RECORD OF DECISION

Old Roosevelt Field Contaminated Groundwater Area Superfund Site
Garden City, Nassau County, New York

United States Environmental Protection Agency
Region 2
New York, New York
September 2007

DECLARATION FOR THE RECORD OF DECISION

SITE NAME AND LOCATION

Old Roosevelt Field Contaminated Groundwater Area Superfund Site
Garden City, Town of Hempstead, Nassau County, New York

Superfund Site Identification Number: NYSFN0204234

STATEMENT OF BASIS AND PURPOSE

This Record of Decision (ROD) documents the U.S. Environmental Protection Agency's selection of a remedy for the Old Roosevelt Field Contaminated Groundwater Area Superfund Site (Site), which is chosen in accordance with the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended (CERCLA), 42 U.S.C. Section 9601, *et seq*., and the National Oil and Hazardous Substances Pollution Contingency Plan, 40 CFR Part 300. This decision document explains the factual and legal basis for selecting the remedy for the Site. The attached index (see Appendix III) identifies the items that comprise the Administrative Record upon which the selection of the remedy is based.

The New York State Department of Environmental Conservation (NYSDEC) was consulted on the planned remedy in accordance with CERCLA Section 121(f), 42 U.S.C. Section 9621(f), and it does not concur at this time with the Record of Decision pending review of the environmental easement requirements (see Appendix IV).

ASSESSMENT OF THE SITE

Actual or threatened releases of hazardous substances from the Site, if not addressed by implementing the response action selected in this ROD, may present an imminent and substantial endangerment to public health, welfare, or the environment.

DESCRIPTION OF THE SELECTED REMEDY

The selected remedy includes the following components:

- Pre-Design Investigation of the Contaminant Plume: A pre-design investigation will be conducted to collect information for the remedial design. The pre-design investigation will include: installation of at least three multiport monitoring wells; a pumping test; and infiltration tests at the Nassau County recharge basin #124.

- Groundwater Modeling: The preliminary three-dimensional groundwater model will be updated for the remedial design. Up-to-date contaminant distribution data will be collected from the pre-design investigation, and used to update the contaminant plume maps. The lithology and Site-specific hydraulic conductivity obtained during literature review and the pumping test will be incorporated into the model.

  The improved groundwater model with up-to-date contaminant data will be used to select the final location(s) of groundwater extraction well(s) and discharge options for treated groundwater for the remedial design.

- Stage II Cultural Resource Survey: If ground intrusion such as well drilling or pipe routing are planned in any areas specified as sensitive for archeological resources during the Stage 1A cultural resource survey, a Stage II survey will be conducted.

- Groundwater Extraction Well: To reduce the contaminant concentrations reaching the two supply wells GWP-10 and GWP-11, a groundwater extraction well(s) will be installed south of SVP/GWM-4. A new remedial extraction well SVP-4E will capture the contaminant plume upgradient of SVP/GWM-4, while ensuring that the pumping capacity of supply wells GWP-10 and GWP-11 is not affected. The final location and number of extraction wells required will be determined after the pre-design investigation is completed and the groundwater model is updated.

- Ex-Situ Groundwater Treatment: A low profile air stripper will remove the volatile organic compound (VOC) contaminants. During the remedial design, additional treatment technologies (including liquid phase carbon adsorption) may be considered if additional information suggests the need for treatment following air stripping. The treated water will meet groundwater and surface water discharge standards.

- Discharge of Treated Groundwater: The treated groundwater will be discharged to the local Nassau County recharge basin #124. During the remedial design, results of infiltration tests will be used to calculate the capacity of the recharge basin. Run-off from a representative rain event will also be calculated to verify the available capacity for treated groundwater discharge.

- Evaluation and Upgrade of the Air Strippers at Supply Wells GWP-10 and GWP-11: An evaluation of the conditions of the air strippers will be conducted. Any necessary upgrade or replacement of the air strippers will be evaluated. The upgrade or replacement costs of the air strippers will be estimated based on the condition of the existing treatment system.

- Vapor Intrusion Sampling: There is concern, based on previous sampling results, that Site-related vapor may migrate into the commercial buildings to the west of the mall. Vapor intrusion sampling will be conducted at six buildings during the winter heating season. Vapor mitigation systems will be installed, if further sampling indicates the need for such systems.

- Institutional Controls: Institutional controls will be relied upon to restrict the future use of groundwater at the Site. Specifically, the New York State Department of Health State Sanitary Code regulates installation of private potable water supply wells in Nassau County. In addition, EPA will rely on the current zoning in the area including and surrounding the mall to restrict the land use to commercial industrial uses. If a change in land use is proposed, additional investigation of soils in this area will be necessary to support the land use change. Regulatory requirements under the State's Superfund program may result in NYSDEC seeking to obtain easements/covenants on various properties within the Site.

- Site Management Plan: A SMP will be developed and will provide for the proper management of all Site remedy components post-construction, such as institutional controls, and shall also include: (a) monitoring of Site groundwater to ensure that, following remedy implementation, the groundwater quality improves; (b) conducting an evaluation of the potential for vapor intrusion, and mitigation, if necessary, in the event of future construction at or in the vicinity of the Site; (c) provision for any operation and maintenance required of the components of the remedy; and (d) periodic certifications by the owner/operator or other person implementing the remedy that any institutional and engineering controls are in place.

- Long-term Monitoring: The contaminant plume will be monitored through annual sampling and analysis of groundwater. The results of the long-term monitoring program will be used to evaluate changes in the contaminant plume over time and to ensure achievement of Maximum Contaminant Levels (MCL)s.

- Contingency Plan: In the event that public supply wells GWP-10 and GWP-11 are taken out of service permanently or are operated at a significant reduction of their current pumping rates, a contingency plan would be implemented to capture and treat the contaminant plume in that area. The contingency plan would include the installation of a new well or wells in the vicinity of supply wells GWP-10 and GWP-11 and an ex-situ treatment system.

- Five-Year Review: Because MCLs will take longer than five years to achieve, it is EPA's policy to conduct a review of Site conditions no less often than once every five years.

DECLARATION OF STATUTORY DETERMINATIONS

The selected remedy meets the requirements for remedial actions set forth in CERCLA Section 121, 42 U.S.C. Section 9621, because it: 1) is protective of human health and the environment; 2) meets a level or standard of control of the hazardous substances, pollutants and contaminants, which at least attains the legally applicable or relevant and appropriate requirements under federal and state laws; 3) is cost-effective; and 4) utilizes permanent solutions and alternative treatment (or resource recovery) technologies to the maximum extent practicable. In keeping with the statutory preference for treatment that reduces toxicity, mobility, or volume of contaminated media as a principal element of the remedy, the contaminated groundwater will be treated.

Because this remedy will result in hazardous substances, pollutants, or contaminants remaining on-Site above levels that allow for unlimited use and unrestricted exposure, a statutory review will be conducted within five years after initiation of the remedial action to ensure that the remedy is, or will be, protective of human health and the environment.

ROD DATA CERTIFICATION CHECKLIST

The ROD contains the remedy selection information noted below. More details may be found in the Administrative Record file for this Site.

- Contaminants of concern and their respective concentrations (see ROD, pages 7-11 and Appendix II, Tables 1-6);
- Baseline risk represented by the contaminants of concern (see ROD, pages 12-18);
- Cleanup levels established for contaminants of concern and the basis for these levels (see ROD, Appendix II, Table 1);
- Manner of addressing source materials constituting principal threats (see ROD, page 27);
- Current and reasonably-anticipated future land use assumptions and current and potential future beneficial uses of groundwater used in the baseline risk assessment and ROD (see ROD, pages 12-18);
- Potential land and groundwater use that will be available at the Site as a result of the selected remedy (see ROD, page 32);

- Estimated capital, annual operation and maintenance, and present-worth costs; discount rate; and the number of years over which the remedy cost estimates are projected (see ROD, page 31); and

- Key factors used in selecting the remedy (*i.e.*, how the selected remedy provides the best balance of tradeoffs with respect to the balancing and modifying criteria, highlighting criteria key to the decision)(see ROD, pages 32-35).

AUTHORIZING SIGNATURE

George Pavlou, Director
Emergency and Remedial Response Division

9/28/07
Date

RECORD OF DECISION FACT SHEET
EPA REGION 2

Site

Site name:	Old Roosevelt Field Contaminated Groundwater Area Site
Site location:	Garden City, Nassau County, New York
HRS score:	100.00
Listed on the NPL:	May 11, 2000

Record of Decision

Date signed:	September 28, 2007
Selected remedy:	Extraction of contaminated groundwater with ex-situ treatment and discharge of the treated water to a nearby recharge basin, installation of vapor mitigation systems at commercial buildings, if necessary, evaluation of the wellhead treatment at two Garden City supply wells, institutional controls, a site management plan, and long-term monitoring.
Capital cost:	$6,240,000
Annual operation and maintenance cost:	$850,000 for years 1 through 10, $175,000 for years 10 through 25 and $111,000 for years 26 through 35.
Present-worth cost:	$13,160,000

Lead	EPA
Primary Contact:	Caroline Kwan, Remedial Project Manager, (212) 637-4275
Secondary Contact:	Angela Carpenter, Chief, Eastern New York Remediation Section, (212) 637-4263
Main PRPs	None identified to date

Waste

Waste type:	Chlorinated Volatile Organic Compounds in Groundwater

Waste origin:	On-Site spills/discharges
Contaminated media:	Groundwater, Air

DECISION SUMMARY

Old Roosevelt Field Contaminated Groundwater Area Superfund Site
Garden City, Nassau County, New York

United States Environmental Protection Agency
Region 2
New York, New York
September 2007

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ATTACHMENTS

SITE NAME, LOCATION, AND DESCRIPTION

The Old Roosevelt Field Contaminated Groundwater Area Superfund Site (Site) is an area of groundwater contamination within the Village of Garden City, Town of Hempstead, in central Nassau County, New York. Figures 1 and 2 provide a Site location and a Site map, respectively. The Site is located on the eastern side of Clinton Road, south of the intersection with Old Country Road, and includes the area of the former Roosevelt Field airfield. The former Roosevelt Field airfield area is currently developed as a large retail shopping mall with a number of restaurants, and a movie theater. Several office buildings (including Garden City Plaza) are on the western perimeter of the mall and share parking space with the mall. A thin strip of open space along Clinton Road (known as Hazelhurst Park) serves as designated parkland and a buffer between the residential community and the mall complex. Two recharge basins are directly east and south of the mall area. The eastern basin is known as Pembrook Basin and is on property owned by the mall. The basin situated to the south is Nassau County Recharge Basin number 124.

Two municipal supply well fields are located south (downgradient) of the former airfield. The Village of Garden City public supply wells (designated as Wells 10 and 11) are located just south of the airfield boundary, on the eastern side of Clinton Road. The Village of Hempstead Wellfield is located approximately 1 mile south of the Garden City supply wells.

SITE HISTORY AND ENFORCEMENT ACTIVITIES

Site History

The Site was used for aviation activities from 1911 to 1951. The original airfield was known as the Hempstead Plains Aerodrome and encompassed 900 to 1,000 acres east of Clinton Road and south of Old Country Road. By the time the field opened in July 1912, there were 5 cement and 30 wooden hangars along Old Country Road, 4 grandstands along Clinton Road, and several flying schools. At least two aviators built aircraft at the field in 1912, including the first all-metal monoplane in America. During its first three years, activities at the airfield included civilian flight training, equipment testing, and aerial stunt shows.

The United States (U. S.) military began using the Hempstead Plains field prior to World War I. The New York National Guard First Aero Company began training at the airfield in 1915, and in 1916 the U.S. Army used the field to train Army and Navy officers. When the U. S. entered World War I in April 1917, the airfield was taken over as a training center for military pilots and renamed Hazelhurst Field. The Army removed the grandstands, built barracks along Clinton Road, and built larger hangars along Old Country Road. In 1918, the Army changed the name of the airfield to Roosevelt Field in honor of Quentin

Roosevelt, a son of Theodore Roosevelt who had trained there and was killed during the war. Roosevelt Field was used throughout the war to train aviators.

After the war, the U. S. Air Service authorized aviation-related companies to operate from Roosevelt Field, but maintained control until July 1, 1920, at which time the Government sold its improvements on the airfield and relinquished control of the field. Subsequently, the property owners sold portions along the southern edge of the field and split the remainder of the property into two flying fields with an incline between them. The eastern half, with sod runways and only two hangars, continued as Roosevelt Field. The western half, which had many hangars, flying schools, and aviation maintenance shops, became known as Curtiss Field.

By 1929, the eastern field (Roosevelt) had served as the starting point or terminus of many notable flights, including Lindbergh's takeoff for his historic trans-Atlantic flight in May 1927. The western field (Curtiss) was used for flying circuses, a flying school, aircraft sales and service, and flight tests. Both fields were bought in 1929 by Roosevelt Field, Inc., and the property was once again called Roosevelt Field. Improvements were quickly made, including the installation of several large steel and concrete buildings for hangars, shops, and office space along Old Country Road. As of November 1929, numerous aviation-related businesses operated in the hangars and other buildings surrounding the western field. By 1932, paved runways and 50 buildings made Roosevelt Field the country's largest and busiest civil airfield. While the western field developed into the large aviation center that continued to operate throughout the 1930s, the eastern field remained unpaved, with few buildings, until it was leased in 1935 and became a racetrack.

Roosevelt Field was used by the Navy and Army during World War II. In July 1939, the Army Air Corps contracted Roosevelt Field, Inc. to provide airplane and engine mechanics training to Army personnel at their school. In early 1941, there were more than 200 Army students and approximately 600 other students at the Roosevelt Aviation School. At the beginning of 1942, after the U.S. had entered the war, civilian flying and private hangar rental had ceased at Roosevelt Field due to a ban on private flying in defense areas.

As of March 1942, there were 6 steel/concrete hangars, 14 wooden hangars, and several other buildings at Roosevelt Field. The Army training school was concentrated in buildings located along Clinton Road. In addition to the training activities, the Roosevelt Field facilities were used to receive, refuel, crate, and ship Army aircraft.

The Navy also used Roosevelt Field during World War II. In November 1942, the Navy Bureau of Aeronautics established a modification center at Roosevelt Field to install British equipment into U.S. aircraft for the British Royal Navy. The Navy leased five steel/concrete hangars along Old Country Road and built a barracks, mess hall, and sick bay and designated this installation as the U.S. Naval Air Facility (NAF) Roosevelt Field by February 1943. By September 1943, the Navy had built wooden buildings between four of the hangars, and in October 1943 leased six additional hangars. NAF Roosevelt Field was responsible for aircraft repair and maintenance, equipment installation, preparation and flight delivery of lend-lease aircraft, and metal work required for the installation of British modifications. The metal work constituted a substantial portion of the facility's work load. The facility also performed salvage work of crashed Royal Navy planes. The Navy vacated all but six hangars shortly after the war ended, and removed their temporary buildings by the time their lease expired on June 30, 1946. Restoration of buildings and grounds was completed by August 1946, and Roosevelt Field operated as a commercial airport until it closed in May 1951.

Soon after the airfield closed, the large Roosevelt Field Shopping Center was constructed at the Site and opened in 1957. The old field is currently the Site of the shopping mall and office building complexes, the Meadowbrook Parkway and is surrounded by commercial areas and light industry. Three of the old Navy hangars remained standing until some time after June 1971, with various occupants, including a moving/storage firm, discotheque, amusement center, and bus garage.

It is likely that chlorinated solvents were used at Roosevelt Field during and after World War II. Chlorinated solvents such as tetrachloroethene (PCE) and trichloroethene (TCE) have been widely used for aircraft manufacturing, maintenance, and repair operations since about the 1930s. Beginning in the late 1930s, the U.S. military issued protocols for use of solvents such as TCE for cleaning airplane parts and for de-icing. The types of airplanes designated for solvent use were present at Roosevelt Field during World War II. The finish specifications for at least one type of plane that the Navy modified at Roosevelt (eight of which were on Site in April 1943) called for aluminum alloy to be cleaned with TCE. An aircraft engine overhaul manual issued in January 1945 specified TCE as a degreasing agent.

Wells 10 and 11 were installed by the Village of Garden City in 1952 and were put into service in 1953. Well 10 is screened from 377 to 417 feet below the ground surface (bgs) and well 11 is screened from 370 to 410 feet bgs. Both wells have shown the presence of PCE and TCE since they were first sampled in the late 1970s and early 1980s, and concentrations increased significantly until 1987, when an air-stripping treatment system was installed to treat the water from the wells. Sampling results of treated well water from May 1993, September 1995, and June/July 1999 indicated that breakthrough of the treatment system had occurred. The highest levels of volatile organic compound (VOC) contamination were noted during the mid-to late 1990s, and have steadily declined since then, although the levels remain above EPA and New York State (NYS) drinking water standards.

In addition to the Village of Garden City supply wells, seven cooling water wells in the mall area pumped contaminated groundwater from the Magothy aquifer for use in the air conditioning systems of the mall building and the office buildings west of the mall. Cooling water wells pumped variable amounts of water, with greater extraction rates during the hot summer months. These wells operated from approximately 1960 to 1985. After the contaminated groundwater was used in air conditioning systems, the untreated water was returned to the aquifer system via surface recharge, first to the Pembrook recharge basin and later to a drain field west of 100 Garden City Plaza and 200 Garden City Plaza.

The discharge of contaminated water into the recharge basin and drain field continued up to 1985 when the cooling water wells were taken out of service due to the presence of VOCs in the groundwater. Surface discharge of contaminated groundwater spread contamination through the Upper Glacial and Magothy aquifers. The recharge basin and drain field also created localized groundwater mounding, which may have spread contamination at the water table. However, the sandy nature of the recharge basin soils likely did not result in retention of VOCs within the soils. In addition, the zone below the recharge basin has been flushed with stormwater runoff for 20 years; residual contamination from Roosevelt Field is not likely to remain in the area. The Pembrook recharge basin currently only receives surficial stormwater runoff from parking lots surrounding the mall and the office buildings. The drain field/diffusion wells near 100 Garden City Plaza are under the paved parking lot west of 100 Garden City Plaza and 200 Garden City Plaza and are not currently identifiable in the field. Significant groundwater contamination is present at depth at SVP/GWM-4, which is located near the general area of the diffusion wells/drain field.

Enforcement Activities

EPA's search for potentially responsible parties (PRPs) is ongoing. EPA has not yet identified any financially viable parties that would be responsible under CERCLA for the Site. If PRPs are identified, EPA will seek to have them perform or pay the cost of EPA's investigation and cleanup.

HIGHLIGHTS OF COMMUNITY PARTICIPATION

EPA conducted an RI/FS at the Site from 2001-2007. The findings are presented in a remedial investigation (RI) report[1] and feasibility study (FS) report[2]. EPA's preferred remedy and the basis for the preferred remedy was identified in a Proposed Plan. These

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1 *Final Remedial Investigation Report, Old Roosevelt Field Contaminated Groundwater Area Site, Remedial Investigation/Feasibility Study, Garden City, New York*, Volumes I and II, CDM Federal Programs Corporation, July 24, 2007.

2 *Final Feasibility Study Report, Old Roosevelt Field Contaminated Groundwater Area Site, Remedial Investigation/Feasibility Study, Garden City, New York*, Volumes I and II, CDM Federal Programs Corporation, August 20, 2007.

documents were made available to the public in information repositories maintained at the following locations: (1) EPA Docket Room in the Region 2 offices at 290 Broadway in Manhattan; (2) at the Garden City Library located at 60 Seventh Street, Garden City, New York; and, (3) the Hempstead Library located at 115 Nichols Court, Hempstead, New York. A notice of the commencement of the public comment period, the public meeting date, a summary of the preferred remedy, EPA contact information, and the availability of the above-referenced documents was published in the *Garden City News* and *Garden City Life* on August 20, 2007 and in the *Garden City News* on August 24, 2007 and in *Garden City Life* on August 31, 2007. The public comment period ran from August 22, 2007 to September 20, 2007. EPA held a public meeting on September 11, 2007, at 7:00 P.M. at the Village of Garden City Village Hall to present the findings of the RI/FS and to answer questions from the public about the Site and the remedial alternatives under consideration. Approximately 25 people, including residents, local business people, and state and local government officials, attended the public meeting. On the basis of comments received during the public comment period, the public generally supports the selected remedy. Public comments were related to remedy details, cost recovery by the Village of Garden City for past treatment of contaminated groundwater and a schedule for implementation of the remedy. Responses to written comments that were received during the public comment period and to comments received at the public meeting are included in the Responsiveness Summary (see Appendix V).

