FEASIBILITY STUDY

Bianchi/Weiss Greenhouses Site (152209) East Patchogue, Suffolk County, New York





New York State Department of Environmental Conservation Division of Environmental Remediation

Prepared by:



EA ENGINEERING, P.C. and Its Affiliate EA SCIENCE and TECHNOLOGY

September 2011



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Prepared for

New York State Department of Environmental Conservation 625 Broadway Albany, New York 12233



Prepared by

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> September 2011 Revision: FINAL EA Project No. 14368.33

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LIST OF ACRONYMS

bgs	Below ground surface
CFR	Code of Federal Regulations
DER	Division of Environmental Remediation
EA EDR	EA Engineering, P.C. and its affiliate EA Science and Technology Environmental Data Resources, Inc.
FS	Feasibility Study
GRA	General response actions
NYCRR NYSDEC	New York Code of Rules and Regulations New York State Department of Environmental Conservation
	1
ppm	Parts per million
ppm RAO RI	
RAO	Parts per million Remedial action objective

1. INTRODUCTION AND PROJECT OVERVIEW

The New York State Department of Environmental Conservation (NYSDEC) tasked EA Engineering, P.C. and its affiliate EA Science and Technology (EA) to perform a remedial investigation (RI) and feasibility study (FS) at the Bianchi/Weiss Greenhouses site (NYSDEC Site No. 152209) located in East Patchogue, Suffolk County, New York (Figure 1).

1.1 PURPOSE AND SCOPE

This FS report has been prepared to develop and evaluate options for remedial action to determine which option is the most appropriate, cost effective, and protective of public health and the environment for the Bianchi/Weiss Greenhouses site.

The FS has been conducted in accordance with the most recent versions of the *Guidance for Conducting Remedial Investigations and Feasibility Studies under Comprehensive Environmental Response, Compensation, and Liability Act* (U.S. Environmental Protection Agency [USEPA] 1988) and Division of Environmental Remediation (DER)-10, Technical *Guidance for Site Investigation and Remediation* (NYSDEC 2010) and focused on a limited number of remedial alternatives proven effective at addressing the pesticide chlordane.

1.2 REPORT ORGANIZATION

The FS report has been organized as follows:

- Section 1—Introduction and Project Overview
- Section 2—Summary of Remedial Investigation and Exposure Assessment
- Section 3—Development of Remedial Action Objectives
- *Section 4*—General Response Actions
- Section 5—Identification and Screening of Technologies
- Section 6—Scoping and Development of Remedial Alternatives
- Section 7—Costing and Evaluation Criteria
- Section 8—Detailed Analysis of Alternatives and Recommendations
- *Section 9*—References.

1.3 BACKGROUND

The following section provides a brief discussion of the site background for the Bianchi/Weiss Greenhouses site. A full description of the site is provided in the Final RI Report (EA 2011), which was submitted as a separate deliverable.

1.3.1 Site Location

The Bianchi/Weiss Greenhouses site is located at 25 Orchard Road, in East Patchogue, Suffolk County, New York (Figure 1). The property is an irregular-shaped parcel that has main access to the site from Orchard Road. An alternative access road exists on Hedges Road to the north of the property, but is currently overgrown with vegetation. Residential properties are located to the north, south, east, and west of the property.

1.3.2 Property Information

Based upon a review of historical information presented in the Environmental Data Resources, Inc. (EDR) report, the site first appears with nine structures including six greenhouses on the 1947 U.S. Geological Survey topographical map. No U.S. Geological Survey topographical maps were provided for the site location between 1904 and 1947 in the EDR report. Historical property ownership documents identified operations of the greenhouses began at the site sometime in 1929. Historic on-site structures were reportedly utilized as a nursery for commercial growing purposes. On-site structures consisted of three buildings (1.5-story storage building, 1.5-story brick/frame residential dwelling, and a generator building), a single-story horse barn, a frame garage, and six greenhouses. During an inspection of the greenhouses and other on-site buildings, it was documented that no slop sinks or floor drains were observed. Planting fields were reported to have been located on the eastern and western portions of the site; however, the western portions of the site are presently covered with asphalt or concrete foundations. Two 275-gal fuel oil aboveground storage tanks, one 1,000-gal aboveground storage tank, and one 20,000-gal fuel oil underground storage tank were identified as being located on the property. Another underground storage tank was identified during the RI in 2009 using ground penetrating radar. The underground storage tank is located just north of the former generator house, as shown on Figure 2. EA also noted what appeared to be the remnants of a drainage trench feature that bisected the northern and southern greenhouses. This drainage feature was an exposed concrete structure (concrete walls and base) approximately 2-3 ft below ground surface (bgs) and assumed to flow from north to south. A copy of the EDR report was provided in the RI/FS Work Plan (EA 2008).

The site is currently zoned for residential use, but is unoccupied and vacant. Figure 2 identifies the existing features at the site. It is estimated that the site operated as a greenhouse/nursery for at least 70 years. After taking ownership in 2005, Henron Development Corporation (Henron) proceeded with demolition activities; therefore, in present condition, none of the greenhouses or on-site structures exist.

1.3.3 Site History

The site historically operated as a nursery and commercial greenhouse from 1929 to 2005. According to property ownership documents, the site, or at least portions of the site, was owned by the Bianchi family and Bianchi Orchards from 1929 to 1990. The Weiss family and Kirk Weiss Greenhouses purchased the site property in 1992. In December 2005, the site property was purchased by Henron and planned for residential redevelopment.

1.3.4 Physiography

The subject site is located on the U.S. Geological Survey Bellport, New York 7.5-minute topographic quadrangle map, dated 1967.

Elevation at the site is approximately 16 ft above mean sea level. The nearest surface water feature, as noted on the topographic map, is Moss Creek which is located approximately 0.25 mi south of the subject site and Abets Creek, which is located approximately 0.25 mi southwest of the subject site. Both creeks flow from north to south and drain to Patchogue Bay. Reportedly, no wetlands or surface expressions of groundwater are located on the property. According to the Federal Emergency Management Agency, the property is not located within the 100-year flood plain. The closest wetlands and surface water bodies are located approximately within 0.5 mi west of the property and are associated with Abets Creek.

1.3.5 Site Geology

A review of the geologic map of New York, Lower Hudson Sheet published by the University of the State of New York, the State Education Department and dated 1970, indicates that the subject site lies within the coastal plain deposits above the Monmouth, Matawan, and Magothy Groups, which are part of the Upper Cretaceous Period. According to the EDR report, the subject site is located within the sands and loams associated with the Pliestocene Epoch in the Quarternary Period.

1.3.6 Site Hydrogeology

Based on groundwater monitoring performed in the vicinity of the site, groundwater was typically encountered 6-8 ft bgs on-site and ranged from 2.5 ft bgs south of the site to 13 ft bgs at monitoring locations north of the property. The regional shallow groundwater flow was previously determined to be in a south-southwest direction.

2. SUMMARY OF REMEDIAL INVESTIGATION AND EXPOSURE ASSESSMENT

The following sections briefly summarize the environmental impacts at the Bianchi/Weiss Greenhouses site. A detailed discussion is provided in the Remedial Investigation report. This section is organized by media of potential concern. The impacts associated with the environmental media are based on analytical results and their comparison with the appropriate standards, criteria, and guidance (SCGs). The media of concern discussed are soil and groundwater.

2.1 SURFACE AND SUBSURFACE SOIL

The focus of the soil screening and characterization efforts conducted during the RI were to determine the nature and extent of pesticides contamination, specifically chlordane, in site soil using both immunoassay field test kits and confirmatory analytical analyses.

Soil samples with the highest total chlordane concentrations were located primarily within the footprints of the former greenhouses and northern portions of the site. As discussed in the RI report (EA 2011), technical grade chlordane is comprised of various chlorinated hydrocarbons with a typical composition of approximately 24 percent *gamma*-chlordane, 19 percent *alpha*-chlordane, 10 percent heptachlor, 21.5 percent chlordene isomers, 7 percent nonachlor, and 18.5 percent closely-related chlorinated hydrocarbon compounds. EA assessed the overall percentage of *alpha* and *gamma*-chlordane analytical results as compared to the total chlordane analytical results to develop a site percentage. Surface soil results reported an average *alpha*-chlordane percentage of 13 percent. Subsurface soil results reported an average *alpha*-chlordane percentage of approximately 15 percent and an average *gamma*-chlordane percentage of approximately 12 percent.

The percentages reported for the sites are within the expected ranges of composition based on the persistence and assumed degradation of the compounds over time.

2.1.1 Pesticides in Surface Soils

Chlordane was found in surface soils (0-2 in.) across the site with the majority of surface soil chlordane concentrations greater than 3 parts per million (ppm). The only areas that were not observed to have elevated chlordane concentrations were the far eastern and northwestern portions of the site.

The greatest concentrations of *alpha*-chlordane in surface soils were found in the northern portion of the site, in the orchard area. The highest concentration of *alpha*-chlordane was 31 ppm, in sampling location GOG. Surface soil samples that contained total chlordane concentrations were located primarily within the footprints of the former greenhouses and in the northern portion of the site. Incidental ingestion, dermal contact, and/or inhalation of

contaminated soils are potential exposure pathways to current site workers, trespassers, and adjacent residents.

2.1.2 Pesticides in Subsurface Soils

Subsurface soils that were analyzed in the field using immunoassay field test kits indicated that the chlordane concentrations exceeding 3 ppm were primarily within the footprints of the former greenhouses. With both the field testing and laboratory analysis, chlordane concentrations in subsurface soils generally decreased with increasing depth. The greatest concentration of *alpha*-chlordane from 1 to 1.5 ft bgs was 4.8 ppm located in the northwest area of the former greenhouse footprints. The greatest concentration of *alpha*-chlordane from 2 to 2.5 ft bgs was 6.1 ppm located in the central area of the former greenhouse footprints. The greatest concentration of *alpha*-chlordane from 3 to 3.5 ft bgs was 1.2 ppm in the central area of the former greenhouse footprints. The greatest concentration of *alpha*-chlordane from 4 to 4.5 ft bgs was 0.34 ppm and the greatest concentration from 5 to 5.5 ft bgs was 0.74 ppm, both in the former greenhouse footprints.

In the orchard area, north of the former greenhouse footprints, subsurface concentrations of *alpha*-chlordane were minimal, with only one detection exceeding the Part 375 unrestricted SCOs in each of the 1-1.5, 2-2.5, and 4-4.5 ft sampling intervals. All of the orchard area exceedances were less than the residential use Part 375 SCO value of 0.91 ppm. Field analyses using immunoassay test kits indicated there were nine sample locations in the 1-1.5 ft sampling interval containing chlordane concentrations exceeding 3 ppm. Concentrations diminished at lower intervals, with only one sample exceeding 3 ppm at 2-2.5 ft on the edge of the orchard near the greenhouse area and none within the deeper intervals. Incidental ingestion, dermal contact, and inhalation of contaminated soils is a potential pathway to current workers.

2.1.3 Volume of Impacted Soil

Surface and subsurface soil were handled as a single element when creating cost estimates for this FS, but were divided into three depths: 0-2, 2-4, and 4-6 ft bgs. Soil impacts exceeding the Part 375 unrestricted SCOs were observed during the RI from 0 to 2 ft over a 9 acre area, for a total volume of approximately 29,000 yd³. Impacts were observed from 2 to 4 ft bgs in a 4.5 acre area, for a total volume of approximately 16,000 yd³. Additionally, impacts were observed from 4 to 6 ft bgs over a 3 acre area, for a total volume of approximately 12,000 yd³.

When compared with the Part 375 residential SCOs, impacted soil volumes are much smaller. Soil impacts were observed from 0 to 2 ft over a 7 acre area, for a total volume of approximately $23,000 \text{ yd}^3$. Impacts were observed from 2 to 4 ft bgs in a 2.5 acre area, for a total volume of approximately 9,000 yd³. Impacts were observed from 4 to 6 ft bgs over a 1 acre area, for a total volume of approximately 2,000 yd³.

2.2 **PESTICIDES IN GROUNDWATER**

The shallow groundwater from monitoring wells at depths ranging between 2.6 and 11 ft bgs was collected and analyzed as part of the RI. The analytical results revealed elevated concentrations of the pesticide chlordane in the groundwater both on-site and downgradient from the site. Chlordane is the most dominant contaminant, as it was detected exceeding the site SCG value in 27 of 43 monitoring wells and 3 of 4 temporary monitoring wells. Dieldrin which is not suspected to be site related was detected exceeding the site SCG value in 4 of 43 monitoring wells located downgradient from the site.

The highest chlordane concentrations were found in temporary monitoring wells on the site and monitoring wells located immediately downgradient and southwest of the site. This information, along with historical groundwater sampling results, indicates that the groundwater contaminant plume tends to follow a south/southwest direction, in line with the interpreted groundwater flow path. Based on interpreted groundwater isopleths developed for the RI report, the length of the plume extends approximately 2,900 ft to the southwest, and is approximately 460 ft at the widest point, along the monitoring wells located just north of South County Road, 300 ft downgradient from the site. The plume does not extend across Abets Creek. Figure 3 depicts monitoring well locations and interpreted contaminated groundwater plume.

Chlordane exhibits low solubility in water (0.009 ppm) and adsorbs strongly to soil. In water, chlordane has an affinity to adsorb to sediment and particles in the water column so it is not expected that chlordane will be lost via the volatilization processes. The most common method of transport for chlordane is via particle transport mechanisms (e.g., surface runoff and erosion, suspended sediments in rivers or streams, and colloidal transport in groundwater), due to its strong affinity for solid matrices. Colloids are very small (from 0.001 to 1 micrometer in diameter) organic, inorganic, or clay particles that move via groundwater flow through the interstitial spaces of subsurface soil. Hydrophobic contaminants (i.e., chlordane) can attach to colloids and migrate with groundwater. Based on the inherent physiochemical characteristics of chlordane, the comparison of the field filtered and unfiltered groundwater samples, the estimated average linear groundwater velocities and retardation factors affecting chlordane transport velocities, and the consistent detections of chlordane in groundwater at monitoring wells located at distances greater than 2,800 ft from the likely on-site source area(s), this scenario would suggest that the transport of chlordane is likely attributable to colloidal movement in the groundwater system. Therefore, it is assumed that the effective concentration of total chlordane reported in groundwater samples collected during this RI is unlikely a dissolved-phase solute.

Groundwater is currently used as a partial private water supply in the vicinity of the site or plume, as it is used for landscape watering and other similar uses. Public water is available to this area and known potable wells do not appear to be located within the plume emanating from the site. Due to shallow groundwater depths, groundwater intrusion is possible in nearby residential homes. Incidental ingestion and dermal contact to contaminated groundwater, temporary ponds, or groundwater upwelling into basements is a potential pathway to area residents and/or workers.

3. DEVELOPMENT OF REMEDIAL ACTION OBJECTIVES

Goals for the remedial program have been established through the remedy selection process stated in 6 New York Code of Rules and Regulations (NYCRR) Part 375. The remedial goal for all remedial actions is considered to be the restoration of the site to the pre-disposal/pre-release conditions to the extent practicable and legal. Remedial action objectives (RAOs) are defined as the medium-specific or operable unit-specific cleanup objectives to provide protection of public health and the environment. The RAOs are based on contaminant-specific SCGs. The RAOs for the Bianchi/Weiss Greenhouses site are to meet the SCGs listed in the following table.

3.1 CLEANUP STANDARDS, CRITERIA, AND GUIDANCE

Cleanup standards for soil and groundwater are presented in the following table along with the range of contaminant detections.

		SOIL -	- CLEANUP SCO	G s	
Chemical of	Concentration Range	Unrestricted Use Soil Cleanup	Restricted Use Soil Cleanup	Frequency of Exceeding	Frequency of Exceeding
Potential	Detected	Objectives SCG	Objectives	Unrestricted Use	Residential Use
Concern	(ppm) ^(a)	(ppm)	SCG (ppm)	SCG	SCG
alpha- chlordane	Non-detect – 31	0.094	0.91	25/55 (surf. soil) 17/87 (1-1.5 ft) 11/35 (2-2.5 ft) 9/37 (3-3.5 ft) 9/20 (4-4.5 ft) 9/26 (5-5.5 ft)	19/55 (surface soil) 12/87 (1-1.5 ft) 7/35 (2-2.5 ft) 3/37 (3-3.5 ft) 0/20 (4-4.5 ft) 0/26 (5-5.5 ft)
gamma- chlordane	Non-detect- 26	0.54 ^(b)	0.54	20/55 (surface soil) 13/87 (1-1.5 ft) 7/35 (2-2.5 ft) 5/37 (3-3.5 ft) 0/20 (4-4.5 ft) 1/26 (5-5.5 ft)	20/55 (surface soil) 13/87 (1-1.5 ft) 7/35 (2-2.5 ft) 5/37 (3-3.5 ft) 0/20 (4-4.5 ft) 1/26 (5-5.5 ft)

(a) Based on samples collected in June and December 2009.
(b) SCG is restricted use soil cleanup objective from CP-51 Table 1 because there is no SCG listed for Unrestricted Use NOTE: Alpha-chlordane SCGs are from NYSDEC 6 NYCRR Table 375-6.8(b): Unrestricted Use SCOs and Table 375-6.8(a): Restricted Use SCOs, respectively. Gamma-chlordane SCGs are from CP-51 Table 1: Supplementary SCOs.

	GI	ROUNDWATER	- CLEANUP S	SCGs	
	Concentration	Ambient	Maximum	Frequency of	Frequency of
Chemical of	Range	Water Quality	Contaminant	Exceeding	Exceeding
Potential	Detected	Standard ^(b)	Level ^(c)	Ambient Water	Drinking Water
Concern	$(\mu g/L)^{(a)}$	(µg/L)	(µg/L)	Quality Standard	Standard
Total	Non-detect -				
Chlordane 25 0.05 (s) 2 28		28/60	10/60		
(a) Based on samples collected in 2009.					
(b) NYSDEC Division of Water Technical and Operational Guidance Series (1.1.1) Ambient Water Quality Standards					
	(Class GA), June 1998; (g) guidance value, (s) standard value.				
(c) USEPA National Primary Drinking Water Regulations Maximum Contaminant Levels					

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The Ambient Water Quality Standards for Class GA waters and the maximum contaminant levels regulate only total chlordane, and do not break down the guidance to alpha- and gamma-chlordane concentrations. All groundwater samples were analyzed for total chlordane.

3.2 REMEDIAL ACTION OBJECTIVES

The medium-specific RAOs for the Bianchi/Weiss Greenhouses site are displayed in the following tables.

Prevent ingestion/direct contact with contaminated soil Prevent inhalation of contaminated dust
Prevent inhelation of contaminated dust
Trevent initiation of contaminated dust
Prevent migration of contaminants that would result in groundwater contamination
Prevent impacts to biota from ingestion/direct contact with soil causing toxicity or impacts from
bioaccumulation through the terrestrial food chain

GROUNDWATER – RAOs

Prevent ingestion of groundwater with contaminant levels exceeding drinking water standards Restore groundwater aquifer to pre-release conditions, to the extent practicable Prevent contact with contaminated groundwater Remove the source of ground or surface water contamination

Remove the source of ground or surface water contamination

3.3 OTHER POTENTIALLY APPLICABLE REQUIREMENTS

The NYSDEC Environmental Remediation Programs guidance (6 NYCRR Part 375) requires that site remedies "conform to standards and criteria that are generally applicable, consistently applied, and officially promulgated, that are either directly applicable, or that are not directly applicable but are relevant and appropriate, unless good cause exists why conformity should be dispensed with (6 NYCRR Part 75, 375-1.8[f][2])." The primary requirements are presented in the following table.

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SCGS FOR THE BIANCHI/WEISS GREENHOUSES REMEDY Requirement Rationale			
Requirement	Katioliale		
FEDERAL			
CLEAN WATER ACT National Pollution Discharge Elimination System 40 Code of Federal Regulations (CFR) Part 122 The National Pollution Discharge Elimination System establishes permitting requirements, technology-based limitations and standards, control of toxic pollutants, and monitoring of effluents to assure discharge permit conditions and limits are not exceeded.	Applicable if groundwater will be extracted from ground and discharged to a surface water body.		
SAFE DRINKING WATER ACT	The removal action is being		
National Primary and Secondary Drinking Water Regulations) (42 U.S.C. 300f, 40 CFR Part 141, 40 CFR Part 143) The Safe Drinking Water Act provides a national framework to ensure the quality and safety of drinking water. The primary standards establish maximum contaminant levels and maximum contaminant level goals for chemical constituents in drinking water. Secondary standards pertain primarily to the aesthetic qualities of drinking water.	conducted to reduce chemical concentrations in soil and groundwater, with a goal of meeting unrestricted use levels.		
CLEAN AIR ACT, as Amended (42 U.S.C. 7401) The Clean Air Act is a comprehensive law which is designed to regulate any activities that affect air quality, and provides the national framework for controlling air pollution. The National Primary and Secondary Ambient Air Quality Standards (40 CFR Part 50) set standards for ambient pollutants which are regulated within a region. The National Emissions Standards for Hazardous Air Pollutants (40 CFR Part 61) establishes numerical standards for hazardous air pollutants.	The Clean Air Act will be required if any remediation alternatives produce air emissions.		
RESOURCE CONSERVATION AND RECOVERY ACT Provides the governing regulations for owners and operators of hazardous waste treatment, storage, and disposal facilities; and for the generators and transporters of hazardous waste.	All waste generated during the removal alternative will be characterized and handled per Resource Conservation and Recovery Act regulations, as implemented by WAC 173- 303.		
OCCUPATIONAL SAFETY AND HEALTH ACT (29 CFR 1910) Establishes the worker health and safety requirements for operations at hazardous waste sites.	Site activities will be conducted under appropriate Occupationa Safety and Health Act standards.		
Rules for Transport of Hazardous Waste (49 CFR 107, 171) The U.S. Department of Transportation establishes requirements for packaging, handling, and manifesting hazardous waste.	Any hazardous waste generated during site activities will be characterized as needed to determine packaging, handling and transport requirements.		

Site cleanup will be conducted

in accordance with 6 NYCRR

These regulations will be followed for off-site

generation, treatment, and disposal of hazardous waste (if

generated during the removal

Local permits may be required depending on the selected

remedial action.

Part 375.

action).

STATE
NYSDEC Environmental Remediation Programs (6 NYCRR Part 375)
This program applies to the development and implementation of remedial
programs for environmental restoration sites.
Solid Waste Management Facilities (6 NYCRR Part 360)

Provides standards and regulations for permitting and operating solid waste management facilities. Waste Transporter Permits (NYCRR Part 364) Provides standards and regulations for waste transporters. Land Disposal Restrictions (6 NYCRR Part 376) Hazardous Waste Management System (6 NYCRR Parts 370, 371, 372,

373.375) Provides standards and regulations for the state hazardous waste management system, identification and listing of hazardous wastes, and provides standards, regulations, and guidelines for the manifest system, as well as additional standards for generators, transporters, and facilities.

New York State Department of Transportation Rules for Hazardous Materials Transport (49 CFR, Parts 107, 171.1-500) Addresses requirements for marking, manifesting, handling, and transport of hazardous materials; applicable if off-site treatment or disposal of wastes is required

is required.	
Water Quality Regulations for Surface Waters and Groundwater (6 NYCRR Part 700-706) Provides standards, regulations, and guidelines for the protection of waters	Water discharged from the site will comply with this guidance.
within the state.	
Air Quality Standards (6 NYCRR Part 257)	All substantive requirements of
Air quality standards are designed to provide protection from the adverse	the State air pollution control
health effects of air contamination; and they are intended further to protect	regulations will be followed if
and conserve the natural resources and environment.	air emissions are created.
LOCAL	
Land development standards, stormwater and surface water regulations, and	Local permits may be required
clearing and grading requirements.	depending on the selected
	remedial action.

Building permits and building codes.

4. GENERAL RESPONSE ACTIONS

In general, remedial technologies fit into one or more category of general response actions (GRAs). GRAs are generic, medium-specific, remedial actions that will satisfy the RAOs discussed earlier. GRAs may include no action, institutional controls, containment, removal, treatment, disposal, monitoring, or a combination thereof (USEPA 1988). The development of remedial alternatives for this FS begins with the identification of GRAs that can meet RAOs. These GRAs are then screened based on their effectiveness, implementability, and cost and developed into remedial alternatives to address contaminated media at the site (e.g., soil, on-site groundwater, and soil vapor).

4.1 SOIL

Technologies for the remediation of soil will fall into the following GRAs: no further action, removal, treatment, and disposal.

No Further Action

The no further action alternative is included to be used as the baseline alternative against which other remedial alternatives are compared.

Removal

Physical removal of contaminated soil would be conducted by excavation, using standard construction equipment (i.e., excavators) to remove material from the ground and load it into transport mechanisms (i.e., trucks) for off-site treatment or disposal.

Disposal

Disposal involves transporting the soil to a landfill that will either put the soil in a lined landfill or use it for daily cover, based on characterization results.

Treatment

Treatment subjects contaminants to processes that alter their state, transform them to innocuous forms, or immobilize them. Potentially applicable treatment technologies for soil at this site include *in situ* bioremediation, *in situ* thermal treatment, *in situ* phytoremediation, and *ex situ* incineration.

Bioremediation involves the mixing of nutrients and/or microbes into the soil matrix to stimulate microbial growth and facilitate the natural breakdown of targeted contaminant compounds. Bioremediation uses indigenous or non-indigenous micro-organisms to degrade contaminants. Soil or groundwater conditions can be altered to allow for more efficient degradation.

Thermal treatment consists of elevating the temperature of the impacted media to destroy or volatilize organic compounds. The gas is then extracted, collected, and treated. This can be accomplished on-site using indirect thermal rods or direct incineration, or off-site using direct or indirect thermal technologies.

Phytoremediation involves the removal of contaminants through uptake and storage, or the transformation of contaminants to less toxic, less mobile, or more stable forms through phytotransformation. When phytoextraction, or uptake and storage occurs, the plants have to be harvested and disposed of at an approved waste facility. Phytotransformation may result in the volatilization of contaminants through plant leaves.

4.2 GROUNDWATER

Technologies for the remediation of groundwater will fall into the following GRAs: no further action, long-term monitoring, hazard exposure reduction, and containment with treatment.

No Further Action

The no further action alternative is included to be used as the baseline alternative against which other remedial alternatives are compared.

Long-Term Monitoring

For groundwater, monitoring consists of sampling groundwater for contaminant concentrations over a long period of time.

Hazard Exposure Reduction with Sump and Foundation Upgrades

Exposure to contaminated groundwater could be limited by performing sump and foundation upgrades to homes with basement flooding issues through foundation cracks and/or the sump. This would involve fixing foundation cracks, improving drainage around the foundation, and installation of a sump pump and filter system.

Containment via Hydraulic Control and Treatment

For groundwater, containment involves physical extraction of groundwater for *ex situ* treatment. Once groundwater is extracted, treatment technologies for groundwater could include air stripping, granular activated carbon, etc.

5. IDENTIFICATION AND SCREENING OF TECHNOLOGIES

The potentially applicable technologies identified earlier are screened using the process defined in DER-10. The screening process and summary of results are described below and the detailed technology screening is presented in Table 1.

5.1 SCREENING CRITERIA

Two preliminary screening criteria (effectiveness and implementability) were used to screen the remedial technologies identified earlier for each media of concern. Definitions for these criteria are presented below.

5.1.1 Effectiveness

Effectiveness is a measure of the ability of an option to: (1) reduce toxicity, mobility, or volume of contamination; (2) minimize residual risks; (3) afford long-term protection; (4) comply with applicable or relevant and appropriate requirements; (5) minimize short-term impacts; and (6) achieve protectiveness in a limited duration. Technologies that offer significantly less effectiveness than other proposed technologies may be eliminated from the alternative development process. Options that do not provide adequate protection of human health and the environment likewise may be eliminated from further consideration.

5.1.2 Implementability

Implementability is a measure of the technical feasibility and availability of the option and the administrative feasibility of implementing it (e.g., obtaining permits for off-site activities, right-of-ways, or construction). Options that are technically or administratively infeasible or that would require equipment, specialists, or facilities that are not available within a reasonable period may be eliminated from further consideration.

5.2 SCREENING SUMMARY

The results of the technology screening are summarized in the following two sections. The first section discusses technologies that were not retained for further analysis, and the reasons for exclusion. The second section lists technologies that were retained for further analysis as individual components in remedial alternatives. The screening is presented in greater detail in Table 1.

5.2.1 Technologies Not Retained for Further Analysis

From the list of technologies potentially applicable for remediation of the chemicals and media of concern at this site, a few technologies were excluded from further consideration because they were considered ineffective, not implementable at this site, or too costly relative to the other technologies under consideration. The reasons for exclusion are explained below.

