REMEDIAL INVESTIGATION REPORT
DRAFT

Photocircuits/Pall Corporation Sites
OU2 (Deep Groundwater) RI/FS
Volume 1 – Text, Tables, and Figures

Photocircuits (#130009),
Pall Corp (#130053B)

Work Assignment No. D004436-04

Prepared for:

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

October 2009

Prepared by:

AECOM Technical Services Northeast, Inc.
300 Broadacres Drive
Bloomfield, New Jersey

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VOLUME 1 OF 2 – TEXT, TABLES, AND FIGURES

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and 1-30-053B

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1.0 INTRODUCTION

AECOM Technical Services Northeast, Inc. (formerly Earth Tech Northeast, Inc. [Earth Tech]) has been issued Work Assignment # D004436-04 under the New York State Department of Environmental Conservation (NYSDEC) State Superfund Standby Contract for Investigation and Design Services (D00436). The scope of work is to conduct a remedial investigation and feasibility study (RI/FS) of deep groundwater (Operable Unit 2 [OU2]) at the Photocircuits and Pall Corporation sites (NYSDEC registry numbers 1-30-009 and 1-30-053B, respectively). The site location is shown on Figure 1, and the site layout is shown on Figure 2. A Record of Decision (ROD) for the soil and shallow groundwater (OU1) at Pall Corp was signed in 2004 (NYSDEC, 2004b). Records of Decision were issued for OU1 at Photocircuits and for the adjoining Pass and Seymour site were issued in 2008 (NYSDEC, 2008a; 2008b, respectively).

AECOM developed and submitted work plans (including a Field Activities Plan, a Quality Assurance Plan, and a Health and Safety Plan) in November and December 2006 for NYSDEC review; the work plans were approved in February 2007. These plans formed the basis of the remedial investigation as implemented, and described in the text of this report.

Additional details regarding the planned execution of this project are found in the project plans, included as appendices to the Work Plan, including

- Appendix A – Field Activities Plan
- Appendix B – Quality Assurance Project Plan
- Appendix C – Site Safety and Health Plan

The scope of work is divided into four principal tasks:

1. Work Plan Development
2. Remedial Investigation
3. Remedial Investigation Report
4. Feasibility Study

This Task 3 RI document presents the findings of the Task 2 Remedial Investigation.

The Task 4 Feasibility Study will be completed after the RI is completed and the RI Report is submitted.

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2.0 SITE HISTORY AND BACKGROUND

2.1 SITE DESCRIPTION AND LOCATION

The study area for this Deep Groundwater (OU2) RI/FS is focused primarily on three areas, from south to north: Photocircuits (for the purpose of this RI, including the former Pass and Seymour site, for which a separate ROD has been prepared); Pall Corporation (including the August Thomsen property formerly owned by Pall); and property owned by the City of Glen Cove to the north, which includes the Well No. 21 and the Carney Street Wellfield, along with other structures and uses, including a day care center. The study also includes the part of Sea Cliff Avenue, a county road, located between the Photocircuits and Pall Corporation Sites. As defined in the Work Assignment (NYSDEC, 2006), OU2 consists of the deep groundwater at the Pall and Photocircuits sites, at a depth of greater than 60 ft below ground surface (bgs).

All three of these sites (Photocircuits, Pall Corporation, and the Carney Street Wellfield) are part of the "Sea Cliff Avenue Industrial Area", which also includes additional industries on Sea Cliff Avenue and other streets on the east side of the Glen Cove Arterial Highway.

2.1.1 Photocircuits

The Photocircuits facility occupies an irregularly-shaped parcel reportedly about 10 acres at 31 Sea Cliff Avenue. Photocircuits is on the south side of the street, directly across from the Pall Corp Site; it is a documented source of chlorinated VOCs and is listed as a NYSDEC Class 2 site (1-30-009). However, the actual size of the site is much larger (25 acres according to a Photocircuits official [Michael Nussbaum, in March 11 2007 New York Times]). At the time of the issuance of the work assignment (2006), Photocircuits also occupied the adjacent former Pass and Seymour site at 45 Sea Cliff Avenue. Manufacturing activities at the site ceased in 2007. Photocircuits is bounded to the east by the Glen Cove Arterial highway; to the south by the Glen Head Country Club; to the west by Pass and Seymour and Glen Cove Creek; and to the north by Sea Cliff Avenue and the Pall Corporation property.

There are four primary buildings on the Photocircuits site (see Figure 2). Fronting Sea Cliff Avenue is the main building. To the south of the main building, along the east side of the site, are two buildings identified as Butler No. 1 and Butler No. 2. On the western side of the site, the part of the site between Pass and Seymour and the Glen Head Country Club, is Butler No. 3.

2.1.2 Pass and Seymour/Slater Electric

The former Pass and Seymour site, on the west side of Glen Cove Creek at 45 Sea Cliff Avenue, occupies about 7.5 acres (MKA, 1996) and is also a NYSDEC Class 2 site (1-30-053A). The Pass and Seymour site was formerly Slater Electric; and many of the historic and previous documents refer to it as Slater Electric. Slater Electric was purchased by Pass and Seymour in 1988. The site is primarily flat with no slopes, depressions or rolling hills. The site has been graded for industrial use with slopes ranging from 0 to 3 percent (MKA, 1996). The site is bounded on the south by a Photocircuits building and the Glen Cove Country Club; to the east by Glen Cove Creek and Photocircuits; to the north by Sea Cliff Avenue (with the former Associated Draperies and August Thomsen buildings across the street), and to the west by the former Tweezerman site building.

The Phase I ESA for Pass and Seymour (MKA, 1996) states that the site is occupied by eight buildings. However, seven of these buildings are contiguous (Buildings 1-6 and 8) and comprise

the main site building. One additional structure (Building 7 as identified in the ESA) is located to the southwest of the main building.

2.1.3 Pall Corporation / August Thomsen

The Pall Corporation Site, located at 30 Sea Cliff Avenue, consists of approximately 5 acres of property. The Site is mostly covered with asphalt pavement except for small landscaped areas around the main Pall building and parking area. Grass and trees border Glen Cove Creek along its entire length where it is present on the west side of the Pall site. The Pall site topography is relatively flat with an estimated slope across the site of less than 3 percent. Locally, the Pall site is situated in a low valley at an approximate elevation of 60 feet above mean sea level (amsl). East and west of the Site, the topography rises to elevations of 160 to 180 ft amsl.

The Pall site includes another industrial facility, August Thomsen, located on the northwest part of the site. The August Thomsen property (36 Sea Cliff Avenue) was once owned by the Pall Corporation (operating as Glen Components). The Pall Corporation facility is currently (2009) inactive, although August Thomsen is an active company. The Pall Corp site is bordered to the east by the Glen Cove Arterial Highway, with residences and commercial areas situated further to the east. The site is bordered to the south by Sea Cliff Avenue. Industrial property, the Photocircuits Corporation site and the (former) Pass and Seymour site, are south of Sea Cliff Avenue. The west side of the site borders on Glen Cove Creek. An industrial facility, Associated Drapery and Equipment Company, is situated west of the creek at 40 Sea Cliff Avenue.

2.1.4 City of Glen Cove / Carney Street Wellfield

The property north of the Pall site is occupied by the City of Glen Cove and includes the Carney Well Field, a childcare (day care) facility, and garage, maintenance, and equipment storage facilities used by Glen Cove DPW, among others. Vehicular access to this area is only from the southbound shoulder of the Glen Cover Arterial Highway (Route 107), located to the east of the property. Glen Cove Creek is to the west, with the Pall/August Thomsen property to the south. In addition to the Carney Street Well No. 21 (N8326), there are two permanently abandoned public supply wells on this property (N3466 and N8327); there are no active public supply wells at this location. Several monitoring wells (used in this RI/FS) are also located on this property (in addition to the new wells installed for this RI/FS). NYSDOH collected air samples at the Glen Cove Child Day Care Facility on February 12, 2004; the samples were analyzed by (NYSDOH) Wadsworth Center for Laboratories and Research in Albany, New York. NYSDOH reported "[t]he results indicate that the groundwater contamination beneath the building is not affecting indoor air quality in the building" (NYSDOH, 2004).

2.1.5 Surrounding Area/Other Sites

The immediate surrounding area is generally industrial/commercial. The elevated Glen Cove Arterial Highway (Route 107) defines the eastern edge of the study area, and Glen Cove Creek (a slow-moving Class C surface water body) forms the western edge of the study area north of Sea Cliff Avenue. To the east of the arterial are both residential and commercial properties (car dealer, bowling alley, warehouse/office facilities, and single family homes). To the west along Sea Cliff Avenue are more commercial properties, with Long Island Railroad (LIRR) tracks and the Sea Cliff LIRR station about 800 ft to the west of Glen Cove Creek.

2.2 SITE HISTORY

The Site is located in the Sea Cliff Avenue Industrial Area, which has been documented as an area of variable industrial use from the 1940s to the present. Historic Sanborn maps show that the only facility in this area as of 1931 was the Knickerbocker Ice Company, and a similar level of development shown on the 1947 Sanborn map. Industrial activities have occurred in the past and are currently occurring on neighboring properties which include Photocircuits Corporation, Pass and Seymour (Slater Electric; currently occupied by Photocircuits), and Associated Draperies. These industrial properties are subject to NYSDEC regulatory enforcement action. The Pall Corporation, Photocircuits Corporation, and the former Pass and Seymour properties are listed as Class 2 Inactive Hazardous Waste Disposal Sites (IHWDS) by the NYSDEC.

2.2.1 Photocircuits

Based on the limited available Sanborn maps, the Photocircuits site was undeveloped as of 1947. Industrial activity began in 1954, when the site was owned by Powers Chemco (previously known as Powers Photoengraving [Glen Cove Record-Pilot, 2005]). Powers Chemco apparently still exists as corporation, and is a supplier of graphic design equipment to printers and newspapers (NY Daily News, 2008); however, the specific activities of Powers Chemco and/or Powers Photoengraving at 31 Sea Cliff Avenue are not known. Kollmorgen Corporation purchased the site in 1971 and used the site to produce printed circuit boards. Photocircuits purchased the site in 1986, and continued to use the site for printed circuit board manufacture. Photocircuits filed for Chapter 11 bankruptcy in 2005. American Pacific Financial Corp. purchased the company in 2006. Manufacturing activities ceased at the site in 2008. The Photocircuits site (along with the Pass and Seymour site) also has documented histories of chlorinated solvent use and discharges to the environment.

2.2.2 Pass and Seymour/Slater Electric

Based on the limited available Sanborn maps, the Pass and Seymour site was undeveloped as of 1947. The 1972 Sanborn map shows the facility as "Slater Electric." The main building at 45 Sea Cliff Avenue was constructed in 1959, with additions in 1981 (Enviroscience, 2000). MKA (1996) notes the existence of eight buildings, with four buildings constructed between 1970 and 1981; MKA also cites 1963 (not 1959) as the date of the original construction. However, the number of buildings includes the main building which is divided into four buildings and three other contiguous structures (see Section 2.1.2, above). Slater Electric was purchased by Pass and Seymour in 1988. Pass and Seymour produced plastic electric parts by injection molding; it is reported that the same products were produced for over 20 years by the former owner/occupant, Slater Electric (NCDPW, 1994). The site buildings were reportedly vacant in 1996 (MKA, 1996). In the 2000s, Photocircuits occupied some of the former Pass and Seymour site. The site is owned by Alpha Forty Five LLC.

2.2.3 Pall Corporation/August Thomsen

The first structure on the Pall Corp site was the Knickerbocker Ice company, whose occupancy pre-dated 1931. Based on the footprint of the building, it appears that the original (pre-1931) structure is still extant. The same structure is the only building in the area as of 1941, although it is now identified as F.R. Hormann, manufacturer of metal tanks. The Pall Corporation has operated the facility at Sea Cliff Avenue since the early 1950s. (However, the 1990 NCDPW investigation states that Photocircuits had been at the 30 Sea Cliff Avenue location since 1946

[Appendix A, Table 2].) The Pall Corporation facility was previously used as a research and development facility for the manufacture of filtration products, but is currently (2008) inactive and unoccupied. The August Thomsen property was owned by the Pall Corporation until 1971, when August Thomsen bought the property. During the period that the Pall Corporation owned the August Thomsen property, it was used by its subsidiary, Glen Components, Inc., as a precision machine shop providing parts to Pall's other divisions. Based on a Pall report, chlorinated solvents were used at the Site until approximately 1971. The operations of Glen Components reportedly were transferred to Florida in 1971 (NCPDW, 1990 [Appendix A, Table 3]).

2.2.4 Glen Cove / Carney Street Wellfield

The three wells at the Carney Street Wellfield were constructed in 1950 or 1951; one structure for the Water Department was also built in 1951. It appears that the wellfield was at the foot (end) of Carney Street when initially built. However, the construction of the Glen Cove Arterial in the mid-1960s isolated the Carney Street Wellfield from Carney Street. None of the Carney Street wells have been used since 1977.

In addition to the Carney Street Wells, this area is also occupied a day care center and two municipal facilities. The former water department building was apparently constructed around the same time as the wells (early 1950s), and the EMS garage constructed in the 1970s (NCDPW, 1994). The Day Care Center was initially constructed in 1989, with an addition constructed in 1992. One of the other municipal buildings was recently (October 2008) converted to use as a youth boxing center (Register-Pilot, 2008).

2.2.5 Other Sites in Sea Cliff Industrial Area

With the exception of the predecessors of Pall Corporation, the Sea Cliff Avenue industrial area (the portion located west of the Glen Cover Arterial Highway, which was constructed sometime in the mid-1960s [www.nycroads.com, 2009]) was undeveloped through at least 1947.

2.3 PREVIOUS ENVIRONMENTAL REPORTS

Review of the key reports described below was completed to focus the investigation. The list below is only a partial list of the site-specific and regional documents and reports reviewed.

- Investigation of Contaminated Aquifer Segment, City of Glen Cove, Nassau County NY, Volumes I and II. 1990. Prepared by Nassau County Department of Public Works (NCDPW) and Nassau County Department of Health (NCDOH). June.
- Source Area Investigation, Sea Cliff Industrial Area Glen Cove, New York, September, 1992. Prepared by H2M Group.
- Engineering Investigations at Inactive Hazardous Waste Sites Preliminary Site Assessment, 1994. prepared by Nassau County Department of Public Works. March.
- Phase I Environmental Assessment, Property Located at 45 Sea Cliff Avenue in Glen Cove, New York. 1996. Prepared by Middleton, Kontokosta Associated Ltd. For Fletcher, Sibell, Migatz, Burns & Mulry. April.
- Remedial Investigation Report, 31 and 45A Sea Cliff Avenue Site, Photocircuits Corporation, 1998; prepared by McClaren/Hart, Inc.

- Preliminary Focused Remedial Investigation Data Report, Pall Corporation Site (Volumes I and II), 1999; prepared by TAMS Consultants and GZA for NYSDEC.
- Phase II Remedial Investigation Report, Pall Corporation (Volumes 1, 2, and 3), 2000; prepared by Enviro-Sciences, Inc.
- Feasibility Study Report, Pall Corporation, 2001; prepared by Enviro-Sciences, Inc.
- Draft Work Plan, Pall and Photocircuits Deep Groundwater OU2; Dvirka and Bartilucci, 2006; prepared for NYSDEC.
- In-Situ Chemical Oxidation Phase II Pilot Test and Source Evaluation Report, Former Pall Corporation Facility, 2006; prepared by Apex Companies, LLC.

These reports were utilized as an aid in understanding historical and current conditions, and evaluate potential contaminant migration pathways and the contaminants of concern. Sample analysis identified elevated concentrations of halogenated and non-halogenated volatile organic compounds (VOCs), including tetrachloroethene (PCE), trichloroethene (TCE), and cis/trans 1,2-dichloroethene (1,2-DCE).

2.3.1 Photocircuits

The Photocircuits site located at 31 Sea Cliff Avenue is one of several properties that comprise the Sea Cliff Avenue Industrial Area. The property was formerly owned by Powers Chemco (1954-1971) and Kollmorgen Corporation (1971-1986). Kollmorgen and Photocircuits manufactured printed circuit boards. During the period of approximately 1963 through 1990, Photocircuits operated one or two high-capacity withdrawal wells (for cooling water) and installed as many as 10 diffusion wells over time to pump this water back into the ground; available information for these wells is provided in Table 2-1. In their 1980 "Notification to EPA of Hazardous Waste Activity," Photocircuits reported generating hazardous waste solvents F002, F006, F007, F008, and F009 (USEPA, 1980) (see Table 2-2 for the constituents associated with these listed wastes).

Past investigations of this area have documented high concentrations of chlorinated organics in the groundwater underlying the site. To identify the source of these contaminants, a Preliminary Site Assessment (PSA) was conducted by the Nassau County Department of Public Works (NCDPW) through a Municipal Delegation Agreement with the NYSDEC. The investigation relied largely on compilation and interpretation of existing raw data. The PSA report noted the presence of VOCs, particularly 1,1,1-TCA, in the soil and groundwater associated with these premises, and identifies Photocircuits as a source of methylene chloride, 1,1,1-TCA and PCE. In January of 1997, a site investigation was conducted by a consultant. Based on the results of this investigation, a Remedial Investigation / Interim Remedial Measure Work Plan was finalized in March 1997, and was executed in 1998. During the summer of 2000, a soil vapor extraction (SVE) system interim remedial measure (IRM) was installed in the most contaminated area of the site. In addition, a pilot study to use bioremediation to remediate groundwater contamination in the same area was conducted. The SVE system operated satisfactorily for a one-year period. The results of the bioremediation pilot study were unsatisfactory. In January 2002, Photocircuits conducted a pilot test for a hydraulic restraint system to prevent migration of VOCs from the site. The full system, consisting of four extraction wells to a depth of about 80 ft bgs arrayed in an "L" shape in the northeast and pumping at about 1 to 3 gpm, was installed in January of 2003.

At the time of the initial site visit (September 2006), Photocircuits was an active manufacturing facility. However, in January 2007, Photocircuits management announced its intention to shut down the plant for economic reasons, and by March 2007 all manufacturing had ceased. During the time of AECOM's field operations (prior to April 2008), the site was shut down and there were no employees at the site. NYSDEC issued a Record of Decision for Photocircuits Operable Unit 1 (Shallow Groundwater) in March, 2008 (NYSDEC, 2008a).

2.3.2 Pass and Seymour

The Pass and Seymour site, which is immediately to the west of the main Photocircuits building (roughly separated at the northern part of the site by Glen Cove Creek), is occupied by several industrial and warehouse buildings. It was constructed in 1959 and used as an industrial facility by Slater Electric. (Other sources provide the date of construction of the original building as 1963 [MKA, 1996]). In its 1980 "Notification to EPA of Hazardous Waste Activity," Slater Electric (45 Sea Cliff Avenue; NYD002036564) reported generating hazardous wastes F001 (halogenated waste solvents; see Table 2-2 for the full list of constituents) and U210 (spent PCE) (USEPA, 1980). During 1988, Pass and Seymour began operations at the premises, consisting of production of electric components using an injection molding process. There were indoor and outdoor drum storage areas. The manufacturing process included a degreasing operation that used PCE as the solvent, which was stored in two aboveground tanks located outside of the building. The buildings were reported vacant in 1996 (MKA, 1996). There were also reportedly two or three withdrawal and three to five diffusion wells on site for supply and discharge of non-contact cooling water from the injection molding process (MKA, 1996; NCDPW, 1990).

A PSA, completed in 1994 by Nassau County DPW for NYSDEC, used existing data from previous investigations. The PSA showed that PCE was found in the soil beneath the site, indicating past disposal of this compound on the property. PCE was also found in the groundwater under the site, at concentrations exceeding the applicable NYS Part 703 Class GA groundwater standard. In 1977, the Carney Street Wellfield was no longer useable as a source of potable water, due to VOC contamination apparently originating in the Sea Cliff Avenue industrial area. Contamination from Pass and Seymour probably contributed to the levels of VOCs that caused the restricted usage of the wells (NCDPW, 1994).

A site investigation was carried out in January 1997. Based on the results of this investigation, a Remedial Investigation/Interim Remedial Measure (RI/IRM) workplan was finalized in March 1997 and was conducted in 1998. Additional data collection to refine the remedial design and a pilot test for an air sparging (AS)/SVE IRM were performed in 1999. The AS/SVE system was constructed in the summer of 2000; however, groundwater sampling results from January 2001 still showed unacceptable levels of contamination in downgradient groundwater. Additional AS and SVE points were installed in the fall of 2002. The full system has been running since December 2002 (although the system did not appear to be in operation in early 2009). NYSDEC issued a Record of Decision for the Pass and Seymour in March, 2008 (NYSDEC, 2008b).

Photocircuits now occupies the former Pass and Seymour site, and further investigations and remediation at Pass and Seymour are discussed under, and considered part of, the Photocircuits site.

2.3.3 Pall Corporation/August Thomsen

The Pall Corporation site is located in the Sea Cliff Avenue Industrial Area and includes both the Pall Corporation and August Thomsen facilities. Pall, which manufactured filtration products at the site, was founded in 1946 and moved to 30 Sea Cliff Avenue some years later. (The 1994 NCDPW report lists 1946 as the first year of Pall's occupancy of the Sea Cliff Avenue site.) August Thomsen is located at 36 Sea Cliff Avenue on the northwest corner of Pall Corporation. This property was reportedly a research and development facility for Pall's Aerospace Division until 1971; however, a 1972 Sanborn map shows this building (36 Sea Cliff Avenue) as "Glen Components Corp. – Electronics Mfg." August Thomsen is currently involved in the manufacture of pastry bags and tubes (also using the trade name "Ateco"). Pall stored solvents on both of these properties in the past. There reportedly was an aboveground PCE storage tank located near the northwest corner of the former Glen Components (now August Thomsen) building (NCDPW, 1994; see Figure 7), although no further information is available regarding this tank. In their 1980 "Notification to EPA of Hazardous Waste Activity," Pall Corp (30 Sea Cliff Avenue) reported being a generator and treatment/storage/disposal facility (TSDF) (NYD002043396); however, they did not identify any specific hazardous wastes (USEPA, 1980). Spent solvents were released to the ground, confirmed by the presence of VOCs such as PCE and TCE in the soil. These solvents were also found in the groundwater at concentrations much higher than would be produced by any potential upgradient source.

As of 1990, Pall Corp reportedly had one withdrawal well (used for air conditioning) and five diffusion wells on site (NCDPW, 1990). An additional withdrawal well was noted on August Thomsen noted as "restricted in 1977" (NCDPW, 1990); no diffusion wells were reported on August Thomsen. Available information on the withdrawal and diffusion wells study area is summarized on Table 2-1.

Subsequent to a 1994 PSA conducted by Nassau County (NCDPW, 1994), TAMS/GZA performed a Focused Remedial Investigation (FRI) at the Pall site, with field work conducted in early 1998. Further investigation was performed due to elevated levels of VOCs in the groundwater (140,000 ppb PCE, 1500 ppb TCE, and 10,000 ppb 1,2-DCE). The PRP signed a Consent Order to complete a RI/FS Phase II investigation. Thirty-six monitoring wells were sampled at the site during the Phase II RI (conducted by Pall's consultant at that time, Enviro-Sciences) in April 1999, January 2000, and December 2000. VOC contamination (maximum 4,250 ppb total VOCs) was detected in several on-site wells and included PCE, TCE, DCE, and Freon-113 (1,1,2-trichlorotrifluoroethane). VOC contamination was also detected in groundwater downgradient (north-northwest) of the site.

A SVE system was installed to remediate soil contamination at the Pall site. A FS and pilot test work plan were approved in 2001 for remediation of groundwater using *in situ* chemical oxidation. In December 2002, the pilot test began with injections of potassium permanganate into the contaminated groundwater. A Record of Decision was signed in March 2004 for *in situ* chemical oxidation of surface and shallow subsurface contamination (Pall Corp OU 1), defined as extending to approximately 60 ft bgs. The PRP signed a Remedial Design/Remedial Action consent order in 2004. A second *in situ* chemical oxidation pilot test was performed in 2005. The pilot test consisted of injection of Fenton's Reagent into on-site injection wells.

2.3.4 Carney Street Wellfield (Glen Cove Property)

The Carney Street Wellfield, which originally consisted of three wells installed in 1950 or 1951, was used as a water supply for public drinking water until its closure in 1977. The wellfield was isolated from the rest of Carney Street when the Glen Cove Arterial Highway was constructed in the mid-1960s. In addition to the Carney Street Wells, this area is also occupied a day care center and two municipal facilities.

Each of the three Carney Street wells was reportedly capable of producing 1400 gpm (about 2 million gallons per day). Available information for these wells is summarized in Table 2-1.

H2M performed investigations (in 1991) at this site and identified potential VOC source areas within the soils (H2M, 1992). The compounds detected include halogenated VOCs, including PCE, 1,2-DCE, and TCE, as well as non-halogenated VOCs. Another investigation was conducted in 1992 by the consulting firm Fanning, Phillips, and Molnar (FPM; 1992). Details are sketchy; however, it appears that eight shallow soil borings were advanced and near-surface (0-3 ft bgs) soil samples were analyzed for VOCs. Low concentrations (1 to less than 100 µg/kg) of halogenated VOCs (c-1,2-DCE, TCE, and PCE; methylene chloride was also detected) were detected in three of the eight samples, along with non-halogenated VOCs (110 mg/kg [110,000 µg/kg] xylene and 5.6 mg/kg ethylbenzene in one sample; this was not one of the samples in which the halogenated VOCs were detected). FPM also obtained groundwater samples from two temporary wells located north of the EMS garage but south of the water department building (one of these locations is under what is now the expansion of the Day Care Center). The depth of these two temporary wells is unknown but is likely to have been shallow. Chlorinated VOCs (vinyl chloride up to 180 µg/L, c-1,2-DCE up to 890 µg/L, TCE up to 60 µg/L, and PCE up to 130 µg/L; 1,1,1-TCA was detected in one of the two samples at 4 µg/L) were detected. BTEX compounds were also detected in the groundwater (toluene up to 25 µg/L; ethylbenzene up to 500 µg/L; and xylenes up to 1400µg/L). NCDPW (1994) concluded that " . . . it is possible that some of the volatile organic contaminants detected in groundwater at the wellfield site may have migrated from upgradient sources. . . it is possible that the halogenated organic compounds observed in groundwater originated from industrial sites to the south. The composition and concentration of aromatic species [i.e., BTEX] at the site suggest that they originated from an on-site source, possibly a localized petroleum spill." No explanation was provided for the presence of the halogenated VOCs on the Wellfield property, however.

Groundwater data for well No. 21 (Nassau County well N8326), covering the period May 1977 through March 2000 (although there are no data for a 10-year period between October 1990 and January 2000) are summarized on D&B Table 3-1 (D&B, 2006). (The other two supply wells in the Carney Street Wellfield, N8327 and N3466, have been permanently abandoned.) The data shown for the three samples in January 2000 correspond to data provided to AECOM by Glen Cove's consultant (Sidney A Bowne) for samples collected at the beginning, mid-point, and end of the pumping test conducted between January 20 and 28, 2006; AECOM was unable to locate the source of the remaining data. In the earliest sample for which data are reported (May, 1977), PCE was detected at a concentration of 195 µg/L and TCE at 104 µg/L (1,1,1-trichloroethane [1,1,1-TCA] was not detected). Concentrations of chlorinated VOCs varied greatly in the 14 samples collected in the remainder of 1977, with PCE ranging from not detected to 295 µg/L; TCE from not detected to 170 µg/L; and 1,1,1-TCA from not detected to 5 µg/L. Between late 1978 and early 1984, VOC concentrations seemed to stabilize at low concentrations (PCE not detected; TCE not detected to 6 µg/L), although the 1,1,1-TCA concentration increased

gradually, from ND in the 1970s to 10 to 18 µg/L in 1982-1984. In December 1984, TCE concentrations spiked at 380 µg/L; and TCE concentrations exceeded 100 µg/L in most of the samples analyzed between 1985 and 1989, with a maximum of 690 µg/L. PCE concentrations also increased in this period, though not nearly as much (ranging from not detected to 35 µg/L). 1,1,1-TCA concentrations were low for most of this period, ranging from not detected to a maximum of 3 µg/L between 1987 and 1989. The first reported detection of cis-1,2-DCE (150 µg/L) was in the March, 1989 sample (the lone sample collected that year).

A sample was collected on January 2, 2000, shortly before the pump test; PCE (26 µg/L), TCE (2.5 µg/L), and cis-1,2-DCE (19 µg/L) were all detected (1,1,1-TCA was not detected). Lower concentrations were reported for the sample collected at the outset of the pump test (January 20, 2000) – TCE (3 µg/L) and cis-1,2-DCE (1.5 µg/L) were the only chlorinated VOCs detected. By the termination of the pump test (January 28, 2000) the reported concentrations of PCE, TCE, and cis-1,2-DCE approached (although were still slightly lower than) the concentrations reported in the pre-test sample (January, 2000).

The last known data reported from Well No. 21 was from a sample collected on March 7, 2000; chlorinated VOCs were not detected, except 1,1,1-TCA at 1 µg/L.

2.3.5 Other Sites in Sea Cliff Industrial Area

With the exception of the predecessors of Pall Corporation, the Sea Cliff Avenue industrial area was undeveloped through at least 1947. However, due to the detection of VOCs that ultimately resulted in the closure of the Carney Street Wellfield in 1977, a number of area-wide investigations were undertaken. Probably the most comprehensive of these was the 1990 Contaminated Aquifer Segment investigation (NCDPW, 1990) which included assessment or records review for 54 active facilities and 24 inactive facilities. Review of address and location data showed that most of the facilities were either upgradient or side-gradient of the study area for this investigation, including locations on Carney Street (on the east of the Glen Cove Arterial Highway) and Hazel Street (which runs roughly parallel to, and just to the east of, the Glen Cove Arterial. (Photocircuits also had a facility at 90 Hazel Street; however, no chemical use was reported for that facility.)

In addition to the facilities discussed in the subsection of this report above (2.3.1 through 2.3.4), the 1990 and 1994 NCDPW surveys included a number of facilities on Sea Cliff Avenue. As there may have been multiple occupants at a single address, the summary below is by address, not facility name.

- 10 Sea Cliff Avenue – Hinkle and Finlayson and Harbor Fuel Oil were reportedly at this address since 1933. This location is to the east of what is now the Glen Cove Arterial Highway. It is reported to have had two fuel oil USTs and a 1000-gallon gasoline UST. This facility is likely side-gradient of the Pall Corp site.
- 40 Sea Cliff Avenue – Associated Drapery had been at that address (located on the west side of Glen Cove Creek, across from Pall and August Thomsen) since 1972, and had no reported chemical use. A prior occupant included HMS Machine Shop, which manufactured aircraft parts. (The company closed in 1969.) Interviews and anecdotal information compiled by NCDPW (1990) suggest that unknown quantities of PCE and TCE may have been used, and HMS may have dumped waste solvents on the ground in their yard. As part of a subsequent investigation conducted by

NCDPW, three soil borings and two shallow monitoring wells (MW-1H and MW-2H, 26 to 27 ft bgs; and boring B1-H) were installed and sampled in 1993 on the Associated Drapery site (NCDPW, 1994). VOC concentrations in soils and were limited to suspect laboratory contaminants (acetone, 2-butanone, and methylene chloride); low levels (generally less than 0.5 mg/kg) of potentially petroleum-related semivolatile organic compounds (SVOCs, specifically polynuclear aromatic hydrocarbons; PAHs) were detected in the soils. Groundwater results were similar in that methylene chloride and acetone were detected in both samples; in addition, 1,2-DCA (14 µg/L) and a low concentration of TCE (estimated concentration of 4 µg/L) was detected in MW-2H, the well on the west side of the Associated Drapery structure. The report concluded that the ". . . data showed no indication of prolonged use of organics on site, as indicated by the low concentrations of VOCs identified in groundwater samples." The SVOCs detected indicated "a petroleum-related problem" (NCDPW, 1994). Insofar as can be determined, the 1993 investigation is the only one in which soil or groundwater samples were collected from the Associated Drapery/HMS Machine Shop (40 Sea Cliff Avenue) site.

- 44 Sea Cliff Avenue (north side of Sea Cliff Avenue, to the west of Associated Drapery) has had multiple occupants, apparently with several occupying the facility concurrently. During the 1988 survey (NCDPW, 1990), none of the tenants reported, or showed evidence of, anything other than *de minimus* use or storage of VOCs. (Slater Development Corp., apparently related to Slater Electric Company at 45 Sea Cliff Avenue, was a tenant but only for office space.) However, prior tenants included heat treatment companies (Eastern Heat Treatment and Bennett Heat Treatment), which may have used solvents for cleaning metal parts (no specific information was reported). Another former tenant was Telco Inc., which manufactured printed circuit boards and did report some use (110 gallons/yr) of 1,1,1-TCA. Solvent use apparently ceased after 1980, and the facility closed (moving to Roslyn, NY) in 1983.
- 45B Sea Cliff Avenue was occupied by Keyco Inc. at the time of the 1988 survey (NCDPW, 1990). Keyco's operations included truck repair and use of kerosene was reported in the previous (1978) survey, though no chemical use was reported in 1988. No use of chlorinated VOCs was reported at 45B Sea Cliff Avenue.
- 55 Sea Cliff Avenue had been occupied by Zoomar since 1953, prior to which the site was vacant. Small amounts (20 gallons or less) of non-halogenated VOCs (acetone, "polishing compounds, soluble oil, Pureline solvent") were used. There is apparently one well (N4980) at this address.
- 59 Sea Cliff Avenue had 13 reported current occupants (and two former occupants) in the 1988 survey. Several did report chemical use (enamel paints, adhesives, lacquers, muriatic [hydrochloric] acid, miscellaneous petroleum products) but none reported the use of chlorinated VOCs.
- 65 Sea Cliff Avenue – Pall Corp reportedly had offices and a warehouse (but no chemical usage) at this location, which was no longer in use as of 1988.

2.4 CURRENT SITE CONDITIONS

On September 7, 2006, a site visit was performed and included Mr. Joe Jones (NYSDEC), Mr. Allen Burton and Paul Kareth (AECOM), and Mr. Ed Chen (YEC, Inc.). The purpose of the site visit was to become familiar with site conditions and make preliminary observations. Mr. Peter Takach of Photocircuits Corp. accompanied NYSDEC and AECOM personnel around the Photocircuits Site. AECOM and NYSDEC also observed the property immediately north of the Photocircuits/Pall Corp site, believed to be owned by the City of Glen Cove, on which are located a day care center; the Carney Street Wells; and what appears to be a storage or maintenance garage used by the Glen Cove Department of Public Works (the Glen Cove Water Department is part of the Glen Cove DPW).

2.4.1 Photocircuits / Pass and Seymour

The Photocircuits site was in use through early 2007 and occupies about 10.8 acres on the south side of Sea Cliff Avenue. Photocircuits began operations in 1951; was sold to the Kollmorgen Corporation in 1970; and went private in 1986. Recently (since 2004) Photocircuits consolidated its North American operations to the facility in Glen Cove. Photocircuits manufactured prototype and military printed circuit boards in Glen Cove (bulk manufacturing was apparently conducted by a plant in China). Subsequently, the company filed for bankruptcy under Chapter 11, and its assets were purchased by American Pacific Financial Corporation in March, 2006. Photocircuits continued to operate under the new owner (having received financial incentives from the state in an attempt to retain as many of the 850 jobs as possible), but in August 2006 announced layoffs at the site (PCDM, August 2006). Photocircuits also occupied the adjacent former Pass and Seymour (previously Slater Electric) facility on the west side of Glen Cove Creek; for the purpose of this RI, Pass and Seymour is considered part of Photocircuits. However, in January 2007, Photocircuits management announced its intention to shut down the plant for economic reasons, and by March 2007 all manufacturing had ceased. During the time of AECOM's field operations (2008), the site was shut down and there were no employees at the site.

2.4.2 Pall Corp / August Thomsen

The Pall Corp part of the site is currently not in use, although operations had apparently ceased recently (sometime in 2006). It had previously been used by the Pall Corporation as a research and development facility for the manufacturing of filtration products. File information indicates that Pall Corp has stated that chlorinated solvents are not used on the Site currently or recently. The Pall Site is asphalt paved except for small landscaped areas around the facility, and tree and grass covered areas along Glen Cove Creek as it flows along the west side of the site.

AECOM observed many apparent monitoring wells on the Pall site (as well as on the August Thomsen property). A comprehensive review of the existing wells was not performed during the initial site visit (September 7, 2006); however, it was apparent that there are many more well covers present on site than are accounted for in the initial list of monitoring wells provided by NYSDEC. Subsequent file review suggests that many of these additional wells were either injection or monitoring points associated with a pilot study conducted recently (by Pall's consultant) in the northeast part of the Pall Corp site.

The August Thomsen building is located north-northwest of the Pall Corporation facility building. The August Thomsen property is currently in use, reportedly for the manufacture and distribution of a comprehensive line of cake decorating items including colors, tubes, decorating

bags, spatulas, turntables, rolled fondant icing, and other tools for baking under the 'Ateco' brand name for bakery and restaurant supply companies and kitchenware stores.

2.4.3 City of Glen Cove / Carney Street Wellfield

The Glen Cove-owned property north of the Pall Corp site includes an active day care center, the inactive Carney Street Wellfield (the wells were not seen but the structure reportedly housing Well 21 was observed, north of the day care center), and other buildings on the west side of the property (garages and maintenance facilities [the same structures noted in NCDPW (1994) and discussed in section 2.3.1 above]; some outside equipment storage was noted). This parcel is only partially paved (i.e., there are open areas in addition to the parts covered by buildings or roadways). At the time of the site visit, access was through the day care center property. The formal access (and only vehicular access) is only from Route 107 (Glen Cove Arterial Highway) southbound.

During the implementation of the second round of groundwater sampling (October, 2008), Glen Cove DPW conducted grading activities in the area, apparently in conjunction with opening a boxing facility at one of the municipal structures adjacent to the Day Care center on the property. (The building was opened as the temporary home of the Glen Cove Boxing Club on October 25, 2008 [Record-Pilot, 2008. On-Line Edition. October 31].) As part of this grading, several of the existing monitoring wells planned for sampling were buried and could not be sampled.

2.4.4 Surrounding Properties

During the initial site walk, some of the locations of other monitoring wells were observed (e.g., wells identified as "Sea Cliff Avenue" and "Public Supply Wellfield" monitoring wells). The Sea Cliff Avenue monitoring wells were found to be located in the center of Sea Cliff Avenue (i.e., in the yellow stripe separating the eastbound and westbound traffic lanes); however, the location of MW-16PCI/PCD cluster was not established. The location shown on the Dvirka and Bartilucci (D&B) Figure 3-3 suggests it is located south of Sea Cliff Avenue, near the northeast corner of the former Pass and Seymour building (D&B, 2006); however, in conversations with Photocircuits consultant, Mr. Barber of B&L, indicated that well cluster MW-16PC is in fact located within Sea Cliff Avenue. Well cluster GC-2S/2D on Hazel Avenue was located, although the NYSDEC project manager indicated that locating all the "GC" wells could be problematic. Further conversation with representatives of Nassau County DPW confirmed that, although the wells are currently under the jurisdiction of the county DPW, the exact location of all the GC-series wells is not known.

2.5 SITE GEOLOGY AND HYDROGEOLOGY

Soil boring logs from previous investigations indicate that the subsurface geology consists of silts and sands. The thickness of the deposits is over 100 feet.

The site is underlain by the following sequences, in descending order: the Upper Glacial Aquifer; the Port Washington confining unit; the Port Washington aquifer; the Lloyd Aquifer; and bedrock. Depth to groundwater varies between 4 and 10 ft below ground surface (ft bgs) at the site. Monitoring wells in the area, as well as the Carney Street Well No. 21, are screened in the Upper Glacial Aquifer. Hydraulic conductivity has been reported as varying between 10 and 300 ft/day (NYSDEC, 2006). Measurements from deep wells (OU2) indicate that groundwater flow is to the northwest. Shallow groundwater (OU1) also flows predominantly toward the northwest. As the groundwater flow direction in the area is generally northwest, the Photocircuits site is

hydraulically upgradient of the Pall site; both sites are upgradient of the former Carney Street Wellfield. Contamination, including PCE, TCE, and their degradation products (e.g., 1,2-DCE and vinyl chloride), along with 1,1,1-TCA and its degradation products (1,1-DCA and chloroethane) and 1,1,2-trichlorotrifluoroethane (Freon-113), have been identified in the saturated soils and groundwater at the site. Previous groundwater investigations have reported groundwater contamination at both Pall and Photocircuits sites, as well as in samples from the Well No. 21 at the Carney Street Wellfield.

2.6 SURFACE WATER

The nearest surface water body is Glen Cove Creek, a small surface water body which runs along the western edge of the Pall Corp/August Thomsen property and runs along the western side of the Photocircuits property (separating Photocircuits from the former Pass and Seymour/Slater Electric site). Glen Cove Creek is a NY Class C surface water body. The part running through Photocircuits is largely channelized. Glen Cove Creek flows to the north and ultimately discharges to the Long Island Sound at Mosquito Cove in Glen Cove.

As a surface water body, Glen Cove Creek was not included in this RI (which was focused on deep groundwater). However, Glen Cove Creek has been sampled in several previous investigations and VOCs including halogenated solvents have been detected at various times in samples from the creek. The flow rate is generally low; the one known attempt to quantify the flow rate was unsuccessful, as the flow was too low to be measured by the meter used (less than 0.5 meters/sec) (Enviroscience, 2000).

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3.0 TASK 2 –REMEDIAL INVESTIGATION

A remedial investigation was conducted to determine the sources of contamination within the site and its threat to human health or the environment. The scope and execution of the RI is discussed below.

3.1 BASE MAP DEVELOPMENT

Prior to the initiation of field work, an initial base map of the site was produced by a land surveyor licensed by the State of New York (YEC of Valley Cottage, NY). The coordinates and elevations of the survey are based on the New York State Plane Coordinate System (North American Datum [NAD] 1983) and North American Vertical Datum (NAVD) of 1988. The map included existing site features, structures, aboveground utilities, horizontal limits of Glen Cove Creek, limits of vegetation, ditches, sidewalks, curbs, catch basins, streets, fences, gates, and other significant physical and environmental sensitive features. The location of each existing and new sample point was determined (±0.1 ft) and presented on the map with a scale of one inch to 40 ft.

The survey was done in two stages. The initial mapping was completed prior to implementation of the intrusive field work (i.e., well installation). This survey was conducted concurrently with the existing well condition survey (see 3.2, below). During this initial phase, the field survey team mobilized several times to the site and also surveyed a greater number of wells than had been originally scoped.

New monitoring wells were surveyed after installation in a second mobilization. During this second mobilization, any additional features identified as needing to be surveyed (subsequent to the initial baseline survey) were surveyed, as well as verification of any data points that appeared suspect or anomalous.

A site map was developed from aerial photogrammetry at a scale of 1"=40' with a horizontal accuracy of 1/40" at map scale (or ±1'). The ground control for the site map was performed by GPS with a horizontal accuracy of ±½" and a vertical accuracy of 3" (3/4" relative accuracy) to tie in with NAD 1983 and NGVD 1988. The aerial survey was enhanced by a ground survey performed by a licensed surveyor in which wells were surveyed with a horizontal and vertical accuracy of ± 0.01' with respect to the control.

3.2 EXISTING WELL CONDITION SURVEY

In order to properly plan and execute subsequent investigative tasks (e.g., groundwater sampling), a well condition survey was performed to locate the existing monitoring wells, and to assess their condition prior to sampling. Monitoring wells in the project vicinity known to exist at the time of the survey, along with available information on the wells (current as of July 2006), are listed in Table 3-1.

AECOM and YEC personnel performed a limited site reconnaissance on September 7, 2006 (later accompanied by the NYSDEC project manager). During this site reconnaissance, it became apparent that there are ambiguities with regard to the location and identity of some of the monitoring wells, including wells on the Pall Corp site (including August Thomsen), the Photocircuits site, and the wells in the center of Sea Cliff Avenue. In some cases, wells could not be located (e.g., Photocircuits wells 16-PCI/PCD, in front of the former Slater Electric/Pass and Seymour site; one of the MW-8P/8S doublet in front of Pall Corp.). In other cases, due to the presence of multiple wells, including injection wells and pilot study monitoring wells (on the

northern part of the Pall/August Thomsen site), it could not be readily determined which of the many flushmount well covers were for monitoring wells which were planned for sampling, and which were installed for other purposes and will not be sampled. It was also noted that in some cases the flushmount covers were missing and the inner pressure closure did not appear to be in good condition; and in at least one case (probably Pall Corp well MW-5P, although this could not be determined definitively) the well appeared to be subject to flooding; possibly due to artesian conditions in wells immediately to the south (pilot study wells), or merely due to the well being located in a low spot and subject to flooding due to poor drainage. On the Photocircuits side, there are extraction and injection/diffusion wells present (not shown on the figures) which also increase the difficulty of proper identification of the monitoring wells planned for sampling.

3.2.1 Existing Condition Survey Scope

Accomplishing this task required coordination with several entities, as noted below.

- Photocircuits – During the site visit, neither AECOM nor Photocircuits representatives could locate or identify some of the monitoring wells (e.g., MW-13, MW-14, and MW-7), based on field observations. It was suspected that at least one of the wells may not have been visible due to it being covered by a pallet of equipment. Identification of the monitoring wells was made more difficult due to the presence of soil vapor extraction points on the east side of the site, and injection/diffusion wells (in addition to monitoring wells) on the north side of the site (along Sea Cliff Avenue, especially the area nearer the Glen Cove Arterial Highway). AECOM coordinated with Photocircuits personnel (and their engineer, B&L) to locate and identify the monitoring wells on the Photocircuits site (including the former Pass and Seymour/Slater Electric, which is currently also occupied by Photocircuits), and also to arrange for access to the wells for the initial well survey, civil survey, and subsequent sampling.
- Pall Corp/August Thomsen. During the site visit, not all wells could be located; and the identity of others (mainly in the northern part of the site, but also MW-2P) was ambiguous. Subsequent to the site visit, AECOM obtained better maps (with surveyed locations, rather than the sketch figure available on September 7, 2006) enabling some (though not all) of the problems in locating and correctly identifying wells to be resolved. AECOM coordinated with Pall Corp's engineers in identifying and accessing the monitoring wells. AECOM located prior survey data for many of the monitoring wells located on the Pall/August Thomsen site (based on the 1998 civil survey performed by YEC).
- City of Glen Cove. A number of wells planned for sampling are located on property believed to be owned or controlled by the City of Glen Cove. These include the wells located in Sea Cliff Avenue; the wells at the Carney Street Wellfield (both the monitoring well and Supply Well No. 21); and "off-site public supply wellfield monitoring wells" (as shown on Figure 3-2, D&B, 2006). Off-site well doublet GC-2D/2S was located during the site visit; however, no effort was made at that time to locate the other five off-site well locations (three doublets and two singlets) tentatively planned for sampling. The locations shown on the currently-available sketch map showing the off-site wells are very approximate; and NYSDEC indicated that at least one of the wells (GC-1) may never have been found. Subsequent conversations with County representatives (NCDOH and

NCDPW) indicated that these wells (GC-series) were installed as a joint effort of the two county departments, but are currently administered by NC DPW.

Inspection and sampling of some of the wells also requires close coordination with Glen Cove and Nassau County (Sea Cliff Avenue is a county road, not a local street), due to their location in the middle of Sea Cliff Avenue. At least part of Sea Cliff Avenue will need to be closed for varying times (depending on the work being performed) for the safety of AECOM or subcontractor personnel. Due to safety issues, the wells located in the center of Sea Cliff Avenue (MW-14PC series, MW-15PC series, and MW-16PC series) were not sampled in Round 1 of the RI (April 2008). However, most of these wells were sampled during Round 2 (October 2008).

- Associated Drapery. Although not included in the list of monitoring wells in the vicinity provided by NYSDEC (based on D&B, 2006), AECOM's review of prior reports (i.e., GZA, 1999) shows that there are two monitoring wells (MW-1H and MW-2H) on the Associated Drapery site (due west of Pall Corp and due north of the former Pass and Seymour/Slater Electric facility). As surveyed data are available for these wells, AECOM included these two wells in the initial monitoring well condition survey. Although these two wells were not included in the preliminary list of wells to be sampled, their usability was established as a contingency should data from them subsequently be determined to be useful. These wells were not sampled during the RI. There is no record of Associated Drapery being a generator of hazardous waste (EPA, 1980).

3.2.2 Existing Well Condition Survey Execution

AECOM representatives performed condition survey of the existing monitoring well at the Photocircuits/Pall Corporation Site. The well condition survey was conducted by AECOM personnel from July 16 through July 18, 2007 for the wells located at the Photocircuits, Pall Corporation, August Thomsen, and Glen Cove Day Care Center properties. The well survey for the wells located in Sea Cliff Avenue was conducted on July 27, 2007. The geophysical survey (utility markout) was performed by a subcontractor (Enviroprobe) under AECOM supervision during this same interval (although it was not completed until August 9). Enviroprobe's letter report is provided separately.

The following information was recorded for each well as part of the existing well condition survey:

- Well Diameter
- Material of Construction
- Total depth of well
- Depth to water
- Observations relating to well integrity
- Any additional observations regarding the well

Each well was also screened for organic vapors immediately after opening the cover using a MiniRae photoionization detector.

The existing condition survey of 43 wells was initiated on July 16 and 17, 2007. On July 16, an official from Pall Corporation, Mr. Richard Van Wickler, met AECOM personnel at the site in

the morning and stayed for about 15 minutes. Flowing artesian conditions were observed in monitoring wells MW-2AI, MW-2AD, MW-2GD, and MW-2GI. The wells were secured properly with watertight J-plugs. Monitoring wells MW-2GD and MW-2GI, located within the Glen Cove Water Department property, required considerable time to locate as they were covered with dirt. In order to survey the wells on the Glen Cove Day Care Center property, AECOM had to contact the office of the Deputy Mayor, City of Glen Cove. A Glen Cove Water Department official (Mr. Mike Colangelo) escorted AECOM personnel for the survey of wells on the Day Care center property.

On July 27, AECOM conducted a condition survey of 24 additional wells. The survey included some off-site wells, selected pilot test wells (on the Pall Corp site) and wells located in the middle of Sea Cliff Avenue. Proper arrangements were made with the office of the Deputy Mayor, City of Glen Cove, and the Nassau County Highway Department (Mr. Steve Anker) for traffic control during the well survey on Sea Cliff Avenue. AECOM utilized traffic cones and flagmen, under the supervision of a health and safety specialist from AECOM's Bloomfield office, to maintain safe and proper traffic control during the condition survey of wells in Sea Cliff Avenue. (Traffic control procedures were adapted from the US Department of Transportation Federal Highway Administration Manual on Uniform Traffic Control Devices; (http://mutcd.fhwa.dot.gov/HTM/2003r1/part6/fig6c-03_longdesc.htm). Personnel from the Nassau County Highway Department were at the Site for about two hours during the street survey. There was no cover and cap at monitoring well MW-15PCD located at the Sea Cliff Avenue; thus there is a possibility of dirt or other foreign matter entering the well during rain. The bottom of this well was measured at 85 ft from the top of the casing, while the as-built well screen interval is between 90 and 100 ft. It appears that the screened interval is filled up with sediment and will have to be developed if this well is to be included in the sampling program. It is recommended that a cap be placed on the top of the riser casing and properly secured during future site work.

3.2.3 Well Condition Survey Findings

The discussion below summarizes the findings. The details of the assessment, along with a compilation of known information about each well surveyed, is provided in the attached Table 3-2.

3.2.3.1 Pall Corp Site

AECOM located and evaluated the existing condition of 31 monitoring wells on the Pall Corporation site, as well as three of the many pilot test wells. During the well condition survey, it was determined that the surveyor had transposed the identity of MW-11PI and MW-11PD (tagging the well bottom during the condition survey conclusively showed which well was the deep well [PD] and which was the intermediate depth well [PI]). Artesian conditions were observed at three of the wells (MW-5PD, MW-10PD, and MW-11PD); these were the same three wells noted as being artesian during a sampling event performed by Apex (Pall Corp's consultant) in April, 2006.

Of the 31 wells, there was some indication of compromised integrity in 11, although in many cases the problems were relatively minor (e.g., broken bolt on lid). The total well depths determined in the survey were compared to those recorded previously (e.g., by Apex), after accounting the additional riser added by Apex (Apex, 2006; Table 5-1). Significant depth discrepancies (defined as about 1.0 ft total depth difference or greater) were noted in seven of the

Pall Corp monitoring wells (well depths were not measured in MW-1P and MW-5PD, due to significant flowing artesian conditions). In four of the seven (MW-1PD, MW10-PD, MW-11PS, and MW-19PI), AECOM's measurement showed the wells to be deeper than previously reported (although the 'as built' well construction diagrams suggest that AECOM's measurements may be more accurate at MW-1PD, MW-10PD, and MW-11PS than the total well depth reported by Apex). In the other three wells (MW-10PI, MW-11PD, and MW-17PS), the total depth measured by AECOM was about 1 to 2 ft less than had been reported previously.

AECOM also spot-checked a few of the pilot test wells on the Pall Corp site, both as an aid to verify well identity and also as a contingency for potential wells to be added to the sampling program. Depth measurements at PT-MW-6S and PT-MW-6I matched the reported values; however, the well depth measured by AECOM at PT-MW-3S was more than 14 ft deeper than the reported value, suggesting an incorrect well ID had been assigned.

Organic vapor measurements were recorded in each surveyed well; high readings were observed in MW-13PD (152 ppm) and MW-4PD (77 ppm). A transient reading of about 17 ppm was observed in MW-6P. Many other wells had organic vapor measurements in the single digits above background (0.1 to 6.5 ppm).

No pumps were permanently installed in any of the Pall Corp monitoring or pilot test wells surveyed by AECOM. MW-4PI was observed to have a 2-inch stainless steel casing; all the other monitoring wells surveyed at the Pall Corp site were constructed of PVC.

It is interesting to note that overall the depth to water was shallow in all 31 Pall Corp monitoring wells surveyed (and also in the three pilot test wells) – the greatest depth to water observed during AECOM's well condition survey was 3.71 ft below top of casing (at MW-1P).

3.2.3.2 August Thomsen Site

AECOM evaluated 11 monitoring wells on the August Thomsen site, including five wells that had not been on the initial list of wells proposed for sampling. Four of these five wells, AT-1 through AT-4, did not appear on the master list of wells that AECOM had compiled from prior reports. Artesian conditions were observed at three of the August Thomsen wells (MW-2AI, MW-2AD, and MW-12PD); these same three wells were also identified as artesian by Apex in 2006.

One well (AT-4) was found but could not be surveyed as it was underneath a dumpster at the time of the survey. Well AT-3 could not be opened as the 4-inch cap was cross-threaded. There were concerns noted regarding the condition of two of the other August Thomsen wells (MW-2AI and AT-2).

Significant well depth discrepancies (more than 1 ft) were noted in three August Thomsen wells (MW-2AI; MW-12PI; and MW-12PD), after taking into account the 2 ft riser added by Apex at the three artesian wells. The depth recorded by AECOM was about 2 ft less than the depth reported by Apex and recorded in the well construction diagram at MW-12PI but was about 1.5 to 1.8 ft greater than the (adjusted) total well depth reported by Apex at MW-2AI and MW-2AD.

Organic vapor measurements were recorded by AECOM; several August Thomsen wells had organic vapor measurements in the single digits above background (0.1 to 5.4 ppm).

No pumps were permanently installed in any of the August Thomsen monitoring wells surveyed by AECOM.

Depth to groundwater was also shallow at the August Thomsen wells, although the total depth to water from top of casing was about 5 ft in two of the wells (AT-1 and AT-2).

3.2.3.3 Sea Cliff Avenue Wells

AECOM evaluated six wells located in the center of Sea Cliff Avenue, between the Photocircuits and Pall Corp sites. While MW-14PCS appears to be part of a three-well cluster (also including MW-14PCI and MW-14PCD), no construction information was available at the time of the survey, and MW-14PCS is a 4-inch PVC well, while the other five Sea Cliff Avenue wells are all 2-inch wells.

Significant problems were noted at MW-15PCD, at which there was no flushmount lid or well cap. There was also a 14-ft depth discrepancy in total well depth between AECOM's measurement and the reported total well depth. It appears that runoff has entered this well and the entire screened interval may be silted up. The condition of the other five Sea Cliff Avenue wells was generally good, although all of the wells were missing bolts. Depths measured by AECOM were greater at MW-14PCI (by 6 ft) and MW-14-PCD (by 1.6 ft) than previously reported by Apex; the depth measured by AECOM was about 1.1 ft less at MW-16PCD than reported by Apex.

3.2.3.4 Former Pass and Seymour Site

It was originally planned to include three wells at the former Pass and Seymour site (most recently occupied by Photocircuits) in the well condition survey. However, the location and identify of these wells was not well-documented and only one of the three wells (MW-3S) could be located; MW-1S and MW-4S were not found. (In the location survey performed by YEC for AECOM earlier in 2007, MW-3S had been incorrectly identified as "MW-16"; this error has been corrected.) An organic vapor reading of 1.6 ppm was recorded at this well. No other issues were noted regarding wells on the Pass and Seymour site. Although not originally planned, Pass and Seymour well MW-2S was located and included in the survey; there are some concerns with the condition of this well (no pad, bolts missing).

The depth to water was about 6 ft in both Pass and Seymour wells (MW-2S and MW-3S).

Monitoring wells south of Sea Cliff Avenue (i.e., Pass and Seymour and Photocircuits) were not accessed by Pall Corp's consultant, Apex; therefore, no recent total well depth data are available for either of these two sites. Depth discrepancies are assessed through review of well construction diagrams or other information recorded at the time of installation; however, such information may not be as accurate as data from surveyed depth measurements.

3.2.3.5 Photocircuits Site

Initially, only seven Photocircuits wells were planned for inclusion in the well condition survey and subsequent groundwater sampling program. However, for several reasons, including consistency with the monitoring wells in Photocircuits' routine groundwater sampling program (e.g., MW-13), as well as the well condition issues noted in most of the Photocircuits wells, AECOM ultimately included most of the Photocircuits wells which could be located in the well condition survey (i.e., MW-1 through MW-14).

Of the 14 wells included in the survey, there were some concerns (although some are minor) with all but three of the wells. Three of the wells (MW-3, MW-8, and MW-12) had dedicated bladder pumps installed, although the pump at MW-12 was not connected beyond the wellhead.

Well depths were not recorded at MW-3 and MW-8 (due to the presence of the pumps) nor at MW-7 (due to possible LNAPL and chemical odor).

Of the 14 Photocircuits wells surveyed, depths were not determined at three wells, and the total well depth recorded by AECOM matched (to within ±0.5 ft) with the bottom of the screened interval from well construction diagrams six wells. AECOM found total well depths less than the reported bottom of screen at MW-1 (4.8 ft less), MW-6 (3.2 ft less), and MW-11 (1 ft less); and the measured total well depth was greater than the reported screen depth at MW-9 (by 2.8 ft) and MW-10 (by 2 ft).

The highest organic vapor reading obtained at any Photocircuits well was 18.6 ppm at MW-13; single-digit readings were also recorded at MW-14 (3.5 ppm) and MW-6 (1.2 ppm). Although field personnel noted a chemical odor and possible floating substance at MW-12, no organic vapor reading above background was recorded.

Depth to water ranged from about 1 ft to 7 ft below top of casing at the Photocircuits wells. However, a second depth measurement at MW-14 on August 9 was anomalous; a depth of 15.05 ft was recorded, which is deeper than the other wells at Photocircuits and also does not match the much shallower reading (2.5 ft) obtained by AECOM on July 17.

3.2.3.6 Carney Street Wellfield Monitoring Wells

Prior data regarding the monitoring wells near the Carney Street Wellfield is ambiguous and sometimes contradictory; one goal of the existing well condition survey was to resolve the ambiguity and determine the exact number of wells and their depths in this area. The Carney Street Wellfield wells are also listed as "City of Glen Cove" wells; apparently since the Carney Street Wellfield is located on property owned by the City of Glen Cove, and the land in the vicinity of the Wellfield houses some Glen Cove operations (e.g., the Water Department; an EMS garage; and a Day Care Center). These wells (the City of Glen Cove/Carney Street Wellfield monitoring wells) are not the same as the "Public Supply Well Field Monitoring Wells" which are scattered throughout the general area (i.e., within or near the Sea Cliff Avenue Industrial Area) and all have a "GC" prefix. For the purpose of this report, the phrase "Carney Street Wellfield Monitoring Wells" will be used; and these wells consist of three clusters of three wells: MW-1GS, 1GI, and 1GD and MW-2GS, 2GD, and 2GI. (The well cluster MW-GC3, located near the Carney Street Wellfield, are actually part of the Public Supply Wellfield monitoring wells and discussed below in section 3.2.3.7.)

Although contradictory historical information exists about the depth of these wells, the measurements taken by AECOM essentially confirm the depth and construction data reported by Apex, including the identity of the two artesian wells (MW-2GI and MW-2GD). However, AECOM did not obtain total well depth measurements of the two artesian wells in this area during the well condition survey (total depth information was recorded subsequently during the groundwater sampling program). Depth to water in all six of these wells was shallow (about 1 ft below top of casing or less). No organic vapors were detected in these wells, and no pumps were installed in any of them. Other than being difficult to locate, and partially covered by dirt, no well condition issues were noted for these wells. The MW-2G series wells are the three that were covered under about six inches of dirt during re-grading activities conducted by the Glen Cove DPW in October 2008.

3.2.3.7 Public Supply Wellfield Monitoring Wells

The public supply wellfield monitoring wells are generally 'off-site' in the sense that they are not located on specific sites but are on public sidewalks or rights-of-way. Information regarding these wells is sketchy; but they may have been installed as a cooperative effort between the Nassau County Department of Public Works (NCDPW) and the Nassau County Department of Health (NCDOH) as part of the 1994 investigation. About 20 wells are known to have been installed at 11 locations (GC-1 through GC-11; most, though not all, of these wells are paired shallow/deep doublets). As part of the well condition survey, the wells at GC-2, GC-3, GC-5, and GC-11 were evaluated. (Neither AECOM nor other consultants have been able to locate the singlet GC-1D; the other well locations [GC-4 through GC-10] were not included in the well condition survey.)

These wells include the deepest wells in the project vicinity, with four of the wells included in the survey with depths of more than 200 ft bgs (GC-2D; GC-3D; GC-5D; and GC-11D); the deepest wells at other locations in the site vicinity are about 100 ft bgs. Depths to groundwater tended to be about the same in each well in the cluster, with the exception of cluster GC-3, in which the depth to water in the shallow well (0.75 ft) was near-artesian, with somewhat greater depths to water in the mid-depth well (2.53 ft) and shallow well (5.85 ft).

AECOM's total well depth measurements were at least 1 ft less than that recorded by Apex at five of the seven wells at which Apex had sampled and recorded well depths (GC-2S and 2D; GC-3M; and GC-5S/5D), with the largest discrepancy (7.7 ft) at GC-5S. At the GC-11 cluster, at which the well depth was estimated based on well construction logs and the reported screened interval, the total well depths recorded by AECOM were 3.0 to 7.0 ft deeper than expected (at GC-11S and -11D, respectively).

Organic vapor measurements were recorded by AECOM; none of the wells had organic vapor measurements above background. No pumps were permanently installed in any of the public water supply wellfield monitoring wells surveyed by AECOM.

The two wells at cluster GC-11 were locked; AECOM cut the locks (but did not replace the locks, as it was unclear as to whom keys should be provided). None of the other public supply wellfield monitoring wells were locked (though a cut lock was found inside GC-2S).

The public supply wellfield wells evaluated were all in reasonably good condition.

3.2.4 Well Condition Survey Conclusions and Recommendations

- Two wells planned for the inclusion in the groundwater sampling, MW-1P (a shallow well on the Pall Corp site) and MW-15PCD (an approximately 100-ft deep well in Sea Cliff Avenue) were in poor condition and not suitable for sampling. AECOM reviewed the overall monitoring program and determined that repair or replacement of these wells was not necessary to achieve adequate coverage. Data from Photocircuits shallow well MW-9 (already planned for inclusion in the program) was used to characterize the shallow groundwater in that area. Data from MW-15PCD was replaced with data from the proposed new well MW-8P (proposed depth about 130 ft), very near MW-15PCD.
- Assistance from site owners or their agents is necessary to access some wells for sampling; specifically MW-3 and MW-8 at Photocircuits (these two wells had bladder pumps installed). In addition, AECOM was unable to complete the evaluation of two

wells on the August Thomsen property, although those two wells (AT-3 and AT-4) were not in the proposed list of wells to be sampled.

