



NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
 DIVISION OF ENVIRONMENTAL REMEDIATION
Site Classification Report



6/21/2011

Site Code: 130003D	Site Name: Town of Oyster Bay Ice Skating Center
City: Bethpage	Town: Oyster Bay
Region: 1	County: Nassau
Current Classification: P	Proposed Classification: 02
Estimated Size (acres): 1.50	Disposal Area: Structure
Significant Threat: Unknown	Site Type:
Priority ranking Score: 280	Project Manager: Steven Scharf

Summary of Approvals

Originator/Supervisor: John Swartwout **02/15/2011**

RHWRE: Walter Parish: **03/10/2011**

BEEI of NYSDOH:

CO Bureau Director: James Harrington, Director, Remedial Bureau A: **03/11/2011**

Assistant Division Director: Robert Schick:

Site Description

Location: The Ice Skating Rink is in Bethpage Community Park and is located in an urbanized area of Bethpage, adjacent to the Northrop Grumman site (Grumman), formerly Grumman Aerospace, and near the Naval Weapons Industrial Reserve Plant.

Site Features: The only site feature is the new ice skating center building.

Current Zoning/Use: The site has been utilized as a Town park since the mid-1960s. It is zoned for light industrial use. The surrounding parcels are used for a combination of industrial, commercial, and residential uses. Bethpage High School is located across Stewart Avenue from the site.

Historical Uses: Grumman has been operating in Bethpage since the early 1930s. The 1.5-acre portion of Bethpage Community Park where the ice skating rink is located was owned by Grumman but was wooded and was not utilized by Grumman for industrial purposes. The 18-acre area which is now Bethpage Community Park was donated by Grumman to the Town of Oyster Bay in 1962 and was subsequently developed into a park. The current indoor ice skating facility was constructed by the Town in 2009 to replace the former outdoor ice skating facility which had been at this location since the 1960s. This was the 2nd time that the ice skating rink has been replaced.

Operable Units: There is only a single operable unit for this site (OU 01), however Bethpage Community Park in its entirety was previously investigated as an offsite operable unit (OU 03) of the Grumman site (site ID # 130003A) due to the former Grumman settling ponds which had been located there. This investigation included the area where the Ice Skating Rink is located.



NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF ENVIRONMENTAL REMEDIATION
Site Classification Report



6/21/2011

Site Code: 130003D

Site Name: Town of Oyster Bay Ice Skating Center

Site Geology and Hydrogeology: The site sits on the Long Island glacial sand deposits which have been designated as a sole source aquifer. Depth to groundwater (upper glacial aquifer) is 50 to 55 feet and flow is generally southward. The upper glacial aquifer is underlain by the magathy aquifer which is the primary source of drinking water. Periodic lower permeability silty-sand and clay lenses exist throughout the area. Most of these confining layers are not continuous in the area of study.

Contaminants of Concern (Including Materials Disposed)	Quantity Disposed
---	--------------------------

OU 01

CHLORODIFLUOROMETHANE
DICHLORODIFLUOROMETHANE

Analytical Data Available for : Groundwater, Soil, Soil Vapor, Indoor Air

Applicable Standards Exceeded for: Groundwater

Site Environmental Assessment

Nature and Extent of Contamination: The Grumman (site ID # 130003A) OU 3 investigation of the former settling ponds found significant soil, soil vapor, and groundwater contamination at Bethpage Community Park. In addition to the contamination originating at the former Grumman settling ponds, significant groundwater and soil vapor contamination with Freon compounds was found to be emanating from the former outdoor ice skating rink. These compounds {Chlorodifluoromethane (Freon 22) and Dichlorodifluoromethane (Freon 12)} had been used as refrigerants at the rink and leaks in the refrigeration system had been documented. Trace levels of Freon 22 were found in shallow soil under the old rink. The maximum Freon 22 concentration in groundwater was found to be 290 ug/L just downgradient of the ice rink with concentrations greater than 100 ug/L persisting to the downgradient extent of Bethpage Community Park. The Freon plume is generally east of and below the VOC plume emanating from the former Grumman settling ponds(the OU 3 plume)but comingles with it as both plumes move southward. Freons 12 and 22 were found in soil gas in the vicinity of the ice rink at levels as high as 646,000 ug/m³. Freon 22 was found in soil gas on school property across the street from the ice rink at 98,100 ug/m³, immediately adjacent to the high school building at 526 ug/m³, in crawl space air at the high school at 49.7 ug/m³ and in first floor indoor air at 12 ug/m³. Most contaminated soils on the 7-acre portion of the park where the ice skating facility is located were removed by the Town of Oyster Bay as an Interim Remedial Measure in connection with redevelopment of the new ice skating facility. Additional on-site and off-site remediation is required.

Special Resources Impacted/Threatened: The Long Island Sole Source Aquifer has been impacted.

Significant Threat: This site presents a significant threat due to the release of contaminants from the source area into groundwater and soil vapor.

Site Health Assessment



6/21/2011

Site Code: 130003D

Site Name: Town of Oyster Bay Ice Skating Center

People are not drinking contaminated groundwater because the area is served by a public water supply that is treated to remove contaminants before distribution to consumers. Volatile organic compounds in the groundwater may move into the soil vapor (air spaces within the soil), which in turn may move into overlying buildings and affect the indoor air quality. This process, which is similar to the movement of radon gas from the subsurface into the indoor air of buildings, is referred to as soil vapor intrusion. Based on available data, the potential exists for the inhalation of site-related contaminants in indoor air of the Ice Skating Rink building via soil vapor intrusion. Sampling identified impacts to the indoor air by site-related contaminants in the high school building across the street from the site; however, these contaminants are not at levels which represent a health concern.

