

**PROPOSED EXPLANATION OF SIGNIFICANT DIFFERENCE  
JUNE, 2017**

**WHITE SWAN CLEANERS/SUN CLEANERS AREA GROUNDWATER  
CONTAMINATION SUPERFUND SITE**

**Site Name and Location**

WHITE SWAN CLEANERS/SUN CLEANERS AREA GROUNDWATER  
CONTAMINATION SUPERFUND SITE

Wall Township, Manasquan Borough, Sea Girt Borough  
Monmouth County, New Jersey

**Introduction**

The purpose of this proposed Explanation of Significant Difference (ESD) is to explain the United States Environmental Protection Agency's (EPA's) changes to the remedy selected in its September 30, 2013, Record of Decision (ROD) for the White Swan Cleaners/Sun Cleaners Area Groundwater Contamination Superfund Site (Site). This proposed ESD provides cost estimates for the treatment of the identified downgradient groundwater "hot spots" and the work required to investigate potential indoor air contamination in buildings located above the Site's groundwater contamination plume, and remediate this contamination, if necessary. Cost estimates for these aspects of the selected remedy were not included in the September 2013 ROD.

The major components of the 2013 ROD include: excavation and off-Site disposal of contaminated soils at the White Swan Cleaners source area; in-situ soil vapor extraction/air sparging of soils and shallow groundwater at the Sun Cleaners source area; construction of a groundwater extraction and treatment system to capture and treat the most highly contaminated groundwater at the Site; monitored natural attenuation for lesser contaminated groundwater; establishment of a Classification Exception Area; indoor air monitoring of buildings in close proximity to groundwater contamination; and installation of vapor mitigation systems, as necessary.

Under Section 117 (c) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended (CERCLA or Superfund), EPA is required to publish an ESD when, after issuance of a ROD, the remedial action taken differs significantly, but not fundamentally, from the selected site remedy. Sections 300.435(c)(2)(i) and 300.825(a)(2) of the National Oil and Hazardous Substances Contingency Plan (NCP) set forth the criteria for issuing an ESD and require that an ESD be published if the remedy is modified in a way that differs significantly in either scope, performance, or cost from the remedy selected in the ROD for the site. For this Site, although the remediation of downgradient groundwater hot spots and vapor intrusion sampling and mitigation work was clearly included in the ROD remedy, cost estimates for these aspects of the remedy were not developed and presented in the Administrative Record.

This proposed ESD presents the details of significant differences to the cost of the remedy selected in the September 30, 2013 ROD for the White Swan/Sun Cleaners Superfund Site in Wall Township, New Jersey. This proposed ESD provides a brief history of the Site, describes the remedy, and explains how, subsequent to the finalization of the ROD, additional cost estimates were developed for portions of the remedy to establish a more accurate overall cost estimate for the remedy. The ROD included estimated costs for remediating contaminated site soils and the areas of the contaminated groundwater plume closest to the sources of contamination using a groundwater pumping and treatment system, but did not include costs associated with collecting and treating groundwater from the four identified downgradient groundwater hot spots. In addition, while the ROD selected ongoing indoor air monitoring of buildings in close proximity to groundwater contamination and installation of vapor mitigation systems as necessary, costs for this vapor intrusion work were not developed or presented in the ROD.

This proposed ESD provides the basis of the modified cost estimate and will be incorporated into the administrative record for the Site in accordance with Section 300.825(a)(2) of the NCP. The administrative record is available for review during business hours at EPA Region 2, 290 Broadway, New York, New York, and at the information repository in the Wall Township Library, Reference Section, 2700 Allaire Road, Wall, New Jersey. The Site documents can also be found at <https://www.epa.gov/superfund/white-swan>

### **Site Location, History, Contamination Problems, Selected Remedy**

The Site is an area of soil and groundwater contaminated with dry cleaning chemicals and/or their breakdown products located in portions of three municipalities: Wall Township, Manasquan Borough and Sea Girt Borough, New Jersey. The Site includes two source areas located approximately 0.2 miles apart that contributed the same contaminant, tetrachloroethylene (also known as perchloroethylene or PCE), to the soils, sediments, groundwater and indoor air. The former White Swan Cleaners was located at 1322 Sea Girt Ave., Wall Township, New Jersey, and the former Sun Cleaners was located at 2213 Route 35 (also known as Manasquan Circle) in Wall Township, New Jersey. (See Figure 2-1.) PCE and its breakdown products continue to migrate in groundwater from the two source areas located near Route 35 eastward toward the Atlantic Ocean, approximately two miles away. There are narrow contaminant plumes emanating from the two source areas. These two contaminant plumes join and mix in an area underlying Old Mill Road and Laurel Ave. The joined contaminant plume then expands laterally as it moves generally eastward.

Densely developed residential/commercial neighborhoods are located to the north, east and south of the two former dry cleaners' properties. To the west, there are mixed residential, commercial and rural areas. The Site groundwater contamination covers approximately two square miles. The two former dry cleaners are located on either side of Route 35 and Manasquan Circle, a heavily travelled highway system. The Site is bordered on the north by Hannabrand Brook and Wreck Pond, which flow east into the Atlantic Ocean, a distance of approximately two miles. To the southeast, the Site is bordered by Judas Creek, Mac Pond and Stockton Lake, which also flow east into the Atlantic Ocean. Impacted groundwater in the vicinity of the Site is utilized by many

of the residents through shallow irrigation wells, but not as a potable water supply. The Wall Township, Manasquan and Sea Girt residents in the area of the Site get their drinking water from the public water supply system that uses deep wells which are not impacted by the Site contamination.

