FINAL REPORT

REMEDIAL INVESTIGATION NIAGARA TRANSFORMER CORPORATION

Prepared for:
Niagara Transformer Corporation
1747 Dale Road
Cheektowaga, New York 14225
August 13, 1993

Woodward-Clyde

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Project Number 90C2139-1

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August 13, 1993
90C2139-1

Mr. Fred Darby
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REMEDIAL INVESTIGATION REPORT
NIAGARA TRANSFORMER CORPORATION
DALE ROAD FACILITY

Dear Mr. Darby:

Woodward-Clyde Consultants (WCC) is pleased to submit the Final Remedial Investigation (RI) Report for Niagara Transformer Corporation's Dale Road Facility. If you have any questions or comments, please contact the undersigned.

Sincerely,

Kelly R. McIntosh, P.E.
Associate

James F. Roetzer, Ph.D.
Senior Associate

KRM:jee

Ntcri.rep

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EXECUTIVE SUMMARY

Woodward-Clyde Consultants (WCC) was retained by the Niagara Transformer Corporation (NTC) to conduct a Remedial Investigation (RI) at its plant located on Dale Road in Cheektowaga, New York. The major objectives of the NTC RI were to:

- Assess the extent of contamination present in soil, sediment and groundwater in the Study Area
- Evaluate contaminant transport from the site, identifying potential exposure routes and receptors

The RI involved analysis of ditch sediment, soil, groundwater and surface water samples obtained from on-site and off-site. The major contaminants of concern were determined to be polychlorinated biphenyls (PCBs). Elevated levels were found in surficial and subsurface soils on and adjacent to the site, on-site ditch sediment, off-site ditch sediment, and in some soils adjacent to the drainage ditches. Comparison of levels found in soils and ditch sediment with Applicable or Relevant and Appropriate Requirements (ARARs) and other factors to be considered (TBCs), indicate that some remediation of contaminated soil and sediment will be required in the Study Area.

1.0
INTRODUCTION

Woodward-Clyde Consultants (WCC) was retained by the Niagara Transformer Corporation (NTC) to conduct a Remedial Investigation (RI) at its plant located on Dale Road in Cheektowaga, New York (Figure 1-1). The major objectives of the NTC RI were to:

- Assess the nature and extent of contamination present in soil, sediment and groundwater in the Study Area

- Evaluate contaminant transport from the site, identifying potential exposure routes and receptors

The RI was conducted in accordance with the "Remedial Investigation Work Plan, Niagara Transformer Corporation", dated February 14, 1991, which was prepared by WCC and approved by the New York State Department of Environmental Conservation (NYSDEC).

A Draft RI Report was submitted to NYSDEC on October 1, 1991. In this report, WCC presented recommendations for additional investigation to more adequately assess the extent of soil contamination related to the site. In letters dated January 21, 1992 and December 9, 1992 the NYSDEC presented further recommendations for additional investigation including installation and sampling of additional groundwater monitoring wells. These recommendations were addressed in supplemental RI investigations conducted by WCC between April 1992 and April 1993. This Final RI Report presents all data collected for the RI, including the results of the supplemental investigations.

1.1 SITE BACKGROUND

1.1.1 Operating History

The Niagara Transformer Corporation (NTC) began manufacturing transformers at the site in 1958. Their business has consisted primarily of manufacturing new transformers (both dry and liquid-filled). On occasion, NTC will repair or recondition transformers for customers. PCB containing oils, used as dielectric fluid in some liquid-filled transformers, were used or stored on-site from approximately 1958 to 1980. Currently, NTC uses either mineral oil, silicone, or RTemp™ in manufacturing liquid-containing transformers. None of these fluids contain PCBs. There are no records of industrial use of the property prior to NTC's ownership.

The property immediately adjacent to Niagara Transformer on the east consists of two lots. The westerly lot was purchased from Kistner Concrete on May 31, 1983. The easterly lot was purchased from Weaver on July 8, 1983. Prior to NTC's purchase, the Kistner property was used to store preform concrete structures. The Weaver lot has just been a vacant building lot. NTC purchased the properties for potential future expansion. Since its purchase, no use has been made of the land. They simply have been sitting as two empty building lots.

A variety of chemicals have been used by NTC at the site. Appendix A presents a list of substances used.

1.1.2 Previous Investigations

On April 10, 1990, Town of Cheektowaga employees observed an oily substance in a drainage ditch running in an east-west direction (parallel to the south perimeter of the site) on Conrail property. The New York State Department of Environmental Conservation (NYSDEC) was contacted and subsequent testing indicated that the sediments within the east-west drainage ditch were contaminated with polychlorinated biphenyl compounds (PCBs). Further testing showed elevated PCB-levels in sediments within a drainage ditch running north to south across the Niagara Transformer property, intersecting the east-west ditch near the southeast corner of the site. Figures 1-2 and 1-3 show the locations of samples obtained prior to the RI sampling events. The results of these preliminary sampling events are presented and discussed in the RI Work Plan, and also later in this RI Report. Prior to initiation of the RI work tasks, one sediment sample was analyzed for 2,3,7,8-tetrachloro-dibenzo-dioxin (2,3,7,8-TCDD) and the U.S. Environmental Protection Agency Contract Laboratory Program Target Compound List

(TCL). The sample was obtained directly from the seepage face where oil has seeped into the ditch (i.e., from the area of the site with the most visible contamination).

The purpose of the 2,3,7,8-TCDD analysis was to provide evidence of whether or not this chemical was a concern at the areas of highest sediment or soil contamination. As stated in the RI Work Plan, 2,3,7,8-TCDD was not detected in this sample. The TCL results for the sample were also presented in the RI Work Plan, and are further discussed later in this RI Report.

Based on the preliminary sampling results, visible seepage to the ditch, and documented use of PCB compounds at the site, the source of contamination was expected to be on the NTC property. Based on this finding, NYSDEC and NTC agreed to an Order on Consent (Index Number B9-0334-90-05). The Order became effective on April 2, 1991 and requires NTC to implement a Remedial Investigation/Feasibility Study (RI/FS) for the site.

Site structures and drainage are shown on Figure 1-4. The contaminated section of the drainage ditches has been designated an Operable Unit (Operable Unit 1) by NYSDEC. An Interim Remedial Measure (IRM) Work Plan for Operable Unit 1 was prepared by WCC and submitted to NYSDEC on February 22, 1991. The objective of the IRM is to minimize the migration of contamination from the ditches during the investigatory process.

1.2 REPORT ORGANIZATION

This RI Report is organized in nine sections. Section 2.0 describes the investigations conducted for the project, including the supplemental RI investigations. Physical characteristics of the Study Area relevant to contaminant transport are presented in Section 3.0. Analytical results and the nature and extent of contamination are presented and discussed in Section 4.0. Section 5.0 presents an evaluation of contaminant fate and transport within the Study Area. Contaminant levels are compared to Applicable or Relevant and Appropriate Requirements, and potential human and environmental exposure routes are discussed in Section 6.0. Section 7.0 includes a summary of the RI and presents WCC's conclusions regarding the nature and extent of contamination and the need for further investigation or remediation at the site. Limitations of the RI are identified in Section 8.0. References are listed in Section 9.0.

2.0 STUDY AREA INVESTIGATIONS

Sections 2.1 through 2.10 describe the work performed for the Draft RI Report (dated October 1, 1991). Section 2.11 describes the work performed subsequent to the Draft RI (supplemental RI) in accordance with recommendations made by WCC and NYSDEC.

2.1 INVESTIGATION OF ENVIRONMENTAL OPERATING HISTORY

The purpose of this task was to ascertain the nature of past releases at the site.

Individual interviews were conducted by WCC with key NTC employees who worked at the facility prior to 1979. In addition, company records were reviewed for documentation of past disposal activities. The results for this task are presented in Section 4.1.

2.2 INVESTIGATION OF SITE DRAINAGE

Surface water drainage from the site was investigated to identify potential contaminant migration pathways involving runoff from the site. This task consisted of the following activities:

1. Field inspection during precipitation events
2. Examination of utility drawings
3. Dye tests of the plant roof drains

The results of this task are presented in Section 3.1.

2.3 GEOPHYSICAL INVESTIGATION

A geophysical investigation was performed by WCC to evaluate the potential presence of buried metal containers at the site. Geophysical surveys (terrain conductivity and metal detector) were conducted at the site on April 15 and 16, 1991. When used together, the results of these surveys can be used to distinguish the presence of buried metal from soil and other fill materials.

2.3.1 Instrumentation

Terrain conductivity: An EM-31 (manufactured by Geonics Ltd. of Mississauga, Ontario, Canada) was used to obtain terrain conductivity measurements at the site. The general principle of terrain conductivity is based upon the induction of eddy currents in the ground by an alternating magnetic field. These currents induce a secondary magnetic field in the subsurface whose quadrature component (phase) is directly related to the conductivity of subsurface materials. Conductivity can be associated with specific subsurface parameters (i.e., lithologic material, permeability, porosity, water content and electrolyte concentration). The in-phase component of the EM-31 is useful for identifying the content of surface and buried metal. This instrument is useful for characterizing the shallow (0 to 15 feet deep) subsurface in the vertical dipole mode.

Metal detector: A Ferro-Trak FT-60 Magnetic Locator (Chicago Steel Tape, Watseka, Illinois) was used at the site to detect the presence of shallow (0 to 5 feet) buried metal. This instrument has two magnetic sensors (upper and lower). Magnetic objects located below the device cause the bottom sensor to receive a stronger signal than the upper sensor. Differences in the magnetic gradient results in a high frequency noise emitted from the detector; the higher the frequency, the greater amount of ferro-magnetic metal.

2.3.2 Methods

Grid establishment: A field grid was laid out with stakes on 25-foot centers in the study area (Figure 2-1) to accurately record the locations of the geophysical measurements.

Terrain conductivity and metal detector measurements were taken on these 25-foot centers within the selected areas of the site. Readings were also observed between stations to assess if anomalous readings occurred. A discussion of how these readings were obtained is presented below.

Terrain conductivity measurements: Readings with the EM-31 were collected in the vertical dipole made with measurements taken in both quadrature and in-phase modes. As discussed previously, the quadrature phase readings are useful in delineating the presence of buried metal and elevated levels of shallow soil/groundwater conductivity. The in-phase reading is used to further evaluate the presence of buried metal or structures. Prior to the collection of any readings, the instrument was calibrated. A minimum of two readings were taken with each phase per station - one reading with the coils oriented north-south and the other with coils oriented east - west. These readings were then averaged to obtain a representative conductivity level for that particular station. The data were recorded by hand as field notes.

Metal detector measurements: The metal detector readings were recorded where the instrument detected the presence of metal. No readings were recorded when metal was not detected.

Mapping of surface debris/features in the study area: Surface debris and features were mapped in the study area to help evaluate the data obtained from the geophysical measurements. These features included the railroad tracks and piles of debris or soil. These features are plotted on Figure 2-1. The results of the geophysical surveys are presented in Section 4.2.

2.4 SURFICIAL SOIL SAMPLING

Surficial soil samples, representing a composite of the top six inches of soil material, were collected from unpaved areas south and west of the main plant building. Soil samples were collected at points spaced approximately 50 feet apart using the pre-established geophysical survey grid as a reference (Figure 2-2). Including three sampling locations in the southeast corner of St. Adalberts Cemetery just west of the site, a total of 28 surficial soil samples were collected for this task. Sample locations and identification numbers are shown on Figure 2-2. All surficial soil samples were collected between July 16, 1991 and July 23, 1991.

Surficial soil samples were collected using a stainless-steel hand trowel and retained/homogenized in a stainless-steel mixing bowl before being transferred to laboratory supplied glassware. Organic matter which had been integrated into the soil was retained in the sample, while undecomposed organic (plant) material was discarded. All sampling equipment was decontaminated in accordance with the procedures outlined in the RI Work Plan. All soil samples were analyzed for PCBs using NYSDEC ASP Category B, September 1989, Analytical Procedures for RCRA Organics, Method 8080. In addition, one surficial soil sample (071691-7) was analyzed for the EPA Target Compound List (TCL) using NYSDEC ASP Category B, September 1989, Analytical Procedures for RCRA Organics, Methods 8240 and 8270. As a result of a laboratory equipment malfunction, resampling (volatile organic fraction only) at the TCL sampling location (071691-7) was performed on August 20, 1991. All surficial soil samples collected throughout the RI were composited and, if applicable, split for the NYSDEC by the analytical laboratory. The contracted laboratory, Alpha Analytical Laboratories, Inc., violated holding times for the resampling due to a second equipment malfunction. Therefore, volatile organic results are not available for surficial soils. Results of this surficial soil sampling are presented and discussed in Section 4-5.

2.5 SOIL SAMPLING IN FLOOD-PRONE AREAS

Surficial soil samples were also collected off-site near the drainage ditches in areas identified as being prone to flooding during periods of high precipitation or snowmelt. The flood-prone areas were identified based on topographic data and field reconnaissance. A total of nine samples were collected for the Draft RI adjacent to the drainage ditches near the southern perimeter of St. Adalberts Cemetery and between the Kennedy Industrial Park and Harlem Road in the vicinity of Gruner Road (Figures 2-3 and 2-4).

Flood-prone area sampling for the Draft RI was performed on May 28 and August 20, 1991. The six samples collected during May, 1991 fulfilled the requirements specified in the RI Work Plan. Based on the results of the soils analyses, WCC recommended that additional samples be obtained a few feet off the ditch (on cemetery property). The purpose of these additional samples was to determine whether PCB concentrations present adjacent to the ditch are a result of previous ditch cleaning (sediment excavation) with subsequent deposition along the sides of the ditch, or from flooding. These samples were collected in August 1991. Figure 2-3 shows the locations of these additional samples, which were obtained approximately 3 feet further back from the ditch at the three May 1991 cemetery sample locations.

Samples were collected using dedicated stainless-steel hand trowels to eliminate the possibility of cross-contamination. Organic matter which had been integrated into the soil was retained in the sample, while undecomposed organic (plant) material was discarded. Samples were transferred directly to laboratory supplied glassware. All soils collected in the flood-prone area sampling events were analyzed for PCBs using NYSDEC ASP Category B, September 1989, Method 8080. All surficial soil samples collected throughout the RI were composited and, if applicable, split for the NYSDEC by the analytical laboratory. As part of the supplemental RI, additional flood-prone soil sampling was performed near the upper ditch. These locations are also shown on Figure 2-3, and are further discussed in Section 2.11.5.

2.6 RESIDENTIAL SOIL SAMPLING PROGRAM

In addition to the sampling required by the RI work plan, NTC collected and analyzed surficial soil samples from the nearest downgradient residential neighborhood. Surficial soil samples were collected on March 28, 1991 at selected private residences along Lemoine Avenue, Wallace Avenue, Kennedy Road, Gruner Road, and Broadway. Surficial soils obtained for the residential sampling program were collected from low lying/flood-prone areas along Gruner Road and Broadway, from properties nearest to the site, and from residences more or less uniformly spaced throughout the residential area bounded by Broadway, Wallace Avenue, Kennedy Road and Gruner Road (Figure 2-5). A total of 14 samples were collected during the residential soil sampling program. In general, two to three locations within each yard were sampled and composited (by the analytical laboratory) into one sample for analysis.

Because of the sensitive nature of surficial soil samples obtained throughout the residential area, samples were collected using dedicated stainless-steel hand trowels to eliminate the possibility of cross-contamination. Organic matter which had been integrated into the soil was retained in the sample, while undecomposed organic material was discarded. Samples were transferred directly to laboratory supplied glassware. All soils collected in the flood-prone area and residential sampling events were analyzed for PCBs using NYSDEC ASP Category B, September 1989, Method 8080. All surficial soil samples collected throughout the RI were composited and, if applicable, split for the NYSDEC by the analytical laboratory.

2.7 SHALLOW MONITORING WELL INSTALLATION AND TESTING

2.7.1 Shallow Monitoring Well Installation

A total of eight shallow monitoring wells were installed for the Draft RI to characterize the overburden stratigraphy and to monitor the quality of shallow or perched groundwater above the glaciolacustrine clay. The RI Work Plan specified nine shallow monitoring wells. However, at Location 1 (north of the main building) no saturated zone was encountered above the clay/till during drilling. Therefore, a perched zone well was not installed at this location. Well locations are shown on Figure 2-6.

All borings in which wells were constructed were advanced using hollow-stem auger drilling techniques. Continuous 2-foot split-spoon samples were collected ahead of the auger flights during drilling and retained for PCB analysis (NYSDEC ASP Category B, September 1989, Method 8080). All drill cuttings were containerized in 55-gallon drums for proper disposal. Wells were constructed with 4-inch schedule 5 stainless-steel screen (10 slot size) and riser, with a #2 sand pack and overlying bentonite pellet well seal. Cement/bentonite grout was used as backfill above the well seal to ground surface. Six-inch locking protective casings were installed at wells NTC- 4S, 5S, 6S, 7S and 8S. Flush mount curb boxes were installed at wells NTC-2S, 3S and 9S.

Well completion details (Appendix B) varied based upon field conditions encountered during drilling (i.e., depth to the glaciolacustrine clay, depth to the shallow water table). Where feasible, the well was constructed such that the well screen spans the observed water table. Well installations were performed between April 3 and 24, 1991. Additional monitoring wells were installed (supplemental RI wells) as described in

Section 2.11.1. The locations of these additional wells are also shown on Figure 2-6.

2.7.2 Shallow Monitoring Well Development

Upon completion, each shallow well was developed to remove fines from the sand pack and to ensure low turbidity groundwater samples. All wells were evacuated and purged using a 3-1/2 inch PVC bailer. A minimum of five well volumes were removed during development, and pH and conductivity were monitored to verify that the well would yield representative groundwater samples. Development water was containerized and disposed of by NTC in accordance with applicable state and federal regulations.

2.7.3 Hydraulic Conductivity Testing

Single well hydraulic conductivity tests (rising and/or falling head tests) were attempted on all wells installed for the Draft RI. To perform these tests without injection of water (injection tests are not appropriate when groundwater chemistry is being investigated), approximately 3 feet of water in the well is required.

Due to the thin saturated thickness of the soil above the clay/till unit, hydraulic conductivity tests were not feasible at wells NTC-4S, NTC-5S, NTC-6S, NTC-7S and NTC-8S. For the remainder of the shallow wells, rising head tests were conducted by evacuating a known volume of water from the well and monitoring the response in hydraulic head. The hydraulic response was measured and recorded using a pressure transducer and Hermit® SE1000B Data Logger. The methods of Bouwer and Rice (1976) were used to estimate hydraulic conductivity from the test results.

2.7.4 Hydraulic Head Monitoring

Hydraulic head measurements from shallow monitoring wells were obtained monthly for a period of six months in accordance with the RI Work Plan. At the time of the Draft RI Report, four rounds of monthly measurements had been taken (June, July, August and September of 1991). The Draft RI Report was prepared based on these data. Hydraulic head measurements were obtained monthly from January to October, 1992.

2.7.5 Groundwater Sampling and Analysis

Groundwater samples were collected from each shallow monitoring well and analyzed for PCBs using NYSDEC ASP Category B, September 1989, Method 89-3 and total petroleum hydrocarbons (TPH) according to EPA Method 418.1. The sample from NTC-7S was analyzed for the EPA TCL using NYSDEC ASP Category B, September 1989, Method 89-1 and 89-2. Sample collection was performed according to the following procedures:

1. The depth to water (DTW) and total well depth were measured. Data were recorded on field sampling sheet and the well volume was calculated. Measuring devices were decontaminated in accordance with the RI Work Plan.

2. Wells were purged a minimum of three and a maximum of five well volumes, or to dryness, using a peristaltic pump. All purge water was containerized for proper disposal. During purging, water quality parameters (pH, specific conductance and temperature) were monitored between each half to one well volume. Sufficient purging was indicated by a stabilization of ± 10 percent for each parameter.

3. All wells, except NTC-7S, were sampled using a peristaltic pump. Sample bottles were filled directly from the peristaltic pump discharge. All pump tubing was dedicated to each well. The NTC-7S sample, which was submitted for full TCL analysis, was collected with a bottom loading Teflon™ bailer to minimize volatilization.

4. Appropriate preservatives were added, as necessary, according to NYSDEC ASP 9/89 protocols and samples were placed in shuttles.

All non-dedicated purging and sampling equipment was decontaminated according to the procedures in the RI Work Plan subsequent to the sampling of each well. Well purging and sampling was performed between June 10 and 12, 1991. Purge water and decontamination water was containerized and disposed of by NTC in accordance with applicable state and federal regulations.

2.8 DEEPER SOIL BORINGS AND DEEP MONITORING WELL INSTALLATIONS AND TESTING

2.8.1 Drilling and Well Construction

A total of four deep soil borings were advanced to further characterize the overburden stratigraphy and investigate whether PCB contamination has penetrated the low hydraulic conductivity lacustrine clay unit. Locations are shown on Figure 2-6. Two of the four borings were completed as monitoring wells (Figure 2-6). The RI Work Plan had specified an additional deep monitoring well to be located off-site to the south. However, permission to install the well could not be obtained from the property owners and NTC and NYSDEC agreed that the RI would progress without a monitoring well at this location, rather than delay the program.

Initially, the borehole was advanced to approximately 5 to 10 feet into the clay using standard hollow-stem auger drilling techniques. If the deep boring was situated adjacent to a pre-existing shallow well then no split-spoon sampling was performed. If the boring was not located adjacent to a shallow well, continuous 2 foot split-spoon samples were obtained to a depth of 5 to 10 feet into the clay. To prevent cross-contamination, a 10-inch carbon steel surface casing was set at this depth. The surface casing was installed using the "grout plug method" which consists of plugging one end of the casing with a cement/bentonite plug, pumping a volume of grout into the existing hole equal to approximately the volume of the hole minus the volume of the casing, and placing the casing down the hole. After the surface casing was allowed to set a minimum of 24 hours, the grout plug was then reamed out and the hole advanced further with a smaller diameter hollow-stem auger (i.e., 4-1/4-inch ID). From this depth, continuous 2-foot split-spoon samples were collected until bedrock was reached. At intervals of 6-feet (every third spoon) and/or if strata containing coarser materials were observed, the split-spoon contents were retained for PCB analysis using NYSDEC ASP, September 1989, Method 8080. After reaching bedrock, all deep soil borings were tremie grouted to ground surface to avoid cross-contamination. Deep borings DSB-1 and DSB-2 were drilled between April 17 and 19, 1991 and between April 23 and 24, 1991, respectively.

Borings were converted to deep monitoring wells at two locations (NTC-1D and NTC-

9D). If the boring was to be completed as a deep monitoring well, after reaching bedrock the 4-1/4-inch ID augers were withdrawn from the hole and a 6-inch flush joint casing was advanced to bedrock. A 2-foot hole was then advanced into bedrock with a 5-7/8-inch tri-cone roller bit using rotary drilling techniques with water as the drilling fluid. The well was then constructed using 5 feet of 2-inch schedule 5 stainless-steel screen (10 slot size), carbon-steel riser, a #2 sand pack, and an overlying bentonite pellet well seal. Cement bentonite grout was used as backfill above the well seal to ground surface. Deep wells NTC-1D and 9D were installed between April 3 and 9, 1991 and between April 12 and 16, 1991, respectively. A 6-inch locking protective casing was installed at NTC-1D. A flush mount curb box was installed at NTC-9D. Well completion details are presented in Appendix B.

2.8.2 Deep Monitoring Well Development

Upon completion, each deep well was developed to remove fines from the sand pack and ensure low turbidity groundwater samples. Both deep wells were evacuated and surged using a 1-1/2-inch stainless-steel bailer. A minimum of five well volumes were removed during development, and pH and conductivity were monitored to ensure that the well will yield representative groundwater samples.

2.8.3 Hydraulic Conductivity Testing

Single well hydraulic conductivity tests were performed on both bedrock monitoring wells. The tests were conducted by inserting a slug of known volume, monitoring the hydraulic response (falling head test), then withdrawing the slug and again monitoring the hydraulic response (rising head test). The hydraulic response was measured and recorded using a pressure transducer and a Hermit® SE1000B Data Logger. The methods of Cooper et. al, 1967 were used to estimate transmissivity from the test results.

2.8.4 Hydraulic Head Monitoring

Hydraulic head measurements from deep monitoring wells were obtained monthly from January through October 1992.

2.8.5 Groundwater Sampling and Analysis

Groundwater samples were collected from the two deep monitoring wells and analyzed for PCBs according to NYSDEC ASP Category B, September 1989, Method 89-3 and TPH according to EPA Method 418.1. Sample collection was performed according to the following procedures:

1. The depth to water (DTW) and total well depth were measured. Data were recorded on field sampling sheet and the well volume was calculated. Measuring devices were decontaminated in accordance with the RI Work Plan.

2. Wells were purged to dryness using a bottom-loading stainless-steel bailer. All purge water was containerized for proper disposal.

3. The sample was obtained using a stainless-steel bottom loading bailer. The bailer was lowered smoothly into the well to the middle of the screened or open hole interval.

4. Appropriate preservatives were added, as necessary, according to NYSDEC ASP 9/89 protocols and samples were placed in shuttles.

All non-dedicated purging and sampling equipment were decontaminated according to the procedures in the RI Work Plan subsequent to the sampling of each well. Well purging and sampling took place between June 10 and 12, 1991.

2.9 SUPPLEMENTAL SEDIMENT SAMPLING

A number of sediment samples were collected from the drainage ditch system to supplement the data obtained in previous sampling events. Within the ditches in the vicinity of the site, paired samples were collected at ten locations as shown in Figure 2-7. Paired samples were also collected at two locations from the ditch into which the pipe passing beneath the railroad tracks and Broadway discharges (approximately 1500 feet south of the site). The two locations (Figure 2-8) are located 20 feet and 200 feet south of the pipe discharge. The paired samples were collected from the center of the ditch at depth intervals of 0 to 0.5 foot and 0.5 to 1.0 foot. Samples from the 0 to 0.5 foot depth interval were collected with a 3- 1/4-inch OD stainless-steel hand operated bucket auger. Samples from the 0.5 to 1.0 foot were collected with a 2-1/4-inch OD stainless-steel hand bucket auger. All samples were retained/homogenized in a stainless-steel mixing bowl before being transferred to laboratory supplied glassware. All sampling equipment was decontaminated in accordance with the procedures presented in the RI Work Plan.

In addition to these depth specific sediment samples, five surficial sediment samples were collected further off-site (Figure 2-8). Two samples were collected in the ditch which passes through the Gruner Road area, one just upgradient of the Harlem Road culvert and the second approximately 1000 feet upgradient of the Harlem Road culvert. The remaining three surficial sediment samples were collected in the retention pond west of the site at approximately equidistant locations between September 1990 sampling location PS-1 and the pond outlet. The five supplemental surficial sediment samples were collected using dedicated stainless- steel hand trowels. When necessary, samples were retained temporarily in dedicated disposable aluminum pans before being transferred to laboratory supplied glassware.

All sediment samples were analyzed for PCBs according to NYSDEC ASP, Category B, September 1989, Method 8080. In addition, three sediment samples (071591-5, 071691-8, and 071691-10) were analyzed for the EPA TCL using NYSDEC ASP Category B, September 1989, Methods 8240 and 8270. Two of the three TCL analysis sampling locations (071691-8, 071691-10) were coincident with paired sampling locations. Sample 071591-5 was collected at a point 100 feet upgradient of the intersection of the north-south trending ditch and the east-west trending ditch (Figure 2-7). Supplemental sediment samples were collected between July 15 and 18, 1991. As a result of a laboratory equipment malfunction, resampling (for volatile organics fraction only) at the TCL sampling locations (071591-5, 071691-8, 071691-10) was performed on August 20, 1991. The contracted laboratory, Alpha Analytical Laboratories, Inc., had a second equipment malfunction and again failed to meet holding times for the resampling. Consequently, no volatile organics data were available for the locations at the time of preparation of the Draft RI Report.

All sediment samples collected during the supplemental sampling event were composited and, if applicable, split with the NYSDEC at the analytical laboratory.

2.10 SUMMARY OF SAMPLING AND ANALYTICAL PROGRAM

Sampling and analysis to be performed for each of the media of concern were presented for each investigative task in the above Subsections 2.4 through 2.9. Table 2-1 summarizes all sampling and analyses which were conducted for the Draft RI.

2.11 SUPPLEMENTAL RI TASKS

Based on the Draft RI Report, dated October 1, 1991, additional investigation was recommended by WCC and NYSDEC to further assess the extent of contamination related to the site. The supplemental RI, performed during April through September 1992, included the following tasks:

1. Installation of four overburden groundwater monitoring wells

2. Installation of one bedrock groundwater monitoring well

3. Groundwater sampling of two of the new overburden wells and the new bedrock well, resampling of NTC-7S and analysis for TAL metals

4. Excavation of three test pits and drilling of one soil boring to investigate potential subsurface preferential pathways

5. Retention pond sediment core sampling and analyses

6. Additional sampling and analyses of flood prone soils

7. Additional sampling and analyses of surficial soils (on-site and adjacent to the site)

8. Additional depth-specific sampling and analysis of ditch sediment

2.11.1 Additional Overburden Monitoring Well Installations and Sampling

Four additional overburden monitoring wells were installed for the supplemental RI. Two were installed as requested by NYSDEC -- NTC-10S, located approximately 150 feet west of the western site boundary and NTC-11S located on Conrail property south of the site, adjacent to the south bank of the east-west ditch. Dense and light non-aqueous phase liquid (NAPL) was observed in NTC-11S. To further investigate the extent of off-site NAPL contamination, three additional wells were installed on Conrail property. NTC-12S was located approximately 50 feet south of NTC-11S, adjacent to the east-west ditch. NTC-13S was located 35 feet south and 20 feet east of NTC-11S and NTC-14S was located 35 feet south and 20 feet west of NTC-11S. Thus, NTC-12S, 13S, and 14S form a semicircle on the downgradient side of NTC-11S.

The supplemental RI overburden wells were installed as described in Section 2.7 with the following location-specific exceptions. Increased drilled depths and screened intervals were used in wells NTC-12S, NTC-13S, NTC-14S, NTC-15S, and NTC-16S. The increased drilled depths were employed in the event that the dense NAPL is sinking as it migrates further from the site. Consequently, the screened interval was expanded to screen the water table for interception of any light NAPL that may be present. Drilled depths and screened intervals were as follows:

Well ID	Drilled Depth (BGS)	Screened Interval (BGS)
NTC-10S	12.9 feet	2.9 to 12.9 feet
NTC-11S	13.1 feet	3.1 to 13.1 feet
NTC-12S	18.7 feet	3.35 to 18.7 feet
NTC-13S	18.5 feet	3.5 to 18.5 feet
NTC-14S	18.5 feet	3.5 to 15.5 feet
NTC-15S	19.5 feet	4.5 to 19.5 feet
NTC-16S	20.0 feet	5.0 to 20.0 feet

The other exception was that PVC well screen and casing was used in wells NTC-13S, NTC-14S, NTC-15S, and NTC-16S as agreed to by NYSDEC.

The supplemental RI wells were installed between June 1 and March 2, 1993. Well locations are shown on Figure 2-6. Well completion drawings and drilling logs are included in Appendices B and C, respectively. NTC-10S, NTC-11S, NTC-12S, NTC-13S, and NTC-14S were sampled and analyzed for PCB and for the following chlorobenzene compounds: 1,2-dichlorobenzene, 1,3-dichlorobenzene, 1,4-dichlorobenzene, and 1,2,4-trichlorobenzene.

2.11.2 Additional Deep Well Installations

In accordance with NYSDEC's request, an additional bedrock well (NTC-8D) was installed at the southeast corner of the site (Figure 2-6) and sampled for PCBs and the chlorobenzene compounds identified above.

2.11.3 Test Pit Excavations and Additional Soil Borings

Three test pits were excavated and two soil borings were advanced as part of the supplemental RI. Locations are shown on Figure 2-9. The objective of this task is to assess whether a subsurface preferential pathway for groundwater flow exists at the site. The soil borings designated TB-1 and TB-2 were drilled into and adjacent to the railroad bedding crossing the site. The test pits were located further downgradient. TP-1 and TP-2 were located just upgradient of the two seeps into the east-west ditch, and excavated parallel to the ditch. TP-3 was excavated in a low-lying portion of the site, near the bend in the railroad tracks.

The dimensions of the test pits were as follows:

Test Pit ID	Width	Length	Depth
TP-1	1 foot	6 feet	4 feet
TP-2	1 foot	7 feet	3 feet
TP-3	1 foot	10 feet	4 feet

The soil borings, TB-1 and TB-2 were drilled to depths of 6 and 10 feet, respectively. Continuous split-spoon samples were obtained and examined for NAPL and screened for organic vapors using an OVA.

2.11.4 Retention Pond Sediment Core Sampling

Three sediment core samples and one sediment grab sample were obtained from the retention pond west of the site. Sampling locations are shown on Figure 2-10. Samples were obtained by pushing polyethylene tubes (with plastic core catchers) to the underlying clay (refusal). The retrieved sample was then divided into separate samples for analysis based on depth. The number of samples submitted for analyses from each core depended on the length of the recovered sample and the sample stratification. Where present, distinct horizons within the core were segregated for separate analysis. All samples were analyzed for PCBs.

2.11.5 Additional Sampling of Flood-Prone Soil

The supplemental RI included sampling of surficial soil from four flood-prone locations near the upper ditch. The samples were obtained approximately 10 feet from the ditch (further from the ditch than the earlier RI flood-prone soil samples). These samples were obtained to further investigate PCB contamination adjacent to the ditch in low lying areas. Sample locations are shown on Figure 2-3. Surficial soil samples were obtained for PCB analyses as described in Section 2.6.

2.11.6 Additional Sampling of On-Site and Near-Site Surficial Soils (Eastern Cemetery and West Side of Main Building)

The supplemental RI included collection of a total of 30 surficial soil samples were collected from the east end of the cemetery near the NTC border. Twenty-five of these were obtained from approximately 1 to 3 inches below ground surface and two were obtained from 6 to 8 inches below ground surface. One sample was obtained from 6 to 12 inches below ground surface. Two samples were collected from the grass root mat and soil (0 to 1 inch below ground surface). Sample locations are shown on Figure 2-11. All samples were analyzed for PCB compounds in accordance with the RI Work Plan.

A total of four surficial soil samples were collected from 0 to 3 inches below ground surface in the narrow strip of NTC property between the main building and the cemetery. Six soil samples were collected in this area from deeper soil, between 1 and 4 feet in depth. Sample locations are shown on Figures 2-11 and 2-12.

2.11.7 Additional Depth-Specific Sampling of Ditch Sediment

The supplemental RI also included additional investigation of subsurface soil at two locations in each the upper and lower ditch. Upper ditch sample locations are shown on Figure 2-7. Lower ditch sample locations are shown on Figure 2-8. At the two upper ditch locations, samples were obtained using a hand auger from the upper 6 inches of sediment, from the 6 to 12 inch interval and from the 12 to 18 inch interval. At the two lower ditch locations, samples were obtained from the upper 6 inches of sediment and from the 6 to 12 inch interval. The total of 10 soil samples obtained were analyzed for PCBs.

2.11.8 Summary of Supplemental Sampling and Analytical Program

Table 2-1A presents a summary of sampling and analyses conducted for the Supplemental RI.

3.0 PHYSICAL CHARACTERISTICS OF THE STUDY AREA

3.1 TOPOGRAPHY, SITE DRAINAGE AND HYDROLOGY

Topography at the site varies from approximately 657 feet above sea level near Dale Road in the north to approximately 645 feet above sea level near the southern property line (Figure 3-1). A drainage ditch runs north to south, along the eastern side of the property and discharges into a drainage ditch which runs east to west along the Conrail railroad easement. The north-south drainage ditch begins at a point just south of the end of a topographically low driveway which extends from the northern parking area, east along the Niagara Transformer facility. This drainage ditch directly receives discharges from a number of sources on the property including 1) surface runoff from the northern parking lot, 2) rainwater from roof drains, and 3) water discharged from a drain beneath the southern parking lot.

The drainage route for the roof drains was verified through dye testing. These tests showed that the roof drains connect to the oil/water separator at the head of the north-south ditch via an underdrain traversing the rear parking lot. In addition, the north-south drainage ditch most likely receives some surface runoff from the property just east of Niagara Transformer (also owned by NTC) because of the low-lying nature of the east driveway and the drainage ditch.

The topographically low railroad spur also appears to serve as a drainage pathway for runoff from the southwest portion of the back parking area and from the topographically higher areas of the site adjacent to the storage building. Flow through this drainage feature occurs in shallow drainage swales which run adjacent and parallel to the railroad spur. The southwest corner of the property has standing water throughout wet periods.

The current drainage of surface water away from the site is as follows. The north-south ditch leads to the east-west ditch on the south perimeter. These ditches are referred to as the upper ditch in these investigations. Approximately 300 feet west of the NTC property, a pipe carries drainage beneath the Conrail railroad yard. This pipe discharges to a ditch approximately 2000 feet south of the site. This ditch, referred to as the lower ditch in this investigation, carries flow first southerly, then westerly, to a sewer pipe at Harlem Road. From there, flow enters the Sloan Storm Drain, a regional stormwater collector which discharges to the Buffalo River approximately 3 miles southwest of the site. The layout of these ditches is shown on Figures 2-7 and 2-8.

Based on the migration of contamination from the site, it appears that surface water from the upper ditch has, in the past, flowed further west than the pipe beneath the railroad, in the direction of the retention pond west of the property. Whether this occurred as a temporary condition due to flooding or blockage within the pipe, or whether it represents a more prevalent past condition, is not known.

3.2 SITE GEOLOGY

The site is located within the Erie-Ontario Lowlands Physiographic Province of New York, which is characterized by a thick, gently dipping (southward at a rate of 20 to 50 feet per mile) sequence of rock formations ranging from sandstones and shales to dolomites and limestones from the Silurian and Devonian Periods. The site is underlain by limestone of the Onondaga Formation. The Onondaga is Early Devonian in age (375 million years before present) and, in general, consists of light gray to gray, coarse textured, fossiliferous limestone with abundant blue/black chert nodules. Depth to the bedrock interface varies between 44 and 54 feet across the site. Groundwater flow in bedrock aquifers of Erie County is primarily through secondary openings such as fractures and solution cavities. The Onondaga Limestone is one of the four principal sources for groundwater withdrawal in Erie County with a median well yield of 180 gpm. However, based upon available records, there are no municipal or private water supply wells within three miles of the site. Regional groundwater flow in the Onondaga is probably westerly toward Lake Erie.

The surficial geology of Western New York has been largely controlled by the effects of Pleistocene glaciation. A majority of the moraines and tills of Erie County have been assigned to the Port Huron Glacial Substage (late Wisconsin), being deposited during the last 12,000 years. The site is located within a lake silt, sand, and clay unit indicative of deposition within ancestral glacial lakes. Material within this unit typically consists of bedded massive silt, fine to medium sand, and clay with moderate bedding plane permeability. A roughly east-west trending end moraine unit running adjacent to Scajaquada Creek exists approximately 3000 feet north of the site. There are no known users of overburden groundwater in the vicinity.

Examination and description of split-spoon samples collected during the monitoring well installations and soil borings performed as part of the RI were used to generally characterize the site overburden stratigraphy, in descending order from ground surface, as follows: 1) 0-3.5 feet of fill material, 2) 30-35 feet of a silt/clay till, 3) 9 to 17 feet of a massive lacustrine clay, and 4) 2-3 feet of a sand/gravel regolith overlying bedrock. Detailed boring logs are located in Appendix C.

Fill materials were observed in areas which had been modified by paving and grading activities on-site. Fill deposits varied from bituminous asphalt and associated subgrade materials in paved areas of the site and cemetery (NTC-2S, 3S, 9S, 9D), to miscellaneous shotrock fill behind the tank farm (NTC-4S), to a mottled silty clay fill placed in front of the main plant building for on-site final grading (NTC-1D).

The silt/clay till typically consists of a firm, brown/tan silty clay with a small sand component, and occasionally with rounded to subrounded fine to medium gravel sized rock clasts. However, sections of the till with thin interbedded moist to saturated fine silt and sand layers, and thicker, dominantly fine to medium sand layers with occasional thin silty clay seams, were encountered. The interbedded nature of the silt/clay till is attributed to the fact that the site is located just south of the aforementioned end moraine unit adjacent to Scajaquada Creek, and therefore was probably subjected to variations between dominantly lacustrine (lake laid) and near-shore (morainal) depositional environments. Variations between these depositional environments would be indicative of conditions marginal to a stagnant or retreating ice sheet. In such a case, the thicker fine to medium sand layers, such as that observed in the near surface overburden at the NTC-9 cluster, probably represent small stream or creek channel/bank deposits indicative of a near-shore environment closer to the ice sheet front.

The lacustrine clay generally consists of a mottled, soft to very soft but cohesive red/brown/tan clay. Lacustrine clay of this type is common in the Western New York area and, because of its soft but cohesive nature, is commonly referred to as "gumbo" clay. Lacustrine units of this nature are the product of deposition in relatively shallow but extensive lakes created in front of stagnating continental ice sheets. A gradational contact from the till to the lacustrine clay was observed throughout the deep soil boring program. The lacustrine clay occasionally contained small rounded rock clasts and had a limited sand component, implying that the silt/clay till and the clay are genetically closely linked.

A thin but continuous sand/gravel regolith was observed above rock in all the deep soil borings. The regolith consisted of a hard, very compact, gray sand and gravel mixture. The rock clasts contained in the regolith were typically very angular as opposed to the clasts observed in the till.

Soils in the vicinity are designated as urban land -- indicating 80 percent or more of the soil surface is covered by asphalt, concrete, buildings, or other impervious structures -- and soils of the Odessa Series. Odessa soils have a high clay content, being formed in gravel and stone-free lake-deposited sediments, are poorly drained, and typically display a seasonally high water table perched in the upper part of the subsoil during wet periods. The permeability of these soils is very low.

3.3 SITE HYDROGEOLOGY

Groundwater flow at the NTC site is a concern with respect to subsurface migration of dissolved and non-aqueous phase contamination. The major focus of the RI was on the groundwater present in the overburden above the thick layer of naturally occurring clay (see Section 3.2). The reasons for this approach were:

- Overburden groundwater is closest to the source (direct application to soil)
- The lacustrine clay is generally non-waterbearing and likely acts as a confining layer, restricting vertical groundwater flow and contaminant migration

The latter point is supported by the observations made during the deep soil borings of intervals of partially saturated clay between the bottom of the shallow monitoring wells and the top-of-bedrock. On this basis, the saturated soil present above the clay is classified as a perched groundwater zone.

Section 3.3.1 presents the hydrogeologic results of the overburden investigation. Section 3.3.2 presents the hydrogeologic results of the bedrock investigation.

3.3.1 Overburden (Perched Zone) Groundwater Flow

The hydrogeologic data collected included monthly hydraulic head measurements from each of the eight shallow monitoring wells, and single well permeability test results from wells containing a sufficient water volume. All hydraulic head data collected for the RI is presented in Appendix D.

3.3.1.1 Hydraulic Conductivity

Three overburden wells contained a sufficient water column depth to yield meaningful single well hydraulic conductivity test (slug test) results. Rising head slug tests were conducted for monitoring wells NTC-2S, NTC-3S and NTC-9S, by pumping a known volume of water from the well and monitoring the hydraulic response in the well. The results of the tests, expressed as estimated hydraulic conductivity, are presented in Table 3-1. For the on-site shallow wells tested, NTC-2S and NTC-3S, estimated hydraulic conductivities of the shallow perched zone were approximately $9x10^{-3}$ and $9x10^{-2}$ ft/day, respectively. For the off-site well tested (NTC-9S), the estimated hydraulic conductivity was approximately 2 ft/day. The substantially higher result for NTC-9S reflects the coarser-grained nature of the soil encountered above the clay. Seven feet of fine to medium sand was encountered above the clay layer during the drilling of NTC-9S. This discontinuous sand layer was probably a result of local variation in the depositional environment as described in Section 3.3. No similar sand unit was observed above the clay layer in on-site monitoring wells. Thus, the hydraulic conductivity results for monitoring wells NTC-2S and NTC-3S are probably more representative of on-site conditions in the perched zone than the result for NTC-9S.

No hydraulic conductivity test results are available for the clay units (silt/clay till and lacustrine clay) overlying bedrock. The total thickness of the clay units ranged from 33 to 50 feet. The hydraulic conductivity of these units is expected to be much less than that estimated for the perched zone, probably in the range of 10^{-7} to 10^{-8} cm/sec. The expected low hydraulic conductivity of the clay units and the observations of unsaturated conditions in split-spoon samples obtained during drilling the deep soil borings suggest that the clay units act as a confining layer (or aquitard), providing a low permeability barrier to vertical groundwater flow from the perched zone to the bedrock groundwater regime.

3.3.1.2 Perched Zone Groundwater Flow

Flow Directions: Figures 3-2 through 3-17 present potentiometric surface contour maps prepared from hydraulic head measurements obtained from June 1991 through November 1992. During the September 1991 hydraulic head measurements several wells were dry. Figure 3-5 shows the hydraulic head measurements obtained during September 1991, which were not contoured due to the dry well conditions. The hydraulic head data for the perched zone monitoring wells for these 4 months are presented in Table 3-2. Appendix D contains all hydraulic head data collected. Groundwater flow directions in the overburden are generally across the site from the north to the south. During the wet months, equipotential lines are more or less parallel to the east-west ditch bordering the south side of the site. This coupled with the observed seepage indicate that groundwater flowing beneath the site was discharging to the east-west ditch bordering the site on the south perimeter.

During the dry months of August and September 1991, the ditches dried up and no longer received groundwater discharge. Hydraulic heads were still generally higher in the north portion of the study area and groundwater flow directions were still generally north to south. During July, August, and September of 1992 hydraulic heads were approximately 3 to 5 feet higher than the previous year. Precipitation during these months was much higher than normal. Equipotential lines were still approximately parallel to the east-west ditch bordering the south side of the site.

Hydraulic Gradients: The hydraulic gradient was estimated from the potentiometric surface maps for June, July and August 1991 hydraulic head measurements. The estimated hydraulic gradients were:

Month	Hydraulic Gradient
June 1991	.016
July 1991	.017
August 1991	.022

Precipitation was well below normal for each of these months. The increase in hydraulic gradient occurred as the dry spell wore on and the perched zone began to dewater.

Although Figure 3-5 is insufficient for preparation of a potentiometric surface map due to the dry wells, it does suggest that, where water was present in the perched zone, hydraulic gradients were in the direction of the north-south ditch (in the north portion of the site) and toward the point of known seepage in the east-west ditch (southwest portion of the site).

No hydraulic head measurements were obtained for October and November 1991. Hydraulic head measurements were obtained from all wells from December 1991 through November 1992. Figures 3-6 through 3-17 present the potentiometric surface maps for these months prepared from all overburden monitoring wells at the site, including additional wells installed from April through September 1992 (as described in Section 2.11). These maps are consistent with the interpretation described above.

The estimated hydraulic gradients for the months December 1991 through November 1992 were:

Month	Hydraulic Gradient
December 1991	.015
January 1992	.017
February 1992	.020

Month	Hydraulic Gradient
March 1992	.017
April 1992	.017
May 1992	.020
June 1992	.020
July 1992	.017
August 1992	.019
September 1992	.017
October 1992	.017
November 1992	.019

Appendix D contains all hydraulic head data obtained at the site to date.

Figure 3-18, based on observations during the depth-specific sediment sampling, indicates that the depth from the bottom of the ditch to the clay is generally less than one foot. This suggests that there is a low potential for groundwater flow to occur beneath the ditch within the perched zone. Figure 3-19 presents the top of clay surface contour map prepared from observations made during installation of monitoring wells on and off-site.

Off-Site Flow Rates:

Darcy's Law for fluid flow in porous media can be used to estimate off-site groundwater flow rates in the perched zone. Darcy's Law is expressed as the following formula:

$$Q = K\ dh/dx\ A$$

where:

Q = Flow rate
K = Hydraulic Conductivity
dh/dx = hydraulic gradient
A = Cross-sectional area through which flow occurs

The use of Darcy's Law is generally limited by the accuracy of the hydraulic conductivity estimate. The hydraulic conductivity estimates for the perched zone in this study should be considered best estimates. Hydraulic conductivity probably varies significantly throughout the site.

Based on the potentiometric surface maps for June, July, August, and September 1991, the highest groundwater flow rates for these months occurred during June 1991 when groundwater levels (i.e., the saturated thickness) were highest. During June, the width of the area through which off-site groundwater flow occurred was approximately 200 feet, along the southern boundary of the site. The flow lines appear to be approximately perpendicular to the ditch. The saturated thickness in the perched zone, based upon measurements in NTC-7S and NTC-8S was approximately 3.5 feet.

Through application of Darcy's Law using a hydraulic conductivity value of $9x10^{-2}$ ft/day and the estimated hydraulic gradient of 0.016, the estimated off-site flow rate for conditions in June 1991 was approximately 1.0 ft^3/day or 7.5 gallons per day.

This estimate pertains to homogeneous flow through the soil and probably underestimates actual flow at the site for the following reasons. Groundwater seepage to the ditch was generally visible during the first six months of 1991. On one occasion during 1990, WCC was able to collect sufficient water directly from the seepage face to fill a quart jar over a period of approximately 15 minutes. This seepage rate, occurring primarily at one location along the ditch, indicates that a preferential (high hydraulic conductivity) pathway exists in the perched zone at the site. One end of this preferential pathway is at the seepage point. Subsequent investigation (see Section 2.11.3) found that two north-south running tile drains caused preferential migration to the seepage points. The drains are present 2 to 3 feet below ground surface. The origin and layout of the pipes was not determined for the RI. However, based on the orientation of the exposed sections, the pipes are expected to extend northerly toward the tank farm area. These drains are discussed further in Section 5.0.

In summary, based on the measurements and testing performed for the RI, groundwater flow rates in the perched zone throughout most of the site are relatively low. In dry months, the perched zone is completely dewatered throughout most of the site.

However, two subsurface tile drains drain perched water from the property. It is probable that most groundwater flow in the perched zone at the site eventually discharged to the ditch via these drains. This is further discussed in Section 5.0.

Groundwater in the perched zone at the site does not represent a significant groundwater resource. Its apparent seasonal existence on-site, the unit's generally low hydraulic conductivity and its small saturated thickness indicate little or no potential for production of water sufficient for any practical usage.

3.3.2 Bedrock Groundwater Flow

A total of three bedrock groundwater monitoring wells were installed as part of the NTC RI. The bedrock monitoring wells are screened in the top-of-bedrock zone as discussed in Section 2.8. The hydrogeology of the top-of-bedrock zone is discussed below.

3.3.2.1 Transmissivity

Slug tests were conducted for two of the deep monitoring wells. The results, expressed as estimated transmissivity, are presented in Table 3-1. The average transmissivity for the top-of-rock zone was approximately 700 ft^2/day.

3.3.2.2 Top-of-Bedrock Zone Groundwater Flow

Figures 3-20 through 3-24 presents potentiometric surface maps for the top-of-bedrock zone based on hydraulic head measurements obtained from July to November 1992. These maps indicate that groundwater flow is from the north to the south across the site. This is approximately the same direction as the slope in the bedrock surface, shown on Figure 3-25. Hydraulic head measurements for the two bedrock wells installed in 1991 are tabulated in Table 3-2. Hydraulic head measurements from all bedrock wells obtained to date are presented in Appendix D.

3.4 DEMOGRAPHY AND LAND USE

The Niagara Transformer Corporation Dale Road facility is located in an industrial community in Cheektowaga, New York. The site is bounded on the downgradient sides by a large cemetery (west) and a Conrail rail yard. Further south and west, land use is generally industrial or commercial.

The closest downgradient residential community to the site is located about 1000 feet to the southwest. This neighborhood of residences on Wallace Avenue, Lemoine Avenue and Kennedy Road, is bounded by Broadway to the north and Gruner Road to the south. There are approximately 130 residences in this neighborhood, and the residential area is completely surrounded by industrial and commercial properties. No other residences were found in the downgradient direction within the Study Area. Neither the upper or lower ditches traverse, or are congruent to, any residential property. The NYSDEC has categorized the retention pond and the upper and lower ditches as residential/commercial for the purposes of establishing remedial goals.

4.0
NATURE AND EXTENT OF CONTAMINATION

The purpose of this Section is to characterize the contamination at and resulting from the site. In Sections 4.1 and 4.2, evidence pertaining to the nature of the contaminant releases to the environment is presented. The data collected concerning contamination potentially resulting from these releases are subsequently presented for surficial soils (Section 4.3), subsurface soils (Section 4.4), groundwater (Section 4.5), ditch sediments (Section 4.6), flood-prone soils (Section 4.7), retention pond sediments (Section 4.8) and surface water (Section 4.9). Sampling results are presented in Section 4.9 for the residential sampling program. Results from the retention pond sampling are presented in Section 4.10.

4.1 PAST ENVIRONMENTAL RELEASES

The nature of past environmental releases of contamination at the NTC site was investigated through employee interviews and review of company records. WCC conducted one-on-one interviews with several employees of NTC who were with the firm during the 1960s and 1970s.

The results of these interviews indicate that the suspected mechanism for contaminant release at the site was likely limited (with the exceptions noted below) to direct application of oil to soil for dust control, weed control, and due to accidental spillage. To these employees knowledge, no burial of waste material or landfilling has occurred during NTC's history of operations at the site.

Based on a compilation of the individual employee's recollections, potential areas of land application were identified. Employees uniformly recall that the majority of releases were for dust control in the formerly unpaved back parking area. More limited application occurred in the driveway on the east side of the main building. WCC was informed by one employee that oil deposition occurred on the thin strip of land between the west side of the main building and the adjacent cemetery. This apparently involved using a watering can to spread oil for weed control. Finally, some spillage was also thought to have occurred south of the parking lot near the sides of the warehouse. Figure 4-1 identifies all areas for which any employee recalls land application of waste oil.

The exceptions to this mode of release were a mineral oil spill from an above ground storage tank, and potential leakage from underground pipes used to pump oil between the main building and the above ground storage tanks. The tanks are/were located just south of the rear parking lot (see Figure 4-1). Employees recall that in 1971, a snowplow caused a break in the discharge pipe beneath an above ground 4,000 gallon tank causing the spill of an unknown volume of new (non-PCB containing) mineral oil. The depth of the snow at the time inhibited both the discovery and the cleanup of the incident. As a consequence, the mineral oil seeped into the soil. No documentation of oil recovery was found.

There were two underground lines in use at the site, one for waste oil and one for mineral oil. The lines led from the back of the NTC building to the tank farm (see Figure 4-6). According to the employees, the underground waste oil line was used for non-PCB containing oil only. However, one employee recalls that the line may have contained PCB oil on at least one occasion. The employee could not recall how or why this deviation from normal operating procedure occurred. No documentation of leaks from the waste oil line was found. The mineral oil line was taken out of service in 1990 when concerns over potential leakage were raised. As with the waste oil line, no specific recollection or documentation of leakage from the line was discovered. No records could be found indicating when the lines were originally installed or when the waste oil line was taken out of service.

Other relevant points discovered during the employee interviews are listed below:

- The adjoining cemetery has been fenced off since before NTC moved their operations to the Dale Road Facility.

- The soils excavated during the original construction of the facility were placed on the east side of the property (east of the north-south ditch), raising the ground surface elevation.

- The steel partitioned box at the head of the north-south ditch was placed there specifically to act as an oil/water separation system. However, no records could be found which documented the time of its installation.

The latter point was verified when WCC excavated soil from the box and noted that the partition and siphon-type pipe would allow water to pass but would retain both lighter than water and denser than water oils. For this reason the box was cleaned and left in place, rather than removed as was the original intent (see the IRM Work Plan). Prior to paving the parking lot in 1985, the box was checked about once per year and evacuated of oil. After the parking lot was paved, oil no longer visibly accumulated in the box and it gradually fell into disuse.

4.2 RESULTS OF GEOPHYSICAL SURVEYS

A geophysical investigation consisting of metal detector and terrain conductivity surveys was conducted as described in Section 2.3. The purpose of the geophysical investigation was to ascertain whether metal containers are buried at the property. The results of the investigation are presented below.

4.2.1 Metal Detector Results

Figure 4-2 presents the areas of the site where high metal detector readings were obtained. As expected, elevated readings were detected around the storage building and railroad tracks, but these are not presented here. A few areas of the site, notably south of the storage building, had elevated metal detector readings, but these were attributed to the presence of scattered surface metal/debris and other surface features (e.g., monitoring wells). No indication of unsuspected buried metal, pipes, drums, or tanks was found.

4.2.2 Terrain Conductivity Results

Figures 4-3 and 4-4 present the results of the terrain conductivity survey in the quadrature and in-phase readings, respectively.

From the quadrature phase data (Figure 4-3), it is apparent that higher readings are located in the area of the storage building, the railroad spur and the metal fence along the western edge of the property. The higher readings in these areas are the result of the presence of surface metal (i.e., railroad tracks, metal debris), and do not appear to be indicative of areas where buried metal is present. In areas of the study area where surface metal was not observed, the readings are lower. Representative conductivity levels of the soil (where high readings from metal and building are absent) range from 17-21 milliSiemens per meter (mS/m). Readings that are above this range of 17 to 21 mS/m and that do not appear to be affected by surface metal are located near/along scattered dirt piles in the area and near a drainage outfall from the above ground oil storage tanks (northwestern corner of the site).

From the in-phase data (Figure 4-4), it is apparent that the higher readings are located in the area of the storage building, the railroad spur and the metal fence along the western edge of the property. There are other measurements that are above 0 and away from the fence, building and tracks (primarily east of the storage building), but it is likely that these readings can be attributed to scattered pieces of surface metal/debris. If, for example, buried drums or tanks were present at these locations, it is likely that the quadrature phase readings would also be high and the metal detector would have registered an elevated reading. However, this is not the case, since the quadrature phase readings are well within background levels and the metal detector did not detect any buried metal in the area east of the storage building.

4.2.3 Summary and Conclusions

Geophysical surveys (terrain conductivity and metal detector) were performed by WCC at the NTC site during April 15 and 16, 1991 to evaluate the presence/absence of buried metal (i.e., buried drums, underground storage tanks). Readings with both instruments were taken over a grid of 25 foot centers over the southern portion of the site from the fence line adjacent to the cemetery to the ditch at the eastern end of the site. Readings were also observed between stations to assess if the readings changed. Surface features that could affect the readings were recorded and plotted on the map (see Figure 4-2). Elevated metal detector readings were recorded where metal was detected. Terrain conductivity readings were taken in the vertical dipole mode, with the quadrature and in-phase readings.

Metal detector readings (see Figure 4-2) indicate that buried metal was not detected in the southern portion of the site. There were select locations in the area where metal was detected, but it is likely that nearby surface metal/debris is the cause of the elevated metal detection readings. Elevated readings were also detected near the storage building, and along the railroad tracks and the fence bordering the cemetery west of the site. These data have not been plotted on the map because it is WCC's opinion that they are not indicative of subsurface features.

Terrain conductivity readings in both the quadrature and in-phase readings indicate elevated conductivity levels near the storage building, western fence line and near the railroad tracks. These readings are indicative of the presence of surface metal and do not appear to be attributable to buried metal. With the quadrature phase readings (see Figure 4-3), slightly elevated readings above representative background (background = 17 to 21 milliSiemens/meters) were detected in the areas of the dirt piles scattered across the site and adjacent to a drainage outfall.

The results of the geophysical surveys provide no evidence of burial of metal containers on the portion of the property surveyed (south of the rear parking lot). This is consistent with recollection of employees that no landfilling or drum disposal has occurred at the site (see Section 4.1).

4.3 SURFICIAL SOIL CONTAMINATION

Based on the assessments presented in Sections 4-1 and 4-2, it is likely that contamination at the site has resulted from surface application or spillage of oil and possibly some subsurface leakage from the underground oil lines. Oil applied or spilled on the soil would tend to be carried southward in surface runoff and subsurface flow.

Figure 4-5 shows the results of PCB analyses of surface soil samples collected in July, 1991. Most PCB was present as PCB-1260, with lower concentrations of PCB-1254 reported. PCB concentrations greater than 1000 mg/kg were present in surficial soil along the west side of the main building and south parking lot and in the northern portion of the property behind the south parking lot. Surficial soil concentrations decreased to the south and west of this area, with the lowest on-site levels (1 to 3 mg/kg) present in the vicinity of the southwest corner of the site (near the observed groundwater seep). This is an important result with respect to contaminant transport, suggesting contamination has migrated to the seepage point through subsurface flow. PCB concentrations were below 1 mg/kg in surficial soil samples taken in the cemetery adjacent to the southwest corner of the site. A data validation report for the surficial soil sampling program was submitted to NYSDEC under separate cover (WCC, February 10, 1992).

Soil sample 071691-7 (see Figure 2-2) was analyzed for the TCL. As shown on Table 4-1, only two TCL chemicals were present above detection limits: PCB-1254 (2.07 mg/kg) and PCB-1260 (8.57 mg/kg).

As part of the Supplemental RI Investigations (see Section 2.11) additional soil samples were collected from the eastern portion of St. Adalbert's Cemetery and from the narrow strip of NTC property adjacent to the west side of the main building. The results of this supplemental sampling and analytical program are described in Section 4.11.

4.4 SUBSURFACE SOIL CONTAMINATION

Subsurface soil samples were collected for PCB analyses during drilling at the monitoring wells and soil borings. Figure 4-6 presents the results of these analyses. PCBs were reported exclusively as PCB-1260 for the subsurface soil samples. In all locations except NTC-7S, PCB concentrations were highest in the 0-2 foot interval. At NTC-7S, PCB concentrations were higher in the 2-4 foot interval, although the concentrations were fairly low compared to other locations. At all on-site locations except those in the parking lot, contamination was limited primarily to the top 4 feet of soil.

At the three locations in the parking lot, the PCBs have penetrated further into the soil. At locations NTC-3S and DSB-1, most contamination has remained in the upper 4 feet, but PCB concentrations were measured above 10 mg/kg at depths greater than 4 feet below grade. Samples collected at Location NTC-2S were highly contaminated through the drilled interval (0 to 10 feet), with levels exceeding 1000 mg/kg in the top 8 feet.

This suggests that NTC-2S is in the vicinity of a significant release of contamination. However, as far as can be determined, most oil released at the site was due to spills or direct application, not loss from the oil lines. PCBs were not detected at quantifiable levels at depths below 12 feet.

As part of the Supplemental RI, six additional monitoring wells were installed south of the NTC site on Conrail property. Split-spoon sampling obtained from these wells for PCB analyses show subsurface contamination immediately adjacent to the south side of the ditch directly across from the seepage area (NTC-11S). No elevated levels were found more distant from this location (NTC-12S, NTC-13S and NTC-14S). At NTC-11S, PCB concentrations were less than 1 mg/kg in the upper 6 feet of soil and greater than 500 mg/kg from 6 to 14 feet below ground surface. The 12 to 14 foot interval was found to contain 6,300 mg/kg. Based on the subsurface soil sampling conducted south of the site, it is apparent that elevated levels of PCB contamination occur from 6 to 14 feet (or more) below ground surface, immediately adjacent to the south side of the portion of ditch whose visible seepage was observed. Analytical data from subsurface soil sampling from the three wells which form a semicircle around NTC-11S show no elevated levels of subsurface PCB contamination 40 feet in potential downgradient directions from NTC-11S.

A data validation report for the subsurface soil analyses conducted in 1991 was submitted to NYSDEC under separate cover (WCC, February 10, 1992). For the supplemental RI subsurface soil analyses, the data validation report is included in Appendix E.

4.5 GROUNDWATER CONTAMINATION

Groundwater contamination at the site was investigated through sampling and analysis of groundwater samples and inspection of soil and water for non-aqueous phase liquid (NAPL).

4.5.1 Non-Aqueous Phase Liquids

NAPL was not observed as a discrete fluid phase in any of the soil samples obtained during the project. NAPL was observed in water at the following locations: NTC-2S; NTC-11S; in the seepage to the ditch at the southwest corner of the site; and in two test pits excavated on-site adjacent to this seepage.

At NTC-2S, a sheen was observed on the surface of water samples obtained from the top of the water column. This suggests that a NAPL with a lighter density than water (LNAPL) may be present in groundwater at this location. The LNAPL was observed only as a surface film and did not have an appreciable thickness. This LNAPL is probably residual mineral oil which was applied or spilled at the site.

During purging of NTC-2S, the peristaltic pump intake was placed at the bottom of the well. Approximately 0.25 liters of a denser than water NAPL (DNAPL) was evacuated from the well. The DNAPL probably consists primarily of Askarel, which contains a high percentage of PCBs. Similar conditions were observed during purging of NTC-11S.

NAPL was observed during the RI at seeps into the ditch near the southwest corner of the site. As in wells NTC-2S and NTC-11S, both LNAPL and DNAPL were observed. LNAPL in seepage was observed at two locations spaced a few feet apart. Containment structures were built and maintained around the seeps as part of the Interim Remedial Measures program (IRM). A sample of seepage water containing some LNAPL was analyzed for PCBs and total petroleum hydrocarbons (TPH) and was found to contain 230 mg/l PCB-1260, well above the aqueous solubility limit. The total TPH concentration in the same was 7,200 mg/l.

DNAPL was found to accumulate in the bottom of the ditch. The first observation of this material was in March 1991. The DNAPL appeared to have a very high surface tension, tending to form beads on the sediment. After the first observation, NTC undertook a program of regular DNAPL removal from the ditch. When found, it was present between the groundwater seep area and the nearest siphon dam downstream.

A sample of the DNAPL was collected for PCB analysis. Analytical results showed it contained 140,000 mg/kg (14 percent) PCB-1260.

In July 1991, the ditch dried up, apparently due to a lowering of the perched water table.

From July through September, 1991 the ditch remained dry except for direct precipitation runoff. During this period, NAPL was not observed in the ditch.

The Draft RI concluded that NAPL was unlikely to have migrated from the probable source areas to the seepage points (a distance of more than 250 feet) through the low-permeability soils encountered and characterized during the subsurface investigation. This suggested that a preferential pathway existed between the source and the seepage points. The Draft RI recommended that test pits be excavated adjacent to the seeps and within the rail bedding traversing the site to investigate preferential migration of NAPL. Three test pits and two soil borings were advanced.

Test pit and test boring locations are shown on Figure 2-9. The two soil borings and one of the test pits were located in the railroad bedding. No evidence of NAPL presence or migration was found at these locations. The other two test pits were excavated on-site, adjacent to the seep areas. A subsurface tile drain was found in each of the test pits. Based on the orientation of the pipes in the test pits, these drains run from north to south. Adjacent to the eastern seep, the tile drain is approximately 2 feet below ground surface. Adjacent to the west seep, the tile drain is approximately 3 feet below ground surface. These drains are the apparent preferential pathway for migration of NAPL to the seeps. As an Interim Remedial Measure (IRM), oil/water separation boxes were installed around the tile drains to prevent further seepage to the ditch.

Based on the lack of NAPL in monitoring wells NTC-7S and NTC-4S, it is likely that the NAPL presence is limited to the immediate vicinity of the drain pipes, between the source area and seepage points.

4.5.2 Aqueous Groundwater Contamination

Groundwater monitoring wells installed for the Draft RI were sampled in June 1991 for PCB and TPH analyses. PCBs (Figure 4-7) were not detected in the cemetery wells (NTC-9S and NTC-9D) or in the upgradient well (NTC-1D). Where detected, PCB concentrations were reported exclusively as PCB-1260. PCB-1260 concentrations were in the 1 to 10 ug/l range in samples from NTC-3S, NTC-4S, NTC-5S, NTC-6S, NTC-7S and NTC-8S. In the sample from NTC-2S, the PCB-1260 concentration was 15,980 ug/l

-- far in excess of the solubility limit. This is probably due to entrainment of NAPL in the sample. PCBs were not detected in the bedrock monitoring wells sampled.

TPH concentrations in groundwater ranged from approximately 1 to 25 mg/l as shown on Figure 4-8. The highest levels were present in wells NTC-2S, NTC-5S and NTC-6S.

The groundwater sampled from NTC-7S was analyzed for the TCL. The following five chemicals were measured above detection limits:

Chemical	Concentration
1,4-dichlorobenzene	230 ug/l
1,2,4-trichlorobenzene	335 ug/l
1,3-dichlorobenzene	17 ug/l
1,2-dichlorobenzene	182 ug/l
bis(2-ethylhexyl)phthalate	11.9 ug/l
PCB-1260	4.6 ug/l

Chlorobenzene compounds are commonly present in Askarel. The TCL results are presented in Table 4-1.

As part of the Supplemental RI, NTC-7S was resampled and analyzed for TAL metals. Results are presented in Table 4-2. Concentrations above 1 mg/L were reported for calcium, magnesium, potassium, and sodium.

A data validation report for these groundwater analyses was submitted to NYSDEC under separate cover (WCC, February 10, 1992).

In June 1992, three newly installed (supplemental RI) monitoring wells were sampled (NTC-10S, NTC-11S and NTC-8D). Samples were analyzed for PCBs, chlorobenzenes and TPH. Results were as follows:

Well Numbers:	NTC-10S	NTC-11S	NTC-8D
TPH (mg/L)	0.1U	111	0.432
PCB 1260 (ug/L)	0.5U	22,000	6.7
1,2-dichlorobenzene (ug/L)	10U	8,000U	10U
1,3-dichlorobenzene (ug/L)	10U	8,000U	10U
1,4-dichlorobenzene (ug/L)	10U	2,200J	10U
1,2,4-trichlorobenzene (ug/L)	10U	51,000	10U

U - not detected

Chlorobenzene results are also presented in Table 4-1A.

The high concentration of PCB-1260 in the sample from NTC-11S reflects the presence of entrained NAPL. A sample of NAPL from this well was obtained and was reported to contain 89 percent PCB-1260.

The PCB detection in NTC-8D was not expected since all previous bedrock groundwater samples were not detected for PCBs. During sampling of NTC-8D, the water was visibly turbid, suggesting that the well still contained some soil brought down during the drilling and well installation. The well was resampled in September 1992, but the sample was filtered in the field. PCBs were not detected in this sample at detection limits of 0.05 ug/L. The results of this resampling verify that significant levels of dissolved PCBs have not migrated to the upper bedrock zone. Chlorobenzene compounds were not detected in NTC-8D. Data validation for the groundwater analyses performed for the supplemental RI are included in Appendix E.

4.6 CONTAMINATION IN DRAINAGE DITCH SEDIMENTS

For purposes of this discussion, the near-site portion of the drainage system including the north-south ditch and east-west ditch east of the retention pond, is referred to as the upper ditch. The southern portion of the drainage ditch is referred to as the lower ditch. Figure 4-9 shows the locations and identification numbers of all surficial sediment samples obtained from the upper ditch, both previous to, and as part of, the RI. Samples from different sampling events are distinguished by symbol. Figure 4-10 shows the locations and identification numbers of all surficial sediment samples obtained from the lower ditch. All sediment samples were analyzed for PCBs.

PCB concentrations were reported primarily as PCB-1260, with lesser concentrations of PCB-1254 sometimes detected. Total PCB concentrations for all upper ditch sediments are presented on Figure 4-11. PCB concentrations are highest in ditch sediment between the pipe passing beneath the railroad tracks and the head of the north-south ditch. In this L-shaped section, total PCB concentrations exceeding 1000 mg/kg were common for the surficial sediment. Further east in the east-west ditch, PCB concentrations are less than 1 mg/kg, except for the 100-foot section immediately east of the intersection with the north-south ditch, where levels range from approximately 2 to 70 mg/kg. West of the pipe passing beneath the railroad tracks, levels gradually decrease in the westerly direction to a level of 19 mg/kg near the east end of the retention pond.

Figure 4-12 shows the PCB concentrations in surficial sediment samples obtained from the lower ditch. Total PCB concentrations in the retention pond ranged from approximately 7 mg/kg to approximately 31 mg/kg. In the lower ditch, the samples taken during the RI from the north-south portion of the ditch immediately south of the pipe discharge were unexpectedly high in total PCB concentration (200 and 613 mg/kg). All other PCB results for the lower ditch were less than 33 mg/kg, and most samples contained less than 10 mg/kg.

The supplemental RI included a resampling at the approximate locations of these two samples. Concentrations were reported to be 4.6 mg/kg and 36 mg/kg, respectively. This suggests that the previous results at these two locations may have been anomalously high.

No samples of sediment within the pipe passing beneath the railroad tracks were obtained. Where visible, sediments within the pipe appear to be very coarse, which is consistent with the higher velocities which occur within the pipe.

The RI included depth specific sediment sampling in the upper ditch (see Figure 2-6). At each location, a sample was collected from the top 6 inches and a second sample was obtained from 6 to 12 inches depth. The results of the PCB analyses for these samples are plotted on Figure 4-13. Comparison of this figure with Figure 3-6 indicates that in the north-south ditch and in the portion of the east-west ditch east of the pipe passing beneath the railroad tracks, the PCB concentrations in the 0 to 6-inch sample are similar to the concentrations in the 6 to 12-inch sample. Further west in the east-west ditch, contaminant levels were limited primarily to the upper 6 inches of sediment. Figure 4-14 shows PCB concentrations in depth-specific sediment samples obtained from the lower ditch.

As part of the supplemental RI, the location just east of the pipe beneath the railroad tracks was resampled and a sample from 12 to 18 inches in depth was obtained. The PCB concentration in this sample was 20 mg/kg (Figure 4-13). Additional depth-specific sampling was performed immediately east of the seepage area into the east-west ditch. Again, a sample from 12 to 18 inches in depth was obtained. The PCB concentration for this sample was reported to be 0.46 mg/kg.