Remedy Description and Cost

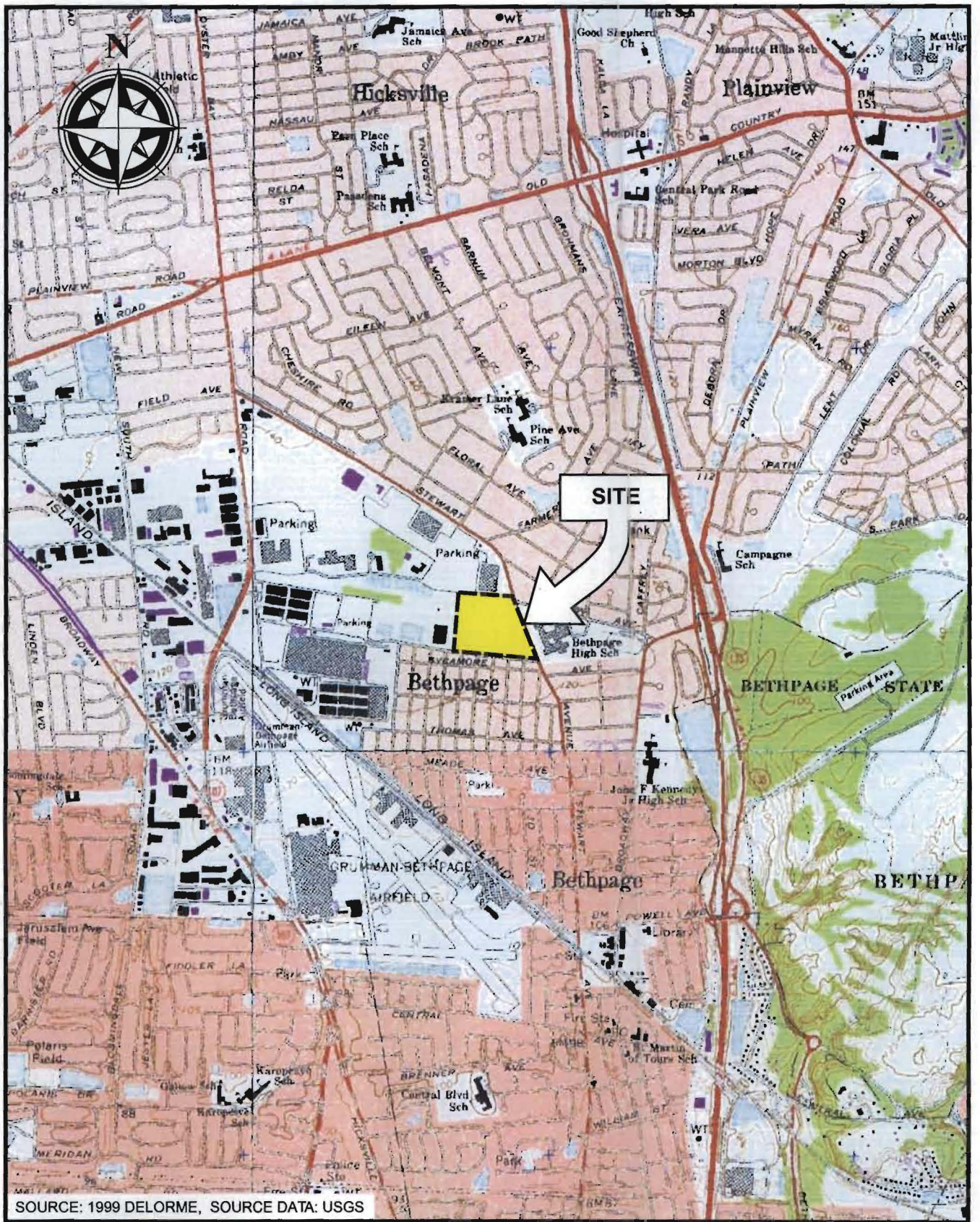
Remedy Description for Operable Unit 01

Total Cost

OU	Site Management Plan Approval:	Status:

Basis for Classification Change

A deposition from a former Town employee documented the leakage of Freon compounds from the refrigeration system of the old municipal ice rink at the park over a period of years. Field investigations conducted by the Town, Grumman, and DEC identified trace levels of Freon in the soil beneath the old rink and significant levels of Freon compounds in groundwater at and downgradient of the old rink. The Class GA groundwater standard is exceeded by a significant margin (290 ppb vs. 5 ppb). The Freon contamination is not being fully captured by Grumman's IRMs for groundwater and soil vapor at the Bethpage Community Park. The extent of contamination has not been determined. A park, a high school, and a residential area are downgradient of the rink.



SOURCE: 1999 DELORME, SOURCE DATA: USGS

RLA/MAPS/NORTHROP1572(02/08/02)

db Dvirka and Bartilucci
 CONSULTING ENGINEERS
 A DIVISION OF WILLIAM F. COULICH ASSOCIATES, P.C.

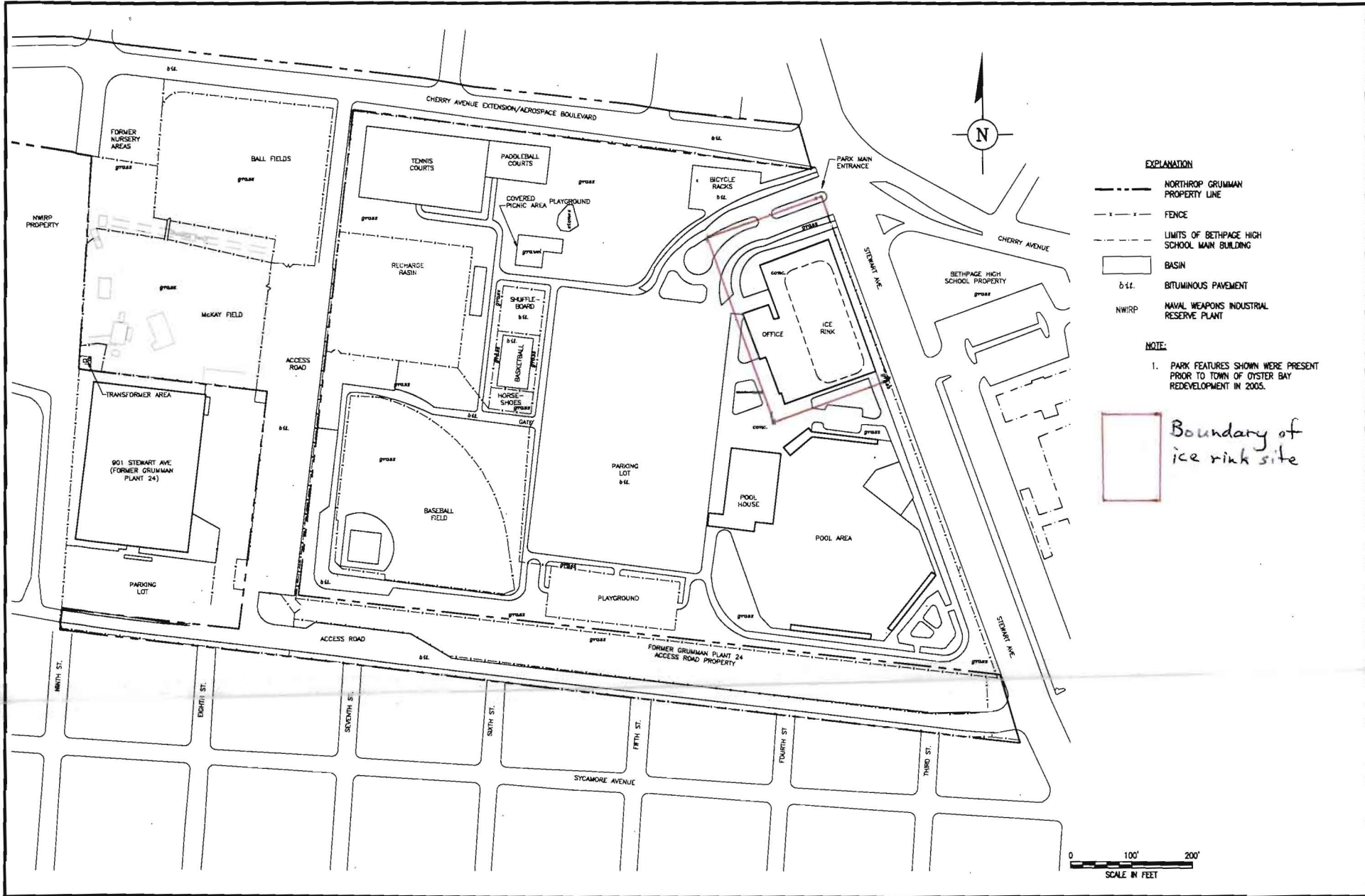
TOWN OF OYSTER BAY
 BETHPAGE COMMUNITY PARK
 BETHPAGE, NEW YORK
SITE LOCATION MAP

FIGURE 2-1

Current Plan No.: 10174
 Date: 01/24/08
 Project No.: 10174

Drawn By: J. G. [Name]
 Checked By: [Name]
 Date: 01/24/08

2008
 ARCADIS OF NEW YORK, INC.



NO.	ISSUED DATE	REVISION DESCRIPTION	BY/CHKD
0	01/2008	REMEDIAL INVESTIGATION REPORT	MR

SEAL

ARCADIS
 OF NEW YORK, INC.

