# 4.2 PRE-DESIGN INVESTIGATION REPORT

4.2

# Pre-Design Investigation Report
# Dzus Fastener Site
# NYSDEC Site No. 1-52-033
# Operable Unit No. 2
# Lake Capri/Willetts Creek

## Work Assignment No. D003821-2

Prepared for:

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

Prepared by:

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Albany, New York 12205

Pre-Design Investigation Report

Dzus Fastener Site

Operable Unit No. 2

Lake Capri/Willetts Creek

Work Assignment No. D003861-02.

Prepared for:

Superfund Standby Program

New York State

Department of Environmental Conservation

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November 1998

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## APPENDICES

# 1.0 INTRODUCTION

## 1.1 GENERAL

This report summarizes the Pre-Design Investigation (PDI) conducted for Operable Unit 2 (OU 2) at the Dzus Fastener Site in West Islip, Suffolk County, New York. The work was performed as Task 2 under Work Assignment No. D003821-2, under Work Elements III and IV of the Superfund Standby Contract (SSC), dated August 1997, between the New York State Department of Environmental Conservation (NYSDEC) and Rust Environment and Infrastructure of N. Y., P.C. (Rust).

The purpose of the PDI was to:

- collect additional data necessary for developing plans and specifications for the remedy set forth in the Record of Decision, and for preparing regulatory applications,
- sample and analyze existing groundwater monitoring wells, and
- photo-document existing conditions in the anticipated work areas.

The work was conducted in general accordance with the PDI Work Plan, and its Sampling and Analysis Plan and Field Health and Safety Plan.

The PDI included the following tasks:

- surveying and developing a base map for use in obtaining access agreements, documenting the PDI results, applying for regulatory authorizations, and developing design drawings;
- collecting groundwater samples from 26 existing monitoring wells installed in the area during prior site investigations;
- collecting 5 surface water samples from Upper Willetts Creek and Lake Capri;
- collecting 76 sediment samples from the main (east) branch of Upper Willetts Creek; 3 sediment samples from the intermittent (west) branch of Upper Willetts Creek; 159 sediment samples from Lake Capri; and 7 sediment samples from the tidal Lower Willetts Creek;
- conducting a treatability study for lake bottom sediments, including physical and chemical characterization, dewatering tests, and evaluation of the feasibility of sediment separation and washing to reduce treatment and disposal costs;
- delineating wetlands; and

- providing photo documentation of existing conditions.

## 1.2 PROJECT BACKGROUND

The subject site is listed as Site Number 1-52-033, Class 2, on NYSDEC's registry of inactive hazardous waste sites. The site has been divided into two operable units (OUs). A Remedial Investigation/Feasibility Study (RI/FS) that addressed both OUs to varying degrees was completed by Lawler, Matusky & Skelly Engineers (LMS) in October 1994, with an Addendum issued October 1995. On-site soils at the one-acre Dzus Fastener Company's manufacturing facility at 425 Union Boulevard in West Islip comprise Operable Unit Number 1 (OU 1). An Interim Remedial Measure was conducted in 1991 to remove a leach field at the eastern side of the site. Solidification of the OU 1 soils containing greater than 10 parts per million (ppm) cadmium was completed in December 1996. This included excavating three small areas in the western side of the site, mixing these soils with the contaminated soils in the eastern side of the site, and installation of an asphalt cover.

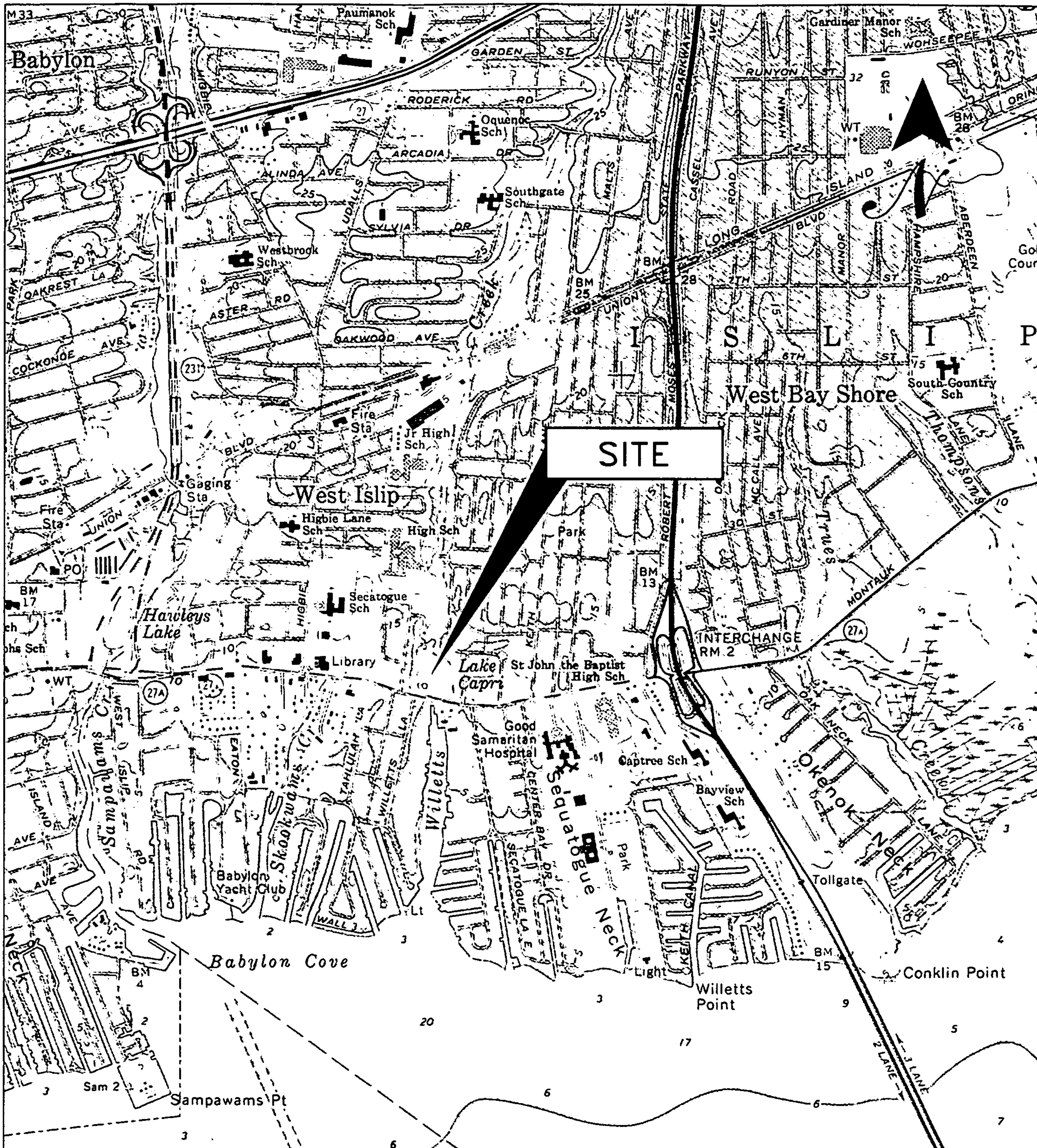
Contamination in groundwater and in surficial sediments and surface waters of nearby Willetts Creek and Lake Capri downstream of the facility comprise the OU 2 site. A portion of the Bay Shore West topographic quadrangle map that includes the general site area is presented on Figure 1-1. The pre-design investigation for OU 2 is the subject of this report.

## 1.3 SITE DESCRIPTION

Willetts Creek, which flows in a southerly direction, is divided into an Upper and a Lower reach. Upper Willetts Creek is located immediately to the east of the Dzus manufacturing facility and extends downstream approximately 4,500 feet to Lake Capri, a privately owned, eight-acre man-made lake. In its course, the creek flows past West Islip Junior High School and West Islip Senior High School, both on the Creek's west bank. Lower Willetts Creek is the channelized 3,000-feet long tidal portion of the creek downstream of the lake and tributary to Babylon Cove in Great South Bay.

Lake Capri was formed by impoundment of the Willetts Creek estuary upon construction of the embankment for Montauk Highway (Route 27A), or its predecessor, before the turn of the century. The northwest corner of the lake is characterized as a small, approximately one-quarter acre lagoon fed in part by what is now a relatively short intermittent stream, referred to herein as the west branch of Upper Willetts Creek. An aerial photograph of the lake and vicinity taken in April 1998 is presented on Figure 1-2.

Prior to the construction or expansion of the southeast parking lot at the Senior High School, a minor west branch of Upper Willetts Creek bifurcated from the main or east branch, passed through a culvert beneath Ivy Court, and conveyed some creek flow to the lagoon. During construction of the Senior High School's southeast parking lot, the northern end of the west branch was apparently backfilled and paved over. A sump with electric pump was subsequently installed in a small vault constructed in the west bank of the main branch near the southeast corner of the parking to divert some creek water back to the west branch. At the time of the field work in May 1998, it was observed that the pump had been removed. This west branch is now only a few feet wide, and flow




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

1000
0 2000ft

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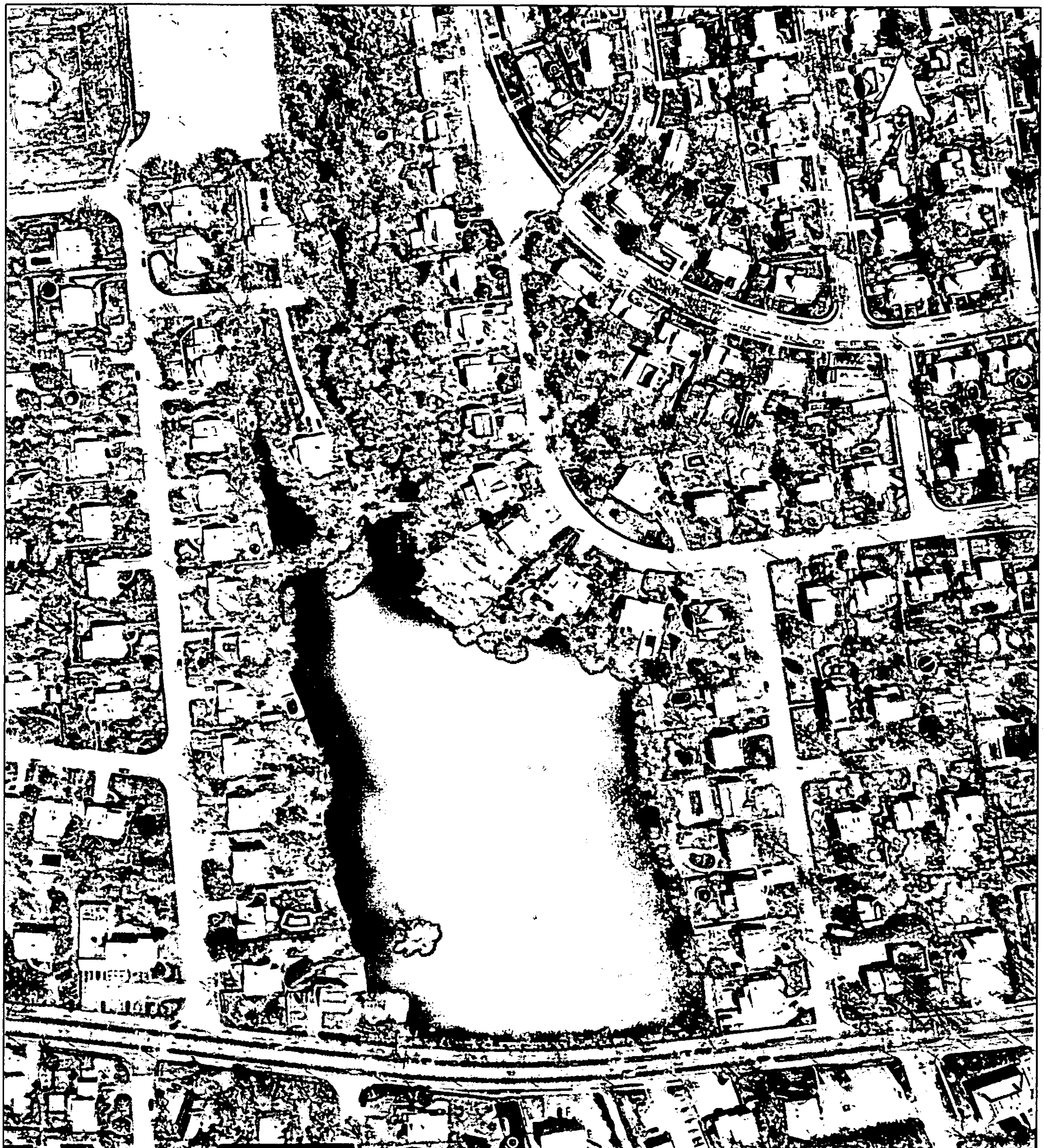
FIGURE 1-1
SITE LOCATION MAP
DZUS FASTENER SITE
LAKE CAPRI/WILLETTS CREEK
NOVEMBER 1998 202563



Approximate Scale

0 200ft

RUST

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FIGURE 1-2
AERIAL PHOTOGRAPH-LAKE CAPRI
DZUS FASTENER SITE

NOVEMBER 1998

202563

aerialcapri

appears to be primarily from groundwater discharge, storm water runoff, and possibly sump pumpage and roof drainage from adjacent residences.

Except for the fenced south end of the lake that fronts Montauk Highway, Lake Capri is surrounded by low-lying residential properties that restrict public access. The lake is relatively shallow; with a depth of slightly greater than three feet over broad areas. The lake is fed principally by surface flows from Upper Willetts Creek, with stormwater runoff from two outflow structures that drain local streets to the east and west, and by groundwater seepage.

A concrete outfall structure at the south end controls overflow into a box culvert that extends under Montauk Highway and to Lower Willetts Creek. Given the approximately 3 - 4 foot average head drop between Lake Capri and the tidal Lower Willetts Creek, it is likely that the lake also discharges by groundwater flow.

Comparison of U.S.G.S. 7.5 minute topographic quadrangle maps (Bay Shore West, N.Y.) developed from photography taken in 1941 and 1966 indicated the following apparent changes during this 25 year time period as the area was developed:

- The residential development of the immediate area around Lake Capri, including construction of the house and driveway between the lagoon and the east branch of Upper Willetts Creek;
- Apparent modification of the north end of the lake including the east-west widening of the north end of the lake, and the narrowing of the lagoon;
- Construction of islands in the north and southwest parts of the lake;
- The construction of the West Islip Senior and Junior High Schools;
- The eastward shifting of portions of Upper Willetts Creek along the reach between the Senior High School and Lake Capri; and
- The channelization of the tidal Lower Willetts Creek.

## 1.4 PREVIOUS FINDINGS AND SELECTED REMEDY

Cadmium is the principal contaminant of concern, although lead, zinc, chromium, cyanide and other constituents have also been associated with past releases at the Dzus site. As reported in the RI/FS, the sediments in Lake Capri are contaminated with cadmium at concentrations greater than 300 mg/kg (ppm), and to depths 18-inches and greater. Concentrations of cadmium in Upper Willetts Creek were reported to range from non-detectable to 79 mg/kg (ppm) at one location just upstream of the Burling Lane foot bridge near the West Islip Junior High School.

A New York State Department of Health fish consumption advisory (1997-98) is currently in effect for carp taken from Lake Capri. Cadmium concentrations in fish flesh exceed acceptable levels. The Dzus facility has been acknowledged to be the source of the cadmium.

The remedy set forth in the Record of Decision (ROD) for OU 2 included hydraulically dredging the upper 12 inches (estimated 12,000 cubic yards (cy) (in-place)) of contaminated sediments from Lake Capri. The remedy also included mechanically excavating an estimated 100 cy of contaminated sediments from a 250 foot-long stretch of Upper Willetts Creek immediately upstream of the Burling Lane foot bridge. The sediments were to be dewatered as necessary and disposed of by landfilling.

A bench-scale treatability test was performed on Lake Capri sediments during the RI/FS. This study was performed by J. D. Meagher under contract to LMS to provide information for selecting and sizing full-scale equipment and materials. The test report concluded that recessed chamber filtration with polymer addition was the recommended dewatering technology. The filter cake from this process contained greater than 50 % solids and did not exceed the Toxicity Characteristic Leaching Procedure (TCLP) threshold for cadmium of 1.0 mg/l (ppm). The filtrate from the bench-scale test exceeded effluent standards for total aluminum, zinc, and pH, indicating that the filtrate will require treatment prior to discharge into Upper Willetts Creek.

## 1.5 REPORT ORGANIZATION

This report is organized as follows. Section 2.0 describes the surveying and mapping, sampling and analysis, wetland delineation methods, and other methods used to acquire site characterization data. Section 3.0 summarizes the characterization results for the various media (sediment, surface water and groundwater), wetlands and significant nearshore features. Section 4.0 summarizes the treatability study methods and results. Section 5.0 presents additional conclusions for consideration in remedial design.

## 2.0 SITE CHARACTERIZATION METHODS

### 2.1 SURVEY AND MAPPING

Surveying and mapping services were conducted primarily by Joy Contracting, Inc. (Joy) of Staten Island, New York, under contract to Rust, to establish a base map for Lake Capri and the surrounding area. The mapping is essential for use in obtaining access agreements, planning and documenting the PDI results, and developing plans for permit-related activities, design drawings, and record drawings. Surveying and mapping activities included:

- Aerial photography of the lake and surrounding area north to the Senior High School parking lot by Geod Corporation of Newfoundland, New Jersey, under contract to Joy. The fly over took place on April 11, 1998. A portion of the aerial photograph that shows Lake Capri is presented on Figure 1-2.

- A bathymetric survey of Lake Capri with depth probe measurements made by soundings from a boat generally at 50-foot centers. Rust made additional bathymetric measurements during the sediment sampling. Lake bottom contours are shown on Plate 1.

- A deed and tax map search/review of properties located both along the Lake Capri Shoreline and along the anticipated dredge discharge line corridor of Upper Willetts Creek from the lake up to the West Islip Senior High School parking lot where the staging/treatment area would be located. The tax map identification numbers and local addresses are included on Plate 1. Copies of the tax map and property deeds were also obtained for a portion of the Upper Willetts Creek north of the Burling Lane foot bridge where localized removal of impacted sediments may be required.

- Preparation of a topographic map, including a local benchmark at the top of the lake's outfall structure, shoreline bulkheads, fences, foot bridges, buildings, outfall structures, tree overhangs (from air photos), an area of floating debris (from on-site observations), and the north end of the Senior High School's southeast parking lot. Property lines were not individually surveyed, but approximate property lines and tax map parcel numbers are shown. These features are shown on Plate 1.

- Staking of a 100-foot grid across the lake used by Rust to locate sediment sampling locations on 50-foot centers throughout the lake, and subsequent surveying of most of the 50-foot stakes installed by Rust at sediment sampling locations. Sampling locations are shown on Plate 2.

Additionally, Rust mapped a 1,000-foot long portion of Upper Willetts Creek upstream from the Burling Lane foot bridge. This mapping was done after creek bottom sediment sampling confirmed the presence of contaminated sediments just upstream of the foot bridge, and additional sampling indicated that the sediment contamination generally extends 900 feet upstream. This map was used to document the sampling locations (Figure 2-1) and provide a basis for possible excavation plans (Plate 6).

## 2.2 SAMPLING AND ANALYSIS

### 2.2.1 Sediment Sampling

The cost of sediment sampling and analysis is relatively low compared to the cost of dredging, dewatering, transportation and disposal. Rust implemented a more detailed lake bottom sediment sampling program to provide better definition of sediments to be targeted for removal which will likely significantly reduce the costs for the remedial action. Available analytical data from the previous investigations of the lake sediments indicated that the magnitude of contamination consistently decreases with depth; therefore the collected samples were analyzed sequentially proceeding from the shallowest samples to the deepest samples.

Sediment was also sampled from the west branch of Upper Willetts Creek upstream of the lagoon which was directly connected to the main or east branch prior to construction of the Senior high School parking lot which obstructed its flow.

Sediment sampling was also conducted in the east branch of Upper Willetts Creek in the area upstream of the Burling Lane foot bridge near the Junior High School. The RI/FS had reported a hot spot region just north of the foot bridge. The sampling was conducted to verify and define the extent of the reported hot spot. This effort eventually led to further upstream sampling to Union Boulevard.

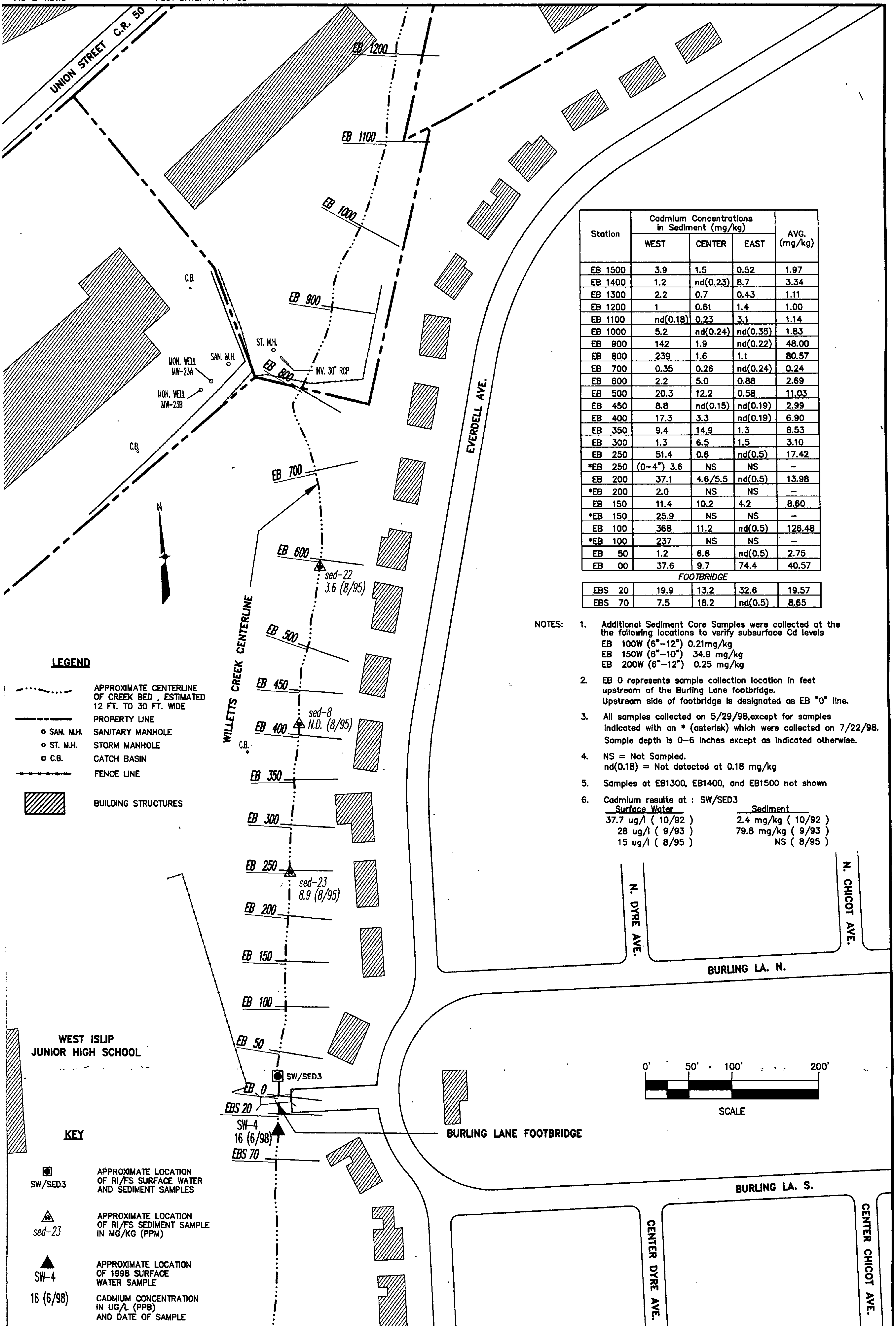
Sediment samples were also collected from the tidal Lower Willetts Creek in response to a comment presented in the ROD Responsiveness Summary. This region of the creek is the discharge area of Lake Capri and comprises a narrow channel leading out to Great South Bay.

Following is a summary of the sampling methods for each of these areas.

#### 2.2.1.1 Lake Capri Sediment

Rust collected core samples of Lake Capri bottom sediment for analysis to better define the horizontal and vertical limits of cadmium contamination. Locations are shown on Plate 2. Core samples were collected at approximately 140 nodes of the 50-foot by 50-foot grid marked with wooden temporary stakes. Samples were collected at additional locations that did not fall on grid points, e.g., in narrows adjacent to the north island. Samples were also collected at approximately 50-foot intervals along the shoreline (just offshore) to characterize the nearshore sediments, and minimize the potential for unnecessary dredging adjacent to homeowners' backyards. The shoreline sampling resulted in at least one sample being collected adjacent to each property lot. Sediment core samples were also collected at three random locations in the lagoon.

FIG-2-1.DWG PLOT DATE: 11-17-98




| Station | Cadmium Concentrations in Sediment (mg/kg) | | | AVG. (mg/kg) |
|---|---|---|---|---|
| | WEST | CENTER | EAST | |
| EB 1500 | 3.9 | 1.5 | 0.52 | 1.97 |
| EB 1400 | 1.2 | nd(0.23) | 8.7 | 3.34 |
| EB 1300 | 2.2 | 0.7 | 0.43 | 1.11 |
| EB 1200 | 1 | 0.61 | 1.4 | 1.00 |
| EB 1100 | nd(0.18) | 0.23 | 3.1 | 1.14 |
| EB 1000 | 5.2 | nd(0.24) | nd(0.35) | 1.83 |
| EB 900 | 142 | 1.9 | nd(0.22) | 48.00 |
| EB 800 | 239 | 1.6 | 1.1 | 80.57 |
| EB 700 | 0.35 | 0.26 | nd(0.24) | 0.24 |
| EB 600 | 2.2 | 5.0 | 0.88 | 2.69 |
| EB 500 | 20.3 | 12.2 | 0.58 | 11.03 |
| EB 450 | 8.8 | nd(0.15) | nd(0.19) | 2.99 |
| EB 400 | 17.3 | 3.3 | nd(0.19) | 6.90 |
| EB 350 | 9.4 | 14.9 | 1.3 | 8.53 |
| EB 300 | 1.3 | 6.5 | 1.5 | 3.10 |
| EB 250 | 51.4 | 0.6 | nd(0.5) | 17.42 |
| *EB 250 | (0-4") 3.6 | NS | NS | - |
| EB 200 | 37.1 | 4.6/5.5 | nd(0.5) | 13.98 |
| *EB 200 | 2.0 | NS | NS | - |
| EB 150 | 11.4 | 10.2 | 4.2 | 8.60 |
| *EB 150 | 25.9 | NS | NS | - |
| EB 100 | 368 | 11.2 | nd(0.5) | 126.48 |
| *EB 100 | 237 | NS | NS | - |
| EB 50 | 1.2 | 6.8 | nd(0.5) | 2.75 |
| EB 00 | 37.6 | 9.7 | 74.4 | 40.57 |
| *FOOTBRIDGE* | | | | |
| EBS 20 | 19.9 | 13.2 | 32.6 | 19.57 |
| EBS 70 | 7.5 | 18.2 | nd(0.5) | 8.65 |

NOTES:

1. Additional Sediment Core Samples were collected at the the following locations to verify subsurface Cd levels
   EB 100W (6"-12") 0.21mg/kg
   EB 150W (6"-10") 34.9 mg/kg
   EB 200W (6"-12") 0.25 mg/kg
2. EB 0 represents sample collection location in feet upstream of the Burling Lane footbridge. Upstream side of footbridge is designated as EB "0" line.
3. All samples collected on 5/29/98,except for samples indicated with an * (asterisk) which were collected on 7/22/98. Sample depth is 0-6 inches except as indicated otherwise.
4. NS = Not Sampled.
   nd(0.18) = Not detected at 0.18 mg/kg
5. Samples at EB1300, EB1400, and EB1500 not shown
6. Cadmium results at : SW/SED3

| Surface Water | Sediment |
|---|---|
| 37.7 ug/l ( 10/92 ) | 2.4 mg/kg ( 10/92 ) |
| 28 ug/l ( 9/93 ) | 79.8 mg/kg ( 9/93 ) |
| 15 ug/l ( 8/95 ) | NS ( 8/95 ) |

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PRE-DESIGN INVESTIGATION REPORT
DZUS FASTENER SITE
WEST ISLIP, NEW YORK
NYSDEC SITE No. 1-52-033
OCT. 1998 202563

# FIGURE 2 - 1
## UPPER WILLETTS CREEK ( EAST BRANCH )
## SEDIMENT SAMPLES

Since the base mapping and sampling program were occurring simultaneously, a temporary lake sediment sampling grid was established using an arbitrary northing (0+00N through 8+00N) and easting (1+00E through 15+50E) position in order to track and document sampling locations during the field work. These reference grid locations are shown on Plate 2. Each sampling point was given an index number at the time it was logged in the field book and these are also reflected on the drawing. Sampling locations were staked and surveyed at the conclusion of the field work for subsequent plotting on the site maps.

Rust collected the samples using a portable piston core sampler with a clear 2.5-inch outside diameter Lexan tube. The core tube was advanced ahead of the piston, which was manually held stationary at the sediment surface by means of a connection rod threaded through the top of the core tube. The tube was initially advanced under manual pressure, then pounded as necessary using a slide hammer impinging on an aluminum top cap to advance the tube into the sediments to refusal. Recoveries were generally greater than 80 %, with the exception of a few locations, including the west central portion of the lake where coarse gravelly material prevented sufficient recovery to obtain a sample for analysis. If necessary, up to three attempts were made at each location to obtain satisfactory recovery.

The sampling effort was facilitated by using a flat bottom Jon boat furnished, with operator, by NYSDEC. The boat was launched from and docked in one of the residential backyards. The lake was shallow enough for wading. During sampling, one or two sampling crew stood in the water adjacent to the boat, and one or two crew stood on the boat. The boat served as a platform to provide height for operating the sampler, and for portaging sampling materials and core tubes.

Core samples were measured in the field and visually described as observed through the clear plastic tubing. The following information was collected for each sampled location.

- Depth of water (using measuring tape; relative lake elevation was measured daily at outfall structure)
- Initial and final penetration resistance
- Length of core push
- Core recovery
- Depth of silt-sand interface

Cores were maintained upright insofar as practicable, indelibly labeled (core location, date, sampled depth), and transported to shore.

Except for the shoreline samples, the upper foot of lake bottom samples were prepared for archiving and possible physical characterization testing, and were set aside. Lake bottom samples below one foot were examined visually, logged for textural changes, cut generally into sample intervals of 0.5-feet or less as appropriate, capped and taped. Care was taken to prevent fines from migrating down through the core samples, but the possibility of this type of cross-contamination could not be totally prevented. Samples were shipped to the analytical lab either immediately, or later after reviewing the results of the initial analyses for the shallower samples that had been analyzed previously.

The depth of cadmium contamination in samples collected along the shoreline was expected to be shallower than in the main body of the lake; therefore the 0 - 0.5 foot and 0.5 - 1.0 foot intervals were analyzed in these samples.

Scilab of Latham, New York conducted all chemical analytical services for the project, with the exception of some analyses conducted for the sediment treatability study.

#### 2.2.1.2 East Branch Upper Willetts Creek Sediment

A portion of the east branch of Willetts Creek was targeted in the ROD for possible remediation based upon a previously identified 79 ppm sediment "hot spot" located immediately upstream of the Burling Lane foot bridge. Although the bridge structure incorporates a number of large diameter culverts to allow creek flows to pass, it is likely that the structure acts like a dam, especially during storm events, creating a depositional area that possibly traps cadmium impacted sediments.

To confirm the presence of the "hot spot" and determine its extent, on May 28, 1998, Rust collected sediment samples at sampling transects located 50 feet apart extending from the foot bridge 250 feet upstream. The north side of the foot bridge was designated as station 0+00. Samples were collected in the approximately upper 6 inches of submerged sediment using a bucket hand-auger. See Figure 2-1 for locations. Sample locations from the RI/FS are also shown for reference.

As directed by the onsite NYSDEC representative, samples were collected at three locations at each transect, near the west shore, midchannel and near the east shore. These discrete samples were labeled 00 W, OOC, and OOE to represent samples collected from along the west side of the creek, center creek, and east side of the creek, respectively. Each sampling location was biased to collect a sample where sediment depostion was most likely. Field notes document the sample locations including any obstructions in the creek that may have created a local depositional area. Wooden stakes were driven in the center of the creek at each transect to mark the location for subsequent surveying. These locations were plotted on a base map developed from a topographic map provided by the Town of West Islip's engineering office. A total of 18 samples were collected north of the bridge during this sampling event. Samples were placed in clean 4-ounce glass jars, capped, labeled and placed in a cooler for later shipment to the analytical lab. All samples were analyzed for cadmium.

As per the PDI work plan, at least one sample was also to be collected just south of the Burling Lane foot bridge. To be consistent with the sampling conducted north of the foot bridge, it was decided on site, with concurrence of the NYSDEC onsite representative, to collect additional samples to an approximate distance of 70 feet downstream (south) of the foot bridge. Samples were collected in the same manner as north of the bridge. On May 28, 1998, three samples were collected at each of two transects located 20 feet and 70 feet south of the bridge's 0+00 location.

The analytical results received after this initial sampling indicated cadmium exceedances (greater than 9 ppm) at the upstream end of the sampled reach, suggesting that the northern extent of the contamination zone had not been defined. Following discussions with NYSDEC, Rust and NYSDEC returned to the site on July 21-22, 1998 and continued sampling upstream at 50-foot intervals from station 300 to station 500, then at 100-foot intervals to station 1500 near Union Boulevard adjacent to the Dzus facility.

In addition, because of the relatively high concentrations of cadmium detected at a few locations during the previous round, samples were collected at depths of 0-6 inches, and 6-12 inches near the west stations at 100W, 150W and 200W to assess the depth of contamination. The piston core sampler was used to collect these samples. An additional shallow (0-4 inches) sample was collected at station 250W.

#### 2.2.1.3 West Branch Upper Willetts Creek Sediment

Rust collected 3 surface sediment samples (WB-1, WB-2 and WB-3) at approximately 150-foot intervals in the narrow channel of the west branch of Upper Willetts Creek upstream of the lagoon. See Plate 2 for locations. Samples were collected from the approximately 0-6 inch depth interval, using a hand auger. Samples were placed in clean 4-ounce glass sampling jars, labeled, and placed in a cooler for later shipment to the analytical lab. The samples were analyzed for cadmium.

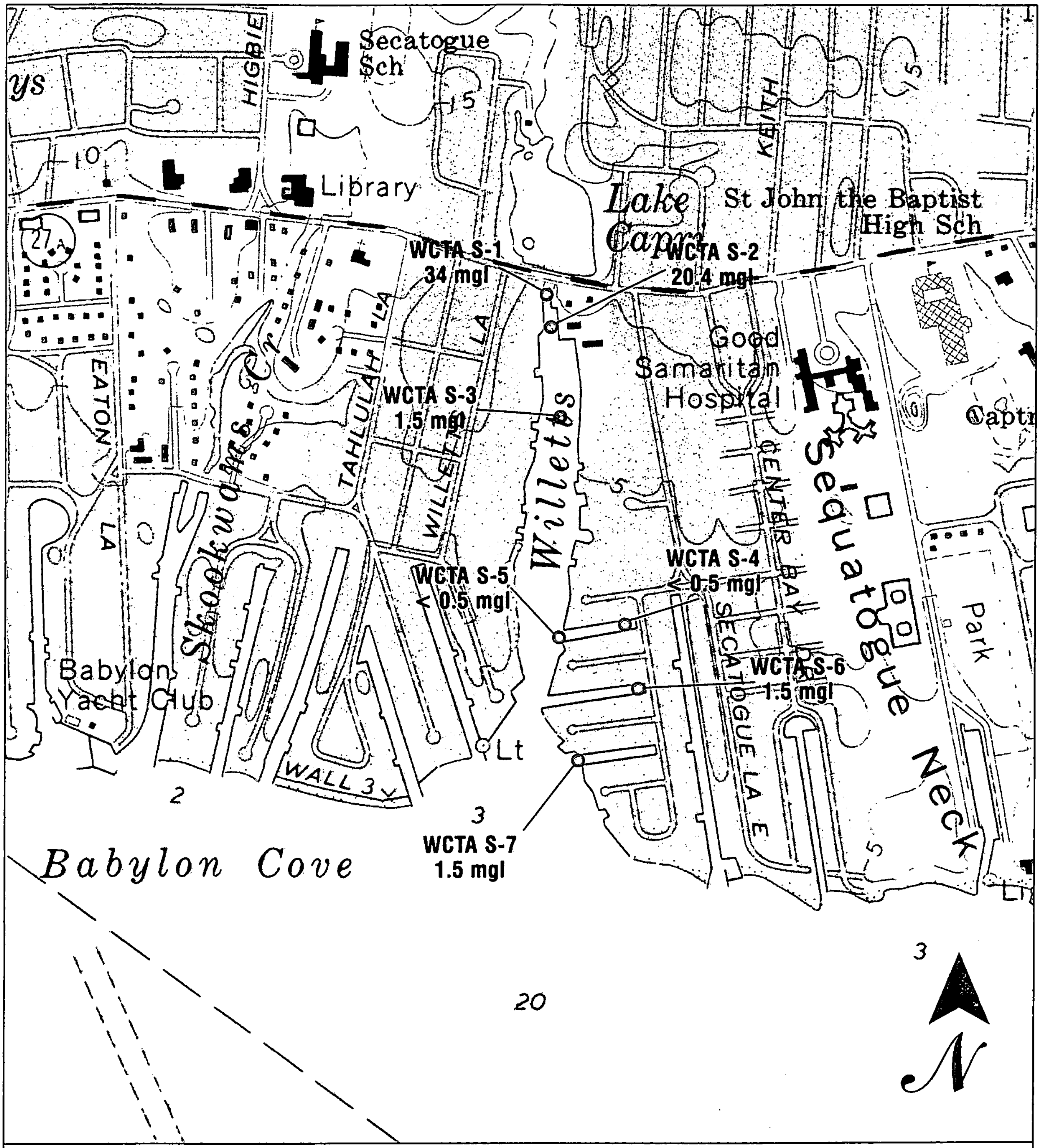
#### 2.2.1.4 Lower Willetts Creek (Tidal) Sediment

On May 28, 1998, surficial sediment samples (WCTA S-1 through S-7) were collected at 7 locations in the tidal Lower Willetts Creek. The samples were collected in each of the three east-west canals, and near the culvert from Lake Capri. Figure 2-2 identifies the sampling locations. NYSDEC supplied a power boat and operator for this effort. A ponar dredge was used to collect the samples from an approximate 0-6 inch depth below mudline. One duplicate sample was collected at location S-2. The samples were placed in clean 4-ounce glass sampling jars, capped, labeled and placed in a cooler for later shipment to the analytical lab. Samples were analyzed for cadmium.

### 2.2.2 Surface Water Sampling

Surface water samples were collected in Upper Willetts Creek and Lake Capri to determine ambient concentrations of water quality constituents of concern for use by the NYSDEC in determining appropriate SPDES (State Pollutant Discharge Elimination System) effluent limits and monitoring requirements for the water to be discharged to upper Willetts Creek from the sediment processing area during remediation.

Rust collected five surface water samples; three on May 28, 1998, and two on June 9, 1998. Two samples were collected from each branch of upper Willetts Creek (SW-1 and SW-2 in the west and SW-4 and SW-5 in the east), and one sample (SW-3) was collected just upstream of the Lake Capri outfall. See Figure 2-3 for sampling locations. Locations for surface water samples collected in this area during the RI/FS are also shown.




NO SCALE
Analytical results are indicated for cadmium detected in bottom sediments collected May 28, 1998.

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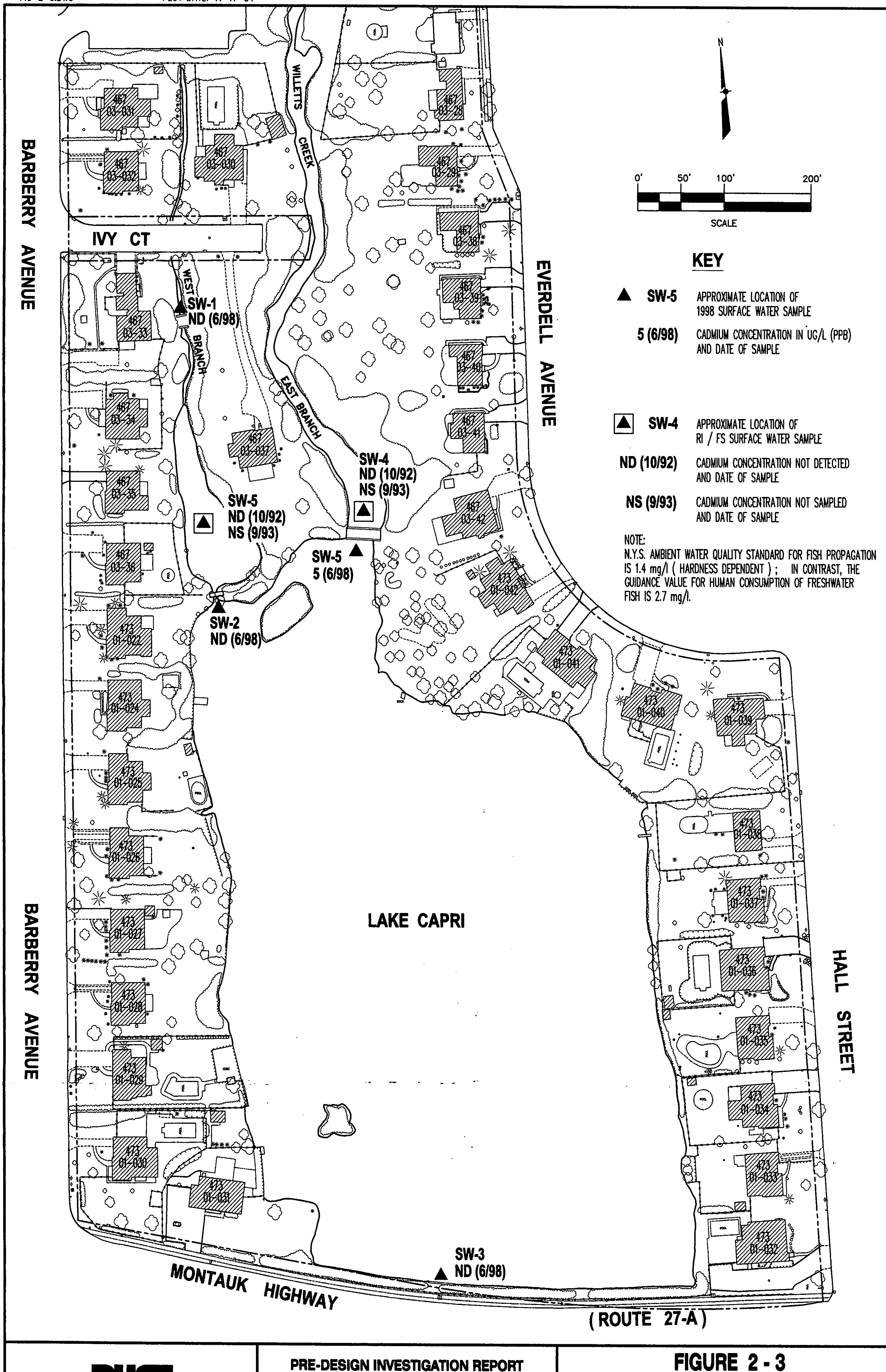
FIGURE 2–2
LOWER (TIDAL) WILLETTS CREEK
SEDIMENT SAMPLES

DZUS FASTENER SITE/LAKE CAPRI
NOVEMBER 1998 202563

FIG-2-3.DWG PLOT DATE: 11-17-94

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**PRE-DESIGN INVESTIGATION REPORT**
**DZUS FASTENER SITE**
**WEST ISLIP, NEW YORK**
**NYSDEC SITE No. 1-52-033**

OCT. 1998 202563

**FIGURE 2 - 3**
**SURFACE WATER CADMIUM CONCENTRATIONS**

The samples were collected by directly filling the sample containers provided by the analytical laboratory. Sample containers were slowly lowered into the surface water with minimal turbulence, allowing the sample stream to flow gently down the side of the bottle. Bottles were capped, labeled, and placed in a cooler for later delivery to the analytical laboratory. The samples were analyzed for aluminum, cadmium, chromium, cyanide, iron, lead, zinc, total suspended solids (TSS), settleable solids, total dissolved solids (TDS) and pH.

### 2.2.3 Groundwater Sampling

Prior to measuring groundwater levels and collecting groundwater samples for analysis, Rust prepared an inventory of the onsite and offsite monitoring wells that had been installed during prior site activities. The review was based on information provided in the RI/FS Report and RI/FS Report Addendum, and identified a total of 36 shallow, intermediate and deep monitoring wells. Table 2-1 summarizes the available data including original installation depth, current depth, location, installation date, and current status. Figure 2-4 shows the well locations.

Rust conducted one round of groundwater sampling on June 8 and 9, 1998. It was determined that 10 wells are no longer accessible, and are most likely removed, buried, or paved over. As a result, only 26 wells were sampled. Each well was sounded to determine its depth. An electronic water level detector was used to measure the depth to water from the top of casing. The volume of water in the wells was determined based on the length of the water column. Each well was purged of at least three well volumes prior to sampling. Sampling was conducted in accordance with the procedures set forth in the Sampling and Analyses Plan.

A separate sample of approximately 200 ml was collected in a plastic bottle to measure pH, conductivity, turbidity and temperature of the well in the field. Field parameters were noted in the field log book and are summarized in Appendix A. Although high turbidity was measured on some samples, samples collected for cadmium analysis were unfiltered samples. Groundwater samples were collected using disposable bailers and placed in clean plastic sampling bottles provided by the analytical lab. The samples were analyzed for total cadmium, chromium, cyanides and volatile organic compounds. Bottles were labeled, and placed in a cooler with wet ice for later shipping to the analytical laboratory. Monitoring well sampling logs are provided in Appendix A.

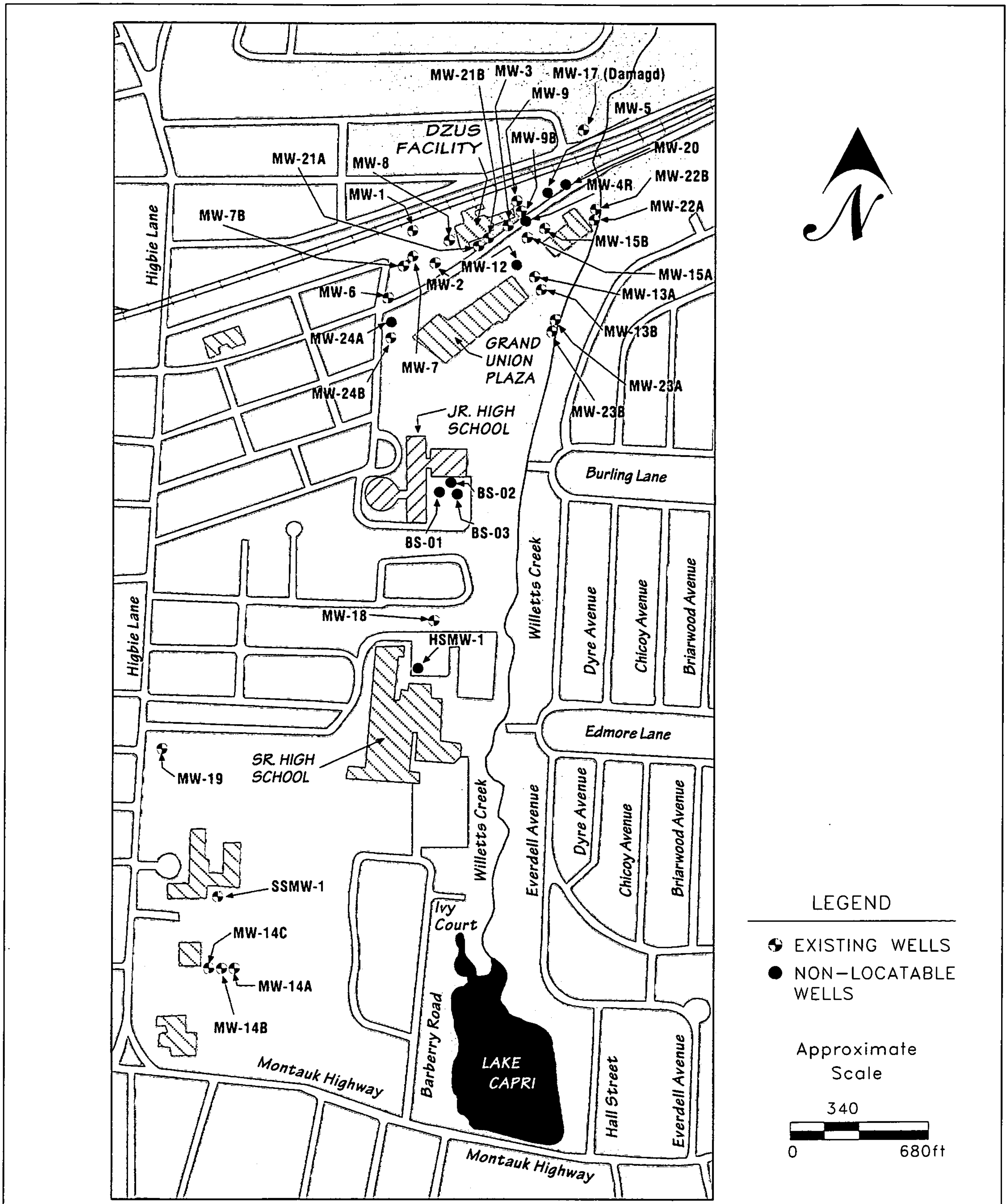
## 2.3 WETLAND MAPPING AND DELINEATION

Rust conducted a wetlands delineation of areas along the upper Willetts Creek and Lake Capri that are anticipated to be potentially impacted during remedial construction. The Army Corps of Engineers (ACOE) require that wetland boundaries be identified, staked, and surveyed. The delineation will be documented for use in obtaining the necessary permits and authorizations for wetland disturbance/mitigation, if any, as determined by the ACOE. Rust used delineation criteria and methods established by the ACOE (1987 Wetland Delineation Manual).

Table 2-1
Groundwater Monitoring Well Inventory
Dzus Fastener Site
West Islip, New York

| Well ID | Type | Original Depth* Measured Depth ** (1998) | Location | Installation Date | | 1998 Status |
|---|---|---|---|---|---|---|
| MW-1 | S | 15.0** | Dzus | pre-October 1992 | | active |
| MW-2 | S | 14.0** | Dzus | pre-October 1992 | | active |
| MW-3 | S | 12.1** | Dzus | pre-October 1992 | | active |
| MW-4 | S | 15* | Dzus | pre-October 1992 | | covered over |
| MW-4R(replacement) | S | 15* | Dzus | Oct/Nov-92 | | covered over |
| MW-5 | S | - | Dzus | pre-October 1992 | | covered over |
| MW-6 | S | 12.95** | Dzus | pre-October 1992 | | active |
| MW-7 | S | 8.15** | Dzus | pre-October 1992 | | active |
| MW-7B | I | 45*/44.5** | Dzus | Sep-93 | Phase II RI | active |
| MW-8 | S | 15*/14.6** | Dzus | pre-October 1992 | | active |
| MW-9 | S | 12.0** | Dzus | pre-October 1992 | | active |
| MW-9B | I | 45*/43.3** | Dzus | Sep-93 | Phase II RI | active |
| MW-12 | S | - | Shopping Plaza | pre-October 1992 | | covered over |
| MW-13A | S | 10.9** | Shopping Plaza | pre-October 1992 | | active |
| MW-13B | I | 45*/44.8** | Shopping Plaza | Sep-93 | Phase II RI | active |
| MW-14A | S | 14*/15.6** | Bus Garage | Oct/Nov-92 | Phase I RI | active |
| MW-14B | I | 46.2** | Bus Garage | Oct/Nov-92 | Phase I RI | active |
| MW-14C | D | 79** | Bus Garage | Oct/Nov-92 | Phase I RI | active |
| MW-15A | S | 30*/29.0** | Shopping Plaza | pre-October 1992 | | active |
| MW-15B | I | 84.5*/84.4** | Shopping Plaza | Oct/Nov-92 | Phase I RI | active |
| MW-17 | S | 15*/16.4** | Orinico Drive | Oct/Nov-92 | Phase I RI | blocked riser |
| MW-18 | S | 14*/13.75** | High School | Oct/Nov-92 | Phase I RI | active |
| MW-19 | S | 14*/13.8** | High School | Oct/Nov-92 | Phase I RI | active |
| MW-20 | S | 14.7* | Dzus | Oct/Nov-92 | Phase I RI | covered over |
| MW-21A | S | 15*/14.5** | Dzus | Sep-93 | Phase II RI | active |
| MW-21B | I | 45*/44.8** | Dzus | Sep-93 | Phase II RI | active |
| MW-22A | S | 15*/14.5** | Shopping Plaza | Sep-93 | Phase II RI | active |
| MW-22B | I | 45*/43.8** | Shopping Plaza | Sep-93 | Phase II RI | active |
| MW-23A | S | 15*/14.8** | Shopping Plaza | Sep-93 | Phase II RI | active |
| MW-23B | I | 45*/44.5** | Shopping Plaza | Sep-93 | Phase II RI | active |
| MW-24A | S | - | Shopping Plaza | Sep-93 | Phase II RI | not found |
| MW-24B | I | 45*/44.6** | Shopping Plaza | Sep-93 | Phase II RI | active |
| BS-01 | -- | - | Secatogue School | pre-October 1992 | | grouted |
| BS-02 cluster of 2 | -- | - | Secatogue School | pre-October 1992 | | grouted |
| HSMW-1 | -- | - | High School | pre-October 1992 | | not found |
| SSMW-1 | S | 9.0** | Secatogue School | pre-October 1992 | | Turbid/intact |

Notes:
1. S = shallow
   I = intermediate
   D = deep




RUST Environment & Infrastructure

FIGURE 2-4
MONITORING WELL INVENTORY
DZUS FASTENER SITE
LAKE CAPRI/WILLETTS CREEK
NOVEMBER 1998 202563

inventk

## 2.4 PRE-CONSTRUCTION SURVEY

Using still photography, Rust documented the existing conditions of the lake shoreline which will be in close proximity to the anticipated remedial construction work activities. The photo-documentation includes fences, shoreline details such as vegetation, wooden bulkheads, and bank erosion. It will be required that this survey be repeated by the contractor prior to construction due to any changes that may occur between now and the time of construction.

## 3.0 RESULTS AND FINDINGS

Section 3 presents the results and findings of the data collected as a result of the PDI field study and includes a brief summary of the previous RI/FS work activities' results by others. The analytical data reporting sheets for all samples are included in the Data Usability Summary Report (DUSR) under separate cover.

## 3.1 SEDIMENT CHARACTERIZATION

### 3.1.1 Lake Capri Sediment

Analytical results for lake bottom sediment are summarized in Table 3-1. The table also indicates the samples' field book index number, temporary field sampling grid (Plate 2) station, total recovery for each sample, a core log, and intervals analyzed. Plate 2 shows the sample locations and the cadmium concentrations of each depth interval analyzed.

Following is a summary of the nature and extent of the cadmium contamination, lake bottom stratigraphy, and how the stratigraphy relates to the distribution of cadmium.

Nature and Extent of Sediment Contamination

The PDI confirmed that the magnitude and thickness of cadmium contamination in lake bottom sediments varies spatially. Most of the contamination is associated with the recently deposited fine grained sediments (referred to herein as the organic silt or silt muck layer), which have accumulated to a greater degree in the southern part of the lake. The highest cadmium concentration detected during the PDI, approaching 400 ppm (dry weight basis) in the silt deposit in the south central part of the lake, is only slightly higher than that detected previously during the RI/FS. Fine grained sediments in the northern region of the lake were generally lower in cadmium concentrations than in the southern region. Substantially lower concentrations were detected in the sands underlying the silt layer.

The total thickness of contamination typically ranges from less than 6 inches in some areas mostly near the eastern shoreline, to 24 inches over a broad area in the southern part of the lake. Contamination possibly as deep as 30 inches was detected in a small localized area, but these deepest occurrences may be related to carry down of contaminants during the sediment sampling operations. Contaminated sediments present in the lagoon in the northwestern corner of the lake are estimated to be a maximum of approximately 18 inches thick.

The thickness of the contaminated material is generally related to the thickness of the fine grained sediments, but appears to extend from a few inches to possibly as much as a foot below the silt muck layer and into the underlying sand layer. Contaminant concentrations in the sand are typically substantially lower than in the overlying silts. The depth of cadmium contamination into the underlying sand layer appears to be shallower in the northern part of the lake as compared to the southern part of the lake.