The White Swan Cleaners and Sun Cleaners both operated from approximately 1960 through 1991. Both operations used the same chemical, PCE, as a dry cleaning solvent and disposed of used solvent on the ground or in septic tanks, from which it migrated to the soil, groundwater, and indoor air. In the late 1990s, a resident of Magnolia Avenue notified the Monmouth County Health Department (MCHD) that their private irrigation well contained PCE. MCHD sampled an additional 29 irrigation wells located east of Route 35, and found extensive PCE contamination. Subsequently, approximately 100 irrigation wells were sampled by MCHD and the New Jersey Department of Environmental Protection (NJDEP), and levels of up to 1,648 parts per billion (ppb) of PCE were detected.

In 1999, MCHD sampled Hannabrand Brook and Wreck Pond and found PCE levels in excess of the NJDEP Surface Water Quality Standard. In 2002, PCE was detected in the surface water of Judas Creek. In January 2000, soil and groundwater samples were collected by NJDEP at the White Swan property. PCE was detected in both soil and groundwater samples. NJDEP concluded that the White Swan property was a source of groundwater contamination. In 2001, NJDEP collected soil and groundwater samples from the Sun Cleaners property that revealed the presence of elevated levels of PCE in soils and groundwater. These data confirmed the Sun Cleaners property as a source of groundwater contamination.

On September 23, 2004, EPA included the White Swan Cleaners/Sun Cleaners Area Groundwater Contamination Site on the National Priorities List of Superfund Sites. On September 21, 2006, Bank of America, a potentially responsible party for Site contamination, commenced remedial investigation and feasibility study (RI/FS) activities under an administrative order on consent issued by EPA. The purpose of the study was to identify the nature and extent of contamination and to develop cleanup alternatives.

The RI/FS was completed in 2013. The RI/FS findings indicated that volatile organic compounds (VOCs), primarily PCE and its breakdown products, are the primary contaminants of concern at the Site. PCE and other compounds found at the Site are hazardous substances within the meaning of Section 101(14) of CERCLA, 42 U.S.C. Section 9601(14).

The data indicate that soils in the two source areas (the White Swan and Sun Cleaners properties) contain highly elevated levels of PCE. It is evident that the contamination from these two source areas have commingled a short distance downgradient from the two properties, forming one plume. Together the two source areas have contributed significant amounts of PCE to the aquifer and are a continuing source of groundwater contamination at the Site. The PCE contamination originates at the two source areas, migrates, and dissolves in the groundwater and then flows primarily to the east to the Atlantic Ocean. The groundwater plume of VOC contamination is approximately one mile wide and two miles long. As this groundwater contamination moves eastward, it moves downward in the aquifer toward a low permeability layer and spreads laterally.

Volatilization of PCE and trichloroethylene (TCE) is occurring from the shallow groundwater, and vapor-phase PCE and TCE is entering the air spaces within the soil vadose zone. Elevated levels of PCE in the vapor phase are accumulating under some building slabs and these contaminants have migrated into the indoor air in some buildings. To date, 36 out of approximately 500 structures sampled have required the installation of vapor mitigation systems. These structures are generally located above the areas of the groundwater plume with the highest concentrations of VOCs. This vapor intrusion work was not part of the RI/FS activities performed by Bank of America. Initially the New Jersey Department of Environmental Protection conducted indoor air sampling and installed 21 mitigation systems. Then EPA took over the vapor intrusion investigation and the installation of vapor mitigation systems as a removal action. However, Bank of America, under the terms of an Administrative Settlement Agreement and Order on Consent (AOC) issued by EPA on August 8, 2013, upgraded existing vapor mitigation systems which were previously installed by EPA and NJDEP, and installed several new systems. The work under that AOC is now complete and EPA is currently performing vapor intrusion sampling at the Site as part of the selected remedy, as discussed below.

On September 30, 2013, EPA issued a ROD that describes the selected remedy for contaminated groundwater, soil and indoor air at the Site. The ROD included the following remedial action objectives:

- Prevent or minimize current and future human exposures, including ingestion of groundwater and/or inhalation of vapors, from Site-related VOCs in groundwater that present a risk to public health and the environment;
- Prevent or minimize migration of Site-related soil contamination to groundwater;
- Restoration of the Site groundwater to meet drinking water standards within a reasonable time frame; and
- Prevent or minimize the migration of Site-related contaminated groundwater to surface water and sediment that presents a risk to the environment.

To achieve these objectives, the major components of EPA's selected remedy are:

- Excavation and off-site disposal of soil contaminated with VOCs at the White Swan source area;
- *In-situ* soil vapor extraction/air sparging of soils and shallow groundwater at the Sun Cleaners source area;
- Construction of a groundwater extraction and treatment system to capture and treat the most highly contaminated groundwater at the Site;
- Monitored natural attenuation for lesser contaminated groundwater;

- Establishment of a Classification Exception Area, which is an institutional control, to minimize the potential for exposure to contaminated groundwater until the groundwater meets the cleanup goals; and
- Indoor air monitoring of buildings in close proximity to groundwater contamination, and installation of vapor mitigation systems, as necessary.

Since the issuance of the Site's ROD in September 2013, a significant amount of remediation work has been completed at the Site. Highly contaminated Site soils at the Sun Cleaners source area are currently being treated by a soil vapor extraction/air sparging system. Construction of the system was completed by EPA in March 2016 and treatment is ongoing. The engineering design for the remediation of the White Swan source soils through excavation and off-site disposal has been recently completed by Bank of America. Construction of this aspect of the work was initiated by Bank of America in 2017. The groundwater extraction and treatment system design was initiated by EPA in 2016 and this design work is ongoing. In addition, EPA's sampling of residential and commercial buildings in the vicinity of the Site for indoor air contamination is ongoing.