Two Huntington Quadrangle
 Suite 1810
 Melville, NY 11747
 Tel: 631-348-7888 Fax: 631-348-7818
 www.arcadis-usa.com

PROJECT TITLE
**NORTHROP GRUMMAN SYSTEMS CORPORATION
 OPERABLE UNIT 3
 (FORMER GRUMMAN SETTLING PONDS)
 BETHPAGE, NEW YORK**

PROJECT MANAGER
C. SAN GIOVANNI

DEPARTMENT MANAGER
M. WOLFERT

SHEET TITLE
**PARK FEATURES
 (PRIOR TO TOWN OF
 OYSTER BAY REDEVELOPMENT)**

LEAD DESIGN PROF.
 TASK/PHASE NUMBER
00007

PROJECT NUMBER
NY001464.0807

CHECKED BY
M. REINDL

DRAWN BY
A. SANCHEZ

DRAWING NUMBER
1-2



1-30-003A-SV01	SV-01
	ug/m ³
Axylene	32.8
Benzene	2.01
1,3-Butadiene	3.77 J
2-Butene	3.86
Carbon dioxide	1.31
Chlorofluoromethane	8,400 EJ
Chloroform	1.34 J
Chloromethane	0.265 J
1-Chloro-2-propene	0.229 J
Dichlorofluoromethane	322
Ethylbenzene	0.265 J
Heptane-113	1.08 J
Heptane-114	14.4
Hexane	1.96
n-Heptane	0.82 J
Isopropenol	1.85
Methylene chloride	2.23
Propylene	48.2 J
Tetrafluoroethane	88.2
Toluene	0.86 J
1,1,1-Trichloroethane	3.75
Trichloroethane	92.2
1,2,4-Trinitrobenzene	0.426 J
2,2,4-Trinitrobenzene	1.58 J
m-Xylene	0.907 J
p-Xylene	0.947 J

1-30-003A-SV05	SV-05
	ug/m ³
Axylene	30.2
Benzene	2.78
1,3-Butadiene	4.78
2-Butene	6.12
Carbon dioxide	1.14
Chlorofluoromethane	13,900 EJ
Chloroform	1.8
Cyclohexane	0.419 J
Dichlorofluoromethane	829
Difluoromethane	0.45 J
4-Ethylbenzene	0.216 J
Heptane-113	1.5 J
Heptane-114	11.3
Hexane	3.06
n-Heptane	7.69
Isopropenol	0.780 J
Methylene chloride	1.91 J
Propylene	18.8
Tetrafluoroethane	1.13 J
Toluene	2.85
1,1,1-Trichloroethane	0.752 J
Trichloroethane	10.8 J
1,3,5-Trinitrobenzene	0.828 J
1,3,4-Trinitrobenzene	1.34 J
2,2,4-Trinitrobenzene	0.729 J
m-Xylene	1.62 J
p-Xylene	1.8

1-30-003A-SV04	SV-04
	ug/m ³
Axylene	16.1
Benzene	2.09
1,3-Butadiene	1.8
2-Butene	6.2
Carbon dioxide	0.947 J
Chlorofluoromethane	814 EJ
Chloroform	0.887 J
Chlorofluoromethane	34.3
Cyclohexane	0.254 J
n-Heptane	1.91
2-Heptane	0.199 J
Isopropenol	1.86 J
Methylene chloride	2.58 J
Propylene	8.25
Tetrafluoroethane	4.8
Toluene	8.93
1,1,1-Trichloroethane	2.43 J
Trichloroethane	6.03 J
p-Xylene	1.1 J

1-30-003A-SV02	SV-02
	ug/m ³
Chloroform	1.81 J
Cyclohexane	0.81
Dichlorofluoromethane	3.27
Ethylbenzene	9.8
4-Ethylbenzene	11.3
Heptane	17.1
n-Heptane	17.8
Isopropenol	2.87 J
Methyl tert butyl ether	0.98
Methylene chloride	3.24
Propylene	10.8
Tetrafluoroethane	6.4
Toluene	118
1,6-Dichlorocyclohexane	7.50 J
1,3,5-Trinitrobenzene	12.7
1,3,4-Trinitrobenzene	34.3
2,2,4-Trinitrobenzene	24.8
m-Xylene	23.2
p-Xylene	23.2

1-30-003A-SV03	SV-03
	ug/m ³
Chlorofluoromethane	228
Chloroform	2.17
Cyclohexane	0.27 J
1,4-Dichlorobenzene	1.85 J
Dichlorofluoromethane	508
Ethylbenzene	3.31
4-Ethylbenzene	3.81
Heptane	1.78
n-Heptane	3.79
2-Heptane	0.224 J
Isopropenol	2.81 J
Methyl tert butyl ether	0.973 J
1,4-Methyl-2-pentanone	3.86
Methylene chloride	6.51 J
Propylene	21.7
Styrene	0.807 J
Tetrafluoroethane	15.8
Tetrahydrofuran	3.59
Toluene	12.8
1,1,1-Trichloroethane	0.50 J
Trichloroethane	0.626 J
Trichlorofluoromethane	0.19 J
1,3,5-Trinitrobenzene	2.88
1,3,4-Trinitrobenzene	17.4
2,2,4-Trinitrobenzene	0.933 J
m-Xylene	6.48
p-Xylene	13.5

1-30-003A-SV06	SV-06
	ug/m ³
Axylene	40.2
Benzene	1.59
1,3-Butadiene	1.32
2-Butene	8.88
Carbon dioxide	2.56
Chlorofluoromethane	86,190 EJ
Cyclohexane	0.718 J
1,4-Dichlorobenzene	1.86 J
Dichlorofluoromethane	4190
Ethylbenzene	2.84
4-Ethylbenzene	2.26
Heptane-113	8.48
Heptane-114	80.8
Hexane	1.54
n-Heptane	2.13
2-Heptane	0.258 J
Isopropenol	1.56 J
4-Methyl-2-pentanone	1.62
Methylene chloride	3.5 J
Styrene	0.851 J
Tetrafluoroethane	3.22
Toluene	11.4
1,1,1-Trichloroethane	3.24 J
Trichloroethane	1.76 J
Trichlorofluoromethane	34.8 J
1,3,5-Trinitrobenzene	2.02
1,3,4-Trinitrobenzene	10.3
2,2,4-Trinitrobenzene	1.08 J
m-Xylene	3.65
p-Xylene	8.71

1-30-003A-SV01	SV-01	SDSP-01
	ug/m ³	ug/m ³
Axylene	8.83	(+0.811)
Benzene	1.08 J	0.885 J
1,3-Butadiene	(+0.771)	0.881 J
2-Butene	12.5	(+1.881)
Carbon dioxide	0.548 J	0.488 J
Chlorofluoromethane	22.4	211
Chloroform	0.880 J	0.480 J
Chlorofluoromethane	0.880 J	(+0.707)
Chlorofluoromethane	3.44	0.28
Hexane	1.68	0.939 J
n-Heptane	1.28	0.737 J
Isopropenol	2.8 J	(+0.811)
Methylene chloride	12.1 J	2.23 J
Propylene	8.83	6.82
Tetrafluoroethane	4	3.48
Toluene	2.21	(+2.24)
1,1,1-Trichloroethane	8.23 J	0.44 J
Trichloroethane	2.43	1.98 J
Trichlorofluoromethane	8.82 J	(+3.81)
2,2,4-Trinitrobenzene	0.729 J	(+1.71)



Legend

- Soil Vapor Sampling Point
- ug/m³ Micrograms per cubic meter (ppbv)
- EJ Reported above the linear range and value is an estimate
- J Reported value is an estimate
- U Analyte detected below the method detection limit