A total of four sediment samples have been collected for CLP TCL analyses. Acetone, toluene, and chlorobenzene were detected at concentrations of 0.061, 0.001 and 0.27 ppm respectively for sample SS-1, collected (prior to the RI) at the main seep location. The acetone and toluene results are annotated with the "B" qualifier, indicating that they may be attributed to laboratory contamination. A number of base/neutral compounds typically associated with fossil fuel combustion residues, asphalt and heavy fuel oils, including acenapthene, anthracene, benzo(a)anthracene, benzo(b)fluoranthene, benzo(n)fluoranthene, benzo(a)pyrene, benzo(ghi)perylene, chrysene, fluoranthene, pyrene, indeno(1,2,3-cd)pyrene, phenanthrene, dibenzo(a,h)anthracene, and fluorene were detected at concentrations ranging from 0.7 to 16 ppm in all three sediment samples. The measured concentrations of these compounds are typical for urban drainageways. TCL results for sediment samples are presented on Table 4-1.

As described in Section 2.9, the volatile organic fraction of the TCL analyses were not performed for three of the sediment samples due to equipment malfunction at the laboratory. However, since volatile organic chemicals were not found at elevated levels in the other samples, WCC does not recommend resampling of sediment for VOC analyses.

4.7 FLOOD-PRONE SOILS

PCB concentrations in flood-prone soils along the fenceline of the cemetery bordering the east-west ditch ranged from 1.0 to 160 ppm (Figure 4-15). These levels appear to be a result of past ditch dredging and piling of excavated materials along the banks rather than flooding. PCB concentrations in flood-prone soils (Figure 4-16) adjacent to the lower ditch were only slightly elevated (2.78 ppm to 11.8 ppm). The maximum level at 11.8 ppm was measured in a sample from the low-lying area adjacent to the ditch at a point obtained 200 feet east of Kennedy Road.

4.8 RESIDENTIAL SOILS

Total PCB concentrations in residential soil samples are plotted on Figure 4-17. Of the fourteen samples analyzed, PCBs were detected in three. In only one of these was the result high enough to quantify (0.38 mg/kg). The other two concentrations were estimated at 0.19 mg/kg and 0.073 mg/kg. These levels are within the range expected in an urban environment and do not constitute a substantial hazard according to the New York State Department of Health.

4.9 SURFACE WATER

Surface water samples were obtained from several locations within the drainage ditch and from the retention pond. Samples were analyzed for PCBs. Surface water sample locations (designated with the SW prefix) and results are plotted on Figure 4-18. The highest concentration was measured in the sample obtained from just upstream of the pipe passing beneath the railroad tracks (5.6 ug/l). The sample collected just south of this pipe contained 1.6 ug/L and the most southerly sample collected near the Dinaire Plant contained 1.2 ug/l. PCBs were not detected in the water sample from the retention pond (detection limit: 1 ug/l).

One surface water sample was analyzed for the TCL. The sample location chosen was just upstream of the pipe passing beneath the railroad tracks (i.e., from the most highly contaminated section of the ditch). Other than the 5.6 ug/l PCB-1260 (noted above), a very low level of the pesticide gamma-BHC (lindane) was detected (0.11 ug/l). No other chemicals were detected.

Surface water samples were collected from the east-west ditch, immediately downstream of the siphon dams monthly from May 1992 through September 1992 (except for June when there was no flow in the ditch). PCB concentrations ranged from 1.3 ug/l (September 1992) to 4.7 ug/l (July 1992). Chlorobenzenes were either not detected or reported as estimated concentrations at levels below the detection limit. Results of the monthly surface water sampling are listed in Table 4-3.

Figure 4-18 also shows the result of a water/oil sample obtained from the seepage face to the ditch near the southwest corner of the site. This sample, designated IRM-2, contained 230,000 ug/l, primarily in the non-aqueous phase. The extreme drop in PCB concentration, far in excess of that attributable to simple dilution, between locations IRM-2 and SW-1 indicates that the siphon dams have been effective in reducing downstream transport of non-aqueous and particulate-borne PCBs.

4.10 RETENTION POND

Figure 4-19 presents the results of PCB analyses of sediment samples collected from the retention pond located west of the site. Total PCB concentrations ranged from 1.1 to 31 ppm in surficial sediment. In subsurface sediment samples (deeper than 4 inches) all total PCB concentrations were approximately 1 ppm or less except for one: a sample from 5 to 10 inches depth taken from the east end of the pond (concentration of 3.4 ppm).

4.11 EASTERN CEMETERY/WEST SIDE OF MAIN NTC BUILDING

Results of the analyses for PCBs are shown on Figures 4-20 and 4-21. Elevated concentrations were found in the upper 3 inches of soil in the cemetery within 15 feet of the fenceline. North and south of the main building, PCB levels exceeding 5 ppm were generally limited to within approximately 2 feet of the fenceline. Directly west of the building, elevated concentrations above 5 ppm were limited to within approximately 7 feet of the fenceline, except for one location (S-5, sampled in September 1992) near the south side of the building (16 ppm, 15 feet from the fenceline).

In the strip of NTC property along the west side of the buildings, concentrations greater than 1,000 ppm were measured in the upper 3 inches of soil. As shown on Figure 4-21, PCB concentrations were approximately 1 ppm or less for samples below 1 foot in depth.

4.12 FIELD QA/QC SAMPLES

Data validation reports have been submitted to NYSDEC for the sampling events prior to the RI and for the residential soil sampling. For the remainder of the RI analyses, a data validation report was submitted under separate cover (WCC, February 10, 1992).

4.12.1 General

To assess the quality of data from the Field Sampling Program, field duplicate samples, field (rinse) blank samples, and trip blank samples were collected (where appropriate) and submitted for chemical analysis. Results stemming from analyses of the field QA/QC samples conducted are summarized in the following subsections.

4.12.2 Field (Rinse) Blank-Samples

Most field rinsate blank samples submitted for chemical analyses yielded non-detected concentration of the parameters of concern. Only di-n-octyl phthalate, a base/neutral compound, and total petroleum hydrocarbons were detected on one occasion in a rinsate blank collected during the groundwater sampling phase. Di-n-octyl phthalate was not detected in any groundwater samples collected from the site. This would therefore imply that the source of the di-n-octyl phthalate contamination in the rinsate blank sample was most likely from the blank water or contamination introduced by the laboratory itself.

Based on the detection of TPHs (4.2 mg/l) in a field (rinse) blank sample, the following sample results should be considered estimated:

Sample	(mg/L)
NTS-7S	1.8 mg/l
NTS-9S	2.5 mg/l
NTS-1D	2.5 mg/l
NTS-4S	3.9 mg/l
NTS-10S	5.0 mg/l
NTS-8S	4.0 mg/l

Due to the contract laboratory's instrumental problems, one field (rinse) blank sample collected during the groundwater sampling phase was unable to be analyzed for VOCs. However, since groundwater VOC compounds were reported as non-detected, the potential for sample contamination attributable to the decontamination protocols was minimal.

4.12.3 Field Duplicate Samples

In total, one groundwater, three sediment, one surface water and six surface soil field duplicate samples were collected during the RI. A summary of detected field duplicate sample data is presented in Table 4-4. Field duplicate samples were collected in order to assess the aggregate analytical and sampling protocol precision.

The results of the field duplicate sample analyses were reproducible in most cases, which indicated satisfactory analytical and sampling protocol precision were achieved during implementation of the RI.

Only sediment sample 071891-3 and its corresponding field duplicate (071891-5) showed non-reproducible data. The ten fold difference in total PCB concentrations in the field duplicate samples may be attributed to the heterogeneity of the sample matrix. Slight changes in the sample matrix may have a substantial effect on the reproducibility of the sample data.

4.12.4 Trip Blank Samples

To evaluate the potential for sample contamination during sample shipment, one trip blank sample consisting of laboratory analyte-free water was submitted along with aqueous samples for VOC determinations. With the exception of acetone detected at 11.2 ug/l, no VOCs were detected in the trip blank sample. Since acetone was not detected in any groundwater samples, the potential for contamination attributable to the foregoing was minimal.

4.12.5 Supplemental RI Analyses

Data validation for the supplemental RI analyses is presented in Appendix E. A summary of detected field duplicate sample data for the Supplemental RI is presented in Table 4-4A.

4.13 SUMMARY

Both PCB-containing oil and non-PCB mineral oil have been spilled onto soil in the vicinity of the rear and sides of the main building. Spillage does not appear to have occurred on the north side of the building. The contaminant releases have resulted in contamination of surficial soils, subsurface soils, ditch sediments, groundwater and surface water. The major contaminants of concern are clearly PCBs. There are also concentrations of petroleum hydrocarbons (associated with the mineral oil) and chlorinated benzene compounds (associated with the PCB-containing Askarel). Chlorinated benzene compounds were not detected in the soil, sediment, surface water or bedrock groundwater samples. However, chlorinated benzene compounds were present in the groundwater samples (172 to 335 ug/l) at concentrations exceeding the PCB concentration (4.6 ug/l). Aqueous PCB contamination and chlorobenzene contamination was limited to overburden wells. Aqueous (i.e., field filtered) PCB and chlorobenzenes were not detected in bedrock groundwater.

5.0
CONTAMINANT FATE AND TRANSPORT

5.1 CHARACTERISTICS OF PCBs

The major contaminants of concern at the site are the PCBs. In addition to PCBs petroleum hydrocarbons, chlorinated benzene compounds and traces of polynuclear aromatic hydrocarbons (PAHs) have been quantified in at least one sample during the RI. However, based on the concentrations of PCBs found, the remedial action at the site will be driven by the PCB concentrations.

PCBs are a class of organic chemicals characterized by two linked phenyl rings that are chlorinated at 2 to 10 sites. They were manufactured in the United States exclusively by Monsanto Corporation under the trade name Aroclor from 1929 until 1977. Because PCBs are fire resistant and poor conductors of electricity, they were widely used as insulating fluids in electrical capacitors and transformers. For many years, PCBs were also used as fillers in adhesives, plastics, carbonless copy paper and other office and consumer products.

As a class of compounds, PCBs are extremely stable, slow to chemically or biochemically degrade. PCBs are currently found worldwide, and measurable concentrations are generally present in most urban stream and river sediments. Studies using animals have suggested that PCBs may cause cancer when administered to certain species at high doses. Despite the large number of industry workers exposed to PCBs in the past, studies have not shown that PCBs cause cancer in humans. PCBs are therefore classified as a Class B carcinogen, potentially capable of causing cancers in animals but not shown to cause similar effects in humans. Because of the uncertainties abut how cancer is caused and develops, Class B carcinogens are regulated as potential human carcinogens.

PCBs are relatively immobile in the environment. The logarithm of the octanol/water partition coefficient (log K_{ow}) for PCB-1260 is approximately 6.0. This indicates a strong tendency for PCBs to dissolve (and remain) in oils and to sorb to organic matter in soils or sediments. Therefore, not only are PCBs extremely persistent in the environment, but they are relatively slow to disperse due to low solubility in water and strong sorption to sediment and soil. The primary mode of dispersal in the environment is through sediment erosion and suspension in flowing water.

5.2 CONTAMINANT TRANSPORT

5.2.1 Airborne Transport

Most areas where the oils were spilled have since been paved. Unpaved areas where PCB concentrations in surficial soils were elevated are beneath a thick vegetative cover. Although the summer of 1991 was the driest in some years, the vegetative cover has remained thick. The pavement and thick vegetation currently inhibit windborne particulate transport from the site. In the past, prior to the paving, dispersal via air transport may have been more of a factor in contaminant migration.

5.2.2 Waterborne Transport

When the oils were spilled or released to the soil, some surface (overland flow) transport probably occurred, accounting for the relatively widespread surficial soil concentrations between the higher ground where the spillage occurred and the low ground at the south end of the property. The subsurface oil contamination is much less widespread. Both mineral oils, which are less dense than water, and PCB oils, which are denser than water, have been spilled on soils at the site. As the oils infiltrate and percolate through the soil, the PCB-containing oil (DNAPL) tends to sink and the mineral oil tends to float on the water (LNAPL). However, the two types of oil intermingle in the soil as downward percolation to the groundwater occurs. Since PCBs are soluble in mineral oil and nearly insoluble in water, PCBs will dissolve into the mineral oil and vice versa. As a result, the situation can develop where the LNAPL is composed primarily of mineral oil, but with a PCB component of several percent. The DNAPL contains a higher PCB concentration.

If DNAPL reaches the low permeability clay in quantities sufficient to overcome capillary forces, it will flow under the force of gravity down the clay slope. At the NTC site, the top of the silt/clay till slopes southward, in general mimicking the surface topography (Figure 3-19). DNAPL, where present, will migrate down the clay slope (southward), driven by gravity. LNAPL will remain on top of the groundwater and will migrate in the direction of the hydraulic gradient. As shown on Figures 3-2 through 3-17, the hydraulic gradient of the perched water table is also toward the south. Thus, the driving forces on both types of oil present will tend to be in the southerly direction, causing migration toward the east-west ditch along the south perimeter of the site.

As described in Section 3.0, the two tile drains buried 2 to 3 feet below ground surface cause seepage to the drainage ditch near the southwest corner of the site. It appears that this pathway has increased the rate of migration of LNAPL and DNAPL toward the southwest corner of the property. Overland flow immediately after the releases could also account for some of this migration. Elevated PCB concentrations are expected to exist within this preferential pathway. Based on results of soil and groundwater analyses, NTC-7S did not penetrate this zone. This suggests that the zone(s) of NAPL contamination is (are) linear (north to south) and not more than a few feet wide.

When the NAPL reaches the ditch, the DNAPL contaminates the ditch sediments and the LNAPL, if uncontrolled, is transported downstream in the flowing water. During extremely high flow conditions, or perhaps historically, the pipe which currently carries flow beneath the railroad tracks west of the site has been bypassed and water flow has occurred westerly toward the retention pond. Thus contaminated sediments currently exist along both drainage pathways.

Based on the surface water data, under current conditions the PCBs are currently transported sorbed to suspended sediment particles in the water column. This is inferred by the lack of the more soluble chlorobenzene compounds in the surface water and is consistent with the strong tendency for PCBs to sorb to soil and sediment particles. If substantial aqueous phase contamination was being carried in surface water, the sample results would be expected to be similar to the perched zone groundwater analytical results, where the more soluble chlorobenzene compounds are present at higher concentrations than the PCBs.

6.0
QUALITATIVE RISK ASSESSMENT

In this section, potential exposure routes are identified based on the contaminant transport assessment presented in Section 5.0. Both human and ecological exposures are considered. PCB concentrations are compared to applicable or relevant and appropriate requirements (ARARs) and other factors to be considered (TBCs) to provide an assessment of PCB contamination levels relative to concentrations considered acceptable in certain circumstances by regulatory agencies.

6.1 POTENTIAL ROUTES OF EXPOSURE

6.1.1 Human Exposure

Potential routes of human exposure include:

Ingestion
Dermal contact
Inhalation

Airborne transport and inhalation of PCBs is not a significant potential route of human exposure at the site due to the low vapor pressure of PCBs, and the limited potential for generation of airborne particulates containing PCBs. The surface of the site is covered with pavement or dense vegetation which limit airborne dust generation.

No surface waters or groundwater in the vicinity of the site represent current or potential potable water supplies. Thus, potential human exposure is limited to potential incidental (accidental) ingestion of, or dermal contact with, contaminated surface soils, sediments, or surface water. The most contaminated soils are located within the fenced area of the site. Employees do not work in the contaminated areas. Due to the absence of residential development in the vicinity of the site, and the railroad yard bordering the site, the potential for exposure of resident trespassers to site soils is limited.

Contact with, and incidental ingestion of, surface water or sediments could occur along drainage ditches on, adjacent to, or downstream of the site. Access to the most contaminated sediments is limited by fences, and by the railroad yard bordering the site. However, these conditions do not eliminate potential exposure.

The retention pond is fenced, has a low visibility in the area, and is separated from the nearest residential areas by 200 feet of railroad track. The potential for exposure is extremely low and the actual concentrations are near or below the lower end of the range of potential action levels. Exposure to retention pond sediment could occur during maintenance and cleaning activities. Trespasser exposures would be expected to be very infrequent.

Exposure could occur in the unrestricted areas of the lower ditch if trespassers wade into the ditch and contact sediments. Such exposure would be expected to be infrequent.

PCB concentrations in residential soils were not detected in 11 of the 14 composite samples obtained. Only one of the three detections was high enough to quantify at 0.38 mg/kg. The other two detections were estimated at lower concentrations. These results likely represent background conditions for a urban environment and no significant risk associated with the NTC site is indicated. Exposure to surficial soil contamination could occur in the cemetery to visitors and workers. This exposure and associated risk is limited by the relatively small area involved, the vegetative (well-maintained grass) cover and the infrequency of exposure.

Downstream of Harlem Road, the drainage system enters the Sloan Storm Drain, which leads to the Buffalo River. Since the drain is underground throughout its length, potential human exposure to contaminants within the storm drain is not expected to occur. Inflow from the drainage ditches within the Study Area appears to make up only a small component of the total flow within the Sloan Storm Drain. Thus dilution within the storm system and within the Buffalo River should minimize any potential human exposure within the Buffalo River.

According to local authorities, there have been reports of flooding in the Village of Sloan. Based on the elevation of the drainage ditch, the invert elevation of the Sloan

Storm Drain, and the elevation of ground surface in this area, flooding is most likely attributable to poor drainage at times when the system has reached its carrying capacity. At such times, runoff from the neighborhood backs up causing standing water at some locations.

Figure 6-1 shows the USGS topographic map covering the lower ditch area and Sloan areas. This map shows the drainage ditch east of Kennedy Road to be low-lying and flood-prone (elevation approximately 620 feet). This section of the ditch has banks of a few inches in height. Road surface elevation along the Sloan Storm Drain at Harlem Road is approximately 619 feet. Road surface elevation along the drain drops at approximately 0.25 percent to an elevation of approximately 612 feet at Michael Street (approximately 3,000 feet west of Harlem Road). The low-lying area adjacent of the lower ditch east of Kennedy Road will flood during high precipitation with little buildup of hydraulic head. Runoff from the NTC site and upper ditch will therefore tend to flood the undeveloped low-lying area east of Kennedy Road. Even during intense precipitation events, insufficient hydraulic head could build up east of Kennedy Road to result in a gradient which could cause water to flow out of manholes in the Village of Sloan. Therefore, exposures to water which had flowed through the lower ditch is not likely to occur along the Sloan Storm Drain.

6.1.2 Ecological Exposure

Since the site and associated contaminated areas are located in an urbanized area, potentially affected ecological resources are limited. The majority of contamination exists in soil on the Niagara Transformer property, an industrial facility. Off-site contamination is limited to a stormwater drainage system of intermittent ditches, and a retention pond, which drain into the Sloan Storm Drain as described above. These bodies therefore, do not represent a potential fishery resource, or other significant ecological resource. The upper ditches are intermittent, flowing during and after rainfall events. The retention pond and lower ditches probably contain some water under all but the driest conditions. Amphibious animals and waterfowl may be present in these water bodies on occasion. The drainage system eventually drains into the Buffalo River indicating that there is a potential for some impact on downstream surface water ecological resources. However, as described in Section 5.1, transport of PCBs in surface water appears to be via suspended sediment. Some settling of this suspended sediment would be expected to occur in the drainage ditch between the most downstream surface water sampling point and the confluence with the Sloan Storm Drain in the Harlem Road area (a distance of about 1500 feet). Sedimentation would tend to lower the rate of contaminant transport to the Buffalo River below that indicated by the furthest downstream surface water sample analytical result.

6.2 APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARs) AND OTHER FACTORS TO BE CONSIDERED (TBCs)

ARARs represent enforceable regulations and standards that are applicable or closely related to conditions at the site. TBCs represent non-enforceable regulatory advisories or guidance that are relevant to site conditions. ARARs and TBCs are used to evaluate the significance of contamination found at the site, in developing remedial goals, and in evaluating remedial alternatives.

For the primary contaminant at the site, PCBs within in-place soil, there are no enforceable standards for cleanup action levels under NYS or federal regulations. Guidance for PCB cleanup has been developed by the USEPA under the Superfund program and the Toxic Substances Control Act (TSCA). Resource Conservation and Recovery Act (RCRA) provisions and NYS hazardous waste regulations may also apply to some aspects of cleanup, treatment and disposal of PCB-containing materials.

Primary sources of ARARs and TBCs for PCBs at the site include:

- EPA's PCB Spill Cleanup Policy (40 CFR 761.120-761.139)
- CERCLA Cleanup Level Guidance concerning remediation of PCB contaminated soils (USEPA, 1990)
- TSCA regulations concerning off-site disposal of soils containing PCBs above 50 ppm (40 CFR 761.60(a)(4)
- RCRA land disposal restrictions for non-liquid hazardous waste containing $\geq$1000 ppm halogenated organic compounds (40 CFR 268.32)
- 6 NYCRR Part 371, Identification and Listing of Hazardous Waste
- 6 NYCRR Part 372 - Hazardous Waste Manifest System and Related Standards

for Generators, Transporters and Facilities
- NYS Surface Water, Groundwater, and Air Quality Standards

6.2.1 PCBs In Soil

New York State has not developed specific guidelines for PCBs in soil. However, based upon WCC experience at other sites in New York, action levels of 1 to 25 ppm for PCBs in soil are commonly applied.

Superfund guidance (USEPA, 1990) has been developed for cleanup of PCB contamination in soils. This guidance is summarized on Table 6-1. Superfund guidance calls for a generic analytical starting point of 1 ppm (mg/kg) PCBs in soil for residential areas, and 10 to 25 ppm PCBs for industrial areas, with provisions for site-specific modification. The generic analytical starting point is based on the analysis of exposure pathways developed for the TSCA Spill Cleanup Policy. The TSCA Spill Cleanup Policy describes the level of cleanup required for PCB spills occurring after May 4, 1987 (the effective date of the policy). Superfund guidance (USEPA, 1990) states that because the TSCA Spill Cleanup Policy is not a regulation and only applies to recent spills, the Spill Policy is not an ARAR for Superfund sites; however, the Spill Policy was used by the EPA as a basis to develop the guidance cleanup levels for Superfund sites.

Superfund guidance further provides that PCBs at concentrations of 500 ppm or greater will constitute the principal threat in industrial/remote areas and PCBs at concentrations of 100 ppm or greater will constitute the principal threat in residential areas. Based on Superfund guidance (USEPA, 1990), nonresidential areas (industrial/remote) are more than 0.1 km from residential/commercial areas or where access is limited by either man-made or natural barriers (e.g., fences or cliffs).

6.2.2 PCBs In Waste

PCB containing wastes are potentially regulated under RCRA, TSCA, and NYS hazardous waste regulations. PCB contaminated soils represent the primary potential wastes at the site. Table 6-2 presents potential guidance related to PCB contaminated soil/waste material.

<u>RCRA Regulations</u>

PCB contaminated soils would not represent waste unless excavated, and would not be RCRA-hazardous unless they exhibited one of the RCRA hazardous waste characteristics. If soils were classified as RCRA-hazardous waste, land disposal restrictions would apply if the total halogenated organic concentration was above 1000 ppm.

<u>TSCA Regulations</u>

TSCA regulates the storage and disposal of materials containing PCBs above 50 ppm. For contaminated soils, TSCA does not apply to in place soils if disposal (or spills) of PCBs occurred prior to February 17, 1978. Regardless of the date of the spill, once excavated, soils containing greater than 50 ppm PCBs are regulated.

Soil containing PCBs at or above 50 ppm, if excavated and disposed, would have to be incinerated, treated by an alternative method that can achieve a level of performance equivalent to incineration (TSCA guidance provides that treatment to 2 ppm is equivalent), or disposed in a TSCA-licensed chemical waste landfill, unless a waiver is granted. Residues of spills occurring after May 4, 1987, are subject to cleanup under the TSCA PCB Spill Cleanup Policy.

<u>New York State Hazardous Waste Regulations</u>

New York State classifies wastes containing greater than 50 ppm PCBs as NY Hazardous Wastes. Thus excavated soils containing greater than 50 ppm PCBs would be subject to NYS regulations on treatment, storage and disposal of hazardous wastes. At present, PCB contaminated soils can be disposed in appropriately licensed landfills.

6.2.3 Surface Water and Groundwater

The NYS surface water quality standard for PCBs is 0.01 ug/l, for human health, and 0.001 ug/l for protection of aquatic life. The groundwater quality standard is 0.1 ug/l for class GA groundwaters, which represent potential drinking water supplies.

6.2.4 Air

The New York State Department of Environmental Conservation (NYSDEC) provides guidance on airborne toxic contaminants through "Air Guide-1, Guidelines for the Control of Toxic Ambient Air Contaminants". Air Guide-1 establishes acceptable ambient concentrations, Ambient Guideline Concentrations (AGC), for various contaminants which are rated as low, moderate or highly toxic. The AGC is considered to be an acceptable annual average concentration to protect the general public from potential chronic health effects resulting from continued exposure. Polychlorinated biphenyls are rated as highly toxic, with an AGC level of 1.67 mg/m^3. Lower draft guidelines for PCBs in air have been proposed.

6.3 COMPARISON OF MEASURED LEVELS WITH ARARs

6.3.1 Soils and Ditch Sediment

EPA has recommended action levels for PCB contamination in soils. Above these levels, some remedial action (i.e., treatment or containment) should be considered. The recommended action levels are 1 ppm for residential soil and 10 to 25 ppm for industrial or remote areas. These recommended action levels are based on risk analysis based on conservative exposure scenarios. They are appropriate for use in determining if remediation should be considered. However, exceedance of these levels at a particular location does not necessarily indicate that remediation is necessary or appropriate. Site specific conditions must be considered prior to making such a recommendation.

In the case of the NTC site and associated contamination, the minimal nature of the aquatic community within the retention pond and drainage ditches and the limited potential for human exposure justify treatment of the ditch and pond sediments as general non-residential soil contamination. Using this approach, remediation should be considered for the following areas: the on-site surficial soil; north-south ditch sediment; east-west ditch sediment, from the point of a few feet upstream of the north-south ditch inflow to and including the retention pond; flood-prone soil (or ditch spoils) along the south cemetery fenceline; and the lower ditch between the pipe under the railroad tracks and Harlem Road. The lower ditch, from approximately 700 feet east of Kennedy Road to Harlem Road, and the retention pond sediments are borderline. Because of the accessibility of the lower ditch sediments to residents in the vicinity, the need for remediation should be subject to further assessment despite the relatively low level of PCBs present. The retention pond is fenced, has a low visibility in the area, and is separated from the nearest residential areas by 200 feet of railroad track. The potential for exposure is extremely low and the actual concentrations are near or below the lower end of the range of potential action levels. Exposure to retention pond sediment could occur during maintenance and cleaning activities. However, the low concentrations involved and in frequent nature of this exposure may not be sufficient to warrant remedial action. If simple safety precautions were taken during the maintenance activities, potential risks to workers would be insignificant.

6.3.2 Groundwater

PCB concentrations in on-site perched zone groundwater resulting from its contact with contaminated soil exceed the NYS groundwater quality standard. This standard is based on groundwater that is a potential source of potable water supply. However, the perched zone is very limited in distribution and does not constitute a potential source of groundwater production.

6.3.3 Surface Water

The PCB concentrations present in surface water due to its contact with contaminated sediments exceed NYS surface water quality standards, except within the retention pond, where no PCBs were detected. However, the detection limit for the pond sample was higher than the water quality standard, so it is unknown whether the standard is exceeded.

7.0
SUMMARY AND CONCLUSIONS

7.1 SUMMARY

7.1.1 Nature and Extent of Contamination

PCB contamination was found in soil, ditch sediment, groundwater and surface water in the RI Study Area.

On-Site Surficial Soils: Figure 7-1 summarizes PCB concentrations in surface soil. The figure shows areas of the site shaded according to the range of surficial soil PCB concentrations. The red shading shows areas where levels greater than 1000 mg/kg were found. Surficial soil PCB concentrations decreased rapidly to the south and east of this area.

Subsurface Soils: PCB concentrations were generally highest from 0-2 feet below ground surface. Deeper contamination was observed beneath the parking lot south of the main building and on the south side of the east-west ditch, across from the seepage area.

Flood-Prone Soils: PCB concentrations in flood-prone soils adjacent the lower ditch were only slightly elevated (11.8 mg/kg and 2.78 mg/kg). PCB concentrations in flood-prone soils along the fenceline of the cemetery bordering the east-west ditch were ranged from 1.0 to 160 mg/kg. These levels could be a result of past ditch dredging and piling of excavated materials along the banks.

Ditch Sediment: Figure 7-2 shows the drainage ditches and retention pond. Drainage ditches on the figure are shaded according to the range of PCB concentrations in the sediment. Levels greater than 500 mg/kg occur in the ditch between the site and the pipe passing beneath the railroad tracks and in two samples in the upper portion of the lower ditch (below the outfall of the aforementioned pipe). Little sedimentation of fine-grained material appears to have occurred within the pipe itself. Other PCB results for the lower ditch were less than 36 mg/kg and most samples contained less than 10 mg/kg.

In the highly contaminated section of the ditches in the immediate vicinity of the site, PCB contamination was generally present throughout the top foot of sediment. More distant from the site, PCB contamination was limited primarily to the upper 6-inches of sediment.

Residential Soils: For the 14 residential soil samples, PCBs were not detected in 11 samples. The concentration was high enough to quantify in only one of three samples where detection occurred. The concentration of the single quantified positive result was 0.38 mg/kg, below EPA recommended action levels for residential soils and probably representative of typical concentration expected in industrial areas.

Retention Pond: Total PCB concentration ranged from 1.1 to 31 ppm in surficial sediment from the retention pond. In subsurface sediment samples (deeper than 4 inches) all total PCB concentrations were approximately 1 ppm or less except for one: a sample from 5 to 10 inches depth taken from the east end of the pond (concentration of 3.4 ppm).

Eastern Cemetery/West Side of Main Building: Elevated concentrations were found in the upper 3 inches of soil in the cemetery within 15 feet of the fenceline. North and south of the main building, PCB levels exceeding 5 ppm were generally limited to within approximately 2 feet of the fenceline. Directly west of the building, elevated concentrations above 5 ppm were limited to within approximately 7 feet of the fenceline, except for one location (S-5, sampled in September 1992) near the south side of the building (16 ppm, 15 feet from the fenceline).

In the strip of NTC property along the west side of the buildings, concentrations greater than 1,000 ppm were measured in the upper 3 inches of soil. PCB concentrations were approximately 1 ppm or less for samples below 1 foot in depth.

7.1.2 Fate and Transport

PCB contamination has migrated from the site as a result of non-aqueous phase liquids

(NAPL) seeping into the drainage ditches. NAPL seepage into the east-west ditch near the southwest corner of the site currently occurs during wet periods. This is apparently the cause of off-site sediment contamination. Any contribution by aqueous transport in groundwater is insignificant by comparison. The data collected during this RI provides evidence that the NAPL has migrated from the major release area directly behind the main building to the seep some 500 feet to the south via two subsurface drain tiles. These drains were probably installed when the property was used for agriculture prior to NTC ownership.

Downstream in the ditches, sediment has become contaminated either through contact with past NAPL discharge or by suspension and redeposition of contaminated sediment from the vicinity of the NAPL seeps.

PCB concentrations in surface water samples appear to be a result of entrainment of contaminated sediment particles into the flowing water.

7.2 RI CONCLUSIONS

The data collected during this RI were sufficient to delineate general areas which will likely require remediation based on comparison with ARARs or TBCs. These include the following general areas:

1. On-site surficial soils
2. On-site subsurface soils
3. On-site and off-site ditch sediment
4. Flood-prone soils
5. Surficial soils adjacent to the west side of the NTC site (St. Adalbert's Cemetery)

The Feasibility Study (FS) for the NTC site will delineate specific areas requiring remediation and evaluate remedial action alternatives for the site.

8.0
LIMITATIONS

WCC's work is in accordance with our understanding of professional practice and environmental standards existing at the time the work was performed. Professional judgements presented are based on our evaluation of technical information gathered and on our understanding of site conditions and site history. Our analyses, interpretations, and judgements rendered are consistent with professional standards of care and skill ordinarily exercised by the consulting community and reflect the degree of conservatism WCC deems proper for this project at this time. Methods are constantly changing and it is recognized that standards may subsequently change because of improvements in the state of the practice.

The information used for this investigation is presented in this report and includes boring logs, water level elevations, and soil and water quality analyses. Boring logs reflect subsurface conditions for the indicated locations and dates. WCC has endeavored to collect soil and water samples which are representative of site conditions. Soil and water quality samples, however, can only represent a small portion of the subsurface conditions in the area, both in volume and through time. The interpretations made in this report are based on the assumption that subsurface conditions do not deviate appreciably from those found during our field investigations.

9.0 REFERENCES

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Tables

TABLE 2-1

SUMMARY OF INVESTIGATIVE AND QA/QC SAMPLE COLLECTION
NIAGARA TRANSFORMER CORPORATION REMEDIAL INVESTIGATION
CHEEKTOWAGA, NEW YORK

Sampling Task	Sample Matrix	Laboratory Parameters	Investigative Samples	Field Duplicates	Rinsate Blanks	Trip Blanks	Matrix Spike/ Matrix Spike Dup	Total
Surface Soil Sampling	Soil	Full Target Compound List (TCL): 1 sample PCBs only samples: 27	28	3: PCB	1: TCL 2: PCB	1: VOA only	1: TCL 2: PCB	38
Monitoring Well Installation and Sampling	Soil	PCBs only	68	---	---	---	4	72
	Water	Full Target Compound List (TCL): 1 sample PCBs and Total Petroleum Hydrocarbon (TPH) analysis: 9 samples	10	1: PCB	1: TCL	1: VOA only	1: TCL	14
Supplemental Sediment Sampling	Soil	Full Target Compound List (TCL): 3 samples PCBs only samples: 27	30	3: PCB	1: TCL 2: PCB	1: VOA only	1: TCL 1: PCB	39
Surface Water Sampling	Water	Full Target Compound List (TCL): 1 sample PCBs only samples: 3	4	1: PCB	---**	---	1: TCL	6
Flood-Prone Area Sampling	Soil	PCBs Only	9	1	---*	---	2	12
Residential Area Sampling	Soil	PCBs Only	14	2	---*	---	1	17

* No rinsate blank required: use of dedicated equipment during sampling
** No rinsate blank required: No sampling equipment used

TABLE 2-1A

SUMMARY OF INVESTIGATIVE AND QA/QC SAMPLE COLLECTION
NIAGARA TRANSFORMER CORPORATION SUPPLEMENTAL REMEDIAL INVESTIGATION
BUFFALO, NEW YORK

Sampling Task	Sample Matrix	Laboratory Parameters	Investigative Samples	Field Duplicates	Rinsate Blanks	Matrix Spike/Matrix Spike Dup.
Cemetery surface soil sampling	soil	PCBs only	32	4	--- *	3
Additional monitoring well installation and sampling	soil	PCBs only	53	5	1	4
NTC 10S/11S/12S/ 13S/14S/8D (See Page 12)	water	PCBs, TPH, and select chloro-benzenes; 9 samples (8 groundwater; 1 NAPL) TAL metals only; 1 sample	10	2	--- *	1
Supplemental sediment sampling	soil	PCBs only	19	1	--- *	1
Surface water sampling	water	PCBs and select chlorobenzenes	2	---	--- **	1
Flood-prone area sampling	soil	PCBs only	4	---	--- *	---
Depth specific soil sampling	soil	PCBs only	7	---	--- *	---

* No rinsate blank required: Use of dedicated equipment during sampling
** No rinsate blank required: No sampling equipment used

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TABLE 3-1

SINGLE WELL PERMEABILITY TEST RESULTS
NIAGARA TRANSFORMER REMEDIAL INVESTIGATION
CHEEKTOWAGA, NEW YORK

Well ID

Perched Zone Wells	Hydraulic Conductivity (ft/day)
NTC-2S	9.30 E-3
NTC-3S	9.23 E-2
NTC-9S	2.17 E-0

Deep Wells	Transmissivity (ft^2/day)
NTC-1D	1257.67
NTC-9D	175.09

TABLE 3-2

HYDRAULIC HEAD MEASUREMENT FOR PERCHED ZONE
AND DEEP MONITORING WELLS
NIAGARA TRANSFORMER CORPORATION REMEDIAL INVESTIGATION
CHEEKTOWAGA, NEW YORK
STATIC WATER LEVELS

Monitoring Well	June 1991	July 1991	August 1991	September 1991
Perched Zone Wells				
NTC-2S	646.38	644.93	643.92	643.57
NTC-3S	645.09	642.79	640.69	639.87
NTC-4S	643.39	643.23	641.08	Dry
NTC-5S	642.50	641.33	637.60	Dry
NTC-6S	641.72	640.38	637.66	Dry
NTC-7S	639.32	638.87	637.82	635.88
NTC-8S	640.48	639.99	638.30	Dry
NTC-9S	639.67	638.68	637.68	636.44
Deep Wells				
NTC-1D	648.22	647.08	646.14	645.58
NTC-9D	635.32	638.10	637.86	636.89

TABLE 4-1

SUMMARY OF DETECTED TCL COMPOUNDS
NIAGARA TRANSFORMER CORPORATION
REMEDIAL INVESTIGATION

Sample ID	071591-15	071591-8	071691-10	SS-1
Date Sampled	7/15/91	7/16/91	7/16/91	9/19/91
Matrix	Sediment	Sediment	Sediment	Sediment
Units	ppm	ppm	ppm	ppm
VOCs				
Acetone				0.061B
Toluene				0.001BJ
Chlorobenzene				0.270
BNAs				
Acenaphthene			1.40	ND(18)
Anthracene			2.33	ND(18)
Benzo(a)anthracene	0.70	1.51	8.60	ND(18)
Benzo(b)fluoranthene	0.74	1.25	8.40	2.20J
Benzo(n)fluoranthene	1.37	1.53	9.62	ND(18)
Benzo(a)pyrene	1.97	2.51	14.4	ND(18)
Benzo(ghi)perylene	0.7	0.77	5.57	ND(18)
Chrysene	0.99	1.84	9.29	ND(18)
Fluoranthene	1.4	4.38	16.40	2.60J
Pyrene	1.17	2.59	13.70	3.40J
Indeno(1,2,3-cd)Pyrene	<DL(0.66)	0.86	5.39	ND(18)
Phenanthrene	<DL(0.66)	2.3	10.4	1.20J
Dibenzo(a,h)anthracene	ND(0.66)	ND(0.66)	2151	ND(18)
Fluorene	<DL(0.66)	<DL(0.66)	1.41	ND(18)
1,4-dichlorobenzene	ND(0.66)	ND(0.66)	ND(0.66)	1.505
1,2,4-trichlorobenzene	ND(0.66)	ND(0.66)	ND(0.66)	1.10J
1,3-dichlorobenzene	ND(0.66)	ND(0.66)	ND(0.66)	ND(18)
1,2-dichlorobenzene	ND(0.66)	ND(0.66)	ND(0.66)	ND(18)
bis(2-ethylhexyl)phthalate	ND(0.66)	<DL(0.66)	<DL(0.66)	ND(18)

TABLE 4-1 (continued)

SUMMARY OF DETECTED TCL COMPOUNDS
NIAGARA TRANSFORMER CORPORATION
REMEDIAL INVESTIGATION

Sample ID	**071591-15**	**071591-8**	**071691-10**	**SS-1**
Date Sampled	**7/15/91**	**7/16/91**	**7/16/91**	**9/19/91**
Matrix	**Sediment**	**Sediment**	**Sediment**	**Sediment**
Units	**ppm**	**ppm**	**ppm**	**ppm**
Pest/PCBs				
g-bhc-lindane	ND(0.3)	ND(0.5)	ND(0.26)	ND(110)
Aldrin	0.30	ND(0.5)	ND(0.26)	ND(110)
PCB-1254	ND(2.4)	49.7	18.0	ND(2200)
PCB-1260	2.40	140	31.6	4500

TABLE 4-1 (continued)

SUMMARY OF DETECTED TCL COMPOUNDS
NIAGARA TRANSFORMER CORPORATION
REMEDIAL INVESTIGATION

Sample ID	**SS-2(DupSS-1)**	**071691-7**	**SW-1**	**NTS-7S**
Date Sampled	**9/19/91**	**7/16/91**	**8/9/91**	**6/11/91**
Matrix	**Sediment**	**Surface Soil**	**Surface Water**	**Groundwater**
Units	**ppm**	**ppm**	**ppb**	**ppb**
<u>VOCs</u>				
Acetone	0.095B		ND(10)	<DL(10)
Toluene	0.006BJ		ND(5)	ND(5)
Chlorobenzene	1.10		ND(5)	ND(5)
<u>BNAs</u>				
Acenaphthene	ND(21)	ND(0.66)	ND(10)	ND(10)
Anthracene	ND(21)	ND(0.66)	ND(10)	ND(10)
Benzo(a)anthracene	ND(21)	ND(0.66)	ND(10)	ND(10)
Benzo(b)fluoranthene	3.0J	ND(0.66)	ND(10)	ND(10)
Benzo(n)fluoranthene	ND(21)	ND(0.66)	ND(10)	ND(10)
Benzo(a)pyrene	1.70J	ND(0.66)	ND(10)	ND(10)
Benzo(ghi)perylene	ND(21)	ND(0.66)	ND(10)	ND(10)
Chrysene	2.0J	<DL(0.66)	ND(10)	ND(10)
Fluoranthene	ND(21)	<DL(0.66)	ND(10)	ND(10)
Pyrene	ND(21)	<DL(0.66)	ND(10)	ND(10)
Indeno(1,2,3-cd)Pyrene	ND(21)	ND(0.66)	ND(10)	ND(10)
Phenanthrene	ND(21)	<DL(0.66)	ND(10)	ND(10)
Dibenzo(a,h)anthracene	ND(21)	ND(0.66)	ND(10)	ND(10)
Fluorene	ND(21)	ND(0.66)	ND(10)	ND(10)
1,4-dichlorobenzene	4.15	ND(0.66)	ND(10)	230
1,2,4-trichlorobenzene	2.80J	ND(0.66)	ND(10)	335
1,3-dichlorobenzene	3.20J	ND(0.66)	ND(10)	172
1,2-dichlorobenzene	ND(21)	ND(0.66)	ND(10)	182
bis(2-ethylhexyl)phthalate	ND(21)	<DL(0.66)	ND(10)	11.9

TABLE 4-1 (continued)

SUMMARY OF DETECTED TCL COMPOUNDS
NIAGARA TRANSFORMER CORPORATION
REMEDIAL INVESTIGATION

Sample ID	SS-2(DupSS-1)	071691-7	SW-1	NTS-7S
Date Sampled	9/19/91	7/16/91	8/9/91	6/11/91
Matrix	Sediment	Surface Soil	Surface Water	Groundwater
Units	ppm	ppm	ppb	ppb
Pest/PCBs				
g-bhc-lindane	ND(130)	ND(0.05)	0.11	ND(0.25)
Aldrin	ND(130)	ND(0.05)	ND(0.05)	ND(0.25)
PCB-1254	ND(2600)	2.07	ND(1.0)	ND(2.5)
PCB-1260	5900	8.57	5.6	4.6

Notes

B - detected in laboratory blank
J - estimated value
DL - detection limit
< - less than
ND - non-detected at detection limit provided in parentheses

TABLE 4-1A

SUMMARY OF DETECTED CHLOROBENZENES IN SUPPLEMENTAL REMEDIAL INVESTIGATION WELLS NIAGARA TRANSFORMER CORPORATION

Sample ID	**NTC-8D**	**NTC-10S**	**NTC-11S**	**11S (D-NAPL)**
Date Sampled	**6/26/92**	**6/26/92**	**6/26/92**	**6/26/92**
Units	**ug/L**	**ug/L**	**ug/L**	**ug/kg**
1,3-dichlorobenzene	ND(10)	ND(10)	ND(8,000)	1,000,000
1,4-dichlorobenzene	ND(10)	ND(10)	2,200J	1,000,000
1,2-dichlorobenzene	ND(10)	ND(10)	ND(8,000)	2,000,000J
1,2,4-trichlorobenzene	ND(10)	ND(10)	51,000	650,000

Sample ID	**NTC-12S**	**NTC-13S**	**NTC-14S**	**NTC-8D**
Date Sampled	**1/11/93**	**1/11/93**	**1/11/93**	**4/7/93**
Units	**ug/L**	**ug/L**	**ug/L**	**ug/L**
1,3-dichlorobenzene	12	ND(10)	ND(10)	ND(10)
1,4-dichlorobenzene	45	ND(10)	ND(10)	ND(10)
1,2-dichlorobenzene	15	ND(10)	ND(10)	ND(10)
1,2,4-trichlorobenzene	68	ND(10)	ND(10)	ND(10)

TABLE 4-2

SUMMARY OF TAL RESULTS IN GROUNDWATER
SAMPLE FROM NTC-7S
NIAGARA TRANSFORMER CORPORATION REMEDIAL INVESTIGATION

Metal	Concentration
aluminum	82.3B ug/l
antimony	19.6B ug/l
arsenic	3.0U ug/l
barium	59.5B ug/l
beryllium	1.0U ug/l
cadmium	2.0U ug/l
calcium	129000 ug/l
chromium	3.8U ug/l
cobalt	16.6U ug/l
copper	3.8U ug/l
iron	678 ug/l
lead	2.3B ug/l
magnesium	39600 ug/l
manganese	575 ug/l
mercury	0.1U ug/l
nickel	7.8U ug/l
potassium	1330B ug/l
selenium	2.8U ug/l
silver	6.2U ug/l
sodium	13200 ug/l
thallium	2.2U ug/l
vanadium	25.5U ug/l
zinc	3.9U ug/l

U Not detected
B Above instrument detection limit, but below the contract required detection limit

TABLE 4-3

MONTHLY SURFACE WATER SAMPLING RESULTS
NIAGARA TRANSFORMER CORPORATION

Month	Aroclor 1260	1,3-dichlorobenzene	1,4-dichlorobenzene
May 1992	NA	10U ug/l	1J ug/l
June 1992	NS	NS	NS
July 1992	4.5 ug/l	5U ug/l	5U ug/l
August 1992	4.7 ug/l	2J ug/l	3J ug/l
September 1992	1.3 ug/l	2J ug/l	3J ug/l
October 1992	2.8 ug/l	10U ug/l	2J ug/l
November 1992	1.2 ug/l	10U ug/l	1J ug/l

Month	1,2-dichlorobenzene	1,2,4,-trichlorobenzene
May 1992	10U ug/l	1J ug/l
June 1992	NS	NS
July 1992	5U ug/l	2J ug/l
August 1992	10U ug/l	3J ug/l
September	10U ug/l	3J ug/l
October 1992	10U ug/l	1J ug/l
November 1992	10U ug/l	2J ug/l

Notes:

NA - Not analyzed
NS - Sample was not collected due to no flowing water
U - Not detected at the stated detection limit
J - Estimated

TABLE 4-4
SUMMARY OF DETECTED FIELD DUPLICATE DATA
NIAGARA TRANSFORMER CORPORATION
REMEDIAL INVESTIGATION

Sample ID				
Matrix	**071991-10/11**	**072291-4/5**	**072391-2/3**	**32891-2S/20S**
Units	**Surface Soil**	**Surface Soil**	**Surface Soil**	**Surficial Soil**
PCBs	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**
1254	148/ND190	ND34/ND40	ND.16/ND.19	ND240/ND240
1260	1,190/1,420	473/400	3.42/3.36	ND240/ND240

Sample ID				
Matrix	**32891S/21S**	**0528FPS-3/4**	**071691-5/6**	**071891-3/5**
Units	**Surface Soil**	**Surface Soil**	**Sediment**	**Sediment**
PCBs	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**
1254	ND240/ND240	-----	8.95/15.4	20.4/200
1260	ND240/ND240	11.8/19.8	22.2/40.5	57.9/541

Sample ID			
Matrix	**071891-14/16**	**SW-4/5**	**NTC-4S/10S**
Units	**Sediment**	**Surface Water**	**Groundwater**
PCBs	**mg/kg**	**ug/L**	**ug/L**
1254	951/1,140	-----	-----
1260	2,780/2,810	1.2/1.3	8.8/7.7

Note: ND - non-detected at provided detection limit

TABLE 4-4A

SUMMARY OF DETECTED FIELD DUPLICATE DATA
NIAGARA TRANSFORMER CORPORATION
SUPPLEMENTAL REMEDIAL INVESTIGATION

Sample ID	NTC-S-2/S-15	NTC-S-11 0"-6"/S-16	NT071592-S-7/S-D
Matrix	Surface soil	Surface soil	Surface soil
Units	ug/kg	ug/kg	ug/kg
PCBs (Total Aroclor)	31,000/45,000	4,600/2,100	680/550

Sample ID	NTC-10S 8'-10'/QA-1	NTC-11S 8'-10'/QA-2	PS-2-B/QA-1
Matrix	Subsurface soil	Subsurface soil	Sediment
Units	ug/kg	ug/kg	ug/kg
PCBs (Total Aroclor)	41/15J	1,400,000/7,400,000	4,400/3,200

Sample ID	NTC-11S
Matrix	Groundwater
Units	ug/l
PCBs (Total Aroclor)	22,000/20,000
1,3-dichlorobenzene	ND(8,000)/210J
1,4-dichlorobenzene	2,200J/1,500
1,2-dichlorobenzene	ND(8,000)/490J
1,2,4-trichlorobenzene	51,000/5,900

TABLE 6-1
POTENTIAL GUIDANCE FOR PCB CONTAMINATED SOIL CLEANUP

Regulation/Program	Guidance	Relevance to Site
TSCA Spill Cleanup Policy	Soil cleanup to 10 ppm PCBs in non-restricted access areas; minimum 10-inch depth of excavation and clean backfill. Cleanup to 25 ppm in industrial areas.	Not relevant to spills prior to May 4, 1987
TSCA Spill Cleanup Policy	Cleanup of surfaces of buildings and equipment to 10 $ug/100cm^2$ in high contact areas, 100 $ug/100cm^2$ in low contact areas	Not relevant; clean-up of building and equipment surfaces not anticipated.
CERCLA (Superfund) Cleanup Level Guidance	Generic analytical starting point of 1 ppm PCBs for residential areas; 10-25 ppm for industrial areas. Analytical starting point may be modified on a site specific basis. Containment may be preferred action for soils below 100 ppm PCBs.	Relevant

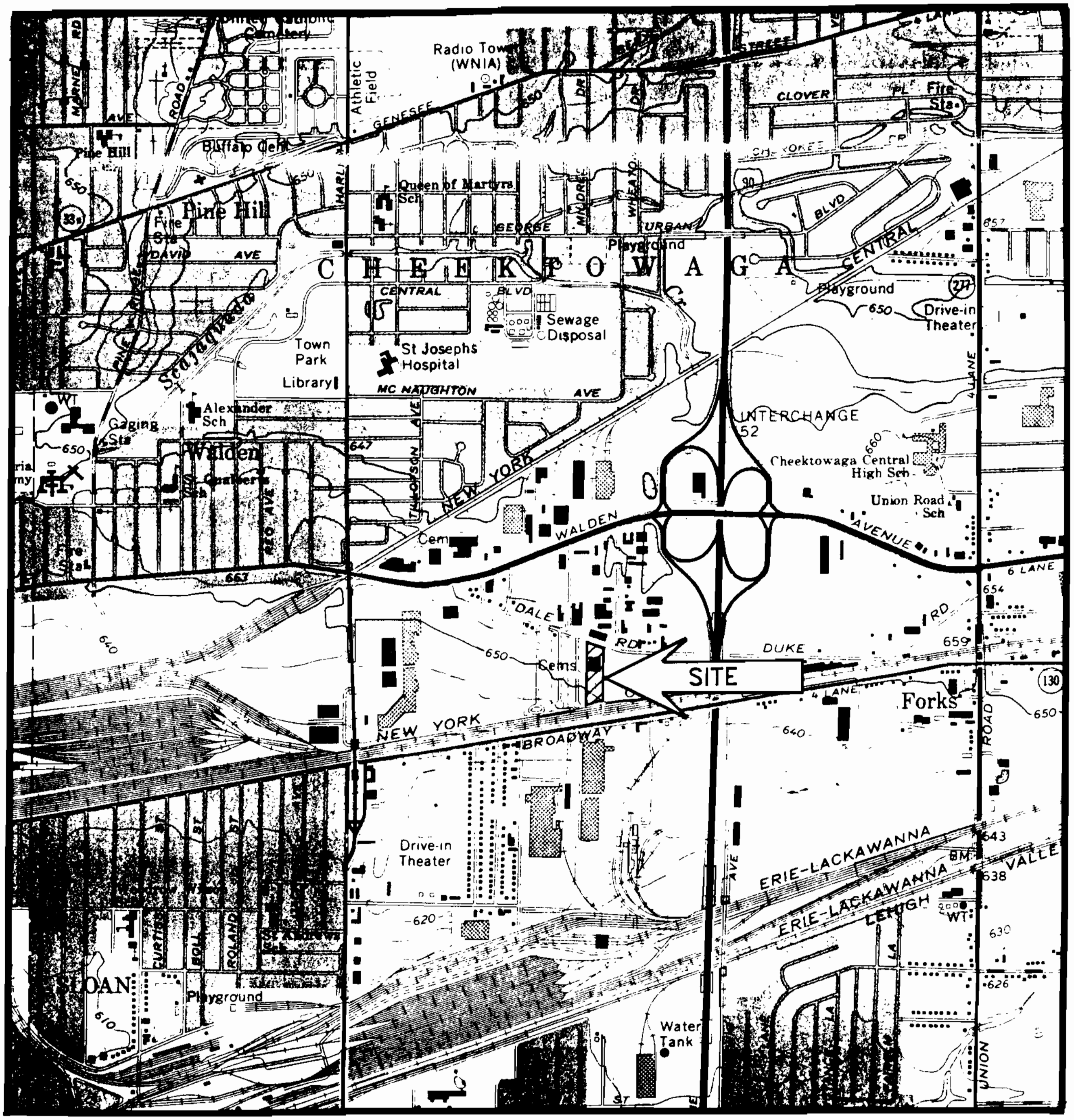
TABLE 6-2
POTENTIAL ARARs OR GUIDANCE FOR PCBs IN SOIL/WASTE MATERIAL

Regulation/Program	ARAR or Guidance	Relevance to Site
TSCA		
Liquids ≥50 ppm PCBs	Restrictions on storage/disposal of PCB containing liquids	Relevant to liquid disposal (NAPL)
Non-Liquids ≥50 ppm PCBs	If disposed, requires treatment by incineration or equivalent (to <2 ppm); or disposal in TSCA chemical waste landfill	Relevant restriction on soils above 50 ppm if stored or disposed.
PCB articles, containers, etc.	Specific treatment requirements for landfills receiving PCB contaminated materials	Not relevant to site
Chemical Waste Landfill Requirements	Design/operation requirements for landfills receiving PCB contaminated materials	Not relevant to site unless an on-site PCB landfill is constructed
RCRA		
Closure Requirements	Requirements for Closure/ Monitoring of RCRA facilities	Not applicable; may be considered depending on PCB concentrations remaining on site

TABLE 6-2 (continued)
POTENTIAL ARARs OR GUIDANCE FOR PCBs IN SOIL/WASTE MATERIAL

Regulation/Program	ARAR or Guidance	Relevance to Site
Land Disposal Restrictions	Land disposal prohibited for liquid hazardous wastes containing ≥50 ppm PCBs, and non-liquid hazardous wastes containing ≥ 1000 ppm halogenated organic compounds. Incineration required for such hazardous wastes, unless a treatability variance or a waiver is obtained. The need for a treatability variance is presumed for CERCLA soil and debris. Potentially relevant if off-site disposal of hazardous wastes is required	Potentially relevant if off-site disposal of hazardous wastes is required

Figures

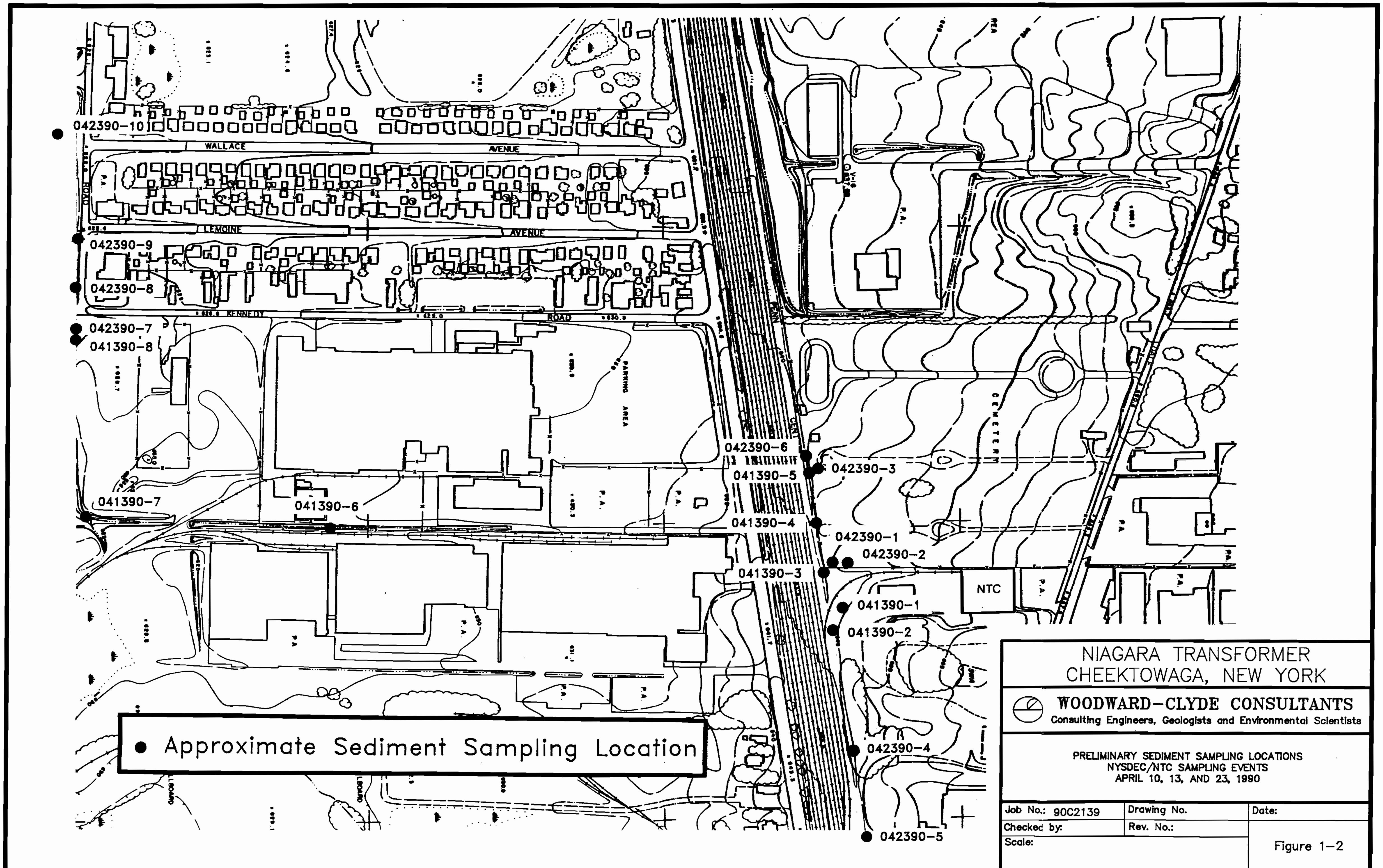


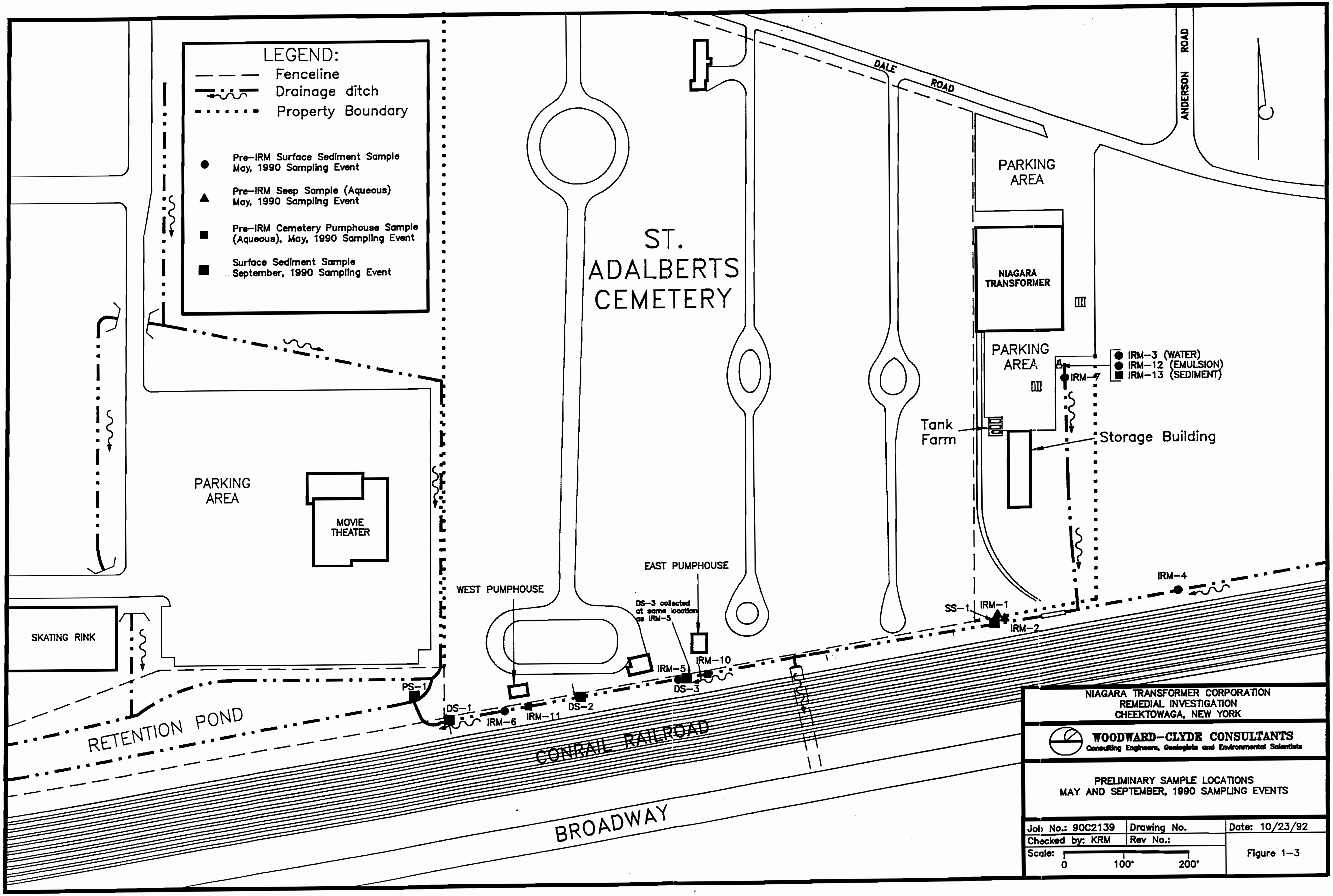
NIAGARA TRANSFORMER
CHEEKTOWAGA, NEW YORK

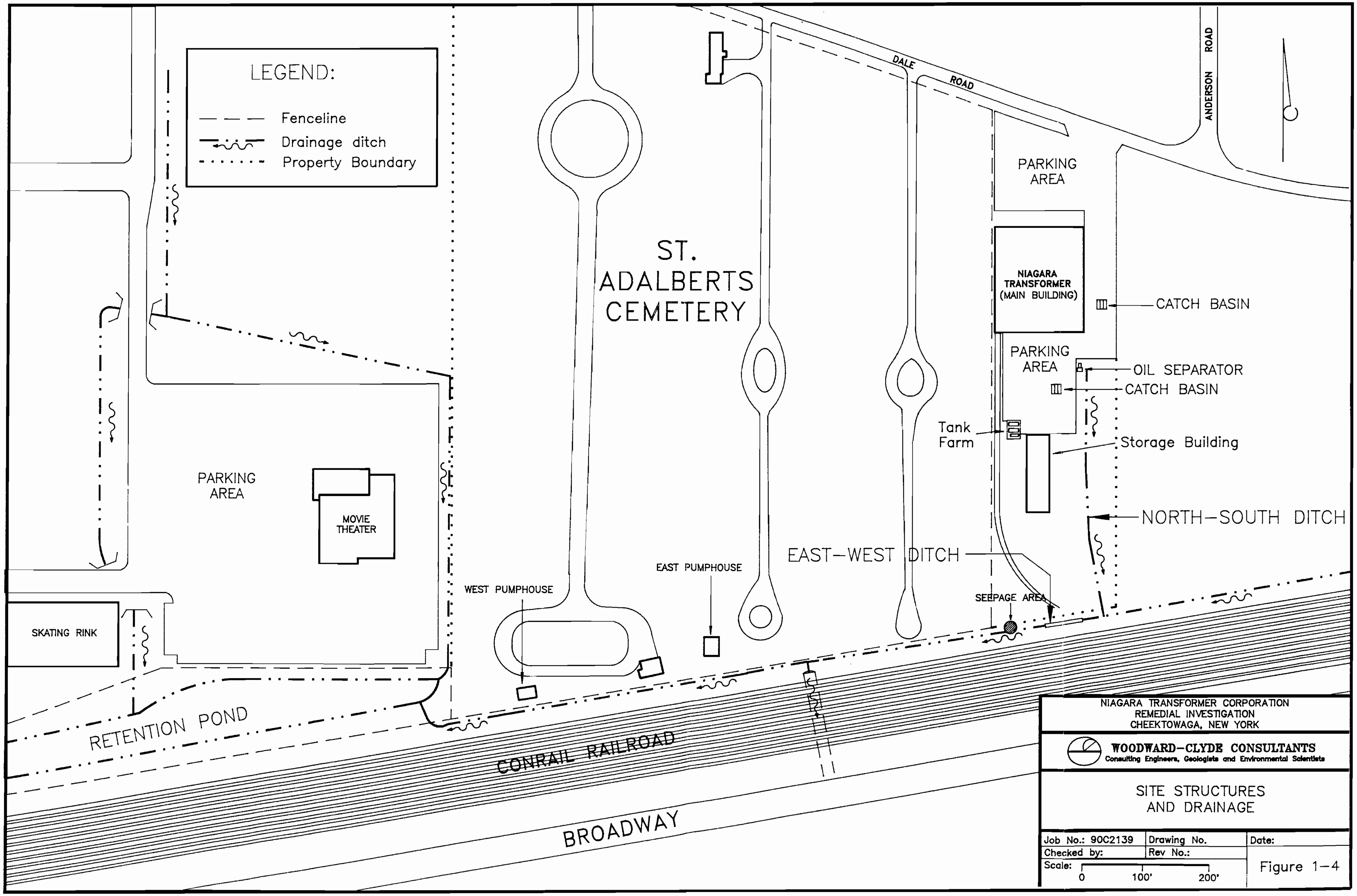
WOODWARD-CLYDE CONSULTANTS
Consulting Engineers, Geologists and Environmental Scientists

SITE LOCATION MAP

Job No.: 90C2139	Drawing No.	Date:
Checked by:	Rev. No.:	Figure 1-1
Scale:		


042390-10
WALLACE
AVENUE
LEMOINE
AVENUE
042390-9
042390-8
KENNEDY
ROAD
042390-7
041390-8
PARKING AREA
CEMETERY
P.A.
042390-6
041390-5
042390-3
041390-7
041390-6
041390-4
042390-1
042390-2
041390-3
NTC
041390-1
041390-2
042390-4
042390-5
● Approximate Sediment Sampling Location
NIAGARA TRANSFORMER
CHEEKTOWAGA, NEW YORK
WOODWARD-CLYDE CONSULTANTS
Consulting Engineers, Geologists and Environmental Scientists
PRELIMINARY SEDIMENT SAMPLING LOCATIONS
NYSDEC/NTC SAMPLING EVENTS
APRIL 10, 13, AND 23, 1990
Job No.: 90C2139
Drawing No.
Date:
Checked by:
Rev. No.:
Scale:
Figure 1-2


LEGEND:
Fenceline
Drainage ditch
Property Boundary
Pre–IRM Surface Sediment Sample May, 1990 Sampling Event
Pre–IRM Seep Sample (Aqueous) May, 1990 Sampling Event
Pre–IRM Cemetery Pumphouse Sample (Aqueous), May, 1990 Sampling Event
Surface Sediment Sample September, 1990 Sampling Event
ST. ADALBERTS CEMETERY
DALE ROAD
ANDERSON ROAD
PARKING AREA
NIAGARA TRANSFORMER
PARKING AREA
IRM–3 (WATER)
IRM–12 (EMULSION)
IRM–13 (SEDIMENT)
IRM–7
Tank Farm
Storage Building
PARKING AREA
MOVIE THEATER
SKATING RINK
EAST PUMPHOUSE
WEST PUMPHOUSE
DS–3 collected at same location as IRM–5
IRM–4
SS–1
IRM–1
IRM–2
IRM–5
IRM–10
DS–3
DS–2
PS–1
DS–1
IRM–6
IRM–11
RETENTION POND
CONRAIL RAILROAD
BROADWAY
NIAGARA TRANSFORMER CORPORATION
REMEDIAL INVESTIGATION
CHEEKTOWAGA, NEW YORK
WOODWARD–CLYDE CONSULTANTS
Consulting Engineers, Geologists and Environmental Scientists
PRELIMINARY SAMPLE LOCATIONS
MAY AND SEPTEMBER, 1990 SAMPLING EVENTS
Job No.: 90C2139
Drawing No.
Date: 10/23/92
Checked by: KRM
Rev No.:
Scale:
0
100'
200'
Figure 1–3



NIAGARA TRANSFORMER CORPORATION
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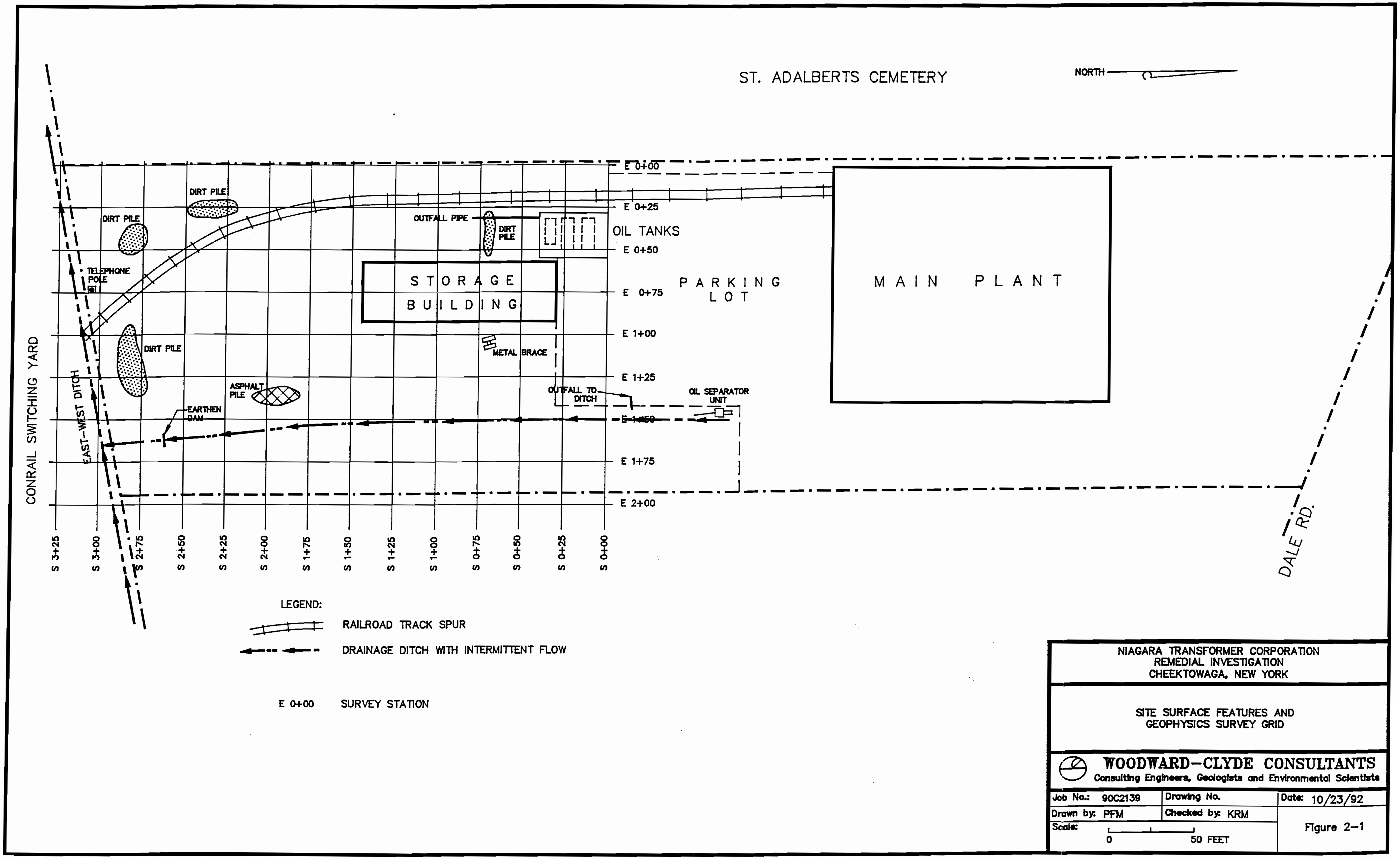
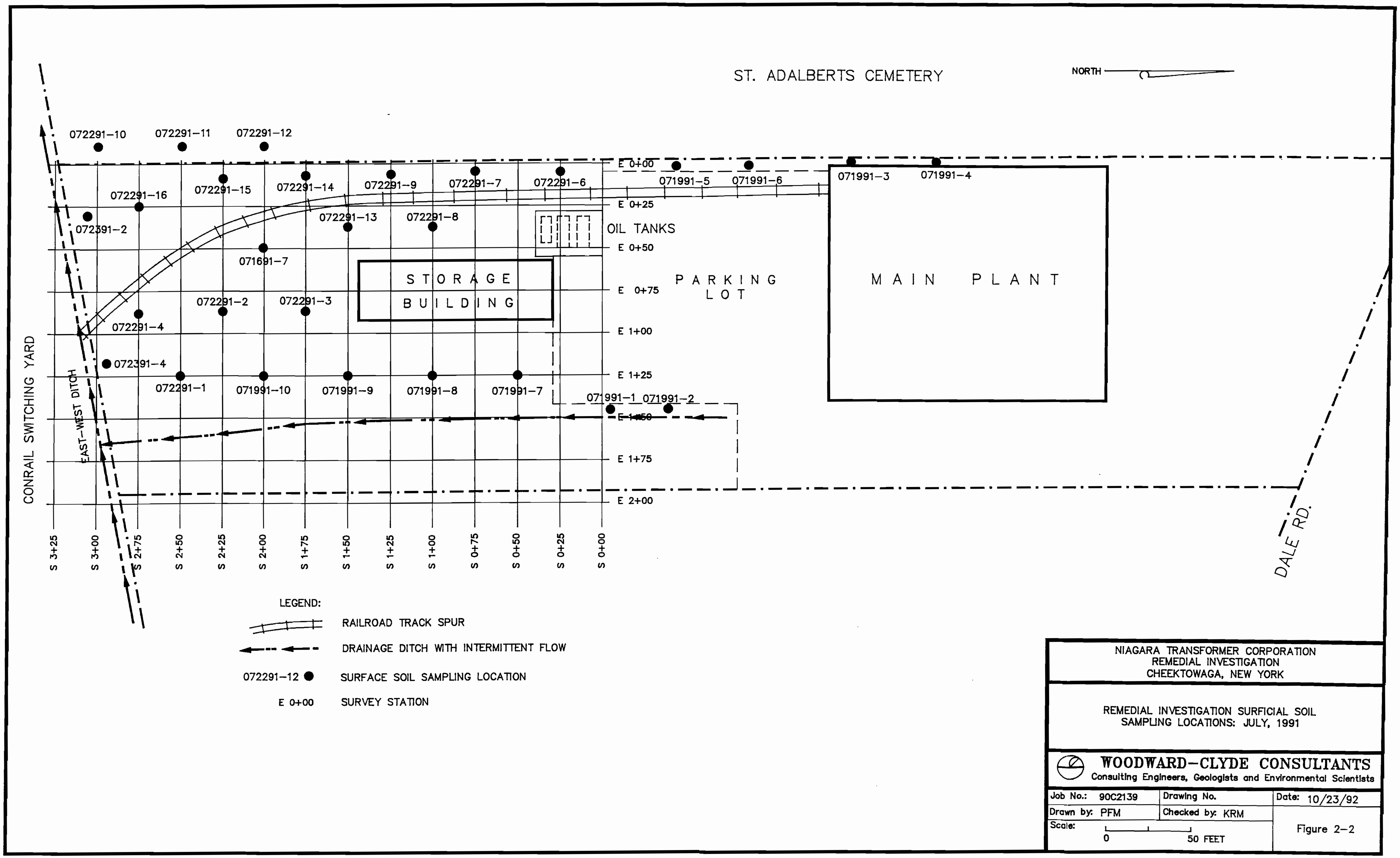
CHEEKTOWAGA, NEW YORK