### **Description of the Significant Differences and the Basis for those Differences**

As described above, the 2013 ROD established cleanup goals for the source area soils and the contaminated groundwater and established remediation methods for achieving those goals. The groundwater extraction and treatment remedy addresses the most highly contaminated part of the aquifer located at and downgradient of the two source areas. The ROD identified two portions of the large groundwater contaminant plume at the Site as the Near Field and the Far Field Areas. The Near Field Area of the plume is the area of the groundwater plume with highly contaminated groundwater (levels of PCE generally greater than 1,000 ppb) located in close proximity to the soil source areas. The Far Field Area of the plume is the area of groundwater located further from the soil source areas with levels of PCE generally below 1,000 ppb. The ROD further indicated that within the Far Field Area of the plume, a number of groundwater hot spots containing PCE levels near or above 1,000 ppb were identified. The ROD stated that these Far Field hot spots would be further evaluated in the remedial design phase and would likely be addressed through the groundwater extraction and treatment system, or smaller localized treatment systems. Four hot spots identified to date are located downgradient of the source areas near Magnolia Ave, Old Mill Road, Christie Lane and Terrace Place (See Figure 2-3). Consistent with EPA requirements, cost estimates were developed for remedial alternatives included in the Feasibility Study for the Site. These costs are summarized in the ROD. The estimates are based on the data gathered during the RI/FS. Cost estimates developed during the RI/FS process are not actual project cost estimates, rather, they are used to compare and contrast the different remedial alternatives as one of EPA's nine evaluation criteria used to select a remedy.

The cost estimates developed for each of the groundwater alternatives in the Feasibility Study did not include costs associated with the potential extraction and treatment of the Far Field groundwater hot spots. Further, although the investigation and remediation of contaminated

indoor air was included in each alternative (except the No Action alternative), costs associated with implementing this aspect of the remedy were not included in the ROD.

### **Estimated Costs for Groundwater Hot Spot Collection and Treatment**

The ROD estimated the cost of the groundwater extraction and treatment system included in the selected remedy to be \$13.5 million. As explained above, this cost estimate included the extraction and treatment of the Site's most contaminated groundwater located in proximity to the source areas, also referred to as the Near Field area, which is described in further detail in the ROD. The cost estimate in the ROD did not include the additional costs required to address contaminated groundwater in the identified downgradient hot spot areas located in the Far Field area. EPA has developed an additional cost estimate for the treatment of contaminated groundwater in four currently identified hot spot areas consistent with the ROD. EPA estimates that the extraction and treatment of the contaminated groundwater located within the four hot spots could total approximately \$5,296,472. This causes the estimate to address all groundwater contamination at the Site in accordance with the selected remedy to increase from \$13.5 million to \$18.8 million.

Separate cost estimates for each of the four currently identified hot spots were developed resulting in the total hot spot cost estimate of \$5,296,472. In developing the cost estimates, major factors considered for each hot spot included additional extraction and injection wells needed, and construction of piping from the hot spot area to the treatment plant. In addition, for each hot spot, other factors considered included in the cost estimate were: obtaining access; handling additional groundwater at the treatment plant; permitting and planning costs; increased costs for plant operation and maintenance; and additional equipment replacement costs. The Terrace Place hot spot, which is in the Far Field downgradient area, was included in the \$5,296,472 estimate as part of the groundwater extraction and treatment system. However, if a Point-of Entry system is installed at the Barlow Flower Farm rather than pumping contaminated groundwater back to the treatment plant, the estimated cost for all four hot spots drops to \$4,142,210. Please see the attached cost estimate (Attachment 1) for details of the cost estimate broken down for each hot spot area. Two estimates are provided for the Terrace Place hot spot, one for having the hot spot included in the Extraction and Treatment system and one for using a point-of-entry treatment system. As stated above, assumptions used in developing the cost estimate are based on best professional judgment at this time and are not intended as an actual project budget. During the remedial design, additional data will be collected, detailed engineering analyses will be performed, and numerous determinations will be made on how best to implement the details of the selected remedy, which may vary from assumptions made for cost estimating purposes.

The cost estimates developed for the downgradient groundwater hot spot treatment using the extraction and treatment system only apply to the selected remedy, which was Alternative 4 in the Feasibility Study and ROD. The cost estimates for the other alternatives presented in the ROD (except the No Action alternative) would also significantly increase by varying amounts if they were revised to include hot spot treatment.

## **Estimated Costs for the Vapor Intrusion Program**

The ROD called for an ongoing program of indoor air sampling and mitigation in numerous buildings where the indoor air is potentially impacted by the Site's groundwater contamination. This program includes sampling of sub-slab air, indoor air and the installation of vapor mitigation systems, as necessary.

The selected vapor intrusion investigation/mitigation aspect of the remedy was included as part of each groundwater alternative developed in the Feasibility Study, except the No Action Alternative. The estimate of the cost of the required work to address vapor intrusion into buildings overlying the groundwater contaminant plume includes a number of activities. These activities include: sampling of sub-slab air and indoor air of buildings that have not yet been sampled; periodic re-sampling of a portion of the buildings sampled; installation of vapor mitigation systems, as required, and maintenance of all vapor mitigation systems. There are approximately 1,200 buildings located over the groundwater contaminant plume footprint at the Site. For cost estimating purposes, EPA has estimated approximately 800 of these buildings may need to be sampled, based on PCE and TCE concentrations in the sub-surface. The estimated cost of the above described work is \$7,348,365. Please see Attachment 2 for additional details regarding this cost estimate.

Since the cost for vapor intrusion work was not included for Groundwater Alternatives 2, 3 and 4 in the Feasibility Study, overall costs for each of those alternatives would increase by the same amount (\$7,348,365). The cost of the No Action alternative for groundwater still remains \$0. The inclusion of costs for vapor intrusion does not change EPA's assessment of each alternative under the cost criteria, as the cost for each alternative has increased by the same amount. The No Action Alternative was not selected as it was determined to be not protective of human health of the environment.

The attached cost estimates developed by EPA for the extraction and treatment of contaminated groundwater in the hot spot locations and the required vapor intrusion work are based on data collected at the Site to date. These cost estimates are not binding as a project budget, and the actual costs of implementing the selected remedy may vary from these estimates based on additional information from the Remedial Design.

