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Remedial Design Work Plan

Solvents Recovery Service of New England, Inc.
(SRSNE) Superfund Site
Southington, Connecticut

November 2010

ARCADIS

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Note: The following is a comprehensive listing of the acronyms and abbreviations used in this Remedial Design Work Plan and associated attachments.

1,1-DCE	1,1-dichloroethene
1,1,1-TCA	1,1,1-trichloroethane
1,2-DCA	1,2-dichloroethane
2,3,7,8-TCDD	2,3,7,8-tetrachlorodibenzo-p-dioxin
ALEP	Action Level Exceedance Plan
AOC	Administrative Order on Consent
AQC	Air Quality Control System
ARARs	Applicable or Relevant and Appropriate Requirements
ATSDR	Agency for Toxic Substance and Disease Registry
B&M	Boston & Maine
BACT	Best Available Control Technology
BBL	Blasland, Bouck & Lee, Inc.
bgs	below ground surface
BTEX	Benzene, Toluene, Ethylbenzene and Xylenes
BTU	British Thermal Unit
°C	degrees Celsius
CA	chloroethane
CBYD	Call Before You Dig
cc	cubic centimeter
cDCE	cis-1,2-dichloroethene
CD	Consent Decree
CEMS	Continuous Emissions Monitoring System
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CERCLIS	Comprehensive Environmental Response, Compensation and Liability Information System
CH_4	methane
CL&P	Connecticut Light & Power

CO_2	carbon dioxide
COCs	Constituents of Concern
CT	carbon tetrachloride
CTDEP	Connecticut Department of Environmental Protection
CTDPH	Connecticut Department of Public Health
CVOCs	Chlorinated Volatile Organic Compounds
CWA	Clean Water Act
DCE	dichloroethene
DCM	dichloromethane
DCP	Demonstration of Compliance Plan
ddms	*de maximis* Data Management Solutions
DHC	Dehalococcoides
DNAPL	dense non-aqueous phase liquid
DO	dissolved oxygen
DQA	Data Quality Assessment
DQOs	Data Quality Objectives
DRE	Destruction/Removal Efficiency
DRO	Diesel Range Organics
EISB	Enhanced In-Situ Bioremediation
ELUR	Environmental Land Use Restriction
°F	degrees Fahrenheit
$Fe(OH)_3$	ferrous hydroxide
f_{oc}	fraction of solid organic carbon in soil
FS	Feasibility Study
FSP	Field Sampling Plan
PMC	Pollutant Mobility Criteria applicable to designated Class “GA” groundwater areas
GAC	granular activated carbon
GCTEOS	Groundwater Containment and Treatment Evaluation and Optimization Study

gpm	gallons per minute
GRO	Gasoline Range Organics
GWPC	Groundwater Protection Criteria
GWTF	Groundwater Treatment Facility
H	Henry's Law Constant
H_2	hydrogen
H_2O	water
H_2S	hydrogen sulfide
HAP	hazardous air pollutant
HCl	hydrochloric acid
HCTS	Hydraulic Containment and Treatment System
HDPE	High-Density Polyethylene
HLVs	Hazard Limiting Values
HZ	Heated Zone
ID	inner diameter
IFT	interfacial tension
IMS	Interim Monitoring and Sampling
IQAT	Independent Quality Assurance Team
IRIS	Integrated Risk Information System
ISTD	In-Situ Thermal Desorption
ISTR	In-Situ Thermal Remediation
J&E	Johnson & Ettinger
K_d	soil-water partition coefficient
kg	kilogram
K_{oc}	chemical-specific organic carbon partition coefficient
LAER	Lowest Achievable Emission Rate
lbs	pounds
LNAPL	light non-aqueous phase liquid
MAROS	Monitoring and Remediation Optimization System
MASC	Maximum Allowable Stack Concentration

MCLs	Maximum Contaminant Levels
MCLG	Maximum Contaminant Level Goal
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
MIBK	4-methyl-2-pentanone (methyl isobutyl ketone)
mL	milliliter
MNA	Monitored Natural Attenuation
MOA	Memorandum of Agreement
N_2	nitrogen
NA	Natural Attenuation
NAPL	non-aqueous phase liquid
ng/L	nanograms per liter
NH_4^+	ammonia
NOAA	National Oceanic and Atmospheric Administration
NO_2^-	nitrite
NO_3^-	nitrate
NSR	New Source Review
NTCRA	Non-Time-Critical Removal Action
O_2	oxygen
O&M	Operations and Maintenance
OD	outer diameter
OH^-	hydroxyl radical
OIS	On-Site Interceptor System
OMM	Operation, Maintenance and Monitoring
ONOGU	Observed NAPL in the Overburden Groundwater Unit
ORP	oxidation-reduction potential
OSHA	Occupational Safety and Health Administration
OSWER	Office of Solid Waste and Emergency Response
PAHs	polycyclic aromatic hydrocarbons
PCBs	polychlorinated biphenyls

PCDDs	polychlorinated dibenzo-p-dioxins
PCDFs	polychlorinated dibenzofurans
PCE	tetrachloroethylene
PCR	Polymerase Chain Reaction
PEL	Permissible Exposure Limit
PFD	process flow diagram
PID	photoionization detector
PIPP	Pre-ISTR Preparation Plan
PLC	Programmable Logic Controller
POP	Project Operations Plan
ppb	parts per billion
PPE	personal protective equipment
ppm	parts per million
PSD	Prevention of Significant Deterioration
psig	pounds per square inch, gauge
PVC	polyvinyl chloride
QAPP	Quality Assurance Project Plan
R^2	correlation coefficient
RAOs	Response Action Objectives
RAWP	Remedial Action Work Plan
RCRA	Resource Conservation and Recovery Act
RDWP	Remedial Design Work Plan
RD/RA	Remedial Design/Remedial Action
Redox	Reduction-Oxidation
RDEC	Residential Direct Exposure Criteria
RH	Relative Humidity
RI	Remedial Investigation
ROD	Record of Decision
RSRs	Remediation Standard Regulations
SAP	Sampling and Analysis Plan

SCAP	Supplemental Containment Action Plan
SCM	Site Conceptual Model
SO_4^{2-}	sulfate
SOP	Standard Operating Procedure
SOW	Statement of Work
SPLP	Synthetic Precipitation Leaching Procedure
SRSNE	Solvents Recovery Service of New England, Inc.
SSO	Site Safety Officer
SVOCs	semi-volatile organic compounds
SWD	Southington Water Department
SWPC	Surface Water Protection Criteria
TAL	Target Analyte List
TCE	trichloroethylene
TCH	thermal conduction heating
TCLP	Toxicity Characteristic Leaching Procedure
TEFs	Toxic Equivalency Factors
TEQ	Toxic Equivalence Quotient
TEX	Toluene, Ethylbenzene and Xylenes
TSCA	Toxic Substances Control Act
TTZ	thermal treatment zone
ug/L	micrograms per liter
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
UV	ultraviolet
VC	vinyl chloride
VI	Vapor Intrusion
VOC	volatile organic compound
WHO	World Health Organization

Executive Summary

On October 30, 2008, the United States Environmental Protection Agency (USEPA) lodged a Consent Decree (CD) with the United States District Court for the District of Connecticut in connection with Civil Actions No. 3:08cv1509 (SRU) and No. 3:08cv1504 (WWE). The CD was entered by the Court on March 26, 2009. The CD and its accompanying Statement of Work (SOW) describe the Remedial Design/Remedial Action (RD/RA) activities to be performed for the Solvents Recovery Service of New England, Inc. (SRSNE) Superfund Site in Southington, Connecticut (Site). The RD/RA activities are to be undertaken by an unincorporated association of Settling Defendants to the CD, referred to as the SRSNE Site Group.

This *Remedial Design Work Plan* (RDWP) addresses the requirements of SOW Section V.C. It summarizes pertinent Site-related background information, identifies and describes the scopes and procedures for various pre-design investigations, describes the anticipated RD process, and discusses the RD-related deliverables and schedule. The information presented herein was developed to be consistent with Section VI of the CD, Section L of the 2005 Record of Decision (ROD), SOW requirements, and applicable guidance documents.

The SRSNE Site is located in the Town of Southington, Connecticut, in Hartford County, approximately 15 miles southwest of the City of Hartford. It is located on Lazy Lane, just off Route 10 (Queen Street), and adjacent to the Quinnipiac River. The Site generally consists of the SRSNE Operations Area (4 acres), the Cianci Property (10 acres), a railroad right-of-way, and those areas where the SRSNE-related plume in groundwater has come to be located, including Southington's Curtiss Street Well Field (the Town Well Field Property). The Town Well Field Property is a 28-acre parcel of undeveloped land containing two municipal drinking water wells (Production Wells No. 4 and No. 6). The wells were closed in 1979 when they were found to contain volatile organic compounds (VOCs).

The SRSNE facility began operations in Southington in 1955. From approximately 1955 until the facility's closure in 1991, spent solvents were received from customers and distilled to remove impurities. Solvents and other wastes were handled and processed by several methods over the operational period, including distillation columns, lagoons, drums, and open pit incineration. Such operations were a source of historical releases of

processed materials solvents and spent fuels, which resulted in the presence of non-aqueous phase liquids (NAPL) in the subsurface.

The Site was listed on the National Priorities List (NPL) in September 1983 and the USEPA initiated the Remedial Investigation (RI) for the Site in 1990. SRSNE operations ceased in 1991, and the USEPA conducted a Time-Critical Removal Action to remove contaminated soils from the railroad grade drainage ditch and to remove some chemicals stored at the property to an off-site location in 1992. In 1994, USEPA and the SRSNE Site Group entered into an Administrative Order on Consent (AOC) to, among other things, construct and operate a pump and treat system to contain the principally contaminated overburden groundwater (the NTCRA 1 work). USEPA subsequently issued an Action Memorandum for a second NTCRA (NTCRA 2) in 1995 to hydraulically contain VOC-impacted bedrock groundwater downgradient of the NTCRA 1 system. USEPA and the SRSNE Site Group entered into a second AOC in 1996 to implement NTCRA 2 and to complete the RI and prepare a Feasibility Study (FS). NTCRA 2 started operation in 1998. The RI and Feasibility Study (FS) were completed between 1996 and 2004, and the USEPA issued the ROD in 2005. The ROD described the selected remedy for the Site, which is the basis for the RD/RA activities being undertaken.

Key elements of the selected remedy are summarized as follows:

- Treat waste oil and solvents – where present as NAPL in the subsurface in the overburden aquifer (i.e., the Overburden NAPL Area) – using in-situ thermal treatment.

- Following in-situ thermal treatment, cap the former SRSNE Operations Area and the railroad right-of-way. The cap will be low-permeability and multi-layered and is to be designed, constructed, and maintained to meet the requirements of RCRA Subtitle C type cap (“RCRA C”).

- Excavate soils exceeding cleanup levels from certain discrete portions of the former Cianci Property. Provided that concentrations of polychlorinated biphenyls (PCBs) do not warrant off-site disposal, soils excavated from the former Cianci Property (and from other areas excavated outside the cap limits as part of other RD/RA activities) may be relocated to the former SRSNE Operations Area for placement beneath the cap.

- Capture and treat (on site) groundwater in both the overburden and bedrock aquifers that exceeds applicable federal drinking water standards and risk-based levels. This will be achieved through continued operation, maintenance, and modification (as needed) of the HCTS.

- Monitored natural attenuation (MNA) of the groundwater plume outside the capture zones (i.e., the severed plume, shown on Figure 3A) that exceeds cleanup levels.

- MNA of constituents in the groundwater plume inside the capture zones and within the Bedrock NAPL Area (Figure 3B).

- Implement institutional controls to minimize the potential for human exposure to Site-related constituents in the subsurface soils and impacted groundwater and to prohibit activities that might affect the performance or integrity of the cap.

- Monitor groundwater and maintain the cap over the long term.

Performance Standards associated with the design and implementation of the remedial approach are specified in Section IV of the SOW.

Section V.C.1 of the SOW requires that the RDWP includes descriptions of a series of pre-design and design-related activities that are to be undertaken to support the final remedial action. These plans, plus additional plans proactively developed to facilitate design and implementation of specific components of the final remedy, are presented as attachments to this RDWP. The following table summarizes the various supporting documents attached to this RDWP.

Attachment Reference	Plan Title	SOW Section(s) Addressed	General Content
A	*Overburden NAPL Delineation Plan*	V.C.1.a	Describes planned investigation to delineate the extent of NAPL in the overburden in the northwest corner of the former Operations Area and includes provisions for collection of samples to support ISTR pre-design testing.

Attachment Reference	Plan Title	SOW Section(s) Addressed	General Content
B	*Thermal Treatment Monitoring Plan*	V.C.1.b	Describes the scope and approach for monitoring air quality within and around the perimeter of the ISTR area during construction, implementation, and demobilization activities to minimize potential impacts to onsite workers and the community. This plan also includes an action level exceedance plan that provides the USEPA, CTDEP, and the community with the information they need to recognize and respond to a release.
C	*Thermal Treatment Performance Criteria Work Plan*	V.C.1.c	Describes the scope and approach for performance monitoring of the In-Situ Thermal Desorption (ISTD) system to determine the progress, demonstrate compliance with the applicable permit equivalency requirements, and monitor the quality of any air or water discharges from the system.
D	*Vapor Treatment Needs Evaluation Work Plan*	V.C.1.d	Evaluates commercially available and proven vapor treatment technologies suitable for treating both the range and anticipated mass load of the SRSNE Site COCs. Focus is on the use of thermal oxidation with and without condensing.
E	*System Design Evaluation Work Plan*	V.C.1.e	Describes the scope and approach for undertaking two design evaluations to support the In-Situ Thermal Desorption (ISTD) system design: 1) a materials compatibility study to evaluate the potential for corrosion of subsurface and above ground system components, and 2) numerical calculations upon which to base the sizing of the heating and treatment equipment.

Attachment Reference	Plan Title	SOW Section(s) Addressed	General Content
F	*NAPL Mobilization Assessment and Mitigation Plan*	V.C.1.f	Describes the potential for DNAPL mobilization during ISTD implementation and the safety measures that will be implemented to prevent mobilization and to mitigate it if it occurs. This plan also references other plans and design documents that describe system features designed to minimize vapor releases.
G	*Post-Excavation Confirmatory Sampling Plan*	V.C.1.g	Describes approach for bottom and/or sidewall sampling to confirm achievement of cleanup levels in areas where soil excavation is performed to address soils exceeding established cleanup goals.
H	*Habitat Restoration Work Plan*	V.C.1.h	Describes plan for assessing, mitigating impacts to, restoring, and monitoring restored habitat areas during RD/RA activities.
I	*Soil Investigation Plan*	V.C.1.i	Describes plan for soil sampling to establish background dioxin concentrations in soil, confirm the extent of the cap areas, and further assess/delineate the targeted soil removal areas on the former Cianci Property.
J	*Vapor Control System Evaluation*	V.C.1.j	Describes the approach for assessing the potential need for vapor controls as a component of the RCRA C cap to be constructed in the former SRSNE Operations Area.
K	*Vapor Intrusion Study Work Plan*	V.C.1.k	Describes the approach to evaluating the potential for vapor intrusion (VI) from groundwater. Outlines steps to be taken based on results of screening level comparisons.
L	*Monitored Natural Attenuation Plan*	V.C.1.l and VII.A.1	Describes the Site Conceptual Model developed in support of selection of MNA as a remedy for constituents in Site groundwater, and presents the *Performance Monitoring Plan* for the MNA portion of the overall Site remedy.

Attachment Reference	Plan Title	SOW Section(s) Addressed	General Content
M	*Pre-ISTR Preparation Plan*	N/A	Describes initial Site preparation activities to be performed prior to implementing the in-situ thermal treatment component of the remedy.
N	*Monitoring Well Network Evaluation and Groundwater Monitoring Program*	V.C.1.m	Describes planned modifications to the groundwater monitoring network, presents various aspects of the monitoring program, and summarizes the scope and timing for the monitoring events. The evaluation considered the anticipated need for groundwater monitoring to address various SOW requirements, including MNA evaluations, compliance monitoring, VI evaluations, and monitoring during ISTR implementation.
O	*Groundwater Containment and Treatment Evaluation and Optimization Study Work Plan*	V.C.4	Describes the proposed approach for evaluating and optimizing the performance of the groundwater extraction and treatment system after groundwater conditions return to equilibrium after in-situ thermal treatment.

Section V of the SOW describes the requirements of the RD phase of the work. This initially includes (SOW Section V.A) a requirement for continued operation of the existing NTCRA 1 and NTCRA 2 groundwater extraction and treatment system upon lodging of the CD. Such operation will be consistent with past requirements, terms, agreements and work plans incorporated under the NTCRA 1 and NTCRA 2 AOCs (CERCLA docket numbers I-94-1095 and I-97-1000, respectively). Upon entry of the CD, the system became a component of the remedial approach for the Site, and is now known as the "Hydraulic Containment and Treatment System" (HCTS).

The remainder of SOW Section V outlines a four-step RD process consisting of:

- **Initial remedial steps (SOW Section V.B):** includes certain activities triggered by lodging of the CD (including USEPA notification of contractor selections) and others triggered by entry of the CD (including initiation of coordination with the Town of Southington regarding potential supply well reactivation and preparation and implementation of a Memorandum of Agreement, Supplemental Containment Action Plan, and Institutional Controls Plan). This phase also calls for meetings with the USEPA and Town officials, if requested by the USEPA.

- **Design initiation (SOW Section V.C):** calls for the development and submittal of the RDWP and the *Remedial Design Project Operations Plan* (RD POP). It also requires the performance of a groundwater containment and treatment evaluation and optimization study to be performed following implementation of the ISTR component of the remedy.

- **Conceptual design (SOW Section V.D) and design completion (SOW Section V.E):** provide for a “typical” remedial design process that calls for the development and submission of remedial design packages at the 30% conceptual design, 95% pre-final design, and 100% final design stages for the remedial approach. This establishes the baseline RD approach. However, modifications are proposed to this approach that are necessitated by other SOW requirements or that target more timely implementation of RD/RA activities.

Relative to the RD process described in the SOW, the SRSNE Site Group anticipates two key modifications to the approach for delivering remedial design packages. First, for the main components of the remedial approach, design deliverables will be prepared and submitted on separate timelines. Second, to the extent possible, the design deliverable packages will be reduced from three (conceptual/pre-final/final) to two (conceptual and final). The use of separate timelines for key remedial components is consistent with SOW Section V.C.3, which includes a provision for key phases of remedial design and action to proceed on separate timelines. It is also necessitated by the SOW-specified inter-relations of specific work tasks.

Whereas the SOW prescribes an RD approach that includes 30% conceptual, 95% pre-final, and 100% final design packages, the SRSNE Site Group plans a reduced process consisting of two design submittals per remedial component: conceptual and final. In this case, the conceptual design would target a 65% design level, allowing the agencies to initially review a more advanced design stage. This approach is to minimize the number of deliverables and accelerate the overall design process. Accelerating the schedule of a final remedy is consistent with Section 3.10.1 of the *Remedial Design/Remedial Action Handbook* (USEPA 1995a).

The SOW requires submittal of various documents and deliverables in conjunction with the RD phase of the work. The SOW-required RD submittals are summarized in the following table:

Item	SOW Reference	Trigger and Timeframe	Scope
Memorandum of Agreement (MOA)	V.B.3	Within 180 days of entry of the RD/RA CD	Sets forth the timing and procedure through which the Town would determine, obtain CTDEP and CTDPH approvals for, and notify the USEPA of plans to reactivate existing production wells, or to install/use other water supply wells in the Town Well Field.
Supplemental Containment Action Plan	V.B.5	Within 30 days of USEPA approval of the MOA	Outlines the steps and schedule for prevention measures to ensure that the groundwater plume does not migrate to production wells in the Town Well Field that are slated for future use.
Institutional Control Plan	V.B.7	Within 30 days of the completion of the vapor intrusion study required by SOW Section V.C.1.k	Detail the process by which ELURs will be recorded and enforced, and provides plans for remedial measures necessary to address potential Site-related vapor intrusion issues on individual parcels requiring institutional controls.
Groundwater Containment and Treatment Evaluation and Optimization Study	V.C.4 and V.C.5	Completion of ISTR component of the remedy and prior to design of the long-term groundwater containment, extraction, and treatment system	Demonstrate that the Performance Standards for the HCTS and the severed plume are being met. Modifications and/or enhancements will be proposed if either (1) Performance Standards are not met, or (2) modifications/enhancements would increase effectiveness and/or decrease the costs or time of operation (while meeting objectives).

Item	SOW Reference	Trigger and Timeframe	Scope
Conceptual Design Package	V.D.1	Within 120 days of USEPA approval of the completion of the requisite pre-design studies	Consists of conceptual design, including the basis for design/assumptions, drawings and specifications, project delivery strategy, draft statement of regulatory compliance with ARARs, draft RAWP, and revised POP, and a summary of the IQAT. Separate Conceptual Design Packages will be submitted for the Pre-ISTR preparation activities, ISTR, and soil excavation and capping components of the remedy.
Final Design Package	V.E.3	Within 90 days of USEPA approval of the Conceptual Design	Consists of a 100% design of all components from the conceptual design stage, as well as contingency plans in the event of an accident or emergency, and a Constructability Review Report. Separate Final Design Packages will be submitted for the Pre-ISTR preparation activities, ISTR, and soil excavation and capping components of the remedy.

In addition to these SOW-specified documents, the various work plans attached to this RDWP call for additional submittals during the RD phase of the project. In general, the purpose of these additional deliverables is to report the findings of various pre-design and design-related activities in a manner that allows for timely progression through the RD and RA phases of the work. These anticipated additional RD-related deliverables, which are not specifically required by the SOW, are summarized in the following table.

Deliverable	Purpose	Reference
NAPL Delineation Investigation Report	Summarize scope and findings of the planned NAPL delineation activities in the northwest portion of the former Operations Area, which is a prerequisite for initiating in-situ thermal treatment design	*Overburden NAPL Delineation Plan* (Attachment A to the RDWP)

Deliverable	Purpose	Reference
Summary of Habitat Restoration Work Plan field activities	Summarize the scope and findings of information review and field reconnaissance activities (Tasks 1 and 2) proposed in the *Habitat Restoration Work Plan*	*Habitat Restoration Work Plan* (Attachment H to the RDWP)
Pre-Design Investigation Summary Report	Summarize non-accelerated pre-design investigation activities, including soil sampling, well integrity survey, well installation, and well abandonment activities	*Soil Investigation Plan* (Attachment I to the RDWP); and *Monitoring Well Network Evaluation and Groundwater Monitoring Program* Attachment N to the RDWP)
Contingent Soil Investigation Report	A contingent interim submittal to USEPA in the event that results of initial soil sampling suggest possible substantial impact on planned capping or removal limits	*Soil Investigation Plan* (Attachment I to the RDWP)
Summary of Vapor Control System Evaluation	Summarize the scope and conclusions of a post-ISTR evaluation to assess the need for a vapor control system to be included with the cap design	*Vapor Control System Evaluation* (Attachment J to the RDWP)
Interim Vapor Intrusion Study Report	Summarize the findings of completed investigations and proposed plan for additional investigations in the event that contingent additional VI study activities are required	*Vapor Intrusion Study Work Plan* (Attachment K to the RDWP)

Although not specifically required by the SOW, the need for these additional submittals was identified in the development of the required RDWP components specified in Section V.C.1 of the SOW. These deliverables are necessary to implement the RD/RA activities as outlined in this RDWP.

1. Introduction

On October 30, 2008, the United States Environmental Protection Agency (USEPA) lodged a Consent Decree (CD) with the United States District Court for the District of Connecticut in connection with Civil Actions No. 3:08cv1509 (SRU) and No. 3:08cv1504 (WWE). The CD and its accompanying Statement of Work (SOW) describe the Remedial Design/Remedial Action (RD/RA) activities to be performed for the Solvents Recovery Service of New England, Inc. (SRSNE) Superfund Site in Southington, Connecticut (Site) (Figure 1). The RD/RA activities are to be undertaken by an unincorporated association of Settling Defendants to the CD, hereafter referred to as the SRSNE Site Group.

On behalf of the SRSNE Site Group, this *Remedial Design Work Plan* (RDWP) represents a collaborative effort among several supporting technical firms. This includes *de maximis, inc.* (Supervising Contractor and Project Coordinator), ARCADIS (Remedial Design Contractor), Weston Solutions, Inc. (Hydraulic Containment and Treatment System [HCTS] operations contractor), TerraTherm, Inc. (thermal remediation contractor), and the SRSNE Site Group's Technical Committee (*de maximis* 2008). Coordination among these groups resulted in this comprehensive and integrated work plan that addresses the SOW requirements and that meets the overall project needs.

1.1 Purpose and Scope

This RDWP addresses the requirements of SOW Section V.C. It summarizes pertinent Site-related background information, identifies and describes the scopes and procedures for various pre-design investigations, describes the anticipated RD process, and discusses the RD-related deliverables and schedule. The information presented herein was developed to be consistent with Section VI of the CD, Section L of the 2005 Record of Decision (ROD) (USEPA 2005a), and the SOW requirements. Where applicable, it also considers the following guidance:

- *Superfund Remedial Design and Remedial Action Guidance* (Office of Solid Waste and Emergency Response [OSWER] Directive 9355.0-04A June 1986)

- *Remedial Design/Remedial Action Handbook* (OSWER Directive 9355.0-04B June 1995)

- *Guidance for Scoping the Remedial Design* (OSWER Directive 9355.0-43 March 1995)

To support the various activities described in this RDWP and associated attachments, a *Remedial Design Project Operations Plan* (RD POP) has also been developed and submitted concurrent with this RDWP. As required by Section V.C.2 of the SOW, the RD POP includes a series of Site-specific plans that establish the procedures to be followed when carrying out the field, laboratory, and analysis work for the RD. A Site Management Plan, a Field Sampling Plan, a Quality Assurance Project Plan, a Health and Safety Plan, and Community Relations Support Plan are all attached to the RD POP. Additional schedule-related information is also provided in the RD POP.

1.2 Document Organization

The text of this RDWP is organized into six sections. The content of each section following this Introduction is briefly summarized as follows:

- **Section 2 – Background Information:** Section 2 summarizes pertinent background information, including site operational history, regulatory status, setting, nature of site impacts, and a summary of the objectives, scope, and Performance Standards associated with the selected remedial action.

- **Section 3 – Overview of Pre-Design Support Activities:** The SOW identifies various pre-design and design-related investigations and evaluations to be included with the RDWP. The scope of these activities, as well as others that have been identified in support of the RD process, are summarized in Section 3 along with reference to the detailed work plans that are provided as attachments to this RDWP and the associated RD POP.

- **Section 4 – Summary of Remedial Design Process:** The remedial design process described in the SOW is presented in Section 4, along with a discussion of planned modifications to that approach for the purpose of integrating and accelerating the overall remedial design and implementation process.

- **Section 5 – Deliverables and Schedule:** The various deliverables associated with the remedial design process, including those required by the SOW and additional submittals that will be developed to report the results of the variety of pre-design activities, are described in Section 5. This section also discusses schedule-related requirements for the various deliverables, including reference to the project schedule provided in the RD POP.

- **Section 6 – References:** The various documents cited within this RDWP are listed in Section 6.

Various figures, appendices, and attachments are also included with this RDWP and referenced within the text.

2. Background Information

The SRSNE Site is located on approximately 14 acres of land along Lazy Lane in Southington, Hartford County, Connecticut, approximately 15 miles southwest of the city of Hartford (Figure 1). The physical setting of the Site – including the regional geology, overburden geology, bedrock geology, hydrogeology, groundwater use and classification, drainage, and surface water use and classification – is summarized below. This information is also described in detail in prior report submittals, including the *Remedial Investigation Report* (Blasland, Bouck & Lee, Inc. [BBL] 1998) and the *Feasibility Study Report* (BBL and USEPA 2005).

The SRSNE Site includes portions of several properties/areas that are referred to within this RDWP consistent with terminology established in prior Site-related documents. These properties/areas include the former SRSNE Operations Area, the former Boston & Maine (B&M) railroad right-of-way, the former Cianci Property, and the Town of Southington Well Field Property (Town Well Field Property). These areas are shown on Figure 2, and further described below:

- **Former SRSNE Operations Area:** The former SRSNE Operations Area comprises approximately 2.5 paved acres on a 3.7-acre lot South of Lazy Lane in the Quinnipiac River basin approximately 600 feet west of the Quinnipiac River channel. This is the area where SRSNE historically performed solvent recovery and related operations. The Operations Area is bordered on the east (downhill) by an abandoned railroad right-of-way and the former Cianci Property; to the north by commercial businesses; to the west (uphill) by private property; and to the south by private property, the Connecticut Light & Power (CL&P) electrical transmission line easement, and the Town Well Field Property.