- AECOM recommended the addition of several existing wells to the groundwater sampling program. Specifically, Pall Corp wells MW-8PS and MW-8PI (completing a three-depth cluster with proposed new well MW-8PD) should be added. AECOM also recommended adding Photocircuits wells MW-13 and MW-14 to obtain coverage in the northeast corner of the Photocircuits property; and also for consistency with Photocircuits' monitoring program.
- Proposed wells in the northeast corner of the Photocircuits property may be difficult or impossible to install due to physical or potential sub-surface constraints. The affected wells are the 01MW-104 cluster (four wells) and provisional well 01MW-107(P). Loss of these wells can be, to some extent, compensated by the cluster at MW-6P, including new well 04MW-6PD2 in the southeast corner of the Pall Corp parking lot. During the geoprobe sampling program (November, 2007), AECOM met with NYSDEC personnel at the site to review the site conditions, the rationale for the these wells, and discuss various options (e.g., installing the wells; trying to find alternate locations; or what extraordinary measures we might be willing to implement to install wells in the northwest corner of Photocircuits). Ultimately it was determined to not install the provisional wells as part of the RI.

3.3 GEOPHYSICAL (UTILITY) SURVEY

The geophysical survey at the proposed monitoring well locations was originally scheduled for July 18, 2007; however, due to persistent heavy rains it was postponed and re-scheduled for the following week. Enviroprobe conducted the geophysical survey for utility clearance on July 26. The geophysical survey was conducted at 14 individual locations. However, three locations within the Photocircuits facility were inaccessible due to obstructions (pallets, drums, etc.) and vegetation. Mr. John O'Conner of Photocircuits was contacted for the removal of the material lying at the proposed well locations. Mr. O'Conner informed AECOM that the material would be removed "in the near future." AECOM also surveyed an additional four wells on the same date.

Enviroprobe returned to the Site on August 9 to complete the geophysical survey of the proposed monitoring well locations that were not completed in July owing to vegetation and obstructions, as well as to establish global positioning system (GPS) coordinates for mapping their findings. While Photocircuits had removed the obstructions from the areas of the site in which the geophysical survey was to be conducted, Enviroprobe was unable to clear the vegetation from the northwest corner of the site, which Photocircuits had indicated they would clear. It appears that the size and density of the vegetation at the location was not amenable to ready removal by portable equipment (e.g., weed whacker).

3.4 DIRECT PUSH/HYDROPUNCH SAMPLING

3.4.1 Direct Push/Hydropunch Approach

The work plan called for Hydropunch sampling on the Photocircuits property in the source area near previous boring 31-GB-04B. Prior to installation of the permanent monitoring well quadruplet near 31-GW-04B (screened at estimated depths of 70, 90, 130 and 160 ft bgs), a complete 5-ft interval profile was to be obtained by Hydropunching ahead of the casing for the deepest (160 ft) well. As provided for in the work, two additional Hydropunch borings were

installed near 31-GW-04B; these borings also had a target depth of 160 ft bgs. Groundwater samples will be taken from the Hydropunch borings from the water table to the maximum depth at 20-ft intervals; except that no sample will be collected from the shallow (0-20 ft bgs) interval.

3.4.2 Direct Push/Hydropunch Implementation

Richard M. Staron and Paul Kareth of AECOM met with Andrea Babel of Aquifer Drilling and Testing (ADT) on Monday, November 5, 2007 at the Photocircuits property to advance three temporary wells: 01HP1, 01HP2, and 01HP3. The crew began a site walk after conducting a health and safety meeting. At the conclusion of the site walk, the crew determined that the sample locations originally approved in the work plan had to be moved as access to these locations was impossible. ADT started advancing 01HP1 by using a 6610DT track-mounted direct push (Geoprobe®) rig with a 2-inch by 3-ft stainless steel screen sampler to advance the borings. Using this technology, ADT was able to advance the boring to 84 ft bgs, substantially less than the 160 ft target depth. The crew began sampling the boring at 5-ft intervals with a peristaltic pump with Teflon tubing and check valve. This sampling method would remain for the duration of the project. Three samples were collected at 73, 78, and 83 ft bgs. A fourth was attempted at 68 ft bgs but no water could be extracted. The technology employed was not conducive to the conditions at the site as poor recovery rates and unacceptable samples were collected which contained microscopic air bubbles and sediment.

On Tuesday morning, a water level indicator was advanced down the boring 01HP1. The water measured about 67.1 ft bgs in the barrel. Water in the boring on the exterior of the 2-inch barrel was measured at a depth of approximately 5 ft bgs. After consultation with AECOM's senior geologist, Paul Kareth, it was determined that the screen was completely silted in and that aquifer water was not entering the sampler. Paul Kareth suggested the that the crew pull the barrels and utilize a 1-inch by 4-ft SP-15 stainless steel sampler and advance the temporary well down the same boring. The thinner SP-15 sampler was able to advance the 01HP1 temporary well to a depth of 110 ft bgs. While this was a significant improvement (by more than 25 ft total depth achieved), site conditions prevented reaching the 160-ft target depth.

Water samples were collected at 5-ft intervals and identified by the top of the screen zone; i.e., 01HP-106 represents the 106-110 ft bgs interval. However, water levels could not be taken from the SP-15 sample barrels because they were too narrow for the water level indicator to fit. The SP-15 sampler allowed better water flow and smother pumping to avoid aeration of the purge water altogether. Nine samples were collected including a field duplicate pair (01HP1-86 and 01HP51-86) and MS/MSD sample (01HP1-91). Prior to sampling the groundwater at each location, field parameters were measured to assess groundwater quality. A PID was also used prior to sampling to determine if the water exhibited any quantitative fugitive VOCs. The samples and trip blank were kept in a cooler full of ice at all times from collection through shipment.

On Wednesday morning, November 7, AECOM and ADT collected the remainder of the samples at 01HP1. At 01HP01, 13 additional samples were collected, for a total of 22 samples from the 01HP1 boring. A field blank was collected at this location after ADT decontaminated the barrels. Decontamination water was containerized in a 55-gallon drum on site. The field blank was collected by inserting a piece Teflon tubing into one of the Geoprobe barrels and running laboratory grade de-ionized water down the barrel and into sample jar. On Wednesday afternoon, the crew then set up at the 01HP2 temporary well location. The boring was advanced

to a depth of 114 ft bgs. Water samples were collected at 20-ft intervals. The samples were collected at 110 ft (i.e.,110-114 ft bgs interval), 90 ft, 70 ft, 50 ft, and 30 ft bgs. In accordance with the work plan, samples were not collected at depths less than 20 ft bgs at this location. A field duplicate pair was collected (01HP2-90 and 01HP52-90) and a MS/MSD was collected at 01HP2-110. Altogether, five samples plus a field duplicate were collected from 01HP2.

On Thursday, November 8, the crew set up at the 01HP3 location. Access to this position was gained by knocking out a bolt off the gate at the corner of the property adjacent to Route 107 (the Glen Cove Arterial Highway) and Sea Cliff Avenue, as approved by the Photocircuits representative (Mike Delguidice). Due to safety concerns and the presence of interferences to the geophysical survey, the first 5-ft interval of this boring was advanced by hand-digging. The boring was advanced to 113 ft bgs, and samples were collected at 20-ft intervals. The samples were collected at 109 ft (i.e., 109-113 ft bgs), 89 ft, 69 ft, 49 ft, and 29 ft bgs. In accordance with the work plan, samples were not collected at depths less than 20 ft bgs at this location. One drum of decontamination water, about half full, was left on site.

Hydropunch sampling was completed on Thursday, August 8, 2007. Hydropunch boring and sampling logs are provided in Appendix A.

3.4.3 Hydropunch Sample and Analysis Summary

A total of 35 samples were shipped to Mitkem (Warwick, RI; ELAP ID#11522) for VOC analysis. All samples were received intact by Friday, November 9, 2007. The samples included 31 discreet environmental samples (two of which were designated for MS and MSD analysis), two blind field duplicates, one trip blank (all samples were shipped together), and one field blank.

The analytical data from this event (discussed in greater detail in Section 4) were utilized in finalizing the screened interval depths for monitoring wells subsequently installed in this area of the Photocircuits site (see Section 3.5, below).

3.5 SOIL BORING AND NEW MONITORING WELL INSTALLATION

3.5.1 Soil Boring and Monitoring Well Installation – General

Prior to installing the wells, a geophysical survey was conducted at each location to investigate the presence of buried utilities. The Hydropunch sampling investigation described above was also completed prior to the initiation of the monitoring well installation program; analytical data from the Hydropunch samples was used to finalize the well screen intervals for wells installed on the Photocircuits site near the suspected source area.

Borings for the new monitoring wells were advanced using 4¼-inch ID hollow stem augers (HSA). Two drilling firms were utilized for the well installation – Delta Well and Pump (Delta) for the deeper wells (100 ft or greater), and Aztech Technologies Inc. (Aztech) for the shallower wells. An overall summary of the well installation and drilling program is presented as Table 3-3. Although the work plan included a provision for use of water or mud rotary for installation of some of the deepest wells, all wells were successfully installed by HSA.

Soil cuttings generated from the boreholes were logged and documented by an AECOM geologist. In addition, a subset (six) of the new deep wells was logged by collecting split spoon samples at 5-ft intervals, utilizing the Unified Soil Classification System to describe the soil.

Cuttings were also screened for VOCs using an organic vapor analyzer equipped with a photoionization detector (PID). Monitoring well boring logs are provided in Appendix B.

The monitoring wells were constructed of 2-inch 0.010-inch slot PVC well screen and threaded, flush joint 80 PVC casing. Schedule 80 PVC was used for the 12 deeper (bottom of screen at 100 ft bgs or greater) installed by Delta; Schedule 40 PVC was used for the shallower wells (less than 100 ft bgs) installed by Aztech. Well screens for the new monitoring were all 10 ft long. With the exception of the wells on the Glen Cove property, all new wells were finished as flush mount wells.

The well screen and riser pipe were inserted into the hollow stem auger and set at the desired depth. A sand filter pack was placed into the annular space around the screen to at least 2 ft above the top of the screen. A minimum 2-ft thick bentonite seal was then placed above the filter pack. The remaining annular space was tremie-grouted with cement-bentonite grout. A flush-mounted well cover was installed in a concrete pad at ground surface. Monitoring well installation logs are provided in Appendix C.

Drilling equipment was decontaminated before the first use during this project, between boreholes and prior to demobilization using high-pressure steam. Decontamination was conducted at a dedicated decontamination pad constructed on the Photocircuits property. Decontamination fluids were contained (drummed) for subsequent disposal.

Soil cuttings from all well borings were initially containerized (drummed) or stockpiled near the location at which they were generated. As the soils generated from wells on the Glen Cove property were believed to be clean (not contaminated), these soils were disposed on site, with permission of Glen Cove personnel. Soils generated from Pall and August Thomsen borings were consolidated in a roll-off in the Pall Corp parking lot; and soil from borings on the Photocircuits site was consolidated into a rolloff container in the Photocircuits site.

All new monitoring wells were purged and sampled after installation.

The locations of the new (and existing) monitoring wells are shown on Figure 2. Details on the execution of the boring and well installation program, as well as a discussion of field changes and modifications to the November 2007 work plans, are discussed below.

3.5.2 New Well Installation - Photocircuits Property

One permanent monitoring well couplet, 01MW-101S/101D, was installed on the southern boundary of the property (north of the Glen Head Country Club) and screened at 60 and 100 ft bgs, respectively. This well couplet, along with existing off-site well couplet MW-GC2S/GC22, serves as the upgradient or background well. Locations of the monitoring wells are shown on Figure 2; boring logs for the new wells are included in Appendix B.

Prior to installation of the permanent monitoring well quadruplet near previous boring 31-GW-04B (screened at estimated depths of 70, 90, 130 and 160 ft bgs), a complete 5-ft interval profile was obtained by Hydropunching ahead of the casing for the deepest (160 ft) well (see discussion in Section 3.5, above). As noted previously, the direct push equipment was not able to penetrate to the target depth of 160 ft bgs; therefore, the Hydropunch groundwater data were limited to a depth of about 115 ft bgs. Based on the Hydropunch data, the depths of the three shallower wells in this cluster (01MW-104) were reduced by about 10 ft; so the final installed depths were 60 ft (104S), 80 ft (104I), and 120 ft (104D). The deepest well, 01MW-104D2, was installed at the planned depth of 160 ft bgs.

No new permanent monitoring wells were planned or installed on the Photocircuits side of Sea Cliff Avenue; assessment of the existing hydraulic controls and migration onto the Pall Corp site is based on existing wells at both Pall and Photocircuits, existing wells in Sea Cliff Avenue, and new wells installed at Pall Corp site (see Section 3.6.3, below).

Precise locations of the wells were determined in the field in consultation with the AECOM project manager and subcontractor personnel, based on safety and access considerations.

3.5.3 New Well Installation - Pall Corp. Property

Four new deep monitoring wells were installed on the Pall Corp site (including wells which may actually be on August Thomsen property). These wells were screened at the planned depth intervals (approximately 145 to 155 ft bgs). These four wells were located near existing wells MW-4PD, MW-12PD, MW-11PD, and MW-2AD; the new wells were identified as 04MW-4PD2, 04MW-11PD2; 05W-12PD2; and 05MW-2AD2.

It was planned to install five new monitoring wells on the Pall Corp site along Sea Cliff Avenue to assess the effectiveness of the existing hydraulic controls (on the Photocircuits property) and contaminant migration onto the Pall Corp. The new wells proposed were 04MW-6PD2 (creating a triplet, along with existing wells MW-6P and MW-6PD); new triplet MW-16PS, 16PI, and 16PD (located along Sea Cliff Avenue between MW-7P and MW-8P); and MW-8PD (creating a triplet with MW-8PS and MW-8PI). However, due to access issues (underground and overhead utilities), the planned well at 8PD was moved about 40 ft west, near well cluster MW-19P. The designation of this new deep well was therefore changed to MW-19PD2 (see Figure 2).

3.5.4 New Well Installation – Glen Cove (Carney Street Wellfield) Property

One permanent monitoring well quadruplet (06MW-103 series: 103S, 103I, 103D, and 103D2) was installed approximately 75 ft south of the Carney Street wellfield. The four wells were screened (bottom of screen) at approximately 80, 120, 160, and 214 ft bgs. The boring for MW-103D2 was terminated slightly before the target depth of 220 ft was achieved, likely due to resistance from the Washington Clay confining unit. The four wells at the Glen Cove property were installed as stickup wells.

3.5.5 Downhole Geophysics / Gamma Logging

After discussions with the NYSDEC project manager and the AECOM project team, it was decided to conduct gamma logging at six deep monitoring wells installed during the RI. Christopher M. Okon of Delta Well and Pump Co. Inc. conducted the gamma logging on April 23, 2008. The gamma tool used during this investigation was a Mount Sopris 2PGA-1000, measuring 31.3 inches long and 1.63 inches in diameter. M. Akbar of AECOM and Richard Baldwin of Apex Companies (consultant to Pall Corp.) observed the gamma logging activities. Joseph Jones of NYSDEC also witnessed the logging at two monitoring wells.

In gamma logging, measurements are made of naturally occurring radiation coming from the materials encountered in the boreholes. Natural gamma logs may be obtained through steel or PVC casing, permitting logging through cased holes or wells, and not dependent upon a fluid-filled borehole. Certain radioactive elements occur naturally in igneous and metamorphic rocks and as depositional particles in unconsolidated sediments. Clays and shales contain high concentrations of radioactive isotopes, usually potassium. Mature sands and gravels, on the other hand, contain primarily silica, a stable substance and therefore emit very low levels of radiation.

Gamma logging was performed in the recently installed six monitoring wells including 01MW-101D, 01MW-104D2, 04MW-6PD2, 04MW-4PD2, 05MW-2AD2, and 06MW-103D2. Split spoon samples were collected at 5-ft intervals in five of these wells during monitoring well installation. Lithological description of split spoon samples was superimposed on the corresponding gamma logs in a cross-sectional view. Generally there was poor correlation between the description of the split spoon samples and the corresponding gamma logs, probably due to the limitation of gamma logging in glacial deposits as discussed above. There was also limitation of the material identification by split spoon sampling. The samples were collected at 5-ft intervals and the blow counts were generally very high with very poor sample recovery. However, some distinct clayey layers identified by split spoon sampling were also indicated in the gamma logging. The strip charts from the logging and a more detailed description about the correlation of the material identified by gamma logging and split spoon sampling are provided where in Appendix G.

3.6 GROUNDWATER SAMPLING INVESTIGATION

3.6.1 Groundwater Sampling – General

AECOM conducted two sampling events (rounds) to collect samples from each well for VOC analysis. Groundwater elevation measurements were obtained at each well during the sampling. The two sampling events were separated by an approximately six-month interval (April and October, 2008).

Prior to sampling, the depth to water in each well (except artesian wells) was measured using an electronic water level indicator. The pump was lowered slowly into the screen zone of the well and positioned at the mid-point of the screened interval. As most of the wells have 10-ft or 15-ft screened intervals [based on information available at the time of sampling; see Table 3-1], the pump was typically set at least 5 ft from the bottom of the well. The pump was operated at flow rates typically between 200 to 500 milliliters per minute (mL/min) with a target flow rate of 300 to 350 mL/min, ideally to stabilize the water level within the well with a maximum draw-down of 0.3 ft.

During purging, pH, specific conductance, temperature, turbidity, dissolved oxygen (DO) and redox potential (Eh) were monitored using a flow-through cell at approximate 5-minute intervals. The wells were considered stabilized and ready for sample collection when indicator parameters have stabilized for three consecutive readings: ±0.1 for pH, ±3% for specific conductance, ±10 millivolts for redox potential, ±10% of DO, and turbidity less than 50 NTU. If parameters did not stabilize within two hours, this was noted on the sampling forms, and the sample was collected after two hours of purging. Purge water was containerized for subsequent disposal (see Section 3.8).

Groundwater samples were collected using the lowest sustainable flow rate into the laboratory-supplied, pre-preserved 40-mL vials. Samples were cooled and maintained at approximately 4º C and shipped under chain-of-custody for overnight delivery to the laboratory. Samples were generally shipped three times weekly (on Tuesday, Thursday, and Friday evenings); samples were kept chilled and custody was maintained between collection and shipment.

QA/QC samples included site-specific matrix spike samples/matrix spike duplicate (MS/MSD) samples, field duplicates, and trip blanks. Field duplicates and MS/MSD samples were collected and submitted at a frequency of one per 20 (or fewer) environmental samples. One trip blank

(analyte-free water provided by the laboratory) accompanied each shipment of samples to the laboratory for VOC analysis.

Decontamination of the submersible pump used for purging was performed in accordance with procedures specified in the FAP (section 2.11).

Water level measurements were collected from wells in the monitoring network identified to be useful and viable during the well inspection survey and all newly installed wells. The water level measurements were collected prior to the first round of sampling of the wells (April 2008) and measurements included recording the following information:

- Security of well cover and lock
- Condition of surface seal
- Existence of ponded water or fluids
- Diameter of well
- Depth of well (and comparison to as-built well diagrams for discrepancies that could indicate that the well has silted up)
- Water level; including measurement of artesian head as applicable
- Other pertinent factors (e.g., accessibility)

Based on the initial scope of work provided by NYSDEC, it was initially planned to sample 53 existing wells. However, based on the well condition survey, field conditions, and other considerations, the specific wells sampled in each event varied somewhat. A list of planned and actual wells sampled is provided on Table 3-4.

A planned, limited third sampling event, collecting samples at the Carney Street Wellfield was to be conducted during the aquifer pump test; however, the pump test and associated sampling was not performed (described below, section 3.7).

3.6.2 Round 1 Groundwater Sampling (April, 2008)

AECOM personnel performed Round 1 groundwater elevation measurements and groundwater sampling of 70 monitoring wells (51 existing and 19 new [installed 2007/2008]) at Pall Corporation, Photocircuits, August Thomsen, Glen Cove (Carney Street Wellfield) and off-site wells (see Table 3-4). Groundwater elevation measurement and/or sampling were not conducted on any of the six existing wells on Sea Cliff Avenue due to safety concerns. A representative from Pall Corporation (Mr. Thomas R. Stolworthy of Apex Companies) performed field oversight during AECOM's sampling activities at the Pall Corporation site on April 16, 17 and again on April 21 through 23. Mr. Stolworthy collected split samples on behalf of Pall Corp at MW-2AD, MW-2A, MW-2AI, 05MW-2AD2, MW-4PS, MW-4PI, MW-PD, 04MW-4PD2, MW-PS, MW-5PI, MW-5PD, MW-12PS, MW-PI, MW-12-PD and 05MW-12-PD2. Concurrently with the groundwater sampling effort, downhole geophysical analysis was conducted on six new wells by AECOM's subcontractor, Delta Well & Pump, on April 23. Well survey (elevation and location) for the new wells was performed by Don Stedge of YEC (subcontractor to AECOM) on April 15. Mr. Joseph Jones, the NYSDEC project manager, was present at the site during the downhole geophysical analysis. Mr. Robert Poll, AECOM's Northeast District Safety Manager, visited the site on April 14, for a site safety audit.

On April 8 and 9, AECOM personnel measured the groundwater elevations in the wells, using a Solinst Water Level Indicator (see Table 3-5). After each measurement, the probe was cleaned with DI water. At MW-7 (Photocircuits site), the water level was measured with a tape measure,

owing to the presence of biosludge in the well. After discussions with Mr. Andrew Barber [of B&L, Photocircuits consultant]), this well was removed from the sampling program. ET personnel also tagged the depth of all 19 new wells.

Groundwater sampling was performed using a QED SamplePro bladder pump with Teflon tubing and poly bladders. A YSI flow cell was used to collect field parameters, including temperature, pH, conductivity, ORP, DO, and turbidity, as outlined in the Work Plan (WP). The water level indicator was used to measure depth to water during purging. Water samples were collected in pre-preserved (HCl) bottles provided by the laboratory. Samples for MS (matrix spike), MSD (matrix spike duplicate), and field duplicates were collected in frequencies specified in the WP (one of each for every 20 or fewer samples; four field duplicates and four MS/MSD pairs were collected and submitted). A laboratory-provided trip blank accompanied each shipment of samples. The samples were preserved in ice and shipped to Mitkem Laboratory (Warwick, RI) for VOC analysis. The samples were generally shipped once every two days; however during the second week of sampling (week of April 14), they were shipped on consecutive days (i.e., April 16, 17, and 18).

AECOM used dedicated water line, air line, and cord that were discarded after each round of sampling. AECOM's method for placing the pump in the well for purging/sampling was to use a cord that was about 5 ft less than the documented well depth, and subsequently lowering the pump to the required depth. For the artesian wells, AECOM fabricated a PVC stickup of suitable length (2 ft or 4 ft, depending on the well) that was attached to the well head. (Well GC-1D, which had not been reported as artesian in previous events, could not be sampled, as the sleeve would not seal against the non-standard well cover.) In general, a purge flow rate of 350 to 400 mL/min was maintained; however for wells that had poor recharge, the flow rate had to be reduced significantly (about 100 to 150 mL/min) in order to prevent a sharp decrease in hydraulic head in the wells during purging. The wells were purged until the field parameters (measured by the YSI) were within the ranges as outlined in the WP. For most of the wells the purging was completed within an hour; however for some of the new wells, the water remained turbid even after two hours (or longer) of purging. The Project Manager was subsequently notified and the wells were sampled after two hours of purging. The purge water and pump decontamination water was stored in 55-gallon drums that were labeled and staged on the property at which they were generated (i.e., the Pall Corporation, Photocircuits, and Glen Cove [Carney Street Wellfield] sites).

The bladder pumps were decontaminated after each purging/sampling event. The pump decontamination was performed in a manner as outlined in the WP and involved the following steps: Alconox wash, potable water rinse, DI water rinse, acetone rinse, DI water rinse. The poly/teflon bladders, O-rings, and screens were replaced after each sampling event.

3.6.3 Round 2 Groundwater Sampling (October/November 2008)

Round 2 groundwater sampling was conducted between October 14 and November 18, 2008. In general, the same procedures were used as for Round 1, as discussed above. A round of synoptic groundwater level measurements was taken on October 13, prior to initiation of sampling (see Table 3-5). For personnel safety reasons, the five wells in Sea Cliff Avenue (the MW-14 PC triplet and the MW-16PC couplet) were not included in the synoptic measurements, although they were included in the subsequent Round 2 sampling. (The October 2008 groundwater elevation data for these wells shown on Table 3-5 were collected during sampling; the data are

provided for information but are not used in the groundwater elevation contour maps in this report.) On the other hand, synoptic water level measurements were obtained from the MW-2GS triplet (Glen Cove property), although due to grading activities conducted in late October 2008 by Glen Cove DPW, the MW-2GS triplet could not be sampled in Round 2. All 19 newly-installed wells were sampled in Round 2, along with 54 existing wells.

For sampling the five wells in Sea Cliff Avenue, the safety procedures were similar to those utilized in the initial well condition survey (see section 3.2.2). Traffic control procedures were adapted from the US Department of Transportation Federal Highway Administration Manual on Uniform Traffic Control Devices; (http://mutcd.fhwa.dot.gov/HTM/2003r1/part6/fig6c-03_longdesc.htm). These wells were sampled on October 16, 2008 with additional personnel present to serve as flagmen for traffic control.

As with Round 1, sampling commenced after completion of the synoptic water level measurements, and generally proceeded from south (Photocircuits) to north (Pall Corp and Glen Cove). However, by the time the field team reached the Glen Cove property on October 28, it was discovered that the roadway in which the MW-2G triplet had been re-graded, the well covers were buried (covered by dirt), and the area was flooded. (The flooding also precluded sampling of two of the 06MW-103 series wells at that time). After several days of no rain, AECOM re-mobilized to sample the remaining wells in the Glen Cove property on November 18 (also bringing a metal detector and accurate measurements of the locations of the buried wells). During this mobilization, AECOM was able to collect the samples from the two 06MW-103 series wells; however, the roadway was still flooded and no Round 2 samples were obtained from the MW-2G triplet.

3.7 AQUIFER (PUMP) TEST AND SAMPLING OF THE CARNEY STREET PRODUCTION WELL (WELL NO. 21)

An aquifer (pump) test was planned for Well No. 21 of the Carney Street Well Field. The objectives of this test were to determine the capture zone and hydraulic dynamics of Well No. 21, and to determine the groundwater quality of the pumped groundwater. However, due to issues related to disposal of the contaminated pump test water, the potential for the test to cause additional contaminant migration (including pulling contaminants into greater depths in the aquifer), that changed local water needs (with the closure of the Photocircuits and Pall Corp operations, neither of these facilities has any current need for industrial or cooling water), performance of this pump test has been deferred indefinitely.

The NYSDEC scope of work assumed that the pumped water would be discharged to the Glen Cove sewer system as was reportedly done during previous investigations (apparently referring to the pump test performed in 2000 by Sidney Bowne, consultants to the Glen Cove Water Department). On further investigation, AECOM has been unable to confirm the disposition of the water from this test, which was run for eight days in January, 2000. AECOM noted that the disposal of this water is problematic (based on the reported 1,400 gpm capacity of this well, over 2,000,000 gallons of water would be generated in a 24-hour test), due at least in part to the fact that Nassau County's stormwater management program (under a general SPDES permit) did not begin until 2003.

3.8 INVESTIGATION-DERIVED WASTE MANAGEMENT

Investigation-derived wastes (IDW) generated during this project fall into three general categories, discussed in greater detail below: drill cuttings (soil); aqueous wastes (from well development and purging); and miscellaneous solid waste (personnel protective equipment and general trash).

3.8.1 Drill Cuttings / Soils

A significant amount of investigation-derived waste (IDW), principally drill cutting from new monitoring well borings, was expected to be generated from this project. Based on available data, it was not expected that this material would be subject to regulation as hazardous waste. AECOM solicited bids for the disposal of soil IDW, and based on the three bids received awarded the disposal contract to American Waste Management Systems (AWMS).

Drill cuttings were staged temporarily at the boring location. With the concurrence of Glen Cove DPW personnel, uncontaminated drill cuttings from the MW-103 borings were disposed on site as directed by DPW personnel (in a low area prone to flooding). Cuttings from Pall Corp/August Thomsen were sampled for disposal and then consolidated into a single 20-CY single roll-off on the Pall Corp lot. Cuttings from Photocircuits were sampled for disposal and subsequently transferred to a 20-CY roll-off container in the Photocircuits lot. AWMS contracted with Freehold Carting (NJ) to provide the roll-offs and transport the roll-off containers to the disposal facility. The containers were covered (e.g., with a non-leaking tarp) to minimize water intrusion into the containerized cuttings.

AECOM submitted samples to Mitkem for limited hazardous characteristics analysis and other parameters required by the disposal facility. AWMS also took bulk samples from the roll-offs. The analytical data confirmed that the soils were not hazardous and were accepted for disposal at Clean Earth (Carteret, NJ) where the soil was treated and rendered safe for beneficial re-use. AECOM acted as an agent operating on behalf of the generator, NYSDEC, in the characterization and in coordinating the disposal of this material.

A total of 30.53 tons (net) was treated and disposed (recycled). The waste profile forms, acceptance letter, and certificate of recycling are provided in Appendix I.1.

3.8.2 Aqueous Waste

Aqueous IDW was generated from development of new wells and well purging prior to groundwater sampling. Drums of aqueous IDW generated during well installation and two rounds of groundwater sampling were staged on the site at which they were generated. Aqueous IDW was disposed after completion of the Round 2 sampling and receipt of the analytical data. Based on the sampling data, the aqueous IDW was classified as hazardous waste for trichloroethene (waste code D040), tetrachloroethene (D039), and vinyl chloride (D043), as contaminant concentrations in groundwater exceeded the regulatory threshold for these constituents in one or more monitoring wells. The aqueous IDW was removed from the site on February 26, 2009 and disposed by Clean Earth NJ; disposal documentation is included in Appendix I.2.

3.8.3 Miscellaneous Solid Waste

Miscellaneous solid waste includes used personnel protective equipment (e.g., gloves) as well as other trash (packaging material, food wastes, general trash, unused scraps of well installation materials, etc.). These materials were disposed as non-hazardous solid waste.

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4.0 GEOLOGY / HYDROGEOLOGY

4.1 REGIONAL GEOLOGY

The Long Island aquifer system lies within the Atlantic Coast Plain physiographic province, and is bounded on the north by the Long Island Sound and on the east and south by the Atlantic Ocean and on the west by New York Bay and the East River. The geologic formations of Long Island are composed of unconsolidated glacial deposits of Pleistocene age, and coastal plain deposits of continental and marine origin of Cretaceous age. The unconsolidated deposits consist of gravel, sand, silt and clay underlain by bedrock of Lower Paleozoic and/or Precambrian age, which forms the base of the groundwater reservoir.

The crystalline bedrock, generally consisting of schist and gneiss, indicates gentle southeasterly dipping weathered surface. Above the bedrock are sediments from the Raritan Formation, Magothy Formation, and Matawan Group from the Cretaceous Period. The Raritan Formation consists of two units: the Lloyd Sand Member, and the overlying Raritan Clay Member (confining unit). The Lloyd Member is of continental origin, having been deposited in a large fresh water lake. The material consists of fine to coarse-grained sands, gravel, and inter-bedded clay and silty sand. The Raritan Clay is also of continental origin and consists of clay, silty clay and clayey silt and fine silty sand. This member acts as a confining layer over the Lloyd Member. The Magothy Formation and Matawan Group sedimentary deposits are similar to the underlying sediments with a sand and gravel deposit in the lower portion of the formation and a clay unit in the upper portion of the formation.

The top of the Magothy Formation is not planar, unlike the surfaces of the underlying units. The Magothy surface was deeply eroded during the Tertiary time and was ice shoved and probably eroded again during the Pleistocene time. In certain portions of the Town of Oyster Bay and the Glen Cove area, the Raritan Clay and the Magothy Formations have been completely removed and replaced with younger materials during the Pleistocene age. In these areas, the Port Washington aquifer and the Port Washington unit were deposited.

The Port Washington aquifer is a sequence of deposits of Pleistocene and/or Late Cretaceous age. These beds consist of sand, sand and gravel, and varying amounts of interbedded clay, silt, and sandy clay. The beds of the Port Washington aquifer form part of the valley fill in the channels cut into the Cretaceous deposits by the glaciers. The Port Washington aquifer and the Lloyd aquifer are hydraulically connected at the study area. The Port Washington confining unit, which also forms part of valley fill, is a sequence of deposits of Pleistocene or late Cretaceous to Holocene age that locally lie above the Port Washington aquifer or overlaps the local Cretaceous deposits. This unit consists mainly of clay and silt, with scattered lenses of sand or sand and gravel. This unit may include or consists of erosional remnants of the Raritan Clay.

The surface of the Port Washington confining unit features topographic highs and buried valleys into which the Upper Glacial sediments were deposited. Northwest of the Sea Cliff Avenue industrial zone, the buried valley of the Port Washington confining unit features a northwesterly to southwesterly trending axis. The apparent deepest elevation of the buried valley is about 150 feet below sea level with the valley walls rising to sea level on each side.

The uppermost formation consists of glacial deposits of Late Pleistocene age (Upper Glacial aquifer). These deposits consist of fine to coarse stratified sand and gravel with thin discontinuous beds of silt, clay, and till. The Upper Glacial aquifer overlies the Port Washington confining unit. In the Glen Cove area, the thickness of the various geologic units, including the

Upper Glacial Aquifer, the Port Washington Confining Unit, the Port Washington Aquifer and the Lloyd Aquifer are estimated to be 150 to 300 ft, 100 to 150 ft, 50 ft, and 200 ft thick, respectively. The top of bedrock is approximately 500 ft below sea level at the project site.

4.2 REGIONAL HYDROGEOLOGY

Long Island groundwater is present in three major aquifers, consisting of the Upper Glacial aquifer, the Magothy aquifer (which includes the Port Washington Aquifer), and the Lloyd Aquifer. The uppermost hydrogeologic unit consists of Pleistocene glacial till and outwash sediments. Predominant regional groundwater flow is to the north (toward Long Island Sound) and south (toward the Atlantic Ocean), away from the water table divide along the center of Long Island. Localized flow is generally toward the northwest. Vertical groundwater movement is restricted by discontinuous silt and clay lenses, and confining units such as the Port Washington Confining unit.

Groundwater in the uppermost part of the zone of saturation on Long Island (mainly in the upper glacial aquifer, but locally also in Magothy aquifer) is generally under water table conditions. Artesian conditions exist in some other parts of the groundwater reservoir of Long Island, where the saturated deposits are overlain and confined by silty and clayey layers of low hydraulic conductivity. The hydraulic head in the confined aquifers varies from several feet below the water table to about 20 ft above it. At places along the north and south shores, the head in the Lloyd aquifer is high enough to result in flowing artesian conditions.

4.3 SITE GEOLOGY

The site is immediately underlain by the Upper Glacial Aquifer followed in descending order by the Port Washington confining unit, the Port Washington Aquifer, the Lloyd Aquifer, and the bedrock. The Upper Glacial Aquifer is composed of stratified beds of fine to coarse sand and gravel with interbedded lenses and intermittent layers of silt and clay and extends to a depth of approximately 200 feet below ground surface (bgs) at the project site. The Port Washington confining unit consists of silt and clay with interbedded sand and gravel lenses and extends approximately about 100 ft below the Upper Glacial Aquifer. The Port Washington Aquifer that underlies the Port Washington confining unit is approximately 50 ft thick and is composed of sand and gravel with variable amounts of interbedded clay and silt. The Lloyd Aquifer, which underlies the Port Washington Aquifer, is approximately 200 ft thick and consists of discontinuous layers of gravel, sand, sandy clay, silt and clay. The top surface of the crystalline bedrock is at approximately 550 feet depth below the site.

The distribution of various types of unconsolidated sediments is illustrated by geologic cross-sections (Figures 3 to 6). These cross-sections are based on the material encountered in the borings advanced for installation of the monitoring wells in 2007-2008 as part of this RI. Most of the borings were terminated in the Upper Glacial Aquifer except 06MW-103D2, which penetrated part of the Port Washington Confining unit. The sediments encountered in the site borings predominantly consist of fine to coarse sand with some sand and gravel beds and occasional discontinuous lenses and layers of silt and clay. Some distinct silt and clay layers were observed in the southwestern portion of the Pall Corporation site (Figure 6; geologic cross section C-C').

4.4 SITE HYDROGEOLGY

Groundwater level measurements were recorded in all the monitoring wells during the first round of groundwater sampling in April 2008 and the second round of groundwater sampling in October 2008 as well as during the Well Condition Survey in July 2007. No significant difference in groundwater flow pattern was observed between the first and the second round of groundwater sampling except that the water levels in the second round of sampling were typically a few inches deeper than the first round. Groundwater flow patterns are consistent with those reported previously (e.g., Enviroscience [1999]; NCDPW [1994]). Groundwater flow conditions, including estimate of hydraulic gradients as discussed below, are based on the first round of water level measurements but were similar in both rounds.

Groundwater was encountered either within about 6 ft of the ground surface or under flowing artesian conditions in the on-site monitoring wells. Ground surface elevation varies from about 48 ft NGVD at the Carney Street Wellfield in the northern part of the study area to about 61 ft amsl at the southern end of the Photocircuits property.

Groundwater was encountered at 15.09 ft and 15.67 ft bgs at MW-GC2S and MW-GC2D, respectively. These wells are located about 200 ft east of the Pall property line with ground surface elevation of 71 ft NGVD.

Groundwater levels were also recorded during July 2007 well condition survey in some off site monitoring wells that were not included during the April 2008 and October 2008 sampling rounds. Groundwater was encountered at 90 ft depth at monitoring wells MW-GC5S and MW-GC5D located about 1300 ft east of the Photocircuits property line with ground elevation of about 138 ft NGVD. Groundwater was encountered at depths of 80.35 and 80.48 ft in MW-GC11S and MW-GC11D, respectively. These wells are located about 1200 ft northwest of the Carney Well Field area at a ground surface elevation of about 133 ft NGVD.

Groundwater was under flowing artesian conditions in a number of wells in the northern portion of the site as illustrated in Figures 11.1 and 11.2. Artesian head above ground surface was measured in the monitoring wells during April 2008 sampling event. Fourteen monitoring wells indicated flowing artesian conditions with 0.30 to 2.99 ft of head above the ground surface. In addition, an upward hydraulic gradient was observed in most of the existing 22 well clusters. The upward gradient varied from 0.0001 to 0.089 and downward hydraulic gradient varied from 0.001 to 0.012. One of the well clusters (GC-2S and GC-2D) showing downward gradient is located about 200 ft east of the Pall Property line and another well cluster (MW-101S and MW-101D) showing a downward gradient is located upgradient of the contaminated area at the southern end of the Photocircuits property.

A summary of groundwater surface elevation data collected during July 2007 well condition survey, April 2008 sampling round, and October 2008 sampling round is presented in Table 3-5. Groundwater elevation contours of the data collected during the two rounds of groundwater sampling (April and October 2008) are shown in Figures 7 through 10. As illustrated in these figures, the groundwater flow direction in the shallow, intermediate, and deep wells indicated flow from the southeast to the northwest across the site.

Figures 7.1 and 7.2 show groundwater elevation contours of shallow wells with top of screen elevations from 50 ft to 40 ft amsl. Ground surface elevation varies from about 48 ft NGVD at the Carney Well Field in the northern portion to about 61 ft NGVD at the southern end of the

Photocircuits property. As shown on Figure 3, the groundwater flow direction is from southeast to northwest with a varying hydraulic gradient. The hydraulic gradient is about 0.013 on the Photocircuits property, about 0.015 along Sea Cliff Avenue, about 0.006 on the Pall/August Thomsen property, and about 0.025 at the northern end of Carney Well Field area.

Figures 8.1 and 8.2 show groundwater elevation contours of intermediate wells with top of screen elevations from about 20 ft to 5 ft NGVD. The groundwater flow direction is southeast to northwest with varying hydraulic gradients. The hydraulic gradient is about 0.004 in the southern portion of the site, about 0.008 in the central part of the site, and about 0.002 in the northern portion of the site.

Figure 9.1 and 9.2 show groundwater elevation contours of deep wells, defined as wells with a top of screen elevation ranging from about -20 ft to -60 ft NGVD. The groundwater flow direction is southeast to northwest in this figure with varying hydraulic gradients. The hydraulic gradient is about 0.003 in the southern portion of the site, about 0.005 in the middle portion of the site, and about 0.004 in the northern portion of the site.

Figure 10.1 and 10.2 shows groundwater elevation contours of the very deep wells (also referred to as "D2" wells), defined as wells with a top of screen elevation ranging from about -80 to -165 ft NGVD. Groundwater flow direction is southeast to northwest in these figures. The hydraulic gradient is about 0.004 to 0.005 with no significant variations across the study area.

4.4.1 Influence of Upward Gradient on Contaminant Migration

As discussed above, an upward gradient was observed in most of the monitoring well clusters (in addition to horizontal flow generally in a northwest direction). Under these groundwater flow conditions, the presence of significant contaminant concentrations in deep wells can be caused by the existence of dense non-aqueous phase liquid (DNAPL) in the source areas or the stress on the groundwater flow regime caused by pumping from deeper portions of the aquifer downgradient of the source area(s). The presence of DNAPL can be investigated by the review of previous groundwater sampling results and by comparing the concentration of individual contaminants with their solubility. The presence of DNAPL has not been indicated in any of the previous remedial investigation reports. The most probable cause of the migration of contaminants indicated in relatively deep monitoring wells is the previous pumping by the water supply (Carney Street Wellfield) and industrial wells (Photocircuits, Pass and Seymour, and Pall Corp all had withdrawal and recharge [diffusion] wells). The Carney Street Wellfield was in operation from about 1950 through 1977, when well No. 21 was closed. The boring logs for Photocircuits suggest that the first withdrawal well was completed in 1963; the wells were in operation through at least 1987 but are believed to have been closed around 1990. No information is available for the period during which Slater/Pass and Seymour and Pall Corp withdrawal and diffusion wells were in operation. As mentioned above, flowing artesian conditions were observed in 14 monitoring wells during April 2008.

A review of the previous reports indicates that a number of public water supply and industrial pumping wells as well as some recharge wells had been operating at the Photocircuits, Pall, Pass and Seymour, and Carney Street Wellfield sites probably beginning around 1950 and extending through at least the late 1980s. An industrial supply well at the Photocircuits site had a reported pumping rate of 1,137,000 gallons per day (gpd) – about 790 gallons per minute (gpm) – during 1988 (Table 1-5, Investigation of Contaminated Aquifer Segment, City of Glen Cove, Nassau

County, New York, June 1990). Similarly, the water supply well at Carney Well Field had a reported pumping rate of about 1400 gpm before it was closed in 1977.

4.4.2 Upward Hydraulic Gradient and Artesian Flow

Groundwater flow patterns are significantly influenced by the topographical configuration of the area. The Glen Cove area features a surface topography that has been formed by the process of glacial recession. Prominent landforms include glacial kames (conical hills deposited in contact with ice), kettles (depressions) and valleys. A north to south valley runs through the heart of the project area, featuring elevations of approximately 61 ft amsl at the southern end of the Photocircuits property dropping northward to about 48 ft amsl at the Carney Well Field at the location of monitoring well cluster MW-2G. Glen Cove Creek drains this valley. Topographic highs exist to the east and west of the Sea Cliff Avenue industrial zone, rising to approximately 180 and 170 ft amsl, respectively (NCDPW, 1990). A study of Long Island regional hydrogeology indicates that upward gradients have been found along topographic low areas near the northern and southern shores (NCDPW, 2005). Predominant upward gradients exist at the project area attributable to the topographic depression.

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5.0 CONTAMINATION – NATURE AND EXTENT

5.1 NATURE OF CONTAMINATION

Historical data collected at various times for more than thirty years have identified volatile organic compounds (VOCs) as the principle contaminants in groundwater at the Photocircuits/ Pall Corp site, as well as in groundwater downgradient of the site (e.g., the Carney Street Wellfield). Data collected during this RI is consistent with previous data with regard to the nature of contamination found. (A limited amount of data generated on the Photocircuits site from sampling conducted in June 2008 [AAL, 2008] is also included in the discussion below, where it supplements or confirms the RI data.) As shown on Tables 4-1 through 4-3, the VOCs detected fall into several categories.

- Chlorinated aliphatics
- Chlorinated aromatics
- Chlorofluorocarbons (Freons)
- Non-halogenated aromatics
- Ketones
- Other/Miscellaneous

5.1.1 Chlorinated Aliphatics

About 14 different chlorinated aliphatic VOCs (CVOCs) have been detected in RI groundwater samples. This contaminant class is the most frequently detected group and has been detected at the highest concentrations. Individual CVOC concentrations as high as 10,000 µg/L have been detected in monitoring well samples (TCE in MW-13 during Round 1), and total CVOC concentrations have exceeded 14,000 µg/L (MW-13 during Round 2). Even higher concentrations were detected in Hydropunch samples collected near the suspected source area on Photocircuits – 59,000 µg/L TCE and more than 80,000 µg/L total CVOCs in 01-HP3-69. CVOCs detected frequently or at high concentrations include source contaminants (PCE, 1,1,1-TCA), degradation byproducts (cis- and trans-1,2-DCE; vinyl chloride), and other CVOCs which may be source materials or degradation byproducts (TCE, methylene chloride). The same suite of CVOCs was detected in each round of sampling, except that 1,2-dichloropropane was detected in one sample (MW-1GS at 4.1 µg/L) in Round 1 but was not detected in any Round 2 sample. Chloroform was detected infrequently (a total of five times over the two events) at low concentrations (maximum of 1.3 µg/L) and never exceeded the SCG (5 µg/L). The other 12 CVOC compounds were detected in at least four samples in both rounds and at concentrations that exceeded the applicable SCG in at least two samples in each round.

5.1.2 Chlorinated Aromatics

Five different chlorinated aromatics have been detected in groundwater samples collected during the RI. Three of these compounds (chlorobenzene, dichlorobenzenes, and 1,2,3-trichlorobenzene) were detected rarely (no more than two samples in any event [including the Hydropunch sampling]) and did not exceed the applicable SCG in any sample. The principle chlorinated aromatic detected is 2-chlorotoluene, detected in 10 to 15 samples in each round (25 of 31 samples in the source area Hydropunch sampling) at a maximum concentration of 2,100 µg/L (MW-12 in Round 2). 4-Chlorotoluene was also detected less frequently (and always in conjunction with 2-chlorotoluene), with a total of four detections over the course of two events

(and only one of which exceeded the SCG, 32 µg/L in MW-14 in Round 2). Although chlorotoluenes were detected frequently in the Hydropunch sampling, the concentrations were relatively low (maximum concentration of 58 µg/L 2-chlorotoluene in 01-HP3-69; no SCG exceedances were noted for 4-chlorotoluene).

Review of background information and literature searches did not reveal any evidence that 2-chlorotoluene was used, stored, or generated by Photocircuits; nor was there any indication that this product would have been used in the printed circuit board or electronic manufacturing industries. A variety of sources indicate that the uses of 2-dichlorotoluene are as a solvent and intermediate in the synthesis of dyes, pharmaceuticals, and other organic chemicals including rubber; and in the production of herbicides (Sittig, 1991; US DHHS, 1995).

5.1.3 Freons (Chlorofluorocarbons)

Freon is a DuPont trademark, but commonly used generically for a variety of chlorofluorocarbons (CFCs), a class of chemicals that contain only atoms of carbon, chlorine, and fluorine. As a group, they are nonflammable, unreactive, stable, and relatively insoluble in water. Commercially, the most important CFCs were derivatives of methane and ethane. These include three CFCs which are typically included in target VOC analyses: trichlorofluoromethane (CCl_3F; also known as CFC-11), dichlorodifluoromethane (CF_2Cl_2, also known as CFC-12), and 1,1,2-trichlorotrifluoroethane ($C_2Cl_3F_3$; also known as CFC-113).

Freons detected during the RI in groundwater were dichlorodifluoromethane (CFC-12) and 1,1,2-trichlorotrifluoroethane (CFC-113). Trichlorofluoromethane (CCl_3F) was also a target VOC but was not detected in Round 1 or Round 2. Freon-113 was not included as a target VOC during Round 1 sample analysis, but was reported as a TIC in two samples; dichlorodifluoroethane was detected in three Round 1 groundwater samples. CFCs were detected slightly more often in Round 2 (in eight samples), with CFC-113 being detected more frequently (seven times) and at higher concentrations (maximum of 240 µg/L in MW-12PS).

Although CFCs have been suggested as an indicator compound for Pall Corp contamination, and to date CFCs have not been detected in monitoring well samples from the Photocircuits site, it should be noted that CFCs have been used in the printed circuit board industry (Morrison, 1999). CFCs are a constituent of RCRA hazardous wastes F001 and F002, which have reportedly been generated by Photocircuits and Slater Electric, respectively (USEPA, 1980). CFCs were detected, albeit at very low concentrations (CFC-12 at less than 1 µg/L) in a few of the samples from Hydropunch boring 01-HP1.

5.1.4 Non-Halogenated Aromatics

The principle non-halogenated aromatic detected in groundwater samples collected during the RI is benzene, which was detected in 10 samples during Round 1 and in 13 samples during Round 2. Although the concentrations detected were relatively low (the highest concentration was 15 µg/L in MW-13 in Round 1), most of the detected concentrations exceed the SCG (1 µg/L). Other non-halogenated aromatics detected were detected very infrequently and include toluene (detected in three samples during each round; maximum concentration of 99 µg/L in MW-14) and xylenes (detected in two Round 1 sample and three Round 2 samples, at a maximum of 9.9 µg/L in MW-14PCI, the only sample which exceeded the SCG). Isopropyl benzene, n-propyl benzene, and 1,2,4-trimethylbenzene were only detected in one sample (at most) in each round, and were never detected at concentrations exceeding the SCG.

Non-halogenated aromatics were detected sporadically and at generally low (less than SCG) concentrations in the Hydropunch borings, with the exception of toluene (exceeded the SCG in two samples, at a maximum concentration of 120 µg/L in 01-HP2-50).

5.1.5 Ketones

Ketones detected in RI groundwater samples are acetone, 2-butanone (methyl ethyl ketone), and 2-hexanone. Most of the acetone and 2-butanone data were rejected (found to be unusable) during data validation (see RI section 8). The only valid detection of 2-butanone in each round was at MW-14 (99 µg/L in Round 1, and 100 µg/L in Round 2; in each case exceeding the SCG of 50 µg/L). Similar concentrations of 2-butanone were detected in the Hydropunch samples (three SCG exceedances, at a maximum of 130 µg/L in 01-HP1-71). Valid detections of acetone were reported in a total of seven monitoring well samples and one Hydropunch sample, but none of the detected concentrations exceeded the SCG. Data for 2-hexanone were fully usable (none of the data were rejected), but it was detected in only one sample (6.5 µg/L at MW-14 during Round 2, below the SCG of 50 µg/L).

5.1.6 Other / Miscellaneous VOCs

Three other VOCs, which do not fit into any of the categories discussed above, were also detected. Two of these compounds – carbon disulfide and naphthalene – were detected only once in groundwater samples (slightly more frequently in the Hydropunch samples) and at concentrations below the applicable SCG (in both monitoring well and Hydropunch samples). Iodomethane was detected in two Hydropunch samples at a maximum concentration of 0.26 µg/L (NYSDEC has not established a SCG for iodomethane), and vinyl acetate was detected once (at 0.22 µg/L). Neither of these two compounds was detected in the Round 1 or Round 2 groundwater samples.

Methyl tert-butyl ether (MTBE), a gasoline additive, was detected in 25 or 26 samples in each round, and in each round the MTBE concentration in six samples exceeded the SCG (10 µg/L), with the highest concentration detected in MW-18PS (210 µg/L during Round 1). MTBE was detected at low concentrations (maximum 1.1 µg/L) in six Hydropunch samples, and did not exceed the SCG in any sample.

5.2 EXTENT OF CONTAMINATION (CONTAMINANT DISTRIBUTION)

This section discussed the distribution of contamination on all properties from which samples were collected and data are available. Inspection of the data and associated figures shows that the distribution is affected by three factors:

- Contaminant class, and in some cases a specific contaminant within a class (e.g., the distribution of c-1,2-DCE does not necessarily mirror the distributions of total CVOCs);
- Location (areal) – Certain contaminant types (or specific compounds) are limited, or largely so, to specific areas within the overall study area; and
- Depth – At any specific location (well cluster), the contamination varies with depth; however, the concentrations do not show a simple attenuation with depth (i.e., it is not generally the case that the shallowest well is the most contaminated, with gradually decreasing concentrations with greater depth).

For this RI, the wells (and groundwater data) have been assigned to one of four depth intervals. It should be noted that the well depth suffix (S, I, D) reflects a relative depth of a well within a cluster, but not necessarily the interval assigned for this RI. In some cases, there may be no well within a specific interval in a given well cluster, but two wells classified in another interval.

- Shallow. This zone is defined as wells with a top of screen elevation of about 55 ft to 35 ft NGVD (typically 3 to 15 ft bgs for the on-site wells). The reader is reminded that a number of wells with "S" as part of the well ID are screened at greater depths (e.g., 04MW-102S) and are not assigned to the shallow zone. (Wells with an "S" suffix are the shallowest well in a cluster, but not necessarily within the shallow zone as used in this report.)
- Intermediate. This zone is defined as wells with a top of screen elevation of between about 10 ft NGVD to about –20 ft NGVD. One modification was made to this range for 06MW-103S; by strict application of the criteria, this well would marginally have been classified as a deep well (along with 06MW-103I). However, this is the shallowest well in the 06MW-103 cluster and the data suggest it is more appropriately included with the intermediate zone wells.
- Deep. The deep zone is defined as wells with a top of screen interval ranging from about –10 ft NGVD (with the except of 06MW-103S, as discussed above) to about –60 ft NGVD. For the purpose of generating contaminant distribution plots, a few wells which were transitional (both in terms of depth interval and contaminant concentrations) between the deep and very deep (D2) zones were not included in either zone in the plots. However, the data have been used in discussions herein and are shown on the cross section (B-B').
- Very deep (referred to as D2). These are wells screened at a depth of –75 ft NGVD and greater (down to the maximum well depth in the RI, about –165 ft NGVD at 06MW-103D2).

While the major discussion of contaminant migration (transport) is in the following sections of this report, the discussion of contaminant distribution in this chapter does assume that (a) groundwater flow is generally to the north or northwest; and (b) the new monitoring well cluster installed at Photocircuits (01MW-101S and 101D) and existing well pair MW-GC-2S and MW-GC-2D are "background" wells relative to the Pall/Photocircuits site.

Contaminant distribution maps (by contaminant type and by depth interval) were developed as an aid in interpreting the data. These maps were developed using Surfer™ and are presented essentially as the output from the program. The only manual changes made to the Surfer output were to eliminate contours to areas in which there were few or no wells (data points), such as to the east of the Photocircuits and Pall Corp property lines, and to the west of Glen Cove Creek. It should also be noted that some of the contour lines shown on the contaminant distribution figures (Figures 12 through 27) may be artifacts of the underlying algorithms in the programs. The krigging method generated more reasonable contours than the inverse-distance weighted method; but the contours shown, especially in areas with few samples (e.g., southern part of the Photocircuits property) may not reflect the actual contaminant distribution patterns.

As discussed in Section 3.6.3, it was not possible to sample well cluster MW-2G on the Glen Cove Property in Round 2 (October 2008). Therefore, in order to show more complete coverage

and improve the contouring, the Round 1 data for this well cluster is shown on Figures 16 through 27; the remainder of the data on those figures is from the Round 2 sampling event.

The distribution of the principle contaminant types detected within the study area is discussed below.

5.2.1 Distribution of CVOCs by Location

An overview of the distribution of contamination by contaminant type, and in some cases specific individual chemical, is presented below, relative to the site (e.g., Pall Corp, Photocircuits) and individual locations where particularly high concentrations were observed.

CVOCs were not detected in background wells, suggesting that these compounds are not migrating into the study area from an upgradient source (to the south or southwest). Very high total CVOC concentrations (10,000 µg/L or greater) have been detected in monitoring wells on Photocircuits (MW-13 and MW-14; with even higher concentrations in the Hydropunch borings near these two wells) and on the Pall Corp property (MW-11PD, MW-13PD), but high concentrations (greater than 1,000 µg/L) are pervasive on both sites, and also in wells within Sea Cliff Avenue (MW-14PC series). CVOCs were detected, although at much lower concentrations (less than 100 µg/L), in the Sea Cliff Avenue wells located farther to the west (west of Glen Cove Creek, and north of the former Pass and Seymour/Slater Electric part of what is now Photocircuits).

5.2.1.1 Tetrachloroethene (PCE)

Tetrachloroethene, a source contaminant (i.e., not a degradation or 'daughter' contaminant), in general, is a relatively small component of the overall CVOC concentration. In Round 1, PCE was detected at or above 1,000 µg/L in only two samples (1,500 µg/L in MW-13 [Photocircuits] and 1,000 µg/L in MW-12PI [Pall Corp]); results were similar in Round 2. The highest concentration detected in the RI sampling was 2,900 µg/L in Hydropunch sample 01-HP2-50.

5.2.1.2 1,1,1-Trichloroethane

1,1,1-Trichloroethane (111-TCA), another source contaminant was detected at or above 1,000 µg/L only two Round 2 samples on the Photocircuits site (2,000 µg/L in MW-14 and 1000 µg/L in 01MW-104S); concentrations in both wells were much lower in Round 1 (430 µg/L and 79 µg/L, respectively). The highest concentration detected in the RI sampling was 13,000 µg/L in Hydropunch sample 01-HP3-69.

5.2.1.3 Trichloroethene

Trichloroethene (TCE) may have been a source contaminant, but is also a degradation (daughter) product of PCE. In both rounds of sampling, the highest concentrations of TCE were detected in MW-13 (9300 and 10000 µg/L) on the Photocircuits site. The highest TCE concentration detected in the RI sampling was 59,000 µg/L in Hydropunch sample 01-HP3-69. High concentrations, between 2100 and 6100 µg/L, were detected in both rounds of sampling in Pall wells MW-11PD; MW-13PD; and MW-4PD. TCE was also detected at 2900 µg/L in off-site well MW-2GI (on Glen Cove property, north of August Thomsen) in Round 1. (Due to grading activities being conducted by the Glen Cove DPW, MW-2GI was not sampled during Round 2.)

5.2.1.4 Dichloroethenes (*cis*- and *trans*-1,2-Dichloroethene and 1,1-Dichloroethene)

Cis-1,2-Dichloroethene (c-1,2-DCE), whose presence is likely only due to degradation of TCE and/or PCE, is the CVOC most frequently detected over the two sampling rounds, and most frequently at high concentrations (over 1,000 µg/L). Cis-1,2-DCE was detected at high concentrations in both rounds of sampling in Pall wells 04MW-102S (5,500 and 4,600 µg/L), 04MW-102I (1,900 and 1,500 µg/L), MW-4PD (3,000 and 2,400 µg/L), MW-6P (1,400 µg/L in both rounds), MW-11PD (4,400 and 4,200 µg/L), and MW-13PD (5,600 and 5,900 µg/L).

At Photocircuits, cis-1,2-DCE was detected in at high concentrations only in MW-13 (1,500 and 2,400 µg/L in Round 1 and Round 2, respectively). However, a much higher concentration was detected in the source area Hydropunch borings (maximum 19,000 µg/L cis-1,2-DCE in 01-HP3-69).

Sea Cliff Avenue wells were sampled only during Round 2; c-1,2-DCE was detected at high concentrations in MW-14PCI (1,200 µg/L) and MW-14PCD (1,800 µg/L).

cis-1,2-DCE was also detected in off-site monitoring well MW-2GI (1,600 µg/L) during Round 2 (this well was not sampled during Round 1).

5.2.1.5 Vinyl Chloride

Vinyl chloride is a bulk chemical commonly used in industry; however, it is not a chemical suspected of having been used as a raw material at Photocircuits or Pall Corp. Rather, its presence is most likely due to the degradation of source materials (PCE to TCE to c-1,2-DCE to vinyl chloride). The only sample in which a high concentration of vinyl chloride was detected was in Sea Cliff Avenue well MW-14PCI (1,200 µg/L), which was only sampled during Round 2. The highest concentration of vinyl chloride detected during Round 1 monitoring well sampling was 360 µg/L in Pall well MW-11PD. Vinyl chloride was detected at a maximum concentration of 610 µg/L in Hydropunch sample 01-HP3-69, the same sample in which the maximum concentrations of TCE and c-1,2-DCE were also detected.

5.2.1.6 Chloroethane and Dichloroethanes

The presence of chloroethane and dichloroethanes (primarily 1,1-dichloroethane [1,1-DCA]) is most likely due to degradation of 1,1,1-TCA. The highest detected concentrations of these compounds were in Photocircuits wells MW-14 (3,200 µg/L chloroethane and 3,200 µg/L 1,1-DCA in Round 2) and 01MW-104S (1,800 µg/L 1,1-DCA in Round 2); these were also the two wells with the highest concentrations of 1,1,1-TCA. Although the 1,1,1-TCA concentration was lower in MW-14 in Round 1 (430 µg/L), the concentrations of chloroethane (6,700 µg/L) and 1,1-DCA (5,700 µg/L) were higher than in Round 2. However, MW-14 is the only monitoring sampled in either round in which the chloroethane concentrations were significant (i.e., were high relative to the 1,1-DCA concentration).

Higher 1,1-DCA concentrations were detected in Hydropunch samples (maximum 12,000 µg/L in 01-HP046), although the highest concentration of chloroethane (600 µg/L) in Hydropunch samples was lower than concentrations detected in monitoring well samples. Chloroethane concentrations in the Hydropunch samples were consistently much lower (typically by a factor of 20) than the corresponding 1,2-DCA concentration.

5.2.1.7 Halogenated Aromatics (2-Chlorotoluene)

The only halogenated aromatic of significance at the Photocircuits/Pall Corp site is 2-chorotoluene (although concentrations of 4-chlorotoluene exceeded SCGs in a few samples, it is always detected in conjunction with, and at lower concentrations than, 2-chlorotoluene). High concentrations of 2-chlorotoluene were detected in Photocircuits well MW-12 in Round 1 and in Round 2 (2,000 and 2,100 µg/L, respectively). Analytical data provided by Photocircuits' consultant confirmed the presence of 2-chorotoluene in MW-12 (at 2,100 µg/L) in a sample collected in June 2008 (AAL, 2008).

During Round 2, 2-chlorotoluene was detected at 1,400 µg/L in Sea Cliff Avenue well MW-14PCI, located about 50 ft north of MW-12. Detections in other wells were fairly infrequent and at much lower concentration in other wells (at a maximum concentration of 38 µg/L and 32 µg/L in Rounds 1 and 2, respectively, at MW-13, and 15 µg/L in MW-14); these data match very well with June 2008 data provided by Photocircuits' consultant (AAL, 2008).

Chlorotoluenes were detected, but at relatively low concentrations (maximum 58 µg/L at 01-HP3-69), in Hydropunch samples on the Photocircuits property.

The June 2008 Photocircuits sampling also included three recovery wells at the northern edge of the east side plant, along Sea Cliff Avenue. 2-Chlorotoluene was detected in RW-2 (480 µg/L) and at a very low concentration (1.3 µg/L) in RW-3, and not detected in RW-1.

5.2.1.8 Chlorofluorocarbons

Detections of CFCs were, for the most part, limited to the Pall Corp site. CFCs were detected in MW-10PS (CFC 11 at 81 µg/L and CFC TICs 60 µg/L in Round 1; CFC-11 at 9.7 µg/L and CFC-113 at 11 µg/L in Round 2); MW-12PI (CFC-113 at 230 µg/L in Round 2 only); MW-12PS (CFC-11 at 7.8 µg/L in Round 1 and CFC 113 at 240 µg/L in Round 2; an additional CFC TIC was also reported in Round 2); MW-4PS (CFC-113 at 160 µg/L in Round 2); MW-4PI (estimated CFC-113 [as a TIC] at 47 µg/L in Round 1; CFC-113 at 130 µg/L); and MW-2A (CFC-113 at 81 µg/L - Round 2 only). The MW-2G cluster, on Glen Clove property just north of August Thomsen, was only sampled during Round 1; CFC-11 was detected at 160 µg/L in MW-2GI.

Low concentrations of CFC-12 were detected in seven of the samples from Hydropunch boring HP-1 (but not in HP-2 or HP-3) at very low concentrations (all detections less than 1 µg/L).