This modified cost estimate results in the increase of the estimated total present worth cost to implement the groundwater and indoor air aspects of the selected remedy from \$13.5 million to \$26.1 million. The overall estimated present worth cost of all aspects of the selected remedy increases from \$18.9 million to \$31.6 million, which includes remediation of the Site's groundwater, soil source areas and indoor air as described in the September 2103 ROD.

## **Support Agency Comments**

The State of New Jersey concurs with this proposed ESD which modifies only the cost estimate for the remedy described in the 2013 ROD.

## **Affirmation of Statutory Determinations**

EPA, after consultation with NJDEP, is issuing this proposed ESD. The proposed ESD modifies the estimated cost to implement the remedy. The scope and performance of the remedy is not being modified by this proposed ESD, and the remedy remains protective of human health and the environment and will comply with federal and State requirements that are legally applicable or relevant and appropriate to the remedial action.

The remedy is technically feasible, cost-effective, and satisfies the statutory requirements of CERCLA by providing for a remedial action that permanently and significantly reduces the toxicity, mobility and volume of hazardous substances at the Site.

## **Public Participation Activities**

In accordance with Section 117(d) of CERCLA, 42 U.S.C. Section 9617(d) and Section 300.435 of the NCP, 40 CFR Section 300.435, EPA published a public notice in the Asbury Park Press newspaper on July 6, 2017 informing the public of the availability of this proposed ESD for review and comment. EPA is providing the public an opportunity to comment on the revised cost estimates presented in this proposed ESD. A thirty (30) day public comment period is established with the issuance of this proposed ESD and EPA will accept comments from July 6, 2017 through August 7, 2017. EPA's responses to comments received during this period will be documented in a Responsiveness Summary, which will be included as an attachment to the final ESD.

This proposed ESD, and the documents which form the basis for the decision to modify the ROD by including the updated cost estimates associated with the indoor air and groundwater hot spot remediation, will be incorporated into the Administrative Record maintained for the Site in accordance with Section 300.825(a)(2) of the NCP. The Administrative Record is available for review during business hours at the information repository in the Wall Township Public Library, 2700 Allaire Road, Wall, New Jersey, and at EPA Region 2 offices, 290 Broadway, New York, New York. In addition, EPA will announce the availability of the ESD in the [Asbury Park Press](#). The site documents can also be found at: <https://www.epa.gov/superfund/white-swan>



