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Department of Environmental Conservation

Division of Environmental Remediation

Record of Decision

D.C. (Dow Craft) Rollforms Site
Jamestown, Chautauqua County New York
Site Number 9-07-019

March 2003

New York State Department of Environmental Conservation

GEORGE E. PATAKI, *Governor* ERIN M. CROTTY, *Commissioner*

D.C. (Dow Craft) Rollforms Inactive Hazardous Waste Site

Jamestown, Chautauqua County, New York

Site No. 9-07-019

Statement of Purpose and Basis

The Record of Decision (ROD) presents the selected remedy for the D.C. Rollforms class 2 inactive hazardous waste disposal site which was chosen in accordance with the New York State Environmental Conservation Law. The remedial program selected is not inconsistent with the National Oil and Hazardous Substances Pollution Contingency Plan of March 8, 1990 (40CFR300).

This decision is based on the Administrative Record of the New York State Department of Environmental Conservation (NYSDEC) for the D.C. Rollforms inactive hazardous waste site and upon public input to the Proposed Remedial Action Plan (PRAP) presented by the NYSDEC. A listing of the documents included as a part of the Administrative Record is included in Appendix B of the ROD.

Assessment of the Site

Actual or threatened release of hazardous waste constituents from this site, if not addressed by implementing the response action selected in this ROD, presents a current or potential significant threat to public health and the environment.

Description of Selected Remedy

Based upon the site investigations and Remedial Investigation/Feasibility Study, the NYSDEC has selected Alternative 5.

The elements of the selected remedy are as follows:

- Sheet piling along the river;
- Enhanced Reductive Dechlorination (ERD) in areas of groundwater contamination;
- Vacuum-Enhanced Pumping and Vacuum-Enhanced Recovery (VEP/VER) system to mitigate groundwater and Non-Aqueous Phase Liquid (NAPL) contamination;
- Dewatering and treatment of impacted groundwater during soil excavation;
- Excavation of contaminated soil between the sheet pile wall and the river to native soil or bedrock and backfilling with clean material;
- River bank stabilization;
- Covering surface soils in any disturbed area, especially along the river bank, with certified clean soil;
- Removal of approximately 10yd^3 contaminated sediment from the Chadakoin River;

- Fish habitat construction;
- Operation, maintenance and monitoring; and
- Imposition of a deed restriction will be required, if warranted, by residual soil or groundwater contamination remaining after remedial actions are completed. If determined necessary by the NYSDEC, the deed restriction will require one or both of the following: (1) prevent the use of groundwater as a source of potable or process water without necessary water quality treatment as determined by the Chautauqua County Health Department, and (2) require compliance with an approved soils management plan requiring annual certification to the NYSDEC.

In addition, based upon the results of the investigations and the Interim Remedial Measures (IRMs) that have been performed at the site, the NYSDEC is selecting "No Further Action" for the northern parcel of the site containing the building and parking lot. The NYSDEC will also exclude the northern parcel from the site definition.

New York State Department of Health Acceptance

The New York State Department of Health concurs with the remedy selected for this site as being protective of human health.

Declaration

The selected remedy is protective of human health and the environment, complies with State and Federal requirements that are legally applicable or relevant and appropriate to the remedial action to the extent practicable, and is cost effective. This remedy utilizes permanent solutions and alternative treatment or resource recovery technologies, to the extent practicable, and satisfies the preference for remedies that reduce toxicity, mobility, or volume as a principal element.

MAR 3 1 2003

Date

Dale A. Desnoyers, Director
Division of Environmental Remediation

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SECTION 1: SITE LOCATION AND DESCRIPTION

The site is approximately 3.2 acres in size, consists of two parcels - a southern parcel (currently vacant) and a northern parcel containing a building and parking lot. The site is located at 583 Allen Street in Jamestown, Chautauqua County, New York. (The site location is shown in Fig 1). The site is bordered by Allen Street on the east, the Chadakoin River along the north and northwestern perimeter, and Webber Knapp and Jamestown Urban Renewal Agency properties on the south. The site is located in a mixed residential and commercial area. The area is served by public water. Municipal well fields which supply water to the area residents are located 2.5 miles to the northeast of the site.

The subsurface geologic conditions at the site consist mainly of two overburden units - a surficial layer of fill material and underlying dense till. As one gets closer to the Chadakoin River, another layer of native deposits which consists of less than 4 feet in thickness of sand, silt, and gravel, occurs between the fill and till layers. The fill layer consists of sand, gravel, cinders, bricks, concrete, and slag and varies in thickness from 7 to 15 feet. The thickness of till varies from less than a foot to over 15 feet in depth. The till is underlain by shale bedrock. Surface water and groundwater flow towards the Chadakoin River.

SECTION 2: SITE HISTORY

Manufacturing operations conducted by the J.P. Daniel Company began at the site in approximately 1910. In 1948 Pendleton Tool Industries acquired this property. In 1950, Pendleton Tool Industries also acquired the northern parcel. In 1964, Ingersoll Rand purchased Pendleton Tool Industries, renaming the facility Proto Tool. In 1985, Ingersoll Rand donated this property to the Jamestown Urban Renewal Agency (JURA). In 1987, JURA sold a majority of the property to the current owner - Dowcraft Corporation.

The northern parcel is currently leased by the American Locker Group.

2.1: Operational/Disposal History

The Proto Tool Company manufactured hand tools. The tool making operations involved processes such as forging, machining, heat treat oil quench, sandblasting, polishing, punch press operations, plastisol dipping of handles, painting, paint stripping, vapor degreasing, electroplating, and wastewater treatment in the southern portion of the site. (Plant buildings are shown in Fig 2). The facility was a

permitted Resource Conservation and Recovery Act (RCRA) treatment and storage facility (TSF) due to storage of hazardous wastes generated from the manufacturing processes. The hazardous wastes generated at this facility were classified as F006 - sludges from the treatment of electroplating wastes; F001- waste trichloroethylene from vapor degreasing; F005- waste toluene; F003 and F005 - waste paint containing solvents. The treatment plant effluent and process water from the plant buildings were discharged directly to the Chadakoin River through seven outfalls.

In 1984, Ingersoll-Rand Company started closure of the Proto Tool Facility under the RCRA program. The closure activities included the identification of wastes for subsequent off-site disposal; closure of hazardous waste management units including the wastewater treatment facility, electroplating baths, vapor degreaser tanks, pumping liquid from machine pits, tanks, and sumps for disposal; decontamination of tanks; and removal of an underground storage tank. The underground storage tanks were abandoned in place by filling with sand. Most of the buildings were demolished in 1986. The RCRA permit was terminated in December 1988.

In 1990 and 1991 a series of environmental investigations commissioned by Dowcraft determined that groundwater was significantly contaminated with chlorinated solvents and oil.

2.2: Remedial History

This site was listed in the New York State's Registry of Inactive Hazardous Waste Disposal Sites in 1994. The site is classified as a Class 2 because hazardous wastes as defined in 6NYCRR Part 371, were found at the site. A Classification 2 means that site poses a significant threat to the public health and environment and action is required.

SECTION 3: SITE CONTAMINATION

3.1: Summary of the Site Investigations

To assess the nature and extent of environmental problems, the following site investigations were conducted:

Environmental Site Assessment - 1990:

While conducting an Environmental Assessment for this site, an orange brown staining and an oil sheen were noticed in a seep alongside the bank of the Chadakoin River.

Environmental Investigation - 1991:

This study consisted of sub-surface soil and groundwater investigation. Eight test pits were excavated and subsurface soil samples were collected and tested from some of the test pits. Seven monitoring wells were installed and groundwater samples were analyzed from these wells.(Locations of test pits and monitoring wells are shown in Fig. 2).

Remedial Investigation Report April 1998 and February 1999:

In order to determine the nature and extent of contamination, a Remedial Investigation (RI) was conducted. The RI was completed in two phases. The first phase was completed in April1998 and second phase in February 1999. The RI phases consisted of the following activities:

- Review of aerial photographs;
- Electromagnetic survey to identify any underground tanks;
- Installation of geoprobes and monitoring wells to determine physical properties of soil, hydrogeologic conditions, and test subsurface soils and groundwater for contaminants;
- Surface soil investigation to determine surficial contamination levels;
- Testing of river water and sediments for contaminants;
- Human health risk assessment and calculation of remedial goal options and;
- Fish and Wildlife Impact Assessment.

To determine which media (soil, groundwater, etc.) contain contamination at levels of concern, the RI analytical data was compared to environmental standards, criteria, and guidance values (SCGs). Groundwater, drinking water and surface water SCGs identified for the D.C. Rollforms site are based on NYSDEC Ambient Water Quality Standards and Guidance Values and Part 5 of NYS Sanitary Code. For soils, NYSDEC TAGM 4046 provides soil cleanup guidelines for the protection of groundwater, background conditions, and health-based exposure scenarios. Guidance values for evaluating contamination in sediments are provided in the NYSDEC publication entitled "Technical Guidance for Screening Contaminated Sediments" and the ecological risk analysis presented in the Supplemental RI report.

Based on the RI results, after comparison to the SCGs and potential public health and environmental exposure routes, certain areas and media of the site require remediation. These areas are summarized below. More complete information can be found in the 1998 and 1999 RI Reports.

Chemical concentrations are reported in parts per billion (ppb) and parts per million (ppm). For comparison purposes, where applicable, SCGs are provided for each medium.

3.1.1 Nature and Extent of Contamination

Soil

Surface Soil :

A total of 14 surface soil samples were collected at the site. No volatile organic compounds (VOCs) were detected in any of the samples. Varying levels of semivolatile organic compounds (SVOCs) were detected in all samples. The levels of SVOCs, mostly polycyclic aromatic hydrocarbons (PAHs), ranged from 2.8 ppm in SS-2 to 89 ppm in SS-13. PCBs were found in all surface samples ranging

from 0.013 ppm to 10.7 ppm. The highest concentration of PCBs was found in SS-1A. According to NYSDEC TAGM-4046, recommended soil clean up level for PCBs in surface soils is 1 ppm.