  Much of the Operations Area is paved with asphalt and/or concrete and the area is completely enclosed with security fencing. In July 1999, all above ground structures and miscellaneous equipment and debris were decontaminated, demolished, and disposed of offsite. Additionally, underground facilities including septic tanks, underground storage tanks, and underground utilities were abandoned through excavation and removal or by pumping contents, cleaning, and backfilling (septic and piping).

- **Railroad Right-of-Way:** The railroad right-of-way is an approximately 50-foot wide corridor running north-south that separates the former Operations Area (to the west) from the former Cianci Property (to the east). The railroad was historically owned and operated by B&M, but is presently abandoned and the rails have been removed. Connecticut Department of Environmental Protection (CTDEP) purchased the right-of-way in this area in support of extending the Farmington Canal Heritage Trail, a rails-to-trails greenway, from New Haven to the Massachusetts border (draft *Preliminary Reuse Assessment* [USEPA 2003]).

- **Former Cianci Property:** The former Cianci Property is a 10-acre parcel located immediately east of the Operations Area and railroad right-of-way. The Quinnipiac River borders the eastern edge of the former Cianci Property. Lazy Lane is to the north, and the Town Well Field Property borders the property to the south.

  The former Cianci Property was occupied by the Cianci Construction Company from approximately 1969 through 1988 and was used for the storage of construction equipment and as a truck washing station. The property was sold to SRSNE in June 1988, although the property was never used as part of SRSNE operations.

- **Town Well Field Property:** The Town Well Field Property consists of approximately 28 acres of undeveloped land south of the former Cianci Property and southeast of the Operations Area. The well field is bounded to the east by the Quinnipiac River and to the south by the Quinnipiac River and Curtiss Street. The railroad right-of-way and the Delahunty Property border the western perimeter of the well field. The CL&P easement runs northwest-southeast through the northern portion of the Town Well Field Property.

  Town Production Wells No. 4 and 6 are approximately 2,000 and 1,400 feet south of the SRSNE Property, respectively. The Quinnipiac River divides the area between Wells No. 4 and 6. Production Well No. 6 is accessible using dirt roads originating from Lazy Lane or Curtiss Street, while Well No. 4 is only accessible from Curtiss Street. Production Well No. 4 was installed in August 1965 and provided drinking water to the Town of Southington from July 1966 to December 1977. Production Well No. 6 was installed in April 1976 and was pumped from May through October 1978, May through July 1979, and March 1980. Except for the brief period of pumping at Well No. 6 in March 1980, Wells No. 4 and 6 have not been used for water supply since approximately 1979 due to the detection of volatile organic compounds (VOCs) in their discharge water (HNUS 1994).

Within these areas, "the Site" includes areas where Site-related constituents have come to be present in soil (including wetland soil) and groundwater at concentrations exceeding SOW-specified cleanup levels. This includes observed and interpreted non-aqueous phase liquid- (NAPL-) containing areas, impacted soils in the Operations Area, railroad right-of-way, and Cianci Property, and areas of impacted groundwater in both the overburden and bedrock zones. These areas, shown on Figures 3A (overburden) and 3B (bedrock), are generally described as follows:

- **Overburden NAPL Area:** This is the area where NAPL has been observed or inferred to exist in overburden soils based on the findings of prior investigations. The estimated extent of the Overburden NAPL Area includes portions of the Operations Area, the railroad right-of-way, and a portion of the Cianci Property, as shown on Figure 3A. This area will be further delineated in the northwest corner of the former Operations Area as component of the pre-design investigations referenced in Section 3.

- **Overburden Groundwater Area:** The Overburden Groundwater Area is the portion of the Site where dissolved VOC concentrations in the overburden aquifer exceed cleanup goals. While the overburden groundwater is typically considered in three zones (each approximately one-third of the saturated thickness), the composite extent of this area (based on *Feasibility Study Report* [BBL and USEPA 2005] data) is depicted on Figure 3A. The overburden groundwater VOC plume extends south to the Town Well Field Property. The extent of the overburden groundwater area, particularly to the east of the Quinnipiac River, is subject to further assessment and delineation as part of the RD investigations referenced in Section 3.

- **Bedrock NAPL Area:** The Bedrock NAPL Area is the area where NAPL has been observed or is inferred to exist based on prior site investigations. This includes a majority of the former SRSNE Operations Area and Cianci Property, as shown on Figure 3B.

- **Bedrock Groundwater Area:** This includes the portion of the Site where dissolved VOC concentrations in the bedrock aquifer exceed groundwater cleanup goals (based on *Feasibility Study Report* [BBL and USEPA 2005] data). The bedrock groundwater VOC plume extends south into the central portion of the Town Well Field Property (Figure 3B).

- **Severed Plume:** The portion of the affected groundwater zone that is outside the groundwater capture zone of the Non-Time-Critical Removal Action 1 (NTCRA 1) and NTCRA 2 extraction systems (described below), but that contains Site-related constituents (primarily VOCs) above detectable levels is referred to as the severed plume. The approximate location and extent of the severed plume is shown on Figure 3A.

Other key Site features referenced throughout this RDWP is the HCTS. The HCTS consist of the on-site groundwater treatment system and the two groundwater extraction systems described as follows:

- **NTCRA 1 Groundwater Extraction System:** The NTCRA 1 groundwater extraction system ("NTCRA 1 system") is located within the NTCRA containment area on the Cianci Property east of the Operations Area (Figure 4). It consists of a steel sheet pile wall through the overburden to the top of bedrock, and 12 overburden groundwater extraction wells (RW-1 through RW-12) west (formerly upgradient) of the sheet pile wall. Groundwater is extracted from the wells to maintain hydraulic gradient reversal across the sheet pile wall. This system was installed in 1995 pursuant to Administrative Order on Consent (AOC) I-94-1045, effective October 4, 1994. Pumping from the NTCRA 1 groundwater extraction system was initiated in 1995.

- **NTCRA 2 Groundwater Extraction System:** The NTCRA 2 groundwater extraction system ("NTCRA 2 system") consists of two overburden extraction wells (RW-13 and RW-14) and one bedrock extraction well (RW-1R) just north of the CL&P easement (Figure 4). These wells were installed pursuant to AOC 1-97-1000, effective February 18, 1997, and began operating in 1999, 2007, and 2001, respectively. The NTCRA 2 groundwater containment system includes a groundwater extraction well in the bedrock (RW-1R) and two overburden groundwater extraction wells (RW-13 and RW-14). This extraction well cluster is located in the Town Well Field Property north of the CL&P easement.

The combined NTCRA 1 and NTCRA 2 groundwater extraction systems generally pumped between 25 and 50 gallons per minute (gpm) in 2008. The capture zones created by the NTCRA 1 and 2 groundwater extraction systems are shown on Figure 3A (overburden) and Figure 3B (bedrock). The operation of the combined NTCRA 1 and NTCRA 2 systems has successfully contained the overburden and bedrock VOC plumes, creating the severed plume within the Town Well Field Property.

Groundwater extracted from the NTCRA 1 and 2 systems is treated using an on-site groundwater treatment system that was originally constructed as part of the NTCRA 1 system and remains in operation today (Figure 4). The combined operations of the extraction systems and the treatment facility were previously referred to as the "NTCRA 1 and NTCRA 2 Groundwater Extraction and Treatment System" or "NTCRA 1/2 Groundwater System." Following entry of the CD, continued operation of the NTCRA 1/2 Groundwater System became part of the ROD-specified remedial approach for groundwater, and the system is now referred to as the HCTS (SOW Section V.A).

2.1 Operational History

This section summarizes the SRSNE operational history and practices that contributed to the environmental conditions at the Site. Additional details regarding the operational history are provided in the *Remedial Investigation Report* (BBL 1998).

The SRSNE facility began operations in Southington in 1955 (ATSDR 1992). From approximately 1955 until the facility's closure in 1991, spent solvents were received from customers and distilled to remove impurities, and the recovered solvents were returned to the customer or sold to others for reuse. Based on a partial record of materials processed at the SRSNE facility (excluding pre-1967 operations files, which were destroyed in a fire), SRSNE handled in excess of 41 million gallons of waste solvents, fuels, paints, etc. Approximately three to five million gallons of liquid wastes and 100,000 pounds of solid wastes were processed annually at the SRSNE facility during this period of operations (ATSDR 1992).

Liquid wastes processed at the SRSNE facility included unrecoverable or spent solvent-based fuels, spent chlorinated solvents, and wastes generated from fuel-blending operations. Contact and non-contact distillation stream generated during the facility's distillation process were discharged into a subsurface drain pipe that discharged into a ditch along the west side of the Operations Area. From 1957 to approximately 1967, the non-recoverable portion of distilled solvents, consisting of distillation or still-bottom sludge, was stored in two on-site, unlined lagoons located in the Operations Area (Figure 3A). The larger, primary lagoon was about 90 feet long, 40 feet wide, and 10 feet deep with a capacity of 270,000 gallons (CTDEP 1978). The secondary lagoon was reportedly used for skimming off free oils for use in SRSNE's fuel blending program. The exact quantity of waste material placed in the on-site lagoons is unknown. Sludge was periodically removed from the lagoons; however, the lagoons sometimes were filled beyond their capacity with solvent sludge (CTDEP 1978). According to the memorandum, the lagoons were frequently full and sometimes overflowed into the drainage ditch adjacent to the railroad tracks east of the facility.

After the closure of the lagoons in 1967, wastes, including still-bottom sludge and flammable liquid wastes, were incinerated in an open pit or disposed of offsite. The open-pit incinerator burned approximately 1,000 gallons of solvent sludge per day between 1966 and 1974, when it was decommissioned (ATSDR 1992). Ash from the open-pit incinerator was used as fill material within the Operations Area. By about 1976, some of the spent solvents were incorporated into SRSNE's fuel blending program. The solvent-burning and fuel-blending operations involved handling, storage, and transfer activities that resulted in leaks and spills to bare ground within the Operations Area. In 1989 and 1990, Site paving and control measures were installed in accordance with a Resource Conservation and Recovery Act (RCRA) Corrective Measures Plan.

Between 1986 and 1991, the on-site groundwater treatment system utilized a cooling tower on the roof of the operations building that was converted to an air stripper, with discharge via a subsurface pipe to the ditch along the railroad tracks east of the Operations Area. In addition to groundwater from the on-site interceptor system (OIS), the converted air stripper also received liquid containing high concentrations of solvent compounds from the solvent distillation process. Thus, during system operation, VOC concentrations in the tens of parts per million (ppm), potentially including NAPL, may have been discharged to the ditch along the railroad tracks.

On September 16, 1976, VOCs were detected at Town of Southington Production Well No. 4. Between 1977 and 1978, water-supply pumping in the Town Well Field Property shifted from Well No. 4 to Well No. 6. In approximately 1979, however, Town of Southington Production Well No. 6 also ceased operation due to the presence of VOCs in the discharge from the well (HNUS 1994).

In 1983, USEPA and SRSNE executed a consent decree that required the installation of an OIS along the downgradient property line of the Operations Area. The on-site interceptor system was installed in 1985 and started operation in 1986 with the intended purpose of capturing overburden groundwater flux from the Operations Area. The 1983 consent decree also required modifications to SRSNE's solvent handling practices and the performance of subsurface investigation activities to assess impacts associated with the Site. Between 1983 and the facility's closure in 1991, SRSNE made some improvements as required under the 1983 consent decree, including spill control measures, paving of the Operations Area, fire protection measures, and installation of a groundwater treatment system.

From 1986 through 1991, SRSNE's on-site groundwater treatment system utilized a cooling tower, which was converted into an air stripper on the roof of the operations building, with discharge via a subsurface drain pipe to the ditch along the railroad tracks east of the site. In addition to groundwater from the OIS wells, the converted air stripper also received wet steam containing high concentrations of solvent compounds from the solvent distillation process. Thus, during system operation, VOC concentrations in the tens of ppm, potentially including NAPL, may have been discharged to the ditch along the railroad tracks.

A USEPA RCRA inspection in February 1989 documented 75 cases of solvent releases from drums, tank trucks, hoses, and other solvent containers and transfer equipment during 1988 (USEPA 1989). During the February 1989 USEPA RCRA inspection, the OIS was not operating as a continuous hydraulic barrier to downgradient groundwater flow (USEPA 1989). Subsequently, three extraction wells were removed and replaced in 1989. The three replacement wells, which were constructed of 4-inch diameter stainless steel screen and riser to improve the groundwater extraction rate of the OIS, were screened across the overburden/bedrock interface.

In 1988, the three batch stills were removed, and spent solvents received by SRSNE were transferred to other facilities for the remainder of SRSNE's operations period. Additional USEPA and CTDEP enforcement orders were subsequently issued to compel SRSNE to perform further cleanup work at the facility. The facility ceased operation in March 1991 and was closed down in May 1991.

In 1992, CTDEP retained Metcalf and Eddy to identify a more effective treatment alternative to the converted cooling tower/air stripper. Based on an evaluation of other treatment options, an ultraviolet (UV) peroxidation system was installed. From July 1992 through 1994, the water pumped from the OIS wells was treated using the UV peroxidation system, which was operated by Metcalf and Eddy on behalf of CTDEP. SRSNE continued to operate the well pumps, which produced an average combined flow rate of approximately 3 gpm during this period of operation. SRSNE discontinued operation of the OIS wells, and the UV peroxidation system was shut down concurrent with NTCRA 1 design activities in 1994.

2.2 Regulatory Status

The SRSNE Site was added to the Superfund program in 1983, and since that time USEPA and the State of Connecticut have implemented a variety of regulatory actions, culminating with the issuance of the Proposed Plan and ROD in 2005. After issuing the ROD, the USEPA and SRSNE Site Group negotiated the terms of the CD, which was lodged on October 30, 2008 with the United States District Court for the District of Connecticut in connection with Civil Actions No. 3:08cv1509 (SRU) and No. 3:08cv1504 (WWE). The CD has not yet been formally entered by the Court, but this action is expected to occur in the near term.

Key regulatory milestones in the recent history of the Site, based on lists included on USEPA's project website (USEPA 2009) and in the fact sheet USEPA developed in support of the 2005 Proposed Plan (USEPA 2005b), are as follows:

- 1983: USEPA adds the Site to the Superfund list; SRSNE signs a consent decree with USEPA to install a groundwater recovery system and store/manage hazardous waste on site.

- 1983-1988: USEPA and the State of Connecticut take enforcement action to require cleanup of the facility operations and the property.

- 1990: USEPA initiates the Remedial Investigation for the Site, conducting three phases of investigation that are presented in a four-volume report (HNUS 1994).

- 1991: SRSNE operations cease.

- 1992: USEPA conducts a Time-Critical Removal Action to remove contaminated soils from the railroad grade drainage ditch and to remove some chemicals stored at the property to an off-site location.

- 1994: USEPA and the SRSNE Group enter into an AOC for Removal Action to construct and operate a pump and treat system to contain the principally contaminated overburden groundwater (the NTCRA 1 work). Other work conducted under this AOC included the construction of a mitigation wetland in the northeast corner of the Cianci Property, implementation of a full-scale phytoremediation study within the NTCRA 1 sheet pile wall, and extension of public water to three buildings adjacent to the Site.

- 1995: USEPA issues an Action Memorandum for a second NTCRA (NTCRA 2) to hydraulically contain VOC-impacted bedrock groundwater downgradient of the NTCRA 1 system.

- 1996: USEPA and the SRSNE Site Group enter into a second AOC for Removal Action and Remedial Investigation/Feasibility study to expand the groundwater containment system and complete site investigations. Work under this AOC resulted in the completion of the Site RI/FS, implementation of NTCRA 2, and the decontamination, demolition and removal of the remaining buildings and tanks from the Operations Area.

- 1996 - 2004: SRSNE Site Group operates groundwater controls in the overburden and bedrock aquifers, completes remedial investigations, and conducts feasibility studies.

- 2005: USEPA issues the Proposed Plan in June and holds two public meetings; the public comment period runs from June through August.

- 2005: USEPA issues the ROD for the Site, which describes the final remedy.

- 2008: USEPA and SRSNE Site Group sign CD to implement the RD/RA activities.

- 2009: Court enters CD; Remedial Design Work initiated.

2.3 Site Setting

This section presents a summary of the site setting including descriptions of local geology, hydrogeology, and hydrology. Information presented in this section is reiterated from the Remedial Investigation Report (BBL 1998).

2.3.1 Geology

The Site is located within the Connecticut Valley Lowland section of the New England physiographic province. The Connecticut Valley Lowland occupies a regional, structural rift basin, which is characterized by block-faulted and tilted bedrock strata. The geology of the region, in general, consists of glacially-derived unconsolidated deposits overlying the Upper Triassic New Haven Arkose bedrock (Rogers 1985). A general geologic map of Connecticut is presented on Figure 5. Bedrock fractures in the region dip moderately eastward, parallel to the eastward-dipping bedding (Hubert et al. 1978; Rogers 1985; BBL 1998). Steeply dipping fractures, however, have also been observed in outcrops near the Site, and in core samples and down-hole fracture-logging results obtained within the Site. While normal faults have been mapped approximately 2.5 miles west and 2.0 miles east of the Site (Rogers 1985), no bedrock faults have been reported within the Study Area (i.e., the targeted investigation area during the Remedial Investigation, including the Site and surrounding areas). The published bedrock geologic maps do not provide a sufficient basis to evaluate the presence or locations of faults, if any, beneath the thick sequence of unconsolidated materials within the Quinnipiac River Valley in the vicinity of the Site (Rogers 1997).

The depth to bedrock varies throughout the Site, from approximately 15 to 40 feet below ground surface (bgs) at the SRSNE Operations Area, to approximately 25 to 45 feet bgs, on the former Cianci Property, to approximately 80 to 100 feet bgs at the Town Well Field Property (Figure 2).

2.3.1.1 Study Area Overburden Geology

Wisconsin-age glaciation partly eroded and smoothed the bedrock hills and deposited the principal unconsolidated overburden units throughout the region (La Sala 1961). The overburden geology beneath the Operations Area and former Cianci Property consists of two main unconsolidated layers. The shallow, upper layer, called outwash, extends from ground surface to approximately 10 to 25 ft bgs at the Site and consists of reddish-brown silty sand and gravel deposits, interbedded with discontinuous layers of silt and relatively well sorted sand and gravel. The lower layer consists of glacial till, a generally unstratified unit consisting of reddish-brown clay, silt, sand, gravel, cobbles, and boulders, but also including isolated, discontinuous sandy seams. Fill materials are present above the outwash in portions of the former Operations Area and Cianci Property, where grading operations have reworked the upper few feet of soil and filled low areas. Fill materials are also observed along the former railroad grade that separates the Operations Area from the former Cianci Property, and appear to have been placed along the east bank of the Quinnipiac River in the area east-southeast of the Operations Area. In the area south of the Operations Area and Cianci Property (i.e., the Town Well Field Property), the entire overburden grades to a coarser overall grain size distribution, and resembles classic stratified drift (Mazzaferro et al. 1979) throughout the overburden thickness. The deeper portion of the overburden south and southeast of the Site generally lacks fine-grained material, and is described as “gravelly drift.”

Geotechnical and organic carbon data were collected during the RI to characterize parameters that are relevant for describing transport of site-related constituents of concern (COCs) within overburden groundwater (BBL 1998). The porosity of overburden materials ranged from 17.3 to 47.2% with a mean value of 27.5±6.8%. Bulk density ranged from 1.40 to 2.25 grams per cubic centimeter (gm/cm^3) with a mean value of 1.94 ± 0.19 gm/cm^3. The total organic carbon content ranged from less than 10 to 13,200 milligrams per kilogram (mg/kg) with a mean value of 4,044 ± 4,244 mg/kg.

2.3.1.2 Study Area Bedrock Geology

The depth to bedrock varies throughout the Site, from approximately 15 to 40 ft bgs at the SRSNE Operations Area, to approximately 25 to 45 ft bgs on the former Cianci Property, and to approximately 80 to 100 ft bgs at the Town Well Field Property. Top-of-bedrock elevation contours, based on drilling activities at the Site, are consistent with top-of-bedrock elevation data published by the USGS (Mazzaferro 1975), and indicate that the bedrock surface and bedding plane fractures dip ~20 degrees toward the south-east in the vicinity of the Site.

To further characterize bedrock geology and to provide a structural context to understand groundwater and COC migration within the RI Study Area, bedrock core samples were obtained continuously from the top of weathered bedrock to the base of the deep borehole at three locations (MW-702DR, MW-704DR, and MW-705DR) during the RI (BBL 1998). The bedrock generally consists of medium to coarse-grained, feldspathic sandstone; conglomerate, silty, fine sandstone; and siltstone. These lithologies reportedly reflect deposition as part of an alluvial fan sequence in an arid paleoclimate (Hubert et al. 1978).

Core samples and drilling observations at the Site indicate that the upper 5 feet of bedrock is severely weathered and partially decomposed (i.e., “weathered bedrock”). The weathering of this top portion of bedrock may be due to groundwater flow and resultant partial dissolution of carbonate cement within the arkose. The degree of weathering generally decreases with depth. The bedrock in the depth interval between five and 30 feet below the top of bedrock (“shallow bedrock”) is more competent than the weathered bedrock, but is still highly fractured and permeable. The fracture spacing generally increases with depth to depths of 30 feet below top of bedrock (BBL 1998). At depths of 30 feet or more below the top of bedrock (“deep bedrock”), the rock is characterized by relatively few fractures and may exhibit slightly lower hydraulic conductivity. The deep bedrock can transmit groundwater flow, however, and is the primary zone tapped by private water supply wells north and east of the Site. Thus, local, transmissive fractured zones are also likely to be present in the deep bedrock.

Select samples were evaluated for organic carbon content, geotechnical parameters (i.e., matrix porosity, matrix permeability, and matrix bulk density), and fracture parameters (i.e., fracture spacing, fracture aperture, and fracture porosity). Results of these analyses are summarized in the table below.

Table 1 Summary of Bedrock Matrix and Fracture Parameters

	Matrix Porosity, %	Matrix Permeability, cm/sec	Matrix Bulk Density, g/cm^3	Matrix TOC, mg/kg	Fracture Aperture, cm	Fracture Spacing, cm	Fracture Porosity, %
# Data	18	18	18	18	18	4	4
Mean	7.7	4.2E-07	2.52	4931	0.0096	142	0.0068
Std. Dev.	3.0	8.7E-07	0.10	6780	0.0049	99	0.0074
Min	4.4	4.3E-09	2.33	200	0.0050	14	0.0098
Max	12.9	3.3E-06	2.64	28900	0.077	305	0.028

Bedrock bedding dips approximately 22° to the south-southeast and bedrock fractures are primarily parallel to the bedding, Bedrock fracture aperture was estimated using bulk hydraulic conductivity data (including data from packer tests) for a few bedrock intervals where fracture spacing was also quantified (BBL 1998). Estimated bulk hydraulic conductivity values ranged from 1×10^{-2} to 8×10^{-7} cm/sec (BBL 1998). This wide range of bulk hydraulic conductivity values is expected where the fracture spacing, interconnectedness, and apertures are variable. The bedrock fracture porosity was estimated as the fracture aperture divided by the fracture spacing.

2.3.2 Hydrogeology

Within the Study Area, groundwater is present in the overburden and bedrock units. The overburden and bedrock groundwater is recharged primarily via precipitation, although groundwater underflow also occurs from the north within the saturated zone in the vicinity of the river. Essentially all overburden and bedrock groundwater within the monitored geologic zones ultimately discharges to the Quinnipiac River and associated wetlands (BBL and USEPA 2005). The overburden and bedrock units are hydraulically connected. Where the till layer is relatively thick, it may limit the rate of groundwater flow between the two geologic units. In areas where till is anomalously thin or absent (“till windows”), or lacks fine-grained material, more groundwater flow may occur between the overburden and bedrock units.

Five groundwater monitoring zones (shallow, middle, and deep overburden and shallow and deep bedrock) were designated based on geology and on the desire to add vertical resolution to the presentation of groundwater data. These groundwater monitoring zones are depicted on cross sections of the Site presented on Figures 6 through 9. These five monitored zones are hydraulically connected and comprise a hydrogeologic continuum from the water table downward through the deepest monitored bedrock interval. Deeper sections of bedrock, below the deepest site monitoring well, are also interpreted as part of the regional groundwater flow system.

2.3.2.1 Study Area Overburden Hydrogeology

In the overburden, depth to the water table generally ranges from 0 to 10 ft bgs throughout the Site. Overburden wells are designated as shallow, middle, or deep overburden depending on the vertical position of the well-screen midpoint with respect to the saturated overburden thickness. This procedure provides a means to differentiate between groundwater quality and hydraulic conditions in different vertical zones within the overburden. The procedure was maintained during the evaluation of the hydraulic head (i.e., groundwater elevation, or potentiometric elevation) and groundwater quality data during the RI (BBL 1998).

Groundwater potentiometric surface maps for the three overburden units are available in the RI Report (BBL 1998) and FS Report (BBL and USEPA 2005). Overburden groundwater flow directions are depicted on Figures 10 through 12. The hydraulic properties of the overburden units vary considerably from location to location due to varying grain size distribution and density of the soil deposits. Hydraulic conductivity values of the overburden range from 3×10^{-1} to 3×10^{-4} cm/sec for outwash materials and from 1×10^{-6} to 4×10^{-7} cm/sec for till materials. Overburden hydraulic conductivities in the vicinity of the Operations Area and former Cianci Property are relatively low, on the order of 3×10^{-3} to 3×10^{-4} cm/sec for outwash materials. The saturated overburden units, including the outwash and underlying “gravelly drift,” are considerably thicker and more permeable south of the Site at the Town Well Field Property, where hydraulic conductivity values greater then 3×10^{-1} have been measured. Groundwater preferentially flows through overburden materials with higher hydraulic conductivity values. On a regional scale, the overburden is viewed as heterogeneous and anisotropic.

2.3.2.2 Bedrock Hydrogeology

Bedrock wells are designated as shallow or deep depending on the well screen location. Shallow bedrock wells are screened in shallow (upper 30 feet) bedrock. Groundwater potentiometric maps for the bedrock units are available from the RI Report (BBL 1998). Deep wells are installed to depths of approximately 60 to 90 feet below the top of the bedrock. The designations facilitate further characterization of the three-dimensional COC distribution and groundwater flow directions. Apparent bedrock groundwater flow directions are depicted on Figures 13 and 14.

Groundwater migration in bedrock is dominated by the presence and interconnection of bedrock fractures rather than by the unfractured matrix of the original bedrock strata. Bedrock flow is expected to be most efficient parallel to the bedding-plane fractures (i.e., within the plane of bedding) and least efficient perpendicular to the plane of bedding. The hydraulic properties of the fractured New Haven Arkose bedrock are interpreted as highly heterogeneous on a small scale (meters to tens of meters) due to the variable spacing and connectedness of bedrock fractures; however, on a regional scale, the bedrock is believed to be relatively homogeneous and anisotropic (BBL and USEPA 2005).

2.3.2.3 Groundwater Use

Within the Study Area, the only known current domestic use of ground water occurs in homes along Lazy Lane to the west of and hydraulically upgradient of the Site (BBL and USEPA 2005). These wells are not impacted by COCs related to the Site. The private wells historically situated nearest the Site have been abandoned and the properties have been connected to the municipal water supply. The remainder of the Study Area is supplied with municipal water (Southington Water Department [SWD] January 1997 and August 1997). Approximately 85 homes on the hill west of the Site also use domestic wells for their water supply, but these wells are located approximately 1,000 to 2,500 feet upgradient (west) of the western boundary of the Site (HNUS 1994; SWD 1997).

The SWD currently has nine municipal water supply wells in their inventory as well as three surface water reservoirs. The only potential sources of municipal water supply in the vicinity of the Site are Wells No. 4 and 6, which have been out of service since 1979-1980 due to the presence of VOCs in their discharge water (BBL and USEPA 2005). The two currently operating production wells that are closest to the Site are Well No. 3, which is approximately 0.8 miles southeast of the Site, and Well No. 1A, which is 1.1 miles south of the Site. These wells are not currently affected by COCs related to the Site (BBL and USEPA 2005). Although Town Production Wells No. 4 and 6, the production wells nearest to the Site, have not been used since approximately 1979, the Town has the right to reactivate the wells at any time (BBL and USEPA 2005). However, the Town has no current plans to reactivate these wells. As required by the SOW, a Memorandum of Agreement will be established between USEPA and the SWD/Town of Southington setting forth the timing and procedure through which the SWD/Town of Southington would determine, obtain the necessary CTDEP and CT Department of Health approvals for and notify USEPA of duly approved municipal plans to reactivate Production Wells No. 4 and/or No. 6, or to install or use other water supply wells in the Town Well Field Property.

2.3.3 Study Area Surface Water Hydrology and Surface Water Use

Surface water from precipitation falling within the Operations Area generally drains to the east, with surface runoff collected in a ditch on the west side of the existing railroad right-of-way. This ditch also collects runoff from areas to the north of the Operations Area, including areas north of Lazy Lane. An existing 30-inch culvert conveys water from this ditch easterly to the Quinnipiac River (BBL and USEPA 2005).