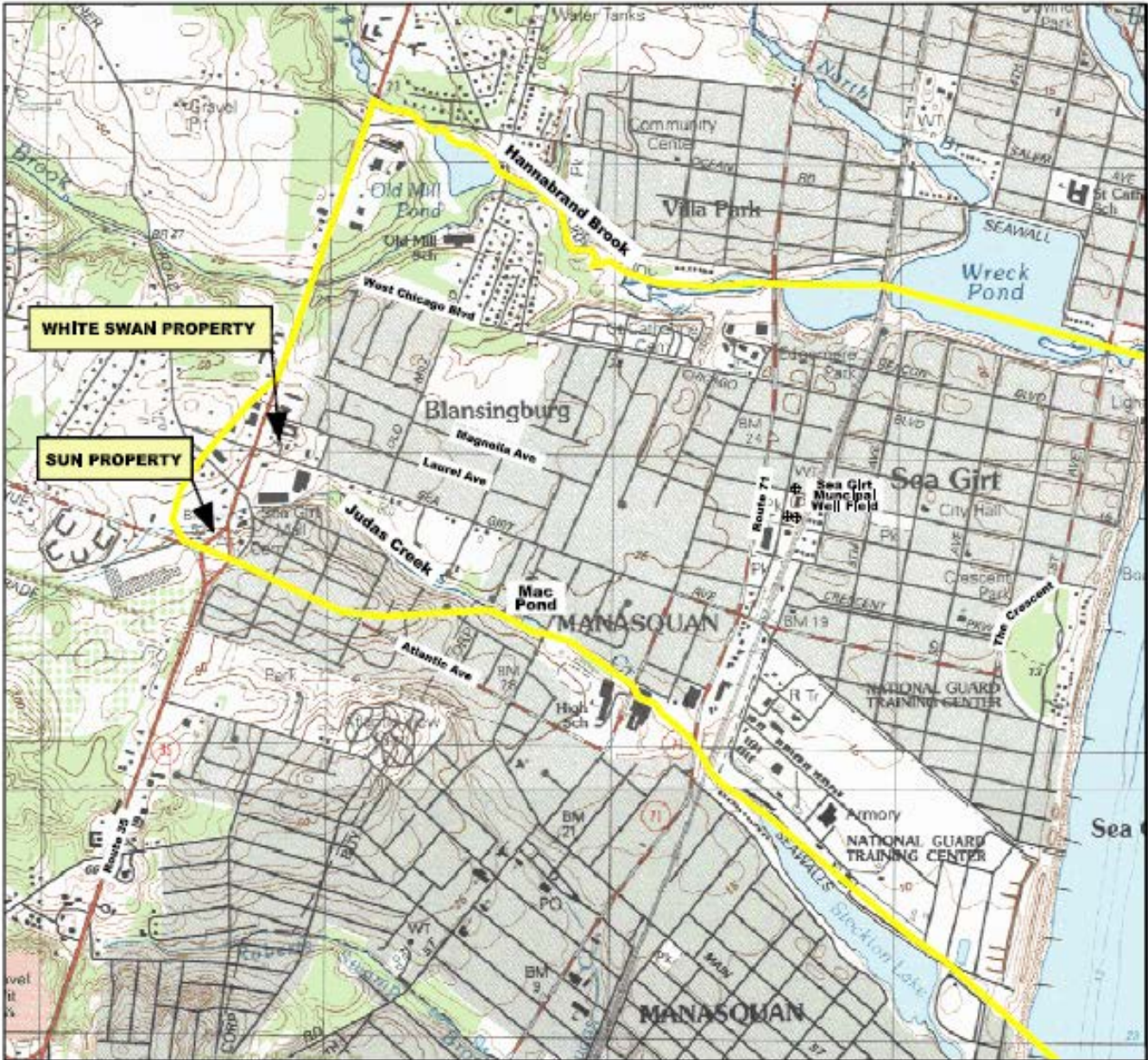


IMAGE SOURCE:  
USGS 7.5 MINUTE SERIES  
TOPOGRAPHIC QUADRANGLE  
ASBURY PARK, NEW JERSEY, 1989



QUADRANGLE LOCATION

**LEGEND**

 APPROXIMATE SITE BOUNDARY

FIGURE 2-1  
SITE LOCATION MAP

FEASIBILITY STUDY

WHITE SWAN CLEANERS / SUN CLEANERS  
AREA GROUND WATER CONTAMINATION  
SUPERFUND SITE



285 DAVIDSON AVENUE, SUITE 405  
SOMERSET, NJ 08873  
(732) 302-9500

SCALE IN FEET



JUNE 2012

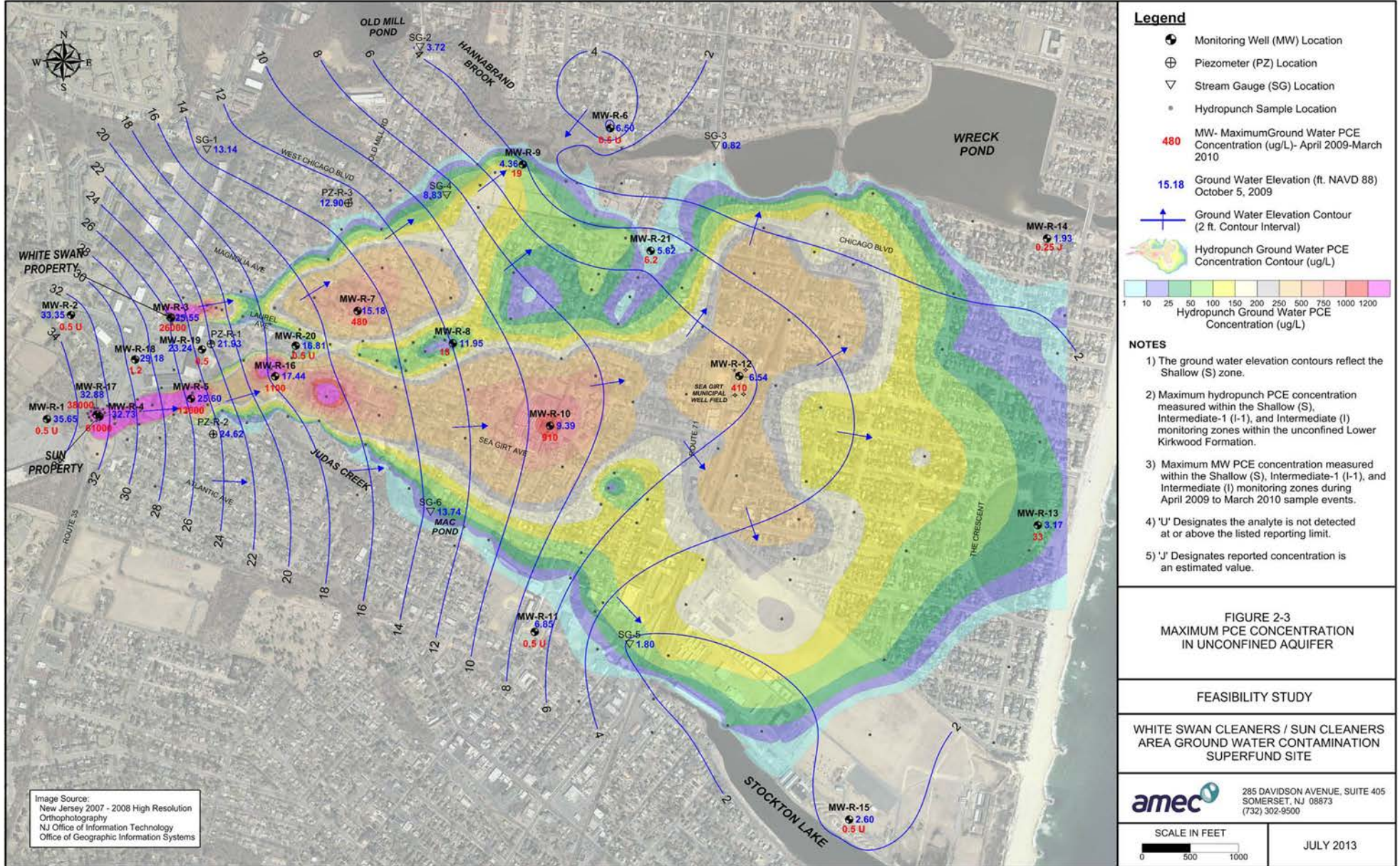


Table 1		White Swan/Sun Cleaners Groundwater Plume													
		Indoor Air Monitoring, Indoor Air Ventilation System Installation and O&M													
Row	Cost Type	Description	Quantity	Unit Rate	Frequency/ Amount	Contingency	Total \$ (non- Discounted)	Present Worth Total (i=7%) (Discounted)							
1	Capital	Indoor Air Sampling (includes cost to acquire canisters, cleaning, labor to deliver/set up an average of 3-5 canisters per house, cost to drill and install ports through lower level floors, set up and retrieve canisters, package up for shipping to lab, collect duplicates, ambient air samples, interaction with lab for QC/QA, interpreting lab results) <sup>1</sup>	800	\$2,000	Once /	15%	1,840,000	1,840,000							
							\$1,600,000								
2	Capital	Project Management/ Administrative cost for RPM to identify houses, gather block/lot/names/address, send information packages, access agreements, follow-up calls and letters, and visiting houses to explain sampling program)	800	\$250	Once /	15%	\$230,000	\$230,000							
							\$200,000								
3	Capital	Indoor air system installation (estimated cost for a complex system installation as experienced by RA Data and Bank of America). Assumes same 5% rate of needing systems as with the previous sampling experience. 5% of 800 houses = 40 houses	40	\$8,000	Once /	15%	\$368,000	\$368,000							
							\$320,000								
		<b>Subtotal Capital Costs</b>						2,438,000	2,438,000						
4	Capital	Construction Management 2	222	\$150		74	15%	\$38,295	\$38,295						
5	Capital	Remedial Design 3	296	\$150		74	15%	\$51,060	\$51,060						
6	Annual	Project Management <sup>4</sup>	30 Yr	\$2,090	Years 1-30		15%	\$72,095	\$29,821						
		<b>O&amp;M</b>													
7	Annual	Indoor Air Sampling: (10% of 800= 80), does not include port installation or admin costs. 80 houses @ \$2000 per house, each year x 30 years	30 Yr	\$160,000	Years 1-30		25%	6,000,000	2,481,808						
8	Annual	Indoor Air Sampling: (10% of 450 houses already sampled between = 45), does not include port installation or admin costs. 45 houses @ \$2,000 per house, each year x 30 years.	30 Yr	\$90,000	Years 1-30		25%	3,375,000	1,396,017						
9	Annual	Annual Reporting (Sampling and O&M) 5	30 Yr	\$30,000	Years 1-30		10%	\$990,000	\$409,498						
10	Periodic	Replace complete indoor air system once in Year 30. 85% of (40 new systems + 34 existing systems) = 63 total systems @ \$8,000 per house.	1 replacement system	\$504,000	Once in Year 30		25%	\$630,000	\$82,761						
11	Periodic	40 new systems + 34 existing systems = 74 total systems @ \$1300 per house. Replace Fan in Years 10 and 20 @\$650	2 fans in 30 years per	\$48,100	Fans Years 1-30, replaced in Year 10		25%	\$120,250	\$46,102						
12	Periodic	Re-sample, inspect, and maintain indoor air systems for 74 houses, 10 times total each in Years 1-30, @ \$1,000 per house	10 events	\$74,000	10 times in Years 1-30		25%	\$925,000	\$375,002						