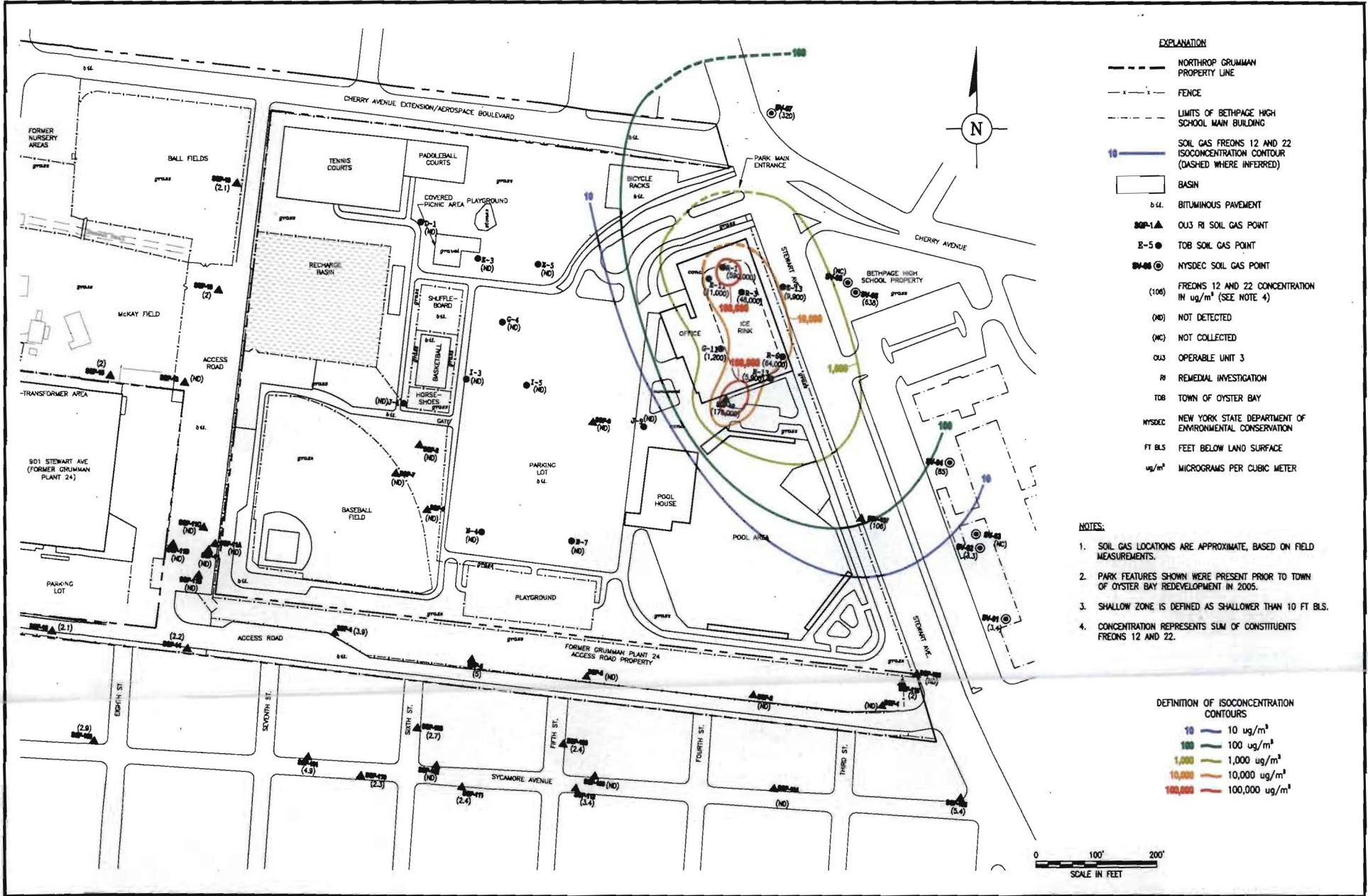
Source: NYS GIS Clearing House

FORMER GRUMMAN SETTLING PONDS (1-30-003A)
ISVI INVESTIGATION
SUMMARY REPORT
BETHPAGE, NEW YORK

PROJECT MGR: RSC	DESIGNED BY: CJS	CREATED BY: MS	CHECKED BY: RSC	SCALE: AS SHOWN	DATE: DECEMBER 2007	PROJECT NO: 14368.18	FILE NO: GIS/PROJECTS/ FIGURES.MXD
---------------------	---------------------	-------------------	--------------------	--------------------	------------------------	-------------------------	--

FIGURE 5
Summary of Detected Volatile
Organic Compounds (VOCs) in
Soil Vapor Samples





- EXPLANATION**
- NORTHROP GRUMMAN PROPERTY LINE
 - - - FENCE
 - - - LIMITS OF BETHPAGE HIGH SCHOOL MAIN BUILDING
 - 10 SOIL GAS FREONS 12 AND 22 ISOCONCENTRATION CONTOUR (DASHED WHERE INFERRED)
 - BASIN
 - b.t. BITUMINOUS PAVEMENT
 - ▲ O&J RI SOIL GAS POINT
 - TOB SOIL GAS POINT
 - ◎ NYSDEC SOIL GAS POINT
 - (100) FREONS 12 AND 22 CONCENTRATION IN ug/m³ (SEE NOTE 4)
 - (ND) NOT DETECTED
 - (NC) NOT COLLECTED
 - O&J OPERABLE UNIT 3
 - RI REMEDIAL INVESTIGATION
 - TOB TOWN OF OYSTER BAY
 - NYSDEC NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
 - ft BLS FEET BELOW LAND SURFACE
 - ug/m³ MICROGRAMS PER CUBIC METER

- NOTES:**
1. SOIL GAS LOCATIONS ARE APPROXIMATE, BASED ON FIELD MEASUREMENTS.
 2. PARK FEATURES SHOWN WERE PRESENT PRIOR TO TOWN OF OYSTER BAY REDEVELOPMENT IN 2005.
 3. SHALLOW ZONE IS DEFINED AS SHALLOWER THAN 10 FT BLS.
 4. CONCENTRATION REPRESENTS SUM OF CONSTITUENTS FREONS 12 AND 22.

- DEFINITION OF ISOCONCENTRATION CONTOURS**
- 10 10 ug/m³
 - 100 100 ug/m³
 - 1,000 1,000 ug/m³
 - 10,000 10,000 ug/m³
 - 100,000 100,000 ug/m³

NO.	ISSUED DATE	REVISION DESCRIPTION	BY/CHK
0	01/2008	REMEDIAL INVESTIGATION REPORT	MR

SEAL

ARCADIS
 OF NEW YORK, INC.

Two Huntington Quadrangle
 Suite 1810
 Melville, NY 11747
 Tel: 631-240-7898 Fax: 631-240-7610
 www.arcadis-us.com

PROJECT TITLE
 NORTHROP GRUMMAN SYSTEMS CORPORATION
 OPERABLE UNIT 3
 (FORMER GRUMMAN SETTLING PONDS)
 BETHPAGE, NEW YORK