**Table 3-1**
**Sediment Analytical Results Summary for Lake Capri**
**Dzus Fastener Site**
**West Islip, New York**

| Rust Sample ID Sample # | Field Grid Location | Interval Analyzed (in) | Cd Result (ppm) | Total Recovery (in) | Comments |
|---|---|---|---|---|---|
| Shoreline-south (181) | 0+52, 12+00 | 0-6 | 18.4 | | 0-10" org.muck/silt,10"-18" sand and sm.gravel |
| | | 6-12 | 84J | 18 | |
| Shoreline-south (182) | 0+39, 13+00 | 0-6 | 37.3J | | 0-.25" org., .25"-11.5" med.fine sand w/silt |
| | | 6-11.5 | 7.1 | 11.5 | coarse med. gravel and wood chips in bottom of sample |
| Line 0 +50 (118) | 0+50, 13+50 | 12-18 | 5.2 | | 0-12" org.muck/silt, 12"-18' org.muck/silt |
| | | 18-24 | 0.66 | 30 | 18"-24" fine sand/silt , some org. |
| Line 0 +50 (117) | 0+50, 14+00 | 12-18 | 2.1 | 29 | 0-12" org.muck/silt/gravel, 12"-18" med.fine sand sm.gravel |
| Shoreline-south (183) | 0+26,14+00 | 0-6 | 27.3J | | 0-10" org.muck/silt |
| of 117 | | 6-10 | 10 | 10 | 2 attempts, limited recovery |
| Line 0 +50 (116) | 0+50, 14+50 | 12-15 | 3.2 | 15 | 0-12" org.muck/silt, 12"-15"med.coarse sand/gravel |
| Line 0 +50 (115) | 0+50, 15+00 | 12-17.5 | 3.5 | 17.5 | 0-8" org.muck/silt and sand, 8"-17.5" med.coarse sand/gravel |
| Shoreline-south (184) | 0+25,15+00 | 0-6 | 172J | | 0-15" org.muck/silt roots,leaves |
| of 115 | | 6-12 | 258J | | 15"-27" br.med.fine sand,fine gravel,little silt |
| | | 12-18 | 2.9 | 27 | |
| Shoreline-west (150) | 1+00, 11+22 | 0-6 | 132J | | 0-12" org.muck/silt, 12"-18" dark tinged fine/med.sand |
| Line 1+00 | | 6-12 | 44.6J | 18 | |
| 36 (TS-2) | 1+00, 11+50 | 12-15 | 317J | | 0-12" org. muck/silt, 12-20" dk gr/br silt (treatability sample loc.) |
| | | 15-20 | 1.3 | 20 | |
| 68 (TS-1) | 1+00, 12+00 | 12-18 | 369J | | 0-12" org. muck/silt, 12"-18", org. muck w/fine/med sand |
| | | 18-24 | 15.8 | | 18"-26"org. muck w/ fine sand |
| | | 24-26 | 5.1J | | 26"-33" br. med coarse sand, sm. gravel |
| | | 26-31 | 3.9 | | (treatability sample loc.) |
| | | 31-33 | 1.8 | 33 | |
| 46 | 1+00, 12+50 | 13-15 | 14.6 | 15 | 0-12" org. muck/silt, 12"-15" coarse sand |
| 105 | 1+00, 13+00 | 12-16 | 28.5 | | 0-12" org. muck/silt, 12"-18" fine-coarse sand,gravel |
| | | 16-18 | 0.56 | 18 | |
| 104 | 1+00, 13+50 | 12-17.5 | 130J | | 0-12" org. muck/silt, 12"-19" fine/med gr. sand w/ gravel |
| | | 17.5-19 | 2.2 | 19 | |
| 106 | 1+00, 14+00 | 12-18 | 23.9 | | 0-12" org. muck/silt, 12"-23" fine/med gr. sand w/ gravel |
| | | 18-23 | 2.7 | 23 | |
| 96 | 1+00, 14+50 | 12-18 | 1.2 | | 0-12" org. muck/silt and some gravel |
| | | 18-22 | nd | 22 | 12"-18" org. silt w/ sand and gravel, 18"-22" fine sand |
| 98 | 1+00, 15+00 | 12-15 | 3.5 | | 0-12" org. muck/silt, 12"-18" org.muck w/gravel |
| | | 15-22 | 2.4 | 22 | 18"-22" fine br.sand |
| near shore (108) | 1+00, 15+52 | 12-17 | 0.54J | | |
| Shoreline-west (160) | 1+00, 15+59 | 0-6 | 2.7 | 17 | 0-2"org..muck/silt., 2"-17"fine med. br.sand,little gravel |
| Line 1+00 | | 6-12 | 2.6 | 12 | 0-2"org.muck/silt,2"-12" fine med.br.sand |

**Table 3-1**
**Sediment Analytical Results Summary for Lake Capri**
**Dzus Fastener Site**
**West Islip, New York**

| Rust Sample ID Sample # | Field Grid Location | Interval Analyzed (in) | Cd Result (ppm) | Total Recovery (in) | Comments |
|---|---|---|---|---|---|
| Line 1+50 (88) | 1+50, 11+00 | 12-18 | 42.2 | | 0-15" org. muck/silt, 15"-24", med. fine sand |
| | | 18-24 | 1.8 | 31 | |
| 87 | 1+50, 11+50 | 12-18 | 94.4J | | 0-12" org. muck/silt, 12"-18" org. muck/silt, little sand. |
| | | 18-24 | 13.6 | | 18"-39.5" fine sand, sm. gravel |
| | | 24-30 | 0.08B | 39.5 | |
| 93 | 1+50, 12+00 | 12-18 | 373J | | 0-12" org. muck/silt, 12"-18" org. muck/fine sand |
| | | 18-22.5 | 22.4 | 22.5 | 18"-22.5" fine/med gr.sand/some gravel |
| 95 | 1+50, 12+50 | 12-18 | 407 | | 0-16" org. muck/silt, 16"-20" med/coarse sand w/gravel |
| | | 18-20 | 3.9 | 20 | |
| 99 | 1+50, 13+00 | 14-16 | 10.4 | 16 | 0-12"org. muck/silt, 12"-fine/med sand some gravel |
| 97 | 1+50, 13+50 | 12-17.5 | 3.4 | | 0-12" org. muck, 12"-19" fine dense sand, some gravel |
| | | 17.5-19 | 0.91 | 19 | |
| 90 | 1+50, 14+00 | 12-15 | nd | | 0-8" org. muck/silt, 8"-17" some org.w/ fine med sand,little gravel |
| | | 15-17 | nd | 17 | |
| 91 | 1+50, 14+50 | 12-15 | 1.5 | | 0-6" org. muck/silt, 6'-17"muck and fine sand |
| | | 15-17 | 0.74 | 17 | |
| 86 | 1+50, 15+00 | 12-18 | 2.5 | 28 | 0-9" org. muck/silt, 9"-28" fine br.sand |
| Shoreline-west (161) | 1+50,15+48 | 0-6 | 2.3 | | |
| | | 6-12 | 1.9 | 16 | no org. silt, 0-1/2" sand, rest org fiber sand/gravel |
| Shoreline-east (151) | 2+00,10+65 | 0-6 | 77.4J | | off dock@Crafa prop.,org. noted in all samples |
| Line 2+00 | | 6-12 | 148J | | med.fine sand,little fine gravel w/ org. muck/silt |
| | | 12-17.5 | 113J | 17.5 | |
| 94 | 2+00,11+00 | 12-16.5 | 199J | | 0-12" org. muck, 12"-16.5" gravel w/ fine/med sand and org. silt |
| | | 16.5-19 | 2.7 | 19 | 16.5"-19" mostly gravel w/ fine gr.sand and org. silt |
| 100 | 2+00,11+50 | 12-14 | 8.4 | | 0-12" org. muck/silt,fine med.coarse sand |
| | | 14-16 | 6.2 | 16 | 12"-16" fine/med gr sand,some gravel |
| 67 | 2+00,12+00 | 12-19 | 313J | | 0-19" org. muck,some mix of gravel , 19"-30" med coarse br.sand |
| | | 19-24 | 2.3 | | |
| | | 24-30 | 4.2 | 30 | |
| 103 | 2+00,12+50 | 12-18 | 34.4 | | 0-18" org. muck/silt, rest coarse/med sand, some gravel |
| | | 18-19.75 | 2.6 | 19.75 | |
| 92 | 2+00,13+00 | 12-18 | 1.4 | | 0-6"org.muck/silt,6"-21.5" gr.fine/med sand,sm.gravel |
| | | 18-21.5 | 0.53 | 21.5 | |
| 102 | 2+00,13+50 | 12-14.5 | 0.74 | 14.5 | 0-6" org. muck/silt, 6"-14.5" org.silt w/gr.sand/sm.gravel |
| 101 | 2+00,14+00 | 9-10.5 | 3.1 | 10.5 | 0-3.5" org.muck/silt,3.5"-10.5" fine/med.coarse sand/gravel w/org.silt |
| 89 | 2+00,14+50 | 12-15.5 | 17.1 | | 0-6" org.muck/silt, 6"-15" org.muck/silt,some sand. |
| | | 15.5-17.5 | 0.73 | 17.5 | 15"-20" fine gr.sand |
| | | 17.5-20.0 | 0.94 | | |
| 80 | 2+00,15+00 | 12-18 | 0.88 | 20 | 0-4" org.muck/silt,4"-8" org.muck/silt w/sand,rest fine med.br.sand |
| Shoreline-east (162) | 2+00,15+49 | 0-6 | 1.9 | | 0-1.5"imix coarse sand/gravel and silt,little org. fiber. |
| | | 6-13 | 9.2 | 13 | |

**Table 3-1**
**Sediment Analytical Results Summary for Lake Capri**
**Dzus Fastener Site**
**West Islip, New York**

| Rust Sample ID Sample # | Field Grid Location | Interval Analyzed (in) | Cd Result (ppm) | Total Recovery (in) | Comments |
|---|---|---|---|---|---|
| Shoreline-west (152) | 2+50, 10+57 | 0-6 | 25.1J | | 0-1" org.,1"-6" med.fine sand/gravel,org. mixed in |
| Line 2+50 | | 6-12 | 1.7 | 17 | 6"-17" med.fine sand/loose gravel |
| 85 | 2+50, 11+00 | 18-Dec | 1 | 23.5 | 0-13" org.muck/silt, 13"-23.5" mix of gr.sands |
| 84 | 2+50, 11+50 | 12-16.5 | 2.1 | | 0-6" org.muck/silt,6"-12" org.muck/silt sand w/gravel |
| | | 16.5-18 | 7.2 | 18 | 12"-18" mostly sm.gravel,little org. |
| 83 | 2+50, 12+00 | 12-17 | 3.1 | | 0-6" org.muck/silt,6"-12" org.muck/silt sand w/gravel |
| | | 17-19 | 1.2 | 19 | 12"-19" fine gr.sand,some gravel |
| 81 | 2+50, 13+00 | 11.5-13.5 | 1.2 | 13.5 | 0-5" org.muck/silt, 5"-13.5" org. muck/silt fine-coarse gr.sand |
| 82 | 2+50, 13+50 | 12-18 | 0.65 | 20.5 | 0-9" org.muck/silt,9"-20.5" fine/med/coarse gr.sand/gravel |
| 78 | 2+50, 14+00 | 12-14 | 5.6 | | 0-12" org.muck/silt, 12"-20" fine/med.gr.sand,sm.gravel |
| | 2+50, 14+00 | 14-20 | 2.9 | | |
| 77 | 2+50, 14+50 | 13-16.5 | 8.2 | 16.5 | 0-5" org. muck/silt, 5"-16.5" org.muck/silt fine sand |
| 76 | 2+50, 14+50 | 11.5-13 | 1.7 | 13 | 0-4.5" org.muck/silt, 4.5"-13" fine/med br.sand |
| 79 | 2+50, 15+00 | 12-18 | 0.91 | 18 | 0-8" org.muck/silt, 8"-25" fine/med.br.sand |
| Shoreline-east (163) | 2+53, 15+45.5 | 0-6 | 3.4J | | 0-1.5"imix coarse sand/gravel and silt. |
| | | 6-12 | nd | 12 | |
| Shoreline-west (185) | 3+00,10+49 | 0-6 | 9.2 | | 0-1.5" org.,1.5"-17"gr.med.fine sand,fine gravel, mix of muck and silt |
| Line 3+00 | | 6-12 | 2.9 | | |
| | | 12-17 | 158J | 17 | |
| 59 | 3+00,11+00 | 12-19.5 | 216 | | 0-12" org.muck/silt, 12"-22" org.muck/silt w/med.br.sand and gravel |
| | | 19.5-22 | 8.8 | 22 | |
| 62 | 3+00,11+50 | 12-18 | 2.5 | | 0-10" org.muck/silt, 10"-23" br.med.coarse sand |
| | | 18-23 | 1.3 | 23 | |
| 72 | 3+00,12+00 | 12-15 | 36.8 | | 0-12" org.muck/silt,12"-17" med.br.sand,silt,sm.gravel |
| | | 15-17 | 9.1 | 17 | |
| 73 | 3+00,12+50 | 12-18 | 38.6 | | 0-12" org.muck/silt,12"-22" med.br.sand,silt,sm.gravel |
| | | 18-22 | 5 | 22 | |
| 75 | 3+00,13+00 | 12-18 | 303J | | 0-12" org.muck/silt,12"-18" org.muck/silt w/fine sand |
| | | 18-24 | 18.6 | | 18"-24" fine sand,sm.gravel |
| | | 24-28 | 4.8 | | |
| | | 28-33.5 | 0.59B | 33.5 | |
| 74 | 3+00,13+50 | 12-17.5 | 81J | | 0-12" org.muck/silt, 12"-19.5"fine br.sand/sm.gravel |
| | | 17.5-19.5 | 3 | 19.5 | |
| 65 | 3+00, 14+00 | 12-18 | 11.7 | | 0-8" org.muck/silt, 8"-18" org.mixed with fine/med.br.sand,sm.gravel |
| | | 18-23 | nd | | |
| | | 23-26 | nd | 26 | |
| 61 | 3+00, 14+50 | 12-15.5 | 1.9 | 15.5 | 0-6" org.muck/silt,6"-15.5" med./coarse br.sand |
| 56 | 3+00, 15+00 | 12-18 | 3..9 | 18 | 0-10" org.muck/silt,10"-18" med.coarse br.sand w/sm.gravel |
| Shoreline-east (164) | 3+00, 15+32 | 0-6 | 1.9 | | 0-.75" org muck |
| | | 6-13.5 | nd | 13.5 | |

Table 3-1
Sediment Analytical Results Summary for Lake Capri
Dzus Fastener Site
West Islip, New York

| Rust Sample ID Sample # | Field Grid Location | Interval Analyzed (in) | Cd Result (ppm) | Total Recovery (in) | Comments |
|---|---|---|---|---|---|
| Line 3+50 (42) | *3+50, 11+00 | 13-15 | 0.44B | | 0-6" org.muck/silt, rest med.fine sand, note org.mixing |
| | | 15-18 | 7.53 | 18 | |
| 52 | 3+50, 11+50 | 12-18 | 0.8 | | 0-7" org.muck/silt, 7"-12" fine/med sand w/org. |
| | | 18-21 | nd | 21 | 12"-21"fine/med/coarse sand w/sm.gravel |
| 40A | 3+50, 12+00 | 14-21.5 | 7.7 | 21.5 | 40A,40B represent duplicate samples |
| 40B | 3+50, 12+00 | 10-17 | 7.5 | 22 | 0-13" org.muck/silt |
| 55 | 3+50, 12+50 | 12-16 | 6.2 | | 0-12" org.muck/silt,little fine sand |
| | | 16-18 | 1.3 | 18 | 12"-18" fine-coarse sand,some gravel |
| 58 | 3+50, 13+00 | 9-19 | 2.5 | 19 | 0-9" org.silt/muck, 9"-19" mostly gr.sm.gravel |
| 64 | 3+50, 13+50 | 8.5-15 | 13 | 15 | 0-8.5" org.muck/silt,rest sand/gravel |
| 63 | 3+50, 14+00 | 12.5-18 | 1.4 | 18 | 0-12.5"org.muck/silt,12.5"-18" sand/gravel |
| 60 | 3+50, 14+50 | 12-18 | 5.2 | | 0-8" org.muck/silt, 8"-26" br.med.fine w/coarse sand |
| | | 18-20 | 0.6 | 26 | |
| 57 | 3+50, 15+00 | 12-14 | 0.36B | | 0-11" org.muck/silt, 11"-19.5" sand |
| | | 14-19.5 | 0.12B | 19.5 | |
| Shoreline-east (165) | 3+50,15+32 | 0-6 | 0.73 | | 0-.25"-org.muck/silt,.25"-13" mix fine-coarse sand,fine gravel. |
| | | 6-13 | nd | 13 | |
| Shoreline-west (153) | 4+00,10+42 | 0-6 | 76.2J | | 0-3" org.,3-6" med.sand w/ gravel |
| Line 4+00 | | 6-12 | 21.1 | 20 | 6"-12" fine org.silt w/ sand,12"-20" br.sand |
| 43 | 4+00, 11+00 | 12-18 | 0.47B | | 0-9" org.muck/silt, 9"-25" med./coarse sand w/sm.gravel |
| | | 18-25 | nd | 25 | |
| 45 | 4+00, 11+50 | 13-18 | 3.1 | | 0-13" org.muck/silt, 13"-20" mix of sand/gravel |
| | | 18-20 | 0.12B | 20 | |
| 66 | 4+00, 12+00 | 12-17 | 4.8 | | 0-12" org.muck/silt,12"-19" med.sand/sm.gravel |
| | | 17-19 | 2.2 | 19 | |
| 51 | 4+00, 12+50 | 12-15 | 1.6 | | 0-11" org.muck/silt, |
| | | 15-18 | 0.1 | | 11"-18"med.coarse sand/gravel, org. specs. |
| | | 18-21 | 0.7 | 21 | 18"-21"larger gravel,very pervious, org. specs. |
| 48 | 4+00, 13+00 | 12-14 | 0.7 | 14 | 0-8" org.muck/silt, 8"-14" fine sand/gravel |
| 44 | 4+00, 13+50 | 12-15 | 0.6 | 15 | 0-7" org.muck/silt,7"-15"fine/med br. sand little gravel |
| 54 | 4+00, 14+00 | 5-7 | 1.09 | 7 | 0-4" org.muck/silt,4-7" fine med. sand |
| 53 | 4+00, 14+50 | 12-15 | 4.6 | 15 | 0-2" org.muck/silt,2"-12" fine brown med. sand, uniform brown sand |
| 50 | 4+00, 15+00 | 12-18 | nd | | 0-3" org.muck/silt,7"-22.5" fine/med brown sand, little gravel |
| | | 18-22.5 | nd | 22.5 | |
| Shoreline-east (166) | 4+00,15+26 | 0-6 | 1.8 | | 0-1" mix org.muck/silt and sand |
| | | 6-12 | 0.54 | 15.5 | 1"-15.5" coarse med.fine sand,little gravel |

Table 3-1
Sediment Analytical Results Summary for Lake Capri
Dzus Fastener Site
West Islip, New York

| Rust Sample ID Sample # | Field Grid Location | Interval Analyzed | Cd Result | Total Recovery | Comments |
|---|---|---|---|---|---|
| | | (in) | (ppm) | (in) | |
| Shoreline-west (155) | 4+50,10+48 | 0-6 | 4.9 | | 0-25" org.,.25"-15" med fine sand,some fine gravel |
| Line 4+50 | | 6-11 | nd | 21 | |
| 186 | 4+50, 10+60 | 12-18 | 96.3J | 18 | |
| 26 | 4+50,11+00 | | NS | | mud only-underlay of gravel |
| 70 | 4+50,11+50 | | NS | | 0-10" org.muck/silt w/ fine sand and gravel |
| 71 | 4+50,12+00 | 12-18 | 318J | | 0-21" org.muck/silt,sand and gravel/cobble |
| | | 18-21 | 26.9 | 21 | |
| 47 | 4+50,12+50 | 11-13 | 0.41B | 13 | 0-5" org.muck/silt, 5"-13"fine/med sand, gravel |
| 49 | 4+50,13+00 | 12-16 | 2.06 | 16 | 0-6" org.muck/silt,some sand,6"-12" grey fine/med/coarse sand and gravel |
| 41 | 4+50,13+50 | 12-14 | 2.1 | 14 | 0-6" org.muck/silt, 6"-14"br.med./coarse sand |
| 39 | 4+50,14+00 | 12-18 | nd | 18 | 0-5" org. muck, 5"-18" br.med.coarse sand,little gravel |
| 38 | 4+50,14+50 | 12-17 | 2.9 | | 0-3" org.muck/silt,3"-10"org. mixed w/br.sand |
| | | 17-19.5 | 5.95 | 19.5 | 10"-19" uniform br.med.fine sand |
| 37 | 4+50,15+00 | 12-18 | nd | | 0-2" org.muck/silt, 2"-6" org.muck/silt w/med.coarse sand |
| | | 18-22 | nd | 22 | 6"-18" med/fine br.sand w/ gravel,18"-22" med/fine sand |
| Shoreline-east (167) | 4+50,15+27 | 0-6 | 0.11J | | 0-.5" org.muck/silt,.5"-12" sand/gravel mix |
| | | 6-12 | 0.33B | 12 | |
| Shoreline-west (200) | 5+00,10+52 | 0-6 | 51.5 | | |
| Line 5+00 | | 6-11 | 7.5 | 11 | |
| 30 | 5+00,11+00 | 12-17 | nd | 17 | 0-5" org.muck/silt, 5"-17" med/coarse sand and gravel |
| 25 | 5+00,11+50 | | NS | | no sample recovered |
| 34 | 5+00,12+00 | 12-15 | 9.4 | 15 | 0-7.5" org.muck/silt, 7.5"-15" gr med/coarse sand w/gravel |
| 35 | 5+00,12+50 | 12-15 | 1.3 | 15 | 0-5" org.muck/silt, 5"-15" med.coarse gr sand and gravel |
| 33 | 5+00,13+00 | 12-17 | nd | 17 | 0-6" org.muck/silt,6"-17" br.fine and med. sand |
| 32 | 5+00,13+50 | 12-16.5 | nd | 16.5 | 0-3" org.muck,3"-12" med/coarse sand,some org. |
| 31 | 5+00,14+00 | 12-18 | nd | | 12"-16.5" med./fine br.sand |
| | | 18-20.5 | nd | 20.5 | |
| 29 | 5+00,14+50 | 12-18 | nd | | 0-6" org.muck/silt/sand mix,6"-12" med.coarse br.sand |
| | | 18-25 | nd | 25 | 12"-25" fine/med br.sand,little gravel |
| 28 | 5+00,15+00 | 12-18 | nd | | 0-5" org.muck/silt, 5-18" med/fine br.sand |
| | | 18-25 | nd | 25 | 18"-25" fine br.sand |
| Shoreline-east (168) | 5+00,15+34 | 0-6 | 3.9 | | 0-1.5" med gravel/coarse sand, little org. |
| | | 6-12 | nd | 18 | 1.5"-18" med.fine sand,trace gravel |

**Table 3-1**
**Sediment Analytical Results Summary for Lake Capri**
**Dzus Fastener Site**
**West Islip, New York**

| Rust Sample ID Sample # | Field Grid Location | Interval Analyzed | Cd Result | Total Recovery | Comments |
|---|---|---|---|---|---|
| | | (in) | (ppm) | (in) | |
| Shoreline-west (156) | 5+50, 10+44 | 0-6 | nd | | 0-.25"org.,.25"-15" med.fine sand |
| Line 5+50 | | 6-12 | nd | 15 | |
| 16 | 5+50, 11+00 | 9-11 | 6.8 | 11 | 0-3" muck,rest fine/med sand |
| 109 | 5+50, 11+00R | 10-12 | 8.4J | 12 | duplicate sample of 16 |
| 19 | 5+50, 11+50 | 7.5-9 | 0.34B | 9 | 0-4" org.muck/silt,4-9" fine/med gr.sand,lt.gravel |
| 6 | 5+50, 12+00 | 10-13 | 0.13B | 13 | 0-1.5" org. muck,1.5"-2.5" org silt,2.5-8" med.gr.sand |
| 17 | 5+50, 12+50 | | NS | 7 | 0-3" org. muck,3"-7" org.silt |
| 18 | 5+50, 13+00 | 12-18.5 | nd | 18.5 | 0-4" org. muck/silt, 4"-12" med. br.sand |
| 20 | 5+50, 13+50 | 12-18.5 | nd | 18.5 | 0-6" org.muck/silt,6-12"mix silt,med/coarse sand |
| 21 | 5+50, 14+00 | 12-18 | nd | | 0-6" org.muck/silt,6-12" med/fine br. sand |
| | | 18-24 | nd | | |
| | | 24-26 | nd | 26 | |
| 22 | 5+50, 14+50 | 11.5-13.5 | nd | 13.5 | 0-5" org. silt, rest br/med.fine sand |
| 24 | 5+50, 15+00 | 9.5-11 | nd | 11 | 0-7"org silt, rest br/compact silt |
| Shoreline-east (169) | 5+50,15+21 | 0-6 | 2.8 | | 0-.5" silt/sand |
| | | 6-12 | nd | 14.5 | .5"-14.5" coarse med.fine sand w/med.fine gravel |
| Shoreline-west (157) | 6+00,10+39 | 0-6 | 3.8 | | 0-.25" org.,.25"-15" med.fine sand w/ gravel |
| Line 6+00 | | 6-12 | nd | 15 | |
| 8 | 6+10,11+00 | 10-13 | 0.31B | 13 | 0-5"org.w/med.sand,5"-13"fine/med gr sand |
| 9 | 6+00, 11+50 | 10-14 | 0.17B | 14 | 0-4"org.muck,4-14"gr. med/coarse sand |
| 10 | 6+19, 12+00 | 12-20 | 0.23B | 20 | 0-6" org.muck/some sand,6"-12"fine,med.br.sand |
| 11 | 6+00, 12+50 | 12-18 | nd | 18 | 0-3"muck,3"-6"sand w/org. |
| 23 | H-1 | 12-15 | 3.9 | 15 | |
| 12 | 6+00, 13+00 | 9-11 | nd | 11 | 0-5"org.muck/med.sand,rest med.coarse sand/gravel |
| 13 | 6+00, 13+50 | 12-18 | nd | | 0-5"org.muck/sand,5"-12"fine br.sand/silt |
| | | 18-21 | nd | 21 | |
| 14 | 6+00, 14+00 | 12-18 | nd | | 0-6" org.muck,6"-12"fine br.sand/silt |
| | | 18-21 | nd | 21 | |
| 15 | 6+39, 14+00 | 12-18 | nd | | 0-8"org.muck,8"-18" coarse sand,fine sand |
| | | 18-21 | nd | 21 | |
| 27 | 6+00,14+50 | 5-7 | 3.4 | 7 | |
| Shoreline-east (170) | 6+00,14+72.5 | 0-6 | 48.6J | | 0-12" dk.br.coarse med fine sand, little fine gravel,trace silt. |
| | | 6-12 | nd | 12 | |

**Table 3-1**
**Sediment Analytical Results Summary for Lake Capri**
**Dzus Fastener Site**
**West Islip, New York**

| Rust Sample ID Sample # | Field Grid Location | Interval Analyzed | Cd Result | Total Recovery | Comments |
|---|---|---|---|---|---|
| | | (in) | (ppm) | (in) | |
| Shoreline-west (158) | 6+50,10+26 | 0-6 | 131J | | 0-2" org.muck/silt,2"-10.5" med.fine sand, little gravel |
| Line 6+50 | | 6-10.5 | 24.1 | 10.5 | |
| 4 | 6+50, 11+00 | 0-6.5 | 3.6 | 6.5 | 0-6.5"org.muck/sand |
| 5 | 6+50, 11+50 | 0-4.5 | 23.2J | | 0-2"org.muck/silt, 2-6.5" med sand/gravel,little org. |
| | | 4.5-6.5 | 0.23B | 6.5 | |
| 7 | 6+50, 12+00 | 12-17 | nd | 17 | 0-5"muck/silt,5"-11"org.silt/med br.sand |
| 107 | 6+50, 12+50 | 12-14 | nd | 14 | br.fine/med sand |
| Shoreline-east (171) | 6+54,14+00 | 0-6 | 2.3 | | |
| | | 6-12 | 0.81 | 12 | |
| Shoreline-east (172) | 6+63,13+50 | 0-6 | 35.6J | | |
| | | 6-12 | 0.6 | 12 | |
| Shoreline-east (173) | 6+79,13+00 | 0-7.5 | 1.8J | 7.5 | Hofmann property |
| 174 | 6+96, 12+48 | 0-6 | 0.43 | | |
| | | 6-10.5 | nd | | |
| Shoreline-west (159) | 7+00,10+24 | 0-6 | 6.4 | | |
| Line 7+00 | | 12-Jun | 0.1B | 10 | |
| 120 | 7+00, 10+50 | 12-15 | 0.7 | 15 | |
| 1 | 7+00, 11+00 | 0-4.5 | 0.7 | | 0-1.5" org.muck,1.5"-6.5" coarse sand |
| | | 4.5-6.5 | 0.15B | 6.5 | |
| 2 | 7+00, 11+50 | 12-17 | nd | 17 | 0-7.5" org.muck, 7.7"-17"med.coarse sand,little org. |
| 3 | 7+00, 12+00 | 6-12 | nd | | 0-6" org.muck,6"-12" med.sand |
| | | 12-18 | 0.42B | | 12"-18" med.sand,some gravel |
| | | 18-24 | 0.20B | 24 | 18"-24"fine sand |
| Shoreline-east (174) | 6+96,12+48 | 0-6 | 0.43 | | |
| | | 6-10.5 | nd | 10.5 | |
| Shoreline-west (180) | 7+50, 10+27 | 0-6 | 1.4J | | |
| Line 7+50 | | 6-10.5 | nd | 10.5 | |
| 111 | 7+50, 10+50 | 12-18 | 0.7 | | 0-6" org.muck, 6"-12" br.med.coarse sand |
| | | 18-20.5 | 0.9 | 20.5 | 12"-20.5"med.coarse sand/gravel |
| Shoreline-west (178) | 7+76,10+50 | 0-6 | nd | | |
| | | 6-11 | nd | 11 | |
| 110 | NIC | 0-6 | 89.9J | | 0-8" org.muck, 8"-18" med.coarse sand |
| | | 6-12 | 45.9 | | |
| | | 12-18 | nd | 31 | |
| Shoreline-east (175) | 7+50,13+46 | 0-6 | 0.57 | | labeled 13+46, but should be 12+46,COC reflects 13+46 |
| | | 6-12 | nd | 17 | |

**Table 3-1**
**Sediment Analytical Results Summary for Lake Capri**
**Dzus Fastener Site**
**West Islip, New York**

| Rust Sample ID Sample # | Field Grid Location | Interval Analyzed (in) | Cd Result (ppm) | Total Recovery (in) | Comments |
|---|---|---|---|---|---|
| Line 8+00 | | | | | |
| Shoreline-north (177) | 8+00,11+00 | 0-6 | 50.7J | | |
| | | 6-12 | 48J | | |
| | | 12-18 | nd | | |
| | | 18-24 | nd | | |
| | | 24-34.5 | nd | 34.5 | |
| 113 | 8+00,11+65 | 0-6 | 4.6 | | outside island retaining wall |
| | | 6-8.5 | nd | 8.5 | 0-1" org.muck/silt, rest med/coarse sand/gravel |
| 114 | 8+00,11+64 | 0-6 | 1.2 | | inside island retaining wall |
| | | 6-12 | 1.8 | 15.5 | 0-12" fine/med.sand,some gravel |
| 121 | 8+00,12+00 | 0-12 | 43.1J | | delta , 0-6" org.muck/silt w/sand |
| | | 12-18 | nd | 18+ | 6"-18" fine,med.br.sand |
| Shoreline-north (176) | 8+00,12+44 | 0-6 | 8.1J | | |
| | | 6-12 | 0.33B | 12 | |
| 122 | 8+50, 12+00 | 0-6 | 7.4 | | |
| | | 6-12 | 2.7 | | |
| Capri Lake North(119) Lagoon | LAG1 | 0-12 | 103J | 41" | southend of lagoon,0-12" org.muck/silt |
| | | 12-18 | 37.6 | | sand gavel layer followed by more org. |
| | | 18-24 | 0.8 | | |
| | | 24-30 | 0.95 | | |
| | | 30-39 | nd | | |
| 123 | LAG2 | 0-12 | nd | 24" | adjacent to Matlock property |
| | | 12-18 | 0.28 | | |
| | | 18-24 | 0.3 | | |
| 124 | LAG3 | 0-12 | 48J | | northend of lagoon |
| | | 12-18 | 0.92 | | |
| | | 18-25 | 2.5 | | |

Notes: Along SW Shoreline appears to be a deeper channel just offshore that has filled in. notice lower organic silt layers covered by cleaner sandy/gravel layers.

Based on a triangulated volume calculation for a digital terrain model developed from the results of sediment sampling and analysis, approximately 17,030 cy of contaminated (i.e., greater than 1 ppm cadmium) material are present in Lake Capri, excluding the lagoon. This is in contrast to the approximately 12,000 cy estimated in the RI/FS. The estimated volume of contaminated sediments in the lagoon (included above) is 398 cy. The total estimated volume of contaminated sediment is 17,428 cy.

Lake Bottom Stratigraphy

The results of core sampling conducted during the PDI indicate that the lake bottom stratigraphy can be characterized as a layer of relatively recent (geologically) fine grained, soft, organic, silt muck sediments deposited over gravely sand glacial outwash. The chemical and physical characteristics of these two layers are relevant to the anticipated remedial activities, and are described below.

*Fine grained, silt deposit* - The fine grained sediments, which are invariably contaminated, are comprised primarily of soft, very dark greenish gray organic silts, occasionally with a decaying organics odor. They originated from the deposition of suspended sediments, particulates, colloids and organic detritus derived primarily from the Willetts Creek drainage basin, and may be mixed with indigenous pre-lacustrine estuarine sediments and windblown fines. The presence of similar contaminated silts in the lagoon suggests that the sediment deposition was occurring before flow was diverted away from the west branch of Upper Willetts Creek.

Plate 3 presents a contour map of the estimated thickness of the silt muck layer. The silt muck layer ranges in thickness from approximately 6 - 18 inches in the southern part of the lake. The thickest deposits are in the two shallow ovate depressions which likely mark the former channel of the pre-lacustrine Willetts Creek. The silt muck layer is much thinner in the northern part of the lake, typically ranging from less than 1/4 inches to 3-inches thick, although thicker occurrences are present. The estimated volume of the silt muck in the lake is 7,040 cy. Assuming that all or most of the contaminated material in the lagoon is silt muck, the volume of silt muck in the lagoon is 398 cy. The total estimated volume of this fine grain material is therefore approximately 7,438 cy.

*Gravelly sand outwash deposit* - The fine grained sediments are underlain by a light gray and tan, native gravelly sand outwash deposit that underlies much of Long Island's south shore. Concentrations of cadmium generally decrease with depth. The outwash is comprised primarily of well graded (SW Unified Soil Classification), fine to coarse sand, with a lower percentage of fine to medium gravel. Percent fines is typically less than 5%. The outwash layer is generally more difficult to penetrate with manual samplers than the overlying silt muck because of its higher percent solids, greater compactness in many areas, and the presence of the gravel. Local areas of softer sand may be present.

A summary of physical properties of the lake bottom sediments is presented in Table 3-2. Information in this table was taken from the RI/FS, and from testing conducted during the PDI. The results on the table are presented for the silt layer, the underlying gravelly sand layer and for samples

**Table 3-2**
**Sediment Physical Characteristics Summary for Lake Capri**
**Dzus Fastener Site**
**West Islip, New York**

| | Silt Layer | Mixed Silt & Sand Layer | Sand Layer | Reference |
|---|---|---|---|---|
| Bulk Density, pcf | | | | |
| TS-1, -2, -3 | | 67.8 - 71.1 | | OBG |
| 6+00N, 12+50E | | | 122.2 | ATL |
| % Solids | | | | |
| SED-13 | | 16.7 - 26.5 | | LMS |
| TS-1, -2, -3 | | 18 - 23 | | OBG |
| 3+50N, 11+50E | 19 | | | ATL |
| 6+00N, 12+50E | | | 87 | ATL |
| Specific Gravity | | | | |
| TS-1, -2, -3 | | 2.23 - 2.30 | | OBG |
| 3+50N, 11+50E | 1.86 | | | ATL |
| 6+00N, 12+50E | | | 2.64 | ATL |
| % Organic Matter Content | | | | |
| 3+50N, 11+50E | 21.7 | | | ATL |
| 6+00N, 12+50E | | | 0.6 | ATL |
| d50, mm | | | | |
| 6+00N, 12+50E | | | 0.9 - 1.1 | ATL |
| SED sample range | | | 0.3 - 6.5 | LMS |
| SED sample mean | | | 2 | LMS |
| %<#200 Sieve | | | | |
| SED-36 | 82 | | | LMS |
| TS-1, -2, -3 | | 52 - 65 | | OBG |
| 3+50N, 11+50E | 79 | | | ATL |
| 6+00N, 12+50E | | | 4 | ATL |
| % Clay-sized particles | | | | |
| TS-1, -2, -3 | | 15 - 21 | | OBG |
| 3+50N, 11+50E | 24 | | | ATL |
| 6+00N, 12+50E | | | 0 - 2 | ATL |

Notes:
RI/FS - From RI/FS or RI/FS Addendum by LMS
OBG - From O'Brien & Gere treatability study during PDI
ATL - From Atlantic Testing Lab testing during PDI

which are considered a mixture of the two layers and therefore appear to have intermediate properties. Grain size distribution curves are included in Appendices E (mixed sample) and F of the PDI, and in Appendix C of the RI/FS Addendum report.

### 3.1.2 East Branch Upper Willetts Creek Sediment

Locations and analytical results for sediment samples collected in the east branch of Upper Willetts Creek during the PDI and RI/FS are tabulated on Figure 2-1.

Elevated levels of cadmium were detected in two regions of the creek, one immediately upstream of the Burling Lane foot bridge (Burling Lane Foot Bridge Area), and one farther upstream coinciding with the west half of the creek (West Bank Area). The contaminated sediments in both areas are estimated to be 6-12 inches thick. Sediments along this part of the creek were reported as being organic-rich or mucky in places, and overlying loamy sand. Plate 6 indicates the sample locations, results and anticipated remediation areas. Characteristics of each area are described below.

Burling Lane Foot Bridge Area

Consistent with the RI/FS results, the portion of the east branch of Upper Willetts Creek immediately upstream of the Burling Lane foot bridge (Figure 2-1) was confirmed to contain sediments with average cadmium concentrations greater than 9 ppm. A sample collected adjacent to the north side of the foot bridge had a cadmium concentration of 74.4 mg/kg, which is very similar to the 79.6 mg/kg detected during the RI/FS. Elevated levels were also present immediately south of the foot bridge where an average cadmium concentration of 20 mg/kg was detected along transect 20 feet south.

An area of creek bed extending from 50 feet upstream of the foot bridge to 75 feet downstream of the foot bridge encompasses these exceedances and is therefore targeted for remediation. Approximately 50 cy of contaminated sediment is estimated to be present in an assumed 125-foot long (22 feet wide, 0.5 feet deep) depositional area, or sediment trap, centered on the Burling Lane foot bridge. This is in addition to the "west bank area" creek bed which is targeted for remediation, as described below.

West Bank Area

A narrow zone of elevated concentrations (Figure 2-1) was identified in a long reach of the creek extending from 100 feet north to approximately 900 feet north of the foot bridge. A consistent aspect of this contamination is that it is distributed only in the western half of the creek bed. In this reach, cadmium concentrations ranged from 0.35 - 368 mg/kg along the west side of the creek, non-detect to 14.9 mg/kg in the central part of the channel, and non-detect to 4.2 mg/kg along the east side. Excluding one anomalously high value along the west bank, the mean concentrations were 45 mg/kg along the west bank, 5 mg/kg mid creek, and 1 mg/kg along the east bank. The anomalously high concentration of 368 ppm was detected in the upper 6 inches of sediment at station EB 100 west and appears to be associated with a small area of ponding upstream of a fallen tree.

This stretch of Upper Willetts Creek generally correlates with the anticipated historic discharge area for the shallow plume of cadmium contaminated groundwater that originated at the eastern side of the Dzus facility. The presence of the plume may explain why the significant contamination in sediment is limited to mainly the western half of the narrow creek bed. The groundwater may be contaminating the creek bottom sediments as the groundwater discharges to the western half of the creek. Samples south of station EB 100 and north of station EB 900 and did not display this pattern, and may be outside the normal discharge area for the impacted groundwater. The samples collected at stations EB 600 and EB 700 also displayed this pattern, but did not exceed the 9 ppm criterion.

The west bank sediments from stations EB 50 to EB 550 and from stations EB 775 to EB 925 are therefore targeted for remediation. The estimated volume of contaminated creek bottom sediments along the west bank in this reach is approximately 150 cy, based on an average width of 11 feet for the western half of the creek, an estimated length of 650 feet for the impacted areas, a depth of 6 inches, and excluding surficial vegetation and debris. This is in addition to the "Burling Lane foot bridge area" which is targeted for remediation, as described above.

The total estimated volume of contaminated sediment in the foot bridge and west bank areas along the East Branch is therefore approximately 200 cy (50 plus 150), in contrast to the volume of 100 cy that the ROD estimated for Upper Willetts Creek.

### 3.1.3 West Branch Upper Willetts Creek Sediment

Analytical results for sediment samples collected in the west branch of Upper Willetts Creek upstream of the lagoon are shown on Plate 2. Only one sample, WB-1, collected 120 feet south from the high school parking lot, reported a detectable cadmium concentration (7.7 ppm). The other two samples were non detect at 0.5 mg/kg. A sample collected from this reach during the RI, SED-7, had a concentration of 0.74 mg/kg. The two samples that contained detectable cadmium were both collected in the short reach upstream of the Ivy Court culvert. The average concentration of the four samples is approximately 2 mg/kg. This concentration is below the action level of 9 ppm established for Upper Willetts Creek.

### 3.1.4 Lower Willetts Creek (Tidal) Sediment

Analytical results for the sediment samples collected from the tidal lower Willetts Creek are presented in Table 3-3, and shown on Figure 2-2. The table also includes a summary of the two samples collected in this area during the RI/FS.

All samples had cadmium concentrations below the 9 ppm action level established for the Upper Willetts Creek sediments except for the two northernmost samples. Sample WCTA S-1 which was collected approximately 25 feet south of the Lake Capri outlet south of Montauk Highway, reported a concentration of 34 mg/kg. Sample WCTA S-2, which was collected approximately 275 feet farther south, reported a concentration of 20.4 mg/kg. These concentrations are generally an order of magnitude lower than the cadmium concentrations detected in the lake.

**Table 3-3**
**Sediment Analytical Results Summary**
**for Lower (Tidal) Willetts Creek**
**Dzus Fastener Site (OU 2)**
**West Islip, New York**

| Sample ID | Cadmium Concentration (mg/kg) | Description |
|---|---|---|
| PDI Samples: | | |
| WCTA S-1 | 34J | 25' south of Lake Capri outfall |
| WCTA S-2 | 20.4J | 300' south of Lake Capri outfall, across from boat house |
| WCTA S-2 (Duplicate) | 6.2 | - |
| WCTA S-3 | 1.5 | 600' south of WCTA S-2 |
| WCTA S-4 | 1.1J | 50' west of east end of northern east/west canal (Bay and Avon Streets) |
| WCTA S-5 | <0.5 | Mouth of canal at Bay and Avon Streets |
| WCTA S-6 | 1.5 | 20' west of east end of central canal (Avon and Devon Streets) |
| WCTA S-7 | <0.5 | Behind jetty at mouth of southern canal |
| RI/FS Samples: | | |
| SED-20 | 4.2 | Approx. 40 ft south of Lake Capri outfall |
| SED-21 | 2.5 | Approx. 200 ft south of Lake Capri outfall |

Notes:
1. WCTA series samples collected by Rust on May 28, 1998.
2. SED series samples collected by Lawler, Matuskey & Skelly in March 1994.

Two sediment samples (SED-20 and SED-21) were collected in the lower Willetts Creek during the RI/FS. These samples had concentrations of 4.2 and 2.5 mg/kg, respectively. They are believed to be located in the general vicinity of PDI samples WCTA S-1 and WCTA S-2 within the northern 300 feet of the tidal area. The average concentration of the four samples is approximately 15 mg/kg. The significance of these results is being evaluated by the NYSDEC.

## 3.2 SURFACE WATER CHARACTERIZATION

Results of surface water analyses (SW-1 through SW-5) for the samples collected in the west branch and east branches of Upper Willetts Creek and in Lake Capri (Class C stream) are presented in Table 3-4. These samples were all unfiltered and were collected for the purpose of characterizing ambient water concentrations to help develop the SPDES discharge limits. NYSDEC Ambient Water Quality Standards (AWQS) and Guidance Values (GV) for Class C streams are also indicated. Figure 2-3 shows the locations and summarizes the analytical results.

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 for those samples.

The NYSDEC SPDES discharge limitations for the treated water from the dredging operations are presented in letter dated July 15, 1998, which is included in Appendix B. Table B-1, which summarizes both the surface water concentrations and SPDES limits, is 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

**Table 3-4**
**Surface Water Analytical Results Summary**
**Dzus Fastener Site**
**West Islip, New York**

| Parameters | [2]Surface Water Std. (Human) | [3]Surface Water Std. (Aquatic) | SW-1 WC west branch north | SW-2 WC west branch south | SW-3 Lake Capri Outfall | SW-4 WC east branch north | SW-5 WC east branch south |
|---|---|---|---|---|---|---|---|
| Calcium | NA | NA | 24.3J | 17.3J/17.7J | 16.4 | 18.3 | 19.5 |
| Magnesium | NA | NA | 3.29J | 3.46J/3.45J | 3.36J | 3.2 | 3.1 |
| Manganese | NA | NA | 2.40J | 2.12J/2.13J | 1.74J | 1.8 | 2.0 |
| Aluminum | NA | 0.10 | **0.26** | **0.103B/0.139B** | 0.075B | 0.057 | 0.059 |
| Cadmium | $0.0027^{GV}$ | *0.0014 | **0.004B** | **0.003B/0.004B** | **0.002B** | **0.016** | **0.005** |
| Chromium | NA | *0.0748 | <0..002 | <0.002/<0.002 | <0.002 | <0.010 | <0.010 |
| Lead | NA | *0.0021 | **0.013** | 0.002B/**0.004** | **0.003B** | <0.005 | <0.005 |
| Iron | NA | 0.300 | **9.99J** | **0.89J/1.16J** | **0.724J** | 0.06 | **0.68** |
| Zinc | NA | *0.052 | 0.037J | 0.031J/**0.052J** | 0.017BJ | **0.074J** | **0.12J** |
| Cyanide | 9.00 | NA | <0.01 | <0.01/<0.01 | <0.01 | <0.01 | <0.01 |
| Dissolved Solids | NA | NA | 130 | 110/120 | 130 | 140 | 120 |
| Total Suspended Solids | NA | NA | 97 | 22/54 | <4 | <4 | <4 |
| Alkalinity (CACO3) | NA | NA | 56 | 30/30 | 30 | 32 | 30 |
| Settleable Solids, ml/hr | NA | NA | <0.2 | <0.2/<0.2 | <0.2 | <0.2 | <0.2 |

Notes
1. Concentrations are in mg/l, unless otherwise specified. All samples were unfiltered; results represent particulate and dissolved phases.
2. NYSDEC Surface Water Standards for the protection of Human Health/Consumption of Fresh Water Fish.
3. NYSDEC Surface Water Standards for the protection of Aquatic Life/Fresh Water Fish Propagation.
4. * = These standards based on average hardness measured in SW-3, SW-4, and SW-5 per NYSDEC guidance.
5. Cadmium Human health Standard is a guidance value (GV) only.
6. Concentrations equal to or greater than NYSDEC Ambient Water Quality Standards (June 1998) are in bold type.
7. "NA" = Not applicable.
8. "J" = Estimated result due to QC deficiency identified during DUSR review.
9. "B" = Result is less than the laboratory reporting limit but over the instrument detection limit.
10. Samples SW-1, SW-2 and SW-3 collected 5/28/98, SW-4 and SW-5 collected 6/9/98.

**Table 3-4**
**Surface Water Analytical Results Summary**
**Dzus Fastener Site**
**West Islip, New York**

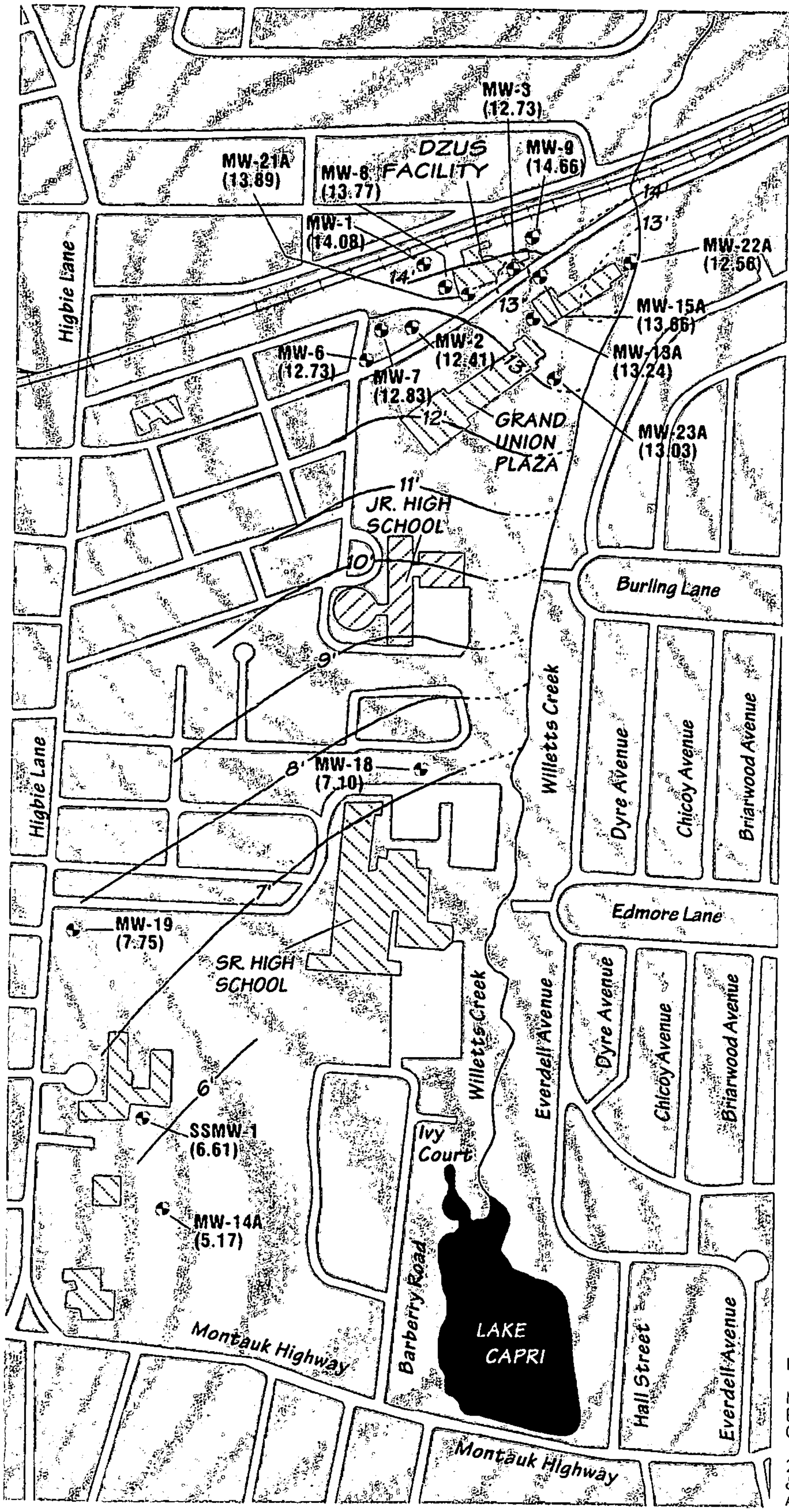
| Parameters | Date collected | SW-1 WC west branch north | SW-2 WC west branch south | SW-3 Lake Capri Outfall | SW-4 WC east branch north | SW-5 WC east branch south |
|---|---|---|---|---|---|---|
| | | 5/28/98 | 5/28/98 | 5/28/98 | 6/9/98 | 6/9/98 |
| Calcium | | 24.3J | 17.3J/17.7J | 16.4 | 18.3 | 19.5 |
| Magnesium | | 3.29J | 3.46J/3.45J | 3.36J | 3.2 | 3.1 |
| Manganese | | 2.40J | 2.12J/2.13J | 1.74J | 1.8 | 2.0 |
| Aluminum | | 0.26 | 0.103B/0.139B | 0.075B | 0.057 | 0.059 |
| Cadmium | | 0.004B | 0.003B/0.004B | 0.002B | 0.016 | 0.005 |
| Chromium | | <0..002 | <0.002/<0.002 | <0.002 | <0.010 | <0.010 |
| Lead | | 0.013 | 0.002B/0.004 | 0.003B | <0.005 | <0.005 |
| Iron | | 9.99J | 0.89J/1.16J | 0.724J | 0.06 | 0.68 |
| Zinc | | 0.037J | 0.031J/0.052J | 0.017BJ | 0.074J | 0.12J |
| Cyanide | | <0.01 | <0.01/<0.01 | <0.01 | <0.01 | <0.01 |
| Dissolved Solids | | 130 | 110/120 | 130 | 140 | 120 |
| Total Suspended Solids | | 97 | 22/54 | <4 | <4 | <4 |
| Alkalinity (CACO3) | | 56 | 30/30 | 30 | 32 | 30 |
| Settleable Solids, ml/hr | | <0.2 | <0.2/<0.2 | <0.2 | <0.2 | <0.2 |

Notes
1. Concentrations are in mg/l, unless otherwise specified.
2. "J" = Estimated result due to QC deficiency identified during DUSR review.
3. "B" = Result is less than the laboratory reporting limit but over the instrument detection limit.

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

RUST Environment & Infrastructure

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

NOVEMBER 1998 202563

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. All results are for unfiltered samples. 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 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.

**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**

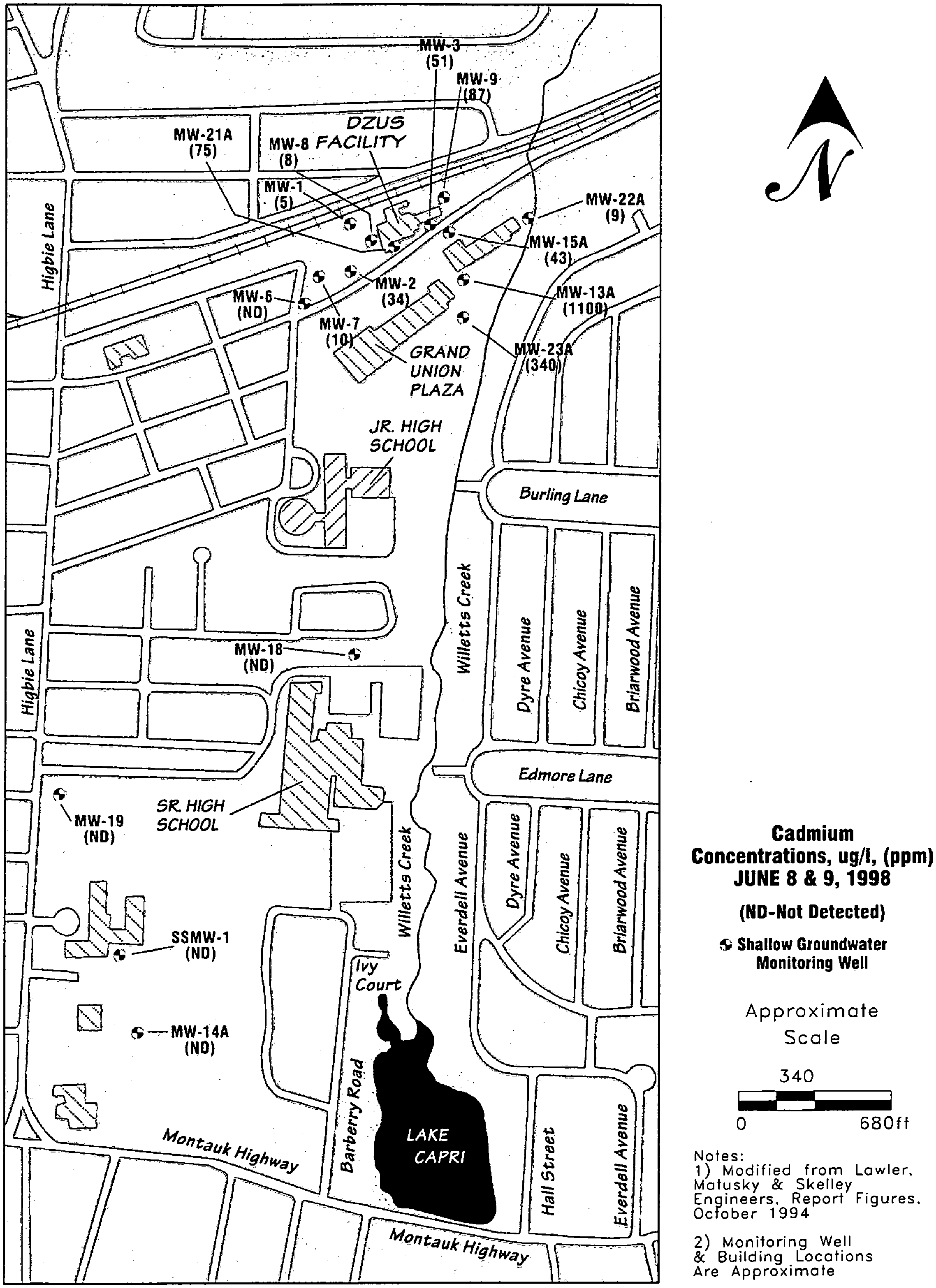
| Parameter SW-846 Method 8260 | PQL (ug/l) | NYSDEC Class GA GW Standard | MW-15A | MW-15B | MW-18 | MW-19 | MW-21A | MW-21B | MW-22A |
|---|---|---|---|---|---|---|---|---|---|
| Chloromethane | 10 | 5 | ND | ND | ND | ND | ND | ND | ND |
| Vinyl Chloride | 10 | 2 | ND | ND | ND | ND | ND | ND | ND |
| 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 quanitation 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.