5.2.1.9 Non-Halogenated Aromatics (Benzene)

Concentrations of benzene exceeding the SCG (1 µg/L) have been detected in the three most contaminated wells on the Photocircuits site sampled during the RI (MW-12, MW-13, and MW-4). Benzene exceedances have also been detected in Pall site wells 04MW-102S, 04MW-102I, MW-6P, MW-11PD, MW-11PI, MW-17PI, and MW-18PI. Benzene concentrations exceeded the SCG in all three MW-14PC series wells in Sea Cliff Avenue; benzene was not detected in the MW-16PC series. Benzene was not detected above the SCG in any of the Glen Cove property wells (MW-1G series, MW-2G series, or GC-3 series). Benzene was detected in about half of the Hydropunch samples (15 of 31) on the Photocircuits property but concentrations were low (maximum 0.64 µg/L), and did not exceed the SCG.

5.2.1.10 Ketones

The only ketone detected above the SCG in either round was 2-butanone (methyl ethyl ketone), which was detected in Photocircuits well MW-14 at similar concentrations in each round (99 and 100 µg/L). Ketones were detected at similar concentrations in the Hydropunch borings (maximum concentration 130 µg/L) near MW-14.

5.2.1.11 Other and Miscellaneous VOCs

The only other VOC detected in excess of SCGs in the study area is MTBE. MTBE is used almost exclusively as a gasoline additive, and its introduction is relatively recent – it was introduced in 1979 to improve octane in gasoline as tetra-ethyl lead was banned from gasoline. Use increased in the early 1990s to comply with Clean Air Act requirements; however, as MTBE contamination of groundwater has become widespread, its use has been reduced. New York banned the sale of MTBE-containing fuels in 2004. Due to its high solubility and low Koc, MTBE tends to move more quickly in groundwater than other gasoline constituents (e.g., benzene, toluene) (California Air Resource Board, 2000).

MTBE concentrations in excess of the SCG (10 µg/L) were detected in Round 2 samples from Pall wells MW-18PS (the highest concentration detected, 180 µg/L), MW-17PS and 17PI; MW-13PI; and MW-5PI, and in Glen Cove well MW-1GS. The detection of MTBE was similar in Round 1; except that the concentration of MTBE was less than the SCG in MW-5PI but exceeded the SCG in MW-10P. In both rounds, the concentration of MTBE in Glen Cove well MW-1GS was fairly high (140 µg/L in Round 1 and 86 µg/L in Round 2). MTBE was detected in a few of the Hydropunch samples at Photocircuits at low concentrations (maximum 1.1 µg/L) and did not exceed the SCG.

None of the historical data indicate that there were gasoline USTs on properties in the study area; and certainly not since 1979 (gasoline leaks prior to 1979 would be unlikely to contain MTBE), and MTBE was not used in any of the manufacturing processes at Photocircuits or Pall Corp. MTBE was also not detected in upgradient wells (MW-2GC series or 01-MW-101 series), nor at concentrations exceeding the SCG in any of Photocircuits wells. (MTBE has been detected at low concentrations – less than 5 µg/L – in wells MW-10 and 01-MW-104D). Review of the location data indicates that, with the exception of MW-10P, the MTBE exceedances were either in wells on the east side of the Pall site (MW-1G, MW-5P, MW-13P, and MW-17P located along the right-of-way for the Glen Cove Arterial Highway), or adjacent to Sea Cliff Avenue (MW-18P; and also Photocircuits well MW-10). (MTBE was also detected at a concentration slightly below the SCG in Sea Cliff Avenue well MW-16PCD [9.6 µg/L]). Therefore, it appears most likely that the presence of MTBE is not site-related but more likely related to releases related to roadways (e.g., traffic accidents that resulted in releases of gasoline).

5.3 CONTAMINANT DISTRIBUTION BY DEPTH

Contaminant isopleths have been developed for total CVOCs for each of the four depth intervals discussed above, and for each groundwater sampling event (Round 1 and Round 2). The assignment of samples to specific depth intervals is, to an extent, arbitrary; in that there are not four distinct geologic strata. Rather, the assignment is based on review of the data and cross sections, and assigning samples to intervals that appear reasonable, based on inspection of the field and laboratory data. Therefore, in a few cases samples that are near the boundary between two intervals may have been assigned (for the purpose of developing the isopleths) to the interval

adjacent to the one to which they would have otherwise been assigned based on a strict application of the depth criteria. These exceptions are addressed in the discussion below.

In addition to developing isopleths for total CVOCs, isopleths were also developed for several subsets of CVOCs. Due to the large number of figures, these additional figures were generally developed only for the second round of sampling. Additional figures developed included:

- Chloroethene source (parent) chemicals (PCE and TCE; although TCE may also be present due to degradation of PCE).
- Chloroethene degradation (daughter) products including dichloroethenes (although only cis-1,2-DCE was present to any significant extent in most samples; trans-1,2-DCE concentrations were low, generally two orders of magnitude lower than the trans isomer, and 1,1-DCE was detected frequently but usually at much lower concentrations than 1,2-DCE) and vinyl chloride.
- 1,1,1-Trichloroethane. This is a source (parent) chemical known to have been used at Photocircuits.
- Chloroethane degradation (daughter) products, including dichloroethanes (primarily 1,1-DCA; concentrations of 1,2-DCA were typically at least an order of magnitude lower) and chloroethane.

5.3.1 Contaminant Distribution in the Shallow Interval

The Shallow interval is defined as samples collected from depths down to about 20 ft NGVD (roughly 30 to 35 ft bgs). The shallow interval was not explicitly included in the scope of this RI/FS for OU2 (which is defined as groundwater at depths greater than 60 ft bgs). However, as there is not a discreet "shallow" aquifer, it is not possible to address deeper contamination without some understanding of the shallow zone. Therefore, shallow wells were sampled and the data plotted, although not to the same degree that wells from the deeper intervals were sampled.

Review of the Round 1 data showed that there was a paucity of data points in the shallow interval on the Photocircuits property (i.e., south of Sea Cliff Avenue). Therefore, AECOM decided to include on the Round 2 isopleths data for two shallow monitoring wells (MW-3S and MW-4S) which Photocircuits' consultant sampled in June 2008. This decision was made after qualitative comparison of the Photocircuits data for other wells that were sampled in common and a determination that the Photocircuits data were comparable to the data generated for this RI. Use of these data enables better definition of the contaminant distribution on the west side of Photocircuits and also provides better definition in the area of Sea Cliff Avenue west of Glen Cove Creek, near Sea Cliff Avenue wells MW-16PCI.

5.3.1.1 Total Chlorinated Aliphatics

Figures 12.1 and 12.2 show the distribution of total chlorinated aliphatics in the shallow zone wells. High concentrations (from about 100 to 800 µg/L) were observed in the wells on the Photocircuits property (MW-3S, MW-9) and in Sea Cliff Avenue (MW-14PCS); concentrations were lower in the well on the Pall Corp site just north of Sea Cliff Avenue (MW-19PS, MW-8PS, MW-17PS, and MW7P) although concentrations were somewhat higher in the October (Round 2) event in these Pall Corp wells. Shallow zone concentrations are relatively low (not detected to less than 100 µg/L) in the monitoring wells on the east side of Pall Corp and Glen Cove property (i.e., wells near the Glen Cove Arterial Highway); total chlorinated aliphatics

increase toward the center of the Pall Corp site (e.g., MW-4PS) and the northwest corner of August Thomsen and the western edge of the Glen Cove property (MW-2A, MW2GS).

5.3.1.2 1,1,1-Trichlorethane and TCA Daughter Products

Concentrations of 1,1,1-TCA (Figure 16) were low in the shallow zone, with the highest concentration (29 µg/L) detected in the northernmost well on the Glen Cove property (MW-GC3S). TCA daughter products (chloroethane and dichloroethanes) were somewhat more wide-spread, (Figure 19) but still relatively low; the highest concentration was 90 µg/L at MW-14PCS.

5.3.1.3 Chloroethene Parent and Daughter Products

The shallow zone distribution of chloroethene parents (TCE and PCE; Figure 22) is similar to that observed for TCA and its daughter products. TCE concentrations are somewhat higher (between about 100 and 150 µg/L in MW-14PCS, MW-4PS, MW-3S, and MW-GC3S), and higher concentrations (about 600 µg/L) of daughter products in two wells (MW-14PCS and MW-2GS) (Figure 25). The most significant difference is a parent product hot spot (mostly PCE) at MW-2A at the northwest corner of August Thomsen; and chloroethene daughter product hot spot (over 600 µg/L) in the probable downgradient (relative to MW-2A) well MW-2GS on the Glen Cove property.

5.3.2 Contaminant Distribution in the Intermediate Interval

The Intermediate interval is defined as samples from wells with the top of screen elevations ranging from about +10 to –20 ft NGVD. In addition, data from the upgradient well 01-MW-101S was assigned to the both the shallow interval and intermediate interval for plotting purposes.

5.3.2.1 Total Chlorinated Aliphatics in the Intermediate Zone

Figures 13.1 and 13.2 show the distribution of total chlorinated aliphatics in the intermediate zone wells. High concentrations (greater than 100 µg/L) were observed in almost every intermediate zone well; with concentrations over 10,000 µg/L in the wells near a suspected source area on the Photocircuits property (MW-13, MW-14). High concentrations (over 5000 µg/L) were detected in 04-MW102S in the southeast corner of the Pall Corp property in both rounds of sampling; with another hot spot (5462 µg/L) at MW-2GI on the Glen Cove property. (As discussed previously, this well was only sampled during Round 1.) Concentrations greater than 1000 µg/L were also detected in intermediate zone wells in the center of the Pall Corp property (MW-4PI and MW-12PI) and Pall Corp wells near the southeast part of the Pall Corp site (MW-18PI, MW6P, and MW-17PI) as well as in MW-14PCI in Sea Cliff Avenue.

5.3.2.2 1,1,1-Trichlorethane and TCA Daughter Products in the Intermediate Zone

Intermediate zone concentrations of 1,1,1-TCA (Figure 17) were low (less than 5 µg/L) in almost all the monitoring wells sampled. There is a distinct “hot spot” in the Photocircuits source area (concentrations between 250 and 2000 µg/L in MW-13, MW-14, and MW-104S; with another isolated high concentration (170 µg/L) detected in the Round 1 sample from MW-2GI on the Glen Cove property.

Concentrations of TCA daughter products were higher than TCA concentrations throughout the study area (Figure 20), with the highest concentrations (up to 6500 µg/L) in the three Photocircuits source area wells, with concentrations gradually decreasing downgradient (i.e., toward the northwest) in the wells in Sea Cliff Avenue and on the Pall Corp site. Another minor hot spot (about 300 µg/L) was detected in the sample from MW-2GI.

5.3.2.3 Chloroethene Parent and Daughter Products in the Intermediate Zone

The intermediate zone distribution of chloroethene parents (TCE and PCE) is shown on Figure 23. The highest parent product concentrations (greater than 10,000 µg/L in both Round 1 and Round 2) are in Photocircuits source area well MW-13; however, concentrations are much lower (21 to 290 µg/L) in the two other source area wells (01-MW104S and MW-13); this phenomenon was observed in both rounds of sampling and therefore is likely real (not an artifact or sampling/ analytical error). TCE/PCE concentrations decrease moving away (downgradient) from MW-13; but concentrations are higher in the center of the Pall site (about 1100 to 2100 µg/L in MW-4PI and MW-12P), and a higher concentration (about 3000 µg/L) in well MW-2GI on the Glen Cove property.

Concentrations of TCE/PCE daughter products show a similar trend (Figure 26), but with the highest concentrations shifted slightly to the northwest, with the highest concentration in 04MW-102S in the southeast corner of the Pall Corp property. High, but somewhat lower, concentrations were detected in MW-14PCS (about 2400 µg/L), MW-6PS (about 1500 µg/L), and Photocircuits source area well MW-13 (about 2800 µg/L). and MW-2GS) (Figure 25). The only other well with a PCE/TCE daughter concentration over 1000 µg/L is at well MW-2GI (about 1900 µg/L) on the Glen Cove property.

5.3.3 Contaminant Distribution in the Deep Interval

The Deep interval is defined as samples collected from –20 to –80 ft NGVD. In addition, data from the upgradient well 01-MW-101D was assigned to the both the deep (D) interval and very deep (D2) interval for plotting purposes.

5.3.3.1 Total Chlorinated Aliphatics in the Deep Zone

Figures 14.1 and 14.2 show the distribution of total chlorinated aliphatics in the deep zone wells. Data for both rounds are consistent in that the high concentrations (greater than 5000 µg/L) were observed in the deep wells in the center and eastern part of the Pall Corp site (greater than 10,000 µg/L in MW-13PD and MW-11PD, and greater than 5000 µg/L in MW-4PD. Deep zone concentrations generally decreased radially away from this area, despite some inconsistency between Round 1 and Round 2 at Photocircuits source area well 01MW-104I (1238 µg/L in Round 1 but only 145 µg/L in Round 2). The deep zone data do not show a secondary hot spot in the northwestern part of August Thomsen (MW-2AD) or well MW-2GD.

5.3.3.2 1,1,1-Trichlorethane and TCA Daughter Products in the Deep Zone

Deep zone concentrations of 1,1,1-TCA (Figure 18) follow a similar pattern to the total chlorinated aliphatics concentrations, except that concentrations were low (less than 5 µg/L) in all deep zone wells south MW-13PD. 1,1,1-TCA concentrations are highest in MW-13PD (350 µg/L) and MW-11 PD (500 µg/L).

Concentrations of TCA daughter products in the deep zone (Figure 21) follow a similar pattern to the total chlorinated aliphatics concentrations. 1,1,1-TCA daughter product concentrations are

highest in MW-13PD (701 µg/L) and MW-11 PD (637 µg/L), with other moderately high concentrations (between 100 and 400µg/L in nearby wells (MW-4PD; MW-5PD to the north; and M04MW-102I and MW-14PCD to the south).

5.3.3.3 Chloroethene Parent and Daughter Products in the Deep Zone

The deep zone distribution of chloroethene parents (TCE and PCE) is shown on Figure 24. Data are similar to that for total chlorinated aliphatics in that the highest concentrations (greater than 2000 µg/L) were observed in the deep wells in the center and eastern part of the Pall Corp site (greater than 5,000 µg/L in MW-13PD and MW-11PD, and 2250 µg/L in MW-4PD. Deep zone concentrations generally decreased radially away from this area. (Round 1 and Round 2 data for Photocircuits source area well 01MW-104I are consistent for chloroethene parents.) The deep zone data do not show a secondary hot spot in the northwestern part of August Thomsen (MW-2AD) or well MW-2GD.

Concentrations of TCE/PCE daughter products show a similar distribution (Figure 27) to the parent compounds. Again, the highest concentrations were in the central and eastern part of the Pall Corp site with the highest concentration in MW-13PD (6500 µg/L), MW-11PD (4988 µg/L), MW-4P (2674 µg/L). the southeast corner of the Pall Corp property. High, but somewhat lower, concentrations were detected in wells to the southeast of MW-13PD (about 2400 µg/L in), MW-6PS (about 1500 µg/L), and Photocircuits source area well MW-13 (about 1500 µg/L in 04MW-102I and about 1900 µg/L in MW-14PCD), and about 840 µg/L in MW-5D, about 60 ft north-northwest of MW-11PD.

5.3.4 Contaminant Distribution in the Very Deep (D2) Interval

The Very Deep (D2) interval is defined as wells with top of screen depths greater than –80 ft NGVD. As shown on Figures 8.1 and 8.2, all the samples in this interval were ‘clean’ – i.e., contaminant concentrations exceeding SCGs were not detected. The one exception is the Round 1 samples from (Glen Cove) wells 06MW-103D and 06MW-103D2, in which TCE and c-1,2-DCE were detected at concentrations near or slightly greater than the SCG (e.g., TCE at 5.5 µg/L in 06MW-103D and 3.3 µg/L in 06MW-103D2). In Round 2, TCE was detected at a concentration of 1.8 µg/L in 06MW-103D2, and no other CVOCs were detected in either 06MW-103D or 06MW-103D2.

Two monitoring wells, MW-6PD2 and 04MW-19PD2, meet the depth criteria for being considered a “D2” well. However, these two wells are at the upper (shallower) end of the range for the D2 well classification, and the data for these two wells are not consistent with the contaminant range of the majority of the wells and would appear as anomalies on figures. Therefore, although the data for these wells are used to establish depth of contamination, they are not shown on figures showing contamination in the D2 interval. These wells are also less contaminated than the wells assigned to the “D” interval in the area in which they are located; and so these two wells are not shown on the deep well isopleths either. These two wells are considered ‘transitional’ wells both from the perspective of depth interval and contaminant levels.

5.4 CONTAMINATION DISTRIBUTION SUMMARY

The nature and extent of contaminant distribution is summarized below. In addition, uncertainties in the determination of the extent and distribution are also discussed. The

approximate areal (horizontal) extent of contamination (areas in which the groundwater criteria were exceeded by one or more contaminants) is shown on Figure 28; and the estimated volume of contaminated groundwater is shown on Table 5-1.

5.4.1 Contaminants Detected

The principle contaminants detected were chlorinated aliphatics. Principle chlorinated aliphatics include PCE, TCE and their degradation products (cis-1,2-DCE and vinyl chloride, although vinyl chloride concentrations were generally low relative to cis-1,2-DCE); and 1,1,1-TCA and its degradation products (1,1-DCA and chloroethane).

5.4.2 Horizontal Extent of Contamination

The historical record does not suggest that site-related contamination extends south of the Photocircuits property, and the data from the background well installed during the RI supports this conclusion. However, due to lack of data points, it cannot be accurately determined how far south on the Photocircuits property the contamination extents. At Photocircuits and Sea Cliff Avenue, contaminant concentrations trend lower toward the west; however, detectable concentrations of site VOCs were detected in the northwest corner of the Photocircuits site and the westernmost of the three Sea Cliff Avenue wells,

5.4.3 Vertical Extent of Contamination

The vertical extent of contamination is well-defined. Chlorinated VOC contamination extends from the groundwater table down to about El -20 NGVD; little or no contamination was detected in samples from monitoring wells at greater depths. Only minimal data was generated from shallow wells south of Sea Cliff Avenue during the RI, as the focus of the RI was OU2 (deep groundwater contamination); however, ample data has been generated under previous investigations and ongoing monitoring to characterize the contamination in the shallow zone.

5.4.4 Uncertainties in Nature and Extent of Contaminant Distribution

The identity of the contaminants is well-established, with data from two rounds of sampling for the current RI confirming data from previous investigations.

The vertical extent of contamination is generally well-defined within the study area.

The horizontal (areal) extent of contamination is not fully defined to the north and west (north of Pass and Seymour and west of Glen Cove Creek, and north of the Carney Street Wellfield0; and there are some uncertainties in the delineation to the east (under the Glen Cove Arterial Highway) and south (within the Photocircuits site).

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6.0 CONTAMINANT FATE AND TRANSPORT

Fate and transport properties are important for understanding the behavior of the chemicals of concern (COCs) at the Site. As shown on Tables 4-2 and 4-3, and summarized on Tables 7-1 and 7-2, the most significant contaminants at the site (i.e., those detected at the greatest frequency, the highest concentrations, and most often exceeding groundwater criteria) are PCE, TCE and their degradation products (cis-1,2-DCE, and vinyl chloride) and 1,1,1,-TCA and its degradation products (1,1-DCA and chloroethane). Therefore, this section focuses on the subsurface fate and the mobility of these chlorinated aliphatics. An understanding of the fate and transport of PCE and its degradation products is necessary to evaluate future potential exposure risks and to evaluate remedial technologies at the FS stage.

Other contaminant types also were detected at concentrations exceeding groundwater criteria (e.g., gasoline-related compounds such as BTEX and MTBE; 2-chlorotoluene; and chlorofluorocarbons); however, these contaminants are not related to the Site.

6.1 POTENTIAL ROUTES OF CONTAMINANT TRANSPORT

Contaminant transport pathways provide the mechanisms for contamination to travel from its area of deposition and to potentially leave the site. Potential contaminant transport pathways include:

- Groundwater flow off site
- Volatilization of VOCs into the vadose zone and air
- Vertical infiltration of free phase chemicals into the unconfined and/or semi-confined aquifer(s)
- Discharge of contaminated groundwater to downgradient surface water bodies
- Rainwater flow through contaminated soils with subsequent flushing and dissolution into the deeper vadose zone and aquifer matrix

Of these potential mechanisms, groundwater flow, and movement of contaminants with groundwater, is the most significant route of migration for chlorinated contaminants in OU2.

Volatilization of contaminants from groundwater occurs near the top of the water table (i.e., the shallow groundwater, addressed as OU1 at Photocircuits and Pall Corp [NYSDEC 2008a; NYSDEC 2004]). OU2, the subject of this RI, is nominally the 'deep' groundwater; so volatilization is not relevant.

Vertical infiltration of free-phase chemicals (non-aqueous phase) is not relevant as no NAPL has been observed at the site.

Discharge of groundwater to downgradient surface water bodies is not relevant in the vicinity of the site. Although there is a surface water body (Glen Cove Creek) at the site and extending downgradient, the deep groundwater does not discharge to the creek.

Rainwater flow through contaminated soils (contaminant leaching) may have been a transport mechanism of historical significance. However, most of the site is paved, and contamination in the deep groundwater is related to migration and dispersion of contaminants in the dissolved phase.

6.2 GROUNDWATER FLOW

The Site is located in a long, narrow valley. Ground surface elevations increase northeast of the Site (Glen Cove Arterial Highway) and also increase southwest of Glen Cove Creek.

During the three groundwater elevation measuring events, groundwater was encountered at elevations of about 54 to 55 ft NGVD at MW-GC2D and MW-GC2S, respectively (see Table 3.5). These wells are located about 200 ft east of the Pall Corp property line with ground elevation of 71 ft NGVD**.**

Groundwater levels were also recorded during July 2007 well condition survey in some off-site monitoring wells that were not included in the subsequent April and October 2008 sampling rounds. Groundwater was encountered at elevations of 47.6 ft NGVD at monitoring wells MW-GC5S and MW-GC5D located about 1300 ft east of the Photocircuits property line with ground elevation of about 138 ft NGVD. Groundwater was encountered at elevations of 52.55 and 52.14 ft NGVD in MW-GC11S and MW-GC11D, respectively. These wells are located about 1200 ft northwest of the Carney Street Wellfield area with ground surface elevation of about 133 ft NGVD.

Groundwater was found be under artesian conditions in a number of wells in the northern portion of the site as illustrated in Figures 11.1 and 11.2. Artesian head above ground surface was measured in the monitoring wells during the April 2008 sampling event, with artesian flowing conditions noted at 14 monitoring wells, with 0.3 to 2.99 ft of head above the ground surface. Similar results were observed during the October 2008 event; however, groundwater elevations were typically about 0.5 to 1 ft lower in the October 2008 and as a result a few wells which were slightly artesian in April did not exhibit artesian conditions in a October (see Figures 11.1 and 11.2). One of the well clusters (GC2S and GC2D) showing a downward gradient is located off site at about 200 ft east of the Pall Corp property line, and another well cluster (MW-101S and MW-101D) showing downward gradient is located upgradient of the contaminated area at the southern end of the Photocircuits property.

A summary of groundwater surface elevation data collected during July 2007 well condition survey and during the two rounds of groundwater sampling (April 2008 and October/November 2008) presented in Table 3-5. Groundwater elevation contours of the data collected during April 2008 sampling event are shown in Figures 7 through 10. As illustrated in these figures, the groundwater flow direction in the shallow, intermediate, and deep wells is from the southeast to the northwest across the site.

Figure 7.1 and 7.2 show groundwater elevation contours of shallow wells with top of screen elevation from 50 ft to 40 ft NGVD. Ground surface elevation varies from about 48 ft NGVD at the Carney Well Field in the northern portion of the site to about 61 ft NGVD at the southern end of the Photocircuits property. Groundwater flow direction is from southeast to northwest, with varying hydraulic gradient. The hydraulic gradient is about 0.013 at the Photocircuits area, about 0.015 at the Sea Cliff Avenue area, about 0.006 at the Pall/August Thomsen area and about 0.025 at the northern end of Carney Well Field area.

Figures 8.1 and 8.2 shows groundwater elevation contours of intermediate wells with top of screen elevation from 20 ft to 5 ft amsl. Groundwater flow direction is from southeast to northwest in this figure with the hydraulic gradient ranging from about 0.004 at southern portion

of the site, about 0.008 at middle portion of the site, and about 0.002 at the northern portion of the site.

Figure 5 shows groundwater elevation contours of deep wells with top of screen elevations from -20 ft to -60 ft NGVD. Groundwater flow direction is from southeast to northwest (Figure 5) with the hydraulic gradient varying from about 0.003 at southern portion of the site, 0.005 at middle portion of the site, and about 0.004 at the northern portion of the site.

Figure 6 shows groundwater elevation contours of deep wells with top of screen elevations from about -60 to -130 ft NGVD. Groundwater flow direction is from the southeast to northwest in this figure. The hydraulic gradient ranges from about 0.004 to 0.005 with no significant variations at the various portion of the site.

Based on the water table elevation, the horizontal hydraulic gradient was estimated across the OU2 study area. For this discussion, the OU2 study area was divided into four areas: 1) Photocircuits; 2) Sea Cliff Avenue; 3) Pall/August Thomsen Area; and 4) Carney Street Wellfield area (the Glen Cove property).

The monitoring well networks at the site are divided as shallow, intermediate and deep zones. Tables 6-2A through 6-2D show the average estimated hydraulic gradient for four areas.

The following modified Darcy equation provides an estimate of the local groundwater seepage velocity, using the hydraulic gradient information with the average hydraulic conductivity and an effective porosity value of 0.3: $v = KI/n_e$

where:
v -- groundwater seepage velocity (ft/day),
K-- hydraulic conductivity (ft /day),
i -- hydraulic gradient (ft/ft), and
n_e -- effective porosity.

Using the above equations, groundwater flow was estimated for the each zone and each of the four areas. These groundwater flow rates were in turn used to calculate contaminant-specific transport, as discussed in Section 6.2, below.

Upward Gradient and its Influence on Contaminant Migration

The groundwater elevation measurements conducted during the April 2008 and October 2008 sampling events are summarized in Table 3-5. The table below shows the overall vertical movement of the groundwater flow at the Photocircuits/Pall Corp site.

SITE AREA	Groundwater Flow - Vertical Head Difference
Photocircuits	Overall Upward, except for area around 01MW-104 cluster wells
Sea Cliff Avenue	Upward
Pall/August Thomsen	Upward and Artesian around August Thomsen property
Carney Street Wellfield	Overall Artesian but Upward along Glen Cove Arterial Highway

Overall, upward groundwater flow was observed at a majority of the monitoring wells. In addition, artesian flow conditions were observed in 14 monitoring wells during April 2008 and in 11 monitoring wells during October 2008 (Table 3-5 and Figures 11.1 and 11.2). The highest artesian head (i.e., above ground surface) was observed at well cluster 06MW-103 on the Carney

Street (Glen Cove) property at the northernmost part of the study area. It should be noted that historically, there have been complex networks of supply and diffusion wells at the Photocircuits and Pall Corporation Sites and, due to limited information on the operation of these wells, it is unclear if the operation of these wells might have caused downward migration of contaminants even though the general trend in 2008 was upward. It appears that the upward groundwater movement along with artesian conditions at the August Thomsen property is keeping the contaminants in the intermediate zone (i.e., preventing further downward migration into the "D2" or very deep zone as discussed in this RI).

6.3 CONTAMINANT TRANSPORT

The process by which a solute (dissolved phase contaminant) is transported by the bulk movement of groundwater flow is referred to as advection (Driscoll, 1986). The average linear velocity of groundwater through a porous aquifer is determined by the hydraulic conductivity, effective porosity of the aquifer formation, and hydraulic gradient (Freeze and Cherry, 1979). The velocity of a contaminant in the groundwater can be decreased if there is precipitation/dissolution or partitioning of the contaminant into other media (e.g., adsorption). These physio-chemical processes are discussed below.

6.3.1 Adsorption

One of the most important geochemical processes affecting the rate of migration of chemicals dissolved in groundwater is adsorption to and desorption from the soil matrix. If the organic chemical is strongly adsorbed to the solid matrix (i.e., the aquifer material), the chemical is relatively immobile and will not be leached or transported from the source. If the organic chemical is weakly adsorbed, the chemical can be transported large distances from the source, contaminating large quantities of groundwater. The degree of adsorption also affects other transformation reactions such as volatilization, hydrolysis, and biodegradation since these reactions require the chemical to be in the dissolved phase.

The distribution of chemicals between water and the adjoining solid matrix is often described by the soil/water distribution coefficient, K_d. For dissolved chemicals at environmental concentrations, the distribution coefficient is usually defined as the ratio of concentrations in the solid and water phase (Freeze and Cherry, 1979). K_d has been shown to be proportional to the fraction of natural organic carbon (foc) in the solid matrix, the solubility of the chemical in the aqueous phase and the n-octanol/water or octanol/carbon partition coefficient (K_{ow} or K_{oc}, respectively). Retardation factors, described below, and K_d values are site specific.

A convenient way to express chemical mobility is by use of the retardation factor (R), which is a function of the average velocity of the retarded constituent, velocity of the groundwater, soil bulk density, and total porosity. If $K_d = 0$, the chemical species of concern is not affected by physio-chemical reactions and migrates at the same velocity as the water based on convective-dispersive mechanisms. If $K_d > 0$, the chemical species will be retarded. More accurately, the retardation factor is the average linear velocity of the groundwater divided by the velocity of the contaminant chemical at the point when the chemical concentration is one-half the concentration of the chemical at its source. When K_d equals zero (no adsorption), R equals one (i.e., the

chemical and water move at the same velocity). If R equals 10, the contaminant chemicals move at 1/10 the velocity of the groundwater.

Adsorption of chlorinated aliphatics at the Site may be an important process influencing the movement of contaminants in groundwater. The importance of adsorption depends significantly upon the characteristics of the aquifer matrix material, which acts as the adsorbing medium. In particular, adsorption of hydrophobic organic compounds has been shown to be a function of the amount of natural organic carbon in the aquifer matrix. The COCs at the Site have a $K_d > 0$ and, therefore, will be adsorbed/retarded to a degree. The calculated retardation factors are based on literature default values for some aquifer characteristics for which site-specific data are not available. Acquisition of such data (e.g., organic carbon in aquifer material) would enable more accurate site-specific estimates of adsorption/retardation occurring at the Site.

6.3.2 Dispersion

The study of dispersion at a site is important to determine the concentration of a contaminant and the time it will take to reach a specific location (e.g., a drinking water well). In other words, dispersion of a contaminant affects the velocity and spatial distribution of a contaminant. Although the above discussion implies one-dimensional dispersion, in actuality, dispersion is three dimensional (i.e., longitudinal, transverse, and vertical). The longitudinal and transverse dispersion coefficient are affected primarily by aquifer heterogeneity, whereas, the vertical dispersion is also affected by the density of the contaminant. Because chlorinated alipahtics as a group are denser than water, they have a tendency to migrate vertically faster than many other contaminants (e.g., gasoline-related hydrocarbons such as benzene and toluene).

6.3.3 Dilution

Dilution is an effect of dispersion. When contaminants come in contact with uncontaminated groundwater, mixing occurs, resulting in a decrease in contaminant concentration. Rainwater precipitation can also cause dilution of contaminant concentrations. The majority of the study area is paved with only small areas of open, grass: the narrow strip of grass along Sea Cliff Avenue in front of the Photocircuits and Pall buildings; and, the play area on the Glen Cove property. A significant open area exists south of the Site on the Glen Head Country Club golf course.

6.4 CONTAMINANT-SPECIFIC TRANSPORT VELOCITY

As noted above, contaminant-specific migration in the groundwater is affected (reduced) by adsorption, expressed as the retardation factor. The retardation factor, Rd, is calculated as:

$Rd = 1 + Koc * foc \, \rho/ne$

Rd = retardation factor
Koc = organic carbon partition coefficient (chemical-specific; see Table 6-1 for values used)
foc = fraction of organic carbon (default value of 0.002 used [USEPA 1996; equation 10])
ρb = dry bulk density of aquifer matrix (value of 1.78 assumed)

The contaminant transport rate V_{pt} is determined by dividing the seepage velocity V_s by the retardation factor Rd:

$V_{pt} = Vs / Rd$

The distance (D) that a contaminant travels in a given time (t) is calculated using the following equation:

D =*Vpt* * *t*

Using above equations, the transport rate and distance for the principle contaminants were calculated and are shown on Tables 6-2A through 6-2D.

Based on the calculated velocities, it appears that the contaminants will migrate at a faster rate in the shallow zone wells relative to the intermediate and deep zone wells at the Photocircuits/Pall Corp site. This is primarily due to higher hydraulic gradient in the shallow zone, relative to other zones. In addition, in the shallow zone the horizontal gradient is higher in the vicinity of the Carney Street Wellfield area compared to Photocircuits/Pall area, and the gradient is close to zero (i.e., almost flat) at the August Thomsen property. In addition, compounds with lower Koc values (e.g., VC and 1,1-DCA) will travel at a faster rate relative to other contaminants.

6.5 CONTAMINANT FATE

At the Photocircuits/Pall Corp site, the principle COCs in groundwater are PCE and its degradation products (chlorinated ethenes), and 1,1,1,-TCA and its degradation products (chlorinated ethanes), as discussed in the beginning of this section. The fate of organic chemicals in the subsurface environment is affected by a variety of physiochemical and biological processes. Biodegradation is the one process expected to be significant at OU2 at the site because significant concentrations of breakdown products have been detected in groundwater samples. Other processes or mechanisms such as hydrolysis, oxidation, and photolysis are not significant factors in contaminant fate under current site conditions.

6.5.1 Biodegradation and Biotransformation

Degradation or transformation of organic chemicals in the subsurface environment can occur through the action of microorganisms that may be attached to the soil or contained in the void space. Active microbial populations are found in most typical subsurface conditions. Even in low numbers, subsurface microbes possess adequate metabolic activity to reduce the levels of organic compounds migrating through the subsurface soil profiles.

Biodegradation of chlorinated organic chemicals ultimately produces microbial cells, water, carbon dioxide, and chloride ion (i.e., complete "mineralization"). The enzymes produced by the microorganisms are essentially responsible for the degradation of the organic chemicals. Whether or not a chemical is transformed depends on the microbial population present and the types of enzymes they express.

Typically, biodegradation rates are found to be proportional based on the substrate and microbial numbers. The substrate is defined as the organic compound that provides the bacteria with carbon and energy. However, some organics, termed secondary substrates, do not provide sufficient energy to support growth of the microbial biomass. In this case, a primary substrate must be present. In some cases, the enzymes produced for degradation of the primary substrate also serve to degrade the secondary substrate; this process is termed co-metabolism.

Microbes can facilitate both oxidation and reduction of organics under oxic (i.e., aerobic) or anoxic (i.e., anaerobic) conditions, respectively. A compound is oxidized by losing electrons and is reduced by gaining electrons. Oxidation and reduction reactions are coupled. Two compounds

must be present to carry out the reaction. One compound donates electrons (i.e., the electron donor is often referred to as the substrate) and is oxidized and the other compound accepts the electrons (i.e., the electron acceptor) donated by the first and is reduced. Normally, the electron acceptor is an inorganic chemical (e.g., oxygen, nitrate, sulfate, carbon dioxide, etc.) and is not the primary contaminant. Microorganisms carry out the transfer of electrons from one compound to the other as they break down chemicals for energy and carbon.

Biodegradation of Chlorinated Ethenes

There are many potential reactions that can degrade chlorinated ethenes (e.g., site contaminants such as PCE, TCE, and DCE) in the subsurface, under both aerobic and anaerobic conditions. Not all contaminants are amenable to degradation by each of these processes as shown below.

Potential Degradation Processes for Contaminants

Degradation Process	Compound*			
	PCE	TCE	DCE	VC
Aerobic Oxidation	N	N	P	Y
Aerobic Co-metabolism	N	Y	Y	Y
Anaerobic Oxidation	N	N	P	Y
Anaerobic Reductive Dechlorination	Y	Y	Y	Y
Co-metabolic Anaerobic Reduction	Y	Y	Y	Y
Abiotic Transformation	Y	Y	Y	Y

* PCE = tetrachloroethene, TCE = trichloroethene, DCE = 1,2-dichloroethene, VC = vinyl chloride
N = Not documented in the literature.
Y = Documented in the literature.
P = Potential for reaction to occur but not well documented in the literature.
Adapted from ITRC, 1999

Biodegradation occurs when indigenous microorganisms consume organic compounds to obtain energy for reproduction and growth. Microorganisms obtain this energy by facilitating the transfer of electrons from an electron donor (organic substrate) to an electron acceptor (typically native inorganics). Common electron donors at contaminated sites can be natural organic carbon or fuel hydrocarbons. Electron acceptors commonly found in groundwater include oxygen, nitrate, manganese, ferric iron, sulfate, and carbon dioxide. Under certain conditions, contaminants may be used as an electron donor, as in the aerobic oxidation of VC. Under anaerobic conditions, contaminants may be used as an electron acceptor, as in the reductive dechlorination of TCE.

Biodegradation also commonly occurs as cometabolism, a reaction in which contaminants are oxidized (aerobic cometabolism) or reduced (anaerobic cometabolism) by a nonspecific enzyme or co-factor produced during microbial metabolism of another compound (i.e., the primary substrate).

The aerobic biodegradation of contaminants consume oxygen and produces inorganic carbon in well-established ratios. Estimating the oxygen supply rate and correlating it with increases in inorganic carbon can yield a quantitative estimate of the rate of contaminants biodegradation, if the changes in inorganic carbon concentration can be measured properly.

The biodegradation of organic contaminants under denitrifying or sulfate-reducing conditions consumes nitrate or sulfate and produces inorganic carbon and alkalinity. Estimating the supply rates of sulfate or nitrate and correlating them with changes in inorganic carbon concentration and alkalinity can provide evidence for these anaerobic biodegradation reactions.

Examples of abiotic degradation pathways include hydrolysis, dehydrochlorination, and abiotic reductive dechlorination. These are chemical degradation reactions not typically associated with biological activity. In practice, it may not be possible to distinguish between the abiotic and biotic reactions listed above at the field scale. Under natural conditions, abiotic reactions may be slow relative to biological degradation processes.

PCE and TCE are not susceptible to aerobic degradation processes (see table above), with the exception of the aerobic cometabolism of TCE which requires the presence of a primary substrate such as toluene or methane (absent or insignificant in deep groundwater at the Site). Therefore, anaerobic degradation pathways are of interest for the chloroethenes. DCE (cis-1,2-DCE or trans-1,2-DCE) can be degraded by all the processes listed in the table above. In general, anaerobic reductive dechlorination occurs by sequential removal of a chloride ion. For example, the chlorinated ethenes are transformed sequentially from PCE to TCE to the DCE isomers (cis- or trans-) to VC to ethene.

The anaerobic biotransformation of PCE/TCE and 111-TCA occurs through a microbially-mediated, sequential dehalogenation processes as follows:

PCE → TCE → *cis*-1,2-DCE → vinyl chloride → ethene → ethane

111-TCA → 11DCA → chloroethane → ethane (via reductive dechlorination; abiotic degradation to ethanol is also possible)

The degree to which this sequence proceeds depends on three factors:

1. The presence of dechlorinating microorganisms
2. The presence of suitable electron donors
3. The presence of competing electron acceptors

6.5.2 Biodegradation at the Site

Several factors indicate that anaerobic reductive degradation is occurring, or has occurred, at the Site. The most important factor, as an indication of anaerobic reductive dechlorination, is the presence of reductive dechlorination byproducts. Both cis-1,2-DCE and vinyl chloride are byproducts of the reductive dechlorination of PCE and TCE and are found throughout the Site. Similarly, 1,1-DCA and chloroethane, degradation byproducts of 1,1,1-TCA, are also present at significant concentrations.

The dechlorination of DCE to VC, and VC to ethene requires the presence of strongly reducing conditions indicative of SO_4^{2-}-reduction or methanogenesis. The lack of relative lack of vinyl chloride, coupled with the relatively high concentrations of cis-1,2-DCE, suggest that complete reductive dechlorination at the site is likely constrained by one or more factors. DCE stall will typically occur when there are either electron donors or biological limitations[1]. It should also be noted that biological activity can be hindered at some sites by extreme conditions that are not

[1] When the reductive dechlorination process is incomplete, levels of DCE (and/or VC) can build up over time. This phenomenon is referred to as DCE stall. At some sites, not all of the necessary conditions for efficient, complete dechlorination of PCE or TCE to ethene are present, and degradation stalls at DCE.

related to the above requirements, such as extreme pH, presence of biotoxins, micronutrient limitations, or low temperature. (RI data suggest that neither pH nor temperature are limiting factors at the Photocircuits/Pall Corp site.) In addition, the lack of VC, ethene, or ethane at a site may be attributed instead to the direct transformation of DCE to carbon dioxide via alternate pathways rather than reductive dechlorination. These alternate pathways include anaerobic or aerobic oxidation (DCE to carbon dioxide), and abiotic degradation of DCE to carbon dioxide via mechanisms such as iron monosulfides. While there is no specific evidence of the direct transformation of DCE to CO_2 at the site, and the persistent high concentrations of cis-1,2-DCE suggest it is not happening to any significant extent, it cannot be completely ruled out based on the available data (e.g., data on natural attenuation parameters and microbial populations present).

The first potential reason for DCE stall is a lack of sufficient electron donor (usually a fermentable carbon source) to achieve the necessary strongly reducing conditions. This occurs when either natural or introduced carbon sources are sufficient to achieve iron- or sulfate-reducing conditions, but are exhausted before the natural sulfate.

The second possible reason for DCE stall is that no bacteria are present at the site that are capable of efficiently dechlorinating DCE to ethene (e.g., *Dehalococcoides ethenogenes*). Characterization of microbial communities at sites all over the world has revealed that D. ethenogenes is present in a wide variety of environments, but is not ubiquitous. For example, in a survey of dechlorinating sites in North America and Europe, it was observed that *D. ethenogenes* was detected at all 21 sites with complete dechlorination, and not at the three sites with DCE stall (USN, 2009 [ERT2 Training tool]).

6.6 SECONDARY CONTAMINANTS

Secondary contaminants include gasoline-related contaminants (MTBE and benzene and other BTEX compounds), 2-chlorotoluene, and chlorofluorocarbons.

6.6.1 Gasoline-Related Contaminants

Gasoline-related contaminants (including MTBE) were detected in the shallow zone, at low concentrations, and are not believed to be site related. These contaminants typically have higher Koc values than the chlorinated aliphatics and as such may migrate more slowly.

6.6.2 2-Chlorotoluene

The presence of 2-chlorotoluene within the study area is limited to Photocircuits well MW-12, where it has been consistently at concentrations of about 2,000 µg/L, and also detected at significantly lower concentrations in a few monitoring wells near MW-12. This distribution suggests that there is a single discrete source for the 2-chlorotoluene, that it does not appear to be degrading to any significant extent; and that it is migrating horizontally only slowly. The slow migration of 2-chlorotoluene relative to the chlorinated ethanes and ethenes is consistent with its higher Koc and therefore a higher (by an order of magnitude or more; see Tables 6-2A through 6-2D) retardation factor and lower contaminant-specific velocity.

6.6.3 Chlorofluorocarbons

Chlorofluorocarbons have been detected at low concentrations (relative to concentrations of chlorinated aliphatics) and primarily on the Pall Corp site. Chlorofluorocarbons were generally detected in the shallower monitoring wells (OU1) and were of less significance in OU2.

Chlorofluorocarbons are generally not susceptible to biodegradation or other natural or in situ degradation processes; however, they generally behave in a similar manner as the chlorinated aliphatics with regard to other processes (e.g. stripping/volatilization; adsorption).

7.0 QUALITATIVE HUMAN HEALTH RISK ASSESSMENT

A qualitative baseline risk assessment was completed based on the information presented in the preceding sections of this RI report. Generally, the human health evaluation involves an exposure assessment, an evaluation of Site occurrence, hazard identification and comparison to New York State and USEPA criteria.

This section discusses the exposure assessment, an evaluation of Site occurrence, and a comparison to State and USEPA criteria related to potential impacts to human health. It should be noted that several conservative assumptions were used in completing this assessment; and, thus, the risks identified are expected to be "worst-case" scenarios.

7.1 EXPOSURE ASSESSMENT

This exposure assessment discusses potential migration routes by which chemicals in the environment may be able to reach human receptors. This discussion is based on current and hypothetical future Site conditions and the extrapolation of Site conditions to off-Site areas.

Currently, the Site and adjoining properties within the Sea Cliff Avenue Industrial Area are used for commercial and industrial purposes (although several of the properties were vacant), with municipal use and a day care center at the northern end. Residential areas are located north and west of the Site (on the other side of the Glen Cove Arterial). For the purposes of this evaluation, it is assumed that the general use of the area will remain unchanged.

The hypothetical future conditions for the Site and surrounding areas include development and/or intrusive Site work in areas near the Site; the possibility for the facilities to be abandoned and left unattended; on-site workers; and re-use of the Carney Street Well 21 as a potable water source.

A complete exposure pathway must exist for a population to be impacted by the chemicals at the Site. A complete exposure pathway consists of five components:

1. a source and mechanism of chemical release;
2. a transport medium;
3. a point of potential human contact with the contaminated medium;
4. an exposure route at the contact point; and
5. a receptor population.

The extent of contamination was discussed in previous sections (5 and 6) of this RI. This section focuses primarily on identifying points of human contact with contaminated media.

The potential exposure pathways identified for the Photocircuits/Pall Corp OU2 (deep groundwater) are discussed below.

Exposure to groundwater, if used as a drinking water supply, includes ingestion, dermal contact and inhalation of vapors. However, a public water system deriving water from deeper aquifers in Nassau County currently services the area, and the potable supply wells are monitored. Therefore, the current exposure is non-existent.

At the onset of this RI (2006), consideration was being given to re-open Carney Street Well 21 as a supply well for industrial uses for industries in the Sea Cliff Avenue Industrial Area. However, as of April 2009, industrial activities requiring significant amounts of water were no longer occurring at Photocircuits or Pall Corp.; therefore, in the near future, the likelihood of exposure is low.

Although the short-term consideration was use of water from Well 21 was for industrial use (most likely closed system cooling water), Carney Street Well 21 was previously (prior to its closure in 1977) used as a potable water source; and it also appears that a well on the August Thomsen property had been used for potable water also. Therefore, the future use scenario includes use of the groundwater as a potable water source.

Based on the groundwater flow direction, it appears that groundwater flows north or northwest in the vicinity of the Site. Potential human exposure may occur at the point of groundwater contact. The likelihood of exposure to groundwater due to construction activities is considered to be minimal, since the OU2 groundwater is, by definition, 60 ft bgs or greater. Potential human exposures include ingestion, dermal contact, and inhalation of vapors. These dermal contact and vapor inhalation scenarios are unlikely within the site vicinity. Ingestion of groundwater (as drinking water) is a potential future exposure scenario.

Potential inhalation exposure from PCE volatilization from subsurface soils and groundwater near the Site source areas may occur under current conditions and under the future development scenarios with excavation (e.g., migration of vapors into buildings, basements, foundations, utilities, and outdoor areas). However, this would occur from shallow groundwater and soils, which are being addressed separately as under RODs for Pall Corp OU1, Photocircuits OU1, and Pass and Seymour. While contamination in the deeper part of the aquifer may indirectly affect the shallow aquifer (OU1), there is no direct exposure route to volatile vapors from OU2 groundwater.

7.2 EVALUATION OF SITE OCCURRENCE

Tables 7-1 and 7-2 present the range of concentrations for the chemicals detected in groundwater. The summary includes the frequency of detection, the frequency of criterion exceedance, the number of samples analyzed, the maximum concentration detected reported, and the location where the maximum value was reported. For purposes of this qualitative and conservative assessment, the exposure point concentration was set as the maximum reported value, and this value was compared to State and USEPA risk-based criteria.

The contaminant concentrations reported for the Site were used for potential off-Site exposure points (i.e., potable water concentrations). This is a somewhat conservative approach as off-Site concentrations may be lower due to dispersion, retardation, and other attenuating mechanisms.

Validated groundwater data from two rounds of sampling, as summarized on Tables 4-2 and 4-3 and provided in full in the tables in Appendix E, were used for this assessment. A summary of the detected analytes and criteria exceedances is provided in Tables 7-1 and 7-2.

7.3 HAZARD IDENTIFICATION AND COMPARISON TO CRITERIA

The potential hazards due to human exposures were reviewed based on chemical-specific criteria. Both State and Federal criteria were examined.

Human health risks associated with exposure to upper glacial aquifer (overburden) groundwater were examined by considering use of the overburden groundwater as a drinking water source.

The SCGs used for human health risks associated with use groundwater at the Site as a drinking water source includes the following:

- NYSDEC Class GA Groundwater Quality Criteria, 6NYCRR Part 701-703, as summarized in TOGS 1.1.1, June 1998, with updates through June, 2004.
- USEPA Maximum Contaminant Levels (MCLs), 40 CFR 141 (last revised June 2008).

With the exception of carbon disulfide (which is not a significant site contaminant, and which did not exceed any applicable criteria), the NY Class GA groundwater criteria were at least as stringent as the USEPA MCLs for all site contaminants. Therefore, screening against the Class GA criteria also addresses the federal criteria.

As shown on Tables 7-1 and 7-2, groundwater samples from the upper glacial aquifer contained several VOC compounds exceeding risk-based criteria in both sampling events. Numerous VOCs exceeded risk-based criteria in one or more samples. TCE was the most significant VOC detection (maximum 10,000 µg/L in Round 2 and 9300 µg/L in Round 2), compared to the criterion of 5 µg/L. TCE was detected in 49 of 70 Round 1 samples and in 54 of 73 groundwater samples analyzed in Round 2, and exceeded the GA criterion in 42 Round1 and 44 Round 2 samples. Cis-1,2DCE was exceeded criteria slightly more frequently (53 of 70 in Round 1, and 45 of 73 samples) but the maximum concentration was lower (5,600 µg/L in Round 1, and 5,900 µg/L in Round 2) than the maximum TCE concentration.

7.4 SUMMARY OF HUMAN HEALTH RISK ASSESSMENT

A qualitative human health risk assessment was completed for the Site. Generally, the human health evaluation involves an exposure assessment, an evaluation of Site occurrence, hazard identification and comparison to Federal and New York State criteria. Exposure scenarios were identified and evaluated based on analytical laboratory results of groundwater samples collected. A summary of the results of the risk assessment is presented below.

The potential for exposure to contaminants in the deep groundwater at the Site is minimal under current conditions (i.e., with the potable wells such as Carney Street Well 21 out of service). However, there is a potential for future exposure due to use of overburden groundwater as a drinking water source is considered. Due to the high concentrations of PCE, TCE, and other contaminants detected in overburden groundwater, exposure to on-Site groundwater could especially pose a significant risk based on ingestion.

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8.0 ANALYTICAL DATA AND USABILITY

The analytical methods used, and the resultant data quality and usability, are discussed in this section.

8.1 SAMPLE ANALYSIS

Environmental samples, all aqueous (groundwater), were analyzed only for VOCs. All analyses were performed using SW-846 Method 8260 by Mitkem (now a division of Spectrum Analytical), NY ELAP certification 11522. In order to verify the presence or absence of target analytes, Mitkem was requested to report target analytes down to a quantitation limit (reporting limit) of 1 µg/L for chlorinated VOCs. (Quantitation limits for some compounds, such as ketones, were higher). With the exception of a few samples with high concentrations of target VOCs that were diluted for the initial analysis, this goal was achieved.

No issues were noted with the transport or custody of the samples.

In addition to the environmental samples, a composite soil sample (stockpiled soil boring cuttings) was analyzed for additional parameters for disposal purposes. These data were not validated and are not used in the RI.

8.2 DATA USABILITY

All the groundwater data generated by Mitkem for this RI/FS were validated by an independent subcontractor, Nancy Potak (Greensboro, VT). The Data Usability Summary reports are provided in Appendix H, and the tabulated data used in this report include any qualifiers applied during validation.

Data were generated and validated for three events:

- Hydropunch sampling, conducted in November 2007
- Groundwater sampling, Round 1 – April 2008
- Groundwater sampling, Round 2 – October-November 2008

A summary of the data quality review of each event is provided below.

8.2.1 Hydropunch Sample Data

Hydropunch data were reported by Mitkem as two SDGs, G1651 and G1652, with one DUSR for each SDG. A total of 66 analyses were validated, included a trip blank, a field blank, two MS/MSD pairs, two field duplicates, 30 environmental samples, and 26 dilutions. Data quality was generally acceptable. Data for 14 of the 66 analyses were qualified as estimated ("J" qualifier) due to low system monitoring compound (SMC) recovery. Precision was poor in one field duplicate pair; data for that sample pair were qualified estimated. Due to low relative response factors (RRFs; less than 0.05) in the initial and/or continuing calibration, non-detect data for acetone, 2-butanone, 1,2-dichloropropane, and 1,2-dibromo-3-chloropropane were rejected (flagged "R") in accordance with USEPA Region 2 guidance (SOP HW-24; USEPA 2006). It is noted that the RRFs for these compounds were greater than 0.01 and that under the current USEPA National Functional Guidelines for organic data review (USEPA, 2007) these data would not have been rejected. However, as the affected compounds are not important site contaminants, the validator and QAO did not override the Region 2 RRF criterion.

8.2.2 Groundwater Sample Data – Round 1

Round 1 groundwater sample data were reported by Mitkem as five SDGs: G0487, G0523, G056, G0562, and G0593; one DUSR was prepared for each SDG. A total of 117 analyses were validated, included a five trip blanks, three field blanks, four MS/MSD pairs, four field duplicates, 71 environmental samples, and 26 dilutions. Data quality was generally acceptable, with exceptions as summarized below. It should be noted that during data review, several anomalies were noted in the initial laboratory submission; in some cases, the laboratory then provided revised pages for the data packages (which included in some cases compounds being reported as detected which were reported as not detected in the laboratory's initial submission). The DUSRs, and the summary below, are based on the revised submissions as appropriate.

G0487 - Initial calibration RSDs and/or continuing calibration %D exceeded criteria for a few compounds in a few samples; affected compounds were qualified as estimated. Due to low relative response factors (RRFs; less than 0.05) in the initial and/or continuing calibration, non-detect data for acetone, 2-butanone, and 1,2-dibromo-3-chloropropane were rejected (flagged "R") in accordance with USEPA Region 2 guidance (SOP HW-24); detected values for these compounds were qualified as estimated. It is noted that the RRFs for these compounds were greater than 0.01 and that under the USEPA National Functional Guidelines these data would not have been rejected. However, the validator and QAO did not override the Region 2 RRF criterion. The detected acetone concentration in one sample was negated (changed to "U" flag at the reported concentration) due to the detection of acetone at a similar concentration in the field blank.

G0523 - Precision was good for all detected analytes in the field duplicate pair. Initial calibration RSDs and/or continuing calibration %D exceeded criteria for a few compounds in a few samples; affected compounds were qualified as estimated. Due to high recoveries in the MS/MSD pair, detected values of 1,1-DCE and 1,1,1-TCA were qualified as estimated in associated samples. Due to low relative response factors (RRFs; less than 0.05) in the initial and/or continuing calibration, non-detect data for acetone, 2-butanone, and dichlorodifluoromethane were rejected (flagged "R") in accordance with USEPA Region 2 guidance (SOP HW-24); detected values for these compounds were qualified as estimated. It is noted that the RRFs for these compounds were greater than 0.01 and that under the USEPA National Functional Guidelines these data would not have been rejected. However, the validator and QAO did not override the Region 2 RRF criterion.

G0536 - Precision was good for all detected analytes in the field duplicate pair. Initial calibration RSDs and/or continuing calibration %D exceeded criteria for a few compounds in a few samples; affected compounds were qualified as estimated. Due to low relative response factors (RRFs; less than 0.05) in the initial and/or continuing calibration, non-detect data for acetone, 2-butanone, and dichlorodifluoromethane were rejected (flagged "R") in accordance with USEPA Region 2 guidance (SOP HW-24); detected values for these compounds were qualified as estimated. It is noted that the RRFs for these compounds were greater than 0.01 and that under the USEPA National Functional Guidelines these data would not have been rejected. However, the validator and QAO did not override the Region 2 RRF criterion.

G0562 - Precision did not meet criteria for two analytes in one field duplicate pair; data for those compounds were qualified as estimated. Initial calibration RSDs and/or continuing calibration %D exceeded criteria for a few compounds in a few samples; affected compounds

were qualified as estimated. Due to high recoveries in the MS/MSD pair, detected values of a number of compounds were qualified as estimated in associated samples. Due to low relative response factors (RRFs; less than 0.05) in the initial and/or continuing calibration, non-detect data for acetone and 2-butanone were rejected (flagged "R") in accordance with USEPA Region 2 guidance (SOP HW-24); detected values for these compounds were qualified as estimated. It is noted that the RRFs for these compounds were greater than 0.01 and that under the USEPA National Functional Guidelines these data would not have been rejected. However, the validator and QAO did not override the Region 2 RRF criterion.

G0593 - Precision was good except for one analyte in one field duplicate pair; data for that on analyte in the duplicate sample pair were qualified estimated. Initial calibration RSDs and/or continuing calibration %D exceeded criteria for a few compounds in a few samples; affected compounds were qualified as estimated. Due to high recoveries in the MS/MSD pair, detected values of a number of compounds were qualified as estimated in associated samples. In addition, due to negative reported recoveries for dichlorodifluoromethane in the MS and MSD (the MS and MSD values were less than that in the unspiked sample), non-detect data for that compound were rejected. Due to low relative response factors (RRFs; less than 0.05) in the initial and/or continuing calibration, non-detect data for acetone, 2-butanone, dichlorodifluoromethane, and chloroethane were rejected (flagged "R") in accordance with USEPA Region 2 guidance (SOP HW-24); detected values for these compounds were qualified as estimated. It is noted that the RRFs for these compounds were greater than 0.01 and that under the USEPA National Functional Guidelines these data would not have been rejected. However, the validator and QAO did not override the Region 2 RRF criterion.

8.2.3 Groundwater Sample Data – Round 2

Round 2 Groundwater sample data were reported by Mitkem as six SDGs: G1805, G1831, G1875, G1906, G1955, and G2172; one DUSR was prepared for each SDG. A total of 129 analyses were validated, included nine trip blanks, five field blanks, four MS/MSD pairs, four field duplicates, 72 environmental samples, and 31 dilutions. Data quality was generally acceptable, with exceptions as summarized below. In Round 2, CFC-113 (1,1,2-trichlorotrifluorethane) was reported as a target compound; in Round 1 it had only been reported as a TIC.

G1805 - Initial calibration RSDs and/or continuing calibration %D exceeded criteria for a few compounds in a few samples; affected compounds were qualified as estimated. MS/MSD recovery and precision was within limits. Due to low relative response factors (RRFs; less than 0.05) in the initial and/or continuing calibration, non-detect data for acetone and 2-butanone were rejected (flagged "R") in accordance with USEPA Region 2 guidance (SOP HW-24); detected values for these compounds were qualified as estimated. It is noted that the RRFs for these compounds were greater than 0.01 and that under the USEPA National Functional Guidelines these data would not have been rejected. However, the validator and QAO did not override the Region 2 RRF criterion. The detected acetone concentration in one sample was negated (changed to "U" flag at the reported concentration) due to the detection of acetone at a similar concentration in the field blank.

G1831 - Precision was good except for one analyte in one field duplicate pair; data for that on analyte in the duplicate sample pair were qualified estimated. Initial calibration RSDs

and/or continuing calibration %D exceeded criteria for a few compounds in a few samples; affected compounds were qualified as estimated. MS/MSD recovery and precision were within limits for most compounds. Low LCS recoveries were reported for a few compounds; associated data for compounds with low recoveries were qualified as estimated. Due to low relative response factors (RRFs; less than 0.05) in the initial and/or continuing calibration, non-detect data for acetone, 2-butanone, and dichlorodifluoromethane were rejected (flagged "R") in accordance with USEPA Region 2 guidance (SOP HW-24); detected values for these compounds were qualified as estimated. It is noted that the RRFs for these compounds were greater than 0.01 and that under the USEPA National Functional Guidelines these data would not have been rejected. However, the validator and QAO did not override the Region 2 RRF criterion.

G1875 - Precision was good except for one analyte in one field duplicate pair; data for that on analyte in the duplicate sample pair were qualified estimated. Initial calibration RSDs and/or continuing calibration %D exceeded criteria for a few compounds in a few samples; affected compounds were qualified as estimated. Low LCS recoveries were reported for a few compounds; associated data for compounds with low recoveries were qualified as estimated. Due to low relative response factors (RRFs; less than 0.05) in the initial and/or continuing calibration, non-detect data for acetone and 2-butanone were rejected (flagged "R") in accordance with USEPA Region 2 guidance (SOP HW-24); detected values for these compounds were qualified as estimated. It is noted that the RRFs for these compounds were greater than 0.01 and that under the USEPA National Functional Guidelines these data would not have been rejected. However, the validator and QAO did not override the Region 2 RRF criterion.

G1906 - Precision did not meet criteria for one analyte in the field duplicate pair; data for this compound were qualified as estimated in the sample and duplicate. Initial calibration RSDs and/or continuing calibration %D exceeded criteria for a few compounds in a few samples; affected compounds were qualified as estimated. MS/MSD recovery and precision were within limits for most compounds; the only affected compound (2,2-dichloropropane) is not a significant site contaminant. Due to low relative response factors (RRFs; less than 0.05) in the initial and/or continuing calibration, non-detect data for acetone and 2-butanone were rejected (flagged "R") in accordance with USEPA Region 2 guidance (SOP HW-24); detected values for these compounds were qualified as estimated. It is noted that the RRFs for these compounds were greater than 0.01 and that under the USEPA National Functional Guidelines these data would not have been rejected. However, the validator and QAO did not override the Region 2 RRF criterion.

G1955 - Precision was good except for all detected analytes in the field duplicate pair. Initial calibration RSDs and/or continuing calibration %D exceeded criteria for a few compounds in a few samples; affected compounds were qualified as estimated. MS/MSD recovery and precision were within limits for most compounds; the only affected compound (acetone) is not a significant site contaminant. Low LCS recoveries were reported for two compounds (both ketones); associated data for compounds with low recoveries were qualified as estimated. Due to low relative response factors (RRFs; less than 0.05) in the initial and/or continuing calibration, non-detect data for acetone and 2-butanone were rejected (flagged "R") in accordance with USEPA Region 2 guidance (SOP HW-24); detected values for these compounds were qualified as estimated. It is noted that the RRFs for these compounds were

greater than 0.01 and that under the USEPA National Functional Guidelines these data would not have been rejected. However, the validator and QAO did not override the Region 2 RRF criterion.

G2172 - Initial calibration RSDs and/or continuing calibration %D exceeded criteria for a few compounds in a few samples; affected compounds were qualified as estimated. LCS recoveries met criteria. Due to low relative response factors (RRFs; less than 0.05) in the initial and/or continuing calibration, non-detect data for acetone and 2-butanone were rejected (flagged "R") in accordance with USEPA Region 2 guidance (SOP HW-24); detected values for these compounds were qualified as estimated. It is noted that the RRFs for these compounds were greater than 0.01 and that under the USEPA National Functional Guidelines these data would not have been rejected. However, the validator and QAO did not override the Region 2 RRF criterion.

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9.0 CONCLUSIONS AND RECOMMENDATIONS

Conclusions and recommendations are presented in this section.

9.1 CONCLUSIONS

AECOM Technical Services Northeast, Inc. (formerly Earth Tech Northeast, Inc. [Earth Tech]) was issued Work Assignment # D004436-04 under the New York State Department of Environmental Conservation (NYSDEC) State Superfund Standby Contract for Investigation and Design Services (D00436). Under this WA, AECOM conducted a remedial investigation (RI) of deep groundwater (Operable Unit 2 [OU2]) at the Photocircuits and Pall Corporation sites (NYSDEC registry numbers 1-30-009 and 1-30-053B, respectively), as presented in this report.AECOM developed and submitted work plans (including a Field Activities Plan, a Quality Assurance Plan, and a Health and Safety Plan) in November and December 2006 for NYSDEC review; the work plans were approved in February 2007. These plans formed the basis of the remedial investigation as implemented, and described in the text of this report.

Additional details regarding the planned execution of this project are found in the project plans, included as appendices to the Work Plan, including a Field Activities Plan, Quality Assurance Project Plan, and Appendix C – Site Safety and Health Plan.

