4.8 LONG TERM MONITORING PLAN

4.8

Long-Term Monitoring Plan

Dzus Fastener Site (OU 1 & OU 2)
NYSDEC Site No. 1-52-033
Lake Capri / Willetts Creek

Work Assignment No. D003821-2.1

Prepared for:
SUPERFUND
STANDBY PROGRAM
New York State
Department of Environmental Conservation
50 Wolf Road
Albany, New York 12233

Prepared by:
Earth Tech of New York, Inc.
12 Metro Park Road
Albany, New York 12205

November 2000

earthtech for the planet.
engineering and technology

Long-Term Monitoring Plan

Dzus Fastener Site (OU 1 & OU 2)
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Work Assignment No. D003821-2.1

Prepared for:

Superfund Standby Program
New York State
Department of Environmental Conservation
50 Wolf Road
Albany, New York 12233-7010

Submitted By:

EARTH TECH OF NEW YORK, INC.
12 Metro Park Road
Albany, New York 12205

NOVEMBER 2000

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1.0 INTRODUCTION

This Long-Term Monitoring Plan (LTMP) has been prepared by Earth Tech of New York, Inc. (Earth Tech) in support of remedial activities undertaken at the Dzus Fastener Site in West Islip, Suffolk County, New York. It was prepared under the authority of New York State Department of Environmental Conservation (NYSDEC) Work Assignment No. D003821-2.1 for Operable Unit (OU) No. 2, and incorporates and supersedes operation and maintenance activities related to OU No. 1. For remediation purposes, the site was divided into two operable units, OU 1 (the site of the manufacturing facility, Dzus Fastener Company) and OU2 (the downgradient groundwater, upper Willetts Creek and Lake Capri).

The purpose of the program is to monitor the long-term effectiveness of remedial actions undertaken at the Site (Figure 1-1), to assess whether significant impacts to human health and/or the environment remain, and to determine if the site should be reclassified. It consists of the following elements:

- Asphalt cover inspection in the manufacturing facility's parking lot
- Groundwater monitoring
- Riprap inspection along creek bed (one location)
- Riprap inspection on lake bed (one location)
- Surface water monitoring
- Sediment monitoring
- Reporting

1.1 SITE DESCRIPTION AND BACKGROUND

The Dzus Fastener manufacturing facility consists of a brick building and associated west and east parking lots situated on a fenced 4-acre lot south of the railroad tracks at 425 Union Boulevard in a densely urbanized area of West Islip (Figure 1-1). Past releases from the facility formerly discharged into upper Willetts Creek, which is located immediately to the east of the facility. The 0.5- to 2.0-foot deep, 10- to 40-foot wide creek flows to the south, through a residential area and adjacent to the West Islip Junior High School and Senior High School complexes, for a distance of approximately 4,500 feet, to Lake Capri.

Lake Capri is an 8-acre, privately owned, freshwater lake, bounded on the south by a fence along Montauk Highway (Route 27A), and on the remaining sides by developed residential properties that

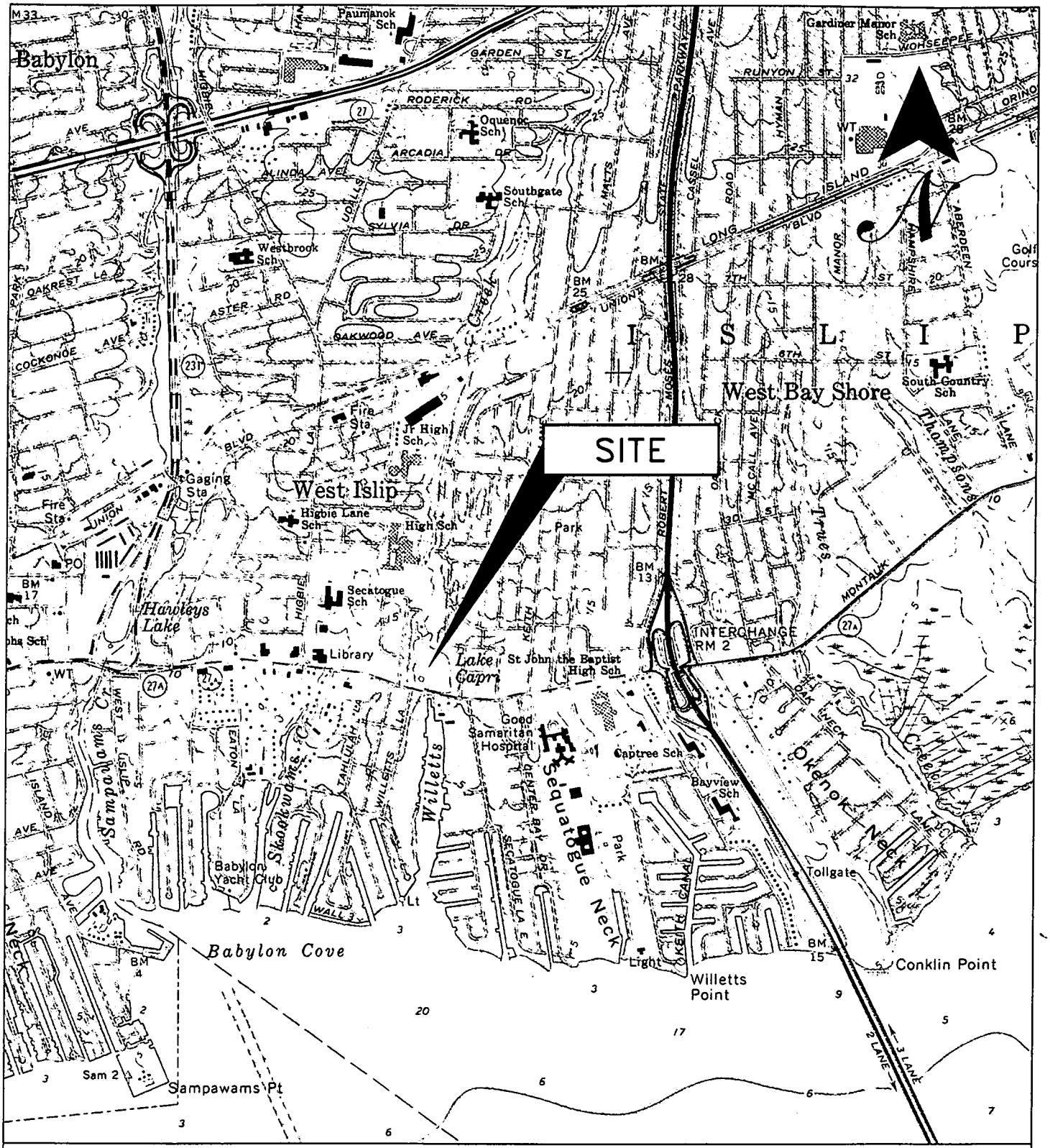
restrict access to the lake. The northwest corner is characterized as a small, approximately one-quarter acre lagoon, separated from the main lake body by a narrow isthmus spanned by a small private wooden footbridge. A private masonry footbridge crosses the mouth of upper Willetts Creek where it flows into the northeast corner of the lake. Two small islands are present. In addition to the creek, the lake is fed by a small intermittent brook that flows into the lagoon, two stormwater outfalls, and groundwater springs primarily in the northern part of the lake.

An aerial photograph of the lake and vicinity taken in April 1998 is presented on Figure 1-2. The lake is relatively shallow, with a depth of approximately 3 to 5 feet over broad areas. The substrate is primarily gravelly sand, but a silt veneer is present in the deeper southern half. Lake-bottom sediments may be very soft near the northern fringes where seasonal upward groundwater flow gradients are likely present. Lake level is controlled by an overflow weir at the head of a concrete outfall structure at the south end of the lake. This structure provides an approximately 3 to 4 foot head drop into a culvert under Montauk Highway to the channelized lower Willetts Creek. At that point, the brackish water flows another 3,000 feet to tidal Babylon Cove in Great South Bay.

Past releases from the Dzus Fastener Company's manufacturing facility contaminated soil and groundwater at the facility, and sediments in Willetts Creek and Lake Capri. Cadmium, the principal contaminant of concern, was reported in groundwater, sampled in 1998, at concentrations as high as 1100 parts per billion (ppb), and in Lake Capri and upper Willetts Creek sediments at maximum concentrations of 350 to 400 parts per million (ppm). Other constituents, such as chromium and cyanide in groundwater, and zinc, iron and lead in surface water, were also present, but at frequencies and concentrations of lesser environmental concern. Health advisories published by the NYS Department of Health restrict the consumption of Carp and American Eel in the lake to no greater than one meal per month.

The State determined that the Dzus Fastener Site posed a threat to human health and the environment (Class 2) and listed it as Site Number 1-52-033 on NYSDEC's registry of inactive hazardous waste sites.

Waste management practices at the Dzus Fastener manufacturing facility (OU 1) have been modified and remedial activities undertaken to eliminate or reduce the potential for future releases. An Interim Remedial Measure conducted in 1991 resulted in removal of a leach field at the eastern side of the facility. Additional remedial activities that focused primarily on soil solidification, were prescribed in the OU1 Record of Decision (ROD) that was issued in March 1995. Solidification of on-site soils containing greater than 10 ppm cadmium was completed in December 1996. This included excavating three small



PORTION OF MAP 34 OF 39 SUFFOLK COUNTY LAST AMENDMENT DATE 10-12-94
BAY SHORE WEST, NY QUADRANGLE. SCALE 1"=2000'

EARTH TECH

A tyco INTERNATIONAL LTD. COMPANY

FIGURE 1
SITE LOCATION MAP
DZUS FASTENER SITE
LAKE CAPRI/ WILLETTS CREEK

SEPTEMBER 2000

PROJ: 32419

NO SCALE

EARTH TECH

A tyco INTERNATIONAL LTD. COMPANY

FIGURE 2
PHOTOGRAPH LOCATION MAP
DZUS FASTENER SITE
LAKE CAPRI/ WILLETTS CREEK

SEPTEMBER 2000

PROJ: 32419

areas on the western side of the facility, mixing and solidifying these soils with in-situ contaminated soils on the eastern side of the facility, and installing an asphalt cover over the consolidated materials.

A ROD for OU2 was issued in October 1997. OU 2 remediation, which focused on removing the most highly contaminated sediments, was completed in December 1999. The upper Willetts Creek remedy consisted of excavating targeted contaminated sediments from the most impacted areas adjacent to the West Islip Junior High School, and covering the identified deeper impacted zone with riprap to prevent future erosion. The target clean-up level was 9 ppm cadmium. The Lake Capri remedy consisted of eradicating contaminated fish with rotenone, removing contaminated sediments by a combination of excavation in nearshore areas and hydraulic dredging in deeper waters, and covering an identified deeper impacted zone with riprap to isolate it from the environment. The target cleanup level was 1 ppm cadmium.

The removed sediments were either dewatered onsite as necessary at the temporary staging area constructed at the West Islip High School parking lot, processed offsite for beneficial use, and used as structural material for construction at a nearby landfill, or placed in a landfill. Water removed with the sediments was treated onsite at the staging area and returned to the lake. Following dredging, the affected areas at and adjacent to the creek and lake were restored, the high school parking lot and an access driveway re-paved, and the lake re-stocked with blue-gill, silversides and large mouth bass.

The remedy for contaminated groundwater in the vicinity of the Dzus facility consisted of source removal and the ongoing natural attenuation.

1.2 PREVIOUS REPORTS

A Remedial Investigation/Feasibility Study (RI/FS) was completed in October 1994, by Lawler, Matusky & Skelly Engineers (LMS). The RI/FS included a treatability study for contaminated sediments, and a survey for cadmium concentrations in fish and other biota. A year later, in October 1995, LMS issued an RI/FS Addendum, which included additional sediment and biota testing results and a groundwater flow and transport model. Earth Tech (formally Rust Environment & Infrastructure) completed a Pre-Design Investigation (PDI) Report for OU 2 in November 1998. The PDI included surveying and mapping, additional sampling and analyses, an expanded treatability study, a wetland delineation, and photo-documentation survey. Earth Tech also prepared the Design Analysis Report (DAR), dated December 1998, and the OU 2 Remediation Contract Drawings and Specifications, dated March 1999. A

Construction Certification Report documented the June 1999 to December 1999 remediation activities at Lake Capri and upper Willetts Creek. It was submitted to NYSDEC in October 2000.

1.3 REMEDIATION GOALS

According to the RODs, the goals of the OU 1 remediation were to:

- Eliminate the potential for direct human contact with the contaminated soils at the site.
- Eliminate or reduce the mobility of contaminants in on-site soils that would cause further groundwater contamination.
- Eliminate the hazardous wastes on-site or treat them to render them as non-hazardous.

The goals of the OU 2 remediation were to:

- Manage contaminated groundwater to prevent human exposure and to minimize impacts to the environment.
- Reduce cadmium concentrations in sediments to levels that are protective of human health and the environment
- Eliminate the potential for direct human or animal contact with contaminated sediments.

1.4 MONITORING OVERVIEW

This document prescribes the specific inspection, sampling, analysis and reporting activities that will be undertaken by NYSDEC or its Contractor for the Dzus Fastener Site long term monitoring program. Work shall be conducted in accordance with an appropriate site-specific health and safety plan, and in a manner which enables comparability between the results of potentially widely spaced monitoring events.

Table 1-1 summarizes the specific elements of the long-term monitoring program, including medium, purpose, parameters, frequency, and duration. Table 1-2 summarizes specific sampling points and location descriptions. Relevant photographs that may be useful to field personnel are included in Appendix A.

IMPORTANT NOTE RELATED TO FISH ADVISORY - NYSDEC Regional Fishery offices collect fish from a subset of state-wide lakes every year for analysis. Analytical results and recommendations are passed on to the NYSDOH, which identifies the need for fish consumption health advisories.

TABLE 1-1

Sampling and Testing Program for Long Term Monitoring Plan Dzus Fastener Site (OU1) & Lake Capri/Willetts Creek Remediation (OU2)					
Program	**Medium**	**Purpose**	**Parameters**	**Method**	**Frequency & Duration (1)**
Long-term Monitoring	Asphalt	Inspect integrity of asphalt cover cap covering solidified in place soils at Dzus facility (OU1)	None	None	Annually starting Fall 2000
	Groundwater (Unfiltered)	Survey existing wells; abandon certain wells; monitor effectiveness of OU 1 remediation. Collect groundwater levels, tabulate, track plume movement, attentuation of contaminants	Metals (RCRA metal list + Cyanide) Turbidity;Temp. DO(Dissolved Oxygen);pH	EPA Method 200.7 series Cyanide – Method 335.2 Field Measurements – "Horiba" meter or equal	Annually starting Fall 2000.
	Surface water	Monitor effectiveness and/or possible impacts of OU 2 sediment removal on creek and lake water	Total Cadmium Temp. pH; DO	EPA Method 200.7 Field Measurements "Horiba" or equal	Same schedule as groundwater
	Sediment	Monitor effectiveness of OU 2 sediment removal in creek and lake	Total Cadmium	EPA Method 200.7	Same schedule as groundwater
	Fish	Notify NYSDOH of monitoring results for media sampled for reference to fish advisory	none		Same schedule as groundwater

(1) Frequency and duration may be modified after the first year of monitoring

TABLE 1-2

Sampling Point Description and Location for Long Term Monitoring Plan
Dzus Fastener Site (OU1) & Lake Capri/Willetts Creek Remediation (OU2)

Media	Sampling Points	Location
Groundwater	MW-1	Dzus facility – NW back parking lot
	MW-2	Dzus facility – SW front corner
	MW-3	Dzus facility – Front entrance yard
	MW-9	Dzus facility – NE parking lot off back corner of building
	MW-9B	Dzus facility – Well pair with MW-9
	MW-13A	Grand Union Plaza East side – across Union Blvd from Dzus facility
	MW-13B	Grand Union Plaza East side – Well pair with MW-13
	MW-23A	Grand Union Plaza –behind N corner of building on asphalt
	MW-23B	Grand Union Plaza – Well pair to MW-23A
	MW-15A	Shopping Plaza front parking lot - across Union Blvd from Dzus facility
	MW-15B	Shopping Plaza front parking lot – Well pair with MW-15A
	MW-22 A	Shopping Plaza side lot – N side of building on asphalt
	MW-22B	Shopping Plaza side lot – Well pair with MW-22A
	MW-18	West Islip HS off Higbie Lane- N side of N parking lot in grass along fence.
Surface water	SW-1N, SW-2N	Access through NYSDOT gate on Montauk Highway- N end of lake 100' and 125'S
	SW-3S, SW-4S	of stone bridge;15 feet from shore
		Access through gate on Montauk Hwy.- off each side of outfall
	SWWC-1,SWWC-2	Willetts Creek (WC) access through WI High School & Burling Ave. (footbridge)
Sediment	SED-1N, SED-2N	Collect in conjunction with surface water samples
	SED-3S, SED-4S	
	SEDWC-1,SEDWC-2	

These advisories are published annually in the NYSDOH's pamphlet, *Chemicals in Sportfish and Game, Health Advisories* (Appendix B). They are also published at http://www.health.state.ny.us/nysdoh/environ/fish.htm. A species, once listed in the fish advisories, will generally remain on the list until sufficient individuals of that species are caught, analyzed, and demonstrated to contain concentrations below target guidelines. NYSDEC Region 1 Fisheries anticipates that they will collect and analyze fish from Lake Capri sometime during the year 2002, and at appropriate time intervals thereafter. Accordingly, fish sampling and analysis are not part of the OU1 and OU 2 long-term monitoring program. However, the analytical results of the long-term monitoring program will be forwarded to the fisheries staff as listed in Section 6.0

DIRECTIONS TO SITE: One of the most direct routes of travel to the site from upstate New York is south on the NYS Thruway (87) to the Throgs Neck or Whitestone Bridge, south to the Long Island Expressway (LIE), then east to Exit 51 (Rt 213). Take Rt. 213 south to Montauk Highway (Rt 27A). Travel east on Montauk Highway approximately 1-mile to Lake Capri. (Figure 3-1, the Monitoring Well Location Map, depicts the local streets, West Islip High School and Junior High School and the location of the Dzus Fastener Company.)

NOTIFICATIONS AND AUTHORIZATIONS: prior to conducting any sampling event, the following notifications and authorizations should be obtained:

Ms. Olivia Marie, Vice President
Dzus Fastener Company, Inc.
425 Union Blvd.
West Islip, N.Y. 11795 Phone Number: 631-669-0494 ext. 154

Mr . Fred Kobel
West Islip High School
Higbie Lane
West Islip, N.Y. 11795 Phone Number: 631-893-3250

Obtain key for Montauk Highway gate:
Mr. Carl Hoffman, P.E.
NYSDEC
Division of Environmental Remediation

Bureau of Hazardous Site Control
50 Wolf Road
Albany, N.Y. 12233 Phone Number: 518-457-9538

Be prepared to respond to any inquiries by concerned citizens as you are performing the monitoring activities, and direct them as necessary to the responsible NYSDEC Project Manager.

2.0 ASPHALT COVER

An asphalt cover was installed at the eastern parking lot at the Dzus manufacturing facilty to eliminate the potential for direct human contact with the underlying contaminated soils at the site, and to eliminate or reduce the mobility of soil contaminants that would cause further groundwater degradation. Figure 2-1 illustrates the area of the parking lot that was asphalted.

Inspect the integrity of the asphalt cover in accordance with the schedule on Table 1-1. Look for the presence of any major depressions where surface water could pond, and areas of damaged or missing pavement, particularly cracking in low-lying areas, that could result in either exposure to the underlying soils or to surface water infiltration. Document the presence or absence of these features on a field form (Appendix D) and by photographs that will be included in the monitoring report. Include a scale and sufficient background features to facilitate location and identification of features of potential interest during subsequent visits by others.