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

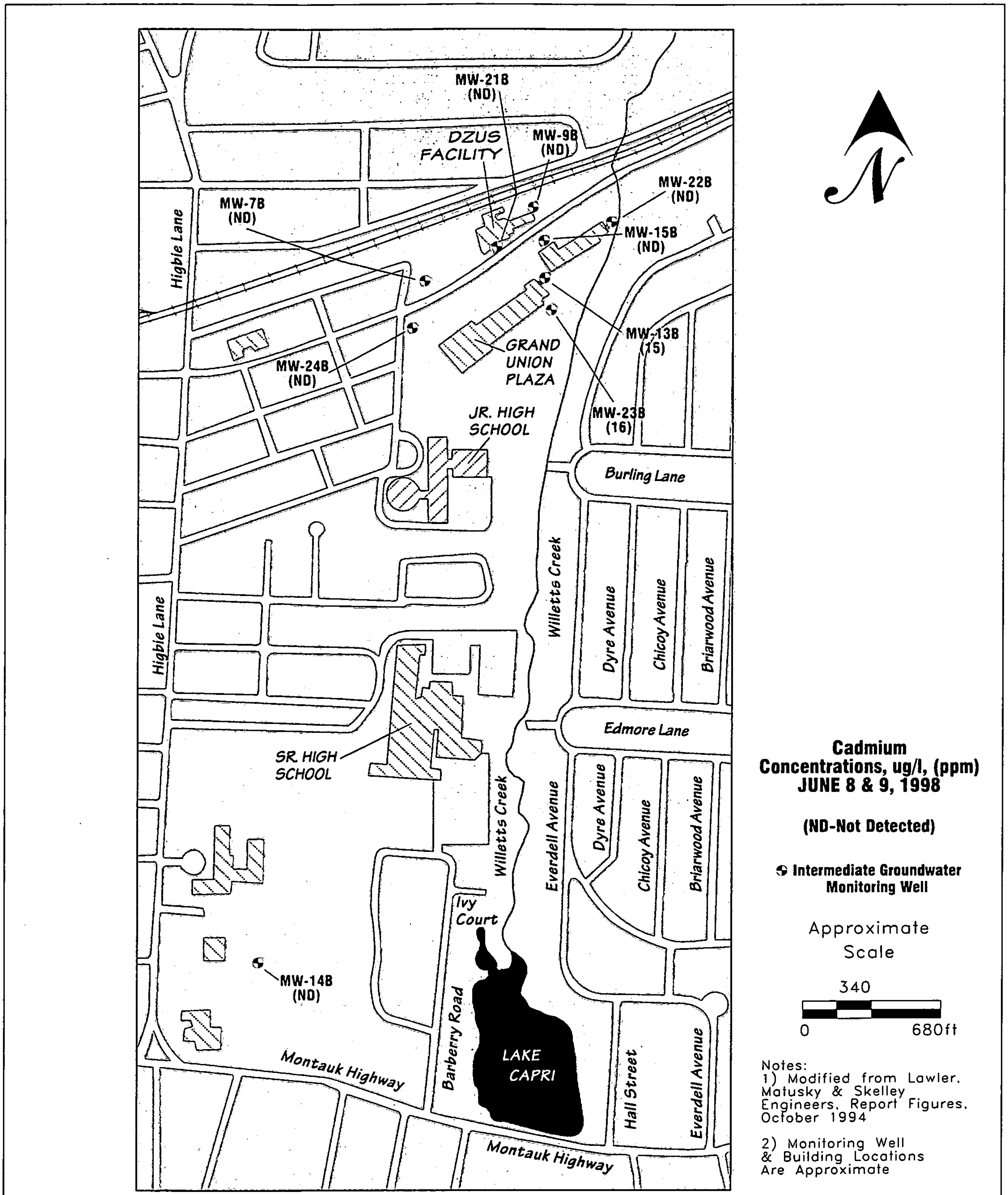
2) Monitoring Well & Building Locations Are Approximate

RUST Environment & Infrastructure

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

NOVEMBER 1998 202563

cdshallowkf




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

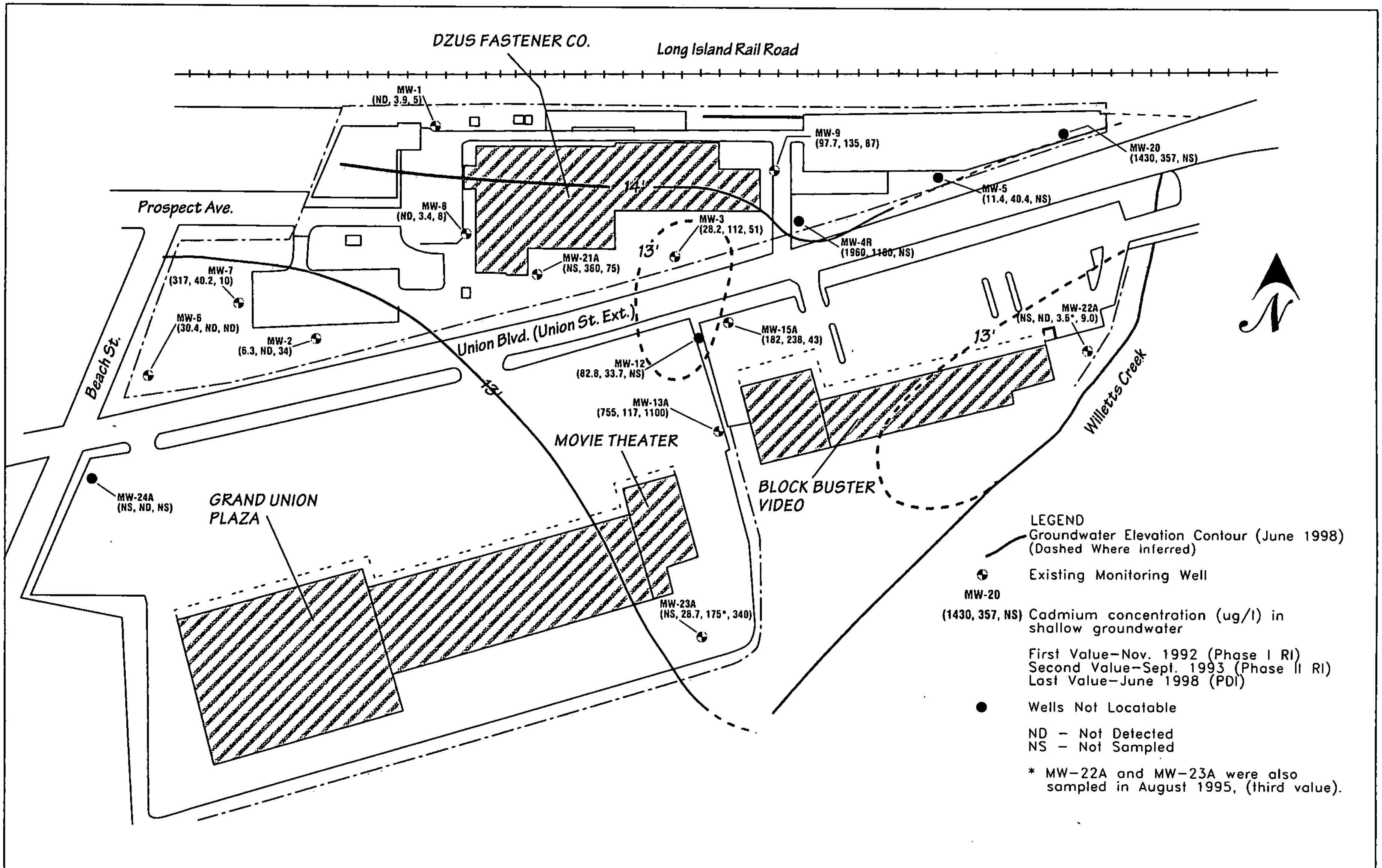
2) Monitoring Well & Building Locations Are Approximate

RUST Environment & Infrastructure

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

NOVEMBER 1998 202563

cdinterkf




Approximate
Scale
80
0 160ft

RUST Environment & Infrastructure

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

OCTOBER 1998 202563

## 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 anticipated 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.

Lake

The depth of water in most of the lake was approximately three feet during the PDI, with shallower areas nearshore and in the northern end of the lake. Depths were generally shallower, i.e. 0.5 feet, along the eastern shoreline, but not the western shoreline, which is largely bordered by wooden bulkheads. Most of the lake was wadable, but a few locally softer and deeper areas were encountered. Waves and currents were very minor in the lake during the field activities.

Except for local areas, the northern half of the lagoon was shallower than 1.5 feet, and would be difficult to access with all but the shallowest draft vessels. The southern half is slightly deeper (Plate 1), but is separated from the main lake body by a shallow narrow outlet covered by a wooden foot bridge.

The elevation of the lake water surface was photogrammetrically mapped at elevation 3.3 feet, NAVD 88 feet New York, Long Island 3104, in April 1998. All lake bottom elevations and associated surfaces in this report are referenced to this elevation. Given that the RI/FS Addendum indicated an approximate lake elevation of 4.3, it is possible that different datums are available in the area, and caution must be used in interpreting the elevations presented herein, or comparing elevations between reports. This concern will be addressed in the Design Analysis Report.

The overall lake bottom is saucer shaped (Plate 1). The central portions are quite flat, with estimated local relief of approximately 4 inches in many areas. Available data were reviewed and evaluated for evidence of the former channel of the pre-Lake Capri Willetts Creek. Such evidence was found in several areas. A detailed sounding profile across the suspected location of this feature along reference line 7+00N (Plate 2) in the north part of the lake indicated a 10 inch deep channel over a width of approximately 20 feet from stations 11+95E to 12+15E. Further evidence is provided by the locally increased thickness of silt muck in three linear areas (Plate 3) that line up with the expected trace of the channel between reference lines 12+00 E and 12+50E.

An alluvial sand delta is present at the mouth of the east branch of Upper Willetts Creek and extends into the north part of the lake. The sediment in this area is relatively loose; the sampling field crew was able to drive the sampler 122 inches deep in this area, the deepest penetration encountered in the lake. (Penetrations on the order of 1 - 3 feet into the gravelly sand were more typical.) Portions of the lake bottom adjacent to the delta are very soft to depths of at least 3 feet, and pose a footing hazard.

Most of the central lake bottom appears to be relatively free of large debris and vegetation, but the possibility of debris or stumps cannot be ruled out. Small debris, rocks, leaf litter, and overhanging branches and protruding tree roots are commonly present along the shorelines. Bulkheads, small riprap and related structures, and small docks are also present. No large submerged obstacles were observed during sampling activities, except for a few scattered rocks and a small row boat that was found split in half. Football-sized clumps of floating soft filamentous algae were occasionally noted in the lake during the May sampling activities, but no emergent vegetation was observed at that time.

South Shore

The south shore, which is a likely access point to the lake during remediation, is characterized by the Montauk Highway embankment and a chain link fence. The entire south shoreline is supported by wooden bulkheads, the depth and condition of which are unknown. This bulkhead was probably installed by NYSDOT as part of the embankment improvements. A brief review of NYSDOT files in Albany failed to recover any relevant drawings or specifications detailing the bulkhead structures. A concrete outfall weir with a fixed outfall elevation is constructed near the midpoint of the south shoreline. The weir regulates the outflow of lake waters under the Montauk Highway, into the tidal or lower Willetts Creek. The largest accumulation of debris in the lake was noted along the south shoreline.

West Shore

The western shoreline is extensively supported by privately owned wooden bulkheads, some sections of which appear in better condition than others. Because of the bulkheads, the water depth along the western side of the lake is generally deeper and with less root structure and debris than the eastern shore. A storm sewer outfall is present. One offshore area in the vicinity of reference grid lines 4+50N to 5+00N appears to be covered with dense or coarse gravel that led to sampler penetration and recovery difficulties. This gravelly area was also encountered during the RI/FS. It may pose dredging difficulties. A densely vegetated island is present off the southwest corner. Its perimeter is mostly supported by a wooden bulkhead.

North Shore and Lagoon

Vegetation, including mature tress with protruding roots and branch overhangs, was dense along the north shore, particularly in the 10-15 foot wide channel between the nearby island and the mainland. The island is densely vegetated and the perimeter extensively supported by a wooden bulkhead in fair condition. The density of the vegetation made passage through this channel a little difficult. A wooden foot bridge in the northwestern corner of the lake shore spans the outlet of the lagoon.

Sediments in the lagoon are soft and contain a considerable amount of debris, submerged tree limbs, roots, and vegetative matter. Approximately 38 inches of very soft material was initially penetrated in the core hole in the eastern part of the lagoon. With a little effort, total penetration of the sampler was 74 inches, second only to the depth achieved in the nearby delta at the mouth of the creek. The lagoon sample consisted of interbedded sand and silt muck. The lagoon outlet in the vicinity of the foot bridge appeared to be slightly shallower than the lagoon bottom suggesting that outflows may be restricted.

East Shore

The eastern shoreline is shallow and is characterized in many areas by an erosional bank at the water's edge adjacent to landscaped backyards. Erosion protection, where present, is commonly comprised of small riprap, concrete blocks or similar supports. A couple of small docks jut out into the lake. Mature trees with protruding shoreline roots and overhanging branches are prevalent. One of these overhangs near the northeast corner of the lake extends out 40 feet. A storm sewer outfall is present.

Anticipated Dredge Pipeline Route

The ROD indicated that lake sediments would be removed by hydraulic dredging and conveyed as a slurry through dredge lines to the Senior High School parking lot. The PDI included a field reconnaissance of the likely dredge line route up the Willetts Creek east branch corridor a distance of approximately 600 feet from the arched masonry foot bridge to the parking lot. The creek in this area was approximately 6-12 inches deep in May and sandy. Except for the area at the western side of the foot bridge, the western shoreline between the lake and parking lot slopes upward away from the creek with relief of 2 - 6 feet. The eastern shore is relatively flat. Creek shorelines are heavily vegetated and include mature trees as well as landscaped lawns.

Anticipated Creek Bottom Excavation Area

The approximately 1000-foot long reach of Upper Willetts Creek upstream of the Burling Lane foot bridge where impacted sediments were detected was traversed during the wetland delineation. Much of this reach borders the Junior High School. The estimated width of the creek bed in this section is 12 - 25 feet. Wetland vegetation is generally dense, particularly along the western shoreline. Portions of this area contained a considerable amount of rocks, debris, submerged tree limbs, roots, and locally dense vegetation matter. Debris was particularly dense at the outfall of a storm water sewer at approximate station 800N. Additional information and some of the available photographs are included in the Wetlands Delineation Report.

# 4.0 TREATABILITY STUDY

## 4.1 INITIAL CHARACTERIZATION OF SEDIMENT

O'Brien & Gere Laboratories, Inc. (OBG) of Plymouth Meeting, Pennsylvania, under contract with Rust, performed a treatability study of the Lake Capri bottom sediments to evaluate treatment options for the sediments and filtrate, and to confirm the results of the treatability test conducted during the RI/FS by J. D. Meagher, Inc. (Meagher). A copy of the Meagher treatability study report that was included in the RI/FS is attached as Appendix D. A copy the OBG treatability study from the PDI is included in Appendix E.

For the PDI treatability study, Rust collected three samples (TS-1, TS-2 and TS-3) of the silt muck from the southern part of the lake which was previously characterized by the highest cadmium concentrations ( Plate 2) and the greatest silt muck thicknesses. A small amount of the underlying sand was incorporated with the fine grained material to simulate dredge samples. Samples were collected with a ponar dredge and placed into 5 gallon pails. Two pails were collected from each of the three locations. The sediments had a very dark, mucky appearance and the consistency of a loose smooth paste. Samples were sealed and shipped to the laboratory for initial testing.

At the laboratory, one sample was collected from each of the six pails, and then the two samples from each location were composited for initial characterization testing. The three composite samples were characterized for bulk density, percent solids, specific gravity, total organic carbon content, particle size distribution and total cadmium content.

Testing of the composite samples indicated bulk density ranging from 67.8 - 71.1 pounds per cubic foot (pcf), percent solids content ranging from 18 - 23%, specific gravity ranging from 2.23 - 2.30, total organic carbon ranging from 32,880 - 58,978 mg/kg, and total cadmium concentrations averaging from 200 - 330 ppm. All samples were classified as sandy clayey silt (ML). Hydrometer testing indicated 15 - 21% clay sized (0.005 mm) particles. Because of the small amount of underlying sand incorporated into these silt samples to simulate a dredge slurry, the results are slightly biased and represent an combination of the properties of the silt and sand layers.

Since all three samples were similar, only one sample, T-3, was chosen to evaluate the mechanical dewatering characteristics of the sediments. The sample was diluted with water to approximately 10% solids to more closely approximate a dredge slurry.

## 4.2 DEWATERING TESTS

OBG performed preliminary dewatering tests using a baroid cell to screen various dewatering agents and dosages. The preliminary dewatering tests were run using lime, and anionic and cationic polymers. For each additive and dosage, a sludge filtration resistivity index was obtained which measured the additive's dewatering effectiveness. The results indicated that cationic polymers and lime were preferable.

Meagher's treatability study recommends a low charge, high weight, "anionic" polymer over a lime slurry applied at a 20% by dry weight of solids (based upon sediment dredge slurry of 5.8% solids) although both reportedly produced a relatively high percent dry solids filter cake after pressing. Following up with Meagher, the type and name brand of the polymer (Nalco 9905, cationic) were identified and used in one of OBG's preliminary runs. The cationic polymer Meagher used is believed to have been erroneously reported as "anionic" in the RI/FS treatability study report.

The OBG testing provided good dewatering/filter cake results using only a 5-7% lime slurry. The cationic polymers tested, including the one used by Meagher, were acceptable, but based upon several factors described below, it was decided to proceed to bench-scale recessed chamber filter pressing using the lime slurry as the recommended conditioning agent.

Three bench-scale recessed chamber filter press dewatering tests were run on the 10% dredge slurry sample (T-3) with 5%, 6% and 7% lime slurry addition. The final filter cakes were analyzed for total cadmium and TCLP cadmium for waste classification. Total cadmium ranged from 106.3 ppm in the 5% lime slurry, 164.5 ppm in the 6% lime slurry sample, and 139.3 ppm in the 7% lime slurry sample. The TCLP procedure reported 0.01 ppm in the 5% lime slurry, and <0.03 ppm in the 6% and 7% lime slurry samples. All of the reported TCLP values were well below the 1 ppm cadmium TCLP limit for a characteristic hazardous waste.

A filtrate sample was analyzed for SPDES parameters. Based upon effluent limitations and monitoring requirements set by NYSDEC (Appendix B), pH, dissolved aluminum, lead, and zinc exceeded the discharge limitations. Treatment options for the filtrate will be evaluated in the Design Analysis Report.

Conditioning Agent Recommendations

In the prior study conducted by Meagher, polymer was recommended as the preferred conditioning agent for sludge dewatering. In the tests performed by OBG as part of the PDI, both polymer and lime were evaluated in the preliminary test steps and found to provide similar benefits as filter aids. Polymer conditioning agents were not carried forward for a final test run as described below. The recommended conditioning agent is lime at a dosage of 5 - 7%, on a dry weight solids (DWS) basis.

The basis of comparison for the conditioning agents consists of the following:

1. Effectiveness of the Conditioning Agent:

Both lime and polymers were found to be capable of yielding a filter cake with a solids content on the order of 50%. The tests run by Meagher indicated a potential advantage to using polymer, which is addressed below under the cost analysis.

2. Usability of the Conditioning Agent:

Lime would be added to a slaking tank and fed at a more or less constant rate. Polymer addition would need to be more carefully controlled, and paced on the actual solids content of the incoming slurry. This could make feeding of the polymer slightly more complex than lime, particularly if the solids content of the slurry varies.

3. Net Cost Evaluation:

Lime is less costly than polymer. However, efficient use of a polymer which achieves the rates indicated by Meagher's tests could reduce the volume for disposal. If lime and polymer performance is equal, lime application would be slightly cheaper, by perhaps $5,000. If the polymer reduces the disposal weight, this could result in a savings of up to $50,000. This savings is predicated on both filter cakes being less than the TCLP characteristic limit for cadmium.

4. Impact on Filter Cake Disposal:

Lime acts to increase the filter cake and filtrate pH and provide buffering capacity in the cake. As a result, use of lime provides a filter cake more likely to pass TCLP tests than would a cake made with polymer, which has no such pH adjusting or buffering capability. If filter cake does not routinely pass TCLP tests, costs would increase for disposal costs as well as the incidental costs associated with analysis and tracking of materials shipped off site.

5. Impact on Filtrate Quality:

The cadmium content of filtrate will impact the treatment system design. In the event lime is used, cadmium concentrations in the filtrate can be expected to be lower than if polymer is used. This difference is due to the tendency of lime to increase pH and soil buffering capacity as described above. Filtrate quality is the one unresolved discrepancy between OBG's and Meagher's results. For lime and polymer conditioning, Meagher's results indicate filtrate cadmium levels of 4.4 mg/l and 2.8 mg/l, respectively. For testing of a lime conditioning agent, OBG reported cadmium <0.01 mg/l in three separate runs. The apparent discrepancy is illustrated below:

| | **Meagher** | **OBG, TS-3 Run #1** | **OBG, TS-3 Run #4** | **OBG, TS-3 Run #3A** |
|---|---|---|---|---|
| Lime dosage (% DWS) | 20% | 5% | 6% | 7% |
| Total Suspended Solids (mg/l) | 80 | NA | 2.5 | 400 |
| Filter Cake % solids | 48% | 46% | 52% | 53% |
| Filtrate pH | NA | 8.1 | 10.89 | 11.78 |
| Filtrate Cadmium (mg/l) | 4.4/ND * | <0.01 | <0.01 | <0.01 |
| Filter Cake TCLP Cadmium (mg/l) | 0.004 | <0.01 | <0.03 | <0.01 |

* This result is reported as 4.4 mg/l by Meagher, but LMS reports Not Detected in the RI/FS report.

The single test result by Meagher can also be considered in light of TCLP extraction data, which showed extractable cadmium well beneath 1 mg/l. In addition, Meagher concluded that cadmium could be removed from the filtrate solely by filtration. Based on the data as a whole, it appears that cadmium in the filtrate will be below 0.01 mg/l, and that cadmium in excess of that level, if present, would be amenable to removal by media filtration.

Based solely on chemical equilibrium considerations, an increase in pH, as would be provided by a lime conditioning agent, would tend to reduce cadmium solubility levels by two orders of magnitude as pH increases from 8 to 10. In the event water must be treated for removal of soluble cadmium, the options are generally softening and selective exchange resins. Therefore, from a filtrate quality stand-point, the use of lime as a conditioning agent offers significant benefits in simplification of water treatment.

In summary, the advantages to using lime are: simpler and more reliable application than polymer, less risk of filter cake being a characteristic hazardous waste, and reduced cadmium solubility in filtrate. For the quantities of sludge anticipated, the tendency of the above factors to simplify and limit risks during construction outweigh the potential savings of polymer. The dewatering specifications will be written around the use of lime at a rate of 5-7%, and finished cake with a solids content not less than 45% and a pH of 10.5 to 11.5.

## 4.3 SEDIMENT SEPARATION TESTING

Based upon sediment gradation analyses presented in the RI/FS and visual observations during sediment sampling, it is apparent that much of the lake bottom, including the sediments immediately underlying the surficial silt layer, are composed of sand and gravel. Therefore, sediment samples were selected from locations across the lake to conduct cadmium analyses of specific particle size fractions to assess the viability of separation as a treatment option to reduce the volume of sediment requiring filter pressing and potentially reduce the total volume of contaminated sediment requiring landfill disposal.

Samples for size separation and chemical testing were chosen from the north, north middle, south middle and south part of the lake. Depth intervals included 0-12 inch deep samples from the northern region which has fairly low cadmium concentrations in the upper foot sediment, to 12-18 inch samples from the southern region where the upper 18 inches of sediment is organic silt high in cadmium concentration. Samples of the underlying gravelly sand were also chosen. Samples from each area were considered typical of the material to be removed from that particular portion of the lake.

Physical testing to characterize the sediments was conducted by Atlantic Testing Laboratories (ATL), Cohoes, New York. This testing included specific gravity (ASTM D854); moisture, ash, and organic matter content (ASTM D2974); wet bulk density, and particle size analysis with hydrometer (ASTM D422). Results are included in the summary in Table 3-2. The low specific gravity of 1.86 for the shallow silt muck layer (3+50N, 11+50E) reflects the high organic matter content (21.7%, by weight), and possibly the presence of other low specific gravity mineral solids. The particle size analyses for two outwash samples tested indicated 27-30 % gravel with a maximum particle size of 1-inch, which may be biased by sampler diameter.

The separation testing consisted of the following elements:

- A dry sieve analysis to gain information on the particle size distribution of the sediments (wet sieving would have removed fines), and obtain a coarse fraction (retained on # 40 sieve) for subsequent testing;

- Wet sieving of a slurry of the coarse fraction, and analyzing the retained fraction for cadmium; and

- Wet sieving and washing of the coarse slurry, and analyzing the retained fraction, with the fines entrained in the sieve, for cadmium.

The samples were dried and a sieve analysis (ASTM C 136) completed to determine the size fractions. The portion of the sample retained on the #40 sieve (0.420 mm) was retained for the subsequent testing. A #40 sieve was used because available data from the OBG treatability study indicated that the cadmium in the sediment was primarily associated with the fines passing the #40 sieve.

By adding water and producing a simulated dredge "slurry", eight samples representing the fraction greater than the #40 screen were prepared to simulate the effects of dredge slurrying, wet screening and spray washing. After two different washing procedures were completed, various wet and dry fractions were sent to Scilab for cadmium analysis. Details are provided in Appendix F.

The treatability study confirmed that cadmium is primarily associated with the sediment finer than the #40 sieve. The sediment coarser than the #40 sieve appears to have much lower concentrations of cadmium. Given this generalization, the results were evaluated for two scenarios.

1.) Samples representing the upper foot of moderately contaminated sediments in the northern region of the lake where the silt layer is thin appeared to be amenable to separation, with the material retained on a #40 screen having cadmium concentrations less than 1 ppm. This material would not require landfilling.

2.) The gravelly sand material underlying the silt muck layer is amenable to separation, but the degree to which this material can be classified as uncontaminated (<1 ppm cadmium) is questionable. The reduction of cadmium concentrations to less than 1 ppm appears to depend primarily on the cadmium concentration in the fines, and the weight percentage of fines remaining in the retained sediment. While it appears feasible to achieve concentrations less than approximately 5 ppm, a consistent 1 ppm result is less likely without additional processing.

Following review of gradation analyses completed during the RI/FS and PDI, preliminary indications are that approximately 60% of the dredged material may be retained on a #40 screen. The remaining

40% would be processed through the filter presses. Whether or not the retained material meets the 1 ppm criterion, its separation could significantly reduce the loading to the filter presses because this material should be amenable to gravity dewatering. The value of size separation during sediment processing will be addressed in the Design Analysis Report.

## 5.0 DESIGN AND CONSTRUCTION CONSIDERATIONS

The following major conclusions for consideration during remedial design and construction are drawn from the pre-design investigation.

## 5.1 LAKE BOTTOM DREDGING

Following review of the sediment cadmium results presented on Plate 2, a plan map was developed (Plate 4) that indicates the anticipated depth of excavation to achieve the 1 ppm cleanup objective. In many instances, the sampling did not penetrate to sufficient depths to document the depth of clean sediments. Where this occurred, a "greater than" symbol was used to indicate that the required removal depth was deeper than the top of the deepest sample analyzed. In some instances, the shallowest sample analyzed had concentrations below the cleanup level. Where this occurred, a "less than" symbol was used to indicate that the required removal depth was less than the top of that shallowest sample analyzed. By superimposing the cadmium 1 ppm depth plan (Plate 4) on the silt muck thickness plan (Plate 3), the plan map of RI/FS and PDI sediment analyses (Plate 2), and the lake bottom topography plan (Plate 1), and by making some simplifications, interpolations and extrapolations, a Preliminary Excavation Depth Plan for Lake Capri (Plate 5) sediments was developed. One of the assumptions used in developing the plan was that a dredge depth precision of 6-inches can be obtained.

The plan indicates a maximum excavation depth of 24 inches. The deepest area is in the south part of the lake and generally coincides with the estimated location of the former Willetts Creek channel. The shallowest anticipated excavation of 6-inches is along the eastern shore where wave energy and groundwater recharge have likely prevented the net deposition of large thicknesses of contaminated silt. The preliminary excavation plan does not address overdredging or practical dredging simplifications. Dredge access to shallow areas where boat draft is limited, and the volumetric impact of any changes to the preliminary excavation plan will need to be addressed in the Design Analysis Report.

Evaluation of the available testing data indicates that most of the cadmium is associated with the solid fine particles that may settle out relatively quickly (within a few minutes). However, a minor but significant portion of the cadmium is included in the dissolved or colloidal phase. This must be taken into account during development of the monitoring requirements and action levels for water quality during dredging.

The northern area of the lake is "gaining" groundwater as a result of an (inferred) upward hydraulic gradient, i.e. Lake Capri is in part "spring-fed". The upward flux in the northern area, including the lagoon and lower reach of Upper Willetts Creek, may have contributed to the relatively smaller thickness of contaminated sediments in this part of the lake. Conversely, areas in the south central part of the lake may be "losing" groundwater where a downward gradient may be present, given the proximity of the hydraulic head drop to Lower Willetts Creek.

The upward and downward gradients and resulting flow patterns are expected to vary seasonally and in response to fluctuating groundwater and surface water levels around the lake. The significance of this complex groundwater-lake interaction should be taken into account during remedial design. The fine grained sediments are expected to have a significantly lower permeability than the underlying sand and gravel. If these low permeability sediments are removed from the lake bottom at a time and in a place where downward flow gradients are present, and a hydraulic stagnation point is absent, the downward hydraulic gradient and effective lake bottom permeability may be increased, thereby potentially increasing seepage outflows. Whether this may significantly impact lake water levels would depend upon the relative rates of surface water and groundwater outflow and inflow. A lowered lake level would increase upward flow gradients and rates and the volume of groundwater inflow, thereby damping the significance of the outflow and establishing a balance. The magnitude and duration to which this may affect lake levels, shoreline exposure and dredge navigability were not assessed.

Lake elevations indicated in the RI/FS and the PDI appear inconsistent, and may be indicative of a different datum being used. Design elevations must address and resolve this potential inconsistency.

## 5.2 SEDIMENT PROCESSING

The bench scale treatability study for lake bottom sediments confirmed that filter pressing of the fine grained sediments is a feasible pre-treatment method to reduce water content to levels acceptable for handling, transportation and disposal. Filter pressing of the fine grained material could be facilitated through use of either a polymer or lime conditioning agent. However, lime was recommended at rates of 5-7% dry solids because it promotes a higher pH filter cake that will bind cadmium, and its optimum required dosage is less sensitive than polymer to the slurry solids content, which is expected to be variable

TCLP testing of the filter cake developed during the bench scale treatability study indicated that, based on toxicity characteristic, and consistent with the RI/FS, the filter cake should be classified as a non-hazardous waste. The filtrate generated during the bench scale treatability study contains concentrations of aluminum, zinc and lead, and total suspended solids, above the SPDES discharge limits. These analytes will need to be addressed during design of the water treatment system. The potential value of segregating the silts and sands by dredge sequencing and by post-dredging processing should be addressed during design.

## 5.3 UPPER WILLETTS CREEK REMEDIATION

A Preliminary Excavation Plan for Upper Willetts Creek is included as Plate 6. The anticipated remediation area extends from 75 feet south of the foot bridge to approximately 925 feet north of the foot bridge, and includes both the Burling Lane foot bridge area and the west bank areas. The excavation plan was based on an estimated average excavation depth of 6-inches in the designated remediation area. However, the extent and depth of sediment removal in Upper Willetts Creek will depend upon the nature of sediment observed during the excavation process. Although most of the the impacted sediments are located in the west half of the creek, excavation of half the creek bed may be difficult and excavating the entire width of the creek should be considered during design. The volumetric impact of changes to the plan will need to be addressed in the Design Analysis Report.

An important consideration in developing the remedial plans for the Upper Willetts Creek area is the need to re-evaluate the anticipated long-term effectiveness of removing contaminated creek bottom sediments from the discharge areas for contaminated groundwater. As outlined in the RI/FS Report, except for the intermittent portion of creek immediately east and southeast of the Dzus facility, the creek routinely acts as a discharge area for the shallow groundwater flow system. Given this groundwater discharge and the enhanced accumulation of cadmium in sediments primarily along the western half of the creek, it appears possible that the organic-rich or fine grained alluvial sediments in this half of the creek sorb cadmium as the contaminated groundwater passes through these sediments into the creek. The sediment contamination in the creek bed therefore, may be partly controlled by the discharge of contaminated groundwater to the creek. The rate, magnitude and significance of the sorption process is expected to vary as the contaminant - groundwater - stream sediment - stream flow relationships vary spatially and temporally.

Removing the contaminated creek sediments from the west bank area may result in locally enhanced groundwater discharge and increased cadmium concentrations in surface water where the groundwater plume continues to discharge to the creek. The presence of cadmium in the creek water in this area has already been documented. A surface water cadmium concentration of 37.7 ug/l was reported in the Burling Lane foot bridge area (Figure 2-1) during the RI/FS (the highest concentration measured in the creek), and 16 ug/l was detected during the PDI. Contaminant transport modeling summarized in the RI/FS Addendum indicated that the plume of contaminated groundwater may continue discharging to the creek for more than 200 years. It is unclear if the center of mass of the plume has reached the creek yet.

Future deposits of fine grained sediments in the remediated, potentially deepened areas may therefore become contaminated, and the need for future monitoring should be considered. However, given the dense vegetation which helps to stabilize creek sediments, the gentle slope of the creek bed which minimizes net erosion and the presence of Lake Capri which has raised the local erosional base level a few feet, erosion of creek bottom sediments with subsequent deposition in Lake Capri is not expected to be a rapid process.

The feasibility of excavation of the creek bottom sediment by creek flow diversion and dewatering must also be evaluated in the Design Analysis Report. The anticipated high permeability of the sand and gravel deposit underlying the creek sediments may make dewatering difficult. Dewatering may induce relatively high upward hydraulic gradients that could create unstable ground conditions. Consideration should therefore be given to sequencing the creek sediment removal to coincide with a period of low groundwater levels, low creek flows and increased evapotranspiration, i.e. late summer - early fall. Upward hydraulic gradients should be lower during these periods.

## 6.0 REFERENCES

Lawler, Matusky & Skelly Engineers, October 1994, Remedial Investigation/Feasibility Study Report, Dzus Fastener Co..

Lawler, Matusky & Skelly Engineers, October 1995, Remedial Investigation/Feasibility Study Report Addendum, Dzus Fastener Co..

New York State Department of Environmental Conservation, March 1995, Record of Decision, Dzus Fastener Company, Operable Unit 01, Inactive Hazardous Waste Site 152033.

New York State Department of Environmental Conservation, June 1997, Supplemental Feasibility Study, Dzus Fastener Company, Operable Unit 2, Site Number 1-52-033.

New York State Department of Environmental Conservation, October 1997, Record of Decision, Dzus Fastener Company, Operable Unit #2, Inactive Hazardous Waste Site 1-52-033.

Rust Environment & Infrastructure, April 1998, Pre-Design Investigation Work Plan, Dzus Fastener (OU 2).

Rust Environment & Infrastructure, April 1998, Remedial Design/Construction Management Work Plan (OU 2), Dzus Fastener Site.

Rust Environment & Infrastructure, September 1998, Wetlands Delineation Report, Lake Capri/Willetts Creek, Dzus Fastener Site.

U.S. Geological Survey, 1954, 7.5 Minute Topographic Map, Bay Shore West, N.Y. Quadrangle.

U.S. Geological Survey, 1969, 7.5 Minute Topographic Map, Bay Shore West, N.Y. Quadrangle.

# APPENDIX A

# MONITORING WELL SAMPLING LOGS

RUST ENVIRONMENT & INFRASTRUCTURE

# WELL SAMPLING LOG

## PROJECT INFORMATION

Project Name: DZUS FASTENER SITE (OU2)
Project No.: 202563.10200
Date: 6/18/98
Personnel: AVL, RT

## WELL INFORMATION

Well I.D.: DZUS MW-1 2" DIA.
Well Condition: GOOD
Depth to Water (ft BMP): 7.8'
Well Depth (initial) (ft BMP): 15.0'
Well Volume: 1.2 GAL

## SAMPLING INFORMATION

Time Start: 15:25 Time Finish: 16:00
Method: DISPOSABLE BAILER
Volume Purged (gals.): 3.6 GAL

## FIELD PARAMETERS

| Time | pH | Conductivity | Turbidity | Temp (C) | Odor | Color | Dissolved Oxygen | Observations |
|---|---|---|---|---|---|---|---|---|
| 16:00 | 7.51 | 67 | 170 | 15.9 | – | ✓ | 0.01 | Slightly brown, slight sheen |
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Notes:

RUST ENVIRONMENT & INFRASTRUCTURE

# WELL SAMPLING LOG

## PROJECT INFORMATION

Project Name: DZUS FASTENER SITE (OU2)
Project No.: 202563.10200
Date: 6/9/98
Personnel: AVL, RT

## WELL INFORMATION

Well I.D.: DZUS MW-2 2"
Well Condition: Good
Depth to Water (ft BMP): 8.8
Well Depth (initial) (ft BMP): 14.00
Well Volume: 0.87

## SAMPLING INFORMATION

Time Start: ________ Time Finish: ________
Method: disposable Bailer
Volume Purged (gals.): 2.6

## FIELD PARAMETERS

| Time | pH | Conductivity | Turbidity | Temp (C) | Odor | Color | Dissolved Oxygen | Observations |
|---|---|---|---|---|---|---|---|---|
| | 7.79 | 80 | 960 | 16.3 | | | 0.00 | |
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Notes:

RUST ENVIRONMENT & INFRASTRUCTURE

# WELL SAMPLING LOG

## PROJECT INFORMATION

Project Name: DZUS FASTENER SITE (OU2)
Project No.: 202563-10200
Date: 6/9/98
Personnel: AVL, RT

## WELL INFORMATION

Well I.D.: DZUS MW-3 2" dia
Well Condition: Good
Depth to Water (ft BMP): 7.0
Well Depth (initial) (ft BMP): 12.1
Well Volume: 0.83

## SAMPLING INFORMATION

Time Start: 10:50 Time Finish: 11:00
Method: disposable Bailer
Volume Purged (gals.): 3.5

## FIELD PARAMETERS

| Time | pH | Conductivity | Turbidity | Temp (C) | Odor | Color | Dissolved Oxygen | Observations |
|---|---|---|---|---|---|---|---|---|
| 11:00 | 7.87 | 66 | 774 | 16.0 | - | ✓ | 0.10 | Light Brown water |
| | | | | | | | | |
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Notes:

RUST ENVIRONMENT & INFRASTRUCTURE

# WELL SAMPLING LOG

## PROJECT INFORMATION

Project Name: DZUS FASTENER SITE (OU2)
Project No.: 202563.10200
Date: 6/9/98
Personnel: AVL, RT

## WELL INFORMATION

Well I.D.: DZUS MW-6 2" dia
Well Condition: Good
Depth to Water (ft BMP): 7.50
Well Depth (initial) (ft BMP): 12.95
Well Volume: 0.93

## SAMPLING INFORMATION

Time Start: ______ Time Finish: ______
Method: disposable Bailer
Volume Purged (gals.): ______

## FIELD PARAMETERS

| Time | pH | Conductivity | Turbidity | Temp (C) | Odor | Color | Dissolved Oxygen | Observations |
|---|---|---|---|---|---|---|---|---|
| | 7.75 | 44 | 55 | 14.3 | ✓ | ✓ | 0.00 | Yellow/brown with slight odor |
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Notes:

RUST ENVIRONMENT & INFRASTRUCTURE

# WELL SAMPLING LOG

**PROJECT INFORMATION**

Project Name: DZUS FASTENER SITE (OU2)
Project No.: 202563.10200
Date: 6/9/98
Personnel: AVL, RT

**WELL INFORMATION**

Well I.D.: DZUS MW-7 2" dia
Well Condition:
Depth to Water (ft BMP): 7.80
Well Depth (initial) (ft BMP): 8.15
Well Volume: 0.06

**SAMPLING INFORMATION**

Time Start: ________ Time Finish: ________
Method: disposable Bailer
Volume Purged (gals.): 0.5

**FIELD PARAMETERS**

| Time | pH | Conductivity | Turbidity | Temp (C) | Odor | Color | Dissolved Oxygen | Observations |
|---|---|---|---|---|---|---|---|---|
| | 7.73 | 71 | 291 | 15.0 | ✓ | ✓ | 0.06 | yellow/Brown, slight odor, some sediment. |
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RUST ENVIRONMENT & INFRASTRUCTURE

# WELL SAMPLING LOG

**PROJECT INFORMATION**

Project Name: DZUS FASTENER SITE (OU2)
Project No.: 202563-10200
Date: 6/9/98
Personnel: AVL, AT

**WELL INFORMATION**

Well I.D.: DZUS MW-7B
Well Condition: Good
Depth to Water (ft BMP): 8.1
Well Depth (initial) (ft BMP): 44.5
Well Volume: 6.07

**SAMPLING INFORMATION**

Time Start: ________ Time Finish: ________
Method: disposable Bailer
Volume Purged (gals.): 18.2

**FIELD PARAMETERS**

| Time | pH | Conductivity | Turbidity | Temp (C) | Odor | Color | Dissolved Oxygen | Observations |
|---|---|---|---|---|---|---|---|---|
| | 7.0 | 76 | 30 | 14.1 | — | ✓ | 0.01 | slightly yellow color |
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Notes:

RUST ENVIRONMENT & INFRASTRUCTURE

# WELL SAMPLING LOG

## PROJECT INFORMATION

Project Name: DZUS FASTENER SITE (OU2)
Project No.: 202563.10200
Date: 6/8/98
Personnel: AVL, RT

## WELL INFORMATION

Well I.D.: DZUS MW-8 2" DiA
Well Condition: Good
Depth to Water (ft BMP): 7.8'
Well Depth (initial) (ft BMP): 14.6
Well Volume: 1.133

## SAMPLING INFORMATION

Time Start: 15:45 Time Finish: 16:00
Method: Disposable Bailer
Volume Purged (gals.): 3.4

## FIELD PARAMETERS

| Time | pH | Conductivity | Turbidity | Temp (C) | Odor | Color | Dissolved Oxygen | Observations |
|---|---|---|---|---|---|---|---|---|
| 16:00 | 6.98 | 55 | 949 | 17.5 | — | ✓ | 0.03 | slightly dirty brown |
| | | | | | | | | |
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Notes:

RUST ENVIRONMENT & INFRASTRUCTURE

# WELL SAMPLING LOG

## PROJECT INFORMATION

Project Name: DZUS FASTENER SITE (OU2)
Project No.: 202563.10200
Date: 6/9/98
Personnel: AVL, RT

## WELL INFORMATION

Well I.D.: DZUS MW-9 2" dia
Well Condition: Good
Depth to Water (ft BMP): 4.4
Well Depth (initial) (ft BMP): 12.0
Well Volume: 1.27

## SAMPLING INFORMATION

Time Start: ______ Time Finish: ______
Method: disposable Bailer
Volume Purged (gals.): ______

## FIELD PARAMETERS

| Time | pH | Conductivity | Turbidity | Temp (C) | Odor | Color | Dissolved Oxygen | Observations |
|---|---|---|---|---|---|---|---|---|
| | 7.68 | 91 | 395 | 17.1 | — | — | 0.02 | |
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Notes:

RUST ENVIRONMENT & INFRASTRUCTURE

# WELL SAMPLING LOG

## PROJECT INFORMATION

Project Name: DZUS FASTENER SITE (OU2)
Project No.: 202563.10200
Date: 6/9/98
Personnel: AVL, RT

## WELL INFORMATION

Well I.D.: DZUS MW-9B 2" dia
Well Condition: Good
Depth to Water (ft BMP): 4.8
Well Depth (initial) (ft BMP): 43.3
Well Volume: 6.42

## SAMPLING INFORMATION

Time Start: ______ Time Finish: ______
Method: disposable Bailer
Volume Purged (gals.): 19.25

## FIELD PARAMETERS

| Time | pH | Conductivity | Turbidity | Temp (C) | Odor | Color | Dissolved Oxygen | Observations |
|---|---|---|---|---|---|---|---|---|
| | 6.85 | 56 | 4 | 14.6 | – | – | 0.04 | clear, odorless |
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Notes:

RUST ENVIRONMENT & INFRASTRUCTURE

# WELL SAMPLING LOG

## PROJECT INFORMATION

Project Name: DZUS FASTENER SITE (OU2)
Project No.: 202563.10200
Date: 6/8/98
Personnel: AVL, Rt

## WELL INFORMATION

Well I.D.: DZUS MW-13A 2"dia
Well Condition: Good
Depth to Water (ft BMP): 2.75
Well Depth (initial) (ft BMP): 10.9
Well Volume: 1.366

## SAMPLING INFORMATION

Time Start: ______ Time Finish: ______
Method: Disposable Bailer
Volume Purged (gals.): ______

## FIELD PARAMETERS

| Time | pH | Conductivity | Turbidity | Temp (C) | Odor | Color | Dissolved Oxygen | Observations |
|---|---|---|---|---|---|---|---|---|
| | 7.77 | 109 | >999 | 19° | | | 0.00 | |
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Notes:

RUST ENVIRONMENT & INFRASTRUCTURE

# WELL SAMPLING LOG

## PROJECT INFORMATION

Project Name: DZUS FASTENER SITE (OU2)
Project No.: 202563.10200
Date: 6/8/98
Personnel: AVL, RT

## WELL INFORMATION

Well I.D.: DZUSMW13B 2" dia
Well Condition: Good
Depth to Water (ft BMP): 2.6
Well Depth (initial) (ft BMP): 44.8
Well Volume: 7.03

## SAMPLING INFORMATION

Time Start: Time Finish:
Method: Disposable Bailer
Volume Purged (gals.): 21.1

## FIELD PARAMETERS

| Time | pH | Conductivity | Turbidity | Temp (C) | Odor | Color | Dissolved Oxygen | Observations |
|---|---|---|---|---|---|---|---|---|
| | 7.55 | 55 | 7 | 16.5 | — | — | 0.00 | clear, odorless |
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Notes:

RUST ENVIRONMENT & INFRASTRUCTURE

# WELL SAMPLING LOG

## PROJECT INFORMATION

Project Name: DZUS FASTENER SITE (OU2)
Project No.: 202563.10200
Date: 6/9/98
Personnel: AVL, RT

## WELL INFORMATION

Well I.D.: DZUS MW-14A 2" dia
Well Condition: Good
Depth to Water (ft BMP): 8.4
Well Depth (initial) (ft BMP): 15.6
Well Volume: 1.2

## SAMPLING INFORMATION

Time Start: ________ Time Finish: ________
Method: Disposable Bailer
Volume Purged (gals.): 3.6

## FIELD PARAMETERS

| Time | pH | Conductivity | Turbidity | Temp (C) | Odor | Color | Dissolved Oxygen | Observations |
|---|---|---|---|---|---|---|---|---|
| | 7.69 | 65 | 433 | 17.9 | - | ✓ | 0.00 | Brown/orange color |
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Notes:

RUST ENVIRONMENT & INFRASTRUCTURE

# WELL SAMPLING LOG

## PROJECT INFORMATION

Project Name: DZUS FASTENER SITE (OU2)
Project No.: 202563.10200
Date: 6/9/98
Personnel: AVL, RT

## WELL INFORMATION

Well I.D.: DZUS MW-14B 2" dia
Well Condition: Good
Depth to Water (ft BMP): 8.4
Well Depth (initial) (ft BMP): 46.2
Well Volume: 6.3

## SAMPLING INFORMATION

Time Start: ________ Time Finish: ________
Method: Disposable Bailer
Volume Purged (gals.): 20.0

## FIELD PARAMETERS

| Time | pH | Conductivity | Turbidity | Temp (C) | Odor | Color | Dissolved Oxygen | Observations |
|---|---|---|---|---|---|---|---|---|
| | 7.59 | 102 | 3 | 15.5 | – | – | 0.02 | TAN Sediment |
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Notes:

RUST ENVIRONMENT & INFRASTRUCTURE

# WELL SAMPLING LOG

## PROJECT INFORMATION

Project Name: DZUS FASTENER SITE (OU2)
Project No.: 202563-10200
Date: 6/9/98
Personnel: AVL, RT

## WELL INFORMATION

Well I.D.: DZUS MW-14C 2" dia
Well Condition: Good
Depth to Water (ft BMP): 8.4
Well Depth (initial) (ft BMP): 79.0
Well Volume: 11.77

## SAMPLING INFORMATION

Time Start: ______ Time Finish: ______
Method: Disposable Bailer
Volume Purged (gals.): 35.3

## FIELD PARAMETERS

| Time | pH | Conductivity | Turbidity | Temp (C) | Odor | Color | Dissolved Oxygen | Observations |
|---|---|---|---|---|---|---|---|---|
| | 7.64 | 17 | 113 | 14.6 | – | ✓ | 0.00 | Yellow/Brown water, clear at depth |
| | | | | | | | | |
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Notes:

RUST ENVIRONMENT & INFRASTRUCTURE

# WELL SAMPLING LOG

## PROJECT INFORMATION

Project Name: DZUS FASTENER SITE (OU2)
Project No.: 202563.10200
Date: 6/8/98
Personnel: AVL, RT

## WELL INFORMATION

Well I.D.: DZUS MW-15A 2" dia
Well Condition: Good
Depth to Water (ft BMP): 5.5
Well Depth (initial) (ft BMP): 29.0
Well Volume: 2.42

## SAMPLING INFORMATION

Time Start: 18:15 Time Finish: 18:30
Method: disposable Bailer
Volume Purged (gals.): 7.25

## FIELD PARAMETERS

| Time | pH | Conductivity | Turbidity | Temp (C) | Odor | Color | Dissolved Oxygen | Observations |
|---|---|---|---|---|---|---|---|---|
| 18:30 | 8.19 | .113 | 3 | 16.7 | – | – | 0.01 | |
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Notes:

**RUST** ENVIRONMENT & INFRASTRUCTURE

# WELL SAMPLING LOG

## PROJECT INFORMATION

Project Name: DZUS FASTENER SITE (OU2)
Project No.: 202563.10200
Date: 6/8/98
Personnel: AVL, RT

## WELL INFORMATION

Well I.D.: DZUS MW-15B 2" dia
Well Condition: Good
Depth to Water (ft BMP): 6.4
Well Depth (initial) (ft BMP): 84.4
Well Volume: 12.0

## SAMPLING INFORMATION

Time Start: 18:20 Time Finish: 19:00
Method: disposable Bailer
Volume Purged (gals.):

## FIELD PARAMETERS

| Time | pH | Conductivity | Turbidity | Temp (C) | Odor | Color | Dissolved Oxygen | Observations |
|---|---|---|---|---|---|---|---|---|
| 19:00 | 8.25 | 0.11 | 28 | 14.2 | – | – | 0.06 | |
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Notes:

RUST ENVIRONMENT & INFRASTRUCTURE

# WELL SAMPLING LOG

**PROJECT INFORMATION**

Project Name: DZUS FASTENER SITE (OU2)
Project No.: 202563-10200
Date: 6/9/98
Personnel: AVL, RT

**WELL INFORMATION**

Well I.D.: DZUS MW-18 2" dia
Well Condition: Good
Depth to Water (ft BMP): 6.50
Well Depth (initial) (ft BMP): 13.75
Well Volume: 1.21

**SAMPLING INFORMATION**

Time Start: 1:20 Time Finish: 1:35
Method: disposable Bailer
Volume Purged (gals.): 3.63

**FIELD PARAMETERS**

| Time | pH | Conductivity | Turbidity | Temp (C) | Odor | Color | Dissolved Oxygen | Observations |
|---|---|---|---|---|---|---|---|---|
| 1:35 | 7.52 | 66 | 204 | 15.0 | – | ✓ | 0.02 | Dark brown Color |
| | | | | | | | | |
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Notes:

RUST ENVIRONMENT & INFRASTRUCTURE

# WELL SAMPLING LOG

## PROJECT INFORMATION

Project Name: DZUS FASTENER SITE (OU2)
Project No.: 202563.10200
Date: 6/9/98
Personnel: AVL, RT

## WELL INFORMATION

Well I.D.: DZUS MW-19 2" dia
Well Condition: Good
Depth to Water (ft BMP): 7.8
Well Depth (initial) (ft BMP): 13.8
Well Volume: 1.0

## SAMPLING INFORMATION

Time Start: ______ Time Finish: ______
Method: disposable Bailer
Volume Purged (gals.): 3.0

## FIELD PARAMETERS

| Time | pH | Conductivity | Turbidity | Temp (C) | Odor | Color | Dissolved Oxygen | Observations |
|---|---|---|---|---|---|---|---|---|
| | 7.71 | 126 | 175 | 14.7 | — | — | 0.08 | water has Black/Gray sediment |
| | | | | | | | | |
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Notes:

**RUST** ENVIRONMENT & INFRASTRUCTURE

# WELL SAMPLING LOG

## PROJECT INFORMATION

Project Name: DZUS FASTENER SITE (OU2)
Project No.: 202563 · 10200
Date: 6/8/98
Personnel: AVL, RT

## WELL INFORMATION

Well I.D.: DZUS MW-21A 2" DiA
Well Condition: Good
Depth to Water (ft BMP): 7.3
Well Depth (initial) (ft BMP): 14.5
Well Volume: 1.2

## SAMPLING INFORMATION

Time Start: 16:14 Time Finish: ___
Method: Disposable Bailer
Volume Purged (gals.): 3.6

## FIELD PARAMETERS

| Time | pH | Conductivity | Turbidity | Temp (C) | Odor | Color | Dissolved Oxygen | Observations |
|---|---|---|---|---|---|---|---|---|
| | 8.12 | 34 | 76 | 17.8 | – | – | 0.03 | Clear Water with small BLACK specs. |
| | | | | | | | | |
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Notes:

RUST ENVIRONMENT & INFRASTRUCTURE

# WELL SAMPLING LOG

## PROJECT INFORMATION

Project Name: DZUS FASTENER SITE (OU2)
Project No.: 202563.10200
Date: 6/8/98
Personnel: AVL, Rt

## WELL INFORMATION

Well I.D.: DZUS MW-21B 2" DiA
Well Condition: Good
Depth to Water (ft BMP): 7.4
Well Depth (initial) (ft BMP): 44.8
Well Volume: 6.233

## SAMPLING INFORMATION

Time Start: 16:20 Time Finish:
Method: Disposable Bailer
Volume Purged (gals.): 19

## FIELD PARAMETERS

| Time | pH | Conductivity | Turbidity | Temp (C) | Odor | Color | Dissolved Oxygen | Observations |
|---|---|---|---|---|---|---|---|---|
| | 7.99 | 54 | 46 | 15.3 | – | – | 0.01 | clear, clean No odor |
| | | | | | | | | |
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Notes:

RUST ENVIRONMENT & INFRASTRUCTURE

# WELL SAMPLING LOG

## PROJECT INFORMATION

Project Name: DZUS FASTENER SITE (OU2)
Project No.: 202563-10200
Date: 6/9/98
Personnel: AVL, RT

## WELL INFORMATION

Well I.D.: DZUS MW-22A 2" dia
Well Condition: Good
Depth to Water (ft BMP): 7.70
Well Depth (initial) (ft BMP): 14.5
Well Volume: 1.13

## SAMPLING INFORMATION

Time Start: ______ Time Finish: ______
Method: disposable Bailer
Volume Purged (gals.): 3.4

## FIELD PARAMETERS

| Time | pH | Conductivity | Turbidity | Temp (C) | Odor | Color | Dissolved Oxygen | Observations |
|---|---|---|---|---|---|---|---|---|
| | 7.86 | 187 | 236 | 15.4 | ✓ | ✓ | 0.04 | Slight odor, orange/Brown color |
| | | | | | | | | |
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Notes:

RUST ENVIRONMENT & INFRASTRUCTURE

# WELL SAMPLING LOG

## PROJECT INFORMATION

Project Name: DZUS FASTENER SITE (OU2)
Project No.: 202563.10200
Date: 6/9/98
Personnel: AVL, RT

## WELL INFORMATION

Well I.D.: DZUS MW-22B 2" diA
Well Condition: Good
Depth to Water (ft BMP): 7.2
Well Depth (initial) (ft BMP): 43.8
Well Volume: 6.27

## SAMPLING INFORMATION

Time Start: ____ Time Finish: ____
Method: disposable Bailer
Volume Purged (gals.): 19

## FIELD PARAMETERS

| Time | pH | Conductivity | Turbidity | Temp (C) | Odor | Color | Dissolved Oxygen | Observations |
|---|---|---|---|---|---|---|---|---|
| | 7.64 | 0.115 | 2 | 15.6 | – | – | 0.03 | |
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Notes:

RUST ENVIRONMENT & INFRASTRUCTURE

# WELL SAMPLING LOG

## PROJECT INFORMATION

Project Name: DZUS FASTENER SITE (OU2)
Project No.: 202563.10200
Date: 6/8/98
Personnel: AVL, RT

## WELL INFORMATION

Well I.D.: DZUS MW-23A 2" DIA
Well Condition: Good
Depth to Water (ft BMP): 4.6
Well Depth (initial) (ft BMP): 14.8
Well Volume: 1.7

## SAMPLING INFORMATION

Time Start: ______ Time Finish: ______
Method: disposable Bailer
Volume Purged (gals.): 5.1

## FIELD PARAMETERS

| Time | pH | Conductivity | Turbidity | Temp (C) | Odor | Color | Dissolved Oxygen | Observations |
|---|---|---|---|---|---|---|---|---|
| | 7.60 | 115 | 253 | 18.2 | — | ✓ | 0.00 | TAN WATer, Organic pieces. |
| | | | | | | | | |
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Notes:

RUST ENVIRONMENT & INFRASTRUCTURE

# WELL SAMPLING LOG

## PROJECT INFORMATION

Project Name: DZUS FASTENER SITE (OU2)
Project No.: 202563.10200
Date: 6/8/98
Personnel: AVL, RT

## WELL INFORMATION

Well I.D.: DZUS MW23B 2" dia
Well Condition: Good
Depth to Water (ft BMP): 4.6
Well Depth (initial) (ft BMP): 44.5
Well Volume: 6.63

## SAMPLING INFORMATION

Time Start: 18:00 Time Finish: 18:10
Method: disposable Bailer
Volume Purged (gals.): 19.9

## FIELD PARAMETERS

| Time | pH | Conductivity | Turbidity | Temp (C) | Odor | Color | Dissolved Oxygen | Observations |
|---|---|---|---|---|---|---|---|---|
| 18:10 | 6.85 | 65 | 5 | 15.2 | - | - | 0.00 | clear, odorless |
| | | | | | | | | |
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Notes:

RUST ENVIRONMENT & INFRASTRUCTURE

# WELL SAMPLING LOG

## PROJECT INFORMATION

Project Name: DZUS FASTENER SITE (OU2)
Project No.: 202563.10200
Date: 6/9/98
Personnel: AVL, RT

## WELL INFORMATION

Well I.D.: DZUS MW 24B 2" dia
Well Condition: Good
Depth to Water (ft BMP): 8.5
Well Depth (initial) (ft BMP): 44.6
Well Volume: 6.03

## SAMPLING INFORMATION

Time Start: ______ Time Finish: ______
Method: disposable Bailer
Volume Purged (gals.): 18.0

## FIELD PARAMETERS

| Time | pH | Conductivity | Turbidity | Temp (C) | Odor | Color | Dissolved Oxygen | Observations |
|---|---|---|---|---|---|---|---|---|
| | 7.43 | 114 | 10 | 14.2 | - | - | 0.04 | |
| | | | | | | | | |
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Notes:

RUST ENVIRONMENT & INFRASTRUCTURE

# WELL SAMPLING LOG

## PROJECT INFORMATION

Project Name: DZUS FASTENER SITE (OU2)
Project No.: 202563-10200
Date: 6/9/98
Personnel: AVL, RT

## WELL INFORMATION

Well I.D.: SSMW 2" dia
Well Condition: OK
Depth to Water (ft BMP): 7.9
Well Depth (initial) (ft BMP): 9.0
Well Volume: 0.2

## SAMPLING INFORMATION

Time Start: ______ Time Finish: ______
Method: disposable Bailer
Volume Purged (gals.): 0.6

## FIELD PARAMETERS

| Time | pH | Conductivity | Turbidity | Temp (C) | Odor | Color | Dissolved Oxygen | Observations |
|---|---|---|---|---|---|---|---|---|
| | 7.92 | 40 | >999 | 20.1 | | | 0.00 | |
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Notes:

# APPENDIX B

## NYSDEC
## SPDES WATER DISCHARGE LIMITS

**Table B-1**
**Ambient Surface Water Concentrations/SPDES Limitations**
**Dzus Fastener Site**
**West Islip, New York**

| Analyte | Ambient Ranges (East & West Branch and Lake) | Ambient Range (West Branch Only) | Average Ambient (Concentrations East Branch Only) | SPDES Limitations* (July 15, 1998) |
|---|---|---|---|---|
| calcium | 16.1 - 24.3 | 18.3 - 19.5 | 18.9 | None |
| magnesium | 3.1 - 3.5 | 3.1 - 3.2 | 3.15 | None |
| manganese | 1.7 - 2.4 | 1.8 - 2.0 | 1.9 | None |
| aluminum, dissolved | 0.057 - 0.260 | 0.057 - 0.059 | 0.058 | 0.360 |
| cadmium, total | <0.005 - 0.016 | 0.005 - 0.016 | 0.011 | 0.017 |
| chromium, total | all <0.010 | all <0.010 | <0.010 | 0.132 |
| lead, total | <0.003 - 0.010 | all <0.005 | <0.005 | 0.014 |
| iron, total | 0.060 - 10.0 | 0.060 - 0.680 | 0.370 | 0.010 |
| zinc, total | <0.020 - 0.061 | 0.024 - 0.061 | 0.043 | 0.072 |
| cyanide | all <0.010 | all <0.010 | <0.010 | 0.060 |
| total dissolved solids | 110 - 140 | 120 - 140 | 130 | Monitor |
| total suspended solids | <4 - 97 | all <4 | <4 | 0.020 |
| alkalinity | 30 - 56 | 30 - 32 | 31 | None |
| setteable solids | all <0.2 (ml/l/hr) | all <0.2 (ml/l/hr) | <0.2 (ml/l/hr) | 0.0001 |

* Analyses must be performed using Graphite Furnace Atomic Absorption, or alternate method approved by NYSDEC.