Concentrations of metals in the surface soil samples varied considerably. In general, the levels of metals were higher in samples collected close to the river bank. The concentrations ranged as follows: copper - from 19.4 ppm in SS-9 to 3,090 ppm in SS-1; lead - from 26.6 ppm in SS-9 to 210 ppm in SS-7; nickel - from 14.2 ppm in SS-9 to 347 ppm in SS-1A; and zinc - from 58 ppm in SS-9 to 1840 ppm in SS-7.

Contaminated soils at SS-1A and SS-13 were removed during an IRM (see section 3.2). Sample locations are shown in Fig. 3.

Subsurface Soil:

During the 1991 investigation, 8 test pits were excavated and sub-surface soil samples were collected from 6 locations where visual contamination was present. The samples were analyzed for Target Compound List (TCL) volatiles, total metals, total cyanides, oil and grease, and pH.

The test results showed wide spread contamination of metals above the TAGM-4046 levels for arsenic, cadmium, chromium, copper, mercury, nickel, and zinc (see Table 1). No volatile organic compounds were detected in unsaturated sub-surface soil samples. Oil and grease varied from 0.21 - 7.1% while cyanide ranged from non-detect (ND) to 15.4 ppm.

Soil samples were also collected from TP-4, the test pit showing highest level of oil and grease (see Fig. 2). These samples were tested for Toxicity Characteristic Leaching Procedure (TCLP) metals, TCLP volatiles, TCLP semi-volatiles, ignitability, PCBs, and total petroleum product. Test results from this sample location found contamination limited to PCBs (3 ppm) and fuel oil (3100 ppm).

Subsurface soil conditions were also observed during the installation of 13 monitoring wells and 27 geoprobes.

In an attempt to evaluate background conditions, a sub-surface soil sample was collected during the first phase of the remedial investigation from location GP-13 in the northern parcel (See Fig. 3). Severe contamination was found in this area, primarily due to lead (86,900 ppm).

In order to determine the extent of lead contamination in the northern parcel, 19 additional test pits were excavated in February 2000. Samples collected from the test pits showed total lead levels ranged from 20 to 33,100 ppm. The results of TCLP lead analysis determined that soils were not a hazardous waste i.e. the TCLP levels for lead were below the regulatory limit of 5 mg/l.

In order to determine the source of the oily seep into the Chadakoin River, 18 test pits were excavated in 2000. The area of oily impacted petroleum soils is shown in Fig. 4. Total VOCs ranged from 0.024

to 66 ppm as compared to the TAGM value of 10 ppm. Total VOCs in excess of 10 ppm were found in TP-11, TP-12, and TP-15. SVOCs concentrations ranged from ND to 79 ppm.

Surface Water/Sediment

Surface water samples did not show any VOCs, SVOCs, and PCBs in either the upstream or downstream samples taken from the Chadakoin River. Traces of copper, lead, and nickel were detected in both upstream and downstream surface water samples.

Ten sediment samples (three upstream and seven adjacent or downstream) were collected from the Chadakoin River during the RI (see Fig. 3). Metals were detected in both the upstream and adjacent/downstream samples. As shown in Table 1, the concentrations of metals such as copper, chromium, iron, lead, nickel, and zinc were higher at the downstream locations than at the upstream locations. Average concentrations of copper, lead, nickel and zinc in the downstream samples exceeded their respective severe effect level of sediment criteria for benthic organisms as described in the DEC sediment criteria.

Groundwater

Fifteen groundwater monitoring wells and 27 geoprobes were installed and tested during the investigation.

VOCs including trichloroethene (TCE), dichloroethene (DCE) and vinyl chloride (VC) were reported in several groundwater samples. The highest level of chlorinated solvents were reported in GP-5 and MW-8 S/D, which were installed in the former TCE, paint and thinner storage area. At GP-5, concentrations of TCE and DCE were 830,000 ppb and 34,000 ppb, respectively. At MW-8S/D, levels of TCE , DCE, and VC varied from 1,900 - 400,000 ppb, 8,300 - 23, 000 ppb, and ND- 1,600 ppb respectively. Up to 1100 ppb of tetrachloroethene was also found in MW-8D. The highest concentration of vinyl chloride (3,200 ppb) was found in GP-27. Vinyl chloride was first reported at ESI-1 in 1990 at 5900 ppb while later it had declined to 280 ppb in 1997. Locations of geoprobes and monitoring wells are shown in Fig. 3.

Total SVOCs, which primarily consisted of PAHs, were found in most of the groundwater samples. Due to high detection limits, the comparison of individual SVOC contaminant levels to groundwater standards is not feasible. The highest concentrations of PAHs were found in GP-5 (60,646 ppb) - the former paint and solvent area, and in GP-6 (248,600 ppb) - the former forging area. The concentrations of SVOCs in the remaining wells/geoprobes varied from ND to 3,649 ppb.

As shown in Table 1, the groundwater standards were exceeded for several dissolved metals such as arsenic, cadmium, chromium, copper, mercury, iron, lead, nickel, and zinc. The highest levels of each of these metals were found in GP-2. In general, the concentrations of dissolved metals collected from the monitoring wells were much lower than the samples collected from geoprobes. The levels of total

metals (non-filtered) for arsenic, cadmium, chromium, copper, iron, lead, nickel, and zinc exceeded groundwater standards in several monitoring wells.

Non-Aqueous Phase Liquid (NAPL) which primarily consists of total petroleum hydrocarbons (TPHs), was observed at the ESI-3, ESI-4, and MW-8 locations. TPHs were reported as gasoline and/or diesel fuel. The highest concentrations of TPHs were recorded in GP-6 (2,405,930 ppb or 0.24%), ESI-3 (420,671 ppb), and GP-5 (332,600 ppb) (see Table 1).

3.2 Interim Remedial Measures :

During the course of the investigation certain actions, known as Interim Remedial Measures (IRMs), were undertaken at the D.C. (Dowcraft) Rollforms site in response to the threats identified above. IRMs are conducted at sites when a source of contamination or exposure pathway can be effectively addressed before completion of the RI/FS. The IRMs undertaken on the vacant southern parcel of this site included:

i) Enhanced Reductive Dechlorination (ERD)

In order to expedite mass removal and in an attempt to mitigate future subsurface impacts from elevated levels of VOCs (predominantly TCE, DCE and VC), ERD was initiated in 1998 in the areas showing high levels of these contaminants. ERD is a process of enhancing conditions which are conducive to growth of naturally occurring anaerobic bacteria capable of metabolizing some VOCs. The process consists of injecting a molasses solution into areas of highly contaminated groundwater (see Fig 4 for the location of Injection Wells IW-1 to IW-5) to create anaerobic conditions in the subsurface contaminated area. The anaerobic bacteria ultimately breaks down TCE and its related products to carbon dioxide, water and chlorides; hence reducing their concentrations.

A report dated July 2002, describing the effectiveness of ERD concludes that the technology is effective within the fill zone but not in the till zone. After starting the ERD technology in 1998, the data indicates the groundwater concentrations in MW-8S decreased for dichloroethene (from 8,500 ppb to 10 ppb) and for trichloroethene (from 3,000 ppb to 85 ppb).

ii) Manual Removal of Non- Aqueous Phase Liquid (NAPL)

NAPL, which primarily consists of total petroleum hydrocarbons (TPHs), were addressed by installing specifically designed passive recovery canisters called Petrotraps. These units only recover NAPL while not having to extract groundwater. Petrotraps were installed in wells located at ESI-3 and ESI-4 (See Fig. 4). The canisters are regularly emptied into a storage tank for off-site disposal. Approximately 2.5 gallons of free product have been recovered.

The following IRM activities were completed by Ingersoll - Rand in 2000:

iii) Southern Parcel (vacant):

- Clearing and grubbing.
- Excavation and off-site disposal of 49 tons of surface soils containing PCBs above 1 ppm. The remediated areas are shown in Fig. 5.

iv) **Northern Parcel (containing building and parking lot)**:

- Excavation and off-site disposal of 400 cubic yards of soil contaminated with lead.

Post-excavation test results showed that soils above 100 ppm were removed from this area. (Fig. 6). The excavated area was backfilled with clean fill and paved over for a parking lot.

3.3 Summary of Human Exposure Pathways:

This section describes the types of human exposures that may present added health risks to persons at or around the site. A more detailed discussion of the health risks can be found in Section 7 of the RI Report.

An exposure pathway is how an individual may come into contact with a contaminant. The five elements of an exposure pathway are 1) the source of contamination; 2) the environmental media and transport mechanisms; 3) the point of exposure; 4) the route of exposure; and 5) the receptor population. These elements of an exposure pathway may be based on past, present, or future events.

Pathways which are known to or may exist at the site include:

- direct contact with seeps discharging into the Chadakoin River.
- incidental ingestion of contaminated soil or sediments by local residents or workers who may visit the site or the river.
- inhalation of volatile compounds and contaminated particulates by visitors or workers at the site.

Currently exposure to site-related contaminants in drinking water is unlikely since area homes and businesses are connected to public water. Institutional controls, which will prevent future residential development of the site and use of groundwater for potable purposes, will further reduce the potential for exposure to site-related contaminants in groundwater.

3.4 Summary of Environmental Exposure Pathways:

This section summarizes the types of environmental exposures which may be presented by the site. The Fish and Wildlife Impact Assessment included in the RI presents a more detailed discussion of the potential impacts from the site to fish and wildlife resources. The following pathways for environmental exposure have been identified:

- water fowl feeding in the contaminated river, which may be hunted for human consumption.
- benthic invertebrates in the river are in direct contact with contaminated sediments in the river.
- common varieties of mammals (e.g. squirrels, muskrats) that may come in contact with contaminated surface soils and sediments.
- plants growing at the site may uptake contamination and incorporate it into the plant material; higher fauna may then be exposed to contamination through ingestion of plant matter.