Technologies Not Retained for Soil Remediation

Phytoremediation was not retained because it was not considered effective. The phytoremediation of soil containing chlordane is still an experimental technology, and effectiveness is unknown. Based on preliminary research, it would take a minimum of 56 years to remediate the site to the standards required, but this is not certain.

Technologies Not Retained for Groundwater Remediation

All technologies considered for groundwater remediation were retained.

5.2.2 Technologies Retained for Further Analysis

Technologies that will be retained for further evaluation for the site are listed below for each media of concern. Since the soil and groundwater will be addressed separately, each technology is also an alternative.

The following remedial technologies are considered in this FS for soil:

- Alternative 1—No Further Action
- Alternative 2—Excavation and Off-site Disposal
- Alternative 3—On-site Incineration
- Alternative 4—*In-Situ* Bioremediation
- Alternative 5—In-Situ Thermal Treatment.

The focused list of remedial technologies considered in this FS for groundwater is:

- Alternative 1—No Further Action
- Alternative 2—Long-Term Monitoring
- Alternative 3—Sump and Foundation Upgrades
- Alternative 4—Containment via Hydraulic Control and Treatment.

6. SCOPING AND DEVELOPMENT OF REMEDIAL ALTERNATIVES

The scoping for the FS was completed based on discussions between EA and NYSDEC. EA has completed the alternative comparison in accordance with DER-10 and the 1988 USEPA publication *Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA* (USEPA 1540IG-891004). The screening of alternatives was designed to provide a basis for an overall assessment of applicable technologies based on impacted media identified at the site during the RI.

The FS is focused and, based on discussions with NYSDEC, the following limitations were placed on the evaluation:

- Remedial alternatives were developed to address chlordane impacts.
- The detections of semivolatile organic compounds (benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrene), metals (arsenic, iron, lead, magnesium, manganese, mercury, sodium, and zinc), pesticides (dichlorodiphenyltrichloroethane, dieldrin, and heptachlor epoxide) in soils and/or groundwater are not considered to be a result of disposal at the site, but from proper application of a product, another source, sporadic, and/or natural conditions. The RI Report (EA 2011) has additional information regarding the findings of these chemicals. The alternatives discussed in this section will not address these constituents.

The scoping and development of the technologies/alternatives selected during the previous step of the FS process are described below.

6.1 SOIL ALTERNATIVES

All soil alternatives were evaluated against the Part 375 Unrestricted Use SCOs and the Residential Use SCOs. Institutional controls will be required for alternatives that do not obtain Unrestricted Use SCOs. The soil treatment areas were determined based on data presented in the RI. The treatment areas selected address the area of concern beneath the former greenhouses and in the orchard (Figures 4 and 5). Detailed soil alternatives screening is presented in Table 2.

6.1.1 Alternative 1: No Further Action

The no further action alternative is evaluated as a procedural requirement and as a basis for comparison. This alternative would leave the site in its present condition.

6.1.2 Alternative 2: Excavation and Off-site Disposal

The second potential remediation alternative to be evaluated is excavation and off-site disposal of soil. This alternative is aimed at removing the soil exceeding the SCGs on the site.

Excavation is a common remedy used to remove contaminated soil from a source area. This approach can be effective and relatively inexpensive if the contaminants are located at a shallow depth, above the water table, and there are no major obstructions on the site.

Off-site treatment and/or disposal can be expensive depending on the location of the site relative to treatment or disposal facilities, the volume of soil involved, the nature of contamination, and the availability of different treatment or disposal options in the area. In addition, the same volume of soil hauled off-site for disposal or treatment must be hauled back to the site as backfill for the excavation. Treatment of the contaminant mass would further eliminate the source of groundwater contamination at and downgradient from the site.

This alternative would be implemented as follows:

- A utility locator would be brought on-site to locate any underground utilities or other obstructions that may prove problematic during excavation.
- The concrete slabs in the excavation area would be demolished and disposed of at a landfill.
- On-site monitoring wells would be removed prior to and replaced following remediation.
- Approximately 57,000 yd³ of soil would be excavated from the site (35,000 yd³ for residential SCOs) to an approximate depth of 6 ft.
- Dust control measures will be utilized to prevent inhalation of contaminated soil particles and a community air monitoring program shall be followed.
- Approximately 1,000 tons of the excavated soil is assumed to be hazardous and would be disposed of at a permitted hazardous waste landfill. The remainder of the soil and the concrete on-site would be disposed of at a general waste landfill, following characterization and acceptance by the disposal facility or facilities.
- It is assumed that a dewatering system would not be needed since the excavation will not extend into the groundwater table.
- Confirmation soil sampling would be conducted during excavation to ensure source removal.

• Once excavation and disposal activities are complete, the site would be restored. This would include restoring grade with an approved backfill source.

6.1.3 Alternative 3: On-Site Incineration

The third potential remediation alternative to be evaluated is excavation and on-site incineration of soil. This alternative is aimed at treating the soil exceeding the SCGs on the site for on-site reuse.

Incineration is a common treatment method used for soils impacted with a variety of contaminants, including pesticides. On-site incineration would eliminate the need to transport the soil to a treatment facility and will reduce the need for an off-site backfill source. Treatment of the contaminant mass would further eliminate the source of groundwater contamination at and downgradient from the site.

This alternative would be implemented as follows:

- A utility locator would be brought on-site to locate any underground utilities or other obstructions that may prove problematic during excavation.
- The concrete slabs in the excavation area would be demolished and disposed at a landfill.
- On-site monitoring wells would be removed prior to and replaced following remediation.
- Approximately 57,000 yd³ of soil would be excavated from the site (35,000 yd³ for residential SCOs) to an approximate depth of 6 ft.
- Dust control measures will be utilized to prevent inhalation of contaminated soil particles and a community air monitoring program shall be followed.
- Soil would be fed through an on-site incinerator at a rate of 25 tons/hour.
- Treated soil would be stockpiled on-site until excavation and treatment is complete.
- Confirmation soil sampling would be conducted during excavation to ensure source removal.
- It is assumed that a dewatering system would not be needed since the excavation will not extend into the groundwater table.
- Once excavation and treatment activities are complete, the site would be restored. This would include restoring grade with treated soil and an approved backfill source, if necessary.

6.1.4 Alternative 4: *In Situ* Bioremediation

In situ bioremediation would be conducted using DARAMEND[®], a technology consisting of organic amendments that are mixed with contaminated soil at a specified moisture content. Through a process of microbiological consumption, contaminant concentrations are reduced at a rate of approximately 30 percent per DARAMEND[®] application. Treatment would protect human health and the environment by removing the contaminant mass from the vadose zone soil. Treatment of the contaminant mass would further eliminate the source of groundwater contamination at and downgradient from the site.

This alternative would be implemented as follows:

- A pre-design investigation would be conducted to develop design parameters. This would include a pilot study.
- Concrete removal. All concrete within the remedial area would be broken up and disposed of prior to implementation.
- On-site monitoring wells would be removed prior to and replaced following remediation.
- Begin applications of Daramend[®]. Due to the ability of tilling equipment to reach a 2 ft depth, there would be several cycles of applications, in three separate phases: 0-2, 2-4, and 4-6 ft bgs. Table 2 shows the estimated number of cycles per phase.
- In between phases, the treated soils would be stockpiled on-site to allow the next phase to begin. Following treatment, all stockpiled soils would be backfilled into the remediated area and original grades would be restored using compaction methods and some additional fill material, as needed.
- Soils would be tilled twice during each cycle: once for the reductive phase and once for the aerobic phase of the treatment.
- Dust control measures will be utilized to prevent inhalation of contaminated soil particles and a community air monitoring program shall be followed.
- Soils would be sampled at a rate of 12 composite samples per acre per treatment cycle to track the treatment progress. This equates to 9 samples per cycle for the 0- to 2-ft treatment phase, 5 samples per cycle for the 2-4 ft treatment phase, and 3 samples per cycle for the 4-6 ft treatment phase.

6.1.5 Alternative 5: On-site Thermal Treatment

On-site thermal treatment of the soil will be conducted using thermal conduction heating to achieve soil temperatures high enough to vaporize contaminants of concern. Treatment of the

contaminant mass would further eliminate the source of groundwater contamination at and downgradient from the site.

This alternative would be implemented as follows:

- A utility locator would be brought on-site to locate any underground utilities or other obstructions that may prove problematic to excavation and heater installation.
- Concrete removal. All concrete within the remedial area would be broken up and disposed of prior to implementation.
- On-site monitoring wells would be removed prior to and replaced following remediation.
- Soil would be excavated and consolidated so that it only covers an area of approximately 80,000 ft² to achieve the required 20 ft treatment depth: 6 ft *in situ* and 14 ft stockpiled on top. Other site material would be used for benching around the treatment pile.
- Dust control measures will be utilized to prevent inhalation of contaminated soil particles and a community air monitoring program shall be followed.
- Six heater rods would be installed surrounding a vertical soil vapor extraction well 14 ft apart. This pattern would repeat over the entire treatment area for a total of 143 soil vapor extraction wells and 472 heater rods.
- There would be 83 temperature monitoring holes and 20 pressure monitoring holes.
- Vapor would be treated using granular activated carbon.
- System components would be installed beneath the surface.
- Soil samples would be collected during three events to evaluate the progress of the remediation.
- Power would be supplied from the grid.
- For this cost estimate, it is assumed the remedial goals would be achieved within 8 months.

6.2 **GROUNDWATER ALTERNATIVES**

Groundwater alternatives retained were limited due to the physiochemical characteristics of chlordane. Detailed groundwater alternatives screening is presented in Table 3.

6.2.1 Alternative 1: No Further Action

The no further action alternative is evaluated as a procedural requirement and as a basis for comparison. This alternative would leave the site in its present condition.

6.2.2 Alternative 2: Long-Term Monitoring

This alternative includes long-term groundwater monitoring for pesticides, along with the decommissioning of potable wells close to and within the impacted area, connection of those properties to public water supply, and the site groundwater use would be limited.

Monitoring will be implemented as follows:

- Groundwater samples would be collected semiannually for the first 5 years and annually thereafter to measure the concentration of pesticides (monitoring is estimated to be conducted for 30 years). Samples would be collected from 29 existing wells.
- Potable wells within and adjacent to the contaminant plume would be decommissioned and those properties would be connected to public water. For the purpose of this FS, it is assumed that five wells will need to be decommissioned and five homes will need to be connected to the public water supply.
- Irrigation wells on the site would be decommissioned.
- An environmental easement would be placed on the Bianchi-Weiss Greenhouses site limiting groundwater use.

6.2.3 Alternative 3: Sump and Foundation Upgrades

This alternative includes upgrading residential sumps by expanding them and installing a pump with a filter. The pump would be activated by the water level within the sump. Foundation upgrades would include patching cracks and improving drainage. In addition, potable wells close to and within the impacted area would be decommissioned, those properties would be connected to the public water supply, and the site groundwater use would be limited.

Sump and foundation upgrades will be completed as follows:

- Area homes will be surveyed to determine how many would need sump and/or foundation upgrades. For the purpose of this FS, it is assumed that five sumps and five foundations will require upgrades.
- It is assumed that sumps will be expanded and a pump will be sized appropriately to send water through a filter and to discharge.

- Foundation cracks will be patched and drainage surrounding the foundations will be improved as necessary.
- Potable wells within and adjacent to the contaminant plume would be decommissioned and those properties would be connected to public water. For the purpose of this FS, it is assumed that five wells will need to be decommissioned and five homes will need to be connected to the public water supply.
- Irrigation wells on the site would be decommissioned.
- An environmental easement would be placed on the Bianchi-Weiss Greenhouses site limiting groundwater use.

6.2.4 Alternative 4: Containment via Hydraulic Control and Treatment

Hydraulic control of the on-site plume will be accomplished via conventional groundwater recovery. Groundwater recovery will be conducted by pumping groundwater from wells installed around the southern boundary of the site and along Abets Creek to a central treatment area where the water will be treated and discharged in an approved location. Figure 6 shows the general layout. In addition, potable and irrigation wells close to and within the impacted area would be decommissioned, those properties would be connected to the public water supply, and the site groundwater use would be limited.

This alternative would be implemented as follows:

- A utility locator would be brought on-site to locate any underground utilities or other obstructions that may prove problematic to well installation.
- New extraction wells would be installed to approximately 25 ft bgs along the southern boundary of the site and along Abets Creek recharge zone.
- Sixty-six extraction wells would be installed approximately 25 ft apart along both boundaries. Wells along Abets Creek would be approximately 100 ft from the edges of the creeks.
- Water will be pumped at a rate of 800 ft³ per day. Extracted groundwater will be treated on-site via filter bags and treated effluent will be discharged to the storm sewer, pending permission from the local authority.
- Groundwater samples would be collected from 12 monitoring wells located both downgradient and upgradient of the site.
- For this cost estimate, it is assumed the remedial goals would be achieved within 30 years

and post-remediation groundwater monitoring would occur semi-annually for the first 2 years and annually thereafter, for a total of 30 years.

- Potable wells within and adjacent to the contaminant plume would be decommissioned and those properties would be connected to public water. For the purpose of this FS, it is assumed that five wells will need to be decommissioned and five homes will need to be connected to the public water supply.
- Irrigation wells on the site would be decommissioned.
- An environmental easement would be placed on the Bianchi-Weiss Greenhouses site limiting groundwater use.

7. COSTING AND EVALUATION CRITERIA

This section describes the process for the detailed analysis of remedial alternatives for the Bianchi/Weiss Greenhouses site and also presents the cost estimates used as part of the analysis.

7.1 CRITERIA USED FOR ANALYSIS OF ALTERNATIVES

The criteria to which potential remedial alternatives are compared (and used during this detailed analysis) are defined in 6 NYCRR Part 375 and are listed below:

- Overall protectiveness of public health and the environment
- Conformance to SCGs
- Long-term effectiveness and permanence
- Reduction in toxicity, mobility, or volume of contamination through treatment
- Short-term impacts and effectiveness
- Implementability
- Cost-effectiveness
- Land use
- Community acceptance.

A description of the criteria and how alternatives are evaluated against them follows.

Overall Protectiveness of Public Health and the Environment—This criterion is an overall evaluation of each alternative's ability to protect public health and the environment.

Conformance to Standards, Criteria, and Guidance—Compliance with SCGs addresses whether a remedy would meet environmental laws, regulations, and other standards and criteria. The SCGs are presented in Section 8.

Long-Term Effectiveness and Permanence—This criterion evaluates the long-term effectiveness of the remedial alternatives after implementation. If wastes or treated residuals remain on-site after the selected remedy has been implemented, the following items are evaluated: (1) magnitude of the remaining risks, (2) adequacy of the engineering and/or institutional controls intended to limit the risk, and (3) reliability of these controls.

Reduction of Toxicity, Mobility, or Volume of Contamination through Treatment—The degree to which the alternative permanently reduces the toxicity, mobility, or volume of hazardous substances including the adequacy of the alternative in destroying the hazardous substances, reduction or elimination of hazardous substance releases and sources of releases, degree of irreversibility of waste treatment process, and characteristics and quantity of treatment residuals generated. Preference is given to alternatives that permanently and significantly reduce the toxicity, mobility, or volume of the wastes at the site.

Short-Term Impacts and Effectiveness—Evaluation of the short-term effectiveness for an alternative includes consideration of the risk to human health and the environment associated with the alternative during construction and implementation, and the effectiveness of measures that will be taken to manage such risks. Impacts from remedial action implementation include vehicle traffic; temporary relocation of residences/buildings; temporary closure of public facilities; odor; open excavations; and noise, dust, and safety concerns associated with extensive heavy equipment activity. The greatest short-term risk to human health is related to safety and general construction activity.

Implementability—The technical and administrative feasibility of implementing each alternative is evaluated. Technical feasibility includes the difficulties associated with construction of the remedy and the ability to monitor its effectiveness. For administrative feasibility, the availability of the necessary personnel and materials is evaluated along with potential difficulties in obtaining specific operating approvals, access for construction, institutional controls, and so forth.

Cost-Effectiveness—Capital costs and annual operation, maintenance, and monitoring costs are estimated for each alternative and compared on a present worth basis. Although cost-effectiveness is the last balancing criterion evaluated, where two or more alternatives have met the requirements of the other criteria, it can be used as the basis for the final decision.

Land Use—The current and anticipated future use of the site will be considered. Land use must comply with applicable zoning laws and maps.

Community Acceptance—Public comments will be considered after the close of the public comment period.

7.2 FURTHER TESTING REQUIREMENTS

Pilot tests, bench-scale testing, hydraulic testing, and other field tests are considered for each alternative, as appropriate, to provide details required in the associated remedial design. The alternatives will be evaluated based on the extensiveness of the further testing required. Costs considered include estimated costs for such further testing, along with some contingency for estimated remedial quantities and expenses.

7.3 COST ASSUMPTIONS

Cost assumptions were prepared for each alternative using USEPA's *Guide to Developing and Documenting Cost Estimates during the Feasibility Study* (USEPA 1996). Net present value of the project costs was estimated using an interest rate of 5 percent. The cost assumptions were calculated using the most common products and application methods available for a remedial alternative. The USEPA guidance was used in conjunction with *DER-10 Technical Guidance for Site Investigation and Remediation* (NYSDEC 2010).

7.4 COSTS

Based on the results of the remedial technology screening in Table 1, the following cost estimates were prepared for each alternative. Appendix A shows the detailed cost estimates developed.

7.4.1 Soil

Costs to meet unrestricted cleanup goals are listed first, followed by costs to meet residential cleanup goals for each alternative in parentheses.

Alternative 1: No Further Action

Present Worth	\$0
Capital Cost	
Annual Costs (Years 0)	

Alternative 2: Excavation and Off-site Disposal

Present Worth	
Capital Cost	
Annual Costs (Years 0)	

Alternative 3: On-site Incineration

Present Worth	\$13,616,000 (\$9,470,000)
Capital Cost	
Annual Costs (Years 0)	

Alternative 4: In Situ Bioremediation

Present Worth	\$12,480,000 (\$9,067,000)
Capital Cost	
Annual Costs (Years 0)	

Alternative 5: In Situ Thermal Treatment

Present Worth	\$10,976,000 (\$10,522,000)
Capital Cost	
Annual Costs (Years 0)	

7.4.2 Groundwater

Costs to meet goals assuming no source removal are listed first, followed by costs to meet goals assuming source removal for each alternative in parentheses.

Alternative 1: No Further Action

Present Worth	\$0
Capital Cost	
Annual Costs	

Alternative 2: Long-Term Monitoring

Present Worth	\$740,000 (\$661,000)
Capital Cost	\$212,000
Annual Costs (Years 1-5)	
Annual Costs (Years 6-30)	

Alternative 3: Sump and Foundation Upgrades

Present Worth	\$726,000 (\$675,000)
Capital Cost	
Annual Costs (Years 1-5)	
Annual Costs (Years 6-30)	

Alternative 4: Containment via Hydraulic Control and Treatment

Present Worth	\$4,192,000 (\$3,471,000)
Capital Cost	
Annual Costs (Years 1-2)	
Annual Costs (Years 3-30)	

8. DETAILED ANALYSIS OF ALTERNATIVES AND RECOMMENDATIONS

The purpose of this FS was to develop, screen, and evaluate potential remedial alternatives for the Bianchi/Weiss Greenhouses site. Remedies were identified and screened in accordance with USEPA and NYSDEC guidance. The comparison of alternatives and recommendations are described below for each media type. Based on comparison of the alternatives a recommended action is provided to obtain remedial action objectives.

Remedial alternatives were developed in this FS, as identified below.

Soil

- Alternative 1—No Further Action
- Alternative 2—Excavation and Off-site Disposal
- Alternative 3—On-site Incineration
- Alternative 4—In Situ Bioremediation
- Alternative 5—In Situ Thermal Treatment.

Groundwater

- Alternative 1—No Further Action
- Alternative 2—Long-Term Monitoring
- Alternative 3—Sump and Foundation Upgrades
- Alternative 4—Containment with *Ex Situ* Treatment.

8.1 COMPARISON OF SOIL ALTERNATIVES

Alternative 1 does not meet any of the RAOs. Alternative 2 will meet the RAOs. Alternative 3 will meet RAOs, but is the most expensive of the alternatives. Alternative 4 would require further testing to further evaluate treatability. Alternative 5 may prove difficult to implement in the field. Detailed analysis of the remedial alternatives is presented in Table 4.

Alternative 2 to the Residential Use SCOs is recommended because it achieves RAOs at the lowest cost and in the shortest time frame. Residential Use is recommended as it meets the current zoning and use near the site without incurring the additional cost necessary to obtain Unrestricted Use SCOs.

8.2 COMPARISON OF GROUNDWATER ALTERNATIVES

Alternative 1 does not meet any of the RAOs. Alternatives 2 and 3 meet some of the RAOs. Alternative 4 will meet all RAOs, but is the most expensive alternative. The detailed analysis of the remedial alternatives is presented in Table 5. A combination of Alternatives 2 and 3 is recommended.

8.3 RECOMMENDED REMEDIAL ACTION

Based on the recommendations made for soil and groundwater, soil Alternative 2 to achieve Residential Use SCO's in combination with groundwater Alternatives 2 and 3 is recommended.

This alternative would be implemented as follows:

- Excavation and off-site disposal of soil and concrete would be implemented as stated in Section 6.1.2.
- Excavation would be backfilled with an approved source of soil, as stated in Section 6.1.2.
- All residential buildings within and adjacent to the shallow contaminant plume would be surveyed to determine the extent of sump and foundation upgrades to be carried out.
- Sump and foundation upgrades would be made as stated in Section 6.2.3.
- Following placement of backfill, monitoring wells would be sampled semiannually for the first 5 years and annually for the next 25 years, as stated in Section 6.2.2.
- Private wells within and adjacent to the contaminant plume would be decommissioned and those properties would be connected to the public water supply, as stated in Section 6.2.2.

The following costs were developed by adding the individual capital costs for soil Alternative 2 to achieve Residential Use SCO's and groundwater Alternatives 2 and 3. Annual long-term monitoring costs for groundwater Alternatives 2 and 3 were added together. The newly calculated capital cost and annual long-term monitoring costs were used to calculate the present worth. Both groundwater alternatives include private well abandonments and public water supply hookups for five homes, so this capital cost was only included once.

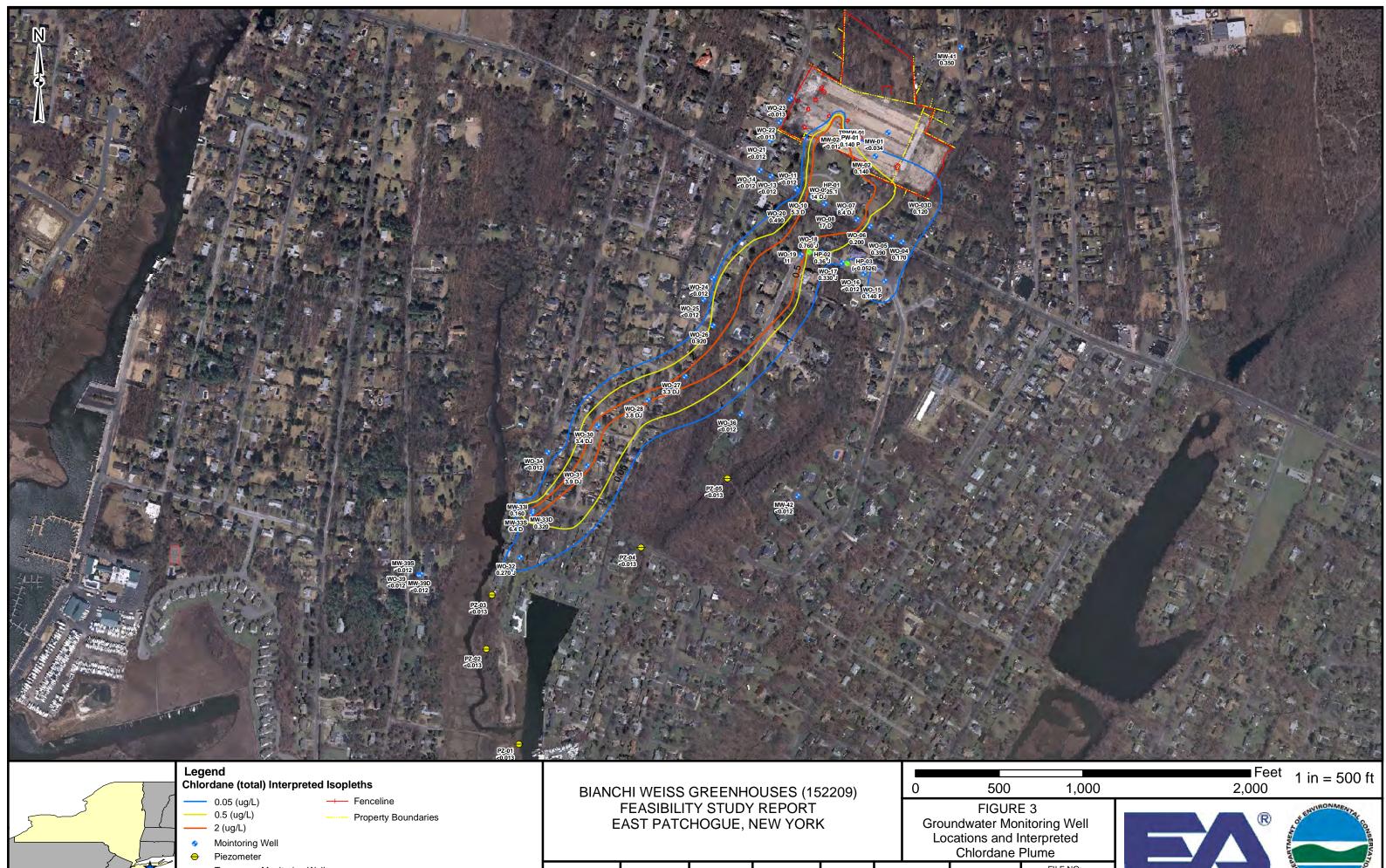
Present Worth	\$7,733,600
Capital Cost	\$7.041.000
Annual Costs	
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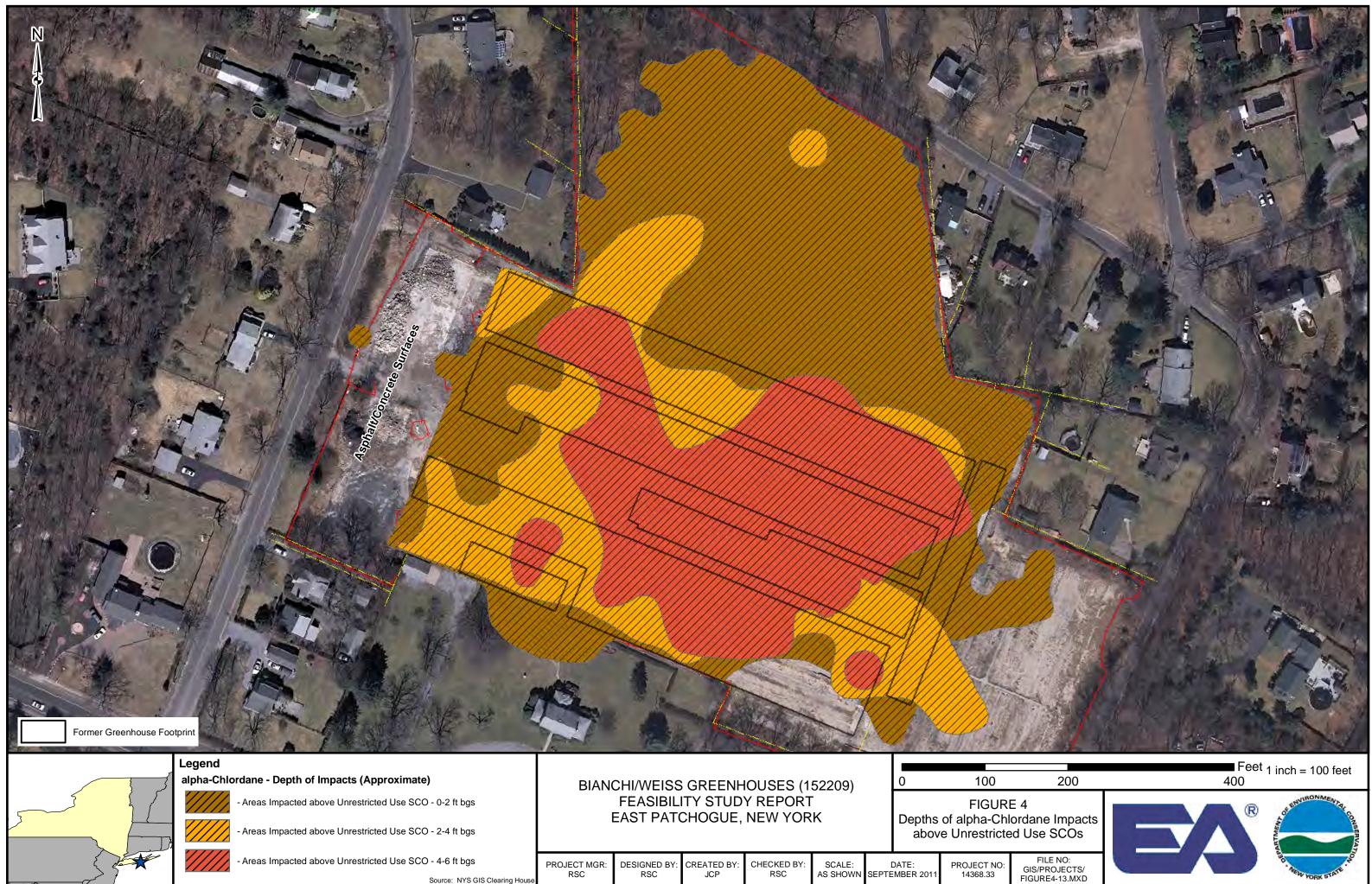