9.1.1 Remedial Investigation

The field work associated with the RI was conducted between September 2006 and November 2008. The work consisted of the following tasks:

- Base Map Development
- Existing Well Condition Survey
- Geophysical (Utility Clearance) Survey
- Direct Push Boring/Hydropunch Sampling
- Soil Boring and New Monitoring Well Installation
- Groundwater Sampling (two rounds); including sample analysis and data validation
- Investigation-Derived Waste Management (Completed in February, 2009)

9.1.2 Site Geology

The site is immediately underlain by the Upper Glacial Aquifer (approximately 200 ft thick) followed in descending order by the Port Washington confining unit (approximately 100 ft thick), the Port Washington Aquifer (approximately 50 ft thick), the Lloyd Aquifer approximately 200 ft thick), and the bedrock. The top surface of the crystalline bedrock is at approximately 550 feet depth below the site. Most of the at the Site borings were terminated in the Upper Glacial Aquifer except 06MW-103D2, which penetrated part of the Port Washington Confining unit. The sediments encountered in the site borings predominantly consist of fine to coarse sand with some sand and gravel beds and occasional discontinuous lenses and layers of silt and clay. Some distinct silt and clay layers were observed in the southwestern portion of the Pall Corporation site.

9.1.3 Site Hydrogeology

Three rounds of groundwater level measurements were recorded in all available monitoring wells: the July 2007 well condition survey, the Round 1 groundwater sampling event (April 2008) and the Round 2 groundwater sampling event (October 2008). No significant difference in groundwater flow pattern was observed between the first and the second round of groundwater sampling except that the water levels in the second round of sampling were typically a few inches deeper than the first round. Groundwater flow patterns are consistent with those reported previously.

Groundwater was encountered either within about 6 ft of the ground surface or under flowing artesian conditions in the on-site monitoring wells. Ground surface elevation varies from about 48 ft NGVD at the Carney Street Wellfield in the northern part of the study area to about 61 ft NGVD at the southern end of the Photocircuits property.

Groundwater was under flowing artesian conditions in a number of wells in the northern portion of the site. Artesian head above ground surface was measured in the monitoring wells during April 2008 sampling event. Fourteen monitoring wells indicated flowing artesian conditions with 0.30 to 2.99 ft of head above the ground surface. In addition, an upward hydraulic gradient was observed in most of the existing 22 well clusters. The upward gradient varied from 0.0001 to 0.089 and downward hydraulic gradient varied from 0.001 to 0.012. One of the well clusters (GC-2S and GC-2D) showing downward gradient is located about 200 ft east of the Pall Property line and another well cluster (01MW-101S and 01MW-101D) showing a downward gradient is located upgradient of the contaminated area at the southern end of the Photocircuits property. Monitoring wells were grouped into four categories based on the depth of the screened intervals. Shallow (50 to 40 ft NGVD); intermediate (20 to 5 ft NGVD); deep (-20 to -60 ft NGVD) and very deep (-80 to -165 ft NGVD). The groundwater flow direction in the shallow, intermediate, and deep wells indicated flow from the southeast to the northwest across the site.

The hydraulic gradient in the shallow monitoring wells is about 0.013 on the Photocircuits property, about 0.015 along Sea Cliff Avenue, about 0.006 on the Pall/August Thomsen property, and about 0.025 at the northern end of Carney Well Field area. The hydraulic gradient in the intermediate wells is about 0.004 in the southern portion of the site, about 0.008 in the central part of the site, and about 0.002 in the northern portion of the site. The hydraulic gradient in the very deep wells is about 0.004 to 0.005 with no significant variations across the study area.

An upward gradient was observed in most of the monitoring well clusters (in addition to horizontal flow generally in a northwest direction). Under these groundwater flow conditions, the presence of significant contaminant concentrations in deep wells can be caused by the existence of dense non-aqueous phase liquid (DNAPL) in the source areas or the stress on the groundwater flow regime caused by pumping from deeper portions of the aquifer downgradient of the source area(s). The presence of DNAPL has not been indicated in any of the previous remedial investigation reports. Consequently, the most probable cause of the migration of contaminants indicated in relatively deep monitoring wells is the previous pumping by the water supply (Carney Street Wellfield) and industrial wells (Photocircuits, Pass and Seymour, and Pall Corp all had withdrawal and recharge [diffusion] wells) as discussed in Section 4. A review of the previous reports indicates that a number of public water supply and industrial pumping wells as well as some recharge wells had been operating at the Photocircuits, Pall, Pass and Seymour, and Carney Street Wellfield sites probably beginning around 1950 and extending through at least the late 1980s.

Groundwater flow patterns are significantly influenced by the topographical configuration of the area. The Glen Cove area features a surface topography that has been formed by the process of glacial recession. Prominent landforms include glacial kames (conical hills deposited in contact with ice), kettles (depressions) and valleys. A north to south valley runs through the heart of the project area, which drops over 10 ft from south to north. Glen Cove Creek drains this valley. Topographic highs exist to the east and west of the Sea Cliff Avenue industrial zone, rising over 100 ft on either side.

9.1.4 Sample Analysis and Data Validation

Environmental samples, all aqueous (groundwater), were analyzed only for VOCs. All analyses were performed using SW-846 Method 8260 by Mitkem (now a division of Spectrum Analytical), NY ELAP certification 11522. In order to verify the presence or absence of target analytes, Mitkem was requested to report target analytes down to a quantitation limit (reporting limit) of 1 µg/L for chlorinated VOCs. All the groundwater data generated by Mitkem for this RI/FS were validated by an independent subcontractor, Nancy Potak (Greensboro, VT). The Data Usability Summary reports are provided in Appendix H, and the tabulated data used in this report include any qualifiers applied during validation.

Data were generated and validated for three events:

- Hydropunch sampling, conducted in November 2007
- Groundwater sampling, Round 1 – April 2008
- Groundwater sampling, Round 2 – October-November 2008

Data quality was generally acceptable. Minor exceptions are detailed in the DUSRs and did not affect the usability of the data for the principal site contaminants (chlorinated aliphatics).

9.1.5 Nature of Contaminants Detected

The principle contaminants detected were chlorinated aliphatics. Principle chlorinated aliphatics include PCE, TCE and their degradation products (cis-1,2-DCE and vinyl chloride, although vinyl chloride concentrations were generally low relative to cis-1,2-DCE); and 1,1,1-TCA and its degradation products (1,1-DCA and chloroethane).

9.1.6 Horizontal Extent of Contamination

The historical record does not suggest that site-related contamination extends south of the Photocircuits property, and the data from the background well installed during the RI supports this conclusion. However, due to lack of data points, it cannot be accurately determined how far south on the Photocircuits property the contamination extents. At Photocircuits and Sea Cliff Avenue, contaminant concentrations trend lower toward the west; however, detectable concentrations of site VOCs were detected in the northwest corner of the Photocircuits site and the westernmost of the three Sea Cliff Avenue wells.,

9.1.7 Vertical Extent of Contamination

The vertical extent of contamination is well-defined. Chlorinated VOC contamination extends from the groundwater table down to about El -20 NGVD; little or no contamination was detected in samples from monitoring wells at greater depths. Only minimal data was generated from shallow wells south of Sea Cliff Avenue during the RI, as the focus of the RI was OU2 (deep

groundwater contamination); however, ample data has been generated under previous investigations and ongoing monitoring to characterize the contamination in the shallow zone.

9.1.8 Uncertainties in Nature and Extent of Contaminant Distribution

The identity of the contaminants is well-established, with data from two rounds of sampling for the current RI confirming data from previous investigations.

The vertical extent of contamination is generally well-defined within the study area.

The horizontal (areal) extent of contamination is not fully defined to the north and west (north of Pass and Seymour and west of Glen Cove Creek, and north of the Carney Street Wellfield0; and there are some uncertainties in the delineation to the east (under the Glen Cove Arterial Highway) and south (within the Photocircuits site).

9.1.9 Contaminant Transport

The primary contaminants of concern at the Site are PCE, TCE and their breakdown products (chlorinated ethanes) and 1,1,1-TCA and its breakdown products (chlorinated ethanes). A few other contaminants were detected at concentrations above the groundwater criteria (BTEX, MTBE, 2-chlorotoluene and chlorofluorocarbons) but are not considered to be related to former manufacturing processes at the Site.

Groundwater flow is generally from the southeast to northwest across the Site. Monitoring wells were grouped by screen depth: shallow (50 to 40 ft NGVD), intermediate (20 to 5 ft NGVD), deep -20 to -60 ft NGVD), and very deep (-60 to -130 ft NGVD). Horizontal gradients ranged from about 0.003 at the southern end of the Site (Photocircuits property boundary), 0.005 in the middle of the Site (August Thomsen), to 0.004 in the northern portion of the Site (Carney Street) and varied by depth. Upward gradients were observed in a majority of the well clusters at the Site. There is a moderate to strong vertical component of groundwater flow in the deeper portion of the aquifer in several well clusters located on the August Thomsen, Pall Corporation, and Carney Street properties. Several wells exhibited flowing artesian conditions with measured head above ground surface up to 3.57 ft (MW-2GD, Carney Street Well Field). It should be noted that historically, there have been complex networks of supply and diffusion wells at the Photocircuits and Pall Corporation Sites and, due to limited information on the operation of these wells, it is unclear if the operation of these wells might have caused downward migration of contaminants even though the general trend evidenced in the RI data was upward. It appears that the upward groundwater movement along with artesian conditions at the August Thomsen property is keeping all the contaminants in the intermediate zone.

The process by which a solute (dissolved phase contaminant) is transported by the bulk movement of groundwater flow is referred to as advection. The average linear velocity of groundwater through a porous aquifer is determined by the hydraulic conductivity, effective porosity of the aquifer formation, and hydraulic gradient.

Adsorption of chlorinated aliphatics at the Site may be an important process influencing the movement of contaminants in groundwater. The importance of adsorption depends significantly upon the characteristics of the aquifer matrix material, which acts as the adsorbing medium. In particular, adsorption of hydrophobic organic compounds has been shown to be a function of the amount of natural organic carbon in the aquifer matrix. The COCs at the Site have a $K_d > 0$ and, therefore, will be adsorbed/retarded to a degree.

Based on the calculated velocities, it appears that the contaminants will migrate at a faster rate in the shallow zone wells relative to the intermediate and deep zone wells at the Photocircuits/Pall Corp site. This is primarily due to higher hydraulic gradient in the shallow zone, relative to other zones. In addition, in the shallow zone the horizontal gradient is higher in the vicinity of the Carney Street Wellfield area compared to Photocircuits/Pall area, and the gradient is close to zero (i.e., almost flat) at the August Thomsen property. In addition, compounds with lower Koc values (e.g., VC and 1,1-DCA) will travel at a faster rate relative to other contaminants.

9.1.10 Contaminant Fate

The fate of organic chemicals in the subsurface environment is affected by a variety of physiochemical and biological processes. Biodegradation is the one process expected to be significant at OU2 at the site because significant concentrations of breakdown products have been detected in groundwater samples. Other processes or mechanisms such as hydrolysis, oxidation, and photolysis are not significant factors in contaminant fate under current site conditions.

PCE and TCE are not susceptible to aerobic degradation processes, with the exception of the aerobic cometabolism of TCE which requires the presence of a primary substrate such as toluene (absent or insignificant in deep groundwater at the Site). Therefore, anaerobic degradation pathways are of interest for the chloroethenes. In general, anaerobic reductive dechlorination occurs by sequential removal of a chloride ion. For example, the chlorinated ethenes are transformed sequentially from PCE to TCE to the DCE isomers (cis- or trans-) to VC to ethene.

The anaerobic biotransformation of PCE/TCE and 1,1,1-TCA occurs through a microbially-mediated, sequential dehalogenation processes as follows:

PCE → TCE → cis-1,2-DCE → vinyl chloride → ethene → ethane

1,1,1-TCA → 1,1-DCA → chloroethane → ethane (via reductive dechlorination; abiotic degradation to ethanol is also possible)

The degree to which this sequence proceeds depends on three factors:

1. The presence of dechlorinating microorganisms

2. The presence of suitable electron donors

3. The presence of competing electron acceptors

Several factors indicate that anaerobic reductive degradation is occurring, or has occurred, at the Site. The most important factor, as an indication of anaerobic reductive dechlorination, is the presence of reductive dechlorination byproducts. Both cis-1,2-DCE and vinyl chloride are byproducts of the reductive dechlorination of PCE and TCE and are found throughout the Site. Similarly, 1,1-DCA and chloroethane, degradation byproducts of 1,1,1-TCA, are also present at significant concentrations.

The dechlorination of DCE to VC, and VC to ethene requires the presence of strongly reducing conditions indicative of SO_4^{2-}-reduction or methanogensis. The lack of relative lack of vinyl chloride, coupled with the relatively high concentrations of cis-1,2-DCE, suggest that complete reductive dechlorination at the site is likely constrained by one or more factors. DCE stall will typically occur when there are either electron donors or biological limitation. (When the reductive dechlorination process is incomplete, levels of DCE (and/or VC) can build up over

time. This phenomenon is referred to as DCE stall.) It should also be noted that biological activity can be hindered at some sites by extreme conditions that are not related to the above requirements, such as extreme pH, presence of biotoxins, micronutrient limitations, or low temperature. RI data suggest that neither pH nor temperature are limiting factors at the Photocircuits/Pall Corp site. In addition, the lack of VC, ethene, or ethane at a site may be attributed instead to the direct transformation of DCE to carbon dioxide via alternate pathways rather than reductive dechlorination. These alternate pathways include anaerobic or aerobic oxidation (DCE to carbon dioxide), and abiotic degradation of DCE to carbon dioxide via mechanisms such as iron monosulfides. While there is no specific evidence of the direct transformation of DCE to CO_2 at the site, and the persistent high concentrations of cis-1,2-DCE suggest it is not happening to any significant extent, it cannot be completely ruled out based on the available data (e.g., data on natural attenuation parameters and microbial populations present).

There are two common causes for DCE stall. The first potential reason for DCE stall is a lack of sufficient electron donor (usually a fermentable carbon source) to achieve the necessary strongly reducing conditions. This occurs when either natural or introduced carbon sources are sufficient to achieve iron- or sulfate-reducing conditions, but are exhausted before the natural sulfate. The second possible reason for DCE stall is that no bacteria are present at the site that are capable of efficiently dechlorinating DCE to ethene.

9.1.11 Human Health Risk Assessment

A qualitative human health risk assessment was completed for the Site. Generally, the human health evaluation involves an exposure assessment, an evaluation of Site occurrence, hazard identification and comparison to Federal and New York State criteria. Exposure scenarios were identified and evaluated based on analytical laboratory results of groundwater samples collected.

The potential for exposure to contaminants in the deep groundwater at the Site is minimal under current conditions (i.e., with the potable wells such as Carney Street Well 21 out of service). However, there is a potential for future exposure due to use of overburden groundwater as a drinking water source is considered. Due to the high concentrations of PCE, TCE, and other contaminants detected in overburden groundwater, exposure to on-Site groundwater could especially pose a significant risk based on ingestion.

9.2 RECOMMENDATIONS

Preliminary recommendations for the project team discuss are presented below.

- Install additional wells to better delineate the extent of contamination, especially to the west (west of Glen Cove Creek), and north of the Glen Cove property. Also evaluate feasibility of at least one more deep well cluster on the east side of the Glen Cove Arterial to attempt to bound the eastern extent of contamination. Analyzed for additional parameters in soil samples from new well borings (TOC; metals; grain size distribution; Shelby tube)
- Re-sample a limited suite of existing wells for parameters to assess biodegradation (e.g., ethane/ethene; sulfate, metals, ferric/ferrous iron; microbial populations/DNA testing; etc.)

- Based on site history, another background well cluster behind Pass and Seymour (behind (SW of) Photocircuits "Butler #3")? Also another Photocircuits background well cluster southwest of drum storage area SW of Butler 1 and SE of Butler 3 (south of general area in which former withdrawal wells were located). This could be coordinated with sampling work which may be conducted as part of the remediation of Photocircuits OU1 (NYSDEC, 2008a) and Pass and Seymour (NYSDEC, 2008b).
- Meet with City of Glen Cove administration to discuss long-term goals and water use (also try to establish better communication and coordination so monitoring wells don't get paved over)
- Arrange meeting with NYSDEC and Glen Cove DPW with regard to feasibility of performing the aquifer pumping test as planned. Or, just consider deleting the pumping test as technically infeasible (due to disposal of 1,000,000 gpd of water) and no longer relevant (as Photocircuits is no longer in operation and does not need the water). Also, would pumping test adversely affect groundwater quality at Pall Corp by drawing contaminated water from Photocircuits site?
- Expand list of presumptive remedies to be assessed in FS (include a bioremediation and/or containment alternative)

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Table 2-1A
Withrdawal and Diffusion Wells on Photocircuits Site

Withdrawal Wells	Nassau Well ID	Depth (bgs)	Surface Elevation	Date Installed	Well Diameter	Length of Screen	Sreen Slot Size	Capacity/Comment
1 (A)	N7427	161	59.60	May-63	12"	41'	50	671,000 gpd (1987)
2 (B)	N8224	155	60.57	Jan-70	10 3/8"	51	50	800,000 gpd (1997);
Diffusion Wells								
1	N7452	107	69.99	May-63	12"	32	60	375 gpm; Out of service during summer
2	N7453	122	55.02	Jun-63	unk	32	unk	375 gpm; Out of service during summer
3	N8028	120	56.00	Apr-66	12"	48	60	300 gpm; Out of service during summer
4	N8930	125	56.62	Mar-73	8"	51	50	300 gpm; Out of service during summer
5	N8931	125	66.01	Apr-73	8"	51	50	300 gpm
6	Unk	125	66.03	Unknown	unk	unk	unk	No log found.
7	N9773	182	62.42	Sep-80	12	51	50	300 gpm; well ID not certain
8	N10107	183	61.88	Unknown	12	75	unk	Installed by Delta; data inferred.
9	Unk	185	67.00	Unknown	unk	unk	unk	No log found; Out of service by 1988?
10	Unk	185	68.60	Unknown	unk	unk	unk	No log found; Out of service by 1988?

According to A Barber of B&L and some info on logs, all wells believed to have been located in parking area south of Photocircuits main building and west of Butler #2. NCDPW (1990) shows both wells in Glen Head; 7427 on east side of Glen Clove Creek and 8224 on west side of creek. Locations (distances from Sea Cliff Avenue and Cedar Swamp Road) recorded on logs are not reliable.
Depth is bottom of well
Well diameter is inside diameter (where both ID and OD were recorded).
Diffusion well capacity is as marked on boring logs.
Withdrawal well capacity reported as "1987 metered flow".
Surface elevation may vary slightly from measuring point reference elevation.
Photocircuits Nassau Well IDs inferred from total depth and screen length data and matched to IDs in NCDPW 1990 (Table 1-5)
Photocircuits Diffusion Wells 9 and 10 could be Slater wells (N9614, N9615, or N9693) based on depth information.

Table 2-1B
Withrdawal and Diffusion Wells on Pall Corp, August Thomsen, Slater Electric and Carney Street Wellfield

Withdrawal Wells	Nassau Well ID	Depth (bgs)	Surface Elevation	Date Installed	Well Diameter	Length of Screen	Sreen Slot Size	Capacity/Comment
Slater Electric (P&S)	N8887	130	65	Unknown	Unknown	25	Unknown	Combined Capacity 150,680 gpd On Demand
Slater Electric (P&S)	N9612	134	Unknown	Unknown	Unknown	25	Unknown	
Slater Electric (P&S)	N9841	121	Unknown	Unknown	Unknown	25	Unknown	
Pall Corp	N2316	185?	75?	Unknown	Unknown	Unknown	Unknown	64,000 gpd 1988; screen bottom at -110 amsl
August Thomsen	N6579	146	57	Unknown	Unknown	16	Unknown	"Restricted" (1977)
Carney St Wellfield	N3466	173	53?	1951	12" ?	25 - 30	Unknown	Well No 20? Information inconsistent.
Carney St Wellfield	N8326	165	53	1951?	Unknown	45	Unknown	Well No. 21; "restricted"; 2,000,000 gpd
Carney St Wellfield	N8327	168	53	Unknown	Unknown	50	Unknown	Out of service (1988); near day care center.
Diffusion Wells								
Slater Electric (P&S)	N9614	185	Unknown	Unknown	Unknown	50	Unknown	Possibly Photocircuits Diffusion Well 9 or 10
Slater Electric (P&S)	N8892	159	Unknown	Unknown	Unknown	45	Unknown	
Slater Electric (P&S)	N8987	72	Unknown	Unknown	Unknown	31	Unknown	
Slater Electric (P&S)	N9615	185	Unknown	Unknown	Unknown	50	Unknown	Possibly Photocircuits Diffusion Well 9 or 10
Slater Electric (P&S)	N9693	185	Unknown	Unknown	Unknown	50	Unknown	Possibly Photocircuits Diffusion Well 9 or 10
Pall Corp	N7153	42	Unknown	Unknown	Unknown	11	Unknown	
Pall Corp	N7154	36	Unknown	Unknown	Unknown	10	Unknown	
Pall Corp	N7155	27	Unknown	Unknown	Unknown	9	Unknown	
Pall Corp	N7919	190	Unknown	Unknown	Unknown	38	Unknown	
Pall Corp	N8886	180	Unknown	Unknown	Unknown	40	Unknown	

Data on Carney Street wells in inconsistent; NCDPW 1990 (Appendix B) has information for Well No. 20 (N3466) and No 19 (installed 1932; no Nassau ID number); no information for Well 21. Logs do not correspond exactly with NCDPW 1990 Table 1-5.
Depth is bottom of well
Well diameter is inside diameter (where both ID and OD were recorded).
Diffusion well capacity is as marked on boring logs.
Withdrawal well capacity reported as "1987 metered flow".
Surface elevation may vary slightly from measuring point reference elevation.
Slater Electric reportedly had one diffusion well (possibly N8987) which failed; three new diffusion wells installed 1981. Slater's discharge SPDES permit, alolwing discharge of 360,000 gpd, deleted by NYSDEC on 10/31/86.
Slater supply wells were on west side of property (NCDPW 1990, figure 1-9).
Pall Corp withdrawal well (2316) located in southwest corner, near Glen Cove Creek (NCDPW 1990, figure 1-9)
August Thomsen withdrawal well located on west side of property, near Glen Cove Creek (NCDPW, 1990; figure 1-9).

Table 2-2
Definitions of USEPA Hazardous Waste Codes for Wastes Generated by Photocircuits, Pall Corp., and Slater Electric

EPA Waste Code	Description/Definition/constituents	Waste Type	Generator
D001	Characteristic Waste Ignitible	(I)	PC (b); Pall (b)
D002	Characteristic Waste - Corrosoive	(C)	PC (b); Pall (b)
D006	Characteristic of Toxicity - TCLP extract greater than 1.0 mg/L cadmium	(T)	PC (b)
D008	Characteristic of Toxicity - TCLP extract greater than 5.0 mg/L lead	(T)	PC(b)
D009	Characteristic of Toxicity - TCLP extract greater than 0.2 mg/L mercury	(T)	Pall (b)
D011	Characteristic of Toxicity - TCLP extract greater than 5.0 mg/L silver	(T)	PC (b)
D018	Characteristic of Toxicity - TCLP extract greater than 0.5 mg/L benzene	(T)	PC (b)
D027	Characteristic of Toxicity - TCLP extract greater than 7.5g/L 1,4-dichlorobenzene	(T)	PC (b)
D035	Characteristic of Toxicity - TCLP extract greater than 200 mg/L methyl ethyl ketone [2-butanone]	(T)	Pall (b)
D039	Characteristic of Toxicity - TCLP extract greater than 0.7 mg/L tetrachloroethylene	(T)	PC (b)
D040	Characteristic of Toxicity - TCLP extract greater than 0.5 mg/L trichloroethylene	(T)	PC (b)
F001	The following spent halogenated solvents used in degreasing: Tetrachloroethylene, trichloroethylene, methylene chloride, 1,1,1-trichloroethane, carbon tetrachloride, and chlorinated fluorocarbons; all spent solvent mixtures/blends used in degreasing containing, before use, a total of ten percent or more (by volume) of one or more of the above halogenated solvents or those solvents listed in F002, F004, and F005; and still bottoms from the recovery of these spent solvents and spent solvent mixtures	(T)	Slater (a)
F002	The following spent halogenated solvents: Tetrachloroethylene, methylene chloride, trichloroethylene, 1,1,1-trichloroethane, chlorobenzene, 1,1,2-trichloro-1,2,2-trifluoroethane, ortho-dichlorobenzene, trichlorofluoromethane, and 1,1,2-trichloroethane; all spent solvent mixtures/blends containing, before use, a total of ten percent or more (by volume) of one or more of the above halogenated solvents or those listed in F001, F004, or F005; and still bottoms from the recovery of these spent solvents and spent solvent mixtures	(T)	PC (a)
F003	The following spent non-halogenated solvents: Xylene, acetone, ethyl acetate, ethyl benzene, ethyl ether, methyl isobutyl ketone, n-butyl alcohol, cyclohexanone, and methanol; all spent solvent mixtures/blends containing, before use, only the above spent non-halogenated solvents; and all spent solvent mixtures/blends containing, before use, one or more of the above non-halogenated solvents, and, a total of ten percent or more (by volume) of one or more of those solvents listed in F001, F002, F004, and F005; and still bottoms from the recovery of these spent solvents and spent solvent mixtures	(T)	Pall (b)
F005	The following spent non-halogenated solvents: Toluene, methyl ethyl ketone, carbon disulfide, isobutanol, pyridine, benzene, 2-ethoxyethanol, and 2-nitropropane; all spent solvent mixtures/blends containing, before use, a total of ten percent or more (by volume) of one or more of the above non-halogenated solvents or those solvents listed in F001, F002, or F004; and still bottoms from the recovery of these spent solvents and spent solvent mixtures	(I, T)	Pall (b)
F006	Wastewater treatment sludges from electroplating operations except from the following processes: (1) Sulfuric acid anodizing of aluminum; (2) tin plating on carbon steel; (3) zinc plating (segregated basis) on carbon steel; (4) aluminum or zinc-aluminum plating on carbon steel; (5) cleaning/stripping associated with tin, zinc and aluminum plating on carbon steel; and (6) chemical etching and milling of aluminum	(T)	PC (a) (b)
F007	Spent cyanide plating bath solutions from electroplating operations	(R, T)	PC (a)
F008	Plating bath residues from the bottom of plating baths from electroplating operations where cyanides are used in the process	(R, T)	PC (a)
F009	Spent stripping and cleaning bath solutions from electroplating operations where cyanides are used in the process	(R, T)	PC (a)
U037	Chlorobenzene	(T)	Pall (b)
U041	Epichlorhydrin, chloroethyl oxirane	(T)	Pall (b)
U210	Tetrachloroethene (CAS 127-18-4)	(T)	Slater (a)

EPA Waste Codes as defined in 40 CFR 261.31 (F-series) and 40 CFR 261.33 (U-series).
Waste Type Codes:
I = Ignitible
C = Corrosive
T= Toxic
R = Reactive

Information sources:
(a) "Notification to EPA of Hazardous Waste Activities - Region 2", USEPA SW-897.2 , 1980.
(b) EDR data base search (December 21, 1999), Volume 2 of Phase II Remedial Investigation Report, Pall Corp; Enviro-Science, July 2000.
Generators:
Pall = Pall Corporation (30 Sea Cliff Avenue); NYD 002054419.
PC = Photocircuits / Kollmorgen (Sea Cliff Avenue; NYD 096920483)
Slater = Slater Electric (45 Sea Cliff Avenue; NYD 002036564)

TABLE 3-1
Photocircuits / Pall Corp. Site
Existing Monitoring and Supply Wells in Project Vicinity

Existing Monitoring Well Construction Details						
Site	Well Designation	Date Installed	Screen Interval (ft bgs)	Well TD (Apex 2006)	Well Diam. (inches)	Comment
Pall Corporation	MW-1P	1/21/1992	5-15	No	4	
	MW-1PI	3/10/1999	41-51	48.10	2	
	MW-1PD	3/11/1999	90-100	90.61	2	
	MW-2P	1/22/1992	4-14	No	4	
	MW-3P	1/21/1992	3-14	15.21	4	
	MW-4P	1/20/1992	13-23	23.80	4	
	MW-4PI	3/12/1999	45-55	48.35	2	
	MW-4PD	3/16/1999	91-101	101.50	2	
	MW-5P	1/20/1992	3-13	13.30	4	
	MW-5PI	3/17/1999	40-50	48.35	2	
	MW-5PD	3/17/1999	90-100 +5	98.82	2	Artesian 3/06
	MW-6P	8/14/1992	50-60	59.88	4	
	MW-6PD	3/9/1999	90-100	100.95	2	
	MW-7P	11/18/1996	3-18	17.55	4	
	MW-8PS	3/25/1999	5-15 +5	13.88	2	
	MW-8PI	3/25/1999	40-50	49.79	2	
	MW-10PS	3/19/1999	5-15 +2	15.16	2	
	MW-10PI	3/19/1999	40-50 +5	50.95	2	
	MW-10PD	3/22/1999	90-100 +5	96.59	2	Artesian 3/06
	MW-11PS	8/17/1999	5-15	11.78	2	
	MW-11PI	8/17/1999	40-50	49.95	2	
	MW-11PD	8/16/1999	85-95	96.59	2	Artesian 3/06
	MW-13-PS	9/19/1999	5-15	14.65	2	
	MW-13PI	8/19/1999	40-50	50.23	2	
	MW-13PD	8/18/1999	85-95	94.70	2	
	MW-17PS	Recent?		28.75	4	Data from Apex
	MW-17PI	Recent?		54.60	4	Data from Apex
	MW-18PS	Recent?		26.20	4	Data from Apex
	MW-18PI	Recent?		56.40	4	Data from Apex
	MW-19PS	Recent?		26.20	4	Data from Apex
	MW-19PI	Recent?		50.23	4	Data from Apex
Pall Corporation Pilot Test Wells	PT-MW-1S	Recent		14.15	4	Data from Apex
	PT-MW-1I	Recent		55.55	4	Data from Apex
	PT-MW-2S	Recent		14.39	4	Data from Apex
	PT-MW-2I	Recent		55.54	4	Data from Apex
	PT-MW-3S	Recent		12.09	4	Data from Apex
	PT-MW-3I	Recent		56.42	4	Data from Apex
	PT-MW-4S	Recent		14.39	4	Data from Apex
	PT-MW-41	Recent		55.54	4	Data from Apex
	PT-MW-5S	Recent		14.35	4	Data from Apex
	PT-MW-51	Recent		56.60	4	Data from Apex
	PT-MW-6S	Recent		14.32	4	Data from Apex
	PT-MW-61	Recent		54.49	4	Data from Apex

TABLE 3-1
Photocircuits / Pall Corp. Site
Existing Monitoring and Supply Wells in Project Vicinity

Existing Monitoring Well Construction Details						
Site	Well Designation	Date Installed	Screen Interval (ft bgs)	Well TD (Apex 2006)	Well Diam. (inches)	Comment
August Thomsen	MW-1A	1/23/1992	3-13	12.02	4	
	MW-2A	1/23/1992	3-13	13.05	4	
	MW-2AI	3/23/1999	40-50	49.85	2	Artesian 3/06
	MW-2AD	3/22/1999	80-90 +5	100.25	2	Artesian 3/06
	MW-12PS	8/23/1999	5-15	14.27	2	
	MW-12-PI	8/23/1999	40-50	49.65	2	
	MW-12PD	8/20/1999	85-95	100.70	2	Artesian 3/06
Photocircuits	MW-1	5/12/1987	15-25	No	2	
	MW-2	5/14/1987	10-25*	No	2	
	MW-3	5/13/1987	10-20	No	2	
	MW-4	5/14/1987	14-24	No	2	
	MW-5	5/20/1987	90-100	No	2	
	MW-6	5/13/1987	5.5-15.5	No	2	
	MW-7	8/30/1988	11-26	No	2?	
	MW-8	8/25/1988	155-170	No	2	
	MW-9	8/10/1988	10-25	No	2	
	MW-10	8/12/1988	115-130	No	2	
	MW-11	8/17/1988	160-175	No	2	
	MW-12	10/14/1999	40-50	No	4	
	MW-13	10/15/1999	40-50	No	4	
	MW-14	10/19/1999	45-45	No	4	
Pass & Seymour (Slater Elec.)	MW-1S	1/27/1992	6-21	No	4	
	MW-2S	1/27/1992	6-21	No	4	
	MW-3S	1/27/1992	5-20	No	4	
	MW-4S ***	4/22/1998	4-14	No	4	
Nassau County	NC-WELL	NA	NA	No	NA	
Sea Cliff Avenue	MW-14PCS	UNK	UNK	23.20	4	Data from Apex
	MW-14PCI	UNK	UNK	49.95	2	Data from Apex
	MW-14PCD	1/4/2000	85-95	90.36	2	
	MW-15PCD	2/22/2000	90-100	99.00	2	
	MW-16PCI	1/6/2000	40-50	49.95	2	
	MW-16PCD	1/6/2000	85-95	96.80	2	
Associated Draperies	MW-1H	Pre-1998	7-27	No	2 or 4	
	MW-2H	Pre-1998	7-27	No	2 or 4	
	MW-1M	NA	19-34	No	2	
Carney Street Well Field	N-3466	NA	148-173	No	NA	
	N-8326 (No. 21)	NA	120-165	No	NA	
	N-8327	NA	115-165	No	NA	
	MW-1GS	NA	TD=23.75	See GC	NA	Duplicate listing
	MW-1GI	NA	TD=113.5	See GC	NA	Duplicate listing
	MW-1GD	NA	TD=205	See GC	NA	Duplicate listing

TABLE 3-1
Photocircuits / Pall Corp. Site
Existing Monitoring and Supply Wells in Project Vicinity

Existing Monitoring Well Construction Details						
Site	Well Designation	Date Installed	Screen Interval (ft bgs)	Well TD (Apex 2006)	Well Diam. (inches)	Comment
City of Glen Cove	MW-1GS	1/17/2000	5-15	15.13	2 (A)	
	MW-1GI	1/18/2000	40-50	50.15	2 (A)	
	MW-1GD	1/18/2000	85-95	95.00	2 (A)	
	MW-2GS	9/7/1999	5-15	13.90	2 (A)	
	MW-2GI	9/7/1999	40-50	49.65	2 (A)	Artesian 3/06
	MW-2GD	9/7/1999	90-100	NR	2 (A)	Artesian 3/06
Public Supply Well Field Monitoring Wells	GC-1S	NA	19-39	No	NA	
	GC-1D	NA	175-195	No	NA	
	GC-2S	NA	19-39	40.42	NA	
	GC-2D	NA	188-208	216.70	NA	
	GC-3S	NA	4-24	23.53	NA	
	GC-3M	NA	94-114	116.15	NA	
	GC-3D	NA	180-200	203.80	NA	
	GC-4S	NA	34-54	55.45	NA	
	GC-4D	NA	200-220	225.25	NA	
	GC-5S	NA	85-105	115.70	NA	
	GC-5D	NA	234-254	265.60	NA	
	GC-6S	NA	130-150	No	NA	
	GC-6D	NA	255-275	No	NA	
	GC-7S	NA	80-100	No	NA	
	GC-8S	NA	86-106	No	NA	
	GC-8D	NA	169-189	No	NA	
	GC-9S	NA	40-60	113.34	NA	Depth anomaly
	GC-10S	NA	20-40	No	NA	
	GC-11S	NA	95-115	No	NA	
	GC-11D	NA	210-230	No	NA	
	GC-WP1	NA	5-10	No	NA	
Nassau County DPW GW Monitoring Wells	G-4 (N01152)	4/21/1965	125-130	No	4	(Screen 127-130.4)
	G-1A (N05250)	3/8/1967	96-101	No	1.25	
	G-3A (N09670)	4/4/1979	37.25-42.25	No	2	
	SC-2 (N11671)	3/19/1990	19.3-24.3	No	4	Glen Head
	SC-5 (N11675)	4/4/1990	23-28	No	4	Sea Cliff
	SC-7 (N11777)	9/25/1990	68-78	No	4	Sea Cliff

Information on this table was current at time of work plan submission (11/06). Some information has been acquired or corrected subsequently to generation of this table.

"+5" (or "+2") on screen interval based on well log showing a 5-ft tailpiece.

* = Well IDs MW-1GS, 1-GI, and 1-GD listed twice on table but shown only once on Figure 3-1; DB Table 4-1 lists Carney St Wells MW-GD1, GD2, GD3, and GD4.

** = Only GC-1 shown on Figure 3-2 (singlet, not GC-1S/1D doublet).

*** = MW-4S shown on figure 3-1 but not on vicinity well table; well log in McLaren-Hart RI, 9/28/98

Boring logs from Enviro-Science except CAR by C A Rich; FDG by Fluor Daniel GTI. Logs for county DPW wells requested but not received at time of work plan submission.

Some data is anomalous (well depth from Enviro-Science sampling log does not match reported well depth).

TABLE 3-2
Photocircuits / Pall Corp. Site
Existing Monitoring Well Condition Survey Results

		Existing Monitoring Well Construction Details					Well Condition Survey Findings (July-August, 2007)									
Site/Property	Well Designation	Date Installed	Screen Zone (ft bgs)	Well TD (Apex 2006)	Well Diam. (inches)	Comment	Found?	Date Surveyed	DTW (ft)	TWD (ft)	Mat'l	Diam (inches)	Pump?	PID Reading	TDW difference	Condition/Comment
Pall Corporation	MW-1P	1/21/1992	5-15	No	4		Yes	7/16/2007	3.71	NR	PVC	4	No	0	NA	PVC is cracked allowing parking lot runoff to enter the well, ponded up.
	MW-1PI	3/10/1999	41-51	48.10	2		Yes	7/16/2007	3.07	48.4	PVC	2	No	0-0.1	0.30	None
	MW-1PD	3/11/1999	90-100	90.61	2		Yes	7/16/2007	2.01	97.6	PVC	2	No	0-0.8	6.99	Bolts broken
	MW-2P	1/22/1992	4-14	No	4		Yes	7/27/2007	2.6	14.2	PVC	4	No	0	NA	Cover loose and dropped in protective casing.
	MW-3P	1/21/1992	3-14	15.21	4		Yes	7/16/2007	2.18	15.3	PVC	4	No	1.1	0.09	OK
	MW-4P	1/20/1992	13-23	23.80	4		Yes	7/16/2007	1.38	23.8	PVC	4	No	2.2	0.00	-
	MW-4PI	3/12/1999	45-55	48.35	2		Yes	7/16/2007	1.72	48.5	SS	2	No	0.8	0.15	Concrete pad slightly cracked; stainless steel well.
	MW-4PD	3/16/1999	91-101	101.50	2		Yes	7/16/2007	0.42	101.4	PVC	2	No	77	-0.10	Lid is hitting J plug
	MW-5P	1/20/1992	3-13	13.30	4		Yes	7/27/2007	0	12.6	PVC	4	No	0	-0.70	
	MW-5PI	3/17/1999	40-50	48.35	2		Yes	7/27/2007	0.3	48.4	PVC	2	No	0	0.05	
	MW-5PD	3/17/1999	90-100 +5	98.82	2	Artesian 3/06	Yes	7/27/2007	Artesian	NR	PVC	2	No	0	NA	Artesian flow; Apex TWD includes 2 ft added riser.
	MW-6P	8/14/1992	50-60	59.88	4		Yes	7/16/2007	2.05	59.6	PVC	4	No	0-17.1	-0.28	-
	MW-6PD	3/9/1999	90-100	100.95	2		Yes	7/16/2007	2.4	100.2	PVC	2	No	0	-0.75	PVC riser is cracked
	MW-7P	11/18/1996	18-Mar	17.55	4		Yes	7/16/2007	2.81	17.6	PVC	4	No	0-0.1	0.05	-
	MW-8PS	3/25/1999	5-15+5	13.88	2		Yes	7/27/2007	3.58	14.1	PVC	2	No	0	0.22	None
	MW-8PI	3/25/1999	40-50	49.79	2		Yes	7/27/2007	2.62	49.6	PVC	2	No	0	-0.19	None
	MW-10PS	3/19/1999	5-15 +2	15.16	2		Yes	7/16/2007	1.55	14.4	PVC	2	No	1.5	-0.76	Well north of grassy area; blue paint; with 2 white bolts
	MW-10PI	3/19/1999	40-50 +5	50.95	2		Yes	7/16/2007	1.2	48.9	PVC	2	No	1.4	-2.05	Located in grassy area
	MW-10PD	3/22/1999	90-100 +5	96.59	2	Artesian 3/06	Yes	7/16/2007	top of PVC	99.2	PVC	2	No	NA	4.61	Very slight artesian; Apex TWD includes 2 ft added riser; in grass
	MW-11PS	8/17/1999	5-15	11.78	2		Yes	7/16/2007	0.72	14.2	PVC	2	No	0	2.42	Broken bolt
	MW-11PD	8/17/1999	40-50	96.59	2	Artesian 3/06	Yes	7/16/2007	Artesian	93.2	PVC	2	No	0	-1.39	Artesian; stopped flowing at ground surface but did flood the flushmount. Missing 1 bolt. Well labeled as MW-11PI; corrected to MW-11PD after well condition survey; Apex TWD includes 2 ft added riser.
	MW-11PI	8/16/1999	85-95	49.95	2		Yes	7/16/2007	1.12	50	PVC	2	No	2.7	0.05	1 Bolt. J plug is hitting the flush lid; well ID corrected to MW-11PI after well condition survey.
	MW-13-PS	9/19/1999	5-15	14.65	2		Yes	7/16/2007	2.48	14.7	PVC	2	No	0.2	0.05	Bolt holes cracked
	MW-13PI	8/19/1999	40-50	50.23	2		Yes	7/16/2007	1.65	50.2	PVC	2	No	1.2	-0.03	Bolt missing, bolt holes cracked
	MW-13PD	8/18/1999	85-95	94.70	2		Yes	7/16/2007	1.52	94.2	PVC	2	No	152	-0.50	Bolts missing, ants in well
	MW-17PS	Recent?		28.75	4		Yes	7/26/2007	2.65	27.8	PVC	4	No	0	-0.95	None
	MW-17PI	11/17/2004	37-57	54.60	4	Apex Well Log	Yes	7/26/2007	1.6	54.8	PVC	4	No	0	0.20	None
	MW-18PS	Recent?		26.20	4		Yes	7/26/2007	2.97	26.2	PVC	4	No	0	0.00	None
	MW-18PI	11/23/2004	37-57	56.40	4	Apex Well Log	Yes	7/26/2007	2.3	55.8	PVC	4	No	6.5	-0.60	Water level indicator probe was stuck up due to some obstruction at about 43 feet depth
	MW-19PS	Recent?		26.20	4		Yes	7/27/2007	3.47	26.2	PVC	4	No	0	0.00	None
	MW-19PI	NR (11/04?)	37-57	50.23	4	Apex Well Log	Yes	7/27/2007	2.68	55.9	PVC	4	No	0	5.67	None
Pall Corporation Pilot Test Wells	PT-MW-3S	Recent		12.09	4		Yes	7/27/2007	0.5	26.9	PVC	4	No	0	14.81	None; well found probably not PTMW-3S
	PT-MW-6S	Recent		14.32	4		Yes	7/27/2007	0.4	14.4	PVC	4	No	0	0.08	None
	PT-MW-6I	Recent		54.49	4		Yes	7/27/2007	0.5	54.5	PVC	4	No	0	0.01	None

TABLE 3-2
Photocircuits / Pall Corp. Site
Existing Monitoring Well Condition Survey Results

		Existing Monitoring Well Construction Details					Well Condition Survey Findings (July-August, 2007)									
Site/Property	Well Designation	Date Installed	Screen Zone (ft bgs)	Well TD (Apex 2006)	Well Diam. (inches)	Comment	Found?	Date Surveyed	DTW (ft)	TWD (ft)	Mat'l	Diam (inches)	Pump?	PID Reading	TDW difference	Condition/Comment
August Thomsen	MW-1A	1/23/1992	3-13	12.02	4		Yes	7/27/2007	2.05	12.5	PVC	4	No	0	0.48	None
	MW-2A	1/23/1992	3-13	13.05	4		Yes	7/16/2007	0.7	13.1	PVC	4	No	0.3	0.05	None
	MW-2AI	3/23/1999	40-50	49.85	2	Artesian 3/06	Yes	7/16/2007	slight artesian	49.65	PVC	2	No	NA	1.80	Slight artesian, flush lid is app 1" higher than the concrete pad, reddish brown colored water; Apex TWD inc 2 ft added riser.
	MW-2AD	3/22/1999	80-90 +5	100.25	2	Artesian 3/06	Yes	7/16/2007	water flowing	-	PVC	2	No	NA	NA	Lip of flush lid is 0.5" above concrete pad, grey cloudy water, decent flow rate at 0.5 gpm; Apex TWD includes 2 ft added riser.
	AT-1	Unkown	Unknown	Unknown	Unknown	No record	Yes	7/16/2007	5.2	25.6	PVC	4	No	0.4	NA	4" screw PVC cap
	AT-2	Unkown	Unknown	Unknown	Unknown	No record	Yes	7/16/2007	4.6	51.2	PVC	4	No	0	NA	4" thread cap with no threads, dirt falling in well, open to runoff
	AT-3	Unkown	Unknown	Unknown	Unknown	No record	Yes	7/16/2007				4			NA	Can't open, 4" cap is wrongly cross threaded
	AT-4	Unkown	Unknown	Unknown	Unknown	No record	Yes	7/16/2007							NA	Can't open, located under a dumpster
	MW-12PS	8/23/1999	5-15	14.27	2		Yes	7/16/2007	1	14.5	PVC	2	No	0.2	0.23	OK
	MW-12-PI	8/23/1999	40-50	49.65	2		Yes	7/16/2007	1.68	47.6	PVC	2	No	5.4	-2.05	OK
	MW-12PD	8/20/1999	85-95	100.70	2	Artesian 3/06	Yes	7/16/2007	Artesian	100.2	PVC	2	No	NA	1.50	Slight flowing artesian; Apex TWD includes 2 ft added riser.
Photocircuits	MW-1	5/12/1987	15-25	No	2	Est TWD=25	Yes	7/16/2007	7.42	20.2	PVC	4	No	0	-4.80	Lid is loose, full of dirt
	MW-2	5/14/1987	10-25	No	2	Est TWD=25	Yes		4.33	24.6	PVC	2	No	0	-0.40	Has a water cap, not sealed
	MW-3	5/13/1987	10-20	No	2	Est TWD=20	Yes	7/16/2007	2.43	NR	PVC	4	Yes, bladder	NA	NA	Bladder pump not running, could not remove w/o disconnecting lines
	MW-4	5/14/1987	10-24	No	2	Est TWD=24	Yes	8/9/2007	1.0	23.7	PVC	2	No	0	-0.30	Does not have a standard flush lid.
	MW-5	5/20/1987	90-100	No	2	Est TWD=100	Yes	7/16/2007	3.62	100.1	PVC	2	No	0	0.10	Does not have a standard flush lid
	MW-6	5/13/1987	5.5-15.5	No	2	Est TWD=15.5	Yes	7/16/2007	2.08	12.3	PVC	2	No	1.2	-3.20	Inside of PVC is black (won't rub off), 6" steel pipe inside flush lid
	MW-7	8/30/1988	11-26	No	2?	Est TWD=26	Yes	7/16/2007	1.2	NR	PVC	4	No	0	NA	Center bolt is bent, flush box filled with dirt, well had something floating with slight chemical odor, water level indicator not inserted.
	MW-8	8/25/1988	155-170	No	2	Est TWD=170	Yes	7/17/2007	3.48	NR	PVC	4	Yes, bladder	0	NA	Lid is broken off at the hinge
	MW-9	8/10/1988	10-25	No	2	Est TWD=25	Yes	7/17/2007	5.4	27.8	PVC	4	No	0	2.80	None
	MW-10	8/12/1988	115-130	No	2	Est TWD=130	Yes	7/17/2007	3.36	132	PVC	4	No	0	2.00	None
	MW-11	8/17/1988	160-175	No	2	Est TWD=175	Yes	7/17/2007	3.51	174	PVC	-	No	0	-1.00	None
	MW-12	10/14/1999	40-50	No	4	Est TWD=50	Yes	7/17/2007	4.62	50.3	PVC	4	Yes, bladder	0	0.30	Bladder pump not connected beyond well head
	MW-13	10/15/1999	40-50	No	4	Est TWD=50	Yes	8/9/2007	3.97	50	PVC	4	No	18.6	0.00	No pad, bolts missing.
	MW-14	10/19/1999	35-45	No	4	Est TWD=45	Yes	8/9/2007	15.05 (2.5 on 7/17)	45	PVC	4	No	3.5	0.00	7/17 Note: Well PVC riser is black on the inside, floater inside, water level indicator not inserted. 8/9 note: No bolts.
Pass & Seymour	MW-1S	1/27/1992	6-21	No	4		No									Well not found.
	MW-2S	1/27/1992	6-21	No	4	Est TWD=21	Yes	7/16/2007	5.8	20.8	PVC	4	No	0	-0.20	Pad missing, no lid, PVC is cracked
	MW-3S	1/27/1992	5-20	No	4	Est TWD=20	Yes	7/17/2007	6.19	19.3	PVC	4	No	1.6	-0.70	Incorrectly marked as MW-16 by YEC. Corrected on 7/27/07
	MW-4S	4/22/1998	4-14	No	4		No									Well not found.
Sea Cliff Avenue	MW-14PCS	UNK	UNK	23.20	4	Data from Apex	Yes	7/27/2007	3.07	23.5	PVC	4	No	0	0.30	No bolts
	MW-14PCI	11/30/2004	37-57	49.95	2	Apex Well Log	Yes	7/27/2007	2.7	55.9	PVC	2	No	0	5.95	No bolts
	MW-14PCD	1/4/2000	85-95	90.36	2		Yes	7/27/2007	2.7	92	PVC	2	No	0	1.64	No bolts
	MW-15PCD	2/22/2000	90-100	99.00	2		Yes	7/27/2007	1.65	85	PVC	2	No	0	-14.00	No pad, cover and cap. May be silted up; cap should be replaced.
	MW-16PCI	1/6/2000	40-50	49.95	2		Yes	7/27/2007	4.57	49.5	PVC	2	No	0	-0.45	No bolts
	MW-16PCD	1/6/2000	85-95	96.80	2		Yes	7/27/2007	4.12	95.7	PVC	2	No	0	-1.10	No bolts

TABLE 3-2
Photocircuits / Pall Corp. Site
Existing Monitoring Well Condition Survey Results

		Existing Monitoring Well Construction Details					Well Condition Survey Findings (July-August, 2007)									
Site/Property	Well Designation	Date Installed	Screen Zone (ft bgs)	Well TD (Apex 2006)	Well Diam. (inches)	Comment	Found?	Date Surveyed	DTW (ft)	TWD (ft)	Mat'l	Diam (inches)	Pump?	PID Reading	TDW difference	Condition/Comment
Carney Street Well Field	MW-1GS	1/17/2000	5-15	15.13	2	Depth uncertain	Yes	7/17/2007	1.02	15	PVC	2	No	0	-0.13	Slip cap only (PVC); ET well data matches Apex (2006)
	MW-1GI	1/18/2000	40-50	50.15	2	Depth uncertain	Yes	7/17/2007	0.55	50.1	PVC	2	No	0	-0.05	ET data matches Apex (2006)
	MW-1GD	1/18/2000	85-95	95	2	Depth uncertain	Yes	7/17/2007	at the cap	94	PVC	2	No	0	-1.00	ET data matches Apex (2006)
	MW-2GD	9/7/1999	90-100	NR	2	TWD not reported; Artesian 3/06	Yes	7/17/2007	artesian	NR	PVC	2	No	NA	NA	Artesian flow at approx 0.5-1 gpm; Apex TWD includes 5 ft added riser.
	MW-2GI	9/7/1999	40-50	49.65	2	Artesian 3/06	Yes	7/17/2007	artesian	NR	PVC	2	No	NA	NA	Artesian, 0.5 gpm (located across from bus door); Apex TWD includes 3 ft added riser
	MW-2GS	9/7/1999	5-15	13.90	2		Yes	7/17/2007	0.6	13.4	PVC	2	No	0	-0.50	Located 5 ft S of MW-2GI
Public Supply Well Field Monitoring Wells	GC-1D	NA	175-195	No	NA		No									Not locatable by Earth Tech or other consultants
	GC-2S	NA	19-39	40.42	4		Yes	7/27/2007	15.65	39	PVC	4	No	0	-1.42	Lock was cut
	GC-2D	NA	188-208	216.70	4		Yes	7/27/2007	16.35	211	PVC	4	No	0	-5.70	Cap came out along with the bolt
	GC-3S	NA	4-24	23.53	4		Yes	7/17/2007	5.85	23.5	PVC	4	No	0	-0.03	None
	GC-3M	NA	94-114	116.15	4		Yes	7/17/2007	2.53	114	PVC	4	No	0	-2.15	None
	GC-3D	NA	180-200	203.80	4		Yes	7/17/2007	0.75	203	PVC	4	No	0	-0.80	None
	GC-4S	NA	34-54	55.45	4		NA									Beyond mapped area; did not attempt to locate.
	GC-4D	NA	200-220	225.25	4		NA									Beyond mapped area; did not attempt to locate.
	GC-5S	NA	85-105	115.70	4		Yes	7/27/2007	90	108	PVC	4	No	0	-7.70	None
	GC-5D	NA	234-254	265.60	4		Yes	7/27/2007	90	263	PVC	4	No	0	-2.60	None
	GC-10S	NA	20-40	No	NA	Est TWD=40	NA									Beyond mapped area; did not attempt to locate.
	GC-11S	NA	95-115	No	NA	Est TWD=115	Yes	7/27/2007	80.35	118	PVC	4	No	0	3.00	Lock had to be cut
	GC-11D	NA	210-230	No	NA	Est TWD=230	Yes	7/27/2007	80.48	237	PVC	4	No	0	7.00	Lock had to be cut

Notes:
DTW = Depth to Water
TWD = Total Well Depth.
TD = Total Depth
"Well TD" column based on data reported in Apex report (May, 2006).
TDW difference = the difference between ET observed depth and Apex (2006) depth; depth estimated from bottom of screen if no Apex data. Additional riser added by Apex included in calculation (Apex, 2006; Table 5-1)
NR = Not recorded
NA = Not Available or Not Applicable

Table 3-3
Well Installation and Drilling Summary
Photcircuits/Pall Corp Site Deep Groundwater RI/FS

Hollow Stem Auger Drilling	Proposed Depth (ft)	Actual Depth	Driller	Rationale / Comment
Photocircuits				
01MW-101S	60	49.5-59.5	Aztech	Upgradient shallow well, characterize groundwater entering the Study Area
01MW-101D (SS)	100	90-100	Aztech	Upgradient deep well, characterize groundwater entering the Study Area
01MW-104S	70	49.5-59.5	Aztech	Shallow well near the SVE system, characterize GW at Photocircuits; depth modified based on hydropunch data.
01MW-104I	90	69.5-79.5	Aztech	Intermediate well near the SVE system, characterize GW at Photocircuits; depth modified based on hydropunch data.
01MW-104D	130	110-120	Delta	Deep well near the SVE system, characterize GW at Photocircuits; depth modified based on hydropunch data.
01MW-104D2 (SS)	160	150-160	Delta	Very deep well near the SVE system, characterize groundwater at Photocircuits
01MW-105D	150	NA	NA	Near SVE area, contingent on hydropunch results. Not installed.
01MW-106D	150	NA	NA	Near SVE area, contingent on hydropunch results. Not installed.
01MW-107D	150	NA	NA	Near SVE area, contingent on hydropunch results. Not installed.
Pall Site				
04MW-102S	60	50-60	Aztech	Shallow well, characterize groundwater entering the Pall Site
04MW-102I	100	89-99	Aztech	Intermediate well, characterize groundwater entering the Pall Site
04MW-102D (SS)	140	140-150	Delta	Deep well, characterize groundwater entering the Pall Site
04MW-4PD2 (SS)	155	145-155	Delta	Very deep well at existing triplet MW-4P
04MW-6PD2	130	116-126	Delta	Very deep well at existing well triplet MW-15
04MW-8PD (19PD2)	130	120-130	Delta	Deep well planned at existing MW-8P; relocated based on field conditions and access; re-named as 04MW-19PD2.
04MW-11PD2	155	145-155	Delta	Very deep well at existing triplet MW-11P
August Thomsen				
05MW-2AD2 (SS)	155	145-155	Delta	Very deep well at existing triplet MW-2A
05MW-12PD2	155	145-155	Delta	Very deep well at existing triplet MW-12P
Carney St WF				
06MW-103S	80	70-80	Aztech	Shallow well, characterize groundwater near Municipal well #21
06MW-103I	120	110-120	Delta	Intermediarte well, characterize groundwater near Municipal well #21
06MW-103D	160	150-160	Delta	Deep well, characterize groundwater near Municipal well #21
06MW-103D2 (SS)	220	202-212	Delta	Very deep well, characterize groundwater near Municipal well #21. Difficult deep drilling; refusal at 214 ft bgs
Hydropunch Drilling/Sampling				
Photocircuits				Comment
01HP-01	150	110	ADT	Stratigraphic characterization of SVE area; refusal at 110 ft bgs; sampled continuously at 5-ft intervals.
01HP-02	150	114	ADT	Stratigraphic characterization of SVE area; refusal at 114 ft bgs; sampled at 20-ft intervals starting at 30 ft bgs.
01HP-03	150	113	ADT	Stratigraphic characterization of SVE area; refusal at 113 ft bgs; sampled at 20-ft intervals starting at 29 ft bgs.

Hydropunch boring and sampling logs are provided in Appendix A.
SS = Soils logged with split spoon sampling at 5-ft intervals. See boring logs in Appendix B.
Monitoring Well installation logs are provided in Appendix C.