The West Islip High School's southeast parking lot was re-paved as part of site restoration activities. Observe and record the general condition of this lot and the adjacent re-vegetated areas during the site visit activities.

Equipment Summary:

- Camera
- Ruler
- Tape measure

LONG ISLAND RAILROAD

C.L.F.

EDGE OF PAVEMENT

CONC. CURB

EDGE OF NEW PAVEMENT

EDGE OF PAVEMENT

EDGE OF NEW PAVEMENT

COLUMN LINES

C.B.

CONC. CURB

MATCH LINE

UNION BOULEVARD

C.L.F.

MATCH LINE

DZUS FASTENER CO.
1 STORY BRICK, FRAME
AND METAL BUILDING

FENCE

SUMP

CONC. PAD

METAL BLDG.

CONC. DRIVE

ASPHALT PARKING

SURVEY OF
DZUS FASTENER SITE
SITUATE AT
WEST ISLIP
TOWN OF ISLIP
SUFFOLK COUNTY, NEW YORK
SCALE 1" = 20' DECEMBER 11, 1996

336 Wave Ave Box 589 Patchogue, N.Y. 11950 (516) 821-5588 Fax 821-5598

3765 Express Drive South Islandia, N.Y. 11779 (516) 342-9292 Fax 342-9218

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JOB NO. F4026
REVISIONS:

SHEET 8 OF 8

3.0 GROUNDWATER MONITORING

Previous investigations at the site have determined that groundwater in the site area flows toward the Bay, with a local component of shallow flow toward the creek. The principal area of impacted groundwater discharge at the creek is characterized by a zone of riprap armor stone that was placed along the west bank and on the creek bed in the area behind (east of) the Grand Union Plaza. This riprap has subsequently become iron-stained. No current or anticipated human exposure points exist for groundwater between the plant and this discharge location regime.

Figure 3-1 shows the locations of all monitoring wells. Excerpts from the groundwater portion of the Pre-Design Investigation report are included in Appendix C for reference.

The overall objective of the groundwater monitoring is:

- to confirm the effectiveness of the remedy at the manufacturing facility, i.e. eliminate or reduce the mobility of soil contaminants that would cause further groundwater contamination;
- to track the progress of natural attenuation; and
- to ensure that unexpected conditions have not developed in flow directions or water quality.

The long-term groundwater monitoring program consists of the following elements:

- Properly abandon obsolete or damaged monitoring wells, and
- Periodically measure groundwater levels, and sample and analyze groundwater from 14 designated monitoring wells.

Abandon Obsolete or Damaged Monitoring Wells

Previous rounds of groundwater monitoring have characterized the aquifer and defined the general nature, extent and depth of groundwater contaminants. Given that the extent of contamination has been defined and modeled numerically, it is reasonable to eliminate certain obsolete or damaged wells from the monitoring network. Such wells pose a potential direct pathway to the phreatic zone and may impact land

use. In addition, several monitoring wells could not be located during the last round of sampling in May 1998, are likely paved over, and should be properly abandoned.

Table 3-1 summarizes the available information regarding the construction details and condition of monitoring wells installed previously as part of the site investigation activity. During the initial post-remediation site visit, attempt to locate these wells visually, and using a metal detector if necessary. Confirm well identity by comparing field measurements with the tabulated construction details. Label the wells with their correct designation if necessary. Any wells found that are not included on Table 1-2 should be designated for proper abandonment. After coordinating with the property owner and NYSDEC Project Manager, abandon the wells following an appropriate procedure such as summarized below.

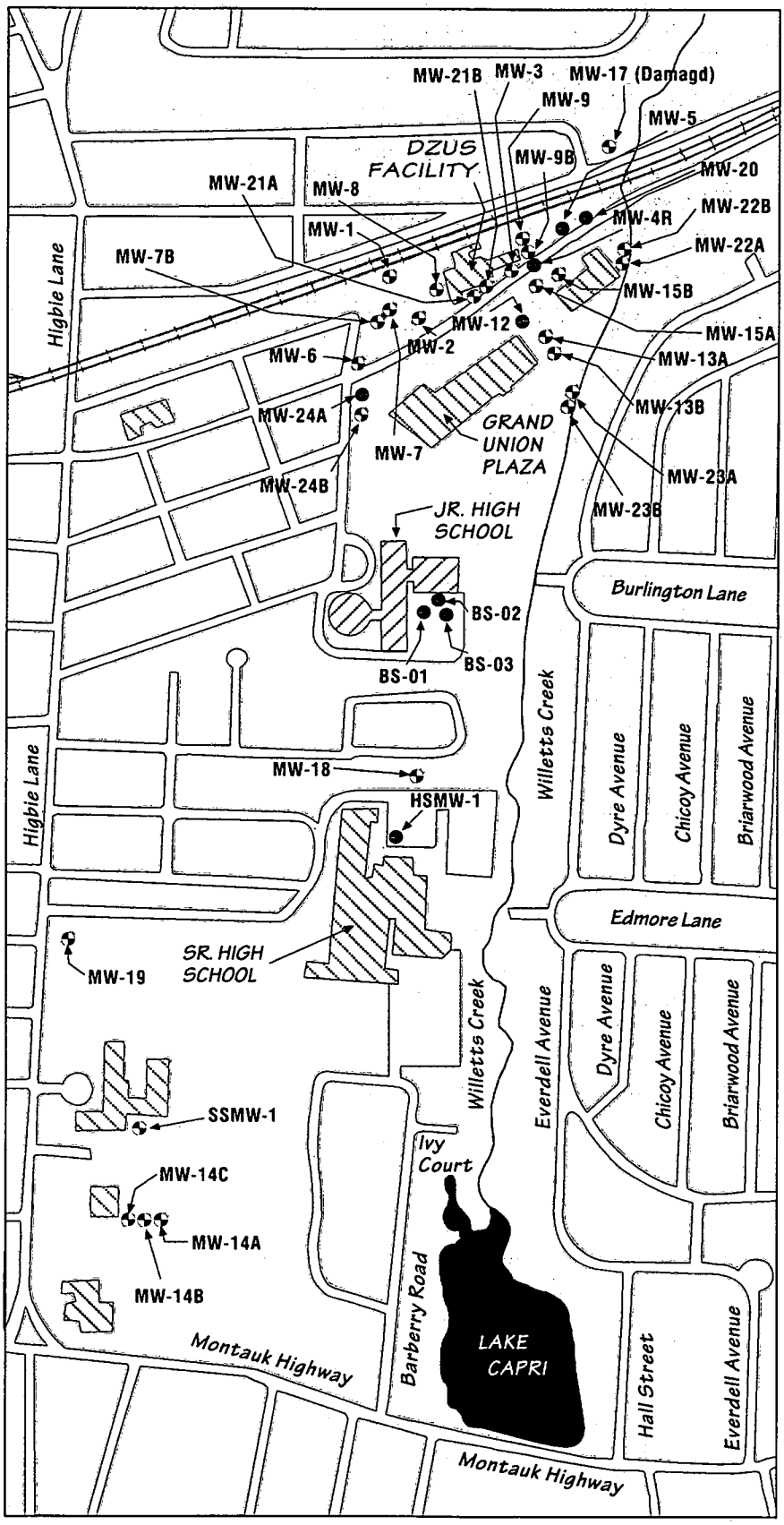
The abandonment procedure will consist of completely removing and grouting the existing wells so that all past evidence of the well and potential migration pathways are permanently removed, and future use of the land unencumbered. Properly restore the well location. Document the abandonment procedure by updating Table 3-1, including the date, method and person responsible for the abandonment procedure. A well abandonment form is included in Appendix D.

Groundwater Monitoring Program

Monitor groundwater levels, and sample and analyze groundwater for metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver) as indicated on Table 1-1. Samples should be collected during approximately the same time(s) each year to allow comparability, e.g. late spring.

Measure and record to the nearest 0.01 foot, the depth to groundwater and total depth in each designated well using the marked measuring point at the top of the inner casing at each well. Taking into account normal seasonal variations, repeat and document the measurement if the depth differs substantially from the previous measurement. Note any observed damage to the wells or changes in total depth and record this information on the water depth table. Convert the depth to an elevation using the measuring point elevations listed on Table 3-1.

Measure the lake level during the same day as the groundwater measurements by measuring the distance down to the lake surface from the top of the concrete outfall structure (elevation 5.90-ft.) at the south end of the lake, and record this on the form.



LEGEND

- EXISTING WELLS
- NON–LOCATABLE WELLS

NOT DRAWN TO SCALE

FIGURE 3-1

EARTH TECH

MONITORING WELL INVENTORY
DZUS FASTENER SITE
LAKE CAPRI/WILLETTS CREEK

SEPTEMBER 1998 202563

Table 3-1
MONITORING WELL INFORMATION
Dzus Fasteners Site
West Islip, New York

MONITORING WELL	WELL DIAMETER (in)	MEASURED DEPTH (ft)(1998)	REF. ELEVATION (ft)	DTW 9/8-9/93	GW ELEV. (ft)	DTW 6/8-9/98	GW ELEV. (ft)
MW-1	2	15.0	21.88	9.9	11.98	7.8	14.08
MW-2	2	14.0	21.21	9.78	11.43	8.8	12.41
MW-3	2	12.1	19.73	7.65	12.08	7	12.73
MW-4R	-	-	18.95	6.7	12.25	nl	nl
MW-5	-	-	19.11	6.71	12.4	nl	nl
MW-6	2	12.95	20.23	9.05	11.18	7.5	12.73
MW-7	2	8.15	20.63	9.04	11.59	7.8	12.83
MW-7B	2	44.5	20.79	9.14	11.65	8.1	12.69
MW-8	2	14.6	21.57	9.75	11.82	7.8	13.77
MW-9	2	12.0	19.06	6.58	12.48	4.4	14.66
MW-9B	2	43.3	19.13	6.48	12.65	4.8	14.33
MW-12	-	-	17.67	5.72	11.95	nl	nl
MW-13A	2	10.9	15.99	4.2	11.79	2.75	13.24
MW-13B	2	44.8	16.02	4.05	11.97	2.6	13.42
MW-14A	2	15.6	13.57	7.74	5.83	8.4	5.17
MW-14B	2	46.2	13.48	7.63	5.85	8.4	5.08
MW-14C	2	79.0	13.2	7.39	5.81	8.4	4.8
MW-15A	2	29.0	19.16	7.1	12.06	5.5	13.66
MW-15B	2	84.8	19.13	7.03	12.1	6.4	12.73
MW-17	-	-	21.82	8.88	12.94	ns	ns
MW-18	2	13.75	13.6	5.81	7.79	6.5	7.1
MW-19	2	13.8	15.55	8.36	7.19	7.8	7.75
MW-20	-	-	19	6.4	12.6	nl	nl
MW-21A	2	14.5	21.19	9.36	11.83	7.3	13.89
MW-21B	2	44.8	21.05	9.2	11.85	7.4	13.65
MW-22A	2	14.5	20.26	7.84	12.42	7.7	12.56
MW-22B	2	43.8	20.02	7.7	12.32	7.2	12.82
MW-23A	2	14.8	17.63	5.88	11.75	4.6	13.03
MW-23B	2	44.5	17.57	5.86	11.71	4.6	12.97
MW-24A	-	-	20.86	9.76	11.1	nl	nl
MW-24B	2	44.6	20.9	9.74	11.16	8.5	12.4
Willets at Union Blv.	-	-	18.93	5.9	13.03	nl	nl
BSMW-1	-	-	19.99	10.33	9.66	nl	nl
HSMW-1	-	-	15.97	8.9	7.07	nl	nl
SSMW-1	2	9.0	14.51	8.04	6.47	7.9	6.61
SC Ivy Court Well	-	-	9.74	4.71	5.03	nl	nl
Willets at Capri	-	-	9.6	5.25	4.35	nl	nl
Willets at H.S.	-	-	11.23	4.93	6.3	nl	nl
SC Edmore Well	-	-	9.07	2.45	6.62	nl	nl
Willets at B.S.	-	-	15.13	5.62	9.51	nl	nl

nl = not located; ns = not sampled

Notes: Of a possible 36 wells noted from LMS plan maps, 26 wells were sampled by Earth Tech in 1998.
MW-4 not located, covered by new paving or curbing MW-5 not located, covered by new landscaping.
MW-12 not located, paved over.MW-17 located off of Orinico Drive has blocked or crimped PVC casing.
MW-20 not located paved over. MW-24A not located.
All other off site wells listed in LMS report were not located with the exception of SSMW-1(Secatogue School)

DTW = depth to groundwater from measuring point
Results are from RI/FS (LMS) except for the 6/8-9/98 round from the PDI (Earth Tech).

Following the water level and well depth measurement(s), calculate the volume of water in the well by measuring the height of the standing column of water in each well casing and multiplying it by the appropriate conversion factor. Purge five well casing volumes from the well using a Grundfos pump, or equivalent. Be sure to evacuate the stagnant water that may be present above the well screen. In the past, purge water was deposited on the ground adjacent to the well. Measure and record field water quality parameters (pH, temperature (centigrade), temperature-adjusted specific conductance (umhos per sq cm at 25 degrees C), and turbidity (NTUs)).

Collect a sample using a new or decontaminated PVC bailer and place the unfiltered sample into clean sample containers as appropriate for the analysis. Be sure that the glassware contains the appropriate preservative as required by the method. Store the samples on ice and transport under routine Chain of Custody procedures. Analyze the samples within the prescribed holding times using the analytical methods as indicated on Table 1-1.

Note – previous groundwater analyses at the site have indicated that groundwater samples may be turbid with turbidity values exceeding 50 NTUs. Where this occurs, the concentrations of reported metals may be at least partly caused by the suspended solids rather than by the dissolved phase that is more representative of groundwater. Minor variations in sample turbidity could result in widely divergent metals concentrations. Take this into account during evaluation of the analytical results, and consider the need for analyzing field-filtered samples to compare with the unfiltered (total) results.

Sampling frequency shall be as indicated on Table 1-1.

Groundwater analytical results should be summarized on cumulative tabulated summary form for cadmium, chromium and cyanide for each well to identify trends. Be sure to clearly indicate whether the samples are unfiltered (total) or filtered (dissolved) so that comparisons are valid.

Properly dispose of all non-re-usable sampling materials and equipment.

Equipment Summary:

- Water level indicator
- Calculator
- Purging pump, with generator if appropriate
- Collection devise (disposable bailers)

- "Horiba" Meter (field parameters)
- Cooler, bottleware, COC's

4.0 SURFACE WATER MONITORING

Surface water will be sampled at Lake Capri and analyzed for cadmium to assess water quality trends and the possible impacts of OU 2 remedial actions on altering surface water concentrations. Sediment samples (Section 5.0) will be collected at the creek and lake bottom at the same time as the surface water sampling. Surface water and sediment sampling locations are shown on Figure 4-1 for Lake Capri. Sampling locations along Willets Creek are described below.

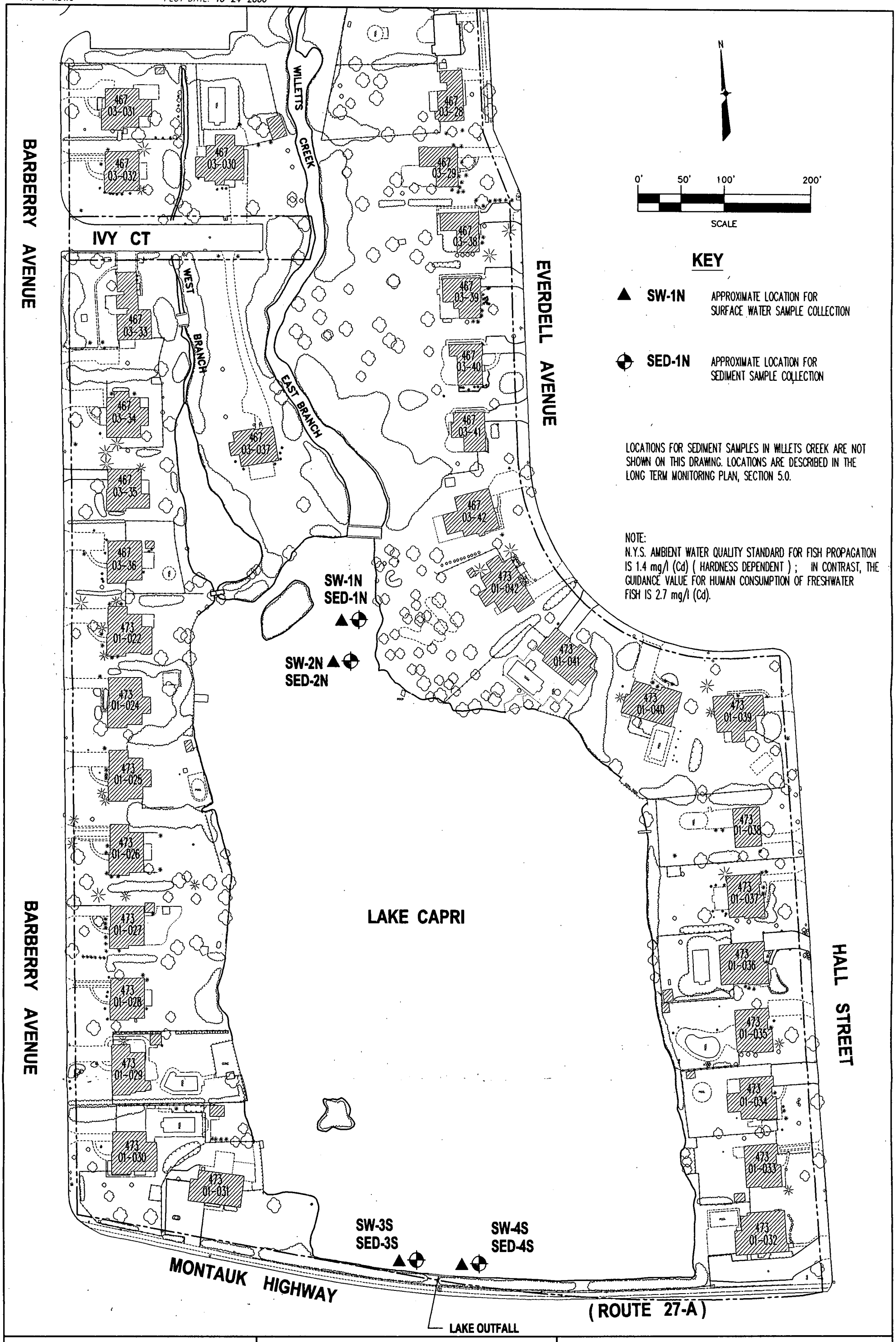
In addition to the surface water and sediment sampling, a brief reconnaissance survey should be made by boat of the entire lake, including the presence of a new sand delta at the mouth of upper Willetts Creek. Observations should also be made of the restored vegetation, the nature and general condition of the rip-rapped lake bottom area, the shoreline bulkheads and docks, and the footbridges.

Creek surface water sample collection should be coordinated with periods when the creek is receiving a high portion of its flow from groundwater base flow, as opposed to surface stormwater runoff. This will be the case when groundwater levels are relatively high compared to stream levels; i.e. sampling should not be done just after a storm. Samples should be collected approximately the same time(s) every year to allow comparability, e.g. late spring.

Sample water at the following locations:

- At the south end of Lake Capri (two samples at the outfall structure; access from locked gate along Montauk Highway; obtain key from NYSDEC);
- At the north end of Lake Capri (two locations approximately 120-feet and 125-feet south (downstream) of the masonry footbridge and both approximately 15-feet off the eastern shore; access by water with small boat brought through gate along Montauk Highway. Access through private property may be possible – obtain resident's permission beforehand – and use a boat. **Caution - lake bottom may be very soft.);**
- In upper Willetts Creek at the downstream side of the Burling Avenue footbridge adjacent to the Junior High School (access from Burling Avenue); and
- In upper Willetts Creek at the downstream edge of the riprap placed on the west bank of the creek behind the Grand Union Plaza (location is on school district property but closest access is from Grand Union Plaza parking lot; notify school district before sampling).