SCOPE AND ROLE OF THE OPERABLE UNIT

The National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 CFR Section 300.5, defines an operable unit as a discrete action that comprises an incremental step toward comprehensively addressing Site problems. A discrete portion of a remedial response eliminates or mitigates a release, threat of a release, or pathway of exposure. The cleanup of a site can be divided into a number of operable units, depending on the complexity of the problems associated with the site. This response action applies a comprehensive approach to the Site; therefore, only one operable unit is required to remediate the Site.

The primary objectives of this action are to remediate the groundwater contamination at the Site, to reduce and minimize the potential for migration of contaminants, and to minimize any potential future health and environmental impacts.

SUMMARY OF SITE CHARACTERISTICS

RI-related field investigation activities included the collection of groundwater through multi-port monitoring wells installed during the RI, existing monitoring wells, municipal supply wells, and collection of soil gas, air/vapors, and soil samples. Associated activities included synoptic water level measurements, an ecological assessment, and a cultural resources survey. The results of the RI are summarized below.

The Site lies within the Atlantic Coastal Plain. The topography of the central portion of Nassau County is characterized by a gently southward-sloping glacial outwash plain. Two linear chains of hills, the remnants of two glacial terminal moraines, border the outwash plain to the north. The southern limit of the outwash plain is defined by the low-lying salt marshes, tidal inlets and creeks, and beach-barrier islands along the Atlantic coast of southern Long Island. The southern chain of morainal hills, the Ronkonkoma moraine, extends from Queens eastward to form the South Fork of Long Island. The northern chain of hills, the Harbor Hill moraine, extends eastward to form the North Fork of Long Island. The moraines converge to the west of Nassau County. The Ronkonkoma moraine reaches elevations of up to 400 feet above mean sea level (msl).

The Site is flat to gently undulating. The Site slopes from approximately 100 feet above msl along Old Country Road down to approximately 70 feet above msl about 4,000 feet south-southwest of Roosevelt Field, along Clinton Road. The Roosevelt Field shopping center is located on a flat area originally called Hempstead Plains, which is at an elevation of approximately 90 feet above msl.

No naturally-occurring surface water bodies are present in the vicinity of the Site. The closest stream is East Meadow Brook, which is about 1.5 miles southeast of the Site and flows south towards Great South Bay and the Atlantic Ocean. The largest body of freshwater near the Site is Hempstead Lake, located at the head of Millbrook Creek, approximately four miles south of the Site. In general, the sandy nature of natural soils on Long Island promotes fast infiltration of precipitation (rainwater) from the ground surface. Almost the entire Site area is paved or is occupied by buildings; therefore, any surface rainwater runoff is routed into storm water collection systems and commonly is discharged directly to either dry wells or recharge/detention basins.

The Pembrook recharge basin and two Nassau County recharge basins are man-made water table recharge basins located at the Site. One of the Nassau County basins is located immediately south of the Pembrook Basin, approximately 1,500 feet southwest of the Roosevelt Field Shopping Center; the other county recharge basin is located about 1,000 feet southeast of the shopping center. The privately-owned Pembrook Basin receives surface water runoff during storm events. The Nassau County basins receive storm runoff from the municipal storm water collection system.

The Site is located within the Atlantic Coastal Plain Physiographic Province. The geology of Long Island is characterized by a southeastward-thickening wedge of unconsolidated sediments unconformably overlying a gently-dipping basement bedrock surface. The wedge ranges in thickness from zero feet beneath Long Island Sound to the north, on the submerged western margin of the Coastal Plain, to more than 2,000 feet under the southern shores of Long Island. In the vicinity of the Site the sedimentary units thicken from about 800 feet at the northern edge of the Town of Hempstead to approximately 1,500 feet thick beneath the barrier islands.

The geologic units consist of:

- Basement - Precambrian to Early Paleozoic igneous or metamorphic bedrock
- Raritan Formation - Cretaceous Lloyd Sand Member (sand and gravel) and the overlying Raritan Clay Member (clay and silt)
- Magothy Formation - Cretaceous fine to medium quartz sand, interbedded clayey sand with silt, clay, and gravel interbeds or lenses
- Pleistocene Deposits - the fluvial Jameco Gravel, the marine Gardiners Clay, and the Upper Glacial deposits

The Upper Glacial Pleistocene sediments and the Magothy Formation are the geologic units of interest for the Site.

The Upper Glacial and Magothy aquifers are unconfined and form a single aquifer unit, albeit with different properties. They are the most productive and heavily utilized groundwater resources on Long Island. The depth to the water table ranges from 25 to 50 feet bgs. Average transmissivities are 32,160 square feet per day (ft^2/d) for the Magothy aquifer and 26,800 ft^2/d in the Upper Glacial aquifer. Average hydraulic conductivities are 228 feet per day (ft/d) in the Upper Glacial and 174 in the Magothy.

Horizontal velocity in the Upper Glacial aquifer generally ranges from 1 to 2 feet per day (ft/d). Based on Site-specific values, the average horizontal flow rate for the Magothy is 1.8 ft/d, although literature values are estimated to be 0.3 ft/d. Based on measurements in the eight multi-port wells and the existing wells, groundwater flow is to the south/southwest. Pressure measurements in the ports indicate the vertical groundwater flow is downward. The five multi-port wells in the mall area have similar vertical gradients, with the differences between water levels in the shallow and deep ports within each well ranging from 1.8 to 2.9 feet. Further to the south, the vertical gradients become larger: 3.2 feet in SVP/GWM-7; 8.2 feet in SVP/GWM-8, and 9.7 in SVP/GWM-6. The higher vertical gradients in SVP/GWM-8 and SVP/GWM-6 are most likely caused by pumping at the Village of Hempstead public supply wells, about a block from multi-port wells SVP/GWM-6 and SVP/GWM-8.

SUMMARY OF REMEDIAL INVESTIGATION RESULTS

Chlorinated volatile organic compounds (VOCs) are the predominant contaminants in the groundwater at the Site. Although a number of organic compounds related to gasoline were detected in the Site groundwater, they could not be attributed to operations at the

Site. The chemicals of concern (COCs) identified for the Site are TCE, PCE, 1,1-dichloroethene, cis-1,2-dichloroethene, and carbon tetrachloride.

The sample results for the various media are summarized below.

Groundwater

EPA and the New York State Department of Health have promulgated health-based protective Maximum Contaminant Levels (MCLs), which are enforceable standards for various drinking water contaminants. MCLs ensure that drinking water does not pose either a short- or long-term health risk to the public. Table 1 summarizes the MCLs for the COCs.

Eight multi-port monitoring wells were drilled during the RI (see Figure 3). Four wells, each with ten ports, were installed in the Roosevelt Field mall area. One upgradient (background) well with ten ports is located on the north side of Old Country Road and three wells, each with six ports, are located in the downgradient area, south of two Village of Garden City supply wells. Two rounds of groundwater samples were collected from the eight multi-port wells (64 ports), ten existing monitoring wells and the two Garden City supply wells (see Figure 3). The concentrations for each of the COCs detected in the sampled wells are summarized in Tables 2 through 5.

The highest levels of PCE and TCE (350 and 280 micrograms per litre (μg/L), respectively) are concentrated at SVP/GWM-4 at approximately 250 to 310 feet deep. It should be noted that the SVP/GWM-4 location was selected for monitoring because of the well/drain field that was operated in the area during the 1980s, to dispose of cooling water contaminated with the Site-related VOCs. The next highest levels occur downgradient (to the south) of SVP/GWM-4 in existing well GWX-10019, at a slightly shallower depth at approximately 223 to 228 feet below ground surface (bgs), and at the two supply wells GWP-10 and GWP-11, at approximately 370 to 417 feet deep. Figures 4 and 5 show the TCE and PCE groundwater contamination in the mall area. Multi-port well SVP/GWM-7, located southwest of the supply wells, showed 20 μg/L of TCE and 7.7 μg/L of PCE at approximately 310 to 315 feet. Further downgradient, monitoring well SVP/GWM-8, installed during the RI, showed 34 μg/L of PCE at approximately 100 to 105 feet and 57 μg/L of PCE at the same depth from round 1 and round 2 sampling, respectively. TCE was detected at levels below the MCL in both rounds. Monitoring well SVP/GWM-6 showed a detection of 8.2 μg/L of TCE at 245 to 250 feet in round 1 and 2.3 μg/L in round 2 at the same depth. PCE was detected in several depths during both sampling rounds, but at levels below the MCL.

GWP-10 and GWP-11 each have a capacity to pump approximately one million gallons per day (mgd) of groundwater from the Magothy aquifer. Groundwater flow and contaminant movement is downward and south from the mall area to the Garden City supply wells. Contamination was observed south (downgradient) of the Garden City supply wells, as observed in the wells sampled.

Further downgradient of the supply wells, PCE and TCE contaminant levels in the most downgradient multi-port well (SVP/GWM-8) are seen at shallower depths than in the mall area. Other sources of VOC contamination in the area south of the Site may have contributed to the contamination of SVP/GWM-8 and therefore are not Site-related.

The Village of Hempstead Water Supply Wellfield, approximately one block south (downgradient) of multi-port monitoring wells SVP-6 and SVP-8, has been contaminated with VOCs since the 1980s. Two of the wells in the Village of Hempstead Wellfield showed detections of 11.8 µg/L (well screened from 390-542 feet bgs) and 9.2 µg/L (well screened from 344 - 444 feet bgs) of TCE early this year through their routine monitoring. The source of this contamination is currently unknown since several potential sources are located in the vicinity of the Hempstead Wellfield.

Soil Gas

Two types of soil gas samples were collected: a screening survey on a 100-foot grid on the northern and western sides of the mall parking lot (see Figure 6) and laboratory samples collected around Garden City Plaza Buildings 100 and 200, 100 Ring Road, and in Hazelhurst Park (see Figure 7). A total of 34 samples were collected for laboratory analysis. EPA also collected soil samples at soil gas screening locations that exceeded 100 parts per billion per volume (ppbv) and at selected locations in Hazelhurst Park adjacent to Clinton Road (summarized below).

Soil gas screening criteria were selected from the EPA 2002 document titled "*Draft Document for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soil*". This document provides potential screening criteria for VOCs based on risk levels and the depth of the sample. The Site-specific soil gas screening criteria shown on Table 6.

Soil Gas Screening Results: Soil gas screening samples were collected at the nodes of a 100-foot by 100-foot grid from 158 locations in a large portion of the paved and unpaved areas of the Site bordering Old Country Road and Clinton Road. Soil gas screening results from approximately 15 feet bgs and 35 feet bgs are summarized below and shown on Figures 8 and 9.

<u>15 Feet bgs</u>: Five of the samples collected at approximately 15 feet bgs had total VOC readings above 100 ppbv.

- Location A0 - This location is at the corner of Old Country Road and Clinton Road. The total VOC reading was 106 ppbv.

- Location A11 - This location borders Clinton Road in Hazelhurst Park. The total VOC reading was 136 ppbv.
- Location D17 - This location is just west of 100 Garden City Plaza. The total VOC reading was 531 ppbv.
- Location D19 - This location is west of 200 Garden City Plaza. The total VOC reading was 534 ppbv.
- Location F20 - This location is south of 200 Garden City Plaza. The total VOC reading was 163 ppbv.

Of the soil gas readings collected at approximately 15 feet bgs, 85 percent were at or below 10 ppbv; 8 percent were between 11 and 50 ppbv, and 4 percent were between 51 and 100 ppbv.

35 Feet bgs: Seven of the samples collected at approximately 35 feet bgs had total VOC readings above 100 ppbv, as described below.

- Locations A9, A10, and A11 - These locations border Clinton Road in Hazelhurst Park. The total VOC readings were 245 ppbv, 233 ppbv, and 148 ppbv, respectively.
- Location D17 - This location is just west of 100 Garden City Plaza. The total VOC reading was 494 ppbv.
- Location E14 - This location is north of the northeast corner of 100 Garden City Plaza. The total VOC reading was 211 ppbv.
- Location H1 - This location is southeast of the Citibank building, near the entrance road to the mall. The total VOC reading was 152 ppbv.
- Location K0 - This location is on the eastern side of the mall entrance road. The total VOC reading was 185 ppbv.

Of the soil gas readings collected at approximately 35 feet bgs, 83 percent were at or below 10 ppbv; 9 percent were between 11 and 50 ppbv, and 2.5 percent were between 51 and 100 ppbv.

Soil Gas Analytical Results: Soil gas samples were collected in Summa canisters for laboratory analysis at 15 feet bgs at 30 locations adjacent to 100 Garden City Plaza, 200 Garden City Plaza, and at 100 Ring Road. In addition, six canister samples (from four different locations) were collected from Hazelhurst Park (the grassy strip along Clinton Road) where the screening survey results were elevated. Detections of COC VOCs are shown on Figure 10 and are summarized below.

TCE detections exceeded the screening criterion for deep soil gas of 2.2 micrograms per cubic meter ($\mu g/m^3$) (see Table 6) in one sample near 200 Garden City Plaza (SGRF-25 at 23$\mu g/m^3$). Three samples collected in Hazelhurst Park had TCE detections that exceeded the criterion (SGHP-2 at 3.9J, SGHP-3 at 12, and SGHP-4 at 3J µg/m^3). PCE did not exceed the screening criterion shown on Table 6.

Numerous other VOCs were detected at very low levels in the soil gas samples collected near the buildings and along Hazelhurst Park. None exceeded the screening criteria and most are associated with gasoline.

Vapor Intrusion

Based on the results of the soil gas screening, EPA is conducting an investigation of indoor air of structures within the area that could potentially be affected by intrusion of vapors from the groundwater contamination plume (summarized below). EPA would implement an appropriate remedy (such as subslab ventilation systems) based on the investigation results.

EPA collected two rounds of vapor samples in April and June 2007. The first round of sampling in April included subslab samples collected underneath the concrete slabs at four commercial buildings on the west side of the Roosevelt Field mall complex.

Based on the Round 1 results, in June 2007 EPA collected a second round of subslab and indoor air samples at six commercial buildings at the Site. No indoor samples were above levels of concern in any of the buildings. Also in June 2007, EPA collected subslab samples at seven homes located west of Clinton Road adjacent to the Roosevelt Field mall/office complex.

Additional evaluation of the residential and commercial buildings will take place to determine the extent of the vapor intrusion impacts.

Soils

A total of 41 subsurface soil samples were collected from 12 soil borings at locations with soil gas screening results above 100 ppbv and at 7 additional locations in Hazelhurst Park.[3] Soil samples were generally collected at 2 depths, 15 and 40 feet bgs, although the actual depths of samples were adjusted slightly because the drilling rig occasionally encountered obstacles in the subsurface.

No VOCs exceeding the detection limit of 5 micrograms per kilogram (µg/kg) were detected in any of the soil samples collected. While it is believed that airfield activities were the source of the groundwater contamination identified in the RI, based on the results of the

[3]Analytical Report prepared by Lockheed Martin, Inc. (Air Results), June 2007; Analytical Report prepared by Lockheed Martin, Inc. (Air Results), August 2007; Analytical Report prepared by Lockheed Martin, Inc., (Soil Results), August 2007.

soil gas and soil borings, there do not appear to be any continuing sources in the soil in the areas that were sampled.

Contamination Fate and Transport

The persistence of contaminants is determined by the rate of degradation, velocity of the groundwater, the geochemical conditions in the aquifer, and the retardation coefficient (Kd) of the individual compounds. The Kd values for the COC VOCs show that they will have low adsorption to the materials in the aquifer. No residual sources in the unsaturated zone were identified.

The COCs are mobile and are expected to move with the groundwater, although at a slower rate. Natural attenuation via biodegradation appears to be limited, and due to the high oxygen levels found in the aquifer, is not likely to sufficiently reduce contaminant levels. Limited natural attenuation, however, is expected to occur through dilution and dispersion.

CURRENT AND POTENTIAL FUTURE SITE AND RESOURCE USES

The Site includes a large shopping mall, numerous restaurants, a movie theater, and office buildings which ring the shopping mall. Most of the open space at the Site is asphalt parking areas for the shopping mall and office buildings. Other parts of the Site include the two Village of Garden City supply wells, two recharge basins and a small strip of open space known as Hazelhurst Park just east of Clinton Road. The use of the Site in the future is unlikely to change.

SUMMARY OF SITE RISKS

As part of the RI/FS, EPA conducted a baseline risk assessment to estimate the current and future effects of contaminants on human health and the environment. A baseline risk assessment is an analysis of the potential adverse human health and ecological effects of releases of hazardous substances from a site in the absence of any actions or controls to mitigate such releases, under current and future land uses. The baseline risk assessment includes a human health risk assessment and an ecological risk assessment. It provides the basis for taking action and identifies the contaminants and exposure pathways that need to be addressed by the remedial action. This section of the ROD summarizes the results of the baseline risk assessments for this Site.

Human Health Risk Assessment

A four-step process is utilized for assessing site-related human health risks for a reasonable maximum exposure scenario: *Hazard Identification* – uses the analytical data collected to identify the contaminants of potential concern at the Site for each medium, with consideration of a number of factors explained below; *Exposure Assessment* - estimates the magnitude of actual and/or potential human exposures, the frequency and duration of these exposures, and the pathways (e.g., ingesting contaminated well-water) by which humans are potentially exposed; *Toxicity Assessment* - determines the types of adverse health effects associated with chemical exposures, and the relationship between magnitude of exposure (dose) and severity of adverse effects (response); and *Risk Characterization* - summarizes and combines outputs of the exposure and toxicity assessments to provide a quantitative assessment of Site-related risks. The risk characterization also identifies contamination with concentrations which exceed acceptable levels, defined by the NCP as an excess lifetime cancer risk greater than 1×10^{-4} - 1×10^{-6} or a Hazard Index (HI) greater than 1.0. The goal of protection is 10^{-6} for cancer risk and an HI of 1 for a noncancer health hazard. Chemicals that exceed a 10^{-4} cancer risk or an HI of 1 are typically those that will require remedial action at the site and are referred to as COCs in the final remedial decision or Record of Decision. This section also includes a discussion of the uncertainties associated with these risks.

Hazard Identification: In this step, the chemicals of potential concern (COPCs) at the Site in each medium were identified based on such factors as toxicity, frequency of occurrence, fate and transport of the contaminants in the environment, concentrations, mobility, persistence, and bioaccumulation. Analytical information that was collected to determine the nature and extent of contamination revealed the presence of a number of constituents, such as PCE, TCE, carbon tetrachloride, chloroform and benzene in groundwater at concentrations of potential concern. Based on this information, the risk assessment focused on groundwater and the contaminants which may pose significant risk to human health. A comprehensive list of all COPCs can be found in the baseline human health risk assessment (BHHRA) in the administrative record. PCE and TCE, which are the COCs whose concentrations pose a significant risk or hazard at the Site, are listed in Table 7.

Exposure Assessment: Consistent with Superfund policy and guidance, the BHHRA is a baseline human health risk assessment and therefore assumes no remediation or institutional controls to mitigate or remove hazardous substance releases. Cancer risks and noncancer hazard indices are calculated based on an estimate of the reasonable maximum exposure (RME) expected to occur under current and future conditions at the Site. The RME is defined as the highest exposure that is reasonably expected to occur at a site. For those contaminants for which the risk or hazard exceeds acceptable levels, the central tendency estimate (CTE), or the average exposure, was also evaluated.