WOODWARD-CLYDE CONSULTANTS
Consulting Engineers, Geologists and Environmental Scientists

SITE STRUCTURES AND DRAINAGE

Job No.: 90C2139	Drawing No.	Date:
Checked by:	Rev No.:	
Scale: 0 100' 200'		Figure 1–4


ST. ADALBERTS CEMETERY
NORTH
CONRAIL SWITCHING YARD
EAST-WEST DITCH
DIRT PILE
DIRT PILE
DIRT PILE
DIRT PILE
TELEPHONE POLE
ASPHALT PILE
EARTHEN DAM
OUTFALL PIPE
OIL TANKS
STORAGE BUILDING
METAL BRACE
OUTFALL TO DITCH
OIL SEPARATOR UNIT
PARKING LOT
MAIN PLANT
DALE RD.
E 0+00
E 0+25
E 0+50
E 0+75
E 1+00
E 1+25
E 1+50
E 1+75
E 2+00
S 3+25
S 3+00
S 2+75
S 2+50
S 2+25
S 2+00
S 1+75
S 1+50
S 1+25
S 1+00
S 0+75
S 0+50
S 0+25
S 0+00
LEGEND:
RAILROAD TRACK SPUR
DRAINAGE DITCH WITH INTERMITTENT FLOW
E 0+00 SURVEY STATION
NIAGARA TRANSFORMER CORPORATION
REMEDIAL INVESTIGATION
CHEEKTOWAGA, NEW YORK
SITE SURFACE FEATURES AND GEOPHYSICS SURVEY GRID
WOODWARD-CLYDE CONSULTANTS
Consulting Engineers, Geologists and Environmental Scientists
Job No.: 90C2139
Drawing No.
Date: 10/23/92
Drawn by: PFM
Checked by: KRM
Scale: 0 50 FEET
Figure 2-1

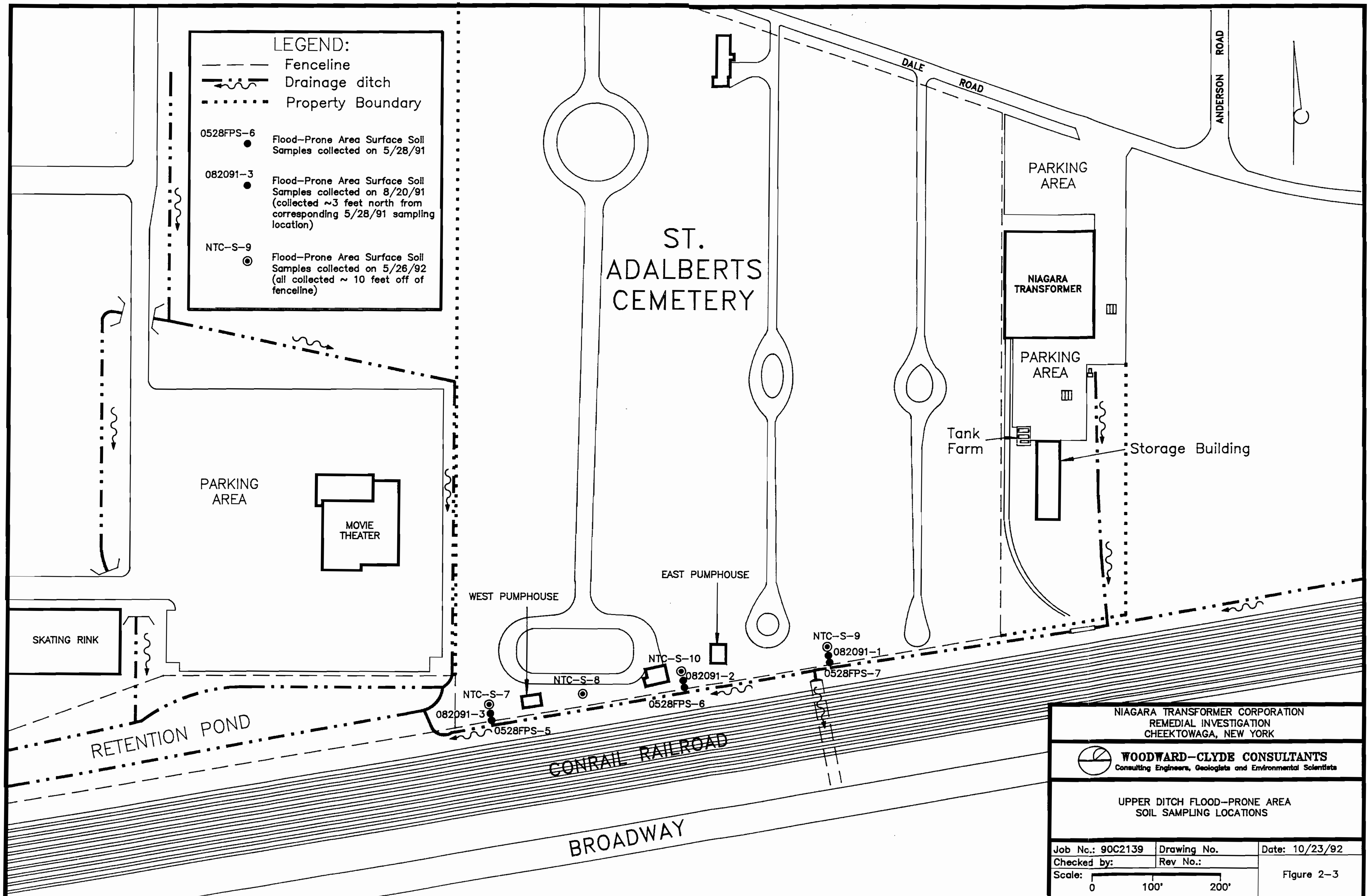


NIAGARA TRANSFORMER CORPORATION
REMEDIAL INVESTIGATION
CHEEKTOWAGA, NEW YORK

REMEDIAL INVESTIGATION SURFICIAL SOIL SAMPLING LOCATIONS: JULY, 1991

WOODWARD-CLYDE CONSULTANTS
Consulting Engineers, Geologists and Environmental Scientists

Job No.: 90C2139	Drawing No.	Date: 10/23/92
Drawn by: PFM	Checked by: KRM	Figure 2-2
Scale: 0 — 50 FEET		



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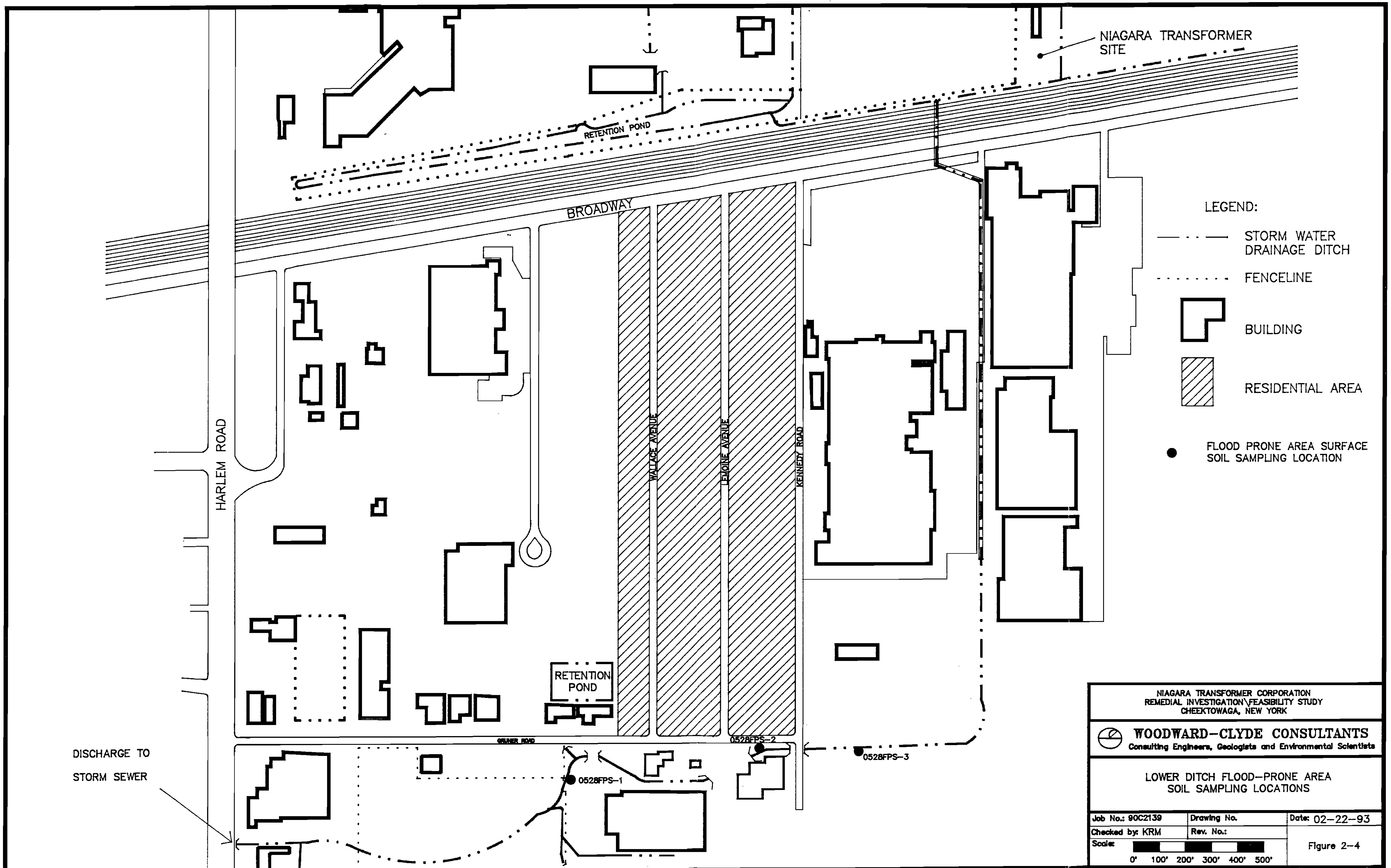
REMEDIAL INVESTIGATION
CHEEKTOWAGA, NEW YORK

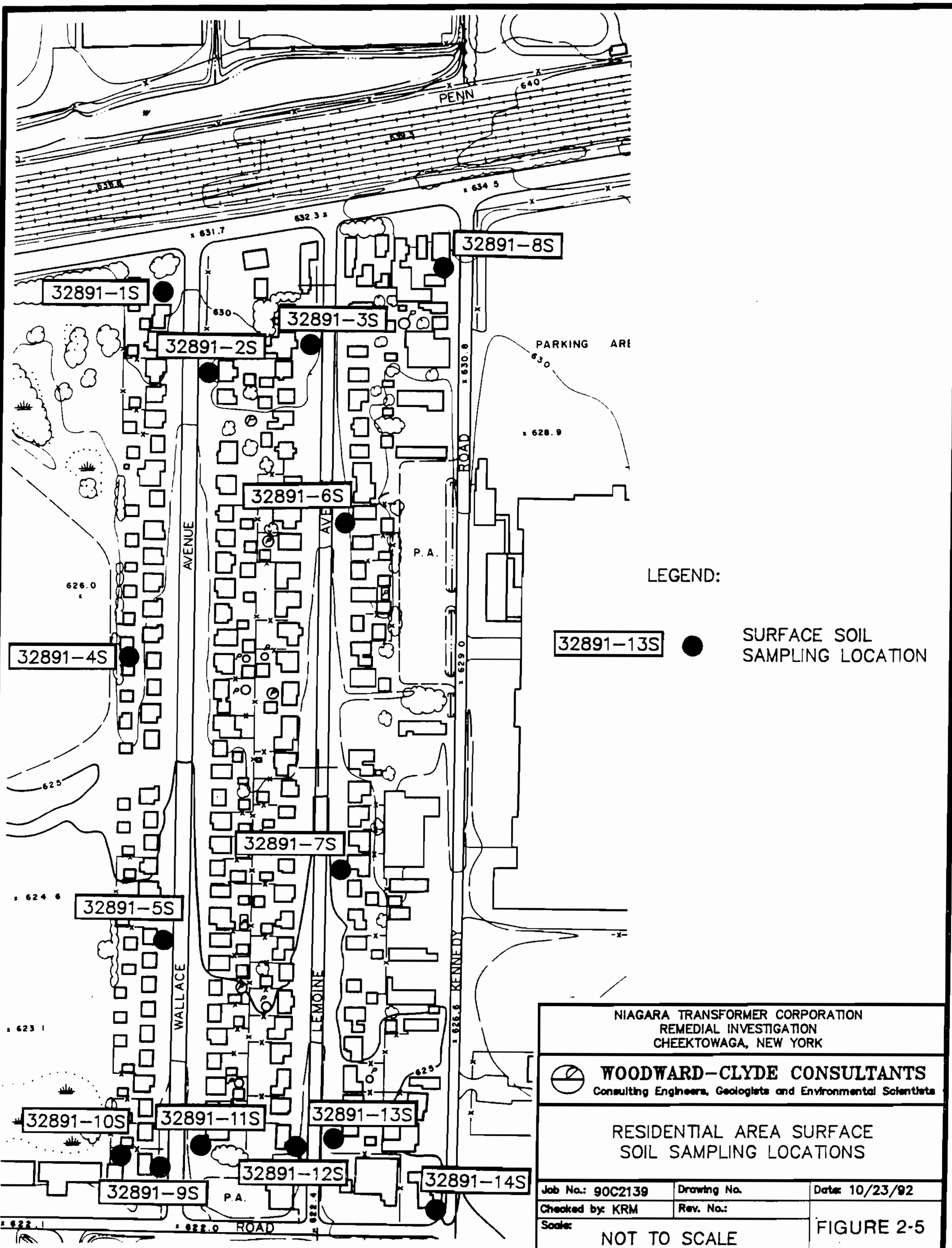
WOODWARD-CLYDE CONSULTANTS
Consulting Engineers, Geologists and Environmental Scientists

UPPER DITCH FLOOD-PRONE AREA
SOIL SAMPLING LOCATIONS

Job No.: 90C2139	Drawing No.	Date: 10/23/92
Checked by:	Rev No.:	
Scale: 0 100' 200'		Figure 2-3


NIAGARA TRANSFORMER SITE
RETENTION POND
BROADWAY
HARLEM ROAD
WALLACE AVENUE
LEMOINE AVENUE
KENNEDY ROAD
RETENTION POND
DISCHARGE TO STORM SEWER
0528FPS-1
0528FPS-2
0528FPS-3
LEGEND:
STORM WATER DRAINAGE DITCH
FENCELINE
BUILDING
RESIDENTIAL AREA
FLOOD PRONE AREA SURFACE SOIL SAMPLING LOCATION
NIAGARA TRANSFORMER CORPORATION
REMEDIAL INVESTIGATION\FEASIBILITY STUDY
CHEEKTOWAGA, NEW YORK
WOODWARD-CLYDE CONSULTANTS
Consulting Engineers, Geologists and Environmental Scientists
LOWER DITCH FLOOD-PRONE AREA
SOIL SAMPLING LOCATIONS
Job No.: 90C2139
Drawing No.
Date: 02-22-93
Checked by: KRM
Rev. No.:
Scale:
0' 100' 200' 300' 400' 500'
Figure 2-4

3cm = 400'



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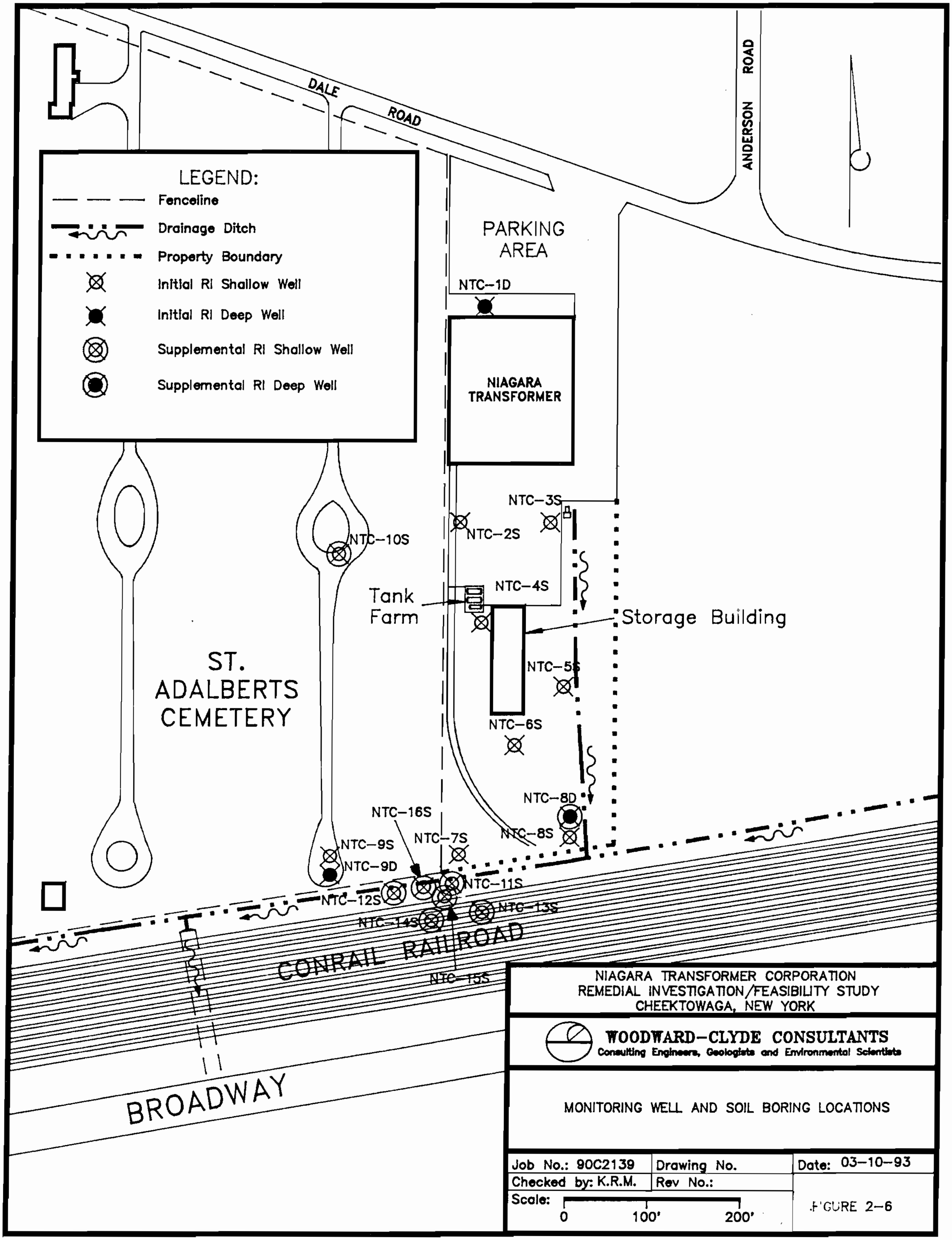
REMEDIAL INVESTIGATION
CHEEKTOWAGA, NEW YORK

WOODWARD-CLYDE CONSULTANTS
Consulting Engineers, Geologists and Environmental Scientists

RESIDENTIAL AREA SURFACE SOIL SAMPLING LOCATIONS

Job No.: 90C2139	Drawing No.	Date: 10/23/92
Checked by: KRM	Rev. No.:	FIGURE 2-5
Scale: NOT TO SCALE		

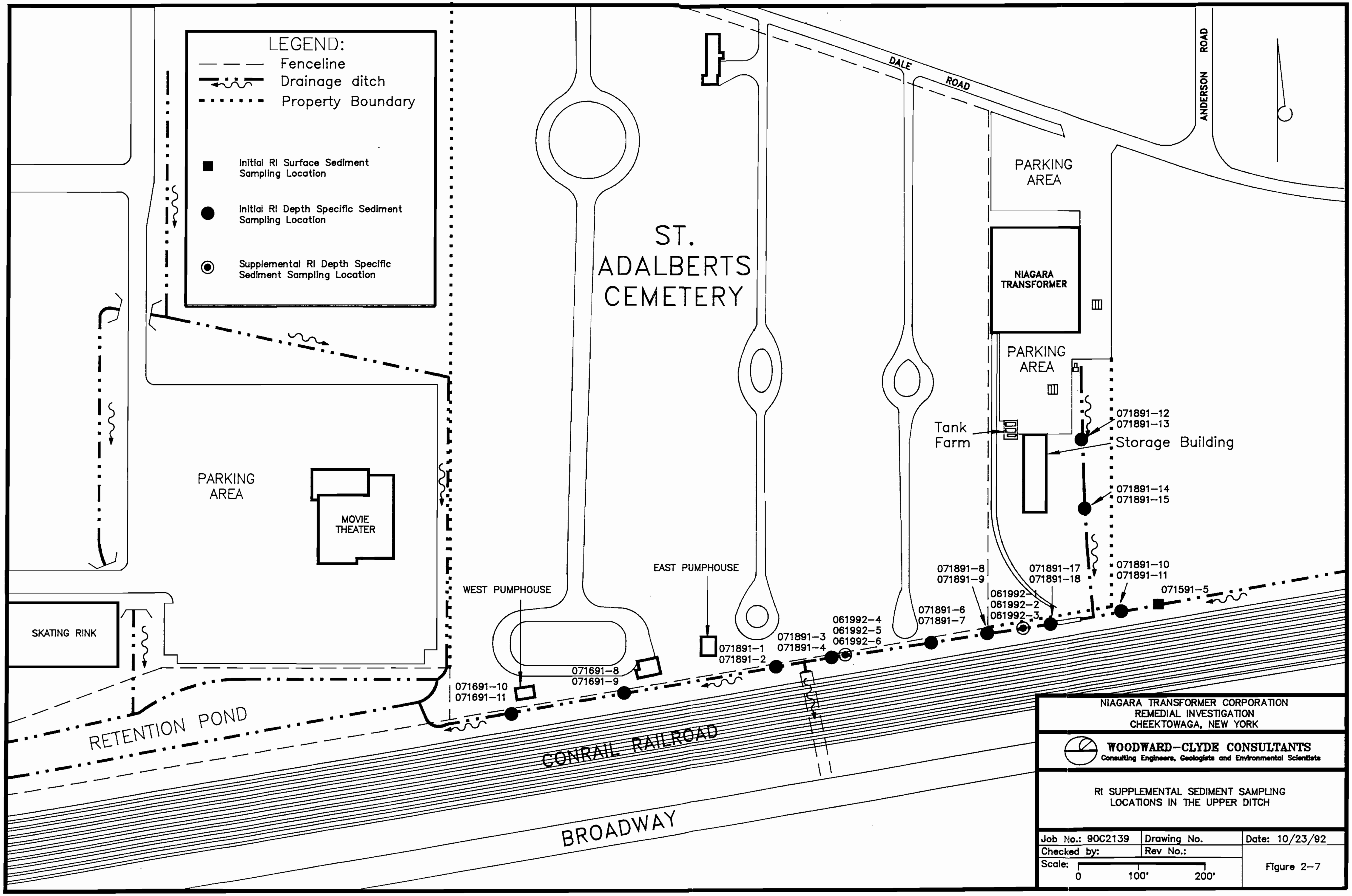


NIAGARA TRANSFORMER CORPORATION
REMEDIAL INVESTIGATION/FEASIBILITY STUDY
CHEEKTOWAGA, NEW YORK

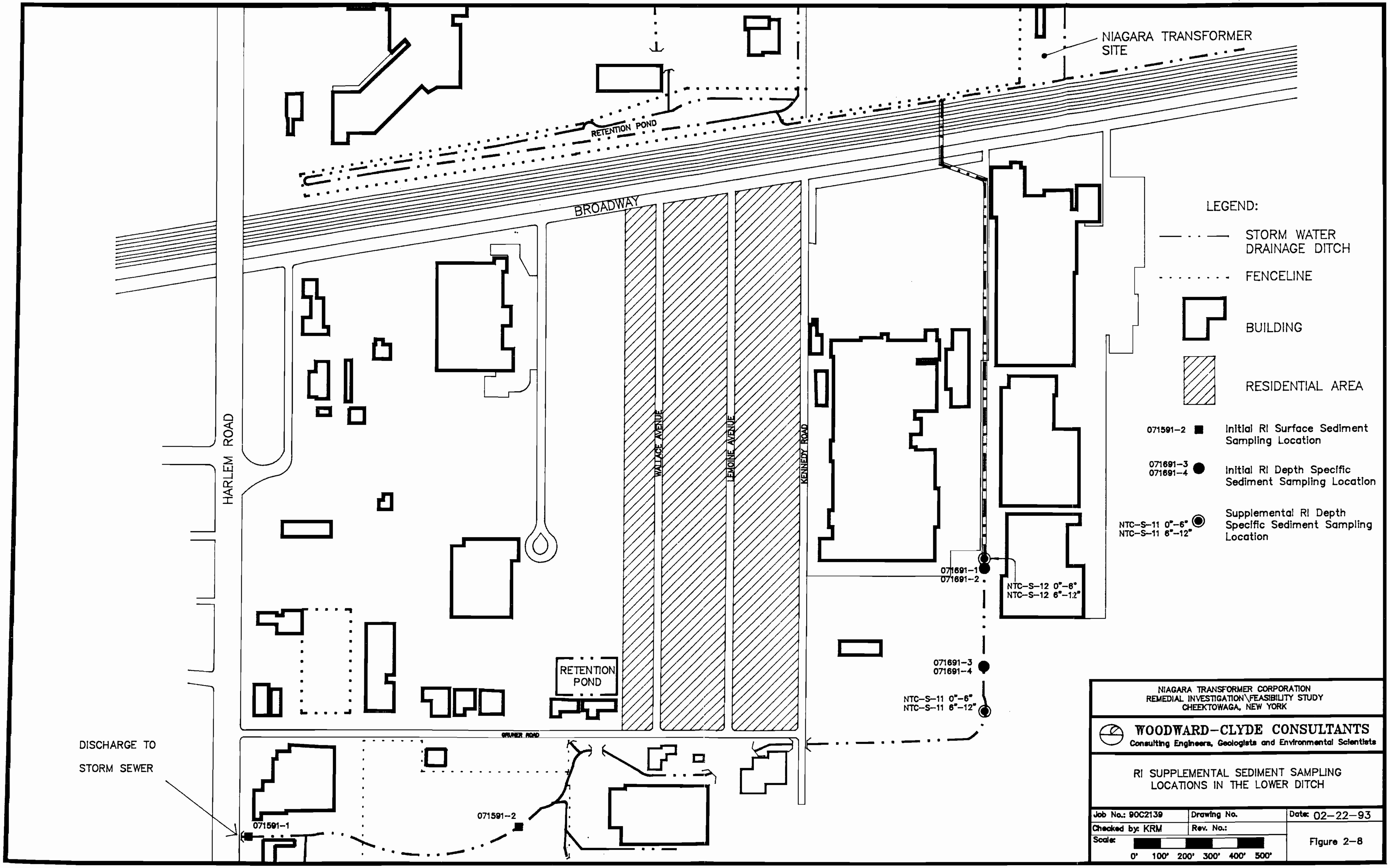
WOODWARD-CLYDE CONSULTANTS
Consulting Engineers, Geologists and Environmental Scientists

MONITORING WELL AND SOIL BORING LOCATIONS

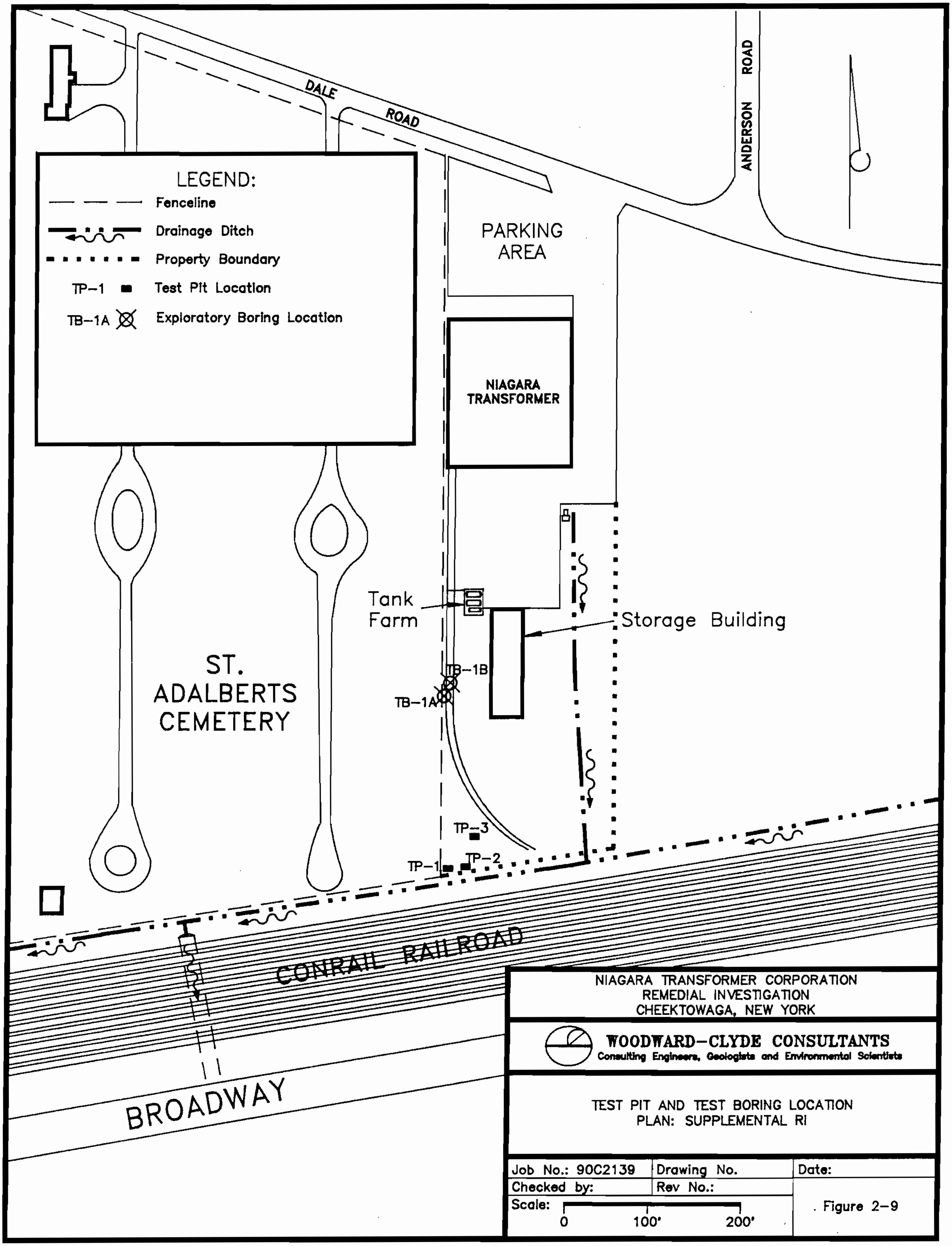
Job No.: 90C2139	Drawing No.	Date: 03-10-93
Checked by: K.R.M.	Rev No.:	
Scale: 0 100' 200'		FIGURE 2-6

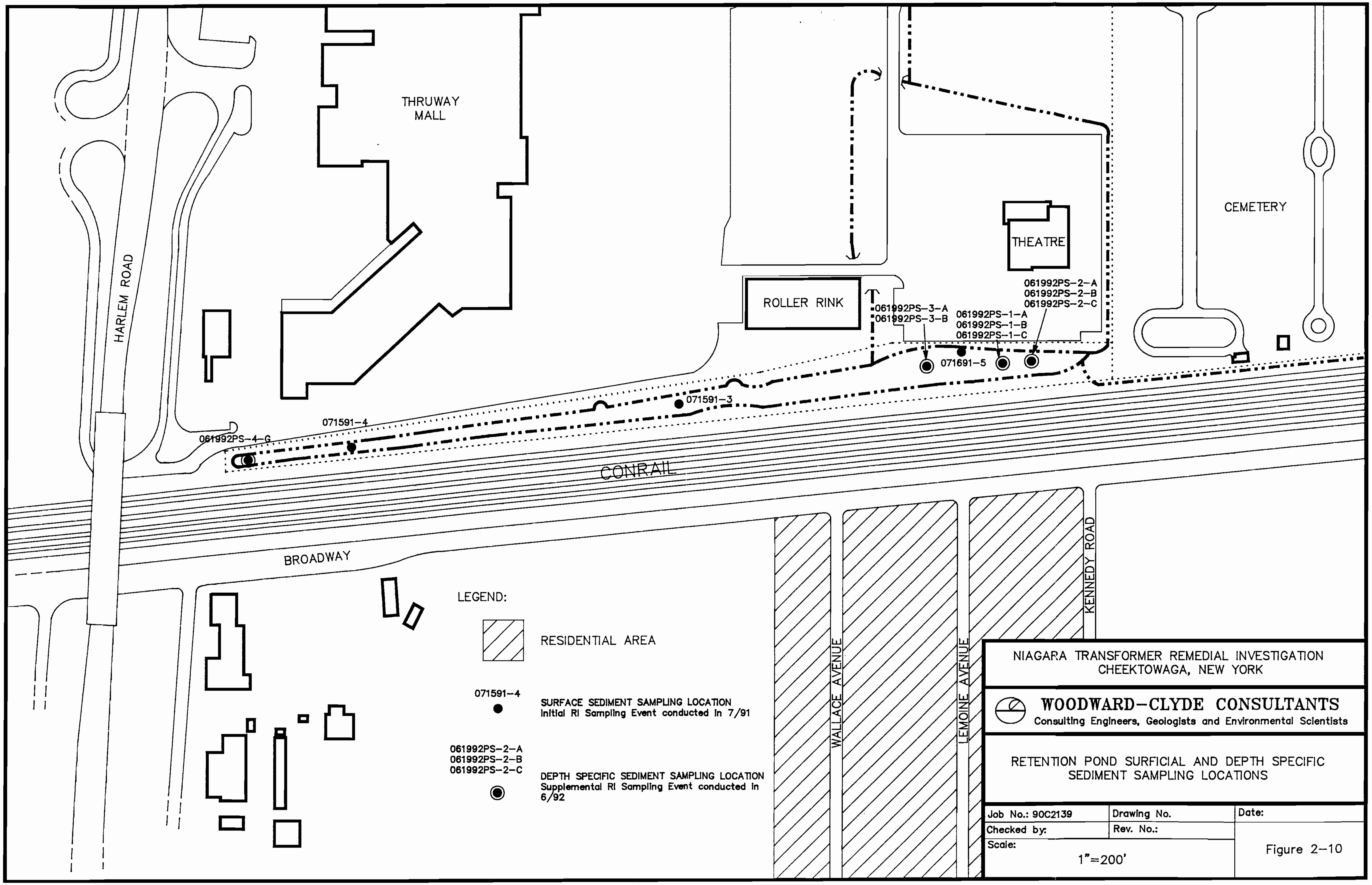


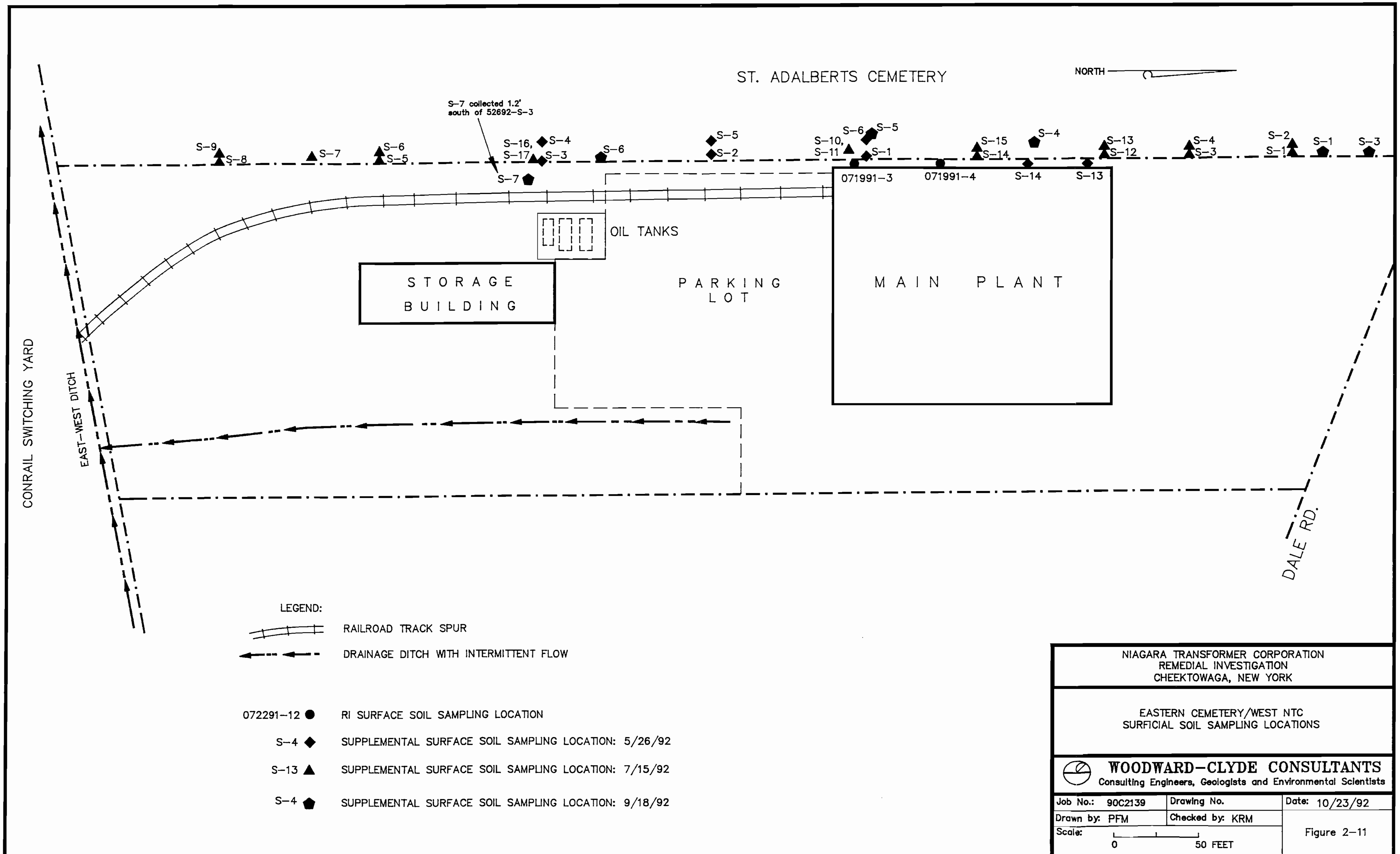
LEGEND:
Fenceline
Drainage ditch
Property Boundary
Initial RI Surface Sediment Sampling Location
Initial RI Depth Specific Sediment Sampling Location
Supplemental RI Depth Specific Sediment Sampling Location
ST. ADALBERTS CEMETERY
DALE ROAD
ANDERSON ROAD
PARKING AREA
NIAGARA TRANSFORMER
PARKING AREA
Tank Farm
Storage Building
PARKING AREA
MOVIE THEATER
SKATING RINK
RETENTION POND
WEST PUMPHOUSE
EAST PUMPHOUSE
CONRAIL RAILROAD
BROADWAY
071891-12
071891-13
071891-14
071891-15
071891-10
071891-11
071591-5
071891-17
071891-18
071891-8
071891-9
061992-1
061992-2
061992-3
071891-6
071891-7
061992-4
061992-5
061992-6
071891-3
071891-4
071891-1
071891-2
071691-8
071691-9
071691-10
071691-11
NIAGARA TRANSFORMER CORPORATION
REMEDIAL INVESTIGATION
CHEEKTOWAGA, NEW YORK
WOODWARD-CLYDE CONSULTANTS
Consulting Engineers, Geologists and Environmental Scientists
RI SUPPLEMENTAL SEDIMENT SAMPLING LOCATIONS IN THE UPPER DITCH
Job No.: 90C2139
Drawing No.
Date: 10/23/92
Checked by:
Rev No.:
Scale:
0
100'
200'
Figure 2-7



NIAGARA TRANSFORMER SITE
RETENTION POND
BROADWAY
HARLEM ROAD
WALLACE AVENUE
LEMOINE AVENUE
KENNEDY ROAD
GRUNER ROAD
RETENTION POND
DISCHARGE TO STORM SEWER
071591-1
071591-2
071691-1
071691-2
071691-3
071691-4
NTC-S-11 0"-6"
NTC-S-11 6"-12"
NTC-S-12 0"-6"
NTC-S-12 6"-12"
LEGEND:
STORM WATER DRAINAGE DITCH
FENCELINE
BUILDING
RESIDENTIAL AREA
071591-2 Initial RI Surface Sediment Sampling Location
071691-3 071691-4 Initial RI Depth Specific Sediment Sampling Location
NTC-S-11 0"-6" NTC-S-11 6"-12" Supplemental RI Depth Specific Sediment Sampling Location
NIAGARA TRANSFORMER CORPORATION
REMEDIAL INVESTIGATION\FEASIBILITY STUDY
CHEEKTOWAGA, NEW YORK
WOODWARD-CLYDE CONSULTANTS
Consulting Engineers, Geologists and Environmental Scientists
RI SUPPLEMENTAL SEDIMENT SAMPLING LOCATIONS IN THE LOWER DITCH
Job No.: 90C2139
Drawing No.
Date: 02-22-93
Checked by: KRM
Rev. No.:
Scale:
0' 100' 200' 300' 400' 500'
Figure 2-8


LEGEND:
Fenceline
Drainage Ditch
Property Boundary
TP-1 Test Pit Location
TB-1A Exploratory Boring Location
DALE ROAD
ANDERSON ROAD
PARKING AREA
NIAGARA TRANSFORMER
Tank Farm
Storage Building
ST. ADALBERTS CEMETERY
TB-1B
TB-1A
TP-3
TP-2
TP-1
CONRAIL RAILROAD
BROADWAY
NIAGARA TRANSFORMER CORPORATION
REMEDIAL INVESTIGATION
CHEEKTOWAGA, NEW YORK
WOODWARD-CLYDE CONSULTANTS
Consulting Engineers, Geologists and Environmental Scientists
TEST PIT AND TEST BORING LOCATION
PLAN: SUPPLEMENTAL RI
Job No.: 90C2139
Drawing No.
Date:
Checked by:
Rev No.:
Scale:
0
100'
200'
Figure 2-9


THRUWAY MALL
HARLEM ROAD
ROLLER RINK
THEATRE
CEMETERY
CONRAIL
BROADWAY
WALLACE AVENUE
LEMOINE AVENUE
KENNEDY ROAD
061992PS-3-A
061992PS-3-B
061992PS-1-A
061992PS-1-B
061992PS-1-C
061992PS-2-A
061992PS-2-B
061992PS-2-C
071691-5
071591-3
071591-4
061992PS-4-G
LEGEND:
RESIDENTIAL AREA
071591-4
SURFACE SEDIMENT SAMPLING LOCATION
Initial RI Sampling Event conducted in 7/91
061992PS-2-A
061992PS-2-B
061992PS-2-C
DEPTH SPECIFIC SEDIMENT SAMPLING LOCATION
Supplemental RI Sampling Event conducted in 6/92
NIAGARA TRANSFORMER REMEDIAL INVESTIGATION
CHEEKTOWAGA, NEW YORK
WOODWARD-CLYDE CONSULTANTS
Consulting Engineers, Geologists and Environmental Scientists
RETENTION POND SURFICIAL AND DEPTH SPECIFIC
SEDIMENT SAMPLING LOCATIONS
Job No.: 90C2139
Drawing No.
Date:
Checked by:
Rev. No.:
Scale:
1"=200'
Figure 2-10

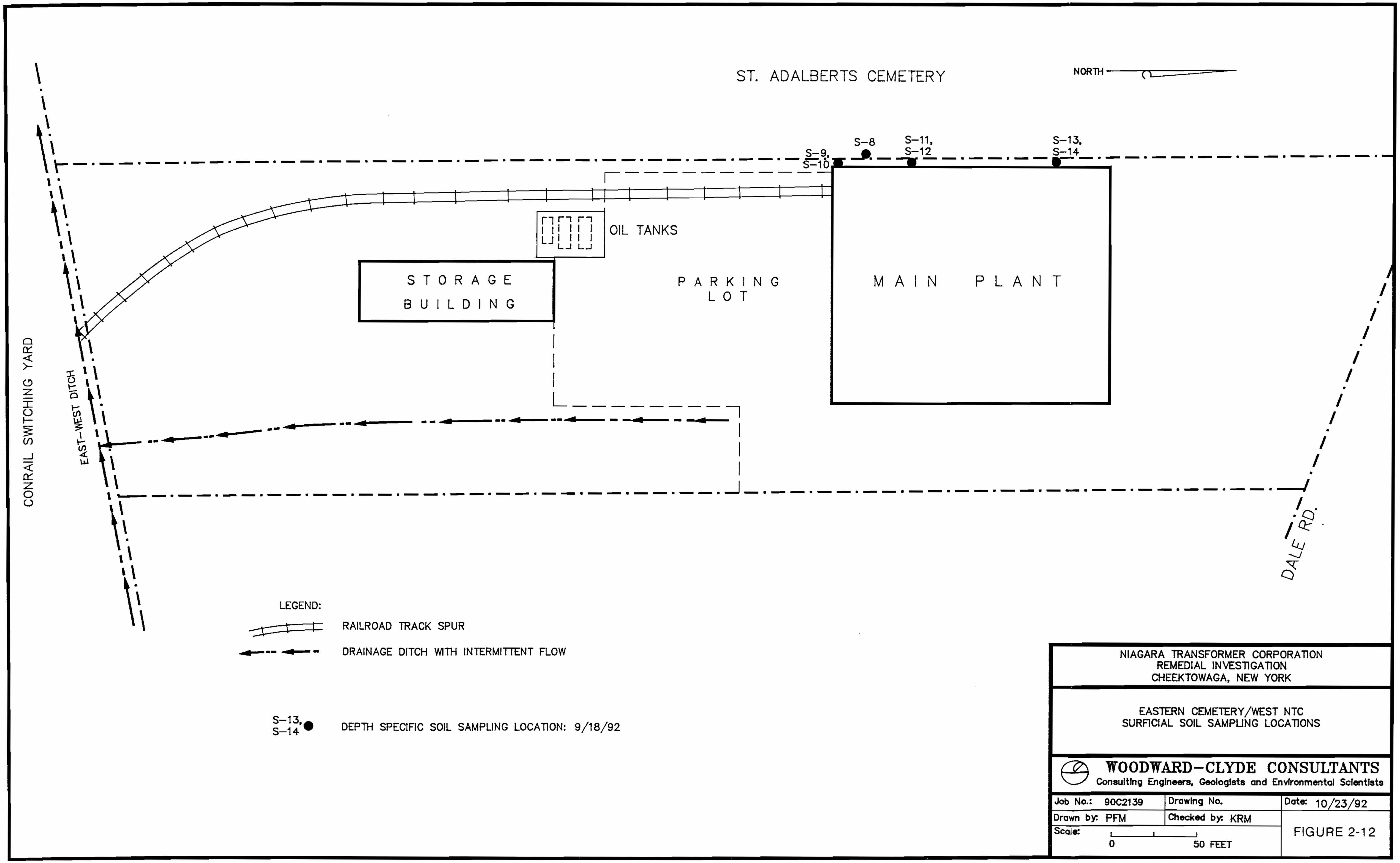


NIAGARA TRANSFORMER CORPORATION
REMEDIAL INVESTIGATION
CHEEKTOWAGA, NEW YORK

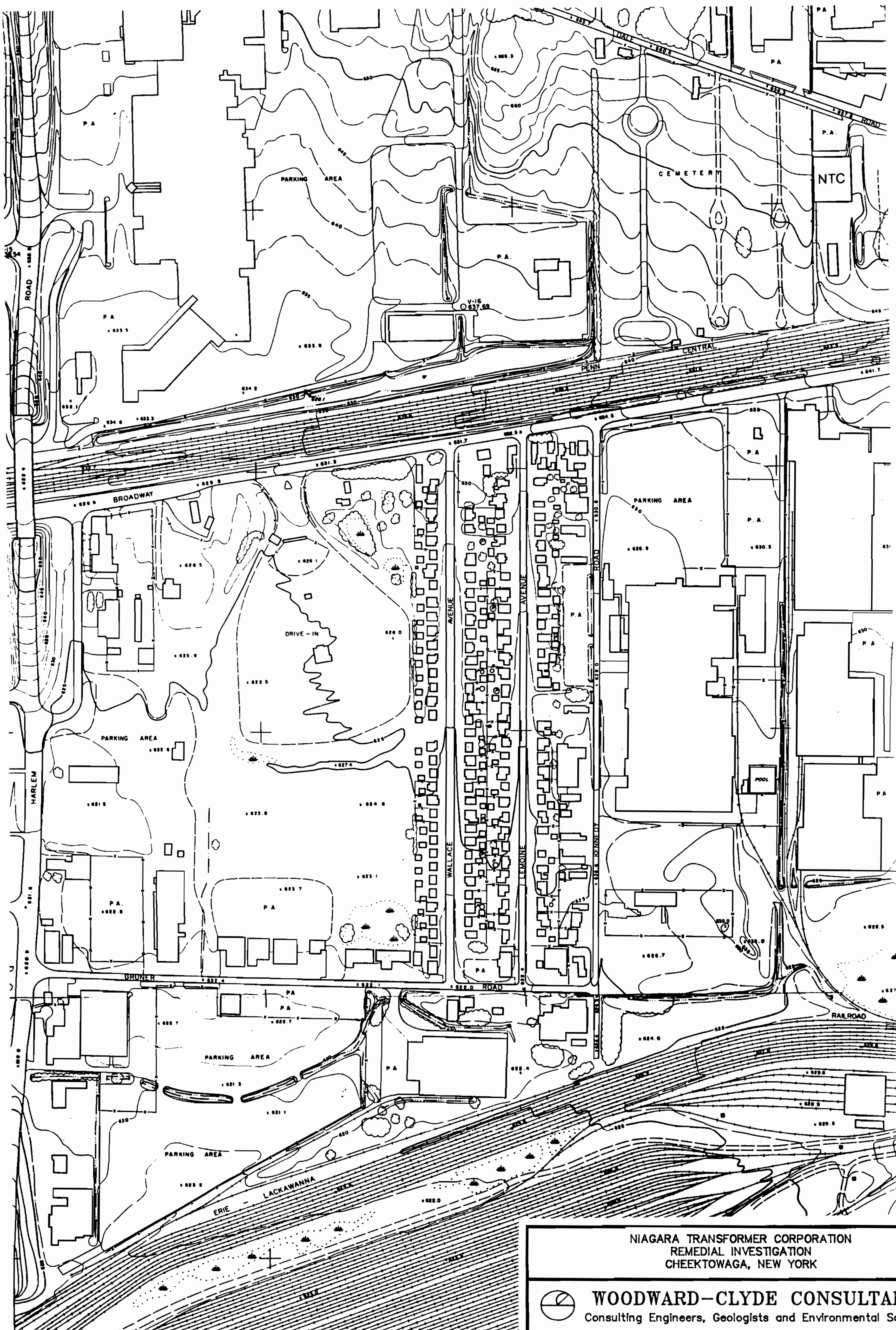
EASTERN CEMETERY/WEST NTC
SURFICIAL SOIL SAMPLING LOCATIONS

WOODWARD-CLYDE CONSULTANTS
Consulting Engineers, Geologists and Environmental Scientists

Job No.: 90C2139	Drawing No.	Date: 10/23/92
Drawn by: PFM	Checked by: KRM	Figure 2-11
Scale: 0 — 50 FEET		



ST. ADALBERTS CEMETERY
NORTH
S-8
S-9,
S-10
S-11,
S-12
S-13,
S-14
OIL TANKS
STORAGE BUILDING
PARKING LOT
MAIN PLANT
CONRAIL SWITCHING YARD
EAST-WEST DITCH
DALE RD.
LEGEND:
RAILROAD TRACK SPUR
DRAINAGE DITCH WITH INTERMITTENT FLOW
S-13,
S-14
DEPTH SPECIFIC SOIL SAMPLING LOCATION: 9/18/92
NIAGARA TRANSFORMER CORPORATION
REMEDIAL INVESTIGATION
CHEEKTOWAGA, NEW YORK
EASTERN CEMETERY/WEST NTC
SURFICIAL SOIL SAMPLING LOCATIONS
WOODWARD-CLYDE CONSULTANTS
Consulting Engineers, Geologists and Environmental Scientists
Job No.: 90C2139
Drawing No.
Date: 10/23/92
Drawn by: PFM
Checked by: KRM
Scale:
0
50 FEET
FIGURE 2-12

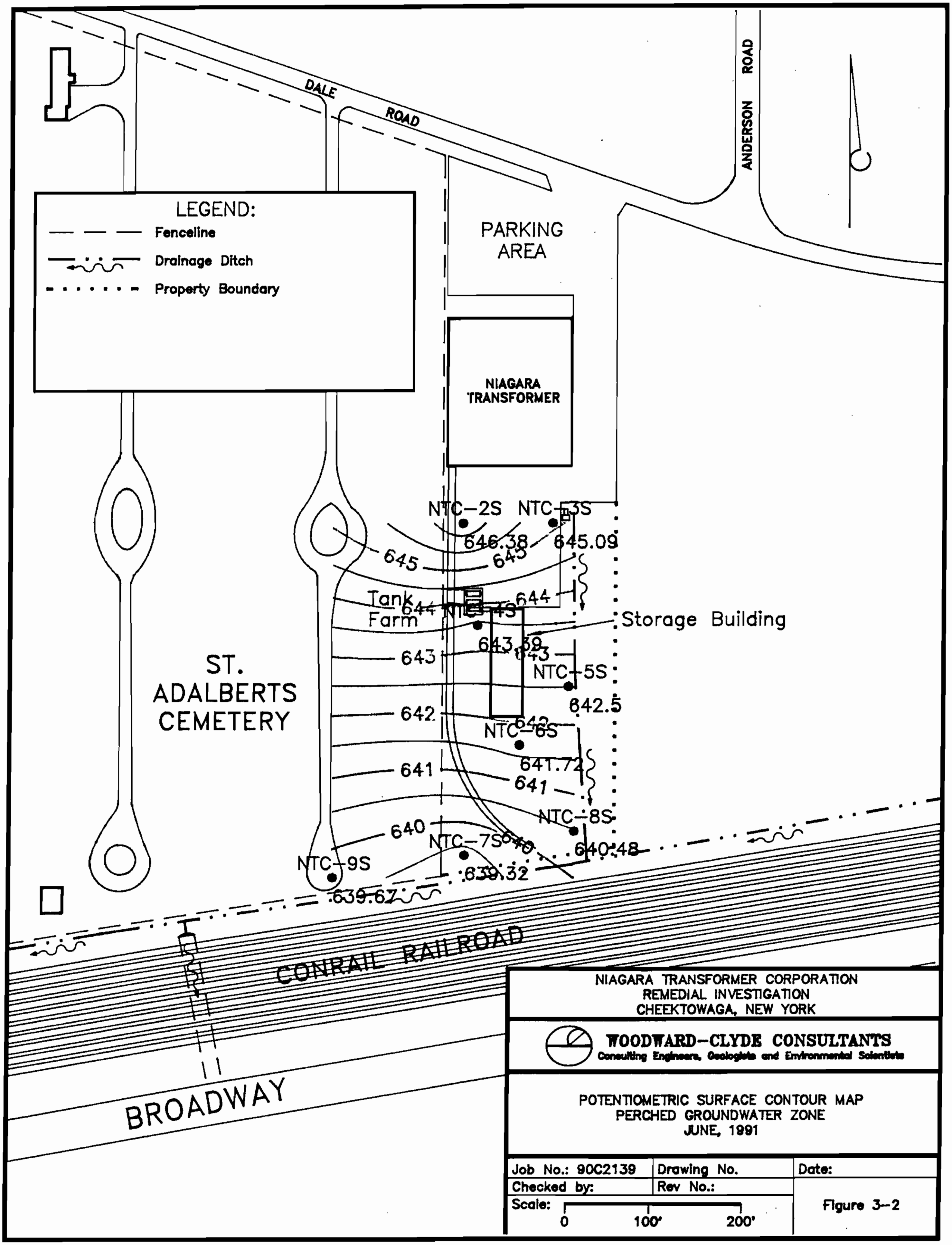


NIAGARA TRANSFORMER CORPORATION
REMEDIAL INVESTIGATION
CHEEKTOWAGA, NEW YORK

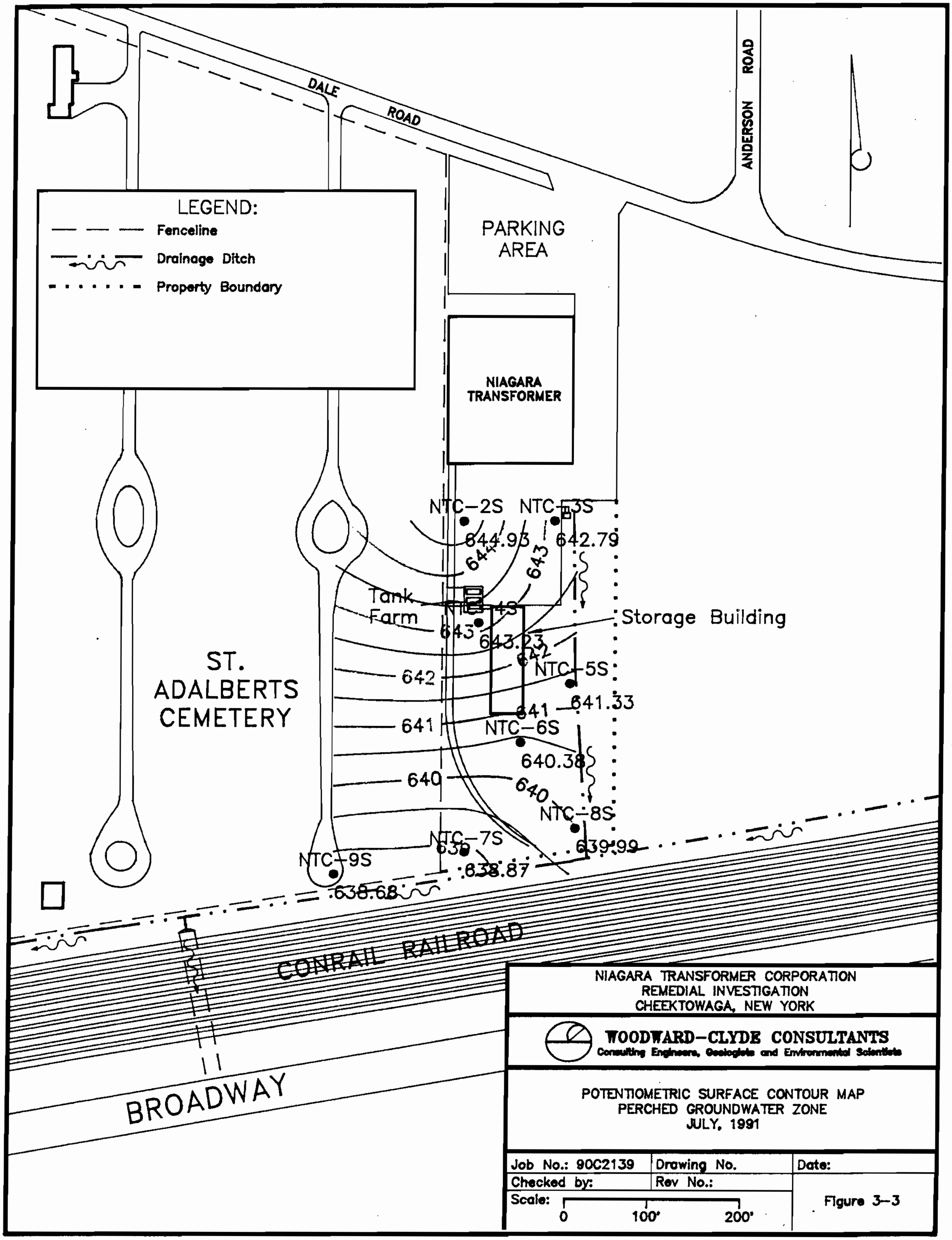
WOODWARD-CLYDE CONSULTANTS
Consulting Engineers, Geologists and Environmental Scientists

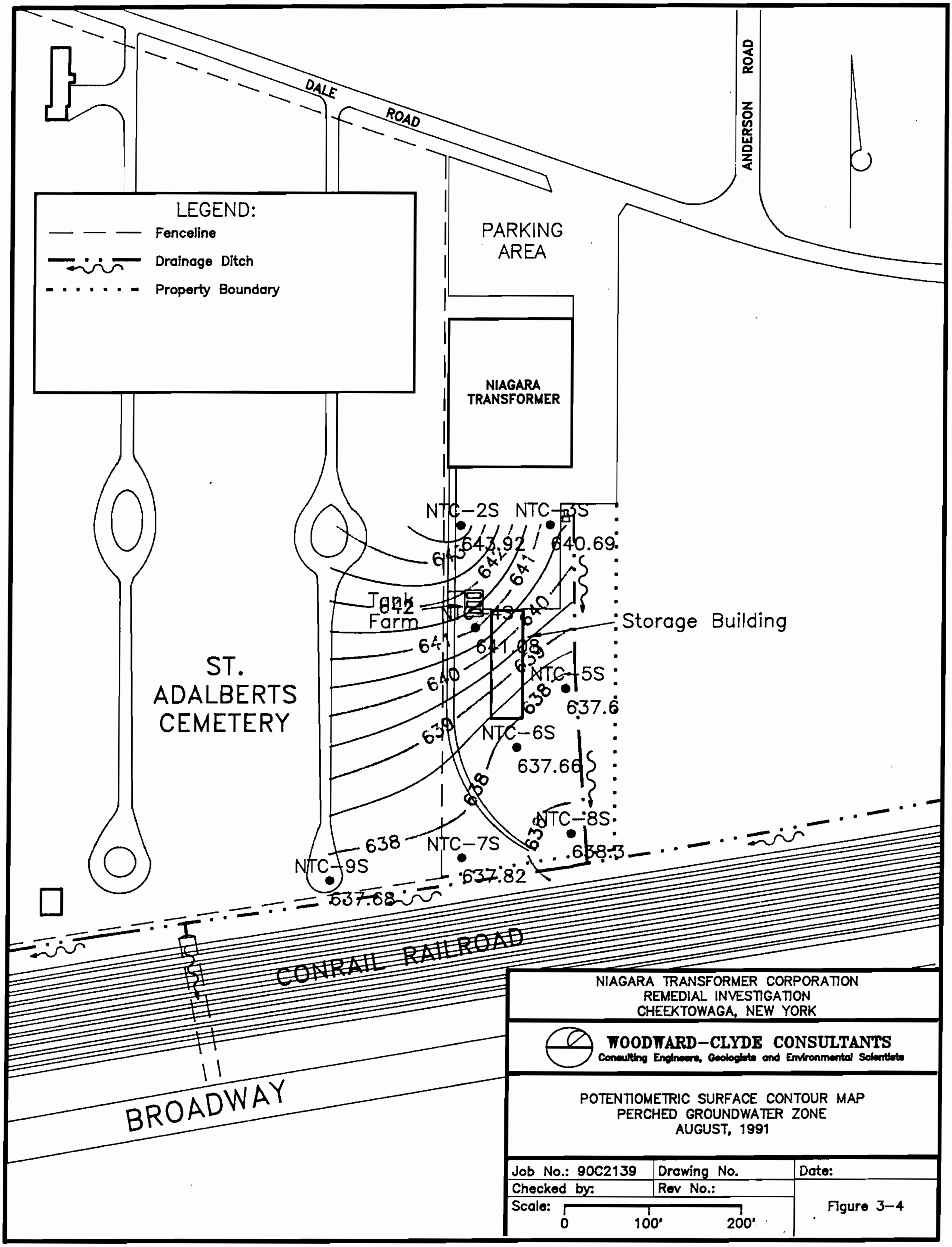
TOPOGRAPHIC MAP OF THE SITE
AND SURROUNDING AREA

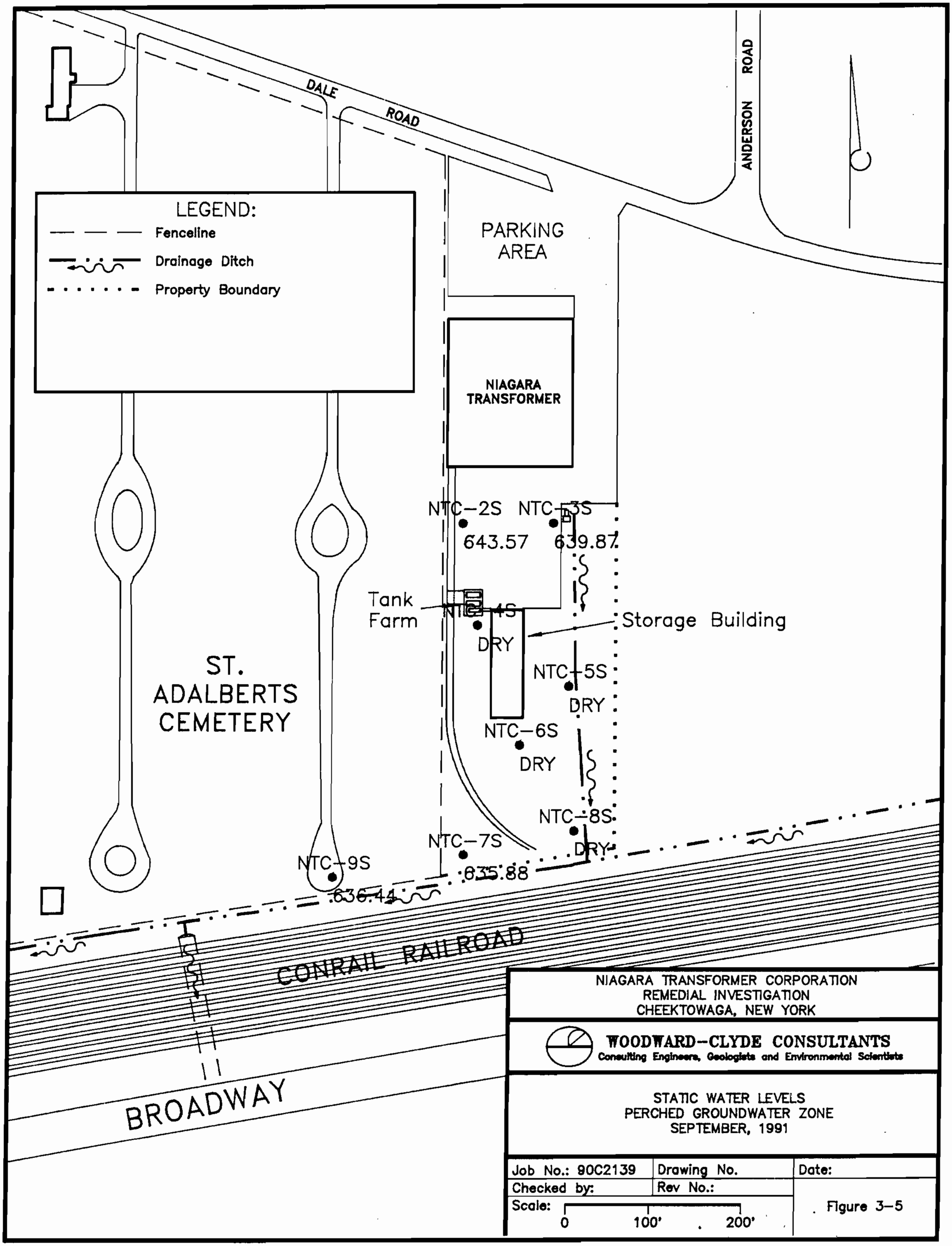
Job No.:	Drawing No.	Date:
Checked by:	Rev. No.:	Figure 3-1
Scale:		

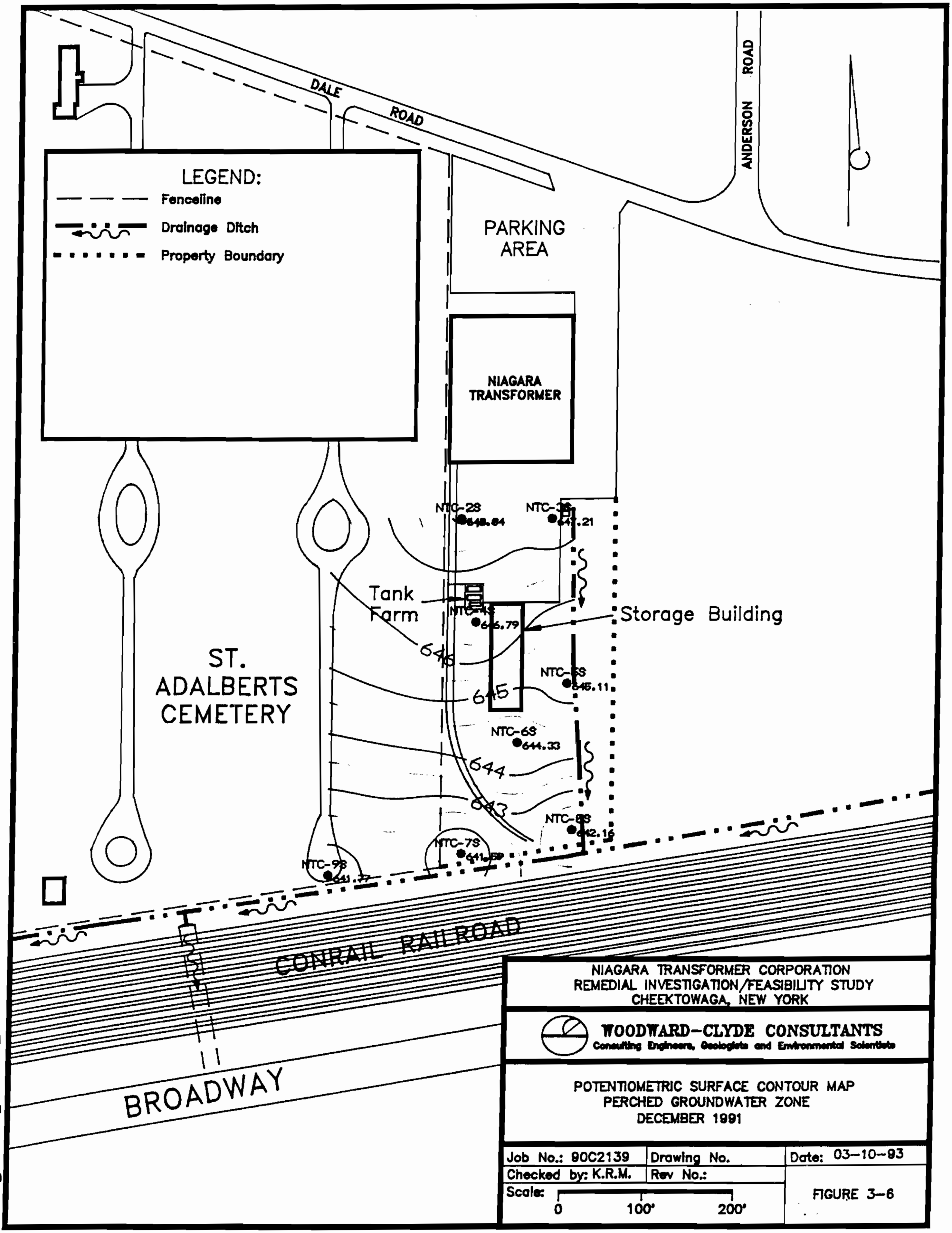


DALE ROAD
ANDERSON ROAD
LEGEND:
Fenceline
Drainage Ditch
Property Boundary
PARKING AREA
NIAGARA TRANSFORMER
NTC-2S
NTC-3S
646.38
645.09
645
645
Tank Farm
644
NTC-4S
644
Storage Building
643.39
643
643
NTC-5S
642.5
642
642
NTC-6S
641.72
641
641
NTC-8S
640
NTC-7S
640
640.48
NTC-9S
639.32
639.67
ST. ADALBERTS CEMETERY
CONRAIL RAILROAD
BROADWAY
NIAGARA TRANSFORMER CORPORATION
REMEDIAL INVESTIGATION
CHEEKTOWAGA, NEW YORK
WOODWARD-CLYDE CONSULTANTS
Consulting Engineers, Geologists and Environmental Scientists
POTENTIOMETRIC SURFACE CONTOUR MAP
PERCHED GROUNDWATER ZONE
JUNE, 1991
Job No.: 90C2139
Drawing No.
Date:
Checked by:
Rev No.:
Scale:
0
100'
200'
Figure 3-2