Table 3-4
Planned and Actual Groundwater Monitoring Wells Sampled

Property	Well Designation	DTW (ft) 7/07	TWD (ft)	Diam (in)	Planned Sample?	April 2008 Sampling	October 08 Sampling	Comment
Photocircuits (Site 01)								
New Wells	01MW-101S	NA	60	2	Yes	X	X	Background; shallow and intermediate
	01MW-101D	NA	100	2	Yes	X	X	Background; deep and very deep
	01MW-104S	NA	60	2	Yes	X	X	
	01MW-104I	NA	80	2	Yes	X	X	
	01MW-104D	NA	120	2	Yes	X	X	
	01MW-104D2	NA	160	2	Yes	X	X	
Old Wells	MW-1	7.42	20.2	4	No			
	MW-2	4.33	24.6	2	No			
	MW-3	2.43	NR	4	Yes	X	X	
	MW-4	1.0	23.7	2	No			
	MW-5	3.62	100.1	2	No			
	MW-6	2.08	12.3	2	No			
	MW-7	1.2	NR	4	Yes	X	X	
	MW-8	3.48	NR	4	Yes	X	X	
	MW-9	5.4	27.8	4	Yes	X	X	
	MW-10	3.36	132	4	Yes	X	X	
	MW-11	3.51	174	NR	Yes	X	X	
	MW-12	4.62	50.3	4	Yes	X	X	
	MW-13	3.97	50	4	Yes	X	X	
	MW-14	2.5	45	4	Yes	X	X	
Pass & Seymour (Site 02)								
	MW-1S	Not found	NM		No			
	MW-2S	5.8	20.8	4	No			
	MW-3S	6.19	19.3	4	No		B&L 7/08	Used B&L data on Rd 2 contam contour
	MW-4S	Not found	NM		No			
Sea Cliff Avenue (Site 04)								
	MW-14PCS	3.07	23.5	4	Yes	No	X	Not sampled Rd 1 - safety/access
	MW-14PCI	2.7	55.9	2	Yes	No	X	Not sampled Rd 1 - safety/access
	MW-14PCD	2.7	92	2	Yes	No	X	Not sampled Rd 1 - safety/access
	MW-15PCD	1.65	85	2	No			Well integrity compromised
	MW-16PCI	4.57	49.5	2	Yes	No	X	Not sampled Rd 1 - safety/access
	MW-16PCD	4.12	95.7	2	Yes	No	X	Not sampled Rd 1 - safety/access

Table 3-4
Planned and Actual Groundwater Monitoring Wells Sampled

Property	Well Designation	DTW (ft) 7/07	TWD (ft)	Diam (in)	Planned Sample?	April 2008 Sampling	October 08 Sampling	Comment
Pall Corp (Site 04)								
New Wells	04MW-102S	NA	60	2	Yes	X	X	
	04MW-102I	NA	100	2	Yes	X	X	
	04MW-102D	NA	150	2	Yes	X	X	
	04MW-4PD2	NA	155	2	Yes	X	X	
	04MW-6PD2	NA	126	2	Yes	X	X	
	04MW-11PD2	NA	155	2	Yes	X	X	
	04MW-19PD2	NA	130	2	Yes	X	X	Well ID corrected (initially 18PD2)
Old Wells	MW-1P	3.71	NR	4	No			
	MW-1PI	3.07	48.4	2	Yes	X	X	
	MW-1PD	2.01	97.6	2	Yes	X	X	
	MW-2P	2.6	14.2	4	No			
	MW-3P	2.18	15.3	4	No			
	MW-4P	1.38	23.8	4	Yes	X	X	
	MW-4PI	1.72	48.5	2	Yes	X	X	
	MW-4PD	0.42	101.4	2	Yes	X	X	
	MW-5P	0.0	12.6	4	Yes	X	X	
	MW-5PI	0.3	48.4	2	Yes	X	X	
	MW-5PD	Artesian	NR	2	Yes	X	X	
	MW-6P	2.05	59.6	4	Yes	X	X	
	MW-6PD	2.4	100.2	2	Yes	X	X	
	MW-7P	2.81	17.6	4	No			
	MW-8PS	3.58	14.1	2	Yes	X	X	
	MW-8PI	2.62	49.6	2	Yes	X	X	
	MW-10PS	1.55	14.4	2	Yes	X	X	
	MW-10PI	1.20	48.9	2	Yes	X	X	
	MW-10PD	top of PVC	99.2	2	Yes	X	X	
	MW-11PS	0.72	14.2	2	Yes	X	X	
	MW-11PI	1.12	50	2	Yes	X	X	
	MW-11PD	Artesian	93.2	2	Yes	X	X	
	MW-13-PS	2.48	14.7	2	Yes	X	X	
	MW-13PI	1.65	50.2	2	Yes	X	X	
	MW-13PD	1.52	94.2	2	Yes	X	X	
	MW-17PS	2.65	27.8	4	Yes	X	X	
	MW-17PI	1.6	54.8	4	Yes	X	X	
	MW-18PS	2.97	26.2	4	Yes	X	X	
	MW-18PI	2.30	55.8	4	Yes	X	X	
	MW-19PS	3.47	26.2	4	Yes	X	X	
	MW-19PI	2.68	55.9	4	Yes	X	X	

Table 3-4
Planned and Actual Groundwater Monitoring Wells Sampled

Property	Well Designation	DTW (ft) 7/07	TWD (ft)	Diam (in)	Planned Sample?	April 2008 Sampling	October 08 Sampling	Comment
August Thomsen								
New Wells	05MW-2AD2	NA	155	2	Yes	X	X	
	05MW-12PD2	NA	155	2	Yes	X	X	
Old Wells	MW-1A	2.05	12.5	4	No			
	MW-2A	0.7	13.1	4	Yes	X	X	
	MW-2AI	Artesian	49.65	2	Yes	X	X	
	MW-2AD	Artesian	-	2	Yes	X	X	
	AT-1	5.2	25.6	4	No			AT Series wells not in historical record
	AT-2	4.6	51.2	4	No			AT Series wells not in historical record
	AT-3	NM	NM	4	No			AT Series wells not in historical record
	AT-4	NM	NM	NM	No			AT Series wells not in historical record
	MW-12PS	1.00	14.5	2	Yes	X	X	
	MW-12-PI	1.68	47.6	2	Yes	X	X	
	MW-12PD	Artesian	100.2	2	Yes	X	X	
Carney Street Wellfield (Glen Cove) (Site 06)								
New Wells	06MW-103S	NA	80	2	Yes	X	X	
	06MW-103I	NA	120	2	Yes	X	X	
	06MW-103D	NA	160	2	Yes	X	X	
	06MW-103D2	NA	214	2	Yes	X	X	
Old Wells	MW-1GS	1.02	15	2	Yes	X	X	
	MW-1GI	0.55	50.1	2	Yes	X	X	
	MW-1GD	at the cap	94	2	Yes	X	X	
	MW-2GD	Artesian	NR	2	Yes	X	No; 4/08	Used 4/08 data on 10/08 contour
	MW-2GI	Artesian	NR (49.6)	2	Yes	X	No; 4/08	Used 4/08 data on 10/08 contour
	MW-2GS	0.6	13.4	2	Yes	X	No; 4/08	Used 4/08 data on 10/08 contour
Public Supply Wellfield Monitoring Wells								
	GC-1D				No			
	MW-GC2S	15.65	39	4	Yes	X	X	
	MW-GC2D	16.35	211	4	Yes	X	X	
	GC-3S	5.85	23.5	4	Yes	X	X	
	GC-3M	2.53	114	4	Yes	X	X	
	GC-3D	0.75	203	4	Yes	X	X	
	GC-4S				No			
	GC-4D				No			
	GC-5S	90	108	4	No			
	GC-5D	90	263	4	No			
	GC-10S				No			
	GC-11S	80.35	118	4	No			
	GC-11D	80.48	237	4	No			

Table 3-4
Planned and Actual Groundwater Monitoring Wells Sampled

Property	Well Designation	DTW (ft) 7/07	TWD (ft)	Diam (in)	Planned Sample?	April 2008 Sampling	October 08 Sampling	Comment

X = Well sampled
NR = Not recorded
DTW = Depth to Water
TWD = Total Well Depth

Table 3-5
Groundwater Elevation Data Used in Groundwater Contour Maps
July 2007, April 2008, and October 2008 Measurements

Well Designation	Site	Ground Elev	PVC Elev	DT Top Screen	Top Elev Screen	TWD (ft)	Diam (inches)	July 2007		April 2008			October 2008		
								DTW	GW ELEV	DTW	GW ELEV	Head	DTW	GW ELEV	Head
Shallow Wells															
MW-2S	Pass & Seymour	61.07	60.96	6.00	55.07	20.8	4	5.80	55.16	5.72	55.24				
MW-3S	Pass & Seymour	58.64	58.31	5.00	53.64	19.3	4	6.19	52.12	5.93	52.38				
MW-7P	Pall Corp	56.28	55.66	3.00	53.28	17.6	4	2.81	52.85	2.05	53.61		2.77	52.89	
GC-5S	Public - Offsite	137.79	137.64	85.00	52.79	108	4	90.00	47.64	Not included	NA		Not included	NA	
MW-GC2S	Public - Offsite	71.21	70.96	19.00	52.21	39	4	15.65	55.31	15.09	55.87		16.35	54.61	
MW-2	Photocircuits	61.07	60.96	10.00	51.07	24.6	2	4.33	56.63	3.54	57.42		4.41	56.55	
MW-8PS	Pall Corp	55.74	55.38	5.00	50.74	14.1	2	3.58	51.80	3.52	51.86		4.19	51.19	
MW-1A	August Thomsen	53.39	52.75	3.00	50.39	12.5	4	2.05	50.70	2.08	50.67		2.49	50.26	
MW-1P	Pall Corp	55.24	54.98	5.00	50.24	NR	4	3.71	51.27	3.23	51.75		3.75	51.23	
MW-3P	Pall Corp	53.15	52.86	3.00	50.15	15.3	4	2.18	50.68	1.62	51.24		2.24	50.62	
MW-2P	Pall Corp	53.78	53.43	4.00	49.78	14.2	4	2.60	50.83	2.52	50.91		2.87	50.56	
MW-13-PS	Pall Corp	54.73	54.43	5.00	49.73	14.7	2	2.48	51.95	1.70	52.73		2.25	52.18	
GC-3S	Public - Offsite	53.22	52.99	4.00	49.22	23.5	4	3.85	49.14	3.51	49.48		3.72	49.27	
MW-5P	Pall Corp	50.88	50.39	3.00	47.88	12.6	4	0.00	50.39	Slight artesian	50.40		0.43	49.96	
MW-7	Photocircuits	58.74	58.42	11.00	47.74	NR	4	1.20	57.22	1.45	56.97		0.89	57.53	
MW-14PCS	Sea Cliff Ave	57.64	57.27	10.00	47.64	23.5	4	3.07	54.20	Not measured	NA		3.42	53.85	
MW-3	Photocircuits	57.48	56.84	10.00	47.48	Not measured	4	2.43	54.41	Not measured	NA		3.13	53.71	
MW-2A	August Thomsen	50.14	49.24	3.00	47.14	13.1	4	0.70	48.54	0.17	49.07		0.55	48.69	
MW-4	Photocircuits	56.55	56.04	10.00	46.55	23.7	2	1.00	55.04	0.70	55.34		0.83	55.21	
MW-12PS	Pall Corp	51.50	51.06	5.00	46.50	14.5	2	1.00	50.06	1.00	50.06		1.15	49.91	
MW-11PS	Pall Corp	51.35	50.78	5.00	46.35	14.2	2	0.72	50.06	0.04	50.74		0.68	50.10	
MW-1GS	Carney St WF	50.92	50.47	5.00	45.92	15	2	1.02	49.45	0.41	50.06		0.93	49.54	
MW-10PS	Pall Corp	50.66	50.32	5.00	45.66	14.4	2	1.55	48.77	0.99	49.33		1.51	48.81	
MW-9	Photocircuits	55.46	57.03	10.00	45.46	27.8	4	5.40	51.63	4.95	52.08		5.52	51.51	
MW-2GS	Carney St WF	48.16	47.73	5.00	43.16	13.4	2	0.60	47.13	0.32	47.41		0.65	47.08	
MW-17PS	Pall Corp	56.27	55.97	15.00	41.27	27.8	4	2.65	53.32	2.16	53.81		3.19	52.78	
MW-18PS	Pall Corp	56.20	55.5	15.00	41.20	26.2	4	2.97	52.53	2.68	52.82		3.40	52.10	
MW-19PS	Pall Corp	55.69	55.07	15.00	40.69	26.2	4	3.47	51.60	3.33	51.74		3.85	51.22	
MW-4P (4PS)	Pall Corp	52.31	51.81	13.00	39.31	23.8	4	1.38	50.43	0.85	50.96		1.41	50.40	
GC-11S	Public - Offsite		132.90		38.06	118	4	80.35	52.55	Not included	NA		Not included	NA	

Table 3-5
Groundwater Elevation Data Used in Groundwater Contour Maps
July 2007, April 2008, and October 2008 Measurements

Well Designation	Site	Ground Elev	PVC Elev	DT Top Screen	Top Elev Screen	TWD (ft)	Diam (inches)	July 2007		April 2008			October 2008		
								DTW	GW ELEV	DTW	GW ELEV	Head	DTW	GW ELEV	Head
Intermediate Wells															
MW-14	Photocircuits	59.16	58.8	35.00	24.16	45	4	2.50	56.30	2.13	56.67		3.25	55.55	
MW-14PCI	Sea Cliff Ave	57.77	57.38	37.00	20.77	55.9	2	2.70	54.68	Not measured	NA		3.16	54.22	
MW-13	Photocircuits	59.59	58.8	40.00	19.59	50	4	3.97	54.83	3.44	55.36		4.24	54.56	
MW-18PI	Pall Corp	56.05	55.61	37.00	19.05	55.8	4	2.30	53.31	1.84	53.77		2.60	53.01	
MW-17PI	Pall Corp	55.92	55.54	37.00	18.92	54.8	4	1.60	53.94	1.46	54.08		1.72	53.82	
MW-19PI	Pall Corp	55.68	55.21	37.00	18.68	55.9	4	2.68	52.53	2.61	52.60		3.02	52.19	
MW-12	Photocircuits	58.16	58.76	40.00	18.16	50.3	4	4.62	54.14	3.55	55.21		4.52	54.24	
MW-16PCI	Sea Cliff Ave	57.34	57.04	40.00	17.34	49.5	2	4.57	52.47	Not measured	NA		5.07	51.97	
MW-8PI	Pall Corp	55.96	55.67	40.00	15.96	49.6	2	2.62	53.05	2.30	53.37		2.93	52.74	
MW-1PI	Pall Corp	55.25	55.04	40.00	15.25	48.4	2	3.07	51.97	2.62	52.42		3.18	51.86	
MW-13PI	Pall Corp	54.61	54.3	40.00	14.61	50.2	2	1.65	52.65	0.72	53.58		1.78	52.52	
MW-12-PI	Pall Corp	51.63	51.33	40.00	11.63	47.6	2	1.68	49.65	1.32	50.01		1.74	49.59	
MW-11PI	Pall Corp	51.38	50.72	40.00	11.38	50	2	1.12	49.60	0.65	50.07		+0.92	51.64	0.26
MW-1GI	Carney St WF	50.97	50.56	40.00	10.97	50.1	2	0.55	50.01	0.24	50.32		0.85	49.71	
MW-10PI	Pall Corp	50.92	50.65	40.00	10.92	48.9	2	1.20	49.45	0.85	49.80		1.26	49.39	
MW-5PI	Pall Corp	50.89	50.5	40.00	10.89	48.4	2	0.30	50.20	+0.13	50.63		0.45	50.05	
01MW-101S	Photocircuits	60.33	59.94	49.50	10.83	60	2	NA	NA	3.13	56.81		3.30	56.64	
MW-2AI	August Thomsen	50.18	49.91	40.00	10.18	49.65	2	Artesian	NM	+0.74	50.65	0.47	+0.25	50.16	-0.02
01MW-104S	Photocircuits	59.60	59.18	49.50	10.10	58.5	2	NA	NA	3.52	55.66		3.91	55.27	
MW-2GI	Carney St WF	48.21	47.93	40.00	8.21	NR (49.6)	2	Artesian	NM	+2.58	50.51	2.30	+3.07	51.00	2.79
04MW-102S	Pall Corp	57.36	57.37	50.00	7.36	60	2	NA	NA	2.93	54.44		2.79	54.58	
MW-4PI	Pall Corp	52.31	51.85	45.00	7.31	48.5	2	1.72	50.13	1.23	50.62		1.71	50.14	
MW-6P	Pall Corp	56.23	55.87	50.00	6.23	59.6	4	2.05	53.82	1.34	54.53		2.11	53.76	
Deep Wells															
01MW-104I	Photocircuits	59.49	59.18	69.50	-10.01	80.15	2	NA	NA	3.40	55.78		3.93	55.25	
06MW-103S	Carney St WF	49.11	51.97	70.00	-20.89	83.1	2	NA	NA	1.07	50.90	1.79	1.67	50.30	
MW-14PCD	Sea Cliff Ave	57.87	57.44	85.00	-27.13	92	2	2.70	54.74	Not measured	NA		2.98	54.46	
MW-16PCD	Sea Cliff Ave	57.24	57.04	85.00	-27.76	95.7	2	4.12	52.92	Not measured	NA		4.55	52.49	
01MW-101D	Photocircuits	60.09	59.54	90.00	-29.91	100	2	NA	NA	3.21	56.33		3.56	55.98	
MW-2AD	August Thomsen	50.09	49.74	80.00	-29.91	104.5	2	Artesian	NM	+1.72	51.46	1.37	+1.18	50.92	0.83
MW-13PD	Pall Corp	54.55	54.33	85.00	-30.45	94.2	2	1.52	52.81	0.89	53.44		1.59	52.74	
04MW-102I	Pall Corp	57.81	57.49	89.00	-31.19	100	2	NA	NA	2.50	54.99		2.85	54.64	
MW-6PD	Pall Corp	56.95	56.67	90.00	-33.05	100.2	2	2.40	54.27	1.76	54.91		2.49	54.18	
MW-12PD	Pall Corp	51.73	51.51	85.00	-33.27	100.2	2	Artesian	NM	+0.46	51.97	0.24	0.06	51.45	
MW-5	Photocircuits	56.55	NS	90.00	-33.45	100.1	2	3.62	Not Surveyed	1.80	NA		1.72	NA	
MW-11PD	Pall Corp	51.45	51.51	85.00	-33.55	93.2	2	Artesian	NM	+1.24	52.75	1.30	+0.64	52.15	0.70
MW-1GD	Carney St WF	51.01	50.69	85.00	-33.99	94	2	at the cap		Slight artesian	50.70	-0.31	0.10	50.59	
MW-15PCD	Off Site	55.48	55.22	90.00	-34.52	85	2	1.65	53.57	Not measured	NA		Not measured	NA	
MW-1PD	Pall Corp	55.05	54.79	90.00	-34.95	97.6	2	2.01	52.78	1.49	53.30		2.07	52.72	
MW-10PD	Pall Corp	51.58	51.17	90.00	-38.42	99.2	2	top of PVC	51.17	+0.41	51.58	0.00	+0.01	51.18	-0.40
MW-4PD	Pall Corp	52.32	52.16	91.00	-38.68	101.4	2	0.42	51.74	0.02	52.14		0.55	51.61	
MW-5PD	Pall Corp	50.96	50.73	90.00	-39.04	98.38	2	Artesian	NM	+1.43	52.16	1.20	+0.81	51.54	0.58
MW-2GD	Carney St WF	48.22	47.93	90.00	-41.78	NR	2	Artesian	NM	+3.28	51.21	2.99	+3.86	51.79	3.57
GC-3M	Public - Offsite	51.73	51.53	94.00	-42.27	114	4	2.53	49.00	2.04	49.49		2.51	49.02	
01MW-104D	Photocircuits	59.34	59.08	110.00	-50.66	132.5	2	NA	NA	3.24	55.84		3.86	55.22	
04MW-6PD2	Pall Corp	56.71	56.42	116.00	-59.29	126	2	NA	NA	1.29	55.13		1.99	54.43	
MW-10	Photocircuits	55.57	56.96	115.00	-59.43	132	4	3.36	53.60	2.85	54.11		3.41	53.55	

Table 3-5
Groundwater Elevation Data Used in Groundwater Contour Maps
July 2007, April 2008, and October 2008 Measurements

Well Designation	Site	Ground Elev	PVC Elev	DT Top Screen	Top Elev Screen	TWD (ft)	Diam (inches)	July 2007		April 2008			October 2008		
								DTW	GW ELEV	DTW	GW ELEV	Head	DTW	GW ELEV	Head
Deep Transitional Wells (see text)															
06MW-103I	Carney St WF	48.52	51.38	110.00	-61.48	122.0	2	NA	NA	0.26	51.12	2.60	0.86	50.52	
04MW-19PD2	Pall Corp	55.39	55.11	120.00	-64.61	130	2	NA	NA	1.02	54.09		1.62	53.49	
Very Deep (D2) Wells															
GC-11D	Public - Offsite		132.62		-77.18	237	4	80.48	52.14	Not included	NA		Not included	NA	
04MW-102D	Pall Corp	57.90	57.56	140.00	-82.10	150	2	NA	NA	2.42	55.14		3.55	54.01	
01MW-104D2	Photocircuits	59.49	59.21	150.00	-90.51	162.9	2	NA	NA	3.50	55.71		4.10	55.11	
04MW-4PD2	Pall Corp	52.38	52.06	145.00	-92.62	155	2	NA	NA	+0.62	52.68	0.30	0.00	52.06	
05MW-12PD2	August Thomsen	51.89	51.66	145.00	-93.11	155	2	NA	NA	+0.72	52.38	0.49	+0.07	51.73	-0.16
04MW-11PD2	Pall Corp	51.53	51.18	145.00	-93.47	152.6	2	NA	NA	+1.41	52.59	1.06	+1.46	52.64	1.11
05MW-2AD2	August Thomsen	50.25	50.05	145.00	-94.75	155	2	NA	NA	+1.71	51.76	1.51	+1.01	51.06	0.81
GC-5D	Public - Offsite	137.93	137.66	234.00	-96.07	263	4	90.00	47.66	Not included	NA		Not included	NA	
MW-8	Photocircuits	57.19	57.56	155.00	-97.81	NR	4	3.48	54.08	2.61	54.95		2.18	55.38	
06MW-103D	Carney St WF	48.59	51.34	150.00	-101.41	161.3	2	NA	NA	0.14	51.20	2.61	0.74	50.60	
MW-11	Photocircuits	55.78	57.00	160.00	-104.22	174	NR	3.51	53.49	3.05	53.95		3.58	53.42	
MW-GC2D	Public - Offsite	70.48	70.63	188.00	-117.52	211	4	16.35	54.28	15.67	54.96		16.62	54.01	
GC-3D	Public - Offsite	51.31	50.99	180.00	-128.69	203	4	0.75	50.24	0.22	50.77		0.72	50.27	
06MW-103D2	Carney St WF	48.66	51.2	202.00	-153.34	212	2	NA	NA	>+2.0	53.74		0.55	50.65	

Elevations in ft NGVD; as surveyed by YEC (2007).
October 2008 Depth to water for Sea Cliff Avenue Wells (MW-14PC and MW-16PC series) measurements taken at time of sample collection.
See RI text (chapter 5) for discussion of depth interval assignment. Deep Transitional Wells not used in contaminant concentration contour maps.
DTW = Depth to Water
TWD = Total Well Depth
Public - Offsite = Public Wellfield Monitoring Wells (installed by NCDOH and NCDPW)
Head = Artesian head

TABLE 4-1
Photocircuits/Pall Corp Deep Groundwater RI/FS
November 2007 Hydropunch Groundwater Data Sorted by Type - Photocircuits Source Area

Field Sample ID	NYSDEC	01HP1-06	01HP1-11	01HP1-16	01HP1-21	01HP1-26	01HP1-31	01HP1-36	01HP1-41	01HP1-46	01HP1-51	01HP1-56	01HP1-61	01HP1-66	01HP1-71	01HP1-76
Lab Sample ID	Class GA	F1652-02A/DL	F1652-01A/DL	F1651-20A/DL	F1651-19A/DL	F1651-18A/DL	F1651-17A/DL	F1651-16A/DL	F1651-15A/DL	F1651-14A/DL	F1651-13A/DL	F1651-12A/DL	F1651-11A/DL	F1651-10A/DL	F1651-09A/DL	F1651-08A/DL
Sample Date	Groundwater	11-07-07	11-07-07	11-07-07	11-07-07	11-07-07	11-07-07	11-07-07	11-07-07	11-07-07	11-07-07	11-07-07	11-07-07	11-07-07	11-06-07	11-06-07
Dilution Factor	Criterion	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Chlorinated Aliphatics																
Chloroethane	5	**35**	**38**	**38** D	**45** D	**55** DJ	**66** DJ	**94** DJ	**160** DJ	**200** DJ	**170** DJ	**150** DJ	**120** D	**140** D	**89** D	**77** DJ
Chloroform	7	ND	ND	ND	ND	0.31 J	0.66 J	0.91 J	1.2 J	1.2 J	1.2 J	1.2 J	0.54 J	0.30 J	0.82	0.70
Chloromethane	5	ND	ND	ND	ND	ND	ND	ND	0.22 J	ND	ND	ND	0.57 J	0.43 J	ND	ND
1,1-Dichloroethane	5	**590** D	**520** D	**1300** DJ	**970** DJ	**2500** DJ	**4400** DJ	**7700** DJ	**11000** DJ	**12000** DJ	**9700** DJ	**7300** DJ	**2600** DJ	**2700** DJ	**3800** DJ	**4300** DJ
1,2-Dichloroethane	0.6	ND	ND	ND	**2.0**	**5.2** J	**22** J	**36** J	**46** J	**48** J	**47** J	**41** J	**13** J	**12**	**30**	**30**
1,1-Dichloroethene	5	**110** D	**100** D	**160** D	**360** D	**1500** D	**2000** D	**3100** D	**4800** D	**5700** D	**5100** D	**6400** D	**850** D	**380** D	**1600** DJ	**1400** D
cis-1,2-Dichloroethene	5	**7.2**	**7**	**19**	**17**	**62** DJ	**79** DJ	**150** DJ	**140** DJ	**150** DJ	**150** DJ	**210** D	**320** D	**280** D	**700** DJ	**500** D
trans-1,2-Dichloroethene	5	0.59	0.65	0.49 J	ND	1 J	1.2 J	1.9 J	1.9 J	1.8 J	2.1 J	2.0 J	1.4 J	1.1	2.1	1.6
Methylene Chloride	5	2.4	1.8	**6.5**	**5.8**	**63** DJ	**130** D	**240** D	**390** D	**410** D	**310** D	**240** D	**30** J	**22**	**20**	**14**
Tetrachloroethene	5	**520** D	**400** D	**810** D	**1000** D	**1200** D	**1300** D	**1700** D	**1900** D	**2000** D	**2300** D	**2700** D	**1200** D	**470** D	**1500** DJ	**940** D
1,1,1-Trichloroethane	5	**150** D	**110** D	**240** D	**460** D	**1700** D	**2400** D	**4200** D	**7400** D	**8600** D	**8600** D	**13000** D	**570** D	**44** DJ	**1000** DJ	**610** D
1,1,2-Trichloroethane	1	ND	ND	0.69	0.61	**1.4** J	**5.9** J	**11** J	**14** J	**14** J	**13** J	**9.4** J	**1.3** J	**1.0**	**2.6**	**2.0**
Trichloroethene	5	**23**	**21**	**45** D	**55** D	**92** DJ	**97** DJ	**130** DJ	**140** DJ	**200** DJ	**210** D	**290** D	**360** D	**210** D	**2000** DJ	**670** D
Vinyl Chloride	2	**10**	**9.4**	**11**	**13**	**83** DJ	**130** D	**200** D	**320** D	**360** D	**310** D	**240** D	**76** D	**54** DJ	**260** DJ	**300** D
Total Chlorinated Aliphaptics		1413	1170	2593	2883	7208	10565	17469	26152	29484	26742	30432	6022	4174	10915	8768
Chlorofluorocarbons																
Dichlorodifluoromethane	5	0.51	0.55	0.73	0.61	ND	ND	ND	ND	ND	ND	0.30 J	ND	ND	0.38 J	0.42 J
Chlorinated Aromatics																
Chlorobenzene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.37 J	0.4 J
2-Chlorotoluene	5	5.0	**5.6**	**8.5**	**8.4**	**8.3** J	**11** J	**14** J	**12** J	**12** J	**13** J	**15** J	**5.8** J	1.9	**8.1**	**6.9**
4-Chlorotoluene	5	ND	0.39 J	0.52	0.53	0.6 J	0.84 J	0.99 J	0.96	0.88	0.99	1	0.34 J	ND	ND	0.2 J
1,2-Dichlorobenzene	3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.8	2.0
1,3-Dichlorobenzene	3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.36 J	0.42 J
1,4-Dichlorobenzene	3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.44 J	0.49 J
Total Chlorinated Aromatics		5.0	6.0	9.0	8.9	8.9	11.8	15.0	13.0	12.9	14.0	16	6.1	1.9	10.7	10.0
Aromatics																
Benzene	1	0.32 J	0.34 J	0.37 J	0.34 J	0.41 J	0.47 J	0.58 J	0.63 J	0.64 J	0.63 J	0.59 J	0.37 J	0.45 J	0.43 J	0.44 J
n-Butylbenzene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.34 J	0.32 J
sec-Butylbenzene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.3 J	0.26 J
Ethylbenzene	5	0.2 J	0.22 J	0.25 J	0.24 J	0.23 J	0.27 J	0.4 J	0.33 J	0.34 J	0.35 J	0.34 J	ND	ND	ND	ND
Toluene	5	0.5	0.47 J	0.9	0.86	1.2 J	1.5 J	2.1 J	2.2 J	2.4 J	2.5 J	1.8 J	0.66 J	0.79	0.31 J	0.32 J
1,2,4-Trimethylbenzene	5	0.3 J	0.35 J	0.47 J	0.43 J	0.31 J	0.51 J	0.7 J	0.59	0.55	0.61	0.8	0.29 J	ND	ND	ND
1,3,5-Trimethylbenzene	5	ND	ND	ND	ND	ND	ND	0.3 J	0.23 J	0.24 J	0.24 J	0.31 J	ND	ND	ND	ND
Xylene (Total)	5	1.0	1.1	1.3	1.3	1.2 J	1.6 J	2.2 J	1.9 J	2 J	1.9 J	1.9 J	0.7 J	0.6	0.64	0.66
Total Aromatics		3.3	3.5	4.6	4.4	4.6	5.9	8.5	7.8	8.2	8.2	7.7	2.7	2.4	2.7	2.7
Ketones																
Acetone	50	R	11 J	R	R	R	R	R	R	R	R	R	R	R	R	R
2-Butanone	50	R	R	15 J	R	R	R	R	R	25 J	32	R	R	**57** J	**130** J	**100** J
Other/Miscellaneous																
Carbon Disulfide	60	ND	ND	0.33 J	0.39 J	ND	0.76 J	0.77 J	0.71 J	0.88 J	0.88 J	0.79 J	1.3 J	3.4	2.0	2.5
Iodomethane	NC	ND	ND	ND	ND	ND	ND	ND	ND	0.26 J	0.2 J	ND	ND	ND	ND	ND
Methyl tert-butyl ether	10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.21 J	0.30 J
Naphthalene	10	ND	0.2 J	0.23 J	ND	ND	ND	0.23 J	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl acetate	NC	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.22 J

Data in ug/L
NC = No Criterion
ND = Not Detected
R = rejected (no usable data)

TABLE 4-1
Photocircuits/Pall Corp Deep Groundwater RI/FS
November 2007 Hydropunch Groundwater Data Sorted by Type - Photocircuits Source Area

Field Sample ID	NYSDEC	01HP1-81	01HP1-86	01HP1-91	01HP1-96	01HP1-101	01HP1-106	01HP2-30	01HP2-50	01HP2-70	01HP2-90	01HP2-110	01HP3-29	01HP3-49	01HP3-69	01HP3
Lab Sample ID	Class GA	F1651-07A/DL	F1651-05A/DL	F1651-04A/DL	F1651-03A/DL	F1651-02A/DL	F1651-01A/DL	F1652-08A/DL	F1652-07A/DL	F1652-06A	F1652-04A	F1652-03A	F1652-13A/DL	F1652-12A/DL	F1652-11A	F1652-
Sample Date	Groundwater	11-06-07	11-06-07	11-06-07	11-06-07	11-06-07	11-06-07	11-07-07	11-07-07	11-07-07	11-07-07	11-07-07	11-08-07	11-08-07	11-08-07	11-08-
Dilution Factor	Criterion	1	1	1	1	1	1	20	20	20	1	1	20	20	20	10
Chlorinated Aliphatics																
Chloroethane	5	4.1	1.5	0.55	1.6	0.76	4.2	**130**	**600**	**66**	ND	ND	**13** J	**45**	**34**	**16**
Chloroform	7	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloromethane	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	5	**240** DJ	**69** DJ	**31** J	**69** DJ	**42** DJ	**240** D	**1100**	**4400** D	**450**	1.1	2.9	**220**	**850**	**700**	**370**
1,2-Dichloroethane	0.6	**2**	0.44 J	ND	0.52	ND	**1.5**	ND	**19** J	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	5	**90** DJ	**20**	**11**	**30**	**23**	**78** DJ	**85**	**440**	**140**	0.73	1.3	**89**	**320**	**580**	**140**
cis-1,2-Dichloroethene	5	**31**	**7.2**	3.4	**8.5**	4.6	**24**	**590**	**3000** D	**910**	3.0	**9.4**	**2100** DJ	**12000** D	**19000** D	**260**
trans-1,2-Dichloroethene	5	ND	ND	ND	ND	ND	ND	**19** J	**160**	**17** J	ND	ND	**12** J	**36**	**57**	ND
Methylene Chloride	5	2.0	0.53	ND	0.72	0.30 J	1.8	**14** J	**45**	ND	ND	ND	ND	ND	**13** J	ND
Tetrachloroethene	5	**150** DJ	**66** D	**71** D	**95** D	**80** D	**150** DJ	**490**	**2900** D	**110**	2.7	2.9	**440**	**530**	**900**	**140**
1,1,1-Trichloroethane	5	**9.2**	1.6	1.3	4.5	3.2	**11**	**160**	**22**	**30**	0.25 J	0.99	**72**	**110**	**99**	**62**
1,1,2-Trichloroethane	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene	5	**48** DJ	**12**	**7.8**	**17**	**15**	**36**	**1700** D	**9800** D	**450**	3.2	**13**	**3300** DJ	**18000** D	**59000** D	**410**
Vinyl Chloride	2	**11**	**3.2**	1.6	**4.3**	**2.3**	**12**	**45**	**220**	**76**	ND	ND	**85**	**390**	**610**	**20**
Total Chlorinated Aliphaptics		583	180.0	127	229.5	170	554	4203	21006	2183	11	30	6318	32236	80959	1402
Chlorofluorocarbons																
Dichlorodifluoromethane	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorinated Aromatics																
Chlorobenzene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Chlorotoluene	5	0.71	0.42 J	0.35 J	0.59	0.52	0.92	ND	**46**	ND	ND	ND	ND	**32**	**58**	ND
4-Chlorotoluene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Total Chlorinated Aromatics		0.71	0.42	0.35	0.59	0.52	0.92	ND	46	ND	ND	ND	ND	32	58	ND
Aromatics																
Benzene	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
n-Butylbenzene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
sec-Butylbenzene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	5	0.35 J	ND	ND	0.26 J	ND	0.35 J	**15** J	**120**	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3,5-Trimethylbenzene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Xylene (Total)	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Total Aromatics		0.35	ND	ND	0.26	ND	0.35	15	120	ND	ND	ND	ND	ND	ND	ND
Ketones																
Acetone	50	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R
2-Butanone	50	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R
Other/Miscellaneous																
Carbon Disulfide	60	1.2	0.28 J	0.26 J	0.43 J	ND	0.46 J	ND	ND	ND	ND	0.36 J	ND	14 J	ND	8.1
Iodomethane	NC	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methyl tert-butyl ether	10	1.1	0.67	ND	ND	ND	0.21 J	ND	ND	ND	ND	0.49 J	ND	ND	ND	ND
Naphthalene	10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl acetate	NC	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Data in ug/L
NC = No Criterion
ND = Not Detected
R = rejected (no usable data)

TABLE 4-1
Photocircuits/Pall Corp Deep Groundwater RI/FS
November 2007 Hydropunch Groundwater Data Sorted by Type - Photocircuits Source Area

Field Sample ID	NYSDEC		01HP3-89					
Lab Sample ID	Class GA		F1652-10A					
Sample Date	Groundwater		11-08-07	Number of Data Points	Number of Detections	Number of GA Criteria Exceeds	Conc Max Detected Value	Location of Max Exceedance Sample
Dilution Factor	Criterion		1					
Chlorinated Aliphatics								
Chloroethane	5		ND	31	28	22	600	01-HP2-50
Chloroform	7		ND	31	11	0	1.2	
Chloromethane	5		ND	31	3	0	0.57	
1,1-Dichloroethane	5		**6.4**	31	31	29	12000	01-HP1-46
1,2-Dichloroethane	0.6		ND	31	17	15	48	01-HP1-46
1,1-Dichloroethene	5		0.97	31	31	28	6400	01-HP1-56
cis-1,2-Dichloroethene	5		**37**	31	31	29	19000	01-HP3-69
trans-1,2-Dichloroethene	5		ND	31	20	5	160	01-HP2-50
Methylene Chloride	5		ND	31	23	16	410	01-HP1-46
Tetrachloroethene	5		1.8	31	31	28	2900	01-HP2-50
1,1,1-Trichloroethane	5		ND	31	30	24	13000	01-HP1-56
1,1,2-Trichloroethane	1		ND	31	13	11	14	01-HP1-46
Trichloroethene	5		**23**	31	31	30	59000	01-HP3-69
Vinyl Chloride	2		1.9	31	29	27	610	01-HP3-69
Total Chlorinated Aliphaptics			71	31	31	27	80959	01-HP3-69
Chlorofluorocarbons								
Dichlorodifluoromethane	5		ND	31	7	0	0.73	
Chlorinated Aromatics								
Chlorobenzene	5		ND	31	2	0	0.40	
2-Chlorotoluene	5		0.27 J	31	25	16	58	01-HP3-69
4-Chlorotoluene	5		ND	31	12	0	1.0	
1,2-Dichlorobenzene	3		ND	31	2	0	2.0	
1,3-Dichlorobenzene	3		ND	31	2	0	0.42	
1,4-Dichlorobenzene	3		ND	31	2	0	0.49	
Total Chlorinated Aromatics			0.27	31	25	NA	58	01-HP3-69
Aromatics								
Benzene	1		ND	31	15	0	0.64	
n-Butylbenzene	5		ND	31	2	0	0.34	
sec-Butylbenzene	5		ND	31	2	0	0.30	
Ethylbenzene	5		ND	31	11	0	0.40	
Toluene	5		ND	31	20	2	120	01-HP2-50
1,2,4-Trimethylbenzene	5		ND	31	12	0	0.80	
1,3,5-Trimethylbenzene	5		ND	31	5	0	0.31	
Xylene (Total)	5		ND	31	15	0	2.2	
Total Aromatics			ND	31	20	2	120	01-HP2-50
Ketones								
Acetone	50		R	1	1	0	11	
2-Butanone	50		R	6	6	3	130	01-HP1-71
Other/Miscellaneous								
Carbon Disulfide	60	J	1.3	31	21	0	14	
Iodomethane	NC		ND	31	2	0	0.26	
Methyl tert-butyl ether	10		ND	31	6	0	1.1	
Naphthalene	10		ND	31	3	0	0.23	
Vinyl acetate	NC		ND	31	1	0	0.22	

Data in ug/L
NC = No Criterion
ND = Not Detected
R = rejected (no usable data)

Table 4-2
Photocircuits/Pall Corp RI - Round 1 Groundwater Data

Well ID		01-MW-101S	01-MW-101D	01-MW-104S	01-MW-104I	01-MW-104D	01MW-104D2	MW-8	MW-9	MW-10	MW-11	MW-12	MW-13
Lab ID		G0487-01A	G0487-02A	G0487-03A	G0487-05A	G0487-04A	G0593-14A	G0593-08A	G0487-08A	G0487-09A	G0487-07A	G0593-07A	G0593-11A
Depth (ft bgs)	NYSDEC	50-60	90-100	50-60	70-80	110-120	150-160	155-170	10-25	115-130	160-175	40-50	40-50
Depth class	Class GA	I	D	I	D	D	D2	D2	S	D	D	I	I
Site Location	Groundwater	Photocircuits	Photocircuits	Photocircuits	Photocircuits	Photocircuits	Photocircuits	Photocircuits	Photocircuits	Photocircuits	Photocircuits	Photocircuits	Photocircuits
Date Sampled	Criterion	4/10/2008	4/10/2008	4/10/2008	4/10/2008	4/10/2008	4/25/2008	4/24/2008	4/11/2008	4/11/2008	4/11/2008	4/24/2008	4/24/2008
Chlorinated Aliphatics													
Chloroethane	5	ND	ND	**38 J**	**19 J**	ND	ND	R	ND	ND	ND	ND	**130 J**
Chloroform	7	ND	ND	**1 J**	**0.7 J**	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	5	ND	ND	**560 D**	**290 D**	ND	ND	ND	**13**	**5.5 J**	ND	**640**	**590 D**
1,2-Dichloroethane	0.6	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	5	ND	ND	**65 J**	**160 J**	ND	ND	ND	ND	ND	ND	ND	**240 D**
cis-1,2-Dichloroethene	5	ND	ND	**83 J**	**190 J**	ND	ND	ND	**50**	**12 J**	ND	**120 J**	**1500 D**
trans-1,2-Dichloroethene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methylene chloride	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	5	ND	ND	**36 J**	**170 J**	ND	ND	ND	**5.1**	ND	ND	ND	**1500 D**
1,1,1-Trichloroethane	5	ND	ND	**79 J**	**46 J**	ND	ND	ND	ND	ND	ND	ND	**310 D**
1,1,2-Trichloroethane	1	ND	ND	**1 J**	**1 J**	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene	5	ND	ND	**21 J**	**320 D**	ND	ND	ND	**29**	ND	ND	**58 J**	**10000 D**
Vinyl chloride	2	ND	ND	**29 J**	**41 J**	ND	ND	ND	ND	ND	ND	**46 J**	**300 DJ**
Total Chlorinated Aliphatics		ND	ND	**913 J**	**1238 J**	ND	ND	ND	**97**	**18 J**	ND	**864**	**14570**
Freons													
Dichlorodifluoromethane	5	ND	ND	ND	ND	ND	R	R	ND	ND	ND	ND	R
Freon TICs	NA												
Total Freons	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aromatic VOCs													
Benzene	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**15**
n-Propylbenzene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Xylene (Total)	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Total Aromatic VOCs		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**15**
Methyl tert-butyl ether	10	ND	ND	ND	ND	**2 J**	ND	ND	ND	**3.3**	ND	ND	ND
Halogenated Aromatics													
Chlorobenzene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Chlorotoluene	5	ND	ND	**1.5 J**	ND	ND	ND	ND	ND	ND	ND	**2000**	**38**
4-Chlorotoluene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**30**	ND
1,2-Dichlorobenzene	3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,3-Trichlorobenzene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Total Halogenated Aromatics	NA	ND	ND	**1.5**	ND	ND	ND	ND	ND	ND	ND	**2030**	**38**
Ketones													
2-Butanone	50	R	R	R	R	R	R	R	R	R	R	R	R
Acetone	50	R	R	R	R	R	R	R	R	R	R	R	R
Other													
Carbon disulfide	60	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Number of TICs		0	0	0	0	0	0	0	0	0	0	**3**	**1**
Total TIC concentration		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**460 J**	**11 J**

GC=Glen Cove Carney St WF
OS = Off Site
R = Rejected (no usable data)
ND = Not Detected

Table 4-2
Photocircuits/Pall Corp RI - Round 1 Groundwater Data

Well ID	MW-14	04MW-102S	04MW-102I	04MW-102D	MW-1PI	MW-1PD	MW-2A	MW-2AI	MW-2AD	05MW-2AD2	MW-4P	MW-4PI	MW-4PD
Lab ID	G0593-13A	G0523-15A	G0523-16A	G0523-17A	G0536-16A	G0536-17A	G0562-17A	G0562-15A	G0562-16A	G0562-14A	G0562-04A	G0562-03A	G0562-01A
Depth (ft bgs)	35-45	50-60	89-99	140-150	41-51	90-100	3-13	40-50	80-90	145-155	13-23	45-51	91-101
Depth class	I	I	D	D2	I	D	S	I	D	D2	S	I	D
Site Location	Photocircuits	PALL	PALL	PALL	PALL	PALL	AT	AT	AT	AT	PALL	PALL	PALL
Date Sampled	4/25/2008	4/16/2008	4/16/2008	4/16/2008	4/18/2008	4/18/2008	4/22/2008	4/22/2008	4/22/2008	4/22/2008	4/21/2008	4/21/2008	4/21/2008
Chlorinated Aliphatics													
Chloroethane	**6700 D**	**11**	**3.4**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	**5700 D**	**330 D**	**330 D**	ND	**6.8**	**13**	**39 J**	**21 J**	ND	ND	**49 J**	**20 J**	**360 DJ**
1,2-Dichloroethane	**6**	**53**	**15**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	**61**	**110 J**	**60 J**	ND	ND	**3.8**	**8.8 J**	**8.4 J**	ND	ND	**9 J**	**5.1 J**	**150 J**
cis-1,2-Dichloroethene	ND	**5500 D**	**1900 D**	**0.6 J**	**64**	**130**	**160**	**270 D**	**1.9 J**	ND	**510 DJ**	**170 J**	**3000 DJ**
trans-1,2-Dichloroethene	ND	**18**	**21**	ND	ND	ND	ND	**1.2**	ND	ND	**4.3**	**1.2**	**20**
1,2-Dichloropropane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methylene chloride	**7.7**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**2.3 J**
Tetrachloroethene	**8.1**	**54**	**65**	ND	**13**	**11**	**270 DJ**	**8.2 J**	**14 J**	ND	**420 DJ**	**930 DJ**	**130 J**
1,1,1-Trichloroethane	**430 D**	ND	**0.6 J**	ND	ND	ND		**1.9 J**	ND	ND	**0.8 J**	**1.6 J**	**96 J**
1,1,2-Trichloroethane	ND	ND	**0.5 J**	ND	ND	ND	ND	ND	ND	ND	ND	ND	**1.4**
Trichloroethene	**13**	**230 D**	**230 D**	ND	**49**	**94**	**67**	**220 DJ**	**2.7**	ND	**300 D**	**70**	**2800 D**
Vinyl chloride	**160 J**	**210 D**	**91**	ND	ND	ND	ND	ND	ND	ND	**13 J**	ND	**97 J**
Total Chlorinated Aliphatics	**13086**	**6516**	**2717**	**0.6 J**	**133**	**252**	**545**	**531**	**19**	ND	**1306**	**1198**	**6657**
Freons													
Dichlorodifluoromethane	R	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Freon TICs												**47 NJ**	
Total Freons	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**47 NJ**	ND
Aromatic VOCs													
Benzene	**2.2**	**13**	**11**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
n-Propylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	**99**	**3.1**	**1.2**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene	**2.7 J**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Xylene (Total)	**2.3 J**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Total Aromatic VOCs	**106.2**	**16.1**	**12.2**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methyl tert-butyl ether	ND	ND	ND	ND	ND	ND	**1.1**	**1.1**	ND	ND	**1.8**	**0.9 J**	**1.4**
Halogenated Aromatics													
Chlorobenzene	ND	ND	**0.7 J**	ND	ND	ND	ND	ND	ND	ND	ND	ND	U
2-Chlorotoluene	**16**	**1.4**	**9.1**	ND	ND	ND	ND	ND	ND	ND	ND	ND	**2.2**
4-Chlorotoluene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	ND	ND	**0.7 J**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,3-Trichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Total Halogenated Aromatics	**16**	**1.4**	**10.5**	ND	ND	ND	ND	ND	ND	ND	ND	ND	**2.2**
Ketones													
2-Butanone	**99 J**	R	R	R	R	R	R	R	R	R	R	R	R
Acetone	R	R	R	R	R	R	R	R	R	R	R	R	R
Other													
Carbon disulfide	ND	ND	**0.7 J**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Number of TICs	**9**	0	0	0	0	0	0	0	0	0	0	0	0
Total TIC concentration	**200 J**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

GC=Glen Cove Carney St WF
OS = Off Site
R = Rejected (no usable data)
ND = Not Detected

Table 4-2
Photocircuits/Pall Corp RI - Round 1 Groundwater Data

Well ID	04MW-4PD2	MW-5P	MW-5PI	MW-5PD	MW-6P	MW-6PD	04MW-6PD2	MW-7P	MW-8PS	MW-8PI	MW-10PS	MW-10PI	MW-10PD
Lab ID	G0562-02A	G0562-11A	G0562-13A	G0562-12A	G0523-21A	G0523-19A	G0523-18A	G0523-20A	G0536-05A	G0536-07A	G0593-04A	G0593-02A	G0593-03A
Depth (ft bgs)	145-155	3-13	40-50	90-100	50-60	90-100	116-126	3-18	5-15	40-50	3-13	40-50	90-100
Depth class	D2	S	I	D	I	D	D	S	S	I	S	I	D
Site Location	PALL	PALL	PALL	PALL	PALL	PALL	PALL	PALL	PALL	PALL	PALL	PALL	PALL
Date Sampled	4/21/2008	4/22/2008	4/22/2008	4/22/2008	4/16/2008	4/16/2008	4/16/2008	4/16/2008	4/17/2008	4/17/2008	4/23/2008	4/23/2008	4/23/2008
Chlorinated Aliphatics													
Chloroethane	ND	ND	ND	ND	ND	ND	**1.2**	ND	ND	ND	R	R	R
Chloroform	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	ND	**3.4 J**	**6.4 J**	**100 J**	**270 D**	**33**	**50**	**0.9 J**	ND	**57**	**3.8**	**46**	**39**
1,2-Dichloroethane	ND	ND	ND	ND	**36**	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	ND	ND	**1.1 J**	**110 J**	**96 J**	**16 J**	**56 J**	ND	ND	**29**	ND	**21**	**26**
cis-1,2-Dichloroethene	ND	**68 J**	**41 J**	**540 J**	**1400 D**	**500 D**	**26**	**4.9**	**1.4**	**320 D**	**380 D**	**230**	**120**
trans-1,2-Dichloroethene	ND	ND	ND	**9**	**10**	**2.2**	ND	ND	ND	**3.1**	**3.3**	ND	ND
1,2-Dichloropropane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methylene chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	ND	**2.4 J**	**5.5 J**	**52 J**	**110**	**28**	**26**	**1.5**	ND	**23**	**13**	**100**	**15**
1,1,1-Trichloroethane	ND	ND	ND	**110 J**	ND	ND	**76**	**0.6 J**	ND	**6.2**	ND	**4.8**	**30**
1,1,2-Trichloroethane	ND	ND	ND	ND	**1.8**	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene	ND	**3.9 J**	**18 J**	**770 J**	**220 D**	**320 D**	**53**	**4**	ND	**140**	**20**	**130**	**270**
Vinyl chloride	ND	ND	ND	**20 J**	**20**	**2.8**	**3.6**	ND	ND	**3.8**	**40 J**	**3.2 J**	ND
Total Chlorinated Aliphatics	ND	**78**	**72**	**1711**	**2164**	**902**	**292**	**12**	**1.4**	**582**	**460**	**535**	**500**
Freons													
Dichlorodifluoromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**81 J**	R	R
Freon TICs											**60 NJ**		
Total Freons	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**141 J**	ND	ND
Aromatic VOCs													
Benzene	ND	ND	ND	ND	**2.2**	ND	ND	**0.6 J**	ND	ND	ND	ND	ND
n-Propylbenzene	ND	ND	ND	ND	ND	ND	ND	**0.6 J**	ND	ND	ND	ND	ND
Toluene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Xylene (Total)	ND	ND	ND	ND	ND	ND	ND	**1**	ND	ND	ND	ND	ND
Total Aromatic VOCs	ND	ND	ND	ND	**2.2**	ND	ND	**2.2 J**	ND	ND	ND	ND	ND
Methyl tert-butyl ether	ND	**1.7**	**1.7**	ND	ND	ND	**0.7 J**	**6 J**	**2.3**	ND	**2.8 J**	**24 J**	ND
Halogenated Aromatics													
Chlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Chlorotoluene	ND	ND	ND	ND	**1.3**	ND	ND	ND	ND	ND	ND	ND	ND
4-Chlorotoluene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,3-Trichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Total Halogenated Aromatics	ND	ND	ND	ND	**1.3**	ND	ND	ND	ND	ND	ND	ND	ND
Ketones													
2-Butanone	R	R	R	R	R	R	R	R	R	R	R	R	R
Acetone	R	R	R	R	R	R	R	R	R	R	R	R	R
Other													
Carbon disulfide	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Number of TICs	0	0	0	0	0	0	0	**9**	0	0	**2**	0	0
Total TIC concentration	ND	ND	ND	ND	ND	ND	ND	**134 J**	ND	ND	**60 NJ**	ND	ND

GC=Glen Cove Carney St WF
OS = Off Site
R = Rejected (no usable data)
ND = Not Detected

Table 4-2
Photocircuits/Pall Corp RI - Round 1 Groundwater Data

Well ID	MW-11PS	MW-11PI	MW-11 PD	04MW-11PD2	MW-12PS	MW-12PI	MW-12PD	05MW-12PD2	MW-13PS	MW13PI	MW-13PD	MW-17PS	MW-17PI
Lab ID	G0536-18A	G0536-19A	G0593-01A	G0593-12A	G0562-05A	G0562-07A	G0562-08A	G0562-06A	G0536-13A	G0536-15A	G0536-12A	G0536-08A	G0536-06A
Depth (ft bgs)	5-15	40-50	85-95	145-155	5-15	40-50	85-95	145-155	5-15	40-50	85-95	15-30	37-57
Depth class	S	I	D	D2	S	I	D	D2	S	I	D	S	I
Site Location	PALL	PALL	PALL	PALL	PALL/AT	PALL/AT	PALL/AT	PALL/AT	PALL	PALL	PALL	PALL	PALL
Date Sampled	4/18/2008	4/18/2008	4/23/2008	4/24/2008	4/21/2008	4/21/2008	4/21/2008	4/21/2008	4/18/2008	4/18/2008	4/17/2008	4/17/2008	4/17/2008
Chlorinated Aliphatics													
Chloroethane	ND	ND	R	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	**1**	**48**	**740**	ND	**65 J**	ND	**54 J**	ND	ND	**51**	**520 D**	ND	**81**
1,2-Dichloroethane	ND	**1.6**	ND	ND	ND	ND	ND	ND	ND	**13**	ND	ND	**13**
1,1-Dichloroethene	ND	**5.6 J**	**780**	ND	**15 J**	ND	**17 J**	ND	ND	**18**	**310 D**	ND	**18**
cis-1,2-Dichloroethene	**6.4**	**210 D**	**4400**	ND	**72 J**	**61**	**470 DJ**	ND	ND	**480 D**	**5600 D**	ND	**820 D**
trans-1,2-Dichloroethene	ND	**2.8**	ND	ND	ND	ND	**1.9**	ND	ND	**3.8**	**23**	ND	**7.9**
1,2-Dichloropropane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methylene chloride	ND	ND	**51 J**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	**1.0 J**	**70**	**280**	ND	**12 J**	**1000 J**	**4.9 J**	ND	ND	**29**	**240 D**	ND	**48**
1,1,1-Trichloroethane	ND	**1.3**	**760**	ND	ND	ND	**16 J**	ND	ND	**1.1**	**230 D**	ND	**3.9**
1,1,2-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	**1.6**	**3**	ND	**2.1**
Trichloroethene	**2.2**	**220 D**	**6100**	ND	**16 J**	**100**	**200 J**	ND	ND	**110**	**4900 D**	ND	**130**
Vinyl chloride	**6.4**	ND	**360 J**	ND	**6.1 J**	ND	ND	ND	ND	**10**	**170**	ND	**6.5**
Total Chlorinated Aliphatics	**17**	**559**	**13471**	ND	**186**	**1161**	**764**	ND	ND	**718**	**11996**	ND	**1130**
Freons													
Dichlorodifluoromethane	ND	ND	R	R	**7.8 J**	ND	ND	ND	ND	ND	ND	ND	ND
Freon TICs													
Total Freons	ND	ND	ND	ND	**7.8 J**	ND	ND	ND	ND	ND	ND	ND	ND
Aromatic VOCs													
Benzene	ND	**0.7 J**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**1.3**
n-Propylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Xylene (Total)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Total Aromatic VOCs	ND	**0.7 J**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**1.3**
Methyl tert-butyl ether	ND	**4.8**	ND	ND	**2.1**	ND	**4.2**	ND	ND	**50**	ND	**45**	**18**
Halogenated Aromatics													
Chlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Chlorotoluene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**4.2**	ND	ND
4-Chlorotoluene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,3-Trichlorobenzene	ND	ND	ND	ND	**1.1**	ND	ND	ND	ND	ND	ND	ND	ND
Total Halogenated Aromatics	ND	ND	ND	ND	1.1	ND	ND	ND	ND	ND	**4.2**	ND	ND
Ketones													
2-Butanone	R	R	R	R	R	R	R	R	R	R	R	R	R
Acetone	R	R	R	R	R	R	R	R	R	R	R	R	R
Other													
Carbon disulfide	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Number of TICs	0	0	0	0	0	0	0	0	0	**1**	0	0	0
Total TIC concentration	ND	ND	ND	ND	ND	ND	ND	ND	ND	**5.4 J**	ND	ND	ND

GC=Glen Cove Carney St WF
OS = Off Site
R = Rejected (no usable data)
ND = Not Detected

Table 4-2
Photocircuits/Pall Corp RI - Round 1 Groundwater Data

Well ID	MW-18PS	MW-18PI	04MW-19PD2	MW-19PS	MW-19PI	MW-1GS	MW-1GI	MW-2GS	MW-2GI	MW-2GD	GC-3S	GC-3M	GC-3D
Lab ID	G0536-02A	G0536-04A	G0536-11A	G0536-01A	G0536-03A	G0523-13A	G0523-14A	G0523-07A	G0523-05A	G0523-08A	G0523-11A	G0523-12A	G0523-10A
Depth (ft bgs)	15-30	37-57	120-130	15-30	37-57	5-15	40-50	5-15	40-50	90-100	4-24	94-114	180-200
Depth class	S	I	D/D2	S	I	S	I	S	I	D	S	D	D2
Site Location	PALL	PALL	PALL	PALL	PALL	GC	GC	GC	GC	GC	GC	GC	GC
Date Sampled	4/17/2008	4/14/2008	4/17/2008	4/17/2008	4/17/2008	4/15/2008	4/15/2008	4/15/2008	4/14/2008	4/15/2008	4/15/2008	4/15/2008	4/15/2008
Chlorinated Aliphatics													
Chloroethane	ND	ND	ND	ND	ND	ND	ND	ND	**5.2**	ND	**3.3**	ND	ND
Chloroform	ND	ND	ND	**1.3**	**1**	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	ND	**190**	**4.7**	**12**	**19**	**6.2**	**4.4**	**13**	**300 D**	**6.4**	**61**	ND	ND
1,2-Dichloroethane	ND	**32**	ND	ND	ND	ND	ND	ND	**3.8**	ND	ND	ND	ND
1,1-Dichloroethene	ND	**37**	ND	**2.1**	**6.6**	**16 J**	**3.9 J**	**4.7**	**300 DJ**	**5.7 J**	**39**	ND	ND
cis-1,2-Dichloroethene	**1.8**	**490 D**	**47**	**15**	**250 D**	**12**	**3.4**	**490 D**	**1600 D**	**37**	**37**	ND	ND
trans-1,2-Dichloroethene	ND	**9.5**	ND	ND	**1.2**	ND	ND	**4.4**	**7.9**	ND	ND	ND	ND
1,2-Dichloropropane	ND	ND	ND	ND	ND	**4.1**	ND	ND	ND	ND	ND	ND	ND
Methylene chloride	ND	ND	ND	ND	ND	ND	ND	ND	**4.2**	ND	ND	ND	ND
Tetrachloroethene	ND	**60**	**1.9**	**1.4**	**17**	**4.9**	**350 D**	**23**	**170**	**4.4**	**53**	ND	ND
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	**1.3**	**2.7**	ND	**170**	**4.4**	**39**	ND	ND
1,1,2-Trichloroethane	ND	**2**	ND	ND	ND	ND	ND	ND	**1.2**	ND	ND	ND	ND
Trichloroethene	ND	**120**	**21**	**1.9**	**110**	**12**	**3.8**	**36**	**2900 D**	**62**	**60**	ND	ND
Vinyl chloride	ND	**16 J**	ND	ND	ND	ND	ND	**110 J**	ND	ND	**5.3 J**	ND	ND
Total Chlorinated Aliphatics	**1.8**	**957**	**75**	**34**	**405**	**57**	**368**	**681**	**5462**	**120**	**298**	ND	ND
Freons													
Dichlorodifluoromethane	ND	R	ND	ND	ND	ND	ND	**160 J**	R	ND	R	R	R
Freon TICs													
Total Freons	ND	ND	ND	ND	ND	ND	ND	**160 J**	ND	ND	ND	ND	ND
Aromatic VOCs													
Benzene	ND	**1.5**	ND	ND	ND	**0.8 J**	ND	ND	ND	ND	ND	ND	ND
n-Propylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Xylene (Total)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Total Aromatic VOCs	ND	**1.5**	ND	ND	ND	**0.8 J**	ND	ND	ND	ND	ND	ND	ND
Methyl tert-butyl ether	**210 D**	ND	ND	**1.3**	ND	**140**	**1.2**	ND	**1.8**	ND	**1.6**	ND	ND
Halogenated Aromatics													
Chlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Chlorotoluene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Chlorotoluene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,3-Trichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Total Halogenated Aromatics	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ketones													
2-Butanone	R	R	R	R	R	R	R	R	R	R	R	R	R
Acetone	**19 J**	R	R	R	R	R	R	R	R	R	R	R	R
Other													
Carbon disulfide	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Number of TICs	0	0	0	0	0	**1**	0	**1**	0	0	0	0	0
Total TIC concentration	ND	ND	ND	ND	ND	**6.2 J**	ND	**19 J**	ND	ND	ND	ND	ND

GC=Glen Cove Carney St WF
OS = Off Site
R = Rejected (no usable data)
ND = Not Detected

Table 4-2
Photocircuits/Pall Corp RI - Round 1 Groundwater Data

Well ID	06-MW-103S	06-MW-103I	06-MW-103D	06-MW-103D2	MW-GC2S	MW-GC2D
Lab ID	G0523-02A	G0523-01A	G0523-04A	G0523-03A	G0593-09A	G0593-10A
Depth (ft bgs)	70-80	110-120	150-160	202-212	19-39	188-208
Depth class	D	D/D2	D2	D2	S	D2
Site Location	GC	GC	GC	GC	OS	OS
Date Sampled	4/14/2008	4/14/2008	4/14/2008	4/14/2008	4/24/2008	4/24/2008
Chlorinated Aliphatics						
Chloroethane	ND	ND	ND	ND	R	R
Chloroform	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	**7.6**	ND	ND	ND	ND	ND
1,2-Dichloroethane	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	**8.6**	ND	ND	ND	ND	ND
cis-1,2-Dichloroethene	**66**	ND	**5**	**2.6**	ND	ND
trans-1,2-Dichloroethene	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane	ND	ND	ND	ND	ND	ND
Methylene chloride	ND	ND	ND	ND	ND	ND
Tetrachloroethene	**4.3**	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	**6.7**	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	ND	ND	ND	ND	ND	ND
Trichloroethene	**73**	ND	**5.9**	**3.3**	ND	ND
Vinyl chloride	ND	ND	ND	ND	ND	ND
Total Chlorinated Aliphatics	**166**	ND	**10.9**	**5.9**	ND	ND
Freons						
Dichlorodifluoromethane	ND	R	R	ND	R	R
Freon TICs						
Total Freons	ND	ND	ND	ND	ND	ND
Aromatic VOCs						
Benzene	ND	ND	ND	ND	ND	ND
n-Propylbenzene	ND	ND	ND	ND	ND	ND
Toluene	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene	ND	ND	ND	ND	ND	ND
Xylene (Total)	ND	ND	ND	ND	ND	ND
Total Aromatic VOCs	ND	ND	ND	ND	ND	ND
Methyl tert-butyl ether	ND	ND	ND	ND	ND	ND
Halogenated Aromatics						
Chlorobenzene	ND	ND	ND	ND	ND	ND
2-Chlorotoluene	ND	ND	ND	ND	ND	ND
4-Chlorotoluene	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	ND	ND	ND	ND	ND	ND
1,2,3-Trichlorobenzene	ND	ND	ND	ND	ND	ND
Total Halogenated Aromatics	ND	ND	ND	ND	ND	ND
Ketones						
2-Butanone	R	R	R	R	R	R
Acetone	R	R	R	R	R	R
Other						
Carbon disulfide	ND	ND	ND	ND	ND	ND
Number of TICs	0	0	0	0	0	0
Total TIC concentration	ND	ND	ND	ND	ND	ND

GC=Glen Cove Carney St WF
OS = Off Site
R = Rejected (no usable data)
ND = Not Detected

Table 4-3
Round 2 (October/November 2008) Goundwater Data
Detected VOCs by Contaminant Type

Field ID	NYSDEC	01MW-101S	01MW-101D	01MW-104S	01MW-104I	01MW-104D	01MW-104D2	MW-3S	MW-4S	MW-8	MW-9	MW-10	MW-11	MW-12
Lab ID	Class GA	G1805-02A	G1805-01A	G1906-17A	G1955-01A	G1906-20A	G1906-19A	AAL0806346-10A	AAL0806346-09A	G1805-07A	G1805-04A	G1805-05A	G1805-03A	G1805-08A
Sample Date	Groundwater	10/14/2008	10/14/2008	10/27/2008	10/27/2008	10/27/2008	10/27/2008	6/27/2008	6/27/2008	10/14/2008	10/14/2008	10/14/2008	10/14/2008	10/14/2008
Site	Criteria	Photocircuits	Photocircuits	Photocircuits	Photocircuits	Photocircuits	Photocircuits	P & S	P & S	Photocircuits	Photocircuits	Photocircuits	Photocircuits	Photocircuits
Screen Interval (ft bgs)	(µg/L)	50-60	90-100	50-60	70-80	110-120	150-160	10-20	14-24	155-170	10-25	115-130	160-175	40-50
Depth Class		I	D	I	D	D	D2	S	S	D2	S	D	D2	I
Chlorinated Aliphatics														
Chloroethane	5	ND	ND	**65**	1.5	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	7	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	5	ND	ND	**1800**	**32**	ND	ND	ND	ND	ND	**34**	ND	ND	**530** D
1,2-Dichloroethane	0.6	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**6.3**
1,1-Dichloroethene	5	ND	ND	**560**	**14**	ND	ND	ND	ND	ND	**7.2**	ND	ND	**6**
cis-1,2-Dichloroethene	5	ND	ND	**100**	**29**	ND	ND	**10**	1.2	2.8	**120**	3.1	ND	**190**
trans-1,2-Dichloroethene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**8.9**
Methylene chloride	5	ND	ND	**24**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	5	ND	ND	**150**	**11**	ND	ND	**21**	**55**	ND	**6.3**	ND	ND	ND
1,1,1-Trichloroethane	5	ND	ND	**1000**	4.1	ND	ND	ND	**51**	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**1.2**
Trichloroethene	5	ND	ND	**140**	**51**	ND	ND	**410**	3.5	2.7	**50**	1	ND	**110**
Vinyl chloride	2	ND	ND	**92**	**2.6**	ND	ND	ND	ND	ND	**8**	ND	ND	**88**
Total Chlorinated Aliphatics		ND	ND	**3931**	**145**	ND	ND	**441**	**111**	**5.5**	**226**	**4.1**	ND	**940**
Chlorofluorocarbons														
Dichlorodifluoromethane	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichlorotrifluoroethane	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Total Chlorofluorocarbons		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorinated Aromatics														
2-Chlorotoluene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**2100** D
4-Chlorotoluene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**32**
1,2-Dichlorobenzene	3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.2
Total Chlorinated Aromatics		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**2133**
Aromatics														
Benzene	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**8**
Isopropylbenzene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**7.3**
1,2,4-Trimethylbenzene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Xylene (Total)	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	3.6
Total Aromatics		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**18.9**
Ketones														
Acetone	50	R	R	R	R	R	R	ND	ND	R	R	R	R	R
2-Butanone	50	R	R	R	R	R	R	ND	ND	R	R	R	R	R
2-Hexanone	50	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Other/Miscellaneous														
Methyl tert-butyl ether	10	ND	ND	ND	ND	1.2	ND	ND	ND	ND	1.3	1.7	ND	ND
Naphthalene	10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

ND = Not Detected
R = Rejected (no usable data)
MW-3S & 4S from AAL; not validated
D/D2 = Deep transitional. See RI Ch 6
Glen Cove = Carney St. Wellfield area
P&S = Pass & Seymour

Table 4-3
Round 2 (October/November 2008) Goundwater Data
Detected VOCs by Contaminant Type

