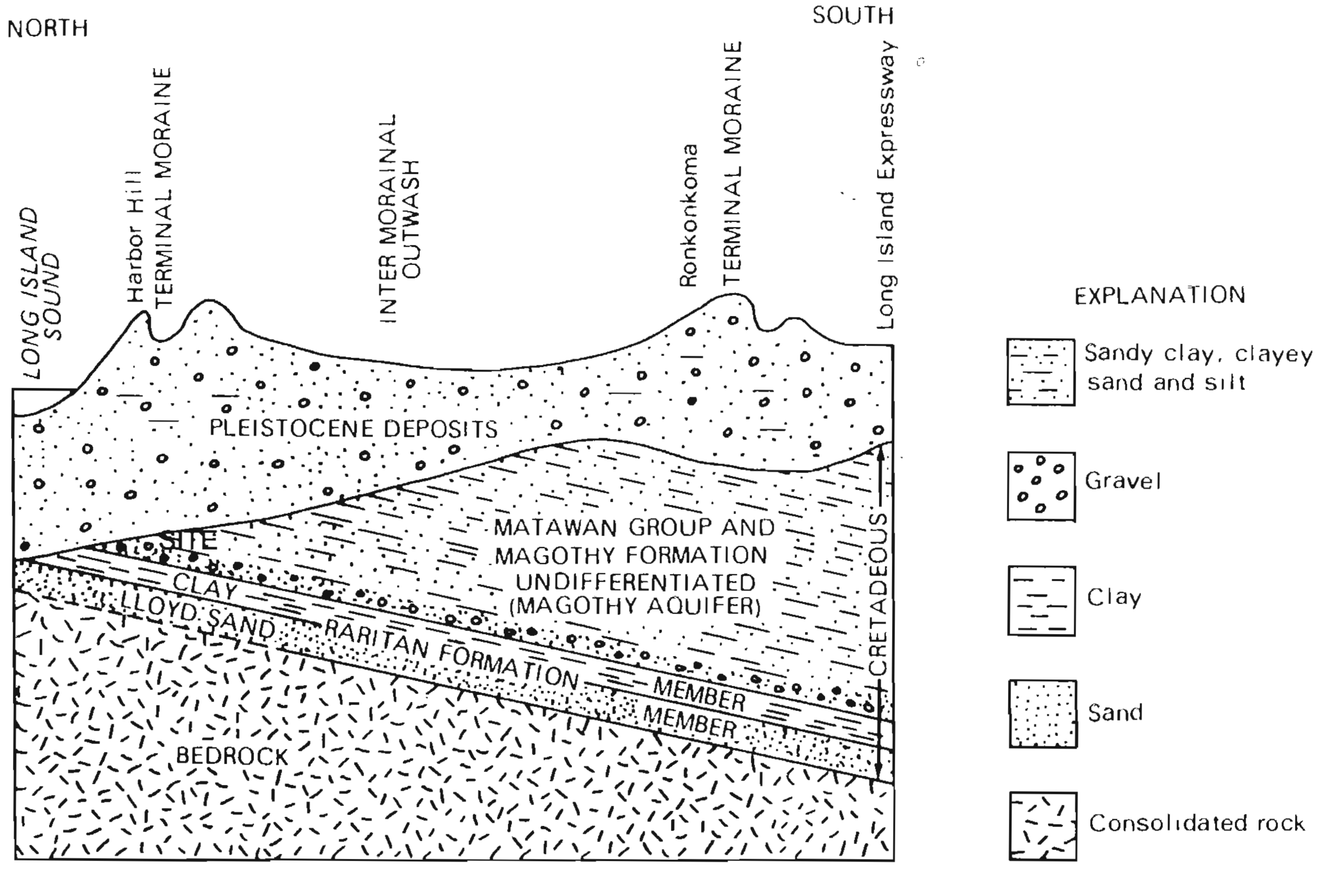
SMITHTOWN GROUNDWATER CONTAMINATION SITE
SMITHTOWN, NEW YORK

Figure 1-3
1998 RESIDENTIAL PCE CONCENTRATION MAP
REMEDIAL INVESTIGATION/FEASIBILITY STUDY

from USGS 1:24,000 scale topographic maps: St. James & Central Islip (both sheets created 1967; revised 1979)

CDM

Figure 1-4
Topographic Map of the Smithtown Site
Remedial Investigation/Feasibility Study
Smithtown Groundwater Contamination Site
Smithtown, New York



(from Cohen et al., 1968)

NOT TO SCALE

CDM

Figure 1-5
Generalized Geologic Cross Section of
North-Central Suffolk County

Remedial Investigation/Feasibility Study
Smithtown Groundwater Contamination Site
Smithtown, New York

System	Series	Stratigraphic unit	Thickness (feet)	Character of deposits	Water-bearing properties
Quaternary	Recent	Recent deposits Artificial fill, marsh deposits, beach deposits, and surficial soil.	0-20±	Sand, gravel, silt, and clay; organic mud, peat, loam, and shells. Colors are brown, yellow and gray.	Sandy and gravelly beach deposits may locally yield small supplies of fresh to brackish water to wells. Marine silt and clay in north-shore harbors retard salt-water encroachment and confine underlying aquifers.
	Pleistocene	Upper Pleistocene deposits.	0-300±	Till composed of unassorted clay, sand, and boulders as ground moraine in area north of Harbor Hill terminal moraine and possibly as buried ground moraine of the Ronkonkoma ice. Outwash deposits of brown well-stratified sand and gravel—predominantly quartzose but containing biotite and other dark minerals and igneous and metamorphic rock fragments—including advance outwash, channel and valley-fill, and outwash-plain deposits. Ice-contact deposits of crudely stratified sand and gravel and isolated masses of till in the Ronkonkoma and Harbor Hill terminal moraines. Glaciolacustrine deposits of brown and gray silt and clay intercalated with outwash deposits in buried valleys.	Till, relatively impermeable; commonly causes perched-water bodies to form locally and impedes recharge from precipitation. Outwash and ice-contact deposits are moderately to highly permeable. Wells screened in outwash deposits generally at depths of less than 250 ft yield as much as 1,700 gpm. Specific capacities of public-supply wells range from 22 to 222 gpm per ft of drawdown. Water is generally fresh and unconfined. Chief source of water for domestic, public-supply, industrial, and irrigation wells in project area. Glaciolacustrine deposits of silt and clay are relatively impermeable and locally retard movement of water between adjacent water-bearing beds in Pleistocene and Cretaceous deposits.
		---Unconformity?---			
		Pleistocene deposits undifferentiated.	0-400±	Sand, gravel, clay, and silt. Lignite present in some silt or clay layers. Colors are brown and gray. These deposits are present in deep buried valleys and may include equivalents of the Gardiners clay and the Jameco gravel found elsewhere on Long Island. This unit may include some Pliocene(?) deposits, but evidence is scanty.	Coarser sand and gravel beds are permeable and would presumably yield moderate to large supplies to properly constructed wells. One well, S16,127, screened in these deposits yields 1,400 gpm, and has a specific capacity of 46 gpm per ft of drawdown. Silt and clay beds confine water in adjacent water-bearing beds.
		---Unconformity?---			
Tertiary(?)	Pliocene(?)	Mannetto gravel	0-300±	Stratified sand and gravel and scattered clay lenses; unit is predominantly quartzose; igneous and metamorphic rock fragments are scarce. Colors are pale to yellowish brown. Caps hills in western part of Huntington and locally present in buried valleys.	Deposits are moderately to highly permeable but generally lie above the zone of saturation. Locally, water supplies for domestic use are obtained from these deposits, such as at wells S4, S208 and S927. No large public-supply or industrial wells were screened in these deposits in 1960.
		--- Unconformity ---			
Cretaceous	Upper Cretaceous	Magothy(?) formation	0-800±	Sand, clayey, with silt, clay, and some gravel. Colors are white, gray, brown, yellow, and red. The upper part of the formation commonly includes interbedded clay, fine to medium sand, silt, and some lignite; the lower part is largely coarse sand, gravel, and some clay.	Generally ranges from moderately to highly permeable. The lower part of the formation is more permeable than the upper part. Several public-supply wells screened in the basal zone have yields ranging from 1,000 to 1,500 gpm and specific capacities from 30 to 90 gpm per ft of drawdown. Water is generally of excellent quality. Second most important source of water to wells. Unconfined conditions are common in uppermost part of formation, but confined conditions prevail in the lower part; some wells flow.
		--- Unconformity ---			
		Raritan formation: Clay member	0(?)-188±	Clay and silt, and a few layers of sand. Lignite and pyrite concretions are common. Colors are mostly gray, white, and red.	Relatively impermeable. Acts as a confining bed, which retards but does not prevent movement of water between the Magothy(?) formation and the Lloyd sand member.
		Raritan formation: Lloyd sand member	200-265±	Sand, fine to coarse, and gravel, mixed with some clay and some layers of silt and clay. Colors are white to pale yellow.	Moderately permeable. Not extensively developed. Several public-supply and industrial wells yield as much as 250 gpm in northern Huntington, but potential yields from properly constructed wells are much greater. Water is confined and some wells flow. Water is generally of excellent quality, but on Eaton Neck it is brackish.
		--- Unconformity ---			
Precambrian to lower Paleozoic		Bedrock		Crystalline metamorphic and igneous rocks.	Relatively impermeable. Forms the floor of the ground-water reservoir.

(adapted from Lubke,1964)

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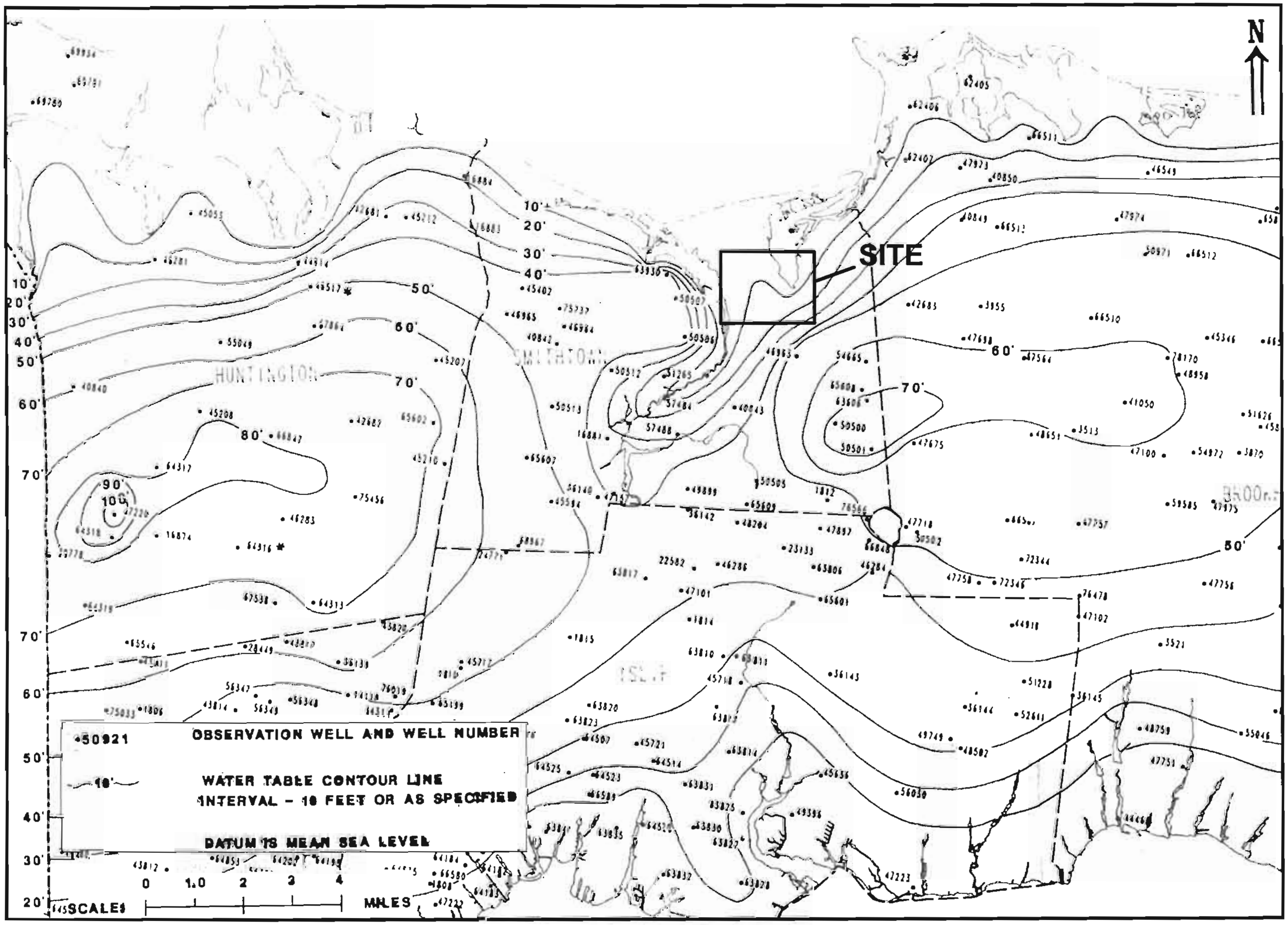
Figure 1-6

Generalized Regional Stratigraphy

Remedial Investigation/Feasibility Study
Smithtown Groundwater Contamination Site
Smithtown, New York



from Hibbard et al. (1993)

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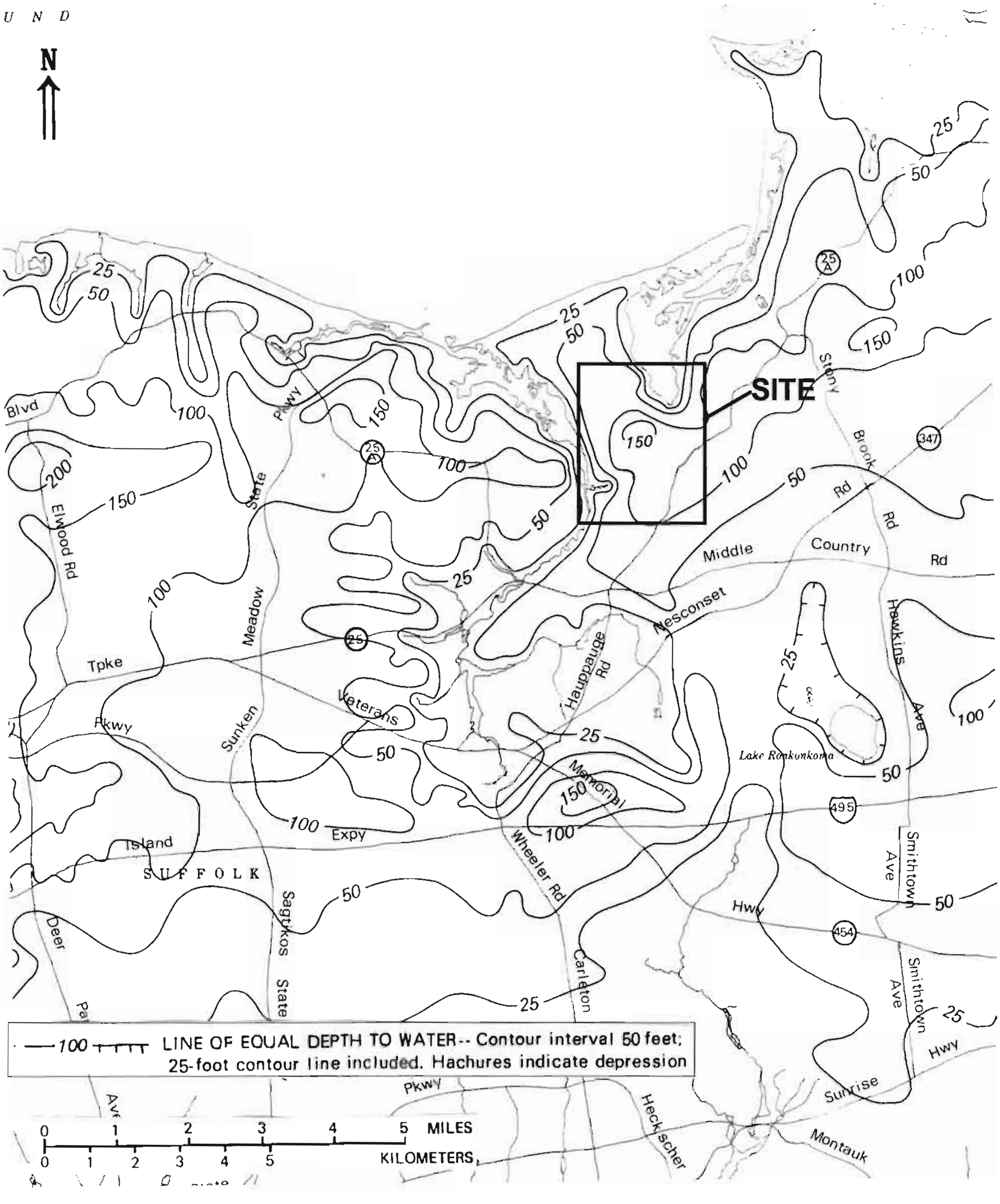
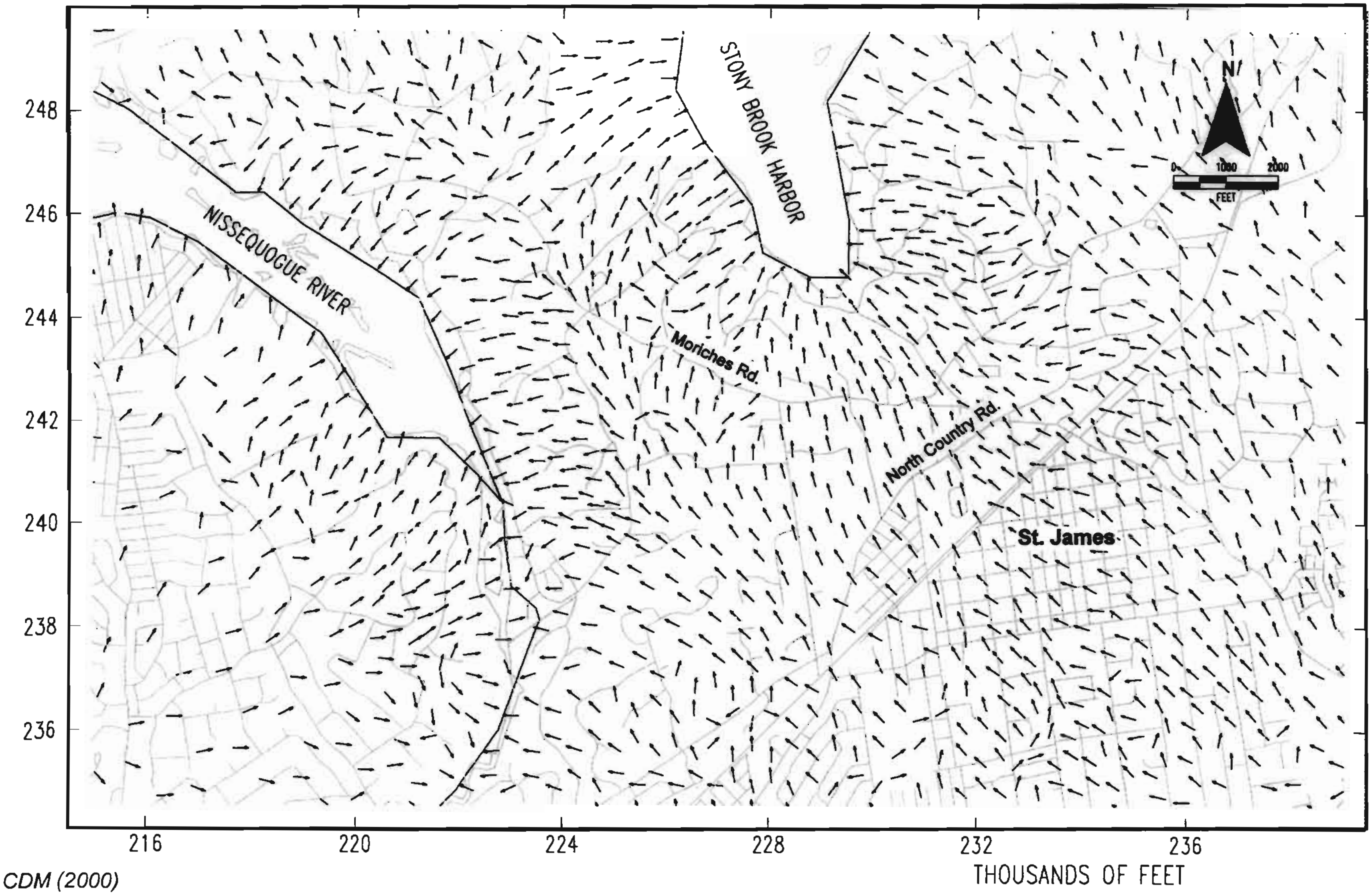
Figure 1-7
Water Table Elevation Contour Map
West Suffolk County, New York
Remedial Investigation/Feasibility Study
Smithtown Groundwater Contamination Site
Smithtown, New York