		<b>Total Capital + Annual + Periodic Costs Years 1-30</b>						14,639,700	7,348,365						
		1 Assume 800 structures between Village Rd and Atlantic Ocean, Hannabrand Brook and Stockton Lake													
		2 Assumes 3 hours/install (74) @ \$150/hour													
		3 Assumes 4 hours/install (89) @ \$150/hour													
		4 assumes 6% of upfront capitol cost over lifespan of the project. This is pro-rated per year and summed for years 1-30													
		5 Assume one sampling / data / O&M report annually. Broken out per year and summed for years 1-30													

Table 2 - Estimated Hot Spot Treatment Costs, page 1 of 5

Magnolia Lane Hot Spot

Row	Cost Type	Description	Quantity	Units	Frequency	Unit Cost	Contingency	Total \$ (non-Discounted)	Present Worth Total (i=7%) (Discounted)
1	Capital	Land Acquisition or Use Agreement	0.25	LS	Once	\$50,000	25%	\$15,625	\$15,625
2	Capital	Permitting and Planning	0.25	LS	Once	\$25,000	15%	\$7,188	\$7,188
3	Capital	Magnolia Hot Spot Extraction Well/Piping/Electrical	1	LS	Once	\$436,000	15%	\$501,400	\$501,400
4	Capital	Additional Injection Wells	0.5	EA	Once	\$80,000	15%	\$46,000	\$46,000
5	Capital	Incremental P&T equipment cost from increased flow rate	0.25	LS	Once	\$529,519	15%	\$152,237	\$152,237
<b>Capital</b>		<b>Subtotal Capital Costs</b>						<b>\$722,449</b>	<b>\$722,449</b>
6	Capital	Construction Management (6%)	1	LS	Once	6%	15%	\$43,347	\$43,347
7	Capital	Remedial Design (8%)	1	LS	Once	8%	15%	\$57,796	\$57,796
8	Capital	Project Management (8%)	1	LS	Once	8%	15%	\$57,796	\$57,796
9	Annual	P&T System O&M (4 addnl EWs)	30	YR	Years 1-30	\$24,250	25%	\$909,375	\$376,149
10	Periodic	P&T System Replacements over 30 years	5	LS	Every 5 years	\$22,685	25%	\$141,778	\$57,461
								<b>\$1,932,541</b>	<b>\$1,314,998</b>

1- Includes 1/4 of the total estimated costs for obtaining easements for extraction well and piping runs for all 4 hot spot areas

2- Includes 1/4 of the total estimated costs for permitting and traffic control for all 4 hot spot areas

3- Includes 1 ea. 30-gpm extraction well and pump installed to 45' bgs; electrical hookup at the extraction well; additional 3,000 linear feet of piping back to the White Swan source area

4- Includes 1/4 of the total estimated cost to install 2 additional injection wells to handle all 4 new extraction wells located 2,000 ft from the treatment plant

5- Includes 1/4 of the total increase from baseline FS pump and treat equipment and building costs based on industry-standard scaling factors for an additional 120 gpm total capacity

6- Based on standard markups on additional costs in accordance with USEPA FS Cost Estimating Guidance

7- Based on standard markups on additional costs in accordance with USEPA FS Cost Estimating Guidance

8- Based on standard markups on additional costs in accordance with USEPA FS Cost Estimating Guidance

9- Includes 1/4 of the total 12% increase in baseline FS O&M costs based on the estimated costs for additional carbon change-outs, operator labor, maintenance, utility markouts, and sampling

10- Includes 1/4 of the total 15% increase in baseline FS equipment replacement costs based on industry-standard scaling factors for equipment cost increases at increasing production rates.