SECTION 4: ENFORCEMENT STATUS

Potentially Responsible Parties (PRPs) are those who may be legally liable for contamination at a site. This may include past or present owners and operators, waste generators, and haulers.

The Potential Responsible Party (PRP) for the site, documented to date, is the Ingersoll-Rand Company.

The NYSDEC and the Ingersoll-Rand Company entered into a Consent Order (B9-0446-94-01) on March 13, 1997. The Order obligates the responsible parties to implement a RI/FS and IRM remedial program. Upon issuance of the Record of Decision the NYSDEC will approach the PRP to implement the selected remedy under an Order on Consent.

SECTION 5: SUMMARY OF THE REMEDIATION GOALS

Goals for the remedial program have been established through the remedy selection process stated in 6 NYCRR Part 375-1.10.

The overall remedial goal is to meet all SCGs and be protective of human health and the environment. At a minimum, the remedy selected should eliminate or mitigate all significant threats to public health and/or the environment presented by the hazardous waste disposed at the site through the proper application of scientific and engineering principles.

The goals selected for this site are:

- *Eliminate, to the extent practicable, potential ingestion of groundwater affected by the site that does not attain NYSDOH Drinking Water Standards. .*
- *Eliminate, to the extent practicable, off-site migration of groundwater that does not attain NYSDEC Class GA Ambient Water Quality Criteria.*
- *Eliminate, to the extent practicable, migration of NAPL (LNAPL and DNAPL),*

- *Eliminate, to the extent practicable, exposures to contaminated soils at levels that present a health concern.*

- *Eliminate, to the extent practicable, the migration of site contaminants in soils into the surface water, groundwater, and sediments.*

- *Eliminate, to the extent practicable, exceedances of applicable environmental quality standards related to releases of contaminants to the waters of the state.*

- *Eliminate, to the extent practicable, the exposure of fish and wildlife to levels of river sediment contaminants above standards/guidance values.*

SECTION 6: SUMMARY OF THE EVALUATION OF ALTERNATIVES

The selected remedy should be protective of human health and the environment, be cost effective, comply with other statutory laws and utilize permanent solutions, alternative technologies or resource recovery technologies to the maximum extent practicable. Potential remedial alternatives for the D.C. Rollforms site were identified, screened and evaluated in the report entitled Feasibility Study Report dated May 2002.

A summary of the detailed analysis follows. As presented below, the time to implement reflects only the time required to implement the remedy, and does not include the time required to design the remedy, procure contracts for design and construction or to negotiate with responsible parties for implementation of the remedy.

6.1 Description of Alternatives

The potential remedies are intended to address the contaminated soil, groundwater, and sediment at the site as described in the following combined alternatives. The detailed analysis and specifics as related to each alternative are presented in the Feasibility Study.

Alternative 1 - Limited Action:

Under this alternative the site would essentially remain in its present un-remediated state. The site would be monitored for surface water and the naturally occurring attenuation for groundwater and sediment. It would also include passive NAPL recovery and institutional controls (including deed restriction).

Present Worth:	*$ 605,248*
Capital Cost:	*$ 20,000*
Annual O&M:	*$ 30,500*
Time to Implement	*N/A*

Alternative 2:

This alternative would include:

a). ERD to breakdown TCE and its related compounds in the saturated fill zone (explained in Section 3.2);
b). passive non-aqueous phase liquid (NAPL) recovery from groundwater (explained in Section 3.2);
c). soil excavation of petroleum contaminated soil from areas near the river bank (See Fig. 4) and off-site disposal;
d). outfall capping/blocking;
e). contaminated sediment from the Chadakoin River would be excavated and disposed off-site at a permitted facility;
f). institutional controls;
g). groundwater monitoring for natural attenuation and;
h). surface water monitoring.

Present Worth:	*$ 1,586,290*
Capital Cost:	*$605,85 0*
Annual O&M:	*$107,850*
Time to Implement	*Less than six months*

Alternative 3:

This alternative would include:

a). ERD to breakdown TCE and its related compounds in the saturated fill zone;
b). passive NAPL recovery;
c). phytoremediation (planting and cultivating certain plants) for hydraulic control and removal of contaminants of concern in soil, sediment, and groundwater in the southern or vacant parcel;
d). outfall capping and blocking;
e). monitoring of groundwater and sediment for natural attenuation;
f). surface-water monitoring and;
g). institutional controls.

Present Worth:	*$ 1,307,333*
Capital Cost:	*$ 373,975*
Annual O&M:	*$ 129,680*
Time to Implement	*Less than six months*

Alternative 4:

This alternative consists of:

a). excavation of all petroleum impacted soils;
b). ERD to breakdown TCE and its related compounds in the saturated fill zone;
c). dewatering and treatment of impacted groundwater;
d). sediment removal from Chadakoin River;
e). outfall capping and blocking;

f). institutional controls;
g). monitoring natural attenuation and;
h). surface water monitoring.

Present Worth:	*$ 3,682,885*
Capital Cost:	*$ 2,620,875*
Annual O&M:	*$ 124,500*
Time to Implement	*Less than six months*

Alternative 5:

The elements of Alternative 5 are as follows:

a). Enhanced Reductive Dechlorination (ERD) which is currently being used as an IRM, would be expanded to address the contamination due to volatiles in the subsurface fill zone and groundwater. ERD would continue until acceptable groundwater levels are achieved. The goal would be to achieve groundwater standards;

b). Installation of permanent sheet piling along the shore line and inside the site approximately 10 feet from the toe of the riverbank. The piling joints would be sealed to prevent any migration of contaminated groundwater to the river;

c). In order to enhance the capture of contaminated groundwater (TCE, its related compounds and petroleum or NAPL) and prevent excessive hydraulic head build up behind the sheet pile wall, a vacuum enhanced pumping system and vacuum enhanced recovery system (VEP/VER)will be installed. Extraction wells would be installed along the upgradient side of the sheet pile wall at locations around ESI-3 (in fill), ESI-4 (in fill), and MW-8D (in till). VEP/VER locations are shown in Fig. 7. Recovered groundwater and NAPL by the VEP/VER system would be treated on site and would either be discharged to a local POTW or to the Chadakoin River under applicable permits or standards.

d). Petroleum impacted soils and outfalls along the riverbank between the sheet pile wall and the river would be excavated and the area backfilled with clean fill. The reconstructed riverbank would include stabilization (area to be stabilized is shown in Fig. 7) and erosion controls using geofabric and plantings on the upper slope and stone rip-rap as shown in Fig. 8. Surficial soils along the disturbed area of river bank would be covered with certified clean fill;

e). Approximately 10 yd^3 of contaminated sediment from Chadakoin River from two locations, SED-1/5 and SED-6, would be excavated and disposed off-site at a permitted facility (see Fig. 7). Each sediment removal area is approximately 40 ft long, 4 ft wide and 6" deep;

f). In order to improve fish habitat in Chadakoin River, a wing deflector would be constructed (See Fig. 7);

g). Monitoring to measure the progress of ERD, the VEP/VER system, and natural attenuation for groundwater would be conducted under an Operation, Maintenance, and Monitoring (OM&M) Plan. Surface water quality monitoring and maintenance of erosion controls would also be performed according to the OM&M Plan;

h). Imposition of a deed restriction would be required, if warranted, by residual soil or groundwater contamination remaining after remedial actions are completed. If determined necessary by the NYSDEC, the deed restriction would require one or both of the following: (1) prevent the use of groundwater as a source of potable or process water without necessary water quality treatment as determined by the Chautauqua County Health Department, and (2) require compliance with an approved soils management plan requiring annual certification to the NYSDEC.

Present Worth:	*$ 2,316,662*
Capital Cost:	*$ 1,072,375*
Annual O&M:	*$ 141,000*
Time to Implement	*Less than six months*

Alternative 6:

Alternative 6 consists of:

a). in-situ reactive zone (ERD);
b). vacuum enhanced pumping and vacuum enhanced recovery (VEP/VER);
c). sediment removal;
d). limited soil excavation ("hot spot") and off-site disposal;
e). oil seep removal;
f). outfall capping and blocking;
g). river bank stabilization;
h). monitoring groundwater for natural attenuation;
i). surface-water monitoring;
j). institutional controls.

Present Worth:	*$ 2,609,428*
Capital Cost:	*$ 695,250*
Annual O&M:	*$ 224,400*
Time to Implement	*Less than six months*

6.2 Evaluation of Remedial Alternatives

The criteria used to compare the potential remedial alternatives are defined in the regulation that directs the remediation of inactive hazardous waste sites in New York State (6 NYCRR Part 375). For each of the criteria, a brief description is provided, followed by an evaluation of the alternatives against that criterion. A detailed discussion of the evaluation criteria and comparative analysis is included in the Feasibility Study.

The first two evaluation criteria are termed threshold criteria and must be satisfied in order for an alternative to be considered for selection.

1. **Compliance with New York State Standards, Criteria, and Guidance (SCGs).** Compliance with SCGs addresses whether or not a remedy will meet applicable environmental laws, regulations, standards, and guidance. Some of the most significant SCGs for this site are outlined in Table 2.

Each of the combined remedial alternatives except Alternative 1 (Limited Action) would ultimately reduce the concentrations of contaminants in soil, sediment, and groundwater and in time the SCGs would be met. Natural attenuation would help attain SCGs outside the active remedial systems and in locations where active remediation cannot achieve SCGs. Phytoremediation, as outlined in Alternative 3, is the only alternative which would provide compliance with the location specific SCGs related to the habitat replacement along the Chadakoin River.

2. **Protection of Human Health and the Environment.** This criterion is an overall evaluation of each alternative's ability to protect public health and the environment.