91-20-2a (1/89)

# EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

During the period beginning May 1999

and lasting until Sept. 1999

the discharges from the treatment facility to Willetts Creek, water index number GSB 205 , Class C , RECEIVING WATER shall be limited and monitored by the operator as specified below:

| Outfall Number and Parameter | Discharge Limitations | | Units | Minimum Monitoring Requirements | |
|---|---|---|---|---|---|
| | Daily Avg. | Daily Max | | Measurement Frequency | Sample Type |
| Outfall 001 - Treated Groundwater Remediation Discharge: | | | | | |
| Flow | Monitor | 1,000,000 | GPD | Continuous | Meter |
| pH (range) | 6.0 to | 9.0 | SU | Weekly | Grab |
| Total Suspended Solids | Monitor | 20 | mg/l | Weekly | Grab |
| Total Dissolved Solids | Monitor | Monitor | mg/l | Weekly | Grab |
| Settlable Solids | Monitor | 0.1 | ml/l | Daily | Grab |
| Aluminium, Dissolved | Monitor | 360 (7) | µg/l | Monthly | Grab |
| Cadmium, Total | Monitor | 17 (7)&(8) | µg/l | Weekly | Grab |
| Chromium, Total | Monitor | 132 | µg/l | Monthly | Grab |
| Cyanide, Amenable to chlorination | Monitor | 60 | µg/l | Monthly | Grab |
| Iron, Total | Monitor | 10 (7) | mg/l | Weekly | Grab |
| Lead, Total | Monitor | 14 (7)&(8) | µg/l | Monthly | Grab |
| Zinc, Total | Monitor | 72 | µg/l | Monthly | Grab |

Additional Conditions:

(1) Discharge is not authorized until such time as an engineering submission showing the method of treatment is approved by the Department. The discharge rate may not exceed the effective or design treatment system capacity. All monitoring data, engineering submissions and modification requests must be submitted to:

Chief - Operation Maintenance and Support Section
Bureau of Hazardous Site Control
Division of Environmental Remediation
NYSDEC
50 Wolf Road
Albany, N.Y. 12233-7010

With a copy sent to:
Robert Schneck, RWE
NYS Dept. Of En. Con.
Bldg. 40 - SUNY @ Stony Brook
Stony Brook, NY 11790-2356
Ph: 516-444-0405

(2) Only site generated wastewater is authorized for treatment and discharge.

(3) Authorization to discharge is valid only for the period noted above but may be renewed if appropriate. A request for renewal must be received 6 months prior to the expiration date to allow for a review of monitoring data and reassessment of monitoring requirements.

(4) Both concentration (mg/l or µg/l) and mass loadings (lbs/day) must be reported to the Department for all parameters except flow and pH.

(5) Any use of corrosion/scale inhibitors or biocidal-type compounds used in the treatment process must be approved by the department prior to use.

(6) This discharge and adminstration of this discharge must comply with the attached General Conditions.

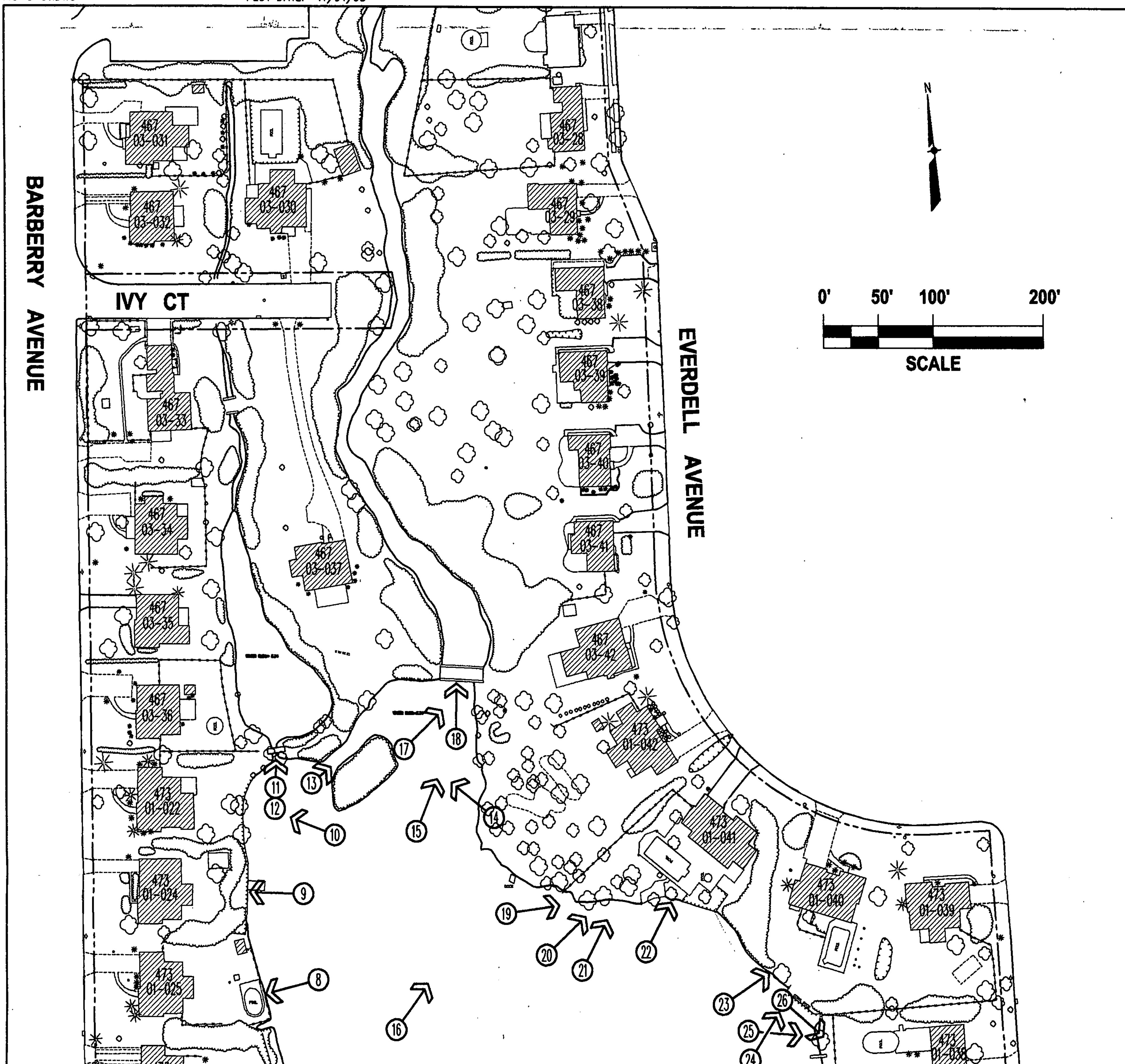
(7) The Department has determined that the calculated water quality based effluent limits: 100 µg/l, 0.74 µg/l, 300 µg/l, and 4 µg/l respectively are clearly unreasonable. Therefore these limits have been replaced with modified limits in accordance with 6 NYCRR 702.16 (b)(2).

(8) Analysis must be performed using GFAA.

# APPENDIX C

# PHOTO DOCUMENTATION
# SURVEY OF LAKE CAPRI

FIG-C-01.DWG PLOT DATE: 11/04/98




**RUST**
Rust Environment & Infrastructure Inc.

PRE-DESIGN INVESTIGATION REPORT
DZUS FASTENER SITE
WEST ISLIP, NEW YORK
NYSDEC SITE No. 1-52-033
OCT. 1998 202563

FIGURE C - 1
PHOTO LOG - LAKE CAPRI

Photo #1: Lot # 473-01-031

Photo #2: Lot # 473-01-031

Photo #3:  Lot # 473-01-030

Lot # 473-01-030 Photo #4 Lot # 473-01-029

Lot # 473-01-028 Photo #5 Lot # 473-01-027

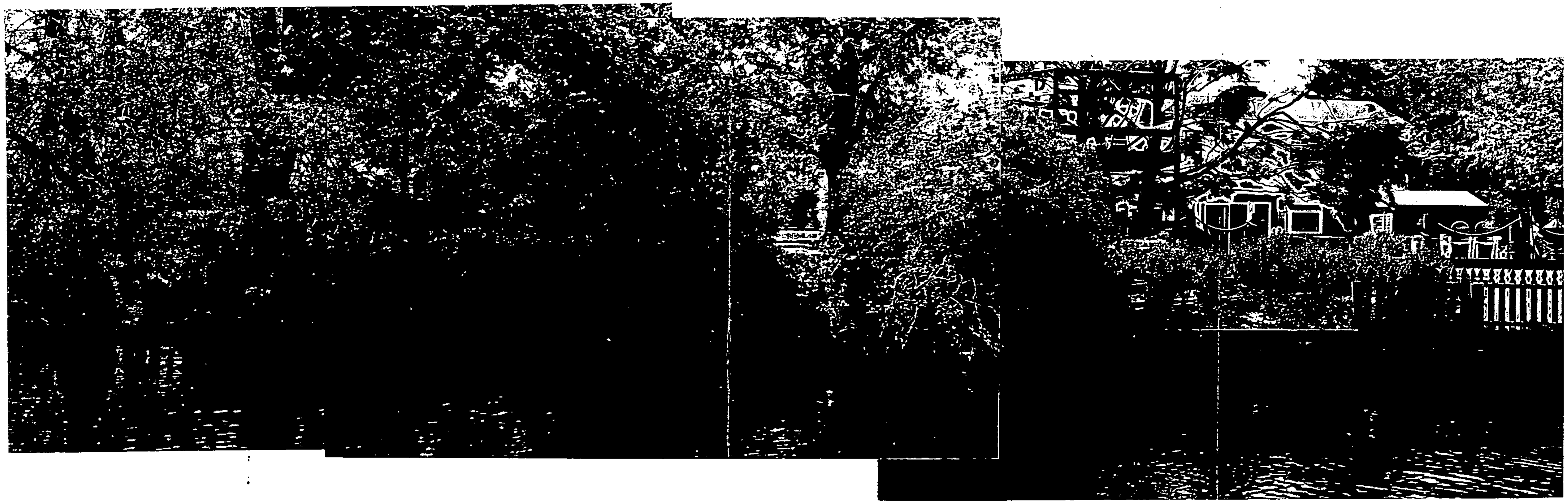


Photo #6: Lot # 473-01-027

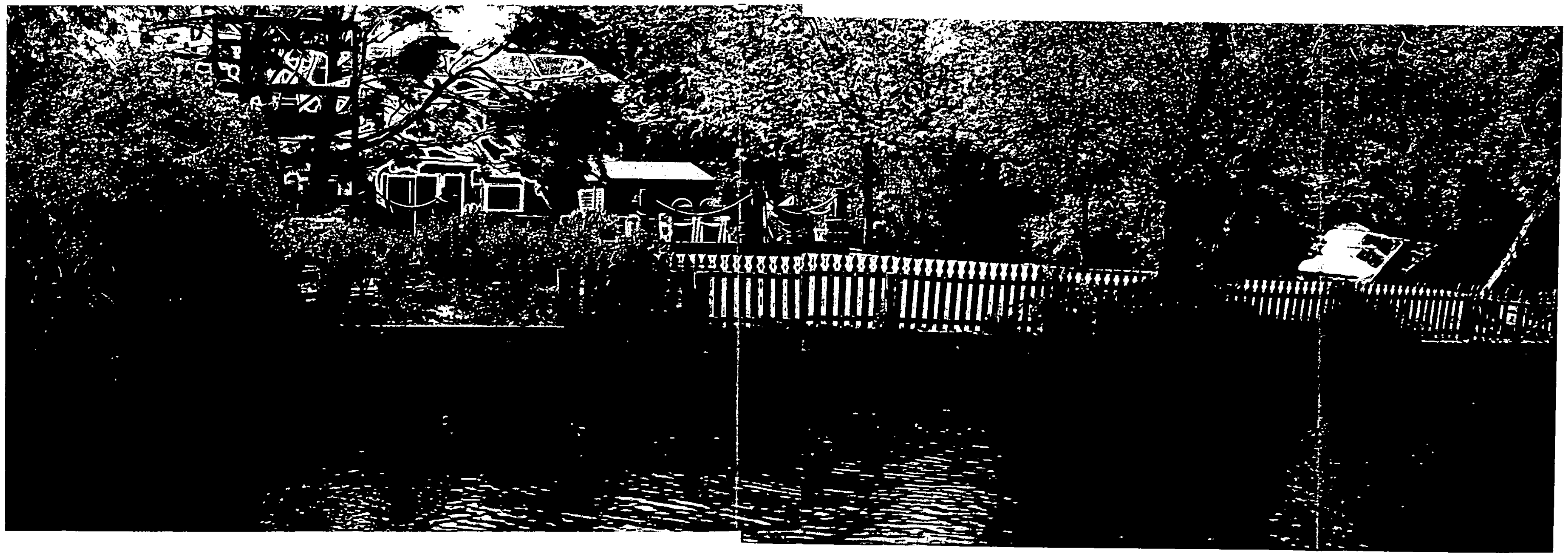


Photo #7: Lot # 473-01-026

Photo #8: Lot # 473-01-025

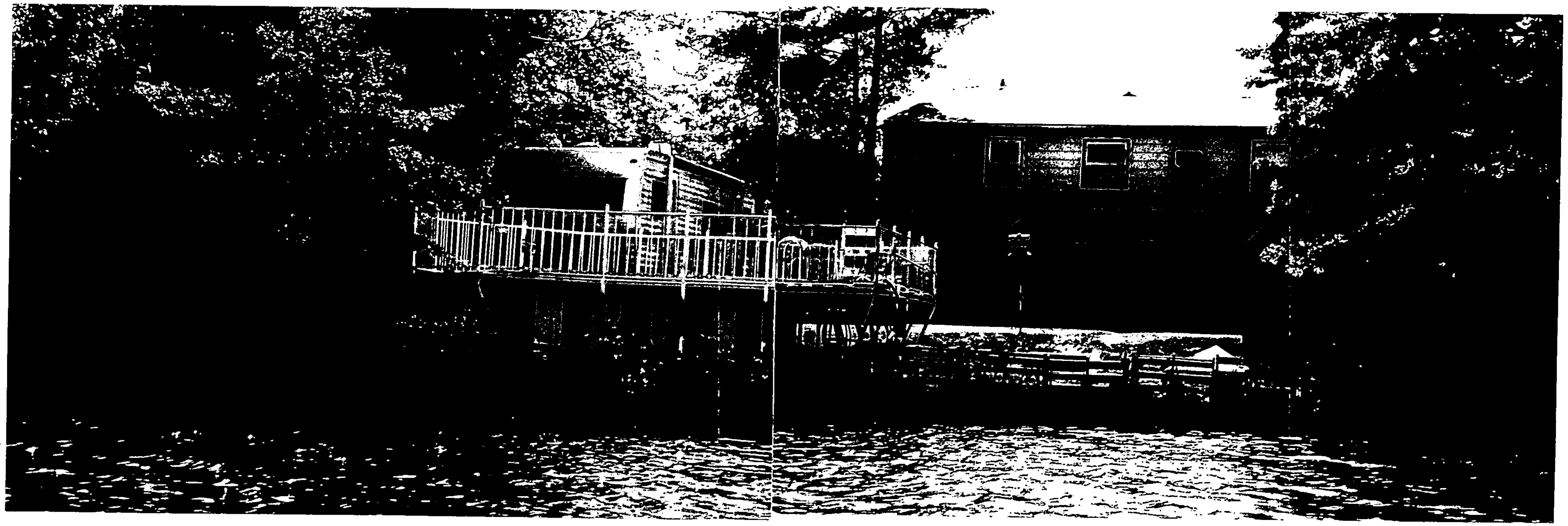
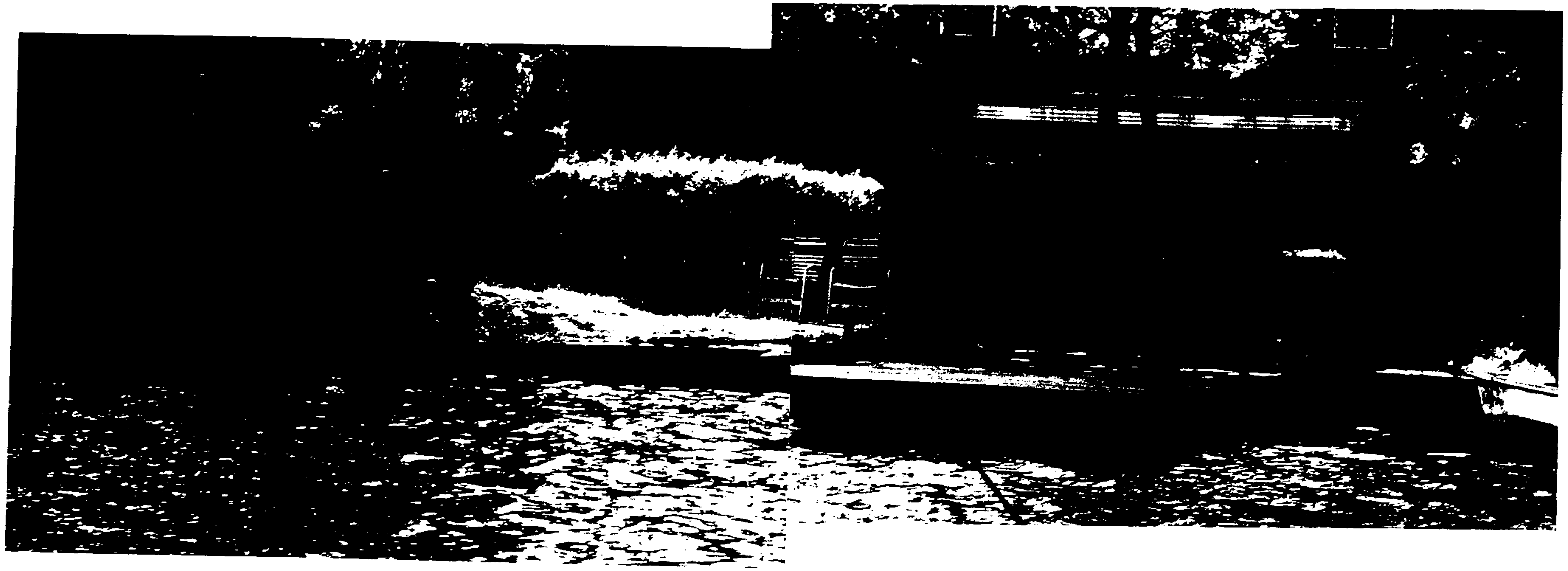


Photo #9: Lot # 473-01-024



Lot # 473-01-024 Photo #10 Lot # 473-01-022

**Photo #11**

**Willetts Creek West Branch Inlet to Lake Capri - Wooden Foot Bridge (April 1998)**

**Photo #12: Wooden Foot Bridge (July 1998)**

**Photo #13: Channel North Side of North Island**

**Photo #14: Lot #467-03-037**
**View of North Island**

**Photo #15:**
**View of South Side of North Island, Stone Foot Bridge, Northeast Shoreline**

**Lot # 476-03-42** **Lot # 473-01-042**

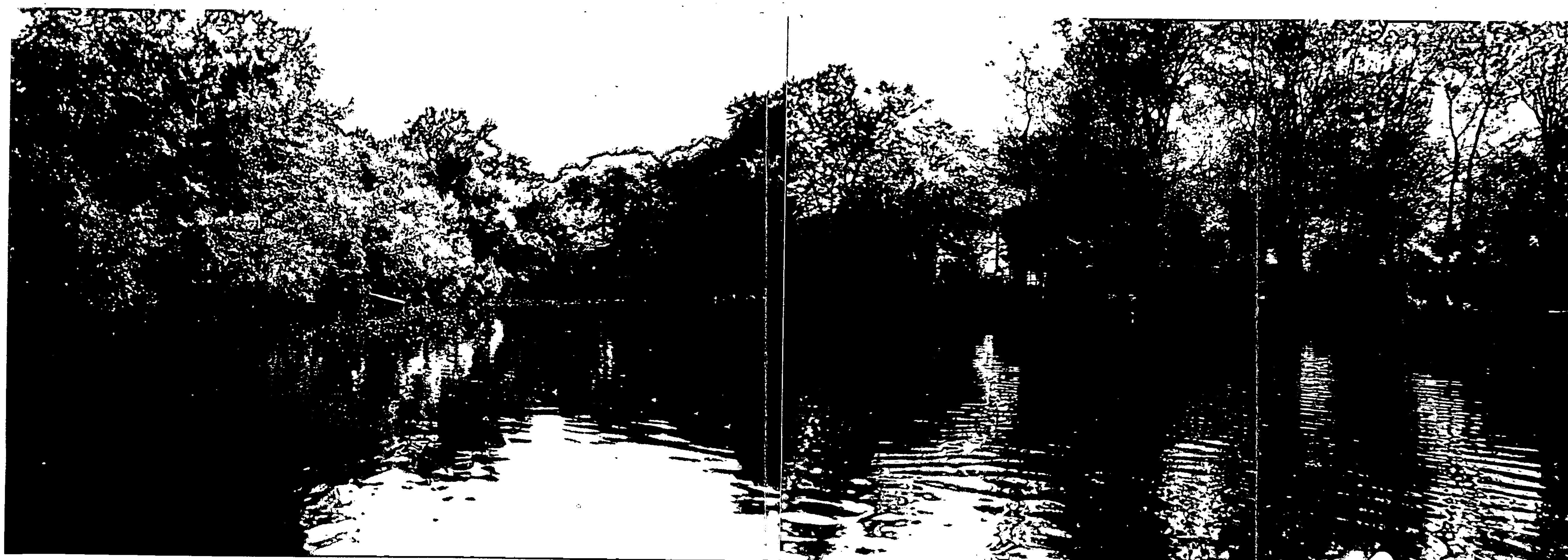


Photo #16:
Willetts Creek East Branch Inlet to Lake Capri

Lot # 476-03-42

Lot # 473-01-042

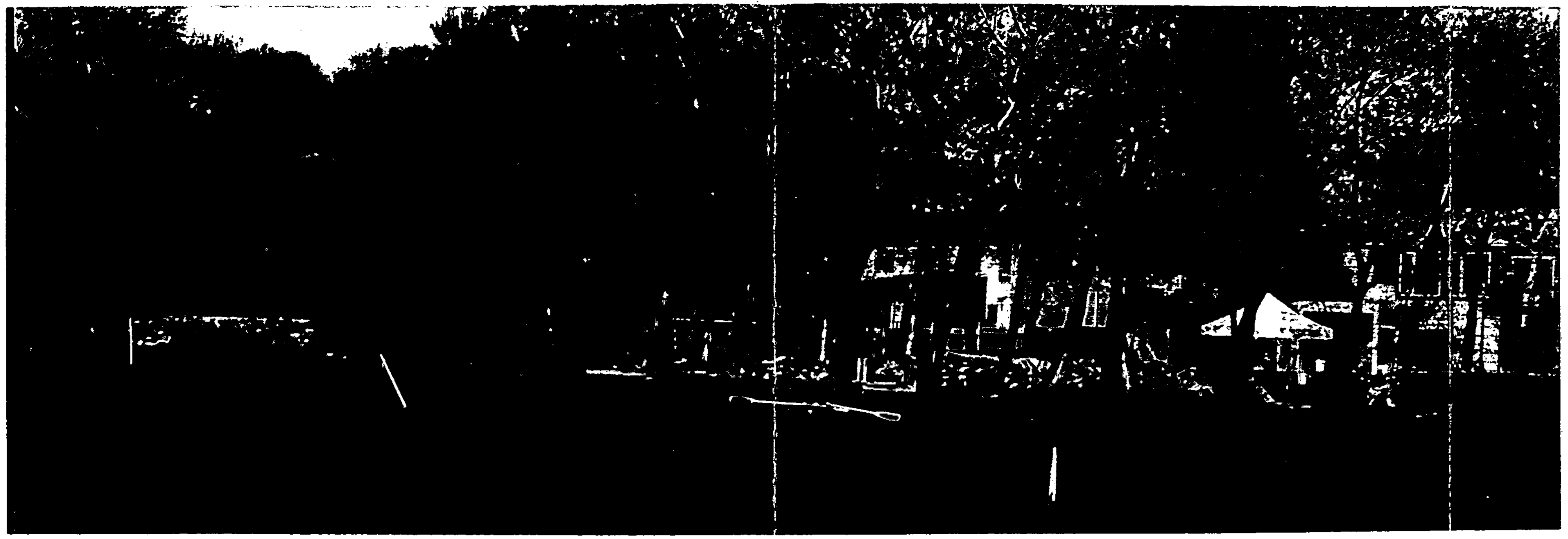
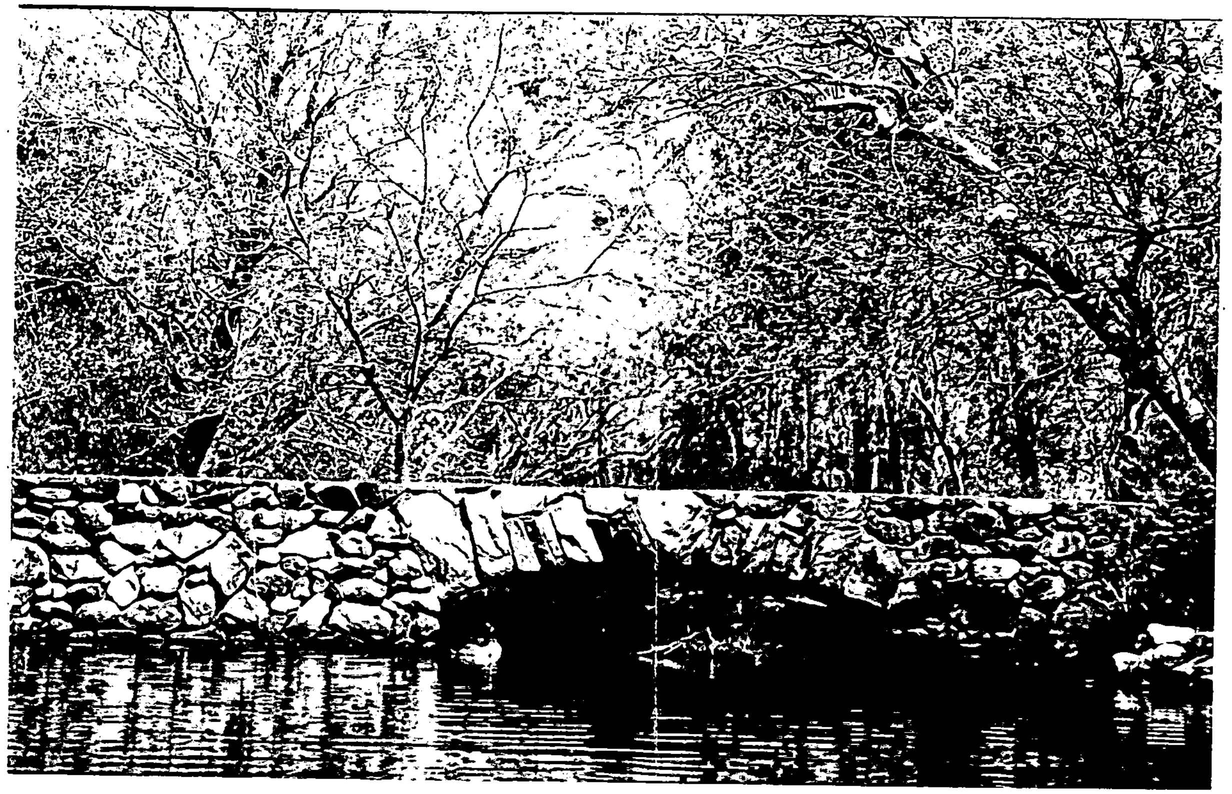


Photo #17: Lot # 476-03-42
Corner

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



## Lot #043-01-041

**Photo #19**

**Photo #20**

**Photo #21**

**Photo #22**

Photo #23

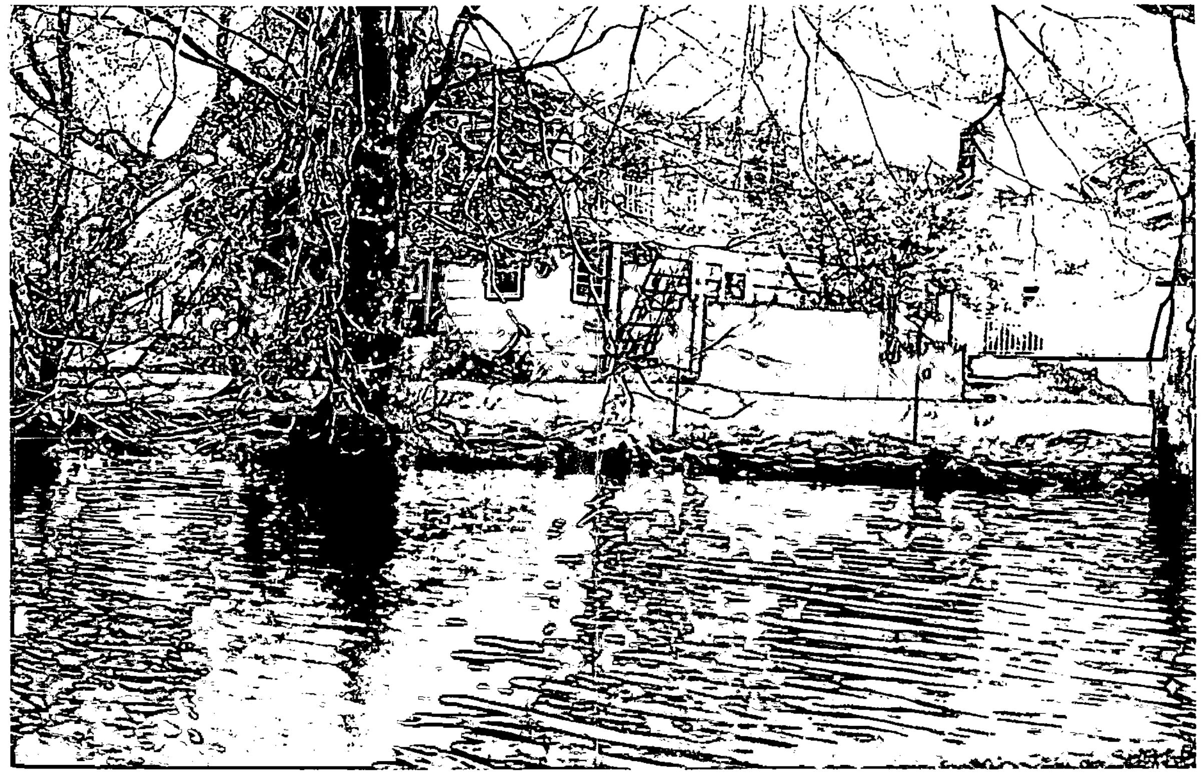
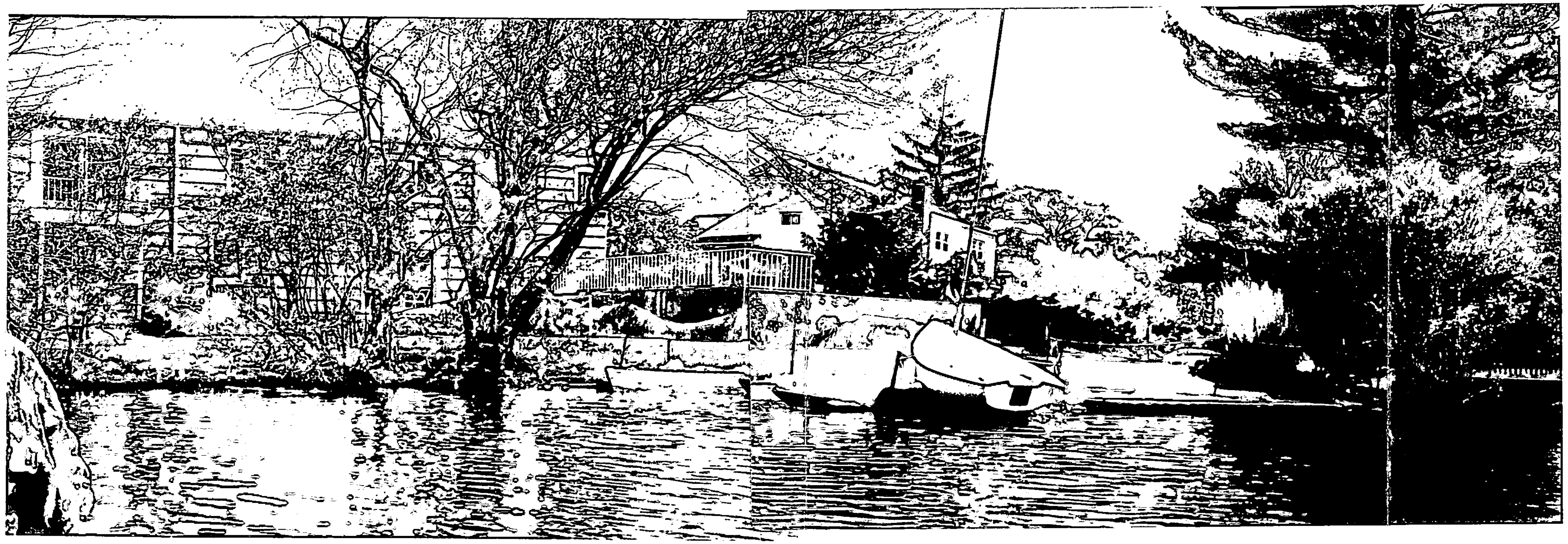


Photo #24



Lot # 473-01-038

Photo # 25

Photo #26

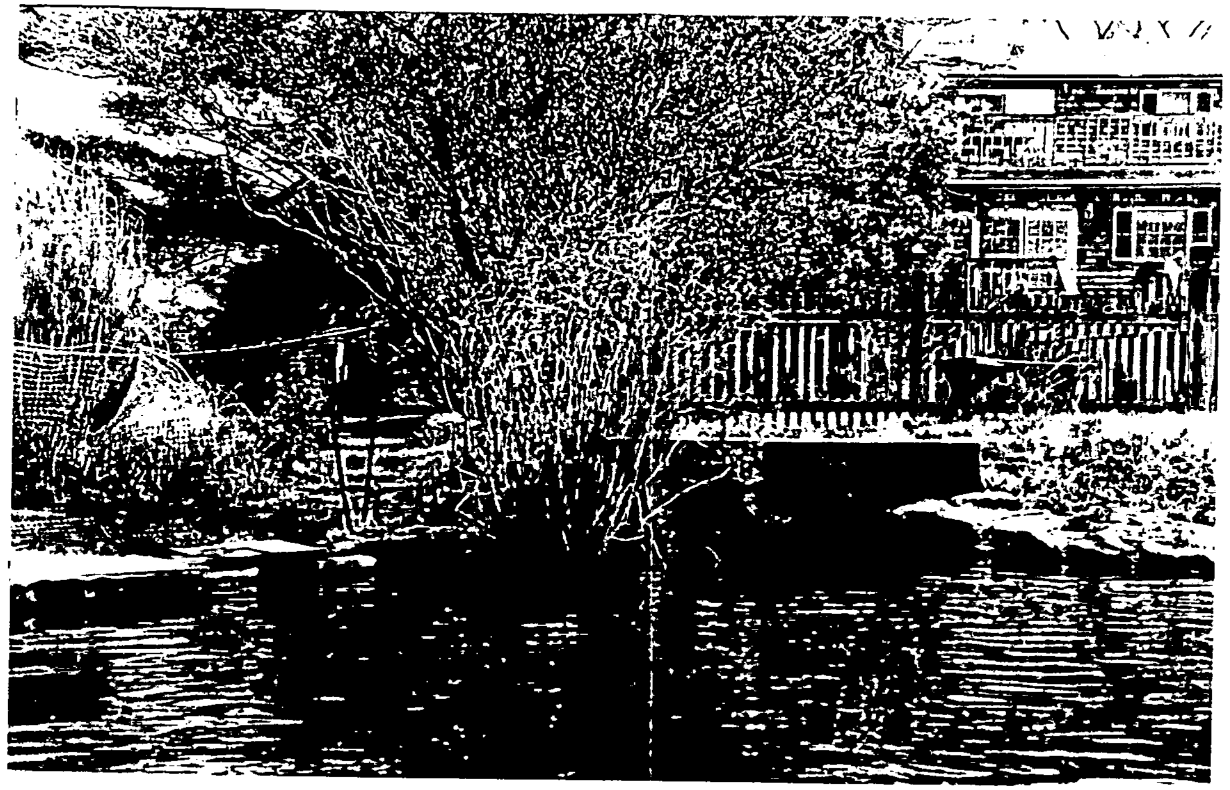
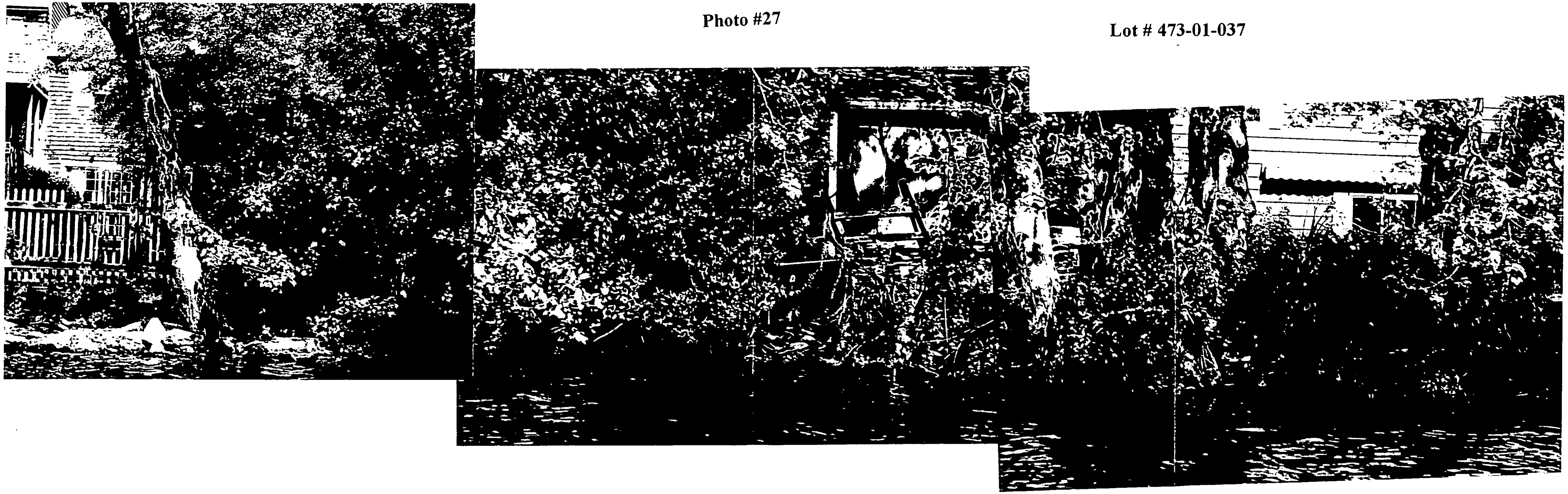


Photo #27

Lot # 473-01-037



Lot # 473-01-037

Photo #28

Photo #29

Lot # 473-01-036

Photo #30

Lot # 473-035 Photo #31

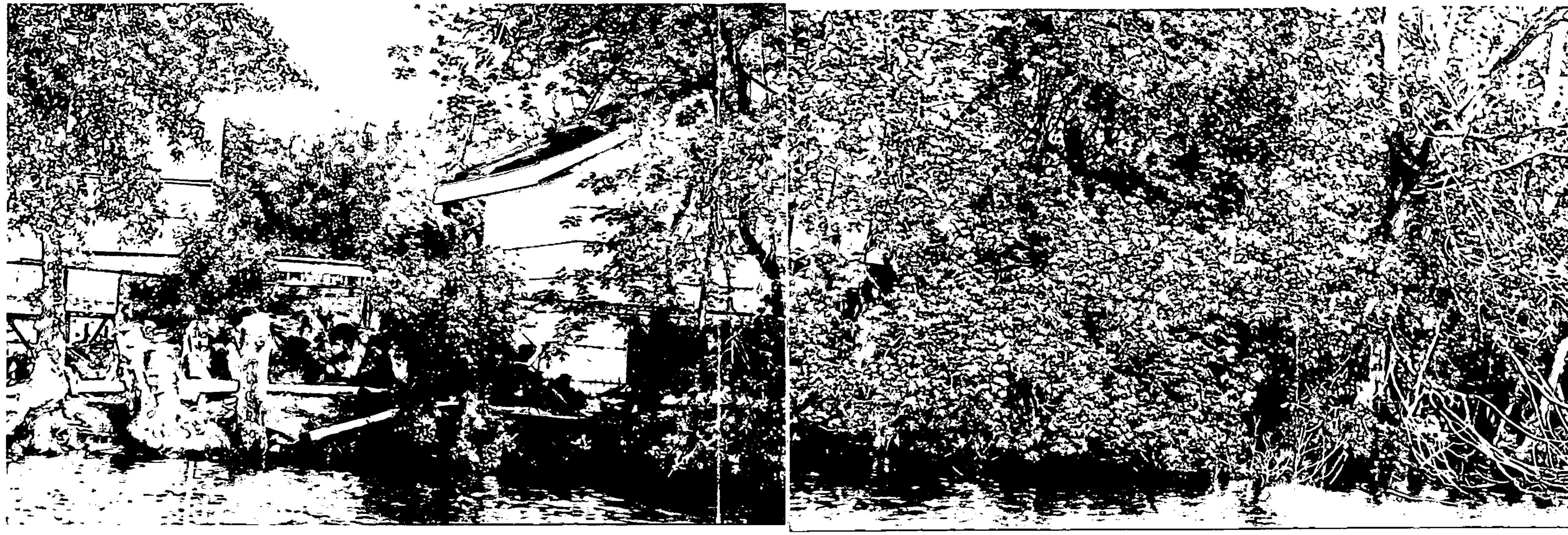


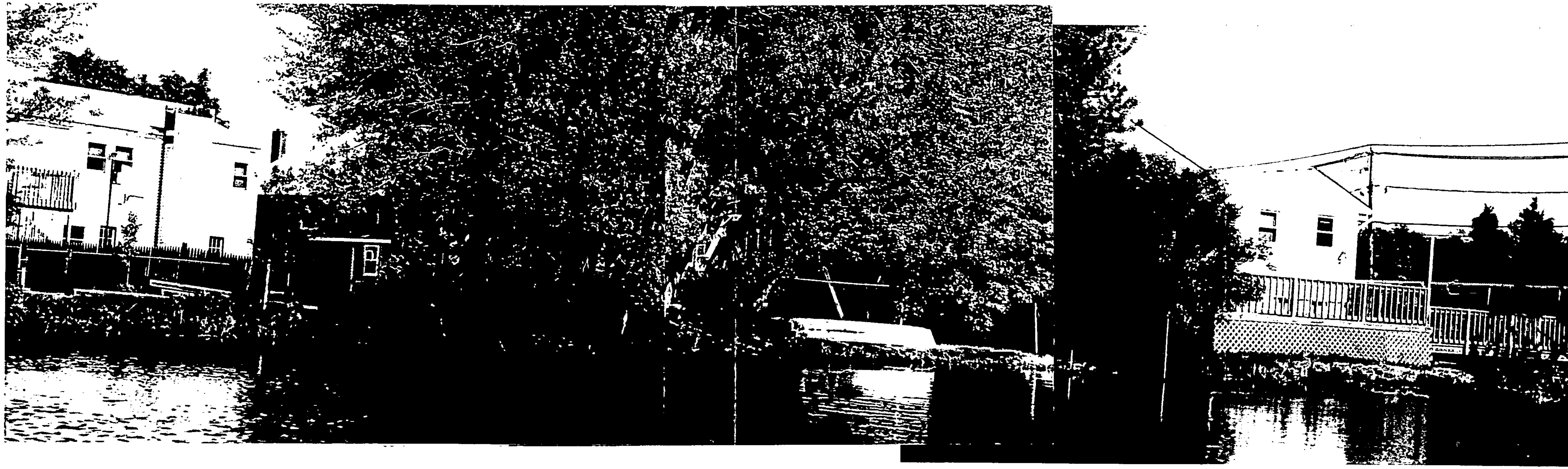
Photo #32 Lot # 473-034

Lot # 473-01-033

Lot # 473-01-034

Photo #33

Lot # 473-01-032



Southwest End Lake Capri

Photo #34

South End Lake Capri

South End View is East of Outfall Structure

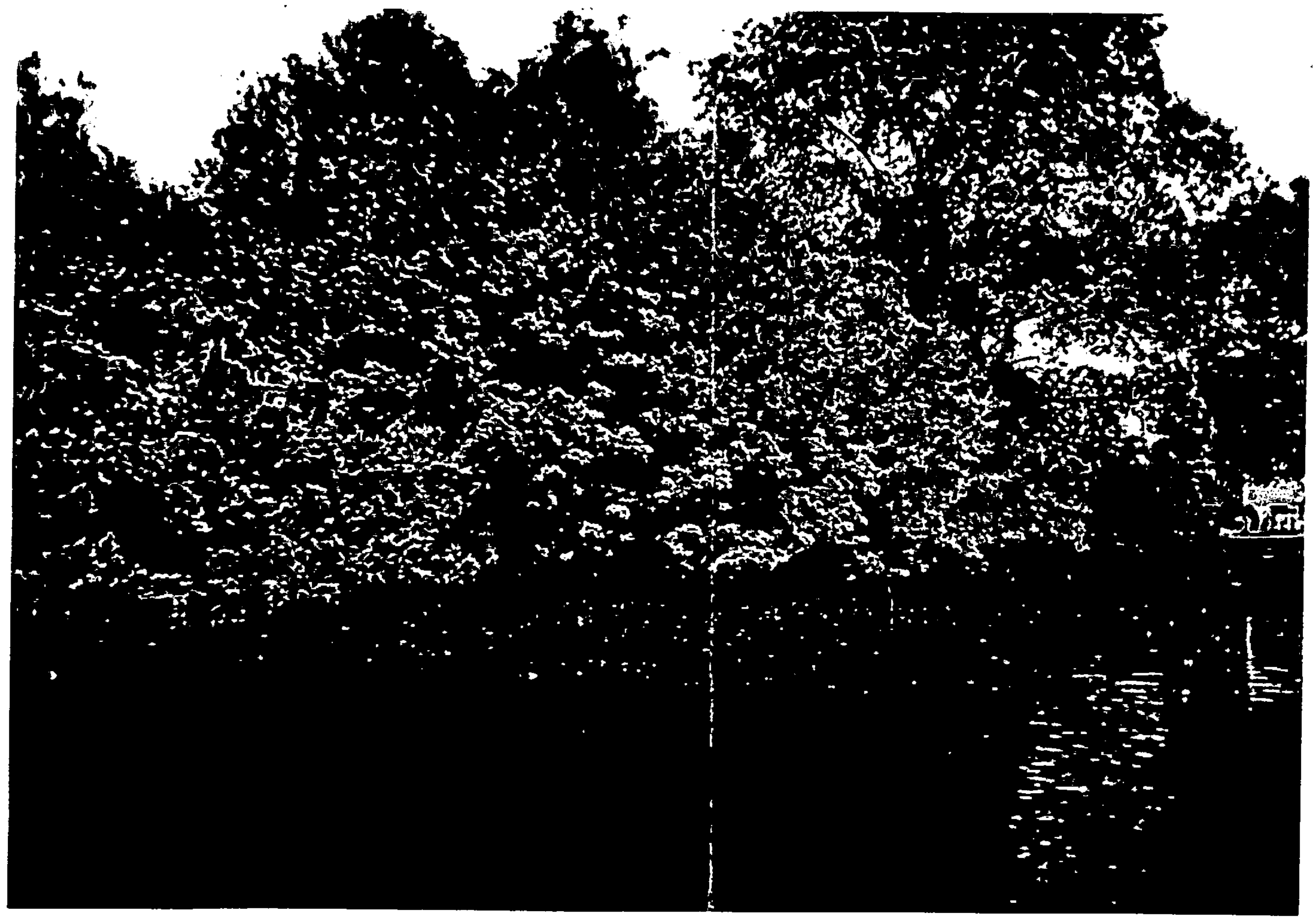
Photo #35

Outfall Structure

Photo #36

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

Photo #37



# APPENDIX D

## J.D. MEAGHER TREATABILITY STUDY REPORT
## (RI/FS, LMS, 1994)

J.D. Meagher, Inc.

# DZUS FASTENER CO.

## Hydraulic Dredging & Sediment Dewatering Bench Test

Prepared For:

Lawler, Matusky & Skelly Engineers
One Blue Hill Plaza
P.O. Box 1509
Pearl River, NY 10965
Contact: Sara A. Handy

Prepared By:

J.D. Meagher/allwaste, Inc
P.O. Box 752
Westborough, MA 01581
Contact: James E. Meagher

Report Date: October 2, 1995

J.D. Meagher, Inc.

**Evaluation of Effectiveness of Dewatering Technologies**

BENCH TEST EQUIPMENT DESCRIPTION

Dewatering tests were performed using clarifier, belt filter press, centrifuge and recessed chamber filter presses. The following is an explanation of each technology and its capabilities. Best and final test results are provided for the clarifier and recessed chamber due to their selected viability for the project.

CLARIFIER The operation of the clarifier is a relatively simple process. The flow starts with process water entering through an inlet pipe at the top of the unit. The pipe, which has a feed line for the flocculent injection, delivers the water to a deflection box. From there the water flows downward into the feed distribution channels. The feed distribution channels run across the bottom of the sloped plates. As slurry rises from the distribution channels, suspended solids begin settling on the plates. The solid materials slides toward the bottom and clarified water overflows the top.

The solids accumulate along the bottom of the unit and are moved to the center by a slow-turning screw. The solids are retained in the bottom of the clarifier long enough to thicken into a sludge state. Under flow pumps are used to remove the thickened sludge either directly to the mechanical dewatering system and or nurse tank.

FINAL TEST RESULTS OF CLARIFIER TESTING

| | |
|---|---|
| Raw Feed In-flow | 5.78 % Dry Solids |
| Polymer Usage Per Dry Ton | 3.0 #/Dry Ton |
| Clarifier Over Flow TSS | 725 mg/l |
| Clarifier Over Flow Ntu's | 62 Ntu's |
| Clarifier Underflow % d.s. | 16.4 % Dry Solids |
| Clarifier Over Flow Cd Level | 23.2 mg/l |

## BELT FILTER PRESS TESTING DESCRIPTION

The Andritz laboratory belt press provides continuous pressure filter (CPF) simulation. This is accomplished with separate gravity, wedge and high pressure apparatus. Independently testing each zone provides greater flexibility while testing because any number of parameters can be observed solitarily.

The gravity zone is simulated by pouring a sample of the flocced slurry onto a piece of belt mesh and allowing the free water to drain. The operator varies the length of time the slurry is allowed to drain by gravity thereby simulating various belt speeds.

A similar piece of belt is placed over the drained sample, followed by an upper tray, and pressure is applied through a pneumatic piston forcing out capillary water as in the wedge zone.

The cake is then passed around the S-roll between the small piece of mesh and the support belt multiple times to simulate the full scale unit. The support belt tension is increased with each subsequent pass around the S-roll. This increases the area pressure applied to the cake by each roll.

Throughput, expressed in dry lbs. or tons per hours, is calculated knowing belt speed, cake thickness, drainage area, and cake density.

## BELT FILTER PRESS TESTING RESULTS

The sludge from all three sample points produced a good floc when treated with polymer. The conditioned slurry releases water well and has a stable enough floc to stand up to pressure applied in the wedge and S-roll pressure zones. Cake solids up to 35% TS were achieved under a belt tension yielding 80 lbs. per linear inch (pli). Area pressures above this would cause the cake to extrude through the belt mesh. Similar problems occurred when the nip roll was used to exert tangential pressure. The optimum belt mesh used has a porosity rating of 310 cfm.

The cake produced would pass the paint filter test, but clearly did not have the strength to warrant a vane shear test. If the sludge were to be dewatering with this technology, post stabilization would be required to produce a cake with sufficient strength to meet the landfill requirements.

## CENTRIFUGE TESTING DESCRIPTION

The Sharples P600 Super-D-Canter centrifuge is designed to test wastewater sludges in the laboratory or during field trials to arrive at a set of operating parameters for sizing full scale dewatering centrifuges. The bowl design incorporates countercurrent flow in which the feed slurry enters near the conical-cylindrical intersection; liquid flows toward the end of the bowl to discharge over dams while deposited solids move toward the cake end with the conveyor. The differential speed between the conveyor and bowl is determined primarily by the gearbox ratio and can be varied by driving the pinion of the gearbox at different speeds. A reduced differential is useful in dewatering soft sludges since the cake residence time is increased and turbulence in the liquid and cake layers is decreased.

The depth of the cake layer in the bowl will be related to the cake solids and can be controlled by varying the pond depth. This is done by raising or lowering the dam at the cake discharge end.

## CENTRIFUGE TESTING RESULTS

The same chemical conditioning program used for the belt press trials was used for the centrifuge runs. A slightly higher polymer consumption was used on the single polymer runs. Polymer was added either at the centrifuge or in the feed tank if additional contact time was required. Sludge feed rate, polymer consumption, conveyor differential and pond depth were varied during each of the centrifuge runs in order to produce the direst cake while maintaining good centrate.

Cake solids up to 34% TS were achieved while maintaining good centrate. Slightly higher cake concentrations were possible, but the centrate was poor at best. The best results were achieved with a bowl-conveyor differential of 2-5 rpm.

## RECESSED CHAMBER FILTER PRESS

Going in to this phase of the pilot test there already was a feeling that the filter press would yield the best results due to previous lab scale testing. It was evident after the first day of testing that the belt press and centrifuge would not produce the kind of filter cake required for land filling, although efforts to maximize the performance of the other two technologies were extended.

Tests were to determine the materials dewatering characteristics including filtration time, chemical conditioning requirements and maximum cake concentrations (% dry solids).

Initial tests were conducted on a low pressure test unit, 100 psi, feed pump operation. This was compared to a high pressure press operation, 225 psi. Both press designs produced similar results with the exception of the high pressure press processing at 36% higher through put rate over the low pressure press. The slurry resulting from the raw samples supplied was conditioned with various percentages of hydrated lime which optimized at 20% by dry weight in a high shear mixing tank. The tank contents were pumped to the test press over time until terminal pressure was achieve at 225 psi. The press cycling was concluded at which point the filter plates were separated to sample the filter cake. Best and final test results follows further in the report. To possibly reduce the additional weight of lime in the final filter cake which would be transported to the landfill, the use of polymer was tested as a conditioning agent substitute for the hydrated lime. After several screenings it was found that a low charge, high weight anionic polymer could be used to achieve similar dewatering results as the hydrated lime. Final test results follow in this report.

FINIAL RESULTS OF RECESSED CHAMBER TESTINC ( with lime ).

<u>Raw Sludge Characteristics</u>

| | |
|---|---|
| Concentration, % Dry Solids | 5.74% |
| Slurry Density | 8.62# /gal |
| Color | light brown |
| Raw Settleability | 1' @ 6 min's |

<u>Chemical Conditioning</u>

| | |
|---|---|
| 7.5% Lime slurry, 93% Ca(OH)2 | 20% by wt D.S. |

<u>Dewatering Characteristics</u>

| | |
|---|---|
| Terminal Pressure | 225 psi |
| Cake Thickness | 1.25" |
| Cake Concentration % dry solids | 47.8% |
| Filtration Time | 70 minutes |

J.D. Meagher, Inc.

| | |
|---|---|
| Filtrate Ntu's | 13 Ntu's |
| Total Suspend Solids | 80 mg/l |
| Filtrate Cd level | 4.4 mg/l |
| Filter Cake Cd level | 263 mg/l |
| Ph @ 69°F | 11.2 |

FINAL TEST RESULTS OF RECESSED CHAMBER ( with polymer )

Raw Sludge Characteristics

| | |
|---|---|
| Concentration, % dry solids | 5.74 % |
| Slurry Density | 8.62 #/ gal |

Chemical Conditioning

| | |
|---|---|
| Polymer per dry ton of raw slurry | 8.6# per/ dry ton |

Dewatering Characteristics

| | |
|---|---|
| Terminal Pressure | 225 psi |
| Cake Thickness | 1.25" |
| Cake Concentration % dry solids | 56.1 % dry solids |
| Filtration Time | 100 minutes |
| Filtrate NTU's | 8 NTU's |
| Total Suspended Solids | 56 mg/l |
| Filtrate Cd Level | 2.8 mg/l |
| Filter Cake Cd Level | 380 mg/l |

J.D. Meagher, Inc.

## REVIEW OF ESTIMATED PROJECT COST & SITE NEEDS

**(recessed chamber filter press, 200 cu. ft. filtration area)**
**(conditioning with polymer)**

| | |
|---|---|
| Dredging Rate | 1500 gpm |
| Dredging Dilution During Pumping | 8:1 |
| Yards In-Place | 12,000 yards |
| Yards Processed | 96,000 yards |
| Gallons Processed | 19,400,000 gallons |
| Average % Dry Solids Of Sediment<br>Note: Based on averaging of raw samples | 30% d.s. |
| Total Bone Dry Tons Processed | 4,635 dry tons |
| Total Wet Tons Filter Cake | 9,268 wet tons |
| Gallons Processed Per Hour | 9,185 gph |
| Dry Tons Processed Per Hour | 2.19 dth |
| Processing Days (24 hours) | 88 days |

Site Requirements

* Power 480 volts, 3 Phase, 300 amps
* Set Up Area 200' x 150'

Estimated Project Cost

( based on awardment 120 days prior to project start date)

| | |
|---|---|
| Dredging & Dewatering (lump sum) | $ 2,572,425.00 |
| Project Cost Per Yard In Place | $ 214.36/ yards |
| Project Cost Per Dry Ton | $ 555.00/ dry ton |

## CONCLUSION

The recessed chamber technology conditioning with polymer meets the project goals of the highest % dry soils filter cake for off site disposal with the lowest filtrate discharge value of cadmium and suspended solids. The sediment material handling characteristics are a good candidate for hydraulic dredging and mechanical dewatering. Should polishing of the discharged filtrate be further required for cadmium and suspended solids using a constructed on site sand filter, the project cost would increase by 12% for construction, operation and decontamination of the system.