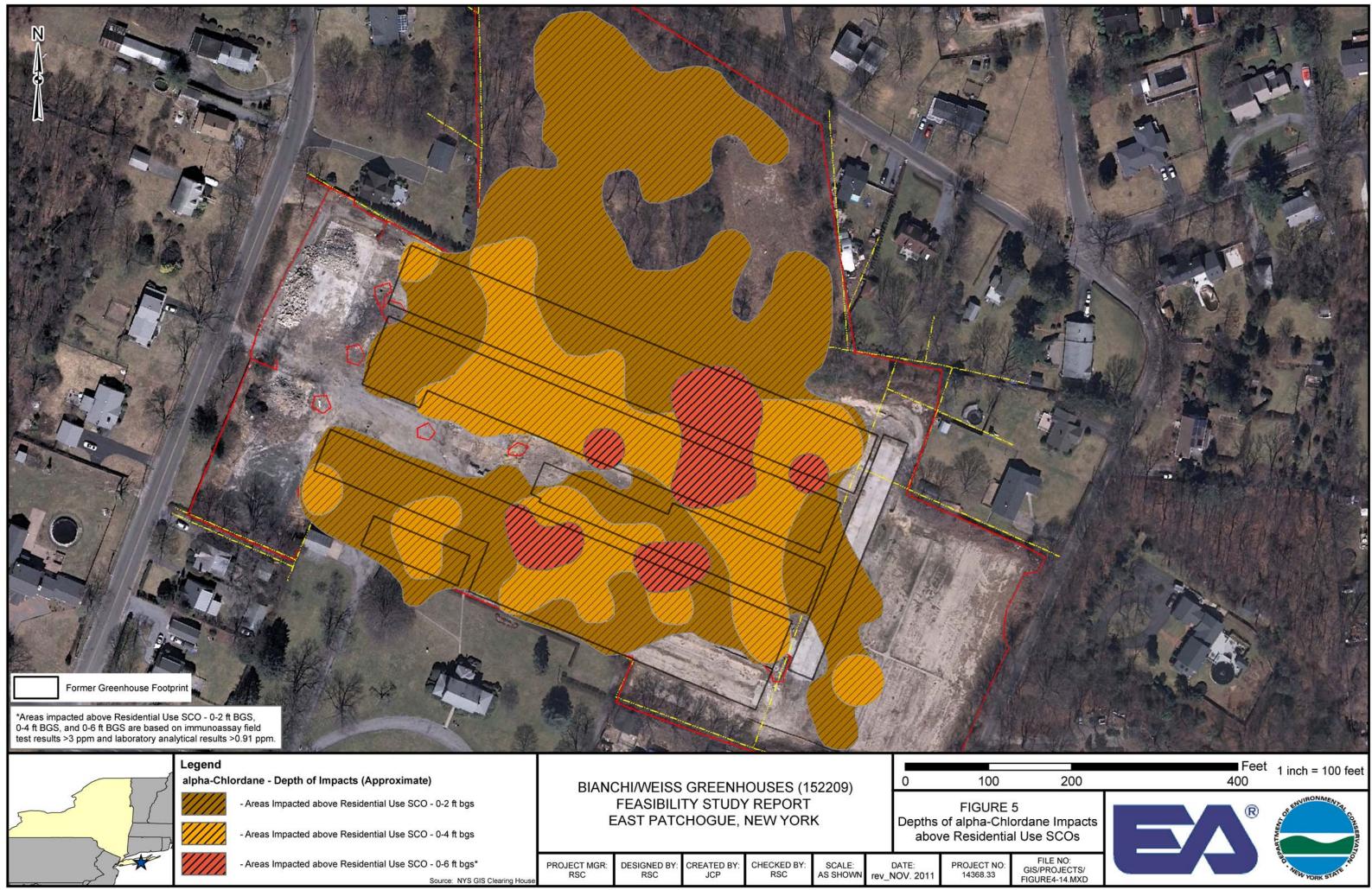


Legend Chlordane (total) Interpreted Isopleths 0.05 (ug/L)			BIANC	0	500				
		undaries		FEASIBILI ⁻ AST PATC	TY STUDY	' REPORT	,		FIGURE Indwater Mon cations and Ir Chlordane F
S detter	 Temporary Monitoring Well Former Potable Well 	Source: NYS GIS Clearing House	RSC	DESIGNED BY: RSC	CREATED BY: JCP	CHECKED BY: RSC	SCALE: AS SHOWN	DATE: SEPTEMBER 2011	PROJECT NO: 14368.33

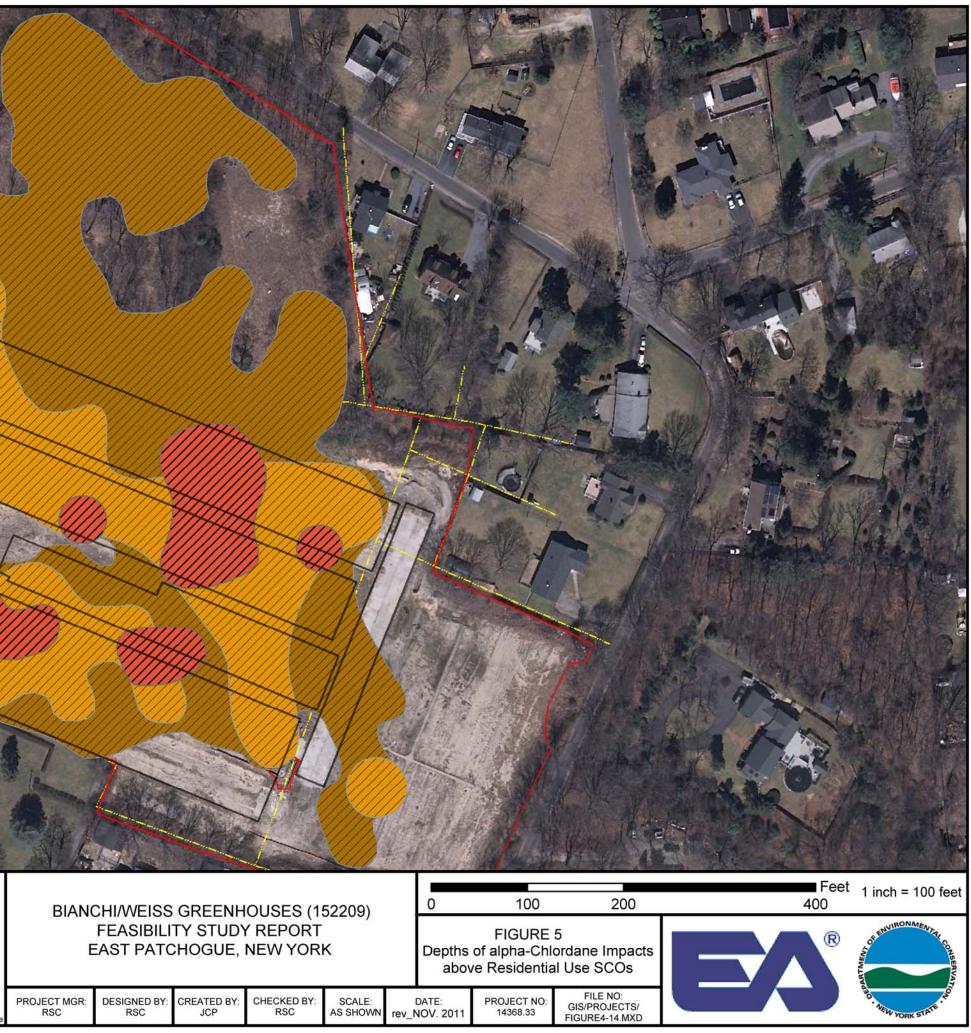
FILE NO: GIS/PROJECTS/ FIGURE3.MXD



Source:	NYS GIS	Clearing	House
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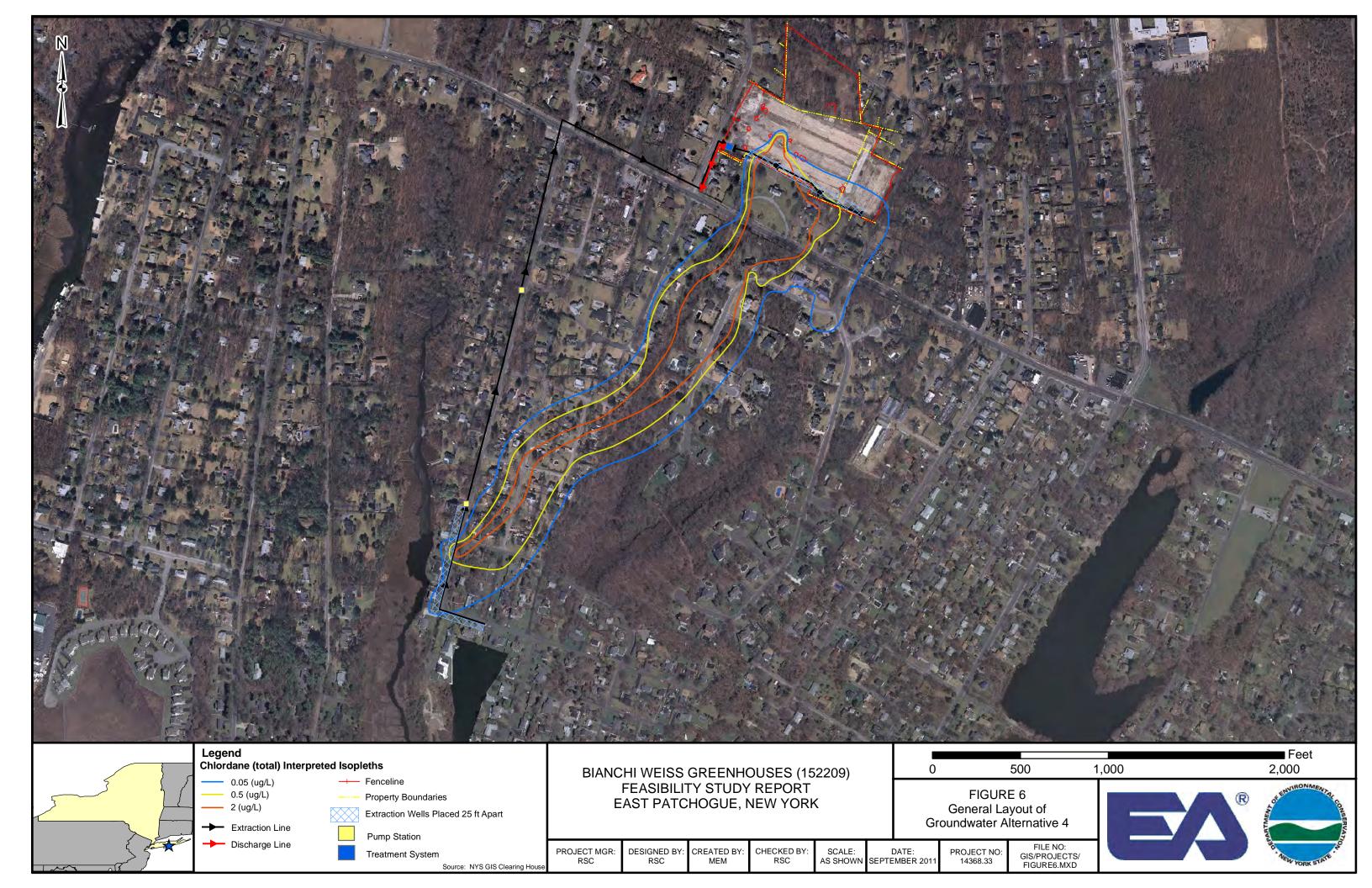


TABLE 1 REMEDIAL TECHNOLOGY SCREENING

General					
Response					
Action	Technology	Effectiveness	Implementability	Status	
		N	Aedia: Soil		
		0	ant of Concern: Chlordane		
No Further Action	No Further Action	Not effective	Easy to implement	Retained	
Removal	Excavation-Off Site Disposal	Effective at removing contamination from the site, thus reducing human health and ecological risks	Would require characterization and acceptance from disposal facilities.	Retained	
Treatment	<i>In-situ</i> Bioremediation	Technology is well proven in treating pesticides in soils.	Would require treatability study to determine effectiveness and collect design parameters.	Retained	
Treatment from soils.		Would require treatability study to determine effectiveness and collect design parameters.	Retained		
Treatment	<i>In-situ</i> Phytoremediation	May marginally reduce chlordane concentrations in upper 2 ft of soil. True effectiveness is unknown.	Would require further research and testing to determine effectiveness on chlordane.	Not Retained due to experimental status of technology with chlordane.	
Treatment	<i>Ex-situ</i> Incineration	Technology is well proven in treating pesticides.	Would require characterization and acceptance from treatment facilities or benchscale testing for on-site treatment.	Retained	
		Media	: Groundwater		
		Target Contaminant of Con	ncern: Volatile Organic Compounds		
No Further Action	No Further Action	Not effective	Easy to implement	Retained	
Monitoring	Long-Term Monitoring	Not effective as stand alone option.	Implementable	Retained	
Exposure Reduction	Sump and Foundation Upgrades	Effective at reducing exposure to contaminated groundwater	Easy to implement	Retained	
Removal and Treatment	Groundwater Extraction and Treatment	Effective at removing contamination from extracted groundwater.	Implementable. Requires long-term operation and maintenance	Retained	
NOTE: Shaded	technologies are retain	ed for further screening.			

TABLE 2 SOIL ALTERNATIVES SCREENING

			Media: Soil		
	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
	No Further Action	Excavation and Off-site Disposal	On-Site Incineration	In-Situ Bioremediation	In-Situ Thermal Treatment
Size and Configuration of Process Options	NA	Approximately 58,000 yd ³ of soil (35,000 yd ³ for residential SCGs) and concrete would be excavated from the site, to a 6 ft maximum depth. 1,000 tons of the excavated soil (assumed to be hazardous) would be disposed of at a permitted hazardous waste landfill. Remaining soils would be transported to a general waste landfill. Or soils would be transported to a treatment facility. An approved source of fill would be used to return the site to pre- remediation grades.	Concrete foundations would be removed from the site and transported to an accepting disposal facility. Approximately 74,000 tons of soil (45,000 tons for residential SCGs) would be placed through an on-site incineration chamber at a rate of 25 tons per hour. Treated soil would be stockpiled onsite until it could be placed back to pre-remediation grades.	Treatment would be completed in phases: 0-2 ft depth with 11 treatment cycles (7 for residential), 2-4 ft depth with 9 treatment cycles (6 for residential), and 4-6 ft depth with 3 treatment cycles (2 for residential). Chemical would be applied and mixed in the soil using tillers. Soil would be irrigated as necessary to maintain required moisture content. Samples would be collected and analyzed at a rate of 12 per acre per treatment cycle. Following initial two phases, soils would be excavated and stockpiled onsite to allow next cycle to begin.	Soil would be excavated and consolidated so that it only covers an area approximately 80,000 SF, to achieve the required 20 ft treatment depth. A total of 472 heater rods and 143 SVE wells would be installed. Six heater rods would surround each SVE wells, with 14 ft between SVE wells and heater rods. Granular activated carbon would be used to treat vapor.
Time for Remediation	NA	Approximately 10 months (7 months for residential SCGs)	Approximately 17 months (11 months for residential SCGs)	Approximately 18 months (12 months for residential SCGs)	Approximately 13 months (11 months for residential SCGs)
Spatial Requirements	None	Area of excavation will be inaccessible during remedial activities. Area for equipment storage and loading and unloading for contaminated/clean soil (~ 100 X 400 ft).	Area of excavation will be inaccessible during remedial activities. Area for on-site treatment equipment (~100 X 400 ft) and stockpiling treated soil (~250 X 250 ft)	Area of excavation will be inaccessible during remedial activities. Area for equipment storage (-100 X 400 ft) and stockpiling treated soil (-250 X 250 ft).	Area of treatment (~80,000 ft ²) will be inaccessible during remedial activities. Area for treatment and utilities equipment (~100 X 100 ft).
Options for Disposal	NA	Off-site disposal through approved hazardous waste and general waste facilities. Consideration for treatment and reuse of soils would be handled by the facility.	Off-site disposal for limited amount of concrete through approved facilities.	Off-site disposal for limited amount of concrete through approved facilities.	Off-site disposal for limited amount of concrete through approved facilities.
Substantive Technical Permit Requirements	None	None	Air permit may be required for air treated with afterburner and scrubbers.	None	Air permit may be required for vapor treated by carbon.
Limitations or Other Factors Necessary to Evaluate Alternatives	None	Disposal facilities will require TCLP analysis for waste characterization prior to acceptance.	Pilot test will be required for full evaluation.	Pilot test will be required for full evaluation. Sampling between cycles will indicate whether or not an additional treatment cycle is required. Treatment wil have to occur during low groundwater conditions.	Pilot test will be required for full evaluation. Sampling during treatment will indicate how long treatment must go on.
Public Impacts	Will not reduce exposure to contaminants.	Noise, dust, and traffic may disturb local residents.	Noise, dust, and traffic may disturb local residents.	Noise, dust, and traffic may disturb local residents.	Noise, dust, and traffic may disturb local residents.
Beneficial and/or Adverse Impacts on Fish and Wildlife Resources	Because soil would be left untreated, the soil could contribute to further groundwater contamination.	No known impacts on fish and wildlife resources. The potential source of groundwater contamination will be removed.	No known impacts on fish and wildlif resources. The potential source of groundwater contamination will be removed.	No known impacts on fish and wildlife resources. The potential source of groundwater contamination will be treated.	No known impacts on fish and wildlife resources. The potential source of groundwater contamination will be treated.
Net Present Worth	\$0.00	\$9,720,000 (Unrestricted) \$6,398,000 (Residential)	\$13,616,000 (Unrestricted) \$9,470,000 (Residential)	\$12,480,000 (Unrestricted) \$9,067,000 (Residential)	\$10,976,000 (Unrestricted) \$10,522,000 (Residential)

TABLE 3 GROUNDWATER ALTERNATIVES SCREENING

		Media: Groundwater		
	Alternative 1	Alternative 2	Alternative 3	Alternative 4
	No Further Action	Long-Term Monitoring	Sump and Foundation Upgrades	Containment via Hydraulic Control and Treatment
Size and Configuration of Process Options	None	Groundwater samples would be collected semiannually. In addition, potable wells within and adjacent to the groundwater contaminant plume would be decommissioned and those homes would be connected to public water.	Sumps and foundations which increase exposure of residents to contaminated groundwater would be upgraded to reduce exposure. Sumps would be expanded and fit with a pump and filter system, which would be triggered when the sump water reaches a certain point. Cracks in foundations would be patched and drainage around foundations would be improved as necessary. In addition, potable wells withir and adjacent to the groundwater contaminant plume would be decommissioned and those homes would be connected to public water.	Approximately 66 extraction wells would be installed along the downgradient edge of the site and throughout the contaminated groundwater plume. Contaminated groundwater would be pumped to a central location for treatment, then discharged to the storm sewer. In addition, potable wells within and adjacent to the groundwater contaminant plume would be decommissioned and those homes would be connected to public water.
Time for Remediation	NA	30 years	30 years (Approximately 2 months construction time)	Approximately 30 years
Time for Remediation Assuming Source Removal	NA	20 years	20 years (Approximately 2 months construction time)	Approximately 15 years
Spatial Requirements	None	None	None	Area for equipment and treatment area (~20,000 ft ²).
Options for Disposal	NA	NA	Water would be treated and sampled prior to discharge.	Water would be treated and sampled prior to discharge to storm sewer.
Substantive Technical Permit Requirements	None	None	SPDES equivalency permit would be required for discharging treated water.	SPDES equivalency permit would be required for discharging treated water.
Limitations or Other Factors Necessary to Evaluate Alternatives	Will not remove contaminants from groundwater.	Will not remove contaminants from groundwater.	Survey will have to be performed on all area homes to determine how many sumps and foundations require upgrades.	Pilot test will be required to finalize design.
Public Impacts	None	Access to properties will be necessary to decommission potable wells and connect homes to public water supply.	Access to properties will be necessary to decommission potable wells, connect home to public water supply, and upgrade sumps and foundations.	Access to properties will be necessary to decommission potable wells and connect homes to public water supply. Excavation along public roads will disturb local residents. Extraction wells will need to be installed on private properties to achieve hydraulic control of the plume.
Beneficial and/or Adverse Impacts on Fish and Wildlife Resources	No known impacts on fish and wildlife resources.	No known impacts on fish and wildlife resources.	No known impacts on fish and wildlife resources.	May have adverse impacts on hyporheic zone of Abets and Moss Creek due to shallow groundwater pumping.
Net Present Worth	\$0.00	\$740,000 (No Source Removal) \$661,000 (Source Removal)	\$726,000 (No Source Removal) \$675,000 (Source Removal)	\$4,192,000 (No Source Removal) \$3,471,000 (Source Removal)
NOTE: NA = Not Applic: SPDES = State Pollut	able tant Discharge Elimination System			

TABLE 4 SOIL ALTERNATIVE EVALUATION SUMMARY

	Alternative 1	Alternative 2	Media: Soil Alternative 3	Alternative 4	Alternative 5
	No Further Action	Excavation and Off-site Disposal	On-site Incineration	In-Situ Bioremediation	In-Situ Thermal Treatment
) Overall Protection o	of the Public Health and the Environment	Demonstration of the second state of the secon	Too second of income days and second se	Transmission of income and a second descent and and in the second	T
	There is no reduction of risk with this alternative. The soil pathways would continue to pose unacceptable risk		of contaminants to groundwater.	Treatment of impacted area reduces potential migration of contaminants to groundwater.	of contaminants to groundwater
	to all receptors.	-	-	-	-
2) Standards, Criteria	and Cuidance (SCCs)				
2) Standards, Criteria	Does not meet SCG criterion.	Will meet SCG criteria.	Will meet SCG criteria.	Will meet SCG criteria.	Will meet SCG criteria.
3) Long-Term Effectiv					
	This alternative will not provide long-term effectiveness or permanence. This alternative offers no	This alternative is effective and permanent.	This alternative is effective and permanent.	This alternative is effective and permanent. Monitoring will provide a means to recognize remedy failure and	This alternative is effective and permanent. Monitoring will provide a means to recognize remedy
	controls.			implement a more aggressive remedy, if necessary.	failure and implement a more aggressive remedy, if
					necessary.
 Reduction of Toxicit Amount of Hazardous 	ty, Mobility, or Volume of Contamination Through Tr		In a second s	Discourse distances il successione allows his side	To also the second second will second de stand
amount of Hazardous faterials Destroyed,	None	excavation will remove soil exceeding allowable risks at the impacted area.	Incineration will treat soil exceeding allowable risks at the impacted area.	Bioremediation will treat soil exceeding allowable risks at the impacted area.	contaminants of concern in the treatment area.
reated, or Removed			-		
Degree of Expected Reductions in Toxicity,	None	Contaminated soil will be disposed of in permitted facilities that use measures to reduce or eliminate the	Contaminant toxicity and volume will be reduced.	Contaminant toxicity and volume will be reduced.	Contaminant toxicity and volume will be reduced.
Mobility, or Volume		risk of toxic mobility.			
rreversible Treatment?	No	Yes	Yes	Yes	Yes
Residuals Remaining	Yes	Trace residuals may remain after excavation is	Trace residuals may remain in soils not treated.	Residuals may remain in areas outside of the treatment	Residuals may remain in areas outside of the treatment
After Treatment		complete.	race residuals may remain in sons not deated.	area.	area.
5) Short-Term Impact	and Effectiveness				
Community Protection	There is no action and therefore, no additional risk to	Increased short-term risks to the public during	Increased short-term risks to the public during	Increased short-term risks to the public during	Increased short-term risks to the public during
	the community.	excavation activities and transport of equipment and	excavation activities and transport of equipment and	implementation. Dust may be produced during tilling	installation activities and transport of equipment and
		materials to and from site. Dust will be produced during excavation activities. These can be mitigated	materials to and from site. Dust will be produced during excavation activities. These can be mitigated	activities. These can be mitigated through standard construction practices and permitting.	materials to and from site. Dust may be produced during earthwork activities. These can be mitigated
		through standard construction practices and permitting.	through standard construction practices and permitting.	construction practices and permitting.	through standard construction practices and permittin
Worker Protection	There is no action and therefore no workers will be	Workers can potentially be exposed to contaminated	Workers can potentially be exposed to contaminated	Workers can potentially be exposed to contaminated	Workers can potentially be exposed to contaminated
WORKER FIOLECTION	present on site.	media during excavation activities. Work around heavy	media during excavation activities. Work around heavy	media during activities. Work around heavy equipment	media during activities. Work around heavy equipmen
		equipment carries potential risk to workers. Risks can	equipment carries potential risk to workers. Risks can	carries potential risk to workers. Risks can be	and electrical power carries potential risk to workers.
		be minimized by implementing health and safety controls.	be minimized by implementing health and safety controls.	minimized by implementing health and safety controls.	Risks can be minimized by implementing controls.
Environmental Impacts	There are no short-term impacts associated with this	Wastes produced will include contaminated PPE.	Wastes produced will include contaminated PPE.	Wastes produced will include contaminated PPE.	Wastes produced will include contaminated PPE and
	alternative.	Wastes will be managed in compliance with ARARs. Limited short term environmental impacts associated	Wastes will be managed in compliance with ARARs. Limited short term environmental impacts associated	Wastes will be managed in compliance with ARARs. Limited short term environmental impacts associated	extracted vapors. Wastes will be managed in compliance with ARARs. Limited short term
		with implementation and air emissions.	with implementation and air emissions.	with implementation and air emissions.	environmental impacts associated with implementatio
					and air emissions.
Time Until Action	No action taken	Approximately 10 months	Approximately 10 months	Approximately 18 months	Approximately 10 months
Complete (Field	No action taken	Approximately to months	Approximately to months	Approximately to months	Approximately to months
Construction Time)					
6) Implementability Ability to Construct and	Net Applicable	Excavation alternatives can be implemented, and have	Provide allowed and have	Bioremediation can be implemented, and has been used	In-situ thermal treatment system would be difficult to
Operate	Not Applicable.	been used nationally.	been used nationally.	nationally for persistent organic pollutants. Pilot study	implement on the site due to shallow groundwater and
				would need to be completed to fully evaluate	shallow treatment depth. Soil would need to be
				effectiveness.	stockpiled on-site to accommodate required treatment depth.
Monitoring	Not Applicable.	Soil shall be sampled and analyzed to confirm removal		Monitoring of soil is necessary to track the treatment	Monitoring of soil is necessary to track the treatment
Requirements		of impacted area.	treatment success, and untreated soil shall be sampled	process and confirm the impacted area was sufficiently treated.	process and ensure the impacted area was sufficiently
			shall be sampled and analyzed to confirm all contaminated soil was treated.	ireated.	treated. Soil temperatures outside of the treatment are should also be monitored.
Availability of	Not Applicable.				1
Equipment and			Equipment and specialists are available for th	he implementation of all of these technologies.	
Specialists			-	-	
Ability to Obtain Approvals and	Not Applicable.				
Coordinate with Other			Ability to obtain approvals and coordinate	with other agencies assumed to be possible.	
Agencies					
7) Cost Effectiveness	<u></u>	f0 720 000 (7* · · · · · ·		¢12.400.000 (*******	\$10.0 7 /.000 ~
Cost	\$0	\$9,720,000 (Unrestricted) \$6,398,000 (Residential)	\$13,616,000 (Unrestricted) \$9,470,000 (Residential)	\$12,480,000 (Unrestricted) \$9,067,000 (Residential)	\$10,976,000 (Unrestricted) \$10,522,000 (Residential)
8) Land Use	·	www.www.testernan	wywood (Residential)	wywwywww (Attention)	www.community
o) Luna coc			Unrestricted (Residential)	Unrestricted (Residential)	Unrestricted (Residential)
	NA	Unrestricted (Residential)	Onicsureicu (Residentiai)	Onrestricted (Residential)	Official ended (Residential)
9) Community Accepta		Unrestricted (Residential) TBD	TBD	TBD	TBD