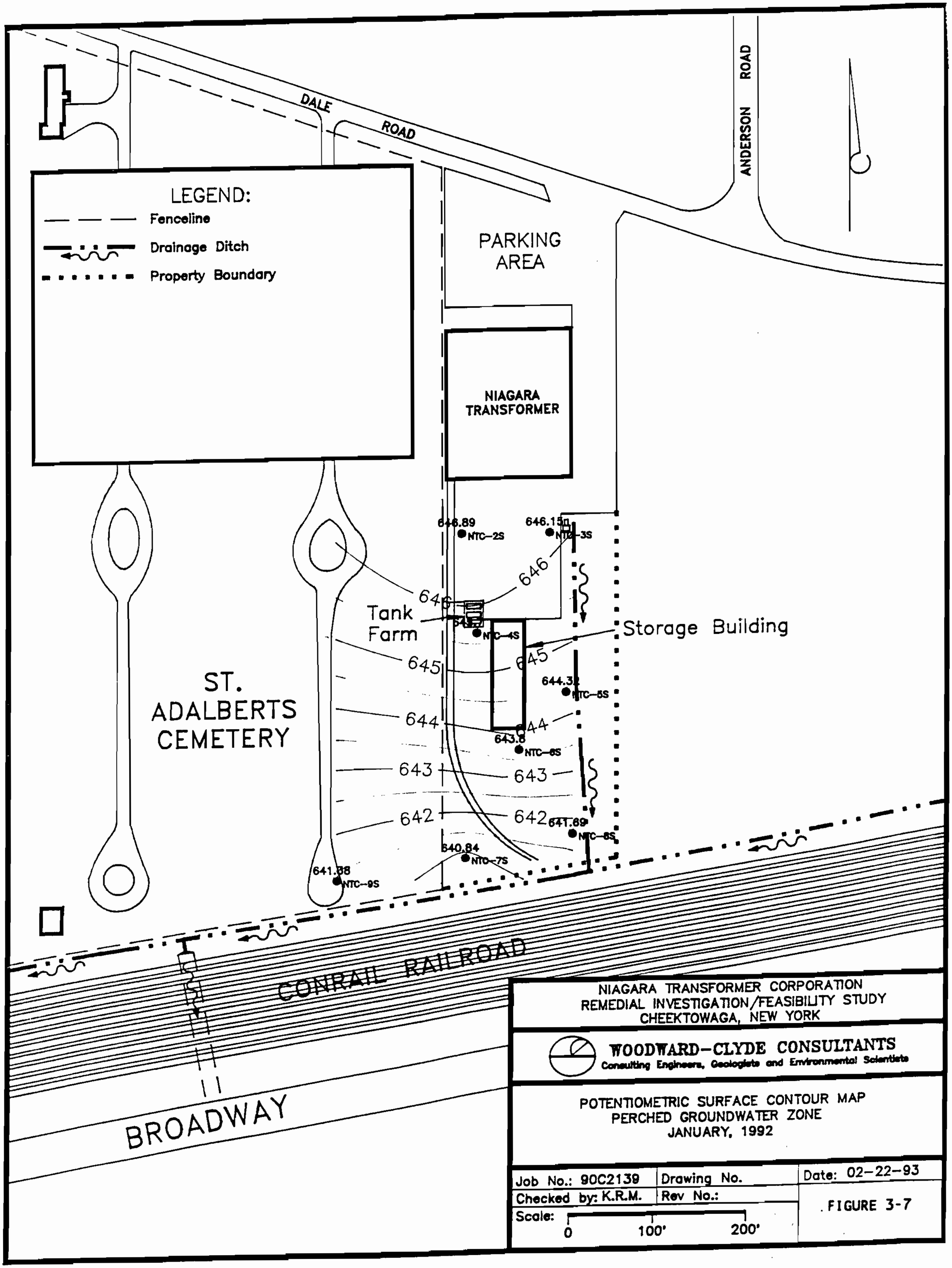

DALE ROAD
ANDERSON ROAD
LEGEND:
Fenceline
Drainage Ditch
Property Boundary
PARKING AREA
NIAGARA TRANSFORMER
NTC-2S
NTC-3S
644.93
642.79
644
643
Tank Farm
NTC-4S
643
643.23
642
Storage Building
NTC-5S
642
641
641.33
641
NTC-6S
640.38
640
640
NTC-8S
NTC-7S
639
639.99
638.87
NTC-9S
638.68
ST. ADALBERTS CEMETERY
CONRAIL RAILROAD
BROADWAY
NIAGARA TRANSFORMER CORPORATION
REMEDIAL INVESTIGATION
CHEEKTOWAGA, NEW YORK
WOODWARD-CLYDE CONSULTANTS
Consulting Engineers, Geologists and Environmental Scientists
POTENTIOMETRIC SURFACE CONTOUR MAP
PERCHED GROUNDWATER ZONE
JULY, 1991
Job No.: 90C2139
Drawing No.
Date:
Checked by:
Rev No.:
Scale:
0
100'
200'
Figure 3-3

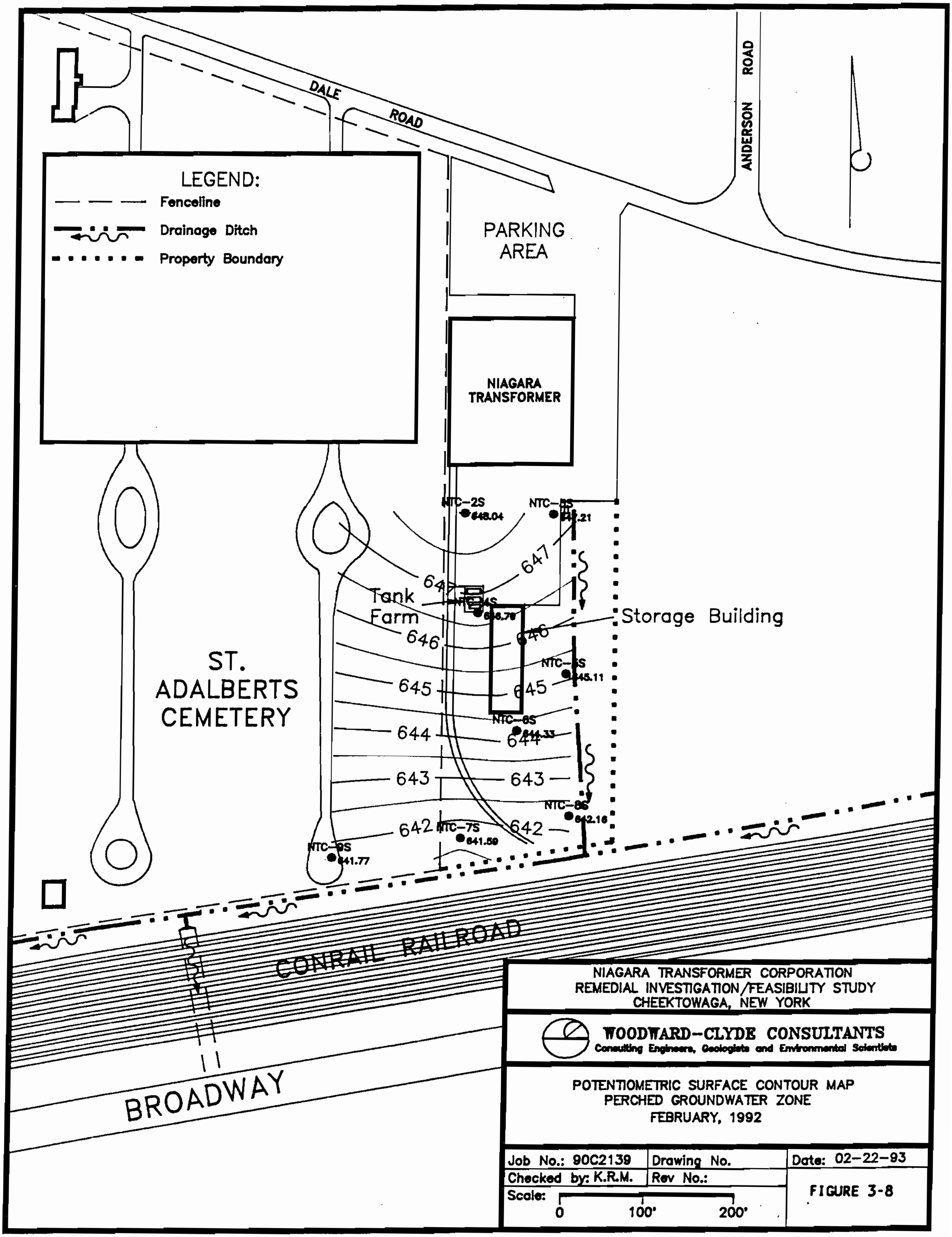

LEGEND:
Fenceline
Drainage Ditch
Property Boundary
DALE ROAD
ANDERSON ROAD
PARKING AREA
NIAGARA TRANSFORMER
NTC-2S
NTC-3S
643.92
640.69
643
642
641
640
639
638
Tank Farm
Storage Building
641.08
NTC-5S
637.6
NTC-6S
637.66
NTC-8S
638.3
NTC-7S
637.82
NTC-9S
637.68
ST. ADALBERTS CEMETERY
CONRAIL RAILROAD
BROADWAY
NIAGARA TRANSFORMER CORPORATION
REMEDIAL INVESTIGATION
CHEEKTOWAGA, NEW YORK
WOODWARD-CLYDE CONSULTANTS
Consulting Engineers, Geologists and Environmental Scientists
POTENTIOMETRIC SURFACE CONTOUR MAP
PERCHED GROUNDWATER ZONE
AUGUST, 1991
Job No.: 90C2139
Drawing No.
Date:
Checked by:
Rev No.:
Scale:
0
100'
200'
Figure 3-4


DALE ROAD
ANDERSON ROAD
LEGEND:
Fenceline
Drainage Ditch
Property Boundary
PARKING AREA
NIAGARA TRANSFORMER
NTC-2S
643.57
NTC-3S
639.87
Tank Farm
NTC-4S
DRY
Storage Building
NTC-5S
DRY
NTC-6S
DRY
NTC-8S
DRY
NTC-7S
635.88
NTC-9S
636.44
ST. ADALBERTS CEMETERY
CONRAIL RAILROAD
BROADWAY
NIAGARA TRANSFORMER CORPORATION
REMEDIAL INVESTIGATION
CHEEKTOWAGA, NEW YORK
WOODWARD-CLYDE CONSULTANTS
Consulting Engineers, Geologists and Environmental Scientists
STATIC WATER LEVELS
PERCHED GROUNDWATER ZONE
SEPTEMBER, 1991
Job No.: 90C2139
Drawing No.
Date:
Checked by:
Rev No.:
Scale:
0
100'
200'
Figure 3-5



LEGEND:
Fenceline
Drainage Ditch
Property Boundary
DALE ROAD
ANDERSON ROAD
PARKING AREA
NIAGARA TRANSFORMER
Tank Farm
Storage Building
ST. ADALBERTS CEMETERY
NTC-2S
NTC-3S
NTC-5S
645.11
NTC-6S
644.33
NTC-8S
642.16
NTC-7S
641.59
NTC-9S
641.77
646
645
644
643
CONRAIL RAILROAD
BROADWAY
NIAGARA TRANSFORMER CORPORATION
REMEDIAL INVESTIGATION/FEASIBILITY STUDY
CHEEKTOWAGA, NEW YORK
WOODWARD-CLYDE CONSULTANTS
Consulting Engineers, Geologists and Environmental Scientists
POTENTIOMETRIC SURFACE CONTOUR MAP
PERCHED GROUNDWATER ZONE
DECEMBER 1991
Job No.: 90C2139
Drawing No.
Date: 03-10-93
Checked by: K.R.M.
Rev No.:
Scale:
0
100'
200'
FIGURE 3-6


DALE ROAD
ANDERSON ROAD
LEGEND:
Fenceline
Drainage Ditch
Property Boundary
PARKING AREA
NIAGARA TRANSFORMER
646.89
NTC-2S
646.15
NTC-3S
646
646
Tank Farm
NTC-4S
Storage Building
645
645
NTC-5S
644
644
643.8
NTC-6S
643
643
642
642
641.69
NTC-8S
640.84
NTC-7S
NTC-9S
ST. ADALBERTS CEMETERY
CONRAIL RAILROAD
BROADWAY
NIAGARA TRANSFORMER CORPORATION
REMEDIAL INVESTIGATION/FEASIBILITY STUDY
CHEEKTOWAGA, NEW YORK
WOODWARD-CLYDE CONSULTANTS
Consulting Engineers, Geologists and Environmental Scientists
POTENTIOMETRIC SURFACE CONTOUR MAP
PERCHED GROUNDWATER ZONE
JANUARY, 1992
Job No.: 90C2139
Drawing No.
Date: 02-22-93
Checked by: K.R.M.
Rev No.:
FIGURE 3-7
Scale:
0
100'
200'



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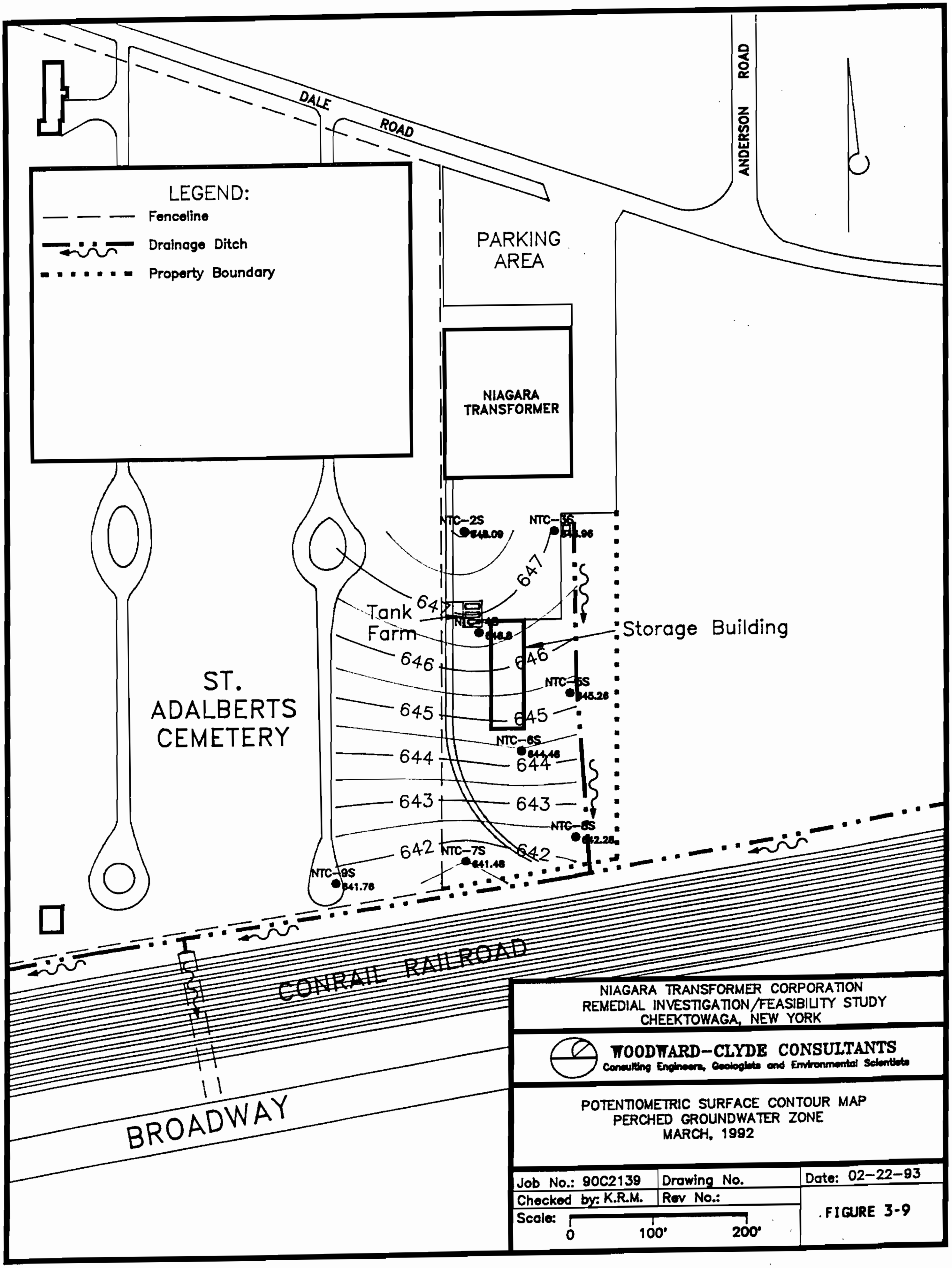
REMEDIAL INVESTIGATION/FEASIBILITY STUDY
CHEEKTOWAGA, NEW YORK

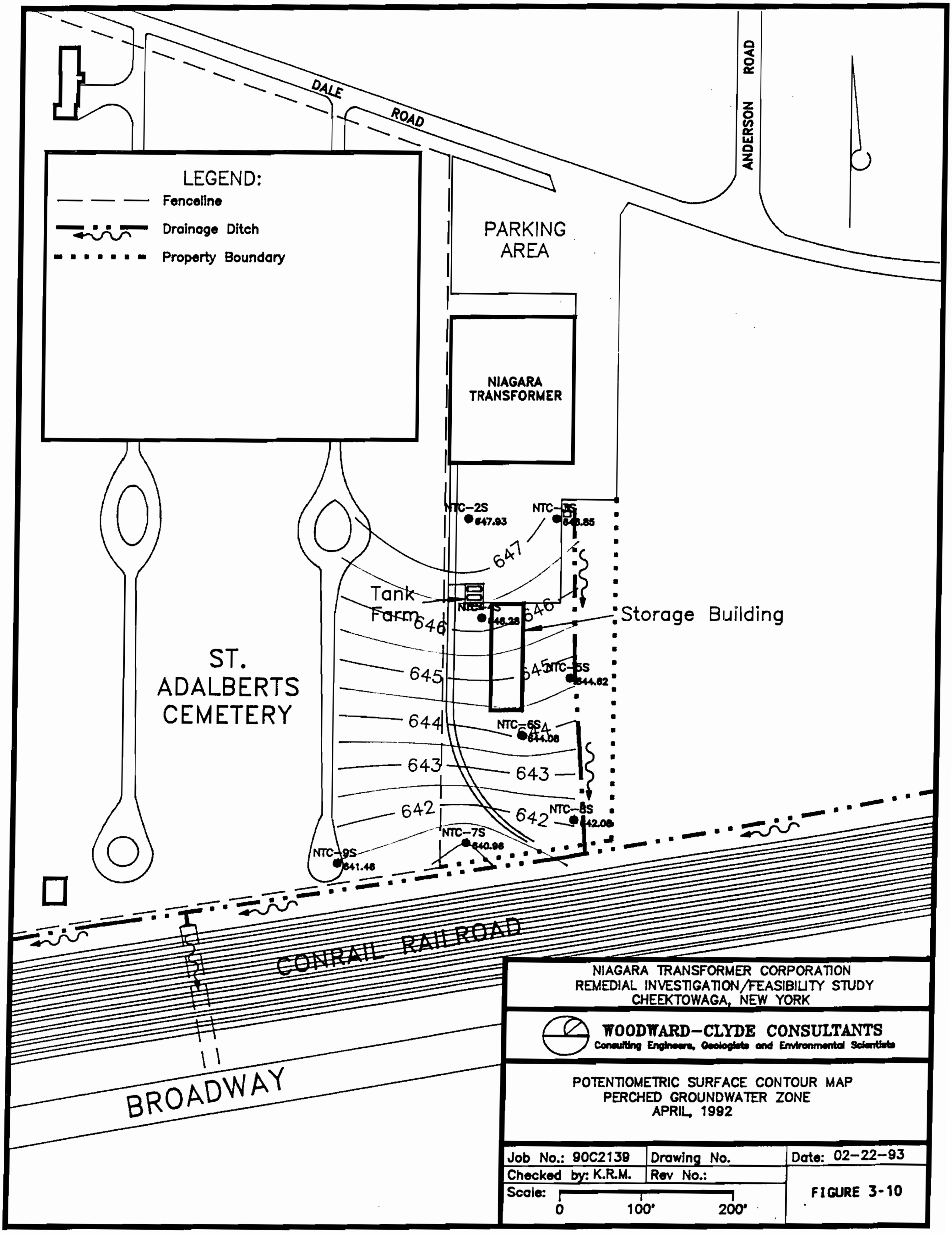
WOODWARD-CLYDE CONSULTANTS
Consulting Engineers, Geologists and Environmental Scientists

POTENTIOMETRIC SURFACE CONTOUR MAP
PERCHED GROUNDWATER ZONE
FEBRUARY, 1992

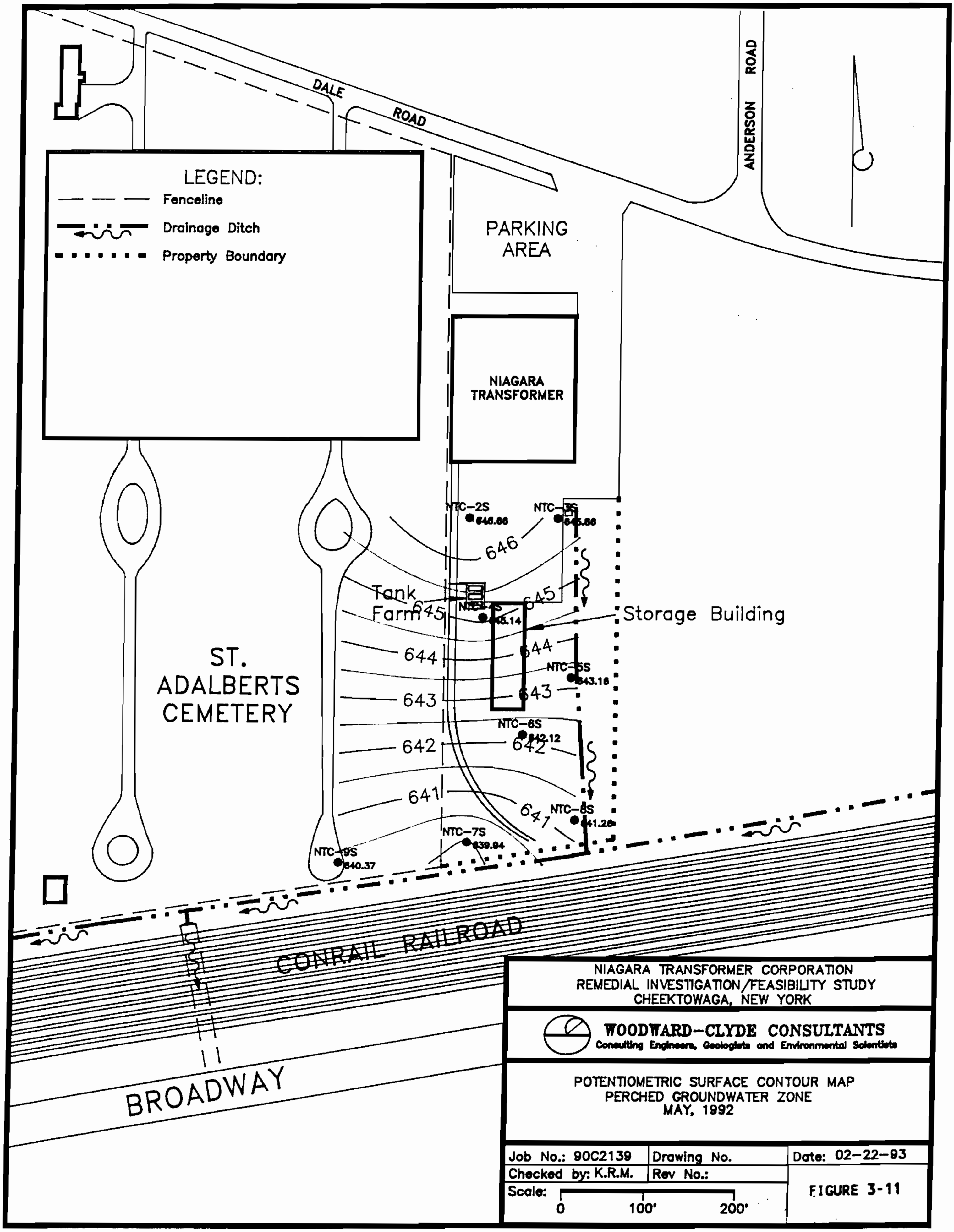
Job No.: 90C2139	Drawing No.	Date: 02-22-93
Checked by: K.R.M.	Rev No.:	FIGURE 3-8
Scale: 0 100' 200'		



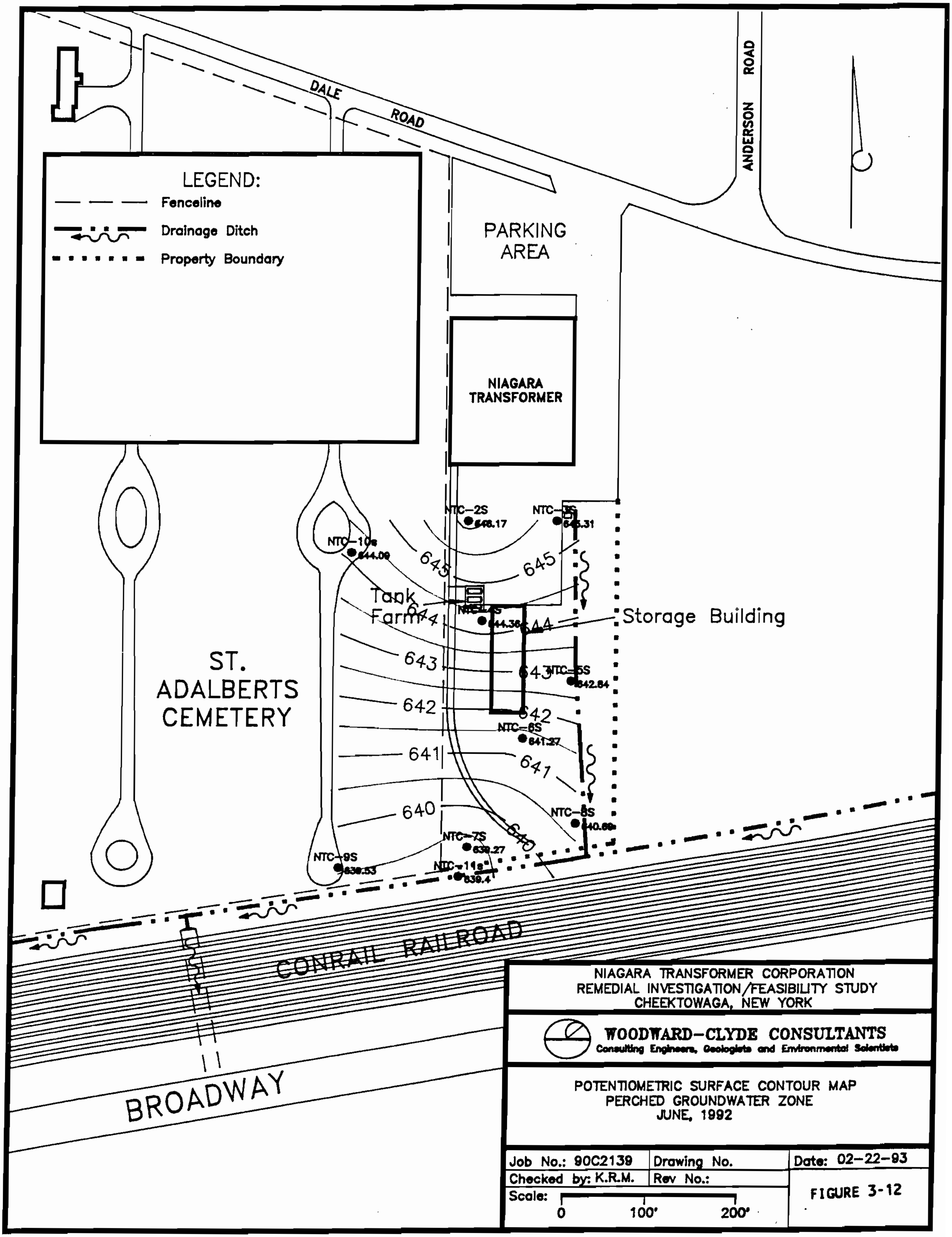
LEGEND:
Fenceline
Drainage Ditch
Property Boundary
DALE ROAD
ANDERSON ROAD
PARKING AREA
NIAGARA TRANSFORMER
NTC-2S
648.09
NTC-3S
647
Tank Farm
NTC-4S
646.8
Storage Building
646
NTC-5S
645.26
645
NTC-6S
644.46
644
643
NTC-8S
642.28
642
NTC-7S
641.48
NTC-9S
641.76
ST. ADALBERTS CEMETERY
CONRAIL RAILROAD
BROADWAY
NIAGARA TRANSFORMER CORPORATION
REMEDIAL INVESTIGATION/FEASIBILITY STUDY
CHEEKTOWAGA, NEW YORK
WOODWARD-CLYDE CONSULTANTS
Consulting Engineers, Geologists and Environmental Scientists
POTENTIOMETRIC SURFACE CONTOUR MAP
PERCHED GROUNDWATER ZONE
MARCH, 1992
Job No.: 90C2139
Drawing No.
Date: 02-22-93
Checked by: K.R.M.
Rev No.:
Scale:
0
100'
200'
FIGURE 3-9



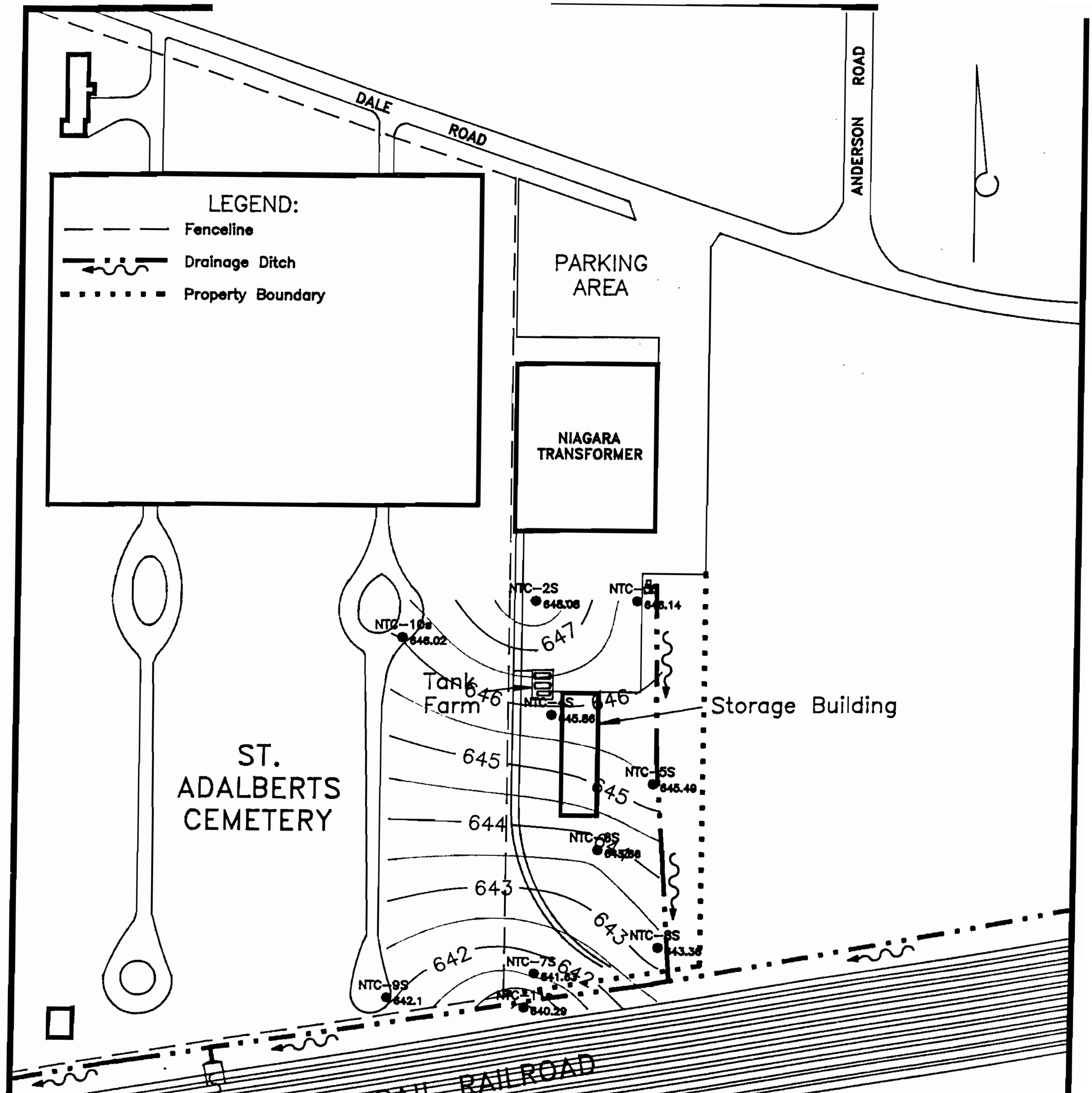
LEGEND:
Fenceline
Drainage Ditch
Property Boundary
DALE ROAD
ANDERSON ROAD
PARKING AREA
NIAGARA TRANSFORMER
NTC-2S
647.93
644.62
644.08
642.08
640.96
641.46
NTC-5S
NTC-6S
NTC-7S
NTC-8S
NTC-9S
647
646
645
644
643
642
Tank Farm
Storage Building
ST. ADALBERTS CEMETERY
CONRAIL RAILROAD
BROADWAY
NIAGARA TRANSFORMER CORPORATION
REMEDIAL INVESTIGATION/FEASIBILITY STUDY
CHEEKTOWAGA, NEW YORK
WOODWARD-CLYDE CONSULTANTS
Consulting Engineers, Geologists and Environmental Scientists
POTENTIOMETRIC SURFACE CONTOUR MAP
PERCHED GROUNDWATER ZONE
APRIL, 1992
Job No.: 90C2139
Drawing No.
Date: 02-22-93
Checked by: K.R.M.
Rev No.:
Scale:
0
100'
200'
FIGURE 3-10



LEGEND:
Fenceline
Drainage Ditch
Property Boundary
DALE ROAD
ANDERSON ROAD
PARKING AREA
NIAGARA TRANSFORMER
Tank Farm
Storage Building
ST. ADALBERTS CEMETERY
NTC-2S
646.66
NTC-6S
642.12
NTC-8S
NTC-7S
639.94
NTC-9S
640.37
646
645
644
643
642
641
CONRAIL RAILROAD
BROADWAY
NIAGARA TRANSFORMER CORPORATION
REMEDIAL INVESTIGATION/FEASIBILITY STUDY
CHEEKTOWAGA, NEW YORK
WOODWARD-CLYDE CONSULTANTS
Consulting Engineers, Geologists and Environmental Scientists
POTENTIOMETRIC SURFACE CONTOUR MAP
PERCHED GROUNDWATER ZONE
MAY, 1992
Job No.: 90C2139
Drawing No.
Date: 02-22-93
Checked by: K.R.M.
Rev No.:
Scale:
0
100'
200'
FIGURE 3-11



LEGEND:
Fenceline
Drainage Ditch
Property Boundary
DALE ROAD
ANDERSON ROAD
PARKING AREA
NIAGARA TRANSFORMER
Tank Farm
Storage Building
ST. ADALBERTS CEMETERY
CONRAIL RAILROAD
BROADWAY
NTC-2S
NTC-10s
644.09
NTC-4S
644.36
NTC-5S
642.84
NTC-6S
641.27
NTC-8S
NTC-7S
NTC-9S
NTC-11s
639.4
645
644
643
642
641
640
NIAGARA TRANSFORMER CORPORATION
REMEDIAL INVESTIGATION/FEASIBILITY STUDY
CHEEKTOWAGA, NEW YORK
WOODWARD-CLYDE CONSULTANTS
Consulting Engineers, Geologists and Environmental Scientists
POTENTIOMETRIC SURFACE CONTOUR MAP
PERCHED GROUNDWATER ZONE
JUNE, 1992
Job No.: 90C2139
Drawing No.
Date: 02-22-93
Checked by: K.R.M.
Rev No.:
Scale: 0 100' 200'
FIGURE 3-12

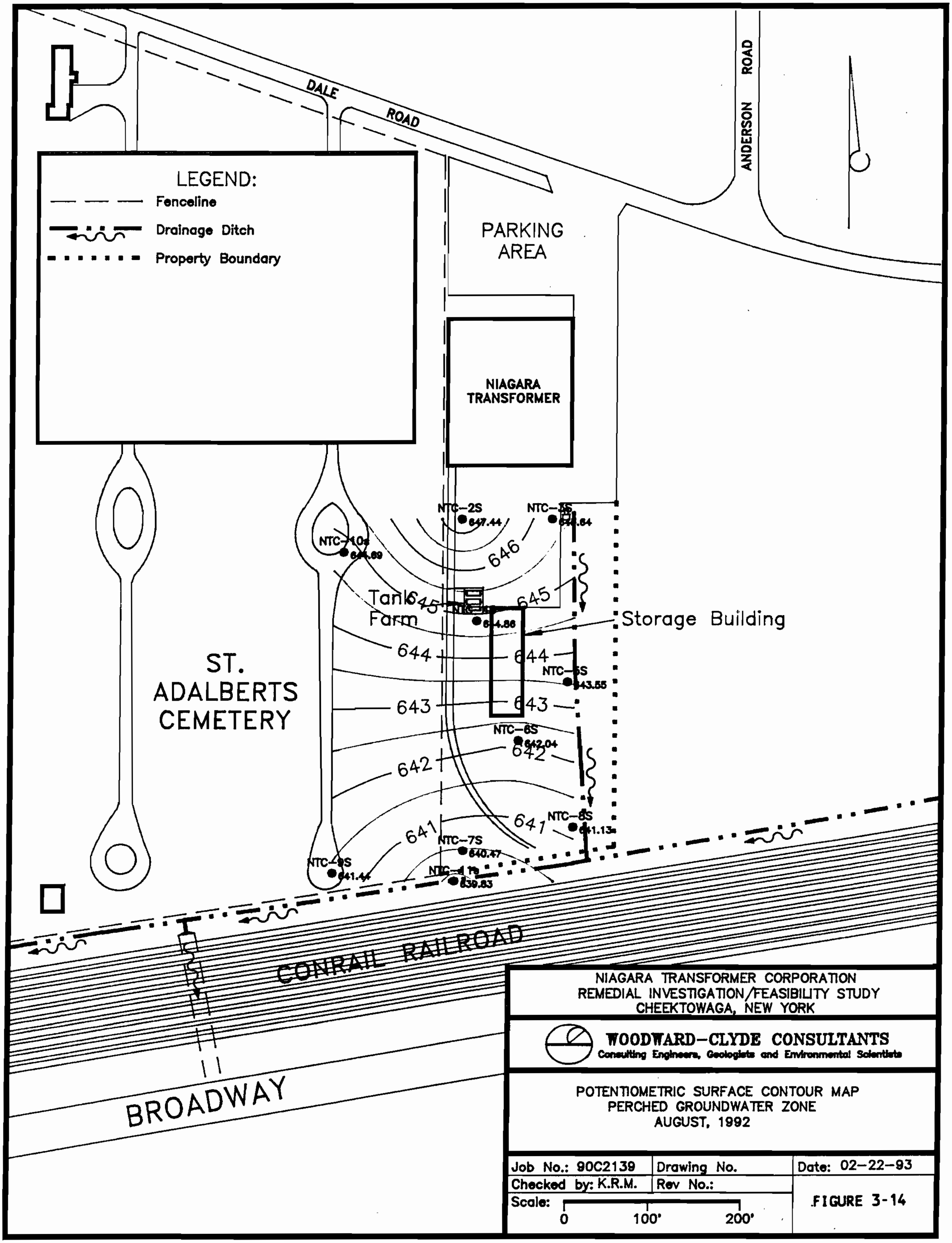


NIAGARA TRANSFORMER CORPORATION
REMEDIAL INVESTIGATION/FEASIBILITY STUDY
CHEEKTOWAGA, NEW YORK

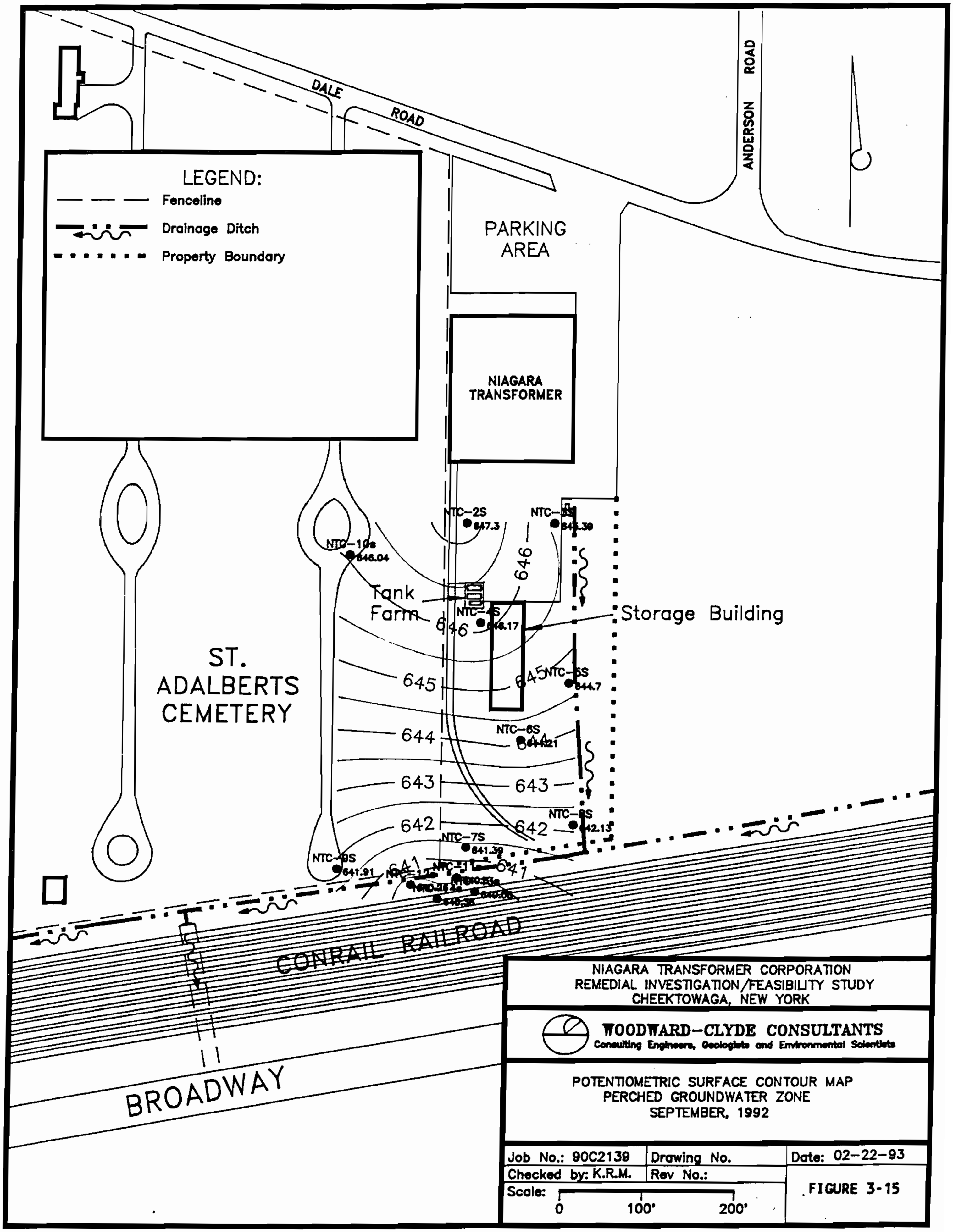
WOODWARD-CLYDE CONSULTANTS
Consulting Engineers, Geologists and Environmental Scientists

POTENTIOMETRIC SURFACE CONTOUR MAP
PERCHED GROUNDWATER ZONE
JULY, 1992

Job No.: 90C2139	Drawing No.	Date: 02-22-93
Checked by: K.R.M.	Rev No.:	FIGURE 3-13
Scale: 0 100' 200'		



LEGEND:
Fenceline
Drainage Ditch
Property Boundary
DALE ROAD
ANDERSON ROAD
PARKING AREA
NIAGARA TRANSFORMER
NTC-2S
647.44
NTC-10s
646
645
Tank Farm
Storage Building
644
643
642
641
NTC-6S
642.04
NTC-7S
640.47
NTC-8S
NTC-9S
639.83
ST. ADALBERTS CEMETERY
CONRAIL RAILROAD
BROADWAY
NIAGARA TRANSFORMER CORPORATION
REMEDIAL INVESTIGATION/FEASIBILITY STUDY
CHEEKTOWAGA, NEW YORK
WOODWARD-CLYDE CONSULTANTS
Consulting Engineers, Geologists and Environmental Scientists
POTENTIOMETRIC SURFACE CONTOUR MAP
PERCHED GROUNDWATER ZONE
AUGUST, 1992
Job No.: 90C2139
Drawing No.
Date: 02-22-93
Checked by: K.R.M.
Rev No.:
Scale:
0
100'
200'
FIGURE 3-14

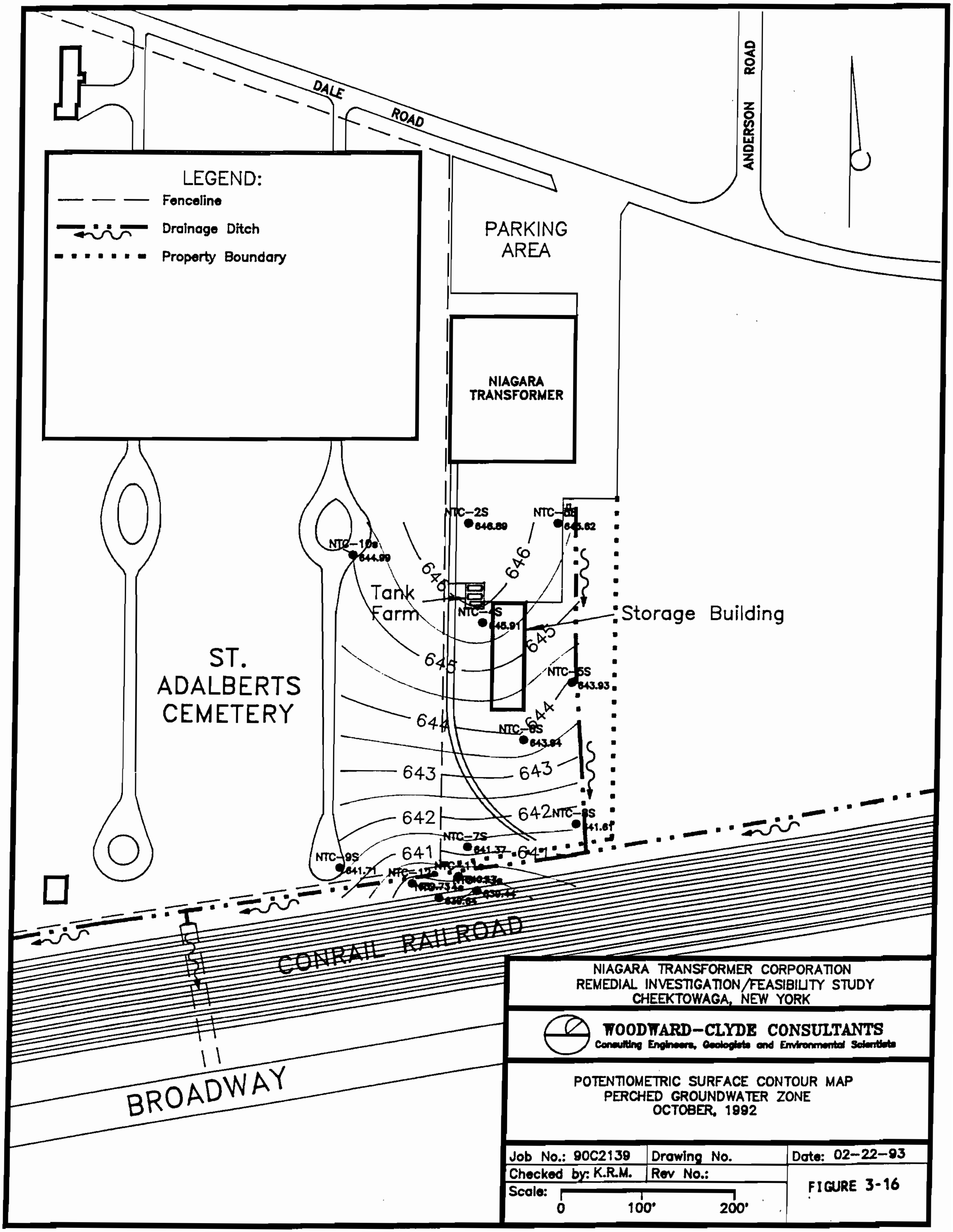


NIAGARA TRANSFORMER CORPORATION
REMEDIAL INVESTIGATION/FEASIBILITY STUDY
CHEEKTOWAGA, NEW YORK

WOODWARD-CLYDE CONSULTANTS
Consulting Engineers, Geologists and Environmental Scientists

POTENTIOMETRIC SURFACE CONTOUR MAP
PERCHED GROUNDWATER ZONE
SEPTEMBER, 1992

Job No.: 90C2139	Drawing No.	Date: 02-22-93
Checked by: K.R.M.	Rev No.:	FIGURE 3-15
Scale: 0 100' 200'		



NIAGARA TRANSFORMER CORPORATION
REMEDIAL INVESTIGATION/FEASIBILITY STUDY
CHEEKTOWAGA, NEW YORK

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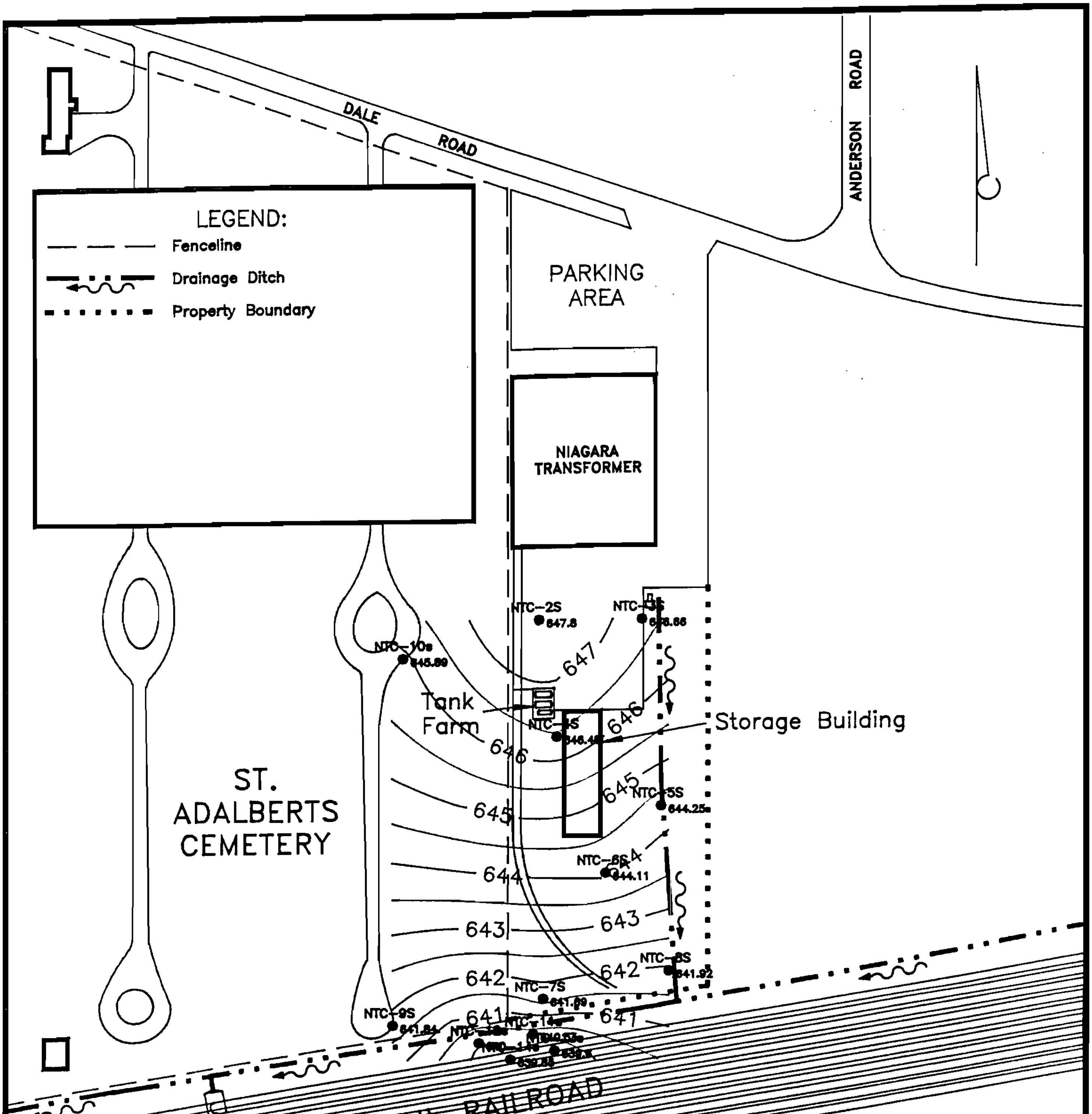
Consulting Engineers, Geologists and Environmental Scientists

POTENTIOMETRIC SURFACE CONTOUR MAP
PERCHED GROUNDWATER ZONE
OCTOBER, 1992

Job No.: 90C2139	Drawing No.	Date: 02-22-93
Checked by: K.R.M.	Rev No.:	FIGURE 3-16
Scale: 0 100' 200'		

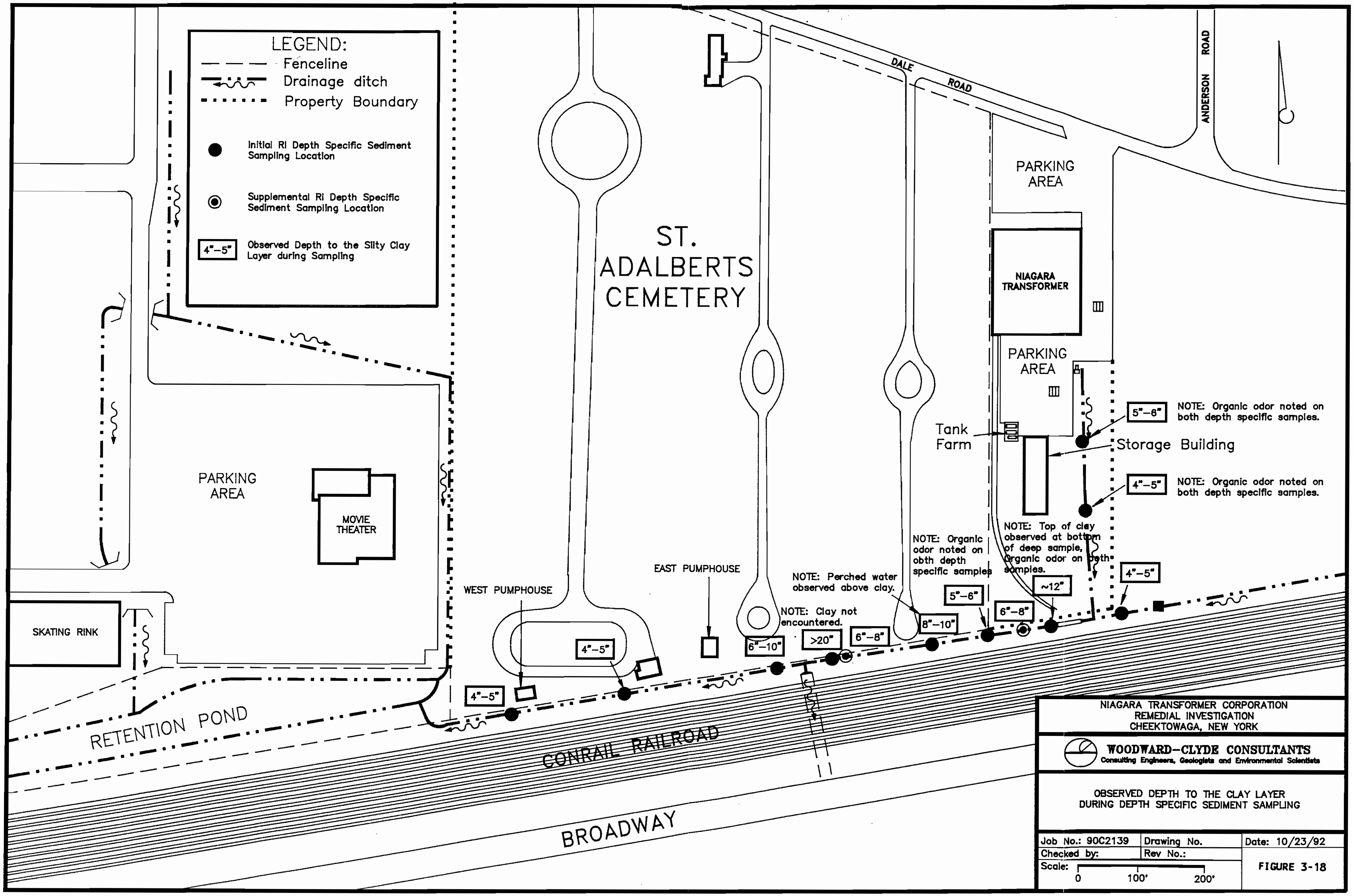


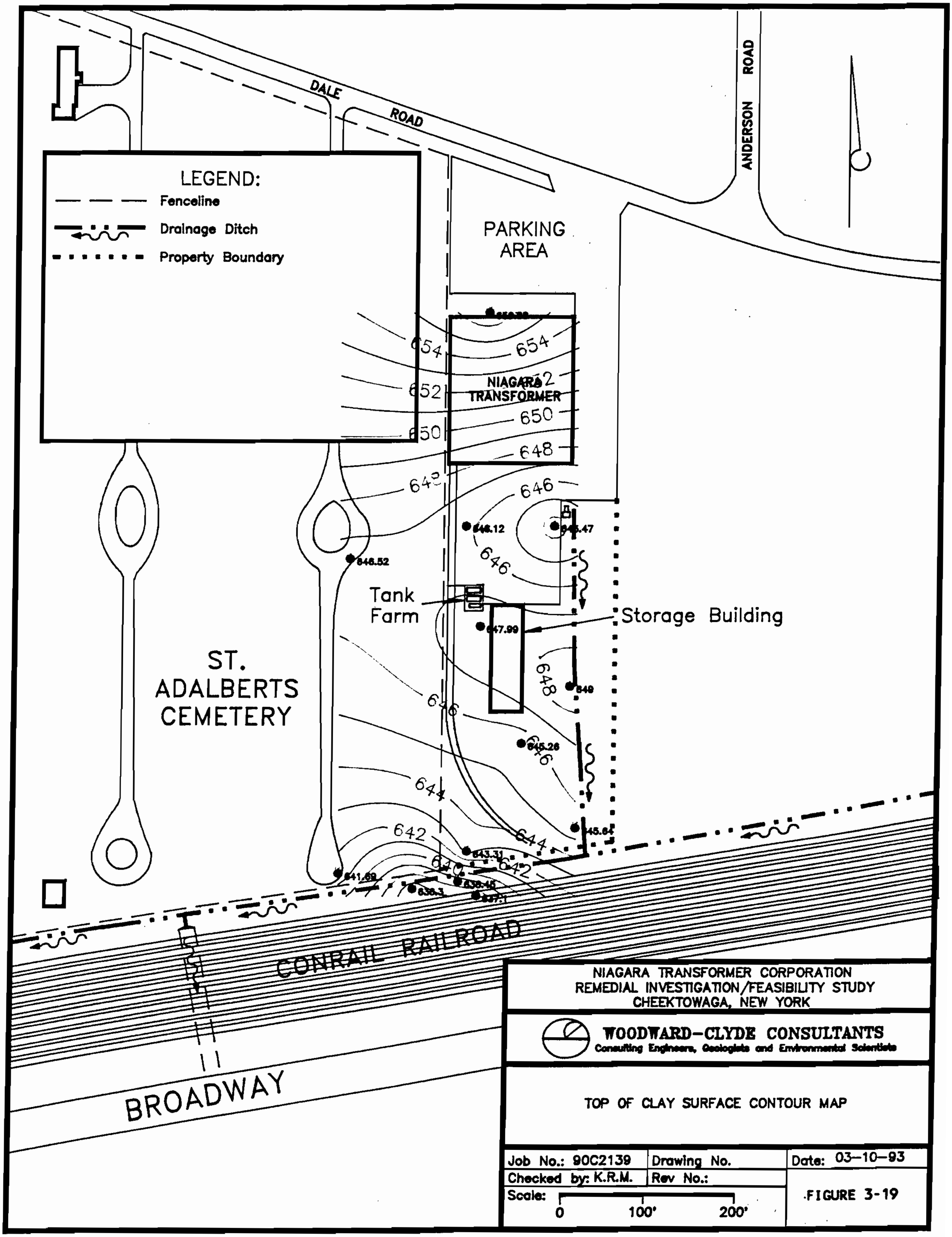
NIAGARA TRANSFORMER CORPORATION
REMEDIAL INVESTIGATION/FEASIBILITY STUDY
CHEEKTOWAGA, NEW YORK

WOODWARD-CLYDE CONSULTANTS
Consulting Engineers, Geologists and Environmental Scientists

POTENTIOMETRIC SURFACE CONTOUR MAP
PERCHED GROUNDWATER ZONE
NOVEMBER, 1992

Job No.: 90C2139	Drawing No.	Date: 02-22-93
Checked by: K.R.M.	Rev No.:	FIGURE 3-17
Scale: 0 100' 200'		


LEGEND:
Fenceline
Drainage ditch
Property Boundary
Initial RI Depth Specific Sediment Sampling Location
Supplemental RI Depth Specific Sediment Sampling Location
4"-5" Observed Depth to the Silty Clay Layer during Sampling
ST. ADALBERTS CEMETERY
DALE ROAD
ANDERSON ROAD
PARKING AREA
NIAGARA TRANSFORMER
PARKING AREA
Tank Farm
Storage Building
5"-6"
NOTE: Organic odor noted on both depth specific samples.
4"-5"
NOTE: Organic odor noted on both depth specific samples.
NOTE: Top of clay observed at bottom of deep sample, Organic odor on both samples.
NOTE: Organic odor noted on obth depth specific samples
~12"
4"-5"
5"-6"
6"-8"
8"-10"
NOTE: Perched water observed above clay.
NOTE: Clay not encountered.
>20"
6"-8"
6"-10"
EAST PUMPHOUSE
WEST PUMPHOUSE
4"-5"
4"-5"
PARKING AREA
MOVIE THEATER
SKATING RINK
RETENTION POND
CONRAIL RAILROAD
BROADWAY
NIAGARA TRANSFORMER CORPORATION
REMEDIAL INVESTIGATION
CHEEKTOWAGA, NEW YORK
WOODWARD-CLYDE CONSULTANTS
Consulting Engineers, Geologists and Environmental Scientists
OBSERVED DEPTH TO THE CLAY LAYER DURING DEPTH SPECIFIC SEDIMENT SAMPLING
Job No.: 90C2139
Drawing No.
Date: 10/23/92
Checked by:
Rev No.:
Scale:
0
100'
200'
FIGURE 3-18

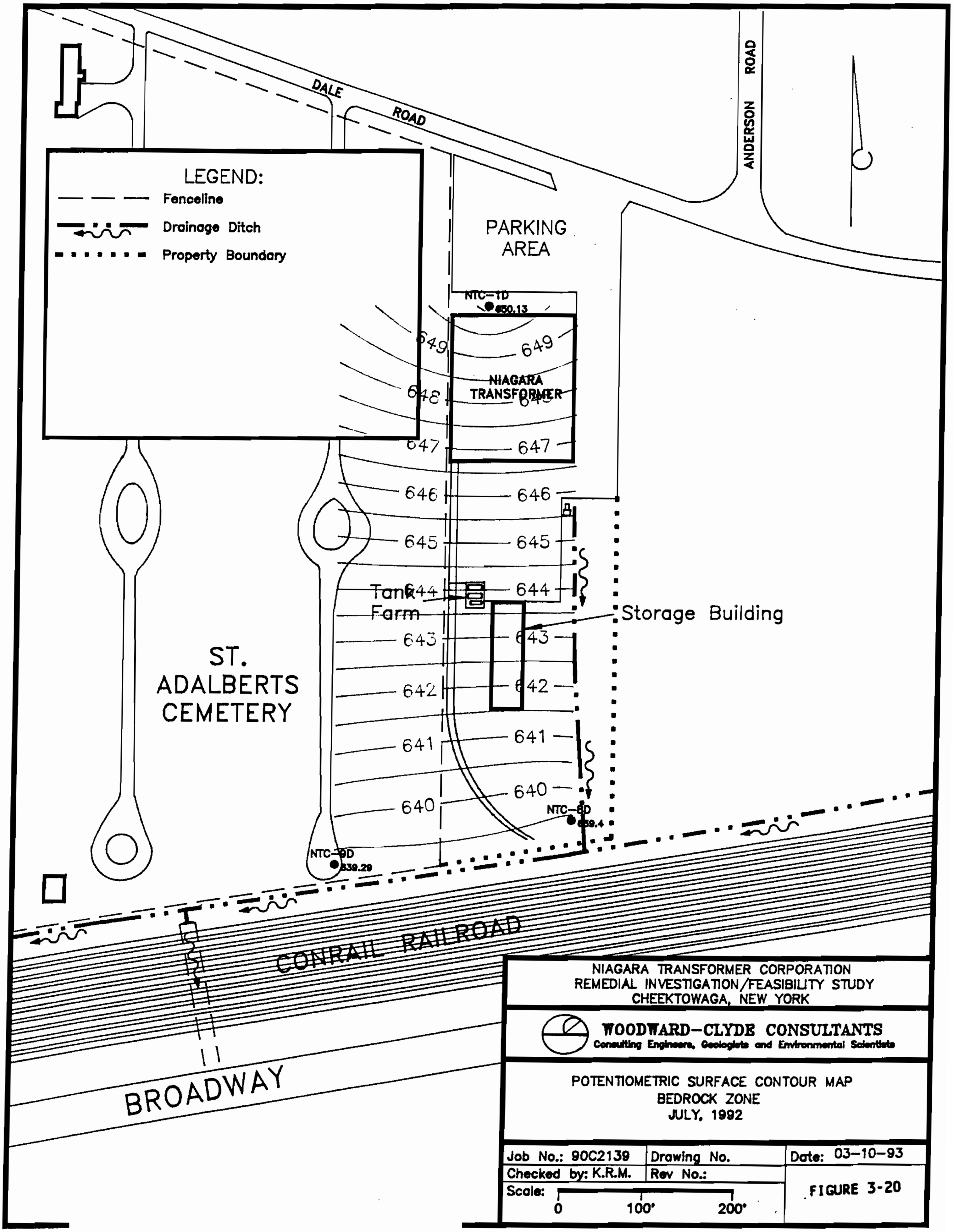


NIAGARA TRANSFORMER CORPORATION
REMEDIAL INVESTIGATION/FEASIBILITY STUDY
CHEEKTOWAGA, NEW YORK

WOODWARD-CLYDE CONSULTANTS
Consulting Engineers, Geologists and Environmental Scientists

TOP OF CLAY SURFACE CONTOUR MAP

Job No.: 90C2139	Drawing No.	Date: 03-10-93
Checked by: K.R.M.	Rev No.:	FIGURE 3-19
Scale: 0 100' 200'		

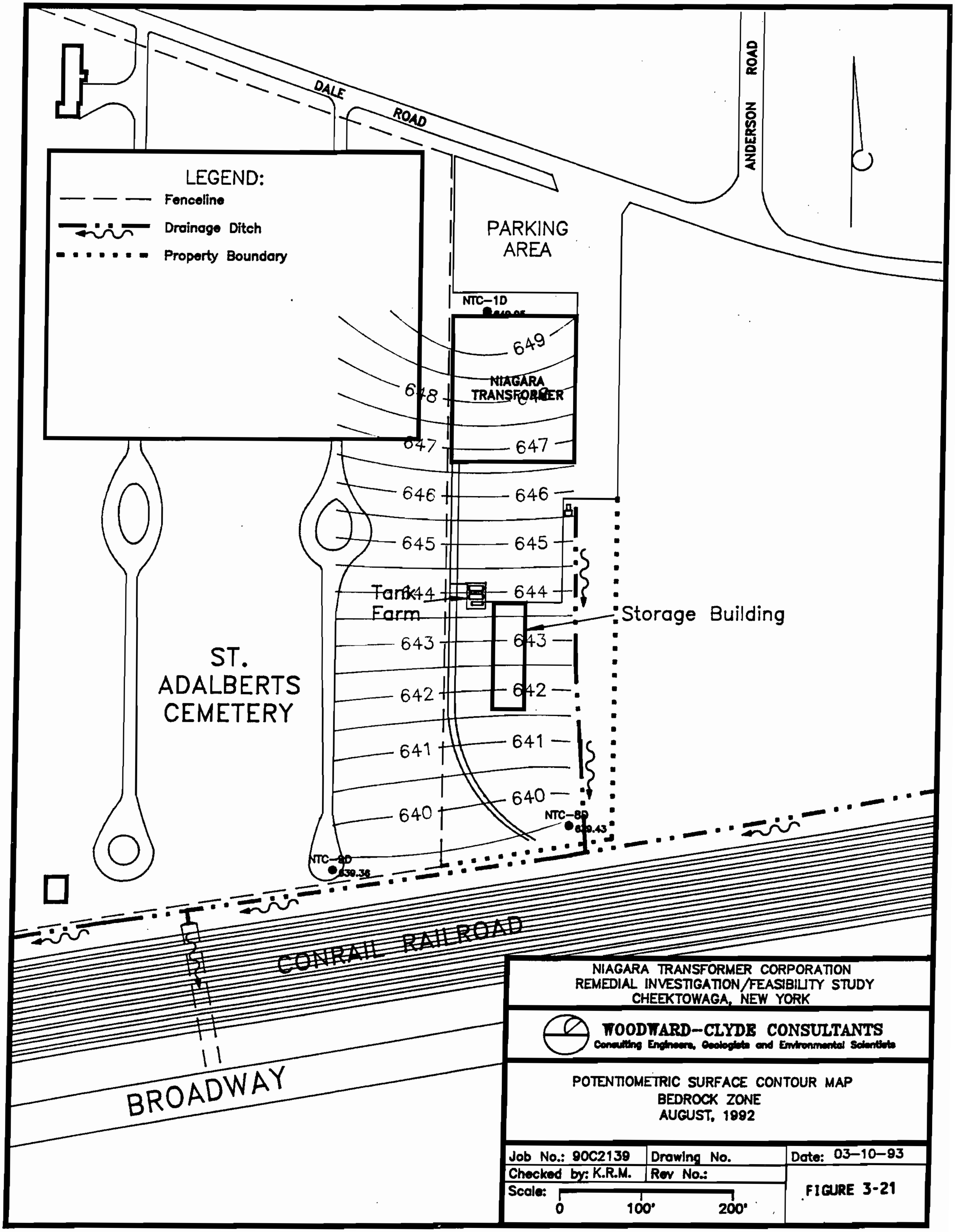


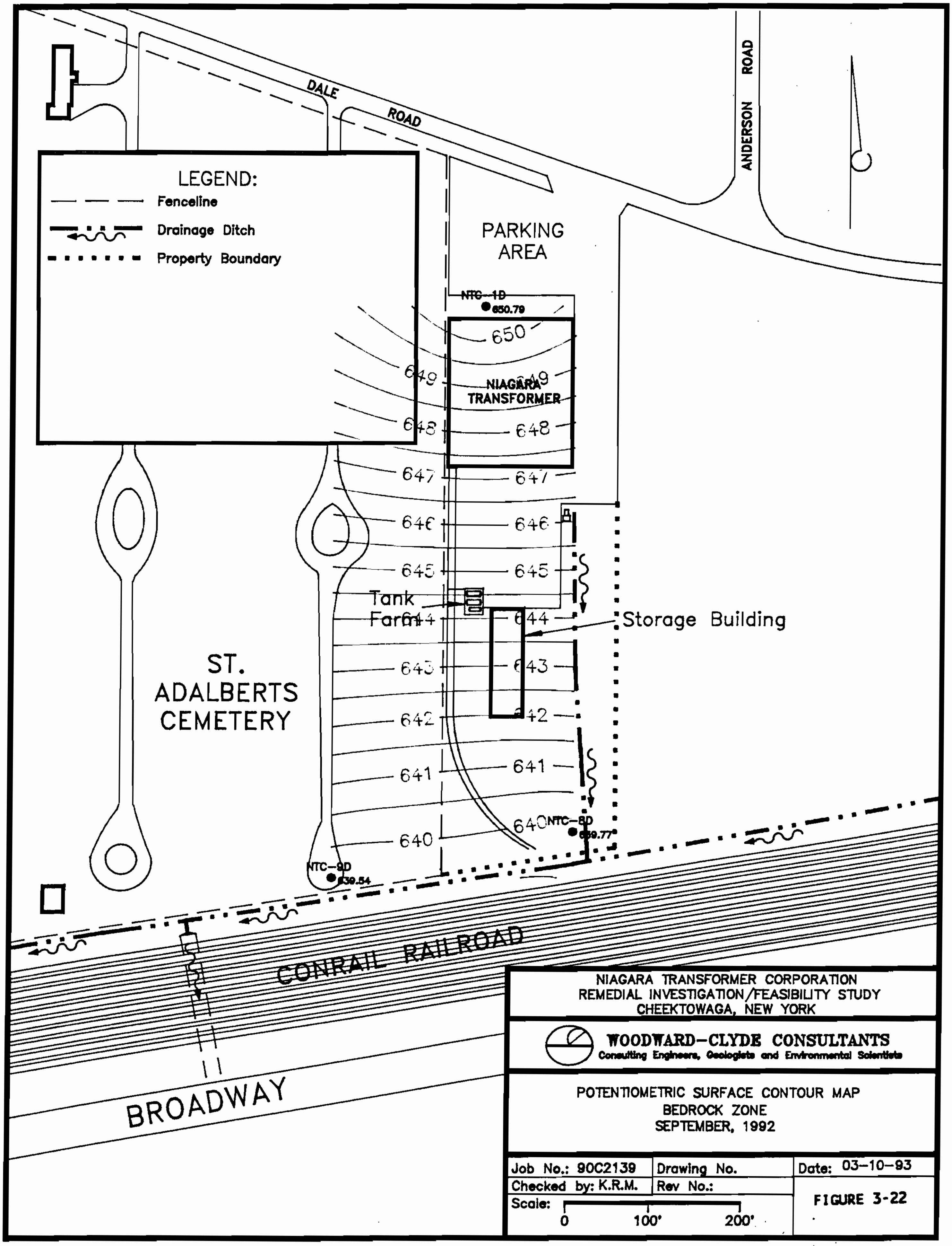
NIAGARA TRANSFORMER CORPORATION
REMEDIAL INVESTIGATION/FEASIBILITY STUDY
CHEEKTOWAGA, NEW YORK