FIG-4-1.DWG PLOT DATE: 10-24-2000



N

0' 50' 100' 200'

SCALE

KEY

▲ **SW-1N** APPROXIMATE LOCATION FOR SURFACE WATER SAMPLE COLLECTION

⊕ **SED-1N** APPROXIMATE LOCATION FOR SEDIMENT SAMPLE COLLECTION

LOCATIONS FOR SEDIMENT SAMPLES IN WILLETS CREEK ARE NOT SHOWN ON THIS DRAWING. LOCATIONS ARE DESCRIBED IN THE LONG TERM MONITORING PLAN, SECTION 5.0.

NOTE:
N.Y.S. AMBIENT WATER QUALITY STANDARD FOR FISH PROPAGATION IS 1.4 mg/l (Cd) (HARDNESS DEPENDENT) ; IN CONTRAST, THE GUIDANCE VALUE FOR HUMAN CONSUMPTION OF FRESHWATER FISH IS 2.7 mg/l (Cd).

EARTH TECH

A tyco INTERNATIONAL LTD. COMPANY

LONG TERM MONITORING PLAN
DZUS FASTENER SITE
WEST ISLIP, NEW YORK
NYSDEC SITE No. 1-52-033

OCT. 2000 32419

FIGURE 4 - 1
SURFACE WATER AND SEDIMENT SAMPLING LOCATION MAP

Sample the water in a downstream to upstream manner that does not cause or entrain re-suspended sediment or other matter in the sample. Use of a boat in the lake should alleviate this potential problem. If the water is sufficiently deep, attempt to collect the sample at the mid-height of the water column. Perform and record routine field water tests (water depth, pH, temperature, specific conductance, dissolved oxygen, and turbidity) at the time of sampling. A combined surface water and sediment sampling form is included in Appendix D.

Collect a sample using a new or decontaminated PVC beaker and place the unfiltered sample into clean laboratory bottleware. Be sure that the glassware contains the appropriate preservative. Store the samples on ice and transport under routine Chain of Custody procedures. Analyze the samples for total cadmium within the prescribed holding times using the analytical methods as indicated on Table 1-1.

Note – previous analyses at the site have indicated that cadmium may be associated with particulate matter as well as dissolved. Minor variations in sample turbidity could result in widely divergent metals concentrations. Take this into account during the sampling and the evaluation of the analytical results, and consider the need for analyzing field-filtered samples to compare with the unfiltered (total) results.

Sampling frequency shall be as indicated on Table 1-1.

Surface water analytical results should be summarized on cumulative tabulated summary form for cadmium for each location to identify trends.

Properly dispose of all non-re-usable sampling materials and equipment.

Equipment Summary:

- Small boat (2-person) with appropriate safety equipment
- "Horiba" Meter (field measurements)
- Collection devise (PVC beakers)
- Bottleware, coolers, COC's

5.0 BOTTOM SEDIMENT MONITORING

Collect samples of the surficial sediment from the lake and creek bottom during the same sampling events as the surface water samples. Indicate the type of sediment sampled, e.g. silt or sand, and avoid entrainment of debris or vegetation in the samples. A combined surface water and sediment sampling form is included in Appendix D. Sediment sampling locations for Lake Capri are shown on Figure 4-1. Sediment sampling locations along Willetts Creek are the same as the surface water locations and are described in Section 4.0.

Collect a sample using a new or decontaminated PVC scoop or ponar dredge and place the sample into a clean container as applicable for the analysis. Store the samples on ice and transport under routine Chain of Custody procedures. Analyze the samples for cadmium within the prescribed holding times using the analytical methods as indicated on Table 1-1.

Sampling frequency shall be as indicated on Table 1-1.

Sediment analytical results should be summarized on cumulative tabulated summary form for cadmium for each location to identify trends.

Properly dispose of all non-re-usable sampling materials and equipment.

Equipment Summary:

- Ponar dredge
- Spatula
- Bottleware, cooler, COC's

6.0 REPORTING

Reports will be submitted following each sampling event. The reports will summarize the methods, findings, and an evaluation as to remedy effectiveness and progress at reducing cadmium concentrations in the various media. Data will be compiled in environmental database format to facilitate long-term compilation, presentation and evaluation. Field data forms including chain of custody forms will be appended to the report.

A copy of the report shall be retained by the NYSDEC, Division of Environmental Remediation, Bureau of Hazardous Site Control, 50 Wolf Road, Albany, N.Y. 12233. Additional copies of the reports shall be distributed as follows:

Attn: Larry Skinner
NYSDEC, Bureau of Habitat
Room 576
50 Wolf Road
Albany, NY 12233-4756
Phone: 518-457-6178

Attn: Ed Horn
NYSDOH, Bureau of Toxic Substance Assessment
Flanigan Square, Room 330
547 River Street
Troy, NY 12180-2216
Phone: 518-402-7800

Fred G. Henson
Aquatic Biologist
NYSDEC Bureau of Fisheries, Region 1
Loop Road, Building 40 SUNY
Stony Brook, NY 11790
Phone: (631) 444-0282
Fax: (631) 444-0272 (FAX)
Email: fghenson@gw.dec.state.ny.us

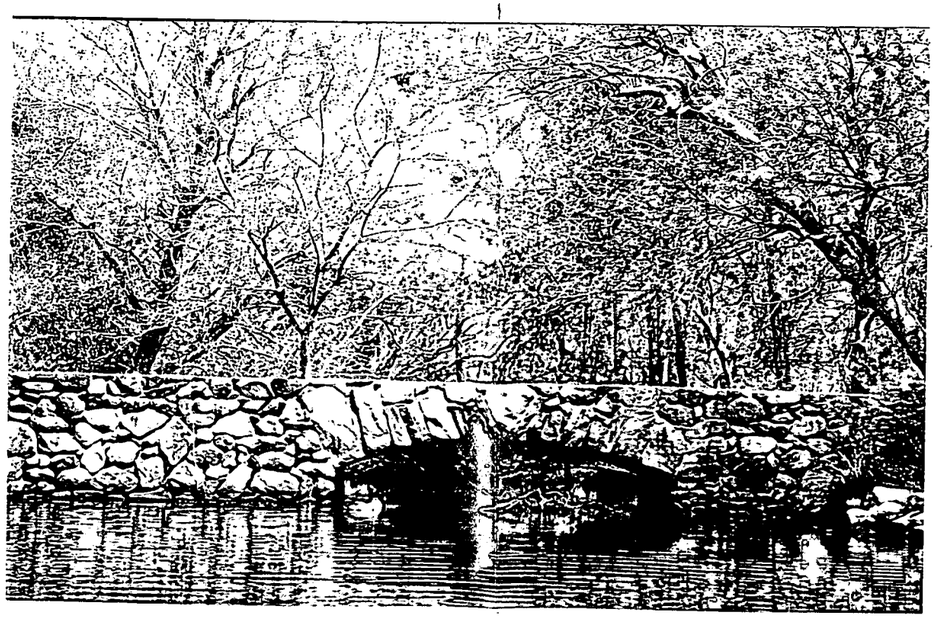
APPENDIX A

Photographs

Photo #16:
Willetts Creek East Branch Inlet to Lake Capri **Lot # 476-03-42** **Lot # 473-01-042**

Photo #17: Lot # 476-03-42
Corner

Photo #18
Close Up of East Branch (Willetts Creek) Inlet to Lake Capri



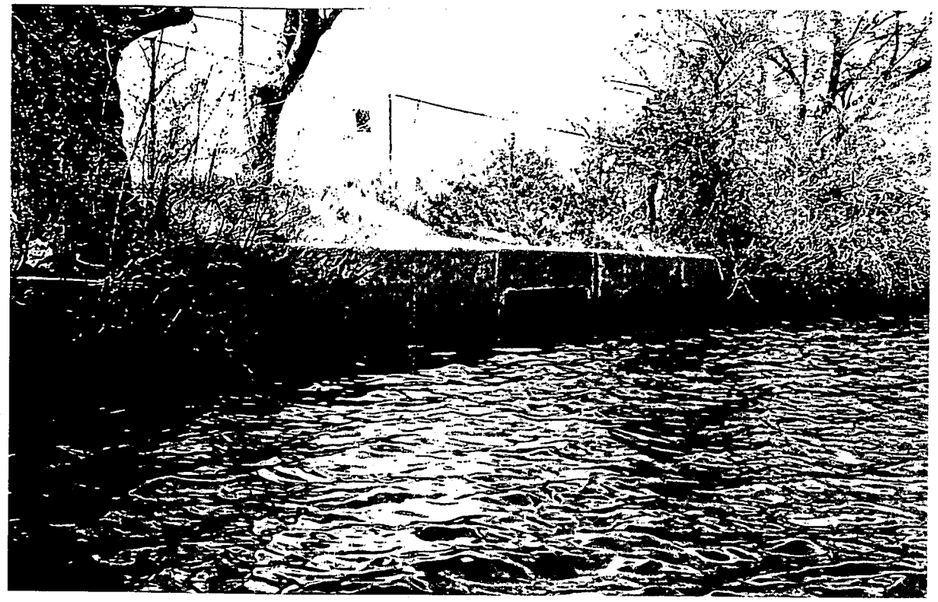
South End Lake Capri

South End View is East of Outfall Structure

Photo #35

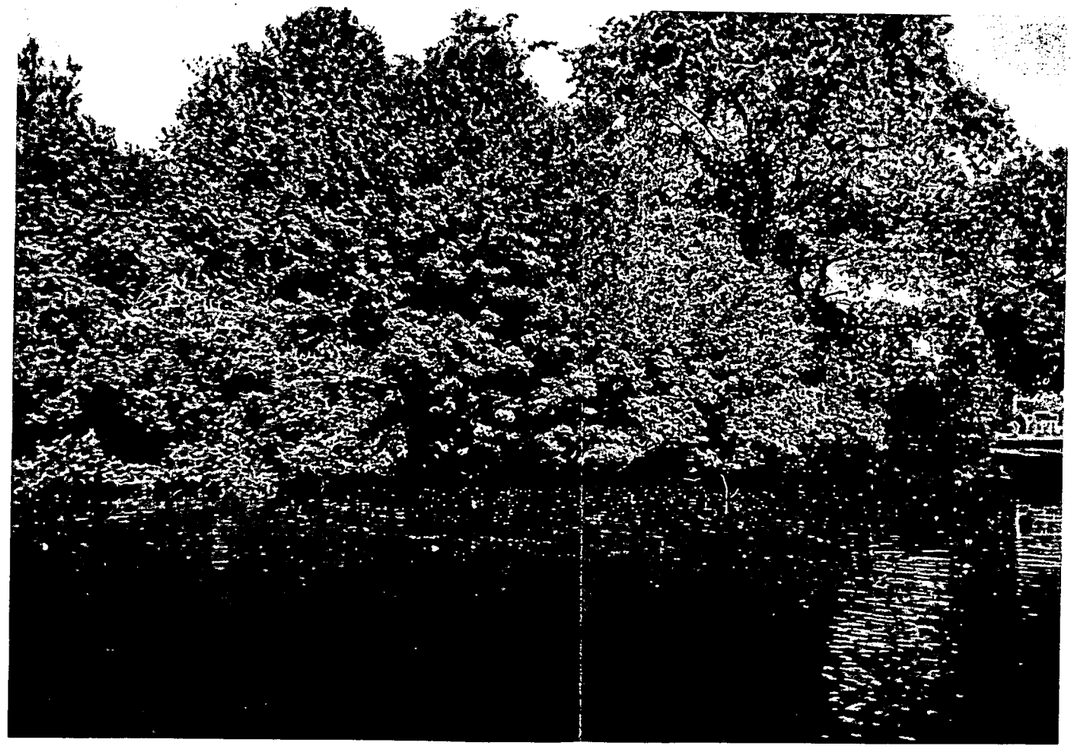
Outfall Structure

Photo #36



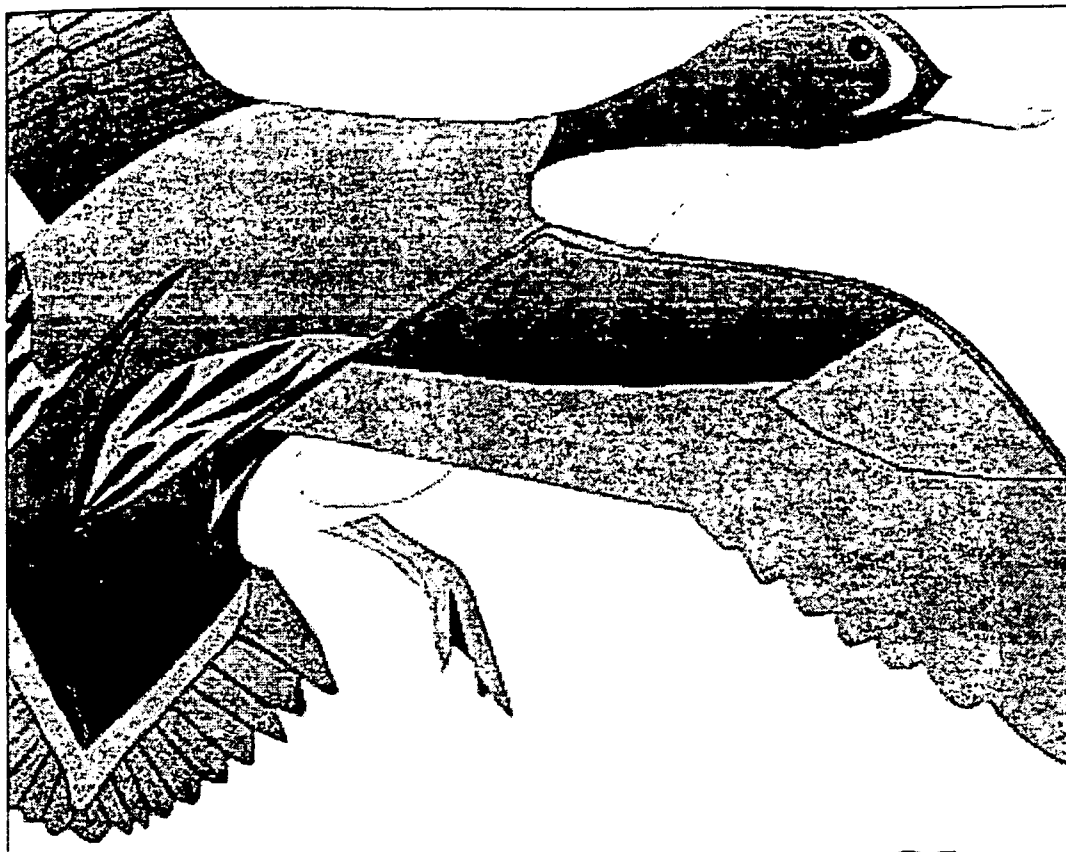
South End View is West of Outfall Structure to Lot 473-01-031

Photo #37



APPENDIX B

NYSDOH Fish Advisory Pamphlet

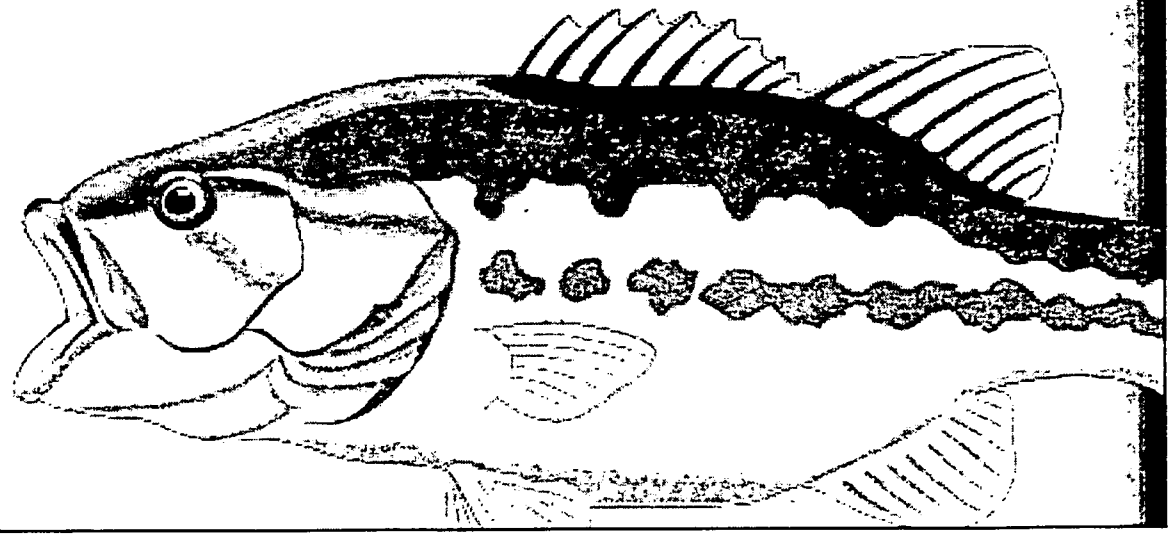


NYSDOH
Center for
Environmental Health
River Street
Troy, NY

Chemicals in Sportfish and Game

Health Advisories 2000-2001

New York State Department of Health



These advisories are also available from the New York State Department of Health Web site on the Internet: *http://www.health.state.ny.us/nysdoh/environ/fish.htm*

In an effort to reduce the costs of printing, please notify us if you wish your name to be deleted from our mailing list or if your address has changed. Comments regarding the format or content of this booklet are welcome. Use the telephone number for Environmental Health Information listed on page 19 or e-mail: *BTSA@health.state.ny.us*

2000-2001 Health Advisories: Chemicals in Sportfish and Game

Summary

The New York State Department of Health (DOH) issues advisories on eating sportfish and game because some of these foods contain chemicals at levels that may be harmful to your health. These advisories are for sportfish and game that people take and are not for fish and game sold in markets. The health advisories are: (1) general advice on sportfish taken from waters in New York State; (2) advice on sportfish from specific waterbodies; and (3) advice on eating game. The advisory tells you how to minimize your exposure to contaminants in sportfish and game and reduce whatever health risks are associated with them. The advisories are updated yearly.

Background

Fish and game are nutritious and good to eat. But some fish may take in contaminants from the water they live in and the food they eat. Game, too, may take in contaminants from their food and water. Some of these contaminants build up in fish and game--and in people--over time. These contaminants could harm people, so it is important to keep your exposure to these contaminants as low as possible.

The federal government sets standards for chemicals in food that is sold commercially, including fish. The decision to eat sportfish or game that you take is not regulated by government. Instead, state governments issue advisories. In New York State, the Department of Environmental Conservation (DEC) routinely monitors contaminant levels in fish and game and DOH issues advisories when sportfish have contaminant levels greater than federal standards.

These advisories are not intended to discourage you from eating fish or game, but should be used as a guide to minimize your exposure to contaminants.

Health Benefits

When properly prepared, fish provide a diet high in protein and low in saturated fats. Almost any kind of fish may have real health benefits if it replaces a high-fat source of protein in the diet. You can get the health benefits of fish and reduce unwanted contaminants by following the guidelines in these advisories.

Contaminants in Fish and Game

Long-lasting contaminants, such as PCBs, DDT and cadmium, build up in your body over time. It may take months or years of regularly eating contaminated fish or game to build up amounts that are a health concern. Health problems that may result from the contaminants found in fish or game range from small changes in health that are hard to detect to birth defects and cancer. Mothers who eat highly contaminated fish and game before becoming pregnant may have children who are slower to develop and learn. The meal advice in this advisory is also intended to protect children from these potential developmental problems. Women beyond their childbearing years and men face fewer health risks from contaminants than children do. People in this group should follow the advisory to reduce their total exposure to contaminants.