Bianchi/Weiss Greenhouses (152209) East Patchogue, New York

TABLE 5 GROUNDWATER ALTERNATIVE EVALUATION SUMMARY

		Media: Groundwater		
	Alternative 1	Alternative 2	Alternative 3	Alternative 4
	No Further Action	Long-Term Monitoring	Sump and Foundation Upgrades	Containment via Hydraulic Control and Treatment
(1) Overall Protection of	f the Public Health and the Environment	·	·	·
	There is no reduction of risk with this alternative. The groundwater pathways would continue to pose unacceptable risk to all receptors.	There is no reduction of risk with this alternative. The groundwater pathways would continue to pose unacceptable risk to all receptors. After on-site source removal groundwater concentrations are anticipated to decrease.	Risk is reduced because exposure to public is limited by sump and foundation upgrades.	No risk remains because entire plume will be treated.
(2) Standards, Criteria	and Guidance (SCGs)	L		L
	Does not meet SCG criterion.	Does not meet SCG criterion.	Does not meet SCG criterion.	Will meet SCG criterion for groundwater in the treated area.
(3) Long-Term Effectiv	eness and Permanence			
	This alternative will not provide long-term effectiveness or permanence. This alternative offers no controls. The plume may expand and contaminate previously uncontaminated portions of the aquifer.	This alternative will only track long-term migration of the plume. It will not prevent the plume from expanding and and contaminating previously uncontaminated portions of the aquifer.	This alternative will be effective in the long-term at reducing exposure to the public. It will not prevent the plume from expanding and contaminating previously uncontaminated portions of the aquifer.	Ex-situ treatment will provide long-term effectiveness and permanence for groundwater within plume. Monitoring will provide a means to recognize remedy failure and implement a more aggressive remedy, if necessary.
(4) Reduction of Toxici	ty, Mobility, or Volume of Contamination Through Tr	reatment		L
Amount of Hazardous Materials Destroyed, Treated, or Removed	None	None	None	Ex-situ filtration treatment will remove cotaminants of concern from groundwater within plume.
Degree of Expected Reductions in Toxicity, Mobility, or Volume	None	None	None	Contaminant toxicity and volume will be reduced.
Irreversible Treatment?	No	No	No	Yes
Residuals Remaining After Treatment	Yes	Yes	Yes	Trace residuals may remain. Since the whole plume is not being treated, residuals will remain after treatment.
(5) Short-Term Impact	and Effectiveness			
Community Protection	There is no action and therefore, no additional risk to the community.	No additional risk to the community.	Risk to the individuals receiving sump and/or foundation upgrades will be reduced. There will be no additional risk to others in the community.	Increased short-term risks to the public during installation activities and transport of equipment and materials to and from site. These can be mitigated through standard construction practices and permitting.
Worker Protection	Workers can potentially be exposed to contaminated groundwater by trenching activities south of the site.	Workers can potentially be exposed to contaminated water during groundwater sampling activities. Risks can be minimized by implementing health and safety controls.	Workers can potentially be exposed to contaminated groundwater by trenching activities south of the site.	Workers can potentially be exposed to contaminated vapors or water during activities. Work around heavy equipment and electrical power carries potential risk to workers. Risks can be minimized by implementing health and safety controls.
Environmental Impacts	None	None	None	Wastes produced will include contaminated personal protective equipment. Wastes will be managed in compliance with Applicable or Relevant and Appropriate Requirement. Groundwater pumping may impact the hyporheic zone of Abets and Moss Creeks.
Time Until Action Complete (Field Construction Time)	No action taken	30 years	30 years (Approximately 2 months construction time)	30 years (Approximately 2 months construction time)

TABLE 5 GROUNDWATER ALTERNATIVE EVALUATION SUMMARY

		Media: Groundwater	r	
	Alternative 1	Alternative 2	Alternative 3	Alternative 4
				Containment via Hydraulic Control and
	No Further Action	Long-Term Monitoring	Sump and Foundation Upgrades	Treatment
(6) Implementability				
Ability to Construct and Operate	Not Applicable.	Not Applicable.	Sump and foundations upgrades are easy to implement if access to properties is granted by property owners.	Ex-situ treatment of groundwater is implementable.
Monitoring Requirements	Not Applicable.	Monitoring would take place semiannually.	Not Applicable.	Groundwater requires monitoring until cleanup confirmed. Monitoring would take place semiannually for the first 2 years and annually for the following 28 years.
Availability of Equipment and Specialists	Not Applicable.	Equipment and specialists are available for the implementation of this alternative.	Equipment and specialists are available for the implementation of this alternative.	Equipment and specialists are available for the implementation of this technology.
Ability to Obtain Approvals and Coordinate with Other Agencies	Not Applicable.	Ability to obtain approvals and coordinate with other agencies assumed to be possible.	Ability to obtain approvals and coordinate with property owners assumed to be possible.	Ability to obtain approvals and coordinate with other agencies assumed to be possible.
(7) Cost Effectiveness			1	
Cost	\$0	\$740,000 (No Source Removal) \$661,000 (Source Removal)	\$726,000 (No Source Removal) \$675,000 (Source Removal)	\$4,192,000 (No Source Removal) \$3,471,000 (Source Removal)
(8) Land Use	·	· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·
	NA	Restrict Groundwater Use	Restrict Groundwater Use	Restrict Groundwater Use
(9) Community Accepta	ance			
· •	TBD	TBD	TBD	TBD
NOTE: TBD = To be dete	ermined			

Appendix A

Cost Estimates

TECHNOLOGY		L	OCATIO	N		MEDI	A		Estimate	ed Cost to In	pleme	ent	\$9,720,000		
Soil Alternative 2 Excavation and Offsite Disposal		Bianchi/ East	Weiss Gro Patchogu		es	Soil					onstructi Operati	on Time:	-	months	
Unrestricted		Quan	itities				Co	ost Brea	kdown (if availabl	Post Remedi	ation Me	onitoring	0 Combined Unit	years	
Description	Data Source (Means ¹ or Other)	Quantity	Quantity Unit	Materi Unit Co	10000	Material Total Cost	L	.abor iit Cost	Labor Total Cost	Equipment Unit Cost		ipment il Cost	Costs Unit Cost	Option Total Cost	
REMEDIAL ACTION	(Means of Official)	TOTAL C (totals rot	APITAL	COST			Un	it Cost	Total Cost	Unit Cost	100	il Cost	Unit Cost	\$9,720,000	
Construction Activities		1				\$2,839,251			\$379,296		\$.	396,508	\$45,717	\$7,704,295	
Site Preparation Utility Locator (based on recent bids)	recent quote	0.5	day	\$ -	s		¢		\$	\$ -	\$		\$ 2,475.00	\$1,238	
Erosion & Sediment Control Plan		1	ls	\$ -	\$		\$	-		\$ -	\$	-	\$ 10,000	\$10,000	
Silt Fence	31 25 13.10 1000 recent quote-	3,200	lf	\$ 0.	55 \$	1,760	\$	0.45	\$ 1,440	\$ -	\$	-	\$ -	\$3,200	
Monitoring Well Abandonment	EnviroTrac recent quote-	80	lf	\$ -	\$	-	\$	-	\$ -	\$ -	\$	-	\$ 26.40	\$2,112	
Monitoring Well Installation	EnviroTrac	80		\$ -	s	-	\$	-	s -	\$ -	\$	-	\$ 112.80	\$9,024	
Soil Characterization Sampling (1 sample per 500 CY, per CWM) Excavation	Chemtech	114	sample	\$ -	\$	-	\$	-	\$ -	\$ -	\$	-	\$612.00	\$69,471	
Community Air Monitoring (Dust)	recent quote - Pine	10	mo				s	8,500	\$ 85,000	\$ 3,420	s	34,200		\$119,200	
Dust Control, Heavy	Environmental 31 23 23.20 2510	200	day	\$ -		-	\$	-	\$ -	\$ -	\$	-	\$ 2,583.24	\$516,648	
Concrete demolition - Break up into small pieces, minimum reinforcing Soil-Excavator, hydraulic, crawler mtd. 1 CY cap = 100 CY/hr	03 05 05.10 0060 31 23 16.42 0200	926 56,757	cy bcy	\$ - \$ -	S		\$ \$	116		\$ 19 \$ 1.38		17,917 78,196	<u>s</u> -	\$125,037 \$152,577	
Confirmation Soil Sampling	512510.12 0200												φ		
Grab Samples- 12 per acre Lab Analyses - TCL Pesticides	Chemtech	128	sample sample	\$ - \$ -	~		\$ \$	- 21	\$ 2,730 \$ -	\$ 67 \$ -	\$ \$	8,571	\$ - \$ 115.50	\$11,351 \$14,836	
Hazardous Soil Disposal							-					-			
Hazardous Soil Disposal Transportation using dumps	CWM CWM	1,000	ton ton	\$ - \$ -	\$ \$		\$ \$	-	\$ - \$ -	\$ - \$ -	\$ \$	-	\$65 \$82	\$65,000 \$82,000	
Demurrage (assume 2 hours per week of loading)	CWM	2	hour	\$ -			\$	-		s -	\$	-	\$85	\$155	
Fuel Surcharge- 36% of Transportation Non-Hazardous Soil Disposal	CWM recent quote -	1	ls	\$ -	\$	-	\$	-	\$ -	\$ -	\$	-	\$ 29,520.00	\$29,520	
Soil transportation and disposal Backfill and Compaction	EnviroTrac	74,330	ton	\$ -	\$	-	\$	-	\$ -	\$ -	\$	-	\$39.87	\$2,963,532	
Supply and Transportation of NYS Certified Clean Back Fill Material	110 Sand Company	65,271	lcy	\$ 43.	47 \$	2,837,441	\$	-	s -	\$ -	\$	-	s -	\$2,837,441	
Dozer backfilling, bulk, up to 300' haul, no compaction	31 23 23.17 0020	65,271	lcy	\$ -			\$	0.81		\$ 1.64		107,011	\$ -	\$159,650	
Compacting backfill, 6" to 12" lifts, vibrating roller Site Restoration	31 23 23.13 1600	56,757	bcy	\$ -	\$	-	\$	0.99	\$ 55,986	\$ 2.65	\$	150,613	\$ -	\$206,599	
Topsoil	A&R Materials	14,247	су		20 \$	278,673								\$278,673	
Finishing grading slopes, gentle Utility mix, 7#/M.S.F., Hydro or air seeding, with mulch and fertilizer	31 22 16.10 3300 32 92 19.14 5400	44,000 396	sy msf	\$ - \$ 64.	5 75 \$	25,642	s	0.12	\$ 5,175 \$ 7,252	\$ 0.10 \$ 11.92		4,243 4,719	s -	\$9,418 \$37,614	
Curity mix, /#/WISTP, Hyuro of an seeding, with mutch and returizer	52 92 19.14 5400	390	illisi	5 04.	15 \$	23,042	3	10.51	3 7,232	\$ 11.92	3	4,/19		357,014	
S% of Total Costs of Site Work, Treatment													\$1,223,117	\$61,156 \$61,156	
Contingency 15% of Total Construction Activities					-								\$7,765,451	\$1,164,818 \$1,164,818	
Professional/Technical Services														\$789,835	
5% Project Management													\$4,646,088	\$232,304	
6% Remedial Design 6% Construction Management								-			-			\$278,765 \$278,765	
TOTAL ESTIMATED NPV TECHNOLOGY COST	` (Capital + Lifetin	ne O&M +	+ Post R	emedia	tion	Monitoring)							\$9,720,000	
Assumptions: Working condition is Safety Level: Weighted Average of city cost index (Riverhead, NY)		D 121.6%	(Labor pr (not appli			82% erived from veno			productivity:	100%	þ				
Costs are loaded with a profit factor Inflation		10%	per year											Labor	
Estimated number of soil samples		107	samples		1 sa	mpling event			0.25	hrs/sample				Cost per hr	
Characterization Cost	Table A (per CWM)	\$612.00	per sample	20%		ded for QA/QC s	ample	es	1	worker sampling					
Analytical cost	TCLP Pesticides	\$105.00	per sample	•											
For each sampling event, assumed: Disposal		\$50	for materia	ils (gloves,	noteb	ooks, etc.)									
Pesticide contaminated soil as a haz	Disposal Transportation	\$82	per ton					soil haza per load		45	loads fe	or inciner	ation		
T&D Pesticide contaminated soil as non-haz	Demurrage Fuel Surcharge	36%	per hour of transpor per ton	tation cost	s	74,330	tons	soil for 1	non-haz disposal	3,379	loads fe	or disposa	ıl		
			-				(assu	ume 2-6	ft is non-haz)						
Concrete Typical Rental Rates - Includes G&A and 10% Profit Mini-Rae Survey Mode PID			lbs per cy			1,540	tons	concrete	for disposal	2	0 loads p	er day			
Truck/SUV (1/2 ton or smaller) Work day consists of:			per day								1 months	g days pe for site p to compl	prep/restoration		
		10								1	. monuls	compi			
Excavation With Concrete and Asphalt: Concrete and Asphalt:	5.0%	% of excavat	ion volume												
Excavation Area:	388,557		(5.05)	۰.											
Excavation Volume: Excavated Weight:	56,757 73,784		65,271	icy											
Roll-off dumpster can hold approximately:		tons													
Notes															
Sy square yard	mo	month													
cy cubic yard lcy loose cubic yard	ls O&M	lump sum Operation an	d maintenar	ice											
bcy bank cubic yard	H&S	Health and S	Safety												
If linear feet sf square feet msf 1,000 square feet															

TECHNOLOGY		L	OCATIO!	1		MEDI	A	Estimat	ed Cost to Im	\$13,616,000		
Soil Alternative 3 On-Site Incineration Unrestricted			Weiss Gree Patchogue			Soil				nstruction Time Operation Time ation Monitoring	15	months months years
		Quan	tities				Cost Brea	kdown (if availab			Combined Unit Costs	-
Description	Data Source (Means ¹ or Other)	Quantity Amount	Quantity Unit	Material Unit Cost		Material Total Cost	Labor Unit Cost	Labor Total Cost	Equipment Unit Cost	Equipment Total Cost	Unit Cost	Option Total Cost
REMEDIAL ACTION		TOTAL CA (totals rour	APITAL CO	OST							1	\$13,616,000
Construction Activities		1				\$1,810		\$311,296		\$369,148	\$133,493	\$10,934,917
Site Preparation												
Bench Scale Testing Utility Locator (based on recent bids)	Engineer's Estimate recent quote	0.5	ls day	\$ - \$ -	\$ \$	-	s - s -	\$ - \$ -	<u>s</u> - s -	\$ - \$ -	\$ 50,000.00 \$ 2,475.00	\$50,000 \$1,238
Temporary Electric service- 3 - 480 volt transformers and removal of same	LIPA			\$ -	\$	-	s -	\$ -	\$ -	\$ -	\$ 12,000.00	\$12,000
Electrician contractor- work required to connect electric service to equipment	Engineer's Estimate	1	ls	s -	\$	-	s -	\$-	s -	\$ -	\$ 50,000.00	\$50,000
Erosion & Sediment Control Plan Silt Fence	31 25 13.10 1000	3,200	ls If	\$ - \$ 0.55	\$; \$	1,760	\$ - \$ 0.45	\$ - \$ 1,440	<u>\$</u> - \$-	\$ - \$ -	\$ 10,000 \$ -	\$10,000 \$3,200
Monitoring Well Abandonment	recent quote-		16			1,700	3 0.45	3 1,440				
Monitoring Well Installation	EnviroTrac recent quote-	80		\$ -	\$		5 -	\$ -	b -	\$ -	\$ 26.40	\$2,112
Excavation	EnviroTrac	80	lf	\$ -	\$		\$ -	\$ -	\$ -	\$ -	\$ 112.80	\$9,024
Community Air Monitoring (Dust)	recent quote - Pine	2	mo				\$ 8,500	\$ 17,000	\$ 3,420	\$ 6,840		\$23,840
Dust Control, Heavy	Environmental 31 23 23.20	40		s -	\$	-	s -	\$ -	\$ -	\$ -	\$ 2,583.24	\$103,330
Concrete demolition - Break up into small pieces, minimum reinforcing Transportation using Tri-Axles	03 05 05.10 0060 Waste Mngmt	926 1,574	cy ton	s - s -	\$ \$		\$ 116 \$	\$ 107,120 \$ -	\$ 19 \$ -		\$ - \$ 62.25	\$125,037 \$97,953
Environmental Fee	Waste Mngmt	70	load	s - s -	\$	-	s - s -	s - s -	s - s -	s - s -	\$ 10.00	\$703
Fuel Surcharge- 6.09% of transportation Concrete Disposal	Waste Mngmt Waste Mngmt	1,546	ls	s - s -	\$ \$		s - s -	<u>s</u> -	<u>s</u> -	<u>s</u> - s -	\$ 5,965.33 \$ 42.25	\$5,965 \$65,309
Soil-Backhoe, hydraulic, crawler mtd. 1 CY cap = 100 CY/hr	31 23 16.42 0200	56,757	ton bcy	s - s -	\$	-	\$ 1.31	\$ 74,381	\$ 1.38		\$ -	\$152,577
Confirmation Soil Sampling Grab Samples- 12 per acre		128	sample	s -	s	50	\$ 21	\$ 2,730	\$ 67	\$ 8,571	s -	\$11,351
Lab Analyses - TCL Pesticides	Chemtech	128	sample	s - s -	\$		\$ -	\$ -	\$ -	\$ -	\$ 115.50	\$11,551 \$14,836
Soil Incineration Direct-fire incinerator (mob/demob, treatment, emmissions handling, air com	plis Maxymillian	73,784	ton	s -	\$	-	s -	\$ -	\$ -	\$ -	\$100	\$7,378,410
Electrical Consumption	LIPA	9,664,000	kW-hr	s -	\$	-	\$ -	\$ -	\$ -	s -	\$ 0.22	\$2,126,080
Backfill and Compaction Dozer backfilling, bulk, up to 300' haul, no compaction	31 23 23.17 0020	65,271	lev	s -	s	-	\$ 0.81	\$ 52,639	\$ 1.64	\$ 107,011	\$	\$159,650
Compacting backfill, 6" to 12" lifts, vibrating roller	31 23 23.13 1600	56,757	lcy bcy	\$ -	\$	-	\$ 0.99	\$ 55,986	\$ 2.65		s -	\$206,599
Site Restoration Topsoil	A&R Materials	14,247		\$ 20) \$	278,673						\$278,673
Finishing grading slopes, gentle	31 22 16.10 3300	44,000	sy	s -	\$	-	\$ 0.12	\$ 5,175	\$ 0.10		s -	\$9,418
Utility mix, 7#/M.S.F., Hydro or air seeding, with mulch and fertilizer	32 92 19.14 5400	396	msf	\$ 64.75	\$	25,642	\$ 18.31	\$ 7,252	\$ 11.92	\$ 4,719	s -	\$37,614
S% of Total Costs of Site Work, Treatment											\$8,323,399	\$416,170
5% of 10tal Costs of Site work, i reatment											\$8,323,399	\$416,170
Contingency 15% of Total Construction Activities											\$11,351,087	\$1,702,663 \$1,702,663
											\$11,551,087	
Professional/Technical Services 5% Project Management					-						\$3,308,505	\$562,446 \$165,425
6% Remedial Design											\$3,308,305	\$105,425
6% Construction Management												\$198,510
TOTAL ESTIMATED NPV TECHNOLOGY COST	(Capital + Lifetin	ne O&M +	Post Rer	nediatior	ı Mo	nitoring)						\$13,616,000
Assumptions: Working condition is Safety Level:		D	(Labor proc	Inctivity:		82%	: Equipmen	t productivity:	100%	Ъ		
Weighted Average of city cost index (Riverhead, NY)		121.6%			derive	ed from vendo		i productivity.	10070	1/		
Costs are loaded with a profit factor Inflation		10%	per year									Labor
Estimated number of soil samples			samples			s sampled			hrs/sample		\$85	Cost per hr
Analytical cost	TCLP Pesticides	\$105.00	per sample	20%	adde	d for QA/QC s	amples	1	worker sampling			
For each sampling event, assumed:		\$50	for materials	(gloves, not	ebooks	, etc.)						
Incineration Incineration chamber		\$100	per ton- May	wmillian		73,784	tons soil for	incineration				
Treatment Time			tons per hou									
Typical Rental Rates - Includes G&A and 10% Profit Mini-Rae Survey Mode PID		\$96.08	per day	\$1,441.2	0 mo				2) loads per day		
Truck/SUV (1/2 ton or smaller)			per day	\$1,061.1					2	0 working days p		
Work day consists of:		10	hrs							1 months for site 1 months to comp		
			-				Onsite Inc	Inoration				
Excavation With Concrete and Asphalt: Concrete and Asphalt:	5.0%	% of excavatio	on volume					Rate of incinerat	tion (ton/hour)			
Excavation Area: Excavation Volume:	388,557	sf	(5.271	D					tion (ton/10 hr da	y)		
Excavation Volume: Excavated Weight:	56,757 73,784		65,271	icy			147.5682	Days of incinera	000			
Roll-off dumpster can hold approximately:		tons										
Notes												
sy square yard	mo	month										
cy cubic yard ley loose cubic yard	ls O&M	lump sum Operation and	maintenance									
bcy bank cubic yard	H&S	Health and Sa										
If linear feet sf square feet												
msf 1,000 square feet												

TECHNOLOGY			LOCATION		ME	DIA	Estimat	ed Cost to Im	plement	\$12,480,000		
Soil Alternative 4 In-Situ Bioremediation using Daramend	L		chi/Weiss Greer East Patchogue,		S	oil		c	onstruction Time: Operation Time:	18	months months	
Unrestricted			ast i utenogue,					Post Remed	liation Monitoring	-	years	
Description	Data Source		ntities	Material	Material	Cost Breakdov Labor	wn (if available) Labor	Eminerat	Eminerat	Combined Unit Costs	Onting	
Description	(Means ¹ or Other)	Quantity Amount	Quantity Unit	Unit Cost	Total Cost	Labor Unit Cost	Total Cost	Equipment Unit Cost	Equipment Total Cost	Unit Cost	Option Total Cost	
REMEDIAL ACTION		TOTAL CAPI	TAL COST d to nearest the	usand)							\$12,480,000	
Construction Activities		1			\$6,195,923		\$186,797		\$261,356	\$108,230	\$9,911,352	
Site Preparation					\$0,195,925		\$186,797		\$201,550			
Utility Locator (based on recent bids) Erosion & Sediment Control Plan	recent quote		day ls	s - s -	\$ - \$ -	\$ - \$ -	s - s -	s - s -	s - s -	\$ 2,475 \$ 10,000	\$2,475	
Pilot Study Silt Fence	Engineer's Estimate 31 25 13.10 1000	1 3,200	ls lf	\$ - \$ 0.55	\$ - \$ 1,763	\$ - \$ 0.45	\$ - \$ 1,455	s - s -	s - s -	\$ 75,000 \$ -	\$75,000 \$3,218	
Monitoring Well Abandonment	recent quote- EnviroTrac	5,200		s -	s -	s -	s -	s -	s -	\$ 26.40	\$2,112	
Monitoring Well Installation	recent quote-	80		s -	s -	s -	s -	s -	s -	\$ 112.80	\$9,024	
Concrete Removal	EnviroTrac			<u> </u>								
Concrete demolition - Break up into small pieces, minimum reinforcing Concrete - Hauling, 50 MPH ave, cycle 30 miles	03 05 05.10 0060 31 23 23.20 1510	926 926	lcy	s - s -	\$ - \$ -	\$ 116 \$ 3.80	\$ 107,120 \$ 3,520	\$ 19 \$ 9.58	\$ 17,917 \$ 8,863	s - s -	\$125,037 \$12,383	
Concrete Disposal Daramend	Waste Mngmt	1,527	ton	s -	\$ -	\$ -	\$ -	\$ -	s -	\$ 82.50	\$125,999	
Daramend	Adventus Adventus	6,002	ton loads	\$ 1,000.00 \$ -	\$ 6,001,500 \$	s - s -	s - s -	s - s -	s - s -	\$	\$6,001,500 \$683,400	
Shipping Cost Oversight	Adventus		loads	s -	s -	s - s -	s -	s -	s -	\$ 3,400.00 \$ 7,000.00	\$683,400	
Applications	See below for equation	2,251	hrs									
2 Tillers	Adventus		month	\$85 \$	\$ 191,309 \$ -	\$ - \$ -	s - s -	s - s -	s - s -	\$ - \$ 2,000.00	\$191,309 \$36,000	
Chemical Spreader, 3 cy	01 54 33 1000 01 54 33 6900	18	month	s -	\$ -	\$ -	s -	s -	s -	\$ 537.31	\$9,672	
Water tank, engine driven discharge, 5000 gallons Tractor	01 54 33 4110	18	month month	s -	s - s -	\$ - \$ -	s - s -	s - s -	s - s -	\$ 1,791.05 \$ 4,649.83	\$32,239 \$83,697	
Water Service Charge	Suffolk County Water Authority	6	qtr	s -	s -	s -	s -	s -	s -	\$ 18.23	\$109	
Water	Suffolk County Water Authority	1000	0 1,000 gal	s -	s -	s -	s -	s -	s -	\$ 1.61	\$1,606	
Soil Sampling												
Grab Samples - 12 per acre Mobilization/Demobilization of Field Sampling Crew		27		s - s -	\$ 1,350 \$ -	\$ 21 \$ -	\$ 74,702 \$ -	\$ 66.73 \$ -	\$ 234,576 \$ -	\$ - \$ 1,020	\$310,628 \$27,540	
Lab Analyses - Pesticides (8081A) Soil Excavation and Stockpiling	Chemtech	3,515	sample	s -	\$ -	\$ -	s -	s -	s -	\$ 115.50	\$406,029	
Soil-Backhoe, hydraulic, crawler mtd. 1 CY cap = 100 CY/hr	31 23 16.42 0200	27,608		s -	ş -	\$ 1.07	\$ 29,668	\$ 1.38	\$ 38,036	s -	\$67,705	
Community Air Monitoring (Dust) Dust Control, Heavy	31 23 23.20 2510		mo day	s -	s -	\$ 8,500 \$ -	\$ 153,000 \$ -	\$ 3,420 \$ -	\$ 61,560 \$ -	\$ 2,280.13	\$214,560 \$820,847	
Site Restoration Dozer backfilling 0-4', bulk, up to 300' haul, no compaction	31 23 23.13 1300*	51,780	lcy	s -	s -	\$ 0.66	\$ 34.051	\$ 1.28	\$ 66,131	s -	\$100,182	
Compacting backfill, 6" to 12" lifts, vibrating roller	31 23 23.13 1600	45,026		s -	\$ -	\$ 0.99	\$ 44,415	\$ 2.65	\$ 119,483	s -	\$163,897	
Topsoil Finishing grading slopes, gentle	A&R Materials 31 22 16.10 3300	18,781 44,000	sy	\$ 20 \$ -	\$ 367,364 \$ -	\$ 0.12	\$ -	\$ 0.09	\$ - \$ 3,973	s - s -	\$367,364 \$9,148	
Utility mix, 7#/M.S.F., Hydro or air seeding, with mulch and fertilizer	32 92 19.14 5400	396	msf	s -	\$ -	\$ 18.31	\$ 7,252	\$ 11.16	\$ 4,419	s -	\$11,671	
Mobilization and Demobilization											\$495,568	
5% of Total Costs of Site Work, Treatment										\$9,911,352	\$495,568	
Contingency 15% of Total Construction Activities										\$10,406,919	\$1,486,703 \$1,486,703	
										310,400,919		
Professional/Technical Services 5% Project Management										\$3,088,070	\$586,733 \$154,404	
8% Remedial Design											\$247,046	
6% Construction Management										I	\$185,284	
TOTAL ESTIMATED NPV TECHNOLOGY COST	(Capital + Lifetime	O&M + Post	Remediation	n Monitoring							\$12,480,000	
Assumptions:			т			1			1			
Working condition is Safety Level: Weighted average of city cost index (Riverhead, NY)		D 121.6%		vity: or costs derived fror	82% n vendor quotes).	; Equipment prod	uctivity:	100%	þ			
Costs are loaded with a profit factor Inflation		10%										
Sales Tax		8.25%					0.05	њ			Labor Cost per hr	
Estimated number of soil samples		12	hrs for travel per		sampling events		0.25	hrs/sample workers per event			added for QA/QC samples	
Analytical cost For each sampling event, assumed:	Pesticides		per sample for materials (glov	ves, notebooks, etc.)								
Typical Rental Rates - Includes G&A and 10% Profit			-									
Mini-Rae Survey Mode PID Truck/SUV (1/2 ton or smaller)		\$70.74	per day per day									
Concrete Demolition and Disposal	Concrete Thickness	3,300 0.75	lbs per cy ft		2,000 Application labor	lbs per ton hours calculation:						
Denominal Application	Concrete Removal Area	33,322	sq ft	7.10.4		9 acres (0-2' area)	*	11 applications	3 laborers	10 hrs per day	+	
Daramend Application		9	0-2' Applications 2-4' Applications	7-10 days apart		rs) (1 acre per tiller 4.92 acres (2-4' are	a) 😫	9 applications	3 laborers	10 hrs per day	+	
Treatment area		3	4-6' Applications ft thick	7-10 days apart		rs) (1 acre per tiller 3.64 acres (4-6' are			3 laborers		-	
Water needed Water costs based on using a 3" meter on a nearby fire hydrant		90,338	gal per 1,000 gallons		(2 tille	rs) (1 acre per tiller	per day)		~ ~			
Work day consists of:			hrs		base charge per da	for 3" meter						
Treatment Area:	388,557	sf										
A reasonant al Ed.		1		ef	9.03							
0-2' Volume	29,149	cy	393,512		4.02							
		cy	393,512 214,340 158,369	sf	4.92 3.64							
0-2' Volume 2-4' Volume	29,149 15,877	cy	214,340	sf								
0-2' Volume 2-4' Volume	29,149 15,877	cy cy	214,340	9 sf 9 sf 9 4.5	3.64 days per application	acres n for 0-2' phase			tillers acres/tiller/day			
6-2' Volume 2-4' Volume 4-6' Volume	29,149 15,877 11,731 Field Crew:	cy cy 3	214,340 158,369 people per day ap	p 4.5 2.5	3.64	acres n for 0-2' phase n for 2-4' phase			tillers acres/tiller/day			
6-2' Volume 2-4' Volume 4-6' Volume Hours per Application Excavation and Stockpiling	29,149 15,877 11,731 Field Crew: Till:	cy cy 3	214,340 158,369	p 4.5 2.5	3.64 days per applicatio days per applicatio	acres n for 0-2' phase n for 2-4' phase		1		nonth		
6-2' Volume 2-4' Volume 4-6' Volume Hours per Application Excavation and Stockpiling Area 1:	29,149 15,877 11,731 Field Crew: Till: 214,340	cy cy 3	214,340 158,369 people per day ap people	p 4.5 2.5 1.8	3.64 days per applicatio days per applicatio	acres n for 0-2' phase n for 2-4' phase		1	acres/tiller/day	nonth		
6-2' Volume 2-4' Volume 4-6' Volume Hours per Application Excavation and Stockpiling Area 1: Volume 1: Area 2:	29,149 15,877 11,731 Field Crew: Till: 214,340 15,877 158,369	cy cy 3 sf cy sf	214,340 158,369 people per day ap people 18,259	p 4.5 2.5 1.8	3.64 days per applicatio days per applicatio	acres n for 0-2' phase n for 2-4' phase		1	acres/tiller/day	nonth		
6-2' Volume 2-4' Volume 4-6' Volume Hours per Application Excavation and Stockpiling Area 1: Volume 1:	29,149 15,877 11,731 Field Crew: Till: 214,340 15,877	cy cy 3 sf cy sf	214,340 158,369 people per day ap people 18,259 13,491	af af p <u>4.5</u> <u>2.5</u> <u>1.8</u> a lcy bcy	3.64 days per applicatio days per applicatio	acres n for 0-2' phase n for 2-4' phase		1	acres/tiller/day	nonth		
6-2' Volume 2-4' Volume 4-6' Volume Hours per Application Excavation and Stockpiling Area 1: Volume 1: Area 2:	29,149 15,877 11,731 Field Crew: Till: 214,340 15,877 158,369	cy cy 3 sf cy sf	214,340 158,369 people per day ap people 18,259 13,491	p 4.5 2.5 1.8	3.64 days per applicatio days per applicatio	acres n for 0-2' phase n for 2-4' phase		1	acres/tiller/day	aonth		
6-2' Volume 2-4' Volume 4-6' Volume Hours per Application Excavation and Stockpiling Area 1: Volume 1: Area 2: Volume 2: Notes Sy square yard	20,149 15,877 11,731 Field Crew: Till: 214,340 15,877 158,369 11,731	cy cy 3 sf cy sf cy cy cy month	214,340 158,369 people per day ap people 18,259 13,491	af af p <u>4.5</u> <u>2.5</u> <u>1.8</u> a lcy bcy	3.64 days per applicatio days per applicatio	acres n for 0-2' phase n for 2-4' phase		1	acres/tiller/day	nonth		
6-2' Volume 2-4' Volume 4-6' Volume Hours per Application Excavation and Stockpiling Area 1: Volume 1: Area 2: Volume 2: Notes Sy square yard cy cubic yard	20,149 15,877 11,731 Field Crew: Till: 214,340 15,877 155,369 11,731 mo k Q&M	ey ey ey 3 sf cy sf cy sf cy cy cy cy cy cy cy the cy cy	214,340 158,369 people per day ap people 18,259 13,491 31,749 intenance	af af p <u>4.5</u> <u>2.5</u> <u>1.8</u> a lcy bcy	3.64 days per applicatio days per applicatio	acres n for 0-2' phase n for 2-4' phase		1	acres/tiller/day	aonth		
6-2' Volume 2-4' Volume 4-6' Volume 4-6' Volume Excavation and Stockpiling Area 1: Volume 1: Area 2: Volume 2: Notes Sy square yard cy cubic yard	20,149 15,877 11,731 Field Crew: Till: 214,340 15,877 158,369 11,731 mo Is	cy cy sf cy sf cy sf cy sf cy sf	214,340 158,369 people per day ap people 18,259 13,491 31,749 intenance	af af p <u>4.5</u> <u>2.5</u> <u>1.8</u> a lcy bcy	3.64 days per applicatio days per applicatio	acres n for 0-2' phase n for 2-4' phase		1	acres/tiller/day	aonth		