WOODWARD-CLYDE CONSULTANTS
Consulting Engineers, Geologists and Environmental Scientists

POTENTIOMETRIC SURFACE CONTOUR MAP
BEDROCK ZONE
JULY, 1992

Job No.: 90C2139	Drawing No.	Date: 03-10-93
Checked by: K.R.M.	Rev No.:	FIGURE 3-20
Scale: 0 100' 200'		


LEGEND:
Fenceline
Drainage Ditch
Property Boundary
DALE ROAD
ANDERSON ROAD
PARKING AREA
NTC-1D
649
648
NIAGARA TRANSFORMER
647
646
645
644
Tank Farm
Storage Building
643
642
641
640
NTC-8D
ST. ADALBERTS CEMETERY
CONRAIL RAILROAD
BROADWAY
NIAGARA TRANSFORMER CORPORATION
REMEDIAL INVESTIGATION/FEASIBILITY STUDY
CHEEKTOWAGA, NEW YORK
WOODWARD-CLYDE CONSULTANTS
Consulting Engineers, Geologists and Environmental Scientists
POTENTIOMETRIC SURFACE CONTOUR MAP
BEDROCK ZONE
AUGUST, 1992
Job No.: 90C2139
Drawing No.
Date: 03-10-93
Checked by: K.R.M.
Rev No.:
Scale:
0
100'
200'
FIGURE 3-21



NIAGARA TRANSFORMER CORPORATION
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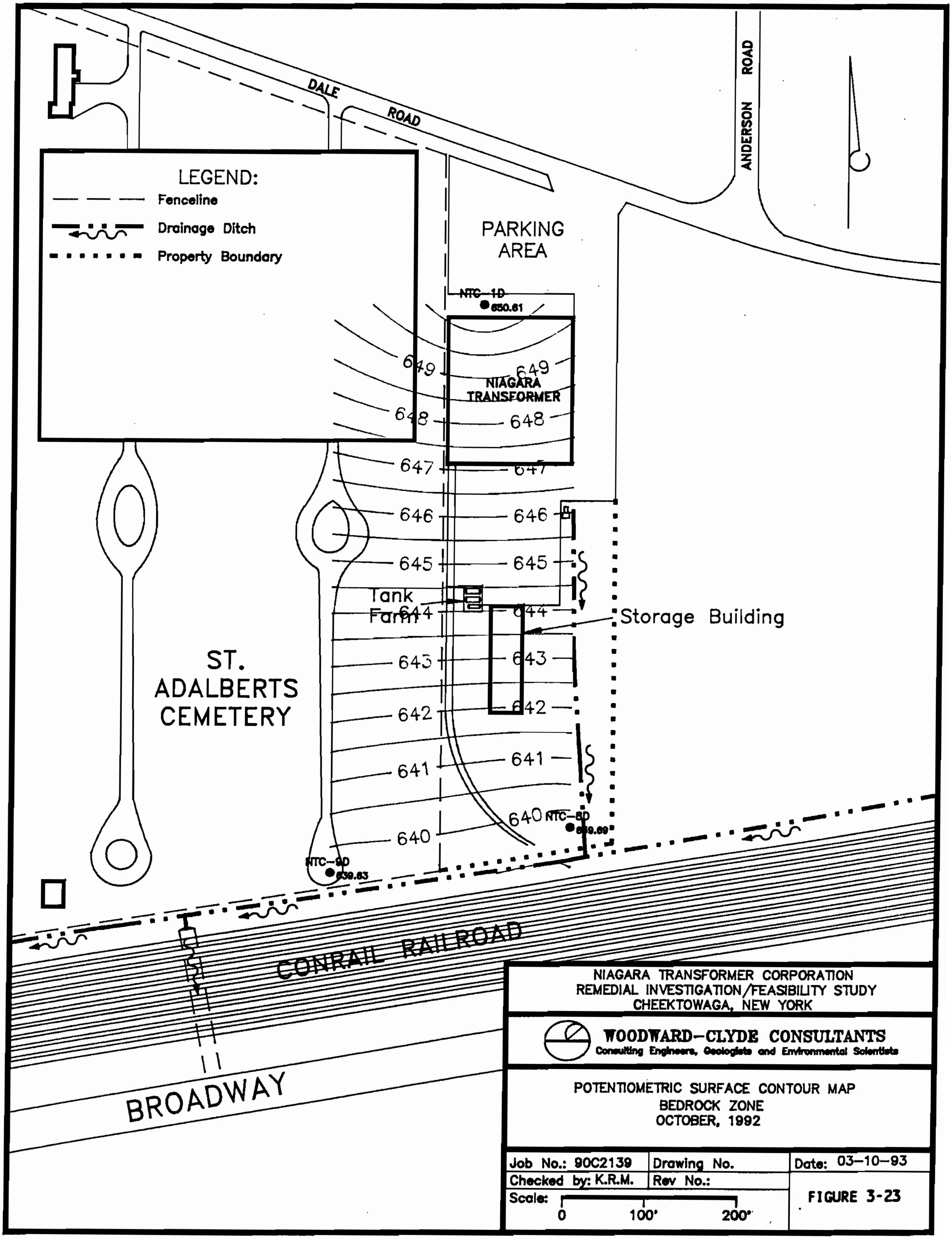
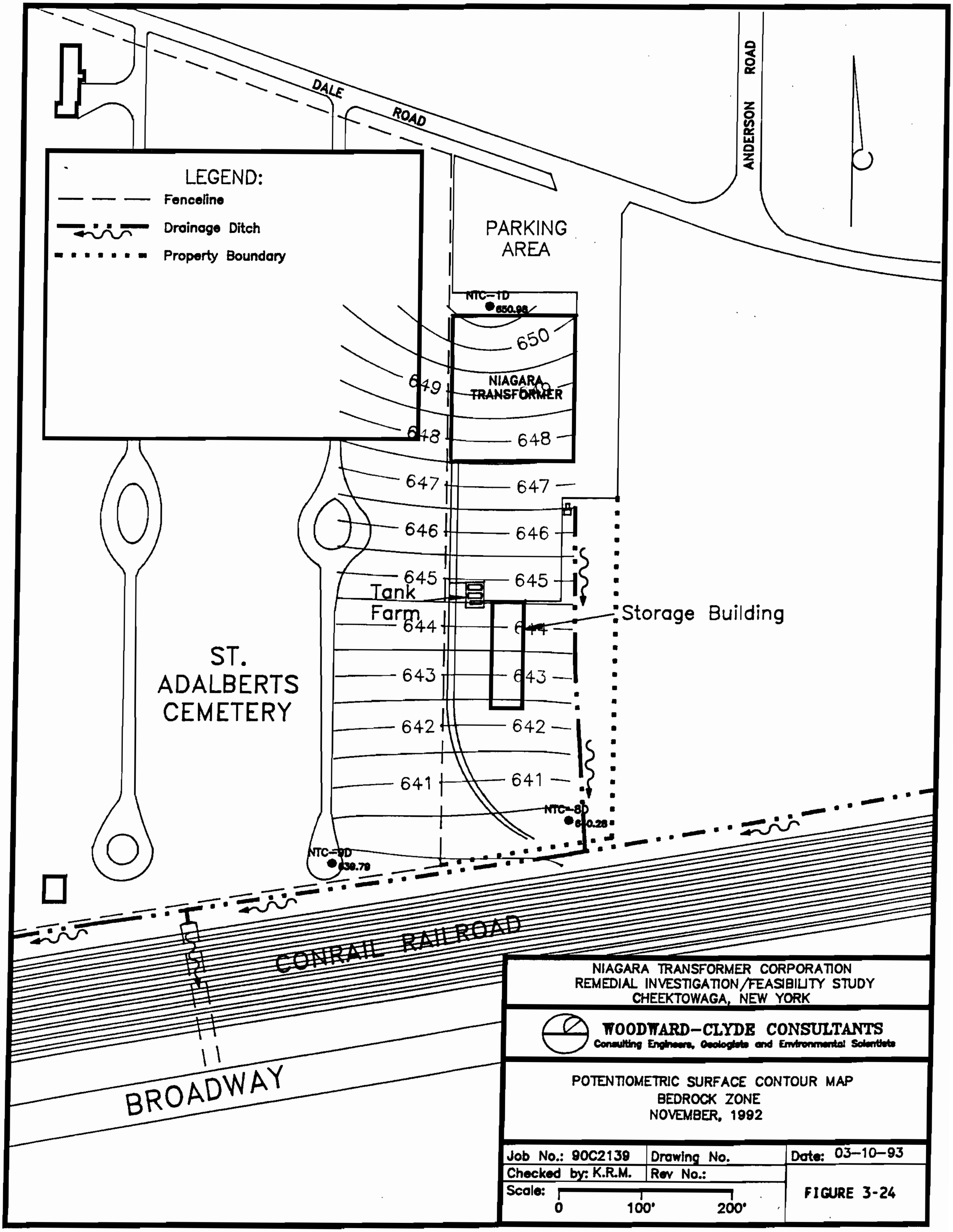
CHEEKTOWAGA, NEW YORK

WOODWARD-CLYDE CONSULTANTS
Consulting Engineers, Geologists and Environmental Scientists

POTENTIOMETRIC SURFACE CONTOUR MAP
BEDROCK ZONE
SEPTEMBER, 1992

Job No.: 90C2139	Drawing No.	Date: 03-10-93
Checked by: K.R.M.	Rev No.:	FIGURE 3-22
Scale: 0 100' 200'		


LEGEND:
Fenceline
Drainage Ditch
Property Boundary
DALE ROAD
ANDERSON ROAD
PARKING AREA
NTC-1D
650.61
NIAGARA TRANSFORMER
649
648
647
646
645
644
643
642
641
640
Tank Farm
Storage Building
ST. ADALBERTS CEMETERY
NTC-9D
639.63
CONRAIL RAILROAD
BROADWAY
NIAGARA TRANSFORMER CORPORATION
REMEDIAL INVESTIGATION/FEASIBILITY STUDY
CHEEKTOWAGA, NEW YORK
WOODWARD-CLYDE CONSULTANTS
Consulting Engineers, Geologists and Environmental Scientists
POTENTIOMETRIC SURFACE CONTOUR MAP
BEDROCK ZONE
OCTOBER, 1992
Job No.: 90C2139
Drawing No.
Date: 03-10-93
Checked by: K.R.M.
Rev No.:
Scale: 0 100' 200'
FIGURE 3-23

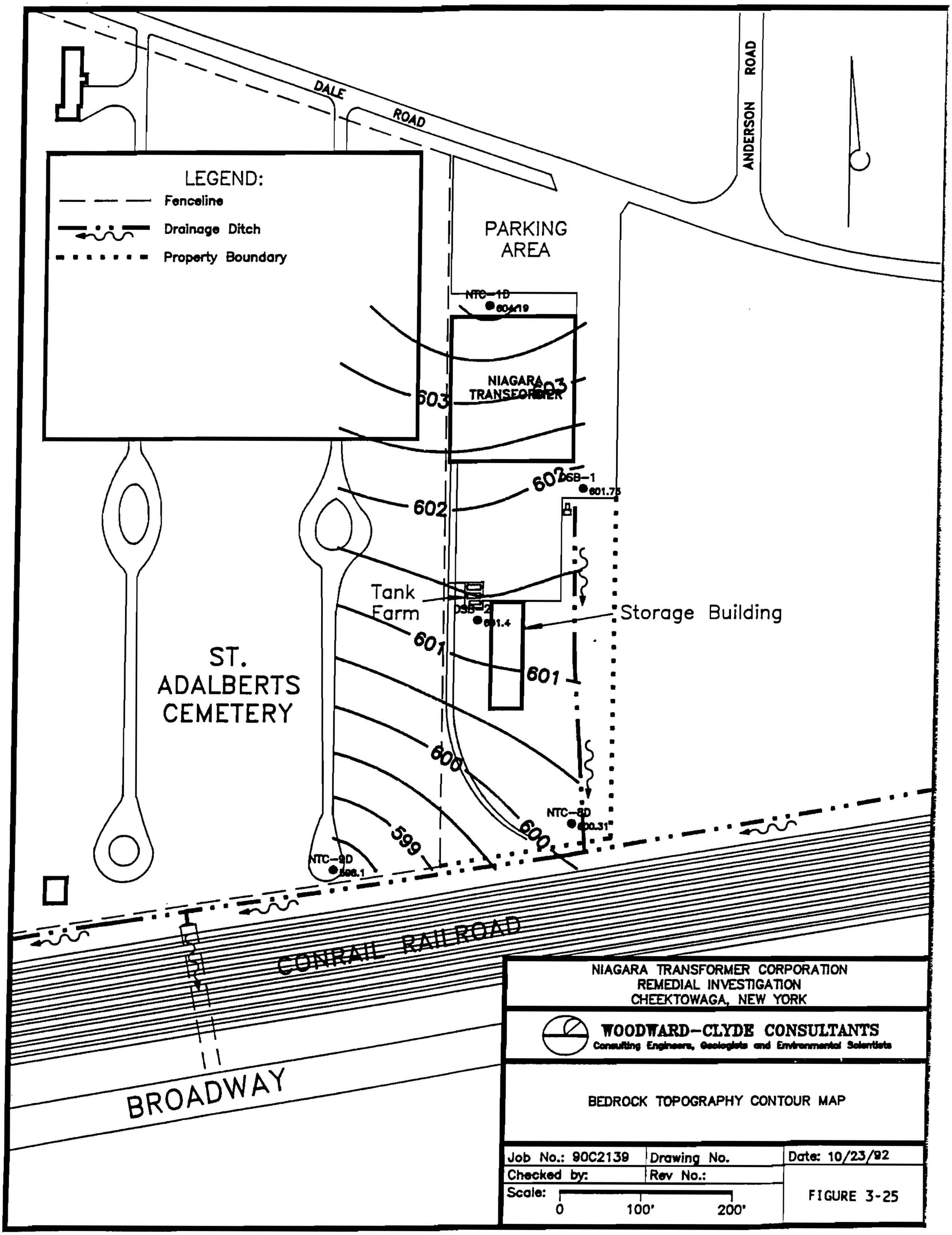


NIAGARA TRANSFORMER CORPORATION
REMEDIAL INVESTIGATION/FEASIBILITY STUDY
CHEEKTOWAGA, NEW YORK

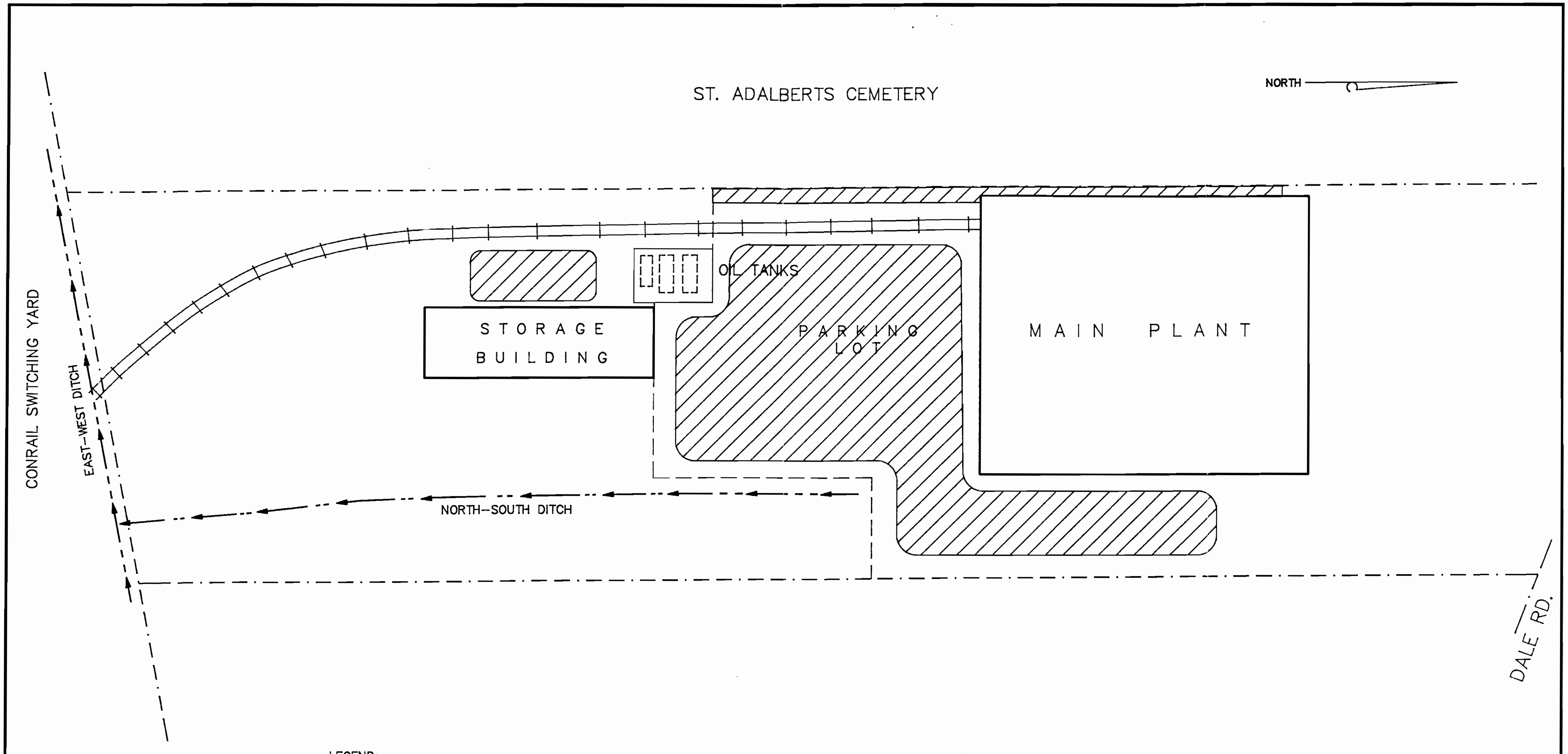
WOODWARD-CLYDE CONSULTANTS
Consulting Engineers, Geologists and Environmental Scientists

POTENTIOMETRIC SURFACE CONTOUR MAP
BEDROCK ZONE
NOVEMBER, 1992

Job No.: 90C2139	Drawing No.	Date: 03-10-93
Checked by: K.R.M.	Rev No.:	
Scale: 0 100' 200'		FIGURE 3-24



LEGEND:
Fenceline
Drainage Ditch
Property Boundary
DALE ROAD
ANDERSON ROAD
PARKING AREA
NTC-1D
604.19
NIAGARA TRANSFORMER
603
603
602
602
DSB-1
601.75
Tank Farm
DSB-2
601.4
Storage Building
601
601
ST. ADALBERTS CEMETERY
600
600
599
NTC-8D
600.31
NTC-9D
598.1
CONRAIL RAILROAD
BROADWAY
NIAGARA TRANSFORMER CORPORATION
REMEDIAL INVESTIGATION
CHEEKTOWAGA, NEW YORK
WOODWARD-CLYDE CONSULTANTS
Consulting Engineers, Geologists and Environmental Scientists
BEDROCK TOPOGRAPHY CONTOUR MAP
Job No.: 90C2139
Drawing No.
Date: 10/23/92
Checked by:
Rev No.:
Scale:
0
100'
200'
FIGURE 3-25

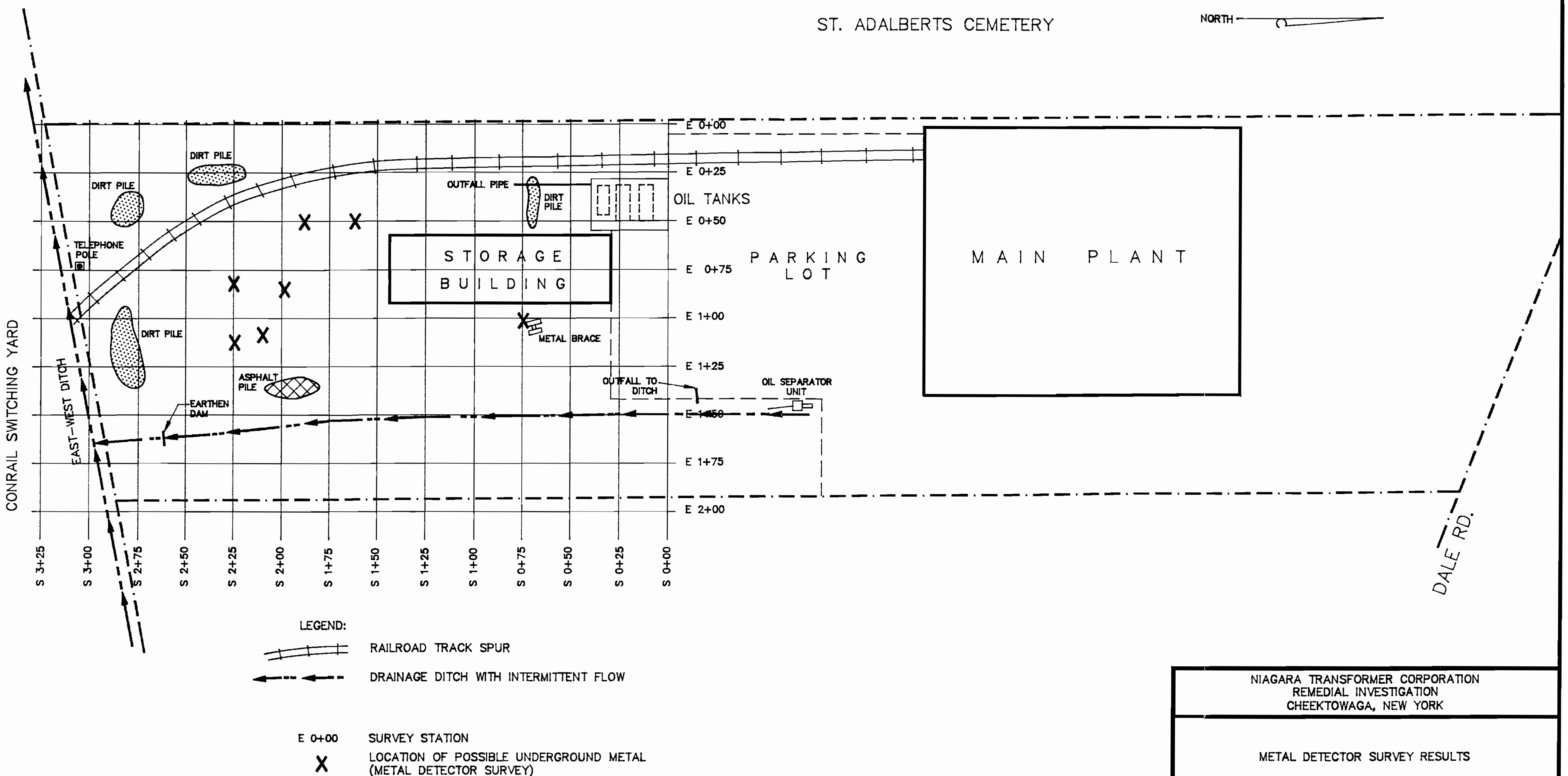


NIAGARA TRANSFORMER CORPORATION
REMEDIAL INVESTIGATION
CHEEKTOWAGA, NEW YORK

PROBABLE AREAS OF DIRECT OIL APPLICATION TO SOIL

WOODWARD-CLYDE CONSULTANTS
Consulting Engineers, Geologists and Environmental Scientists

Job No.: 90C2139	Drawing No. 01393000	Date:
Drawn by:	Checked by:	Figure 4-1
Scale: 0 — 50 FEET		

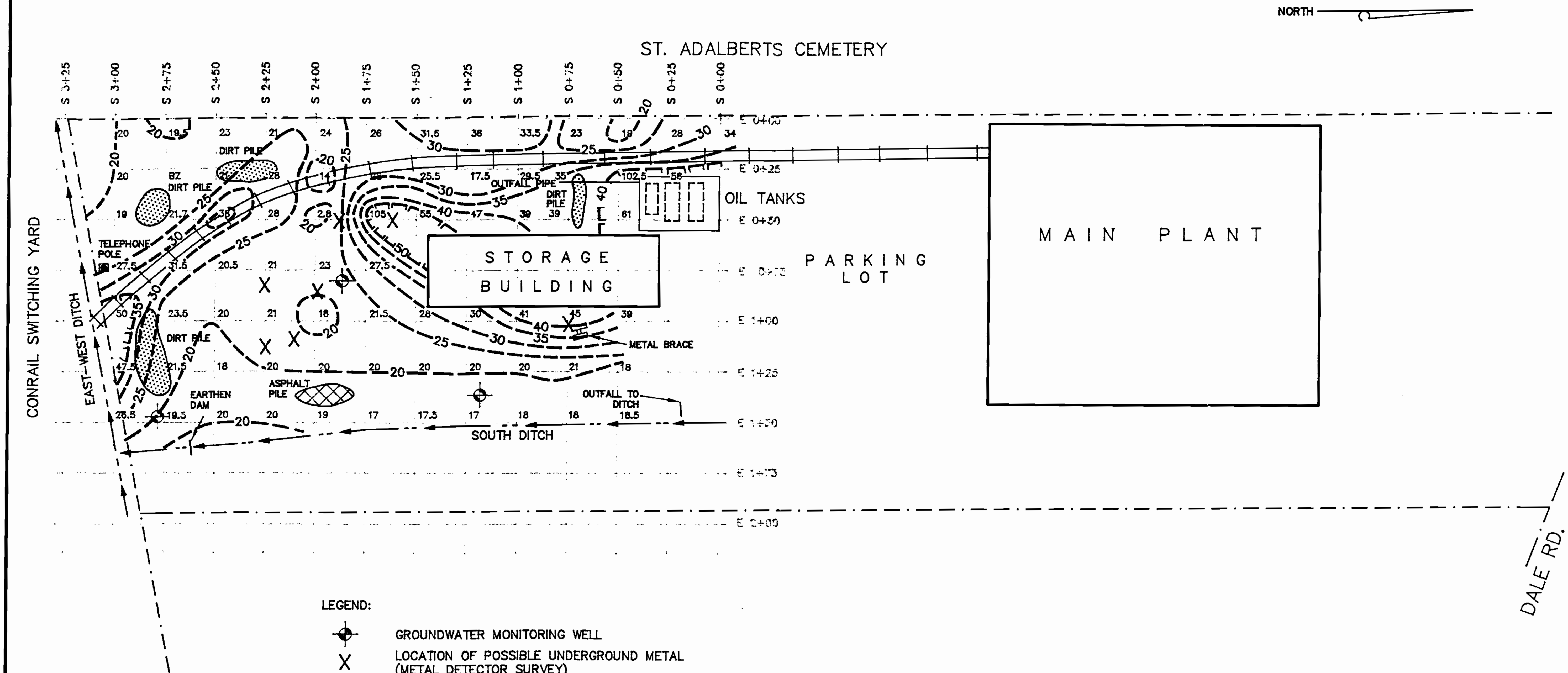


NIAGARA TRANSFORMER CORPORATION
REMEDIAL INVESTIGATION
CHEEKTOWAGA, NEW YORK

METAL DETECTOR SURVEY RESULTS

WOODWARD-CLYDE CONSULTANTS
Consulting Engineers, Geologists and Environmental Scientists

Job No.: 90C2139	Drawing No.	Date: 02-22-93
Drawn by: F.R.G.	Checked by: KRM	Figure 4-2
Scale: 0 — 50 FEET		



LEGEND:

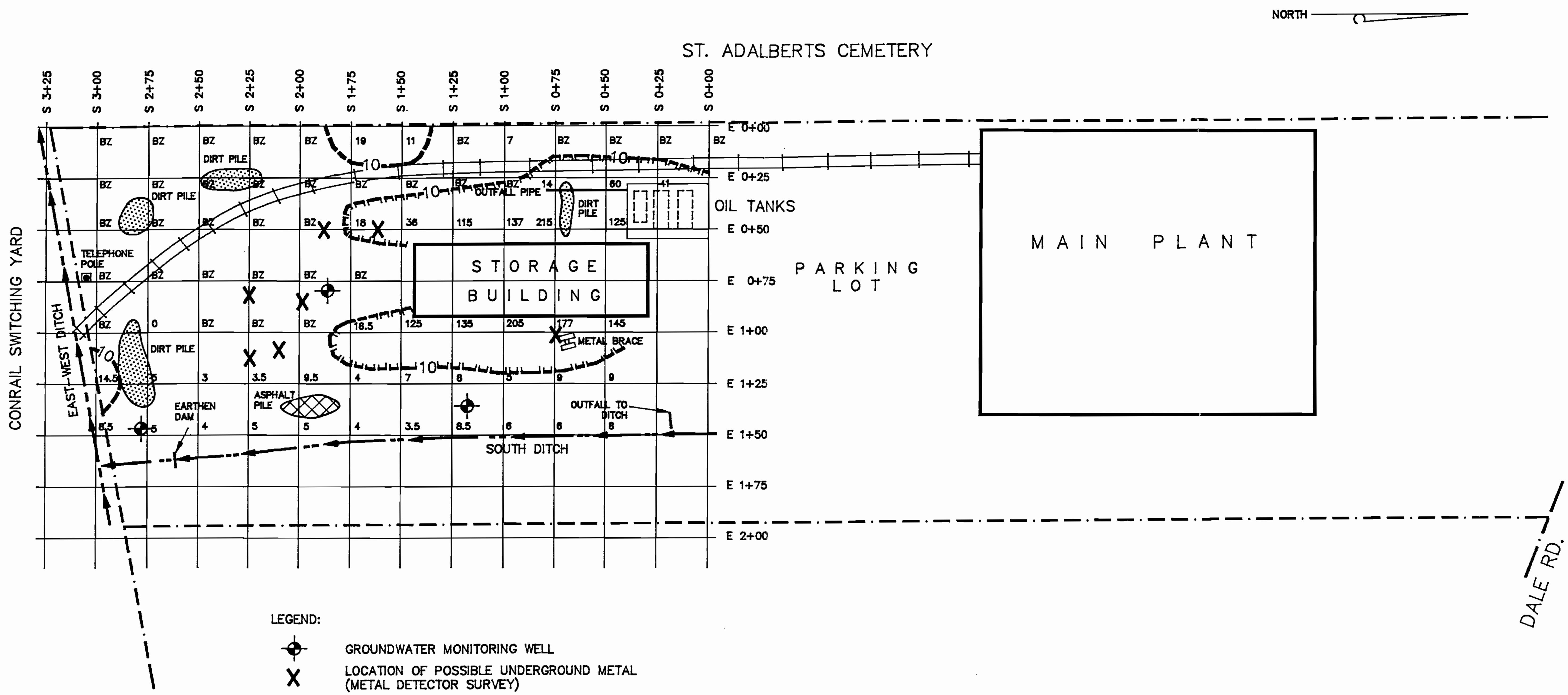
- GROUNDWATER MONITORING WELL
- X — LOCATION OF POSSIBLE UNDERGROUND METAL (METAL DETECTOR SURVEY)
- RAILROAD TRACK SPUR
- DRAINAGE DITCH WITH INTERMITTANT FLOW
- E 0+00 — SURVEY STATION
- 61 — TERRAIN CONDUCTIVITY READING (QUADRATURE PHASE)
- BZ — BELOW ZERO
- 20 — CONTOUR INTERVAL = 20 MilliSiemens/Meter (MS/M)
- 50 — CONTOUR INTERVAL > 50 MilliSiemens/Meter (MS/M)

NIAGARA TRANSFORMER CORPORATION
REMEDIAL INVESTIGATION
CHEEKTOWAGA, NEW YORK

TERRAIN CONDUCTIVITY SURVEY RESULTS
QUADRATURE READINGS

WOODWARD-CLYDE CONSULTANTS
Consulting Engineers, Geologists and Environmental Scientists

Job No.: 90C2139	Drawing No. 01393020	Date: 05/13/91
Drawn by: D.E.G.	Checked by: D.K.	Figure 4-3
Scale: 0 — 50 FEET		



LEGEND:

GROUNDWATER MONITORING WELL

X LOCATION OF POSSIBLE UNDERGROUND METAL (METAL DETECTOR SURVEY)

RAILROAD TRACK SPUR

DRAINAGE DITCH WITH INTERMITTANT FLOW

E 0+00 SURVEY STATION

18 TERRAIN CONDUCTIVITY READING (INPHASE READING)

BZ BELOW ZERO

10 CONTOUR INTERVAL = 10 MilliSiemens/Meter (MS/M)

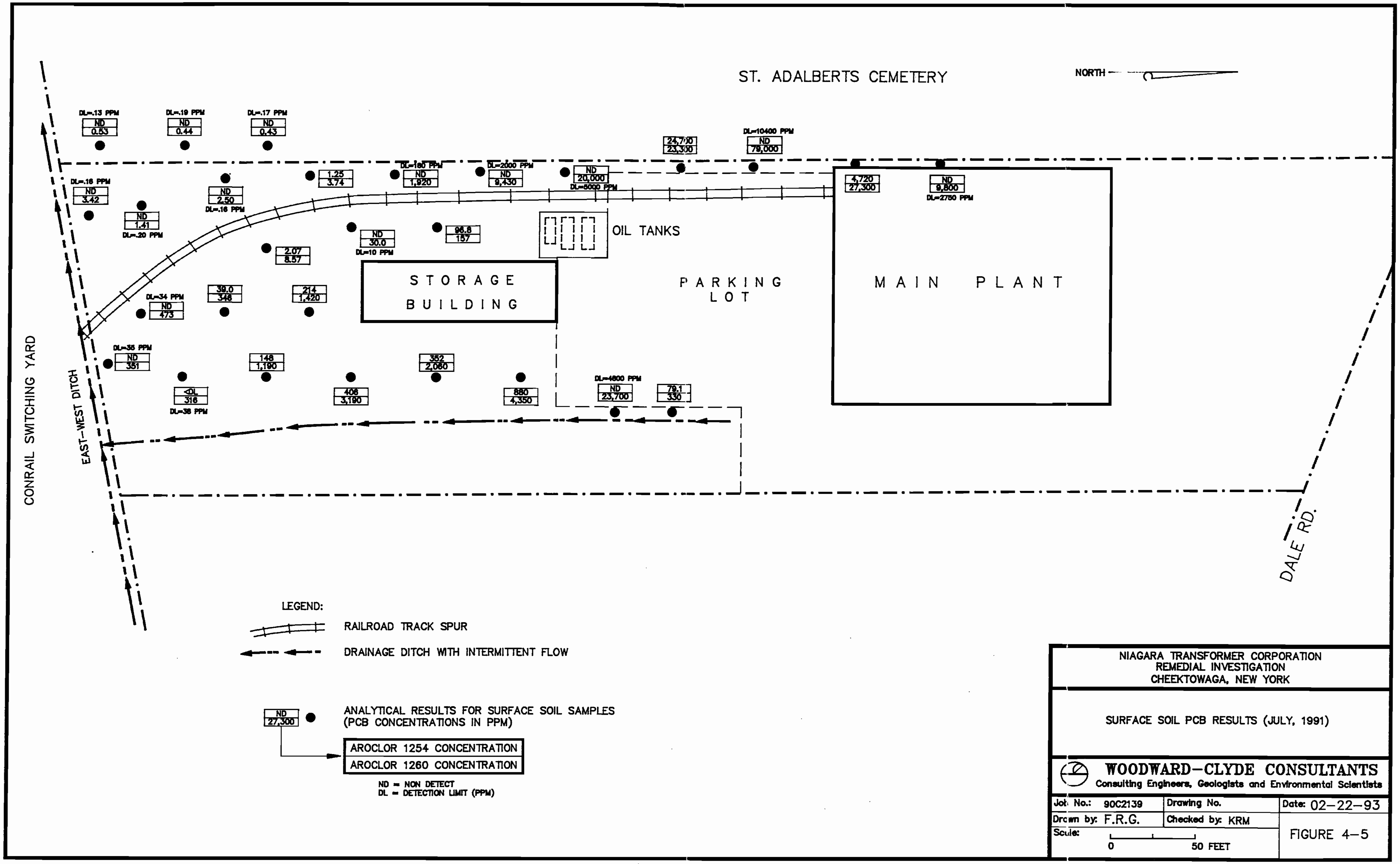
10 CONTOUR INTERVAL > 10 MilliSiemens/Meter (MS/M)

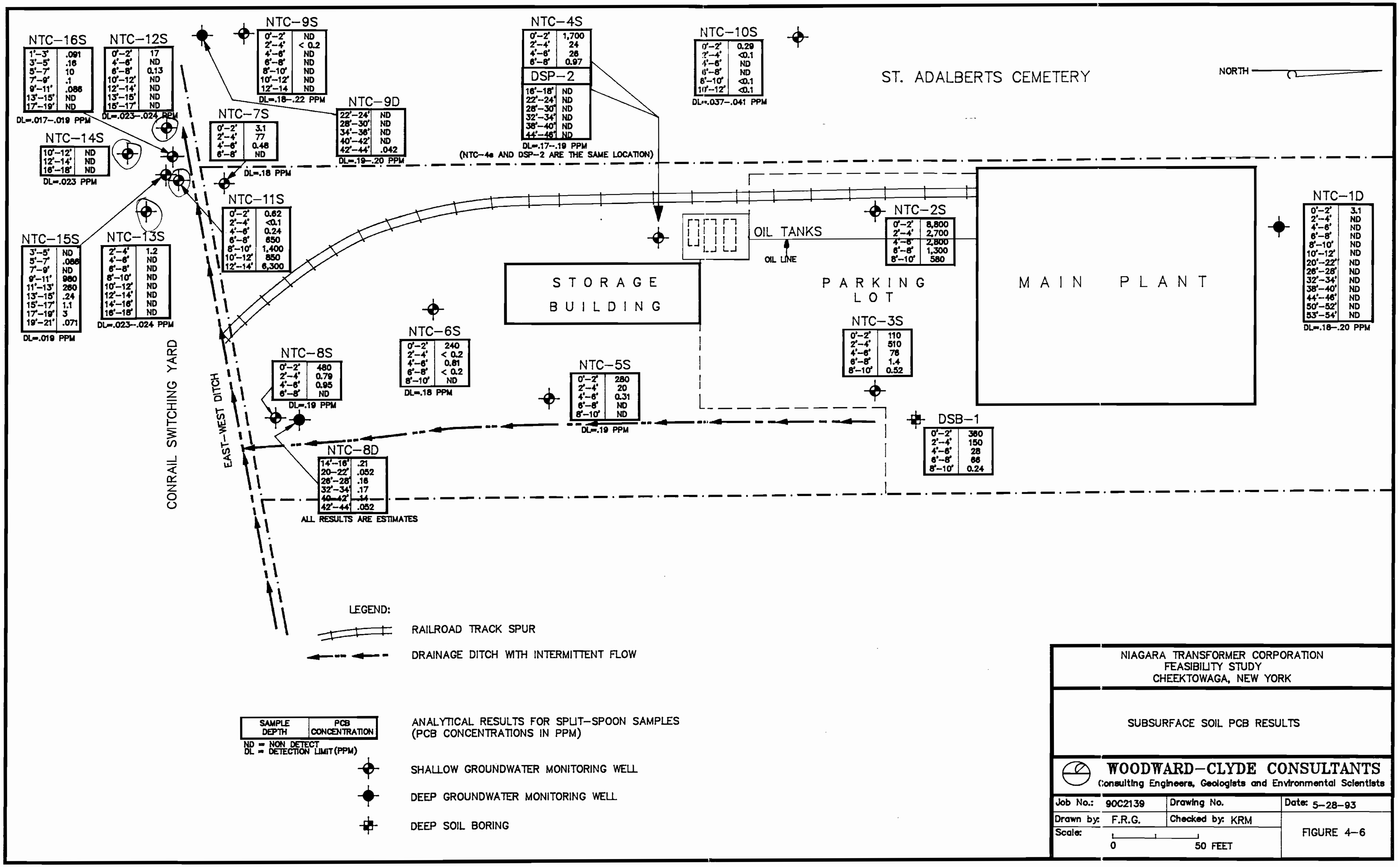
NIAGARA TRANSFORMER CORPORATION
REMEDIAL INVESTIGATION
CHEEKTOWAGA, NEW YORK

TERRAIN CONDUCTIVITY SURVEY RESULTS
INPHASE READINGS

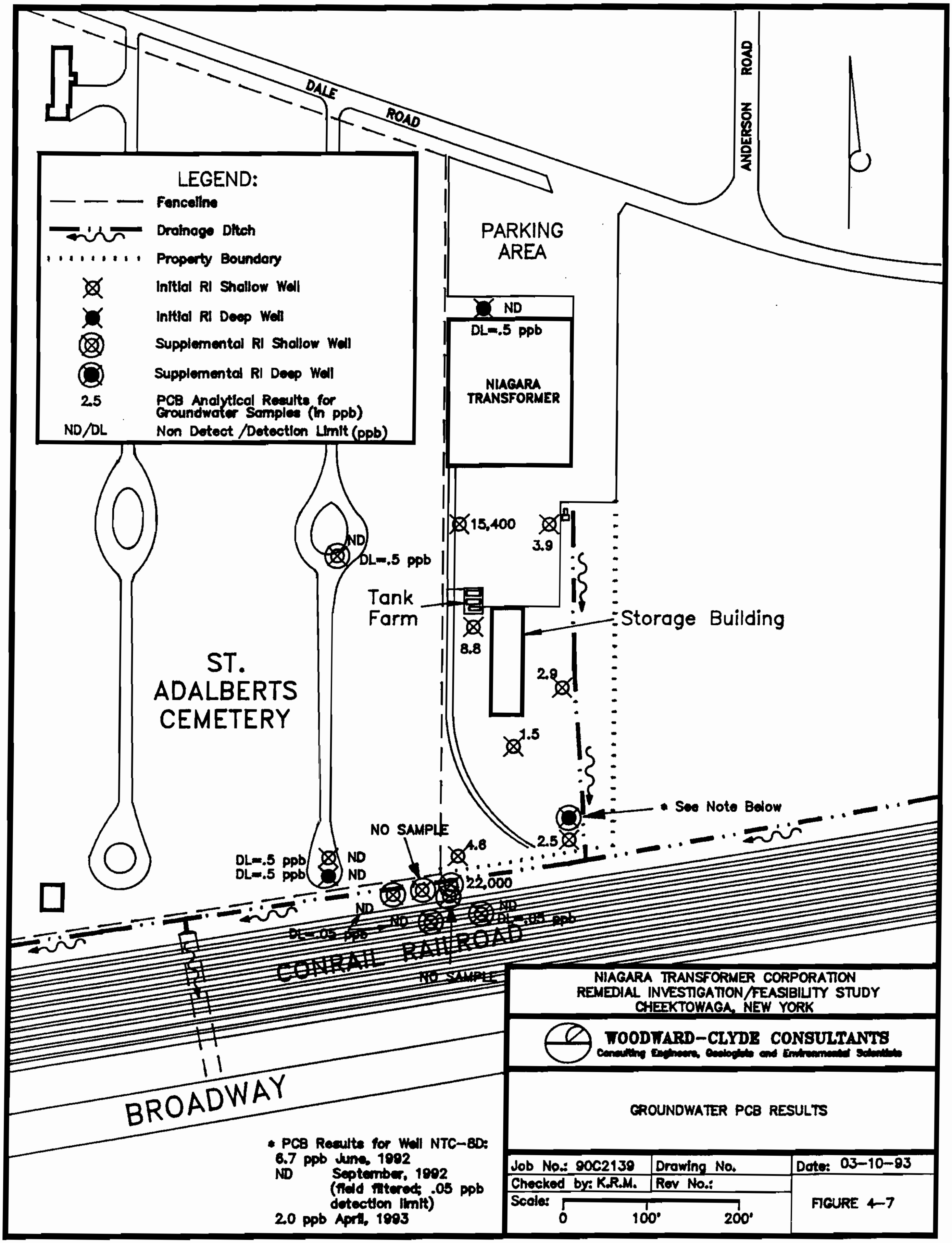
WOODWARD-CLYDE CONSULTANTS
Consulting Engineers, Geologists and Environmental Scientists

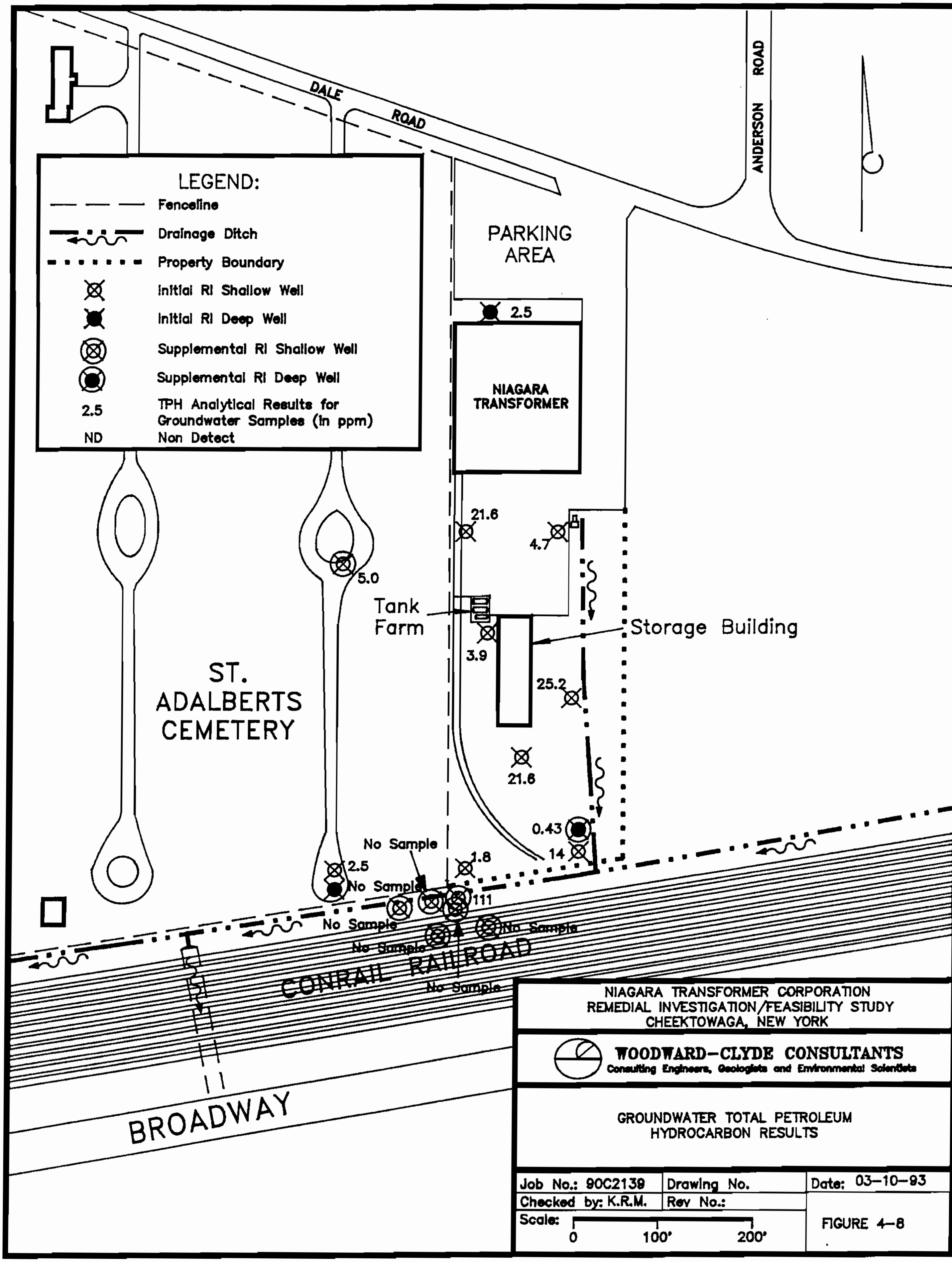
Job No.: 90C2139	Drawing No. 01393010	Date: 05/10/91
Drawn by: D.E.G.	Checked by: D.K.	Figure 4-4
Scale: 0 — 50 FEET		


ST. ADALBERTS CEMETERY
NORTH
CONRAIL SWITCHING YARD
EAST-WEST DITCH
DL=.13 PPM
ND
0.53
DL=.19 PPM
ND
0.44
DL=.17 PPM
ND
0.43
24,700
23,300
DL=10400 PPM
ND
79,000
DL=.16 PPM
ND
3.42
ND
1.41
DL=.20 PPM
ND
2.50
DL=.16 PPM
1.25
3.74
DL=180 PPM
ND
1,920
DL=2000 PPM
ND
9,430
ND
20,000
DL=5000 PPM
4,720
27,300
ND
9,800
DL=2750 PPM
ND
30.0
DL=10 PPM
96.8
157
2.07
8.57
OIL TANKS
STORAGE BUILDING
PARKING LOT
MAIN PLANT
DL=34 PPM
ND
473
39.0
348
214
1,420
DL=38 PPM
ND
351
<DL
316
DL=38 PPM
148
1,190
406
3,190
352
2,060
880
4,350
DL=4800 PPM
ND
23,700
79.1
330
DALE RD.
LEGEND:
RAILROAD TRACK SPUR
DRAINAGE DITCH WITH INTERMITTENT FLOW
ND
27,300
ANALYTICAL RESULTS FOR SURFACE SOIL SAMPLES (PCB CONCENTRATIONS IN PPM)
AROCLOR 1254 CONCENTRATION
AROCLOR 1260 CONCENTRATION
ND = NON DETECT
DL = DETECTION LIMIT (PPM)
NIAGARA TRANSFORMER CORPORATION
REMEDIAL INVESTIGATION
CHEEKTOWAGA, NEW YORK
SURFACE SOIL PCB RESULTS (JULY, 1991)
WOODWARD-CLYDE CONSULTANTS
Consulting Engineers, Geologists and Environmental Scientists
Job No.: 90C2139
Drawing No.
Date: 02-22-93
Drawn by: F.R.G.
Checked by: KRM
Scale: 0 50 FEET
FIGURE 4-5



NTC-16S
1'-3' .091
3'-5' .16
5'-7' 10
7'-9' .1
9'-11' .086
13'-15' ND
17'-19' ND
DL=.017-.019 PPM
NTC-12S
0'-2' 17
4'-6' ND
6'-8' 0.13
10'-12' ND
12'-14' ND
13'-15' ND
15'-17' ND
DL=.023-.024 PPM
NTC-9S
0'-2' ND
2'-4' < 0.2
4'-6' ND
6'-8' ND
8'-10' ND
10'-12' ND
12'-14 ND
DL=.18-.22 PPM
NTC-9D
22'-24' ND
28'-30' ND
34'-36' ND
40'-42' ND
42'-44' .042
DL=.19-.20 PPM
NTC-7S
0'-2' 3.1
2'-4' 77
4'-6' 0.48
6'-8' ND
DL=.18 PPM
NTC-4S
0'-2' 1,700
2'-4' 24
4'-6' 26
6'-8' 0.97
DSP-2
16'-18' ND
22'-24' ND
28'-30' ND
32'-34' ND
38'-40' ND
44'-46' ND
DL=.17-.19 PPM
(NTC-4s AND DSP-2 ARE THE SAME LOCATION)
NTC-10S
0'-2' 0.29
2'-4' <0.1
4'-6' ND
6'-8' ND
8'-10' <0.1
10'-12' <0.1
DL=.037-.041 PPM
ST. ADALBERTS CEMETERY
NORTH
NTC-14S
10'-12' ND
12'-14' ND
16'-18' ND
DL=.023 PPM
NTC-11S
0'-2' 0.62
2'-4' <0.1
4'-6' 0.24
6'-8' 650
8'-10' 1,400
10'-12' 850
12'-14' 6,300
NTC-15S
3'-5' ND
5'-7' .086
7'-9' ND
9'-11' 980
11'-13' 280
13'-15' .24
15'-17' 1.1
17'-19' 3
19'-21' .071
DL=.019 PPM
NTC-13S
2'-4' 1.2
4'-6' ND
6'-8' ND
8'-10' ND
10'-12' ND
12'-14' ND
14'-16' ND
16'-18' ND
DL=.023-.024 PPM
OIL TANKS
OIL LINE
NTC-2S
0'-2' 8,800
2'-4' 2,700
4'-6' 2,800
6'-8' 1,300
8'-10' 580
NTC-1D
0'-2' 3.1
2'-4' ND
4'-6' ND
6'-8' ND
8'-10' ND
10'-12' ND
20'-22' ND
26'-28' ND
32'-34' ND
38'-40' ND
44'-46' ND
50'-52' ND
53'-54' ND
DL=.18-.20 PPM
STORAGE BUILDING
PARKING LOT
MAIN PLANT
NTC-3S
0'-2' 110
2'-4' 510
4'-6' 76
6'-8' 1.4
8'-10' 0.52
NTC-6S
0'-2' 240
2'-4' < 0.2
4'-6' 0.81
6'-8' < 0.2
8'-10' ND
DL=.18 PPM
NTC-8S
0'-2' 480
2'-4' 0.79
4'-6' 0.95
6'-8' ND
DL=.19 PPM
NTC-5S
0'-2' 280
2'-4' 20
4'-6' 0.31
6'-8' ND
8'-10' ND
DL=.19 PPM
DSB-1
0'-2' 360
2'-4' 150
4'-6' 28
6'-8' 66
8'-10' 0.24
CONRAIL SWITCHING YARD
EAST-WEST DITCH
NTC-8D
14'-16' .21
20-22' .052
26'-28' .16
32'-34' .17
40-42' .14
42'-44' .052
ALL RESULTS ARE ESTIMATES
LEGEND:
RAILROAD TRACK SPUR
DRAINAGE DITCH WITH INTERMITTENT FLOW
SAMPLE DEPTH
PCB CONCENTRATION
ND = NON DETECT
DL = DETECTION LIMIT (PPM)
ANALYTICAL RESULTS FOR SPLIT-SPOON SAMPLES
(PCB CONCENTRATIONS IN PPM)
SHALLOW GROUNDWATER MONITORING WELL
DEEP GROUNDWATER MONITORING WELL
DEEP SOIL BORING
NIAGARA TRANSFORMER CORPORATION
FEASIBILITY STUDY
CHEEKTOWAGA, NEW YORK
SUBSURFACE SOIL PCB RESULTS
WOODWARD-CLYDE CONSULTANTS
Consulting Engineers, Geologists and Environmental Scientists
Job No.: 90C2139
Drawing No.
Date: 5-28-93
Drawn by: F.R.G.
Checked by: KRM
Scale:
0
50 FEET
FIGURE 4-6


LEGEND:
Fenceline
Drainage Ditch
Property Boundary
Initial RI Shallow Well
Initial RI Deep Well
Supplemental RI Shallow Well
Supplemental RI Deep Well
2.5 PCB Analytical Results for Groundwater Samples (in ppb)
ND/DL Non Detect /Detection Limit (ppb)
DALE ROAD
ANDERSON ROAD
PARKING AREA
ND
DL=.5 ppb
NIAGARA TRANSFORMER
15,400
3.9
ND
DL=.5 ppb
Tank Farm
8.8
Storage Building
2.9
1.5
ST. ADALBERTS CEMETERY
* See Note Below
2.5
NO SAMPLE
4.8
DL=.5 ppb ND
DL=.5 ppb ND
22,000
ND
ND
DL=.05 ppb
DL=.05 ppb
ND
CONRAIL RAILROAD
NO SAMPLE
BROADWAY
* PCB Results for Well NTC-8D:
6.7 ppb June, 1992
ND September, 1992 (field filtered; .05 ppb detection limit)
2.0 ppb April, 1993
NIAGARA TRANSFORMER CORPORATION
REMEDIAL INVESTIGATION/FEASIBILITY STUDY
CHEEKTOWAGA, NEW YORK
WOODWARD-CLYDE CONSULTANTS
Consulting Engineers, Geologists and Environmental Scientists
GROUNDWATER PCB RESULTS
Job No.: 90C2139
Drawing No.
Date: 03-10-93
Checked by: K.R.M.
Rev No.:
Scale:
0
100'
200'
FIGURE 4-7



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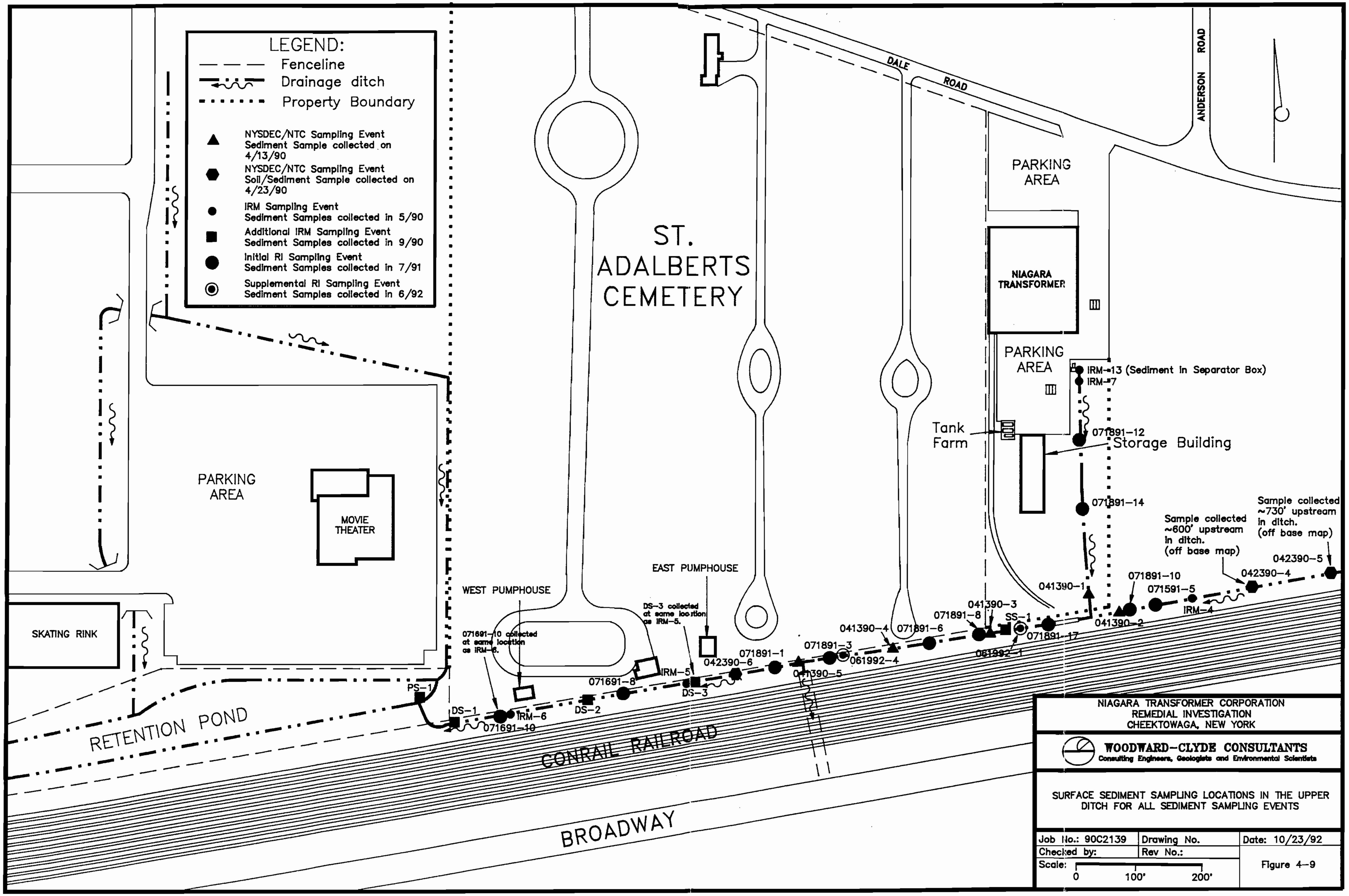
REMEDIAL INVESTIGATION/FEASIBILITY STUDY
CHEEKTOWAGA, NEW YORK

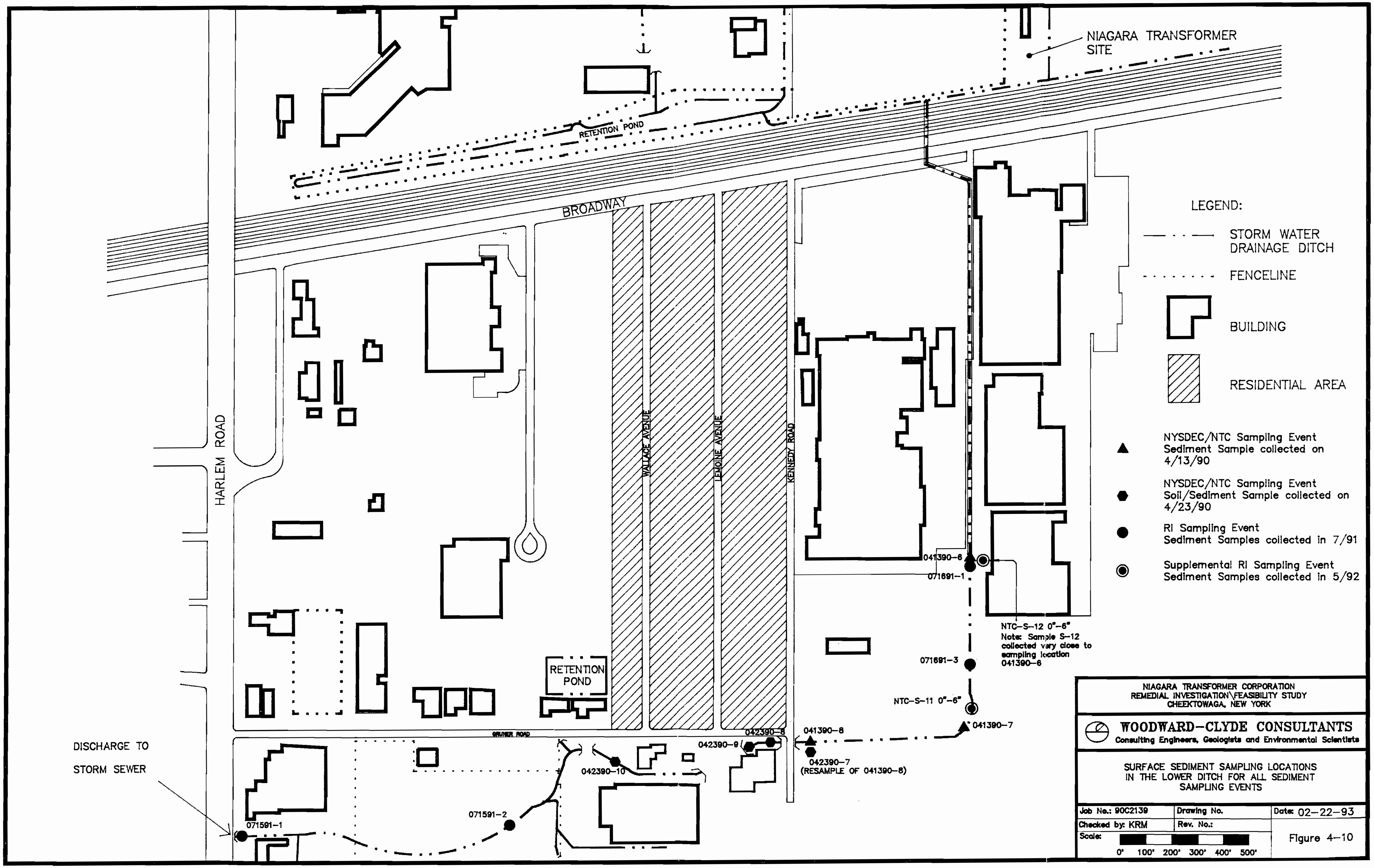
WOODWARD-CLYDE CONSULTANTS
Consulting Engineers, Geologists and Environmental Scientists

GROUNDWATER TOTAL PETROLEUM HYDROCARBON RESULTS

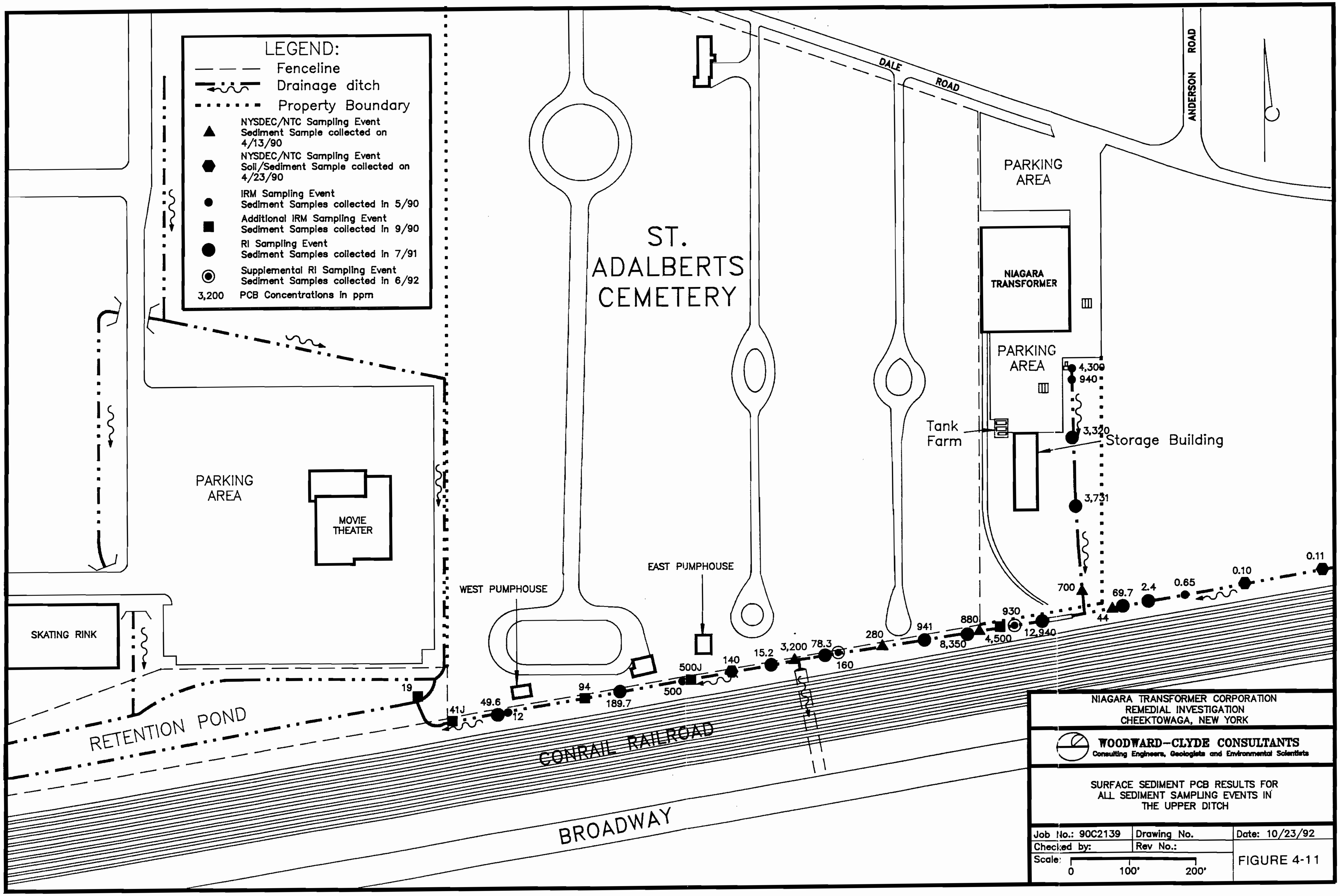
Job No.: 90C2139	Drawing No.	Date: 03-10-93
Checked by: K.R.M.	Rev No.:	FIGURE 4-8
Scale: 0 100' 200'		