Current Site land use is primarily commercial, including office buildings and a shopping mall. The neighboring properties are mixed-use (commercial and residential) in nature. Future land use is expected to remain the same, although the unlikely possibility that the mall and office buildings would be developed into a residential area was considered in the BHHRA. Although residents and businesses in the area are served by municipal water, groundwater is designated by the State as a potable water supply, meaning it could be used for drinking in the future. Therefore, potential exposure to groundwater was evaluated. The BHHRA evaluated potential risks to populations associated with both current and potential future land uses.

Exposure pathways were identified for each potentially exposed population and each potential exposure scenario for the groundwater at the Site. Exposure pathways assessed in the BHHRA for the groundwater included ingestion of and dermal contact with tap water. Inhalation of volatile contaminants while showering and bathing was also evaluated for the hypothetical future resident. Based on current and anticipated future use of the Site, the BHHRA considered a variety of possible receptors: the current and future on-site worker and the potential future on-site resident (adult and child). A summary of the exposure pathways included in the baseline human health risk assessments can be found in Table 8.

Typically, exposures are evaluated using a statistical estimate of the exposure point concentration (EPC), which is usually an upperbound estimate of the average concentration for each contaminant, but in some cases may be the maximum detected concentration. A summary of the exposure point concentrations for the COCs in groundwater can be found in Table 7, while a comprehensive list of the exposure point concentrations for all COPCs can be found in the BHHRA.

Toxicity Assessment: Under current EPA guidelines, the likelihood of carcinogenic risks and noncancer hazards due to exposure to Site chemicals are considered separately. Consistent with current EPA policy, it was assumed that the toxic effects of the Site-related chemicals would be additive. Thus, cancer and noncancer risks associated with exposures to individual COPCs were summed to indicate the potential risks and hazards associated with mixtures of potential carcinogens and noncarcinogens, respectively.

Toxicity data for the human health risk assessment were provided by the Integrated Risk Information System (IRIS) database, the Provisional Peer Reviewed Toxicity Database (PPRTV), or other sources that are identified as appropriate references for toxicity values consistent with EPA's directive on toxicity values. This information is presented in Table 9 (noncancer toxicity data summary) and Table 10 (cancer toxicity data summary).

Risk Characterization: Noncarcinogenic (systemic) risks were assessed using a hazard index (HI) approach, based on a comparison of expected contaminant intakes and benchmark comparison levels of intake (reference doses [RfDs], reference concentrations [RfCs]). RfDs and RfCs are estimates of daily exposure levels for humans (including sensitive individuals) which are thought to be safe over a lifetime of exposure. The estimated intake of chemicals identified in environmental media (*e.g.*, the amount of a chemical in soil incidentally ingested) is compared to the RfD or the RfC to derive the hazard quotient (HQ) for the contaminant in the particular medium. The HI is obtained by adding the hazard quotients for all compounds within a particular medium that impact a particular receptor population.

The HQs for oral and dermal exposures are calculated as below. The HQ for inhalation exposures is calculated using a similar model that incorporates the RfC rather than the RfD.

HQ = Intake/RfD

Where: HQ = hazard quotient
Intake = estimated intake for a chemical (mg/kg-day)
RfD = reference dose (mg/kg-day)

The intake and the RfD represent the same exposure period (i.e., chronic, subchronic, or acute).

As previously stated, the HI is calculated by summing the HQs for all chemicals for likely exposure scenarios for a specific population. An HI greater than 1.0 indicates that the potential exists for noncarcinogenic health effects to occur as a result of Site-related exposures, with the potential for health effects increasing as the HI increases. When the HI calculated for all chemicals for a specific population exceeds 1.0, separate HI values are then calculated for those chemicals which are known to act on the same target organ. These discrete HI values are then compared to the acceptable limit of 1.0 to evaluate the potential for noncancer health effects on a specific target organ. The HI provides a useful reference point for gauging the potential significance of multiple contaminant exposures within a single medium or across several media. A summary of the noncarcinogenic risks associated with these chemicals for each exposure pathway is contained in Table 11.

As seen in Table 11, noncancer hazards for the on-site worker, adult on-site resident, and on-site child resident exceed EPA's HI threshold of 1, at 3, 10 and 35, respectively. Therefore, noncarcinogenic risks may occur from exposure routes evaluated in the risk assessment. The noncarcinogenic risks were attributable primarily to ingestion of TCE in groundwater.

For carcinogens, risks are generally expressed as the incremental probability of an individual developing cancer over a lifetime as a result of exposure to a carcinogen, using the cancer slope factor (SF) for oral and dermal exposures and the inhalation unit risk (IUR) for inhalation exposures. Excess lifetime cancer risk for oral and dermal exposures is calculated from the following equation, while the equation for inhalation exposures uses the IUR, rather than the SF:

Risk = LADD x SF

Where: Risk = a unitless probability (1×10^{-6}) of an individual developing cancer

LADD = lifetime average daily dose averaged over 70 years (mg/kg-day)
SF = cancer slope factor, expressed as [1/(mg/kg-day)]

These risks are probabilities that are usually expressed in scientific notation (such as 1×10^{-4}). An excess lifetime cancer risk of 1×10^{-4} indicates that one additional incidence of cancer may occur in a population of 10,000 people who are exposed under the conditions identified in the assessment. As stated in the NCP, the acceptable risk range for Site-related exposure is 10^{-6} to 10^{-4}, with 10^{-6} being the goal of protection.

As shown in BHHRA and summarized in Table 12, in the unlikely event that untreated Site groundwater were to be used as drinking water, exposure to groundwater contaminated with PCE and TCE would be associated with combined excess lifetime cancer risks of 2×10^{-4} for the future on-site worker, 2×10^{-3} for the future on-site adult resident, and 6×10^{-3} for the future on-site child resident.

These cancer risks and noncancer health hazards indicate that there is significant potential risk from direct exposure to groundwater to potentially exposed populations. For these receptors, exposure to PCE and TCE in groundwater results in both an excess lifetime cancer risk that exceeds EPA's target risk range of 10^{-4} to 10^{-6} and an HI above the threshold of 1. Concentrations of PCE and TCE are also in excess of the Federal and State MCL of 5µg/L for these contaminants. 1,1-Dichloroethene and cis-1,2-dichloroethene are also site-related contaminants that exceeded the MCL of 5µg/L and are therefore considered COCs. Carbon tetrachloride is considered a site-related contaminant, but concentrations did not exceed the MCL of 5 µg/L. However, a cleanup goal has been established (5µg/L) should future sampling indicate that carbon tetrachloride exceeds MCLs.

Based on the soil gas data collected, EPA conducted an investigation of indoor air/vapor intrusion into commercial structures within the area that could potentially be affected by the groundwater contamination plume. EPA is currently planning a further investigation of vapor intrusion into these structures. More information about the vapor intrusion investigation can be found in a separate report in the information repository for the Site. If the results of the investigations indicate that there is concern with Site-related vapors migrating into buildings, EPA would perform mitigation as necessary.

The response action selected in the Record of Decision is necessary to protect the public health or welfare of the environment from actual or threatened releases of contaminants into the environment.

Uncertainties: The procedures and inputs used to assess risks in this evaluation, as in all such assessments, are subject to a wide variety of uncertainties. In general, the main sources of uncertainty include:

- environmental chemistry sampling and analysis;
- environmental parameter measurement;
- fate and transport modeling;
- exposure parameter estimation; and
- toxicological data.

Uncertainty in environmental sampling arises in part from the potentially uneven distribution of chemicals in the media sampled. Consequently, there is significant uncertainty as to the actual levels present. Environmental chemistry-analysis error can stem from several sources including the errors inherent in the analytical methods and characteristics of the matrix being sampled.

Uncertainties in the exposure assessment are related to estimates of how often an individual would actually come in contact with the chemicals of concern, the period of time over which such exposure would occur, and in the models used to estimate the concentrations of the chemicals of concern at the point of exposure.

Uncertainties in toxicological data occur in extrapolating both from animals to humans and from high to low doses of exposure, as well as from the difficulties in assessing the toxicity of a mixture of chemicals. These uncertainties are addressed by making conservative assumptions concerning risk and exposure parameters throughout the assessment. As a result, the risk assessment provides upper-bound estimates of the risks to populations near the Site, and is highly unlikely to underestimate actual risks related to the Site.

More specific information concerning public health risks, including a quantitative evaluation of the degree of risk associated with various exposure pathways, is presented in the BHHRA report.

Summary of Ecological Risks

The initial activities associated with a Screening Level Ecological Risk Assessment (SLERA) were completed for this investigation. The first step was to obtain information regarding the environmental setting and chemical contamination at the Site by compiling information from the Site history and other reports related to the Site. This was followed by collecting additional information related to the ecological resources at the Site regarding threatened and endangered species, as well as utilizing topographical maps and aerial photographs. Finally, a Site visit was performed to obtain detailed information relating to the habitat types present at the Site and to identify the flora and fauna at the Site.

An evaluation of the information and data that was collected was then performed, and the results of the evaluation indicated that a scientific/management decision point (SMDP) was reached. During the SLERA process, there are three possible outcomes that can be reached at the SMDP:

(1) There is adequate information to conclude that ecological risks are negligible and therefore there is no need for remediation on the basis of ecological risk;

(2) The information is not adequate to make a decision at this point, and the ecological risk assessment process will continue;

(3) The information indicates a potential for adverse ecological effects, and a more thorough assessment is warranted.

As described in preceding sections, VOCs in the groundwater are the primary contaminants, and groundwater is the primary medium of concern at the Site. Given that groundwater does not discharge to a surface water body or any surface features (i.e., the recharge basins) at the Site, which prevents exposure to any potential ecological receptor at the Site, a conclusion can be reached that there are no completed pathways present at the Site for ecological receptors. In addition, most of the land area is paved and there do not appear to be any continuing sources of contamination in the areas sampled, which prevents any potential exposure for ecological receptors. Based on this information, there is adequate information to conclude that ecological risks are negligible and therefore there is no need for remediation on the basis of ecological risk.

Summary of Human Health and Ecological Risks

The results of the risk assessment indicate that exposure of future receptors to untreated Site groundwater presents unacceptable increased cancer risks and noncancer hazards. In addition, groundwater COC concentrations exceed their respective MCLs, thereby posing a potential human health risk.

EPA determined that ecological risks are negligible. VOCs in the groundwater are the primary contaminants and groundwater is the primary medium of concern for the Site. Groundwater does not discharge to a surface water body or surface feature (i.e., recharge basins) at the Site, which prevents exposure to any potential ecological receptors at the Site.

Basis for Action

Based upon the results of the RI and human health risk assessment, EPA has determined that the response action selected in this ROD is necessary to protect the public health or welfare of the environment from actual or threatened releases of hazardous substances into the environment.

REMEDIAL ACTION OBJECTIVES

Remedial action objectives are specific goals to protect human health and the environment. These objectives are based on available information and standards, such as applicable or relevant and appropriate requirements (ARARs), to-be-considered guidance, and Site-specific risk-based levels.

The following remedial action objectives were established for the Site:

- Prevent or minimize potential, current, and future human exposures including inhalation, ingestion, and dermal contact with VOC-contaminated groundwater that exceeds MCLs;

- Minimize the potential for off-site migration of groundwater with VOC contaminant concentrations greater than MCLs;

- Restore groundwater to beneficial use levels within a reasonable time frame, as specified in the National Contingency Plan (NCP); and

- Mitigate, if necessary, Site-related vapor migrating into the commercial buildings.

Groundwater cleanup goals will be the more stringent of the New York State or federal MCLs, which are summarized on Table 1.

SUMMARY OF REMEDIAL ALTERNATIVES

Section 121(b)(1) of CERCLA, 42 U.S.C. §9621(b)(1) mandates that remedial actions must be protective of human health and the environment, cost-effective, comply with ARARS, and utilize permanent solutions and alternative treatment technologies and resource recovery alternatives to the maximum extent practicable. Section 121(b)(1) also establishes a preference for remedial actions which employ, as a principal element, treatment to permanently and significantly reduce the volume, toxicity, or mobility of the hazardous substances, pollutants and contaminants at a site. Section 121(d) of CERCLA, 42 U.S.C. §9621(d) further specifies that a remedial action must attain a level or standard of control of the hazardous substances, pollutants, and contaminants, which at least attains ARARs under federal and state laws, unless a waiver can be justified pursuant to Section 121(d)(4) of CERCLA, 42 U.S.C. §9621(d)(4).

Detailed descriptions of the remedial alternatives for addressing the contamination associated with the Site can be found in the FS report. The FS report presents the three groundwater alternatives summarized below.

The duration time for each alternative reflects the estimated time required for the contaminant levels in the entire groundwater contaminant plume associated with the Site to be reduced below MCLs.

The remedial alternatives are:

Alternative 1: No Action

Capital Cost:	$0
Annual Operation and Maintenance (O&M) Cost:	$0
Present-Worth Cost:	$0
Duration:	46 years

The Superfund program requires that the "no-action" alternative be considered as a baseline for comparison with the other alternatives. The no-action remedial alternative would not include any physical remedial measures to address the groundwater contamination at the Site. The preliminary groundwater model predicted it would take 46 years for the contaminant concentrations in the plume to decrease below the MCLs via natural attenuation processes.

Because this alternative would result in contaminants remaining on-site above levels that allow for unrestricted use and unlimited exposure, CERCLA requires that the Site be reviewed at least once every five years.

Alternative 2: Monitoring and Institutional Controls

Capital Cost:	$300,000
Annual O&M Cost (4):	$150,000/$110,000(5)
Present-Worth Cost:	$2,290,000
Duration:	46 years

(4) Includes long-term monitoring costs only
(5) The long-term monitoring program would be reduced after 25 years due to the reduction in the size of the plume.

Alternative 2 includes long-term monitoring of the contaminant plume through annual sampling and analysis of 7 existing multi-port wells and 2 existing single-screen monitoring wells (GWX-10019 and GWX-10020).

The results of the long-term monitoring program would be used to evaluate the migration and changes in the contaminant plume over time to ensure attainment of the MCLs. The preliminary groundwater model predicted it would take 46 years for the contaminant concentrations in the plume to decrease below the MCLs via natural attenuation processes. This alternative would also include future vapor intrusion sampling to determine if there is a concern with Site-related vapor migrating into the buildings.

In addition, this alternative would include institutional controls that restrict future use of groundwater at the Site. Specifically, the New York State Department of Health State Sanitary Code regulates installation of private potable water supply wells in Nassau County. In addition, EPA would rely on the current zoning in the area including and surrounding the mall to restrict the land use to commercial industrial uses. If a change in land use is proposed, additional investigation of soils in this area would be necessary to support the land use change. Regulatory requirements under the State's Superfund program may result in NYSDEC seeking to obtain easements/covenants on various properties within the Site.

A site management plan (SMP) would also be developed and would provide for the proper management of all Site remedy components post-construction, such as institutional controls, and shall also include: (a) monitoring of Site groundwater to ensure that, following remedy implementation, the groundwater quality improves; (b) conducting an evaluation of the potential for vapor intrusion, and mitigation, if necessary, in the event of future construction; (c) provision for any operation and maintenance required of the components of the remedy; and (d) periodic certifications by the owner/operator or other person implementing the remedy that any institutional and engineering controls are in place.

Because this alternative would result in contaminants remaining on-site above levels that allow for unrestricted use and unlimited exposure, CERCLA requires that the Site be reviewed at least once every five years.

Alternative 3: Groundwater Extraction and Ex-situ Treatment (Pump and Treat)

Capital Cost:	$6,240,000
Annual O&M Cost:	$850,000/$175,000/111,000(6)
Present-Worth Cost:	$13,160,000
Duration:	35 years

(6) O&M and long-term monitoring for years 1-10/long-term monitoring for years 10-25/reduced long-term monitoring for years 25-35.

Alternative 3 includes a groundwater extraction well(s) which would be installed downgradient from monitoring well SVP/GWM-4 (see Figure 11), to capture the portion of the contaminant plume with high PCE and TCE concentrations without impacting the pumping capacity of supply wells GWP-10 and GWP-11, which have a pumping zone of influence radius of approximately 1,000 feet. The number of extraction wells needed would be determined after the completion of the pre-design investigation described below. Extracted groundwater would be treated via air strippers for approximately 10 years, with the treated water expected to be discharged to Nassau County recharge basin #124. Figure 12 shows the approximate location of the treatment facility. Based on the preliminary groundwater model, it is estimated that MCLs would be achieved in the zone of influence of the new pumping well in approximately 10 years, at which time the contamination in the extracted groundwater would have reached drinking water standards (MCLs). It is also noted that at the end of the same 10-year period, the supply wells GWP-10 and 11 would withdraw groundwater, before wellhead treatment, with contamination at or close to MCLs. It would take another 25 years for contaminant residuals in the aquifer to reach MCLs through natural attenuation processes. In summary, the preliminary model estimated that complete restoration of the aquifer to levels below the MCLs would require a total of 35 (10 + 25) years.

Alternative 3 includes a pre-design investigation which would include installation of at least 3 new multi-port wells: one well to the north of existing well GWX-9953 to confirm the northern boundary of the plume, a second well to the west of GWX-9953 to confirm the total depth of the plume, and a third well to the south of the Village of Garden City supply wells to better define the leading edge of the plume. Figure 13 shows the locations of the proposed multi-port wells.

Alternative 3 would also include evaluation and future upgrading, if necessary, of the wellhead treatment at the Garden City supply wells 10 and 11, which have been impacted by Site-related contamination. This wellhead treatment system would be needed until it has been determined that these public supply wells are no longer being impacted by the Site-related contaminants above MCLs.

In addition, if future vapor intrusion investigations indicate that there is a concern with Site-related vapors migrating into the commercial buildings, EPA would perform mitigation, as necessary.

This alternative would also include institutional controls that restrict future use of groundwater at the Site. Specifically, the New York State Department of Health State Sanitary Code regulates installation of private potable water supply wells in Nassau County. In addition, EPA would rely on the current zoning in the area including and surrounding the mall to restrict the land use to commercial industrial uses. If a change in land use is proposed, additional investigation of soils in this area would be necessary to support the land use change. Regulatory requirements under the State's Superfund program may result in NYSDEC seeking to obtain easements/covenants on various properties within the Site.

An SMP would also be developed and would provide for the proper management of all Site remedy components post-construction, such as institutional controls, and shall also include: (a) monitoring of Site groundwater to ensure that, following remedy implementation, the groundwater quality improves; (b) conducting an evaluation of the potential for vapor intrusion, and mitigation, if necessary, in the event of future construction; (c) provision for any operation and maintenance required of the components of the remedy; and (d) periodic certifications by the owner/operator or other person implementing the remedy that any institutional and engineering controls are in place.

Alternative 3 would also include long-term monitoring of the contaminant plume through annual sampling and analysis. For cost estimating purposes, 7 existing multi-port wells, 2 existing single-screen monitoring wells (GWX-10019 and GWX-10020), and the new multi-port wells to be installed as part of the pre-design investigation would be monitored. The results of the long-term monitoring program would be used to evaluate changes in the contaminant plume over time and to ensure achievement of MCLs.

In the event that public supply wells GWP-10 and GWP-11 were to be taken out of service permanently or were to be operated at a significant reduction of their current pumping rates, a contingency plan would be implemented to capture and treat the contaminant plume in that area. The contingency plan would include the installation of a new well or wells in the vicinity of supply wells GWP-10 and GWP-11 and an ex-situ treatment system.

Because MCLs will take longer than five years to achieve, a review of Site conditions will be conducted no less often than once every five years.