The former Cianci Property currently drains by overland flow to the east towards the Quinnipiac River and adjoining wetland and low-lying areas. The Town Well Field Property also drains by overland flow towards the east, although an intermittent stream collects some runoff in the eastern and central portions of the property (BBL and USEPA 2005).

The Quinnipiac River is not used as a drinking water supply; however, nearby drinking water wells could be affected by the river (BBL and USEPA 2005). For example, public supply wells and large-capacity cooling water wells situated near the river could induce infiltration of river water. Urban runoff resulting from extensive paving of the river basin is likely the source of COC presence within the river (HNUS 1994). Adjacent to and south of the Site there is limited access to the Quinnipiac River, as it is a narrow, shallow meandering channel bordered by steep banks along Queen Street to the east and the Town Well Field Property to the west. Seasonally low water and lack of access leads to little to no recreational use of the river in the vicinity of the Site (BBL and USEPA 2005). Downstream of the Site, the Quinnipiac River is used for recreation from Southington to its mouth in New Haven Harbor (BBL and USEPA 2005). Two recreational areas within the Town of Southington, but at least two miles downriver of the Site, provide public access to the river, including canoe access points.

2.4 Transport, Distribution, and Mass of COCs in Groundwater

During completion of the RI, the hydrogeologic and groundwater quality conditions at the Site were characterized using an extensive network of monitoring wells, extraction wells, wetland drive points, and piezometers. Based on the results of these evaluations, the extent of NAPL and dissolved phase COCs in overburden and bedrock groundwater were delineated or estimated and primary transport mechanisms were inferred (BBL 1998).

2.4.1 NAPL Zones

Based on COC concentrations in unsaturated (vadose zone) soils, NAPL entered the subsurface within the Operations Area (BBL 1998). Elevated concentrations of COCs in vadose zone soil suggest that solvent VOCs likely entered the subsurface in varying quantities at several locations within the Operations Area. Observations of light NAPL (LNAPL) in Site groundwater have been limited and most NAPL released to the subsurface likely was denser than water. Samples of dense NAPL (DNAPL) collected from select wells had a density of approximately 1.1 gm/cm^3 indicating that the NAPL is denser than water and would preferentially sink in groundwater.

DNAPL migration is generally not affected by hydraulic gradients; rather, the effect of geologic heterogeneity dominates the migration and distribution of NAPL in field situations (Pankow and Cherry 1996). Even in relatively homogenous sandy soils, DNAPL migration is controlled by extremely subtle differences in soil structure, permeability, and displacement pressure characteristics (Poulsen and Kueper 1992). Stratigraphic features that are not visually discernable in the field can halt or redirect the downward migration of DNAPL (Pankow and Cherry 1996). Because the NAPL migration is dominated by the structure of subsurface media, laterally continuous low-permeability layers may serve as (partial) capillary barriers to downward DNAPL migration.

DNAPL can migrate further in subsurface media characterized by a relatively high degree of heterogeneity, such as the overburden and the fractured New Haven Arkose bedrock, because the NAPL penetrates primarily or exclusively the more permeable pathway, leaving the remainder of the formation essentially free of NAPL. Thus, NAPL tends to penetrate in narrow, elongated distributions, such that invasion by even small volumes of NAPL can result in extensive spreading (Pankow and Cherry 1996).

In the overburden, gravel lenses are observed. These gravel lenses may represent stream channels in the outwash deposits and present potential pathways for NAPL accumulation and migration, and are likely complex and discontinuous in their distribution. Thus, the distribution of mobilized NAPL is likely sporadic, with many small pools scattered throughout the overburden NAPL zone, rather than a large accumulation in any individual stratum.

The basal till beneath the Operations Area, where present, appears to have behaved as a relatively effective capillary barrier, based on the generally lower concentrations of COCs in till versus overlying overburden materials (BBL 1998). However, boreholes drilled through the till, including several OIS extraction wells, may have provided a preferential vertical pathway for downward migration of DNAPL to bedrock (BBL 1998). The bedrock fracture network represents the likely DNAPL migration pathway within bedrock. NAPL within fractures may be reduced from mobile to residual due to the influence of matrix diffusion.

As part of the RI, "probable" and "potential" NAPL zone boundaries in both overburden and bedrock were delineated (BBL 1998). A subsequent field-based NAPL delineation study in support of the FS further refined the area in the overburden where most of the NAPL appears to be located (BBL and USEPA 2005). The Overburden NAPL area is shown on Figure 15. The estimated extent of NAPL in bedrock is shown on Figure 16.

2.4.2 Dissolved-Phase Groundwater Plume

Dissolved-phase COCs migration is strongly influenced by hydraulic gradients and hydraulic conductivity. Migration of the dissolved COC plume will preferentially occur in zones of higher hydraulic conductivity and gradient. In the overburden, dissolved COC migration will preferentially occur within coarser-grained material. In bedrock, dissolved COC migration will preferentially occur within the bedrock fracture system.

The shallow overburden groundwater VOC plume associated with the Site extends approximately 300 feet east of the Operations Area and the NTCRA 1 Containment Area (Figure 10). The middle overburden groundwater VOC plume associated with the Site extends into the center of the Town Well Field (Figure 11). The southern extension of the middle overburden VOC plume attenuated to below regulatory standards following the startup of the NTCRA 2 groundwater capture system. The deep overburden groundwater VOC plume associated with the SRSNE Site extends into the northern portion of the Town Well Field Property (Figure 12). A second unrelated VOC source is interpreted near the southwestern portion of the Town Well Field Property. The shallow and deep bedrock groundwater VOC plumes associated with the Site extend into the central portion of the Town Well Field Property (Figures 13 and 14).

Groundwater COC plumes with dissolved VOC concentrations in excess of drinking water standards ("regulatory VOC plumes") were delineated during the RI based on fundamental groundwater hydraulics and solute-transport principles, as well as exceedances of regulatory criteria such as Federal Maximum Contaminant Levels (MCLs) and State of Connecticut Class GA/GAA Groundwater Protection Criteria (BBL 1998). The regulatory VOC plumes were re-evaluated based on groundwater monitoring results from the April 2005 (final) sampling event of the Interim Monitoring and Sampling (IMS) program (BBL 2005). The IMS program was performed to monitor the status of the plume between the completion of the RI and the issuance of the ROD, and covered 14 semi-annual sampling events at 25 monitoring wells. Based on a comparison of the April 2005 plume extent (Figures 10 through 14) with plume extent shown in the RI (BBL 1998), the southward extent of SRSNE-related COCs with concentrations above MCLs or GWPCs has decreased in middle and deep overburden and shallow bedrock groundwater since the completion of the RI and startup of the NTCRA 2 groundwater capture system. Overburden and bedrock groundwater capture area boundaries are shown on Figures 17 and 18.

2.4.3 VOC Mass Estimate

The total VOC mass at the Site is estimated to be 546,700 kg and is thought to be distributed approximately as follows (BBL and USEPA 2005):

- *Unsaturated Soil*: 2,200 kg sorbed and dissolved, and 1,300 kg as NAPL; for a total of 3,500 kg, or 0.64% of the estimated total VOC mass

- *Overburden NAPL Area*: 460,000 kg as NAPL, or 84% of the estimated total VOC mass

- *Overburden Groundwater*: 1,900 kg dissolved, 9,300 kg sorbed; for a total of 11,200 kg, or 2.1% of the estimated total VOC mass

- *Bedrock*: 39,000 kg dissolved and sorbed (combined), 33,000 kg NAPL, or 7.1% and 6.0% of the estimated total VOC mass, respectively

In summary, the majority of the VOC mass is in the form of NAPL in the Overburden NAPL Area.

2.5 Summary of Planned Remedial Action

Various remedial alternatives intended to address the affected media and areas of the Site were identified and evaluated in the May 2005 *Feasibility Study Report* (BBL and USEPA 2005). The *Feasibility Study Report* also identified the proposed remedial approaches selected for each specific area/medium, and served as the basis for the overall remedial approach described in the ROD.

As described in the ROD, the remedy selected for the SRSNE Superfund Site is a comprehensive remedy that incorporates source control and management of migration components to address all impacted areas at the Site. The USEPA determined that the final remedy is consistent with the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), is protective of human health and the environment, complies with applicable or relevant and appropriate requirements (ARARs), is cost-effective, incorporates permanent solutions and alternative treatment or resource recovery technologies to the extent possible, satisfies the preference for treatment, and includes provisions for five-year reviews.

The specific objectives and scope of the remedy are summarized below. Also provided below is a summary of the SOW-specified Performance Standards applicable to the specific media and areas of the Site.

2.5.1 Objectives

Prior to the development and screening of remedial alternatives in the *Feasibility Study Report* (BBL and USEPA 2005), response action objectives (RAOs) were established based on types of constituents, environmental media of concern (e.g., soil, groundwater) and potential exposure pathways. The RAOs were developed to guide plans to mitigate, restore, and/or prevent existing and future potential threats to human health and/or the environment from soil and wetland soil, overburden and bedrock groundwater, and NAPL in the overburden and bedrock aquifers; and to meet ARARs. The specific RAOs presented in the ROD are summarized in the following table:

Table 2 Remedial Action Objectives

Site Area/ Medium	Protection of Human Health	Protection of the Environment
Former SRSNE Operations Area/ Railroad Soil	• Prevent potential human exposure (dermal contact, ingestion and inhalation) to soil with constituents that exceed an excess carcinogenic risk of 10^{-4} to 10^{-6}, that pose a non-carcinogenic Hazard Index greater than 1, or that exceed ARARs. • Prevent migration of constituents from soils to groundwater that would result in groundwater concentrations in excess of ARARs or which otherwise present an unacceptable risk in groundwater.	• Prevent migration of constituents from soils to groundwater that would result in groundwater concentrations in excess of ARARs.
Former Cianci Property Soil	• Same as Former SRSNE Operations Area/Railroad Soil Area.	• Prevent ecological risks associated with SRSNE-related constituents.
Overburden NAPL Area	• Reduce or stabilize constituents in the Overburden NAPL Area that would otherwise result in groundwater concentrations that pose a carcinogenic risk in excess of 10^{-4} to 10^{-6}, non-carcinogenic Hazard Index greater than 1, or that exceed ARARs.	• Reduce constituents in the Overburden NAPL Area to achieve one or more of the following: - Shorten the timeframe that groundwater standards are exceeded - Shrink the size of the groundwater plume - Reduce groundwater constituent concentrations - Prevent the migration of NAPL

Site Area/ Medium	Protection of Human Health	Protection of the Environment
Overburden Groundwater	• Prevent potential human exposure (dermal contact, ingestion and inhalation) to groundwater in the overburden aquifer with constituents that pose an excess carcinogenic risk of 10^{-4} to 10^{-6}, non-carcinogenic Hazard Index greater than 1, or that exceed ARARs.	• Restore groundwater quality to meet ARARs.
Bedrock NAPL Area	• Minimize expansion of the extent of impacted bedrock groundwater due to further NAPL migration.	• Minimize expansion of the extent of impacted bedrock groundwater due to further NAPL migration.
Bedrock Groundwater	• Prevent potential human exposure (dermal contact, ingestion and inhalation) to groundwater in the bedrock aquifer with constituents that pose an excess carcinogenic risk of 10^{-4} to 10^{-6}, non-carcinogenic Hazard Index greater than 1, or that exceed ARARs.	• Prevent continuing migration of constituents that exceed ARARs; and restore bedrock groundwater to meet ARARs once VOC residuals are depleted.

2.5.2 Scope

The selected remedy, developed by combining components of different alternatives for source control and management of migration to obtain a comprehensive approach for Site remediation, was described in the ROD. Key elements are summarized as follows and depicted on Figure 4:

- Treat waste oil and solvents – where present as NAPL in the subsurface in the overburden aquifer (i.e., the Overburden NAPL Area) – using in-situ thermal treatment.

- Following in-situ thermal treatment, cap the former SRSNE Operations Area and the railroad right-of-way. The cap will be low-permeability and multi-layered and is to be designed, constructed, and maintained to meet the requirements of RCRA Subtitle C type cap (“RCRA C”).

- Excavate soils exceeding cleanup levels from certain discrete portions of the former Cianci Property. The estimated limits of soil removal on the former Cianci Property (five discrete excavation areas) are shown on Figure 4; these limits are subject to modification based on additional sampling proposed as part of remedial design. Provided that concentrations of polychlorinated biphenyls (PCBs) do not warrant off-site disposal, soils excavated from the former Cianci Property (and from other areas excavated outside the cap limits as part of other RD/RA activities) may be relocated to the former SRSNE Operations Area for placement beneath the cap.

- Capture and treat (on site) groundwater in both the overburden and bedrock aquifers that exceeds applicable federal drinking water standards and risk-based levels. This will be achieved through continued operation, maintenance, and modification (as needed) of the HCTS.

- Monitored natural attenuation (MNA) of the groundwater plume outside the capture zones (i.e., the severed plume, shown on Figure 3A) that exceeds cleanup levels.

- MNA of constituents in the groundwater plume inside the capture zones and within the Bedrock NAPL Area (Figure 3B).

- Implement institutional controls (i.e., Environmental Land Use Restrictions [ELURs]) to minimize the potential for human exposure to Site-related constituents in the subsurface soils and impacted groundwater and to prohibit activities that might affect the performance or integrity of the cap.

- Monitor groundwater and maintain the cap over the long term.

2.5.3 Performance Standards

Section IV of the SOW establishes Performance Standards for the various affected media at the SRSNE Site. It also establishes Performance Standards for other aspects of the RD/RA, including subsurface NAPL in the overburden and bedrock aquifers, performance of the multi-layer cap, hydraulic containment and treatment, the severed plume, habitat restoration, environmental monitoring, and institutional controls. These non-media-specific Performance Standards are summarized and addressed (to the extent applicable at this point in the RD/RA process) in the various taskspecific work plans summarized in Section 3 and included as attachments to this document.

In support of the development of this RDWP, and as required by SOW Section V.C.1.i, Performance Standards for soil, wetland soil, and groundwater have been reviewed and compared to the current applicable USEPA and CTDEP standards and guidance. Based on this review, it was concluded that none of the USEPA or CTDEP criteria for Site-related constituent have been revised since the ROD was issued. However, the CTDEP has published a lower detection limit for 1,2,4-trichlorobenzene in water (0.5 micrograms per liter [ug/L] rather than the prior value of 2 ug/L). Because the detection limit is the cleanup level for groundwater (discussed below), this modification is noted on the copy of Table L-1 from the ROD that is provided as Appendix 1 to this RDWP. No other modifications were warranted to Tables L-1 or L-2 of the ROD to reflect current published guidance and standards. The remainder of this section discusses the applicability of the media-specific Performance Standards (i.e., “cleanup levels”) for groundwater and soil specified in the SOW along with factors regarding the applicability of the various standards.

Groundwater: Interim cleanup levels for groundwater are specified by the USEPA in Table L-1 of the ROD; a copy of the table is included in Appendix 1 to this RDWP. These levels were developed in consideration of USEPA Maximum Contaminant Levels (or Goals) (MCL/MCLGs) for groundwater and the CTDEP groundwater standards established in the Connecticut Remediation Standard Regulations (RSRs). While the interim cleanup levels in Table L-1 are consistent with ARARs, the levels are considered “interim” because the cumulative risk posed by these COCs, after attainment of the interim cleanup levels, may still exceed the USEPA's risk management standard. Accordingly, a site-specific risk assessment will be conducted to evaluate cumulative risk associated with consumption of residual Site-related constituents once the interim groundwater cleanup levels are achieved (in accordance with SOW Section IV.A.1). In its review of the residual risk assessment, USEPA may determine that the residual groundwater concentrations are within USEPA’s risk management standards. In this case, the SOW states that the residual groundwater concentrations shall constitute the final Cleanup Levels for Site groundwater and shall be considered Performance Standards for any remedial action regarding Site groundwater.

The RSRs include multiple groundwater-based standards intended to be protective of specific exposure types and/or receptors. These include the Groundwater Protection Criteria (GWPC), the Groundwater Volatilization Criteria (GWVC), and the Surface Water Protection Criteria (SWPC). However, for designated "GA" groundwater quality areas (as is applicable for the Site), the RSRs require "reduction of each substance therein to a concentration equal to or less than the background concentration…" For VOCs, background levels are concluded to be non-detect. In this case, the analytical detection level, as defined by the RSRs, becomes the remedial goal. This is reflected on Table L-1, where the interim cleanup levels for VOCs reflects the analytical detection level. Therefore, while the RSRs indicate specific types of groundwater standards reflective of different end uses, the overriding long-term goal is to achieve non-detect levels for these constituents.

Groundwater sampling is proposed as part of the RDWP activities referenced in Section 3 and further discussed in attachments to this RDWP. The resulting data, in combination with prior groundwater analytical data and published values, where appropriate, will be used for the purpose of assessing background concentrations and establishing interim cleanup goals (refer to Note 1 in Table L-1 provided in Appendix 1).

Soil and Wetland Soil: Cleanup levels for soil and wetland soil are specified in Table L-2 of the ROD; a copy of the table is provided in Appendix 1 of this RDWP. These cleanup levels apply to soil beyond the extent of the cap in the former SRSNE Operations Area and along the railroad right-of-way; and in soil and wetland soil on the former Cianci Property after the excavation of the five areas shown on Figure 4. The depths to which the Cleanup Levels apply are based on the CTDEP RSRs. In general, the Residential Direct Exposure Criteria (RDEC) applies to all soils between the surface and 15 feet bgs. The Pollutant Mobility Criteria for GA groundwater classification areas (PMC) apply to soils located above the seasonal low groundwater table. However, some exceptions apply to both the RDEC and PMC, and there are alternative ways to compare analytical results to the criteria. These issues are described below, and will be considered when applying soil-based cleanup levels in the course of RD/RA activities.

With the exception of PCBs, if soils are rendered "inaccessible," as defined by the CTDEP RSRs, then the RDEC do not apply, as long as an ELUR is in place that restricts disturbance of soils beneath the subject area. Inaccessible soils are defined by the CTDEP as soils that are one or more of the following:

- more than four feet below ground surface
- more than two feet below a three-inch minimum paved surface
- beneath an existing building
- beneath any other permanent structure approved by the Commissioner of the CTDEP

For PCBs, if the concentration of PCBs is 10 ppm or less in inaccessible soils, the RDEC do not apply. As indicated in Section 2.5.2, an ELUR is a planned component of the remedial approach for the Site. Accordingly, RDEC-based soil cleanup levels will not apply to soils meeting one or more of the inaccessibility criteria listed above.

With the exception of VOCs, the PMC do not apply to soils that are "environmentally isolated", as defined by the CTDEP. Environmentally isolated soils are those which meet all of the following:

- located beneath an existing building or other permanent structure as approved by the CTDEP Commissioner
- not a continuing source of pollution
- not impacted with VOCs
- located above the seasonal high water table

In addition to the above exception to the PMC, for inorganics and PCBs, analytical results from the Toxicity Characteristic Leaching Procedure (TCLP) or the Synthetic Precipitation Leaching Procedure (SPLP) can be compared directly to the PMC; or, mass analytical results, when divided by 20, may be compared to the GWPC. Note that if the mass analytical results indicate that PCBs are less than 1 mg/kg, then further analysis via TCLP or SPLP is not required to comply with the PMC (CTDEP 2005). Lastly, for inorganics and PCBs in a GA groundwater classification area, TCLP or SPLP analytical results can be compared to ten times the GWPC; or mass analytical results can be compared to ten times the PMC if the release area is at least 25 feet away from the downgradient property line, there is no non-aqueous phase product, and if the water table is at least 15 feet above bedrock.

With respect to dioxin sampling, the Site-specific cleanup level for dioxins has not yet been determined. In accordance with SOW Section V.C.1.i, soil sampling for the purpose of assessing background dioxin concentrations will be performed as part of the planned RDWP activities (Section 3). Because “dioxin” generically refers to 210 congeners of polychlorinated dibenzo-p-dioxins and polychlorinated dibenzofurans, cleanup goal evaluations for dioxin will be based on evaluation of the Toxic Equivalence Quotient (TEQ) for 2,3,7,8-tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD). This specific congener is considered to be the most toxic form among the 210 dioxin and furan congeners. The TEQ will be calculated based on World Health Organization (WHO) 2005 Toxic Equivalency Factor (TEF) values, or any updates that may be published prior to remedy implementation. In Table L-2 of the ROD, the cleanup level for dioxin is given as the lesser of the 1 part per billion (ppb) 2,3,7,8-TCDD TEQ (per USEPA’s OSWER Directive # 9200.4-26, April 1998) or the background value, or an alternate value that is consistent with the CTDEP RSRs (but not lower than background).

3. Overview of Pre-Design Support Activities

As required by Section V.C.1 of the SOW attached to the CD, this RDWP includes descriptions of a series of pre-design and design-related activities that are to be undertaken to support the final remedial action. There are a total of 15 attachments to this RDWP – all are either specifically required under the SOW or proactively developed to facilitate design and implementation of specific components of the final remedy.

The following table summarizes the various supporting documents attached to this RDWP, including the Attachment reference, plan title, SOW section(s) addressed (where applicable), and general content of each plan.

Table 3 Pre-Design Work Plans

Attachment Reference	Plan Title	SOW Section(s) Addressed	General Content
A	*Overburden NAPL Delineation Plan*	V.C.1.a	Describes planned investigation to delineate the extent of NAPL in the overburden in the northwest corner of the former Operations Area and includes provisions for collection of samples to support ISTR pre-design testing.
B	*Thermal Treatment Monitoring Plan*	V.C.1.b	Describes the scope and approach for monitoring air quality within and around the perimeter of the ISTR area during construction, implementation, and demobilization activities to minimize potential impacts to onsite workers and the community. This plan also includes an action level exceedance plan that provides the USEPA, CTDEP, and the community with the information they need to recognize and respond to a release.
C	*Thermal Treatment Performance Criteria Work Plan*	V.C.1.c	Describes the scope and approach for performance monitoring of the In-Situ Thermal Desorption (ISTD) system to determine the progress, demonstrate compliance with the applicable permit equivalency requirements, and monitor the quality of any air or water discharges from the system.

Attachment Reference	Plan Title	SOW Section(s) Addressed	General Content
D	*Vapor Treatment Needs Evaluation Work Plan*	V.C.1.d	Evaluates commercially available and proven vapor treatment technologies suitable for treating both the range and anticipated mass load of the SRSNE Site COCs. Focus is on the use of thermal oxidation with and without condensing.
E	*System Design Evaluation Work Plan*	V.C.1.e	Describes the scope and approach for undertaking two design evaluations to support the In-Situ Thermal Desorption (ISTD) system design: 1) a materials compatibility study to evaluate the potential for corrosion of subsurface and above ground system components, and 2) numerical calculations upon which to base the sizing of the heating and treatment equipment.
F	*NAPL Mobilization Assessment and Mitigation Plan*	V.C.1.f	Describes the potential for DNAPL mobilization during ISTD implementation and the safety measures that will be implemented to prevent mobilization and to mitigate it if it occurs. This plan also references other plans and design documents that describe system features designed to minimize vapor releases.
G	*Post-Excavation Confirmatory Sampling Plan*	V.C.1.g	Describes approach for bottom and/or sidewall sampling to confirm achievement of cleanup levels in areas where soil excavation is performed to address soils exceeding established cleanup goals.
H	*Habitat Restoration Work Plan*	V.C.1.h	Describes plan for assessing, mitigating impacts to, restoring, and monitoring restored habitat areas during RD/RA activities.
I	*Soil Investigation Plan*	V.C.1.i	Describes plan for soil sampling to establish background dioxin concentrations in soil, confirm the extent of the cap areas, and further assess/delineate the targeted soil removal areas on the former Cianci Property.

Attachment Reference	Plan Title	SOW Section(s) Addressed	General Content
J	*Vapor Control System Evaluation*	V.C.1.j	Describes the approach for assessing the potential need for vapor controls as a component of the RCRA C cap to be constructed in the former SRSNE Operations Area.
K	*Vapor Intrusion Study Work Plan*	V.C.1.k	Describes the approach to evaluating the potential for vapor intrusion (VI) from groundwater. Outlines steps to be taken based on results of screening level comparisons.
L	*Monitored Natural Attenuation Plan*	V.C.1.l and VII.A.1	Describes the Site Conceptual Model developed in support of selection of MNA as a remedy for constituents in Site groundwater, and presents the *Performance Monitoring Plan* for the MNA portion of the overall Site remedy.
M	*Pre-ISTR Preparation Plan*	N/A	Describes initial Site preparation activities to be performed prior to implementing the in-situ thermal treatment component of the remedy.
N	*Monitoring Well Network Evaluation and Groundwater Monitoring Program*	V.C.1.m	Describes planned modifications to the groundwater monitoring network, presents various aspects of the monitoring program, and summarizes the scope and timing for the monitoring events. The evaluation considered the anticipated need for groundwater monitoring to address various SOW requirements, including MNA evaluations, compliance monitoring, VI evaluations, and monitoring during ISTR implementation.
O	*Groundwater Containment and Treatment Evaluation and Optimization Study Work Plan*	V.C.4	Describes the proposed approach for evaluating and optimizing the performance of the groundwater extraction and treatment system after groundwater conditions return to equilibrium after in-situ thermal treatment.

This RDWP is also supported by the separately bound RD POP, which provides information and procedures related to the performance of work activities described in this RDWP. The RD POP includes information regarding the RD/RA project schedule, and includes several supporting attachments as summarized in the following table.

Table 4 Pre-Design Work Plans

RD POP Attachment	Scope/Content
A - Site Management Plan (SMP)	The SMP describes how the RD activities will be managed. The overall objective of the SMP is to provide USEPA and CTDEP with a written understanding of how various project aspects such as access, security, contingency procedures, management responsibilities, waste disposal, budgeting, and data handling will be performed by the SRSNE Site Group.
B - Sampling and Analysis Plan: Field Sampling Plan (FSP)	The FSP establishes sample collection and field monitoring methods and procedures to ensure that sampling and investigatory activities are conducted in a consistent manner and in accordance with technically acceptable protocols. The objective of the FSP is to facilitate the collection of environmental monitoring data that meets Data Quality Objectives (DQOs) established in the QAPP.
C - Sampling and Analysis Plan: Quality Assurance Project Plan (QAPP)	The QAPP supplements the RDWP and presents the sampling and analytical methods and procedures that will be used during RD investigations at the Site. It integrates the technical and quality aspects of the project into an approach for obtaining the type and quality of environmental data and information needed for a specific decision or use.
D - Health and Safety Plan (HASP)	The HASP establishes the minimum procedures, personnel responsibilities and training necessary to protect the health and safety of all on-site personnel during the RD activities, including routine but potentially hazardous field activities and unexpected site emergencies.
E - Community Relations Support Plan (CRSP)	The CRSP summarizes pertinent information regarding the Site history and anticipated public involvement activities, and describes how the SRSNE Site Group will support USEPA's implementation of a Community Relations Support Plan.

4. Summary of Remedial Design Process

Section V of the SOW describes the requirements of the RD phase of the work. This initially includes (SOW Section V.A) a requirement for continued operation of the existing NTCRA 1 and NTCRA 2 groundwater extraction and treatment system upon lodging of the CD. Such operation will be consistent with past requirements, terms, agreements and work plans incorporated under the NTCRA 1 and NTCRA 2 AOCs (CERCLA docket numbers I-94-1095 and I-97-1000, respectively). Upon entry of the CD, the system became a component of the remedial approach for the Site, and is now known as the "Hydraulic Containment and Treatment System" (HCTS).

The remainder of SOW Section V outlines a four-step RD process consisting of:

1. initial remedial steps (SOW Section V.B)

2. design initiation (SOW Section V.C)

3. conceptual design (SOW Section V.D)

4. design completion (SOW Section V.E)

These RD elements are further described below. In addition, Section 4.4 identifies planned measures for phasing and streamlining the RD process for the Site.

4.1 Initial Remedial Steps Phase

The initial remedial steps phase includes certain activities triggered by lodging of the CD (which occurred on October 30, 2008), and others triggered by entry of the CD (which occurred on March 26, 2009). Activities triggered by lodging of the CD are primarily related to identification of key contractors. The requirements of this phase include the selection of a Supervising Contractor, Project Coordinator, and Remedial Design Contractor. The SRSNE Site Group has completed these requirements, selecting *de maximis, inc.* as the Supervising Contractor, Mr. Bruce Thompson of *de maximis, inc.* as the Project Coordinator, and ARCADIS as the Remedial Design Contractor. This notification was made on November 7, 2008 and approved by the USEPA on December 22, 2008.

This phase also includes certain activities that were triggered by entry of the CD by the Court. These include development of several documents and initiation of coordination with the Town of Southington with regard to the Town's procedure for reactivating, installing, or using water supply wells in the Town Well Field. Specific documents required under this section are a Memorandum of Agreement (MOA) (Section V.B.3), Supplemental Containment Action Plan (Section V.B.5), and Institutional Controls Plan (Section V.B.7). The content and submittal timeframe associated with these documents is further described in Section 5.