TECHNOLOGY		L	OCATION	Ň	MEI	DIA	Estimated	l Cost to In	plement	\$10,9	976,000
Soil Alternative 5		Bianchi/V			So	il		с	onstruction Time:		months
In-Situ Thermal Unrestricted		East 1	Patchogue	, NY				Post Remed	Operation Time: iation Monitoring	8	months years
		Quant	ities			Cost Bre	akdown (if available	2)		Combined Unit Costs	
Description	Data Source (Means ¹ or Other)	Quantity Amount	Quantity Unit	Material Unit Cost	Material Total Cost	Labor Unit Cost	Labor Total Cost	Equipment Unit Cost	Equipment Total Cost	Unit Cost	Option Total Cost
REMEDIAL ACTION		TOTAL CA	PITAL CO	OST	<u>.</u>						\$10,976,000
Construction Activities		1			\$840,134		\$411,023		\$538,077	\$4,628,173	\$8,987,281
Site Preparation Utility Locator (based on recent bids)	recent quote	0.5	day	s -	s -	s -	s -	s -	s -	\$ 2,475.00	\$1,238
Pilot Test	Engineer's Estimate	1	ls	s -	s -	s -	s -	s -	s -	\$ 150,000.00	\$150,000
Conceptual design and cost estimate Detailed design, permitting	Terratherm Terratherm	1	ls ls	\$ - \$ -	s - s -	s - s -	s - s -	s - s -	s - s -	\$ 45,144.00 \$ 191,000.00	\$45,144 \$191,000
Procurement	Terratherm	1	ls	\$ -	s -	s -	\$ -	s -	\$ -	\$ 144,000.00	\$144,000
Mobilization and Site Setup Erosion & Sediment Control Plan	Terratherm	1	ls	\$ - \$ -	s - s -	s - s -	s - s -	s - s -	s - s -	\$ 367,000.00 \$ 10,000	\$367,000 \$10,000
Silt Fence	31 25 13.10 1000	3,200	lf	\$ 0.55	\$ 1,760	\$ 0.45	\$ 1,440	s -	\$ -	\$ -	\$3,200
Temporary Electric service- 3 - 480 volt transformers and removal of same	LIPA	1	ls	s -	s -	\$ -	s -	s -	s -	\$ 12,000.00	\$12,000
Electrician contractor- work required to connect electric service to equipment	Engineer's Estimate	1	ls	s -	s -	s -	s -	s -	s -	\$ 50,000.00	\$50,000
Community Air Monitoring (Dust)	recent quote - Pine Environmental	5	mo			\$ 8,500	\$ 42,500	\$ 3,420	\$ 17,100		\$59,600
Dust Suppression	01 54 33.20 5300	5	mo			\$ 85	\$ 425	\$ 1,225	\$ 6,125		\$6,550
Concrete demolition - Break up into small pieces, minimum reinforcing	03 05 05.10 0060	926	су	s -	s -	\$ 116	\$ 107,120	\$ 19	\$ 17,917	s -	\$125,037
Concrete - Hauling, 50 MPH ave, cycle 30 miles Concrete Disposal	31 23 23.20 1510 Waste Mngmt	926 1,527	cy ton	\$ - \$ -	s - s -	\$ 3.80 \$ -	\$ 3,520 \$ -	\$ 9.58 \$ -	\$ 8,863 \$ -	\$ - \$ 82.50	\$12,383 \$125,999
Soil-Backhoe, hydraulic, crawler mtd. 1 CY cap = 100 CY/hr	31 23 16.42 0200	44,100	bcy	\$ -	\$ -	\$ 1.31	\$ 57,795	\$ 1.38	\$ 60,758	s -	\$118,553
Soil -Hauling, 12 cy truck, cycle 0.5 mile, 15 MPH ave, 15 min. wait/Ld./Uld	31 23 23.20 1014 recent quote-	50,715	lcy	\$ -	s -	\$ 1.33	\$ 67,452	\$ 2.74	\$ 138,960	\$ -	\$206,412
Monitoring Well Abandonment	EnviroTrac	80	lf	\$ -	s -	\$ -	s -	\$ -	\$ -	\$ 22.00	\$1,760
Monitoring Well Installation	recent quote- EnviroTrac	80	lf	\$ -	s -	s -	s -	s -	s -	\$ 94.00	\$7,520
Pre-Operation Site Activities			1-	6	e			¢	¢		
Drilling and Well Installation Vapor cover installation	Terratherm Terratherm	1	is İs	\$ - \$ -	s - s -	s - s -	s - s -	\$ - \$ -	\$ - \$ -	\$ 1,227,000.00 \$ 642,000.00	\$1,227,000 \$642,000
Well-field piping	Terratherm	1	ls	\$ -	\$ -	s -	\$ -	\$ -	\$ -	\$ 326,000.00	\$326,000
ISTD power equipment installation Treatment system installation	Terratherm Terratherm	1	ls le	s -	s - s -	s - s -	\$ - \$ -	s - s -	s - s -	\$ 108,000.00 \$ 184,000.00	\$108,000
Electrical Installation, well-field and process	Terratherm	1	ls	s - \$ -	s - s -	s -	s -	s - s -	s - s -	\$ 184,000.00 \$ 138,000.00	\$184,000 \$138,000
Instrument and monitoring system installation Pre-startup and shakedown	Terratherm Terratherm	1	ls ls	s - s -	s - s -	s - s -	s - s -	s - s -	s - s -	\$ 73,000.00 \$ 48,000.00	\$73,000 \$48,000
Operation											
ISTD Power Equipment Rental	Terratherm	1	ls	\$ -	\$ -	\$ -	s -	\$ -	\$ -	\$ 85,000.00	\$85,000
Effluent Treatment System Rental Labor, travel, per diem	Terratherm Terratherm	1	ls	\$ - \$ -	s - s -	s - s -	s - s -	s - s -	s - s -	\$ 20,000.00 \$ 267,000.00	\$20,000 \$267,000
Process monitoring, sampling and analysis	Terratherm	1		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 49,000.00	\$49,000
Waste and GAC	Terratherm	1	ls	\$ -	s -	s -	\$ -	s -	s -	\$ 13,000.00	\$13,000
Repair/maintenance Tools, rentals and fees	Terratherm	1	ls ls	\$ - \$ -	s - s -	s - s -	s - s -	\$ - \$ -	\$ - \$ -	\$ 58,000.00 \$ 22,000.00	\$58,000 \$22,000
Electrical Consumption	LIPA	9,664,000	kW-hr	\$ -	\$ -	s -	\$ -	\$ -	\$ -	\$ 0.22	\$2,126,080
Supply and Transportation of Clean Back Fill Material for 3:1 side slope	110 Sand Company	19,284	lcy	\$ 43.47	\$838,324	s -	\$ -	s -	s -	\$-	\$838,324
Soil Sampling Geoprobe Rig		1	day	s -	s -	s -	s -	s -	s -	\$2,200	\$2,200
Sampling Materials, Labor, and Equipment		49	sample	\$ -	\$ 50	\$ 43	\$ 2,083	\$ 66.73	\$ 3,270	\$ -	\$5,402
Mobilization/Demobilization of Field Sampling Crew Lab Analyses - Pesticides (8081)	Chemtech	49	event sample	s - s -	s - s -	\$ - \$ -	s - s -	s - s -	\$ - \$ -	\$ 2,040 \$ 115.50	\$2,040 \$5,660
Demobilization and Other											
Decommissioning	Terratherm	1	ls							\$ 166,000.00	\$166,000
Site Clearance and Demobilization Reporting	Terratherm Terratherm	1	ls ls	s -	s -	\$.	\$ -	\$	\$.	\$ 179,000.00 \$ 47,000.00	\$179,000 \$47,000
Dozer backfilling, bulk, up to 300' haul, no compaction	31 23 23.13 1300	70,000	lcy	\$ -	\$ -	\$ 0.81	\$ 56,453	\$ 1.64	\$ 114,764	\$ -	\$171,217
Compacting backfill, 6" to 12" lifts, vibrating roller	31 23 23.13 1600	60,869	bcy	\$ -	s -	\$ 0.99	\$ 60,043	\$ 2.65	\$ 161,525	s -	\$221,568
Topsoil Finishing grading slopes, gentle	A&R Materials 31 22 16.10 3300	14,276 43,173	cy sy	\$ 20 \$ -	\$ 279,247 \$ -	\$ 0.12	\$ 5,078	\$ 0.10	\$ 4,164	s -	\$279,247 \$9,241
Utility mix, 7#/M.S.F., Hydro or air seeding, with mulch and fertilizer	32 92 19.14 5400		· · · ·	\$ 64.75			\$ 7,116	\$ 11.92	\$ 4,631	\$ -	\$36,907
Contingency											\$1,348,092
15% of Total Construction Activities		<u> </u>								\$8,987,281	\$1,348,092
Professional/Technical Services 5% Project Management										\$5,822,496	\$640,475 \$291,125
6% Construction Management	0	OPM . D.	4 D								\$349,350
TOTAL ESTIMATED NPV TECHNOLOGY COST (apitai + Lifetime	0am + P0	si Kemet	nation M	muoring)						\$10,976,000
Assumptions: Working condition is Safety Level:		D	(Labor pro	ductivity	82%	; Equipment	productivity	100%	b		
Weighted Average of city cost index (Rochester, NY)		121.6%	(not applic	able for costs	derived from v	endor quotes).	·		<i>ν</i>		
Costs are loaded with a profit factor Inflation		10%	-								Labor
Estimated number of soil samples		41	per year samples	1	sampling event	s	0	hrs/sample			Cost per hr
	N		hrs for trave					workers per eve	nt	-	
Analytical cost For each sampling event, assumed:	Pesticides		per sample for material	s (gloves, note	books, etc.)						
Typical Rental Rates - Includes G&A and 10% Profit			-								
Mini-Rae Survey Mode PID Truck/SUV (1/2 ton or smaller)		\$96.08 \$70.74	per day per day								
Work day consists of:		10	hrs								
Treatment Area: Treatment Volume:	148,225 55,831		64,206	lev	1,507,448	cf			20	working days per me	onth
Excavation Volume:	44,100	-	50,715	-		1			20	. 8 m, s por in	
Notes											
sy square yard	mo	month									
cy cubic yard	ls O&M	lump sum									
lcy loose cubic yard bcy bank cubic yard	O&M H&S	Operation and n Health and Sat									
If linear feet			•								
sf square feet msf 1,000 square feet											
nos 1,000 square reet											

TECHNOLOGY		L	OCATIO	DN		MEDI	A		Estimate	ed Cost to Im	plen	nent		\$6,39	98,000
Soil Alternative 2 Excavation and Off-site Disposal			Weiss Gr Patchogu	eenhouses 1e, NY		Soil					Opera	tion Time: tion Time:		- n	nonths
Residential		-		1			~			Post Remedia	ation l	Aonitoring	Combin		ears
Description	Data Source	Quan Quantity	Quantity	Material		Material		abor	kdown (if availabl Labor	e) Equipment	E	uipment	Co		Option
Description	(Means ¹ or Other)	Amount	Unit	Unit Cost		Fotal Cost		it Cost	Total Cost	Unit Cost		otal Cost	Unit	Cost	Total Cost
REMEDIAL ACTION		TOTAL C (totals rot		COST nearest tho	ousand	l)									\$6,398,000
Construction Activities		1				\$1,708,114			\$280,841			\$252,374	\$4	15,717	\$4,975,727
Site Preparation Utility Locator (based on recent bids)		0.5	4	\$ -	s		6		¢	¢	\$		¢)	475.00	¢1.22
Erosion & Sediment Control Plan	recent quote	0.5	day ls	<u>s</u> -	\$		5	-	\$ - \$ -	s -	\$	-		10,000	\$1,238
Silt Fence	31 25 13.10 1000	3,200	lf	\$ 0.55	\$	1,760	\$	0.45	\$ 1,440	\$ -	\$	-	\$	-	\$3,200
Monitoring Well Abandonment	recent quote- EnviroTrac	80	lf	s -	s	-	s	-	\$ -	\$ -	\$	-	\$	26.40	\$2,112
Monitoring Well Installation	recent quote-	80	lf	s -	s		s		s -	s -	s		s	112.80	\$9,024
Excavation	EnviroTrac	00		Ψ			÷		•	Ψ			φ	112.00	\$7,02
Community Air Monitoring (Dust)	recent quote - Pine	7	mo				s	8,500	\$ 59,500	\$ 3,420	\$	23,940			\$83,440
Dust Control, Heavy	Environmental 31 23 23.20 2510	140	mo				\$			\$ -	\$	- 23,740	\$ 2,	583.24	\$361,654
Concrete demolition - Break up into small pieces, minimum reinforcing	03 05 05.10 0060	926	су	\$ -	\$	-	\$			\$ 19		17,917	\$	-	\$125,037
Soil-Excavator, hydraulic, crawler mtd. 1 CY cap = 100 CY/hr Confirmation Soil Sampling	31 23 16.42 0200	34,131	bcy	\$ -	\$	-	\$	1.31	\$ 44,729	\$ 1.38	\$	47,023	\$	-	\$91,753
Grab Samples- 12 per acre		128	sample	\$ -	\$	50	\$	21	\$ 2,730	\$ 67	\$	8,571	\$	-	\$11,351
Lab Analyses - TCL Pesticides	Chemtech	128	sample	\$ -	\$	-	\$	-	\$ -	\$ -	\$	-	\$	115.50	\$14,836
Hazardous Soil Disposal Soil Characterization Sampling (1 sample per 500 CY, per CWM)	Chemtech	68	sample	\$ -	s		s	-	\$ -	\$ -	\$		s	612.00	\$41,776
Hazardous Soil Disposal	CWM	1,000	ton	s -	\$	-	\$			s -	\$	-	\$	65.00	\$65,000
Transportation using dumps	CWM	1,000	ton	\$ -	\$	-	\$			\$ -	\$	-	\$	82.00	\$82,000
Demurrage (assume 2 hours per week of loading) Fuel Surcharge- 36% of Transportation	CWM CWM	2	hour	\$ - \$ -	S S	-	S S			\$ - \$ -	\$	-	\$ \$ 29.	85.00 520.00	\$155 \$29,520
Non-Hazardous Soil Disposal	Cinin	1		÷ -	9		3		÷ -	Ψ -	\$	-	φ <u>2</u> 9,		\$27,320
Soil transportation and disposal	Recent quote-	44,916	top	s -	s		s	_	s -	s	s			\$39.87	\$1,790,804
Backfill and Compaction	EnviroTrac	44,910	1011				3	-	3 -	<u> </u>	\$	-		\$37.67	31,790,804
Supply and Transportation of NYS Certified Clean Back Fill Material	110 Sand Company	39,251	lcy	\$ 43.47	s	1,706,304	s	-	s -	s -	s	-	s	-	\$1,706,304
Dozer backfilling, bulk, up to 300' haul, no compaction	31 23 23.17 0020	39,251	lcy	s -	s		s	0.81	\$ 31,655	\$ 1.64	\$	64,351	s	-	\$96,006
Compacting backfill, 6" to 12" lifts, vibrating roller	31 23 23.13 1600	34,131	bcy	\$ -	\$	-	\$	0.99	\$ 33,667	\$ 2.65		90,571	\$	-	\$124,239
Site Restoration	40014 1	14.076				270 247									\$270 A IS
Topsoil Finishing grading slopes, gentle	A&R Materials 31 22 16.10 3300	14,276	cy sv	\$ 20 \$ -	s s	279,247	s	0.12	\$ 5,175	\$ 0.10	\$	4,243	s	-	\$279,247 \$9,418
Utility mix, 7#/M.S.F., Hydro or air seeding, with mulch and fertilizer	32 92 19.14 5400		msf	\$ 64.75	\$	25,642	\$	18.31	\$ 7,252	\$ 11.92		4,719	\$	-	\$37,614
M-Likeden and Dam-Likeden															\$142.010
S% of Total Costs of Site Work, Treatment	· · · · · · · · · · · · · · · · · · ·										_		\$2,	858,196	\$142,910 \$142,910
Contingency															\$767,795
15% of Total Construction Activities													\$5,	118,636	\$767,795
															A
Professional/Technical Services 5% Project Management											-		\$3	008,248	\$511,402 \$150,412
6% Remedial Design					-			-					φ3,	,00,210	\$180,495
6% Construction Management															\$180,495
TOTAL ESTIMATED NPV TECHNOLOGY COST	(Capital + Lifetin	ne O&M +	- Post R	emediatio	on M	onitoring)								\$6,398,000
Assumptions:															
Working condition is Safety Level:		D	(Labor p	roductivity:		82%	; Equ	uipment	productivity:	100%)				
Weighted Average of city cost index (Riverhead, NY)			(not appli	cable for cos	ts deriv	ved from ven	dor qu	uotes).	_		_				
Costs are loaded with a profit factor Inflation		10%	per year											I	abor
Estimated number of soil samples			samples	1	times	sampled		ſ	0.25	hrs/sample					Cost per hr
				20%	added	l for QA/QC s	ample	es	1	worker sampling					
Characterization Cost Analytical cost	Table A (per CWM) TCLP Pesticides	\$612.00	per sample per sample	e											
For each sampling event, assumed:	rear readences			als (gloves, no	otebook	s, etc.)									
Disposal			-				1								
Pesticide contaminated soil as a "listed" waste- incineration	Disposal Transportation		per ton			1,000	tons s	soil haza per load	irdous	45	loads	for inciner	ation		
	Demurrage		per hour				tons	per load	L	40	Toada	Tor memer	ation		
				rtation costs											
T&D Pesticide contaminated soil as non-haz		\$39.87	per ton			44,916	tons s	soil for r	non-haz disposal	2,042	loads	for dispos	al		
Concrete		3,300	lbs per cy			1,546	tons	concrete	for disposal						
Typical Rental Rates - Includes G&A and 10% Profit															
Mini-Rae Survey Mode PID Truck/SUV (1/2 ton or smaller)		\$96.08	per day per day									per day ing days pe	r month		
Work day consists of:			hrs							1	l mont	hs for site p hs to comp	orep/restor	ation	
work day consists of:		10	nrs							c	5 mon	ns to comp	letion		
Excavation With Concrete and Asphalt:		-													
Concrete and Asphalt:	5.0%	% of excavat	ion volume												
Excavation Area: Excavation Volume:	388,557 34,131		39,25	l lcy											
Excavated Weight:	44,370	tons													
Roll-off dumpster can hold approximately:	5	tons													
Notes															
		month													
	mo														
cy cubic yard	ls	lump sum													
cy cubic yard lcy loose cubic yard	ls O&M	lump sum Operation an		nce											
cy cubic yard lcy loose cubic yard bcy bank cubic yard lf linear feet	ls	lump sum		nce											
y cubic yard cy loose cubic yard bey bank cubic yard	ls O&M	lump sum Operation an		nce											