PROJECT MANAGER
 C. SAN GIOVANNI

DEPARTMENT MANAGER
 M. WOLFERT

SHEET TITLE
 FREONS 12 AND 22
 IN SHALLOW SOIL GAS

LEAD DESIGN PROF.
 TASK/PHASE NUMBER
 00007

PROJECT NUMBER
 NY001464.0807

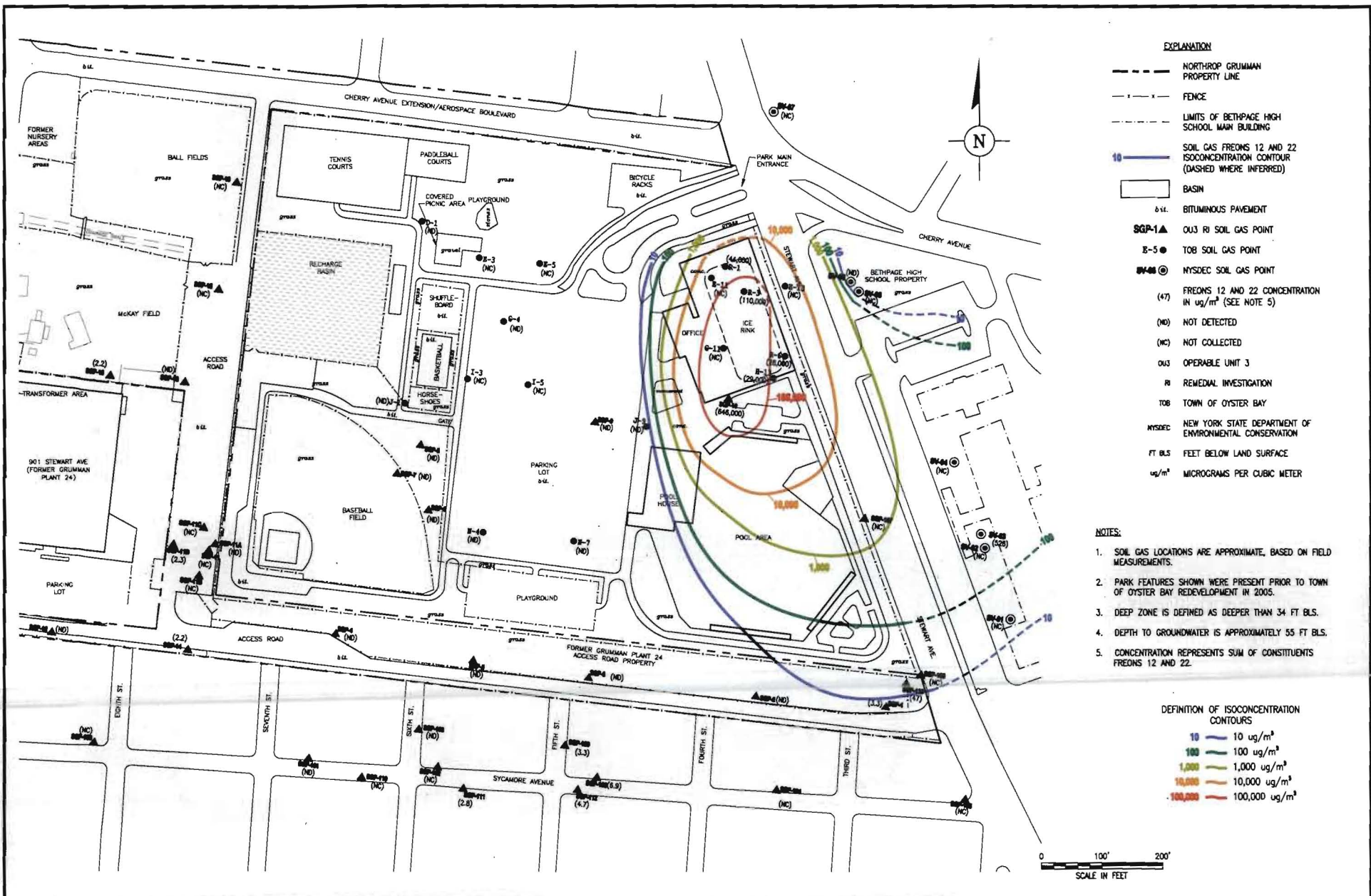
CHECKED BY
 M. REINDL

DRAWN BY
 A. SANCHEZ

DRAWING NUMBER
5-4

Current Profile: B/C-2
Layout Tab: B 2-5

Arch Number: B1724 (MS Title)
Date: 28 Jan 2008 - 11:07am
Project Name: SYPURJECT (Wastepond Remediation) Report B 2-5 from 12-22-07.dwg



- EXPLANATION**
- NORTHROP GRUMMAN PROPERTY LINE
 - - - FENCE
 - - - LIMITS OF BETHPAGE HIGH SCHOOL MAIN BUILDING
 - 10 SOIL GAS FREONS 12 AND 22 ISOCONCENTRATION CONTOUR (DASHED WHERE INFERRED)
 - BASIN
 - b.s. BITUMINOUS PAVEMENT
 - SGP-1▲ OUG RI SOIL GAS POINT
 - E-5● TOB SOIL GAS POINT
 - NY-48● NYSDEC SOIL GAS POINT
 - (47) FREONS 12 AND 22 CONCENTRATION IN ug/m³ (SEE NOTE 5)
 - (ND) NOT DETECTED
 - (NC) NOT COLLECTED
 - OU3 OPERABLE UNIT 3
 - RI REMEDIAL INVESTIGATION
 - TOB TOWN OF OYSTER BAY
 - NYSDEC NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
 - ft BLS FEET BELOW LAND SURFACE
 - ug/m³ MICROGRAMS PER CUBIC METER

- NOTES:**
1. SOIL GAS LOCATIONS ARE APPROXIMATE, BASED ON FIELD MEASUREMENTS.
 2. PARK FEATURES SHOWN WERE PRESENT PRIOR TO TOWN OF OYSTER BAY REDEVELOPMENT IN 2005.
 3. DEEP ZONE IS DEFINED AS DEEPER THAN 34 FT BLS.
 4. DEPTH TO GROUNDWATER IS APPROXIMATELY 55 FT BLS.
 5. CONCENTRATION REPRESENTS SUM OF CONSTITUENTS FREONS 12 AND 22.

- DEFINITION OF ISOCONCENTRATION CONTOURS**
- 10 10 ug/m³
 - 100 100 ug/m³
 - 1,000 1,000 ug/m³
 - 10,000 10,000 ug/m³
 - 100,000 100,000 ug/m³

© 2008	ARCADIS OF NEW YORK, INC.	SEAL	
NO.	ISSUED DATE	REVISION DESCRIPTION	BY/CHKD
0	01/2008	REMEDIAL INVESTIGATION REPORT	MR
		REVISION DESCRIPTION	BY/CHKD

ARCADIS
OF NEW YORK, INC.

Two Huntington Quadrangle
Suite 1818
Melville, NY 11747
Tel: 631-248-7800 Fax: 631-248-7810
www.arcadis-us.com

PROJECT TITLE
**NORTHROP GRUMMAN SYSTEMS CORPORATION
OPERABLE UNIT 3
(FORMER GRUMMAN SETTLING PONDS)
BETHPAGE, NEW YORK**