Finally, the initial remedial steps phase calls for (if requested by USEPA) meetings with the USEPA and Town officials to discuss the MOA (Section V.B.4), implementation of the Supplemental Containment Action Plan once approved by USEPA (Section V.B.6), and implementation of the Institutional Control Plan once approved by USEPA.

4.2 Design Initiation Phase

The design initiation phase calls for the development and submittal of the RDWP and the RD POP. The elements of this RDWP are described throughout this document, and generally include a summary of pertinent Site information, a summary of the RD process, identification of RD-related deliverables, and identification of various pre-design activities proposed to support development of later stages of the RD. As required by the CD, this work plan is intended to provide an approach for achievement of the Performance Standards and other requirements included in the ROD, CD and SOW.

The RD POP, which has been developed and submitted to USEPA concurrent with this RDWP, includes a series of site-specific plans that establish the procedures to be followed when carrying out the field, laboratory, and analysis work for the RD.

The design initiation phase also requires the performance of a groundwater containment and treatment evaluation and optimization study. A work plan for this study is provided as Attachment O to this RDWP. This study is to be performed following implementation of the ISTR component of the remedy for the purposes of:

a. Demonstrating that the SOW-specified Performance Standards for the hydraulic containment and treatment system and severed plume are being met

b. Proposing modifications or enhancements to the hydraulic containment and treatment system if the Performance Standards are not met, or if such modifications will increase effectiveness and/or decrease the costs or time of operation

c. Evaluating the effectiveness of the demonstration of compliance requirements set forth in Attachment B of the SOW

SOW Section V.C.5 allows for incorporation of USEPA-approved modifications to the hydraulic containment and treatment system following implementation of the evaluation and optimization study. SOW Section V.C.6 allows for additional optimization studies at the direction of the USEPA or request of the SRSNE Site Group, with a frequency of no less than every 10 years.

4.3 Conceptual Design Phase and Design Completion Phase

Sections V.D. and V.E. of the SOW provide for a "typical" remedial design process that calls for the development and submission of remedial design packages at the 30% conceptual design, 95% pre-final design, and 100% final design stages for the remedial approach. This section summarizes the approach that is laid out in the SOW because it establishes the baseline RD approach. However, Section 4.4 identifies anticipated modifications to the approach that are necessitated by other SOW requirements or that target more timely implementation of RD/RA activities.

The specific types of information to be included at each level are specified in Sections V.D. and V.E. of the SOW and summarized in the following table:

Table 5 Conceptual Design Phase Summary

Design Phase	Key Content
Conceptual (30%)	• Results of pre-design activities, the basis of design (including assumptions) and project delivery strategy. • Plans, drawings, sketches, calculations and technical specifications at 30% design stage. • Draft statement of regulatory compliance with ARARs. • Draft construction environmental monitoring plan. • Initial draft Remedial Action Work Plan (RAWP) and revised POP. • Sampling program for the ISTR component to determine whether Overburden NAPL Cleanup Levels have been obtained.
Pre-Final (95%)	• All revisions required by USEPA and/or CTDEP based on review of the conceptual design. • Revised basis of design, with changes noted. • Plans, drawings, sketches, calculations and technical specifications at 95% design stage. • Final draft RAWP, revised POP, regulatory compliance statement and construction environmental monitoring plan. • List of pre-qualified contractors. • Draft operations and maintenance (O&M) plan.
Final (100%)	• All revisions required by USEPA and/or CTDEP based on review of the pre-final design. • Revised basis of design, with changes noted. • Plans, drawings, sketches, calculations and technical specifications at 100% final design stage. • Updated draft RAWP and revised POP. • Final regulatory compliance statement and construction environmental monitoring plan. • Contingency Plan to address on-site workers and the local affected population in the event of an accident or emergency. • Constructability Review Report to evaluate the suitability of the project and its components in relation to the Site.

The conceptual and pre-final design packages are subject to review and approval or modification by the USEPA, with reasonable opportunity for review and comment by the CTDEP. USEPA approval or modification of these packages then triggers the next submittal package within SOW-specified timeframes (i.e., 90 days for the pre-final design package following approval of the conceptual design and 45 days for the final design package following approval of the pre-final design).

The initial design submittal will also include details on the establishment of the Independent Quality Assurance Team (IQAT), as required under Section V.D.1.i of the SOW. The IQAT will review the design, train construction quality assurance inspection personnel, schedule and coordinate construction quality assurance inspections, verify a quality control plan for the construction is in place and implemented, perform periodic independent inspections, and report all results.

The RD process described in the SOW also requires at least two technical information meetings during these phases – one to discuss the conceptual design package, and a second to discuss the final design. These meetings will be attended by representatives of the USEPA, CTDEP, and SRSNE Site Group at a mutually convenient date following submittal of the respective packages. The SRSNE Site Group will prepare meeting minutes and address comments received from the agencies during these meetings in writing.

4.4 Remedial Design Approach

Relative to the RD process described in the SOW and summarized above, the SRSNE Site Group anticipates two key modifications to the approach for delivering remedial design packages. First, for the main components of the remedial approach, design deliverables will be prepared and submitted on separate timelines. Second, to the extent possible, the design deliverable packages will be reduced from three (conceptual/pre-final/final) to two (conceptual and final). This approach, along with the rationale and ancillary implications, is described below.

4.4.1 RD Timelines for Key Remedy Components

The use of separate timelines for key remedial components is consistent with SOW Section V.C.3, which includes a provision for key phases of remedial design and action to proceed on separate timelines. Furthermore, this approach is necessitated by the SOW-specified inter-relations of specific work tasks. For example, Section V.C.1.j of the SOW requires an evaluation of whether or not the cap to be installed in the Operations Area will require a vapor control system. It also requires that this evaluation be performed after implementation of the ISTR component of the remedy. Therefore, the design and implementation of the ISTR component must occur before the design of the cap can be completed. This will require separate timelines for design of the ISTR and cap components of the remedy. Finally, developing RD deliverables on separate timelines is expected to result in the most timely implementation of remedial actions. This is based on the fact that it allows certain design elements to proceed as soon as possible rather than delaying them while awaiting information critical to subsequent design elements. Also, it will result in smaller, more focused project deliverables that may facilitate reduced agency review timeframes.

For this project, the SRSNE Site Group anticipates that the remedial design packages will proceed on separate tracks for three aspects of the remedy:

- **Pre-ISTR Site preparation activities:** This component would address certain activities necessary to prepare the Site for implementation of ISTR, including culvert relocation, grading of the treatment area, and modification of the hydraulic containment and treatment system to accommodate the ISTR activities. The conceptual design for this phase of the work is addressed in Attachment M to the RDWP.

- **ISTR:** This component would address the ISTR activities, including thermal well installation, installation of a temporary surface cover, installation and operation of the ISTR system, verification sampling, and demobilization.

- **Excavation and Capping:** This component would address soil excavation on the Cianci Property, consolidation beneath the cap area, and cap construction for the Operations Area and railroad right-of-way.

Because the hydraulic containment and treatment system already exists, the RD phases described above will not be applicable to the design of this system. Rather, modifications to the system will be evaluated and implemented consistent with the SOW-specified process, including the groundwater containment and treatment evaluation and optimization study.

4.4.2 RD Phases

Whereas the SOW prescribes an RD approach that includes 30% conceptual, 95% pre-final, and 100% final design packages, the SRSNE Site Group plans a reduced process consisting of two design submittals per remedial component: conceptual and final. In this case, the conceptual design would target a 65% design level, allowing the agencies to initially review a more advanced design stage.

The intent of this approach is to minimize the number of deliverables and accelerate the overall design process. Accelerating the schedule of a final remedy is consistent with Section 3.10.1 of the *Remedial Design/Remedial Action Handbook* (USEPA 1995a), which states that every project should be evaluated for opportunities to accelerate the schedule and that process steps should be eliminated where possible. Also, this approach was presented to the USEPA during a project meeting on February 12, 2009.

While the second submittal will target a 100% final design, the SRSNE Site Group recognizes the potential for receiving agency comments regarding the planned final submittal. In the event that the USEPA has significant comments on the 100% design, the SRSNE Site Group would modify and resubmit the final design package as requested. Alternately, or in the case of only minor comments, comments could be addressed in the form of addenda or written responses to comments without complete resubmittal of the design package. The means by which any comments would be addressed will be coordinated with the USEPA in consideration of the nature and extent of comments for each final deliverable package.

4.4.3 Ancillary Modifications

The modifications proposed above (relative to the RD process described in the SOW) trigger certain additional minor, but noteworthy, changes to the RD/RA activities. These include:

- Whereas the SOW requires at least one meeting with the USEPA and CTDEP to discuss the conceptual and pre-final design submittals, it is anticipated that separate meetings may be required corresponding to the RD phases for each of the main remedy components indicated above.

- Elimination of the pre-final design submittal eliminates the opportunity for a technical meeting following the 95% design submittal. In lieu of that meeting, the SRSNE Site Group would instead meet with the USEPA following the final design submittal. Also, consistent with past practice and at the discretion of the agencies, the SRSNE Site Group would conduct one or more meetings with the USEPA and CTDEP during the final design stages in order to identify and resolve potential issues prior to the final submittal.

- Submittal of multiple remedial design packages for the remedial components will require submittal of multiple RAWPs and POPs. As required by Section V.E.3.d, final draft RAWPs and revised POPs, as needed, will be submitted with the final design packages. These documents will address the specific RA activities required for the remedy design component that they accompany.

5. Deliverables and Schedule

The SOW requires submittal of various documents and deliverables in conjunction with the RD phase of the work. RD-related deliverables are specified in Section V of the SOW and included in the Summary of SOW Deliverables and Activities (Section X of the SOW). Of the various RD-related submittals, two have been submitted prior to or in conjunction with this RDWP:

- Notification of Supervising Contractor, Project Coordinator, and Remedial Design Contractor (SOW Sections V.B.1 and V.B.2) – November 7, 2008

- RD POP (SOW Section V.C.2) – concurrent with the RDWP, April 2009

Future RD-related documents required by the SOW are summarized in the following table. The table also indicates the trigger and timeframe for each document, and provides a brief description of the scope. Note that the table reflects the modified approach described in Section 4.4 for delivery of conceptual and final design packages.

Table 6 SOW-Required Remedial Design Documents

Item	SOW Reference	Trigger and Timeframe	Scope
Memorandum of Agreement (MOA)	V.B.3	Within 180 days of entry of the RD/RA CD	Sets forth the timing and procedure through which the Town would determine, obtain CTDEP and CTDPH approvals for, and notify the USEPA of plans to reactivate existing production wells, or to install/use other water supply wells in the Town Well Field.
Supplemental Containment Action Plan	V.B.5	Within 30 days of USEPA approval of the MOA	Outlines the steps and schedule for prevention measures to ensure that the groundwater plume does not migrate to production wells in the Town Well Field that are slated for future use.

Item	SOW Reference	Trigger and Timeframe	Scope
Institutional Control Plan	V.B.7	Within 30 days of the completion of the vapor intrusion study required by SOW Section V.C.1.k	Detail the process by which ELURs will be recorded and enforced, and provides plans for remedial measures necessary to address potential Site-related vapor intrusion issues on individual parcels requiring institutional controls.
Groundwater Containment and Treatment Evaluation and Optimization Study	V.C.4 and V.C.5	Completion of ISTR component of the remedy and prior to design of the long-term groundwater containment, extraction, and treatment system	Demonstrate that the Performance Standards for the HCTS and the severed plume are being met. Modifications and/or enhancements will be proposed if either (1) Performance Standards are not met, or (2) modifications/enhancements would increase effectiveness and/or decrease the costs or time of operation (while meeting objectives).
Conceptual Design Package	V.D.1	Within 120 days of USEPA approval of the completion of the requisite pre-design studies	Consists of conceptual design, including the basis for design/assumptions, drawings and specifications, project delivery strategy, draft statement of regulatory compliance with ARARs, draft RAWP, and revised POP, and a summary of the IQAT. Separate Conceptual Design Packages will be submitted for the Pre-ISTR preparation activities, ISTR, and soil excavation and capping components of the remedy.
Final Design Package	V.E.3	Within 90 days of USEPA approval of the Conceptual Design	Consists of a 100% design of all components from the conceptual design stage, as well as contingency plans in the event of an accident or emergency, and a Constructability Review Report. Separate Final Design Packages will be submitted for the Pre-ISTR preparation activities, ISTR, and soil excavation and capping components of the remedy.

In addition to these SOW-specified documents, the various work plans attached to this RDWP call for additional submittals during the RD phase of the project. In general, the purpose of these additional deliverables is to report the findings of various pre-design and design-related activities in a manner that allows for timely progression through the RD and RA phases of the work. These anticipated additional RD-related deliverables, which are not specifically required by the SOW, are summarized in the following table, along with reference to the appropriate documents for additional information.

Table 7 Additional RD Documents

Deliverable	Purpose	Reference
NAPL Delineation Investigation Report	Summarize scope and findings of the planned NAPL delineation activities in the northwest portion of the former Operations Area, which is a prerequisite for initiating in-situ thermal treatment design	*Overburden NAPL Delineation Plan* (Attachment A to the RDWP)
Summary of Habitat Restoration Work Plan field activities	Summarize the scope and findings of information review and field reconnaissance activities (Tasks 1 and 2) proposed in the *Habitat Restoration Work Plan*	*Habitat Restoration Work Plan* (Attachment H to the RDWP)
Pre-Design Investigation Summary Report	Summarize non-accelerated pre-design investigation activities, including soil sampling, well integrity survey, well installation, and well abandonment activities	*Soil Investigation Plan* (Attachment I to the RDWP); and *Monitoring Well Network Evaluation and Groundwater Monitoring Program* Attachment N to the RDWP)
Contingent Soil Investigation Report	A contingent interim submittal to USEPA in the event that results of initial soil sampling suggest possible substantial impact on planned capping or removal limits	*Soil Investigation Plan* (Attachment I to the RDWP)

Deliverable	Purpose	Reference
Summary of Vapor Control System Evaluation	Summarize the scope and conclusions of a post-ISTR evaluation to assess the need for a vapor control system to be included with the cap design	*Vapor Control System Evaluation* (Attachment J to the RDWP)
Interim Vapor Intrusion Study Report	Summarize the findings of completed investigations and proposed plan for additional investigations in the event that contingent additional VI study activities are required	*Vapor Intrusion Study Work Plan* (Attachment K to the RDWP)

Although not specifically required by the SOW, the need for these additional submittals was identified in the development of the required RDWP components specified in Section V.C.1 of the SOW. The primary purposes of these additional submittals are to:

- Facilitate timely initiation of RD activities (for example: delineation of the Overburden NAPL Area is a prerequisite for the ISTR design; submittal of the NAPL Delineation Investigation Report separate from the results of other pre-design studies will allow ISTR design to be initiated as soon as possible)

- Facilitate continuity of flow of RD/RA activities (i.e., allows for performance, reporting, and approval of certain RD/RA activities in advance of completing subsequent activities and submittals)

- Accommodate the fact that RD/RA activities will proceed along separate timelines for major work activities (i.e., it will be necessary to perform and report investigations supporting ISTR implementation prior to capping-related investigations)

- Accommodate SOW requirements for performing certain RD tasks following other RA activities (e.g., evaluation of vapor control requirements for the cap after implementing ISTR), which precludes a single report summarizing all pre-design investigations

Regarding the first bullet above, the SRSNE Site Group is requesting accelerated approval of certain RD activities so that work activities can commence as soon as possible during the 2009 field season. Specifically, accelerated agency review is requested so that one or more field activities associated with the following plans can be initiated during 2009:

- *Overburden NAPL Delineation Plan* (Attachment A to the RDWP)
- *Habitat Restoration Work Plan* (Attachment H to the RDWP)
- *Pre-ISTR Preparation Plan* (Attachment M to the RDWP)

As required under Section V.C.2.b of the SOW, the schedule for implementation and reporting of RD activities is included in the RD POP. Additional schedule-related information is presented in Section 2 and Figures 1 and 2 of the RD POP.

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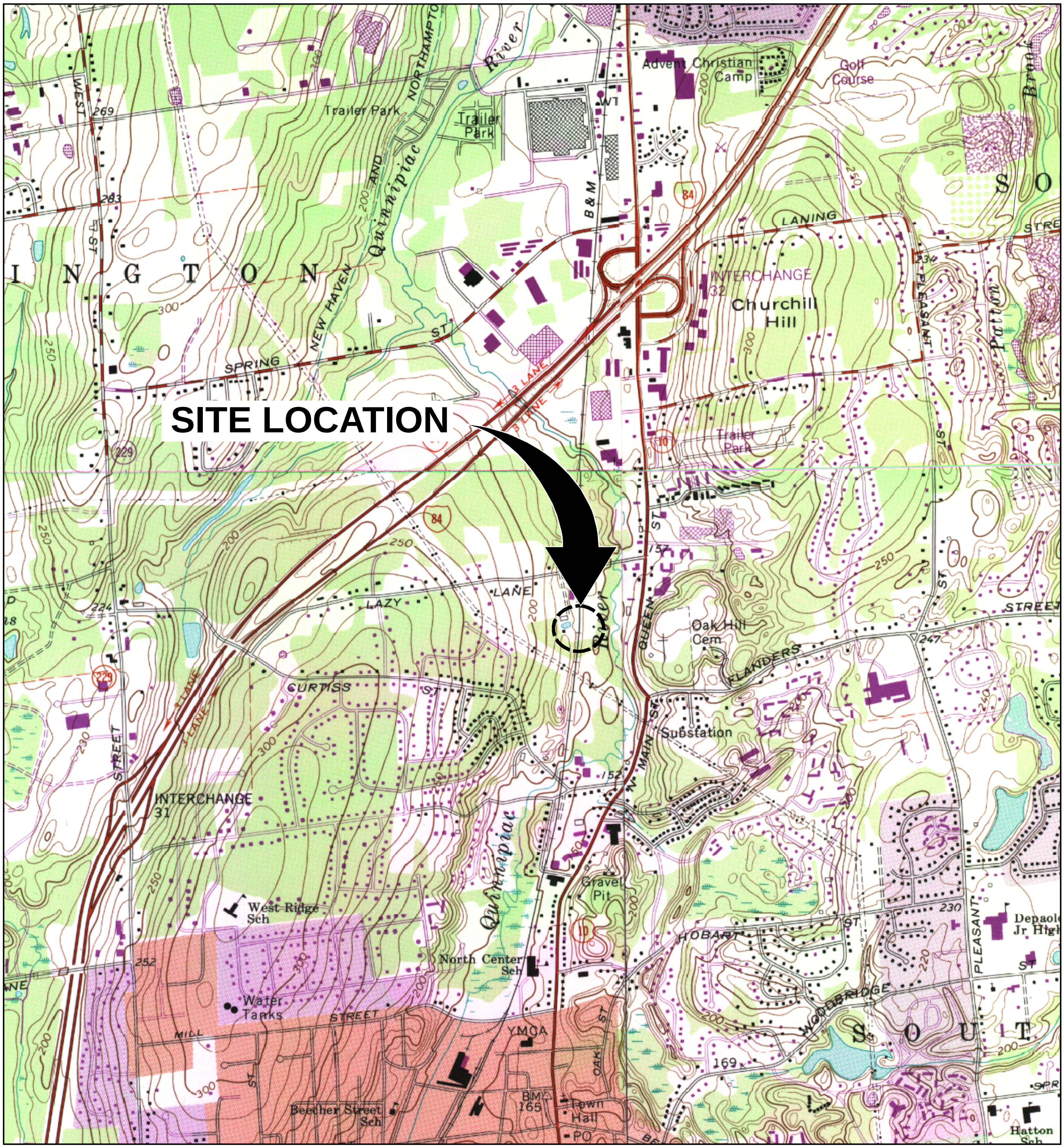
ARCADIS

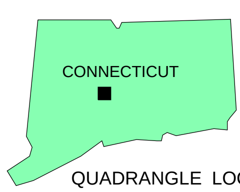
Figures



REFERENCE: SOUTHINGTON, CONN. USGS QUAD. 1968 PR 1992, MERIDEN, CONN. USGS QUAD. 1966 PR 1984, NEW BRITAIN, CONN. USGS QUAD. 1966 PR 1984, & BRISTOL, CONN. USGS QUAD 1967 PR 1984

2000' 0 2000'

APPROX. SCALE: 1" = 2000'



QUADRANGLE LOCATION

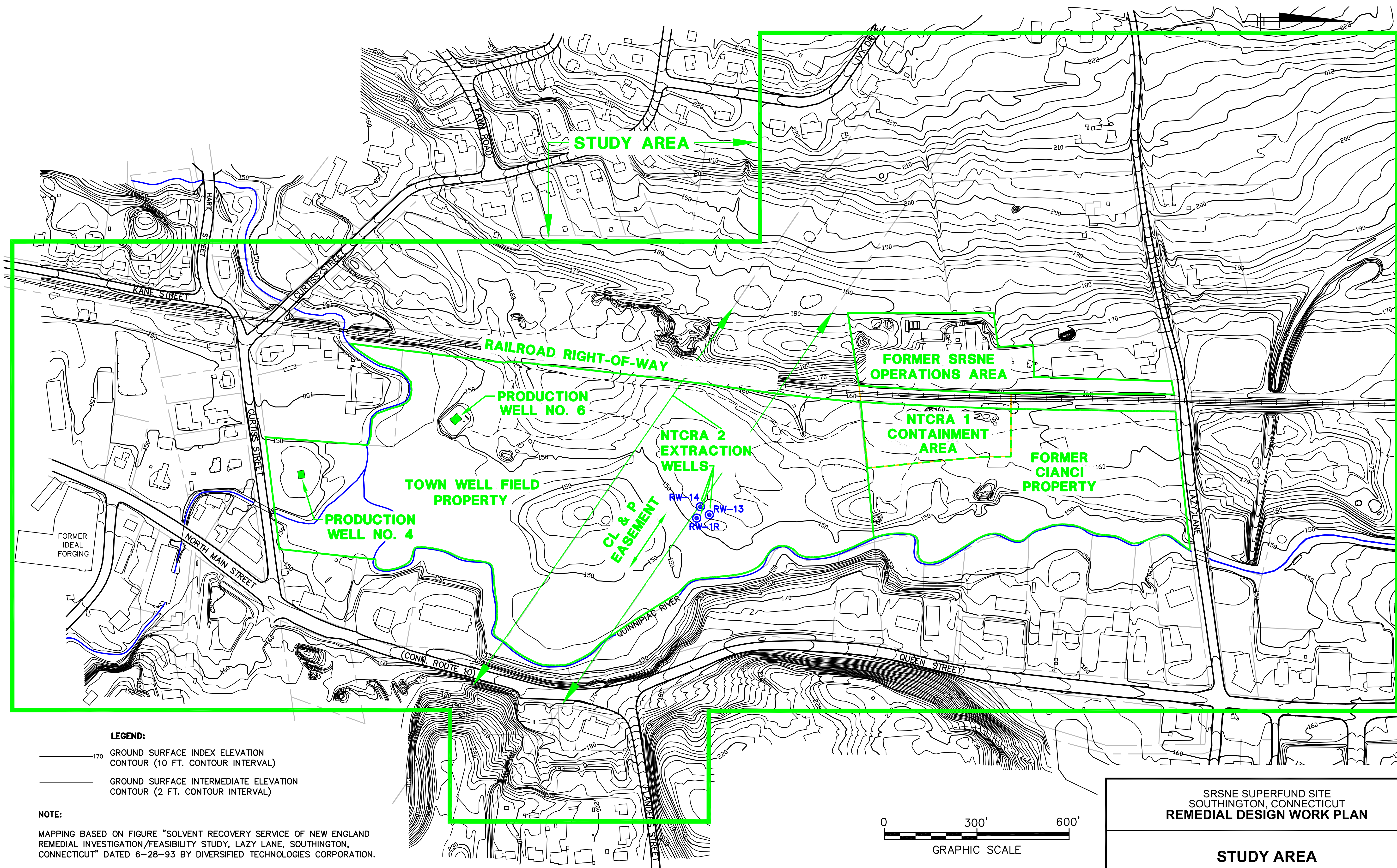
SRSNE SUPERFUND SITE
SOUTHINGTON, CONNECTICUT
REMEDIAL DESIGN WORK PLAN

SITE LOCATION MAP

ARCADIS

FIGURE
1

02/27/09 SYRACUSE, NY-ENV/CAD DJH, LJP
B0054634\0000\10000\CDR\RDWP\54634N01.CDR



LEGEND:

170 GROUND SURFACE INDEX ELEVATION CONTOUR (10 FT. CONTOUR INTERVAL)

GROUND SURFACE INTERMEDIATE ELEVATION CONTOUR (2 FT. CONTOUR INTERVAL)

NOTE:

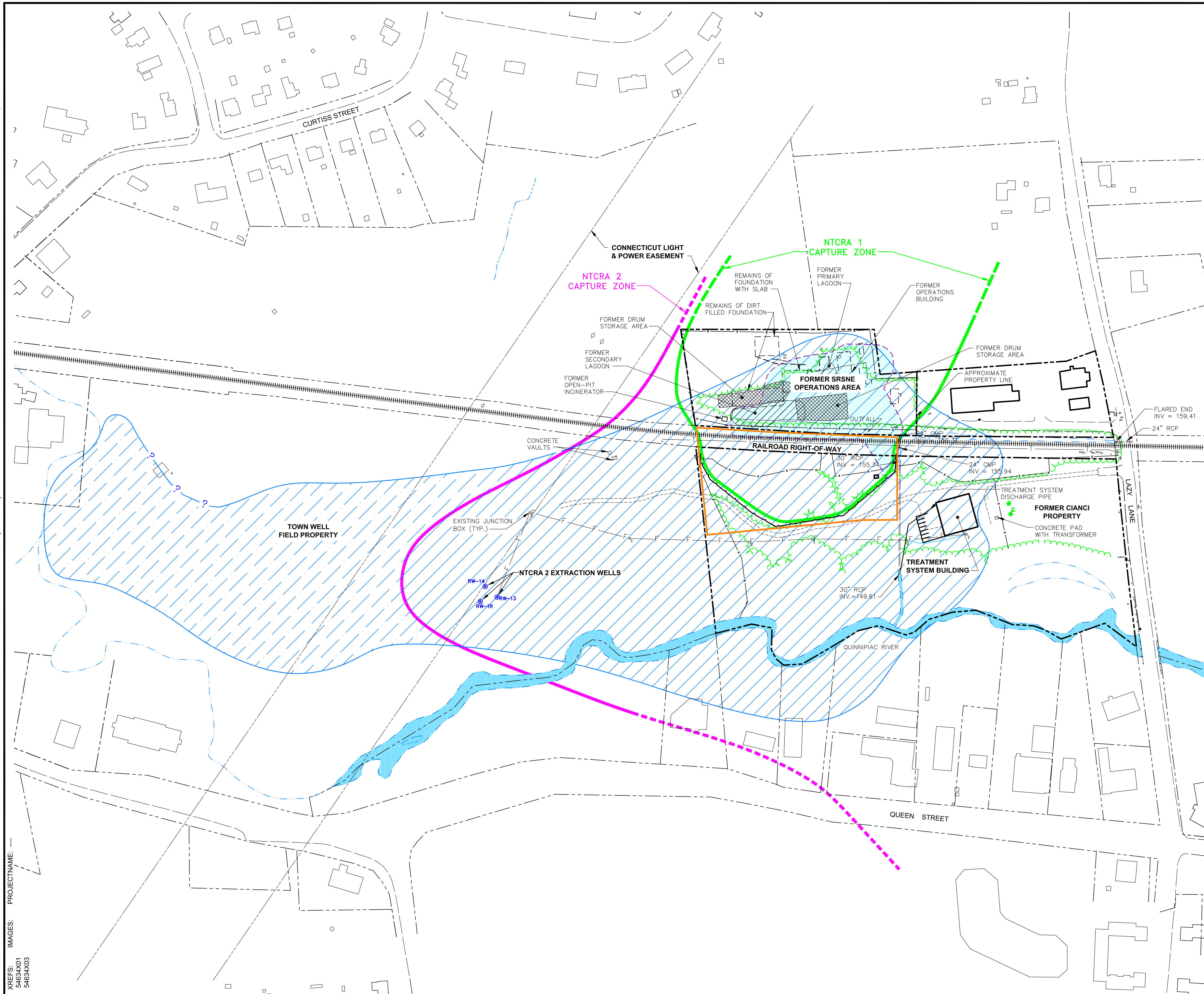
MAPPING BASED ON FIGURE "SOLVENT RECOVERY SERVICE OF NEW ENGLAND REMEDIAL INVESTIGATION/FEASIBILITY STUDY, LAZY LANE, SOUTHINGTON, CONNECTICUT" DATED 6-28-93 BY DIVERSIFIED TECHNOLOGIES CORPORATION.