TECHNOLOGY		L	OCATION	1		MEDL	A	Estimat	ed Cost to Im	plement	\$9,4	70,000
Soil Alternative 3 On-Site Incineration Residential			Weiss Gree Patchogue,			Soil				nstruction Time Operation Time ation Monitoring	: 9	months months years
Колосичин		Quar	tities				Cost Brea	kdown (if availab			Combined Unit	years
Description	Data Source (Means ¹ or Other)	Quantity Amount	Quantity Unit	Material Unit Cost		Material Total Cost	Labor Unit Cost	Labor Total Cost	Equipment Unit Cost	Equipment Total Cost	Costs Unit Cost	Option Total Cost
REMEDIAL ACTION		TOTAL CA (totals rou			and)					1	1	\$9,470,000
Construction Activities		1			<u> </u>	\$1,810		\$238,341		\$235,274	\$133,493	\$7,149,459
Site Preparation	En de releve											
Benchscale Testing Utility Locator (based on recent bids)	Engineer's Estimate recent quote	0.5	ls dav	s -	\$	-	s -	s -	\$ -	\$ -	\$50,000 \$ 2,475.00	\$50,000 \$1,238
Temporary Electric service- 3 - 480 volt transformers and removal of same	LIPA	1	ls	s -	\$	-	s -	\$ -	\$ -	\$ -	\$ 12,000.00	\$12,000
Electrician contractor- work required to connect electric service to equipment	Engineer's Estimate	1	ls	s -	\$	-	s -	\$ -	\$ -	s -	\$ 50,000.00	\$50,000
Erosion & Sediment Control Plan		1	ls	s -	\$	-	s -	\$ -	s -	\$ -	\$ 10,000	\$10,000
Silt Fence	31 25 13.10 1000 recent quote-	3,200	lt	\$ 0.55	\$	1,760	\$ 0.45	\$ 1,440	\$ -	\$ -	s -	\$3,200
Monitoring Well Abandonment	EnviroTrac recent quote-	80	lf	s -	\$	-	\$ -	\$ -	\$ -	\$ -	\$ 26.40	\$2,112
Monitoring Well Installation	EnviroTrac	80	lf	s -	\$	-	s -	\$-	\$-	\$ -	\$ 112.80	\$9,024
Excavation	recent quote - Pine											
Community Air Monitoring (Dust) Dust Control, Heavy	Environmental 31 23 23.20 2510	2 40	mo day				\$ 8,500	\$ 17,000 \$ -	\$ 3,420	\$ 6,840 \$ -	\$ 2,583.24	\$23,840 \$103,330
Concrete demolition - Break up into small pieces, minimum reinforcing	03 05 05.10 0060	926	cy	s -	\$	-	\$ 116	\$ 107,120	\$ 19		\$ 2,383.24 \$ -	\$103,330 \$125,037
Transportation using Tri-Axles	Waste Mngmt	1,574	ton	s -	\$	-	s -	\$ -	\$ -	\$ -	\$ 62.25	\$97,953
Environmental Fee Fuel Surcharge- 6.09% of transportation	Waste Mngmt Waste Mngmt	70	load	s - s -	\$ \$		s - s -	\$ - \$ -	\$ - \$ -	\$ - \$ -	\$ 10.00 \$ 5,965.33	\$703 \$5,965
Concrete Disposal	Waste Mngmt	1,546	ton	\$ -	\$	-	s -	\$ -	\$ -	\$ -	\$ 42.25	\$65,309
Soil-Backhoe, hydraulic, crawler mtd. 1 CY cap = 100 CY/hr	31 23 16.42 0200	34,131	bcy	\$ -	\$	-	\$ 1.31	\$ 44,729	\$ 1.38	\$ 47,023	s -	\$91,753
Confirmation Soil Sampling Grab Samples- 12 per acre		128	sample	s -	\$	50	\$ 21	\$ 2,730	\$ 67	\$ 8,571	s -	\$11,351
Lab Analyses - TCL Pesticides	Chemtech	128	sample	s -	\$	-	\$ -	\$ -	\$-	\$ -	\$ 115.50	\$14,836
Soil Incineration Direct-fire incinerator (mob/demob, treatment, emmissions handling, air comp	li: Maxymillian	44,370	ton	s -	s	-	s -	s -	s -	s -	\$ 100.00	\$4,437,030
Electrical Consumption	LIPA	6,764,800	kW-hr	s -	\$	-	\$ -	\$ -	\$ -	\$ -	\$ 0.22	\$1,488,256
Backfill and Compaction												
Dozer backfilling, bulk, up to 300' haul, no compaction Compacting backfill, 6" to 12" lifts, vibrating roller	31 23 23.17 0020 31 23 23.13 1600	39,251 34,131	lcy bcy	s - s -	\$ \$	-	\$ 0.81 \$ 0.99	\$ 31,655 \$ 33,667	\$ 1.64 \$ 2.65	\$ 64,351 \$ 90,571	s - s -	\$96,006 \$124,239
Site Restoration	57 25 25:15 1000	54,151		•	<i>.</i>		• • • • • •	\$ 55,007	\$ 2.05	\$ 50,571		
Topsoil	A&R Materials 31 22 16.10 3300	14,276 44,000	cy	\$ 20 \$ -	\$	279,247	\$ 0.12	\$ 5,175	\$ 0.10	\$ 4,243	e	\$279,247 \$9,418
Finishing grading slopes, gentle Utility mix, 7#/M.S.F., Hydro or air seeding, with mulch and fertilizer	32 92 19.14 5400	396	msf	\$ 64.75		25,642	\$ 18.31	\$ 7,252	\$ 11.92			\$37,614
M-12-4												\$272.028
S% of Total Costs of Site Work, Treatment					-						\$5,478,551	\$273,928 \$273,928
Contingency 15% of Total Construction Activities											\$7,423,387	\$1,113,508 \$1,113,508
1376 of Total Construction Activities											\$1,425,567	\$1,115,508
Professional/Technical Services												\$933,517
5% Project Management 6% Remedial Design											\$5,491,274	\$274,564 \$329,476
6% Construction Management												\$329,476
TOTAL ESTIMATED NPV TECHNOLOGY COST	(Capital + Lifetin	ne O&M +	Post Ren	nediation	n Ma	nitoring)						\$9,470,000
Assumptions:			т		_		í			٦.		
Working condition is Safety Level: Weighted Average of city cost index (Riverhead, NY)		D 121.6%	(Labor prod (not applical		deriv	82% ed from vendo		nt productivity:	100%	p		
Costs are loaded with a profit factor		10%	Ī									
Inflation Estimated number of soil samples		3%	per year samples	1	time	s sampled		0.25	hrs/sample		\$85	Labor Cost per hr
			-	20%		ed for QA/QC s	amples	1	worker sampling		<i>402</i>	cox per m
Analytical cost	TCLP Pesticides		per sample	(-1								
For each sampling event, assumed: Incineration		\$50	for materials	(gloves, note	ebook:	s, etc.)						
Incineration Unit		\$100	per ton- Max	ymillian		44,370	tons soil for	incineration				
Treatment time		25	tons per hour									
Typical Rental Rates - Includes G&A and 10% Profit			_									
Mini-Rae Survey Mode PID Truck/SUV (1/2 ton or smaller)			per day	\$1,441.20						loads per day		
Truck/SUV (1/2 ton or smaller)		\$/0./4	per day	\$1,061.10) mo					working days p months for site		
Work day consists of:		10	hrs							months to comp		
Excavation With Concrete and Asphalt:												
Concrete and Asphalt:		% of excavation	on volume		On	site Incinerat						
Excavation Area: Excavation Volume:	388,557 34,131		39,251	lori				ineration (ton/ho ineration (ton/10				
Excavated Weight:	44,370		39,431	icy			Days of inc		(III uay)			
Roll-off dumpster can hold approximately:		tons										
Notes												
sy square yard	mo	month										
cy cubic yard	ls	lump sum										
lcy loose cubic yard bcy bank cubic yard	O&M H&S	Operation and Health and Sa										
If linear feet			-									
sf square feet												
msf 1,000 square feet												

TECHNOLOGY			LOCATIO	N	MEDI	A	Estima	ted Cost (o Implement	\$9	,067,000	
Soil Alternative 4 In-Situ Bioremediation using Daramen	d		hi/Weiss Gre ist Patchogu		Soil				Construction Time: Operation Time:	12	months months	
Residential		Ea	ist I atchogu	., 141				Post R	emediation Monitoring	-	years	
			ntities				kdown (if availal		1	Combined Unit Costs		
Description	Data Source (Means ¹ or Other)	Quantity Amount	Quantity Unit	Material Unit Cost	Material Total Cost	Labor Unit Cost	Labor Total Cost	Equipment Unit Cost	Equipment Total Cost	Unit Cost	Option Total Cost	
REMEDIAL ACTION			APITAL CO	ST est thousand)						\$9,067,000	
Construction Activities		1			\$4,176,460		\$137,070		\$105,207	\$106,955	\$6,372,276	
Site Preparation Utility Locator (based on recent bids)	recent quote	1.0	day	\$ -	s -	s -	s -	s -	s -	\$ 2,475	\$2,475	
Erosion & Sediment Control Plan Pilot Study	Engineer's Estimate	1	ls ls	s - s -	s - s -	s - s -	s - s -	s - s -	s - s -	\$ 10,000 \$ 75,000	\$10,000 \$75,000	
Silt Fence	31 25 13.10 1000 recent quote-	3,200	lf	\$ 0.55	\$ 1,763	\$ 0.45	\$ 1,455	s -	s -	s -	\$3,218	
Monitoring Well Abandonment Monitoring Well Installation	EnviroTrac recent quote-	80	lf	s -	s -	s -	s -	s -	s -	\$ 26.40	\$2,112	
Concrete Removal	EnviroTrac	80	lf	\$ -	s -	s -	s -	s -	s -	\$ 112.80	\$9,024	
Concrete demolition - Break up into small pieces, minimum reinforcing Concrete - Hauling, 50 MPH ave, cycle 30 miles	03 05 05.10 0060 31 23 23.20 1510	926 926	cy lcy	s - s -	s - s -	\$ 116 \$ 3.80	\$ 107,120 \$ 3,520	\$ 19 \$ 9.58		s - s -	\$125,037 \$12,383	
Concrete Disposal	Waste Mngmt	1,527	ton	s -	ş -	\$ -	\$ -	\$ -	\$ -	\$ 82.50	\$125,999	
Daramend Daramend	Adventus	4,001		\$ 1,000.00	\$ 4,001,000	s -	s -	s -	s -	s -	\$4,001,000	
Shipping Cost Oversight	Adventus Adventus		loads ls	s - s -	s - s -	s - s -	s - s -	\$ - \$ -	s -	\$ 3,400.00 \$ 7,000.00	\$683,400 \$7,000	
Applications Labor		2,039	hour	\$85	\$ 173,276	\$	s -	\$	\$	s -	\$173,276	
2 Tillers	Adventus	12	mo	\$ -	s -	\$ -	s -	\$ -	\$ -	\$ 2,000.00	\$24,000	
Chemical Spreader, 3 cy Water tank, engine driven discharge, 5000 gallons	01 54 33 1000 01 54 33 6900	12		\$ - \$ -	s - s -	s - s -	s - s -	s - s -	s - s -	\$ 537.31 \$ 1,791.05	\$6,448 \$21,493	
Tractor	01 54 33 4110 Suffolk County Water	12	mo	\$ -	s -	s -	s -	ş -	\$ -	\$ 3,375.00	\$40,500	
Water Service Charge	Authority Suffolk County Water	3	·	\$ -	s -	s -	s -	s -	s -	\$ 18.23	\$55	
Water	Suffolk County Water Authority	1000	1,000 gal	\$ -	s -	s -	s -	s -	s -	\$ 1.61	\$1,606	
Soil Sampling Grab Samples - 12 per acre	·····	1,175		s -	\$ 420	\$ 21	\$ 24,976	\$ 66.73	\$ 78,427	s -	\$103,823	
Mobilization/Demobilization of Field Sampling Crew	Chemtech	18 1,175		s - s -	s -	s - s -	s -	s - s -	s -	\$ 1,020 \$ 115.50	\$18,360	
Lab Analyses - Pesticides (8081A) Soil Excavation and Stockpiling					s -		\$ -		\$ -	÷ 113.30	\$135,750	
Soil-Backhoe, hydraulic, crawler mtd. 1 CY cap = 100 CY/hr Community Air Monitoring (Dust)	31 23 16.42 0200	11,132		\$ -	s -	\$ 1.07 \$ 8,500				s -	\$27,300 \$143,040	
Dust Control, Heavy Site Restoration	31 23 23.20 2510	240	day			s -	s -	s -	s -	\$ 2,583.24	\$619,978	
Dozer backfilling 0-4', bulk, up to 300' haul, no compaction	31 23 23.13 1300*	36,799	lcy	\$ -	s -	\$ 0.66		\$ 1.28		s -	\$71,197	
Compacting backfill, 6" to 12" lifts, vibrating roller Topsoil	31 23 23.13 1600 A&R Materials	31,999 14,276	bcy cy	\$ - \$ 20	\$ - \$ 279,247	\$ 0.99	\$ 31,564	\$ 2.65	\$ 84,914	s -	\$116,478 \$279,247	
Finishing grading slopes, gentle Utility mix, 7#/M.S.F., Hydro or air seeding, with mulch and fertilizer	31 22 16.10 3300 32 92 19.14 5400	44,000 396	sy msf	\$ - \$ -	s - s -	\$ 0.12 \$ 18.31		\$ 0.09 \$ 11.16		s - s -	\$9,148 \$11,671	
Mobilization and Demobilization	52 72 17.14 5465			÷		5 10.51	· /,202	• •			\$289,420	
5% of Total Costs of Site Work, Treatment										\$5,788,391	\$289,420	
Contingency 15% of Total Construction Activities										\$6,661,696	\$868,259 \$868,259	
Professional/Technical Services											\$1,048,993	
5% Project Management												
										\$5,521,013	\$276,051	
5% Project Management 8% Remedial Design 6% Construction Management										\$5,521,013		
8% Remedial Design	(Capital + Lifetime	O&M + H	Post Remed	liation Mon	itoring					\$5,521,013	\$276,051 \$441,681	
	(Capital + Lifetime		_			T				\$5,521,013	\$276,051 \$441,681 \$331,261	
8% Remedial Design 6% Construction Management TOTAL ESTIMATED NPV TECHNOLOGY COST	(Capital + Lifetime	D	(Labor produ	ctivity:			nt productivity:	100%])	\$5,521,013	\$276,051 \$441,681 \$331,261	
8% Remedial Design 6% Construction Management TOTAL ESTIMATED NPV TECHNOLOGY COST Assumptions: Working condition is Safety Level: Weighted average of city cost index (Riverhead, NY) Costs are loaded with a profit factor	(Capital + Lifetime	D 121.6% 10%	(Labor produ (not applicab)	ctivity:	82%		nt productivity:	100%],	\$5,521,013	\$276,051 \$441,681 \$331,261	
8% Remodul Design 6% Construction Management TOTAL ESTIMATED NPV TECHNOLOGY COST Assumptions: Working condition is Safety Level: Weighted average of city cost node: Working condition is Affety Level: Costs are loaded with a profit factor Inflation Safes Tax		D 121.6% 10% 3% 8.25%	(Labor produ (not applicab) per year	ctivity: e for costs deriv	82% red from vendor q	uotes).],		\$276.051 \$441.081 \$331,261 \$9,067,000 Labor	
8% Remodul Design 6% Construction Management TOTAL ESTIMATED NPV TECHNOLOGY COST Assumptions: Working condition is Safety Level: Weighted average of city cost node: Working condition is Affety Level: Costs are loaded with a profit factor Inflation Safes Tax	(Capital + Lifetime For 0-2' applications For 2-4' applications	D 121.6% 10% 3% 8.25% 86 34	(Labor produ (not applicab) per year samples per ap samples per ap	ctivity: le for costs deriv plication plication	82% red from vendor q 8	uotes).	s 0.25	100%],		\$276.051 \$441,681 \$331,261 \$9,067,000	
8% Remodul Design 6% Construction Management TOTAL ESTIMATED NPV TECHNOLOGY COST Assumptions: Working condition is Safety Level: Weighted average of city cost node: Working condition is Affety Level: Costs are loaded with a profit factor Inflation Safes Tax	For 0-2' applications	D 121.6% 10% 3% 8.25% 86 34 8	(Labor produ (not applicabl per year samples per a samples per a samples per a	ctivity: le for costs deriv plication plication plication	82% red from vendor q 8 7	uotes).	s 0.25 tts	hrs/sample])	\$85	\$27061 \$441,681 \$342,681 \$ 9,067,000 Labor Cost per hr	
8% Remedial Design 6% Construction Management TOTAL ESTIMATED NPV TECHNOLOGY COST Assumptions: Working condition is Safety Level: Weighted average of rity cost index (Riverhead, NY) Costs are loaded with a profit factor Inflation Safes Tax Estimated number of soil samples Analytical cost	For 0-2' applications For 2-4' applications	D 121.6% 10% 3% 8.25% 86 34 8 8 12 \$105.00	(Labor produ (not applicabl per year samples per af samples per af samples per af hrs for travel p per sample	ctivity: /e for costs deriv plication /plication /plication er event	82% eed from vendor q 8 7 2	uotes). samp.event samp. even	s 0.25 tts])	\$85	\$276.051 \$441.681 \$331,261 \$9,067,000 Labor	
8% Remedial Design 6% Construction Management TOTAL ESTIMATED NPV TECHNOLOGY COST Assumptions: Working condition is Safety Level: Working condition is Safety Level: Working average of city cost index (Riverhead, NY) Costs are loaded with a profit factor Inflation Sales Tax Estimated number of soil samples	For 0-2' applications For 2-4' applications For 4-6' applications	D 121.6% 10% 3% 8.25% 86 34 8 8 12 \$105.00	(Labor produ (not applicabl per year samples per af samples per af samples per af hrs for travel p per sample	ctivity: le for costs deriv plication plication plication	82% eed from vendor q 8 7 2	uotes). samp.event samp. even	s 0.25 tts	hrs/sample])	\$85	\$27051 \$441,681 \$342,681 \$ 9,067,000 Labor Cost per hr	
8% Remedial Design 6% Construction Management TOTAL ESTIMATED NPV TECHNOLOGY COST Assumptions: Working condition is Safety Level: Weighted average of city cost index (Riverhead, NY) Costs are loaded with a profit factor Inflation Sales Tax Estimated number of soil samples Analytical cost For each sampling event, assumed: For each sampling event, assumed: For each sampling bervery Mode PID	For 0-2' applications For 2-4' applications For 4-6' applications	D 121.6% 10% 3% 8.25% 86 34 8 12 \$105.00 \$50	(Labor produ (not applicabi per year samples per af samples per af hrs for travel p per sample for materials (per day	ctivity: /e for costs deriv plication /plication /plication er event	82% eed from vendor q 8 7 2	uotes). samp.event samp. even	s 0.25 tts	hrs/sample)	\$85	\$27051 \$441,681 \$342,681 \$ 9,067,000 Labor Cost per hr	
8% Remedial Design 6% Construction Management TOTAL ESTIMATED NPV TECHNOLOGY COST Assumptions: Working condition is Safety Level: Working condition is Safety Level: Weighted average of city cost index (Riverhead, NY) Costs are loaded with a profit factor Inflation Safer Tax Estimated number of soil samples Analytical cost For each sampling event, assumed: Typical Rental Rates - Includes G&A and 10% Profit	For 0-2' applications For 2-4' applications For 4-6' applications Pesticides Concrete	D 121.6% 3% 8.65% 34 8 12 \$105.000 \$305.000 \$90.08 \$70.74 3,300	(Labor produ (not applicab) per year samples per af samples per af samples per af hrs for travel p per sample for materials (per day per day Ibs per cy	ctivity: /e for costs deriv plication /plication /plication er event	82% eed from vendor q 8 7 2 s, etc.)	samp.event samp.event samp. even samp. even	s 0.25 ts ts 1	hrs/sample workers per		\$85	\$27051 \$441,681 \$342,681 \$ 9,067,000 Labor Cost per hr	
8% Remedial Design 6% Construction Management TOTAL ESTINATED NPV TECHNOLOGY COST Assumptions: Working condition is Safety Level: Weighted average of city cost index (Riverhead, NY) Costs are loaded with a profit factor Inflation Sales Tax Estimated number of soil samples Analytical cost For each sampling event, assumed: Typical Rotal Rates - Includes G&A and 10% Profit Mini-Rae Survey Mode PID TuckSUV (1/2 ton or smaller) Concrete Demolition and Disposal	For 0-2' applications For 2-4' applications For 4-6' applications Pesticides	D 121.6% 10% 84 86 344 8 81 5105.000 \$500 \$500,04 \$100,000 \$50,074 3,300 0,75 3,33,020 1,33,000 1,3	(Labor produ (not applicab) per year samples per a samples per a mer sample per a per sample for materials (per day per day the per cy ft sq ft	ctivity: e for costs deriv plication plication plication er event gloves, notebook	82% eed from vendor q 8 7 2 s, etc.) 2,000	samp.event samp.event samp.even samp.even	s 0.25 ts ts 1 0n Labor hours 7.13 acres (0-2'	hrs/sample workers per calculation: rea)			S270,611 S441,081 S331,261 S331,261 S9,067,000 Labor Cost per hr added for QA-QC samples	
8% Remedial Design 6% Construction Management TOTAL ESTIMATED NPV TECHNOLOGY COST Assumptions: Working condition is Safety Level: Weighted average of city cost index (Riverhead, NY) Costs are loaded with a profit factor Inflation Sales Tax Estimated number of soil samples Analytical cost For each sampling event, assumed: Typical Rental Rates - Includes G&A and 10% Profit Mini-Rac Survey Mode PID Truck/SUV (12 ton or smaller)	For 0-2' applications For 2-4' applications For 4-6' applications Pesticides Concrete Thickness	D 121.6% 3% 8.6% 34 88 500.05 500.05 500.05 500.075 3,300 0.75 3,3302 3,322	(Labor produ (not applicab) per year samples per ag samples per ag her for travel r per sample for materials (per day per day fls per cy ft sq ft o 2 ² Applicatic	ctivity: e for costs deriv plication plication er event gloves, notebook	82% eed from vendor q 8 7 2 s, etc.) 2,000 art	samp.event samp.event samp.even samp.even	s 0.25 is is 0n Labor hours 7.13 acres (0-2': rs) (1 acre per till	hrs/sample workers per calculation: rea) r per day)	7 applications	\$85 20% 3 laborers	S270,631 S441,081 S331,261 S9,067,000 Labor Cost per hr added for QA/QC samples	
8% Remedial Design 6% Construction Management TOTAL ESTIMATED NPV TECHNOLOGY COST Assumptions: Working condition is Safety Level: Weighted average of city cost index (Riverhead, NY) Costs are loaded with a profit factor Inflation Sales Tax Estimated number of soil samples Analytical cost For each sampling event, assumed: Typical Rental Retates - Includes G&A and 10% Profit Mini-Rae Survey Mode PID Truck/SUV (1/2 ton or smaller) Concrete Demolition and Disposal Daramend Application	For 0-2' applications For 2-4' applications For 4-6' applications Pesticides Concrete Thickness	D 121.6% 10% 3% 86 34 8 5105.00 550 550.08 570.74 3,300 0.75 3,3302 7 6 2 2 2 7 6 2 2 2 2 2 2 2 2 2 2 2 2 2	(Labor produ (not applicab) per year samples per ag samples per ag her for materials (per day per day lbs per cy ft sq ft 0-2' Applicatic 2-4' Applicatic	ctivity: e for costs deriv plication plication plication er event gloves, notebook	82% eed from vendor q 8 7 2 8, etc.) 2,000 art art	samp.event samp.event samp.even samp.even <u>Applicatio</u> (2 tillet	a 0.25 is is 1 0.25 0.25 0.25 0.25 0.27 0.27 0.27 0.27 0.27 0.27 0.27 0.27 0.27 0.27 0.25	hrs/sample workers per calculation: rea r per day) rea	7 applications 6 applications	\$85 20% 3 laborers 3 laborers	S270,611 S441,081 S331,261 \$9,067,000 Labor Cost per hr added for QA-QC samples 10 hrs per day	
8% Remedial Design 6% Construction Management TOTAL ESTIMATED NPV TECHNOLOGY COST Assumptions: Working condition is Safety Level: Weighted average of city cost index (Riverhead, NY) Costs are loaded with a profit factor Inflation Sales Tax Estimated number of soil samples Analytical cost For each sampling event, assumed: For each sampling event, assumed: Typical Rental Reta: Includes G&A and 10% Profit Mini-Kas Every Mode PID TrackSUV (J/2 ton or smaller) Concrete Demolition and Disposal Daramend Application	For 0-2' applications For 2-4' applications For 4-6' applications Pesticides Concrete Thickness	D 121.6% 10% 3% 8% 8% 34% 8% 5105.00 550 550.08 500.75 333.322 7 7 6 2 2 2 71.27%	(Labor produ (not applicab) per year samples per aq samples per aq her sor travel per ger ample for materials (per day per day lbs per cy ft sq ft 0-2' Applicatic 4-6' Applicatic 4-6' Applicatic	etivity: e for costs deriv plication plication plication er event gloves, notebook nss 7-10 days apa nss 7-10 days apa	82% eed from vendor q 8 7 2 8, etc.) 2,000 art art	Ibs per ton Application (2 tiller	0.25 is is 1 1 1 1 1 1 1 1 1 1 1 1 1	hrs/sample workers per calculation: rea) r per day) r per day) rere day) rea)	7 applications 6 applications 2 applications	\$85 20% 3 laborers	S270,631 S441,081 S331,261 S9,067,000 Labor Cost per hr added for QA/QC samples	
8% Remedial Design 6% Construction Management TOTAL ESTIMATED NPV TECHNOLOGY COST Assumptions: Working condition is Safety Level: Working condition is Safety Level: Weighted average of rity cost index (Riverhead, NY) Costs are loaded with a profit factor Inflation Sales Tax Estimated number of soil samples Analytical cost For each sampling event, assumed: Typical Rental Rates - Includes G&A and 10% Profit TrackSUV (12 ton or smaller) Concrete Demolition and Disposal Daramend Application Treatment area	For 0-2' applications For 2-4' applications For 4-6' applications Pesticides Concrete Thickness	D 121.6% 10% 8,25% 8,25% 8,6 3,4 4,8 8,12 5,105,00 5,50 6,05 5,90,608 5,90,608 5,90,608 5,90,608 5,90,608 5,90,608 7,70 6,22 7,22 7,1,278 5,146 5,1475,147 5,1475,147 5,1475,147 5,147 5,147 5,1475,147 5,147 5,1475,147 5,147 5,1475,147 5,147	(Labor produ (not applicabi per year samples per aj samples per aj samples per aj for materials (, per day per day per day bs per cy fi 6-2° Applicatic fi thick gal per 1,000 galik	etivity: e for costs deriv plication plication plication er event gloves, notebook nss 7-10 days apa nss 7-10 days apa	82% eed from vendor q 8 7 2 8, etc.) 2,000 art art	Ibs per ton Application (2 tiller	0.25 is is 1 1 1 1 1 1 1 1 1 1 1 1 1	hrs/sample workers per calculation: rea) r per day) r per day) rere day) rea)	7 applications 6 applications	\$85 20% 3 laborers 3 laborers	S270,611 S441,081 S331,261 \$9,067,000 Labor Cost per hr added for QA-QC samples 10 hrs per day	
8% Remedial Design 6% Construction Management TOTAL ESTIMATED NPV TECHNOLOGY COST Assumptions: Working condition is Safety Level: Weighted average of eity cost index (Riverhead, NY) Costs are loaded with a pofit factor Inflation Safe: Tax Estimated number of soil samples Analytical cost For each sampling event, assumed: Typical Rental Rates - Includes G&A and 10% Profit Mini-Rac Survey Mode PID Track/SUV (12 ton or smaller) Concrete Demolition and Disposal Daramend Application Treatment area Water costs based on using a 3" meter on a nearby fire hydrant Water costs based on using a 3" meter on a nearby fire hydrant	For 0-2' applications For 2-4' applications For 4-6' applications Pesticides Concrete Thickness Concrete Removal Are	D 121.6% 10% 8,25% 8,25% 8,25% 8,25% 8,25% 8,25% 8,35% 8,35% 12,25% 8,35% 8,35% 12,5% 8,35% 8,35% 12,5% 8,5%	(Labor produ (not applicab) per year samples per aq samples per aq her sor travel per ger ample for materials (per day per day lbs per cy ft sq ft 0-2' Applicatic 4-6' Applicatic 4-6' Applicatic	etivity: e for costs deriv plication plication plication er event gloves, notebook nss 7-10 days apa nss 7-10 days apa	82% eed from vendor q 8 7 2 8, etc.) 2,000 art art	Ibs per ton Application (2 tiller	0.25 is is 1 1 1 1 1 1 1 1 1 1 1 1 1	hrs/sample workers per calculation: rea) r per day) r per day) rere day) rea)	7 applications 6 applications 2 applications	\$85 20% 3 laborers 3 laborers	S270,611 S441,081 S331,261 \$9,067,000 Labor Cost per hr added for QA-QC samples 10 hrs per day	
8% Remedial Design 6% Construction Management TOTAL ESTIMATED NPV TECHNOLOGY COST Assumptions: Working condition is Safety Level: Weighted average of city cost index (Riverhead, NY) Costs are loaded with a pofit factor Inflation Safe: Tax Estimated number of soil samples Analytical cost For each sampling event, assumed: Typical Rental Rates - Includes G&A and 10% Profit Mini-Rac Survey Mode PID Truck/SUV (12 ton or smaller) Concrete Demolition and Disposal Daramend Application Treatment area Water needed Water costs based on using a 3° meter on a nearby fire hydrant Work day consists of: Treatment Area: Q-2 Volume	For 0-2' applications For 2-4' applications For 4-6' applications Pesticides Concrete Thickness Concrete Removal Are 888,557 22,999	D 121.6% 10% 3% 3% 86 344 8.82% 580 550 550 550 550 550 77 3,330 0.075 6 3,330 0.075 7 6 2 2 2 71,278 514 514 6 10% 514 514 514 514 514 514 514 514 514 514	(Labor produ (not applicab) per year samples per aj samples per aj samples per aj her for travel per per asymple for materials (per day Be per cy ft oc 2' Applicatic 2-4' Applicatic ft thick gal per 1,000 gall hrs 310,487	etivity: e for costs deriv plication plication er event gloves, notebook ns 7-10 days ap ns 7-10 days ap ns 7-10 days ap	82% ed from vendor q 8 7 2 8, etc.) 2,000 art art art art art 7,13	samp. event samp. even samp. even samp. even (2 tillet (2 tillet (2 tillet (2 tillet) (2 tillet)	0.25 is is 1 1 1 1 1 1 1 1 1 1 1 1 1	hrs/sample workers per calculation: rea) r per day) r per day) rere day) rea)	7 applications 6 applications 2 applications	\$85 20% 3 laborers 3 laborers	S270,611 S441,081 S331,261 \$9,067,000 Labor Cost per hr added for QA-QC samples 10 hrs per day	
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8% Remedial Design 6% Construction Management TOTAL ESTIMATED NPV TECHNOLOGY COST Assumptions: Working condition is Safety Level: Weighted average of city cost index (Riverhead, NY) Costs are loaded with a profit factor Inflation Sales Tax Estimated number of soil samples Analytical cost For each sampling event, assumed: Typical Rental Rates - Includes G: Typical Rental Rates - Includes G: Concrete Demolition and Disposal Daramend Application Treatment area Water needed Water needed Water costs based on using a 3" meter on a nearby fire hydrant Work day consists of: Treatment Area: 0-2 Volume	For 0-2' applications For 2-4' applications For 4-6' applications Pesticides Concrete Thickness Concrete Removal Are 388,557 22,999 9,000	D 121.6% 3% 8.65% 344 8.82% 5105.00 \$50 550 550 3.33,02 7 6 6 2 2 71,278 51.466 10 51.466 10	(Labor produ (not applicab) per year samples per a samples per ag samples per ag per sample for materials (per day per day the per day the per day the per day the per day th	etivity: e for costs deriv plication plication plication er event gloves, notebook ms 7-10 days apa ms 7-10 days apa ms 7-10 days apa s f	82% 82% 8 7 7 2 2 5, etc.) 2,000 art art art 7,13 2,79	uotes). samp. event samp. even samp. even (2 tillet (2 tillet (2 tillet (2 tillet (2 tillet (2 tillet	0.25 is is 1 1 1 1 1 1 1 1 1 1 1 1 1	hrs/sample workers per calculation: rea) r per day) r per day) rere day) rea)	7 applications 6 applications 2 applications	\$85 20% 3 laborers 3 laborers	S270,611 S441,081 S331,261 \$9,067,000 Labor Cost per hr added for QA-QC samples 10 hrs per day	
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8% Remedial Design 6% Construction Management TOTAL ESTIMATED NPV TECHNOLOGY COST Assumptions: Working condition is Safety Level: Weighted average of city cost index (Riverhead, NY) Costs are loaded with a profit factor Inflation Sales Tax Estimated number of soil samples Analytical cost For each sampling event, assumed: Typical Rental Raties - Includes G&A and 10% Profit Mini-Kas zurvey Mode PID TrackSUV (1/2 ton or smaller) Concrete Demolition and Disposal Daramend Application Treatment area Water needed Water outs based on using a 3° meter on a nearby fire hydrant Work day consists of: Treatment area 9.2 Volume 2.4 Volume	For 0-2' applications For 2-4' applications For 4-6' applications Pesticides Concrete Thickness Concrete Removal Are <u>388,557</u> 22,999 9,000 2,132	D 121.6% 3% 8.6 3% 586 344 5105.00 556.08 570.74 3,300 0.75 7 3,33,322 71,278 51.46 2 2 71,278 51.46 10 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	(Labor produ (not applicab) per year samples per a samples per ag samples per ag her for materials (per day per day hes for travel r per day hes per cy fi 30 f² Ac? Applicatic fa thick gal per 1,000 gall hes 310,487 121,500 28,782 people	etivity: e for costs deriv plication plication er event gloves, notebook ns 7-10 days apt ns 7-10 days apt ns 7-10 days apt sf sf sf sf 14	82% ed from vendor q 7 2 s, etc.) 2,000 art art art art art 2,79 0,66	uotes). samp.event samp.even samp.even (2 tillet (2 tillet (0 0.25 15 15 13 acres (0.2; 1) (1 acre per tille 1) (1 acre per tille 1) (1 acre per tille 0.06 acres (4-6; 1) (1 acre per tille 1) (1 acre per t	hrs/sample workers per recalculation: recalculation: r per day) r per day) base charge	7 applications 6 applications 2 applications per day for 3" meter	\$85 20% 3 laborers 3 laborers	S270,611 S441,081 S331,261 \$9,067,000 Labor Cost per hr added for QA-QC samples 10 hrs per day	
8% Remedial Design 6% Construction Management TOTAL ESTIMATED NPV TECHNOLOGY COST Assumptions: Working condition is Safety Level: Weighted average of city cost index (Riverhead, NY) Costs are loaded with a profit factor Inflation Sales Tax Estimated number of soil samples Analytical cost For each sampling event, assumed: Typical Rental Raties - Includes G&A and 10% Profit Mini-Kas zurvey Mode PID TrackSUV (1/2 ton or smaller) Concrete Demolition and Disposal Daramend Application Treatment area Water needed Water outs based on using a 3° meter on a nearby fire hydrant Work day consists of: Treatment area 9.2 Volume 2.4 Volume	For 0-2' applications For 2-4' applications For 4-6' applications Pesticides Concrete Thickness Concrete Removal Are <u>388,557</u> 22,999 <u>9,000</u> 2,132 Field Crew Till:	D 121.6% 10% 3% 86 344 8.82% 5105.00 \$50.04 550.05 550.04 33,320 0.075 a 33,322 71.278 51.46 10 51.46 10 51.45 10 51.55	(Labor produ (not applicab) per year samples per aj samples per aj samples per aj per sample for materials (per day per day Bis per cy fi 0-2' Applicatić 2-4' Applicatić 2-4' Applicatić gal per 1,000 galk hrs 310,487 121,500 28,782	etivity: e for costs deriv plication plication er event gloves, notebook ns 7-10 days apt ns 7-10 days apt ns 7-10 days apt sf sf sf sf 14	82% ed from vendor q 7 2 s, etc.) 2,000 art art rt days per application days per application	uotes). samp.event samp.even samp.even (2 tillet (2 tillet (0 0.25 15 15 13 acres (0.2; 1) (1 acre per tille 1) (1 acre per tille 1) (1 acre per tille 0.06 acres (4-6; 1) (1 acre per tille 1) (1 acre per t	hrs/sample workers per calculation: recal r per day) r per day) base charge	7 applications 6 applications 2 applications per day for 3" meter	S85 20% 3 laborers 3 laborers 3 laborers	S270,611 S441,081 S331,261 \$9,067,000 Labor Cost per hr added for QA-QC samples 10 hrs per day	
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TECHNOLOGY			OCATIO!		ME		Estimate	d Cost to In			522,000
Soil Alternative 5 In-Situ Thermal			Weiss Gree Patchogue		Se	oil		c	Construction Time: Operation Time:	2	months
Residential		Last	ratenogue	,				Post Remee	diation Monitoring	. 0	years
		Quan	-				eakdown (if availab			Combined Unit Costs	
Description	Data Source (Means ¹ or Other)	Quantity Amount	Quantity Unit	Material Unit Cost	Material Total Cost	Labor Unit Cost	Labor Total Cost	Equipment Unit Cost	Equipment Total Cost	Unit Cost	Option Total Cost
REMEDIAL ACTION		TOTAL CA		OST arest thous	and)						\$10,522,000
Construction Activities		1	L		\$676,824		\$316,184		\$387,589	\$4,630,780	\$8,044,016
Site Preparation Utility Locator (based on recent bids)	recent quote	0.5	day	s -	s -	s -	\$ -	\$ -	s -	\$ 2,475.00	\$1,23
Pilot Test	Engineer's Estimate	1	ls	s -	s -	s -	\$ -	\$ -	s -	\$ 150,000.00	\$150,00
Conceptual design and cost estimate Detailed design, permitting	Terratherm Terratherm		ls ls	s - s -	s - s -	s - s -	s - s -	s - s -	s - s -	\$ 45,144.00 \$ 191,000.00	\$45,144 \$191,000
Procurement	Terratherm	1	ls	\$ -	\$ -	s -	\$ -	s -	\$ -	\$ 144,000.00	\$144,00
Mobilization and Site Setup Erosion & Sediment Control Plan	Terratherm	1		s - s -	s - s -	s - s -	s - s -	s - s -	\$ - \$ -	\$ 367,000.00 \$ 10,000	\$367,00
Silt Fence	31 25 13.10 1000	3,200	lf	\$ 0.55	\$ 1,760	\$ 0.45	\$ 1,440	\$ -	\$ -	s -	\$3,20
Temporary Electric service- 3 - 480 volt transformers and removal of same	LIPA	1	ls	s -	s -	s -	s -	s -	s -	\$ 12,000.00	\$12,00
Electrician contractor- work required to connect electric service to equipment	Engineer's Estimate		10	s .	s .	s .	\$	s .	s .	\$ 50,000.00	\$50,00
Community Air Monitoring (Dust)	recent quote - Pine			•	Ψ		φ	÷	•	5 50,000.00	
	Environmental	2	mo			\$ 8,500	\$ 17,000	\$ 3,420	\$ 6,840		\$23,84
Dust Control, Heavy	31 23 23.20 2510	40		l		s -	s -	\$ -	s -	\$ 2,583.24	\$103,33
Concrete demolition - Break up into small pieces, minimum reinforcing Concrete - Hauling, 50 MPH ave, cycle 30 miles	03 05 05.10 0060 31 23 23.20 1510	926 926		s - s -	s - s -	\$ 116 \$ 3.80	\$ 107,120 \$ 3,520	\$ 19 \$ 9.58	\$ 17,917 \$ 8,863	s -	\$125,03 \$12,38
Concrete Disposal	Waste Mngmt	1,527	ton	\$ -	s -	\$ -	s -	s -	s -	\$ 82.50	\$125,99
Soil-Backhoe, hydraulic, crawler mtd. 1 CY cap = 100 CY/hr Soil Hawling 12 cy truck cycla 0.5 mila 15 MPH ava 15 min yait/l.d //Ild	31 23 16.42 0200	31,073	bcy lcy	\$ - \$	\$ - s	\$ 1.31 \$ 1.33	\$ 40,722 \$ 47,527	\$ 1.38 \$ 2.74	\$ 42,811 \$ 97,912	s -	\$83,53
Soil -Hauling, 12 cy truck, cycle 0.5 mile, 15 MPH ave, 15 min. wait/Ld./Uld Monitoring Well Abandonment	31 23 23.20 1014 recent quote-	35,734	lcy	s -	s -	\$ 1.33	\$ 47,527	\$ 2.74	\$ 97,912	s -	\$145,43
	EnviroTrac recent quote-	80	lf	s -	\$ -	s -	\$ -	\$ -	s -	\$ 26.40	\$2,112
Monitoring Well Installation Pre-Operation Site Activities	EnviroTrac	80	lf	\$ -	\$ -	s -	\$ -	\$ -	\$ -	\$ 112.80	\$9,024
Drilling and Well Installation	Terratherm	1	ls	s -	s -	s -	\$-	s -	\$ -	\$ 1,227,000.00	\$1,227,000
Vapor cover installation Well-field piping	Terratherm Terratherm	1		s - s -	s - s -	s - s -	s - s -	s - s -	\$ - \$ -	\$ 642,000.00 \$ 326,000.00	\$642,000 \$326,000
ISTD power equipment installation	Terratherm	1		s - s -	s - s -	s - s -	s - s -	s - s -	s -	\$ 108,000.00	\$108,000
Treatment system installation	Terratherm	1		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 184,000.00	\$184,000
Electrical Installation, well-field and process Instrument and monitoring system installation	Terratherm Terratherm	1	ls ls	s - s -	s - s -	s - s -	\$ - \$ -	\$ - \$ -	\$ - \$ -	\$ 138,000.00 \$ 73,000.00	\$138,000 \$73,000
Pre-startup and shakedown	Terratherm	1	ls	\$ -	\$ -	\$ -	\$ -	\$ -	s -	\$ 48,000.00	\$48,000
Operation			-								
ISTD Power Equipment Rental	Terratherm	1	ls	s -	\$ -	s -	\$-	s -	\$ -	\$ 85,000.00	\$85,000
Effluent Treatment System Rental Labor, travel, per diem	Terratherm	1		s -	s - s -	s -	s - s -	s - s -	s -	\$ 20,000.00 \$ 267,000.00	\$20,000
Process monitoring, sampling and analysis	Terratherm Terratherm	1		s - s -	s - s -	s - s -	s -	s -	\$ - \$ -	\$ 49,000.00	\$49,000
Waste and GAC	Terratherm	1		s -	\$	s -	\$ -	\$ -	\$ -	\$ 13,000.00	\$13,000
Repair/maintenance Tools, rentals and fees	Terratherm	1	ls	s -	s -	s -	\$ -	\$ - C	s -	\$ 58,000.00 \$ 22,000.00	\$58,000 \$22,000
Electrical Consumption	Terratherm LIPA	6,764,800	kW-hr	s - s -	s - s -	s - s -	\$ - \$ -	s - s -	s - s -	\$ 22,000.00 \$ 0.22	\$1,488,250
Supply and Transportation of Clean Back Fill Material for 3:1 side slope	110 Sand Company	15,528		\$ 43.47	\$675,014	s -	\$-	\$ -	\$ -	s -	\$675,014
Soil Sampling Geoprobe Rig		1	day	s -	s -	s -	s -	s -	s -	\$2,200	\$2,200
Sampling Materials, Labor, and Equipment		32	sample	\$ -	\$ 50	\$ 43	\$ 1,350	\$ 66.73	\$ 2,120	s -	\$3,520
Mobilization/Demobilization of Field Sampling Crew Lab Analyses - Pesticides (8081)	Chemtech	32	event sample	s - s -	s - s -	s - s -	\$ - \$ -	\$ - \$ -	\$ - \$ -	\$ 2,040 \$ 115.50	\$2,04
	chemicen		Jumpie	•	•	4	φ	•	•	• 115.50	\$3,00
Demobilization and Other Decommissioning	Terratherm		le			· · · ·				\$ 166,000.00	\$166.000
Site Clearance and Demobilization	Terratherm	1	ls							\$ 179,000.00	\$179,000
Reporting	Terratherm	1	ls	s -	s -	S -	\$ -	\$ -	\$ -	\$ 47,000.00	\$47,000
Dozer backfilling, bulk, up to 300' haul, no compaction Compacting backfill, 6" to 12" lifts, vibrating roller	31 23 23.13 1300 31 23 23.13 1600	51,262 44,576	bcy	s - s -	s - s -	\$ 0.81 \$ 0.99	\$ 41,341 \$ 43,970	\$ 1.64 \$ 2.65	\$ 84,044 \$ 118,288	s -	\$125,385 \$162,255
Topsoil	A&R Materials	14,276	су	\$ 20	\$ 279,247						\$279,24
Finishing grading slopes, gentle Utility mix, 7#/M.S.F., Hydro or air seeding, with mulch and fertilizer	31 22 16.10 3300 32 92 19.14 5400	43,173 388.56	sy msf	\$ - \$ 64.75	\$	\$ 0.12 \$ 18.31	\$ 5,078 \$ 7,116		\$ 4,164 \$ 4,631	s -	\$9,24
							.,				
Contingency 15% of Total Construction Activities		+			<u> </u>			·		\$8,044,016	\$1,206,602 \$1,206,602
Professional/Technical Services 5% Project Management		·		<u> </u>	<u> </u>	<u> </u>		+		\$6,690,821	\$1,271,256 \$334,54
8% Remedial Design										50,050,021	\$535,260
6% Construction Management				L	L			L			\$401,449
TOTAL ESTIMATED NPV TECHNOLOGY COST	(Capital + Lifetime	O&M + P	ost Reme	diation N	Ionitoring)					\$10,522,000
Assumptions:			-		r	,		r			
Working condition is Safety Level: Weighted Average of city cost index (Rochester, NY)		D 121.6%		ductivity: able for costs	82% derived from		productivity:	100%)		
Costs are loaded with a profit factor		10%									
Inflation Estimated number of soil samples		3%	samples	1	sampling even	its	0	hrs/sample		\$85	Labor Cost per hr
-		1	hrs for trave					workers per eve	ent	500	<u>.</u>
Analytical cost For each sampling event, assumed:	Pesticides) per sample for material	s (gloves, note	ebooks, etc.)						
Typical Rental Rates - Includes G&A and 10% Profit			_		, etc.)						
Mini-Rae Survey Mode PID Truck/SUV (1/2 ton or smaller)			per day per day								
Work day consists of:			hrs								
Treatment Area:	96,100			_		_					
Treatment Volume:	33,205		38,186	lcy	896,546	cf			20	working days per m	onth
Excavation Volume:	31,073	cy	35,734	lcy							
Notes Sy square yard	mo	month									
cy cubic yard	ls	lump sum									
lcy loose cubic yard	O&M H&S	Operation and Health and S									
bcy bank cubic yard If linear feet	паз	Health and S	arety								
sf square feet											
msf 1,000 square feet											