J.D. Meagher, Inc.

## Bench Testing Objectives

The objectives of the Lake Capri sediment dredging and dewatering bench test are to:

- Review the equipment operation requirements to maintain the least amount of turbidity during the dredging operation.

- Evaluate the effectiveness of the selected dewatering equipment for it's ability to produce filtrate meeting discharge criteria and filter cake meeting the paint filter test.

- Discuss the operational set up of the chosen technology and its operating parameters.

- Review the estimated project cost and site needs.

- Submit photos of the filter cake's final product of each technology.

## REVIEW OF DREDGING OPERATION

The project site will not require cable grappling to remove obstructions such as large rocks and/or fallen trees. The sediment is mostly fine sand, silt, and clay (see: Geo Testing Results). The accepted means to remove the sediment from the lake is hydraulic dredging which is a high powered centrifugal pump that feeds the material through a discharge pipe to a processing unit. The dredge unit has a horizonal cutter head mounted on the hydraulically operated boom. The cutter head is equipped with cutter knives which dislodge and cut up the material with a scissor like action. The spiral auger in the cutter head drives the material to the pump suction intake. A shield shrouds the cutter head entrapping suspended material and minimizing turbidity. Over the water, travel of the dredge requires (deadman) or anchors to be positioned at various points around the shore line. A traverse cable is attached between opposing points on the lake which the travel winch on the dredge is attached. This allows the dredge to move freely under it's on power from one point to the other assuring straight dredging cuts which is outlined as follows:

Travel On The Water

The Dredge will travel under its own power at a fair rate of speed, but it can not steer itself and it cannot stop itself. Steering and stopping must be with an assisting water craft.

To travel forward:

1. Disconnect the discharge line at the dredge and leave it open.

2. Lower the pumping head into the water.

3. Start the pump at a Slow RPM and increase RPM until the desired thrust is achieved. The pumping suction in front and the discharge at the rear will achieve forward thrust.

To steer:

1. Lash a motor boat (10 HP or larger) to the side of the dredge. Thrust forward to turn the dredge on way and reverse to turn the other.

To stop:

1. Shut off pump.

2. Reverse thrust of motorboat.

3. Lower pump head to bottom.

DREDGING AND USING THE IN-LINE TRAVEL CABLE

Use a 5/16" galvanized aircraft type cable.

1. The most economical method is to use a large reel of cable. Pay out the amount needed, but don't cut it.

2. String the cable so you work toward the short or bitter end. This way when the cable does wear you are cutting off the short worn end, and not the unused cable reel end.

The best operating tension on the cable will vary from job to job. The cable will typically hang down some and might even be in the water behind the machine. The harder the materi being dredged, or the harder you wish to pull on the cable, the more cable wraps are required around the windlass drum. Also, the more warps you have will allow less cable tension.

Use the following as a basic guide:

1. One wrap can be used to move the machine in light sludge.

2. Two wraps can be used for sludges and slurry gate operations, and sometime for jetting soft sand or where a soft advance is needed.

3. Three wraps are as many as should ever be required.

Do not allow any "slip" of the cable on the drum to set the advancing force into the material as this wears out both the drum and the cable.

The weight of the cable in front of the machine provides a constant thrust of the machine into the material being dredged.

1. Pull some cable through the front block using the windlass control lever. This will make the cable in front of the machine tight, and the cable behind the machine slack. As the forces fore and aft try to equalize, the machine will move forward.

2. Even when you let go of the windlass lever the machine will continue to move forward; so advance the cable only gradually (4-6 inches at a time).

3. As you get closer to the front anchor point, or as the material get harder, the front cable will have more of a tendency to stay taut and you will need to pull the machine along it.

4. If the cutterhead or pump starts to "load up", stop forward movement for a while and let the cable tension equalize. If the pump continues to "load up" again, you should back away and then advance once again into the material.

5. Occasionally the discharge line will need to be pumped clean of solids. (This should always be performed at the end of the day before machine shutdown.) Should a drastic reduction in discharge flow be noticed by the dredge operator or by the assisting operator on the bank, the line should be pumped clean to prevent "sanding" a line closed. Increase engine RPM to increase pump discharge flow.

BACKING UP FOR A NEW CUT

Always move the tail anchor point before you back up and the front anchor point after you have backed up.

Backing out the discharge hose.

1. The wind will move the float line, so it is much easier if you can set the line so the wind will pull it out of the way while backing up.

2. Sometimes the float line will back out the same way it came in while under pressure or reduced pressure.

3. While completely relaxed (pump off), the float line can sometimes be made to "accordion fold" behind the machine while backing out, or drag along the side.

4. Under adverse conditions, a vehicle or a steering winch can be used with a rope to pull the float line back and out of the way.

DISCHARGE LINE

Float line - Flexible Butyl Hose

1. There are two types of discharge piping, flexible butyl rubber rollflat hose and polyethylene pipe. These are normally furnished in 20 ft. lengths for convenience and ease of handling.

2. The standard discharge fitting on the dredge is a male lock ring quick disconnect. Each length of discharge pipe has the same male fitting on one end and matching female on the other, so you can mix and match hard and flexible discharge pipe to any configuration desired.

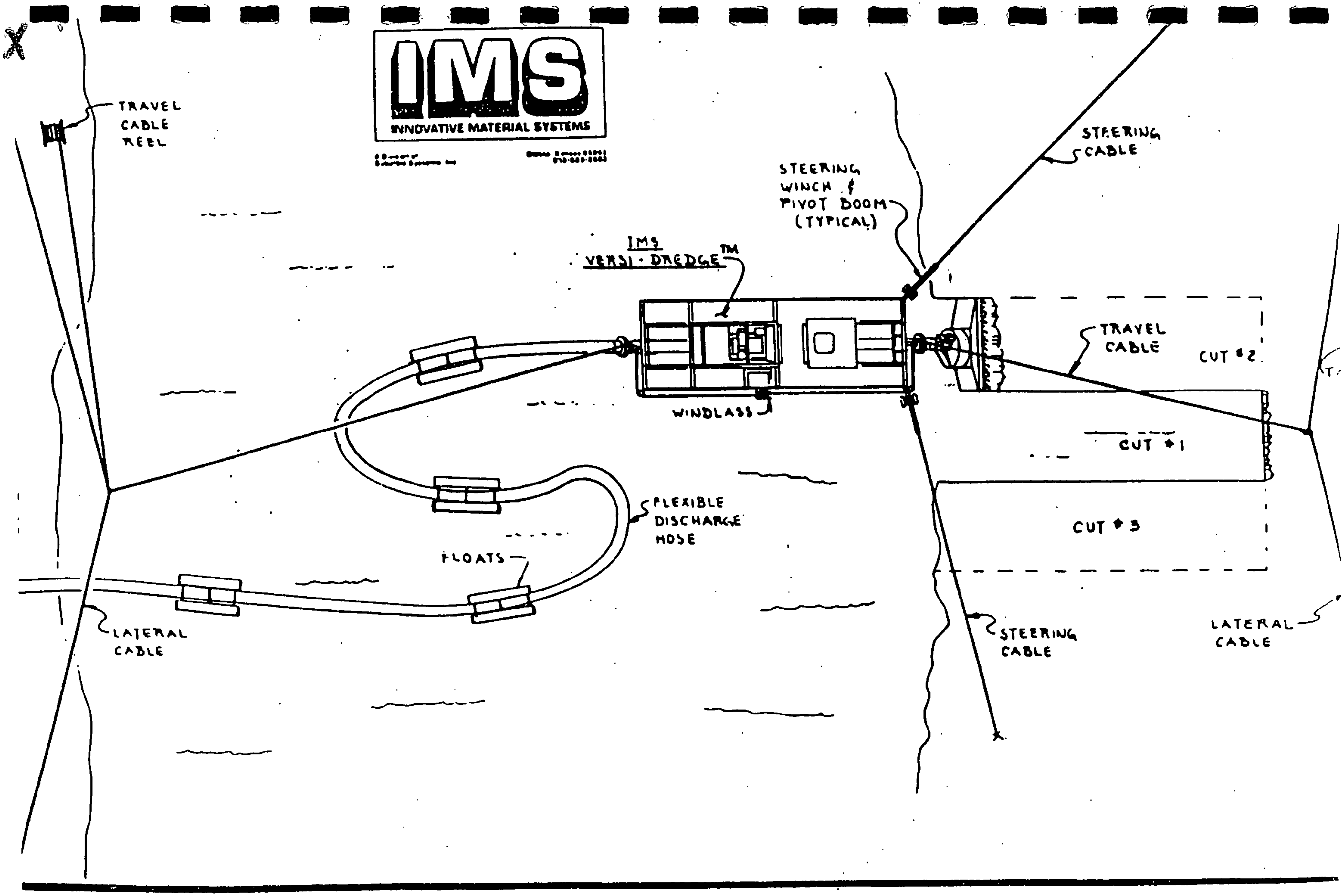
3. Typically 250-350 ft. of flexible butyl rubber hose is used to connect the dredge discharge line to rigid pipe. This provides a loop or radius in the discharge float line which allows forward/reverse travel.

4. Floats are attached to the discharge line by using chain and snaps through rings on the floats and rings on the discharge line.

5. The floats are made of sealed lengths of Poly or PVC pipe.

6. The floats can be used as pairs with the line suspended between them or as single units with the line suspended beneath.

7. The flexible float line should be made into a "U" shaped open loop on the downwind side of the dredge if possible.




"TRIPLE CUT SET UP"

8. The dredge can normally travel about one and one half times the length of the flexible line (measured from bank to dredge straight line with hose positioned in "U" shape).

9. The hard pipe is floated to get from the bank to the beginning of the loop.

10. When connecting 10" pipe or hose, remember there will be two tons of hydraulic force (from discharge line pressure) plus the machine pulling on the line to try to pull it apart. An 8" line will be 2500 #'s or hydraulic force and a 12" line will be nearly 6000 #'s of hydraulic force.

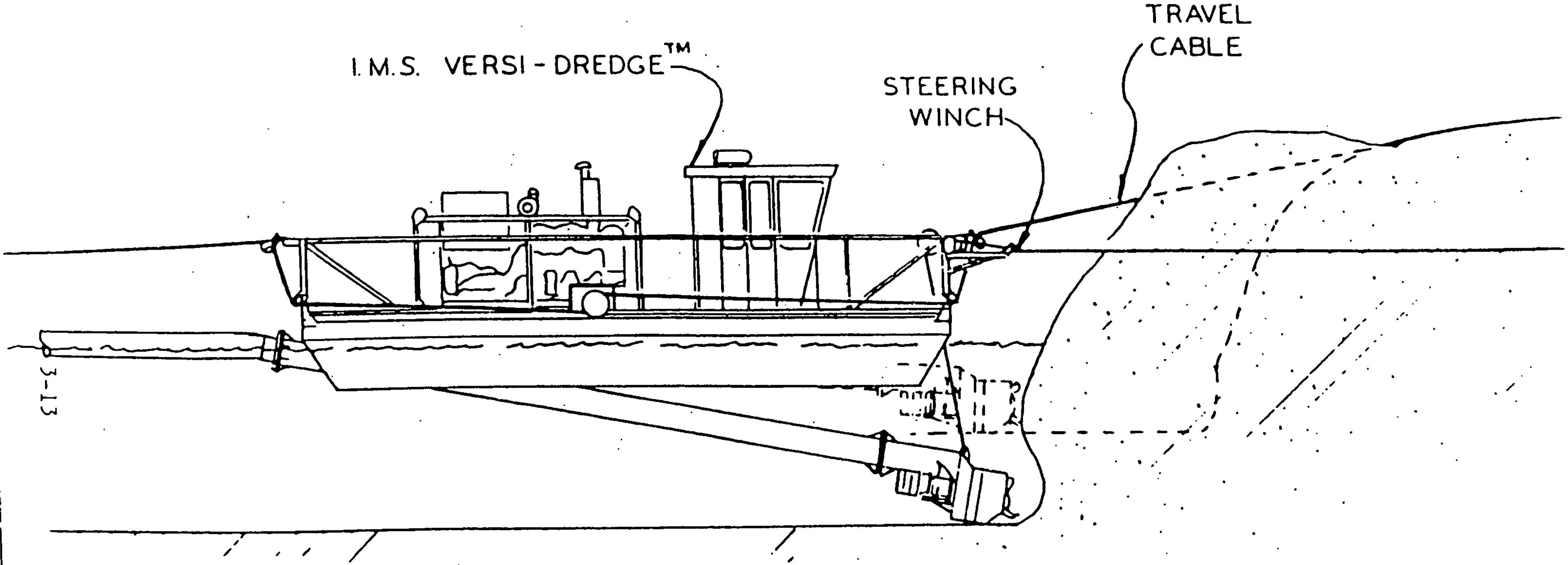
Land Line or Shore Line

1. The land line is usually all plastic pipe because of the cost.

2. Plastic pipe is also much easier to handle and install on a hillside.

3. Care must be taken when laying pipe across ditches or sharp objects; the full pipe is heavy and will fail if it is not supported properly. A sharp object against the pipe line will wear a hole in it.

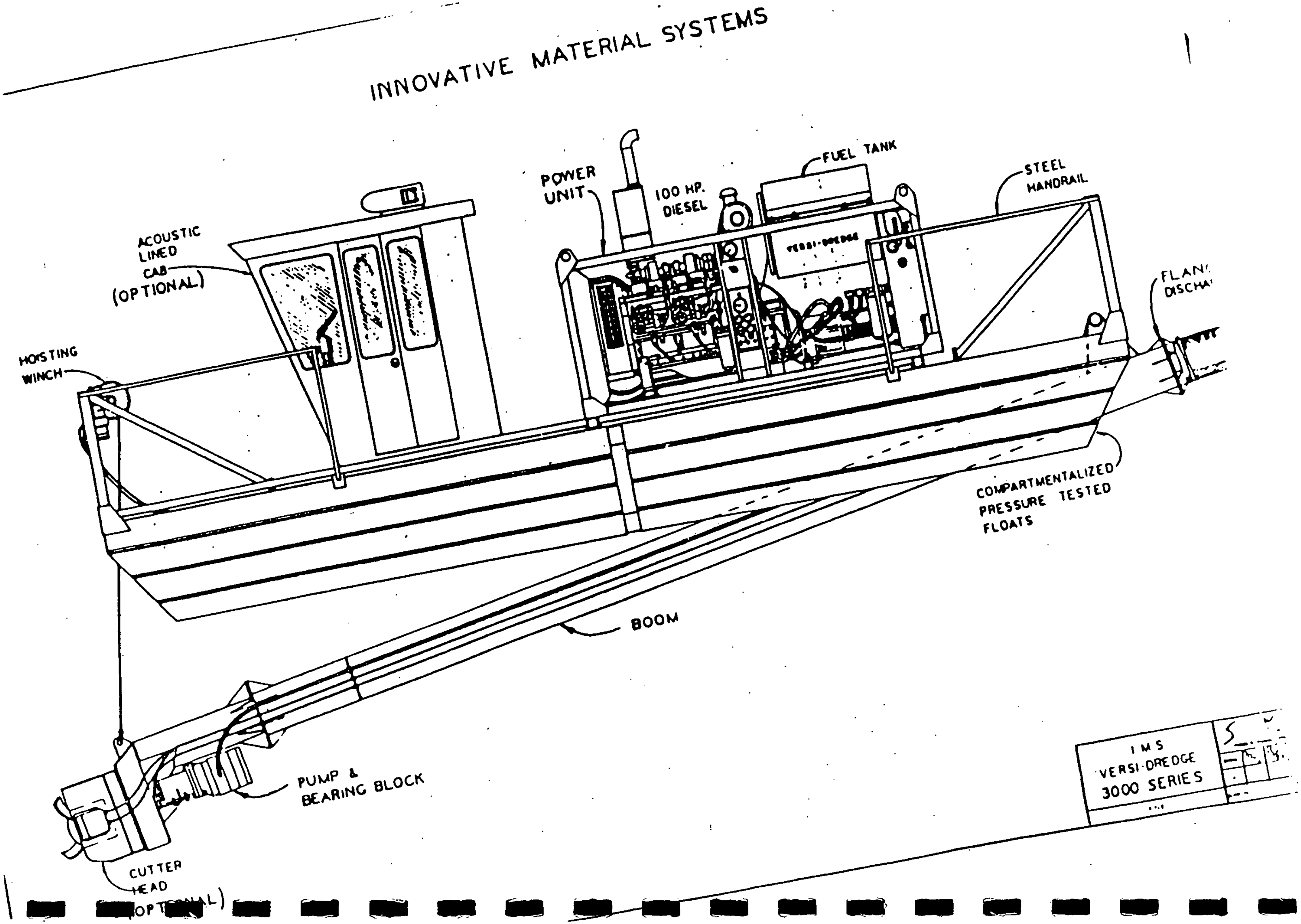
4. Wherever a long run is made after a significant elevation rise, a vacuum breaker or anti -siphon device should be installed to keep the pipe from collapsing on engine shutdown or sudden flow stoppage.




Suburbia Systems In

DRN

JOB NO.



INNOVATIVE MATERIAL SYSTEMS
ACOUSTIC LINED CAB (OPTIONAL)
POWER UNIT
100 HP. DIESEL
FUEL TANK
STEEL HANDRAIL
HOISTING WINCH
COMPARTMENTALIZED PRESSURE TESTED FLOATS
BOOM
PUMP & BEARING BLOCK
CUTTER HEAD
IMS VERSI-DREDGE 3000 SERIES

J.D. Meagher, Inc.

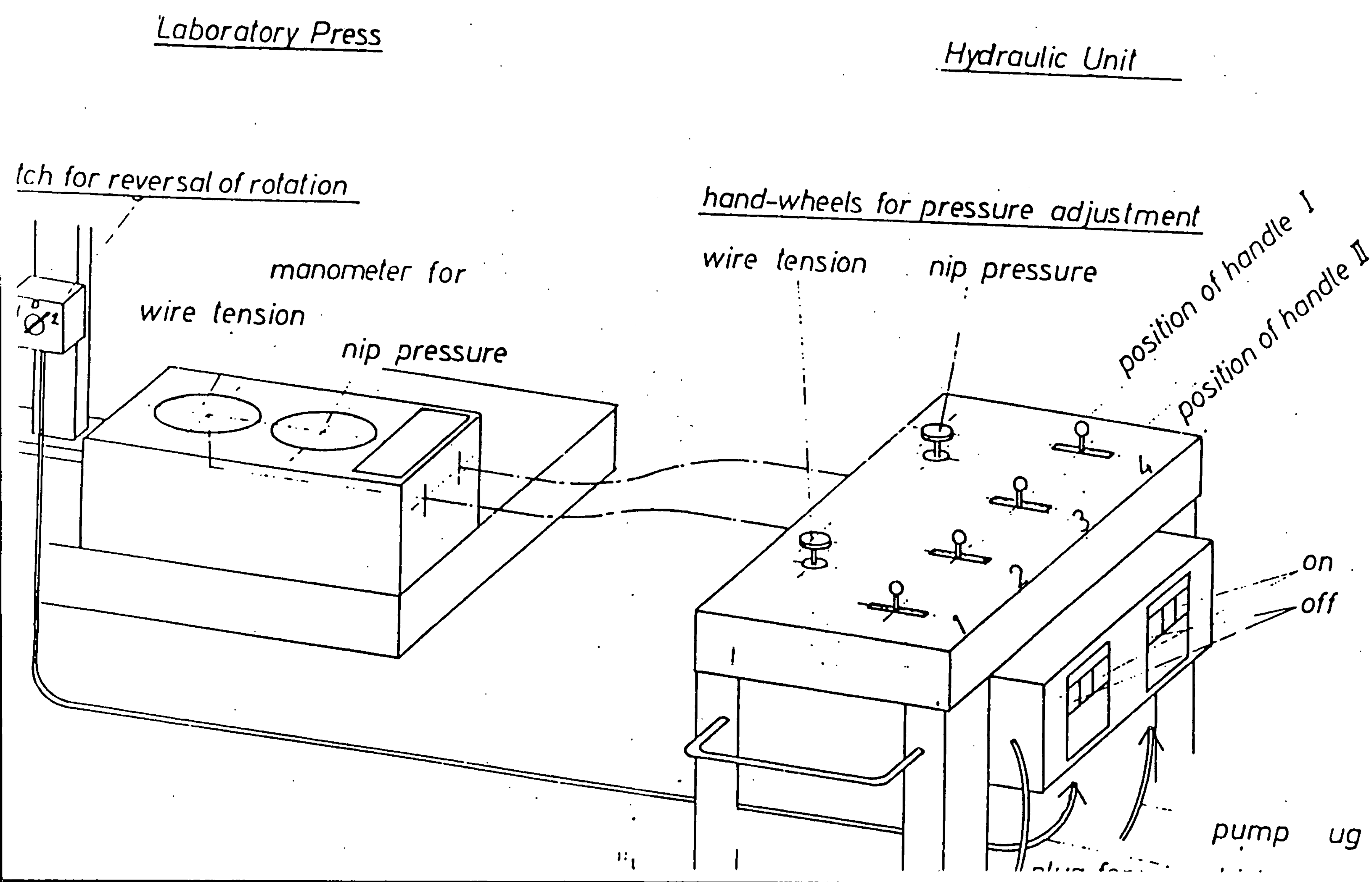
# TEST EQUIPMENT DRAWING

## CLARIFIER

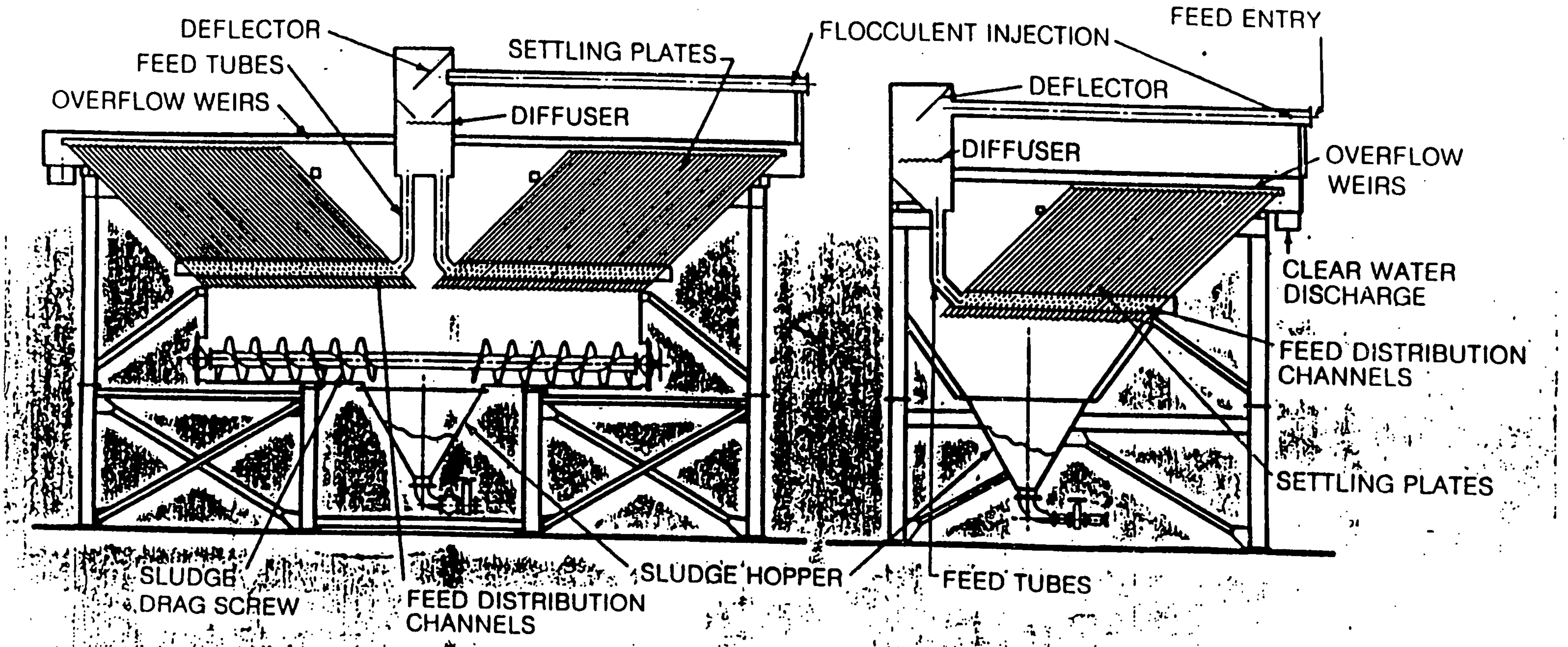
## BELT FILTER PRESS

## CENTRIFUGE

## RECESSED CHAMBER

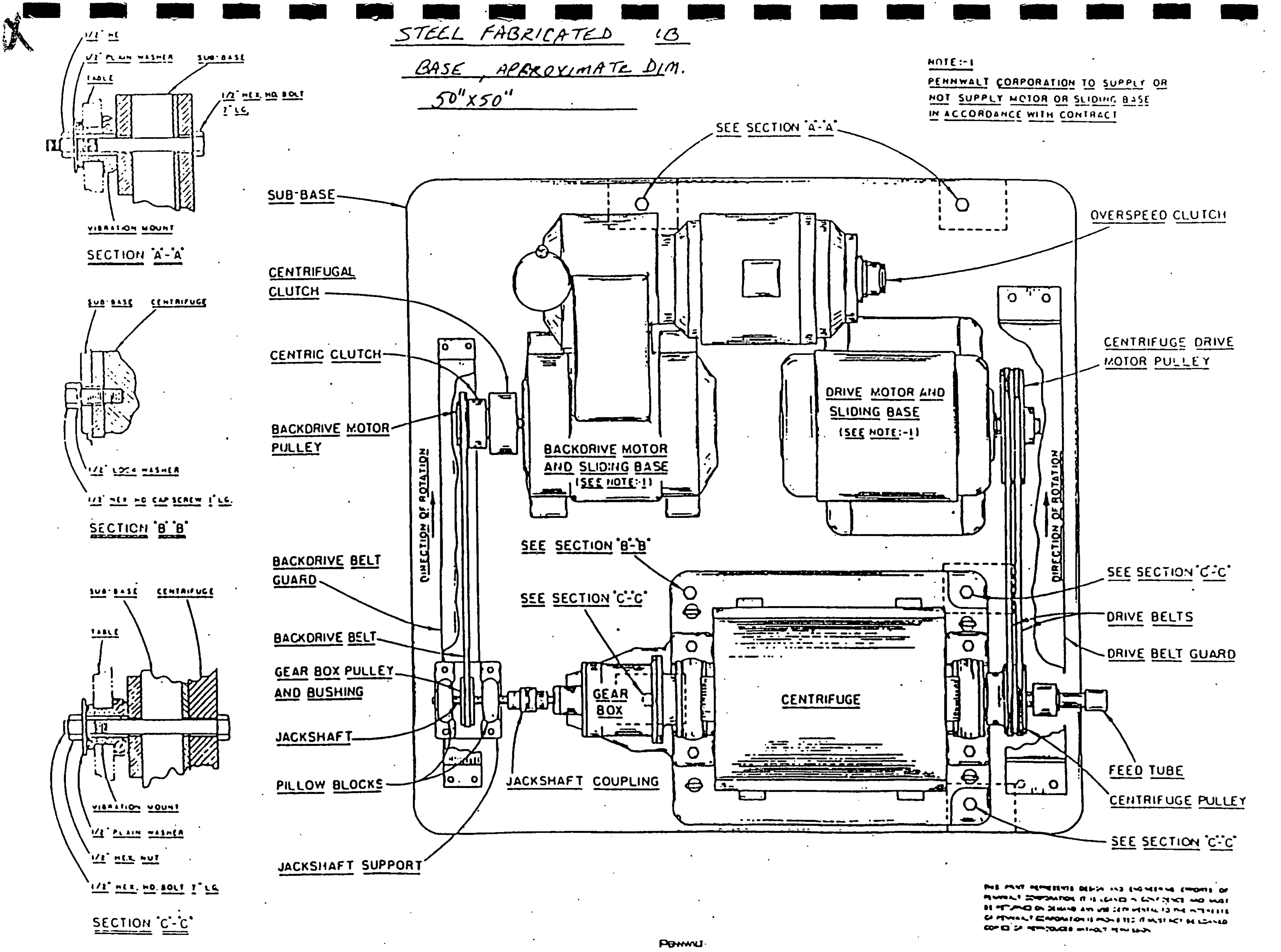



ANDRITZ
ACTIENGESELLSCHAFT




Model 12

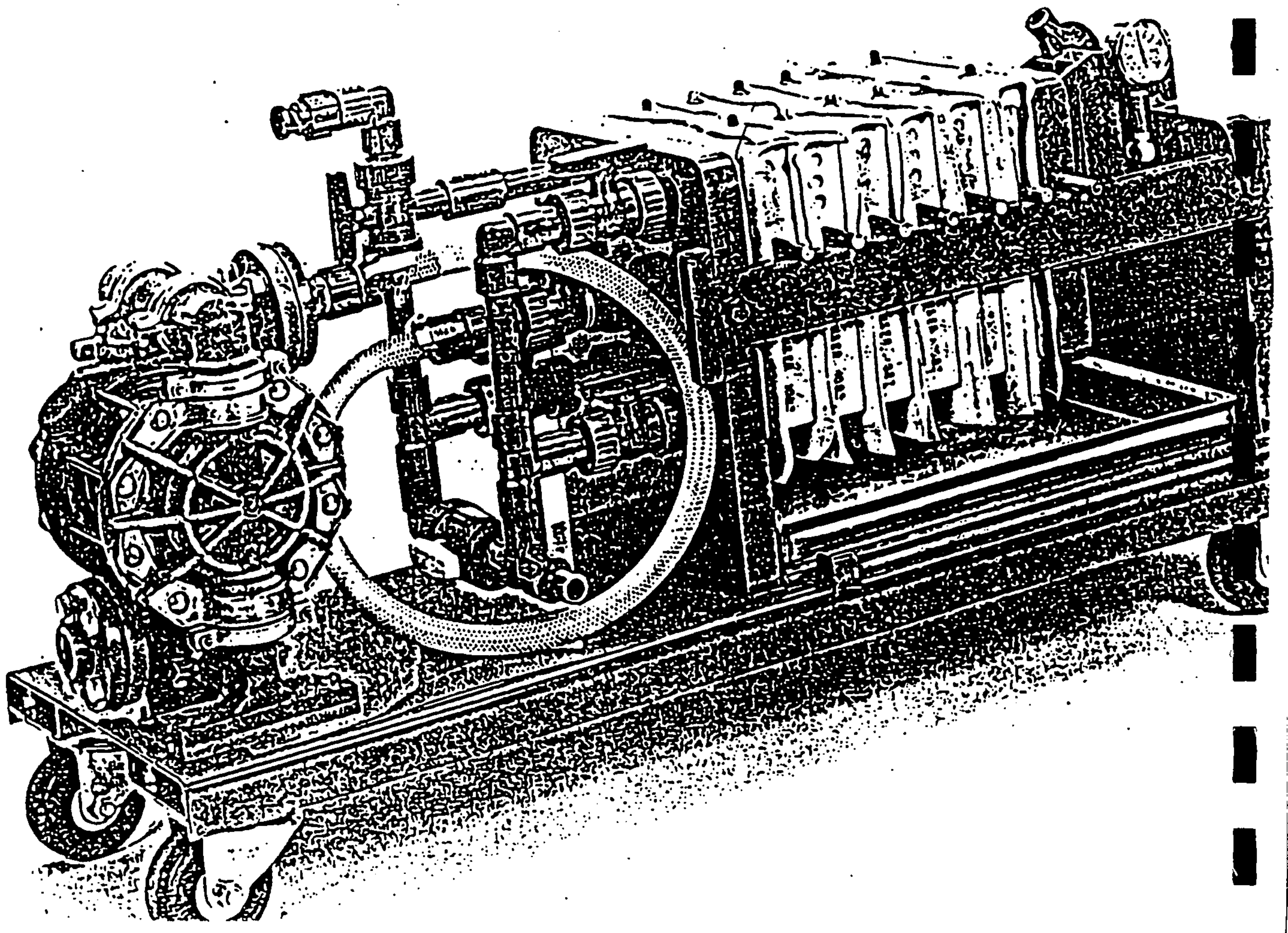
Model 6


STEEL FABRICATED CB
BASE, APPROXIMATE DIM.
50"x50"
NOTE:-1
PENNWALT CORPORATION TO SUPPLY OR NOT SUPPLY MOTOR OR SLIDING BASE IN ACCORDANCE WITH CONTRACT
1/2" HEX. HD. BOLT 7" LG.
SUB-BASE
TABLE
VIBRATION MOUNT
SECTION "A"-"A"
SUB-BASE
CENTRIFUGE
1/2" LOCK WASHER
1/2" HEX HD CAP SCREW 1" LG.
SECTION "B"-"B"
SUB-BASE
CENTRIFUGE
TABLE
VIBRATION MOUNT
1/2" PLAIN WASHER
1/2" HEX. NUT
1/2" HEX. HD. BOLT 7" LG.
SECTION "C"-"C"
SEE SECTION "A"-"A"
SUB-BASE
OVERSPEED CLUTCH
CENTRIFUGAL CLUTCH
CENTRIC CLUTCH
BACKDRIVE MOTOR PULLEY
BACKDRIVE MOTOR AND SLIDING BASE (SEE NOTE:-1)
DRIVE MOTOR AND SLIDING BASE (SEE NOTE:-1)
CENTRIFUGE DRIVE MOTOR PULLEY
DIRECTION OF ROTATION
DIRECTION OF ROTATION
SEE SECTION "B"-"B"
SEE SECTION "C"-"C"
SEE SECTION "C"-"C"
BACKDRIVE BELT GUARD
BACKDRIVE BELT
DRIVE BELTS
DRIVE BELT GUARD
GEAR BOX PULLEY AND BUSHING
JACKSHAFT
GEAR BOX
CENTRIFUGE
FEED TUBE
PILLOW BLOCKS
JACKSHAFT COUPLING
CENTRIFUGE PULLEY
SEE SECTION "C"-"C"
JACKSHAFT SUPPORT
PENNWALT

# Product Testing Sample Service

JWI will run a sample analysis in our lab to determine the feasibility of using the J-Press for your process or application. The initial test will determine the type of cloth, plate style, operating pressure, chemical additives, and process time to assure the proper size filter press for your specific application. When testing is completed, an actual sample of the filtrate and cake is sent along with a lab report which dramatically shows what a J-Press can do for you.

JWI has available, for rent or sale, 250 MM (10" x 10" plate), .15 ($ft^3$ portable pilot filter presses for field testing purposes. These units include a double diaphragm feed pump, interconnecting piping and air blowdown manifold, all mounted on a skid with casters. The press can be fitted with different cake thicknesses, cloth types and feed pressures for testing different applications. See photo below.



# APPENDIX E

# O'BRIEN & GERE TREATABILITY STUDY REPORT
# (PDI, MAY-AUGUST, 1998)

# TREATABILITY STUDY REPORT

# LAKE CAPRI SEDIMENTS

# BENCH-SCALE DEWATERING PROGRAM RESULTS

prepared for

Rust Environment & Infrastructure

Albany, New York

August 1998

O'BRIEN & GERE
LABORATORIES, INC.

## 1.0 Lake Capri Sediments- Characterization

O'Brien & Gere Laboratories (OBGL) received representative samples of reference sediment for evaluation of volume reduction or mechanical dewatering techniques by pressure filtration. These materials were identified as Lake Capri sediments TS-1, TS-2, and TS-3.

Lake sediment solids content (as rec'd) was found to range from 16.2 to 23.3 percent, with an average unit density of 69.7 pounds per cubic foot for the samples provided. The pumpable sediments appeared dark brown in color and were classified in the laboratory as sandy clayey silts. Total cadmium was found to range from 199 to 359[†] ppm, with the highest concentration found in the TS-3 materials which were selected for use in the majority of the bench tests.

TS-3 sediment was diluted with 1 part water, and used at approximately 10 percent total solids content and corresponding unit weight of 65.5 pounds per cubic foot. The pH of the adjusted sediment solids was found at 5.87 standard units. All filtration tests used this diluted sediment.

## 2.0 Dewatering Screening Evaluation- Sludge Conditioning

OBGL performed an initial evaluation of several sludge dewatering conditioning chemicals for the diluted TS-3 sediment. Typically, dewatering of sediments is greatly facilitated if they are chemically or physically conditioned. The purpose of conditioning is to increase the dewatering rate. Dewatering by pressure filtration can be affected on most sediments without any conditioning, but extremely long filtration times may result, many times rendering a full-scale system impractical.

## 2.1 Experimental Method- Initial Screening Tests

Investigations of conditioning admix requirements were conducted on a Baroid filter press. This device is a stainless steel filter cell, pressurized with compressed air. The inside diameter of the cell is nine centimeters (3.5 in.). A filter paper medium is replaced for each test to insure uniform permeability. The outlet from the cylindrical pressure filter cell ends in a nipple which is connected by a rubber hose to a 100-milliliter burette.

Normally, 250 milliliters of sludge are measured into the cell and the pressure-tight cover is screwed down. A valve is opened to pressurize the unit with up to 170 psig pressure, obtained from a nitrogen bottle through a regulator.

After a short period of time, solids are deposited upon the filtration medium through which additional sludge water must flow. By recording the filtrate cumulative volume as a function of time, it is possible to calculate a parameter of filterability through the deposited sludge solids. This measurement, or the Sludge Filtration Rate Index (SFRI), is a dimensionless relative value. However, OBGL has determined a SFRI number of 1.0 as the threshold of good dewatering in its pressure filtration studies, and sludges are conditioned with chemical and physical admix to obtain this value or less. Pressure filtration systems can be scaled-up using this routine indicator screening test.

The first test on the Baroid cell is usually made <u>without</u> the addition of any chemical or physical conditioning agent. This establishes the inherent index of the raw sludge.

## 2.2 Dewatering Screening Program Results (optimum SFRI data)

The sediment conditioning additives selected and application rates utilized for TS-3 sediment were based on previous bench scale dewatering work, and/or settlement test experience on natural sediments having similar properties. The dewatering additives evaluated and dosage utilized (based either on the sediment dry weight, on a volume-to-volume basis, or on a volume-to-weight basis) with the TS-3 sediment selected for the testing program are as follows:

| Conditioner | Dosage |
|---|---|
| anionic polymers (0.25 % w/v soln) | up to 100 ml/l of diluted sediment |
| cationic polymers (0.25 % w/v soln) | up to 120 ml/l of diluted sediment |
| lime hydrate (10 % w/v soln) | up to 20.0 % by dry weight of solids |

Lowest SFRI values with the sediment were obtained with either cationic polymers or lime conditioning. An SFRI as low as 0.56 was realized using Nalco 9905 cationic polymer at a dose of 120 ml/l with the TS-3 slurry. Similarly, another cationic polymer, Cytec SD2065, gave a low SFRI of 0.56. Neat polymer in each case was diluted to 0.25% solution concentration for the diluted lake sediment conditioning. Anionic polymers gave poor dewatering performance, having characteristically high SFRI values.

Lime conditioning at 20% by dry weight of sediment solids gave an SFRI as low as 0.34. However, when the lime dosage was reduced to just 5% by dry weight of sediment solids (i.e, expressed as "5% dws"), the SFRI remained acceptable at 0.92. This conditioning chemical rate was used for baseline testing evaluation on the diluted TS-3 sediment. Lime dosages of 6% and 7% were also explored later (i.e., expressed as "6% dws" and "7% dws" respectively)

Although lowest SFRI values for the conditioned sediment were found using a cationic polymer solutions (an SFRI as low as 0.56 was measured when using a medium-charge, high-molecular weight cationic polymer added at 120 ml/l of wet sediment) these specific chemical rates were not used for additional bench tests on the lake sediment solids.

## 3.0 Pilot Testing Using Plate-and-Frame Filter

A small (150 mm) plate-and-frame filter press was used for high-pressure (225 psig) sludge dewatering. As the conditioned slurry is pumped through the feed channels of the test press, it fills the frame to capacity with cake solids, forming a filter cake. The faces of the plates are grooved, with the entire plate covered with an appropriate filter cloth, which forms the filtering surface. As the feed pump continues to supply the slurry and build up pressure, the filtrate passes through the cloths to the drainage field of the plates and passes out through discharge ports. The filtrate discharge is monitored as an indicator of filtration cycle completeness and is a direct function of cake permeability. A predetermined discharge rate (1 gph/ft$^2$ of filter area) is the most consistent indicator of obtaining the driest possible filter cake, and related optimum volume reduction.

Two filtration feed pressures (100 psi and 225 psi) were tested using the selected baseline lime dosage (5% dws). These initial tests showed a marked improvement with the higher slurry feed pressure, with respect to overall filter cake quality. Subsequent test press runs using slightly higher lime additions (up to 7% dws) also used this high pressure condition to affect good results.

Tables 1 and 2 summarize the filtration test results for the diluted TS-3 sediment, conditioned with dewatering chemical (i.e., hydrated lime slurry) at rates found to be optimum during the dewatering screening tests (i.e., using available SFRI data). The tabular summary provides a brief qualitative overview of each test press run completed for dewatered TS-3 material. Additional detail data (certain quantitative cake and filtrate test parameters results) are presented in the analytical data appendix.

Samples of filter cake and filtrate from each of three high pressure filter press runs were collected and tested for certain extended analytical parameters. Leachable cadmium evaluations on the cake from all three high pressure runs (i.e., 5%, 6% and 7% dws) showed low TCLP values in each case (from 0.1 mg/l at low lime content to <0.03 mg/l with the highest lime doses). Two complete sets of data are available for selected press runs (6% & 7% lime by dws) which can be found in the analytical data appendix.

If duplicated at full scale, estimated total cycle time (beyond the actual filtration 1 hour run time for liquids-solids separation) would increase by about 1 hour in any case, to allow for cake drop and re-close of the filter pack (turn-around time). Fill time (after closure) is included in this hour interval.

The impact of sediment variability within the lake, as well as variable conditions expected with the full-scale dredge operation, on the dewatering results is unknown at this time. Further dewatering studies (i.e., an extended field trial) may be necessary to evaluate the best volume reduction rate which can be achieved through pressure filtration at Lake Capri.

---

Note:

† value denotes cadmium concentration in segregated <100 mesh size dry sediment fines

**Table 1.** **Lake Capri volume reduction by pressure filtration**
**Bench testing program summary of results using plate-and-frame filter**

| sample/test run | TS-3 run #1 | TS-3 run #2 |
|---|---|---|
| wet density, as rec'd | 67.8 pcf | 67.8 pcf |
| dry solids, as rec'd | 18.1% | 18.1% |
| dry solids, as used | 9-10%[1] | 9-10%[1] |
| density, as used | 65.5[1] pcf | 65.5[1] pcf |
| conditioning scheme | 5% lime dws | 5% lime dws |
| feed slurry solids | 9.7% | 9.7% |
| feed slurry density | 67.5 pcf | 67.5 pcf |
| filtration time | 60 min. | 50 min. |
| terminal pressure, psig | 225 | 100 |
| cake thickness | 32 mm (1¼") | 32 mm (1¼") |
| cake solids | 46.4% | 36.4% |
| cake density | 85.5 pcf | -- |
| cake quality | very solid, well formed, excellent release | soft, not well formed, sticky release |
| cake total Cd, ppm | 106 | -- |
| cake TCLP Cd, mg/l | 0.10 | -- |
| filtrate pH | 8.10 | -- |
| filtrate total Cd, ppm | <0.01 | -- |

[1] sludge solids diluted approximately 1 to 1

Table 2. Lake Capri volume reduction by pressure filtration
Bench testing program summary of results using plate-and-frame filter

| sample/test run | TS-3 run #4 | TS-3 run #3A |
|---|---|---|
| wet density, as rec'd | 67.8 pcf | 67.8 pcf |
| dry solids, as rec'd | 18.1% | 18.1% |
| dry solids, as used | 9-10%[1] | 9-10%[1] |
| density, as used | 65.5[1] pcf | 65.5[1] pcf |
| conditioning scheme | 6% lime dws | 7% lime dws |
| feed slurry solids | 9.9% | 10.3% |
| feed slurry density | 67.6 pcf | 67.9 pcf |
| filtration time | 70 min. | 70 min. |
| terminal pressure, psig | 225 | 225 |
| cake thickness | 32 mm (1¼") | 32 mm (1¼") |
| cake solids | 51.9% | 52.6% |
| cake density | 86.7 pcf | 87.2 pcf |
| cake quality | very solid, well formed, excellent release | very solid, well formed, excellent release |
| cake total Cd, ppm | 164.5 | 139.3 |
| cake TCLP Cd, mg/l | <0.03 | <0.03 |
| filtrate pH | 10.89 | 11.78 |
| filtrate total Cd, ppm | <0.01 | <0.01 |

[1] sludge solids diluted approximately 1 to 1

**O'BRIEN & GERE**
LABORATORIES, INC.

# Quick Note

To: Amy Van Laak RUST
Date: Aug 24, 1998
Subj: test samples
Job: Lake Capri sediments

Amy:

Enclosed, please find 4 cake samples, identified as follows:

| | |
|---|---|
| Run #1 | high pressure run @ 5% lime dws (good cake-- 46% solids) |
| Run #2 | low pressure run @ 5% lime dws (very soft cake--36% solids) |
| Run #3A | high pressure run @ 7% lime dws (very good cake--52% solids) |
| Run #4 | high pressure run @ 6% lime dws (excellent cake--53% solids) |

In addition, run #3A filtrate sample is provided.

John Doerner

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# LABORATORY TEST CERTIFICATE

August 26, 1998

O'Brien & Gere Laboratories, Inc.
5221 Militia Hill Road
Plymouth Meeting, Pa 19462

**Report#: 0825-18-177 (Page 1 of 2)**

**Sample: Lake Capri, Long Island, NY**

| | | |
|---|---|---|
| pH | 10.89 | EPA 150.1 |
| Total Suspended Solids | 2.5 mg/l | EPA 160.2 |
| Settleable Solids | < 0.10 mg/l | EPA 160.5 |
| Total Dissolved Solids | 1,119.1 mg/l | EPA 160.4 |
| Aluminum (Dissolved) | 6.0 mg/l | SW-846-6010 |
| Total Cadmium | < 0.01 mg/l | SW-846-6010 |
| Total Calcium | 274.8 mg/l | SW-846-6010 |
| Total Chromium | < 0.01 mg/l | SW-846-6010 |
| Total Iron | 0.14 mg/l | SW-846-6010 |
| Total Lead | < 0.03 mg/l | SW-846-6010 |
| Total Magnesium | 0.30 mg/l | SW-846-6010 |
| Total Manganese | 0.03 mg/l | SW-846-6010 |
| Total Zinc | 0.06 mg/l | SW-846-6010 |
| BOD | 18.0 mg/l | EPA 335.1 |
| Oil and Grease | 23 mg/l | EPA 413.1 |
| Cyanide, Amenable to Chlorination | < 0.01 mg/l | EPA 335.1 |
| Total Alkalinity | 254 mg/l | EPA 310.2 |

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Clara Myers
Manager

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# LABORATORY TEST CERTIFICATE

August 26, 1998

O'Brien & Gere Laboratories, Inc.
5221 Militia Hill Road
Plymouth Meeting, Pa 19462

Report#: 0825-18-177 (Page 2 of 2)

Sample: Lake Capri, Long Island, NY

**TS-3 Run #4 Cake Analyses:**

TOTALS:
The sample was acid Digested using, EPA SW-846, Method 3050A and analyzed by Method Indicated.

| PARAMETER | CONCENTRATION FOUND (ppm) | METHODS |
|---|---|---|
| Cadmium | 164.5 | SW-846-Method 6010B |

TCLP:
The Sample was leached Using Toxicity Characteristic Leading Procedure (TCLP) EPA SW-846, Method 1311.

1st pH: 10.68 Final pH: 6.34
2nd pH: 2.72 Solution Type: 1

| PARAMETER | CONCENTRATION FOUND (mg/l) | METHODS |
|---|---|---|
| Cadmium | < 0.03 | SW-846-6010B |

SOUTHERN SPECTROGRAPHIC LABORATORY

Clara Myers
Clara Myers
Manager

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# LABORATORY TEST CERTIFICATE

August 26, 1998

O'Brien & Gere Laboratories, Inc.
5221 Militia Hill Road
Plymouth Meeting, Pa 19462

Report#: 0825-25-278

Sample: Lake Capri, NY
TS-3 Run #3A Filter Cake
08-24-98

**TOTALS:**
The sample was acid Digested using, EPA SW-846, Method 3050A and analyzed by Method Indicated.

| PARAMETER | CONCENTRATION FOUND (ppm) | METHODS |
|---|---|---|
| Cadmium | 139.3 | SW-846 Method 6010B |

**TCLP:**
The Sample was leached Using Toxicity Characteristic Leading Procedure (TCLP) EPA SW-846, Method 1311.

1st pH: 10.65 Final pH: 8.05
2nd pH: 4.76 Solution Type: 1

| PARAMETER | CONCENTRATION FOUND (mg/l) | METHODS |
|---|---|---|
| Cadmium | < 0.03 | SW-846 Method 6010B |

SOUTHERN SPECTROGRAPHIC LABORATORY

Clara Myers
Manager

**O'BRIEN & GERE**
LABORATORIES, INC.

## Quick Note

| | | |
|---|---|---|
| **To:** | **Alan Tavenner** | **RUST Environment & Infrastructure** |
| **Date:** | **Sept. 02, 1998** | |
| **Subj:** | **additional test data** | |
| **Job:** | **Lake Capri sediments** | |

Alan:

Following are data on the filtrate from test press Run #3A (7% lime dws).

respectfully submitted,

John Doerner

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# O'Brien & Gere Laboratories,Inc.

# Analytical Results Trace Metals

Client: Lake Capri
Project:
Proj. Desc: Long Island, N.Y.

Job No.: 8011.001.517
Certification NY No.: 10155

Sample: J3379
Samp. Description: Press Run #3A Filtrate - Total
Units: mg/L

Collected: 08/05/98
Received: 08/07/98

Matrix: Water
%Solids:
Number of analytes: 8

| Parameter | Result | Method | Prepared | Analyzed | QC Batch | Dilut. | Note |
|---|---|---|---|---|---|---|---|
| Cadmium | <.01 | 6010 | 08/12/98 | 08/13/98 | 081298W1 | 1 | |
| Calcium | 190. | 6010 | 08/12/98 | 08/13/98 | 081298W1 | 1 | |
| Chromium | <.01 | 6010 | 08/12/98 | 08/13/98 | 081298W1 | 1 | |
| Iron | .28 | 6010 | 08/12/98 | 08/13/98 | 081298W1 | 1 | |
| Lead | .022 | 6010 | 08/12/98 | 08/13/98 | 081298W1 | 1 | |
| Magnesium | <1. | 6010 | 08/12/98 | 08/13/98 | 081298W1 | 1 | |
| Manganese | .06 | 6010 | 08/12/98 | 08/13/98 | 081298W1 | 1 | |
| Zinc | .29 | 6010 | 08/12/98 | 08/13/98 | 081298W1 | 1 | |

Notes:

J-Estimated value

Authorized: Thomas Alexander
Date: August 21,1998 Thomas Alexander

5000 Brittonfield Parkway / Suite 300, Box 4942 / Syracuse, NY 13221 / (315) 437-0200

# O'Brien & Gere Laboratories, Inc.

# Analytical Results Wet Chemistry

Client: Lake Capri
Project:
Proj. Desc: Long Island, N.Y.

Job No.: 8011.001.517
Certification NY No.: 10155

Sample: J3377
Samp. Description: Press Run #3A Cake - Total

Collected: 08/05/98
Received: 08/07/98 09:30
Matrix: Solid

| Parameter | Result | Units | Method | Prepared | Analyzed | QC Batch | Note |
|---|---|---|---|---|---|---|---|
| % Total Solids | 47.4 | % | 2540-G | | 08/11/98 | 081198S11 | |

Notes:

Sample: J3379
Samp. Description: Press Run #3A Filtrate - Total

Collected: 08/05/98
Received: 08/07/98 09:30
Matrix: Water

| Parameter | Result | Units | Method | Prepared | Analyzed | QC Batch | Note |
|---|---|---|---|---|---|---|---|
| Amenable Cyanide | <.01 | mg/L | EPA 335.1 | 08/11/98 | 08/11/98 | 073198W21 | |
| BOD 5 | 38. | mg/L | EPA 405.1 | | 08/07/98 | 080798W22 | |
| Oil and Grease | <7. | mg/L | EPA 413.1 | | 08/11/98 | 081198W22 | |
| Settleable solids | <.1 | ml/L | EPA 160.5 | | 08/07/98 | 080498W16 | |
| Total alkalinity | 350. | mg/L | EPA 310.1 | | 08/20/98 | 082098W15 | |
| Total cyanide | <.01 | mg/L | EPA 335.2 | 08/11/98 | 08/11/98 | 073198W21 | |
| Total dissolved solids | 780. | mg/L | EPA 160.1 | | 08/12/98 | 081298W13 | |
| Total suspended solids | 400. | mg/L | EPA 160.2 | | 08/11/98 | 081198W11 | |

Notes:

J-Estimated value

Authorized: Thomas Alexander
Date: August 23,1998 Thomas Alexander

5000 Brittonfield Parkway / Suite 300, Box 4942 / Syracuse, NY 13221 / (315) 437-0200

O'Brien & Gere
Laboratories,Inc.

# Analytical Results
# Trace Metals

Client: Lake Capri
Project:
Proj. Desc: Long Island, N.Y.

Job No.: 8011.001.517
Certification NY No.: 10155

Sample: J3380
Samp. Description: Press Run #3A Filtrate - Lab Filtered
Units: mg/L

Collected: 08/05/98
Received: 08/07/98

Matrix: Water
%Solids:
Number of analytes: 1

| Parameter | Result | Method | Prepared | Analyzed | QC Batch | Dilut. | Note |
|---|---|---|---|---|---|---|---|
| Aluminum, filtered | 4.1 | 6010 | 08/12/98 | 08/13/98 | 081298W1 | 1 | |

Notes:

J-Estimated value

Authorized: Thomas Alexander
Date: August 21,1998 Thomas Alexander

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# LABORATORY TEST CERTIFICATE

August 25, 1998

O'Brien & Gere Laboratories, Inc.
5221 Militia Hill Road
Plymouth Meeting, Pa 19462

Report#: 0825-24-261

Sample: Lake Capri, NY
TS-3 Run #1 Filter Cake
07-29-98

TOTALS:
The sample was acid Digested using, EPA SW-846, Method 3050A and analyzed by Method Indicated.

| PARAMETER | CONCENTRATION FOUND (ppm) | METHODS |
|---|---|---|
| Cadmium | 106.3 | SW-846-Method 6010B |

TCLP:
The Sample was leached Using Toxicity Characteristic Leading Procedure (TCLP) EPA SW-846, Method 1311.

| | | | |
|---|---|---|---|
| 1st pH: | 9.41 | Final pH: | 5.89 |
| 2nd pH: | 2.55 | Solution Type: 1 | |

| PARAMETER | CONCENTRATION FOUND (mg/l) | METHODS |
|---|---|---|
| Cadmium | 0.10 | SW-846-Method 6010B |

SOUTHERN SPECTROGRAPHIC LABORATORY

Clara Myers
Manager

SOUTHERN SPECTROGRAPHIC LABORATORY

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# LABORATORY TEST CERTIFICATE

August 24, 1998

O'Brien & Gere Laboratories, Inc.
5221 Militia Hill Road
Plymouth Meeting, Pa 19462

Report#: 0825-24-2623

Sample: Lake Capri, NY
TS-3 Run #1 Filtrate
07-29-98

| | | |
|---|---|---|
| pH | 8.10 | EPA 500, Method 150.1 |

TOTALS:
The sample was acid Digested using, EPA SW-846, Method 3050A and analyzed by Method Indicated.

| PARAMETER | CONCENTRATION FOUND (mg/l | METHODS |
|---|---|---|
| Cadmium | < 0.01 | SW-846-Method 6010B |

SOUTHERN SPECTROGRAPHIC LABORATORY

Clara Myers
Manager

**O'BRIEN & GERE**
LABORATORIES, INC.

# Quick Note

| | | |
|---|---|---|
| To: | Amy Van Laak RUST | cc: Alan Tavenner |
| Date: | July 23, 1998 | |
| Subj: | additional test data | |
| Job: | Lake Capri sediments | |

Amy:

The following results are available for your review:

| Run | conditioner | dose | SFRI | pH |
|---|---|---|---|---|
| 1 | lime slurry | 20% dws | 0.34 | 13.18 |
| 2 | lime slurry | 8% dws | 1.06 | 12.29 |
| 3 | Nalco 9905 (cation) | 80 ml/l | 4.03 | 5.87 |
| 4 | Cytec A100 (anion) | 20 ml/l | 13.5 | 5.88 |
| 5 | (open run) | -- | -- | -- |
| 6 | Nalco 9905 (cation) | 120 ml/l | 0.56 | 5.87 |
| 7 | Cytec A100 (anion) | 60 ml/l | >15 | 5.90 |
| 8 | Cytec SD2065 (cat) | 100 ml/l | 0.638 | 5.87 |
| 9 | Cytec SD2065 (cat) | 50 ml/l | 3.22 | 5.86 |
| 10 | Cytec SD2065 (cat) | 80 ml/l | 0.743 | 5.88 |
| 11 | Cytec SD2065 (cat) | 65 ml/l | 2.32 | -- |
| 12 | lime slurry | 5% dws | 0.915 | 12.01 |
| 13 | Cytec A1820 (anion) | 70 ml/l | TSTM | -- |
| 14 | Cytec A1820 (anion) | 100 ml/l | TSTM | -- |
| 15 | lime slurry | 3% dws | 3.57 | 11.83 |

SFRI is sludge filtration resistivity index (value near 1.0 is target)
TSTM means too slow to measure relative to filtrate flow.