The site would remain in its current condition in Alternative 1 and the potential for exposure to pedestrians from surficial contaminated soils along the river bank and to the individuals going into the river from sediments would remain. No active remediation of NAPL and VOCs and no action to control contaminants seeping into river would be done under Alternative 1. The best overall protection of human health and environment would be achieved in Alternative 4 as petroleum contaminated soils would be excavated and taken off-site. The sheet pile wall and VEP/VER component in Alternative 5 would prevent migration of contaminants seeping into the river. Alternative 6, which relies on VEP/VER system to control contaminants seeping into the river, would be less effective than Alternative 5 and hence less protective of the environment. Covering surficial soils in the disturbed area along the river bank in Alternative 5 would provide better overall protection of human health than Alternatives 1, 2, 3, and 6. Alternatives 2 and 3 would be less protective of the environment as compared to alternatives 4, 5, and 6 as contaminants would continue seeping into the river during remediation.

The next five "primary balancing criteria" are used to compare the positive and negative aspects of each of the remedial strategies.

3. **Short-term Effectiveness.** The potential short-term adverse impacts of the remedial action upon the community, the workers, and the environment during the construction and/or implementation are

evaluated. The length of time needed to achieve the remedial objectives is also estimated and compared against the other alternatives.

No short term impacts would result in Alternatives 1 and 3 as no soil or sediment excavation is proposed. During excavation of sediments in Alternatives 2, 4, 5, and 6, river water may be adversely impacted by activities by re-suspending sediments. Measures, such as using temporary silt curtains, would be taken to minimize or eliminate this problem. Short term impacts would also result during excavation of petroleum impacted soils in Alternatives 2, 4, and 5 and river bank stabilization in Alternatives 2, 4, 5, and 6. Measures would be taken to control possible impacts such as fugitive dust, erosion, and sediment, etc. during implementation of the remedy. Short term impacts would also be experienced during the groundwater treatment phase in Alternatives 4, 5 and 6. All other alternatives except Alternative 1 would provide protection of possible releases to surface water and sediment in the short term via removal or stabilization of impacted soil and removal of the existing outfalls.

4. Long-term Effectiveness and Permanence. This criterion evaluates the long-term effectiveness of the remedial alternatives after implementation. If wastes or treated residuals remain on site after the selected remedy has been implemented, the following items are evaluated: 1) the magnitude of the remaining risks, 2) the adequacy of the controls intended to limit the risk, and 3) the reliability of these controls.

Except for Alternative 1 (Limited Action), all other alternatives would be effective in varying degrees in the long term. Soil removal in Alternatives 2, 4, 5, and 6 and containment by phytoremediation in Alternative 3, would be effective in the long term to prevent human exposure. Breakdown of TCE and its related compounds in Alternatives 2, 3, 4, 5, and 6 would be permanent and would be effective in the long term. VEP/VER in Alternatives 5 and 6 would substantially reduce the impact of contaminants to the Chadakoin River and would be effective in the long term. At the end of the active remedial program residual impacts would remain at the site; however, natural attenuation processes would continue to reduce the residual contamination. The natural attenuation process would be measured via ongoing groundwater and sediment monitoring, as applicable.

5. Reduction of Toxicity, Mobility or Volume. Preference is given to alternatives that permanently and significantly reduce the toxicity, mobility or volume of the wastes at the site.

Except the Alternative 1, all other alternatives would offer a significant reduction in the toxicity, mobility, and volume of the impacts in the soils, sediment, and groundwater (including NAPL removal). Alternatives 4, 5, and 6 would provide a greater reduction in volume and mobility as compared to Alternatives 2 and 3.

6. Implementability. The technical and administrative feasibility of implementing each alternative are evaluated. Technical feasibility includes the difficulties associated with the construction and the ability to monitor the effectiveness of the remedy. For administrative feasibility, the availability of the

necessary personnel and material is evaluated along with potential difficulties in obtaining specific operating approvals, access for construction, etc.

All the alternatives are expected to be technically and administratively implementable. The installation and operation is easier for Alternative 2 as compared to other alternatives. Because of soil excavation and above ground treatment of groundwater Alternative 4 would be moderately difficult to implement. Alternative 5 and 6 would be most difficult to implement due to handling of large volume of extracted groundwater in the VEP/VER. Coordination with local and/or federal agencies would be required for removal of sediment in the Chadakoin River for Alternatives 2, 4, 5 and 6. This co-ordination can be easily accomplished.

7. **Cost**. Capital and operation and maintenance costs are estimated for each alternative and compared on a present worth basis. Although cost is the last balancing criterion evaluated, where two or more alternatives have met the requirements of the remaining criteria, cost effectiveness can be used as the basis for the final decision. The costs for each alternative are presented in the following Table.

Alternative	Capital Cost	Annual O&M	Present Worth
1	$20,000	$30,500	$605,248
2	605,850	107,850	1,586,290
3	373,975	129,680	1,307,333
4	2,620,875	124,500	3,682,885
5	1,072,375	141,000	2,316,662
6	695,250	224,400	2,609,428

This final criterion is considered a modifying criterion and is taken into account after evaluating those above. It is evaluated after public comments on the Proposed Remedial Action Plan have been received.

8. **Community Acceptance** - Concerns of the community regarding the RI/FS reports and the Proposed Remedial Action Plan are evaluated. A "Responsiveness Summary" is prepared that describes public comments received and how the NYSDEC will address the concerns raised. If the selected remedy differs significantly from the proposed remedy, notices to the public will be issued describing the differences and reasons for the changes.

SECTION 7: SUMMARY OF THE SELECTED REMEDY

Based upon the results of the RI/FS, and the evaluation presented in Section 6, the NYSDEC is selecting Alternative 5 as the remedy for this site.

This selection is based upon the evaluation of the six alternatives developed for this site. With the exception of Alternative 1- Limited Action, each of the other alternatives would comply with the threshold criteria. In addition, all five alternatives are similar with respect to the majority of the balancing criteria.

Alternative 3 would be less costly as compared to Alternatives 2, 4, 5, and 6; however the effectiveness of Alternative 3 to remediate contamination in soil, groundwater and sediment by phytoremediation is questionable. Alternatives 4, 5, and 6 are preferred over Alternatives 2 and 3 because there are no measures contained in Alternatives 2 and 3 which control seeping of contaminants into the river. Alternative 5 is preferred over Alternative 6 because the sheet pile wall in Alternative 5 would better prevent migration of contaminants into the river. Removal or prevention of contaminants seeping into the river would be best addressed in Alternatives 4 (excavation of contaminated soils) and Alternative 5 (sheet piling along the river). Since both Alternatives 4 and 5 would be equally effective in remediating the site, and Alternative 5 is less costly, Alternative 5 was chosen over Alternative 4.

The estimated present worth cost to implement Alternative 5 is $2,316,662. The cost to construct the remedy is estimated to be $1,072,375 and the estimated average annual operation and maintenance cost for 10 years is $141,000.

A remedial engineering design will be required to verify the components of the conceptual design and provide the details necessary for the construction, operation, maintenance, and monitoring of the remedial program. Any uncertainties identified during the RI/FS will be resolved during the remedial design.

The elements of the selected remedy are as follows:

- Sheet piling along the river;
- Enhanced Reductive Dechlorination (ERD);
- Vacuum-Enhanced Pumping and Vacuum-Enhanced Recovery (VEP/VER) system to address groundwater and NAPL contamination;
- Dewatering and treatment of impacted groundwater during soil excavation;
- Excavation of contaminated soil between the sheet pile wall and the river to native soil or bedrock and backfilling with clean material;
- River bank stabilization;
- Covering surface soils in any disturbed area especially along the river bank with certified clean soil;
- Removal of approximately 10yd^3 contaminated sediment from Chadakoin River;
- Fish habitat construction;
- Operation, maintenance and monitoring plan; and
- Imposition of a deed restriction will be required if warranted by residual soil or groundwater contamination remaining after remedial actions are completed. If determined necessary by the NYSDEC, the deed restriction will require one or both of the following: (1) prevent the use

of groundwater as a source of potable or process water without necessary water quality treatment as determined by the Chautauqua County Health Department, and (2) require compliance with an approved soils management plan requiring annual certification to the NYSDEC.

Based upon the results of the investigations and the IRMs that have been performed at the site, the NYSDEC concludes that no further action is required for the northern parcel of the site containing the building and parking lot (See Fig. 7). The NYSDEC will also exclude the northern parcel from the site definition.

TABLE 1
Levels of Contamination

Sub-Surface Soil (Empire Soils Investigations - October 1991)			
Element	Concentration Range (ppm)	HWR-94-4046 TAGM (ppm)	Frequency of Exceeding TAGM
Arsenic	ND(22.3) - 74.5	7.5	6 of 6
Cadmium	2.3 - 20.4	10	4 of 6
Chromium	16.7 - 104	50	3 of 6
Copper	67.5 - 1370	25	6 of 6
Mercury	ND(0.11) - 0.55	0.1	6 of 6
Nickel	39 -904	13	6 of 6
Zinc	83.7 - 444	20	6 of 6

Sediment (Chadakoin River) (RI Report - 1998)			
Element	Concentration Range (ppm)	Severe Effect Level (SEL) (ppm)	Frequency of Exceeding SEL in Downstream samples
Copper	88.9 - 9750	110	5 of 7
Chromium	33 -211	110	2 of 7
Iron	34,200-102,000	40,000	5 of 7
Lead	26 - 524	110	6 of 7
Nickel	26.1 - 125	50	4 of 7
Zinc	169 - 2380	270	1 of 7

TAGM - Technical and Administrative Guidance Memorandum
RI - Remedial Investigation
VOCs - Volatile Organic Compounds
SVOCs - Semi Volatile Organic Compounds
TPH - Total Petroleum Hydrocarbons
SEL - Severe Effect Level for benthic organisms
ppb - parts per billion
ppm - parts per million
GW Std - Groundwater Standard
ND - None detect

GROUNDWATER DATA (RI Report - 1998)			
VOCs	Concentration Range (ppb)	Groundwater Standard (ppb)	Frequency of exceeding Groundwater Standard
Vinyl Chloride	2 - 3,200	2	10 of 35
Dichloroethene	1 - 34,000	5	14 of 35
Trichloroethene	3 - 830,000	5	9 of 35
Xylenes	5 - 20	5	3 of 35
* - Detection Limits for VOCs in some samples were higher than the Groundwater Standards			