Field ID	NYSDEC	MW-13	MW-14	MW-14PCS	MW-14PCI	MW-14PCD	MW-16PCI	MW-16PCD	04MW-102S	04MW-102I	04MW-102D	MW-1 PI	MW-1PD	MW4 PS
Lab ID	Class GA	G1955-05A	G1955-02A	G1831-05A	G1831-04A	G1831-03A	G1831-01A	G1831-02A	G1805-10A	G1831-07A	G1805-11A	G1875-04A	G1875-03A	G1875-05A
Sample Date	Groundwater	10/27/2008	10/27/2008	10/16/2008	10/16/2008	10/16/2008	10/16/2008	10/16/2008	10/15/2008	10/16/2008	10/15/2008	10/20/2008	10/20/2008	10/20/2008
Site	Criteria	Photocircuits	Photocircuits	Sea Cliff Ave	Sea Cliff Ave	Sea Cliff Ave	Sea Cliff Ave	Sea Cliff Ave	Pall	Pall	Pall	Pall	Pall	Pall
Screen Interval (ft bgs)	(µg/L)	40-50	40-45	10-23	37-56	85-95	40-50	85-95	50-60	89-99	140-150	40-50	90-100	13-23
Depth Class		I	I	S	I	D	I	D	I	D	D	I	D	S
Chlorinated Aliphatics														
Chloroethane	5	**99**	**3300** D	ND	ND	ND	ND	ND	**6.2**	ND	ND	ND	ND	ND
Chloroform	7	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	5	**960** D	**3200** D	**90**	**530** D	**140**	4.1	ND	**310** D	**310** D	ND	**6**	**10**	**33**
1,2-Dichloroethane	0.6	**3.6**	ND	ND	ND	ND	ND	ND	**57**	ND	ND	ND	ND	ND
1,1-Dichloroethene	5	**230** EJ	**170**	**13**	**7.6**	**15**	ND	ND	**89**	**18**	ND	ND	2.5	**7.1**
cis-1,2-Dichloroethene	5	**2400** D	ND	**540** D	**1200** D	**1800** D	**37**	2.8	**4600** D	**1500** D	ND	**55**	**110**	**140**
trans-1,2-Dichloroethene	5	**13**	ND	**5.6**	**15**	**11**	ND	ND	**17**	**14**	ND	ND	ND	ND
Methylene chloride	5	2.9	4.7	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	5	**930** D	**10**	**34**	**5.4**	**30**	2.2	1.9	**49**	**29**	ND	**12**	**8**	**42**
1,1,1-Trichloroethane	5	**250** D	**2000** D	**7.1**	ND	ND	ND	ND	1.3	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene	5	**9300** D	**16**	**97**	**53**	**250** D	**26**	3.7	**230** D	**190** D	ND	**44**	**70**	**110**
Vinyl chloride	2	**210** EJ	**77**	**7.2**	**1200** D	**64**	1.3	ND	**180**	**3**	ND	ND	ND	**5.3**
Total Chlorinated Aliphatics		**14399**	**8778**	**794**	**3011**	**2310**	**70.6**	**8**	**5533**	**2064**	ND	**117**	**201**	**337**
Chlorofluorocarbons														
Dichlorodifluoromethane	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.3
1,1,2-Trichlorotrifluoroethane	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**160** J
Total Chlorofluorocarbons		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**162**
Chlorinated Aromatics														
2-Chlorotoluene	5	**32**	**15**	**12**	**1400** D	**7.7**	ND	ND	**18**	**6.3**	ND	ND	ND	ND
4-Chlorotoluene	5	ND	1.1	ND	**27**	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	3	ND	ND	ND	1.2	ND	ND	ND	ND	ND	ND	ND	ND	ND
Total Chlorinated Aromatics		**32**	**16.1**	**12**	**1428**	**7.7**	ND	ND	**18**	**6.3**	ND	ND	ND	ND
Aromatics														
Benzene	1	**13**	**1.3**	**1.1**	**12**	**3.5**	ND	ND	**11**	**3.7**	ND	ND	ND	ND
Isopropylbenzene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	5	ND	**67**	ND	**6.8**	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene	5	ND	2.6	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Xylene (Total)	5	ND	3.7	ND	**9.9**	ND	ND	ND	ND	ND	ND	ND	ND	ND
Total Aromatics		**13**	**74.6**	**1.1**	**28.7**	**3.5**	ND	ND	**11**	**3.7**	ND	ND	ND	ND
Ketones														
Acetone	50	R	R	R	R	R	R	R	R	R	R	R	R	R
2-Butanone	50	R	**100** J	R	R	R	R	R	R	R	R	R	R	R
2-Hexanone	50	ND	6.5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Other/Miscellaneous														
Methyl tert-butyl ether	10	ND	ND	ND	ND	ND	ND	9.6	ND	ND	ND	ND	ND	2
Naphthalene	10	ND	1.7	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

ND = Not Detected
R = Rejected (no usable data)
MW-3S & 4S from AAL; not validated
D/D2 = Deep transitional. See RI Ch 6
Glen Cove = Carney St. Wellfield area
P&S = Pass & Seymour

Table 4-3
Round 2 (October/November 2008) Goundwater Data
Detected VOCs by Contaminant Type

Field ID	NYSDEC	MW-4PI	MW-4PD	04MW-4PD2	MW-5P	MW-5PI	MW-5PD	MW-6P	MW-6PD	MW-6PD2	MW-7P	MW-8PS	MW-8PI	MW-10PS
Lab ID	Class GA	G1875-10A	G1875-14A	G1875-11A	G1875-16A	G1875-18A	G1875-15A	G1831-08A	G1831-13A	G1831-11A	G1805-12A	G1805-13A	G1805-15A	G1805-17A
Sample Date	Groundwater	10/21/2008	10/21/2008	10/21/2008	10/22/2008	10/22/2008	10/22/2008	10/16/2008	10/17/2008	10/17/2008	10/15/2008	10/15/2008	10/15/2008	10/15/2008
Site	Criteria	Pall	Pall	Pall	Pall	Pall	Pall	Pall	Pall	Pall	Pall	Pall	Pall	Pall
Screen Interval (ft bgs)	(µg/L)	45-51	91-101	145-155	3-13	40-50	90-100	50-60	90-100	116-126	3-18	5-15	40-50	3-13
Depth Class		I	D	D2	S	I	D	I	D	D	S	S	I	S
Chlorinated Aliphatics														
Chloroethane	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	7	ND	ND	ND	ND	ND	1.1	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	5	**22**	**330** D	ND	2.9	3	**120**	**260** D	**44**	**67**	1.7	ND	**56**	3.7
1,2-Dichloroethane	0.6	ND	**4.6**	ND	ND	ND	ND	**46**	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	5	**5.4**	**170** DJ	ND	ND	ND	**190**	**79**	**19**	**47**	1.2	ND	**30**	1.2
cis-1,2-Dichloroethene	5	**130**	**2400** D	ND	**62**	**12**	**620** D	**1400** D	**550** D	**13**	**9.5**	**5.1**	**320**	**210** D
trans-1,2-Dichloroethene	5	ND	**11**	ND	ND	ND	1.5	**10**	2.5	ND	ND	ND	2.2	1.8
Methylene chloride	5	ND	4.5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	5	**2000** D	**150**	ND	1.7	1.9	**51**	**94**	**31**	**23**	1.5	ND	**19**	**11**
1,1,1-Trichloroethane	5	4.6	**160** D	ND	ND	ND	**170**	1.2	4	**55**	ND	ND	5	ND
1,1,2-Trichloroethane	1	ND	**1.4**	ND	ND	ND	ND	**2.1**	ND	ND	ND	ND	ND	ND
Trichloroethene	5	**100**	**2100** D	ND	4.5	4	**870** D	**250** D	**360** D	**27**	**5.7**	ND	**150**	**15**
Vinyl chloride	2	ND	**93**	ND	ND	ND	**24**	**16**	**3.6**	**3.6**	ND	ND	**3.2**	**19**
Total Chlorinated Aliphatics		**2262**	**5425**	ND	**71**	**21**	**2048**	**2158**	**1014**	**236**	**19.6**	**5.1**	**585**	**262**
Chlorofluorocarbons														
Dichlorodifluoromethane	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**9.7**
1,1,2-Trichlorotrifluoroethane	5	**130** J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**11**
Total Chlorofluorocarbons		**130**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**20.7**
Chlorinated Aromatics														
2-Chlorotoluene	5	ND	2.4	ND	ND	ND	2.1	1.5	ND	ND	ND	ND	2.2	ND
4-Chlorotoluene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Total Chlorinated Aromatics		ND	**2.4**	ND	ND	ND	**2.1**	**1.5**	ND	ND	ND	ND	**2.2**	ND
Aromatics														
Benzene	1	ND	ND	ND	ND	ND	ND	**2.4**	ND	ND	ND	ND	ND	ND
Isopropylbenzene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.1	ND	ND	ND
Toluene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Xylene (Total)	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Total Aromatics		ND	ND	ND	ND	ND	ND	**2.4**	ND	ND	**1.1**	ND	ND	ND
Ketones														
Acetone	50	R	R	R	R	R	R	49 J	R	R	R	6.5 J	R	R
2-Butanone	50	R	R	R	R	R	R	R	R	R	R	R	R	R
2-Hexanone	50	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Other/Miscellaneous														
Methyl tert-butyl ether	10	ND	3	ND	7.6	**14**	ND	ND	ND	ND	10	3.7	ND	**11**
Naphthalene	10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

ND = Not Detected
R = Rejected (no usable data)
MW-3S & 4S from AAL; not validated
D/D2 = Deep transitional. See RI Ch 6
Glen Cove = Carney St. Wellfield area
P&S = Pass & Seymour

Table 4-3
Round 2 (October/November 2008) Goundwater Data
Detected VOCs by Contaminant Type

Field ID	NYSDEC	MW-10P1	MW-10PD	MW-11PS	MW-11PI	MW-11PD	04MW-11PD2	MW-12PS	MW-12PI	MW-12PD	05MW-12PD2	MW-13PS	MW-13PI	MW-13PD	MW-17PS
Lab ID	Class GA	G1805-18A	G1875-17A	G1875-19A	G1906-14A	G1875-20A	G1906-13A	G1875-06A	G1831-18A	G1875-09A	G1875-07A	G1805-14A	G1875-02A	G1875-01A	G1831-16A
Sample Date	Groundwater	10/15/2008	10/22/2008	10/22/2008	10/24/2008	10/22/2008	10/24/2008	10/21/2008	10/21/2008	10/21/2008	10/21/2008	10/15/2008	10/20/2008	10/20/2008	10/17/2008
Site	Criteria	Pall	Pall	Pall	Pall	Pall	Pall	Pall	Pall	Pall	Pall	Pall	Pall	Pall	Pall
Screen Interval (ft bgs)	(µg/L)	40-50	90-100	5-15	40-50	85-95	145-155	5-15	40-50	85-95	145-155	5-15	40-50	85-95	15-30
Depth Class		I	D	S	I	D	D2	S	I	D	D2	S	I	D	S
Chlorinated Aliphatics															
Chloroethane	5	ND	ND	ND	**16**	**19**	ND	ND	ND	ND	ND	ND	ND	**12**	ND
Chloroform	7	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	5	**66**	**13**	1.2	**570** D	**610** D	ND	**57**	**12**	**54**	ND	ND	**62**	**680** D	ND
1,2-Dichloroethane	0.6	ND	ND	ND	**7.7**	**7.9**	ND	ND	ND	ND	ND	ND	**15**	**9.1**	ND
1,1-Dichloroethene	5	**22**	**11**	ND	**550** D	**540** D	ND	**13**	2.5	**35**	ND	ND	**20**	**420** D	ND
cis-1,2-Dichloroethene	5	**290** D	**47**	4.2	**3600** D	**4200** D	ND	**71**	**71**	**310** D	ND	ND	**550** D	**5900** D	ND
trans-1,2-Dichloroethene	5	2.3	ND	ND	**15**	**18**	ND	ND	ND	1.7	ND	ND	4	**20**	ND
Methylene chloride	5	ND	ND	ND	**34**	**35**	ND	ND	ND	ND	ND	ND	ND	**5.9**	ND
Tetrachloroethene	5	**110**	**6.1**	1.3	**230** D	**240** D	ND	**9.4**	**1000** D	**19**	ND	ND	**31**	**280** D	ND
1,1,1-Trichloroethane	5	4.4	**10**	ND	**510** D	**500** D	ND	ND	ND	**34**	ND	ND	2.2	**350** D	ND
1,1,2-Trichloroethane	1	ND	ND	ND	**2.6**	**3.1**	ND	ND	ND	ND	ND	ND	**1.8**	**2.9**	ND
Trichloroethene	5	**190**	**84**	1.7	**4700** D	**5300** D	ND	**16**	**130**	**280** D	ND	ND	**150**	**5300** D	ND
Vinyl chloride	2	**4.5**	ND	**4.6**	**210** DJ	**230** D	ND	**8.6**	**2.3**	ND	ND	ND	**8.2**	**160**	ND
Total Chlorinated Aliphatics		**689**	**171**	**13**	**10445**	**11703**	ND	**175**	**1218**	**734**	ND	ND	**844**	**13128**	ND
Chlorofluorocarbons															
Dichlorodifluoromethane	5	ND	ND	ND	ND	ND	ND	**7**	**55** J	ND	ND	ND	ND	ND	ND
1,1,2-Trichlorotrifluoroethane	5	ND	ND	ND	ND	3.2 J	ND	**240** DJ	**230** DJ	ND	ND	ND	ND	ND	ND
Total Chlorofluorocarbons		ND	ND	ND	ND	**3.2**	ND	**247**	**285**	ND	ND	ND	ND	ND	ND
Chlorinated Aromatics															
2-Chlorotoluene	5	ND	ND	ND	**15**	**16**	ND	ND	ND	ND	ND	ND	ND	4.6	ND
4-Chlorotoluene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Total Chlorinated Aromatics		ND	ND	ND	**15**	**16**	ND	ND	ND	ND	ND	ND	**ND**	**4.6**	ND
Aromatics															
Benzene	1	ND	ND	ND	**4**	**4.4**	ND	ND	ND	ND	ND	ND	ND	ND	ND
Isopropylbenzene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Xylene (Total)	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Total Aromatics		ND	ND	ND	**4**	**4.4**	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ketones															
Acetone	50	R	R	R	R	R	R	R	12 J	R	R	R	R	R	8.2 J
2-Butanone	50	R	R	R	R	R	R	R	R	R	R	R	R	R	R
2-Hexanone	50	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Other/Miscellaneous															
Methyl tert-butyl ether	10	8.8	ND	ND	ND	ND	ND	2.1	ND	6.1	ND	ND	**25**	ND	**29**
Naphthalene	10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

ND = Not Detected
R = Rejected (no usable data)
MW-3S & 4S from AAL; not validated
D/D2 = Deep transitional. See RI Ch 6
Glen Cove = Carney St. Wellfield area
P&S = Pass & Seymour

Table 4-3
Round 2 (October/November 2008) Goundwater Data
Detected VOCs by Contaminant Type

Field ID	NYSDEC	MW-17PI	MW18-PS	MW-18PI	MW-19PS	MW-19PI	04MW-19PD2	MW-2A	MW-2AI	MW-2AD	05MW-2AD2	MW-1GS	MW-1GI	MW-1GD
Lab ID	Class GA	G1831-14A	G1831-12A	G1831-10A	G1831-19A	G1831-20A	G1831-15A	G1906-08A	G1906-10A	G1906-11A	G1906-09A	G1906-02A	G1906-01A	G1906-04A
Sample Date	Groundwater	10/17/2008	10/17/2008	10/17/2008	10/20/2008	10/20/2008	10/17/2008	10/24/2008	10/24/2008	10/24/2008	10/24/2008	10/23/2008	10/23/2008	10/23/2008
Site	Criteria	Pall	Pall	Pall	Pall	Pall	Pall	AT	AT	AT	AT	Glen Cove	Glen Cove	Glen Cove
Screen Interval (ft bgs)	(µg/L)	37-57	15-30	37-57	15-30	37-56	120-130	3-13	40-50	80-90	145-155	5-15	40-50	85-95
Depth Class		I	S	I	S	I	D/D2	S	I	D	D2	S	I	D
Chlorinated Aliphatics														
Chloroethane	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	7	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	5	**87**	**6.6**	**200** D	**51**	**19**	**22**	**34**	**20**	3.1	ND	**8.1**	2	2
1,2-Dichloroethane	0.6	**14**	ND	**40**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	5	**22**	2.9	**40**	**11**	**7.8**	**6.1**	**8.4**	**6.9**	1.7	ND	**14**	ND	ND
cis-1,2-Dichloroethene	5	**890** D	**31**	**750** D	**100**	**210** D	**44**	**160**	**240** D	**13**	ND	**15**	2	2.7
trans-1,2-Dichloroethene	5	**7.8**	ND	**9.1**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methylene chloride	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	5	**44**	3.3	**62**	2.6	**14**	**9.1**	**860** D	**7.2**	1.3	ND	**7.3**	**170**	**6**
1,1,1-Trichloroethane	5	3.7	ND	1.7	ND	ND	3.2	1.4	1.1	1.9	ND	2.1	1.1	ND
1,1,2-Trichloroethane	1	**2.1**	ND	**2.4**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene	5	**140**	**12**	**140**	**8.3**	**110**	**22**	**82**	**150**	**28**	ND	**14**	2.5	3.2
Vinyl chloride	2	**7.5**	ND	**12**	**2.4**	ND	ND	**3**	ND	ND	ND	ND	ND	ND
Total Chlorinated Aliphatics		**1218**	**56**	**1257**	**175**	**361**	**106**	**1149**	**425**	**49**	ND	**61**	**178**	**14**
Chlorofluorocarbons														
Dichlorodifluoromethane	5	ND	ND	ND	ND	1.6	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichlorotrifluoroethane	5	ND	ND	ND	ND	ND	ND	**81** J	ND	ND	ND	ND	ND	ND
Total Chlorofluorocarbons		ND	ND	ND	ND	**1.6**	ND	**81**	ND	ND	ND	ND	ND	ND
Chlorinated Aromatics														
2-Chlorotoluene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Chlorotoluene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Total Chlorinated Aromatics		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aromatics														
Benzene	1	**1.2**	ND	**1.6**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Isopropylbenzene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Xylene (Total)	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Total Aromatics		**1.2**	ND	**1.6**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ketones														
Acetone	50	R	R	12 J	34 J	R	R	R	R	R	R	R	R	R
2-Butanone	50	R	R	R	R	R	R	R	R	R	R	R	R	R
2-Hexanone	50	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Other/Miscellaneous														
Methyl tert-butyl ether	10	**11**	**180** DJ	ND	2.3	ND	ND	2.3	1.1	2.2	ND	**86**	1.4	ND
Naphthalene	10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

ND = Not Detected
R = Rejected (no usable data)
MW-3S & 4S from AAL; not validated
D/D2 = Deep transitional. See RI Ch 6
Glen Cove = Carney St. Wellfield area
P&S = Pass & Seymour

Table 4-3
Round 2 (October/November 2008) Goundwater Data
Detected VOCs by Contaminant Type

Field ID	NYSDEC	GC-3S	GC-3M	GC-3D	MW-GC 2S	MW-GC 2D	06MW-103S	06MW-103 I	06MW-103D	06MW-103D2
Lab ID	Class GA	G1906-06A	G1906-03A	G1906-07A	G1955-03A	G1955-04A	G1955-06A	G2172-02A	G2172-01A	G1955-07A
Sample Date	Groundwater	10/23/2008	10/23/2008	10/23/2008	10/27/2008	10/27/2008	10/28/2008	11/18/2008	11/18/2008	10/28/2008
Site	Criteria	Glen Cove	Glen Cove	Glen Cove	OffSite	OffSite	Glen Cove	Glen Cove	Glen Cove	Glen Cove
Screen Interval (ft bgs)	(µg/L)	4-24	94-114	180-200	19-39	190-210	70-80	110-120	150-160	202-212
Depth Class		S	D	D2	S	D	D	D/D2	D2	D2
Chlorinated Aliphatics										
Chloroethane	5	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	7	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	5	**56**	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	0.6	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	5	**26**	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,2-Dichloroethene	5	**35**	ND	ND	ND	ND	2.3	ND	ND	ND
trans-1,2-Dichloroethene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methylene chloride	5	1.6	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	5	**40**	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	5	**29**	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	1	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene	5	**64**	ND	ND	ND	ND	3.5	ND	ND	1.8
Vinyl chloride	2	**3**	ND	ND	ND	ND	ND	ND	ND	ND
Total Chlorinated Aliphatics		**255**	ND	ND	ND	ND	**6**	ND	ND	**2**
Chlorofluorocarbons										
Dichlorodifluoromethane	5	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichlorotrifluoroethane	5	ND	ND	ND	ND	ND	ND	ND	ND	ND
Total Chlorofluorocarbons		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorinated Aromatics										
2-Chlorotoluene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Chlorotoluene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	3	ND	ND	ND	ND	ND	ND	ND	ND	ND
Total Chlorinated Aromatics		ND	ND	ND	ND	ND	ND	ND	ND	ND
Aromatics										
Benzene	1	ND	ND	ND	ND	ND	ND	ND	ND	ND
Isopropylbenzene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND
Xylene (Total)	5	ND	ND	ND	ND	ND	ND	ND	ND	ND
Total Aromatics		ND	ND	ND	ND	ND	ND	ND	ND	ND
Ketones										
Acetone	50	R	R	R	R	R	R	R	R	R
2-Butanone	50	R	R	R	R	R	R	R	R	R
2-Hexanone	50	ND	ND	ND	ND	ND	ND	ND	ND	ND
Other/Miscellaneous										
Methyl tert-butyl ether	10	1.2	ND	ND	ND	ND	ND	ND	ND	ND
Naphthalene	10	ND	ND	ND	ND	ND	ND	ND	ND	ND

ND = Not Detected
R = Rejected (no usable data)
MW-3S & 4S from AAL; not validated
D/D2 = Deep transitional. See RI Ch 6
Glen Cove = Carney St. Wellfield area
P&S = Pass & Seymour

Table 5-1
Photocircuits/Pall Corp OU2 RI/FS
Contaminated Area and Volume Estimates

Site	Area		Water Column	Volume			Effective	Pore Volume
(Property Name)	Sq Ft	Acres	(OU2; ft thick)	Cu ft	Gal	Million Gal	**Porosity**	MG
Photocircuits - adjusted	142,262	3.3	95	13,514,852	101,091,093	101.09	0.3	30.3
Sea Cliff Ave (Street ROW)	26,695	0.6	95	2,536,025	18,969,467	18.97	0.3	5.7
Pall Corp	172,230	4.0	95	16,361,850	122,386,638	122.39	0.3	36.7
August Thomsen	54,430	1.2	95	5,170,850	38,677,958	38.68	0.3	11.6
Day Care & Carney Well Field	76,015	1.7	105	7,981,575	59,702,181	59.70	0.3	17.9
Total	471,632	10.8						**102.2**

See figure 28 for areas included in each site. Areas are approximate and do not necessarily follow legal property lines.
"Adjusted" Photocircuits area is northern 41.6 percent of area shown on figure; assumes southern part is uncontaminated.
Carney Street Wellfield assumed to include entire thickness of contaminated aquifer; area not addressed in OU1 ROD for Pall or Photocircuits.
Water-filled soil porosity 0.3; from USEPA (1996) Equation 10.

Assumptions:
OU1 - Depth up to (-10 ft amsl)
OU2 - Depth upto (-105 ft amsl, considering mid screen of all the deep or extra deep [D2] wells which are uncontaminated)
Thickness of OU2 = 95 ft
Cu. Ft/Gal = 7.48

Table 6-1
Chemical-Specific Values Used in Fate and Transport Calculations

CAS No.	Chemical	Org. Car. partition coefficient K_{oc} (cm^3/g)	Log K_{oc} (unitless)	Diffusivity in air D_a (cm^2/s)	Diffusivity in water D_w (cm^2/s)	Pure component water sol S (mg/L)	Henry's Law Constant H' (unitless)	Normal boiling point (bp) T_B (^oC)	Density (Specific Gravity) ρ (g/cm^3)
71432	Benzene	5.89E+01	1.77E+00	8.80E-02	9.80E-06	1.79E+03	2.27E-01	80.1	0.879
78933	2-Butanone (methyl ethyl ketone)	2.30E+00	3.62E-01	8.08E-02	9.80E-06	2.23E+05	2.29E-03	79.4	0.805
108907	Chlorobenzene	2.19E+02	2.34E+00	7.30E-02	8.70E-06	4.72E+02	1.51E-01	131.7	1.107
75003	Chloroethane (ethyl chloride)	4.40E+00	6.43E-01	2.71E-01	1.15E-05	5.68E+03	3.61E-01	12.2	[gas]
95498	2-Chlorotoluene	6.12E+02	2.79E+00	6.07E-02[d]	8.31E-06[d]	3.73E+02[e]	1.46E-01[e]	158.8	1.082
75718	Dichlorodifluoromethane (Freon 12)	4.57E+02	2.66E+00	6.65E-02	9.92E-06	2.80E+02	1.40E+01	-30.0	[gas]
75343	1,1-Dichloroethane	3.16E+01	1.50E+00	7.42E-02	1.05E-05	5.06E+03	2.30E-01	57.4	1.175
107062	1,2-Dichloroethane	1.74E+01	1.24E+00	1.04E-01	9.90E-06	8.52E+03	4.00E-02	83.5	1.256
75354	1,1-Dichloroethene	5.89E+01	1.77E+00	9.00E-02	1.04E-05	2.25E+03	1.07E+00	31.6	1.215
156592	1,2-Dichloroethene (cis)	3.55E+01	1.55E+00	7.36E-02	1.13E-05	3.50E+03	1.67E-01	60.5	1.284
156605	1,2-Dichloroethene (trans)	5.25E+01	1.72E+00	7.07E-02	1.19E-05	6.30E+03	3.84E-01	47.7	1.256
100414	Ethylbenzene	3.63E+02	2.56E+00	7.50E-02	7.80E-06	1.69E+02	3.22E-01	136.2	0.867
1634044	MTBE (methyl tert-butyl ether)	7.26E+00	8.61E-01	1.02E-01	1.05E-05	5.10E+04	2.56E-02	55.2	0.740
127184	Tetrachloroethene (PCE)	1.55E+02	2.19E+00	7.20E-02	8.20E-06	2.00E+02	7.53E-01	121.3	1.624
108883	Toluene	1.82E+02	2.26E+00	8.70E-02	8.60E-06	5.26E+02	2.72E-01	110.6	0.866
71556	1,1,1-Trichloroethane	1.10E+02	2.04E+00	7.80E-02	8.80E-06	1.33E+03	7.03E-01	74.1	1.325
79005	1,1,2-Trichloroethane	1.66E+02	2.22E+00	7.80E-02	8.80E-06	4.42E+03	3.73E-02	113.0	1.441
79016	Trichloroethene (TCE)	1.66E+02	2.22E+00	7.90E-02	9.10E-06	1.47E+03	4.21E-01	87.2	1.466
75694	Trichlorofluoromethane (Freon 11)	4.97E+02	2.70E+00	8.70E-02	9.70E-06	1.10E+03	3.97E+00	23.6	[gas]
76131	1,1,2-Trichlorotrifluoroethane (Freon 113)	1.11E+04	4.05E+00	7.80E-02	8.20E-06	1.70E+02	1.97E+01	47.6	1.42
75014	Vinyl chloride	1.86E+01	1.27E+00	1.06E-01	1.23E-05	8.80E+03	1.10E+00	-13.9	0.908
1330207	Xylenes (total)	3.86E+02	2.59E+00	7.80E-02	8.75E-06	1.75E+02	2.75E-01	140.7	0.870

Table adapted from NJDEP (2007; Table G-2)

NOTES

[d]Calculated using USEPA (2001b)

[e]From Hazardous Substances Databank (2004)

Table 6-2A
Groundwater Flow and Contaminant Migration
Shallow Aquifer (about 50 to 40 ft NGVD)

CONTAMINANT	SITE AREA	HORIZONTAL GRADIENT (ft/ft)	HYDRAULIC CONDUCTIVITY Cm/S	HYDRAULIC CONDUCTIVITY FT/DAY	EFFECTIVE POROSITY	GW FLOW (FT/DAY)	PARTITON K_{oc}	CARBON f_{oc}	DENSITY P_b	RETARDATION Rd	CONTAM TRANSPORT FT/DAY	CONTAM TRANSPORT FT/YEAR	Distance [1]	TIME[2] (YRS)
PCE	Photocirc	0.0130	8.73E-04	2.5	0.3	0.11	155	0.002	1.78	2.84	0.04	13.8	1320	84
	Sea Cliff	0.0150	8.73E-04	2.5	0.3	0.12	155	0.002	1.78	2.84	0.04	15.9	960	62
	Pall/August	0.0060	8.73E-04	2.5	0.3	0.05	155	0.002	1.78	2.84	0.02	6.4	650	42
	Carney	0.0250	8.73E-04	2.5	0.3	0.21	155	0.002	1.78	2.84	0.07	26.5	NA	NA
TCE	Photocirc	0.0130	8.73E-04	2.5	0.3	0.11	166	0.002	1.78	2.97	0.04	13.2	1320	88
	Sea Cliff	0.0150	8.73E-04	2.5	0.3	0.12	166	0.002	1.78	2.97	0.04	15.2	960	60
	Pall/August	0.0060	8.73E-04	2.5	0.3	0.05	166	0.002	1.78	2.97	0.02	6.1	650	38
	Carney	0.0250	8.73E-04	2.5	0.3	0.21	166	0.002	1.78	2.97	0.07	25.3	NA	NA
111-TCA	Photocirc	0.0130	8.73E-04	2.5	0.3	0.11	110	0.002	1.78	2.31	0.05	17.0	1320	69
	Sea Cliff	0.0150	8.73E-04	2.5	0.3	0.12	110	0.002	1.78	2.31	0.05	19.6	960	57
	Pall/August	0.0060	8.73E-04	2.5	0.3	0.05	110	0.002	1.78	2.31	0.02	7.8	650	46
	Carney	0.0250	8.73E-04	2.5	0.3	0.21	110	0.002	1.78	2.31	0.09	32.7	NA	NA
cis 12-DCE	Photocirc	0.0130	8.73E-04	2.5	0.3	0.11	355	0.002	1.78	5.21	0.02	7.5	1320	155
	Sea Cliff	0.0150	8.73E-04	2.5	0.3	0.12	355	0.002	1.78	5.21	0.02	8.7	960	70
	Pall/August	0.0060	8.73E-04	2.5	0.3	0.05	355	0.002	1.78	5.21	0.01	3.5	650	33
	Carney	0.0250	8.73E-04	2.5	0.3	0.21	355	0.002	1.78	5.21	0.04	14.4	NA	NA
11-DCA	Photocirc	0.0130	8.73E-04	2.5	0.3	0.11	31.6	0.002	1.78	1.37	0.08	28.5	1320	41
	Sea Cliff	0.0150	8.73E-04	2.5	0.3	0.12	31.6	0.002	1.78	1.37	0.09	32.8	960	29
	Pall/August	0.0060	8.73E-04	2.5	0.3	0.05	31.6	0.002	1.78	1.37	0.04	13.1	650	19
	Carney	0.0250	8.73E-04	2.5	0.3	0.21	31.6	0.002	1.78	1.37	0.15	54.7	NA	NA
VC	Photocirc	0.0130	8.73E-04	2.5	0.3	0.11	18.6	0.002	1.78	1.22	0.09	32.1	1320	36
	Sea Cliff	0.0150	8.73E-04	2.5	0.3	0.12	18.6	0.002	1.78	1.22	0.10	37.0	960	32
	Pall/August	0.0060	8.73E-04	2.5	0.3	0.05	18.6	0.002	1.78	1.22	0.04	14.8	650	30
	Carney	0.0250	8.73E-04	2.5	0.3	0.21	18.6	0.002	1.78	1.22	0.17	61.7	NA	NA
2-Chlorotoluene	Photocirc	0.0130	8.73E-04	2.5	0.3	0.11	612	0.002	1.78	8.26	0.01	4.7	1320	246
	Sea Cliff	0.0150	8.73E-04	2.5	0.3	0.12	612	0.002	1.78	8.26	0.01	5.5	960	172
	Pall/August	0.0060	8.73E-04	2.5	0.3	0.05	612	0.002	1.78	8.26	0.01	2.2	650	115
	Carney	0.0250	8.73E-04	2.5	0.3	0.21	612	0.002	1.78	8.26	0.02	9.1	NA	NA

1. Distance (in ft) between Carney St Wellfield and Photocircuits [contaminant source area (MW-7)], Sea Cliff Ave (at MW-15PCD) and center of Pall Corp property (MW-3P).
2. Estimated time required for the contaminant to reach Carney Street Wellfield area.
3. Fraction organic carbon (Foc) default value of 0.2% from USEPA Soil Screening Levels, Equation 10 (EPA/540/R-96/018; July 1996).
4. Koc values were obtained from www.state.nj.us/dep/srp/vaporintrusion.htm; see Table 6-1.
5. The hydraulic conductivity value was obtained from Jan, 2002 pump test data; see Table 6-2D.

Table 6-2B
Groundwater Flow and Contaminant Migration
Intermediate Zone (about +20 to -5 ft NGVD)

CONTAMINANT	SITE AREA	HORIZONTAL GRADIENT (ft/ft)	HYDRAULIC CONDUCTIVITY cm/S	HYDRAULIC CONDUCTIVITY FT/DAY	EFFECTIVE POROSITY	GW FLOW (FT/DAY)	PARTITON K_{oc}	CARBON f_{oc}	DENSITY P_b	RETARDATION Rd	CONTAM. TRANSPORT FT/DAY	CONTAM. TRANSPORT FT/YEAR	Distance [1]	TIME[2] (YRS)
PCE	Photocirc	0.0040	5.49E-04	1.6	0.3	0.02	155	0.002	1.78	2.84	0.0073	2.7	1320	440
	Sea Cliff	0.0040	5.49E-04	1.6	0.3	0.02	155	0.002	1.78	2.84	0.0073	2.7	960	323
	Pall/August	0.0080	5.49E-04	1.6	0.3	0.04	155	0.002	1.78	2.84	0.0146	5.3	650	221
	Carney	0.0020	5.49E-04	1.6	0.3	0.01	155	0.002	1.78	2.84	0.0037	1.3	NA	NA
TCE	Photocirc	0.0040	5.49E-04	1.6	0.3	0.02	166	0.002	1.78	2.97	0.0070	2.6	1320	460
	Sea Cliff	0.0040	5.49E-04	1.6	0.3	0.02	166	0.002	1.78	2.97	0.0070	2.6	960	314
	Pall/August	0.0080	5.49E-04	1.6	0.3	0.04	166	0.002	1.78	2.97	0.0140	5.1	650	201
	Carney	0.0020	5.49E-04	1.6	0.3	0.01	166	0.002	1.78	2.97	0.0035	1.3	NA	NA
111-TCA	Photocirc	0.0040	5.49E-04	1.6	0.3	0.02	110	0.002	1.78	2.31	0.0090	3.3	1320	357
	Sea Cliff	0.0040	5.49E-04	1.6	0.3	0.02	110	0.002	1.78	2.31	0.0090	3.3	960	296
	Pall/August	0.0080	5.49E-04	1.6	0.3	0.04	110	0.002	1.78	2.31	0.0180	6.6	650	234
	Carney	0.0020	5.49E-04	1.6	0.3	0.01	110	0.002	1.78	2.31	0.0045	1.6	NA	NA
cis 12-DCE	Photocirc	0.0040	5.49E-04	1.6	0.3	0.02	355	0.002	1.78	5.21	0.0040	1.5	1320	807
	Sea Cliff	0.0040	5.49E-04	1.6	0.3	0.02	355	0.002	1.78	5.21	0.0040	1.5	960	362
	Pall/August	0.0080	5.49E-04	1.6	0.3	0.04	355	0.002	1.78	5.21	0.0080	2.9	650	177
	Carney	0.0020	5.49E-04	1.6	0.3	0.01	355	0.002	1.78	5.21	0.0020	0.7	NA	NA
11-DCA	Photocirc	0.0040	5.49E-04	1.6	0.3	0.02	31.6	0.002	1.78	1.37	0.0151	5.5	1320	213
	Sea Cliff	0.0040	5.49E-04	1.6	0.3	0.02	31.6	0.002	1.78	1.37	0.0151	5.5	960	151
	Pall/August	0.0080	5.49E-04	1.6	0.3	0.04	31.6	0.002	1.78	1.37	0.0302	11.0	650	99
	Carney	0.0020	5.49E-04	1.6	0.3	0.01	31.6	0.002	1.78	1.37	0.0075	2.8	NA	NA
VC	Photocirc	0.0040	5.49E-04	1.6	0.3	0.02	18.6	0.002	1.78	1.22	0.0170	6.2	1320	189
	Sea Cliff	0.0040	5.49E-04	1.6	0.3	0.02	18.6	0.002	1.78	1.22	0.0170	6.2	960	170
	Pall/August	0.0080	5.49E-04	1.6	0.3	0.04	18.6	0.002	1.78	1.22	0.0340	12.4	650	150
	Carney	0.0020	5.49E-04	1.6	0.3	0.01	18.6	0.002	1.78	1.22	0.0085	3.1	NA	NA
2-Chlorotoluene	Photocirc	0.0040	5.49E-04	1.6	0.3	0.02	612	0.002	1.78	8.26	0.0025	0.9	1320	1280
	Sea Cliff	0.0040	5.49E-04	1.6	0.3	0.02	612	0.002	1.78	8.26	0.0025	0.9	960	897
	Pall/August	0.0080	5.49E-04	1.6	0.3	0.04	612	0.002	1.78	8.26	0.0050	1.8	650	567
	Carney	0.0020	5.49E-04	1.6	0.3	0.01	612	0.002	1.78	8.26	0.0013	0.5	NA	NA

1. Distance (in ft) between Carney St Wellfield and Photocircuits [contaminant source area (MW-7)], Sea Cliff Ave (at MW-15PCD), and center of Pall Corp property (MW-3P).
2. Estimated time required for the contaminant to reach Carney Street Wellfield area.
3. Fraction organic carbon (Foc) default value of 0.2% from USEPA Soil Screening Levels, Equation 10 (EPA/540/R-96/018; July 1996).
4. Koc values were obtained from www.state.nj.us/dep/srp/vaporintrusion.htm; see Table 6-1.
5. The hydraulic conductivity value was obtained from Jan, 2002 pump test data; see Table 6-2D.

Table 6-2C
Groundwater Flow and Contaminant Migration
Deep Aquifer (about -20 to -60 ft NGVD)

CONTAMINANT	SITE AREA	HORIZONTAL GRADIENT (ft/ft)	HYDRAULIC CONDUCTIVITY Cm/S	HYDRAULIC CONDUCTIVITY FT/DAY	EFFECTIVE POROSITY	GW FLOW (FT/DAY)	PARTITON K_{oc}	CARBON f_{oc}	DENSITY P_b	RETARDATION Rd	CONTAM. TRANSPORT FT/DAY	CONTAM. TRANSPORT FT/YEAR	Distance [1]	TIME[2] (YRS)
PCE	Photocirc	0.0030	3.43E-03	9.7	0.3	0.10	155	0.002	1.78	2.84	0.03	12.5	1320	84
	Sea Cliff	0.0030	3.43E-03	9.7	0.3	0.10	155	0.002	1.78	2.84	0.03	12.5	960	62
	Pall/August	0.0050	3.43E-03	9.7	0.3	0.16	155	0.002	1.78	2.84	0.06	20.8	650	42
	Carney	0.0040	3.43E-03	9.7	0.3	0.13	155	0.002	1.78	2.84	0.05	16.7	NA	NA
TCE	Photocirc	0.0030	3.43E-03	9.7	0.3	0.10	166	0.002	1.78	2.97	0.03	12.0	1320	88
	Sea Cliff	0.0030	3.43E-03	9.7	0.3	0.10	166	0.002	1.78	2.97	0.03	12.0	960	61
	Pall/August	0.0050	3.43E-03	9.7	0.3	0.16	166	0.002	1.78	2.97	0.05	19.9	650	39
	Carney	0.0040	3.43E-03	9.7	0.3	0.13	166	0.002	1.78	2.97	0.04	15.9	NA	NA
111-TCA	Photocirc	0.0030	3.43E-03	9.7	0.3	0.10	110	0.002	1.78	2.31	0.04	15.4	1320	69
	Sea Cliff	0.0030	3.43E-03	9.7	0.3	0.10	110	0.002	1.78	2.31	0.04	15.4	960	56
	Pall/August	0.0050	3.43E-03	9.7	0.3	0.16	110	0.002	1.78	2.31	0.07	25.7	650	43
	Carney	0.0040	3.43E-03	9.7	0.3	0.13	110	0.002	1.78	2.31	0.06	20.5	NA	NA
cis 12-DCE	Photocirc	0.0030	3.43E-03	9.7	0.3	0.10	355	0.002	1.78	5.21	0.02	6.8	1320	155
	Sea Cliff	0.0030	3.43E-03	9.7	0.3	0.10	355	0.002	1.78	5.21	0.02	6.8	960	72
	Pall/August	0.0050	3.43E-03	9.7	0.3	0.16	355	0.002	1.78	5.21	0.03	11.3	650	36
	Carney	0.0040	3.43E-03	9.7	0.3	0.13	355	0.002	1.78	5.21	0.02	9.1	NA	NA
11-DCA	Photocirc	0.0030	3.43E-03	9.7	0.3	0.10	31.6	0.002	1.78	1.37	0.07	25.8	1320	41
	Sea Cliff	0.0030	3.43E-03	9.7	0.3	0.10	31.6	0.002	1.78	1.37	0.07	25.8	960	29
	Pall/August	0.0050	3.43E-03	9.7	0.3	0.16	31.6	0.002	1.78	1.37	0.12	43.0	650	19
	Carney	0.0040	3.43E-03	9.7	0.3	0.13	31.6	0.002	1.78	1.37	0.09	34.4	NA	NA
VC	Photocirc	0.0030	3.43E-03	9.7	0.3	0.10	18.6	0.002	1.78	1.22	0.08	29.1	1320	36
	Sea Cliff	0.0030	3.43E-03	9.7	0.3	0.10	18.6	0.002	1.78	1.22	0.08	29.1	960	32
	Pall/August	0.0050	3.43E-03	9.7	0.3	0.16	18.6	0.002	1.78	1.22	0.13	48.5	650	27
	Carney	0.0040	3.43E-03	9.7	0.3	0.13	18.6	0.002	1.78	1.22	0.11	38.8	NA	NA
2-Chlorotoluene	Photocirc	0.0030	3.43E-03	9.7	0.3	0.10	612	0.002	1.78	8.26	0.01	4.3	1320	246
	Sea Cliff	0.0030	3.43E-03	9.7	0.3	0.10	612	0.002	1.78	8.26	0.01	4.3	960	168
	Pall/August	0.0050	3.43E-03	9.7	0.3	0.16	612	0.002	1.78	8.26	0.02	7.2	650	101
	Carney	0.0040	3.43E-03	9.7	0.3	0.13	612	0.002	1.78	8.26	0.02	5.7	NA	NA

1. Distance (in ft) between Carney St Wellfield and Photocircuits [contaminant source area (MW-7)], Sea Cliff Ave (at MW-15PCD), and center of Pall Corp property (MW-3P).
2. Estimated time required for the contaminant to reach Carney Street Wellfield area.
3. Fraction organic carbon (Foc) default value of 0.2% from USEPA Soil Screening Levels, Equation 10 (EPA/540/R-96/018; July 1996).
4. Koc values were obtained from www.state.nj.us/dep/srp/vaporintrusion.htm; see Table 6-1.
5. The hydraulic conductivity value was obtained from Jan, 2002 pump test data; see Table 6-2D.

Table 6-2D
Hydraulic Conductivity Values Used In Fate and Transport Calculations
Derived From 2002 B

Well ID	Top Screen Elev (ft NGVD)	K value	
		cm/sec	ft/day
MW-8	-97.81	8.39E-03	23.8
MW-9	45.46	8.73E-04	2.5
MW-10	-59.43	3.43E-03	9.7
MW-11	-104.22	3.29E-02	93.3
MW-12	18.16	1.04E-03	2.9
MW-13	19.59	5.81E-05	0.2

Zone	Approx Elev (ft NGVD)	K value (average)	
		cm/sec	ft/day
Shallow	50 to 40	8.73E-04	2.5
Intermediate	20 to 5	5.49E-04	1.6
Deep	-20 to -60	3.43E-03	9.7
Very Deep	-80 to -150	0.020645	58.5

Conversion cm/sec to ft/day

cm/sec * 1 ft/30.48 cm * (60 * 60 * 24) sec/day

2385 ft/day per cm/sec

Table 7-1
Data Set Assessment - Round 1 Data

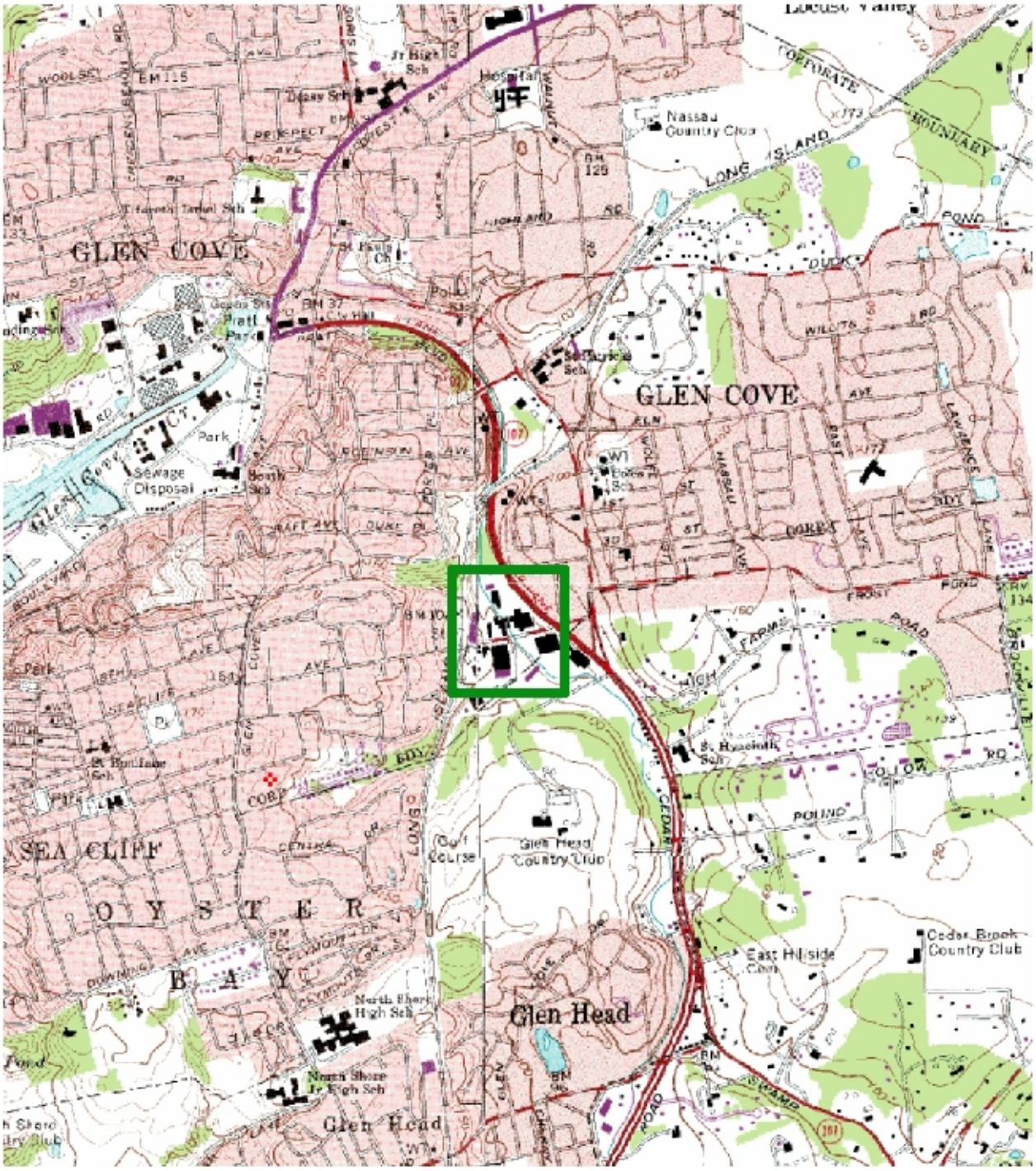
Contaminant	Screening Concentration (Class GA Criterion) (ug/L)	Number of Data Points	Number of Detections	Number Exceeding Class GA Criteria	Maximum Detected Value	Maximum Detection Sample
Chlorinated Aliphatics						
Chloroethane	5	63	9	6	6700	MW-14
Chloroform	7	70	4	0	1.3	MW-19PS
1,1-Dichloroethane	5	70	46	39	5700	MW-14
1,2-Dichloroethane	0.6	70	9	9	53	04MW-102S
1,1-Dichloroethene	5	70	37	32	780	MW-11PD
cis-1,2-Dichloroethene	5	70	53	44	5600	MW-13PD
trans-1,2-Dichloroethene	5	70	20	9	23	MW-13PD
1,2-Dichloropropane	1	70	1	1	4.1	MW-1GS
Methylene chloride	5	70	4	2	51	MW-11PD
Tetrachloroethene	5	70	46	37	1500	MW-13
1,1,1-Trichloroethane	5	70	27	15	760	MW-11PD
1,1,2-Trichloroethane	1	70	10	7	3	MW-13PD
Trichloroethene	5	70	49	42	10000	MW-13
Vinyl chloride	2	70	25	25	360	MW-11PD
Chlorofluorocarbons						
Dichlorodifluoromethane	5	53	3	3	160	MW-2GS
Chlorinated Aromatics						
2-Chlorotoluene	5	70	10	4	2000	MW-12
4-Chlorotoluene	5	70	1	1	30	MW-12
Chlorobenzene	5	70	1	0	0.69	MW-102I
1,2-Dichlorobenzene	3	70	1	0	0.68	04MW-102I
1,2,3-Trichlorobenzene	5	70	1	0	1.1	MW-12PS
1,2,4-Trimethylbenzene	5	70	1	0	2.7	MW-14
Aromatics						
Benzene	1	70	10	7	15	MW-13
Isopropylbenzene	5	70	1	0	1.2	MW-7P
n-Propylbenzene	5	70	1	0	0.6	MW-7P
Toluene	5	70	3	1	99	MW-14
Xylene (Total)	5	70	2	0	2.3	MW-14
Ketones						
Acetone	50	1	1	0	19	MW-18PS
2-Butanone	50	1	1	1	99	MW-14
Other/Miscellaneous						
Methyl tert-butyl ether	10	70	24	6	210	MW-18PS
Carbon disulfide	60	70	1	0	0.7	MW-102I

USEPA MCL for Carbon Disulfide is 50 ug/L
All other Class GA criteria are equal to or more stringent than USEPA MCLs.

Table 7-2
Data Set Assessment - Round 2 Data

Contaminant	Screening Concentration (Class GA Criterion) (ug/L)	Number of Data Points	Number of Detections	Number Exceeding Class GA Criteria	Maximum Detected Value	Maximum Detection Sample
Chlorinated Aliphatics						
Chloroethane	5	73	8	7	3300	MW-14
Chloroform	7	73	1	0	1.1	MW-5PD
1,1-Dichloroethane	5	73	49	40	3200	MW-14
1,2-Dichloroethane	0.6	73	11	11	57	MW-102S
1,1-Dichloroethene	5	73	42	36	560	MW-104S
cis-1,2-Dichloroethene	5	73	55	45	5900	MW-13PD
trans-1,2-Dichloroethene	5	73	21	14	20	MW-13PD
Methylene chloride	5	73	8	4	35	MW-11PD
Tetrachloroethene	5	73	51	40	2000	MS-4PI
1,1,1-Trichloroethane	5	73	30	13	2000	MW-14
1,1,2-Trichloroethane	1	73	9	9	3.1	MW-11PD
Trichloroethene	5	73	56	44	9300	MW-13
Vinyl chloride	2	73	33	32	1200	MW-14PCI
Chlorofluorocarbons						
Dichlorodifluoromethane	5	73	5	3	55	MW-12PI
1,1,2-Trichlorotrifluoroethane	5	73	7	6	240	MW-12PS
Chlorinated Aromatics						
2-Chlorotoluene	5	73	15	9	2100	MW-12
4-Chlorotoluene	5	73	3	1	32	MW-14
1,2-Dichlorobenzene	3	73	2	0	1.2	MW-14PCI
Aromatics						
Benzene	1	73	13	13	13	MW-13
Isopropylbenzene	5	73	1	0	1.1	MW-7P
Toluene	5	73	3	2	67	MW-14
1,2,4-Trimethylbenzene	5	73	1	0	2.6	MW-14
Xylene (Total)	5	73	3	1	9.9	MW-14PCI
Ketones						
Acetone	50	6	6	0	49	MW-6P
2-Butanone	50	1	1	1	100	MW-14
2-Hexanone	50	73	1	0	6.5	MW-14
Other/Miscellaneous						
Methyl tert-butyl ether	10	73	25	6	180	MW-18PS
Naphthalene	10	73	1	0	1.7	MW-14

Class GA criteria are equal to or more stringent than USEPA MCLs.



LEGEND

SITE LOCATION

0.2 0 0.2 0.4

GRAPHIC SCALE

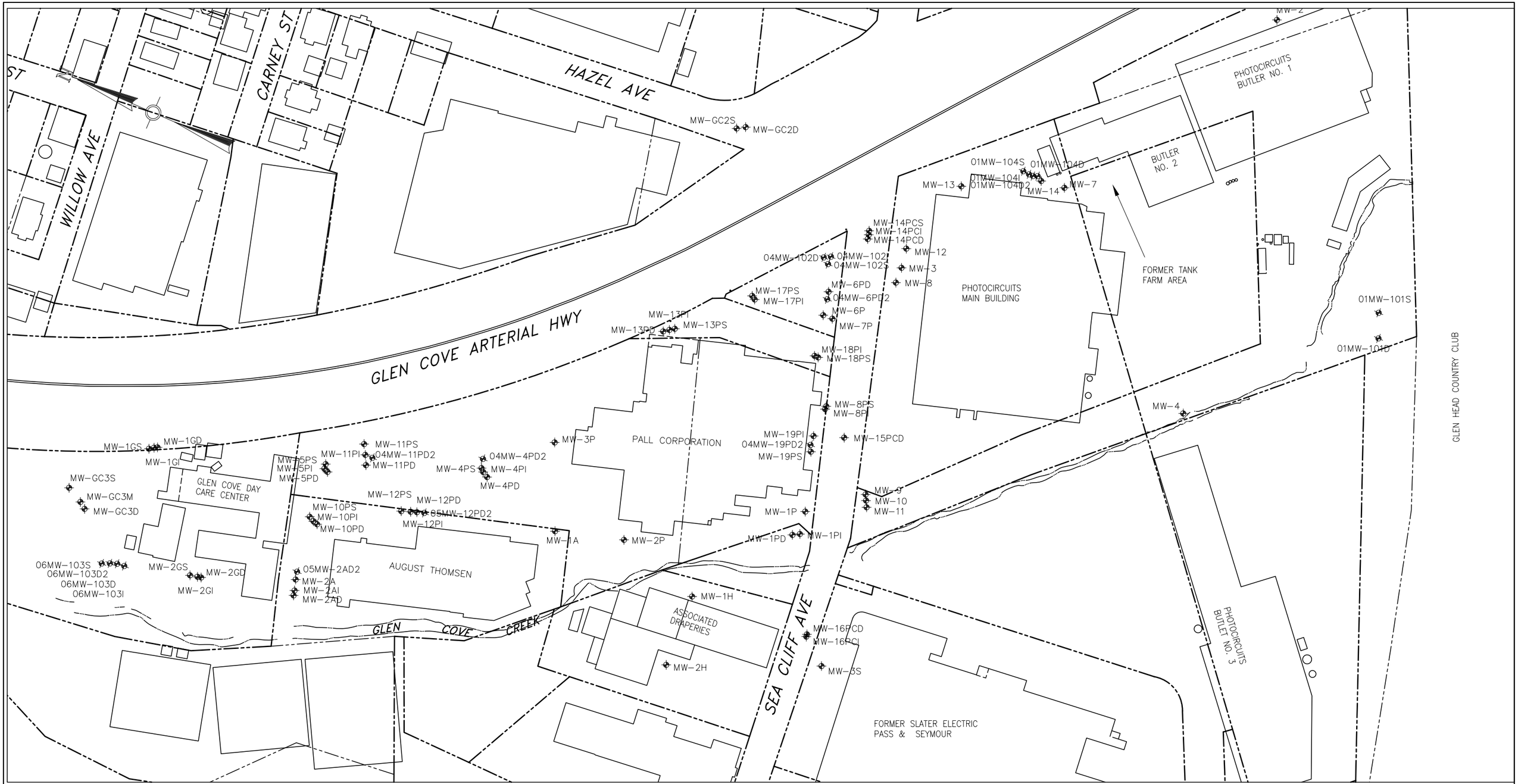
NUMBER	DESCRIPTION	DATE	APPROVED
	REVISIONS		

Prepared by: EarthTech, A Tetra Tech Company

Prepared for: New York State Department of Environmental Conservation

DESIGNED BY: RS	Photocircuits / Pall Corp.
DRAWN BY: RS	GLEN COVE, N.Y.
CHECKED BY: AB	SITE LOCATION PLAN

SUBMITTED BY:	DATE:	SCALE:	DRAWING NO.
AB	SEPTEMBER 2006	AS SHOWN	FIGURE 1



LEGEND

MONITORING WELL

0 60 120
SCALE IN FEET

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

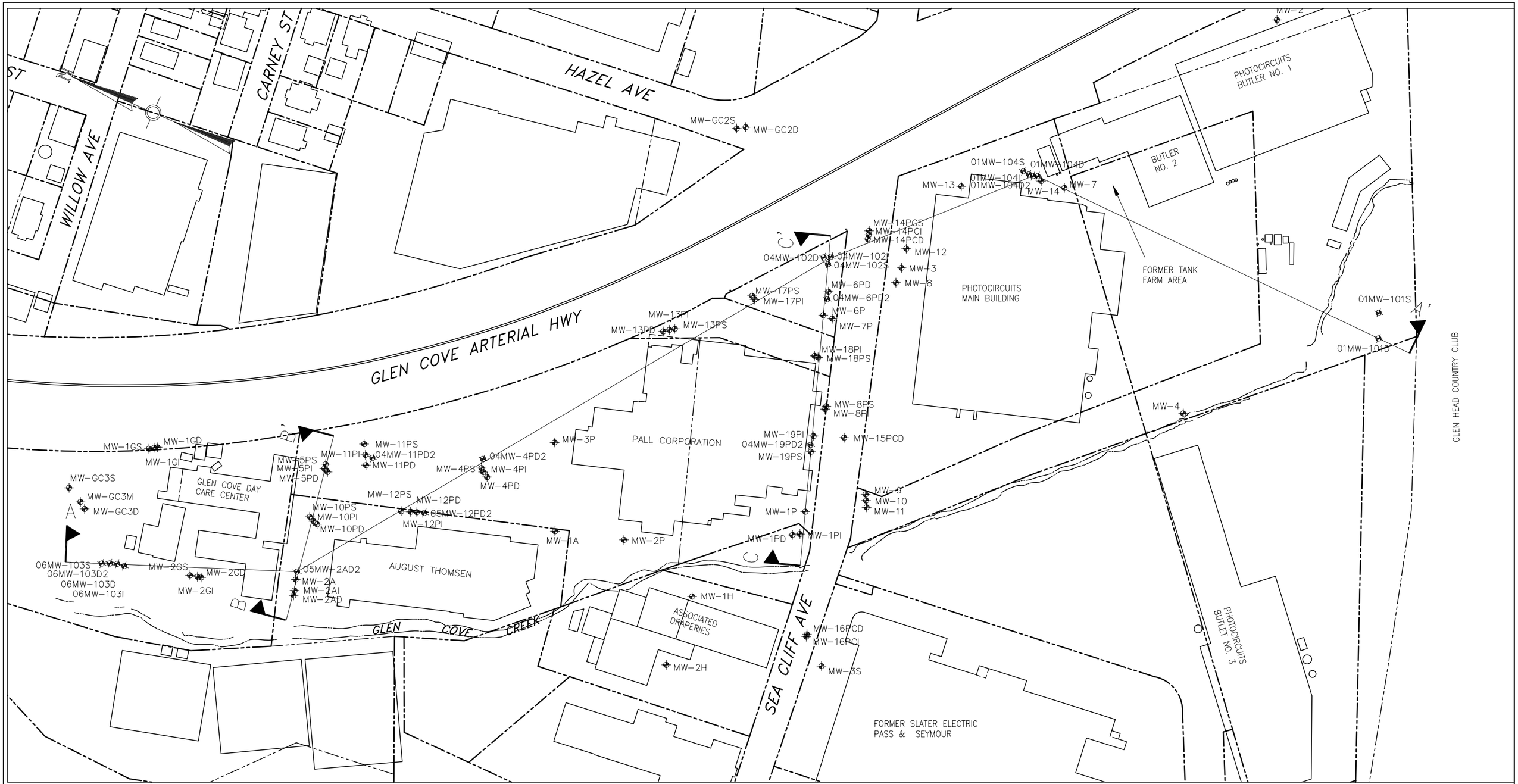
PHOTOCIRCUITS AND PALL CORP.

Glen Cove, New York
NYSDEC SITES 1-30-009 & 1-30-053B

SITE PLAN

EARTH TECH | AECOM

AUGUST 2009 FIGURE NO. 2



LEGEND

MONITORING WELL

A A' GEOLOGIC CROSS SECTION

0 60 120
SCALE IN FEET

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PHOTOCIRCUITS AND PALL CORP.

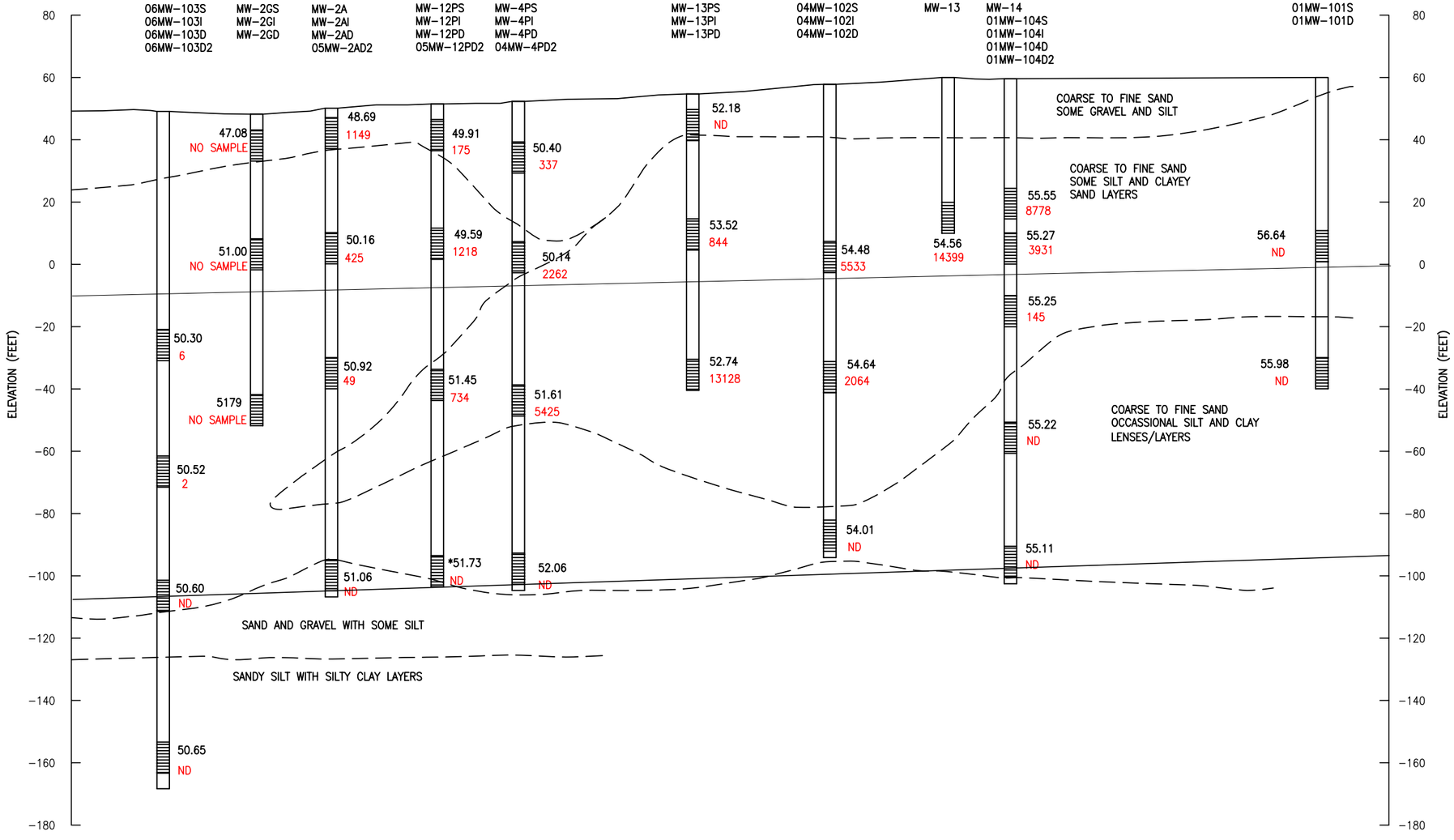
Glen Cove, New York

NYSDEC SITES 1-30-009 & 1-30-053B

CROSS-SECTION MAP

EARTH TECH | AECOM

AUGUST 2009 FIGURE NO. 3



LEGEND

MW-12PS
MW-12PI
MW-12PD
05MW-12PD2

MONITORING WELL SCREEN INTERVAL

47.41 GROUNDWATER ELEVATION OCTOBER 2008

6 TOTAL CHLORINATED ALIPHATIC COMPOUNDS CONCENTRATION IN ug/L

NOTE:

1. LOCATIONS OF GEOLOGIC CROSS SECTIONS ARE SHOWN ON FIGURE 3.
2. TOTAL CHLORINATED ALIPHATIC COMPOUNDS CONCENTRATION FROM ROUND 2 GROUNDWATER SAMPLING EVENT CONDUCTED IN OCTOBER 2008.