Contingency Plan

Capital Cost:	$5,660,000
Annual O&M Cost:	$680,000

As a potential element of Alternatives 3, in the event that public supply wells GWP-10 and GWP-11 were to be taken out of service permanently or were to be operated at a significant reduction of their current pumping rates, a contingency plan would be implemented to capture and treat the contaminant plume in that area. The contingency plan would include the installation of a new well or wells in the vicinity of supply wells GWP-10 and GWP-11 and an ex-situ treatment system.

COMPARATIVE ANALYSIS OF ALTERNATIVES

In selecting a remedy, EPA considers the factors set out in Section 121 of CERCLA, 42 U.S.C. § 9261, by conducting a detailed analysis of the remedial alternatives pursuant to the NCP, 40 CFR §300.430(e)(9) and Office of Solid Waste and Emergency Response (OSWER) Directive 9355.3-01. The detailed analysis consists of an assessment of the alternatives against each of nine evaluation criteria and comparative analysis focusing upon the relative performance of each alternative against those criteria.

The following "threshold" criteria are the most important and must be satisfied by any alternative in order to be eligible for selection:

1. Overall protection of human health and the environment addresses whether or not a remedy provides adequate protection and describes how risks posed through each exposure pathway (based on a reasonable maximum exposure scenario) are eliminated, reduced, or controlled through treatment, engineering controls, or institutional controls.

2. Compliance with ARARs addresses whether or not a remedy would meet all of the applicable or relevant and appropriate requirements of other federal and state environmental statutes and regulations or provide grounds for invoking a waiver. Other federal or state advisories, criteria, or guidance are To-Be-Considered (TBCs). TBCs are not required by the NCP, but may be very useful in determining what is protective of a Site or how to carry out certain actions or requirements.

The following "primary balancing" criteria are used to make comparisons and to identify the major tradeoffs between alternatives:

3. Long-term effectiveness and permanence refers to the ability of a remedy to maintain reliable protection of human health and the environment over time, once cleanup goals have been met. It also addresses the magnitude and effectiveness of the measures that may be required to manage the risk posed by treatment residuals and/or untreated wastes.

4. Reduction of toxicity, mobility, or volume through treatment is the anticipated performance of the treatment technologies, with respect to these parameters, a remedy may employ.

5. Short-term effectiveness addresses the period of time needed to achieve protection and any adverse impacts on human health and the environment that may be posed during the construction and implementation period until cleanup goals are achieved.

6. Implementability is the technical and administrative feasibility of a remedy, including the availability of materials and services needed to implement a particular option.

7. Cost includes estimated capital and O&M costs, and net present-worth costs.

The following "modifying" criteria are used in the final evaluation of the remedial alternatives after the formal comment period, and may prompt modification of the preferred remedy that was presented in the Proposed Plan:

8. State acceptance indicates whether, based on its review of the RI/FS reports and Proposed Plan, the State concurs with, opposes, or has no comments on the selected remedy.

9. Community acceptance refers to the public's general response to the alternatives described in the RI/FS reports and Proposed Plan.

A comparative analysis of these alternatives based upon the evaluation criteria noted above follows.

1. Overall Protection of Human Health and the Environment

The HHRA for the Site indicated the potential for risks associated with ingestion of contaminated groundwater by future on-site workers and future on-site adult and child residents. Alternative 1 would not include any monitoring or remedial measures, and as such, would not be protective of public health and the environment. Alternative 2 would only require long-term monitoring of the groundwater plume and institutional controls. As such, Alternative 2 would only be marginally more protective of human health and the environment than Alternative 1 because the groundwater plume would be monitored. Alternative 3 would provide overall protection of human health and the environment through implementation of a pump and treat system to extract and treat the groundwater contamination and natural attenuation processes. Alternatives 1 and 2 would rely solely upon natural processes to restore groundwater quality to drinking water standards. Although more costly than the other two alternatives, Alternative 3, which would include extraction and ex-situ treatment of contaminated groundwater, would result in the restoration of water quality in the aquifer approximately 11 years sooner than natural processes alone.

2. Compliance with ARARs

EPA and NYSDOH have promulgated health-based protective MCLs (40 CFR Part 141, and 10 NYCRR, Chapter 1), which are enforceable standards for various drinking water contaminants. Alternatives 1 and 2 would not comply with chemical-specific ARARs because no groundwater treatment would be undertaken and the groundwater model predicts it would take 46 years for the contaminant levels to drop below MCLs. Alternative 3 would comply with chemical-specific ARARs through active removal and treatment of groundwater contamination. Alternative 3 would also comply with location- and action-specific ARARs that may be applicable to the treatment plant location, any necessary piping to the plant from the extraction well or from the plant to the recharge basin. All work would comply with health and safety ARARs.

3. Long-Term Effectiveness and Permanence

Alternatives 1, 2 and 3 would provide long-term effectiveness and permanence, but in different time frames. Alternatives 2 and 3 would require 46 years for the groundwater contaminant levels to be reduced to levels below the MCLs. Alternative 2 would provide slighter greater long-term effectiveness than Alternative 1 because institutional controls would be employed. Alternative 3 would achieve long-term effectiveness and permanence in 35 years by extracting contaminated groundwater from the aquifer and treating it to remove the contaminants. Alternatives 2 and 3 also would include vapor intrusion sampling and mitigation, if necessary, in six commercial buildings at the Site.

4. Reduction in Toxicity, Mobility, or Volume Through Treatment

Alternatives 1 and 2 would not reduce toxicity, mobility, or volume through treatment since no treatment would be implemented. Alternative 3 would reduce the mobility and volume of the contaminant plume through groundwater extraction and reduce the toxicity through ex-situ treatment using air strippers. Alternative 3 would prevent the contaminant plume with concentrations above the MCLs from migrating downgradient. Alternatives 2 and 3 would also provide for mitigation due to vapor intrusion in the commercial buildings, if deemed necessary.

5. Short-Term Effectiveness

Alternative 1 would not have any short-term impact. Alternative 2 would have minimal short-term impact to the community and the environment due to the annual sampling of wells. Alternative 3 would have some additional impact to the community due to the drilling of wells and the construction of the groundwater extraction well(s) and treatment systems, but the duration would be short and the disturbance would be minimal.

6. Implementability

All three alternatives are implementable. Alternative 1 would be the easiest to implement, since it involves no action. Alternative 2 would be the next easiest to implement, since it only involves annual sampling of monitoring wells and would not have any ground intrusion activities. Alternative 3 would be also be easy to implement but more involved. Access for installation of extraction well(s) and construction of a treatment facility would be required and various contractors would need to be procured. Construction activities could be readily conducted using standard equipment and procedures.

7. Cost

Alternative 1 would not involve any costs. Alternative 2 would have relatively low costs since it only includes annual sampling of monitoring wells and vapor intrusion investigation of the commercial buildings. The costs associated with Alternative 3 primarily reflect the installation and operation of a groundwater extraction and treatment system and vapor intrusion mitigation systems in the commercial buildings, if deemed necessary. Although more costly than the other two Alternatives, Alternative 3 would result in the restoration of water quality in the aquifer approximately 11 years sooner than the natural processes relied on in Alternatives 1 and 2 alone.

Alternative	Capital Cost	Annual O&M	Total Present Worth
1	$0	$0	$0
2	$300,000	$150,000/$110,000(7)	$2,290,000
3*	$6,240,000	$850,000/175,000/110,000(8)	$13,160,000

* If the Contingency Plan is necessary, the capital costs for these alternatives would increase by $5,660,000 and the annual O & M costs would increase by $680,000. The actual present worth value of the contingency plan cannot be calculated, however, if it were to be implemented, the contingency plan would only operate until the MCLs are achieved.
(7) Includes long-term monitoring costs only. The monitoring program would be reduced after 25 years.
(8) O&M and long-term monitoring for years 1-10/long-term monitoring for years 10-25/reduced long-term monitoring for years 25-35.

8. State Acceptance

NYSDEC does not concur with the Record of Decision at this time pending review of the environmental easement requirements (see Appendix IV).

9. Community Acceptance

Comments received during the public comment period indicate that the public generally supports the selected remedy. These comments are summarized and addressed in the

Responsiveness Summary, which is attached as Appendix V to this document.

PRINCIPAL THREAT WASTE

No materials which meet the definition of "principal threat wastes" were identified during the RI/FS. Nevertheless, the EPA mandate (NCP Section 300.430 (a)(1)(iii)(F)) which requires that a contaminated sole-source drinking water aquifer be restored to beneficial use is met through treatment of the TCE and PCE groundwater contamination. No evidence was found during the RI that dense nonaqueous phase liquids (DNAPLs) are present within the saturated zone of the aquifer. Soil sample results indicated no VOCs remain in the unsaturated zone in the areas of the former airfield that were sampled. Therefore, no principal threat wastes are present at the Site.

SELECTED REMEDY

Summary of the Rationale for the Selected Remedy

Based upon consideration of the requirements of CERCLA, the detailed analysis of the alternatives, and public comments, EPA has determined that Alternative 3 (groundwater extraction and ex-situ treatment) best satisfies the requirements of CERCLA Section 121, 42 U.S.C. Section 9621, and provides the best balance of tradeoffs among the remedial alternatives with respect to the NCP's nine evaluation criteria listed at 40 CFR Section 300.430(e)(9).

Through groundwater extraction and ex-situ treatment, Alternative 3 will satisfy CERCLA's preference for remedial actions which employ, as a principal element, treatment to permanently and significantly reduce the volume, toxicity, or mobility of the hazardous substances, pollutants and contaminants at a site.

Alternative 3, which includes extraction and ex-situ treatment of contaminated groundwater, will result in the restoration of water quality in the aquifer more quickly than natural processes alone and provide for vapor intrusion mitigation, if deemed necessary.

EPA believes that the preferred remedy will remove contaminated groundwater from the aquifer, be protective of human health and the environment, comply with ARARs, be cost-effective, and utilize permanent solutions to the maximum extent practicable. The preferred remedy also will meet the statutory preference for the use of treatment as a principal element.

Description of the Selected Remedy

The selected remedy includes the following components:

Pre-Design Investigation of the Contaminant Plume: A pre-design investigation will be conducted to collect information for the remedial design. The pre-design investigation will include: installation of three multiport monitoring wells; a pumping test; a literature review; and infiltration tests at the Nassau County recharge basin #124.

The northern boundary and the vertical extent of the contaminant plume will be refined atwell locations SVP/GWM-2 and SVP/GWM-4. A new well, SVP/GWM-9, will be installed to the north of well GWX-9953 to confirm the northern boundary of the plume. A new well, SVP/GWM-10, will be installed to the west of well GWX-10019 to confirm the total depth, the contaminant levels, and the vertical distribution of the contaminant plume at this area. A new well, SVP/GWM-11, will be installed to the south of the two supply wells GWP-10 and GWP-11 to monitor whether contaminants are migrating downgradient from the area directly south of the supply wells (see map at Figure 13). The new multi-port monitoring wells will be installed 40 feet deeper than SVP/GWM-4. The installation of the three new wells will be similar to the multi-port monitoring well installation conducted during the RI. In addition, gamma logs will be run in all new wells to determine lithology.

A pumping test will be conducted to improve the accuracy of the groundwater model. A literature review will be conducted to obtain all available lithology logs of existing wells near the Site. The lithology data obtained from this review and the pre-design investigation gamma logs at the new multiport wells will be used to further refine the groundwater model's Site-specific conditions.

Infiltration tests will also be conducted at the Nassau County recharge basin #124 to obtain information on its current capacity in order to calibrate the groundwater model.

Groundwater Modeling: The preliminary three-dimensional groundwater model will be updated for the remedial design. Up-to-date contaminant distribution data will be collected from the pre-design investigation, and used to update the contaminant plume maps. The lithology and Site-specific hydraulic conductivity obtained during literature review and the pumping test will be incorporated into the model. During the remedial design, the most recent available pumping data and water level data will be used and the model will be re-calibrated accordingly.

The improved groundwater model with up-to-date contaminant data will be used to select the final location(s) of groundwater extraction well(s) and discharge options for treated groundwater for the remedial design.

Stage II Cultural Resource Survey: If ground intrusion such as well drilling or pipe routing are planned in any areas specified as sensitive for archeological resources during the Stage 1A cultural resource survey, a Stage II survey will be conducted.

Groundwater Extraction Well: To reduce the contaminant concentrations reaching the two supply wells GWP-10 and GWP-11, a groundwater extraction well(s) will be installed south of SVP/GWM-4 as shown in Figure 11. A new remedial extraction well SVP-4E will capture the contaminant plume upgradient of SVP/GWM-4, including the 200 μg/L contour of the PCE plume, while ensuring that the pumping capacity of supply wells GWP-10 and GWP-11 is not affected. The final location and number of extraction wells required will be determined after the pre-design investigation is completed and the groundwater model is updated.

The location, screen interval, and pumping rate of new SVP-4E were estimated using the preliminary groundwater model. The proposed pumping rate is 150 gpm with the screened interval from 175 to 275 below msl. The preliminary groundwater model indicated that after 10 years of pumping at SVP-4E, most of the contaminant plume upgradient of this extraction well will be removed. A very small portion of the contaminant plume near SVP-4E will still have concentrations above the MCLs. However, continuous operation of SVP-4E after 10 years was not recommended in the model, because it will not improve the overall cleanup time of the entire plume. As the preliminary groundwater model indicated, the drawdown caused by operation of both the new extraction well (SVP-4E) and the supply wells GWP-10 and GWP-11 may create a low flow zone between the two pumping areas. To the north of this low flow zone, groundwater flows toward SVP-4E; to the south of this low flow zone, groundwater flows toward the two supply wells. However, contaminants within the low flow zone may be held in place until extraction well SVP-4E is shut down. Once the extraction well SVP-4E is shut down, the low flow zone would disappear.

To minimize the low flow zone, several model simulations were conducted. Simulations included: a) one extraction well sequentially at different locations, b) three extraction wells running simultaneously at a lower flow rate and perpendicular to the groundwater flow, and c) three extraction wells running simultaneously at a lower flow rate and parallel to the groundwater flow. The results indicated that in order to capture the contaminant plume upgradient of new extraction wells, it is difficult to avoid creating a low flow zone.

<u>Ex-Situ Groundwater Treatment</u>: A low profile air stripper will remove the VOC contaminants. During the remedial design, additional treatment technologies (including liquid phase carbon adsorption) may be considered if additional information suggests the need for treatment following air stripping. The treated water will meet groundwater and surface water discharge standards.

Based on the maximum concentrations of PCE and TCE detected in SVP/GWM-4 during the RI, the maximum total VOCs (PCE and TCE) generated in the off-gas from the air stripper would be 1.5 pounds per day (lbs/day). According to the OSWER Directive 9355.0-28, *Control of Air Emissions from Superfund Air Strippers and Superfund Sites* (EPA 1989), off-gas treatment will not be necessary since the total VOC emissions are below 15 lbs/day. For New York State, according to air emission regulation 6NYCRR Part

212, the off-gas treatment required for VOC emission less than 1 pound per hour (lb/hr) is determined by the commissioner on a case by case basis. The emission rate at this Site is expected to be significantly below 1 lb/hr.

As stated above, the new extraction well SVP-4E will be operated for approximately 10 years, at which time it is estimated that contaminant levels in the majority of the zone of influence upgradient of the new pumping well would approach or achieve the MCLs, although the contamination in the groundwater near SVP-4E may be slightly above MCLs. It is also noted that at the end of the same 10-year period, the contamination in extracted groundwater in supply wells GWP-10 and 11 would, before wellhead treatment, be at or near the MCLs since the wells pump water from both contaminated and clean parts of the Magothy aquifer. The preliminary groundwater model indicated that after SVP-4E is shut down, it will take approximately another 25 years for the PCE and TCE contaminant residuals in the aquifer to achieve MCLs through natural processes. The residual contamination is expected to remain within the capture zone of the two supply wells until levels are reduced to below the MCLs. The overall duration for this alternative is estimated to be 35 years.

The proposed location of the ex-situ treatment system is shown in Figure 12.

Discharge of Treated Groundwater: The treated groundwater will be discharged to the local Nassau County recharge basin #124. The basin was constructed in 1940 and was designed for an estimated tributary area of 162 acres. The estimated available capacity is approximately 1,124,960 cubic feet. This basin has a 36-inch overflow pipe located in the southeast corner. The overflow eventually leads to Hempstead Lake and ultimately to tidal waters. With a 150 gpm discharge rate from the new groundwater extraction well SVP-4E, the daily loading to the recharge basin will be 28,944 cubic feet, significantly lower than the basin's capacity. However, during a storm event, the run-off would reduce the available capacity of the basin for groundwater discharge. During the remedial design, results of infiltration tests will be used to calculate the capacity of the recharge basin. Run-off from a representative rain event will also be calculated to verify the available capacity for treated groundwater discharge.

Evaluation and Upgrade of the Air Strippers at supply wells GWP-10 and GWP-11: The two packed tower air strippers at the supply wells were installed in 1987, and have been in operation for approximately 20 years. During the years of operation, the Village has upgraded the stripper capacity several times. An evaluation of the conditions of the air strippers will be conducted. Any necessary upgrade or replacement of the air strippers will be evaluated. The upgrade or replacement costs of the air strippers will be estimated based on the condition of the existing treatment system.

Vapor Intrusion Sampling: There is concern, based on previous sampling results, that Site-related vapor may migrate into the commercial buildings to the west of the mall.

Vapor intrusion sampling will be conducted at six buildings during the winter heating season. Vapor mitigation systems will be installed, if further sampling indicates the need for such systems.

Institutional Controls: Institutional controls will be relied upon to restrict the future use of groundwater at the Site. Specifically, the New York State Department of Health State Sanitary Code regulates installation of private potable water supply wells in Nassau County. In addition, EPA will rely on the current zoning in the area including and surrounding the mall to restrict the land use to commercial industrial uses. If a change in land use is proposed, additional investigation of soils in this area will be necessary to support the land use change. Regulatory requirements under the State's Superfund program may result in NYSDEC seeking to obtain easements/covenants on various properties within the Site.

Site Management Plan: A SMP will be developed and will provide for the proper management of all Site remedy components post-construction, such as institutional controls, and shall also include: (a) monitoring of Site groundwater to ensure that, following remedy implementation, the groundwater quality improves; (b) conducting an evaluation of the potential for vapor intrusion, and mitigation, if necessary, in the event of future construction at or in the vicinity of the Site; (c) provision for any operation and maintenance required of the components of the remedy; and (d) periodic certifications by the owner/operator or other person implementing the remedy that any institutional and engineering controls are in place.

Long-term Monitoring: The contaminant plume will be monitored through annual sampling and analysis of groundwater. The results of the long-term monitoring program will be used to evaluate changes in the contaminant plume over time and to ensure achievement of MCLs. Approximately 14 wells will be included in the long-term monitoring program, including seven multi-port wells installed during the RI (SVP/GWM-2 through SVP/GWM-8), three new multi-port wells, two single screen monitoring wells (GWX-10019 and GWX-10020), two supply wells, and annual groundwater sampling reports. Each new multi-port monitoring well was assumed to have 10 sampling ports.

Contingency Plan: In the event that public supply wells GWP-10 and GWP-11 are taken out of service permanently or area operated at a significant reduction of their current pumping rates, a contingency plan would be implemented to capture and treat the contaminant plume in that area. The contingency plan would include the installation of a new well or wells in the vicinity of supply wells GWP-10 and GWP-11 and an ex-situ treatment system.

Five Year Review: Because MCLs will take longer than five years to achieve, a review of Site conditions will be conducted no less often than once every five years.

Summary of the Estimated Remedy Costs

The estimated capital, annual O&M, and total present-worth cost for the selected groundwater remedy are $6,240,000, $850,000 (for O&M and long-term monitoring for the first 10 years), $175,000 (long-term monitoring for years 10 through 25 and $111,000 for years 26 through 35), and $13,160,000, respectively. Table 13 provides the basis for the cost estimates for Alternative 3. As stated earlier, if the Contingency Plan is implemented, it would result in additional estimated costs of $5,660,000 and $680,000, for capital costs and O&M costs, respectively.