(from Simmons, 1988)

Figure 1-8
Depth to Water Table Contour Map,
Northwest Suffolk County

Remedial Investigation/Feasibility Study
Smithtown Groundwater Contamination Site
Smithtown, New York



from CDM (2000)

Figure 1-9
Simulated Direction of Groundwater Flow for the Upper Glacial Aquifer

CDM

Remedial Investigation/Feasibility Study
Smithtown Groundwater Contamination Site
Smithtown, New York

File Path: c:\egis\smithtown\smith1apr.apr

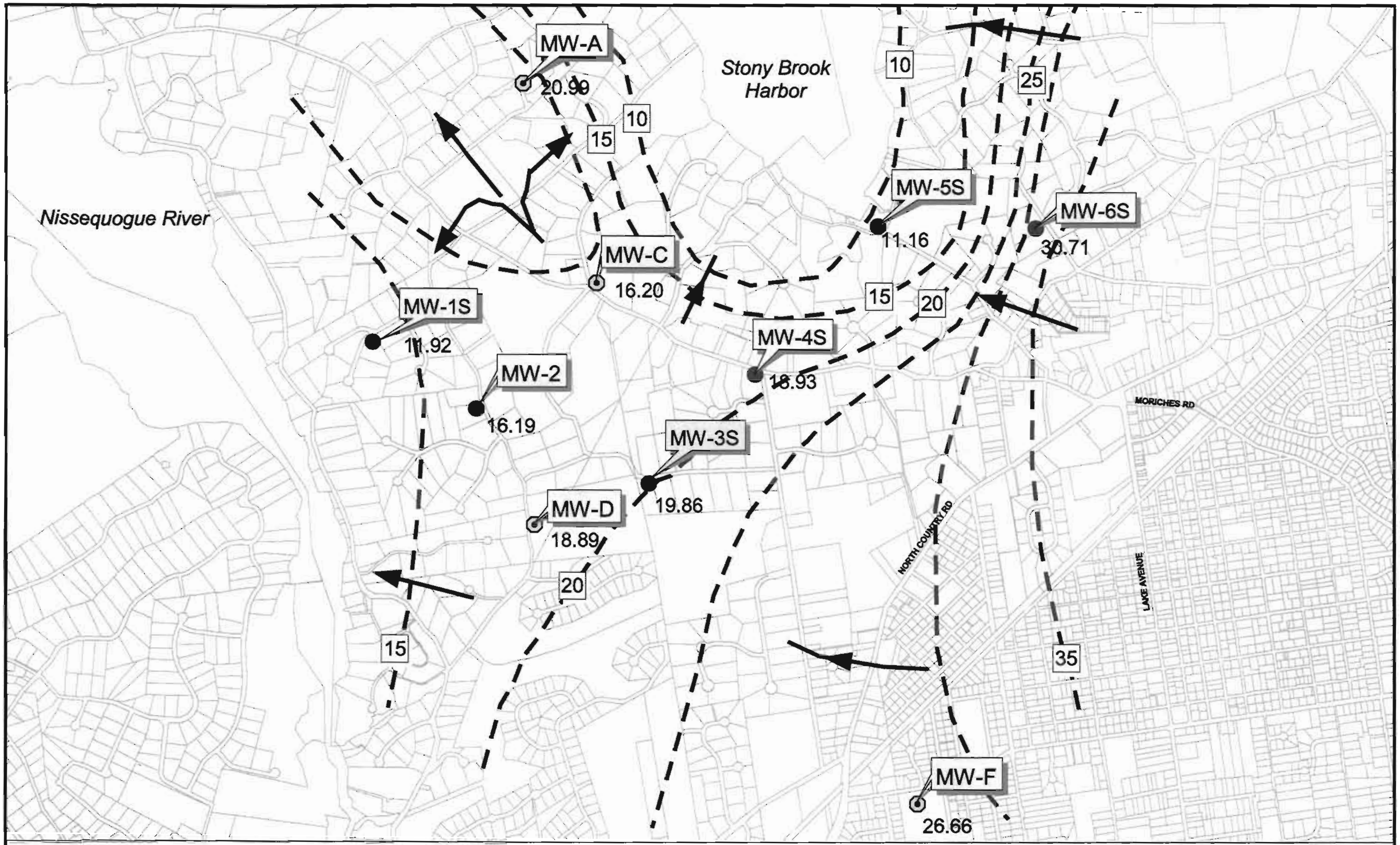


Figure 1-10
Water Table Elevation Map (March 19, 2002)

Remedial Investigation/Feasibility Study
Smithtown Groundwater Contamination Site
Smithtown, New York

CDM

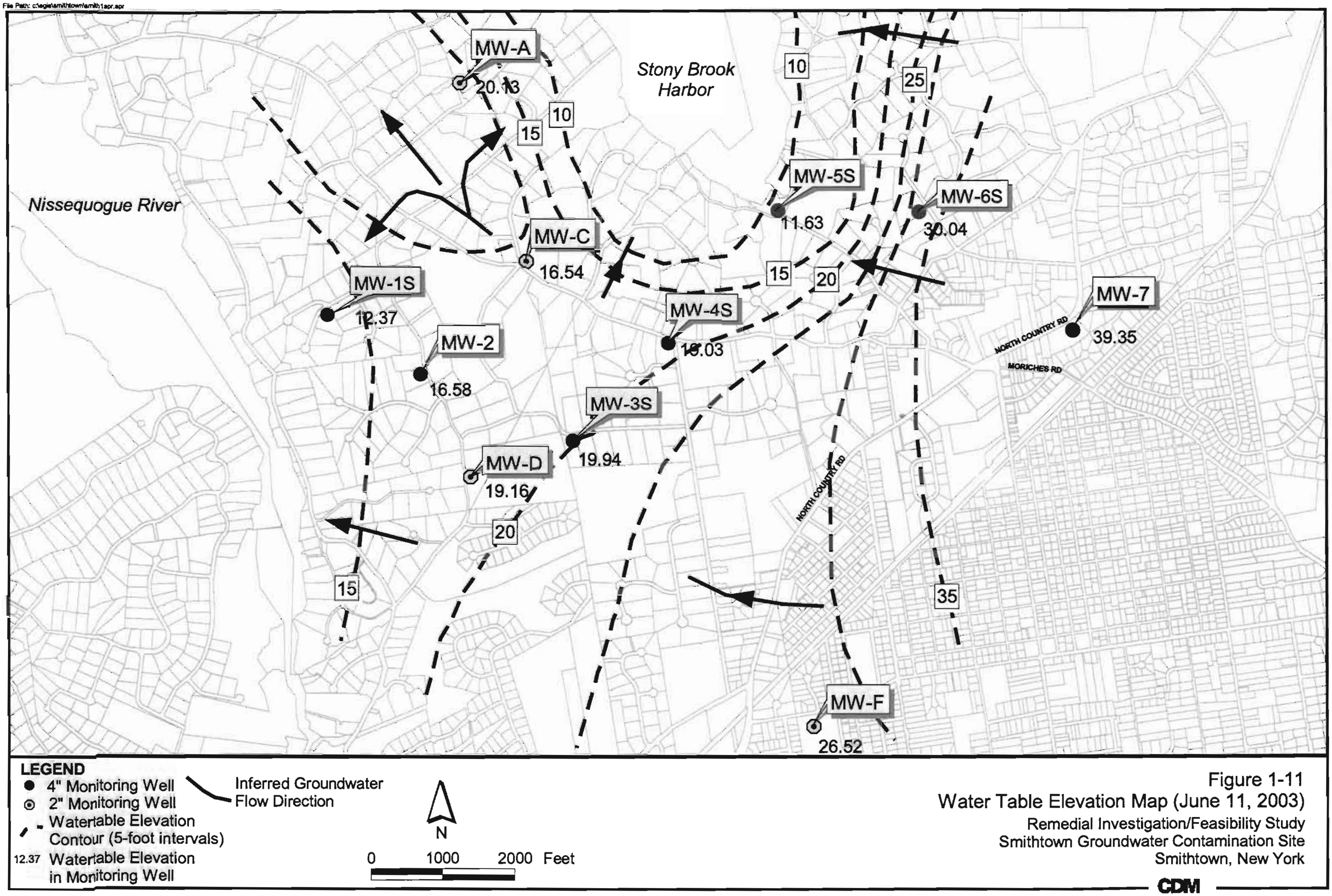


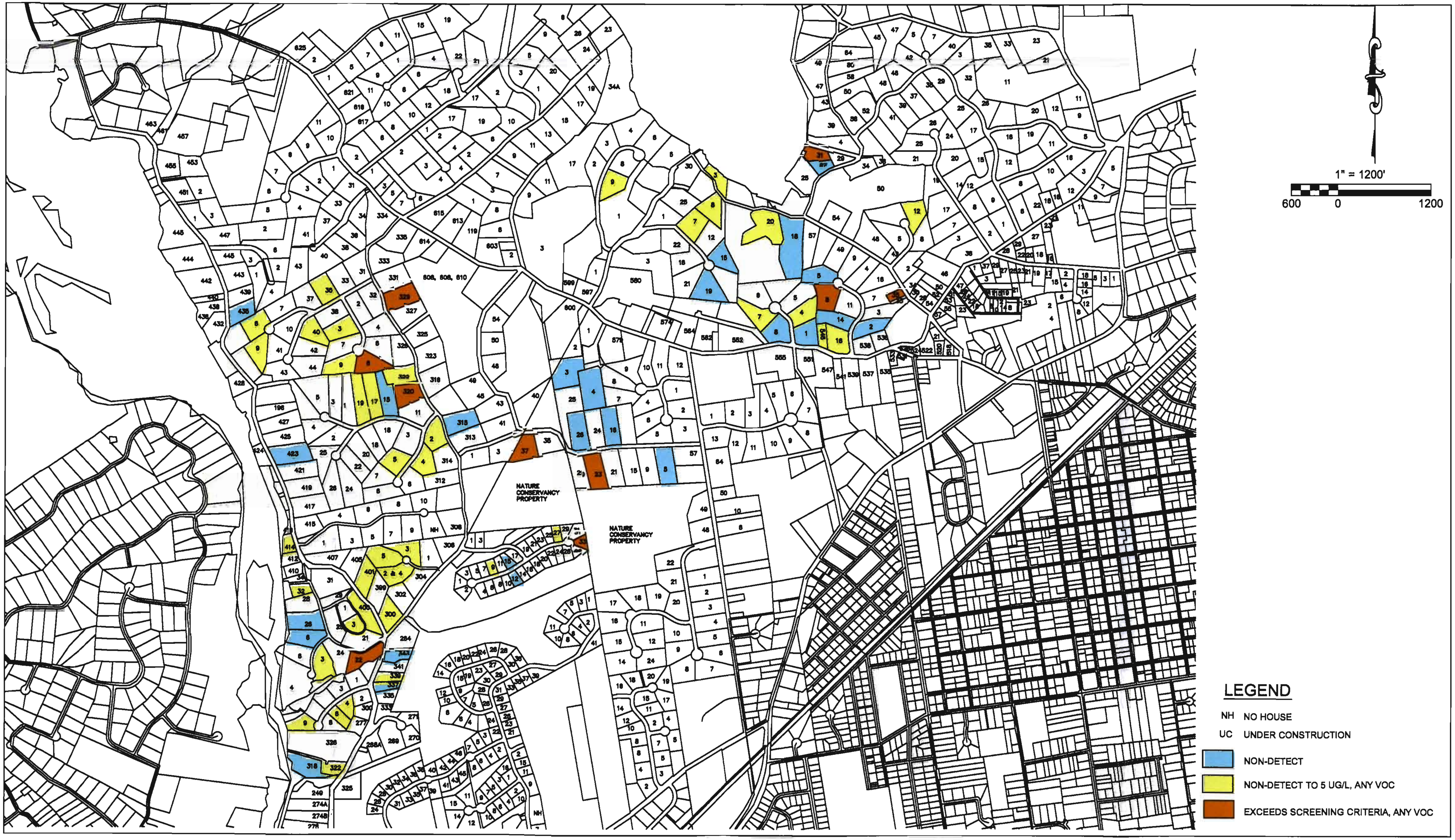
Figure 1-11
Water Table Elevation Map (June 11, 2003)
Remedial Investigation/Feasibility Study
Smithtown Groundwater Contamination Site
Smithtown, New York

CDM

CDM

SMITHTOWN GROUNDWATER CONTAMINATION SITE
SMITHTOWN, NEW YORK

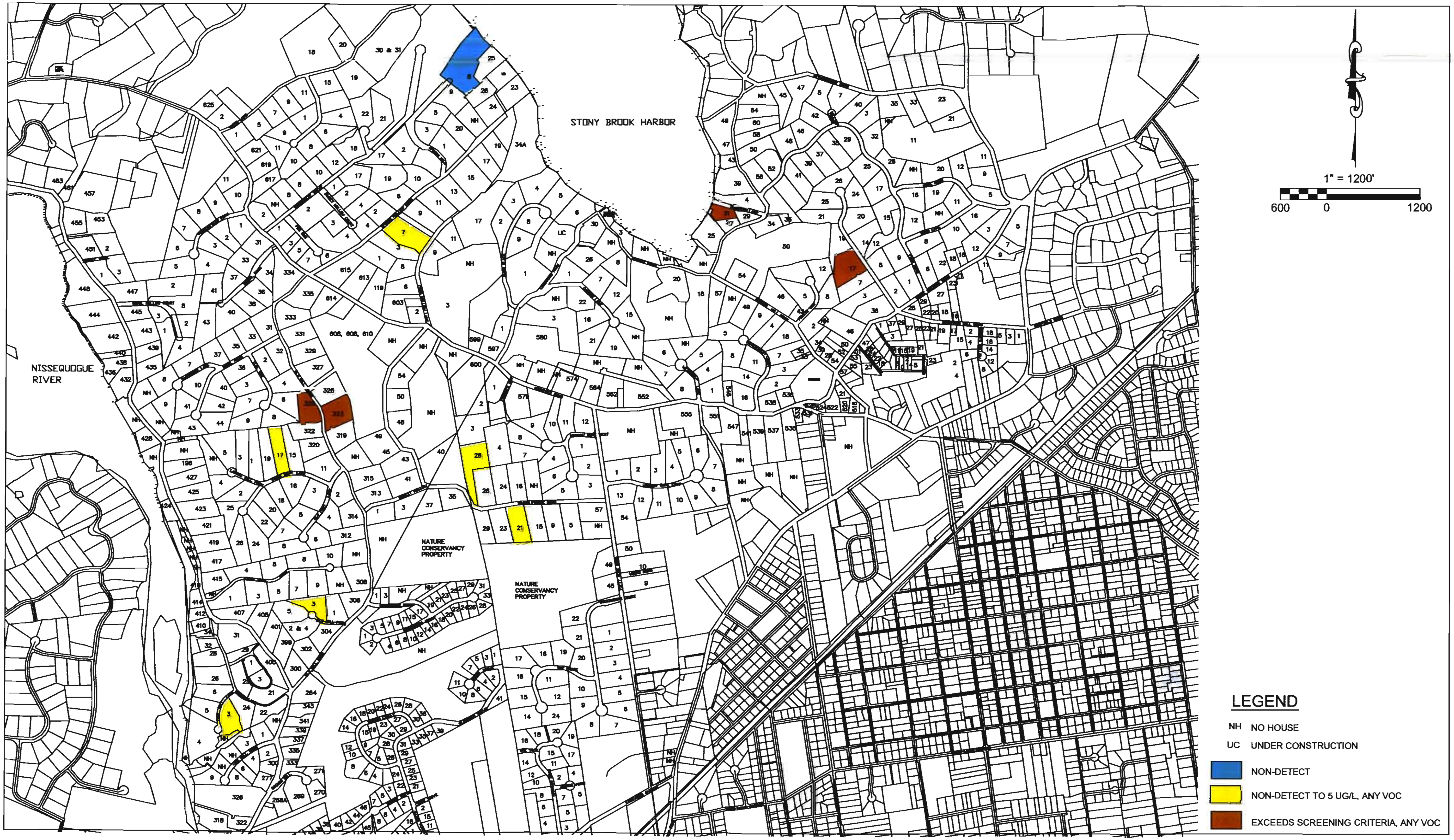
Figure 1-15
RESIDENTIAL ROUND ONE - VOCS EXCEEDING SCREENING CRITERIA
REMEDIAL INVESTIGATION/FEASIBILITY STUDY