Some contaminants cause cancer in animals. We cannot predict with certainty your risks of cancer from eating contaminated fish or game. Cancer currently affects about one in every three people, primarily due to smoking, diet and hereditary risk factors. Exposure to contaminants in the fish and game you eat may not increase your cancer risk at all. If you follow this advisory over your lifetime, you will minimize your exposure and reduce whatever cancer risk is associated with these contaminants.

More information about the chemicals that

have led to advisories in New York State sportfish and game and potential health effects can be found on page 16. When the federal government sets standards for fish, it generally assumes that people eat about a half-pound of fish each month. The contaminant levels are measured in a skin-on fillet which has not been trimmed; this sample is used in determining whether or not the fish exceeds standards. Fish cannot be legally sold if they contain a contaminant at a level greater than its standard. When sportfish from a waterbody contain contaminants at levels greater than the federal standards, DOH issues a specific advisory.

General Advisory for Eating Sportfish

The general health advisory for sportfish is that you eat no more than one meal (one-half pound) per week of fish taken from the state's freshwaters and some marine waters at the mouth of the Hudson River. These include the New York waters of the Hudson River, Upper Bay of New York Harbor (north of Verrazano Narrows Bridge), Arthur Kill, Kill Van Kull, Harlem River and the East River to the Throgs Neck Bridge (see map on page 14). This general advisory is to protect against eating large amounts of fish that have not been tested or may contain unidentified contaminants. The general advisory does not apply to most marine waters.

Specific Advisories for Freshwater, the Hudson River and the Upper Bay of New York Harbor

Fish from more than 70 waterbodies in New York have contaminant levels that are greater than federal standards. For these waters, DOH recommends either limiting or not eating a specific kind of fish (see pages 5 to 12). In some cases, enough information is available to issue advisories based on the length of the fish. Older (larger) fish are often more contaminated than younger (smaller) fish.

The contaminants that led to the advisory (mercury, cadmium, PCBs, chlordane, dioxin, DDT and mirex) are listed next to each advisory. If you eat fish from more than one water body with these advisories, you should limit consumption from all of the waters you fish. For example, if you eat a meal of Saw Mill River carp, you should not eat American eel from Kinderhook Lake for the rest of that month since both of these fish species have EAT NO MORE THAN ONE MEAL PER MONTH advisories and both are based on PCB contamination.

Advisory for Women, Infants and Children

Health advice is also given for infants, children under the age of 15 and women of childbearing age. DOH recommends that these groups not eat any fish from the specific waterbodies listed in the advisory. The reason for this specific advice is that chemicals may have a greater effect on developing organs in young children or in the fetus. They also build up in women's bodies and are often passed on in mother's milk. Waters that have specific advisories have at least one species of fish with an elevated contaminant level, which means that a contamination source is or was in or near the water.

When eating fish from waters where cadmium or mercury are listed as primary contaminants, it is important to space out fish meals according to the specific advisory for that waterbody. For example, if you eat a meal of yellow perch from Moshier Reservoir, you should not eat any more fish with the same mercury advisory for the rest of that month. However, for other contaminants, the total number of meals that you eat during the year is important and many of those meals can be eaten during a few months of the year. If most of the fish you eat are from the ONE MEAL PER WEEK category, you should not exceed 52 meals per year. Likewise, if most of the fish you eat are in the ONE MEAL PER MONTH category, you should not exceed 12 meals per year. Remember, eating one meal of fish from the ONE MEAL PER MONTH group is the same as eating four meals from the ONE MEAL PER WEEK group.

Advisories for Other Marine Waters

DOH also issues specific advisories for Long Island Sound, Block Island Sound, Peconic/Gardiners Bays, the Lower Bay of New York Harbor, Jamaica Bay and other Long Island south shore waters (see maps on pages 14 and 15). These apply to striped bass, bluefish and American eels and are the only fish advisories that apply to these waters.

Ocean fish, although tested less often, are generally less contaminated than freshwater fish. However, striped bass, bluefish and eels have specific habits or characteristics that make them more likely to have contaminants than other marine species (see page 15).

Advisories for Chemical Contaminants in Crabs and Lobsters

DOH has a special advisory to eat no more than six Hudson River blue crabs per week and to avoid consuming crab cooking liquid due to cadmium and PCB contamination. DOH also recommends that you not eat the soft green substance (mustard, tomalley, liver or hepatopancreas) found in the body section of crabs and lobsters from any waters, because cadmium, PCBs and other contaminants concentrate there.

Advisories for Eating Game

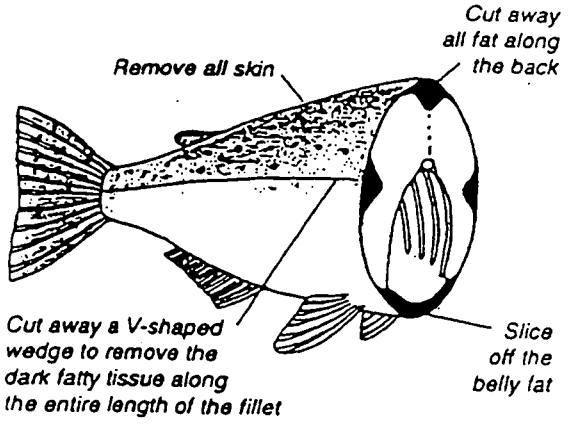
DOH also issues advisories about eating some game. These are on page 15 of this booklet and include advisories for eating snapping turtles and waterfowl statewide because they contain PCBs and other contaminants. Because these contaminants concentrate in fat, you can minimize your exposure by not eating fat from these game and by following the cooking and eating advice on page 15.

Deformed or Abnormal Fish

The health implications of eating deformed or abnormal fish are unknown. Any obviously diseased fish (marked by tumors, lesions or other abnormal condition of the fish skin, meat or internal organs) should be discarded.

Cleaning and Cooking Your Fish

Many contaminants are found at higher levels in the fat of fish. You can reduce the amount of these contaminants in a fish meal by properly trimming, skinning and cooking your catch. Remove the skin and trim all the fat from the belly flap, the line along the sides, the fat along the back and under the skin (see the diagram at the top of the next column).



Cooking or soaking fish cannot eliminate the contaminants, but heat from cooking melts some of the fat in fish and allows some of the contaminated fat to drip away. Broil, grill or bake the trimmed, skinned fish on a rack so that the fat drips away. Do not use drippings to prepare sauces or gravies.

These precautions will not reduce the amount of mercury or other metals. Mercury is distributed throughout a fish's muscle tissue (the part you eat), rather than in the fat and skin. Therefore, the only way to reduce mercury intake is to reduce the amount of contaminated fish you eat.

Good sanitary practices should be followed when preparing any fish. Fish should be kept iced or refrigerated until cleaned and filleted and then refrigerated until cooked. Hands, utensils and work surfaces should be washed before and after handling any raw food, including fish. Seafood should be cooked to an internal temperature of 140°F.

Advice on Eating Raw or Partially Cooked Fish, Shellfish and Other Meats

Foods of animal origin, such as pork, poultry, beef, dairy products, fish and shellfish, can be contaminated with bacteria, viruses or parasites that can cause illness. Persons at high risk (for example, those who are immunocompromised, suffer from liver disease or other chronic diseases) can be more susceptible to and more severely affected by these infectious diseases. This is why the Department of Health recommends that all of these foods be thoroughly cooked before eating. Government agencies, universities and

the food industry have active programs that strive to minimize contamination of raw animal foods and assure safe food products.

Information on rules and regulations, including areas in which clam, oyster and mussel collection is permitted, can be obtained from DEC by calling (631) 444-0475. DEC routinely tests clam, oyster and mussel beds for bacteria. Based on these tests, an area may be closed to clam, oyster and mussel harvesting. Call DEC at (631) 444-0480 for a list of emergency closures.

Fish From Waters Affected by Beach Wash-ups

There is no indication that the wash-up of medical-type waste and garbage on New York and Long Island beaches has affected the sanitary condition of marine fish, lobster and crabs. Fish do not carry the AIDS virus. Consumers need not worry about eating these foods because of these problems. Good sanitary practices should be followed when preparing fish or any other food.

Reducing Exposure To Chemical Contaminants From Fish

Fish are an important source of protein and are low in saturated fat. Naturally occurring fish oils lower plasma cholesterol and triglycerides, thereby decreasing the risk of coronary heart disease. Increasing fish consumption is useful in reducing dietary fat and controlling weight. By eating a diet that includes food from a variety of protein sources, an individual is more likely to have a diet that is adequate in all nutrients.

Although eating fish has some health benefits, fish with high contaminant levels should be avoided. When deciding whether or not to eat fish that may be contaminated, the benefits of eating those fish can be weighed against the risks.

For young women, eating contaminated fish is a health concern not only for themselves but also for any unborn or nursing child, since the chemicals may reach the unborn babies and can be passed on in mother's milk. For an older person with heart disease, the risks, especially of long-term health effects, may not be as great a concern when compared to the benefits of reducing the risks of heart disease.

Everyone can benefit from eating the fish they catch and can minimize their contaminant intake by following these general recommendations:

1. Choose fish from waterbodies that are not listed in the DOH advisories. Follow the advice in this booklet.
2. Use a method of filleting the fish that will reduce the skin, fatty material and dark meat. These parts of the fish contain many of the contaminants.
3. Choose smaller fish, consistent with DEC regulations, within a species since they may have lower contaminant levels. Older (larger) fish within a species may be more contaminated because they have had more time to accumulate contaminants in their bodies.
4. Do not eat the soft green tissue (mustard, tomalley, liver or hepatopancreas) found in the body section of crab and lobster. This tissue has been found to contain high levels of chemical contaminants, including PCBs and heavy metals.
5. Cooking methods such as broiling, poaching, boiling and baking, which allow contaminants from the fatty portions of fish to drain out, are preferable. Pan frying is not recommended. The cooking liquids of fish from contaminated waters should be discarded since these liquids may retain contaminants.
6. Anglers who want to enjoy the fun of fishing but who wish to eliminate the potential risks associated with eating contaminated sportfish may want to consider "catch and release" fishing. Refer to the DEC *New York State Fishing Regulations Guide* for suggestions on catch and release fishing techniques.

2000-2001 Health Advisories

The following recommendations are based on contaminant levels in fish and game. To minimize potential adverse health impacts, the DOH recommends:

- **Eat no more than one meal (one-half pound) per week** of fish from the state's freshwaters, the Hudson River estuary, Upper Bay of New York Harbor (north of the Verrazano Narrows Bridge), Arthur Kill, Kill Van Kull, East River to the Throgs Neck Bridge and Harlem River, except as recommended below.
- **Women of childbearing age, infants and children under the age of 15 should not eat** any fish species from waters listed below.
- **Follow trimming and cooking advice.**
- Observe the following restrictions on eating fish from these waters and their tributaries to the first barrier impassable by fish.
- Advice for other marine waters is on page 15.

Water (County)	Species	Recommendations	Chemical(s) of Concern
Arthur Kill [58] (Richmond)	See Hudson River (south of Catskill)		PCBs
Ashokan Reservoir [53] (Ulster)	Smallmouth bass over 16" and walleye	Eat no more than one meal per month	Mercury
Barge Canal [4] Tonawanda Creek from Lockport to Niagara River (Erie & Niagara)	Carp	Eat no more than one meal per month	PCBs
Beaver Lake [30] (Lewis)	Chain pickerel	Eat no more than one meal per month	Mercury
Belmont Lake [70] (Suffolk)	Carp	Eat no more than one meal per month	Chlordane, PCBs
Big Moose Lake [32] (Herkimer)	Yellow perch	Eat no more than one meal per month	Mercury
Buffalo River/Harbor [6] (Erie)	Carp	Eat none	PCBs
Canadice Lake [9] (Ontario)	Lake or brown trout	Eat no more than one meal per month	PCBs
Canandaigua Lake [10] (Ontario & Yates)	Lake trout over 24"	Eat no more than one meal per month	PCBs
Cannonsville Reservoir [49] (Delaware)	Smallmouth bass over 15"	Eat no more than one meal per month	Mercury

Waters with changes from the 1999-2000 Health Advisories are **underlined**.
Numbers in brackets refer to map on page 13.

Water (County)	Species	Recommendations	Chemical(s) of Concern
Carry Falls Reservoir [35] (St. Lawrence)	Walleye	Eat no more than one meal per month	Mercury
Cayuga Creek [2] (Niagara)	All species	Eat none	Dioxin
Chenango River [14]	Walleye over 22"	Eat no more than one meal per month	Mercury
Cranberry Lake [34] (St. Lawrence)	Smallmouth bass	Eat no more than one meal per month	Mercury
Delaware Park Lake [5] (Erie)	Carp	Eat no more than one meal per month	PCBs
East River [57] (NYC)	American eel	Eat none	PCBs
	Atlantic needlefish, bluefish, striped bass and white perch	Eat no more than one meal per month	PCBs
Eighteen Mile Creek [3] (Niagara)	All species	Eat none	PCBs
Ferris Lake [23] (Hamilton)	Yellow perch over 12"	Eat none	Mercury
	Smaller yellow perch	Eat no more than one meal per month	Mercury
Fourth Lake [24] (Herkimer & Hamilton)	Lake trout	Eat none	DDT
Francis Lake [26] (Lewis)	Yellow perch	Eat no more than one meal per month	Mercury
Freeport Reservoir [68] (Nassau)	Carp	Eat no more than one meal per month	Chlordane
Grant Park Pond [63] (Nassau)	Carp	Eat no more than one meal per month	PCBs
Grasse River [38] Mouth to Massena Power Canal (St. Lawrence)	All species	Eat none	PCBs
Halfmoon Lake [25] (Lewis)	Yellow perch	Eat no more than one meal per month	Mercury

Waters with changes from the 1999-2000 Health Advisories are **underlined.**
Numbers in brackets refer to map on page 13.
Please note the special advice for **women of childbearing age, infants and children under the age of 15** on page 5.

Water (County)	Species	Recommendations	Chemical(s) of Concern
Hall's Pond [64] (Nassau)	Carp and goldfish	Eat none	Chlordane
Harlem River [56] (NYC)	American eel	Eat none	PCBs
	Atlantic needlefish, bluefish, striped bass and white perch	Eat no more than one meal per month	PCBs
Herrick Hollow Creek [48] (Delaware)	Brook trout	Eat no more than one meal per month	PCBs
Hoosic River [43] (Rensselaer)	Brown trout over 14"	Eat no more than one meal per month	PCBs-
Hudson River [47] Sherman Island Dam downstream to Feeder Dam at South Glens Falls	Carp	Eat no more than one meal per month	PCBs
Hudson Falls to Troy Dam	All species	Eat none	PCBs
Troy Dam south to bridge at Catskill	All species except Alewife, American shad, blueback herring, rock bass and yellow perch	Eat none	PCBs
	Alewife, blueback herring, rock bass and yellow perch	Eat no more than one meal per month	PCBs
	American shad (general advisory)	Eat no more than one meal per week	PCBs
Bridge at Catskill south to and including the Upper Bay of New York Harbor (north of Verrazano Narrows Bridge), Arthur Kill and Kill Van Kull	American eel, Atlantic needlefish, bluefish, carp, goldfish, largemouth bass, smallmouth bass, rainbow smelt, striped bass, walleye, white catfish and white perch	Eat no more than one meal per month	PCBs

Hudson River Advisory continued on next page

Waters with changes from the 1999-2000 Health Advisories are **underlined.**
Numbers in brackets refer to map on page 13.
Please note the special advice for **women of childbearing age, infants and children under the age of 15** on page 5.

Water (County)	Species	Recommendations	Chemical(s) of Concern
Hudson River (continued) Bridge at Catskill south to and including the Upper Bay of New York Harbor (north of Verrazano Narrows Bridge), Arthur Kill and Kill Van Kull	Blue crab	Eat no more than six crabs per week	Cadmium, PCBs
	--hepatopancreas (mustard, tomalley, or liver)	Eat none	Cadmium, PCBs
	--cooking liquid	Discard	Cadmium, PCBs
Dobbs Ferry south to Greystone	American eel	Eat none	PCBs
	Other species	See advisories for Hudson River south of Catskill (previous page and above)	
Indian Lake [33] (Lewis)	All species	Eat no more than one meal per month	Mercury
Irondequoit Bay [8] (Monroe)	Carp	Eat none	PCBs, Mirex
Keuka Lake [11] (Yates & Steuben)	Lake trout over 25"	Eat no more than one meal per month	DDT
Kill Van Kull [59] (Richmond)	See Hudson River (south of Catskill)		PCBs
Kinderhook Lake [46] (Columbia)	American eel	Eat no more than one meal per month	PCBs
Koppers Pond [12] (Chemung)	Carp	Eat no more than one meal per month	PCBs
Lake Capri [71] (Suffolk)	American eel and carp	Eat no more than one meal per month	Chlordane, Cadmium
Lake Champlain [40] Whole Lake	Lake trout over 25" and walleye over 19"	Eat no more than one meal per month	PCBs, Mercury
Bay within Cumberland Head to Crab Island	Brown bullhead	Eat none	PCBs
	American eel and yellow perch	Eat no more than one meal per month	PCBs

Waters with changes from the 1999-2000 Health Advisories are **underlined.**
Numbers in brackets refer to map on page 13.
Please note the special advice for **women of childbearing age, infants and children under the age of 15** on page 5.

Water (County)	Species	Recommendations	Chemical(s) of Concern
Lake Ontario [7] Including Niagara River below Niagara Falls (see Niagara River for additional advice)	American eel, channel catfish, carp, lake trout over 25", brown trout over 20" and chinook salmon	Eat none	PCBs, Mirex, Dioxin
	White sucker, rainbow trout, smaller lake trout, smaller brown trout and coho salmon over 25"	Eat no more than one meal per month	PCBs, Mirex, Dioxin
West of Point Breeze	White perch	Eat none	PCBs, Mirex, Dioxin
East of Point Breeze	White perch	Eat no more than one meal per month	PCBs, Mirex, Dioxin
Loft's Pond [66] (Nassau)	Carp and goldfish	Eat no more than one meal per month	Chlordane
Long Pond-Croghan [31] (Lewis)	Splake over 12"	Eat none	Mercury
Upper Massapequa Reservoir [69] (Nassau)	White perch	Eat no more than one meal per month	Chlordane
Massena Power Canal [37] (St. Lawrence)	Smallmouth bass	Eat no more than one meal per month	PCBs
Meacham Lake [39] (Franklin)	Yellow perch over 12"	Eat none	Mercury
	Smaller yellow perch	Eat no more than one meal per month	Mercury
Mohawk River [21] Between Oriskany and West Canada Creeks (Oneida & Herkimer)	Carp	Eat none	PCBs
	Largemouth bass and tiger muskellunge	Eat no more than one meal per month	PCBs
Moshier Reservoir [29] (Herkimer)	Yellow perch	Eat no more than one meal per month	Mercury
Nassau Lake [45] (Rensselaer)	All species	Eat none	PCBs
Neversink Reservoir [51] (Sullivan)	Smallmouth bass	Eat no more than one meal per month	Mercury

Waters with changes from the 1999-2000 Health Advisories are **underlined.**
Numbers in brackets refer to map on page 13.
Please note the special advice for **women of childbearing age, infants and children under the age of 15** on page 5.