SRSNE SUPERFUND SITE
SOUTHINGTON, CONNECTICUT
REMEDIAL DESIGN WORK PLAN

STUDY AREA

ARCADIS

FIGURE
2



LEGEND:

- PROPERTY LINE
- PROPERTY LINE – ADJOINER
- BUILDING
- BUILDING – ADJOINER
- FORMER BUILDING
- RAILROAD
- ROAD
- GRAVEL ROAD
- DRAINAGE SWALE
- RIVER
- EASEMENT
- CHAINLINK FENCE
- SHEETPILE
- FORCEMAIN
- PIPE
- UTILITY POLE
- TELEPHONE SERVICE
- TREELINE
- TREE
- BOLLARD
- NTCRA 1 CONTAINMENT AREA
- OVERBURDEN GROUNDWATER AREA (FROM FIGURE 2–4 OF FEASIBILITY STUDY [BBL AND USEPA 2005])
- SEVERED PLUME (FROM FIGURE 2–4 OF FEASIBILITY STUDY [BBL AND USEPA 2005])
- OVERBURDEN NAPL AREA (FROM FIGURE 2–3 OF FEASIBILITY STUDY [BBL AND USEPA 2005])

NOTES:

1. BASEMAP INFORMATION OBTAINED FROM A FIGURE CREATED BY CONKLIN & SOROKA, INC., ENTITLED "TOPOGRAPHIC SURVEY" DATED 1/13/09 AT A SCALE OF 1"=50'.
2. ALL LOCATIONS ARE APPROXIMATE.
3. THIS FIGURE PRESENTS AN OVERLAY OF THE ESTIMATED EXTENTS OF THE GROUNDWATER PLUME IN THREE MONITORED OVERBURDEN ZONES, BASED ON PLUME DELINEATION LIMITS PRESENTED IN THE FEASIBILITY STUDY (BBL AND USEPA 2005).

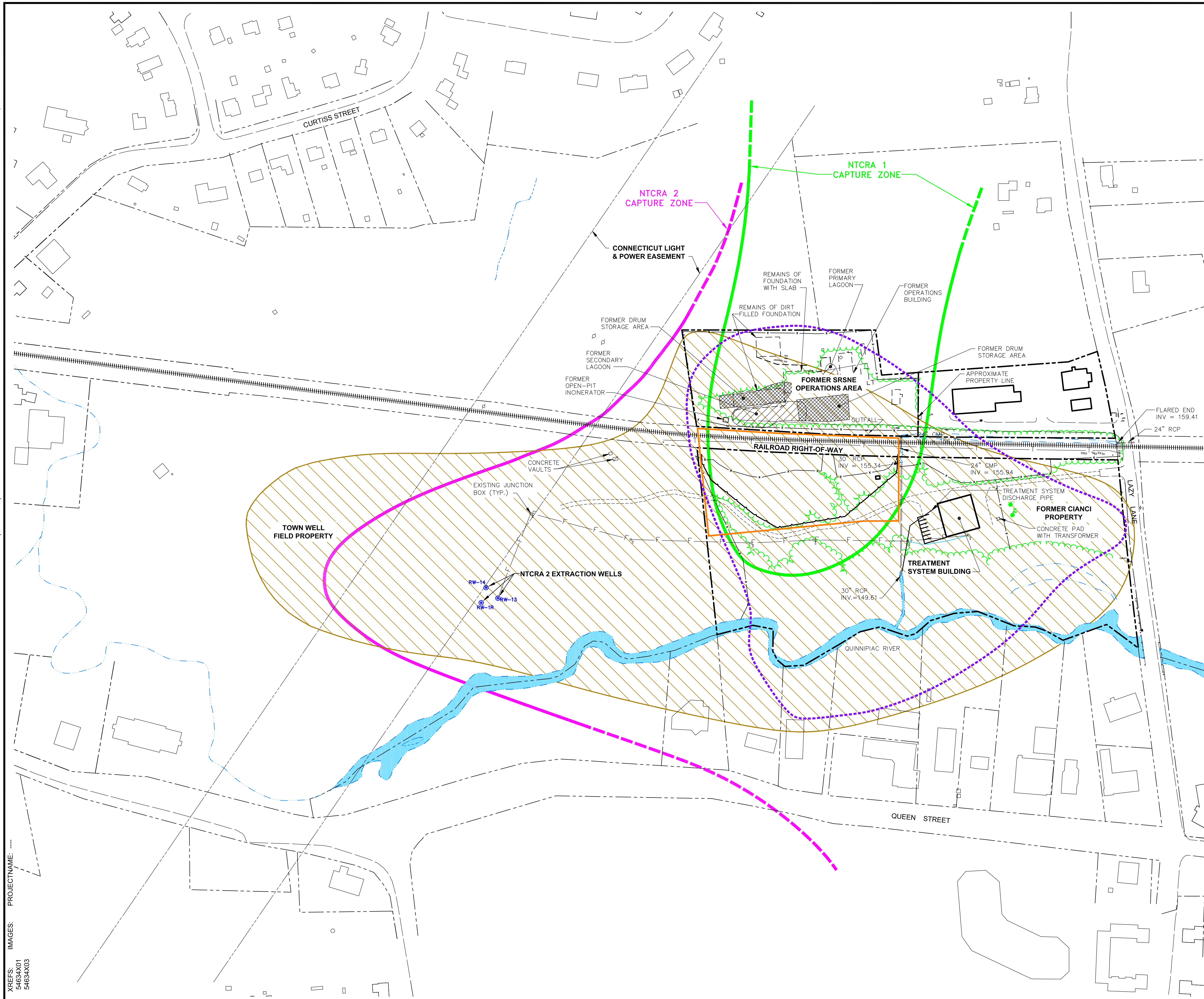
0 120' 240'
GRAPHIC SCALE

SRSNE SUPERFUND SITE
SOUTHINGTON, CONNECTICUT
REMEDIAL DESIGN WORK PLAN

ESTIMATED GROUNDWATER PLUME AND NAPL AREAS - OVERBURDEN

ARCADIS

FIGURE
3A



LEGEND:

- PROPERTY LINE
- PROPERTY LINE – ADJOINER
- BUILDING
- BUILDING – ADJOINER
- FORMER BUILDING
- RAILROAD
- ROAD
- GRAVEL ROAD
- DRAINAGE SWALE
- RIVER
- EASEMENT
- CHAINLINK FENCE
- SHEETPILE
- FORCEMAIN
- PIPE
- UTILITY POLE
- TELEPHONE SERVICE
- TREELINE
- TREE
- BOLLARD
- NTCRA 1 CONTAINMENT AREA
- BEDROCK NAPL AREA (FROM FIGURE 2–5 OF FEASIBILITY STUDY [BBL AND USEPA 2005])
- BEDROCK GROUNDWATER AREA (FROM FIGURE 2–6 OF FEASIBILITY STUDY [BBL AND USEPA 2005])

NOTES:

1. BASEMAP INFORMATION OBTAINED FROM A FIGURE CREATED BY CONKLIN & SOROKA, INC., ENTITLED "TOPOGRAPHIC SURVEY" DATED 1/13/09 AT A SCALE OF 1"=50'.
2. ALL LOCATIONS ARE APPROXIMATE.
3. THIS FIGURE PRESENTS AN OVERLAY OF THE ESTIMATED EXTENTS OF THE GROUNDWATER PLUME IN TWO MONITORED BEDROCK ZONES, BASED ON PLUME DELINEATION LIMITS PRESENTED IN THE FEASIBILITY STUDY (BBL AND USEPA 2005).

0 120' 240'
GRAPHIC SCALE

SRSNE SUPERFUND SITE
SOUTHINGTON, CONNECTICUT
REMEDIAL DESIGN WORK PLAN

ESTIMATED GROUNDWATER PLUME AND NAPL AREAS - BEDROCK

ARCADIS

FIGURE
3B

CITY: SYRACUSE DIV/GROUP: ENVCAD DB: PGL LAF GMS LD:(Opt) PIC: G. CAMERON PM: J. HOLDEN TM: J. HOLDEN LYR: ON=*;OFF=*REF* ,FLOODPLAIN
G:\ENVCAD\SYRACUSE\ACT\B0054634\0000\10000\DWG\RDWP\54634G04.DWG LAYOUT: 3B SAVED: 3/17/2009 9:26 AM ACADVER: 17.0S (LMS TECH) PAGESETUP: C-LD2B-PDF-TABLOID PLOTSTYLETABLE: PLTFULL.CTB PLOTTED: 3/17/2009 9:26 AM BY: STOWELL, GARY
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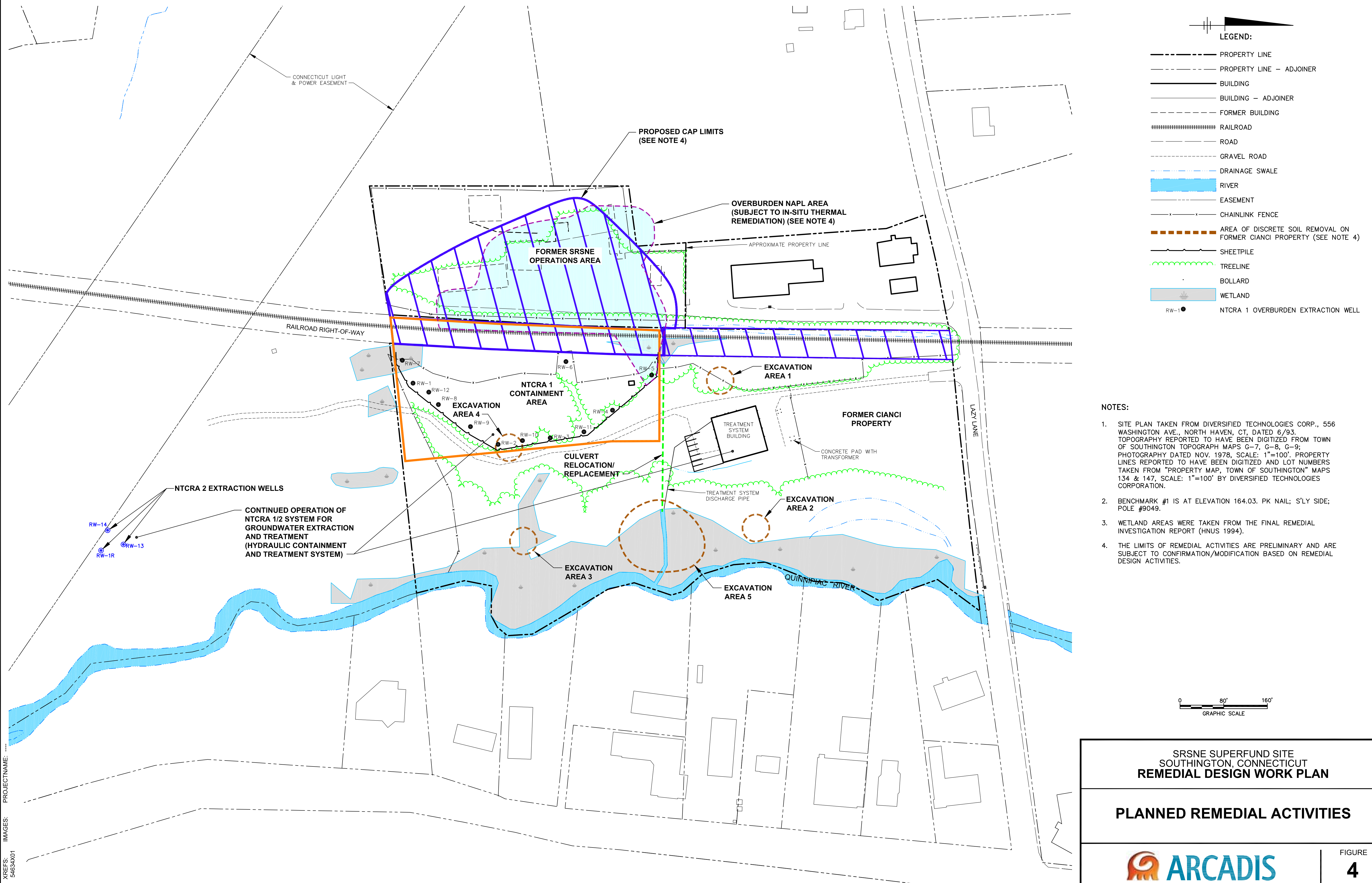

NOTES:

1. SITE PLAN TAKEN FROM DIVERSIFIED TECHNOLOGIES CORP., 556 WASHINGTON AVE., NORTH HAVEN, CT, DATED 6/93. TOPOGRAPHY REPORTED TO HAVE BEEN DIGITIZED FROM TOWN OF SOUTHINGTON TOPOGRAPH MAPS G-7, G-8, G-9; PHOTOGRAPHY DATED NOV. 1978, SCALE: 1"=100'. PROPERTY LINES REPORTED TO HAVE BEEN DIGITIZED AND LOT NUMBERS TAKEN FROM "PROPERTY MAP, TOWN OF SOUTHINGTON" MAPS 134 & 147, SCALE: 1"=100' BY DIVERSIFIED TECHNOLOGIES CORPORATION.
2. BENCHMARK #1 IS AT ELEVATION 164.03. PK NAIL; S'LY SIDE; POLE #9049.
3. WETLAND AREAS WERE TAKEN FROM THE FINAL REMEDIAL INVESTIGATION REPORT (HNUS 1994).
4. THE LIMITS OF REMEDIAL ACTIVITIES ARE PRELIMINARY AND ARE SUBJECT TO CONFIRMATION/MODIFICATION BASED ON REMEDIAL DESIGN ACTIVITIES.

SRSNE SUPERFUND SITE
SOUTHINGTON, CONNECTICUT
REMEDIAL DESIGN WORK PLAN

PLANNED REMEDIAL ACTIVITIES

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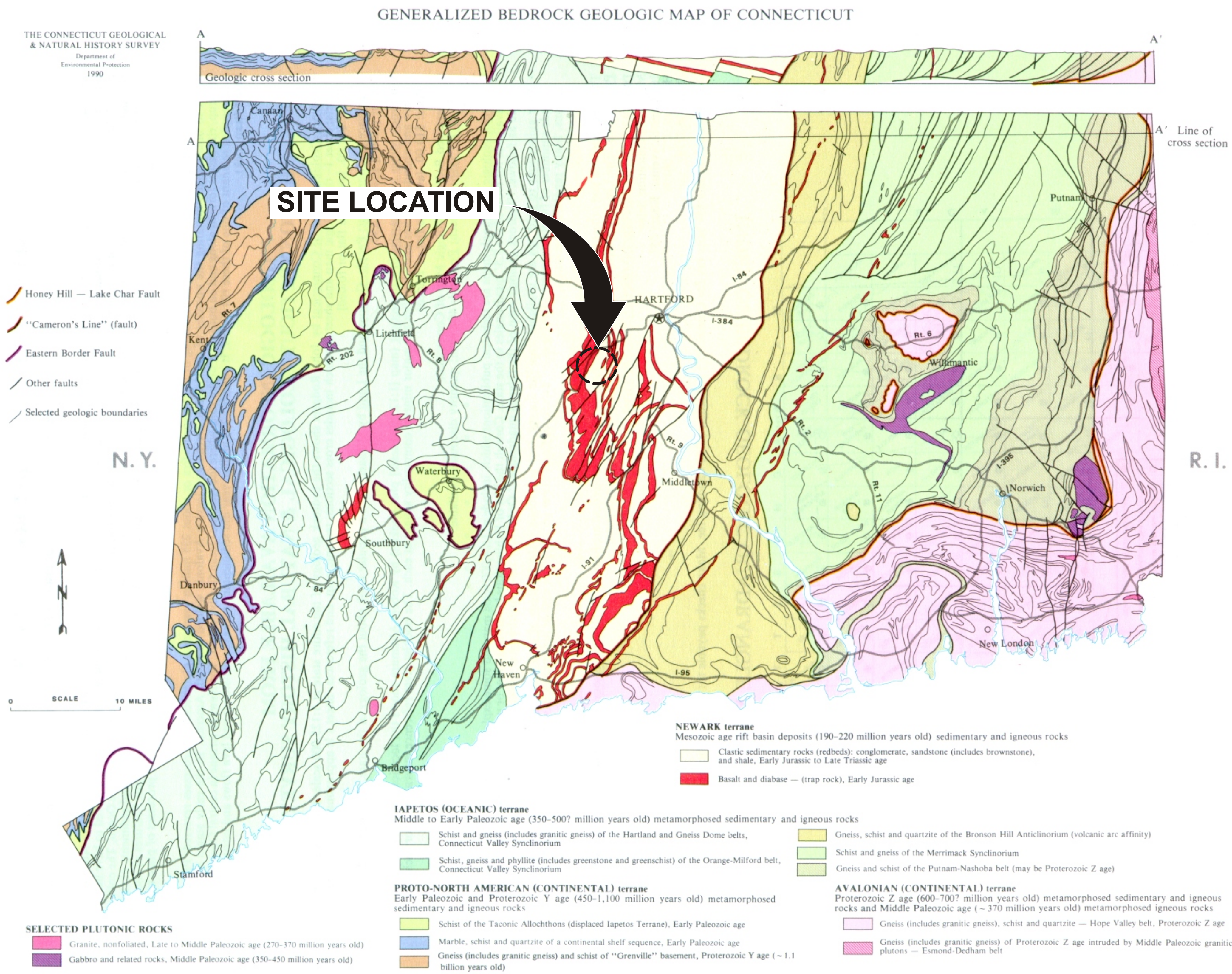
FIGURE
4



NOTE:

1. Base map published by CTDEP and by the Connecticut Geological & Natural History Survey (1990).

SRSNE SUPERFUND SITE
SOUTHINGTON, CONNECTICUT

REMEDIAL DESIGN WORK PLAN

GENERALIZED BEDROCK MAP OF CONNECTICUT

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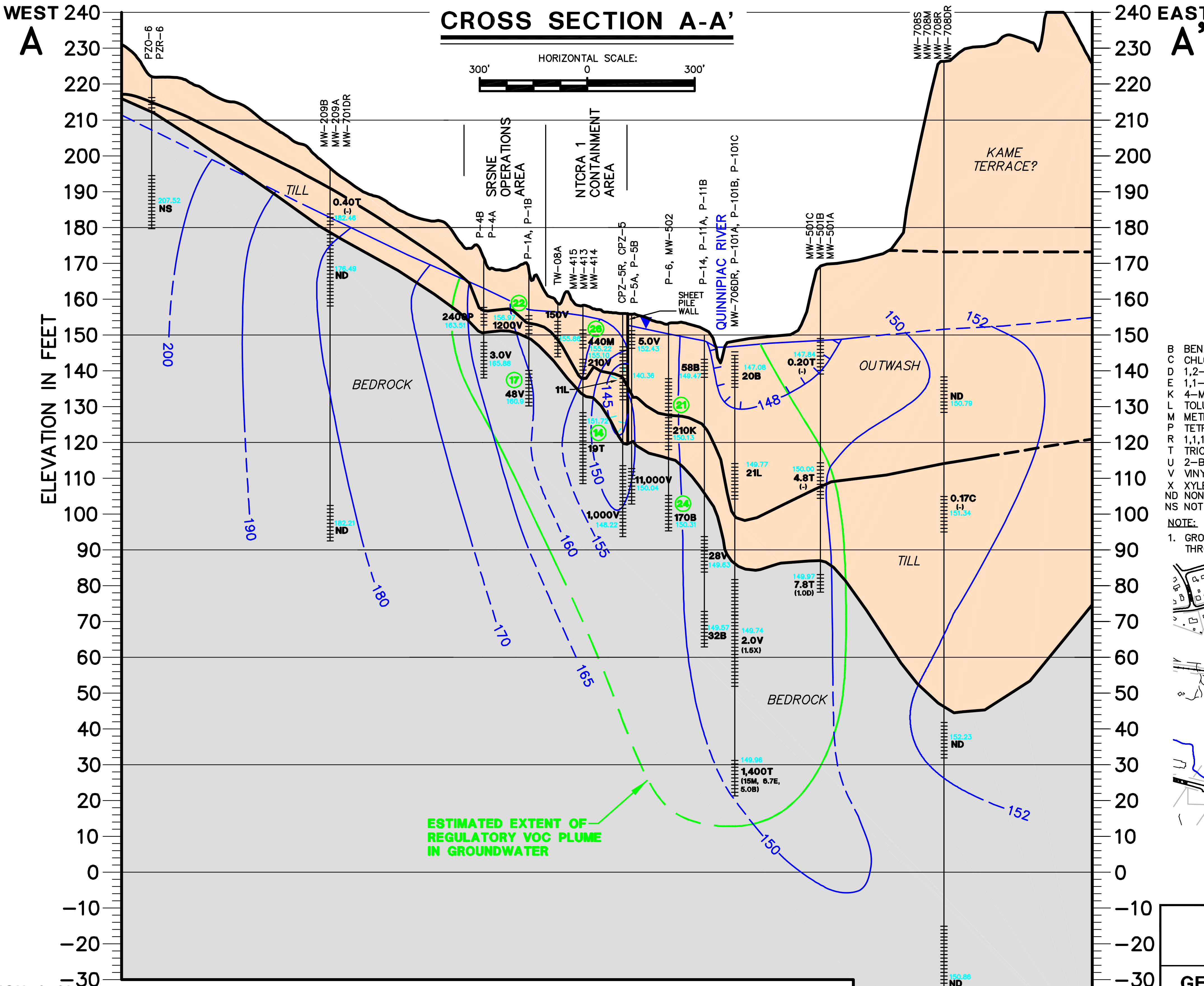
FIGURE
5

03/25/09 SYRACUSE, NY-ENV/CAD-DJH
B0054634/0000/10000/CDR/RDWP/54634G01.CDR



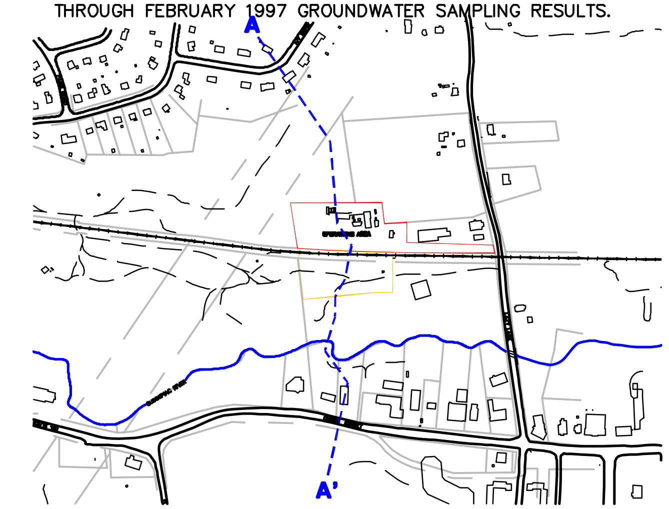
LEGEND:

- MW-125A — WELL NUMBER
- MONITORING WELL
- WATER TABLE JANUARY 21, 1997, DASHED WHERE INFERRED
- 152 — GROUNDWATER ELEVATION (HEAD) CONTOUR, JANUARY 21, 1997, INTERVAL VARIABLE
- 152.86 — GROUNDWATER ELEVATION MEASURED JANUARY 21, 1997
- SCREENED INTERVAL
- (20) — USAF NATURAL ATTENUATION RANK
- 46B (2.0B) — WELL WITH REGULATORY EXCEEDANCE RATIO. NUMBERS >1.0 INDICATE GROUNDWATER REGULATORY LIMIT EXCEEDED. NUMBERS <1.0 INDICATE EXCEEDANCE RATIO FOR COMPOUNDS DETECTED BELOW REGULATORY LIMIT. FIRST NUMBER INDICATES MULTIPLE OF A DETECTED VOC OVER REGULATORY LIMIT. LETTER INDICATES COMPOUND WITH INDICATED EXCEEDANCE RATIO. NUMBERS IN PARENTHESIS INDICATE OTHER EXCEEDANCE RATIOS FOR SELECT COMPOUNDS AND WELLS. (-) = NO OTHER EXCEEDANCES.
- BOTTOM OF BORING

B	BENZENE
C	CHLOROFORM
D	1,2-DICHLOROETHENE
E	1,1-DICHLOROETHENE
K	4-METHYL-2-PENTANONE (MIBK)
L	TOLUENE
M	METHYLENE CHLORIDE
P	TETRACHLOROETHENE
R	1,1,1-TRICHLOROETHANE
T	TRICHLOROETHENE
U	2-BUTANONE
V	VINYL CHLORIDE
X	XYLENES
ND	NONE DETECTED
NS	NOT SAMPLED

NOTE:

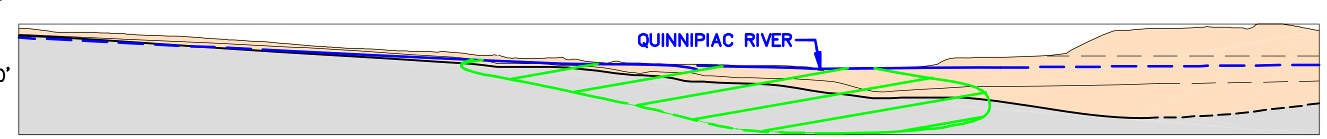
1. GROUNDWATER QUALITY DATA BASED ON NOVEMBER 1996 THROUGH FEBRUARY 1997 GROUNDWATER SAMPLING RESULTS.