CDM

SMITHTOWN GROUNDWATER CONTAMINATION SITE
SMITHTOWN, NEW YORK

Figure 1-16
RESIDENTIAL ROUND TWO - VOCS EXCEEDING SCREENING CRITERIA
REMEDIAL INVESTIGATION/FEASIBILITY STUDY



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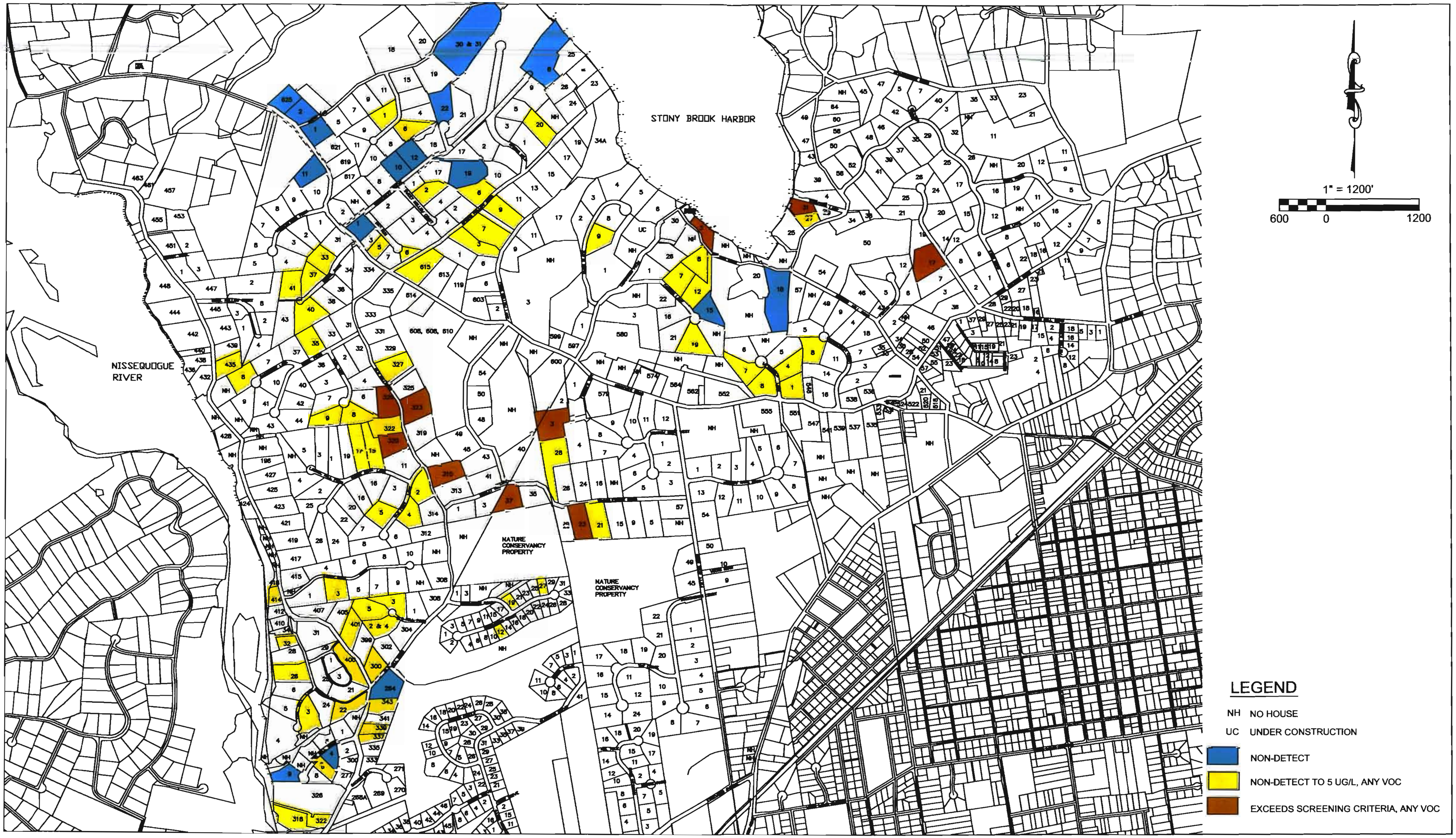
SMITHTOWN GROUNDWATER CONTAMINATION SITE
SMITHTOWN, NEW YORK

Figure 1-17
RESIDENTIAL ROUND THREE - VOCS EXCEEDING SCREENING CRITERIA
REMEDIAL INVESTIGATION/FEASIBILITY STUDY



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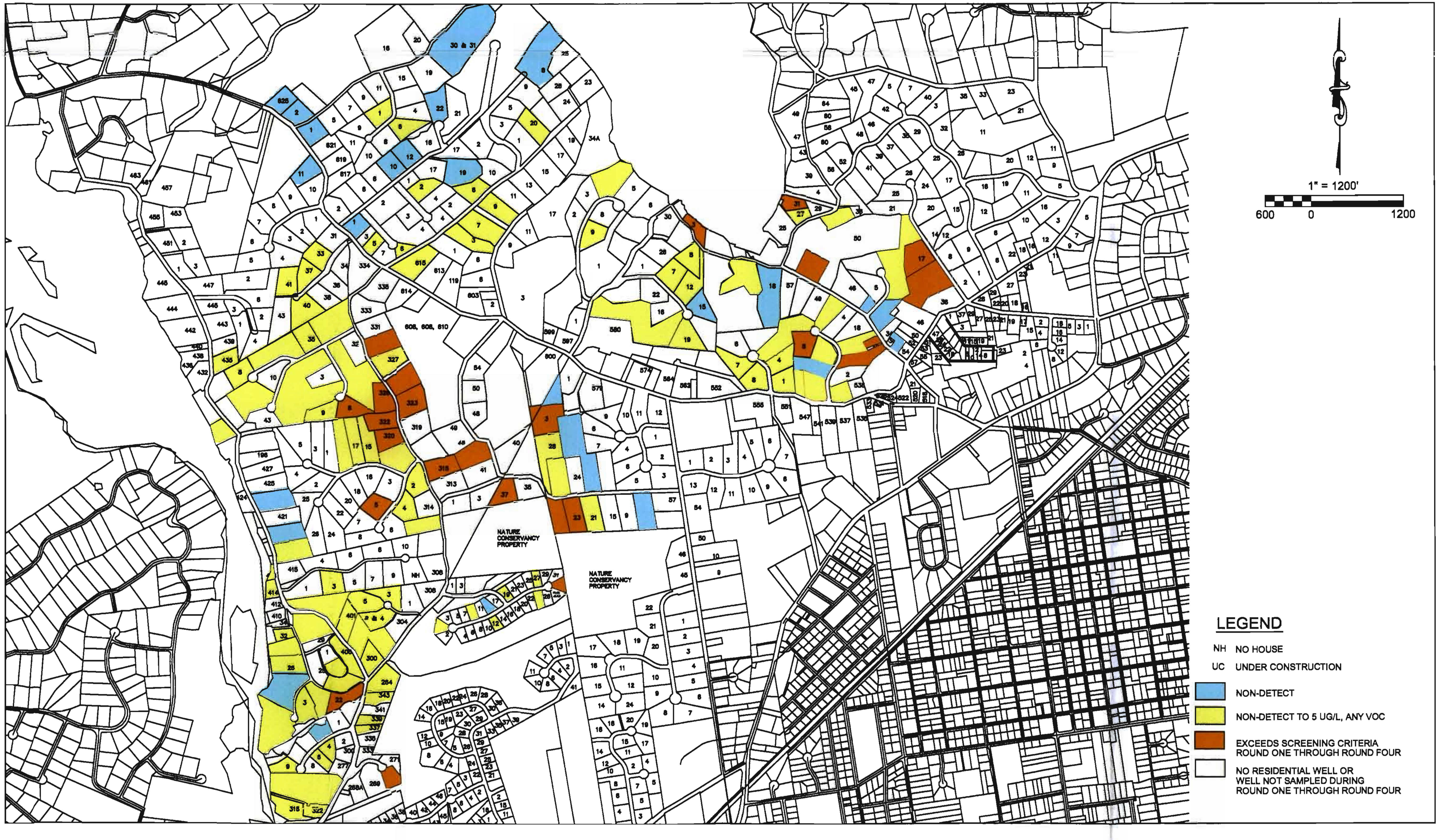
SMITHTOWN GROUNDWATER CONTAMINATION SITE
SMITHTOWN, NEW YORK

Figure 1-18
RESIDENTIAL ROUND FOUR - VOCS EXCEEDING SCREENING CRITERIA
REMEDIAL INVESTIGATION/FEASIBILITY STUDY



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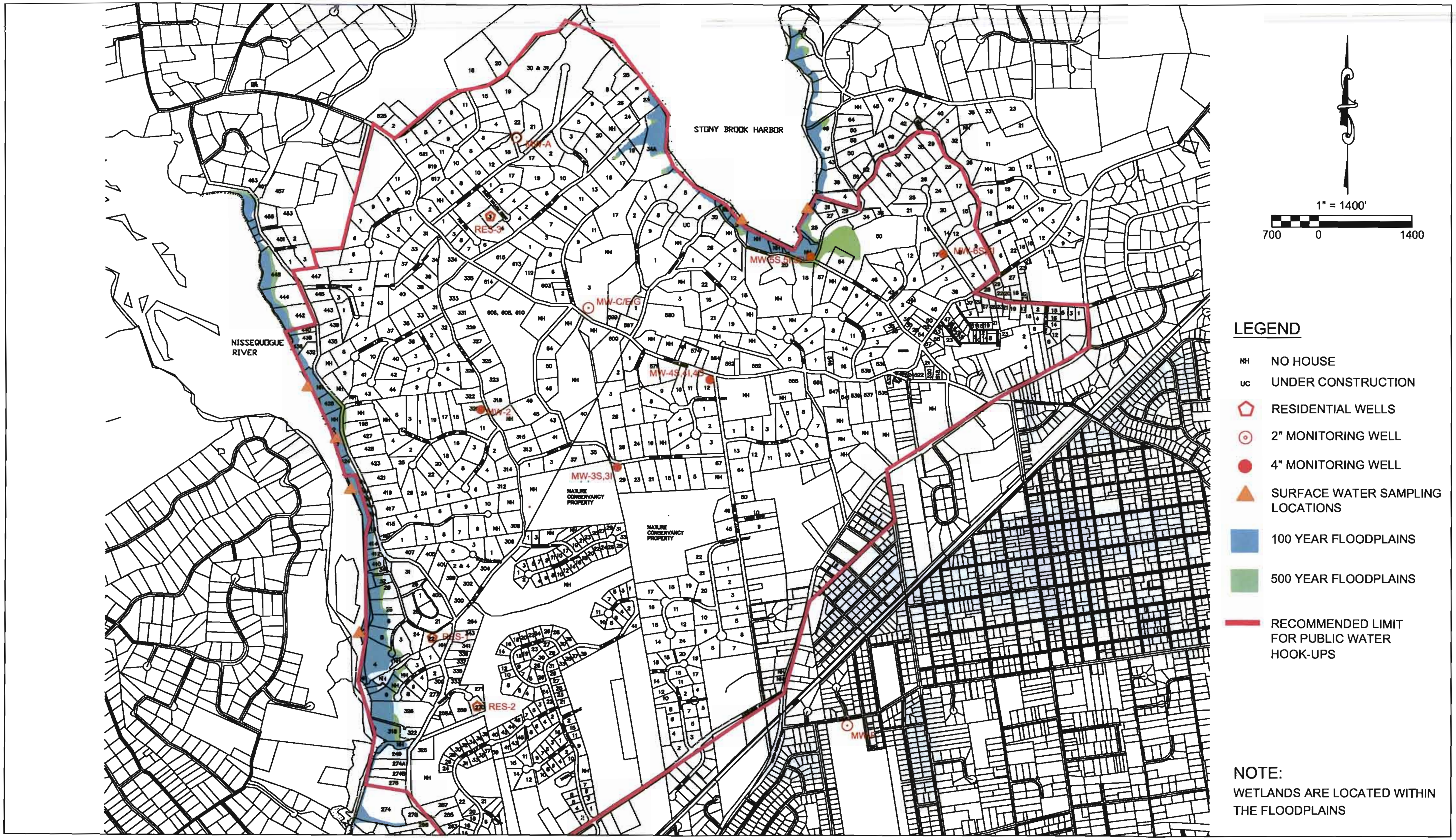
SMITHTOWN GROUNDWATER CONTAMINATION SITE
SMITHTOWN, NEW YORK

Figure 1-19
ROUND ONE THROUGH ROUND FOUR RESIDENTIAL
MAXIMUM VOC CONCENTRATION DETECTED DURING ANY ROUND
REMEDIAL INVESTIGATION/FEASIBILITY STUDY



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SMITHTOWN GROUNDWATER CONTAMINATION SITE
SMITHTOWN, NEW YORK

Figure 4-1
PROPOSED LONG-TERM MONITORING PROGRAMS
REMEDIAL INVESTIGATION/FEASIBILITY STUDY

SMITHTOWN GROUNDWATER CONTAMINATION SITE
SMITHTOWN, NEW YORK

Figure 4-2
PROPOSED LOCATIONS FOR EXTRACTION WELLS,
INJECTION WELLS, AND TREATMENT PLANTS
REMEDIAL INVESTIGATION/FEASIBILITY STUDY

Appendix A

Groundwater Modeling Report

CDM

Memorandum

To: *Frank Tsang, Susan Schofield*

From: *John Boyer, Dan O'Rourke, Mary Anne Taylor*

Date: *December 15, 2003; Revised December 18, 2003*

Subject: *Smithtown Groundwater Contamination Site – Groundwater Modeling*

This memorandum details the development, update, and application of a groundwater flow and contaminant transport model of the Smithtown Groundwater Contamination Site. The purpose of the modeling was to provide support for certain remedial alternatives identified in the Feasibility Study. Specifically, the results of the modeling were used to justify boundaries for public water hook-ups based on simulated projected future migration of observed groundwater contamination and to evaluate groundwater pump and treat options.

Flow Model Development

In 1999, working on behalf of the Suffolk County Department of Health Services, CDM developed a groundwater flow and contaminant transport model to assist the County in the evaluation of private well organic contamination in the Villages of Nissequogue, Head of the Harbor and the Hamlet of St. James. The groundwater flow model was developed using DYNFLOW, a finite-element model capable of simulating three-dimensional groundwater flow for both confined and unconfined aquifers. Contaminant transport simulations were conducted using DYNTRACK, the primary companion mass transport model for DYNFLOW. DYNTRACK inputs flow fields from DYNFLOW, and simulates dissolved contaminant fate and transport using the random walk method. DYNTRACK also performs particle tracking, and has the ability to "backtrack" for such purposes as defining zones-of-capture of pumping wells.

The local groundwater model was developed from the existing Suffolk County regional groundwater flow model. The local grid consisted of 1,670 nodes and 3,223 elements divided into eight layers and nine levels. Node spacing in the Nissequogue/Head of the Harbor/St. James area was approximately 500 to 700 feet.

The much finer discretization of the local model allowed for refinements to local stratigraphy, primarily to the Smithtown Clay unit. The Smithtown Clay is an extensive lacustrine clay unit that lies within the glacial deposits between the Harbor Hill and Ronkonkoma moraines.

The extent of the Smithtown Clay, as represented in the regional model, was based on United States Geological Survey mappings (Krulikas, 1983; Lubke, 1964).

Flow Model Update

Prior to the most recent model application, changes to sediment lithology were made in the existing Smithtown groundwater model based upon natural gamma logs from 18 monitoring and vertical profile wells (VPWs) (**Figure 1**). In general, the gamma logs revealed three distinct units: sand (or sand and gravel), clay (the Smithtown Clay), and a tighter sand formation at depth (reworked Magothy). The most distinct of these units is the Smithtown Clay. Only minor changes were made to the existing model, primarily consisting of changes to the thickness and spatial extent of the Smithtown Clay at various locations. A plan view showing the revised spatial extent of the Smithtown Clay (layer 7) is shown on **Figure 2**. The modifications are described below.

- At MW-1/VPW-19, till (Harbor Hill ground moraine) was replaced with upper glacial material (UG 275);
- At MW-2 the elevation of level 7 was moved down 90′ and level 8 was moved down 35′ (i.e. the thickness of layer 7 was increased by 55′);
- At MW-3, Smithtown Clay was replaced with upper glacial material (UG 275);
- At MW-4, till was added at the surface, the elevation of level 8 was raised 70′, while the elevation of level 7 was lowered 15′ (or layer 7 was thickened by 85′);
- At MW-5, till was replaced by upper glacial material (UG 275), the elevation of level 8 was lowered 80′ and the elevation of level 7 was lowered 120′ (layer 7 thickened by 40′); till was replaced by Smithtown Clay in layer 7;
- At MW-6, till replaced Smithtown Clay and the Smithtown Clay was added at the surface (layer 8);
- A small area of layer 6 east of MW-A and west of MW-6 was changed to Smithtown Clay;
- At MW-A, level 6 was raised 10′; a new material, 'clay', that is looser than the Smithtown Clay, but slightly tighter than the reworked Magothy material was defined. The horizontal/vertical hydraulic conductivities of this material are 1.0 and 0.10 ft/day respectively. This material was added around MW-A;
- At MW-G, the surface layer (layer 8) was changed to till (HH moraine) from upper glacial material;

- At VPW-15, Smithtown Clay was replaced by till;
- At VPW-16, till was added in the surface layer and Smithtown Clay was replaced by upper glacial material in layer 7;
- At VPW-20, Smithtown Clay was added at layer 7; the elevation of level 8 was lowered 15′ and the elevation of level 7 was lowered 18′ (layer 7 thickened by 3′);
- At VPW-23, the elevation of level 8 was lowered 60′ and the elevation of level 7 was lowered 100′ (layer 7 thickened by 40′);
- At VPW-24, the elevation of level 7 was lowered 85′; and
- The base of the Nissequogue peninsula was coarsened slightly in which upper glacial 185 was replaced with upper glacial 275.