-5% lime slurry still most cost-efficient and less dose sensitive (higher SFRI when cut to 3%).
-Again, anionic polys not recommended, even at higher charge (may need very high dose and won't fix Cd).
-Nalco cat poly not tried at 100 ml/l for direct comparison to Cytec cat at same dose.
-5% lime runs done at high (225 psi) and low (100 psi) pressure in test press using 32mm (1¼") chamber thickness.
-higher pressure, as expected, gave better filter cake quality (46% solids vs 36% solids)

respectfully submitted,

John Doerner

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**O'BRIEN & GERE**
LABORATORIES, INC.

# Quick Note

**To:** **Amy Van Laak** **RUST Environment & Infrastructure**

**Date:** **July 13, 1998**

**Subj:** **initial test data**

**Job:** **Lake Capri sediments**

Amy:

The following results are available for your review:

| Run | conditioner | dose | SFRI | pH |
|---|---|---|---|---|
| 1 | lime slurry | 20% dws | 0.34 | 13.18 |
| 2 | lime slurry | 8% dws | 1.06 | 12.29 |
| 3 | Nalco 9905 (cation) | 80 ml/l | 4.03 | 5.87 |
| 4 | Cytec A100 (anion) | 20 ml/l | 13.5 | 5.88 |
| 5 | (open run) | -- | -- | -- |
| 6 | Nalco 9905 (cation) | 120 ml/l | 0.56 | 5.87 |
| 7 | Cytec A100 (anion) | 60 ml/l | >15 | 5.90 |
| 8 | Cytec SD2065 (cat) | ** | to do | to do |
| 9 | lime slurry | 5% dws | to do | to do |
| 10 | Cytec A1820 (anion) | 60-80 ml/l | to do | to do |

SFRI is sludge filtration resistivity index (value near 1.0 is target)

Lime slurry appears most efficient but high pH concern (try 5% dws to control).

Nalco polymer looks good but 120 ml/l showed unreacted (excess) polymer at this dose (try 100 ml/l next). NOTE that the 80 ml/l run had very good cake quality even at SFRI >1.

**Need to try Cytec cationic SD2065 next at 60-80 ml/l-- had meeting with Cytec technical rep at lab on this polymer usage on our material--says it's really good for dredge sludge separation. Caveat on using cationics is impact on aquatic biota, thus Cytec A1820 trial run to do.

respectfully submitted,

John Doerner

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**O'BRIEN & GERE**
LABORATORIES, INC.

# Quick Note

To: Amy Van Laak RUST Environment & Infrastructure cc: A. Tavenner

Date: July 24, 1998

Subj: dry sieved fractional analyses

Job: Lake Capri sediments

Amy:

The following sieve fractions tested for total cadmium as follows: (see back-up SSL data report)

| fraction | total Cd (ppm) |
|---|---|
| >#4 | <1.0 |
| >#10 | 21.2 |
| >#16 | 8.0 |
| >#30 | 38.6 |
| >#40 | 18.1 |
| >#50 | 82.4 |
| >#100 (test A) | 344.4 |
| (test B) | 291.6 |
| <#100 (test A) | 358.9 |
| (test B) | 345.0 |

John Doerner

SOUTHERN SPECTROGRAPHIC LABORATORY

LABORATORY TEST CERTIFICATE

July 1, 1998

O'Brien & Gere Laboratories, Inc.
5221 Militia Hill Road
Plymouth Meeting, Pa 19462

Report#: 0724-23-379

Sample: Lake Capri, NY
Sediment

TOTALS:
The sample was acid Digested using, EPA SW-846, Method 3050A and analyzed by Method Indicated.

| Sample ID | Cadmium |
|---|---|
| TS-3 > #4 Sieve | < 1.0 ppm |
| TS-3 > #10 Sieve | 21.2 |
| TS-3 > #16 Sieve | 8.0 |
| TS-3 > #30 Sieve | 38.6 |
| TS-3 > #40 Sieve | 18.1 |
| TS-3 > #50 Sieve | 82.4 |
| TS-3 > #100 Sieve (A) | 344.4 |
| TS-3 > #100 Sieve (B) | 291.6 |
| TS-3 < #100 Sieve (A) | 358.9 |
| TS-3 < #100 Sieve (B) | 345.0 |

SOUTHERN SPECTROGRAPHIC LABORATORY

Clara Myers
Manager

**O'BRIEN & GERE**
LABORATORIES, INC.

| Lake Capri- composite sediment samples characterization summary | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Sediment I.D. | Sample TS-1 composite | | | Sample TS-2 composite | | | Sample TS-3 composite | | |
| Bulk density, pcf | 71.1 pcf | | | 70.1 pcf | | | 67.8 pcf | | |
| Solids content, % | 23.2 - 23.3 % | | | 19.0 - 20.0 % | | | 16.2 - 19.4 % | | |
| TOC mg/kg | 58,978 ± 9,346 | | | 32,880 ± 8,189 | | | 35,311 ± 1,172 | | |
| Total Cd, mg/kg | as rec'd | dwb SSL* | dwb OBG** | as rec'd | dwb SSL* | dwb OBG** | as rec'd | dwb SSL* | dwb OBG** |
| | 50.0 | 203. | 200. | 42.0 | 199. | 230. | 58.2 | 265. | 330. |
| Specific gravity | 2.30 | | | 2.28 | | | 2.23 | | |
| Classification | Sandy clayey silt (ML) | | | Sandy clayey silt (ML) | | | Sandy clayey silt (ML) | | |

**Notes:** SSL* denotes data from Southern Spectrographic Laboratories (SSL)
OBG** denotes data from O'Brien & Gere Laboratories (OBG)

John M Doerner
John M. Doerner

6-12-98
Date

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**O'BRIEN & GERE**
LABORATORIES, INC.

# Quick Note

**To:** **Alan Tavenner** **RUST Environment & Infrastructure**

**Date:** **June 10, 1998**

**Subj:** **initial test data**

**Job:** **Lake Capri sediments**

Alan:

Expecting final results from our lab in Syracuse, including TOC by this Friday.

I'm faxing herewith, a more legible grain size report.

Possible to make dewatering/settling test sample(s) selection soon?

regards,

John Doerner

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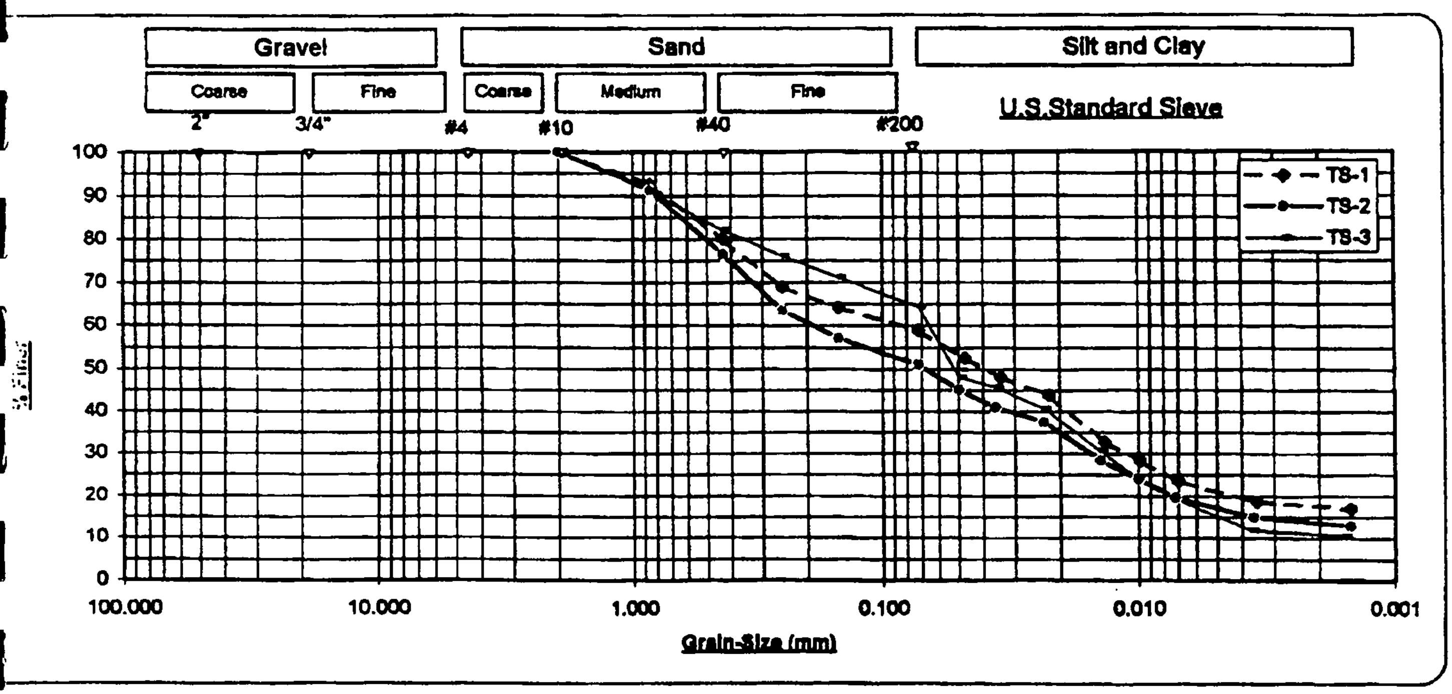
| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Name: | OBG LAB :LAKE CAPRI | | | | File No | 98[illegible]AH1 | | |
| Job No. | 98G026 | | | | Date | 5-Jun-98 | | |
| Dry Wt. | 100.00 | 100.00 | 100.00 | | | | | |
| Sieve No. | Weight Retained | Weight Retained | Weight Retained | Sieve No. | Sieve Size , mm | % Finer | % Finer | % Finer |
| Sample No | TS-1 | TS-2 | TS-3 | Sample No | | TS-1 | TS-2 | TS-3 |
| 3" | 0.00 | 0.00 | 0.00 | 3" | 76.00 | | | |
| 2" | 0.00 | 0.00 | 0.00 | 2" | 50.80 | | | |
| 1.5" | 0.00 | 0.00 | 0.00 | 1.5" | 38.10 | | | |
| 1" | 0.00 | 0.00 | 0.00 | 1" | 25.40 | | | |
| 3/4 | 0.00 | 0.00 | 0.00 | 3/4 | 19.00 | | | |
| 1/2" | 0.00 | 0.00 | 0.00 | 1/2" | 12.70 | | | |
| 3/8" | 0.00 | 0.00 | 0.00 | 3/8" | 9.50 | | | |
| #4 | 0.00 | 0.00 | 0.00 | #4 | 4.75 | | | |
| #10 | 0.00 | 0.00 | 0.00 | #10 | 2.00 | 100.00 | 100.00 | 100.00 |
| #20 | 6.00 | 7.00 | 7.20 | #20 | 0.850 | 92.50 | 91.25 | 91.00 |
| #40 | 16.00 | 18.80 | 14.40 | #40 | 0.430 | 80.00 | 76.50 | 82.00 |
| #60 | 24.90 | 29.20 | 19.20 | #60 | 0.250 | 68.88 | 63.50 | 76.00 |
| #100 | 28.80 | 34.30 | 23.10 | #100 | 0.150 | 64.00 | 57.13 | 71.13 |
| #200 | 32.90 | 39.20 | 28.50 | #200 | 0.072 | 58.88 | 51.00 | 64.38 |

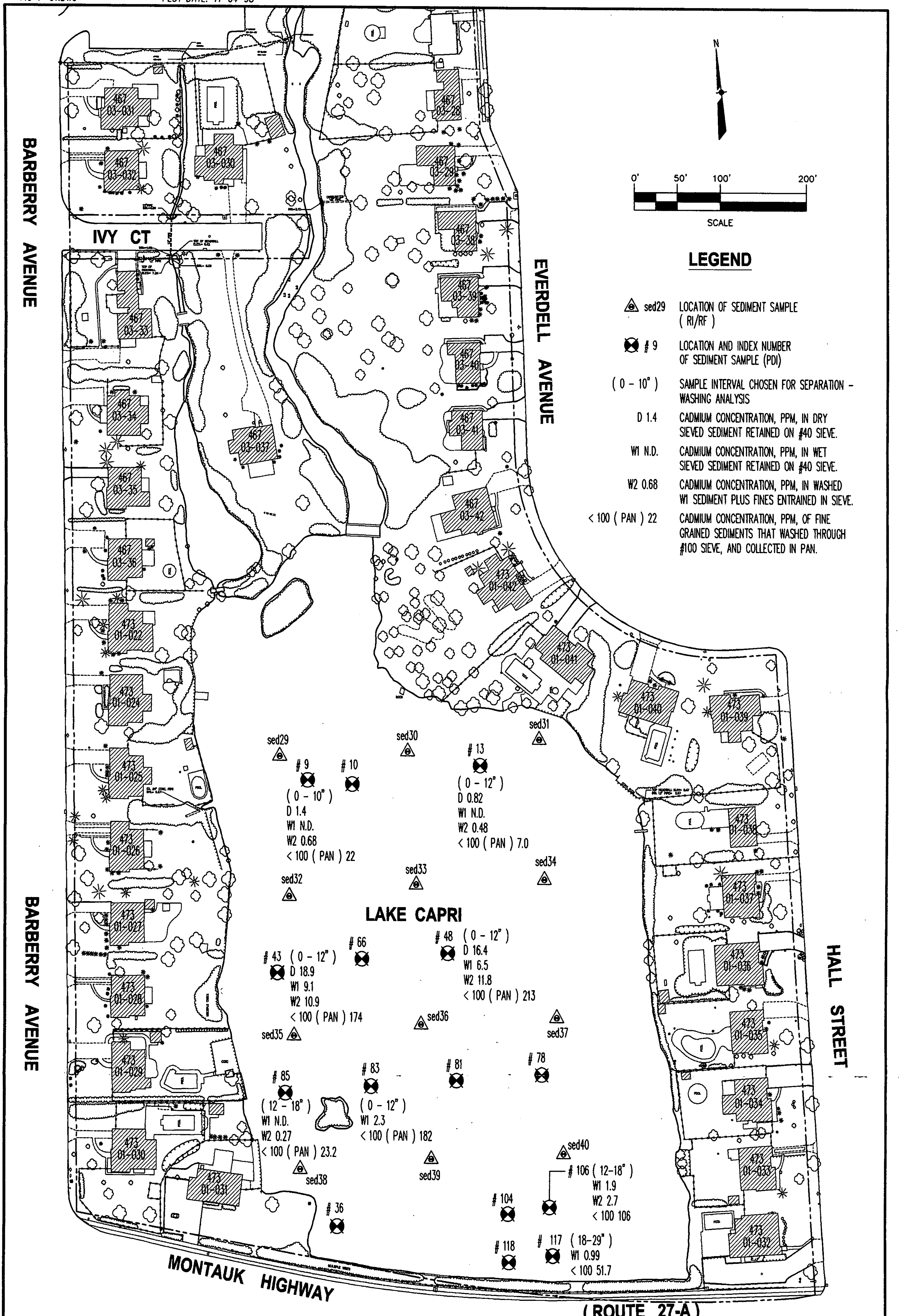



| Boring No. | Sample No. | Depth Ft. | Water Content,% | Specific gravity | Description |
|---|---|---|---|---|---|
| TS-1 | | | | 2.30 | Dark Gray Sandy Clayey Silt (ML) |
| TS-2 | | | | 2.28 | Dark Gray Sandy Clayey Silt (ML) |
| TS-3 | | | | 2.23 | Dark Gray Sandy Clayey Silt (ML) |

# APPENDIX F

# GRADATION TESTING AND CHEMICAL ANALYSIS

FIG-F-01.DWG PLOT DATE: 11-04-98




**RUST**
Rust Environment & Infrastructure Inc.

**PRE-DESIGN INVESTIGATION REPORT**
**DZUS FASTENER SITE**
**WEST ISLIP, NEW YORK**
**NYSDEC SITE No. 1-52-033**
OCT. 1998 202563

# FIGURE F - 1
## SEDIMENT SEPARATION STUDY

**Table F-1**
**Gradation Analyses Summary**
**Dzus Fastener Site**
**West Islip, New York**

| *RI/FS* ID# | *PDI* ID # | Sample ID | Interval | % Passing #40 | % Retain #40 | % Gravel | PDI Analysis Cd Concentration (PPM) | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | D1 | W1 | W2 | <#100 |
| ***North Part of Lake*** | | | | | | | | | | |
| | 9 | 6+00, 11+50 | 0-10" | 23 | 77 | 14 | 1.4 | nd | 0.68 | 22 |
| | 10 | 6+19, 12+00 | 0-12" | 36 | 64 | 20 | | | | |
| | 13 | 6+00, 13+50 | 0-12" | 25 | 75 | 27 | 0.82 | nd | 0.48 | 7 |
| Sed-29 | | | 0-12" | 36 | 64 | 0 | | | | |
| Sed-30 | | | 0-12" | 21 | 79 | 38 | | | | |
| Sed-30 | | | 12-24" | 18 | 82 | 39 | | | | |
| Sed-31 | | | 0-12 | 8 | 92 | 45 | | | | |
| | | | | | (0-12")AVG= 75% | | | | | |
| ***North Mid Part of Lake*** | | | | | | | | | | |
| | 66 | 4+00, 12+00 | 0-12" | 22 | 78 | 47 | | | | |
| | 48 | 4+00, 13+00 | 0-12" | 28 | 72 | 26 | 16.4 | 6.5 | 11.8 | 213 |
| | 43 | 4+00,11+00 | 0-12" | 34 | 66 | 13 | 18.9 | 9.1 | 10.9 | 174 |
| Sed-32 | | | 0-12" | 17 | 83 | 65 | | | | |
| Sed-33 | | | 0-12" | 27 | 73 | 33 | | | | |
| Sed-34 | | | 0-12" | 17 | 83 | 33 | | | | |
| | | | | | (0-12")AVG=75.8% | | | | | |
| ***South Mid Part of Lake*** | | | | | | | | | | |
| | 81 | 2+50, 13+00 | 0-11.5" | 24 | 76 | 36 | | | | |
| | 83 | 2+50, 12+00 | 0-12" | 50 | 50 | 11 | na | 2.3 | na | 182 |
| | 85 | 2+50, 11+00 | 0-12" | 96 | 4 | 0 | na | nd | 0.27 | 23.2 |
| | 78 | 2+50, 14+00 | 0-12" | 38 | 62 | 14 | | | | |
| | 85 | 2+50, 11+00 | 12-18" | 23 | 77 | 23 | | | | |
| Sed-35 | | | 0-12" | 54 | 46 | 8 | | | | |
| Sed-36 | | | 0-12" | 92 | 8 | 0 | | | | |
| Sed-36 | | | 12"-24" | 25 | 75 | 31 | | | | |
| Sed-37 | | | 0-12 | 22 | 78 | 38 | | | | |
| | | | | | (0-12")AVG=54% | | | | | |
| | | | | | (12-24")AVG=76% | | | | | |
| ***Southern Part of Lake*** | | | | | | | | | | |
| | 117 | 0+50, 14+00 | 0-12" | 56 | 44 | 13 | | | | |
| | 104 | 1+00, 13+50 | 0-12" | 96 | 4 | 0 | | | | |
| | 36(TS2) | 1+00, 11+50 | 0-12" | 95 | 5 | 0 | | | | |
| | 118 | 0+50, 13+50 | 12-18" | 35 | 65 | 18 | | | | |
| | 106 | 1+00, 14+00 | 12-18" | 26 | 74 | 16 | na | 1.9 | 2.7 | 106 |
| | 117 | 0+50, 14+00 | 12-18" | 24 | 76 | 30 | na | 0.99 | na | 51.7 |
| | 68(TS-1) | 1+00, 12+00 | 18-24" | 33 | 67 | 22 | | | | |
| | 117 | 0+50, 14+00 | 18-29" | 14 | 86 | 21 | | | | |
| Sed-38 | | | 0-12 | 14 | 86 | 61 | | | | |
| Sed-39 | | | 0-12 | 79 | 21 | 0 | | | | |
| Sed-40 | | | 0-12 | 19 | 81 | 22 | | | | |
| | | | | | (0-12")AVG=40% | | | | | |
| | | | | | (12-24")AVG=74% | | | | | |

nd = non-detected, na = not analyzed

1. Samples were collected from the above Lake Capri locations during the PDI for gradation analysis as shown above designated with Rust ID's. As part of the LMS RI/FS (1995), 14 Lake Capri sediment sample gradations were also conducted and are included in the above table. Locations of the RI/FS "Sed" locations can be found on Plate 2 of the PDI report and on Figure D-1.
2. D1 - dry sieve analyses retained on #40 sieve.
   W1 - wet sieve analyses retained on #40 sieve
   W2 - washed W1 plus entrained fines

# *ATLANTIC TESTING LABORATORIES, Limited*

**Albany**
12 Arrowhead Lane
Cohoes, NY 12047
(518) 783-9073 (T)
(518) 783-6987 (F)

**Canton**
6431 U.S. Highway 11
P.O. Box 29
Canton, NY 13617
(315) 386-4578 (T)
(315) 386-1012 (F)

**Utica**
698 Stevens Street
Utica, NY 13502
(315) 735-3309 (T)
(315) 735-0742(F)

July 27, 1998

Rust Environment & Infrastructure
12 Metro Park Road
Albany, NY 12205

Attn: Ms. Amy Van Laak

Re: Laboratory Test Results
Dzus-Fastener Site
Albany, NY
ATL Report No. AT089S-8-7-98

Ladies/Gentlemen:

On July 14, 1998, your representative delivered soil samples to our Cohoes, New York facility for testing. A Sieve Analysis in accordance with ASTM C 136 was performed on each sample. The Sieve Analysis curves are enclosed.

Please contact our office should you have any questions or if we can be of further service.

Respectfully,

Robert E. Field

Robert E. Field
Assistant Manager
Albany Testing Division

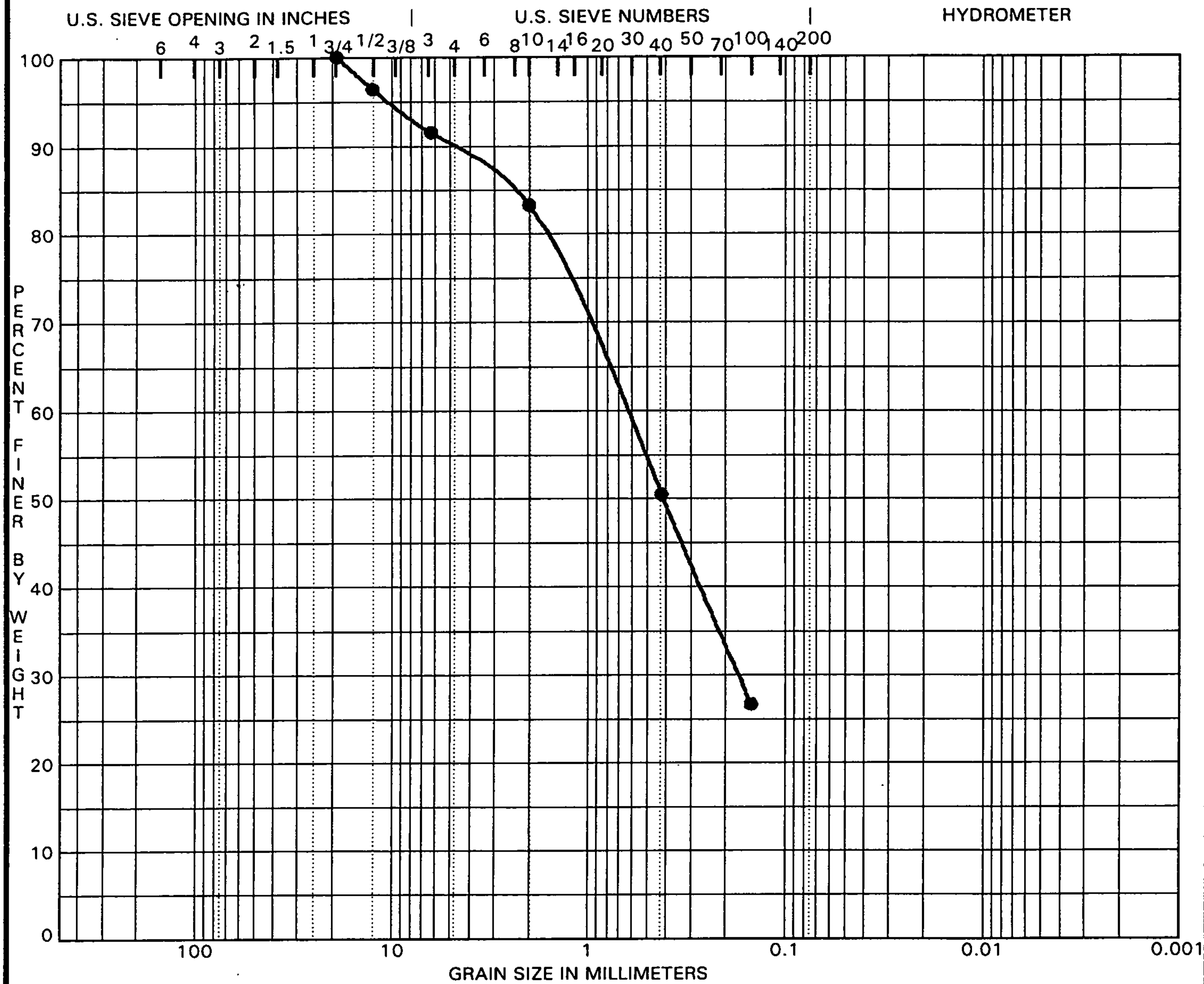
REF/rll

Enclosures

# ATLANTIC TESTING LABORATORIES, Limited

## GRADATION CURVES

PROJECT Dzus-Fastener Site REPORT NO. AT089S-8-7-98
CLIENT Rust Environment & Infrastructure DATE 07/27/98




| COBBLES | GRAVEL | | | SAND | | | SILT OR CLAY |
|---|---|---|---|---|---|---|---|
| | coarse | medium | fine | coarse | medium | fine | |

| Specimen Identification | Classification | MC% | LL | PL | PI | Cc | Cu |
|---|---|---|---|---|---|---|---|
| ● 08939 | 2+50N, 12+00E (0-12") | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

| Specimen Identification | D100 | D60 | D30 | D10 | %Gravel | %Sand | %Silt | %Clay |
|---|---|---|---|---|---|---|---|---|
| ● 08939 | 19.00 | 0.67 | 0.173 | | 11 | | | |
| | | | | | | | | |
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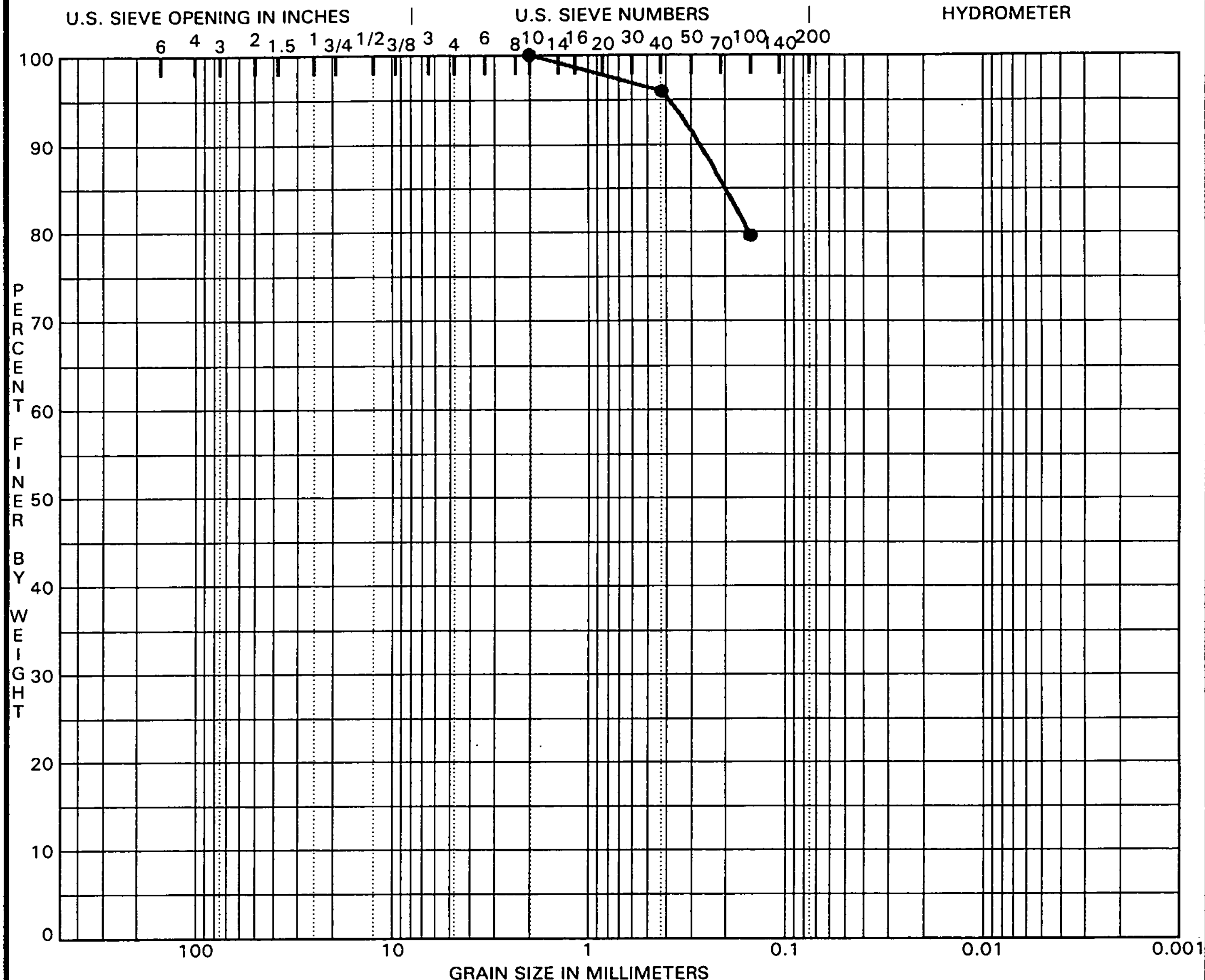
# ATLANTIC TESTING LABORATORIES, Limited

## GRADATION CURVES

PROJECT Dzus-Fastener Site — REPORT NO. AT089S-8-7-98

CLIENT Rust Environment & Infrastructure — DATE 07/27/98




| COBBLES | GRAVEL | | | SAND | | | SILT OR CLAY |
|---|---|---|---|---|---|---|---|
| | coarse | medium | fine | coarse | medium | fine | |

| | Specimen Identification | Classification | MC% | LL | PL | PI | Cc | Cu |
|---|---|---|---|---|---|---|---|---|
| ● | 08940 | 2+50N, 11+00E (0-12") | | | | | | |
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| | | | | | | | | |

| | Specimen Identification | D100 | D60 | D30 | D10 | %Gravel | %Sand | %Silt | %Clay |
|---|---|---|---|---|---|---|---|---|---|
| ● | 08940 | 2.00 | | | | 0 | | | |
| | | | | | | | | | |
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# ATLANTIC TESTING LABORATORIES, Limited

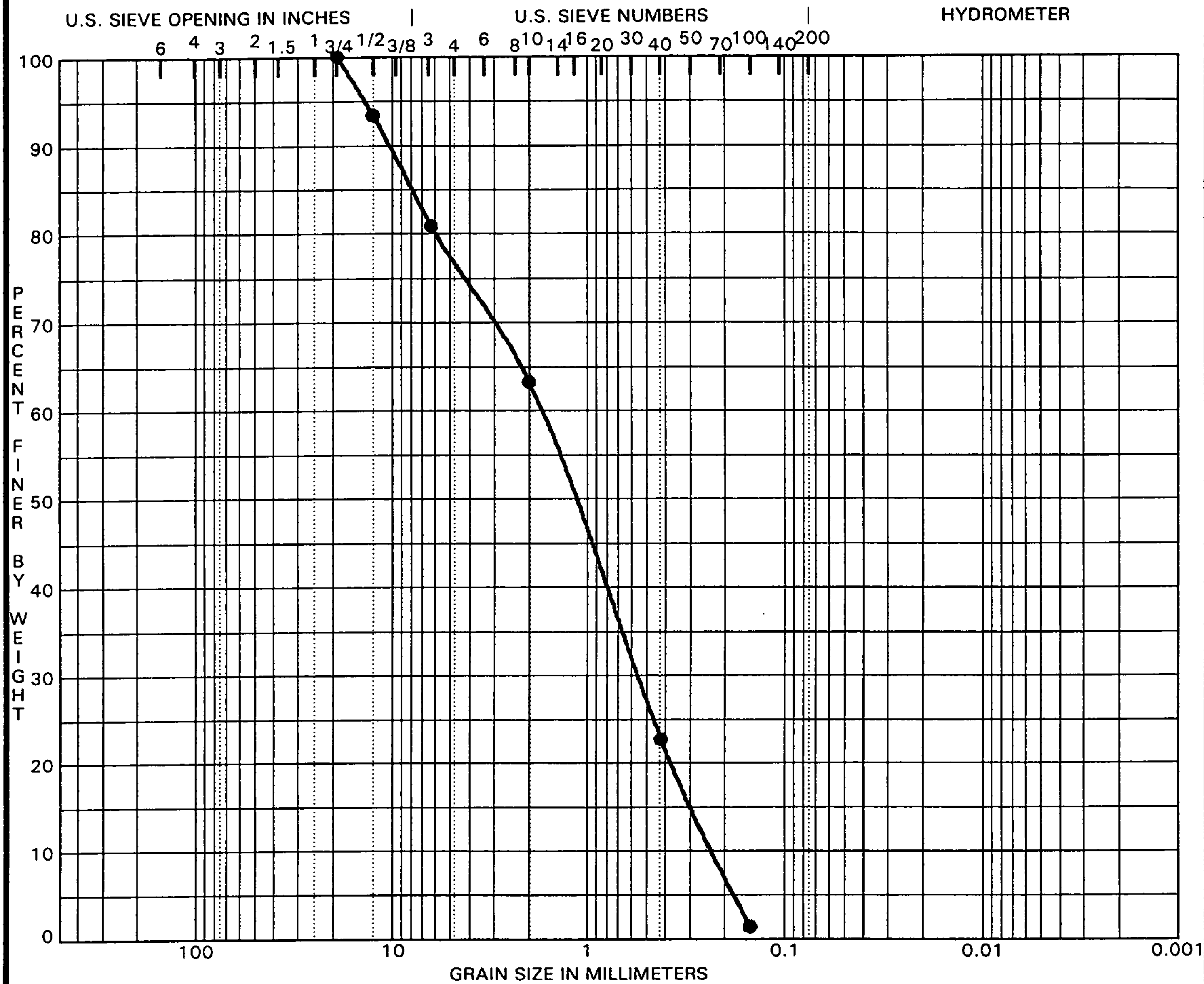
## GRADATION CURVES

PROJECT Dzus-Fastener Site

CLIENT Rust Environment & Infrastructure

REPORT NO. AT089S-8-7-98

DATE 07/27/98




| COBBLES | GRAVEL | | | SAND | | | SILT OR CLAY |
|---|---|---|---|---|---|---|---|
| | coarse | medium | fine | coarse | medium | fine | |

| | Specimen Identification | Classification | MC% | LL | PL | PI | Cc | Cu |
|---|---|---|---|---|---|---|---|---|
| ● | 08941 | 2+50N, 11+00E (12-18") | | | | | | |
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| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

| | Specimen Identification | D100 | D60 | D30 | D10 | %Gravel | %Sand | %Silt | %Clay |
|---|---|---|---|---|---|---|---|---|---|
| ● | 08941 | 19.00 | 1.76 | 0.562 | 0.2277 | 23 | | | |
| | | | | | | | | | |
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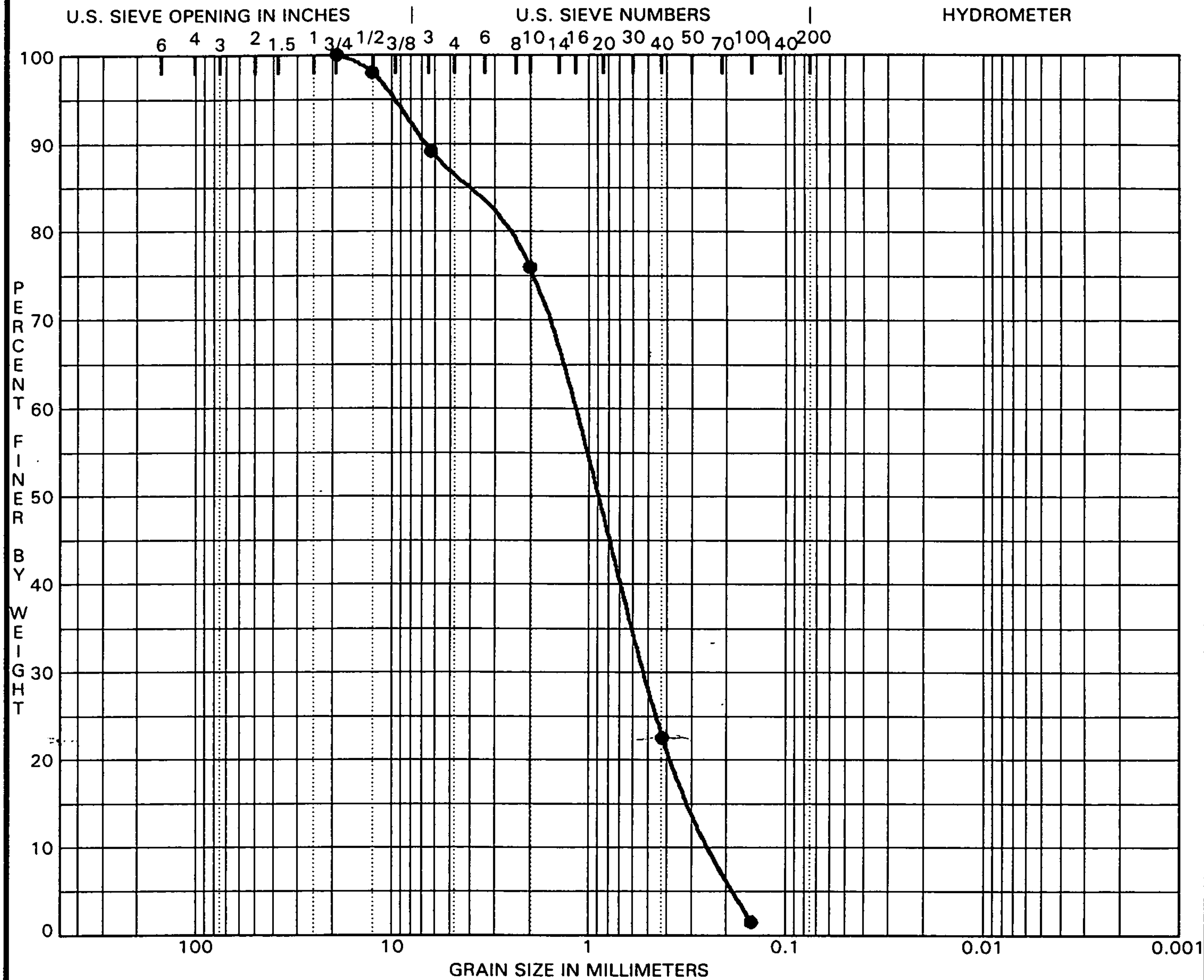
## GRADATION CURVES

PROJECT Dzus-Fastener Site REPORT NO. AT089S-8-7-98
CLIENT Rust Environment & Infrastructure DATE 07/27/98




| COBBLES | GRAVEL | | SAND | | | SILT OR CLAY |
|---|---|---|---|---|---|---|
| | coarse | medium / fine | coarse | medium | fine | |

| | Specimen Identification | Classification | MC% | LL | PL | PI | Cc | Cu |
|---|---|---|---|---|---|---|---|---|
| ● | 08942 | 6+00N, 11+50E (0-10") | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

| | Specimen Identification | D100 | D60 | D30 | D10 | %Gravel | %Sand | %Silt | %Clay |
|---|---|---|---|---|---|---|---|---|---|
| ● | 08942 | 19.00 | 1.26 | 0.528 | 0.2280 | 14 | | | |
| | | | | | | | | | |
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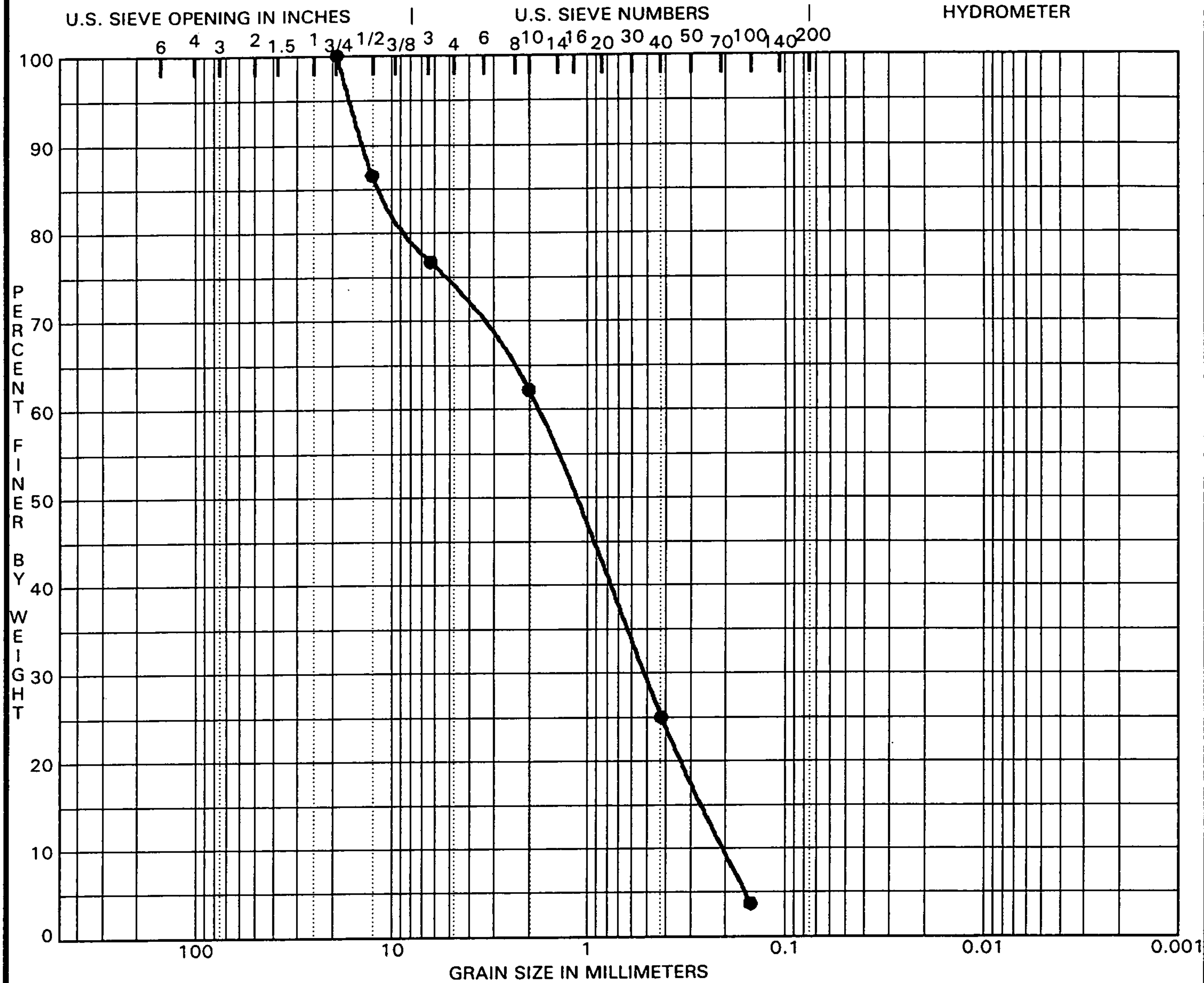
## GRADATION CURVES

PROJECT Dzus-Fastener Site
CLIENT Rust Environment & Infrastructure

REPORT NO. AT089S-8-7-98
DATE 07/27/98




| COBBLES | GRAVEL | | | SAND | | | SILT OR CLAY |
|---|---|---|---|---|---|---|---|
| | coarse | medium | fine | coarse | medium | fine | |

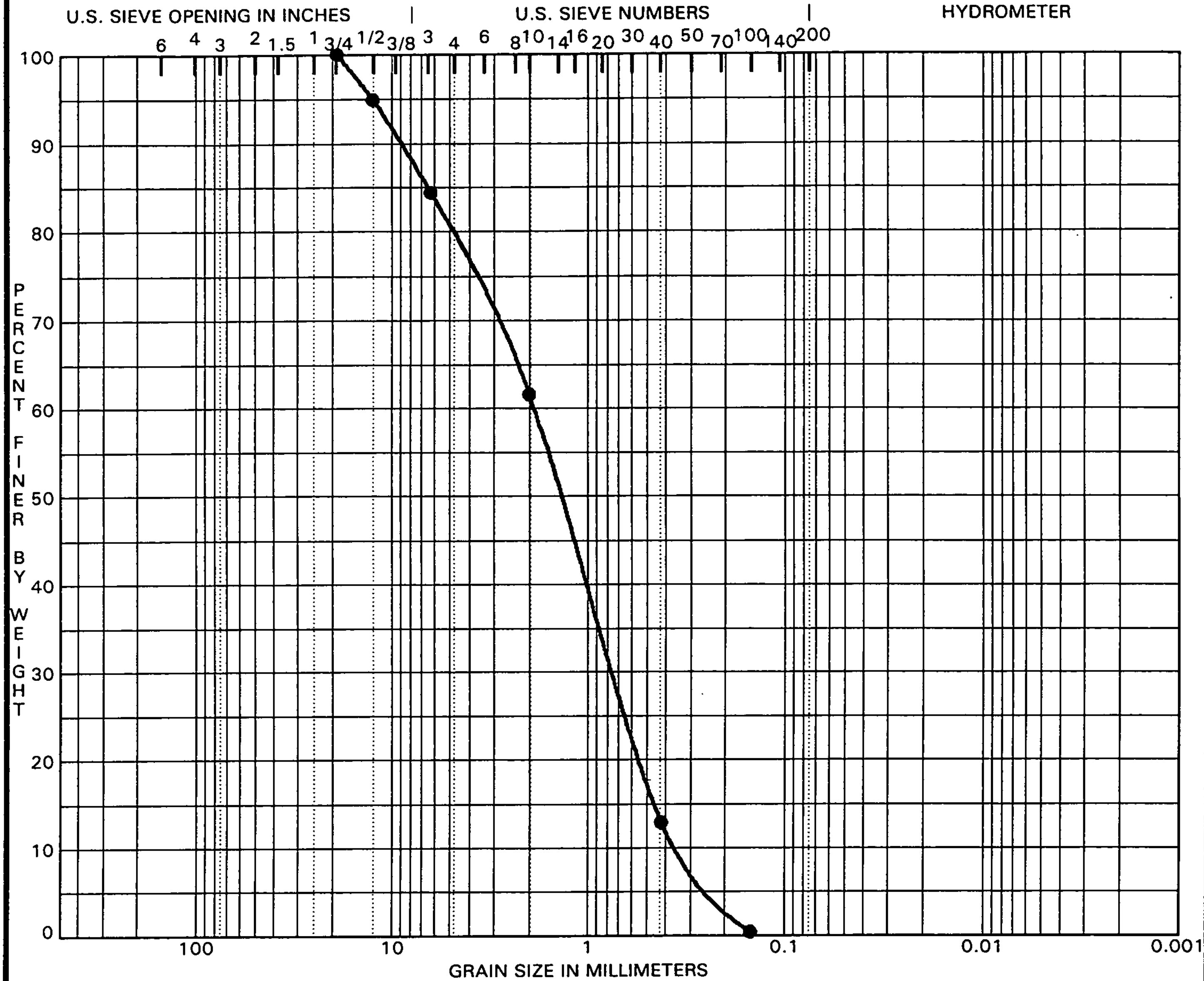
| | Specimen Identification | Classification | MC% | LL | PL | PI | Cc | Cu |
|---|---|---|---|---|---|---|---|---|
| ● | 08943 | 6+00N, 13+50E (0-12") | | | | | | |

| | Specimen Identification | D100 | D60 | D30 | D10 | %Gravel | %Sand | %Silt | %Clay |
|---|---|---|---|---|---|---|---|---|---|
| ● | 08943 | 19.00 | 1.83 | 0.523 | 0.2034 | 27 | | | |

# ATLANTIC TESTING LABORATORIES, Limited

## GRADATION CURVES

PROJECT Dzus-Fastener Site
CLIENT Rust Environment & Infrastructure
REPORT NO. AT089S-8-7-98
DATE 07/27/98




| COBBLES | GRAVEL | | | SAND | | | SILT OR CLAY |
|---|---|---|---|---|---|---|---|
| | coarse | medium | fine | coarse | medium | fine | |

| | Specimen Identification | Classification | MC% | LL | PL | PI | Cc | Cu |
|---|---|---|---|---|---|---|---|---|
| ● | 08944 | 0+50N, 14+00E (18-29") | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

| | Specimen Identification | D100 | D60 | D30 | D10 | %Gravel | %Sand | %Silt | %Clay |
|---|---|---|---|---|---|---|---|---|---|
| ● | 08944 | 19.00 | 1.90 | 0.732 | 0.3331 | 21 | | | |
| | | | | | | | | | |
| | | | | | | | | | |
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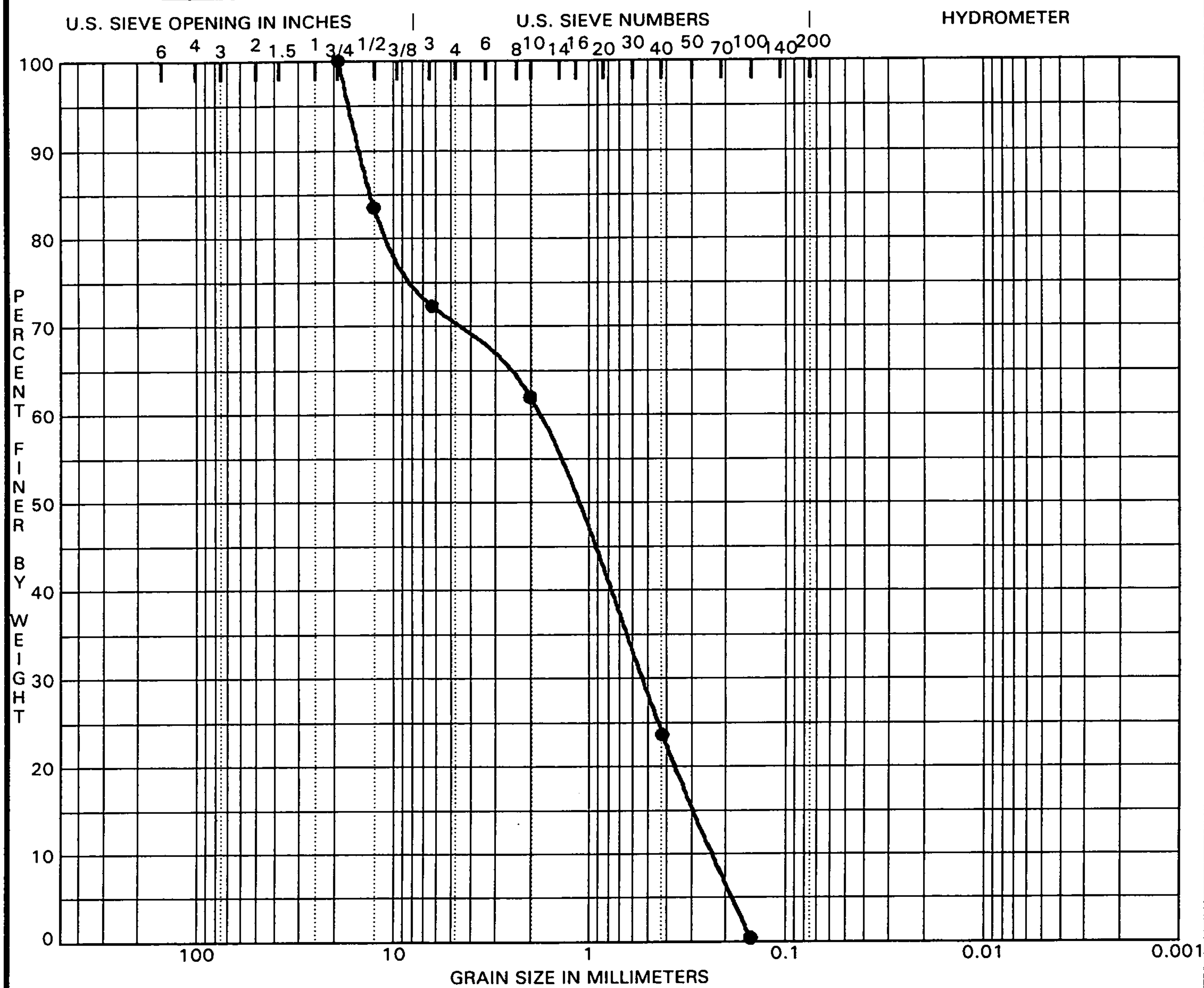
## GRADATION CURVES

PROJECT Dzus-Fastener Site — REPORT NO. AT089S-8-7-98

CLIENT Rust Environment & Infrastructure — DATE 07/27/98




| COBBLES | GRAVEL | | | SAND | | | SILT OR CLAY |
|---|---|---|---|---|---|---|---|
| | coarse | medium | fine | coarse | medium | fine | |

| Specimen Identification | Classification | MC% | LL | PL | PI | Cc | Cu |
|---|---|---|---|---|---|---|---|
| ● 08945 | 0+50N, 14+00E (12-18") | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

| Specimen Identification | D100 | D60 | D30 | D10 | %Gravel | %Sand | %Silt | %Clay |
|---|---|---|---|---|---|---|---|---|
| ● 08945 | 19.00 | 1.85 | 0.550 | 0.2302 | 30 | | | |
| | | | | | | | | |
| | | | | | | | | |
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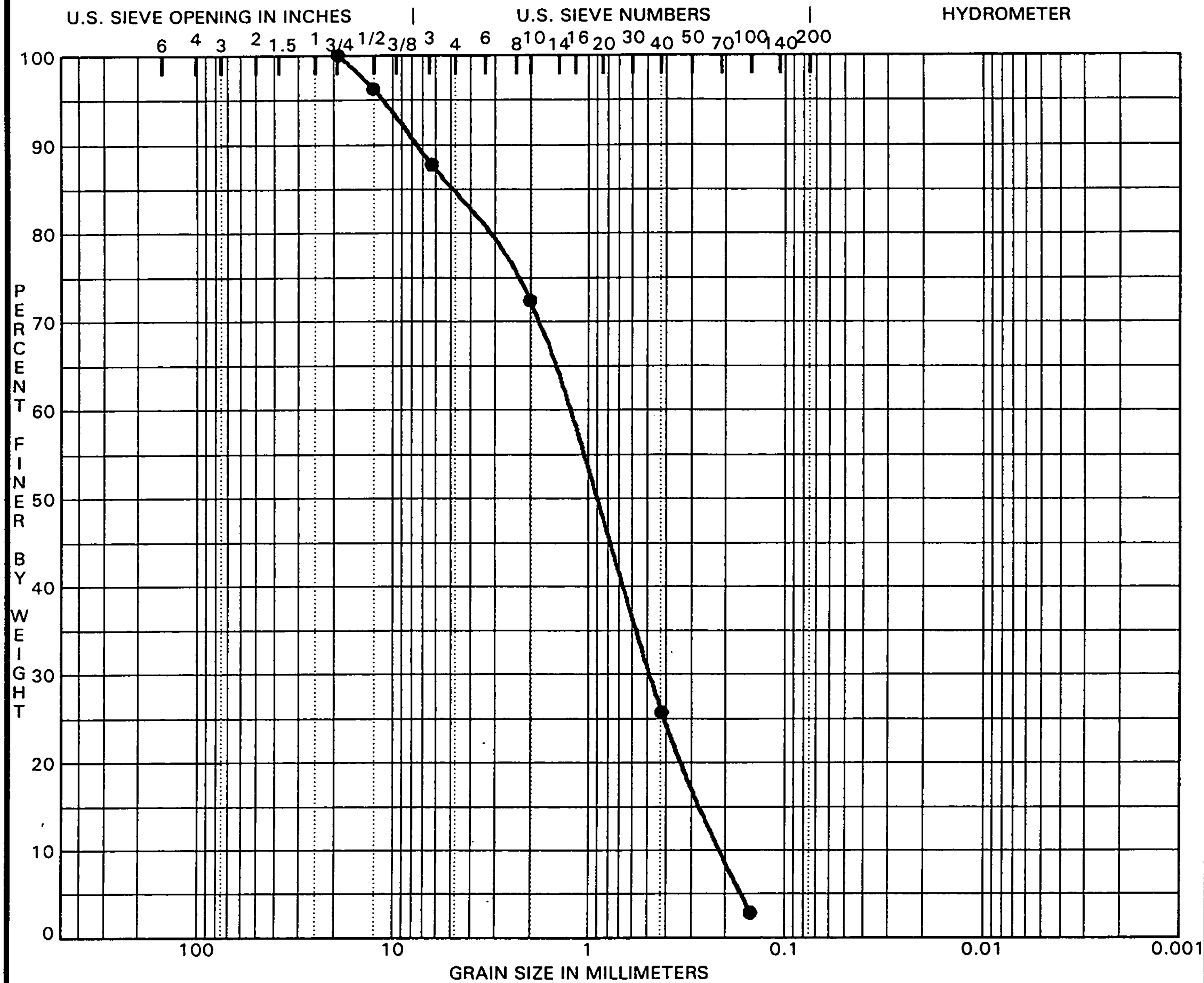
# ATLANTIC TESTING LABORATORIES, Limited