It should be noted that these cost estimates are order-of-magnitude engineering cost estimates that are expected to be within +50 to -30 percent of the actual project cost. These cost estimates are based on the best available information regarding the anticipated scope of the selected remedy. Changes in the cost elements are likely to occur as a result of new information and data collected during the engineering design of the remedy.

Expected Outcomes of the Selected Remedy

The results of the risk assessment indicate that there is an unacceptable future cancer risk from exposure to contaminated groundwater through ingestion, inhalation and dermal contact to future residents if the Site were ever developed as a residential area, and through ingestion to future on-site workers.

The selected remedy will allow for the following potential land and groundwater use.

Land Use

The land use at the Site is not expected to change in the future. The mall area is developed as commercial and office facilities and the residential areas are also fully developed, with very little vacant land available for development.

Groundwater Use

Under the selected remedy, contaminated groundwater will be treated and returned to productive use. The use of remediation well(s) will accelerate the cleanup of the groundwater and prevent the most highly contaminated groundwater from reaching the two Village of Garden City supply wells. EPA does not anticipate that groundwater usage at the two supply wells will change in the future, but a Contingency Plan will ensure that contaminated groundwater does not migrate downgradient should the two supply wells be shut down or their level of pumping be severely reduced.

STATUTORY DETERMINATIONS

Under CERCLA Section 121 and the NCP, the lead agency must select remedies that are protective of human health and the environment, comply with ARARs (unless a statutory waiver is justified), are cost-effective, and utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. Section 121(b)(1) also establishes a preference for remedial actions which employ treatment to permanently and significantly reduce the volume, toxicity, or mobility of the hazardous substances, pollutants, or contaminants at a site.

For the reasons discussed below, EPA has determined that the selected remedy meets these statutory requirements.

Protection of Human Health and the Environment

Groundwater concentrations of several chlorinated VOCs in the aquifer exceed their respective MCLs, thereby posing a potential human health risk.

The selected remedy will be protective of human health and the environment through implementation of a remedial pump and treat system to extract and treat the groundwater contamination. The remedy will restore the groundwater to levels below the MCLs more rapidly than relying on natural attenuation processes alone.

Compliance with ARARs and Other Environmental Criteria, Advisories or Guidance

A summary of the ARARs and other federal or state advisories, criteria, or guidance and To-Be-Considered (TBCs) is presented below. TBCs may be very useful in determining what is protective of a Site or how to carry out certain actions or requirements.

- National Primary Drinking Water Standards-Maximum Contaminant Levels (MCLs) and Maximum Contaminant Level Goals (MCLGs) (40 CFR Part 141)
- OSWER Draft guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils
- New York Surface Water and Groundwater Quality Standards and Groundwater Effluent Limitations (6 NYCRR Part 703)
- New York State Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations (Technical and Operational Guidance Series 1.1.1)
- New York State Department of Health Drinking Water Standards (10 NYCRR Part 5)
- National Historic Preservation Act (40 CFR 6.301)
- RCRA Identification and Listing of Hazardous Wastes (40 CFR 261)
- RCRA Standards Applicable to Generators of Hazardous Wastes (40 CFR 262)
- RCRA—Standards for Owners/Operators of Permitted Hazardous Waste Facilities (40 CFR 264.10–164.18)
- RCRA—Preparedness and Prevention (40 CFR 264.30–264.31)
- RCRA—Contingency Plan and Emergency Procedures (40 CFR 264.50–264.56)
- New York Hazardous Waste Management System – General (6 NYCRR Part 370)
- New York Identification and Listing of Hazardous Waste (6 NYCRR Part 371)
- Department of Transportation (DOT) Rules for Transportation of hazardous materials (49 CFR Parts 107, 171, 172, 177 to 179)
- RCRA Standards Applicable to Transporters of Hazardous Waste (40 CFR 263)
- New York Hazardous Waste Manifest System and Related Standards for Generators, Transporters and Facilities (6 NYCRR Part 372)
- New York Waste Transporter Permit Program (6 NYCRR Part 364)
- RCRA Land Disposal Restrictions (40 CFR 268)

- New York Standards for Universal Waste (6 NYCRR Part 374-3) and Land Disposal Restrictions (6 NYCRR Part 376)
- Clean Water Act (40 CFR 122, 125)
- Clean Water Act Water Quality Criteria (Federal Ambient Water Quality Criteria and Guidance Values [40 CFR 131.36])
- Safe Drinking Water Act - Underground Injection Control (40 CFR 144, 146)
- New York Regulations on State Pollution Discharge Elimination System (SPDES) (6 NYCRR Parts 750-757)
- New York Surface Water and Groundwater Quality Standards and Groundwater Effluent Limitations (6 NYCRR Part 703)
- New York State Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations (Technical and Operational Guidance Series 1.1.1)
- New York State Regulations on Environmental Remediation 6 NYCRR part 375-1.8(a)(5)
- Clean Air Act, National Ambient Air Quality Standards (40 CFR 50)
- Federal Directive - Control of Air Emissions from Superfund Air Strippers (OSWER Directive 9355.0-28)
- New York State Air Regulations (6 NYCRR Part 200, et seq.)
- New York State Department of Environmental Conservation (6 NYCRR Part 602) Applications for Long Island Wells
- New York State Department of Health State Sanitary Code Appendix 5-B Standards for Water Wells

Cost-Effectiveness

A cost-effective remedy is one whose costs are proportional to the remedy's overall effectiveness (NCP Section 300.430(f)(1)(ii)(D)). Overall effectiveness is based on the evaluations of: long-term effectiveness and permanence; reduction in toxicity, mobility, and volume through treatment; and short-term effectiveness. Based on the comparison of overall effectiveness to cost, the selected remedy meets the statutory requirement that Superfund remedies be cost-effective in that it will achieve the remediation goals more rapidly than solely relying on natural processes within the aquifer.

Each of the alternatives has undergone a detailed cost analysis. In that analysis, capital and annual O&M costs have been estimated and used to develop present-worth costs. In the present-worth cost analysis, annual O&M costs were calculated for the estimated life of an alternative using a 7% discount rate. The estimated present-worth cost of the selected groundwater remedy is $13,160,000. EPA believes that the cost of the selected alternative is proportional to its overall effectiveness because it reduces the time required to achieve MCLs within the aquifer.[9]

Utilization of Permanent Solutions and Alternative Treatment Technologies to the Maximum Extent Practicable

The selected remedy provides the best balance of tradeoffs among the alternatives with respect to the balancing criteria set forth in NCP Section 300.430(f)(1)(i)(B), such that it represents the maximum extent to which permanent solutions and treatment technologies can be utilized for the groundwater at the Site. In addition, the selected remedy provides significant protection of human health and the environment, provides long-term effectiveness, is able to achieve the ARARs more quickly than the other alternatives, and is therefore cost-effective.

The selected groundwater remedy is considered a permanent remedy and will employ a treatment technology to reduce the toxicity, mobility, and volume of the contaminants in the groundwater.

Preference for Treatment as a Principal Element

The statutory preference for remedies that employ treatment as a principal element is satisfied under the selected remedy in that contaminated groundwater will be treated and treatment will be used to reduce the toxicity, mobility, and volume of contamination and achieve cleanup levels.

Five-Year Review Requirements

Under EPA policy, since MCLs will take longer than five years to achieve, a review of Site conditions will be conducted no less often than once every five years.

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[9] As stated earlier, the actual present worth value of the contingency plan cannot be calculated. However, if implemented, the contingency plan would only operate until MCLs are achieved. Even if the contingency plan were to be implemented, the selected remedy would still be cost-effective because it would ensure treatment of the contaminant plume in the area of GWP-10 and GWP-11.

DOCUMENTATION OF SIGNIFICANT CHANGES

The Proposed Plan, released for public comment on August 22, 2007, identified Alternative 3 (groundwater extraction and treatment). Based upon its review of the written and oral comments submitted during the public comment period, EPA determined that no significant changes to the remedy, as originally identified in the Proposed Plan, were necessary or appropriate. However, a typographical error was noted in the Proposed Plan; O&M costs for the preferred alternative were reported as $850,000 for the first 10 years and $790,000 for the remaining 25 years. The correct O&M costs are $850,000 (O&M and long-term monitoring for years 1-10), $175,000 (long-term monitoring for years 10-25) and $111,000 (reduced long-term monitoring for years 25-35). As there was no impact on the overall remedy cost this change is not considered significant.

OLD ROOSEVELT FIELD CONTAMINATED GROUNDWATER AREA SUPERFUND SITE RECORD OF DECISION

APPENDIX I

FIGURES

SUMMARY OF FIGURES

OLD ROOSEVELT FIELD CONTAMINATED GROUNDWATER AREA SUPERFUND SITE RECORD OF DECISION

APPENDIX II

TABLES

SUMMARY OF TABLES

OLD ROOSEVELT FIELD CONTAMINATED GROUNDWATER AREA SUPERFUND SITE RECORD OF DECISION

APPENDIX III

ADMINISTRATIVE RECORD INDEX

OLD ROOSEVELT FIELD CONTAMINATED GROUNDWATER AREA
SUPERFUND SITE
RECORD OF DECISION

APPENDIX III

ADMINISTRATIVE RECORD INDEX

Data are summarized in several of the documents that comprise the Administrative Record. The actual data, quality assurance/quality control, chain of custody, etc. are compiled at various EPA offices and can be made available at the record repository upon request. Bibliographies in the documents and in the references cited in this Record of Decision are incorporated by reference in the Administrative Record. Many of the documents referenced in the bibliographies and cited in this Record of Decision are publically available and readily accessible. Most of the referenced guidance documents are available on the EPA website (www.epa.gov). If copies of the documents cannot be located, contact the EPA Project Manager Caroline Kwan at (212) 637-4275. Copies of the Administrative Record documents that are not available in the Administrative Record repository file at the Village of Garden City Library or Village of Hempstead Library can be made available at this location upon request.

OLD ROOSEVELT FIELD CONTAMINATED GROUNDWATER AREA SUPERFUND SITE RECORD OF DECISION

APPENDIX I

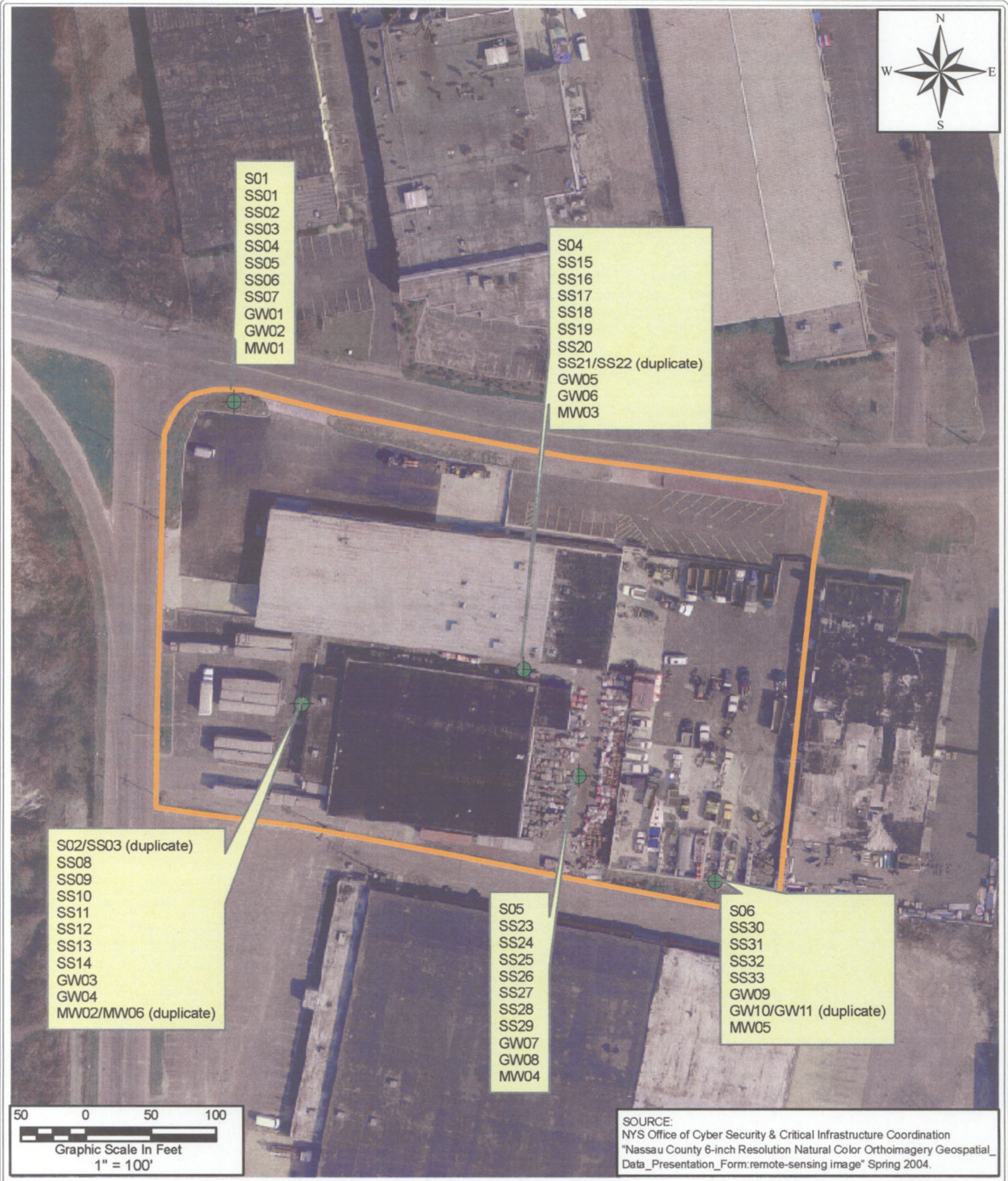
FIGURES

SUMMARY OF FIGURES

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

CDM

Figure 1
Site Location Map
Old Roosevelt Field Contaminated Groundwater Site
Garden City, New York



LEGEND:

Site Boundary

Proposed Sampling and Monitoring Well Location

Note: All sample numbers are preceded by "ALC-"

PROJECT: Aluminum Louvre Corp.

CLIENT NAME: EPA

TITLE:

Proposed Sample Location Map
Aluminum Louvre Corp.
Old Bethpage
Nassau County, NY

WESTON SOLUTIONS

DATE: May 2007

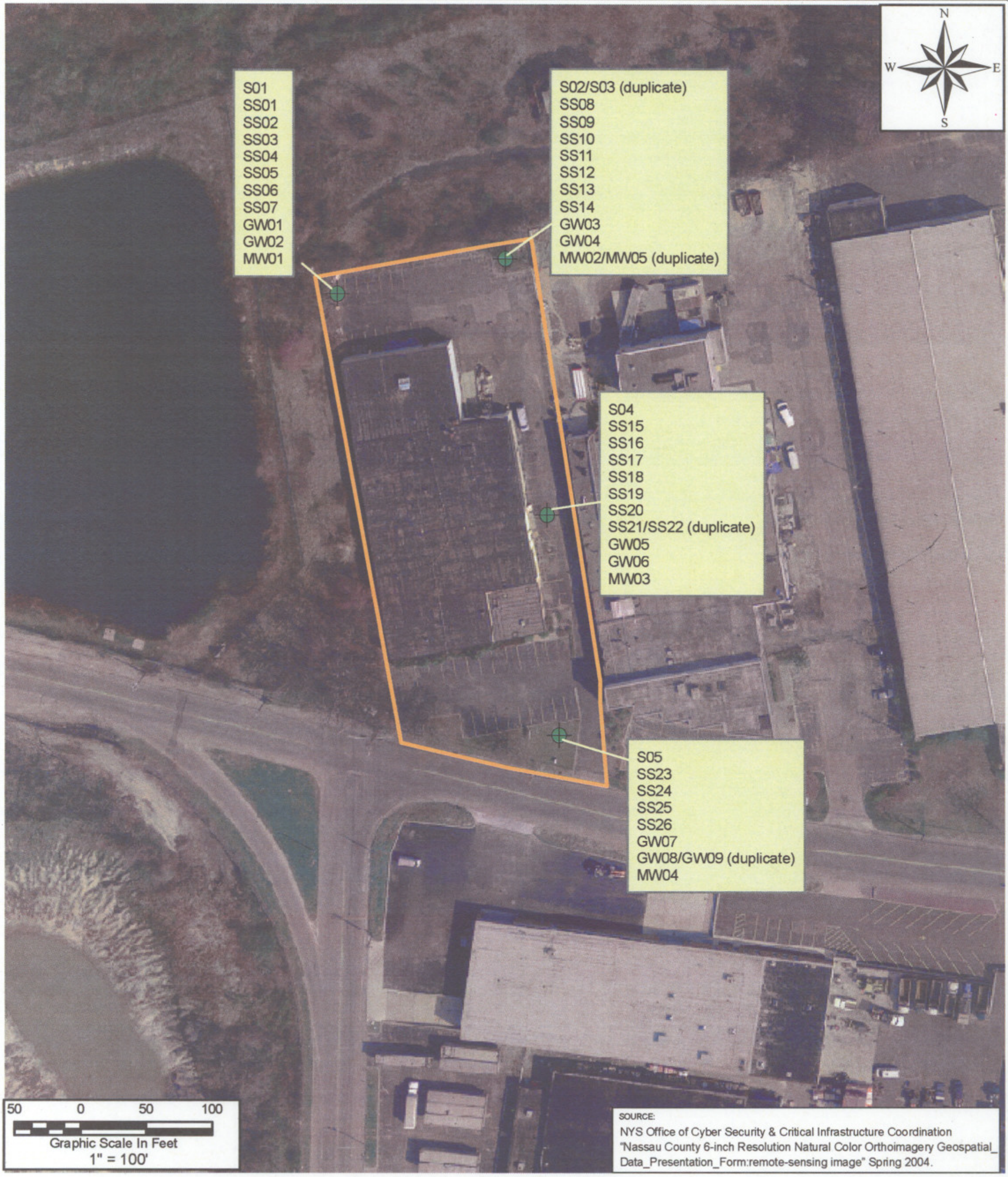
FIGURE #: 2

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

CDM

0.25 0.125 0 0.25 Miles

Figure 2
Site Map
Old Roosevelt Field Contaminated Groundwater Site
Garden City, New York



LEGEND:

Site Boundary

Proposed Sampling and Monitoring Well Location

Note: All sample numbers are preceded by "FILT-"

TITLE:

Proposed Sample Location Map
Filtron Corp
Old Bethpage
Nassau County, NY

PROJECT: Filtron Corp

CLIENT NAME: EPA

WESTON SOLUTIONS

DATE: May 2007

FIGURE #: 2

C:\IMS\GIS\Roosevelt Field\ArcMap_projects\Well_locations_PP.mxd

- Existing Monitoring Wells
- Multi-port Wells
- Village of Garden City Supply Wells
- N-8050 - A former cooling water well in which the highest concentrations were historically detected; the well is no longer active