Flow Model Calibration

In addition to changes in lithology, updates to water supply pumping were also included as part of the modifications made to the Smithtown groundwater model. New public supply wells that have been installed within the modeled area since the previous 1994 calibration simulation was completed were included in the Smithtown groundwater model. Long-term average pumping rates were used to represent each well, representing rates from 1994, 1997, or 2001, depending on the installation date of the well and available data. As with the original Smithtown groundwater model, 85percent of pumping was returned to the aquifer as sanitary return through on-site wastewater treatment systems.

The model was calibrated to June 2003 observed heads in monitoring wells, piezometers, and vertical profile wells. To incorporate changes in precipitation and recharge, the flow model was run for 10 years in a transient fashion in which monthly recharge rates were varied based on monthly precipitation rates measured at Brookhaven National Laboratory, Upton Station. A comparison in model simulated heads versus observed heads is shown on **Figure 3**. In general, the model was in good agreement with observed values, with one exception. MW-F was simulated as being approximately 10 feet too high. Based upon good agreement between simulated and measured water levels at other wells near MW-F, the disagreement between the model-simulated and actual conditions appears to be localized to the immediate area, and does not appear to have a major impact on the direction of groundwater flow within the Smithtown Groundwater Contamination Site. The statistics from MW-F are not shown on **Figure 3**, as to not skew the statistics for the majority of the results.

Contaminant Transport Simulations

The approach to simulating contaminant migration for the purpose of justifying public water hook-up boundaries is described in the following paragraphs.

Particles, representing volatile organic compounds (VOCs) detected above screening criteria in monitoring wells, VPWs, piezometers, and residential wells sampled between 1999 and 2003, were introduced into the model as 100-foot diameter circular "sources" at the location and depth of detection. Also included were historical total volatile organic compound (TVOC) detections (above 10 ppb) in residential wells sampled between 1997 and 1998 (as provided by the SCDHS during earlier modeling efforts). For residential wells, it was assumed that wells were constructed and screened to a depth of 40 feet below the water table (consistent with the minimum depth specified in SCDHS potable well construction standards); therefore, for residential wells, particles were introduced into the model at a depth of 40 feet below the water table.

Using the long-term average annual flow field (long term average of precipitation and recharge and recent levels of water supply pumping), DYNTRACK was used to simulate particle migration for a total period of 30 years. For this evaluation, the locations where VOCs exceeded screening criteria were simulated as sources, rather than as slugs of contamination, to more easily depict the path of migration and justify boundaries for public hook-ups. During the simulation, the extent of particle migration was assessed at 1, 2, 5, 10, 20 and 30 years. **Figures 4** and **5** depict particle migration over periods of 10 and 30 years, respectively. The simplifying assumption was made that VOCs remained above screening criteria at the start of the contaminant transport simulation (January 2004) at all locations where historical past exceedances had been recorded. Particle migration was simulated assuming a longitudinal dispersivity of 30 feet, a transverse dispersivity of 3 feet, a vertical dispersion anisotropy of 0.1, and no retardation.

Figure 4 depicts particle migration over a period of 30 years from the 55 locations where VOCs were detected above screening criteria between 1997 and 2003. Orange particles represent particle migration from VPWs, monitoring wells, and piezometers. Green particles represent particle migration from residential wells sampled during 1999-2003. Blue particles represent particle migration from residential wells sampled during 1997-1998.

Figure 5 depicts particle migration over a period of 10 years from the same 55 locations. The same particle color scheme is used.

Figure 6 depicts the 30-year particle clouds and includes information related to the recommended extent of public water hook-ups. The orange shading represents the areas recommended for public water hookup. The magenta-colored circular symbols depict the centroid of parcels that are not connected to SCWA or St. James Water District (WD) water supply systems. The symbols located east of the blue line representing the St. James WD are those that were identified as not being part of the SCWA billing system or the St. James WD. It should be noted that many of the parcels containing symbols do not contain a house; therefore, residential wells are not likely to be present on these parcels.

In each figure, the blue and green particle clouds at the lower left represent contamination originating from residential wells located just east of the Nissequogue River. Due to the configuration of the Smithtown Clay in this area, the particles travel west towards the Nissequogue River, then trend north and move through the clay, before discharging to the river.

Particles originating from MW-F appear to pass below the likely screened zones of the wells immediately downgradient of MW-F (just west of Fifty-Acre Rd and north of Edgewood Ave); however, they have been included in the recommended boundaries for public hook-ups since the screened zones of these wells are unknown.

Pump and Treat Alternatives Evaluation

Additional contaminant transport modeling was conducted to assess groundwater pump and treat alternatives. The objective of the modeling was to determine the appropriate number and location of extraction wells to adequately control/remediate the groundwater "hot spots".

A number of wells where VOCs were detected above screening criteria are located near discharge points (i.e., the Nissequogue River and Stony Brook Harbor). **Figure 7** depicts the time of travel, using single particle tracks (no dispersion), from wells with VOCs detected above screening criteria between 1997 and 2003. An asterisk denotes the location where a particle has discharged to a surface water feature. As is apparent in the figure, a significant amount of the contamination detected since 1997 may have already discharged to the river or to the harbor. With this in mind, extraction wells were not located in certain areas where contamination is likely to have already discharged.

Figure 8 depicts particle clouds originating from the wells where VOCs were detected above screening criteria between 1997 and 2003. The particle clouds represent contaminant migration over a 30-year period, assuming constant sources, under long term average conditions of precipitation and recharge and no remediation pumping. Presented in this manner, the particle clouds show the expected path of future contaminant migration, and facilitate the selection of extraction well locations.

In the western portion of the site, three proposed extraction wells were placed approximately 1,000 feet apart, along Old Mill Road, beginning in the south at the Nature Conservancy property, and extending to just south of Quail Path. The location of these extraction wells is meant to control/remediate the "hot spot" detected in this area, as well as capture contamination as it migrates from potential sources to the south. The extraction wells are not meant to control or capture contaminants that may already be between Old Mill Road and the Nissequogue River as they are expected to travel through the aquifer to discharge before the remedial pumping can be implemented.

In the eastern portion of the site, three proposed extraction wells were placed approximately 1,000 feet apart, halfway between Moriches Road and Stony Brook Harbor. The location of these extraction wells is meant to control/remediate the "hot spot" detected just south of the harbor, as well as capture contamination as it migrates from potential sources further to the south. The extraction wells are not meant to control or capture contaminants that may already have traveled downgradient, towards the harbor.

All pumping wells were simulated to recover groundwater from the upper glacial aquifer, at elevations ranging from approximately 0 to -50 feet msl.

Three pumping simulations were performed to assess the extraction systems' ability to capture/control the "hot spots". For the first pumping simulation, each well was simulated to withdraw 500 gallons per minute (gpm), for a six-well total of 3,000 gpm. For the second pumping simulation, each well was simulated to withdraw 250 gpm, for a six-well total of 1,500 gpm. For the third pumping simulation, each well was simulated to withdraw 100 gpm, for a six-well total of 600 gpm. In each simulation, extracted groundwater was returned to the upper levels of the aquifer system as follows:

- Groundwater extracted from the three wells along Old Mill Road was returned via two injection wells located between wells EW-1/EW-2 and EW-2/EW-3 (not shown on the figure); and

- Groundwater extracted from the three wells south of Stony Brook Harbor was returned via three injection wells located immediately downgradient of each well.

In each simulation, it was assumed that 100 percent of the extracted groundwater was returned through the injection wells, following treatment.

Similar to the approach used in justifying public water hookup boundaries, particles were introduced at the locations where VOCs were detected above screening criteria between 1997 and 2003; however, rather than using constant sources, discrete slugs of contamination were simulated. The extraction systems' ability to control/remediate the "hot spots" was assessed by comparing the hypothetical contaminant mass (determined by the number of particles) remaining in the system, at one year intervals, over a 30-year period. The relative mass removal rates were then compared to a baseline simulation, which did not include pumping from extraction wells, to differentiate the mass removed by extraction wells from the mass removed by discharge to surface water features. **Figure 9** shows the results of this evaluation.

At the end of the first, second, and third years, the contaminant mass remaining in the system under the three pumping alternatives is approximately 20 percent lower than the "no-pumping" alternative. By year four, the difference has dropped to 10 percent or less. The three pumping simulations result in almost identical mass removal through their first two years, and differ by less than 10 percent for the remainder of the 30 years. Beginning in year 7 and continuing until year 30, the "100 gpm per well" scenario is simulated to result in the highest removal of contaminant mass. This somewhat unexpected result may be explained in part by the influence of the higher rate pumping on contaminant migration in areas between the extraction wells and the river/harbor. The higher rate pumping scenarios change the direction of groundwater flow immediately downgradient of the extraction wells, creating a groundwater divide closer to the river/harbor and causing some contamination that is between the wells and river/harbor to migrate back towards the wells. The time it takes for the contamination to migrate back towards the extraction wells and be removed from the system is longer than it would have taken it to discharge to the river/harbor under the "100-gpm per well" scenario.

It should be noted that the results shown in **Figure 9** do not truly represent the expected contaminant mass remaining in the system since identical assumed contaminant concentrations, rather than the actual observed concentrations, were used at each well where VOCs were detected above screening criteria. Furthermore, contaminants detected below screening criteria were not modeled, but would contribute to the total mass in the system. The approach described above was performed to generally evaluate the differences between various pumping scenarios and identify the most appropriate alternative.

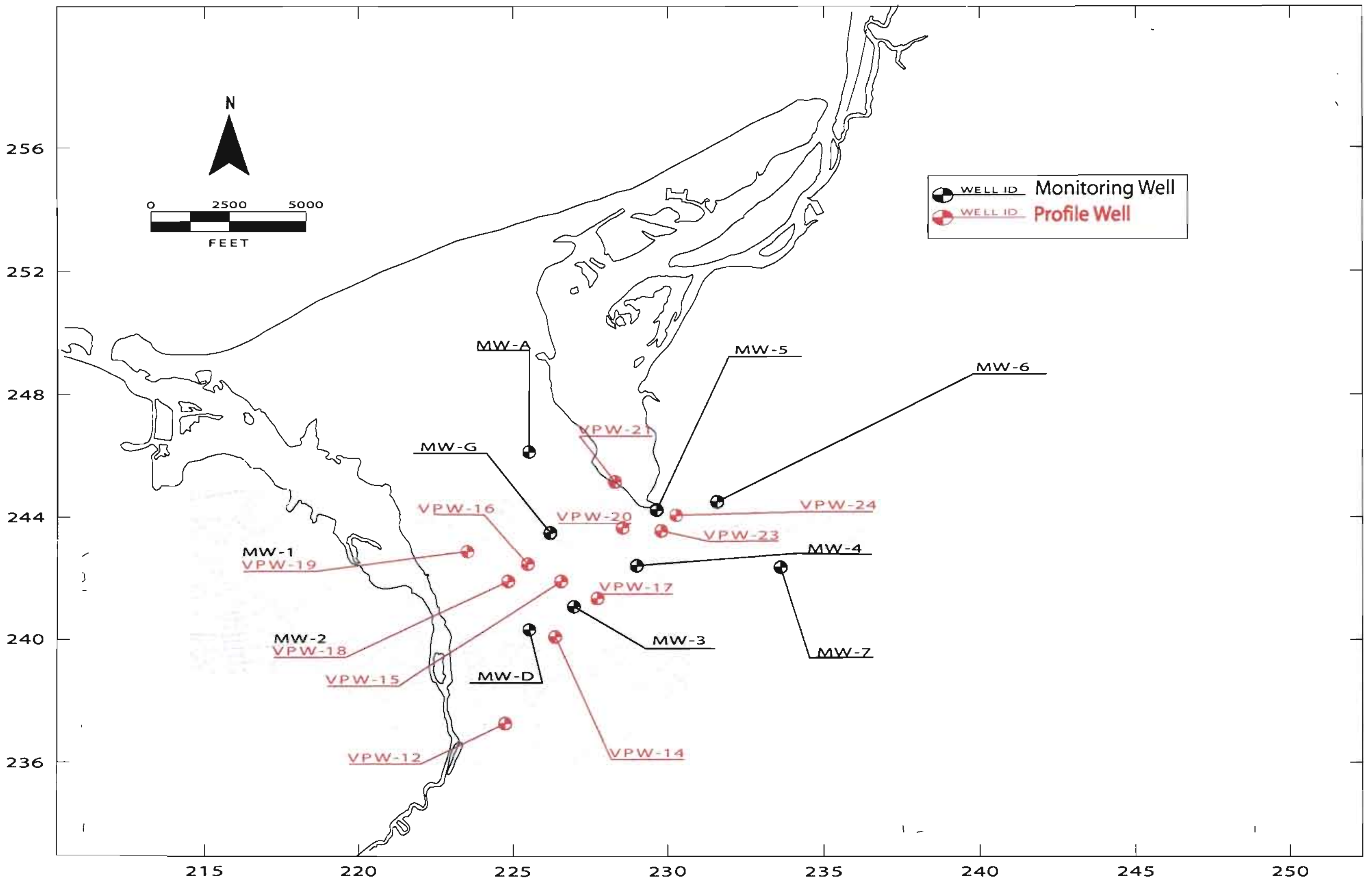
Before any pump and treat alternative is pursued, pump tests should be conducted to determine the achievable long-term pumping rates at these locations. Because of the complicated lithology and presence of various clay units, it is unclear whether the modeled extraction or injection rates are possible.

References

Krulikas, R. K and E.J. Koszalka. Geologic Reconnaissance of an Extensive Clay Unit in North-Central Suffolk County, Long Island, New York. USGS Water Resources Investigations 82-4075. Syosset, New York. 1983.

Lubke, E.R. Hydrology of the Huntington-Smithtown Area. Geological Water Supply Paper 1669D. Suffolk County, New York. 1964.

cc: M. Taylor
D. O'Rourke



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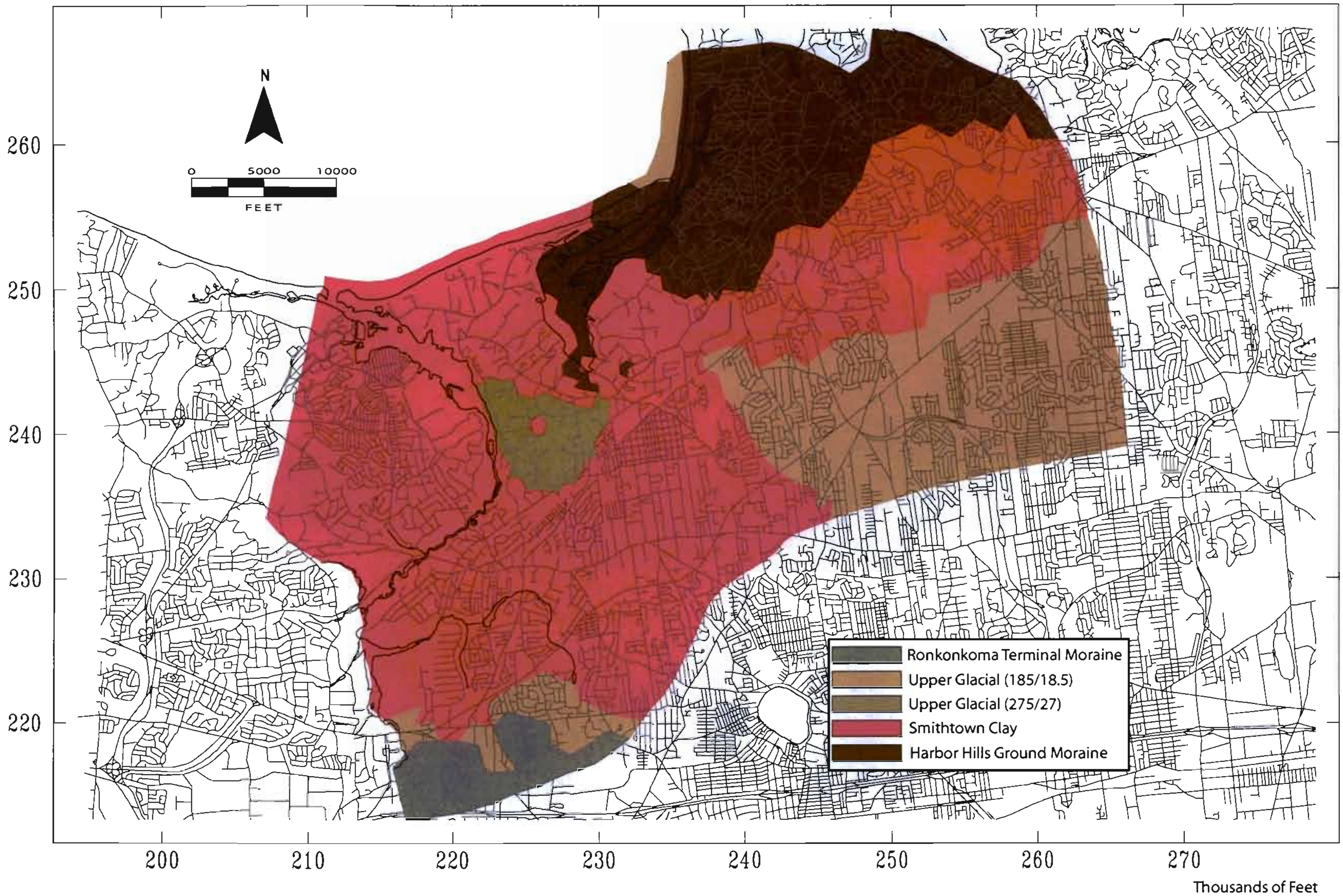
Smithtown Groundwater Model
Gamma Log Locations