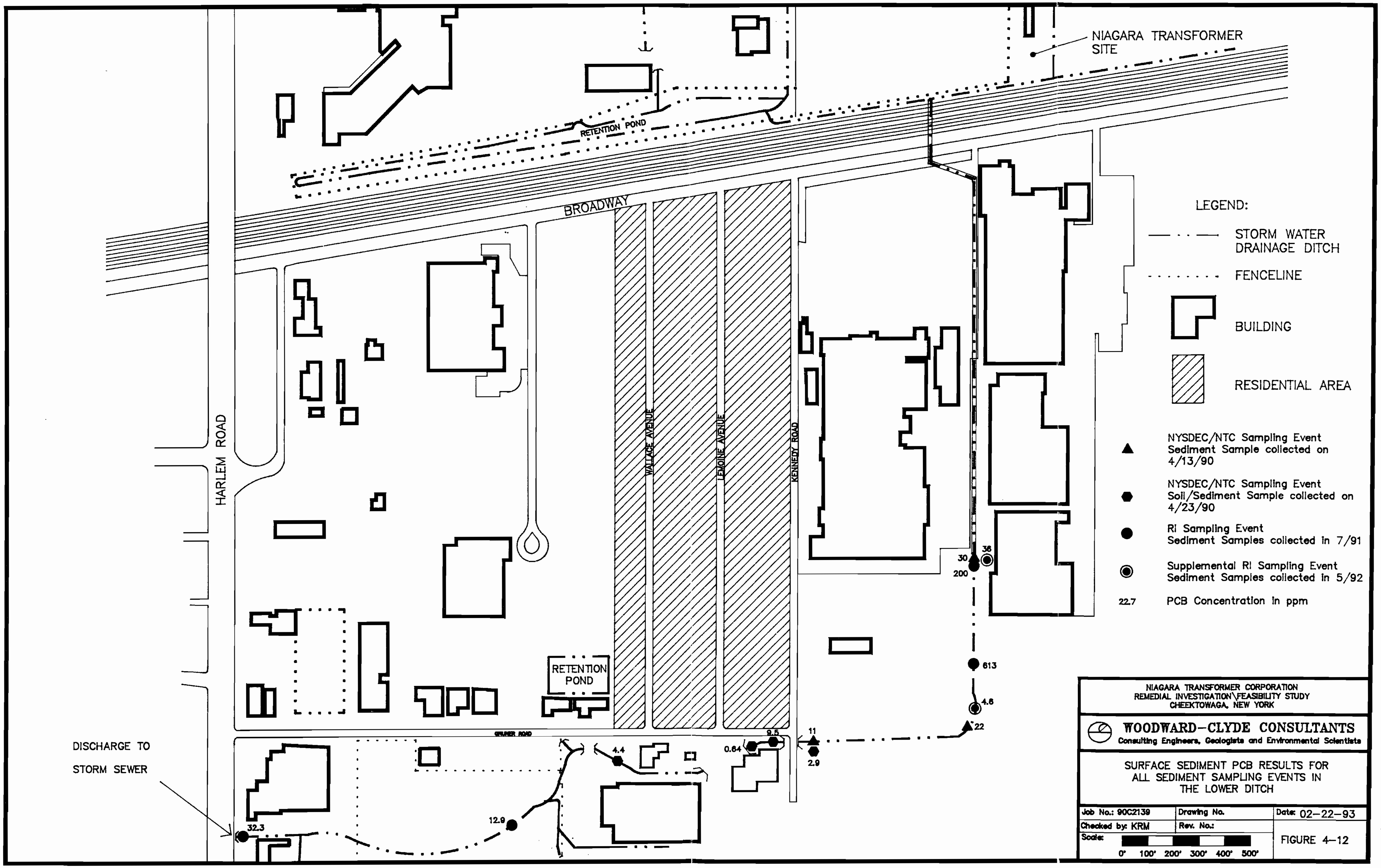


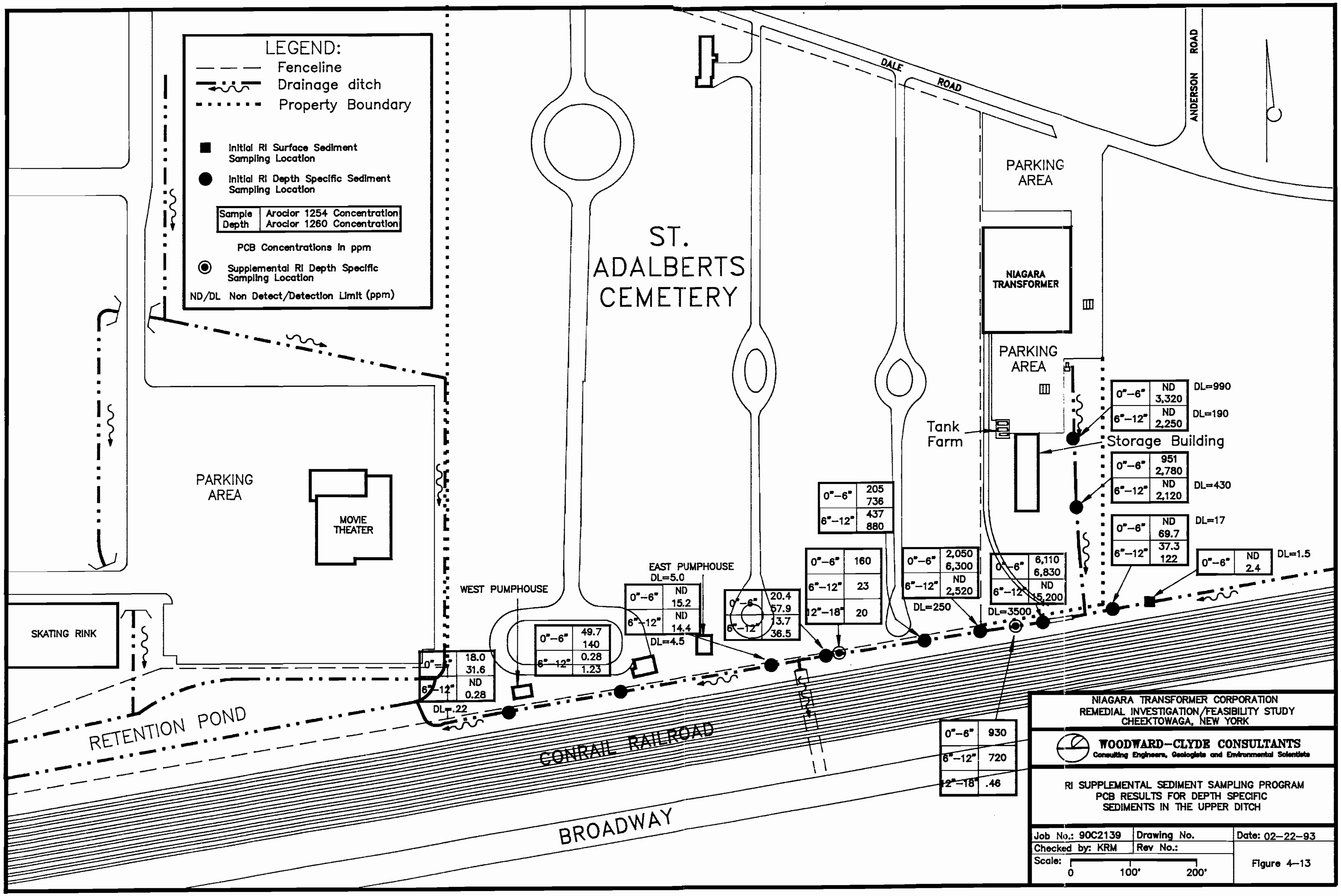
LEGEND:
Fenceline
Drainage ditch
Property Boundary
NYSDEC/NTC Sampling Event Sediment Sample collected on 4/13/90
NYSDEC/NTC Sampling Event Soil/Sediment Sample collected on 4/23/90
IRM Sampling Event Sediment Samples collected in 5/90
Additional IRM Sampling Event Sediment Samples collected in 9/90
Initial RI Sampling Event Sediment Samples collected in 7/91
Supplemental RI Sampling Event Sediment Samples collected in 6/92
ST. ADALBERTS CEMETERY
DALE ROAD
ANDERSON ROAD
PARKING AREA
NIAGARA TRANSFORMER
PARKING AREA
IRM-13 (Sediment in Separator Box)
IRM-7
Tank Farm
071891-12
Storage Building
071891-14
Sample collected ~600' upstream in ditch. (off base map)
Sample collected ~730' upstream in ditch. (off base map)
042390-5
042390-4
071891-10
071591-5
IRM-4
041390-1
041390-2
041390-3
071891-8
SS-1
071891-17
061992-1
041390-4
071891-6
071891-3
061992-4
071891-1
041390-5
042390-6
EAST PUMPHOUSE
DS-3 collected at same location as IRM-5.
IRM-5
DS-3
071691-8
DS-2
WEST PUMPHOUSE
071691-10 collected at same location as IRM-6.
IRM-6
071691-10
DS-1
PS-1
PARKING AREA
MOVIE THEATER
SKATING RINK
RETENTION POND
CONRAIL RAILROAD
BROADWAY
NIAGARA TRANSFORMER CORPORATION
REMEDIAL INVESTIGATION
CHEEKTOWAGA, NEW YORK
WOODWARD-CLYDE CONSULTANTS
Consulting Engineers, Geologists and Environmental Scientists
SURFACE SEDIMENT SAMPLING LOCATIONS IN THE UPPER DITCH FOR ALL SEDIMENT SAMPLING EVENTS
Job No.: 90C2139
Drawing No.
Date: 10/23/92
Checked by:
Rev No.:
Scale: 0 100' 200'
Figure 4-9



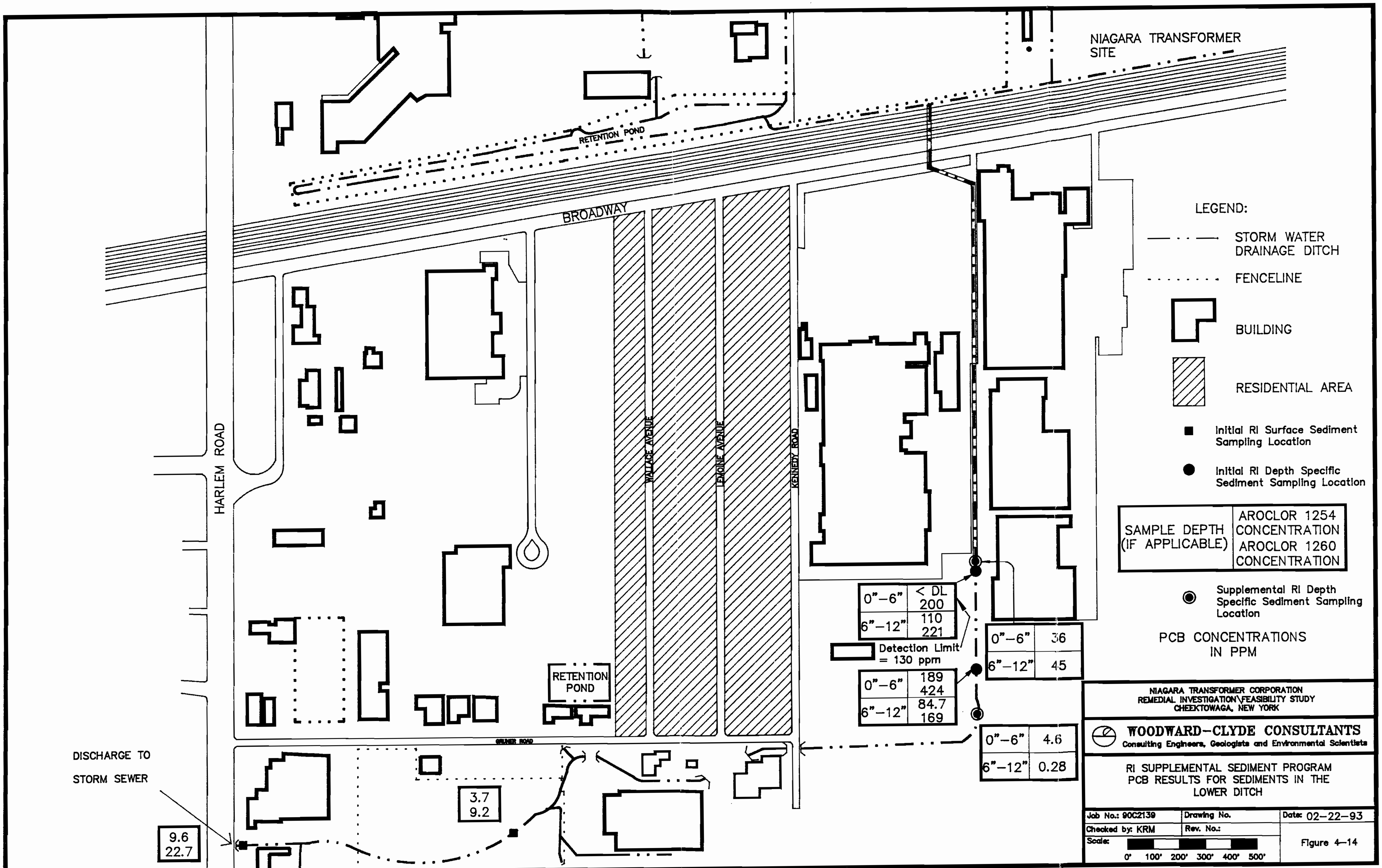
NIAGARA TRANSFORMER SITE
RETENTION POND
BROADWAY
HARLEM ROAD
WALLACE AVENUE
LEMOINE AVENUE
KENNEDY ROAD
RETENTION POND
GRUNER ROAD
DISCHARGE TO STORM SEWER
LEGEND:
STORM WATER DRAINAGE DITCH
FENCELINE
BUILDING
RESIDENTIAL AREA
NYSDEC/NTC Sampling Event Sediment Sample collected on 4/13/90
NYSDEC/NTC Sampling Event Soil/Sediment Sample collected on 4/23/90
RI Sampling Event Sediment Samples collected in 7/91
Supplemental RI Sampling Event Sediment Samples collected in 5/92
041390-6
071691-1
NTC-S-12 0"-6"
Note: Sample S-12 collected very close to sampling location 041390-6
071691-3
NTC-S-11 0"-6"
041390-7
041390-8
042390-7 (RESAMPLE OF 041390-8)
042390-8
042390-9
042390-10
071591-2
071591-1
NIAGARA TRANSFORMER CORPORATION
REMEDIAL INVESTIGATION\FEASIBILITY STUDY
CHEEKTOWAGA, NEW YORK
WOODWARD-CLYDE CONSULTANTS
Consulting Engineers, Geologists and Environmental Scientists
SURFACE SEDIMENT SAMPLING LOCATIONS IN THE LOWER DITCH FOR ALL SEDIMENT SAMPLING EVENTS
Job No.: 90C2139
Drawing No.
Date: 02-22-93
Checked by: KRM
Rev. No.:
Scale:
0' 100' 200' 300' 400' 500'
Figure 4-10


LEGEND:
Fenceline
Drainage ditch
Property Boundary
NYSDEC/NTC Sampling Event Sediment Sample collected on 4/13/90
NYSDEC/NTC Sampling Event Soil/Sediment Sample collected on 4/23/90
IRM Sampling Event Sediment Samples collected in 5/90
Additional IRM Sampling Event Sediment Samples collected in 9/90
RI Sampling Event Sediment Samples collected in 7/91
Supplemental RI Sampling Event Sediment Samples collected in 6/92
3,200 PCB Concentrations in ppm
ST. ADALBERTS CEMETERY
DALE ROAD
ANDERSON ROAD
PARKING AREA
NIAGARA TRANSFORMER
PARKING AREA
Tank Farm
Storage Building
PARKING AREA
MOVIE THEATER
SKATING RINK
WEST PUMPHOUSE
EAST PUMPHOUSE
RETENTION POND
CONRAIL RAILROAD
BROADWAY
4,300
940
3,320
3,731
700
44
69.7
2.4
0.65
0.10
0.11
930
12,940
880
4,500
8,350
941
280
78.3
160
3,200
15.2
140
500J
500
94
189.7
49.6
12
41J
19
NIAGARA TRANSFORMER CORPORATION
REMEDIAL INVESTIGATION
CHEEKTOWAGA, NEW YORK
WOODWARD-CLYDE CONSULTANTS
Consulting Engineers, Geologists and Environmental Scientists
SURFACE SEDIMENT PCB RESULTS FOR ALL SEDIMENT SAMPLING EVENTS IN THE UPPER DITCH
Job No.: 90C2139
Drawing No.
Date: 10/23/92
Checked by:
Rev No.:
Scale: 0 100' 200'
FIGURE 4-11


NIAGARA TRANSFORMER SITE
RETENTION POND
BROADWAY
HARLEM ROAD
WALLACE AVENUE
LEMOINE AVENUE
KENNEDY ROAD
RETENTION POND
DISCHARGE TO STORM SEWER
32.3
12.9
4.4
0.64
9.5
11
2.9
22
4.6
613
30
200
36
LEGEND:
STORM WATER DRAINAGE DITCH
FENCELINE
BUILDING
RESIDENTIAL AREA
NYSDEC/NTC Sampling Event Sediment Sample collected on 4/13/90
NYSDEC/NTC Sampling Event Soil/Sediment Sample collected on 4/23/90
RI Sampling Event Sediment Samples collected in 7/91
Supplemental RI Sampling Event Sediment Samples collected in 5/92
22.7 PCB Concentration in ppm
NIAGARA TRANSFORMER CORPORATION
REMEDIAL INVESTIGATION\FEASIBILITY STUDY
CHEEKTOWAGA, NEW YORK
WOODWARD-CLYDE CONSULTANTS
Consulting Engineers, Geologists and Environmental Scientists
SURFACE SEDIMENT PCB RESULTS FOR ALL SEDIMENT SAMPLING EVENTS IN THE LOWER DITCH
Job No.: 90C2139
Drawing No.
Date: 02-22-93
Checked by: KRM
Rev. No.:
Scale:
0' 100' 200' 300' 400' 500'
FIGURE 4-12



LEGEND:
Fenceline
Drainage ditch
Property Boundary
Initial RI Surface Sediment Sampling Location
Initial RI Depth Specific Sediment Sampling Location
Sample Depth | Aroclor 1254 Concentration / Aroclor 1260 Concentration
PCB Concentrations in ppm
Supplemental RI Depth Specific Sampling Location
ND/DL Non Detect/Detection Limit (ppm)
ST. ADALBERTS CEMETERY
DALE ROAD
ANDERSON ROAD
PARKING AREA
NIAGARA TRANSFORMER
PARKING AREA
Tank Farm
Storage Building
PARKING AREA
MOVIE THEATER
SKATING RINK
RETENTION POND
WEST PUMPHOUSE
EAST PUMPHOUSE
CONRAIL RAILROAD
BROADWAY
0"–6" ND 3,320 DL=990
6"–12" ND 2,250 DL=190
0"–6" 951 2,780
6"–12" ND 2,120 DL=430
0"–6" ND 69.7 DL=17
6"–12" 37.3 122
0"–6" ND 2.4 DL=1.5
0"–6" 205 736
6"–12" 437 880
0"–6" 160
6"–12" 23
12"–18" 20
0"–6" 2,050 6,300
6"–12" ND 2,520
DL=250
0"–6" 6,110 6,830
6"–12" ND 15,200
DL=3500
0"–6" 20.4 57.9
6"–12" 13.7 36.5
DL=5.0
0"–6" ND 15.2
6"–12" ND 14.4
DL=4.5
0"–6" 49.7 140
6"–12" 0.28 1.23
0"–6" 18.0 31.6
6"–12" ND 0.28
DL=.22
0"–6" 930
6"–12" 720
12"–18" .46
NIAGARA TRANSFORMER CORPORATION
REMEDIAL INVESTIGATION/FEASIBILITY STUDY
CHEEKTOWAGA, NEW YORK
WOODWARD–CLYDE CONSULTANTS
Consulting Engineers, Geologists and Environmental Scientists
RI SUPPLEMENTAL SEDIMENT SAMPLING PROGRAM
PCB RESULTS FOR DEPTH SPECIFIC
SEDIMENTS IN THE UPPER DITCH
Job No.: 90C2139
Drawing No.
Date: 02–22–93
Checked by: KRM
Rev No.:
Scale: 0 100' 200'
Figure 4–13

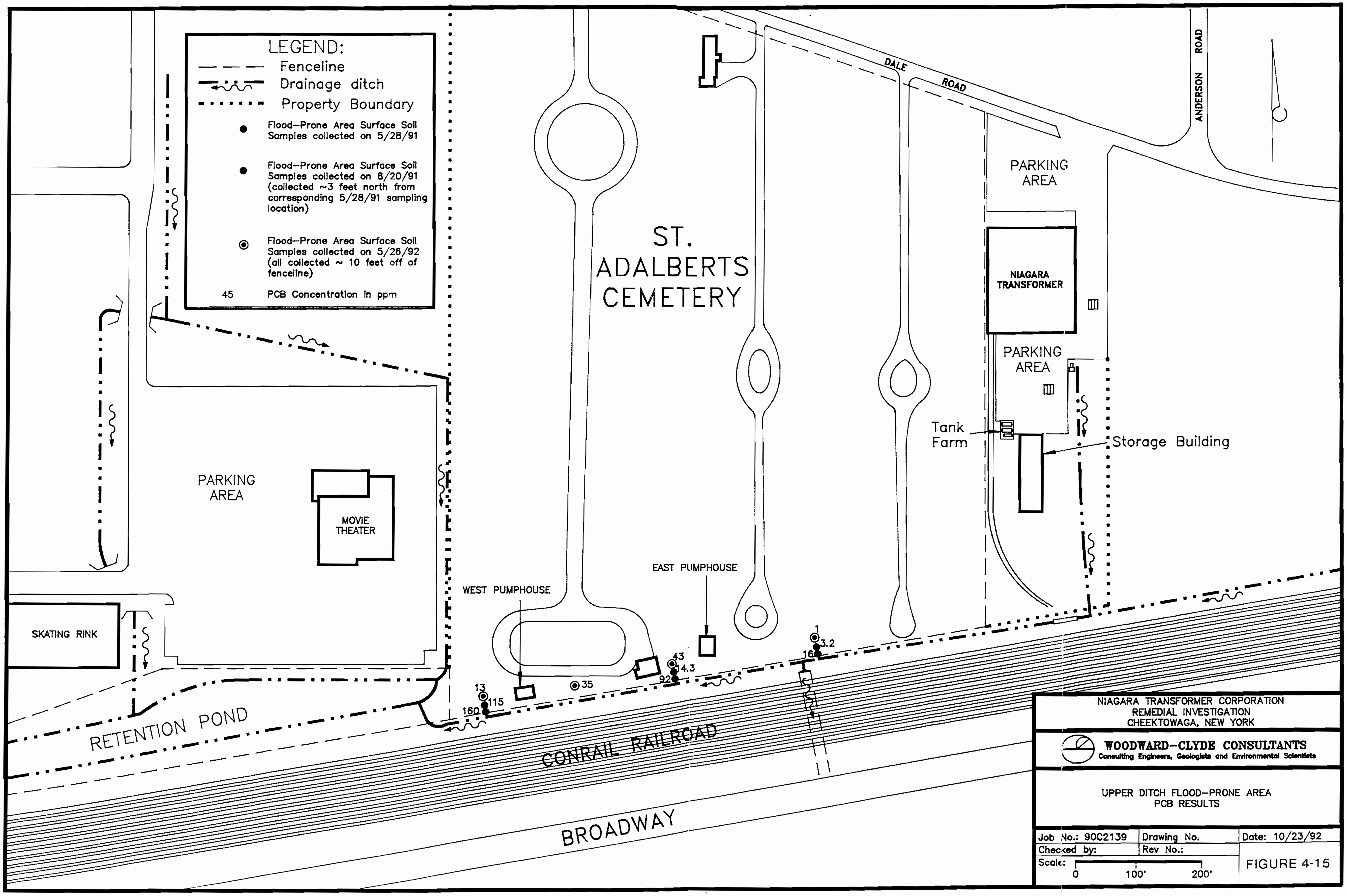


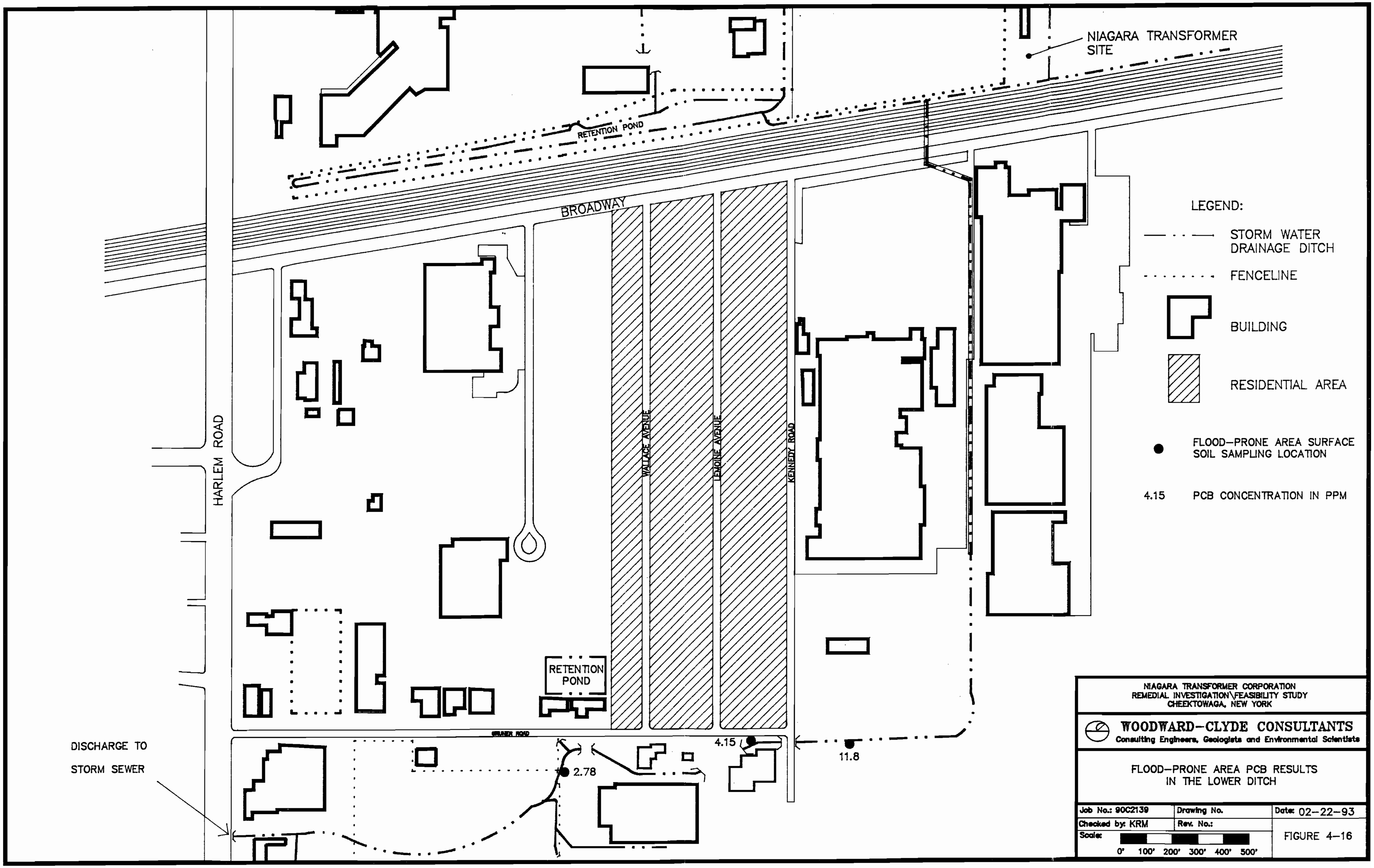
NIAGARA TRANSFORMER CORPORATION
REMEDIAL INVESTIGATION\FEASIBILITY STUDY
CHEEKTOWAGA, NEW YORK

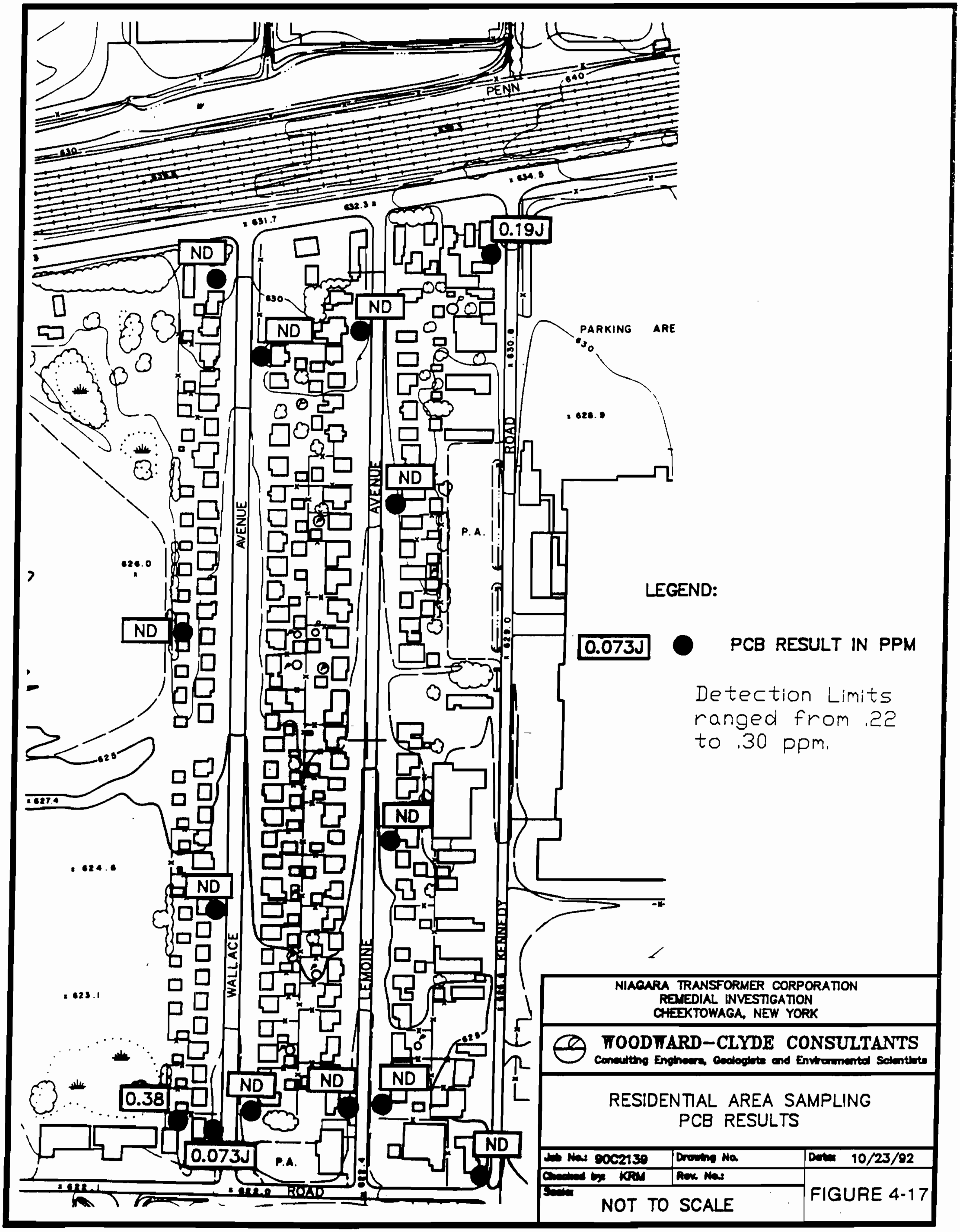
WOODWARD-CLYDE CONSULTANTS
Consulting Engineers, Geologists and Environmental Scientists

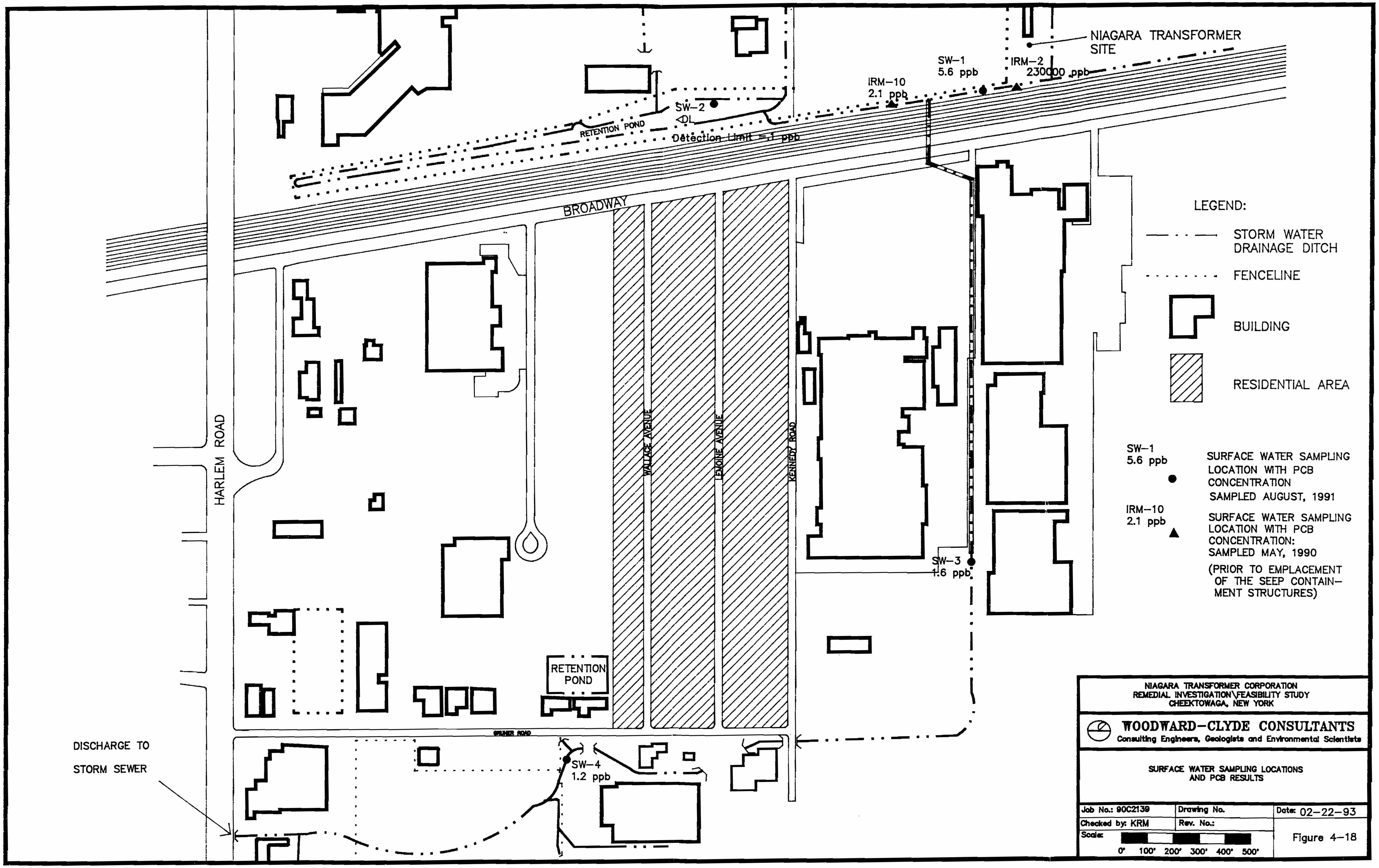
RI SUPPLEMENTAL SEDIMENT PROGRAM
PCB RESULTS FOR SEDIMENTS IN THE
LOWER DITCH

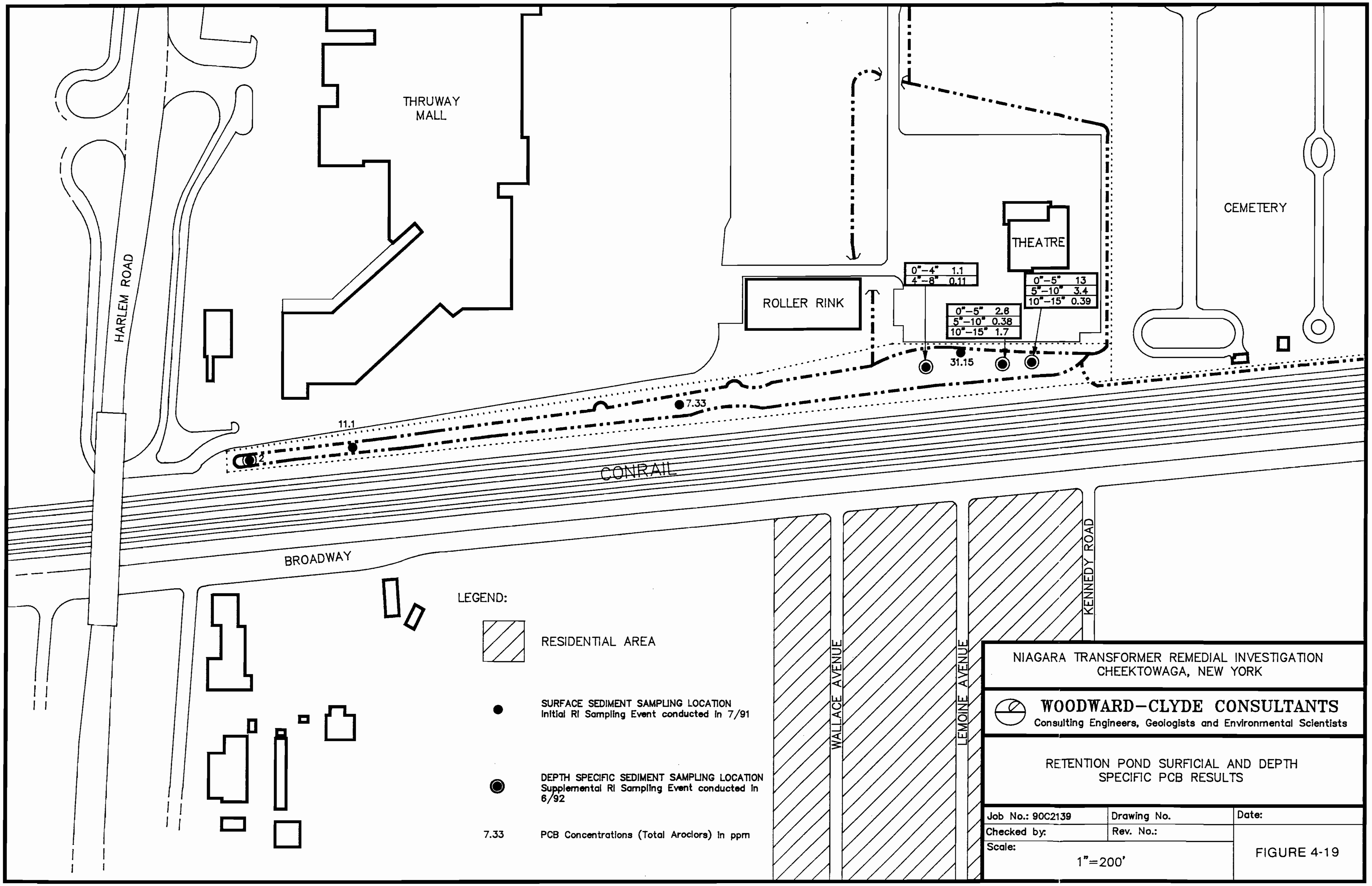
Job No.: 90C2139	Drawing No.	Date: 02-22-93
Checked by: KRM	Rev. No.:	Figure 4-14

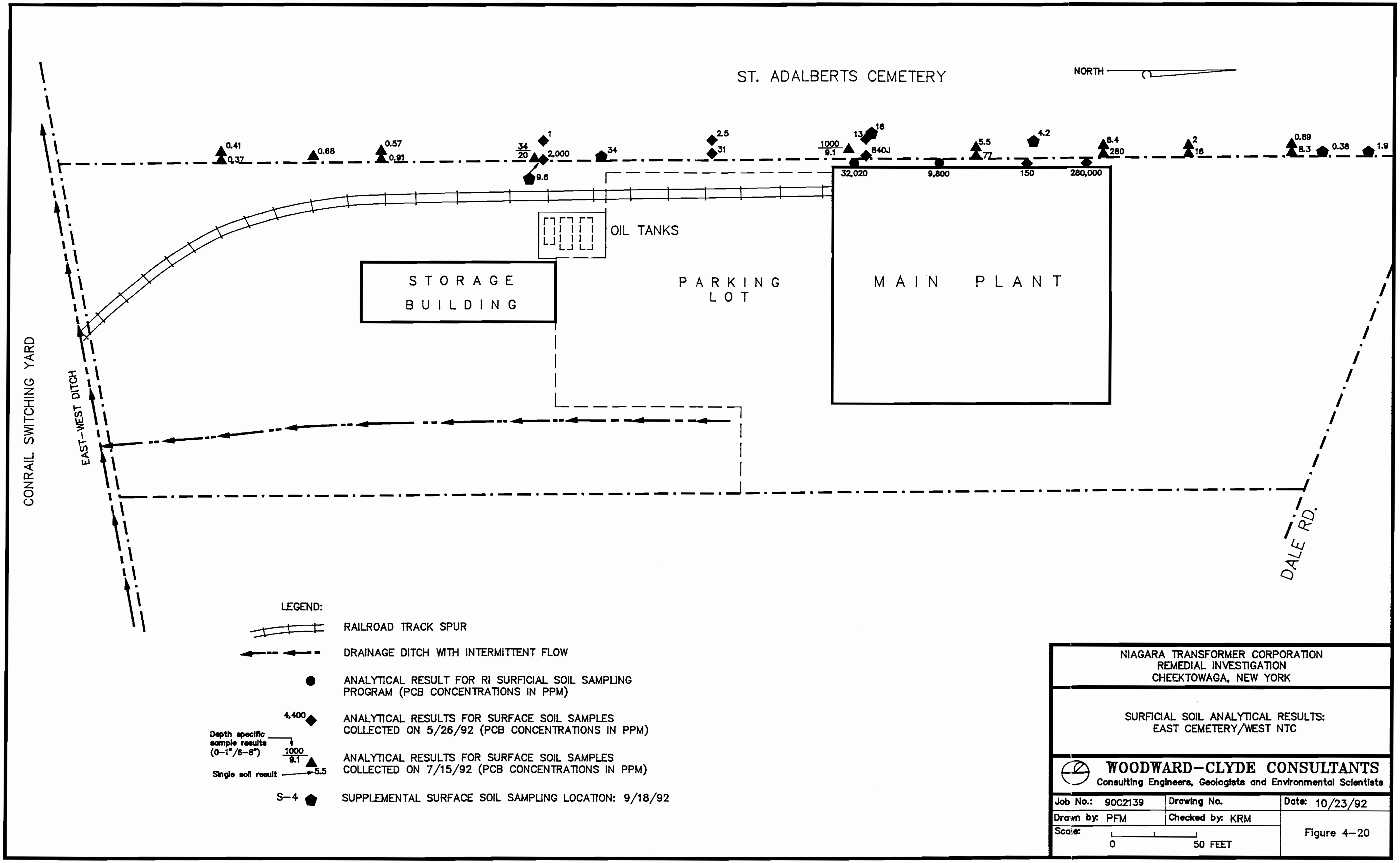

LEGEND:
Fenceline
Drainage ditch
Property Boundary
Flood–Prone Area Surface Soil Samples collected on 5/28/91
Flood–Prone Area Surface Soil Samples collected on 8/20/91 (collected ~3 feet north from corresponding 5/28/91 sampling location)
Flood–Prone Area Surface Soil Samples collected on 5/26/92 (all collected ~ 10 feet off of fenceline)
45 PCB Concentration in ppm
ST. ADALBERTS CEMETERY
DALE ROAD
ANDERSON ROAD
PARKING AREA
NIAGARA TRANSFORMER
PARKING AREA
Tank Farm
Storage Building
PARKING AREA
MOVIE THEATER
SKATING RINK
EAST PUMPHOUSE
WEST PUMPHOUSE
RETENTION POND
CONRAIL RAILROAD
BROADWAY
1
3.2
16
43
14.3
92
35
13
115
160
NIAGARA TRANSFORMER CORPORATION
REMEDIAL INVESTIGATION
CHEEKTOWAGA, NEW YORK
WOODWARD-CLYDE CONSULTANTS
Consulting Engineers, Geologists and Environmental Scientists
UPPER DITCH FLOOD–PRONE AREA
PCB RESULTS
Job No.: 90C2139
Drawing No.
Date: 10/23/92
Checked by:
Rev No.:
Scale:
0
100'
200'
FIGURE 4-15


NIAGARA TRANSFORMER SITE
RETENTION POND
BROADWAY
HARLEM ROAD
WALLACE AVENUE
LEMOINE AVENUE
KENNEDY ROAD
RETENTION POND
DISCHARGE TO STORM SEWER
4.15
2.78
11.8
LEGEND:
STORM WATER DRAINAGE DITCH
FENCELINE
BUILDING
RESIDENTIAL AREA
FLOOD-PRONE AREA SURFACE SOIL SAMPLING LOCATION
4.15 PCB CONCENTRATION IN PPM
NIAGARA TRANSFORMER CORPORATION
REMEDIAL INVESTIGATION\FEASIBILITY STUDY
CHEEKTOWAGA, NEW YORK
WOODWARD-CLYDE CONSULTANTS
Consulting Engineers, Geologists and Environmental Scientists
FLOOD-PRONE AREA PCB RESULTS IN THE LOWER DITCH
Job No.: 90C2139
Drawing No.
Date: 02-22-93
Checked by: KRM
Rev. No.:
Scale:
0' 100' 200' 300' 400' 500'
FIGURE 4-16

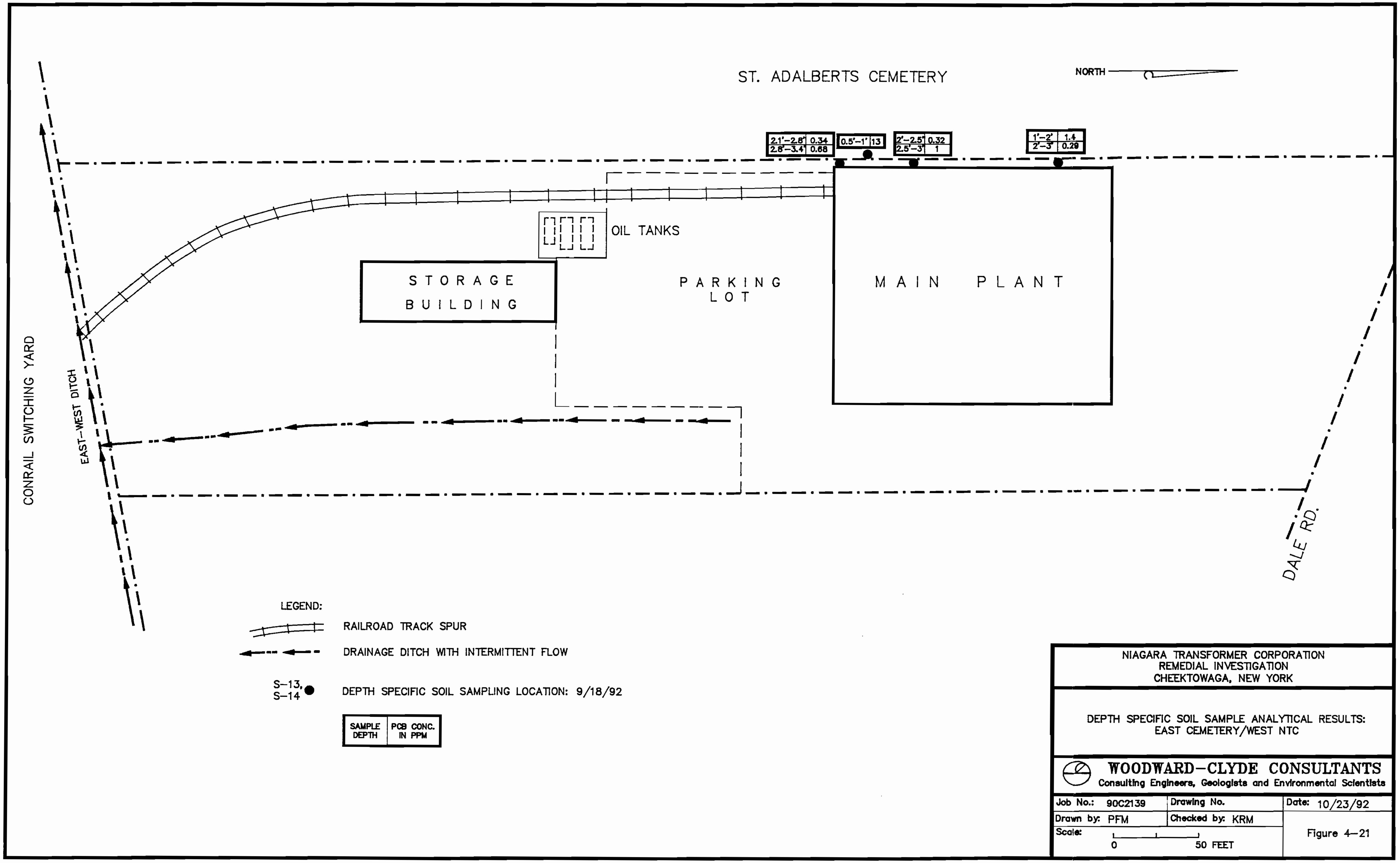

PENN
PARKING ARE
P.A.
AVENUE
WALLACE
AVENUE
LEMOINE
ROAD
KENNEDY
ROAD
ND
0.19J
ND
ND
ND
ND
ND
ND
0.38
0.073J
ND
ND
ND
ND
LEGEND:
0.073J PCB RESULT IN PPM
Detection Limits ranged from .22 to .30 ppm.
NIAGARA TRANSFORMER CORPORATION
REMEDIAL INVESTIGATION
CHEEKTOWAGA, NEW YORK
WOODWARD-CLYDE CONSULTANTS
Consulting Engineers, Geologists and Environmental Scientists
RESIDENTIAL AREA SAMPLING
PCB RESULTS
Job No.: 90C2139
Drawing No.
Date: 10/23/92
Checked by: KRM
Rev. No.:
Scale:
NOT TO SCALE
FIGURE 4-17

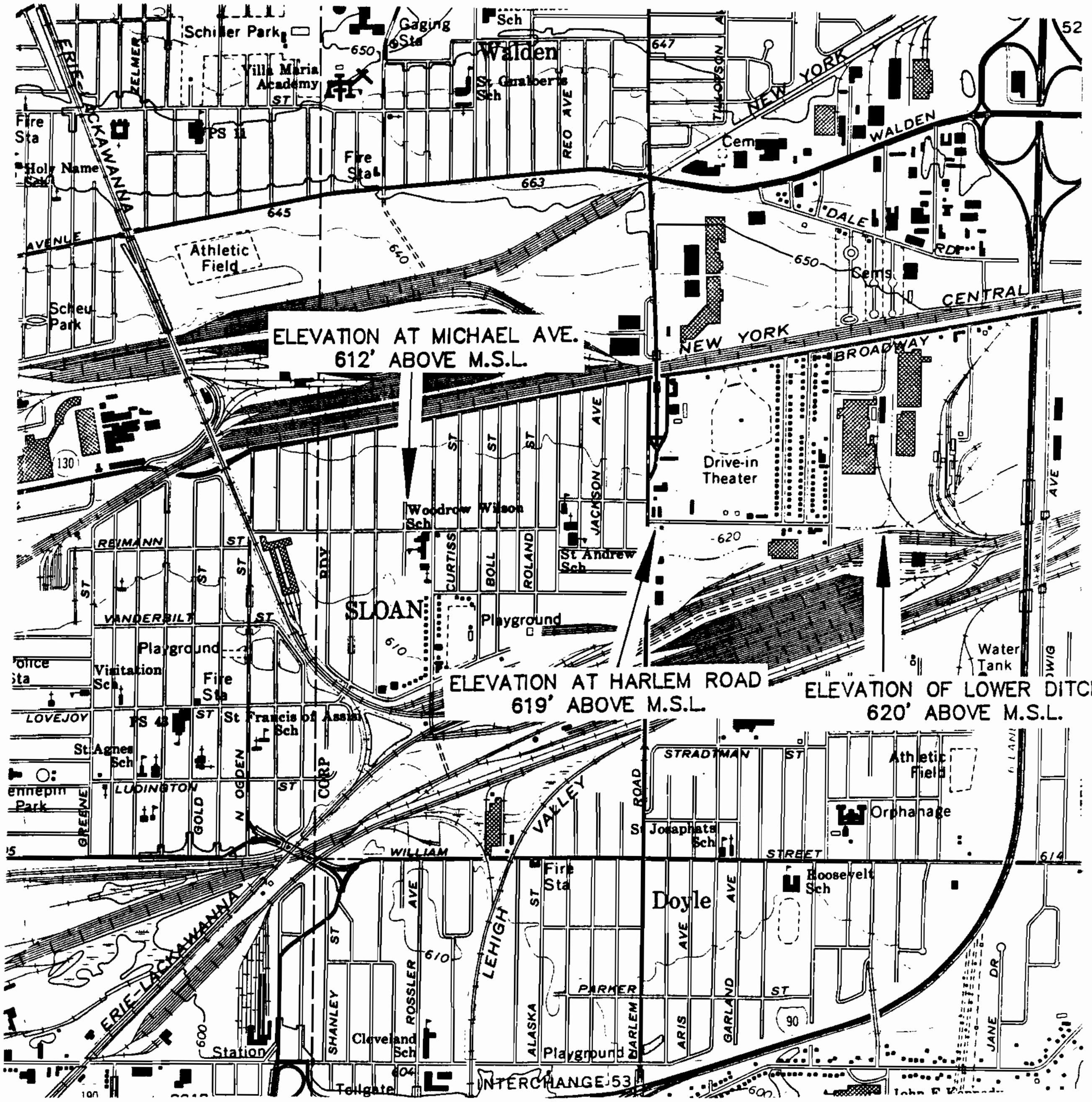

NIAGARA TRANSFORMER SITE
SW-1
5.6 ppb
IRM-2
230000 ppb
IRM-10
2.1 ppb
SW-2
<DL
Detection Limit =.1 ppb
RETENTION POND
BROADWAY
HARLEM ROAD
WALLACE AVENUE
LEMOINE AVENUE
KENNEDY ROAD
SW-3
1.6 ppb
RETENTION POND
GRUNER ROAD
SW-4
1.2 ppb
DISCHARGE TO
STORM SEWER
LEGEND:
STORM WATER DRAINAGE DITCH
FENCELINE
BUILDING
RESIDENTIAL AREA
SW-1
5.6 ppb
SURFACE WATER SAMPLING LOCATION WITH PCB CONCENTRATION
SAMPLED AUGUST, 1991
IRM-10
2.1 ppb
SURFACE WATER SAMPLING LOCATION WITH PCB CONCENTRATION: SAMPLED MAY, 1990
(PRIOR TO EMPLACEMENT OF THE SEEP CONTAINMENT STRUCTURES)
NIAGARA TRANSFORMER CORPORATION
REMEDIAL INVESTIGATION\FEASIBILITY STUDY
CHEEKTOWAGA, NEW YORK
WOODWARD-CLYDE CONSULTANTS
Consulting Engineers, Geologists and Environmental Scientists
SURFACE WATER SAMPLING LOCATIONS
AND PCB RESULTS
Job No.: 90C2139
Drawing No.
Date: 02-22-93
Checked by: KRM
Rev. No.:
Scale:
0' 100' 200' 300' 400' 500'
Figure 4-18


THRUWAY MALL
HARLEM ROAD
ROLLER RINK
THEATRE
CEMETERY
CONRAIL
BROADWAY
WALLACE AVENUE
LEMOINE AVENUE
KENNEDY ROAD
0"–4" 1.1
4"–8" 0.11
0"–5" 13
5"–10" 3.4
10"–15" 0.39
0"–5" 2.6
5"–10" 0.38
10"–15" 1.7
31.15
7.33
11.1
LEGEND:
RESIDENTIAL AREA
SURFACE SEDIMENT SAMPLING LOCATION
Initial RI Sampling Event conducted in 7/91
DEPTH SPECIFIC SEDIMENT SAMPLING LOCATION
Supplemental RI Sampling Event conducted in 6/92
7.33
PCB Concentrations (Total Aroclors) in ppm
NIAGARA TRANSFORMER REMEDIAL INVESTIGATION
CHEEKTOWAGA, NEW YORK
WOODWARD–CLYDE CONSULTANTS
Consulting Engineers, Geologists and Environmental Scientists
RETENTION POND SURFICIAL AND DEPTH
SPECIFIC PCB RESULTS
Job No.: 90C2139
Drawing No.
Date:
Checked by:
Rev. No.:
Scale:
1"=200'
FIGURE 4-19



ST. ADALBERTS CEMETERY
NORTH
OIL TANKS
STORAGE BUILDING
PARKING LOT
MAIN PLANT
CONRAIL SWITCHING YARD
EAST-WEST DITCH
DALE RD.
0.41
0.37
0.68
0.57
0.91
34
20
1
2,000
9.6
34
2.5
31
1000
9.1
13
16
840J
32,020
9,800
5.5
77
4.2
150
8.4
280
280,000
2
16
0.89
8.3
0.38
1.9
LEGEND:
RAILROAD TRACK SPUR
DRAINAGE DITCH WITH INTERMITTENT FLOW
ANALYTICAL RESULT FOR RI SURFICIAL SOIL SAMPLING PROGRAM (PCB CONCENTRATIONS IN PPM)
4,400
ANALYTICAL RESULTS FOR SURFACE SOIL SAMPLES COLLECTED ON 5/26/92 (PCB CONCENTRATIONS IN PPM)
Depth specific sample results (0-1"/6-8")
1000
9.1
Single soil result
5.5
ANALYTICAL RESULTS FOR SURFACE SOIL SAMPLES COLLECTED ON 7/15/92 (PCB CONCENTRATIONS IN PPM)
S-4
SUPPLEMENTAL SURFACE SOIL SAMPLING LOCATION: 9/18/92
NIAGARA TRANSFORMER CORPORATION
REMEDIAL INVESTIGATION
CHEEKTOWAGA, NEW YORK
SURFICIAL SOIL ANALYTICAL RESULTS:
EAST CEMETERY/WEST NTC
WOODWARD-CLYDE CONSULTANTS
Consulting Engineers, Geologists and Environmental Scientists
Job No.: 90C2139
Drawing No.
Date: 10/23/92
Drawn by: PFM
Checked by: KRM
Scale:
0
50 FEET
Figure 4-20


ST. ADALBERTS CEMETERY
NORTH
2.1'-2.8' 0.34
2.8'-3.4' 0.68
0.5'-1' 13
2'-2.5' 0.32
2.5'-3' 1
1'-2' 1.4
2'-3' 0.29
OIL TANKS
STORAGE BUILDING
PARKING LOT
MAIN PLANT
CONRAIL SWITCHING YARD
EAST-WEST DITCH
DALE RD.
LEGEND:
RAILROAD TRACK SPUR
DRAINAGE DITCH WITH INTERMITTENT FLOW
S-13, S-14
DEPTH SPECIFIC SOIL SAMPLING LOCATION: 9/18/92
SAMPLE DEPTH
PCB CONC. IN PPM
NIAGARA TRANSFORMER CORPORATION
REMEDIAL INVESTIGATION
CHEEKTOWAGA, NEW YORK
DEPTH SPECIFIC SOIL SAMPLE ANALYTICAL RESULTS:
EAST CEMETERY/WEST NTC
WOODWARD-CLYDE CONSULTANTS
Consulting Engineers, Geologists and Environmental Scientists
Job No.: 90C2139
Drawing No.
Date: 10/23/92
Drawn by: PFM
Checked by: KRM
Scale:
0
50 FEET
Figure 4-21

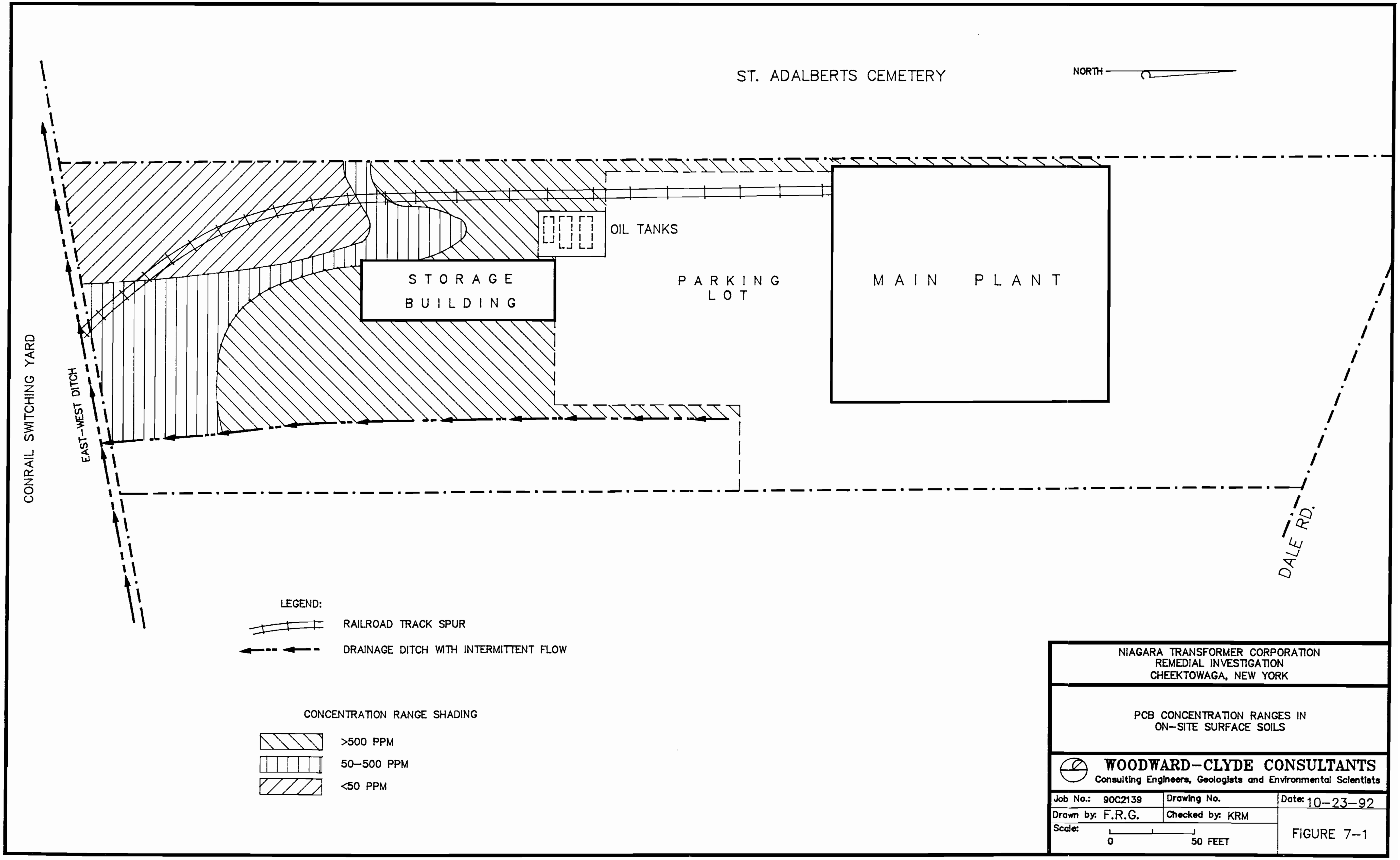


NIAGARA TRANSFORMER CORPORATION
REMEDIAL INVESTIGATION/FEASIBILITY STUDY
CHEEKTOWAGA, NEW YORK

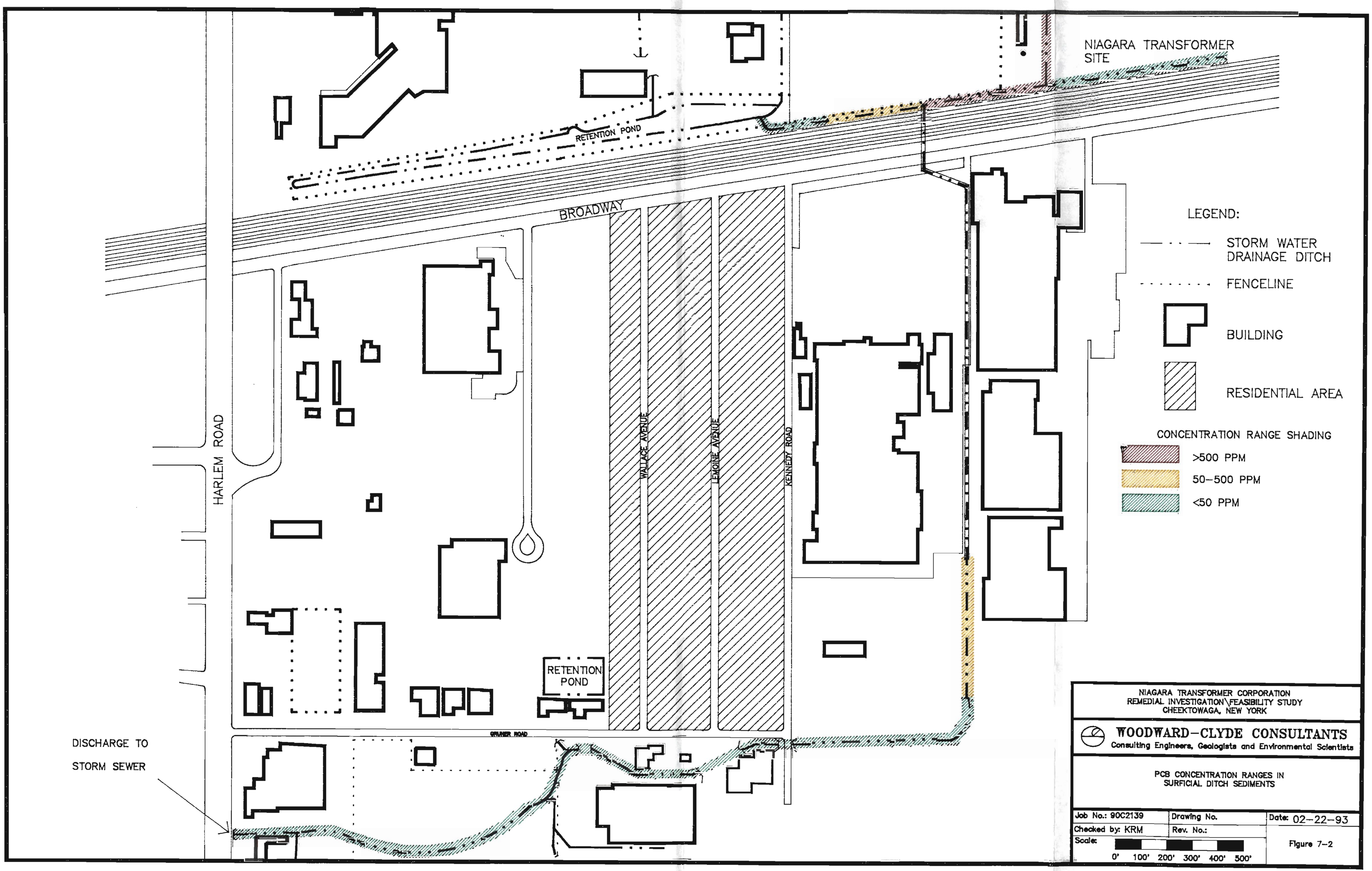
WOODWARD-CLYDE CONSULTANTS
Consulting Engineers, Geologists and Environmental Scientists

TOPOGRAPHIC MAP
LOWER DITCH/VILLAGE OF SLOAN

Job No.: 90C2139	Drawing No.	Date: 07/15/93
Checked by: K.R.M.	Rev No.:	FIGURE 6-1
Scale: 1:24000		



ST. ADALBERTS CEMETERY
NORTH
OIL TANKS
STORAGE BUILDING
PARKING LOT
MAIN PLANT
CONRAIL SWITCHING YARD
EAST-WEST DITCH
DALE RD.
LEGEND:
RAILROAD TRACK SPUR
DRAINAGE DITCH WITH INTERMITTENT FLOW
CONCENTRATION RANGE SHADING
>500 PPM
50-500 PPM
<50 PPM
NIAGARA TRANSFORMER CORPORATION
REMEDIAL INVESTIGATION
CHEEKTOWAGA, NEW YORK
PCB CONCENTRATION RANGES IN
ON-SITE SURFACE SOILS
WOODWARD-CLYDE CONSULTANTS
Consulting Engineers, Geologists and Environmental Scientists
Job No.: 90C2139
Drawing No.
Date: 10-23-92
Drawn by: F.R.G.
Checked by: KRM
Scale:
0
50 FEET
FIGURE 7-1


NIAGARA TRANSFORMER SITE
RETENTION POND
BROADWAY
HARLEM ROAD
WALLACE AVENUE
LEMOINE AVENUE
KENNEDY ROAD
RETENTION POND
GRUNER ROAD
DISCHARGE TO STORM SEWER
LEGEND:
STORM WATER DRAINAGE DITCH
FENCELINE
BUILDING
RESIDENTIAL AREA
CONCENTRATION RANGE SHADING
>500 PPM
50–500 PPM
<50 PPM
NIAGARA TRANSFORMER CORPORATION
REMEDIAL INVESTIGATION\FEASIBILITY STUDY
CHEEKTOWAGA, NEW YORK
WOODWARD–CLYDE CONSULTANTS
Consulting Engineers, Geologists and Environmental Scientists
PCB CONCENTRATION RANGES IN SURFICIAL DITCH SEDIMENTS
Job No.: 90C2139
Drawing No.
Date: 02–22–93
Checked by: KRM
Rev. No.:
Scale:
0' 100' 200' 300' 400' 500'
Figure 7–2

Appendix A

SUMMARY OF CHEMICAL SUBSTANCES USED AT NIAGARA TRANSFORMER CORP.