Water (County)	Species	Recommendations	Chemical(s) of Concern
New York Harbor [60]	See Hudson River (south of Catskill) and marine waters advice on page 15		PCBs
Niagara River [1] Above Niagara Falls	Carp	Eat no more than one meal per month	PCBs
Below Niagara Falls (also see Lake Ontario)	White perch	Eat none	PCBs, Mirex, Dioxin
	Smallmouth bass	Eat no more than one meal per month	PCBs, Mirex, Dioxin
Onondaga Lake [17] (Onondaga)	Walleye	Eat none	Mercury
	All other species	Eat no more than one meal per month	Mercury
Oswego River [18] Oswego power dam to upper dam at Fulton (Oswego)	Channel catfish	Eat no more than one meal per month	PCBs
Pepacton Reservoir [50] (Delaware)	Smallmouth bass over 15"	Eat no more than one meal per month	Mercury
Ridders Pond [62] (Nassau)	Goldfish	Eat none	Chlordane
Rondout Reservoir [52] (Sullivan and Ulster)	Smallmouth bass over 16"	Eat no more than one meal per month	Mercury
Round Pond [41] Town of Long Lake (Hamilton)	Yellow perch over 12"	Eat no more than one meal per month	Mercury
St. James Pond [72] (Suffolk)	All species	Eat no more than one meal per month	Chlordane, DDT

Waters with changes from the 1999-2000 Health Advisories are **underlined.**
Numbers in brackets refer to map on page 13.
Please note the special advice for **women of childbearing age, infants and children under the age of 15** on page 5.

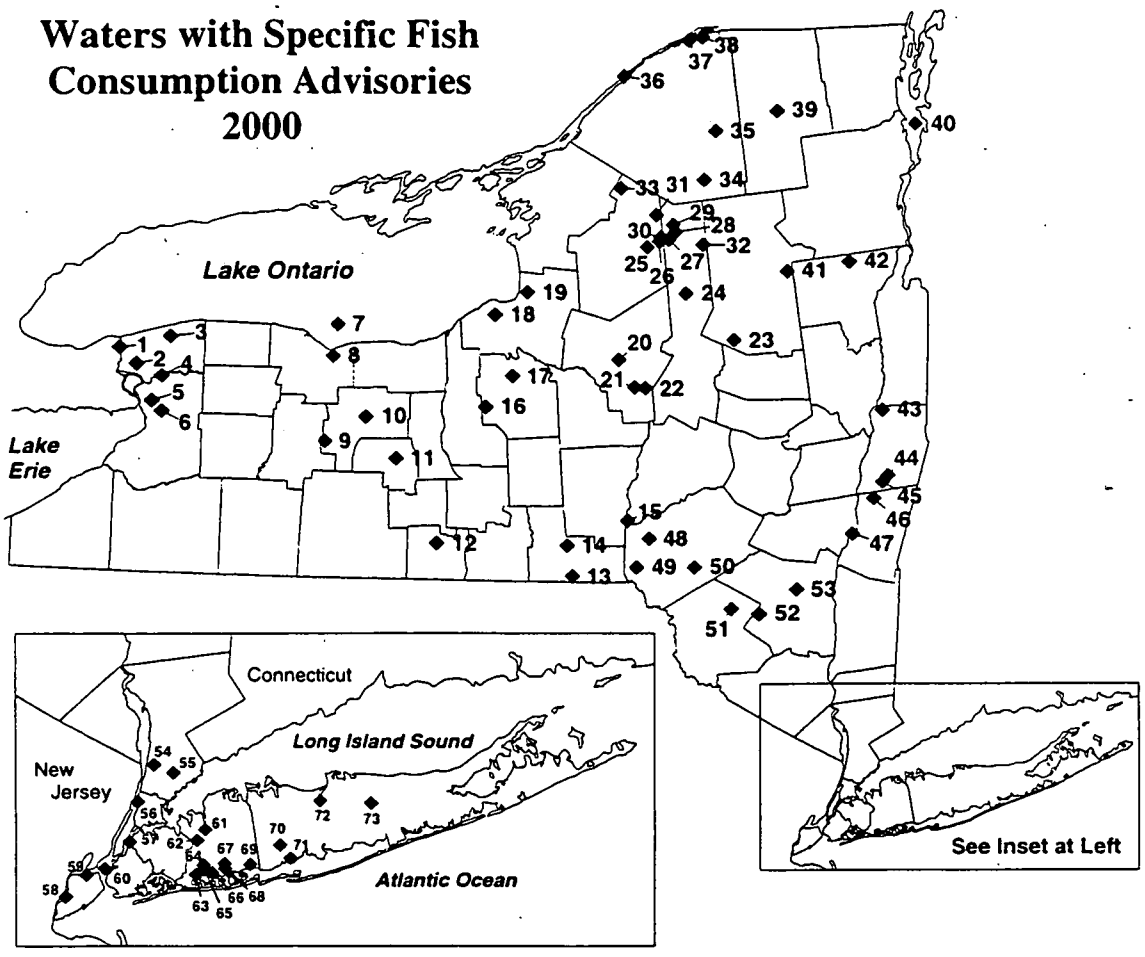
Water (County)	Species	Recommendations	Chemical(s) of Concern
St. Lawrence River [36] Whole River	American eel, channel catfish, lake trout over 25", carp, brown trout over 20" and chinook salmon	Eat none	PCBs, Mirex, Dioxin
	White perch, white sucker, rainbow trout, smaller lake trout, smaller brown trout and coho salmon over 25"	Eat no more than one meal per month	PCBs, Mirex, Dioxin
Bay at St. Lawrence/ Franklin Co. line	All species	Eat none	PCBs
Salmon River [19] Mouth to Salmon Reservoir (Oswego) (also see Lake Ontario)	Smallmouth bass	Eat no more than one meal per month	PCBs, Mirex
Sauquoit Creek [22] Between Old Silk Mill Dam (near New Hartford/Paris town line) and Mohawk River (Oneida)	Brown trout	Eat none	PCBs
Saw Mill River [54] (Westchester)	American eel	Eat no more than one meal per month	Chlordane
Schroon Lake [42] (Warren & Essex)	Lake trout over 27", yellow perch over 13" and smallmouth bass	Eat no more than one meal per month	PCBs, Mercury
Sheldrake River [55] (Westchester)	American eel	Eat none	Chlordane, Dieldrin
	Goldfish	Eat no more than one meal per month	Chlordane
Skaneateles Creek [16] From dam at Skaneateles to Seneca River (Onondaga)	Brown trout over 10"	Eat no more than one meal per month	PCBs
Smith Pond - Rockville Centre [65] (Nassau)	White perch	Eat no more than one meal per month	Chlordane

Waters with changes from the 1999-2000 Health Advisories are **underlined.**
Numbers in brackets refer to map on page 13.
Please note the special advice for **women of childbearing age, infants and children under the age of 15** on page 5.

Water (County)	Species	Recommendations	Chemical(s) of Concern
Smith Pond - Roosevelt Park [67] (Nassau)	American eel	Eat none	Chlordane
	Carp and goldfish	Eat no more than one meal per month	Chlordane
Spring Pond - Middle Island [73] (Suffolk)	Carp and goldfish	Eat none	Chlordane
Stillwater Reservoir [28] (Herkimer)	Yellow perch over 9", smallmouth bass and splake	Eat no more than one meal per month	Mercury
Sunday Lake [27] (Herkimer)	Yellow perch	Eat no more than one meal per month	Mercury
Susquehanna River [13]	Walleye over 22"	Eat no more than one meal per month	Mercury
Threemile Creek [20] (Oneida)	White sucker	Eat no more than one meal per month	PCBs
Unadilla River [15]	Walleye over 22"	Eat no more than one meal per month	Mercury
Valatie Kill [44] Between County Rt. 18 and Nassau Lake (Rensselaer)	All species	Eat none	PCBs
Whitney Park Pond [61] (Nassau)	Carp and goldfish	Eat no more than one meal per month	Chlordane

Waters with changes from the 1999-2000 Health Advisories are **underlined.**
Numbers in brackets refer to map on page 13.
Please note the special advice for **women of childbearing age, infants and children under the age of 15** on page 5.

Waters with Specific Fish Consumption Advisories 2000



1	Niagara River	25	Halfmoon Lake	49	Cannonsville Reservoir
2	Cayuga Creek	26	Francis Lake	50	Pepacton Reservoir
3	Eighteen Mile Creek	27	Sunday Lake	51	Neversink Reservoir
4	Barge Canal	28	Stillwater Reservoir	52	Rondout Reservoir
5	Delaware Park Lake	29	Moshier Reservoir	53	Ashokan Reservoir
6	Buffalo River and Harbor	30	Beaver Lake	54	Saw Mill River
7	Lake Ontario	31	Long Pond (Croghan)	55	Sheldrake River
8	Irondequoit Bay	32	Big Moose Lake	56	Harlem River
9	Canadice Lake	33	Indian Lake	57	East River
10	Canandaigua Lake	34	Cranberry Lake	58	Arthur Kill
11	Keuka Lake	35	Carry Falls Reservoir	59	Kill Van Kull
12	Koppers Pond	36	St. Lawrence River	60	New York Harbor
13	Susquehanna River	37	Massena Power Canal	61	Whitney Park Pond
14	Chenango River	38	Grasse River	62	Ridders Pond
15	Unadilla River	39	Meacham Lake	63	Grant Park Pond
16	Skaneateles Creek	40	Lake Champlain	64	Hall's Pond
17	Onondaga Lake	41	Round Pond	65	Smith Pond (Rockville Centre)
18	Oswego River	42	Schroon Lake	66	Loft's Pond
19	Salmon River	43	Hoosic River	67	Smith Pond (Roosevelt Park)
20	Threemile Creek	44	Valatie Kill	68	Freeport Reservoir
21	Mohawk River	45	Nassau Lake	69	Upper Massapequa Reservoir
22	Sauquoit Creek	46	Kinderhook Lake	70	Belmont Lake
23	Ferris Lake	47	Hudson River	71	Lake Capri
24	Fourth Lake	48	Herrick Hollow Creek	72	St. James Pond
				73	Spring Pond (Middle Island)

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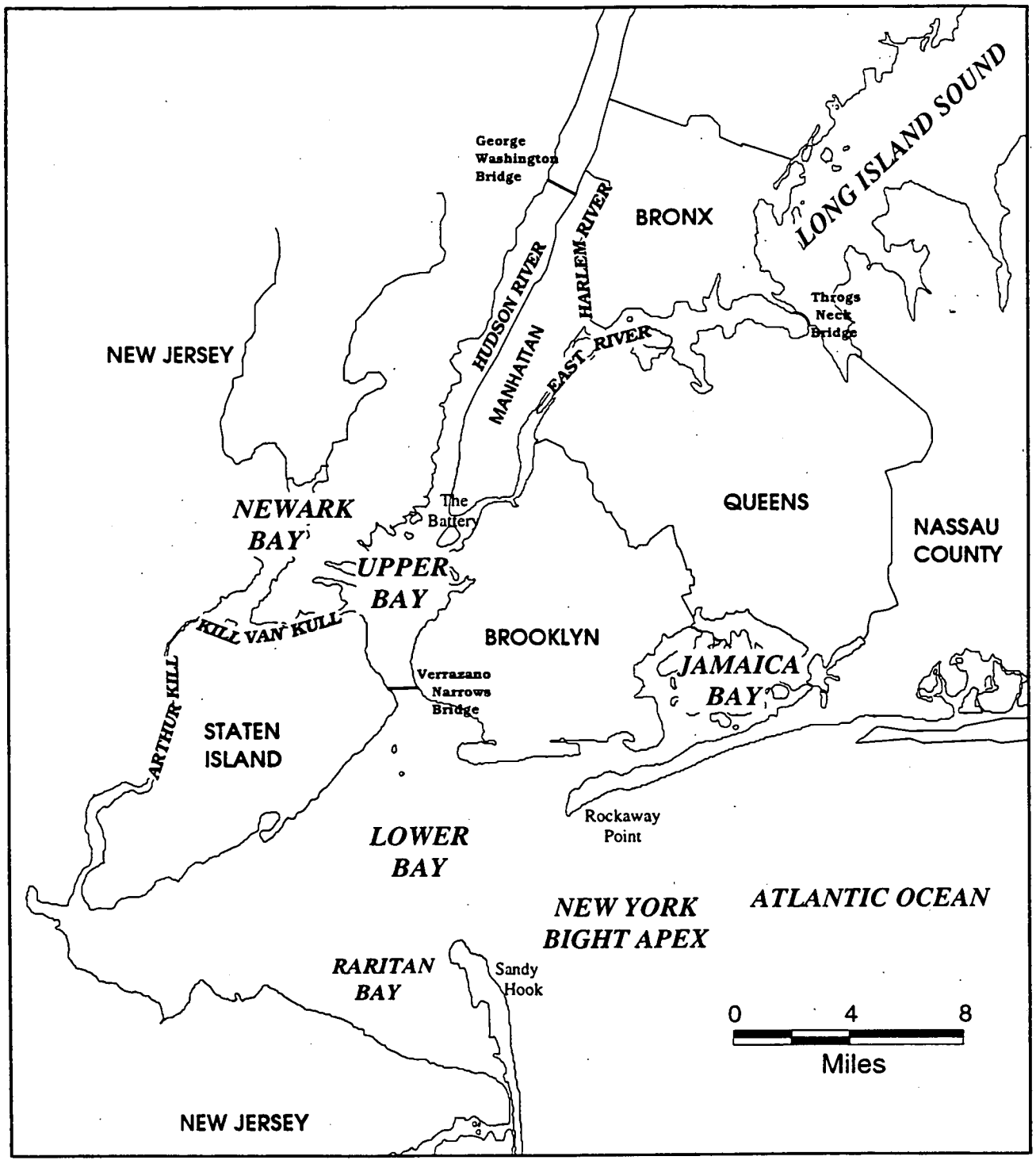
Map of New York City Harbor Region



Additional Advice

Advisories for Lake Erie - Due to PCB contamination, women of childbearing age, infants and children under the age of 15 are advised to eat no more than one meal per week of chinook salmon less than 19 inches, burbot, freshwater drum, lake whitefish, rock bass and yellow perch and to EAT NO MORE THAN ONE MEAL PER MONTH of all other fish from Lake Erie. Other people should eat no more than one meal per week of any Lake Erie fish species.

Marine Bluefish and Eels - The general advisory {Eat no more than one meal (one-half pound) per week} applies to bluefish and American eels but not to most other fish (see Marine Striped Bass below) from Long Island Sound, Block Island Sound, Peconic/ Gardiners Bays, the Lower Bay of New York Harbor, Jamaica Bay and other Long Island south shore waters. (Contaminants of concern - PCBs)

Marine Striped Bass - Women of childbearing age and children under the age of 15 should eat no striped bass taken from Upper and Lower Bays of New York Harbor or Long Island Sound west of Wading River. Other people should EAT NO MORE THAN ONE MEAL PER MONTH of striped bass from these waters. Everyone should eat no more than one meal per week of striped bass taken from Jamaica Bay, Eastern Long Island Sound, Block Island Sound, Peconic/Gardiners Bay or Long Island south shore waters. (Contaminants of concern - PCBs)

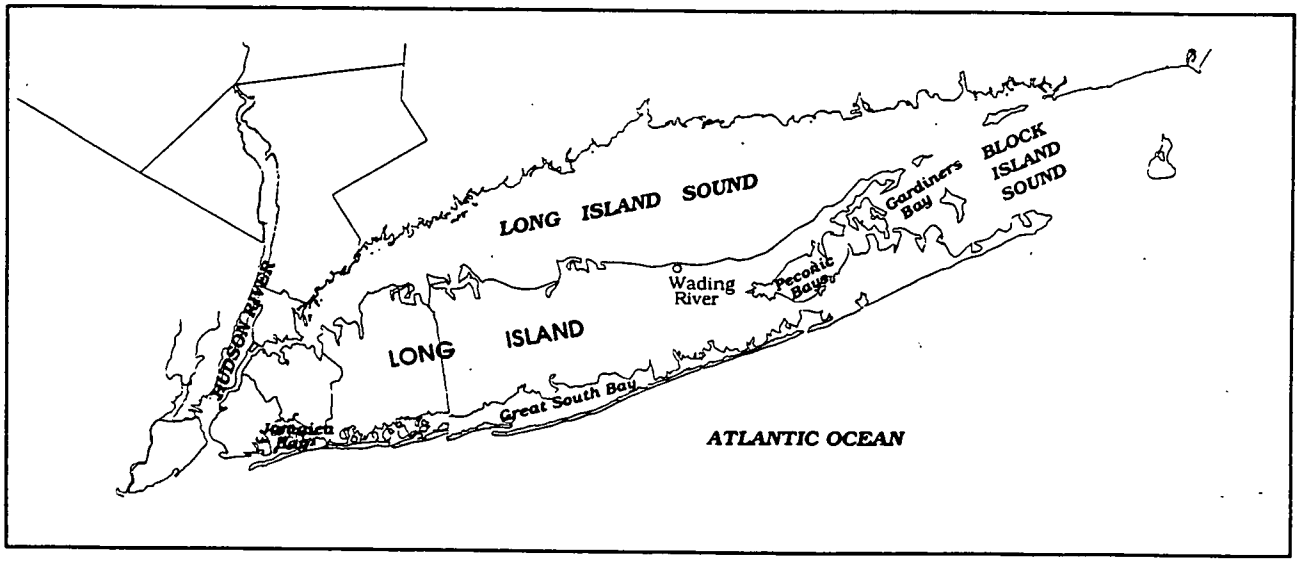
Crabs and Lobsters - The hepatopancreas (sometimes called mustard, tomalley or liver) of crabs and lobsters should not be eaten because it has high contaminant levels. (Contaminants of concern - PCBs, cadmium, dioxin)

Hudson River Shad - The advisory for women of childbearing age, infants and children under the age of 15 is EAT NONE for all fish from the lower Hudson River because of PCB contamination. However, shad have lower PCB levels than other species. A few meals of Hudson River shad meat and roe, especially using cooking and trimming methods that minimize PCB content, would not pose an unacceptable health risk for women of childbearing age and children, assuming this is their only significant exposure to PCBs.

Snapping Turtles - Snapping turtles retain contaminants in their fat, liver, eggs and, to a lesser extent, muscle. If you choose to consume snapping turtles, you can reduce your exposure by carefully trimming away all fat and discarding the fat, liver and eggs prior to cooking the meat or preparing soup. Women of childbearing age, infants and children under the age of 15 should AVOID EATING snapping turtles or soups made with their meat. (Contaminants of concern - PCBs)

Wild Waterfowl - Mergansers are the most heavily contaminated waterfowl species and should NOT BE EATEN. Other wild waterfowl should be skinned and all fat removed before cooking, stuffing should be discarded after cooking and EAT NO MORE THAN TWO MEALS PER MONTH. Monitoring data indicate that wood ducks and Canada geese are less contaminated than other wild waterfowl species and diving ducks are more contaminated than dabbler ducks. (Contaminants of concern - PCBs, mirex, chlordane, DDT)

Map of New York Marine Waters



Information on Chemicals in Sportfish and Game

The following paragraphs give some basic information on chemicals in sportfish and game in New York State. Most of our knowledge of potential health effects comes from high dose animal studies or worker exposures. Chemicals that cause adverse health effects in humans and laboratory animals after high levels of exposure may increase the risk of adverse effects in humans exposed to lower levels for long periods of time. Following the suggestions in the advisory will minimize your exposure and any health risks from contaminants in fish.

Chlordane

Chlordane is a man-made pesticide that was used widely to control agricultural and home/garden pests until most uses were banned in the United States during the mid-1970s. In New York State, chlordane was used for the underground control of termites until that use was banned in 1985. Chlordane generally gets into bodies of water after improper waste disposal or run-off from treated areas. Chlordane builds up in the fatty tissues of fish, birds and mammals and can be found in fish and shellfish caught in chlordane-contaminated waters. Since chlordane is present in the fatty tissues of fish, exposure to chlordane in fish can be reduced by certain cleaning and cooking practices. For more information, see page 3.

People exposed to large amounts of chlordane may have nervous system damage. Exposure to high levels of chlordane damages the nervous system and liver of laboratory animals. Some animals exposed before birth and while nursing developed behavioral effects later. Chlordane causes cancer in laboratory animals exposed to high levels over their lifetimes. Whether chlordane causes cancer in humans is unknown. For general information, see the first paragraph of this section.