LOCATION MAP

1000' 0 1000'

CROSS SECTION A-A'
WITH NO VERTICAL EXAGGERATION
HORIZONTAL SCALE:
400' 0 400'

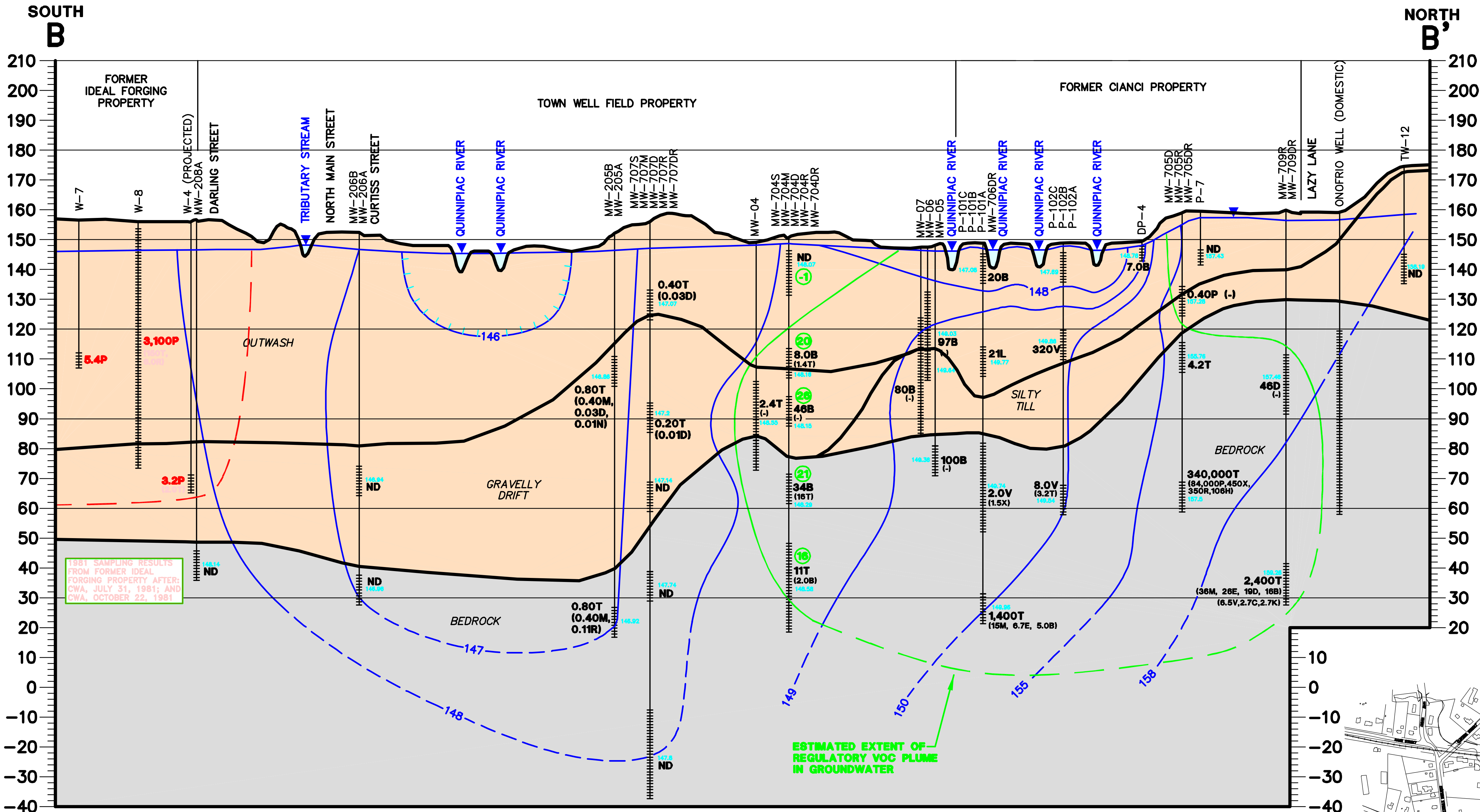


SRSNE SUPERFUND SITE
SOUTHINGTON, CONNECTICUT
REMEDIAL DESIGN WORK PLAN

GEOLOGIC CROSS SECTION A-A' WITH HEAD CONTOURS AND REGULATORY PLUME

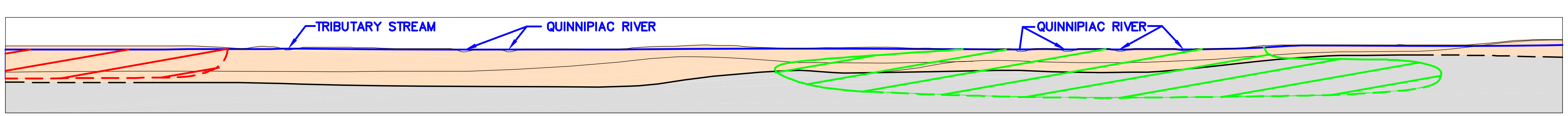
ARCADIS

FIGURE
6



CROSS SECTION B-B'

HORIZONTAL SCALE:
400' 0 400'



CROSS SECTION B-B' WITH NO VERTICAL EXAGGERATION

HORIZONTAL SCALE:
400' 0 400'

LEGEND

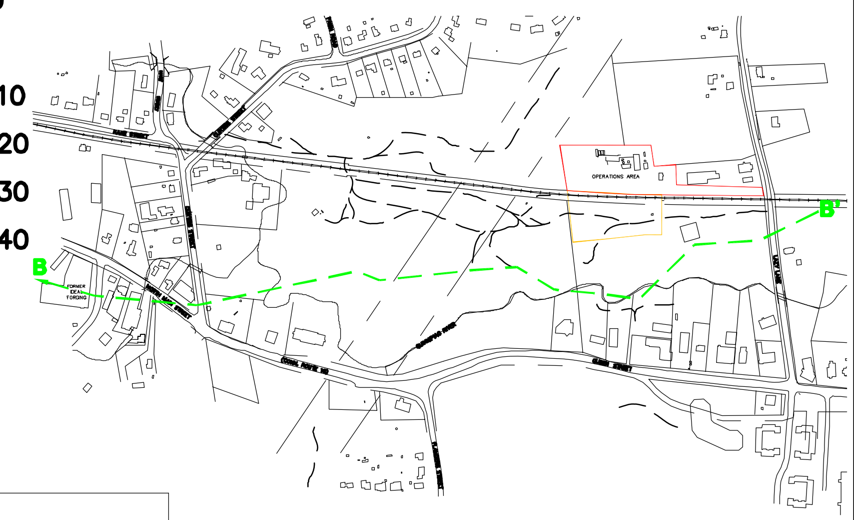
- MW-125A — WELL NUMBER
- MONITORING WELL
- WATER TABLE JANUARY 21, 1997, DASHED WHERE INFERRED
- 152 — GROUNDWATER ELEVATION (HEAD) CONTOUR, JANUARY 21, 1997, INTERVAL VARIABLE
- GROUNDWATER ELEVATION MEASURED JANUARY 21, 1997
- SCREENED INTERVAL
- 20 — USAF NATURAL ATTENUATION RANK
- 46B (2.0B) — WELL WITH REGULATORY EXCEEDANCE RATIO. NUMBERS >1.0 INDICATE GROUNDWATER REGULATORY LIMIT EXCEEDED. NUMBERS <1.0 INDICATE COMPOUNDS DETECTED BELOW REGULATORY LIMIT. FIRST NUMBER INDICATES MAXIMUM MULTIPLE OF A DETECTED VOC OVER REGULATORY LIMIT (e.g., 2.0 INDICATES 2 x LIMIT). LETTER INDICATES COMPOUND WITH INDICATED EXCEEDANCE RATIO (e.g., B = BENZENE). NUMBERS IN PARENTHESIS INDICATE OTHER EXCEEDANCE RATIOS FOR SELECT COMPOUNDS AND WELLS. (-) = NO OTHER EXCEEDANCES.
- BOTTOM OF BORING

B	BENZENE
C	CHLOROFORM
D	1,2-DICHLOROETHENE
E	1,1-DICHLOROETHENE
K	4-METHYL-2-PENTANONE (MIBK)
L	TOLUENE
M	METHYLENE CHLORIDE
P	TETRACHLOROETHENE
R	1,1,1-TRICHLOROETHANE
T	TRICHLOROETHENE
U	2-BUTANONE
V	VINYL CHLORIDE
X	XYLENES
ND	NONE DETECTED

NOTE:
1. GROUNDWATER QUALITY DATA BASED ON NOVEMBER/DECEMBER 1996 GROUNDWATER SAMPLING RESULTS, EXCEPT FOR DATA FROM FORMER IDEAL FORGING PROPERTY.

LOCATION MAP

1000' 0 1000'



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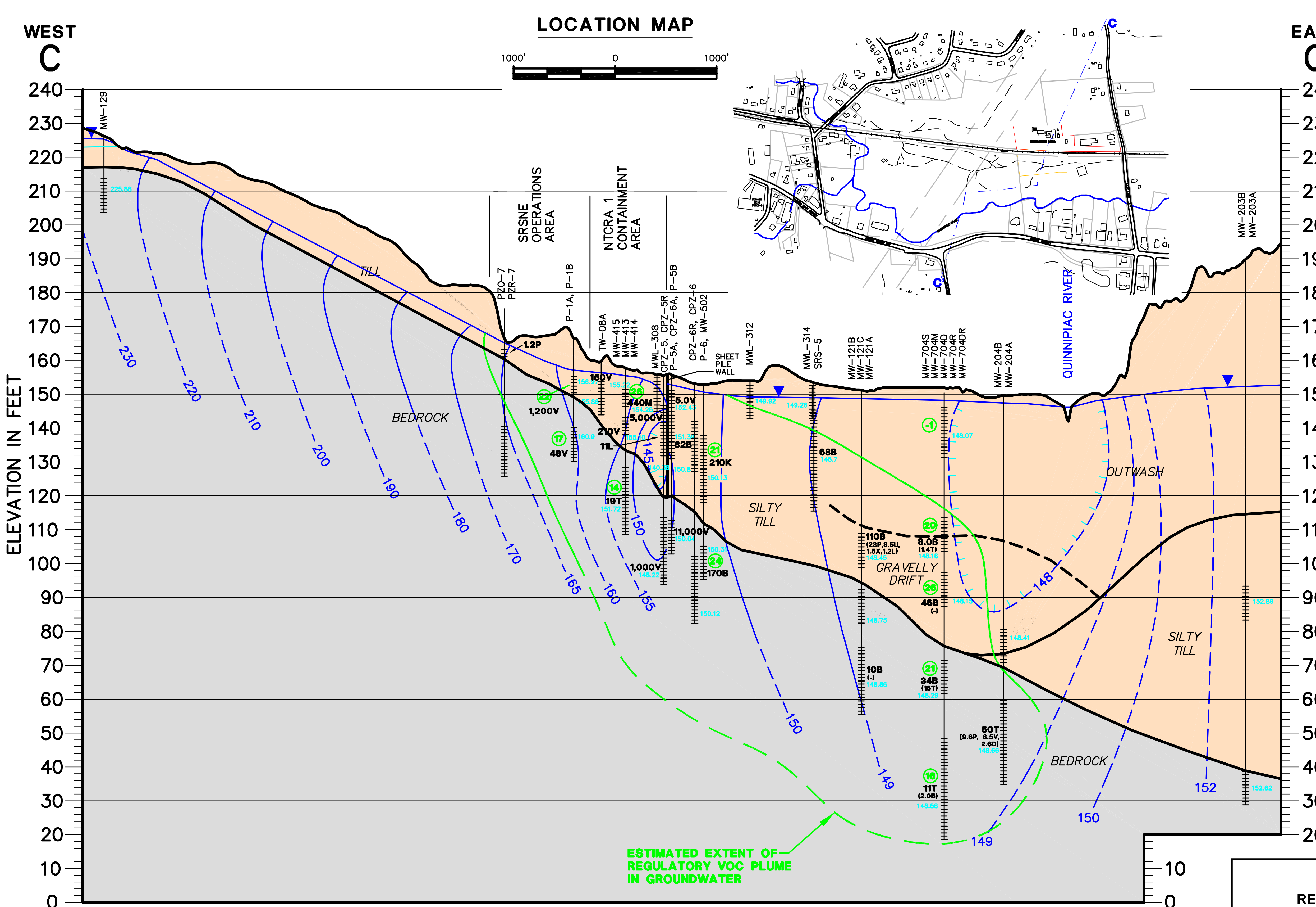
SOUTHINGTON, CONNECTICUT
REMEDIAL DESIGN WORK PLAN

GEOLOGIC CROSS SECTION B-B' WITH HEAD CONTOURS AND REGULATORY PLUME

ARCADIS

FIGURE
7



CROSS SECTION C-C'

HORIZONTAL SCALE:

300' 0 300'

LEGEND

- MW-125A — WELL NUMBER
- MONITORING WELL
- WATER TABLE JANUARY 21, 1997, DASHED WHERE INFERRED
- 152 — GROUNDWATER ELEVATION (HEAD) CONTOUR, JANUARY 21, 1997, INTERVAL VARIABLE
- 152.86 — GROUNDWATER ELEVATION MEASURED JANUARY 21, 1997
- SCREENED INTERVAL
- 20 — USAF NATURAL ATTENUATION RANK
- BOTTOM OF BORING
- 46B (2.0B) — WELL WITH REGULATORY EXCEEDANCE RATIO. NUMBERS >1.0 INDICATE GROUNDWATER REGULATORY LIMIT EXCEEDED. NUMBERS <1.0 INDICATE EXCEEDANCE RATIO FOR COMPOUNDS DETECTED BELOW REGULATORY LIMIT. FIRST NUMBER INDICATES MAXIMUM MULTIPLE OF A DETECTED VOC OVER REGULATORY LIMIT (e.g., 2.0 INDICATES 2 x LIMIT). LETTER INDICATES COMPOUND WITH INDICATED EXCEEDANCE RATIO (e.g., B = BENZENE). NUMBERS IN PARENTHESIS INDICATE OTHER EXCEEDANCE RATIOS FOR SELECT COMPOUNDS AND WELLS. (-) = NO OTHER EXCEEDANCES.

B	BENZENE
C	CHLOROFORM
D	1,2-DICHLOROETHENE
E	1,1-DICHLOROETHENE
K	4-METHYL-2-PENTANONE (MIBK)
L	TOLUENE
M	METHYLENE CHLORIDE
P	TETRACHLOROETHENE
R	1,1,1-TRICHLOROETHANE
T	TRICHLOROETHENE
U	2-BUTANONE
V	VINYL CHLORIDE
X	XYLENES
ND	NONE DETECTED

NOTE:

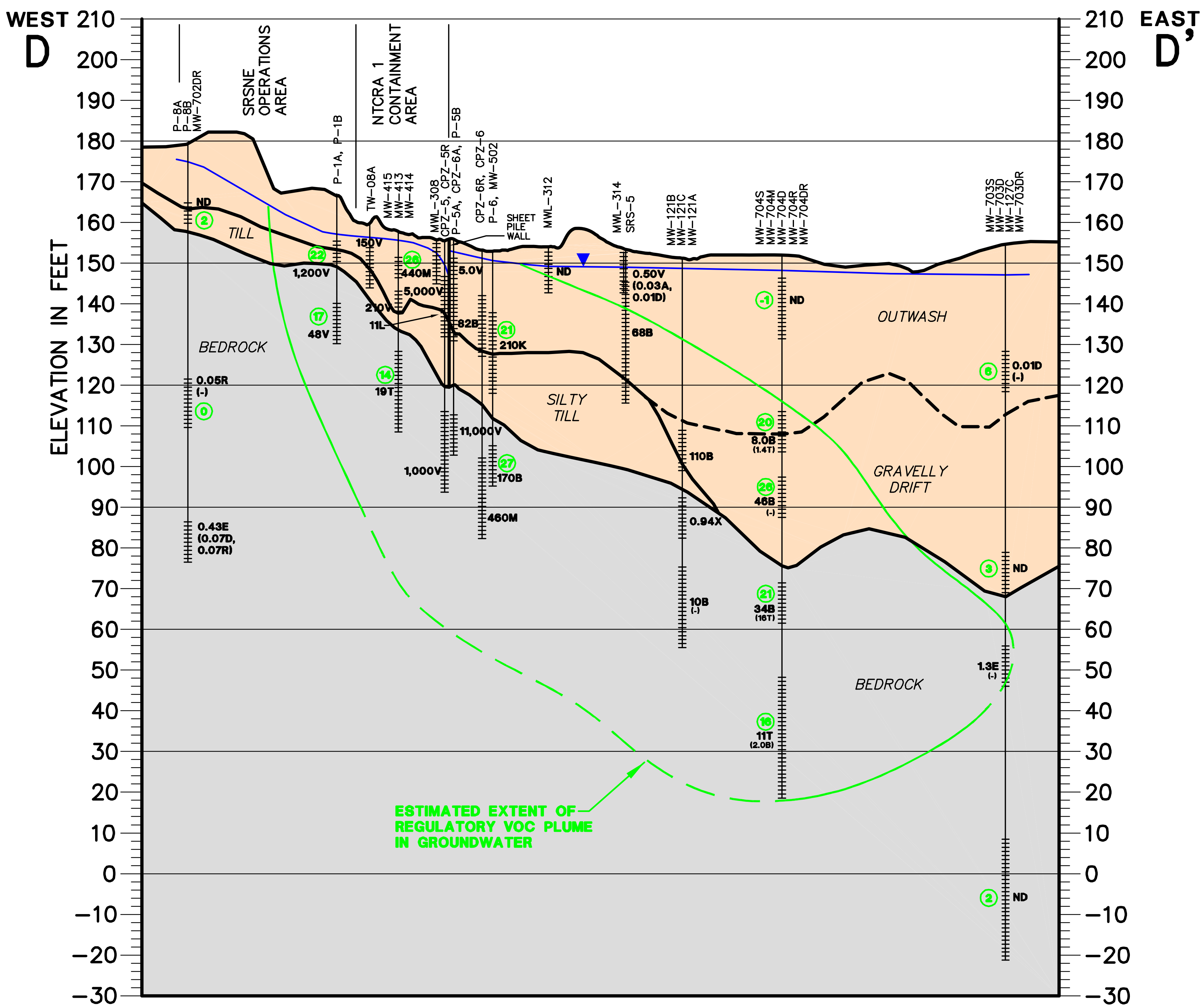
1. GROUNDWATER QUALITY DATA BASED ON NOVEMBER/DECEMBER 1996 GROUNDWATER SAMPLING RESULTS

SRSNE SUPERFUND SITE
SOUTHINGTON, CONNECTICUT
REMEDIAL DESIGN WORK PLAN

GEOLOGIC CROSS SECTION C-C' WITH HEAD CONTOURS AND REGULATORY PLUME

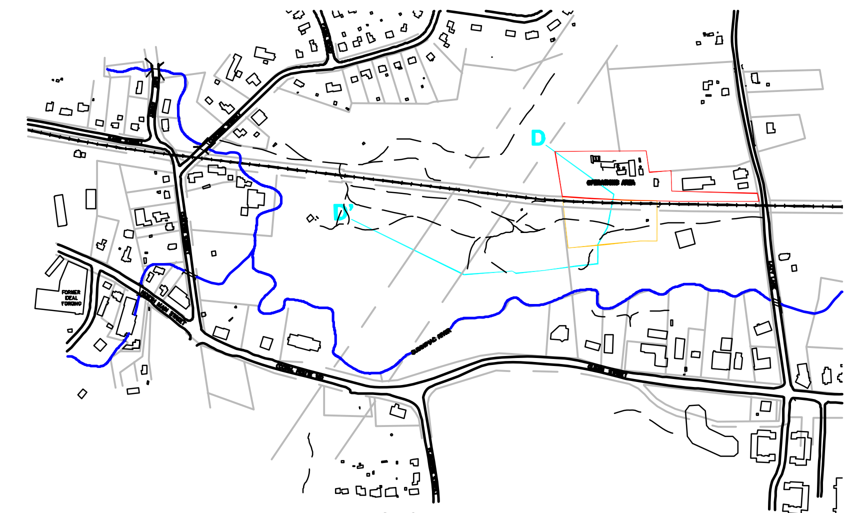
ARCADIS

FIGURE 8



CROSS SECTION D-D'

HORIZONTAL SCALE:
300' 0 300'



LOCATION MAP

1000' 0 1000'

LEGEND

MW-125A — WELL NUMBER

MONITORING WELL

WATER TABLE JANUARY 21, 1997, DASHED WHERE INFERRED

SCREENED INTERVAL

(20) USAF NATURAL ATTENUATION RANK

46B (2.0B) BOTTOM OF BORING

WELL WITH REGULATORY EXCEEDANCE RATIO. NUMBERS >1.0 INDICATE GROUNDWATER REGULATORY LIMIT EXCEEDED. NUMBERS <1.0 INDICATE EXCEEDANCE RATIO FOR COMPOUNDS DETECTED BELOW REGULATORY LIMIT. FIRST NUMBER INDICATES MAXIMUM MULTIPLE OF A DETECTED VOC OVER REGULATORY LIMIT (e.g., 2.0 INDICATES 2 x LIMIT). LETTER INDICATES COMPOUND WITH INDICATED EXCEEDANCE RATIO (e.g., B = BENZENE). NUMBERS IN PARENTHESIS INDICATE OTHER EXCEEDANCE RATIOS FOR SELECT COMPOUNDS AND WELLS.

B	BENZENE
C	CHLOROFORM
D	1,2-DICHLOROETHENE
E	1,1-DICHLOROETHENE
M	METHYLENE CHLORIDE
P	TETRACHLOROETHENE
R	1,1,1-TRICHLOROETHANE
T	TRICHLOROETHENE
U	2-BUTANONE
V	VINYL CHLORIDE
X	XYLENES
ND	NONE DETECTED

NOTE:

1. GROUNDWATER QUALITY DATA BASED ON NOVEMBER/DECEMBER 1996 GROUNDWATER SAMPLING RESULTS

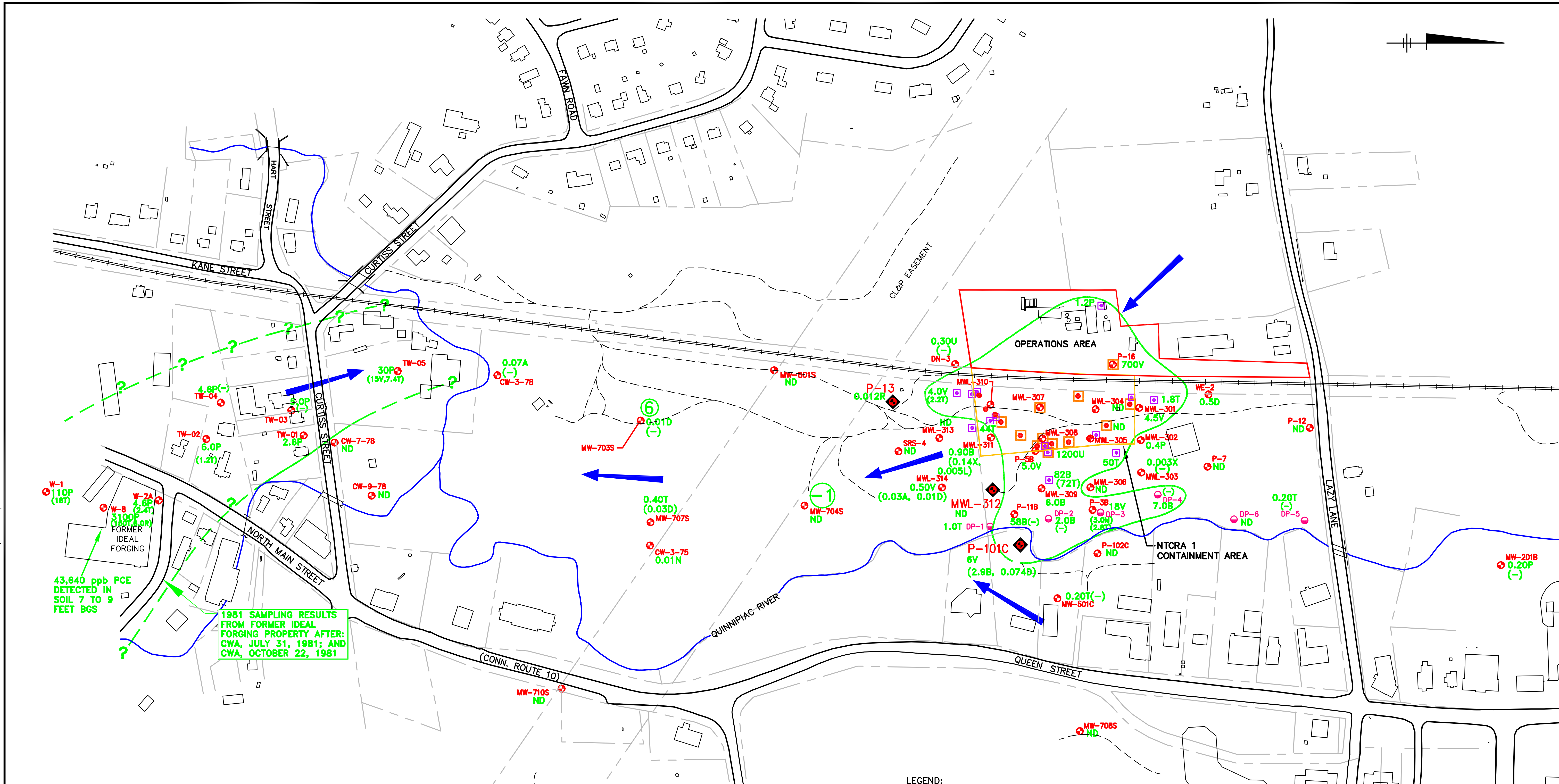
SRSNE SUPERFUND SITE
SOUTHINGTON, CONNECTICUT
REMEDIAL DESIGN WORK PLAN

GEOLOGIC CROSS SECTION D-D' WITH REGULATORY PLUME

ARCADIS

FIGURE
9

CITY: SYRACUSE, NY GROUP: ENVCAD DB: P. LISTER R. BASSETT PM: J. HOLDEN TR: J. HEADRICK LYR: ON=*;OFF=REF, (FRZ) PAGESETUP: ---- PLOTSTYLETABLE: PLTFULL.CTB PLOTTED: 3/25/2009 10:18 AM BY: LISTER, PAUL
G:\ENVCAD\SYRACUSE\ACT\B0054634\0000\00800\DWG\MNA\54634C02.DWG LAYOUT: 10 SAVED: 3/25/2009 10:18 AM ACADVER: 17.0S (LMS TECH)
XREFS: 54634XBR 54634X01 IMAGES: PROJECTNAME: ----



A	1,1–DICHLOROETHANE
B	BENZENE
C	CHLOROFORM
D	1,2–DICHLOROETHENE
E	1,1–DICHLOROETHENE
M	METHYLENE CHLORIDE
N	ACETONE
P	TETRACHLOROETHENE
R	1,1,1–TRICHLOROETHANE
T	TRICHLOROETHENE
U	2–BUTANONE
V	VINYL CHLORIDE
Z	CHLOROBENZENE
ND	NO VOCs DETECTED

NOVEMBER 1996–JANUARY 1997 GROUNDWATER SAMPLING RESULTS PLOTTED, EXCEPT AT INTERIM MONITORING AND SAMPLING, OR SUPPLEMENTAL SAMPLING LOCATIONS, WHERE NEW RESULTS ARE PLOTTED.

TW-04 4.6P — WELL WITH REGULATORY EXCEEDANCE RATIO. NUMBERS >1.0 INDICATE GROUNDWATER REGULATORY LIMIT EXCEEDED. NUMBERS <1.0 INDICATE EXCEEDANCE RATIO FOR COMPOUNDS DETECTED BELOW REGULATORY LIMIT. FIRST NUMBER INDICATES MAXIMUM MULTIPLE OF A DETECTED VOC OVER REGULATORY LIMIT (e.g., 4.6 INDICATES 4.6 x LIMIT) LETTER INDICATES COMPOUND WITH INDICATED EXCEEDANCE RATIO (e.g., P = TETRACHLOROETHENE) NUMBERS IN PARENTHESES INDICATE OTHER EXCEEDANCE RATIOS FOR SELECT COMPOUNDS AND WELLS. COMPOUNDS DETECTED IN BLANK(S) NOT INCLUDED IN THIS EVALUATION

LEGEND:

- INTERIM MONITORING AND SAMPLING LOCATIONS
- SHALLOW OVERBURDEN MONITORING WELL
- NTCRA 1 EXTRACTION WELL
- NTCRA 1 COMPLIANCE PIEZOMETER
- NTCRA 1 WETLAND DRIVEPOINT
- ESTIMATED EXTENT OF GROUNDWATER VOC REGULATORY EXCEEDANCE(S)
- 6 USAF NATURAL ATTENUATION RANK
- LOCATION WITH ALCOHOLS DETECTION IN GROUNDWATER
- GENERALIZED GROUNDWATER FLOW DIRECTION

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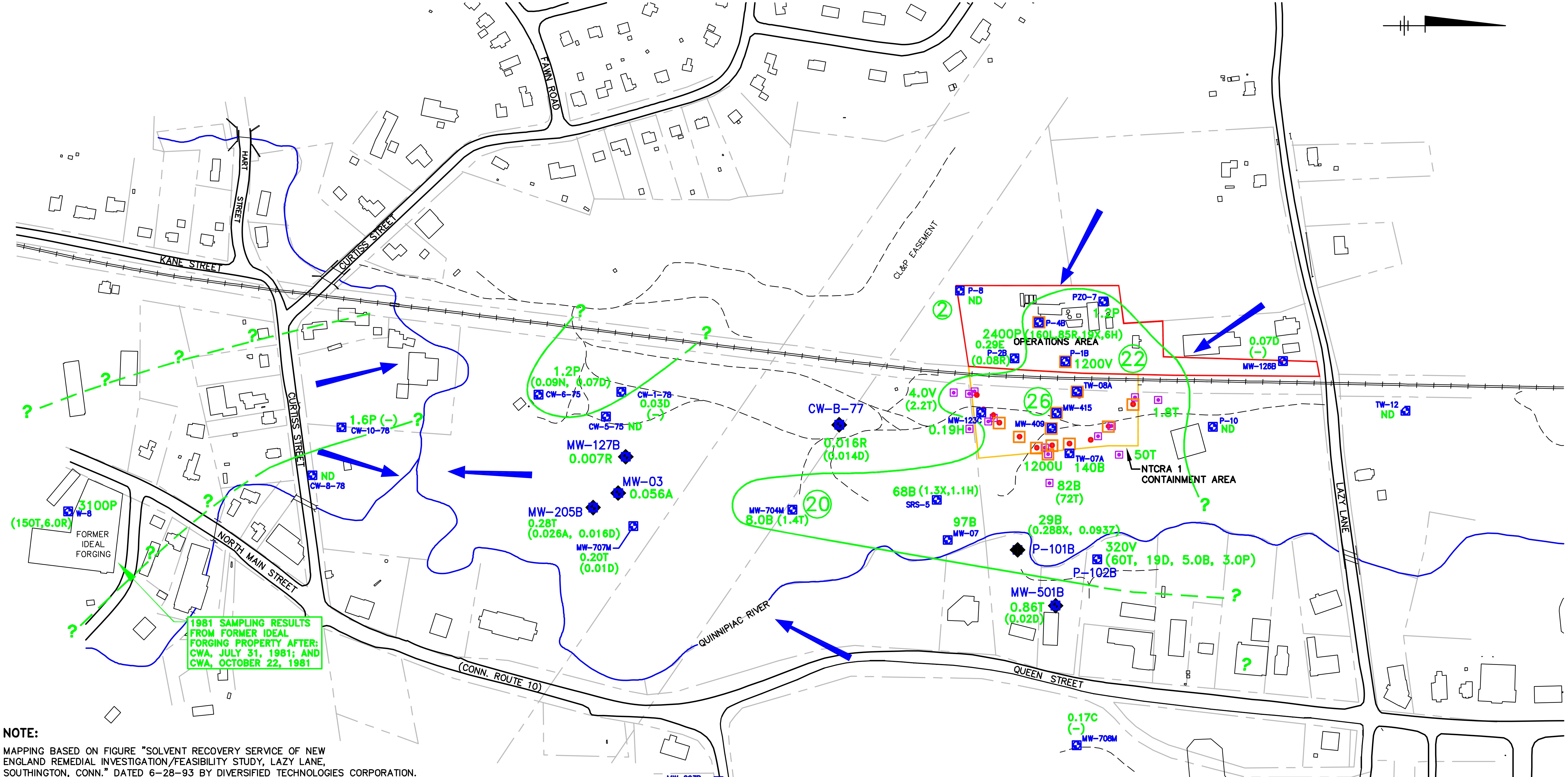
SOUTHINGTON, CONNECTICUT
REMEDIAL DESIGN WORK PLAN

ESTIMATED SHALLOW OVERBURDEN GROUNDWATER REGULATORY VOC PLUME, APRIL 2005

ARCADIS

FIGURE 10



NOTE:

MAPPING BASED ON FIGURE "SOLVENT RECOVERY SERVICE OF NEW ENGLAND REMEDIAL INVESTIGATION/FEASIBILITY STUDY, LAZY LANE, SOUTHINGTON, CONN." DATED 6-28-93 BY DIVERSIFIED TECHNOLOGIES CORPORATION.