PROJECT MANAGER
C. SAN GIOVANNI

DEPARTMENT MANAGER
M. WOLPERT

SHEET TITLE
**FREONS 12 AND 22
IN DEEP SOIL GAS**

LEAD DESIGN PROF.
M. REINDL

CHECKED BY
M. REINDL

TASK/PHASE NUMBER
00007

DRAWN BY
A. SANCHEZ

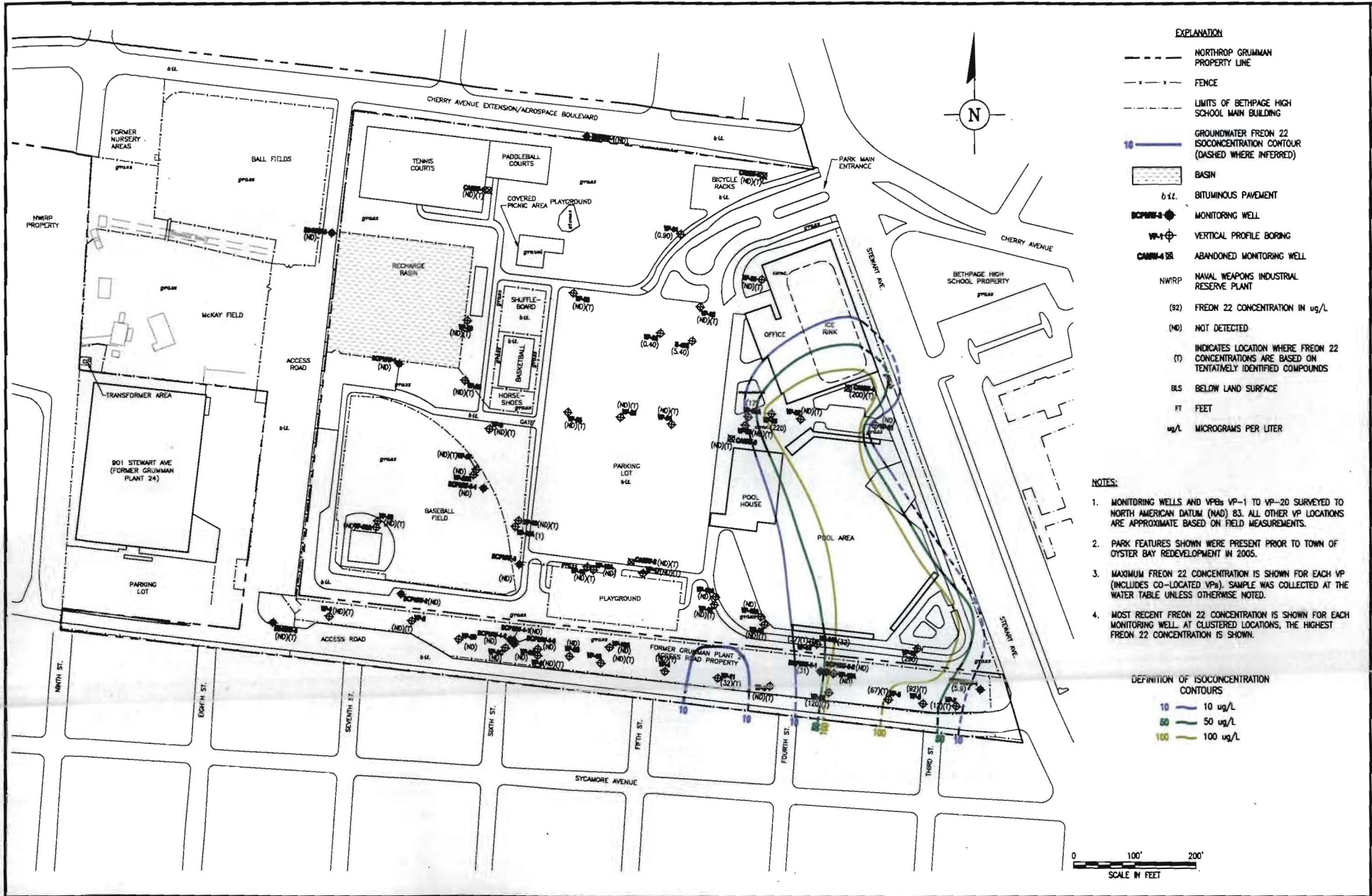
PROJECT NUMBER
NY001464.0807

DRAWING NUMBER
5-5

Current Plotting: B/C/Color
Layout: Etc. B 5-11

Drawn/View: M. San, 28 Jan 2008 - 13:30pm
File/Name: C:\PROJECTS\Workshop\Drawings\03\0807\B 5-11 Freon 22 shallow groundwater

Acad Version: R17.0a (AutoCAD)
User Name: jacobstuch



- EXPLANATION**
- NORTHROP GRUMMAN PROPERTY LINE
 - FENCE
 - LIMITS OF BETHPAGE HIGH SCHOOL MAIN BUILDING
 - 10 --- GROUNDWATER FREON 22 ISOCONCENTRATION CONTOUR (DASHED WHERE INFERRED)
 - BASIN
 - b.s.l. BITUMINOUS PAVEMENT
 - W-1 --- MONITORING WELL
 - VP-1 --- VERTICAL PROFILE BORING
 - CANN-4 --- ABANDONED MONITORING WELL
 - NWRP NAVAL WEAPONS INDUSTRIAL RESERVE PLANT
 - (92) FREON 22 CONCENTRATION IN ug/L
 - (ND) NOT DETECTED
 - (T) INDICATES LOCATION WHERE FREON 22 CONCENTRATIONS ARE BASED ON TENTATIVELY IDENTIFIED COMPOUNDS
 - BLS BELOW LAND SURFACE
 - FT FEET
 - ug/L MICROGRAMS PER LITER

- NOTES:**
1. MONITORING WELLS AND VPs VP-1 TO VP-20 SURVEYED TO NORTH AMERICAN DATUM (NAD) 83. ALL OTHER VP LOCATIONS ARE APPROXIMATE BASED ON FIELD MEASUREMENTS.
 2. PARK FEATURES SHOWN WERE PRESENT PRIOR TO TOWN OF OYSTER BAY REDEVELOPMENT IN 2005.
 3. MAXIMUM FREON 22 CONCENTRATION IS SHOWN FOR EACH VP (INCLUDES CO-LOCATED VPs). SAMPLE WAS COLLECTED AT THE WATER TABLE UNLESS OTHERWISE NOTED.
 4. MOST RECENT FREON 22 CONCENTRATION IS SHOWN FOR EACH MONITORING WELL. AT CLUSTERED LOCATIONS, THE HIGHEST FREON 22 CONCENTRATION IS SHOWN.

- DEFINITION OF ISOCONCENTRATION CONTOURS**
- 10 --- 10 ug/L
 - 50 --- 50 ug/L
 - 100 --- 100 ug/L



SEAL			
NO.	ISSUED DATE	REVISION DESCRIPTION	BY/CHKD
0	01/2008	REMEDIAL INVESTIGATION REPORT	MR

ARCADIS
OF NEW YORK, INC.

Two Huntington Quadrangle
Suite 1810
Melville, NY 11747
Tel: 631-248-7888 Fax: 631-248-7818
www.arcadis-usa.com

PROJECT TITLE
NORTHROP GRUMMAN SYSTEMS CORPORATION
OPERABLE UNIT 3
(FORMER GRUMMAN SETTLING PONDS)
BETHPAGE, NEW YORK

PROJECT MANAGER
C. SAN GIOVANNI

DEPARTMENT MANAGER
M. WOLFERT

SHEET TITLE
FREON 22
IN SHALLOW GROUNDWATER

LEAD DESIGN PROF.
M. REINDL

CHECKED BY
M. REINDL

TASK/PHASE NUMBER
00007

DRAWN BY
A. SANCHEZ

PROJECT NUMBER
NY001464.0807

DRAWING NUMBER
5-11

ARCADIS

Table 1. Concentrations of Volatile Organic Compounds in On-Site Soil Gas Samples, Former Grumman Settling Ponds (Operable Unit 3 - Bethpage Community Park), Bethpage, New York.

Constituent	Sample ID:	SGP10-(7.5-8)		SGP10-(34-34.5)		SGP10-(49-49.5)		SGP11-(7-7.5)	
	Depth (ft bls):	7.5-8		34-34.5		49-49.5		7-7.5	
	Date:	4/27/2006		4/27/2006		4/27/2006		5/5/2006	
	Units:	µg/m ³		µg/m ³		µg/m ³		µg/m ³	
Acetone		31,000	U	24,000	U	95,000	U	950	U
Benzene		1,700	U	1,300	U	5,100	U	51	U
Bromodichloromethane		3,600	U	2,700	U	11,000	U	110	U
Bromoform		5,500	U	4,100	U	17,000	U	170	U
Bromomethane		2,100	U	1,600	U	6,200	U	62	U
1,3-Butadiene		2,900	U	2,200	U	8,800	U	88	U
Carbon Disulfide		5,000		3,100	U	12,000	U	180	
Carbon Tetrachloride		3,300	U	2,500	U	10,000	U	100	U
Chlorobenzene		2,400	U	1,800	U	7,400	U	74	U
Chloroethane		1,400	U	1,100	U	4,200	U	110	U
Chloroform		2,600	U	2,000	U	7,800	U	78	U
Chloromethane		2,700	U	2,100	U	8,300	U	83	U
Dibromochloromethane		4,500	U	3,400	U	14,000	U	140	U
Dichlorodifluoromethane		16,000		22,000		46,000		200	U
1,1-Dichloroethane		2,100	U	1,600	U	6,500	U	65	U
1,2-Dichloroethane		2,100	U	1,600	U	6,500	U	65	U
1,1-Dichloroethene		2,100	U	1,600	U	6,300	U	63	U
cis-1,2-Dichloroethene		2,100	U	1,600	U	6,300	U	370	
trans-1,2-Dichloroethene		2,100	U	1,600	U	6,300	U	63	U
1,2-Dichloroethene (total)		2,100	U	1,600	U	6,300	U	370	
1,2-Dichloropropane		2,400	U	1,800	U	7,400	U	74	U
cis-1,3-Dichloropropene		2,400	U	1,800	U	7,300	U	73	U
trans-1,3-Dichloropropene		2,400	U	1,800	U	7,300	U	73	U
1,3-Dichloropropene (total) (a)		2,400	U	1,800	U	7,300	U	73	U
Ethylbenzene		2,300	U	1,700	U	6,900	U	69	U
Freon 22		160,000		240,000		600,000		140	U
Freon TF		4,100	U	3,100	U	12,000	U	120	U
Methyl Butyl Ketone		5,300	U	4,100	U	16,000	U	160	U
Methylene Chloride		4,500	U	3,500	U	14,000	U	140	U
Methyl Ethyl Ketone		3,800	U	2,900	U	12,000	U	120	U
Methyl Isobutyl Ketone		5,300	U	4,100	U	16,000	U	160	U
Styrene		2,300	U	1,700	U	6,800	U	68	U
1,1,2,2-Tetrachloroethane		3,600	U	2,700	U	11,000	U	110	U
Tetrachloroethene		3,600	U	2,700	U	11,000	U	110	U
Toluene		2,000	U	1,500	U	6,000	U	60	U
1,1,1-Trichloroethane		2,900	U	2,200	U	8,700	U	980	
1,1,2-Trichloroethane		2,900	U	2,200	U	8,700	U	87	U
Trichloroethene		2,800	U	2,100	U	8,600	U	11,000	
Vinyl Chloride		1,400	U	1,000	U	4,100	U	41	U
Xylene (m,p)		5,600	U	4,300	U	17,000	U	170	U
Xylene (o)		2,300	U	1,700	U	6,900	U	69	U
Xylene (total)		2,300	U	1,700	U	6,900	U	69	U