TECHNOLOGY		LOCATIO	N		MED	[A			mated (Impleme		t to	\$740,000	\$661,000
Groundwater Alternative 2	Bianch	i/Weiss Gre	enhouses		Groundy	vater			Cor	nstru	iction Time:	: NA	days
Long Term Monitoring of GW	Ea	st Patchogu	e, NY						(Oper	ation Time:	NA	years
								Po	st Remedia	ation	Monitoring	g 30	years
	Qua	ntities			Cos	t Breakdow	n (if a	vailable)				Combined Unit Costs	
Description Data Source	Quantity	Quantity	Material		Material	Labor		Labor	Equipmen	nt	Equipment		Option
(Means ¹ or Othe) Amount	Unit	Unit Cost	t	Total Cost	Unit Cost	Te	otal Cost	Unit Cos	st	Total Cost	Unit Cost	Total Cost
REMEDIAL ACTION		APITAL Co inded to nea		and	l)								\$212,000
Abandon five residential wells and connect five homes to public water	5	ea										\$ 37,322.20	\$186,611
Institutional Controls Engineer's Estimat	e 1	ls										\$ 25,000.00	\$25,000
LONG TERM MONITORING		I				LIFETIN LIFETIN			ANNUA V) (no sou	L L urce	TM COS e removal)	T (YRS 1-5) T (YRS 6-30)	\$53,000 \$27,000 \$527,600 \$449,000
Monitoring, Sampling, Testing and Analysis (Per Event)				-		· · · · ·							\$26,749
Site Monitoring		1	1			· · · · · ·	-		· · · · ·				φ_0,749
Sampling for 1 event - Includes collection of field parameters	35	well	\$ 10	00	\$ 11,900	\$ 34) \$	3,207	\$ 9	2	3206.91	\$ -	\$18,314
Mobilization/Demobilization of Field Sampling Crew	1	event	s	-	s -	s -	\$	-	s -	5	5 -	\$ 510.00	\$510
Reporting	50	hr	\$ 8	35	\$ 4,250.00	s -	\$	-	s -	5	5 -	\$ -	\$4,250
Laboratory analysis													
Pesticides (8081) Chemtech	35	ea	\$	- 1	\$ -	\$ -	\$	-	\$	- 3	5 -	\$105.00	\$3,675
Lifetime Long Term Monitoring (Net Present Value)													
5 Years of Semi-Annual Monitoring													
25 Years of Annual Monitoring													
5% Discount Factor (per NYSDEC)													
TOTAL ESTIMATED NPV TECHNOLOGY COST (Capital + Life	time O&M	+ Long Te	erm Mon	itoı	ring							(no source removal) \$740,000	(source removal) \$661,000
Assumptions:													
Working condition is Safety Level:	D	(Labor prod	uctivity:		82%	; Equipme	nt proe	luctivity:	100%)			
Weighted Average of city cost index (Riverhead, NY)	121.6%	(not applical	ble for costs o	deriv	ved from vendor	quotes).							
Costs are loaded with a profit factor	10%												
Inflation	3%												
Sampling	29			2 E	Events per year				hrs/sample			\$85	Cost per hr
	3							2	workers pe	er ev	ent		
Long Term Monitoring	20%	added for QA	VQC										
First 5 years will be on a semiannual sampling schedule. After 5 years, monitoring will occur on an annual basis.													
Analytical cost													
Pesticides	\$105.0	per sample											
For each sampling event, assumed:		for materials	(gloves, notel	book	cs, etc.)								
Work day consists of:	10 hrs												
Typical Rental Rates - Includes G&A and 10% Profit													
	74 per day												
	.00 per day												
	.80 per day												
	91 per day												
	.68 per day												
N-4													
Notes ea each													
O&M Operation and maintenance													
apression and manifoldance													