NOTES:

* INDICATES ARTESIAN CONDITION

VERTICAL 0 10 20 SCALE IN FEET

HORIZONTAL 0 100 200 SCALE IN FEET

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

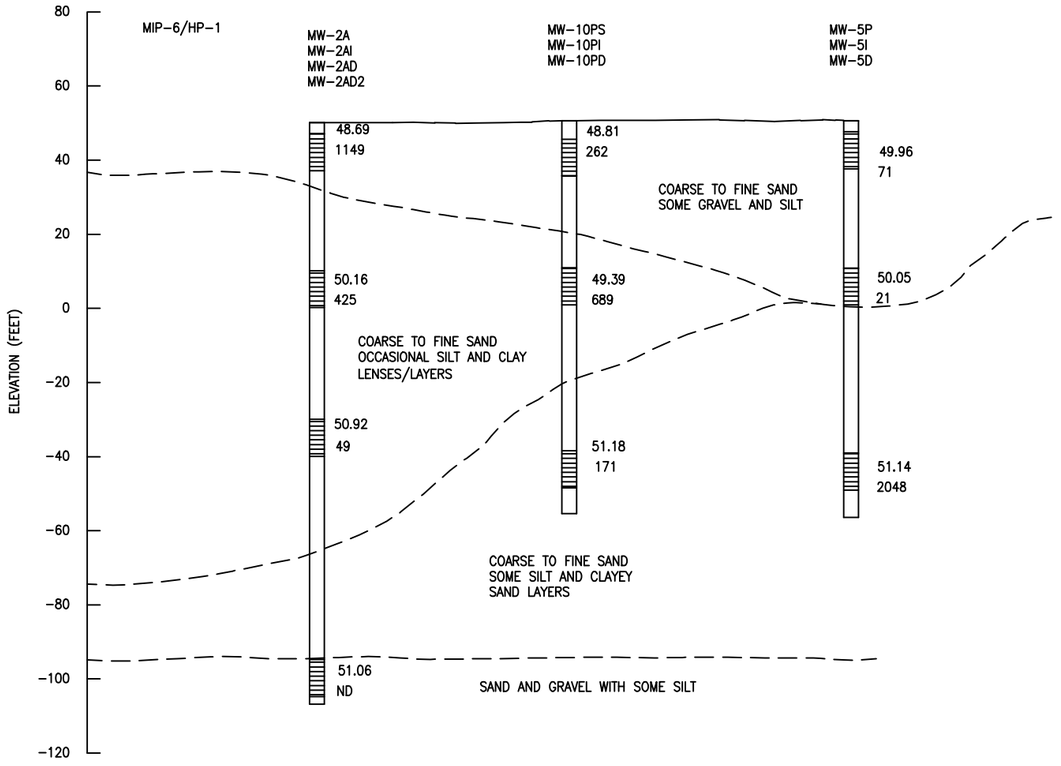
PHOTOCIRCUITS AND PALL CORP.

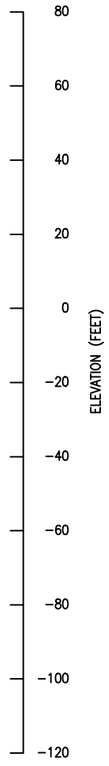
Glen Cove, New York
NYSDEC SITES 1-30-009 & 1-30-053B

GEOLOGIC CROSS SECTION A-A'

EARTH TECH | AECOM

AUGUST 2009 FIGURE NO. 4





LEGEND

MW-5PS
MW-5PI
MW-5PD

MONITORING WELL SCREEN INTERVAL

50.40
71

GROUNDWATER ELEVATION – OCTOBER 2008

TOTAL CHLORINATED ALIPHATIC CONCENTRATION IN ug/L

NOTE:

1. LOCATIONS OF GEOLOGIC CROSS SECTIONS ARE SHOWN ON FIGURE 3.
2. TOTAL CHLORINATED ALIPHATIC COMPOUNDS CONCENTRATION FROM ROUND 2 GROUNDWATER SAMPLING EVENT CONDUCTED IN OCTOBER 2008.

VERTICAL 0 20 40 SCALE IN FEET

HORIZONTAL 0 20 40 SCALE IN FEET

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

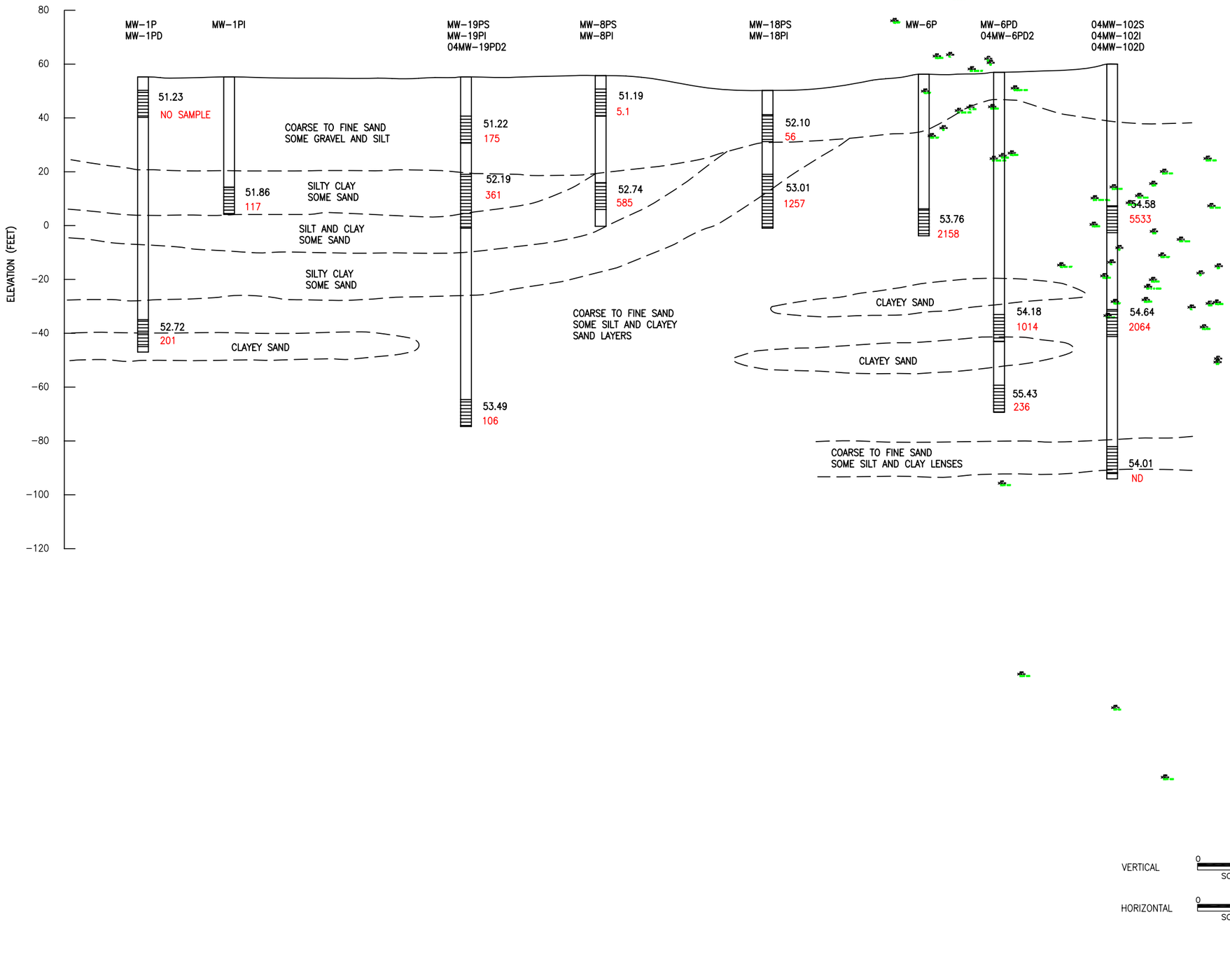
PHOTOCIRCUITS AND PALL CORP.

Glen Cove, New York
NYSDEC SITES 1-30-009 & 1-30-053B

GEOLOGIC CROSS SECTION B-B'

EARTH TECH | AECOM

AUGUST 2009 FIGURE NO. 5



NOTE:

1. LOCATIONS OF GEOLOGIC CROSS SECTIONS ARE SHOWN ON FIGURE 3.
2. TOTAL CHLORINATED ALIPHATIC COMPOUNDS CONCENTRATION FROM ROUND 2 GROUNDWATER SAMPLING EVENT CONDUCTED IN OCTOBER 2008.

VERTICAL 0 20 40 SCALE IN FEET

HORIZONTAL 0 20 40 SCALE IN FEET

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

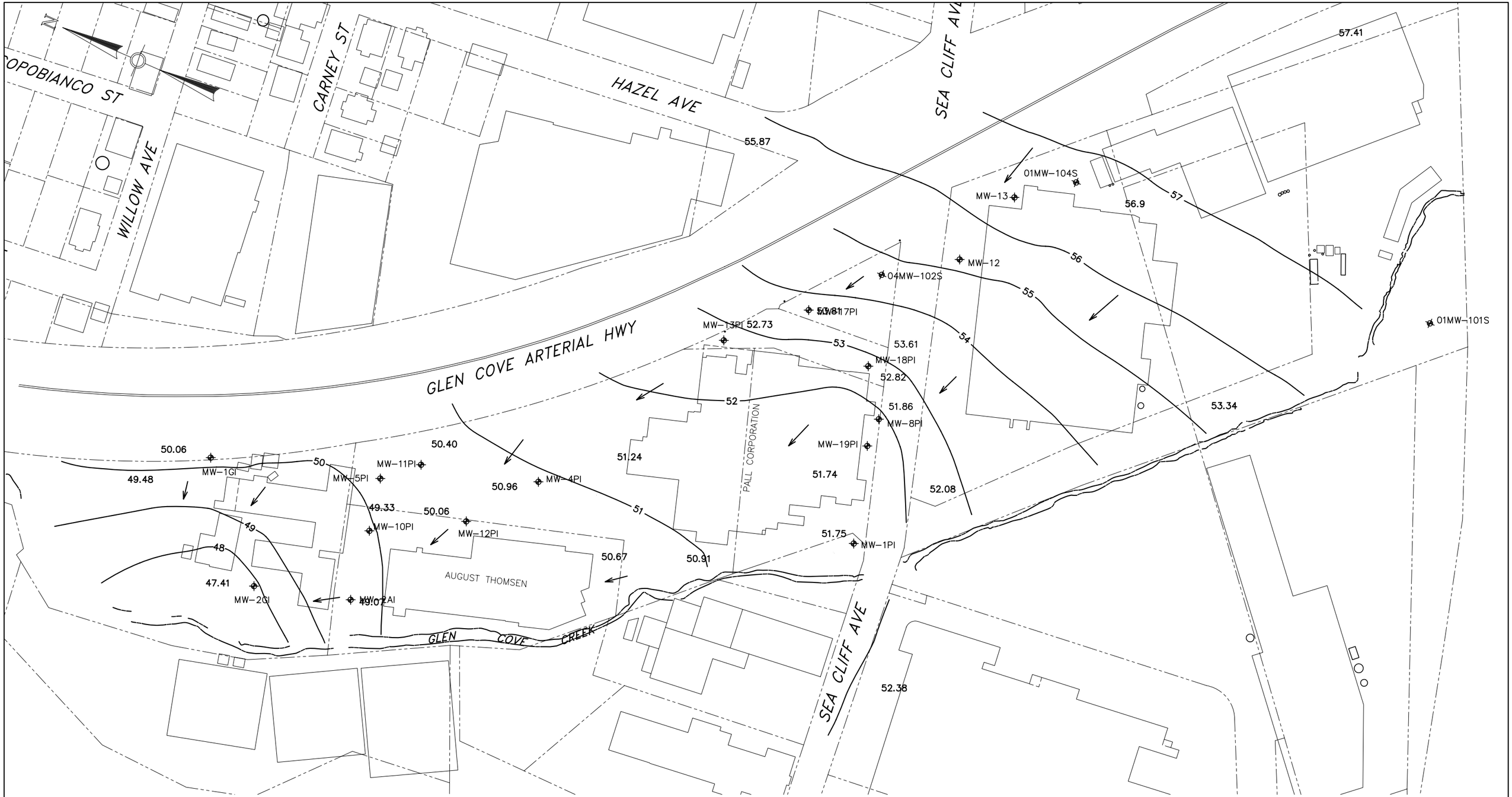
PHOTOCIRCUITS AND PALL CORP.

Glen Cove, New York
NYSDEC SITES 1-30-009 & 1-30-053B

GEOLOGIC CROSS SECTION C-C'

EARTH TECH | AECOM

AUGUST 2009 FIGURE NO. 6



LEGEND

- MONITORING WELL
- 51.5 GROUNDWATER ELEVATION
- 52 GROUNDWATER ELEVATION CONTOUR
- GROUNDWATER FLOW DIRECTION

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PHOTOCIRCUITS AND PALL CORP.

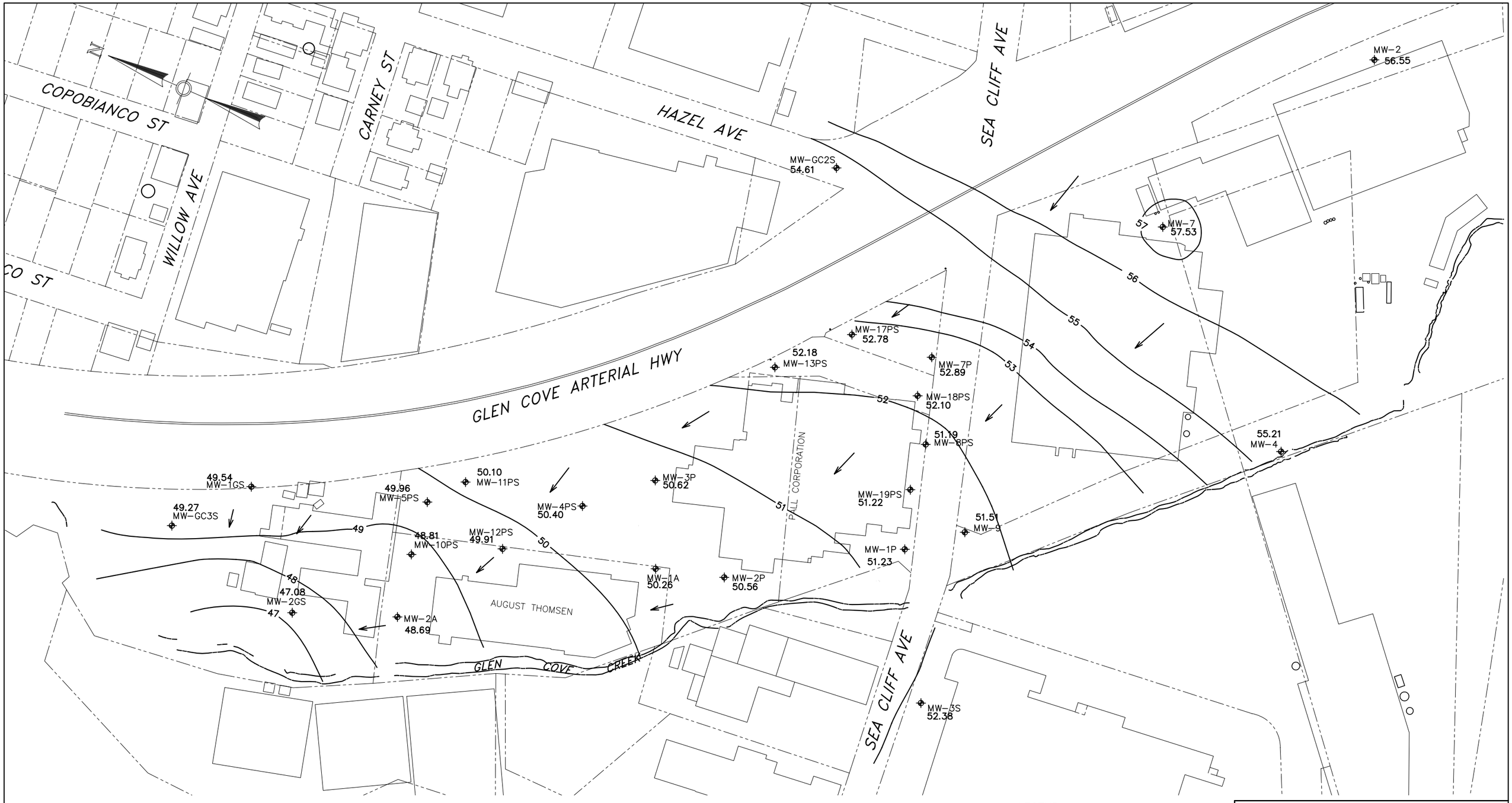
Glen Cove, New York

NYSDEC SITES 1-30-009 & 1-30-053B

GROUNDWATER ELEVATION CONTROURS - SHALLOW WELLS - APRIL 2008

EARTH TECH | AECOM

AUGUST 2009 FIGURE NO. 7.1



LEGEND

- MONITORING WELL
- 51.5 GROUNDWATER ELEVATION
- 52 GROUNDWATER ELEVATION CONTOUR
- GROUNDWATER FLOW DIRECTION

0 60 120
SCALE IN FEET

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

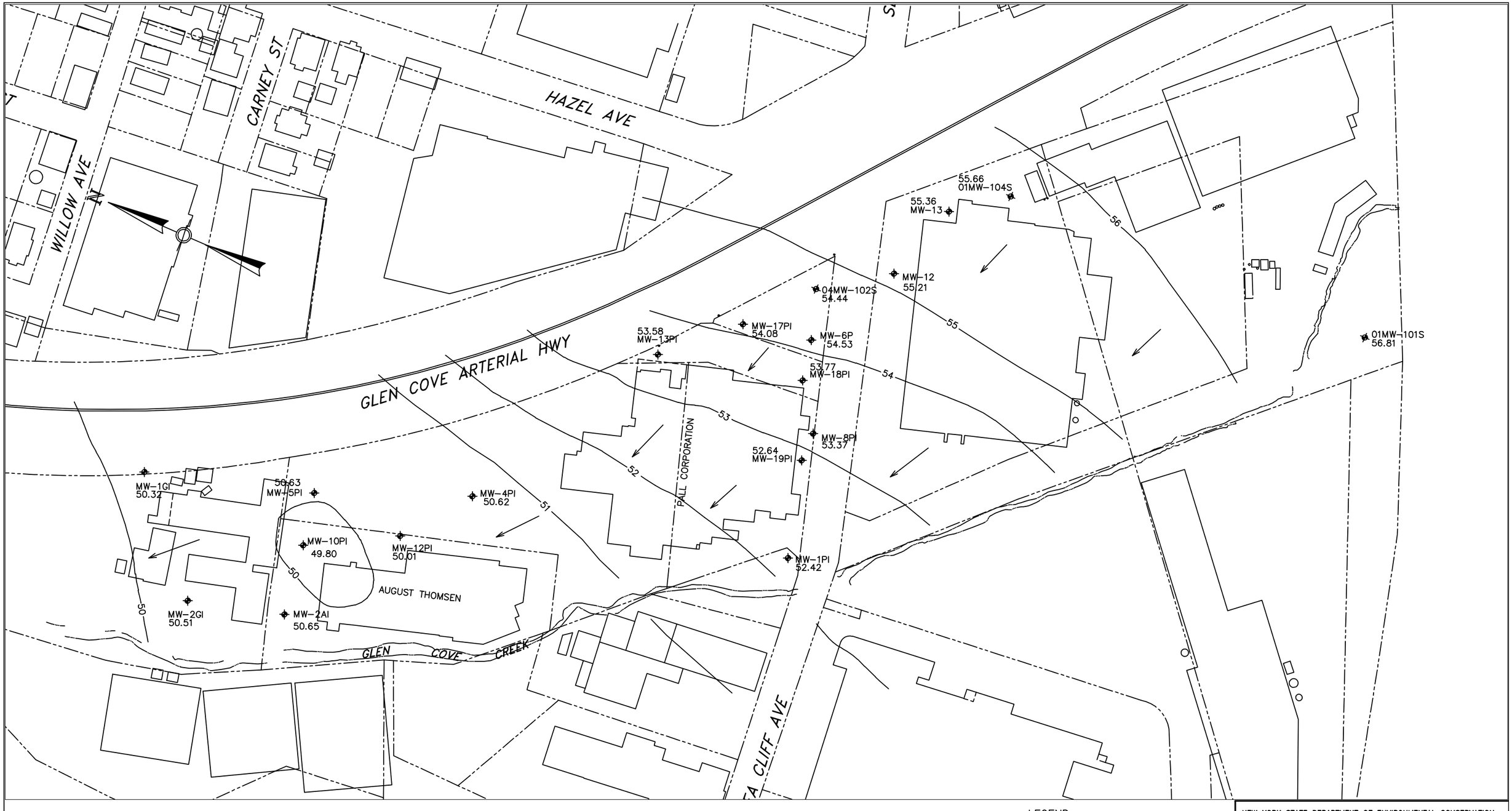
PHOTOCIRCUITS AND PALL CORP.

Glen Cove, New York
NYSDEC SITES 1-30-009 & 1-30-053B

GROUNDWATER CONTOUR MAP-OCTOBER 2008 DATA
SHALLOW WELLS, TOP OF SCREEN ELEV. 50' TO 40'

EARTH TECH | AECOM

AUGUST 2009 FIGURE NO. 7.2



NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PHOTOCIRCUITS AND PALL CORP.

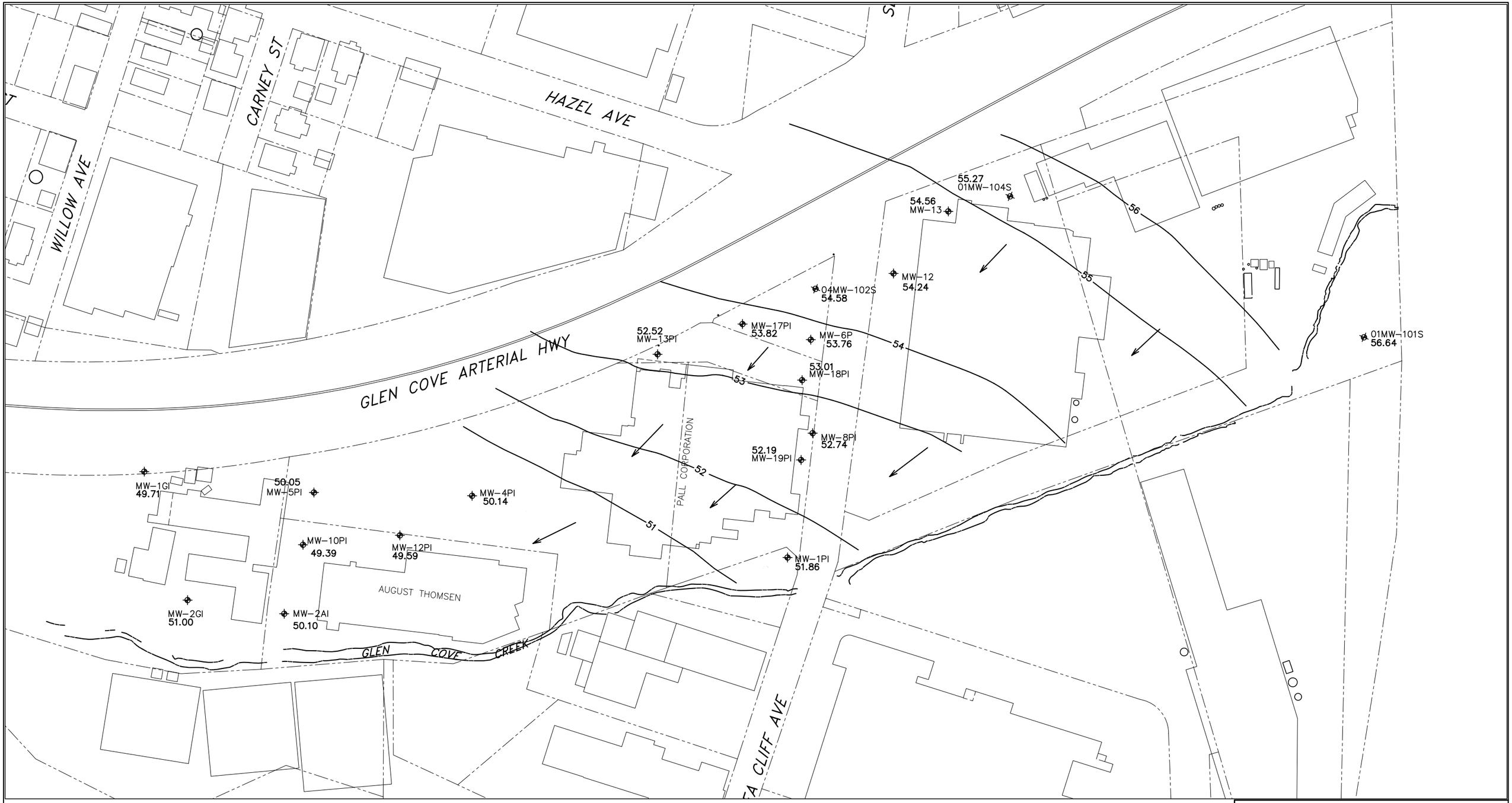
Glen Cove, New York

NYSDEC SITES 1-30-009 & 1-30-053B

GROUNDWATER ELEVATION CONTOURS – INTERMEDIATE WELLS – APRIL 2008

EARTH TECH | AECOM

AUGUST 2009 FIGURE NO. 8.1



LEGEND

- MONITORING WELL
- 51.5 GROUNDWATER ELEVATION
- 52 GROUNDWATER ELEVATION CONTOUR
- GROUNDWATER FLOW DIRECTION

0 60 120
SCALE IN FEET

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PHOTOCIRCUITS AND PALL CORP.

Glen Cove, New York
NYSDEC SITES 1-30-009 & 1-30-053B

GROUNDWATER CONTOUR MAP-OCTOBER 2008 DATA
INTERMEDIATE WELLS, TOP OF SCREEN ELEV. 20' TO 5'

EARTH TECH | AECOM

AUGUST 2009 FIGURE NO. 8.2

N

CEDAR SWAMP RD

CEDAR SWAMP RD

HAZEL AVE

HAZEL AVE

SEA CLIFF AVE

COPOBIANCO ST

CARNEY ST

GROVE AVE

WILLOW AVE

STANCO ST

GLEN COVE ARTERIAL HWY

PALL CORPORATION

AUGUST THOMSEN

GLEN COVE CREEK

SEA CLIFF AVE

55.84
01MW-101D

54.91
MW-6PD

MW-13PD
53.44

01MW-101D
56.33

50.70
MW-1GD

MW-5PD
52.16

MW-GC3M
49.49

51.97
MW-12PD

MW-4PD
52.14

MW-10PD
51.58

MW-10
54.11

MW-1PD
53.33

08MW-103I
51.12

51.21
MW-2GD

MW-2PD
51.46

55

54

53

52

51

LEGEND

- MONITORING WELL
- 51 GROUNDWATER ELEVATION
- 52 GROUNDWATER ELEVATION CONTOUR

0 60 120
SCALE IN FEET

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

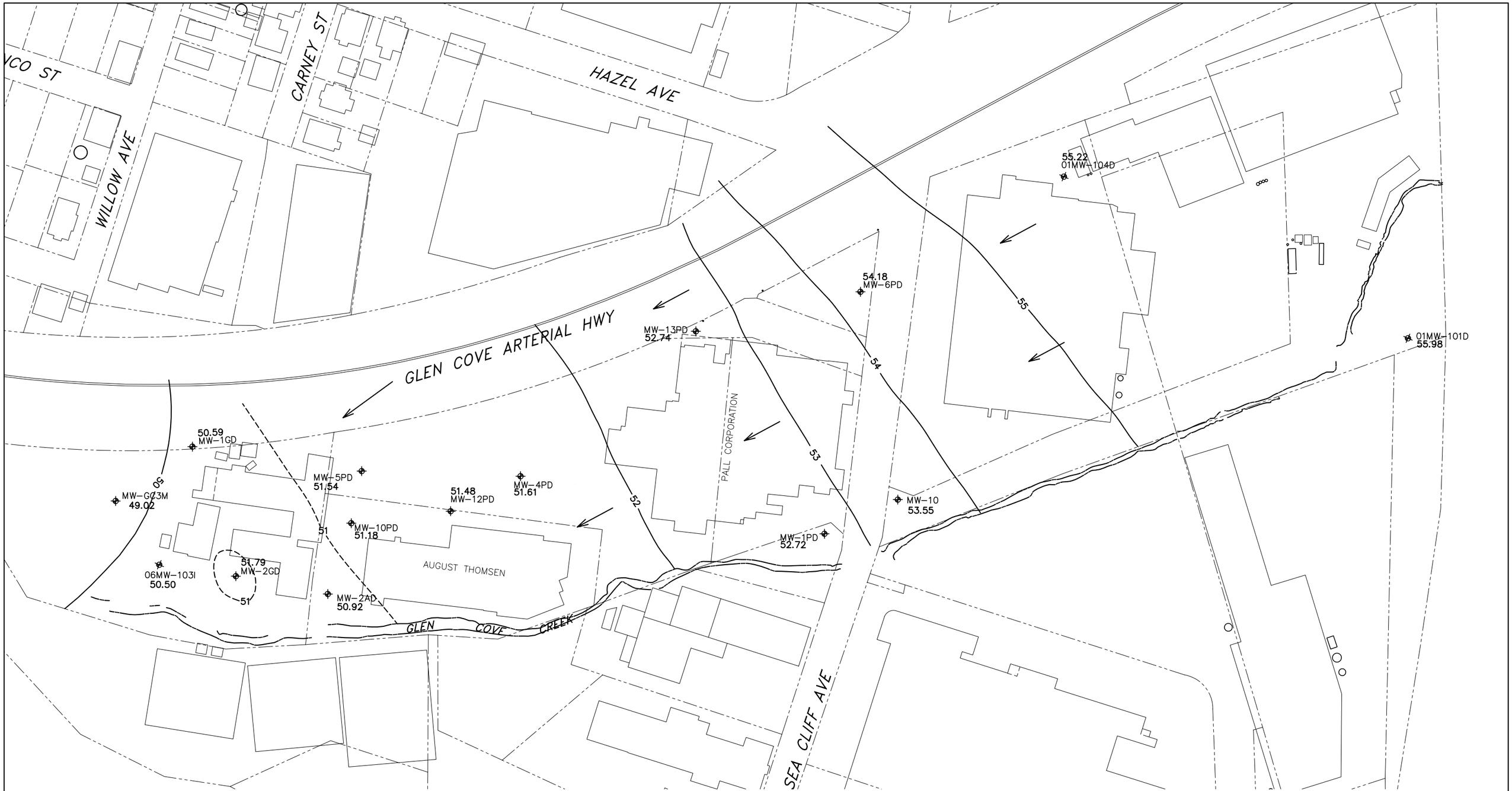
PHOTOCIRCUITS AND PALL CORP.

Glen Cove, New York
NYSDEC SITES 1-30-009 & 1-30-053B

GROUNDWATER ELEVATION CONTOURS – DEEP WELLS – APRIL 2008

EARTH TECH | AECOM

AUGUST 2009 FIGURE NO. 9.1



LEGEND

- MONITORING WELL
- 51 GROUNDWATER ELEVATION
- 52 GROUNDWATER ELEVATION CONTOUR

0 60 120
SCALE IN FEET

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PHOTOCIRCUITS AND PALL CORP.

Glen Cove, New York

NYSDEC SITES 1-30-009 & 1-30-053B

GROUNDWATER CONTOUR MAP-OCTOBER 2008 DATA

DEEP WELLS, TOP OF SCREEN ELEV. -20' TO -60'

EARTH TECH | AECOM

AUGUST 2009 FIGURE NO. 9.2

N

CEDAR SWAMP RD

HAZEL AVE

COPOBIANCO ST

GROVE AVE

WILLOW AVE

STANCO ST

CARNEY ST

HAZEL AVE

SEA CLIFF AVE

CEDAR SWAMP RD

GLEN COVE ARTERIAL HWY

MW-GC2D
54.96

01MW-10D2
55.71

04MW-102D
55.14

MW-3
54.95

55

PALL CORPORATION

54.09
04MW-18PD2

52.68
04MW-4PD2

MW-GC3D
50.77

52.38
05MW-12PD2

06MW-103D
51.20

51.76
05MW-2AD2

AUGUST THOMSEN

GLEN COVE CREEK

MW-11
53.95

SEA CLIFF AVE

LEGEND

- MONITORING WELL
- 51.5 GROUNDWATER ELEVATION
- 52 GROUNDWATER ELEVATION CONTOUR
- GROUNDWATER FLOW DIRECTION

0 60 120
SCALE IN FEET

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

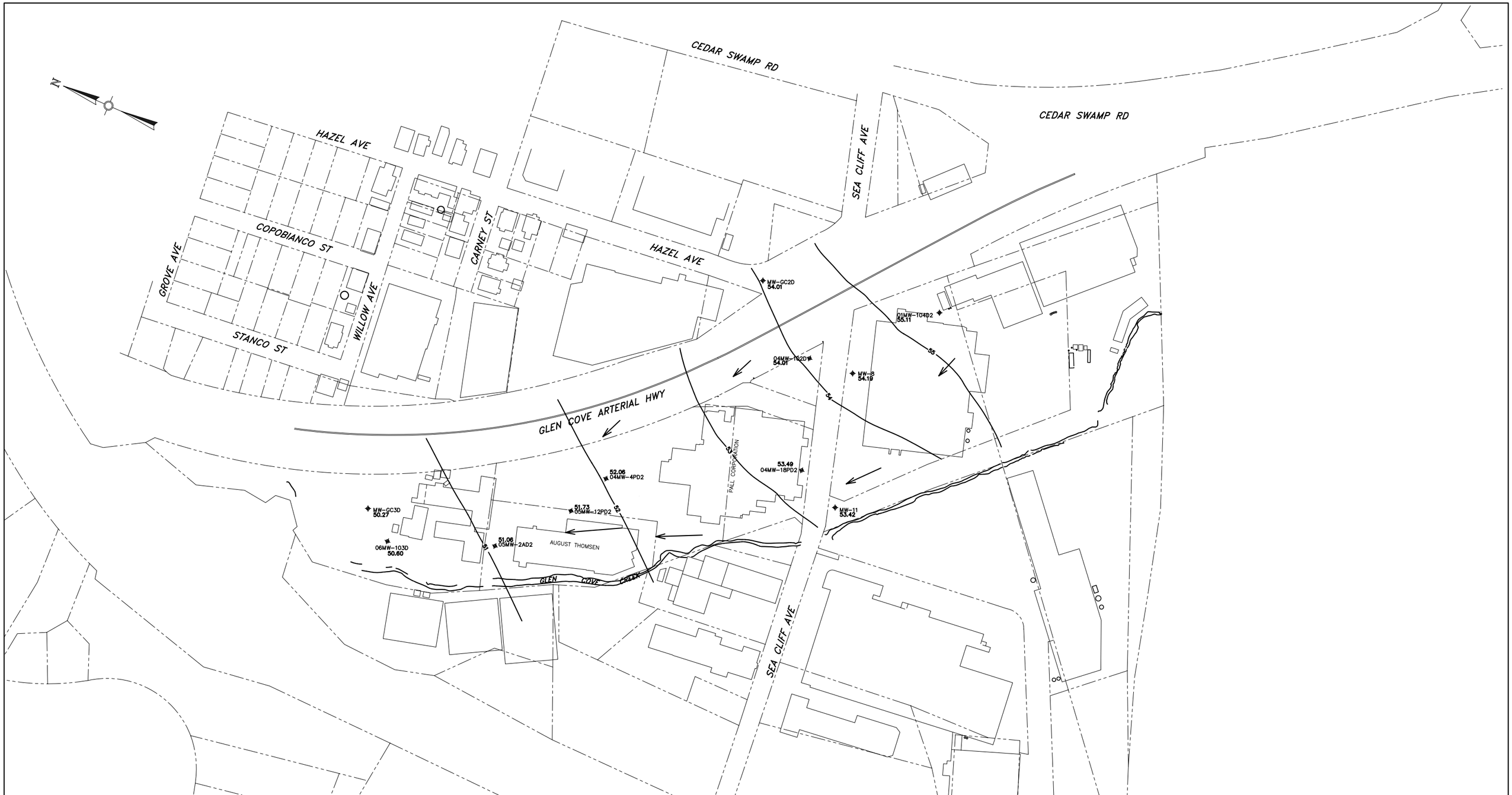
PHOTOCIRCUITS AND PALL CORP.

Glen Cove, New York
NYSDEC SITES 1-30-009 & 1-30-053B

GROUNDWATER ELEVATION CONTOURS – EXTRA DEEP WELLS – APRIL 2008

EARTH TECH | AECOM

AUGUST 2009 FIGURE NO. 10.1



LEGEND

- MONITORING WELL
- 51.5 GROUNDWATER ELEVATION
- 52 GROUNDWATER ELEVATION CONTOUR
- GROUNDWATER FLOW DIRECTION

0 60 120
SCALE IN FEET

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PHOTOCIRCUITS AND PALL CORP.

Glen Cove, New York

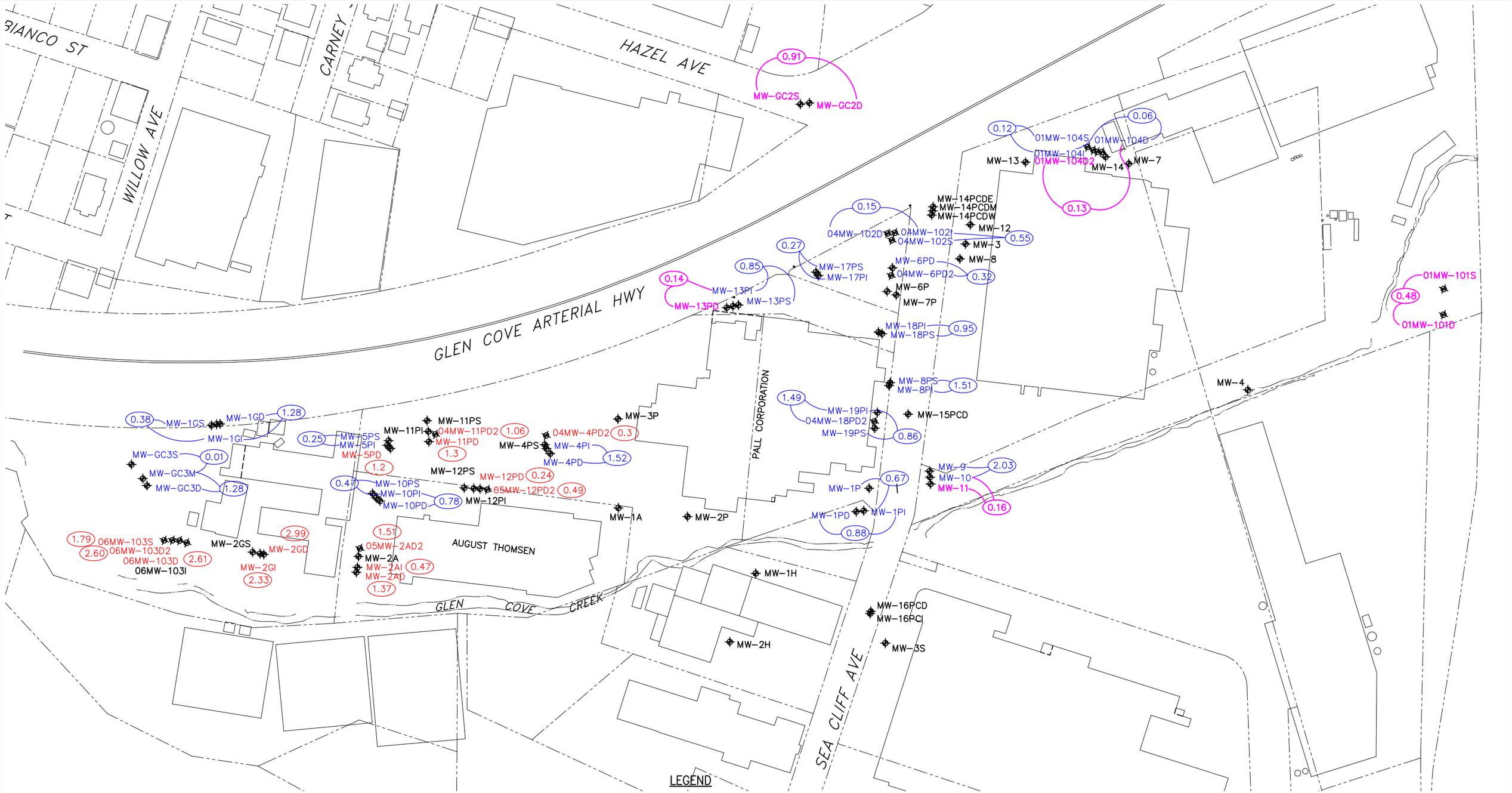
NYSDEC SITES 1-30-009 & 1-30-053B

GROUNDWATER CONTOUR MAP-OCTOBER 2008 DATA

EXTTRA-DEEP WELLS, TOP OF SCREEN ELEV. -80' TO -150'

EARTH TECH | AECOM

AUGUST 2009 FIGURE NO. 10.2



LEGEND

- MONITORING WELL
- MW-2GI — 1.5 — ARTESIAN HEAD ABOVE GROUND SURFACE
- MW-12S / MW-12I — 1.3 — UPWARD HEAD DIFFERENCE BETWEEN MONITORING WELLS
- MW-12D — 0.9 — DOWNWARD HEAD DIFFERENCE BETWEEN MONITORING WELLS

0 100 200
SCALE IN FEET

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

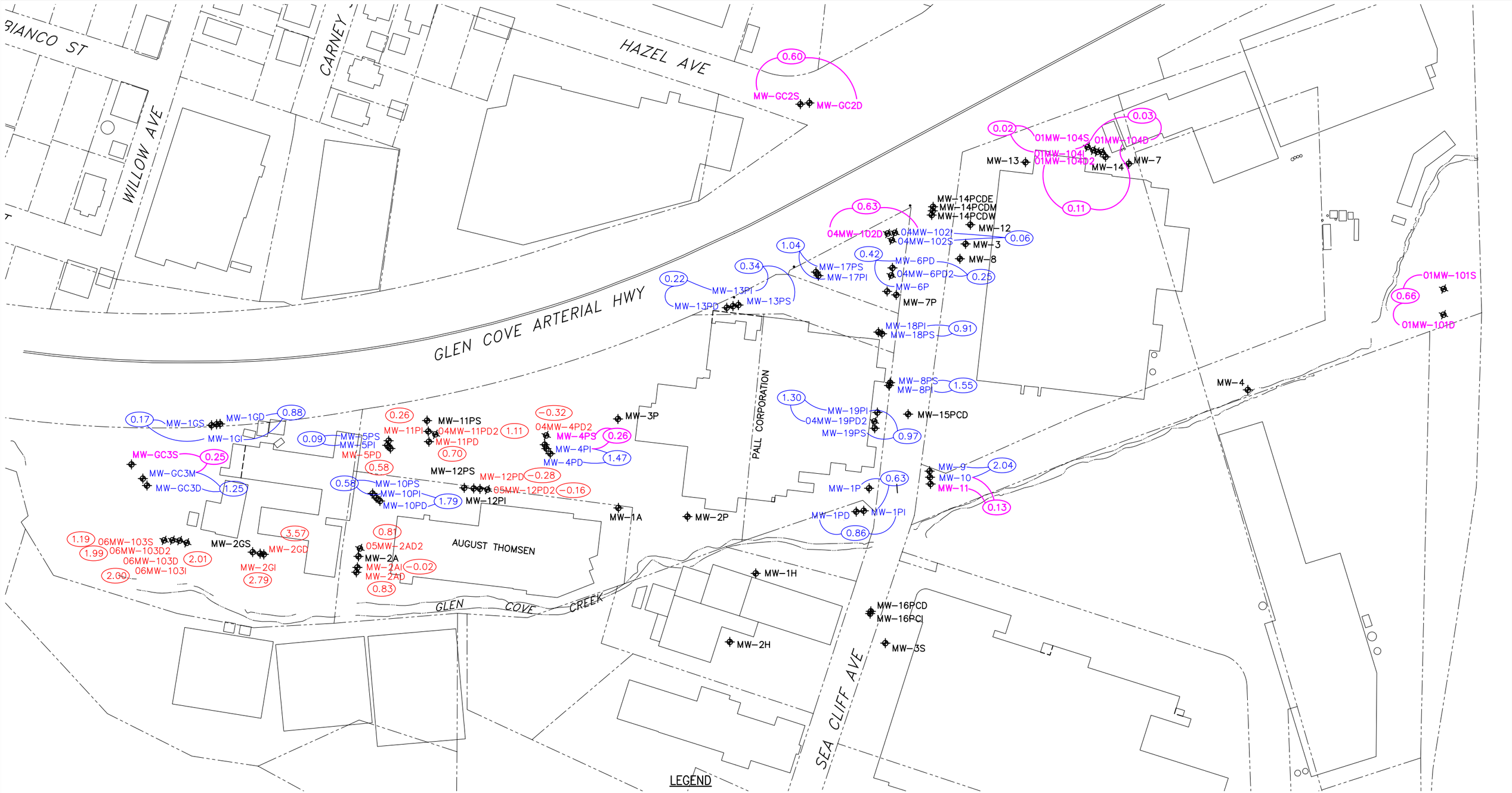
PHOTOCIRCUITS AND PALL CORP.

Glen Cove, New York
NYSDEC SITES 1-30-009 & 1-30-053B

ARTESIAN FLOW AND HEAD DIFFERENCE IN MONITORING WELLS–APRIL 2008 DATA

EARTH TECH | AECOM

AUGUST 2009 FIGURE NO. 11.1



LEGEND

- MONITORING WELL
- MW-2GI (1.5) ARTESIAN HEAD ABOVE GROUND SURFACE (NEGATIVE VALUE INDICATES, WATER ELEVATION IS ABOVE TOP OF THE SCREEN BUT BELOW GROUND SURFACE
- MW-12S, MW-12I (1.3) UPWARD HEAD DIFFERENCE BETWEEN MONITORING WELLS
- MW-12D (0.9) DOWNWARD HEAD DIFFERENCE BETWEEN MONITORING WELLS

0 100 200
SCALE IN FEET

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

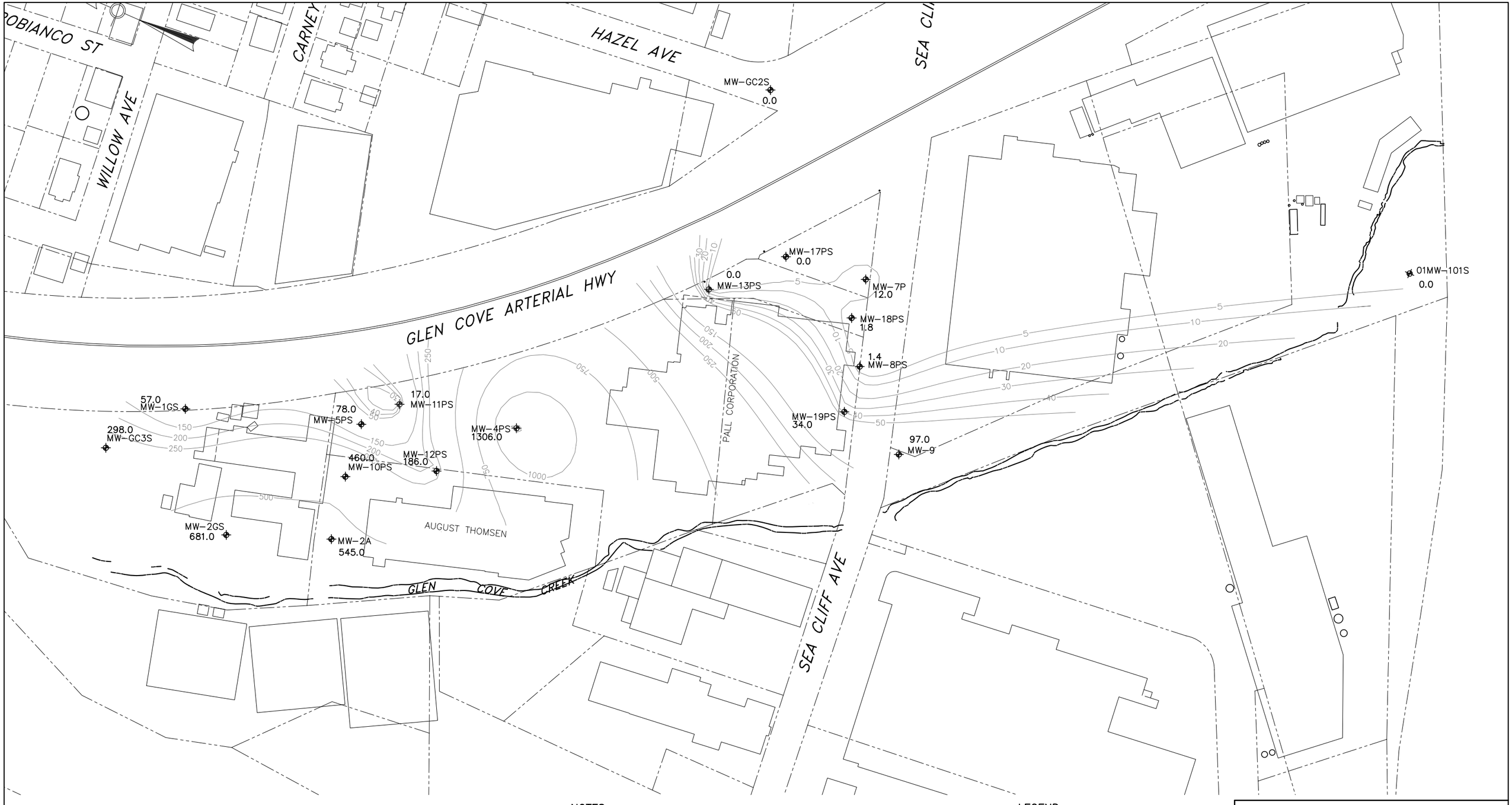
PHOTOCIRCUITS AND PALL CORP.

Glen Cove, New York
NYSDEC SITES 1-30-009 & 1-30-053B

ARTESIAN FLOW AND HEAD DIFFERENCE IN MONITORING WELLS–OCTOBER 2008 DATA

EARTH TECH | AECOM

AUGUST 2009 FIGURE NO. 11.2



NOTES:

1. ISOCONCENTRATION CONTOURS GENERATED USING SURFER 8.0 KRIGGING INTERPOLATION METHOD

LEGEND

- MONITORING WELL
- 545.0 TOTAL CHLORINATED ALIPHATIC CONCENTRATION IN µg/L
- 50 ISOCONCENTRATION CONTOUR

0 60 120
SCALE IN FEET

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PHOTOCIRCUITS AND PALL CORP.

Glen Cove, New York
NYSDEC SITES 1-30-009 & 1-30-053B

TOTAL CHLORINATED ALIPHATICS – SHALLOW WELLS–APRIL 2008 DATA

EARTH TECH | AECOM

AUGUST 2009 FIGURE NO. 12.1

N

MW-GC2S
0.0

MW-14PCS
794

MW-17PS
0.0

MW-13PS
0.0

MW-7P
19.6

MW-18PS
56

5.1
MW-8PS

01MW-1C
0.0

13
MW-11PS

61
MW-1GS

71
MW-5PS

255
MW-GC3S

MW-4PS
337

262
MW-10PS

MW-12PS
175

MW-19PS
175

226
MW-9

MW-2A
1149

MW-3S
441

PALL CORPORATION

AUGUST THOMSEN

GLEN COVE CREEK

NOTES:

1. ISOCONCENTRATION CONTOURS GENERATED USING SURFER 8.0 KRIGGING INTERPOLATION METHOD

LEGEND

- MONITORING WELL
- 226 TOTAL CHLORINATED ALIPHATIC CONCENTRATION IN µg/L
- 250 ISOCONCENTRATION CONTOUR

0 60 120
SCALE IN FEET

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

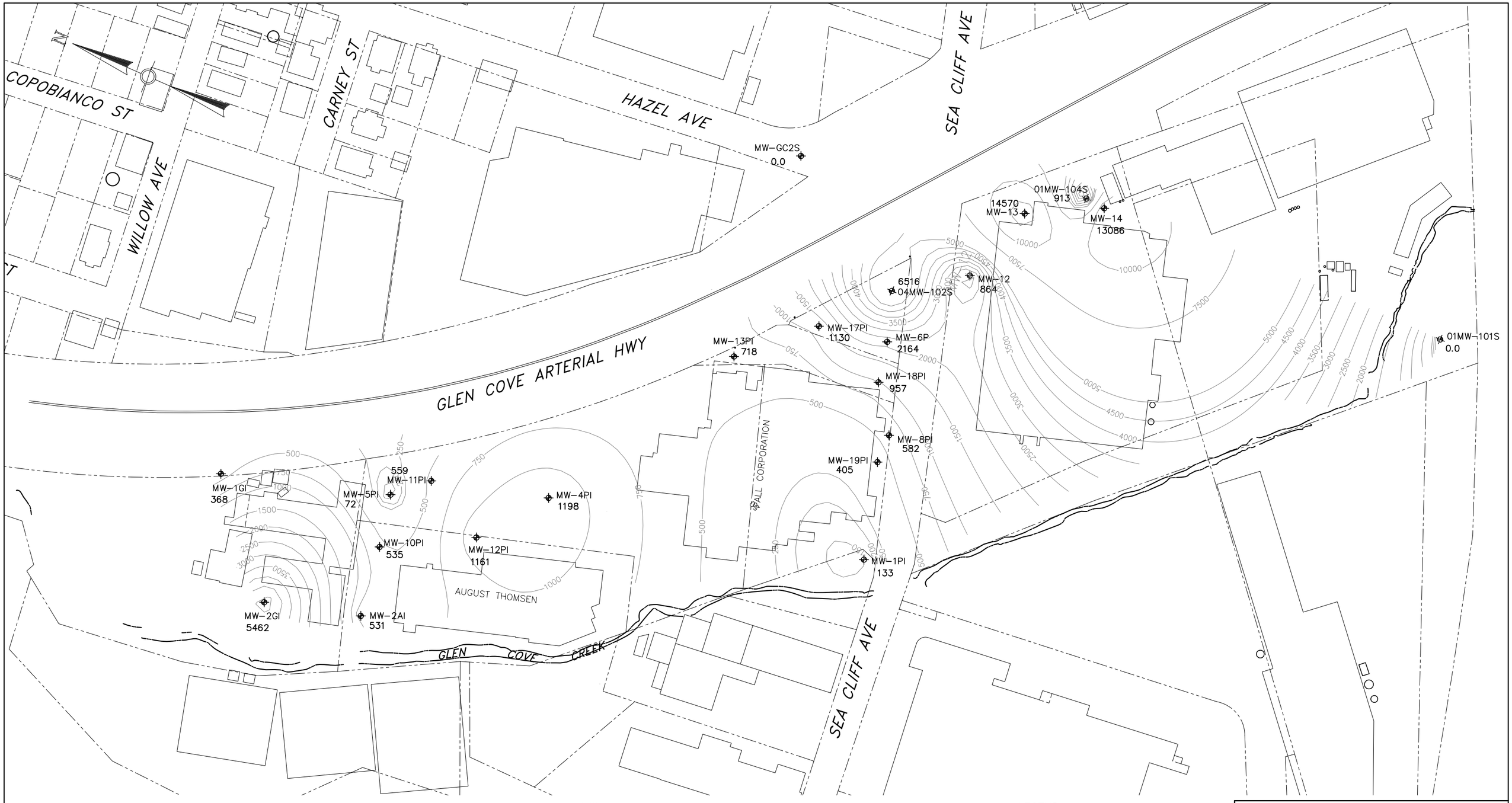
PHOTOCIRCUITS AND PALL CORP.

Glen Cove, New York
NYSDEC SITES 1-30-009 & 1-30-053B

TOTAL CHLORINATED ALIPHATICS – SHALLOW WELLS –OCTOBER 2008 DATA

EARTH TECH | AECOM

AUGUST 2009 FIGURE NO. 12.2



NOTES:

1. ISOCONCENTRATION CONTOURS GENERATED USING SURFER 8.0 KRIGGING INTERPOLATION METHOD

LEGEND

- MONITORING WELL
- 6516 TOTAL CHLORINATED ALIPHATIC CONCENTRATION IN µg/L
- 500 ISOCONCENTRATION CONTOUR LINE

0 60 120
SCALE IN FEET

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

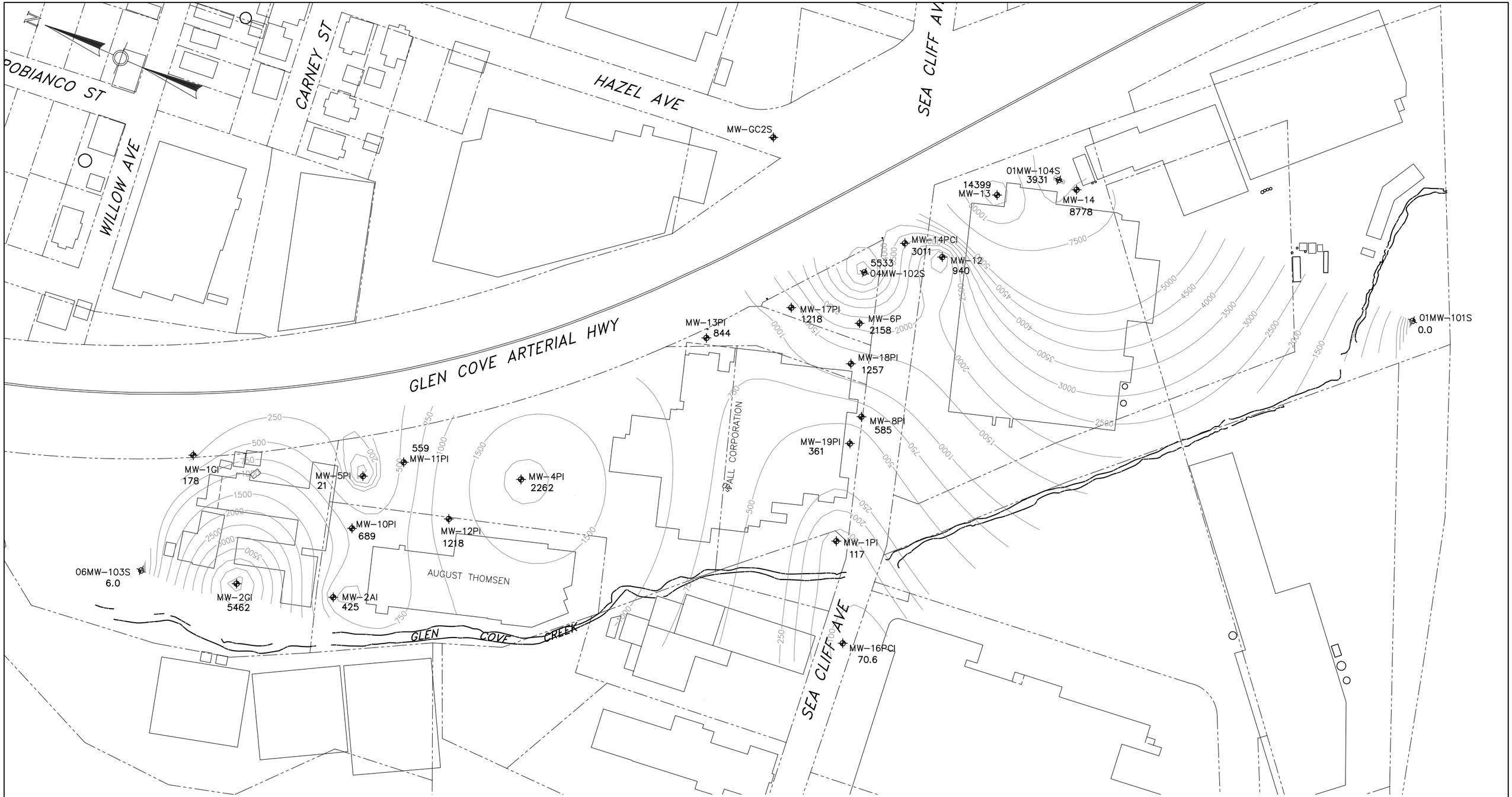
PHOTOCIRCUITS AND PALL CORP.

Glen Cove, New York
NYSDEC SITES 1-30-009 & 1-30-053B

TOTAL CHLORINATED ALIPHATICS – INTERMEDIATE WELLS–APRIL 2008 DATA

EARTH TECH | AECOM

AUGUST 2009 FIGURE NO. 13.1



NOTES:

1. ISOCONCENTRATION CONTOURS GENERATED USING SURFER 8.0 KRIGGING INTERPOLATION METHOD

LEGEND

- MONITORING WELL
- 6516 TOTAL CHLORINATED ALIPHATIC CONCENTRATION IN µg/L
- 500 ISOCONCENTRATION CONTOUR LINE

0 60 120
SCALE IN FEET

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

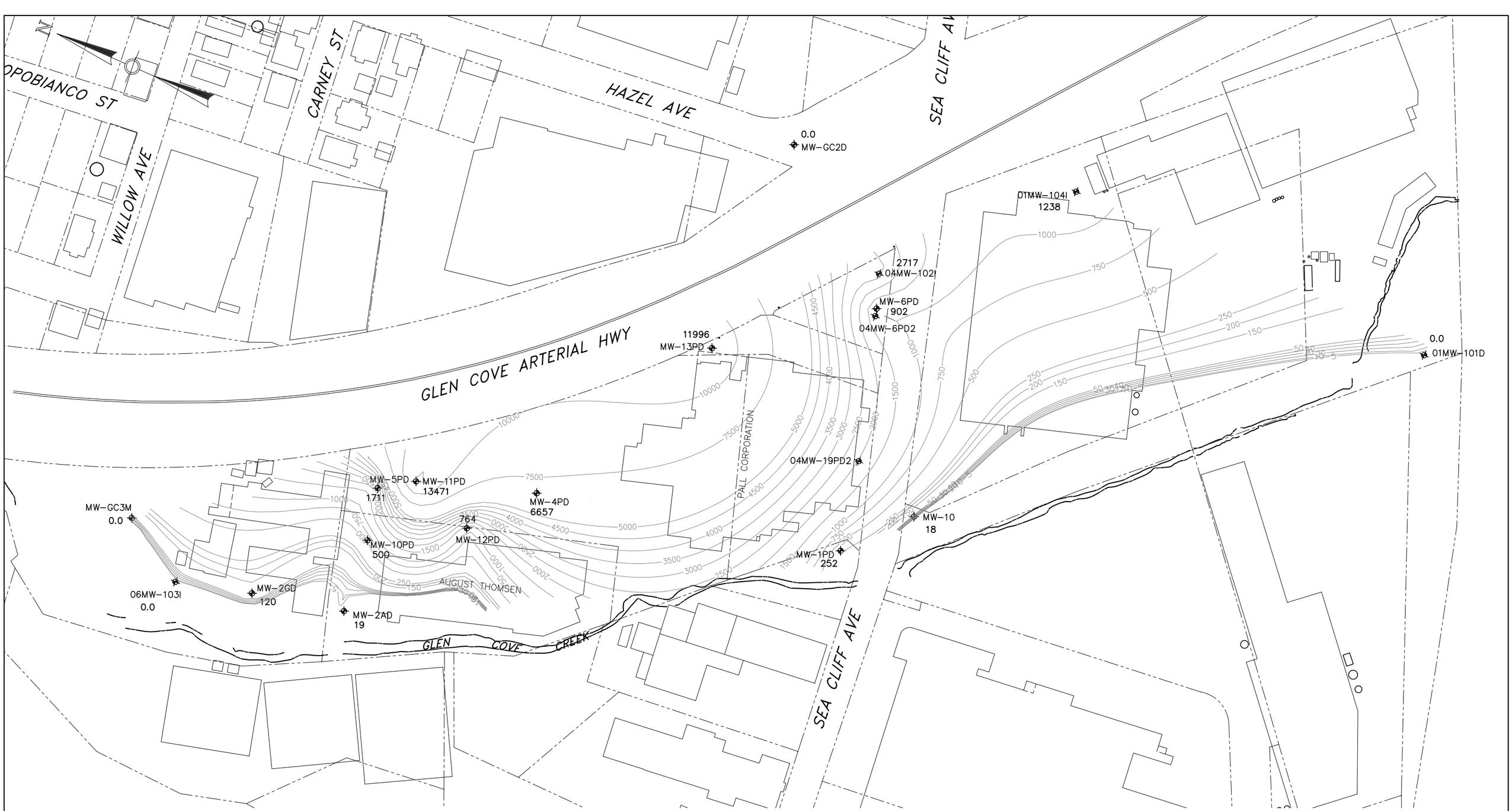
PHOTOCIRCUITS AND PALL CORP.