Notes:

- U Constituent not detected
- ft bls Feet below land surface
- µg/m³ Micrograms per cubic meter
- (a) Total represents sum of cis and trans isomers

Bold indicates a detection

concentration decreases by two orders of magnitude. More significant decreases occur to the west, north, and east from the $1,000 \mu\text{g}/\text{m}^3$ contour.

Figure 5-2 depicts TCE beneath the Site Area in deep soil gas. The highest concentration of TCE in the deep soil gas was $1,200,000 \mu\text{g}/\text{m}^3$ at Soil Gas Point SGP-8, located in the Park, at Area "D". The overall distribution of TCE in deep soil gas is similar to the shallow soil gas, with the $1,000 \mu\text{g}/\text{m}^3$ contour occupying the same general area. However, within the $1,000 \mu\text{g}/\text{m}^3$ contour in the deep soil gas, there are areas of TCE concentrations greater than $10,000 \mu\text{g}/\text{m}^3$ that occur over a much broader area, in contrast to shallow soil gas. Furthermore, the highest TCE concentration in soil gas greater than $1,000,000 \mu\text{g}/\text{m}^3$ was detected at Soil Gas Point SGP-8 within Area "D". Generally, as with the shallow soil gas, moving away from the $1,000 \mu\text{g}/\text{m}^3$ contour in the deep zone in all four compass directions, TCE concentrations decrease substantially.

Figure 5-3 depicts the vertical distribution of TCE in soil gas. Overall, the highest concentrations of TCE in soil gas are present underlying Area "D", within the LPZ and immediately above the water table (from elevations of 70 to 80 ft msl). Consistent with the shallow and deep soil gas plan view figures, the cross-sectional view shows that TCE concentrations decrease by three to four orders of magnitude to the south and north. In addition, a decreasing trend in TCE concentrations from the LPZ upward to land surface also exists.

Figure 5-4 depicts the sum of Freons 12 and 22 beneath the Site Area in shallow soil gas. The highest concentration of Freons 12 and 22 in the shallow soil gas was $590,000 \mu\text{g}/\text{m}^3$ at Soil Gas Point R-1, located within the northern end of the former Town ice rink area. The highest concentrations of Freons 12 and 22 (as defined by concentrations greater than $1,000 \mu\text{g}/\text{m}^3$) are located in and around the area of the former Town ice rink. Within the northern and southern portions of the $1,000 \mu\text{g}/\text{m}^3$ contour, data from two samples indicate higher localized Freons 12 and 22 concentrations greater than $100,000 \mu\text{g}/\text{m}^3$. Moving away from the $1,000 \mu\text{g}/\text{m}^3$ contour toward the west, Freons 12 and 22 concentrations decrease to less than $10 \mu\text{g}/\text{m}^3$ at the eastern edge of the parking lot area and were not detected in the remainder of shallow soil gas samples collected within the Park. North and east of the Park, the extent of the $10 \mu\text{g}/\text{m}^3$ contour has not been defined.

Figure 5-5 depicts Freons 12 and 22 beneath the Site Area in deep soil gas. The highest concentration of Freons 12 and 22 in deep soil gas was $646,000 \mu\text{g}/\text{m}^3$ at Soil Gas Point SGP-10, located near the southern end of the former Town ice rink area.

The overall distribution of Freons 12 and 22 in deep soil gas is similar compared to shallow soil gas, however in contrast, the contours encompass a greater area, denoting overall higher concentrations in deep soil gas compared to the shallow soil gas. As an example, the 100,000 $\mu\text{g}/\text{m}^3$ contour of Freons 12 and 22 in deep soil gas occupies the same location and area as the 10,000 $\mu\text{g}/\text{m}^3$ in shallow soil gas. Moving away from the 1,000 $\mu\text{g}/\text{m}^3$ contour toward the west, Freons 12 and 22 concentrations decrease to less than 10 $\mu\text{g}/\text{m}^3$ at the eastern edge of the parking lot area and were not detected in the remainder of deep soil gas samples collected within the Park. North and east of the Park, the extent of the 10 $\mu\text{g}/\text{m}^3$ contour has not been defined.

5.5 Nature and Extent of Constituents in Perched Water

This section of the RI Report discusses the nature and extent of COCs in the zone of perched water that was encountered in the Park and evaluates biogeochemical conditions in perched water related to the biodegradation of VOCs. The LPZ that was identified during the RI (Section 4.2) suggested the presence of perched water in the southwest Park region. Pore dissipation testing of CPT borings initially identified up to 8 ft of perched water within some areas of apparent historical soil disturbance (Figure 1-3). Perched water Piezometers H-3-PZ, H-7-PZ, I-4-PZ, I-97-PZ, F-8-PZ, and O-97-PZ were installed in areas where perched water was suspected to be present. The results of sampling these piezometers are presented in this section.

In general the data obtained from the perched water piezometers have met the RI goal of determining the nature and extent of COCs in perched water on the Site Area. Data obtained from the piezometers in and close to apparent historical areas of disturbance indicated the highest concentrations of VOCs (some values greater than 100,000 $\mu\text{g}/\text{L}$) with substantially lower to non-detected concentrations of other COCs. The VOCs detected and their concentration as a percentage of total VOCs differed greatly by location and over time. Additionally, approximately 3 inches of light, non-aqueous phase liquid (LNAPL) was detected in Piezometer I4-PZ during one sampling event. A more detailed discussion of results is provided below. Perched water data are provided in Tables 5-7 to 5-11 and depicted on Figure 5-6. Additional supporting information related to determination of the nature and extent of perched water is provided in the Perched Water Sampling Logs (Appendix F).

The NYSDEC has not developed SCGs for perched water.