DDT

DDT is a man-made pesticide that was used widely to control insects on agricultural crops and biting insects, such as mosquitos and black flies. Its use was banned in New York in 1971 and throughout the United States in 1973. DDT generally gets into bodies of water after improper waste disposal, direct spraying of water bodies or run-off from treated areas. DDT builds up in the fatty tissues of fish, birds and mammals. It can be found in fish and shellfish caught in DDT-contaminated waters. Since DDT is present in the fatty tissues of fish, exposure to DDT in fish can be reduced by certain cleaning and cooking practices. For more information, see page 3.

People who accidentally ingested large amounts of DDT had effects on the nervous system that went away once the exposure stopped. Exposure of laboratory animals to high levels of DDT damages the liver and can cause reproductive, developmental and nervous system effects. DDT causes cancer in laboratory animals exposed to high levels over their lifetimes. Whether DDT causes cancer in humans is unknown. For general information, see the first paragraph of this section.

Mirex

Mirex is a man-made chemical that was used as a pesticide to control fire ants until its use was banned in the United States in the late 1970s. It was also used as a flame retardant in plastics, rubber, paint, paper and electrical goods until the early 1970s. Mirex generally gets into bodies of water after improper waste disposal or run-off from treated areas. Mirex builds up in the fatty tissues of fish, birds and mammals and can be found in fish and shellfish caught in mirex-contaminated waters. Since mirex is present in the fatty tissues of fish, exposure to mirex in fish can be reduced by certain cleaning and cooking practices. For more information, see page 3.

Laboratory animals exposed to mirex had damage to the eyes, nervous system, reproductive system, liver, thyroid and kidneys. Mirex causes cancer in laboratory animals exposed to high levels over their lifetimes. Whether mirex causes cancer in humans is unknown. For general information, see the first paragraph of this section.

PCBs

PCBs are a family of man-made chemicals that were used in many commercial and electrical products until their manufacture was banned in the mid-1970s. Some electrical equipment still in use contains PCBs. In this country, most PCBs were sold as mixtures called Aroclors. PCBs build up in fatty tissues of fish, birds and mammals. Since PCBs are present in the fatty tissues of fish, exposure to PCBs in fish can be reduced by certain cleaning and cooking practices. For more information, see page 3.

Industrial workers exposed to large amounts of PCBs had skin damage. However, these workers were also exposed to other, more toxic chemicals that may have caused the skin effects. Some studies of pregnant women suggest a link between a mother's increased exposure to PCBs from eating contaminated fish or other environmental sources and slight effects on her child's birthweight, short-term memory and learning.

Exposure to high levels of PCBs damages skin, liver and the nervous, immune and reproductive systems of laboratory animals. It also reduces the birthweight and changes the behavior of offspring born to animals exposed before, during and after pregnancy. Certain types of PCBs cause birth defects in offspring born to animals exposed to high levels during pregnancy. Some types of PCBs cause cancer in laboratory animals exposed to high levels over their lifetime. Whether PCBs cause cancer in humans is unknown. For general information, see the first paragraph of this section.

Polychlorinated dibenzo-*p*-dioxins (PCDDs, dioxins)

Polychlorinated dibenzo-*p*-dioxins (also known as PCDDs or dioxins) and chlorinated dibenzofurans (also known as PCDFs or furans) are two closely related families of chemical compounds. Some dioxins and furans are produced as unwanted by products in chemical manufacturing processes, such as in the production of certain herbicides and disinfectants. They are also found in the smoke or ash from motor vehicles, municipal waste incinerators and wood fires. Some dioxins and furans are environmentally and biologically persistent. They are highly soluble in fats and are stored in the fatty tissue of fish and other animals. Since dioxins and furans are present in fatty tissues of fish, exposure to dioxins and furans in fish can be reduced by certain cleaning and cooking practices. For more information, see page 3.

Dioxins and furans are thought to produce similar health effects. TCDD (2,3,7,8-tetrachlorodibenzo-*p*-dioxin) is the most potent of the dioxins and furans, and much of what we know about the toxicity of dioxins and furans comes from studies of TCDD.

People exposed to high levels of dioxins and furans during industrial accidents have developed a condition called chloracne (a severe acne-like skin condition) and other skin disorders, as well as skin, eye and respiratory tract irritation, dizziness, headaches, nausea, vomiting and possibly disorders of the liver and nervous system. In men exposed to lower levels over longer time, there is some evidence that TCDD can cause small changes in the liver function and levels of sex hormones, and may disrupt the metabolism of glucose (sugar). Some studies have found that workers in plants where products contaminated with dioxins and furans (for example, some herbicides) were made developed cancers which may have been caused by TCDD.

In laboratory animals, TCDD has damaged the liver, skin, blood and immune and reproductive systems. It also affects prenatal development in animals whose mothers were exposed to TCDD. TCDD causes cancer in animals exposed to high levels over their lifetime. For general information, see the first paragraph of this section.

Mercury

Mercury is a metal that occurs naturally in the environment in several forms. The most common form, metallic or elemental, is a silvery, odorless liquid that can evaporate at room temperature to form a vapor. Mercury can also combine with other elements to form both inorganic and organic compounds. Mercury and mercury compounds can be found in air, soil and water. Most of the mercury that accumulates in the fleshy part of fish is methylmercury. Fish absorb methylmercury directly from water and from eating smaller

organisms that contain methylmercury. Greater amounts of methylmercury are found in older fish which tend to eat other fish and organisms in water containing methylmercury. Methylmercury is found throughout the part of the fish that is eaten; therefore, cleaning and cooking methods which may reduce exposure to other contaminants are NOT effective for reducing exposure to mercury.

Exposure to high levels of metallic, inorganic or organic mercury can damage the nervous system and kidneys. People who ate fish and grain which contained large amounts of methylmercury had permanent damage to the nervous system, kidneys and fetus. Exposure to methylmercury is more of a concern for children and unborn babies because their nervous systems are still developing and the nervous system is a target organ for mercury. Health effects might include brain damage, behavioral and developmental problems. For general information, see the first paragraph of this section.

Cadmium

Cadmium is a naturally occurring metal found at low levels in soil and water. Cadmium is used in many industrial operations and in consumer products such as paints, plastics and batteries. Food, air and drinking water all contribute to a person's exposure to cadmium. Cadmium can be found in food items and in tobacco. Vegetables, fruits and cereals are the greatest source of cadmium. Cadmium can also be found in fish and shellfish from waters containing cadmium.

Eating food or drinking beverages containing high levels of cadmium can cause nausea, vomiting, stomach upset, cramps and diarrhea. Because cadmium leaves the body slowly, it can accumulate in the body, mainly in the kidneys, with continuing exposure. Some people with long-term exposure had kidney, bone and blood damage. For general information, see the first paragraph of this section.

Contacts for Additional Information

New York State Department of Health

For more information on **health effects** from exposure to chemical contaminants or to provide comments on the format or content of this report contact:

Environmental Health Information: 1-800-458-1158, extension 27815 (toll-free). Calls are taken from 8:00AM-4:30PM, Monday through Friday. After hours, leave a voice mail message. The full advisories are also available from the Internet: *http://www.health.state.ny.us/nysdoh/environ/fish.htm* or can be requested by e-mail: *BTSA@health.state.ny.us*

New York State Department of Environmental Conservation

For more information on **fishing inland waters**, contact:

Region 1
Loop Rd.
Bldg. 40 SUNY
Stony Brook, NY 11790
(631) 444-0280

Region 2
1 Hunter Point Plaza
4740 21st St.
Long Island City, NY 11101-5407
(718) 482-4900

Region 3
21 South Putt Corners Rd.
New Paltz, NY 12561-1696
(914) 256-3161

Region 4
Rt. 10, Jefferson Rd.
Stamford, NY 12167-9503
(607) 652-7366

Region 5
Rt. 86, P.O. Box 296
Raybrook, NY 12977-0296
(518) 897-1333

Region 6
317 Washington St.
Watertown, NY 13601-3787
(315) 785-2266

Region 7
1285 Fisher Ave.
Cortland, NY 13045-1090
(607) 753-3095

Region 8
6274 E. Avon-Lima Rd.
Avon, NY 14414-9519
(716) 226-2466

Region 9
270 Michigan Ave.
Buffalo, NY 14203-2999
(716) 851-7000

For more information on **fishing marine waters**, contact:

Bureau of Finfish and Crustaceans
205 North Belle Mead Road, Suite 1
East Setauket, NY 11733
(631) 444-0435

For information on **contaminant levels**, in fish and shellfish and wildlife contact:

Bureau of Habitat
50 Wolf Road
Albany, NY 12233
(518) 457-6178

Prepared by:
New York State Department of Health
Division of Environmental Health Assessment
May 15, 2000
H:\FISH\ADVISORY\00FISH.WPD

State of New York
George E. Pataki, Governor

Department of Health
Antonia C. Novello, M.D., M.P.H., Dr.P.H., Commissioner

APPENDIX C

Pre-Design Investigation Report - Section 3.3
Groundwater Characterization

Cadmium was detected in only two surface water samples. Sample SW-4 collected in Upper Willetts Creek had a concentration of 16 ug/l, and SW-5 collected at the outfall structure in Lake Capri had a concentration of 5 ug/l. Both samples exceed the NYSDEC Ambient Water Quality Standard for cadmium for Class C streams.

Only total concentrations of cadmium were measured in these water samples. Previous analyses of total and filtered samples collected in Upper Willetts Creek during the RI/FS indicated that the dissolved fractions comprised 24-37 % of the total concentrations.

A NYSDEC letter dated July 15, 1998 includes a table that presents the SPDES discharge limitations established by the NYSDEC for the dredging operation in this Class C stream. The letter and Table B-1, which summarizes surface water concentrations and SPDES limits, are included in Appendix B.

3.3 GROUNDWATER CHARACTERIZATION

3.3.1 Groundwater Flow

Table 3-5 summarizes groundwater depth measurements and elevations for site monitoring wells. Data from 1992 to the latest round of measurements on June 8-9, 1998, are included. A groundwater elevation contour map based on the limited water level data for shallow (upper 30 feet of saturated zone) groundwater is presented on Figure 3-1. Contours in the immediate vicinity of the creek are inferred (dashed), and may change with time in response to relative changes in creek and groundwater levels.

Review of the contour map indicates that shallow groundwater in the vicinity of the Dzus facility flows southerly toward Upper Willetts Creek. This flow direction and discharge area are consistent with the findings and flow model presented in the RI/FS Addendum. Groundwater at the eastern side of the Dzus facility, where the major contaminant plume was observed prior to OU 1 remediation, is expected to discharge to the portion of Willetts Creek southeast of the Grand Union Plaza. However, flow directions in that immediate area cannot be fully identified because a number of wells formerly located in that general area of the facility are no longer present (MW-4R, -5, -12, -20), and a few anomalously low groundwater levels (MW-3 and MW-22) were measured. The cause of the apparently low levels is unknown, and should be addressed during future rounds of water level measurements.

3.3.2 Groundwater Quality

Table 3-6 summarizes the analytical results for cadmium and other analytes for the June 8-9, 1998 round of sampling in accessible monitoring wells. A map of cadmium concentrations in shallow groundwater in the general site area is presented in Figure 3-2. A similar map for the intermediate zone (lower outwash below saturated depth of 30 feet) groundwater is presented in Figure 3-3.

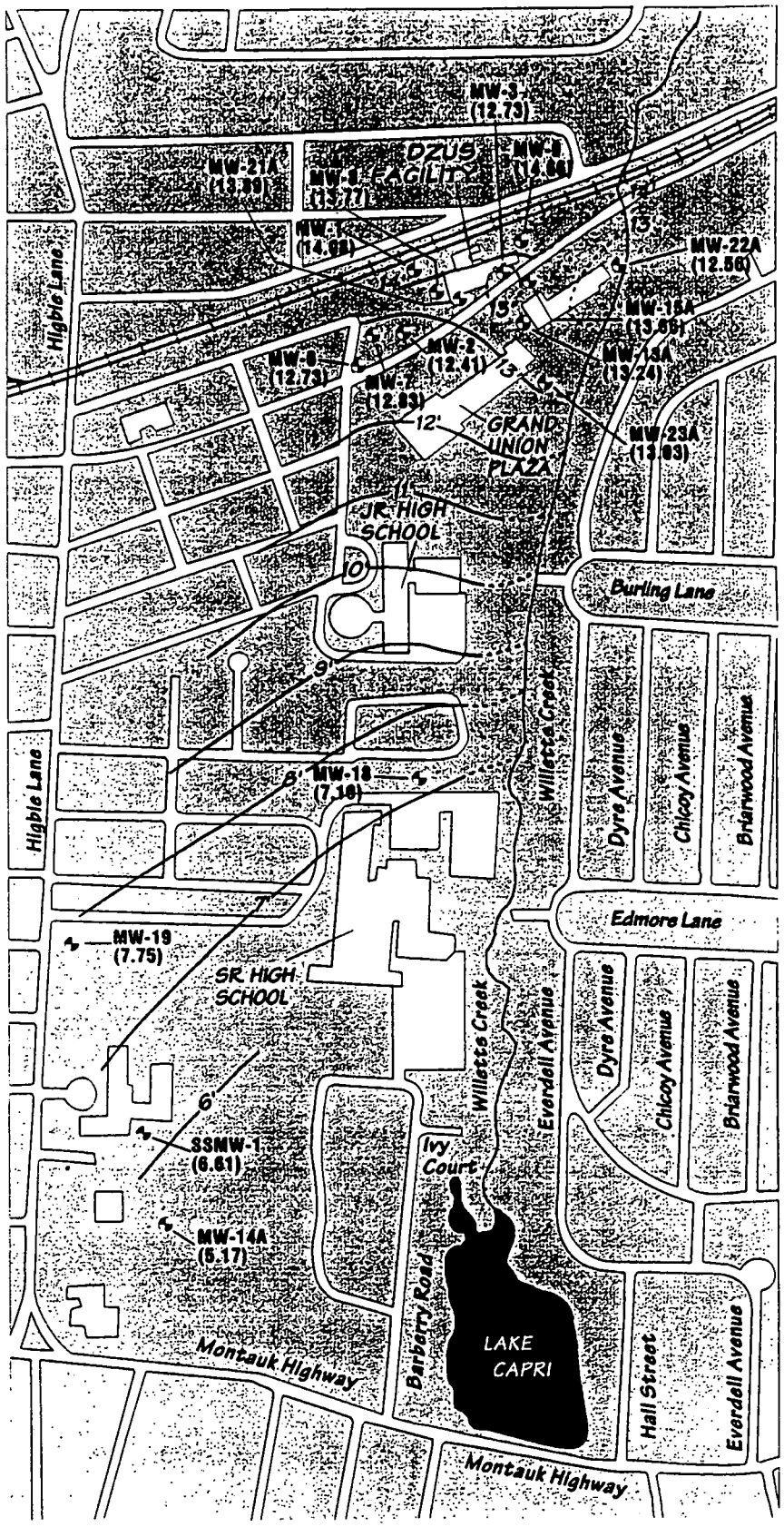
The groundwater investigation conducted during the RI/FS indicated that two cadmium contamination plumes were present at the site: one in the western portion of the site which is reported to have originated from an industrial leach pool; and one in the eastern portion of the site

Table 3-5
Groundwater Elevations Summary
Dzus Fasteners Site
West Islip, New York

MONITORING WELL	REF. ELEVATION	DTW 11/5/92	GW ELEV.	DTW 11/16-18/92	GW ELEV.	DTW 12/2/92	WATER ELEV.	DTW 9/8-9/93	GW ELEV.	DTW 6/8-9/98	GW ELEV.
MW-1	21.88	8.9	12.98	9	12.88	8.93	12.95	9.9	11.98	7.8	14.08
MW-2	21.21	8.83	12.38	8.99	12.22	8.6	12.61	9.78	11.43	8.8	12.41
MW-3	19.73	6.7	13.03	6.87	12.86	6.48	13.25	7.65	12.08	7	12.73
MW-4R	18.95	5.68	13.27	5.81	13.14	5.5	13.45	6.7	12.25	nm	nm
MW-5	19.11	5.64	13.47	5.86	13.25	5.48	13.63	6.71	12.4	nm	nm
MW-6	20.23	8.1	12.13	8.25	11.98	7.87	12.36	9.05	11.18	7.5	12.73
MW-7	20.63	8.32	12.31	8.4	12.23	8	12.63	9.04	11.59	7.8	12.83
MW-7B	20.79	*	*	*	*	*	*	9.14	11.65	8.1	12.69
MW-8	21.57	8.82	12.75	8.95	12.62	8.57	13	9.75	11.82	7.8	13.77
MW-9	19.06	5.79	13.27	6	13.06	5.61	13.45	6.58	12.48	4.4	14.66
MW-9B	19.13	*	*	*	*	*	*	6.48	12.65	4.8	14.33
MW-12	17.67	4.78	12.89	7.33	10.34	4.58	13.09	5.72	11.95	nm	nm
MW-13	15.99	3.34	12.65	3.42	12.57	3.18	12.81	4.2	11.79	2.75	13.24
MW-13B	16.02			*	*	*	*	4.05	11.97	2.6	13.42
MW-14A	13.57	7.05	6.52	7.32	6.25	6.92	6.65	7.74	5.83	8.4	5.17
MW-14B	13.48	6.93	6.55	7.21	6.27	6.79	6.69	7.63	5.85	8.4	5.08
MW-14C	13.2	6.68	6.52	6.93	6.27	6.55	6.65	7.39	5.81	8.4	4.8
MW-15A	19.16	6.19	12.97	6.29	12.87	5.98	13.18	7.1	12.06	5.5	13.66
MW-15B	19.13	6.06	13.07	6.23	12.9	5.92	13.21	7.03	12.1	6.4	12.73
MW-17	21.82	7.5	14.32	7.87	13.95	7.43	14.39	8.88	12.94	nm	nm
MW-18	13.6	5.28	8.32	5.37	8.23	5.13	8.47	5.81	7.79	6.5	7.1
MW-19	15.55	7.58	7.97	7.78	7.77	7.31	8.24	8.36	7.19	7.8	7.75
MW-20	19	5.34	13.66	5.52	13.48	5.1	13.9	6.4	12.6	nm	nm
MW-21A	21.19	*	*	*	*	*	*	9.36	11.83	7.3	13.89
MW-21B	21.05	*	*	*	*	*	*	9.2	11.85	7.4	13.65
MW-22A	20.26	*	*	*	*	*	*	7.84	12.42	7.7	12.56
MW-22B	20.02	*	*	*	*	*	*	7.7	12.32	7.2	12.82
MW-23A	17.63	*	*	*	*	*	*	5.88	11.75	4.6	13.03
MW-23B	17.57	*	*	*	*	*	*	5.86	11.71	4.6	12.97
MW-24A	20.86	*	*	*	*	*	*	9.76	11.1	nm	nm
MW-24B	20.9	*	*	*	*	*	*	9.74	11.16	8.5	12.4
Willets at Union Blv.	18.93	5.05	13.88	nm	nm	4.97	13.96	5.9	13.03	nm	nm
BSMW-1	19.99	9.79	10.2	nm	nm	9.57	10.42	10.33	9.66	nm	nm
HSMW-1	15.97	8.3	7.67	nm	nm	8.12	7.85	8.9	7.07	nm	nm
SSMW-1	14.51	7.35	7.16	nm	nm	7.14	7.37	8.04	6.47	7.9	6.61
SC Ivy Court Well	9.74	4.55	5.19	nm	nm	4.42	5.32	4.71	5.03	nm	nm
Willets at Capri	9.6	5.25	4.35	nm	nm	5.1	4.5	5.25	4.35	nm	nm
Willets at H.S.	11.23	4.75	6.48	nm	nm	4.8	6.43	4.93	6.3	nm	nm
SC Edmore Well	9.07	2.44	6.63	nm	nm	2.77	6.3	2.45	6.62	nm	nm
Willets at B.S.	15.13	5.38	9.75	nm	nm	5.32	9.81	5.62	9.51	nm	nm

Notes:

1. Additional water level data is found on the groundwater sampling sheets
2. * = Phase II RI well installed in 1993
   nm = not measured during this round of water levels
   DTW = depth to groundwater from measuring point
3. All results are from RI/FS except for the 6/8-9/98 round from the PDI.