Glen Cove, New York
NYSDEC SITES 1-30-009 & 1-30-053B

TOTAL CHLORINATED ALIPHATICS – INTERMEDIATE WELLS – OCTOBER 2008 DATA

EARTH TECH | AECOM

AUGUST 2009 FIGURE NO. 13.2



NOTES:

1. ISOCONCENTRATION CONTOURS GENERATED USING SURFER 8.0 KRIGGING INTERPOLATION METHOD
2. 04MW-19PD2 AND 04MW-6PD2 NOT CONSIDERED FOR ISOCONCENTRATION CONTOURS

LEGEND

- MONITORING WELL
- 10996 TOTAL CHLORINATED ALIPHATIC CONCENTRATION IN µg/L
- 500 ISOCONCENTRATION CONTOUR LINE

0 60 120
SCALE IN FEET

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

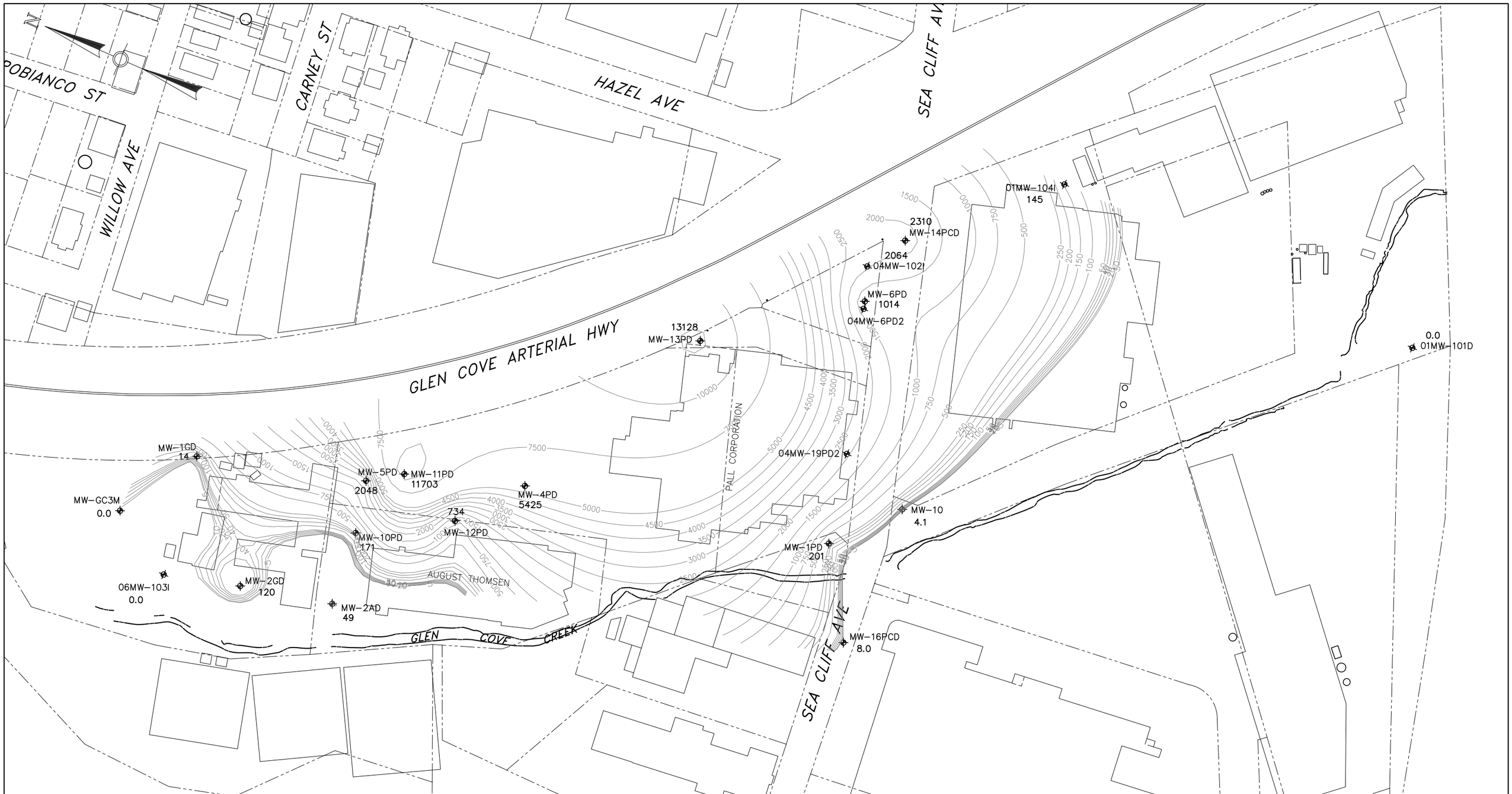
PHOTOCIRCUITS AND PALL CORP.

Glen Cove, New York
NYSDEC SITES 1-30-009 & 1-30-053B

TOTAL CHLORINATED ALIPHATICS - DEEP WELLS-APRIL 2008 DATA

EARTH TECH | AECOM

AUGUST 2009 FIGURE NO. 14.1



NOTES:

1. ISOCONCENTRATION CONTOURS GENERATED USING SURFER 8.0 KRIGGING INTERPOLATION METHOD
2. 04MW-19PD2 AND 04MW-6PD2 NOT CONSIDERED FOR ISOCONCENTRATION CONTOURS

LEGEND

- MONITORING WELL
- 10996 TOTAL CHLORINATED ALIPHATIC CONCENTRATION IN µg/L
- 500 ISOCONCENTRATION CONTOUR LINE

0 60 120
SCALE IN FEET

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

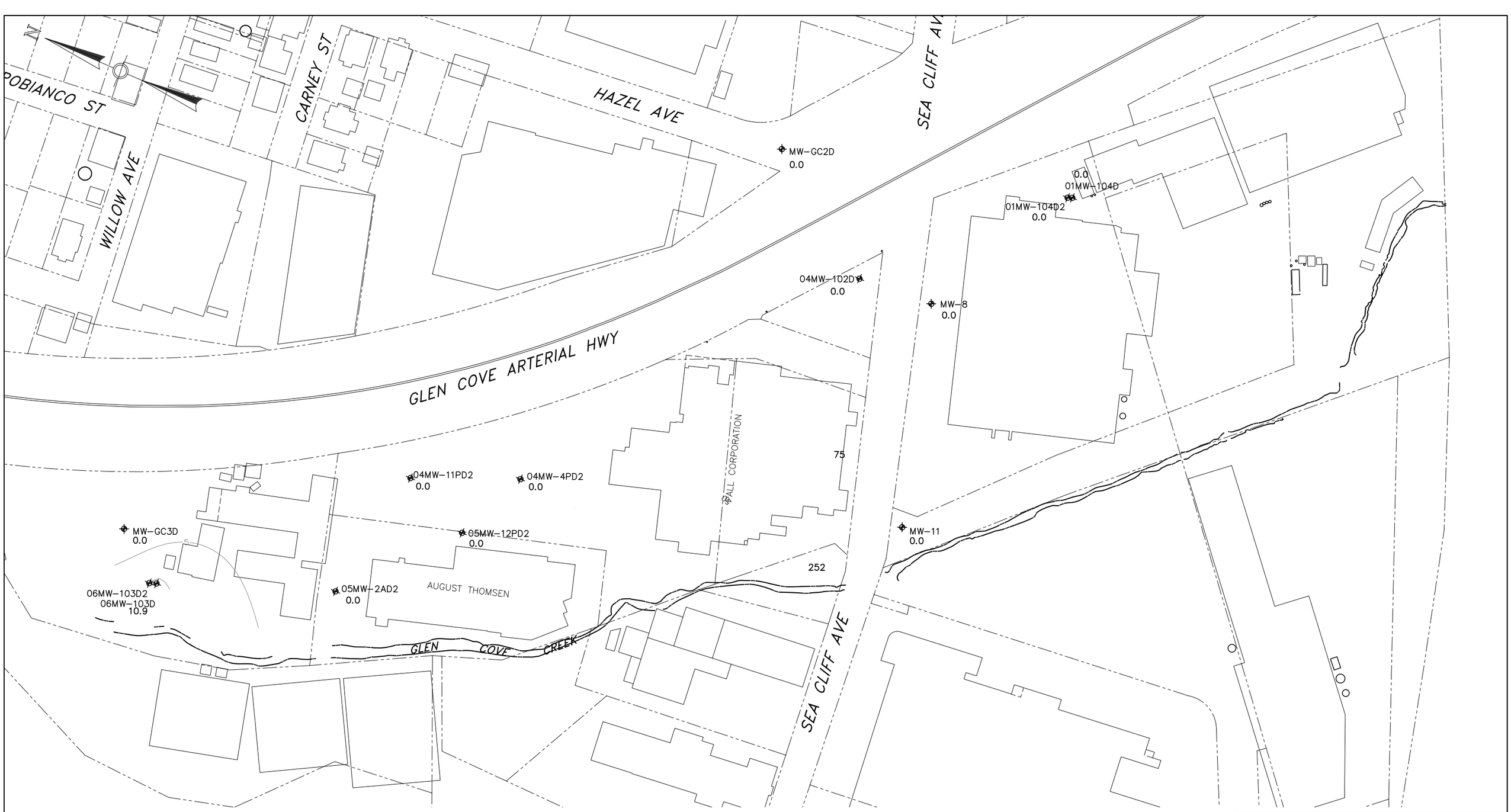
PHOTOCIRCUITS AND PALL CORP.

Glen Cove, New York
NYSDEC SITES 1-30-009 & 1-30-053B

TOTAL CHLORINATED ALIPHATICS - DEEP WELLS - OCTOBER 2008 DATA

EARTH TECH | AECOM

AUGUST 2009 FIGURE NO. 14.2



NOTES:

1. ISOCONCENTRATION CONTOURS GENERATED USING SURFER 8.0 KRIGGING INTERPOLATION METHOD
2. 03MW-103D2 NOT CONSIDERED FOR ISOCONCENTRATION CONTOURS

LEGEND

- MONITORING WELL
- 10.9 TOTAL CHLORINATED ALIPHATIC CONCENTRATION IN µg/L
- 5 ISOCONCENTRATION CONTOUR LINE

0 60 120
SCALE IN FEET

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

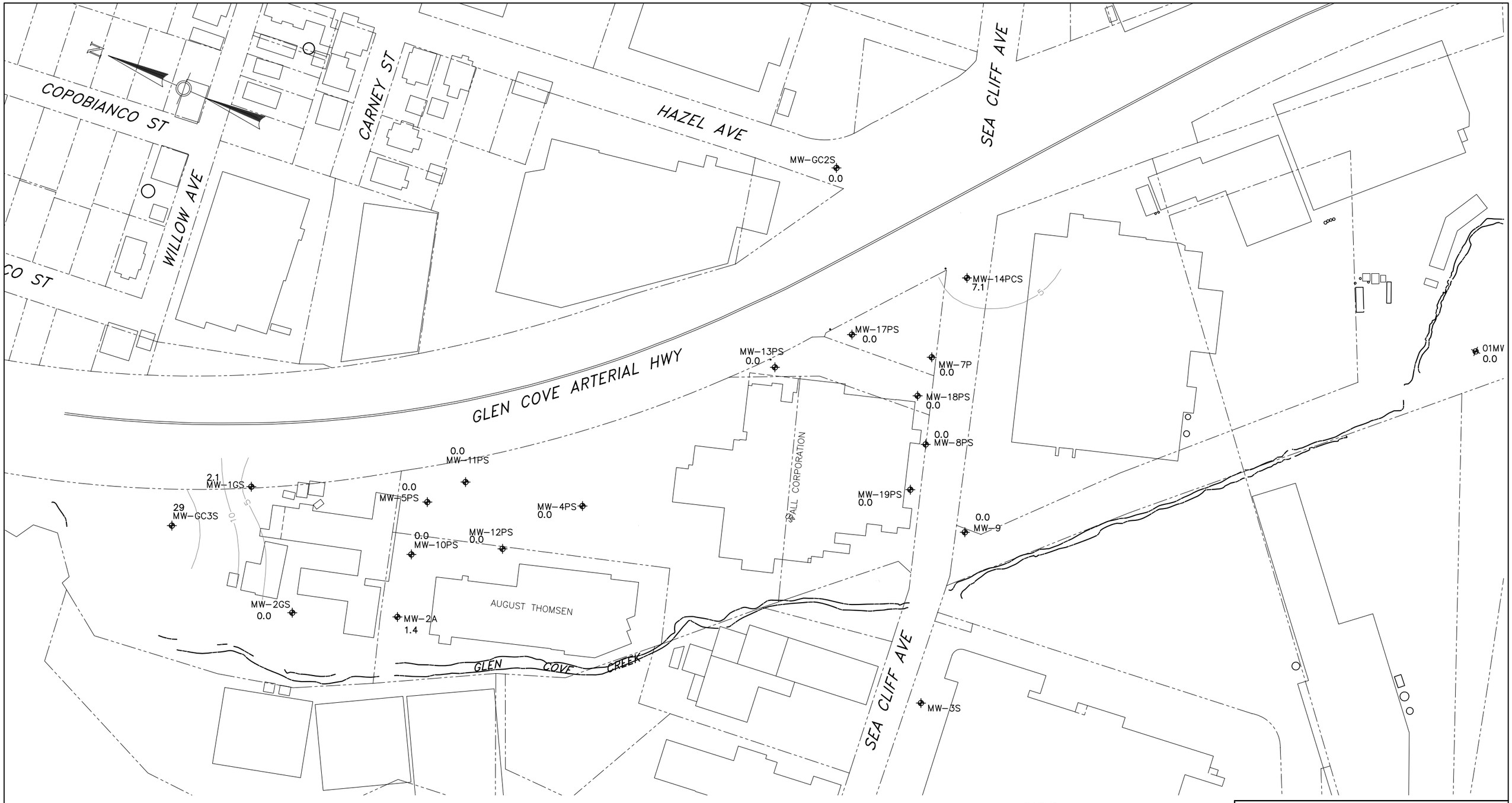
PHOTOCIRCUITS AND PALL CORP.

Glen Cove, New York
NYSDEC SITES 1-30-009 & 1-30-053B

TOTAL CHLORINATED ALIPHATICS – EXTRA DEEP WELLS–APRIL 2008 DATA

EARTH TECH | AECOM

AUGUST 2009 FIGURE NO. 15.1



NOTES:

1. ISOCONCENTRATION CONTOURS GENERATED USING SURFER 8.0 KRIGGING INTERPOLATION METHOD

LEGEND

- MONITORING WELL
- 7.1 — 1,1,1 – TRICHLOROETHANE CONCENTRATION IN µg/L
- 5 — ISOCONCENTRATION CONTOUR

0 60 120
SCALE IN FEET

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

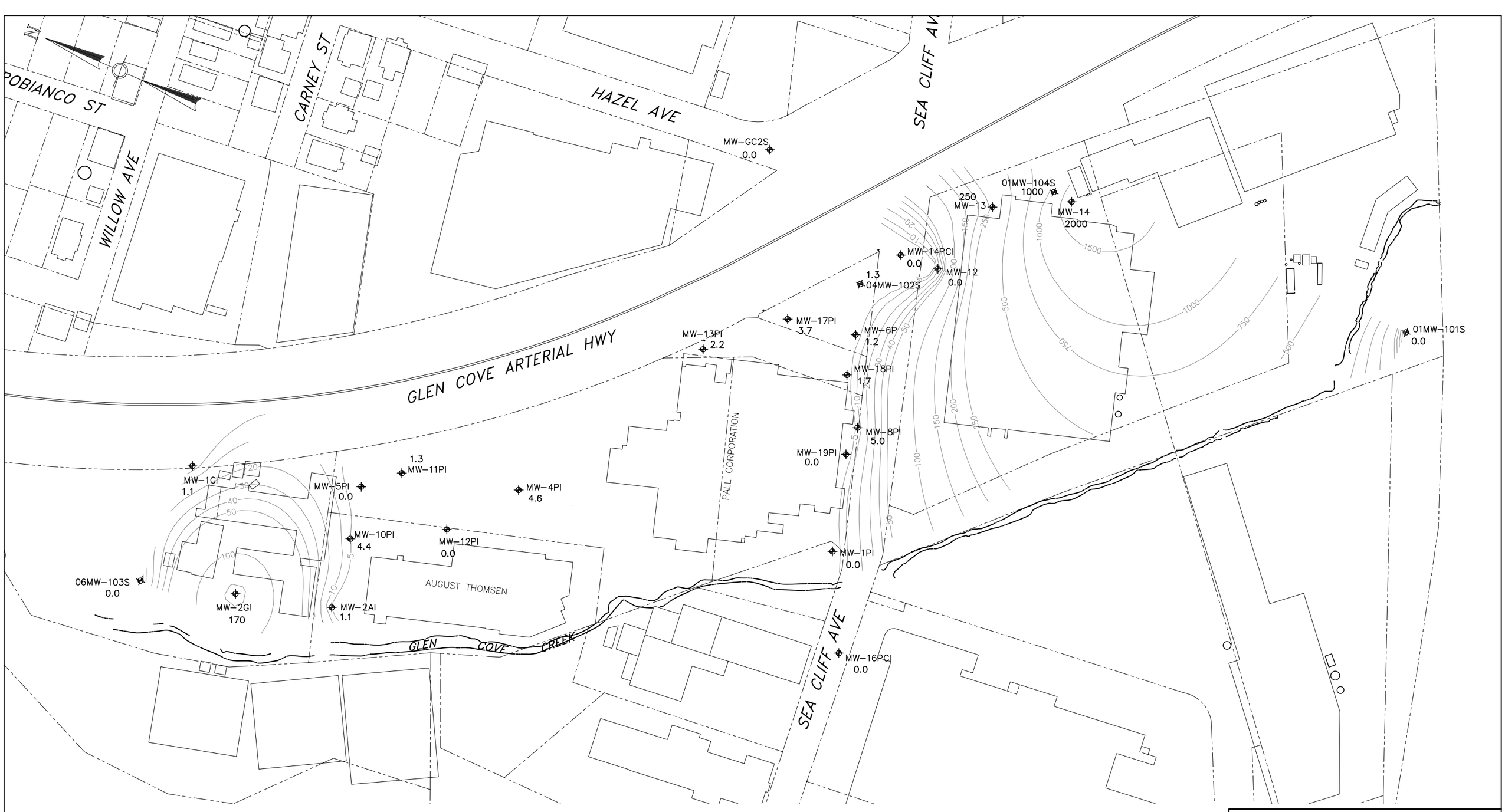
PHOTOCIRCUITS AND PALL CORP.

Glen Cove, New York
NYSDEC SITES 1-30-009 & 1-30-053B

1,1,1 – TRICHLOROETHANE MAP – SHALLOW WELLS – OCTOBER 2008 DATA

EARTH TECH | AECOM

AUGUST 2009 FIGURE NO. 16



NOTES:

1. ISOCONCENTRATION CONTOURS GENERATED USING SURFER 8.0 KRIGGING INTERPOLATION METHOD

LEGEND

- MONITORING WELL
- 5.0 — 1,1,1 – TRICHLOROETHANE CONCENTRATION IN µg/L
- 5.0 — ISOCONCENTRATION CONTOUR LINE

0 60 120
SCALE IN FEET

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

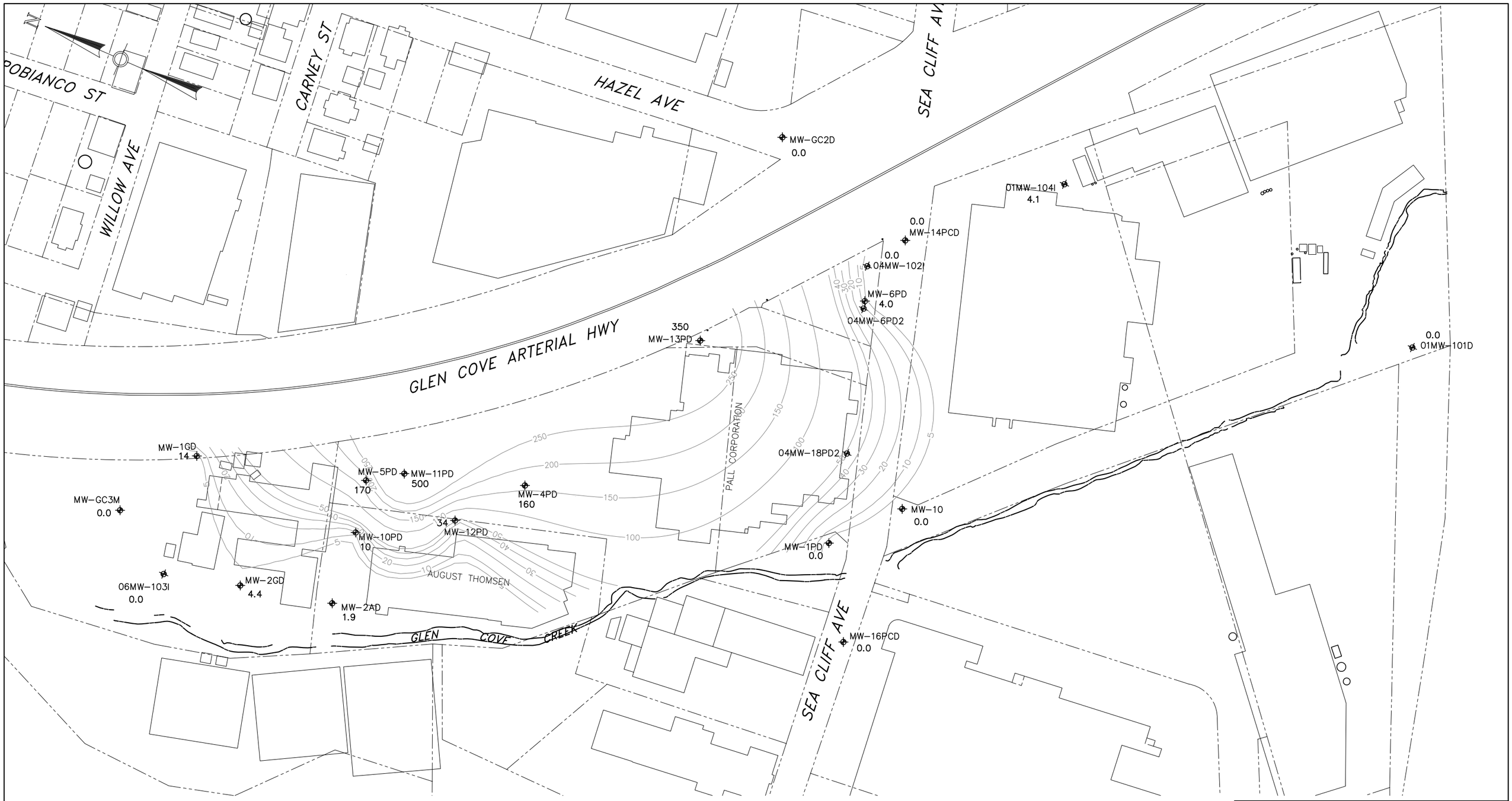
PHOTOCIRCUITS AND PALL CORP.

Glen Cove, New York
NYSDEC SITES 1-30-009 & 1-30-053B

1,1,1 – TRICHLOROETHANE MAP – INTERMEDIATE WELLS – OCTOBER 2008 DATA

EARTH TECH | AECOM

AUGUST 2009 FIGURE NO. 17



NOTES:

1. ISOCONCENTRATION CONTOURS GENERATED USING SURFER 8.0 KRIGGING INTERPOLATION METHOD
2. 04MW-19PD2 AND 04MW-6PD2 NOT CONSIDERED FOR ISOCONCENTRATION CONTOURS

LEGEND

- MONITORING WELL
- 500 — 1,1,1 – TRICHLOROETHANE CONCENTRATION IN µg/L
- 250 — ISOCONCENTRATION CONTOUR LINE

0 60 120
SCALE IN FEET

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

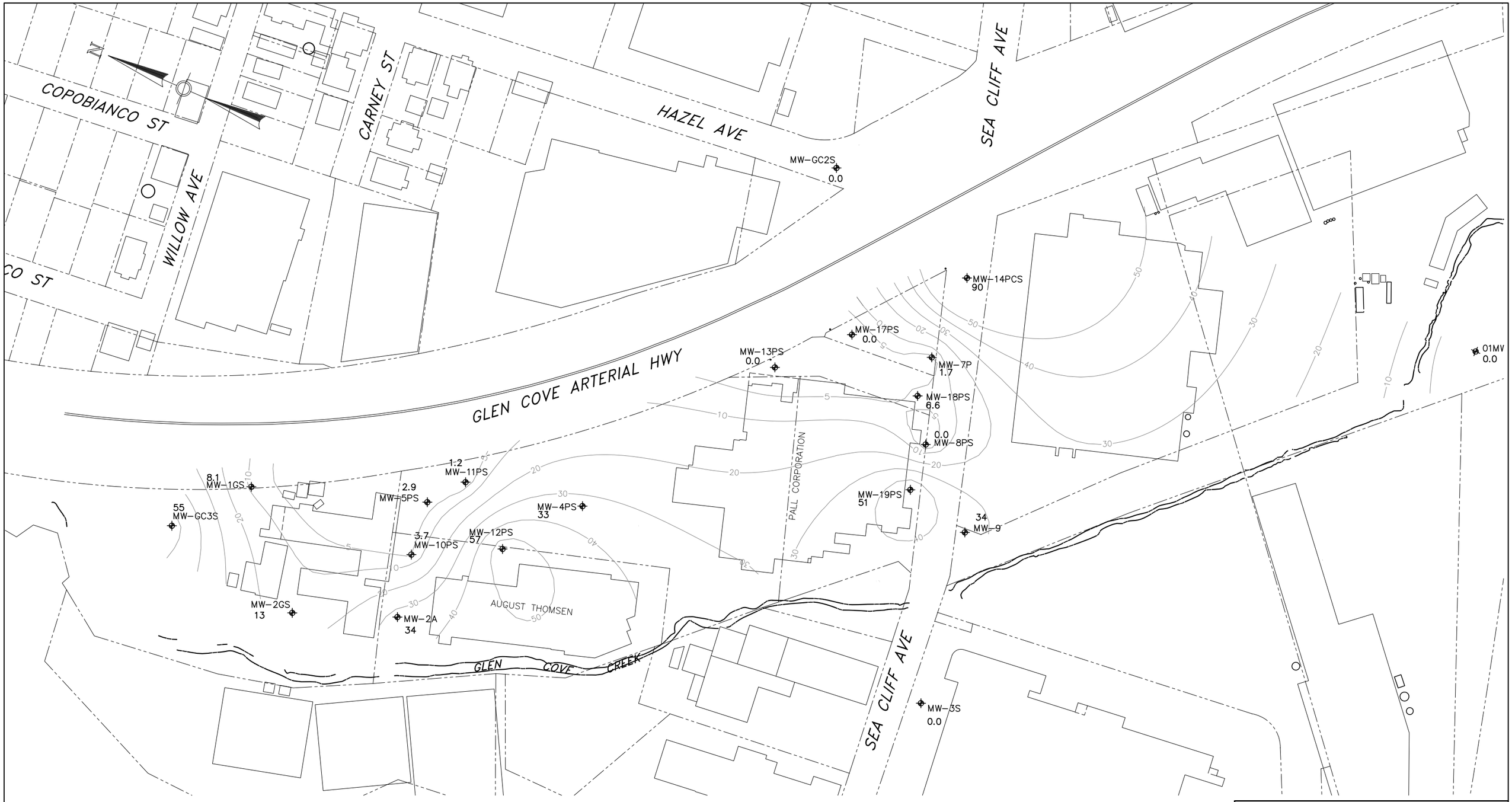
PHOTOCIRCUITS AND PALL CORP.

Glen Cove, New York
NYSDEC SITES 1-30-009 & 1-30-053B

1,1,1 – TRICHLOROETHANE MAP – DEEP WELLS – OCTOBER 2008 DATA

EARTH TECH | AECOM

AUGUST 2009 FIGURE NO. 18



NOTES:

1. ISOCONCENTRATION CONTOURS GENERATED USING SURFER 8.0 KRIGGING INTERPOLATION METHOD

LEGEND

- MONITORING WELL
- 34 TOTAL TRICHLOROETHANE DAUGHTER PRODUCT CONCENTRATION IN µg/L
- 10 ISOCONCENTRATION CONTOUR

0 60 120
SCALE IN FEET

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

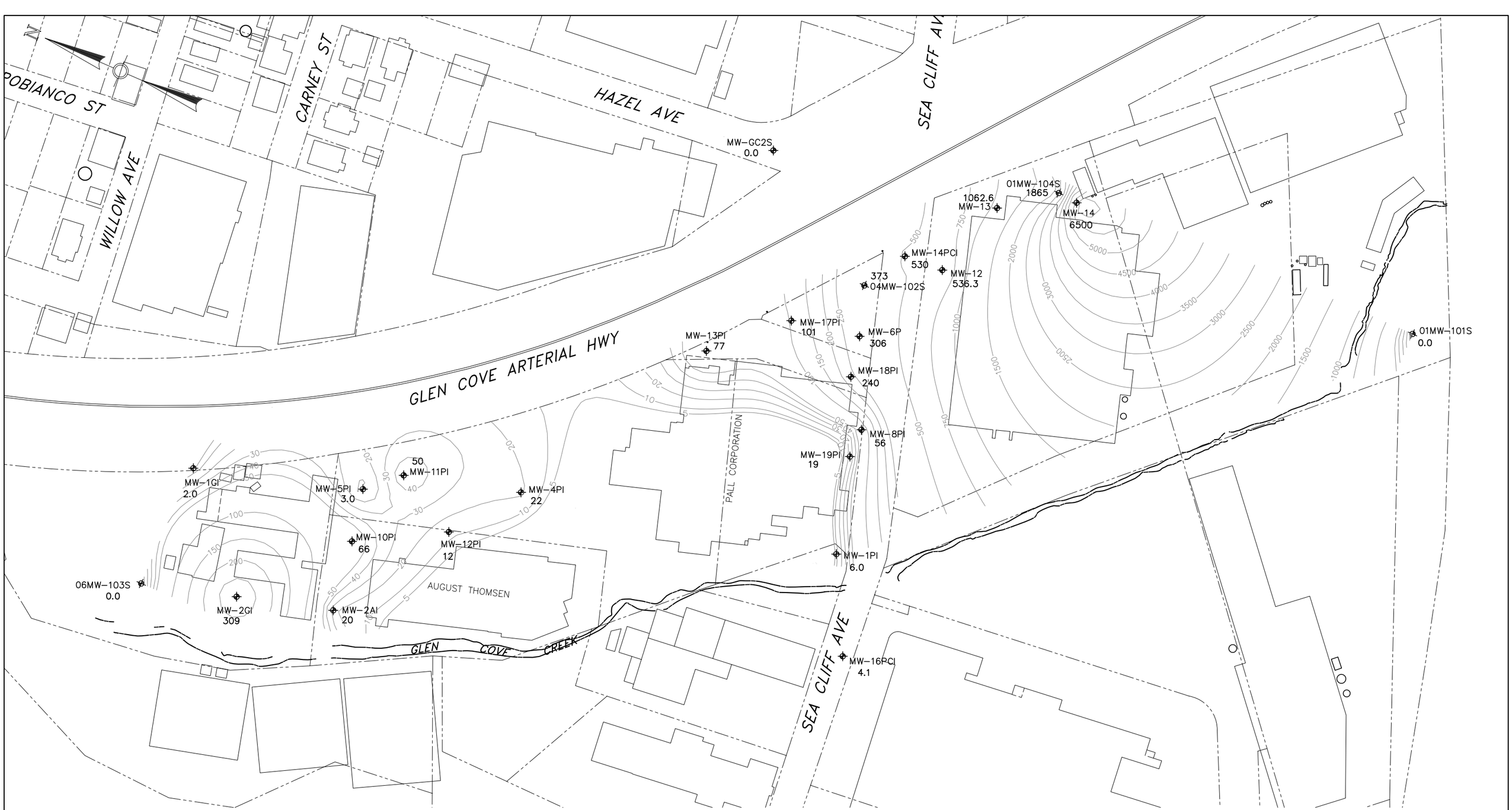
PHOTOCIRCUITS AND PALL CORP.

Glen Cove, New York
NYSDEC SITES 1-30-009 & 1-30-053B

TOTAL TRICHLOROETHANE DAUGHTER PRODUCT MAP-SHALLOW WELLS - OCTOBER 2008 DATA

EARTH TECH | AECOM

AUGUST 2009 FIGURE NO. 19



NOTES:

1. ISOCONCENTRATION CONTOURS GENERATED USING SURFER 8.0 KRIGGING INTERPOLATION METHOD

LEGEND

- MONITORING WELL
- 530 TOTAL TRICHLOROETHANE DAUGHTER PRODUCT CONCENTRATION IN µg/L
- 50 ISOCONCENTRATION CONTOUR LINE

0 60 120
SCALE IN FEET

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

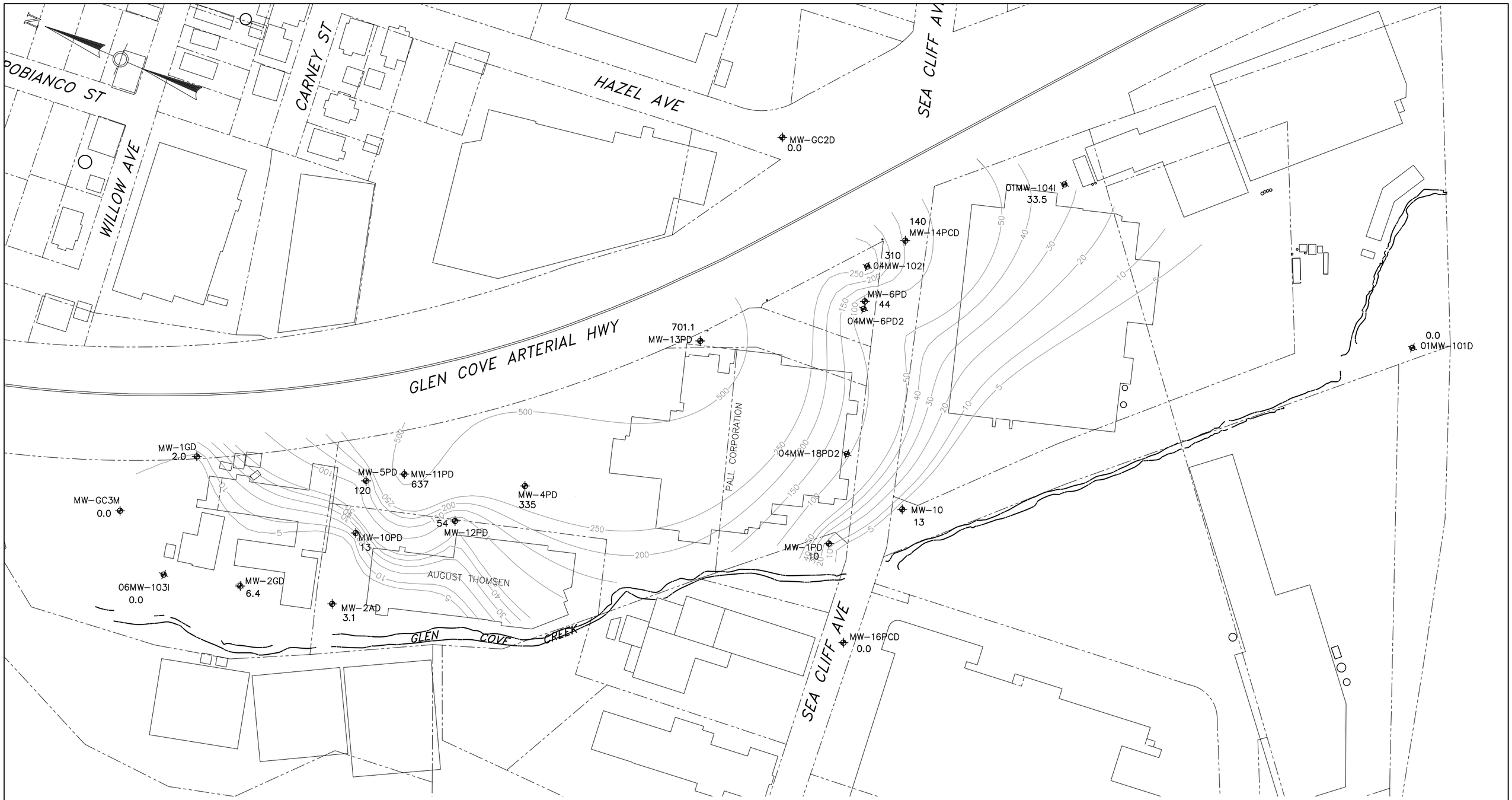
PHOTOCIRCUITS AND PALL CORP.

Glen Cove, New York
NYSDEC SITES 1-30-009 & 1-30-053B

TOTAL TRICHLOROETHANE DAUGHTER PRODUCT MAP-INTERMEDIATE WELLS - OCTOBER 2008 DATA

EARTH TECH | AECOM

AUGUST 2009 FIGURE NO. 20



NOTES:

1. ISOCONCENTRATION CONTOURS GENERATED USING SURFER 8.0 IKRIGGING INTERPOLATION METHOD
2. 04MW-19PD2 AND 04MW-6PD2 NOT CONSIDERED FOR ISOCONCENTRATION CONTOURS

LEGEND

- MONITORING WELL
- 13 TOTAL TRICHLOROETHANE DAUGHTER PRODUCT CONCENTRATION IN µg/L
- 100 ISOCONCENTRATION CONTOUR LINE

0 60 120
SCALE IN FEET

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

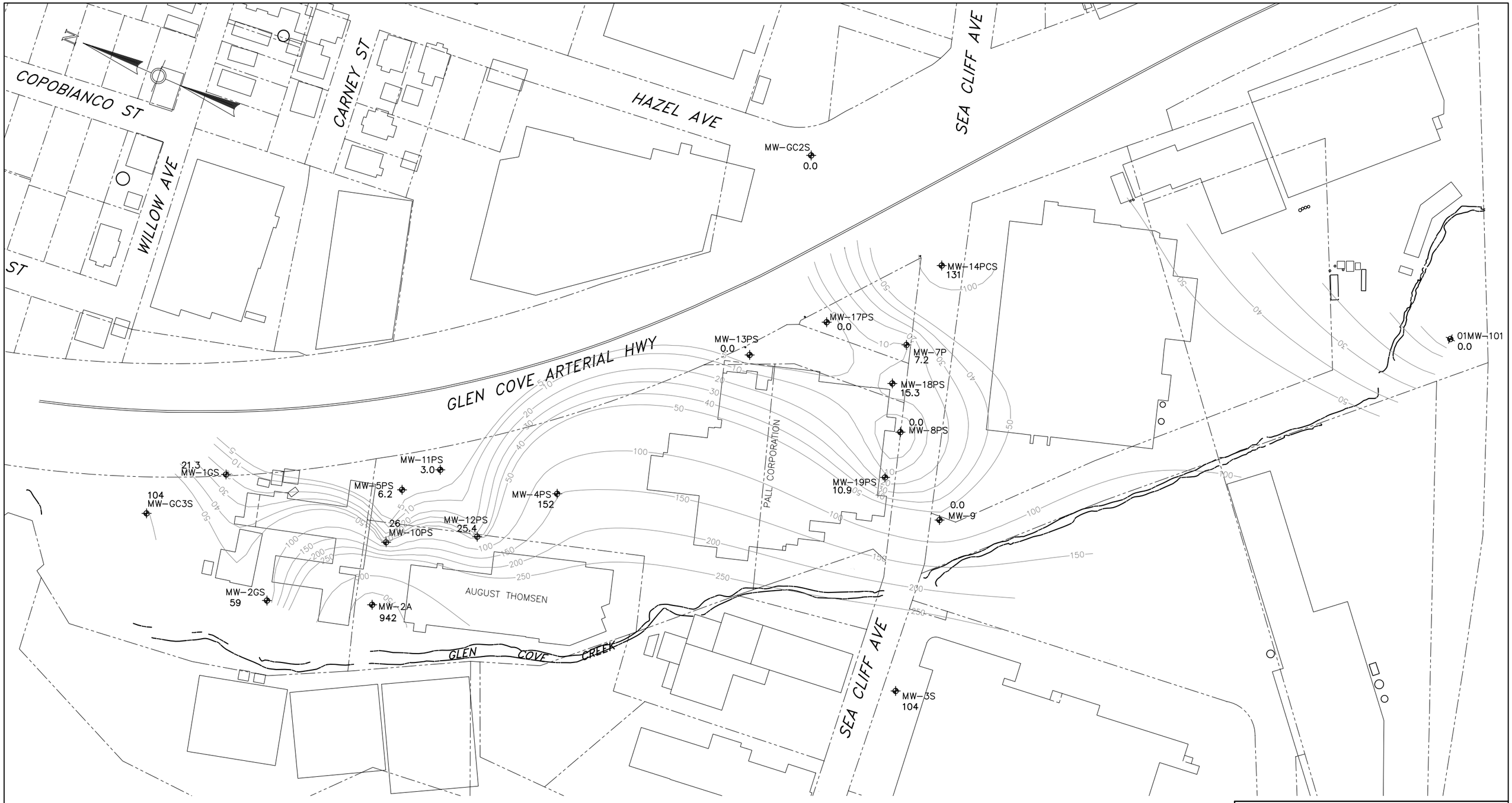
PHOTOCIRCUITS AND PALL CORP.

Glen Cove, New York
NYSDEC SITES 1-30-009 & 1-30-053B

TOTAL TRICHLOROETHANE DAUGHTER PRODUCT MAP-DEEP WELLS - OCTOBER 2008 DATA

EARTH TECH | AECOM

AUGUST 2009 FIGURE NO. 21



NOTES:

1. ISOCONCENTRATION CONTOURS GENERATED USING SURFER 8.0 KRIGGING INTERPOLATION METHOD

LEGEND

- MONITORING WELL
- 7.1 TOTAL CHLOROETHENE PARENT PRODUCT CONCENTRATION IN µg/L
- 5 ISOCONCENTRATION CONTOUR

0 60 120
SCALE IN FEET

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

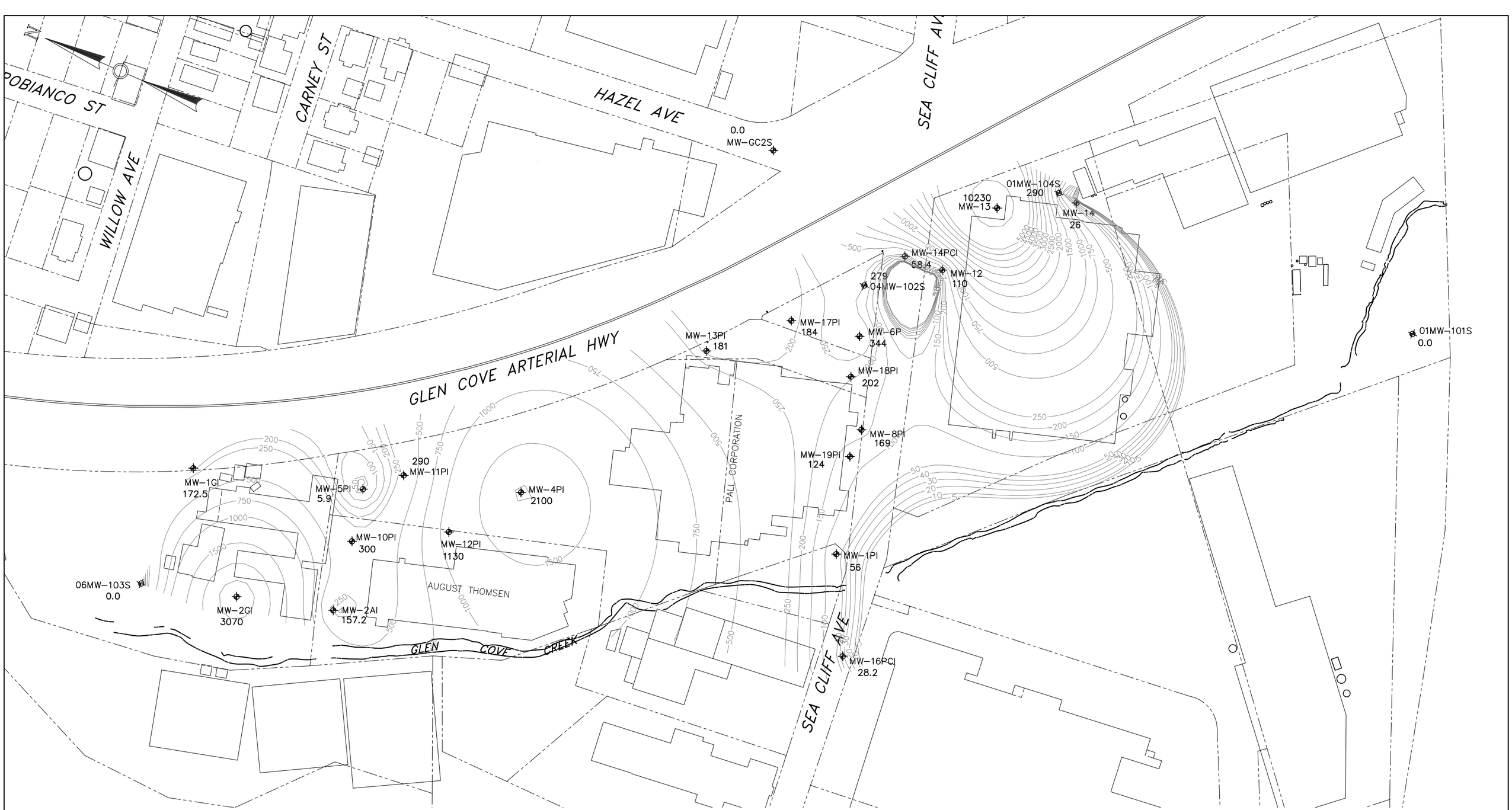
PHOTOCIRCUITS AND PALL CORP.

Glen Cove, New York
NYSDEC SITES 1-30-009 & 1-30-053B

TOTAL CHLOROETHENE PARENT PRODUCT
MAP- SHALLOW WELLS - OCTOBER 2008 DATA

EARTH TECH | AECOM

AUGUST 2009 FIGURE NO. 22



NOTES:

1. ISOCONCENTRATION CONTOURS GENERATED USING SURFER 8.0 KRIGGING INTERPOLATION METHOD

LEGEND

- MONITORING WELL
- 202 TOTAL CHLOROETHANE PARENT PRODUCT CONCENTRATION IN µg/L
- 50 ISOCONCENTRATION CONTOUR LINE

0 60 120
SCALE IN FEET

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

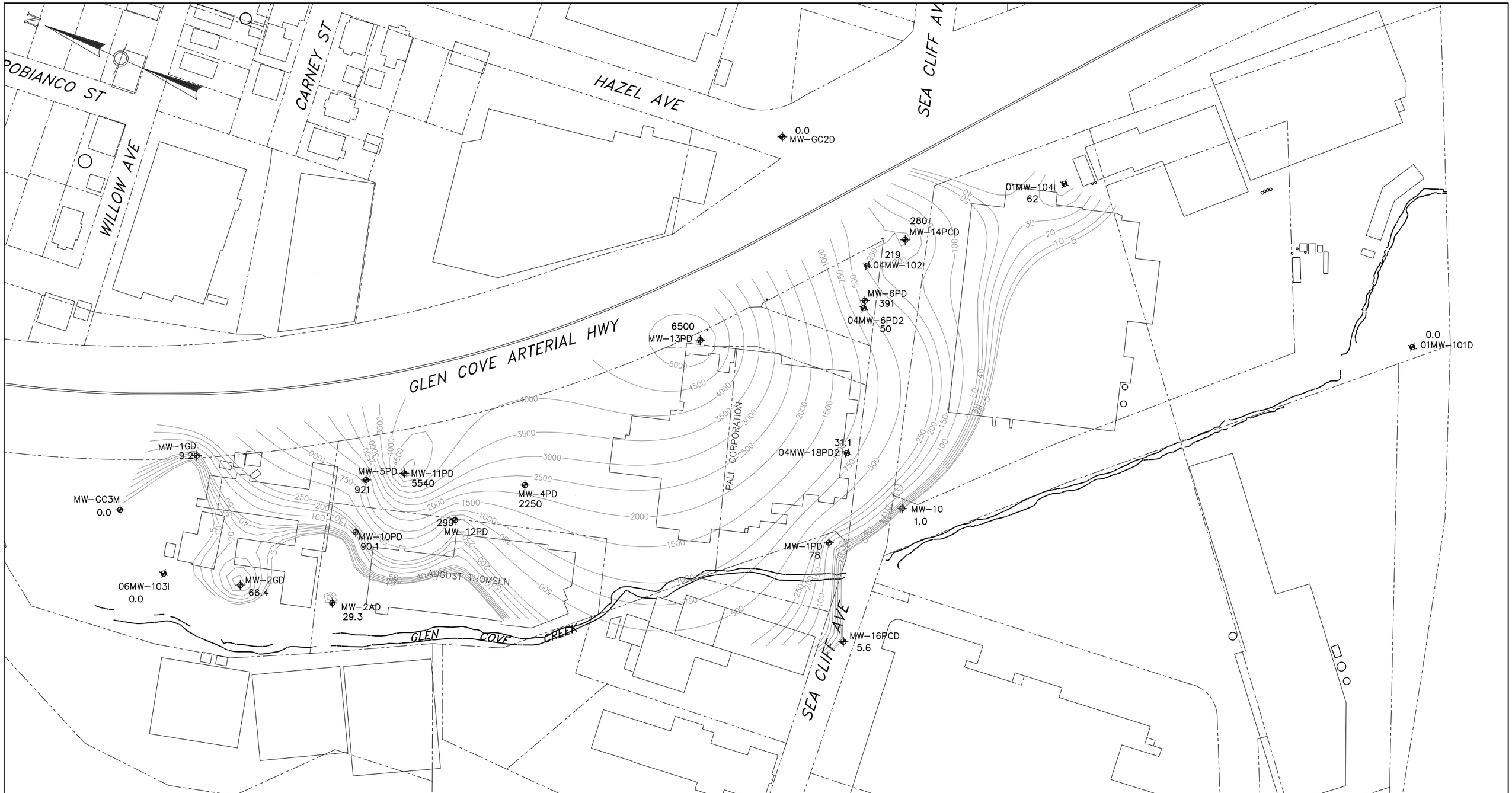
PHOTOCIRCUITS AND PALL CORP.

Glen Cove, New York
NYSDEC SITES 1-30-009 & 1-30-053B

TOTAL CHLOROETHENE PARENT PRODUCT
MAP- INTERMEDIATE WELLS - OCTOBER 2008 DATA

EARTH TECH | AECOM

AUGUST 2009 FIGURE NO. 23



NOTES:

1. ISOCONCENTRATION CONTOURS GENERATED USING SURFER 8.0 KRIGGING INTERPOLATION METHOD
2. 04MW-19PD2 AND 04MW-6PD2 NOT CONSIDERED FOR ISOCONCENTRATION CONTOURS

LEGEND

- MONITORING WELL
- 2250 TOTAL CHLOROETHENE PARENT PRODUCT CONCENTRATION IN µg/L
- 250 ISOCONCENTRATION CONTOUR LINE

0 60 120
SCALE IN FEET

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PHOTOCIRCUITS AND PALL CORP.

Glen Cove, New York
NYSDEC SITES 1-30-009 & 1-30-053B

TOTAL CHLOROETHENE PARENT PRODUCT
MAP- DEEP WELLS - OCTOBER 2008 DATA

EARTH TECH | AECOM

AUGUST 2009 FIGURE NO. 24

COPOBIANCO ST

WILLOW AVE

CARNEY ST

HAZEL AVE

SEA CLIFF AVE

GLEN COVE ARTERIAL HWY

GLEN COVE CREEK

PALL CORPORATION

AUGUST THOMSEN

MW-GC2S
0.0

MW-14PCS
565.8

MW-17PS
0.0

MW-13PS
0.0

MW-7P
10.7

MW-18PS
33.9

5.1
MW-8PS

MW-19PS
113.4

135.2
MW-9

01MV
0.0

8.8
MW-11PS

29
MW-1CS

62
MW-5PS

64
MW-GC3S

MW-4PS
152.4

232
MW-10PS

MW-12PS
92.6

MW-2GS
609.1

MW-2A
171.4

MW-3S
10

NOTES:

1. ISOCONCENTRATION CONTOURS GENERATED USING SURFER 8.0 KRIGGING INTERPOLATION METHOD

LEGEND

- MONITORING WELL
- 10 TOTAL CHLOROETHANE DAUGHTER PRODUCT CONCENTRATION IN µg/L
- 50 ISOCONCENTRATION CONTOUR

0 60 120
SCALE IN FEET

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

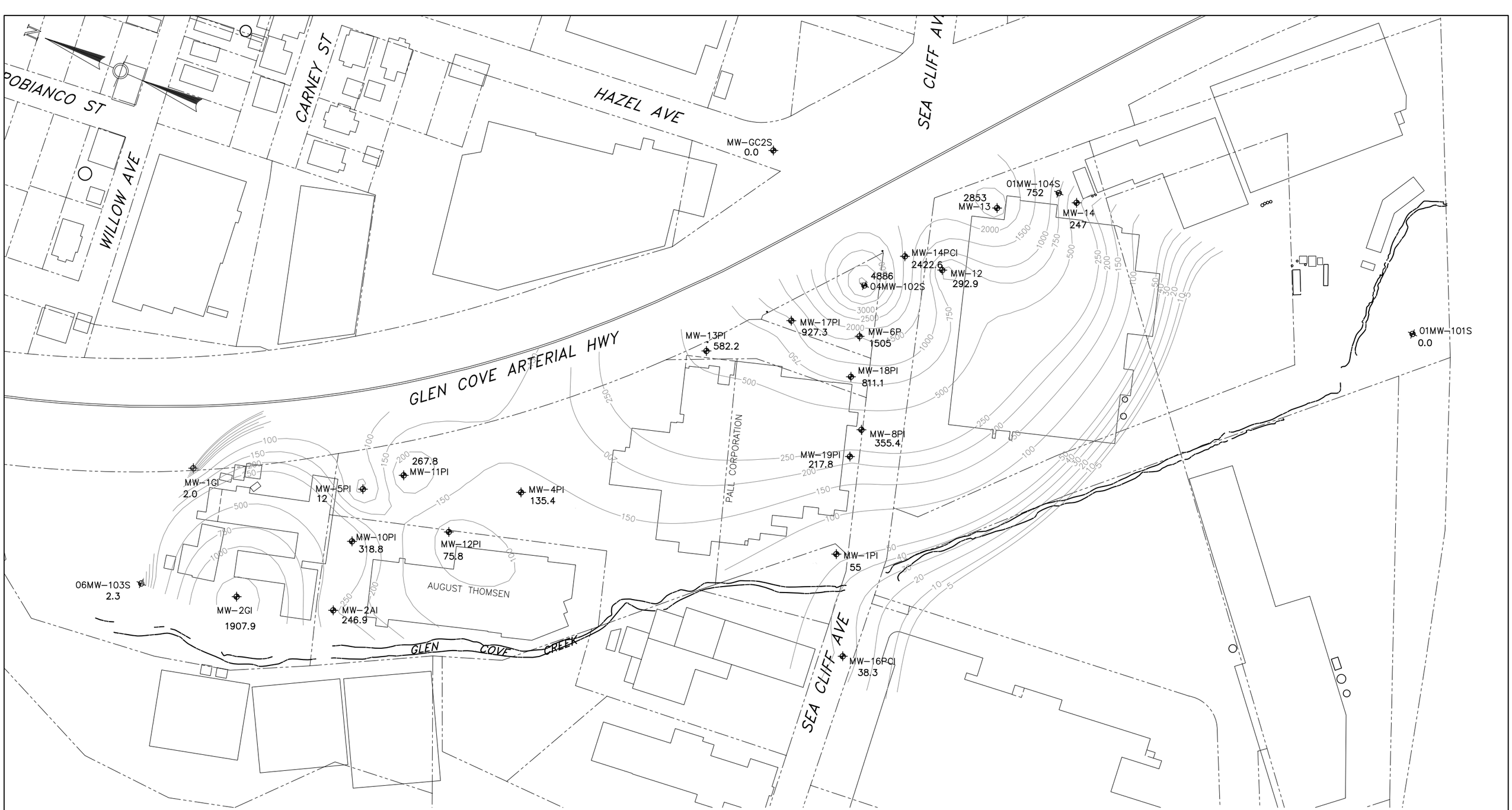
PHOTOCIRCUITS AND PALL CORP.

Glen Cove, New York
NYSDEC SITES 1-30-009 & 1-30-053B

TOTAL CHLOROETHENE DAUGHTER PRODUCT MAP- SHALLOW WELLS - OCTOBER 2008 DATA

EARTH TECH | AECOM

AUGUST 2009 FIGURE NO. 25



NOTES:

1. ISOCONCENTRATION CONTOURS GENERATED USING SURFER 8.0 KRIGGING INTERPOLATION METHOD

LEGEND

- MONITORING WELL
- 38.3 TOTAL CHLOROETHENE DAUGHTER PRODUCT CONCENTRATION IN mg/L
- 500 ISOCONCENTRATION CONTOUR LINE

0 60 120
SCALE IN FEET

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

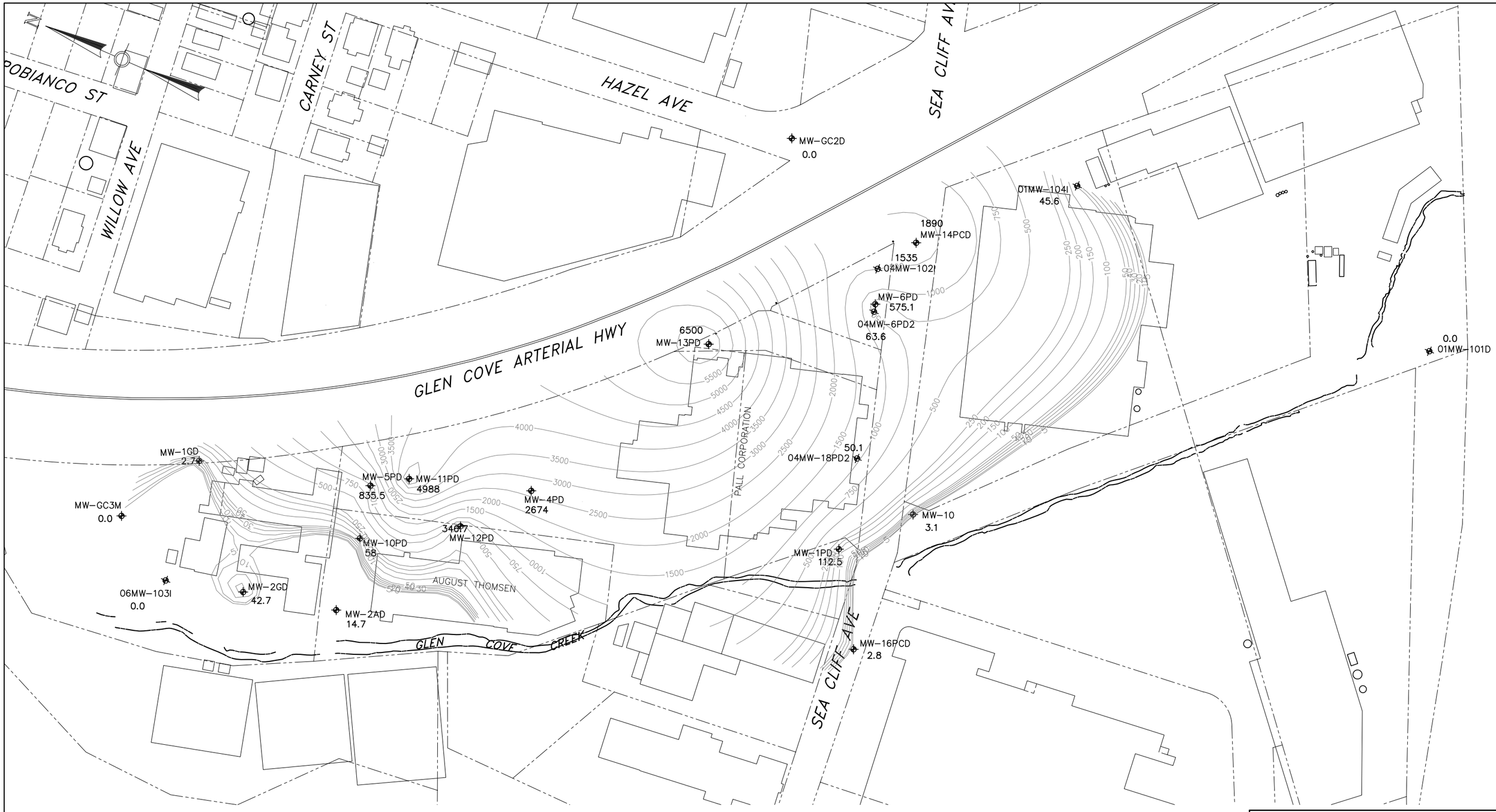
PHOTOCIRCUITS AND PALL CORP.

Glen Cove, New York
NYSDEC SITES 1-30-009 & 1-30-053B

TOTAL CHLOROETHENE DAUGHTER PRODUCT
MAP- INTERMEDIATE WELLS - OCTOBER 2008 DATA

EARTH TECH | AECOM

AUGUST 2009 FIGURE NO. 26



NOTES:

1. ISOCONCENTRATION CONTOURS GENERATED USING SURFER 8.0 KRIGGING INTERPOLATION METHOD
2. 04MW-19PD2 AND 04MW-6PD2 NOT CONSIDERED FOR ISOCONCENTRATION CONTOURS

LEGEND

- MONITORING WELL
- 112.5 TOTAL CHLOROETHENE DAUGHTER PRODUCT CONCENTRATION IN µg/L
- 250 ISOCONCENTRATION CONTOUR LINE

0 60 120
SCALE IN FEET

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PHOTOCIRCUITS AND PALL CORP.

Glen Cove, New York
NYSDEC SITES 1-30-009 & 1-30-053B

TOTAL CHLOROETHENE DAUGHTER PRODUCT
MAP- DEEP WELLS - OCTOBER 2008 DATA

EARTH TECH | AECOM

AUGUST 2009 FIGURE NO. 27

ST

WILLOW AVE

CARNEY ST

HAZEL AVE

GLEN COVE ARTERIAL HWY

Assumed northern extent of contamination at
Carney Street wellfield; actual extent not determined.

GLEN COVE DAY
CARE CENTER

AUGUST THOMSEN

GLEN COVE CREEK

PALL CORPORATION

ASSOCIATED
DRAPERIES

SEA CLIFF AVE

PHOTOCIRCUITS
BUTLER NO. 1

BUTLER
NO. 2

PHOTOCIRCUITS
MAIN BUILDING

FORMER TANK
FARM AREA

Assumed southern extent of contamination on Photocircuits property.

GLEN HEAD COUNTRY CLUB

PHOTOCIRCUITS
BUTLET NO. 3

A separate ROD has been issued by NYSDEC in 2008 for the
former Pass and Seymour site 1-30-053A;
Not included in estimates for the Photocircuits/Pall Corp RI/FS.

FORMER SLATER ELECTRIC
PASS & SEYMOUR

LEGEND

MONITORING WELL

PROPERTY BOUNDARY

0 60 120
SCALE IN FEET

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PHOTOCIRCUITS AND PALL CORP.

Glen Cove, New York

NYSDEC SITES 1-30-009 & 1-30-053B

APPROXIMATE CONTAMINATED AREAS WITHIN
PHOTOCIRCUITS/PALL CORP RI STUDY AREA

EARTH TECH | AECOM

AUGUST 2009 FIGURE NO. 28