Figure 1



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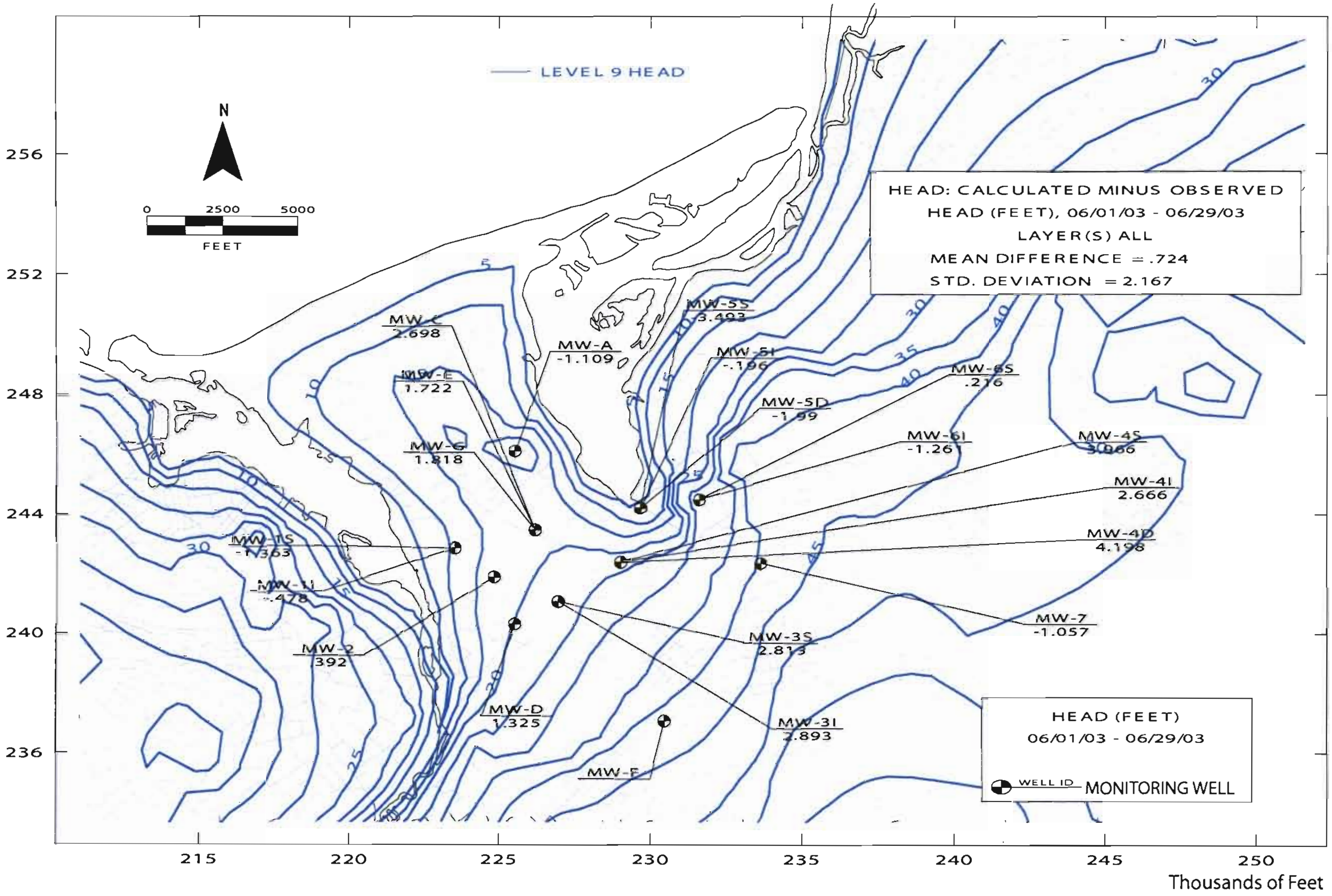
Smithtown Groundwater Model
Spatial Extent of the Smithtown Clay (model layer 7)

Figure 2



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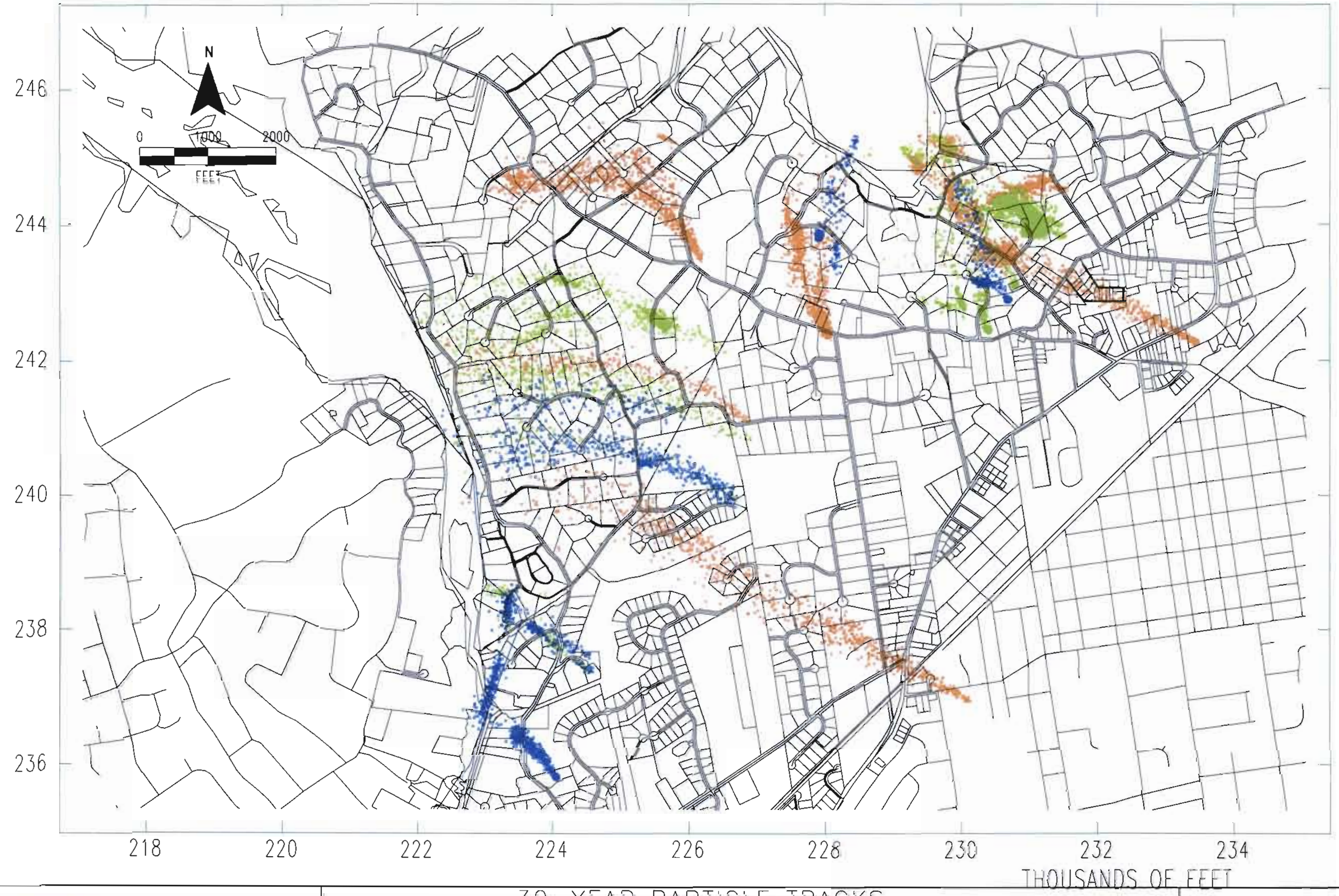
Smithtown Groundwater Model
Calibration Statistics and Water Table Elevation

Figure 3



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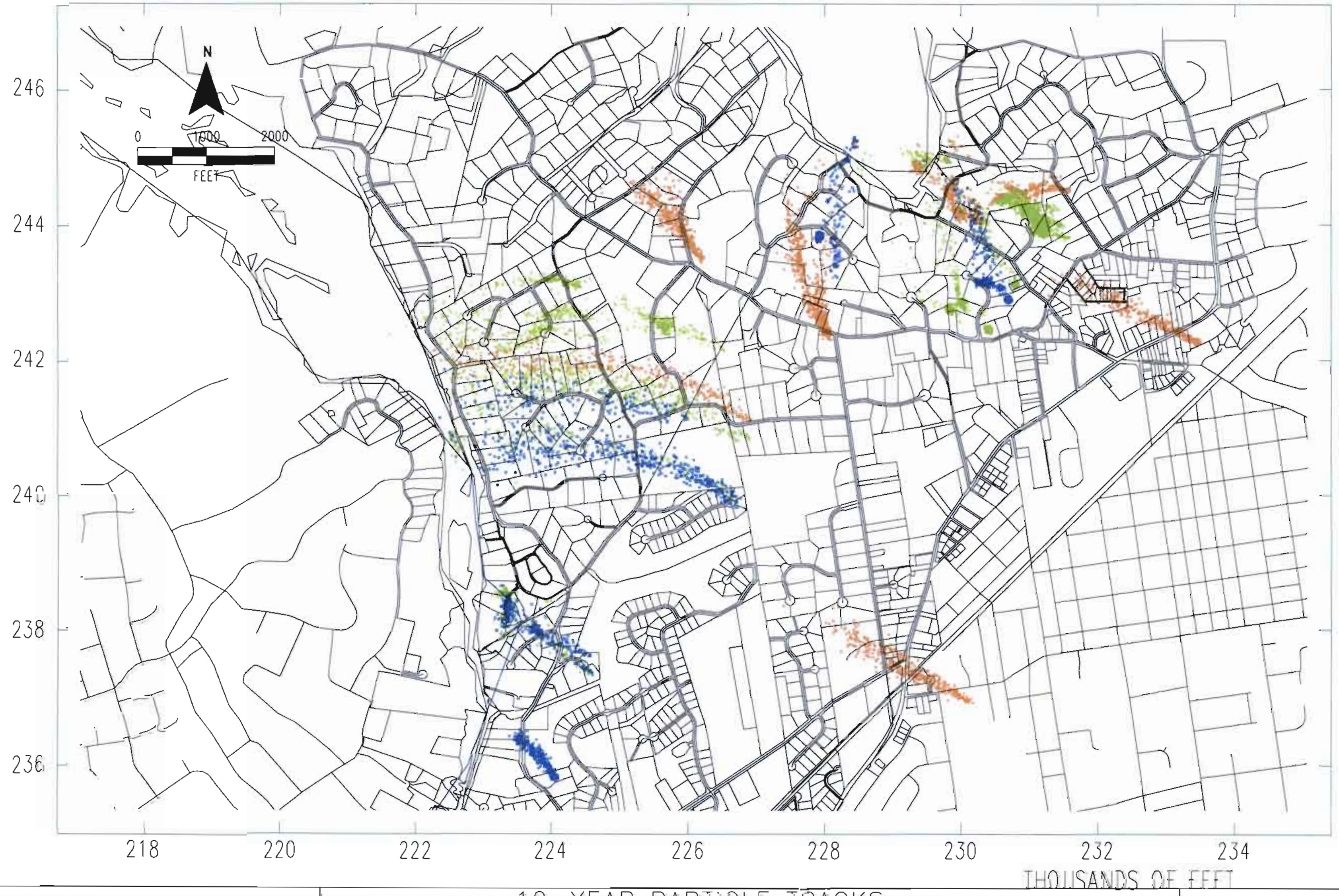
30-YEAR PARTICLE TRACKS
FROM VPWs, MWs, PIEZOMETERS (ORANGE) AND PRIVATE
WELLS (GREEN, '99-'03; BLUE '97-'98) WITH VOCs
DETECTED ABOVE SCREENING CRITERIA

FIGURE
4



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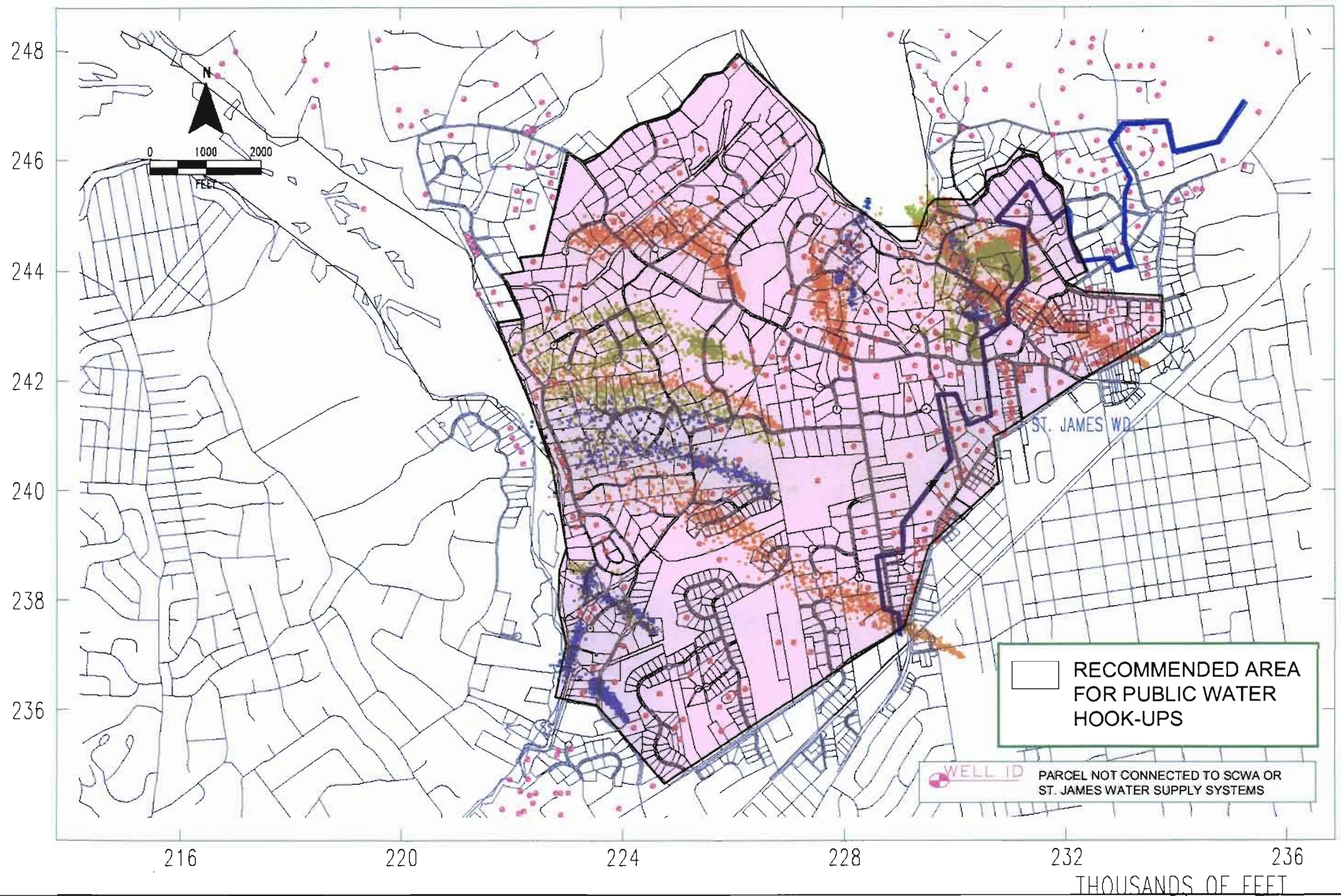
10-YEAR PARTICLE TRACKS
FROM VPWs, MWs, PIEZOMETERS (ORANGE) AND PRIVATE
WELLS (GREEN, '99-'03; BLUE '97-'98) WITH VOCs
DETECTED ABOVE SCREENING CRITERIA

FIGURE
5



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30-YEAR PARTICLE TRACKS
FROM VPWs, MWs, PIEZOMETERS (ORANGE) AND PRIVATE
WELLS (GREEN, '99-'03; BLUE '97-'98) WITH VOCs
DETECTED ABOVE SCREENING CRITERIA

FIGURE
6

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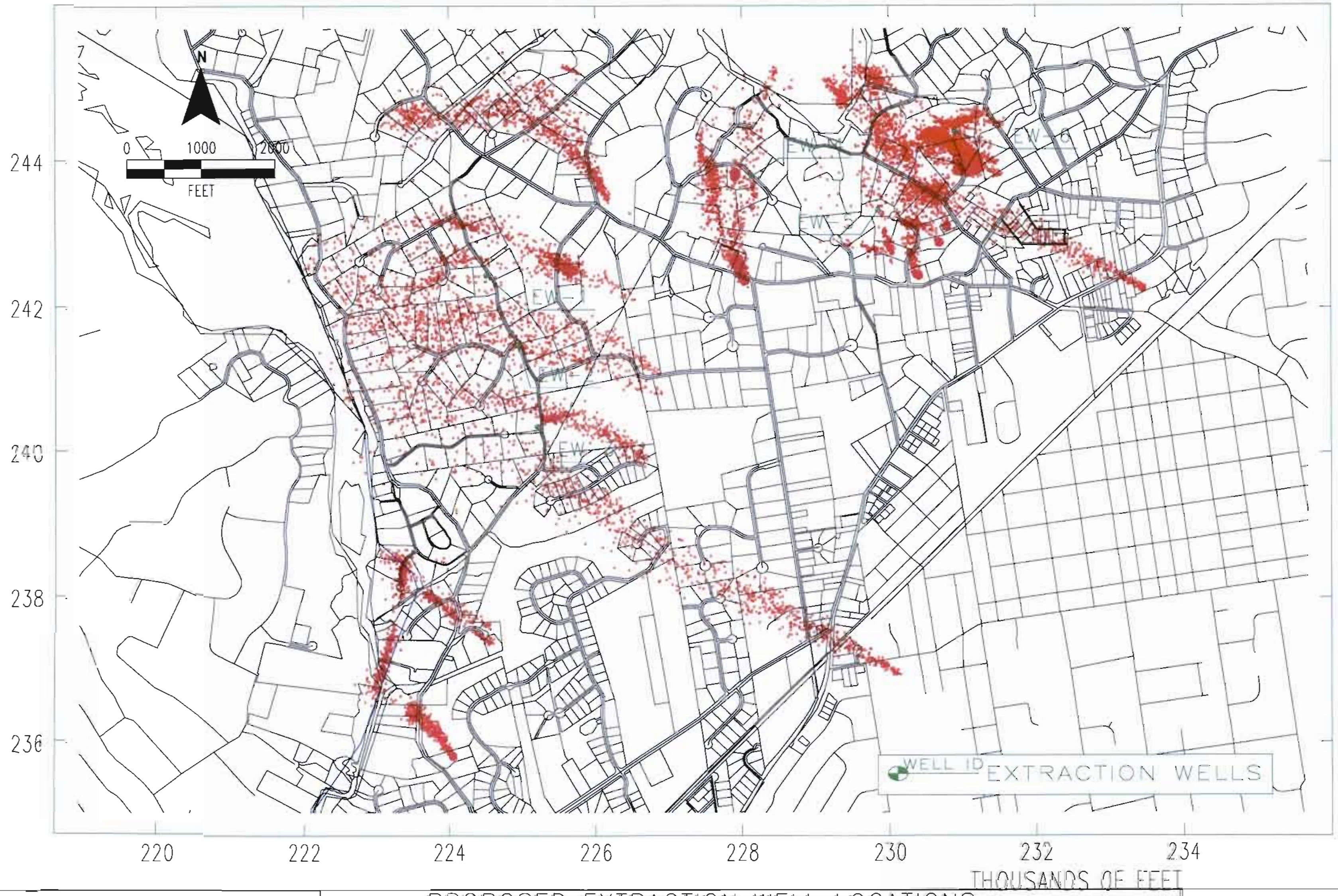
5-YEAR SINGLE PARTICLE TRACKS (NO DISPERSION)
FROM WELLS WITH VOC DETECTIONS
ABOVE SCREENING CRITERIA
TICK MARKS REPRESENT 1-YEAR INTERVALS