Figure 3
Multi-port Well, Existing Monitoring Well, and Supply Well Locations

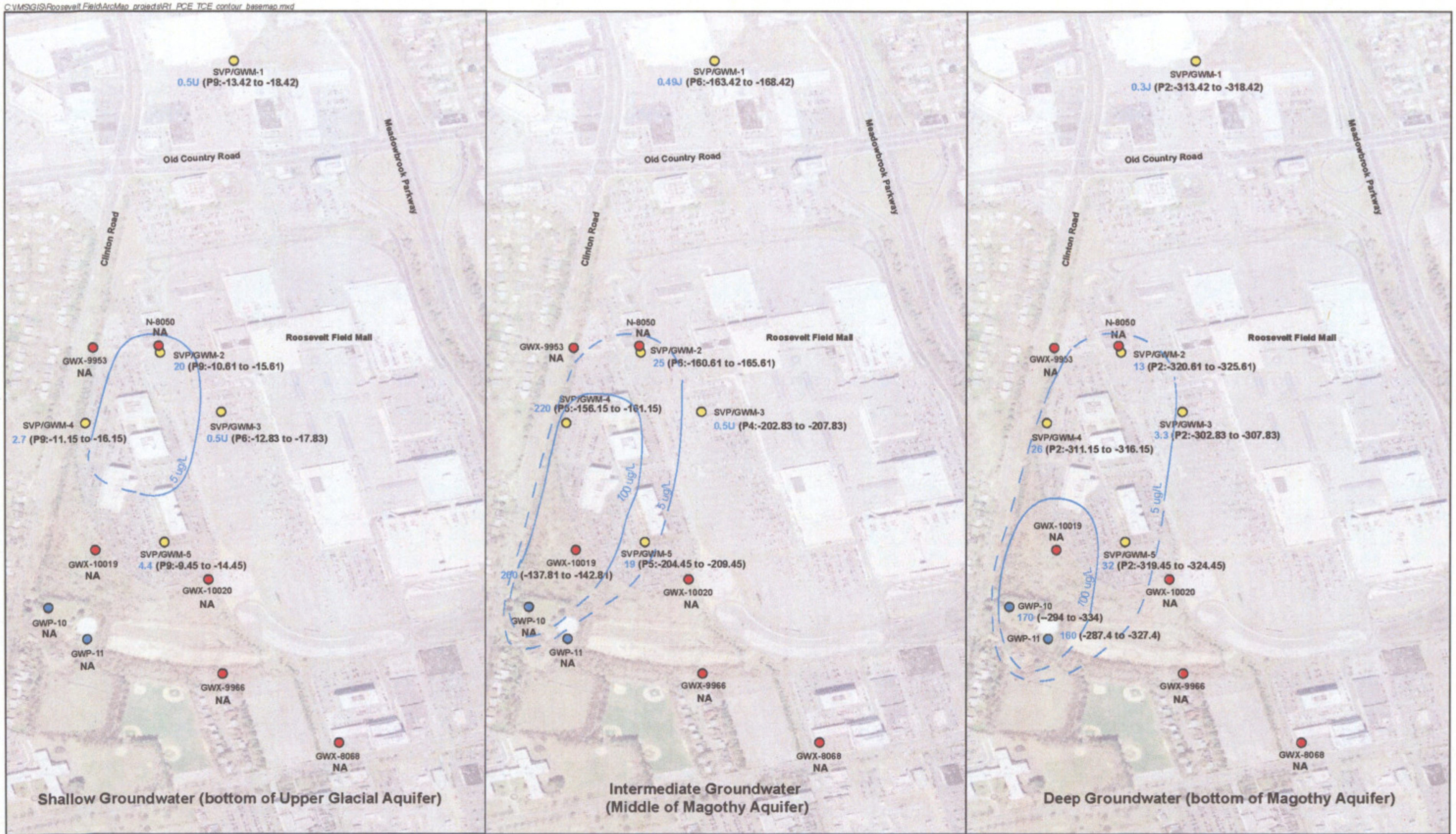
Old Roosevelt Field Contaminated Groundwater Site
Garden City, New York

N

0 375 750 1,500 Feet

CDM

C:\MSGIS\Roosevelt Field\ArcMap projects\R1 PCE TCE contour basemap.mxd



- Existing Wells
- Multiport Wells
- Supply Wells
- PCE Contour (µg/L), dashed where inferred.

TCE value (Port #: screen interval in feet AMSL)

All posted values are in micrograms per liter (µg/L)
PCE = Tetrachloroethene
NA = Not applicable - no data exists at elevation range
MCL = 5 µg/L

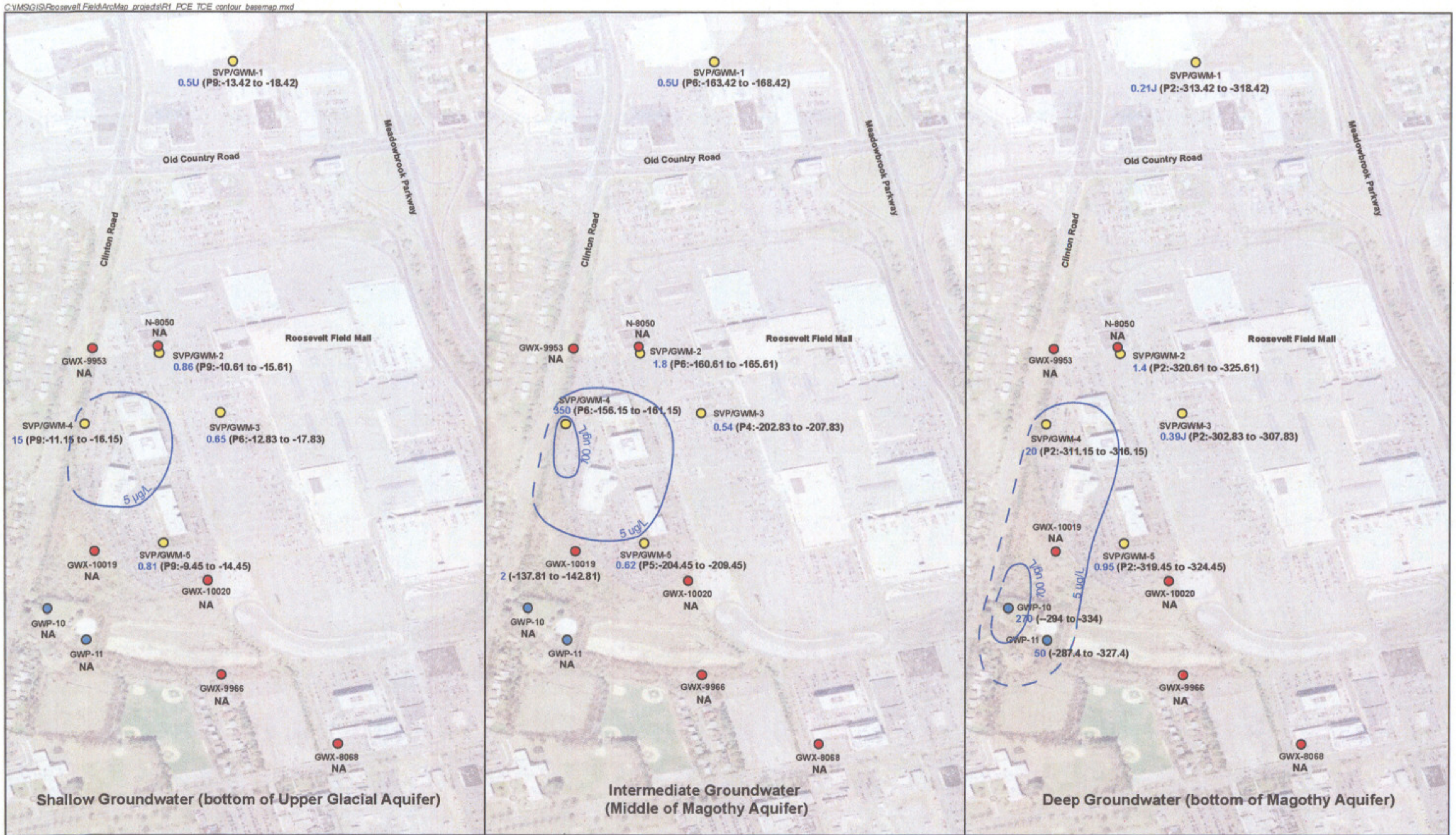
N

0 500 1,000 2,000 Feet

Figure 4
March 2006 (Round 1) TCE Isocontours at Select Elevations
Old Roosevelt Field Contaminated Groundwater Site
Garden City, New York

CDM

C:\MSGIS\Roosevelt Field\ArcMap_projects\R1_PCE_TCE_contour_basemap.mxd



- Existing Wells
- Multiport Wells
- Supply Wells
- PCE Contour (µg/L), dashed where inferred

PCE value (Port #: screen interval in feet AMSL)

All posted values are in micrograms per liter (µg/L)
PCE = Tetrachloroethene
NA = Not applicable - no data exists at elevation range
MCL = 5 µg/L

N

0 500 1,000 2,000 Feet

Figure 5
March 2006 (Round 1) PCE Isocontours at Select Elevations
Old Roosevelt Field Contaminated Groundwater Site
Garden City, New York

CDM

C:\IMS\GIS\Roosevelt Field\ArcMap_projects\Soil_gas_screening_locations_rev1.mxd

Soil Gas Screening Grid Point Location

N

0 100 200 400 Feet

Figure 6
Soil Gas Screening Locations
Old Roosevelt Field Contaminated Groundwater Site
Garden City, New York

CDM

C:\IMS\GIS\Roosevelt Field\ArcMap_projects\Fig2-2B_soil gas analytical.mxd

○ Soil Gas Boring Location for VOC Analysis via method TO-15

Note: SGRF10 and SGRF11 were not collected due to underground utilities.

Feet
0 30 60 120

Figure 7
Soil Gas Analytical Sample Locations
Old Roosevelt Field Contaminated Groundwater Site
Garden City, New York

C:\WMS\GIS\Roosevelt Field\ArcMap_projects\Roosevelt 15 ft Screening Results.mxd

- Soil gas screening point with grid point number and screening reading in parts per billion per volume (ppbv)
- Soil gas screening point with outdoor building boring location number
- Screening results at location exceed 10 ppbv
- Existing Wells and Multi-port Wells included for Spatial Reference

Notes: H19 and H18 were combined at location H-19
bgs = below ground surface
All soil gas measurements were made with a ppbRAE

N

0 125 250 500 Feet

Figure 8
Soil Gas Total VOC Screening Results - 15 feet bgs
Old Roosevelt Field Contaminated Groundwater Site
Garden City, New York

CDM

C:\MS\GIS\Roosevelt Field\ArcMap_projects\Roosevelt 35 ft Screening Results_revised.mxd

- Soil gas screening point with grid point number and screening reading in parts per billion per volume (ppbv)
- Soil gas screening point with outdoor building boring location number
- Screening results at location exceed 10 ppbv
- Existing Wells and Multi-port Wells include for Spatial Reference

Notes: H19 and H18 were combined at location H-19
bgs = below ground surface
All soil gas measurements were made with a ppbRAE

N

0 140 280 560 Feet

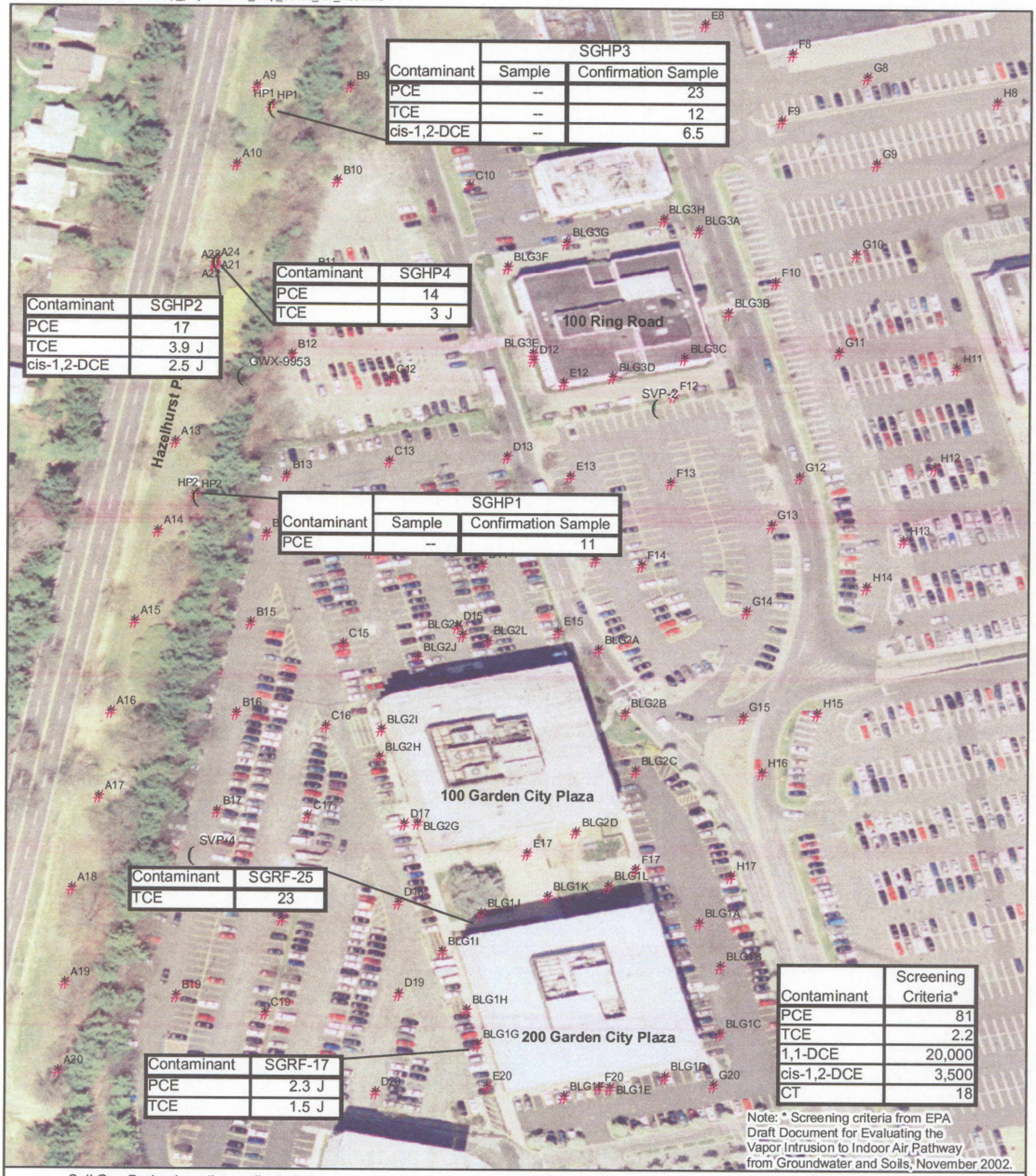
Figure 9

Soil Gas Total VOC Screening Results - 35 feet bgs

Old Roosevelt Field Contaminated Groundwater Site
Garden City, New York

CDM

C:\MS\GIS\Roosevelt Field\ArcMap_projects\base_map_boxes_rev_Rod.mxd



Contaminant	SGHP3 Sample	SGHP3 Confirmation Sample
PCE	--	23
TCE	--	12
cis-1,2-DCE	--	6.5

Contaminant	SGHP4
PCE	14
TCE	3 J

Contaminant	SGHP2
PCE	17
TCE	3.9 J
cis-1,2-DCE	2.5 J

Contaminant	SGHP1 Sample	SGHP1 Confirmation Sample
PCE	--	11

Contaminant	SGRF-25
TCE	23

Contaminant	SGRF-17
PCE	2.3 J
TCE	1.5 J

Contaminant	Screening Criteria*
PCE	81
TCE	2.2
1,1-DCE	20,000
cis-1,2-DCE	3,500
CT	18

- Soil Gas Boring Location, collected at 15 feet bgs,for VOC Analysis via method TO-15
- (Existing Monitoring Wells and Multi-port Wells Included for Spatial Reference
- Soil gas screening locations provided for reference.

Notes
SGRF10 and SGRF11 were not collected due to underground utilities.
All values are in micrograms per cubic meter (µg/m3)

J = Estimated Value
U = Non Detect
CT = Carbon Tetrachloride
PCE = Tetrachloroethene
TCE = Trichloroethene
1,1-DCE = 1,1 Dichloroethene
cis-1,2-DCE = cis-1,2-Dichloroethene

Feet: 0, 75, 150, 300

Figure 10
Soil Gas Analytical Results
Old Roosevelt Field Contaminated Groundwater Site
Garden City, New York

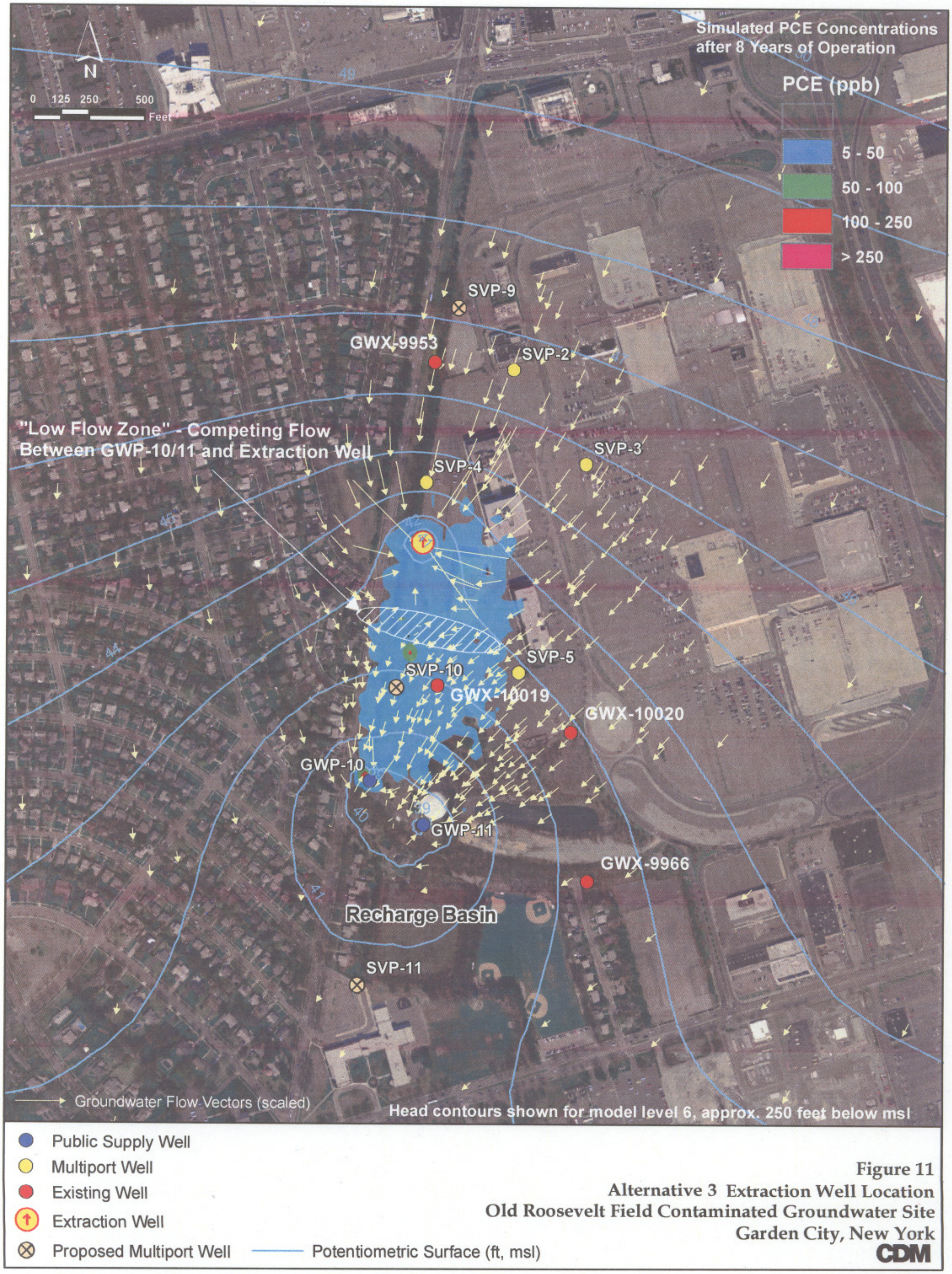


Figure 11
Alternative 3 Extraction Well Location
Old Roosevelt Field Contaminated Groundwater Site
Garden City, New York