Table 1
Summary of Volatile Organic Compounds (VOCs) in Vapor/Air Samples
Supplemental Soil Vapor Intrusion Investigation
Former Grumman Settling Ponds (NYSDEC Site No. 1-30-003A)
Bethpage, New York

Parameter List EPA Method TO-15	Property ID	High School		
	Sample ID	1-30-003A-CS-HS-0208	1-30-003A-AF-HS-0208	
	Lab ID	L0802498-15	L0802498-14	
	Sample Type	Crawl Space Air	First Floor Indoor Air	
	Sample Date	2/19/2008	2/19/2008	
Acetone	(ug/m3)	10.5	8.83	
Benzene	(ug/m3)		U	U
Benzyl chloride	(ug/m3)		U	U
Bromodichloromethane	(ug/m3)		U	U
Bromoform	(ug/m3)		U	U
Bromomethane	(ug/m3)		U	U
1,3- Butadiene	(ug/m3)		U	U
2- Butanone	(ug/m3)	2.57		U
Carbon disulfide	(ug/m3)		U	U
Carbon tetrachloride	(ug/m3)		U	U
Chlorobenzene	(ug/m3)		U	U
Chlorodifluoromethane	(ug/m3)	49.7	12	
Chloroethane	(ug/m3)		U	U
Chloroform	(ug/m3)		U	U
Chloromethane	(ug/m3)	0.61	J	1.21
3- Chloropropene	(ug/m3)		U	U
Cyclohexane	(ug/m3)		U	U
Dibromochloromethane	(ug/m3)		U	U
1,2- Dibromoethane	(ug/m3)		U	U
1,3- Dichlorobenzene	(ug/m3)		U	U
1,2- Dichlorobenzene	(ug/m3)		U	U
1,4- Dichlorobenzene	(ug/m3)		U	U
Dichlorodifluoromethane	(ug/m3)	1.94	J	3.2
1,2- Dichloroethane	(ug/m3)		U	U
1,1- Dichloroethane	(ug/m3)		U	U
trans-1,2- Dichloroethene	(ug/m3)		U	U
cis-1,2- Dichloroethene	(ug/m3)		U	U
1,1- Dichloroethene	(ug/m3)		U	U
1,2- Dichloropropane	(ug/m3)		U	U
trans-1,3- Dichloropropene	(ug/m3)		U	U
cis-1,3- Dichloropropene	(ug/m3)		U	U
1,4- Dioxane	(ug/m3)		U	U
Ethyl Acetate	(ug/m3)		U	U
Ethylbenzene	(ug/m3)		U	U
4- Ethyltoluene	(ug/m3)		U	U
Freon-113	(ug/m3)		U	U
Freon-114	(ug/m3)		U	U
Heptane	(ug/m3)		U	U
Hexachlorobutadiene	(ug/m3)		U	U
n- Hexane	(ug/m3)		U	U
2- Hexanone	(ug/m3)		U	U
Isopropanol	(ug/m3)	6.79	6.13	
Methyl tert butyl ether	(ug/m3)		U	U
4- Methyl-2-pentanone	(ug/m3)		U	U
Methylene chloride	(ug/m3)		U	U
Propylene	(ug/m3)		U	U
Styrene	(ug/m3)		U	U
1,1,2,2- Tetrachloroethane	(ug/m3)		U	U
Tetrachloroethene	(ug/m3)		U	U
Tetrahydrofuran	(ug/m3)		U	U
Toluene	(ug/m3)	3.82	3.07	
1,2,4- Trichlorobenzene	(ug/m3)		U	U
1,1,2- Trichloroethane	(ug/m3)		U	U
1,1,1- Trichloroethane	(ug/m3)		U	U
Trichloroethene	(ug/m3)		U	U
Trichlorofluoromethane	(ug/m3)	1.63	1.79	
1,3,5- Trimethylbenzene	(ug/m3)		U	U
1,2,4- Trimethylbenzene	(ug/m3)		U	U
2,2,4- Trimethylpentane	(ug/m3)		U	U
Vinyl acetate	(ug/m3)		U	U
Vinyl bromide	(ug/m3)		U	U
Vinyl chloride	(ug/m3)		U	U
p/m- Xylene	(ug/m3)		U	U
o- Xylene	(ug/m3)		U	U

Note:
EPA = Environmental Protection Agency
J = Reported value is an estimate
U = Analyte detected below the method detection limit.
ug/m3 = micrograms per cubic meter

TOWN OF OYSTER BAY, BETHPAGE COMMUNITY PARK
 INTERIM REMEDIAL MEASURE - CONSTRUCTION AREA
 SUPPLEMENTAL SOIL INVESTIGATION


TABLE 4.2.3. SOIL SAMPLING RESULTS FOR VOLATILE ORGANIC COMPOUNDS (VOCs)

Parameter	NYSDEC Recommended Soil Cleanup Objective ⁽¹⁾ (µg/kg)	R-1					R-2	R-3 (under old rink)				
		2-4 ft	6-8 ft	8-10 ft	28-30 ft	48-50 ft	2-4 ft	2-4 ft	8-10 ft	30-32 ft	48-50 ft	
		(µg/kg)	(µg/kg)	(µg/kg)	(µg/kg)	(µg/kg)	(µg/kg)	(µg/kg)	(µg/kg)	(µg/kg)	(µg/kg)	
1,1,1 Trichloroethane	800	U	U	U	U	U	U	U	U	U	U	U
1,1,2,2-Tetrachloroethane	600	U	U	U	U	U	U	U	U	U	U	U
1,1,2 Trichloroethane		U	U	U	U	U	U	U	U	U	U	U
1,1-Dichloroethane	200	U	U	U	U	U	U	U	U	U	U	U
1,1-Dichloroethene	400	U	U	U	U	U	U	U	U	U	U	U
1,2-Dichloroethane	100	U	U	U	U	U	U	U	U	U	U	U
1,2-Dichloroethene	300	U	U	U	U	U	U	U	U	U	U	U
1,2 Dichloropropane		U	U	U	U	U	U	U	U	U	U	U
2-Butanone	300	U	U	U	U	U	U	U	U	U	U	U
2-Hexanone		U	U	U	U	U	U	U	U	U	U	U
4-Methyl-2-Pentanone	1000	U	U	U	U	U	U	U	U	U	U	U
Acetone	200	U	U	U	U	U	U	U	U	U	U	U
Benzene	60	U	U	U	U	U	U	U	U	U	U	U
Bromodichloromethane		U	U	U	U	U	U	U	U	U	U	U
Bromoform		U	U	U	U	U	U	U	U	U	U	U
Bromomethane		U	U	U	U	U	U	U	U	U	U	U
Carbon Disulfide	2700	U	U	U	U	U	U	U	U	U	U	U
Carbon Tetrachloride	600	U	U	U	U	U	U	U	U	U	U	U
Chlorobenzene	1700	U	U	U	U	U	U	U	U	U	U	U
Chlorodifluoromethane		U	U	U	U	U	U	U	U	U	U	U
Chloroethane	1900	U	U	U	U	U	U	U	U	U	U	U
Chloroform	300	U	U	U	U	U	U	U	U	U	U	U
Chloromethane		U	U	U	U	U	U	U	U	U	U	U
cis-1,3 Dichloropropene		U	U	U	U	U	U	U	U	U	U	U
Dibromochloromethane		U	U	U	U	U	U	U	U	U	U	U
Dichlorodifluoromethane		JU	JU	JU	JU	JU	JU	JU	JU	JU	JU	JU
Ethylbenzene	5500	U	U	U	U	U	U	U	U	U	U	U
Methylene chloride	100	10 U	10 BJ	10 BJ	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Styrene		U	U	U	U	U	U	U	U	U	U	U
Tetrachloroethene	1400	U	U	U	U	U	U	U	U	U	U	U
Toluene	1500	U	U	U	U	U	U	U	U	U	U	U
trans-1,3 Dichloropropene		U	U	U	U	U	U	U	U	U	U	U
Trichloroethene	700	U	U	U	U	U	U	U	U	U	U	U
Vinyl chloride	200	U	U	U	U	U	U	U	U	U	U	U
Xylenes	1200	U	U	U	U	U	U	U	U	U	U	U
Total	10000	10	10	10	14	10	10	12	20	10	10	10

(1): New York State Department of Environmental Conservation (NYSDEC) Technical & Administrative Guidance Memorandum (TAGM) #4046.
 B – Analyte found in associated blank as well as sample and may indicate blank contamination.
 D – Analyte detected in an analysis at a secondary dilution factor.
 J – Estimated value.
 U – Parameter was analyzed but was not detected.

Nassau County - Land Record Viewer

Overview Zoom In Zoom Out Full View Last Extent Pan Identify Query Measure Buffer Select Clear Select



LAYERS

- All Layers
- Lot Lines
- Parcel Lines
- Street Names
- Water Districts
- School Districts
- Fire Districts
- Zip Code
- Places
- Aerial Photos

Refresh Map

Auto Refresh

Lot Lines

	Parcel Key	Section	Block	Lot
Map	46 G	43	46	G 43