FIGURE
7



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PROPOSED EXTRACTION WELL LOCATIONS
PARTICLE CLOUDS (IN RED) INDICATE PATH OF
CONTAMINANT MIGRATION UNDER LONG-TERM
AVERAGE CONDITIONS (NO-PUMPING)

FIGURE
8

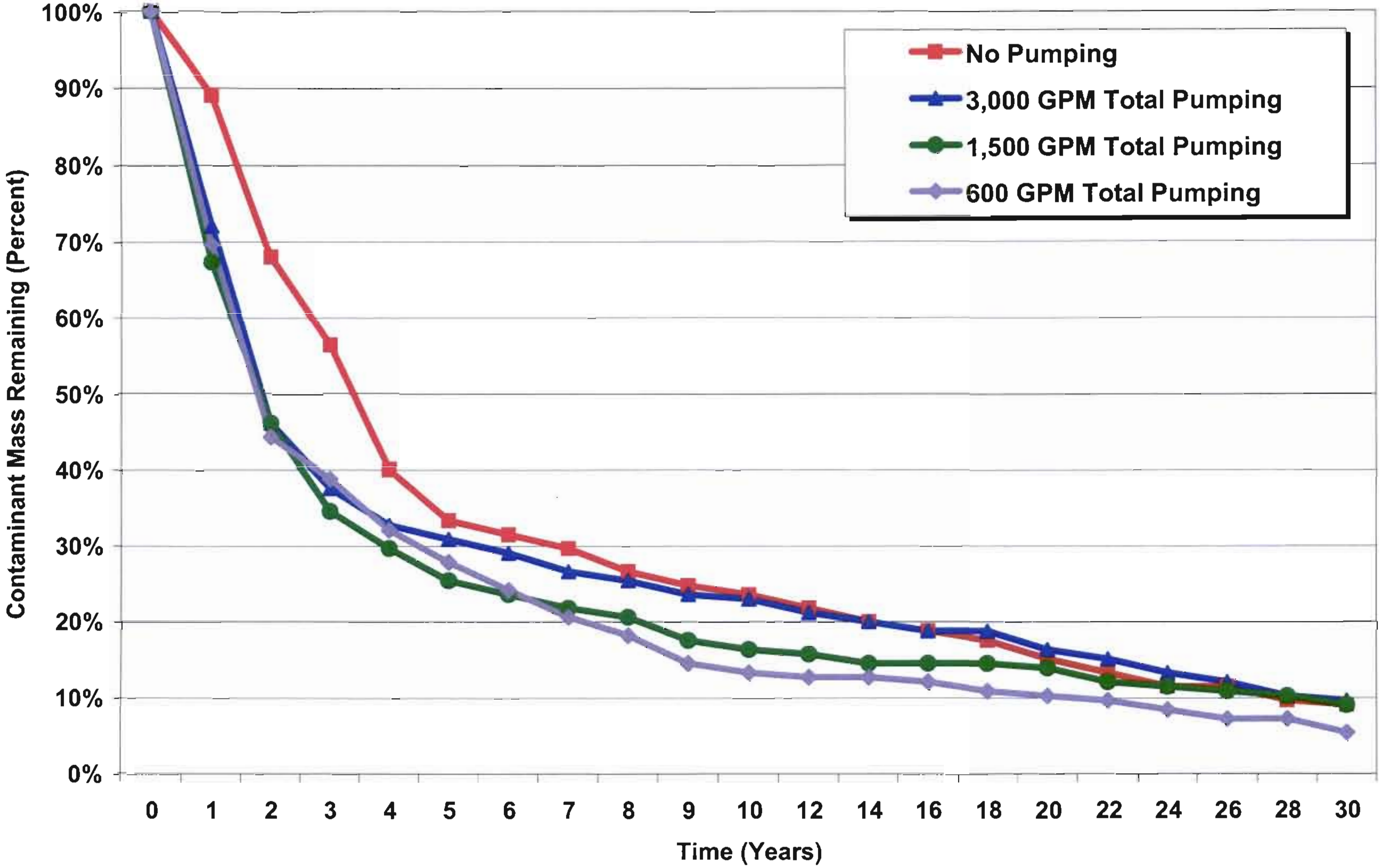


Figure 9
Comparison of Percent Contaminant Mass Remaining Under No Action and Three Pumping Alternatives

Appendix B

Cost Estimate Details

Alternative 2: Alternate Water Supply - Cost Estimate Summary
Smithtown Groundwater Contaminiation Site

Item No.	Item Description	Quantity	Unit Cost	Unit	Extension
CAPITAL COSTS					
Construction Costs					
1.	Work Plans/HASP/CQCP	1	$ 35,300	LS	$ 35,300
2.	Mobilization/Demobilization	1	$ 36,000	LS	$ 36,000
3.	Construction Management	1	$ 203,343	LS	$ 203,343
4.	Alternate Water Supply	1	$ 2,033,427	LS	$ 2,033,427
	SUBTOTAL CONSTRUCTION COSTS				$ 2,308,069
	General contractor Fee (10% construction)				$ 230,807
	Design Engineering (10% construction)				$ 230,807
	Resident Engineering/Inspection (10% construction)				$ 230,807
	Contingency (20%)				$ 461,614
	TOTAL CAPITAL COSTS				**$ 3,462,104**
ANNUAL O&M COSTS					
5.	Project Planning and Organizing	1	$ 2,400	LS	$ 2,400
6.	Field Sampling Labor	1	$ 17,820	LS	$ 17,820
7.	Sampling Equipment, Shipping, Consumable Supplies	1	$ 7,700	LS	$ 7,700
8.	Sample Analysis and Data Validation	1	$ 8,400	EA	$ 8,400
9.	Data Evaluation and Reporting	1	$ 10,500	LS	$ 10,500
	Total Annual O&M Costs				**$ 46,820**
FIVE YEAR REVIEW					
10.	Five Year Review Report	1	$ 8,400	LS	**$ 8,400**
PRESENT WORTH OF COSTS					
11.	Total Capital Costs				$ 3,462,104
12.	Annual O&M Costs (30 year duration)				$ 580,989
13.	Five Year Review Costs (30 year duration)				$ 18,126
	TOTAL PRESENT WORTH				**$ 4,061,219**

Job No. 3223
Project Smithtown Groundwater FS
Subject Alternative 2 - Cost Backup

Computed by: ___________
Checked by: ___________

No. 1 Work Plan/HASP/CQCP Preparation

Assume 2 persons for 1 month.
Assume salary rate of $35/hour.
Assume salary multiplier of 3.

2 persons x $ 35 /hour x 40 hours/week x 4.2 weeks/month x 1 month x 3 multiplier

= $ 35,280

Assume: $ 35,300

No. 2 Mobilization/Demobilization

Materials/supplies	12 months x	1000 per mo	$	12,000
Utilities	12 months x	1000 per mo	$	12,000
Temp Facilities	12 months x	1000 per mo	$	12,000
		Total:	**$**	**36,000**

No. 3 Construction Management

PM/construction supervision at 10% of construction cost **$ 203,343**

Job No. 3223
Project Smithtown Groundwater FS
Subject Alternative 2 - Cost Backup

Computed by: _______
Checked by: ________

No. 4 Alternative Water Supply Summary

total hook-up cost:	$267,650
total excavation cost:	$787,869
total restoration cost:	$182,908
total well abandonment cost:	$795,000
	$2,033,427

Hook-up per house

Number of well to be hooked up to town water:		**265** homes
* Assume 65% larger properties	0.65	**173**
* Assume 35% small properties	0.35	**93**

Hook-up cost (called the town water authority)*

Installation of meters		$50.00 ea.	
Tapping fee		$950.00 ea.	
meter test		$10.00 ea.	
	total:	**$1,010.00** per house	**$267,650.00** total

* https://www.scwa.com/residential/scheduleoffees.cfm

Job No. 3223
Project Smithtown Groundwater FS
Subject Alternative 2 - Cost Backup

Computed by: _______
Checked by: _______

Excavation and pipe line installation from main to house

Number of well to be hooked up to town water:		265 homes				
* Assume 65% larger properties	0.65	**173**				
* Assume 35% small properties	0.35	**93**				

Large properties

Trenching						
Assume trench depth (below freeze zone):		4.5 ft				
Assume trench width:		1 ft				
	large props	200 ft		33.33 CY		
excavation trench 1' to 4' deep, 3/8 CY trct/bkhoe MEANS 022 200 254 0050				$4.87 CY		**$162.22**
Backfill with the excavated materials compact soil with vibrating plate, 6" lifts MEANS 17 03 0511				$3.37 CY		**$112.49**
Piping from the main to the house Approximate distance from water main to house for : MEANS 026 650 658 3020	large props	200 ft	2" copper pipe	$14.41 per LF	Mat. & Lab.	**$2,881.03**
Pipe, copper, fittings Assume 2 for each property MEANS 151 400 430 0160	2 x per home	1 home	90° bend or elbows	$41.00 ea.	Mat. & Lab.	**$ 82.00**
					Total per large home:	**$3,237.74**
					Large property total:	**$560,129.58**

Small Properties

Trenching						
Assume trench depth (below freeze zone):		4.5 ft				
Assume trench width:		1 ft				
	small props	150 ft		25 CY		
excavation trench 1' to 4' deep, 3/8 CY trct/bkhoe MEANS 022 200 254 0050				$4.87 CY		**$121.67**
Backfill with the excavated materials compact soil with vibrating plate, 6" lifts MEANS 17 03 0511				$3.37 CY		**$84.36**
Piping from the main to the house Approximate distance from water main to house for : MEANS 026 650 658 3020	small props	150 ft	2" copper pipe	$14.41 per LF	Mat. & Lab.	**$2,160.78**
Pipe, copper, fittings Assume 2 for each property MEANS 151 400 430 0160	2 x per home	1 home	90° bend or elbows	$41.00 ea.	Mat. & Lab.	**$ 82.00**
					Total per small home:	**$2,448.81**
					Small proerty total:	**$227,739.15**
					EXCAVATION COSTS TOTAL:	**$787,868.73**

Job No. 3223
Project Smithtown Groundwater FS
Subject Alternative 2- Cost Backup

Computed by: ______
Checked by: ______

Restoration of property due to trenching/well abandonment/other

Number of well to be hooked up to town water:		265 homes			
* Assume 65% larger properties	0.65	**173**			
* Assume 35% small properties	0.35	**93**			
Large properties					
top soil replacement					
Top soil, 6" lifts:		$27.92 per CY			$103.40
MS 18 05 0301 (2001 cost adjusted to 2004)					
	0.5 ft lifts x	1 foot wide x	200 ft long	3.704 CY	
Sodding					
Sodding, average continental US	$22,257.00 per acres x	0.000023 acres/ sq. ft	200 ft long x	1 ft wide =	$102.19
MEANS 18 05 0404					
Other misc. landscape items:					$500.00
				Total per large home:	$705.59
				Large property total	$122,068
Small properties					
top soil replacement					
Top soil, 6" lifts:		$27.92 per CY			$77.55
MS 18 05 0301 (2001 cost adjusted to 2004)					
	0.5 ft lifts x	1 foot wide x	150 ft long	2.778 CY	
Sodding					
Sodding, average continental US	$22,257.00 per acres x	0.000023 acres/ sq. ft	150 ft long x	1 ft wide =	$76.64
MEANS 18 05 0404					
Other misc. landscape items:					$500.00
				total per small home	$654.20
				Small property total	$60,840
				Total:	**$182,908**

Job No. 3223
Project Smithtown Groundwater FS
Subject Alternative 2 - Cost Backup

Computed by: ________
Checked by: ________

Well Abandonment of current potable water source

Number of well to be abandoned:	265	homes with wells			
Per experience, assume well abandonement costs:	$15.00	per LF including grouting, water suction to collect displaced water, disposal			
Assume homes have wells 200 feet bgs:	265	well x	200	LF per well =	**$795,000.00**
				total:	**$795,000.00**

Annual O&M

Assume annual monitoring on long-term basis

No. 5 **Organization of Sampling Event (e.g., Staffing, Lab Procurement, Obtaining Equipment)**

Assume 1 Project Manager @ $40 per hour for 4 hours
Assume 1 Engineer @ $30 per hour for 16 hours
Assume 1 puchasing specialist @ $20 per hour for 8 hours
Assume salary multiplier of 3

=	$	40	per hour x	4	hours x	3 multiplier +
	$	30	per hour x	16	hours x	3 multiplier +
	$	20	per hour x	8	hours x	3 multiplier
=	$	2,400	per sampling event			
Assume:	**$**	**2,400**	**per sampling event**			

No. 6 **Sampling Labor**

Assume 2 persons for 7 days x 11 hour days @ $30 per hour
Assume 3 wells per day including purging and sampling
Two Sampling personnel and one Sample Management Organizer/Field Team Leader
Assume salary multiplier of 3

= 2 persons x 11 hours/day x 9 days x $ 30 / hour x 3 multiplier
= $ **17,820** **per sampling event**

No. 7 **Sampling Equipment**

Assume sample shipping cost of $200 per day
Assume sampling equipment (e.g., bailers and pumps) @ $100 per day
Assume PPE @ $20 per person per day
Assume miscellaneous materials @ $100 per day

Shipping	$	200	per day x	9 days =	$	1,800
Sampling Equipment	$	100	per day x	9 days =	$	900
Monitoring Equipment	$	100	per day x	9 days =	$	900
PPE	$	40	$'20 per set/2 set /day x	9 days =	$	360
Vehicle Rental	$	70	per day x	9 days =	$	630
Per Diem	$	120	Per person/day	18 man days =	$	2,160
Misc	$	100	per day x	9 days +	$	900
=	**$**	**7,650**	**per sampling event**			
Assume:	**$**	**7,700**	**per sampling event**			

No. 8 **Sampling Analysis and Validation**

Assume groundwater samples will be collected from 15 monitoring wells + 3 residential wells+6 surface water; analyzed for VOCs

Total No. of Samples:		
	24	samples
	2	field duplicate
	2	MS
	2	MSD
	2	Field Blank
	7	Trip Blanks
	39	Total Samples Per Sampling Event

Assume	$	125	per sample for VOC analysis
	$	125	Total sample cost

Assume samples validated @ 1 hrs per sample

$	30	per hour x	39	hours x	3 multiplier +
#					

Analysis Cost:	39	samples x	$	125.00
= $	4,875	per sampling event		

Total Analysis & Validation:	$	8,385
Assume:	**$**	**8,400**

No. 9 **Data Review & Reporting (Annual Monitoring)**

Assume 1 engineer at $35 per hour for 100 hours per sampling event
Assume salary multiplier of 3

= 1 person x $ 35 per hour x 100 hours x 3 multiplier
= $ **10,500**

Job No. 3223
Project Smithtown Groundwater FS
Subject Alternative 2 - Cost Backup

Computed by: ___________
Checked by: ___________

No. 10 Five Year Review

Assume 5-year reviews will be conducted every 5 years for 30 years.

Work includes: 5-year review of groundwater monitoring data
Preparation of report

Assume 1 person for 2 weeks
Assume salary rate of $35/hour.
assume multiplier of 3

1 persons x $ 35 /hour x 80 hours/review x 3

Assume: $ 8,400

Present Worth Calculations

Assume discount rate is 7%:

No. 12 Total Annual O&M Costs

This is a recurring cost every year for 30 years

This is a problem of the form find (P given A, i, n) or (P/A,i,n)

P = Present Worth
A= Annual amount
i = interest rate
Assume 7%

Looking up the interest rate tables for i = 7% and n = 30 years

The multiplier for (P/A) = **12.409**

No. 13 Total 5-year review costs

This cost occurs every 5 years.

need to calculate the effective interest rate i_e

Given i = 7% (nominal interest rate)	0.07	
m= # of compounding periods = 5 years	5	
$i_e = (1+i)^m - 1$	0.403 =	40% / 5 years

$$P = A^* \frac{(1+i)^n - 1}{i(1+i)^n}$$

in this case there are 6 - 5yr periods

n = 6	6
i =	0.403
The multiplier is =	**2.158**

Alternative 3: Alternate Water Supply and Pump & Treat - Cost Estimate Summary
Smithtown Groundwater Contaminiation Site

Item No.	Item Description	Quantity	Unit Cost	Unit	Extension
CAPITAL COSTS					
Construction Costs					
1.	Work Plans/HASP/CQCP	1	$ 35,300	LS	$ 35,300
2.	Mobilization/Demobilization	1	$ 36,000	LS	$ 36,000
3.	Construction Management	1	$ 317,843	LS	$ 317,843
4.	Pump and Treat Systems	1	$ 1,145,001	LS	$ 1,145,001
5.	Alternate Water Supply	1	$ 2,033,427	LS	$ 2,033,427
	SUBTOTAL CONSTRUCTION COSTS				$ 3,567,571
	General contractor Fee (10% construction)				$ 356,757
	Design Engineering (20% construction)				713,514
	Resident Engineering/Inspection (10% construction)				$ 356,757
	Contingency (20%)				$ 713,514
	TOTAL CAPITAL COSTS				**$ 5,708,114**
ANNUAL O&M COSTS					
6.	Groundwater Treatment Plant O&M	1	$ 120,099	LS	**$ 120,099**
ANNUAL MONITORING COSTS					
7.	Project Planning and Organizing	1	$ 2,400	LS	$ 2,400
8.	Field Sampling Labor	1	$ 17,820	LS	$ 17,820
9.	Sampling Equipment, Shipping, Consumable Supplies	1	$ 7,700	LS	$ 7,700
10.	Sample Analysis and Data Validation	1	$ 8,400	EA	$ 8,400
11.	Data Evaluation and Reporting	1	$ 10,500	LS	$ 10,500
	Total Annual Monitoring Costs				**$ 46,820**
CARBON REPLACEMENT					
12.	Carbon Change Out at Year 5	1	$ 28,200	EA	**$ 28,200**
FIVE YEAR REVIEW					
13.	Five Year Review Report	1	$ 8,400	LS	**$ 8,400**
PRESENT WORTH OF COSTS					
14.	Total Capital Costs				$ 5,708,114
15.	O&M Costs (10 year duration)				$ 843,525
16.	Carbon Replacement at Year 5				$ 20,107
17.	Long-tem Monitoring Cost (30 year duration)				$ 580,989
18.	Five-Year Reviews (30 year duration)				$ 18,126
	TOTAL PRESENT WORTH				**$ 7,170,861**

Job No. 3223
Project Smithtown Groundwater FS
Subject Alternative 3 - Cost Backup

Prepared by: __________
Checked by: __________

No. 1 Work Plan/HASP/CQCP Preparation

Assume 2 persons for 1 month.
Assume salary rate of $35/hour.
Assume salary multiplier of 3.