Total Petroleum Hydrocarbons (TPH) in Geoprobes and Wells (RI Report - 1998)			
Geoprobe/ Monitoring Well	Gasoline Range Organics (ppb)	Diesel Range Organics (ppb)	TPH (ppb)
GP -2	986	-	986 +
GP -4	193	1,200	1,393
GP -5	327,000	5,600	332,600
GP -6	5,930	2,400,000	2,405,930 (0.24%)
GP -7	14,900	500	15,400
GP - 9	91,800	11,000	102,800
GP -11	470	800	1,270
GP -15	56	2,000	2,056
ESI -1	360	8,000	8,360
ESI -2	127	1,700	1,827
ESI -3	671	420,000	420,671
ESI -4	71	7,900	7,971
ESI - 5	161	1,400	1,561
MW -8D	172,000	460	172,460
MW - 8S	586	-	586 +
MW -9	91	-	91 +

Dissolved Metals in Groundwater (RI Report - 1998)			
Contaminant	Concentration Range (ppb)	GW Std (ppb)	Frequency of Exceeding GW Std.
Arsenic	ND(3.0) - 854	25	2 of 28
Cadmium	ND(1.0) - 3870	10	3 of 28
Chromium	ND (5.9) - 3260	50	2 of 28
Copper	3.0 - 6730	200	4 of 28
Mercury	ND(0.2) - 19.4	2	1 of 28
Iron	210 - 2,300,000 (0.23%)	300	19 of 28
Lead	ND(2.0) - 7,530	25	5 of 28
Nickel	ND(0.2) - 23,200	100	4 of 28
Zinc	ND(9.4) - 9,040	300	5 of 28

TABLE 2

Standards, Criteria, and Guidance

Regulation/Policy	Title	Applicability
6 NYCRR Part 371	Identification and Listing of Hazardous Wastes	Defines hazardous waste for purposes of disposal
6 NYCRR Part 375	Inactive Hazardous Waste Disposal Site Remedial Program	Regulates the permitting of activities at the site, defines new uses, public participation and otherwise provides guidance to the hazardous waste clean up program
TAGM HWR-94-4046	Determination of Soil Cleanup Objectives and Cleanup Levels.	Guidelines for developing clean up goals
6 NYCRR Parts 700 -705	Water Quality Regulations for Surface Water and Groundwater	Sets standards for groundwater
TAGM HWR-89-4031	Fugitive Dust Suppression and Particulate Monitoring Program at Inactive Hazardous Waste Sites.	Guidelines for remedial activities
Sediments Criteria	Technical Guidance for Screening Contaminated Sediments - July 1994	Guidelines for developing clean up goals for sediments.

Appendix A

Responsiveness Summary

D. C. Rollforms Site
Jamestown, Chautauqua County

Site # 907019

The responsiveness summary contains questions and comments received by the New York State Department of Environmental Conservation (NYSDEC) regarding the Proposed Remedial Action Plan (PRAP) for the subject site. A public meeting for the PRAP for the D. C. Rollforms site was held on February 19, 2003 at the Falconer Fire Hall, Falconer, NY beginning at 7:00 P.M. The public comment period lasted from February 3, 2003 through March 5, 2003.

Please refer to Section 7 of the Record of Decision for a review of the elements of the selected remedy.

NYSDEC responses to the public comments and concerns expressed at the public meeting on February 19, 2003 are as follows:

Q. **Will the excavation along the river bank create any dust ? Some of the Weber Knapp employees use the company parking lot as a break area, will the dust effect that area ?**

A. A Health and Safety Plan will be in effect during remedial work at the site. Dust levels will be measured in the work area and at the perimeter of the property. If dust levels reach the recommended action level at the site perimeter, engineering controls e.g. sprinkling water to control dust will be used. If the dust levels exceed the acceptable levels, immediate actions will be taken to bring those levels under control or by suspending the work temporarily.

Appendix B

Administrative Record

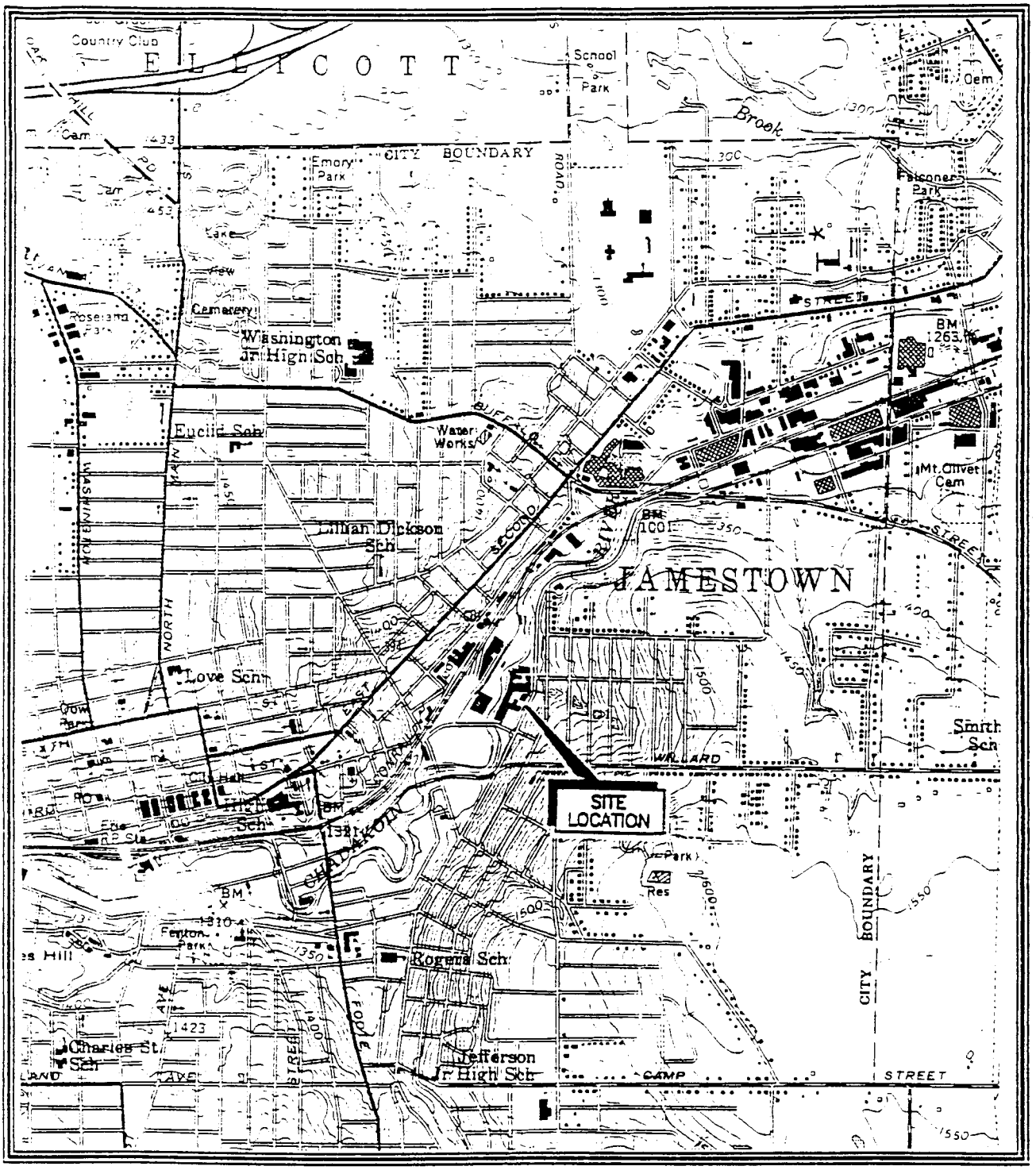
D. C. Rollforms Site
Jamestown, Chautauqua County

Site # 907019

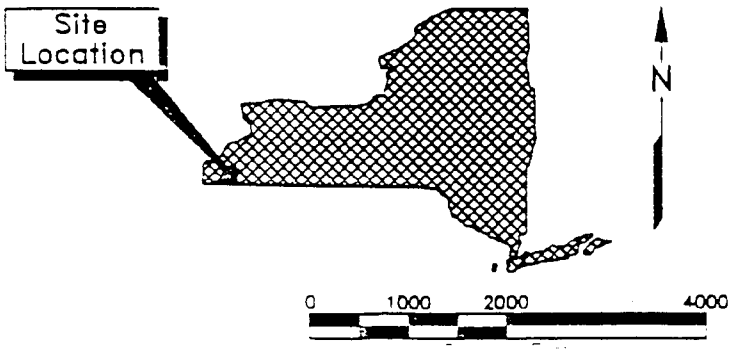
Record of Decision ..... March, 2003
Proposed Remedial Action Plan ..... February, 2003
Phase II Status Report for Enhanced Reductive Dechlorination and NAPL Recovery Interim Remedial Measures Report ..... July, 2002
Feasibility Study ..... May, 2002
Lead Soil Removal ..... February, 2001
Phase I Interim Remedial Measures Report ..... June, 1999
Supplemental Remedial Investigation Report ..... February, 1999
Remedial Investigation Report ..... April, 1998
Environmental Investigation Report ..... October, 1991

Relevant Correspondence:

Gary A. Litwin to Dale Desnoyers - NYSDOH concurrence letter for Record of Decision, March, 2003
Gary A. Litwin to Dale Desnoyers - NYSDOH concurrence letter for Proposed Remedial Action Plan, December 18, 2002
Marc Sanford to Jaspal Walia and Martin Doster - Post Excavation Sample Results, Lead Soil Removal IRM, April 16, 2002
Robert Marino (NYSDEC) to Dowcraft Corporation - Listing of the site as class 2, September 19, 1994



Reference: U.S. Geological Survey, 7.5 Minute Quadrangle, Jamestown, New York, Edited 1954.