## GRADATION CURVES

PROJECT Dzus-Fastener Site    REPORT NO. AT089S-8-7-98
CLIENT Rust Environment & Infrastructure    DATE 07/27/98




| COBBLES | GRAVEL | | | SAND | | | SILT OR CLAY |
|---|---|---|---|---|---|---|---|
| | coarse | medium | fine | coarse | medium | fine | |

| | Specimen Identification | Classification | MC% | LL | PL | PI | Cc | Cu |
|---|---|---|---|---|---|---|---|---|
| ● | 08946 | 1+00N, 14+00E (12-18") | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
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| | Specimen Identification | D100 | D60 | D30 | D10 | %Gravel | %Sand | %Silt | %Clay |
|---|---|---|---|---|---|---|---|---|---|
| ● | 08946 | 19.00 | 1.33 | 0.490 | 0.2075 | 16 | | | |
| | | | | | | | | | |
| | | | | | | | | | |
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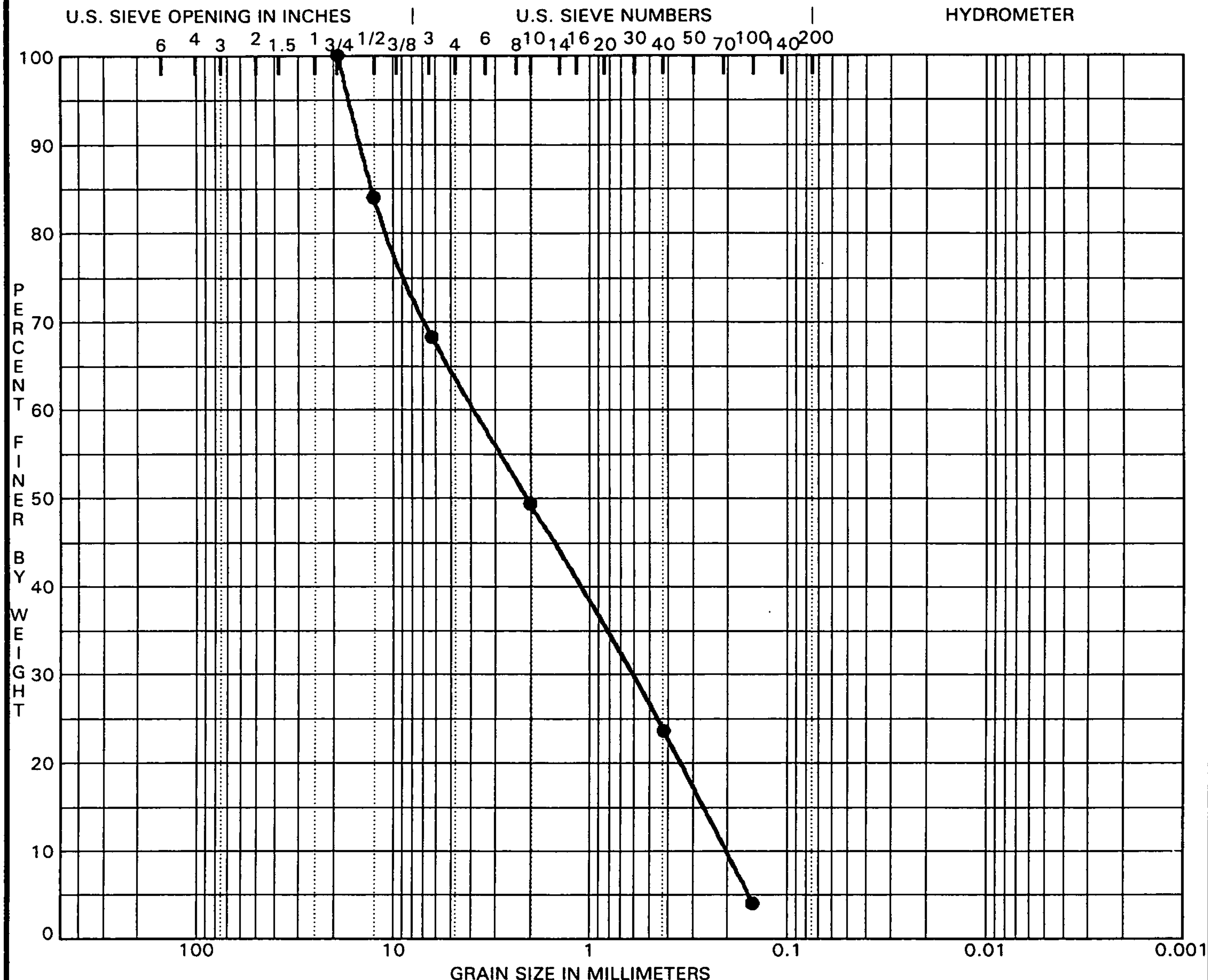
# ATLANTIC TESTING LABORATORIES, Limited

## GRADATION CURVES

PROJECT Dzus-Fastener Site
CLIENT Rust Environment & Infrastructure

REPORT NO. AT089S-8-7-98
DATE 07/27/98




| COBBLES | GRAVEL | | SAND | | | SILT OR CLAY |
|---|---|---|---|---|---|---|
| | coarse | fine | coarse | medium | fine | |

| | Specimen Identification | Classification | MC% | LL | PL | PI | Cc | Cu |
|---|---|---|---|---|---|---|---|---|
| ● | 08947 | 2+50N, 13+00E (0-11.5") | | | | | | |

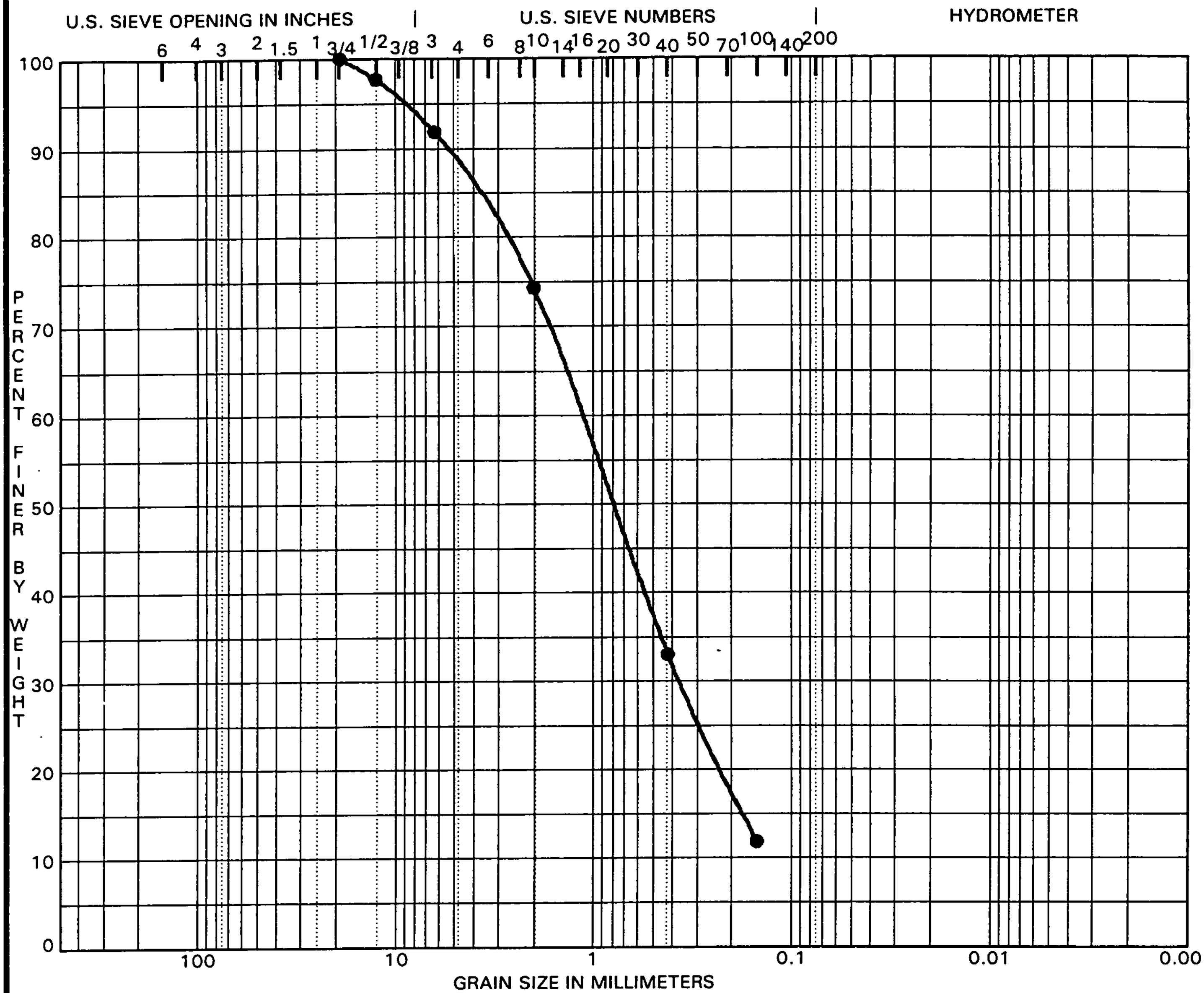
| | Specimen Identification | D100 | D60 | D30 | D10 | %Gravel | %Sand | %Silt | %Clay |
|---|---|---|---|---|---|---|---|---|---|
| ● | 08947 | 19.00 | 3.81 | 0.624 | 0.2056 | 36 | | | |

# ATLANTIC TESTING LABORATORIES, Limited

## GRADATION CURVES

PROJECT Dzus-Fastener Site
CLIENT Rust Environment & Infrastructure

REPORT NO. AT089S-8-7-98
DATE 07/27/98




| COBBLES | GRAVEL | | SAND | | | SILT OR CLAY |
|---|---|---|---|---|---|---|
| | coarse | medium | fine | coarse | medium | fine |

| Specimen Identification | Classification | MC% | LL | PL | PI | Cc | Cu |
|---|---|---|---|---|---|---|---|
| ● 08948 | 4+00N, 11+00E (0-12") | | | | | | |

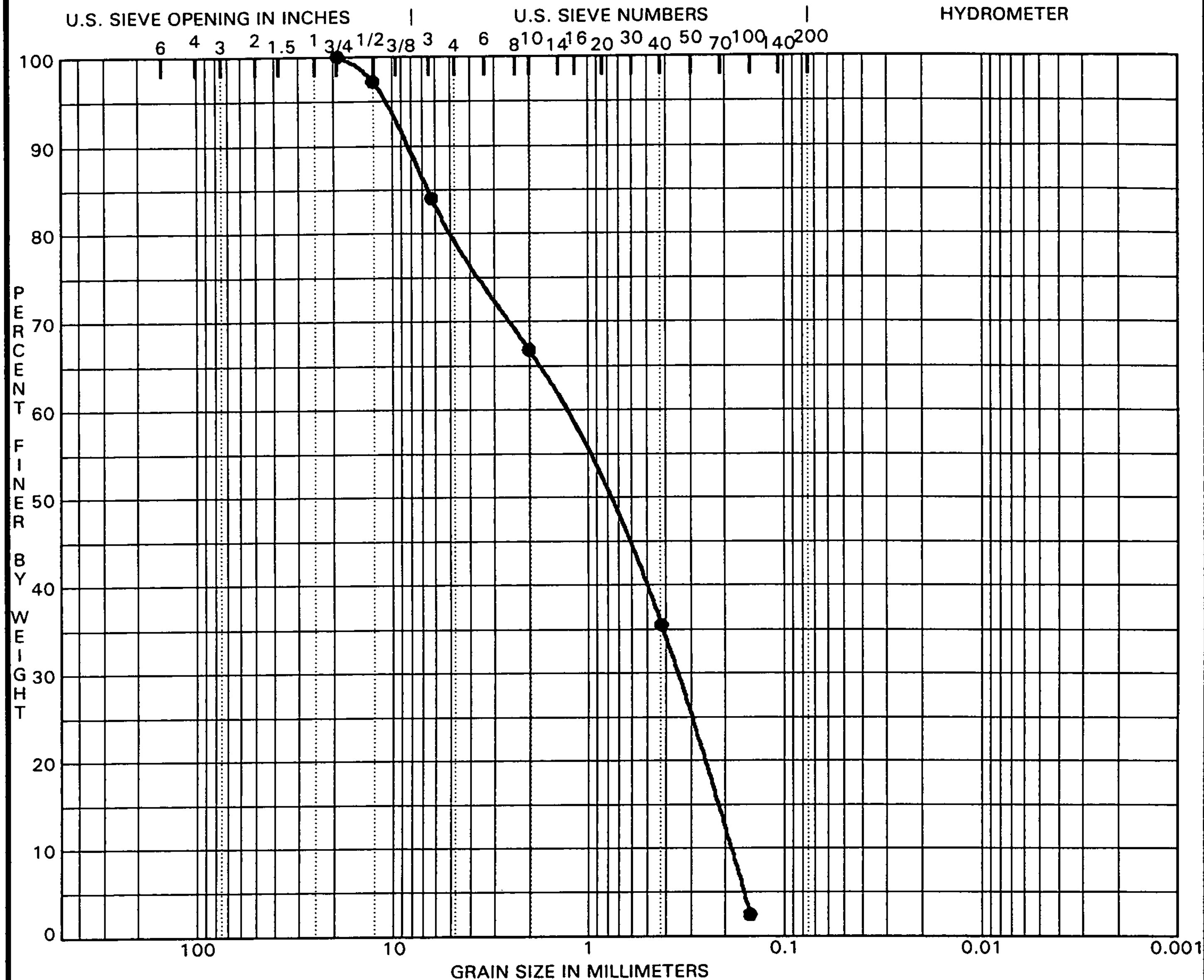
| Specimen Identification | D100 | D60 | D30 | D10 | %Gravel | %Sand | %Silt | %Clay |
|---|---|---|---|---|---|---|---|---|
| ● 08948 | 19.00 | 1.17 | 0.367 | | 13 | | | |

## ATLANTIC TESTING LABORATORIES, Limited

### GRADATION CURVES

PROJECT: Dzus-Fastener Site
CLIENT: Rust Environment & Infrastructure

REPORT NO. AT089S-8-7-98
DATE 07/27/98




| COBBLES | GRAVEL | | | SAND | | | SILT OR CLAY |
|---|---|---|---|---|---|---|---|
| | coarse | medium | fine | coarse | medium | fine | |

| | Specimen Identification | Classification | MC% | LL | PL | PI | Cc | Cu |
|---|---|---|---|---|---|---|---|---|
| ● | 08949 | 6+19N, 12+00E (0-12") | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

| | Specimen Identification | D100 | D60 | D30 | D10 | %Gravel | %Sand | %Silt | %Clay |
|---|---|---|---|---|---|---|---|---|---|
| ● | 08949 | 19.00 | 1.43 | 0.357 | 0.1901 | 20 | | | |
| | | | | | | | | | |
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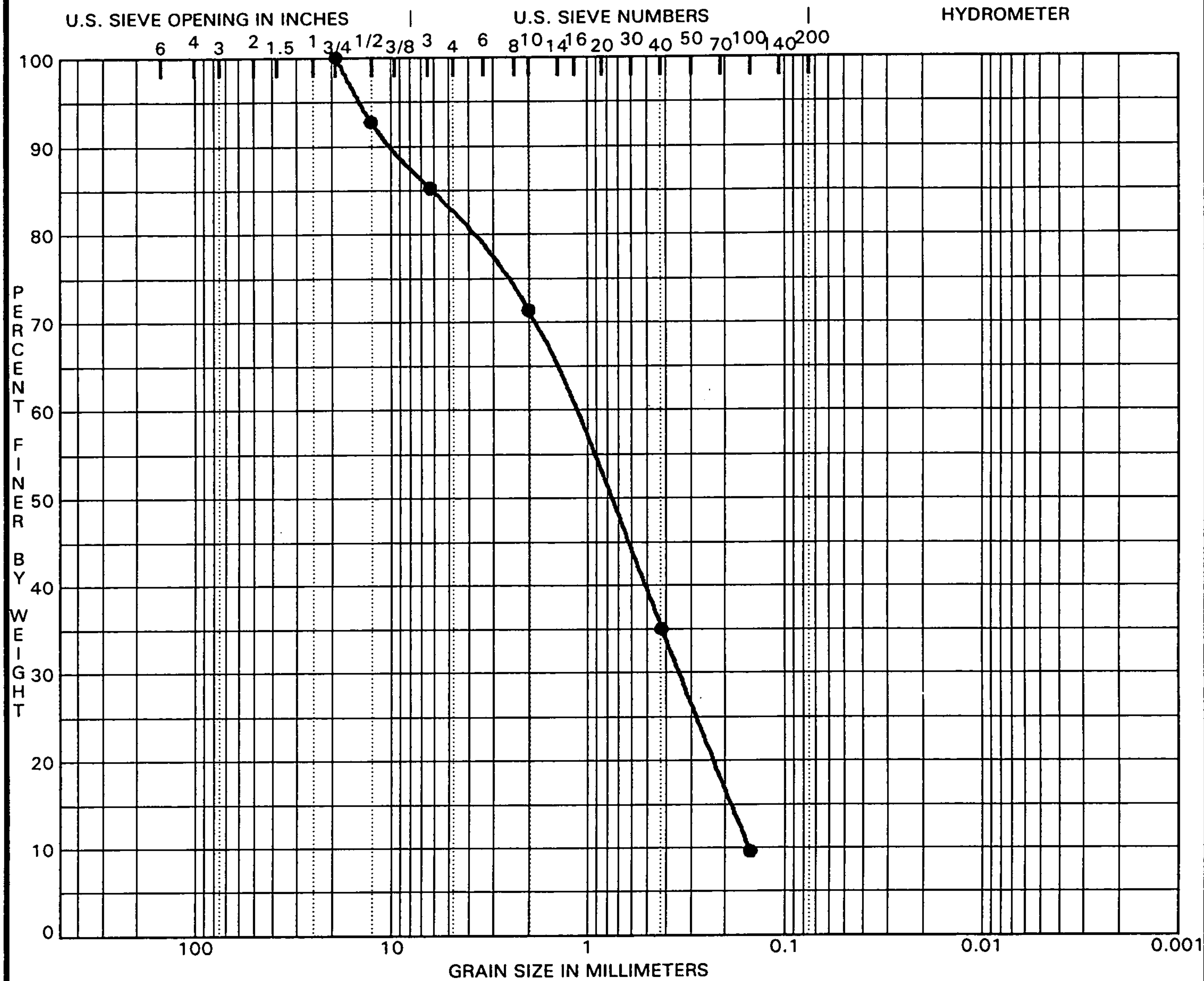
# ATLANTIC TESTING LABORATORIES, Limited

## GRADATION CURVES

PROJECT Dzus-Fastener Site
CLIENT Rust Environment & Infrastructure

REPORT NO. AT089S-8-7-98
DATE 07/27/98




| COBBLES | GRAVEL | | SAND | | | SILT OR CLAY |
|---|---|---|---|---|---|---|
| | coarse | medium | fine | coarse | medium | fine | |

| | Specimen Identification | Classification | MC% | LL | PL | PI | Cc | Cu |
|---|---|---|---|---|---|---|---|---|
| ● | 08950 | 0+50N, 13+50E (12-18") | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

| | Specimen Identification | D100 | D60 | D30 | D10 | %Gravel | %Sand | %Silt | %Clay |
|---|---|---|---|---|---|---|---|---|---|
| ● | 08950 | 19.00 | 1.23 | 0.346 | 0.1525 | 18 | | | |
| | | | | | | | | | |
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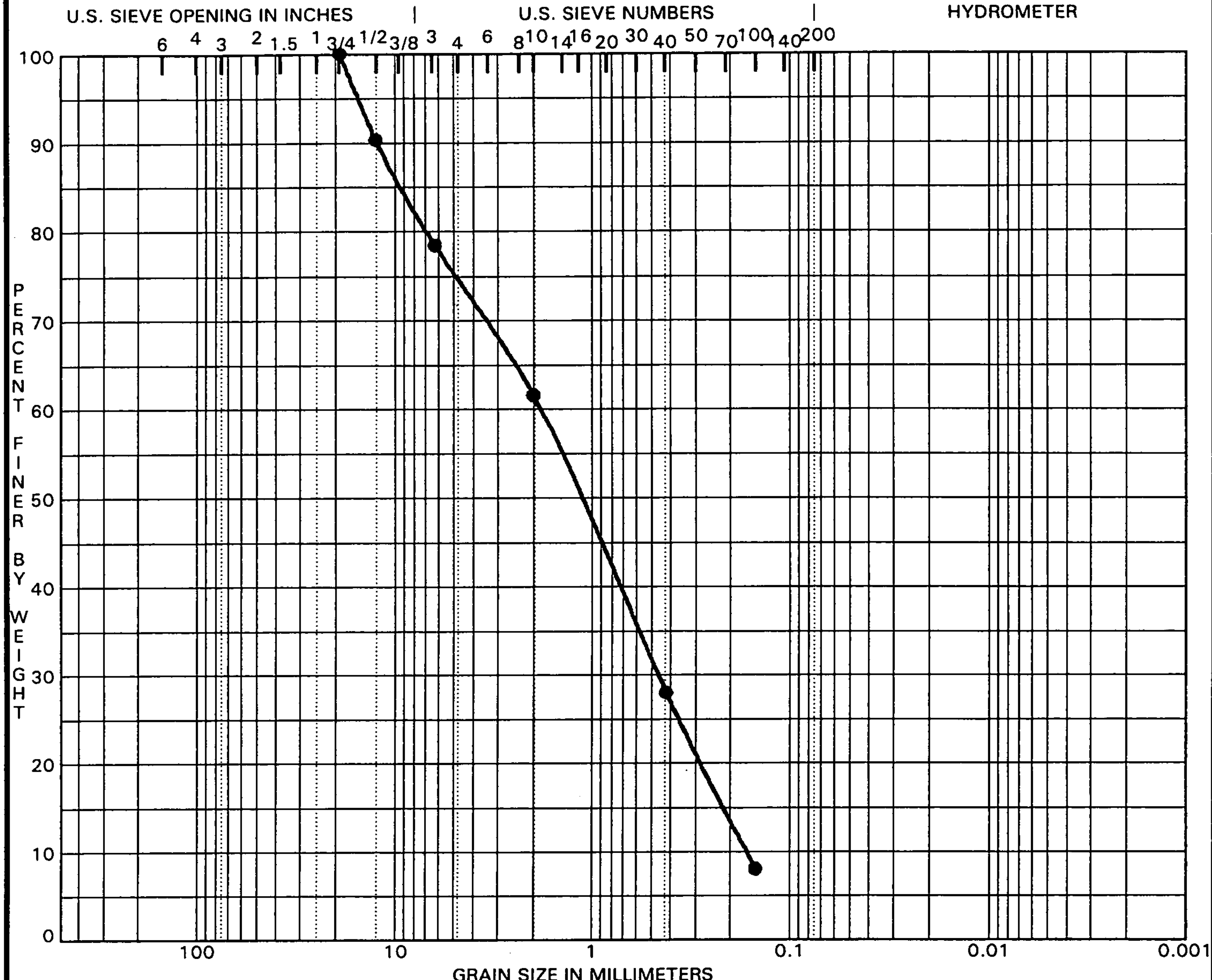
# ATLANTIC TESTING LABORATORIES, Limited

## GRADATION CURVES

PROJECT Dzus-Fastener Site  REPORT NO. AT089S-8-7-98
CLIENT Rust Environment & Infrastructure  DATE 07/27/98




| COBBLES | GRAVEL | | | SAND | | | SILT OR CLAY |
|---|---|---|---|---|---|---|---|
| | coarse | medium | fine | coarse | medium | fine | |

| | Specimen Identification | Classification | MC% | LL | PL | PI | Cc | Cu |
|---|---|---|---|---|---|---|---|---|
| ● | 08951 | 4+00N, 13+00E (0-12") | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

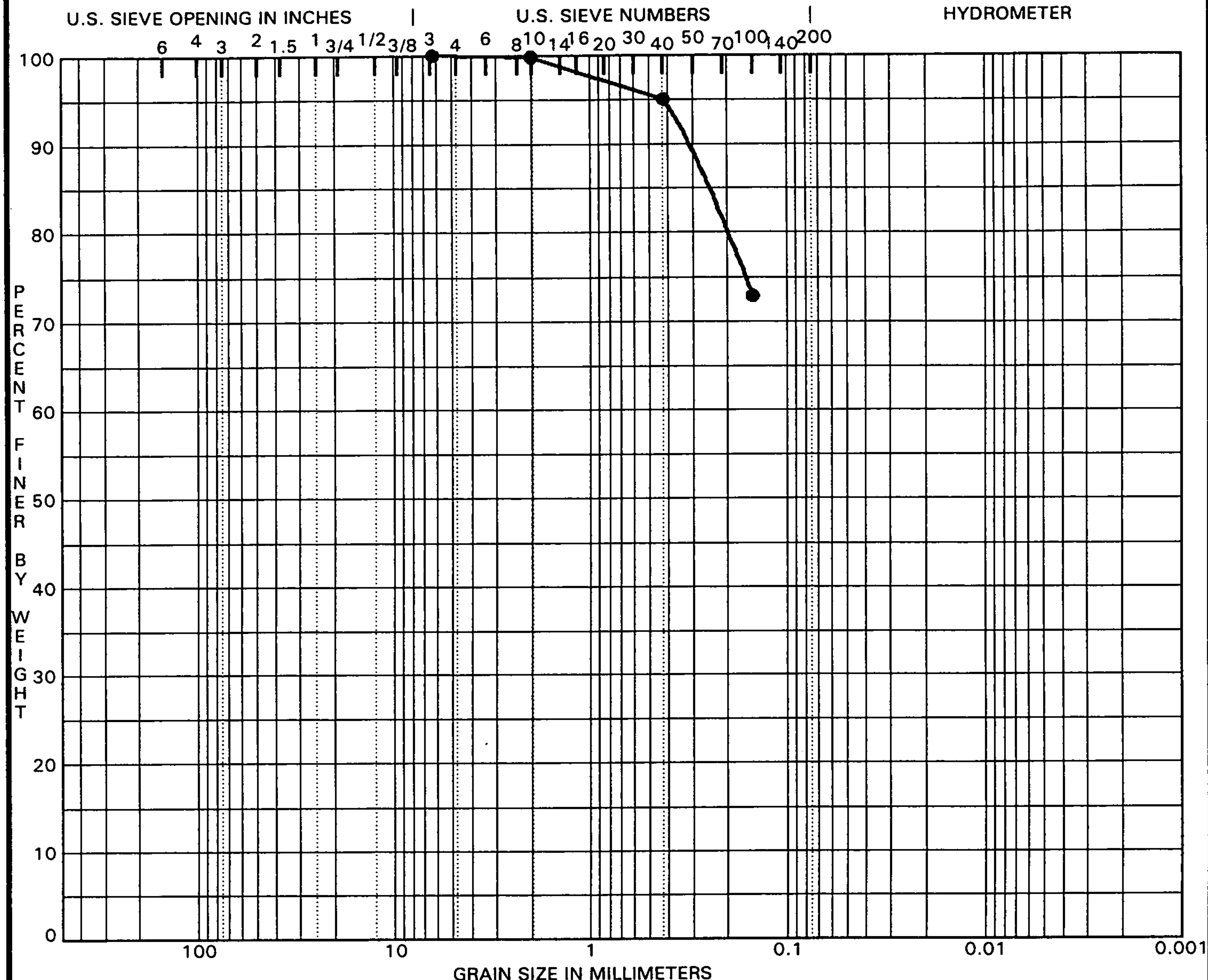
| | Specimen Identification | D100 | D60 | D30 | D10 | %Gravel | %Sand | %Silt | %Clay |
|---|---|---|---|---|---|---|---|---|---|
| ● | 08951 | 19.00 | 1.86 | 0.466 | 0.1657 | 26 | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |

# ATLANTIC TESTING LABORATORIES, Limited

## GRADATION CURVES

PROJECT Dzus-Fastener Site
CLIENT Rust Environment & Infrastructure

REPORT NO. AT089S-8-7-98
DATE 07/27/98




| COBBLES | GRAVEL | | SAND | | | SILT OR CLAY |
|---|---|---|---|---|---|---|
| | coarse | fine | coarse | medium | fine | |

Note: the GRAVEL subdivisions are printed as coarse, medium, fine.

| | Specimen Identification | Classification | MC% | LL | PL | PI | Cc | Cu |
|---|---|---|---|---|---|---|---|---|
| ● | 08952 | 1+00N, 11+50E (0-12") | | | | | | |

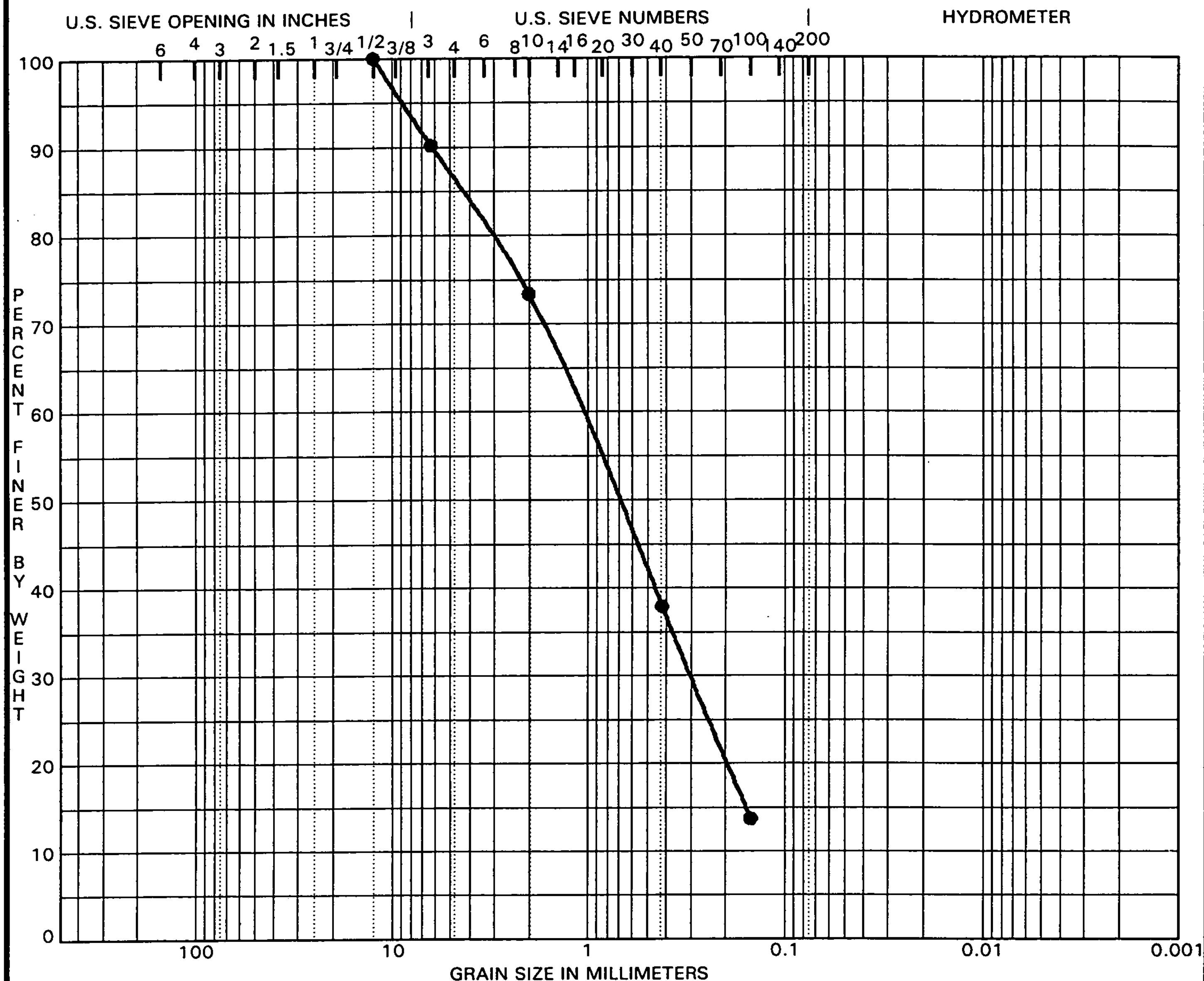
| | Specimen Identification | D100 | D60 | D30 | D10 | %Gravel | %Sand | %Silt | %Clay |
|---|---|---|---|---|---|---|---|---|---|
| ● | 08952 | 6.30 | | | | 0 | | | |

# ATLANTIC TESTING LABORATORIES, Limited

## GRADATION CURVES

PROJECT Dzus-Fastener Site | REPORT NO. AT089S-8-7-98

CLIENT Rust Environment & Infrastructure | DATE 07/27/98




| COBBLES | GRAVEL | | | SAND | | | SILT OR CLAY |
|---|---|---|---|---|---|---|---|
| | coarse | medium | fine | coarse | medium | fine | |

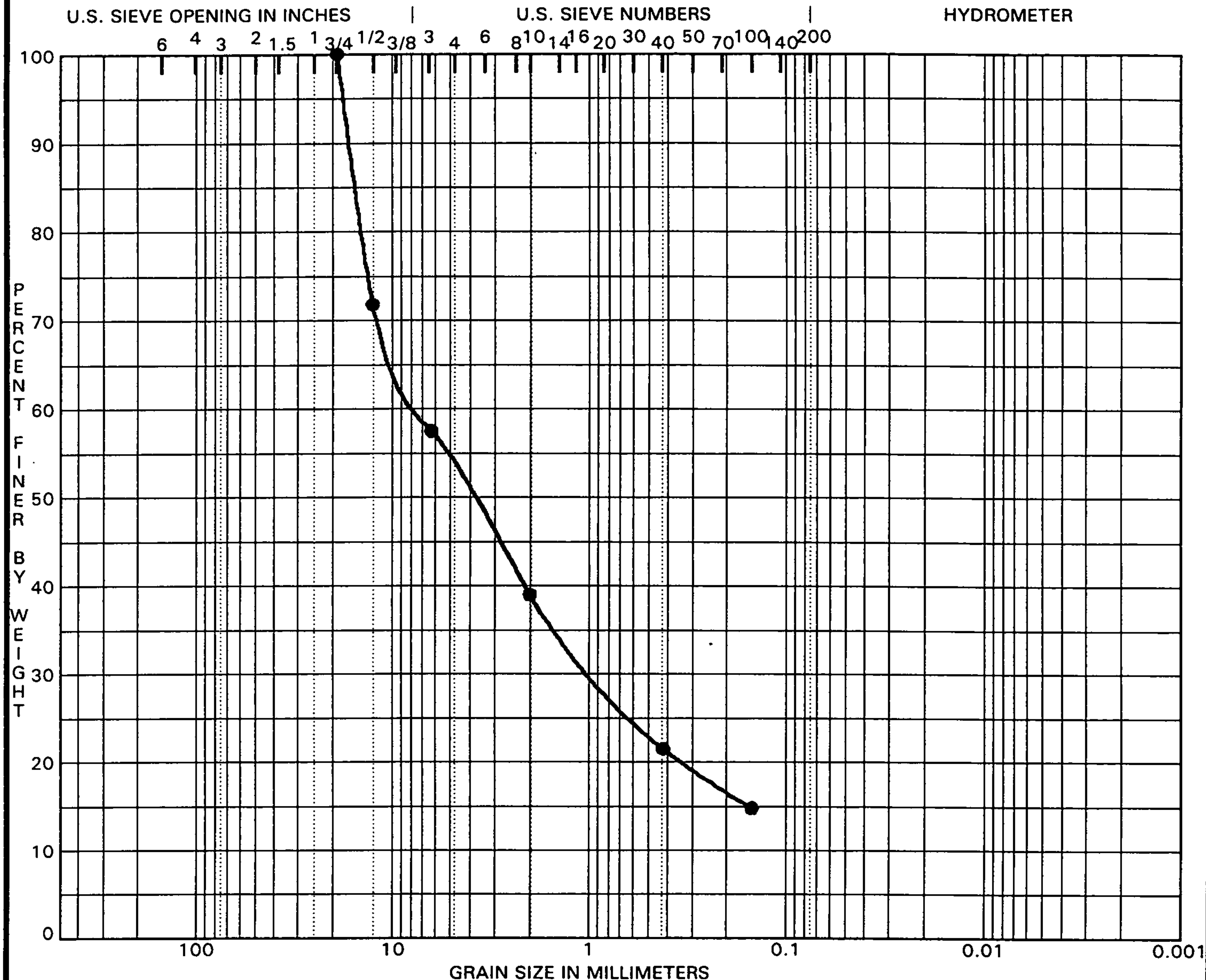
| Specimen Identification | Classification | MC% | LL | PL | PI | Cc | Cu |
|---|---|---|---|---|---|---|---|
| ● 08953 | 2+50N, 14+00E (0-12") | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

| Specimen Identification | D100 | D60 | D30 | D10 | %Gravel | %Sand | %Silt | %Clay |
|---|---|---|---|---|---|---|---|---|
| ● 08953 | 12.50 | 1.12 | 0.303 | | 14 | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

# ATLANTIC TESTING LABORATORIES, Limited

## GRADATION CURVES

PROJECT Dzus-Fastener Site REPORT NO. AT089S-8-7-98
CLIENT Rust Environment & Infrastructure DATE 07/27/98




| COBBLES | GRAVEL | | SAND | | | SILT OR CLAY |
|---|---|---|---|---|---|---|
| | coarse | medium fine | coarse | medium | fine | |

| | Specimen Identification | Classification | MC% | LL | PL | PI | Cc | Cu |
|---|---|---|---|---|---|---|---|---|
| ● | 08954 | 4+00N, 12+00E (0-12") | | | | | | |

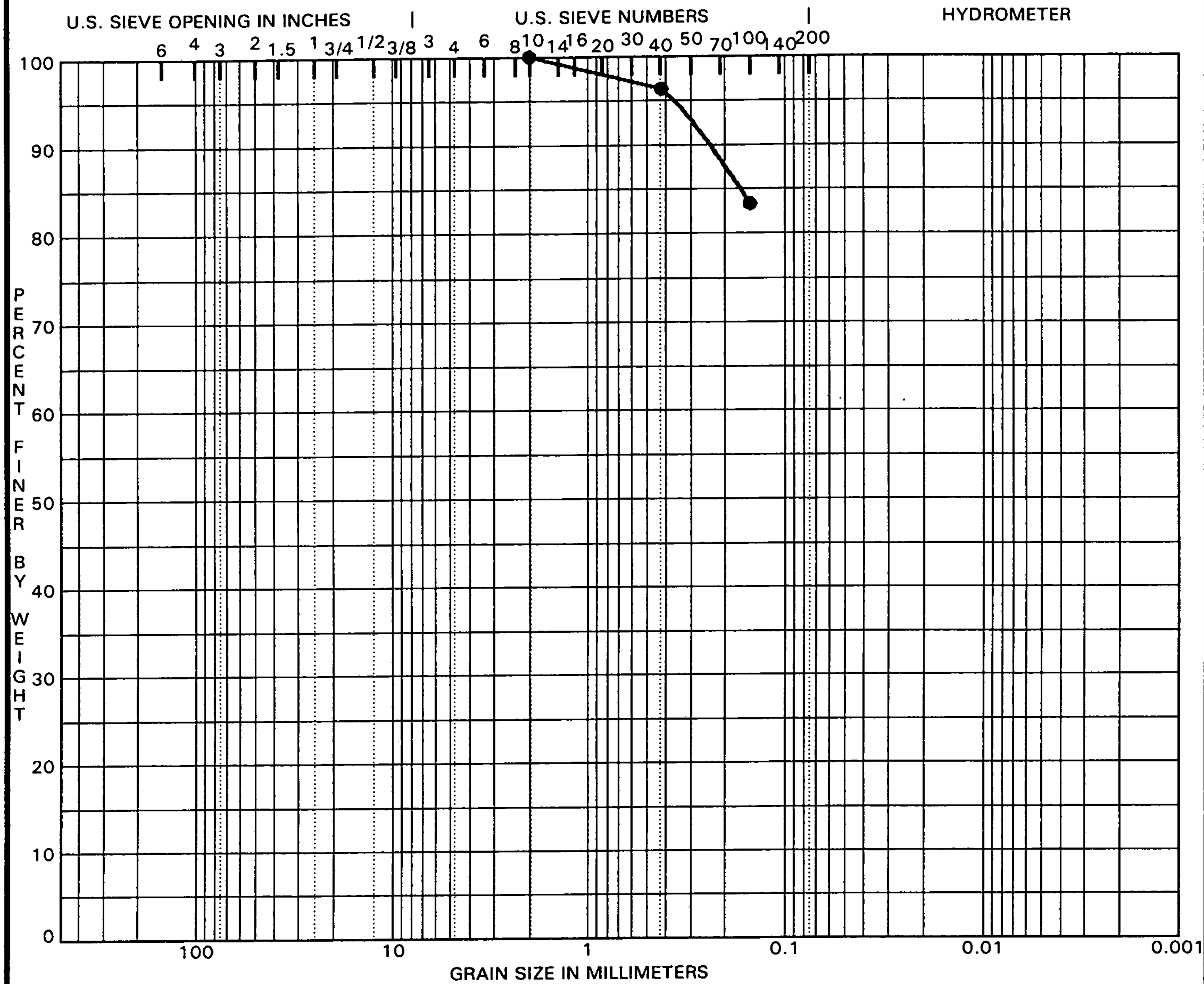
| | Specimen Identification | D100 | D60 | D30 | D10 | %Gravel | %Sand | %Silt | %Clay |
|---|---|---|---|---|---|---|---|---|---|
| ● | 08954 | 19.00 | 7.10 | 0.902 | | 47 | | | |

# ATLANTIC TESTING LABORATORIES, Limited

## GRADATION CURVES

PROJECT Dzus-Fastener Site
CLIENT Rust Environment & Infrastructure

REPORT NO. AT089S-8-7-98
DATE 07/27/98




| COBBLES | GRAVEL | | | SAND | | | SILT OR CLAY |
|---|---|---|---|---|---|---|---|
| | coarse | medium | fine | coarse | medium | fine | |

| Specimen Identification | Classification | MC% | LL | PL | PI | Cc | Cu |
|---|---|---|---|---|---|---|---|
| ● 08955 | 1+00N, 13+50E (0-12") | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

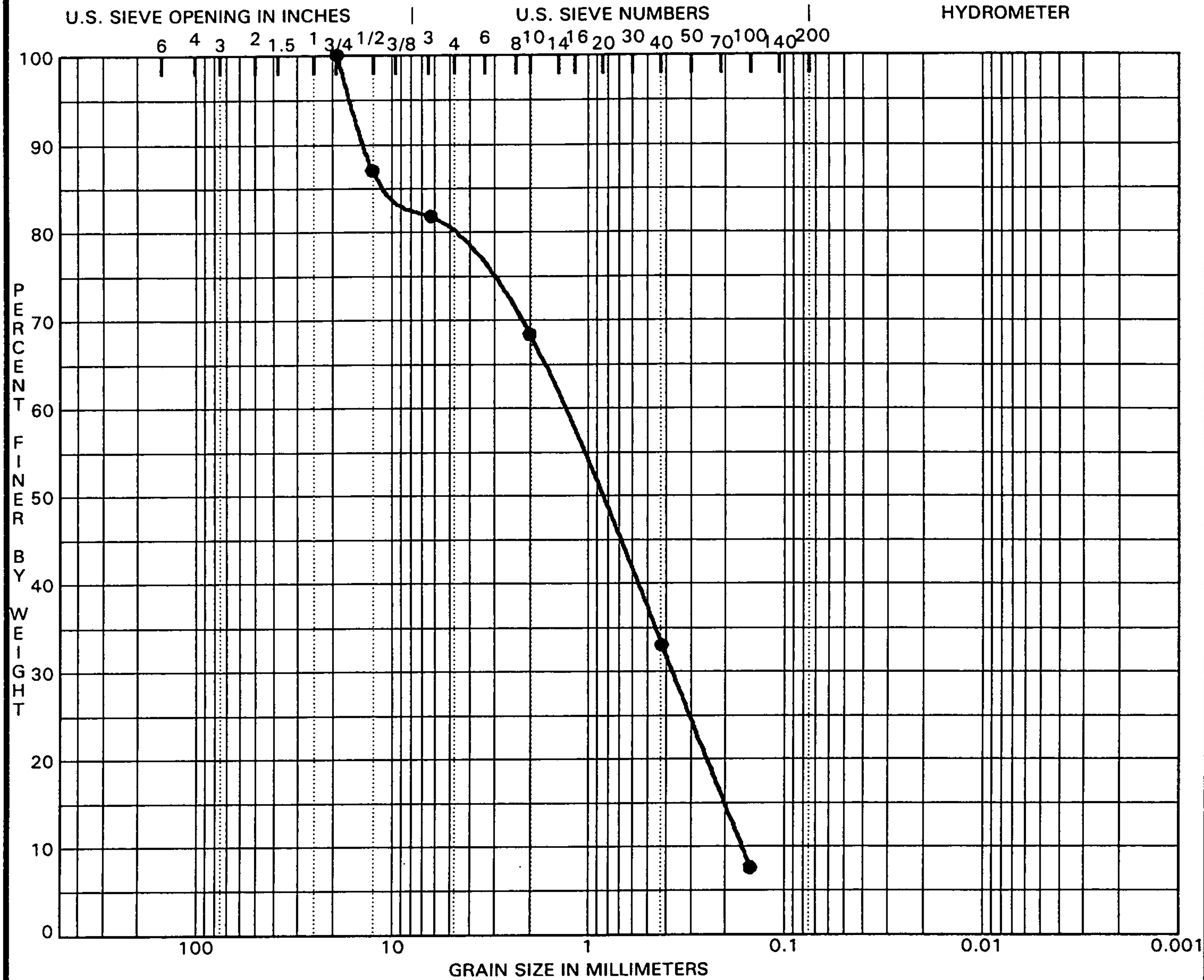
| Specimen Identification | D100 | D60 | D30 | D10 | %Gravel | %Sand | %Silt | %Clay |
|---|---|---|---|---|---|---|---|---|
| ● 08955 | 2.00 | | | | 0 | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

# ATLANTIC TESTING LABORATORIES, Limited

## GRADATION CURVES

PROJECT Dzus-Fastener Site
CLIENT Rust Environment & Infrastructure

REPORT NO. AT089S-8-7-98
DATE 07/27/98




| COBBLES | GRAVEL | | | SAND | | | SILT OR CLAY |
|---|---|---|---|---|---|---|---|
| | coarse | medium | fine | coarse | medium | fine | |

| | Specimen Identification | Classification | MC% | LL | PL | PI | Cc | Cu |
|---|---|---|---|---|---|---|---|---|
| ● | 08956 | 1+00N, 12+00E (18-24") | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

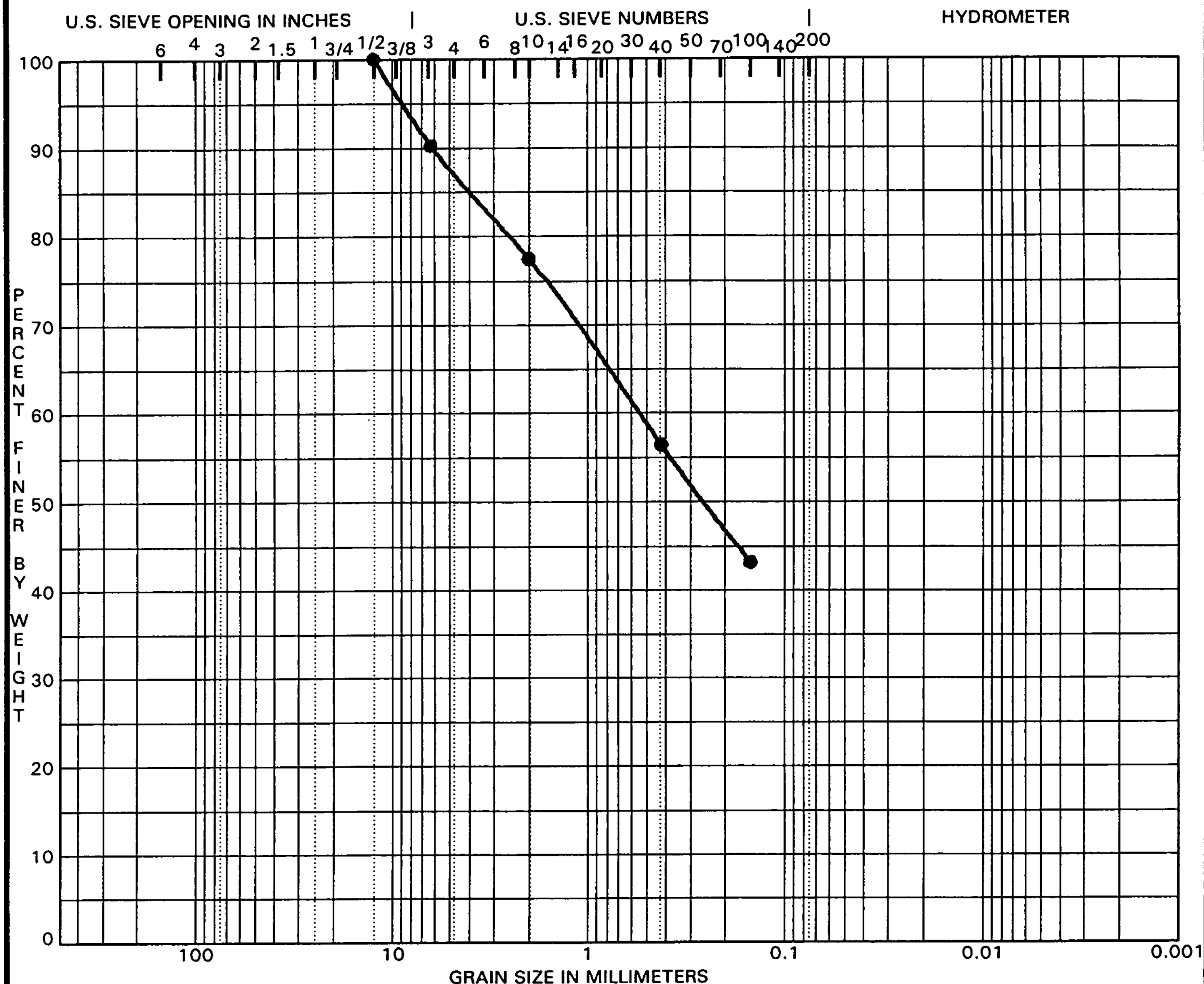
| | Specimen Identification | D100 | D60 | D30 | D10 | %Gravel | %Sand | %Silt | %Clay |
|---|---|---|---|---|---|---|---|---|---|
| ● | 08956 | 19.00 | 1.39 | 0.376 | 0.1655 | 22 | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |

# ATLANTIC TESTING LABORATORIES, Limited

## GRADATION CURVES

PROJECT Dzus-Fastener Site
CLIENT Rust Environment & Infrastructure

REPORT NO. AT089S-8-7-98
DATE 07/27/98




| COBBLES | GRAVEL | | | SAND | | | SILT OR CLAY |
|---|---|---|---|---|---|---|---|
| | coarse | medium | fine | coarse | medium | fine | |

| Specimen Identification | Classification | MC% | LL | PL | PI | Cc | Cu |
|---|---|---|---|---|---|---|---|
| ● 08957 | 0+50N, 14+00E (0-12") | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

| Specimen Identification | D100 | D60 | D30 | D10 | %Gravel | %Sand | %Silt | %Clay |
|---|---|---|---|---|---|---|---|---|
| ● 08957 | 12.50 | 0.55 | | | 13 | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

## Procedure for Washing Sediments

PROCEDURE WASH SEDIMENT PREPARATION
CAPRI LAKE PROJECT

Wash dry screened sediments to simulate the effects of :

- a. Suspension in a dredge slurry and draining of the slurry liquid. Estimate the dredge stream is 10% solids by weight.
- b. Wet screening of the dredge stream on vibratory screen units

Preparation will consist of two steps

1. Slurry make-up and screening
   - a. Weigh the sample, which consists of the fraction retained on a #40 screen.
   - b. Mix the sample with tap water at a weight ratio of 10 water : 1 solid. Mix in a jar and shake for 1 minute.
   - c. Pour suspension through a #40 screen, making sure all solids go on the screen.
   - d. Split sample in half. One half to be submitted for cadmium analysis, the other half to be washed in Step 2 below.

2. Sediment washing
   - a. Weigh wet sample to be washed. Retain sample on a #40 screen.
   - b. Spray water over the sample on the screen. Use a coarse spray with some pressure.
   - c. The amount of water sprayed should be approximately 5-times the weight of wet sample material. The wash ratio (water:solid) should be kept close for the different test runs. Either spray a measured volume of water or retain water below the screen and weigh.
   - d. The washed material is to be submitted for cadmium analysis.

The procedure carried out by Atlantic Testing laboratories included the following:
After completion of 1. d., The sample to be submitted for analysis was scooped out fronm the screen leaving the remaining portion of the material to be carried on to step 2.
After complettion of 2.d., The washed sample was tipped out from the screen and any material attached to the screen was removed as part of that sample.

The analytical results may reflect a slightly higher cadmium concentration in the second washed sample since the sample may contain more fine material as a result of the procedure carried out by the testing laboratory.

# Cadmium Analyses of Sediment Gradation Fractions

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**SCILAB ALBANY, INC.**
15 Century Hill Drive
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Tel: (518) 786-8100
Fax: (518) 786-7700

# PRELIMINARY REPORT

Laboratory Analysis Report
Prepared for: RUST E&I
Project Number: 9907700
Task Number: 980827X
02 SEP 1998

IMPORTANT - PLEASE NOTE

1. All results are calculated on a dry weight basis unless otherwise specified.
2. PQL = Practical Quantitation Limit.
3. A result with a "D" means that the result was "Detected" below the Practical Quantitation Limit (PQL), but above the Method Detection Limit (MDL).
4. ND = Not Detected at or above the PQL.
5. NTP = Non-target peaks (1-5 peaks).
   MNTP = Many non-target peaks (5+ peaks).
6. pH results not performed in the field should be considered estimated since the holding time is 15 minutes from the sampling time.
7. If the samples are collected independently of our laboratory, Scilab is not responsible for the possible contamination during the sampling procedure.
8. Methylene chloride and acetone are common laboratory artifacts for volatile organic analysis. Bis-(2-ethyl-hexyl) phthalate and di-n-butylphthalate are common laboratory artifacts for GC/MS semivolatile analysis. Other compounds may also appear as laboratory artifacts for the organic analyses. The above compounds will be flagged as suspected laboratory artifacts if the detected value is less than five (5) times of the PQL in the sample. Acetone will be flagged as a suspected laboratory artifact only up to two and a half (2.5) times of the PQL.
9. If air samples are collected independently of our laboratory, Scilab is not responsible for inadequate sample volume for air analysis.