A 1,1-DICHLOROETHANE
B BENZENE
C CHLOROFORM
D 1,2-DICHLOROETHENE
E 1,1-DICHLOROETHENE
H ETHYLBENZENE
L TOLUENE
M METHYLENE CHLORIDE
N ACETONE
P TETRACHLOROETHENE
R 1,1,1-TRICHLOROETHANE
T TRICHLOROETHENE
U 2-BUTANONE
V VINYL CHLORIDE
X XYLENES
Z CHLOROBENZENE
ND NO VOCs DETECTED

NOVEMBER 1996-JANUARY 1997 GROUNDWATER SAMPLING RESULTS PLOTTED, EXCEPT AT INTERIM MONITORING AND SAMPLING, OR SUPPLEMENTAL SAMPLING LOCATIONS, WHERE NEW RESULTS ARE PLOTTED.

MW-07
97B

WELL WITH REGULATORY EXCEEDANCE RATIO. NUMBERS >1.0 INDICATE GROUNDWATER REGULATORY LIMIT EXCEEDED. NUMBERS <1.0 INDICATE EXCEEDANCE RATIO FOR COMPOUNDS DETECTED BELOW REGULATORY LIMIT. FIRST NUMBER INDICATES MAXIMUM MULTIPLE OF A DETECTED VOC OVER REGULATORY LIMIT (e.g., 97 INDICATES 97 x LIMIT) LETTER INDICATES COMPOUND WITH INDICATED EXCEEDANCE RATIO (e.g., B = BENZENE) NUMBERS IN PARENTHESES INDICATE OTHER EXCEEDANCE RATIOS FOR SELECT COMPOUNDS AND WELLS. COMPOUNDS DETECTED IN BLANK(S) NOT INCLUDED IN THIS EVALUATION

LEGEND:

INTERIM MONITORING AND SAMPLING LOCATIONS

MIDDLE OVERBURDEN MONITORING WELL

NTCRA 1 EXTRACTION WELL

NTCRA 1 COMPLIANCE PIEZOMETER

ESTIMATED EXTENT OF GROUNDWATER VOC REGULATORY EXCEEDANCE(S)

2 USAF NATURAL ATTENUATION RANK

LOCATION WITH ALCOHOLS DETECTION IN GROUNDWATER

GENERALIZED GROUNDWATER FLOW DIRECTION

ND NO VOCs DETECTED DURING NOVEMBER 1996-JANUARY 1997 GROUNDWATER SAMPLING EVENT

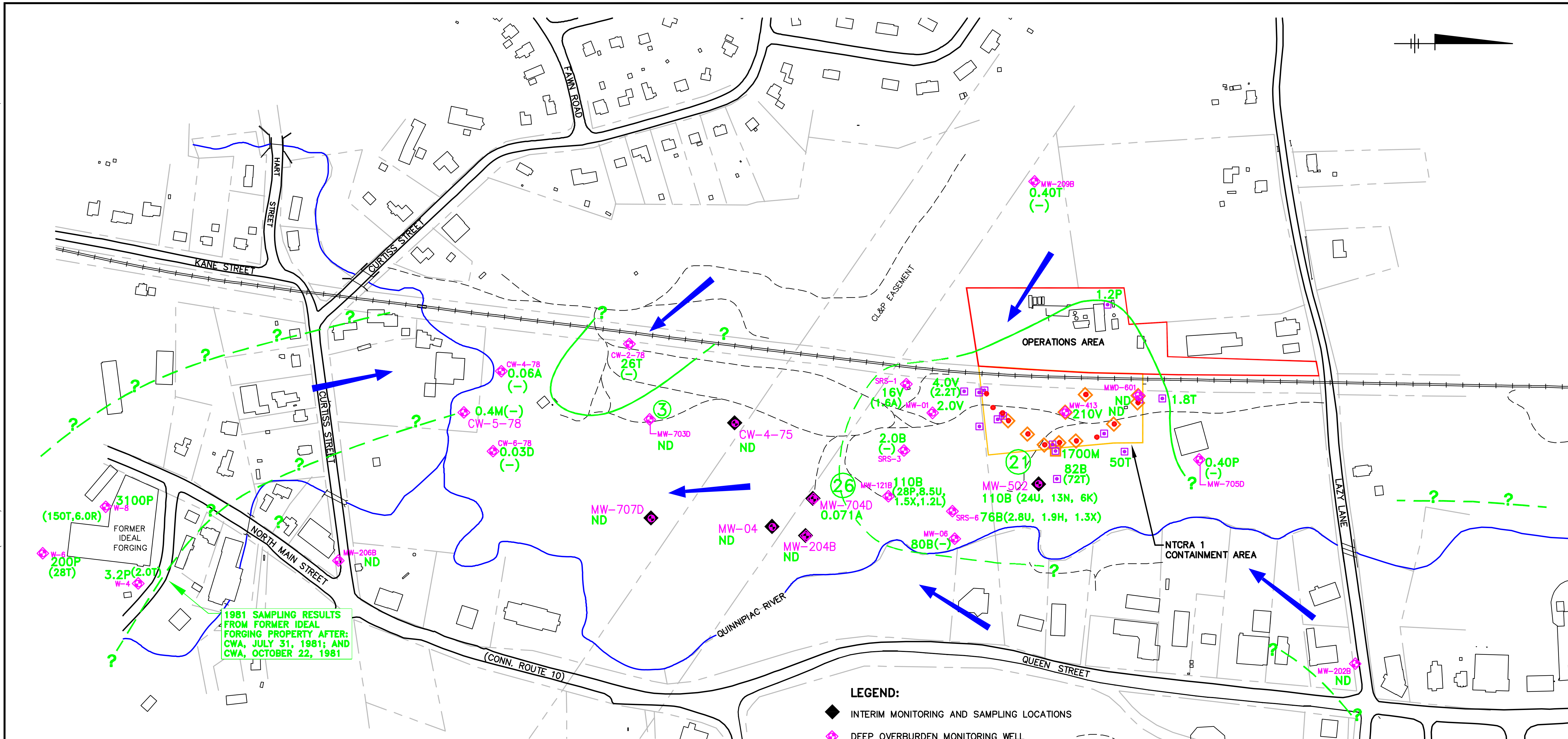
0 300' 600'

SRSNE SUPERFUND SITE
SOUTHINGTON, CONNECTICUT
REMEDIAL DESIGN WORK PLAN

ESTIMATED MIDDLE OVERBURDEN GROUNDWATER REGULATORY VOC PLUME, APRIL 2005

ARCADIS

FIGURE
11



A	1,1–DICHLOROETHANE
B	BENZENE
C	CHLOROBENZENE
D	1,2–DICHLOROETHENE
E	1,1–DICHLOROETHENE
H	ETHYLBENZENE
K	4–METHYL–2–PENTANONE (MIBK)
L	TOLUENE
M	METHYLENE CHLORIDE
N	ACETONE
P	TETRACHLOROETHENE
R	1,1,1–TRICHLOROETHANE
T	TRICHLOROETHENE
U	2–BUTANONE
V	VINYL CHLORIDE
X	XYLENES
ND	NO VOCs DETECTED
NE	NO EXCEEDANCES DETECTED

MW–502 3300C — WELL WITH REGULATORY EXCEEDANCE RATIO. NUMBERS >1.0 INDICATE GROUNDWATER REGULATORY LIMIT EXCEEDED. NUMBERS <1.0 INDICATE EXCEEDANCE RATIO FOR COMPOUNDS DETECTED BELOW REGULATORY LIMIT. FIRST NUMBER INDICATES MAXIMUM MULTIPLE OF A DETECTED VOC OVER REGULATORY LIMIT (e.g., 3300 INDICATES 3300 x LIMIT) LETTER INDICATES COMPOUND WITH INDICATED EXCEEDANCE RATIO (e.g., C = CHLOROFORM) NUMBERS IN PARENTHESES INDICATE OTHER EXCEEDANCE RATIOS FOR SELECT COMPOUNDS AND WELLS. COMPOUNDS DETECTED IN BLANK(S) NOT INCLUDED IN THIS EVALUATION

NOVEMBER 1996–JANUARY 1997 GROUNDWATER SAMPLING RESULTS PLOTTED, EXCEPT AT INTERIM MONITORING AND SAMPLING, OR SUPPLEMENTAL SAMPLING LOCATIONS, WHERE NEW RESULTS ARE PLOTTED.

NOTE:

1. MAPPING BASED ON FIGURE "SOLVENT RECOVERY SERVICE OF NEW ENGLAND REMEDIAL INVESTIGATION/FEASIBILITY STUDY, LAZY LANE, SOUTHINGTON, CONNECTICUT" DATED 6–28–93 BY DIVERSIFIED TECHNOLOGIES CORPORATION.

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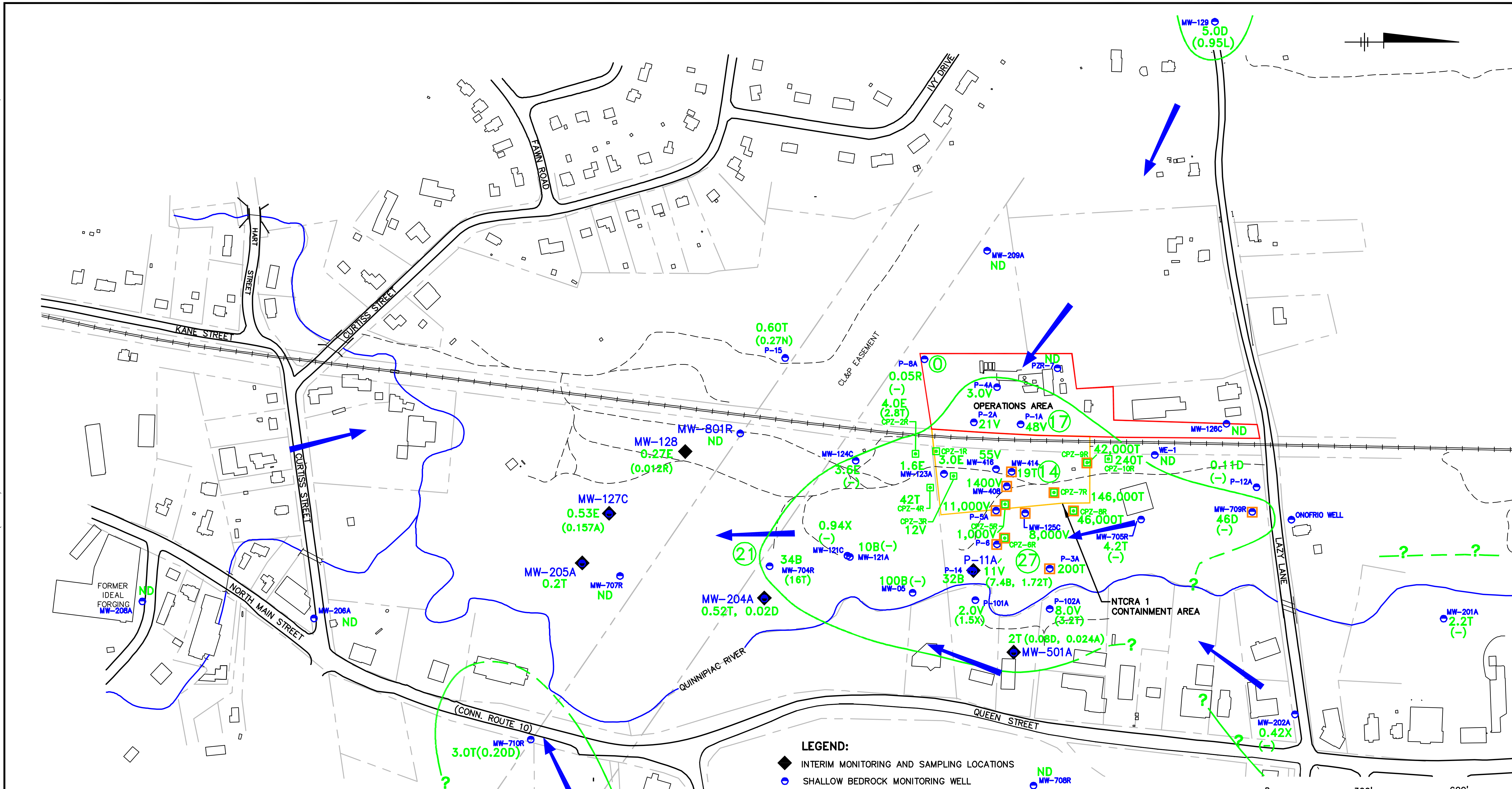
SOUTHINGTON, CONNECTICUT
REMEDIAL DESIGN WORK PLAN

ESTIMATED DEEP OVERBURDEN GROUNDWATER REGULATORY VOC PLUME, APRIL 2005

ARCADIS

FIGURE
12

CITY: SYRACUSE, NY GROUP: ENV/CAD DB: P. LISTER R.BASSETT PM: J. HOLDEN TR: J. HEADRICK LYR: ON=*;OFF=REF (FRZ)
G:\ENVCAD\SYRACUSE\ACT\B0054634\0000\00800\DWG\MNA\54634C04.DWG LAYOUT: 12 SAVED: 3/25/2009 10:25 AM ACADVER: 17.0S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: PLTFULL.CTB PLOTTED: 3/25/2009 10:25 AM BY: LISTER, PAUL
XREFS: 54634XBR 54634X01 IMAGES: PROJECTNAME: ----



LEGEND:

- INTERIM MONITORING AND SAMPLING LOCATIONS
- SHALLOW BEDROCK MONITORING WELL
- SHALLOW BEDROCK PIEZOMETER
- ESTIMATED EXTENT OF GROUNDWATER VOC REGULATORY EXCEEDANCE(S)
- (0) USAF NATURAL ATTENUATION RANK
- LOCATION WITH ALCOHOLS DETECTION IN GROUNDWATER
- GENERALIZED GROUNDWATER FLOW DIRECTION

A	1,1-DICHLOROETHANE
B	BENZENE
C	CHLOROFORM
D	1,2-DICHLOROETHENE
E	1,1-DICHLOROETHENE
M	METHYLENE CHLORIDE
N	ACETONE
P	TETRACHLOROETHENE
R	1,1,1-TRICHLOROETHANE
T	TRICHLOROETHENE
U	2-BUTANONE
V	VINYL CHLORIDE
X	XYLENES
Y	1,2-DIBROMO-3-CHLOROPROPANE
Z	CHLOROBENZENE
ND	NO VOCs DETECTED

NOVEMBER 1996–JANUARY 1997 GROUNDWATER SAMPLING RESULTS PLOTTED, EXCEPT AT INTERIM MONITORING AND SAMPLING, OR SUPPLEMENTAL SAMPLING LOCATIONS, WHERE NEW RESULTS ARE PLOTTED.

MW-707R
4.8T

WELL WITH REGULATORY EXCEEDANCE RATIO. NUMBERS >1.0 INDICATE GROUNDWATER REGULATORY LIMIT EXCEEDED. NUMBERS <1.0 INDICATE EXCEEDANCE RATIO FOR COMPOUNDS DETECTED BELOW REGULATORY LIMIT. FIRST NUMBER INDICATES MAXIMUM MULTIPLE OF A DETECTED VOC OVER REGULATORY LIMIT (e.g., 4.8 INDICATES 4.8 x LIMIT) LETTER INDICATES COMPOUND WITH INDICATED EXCEEDANCE RATIO (e.g., T = TRICHLOROETHENE) NUMBERS IN PARENTHESES INDICATE OTHER EXCEEDANCE RATIOS FOR SELECT COMPOUNDS AND WELLS. COMPOUNDS DETECTED IN BLANK(S) NOT INCLUDED IN THIS EVALUATION

NOTE:

1. MAPPING BASED ON FIGURE "SOLVENT RECOVERY SERVICE OF NEW ENGLAND REMEDIAL INVESTIGATION/FEASIBILITY STUDY, LAZY LANE, SOUTHINGTON, CONNECTICUT" DATED 6-28-93 BY DIVERSIFIED TECHNOLOGIES CORPORATION.

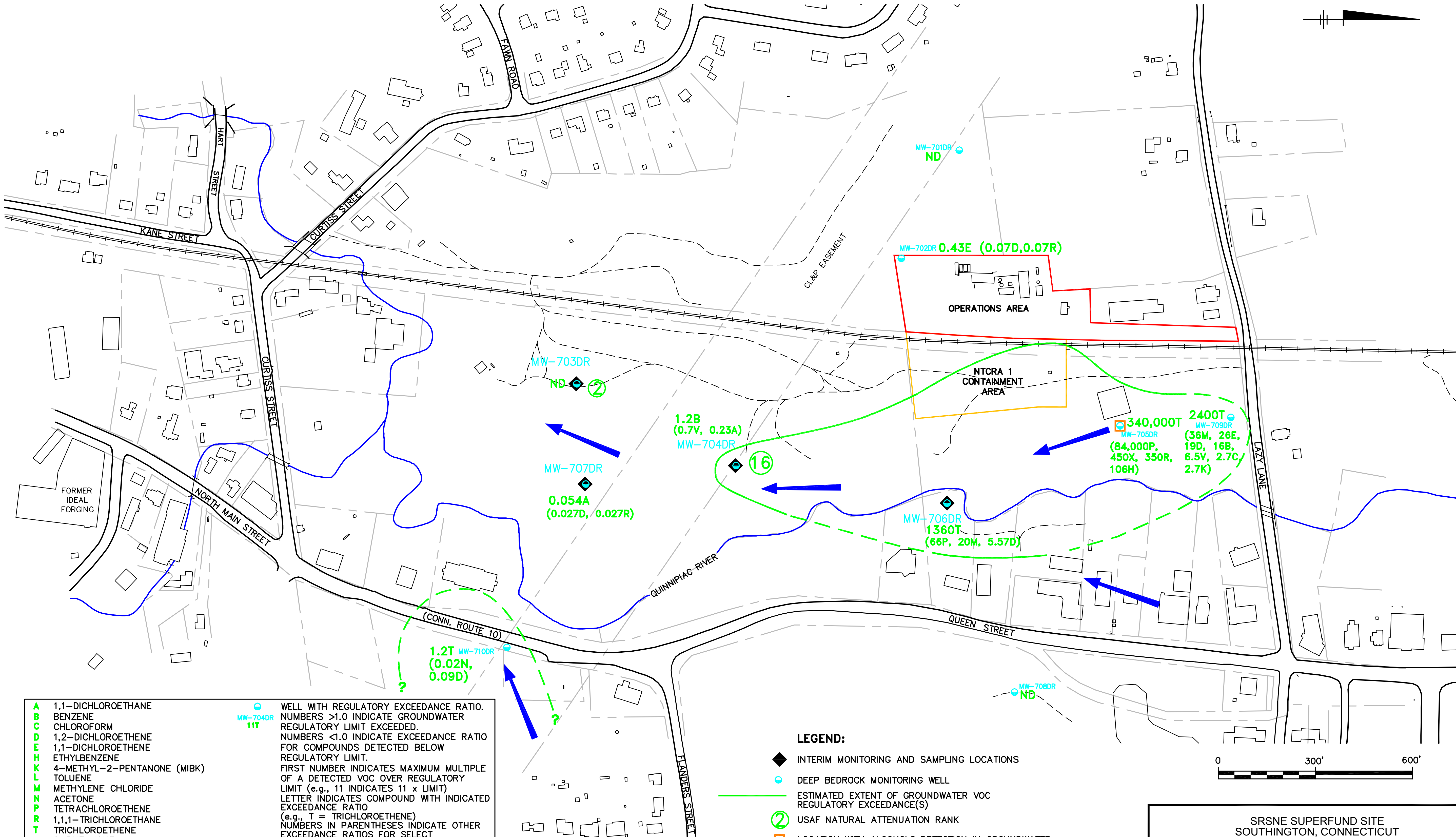
0 300' 600'

SRSNE SUPERFUND SITE
SOUTHINGTON, CONNECTICUT
REMEDIAL DESIGN WORK PLAN

ESTIMATED SHALLOW BEDROCK GROUNDWATER REGULATORY VOC PLUME, APRIL 2005

ARCADIS

FIGURE
13



A 1,1-DICHLOROETHANE
B BENZENE
C CHLOROFORM
D 1,2-DICHLOROETHENE
E 1,1-DICHLOROETHENE
H ETHYLBENZENE
K 4-METHYL-2-PENTANONE (MIBK)
L TOLUENE
M METHYLENE CHLORIDE
N ACETONE
P TETRACHLOROETHENE
R 1,1,1-TRICHLOROETHANE
T TRICHLOROETHENE
U 2-BUTANONE
V VINYL CHLORIDE
X XYLENES
ND NO VOCs DETECTED

NOVEMBER 1996-JANUARY 1997 GROUNDWATER SAMPLING RESULTS PLOTTED, EXCEPT AT INTERIM MONITORING AND SAMPLING, OR SUPPLEMENTAL SAMPLING LOCATIONS, WHERE NEW RESULTS ARE PLOTTED.

MW-704DR 11T WELL WITH REGULATORY EXCEEDANCE RATIO. NUMBERS >1.0 INDICATE GROUNDWATER REGULATORY LIMIT EXCEEDED. NUMBERS <1.0 INDICATE EXCEEDANCE RATIO FOR COMPOUNDS DETECTED BELOW REGULATORY LIMIT. FIRST NUMBER INDICATES MAXIMUM MULTIPLE OF A DETECTED VOC OVER REGULATORY LIMIT (e.g., 11 INDICATES 11 x LIMIT) LETTER INDICATES COMPOUND WITH INDICATED EXCEEDANCE RATIO (e.g., T = TRICHLOROETHENE) NUMBERS IN PARENTHESES INDICATE OTHER EXCEEDANCE RATIOS FOR SELECT COMPOUNDS AND WELLS.

COMPOUNDS DETECTED IN BLANK(S) OR IN SAMPLES WITH SURROGATE RECOVERY OUTSIDE QC LIMITS (*) NOT INCLUDED IN THIS EVALUATION.

LEGEND:

- INTERIM MONITORING AND SAMPLING LOCATIONS
- DEEP BEDROCK MONITORING WELL
- ESTIMATED EXTENT OF GROUNDWATER VOC REGULATORY EXCEEDANCE(S)
- 2 USAF NATURAL ATTENUATION RANK
- LOCATION WITH ALCOHOLS DETECTION IN GROUNDWATER
- GENERALIZED GROUNDWATER FLOW DIRECTION

NOTE:

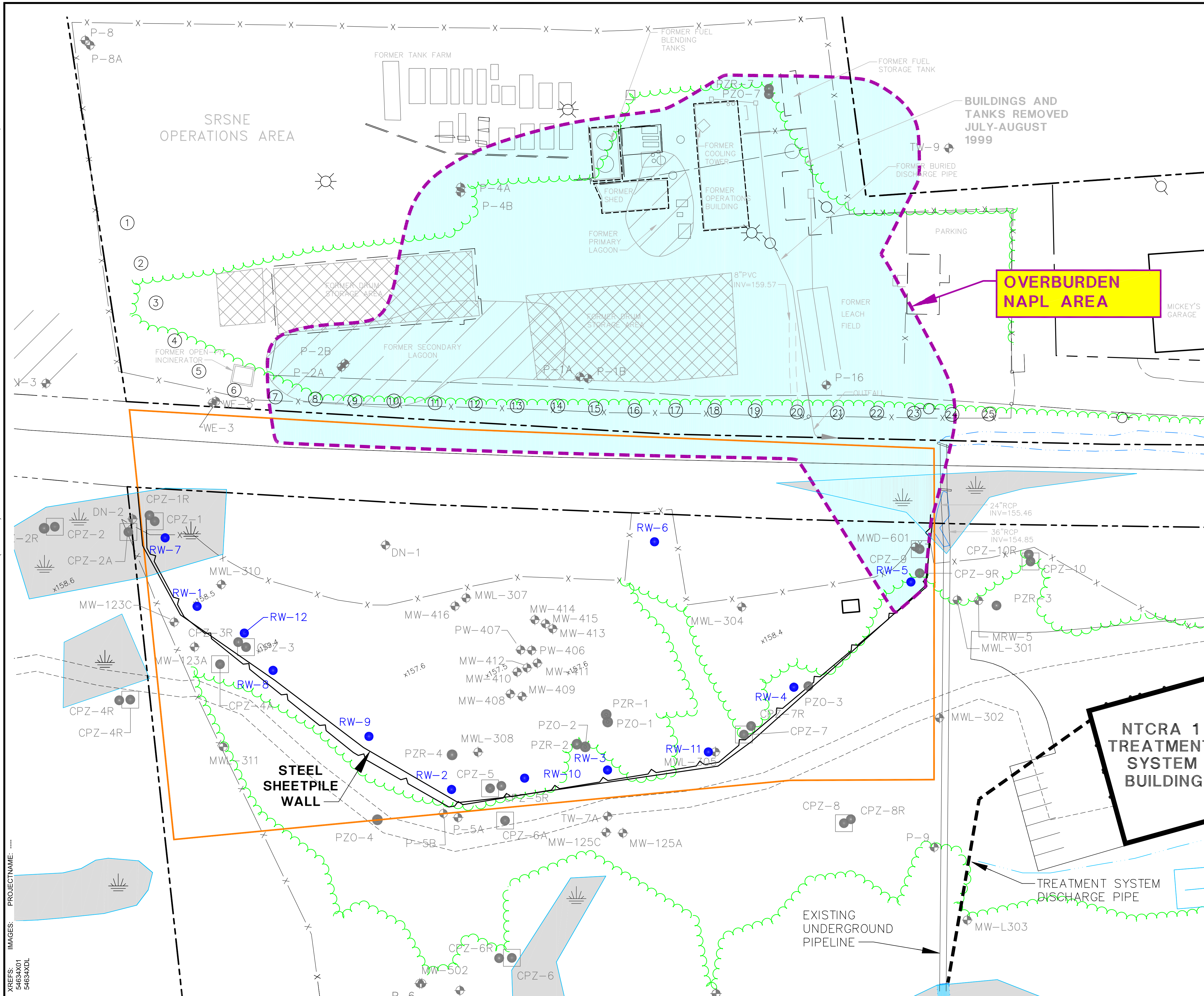
1. MAPPING BASED ON FIGURE "SOLVENT RECOVERY SERVICE OF NEW ENGLAND REMEDIAL INVESTIGATION/FEASIBILITY STUDY, LAZY LANE, SOUTHINGTON, CONNECTICUT" DATED 6-28-93 BY DIVERSIFIED TECHNOLOGIES CORPORATION.

SRSNE SUPERFUND SITE
SOUTHINGTON, CONNECTICUT
REMEDIAL DESIGN WORK PLAN

ESTIMATED DEEP BEDROCK GROUNDWATER REGULATORY VOC PLUME, APRIL 2005

ARCADIS

FIGURE
14



LEGEND:

PROPERTY LINE

WETLAND

NTCRA 1 CONTAINMENT AREA

EXISTING STRUCTURE

FENCE

P-10 MONITORING WELL

PZR-1 NTCRA 1 PIEZOMETER

CPZ-10 NTCRA 1 COMPLIANCE PIEZOMETER

RW-1 NTCRA 1 OVERBURDEN EXTRACTION WELL

12 FORMER ON-SITE INTERCEPTOR SYSTEM EXTRACTION WELL

LIGHT POLE

POWER POLE

NOTES:

1. SITE PLAN TAKEN FROM DIVERSIFIED TECHNOLOGIES CORP., 556 WASHINGTON AVE., NORTH HAVEN, CT, DATED 6/93. TOPOGRAPHY REPORTED TO HAVE BEEN DIGITIZED FROM TOWN OF SOUTHINGTON TOPOGRAPH MAPS G-7, G-8, G-9; PHOTOGRAPHY DATED NOV. 1978. SCALE: 1"=100'. PROPERTY LINES REPORTED TO HAVE BEEN DIGITIZED AND LOT NUMBERS TAKEN FROM "PROPERTY MAP, TOWN OF SOUTHINGTON" MAPS 134 & 147, SCALE: 1"=100' BY DIVERSIFIED TECHNOLOGIES CORPORATION.