CDM

Figure 12
Proposed Location for Treatment System
Pump and Treat Alternative
Old Roosevelt Field Contaminated Groundwater Site
Garden City, New York
CDM

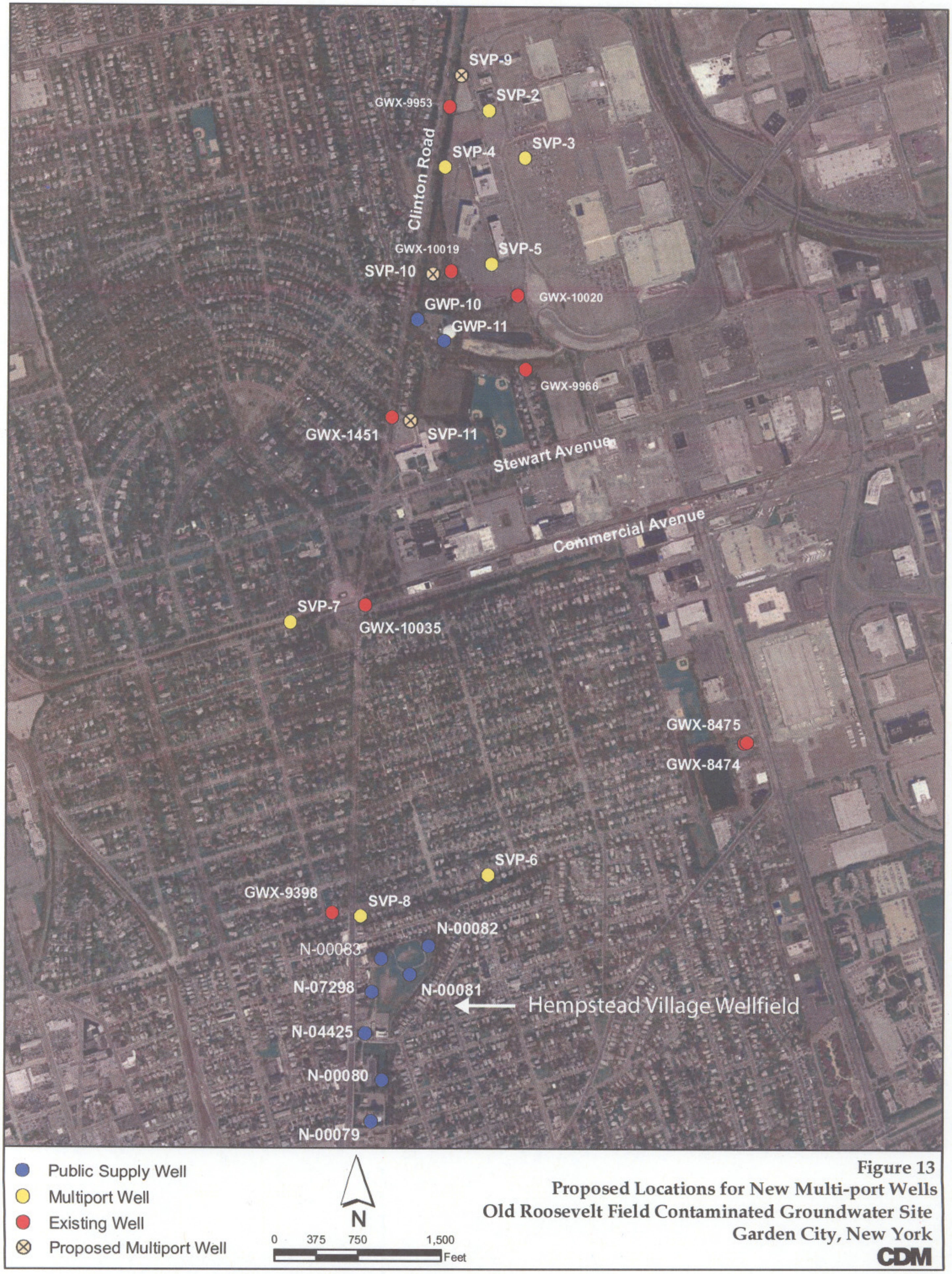


Figure 13
Proposed Locations for New Multi-port Wells
Old Roosevelt Field Contaminated Groundwater Site
Garden City, New York

CDM

OLD ROOSEVELT FIELD CONTAMINATED GROUNDWATER AREA SUPERFUND SITE RECORD OF DECISION

APPENDIX II

TABLES

SUMMARY OF TABLES

Table 1
Maximum Contaminant Levels for Contaminants of Concern

Chemical	Groundwater MCL (µg/L)[1]
Tetrachloroethene	5
Trichloroethene	5
1,1-Dichloroethene	5
cis-1,2-Dichloroethene	5
Carbon tetrachloride	5

µg/L = microgram per liter
[1] New York State Department of Health Drinking Water Standards, NYCRR Title 10, Part 5, Subpart 5-1 Public Water Systems, Effective November 23, 2005 (Statutory authority: Public Health Law 225, Effective May 26, 2004).
(http://www.health.state.ny.us/environmental/water/drinking/part5/subpart5.htm)

Table 2
Multi-Port Well COC Results - Round 1

Chemical	SVP/GWM-1								
	Port 2 400-405 ft	Port 3 370-375 ft	Port 4 315-320 ft	Port 5 290-295 ft	Port 6 250-255 ft	Port 7 200-205 ft	Port 8 150-155 ft	Port 9 100-105 ft	Port 10 50-55 ft
Tetrachloroethene	0.21 J	0.24 J	0.38 J	0.28 J	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Trichloroethene	0.3 J	0.77	0.5	0.32 J	0.49 J	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethene	0.32 J	0.32 J	0.64	0.55 J	0.61	0.12 J	0.5 U	0.5 U	0.5 U
cis-1,2-Dichloroethene	0.5 U	0.5 U	0.5 U	1.3 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Carbon tetrachloride	0.5 U	0.5 U	0.5 U	1.3 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U

Chemical	SVP/GWM-2									
	Port 1 450-455 ft	Port 2 410-415 ft	Port 3 370-375 ft	Port 4 330-335 ft	Port 5 290-295 ft	Port 6 250-255 ft	Port 7 190-195 ft	Port 8 150-155 ft	Port 9 100-105 ft	Port 10 50-55 ft
Tetrachloroethene	2.4	1.4	1.6	2.8	5.8	1.8	3.2	2.8	0.86	0.68
Trichloroethene	22	13	16	23	24	25	18	25	20	4.9
1,1-Dichloroethene	0.5 U	0.46 J	0.41 J	0.5 U	0.5 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U
cis-1,2-Dichloroethene	0.97	0.86	2.7	5.2	4.9	8.4	0.29 J	0.36 J	0.8	0.69
Carbon tetrachloride	0.14 J	0.13 J	0.5 U	0.5 U	0.1 J	1 U	0.16 J	0.5 U	0.5 U	0.5 U

Chemical	SVP/GWM-3						
	Port 1 450-455 ft	Port 2 390-395 ft	Port 3 370-375 ft	Port 4 290-295	Port 5 170-175 ft	Port 6 100-105 ft	Port 7 50-55 ft
Tetrachloroethene	0.2 J	0.39 J	0.25 J	0.54	0.39 J	0.65	0.72
Trichloroethene	1.9	3.3	8.9	0.5 U	0.4 J	0.5 U	0.5 U
1,1-Dichloroethene	0.11 J	0.84	0.27 J	0.12 J	0.15 J	0.23 J	0.5 U
cis-1,2-Dichloroethene	0.5 U	0.25 J	0.39 J	0.5 U	0.5 U	0.5 U	0.5 U
Carbon tetrachloride	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U

Table 2
Multi-Port Well COC Results - Round 1

Chemical	SVP/GWM-4									
	Port 1 420-425 ft	Port 2 400-405 ft	Port 3 350-355 ft	Port 4 305-310 ft	Port 5 285-290 ft	Port 6 245-250 ft	Port 7 185-190 ft	Port 8 145-150 ft	Port 9 100-105 ft	Port 10 45-50 ft
Tetrachloroethene	7.3	20	21	180	220	350	14	41	15	0.37 J
Trichloroethene	30	26	64	280	260	220	260	90	2.7	1.3
1,1-Dichloroethene	1.2	1.7	1.3 J	8.9	7.8	5.5 J	2.2 J	0.57	0.5 U	0.5 U
cis-1,2-Dichloroethene	0.41 J	0.82 J	1.4 J	3.9 J	3.6 J	5.3 J	2.2 J	2.3	0.89	0.1 J
Carbon tetrachloride	0.4 J	1.3	2.5 U	8.4 U	6.3 U	13 U	6.3 U	0.1 J	0.5 U	0.5 U

Chemical	SVP/GWM-5									
	Port 1 430-435 ft	Port 2 405-410 ft	Port 3 355-360 ft	Port 4 310-315 ft	Port 5 290-295 ft	Port 6 250-255 ft	Port 7 190-195 ft	Port 8 150-155 ft	Port 9 95-100 ft	Port 10 45-50 ft
Tetrachloroethene	0.5	0.95	0.55	0.72	0.62	0.31 J	0.5	0.33 J	0.81	0.11 J
Trichloroethene	6.6	32	12	14	19	5	2.6	0.91	4.4	0.11 J
1,1-Dichloroethene	1	1	0.37 J	0.4 J	0.44 J	0.5 U	2.7	2.8	1.2	0.5 U
cis-1,2-Dichloroethene	0.56	1.8	0.97	1.1	1.7	0.58	0.23 J	0.12 J	0.34 J	0.5 U
Carbon tetrachloride	0.18 J	0.25 J	0.17 J	0.5 U	0.12 J	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U

Chemical	SVP/GWM-6					
	Port 1 445-450 ft	Port 2 365-370 ft	Port 3 245-250 ft	Port 4 175-180 ft	Port 5 100-105 ft	Port 6 45-50 ft
Tetrachloroethene	0.23 J	0.5 U	0.7	0.52	1.1	0.5 U
Trichloroethene	1.7	0.33 J	8.2	2.1	4.3	0.26 J
1,1-Dichloroethene	6.6	3.7	13	14	22	1.5
cis-1,2-Dichloroethene	1.8	0.69	4.8 J	41. J	22 J	0.26 J
Carbon tetrachloride	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U

Table 2
Multi-Port Well COC Results - Round 1

Chemical	SVP/GWM-7					
	Port 1 445-450 ft	Port 2 425-430 ft	Port 3 310-315 ft	Port 4 205-210 ft	Port 5 100-105 ft	Port 6 45-50 ft
Tetrachloroethene	0.5 U	0.11 J	2.2	0.21 J	0.45 J	0.5 U
Trichloroethene	0.18 J	0.66	9.4	0.38 J	1.2	0.5 U
1,1-Dichloroethene	0.18 J	1.4	0.5 U	0.5 U	0.5 U	0.5 U
cis-1,2-Dichloroethene	0.5 U	0.5 U	1	0.5 U	0.5 U	0.5 U
Carbon tetrachloride	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chemical	**SVP/GWM-8**					
	Port 1 435-440 ft	Port 2 370-375 ft	Port 3 235-240 ft	Port 4 155-160 ft	Port 5 100-105 ft	Port 6 45-50 ft
Tetrachloroethene	1.9	1.9	15	17	34	0.92
Trichloroethene	1.9	1.5	1.2	1	1.6	0.5 U
1,1-Dichloroethene	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
cis-1,2-Dichloroethene	0.21 J	0.18 J	0.5 U	0.5 U	0.18 J	0.5 U
Carbon tetrachloride	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U

All results in micrograms per liter (μg/L)
ft = feet
U = Not detected
J = Result is estimated due to exceeded quality control criteria

Table 3
Multi-Port Well COC Results - Round 2

Chemical	SVP/GWM-1								
	Port 2 400-405 ft	Port 3 370-375 ft	Port 4 315-320 ft	Port 5 290-295 ft	Port 6 250-255 ft	Port 7 200-205 ft	Port 8 150-155 ft	Port 9 100-105 ft	Port 10 50-55 ft
Tetrachloroethene	0.7	0.8	0.8	0.21 J	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Trichloroethene	0.99	2.4	0.92	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethene	0.5 U	4	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
cis-1,2-Dichloroethene	0.13 J	0.22 J	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Carbon tetrachloride	0.5 U	0.49 J	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U

Chemical	SVP/GWM-2									
	Port 1 450-455 ft	Port 2 410-415 ft	Port 3 370-375 ft	Port 4 330-335 ft	Port 5 290-295 ft	Port 6 250-255 ft	Port 7 190-195 ft	Port 8 150-155 ft	Port 9 100-105 ft	Port 10 50-55 ft
Tetrachloroethene	1.8	2.3	4.4	2.6	2.2	4.3	2.3	2.3	0.38 J	0.14 J
Trichloroethene	15	17	38 J	21	23 J	17	12	18	18	1
1,1-Dichloroethene	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
cis-1,2-Dichloroethene	0.74	4.1	10	5.8	5.7	10	0.34 J	0.48 J	0.76	0.14 J
Carbon tetrachloride	0.03 J	0.5 U	0.5 U	0.06 J	0.07 J	0.13 J	0.1 J	0.06 J	0.5 U	0.5 U

Chemical	SVP/GWM-3						
	Port 1 450-455 ft	Port 2 390-395 ft	Port 3 370-375 ft	Port 4 290-295	Port 5 170-175 ft	Port 6 100-105 ft	Port 7 50-55 ft
Tetrachloroethene	0.5 U	0.5 U	0.3 J	0.24 J	0.46 J	0.64	0.54
Trichloroethene	6.1	14	13	0.51	1	0.5 U	0.5 U
1,1-Dichloroethene	0.5 U	1	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
cis-1,2-Dichloroethene	0.12J	0.8	0.61	0.5 U	0.5 U	0.5 U	0.5 U
Carbon tetrachloride	0.5 U	0.21 J	0.5 U	0.5 U	0.5 U	0.12 J	0.07 J

Table 3
Multi-Port Well COC Results - Round 2

Chemical	SVP/GWM-4									
	Port 1 420-425 ft	Port 2 400-405 ft	Port 3 350-355 ft	Port 4 305-310 ft	Port 5 285-290 ft	Port 6 245-250 ft	Port 7 185-190 ft	Port 8 145-150 ft	Port 9 100-105 ft	Port 10 45-50 ft
Tetrachloroethene	21 J	29	210	200	100	94	25	16	14	0.31 J
Trichloroethene	21 J	22	180	200	130	94	120	16	2.9	1.6
1,1-Dichloroethene	5.8	4	9.7	4.8	3.4	2	0.5 U	0.5 U	0.5 U	0.5 U
cis-1,2-Dichloroethene	2.2 J	2.9	11 J	5	4.7	7.8	2.7	1.4	0.62	0.13 J
Carbon tetrachloride	1.8	2.9	0.29 J	0.12 J	0.08 J	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U

Chemical	SVP/GWM-5									
	Port 1 430-435 ft	Port 2 405-410 ft	Port 3 355-360 ft	Port 4 310-315 ft	Port 5 290-295 ft	Port 6 250-255 ft	Port 7 190-195 ft	Port 8 150-155 ft	Port 9 95-100 ft	Port 10 45-50 ft
Tetrachloroethene	0.35 J	0.92	0.63	0.73	0.6	0.72	0.4 J	0.49 J	0.11 J	0.37 J
Trichloroethene	9.3	28	14	18	18	12	2.1	1.7	0.19 J	1.6
1,1-Dichloroethene	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1.4	0.5 U	0.5 U
cis-1,2-Dichloroethene	1.1	2.9	1.8	2	2	1.8	0.26 J	0.25 J	0.5 U	0.18 J
Carbon tetrachloride	0.43 J	0.87	0.19J	0.11 J	0.12 J	0.5 U	0.12 J	0.16 J	0.5 U	0.5 U

Chemical	SVP/GWM-6					
	Port 1 445-450 ft	Port 2 365-370 ft	Port 3 245-250 ft	Port 4 175-180 ft	Port 5 100-105 ft	Port 6 45-50 ft
Tetrachloroethene	0.5 U	0.5 U	0.29 J	0.24 J	0.54	0.087 J
Trichloroethene	1.4	0.5 U	2.3	1	2.5	0.5 U
1,1-Dichloroethene	0.5 U	0.5 U	9.7	6.7	16	0.5 U
cis-1,2-Dichloroethene	0.67	0.19 J	5.9 J	3.7 J	17 J	0.5 U
Carbon tetrachloride	0.06 J	0.5 U	0.5 U	0.29 J	1	0.5 U

Table 3
Multi-Port Well COC Results - Round 2

Chemical	SVP/GWM-7					
	Port 1 445-450 ft	Port 2 425-430 ft	Port 3 310-315 ft	Port 4 205-210 ft	Port 5 100-105 ft	Port 6 45-50 ft
Tetrachloroethene	0.5 U	0.5 U	7.7	0.56	0.69	0.5 U
Trichloroethene	0.24 J	6.2	20	0.81	1.8	0.5 U
1,1-Dichloroethene	0.5 U	5.2	0.5 U	0.5 U	0.5 U	0.5 U
cis-1,2-Dichloroethene	0.5 U	0.76	3.9	0.5 U	0.5 U	0.5 U
Carbon tetrachloride	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chemical	**SVP/GWM-8**					
	Port 1 435-440 ft	Port 2 370-375 ft	Port 3 235-240 ft	Port 4 155-160 ft	Port 5 100-105 ft	Port 6 45-50 ft
Tetrachloroethene	6.7	13	23	23	57	0.35 J
Trichloroethene	1.4	3.2	1.1	1.6	2	0.5 U
1,1-Dichloroethene	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
cis-1,2-Dichloroethene	0.5 U	0.46 J	0.5 U	0.5 U	0.3 J	0.5 U
Carbon tetrachloride	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U

All results in micrograms per liter (µg/L)
ft = feet
U = Not detected
J = Result is estimated due to exceeded quality control criteria

Table 4 Existing Well and Supply Well Results - Round 1										
Well	GWP-10	GWP-11	10019	10020	10035	8474	8475	9398	9966	9953
Chemical/Depth	377-417 ft	370-410 ft	223-228 ft	185-190 ft	48-53 ft	485-556 ft	409-481 ft	21-22 ft	38-51 ft	35-40 ft
Tetrachloroethene	270	50	2	1.3	0.5 U	5.8	5.5	0.16 J	0.5 U	0.5 U
Trichloroethene	170	160	260	1.6	1.2	29	24	0.5 U	0.5 U	0.5 U
1,1-Dichloroethene	5.5	4	0.5 U	0.5 U	0.5 U	0.5 U	17	0.5 U	0.5 U	0.5 U
cis-1,2-Dichloroethene	13	13	21	0.19 J	0.5 U	0.76	1.2	0.5 U	0.5 U	0.5 U
Carbon tetrachloride	0.85	0.42 J	0.2 J	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U

All results in micrograms per liter (µg/L)
ft = feet
U = Not detected
J = Result is estimated due to exceeded quality control criteria

Table 5 Existing Well and Supply Well Results - Round 2											
Well	GWP-10	GWP-11	10019	10020	10035	8086	8474	8475	9398	9966	9953
Chemical/Depth	377-417 ft	370-410 ft	223-228 ft	185-190 ft	48-53 ft	265-291 ft	485-556 ft	409-481 ft	21-22 ft	38-51 ft	35-40 ft
Tetrachloroethene	230	58	2.2	0.5 U	0.5 U	170	6.3	3.7	0.5 U	0.5 U	0.5 U
Trichloroethene	220	160	170	0.14 J	0.31 J	54	25	16	0.5 U	0.5 U	0.5 U
1,1-Dichloroethene	12	3.7	0.5 U	0.5 U	0.5 U	17	7.4	20 J	0.5 U	0.5 U	0.5 U
cis-1,2-Dichloroethene	26 J	10	23	0.5 U	0.5 U	5.3 J	1.4 J	0.79 J	0.5 U	0.5 U	0.5 U
Carbon tetrachloride	1.2	0.46 J	0.28 J	0.5 U	0.5 U	0.44 J	0.42 J	0.5 U	0.5 U	0.5 U	0.5 U

All results in micrograms per liter (µg/L)
ft = feet
U = Not detected
J = Result is estimated due to exceeded quality control criteria

Table 6
Soil Gas Screening Criteria for Chemicals of Concern[1]

Chemical	Screening Criteria ($\mu g/m^3$)
Tetrachloroethene	81
Trichloroethene	2.2
1,1-Dichloroethene	20,000
cis-1,2-Dichloroethene	3,500
Carbon tetrachloride	16

$\mu g/m^3$ = micrograms per cubic meter

[1] Target Deep Soil Gas Concentrations from Table 2c of the EPA 2002, Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (EPA 530-D-02-04).