SITE LOCATION

D.C. ROLLFORMS/INGERSOLL-RAND SITE
Jamestown, New York

DRAWN: TAD/G248A	DATE:	FIGURE 1
APP'D:		

ARCADIS GERAGHTY & MILLER

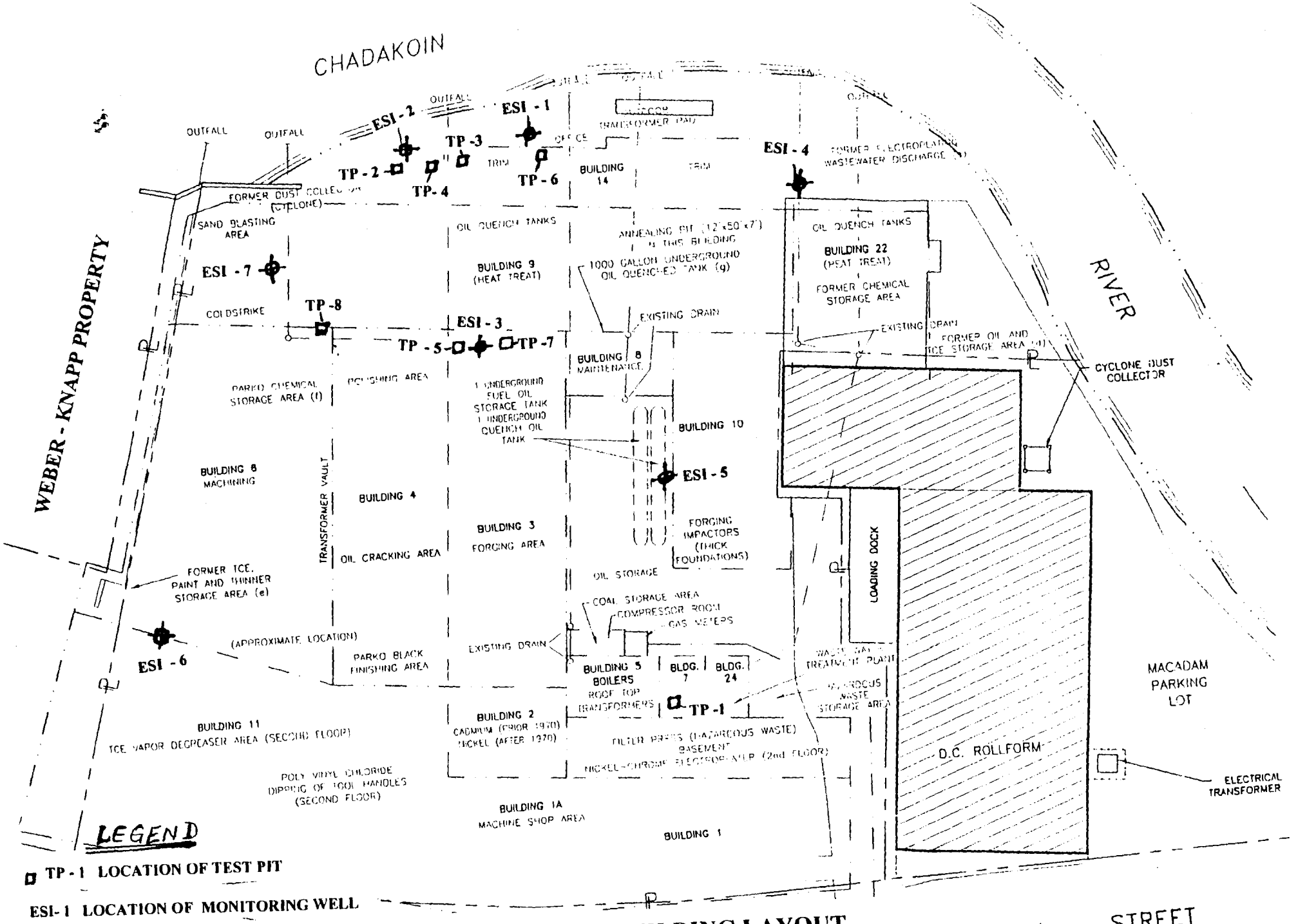
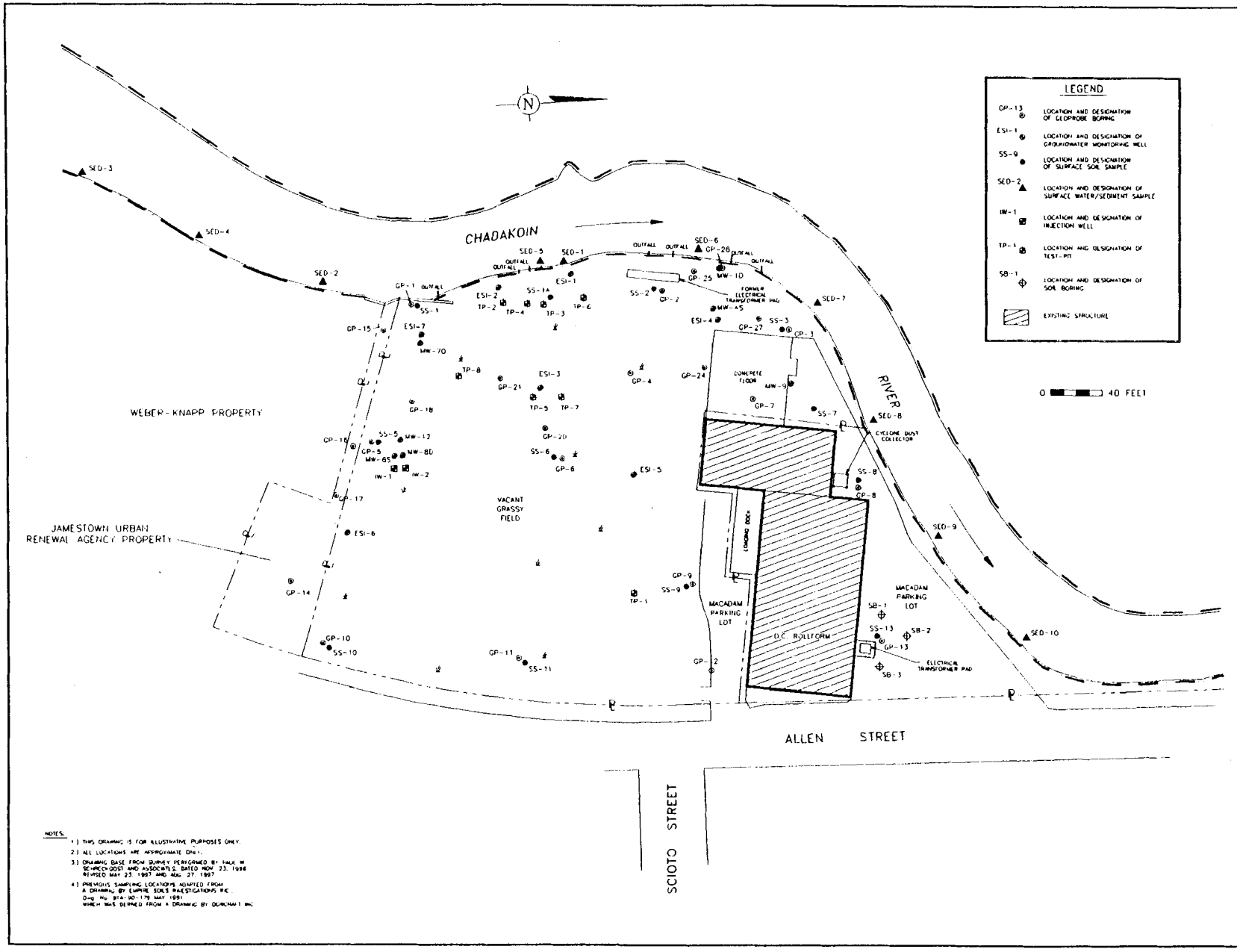


FIG. 2: FORMER PROTO TOOLS BUILDING LAYOUT



NOTES:

1) THIS DRAWING IS FOR ILLUSTRATIVE PURPOSES ONLY.
2) ALL LOCATIONS ARE APPROXIMATE ONLY.
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4) PREVIOUS SAMPLING LOCATIONS ADAPTED FROM A DRAWING BY EMPIRE SOILS INVESTIGATIONS, INC. Dwg. No. 91A-90-179 MAY 1991 WHICH WAS DERIVED FROM A DRAWING BY DURCHAM INC.