WATER LEVEL MEASUREMENTS TAKEN JUNE 8 & 9, 1998

Groundwater Contours

(Dashed Where Inferred)

12'

Approximate Scale

340

0 680ft

Notes:
1) Modified from Lawler, Matusky & Skelley Engineers, Report Figures, October 1994

2) Monitoring Well & Building Locations Are Approximate

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FIGURE 3-1
GROUNDWATER ELEVATION CONTOURS
SHALLOW MONITORING WELLS
DZUS FASTENER SITE
WEST ISLIP, NEW YORK

NOVEMBER 1998

202563

Table 3-6
Groundwater Analytical Results Summary
Dzus Fastener Site
West Islip, New York

Parameter SW-846 Method 8260	PQL (ug/l)	NYSDEC Class GA GW Standard	MW-1	MW-2	MW-3	MW-6	MW-7	MW-7B	MW-8	MW-9
Chloromethane	10	5	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride	10	2	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane	10	5	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane	10	5	ND	ND	ND	ND	ND	ND	ND	ND
Trichlorofluoromethane	10	5	ND	ND	ND	ND	ND	ND	ND	ND
1,1-dichloroethene	5	5	ND	ND	ND	ND	ND	ND	ND	ND
Acetone	10	50GV	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Disulfide	5	50GV	2J	64	ND	1J	ND	68	ND	2J
Iodomethane	5	5	ND	ND	ND	ND	ND	ND	ND	ND
Methylene Chloride	5	5	ND	ND	ND	ND	ND	ND	ND	ND
Acrylonitrile	10	5	ND	ND	ND	ND	ND	ND	ND	ND
Trans-1,2 dichloroethane	5	5	ND	ND	ND	ND	ND	ND	ND	ND
1,1 dichloroethane	5	5	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl Acetate	10	NS	ND	ND	ND	ND	ND	ND	ND	ND
2-Butanone (MEK)	10	50GV	ND	ND	ND	ND	ND	ND	ND	ND
Cis-1,2-dichloroethene	5	5	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	5	7	ND	ND	ND	ND	ND	ND	ND	ND
Bromochloromethane	5	5	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	5	5	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Tetrachloride	5	5	ND	ND	ND	ND	ND	ND	ND	ND
Benzene	5	0.7	ND	ND	ND	ND	ND	ND	ND	ND
1,2-dichloroethane	5	5	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene	5	5	4J	ND	ND	ND	ND	ND	2J	ND
1,2-dichloropropane	5	5	ND	ND	ND	ND	ND	ND	ND	ND
Dibromomethane	5	5	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane	5	5	ND	ND	ND	ND	ND	ND	ND	ND
4-methyl 2-pentanone	10	50GV	ND	ND	ND	ND	ND	ND	ND	ND
Cis-1,3-dichloropropene	5	5	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	5	5	ND	ND	ND	ND	ND	ND	ND	ND
Trans-1,3-dichloropropene	5	5	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-trichloroethene	5	5	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	5	5	12	ND	ND	ND	ND	ND	ND	ND
2-Hexanone	10	50GV	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane	5	50GV	ND	ND	ND	ND	ND	ND	ND	ND
1,2-dibromoethane	5	5	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	5	5	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	5	5	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1,2-tetrachloroethane	5	5	ND	ND	ND	ND	ND	ND	ND	ND
Total Xylenes	5	5	ND	ND	ND	ND	ND	ND	ND	ND
Stryene	5	5	ND	ND	ND	ND	ND	ND	ND	ND
Bromoform	5	5	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-tetrachloroethane	5	5	ND	ND	ND	ND	ND	ND	ND	ND
1,2,3-trichloropropane	5	5	ND	ND	ND	ND	ND	ND	ND	ND
Trans-1,4-dichloro-2-butene	10	5	ND	ND	ND	ND	ND	ND	ND	ND
1,2-dichlorobenzene	5	5	ND	ND	ND	ND	ND	ND	ND	ND
1,4-dichlorobenzene	5	5	ND	ND	ND	ND	ND	ND	ND	ND
1,2-dibromo-3-chloropropane	10	5	ND	ND	ND	ND	ND	ND	ND	ND
Cadmium (ICP,EPA Method 200.7)	5	10	5	34	51	ND	10	ND	8	87
Chromium (ICP, EPA Method 200.7)	10	50	ND	ND	ND	14	10	ND	ND	150
Cyanide (EPA Method 335.2)	10	100	10	ND	10	ND	ND	ND	10	830

Table 3-6
Groundwater Analytical Results Summary
Dzus Fastener Site
West Islip, New York

Parameter SW-846 Method 8260	PQL (ug/l)	NYSDEC Class GA GW Standard	MW-9B	MW-13A	MW-13B	MW-FD	MW-14A	MW-14B	MW-14C
Chloromethane	10	5	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride	10	2	ND	ND	ND	ND	ND	ND	ND
Bromomethane	10	5	ND	ND	ND	ND	ND	ND	ND
Chloroethane	10	5	ND	ND	ND	ND	ND	ND	ND
Trichlorofluoromethane	10	5	ND	ND	ND	ND	ND	ND	ND
1,1-dichloroethene	5	5	ND	ND	ND	ND	ND	ND	ND
Acetone	10	50GV	ND	ND	ND	ND	ND	ND	ND
Carbon Disulfide	5	50GV	17	ND	12	ND	1J	4J	8
Iodomethane	5	5	ND	ND	ND	ND	ND	ND	ND
Methylene Chloride	5	5	ND	ND	ND	ND	ND	5JB	ND
Acrylonitrile	10	5	ND	ND	ND	ND	ND	ND	ND
Trans-1,2 dichloroethane	5	5	ND	ND	ND	ND	ND	ND	ND
1,1 dichloroethane	5	5	ND	ND	ND	ND	ND	2J	ND
Vinyl Acetate	10	NS	ND	ND	ND	ND	ND	ND	ND
2-Butanone (MEK)	10	50GV	ND	ND	ND	ND	ND	ND	ND
Cis-1,2-dichloroethene	5	5	ND	ND	ND	ND	ND	ND	ND
Chloroform	5	7	ND	ND	ND	ND	ND	ND	ND
Bromochloromethane	5	5	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	5	5	ND	ND	ND	ND	ND	ND	ND
Carbon Tetrachloride	5	5	ND	ND	ND	ND	ND	ND	ND
Benzene	5	0.7	ND	ND	ND	ND	ND	ND	ND
1,2-dichloroethane	5	5	ND	ND	ND	ND	ND	ND	ND
Trichloroethene	5	5	ND	ND	ND	ND	ND	ND	ND
1,2-dichloropropane	5	5	ND	ND	ND	ND	ND	ND	ND
Dibromomethane	5	5	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane	5	5	ND	ND	ND	ND	ND	ND	ND
4-methyl 2-pentanone	10	50GV	ND	ND	ND	ND	ND	ND	ND
Cis-1,3-dichloropropene	5	5	ND	ND	ND	ND	ND	ND	ND
Toluene	5	5	ND	ND	ND	ND	ND	ND	ND
Trans-1,3-dichloropropene	5	5	ND	ND	ND	ND	ND	ND	ND
1,1,2-trichloroethene	5	5	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	5	5	ND	ND	ND	ND	ND	ND	ND
2-Hexanone	10	50GV	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane	5	50GV	ND	ND	ND	ND	ND	ND	ND
1,2-dibromoethane	5	5	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	5	5	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	5	5	ND	ND	ND	ND	ND	ND	ND
1,1,1,2-tetrachloroethane	5	5	ND	ND	ND	ND	ND	ND	ND
Total Xylenes	5	5	ND	ND	ND	ND	ND	ND	ND
Stryene	5	5	ND	ND	ND	ND	ND	ND	ND
Bromoform	5	5	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-tetrachloroethane	5	5	ND	ND	ND	ND	ND	ND	ND
1,2,3-trichloropropane	5	5	ND	ND	ND	ND	ND	ND	ND
Trans-1,4-dichloro-2-butene	10	5	ND	ND	ND	ND	ND	ND	ND
1,2-dichlorobenzene	5	5	ND	ND	ND	ND	ND	ND	ND
1,4-dichlorobenzene	5	5	ND	ND	ND	ND	ND	ND	ND
1,2-dibromo-3-chloropropane	10	5	ND	ND	ND	ND	ND	ND	ND
Cadmium (ICP,EPA Method 200.7)	5	10	ND	1100	15	15	ND	ND	ND
Chromium (ICP, EPA Method 200.7)	10	50	ND	14	22	ND	ND	ND	ND
Cyanide (EPA Method 335.2)	10	100	ND	10	30	ND	ND	ND	ND

Table 3-6
Groundwater Analytical Results Summary
Dzus Fastener Site
West Islip, New York

Parameter SW-846 Method 8260	PQL (ug/l)	NYSDEC Class GA GW Standard	MW-15A	MW-15B	MW-18	MW-19	MW-21A	MW-21B	MW-22A
Chloromethane	10	5	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride	10	2	ND	ND	ND	ND	ND	ND	ND
Bromomethane	10	5	ND	ND	ND	ND	ND	ND	ND
Chloroethane	10	5	ND	ND	ND	ND	ND	ND	ND
Trichlorofluoromethane	10	5	ND	ND	ND	ND	ND	ND	ND
1,1-dichloroethene	5	5	ND	ND	ND	ND	ND	ND	ND
Acetone	10	50GV	ND	ND	ND	ND	ND	ND	ND
Carbon Disulfide	5	50GV	**50**	**64**	ND	ND	**3J**	**31**	**1J**
Iodomethane	5	5	ND	ND	ND	ND	ND	ND	ND
Methylene Chloride	5	5	ND	ND	ND	ND	ND	ND	ND
Acrylonitrile	10	5	ND	ND	ND	ND	ND	ND	ND
Trans-1,2 dichloroethane	5	5	ND	ND	ND	ND	ND	ND	ND
1,1 dichloroethane	5	5	ND	ND	ND	ND	ND	ND	ND
Vinyl Acetate	10	NS	ND	ND	ND	ND	ND	ND	ND
2-Butanone (MEK)	10	50GV	ND	ND	ND	ND	ND	ND	ND
Cis-1,2-dichloroethene	5	5	ND	ND	ND	ND	ND	ND	ND
Chloroform	5	7	ND	ND	ND	ND	ND	ND	ND
Bromochloromethane	5	5	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	5	5	ND	ND	ND	ND	ND	ND	ND
Carbon Tetrachloride	5	5	ND	ND	ND	ND	ND	ND	ND
Benzene	5	0.7	ND	ND	ND	ND	ND	ND	ND
1,2-dichloroethane	5	5	ND	ND	ND	ND	ND	ND	ND
Trichloroethene	5	5	ND	ND	ND	ND	ND	ND	ND
1,2-dichloropropane	5	5	ND	ND	ND	ND	ND	ND	ND
Dibromomethane	5	5	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane	5	5	ND	ND	ND	ND	ND	ND	ND
4-methyl 2-pentanone	10	50GV	ND	ND	ND	ND	ND	ND	ND
Cis-1,3-dichloropropene	5	5	ND	ND	ND	ND	ND	ND	ND
Toluene	5	5	ND	ND	ND	ND	ND	ND	ND
Trans-1,3-dichloropropene	5	5	ND	ND	ND	ND	ND	ND	ND
1,1,2-trichloroethene	5	5	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	5	5	ND	ND	ND	ND	ND	ND	ND
2-Hexanone	10	50GV	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane	5	50GV	ND	ND	ND	ND	ND	ND	ND
1,2-dibromoethane	5	5	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	5	5	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	5	5	ND	ND	ND	ND	ND	ND	ND
1,1,1,2-tetrachloroethane	5	5	ND	ND	ND	ND	ND	ND	ND
Total Xylenes	5	5	ND	ND	ND	ND	ND	ND	ND
Stryene	5	5	ND	ND	ND	ND	ND	ND	ND
Bromoform	5	5	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-tetrachloroethane	5	5	ND	ND	ND	ND	ND	ND	ND
1,2,3-trichloropropane	5	5	ND	ND	ND	ND	ND	ND	ND
Trans-1,4-dichloro-2-butene	10	5	ND	ND	ND	ND	ND	ND	ND
1,2-dichlorobenzene	5	5	ND	ND	ND	ND	ND	ND	ND
1,4-dichlorobenzene	5	5	ND	ND	ND	ND	ND	ND	ND
1,2-dibromo-3-chloropropane	10	5	ND	ND	ND	ND	ND	ND	ND
Cadmium (ICP,EPA Method 200.7)	5	10	**43**	ND	ND	ND	**75**	ND	**9/3.6*/ND****
Chromium (ICP, EPA Method 200.7)	10	50	ND	ND	ND	ND	**65**	ND	ND/NA*
Cyanide (EPA Method 335.2)	10	100	ND	**10**	ND	ND	**130**	ND	**20/10*/ND****

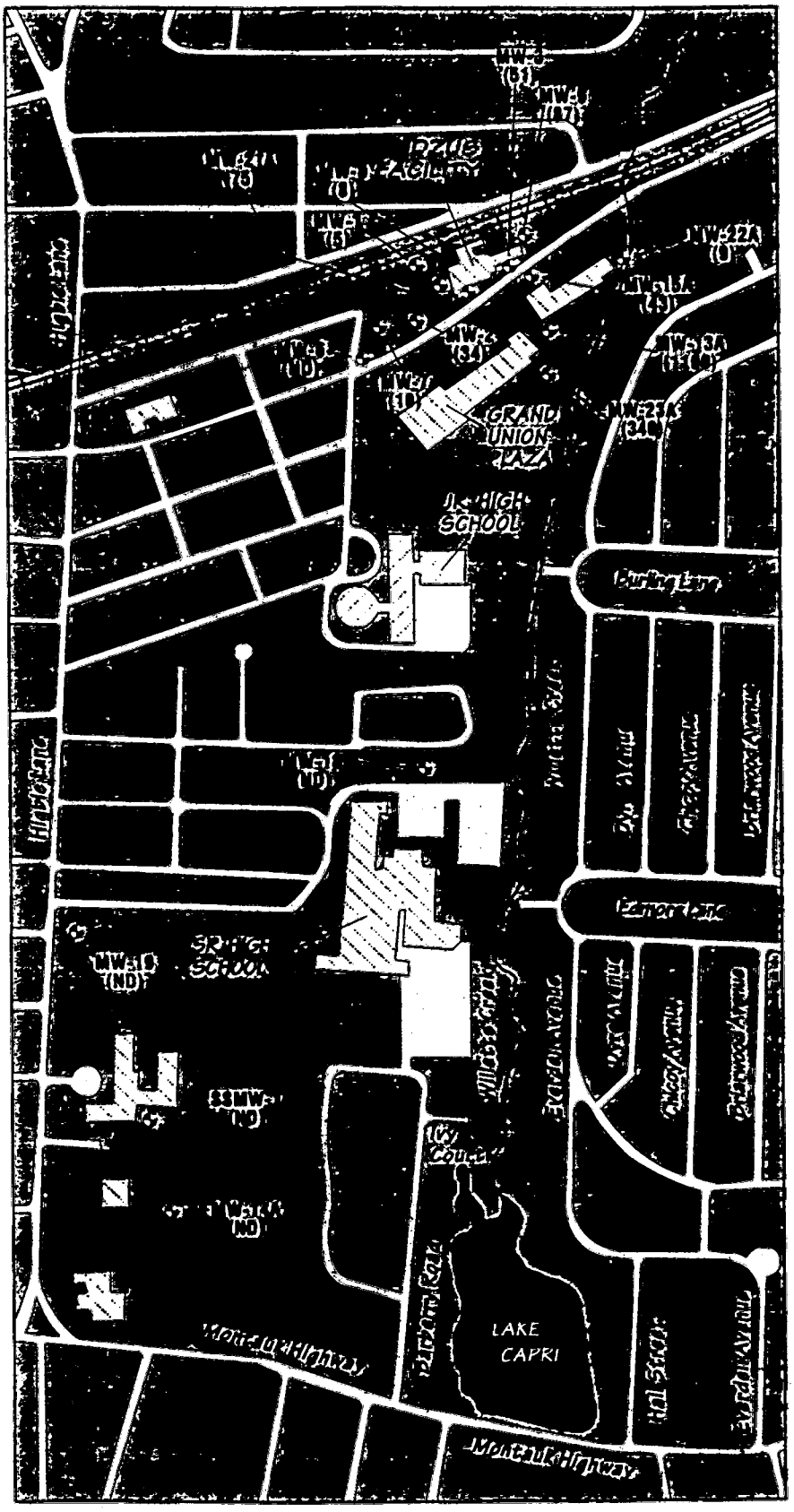
Table 3-6
Groundwater Analytical Results Summary
Dzus Fastener Site
West Islip, New York

Parameter SW-846 Method 8260	PQL (ug/l)	NYSDEC Class GA GW Standard	MW-22B	MW-23A	MW-23B	MW-24B	SSMW
Chloromethane	10	5	ND	ND	ND	ND	ND
Vinyl Chloride	10	2	ND	ND	ND	ND	ND
Bromomethane	10	5	ND	ND	ND	ND	ND
Chloroethane	10	5	ND	ND	ND	ND	ND
Trichlorofluoromethane	10	5	ND	ND	ND	ND	ND
1,1-dichloroethene	5	5	ND	ND	ND	ND	ND
Acetone	10	50GV	ND	ND	ND	ND	ND
Carbon Disulfide	5	50GV	**9**	**5**	**28**	**39J**	**2J**
Iodomethane	5	5	ND	ND	ND	ND	ND
Methylene Chloride	5	5	ND	ND	ND	ND	ND
Acrylonitrile	10	5	ND	ND	ND	ND	ND
Trans-1,2 dichloroethane	5	5	ND	ND	ND	ND	ND
1,1 dichloroethane	5	5	ND	ND	ND	ND	ND
Vinyl Acetate	10	NS	ND	ND	ND	ND	ND
2-Butanone (MEK)	10	50GV	ND	ND	ND	ND	ND
Cis-1,2-dichloroethene	5	5	ND	ND	ND	ND	ND
Chloroform	5	7	ND	ND	ND	ND	ND
Bromochloromethane	5	5	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	5	5	ND	ND	ND	ND	ND
Carbon Tetrachloride	5	5	ND	ND	ND	ND	ND
Benzene	5	0.7	ND	ND	ND	ND	ND
1,2-dichloroethane	5	5	ND	ND	ND	ND	ND
Trichloroethene	5	5	ND	ND	ND	ND	ND
1,2-dichloropropane	5	5	ND	ND	ND	ND	ND
Dibromomethane	5	5	ND	ND	ND	ND	ND
Bromodichloromethane	5	5	ND	ND	ND	ND	ND
4-methyl 2-pentanone	10	50GV	ND	ND	ND	ND	ND
Cis-1,3-dichloropropene	5	5	ND	ND	ND	ND	ND
Toluene	5	5	ND	ND	ND	ND	ND
Trans-1,3-dichloropropene	5	5	ND	ND	ND	ND	ND
1,1,2-trichloroethene	5	5	ND	ND	ND	ND	ND
Tetrachloroethene	5	5	ND	ND	ND	ND	ND
2-Hexanone	10	50GV	ND	ND	ND	ND	ND
Dibromochloromethane	5	50GV	ND	ND	ND	ND	ND
1,2-dibromoethane	5	5	ND	ND	ND	ND	ND
Chlorobenzene	5	5	ND	ND	ND	ND	ND
Ethylbenzene	5	5	ND	ND	ND	ND	ND
1,1,1,2-tetrachloroethane	5	5	ND	ND	ND	ND	ND
Total Xylenes	5	5	ND	ND	ND	ND	ND
Stryene	5	5	ND	ND	ND	ND	ND
Bromoform	5	5	ND	ND	ND	ND	ND
1,1,2,2-tetrachloroethane	5	5	ND	ND	ND	ND	ND
1,2,3-trichloropropane	5	5	ND	ND	ND	ND	ND
Trans-1,4-dichloro-2-butene	10	5	ND	ND	ND	ND	ND
1,2-dichlorobenzene	5	5	ND	ND	ND	ND	ND
1,4-dichlorobenzene	5	5	ND	ND	ND	ND	ND
1,2-dibromo-3-chloropropane	10	5	ND	ND	ND	ND	ND
Cadmium (ICP,EPA Method 200.7)	5	10	ND/2.8*/ND**	**340/175*/40****	**16/51*/31.9****	ND	ND
Chromium (ICP, EPA Method 200.7)	10	50	ND/NA*	ND/NA*	ND/NA*	ND	**31**
Cyanide (EPA Method 335.2)	10	100	ND/ND*/ND**	ND/7.6*/6.8**	**40/910*/850****	ND	ND

1. Sampling Date: 6/8/98 and 6/9/98
2. All results in ug/l (ppb). PQL - practical quantitation limit.
3. B = Transport Blank reported 4 ug/l of methylene chloride
   J= Estimated value. Result is below sample quantitation level, but above the instrument detection limit.
   NS= No Standard
4. Results for cadmium, chromium, and cyanide are "totals" not filtered samples. For comparison purposes, analytical results for unfiltered and filtered groundwater collected from MW-22A and MW-22B, MW-23A and MW-23B by LMS in Aug 1995 (LMS Addendum Report 10/95) are also shown.