Table 7
Summary of Chemicals of Concern and Medium-Specific Exposure Point Concentrations

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Point	Chemical of Concern [2]	Concentration Detected		Concentration Units	Frequency of Detection	Exposure Point Concentration (EPC)	EPC Units	Statistical Measure
		Min	Max					
Tap Water[1]	Tetrachloroethene	0.09	350	µg/L	108/127	60	µg/L	99% Cheb
	Trichloroethene	0.11	280	µg/L	110/127	77	µg/L	99% Cheb

[1] Exposure to volatilizing chemicals during showering was evaluated using the Andelman shower model, as modified by Shaum, et al. The modeled EPCs for the adult resident were 900 ug/m^3 for PCE and 1,200 ug/m^3 for TCE. The modeled EPCs for the child resident were 1,600 ug/m^3 for PCE and 2,200 ug/m^3 for TCE.
[2] 1,1-dichloroethene, cis-1,2-dichloroethene and carbon tetrachloride are site-related contaminants that are considered COCs because they exceed or have the potential to exceed their MCLs.
99% Chebyshev UCL (99% Cheb)

Summary of Chemicals of Concern and Medium-Specific Exposure Point Concentrations

This table presents the chemicals of concern (COCs) and exposure point concentrations (EPCs) for each of the COCs detected in groundwater (i.e., the concentration that will be used to estimate the exposure and risk from each COC in groundwater). The table includes the range of concentrations detected for each COC, as well as the frequency of detection (i.e., the number of times the chemical was detected in the samples collected at the site), the EPC and how it was derived.

Table 8
Selection of Exposure Pathways

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	On-Site /Off-Site	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Current	Ground-water	Groundwater	Tap Water	Resident	Adult	Dermal	Off-Site	None	Current nearby residents are connected to the public water supply.
						Ingestion	Off-Site	None	Current nearby residents are connected to the public water supply.
					Child (0-6 yrs)	Dermal	Off-Site	None	Current nearby residents are connected to the public water supply.
						Ingestion	Off-Site	None	Current nearby residents are connected to the public water supply.
				Site Worker	Adult	Ingestion	On-Site	None	Current nearby residents are connected to the public water supply.
		Air	Water Vapors at Shower-head	Resident	Adult	Inhalation	Off-Site	None	Current nearby residents are connected to the public water supply.
					Child (0-6 yrs)	Inhalation	Off-Site	None	Current nearby residents are connected to the public water supply.
	Air	Vapors	Indoor Air Vapors from Subsurface	Resident	Adult	Inhalation	Off-Site	None	Nearby residents could be exposed via inhalation of vapors from subsurface intrusion. More information about the vapor intrusion investigation at the site can be found in a separate report in the administrative record.
					Child (0-6 yrs)	Inhalation	Off-Site	None	
				Site Worker	Adult	Inhalation	On-Site	None	Site workers may be exposed via inhalation of vapors from subsurface intrusion. More information about the vapor intrusion investigation at the site can be found in a separate report in the administrative record.
Future	Ground-water	Groundwater	Tap Water	Resident	Adult	Dermal	On-Site	Quant	Private wells could be installed in the future for residents.
						Ingestion	On-Site	Quant	Private wells could be installed in the future for residents.
					Child (0-6 yrs)	Dermal	On-Site	Quant	Private wells could be installed in the future for residents.
						Ingestion	On-Site	Quant	Private wells could be installed in the future for residents.
				Site Worker	Adult	Ingestion	On-Site	Quant	Private wells could be installed in the future for residents.
		Air	Water Vapors at Shower-head	Resident	Adult	Inhalation	On-Site	Quant	Private wells could be installed in the future for residents.
					Child (0-6 yrs)	Inhalation	On-Site	Quant	Private wells could be installed in the future for residents.
	Air	Vapors	Indoor Air Vapors from Subsurface	Resident	Adult	Inhalation	On-Site	None	Residential homes could be located on the site in the future and residents could be exposed via inhalation of vapors from subsurface intrusion. More information about the vapor intrusion investigation at the site can be found in a separate report in the administrative record.
					Child (0-6 yrs)	Inhalation	On-Site	None	
				Site Worker	Adult	Inhalation	On-Site	None	

Table 8

Selection of Exposure Pathways

Quant = Quantitative risk analysis performed.

Summary of Selection of Exposure Pathways

The table describes the exposure pathways associated with the groundwater that were evaluated for the risk assessment, and the rationale for the inclusion of each pathway. Exposure media, exposure points, and the characteristics of receptor populations are included.

Table 9

Non-Cancer Toxicity Data Summary

Pathway: Oral/Dermal

Chemical of Concern	**Chronic/ Subchronic**	**Oral RfD Value**	**Oral RfD Units**	**Absorp. Efficiency (Dermal)**	**Adjusted RfD (Dermal)**	**Adjusted Dermal RfD Units**	**Primary Target Organ**	**Combined Uncertainty Modifying Factors**	**Sources of RfD Target Organ**	**Dates of RfD**
Tetrachloroethene	Chronic	1.0E-2	mg/kg-day	NA	1.0E-2	mg/kg-day	Liver	1000	IRIS	11/01/06
Trichloroethene	Chronic	3.0E-4	mg/kg-day	NA	3.0E-4	mg/kg-day	Liver, kidney, fetus	3000	NCEA	4/15/03

Pathway: Inhalation

Chemical of Concern	Chronic/ Subchronic	Inhalation RfC	Inhalation RfC Units	Inhalation RfD	Inhalation RfD Units	Primary Target Organ	Combined Uncertainty/ Modifying Factors	Sources of RfD: Target Organ	Dates
Tetrachloroethene	NA	NA	mg/m3	NA	mg/kg-day	NA	NA	NA	11/17/07
Trichloroethene	Chronic	4.0E-2	mg/m3	1.1E-2	mg/kg-day	CNS	1000	NCEA	04/14/03

Key

NA: No information available

IRIS: Integrated Risk Information System, U.S. EPA

NCEA: National Center for Environmental Assessment

Summary of Toxicity Assessment

This table provides non-carcinogenic risk information which is relevant to the contaminants of concern in groundwater. When available, the chronic toxicity data have been used to develop oral reference doses (RfDs) and inhalation reference doses (RfDi).

Table 10
Cancer Toxicity Data Summary

Pathway: Oral/Dermal							
Chemical of Concern	**Oral Cancer Slope Factor**	**Units**	**Adjusted Cancer Slope Factor (for Dermal)**	**Slope Factor Units**	**Weight of Evidence/Cancer Guideline Description**	**Source**	**Date**
Tetrachloroethene	5.4E-1	$(mg/kg/day)^{-1}$	5.4E-1	$(mg/kg/day)^{-1}$	2B	CalEPA	03/03/07
Trichloroethene	4.0E-1	$(mg/kg/day)^{-1}$	4.0E-1	$(mg/kg/day)^{-1}$	B2-C	NCEA	01/22/03
Pathway: Inhalation							
Chemical of Concern	**Unit Risk**	**Units**	**Inhalation Slope Factor**	**Slope Factor Units**	**Weight of Evidence/ Cancer Guideline Description**	**Source**	**Date**
Tetrachloroethene	5.9E-6	$(mg/m^3)^{-1}$	2.1E-2	$(mg/kg-day)^{-1}$	2B	CalEPA	12/13/04
Trichloroethene	1.1E-4	$(mg/m^3)^{-1}$	4.0E-1	$(mg/kg-day)^{-1}$	B2-C	NCEA	01/17/07

Key:
CalEPA: California Environmental Protection Agency
NA: No information available
NCEA: National Center for Environmental Assessment

EPA Weight of Evidence:
A - Human carcinogen
B1 - Probable Human Carcinogen-Indicates that limited human data are available
B2 - Probable Human Carcinogen-Indicates sufficient evidence in animals associated with the site and inadequate or no evidence in humans
C - Possible human carcinogen
D - Not classifiable as a human carcinogen
E- Evidence of noncarcinogenicity

California Weight of Evidence:
2B - The agent is possibly carcinogenic to humans

Summary of Toxicity Assessment

This table provides carcinogenic risk information which is relevant to the contaminants of concern in groundwater. Toxicity data are provided for both the oral and inhalation routes of exposure.

Table 11
Risk Characterization Summary - Noncarcinogens

Scenario Timeframe: Future
Receptor Population: Site Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Primary Target Organ	Non-Carcinogenic Risk			
					Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Tap Water	Tetrachloroethene	Liver	0.06			0.06
			Trichloroethene	Liver, Kidney, Fetus, CNS	2.5			2.5
							Groundwater Hazard Index Total[1] =	3.0
							Total Liver HI =	3.0
							Total Kidney HI =	3.0
							Total Fetus HI =	3.0
							Total CNS HI =	3.0

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Primary Target Organ	Non Carcinogenic Risk			
					Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Tap Water	Tetrachloroethene	Liver	0.2		0.01	0.2
			Trichloroethene	Liver, Kidney, Fetus, CNS	7.0	0.9	0.2	8.0
							Groundwater Hazard Index Total[1] =	10
							Total Liver HI =	9.0
							Total Kidney HI =	8.0
							Total Fetus HI =	8.0
							Total CNS HI =	8.0

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Table 11
Risk Characterization Summary - Noncarcinogens

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Primary Target Organ	Non-Carcinogenic Risk			
					Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Tap Water	Tetrachloroethene	Liver	0.4		0.04	0.4
			Trichloroethene	Liver, Kidney, Fetus, CNS	16	12	0.6	29
							Groundwater Hazard Index Total[1] =	35
							Total Liver HI =	32
							Total Kidney HI =	29
							Total Fetus =	29
							Total CNS HI =	29

[1] The HI represents the summed HQs for all chemicals of potential concern at the site, not just those chemicals requiring remedial action which are shown here.

CNS = Central Nervous System

Summary of Risk Characterization - Non-Carcinogens

The table presents hazard quotients (HQs) for each route of exposure and the hazard index (sum of hazard quotients) for all routes of exposure. The Risk Assessment Guidance for Superfund states that, generally, a hazard index (HI) greater than 1 indicates the potential for adverse non-cancer effects.

Table 12
Risk Characterization Summary - Carcinogens

Scenario Timeframe: Future
Receptor Population: Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Tap Water	Tetrachloroethene	1E-04			1E-04
			Trichloroethene	1E-04			1E-04
						Total Risk =	2E-04

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Tap Water	Tetrachloroethene	3E-04	5E-05	2E-05	4E-04
			Trichloroethene	3E-04	1E-03	8E-06	2E-03
						Total Risk =	2E-03

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Tap Water	Tetrachloroethene	2E-04	2E-04	2E-05	4E-04
			Trichloroethene	2E-04	5E-03	2E-06	5E-03
						Total Risk =	6E-03

Summary of Risk Characterization - Carcinogens

The table presents cancer risks for each route of exposure and for all routes of exposure combined. As stated in the National Contingency Plan, the acceptable risk range for site-related exposure is 10^{-6} to 10^{-4}.

Table 13 Alternative 3: Pump and Treat - Cost Estimate Summary		
Item Description		**Extended Cost**
CAPITAL COSTS		
1.	Pre-Design Investigation	$1,110,440
2.	Work Plan for Long-term Monitoring Program and Site Management Plan	$69,120
3.	Baseline Groundwater Sampling	$174,756
4.	Groundwater Modeling	$72,000
5.	Engineering Design	$750,000
6.	Groundwater Pump and Treat System Construction	$3,203,963
7.	Evaluation and Replacement of Supply Well Air Strippers	$799,700
8.	Soil Vapor Sampling	$84,114
TOTAL CAPITAL COSTS		**$6,239,000**
OPERATION & MAINTENANCE (O&M) COSTS		
Annual O&M Costs		
9.	Groundwater Treatment Plant O&M	$675,152
10.	Long-term Monitoring (Annual Groundwater Sampling (Year 1 to Year 25)	$174,756
11.	Reduced Long-term Monitoring (Annual Groundwater Sampling (Year 26 to Year 35)	$111,000
PRESENT WORTH OF 35 YEAR COSTS (with discounting)		
12.	Total Capital Costs	$6,239,000
13.	Pump-and-Treat O&M Costs (for 10 years)	$4,741,998
14.	Long-term Monitoring Costs (for 35 years)	$2,180,142

Table 13
Alternative 3: Pump and Treat - Cost Estimate Summary

Item Description	Extended Cost
TOTAL PRESENT WORTH COST	**$13,160,000**

Present worth cost calculations assume no inflation.

The pump-and-treat system downgradient of SVP/GWM-4 will operate for 10 years.

It will take 35 years for contaminant concentrations in the plume to be reduced below MCLs. However, because the size of the plume would be reduced after 25 years, the scale of long-term monitoring will be reduced after 25 years.

OLD ROOSEVELT FIELD CONTAMINATED GROUNDWATER AREA SUPERFUND SITE RECORD OF DECISION

APPENDIX III

ADMINISTRATIVE RECORD INDEX

OLD ROOSEVELT FIELD CONTAMINATED GW AREA
ADMINISTRATIVE RECORD FILE
INDEX OF DOCUMENTS

1.0 SITE IDENTIFICATION

1.3 Preliminary Assessment Reports

P. 100001 - 100528 Report: Hazard Ranking System Documentation Package, Old Roosevelt Field Contaminated GW Area, Garden City, Nassau County, New York, CERCLIS ID No. NYSFN0204234, Volume 1 of 1, prepared by Region II Superfund Technical Assessment and Response Team, Roy F. Weston, Inc., Federal Programs Division, prepared for United States Environmental Protection Agency, January 2000.

3.0 REMEDIAL INVESTIGATION

3.2 Sampling and Analysis Data/Chain of Custody Forms

P. 300001 - 300017 Letter to Ms. Amelia Jackson, EPA QA Officer for RAC II, U.S. Environmental Protection Agency, from Ms. Jeniffer Oxford, RAC II QA Coordinator, CDM Federal Programs Corporation, re: QA Field Technical Systems Audit Report, Old Roosevelt Field Contaminated Groundwater Superfund Site, Remedial Investigation/Feasibility Study, Nassau County, New York, October 19, 2005.

P. 300018 - 300065 Letter to Mr Adly Michael US EPA Region 2, from Mr. Scott Kirchner, RAC II Analytical Services Coordinator, CDM Federal Programs Corporation, re: Sampling Trip Report for RAS Case Number 35187, Old Roosevelt Field Groundwater Contamination Site, Groundwater Sampling Event-Round One, prepared by CDM Federal Programs Corporation, prepared for U.S. Environmental Protection Agency, Region II, April 20, 2006.

County, New York, prepared by John Milner Associates, Inc., prepared for CDM Federal Programs Corporation, May 2005.

P. 300799 - 300995 Report: Final Remedial Investigation Report, Old Roosevelt Field Contaminated Groundwater Site, Remedial Investigation/Feasibility Study, Garden City, New York, Volume 1, prepared by CDM Federal Programs Corporation, prepared for U.S. Environmental Protection Agency, July 24, 2007.

P. 300996 - 301929 Report: Final Remedial Investigation Report, Old Roosevelt Field Contaminated Groundwater Site, Remedial Investigation/Feasibility Study, Garden City, New York, Volume 2, prepared by CDM Federal Programs Corporation, prepared for U.S. Environmental Protection Agency, July 24, 2007.

P. 301930 - 302160 Report: Final Human Health Risk Assessment, Old Roosevelt Field Contaminated Groundwater Site, Remedial Investigation/Feasibility Study, Garden City, New York, prepared by CDM Federal Programs Corporation, prepared for U.S. Environmental Protection Agency, July 24, 2007.

8.0 HEALTH ASSESSMENTS

8.1 ATSDR Health Assessments

P. 800001 - 800045 Report: Public Health Assessment for Old Roosevelt Field Contaminated Groundwater Area, Garden City, Nassau County, New York, EPA Facility ID: NYSFN0204234, Final Release, prepared by New York State Department of Health Under a Cooperative Agreement with the Agency for Toxic Substances and Disease Registry, July 13, 2004.

9.0 NATURAL RESOURCE TRUSTEES

9.3 Reports

P. 900001 - 900070 Report: Chlorinated Organic Compounds in Ground Water at Roosevelt Field, Nassau County, Long Island, New York, prepared by U.S. Geological Survey, Water-Resources Investigations, Report 86-4333, prepared in cooperation with the Nassau County Department of Public Works, Syosset, New York, 1989.

OLD ROOSEVELT FIELD CONTAMINATED GW AREA
ADMINISTRATIVE RECORD FILE UPDATE
INDEX OF DOCUMENTS

3.0 REMEDIAL INVESTIGATION

3.2 Sampling and Analysis Data/Chain of Custody Forms

P. 302161 - 302194 Report: Analytical Report, Roosevelt Field Ground Water Contamination Superfund Site, Garden City, NY, prepared by Lockheed Martin, Inc., prepared for U.S. EPA, Region 2, August 9, 2007.

P. 302195 - 302233 Memorandum to Mr. Jeff Catanzarita, U.S. EPA, Region 2, from Mr. Tim Macaluso, REAC Geologist, Lockheed Martin Technology Services, re: Roosevelt Field Soil Boring Event July 2007, Work Assignment No. 0-254.1 - Trip Report, August 10, 2007.

P. 302234 - 302283 Memorandum (with attachment) to R. Singhvi, EPA/ERT Analytical Work Assignment Manager, from V. Kansal, REAC Analytical Section Leader, Lockheed Martin Technology Services, re: Document transmittal under Work Assignment #0-254, August 20, 2007.

4.0 FEASIBILITY STUDY

4.3 Feasibility Study Reports

P. 400001 - 400218 Report: Final Feasibility Study Report, Old Roosevelt Field Contaminated Groundwater Site, Garden City, New York, prepared by CDM Federal Programs Corporation, prepared for U.S. EPA, Region 2, August 20, 2007.

OLD ROOSEVELT FIELD CONTAMINATED GROUNDWATER AREA SUPERFUND SITE RECORD OF DECISION

APPENDIX IV

STATE LETTER OF CONCURRENCE

New York State Department of Environmental Conservation
Division of Environmental Remediation, 12th Floor
625 Broadway, Albany, New York 12233-7011
Phone: (518) 402-9706 • **FAX:** (518) 402-9020
Website: www.dec.ny.gov

Alexander B. Grannis
Commissioner

September 28, 2007

Mr. George Pavlou, Director
United States Environmental Protection Agency
Emergency & Remedial Response Division
Floor 19-No. E-38
290 Broadway
New York, New York 10007-1866

RE: Old Roosevelt Field, Site # 130051
Contaminated Groundwater Area Superfund Site
Record of Decision (ROD)

Dear Mr. Pavlou:

The New York State Department of Environmental Conservation (Department) does not concur with the Old Roosevelt Field site Record of Decision at this time while the Department reviews the environmental easement requirements.

If you have any questions, please contact Dr. Chittibabu Vasudevan at (518) 402-9625.

Sincerely,

Dale A. Desnoyers
Director
Division of Environmental Remediation

cc: J. LaPadula, USEPA
A. Carpenter, USEPA
K. Willis, USEPA