NO.	DATE	REVISION DESCRIPTION	BY / CKD

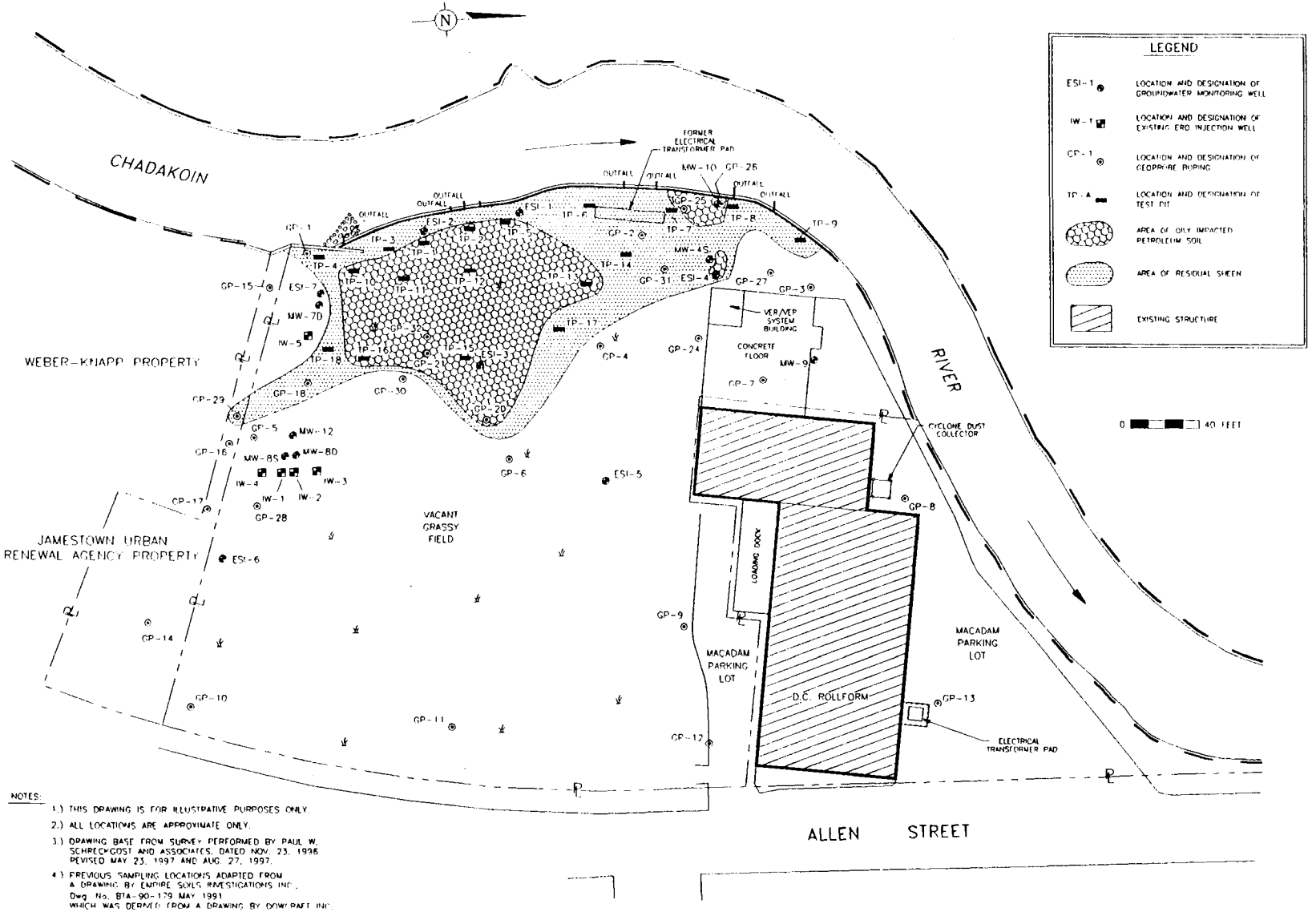
ARCADIS
441 New Karner Rd., Suite 2
Albany, New York 12205
Tel: 518/452-7826 Fax: 518/452-4398

SAMPLE LOCATIONS DURING THE RI AND PREVIOUS INVESTIGATIONS

D.C. ROLLFORMS/INGERSOLL-RAND
JAMESTOWN, NEW YORK

PROJECT MANAGER M. SANFORD	DRAWING NUMBER G2542
LEAD DESIGN PROF. E. ROBERTS	PROJECT NUMBER AY0000219.0004
CHECKED BY E. ROBERTS	
DRAWN BY F.M./Adesso	DATE 5/09/02

FIG. 3



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D.C. ROLLFORMS/INGERSOLL-RAND
JAMESTOWN, NEW YORK

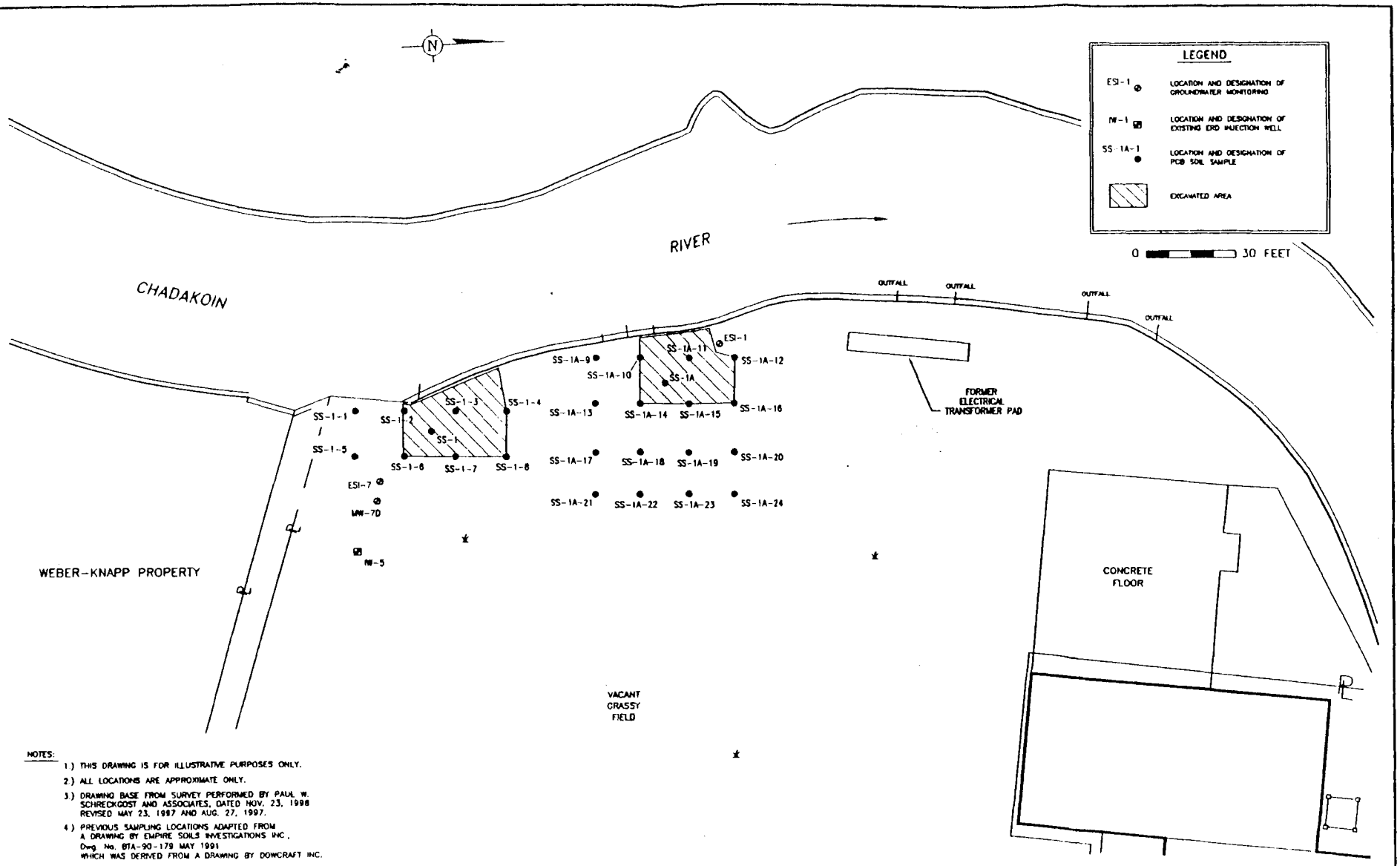
ESTIMATED AREAS OF PETROLEUM IMPACTED SOILS

DRAWN	DATE
EJF/TAD	11-29-00

PROJECT MANAGER	DEPARTMENT MANAGER
M SANFORD	-
LEAD DESIGN RPSN	CHECKED
E ROBERTS	E ROBERTS

PROJECT NUMBER
AY0002190003

FIG 4



NOTES:

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NO.	DATE	REVISION DESCRIPTION	BY	CKD

SCALE VERIFICATION

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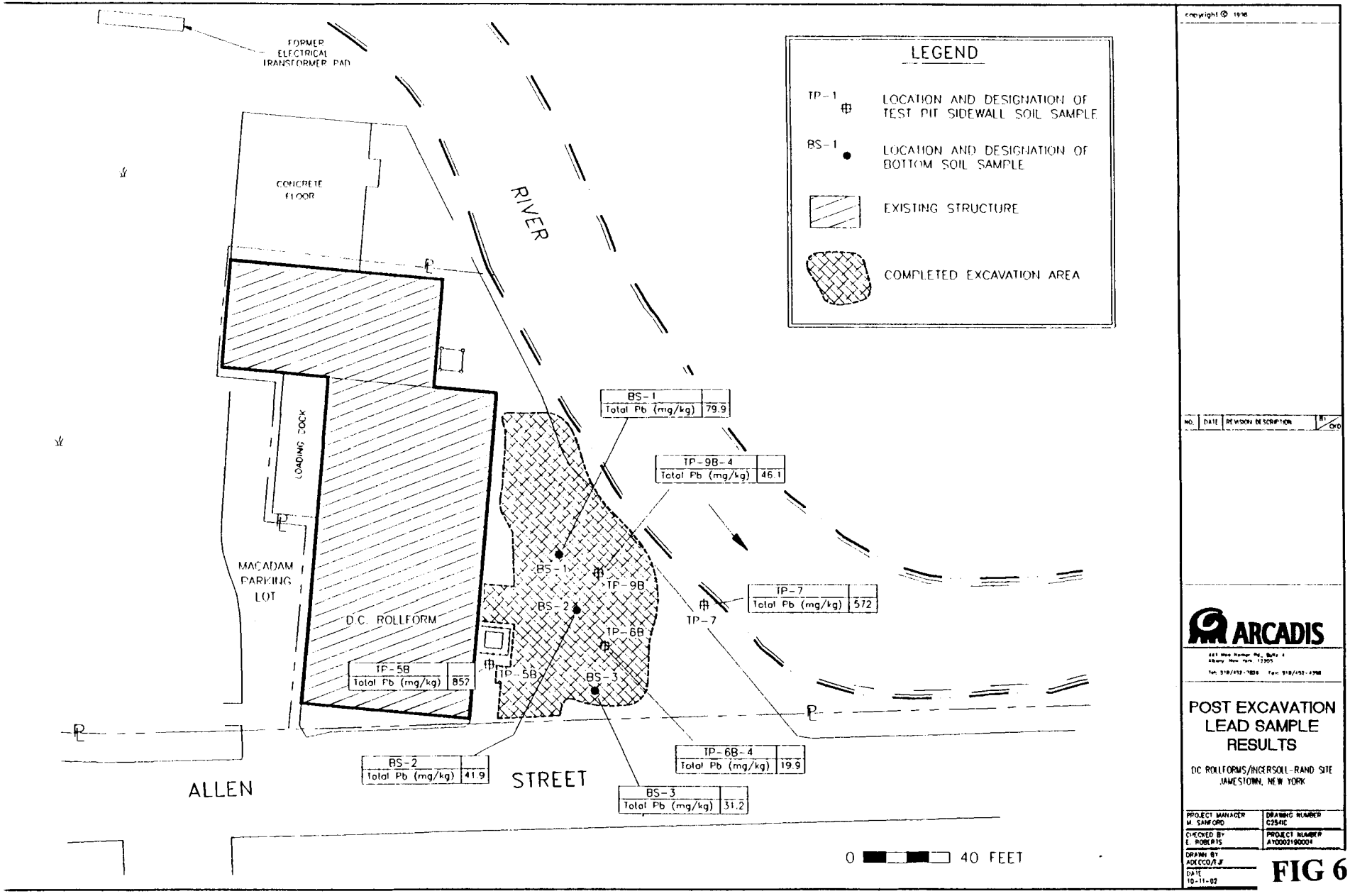
O.C. ROLLFORMS/INGERSOLL-RAND
JAMESTOWN, NEW YORK