2. BENCHMARK #1 IS AT ELEVATION 164.03. PK NAIL; S'LY SIDE; POLE #9049.

3. THE LOCATIONS OF EXISTING DRIVE POINTS WELLS AND PIEZOMETERS ARE APPROXIMATE ONLY.

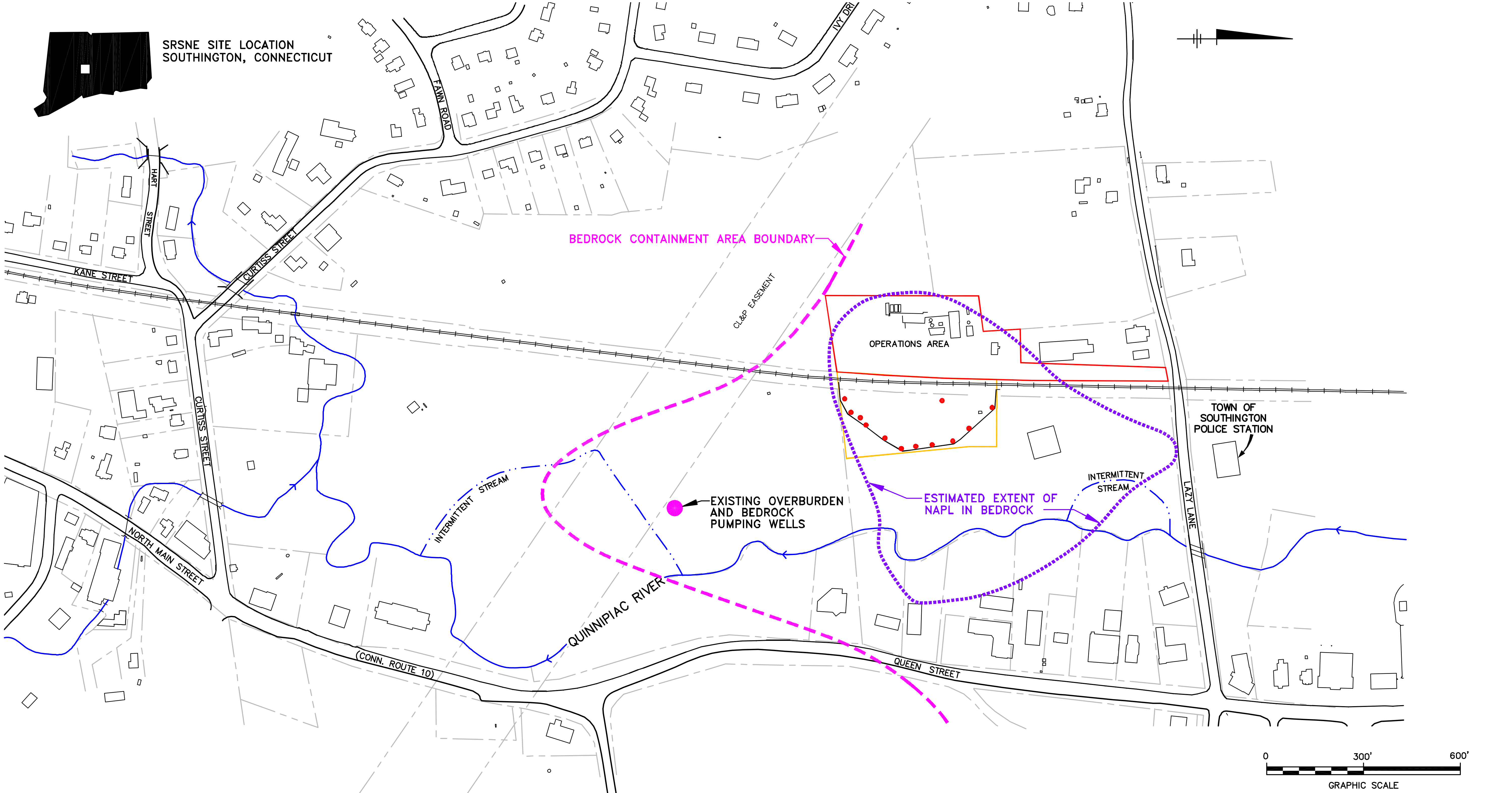
0 30' 60'
GRAPHIC SCALE

SRSNE SUPERFUND SITE
SOUTHINGTON, CONNECTICUT
REMEDIAL DESIGN WORK PLAN

OVERBURDEN NAPL AREA

ARCADIS

FIGURE
15



NOTE:

1. MAPPING BASED ON FIGURE "SOLVENT RECOVERY SERVICE OF NEW ENGLAND REMEDIAL INVESTIGATION/FEASIBILITY STUDY, LAZY LANE, SOUTHINGTON, CONNECTICUT" DATED 6–28–93 BY DIVERSIFIED TECHNOLOGIES CORPORATION.

LEGEND:

- OVERBURDEN SHEET PILE WALL
- OVERBURDEN EXTRACTION WELL (12)
- NTCRA 1 CONTAINMENT AREA

SRSNE SUPERFUND SITE
SOUTHINGTON, CONNECTICUT
REMEDIAL DESIGN WORK PLAN

BEDROCK NAPL AREA

ARCADIS

FIGURE
16

CITY: SYRACUSE, NY GROUP: ENVCAD DB: P. LISTER, R. BASSETT, P. LISTER PM: J. HOLDEN TR: R. STEVENSON LYR: ON=*;OFF=REF (FRZ) PAGESETUP: ---- PLOTSTYLETABLE: PLTFULL.CTB PLOTTED: 4/15/2009 2:03 PM BY: LISTER, PAUL
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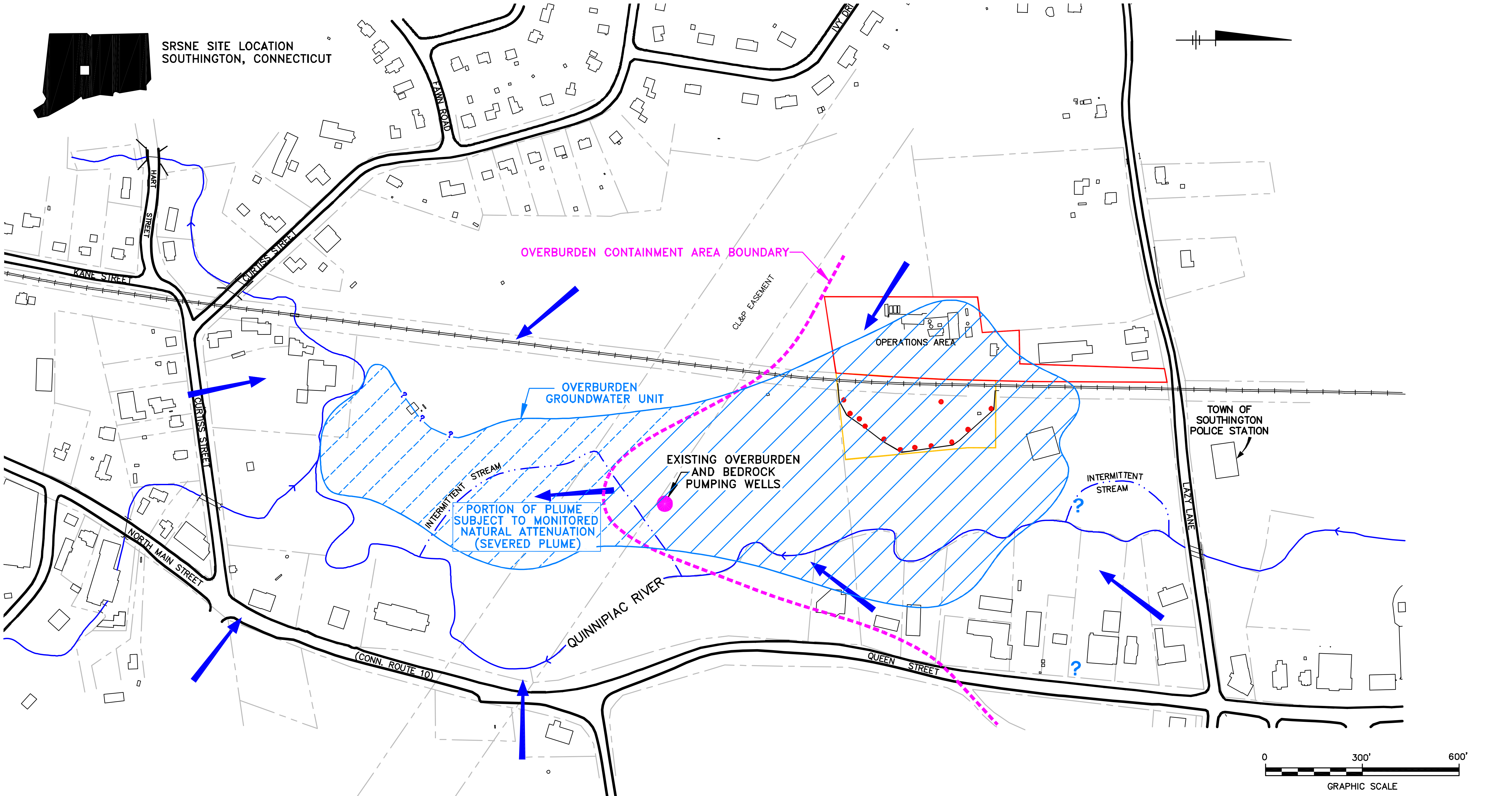

NOTE:

1. MAPPING BASED ON FIGURE "SOLVENT RECOVERY SERVICE OF NEW ENGLAND REMEDIAL INVESTIGATION/FEASIBILITY STUDY, LAZY LANE, SOUTHINGTON, CONNECTICUT" DATED 6–28–93 BY DIVERSIFIED TECHNOLOGIES CORPORATION.

LEGEND:

- OVERBURDEN SHEET PILE WALL
- OVERBURDEN EXTRACTION WELL (12)
- GENERALIZED GROUNDWATER FLOW DIRECTIONS
- NTCRA 1 CONTAINMENT AREA

SRSNE SUPERFUND SITE
SOUTHINGTON, CONNECTICUT
REMEDIAL DESIGN WORK PLAN

OVERBURDEN GROUNDWATER AREA

ARCADIS

FIGURE
17

CITY: SYRACUSE, NY GROUP: ENVCAD DB: P. LISTER, R. BASSETT, P. LISTER PM: J. HOLDEN TR: R. STEVENSON LYR: ON=*;OFF=REF, (FRZ)
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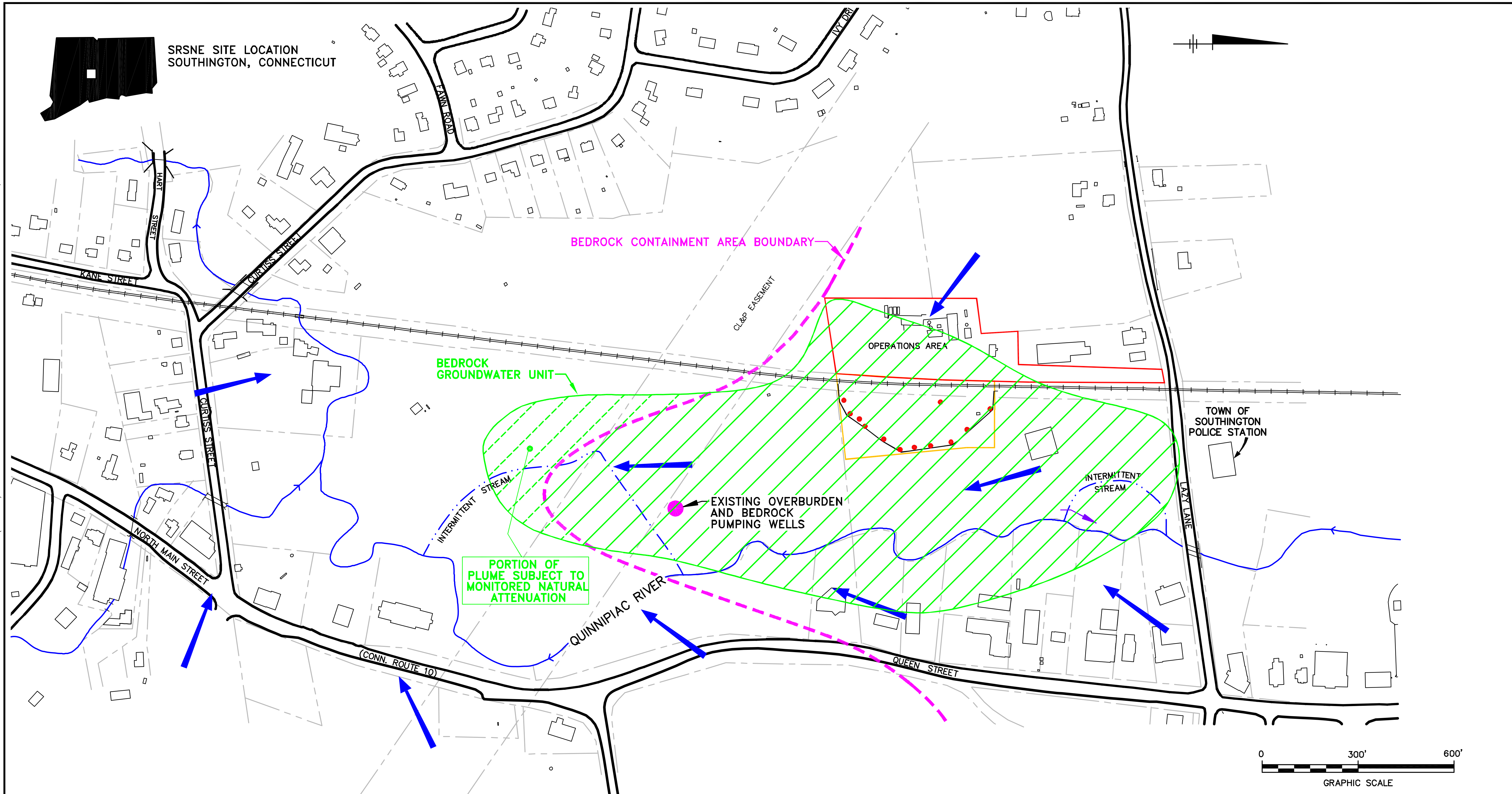

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SRSNE SUPERFUND SITE
SOUTHINGTON, CONNECTICUT
REMEDIAL DESIGN WORK PLAN

BEDROCK GROUNDWATER AREA

ARCADIS

FIGURE
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ARCADIS

Appendix 1

Groundwater and Soil Cleanup Levels

TABLE L-1

INTERIM CLEANUP LEVELS FOR GROUNDWATER [1]

Chemical Name	Units	Interim Cleanup Level [1]	Basis of Interim Cleanup Level
1,1,1-Trichloroethane	ug/l	0.5	CT RSR
1,1,1,2-Tetrachloroethane	ug/l	0.5	CT RSR
1.1.2-Trichloroethane	ug/l	0.5	CT RSR
1,1-Dichloroethane	ug/l	0.5	CT RSR
1,1-Dichloroethene	ug/l	0.5	CT RSR
1,2-Dibromo-3-chloropropane	ug/l	0.05	CT RSR
1,2-Dichlorobenzene	ug/l	0.5	CT RSR
1,2-Dichloroethane	ug/l	0.5	CT RSR
1,4-Dichlorobenzene	ug/l	0.5	CT RSR
2-Butanone	ug/l	5	CT RSR
2-Hexanone	ug/l	5	CT RSR
4-Methyl-2-pentanone	ug/l	5	CT RSR
Acetone	ug/l	5	CT RSR
Benzene	ug/l	0.5	CT RSR
Bromomethane	ug/l	0.5	CT RSR
Carbon Disulfide	ug/l	0.5	CT RSR
Carbon tetrachloride	ug/l	0.5	CT RSR
Chlorobenzene	ug/l	0.5	CT RSR
Chloroethane	ug/l	0.5	CT RSR
Chloroform	ug/l	0.5	CT RSR
Chloromethane	ug/l	0.5	CT RSR
cis-1,2-Dichloroethene	ug/l	0.5	CT RSR
Ethylbenzene	ug/l	0.5	CT RSR
Methylene chloride	ug/l	0.5	CT RSR
Styrene	ug/l	0.5	CT RSR
Tetrachloroethene	ug/l	0.5	CT RSR
Tetrahydrofuran	ug/l	0.5	CT RSR
Toluene	ug/l	0.5	CT RSR
trans-1,2-Dichloroethene	ug/l	0.5	CT RSR
trans-1,3-Dichloropropene	ug/l	0.5	CT RSR
Trichloroethene	ug/l	0.5	CT RSR
Vinyl chloride	ug/l	0.5	CT RSR
Xylenes	ug/l	0.5	CT RSR
1,2,4-Trichlorobenzene	ug/l	0.5 * ~~2~~	CT RSR
2,4-Dimethylphenol	ug/l	10	CT RSR
2-Methylphenol	ug/l	10	CT RSR
4-Methylphenol	ug/l	10	CT RSR
Benzoic Acid	ug/l	10	CT RSR
bis(2-Ethylhexyl)phthalate	ug/l	10	CT RSR
Di-n-butyl phthalate	ug/l	10	CT RSR
Di-n-octyl phthalate	ug/l	10	CT RSR
Hexachlorobutadiene	ug/l	0.45 [2]	CT RSR
Isophorone	ug/l	10	CT RSR
Napthalene	ug/l	0.5 [3]	CT RSR
Phenol	ug/l	10	CT RSR
Aroclor-1254	ug/l	0.5	CT RSR
Aroclor-1260	ug/l	0.5	CT RSR

TABLE L-1
INTERIM CLEANUP LEVELS FOR GROUNDWATER [1]

Chemical Name	Units	Interim Cleanup Level [1]	Basis of Interim Cleanup Level
Aluminum	ug/l	(1)	CT RSR
Antimony	ug/l	(1)	CT RSR
Arsenic	ug/l	(1)	CT RSR
Barium	ug/l	(1)	CT RSR
Beryllium	ug/l	(1)	CT RSR
Cadmium	ug/l	(1)	CT RSR
Chromium (Total)	ug/l	(1)	CT RSR
Cobalt	ug/l	(1)	CT RSR
Copper	ug/l	(1)	CT RSR
Iron	ug/l	(1)	CT RSR
Lead	ug/l	(1)	CT RSR
Manganese	ug/l	(1)	CT RSR
Nickel	ug/l	(1)	CT RSR
Silver	ug/l	(1)	CT RSR
Thallium	ug/l	(1)	CT RSR
Vanadium	ug/l	(1)	CT RSR
Zinc	ug/l	(1)	CT RSR
4,4'-DDD	ug/l	0.1	CT RSR
Aldrin	ug/l	0.05	CT RSR
Ethanol	ug/l	1000	CT RSR
Isopropanol	ug/l	1000	CT RSR
Methanol	ug/l	1000	CT RSR
Sec-Butanol	ug/l	1000	CT RSR

Notes:

1. CT Remediation Standards Regulation requires that "Remediation of groundwater in a GA area shall result in reduction of each substance therein to a concentration equal to or less than the background concentration for groundwater of such substance...." (RCSA 22a-133k-3(a)(2). Where background concentrations are reported as non-detects, the analytical detection level as defined in the CT RSRs shall be the remedial goal. Background levels for metals will be established based on future field sampling and laboratory analyses.

2. A special request to the laboratory is needed to provide an analytical detection limit of 0.45 ug/l for hexachlorobutadiene.

3. The analytical detection limit for napthalene is 0.5 ug/l via EPA Test Method 8260.

* Detection limit for 1,2,4-trichlorobenzene modified to reflect the value specified in CTDEP's Reasonable Confidence Protocol for Method 8260 (Version 3.0, July 2006)

TABLE L-2

SOIL AND WETLAND SOIL CLEANUP LEVELS FOR THE PROTECTION OF HUMAN HEALTH AND THE AQUIFER[1]

Chemical Name	Connecticut Residential Direct Exposure Criteria (mg/kg)	Connecticut GA, GAA Pollutant Mobility Criteria (mg/kg) [2]	Soil Cleanup Level (mg/kg) [1]	Basis of Cleanup Level	Carcinogenic Risk [3]	Non-Carcinogenic Hazard Quotient [3]	Non-cancer Target Endpoint
1,1,1-Trichlorethane	500	4	4	CT RSR	-	NA	-
1,1,2,2-Tetrachloroethane	3.1	0.01	0.01	CT RSR	2.E-08	1.E-05	liver
1.1.2-Trichloroethane	11	0.1	0.1	CT RSR	1.E-07	3.E-03	blood
1,1-Dichloroethane	500	1.4	1.4	CT RSR	-	3.E-03	kidney
1,1-Dichloroethene	1	0.14	0.14	CT RSR	-	1.E-03	liver
1,2-Dichloroethene, Total	500	1.4	1.4	CT RSR	-	3.E-02	blood
1,2-Dichloropropane	9	0.1	0.1	CT RSR	3.E-07	NA	-
2-Butanone	500	8	8	CT RSR	-	4.E-03	fetal weight
4-Methyl-2-pentanone	500	7	7	CT RSR	-	1.E-03	liver/ kidney
Acetone	500	14	14	CT RSR	-	1.E-03	kidney
Benzene	21	0.02	0.02	CT RSR	3.E-08	1.E-03	blood
Carbon tetrachloride	4.7	0.1	0.1	CT RSR	4.E-07	5.E-02	liver
Chlorobenzene	500	2	2	CT RSR	-	1.E-02	liver
Chlorodibromomethane	7.3	0.01	0.01	CT RSR	9.E-09	3.E-04	liver
Chloroform	100	0.12	0.12	CT RSR	6.E-07	2.E-03	liver
Ethylbenzene	500	10.1	10.1	CT RSR	-	5.E-03	liver
Methylene chloride	82	0.1	0.1	CT RSR	1.E-08	5.E-05	liver
Styrene	500	2	2	CT RSR	-	5.E-04	blood/ immune
Tetrachloroethene	12	0.1	0.1	CT RSR	2.E-07	3.E-03	liver
Toluene	500	20	20	CT RSR	-	3.E-02	liver/kidney
Trichloroethene	56	0.1	0.1	CT RSR	2.E-06	6.E-03	liver/ kidney/ developmental
Vinyl chloride	0.32	0.04	0.04	CT RSR	5.E-07	1.E-03	liver
Xylenes, Total	500	19.5	19.5	CT RSR	-	7.E-02	body weight
2-Methylnapthalene	474	0.98	0.98	CT RSR	NA	NA	-
4-Chloroaniline	270	1	1	CT RSR	-	4.E-03	spleen
4-Methylphenol	340	0.7	0.7	CT RSR	-	2.E-03	nervous system
Benzo(a)anthracene	1	1	1	CT RSR	2.E-06	-	-
Benzo(a)pyrene	1	1	1	CT RSR	2.E-05	-	-
Benzo(b)fluoranthene	1	1	1	CT RSR	2.E-06	-	-
Benzo(k)fluoranthene	8.4	1	1	CT RSR	2.E-07	-	-
bis(2-Ethylhexyl)phthalate	44	1	1	CT RSR	3.E-08	1.E-03	liver
Chrysene	84	1	1	CT RSR	2.E-08	-	-
Dibenzofuran	270	1	1	CT RSR	-	7.E-03	kidney
Di-n-butyl phthalate	1000	14	14	CT RSR	-	2.E-03	mortality
Di-n-octyl phthalate	1000	2	2	CT RSR	-	8.E-04	liver/thyroid

TABLE L-2

SOIL AND WETLAND SOIL CLEANUP LEVELS FOR THE PROTECTION OF HUMAN HEALTH AND THE AQUIFER[1]

Chemical Name	Connecticut Residential Direct Exposure Criteria (mg/kg)	Connecticut GA, GAA Pollutant Mobility Criteria (mg/kg) [2]	Soil Cleanup Level (mg/kg) [1]	Basis of Cleanup Level	Carcinogenic Risk [3]	Non-Carcinogenic Hazard Quotient [3]	Non-cancer Target Endpoint
Fluoranthene	1000	5.6	5.6	CT RSR	-	2.E-03	liver
Indeno(1,2,3-cd)pyrene	1	1	1	CT RSR	2.E-06	-	-
Phenanthrene	1000	4	4	CT RSR	NA	NA	-
Pyrene	1000	4	4	CT RSR	-	2.E-03	kidney
2,3,7,8 TCDD -TEQ	NA [4]	NA [4]	lower of 0.001 mg/kg or background [4]	EPA Policy [4]/ background	To be determined	-	-
PCBs Total	1	0.0005 mg/l [2]	1 mg/kg and 0.0005 mg/l [2]	CT RSR	5.E-06	9.E-01	immune
Antimony	27	0.006 mg/l [2]	27 mg/kg and 0.006 mg/l [2]	CT RSR	-	9.E-01	mortality/ blood
Arsenic	10	0.05 mg/l [2]	10 mg/kg and 0.05 mg/l [2]	CT RSR	3.E-05	5.E-01	skin
Barium	4700	1 mg/l [2]	4700 mg/kg and 1 mg/l [2]	CT RSR	-	9.E-01	kidney
Beryllium	2	0.004 mg/l [2]	2 mg/kg and 0.004 mg/l [2]	CT RSR	1.E-09	1.E-02	small intestine
Cadmium	34	0.005 mg/l [2]	34 mg/kg and 0.005 mg/l [2]	CT RSR	2.E-08	9.E-01	kidney
Chromium^{+3}	3900	0.05 mg/l [2,5]	3900 mg/kg and 0.05 mg/l [2,5]	CT RSR	-	3.E-02	none
Chromium^{+6}	100	0.05 mg/l [2,5]	100 mg/kg and 0.05 mg/l [2,5]	CT RSR	3.E-06	5.E-01	none
Lead	500	0.015 mg/l [2]	400 mg/kg [6] and 0.015 mg/l [2]	EPA Policy [6]/ CT RSR	NA	NA [6]	nervous system

Total Cancer Risk[7] =	7.E-05

Cumulative HI by Target Endpoint

kidney	2.E+00
immune	9.E-01
mortality	9.E-01
skin	5.E-01
other endpoints	HI below 1

SOIL AND WETLAND SOIL CLEANUP LEVELS FOR THE PROTECTION OF HUMAN HEALTH AND THE AQUIFER[1]

Notes:

NA = Not Available or Not Applicable

1. Soil Cleanup levels are the more stringent of the Connecticut Residential Direct Exposure Criteria (RDEC) or Pollutant Mobility Criteria (PMC) for those depths of soil where both RDEC and PMC apply, and where both RDEC and PMC are expressed in mass concentrations (e.g. mg/kg). Cleanup levels for those substances where PMC are leachate concentrations (see footnote 3), both RDEC and PMC apply except for lead where the cleanup level is based on EPA policy (see footnote 7) and the CT PMC for lead. Cleanup levels may revert to background concentrations if adequate documentation is provided.

2. For inorganics and PCBs, the Pollutant Mobility Criteria are based on leachate concentrations (expressed in mg/l) as obtained via either the SPLP or TCLP leaching procedures.

3. Cancer risk and non-cancer hazard are based on residential exposure and assume exposure parameters consistent with EPA Region 9 Preliminary Remediation Goals which reflect ingestion, dermal contact, and inhalation of the soil medium. Values for PCBs and inorganics reflect risk or hazard for cleanup levels expressed as a soil concentration (mg/kg).

4. There are no CT residential DEC or PMC for 2,3,7,8 TCDD-TEQ (Dioxin) in the CT RSRs. EPA and CT DEP have agreed that the cleanup level for 2,3,7,8-TCDD TEQ will be the lower of the EPA policy for residential sites (0.001 mg/kg per OSWER Directive # 9200.4-26 April 1998) and the background concentration which will be determined based on future field study, or another concentration consistent with CT RSRs, but not lower than background.

5. The PMC based cleanup levels for chromium (both trivalent and hexavalent) are based on a total chromium concentration.

6. The value of 400 mg/kg lead protects 95% of the exposed population from blood lead levels in excess of 10 ug/dl consistent with EPA's policy for lead (OSWER Directive #9355.4-12 July 14, 1994).

7. The total cancer risk does not include the risk attributed to 2,3,7,8 TCDD-TEQs as the cleanup level will be determined during remedial design.

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Attachment A

Overburden NAPL Delineation Plan

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Attachment B

Thermal Treatment Monitoring Plan

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Attachment C

Thermal Treatment Performance Criteria Work Plan

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Attachment D

Vapor Treatment Needs Evaluation Work Plan

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Attachment E

System Design Evaluation
Work Plan

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Attachment F

NAPL Mobilization
Assessment and Mitigation
Plan

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Attachment G

Post-Excavation Confirmatory Sampling Plan

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Attachment H

Habitat Restoration Work Plan

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Attachment I

Soil Investigation Plan

Attachment J

Vapor Control System
Evaluation

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Attachment K

Vapor Intrusion Study Work Plan

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Attachment L

Monitored Natural Attenuation Plan

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Attachment M

Pre-ISTR Preparation Plan

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Attachment N

Monitoring Well Network
Evaluation and Groundwater
Monitoring Program

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Attachment O

Groundwater Containment and Treatment Evaluation and Optimization Study Work Plan