* = results for unfiltered samples analyzed Aug. 1995.

** = results for filtered samples analyzed Aug. 1995.



Cadmium Concentrations, ug/l, (ppm) JUNE 8 & 9, 1998

(ND-Not Detected)

Shallow Groundwater Monitoring Well

Approximate Scale

340

0 680ft

Notes:
1). Modified from Lawler, Matusky & Skelley Engineers, Report Figures, October 1994.

2). Monitoring Well & Building Locations Are Approximate

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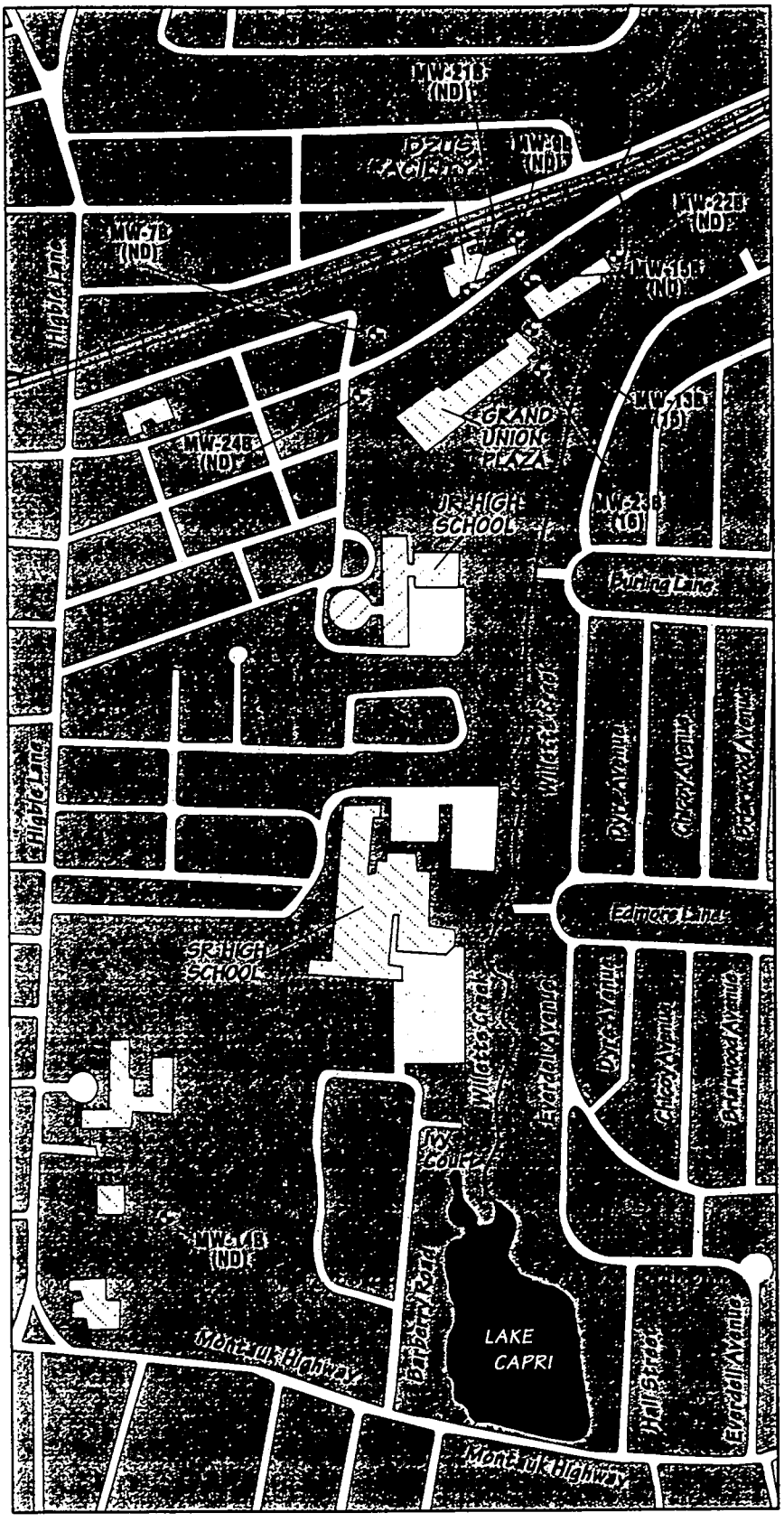
FIGURE 3-2
CADMIUM CONCENTRATIONS
SHALLOW MONITORING WELLS
DZUS FASTENER SITE
WEST ISLIP, NEW YORK

NOVEMBER 1998 202563

cdshallowkf



Cadmium Concentrations, ug/l, (ppm) JUNE 8 & 9, 1998

(ND-Not Detected)

Intermediate Groundwater Monitoring Well

Approximate Scale

340

0 680ft

Notes:
1) Modified from Lawler, Matusky & Skelley Engineers, Report Figures, October 1994

2) Monitoring Well & Building Locations Are Approximate

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FIGURE 3-3
CADMIUM CONCENTRATIONS
INTERMEDIATE MONITORING WELLS
DZUS FASTENER SITE
WEST ISLIP, NEW YORK

NOVEMBER 1998 202563

cdinterkf

caused by another leach field and processes from a former plating building. Comparison of cadmium concentrations reported historically for wells near the Dzus facility (see Figure 3-4) suggest that the plumes may be migrating in a southerly direction. Monitoring wells at the western fringe of the western plume (MW-6, MW-7) have decreased, but concentrations closer to the Dzus building have increased (MW-1, MW-2, MW-8). Concentrations in monitoring wells on the northern boundary of the eastern plume have decreased, while those wells on the south (MW-13, MW-23A) have increased.

Rust assessed the potential impact that turbidity may have had on the cadmium concentrations reported for the samples, all of which were unfiltered. A review of the available groundwater sample turbidity data from field measurements indicates that cadmium concentrations in groundwater correlate poorly with sample turbidity, i.e. sediment loading. The quantitative relationship between cadmium concentrations and turbidity are variable, ambiguous, and inconclusive. Cadmium concentrations measured to date in groundwater are likely related to both solids and dissolved phase, but the degree to which these two elements play a part in the total concentrations cannot be determined without analyzing the samples for both total matrix and filtrate. It was noted that a sample of groundwater collected from wells MW-23A and MW-23B during the RI/FS indicated that dissolved fractions comprised 23-63 % of the total concentration.

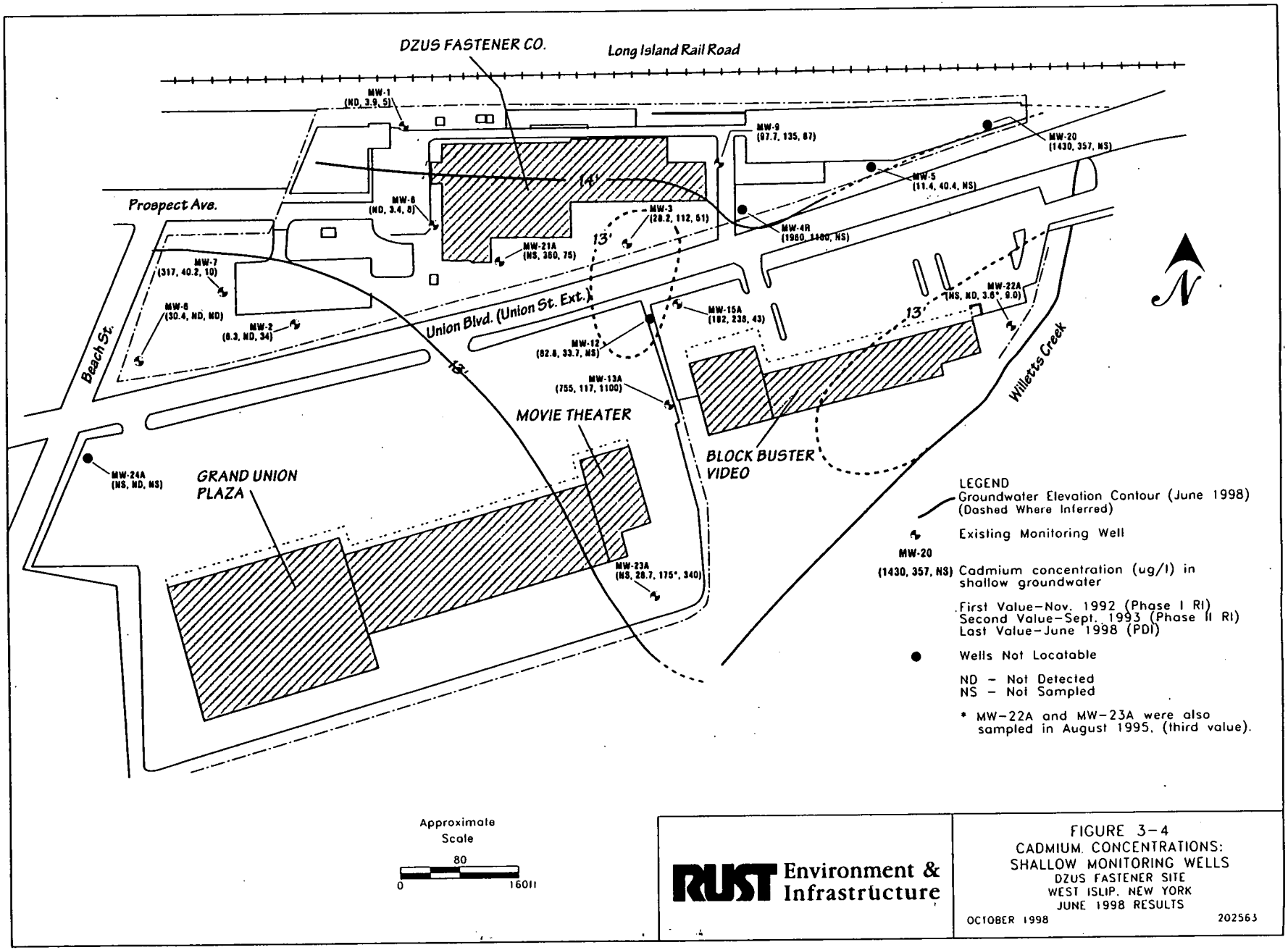
Most concentrations of cadmium in the intermediate wells were non-detect except for relatively low cadmium concentrations of 15 ug/l in MW-13B and 16 ug/l in MW-23B. This suggests that most of the contaminants are in the shallow groundwater. The groundwater transport modeling reported in the RI/FS Addendum predict that the intermediate groundwater, as well as the shallow groundwater, will discharge to the creek in the general vicinity southeast of the Grand Union Plaza.

3.4 WETLANDS

A wetland delineation completed on August 31 and September 1, 1998, identified jurisdictional wetlands primarily along the banks of Upper Willetts Creek in the areas that may be disturbed by remediation activities. The wetlands are vegetated with a variety of trees, shrubs, and herbs and are associated with periodic flooding of Willetts Creek. The total wetland area affected by proposed excavation activities in Upper Willetts Creek is 0.63 acres. Approximately 0.47 acres of wetlands in the lower reach of Upper Willetts Creek will be temporarily affected by a dredge pipe(s) within the creek corridor. Wetland boundaries are delineated on Plate 6. Additional details are presented in the Wetlands Delineation Report.

3.5 PHYSICAL SETTING

Observations during the pre-design investigation identified a number of conditions that need to be addressed during design. The major features in the lake itself and along each of the shorelines are described below. Many of the features are shown on the photographs presented in Appendix C.



RUST Environment & Infrastructure

FIGURE 3–4
CADMIUM CONCENTRATIONS:
SHALLOW MONITORING WELLS
DZUS FASTENER SITE
WEST ISLIP, NEW YORK
JUNE 1998 RESULTS

OCTOBER 1998

202563

APPENDIX D

Field Forms

DZUZ FASTENER SITE
LONG TERM MONITORING PLAN
FIELD LOG FORM

Date _____ Personnel _____

Weather Conditions/Temperature _____

Lake Level (top of outfall 5.90) _____

ASPHALT COVER

DZUS FASTENER COMPANY PARKING LOT

CONDITION _____
NOTES

WEST ISLIP HIGH SCHOOL

CONDITION _____
NOTES

SURFACE WATER/SEDIMENT SAMPLING

Field Parameters	Temp(C)	pH	Cond(umhos)	Turb(NTUs)	Physical Description
LAKE CAPRI					**LAKE CAPRI**
SW-1N					SED-1N
SW-2N					SED-2N
SW-3S					SED-3S
SW-4S					SED-4S
WILLETTS CREEK					**WILLETTS CREEK**
SWWC-1					SEDWC-1
SWWC-2					SEDWC-2

RIPRAP WILLETTS CREEK INSPECTION
NOTES

RIPRAP NORTHCOVE LAKE CAPRI
NOTES

OTHER OBSERVATIONS:

DZUZ FASTENER SITE
LONG TERM MONITORING PLAN
FIELD LOG FORM

Date _____

Weather Conditions/Temperature _____

GROUNDWATER WATER SAMPLING

	Time	Depth(ft)	DTW(ft)	MP ele. (ft)	GW ele.(ft)	Well Vol.(gal)	Purge Vol.(gal)	FIELD PARAMETERS pH	Cond(umhos)	Turb(NTUs)	Temp(C)
MW-1				21.88							
MW-2				21.21							
MW-3				19.73							
MW-9				19.06							
MW-9B				19.13							
MW-13A				15.99							
MW-13B				16.02							
MW-23A				17.63							
MW-23B				17.57							
MW-15A				19.16							
MW-15B				19.13							
MW-22A				20.26							
MW-22B				20.02							
MW-18				13.60							

Depth - depth of well below ground surface

DTW - depth to groundwater measured from marked point top of well casing
Well Vol. - for 2-inch well, multiply water column by 0.1632
Purge Vol. - 3 x Well Vol. (at least 3 well volumes should be purged from each well prior to sample collection)

	Start time	Stop time	Method	OBSERVATIONS
MW-1				
MW-2				
MW-3				
MW-9				
MW-9B				
MW-13A				
MW-13B				
MW-23A				
MW-23B				
MW-15A				
MW-15B				
MW-22A				
MW-22B				
MW-18				

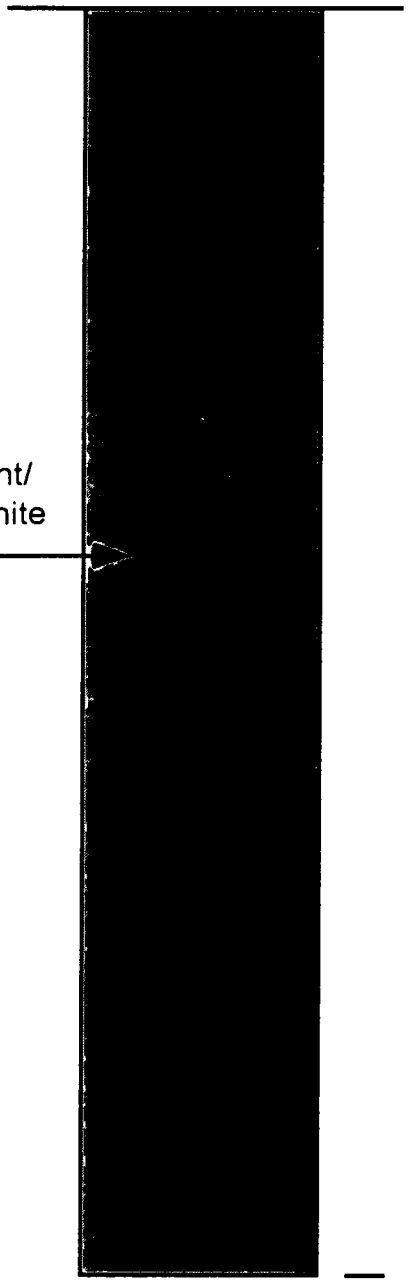
MONITORING WELL ABANDONMENT LOG

WELL NO. _____

Earth Tech, Inc.
12 Metro Park Road
Albany, NY 12205
(518) 458-1313

Project _____
Client _____
Location _____
Project No. _____
Date Drilled _____
Date Developed _____
Date Abandoned _____

WELL ABANDONMENT DETAIL



NOT TO SCALE

INSPECTION NOTES

Inspector _____
Drilling Contractor _____

Type of Well _____
Static Water Level _____ Date _____
Measuring Point (M.P.) _____

Total Depth of Well _____
Total Depth of Boring _____

Drilling Method
Type _____ Diameter _____
Casing _____

Seal(s)
Type _____ Interval _____
Type _____ Interval _____
Type _____ Interval _____

Locking Casing ☐ Yes ☐ No

Notes on Abandonment and Restoration:

Chain of Custody Record

EARTH TECH

A tyco INTERNATIONAL LTD. COMPANY

Custody Seal #	Rust E&I Cooler #

Project Number	Project Name/Client

Sample Custodian: (Signature)

Item No.	Sample Description (Field ID Number)	Date	Time	Grab	Comp.	PID Reading (ppm)	Label Number	Analysis Required										Matrix: Sample Type					Matrix: Sample Container				
1																											
2																											
3																											
4																											
5																											
6																											
7																											
8																											
9																											
10																											
11																											
12																											
13																											
14																											
15																											
16																											
17																											
18																											

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Disposed of by: (Signature)	Items:	Date / Time
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Disposed of by: (Signature)	Items:	Date / Time

Send Lab Results To:	Remarks:	Check Delivery Method:	Laboratory Receiving Notes:
	Federal Express Airbill No.: Lab:	☐ Samples delivered in person ☐ Common carrier	Custody Seal Intact? Temp. of Shipping Container: Sample Condition:

File on eDOCs X Yes _____ No
Site Name D205
Site No. 152033
County Suffolk
Town West Islip
Foilable X Yes _____ No
File Name 2000-11-01. Long term Monitoring Plan
Scanned & eDOC _____