Table 2 - Estimated Hot Spot Treatment Costs, page 2 of 5

Old Mill Road Hot Spot

Row	Cost Type	Description	Quantity	Units	Frequency	Unit Cost	Contingency	Total \$ (non-Discounted)	Present Worth Total (i=7%) (Discounted)
1	Capital	Land Acquisition or Use Agreement	0.25	LS	Once	\$50,000	25%	\$15,625	\$15,625
2	Capital	Permitting and Planning	0.25	LS	Once	\$25,000	15%	\$7,188	\$7,188
3	Capital	Old Mill Road Hot Spot Extraction Well/Piping/Electrical	1	LS	Once	\$264,000	15%	\$303,600	\$303,600
4	Capital	Additional Injection Wells	0.5	EA	Once	\$80,000	15%	\$46,000	\$46,000
5	Capital	Incremental P&T equipment cost from increased flow rate	0.25	LS	Once	\$529,519	15%	\$152,237	\$152,237
<b>Capital</b>		<b>Subtotal Capital Costs</b>						<b>\$524,649</b>	<b>\$524,649</b>
6	Capital	Construction Management (6%)	1	LS	Once	6%	15%	\$31,479	\$31,479
7	Capital	Remedial Design (8%)	1	LS	Once	8%	15%	\$41,972	\$41,972
8	Capital	Project Management (8%)	1	LS	Once	8%	15%	\$41,972	\$41,972
9	Annual	P&T System O&M (4 addnl EWs)	30	YR	Years 1-30	\$24,250	25%	\$909,375	\$376,149
10	Periodic	P&T System Replacements over 30 years	5	LS	Every 5 years	\$22,685	25%	\$141,778	\$57,461
								<b>\$1,691,225</b>	<b>\$1,073,682</b>

1- Includes 1/4 of the total estimated costs for obtaining easements for extraction well and piping runs for all 4 hot spot areas

2- Includes 1/4 of the total estimated costs for permitting and traffic control for all 4 hot spot areas

3- Includes 1 ea. 30-gpm extraction well and pump installed to 55' bgs; electrical hookup at the extraction well; additional 1,500 linear feet of piping back to the White Swan source area

4- Includes 1/4 of the total estimated cost to install 2 additional injection wells to handle all 4 new extraction wells located 2,000 ft from the treatment plant

5- Includes 1/4 of the total increase from baseline FS pump and treat equipment and building costs based on industry-standard scaling factors for an additional 120 gpm total capacity

6- Based on standard markups on additional costs in accordance with USEPA FS Cost Estimating Guidance

7- Based on standard markups on additional costs in accordance with USEPA FS Cost Estimating Guidance

8- Based on standard markups on additional costs in accordance with USEPA FS Cost Estimating Guidance

9- Includes 1/4 of the total 12% increase in baseline FS O&M costs based on the estimated costs for additional carbon change-outs, operator labor, maintenance, utility markouts, and sampling

10- Includes 1/4 of the total 15% increase in baseline FS equipment replacement costs based on industry-standard scaling factors for equipment cost increases at increasing production rates.

Table 2 - Estimated Hot Spot Treatment Costs, page 3 of 5

Christie Lane Hot Spot

Row	Cost Type	Description	Quantity	Units	Frequency	Unit Cost	Contingency	Total \$ (non-Discounted)	Present Worth Total (i=7%) (Discounted)
1	Capital	Land Acquisition or Use Agreement	0.25	LS	Once	\$50,000	25%	\$15,625	\$15,625
2	Capital	Permitting and Planning	0.25	LS	Once	\$25,000	15%	\$7,188	\$7,188
3	Capital	Christie Lane Hot Spot Extraction Well/Piping/Electrical	1	LS	Once	\$305,000	15%	\$350,750	\$350,750
4	Capital	Additional Injection Wells	0.5	EA	Once	\$80,000	15%	\$46,000	\$46,000
5	Capital	Incremental P&T equipment cost from increased flow rate	0.25	LS	Once	\$529,519	15%	\$152,237	\$152,237
<b>Capital</b>		<b>Subtotal Capital Costs</b>						<b>\$571,799</b>	<b>\$571,799</b>
6	Capital	Construction Management (6%)	1	LS	Once	6%	15%	\$34,308	\$34,308
7	Capital	Remedial Design (8%)	1	LS	Once	8%	15%	\$45,744	\$45,744
8	Capital	Project Management (8%)	1	LS	Once	8%	15%	\$45,744	\$45,744
9	Annual	P&T System O&M (4 addnl EWs)	30	YR	Years 1-30	\$24,250	25%	\$909,375	\$376,149
10	Periodic	P&T System Replacements over 30 years	5	LS	Every 5 years	\$22,685	25%	\$141,778	\$57,461
								<b>\$1,748,748</b>	<b>\$1,131,205</b>

1- Includes 1/4 of the total estimated costs for obtaining easements for extraction well and piping runs for all 4 hot spot areas

2- Includes 1/4 of the total estimated costs for permitting and traffic control for all 4 hot spot areas

3- Includes 1 ea. 30-gpm extraction well and pump installed to 55' bgs; electrical hookup at the extraction well; additional 2,100 linear feet of piping back to the White Swan source area

4- Includes 1/4 of the total estimated cost to install 2 additional injection wells to handle all 4 new extraction wells located 2,000 ft from the treatment plant

5- Includes 1/4 of the total increase from baseline FS pump and treat equipment and building costs based on industry-standard scaling factors for an additional 120 gpm total capacity

6- Based on standard markups on additional costs in accordance with USEPA FS Cost Estimating Guidance

7- Based on standard markups on additional costs in accordance with USEPA FS Cost Estimating Guidance

8- Based on standard markups on additional costs in accordance with USEPA FS Cost Estimating Guidance

9- Includes 1/4 of the total 12% increase in baseline FS O&M costs based on the estimated costs for additional carbon change-outs, operator labor, maintenance, utility markouts, and sampling

10- Includes 1/4 of the total 15% increase in baseline FS equipment replacement costs based on industry-standard scaling factors for equipment cost increases at increasing production rates.