2 persons x $ 35 /hour x 40 hours/week x 4.2 weeks/month x 1 month x 3 multiplier

= $ 35,280

Assume: $ 35,300

No. 2 Mobilization/Demobilization

Materials/supplies	12 months x	1000 per mo	$	12,000
Utilities during construction	12 months x	1000 per mo	$	12,000
Temp Facilities	12 months x	1000 per mo	$	12,000
		Total:	**$**	**36,000**

No. 3 Construction Management

PM/construction supervision at 10% of construction cost $ 317,843

Job No. 3223
Project Smithtown Groundwater FS
Subject Alternative 3 - Cost Backup

Prepared by: ________
Checked by: ________

No. 4 Pump and Treat System total

Drilling	$	471,530
Pre-Fab Bldg.	$	40,410
Above Ground Treatment System	$	120,000
Vaulted Treatment Systems	$	198,961
T&D	$	113,180
Earthwork	$	70,241
Wellhead Treatment	$	12,278
Pump & Vault Installations	$	118,400
TOTAL	**$**	**1,145,001**

No. 5 Alternate Water Supply $ 2,033,427
(See Alternative 2 for details)

Total Construction Cost $ 3,178,428

Job No. 3223 Prepared by: ____________
Project Smithtown Groundwater FS Checked by: ____________
Subject Alternative 3 - Cost Backup

Earthwork for the piping/electrical

Excavation **$ 4,081**
3000 LF
5 depth
2 width
30000 CF
1111 CY $ 3.37
means, 1998 - 022-254-0090
1.09 time adjust
$ 3.67

Piping **$ 32,200**
5000 LF
4" HDPE for Hydraulic Control
material $ 4.52 7.37
**vendor quote Plastic Pipe, (401) 467-9370

labor $ 1.92
Echos, 2001 - 33-26-0512

Electrical **$ 6,000**
(power and control) 3000 LF
$ 2
previous work

Backfill **$ 21,293**
Sand placement 767 CY (with 15% compaction)
$ 8.61 Sand placement $ 7,195
means, 1998 - 026-012-0200
1.09 time adjust
$ 9.38
3 deep
2 wide
18000 CF

Stone placement 256 CY (with 15% compaction)
$ 20.43 Stone placement $ 5,691
means, 1998 - 026-012-0200
1.09 time adjust
$ 22.27
1 deep
2 wide
6000 CF

reuse 256 CY (with 15% compaction)
$ 5.03 reuse $ 1,401
means, 1998 - 026-012-0200
1.09 time adjust
$ 5.48

			1 deep				
			2 wide				
			6000 CF				
compaction		1278	CY (with 15% compaction)				
	$	5.03	compaction	$	7,006		
			means, 1998 - 026-012-0200				
		1.09	time adjust				
	$	5.48					
			5 deep				
			2 wide				
			30000 CF				
Pavement Restoration						**$**	**6,667**
	$	10.00	SY				
			previous work				
			3000 LF				
			2 wide				
			6000 SF				
			667 SY				

TOTAL EARTHWORK: $ 70,241

Job No. 3223
Project Smithtown Groundwater FS
Subject Alternative 3 - Cost Backup

Prepared by: __________
Checked by: __________

Trenching and Disposal

Contaminated

Included in Driller Costs

Uncontaminated

$ 113,180

from trenches

assume 1/2 of trenching excavation volume
556 CY

from vaulted systems

213 CY

total

1.15 fluff factor
884 CY
1415 Tons

$ 80.00 /ton
Echos, 2001 - 33-19-7263

Job No. 3223
Project Smithtown Groundwater FS
Subject Alternative 3 - Cost Backup

Prepared by: ________
Checked by: ________

Extraction and Injection Wells

Extraction Well

Assume a depth of 250 ft, with 100 ft of screen

Soil boring 10" AR	250 ft	x	$ 32	per LF	$ 8,000	
6-inch SS casing	150 ft	x	$ 95	per LF	$ 14,250	
Well completion materials	250 ft	x	$ 14	per LF	$ 3,500	
6-inch SS screen	100 ft	x	$ 145	per LF	$ 14,500	
Well development	4 hr	x	$ 160	per hr	$ 640	
Decon of equipment	2 hr	x	$ 180	per hr	$ 360	
Drum (Assume 16 per boring, includes staging)	20 each	x	$ 100	per drum	$ 2,000	
Total for One Extraction Well					$ 43,250	
For this Alternative, 6 Extraction Wells are required						$ 259,500

Injection Well

Assume a depth of 100 ft, with 50 ft of screen

Soil boring 10" AR	100 ft	x	$ 32	per LF	$ 3,200	
6-inch SS casing	50 ft	x	$ 95	per LF	$ 4,750	
Well completion materials	100 ft	x	$ 14	per LF	$ 1,400	
6-inch SS screen	50 ft	x	$ 145	per LF	$ 7,250	
Well development	0 hr	x	$ 160	per hr	$ -	
Decon of equipment	2 hr	x	$ 180	per hr	$ 360	
Drum (Assume 16 per boring, includes staging)	12 each	x	$ 100	per hr	$ 1,200	
Total for One Extraction Well					$ 18,160	
For this Alternative, 9 Injection Wells are required						$ 163,440

Misc Items

Drum disposal	252 each	x	$ 120	each	$ 30,240	
Decon water & decon fluid disposal	20000 gal	x	$ 0.35	per gal	$ 7,000	
Driller mobilization	1 LS	x	$ 10,000	each	$ 10,000	
Baker tank rental	30 tank	x	$ 45	day	$ 1,350	
Total misc. per set of wells					$ 48,590	
						$ 48,590
Total Cost						**$ 471,530**

Job No. 3223
Project Smithtown Groundwater FS
Subject Alternative 3 - Cost Backup

Prepared by: __________
Checked by: __________

Pre-Fabrication Building

Dimensions of building

Length	=	30	ft
Breadth	=	20	ft
Height	=	16	ft
Floor Area	=	600	ft^2
Wall Area	=	1600	ft^2
Perimeter	=	100	ft

Cost per square foot of floor area

From RS Means, for the mini warehouse with steel frame, the unit cost of building is:

Unit cost per ft^2 = $ 67.35

Cost of Building = $ 40,410

Total cost of pre-fab building = $ 40,410

Job No. 3223
Project Smithtown Groundwater FS
Subject Alternative 3 - Cost Backup

Prepared by: ______
Checked by: ______

Pumps and Vaults

Pump Costs	5300 July 95 cat.			**$**	**6,069**
	1.145 time adjust				
Labor				**$**	**4,573**
	91.6/hr, 732.8/d	$	732.80		
	Echos, 2001 - crew MPLUU				
	1 day/well				
	1.04 time adjustment	$	762.11		
	6 days				
Total Each Pump				**$**	**10,641**
Total six pumps				**$**	**63,847**
Vaults				**$**	**54,553**
		$	3,497.00		
	Echos, 2001 - 33-23-2205				
	4'x4' Traffic load				
	1.04 time adjustment	$	3,636.88		
	15 vaults				
Total Pump and Vaults				**$**	**118,400**

Job No. 3223
Project Smithtown Groundwater FS
Subject Alternative 3 - Cost Backup

Prepared by: ______
Checked by: ______

Aboveground Treatment (other components)

GAC	$	45,000
2 PV5000 i	in series	
Bag Filters	$	5,000
Controls/electric	$	15,000
Sump w/pump	$	5,000
Startup	$	50,000
TOTAL	**$**	**120,000**

Job No. 3223
Project Smithtown Groundwater FS
Subject Alternative 3 - Cost Backup

Prepared by: __________
Checked by: __________

Vaulted System (3 on site)

GAC						**$ 6,500**
	PV2000					
Bag Filters						**$ 5,000**
Controls/electric	including aboveground sample box					**$ 15,000**
Sump w/pump						**$ 5,000**
Vaults	10'x8'x12'					**$ 18,154**
pre-cast vaults formed and delivered					$ 10,500	
vault, equipment and stone placement		$	176.13	hour	$ 7,045	
	Echos, 2001 - crew MPLUQ		3	days		
			40	hours		
stone material costs					$ 454	
	excavation space		71			
	vault space		44			
	excavation space - vault space =		27			
	means, 1998 - 022-216-1040	$	15.35			
	time adjustment		1.09			
		$	16.73			
excavation			12	long	$ 155	
			10	wide		
			16	deep		
			1920	CF		
			71	CY		
		$	2.00	/CY		
	time adjustment		1.09			
		$	2.18			
		SUBTOTAL CONSTRUCTION				**$ 49,654**
		3 SYSTEM SUBTOTAL				**$ 148,961**
		Startup				**$ 50,000**
		3 SYSTEM TOTAL				**$ 198,961**

Job No. 3223
Project Smithtown Groundwater FS
Subject Alternative 3 - Cost Backup

Prepared by: ____________
Checked by: ____________

Wellhead Treatment

10 gpm - GAC		**$ 428**
Model PC 1		
Filter		**$ 50**
Labor		**$ 136**
	$ 43.56 /hour cost for crew	
	Echos, MPLUD	
	1.04 time adjust	
	$ 45.30	
	3 hours of installation	
	Subtotal	**$ 614**
	20-Home Total	**$ 12,278**

Job No. 3223
Project Smithtown Groundwater FS
Subject Alternative 3 - Cost Backup

Prepared by: ___________
Checked by: ___________

No. 6 Groundwater Treatment Plant Annual Operation and Maintenance Cost

Following costs are for each unit:

Labor Cost:
Months of Operation = 12
Number of Tecnincians = 1
Hours per two weeks = 8
Hourly Salary of Tecnincian = $ 22.59
System O&M Technician **E 33-22-0107**
Weekly Labor cost for Technician = $ 181

Total Labor Cost = $ 4,699

Analysis Cost:

Sample analysis cost = $ 125

Frequency of sampling
Number of samples per unit = 2 in 3 months
Number of QA/QC samples per unit = 5 in 3 months

Total samples per unit = 28

Cost for sample analysis per unit = $ 3,500

Total analysis cost (4 units) = $ 14,000

Power Cost:

Unit cost of Power per KW/hr. = $ 0.10
Hourly consumption of power = 100 KW/hr
Total power consumption = 864,000 KW

Total Power Cost = $ 86,400

Maintenance Cost:
Estimated Maintenance Cost = $ 15,000
(for parts and supplies)

Total Annual Operation and Maintenance Cost: $ 120,099

Job No. 3223
Project Smithtown Groundwater FS
Subject Alternative 3 - Cost Backup

Prepared by: ________
Checked by: ________

Assume annual monitoring on long-term basis

No. 7 Organization of Sampling Event (e.g., Staffing, Lab Procurement, Obtaining Equipment)

Assume 1 Project Manager @ $40 per hour for 4 hours
Assume 1 Engineer @ $30 per hour for 16 hours
Assume 1 puchasing specialist @ $20 per hour for 8 hours
Assume salary multiplier of 3

=	$	40	per hour x	4	hours x	3 multiplier +
	$	30	per hour x	16	hours x	3 multiplier +
	$	20	per hour x	8	hours x	3 multiplier
=	$	2,400	per sampling event			
Assume:	**$**	**2,400**	**per sampling event**			

No. 8 Sampling Labor

Assume 2 persons for 7 days x 11 hour days @ $30 per hour
Assume 3 wells per day including purging and sampling
Two Sampling personnel and one Sample Management Organizer/Field Team Leader
Assume salary multiplier of 3

2 persons x 11 hours/day x 9 days x $ 30 / hour x 3 multiplier
= **$ 17,820 per sampling event**

No. 9 Sampling Equipment

Assume sample shipping cost of $200 per day
Assume sampling equipment (e.g., bailers and pumps) @ $100 per day
Assume PPE @ $20 per person per day
Assume miscellaneous materials @ $100 per day

Shipping	$	200	per day x	9 days =	$	1,800
Sampling Equipment	$	100	per day x	9 days =	$	900
Monitoring Equipment	$	100	per day x	9 days =	$	900
PPE	$	40	$'20 per set/2 set /day x	9 days =	$	360
Vehicle Rental	$	70	per day x	9 days =	$	630
Per Diem	$	120	Per person/day	18 man days =	$	2,160
Misc	$	100	per day x	9 days +	$	900
=	**$**	**7,650**	**per sampling event**			
Assume:	**$**	**7,700**	**per sampling event**			

No. 10 Sampling Analysis and Validation

Assume groundwater samples will be collected from 15 monitoring wells + 3 residential wells+6 surface water; analyzed for VOCs

Total No. of Samples:	24	samples
	2	field duplicate
	2	MS
	2	MSD
	2	Field Blank
	7	Trip Blanks
	39	Total Samples Per Sampling Event

Assume $ 125 per sample for VOC analysis
$ 125 Total sample cost

Assume samples validated @ 1 hrs per sample
$ 30 per hour x 39 hours x 3 multiplier + #

Analysis Cost: 39 samples x $ 125.00
= $ 4,875 per sampling event

Total Analysis & Validation:	$	8,385
Assume:	**$**	**8,400**

No. 11 Data Review & Reporting (Annual Monitoring)

Assume 1 engineer at $35 per hour for 100 hours per sampling event
Assume salary multiplier of 3

= 1 person x $ 35 per hour x 100 hours x 3 multiplier
= **$ 10,500**

Job No. 3223
Project Smithtown Groundwater FS
Subject Alternative 3 - Cost Backup

Prepared by: __________
Checked by: __________

No. 13 Five Year Review

Assume 5-year reviews will be conducted every 5 years for 30 years.

Work includes: 5-year review of groundwater monitoring data
Preparation of report

Assume 1 person for 2 weeks
Assume salary rate of $35/hour.
assume multiplier of 3

1 persons x $ 35 /hour x 80 hours/review x 3

Assume: $ 8,400

No. 12 Carbon Regeneration Cost:

Carbon regeneration frequency = 1 per 5 year

Carbon regenerated per change = 10,000 lb for the facility
Cost per lb for regenaration = $ 1.26 non-confined space
$ 12,600.00

Carbon regenerated per change = 6,000 lb total for the 3 vault systems
Cost per lb for regenaration = $ 2.60
$ 15,600.00

Total Regeneration cost = $ 28,200

TOTAL 5 YEAR REVIEW & CARBON CHANGE OUT: $ 36,600

Job No. 3223
Project Smithtown Groundwater FS
Subject Alternative 3 - Cost Backup

Prepared by: __________
Checked by: __________

Present Worth Calculations

Assume discount rate is 7%: **0.07**

No. 15 Total Annual O&M Costs

This is a recurring cost every year for 10 years

This is a problem of the from find (P give A, i, n) or(P/A,i,n)

P = Present Worth
A= Annual amount
i = interest rate
Assume 7%

Looking up the interest rate tables for i = 7% and n = 10 years
The multiplier for (P/A) = 7.0236

No. 16 Carbon Change Out

this cost occurs in year 5

Looking up the interest rate tables for i = 7% and n = 10 years
The multiplier for (P/F) = 0.713

No. 17 Total 5-year review costs

This cost occurs every 5 years.