AUTHORIZED FOR RELEASE: [signature]

DATE: 9/2/98

CERTIFICATIONS:

NYS E.L.A.P. ID NO: 10358 MA: NY052 CT: PH-0551 NJ: 73581

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RUST E&I
12 METRO PARK
ALBANY NY 12205

PROJECT #: 9907700

Task #: 980827X

Attention: MR. AMY VAN LAAK

Purchase Order Number:
Date Sampled: 08/27/98 Time: 00:00
Sampled By : LAAK
Sample Id: 1+00N 14+00E W1
Location : 12-18

Sample No: 980827X 01
Date Received: 08/27/98
Collection Method: COMPOSITE
Matrix: SOIL

| Parameters and Standard Methodology Used | | Results | PQL | Unit | Analyst Reference |
|---|---|---|---|---|---|
| % SOLIDS | CLP SOW 4/89 | 83.9 | | % | MJS 8/28/98 |
| ACID DIGESTION - FLAME/ICP | SW-846 METHOD 3050 | COMPLETED | | | D-30:34 8/28/98 |
| CADMIUM | ICP, SW-846 METHOD 6010 | 1.9 | 0.24 | MG/KG | F-7:413 9/1/98 |

REMARKS:

LEGEND: MG/KG=PPM, MCG/KG=PPB, MG/L=PPM, MCG/L=PPB, MCG/G=PPM

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RUST E&I
12 METRO PARK
ALBANY NY 12205

PROJECT #: 9907700

Task #: 980827X

Attention: MR. AMY VAN LAAK

Purchase Order Number:
Date Sampled: 08/27/98 Time: 00:00
Sampled By : LAAK
Sample Id: 1+00N 14+00E W2
Location : 12-18

Sample No: 980827X 02
Date Received: 08/27/98
Collection Method: COMPOSITE
Matrix: SOIL

| Parameters and Standard Methodology Used | | Results | PQL | Unit | Analyst Reference |
|---|---|---|---|---|---|
| % SOLIDS | CLP SOW 4/89 | 78.8 | | % | MJS 8/28/98 |
| ACID DIGESTION - FLAME/ICP | SW-846 METHOD 3050 | COMPLETED | | | D-30:34 8/28/98 |
| CADMIUM | ICP, SW-846 METHOD 6010 | 2.7 | 0.25 | MG/KG | F-7:413 9/1/98 |

REMARKS:

LEGEND: MG/KG=PPM, MCG/KG=PPB, MG/L=PPM, MCG/L=PPB, MCG/G=PPM

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RUST E&I
12 METRO PARK
ALBANY NY 12205

PROJECT #: 9907700

Task #: 980827X

Attention: MR. AMY VAN LAAK

Purchase Order Number:
Date Sampled: 08/27/98 Time: 00:00
Sampled By : LAAK
Sample Id: 1+00N 14+00E 100
Location : 12-18

Sample No: 980827X 03
Date Received: 08/27/98
Collection Method: COMPOSITE
Matrix: SOIL

| Parameters and Standard Methodology Used | | Results | PQL | Unit | Analyst Reference |
|---|---|---|---|---|---|
| % SOLIDS | CLP SOW 4/89 | 97.8 | | % | MJS 8/28/98 |
| ACID DIGESTION - FLAME/ICP | SW-846 METHOD 3050 | COMPLETED | | | D-30:34 8/28/98 |
| CADMIUM | ICP, SW-846 METHOD 6010 | 106 | 0.20 | MG/KG | F-7:413 9/1/98 |

REMARKS:

LEGEND: MG/KG=PPM, MCG/KG=PPB, MG/L=PPM, MCG/L=PPB, MCG/G=PPM

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RUST E&I
12 METRO PARK
ALBANY NY 12205

PROJECT #: 9907700

Task #: 980827X

Attention: MR. AMY VAN LAAK

Purchase Order Number:
Date Sampled: 08/27/98 Time: 00:00
Sampled By : LAAK
Sample Id: 0+50N 14+0E W1
Location : 18-29

Sample No: 980827X 04
Date Received: 08/27/98
Collection Method: COMPOSITE
Matrix: SOIL

| Parameters and Standard Methodology Used | | Results | PQL | Unit | Analyst Reference |
|---|---|---|---|---|---|
| % SOLIDS | CLP SOW 4/89 | 90.8 | | % | MJS 8/28/98 |
| ACID DIGESTION - FLAME/ICP | SW-846 METHOD 3050 | COMPLETED | | | D-30:34 8/28/98 |
| CADMIUM | ICP, SW-846 METHOD 6010 | 0.49 | 0.14 | MG/KG | F-7:413 9/1/98 |

REMARKS:

LEGEND: MG/KG=PPM, MCG/KG=PPB, MG/L=PPM, MCG/L=PPB, MCG/G=PPM

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RUST E&I
12 METRO PARK
ALBANY NY 12205

Attention: MR. AMY VAN LAAK

PROJECT #: 9907700

Task #: 980827X

Purchase Order Number:
Date Sampled: 08/27/98 Time: 00:00
Sampled By : LAAK
Sample Id: 0+50N 14+0E 100
Location : 18-29

Sample No: 980827X 05
Date Received: 08/27/98
Collection Method: COMPOSITE
Matrix: SOIL

| Parameters and Standard Methodology Used | | Results | PQL | Unit | Analyst Reference |
|---|---|---|---|---|---|
| % SOLIDS | CLP SOW 4/89 | 93.0 | | % | MJS 8/28/98 |
| ACID DIGESTION - FLAME/ICP | SW-846 METHOD 3050 | COMPLETED | | | D-30:34 8/28/98 |
| CADMIUM | ICP, SW-846 METHOD 6010 | 51.7 | 0.22 | MG/KG | F-7:413 9/1/98 |

REMARKS:

LEGEND: MG/KG=PPM, MCG/KG=PPB, MG/L=PPM, MCG/L=PPB, MCG/G=PPM

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RUST E&I
12 METRO PARK
ALBANY NY 12205

PROJECT #: 9907700

Task #: 980827X

Attention: MR. AMY VAN LAAK

Purchase Order Number:
Date Sampled: 08/27/98 Time: 00:00
Sampled By : LAAK
Sample Id: 6+00N 11+50E W2
Location : 0-10

Sample No: 980827X 06
Date Received: 08/27/98
Collection Method: COMPOSITE
Matrix: SOIL

| Parameters and Standard Methodology Used | | Results | PQL | Unit | Analyst Reference |
|---|---|---|---|---|---|
| % SOLIDS | CLP SOW 4/89 | 79.9 | | % | MJS 8/28/98 |
| ACID DIGESTION - FLAME/ICP | SW-846 METHOD 3050 | COMPLETED | | | D-30:34 8/28/98 |
| CADMIUM | ICP, SW-846 METHOD 6010 | 0.68 | 0.19 | MG/KG | F-7:413 9/1/98 |

REMARKS:

LEGEND: MG/KG=PPM, MCG/KG=PPB, MG/L=PPM, MCG/L=PPB, MCG/G=PPM

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RUST E&I
12 METRO PARK
ALBANY NY 12205

PROJECT #: 9907700

Task #: 980827X

Attention: MR. AMY VAN LAAK

Purchase Order Number:
Date Sampled: 08/27/98 Time: 00:00
Sampled By : LAAK
Sample Id: 6+00N 11+50E D
Location : 0-10

Sample No: 980827X 07
Date Received: 08/27/98
Collection Method: COMPOSITE
Matrix: SOIL

| Parameters and Standard Methodology Used | | Results | PQL | Unit | Analyst Reference |
|---|---|---|---|---|---|
| % SOLIDS | CLP SOW 4/89 | 100.0 | | % | MJS 8/28/98 |
| ACID DIGESTION - FLAME/ICP | SW-846 METHOD 3050 | COMPLETED | | | D-30:34 8/28/98 |
| CADMIUM | ICP, SW-846 METHOD 6010 | 1.4 | 0.21 | MG/KG | F-7:413 9/1/98 |

REMARKS:

LEGEND: MG/KG=PPM, MCG/KG=PPB, MG/L=PPM, MCG/L=PPB, MCG/G=PPM

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PROJECT #: 9907700

RUST E&I
12 METRO PARK
ALBANY NY 12205

Task #: 980827X

Attention: MR. AMY VAN LAAK

Purchase Order Number:
Date Sampled: 08/27/98 Time: 00:00
Sampled By : LAAK
Sample Id: 4+00N 13+00E D
Location : 0-12

Sample No: 980827X 08
Date Received: 08/27/98
Collection Method: COMPOSITE
Matrix: SOIL

| Parameters and Standard Methodology Used | | Results | PQL | Unit | Analyst Reference |
|---|---|---|---|---|---|
| % SOLIDS | CLP SOW 4/89 | 93.5 | | % | MJS 8/28/98 |
| ACID DIGESTION - FLAME/ICP | SW-846 METHOD 3050 | COMPLETED | | | D-30:34 8/28/98 |
| CADMIUM | ICP, SW-846 METHOD 6010 | 16.4 | 0.22 | MG/KG | F-7:413 9/1/98 |

REMARKS:

LEGEND: MG/KG=PPM, MCG/KG=PPB, MG/L=PPM, MCG/L=PPB, MCG/G=PPM

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12 METRO PARK
ALBANY NY 12205

PROJECT #: 9907700

Task #: 980827X

Attention: MR. AMY VAN LAAK

Purchase Order Number:
Date Sampled: 08/27/98 Time: 00:00
Sampled By : LAAK
Sample Id: 4+00N 11+00E D
Location : 0-12

Sample No: 980827X 09
Date Received: 08/27/98
Collection Method: COMPOSITE
Matrix: SOIL

| Parameters and Standard Methodology Used | | Results | PQL | Unit | Analyst Reference |
|---|---|---|---|---|---|
| % SOLIDS | CLP SOW 4/89 | 100.0 | | % | MJS 8/28/98 |
| ACID DIGESTION - FLAME/ICP | SW-846 METHOD 3050 | COMPLETED | | | D-30:34 8/28/98 |
| CADMIUM | ICP, SW-846 METHOD 6010 | 18.9 | 0.18 | MG/KG | F-7:413 9/1/98 |

REMARKS:

LEGEND: MG/KG=PPM, MCG/KG=PPB, MG/L=PPM, MCG/L=PPB, MCG/G=PPM

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PROJECT #: 9907700

RUST E&I
12 METRO PARK
ALBANY NY 12205

Task #: 980827X

Attention: MR. AMY VAN LAAK

Sample No: 980827X 10
Date Received: 08/27/98
Collection Method: COMPOSITE
Matrix: SOIL

Purchase Order Number:
Date Sampled: 08/27/98 Time: 00:00
Sampled By : LAAK
Sample Id: 4+00N 11+00E W2
Location : 0-12

| Parameters and Standard Methodology Used | | Results | PQL | Unit | Analyst Reference |
|---|---|---|---|---|---|
| % SOLIDS | CLP SOW 4/89 | 79.5 | | % | MJS 8/28/98 |
| ACID DIGESTION - FLAME/ICP | SW-846 METHOD 3050 | COMPLETED | | | D-30:34 8/28/98 |
| CADMIUM | ICP, SW-846 METHOD 6010 | 10.9 | 0.23 | MG/KG | F-7:413 9/1/98 |

REMARKS:

LEGEND: MG/KG=PPM, MCG/KG=PPB, MG/L=PPM, MCG/L=PPB, MCG/G=PPM

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PROJECT #: 9907700

RUST E&I
12 METRO PARK
ALBANY NY 12205

Task #: 980827X

Attention: MR. AMY VAN LAAK

Sample No: 980827X 11
Date Received: 08/27/98
Collection Method: COMPOSITE
Matrix: SOIL

Purchase Order Number:
Date Sampled: 08/27/98 Time: 00:00
Sampled By : LAAK
Sample Id: 4+00N 11+00E 100
Location : 0-12

| Parameters and Standard Methodology Used | | Results | PQL | Unit | Analyst Reference |
|---|---|---|---|---|---|
| % SOLIDS | CLP SOW 4/89 | 98.1 | | % | MJS 8/28/98 |
| ACID DIGESTION - FLAME/ICP | SW-846 METHOD 3050 | COMPLETED | | | D-30:34 8/28/98 |
| CADMIUM | ICP, SW-846 METHOD 6010 | 174 | 0.17 | MG/KG | F-7:413 9/1/98 |

REMARKS:

LEGEND: MG/KG=PPM, MCG/KG=PPB, MG/L=PPM, MCG/L=PPB, MCG/G=PPM

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RUST E&I
12 METRO PARK
ALBANY NY 12205

PROJECT #: 9907700

Task #: 980827X

Attention: MR. AMY VAN LAAK

Purchase Order Number:
Date Sampled: 08/27/98 Time: 00:00
Sampled By : LAAK
Sample Id: 6+00N 11+50E W1
Location : 0-10

Sample No: 980827X 12
Date Received: 08/27/98
Collection Method: COMPOSITE
Matrix: SOIL

| Parameters and Standard Methodology Used | | Results | PQL | Unit | Analyst Reference |
|---|---|---|---|---|---|
| % SOLIDS | CLP SOW 4/89 | 87.9 | | % | MJS 8/28/98 |
| ACID DIGESTION - FLAME/ICP | SW-846 METHOD 3050 | COMPLETED | | | D-30:34 8/28/98 |
| CADMIUM | ICP, SW-846 METHOD 6010 | ND | 0.20 | MG/KG | F-7:413 9/1/98 |

REMARKS:

LEGEND: MG/KG=PPM, MCG/KG=PPB, MG/L=PPM, MCG/L=PPB, MCG/G=PPM

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RUST E&I
12 METRO PARK
ALBANY NY 12205

PROJECT #: 9907700

Task #: 980827X

Attention: MR. AMY VAN LAAK

Purchase Order Number:
Date Sampled: 08/27/98 Time: 00:00
Sampled By : LAAK
Sample Id: 6+00N 11+50E 100
Location : 0-10

Sample No: 980827X 13
Date Received: 08/27/98
Collection Method: COMPOSITE
Matrix: SOIL

| Parameters and Standard Methodology Used | | Results | PQL | Unit | Analyst Reference |
|---|---|---|---|---|---|
| % SOLIDS | CLP SOW 4/89 | 99.5 | | % | MJS 8/28/98 |
| ACID DIGESTION - FLAME/ICP | SW-846 METHOD 3050 | COMPLETED | | | D-30:34 8/28/98 |
| CADMIUM | ICP, SW-846 METHOD 6010 | 22.0 | 0.21 | MG/KG | F-7:413 9/1/98 |

REMARKS:

LEGEND: MG/KG=PPM, MCG/KG=PPB, MG/L=PPM, MCG/L=PPB, MCG/G=PPM

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Latham, NY 12110
Tel: (518) 786-8100
Fax: (518) 786-7700

SCILAB
FULL SERVICE ENVIRONMENTAL LABORATORIES

PROJECT #: 9907700

RUST E&I
12 METRO PARK
ALBANY NY 12205

Task #: 980827X

Attention: MR. AMY VAN LAAK

Sample No: 980827X 14
Date Received: 08/27/98
Collection Method: COMPOSITE
Matrix: SOIL

Purchase Order Number:
Date Sampled: 08/27/98 Time: 00:00
Sampled By : LAAK
Sample Id: 6+00N 13+50E
Location : 0-12

| Parameters and Standard Methodology Used | | Results | PQL | Unit | Analyst Reference |
|---|---|---|---|---|---|
| % SOLIDS | CLP SOW 4/89 | 91.1 | | % | MJS 8/28/98 |
| ACID DIGESTION - FLAME/ICP | SW-846 METHOD 3050 | COMPLETED | | | D-30:34 8/28/98 |
| CADMIUM | ICP, SW-846 METHOD 6010 | ND | 0.22 | MG/KG | F-7:413 9/1/98 |

REMARKS:

LEGEND: MG/KG=PPM, MCG/KG=PPB, MG/L=PPM, MCG/L=PPB, MCG/G=PPM

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Tel: (518) 786-8100
Fax: (518) 786-7700

RUST E&I
12 METRO PARK
ALBANY NY 12205

PROJECT #: 9907700

Task #: 980827X

Attention: MR. AMY VAN LAAK

Purchase Order Number:
Date Sampled: 08/27/98 Time: 00:00
Sampled By : LAAK
Sample Id: 6+00N 13+50E D
Location : 0-12

Sample No: 980827X 15
Date Received: 08/27/98
Collection Method: COMPOSITE
Matrix: SOIL

| Parameters and Standard Methodology Used | | Results | PQL | Unit | Analyst Reference |
|---|---|---|---|---|---|
| % SOLIDS | CLP SOW 4/89 | 100.0 | | % | MJS 8/28/98 |
| ACID DIGESTION - FLAME/ICP | SW-846 METHOD 3050 | COMPLETED | | | D-30:34 8/28/98 |
| CADMIUM | ICP, SW-846 METHOD 6010 | 0.82 | 0.2 | MG/KG | F-7:413 9/1/98 |

REMARKS:

LEGEND: MG/KG=PPM, MCG/KG=PPB, MG/L=PPM, MCG/L=PPB, MCG/G=PPM

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P.O. Box 787
Latham, NY 12110
Tel: (518) 786-8100
Fax: (518) 786-7700

PROJECT #: 9907700

RUST E&I
12 METRO PARK
ALBANY NY 12205

Task #: 980827X

Attention: MR. AMY VAN LAAK

Purchase Order Number:
Date Sampled: 08/27/98 Time: 00:00
Sampled By : LAAK
Sample Id: 6+00N 13+50E W2
Location : 0-12

Sample No: 980827X 16
Date Received: 08/27/98
Collection Method: COMPOSITE
Matrix: SOIL

| Parameters and Standard Methodology Used | | Results | PQL | Unit | Analyst Reference |
|---|---|---|---|---|---|
| % SOLIDS | CLP SOW 4/89 | 80.9 | | % | MJS 8/28/98 |
| ACID DIGESTION - FLAME/ICP | SW-846 METHOD 3050 | COMPLETED | | | D-30:34 8/28/98 |
| CADMIUM | ICP, SW-846 METHOD 6010 | 0.48 | 0.22 | MG/KG | F-7:413 9/1/98 |

REMARKS:

LEGEND: MG/KG=PPM, MCG/KG=PPB, MG/L=PPM, MCG/L=PPB, MCG/G=PPM

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SCILAB
FULL SERVICE ENVIRONMENTAL LABORATORIES

PROJECT #: 9907700

RUST E&I
12 METRO PARK
ALBANY NY 12205

Task #: 980827X

Attention: MR. AMY VAN LAAK

Sample No: 980827X 17
Date Received: 08/27/98
Collection Method: COMPOSITE
Matrix: SOIL

Purchase Order Number:
Date Sampled: 08/27/98 Time: 00:00
Sampled By : LAAK
Sample Id: 6+00N 13+50E 100
Location : 0-12

| Parameters and Standard Methodology Used | | Results | PQL | Unit | Analyst Reference |
|---|---|---|---|---|---|
| % SOLIDS | CLP SOW 4/89 | 99.3 | | % | MJS 8/28/98 |
| ACID DIGESTION - FLAME/ICP | SW-846 METHOD 3050 | COMPLETED | | | D-30:34 8/28/98 |
| CADMIUM | ICP, SW-846 METHOD 6010 | 7.0 | 0.20 | MG/KG | F-7:413 9/1/98 |

REMARKS:

LEGEND: MG/KG=PPM, MCG/KG=PPB, MG/L=PPM, MCG/L=PPB, MCG/G=PPM

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RUST E&I
12 METRO PARK
ALBANY NY 12205

Attention: MR. AMY VAN LAAK

PROJECT #: 9907700

Task #: 980827X

Purchase Order Number:
Date Sampled: 08/27/98 Time: 00:00
Sampled By : LAAK
Sample Id: 4+00N 11+00E W1
Location : 0-12

Sample No: 980827X 18
Date Received: 08/27/98
Collection Method: COMPOSITE
Matrix: SOIL

| Parameters and Standard Methodology Used | | Results | PQL | Unit | Analyst Reference |
|---|---|---|---|---|---|
| % SOLIDS | CLP SOW 4/89 | 86.0 | | % | MJS 8/28/98 |
| ACID DIGESTION - FLAME/ICP | SW-846 METHOD 3050 | COMPLETED | | | D-30:34 8/28/98 |
| CADMIUM | ICP, SW-846 METHOD 6010 | 9.1 | 0.23 | MG/KG | F-7:413 9/1/98 |

REMARKS:

LEGEND: MG/KG=PPM, MCG/KG=PPB, MG/L=PPM, MCG/L=PPB, MCG/G=PPM

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RUST E&I
12 METRO PARK
ALBANY NY 12205

PROJECT #: 9907700

Task #: 980827X

Attention: MR. AMY VAN LAAK

Purchase Order Number:
Date Sampled: 08/27/98 Time: 00:00
Sampled By : LAAK
Sample Id: 4+00N 13+00E W1
Location : 0-12

Sample No: 980827X 19
Date Received: 08/27/98
Collection Method: COMPOSITE
Matrix: SOIL

| Parameters and Standard Methodology Used | | Results | PQL | Unit | Analyst Reference |
|---|---|---|---|---|---|
| % SOLIDS | CLP SOW 4/89 | 90.2 | | % | MJS 8/28/98 |
| ACID DIGESTION - FLAME/ICP | SW-846 METHOD 3050 | COMPLETED | | | D-30:34 8/28/98 |
| CADMIUM | ICP, SW-846 METHOD 6010 | 6.5 | 0.20 | MG/KG | F-7:413 9/1/98 |

REMARKS:

LEGEND: MG/KG=PPM, MCG/KG=PPB, MG/L=PPM, MCG/L=PPB, MCG/G=PPM

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RUST E&I
12 METRO PARK
ALBANY NY 12205

PROJECT #: 9907700

Task #: 980827X

Attention: MR. AMY VAN LAAK

Purchase Order Number:
Date Sampled: 08/27/98 Time: 00:00
Sampled By : LAAK
Sample Id: 4+00N 13+00E W2
Location : 0-12

Sample No: 980827X 20
Date Received: 08/27/98
Collection Method: COMPOSITE
Matrix: SOIL

| Parameters and Standard Methodology Used | | Results | PQL | Unit | Analyst Reference |
|---|---|---|---|---|---|
| % SOLIDS | CLP SOW 4/89 | 84.6 | | % | MJS 8/28/98 |
| ACID DIGESTION - FLAME/ICP | SW-846 METHOD 3050 | COMPLETED | | | D-30:34 8/28/98 |
| CADMIUM | ICP, SW-846 METHOD 6010 | 11.8 | 0.18 | MG/KG | F-7:413 9/1/98 |

REMARKS:

LEGEND: MG/KG=PPM, MCG/KG=PPB, MG/L=PPM, MCG/L=PPB, MCG/G=PPM

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RUST E&I
12 METRO PARK
ALBANY NY 12205

PROJECT #: 9907700

Task #: 980827X

Attention: MR. AMY VAN LAAK

Purchase Order Number:
Date Sampled: 08/27/98 Time: 00:00
Sampled By : LAAK
Sample Id: 4+00N 13+00E 100
Location : 0-12

Sample No: 980827X 21
Date Received: 08/27/98
Collection Method: COMPOSITE
Matrix: SOIL

| Parameters and Standard Methodology Used | | Results | PQL | Unit | Analyst Reference |
|---|---|---|---|---|---|
| % SOLIDS | CLP SOW 4/89 | 98.5 | | % | MJS 8/28/98 |
| ACID DIGESTION - FLAME/ICP | SW-846 METHOD 3050 | COMPLETED | | | D-30:36 8/30/98 |
| CADMIUM | ICP, SW-846 METHOD 6010 | 213 | 0.20 | MG/KG | F-7:413 9/1/98 |

REMARKS:

LEGEND: MG/KG=PPM, MCG/KG=PPB, MG/L=PPM, MCG/L=PPB, MCG/G=PPM

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RUST E&I
12 METRO PARK
ALBANY NY 12205

PROJECT #: 9907700

Task #: 980827X

Attention: MR. AMY VAN LAAK

Purchase Order Number:
Date Sampled: 08/27/98 Time: 00:00
Sampled By : LAAK
Sample Id: 2+50N 12+0E W1
Location : 0-12

Sample No: 980827X 22
Date Received: 08/27/98
Collection Method: COMPOSITE
Matrix: SOIL

| Parameters and Standard Methodology Used | | Results | PQL | Unit | Analyst Reference |
|---|---|---|---|---|---|
| % SOLIDS | CLP SOW 4/89 | 83.0 | | % | MJS 8/28/98 |
| ACID DIGESTION - FLAME/ICP | SW-846 METHOD 3050 | COMPLETED | | | D-30:36 8/30/98 |
| CADMIUM | ICP, SW-846 METHOD 6010 | 2.3 | 0.23 | MG/KG | F-7:413 9/1/98 |

REMARKS:

LEGEND: MG/KG=PPM, MCG/KG=PPB, MG/L=PPM, MCG/L=PPB, MCG/G=PPM

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RUST E&I
12 METRO PARK
ALBANY NY 12205

Attention: MR. AMY VAN LAAK

Purchase Order Number:
Date Sampled: 08/27/98 Time: 00:00
Sampled By : LAAK
Sample Id: 2+50N 12+0E 100
Location : 0-12

PROJECT #: 9907700

Task #: 980827X

Sample No: 980827X 23
Date Received: 08/27/98
Collection Method: COMPOSITE
Matrix: SOIL

| Parameters and Standard Methodology Used | | Results | PQL | Unit | Analyst Reference |
|---|---|---|---|---|---|
| % SOLIDS | CLP SOW 4/89 | 97.8 | | % | MJS 8/28/98 |
| ACID DIGESTION - FLAME/ICP | SW-846 METHOD 3050 | COMPLETED | | | D-30:36 8/30/98 |
| CADMIUM | ICP, SW-846 METHOD 6010 | 182 | 0.20 | MG/KG | F-7:413 9/1/98 |

REMARKS:

LEGEND: MG/KG=PPM, MCG/KG=PPB, MG/L=PPM, MCG/L=PPB, MCG/G=PPM

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RUST E&I
12 METRO PARK
ALBANY NY 12205

PROJECT #: 9907700

Task #: 980827X

Attention: MR. AMY VAN LAAK

Purchase Order Number:
Date Sampled: 08/27/98 Time: 00:00
Sampled By : LAAK
Sample Id: 2+50N 11+00E W1
Location : 12-18

Sample No: 980827X 24
Date Received: 08/27/98
Collection Method: COMPOSITE
Matrix: SOIL

| Parameters and Standard Methodology Used | | Results | PQL | Unit | Analyst Reference |
|---|---|---|---|---|---|
| % SOLIDS | CLP SOW 4/89 | 85.8 | | % | MJS 8/28/98 |
| ACID DIGESTION - FLAME/ICP | SW-846 METHOD 3050 | COMPLETED | | | D-30:36 8/30/98 |
| CADMIUM | ICP, SW-846 METHOD 6010 | ND | 0.19 | MG/KG | F-7:413 9/1/98 |

REMARKS:

LEGEND: MG/KG=PPM, MCG/KG=PPB, MG/L=PPM, MCG/L=PPB, MCG/G=PPM

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RUST E&I
12 METRO PARK
ALBANY NY 12205

PROJECT #: 9907700

Task #: 980827X

Attention: MR. AMY VAN LAAK

Purchase Order Number:
Date Sampled: 08/27/98 Time: 00:00
Sampled By : LAAK
Sample Id: 2+50N 11+00E W2
Location : 12-18

Sample No: 980827X 25
Date Received: 08/27/98
Collection Method: COMPOSITE
Matrix: SOIL

| Parameters and Standard Methodology Used | | Results | PQL | Unit | Analyst Reference |
|---|---|---|---|---|---|
| % SOLIDS | CLP SOW 4/89 | 81.3 | | % | MJS 8/28/98 |
| ACID DIGESTION - FLAME/ICP | SW-846 METHOD 3050 | COMPLETED | | | D-30:36 8/30/98 |
| CADMIUM | ICP, SW-846 METHOD 6010 | 0.27 | 0.18 | MG/KG | F-7:413 9/1/98 |

REMARKS:

LEGEND: MG/KG=PPM, MCG/KG=PPB, MG/L=PPM, MCG/L=PPB, MCG/G=PPM

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RUST E&I
12 METRO PARK
ALBANY NY 12205

PROJECT #: 9907700

Task #: 980827X

Attention: MR. AMY VAN LAAK

Purchase Order Number:
Date Sampled: 08/27/98 Time: 00:00
Sampled By : LAAK
Sample Id: 2+50N 11+00E 100
Location : 12-18

Sample No: 980827X 26
Date Received: 08/27/98
Collection Method: COMPOSITE
Matrix: SOIL

| Parameters and Standard Methodology Used | | Results | PQL | Unit | Analyst Reference |
|---|---|---|---|---|---|
| % SOLIDS | CLP SOW 4/89 | 98.9 | | % | MJS 8/28/98 |
| ACID DIGESTION - FLAME/ICP | SW-846 METHOD 3050 | COMPLETED | | | D-30:36 8/30/98 |
| CADMIUM | ICP, SW-846 METHOD 6010 | 23.2 | 0.20 | MG/KG | F-7:413 9/1/98 |

REMARKS:

END OF REPORT

LEGEND: MG/KG=PPM, MCG/KG=PPB, MG/L=PPM, MCG/L=PPB, MCG/G=PPM

980827 X

# Chain of Custody
## Rust Environment and Infrastructure

12 Metro Park Road
Albany, N.Y. 12205
Ph: (518) 458-1313 Fax: (518) 458-2472

RUST

Client Name: RUST
Project No.: 202563.10200
Site Location: DZUS FASTENER SITE - LAKE CLAPPE
Sampler: SAMPLES PREPARED BY ADIRONDACK TESTING LAB.

Rust Contact: AMY VAN LAAK
Laboratory Contact: TIM HOLTEEN
Lab Identification:
Date Report Required: (1 week) ASAP

| | Sample Identification | Date | Time | Sample Matrix | Collection Vessel | # Sample Containers | Preserv. | Comp. or Grab | ANALYSIS REQUIRED/COMMENTS |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1+00N 14+00E (W1) 12"-18" | 8/27/98 | | SEDIMENT | Plastic Bag | 1 | - | | Cd |
| 2 | 1+00N 14+00E (W2) 12"-18" | | | SEDIMENT | | | - | | |
| 3 | 1+00N 14+00E (<100) 12"-18" | | | SEDIMENT | | | - | | |
| 4 | 0+50N 14+0E (W1) 18"-29" | | | SEDIMENT | | | - | | |
| 5 | 0+50N 14+00E (<100) 18"-29" | | | SEDIMENT | | | - | | |
| 6 | 6+00N 11+50E (W2) 0-10" | | | SEDIMENT | | | - | | |
| 7 | 6+00N 11+50E (D) 0-10" | | | SEDIMENT | | | - | | |
| 8 | 4+00N 13+00E (D) 0-12" | | | SEDIMENT | | | - | | |
| 9 | 4+00N 11+00E (D) 0-12" | | | SEDIMENT | | | - | | |
| 10 | 4+00N 11+00E (W2) 0-12" | | | SEDIMENT | | | - | | |
| 11 | 4+00N 11+00E (<100) 0-12" | | | SEDIMENT | | | - | | |

ASP B

| | Name | Affiliation | Date | Time |
|---|---|---|---|---|
| Relinquished by: | [signature] | RUST | 8/27/98 | 12:26 |
| Received by: | | | | |
| Relinquished by: | | | | |
| Received by: | | | | |

| | Name | Date | Time |
|---|---|---|---|
| Received by Laboratory: | [signature] | 8/27/98 | 1226 |

Samples Intact & Properly Preserved: Yes or No
Laboratory Comments:

Form 3C

980827 X

# Chain of Custody

**Rust Environment and Infrastructure**
**12 Metro Park Road**
**Albany, N.Y. 12205**
**Ph: (518) 458-1313** **Fax: (518) 458-2472**

RUST

**Client Name:** RUST
**Project No.:** 202563. 10200
**Site Location:** DZUS FASTENER SITE - LAKE CAPRI
**Sampler:** SAMPLES PREPARED BY ADIRONDACK TESTING LAB

**Rust Contact:** AMY VAN LAAK
**Laboratory Contact:** TIM HOLTEEN
**Lab Identification:**
**Date Report Required:** ASAP (1 week)

| | Sample Identification | Date | Time | Sample Matrix | Collection Vessel | # Sample Containers | Preserv. | Comp. or Grab | ANALYSIS REQUIRED/COMMENTS |
|---|---|---|---|---|---|---|---|---|---|
| 12 | 6+00N 11+50E (W1) 0-10" | 8/27/98 | | SEDIMENT | PLASTIC Bag | 1 | - | . | Cd |
| 13 | 6+00N 11+50E (<100) 0-10" | | | | | | - | | |
| 14 | 6+00N 13+50E (W1) 0-12" | | | | | | - | | |
| 15 | 6+00N 13+50E (D) 0-12" | | | | | | - | | |
| 16 | 6+00N 13+50E (W2) 0-12" | | | | | | - | | |
| 17 | 6+00N 13+50E (<100) 0-12" | | | | | | - | | |
| 18 | 4+00N 11+00E (W1) 0-12" | | | | | | - | | |
| 19 | 4+00N 13+00E (W1) 0-12" | | | | | | - | | |
| 20 | 4+00N 13+00E (W2) 0-12" | | | | | | - | | |
| 21 | 4+00N 13+00E (<100) 0-12" | | | | | | - | | |
| 22 | 2+50N 12+0E (W1) 0-12" | | | | | | - | | |
| 23 | 2+50N 12+0E (<100) 0-12" | | | | | | - | | |
| 24 | 2+50N 11+00E (W1) 12"-18" | | | | | | - | | ASP B |
| 25 | 2+50N 11+00E (W2) 12"-18" | | | | | | - | | |
| 26 | 2+50N 11+00E (<100) 12"-18" | | | | | | - | | |

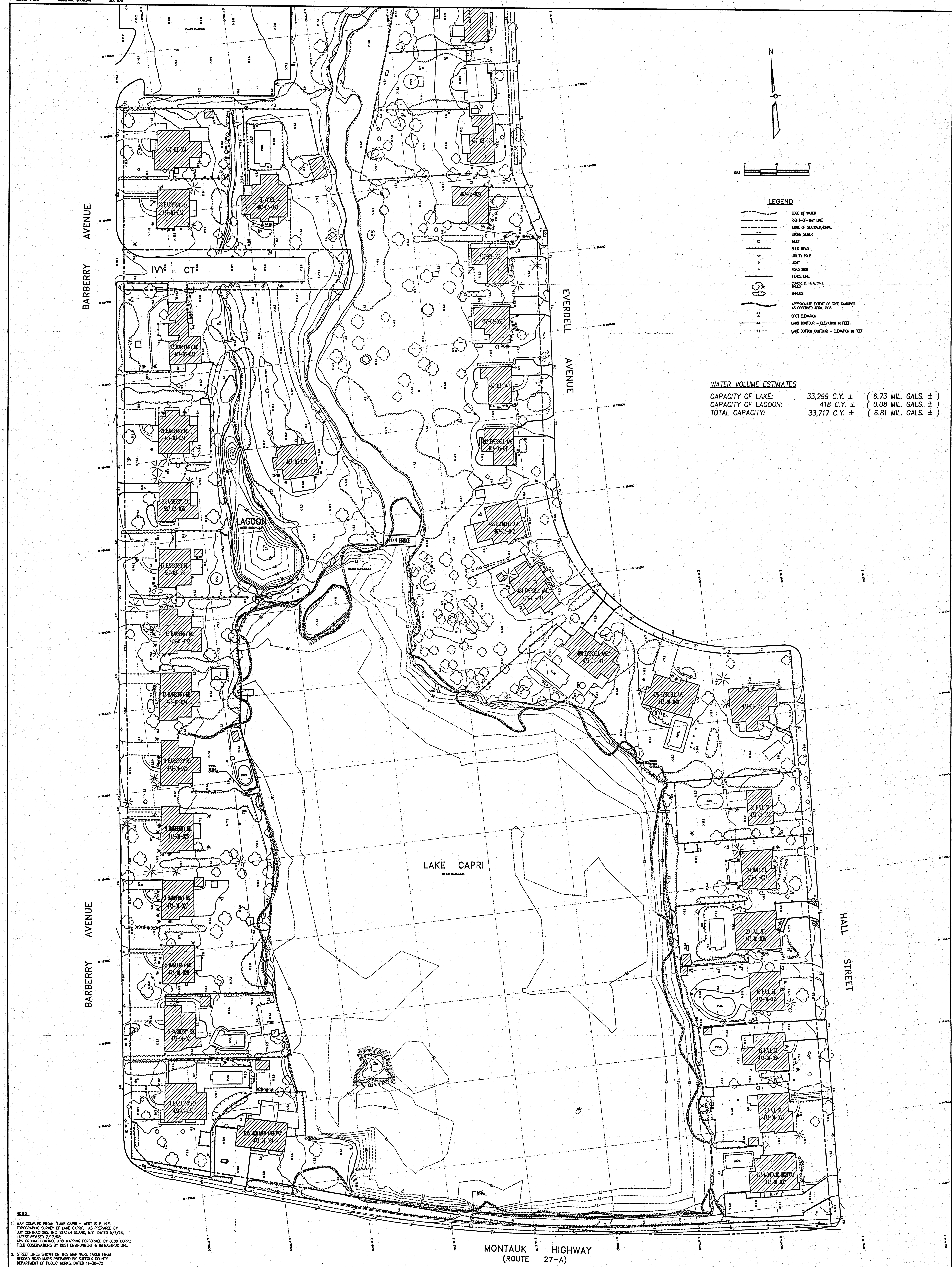
| | Name | Affiliation | Date | Time |
|---|---|---|---|---|
| Relinquished by: | [signature] | Rust | 8/27/98 | 12:36 |
| Received by: | | | | |
| Relinquished by: | | | | |
| Received by: | | | | |

| | Name | Date | Time |
|---|---|---|---|
| Received by Laboratory: | [signature] | 8/27/98 | 1236 |

Samples Intact & Properly Preserved: Yes or No

Laboratory Comments:

Form 3C




NOTES

1. MAP COMPILED FROM: "LAKE CAPRI – WEST ISLIP, N.Y. TOPOGRAPHIC SURVEY OF LAKE CAPRI", AS PREPARED BY JOY CONTRACTORS, INC. STATEN ISLAND, N.Y., DATED 5/7/98, LATEST REVISED 7/17/98; GPS GROUND CONTROL AND MAPPING PERFORMED BY GEOD CORP.; FIELD OBSERVATIONS BY RUST ENVIRONMENT & INFRASTRUCTURE.
2. STREET LINES SHOWN ON THIS MAP WERE TAKEN FROM RECORD ROAD MAPS PREPARED BY SUFFOLK COUNTY DEPARTMENT OF PUBLIC WORKS, DATED 11-30-72
3. COORDINATES ARE NAD 83-92/NAVD 88 FEET NEW YORK, LONG ISLAND 3104.

| NO | REVISIONS | DRN | CHK | DATE |
|---|---|---|---|---|
| | | | | |

ALBANY, N.Y.

| | | |
|---|---|---|
| DRN | - | - |
| DES | - | - |
| CHK | - | - |
| APP | - | - |



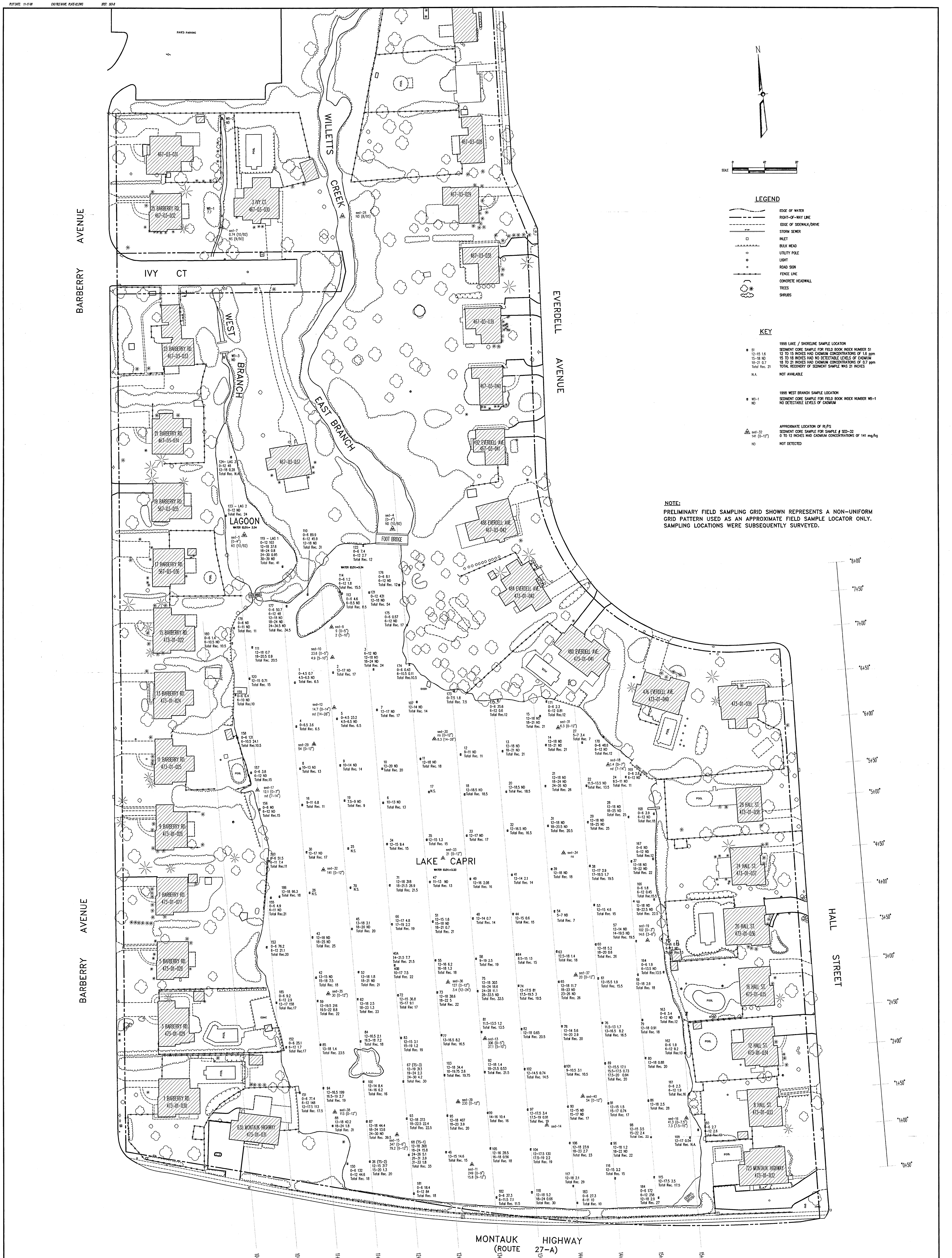
UNAUTHORIZED ALTERATION OR ADDITION TO THIS DOCUMENT IS A VIOLATION OF SECTION 7209 SUBDIVISION 2 OF THE NEW YORK STATE EDUCATION LAW.

TOPOGRAPHIC PLAN - LAKE CAPRI

RUST
Rust Environment & Infrastructure Inc.

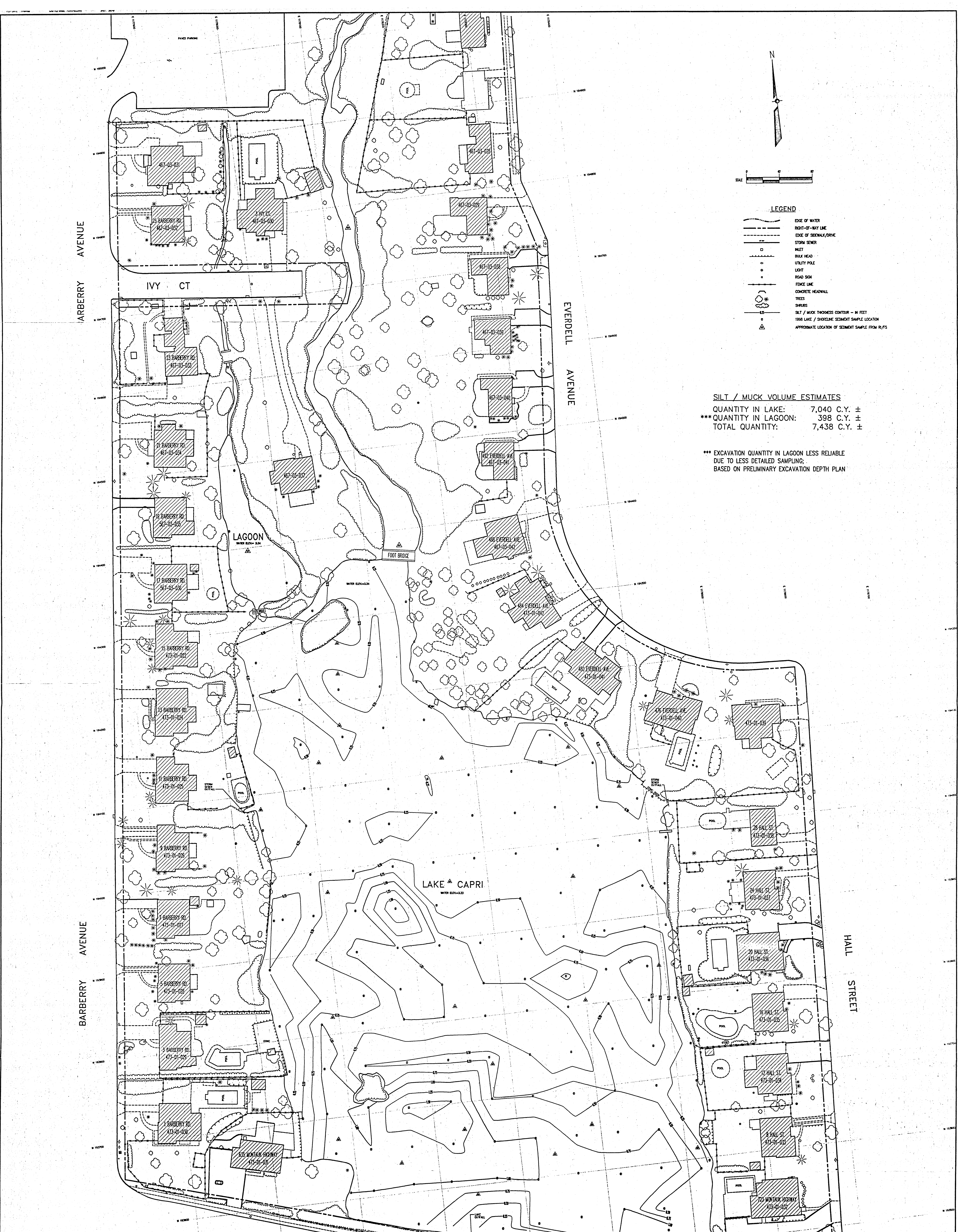
PRE - DESIGN INVESTIGATION REPORT
DZUS FASTENER SITE
WEST ISLIP, NEW YORK
NYSDEC SITE No. 1-52-033

| | |
|---|---|
| DATE: | OCT. 1998 |
| PROJECT NO: | 202563 |
| FILENAME: | PLATE - 01 |
| PLATE NO: | 1 |
| DRAWING NO: | PLATE - 01 |




| | | | | |
|---|---|---|---|---|
| ALBANY, N.Y. | UNAUTHORIZED ALTERATION OR ADDITION TO THIS DOCUMENT IS A VIOLATION OF SECTION 7209 SUBDIVISION 2 OF THE NEW YORK STATE EDUCATION LAW. | CADMIUM CONCENTRATION PLAN - LAKE CAPRI | PRE - DESIGN INVESTIGATION REPORT<br>DZUS FASTENER SITE<br>WEST ISLIP, NEW YORK<br>NYSDEC SITE No. 1-52-033 | DATE: OCT. 1998 |
| DRN - - | | Rust Environment & Infrastructure Inc. | | PROJECT NO: 202563 |
| DES - - | | | | FILENAME: PLATE - 02 |
| CHK - - | | | | PLATE NO: 2 |
| APP - - | | | | DRAWING NO: PLATE - 02 |

NO | REVISIONS | DRN | CHK | DATE




NOTES

1. MAP COMPILED FROM: "LAKE CAPRI – WEST ISLIP, N.Y. TOPOGRAPHIC SURVEY OF LAKE CAPRI", AS PREPARED BY JOY CONTRACTORS, INC. STATEN ISLAND, N.Y., DATED 5/7/98, LATEST REVISED 7/17/98; GPS GROUND CONTROL AND MAPPING PERFORMED BY GEOD CORP.; FIELD OBSERVATIONS BY RUST ENVIRONMENT & INFRASTRUCTURE.
2. STREET LINES SHOWN ON THIS MAP WERE TAKEN FROM RECORD ROAD MAPS PREPARED BY SUFFOLK COUNTY DEPARTMENT OF PUBLIC WORKS, DATED 11-30-72
3. COORDINATES ARE NAD 83-92/NAVD 88 FEET NEW YORK, LONG ISLAND 3104.

| NO | REVISIONS | DRN | CHK | DATE |
|---|---|---|---|---|
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ALBANY, N.Y.

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|---|---|---|
| DRN | - | - |
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| CHK | - | - |
| APP | - | - |



**SILT / MUCK THICKNESS PLAN - LAKE CAPRI**

RUST
Rust Environment & Infrastructure Inc.

**PRE - DESIGN INVESTIGATION REPORT**
**DZUS FASTENER SITE**
**WEST ISLIP, NEW YORK**
**NYSDEC SITE No. 1-52-033**

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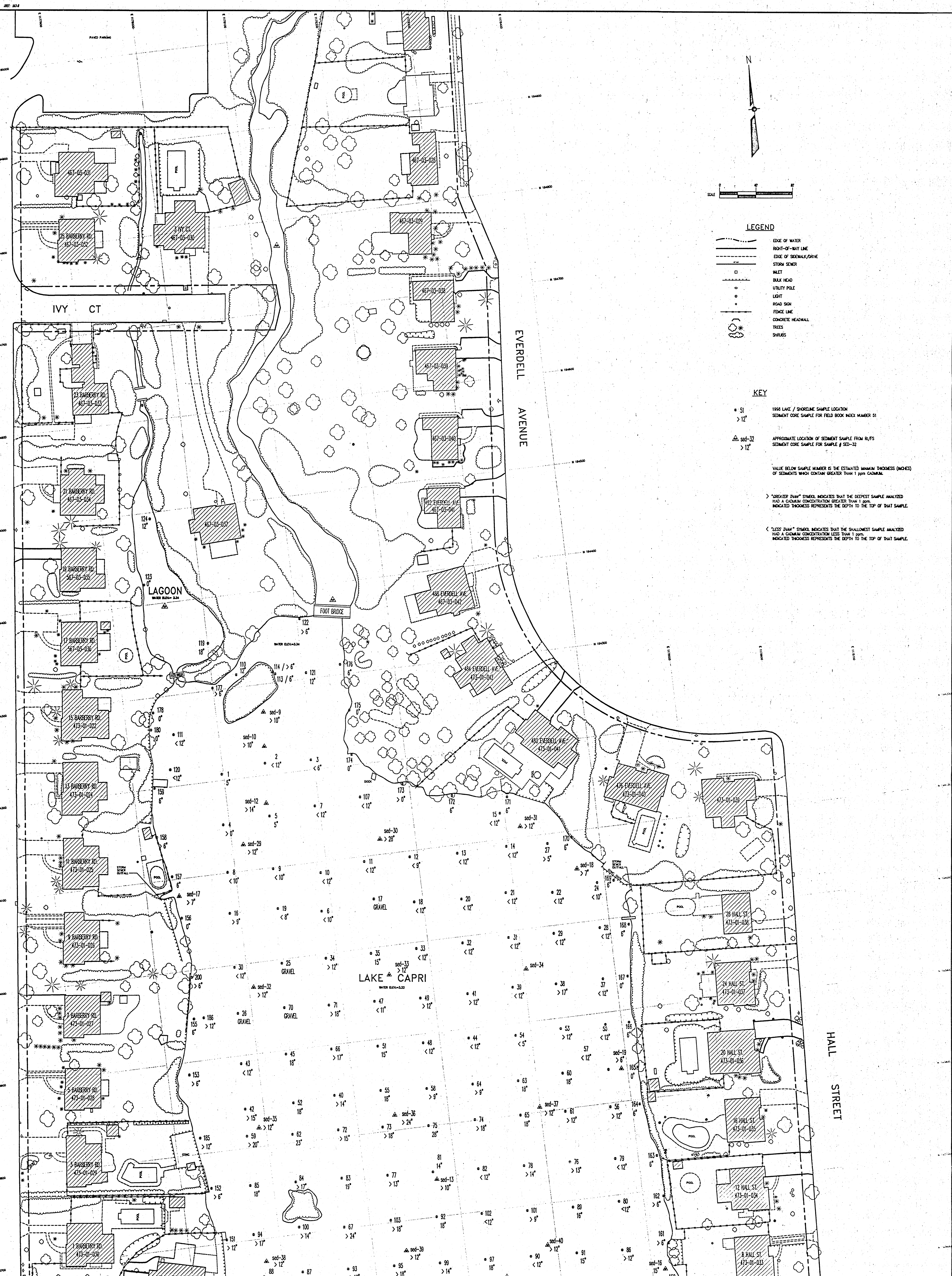
|---|---|
| DATE: | OCT. 1998 |
| PROJECT NO: | 202563 |
| FILENAME: | PLATE - 03 |
| PLATE NO: | 3 |
| DRAWING NO: | PLATE - 03 |




NOTES

1. MAP COMPILED FROM: "LAKE CAPRI – WEST ISLIP, N.Y. TOPOGRAPHIC SURVEY OF LAKE CAPRI", AS PREPARED BY JOY CONTRACTORS, INC. STATEN ISLAND, N.Y., DATED 5/7/98, LATEST REVISED 7/17/98; GPS GROUND CONTROL AND MAPPING PERFORMED BY GEOD CORP.; FIELD OBSERVATIONS BY RUST ENVIRONMENT & INFRASTRUCTURE.
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| NO | REVISIONS | DRN | CHK | DATE |
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| CHK | - | - |
| APP | - | - |



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**CADMIUM 1 PPM DEPTH PLAN - LAKE CAPRI**

RUST
Rust Environment & Infrastructure Inc.

**PRE - DESIGN INVESTIGATION REPORT**
**DZUS FASTENER SITE**
**WEST ISLIP, NEW YORK**
**NYSDEC SITE No. 1-52-033**

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| DATE: | OCT. 1998 |
| PROJECT NO: | 202563 |
| FILENAME: | PLATE - 04 |
| PLATE NO: | 4 |
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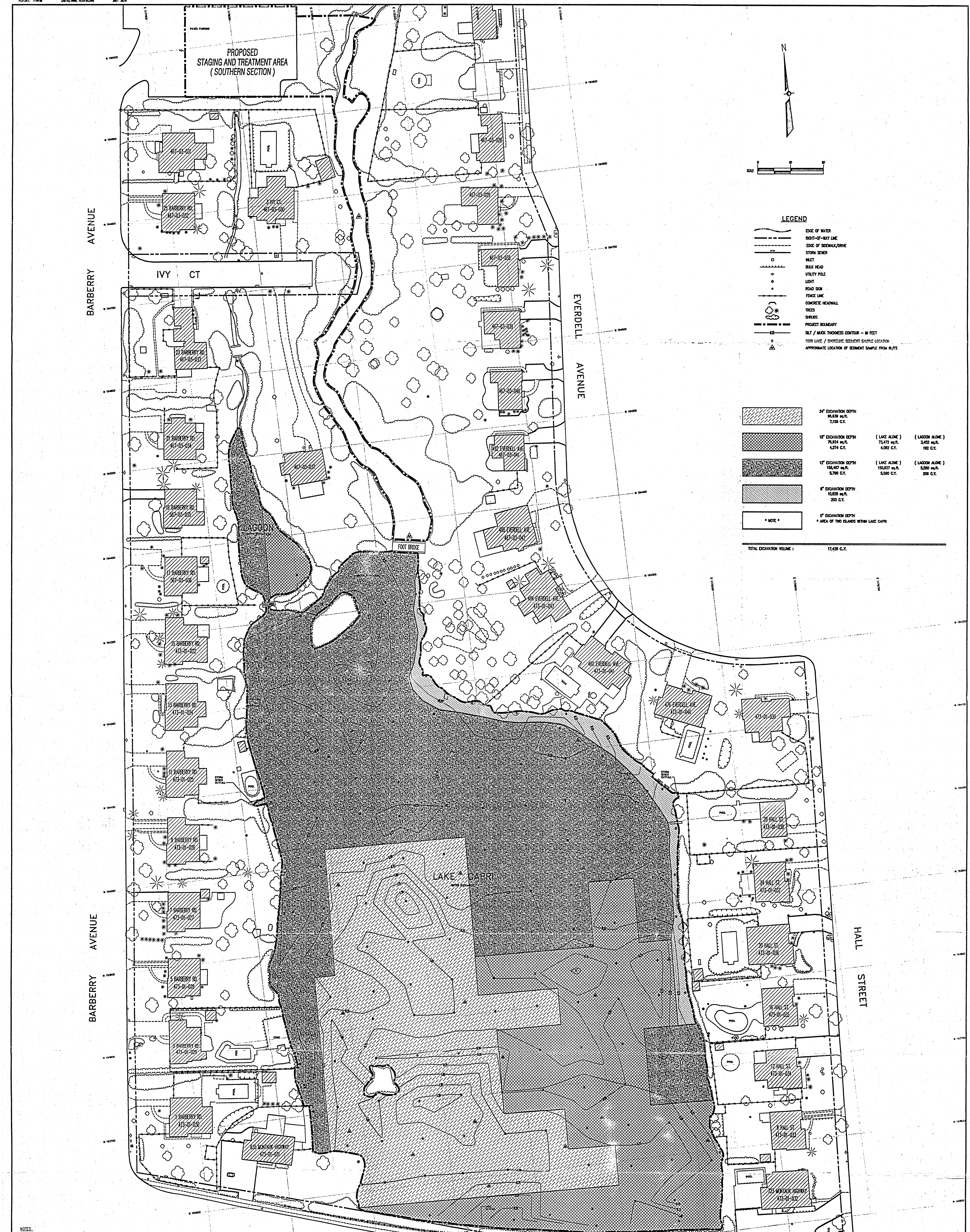


NOTES

1. MAP COMPILED FROM: "LAKE CAPRI – WEST ISLIP, N.Y. TOPOGRAPHIC SURVEY OF LAKE CAPRI", AS PREPARED BY JOY CONTRACTORS, INC. STATEN ISLAND, N.Y., DATED 5/7/98, LATEST REVISED 7/17/98; GPS GROUND CONTROL AND MAPPING PERFORMED BY GEOD CORP.; FIELD OBSERVATIONS BY RUST ENVIRONMENT & INFRASTRUCTURE.
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3. COORDINATES ARE NAD 83-92/NAVD 88 FEET NEW YORK, LONG ISLAND 3104.

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PRELIMINARY EXCAVATION
DEPTH PLAN - LAKE CAPRI

RUST
Rust Environment & Infrastructure Inc.

PRE - DESIGN INVESTIGATION REPORT
DZUS FASTENER SITE
WEST ISLIP, NEW YORK
NYSDEC SITE No. 1-52-033

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|---|---|
| DATE: | OCT. 1998 |
| PROJECT NO: | 202563 |
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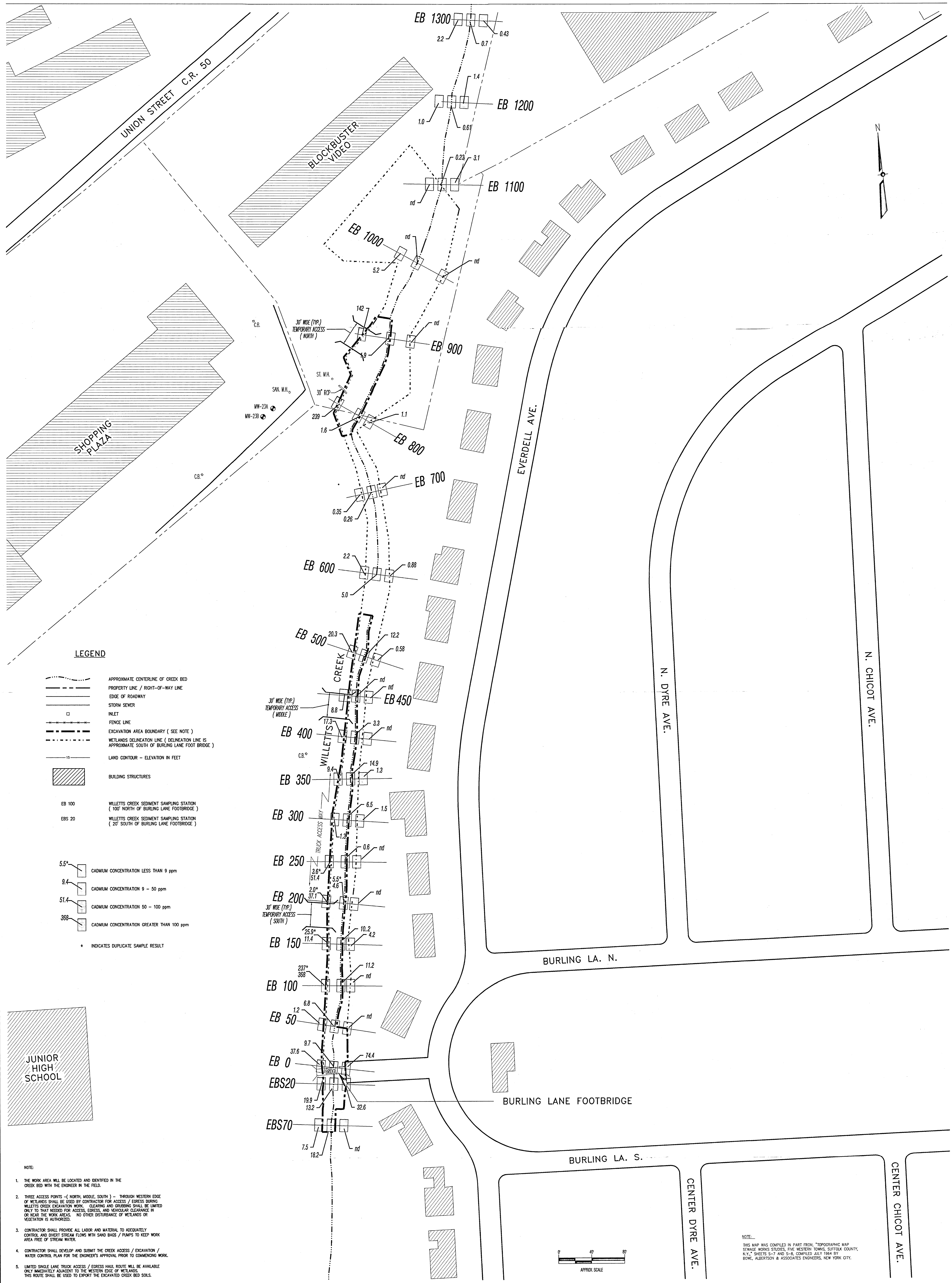
| PLATE NO: | 5 |
| DRAWING NO: | PLATE - 05 |




| NO | REVISIONS | DRN | CHK | DATE |
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ALBANY, N.Y.

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| DRN | - | - |
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**PRELIMINARY EXCAVATION PLAN**
**WILLETTS CREEK**

RUST
Rust Environment & Infrastructure Inc.

**PRE - DESIGN INVESTIGATION REPORT**
**DZUS FASTENER SITE**
**WEST ISLIP, NEW YORK**
**NYSDEC SITE No. 1-52-033**

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|---|---|
| DATE: | OCT. 1998 |
| PROJECT NO: | 202563 |
| FILENAME: | PLATE - 06 |
| PLATE NO: | 6 |
| DRAWING NO: | PLATE - 06 |

**File on eDOCs** X **Yes** ____ **No**
**Site** Name Dzus
**Site** No. 152033
**County** Suffolk
**Town** West Islip
**Foilable** X **Yes** ____ **No**
**File** Name 1998-11-01, Pre design Documents
**Scanned** & eDOC ____