Table 2 - Estimated Hot Spot Treatment Costs, page 4 of 5

Terrace Place Hot Spot - New Extraction and Production Well

Row	Cost Type	Description	Quantity	Units	Frequency	Unit Cost	Contingency	Total \$ (non-Discounted)	Present Worth Total (i=7%) (Discounted)	
1	Capital	Land Acquisition or Use Agreement	0.25	LS	Once	\$50,000	25%	\$15,625	\$15,625	
2	Capital	Permitting and Planning	0.25	LS	Once	\$25,000	15%	\$7,188	\$7,188	
3	Capital	Terrace Place Hot Spot Extraction Well/Piping/Electrical	1	LS	Once	\$654,000	15%	\$752,100	\$752,100	
4	Capital	Terrace Place New Deep Production Well	1	LS	Once	\$111,000	15%	\$127,650	\$127,650	
5	Capital	Additional Injection Wells	0.5	EA	Once	\$80,000	15%	\$46,000	\$46,000	
6	Capital	Incremental P&T equipment cost from increased flow rate	0.25	LS	Once	\$529,519	15%	\$152,237	\$152,237	
<b>Capital</b>		<b>Subtotal Capital Costs</b>							<b>\$1,100,799</b>	<b>\$1,100,799</b>
7	Capital	Construction Management (6%)	1	LS	Once	6%	15%	\$66,048	\$66,048	
8	Capital	Remedial Design (8%)	1	LS	Once	8%	15%	\$88,064	\$88,064	
9	Capital	Project Management (8%)	1	LS	Once	8%	15%	\$88,064	\$88,064	
10	Annual	P&T System O&M (4 addnl EWs)	30	YR	Years 1-30	\$24,250	25%	\$909,375	\$376,149	
11	Periodic	P&T System Replacements over 30 years	5	LS	Every 5 years	\$22,685	25%	\$141,778	\$57,461	
								<b>\$2,394,128</b>	<b>\$1,776,585</b>	

1- Includes 1/4 of the total estimated costs for obtaining easements for extraction well and piping runs for all 4 hot spot areas

2- Includes 1/4 of the total estimated costs for permitting and traffic control for all 4 hot spot areas

3- Includes 1 ea. 30-gpm extraction well and pump installed to 45' bgs; electrical hookup at the extraction well; additional 4.700 linear feet of piping back to the White Swan source area

4- Includes abandonment of the existing production well and installation of a new 500-gpm production well to a depth of 110' bgs based on the aquifer profile at this location with hookup to existing piping system

5- Includes 1/4 of the total estimated cost to install 2 additional injection wells to handle all 4 new extraction wells located 2,000 ft from the treatment plant

6- Includes 1/4 of the total increase from baseline FS pump and treat equipment and building costs based on industry-standard scaling factors for an additional 120 gpm total capacity

7- Based on standard markups on additional costs in accordance with USEPA FS Cost Estimating Guidance

8- Based on standard markups on additional costs in accordance with USEPA FS Cost Estimating Guidance

9- Based on standard markups on additional costs in accordance with USEPA FS Cost Estimating Guidance

10- Includes 1/4 of the total 12% increase in baseline FS O&M costs based on the estimated costs for additional carbon change-outs, operator labor, maintenance, utility markouts, and sampling

11- Includes 1/4 of the total 15% increase in baseline FS equipment replacement costs based on industry-standard scaling factors for equipment cost increases at increasing production rates.

Table 2 - Estimated Hot Spot Treatment Costs, page 5 of 5

Terrace Place Hot Spot - Wellhead Treatment

Row	Cost Type	Description	Quantity	Units	Frequency	Unit Cost	Contingency	Total \$ (non-Discounted)	Present Worth Total (i=7%) (Discounted)
1	Capital	Land Acquisition or Use Agreement	0.25	LS	Once	\$50,000	25%	\$15,625	\$15,625
2	Capital	Permitting and Planning	0.25	LS	Once	\$25,000	15%	\$7,188	\$7,188
3	Capital	Terrace Place Wellhead Treatment	1	LS	Once	\$81,000	15%	\$93,150	\$93,150
<b>Capital</b>	<b>Subtotal Capital Costs</b>							<b>\$115,963</b>	<b>\$115,963</b>
4	Capital	Construction Management (6%)	1	LS	Once	6%	15%	\$6,958	\$6,958
5	Capital	Remedial Design (8%)	1	LS	Once	8%	15%	\$9,277	\$9,277
6	Capital	Project Management (8%)	1	LS	Once	8%	15%	\$9,277	\$9,277
7	Annual	Terrace Place Wellhead Treatment System O&M	30	YR	Years 1-30	\$31,000	25%	\$1,162,500	\$480,850
								<b>\$1,303,974</b>	<b>\$622,325</b>

- 1- Includes 1/4 of the total estimated costs for obtaining easements
- 2- Includes 1/4 of the total estimated costs for NJDEP and NPDES permitting and traffic control for all 4 hot spot areas
- 3- Includes 2 ea. 6,000 lb carbon vessels to treat production well water
- 4- Based on standard markups on additional costs in accordance with USEPA FS Cost Estimating Guidance
- 5- Based on standard markups on additional costs in accordance with USEPA FS Cost Estimating Guidance
- 6- Based on standard markups on additional costs in accordance with USEPA FS Cost Estimating Guidance
- 7- Includes O&M costs for carbon change-outs, operator labor for maintenance, and sampling