PCB SURFACE SOIL SAMPLE LOCATIONS

DRAWN	DATE	PROJECT MANAGER	DEPARTMENT MANAGER
F.J. / ADC.CO.D	03-08-02	M. SANFORD	-
		LEAD DESIGN PROF.	CHECKED
		PROJECT NUMBER	M. TUTOR
		AY000219.0000	

FIG 5



NO.	DATE	REVISION DESCRIPTION	BY ORD

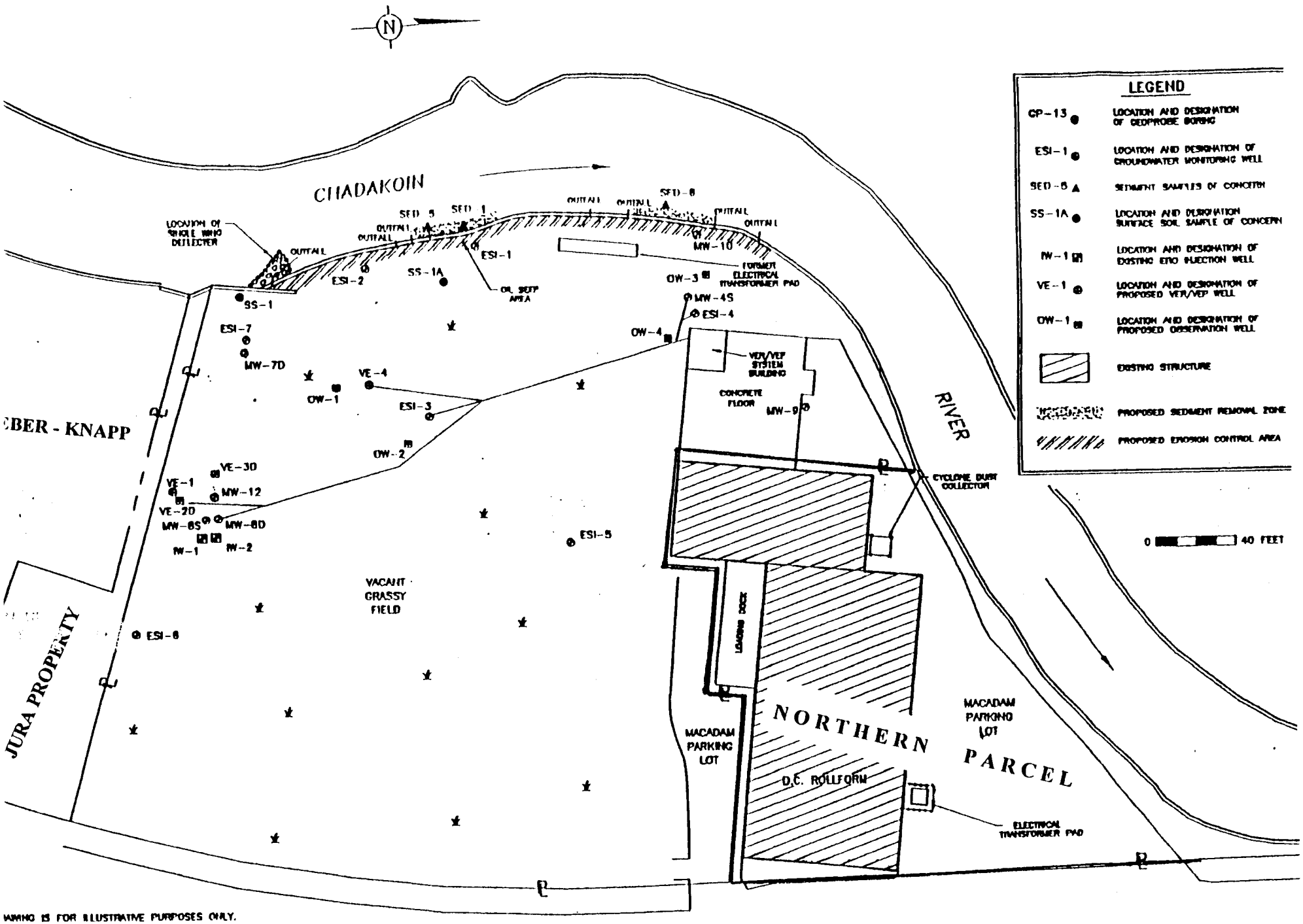
ARCADIS

POST EXCAVATION LEAD SAMPLE RESULTS

DC ROLLFORMS/INGERSOLL-RAND SITE
JAMESTOWN, NEW YORK

PROJECT MANAGER M. SANFORD	DRAWING NUMBER C2541C
CHECKED BY E. ROBERTS	PROJECT NUMBER AY0003190004
DRAWN BY ADECCO/R.F	
DATE 10-11-02	

FIG 6



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LOCATIONS ARE APPROXIMATE ONLY.

BASE FROM SURVEY PERFORMED BY PAUL W. KOOST AND ASSOCIATES, DATED NOV. 23, 1996 MAY 23, 1997 AND AUG. 27, 1997.

FIG 7 : VEP/VER LOCATIONS; EROSION CONTROL AREA; SEDIMENT REMOVAL ZONE

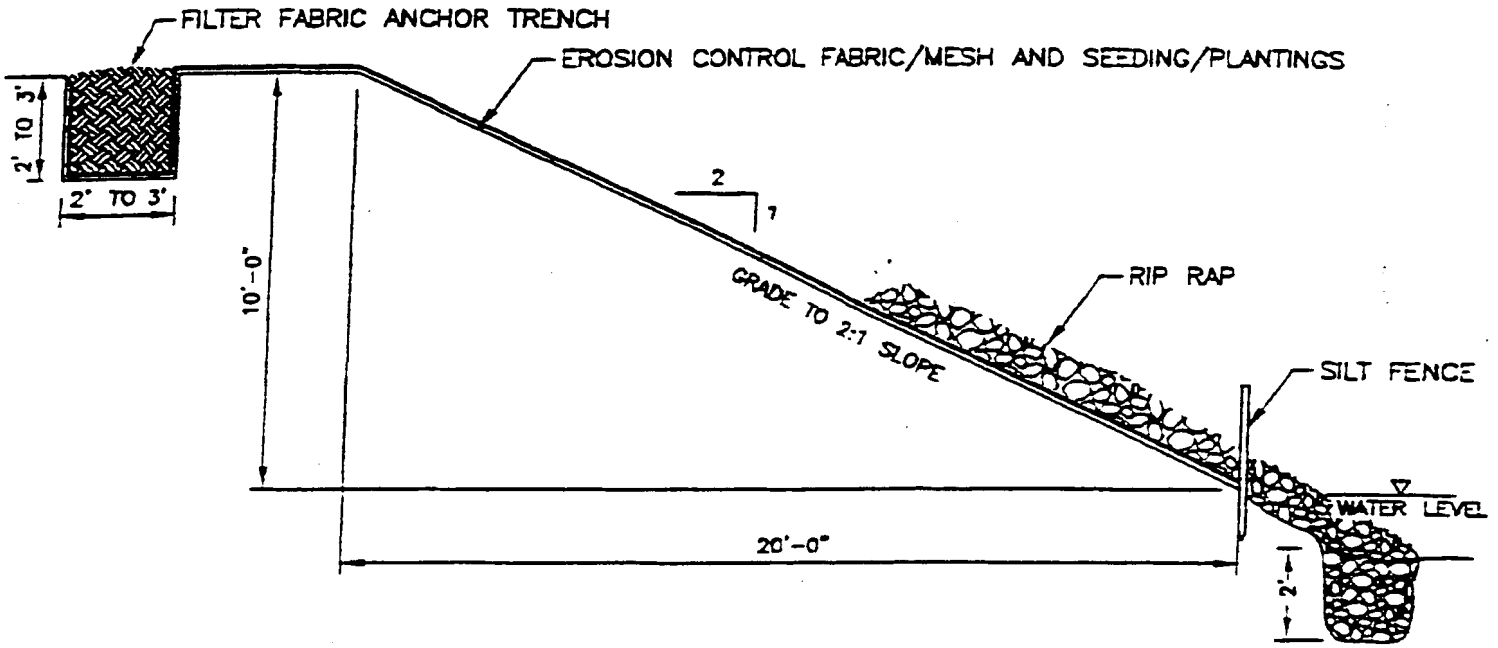

FIG 8 : RIVER BANK STABILIZATION/ EROSION CONTROLS