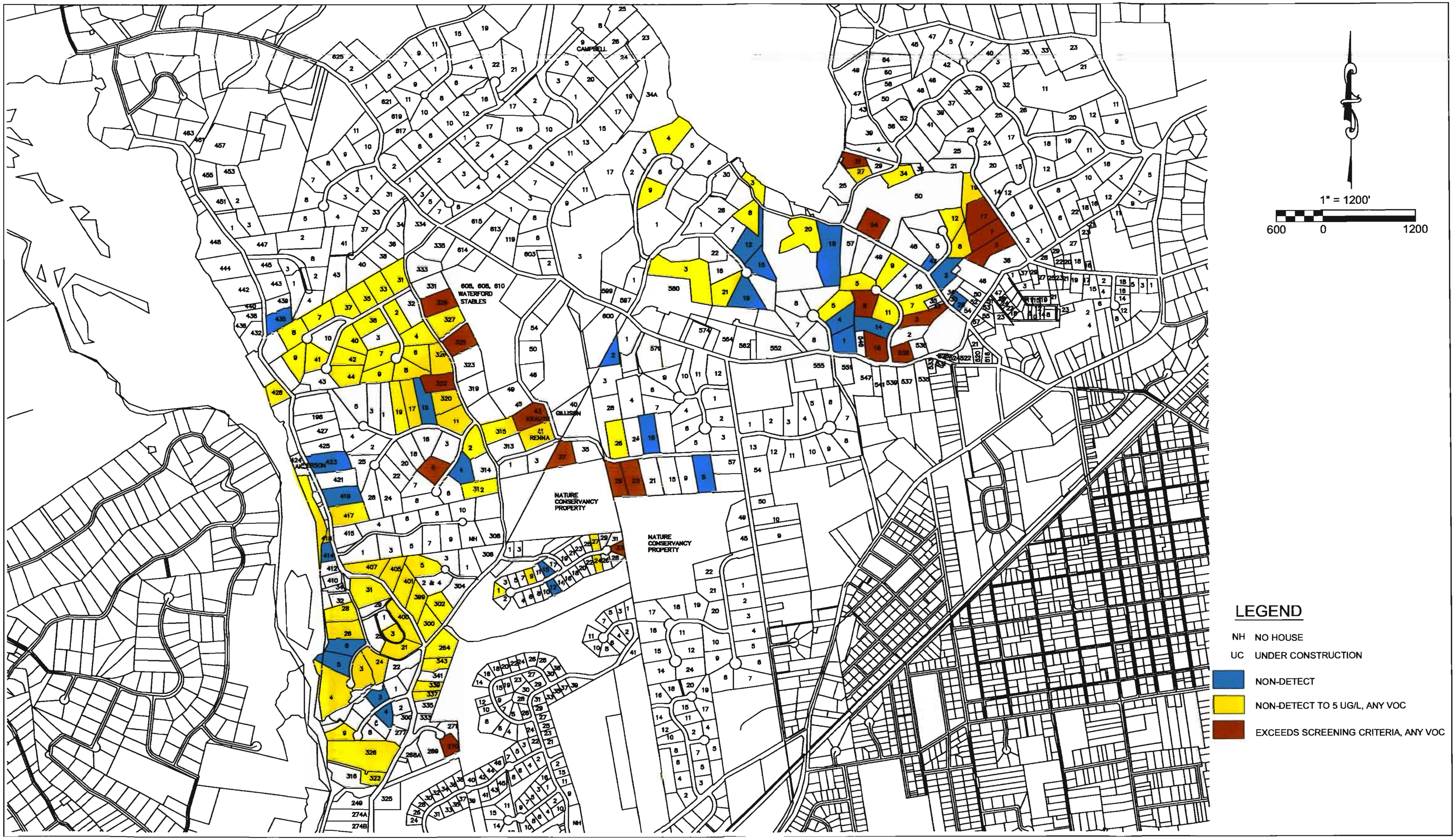
nedd to calculate the effective interest rate i_e
Given i = 7% (nominal interest rate) 0.07
m= # of compounding periods = 5 years 2

$i_e = (1+i)^m - 1$ 0.145 = 14% / 5 years

$$P = A^* \frac{(1+i)^n - 1}{i(1+i)^n}$$

in this case there are 2 - 5yr periods
n = 2 2
i = 0.145

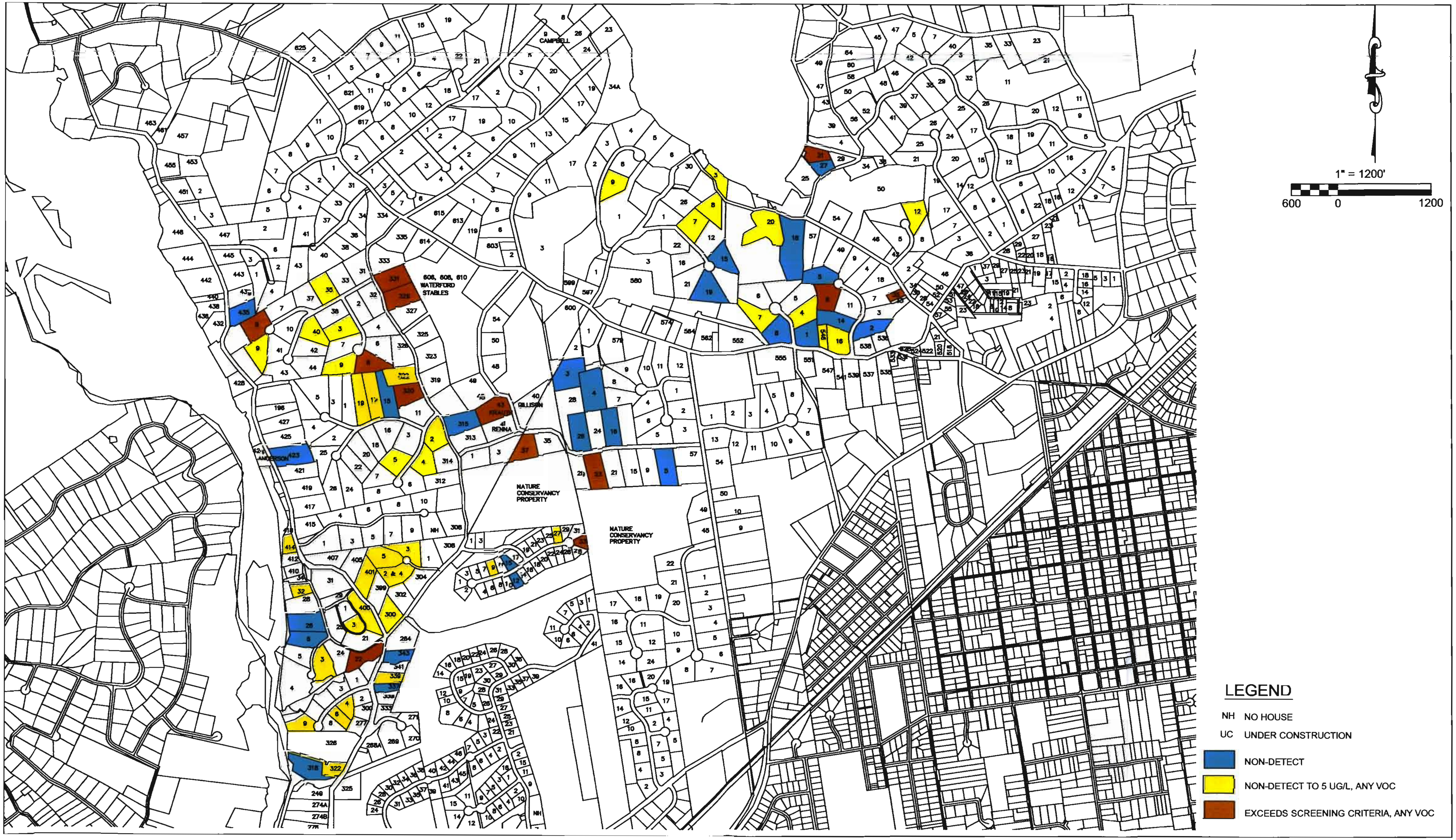
The multiplier is = 1.636



CDM

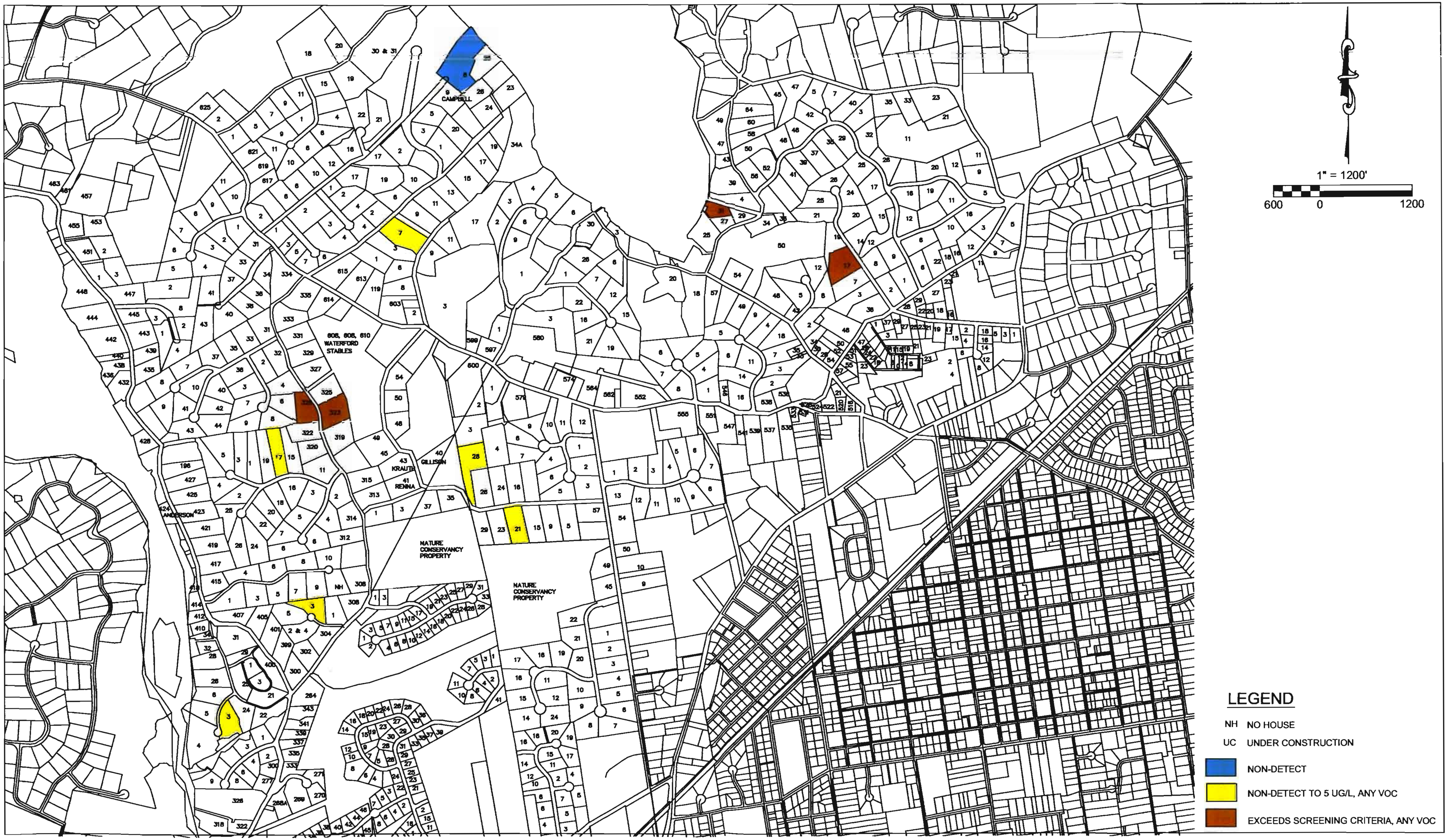
SMITHTOWN GROUNDWATER CONTAMINATION SITE
SMITHTOWN, NEW YORK

Figure 1-15
RESIDENTIAL ROUND ONE - VOCS EXCEEDING SCREENING CRITERIA
REMEDIAL INVESTIGATION/FEASIBILITY STUDY



SMITHTOWN GROUNDWATER CONTAMINATION SITE
SMITHTOWN, NEW YORK

Figure 1-16
RESIDENTIAL ROUND TWO - VOCS EXCEEDING SCREENING CRITERIA
REMEDIAL INVESTIGATION/FEASIBILITY STUDY



CDM

SMITHTOWN GROUNDWATER CONTAMINATION SITE
SMITHTOWN, NEW YORK

Figure 1-17
RESIDENTIAL ROUND THREE - VOCS EXCEEDING SCREENING CRITERIA
REMEDIAL INVESTIGATION/FEASIBILITY STUDY

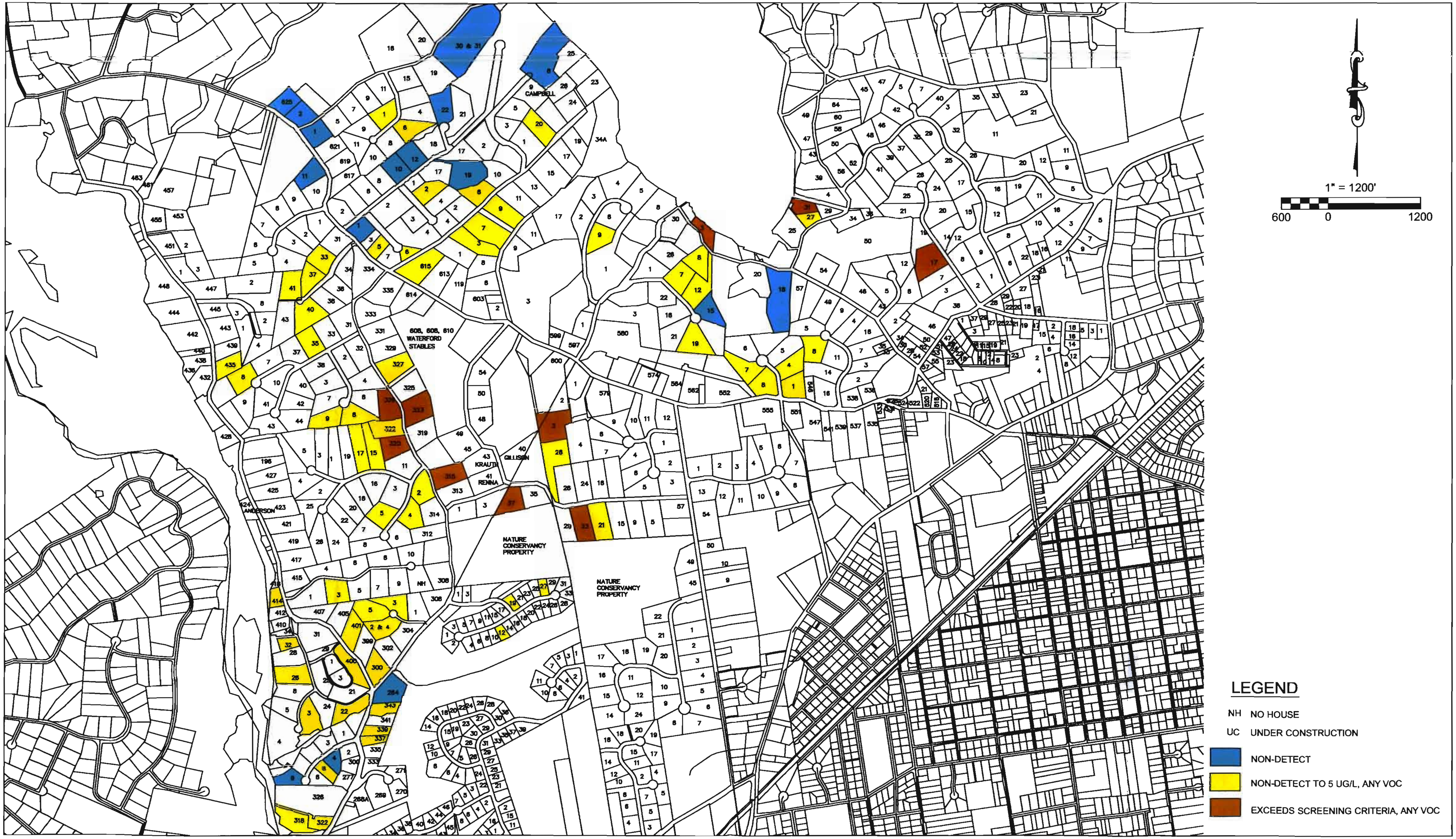
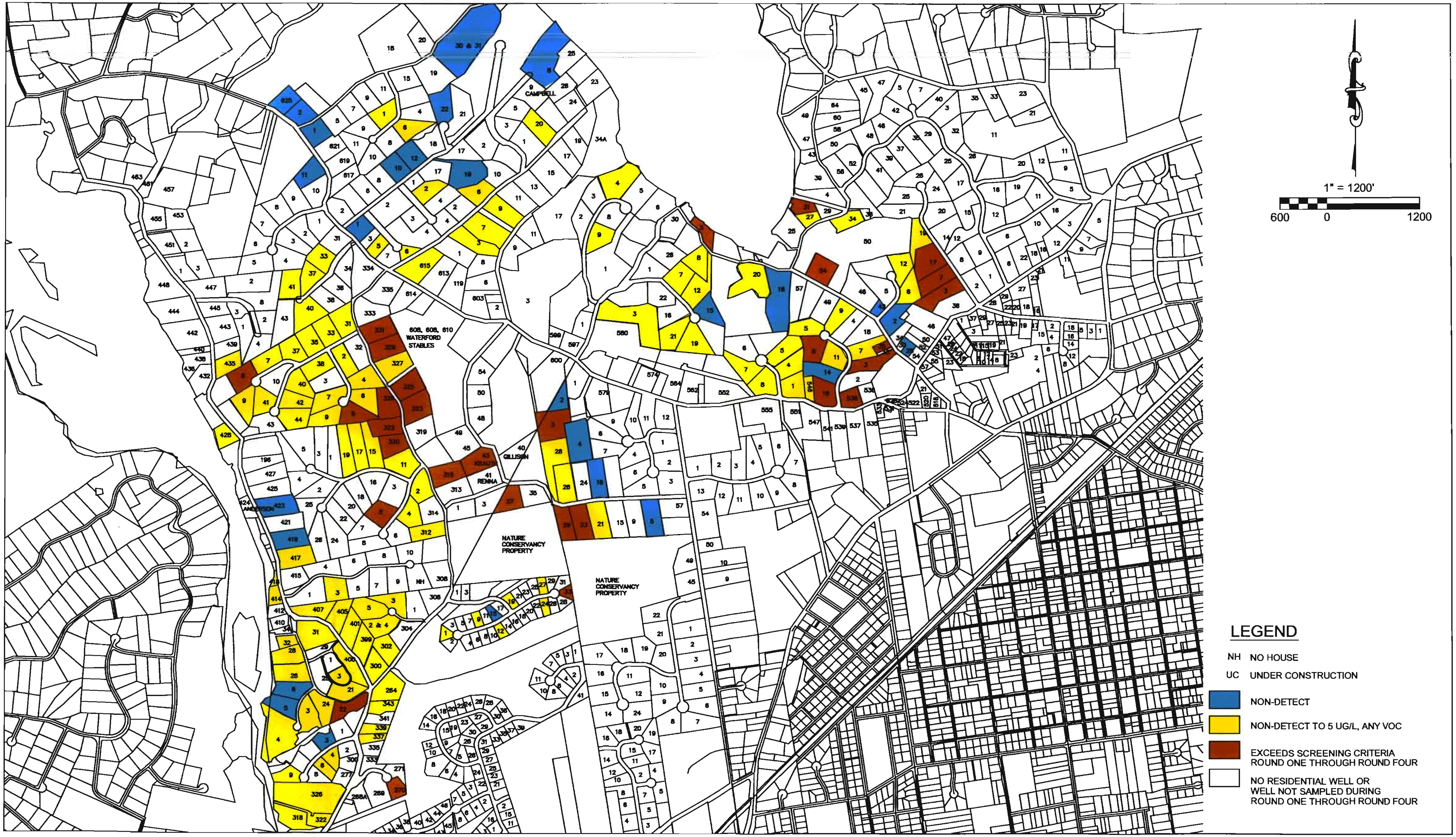


Figure 1-18
RESIDENTIAL ROUND FOUR - VOCS EXCEEDING SCREENING CRITERIA
REMEDIAL INVESTIGATION/FEASIBILITY STUDY

SMITHTOWN GROUNDWATER CONTAMINATION SITE
SMITHTOWN, NEW YORK

CDM



CDM

SMITHTOWN GROUNDWATER CONTAMINATION SITE
SMITHTOWN, NEW YORK

Figure 1-19
ROUND ONE THROUGH ROUND FOUR RESIDENTIAL
MAXIMUM VOC CONCENTRATION DETECTED DURING ANY ROUND
REMEDIAL INVESTIGATION/FEASIBILITY STUDY