	INOLOGY			1	OCATIO	DN		ME	DIA		I	Esti	mated Cos	st to		\$726,000	\$675,000
G		2		Bianchi/	Weiss Gr	eenhouses		Fround	dwate	r			Constr	uction	Time:	2	months
Groundwat Sump and For	ter Alternati undation Un				Patchogu								Ope	ration	Time:	30	years
~ F		8		East	Tatenogu	i, 111						Po	st Remediatio			30	years
				Quar	ntities			c	Cost Br	eakdo	wn (if av	ailab	ole)			Combined Unit Costs	
Description	L	d	Data Source Means ¹ or Other	Quantity Amount	Quantity Unit	Material Unit Cost		terial al Cost	Lat Unit		Labor Total Co		Equipment Unit Cost	Equip Total		Unit Cost	Option Total Cost
REMEDIAL ACTION				TOTAL	CAPITAL	COST (C	ost fo	r upgr									\$431,000
				(totals ro	unded to	nearest the	ousan	d)		1							
Site Preparation				1			5	\$7,269			\$7,2	:03		\$0	6,657	\$62,873	\$291,21
Utility Locator (based on recent bids)		r	ecent quote	1	day	s -	\$		\$	-	\$		s -	\$	-	\$ 2,475.00	\$2,47
Discharge Line		0	02 41 13.33	1	ls	s -	\$	-	\$	-	\$.		\$ -	\$	-	\$ 15,000.00	\$15,00
Demo Basement Floor Slab for new Se Install sump	ump (5 homes (@2 cy ea) 4	4310	10	cy ea	\$ 84.73 \$ 150.00	\$ \$	847 750		54.42 54.42	\$ 5 \$ 2,1	44 77	\$ 18.81 \$ 75.00	\$ \$	188 375	\$ 315.91 \$ 660.36	\$1,58
Treatment System		ŀ	Engineer's														
Treatment Construction Enclosure for	Bag Filter	E	Estimate 33 11 13.25	5	ea	s -	\$	-	\$	-	\$.		s -	\$	-	\$ 6,000.00	\$30,00
6" PVC pipe (5 homes with 100 ft each		4	530 10 Sand	500	ft	\$ 6.38	\$	3,189	\$	5.65	\$ 2,8	24	s -	\$	-	s -	\$6,01
Supply and Transportation of NYS Ce	ertified Clean B	ack Fill Mate	Company 31 23 16.13	44	lcy	\$ 54.34	\$	2,415	\$	-	s -		s -	\$	-	s -	\$2,41
Trenching- 4' deep, 3/8 CY excavator		0	0050	296		s -	\$	-	\$	5.59	\$ 1,6		\$ 3.10	\$	918	s -	\$2,57
Filter bag housing - Flowline II from H 0.5 micron, size #2, one year	Laton	E	Eaton Eaton	5 10		\$ - \$ 6.95	\$ \$	- 66.72	\$	-	\$ - \$ -	-	\$ 1,035.00 \$ -	\$ \$	5,175	\$ - \$ -	\$5,17 \$6
Little Giant Sump Pump w/ Aux Powe Abandon five residential wells and con			Build.com ter	10	ea ea	s -	\$	-	\$	-	\$ -		s -	s	-	\$ 1,100.00 \$ 37,322.20	\$11,00 \$186,61
Institutional Controls	iive noille	E	Engineer's Estimate		ls		1									\$ 25,000.00	\$180,0
		ŀ	animale	1	-											- 20,000.00	
Contingency	15%	of Total Cons	truction Activitie				+					┥				\$291,214	\$43,68 \$43,68
Professional/Technical Con-																	
Professional/Technical Services	8%	Project Manaș														\$291,214	\$96,10 \$23,29
	15% 10%	Remedial Des Construction										_					\$43,68 \$29,12
LONG TERM MONITORING				for first 5	years, An	nual moni	toring	for ne	ext 25)			ANNUAL I	.TM C	COST	(YRS 1-5)	\$11,200
													ANNUAL I				\$5,600
													E LTM (NP E LTM (NP				\$110,300 \$94,000
				I			1						× · ·				
Monitoring, Sampling, Testing	and Analysis Site Monito		t)														\$5,57
	Sampling	for 1 event - ion/Demobil		5	sample	\$ 170 ¢	\$	850	\$	170	\$ 8	50	\$ 92	s	458	\$ - \$ 2,040.00	\$2,15 \$2,04
	Reporting			1 8	event hr	\$ \$85	\$ \$	- 680.00	\$ \$	-	s .		s - s -	s s	-	\$ 2,040.00 \$ -	\$2,04 \$68
	Laboratory Pesticides		Chemtech	6	ea	s -	s		\$	-	\$.		s -	s		\$ 115.50	\$69
Lifetime Long Term Monitoring	g (Net Prese	nt Value)					-		-		-						
	5 25		iannual Monitori nual Monitorin									-					
	5%		ctor (per NYSD	EC)													*** 0.00
LONG TERM OPERATIONS	AND MAIN	TENANCE									LIFET					ST (YRS 1-30) irce removal)	\$12,000 \$184,500
													(
											LIFET	MF	E LTOM (N	PV) (s	ource		\$149,500
System Operations (per month)											LIFET	MF	E LTOM (N	PV) (s	ource		
System Operations (per month)	Electricity		LIPA	500	kW-hr	s -	\$	-	\$	-	\$		S	PV) (s s	ource		\$86
System Operations (per month) Lifetime Operations and Maint	General O	&M		500	kW-hr months	\$ - \$ -	\$ \$	-	\$ \$ 75	- 50.00	\$		<u>s</u> - <u>s</u> -	PV) (s s s	- -	e removal)	\$86
	General O enance (Net 30	&M Present Va Years of Op	lue) erations and M	aintenance		\$ - \$ -	\$ \$	-	\$ \$ 75	-	\$		\$ - \$	PV) (s s s	- -	e removal)	\$86
	General O enance (Net	&M Present Va Years of Op	lue)	aintenance		\$ - \$ -	\$	-	\$ \$ 75	-	\$		\$ - \$ -	PV) (s	-	s 0.22 s -	\$86
	General O cenance (Net 30 5%	&M Present Va Years of Op Discount Fac	lue) erations and Ma ctor (per NYSD	aintenance EC)	months	s - s -	\$ \$ ost R	- - emedi		- 50.00	\$	00	<u>s -</u> <u>s -</u>	PV) (s	-	s 0.22 s -	\$86 \$11 \$75
Lifetime Operations and Maint	General O cenance (Net 30 5%	&M Present Va Years of Op Discount Fac	lue) erations and Ma ctor (per NYSD	aintenance EC)	months	\$ - \$ - &M + Pe	s s ost R	emedi		- 50.00	\$	00	<u>s -</u> <u>s -</u>	PV) (s	-	s 0.22 s - (no source removal)	\$86 \$11 \$75 (source removal)
Lifetime Operations and Maint	General O cenance (Net 30 5% V TECHN Working co	M Present Vai Years of Opu Discount Fac OLOGY (ndition is Safe	lue) erations and M ctor (per NYSD COST (Caj ty Level:	initenance EC) pital + Li	months fetime O (Labor pro	ductivity:	8	2%	iatio	- 50.00 n Mo	\$ \$ 750	00 ng)	<u>S</u> - <u>S</u> - <u>100%</u>	PV) (s	-	s 0.22 s - (no source removal)	\$86 \$11 \$75 (source removal)
Lifetime Operations and Maint	General O cenance (Net 30 5% V TECHN Working co Weighted A	M Present Vai Years of Opu Discount Fac OLOGY (ndition is Safe	lue) erations and M. ctor (per NYSD COST (Caj ty Level: cost index (Roch	initenance EC) pital + Li	months fetime O (Labor pro	ductivity: able for cost	8 s deriv	2% ed from	iatio ; Equi	- 50.00 n Mo	\$ \$ 750	00 ng)	\$ - \$ -	PV) (s	-	s 0.22 s - (no source removal)	\$86 \$11 \$75 (source removal)
Lifetime Operations and Maint	General O cenance (Net 30 5% V TECHN Working co Weighted A	We M Present Val Years of Opp Discount Fac OLOGY (ndition is Safe verage of city aded with a pro-	lue) erations and M. ctor (per NYSD COST (Caj ty Level: cost index (Roch ofit factor	1 aintenance EC) pital + Li	months fetime O (Labor pro (not applic per year	ductivity: able for cost 23%	8 s deriv	2% ed from years of	iatioi ; Equi vendo	- 50.00 n Mo ipment or quot	\$ \$ 750	00 ng)	\$ - \$ -	PV) (s	-	s 0.22 s - (no source removal)	\$86 \$11 \$7? (source removal)
Lifetime Operations and Maint	General O enance (Net 30 5% V TECHN Working co Weighted A Costs are lo Inflation	&M Present Vai Years of Opp Discount Fac OLOGY (ndition is Safe verage of city aded with a pro- Gruck/SUV (1/	lue) erations and M. ctor (per NYSD COST (Cap ty Level: cost index (Rock ofit factor Consultant Bill (2 ton or smaller,	1 1 aintenance EC) pital + Li 10% 10% 3% Rates (as c \$70.74	months fetime O (Labor pro (not applic per year of 12/15/20) per day	ductivity: able for cost 23%	8 s deriv	2% ed from years of	iatioi ; Equi vendo	- 50.00 n Mo ipment or quot	\$ \$ 750	00 ng)	\$ - \$ -	PV) (s	-	s 0.22 s - (no source removal)	\$86 \$11 \$7? (source removal)
Lifetime Operations and Maint	General O enance (Net 30 5% V TECHN Working co Weighted A Costs are lo Inflation	M Present Vai Years of Opp Discount Fai OLOGY (ndition is Safet verage of city aded with a pro C Fruck/SUV (1) Water (lue) erations and M. ctor (per NYSD COST (Ca) ty Level: cost index (Roch ofit factor Consultant Bill	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	months fetime O (Labor pro (not applic per year f 12/15/20) per day per day	ductivity: able for cost 23%	8 s deriv	2% ed from years of	iation ; Equi vendo	- 50.00 n Mo ipment or quot	\$ \$ 750	00 ng)	\$ - \$ -	PV) (s	-	s 0.22 s - (no source removal)	\$86 \$11 \$7? (source removal)
Lifetime Operations and Maint	General O enance (Net 30 5% V TECHN Working co Weighted A Costs are lo Inflation	ARC STATES AND A S	Iue) erations and M. ctor (per NYSD COST (Cap ty Level: cost index (Rocl ofit factor Consultant Bill 2 ton or smaller, Quality Analyze fater Level Metec homersible Pump	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	months fetime O (Labor pro (not applic per year of 12/15/20) per day per day per day per day	ductivity: able for cost 23%	8 s deriv	2% ed from years of	iation ; Equi vendo	- 50.00 n Mo ipment or quot	\$ \$ 750	00 ng)	\$ - \$ -	PV) (s	-	s 0.22 s - (no source removal)	\$86 \$11 \$7? (source removal)
Lifetime Operations and Maint	General O enance (Net 30 5% V TECHN Working co Weighted A Costs are lo Inflation	ARC STATES AND A S	lue) erations and M: ctor (per NYSD COST (Caj ty Level: cost index (Roch ofit factor Consultant Bill (2 ton or smaller; Quality Analyze: dare Level Meter	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	months fetime O (Labor pro (not applic per year f 12/15/20) per day per day	ductivity: able for cost 23%	8 s deriv	2% ed from years of	iation ; Equi vendo	- 50.00 n Mo ipment or quot	\$ \$ 750	00 ng)	\$ - \$ -	PV) (s	-	s 0.22 s - (no source removal)	\$86 \$11 \$7? (source removal)
Lifetime Operations and Maint	General O enance (Net 30 5% V TECHN Working co Weighted A Costs are lo Inflation	ARC STATES AND A S	Iue) erations and M. ctor (per NYSD COST (Cap ty Level: cost index (Rocl ofit factor Consultant Bill 2 ton or smaller, Quality Analyze fater Level Metec homersible Pump	1 1 aintenance EC) D 121.6% 10% 30% Rates (as c \$70.74 \$159.00 \$31.80 \$113.91 \$\$2.68	months fetime O (Labor pro (not applic per year of 12/15/20) per day per day per day per day	ductivity: able for cost 23%	8 s deriv for 7 es G&	2% ed from years of	; Equi	- 50.00 ipmeni pr quot	\$ \$ 750	000 ivit	\$ - \$ -	PV) (s	-	s e removal) s 0.22 s - (no source removal) \$726,000	\$86 \$11 \$75 (source removal)
Lifetime Operations and Maint TOTAL ESTIMATED NP ¹ Assumptions:	General O enance (Net 30 5% V TECHN Working co Weighted A Costs are lo Inflation	ARC STATES AND A S	Iue) erations and M. ctor (per NYSD COST (Cap ty Level: cost index (Rocl ofit factor Consultant Bill 2 ton or smaller, Quality Analyze fater Level Metec homersible Pump	1 aintenance EC) pital + Li 121.6% 10% 121.6% 10% 3% Rates (as c \$31.80 \$\$11.391 \$\$2.68	months fetime O (Labor pro (not applic per year of 12/15/20: per day per day per day per day per day wells	ductivity: able for cost 23% 10) - Includ 2 1	for 7 of G&	2% ed from years of A and	; Equi ; Equi i vendo i inflatid 10% I	- 50.00 ipmeni ipmeni on Profit	\$ \$ 750	ng) ivit	\$ - \$ \$ - 100%	<u>s</u> s	-	s e removal) s 0.22 s - (no source removal) \$726,000	\$86 \$11 \$75 (source removal) \$675,000
Lifetime Operations and Maint TOTAL ESTIMATED NP ¹ Assumptions:	General O enance (Net 30 5% V TECHN Working co Weighted A Costs are lo Inflation	ARC STATES AND A S	Iue) erations and M. ctor (per NYSD COST (Cap ty Level: cost index (Rocl ofit factor Consultant Bill 2 ton or smaller, Quality Analyze fater Level Metec homersible Pump	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	months fetime O (Labor pro (not applic per year f 12/15/20: per day per day per day per day wells hrs for trave filter chang	ductivity: able for cost 23% (0) - Includ (0) - Includ 2 1 per event couts per hou	s deriv	2% ed from years of A and ts per yea	iation ; Equi vendo inflatio 10% I	- 50.00 n Mc ipmen or quot on Profit	<u>s</u> 750 nitorin t productions).	00 11g)	\$ - S - 100%)		s e removal) s 0.22 s - (no source removal) \$726,000	\$88 \$11 \$7? (source removal) \$675,000
Lifetime Operations and Maint TOTAL ESTIMATED NP Assumptions:	General O enance (Net 30 5% V TECHN Working co Weighted A Costs are lo Inflation	ARC STATES AND A S	Iue) erations and M. ctor (per NYSD COST (Cap ty Level: cost index (Rocl ofit factor Consultant Bill 2 ton or smaller, Quality Analyze fater Level Metec homersible Pump	1 aintenance EC) pital + Li D 121.6% 10% 30% Rates (as c \$70.74 \$159.00 \$31.80 \$31.80 \$129 12 12 12 12 12 12 12 12 12 12 12 12 12	months fetime O (Labor prof (not applic per year of 12/15/20: per day per day per day per day wells hrs for trawf filter chang filter housing	ductivity: able for cost 23% 10) - Includ	s deriv	2% ed from years of A and ts per yea	iation ; Equi vendo inflatio 10% I	- 50.00 n Mc ipmen or quot on Profit	<u>s</u> 750 nitorin t productions).	00 11g)	\$ - \$ - 100%)		s e removal) s 0.22 s - (no source removal) \$726,000	\$86 \$11 \$75 (source removal) \$675,000
Lifetime Operations and Maint TOTAL ESTIMATED NP ¹ Assumptions: Sampling Filters	General Q enance (Net 30 5% V TECHN Working co Weighted A Costs are lo Inflation	VEM Present Vai Years of Opu Discount Far OLOGY (Indition is Safe verage of city aded with a pro- C fruck/SUV (I/Water W W St Gene Pesticides	Ine) erations and M. ctor (per NYSD COST (Ca) ty Level: cost index (Roel offi factor Consultant Bill 2 to no smaller Quality Analyze atter Level Metes Amersible Pump rators: 220 Vol	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	months fetime O (Labor pro (not applic per year f 12/15/20) per day per day per day per day hrs for trave filter chang filter housin per sample	ductivity: able for cost 23% (0) - Includ (0) - Includ 2 1 per event couts per hou rgs, one per h	s deriv s deriv for 7 es G& Event Event sing pe ouse	2% ed from years of A and is per yea per yea :r month	iation ; Equi vendo inflatio 10% I	- 50.00 n Mc ipmen or quot on Profit	<u>s</u> 750 nitorin t productions).	00 11g)	\$ - \$ - 100%)		s e removal) s 0.22 s - (no source removal) \$726,000	\$86 \$11 \$75 (source removal) \$675,000
Lifetime Operations and Maint TOTAL ESTIMATED NP' Assumptions: Sampling Filters Analytical cost	General Q enance (Net 30 5% V TECHN Working co Weighted A Costs are lo Inflation	NEM Present Vai Years of Opp Discount Far OLOGY (Indition is Safe verage of city adde with a provided fruct/SUV (1/ Water (W St Gene	Ine) erations and M ctor (per NYSD COST (Ca) ty Level: cost index (Roel ofit factor Consultant Bill 2 ton or smaller Quality Analyze afare Level Meet abmersible Pump rators: 220 Vol	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	months fetime O (Labor pro (not applic per year f 12/15/20) per day per day per day per day hrs for trave filter chang filter housin per sample	ductivity: able for cost 23% (0) - Includ (0) - Includ 2 1 per event couts per hou	s deriv s deriv for 7 es G& Event Event sing pe ouse	2% ed from years of A and is per yea per yea :r month	iation ; Equi vendo inflatio 10% I	- 50.00 n Mc ipmen or quot on Profit	<u>s</u> 750 nitorin t productions).	00 11g)	\$ - \$ - 100%)		s e removal) s 0.22 s - (no source removal) \$726,000	\$88 \$11 \$7? (source removal) \$675,000
Lifetime Operations and Maint TOTAL ESTIMATED NP ¹ Assumptions: Sampling Filters	General Q enance (Net 30 5% V TECHN Working co Weighted A Costs are lo Inflation	VEM Present Vai Years of Opu Discount Far OLOGY (Indition is Safe verage of city aded with a pro- C fruck/SUV (I/Water W W St Gene Pesticides	Ine) erations and M ctor (per NYSD COST (Ca) ty Level: cost index (Roel ofit factor Consultant Bill 2 ton or smaller Quality Analyze afare Level Meet abmersible Pump rators: 220 Vol	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	months fetime O (Labor pro (not applic per year f 12/15/20) per day per day per day per day hrs for trave filter chang filter housin per sample	ductivity: able for cost 23% (0) - Includ (0) - Includ 2 1 per event couts per hou rgs, one per h	s deriv s deriv for 7 es G& Event Event sing pe ouse	2% ed from years of A and is per yea per yea :r month	iation ; Equi vendo inflatio 10% I	- 50.00 n Mc ipmen or quot on Profit	<u>s</u> 750 nitorin t productions).	00 11g)	\$ - \$ - 100%)		s e removal) s 0.22 s - (no source removal) \$726,000	\$86 \$11 \$75 (source removal) \$675,000
Lifetime Operations and Maint TOTAL ESTIMATED NP Assumptions: Sampling Filters Analytical cost	General Q enance (Net 30 5% V TECHN Working co Weighted A Costs are lo Inflation	VEM Present Vai Years of Opu Discount Far OLOGY (Indition is Safe verage of city aded with a pro- C fruck/SUV (I/Water W W St Gene Pesticides	Ine) erations and M ctor (per NYSD COST (Ca) ty Level: cost index (Roel ofit factor Consultant Bill 2 ton or smaller Quality Analyze afare Level Meet abmersible Pump rators: 220 Vol	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	months fetime O (Labor pro (not applic per year f 12/15/20) per day per day per day per day hrs for trave filter chang filter housin per sample	ductivity: able for cost 23% (0) - Includ (0) - Includ 2 1 per event couts per hou rgs, one per h	s deriv s deriv for 7 es G& Event Event sing pe ouse	2% ed from years of A and is per yea per yea :r month	iation ; Equi vendo inflatio 10% I	- 50.00 n Mc ipmen or quot on Profit	<u>s</u> 750 nitorin t productions).	00 11g)	\$ - \$ - 100%)		s e removal) s 0.22 s - (no source removal) \$726,000	\$86 \$11 \$75 (source removal) \$675,000
Lifetime Operations and Maint TOTAL ESTIMATED NP' Assumptions: Sampling Filters Analytical cost	General Q enance (Net 30 5% V TECHN Working co Weighted A Costs are to Inflation	VEM Present Vai Years of Opp Discount Far OLOGY (ndition is Safe verage of city adde with a safe verage of city adde with a safe (fruct/SUV (1// Water (W St Gene Pesticides npling event, a	Ine) erations and M ctor (per NYSD COST (Cap ty Level: cost index (Roed off factor Consultant Bill 2 ton or smaller; Quality Analyze atter Level Mete abmersible Pum prators: 220 Vol sssumed: 10	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	months fetime O (Labor pro (not applic per year f 12/15/20) per day per day per day per day hrs for trave filter chang filter housin per sample	ductivity: able for cost 23% (0) - Includ (0) - Includ 2 1 per event couts per hou rgs, one per h	s deriv s deriv for 7 es G& Event Event sing pe ouse	2% ed from years of A and is per yea per yea :r month	iation ; Equi vendo inflatio 10% I	- 50.00 n Mc ipmen or quot on Profit	<u>s</u> 750 nitorin t productions).	00 11g)	\$ - \$ - 100%)		s e removal) s 0.22 s - (no source removal) \$726,000	\$88 \$11 \$7? (source removal) \$675,000
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Lifetime Operations and Maint TOTAL ESTIMATED NP ⁹ Assumptions: Sampling Filters Analytical cost Work day consists of: Notes Assume NPDES or equivalent permi bey ECY H&S	General C enance (Net 30 5% V TECHN Working co Weighted A Costs are lo Inflation For each sar		Ine) Territors and M territors	1 1 aintenance EC) pital + Li D 10% 3% Rates (as c 3% 3% S113.91 \$\$113.91 \$\$2.68 \$\$113.91 \$\$12.2 12 12 12 12 12 12 12 12 12 12 12 12 12	months fetime O (Labor pre (not applic per year of 12/15/20: per day per day per day per day mer day per day per day filter chang filte	ductivity: able for cost 23% 0) - Includ 0) - Includ 2 = 1 per event couts per hot rgs, one per h s (gloves, no ance	s deriv s deriv for 7 es G& Event Event sing pe ouse	2% ed from years of A and is per yea per yea :r month	iation ; Equi vendo inflatio 10% I	- 50.00 n Md ipmen or quot on Profit	<u>s</u> 750 nitorin t productions).	00 11g)	\$ - \$ - 100%)		s e removal) s 0.22 s - (no source removal) \$726,000	\$88 \$11 \$7? (source removal) \$675,000
Lifetime Operations and Maint Lifetime Operations and Maint TOTAL ESTIMATED NP Assumptions: Sampling Filters Analytical cost Work day consists of: Notes Assume NPDES or equivalent permitively ECY	General C enance (Net 30 5% V TECHN Working co Weighted A Costs are to Inflation	View Present Vai Years of Opu Discount Far OLOGY (Indition is Safe verage of city aded with a pre (Fruck/SUV (1/) Water (W W Ss. Gene Pesticides npling event, a Control of the safe o	Ine) Territors and M territors	1 1 aintenance EC) pital + Li D 10% 3% 3% Sitis9.00 Siti	months fetime O (Labor pre (not applic per year of 12/15/20: per day per day per day per day mer day per day per day filter chang filte	ductivity: able for cost 23% 0) - Includ 0) - Includ 2 = 1 per event couts per hot rgs, one per h s (gloves, no ance	s deriv s deriv for 7 es G& Event Event sing pe ouse	2% ed from years of A and is per yea per yea :r month	iation ; Equi vendo inflatio 10% I	- 50.00 n Md ipmen or quot on Profit	<u>s</u> 750 nitorin t productions).	00 11g)	\$ - \$ - 100%)		s e removal) s 0.22 s - (no source removal) \$726,000	\$675,000

	TECHNOLOGY			OCATIO			EDIA	Estimated		-	\$4,192,000	\$3,471,000
	undwater Alternative 4 Hydraulic Control and Treati	nent		Weiss Gre Patchogu		Groun	ndwater			struction Time: peration Time:	6 30 (15)	months
			0				ContRoad	lown (if availabl		Monitoring	30 (15) Combined Unit Costs	years
,	Description	Data Source	Quantity	Quantity	Material	Material	Labor	Labor	e) Equipment	Equipment	Combined Unit Costs	Option
REMEDIAL ACTION		(Means ¹ or Otl	TOTAL	Unit		Total Cost	Unit Cost	Total Cost	Unit Cost	Total Cost	Unit Cost	Total Cost \$1,946,000
			(totals ro	ounded to	nearest th	ousand) \$10,461		\$61,111		\$32,857	\$4,322	\$1,314,891
Pump Test Fouinment Rental- nump wa	ter level meter, generator, filters		8	day	\$ 100	\$ 800	s .	\$.	\$ 228			\$1,514,671
Filter bag housing rental Oversight/Engineering				mo	s - s -	s - s -	\$ - \$ 85	\$ - \$ 34,000	s - s -	s - s -	\$ 750.00 \$ -	\$751 \$34,001
Drill Rig and Crew for Ext Mobilization/Demobilization		PEC	4	ea	s -	s -	s -	s -	s -	s -	\$ 1,650.00	\$6,60
4 1/4" Hollow Stem Auger Decontamination Pad		PEC PEC	100	ls	s - s -	s - s -	s - s -	s - s -	s - s -	s - s -	\$ 13.20 \$ 220.00	\$1,320 \$440
Steam Generator Standby Time (Decontaminat	tion)	PEC PEC	22 66	day hr	s - s -	\$ - \$ -	\$ - \$ 204	\$ - \$ 13,431	s - s -	s - s -	\$ 82.50 \$ -	\$1,81 \$13,43
Well Installation Geoprobe Daily Rate - 8 hour	r day	PEC 33 21	22	day	ş .	ş .	ş .	s -	ş .	ş .	\$ 1,210.00	\$26,62
4" PVC Piping Monitoring W	/ells Installed	13.10 8340	1,650	lf	\$ 5.86	\$ 9,661	\$ 6.13	\$ 10,116	\$ 18.81	\$ 31,030		\$50,80
Flush Mount Well Covers Well Development		PEC	66 66	ea hr	s - s -	s - s -	s - s -	s - s -	s - s -	s - s -	\$ 165.00 \$ 165.00	\$10,89 \$10,89
Containerized Drill Materials 55-Gallon Drums	in 55-Gallon Drums	PEC PEC	18 18	ea ea	\$ - \$ -	\$ - \$ -	\$ 198 \$ -	\$ 3,564 \$ -	\$ - \$ -	s - s -	\$ - \$ 66.00	\$3,56 \$1,18
Site Preparation Utility Locator (based on rece	ent bids)	recent quote	10	day	s .	s -	s -	s -	s -	s -	\$ 2,475.00	\$24,75
Discharge Line Electrical Permit and Utility (Connection to PCU	TRS	1	ls	s.	s . s .	s -	s - s -	s - s -	s -	\$ 15,000.00	\$15,00
Treatment System		Group Engineer's	5	day	\$ -	\$.	5 -	5 -	\$ -	5 -	\$ 44,000.00	\$220,00
Two Treatment Construction	Enclosure	Estimate 33 11	2	ls	s -	s -	s -	s -	\$ -	s -	\$ 125,000.00	\$250,00
6" PVC pipe		13.25 4530 110 Sand	5,000	ft	\$ 6.38	\$ 31,894	\$ 5.65	\$ 28,243	s -	s -	\$ -	\$60,13
Supply and Transportation of	NYS Certified Clean Back Fill Materi	Company 31 23	444	lcy	\$ 54.34	\$ 24,151	s -	s -	s -	s -	s -	\$24,15
Trenching- 4' deep, 3/8 CY es	xcavator	16.13 0050 Engineer's	2,963	bcy	ş .	s -	\$ 5.59	\$ 16,574	\$ 3.10	\$ 9,185	ş -	\$25,75
Lift Station for plume edge en Filter bag housing - Flowline	II from Eaton	Estimate Eaton	2	ea ea	ş -	s -	L	s -	\$ 1,035.00	\$ 4,140	\$ 12,000.00 \$ -	\$24,00 \$4,14
Submersible Pumps		Pine Environme	66	2	s .	s .	s .	s .	\$.	s .	\$ 4,400.00	\$290.40
Abandon five residential well	ls and connect five homes to public wa	ntal ter Engineer's	5	ea							\$ 37,322.20	\$186,61
Institutional Controls		Estimate	1	ls							\$ 25,000.00	\$25,00
Contingency	15% of Total Construction Ac	tivities									\$1,314,891	\$197,234 \$197,234
Professional/Technical S												\$433,914
	8% Project Management 15% Remedial Design										\$1,314,891	\$105,191 \$197,234
LONG TERM MONITO	10% Construction Management	1t						L	ANNUAL	LTM COST	(YRS 1-2)	\$131,48 \$25,200
X		0						LIFETIME				\$217,100 \$154,200
Monitoring, Sampling, T												
	Site Monitoring	()	16	mall	\$ 240	\$ \$ 140	\$ 02	\$ 1.466	£	\$ 100	\$	\$12,62
	Site Monitoring Sampling for 1 event - Includes Mobilization/Demobilization of Fie		1		\$ 340 \$ - \$85	\$ 5,440 \$ - \$ 1,360.00	\$ 92 \$ - \$ -	s -	\$ - \$ - \$ -	\$ 100 \$ - \$ -	\$	\$7,00 \$2,04
	Site Monitoring Sampling for 1 event - Includes			event		\$ 5,440 \$ - \$ 1,360.00 \$ -	\$ 92 \$ - \$ - \$ -		÷	s -		\$7,00 \$2,04 \$1,36
	Site Monitoring Sampling for 1 event - Includes Mobilization/Demobilization of Fie Reporting Laboratory analysis Pesticides (8081) Initoring (Net Present Value) 2 Years of Semiannual Mo	ld Chemtech nitoring	1	event	\$ -	s -	\$ 92 \$ - \$ - \$ -	s -	÷	s -	\$ 2,040.00 \$ -	\$7,00 \$2,04 \$1,36
Lifetime Long Term Mo	Site Monitoring Sampling for 1 event - Includes Mobilization/Demobilization of Fie Reporting Laboratory analysis Pesticides (8081) mitoring (Net Present Value) 2 Years of Semiannual Moni 28 Years of Annual Moni 5% Discourt Factor (per N	ld Chemtech nitoring oring YSDEC)	1	event	\$ -	s -	\$ 92 \$ - \$ - \$ -	s -	÷	s -	\$ 2,040.00 \$ -	\$7,00 \$2,04
Lifetime Long Term Mo	Site Monitoring Sampling for 1 event - Includes Mobilization Demobilization of Fie Reporting Laboratory analysis Pesticides (8081) nitoring (Net Present Value) 2 Years of Semiannual Moni 28 Years of Annual Monit	ld Chemtech nitoring oring YSDEC)	1	event	\$ -	s -	\$ 92 \$ - \$ - \$ -	S - S - S -	\$ - 5 \$ \$ \$	\$ - \$ - \$ -	\$ 2.040.00 \$. \$ 115.50 T (VRS 1-30)	\$7,000 \$2,044 \$1,361 \$2,211 \$2,211 \$132,000
Lifetime Long Term Mo	Site Monitoring Sampling for 1 event - Includes Mobilization/Demobilization of Fie Reporting Laboratory analysis Pesticides (8081) mitoring (Net Present Value) 2 Years of Semiannual Monitoring (Net Scouth Factor (per N	ld Chemtech nitoring oring YSDEC)	1	event	\$ -	s -	\$ 92 \$ - \$ - \$ -	s -	s - s - s - ANNUAL I	S - S - S - LTOM COS ^T	\$ 2,040.00 \$ - \$ 115.50 T (YRS 1-30) e removal)	\$7,000 \$2,04 \$1,360 \$2,211
Lifetime Long Term Mo	Site Monitoring Sampling for 1 event – Includes Mohitzation Dremohitzation of Fie Reporting Laboratory analysis Periotides (2081) mitoring (Net Present Value) 2 Vears of Annual Moni 5 Discout Factor (per N TONS AND MAINTENANCE	ld Chemtech nitoring oring YSDEC)	1	event hr ea	\$ -	s -	\$ 92 \$ - \$ - \$ -	S - S - S - S - S - S - S - S - S - S -	s - s - s - ANNUAL I	S - S - S - LTOM COS ^T	\$ 2,040.00 \$ - \$ 115.50 T (YRS 1-30) e removal)	\$7.000 \$2.044 \$1.360 \$2.214 \$1.32,000 \$2,029,200 \$1,370,100 \$1,053
Lifetime Long Term Mo LONG TERM OPERAT	Site Monitoring Sampling for 1 event - Includes Mohitzation/Demohitzation of Fie Reporting Laboratory analysis Penticides (8081) Statistic (Net Present Value) 2 Vers of Semiannal Monit 28 Vers of Annual Monit 595 Discour Factor (per N TOONS AND MAINTENANCE	Id Chemtech mitoring oring YSDEC) LIPA	1 16 19	event hr ea	\$ -	s -	\$ 92 \$ - \$ - \$ - \$ - \$ - \$ - \$ - \$ - \$ - \$ -	S - S - S - S - S - S - S - S - S - S -	s - s - s - ANNUAL I	S - S - S - LTOM COS ^T	\$ 2,040.00 \$ - \$ 115.50 T (YRS 1-30) r removal)	\$7.00 \$2.04 \$1.36 \$2.21 \$2.21 \$2.21 \$1.32,000 \$2,029,200 \$1,370,100
Lifetime Long Term Mo LONG TERM OPERAT System Operations (per mont	Site Monitoring Sampling for 1 event - Includes Mobilization Dremohilization of Fice Reporting Laboratory analysis Poticides (808) Poticides (Id Chemtech nitoring oring YSDEC) LIPA une discharge luc)	1 16 19 19 28,500	event hr ea	\$ -	s -	\$ 92 \$ - \$ - \$ - \$ \$ br>\$ - \$ \$ \$ - \$ \$ \$ - \$ \$ \$ - \$ \$ \$ - \$ \$ \$ - \$ \$ \$ \$	S - S - S - S - S - S - S - S - S - S -	s - s - s - ANNUAL I	S - S - S - LTOM COS ^T	\$ 2,040.00 \$ - \$ 115.50 T (YRS 1-30) r removal)	\$7.000 \$2.044 \$1.360 \$2.214 \$1.32,000 \$2,029,200 \$1,370,100 \$1,053
Lifetime Long Term Mo LONG TERM OPERAT System Operations (per mont	Site Monitoring Sampling for 1 event - Includes Mohitration/Demohitration of Fic Reporting Iaboratory analysis Penticides (SORI) Inform (Net Present Value) 2 Vers of Semiannal Moni 5% Discoun Factor (perv 5% Discoun Factor (perv TIONS AND MAINTENANCE Discretizioni Coneral O&M (labor, filter bags, sass to storn sever)	Id Chemtech nitoring oring YSDEC) <i>LIPA</i> me discharge lue) d Maintenance	1 16 19 19 28,500	event hr ea	\$ -	s -	5 92 5 - 5 - 5 - 5 - 5 - 5 - 5 - 5 - 5 - 5 -	S - S - S - S - S - S - S - S - S - S -	s - s - s - ANNUAL I	S - S - S - LTOM COS ^T	\$ 2,040.00 \$ - \$ 115.50 T (YRS 1-30) r removal)	\$7.000 \$2.044 \$1.360 \$2.214 \$1.32,000 \$2,029,200 \$1,370,100 \$1,053
Lifetime Long Term Mo LONG TERM OPERAT System Operations (per mont Lifetime Operations and	Site Monitoring Sampling for 1 event - Includes Mobilization Dremobilization of File Reporting Laboratory analysis Pencicales (080) Poincides (080) 2 Years of Semiannal Monits 5% Discourt Factor (per N) 5% Discourt Factor (per N) Electricity Beneticity Constrained Monits State 1b Electricity Censeral QAM (labor, filter bags, asso to storm sever) Nations Nationscience (Net Present Value) Maintenance (Net Present Value)	Id Chemtech nitoring ySDEC) LIPA IMPA d Maintenance ySDEC)	1 16 19 28,500 1	event hr ea kW-hr month	\$ \$ \$ \$	\$ \$ 1,360.00 \$ \$ \$ \$ \$ \$ \$	\$ - \$ - \$ - \$ - \$ - \$ 4,261.12	\$	s - s - s - ANNUAL I	S - S - S - LTOM COS ^T	\$ 2,040.00 \$ \$ 115.50 T (YRS 1-30) r emoval) \$ 0.22 \$	\$7,000 \$2,040 \$1,340 \$2,211 \$132,000 \$2,029,200 \$1,370,100 \$1,370,100 \$1,370,100
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Lifetime Long Term Mo LONG TERM OPERAT System Operations (per mont Lifetime Operations and TOTAL ESTIMATE	Site Monitoring Sampling for 1 event - Includes Mobilization Dramobilization of File Reporting Laboratory analysis Pencicales (080) 2010 - 2010 - 2010 - 2010 2010 - 2	Id Chemtech mitoring oring YSDEC) LIPA LIPA Maintenance YSDEC) COST (Ca	1 16 19 28,500 1 28,500 1 1 2 9 121,6%	event hr ea kW-hr month ifetime ((Labor pro (not applic	s sss s s s s bductivity: able for cos	5 - 5 - 5	5 - 5 - 5 - 5 - 5 - 5 - 5 4,261.12 tintion Mo]: Equipment 1	\$	S · S · S · S · S · S · S · S · S · S ·	S - S - S - LTOM COS ^T	\$ 2,00000 \$ \$ T (YRS 1-30) r (moval) \$ 0,22 \$ (to source removal)	\$7,000 \$2,040 \$1,360 \$2,211 \$132,000 \$1,370,100 \$1,370,100 \$1,370,100 \$1,420 \$4,26 \$4,26 \$4,26
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