1747 DALE ROAD, BUFFALO, NEW YORK

USAGE HISTORY

SUPPLIER	PRODUCT	1989	1988	1987	1986	1985	1984	1983	1982	1981	1980	1979	1978
American Gas & Chemical	#372E-01 Thin Film Bubble Gaz Tec III Leak Testing Solution	80 Gal.	12 Gal.	-	-	-	1 Case	-	1 sample	-	1 sample	12 (48 oz.)	-
American Lubricants	Exxon Univolt 60 Transformer Oil	36,943 Gal.	-	-	-	-	-	-	-	-	-	-	-
"	#90-210 Gear Oil	5 Gal.	-	-	-	5 Gal.	5 Gal.	-	10 Gal.	-	-	-	-
"	Sunvis 9150 Hydraulic Oil	25 Gal.	-	-	-	-	-	-	-	-	-	-	-
"	#2 EP Lithium Grease	5 Gal. (70 #)	-	-	-	-	5 Gal. (70 #)	-	-	-	-	-	-
"	Sun Trans I Transformer Oil	-	-	-	-	-	-	-	40,373 Gal.	-	-	10,059 Gal.	-
"	Sun Trans II Transformer Oil	-	35,717 Gal.	47,570 Gal.	41,959 Gal.	5,971 Gal.	-	-	-	-	-	550 Gal.	-
"	AGMA #4 Gear Oil	-	-	-	-	5 Gal.	-	-	-	-	-	-	-
"	Marfax #2 Heavy Grease	-	-	-	-	10 Gal. (35 #)	-	-	-	-	-	10 Gal. (35 #)	-
"	Solnus AC-300 Lubricant	-	-	-	-	110 Gal.	-	-	-	-	-	55 Gal.	-
"	Texaco Meropa #150 Oil	-	-	-	-	-	-	-	-	-	-	10 Gal. (35 #)	-

SUPPLIER	PRODUCT	1989	1988	1987	1986	1985	1984	1983	1982	1981	1980	1979	1978
American Lubricants (Cont'd)	Meropa #220 Oil	-	-	-	-	-	10 Gal. (70 #)	-	-	-	-	-	-
"	#600 R & O Oil	-	-	-	-	-	-	-	55 Gal.	-	-	-	-
"	#7654 Regal Oil R & O	-	-	-	-	-	55 Gal.	-	-	-	-	-	-
Angert Auto Parts	3M #8816 Undercoat	-	-	-	-	-	-	-	-	-	-	25 Gal.	-
AT Supply	#1030 Rustoleum	-	-	-	-	-	-	-	-	-	15 Gal.	32 Gal.	-
BASF Wyandotte Corp.	#592691 Activator for Coal Tar Epoxy	-	-	-	-	-	-	-	-	-	-	-	37 Gal.
Bisonite Paint Company	11-0450-0671 White HDCT R/B Masonry	-	-	-	-	-	-	12 Gal.	-	-	-	-	-
"	15-3116-062 Epoxy Oil Zinc Chromate Primer	-	-	75 Gal.	-	-	-	-	-	-	-	-	-
"	15-3134-0601 Sand Tone Super Hardcote Enamel	-	-	275 Gal.	-	-	-	-	-	-	-	-	-
"	15-6610-0631 Epoxy Ester Gray Primer	-	-	75 Gal.	-	-	-	-	-	-	-	-	-
"	15-9133-0702 Epiflex Gray Primer	-	-	20 Gal.	-	-	-	-	-	-	-	-	-
Buffalo Slurry Seal	Sealer	-	-	-	-	-	-	-	-	-	55 Gal.	-	-
Carboline	Subox 11 FD Red Primer #1591	-	-	-	-	-	-	-	-	-	20 Gal.	-	-
"	Subox 9 FD Blue, Gray #2717	-	-	-	-	-	-	-	-	-	10 Gal.	-	-

SUPPLIER	PRODUCT	1989	1988	1987	1986	1985	1984	1983	1982	1981	1980	1979	1978
Caton Hendler	Zinsesser's Orange Shellac	108 Gal.	92 Gal.	104 Gal.	116 Gal.	152 Gal.	104 Gal.	88 Gal.	144 Gal.	90 Gal.	-	-	-
"	Bruning Silathane Enamel White	8 Gal.	17 Gal.	-	-	-	-	-	-	-	-	-	-
"	Rustoleum 1030 Green	3 Gal.	2 Gal.	-	-	-	-	-	-	-	-	-	-
"	Bruning Pro-Am Latex White	-	94 Gal.	-	-	-	-	-	-	-	-	-	-
"	Block-out Primer	-	9 Gal.	-	-	-	-	-	-	-	-	-	-
"	Bruning Supreme Alkyd S.G.	-	5 Gal.	-	-	-	-	-	-	-	-	-	-
"	Bruning Silathane Enamel Tobacco Brown	-	2 Gal.	-	-	-	-	-	-	-	-	-	-
"	Liquid Envelope	-	-	-	-	5 Gal.	-	-	-	-	-	-	-
Central O.B. Products	O.B. Liquid Hand Soap	-	-	-	5 Gal.	15 Gal.	15 Gal.	5 Gal.	20 Gal.	25 Gal.	20 Gal.	25 Gal.	15 Gal.
"	A OK Metal Polish	-	-	-	-	-	1 Qt.	-	-	-	-	-	-
Certified Labs.	SAF/SOL 20/20	55 Gal.	-	-	-	-	-	-	-	-	-	-	-
Chem Central	Mineral Spirits RULE 66	770 Gal.	890 Gal.	-	-	-	-	-	-	-	-	-	-
"	Xylene	110 Gal.	220 Gal.	-	-	-	-	-	-	-	-	-	-
Chemsearch	SS-25 Solvent	-	55 Gal.	55 Gal.	-	55 Gal.	-	-	-	-	-	-	-
Complete Reading	Dolph BC 346A Varnish	2,585 Gal.	3,025 Gal.	1,760 Gal.	2,750 Gal.	4,290 Gal.	2,640 Gal.	2,475 Gal.	3,300 Gal.	3,300 Gal.	2,200 Gal.	-	1,650 Gal.
"	Glyptal #880	14 Qts.	23 Qts.	24 Qts.	34 Qts.	18 Qts.	12 Qts.	6 Qts.	12 Qts.	18 Gal.	12 Gal.	-	10 Qts.
"	Dolph EB-41 Enamel Insulator	4 Gal.	6 Gal.	10 Gal.	-	29 Gal.	12 Gal.	14 Gal.	16 Gal.	20 Gal.	-	-	-
"	Dolph Reactor RE-2001	-	6 Gal. (48#)	-	-	6 Gal. (48#)	32 Gal. (256#)	30 Gal. (240#)	35 Gal. (280#)	12 Gal. (96#)	-	-	-
"	Dolph Resin CB-1078	-	10 Gal. (120#)	-	-	3 Gal. (36#)	74 Gal. (888#)	50 Gal. (600#)	40 Gal. (480#)	20 Gal. (240#)	-	-	65 Gal. (780#)

SUPPLIER	PRODUCT	1989	1988	1987	1986	1985	1984	1983	1982	1981	1980	1979	1978
Complete Reading (Cont'd)	Dolph CC 1120 Potting Compound	-	-	4 Gal.	-	-	-	-	-	-	-	-	-
"	Dolph T-352 Solvent	-	-	10 Gal.	10 Gal.	20 Gal.	-	10 Gal.	-	-	-	-	-
"	Dolph BC-352 Varnish	-	-	-	110 Gal.	110 Gal.	-	100 Gal.	-	-	-	-	-
"	Dolph T-200X Thinner	-	-	-	275 Gal.	55 Gal.	-	-	-	-	-	-	-
"	#7031 GE Adhesive	-	-	-	-	-	7 Gal.	4 Gal.	10 Gal.	-	12 Gal.	-	24 Gal.
"	Ideal 30-030 No Aloy Compound	-	-	-	-	-	-	-	4 Gal.	-	-	-	-
"	Dolph AC-29-7S-G Moisture & Fungus Resistant Varnish	-	-	-	-	-	-	-	-	4 Gal.	-	-	-
"	RTV-108-12T RTV Silicone	-	-	-	-	-	-	-	-	6 Tubes	-	-	-
"	TMF 10 BB Spray Paint	-	-	-	-	-	-	-	-	6 Cans	-	-	-
"	Dolph RE 2013-6 Reactor	-	-	-	-	-	-	-	-	-	-	-	11 Gal.
"	ER41-G Dolph	-	-	-	-	-	-	-	-	-	-	-	4 Gal.
"	RE 2000 Reactor	-	-	-	-	-	-	-	-	-	-	-	9 Qts.
Conlux Coatings	Steel Guard PS103-8 Meadow Gold Enamel	-	-	-	-	-	-	-	-	-	-	5 Gal.	-
Cool-Amp	Silver Plating Powder	-	-	-	-	2#	2#	-	5#	-	-	-	4#
Crandall & Son	DuPont Dulux Green Enamel 93-23666	-	-	-	-	3 Gal.	-	-	-	-	-	-	-
Davis Howland Oil Company	Exxon Univolt Uninhibited Oil	-	-	6,119 Gal.	-	-	-	-	-	-	-	-	-
De Boom Paint	#562-40 K Arbor Green Enamel #121	-	-	-	-	-	-	-	-	-	-	30 Gal.	-

SUPPLIER	PRODUCT	1989	1988	1987	1986	1985	1984	1983	1982	1981	1980	1979	1978
De Boom Paint (Cont'd)	#570 Thinner for #562-40 K	-	-	-	-	-	-	-	-	-	-	10 Gal.	-
Dexsill Corp.	Oil PCB Test Kits Clor-in-oil	-	4 Kits	1 Kit	1 Kit	40 Kits	-	-	-	-	-	-	-
Diamond Shamrock	Perclene TG Transformer Fluid	-	-	-	1,338 Gal.	-	-	-	-	-	-	-	-
A B Dick	#24-2030 Spirit Fluid 31	-	-	-	-	6 Gal.	6 Gal.	6 Gal.	12 Gal.	6 Gal.	12 Gal.	6 Gal.	12 Gal.
"	#24-4102 Hand Cleaner	-	-	-	-	-	-	-	-	19 Jars	-	-	-
Dow Corning	561 Silicone Fluid	25,905 Gal.	34,045 Gal.	31,384 Gal.	6,380 Gal.	18,645 Gal.	6,600 Gal.	3,630 Gal.	16,445 Gal.	4,840 Gal.	5,225 Gal.	3,850 Gal.	4,895 Gal.
Durako Paint	#610 Tile Red Air Dry Enamel	-	-	-	-	5 Gal.	-	-	-	-	-	-	-
"	#M5J86	-	-	-	-	-	-	-	-	-	-	-	20 Gal.
Dwelle Kaiser	Orange Shellac	-	-	-	-	-	-	-	-	-	-	-	108 Gal.
E. I. Du Pont	Freon 116 Dielectric Grade	-	-	-	-	337#	-	190#	-	-	-	-	95#
E. S. Doyle Paint	Quik Tred Tint	-	-	-	-	-	-	-	-	9 Gal.	-	-	-
Edwards High Vacuum	#16 Oil	-	-	-	-	-	-	-	-	-	10 Gal.	-	5 Gal.
Ellicott Paint	Penetrol Conditioner	-	1 Gal.	-	-	-	-	-	-	-	-	-	-
"	Skyco OSPHO Metal Treatment	-	1 Gal.	-	-	3 Gal.	2 Gal.	2 Gal.	4 Gal.	2 Gal.	-	-	-
"	I-M-F Chrom Redoxide Primer	-	-	2 Gal.	5 Gal.	-	-	-	-	-	-	-	-
"	Zinsesser's Orange Shellac	-	-	4 Gal.	-	-	-	-	-	-	-	-	-
"	Effecto Enamel Grenadier Red P45-E115/1	-	-	-	2 Gal.	-	-	-	-	2 Gal.	-	-	-

SUPPLIER	PRODUCT	1989	1988	1987	1986	1985	1984	1983	1982	1981	1980	1979	1978
Ellicott Paint (Cont'd)	INS-SA2723/1 Safety Yellow Enamel	-	-	-	-	-	2 Gal.	-	-	-	-	-	-
"	CC1-310160/1 Safety Yellow Gloss 47X	-	-	-	-	-	1 Gal.	-	2 Gal.	2 Gal.	-	-	-
"	Liquid Envelope Spray Booth Coating ESS495396/5	-	-	-	-	-	-	5 Gal.	5 Gal.	10 Gal.	5 Gal.	-	-
"	P45-E31197/1 Effecto Enamel Tint 628A Thistle	-	-	-	-	-	-	-	-	1 Gal.	-	-	-
"	Oil-PT/5 Paint Thinner	-	-	-	-	-	-	-	-	15 Gal.	-	-	-
"	Xylene	-	-	-	-	-	-	-	-	-	11 Gal.	-	-
"	P45-E31190/1 Effecto Enamel Tint 733M, French Blue	-	-	-	-	-	-	-	-	-	5 Gal.	-	-
"	Toluene	-	-	-	-	-	-	-	-	-	-	-	2 Gal.
"	4693 EDCO Latex Flat Ceiling White	-	-	-	-	-	-	-	-	-	-	-	4 Gal.
Ensign Products	#A-269-B Wire Stripper	-	-	-	-	-	-	-	-	-	-	-	2 Gal.
Fine Basic Chemicals	Lacquer Thinner	5 Gal.	10 Gal.	10 Gal.	10 Gal.	10 Gal.	15 Gal.	15 Gal.	15 Gal.	40 Gal.	65 Gal.	75 Gal.	-
"	Spray Gun Cleaner	45 Gal.	60 Gal.	55 Gal.	50 Gal.	45 Gal.	55 Gal.	45 Gal.	40 Gal.	20 Gal.	150 Gal.	160 Gal.	-
"	Mineral Oil Spirits-Rule 66	495 Gal.	1,320 Gal.	1,595 Gal.	1,375 Gal.	1,595 Gal.	1,705 Gal.	990 Gal.	1,375 Gal.	1,595 Gal.	1,650 Gal.	2,145 Gal.	-
"	ELTO I Degreaser	110 Gal.	65 Gal.	-	-	-	-	-	-	-	-	-	-
"	Xylene	55 Gal.	230 Gal.	385 Gal.	220 Gal.	330 Gal.	385 Gal.	385 Gal.	550 Gal.	855 Gal.	720 Gal.	110 Gal	-
"	Ethyl Alcohol 200 Proof	-	40 Gal.	50 Gal.	45 Gal.	50 Gal.	-	-	-	-	-	-	-
"	Ethyl Alcohol 190 Proof	-	-	15 Gal.	-	-	-	-	-	-	-	-	-

SUPPLIER	PRODUCT	1989	1988	1987	1986	1985	1984	1983	1982	1981	1980	1979	1978
Fine Basic Chemicals (Cont'd)	Denatured Ethyl Alcohol	-	-	-	-	-	-	5 Gal.	15 Gal.	5 Gal.	5 Gal.	25 Gal.	-
"	Kerosene	-	-	-	-	-	-	-	55 Gal.	-	-	-	-
"	Emcolope	-	-	-	-	-	-	-	-	-	5 Gal.	-	-
"	Toluene	-	-	-	-	-	-	-	-	-	55 Gal.	220 Gal.	-
G & W Electric	NOVOID X Compound	-	-	-	5 Gal.	-	-	-	-	-	-	-	5 Gal.
General Electric Co.	SF97-50 Silicone Fluid	12,745 Gal.	5,830 Gal.	12,045 Gal.	11,715 Gal.	-	-	-	-	-	-	-	-
Gerin Corp.	Neutral Solution	-	-	-	-	-	-	-	-	4 Qts.	-	-	-
"	Ampules	-	-	-	-	-	-	-	-	3 Lbs.	-	-	-
Glidden Paint	#4580 Keller Green Alkyd Enamel	16 Gal.	-	-	-	-	-	-	-	-	-	-	-
"	#5207 Tank Primer White	15 Gal.	-	-	-	-	-	-	-	-	-	-	-
"	#4503 Alkyd Industrial Enamel	-	20 Gal.	-	-	-	-	-	-	-	-	-	-
"	#5206 Tank Primer	-	20 Gal.	-	-	-	-	-	-	-	-	-	-
Goetz Oil	#2316 MGL 80W90 Texaco Gear Oil	-	-	5 Gal.	-	-	-	-	-	-	-	-	-
"	Texaco 55 Transformer Oil	-	-	-	-	-	55 Gal.	-	-	-	-	-	-
HBS Equip.	#311 Tin Coatalyte	-	-	-	12 Jars	12 Jars	6 Jars	12 Jars	12 Jars	12 Jars	-	12 Jars	-
"	#314 Copper Coatalyte	-	-	-	12 Jars	24 Jars	6 Jars	24 Jars	12 Jars	12 Jars	-	12 Jars	-
"	#316 Silver Coatalyte	-	-	-	-	-	-	-	-	-	-	-	6 Jars

SUPPLIER	PRODUCT	1989	1988	1987	1986	1985	1984	1983	1982	1981	1980	1979	1978
Haynes Coatings & Chemicals	Hydroline Red Oxide Primer KDA 258	-	-	-	-	-	-	-	-	-	-	5 Gal.	-
Keeler & Long	Tri-Polar Silicone Enamel Disney BL 42	10 Gal.	-	-	-	-	-	-	-	-	-	-	-
"	Tri-Polar White Primer	7 Gal.	-	-	-	-	-	-	-	-	-	-	-
"	Poly Silicone Enamel Bayou Green	-	-	-	20 Gal.	-	-	-	-	-	-	-	-
Miller Stephenson Chemical	MS 143 Release Agent	-	-	-	-	-	-	1 Gal.	-	-	-	2 Gal.	-
"	MS 142 Release Agent	-	-	-	-	-	-	-	2 Gal.	-	-	-	-
National Chemsearch	SS-25 Solvent	-	-	-	-	-	-	55 Gal.	-	55 Gal.	-	35 Gal.	-
National Ammonia	Anhydrous Ammonia	-	-	-	-	-	-	-	-	-	-	-	150#
National Mfg.	Industrial Enamel Black #32211-AN	-	-	-	-	-	-	-	-	-	-	4 Gal.	-
Niagara Lubricant	Met Kut 0850	-	-	-	-	-	-	10 Gal.	-	-	-	-	-
Oakite Products	Oakite 31	-	-	-	-	-	-	-	-	-	-	-	55 Gal.
"	Cryscoat 287SC	-	-	-	-	5 Gal.	-	-	-	-	-	-	-
Occidental Chemical	Perclene TG	-	-	220 Gal.	-	-	-	-	-	-	-	-	-
PPG	23-810 Safety Orange Enamel	-	-	-	-	-	15 Gal.	-	-	-	-	-	-
R & D Metal & Chem.	AL-25 Spachem Flux	-	-	-	-	-	-	-	24 ea.	-	-	-	-
RTE Corp.	RTEmp Fluid	9,790 Gal.	5,720 Gal.	1,815 Gal.	4,730 Gal.	6,655 Gal.	8,965 Gal.	2,585 Gal.	1,760 Gal.	-	2,255 Gal.	-	-

SUPPLIER	PRODUCT	1989	1988	1987	1986	1985	1984	1983	1982	1981	1980	1979	1978
Rapid Electro Plate	Copper Coatalyte #314	-	-	12 Jars	-	-	-	-	-	-	-	-	12 Jars
"	#316 Silver Coatalyte	-	-	-	-	-	-	-	-	-	-	-	13 Jars
Reichold	Y-510 Masking Grease	-	-	80#	80#	80#	80#	80#	120#	-	120#	-	64#
"	E676 Thermo Epoxy	-	-	-	-	-	-	-	-	-	-	-	224#
"	C-80 Catalyst	-	-	-	-	-	-	-	-	-	-	-	56#
"	Y-390 Thermo Epoxy	-	-	-	-	-	-	-	-	-	-	-	20 Gal.
Riverside Chemical	Silver Plating Paste	20 Pts.	31 Pts.	19 Pts.	12 Pts.	21 Pts.	12 Pts.	14.5 Pts.	7 Pts.	12 Pts.	19 Pts.	12 Pts.	-
"	Anhydrous Ammonia	-	-	150#	150#	150#	150#	-	150#	150#	150#	150#	-
"	Mineral Spirits Rule 66	-	-	-	10 Gal.	-	-	-	-	-	-	-	-
"	Muriatic Acid	-	-	-	-	-	-	-	-	-	-	4 Gal.	-
"	Sodium Silicate	-	-	-	-	-	-	-	-	-	-	-	1 Gal.
Rockfort Ind.	IS-1000 Solvent	-	-	-	-	165 Gal.	165 Gal.	110 Gal.	110 Gal.	275 Gal.	110 Gal.	110 Gal.	40 Gal.
Roy Anderson Paint Co.	#562-40K #121 Arbor Green Epoxy Enamel	-	-	-	-	-	-	-	-	-	10 Gal.	-	-
"	#570 Epoxy Thinner	-	-	-	-	-	-	-	-	-	10 Gal.	-	-
Schuele Co.	Orange Shellac	-	-	-	-	-	-	-	-	54 Gal.	104 Gal.	152 Gal.	56 Gal.
"	Zinc Chromate Primer BM#15400	-	-	-	-	-	-	-	-	-	5 Gal.	-	-
Shell Oil	Diala A Uninhibited Transformer Oil	41,807 Gal.	53,645 Gal.	11,767 Gal.	-	30,072 Gal.	-	-	-	-	-	-	-
"	Diala AX Inhibited Transformer Oil	-	-	-	36,082 Gal.	5,883 Gal.	-	-	-	-	-	-	-

SUPPLIER	PRODUCT	1989	1988	1987	1986	1985	1984	1983	1982	1981	1980	1979	1978
Sherwin Williams	KEM A & A Epoxy #9063	40 Gal.	-	-	-	-	-	-	-	-	-	-	-
"	ASA70 Quick Dry Enamel	15 Gal.	-	-	-	-	-	-	-	-	-	-	-
"	ASA61 Ind. Enamel	20 Gal.	20 Gal.	20 Gal.	-	10 Gal.	-	5 Gal.	-	-	-	-	-
"	ASA61 Quick Dry Enamel	49 Gal.	-	-	-	-	-	-	5 Gal.	-	-	-	-
"	Kem Flash Primer E61A45	-	-	-	-	85 Gal.	120 Gal.	80 Gal.	30 Gal.	-	-	-	-
"	Kem Kronic White Primer	15 Gal.	-	-	-	-	-	-	-	-	-	-	-
"	MC-40 Ind. Enamel	15 Gal.	-	-	-	-	-	-	-	-	-	-	-
"	Tile Clad ASA 61	15 Gal.	-	-	-	-	-	-	-	-	-	-	-
"	Gloss Activator for Tile Clad	15 Gal.	-	-	-	-	-	-	-	-	-	-	-
"	Tile Clad MC-71	1 Gal.	-	-	-	-	-	-	-	-	-	-	-
"	Gloss Activator for Tile Clad MC-71	1 Gal.	-	-	-	-	-	-	-	-	-	-	-
"	B54Y17 OSHA Yellow Ind. Enamel	2 Gal.	-	-	-	-	-	-	-	-	-	-	-
"	MC-30 Jade Green Ind. Enamel	-	1 Gal.	-	-	-	-	-	-	-	-	-	-
"	Safety Orange Ind. Enamel	-	1 Gal.	-	-	-	-	-	-	-	-	-	-
"	Kem Lustral Pale Green	-	5 Gal.	-	-	-	-	-	-	-	-	-	-
"	B54UC 12872 Ind. Enamel	-	-	2 Gal.	-	-	-	-	-	-	-	-	-
"	Spray Booth Coat #M69W1	-	-	5 Gal.	-	-	-	-	-	-	-	-	-
"	Pro-Mar Alkyd S-G Enamel Appliance White	-	-	-	2 Gal.	-	-	-	-	-	-	-	-
"	MC-62 Marble S-G Enamel	-	-	-	-	5 Gal.	-	-	-	-	-	-	-
"	Zinc Chromate Primer B50Y1	-	-	-	-	5 Gal.	-	-	-	-	-	-	-

SUPPLIER	PRODUCT	1989	1988	1987	1986	1985	1984	1983	1982	1981	1980	1979	1978
Sherwin Williams (Cont'd)	Primer B50A1	-	-	-	-	-	1 Gal.	-	-	-	-	-	-
"	Tile Clad B62W101	-	-	-	-	-	-	-	1 Gal.	-	-	-	-
"	Catalyst B6N70	-	-	-	-	-	-	-	1 Gal.	-	-	-	-
"	B54T104 OSHA Blue	-	-	-	-	-	-	-	15 Gal.	-	-	-	-
"	Industrial Enamel Precaution Blue	-	-	-	-	-	-	-	-	15 Gal.	-	-	-
"	Industrial Enamel Black B54B11	-	-	-	-	-	-	-	-	10 Gal.	-	-	-
"	B50N2 Kem Kromic Primer	-	-	-	-	-	-	-	-	-	-	30 Gal.	-
"	Tile Clad II Primer Epoxy	-	-	-	-	-	-	-	-	-	-	9 Gal.	-
"	Tile Clad II Activator	-	-	-	-	-	-	-	-	-	-	19 Gal.	-
"	Tile Clad II ANSI 61 Gray	-	-	-	-	-	-	-	-	-	-	10 Gal.	-
Strathmore Prod.	W23-0025P Dri Quik Off White Epoxy	20 Gal.	-	-	-	-	-	-	-	-	-	-	-
"	E13-0048 ASA 70 Gray Enamel	65 Gal.	83 Gal.	226 Gal.	184 Gal.	56 Gal.	121 Gal.	-	137 Gal.	29 Gal.	51 Gal.	-	78 Gal.
"	G23-0063 Strathpon Forest Green Enamel	17 Gal.	22 Gal.	-	-	-	-	-	-	121 Gal.	116 Gal.	-	-
"	N16-0010P Dri Quik Zinc Oxide Primer	-	-	20 Gal.	-	-	15 Gal.	-	-	-	-	-	-
"	G13-0048 Forest Green Enamel	-	50 Gal.	55 Gal.	84 Gal.	50 Gal.	110 Gal.	-	54 Gal.	170 Gal.	42 Gal.	-	124 Gal.
"	E11-0023 Silicone Alkyd Enamel Gray	-	23 Gal.	-	-	-	-	-	-	-	-	-	-
"	E23-0062 ASA 70 Strathpon Enamel	-	67 Gal.	53 Gal.	-	30 Gal.	-	-	-	-	-	-	-
"	E23-0036 ASA 24 Modified Epoxy	-	19 Gal.	-	-	5 Gal.	-	-	158 Gal.	-	57 Gal.	-	-

SUPPLIER	PRODUCT	1989	1988	1987	1986	1985	1984	1983	1982	1981	1980	1979	1978
Strathmore Prod. (Cont'd)	C86-0006 Catalyst	-	3 Gal.	-	-	-	-	-	-	11 Gal.	-	-	-
"	S 71-0040 Epon Reducer	-	5 Gal.	-	-	-	-	-	-	-	-	-	-
"	C31-0034 Clear Acrylic Overcoat	-	-	10 Gal.	-	-	-	-	-	-	-	-	-
"	E21-0006 Pearl Gray Oxi-Poxi	-	-	2 Gal.	-	-	-	-	-	-	-	-	-
"	E13-0022 Lt. Gray Enamel	-	-	-	209 Gal.	761 Gal.	532 Gal.	418 Gal.	432 Gal.	594 Gal.	315 Gal.	-	203 Gal.
"	G13-0036 Berkshire Green	-	-	-	28 Gal.	-	-	-	-	-	-	-	-
"	E23-0061 Modified Dri Quik Epoxy Enamel	-	-	-	-	32 Gal.	-	-	-	-	-	-	-
"	Y21-0006P Oxi-Poxi Yellow Primer	12 Gal.	14 Gal.	-	-	-	-	-	-	-	-	-	-
"	E11-0026 #24 Dri Quik Silicone Enamel	10 Gal.	-	-	-	-	-	-	-	-	-	-	-
"	Y16-0007P Zinc Chromate Primer	60 Gal.	79 Gal.	25 Gal.	-	20 Gal.	-	-	-	-	-	-	-
"	G13-0054 Low Gloss Forest Green Enamel	58 Gal.	-	-	-	-	-	-	-	-	-	-	-
"	E07-0284P Dri Quik Gray Primer	205 Gal.	173 Gal.	275 Gal.	150 Gal.	432 Gal.	432 Gal.	216 Gal.	432 Gal.	810 Gal.	638 Gal.	-	1,080 Gal.
"	E13-0063 Lt. Gray Enamel	338 Gal.	1,434 Gal.	773 Gal.	375 Gal.	-	-	-	-	-	-	-	-
"	E13-0032 Dri Quik Gray Enamel	202 Gal.	453 Gal.	210 Gal.	545 Gal.	432 Gal.	317 Gal.	353 Gal.	270 Gal.	431 Gal.	432 Gal.	-	520 Gal.
"	G13-0053 Dri Quik L.F. Green Enamel	54 Gal.	-	-	-	-	-	-	-	-	-	-	-
"	ASA61 E13-0064 Low Gloss Lt. Gray Enamel	880 Gal.	-	-	-	-	-	-	-	-	-	-	-

SUPPLIER	PRODUCT	1989	1988	1987	1986	1985	1984	1983	1982	1981	1980	1979	1978
Strathmore Prod. (Cont'd)	ASA 24 E13-0065 Low Gloss Gray	312 Gal.	-	-	-	-	-	-	-	-	-	-	-
"	ASA 70 E13-0066 Low Gloss Gray Enamel	402 Gal.	-	-	-	-	-	-	-	-	-	-	-
"	L13-0064 Blue Enamel	30 Gal.	-	-	-	-	-	-	-	-	-	-	-
"	W23-0026 Strathpon White Enamel	53 Gal.	89 Gal.	-	-	-	-	-	-	-	-	-	-
"	E07-0588P Rust Inhibiting Primer	328 Gal.	-	-	-	-	-	-	-	-	-	-	-
"	E16-0002P Primer Surfacer Gray	250 Gal.	349 Gal.	250 Gal.	261 Gal.	163 Gal.	-	-	-	-	-	-	-
"	E13-0030 ASA49 Med. Gray Enamel	152 Gal.	154 Gal.	55 Gal.	50 Gal.	98 Gal.	54 Gal.	160 Gal.	108 Gal.	95 Gal.	270 Gal.	-	283 Gal.
"	L32-0021 Fed. Blue Acrylic Enamel	-	-	-	-	-	28 Gal.	-	-	-	-	-	-
"	W16-00128 Transport Enamel Surfacer White	-	-	-	-	-	15 Gal.	-	-	-	-	-	-
"	Y07-0022P Zinc Primer	-	-	-	-	-	35 Gal.	10 Gal.	-	84 Gal.	467 Gal.	-	-
"	S72-0418 Wash & Cleaning Thinner	-	-	-	-	-	-	20 Gal.	15 Gal.	-	-	-	-
"	E21-0016P Oxi-Poxi Primer	-	-	-	-	-	-	25 Gal.	-	-	-	-	-
"	E21-0017 Oxi-Poxi ASA 61	-	-	-	-	-	-	30 Gal.	-	-	-	-	-
"	E21-0004P Lt. Gray Primer	-	-	-	-	-	-	-	25 Gal.	25 Gal.	-	-	-
"	E21-0015 ASA 24 Oxi-Poxi	-	-	-	-	-	-	-	25 Gal.	30 Gal.	-	-	-
"	S72-0598 Oxi-Poxi Enamel	-	-	-	-	-	-	-	5 Gal.	-	-	-	-
"	S72-0917 Oxi-Poxi Reducer	-	-	-	-	-	-	-	-	25 Gal.	-	-	-

SUPPLIER	PRODUCT	1989	1988	1987	1986	1985	1984	1983	1982	1981	1980	1979	1978
Strathmore Prod. (Cont'd)	E11-0017 Silicone Alkyd Enamel	-	-	-	-	-	-	-	-	-	60 Gal.	-	-
"	B23-0011 Black Mod. Epoxy Semi-gloss Enamel	-	-	-	-	-	-	-	-	-	166 Gal.	-	-
"	X9064 ASA 24 Flow Coat Enamel	-	-	-	-	-	-	-	-	-	-	324 Gal.	-
"	G130051 SA 16 Green Enamel	-	-	-	-	-	-	-	-	-	-	-	6 Gal.
"	X9736 ASA 70 Flow Coat Enamel	-	-	-	-	-	-	-	-	-	-	55 Gal.	-
"	G130034 Bell Telephone Green Enamel	-	-	-	-	-	-	-	-	-	-	-	159 Gal.
"	X10238 Forest Green Enamel	-	-	-	-	-	-	-	-	-	-	162 Gal.	-
"	X10423 Dri Quik 224 Blue Enamel	-	-	-	-	-	-	-	-	-	-	-	10 Gal.
"	X5059 Rust Inhibiting Primer	-	-	-	-	-	-	-	-	-	-	864 Gal.	-
"	X6640 Strathpon White Enamel	-	-	-	-	-	-	-	-	-	-	-	10 Gal.
Subox	#11FD Red Primer	-	-	-	-	-	-	-	-	-	-	20 Gal.	-
"	#9FD Blue Gray ASA 24	-	-	-	-	-	-	-	-	-	-	10 Gal.	-
Texaco	#600 Uninhibited Transformer Oil (55)	-	-	-	-	-	53,852 Gal.	10,000 Gal.	-	19,999 Gal.	-	77,684 Gal.	-
"	#1515 Inhibited Transformer Oil	-	-	-	-	-	275 Gal.	-	-	-	-	-	-
U. S. Gulf	Sigma 66 Leak Detector	-	16 Gal. +3 Qts.	4 Gal. + 48 oz.	-	6 Gal.	-	-	-	-	-	-	-
"	TAU-10	-	-	-	-	-	-	-	-	4 Gal.	4 Gal.	4 Gal.	-

SUPPLIER	PRODUCT	1989	1988	1987	1986	1985	1984	1983	1982	1981	1980	1979	1978
U. S. Steel Supply	#30-3173 Lt. Gray Green Enamel	-	-	-	-	-	-	-	-	10 Gal.	-	-	-
Uniroyal Chemical	Naugard BHT Anti-oxidant	50#	50#	-	-	-	-	-	-	-	-	-	-
Victor's Paint & Hardware	#88-6 Arabian Beige	-	-	-	-	-	-	-	-	2 Gal.	-	-	-
Whittaker Corp.	Hydroline Red Oxide Primer	-	-	-	-	-	-	-	-	-	5 Gal.	-	-
Zep	TKO Hand Soap	24 Gal.	30 Gal.	6 Gal.	1 Gal.	-	-	-	-	-	-	-	-
"	Zep Grip	-	-	-	-	-	-	-	16 Gal.	-	8 Gal.	16 Gal.	-
"	Zep Cinch 52502	-	-	-	-	-	-	-	-	-	-	-	525 Oz.

SUPPLIER	PRODUCT	1977	1976	1975	1974	1973	1967	1966	1965	1963	1962	1961	1960	1959
Ajax Consolidated	#121 Silver Electro-plating solution	6 Qts.	-	6 Qts.	-	18 Qts.	16 Qts.	-	-	-	-	-	-	-
American Gas & Chemical	Leaktec #372A	48 Oz.	-	-	-	-	-	-	-	-	12 Ea.	24 Ea.	-	-
American Lubricants	#2 Multi Purpose Lithium Grease	70#	-	-	-	-	-	-	-	-	-	-	-	-
Ameron Corrosion Control	Amercoat #86 Red Primer	-	-	3 Gal.	-	-	-	-	-	-	-	-	-	-
"	#9 Thinner for above	-	-	3 Gal.	-	-	-	-	-	-	-	-	-	-
"	#99R Pearl Gray Finish Coat	-	-	3 Gal.	-	-	-	-	-	-	-	-	-	-
"	#10 Thinner for Finish Coat	-	-	3 Gal.	-	-	-	-	-	-	-	-	-	-
Angert Auto Parts	3M #8816 Undercoating	5 Gal.	-	10 Gal.	-	10 Gal.	10 Gal.	-	-	-	-	-	-	-
"	3M #8805 Undercoating	-	-	1 Gal.	-	-	-	-	-	-	-	-	-	-
AT Supply	Rustoleum #960 Primer	-	-	5 Gal.	-	-	-	-	-	-	-	-	-	-
"	Rustoleum #865 Tan Paint	-	-	2 Gal.	-	-	-	-	-	-	-	-	-	-
"	Rustoleum #1030 Green Paint	-	-	5 Gal.	-	-	-	-	-	-	-	-	-	-
"	Rustoleum #634 Black Paint	-	-	1 Gal.	-	-	-	-	-	-	-	-	-	-
Balanrol Corp.	#89 Keystone Silicone Greaser	-	-	-	-	-	-	-	-	6#	3#	3#	9#	6#
Battery & Starter Company	3M #8816 Undercoating	5 Gal.	-	-	-	-	-	-	-	-	-	-	-	-
Beals, McCarthy & Rogers	Keycut Soluable Cutting Oil	-	-	-	-	-	-	-	-	-	10 Gal.	-	5 Gal.	5 Gal.

SUPPLIER	PRODUCT	1977	1976	1975	1974	1973	1967	1966	1965	1963	1962	1961	1960	1959
Bison Oil Products	SAE #20 Bison Oil	-	-	-	-	-	-	-	-	-	5 Gal.	9 Gal.	-	2 Gal.
"	SAE #90 Lubricant	-	-	-	-	-	-	-	-	-	-	-	2 Gal.	-
Bisonite	G7-161 Zinc Yellow Iron Oxide Primer	-	-	10 Gal.	-	-	-	-	-	-	-	-	-	-
MB Brooks	Solox Thinner	-	-	-	-	-	5 Gal.	-	-	-	-	-	-	-
"	Orange Shellac	-	-	-	-	-	60 Gal.	-	-	6 Gal.	18 Gal.	12 Gal.	-	-
"	Lacquer Thinner	-	-	-	-	-	10 Gal.	-	-	-	2 Gal.	1 Gal.	1 Gal.	-
"	Solox Alcohol	-	-	-	-	-	20 Gal.	-	-	5 Gal.	-	-	-	5 Gal.
"	Gym Seal	-	-	-	-	-	-	-	-	2 Gal.	-	-	-	-
"	Benzene (Naptha)	-	-	-	-	-	-	-	-	5 Gal.	-	-	-	-
"	Chrome Yellow Med. Paint	-	-	-	-	-	-	-	-	2 Tubes	-	-	6 Tubes	6 Tubes
"	Strypeeze Paint Remover	-	-	-	-	-	-	-	-	-	-	1 Gal.	-	-
"	Flat White Paint Rubber Base	-	-	-	-	-	-	-	-	-	-	-	1 Gal.	-
"	Paint Remover	-	-	-	-	-	-	-	-	-	-	-	-	1 Gal.
Bruening Bearings	#89 Med. Keystone Grease	-	-	-	-	-	25#	-	-	-	-	-	-	-
Buffalo Builders	Sealcote Drive	-	-	-	-	-	440 Gal.	-	-	-	-	-	-	-
Buffalo Dri-Mix	#7-8803-55 Traffic Top	-	-	-	-	6 Ea.	-	-	-	-	-	-	-	-
Buffalo Electric	#121 Silver Electro-plating Solution	-	-	-	-	-	-	-	-	2 Qts.	4 Qts.	4 Qts.	2 Qts.	3 Qts.

SUPPLIER	PRODUCT	1977	1976	1975	1974	1973	1967	1966	1965	1963	1962	1961	1960	1959
Buffalo Solvents & Chemicals	Mineral Spirits Rule 66	-	-	-	-	3,575 Gal.	-	-	-	-	-	-	-	-
"	Toluene	-	-	-	-	990 Gal.	-	-	-	-	-	-	-	-
"	Xylene/Xylol	-	-	-	-	55 Gal.	110 Gal.	-	-	-	54 Gal.	110 Gal.	-	-
"	Kerosene	-	-	-	-	-	55 Gal.	-	-	-	-	-	-	-
"	Mineral Spirits	-	-	-	-	-	1,430 Gal.	-	-	220 Gal.	220 Gal.	110 Gal.	-	-
"	Diacetone Alcohol	-	-	-	-	-	-	-	-	10 Gal.	15 Gal.	20 Gal.	-	-
Caton Hendler Paint Company	Bruning #95 Grey Polyurethane	15 Gal.	-	-	-	-	-	-	-	-	-	-	-	-
Central OB Products	OB Liquid Soap	15 Gal.	-	20 Gal.	-	30 Gal.	45 Gal.	-	-	-	5 Gal.	5 Gal.	5 Gal.	5 Gal.
Commercial Blue-Print	Ammonia	-	-	-	-	-	-	-	-	32 Gal.	-	16 Gal.	-	-
Complete Reading	G.E. #880 Adhesive	12 Qts.	-	-	-	-	-	-	-	-	-	-	-	-
"	Dolphac-29-7S Varnish	8 Gal.	-	-	-	-	-	-	-	-	-	-	-	-
A B Dick	#24-2030 Spirit Fluid	18 Gal.	-	-	-	-	-	-	-	-	-	-	-	-
"	#24-2040 Spirit Fluid	-	-	6 Gal.	-	12 Gal.	18 Gal.	-	-	-	-	-	-	-
"	#24-4102 Hand Cleaner	-	-	6 Ea.	-	6 Ea.	6 Ea.	-	-	-	-	-	-	6 Ea.
"	#24-2010 Spirit Fluid	-	-	-	-	-	-	-	-	-	4 Gal.	-	-	4 Gal.
Dow Corning	#561 Silicone Fluid	440 Gal.	-	-	-	-	-	-	-	-	-	-	-	-

SUPPLIER	PRODUCT	1977	1976	1975	1974	1973	1967	1966	1965	1963	1962	1961	1960	1959
Dubois Chemicals	MDR Actusol	-	-	-	-	-	55 Gal.	-	-	-	-	-	-	-
"	Du Brite	-	-	-	-	-	-	-	-	-	-	30 Gal.	-	30 Gal.
Dwelle Kaiser	Orange Shellac	192 Gal.	-	-	-	-	-	-	-	-	-	-	-	-
Edwards High Vacuum	#16 Pump Oil	5 Gal.	-	-	-	-	-	-	-	-	-	-	-	-
Ellicott Paint	Liquid Envelope	5 Gal.	-	-	-	10 Gal.	5 Gal.	-	-	-	-	5 Gal.	-	-
"	Skyco Ospho	5 Gal.	-	-	-	-	-	-	-	-	-	-	-	-
"	Derusto PC-73 Black	-	-	1 Gal.	-	-	-	-	-	-	-	-	-	-
"	Xylene Reducer for Derusto	-	-	1 Gal.	-	-	-	-	-	-	-	-	-	-
"	Xylene	-	-	-	-	5 Gal.	-	-	-	-	-	-	-	-
"	Liquid Envelope Thinner	-	-	-	-	-	2 Gal.	-	-	-	-	-	-	-
E Kay Chemical Co.	Anhydrous Ammonia	-	-	300#	-	-	-	-	-	-	-	-	-	-
Essex International	#1890 Dow Corning Sealer	2 Gal.	-	1 Gal.	-	-	-	-	-	-	-	-	-	-
"	#2106 Pedigree Varnish	-	-	440 Gal.	-	702 Gal.	-	-	-	-	-	-	-	-
"	#302 Black Protective Sealer	-	-	-	-	48 Gal.	-	-	-	-	-	-	-	-
Esso/Humble Oil	Xylol	-	-	-	-	-	1,760 Gal.	-	-	-	-	-	-	-
"	Solvesso Xylene	-	-	-	-	-	495 Gal.	-	-	-	-	-	-	-
"	Univolt Inhibited Oil #N34	-	-	-	-	-	-	330 Gal.	-	-	-	-	-	-

SUPPLIER	PRODUCT	1977	1976	1975	1974	1973	1967	1966	1965	1963	1962	1961	1960	1959
Esso/Standard Oil	Solvesso Xylol	-	-	-	-	-	-	-	-	165 Gal.	220 Gal.	-	165 Gal.	-
"	Univolt 35 Oil	-	-	-	-	-	-	-	-	-	-	-	8,000 Gal.	8,100 Gal.
Fine Basic Chemicals (FBC)	Shellac Thinner	45 Gal.	-	-	-	-	-	-	-	-	-	-	-	-
"	Mineral Spirits Rule 66	1,980 Gal.	-	-	-	-	-	-	-	-	-	-	-	-
"	Toluene	550 Gal.	-	-	-	-	-	-	-	-	-	-	-	-
"	#608 Lacquer Thinner	20 Gal.	-	-	-	-	-	-	-	-	-	-	-	-
G. E. Supply Co.	G. E. #7031 Adhesive	-	-	40 Gal.	-	16 Gal.	-	-	-	-	-	-	-	-
"	G. E. #880 Adhesive	-	-	24 Qts.	-	18 Qts.	8 Gal.	-	-	-	4 Gal.	-	4 Gal.	-
"	#8735 Lt. Gray Paint	-	-	-	-	30 Gal.	-	-	-	-	-	-	-	-
"	Egyptian Lacquer #MNL 220	-	-	-	-	-	-	5 Gal.	-	-	-	-	-	-
G & W Electric	Novoid A Compound	-	-	-	-	-	-	-	-	25 Gal.	-	-	50 Gal.	-
HBS Equipment	#314 Copper Coatalyte	6 Jars	-	-	-	6 Jars	-	-	-	-	-	-	-	-
"	#311 Tin Coatalyte	-	-	-	-	6 Jars	-	-	-	-	-	-	-	-
Insulation Mfg. Co.	DC-980 Dow Corning Silicone Varnish	-	-	-	-	-	-	-	-	110 Gal.	200 Gal.	50 Gal.	-	-
"	#40-C Dow Corning Adhesive	-	-	-	-	-	-	-	-	8#	8#	8#	-	-
"	#653 Pedegree Varnish	-	-	-	-	-	-	-	-	-	20 Gal.	-	-	-
"	#2106 Pedegree Varnish	-	-	-	-	-	-	-	-	-	324 Gal.	984 Gal.	990 Gal.	-

SUPPLIER	PRODUCT	1977	1976	1975	1974	1973	1967	1966	1965	1963	1962	1961	1960	1959
James Sipe Co.	Japan Spirits	-	-	-	-	-	-	-	-	-	-	110 Gal.	-	55 Gal.
Karle Saw	Marvel Cutting Oil	-	-	-	-	-	-	-	-	-	-	-	10 Gal.	5 Gal.
Kenmore Building Supply	Blacktop Sealer #8803	-	-	5 Gal.	-	-	-	-	-	-	-	-	-	-
"	Blacktop Patch	-	-	300#	-	-	-	-	-	-	-	-	-	-
Lake Chemical Co.	Lacquer Stik-Black	-	-	-	24 Ea.	-	-	-	-	-	-	-	-	-
Master Bronze Powder Co.	DeRusto OE-51 Unit Rig Grey	-	-	-	-	-	-	3 Gal.	-	-	-	-	-	-
McDougall Butler Paint Co.	#2003N Neutral Tint Base	-	-	-	-	-	-	4 Gal.	-	-	-	-	-	-
"	F-1-Colorant	-	-	-	-	-	-	8 Pods	-	-	-	-	-	-
"	E-1-Colorant	-	-	-	-	-	-	4 Pods	-	-	-	-	-	-
"	H-1-Colorant	-	-	-	-	-	-	1 Pod	-	-	-	-	-	-
"	#8349 Lt. Gray Enamel	-	-	-	-	-	-	-	-	-	200 Gal.	100 Gal.	-	-
"	#8230 Dark Gray Enamel	-	-	-	-	-	-	-	-	-	100 Gal.	100 Gal.	100 Gal.	110 Gal.
"	#8236 Med. Gray Primer	-	-	-	-	-	-	-	-	-	100 Gal.	110 Gal.	-	110 Gal.
"	Tile-It Kopen Blue	-	-	-	-	-	-	-	-	-	-	6 Units	-	-
"	Tile-It Black	-	-	-	-	-	-	-	-	-	-	1 Kit	-	-
"	#2195 Kopon Spray & Reducer	-	-	-	-	-	-	-	-	-	-	2 Gal.	-	-
"	#8378 Square D Paint	-	-	-	-	-	-	-	-	-	-	55 Gal.	-	25 Gal.

SUPPLIER	PRODUCT	1977	1976	1975	1974	1973	1967	1966	1965	1963	1962	1961	1960	1959
McDougal Butler Paint Co. (Cont'd)	OAAA Standard Lemon Yellow	-	-	-	-	-	-	-	-	-	-	-	1 Gal.	-
"	Masonry Blue Paint	-	-	-	-	-	-	-	-	-	-	-	2 Gal.	-
"	Masonry White Paint	-	-	-	-	-	-	-	-	-	-	-	5 Gal.	-
Mobil Oil	Mobil Vactra Extra Heavy	-	-	-	-	5 Gal.	-	-	-	-	5 Gal.	30 Gal.	-	-
"	Mobil Compound BB	-	-	-	-	5 Gal.	-	-	-	5 Gal.	-	16 Gal.	-	-
"	Mobil DTE Oil	-	-	-	-	-	-	-	-	-	-	5 Gal.	-	-
"	Sovarex L-1 Grease	-	-	-	-	-	-	-	-	-	-	35#	-	-
Monsanto	Inverteen 70-30	1,078 Gal.	-	39,824 Gal.	44,614 Gal.	46,112 Gal.	-	-	-	-	-	-	-	-
"	Inerteen PPO	-	-	-	-	-	-	-	-	-	8,000 Gal.	3,850 Gal.	3,850 Gal.	-
"	Pyranol #1467	-	-	-	-	-	-	-	-	-	-	-	3,850 Gal.	-
National Ammonia	Anhydrous Ammonia	-	-	-	-	300#	-	-	-	-	-	-	-	-
National Chem Search	SS-25 Solvent Degreaser	70 Gal.	-	35 Gal.	-	-	-	-	-	-	-	-	-	-
Oakite Products	#31 Solution	-	-	230#	-	230#	-	-	-	-	-	-	-	-
Randustrial Corp.	#F-161 Magic Floor w/primer	-	-	-	-	15 Gal.	-	-	-	-	-	-	-	-
Reichold Chemical/ Sterling Reichold	Y510 Masking Grease	8 Gal.	-	-	-	10 Gal.	-	-	-	-	-	-	-	-
"	Y338 Varnish	-	-	-	-	2200 Gal.	-	-	-	-	-	-	-	-

SUPPLIER	PRODUCT	1977	1976	1975	1974	1973	1967	1966	1965	1963	1962	1961	1960	1959
Riverside Chemical	Arseco 22 Cleaner	55 Gal.	-	110 Gal.	200 Gal.	60 Gal.	-	-	-	-	-	-	-	-
"	Bright Copper & Brass Dip	2 Gal.	-	-	1 Gal.	-	-	-	-	-	-	-	-	-
"	Soda Lime	-	-	1850#	1480#	740#	-	-	-	-	-	-	-	-
"	Oxalic Acid	-	-	-	5#	-	-	-	-	-	-	-	-	-
"	Sulfamic Acid (Inhibited)	-	-	-	-	10#	-	-	-	-	-	-	-	-
"	Trisodium Phosphate	-	-	-	-	100#	-	-	-	-	-	-	-	-
"	Muriatic Acid	-	-	-	-	-	-	-	-	-	-	2 Gal.	-	-
Schmitz Bros.	Dolph Synthite AC-29-7S Varnish	8 Gal.	-	-	-	-	-	-	-	-	-	-	-	-
Schuele & Co.	Orange Shellac	-	-	60 Gal.	-	-	-	-	-	-	-	-	-	-
"	Lacquer Thinner	-	-	4 Gal.	-	-	-	-	-	-	-	-	-	-
"	Shellac Thinner	-	-	5 Gal.	-	-	-	-	-	-	-	-	-	-
"	Moonwhite Primer	-	-	8 Gal. +1 Qt.	-	-	-	-	-	-	-	-	-	-
"	Wonder Water Wash Paint & Varnish Remover	-	-	4 Gal.	-	-	-	-	-	-	-	-	-	-
"	Moor Gard White Latex	-	-	11 Gal.	-	-	-	-	-	-	-	-	-	-
"	Moore #2-63 Granada Gold Enamel	-	-	1 Gal.	-	-	-	-	-	-	-	-	-	-
hell Chemical Co.	Diala Ax Transformer Oil	-	-	-	-	-	-	165 Gal.	-	-	-	-	-	-

SUPPLIER	PRODUCT	1977	1976	1975	1974	1973	1967	1966	1965	1963	1962	1961	1960	1959
Strathmore Products	X5059 Rust Inhibiting Gray Primer	594 Gal.	432 Gal.	1,079 Gal.	-	918 Gal.	-	-	-	-	-	-	-	-
"	X9081 Bell Telephone Green Enamel	51 Gal.	-	162 Gal.	-	491 Gal.	-	-	-	-	-	-	-	-
"	X9063 ASA49 Med. Gray Enamel	175 Gal.	368 Gal.	270 Gal.	-	257 Gal.	-	-	-	-	-	-	-	-
"	Munsell 7.0GY-3.29/1.5 Green Enamel	25 Gal.	-	-	-	-	-	-	-	-	-	-	-	-
"	X6640 White Mod. Epoxy Enamel	15 Gal.	-	-	-	-	-	-	-	-	-	-	-	-
"	X10423 DuPont Signal Blue	5 Gal.	-	-	-	-	-	-	-	-	-	-	-	-
"	X9064 Dark Gray Enamel	412 Gal.	216 Gal.	527 Gal.	-	324 Gal.	-	-	-	-	-	-	-	-
"	X10069 Federal Gray Enamel	10 Gal.	-	-	-	-	-	-	-	-	-	-	-	-
"	Munsell #9GY1.5/2.6 Munsell Green Enamel	10 Gal.	16 Gal.	-	-	-	-	-	-	-	-	-	-	-
"	X9736 ASA 70 Lt. Gray Enamel	25 Gal.	50 Gal.	30 Gal.	-	49 Gal.	-	-	-	-	-	-	-	-
"	X9499 Berkshire Green Enamel	17 Gal.	-	-	-	28.5 Gal.	-	-	-	-	-	-	-	-
"	X7410 Red Oxide Primer	15 Gal.	-	25 Gal.	-	-	-	-	-	-	-	-	-	-
"	X8036 ASA 61 Lt. Gray Enamel	162 Gal.	229 Gal.	270 Gal.	-	108 Gal.	-	-	-	-	-	-	-	-
"	X9820 Fed. Pacific Lt. Gray Enamel	-	65 Gal.	-	-	-	-	-	-	-	-	-	-	-
"	X10238 Forest Green Enamel	-	5 Gal.	-	-	-	-	-	-	-	-	-	-	-

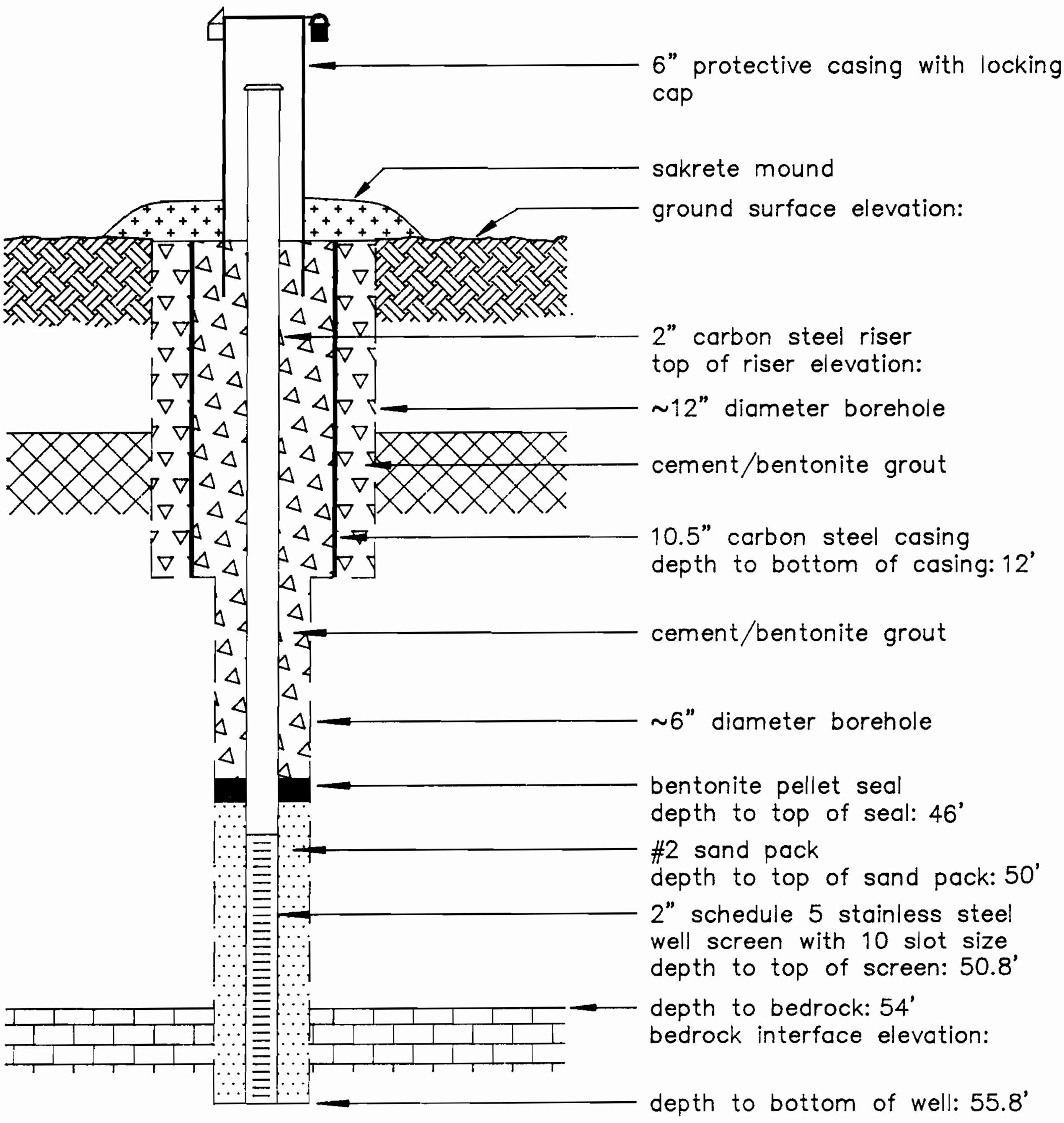
SUPPLIER	PRODUCT	1977	1976	1975	1974	1973	1967	1966	1965	1963	1962	1961	1960	1959
Strathmore Prod. (Cont'd)	X9348 Dark Gray ASA 24 Epoxy	–	–	287 Gal.	–	41 Gal.	–	–	–	–	–	–	–	–
"	X4629 Federal Gray Enamel	–	–	13 Gal.	–	–	–	–	–	–	–	–	–	–
"	X10013H Paint 7.5Y9/10	–	–	23 Gal.	–	–	–	–	–	–	–	–	–	–
"	X1736 Zinc Chromate Primer	–	–	–	–	30 Gal.	–	–	–	–	–	–	–	–
"	X9732 Antique Bronze Enamel	–	–	–	–	11 Gal.	–	–	–	–	–	–	–	–
"	X6505 Strathpon 7B Gray Enamel	–	–	–	–	3 Gal.	–	–	–	–	–	–	–	–
Subox	Black Coal Tar Epoxy	15 Gal.	–	–	–	–	–	–	–	–	–	–	–	–
"	Activator for Coal Tar Epoxy	2 Gal.	–	–	–	–	–	–	–	–	–	–	–	–
"	Capox "A" Blue/gray paint	–	–	–	–	–	–	–	–	–	–	–	–	1 Gal.
"	Capox "A" Thinner	–	–	–	–	–	–	–	–	–	–	–	–	1 Gal.
Sullivan McKeegan	Ammonia	–	–	–	–	–	–	–	–	–	–	16 Gal.	32 Gal.	16 Gal.
Sun Oil Company	Socony Gargoyle Cylinder Oil	–	–	–	–	–	–	–	–	–	5 Gal.	–	–	–
"	Solnus 300 Oil	54 Gal.	–	–	–	108 Gal.	–	–	–	–	–	5 Gal.	10 Gal.	–
"	Sunoco Transformer Oil	–	–	–	–	–	–	–	–	–	–	–	8,000 Gal.	–
Sutton Petroleum Corp.	Benetone #2 Grease	–	–	–	–	35#	–	–	–	–	–	–	–	–
"	Cup Grease #3	–	–	–	–	35#	–	–	–	–	–	–	–	–
"	#290 Hydraulic Oil	–	–	–	–	5 Gal.	–	–	–	–	–	–	–	–

SUPPLIER	PRODUCT	1977	1976	1975	1974	1973	1967	1966	1965	1963	1962	1961	1960	1959
Texaco	#2320 Meropa 150 Oil	-	35#	70#	-	-	-	-	-	-	-	-	-	-
"	Regal F R & O	-	55 Gal.	55 Gal.	-	10 Gal.	-	-	-	-	-	-	-	-
"	Code 600 Transformer Oil (55)	-	61,006 Gal.	60,393 Gal.	-	10,212 Gal.	-	-	-	-	19,475 Gal.	10,000 Gal.	-	-
"	Marfak #2 H.D. Grease	-	-	35#	-	-	-	-	-	-	-	-	-	-
"	#2207 Transformer Oil (Inhibited)	-	-	-	-	95,509 Gal.	-	-	-	-	-	-	-	-
"	Regal A R & O	-	-	-	-	10 Gal.	-	-	-	-	-	-	-	-
"	Multifak 2	-	-	-	-	35#	-	-	-	-	-	-	-	-
Tremco	Mulsomastic Primer	-	-	-	-	-	-	-	-	-	5 Gal.	-	-	5 Gal.
"	Mulsomastic Ready Mix	-	-	-	-	-	-	-	-	-	-	-	-	5 Gal.
arrenoff's	389Y310 DuPont White Latex	-	-	5 Gal.	-	-	-	-	-	-	-	-	-	-
Westinghouse	Doryl Insulating Varnish	-	-	-	-	-	-	-	-	55 Gal.	-	-	-	-
Zep	Zep Cinch Hand Cleaner	36 Cans	60 Cans	-	-	-	-	-	-	-	-	-	-	-

Appendix B

NIAGARA TRANSFORMER
Remedial Investigation

WOODWARD-CLYDE CONSULTANTS
Consulting Engineers, Geologists and Environmental Scientists



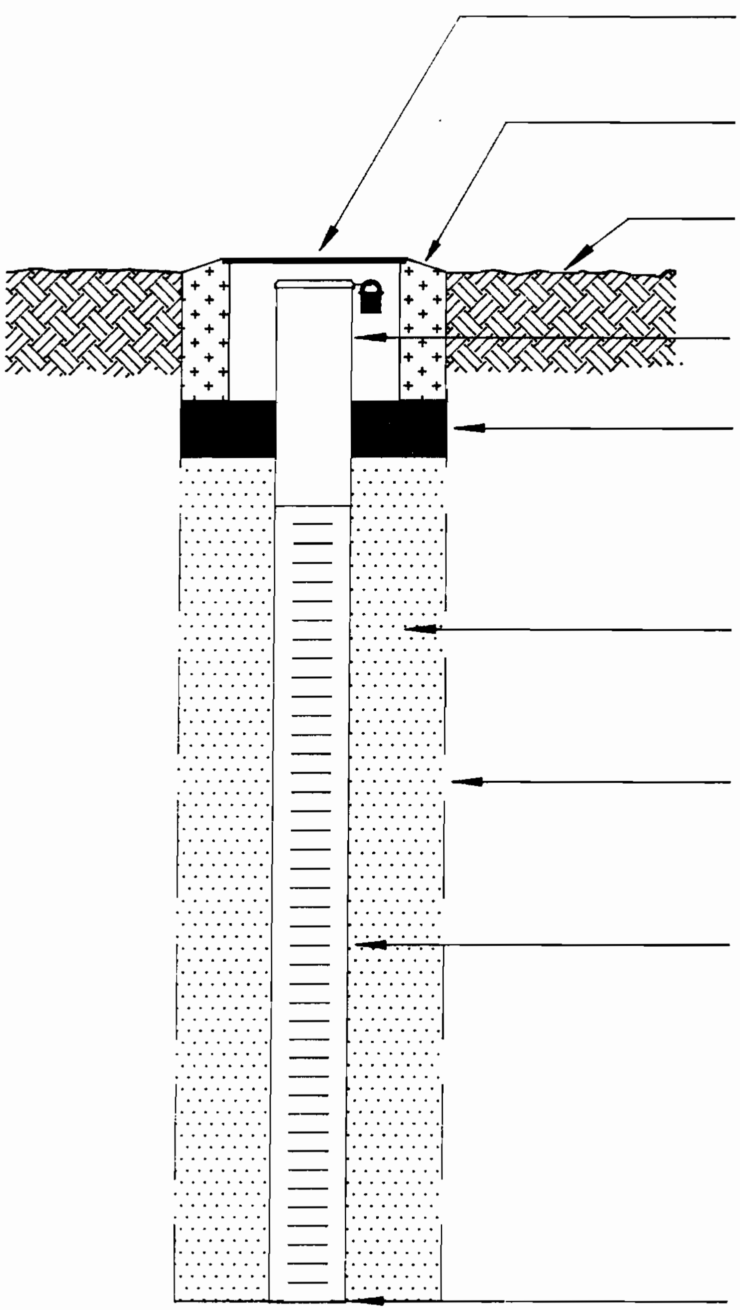
REPORT OF MONITORING WELL: NTC-1D

COMPLETION DATE: 4/10/91	INSPECTED BY: Paul F. Mazierski

DRAWN BY: PFM	CHECKED BY: PFM	PROJECT NO: 90C2139	DATE: 6/20/91	FIGURE NO:

NIAGARA TRANSFORMER
Remedial Investigation

WOODWARD-CLYDE CONSULTANTS
Consulting Engineers, Geologists and Environmental Scientists



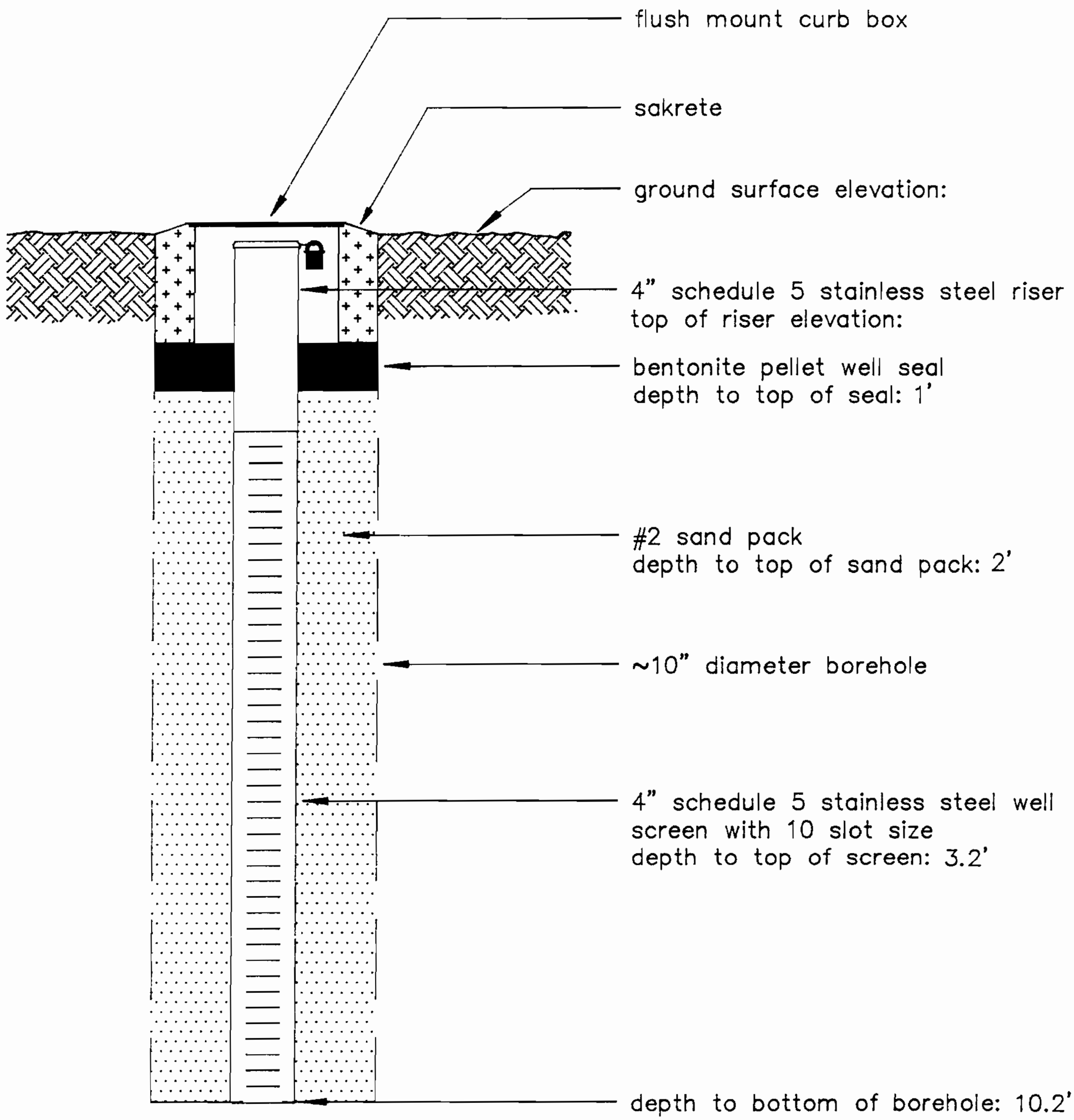
REPORT OF MONITORING WELL: NTC-2S

COMPLETION DATE: 4/18/91	INSPECTED BY: Paul F. Mazierski

DRAWN BY: PFM	CHECKED BY: PFM	PROJECT NO: 90C2139	DATE: 6/20/91	FIGURE NO:

NIAGARA TRANSFORMER
Remedial Investigation

WOODWARD-CLYDE CONSULTANTS
Consulting Engineers, Geologists and Environmental Scientists



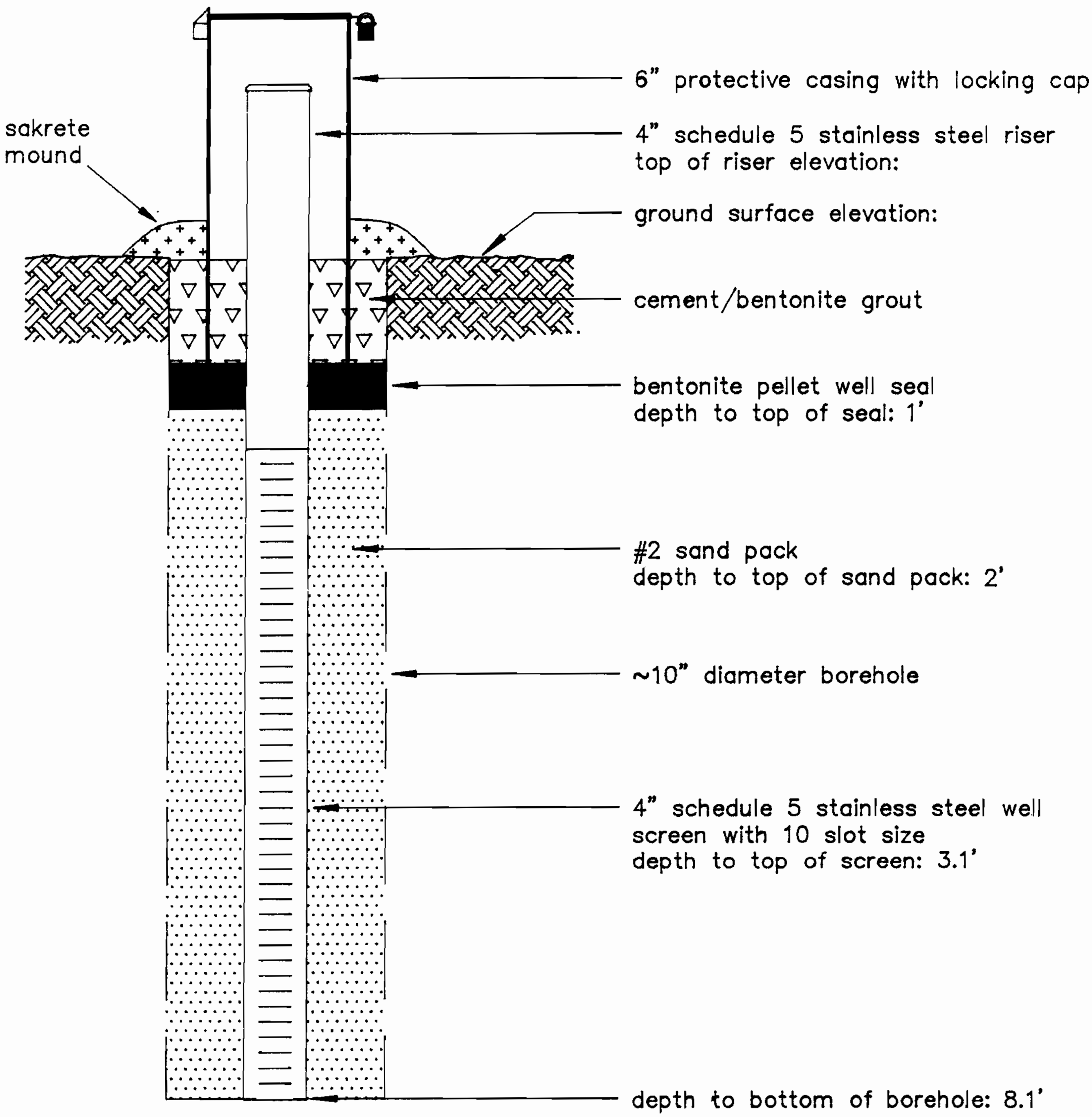
REPORT OF MONITORING WELL: NTC-3S

COMPLETION DATE: 4/18/91	INSPECTED BY: Paul F. Mazierski

DRAWN BY: PFM	CHECKED BY: PFM	PROJECT NO: 90C2139	DATE: 6/20/91	FIGURE NO:

NIAGARA TRANSFORMER
Remedial Investigation

WOODWARD-CLYDE CONSULTANTS
Consulting Engineers, Geologists and Environmental Scientists



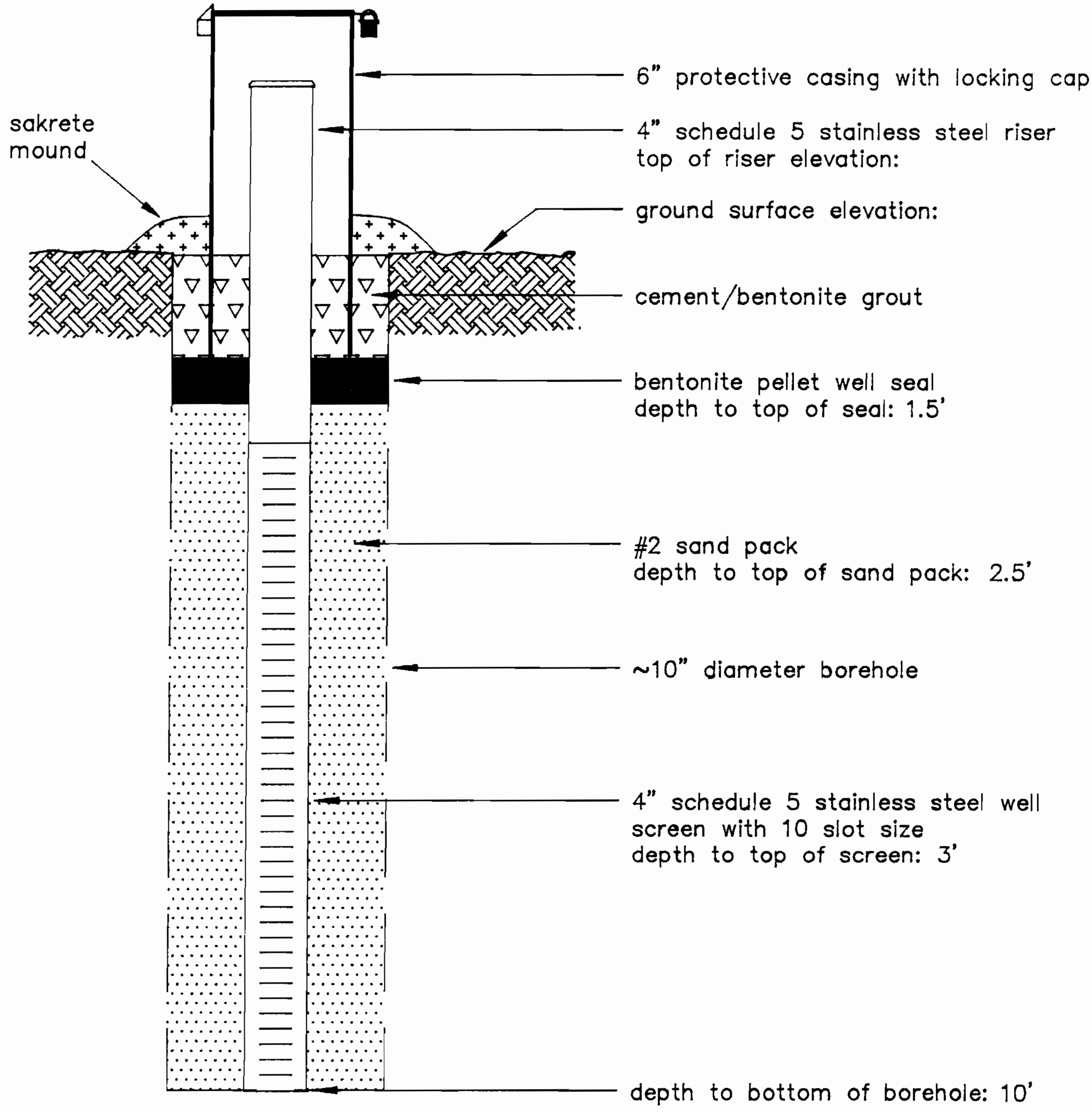
REPORT OF MONITORING WELL: NTC-4S

COMPLETION DATE: 4/22/91	INSPECTED BY: Paul F. Mazierski

DRAWN BY: PFM	CHECKED BY: PFM	PROJECT NO: 90C2139	DATE: 6/20/91	FIGURE NO:

NIAGARA TRANSFORMER
Remedial Investigation

WOODWARD-CLYDE CONSULTANTS
Consulting Engineers, Geologists and Environmental Scientists



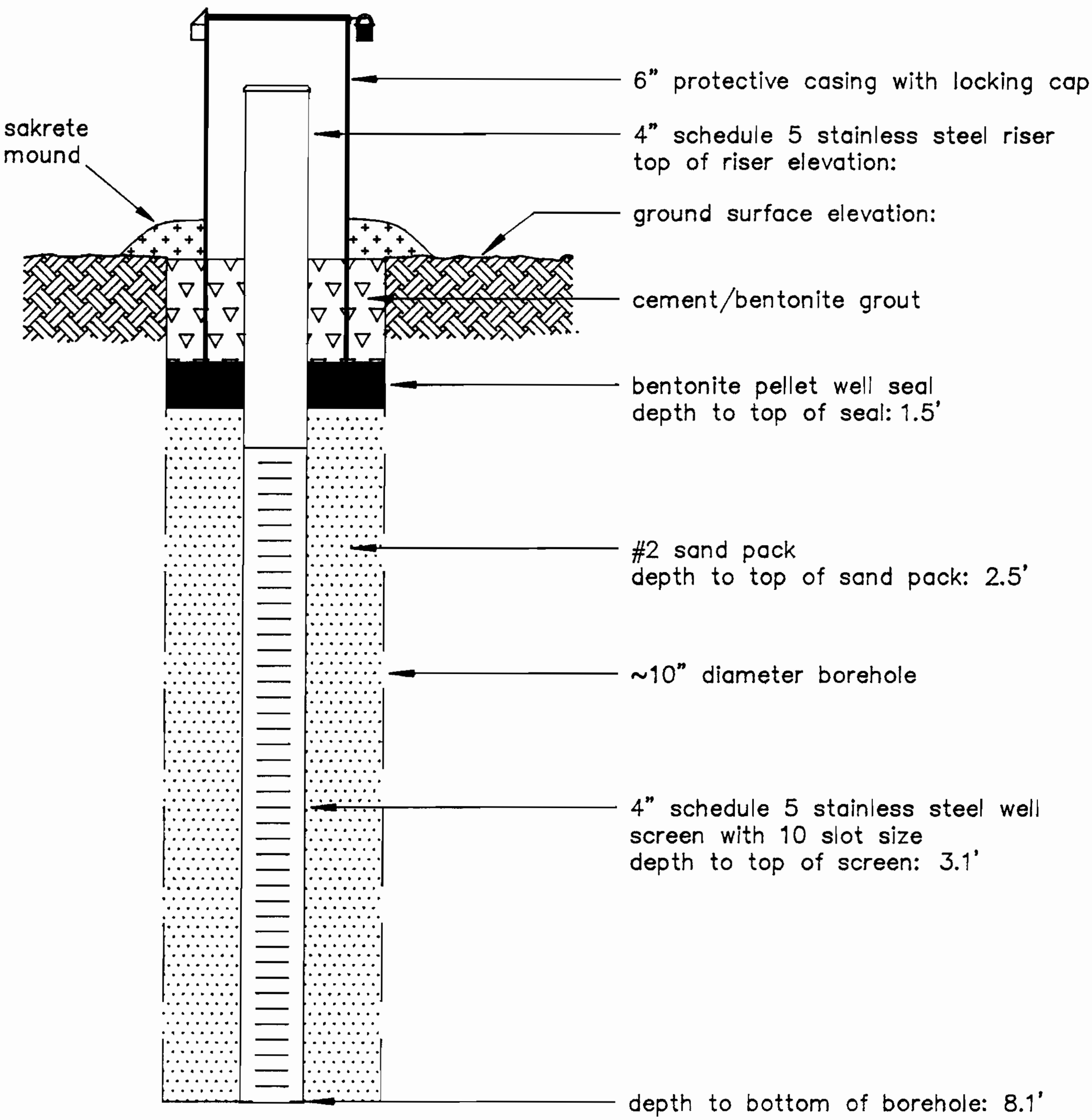
REPORT OF MONITORING WELL: NTC-5S

COMPLETION DATE: 4/4/91	INSPECTED BY: Paul F. Mazierski

DRAWN BY: PFM	CHECKED BY: PFM	PROJECT NO: 90C2139	DATE: 6/20/91	FIGURE NO:

NIAGARA TRANSFORMER
Remedial Investigation

WOODWARD-CLYDE CONSULTANTS
Consulting Engineers, Geologists and Environmental Scientists



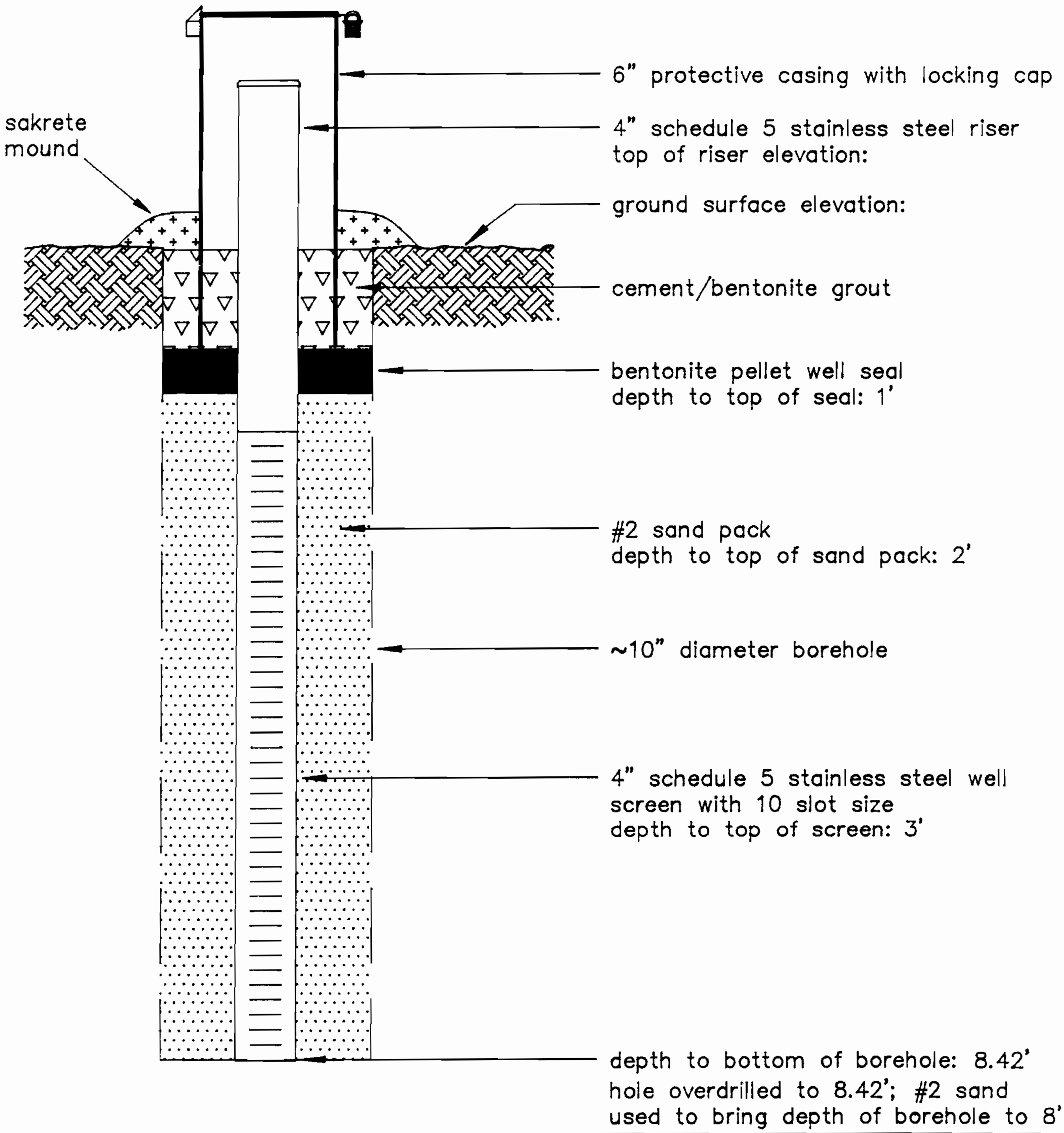
REPORT OF MONITORING WELL: NTC-6S

COMPLETION DATE: 4/11/91	INSPECTED BY: Paul F. Mazierski

DRAWN BY: PFM	CHECKED BY: PFM	PROJECT NO: 90C2139	DATE: 6/20/91	FIGURE NO:

NIAGARA TRANSFORMER
Remedial Investigation

WOODWARD-CLYDE CONSULTANTS
Consulting Engineers, Geologists and Environmental Scientists



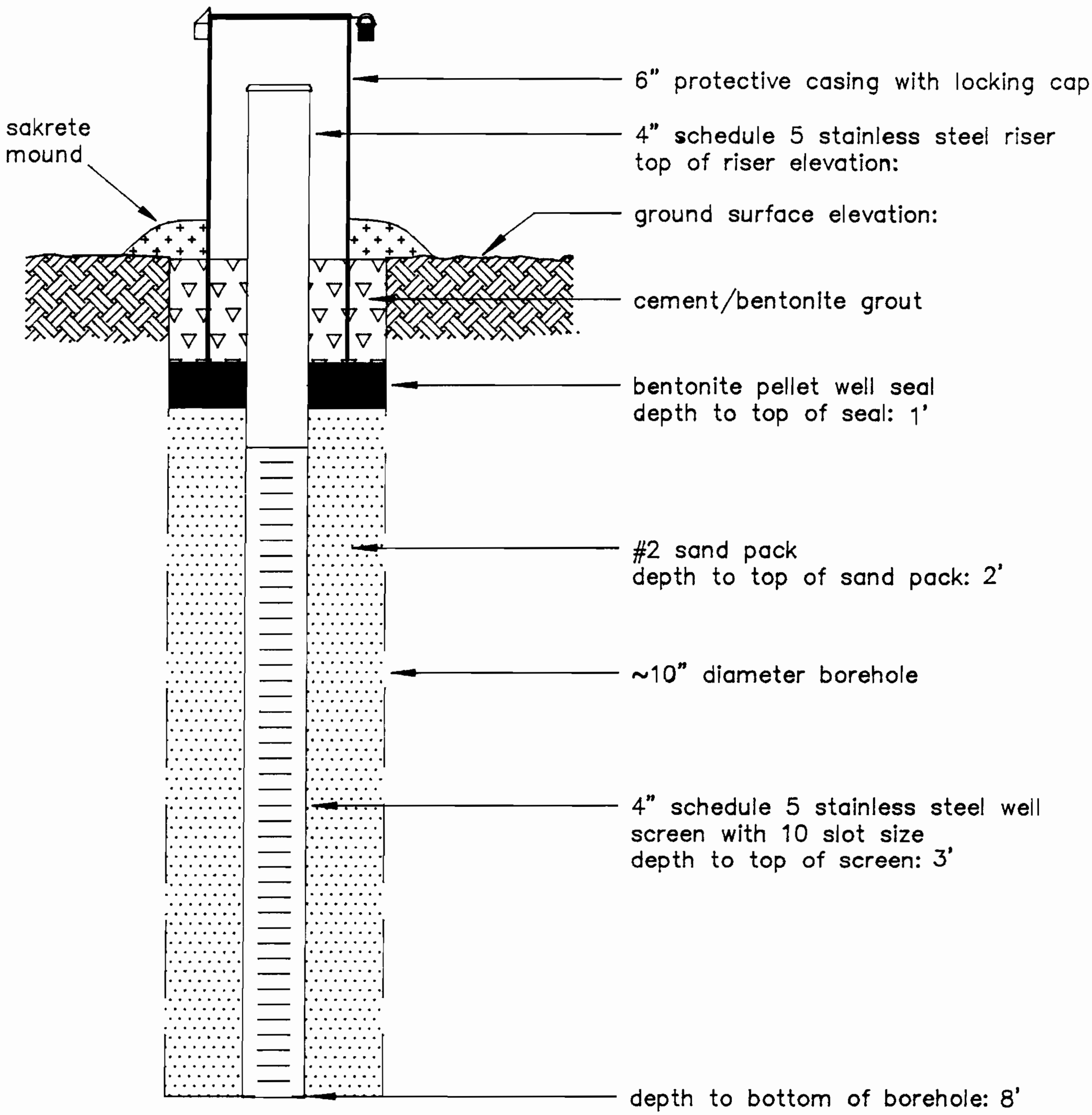
REPORT OF MONITORING WELL: NTC-7S

COMPLETION DATE: 4/23/91	INSPECTED BY: Paul F. Mazierski

DRAWN BY: PFM	CHECKED BY: PFM	PROJECT NO: 90C2139	DATE: 6/20/91	FIGURE NO:

NIAGARA TRANSFORMER
Remedial Investigation

WOODWARD-CLYDE CONSULTANTS
Consulting Engineers, Geologists and Environmental Scientists



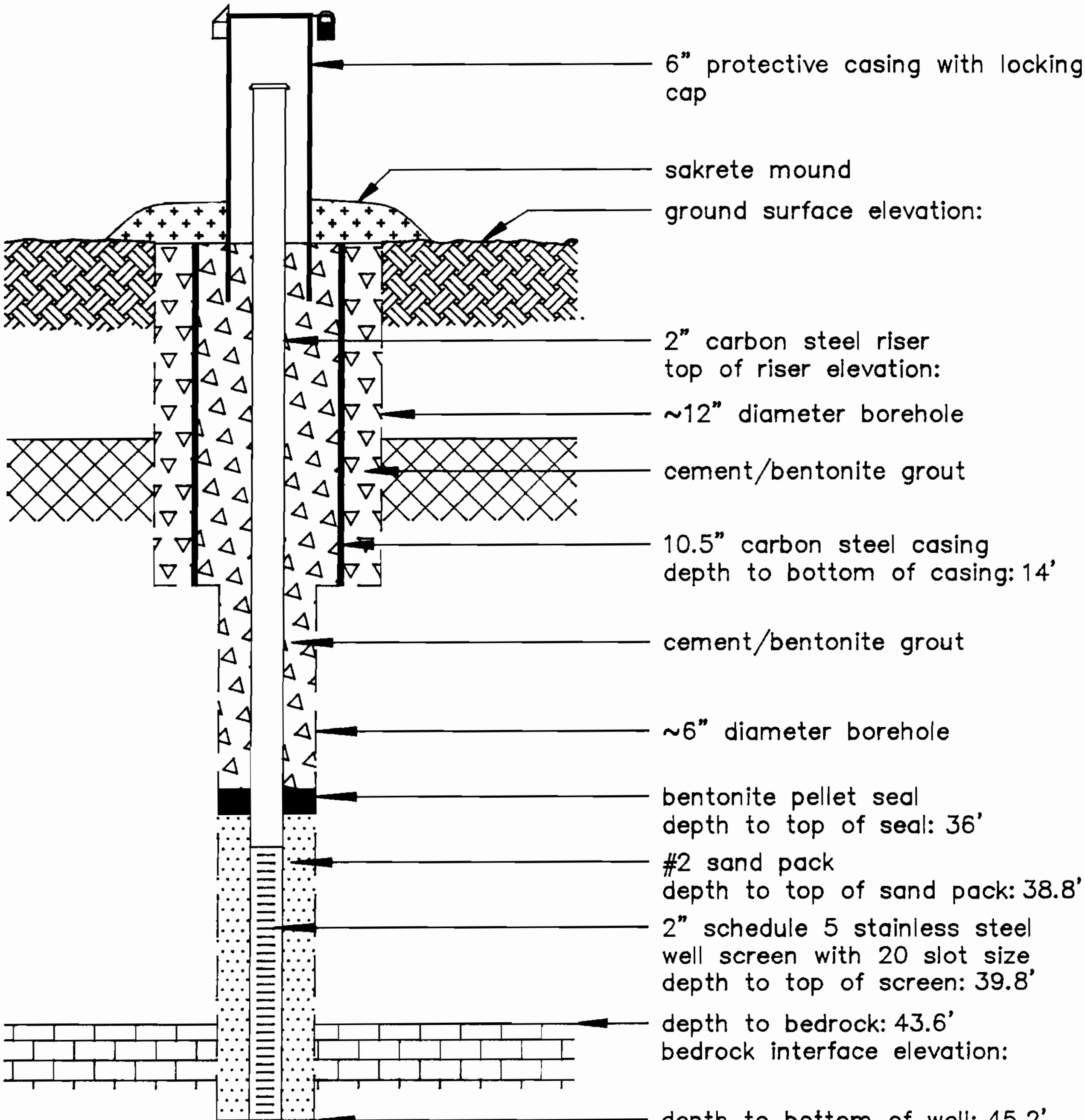
REPORT OF MONITORING WELL: NTC-8S

COMPLETION DATE: 4/4/91	INSPECTED BY: Paul F. Mazierski

DRAWN BY: PFM	CHECKED BY: PFM	PROJECT NO: 90C2139	DATE: 6/20/91	FIGURE NO:

NIAGARA TRANSFORMER
Remedial Investigation

WOODWARD-CLYDE CONSULTANTS
Consulting Engineers, Geologists and Environmental Scientists



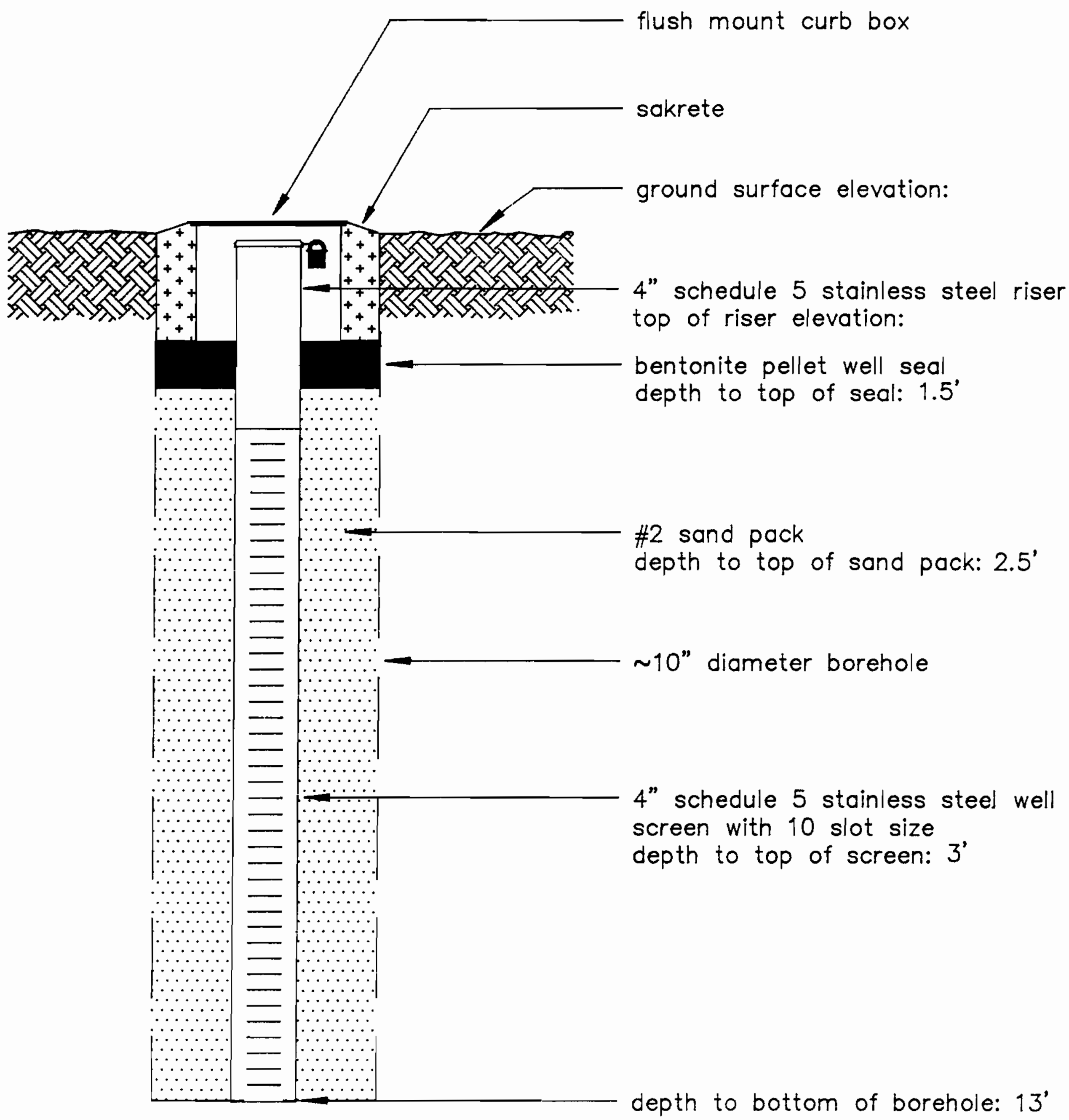
REPORT OF MONITORING WELL: NTC-8D

COMPLETION DATE: 6/4/92	INSPECTED BY: Frank G. Garbe

DRAWN BY: PFM	CHECKED BY: FRG	PROJECT NO: 90C2139	DATE: 9/28/92	FIGURE NO:

NIAGARA TRANSFORMER
Remedial Investigation

WOODWARD-CLYDE CONSULTANTS
Consulting Engineers, Geologists and Environmental Scientists



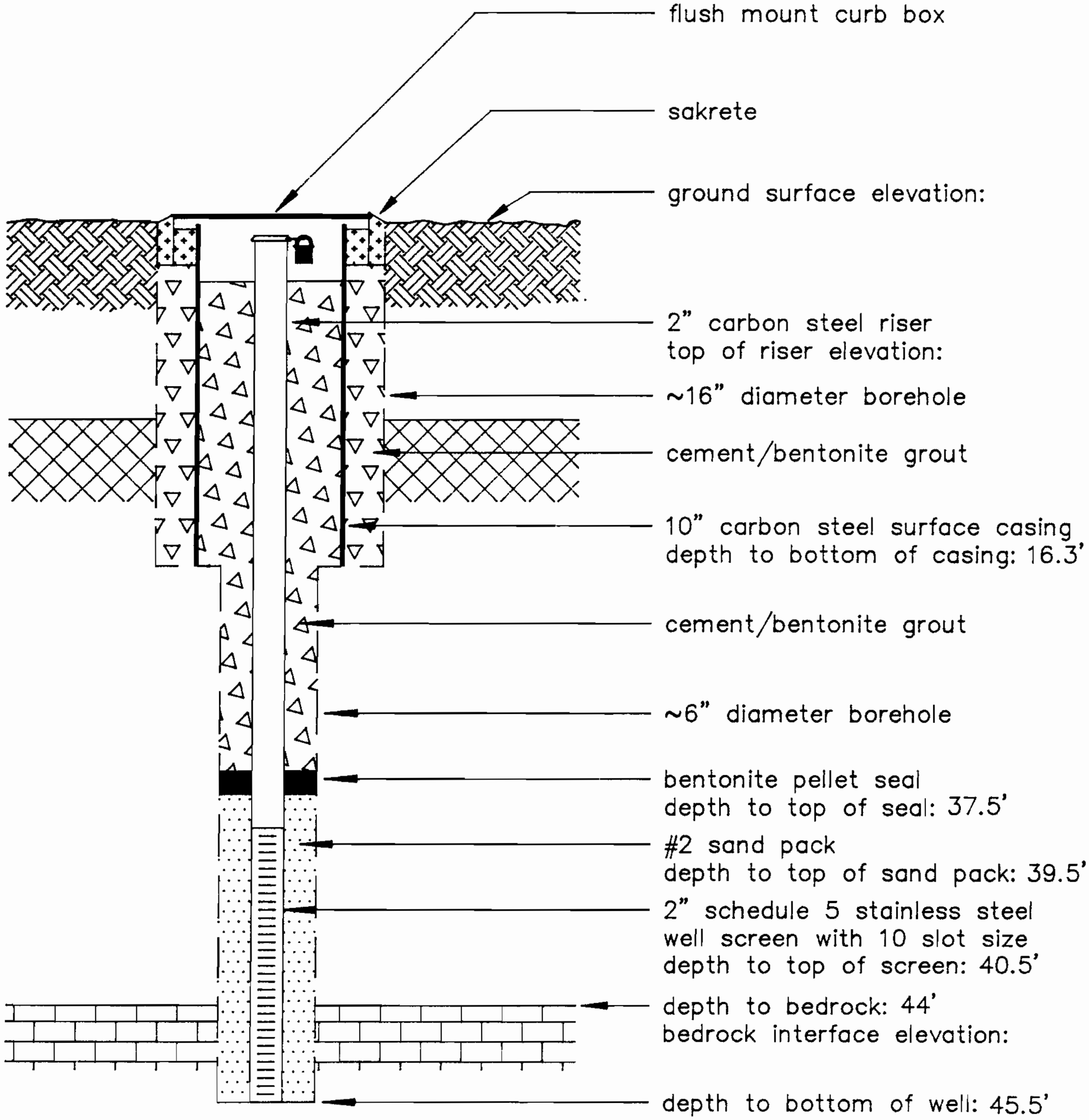
REPORT OF MONITORING WELL: NTC-9S

COMPLETION DATE: 4/5/91	INSPECTED BY: Paul F. Mazierski

DRAWN BY: PFM	CHECKED BY: PFM	PROJECT NO: 90C2139	DATE: 6/20/91	FIGURE NO:

NIAGARA TRANSFORMER
Remedial Investigation

WOODWARD-CLYDE CONSULTANTS
Consulting Engineers, Geologists and Environmental Scientists



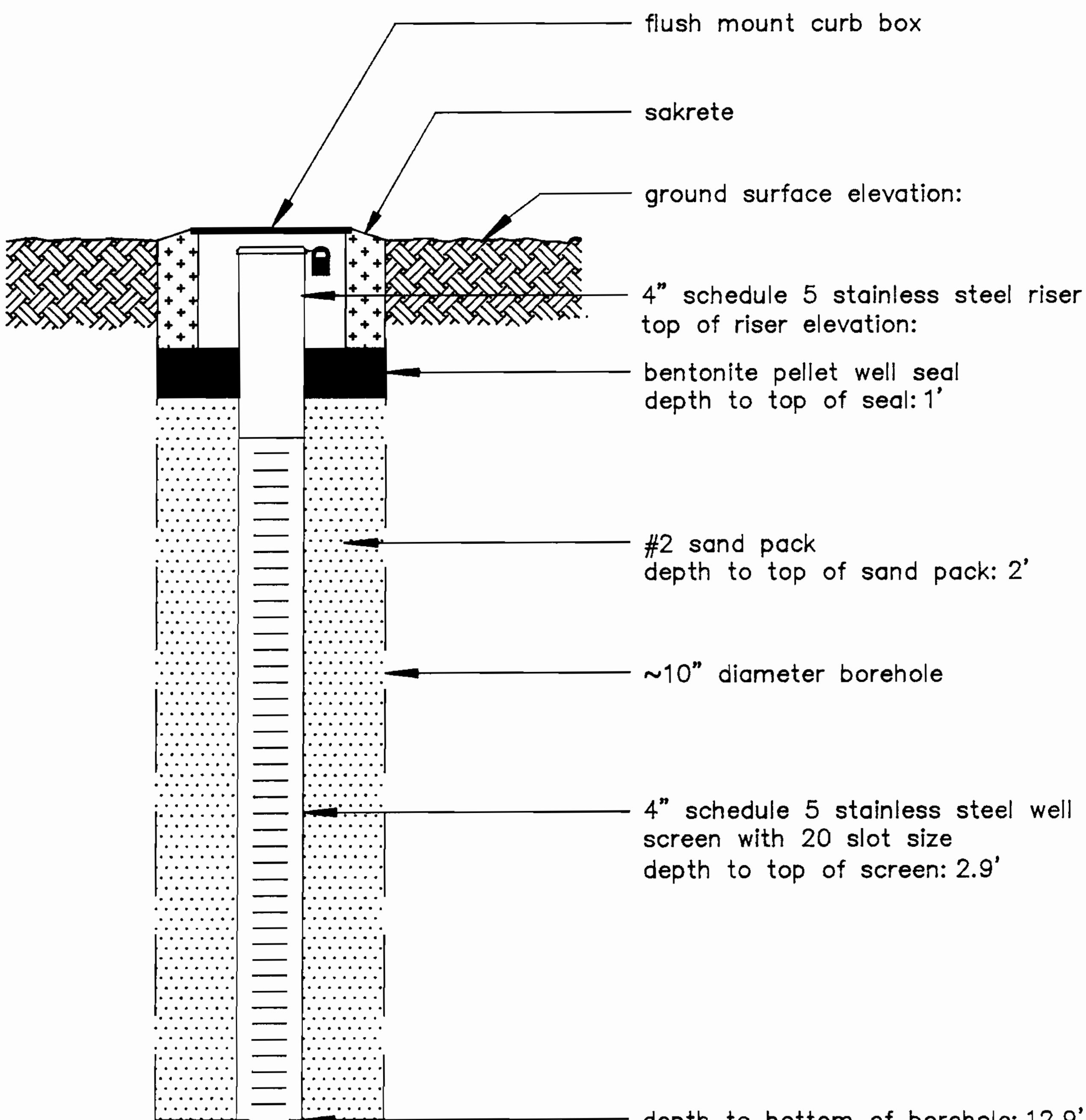
REPORT OF MONITORING WELL: NTC-9D

COMPLETION DATE: 4/16/91	INSPECTED BY: Paul F. Mazierski

DRAWN BY: PFM	CHECKED BY: PFM	PROJECT NO: 90C2139	DATE: 6/20/91	FIGURE NO:

NIAGARA TRANSFORMER
Remedial Investigation

WOODWARD-CLYDE CONSULTANTS
Consulting Engineers, Geologists and Environmental Scientists



REPORT OF MONITORING WELL: NTC-10S

COMPLETION DATE: 6/2/92	INSPECTED BY: Paul F. Mazierski

DRAWN BY: PFM	CHECKED BY: FRG	PROJECT NO: 90C2139	DATE: 9/28/92	FIGURE NO:

NIAGARA TRANSFORMER
Remedial Investigation

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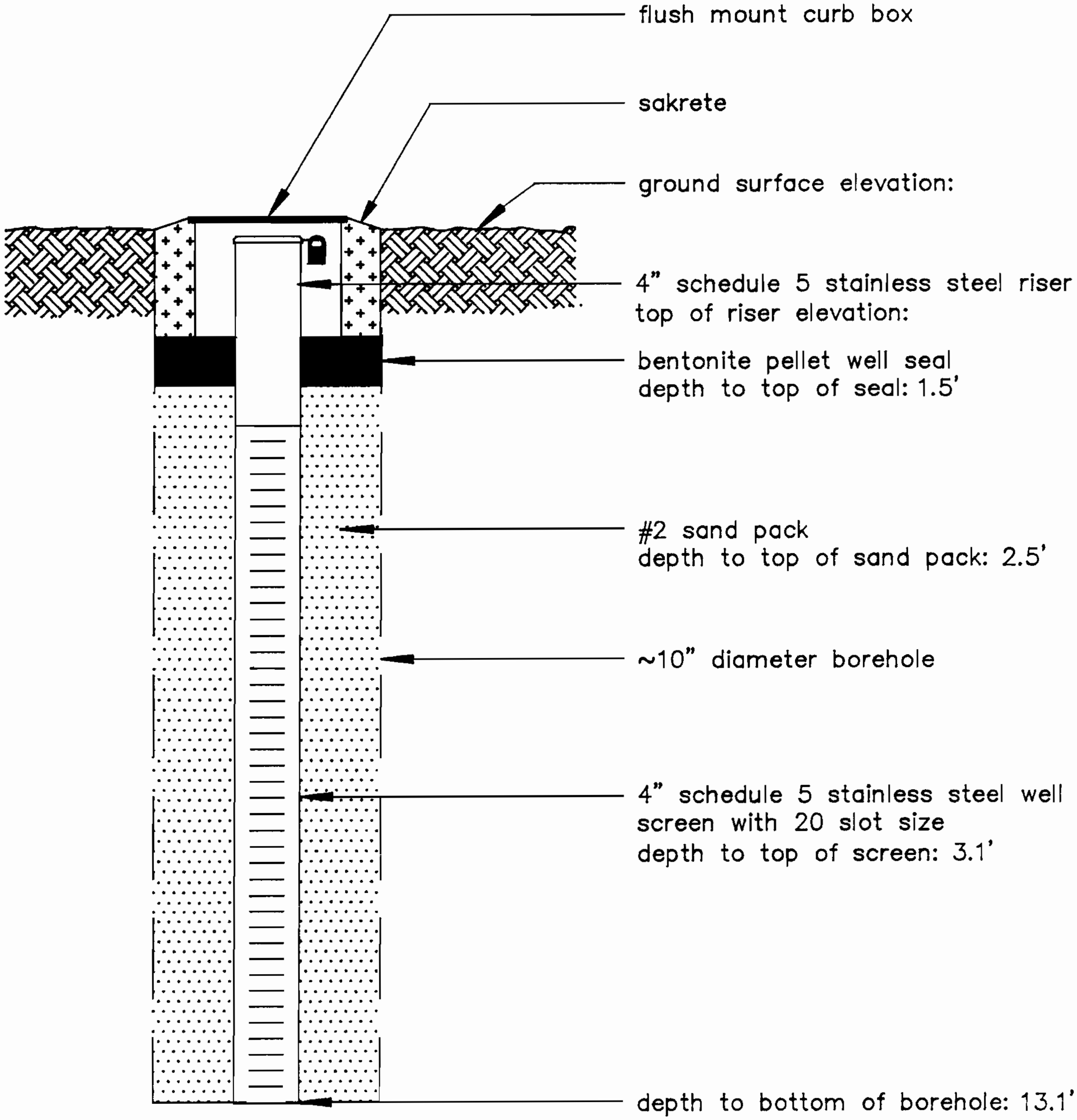

REPORT OF MONITORING WELL: NTC-11S

COMPLETION DATE: 6/8/92	INSPECTED BY: Paul F. Mazierski

DRAWN BY: PFM	CHECKED BY: FRG	PROJECT NO: 90C2139	DATE: 9/28/92	FIGURE NO:

NIAGARA TRANSFORMER
Remedial Investigation

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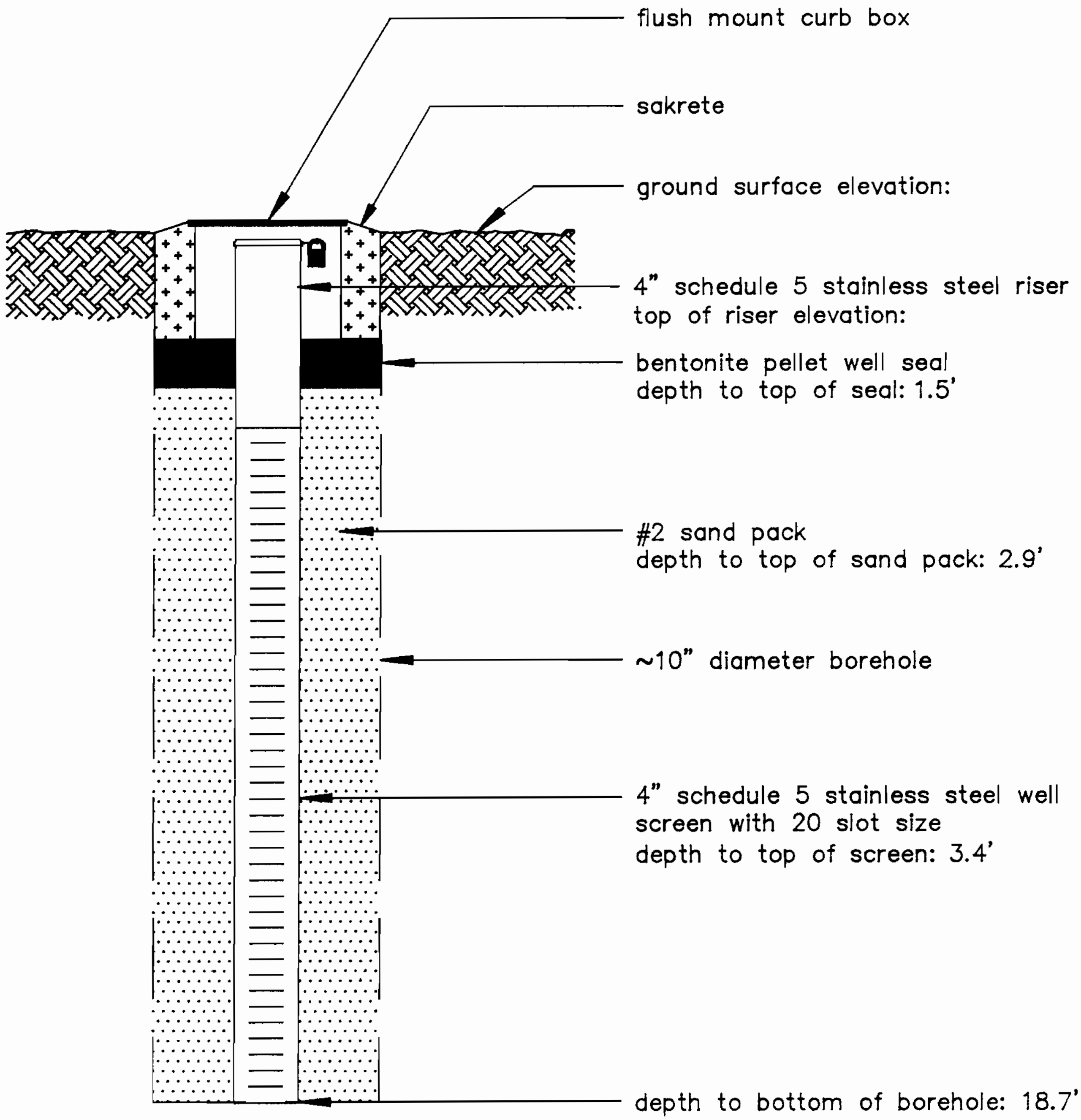


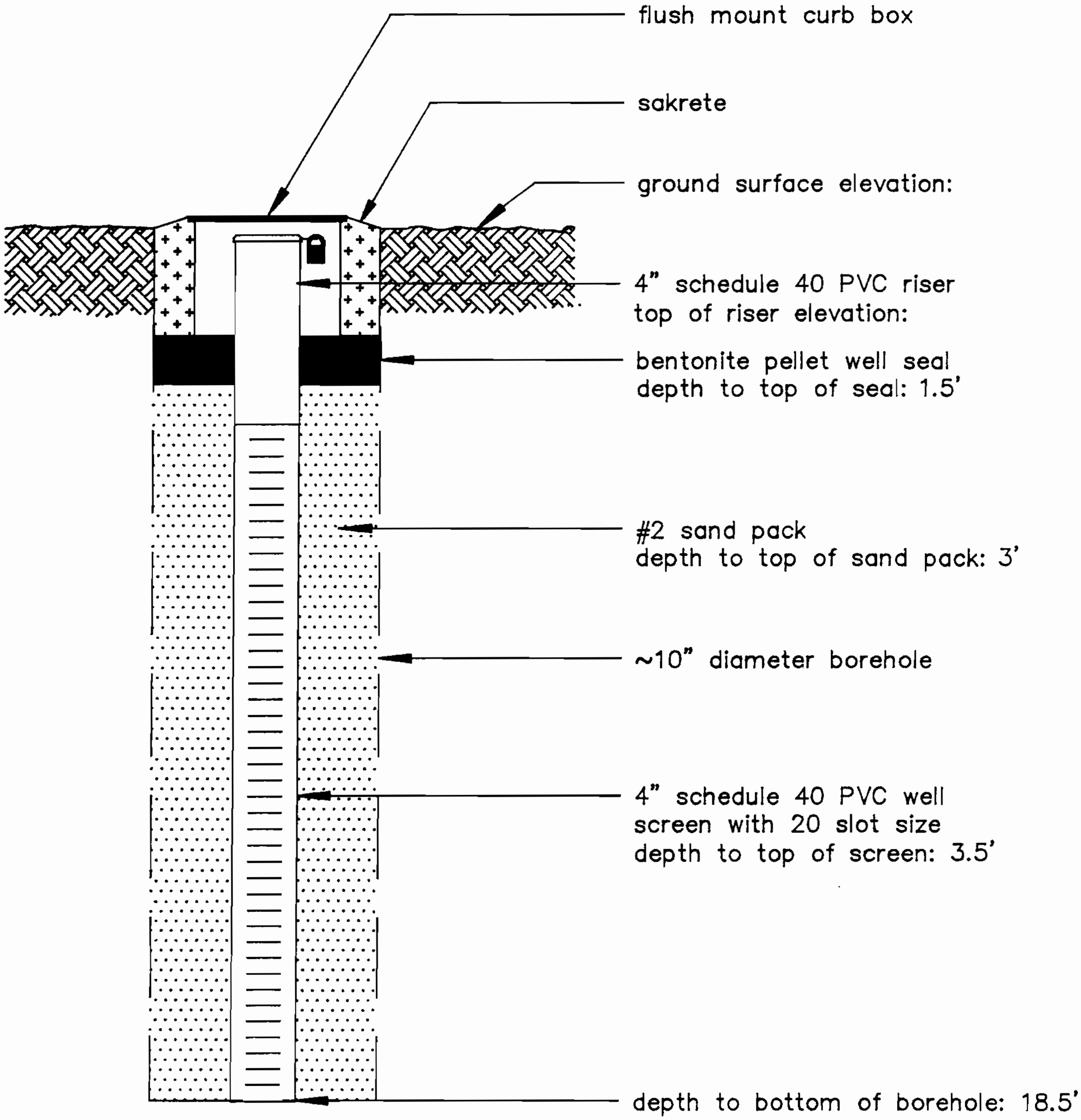
REPORT OF MONITORING WELL: NTC-12S

COMPLETION DATE: 9/14/92	INSPECTED BY: Frank R. Garbe

DRAWN BY: PFM	CHECKED BY: FRG	PROJECT NO: 90C2139	DATE: 9/28/92	FIGURE NO:

NIAGARA TRANSFORMER
Remedial Investigation

WOODWARD-CLYDE CONSULTANTS
Consulting Engineers, Geologists and Environmental Scientists



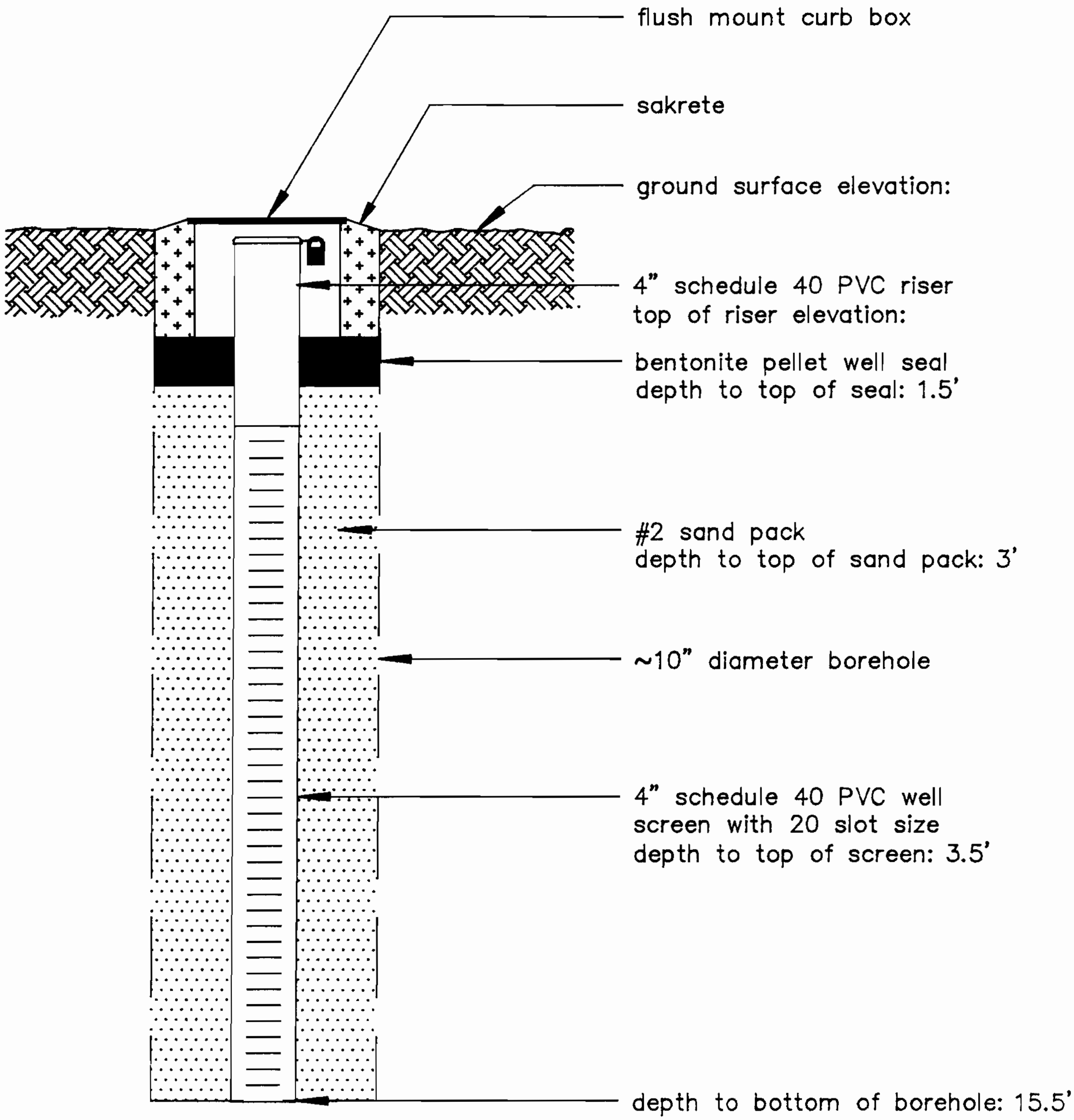
REPORT OF MONITORING WELL: NTC-13S

COMPLETION DATE: 9/16/92	INSPECTED BY: Frank R. Garbe

DRAWN BY: PFM	CHECKED BY: FRG	PROJECT NO: 90C2139	DATE: 9/28/92	FIGURE NO:

NIAGARA TRANSFORMER
Remedial Investigation

WOODWARD-CLYDE CONSULTANTS
Consulting Engineers, Geologists and Environmental Scientists



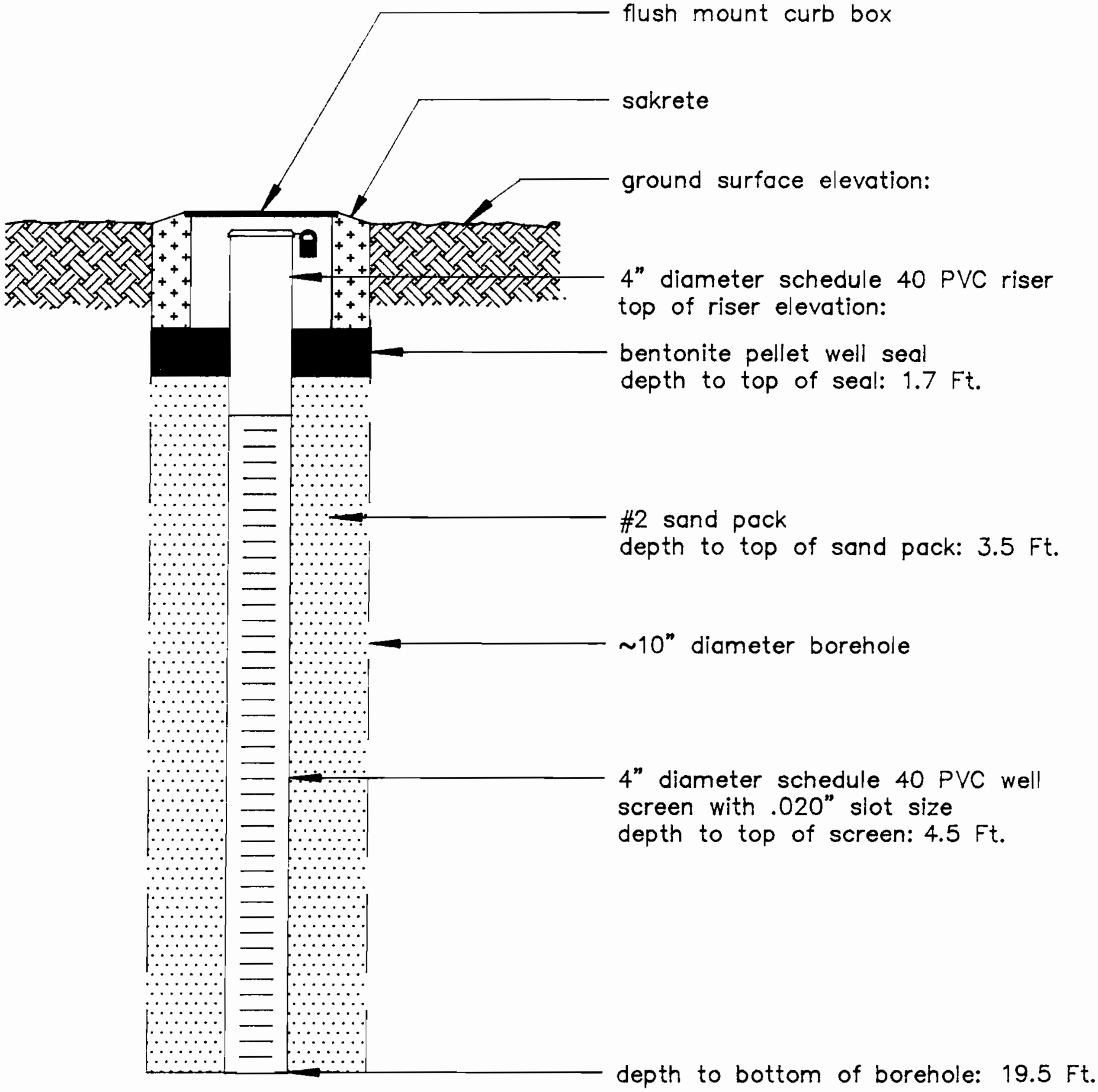
REPORT OF MONITORING WELL: NTC-14S

COMPLETION DATE: 9/16/92	INSPECTED BY: Frank R. Garbe

DRAWN BY: PFM	CHECKED BY: FRG	PROJECT NO: 90C2139	DATE: 9/28/92	FIGURE NO:

NIAGARA TRANSFORMER
Remedial Investigation

WOODWARD-CLYDE CONSULTANTS
Consulting Engineers, Geologists and Environmental Scientists



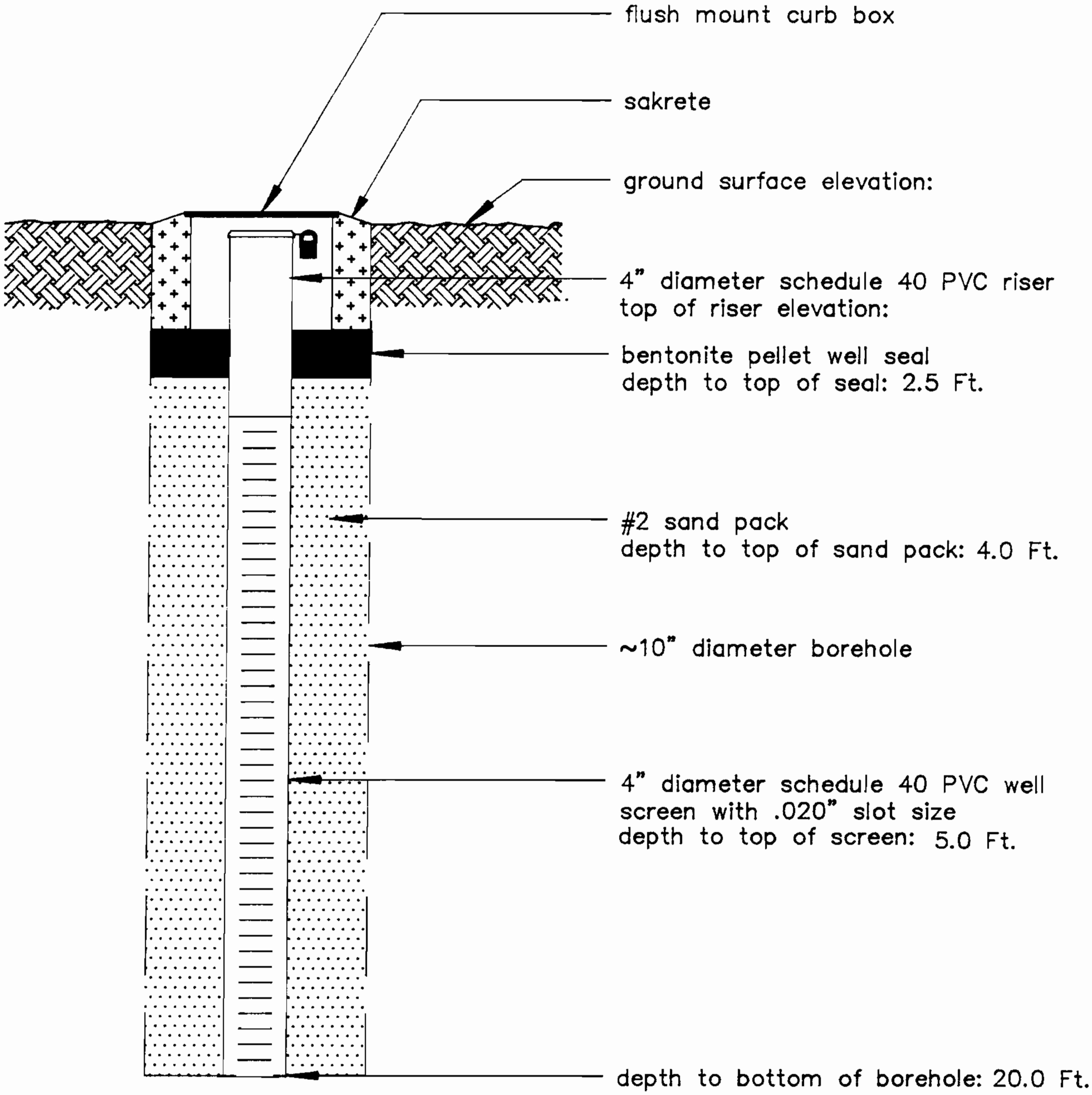
REPORT OF MONITORING WELL: NTC-15S

COMPLETION DATE: 03-01-93	INSPECTED BY: Frank R. Garbe

DRAWN BY: FRG	CHECKED BY: KRM	PROJECT NO: 90C2139	DATE: 3-5-93	FIGURE NO:

NIAGARA TRANSFORMER
Remedial Investigation

WOODWARD-CLYDE CONSULTANTS
Consulting Engineers, Geologists and Environmental Scientists



REPORT OF MONITORING WELL: NTC-16S

COMPLETION DATE: 03-02-93	INSPECTED BY: FRANK R. GARBE

DRAWN BY: FRG	CHECKED BY: KRM	PROJECT NO: 90C2139	DATE: 3-5-93	FIGURE NO:

Appendix C

LOG of BORING No. NTC-1S

Sheet 1 of 1

DATE 4/3/91 SURFACE ELEVATION ______ LOCATION ______

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	SAMPLE TYPE	DESCRIPTION	STRATUM ELEVATION	POCKET PENETROMETER	WATER CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	OTHER TESTS
0		8	SS	Medium dense dark brown clayey silt, little sand, soil fill for grass area just north of main building (FILL)						3.1
		8	SS	Firm mottled brown-tan-gray-green silty clay, some thin coal seams, dry, very cohesive (FILL)						ND
5		17	SS	Stiff brown-tan silty clay, trace sand, abundant rounded to subrounded fine gravel sized rock clasts, dry, hard, cohesive						ND
		27	SS							ND
		25	SS							ND
10		46	SS							ND
15										
20										
25										
30										
35										

NOTE:
(1) No shallow well installed, insufficient quantity of water observed during drilling.
(2) 10.5" diameter surface casing set for deep well
(3) Values under "OTHER TESTS" are Aroclor-1260 concentration in ppm.

Completion Depth: 12.0 Ft. Water Depth: ______ ft., After ______ hrs.

Project No.: 90C2139 ______ ft., After ______ hrs.

Project Name: Niagara Transformer RI ______ ft., After ______ hrs.

Drilling Method: Hollow-Stem Auger ______ ft., After ______ hrs.

Woodward-Clyde Consultants

LOG of BORING No. NTC-1D

DATE 4/9/91 SURFACE ELEVATION ______ LOCATION ______

DEPTH, ft.	SAMPLING RESISTANCE	SAMPLE TYPE	DESCRIPTION	STRATUM ELEVATION	POCKET PENETROMETER	WATER CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	OTHER TESTS
0			SEE BORING LOG FOR NTC-1S - surface casing set to 12 feet						
	29	SS	Brown-red clay, some silt, with small subrounded rock clasts, hard, damp						
15	27	SS							
	22	SS							
20	32	SS							ND
	25	SS	- moist in sections with higher sand content						
	25	SS							
25	14	SS	Alternating brown-tan silty clay with small rock clasts, moist to dry, hard to firm AND brown-tan fine sand and silt, saturated						ND
	11	SS							
30	24	SS							
	29	SS	Brown-red clay some to little silt, trace to little sand, dry, hard, compact, occasional small rock clasts and thin moist layers of higher silt and sand content						ND
35	23	SS							
	26	SS	CONTINUED ON SHEET 2 OF 2						

Completion Depth: 56.0 Ft. Water Depth: ______ ft., After ______ hrs.

Project No.: 90C2139 ______ ft., After ______ hrs.

Project Name: Niagara Transformer RI ______ ft., After ______ hrs.

Drilling Method: Hollow-Stem Auger ______ ft., After ______ hrs.

LOG of BORING No. NTC-1D

DATE 4/9/91 SURFACE ELEVATION ______ LOCATION ______

DEPTH, ft.	SAMPLING RESISTANCE	SAMPLE TYPE	DESCRIPTION	STRATUM ELEVATION	POCKET PENETROMETER	WATER CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	OTHER TESTS
	39	SS	Brown-red clay some to little silt, trace to little sand, dry, hard, compact, occasional small rock clasts and thin moist layers of higher silt and sand content						ND
40	46	SS							
	39	SS							
45	40	SS							ND
	46	SS							
	53	SS							
50	37	SS							ND
	177/10"	SS	Gray regolith; sand, little silt matrix with abundant subangular to subrounded rock clasts, compact, very hard						ND
55	100/5"	SS							
60			NOTES: (1) Bedrock (auger refusal) at 54 feet (2) Drilled 2 feet into rock with 5.9" Tri-cone roller bit (3) See monitoring well report for well completion details (4) Values under "OTHER TESTS" are Aroclor-1260 concentration in ppm						
65									
70									

Completion Depth: 56.0 Ft.

Project No.: 90C2139

Project Name: Niagara Transformer RI

Drilling Method: Hollow-Stem Auger

Water Depth: ______ ft., After ______ hrs.
______ ft., After ______ hrs.
______ ft., After ______ hrs.
______ ft., After ______ hrs.

LOG of BORING No. NTC-2S

Sheet 1 of 1

DATE 4/18/91 SURFACE ELEVATION ______ LOCATION ______

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	SAMPLE TYPE	DESCRIPTION	STRATUM ELEVATION	POCKET PENETROMETER	WATER CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	OTHER TESTS
0		34	SS	Bituminous asphalt with coarse subgrade						
				Coarse fill material, gray shot rock with brown						8800
		14	SS	silt and clay matrix, organic odors noted, moist						2700
				Brown-tan clay, little silt, trace sand, occasional						
		17	SS	rock clasts, dry, hard, slight organic odor off of						2800
5				entire 2'-4' spoon						
				- slight organic odor						
		20	SS							1300
				- moist to dry, very firm						
		21	SS							580
10										
15				NOTES:						
				(1) See monitoring well report for well completion details						
				(2) Values under "OTHER TESTS" are Aroclor-1260 concentration in ppm						
20										
25										
30										
35										

Completion Depth: 11.2 Ft.

Project No.: 90C2139

Project Name: Niagara Transformer RI

Drilling Method: Hollow-Stem Auger

Water Depth: ____ ft., After ____ hrs.

____ ft., After ____ hrs.

____ ft., After ____ hrs.

____ ft., After ____ hrs.

Woodward-Clyde Consultants

LOG of BORING No. NTC-3S

Sheet 1 of 1

DATE 4/18/91 SURFACE ELEVATION ______ LOCATION ______

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	SAMPLE TYPE	DESCRIPTION	STRATUM ELEVATION	POCKET PENETROMETER	WATER CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	OTHER TESTS
0		30	SS	Bituminous asphalt with coarse subgrade						110
				Miscellaneous fill, shot rock, slag, etc. (FILL)						
		31	SS	Alternating tan fine sand very wet to saturated AND brown-tan silty clay, little sand, moist - Organic odors from saturated sands, slight sheen noted on wet sand layers						510
5		35	SS							76
		40	SS	Brown-orange-tan silty clay, little sand, occasional rock clasts, very firm to hard, dry, occasional thin medium sand lenses, wet						1.4
		51	SS							0.52
10										
15										
20										
25										
30										
35										

NOTES:
(1) See monitoring well report for well completion details
(2) Values under "OTHER TESTS" are Aroclor-1260 concentration in ppm

Completion Depth: 10.2 Ft. Water Depth: ______ ft., After ______ hrs.

Project No.: 90C2139 ______ ft., After ______ hrs.

Project Name: Niagara Transformer RI ______ ft., After ______ hrs.

Drilling Method: Hollow-Stem Auger ______ ft., After ______ hrs.

Woodward-Clyde Consultants

LOG of BORING No. NTC-4S

DATE 4/22/91 SURFACE ELEVATION ______ LOCATION ______

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	SAMPLE TYPE	DESCRIPTION	STRATUM ELEVATION	POCKET PENETROMETER	WATER CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	OTHER TESTS
0		17	SS	Black-gray shot rock fill, sand and silt matrix, organic odor and sheen noted						1700
		10	SS	Black-brown silt and clay, little sand, odor noted, black discoloration						24
5		16	SS	Brown-tan clay, some silt, little sand, moist to wet, firm to soft, high plasticity, very slight odor						27
		33	SS	- same brown-tan clay, dry, hard						0.97
10										
15										
20										
25										
30										
35										

NOTES:
(1) See monitoring well report for well completion details
(2) Values under "OTHER TESTS" are Aroclor-1260 concentration in ppm

Completion Depth: 8.0 Ft.
Project No.: 90C2139
Project Name: Niagara Transformer RI
Drilling Method: Hollow-Stem Auger

Water Depth: ____ ft., After ____ hrs.
____ ft., After ____ hrs.
____ ft., After ____ hrs.
____ ft., After ____ hrs.

Woodward-Clyde Consultants

LOG of BORING No. NTC-5S

DATE 4/4/91 SURFACE ELEVATION ______ LOCATION ______

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	SAMPLE TYPE	DESCRIPTION	STRATUM ELEVATION	POCKET PENETROMETER	WATER CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	OTHER TESTS
0		9	SS	Dark brown loam, abundant roots and organic debris						280
		7	SS	Brown-tan silty clay, trace sand, some occasional gray mottling, occasional small rock clasts, damp to moist						20
		12	SS							0.31
5				- becoming dryer and more unform in composition						
		42	SS							ND
				- moist again						
		31	SS	Brown-red clay, hard, dry, occasional rock clasts						ND
10										

NOTES:
(1) See monitoring well report for well completion details
(2) Values under "OTHER TESTS" are Aroclor-1260 concentration in ppm

Completion Depth: 10.0 Ft.
Project No.: 90C2139
Project Name: Niagara Transformer RI
Drilling Method: Hollow-Stem Auger

Water Depth: ____ ft., After ____ hrs.
____ ft., After ____ hrs.
____ ft., After ____ hrs.
____ ft., After ____ hrs.

LOG of BORING No. NTC-6S

Sheet 1 of 1

DATE 4/11/91 SURFACE ELEVATION ______ LOCATION ______

DEPTH, ft.	SAMPLING RESISTANCE	SAMPLE TYPE	DESCRIPTION	STRATUM ELEVATION	POCKET PENETROMETER	WATER CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	OTHER TESTS
0	4	SS	Dark brown loam little sand, roots and organic debris abundant for first 0.2'						240
	10	SS	Brown-tan silty clay, trace sand with small rock clasts, moist at top						< 0.2
	33	SS	- moist to wet						0.81
5	39	SS	- becoming more clay dominated, silt and sand content lower, dry, some rock clasts, very firm						< 0.2
	47	SS							ND
			- abundant rock clasts, dry, hard						
10									
15			NOTES: (1) See monitoring well report for well completion details (2) Values under "OTHER TESTS" are Aroclor-1260 concentration in ppm						
20									
25									
30									
35									

Completion Depth: 10.0 Ft.

Project No.: 90C2139

Project Name: Niagara Transformer RI

Drilling Method: Hollow-Stem Auger

Water Depth: ______ ft., After ______ hrs.

______ ft., After ______ hrs.

______ ft., After ______ hrs.

______ ft., After ______ hrs.

Woodward-Clyde Consultants

LOG of BORING No. NTC-7S

Sheet 1 of 1

DATE 4/23/91 SURFACE ELEVATION ______ LOCATION ______

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	SAMPLE TYPE	DESCRIPTION	STRATUM ELEVATION	POCKET PENETROMETER	WATER CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	OTHER TESTS
0		4	SS	Black organic rich silty loam, no sheen, no odor, gradational change to brown-tan clay, very wet, very soft						3.1
		9	SS							77
				Brown-tan-orange silty clay, little sand, wet, soft						
5		23	SS	- alternating zones of brown-tan silty clay little sand, moist to wet, soft to firm AND mottled brown-orange clay, hard, dry						0.48
		25	SS	- organic odor noted in moist to wet zones						ND
10										
15										
20										
25										
30										
35										

NOTES:
(1) See monitoring well report for well completion details
(2) Values under "OTHER TESTS" are Aroclor-1260 concentration in ppm

Completion Depth: 8.0 Ft.
Project No.: 90C2139
Project Name: Niagara Transformer RI
Drilling Method: Hollow-Stem Auger

Water Depth: ____ ft., After ____ hrs.
____ ft., After ____ hrs.
____ ft., After ____ hrs.
____ ft., After ____ hrs.

Woodward-Clyde Consultants

LOG of BORING No. NTC-8S

Sheet 1 of 1

DATE 4/4/91 SURFACE ELEVATION ______ LOCATION ______

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	SAMPLE TYPE	DESCRIPTION	STRATUM ELEVATION	POCKET PENETROMETER	WATER CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	OTHER TESTS
0		6	SS	Dark brown silt clay loam, little sand, roots, organic details abundant for first 0.2', becoming a brown-tan clay, trace sand, with small angular to subangular rock clasts, moist						480
		4	SS							0.79
5		21	SS	- tan sand lense at approximately 5.2', wet, slight organic odor						0.95
		22	SS	Brown-red-tan clay, trace silt and small rock clasts, dry, hard						ND
10										
15										
20										
25										
30										
35										

NOTES:
(1) See monitoring well report for well completion details
(2) Values under "OTHER TESTS" are Aroclor-1260 concentration in ppm

Completion Depth: 8.0 Ft.
Project No.: 90C2139
Project Name: Niagara Transformer RI
Drilling Method: Hollow-Stem Auger

Water Depth: ____ ft., After ____ hrs.
____ ft., After ____ hrs.
____ ft., After ____ hrs.
____ ft., After ____ hrs.

LOG of BORING No. NTC-8D

DATE 6/4/92 SURFACE ELEVATION ______ LOCATION ______

DEPTH, ft.	SAMPLING RESISTANCE	SAMPLE TYPE	DESCRIPTION	STRATUM ELEVATION	HNu HEAD SPACE (ppm)	OVA HEAD SPACE (ppm)
0						
5						
10			NO SPLIT SPOON SAMPLES TAKEN UNTIL 14' BELOW GROUND SURFACE			
15	79	SS	Interbedded fine to medium light tan and gray sands and brown silty clay with rock clasts. Wet.			
	84	SS	Brown silty clay, trace sand, some very small rock clasts. Very firm.			
	104	SS	Interbedded brown silt and clay, little to some gray medium sand occuring as irregular thin lenses. Firm, wet. Some small black rock clasts.			
20	66	SS				
	78	SS	More massive mottled gray-brown clayey silt, some to little sand, no rock clasts. Firm to very firm. Wet.			
25	109	SS	Brown to brown-gray silty clay, firm, with trace to little sand and small rock clasts. Occassional thin sandier seams.			
	58	SS	Seam of brown fine sand .3' thick clay is firmer, dryer, with less sand			
	44	SS				
30	33	SS				
	26	SS	Seam of gray sand and small black rock clasts .3' thick			
35	20	SS	Brown-red clay, little silt and sand. Massive, soft, high plasticity.			
	14	SS				
	17	SS				
40	76	SS	Black gray medium to coarse sand, some silt and clay, becoming very hard, with rock clasts.			
	175	SS				
			BEDROCK			

Completion Depth: 45.6 Ft. Water Depth: 7.3 ft., After 141 hrs.

Project No.: 90C2139 ______ ft., After ______ hrs.

Project Name: Niagara Transformer ______ ft., After ______ hrs.

Drilling Method: 8.25" H.S.A ______ ft., After ______ hrs.

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LOG of BORING No. NTC-9S

Sheet 1 of 1

DATE 4/5/91 SURFACE ELEVATION ______ LOCATION ______

DEPTH, ft.	SAMPLING RESISTANCE	SAMPLE TYPE	DESCRIPTION	STRATUM ELEVATION	POCKET PENETROMETER	WATER CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	OTHER TESTS
0	19	SS	Bituminous asphalt and coarse subgrade						
			Brown silty clay, trace to little sand with black rock clasts, wet						ND
	6	SS							
			Tan-light brown silt and sand, little clay, wet, no mottling						< 0.2
	29	SS							ND
5			Brown-tan fine to medium sand, trace silt and clay, saturated						
	44	SS							ND
	40	SS							ND
10	53	SS							ND
			Brown-red-tan silty clay, dry, very firm with fine gravel sized angular to subangular sized rock clasts						
	70	SS							
15									
20									
25									
30									
35									

NOTES:
(1) See monitoring well report for well completion retails
(2) Values under "OTHER TESTS" are Aroclor-1260 concentration in ppm

Completion Depth: 14.0 Ft.
Project No.: 90C2139
Project Name: Niagara Transformer RI
Drilling Method: Hollow-Stem Auger

Water Depth: ______ ft., After ______ hrs.
______ ft., After ______ hrs.
______ ft., After ______ hrs.
______ ft., After ______ hrs.

Woodward-Clyde Consultants

LOG of BORING No. NTC-9D

DATE 4/15/91 SURFACE ELEVATION ________ LOCATION ________

DEPTH, ft.	SAMPLING RESISTANCE	SAMPLE TYPE	DESCRIPTION	STRATUM ELEVATION	POCKET PENETROMETER	WATER CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	OTHER TESTS
0			SEE BORING LOG FOR NTC-9S - surface casing set to 17 feet						
	46	SS	Alternating brown-tan fine to medium sand and silty sands, occasional rock clasts, saturated AND brown-tan silt and clay, little sand, moist to dry, harder, dryer in clay dominated portions; saturated in sand dominated lenses						
20	45	SS							
	77	SS							ND
	87	SS							
25	34	SS	Brown-tan silty clay with subrounded to rounded rock clasts, trace sand, hard to firm, moist to dry						
	33	SS							ND
30	26	SS							
	23	SS	Brown-red mottled clay, soft to very soft, cohesive, occasional areas with little sand, trace rock clasts, "gumbo clay"						
35	18	SS							ND
	14	SS	CONTINUED ON SHEET 2 OF 2						

Completion Depth: 46.0 Ft. Water Depth: ____ ft., After ____ hrs.

Project No.: 90C2139 ____ ft., After ____ hrs.

Project Name: Niagara Transformer RI ____ ft., After ____ hrs.

Drilling Method: Hollow-Stem Auger ____ ft., After ____ hrs.

LOG of BORING No. NTC-9D

DATE 4/15/91 SURFACE ELEVATION ______ LOCATION ______

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	SAMPLE TYPE	DESCRIPTION	STRATUM ELEVATION	POCKET PENETROMETER	WATER CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	OTHER TESTS
		5	SS	SAME AS ABOVE						
40		23	SS	- occasional gray sand layers						ND
		113/11"	SS	Gray sand and silt with abundant fine to medium sized gravel clasts, saturated, "regolith"						< 0.2
45										
50										
55										
60										
65										
70										

NOTES:
(1) Bedrock auger refusal at 44 feet
(2) Drilled 2 feet into rock with 5.9" Tri-cone roller bit
(3) See monitoring well report for well completion details
(4) Values under "OTHER TESTS" are Aroclor-1260 concentration in ppm

Completion Depth: 46.0 Ft.
Project No.: 90C2139
Project Name: Niagara Transformer RI
Drilling Method: Hollow-Stem Auger

Water Depth: ____ ft., After ____ hrs.
____ ft., After ____ hrs.
____ ft., After ____ hrs.
____ ft., After ____ hrs.

LOG of BORING No. NTC-10S

DATE 6/2/92 SURFACE ELEVATION ______ LOCATION ______

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	SAMPLE TYPE	DESCRIPTION	STRATUM ELEVATION	HNu HEAD SPACE (ppm)	OVA HEAD SPACE (ppm)
0		16	SS	Tan brown fine sand, trace silt			
		17	SS	Brown-tan silty clay, trace sand, wet, high plasticity. Occassional small black rock clasts. Soft to firm.			
5		10	SS				
		32	SS				
		56	SS	Brown-tan silty clay, little sand and small black rock clasts, dryer, firm to very firm, becoming a mottled brown/tan/gray silty clay to a gray silty clay.			
10		39	SS				
15							
20							
25							
30							
35							
40							

Completion Depth: 12.6 Ft.
Project No.: 90C2139
Project Name: Niagara Transformer
Drilling Method: 8.25" H.S.A.

Water Depth: 3.1 ft., After 170 hrs.
____ ft., After ____ hrs.
____ ft., After ____ hrs.
____ ft., After ____ hrs.

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LOG of BORING No. NTC-11S

Sheet 1 of 1

DATE 6/8/92 SURFACE ELEVATION ______ LOCATION ______

DEPTH, ft.	SAMPLING RESISTANCE	SAMPLE TYPE	DESCRIPTION	STRATUM ELEVATION	HNu HEAD SPACE (ppm)	OVA HEAD SPACE (ppm)
0	87	SS	Shot rock fill and angular stone with brown sand, little silt.			
	35	SS	Mottled brown-tan clay, some to little silt, little small rock clasts, dry, firm to very firm.			
5	38	SS	Brown clay, little silt, trace sand, little to trace small rock clasts (decreasing with depth).			
	50	SS	Sandier seams wet, with odor.			
	55	SS	Slight odor apparent			
10	49	SS	Odor stronger, slight sheen apparent			
			Some sandier, thin lenses.			
	26	SS	Brown-gray silt and clay, little to some sand, very wet, odoriferous.			
15						
20						
25						
30						
35						
40						

Completion Depth: 13.5 Ft.

Project No.: 90C2139

Project Name: Niagara Transformer

Drilling Method: 8.25" H.S.A.

Water Depth: 2.8 ft., After 29 hrs.

2.6 ft., After 50 hrs.

____ ft., After ____ hrs.

____ ft., After ____ hrs.

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LOG of BORING No. NTC-12S

DATE 9/14/92 SURFACE ELEVATION ______ LOCATION ______

DEPTH, ft.	SAMPLING RESISTANCE	SAMPLE TYPE	DESCRIPTION	STRATUM ELEVATION	HNu HEAD SPACE (ppm)	OVA HEAD SPACE (ppm)
0	70	SS	Shot rock			1.0-5.0
	30	SS	No recovery			
5	19	SS	Brown silty clay, trace sand, moist with infrequent thin lenses of tan-brown fine to medium sand, trace silt.			0-0.4
	76	SS				0-2.0
	69	SS	No recovery			
10	39	SS	Brown to yellow-brown silty clay, moist, stiff, with little sand and fine gravel/subrounded rock clasts.			0-0.2
	53	SS				0-3.0
15	41	SS				0-0.2
	45	SS				0-0.2
20			Note : Values under "OVA Head Space" are OVA readings off of freshly broken surfaces in split spoon samples and represent peak readings, not sustained readings.			
25						
30						
35						
40						

Completion Depth: 18.7 Ft. Water Depth: .04 ft., After 185 hrs.

Project No.: 90C2139 ______ ft., After ______ hrs.

Project Name: Niagara Transformer ______ ft., After ______ hrs.

Drilling Method: 8.25" H.S.A. ______ ft., After ______ hrs.

LOG of BORING No. NTC-13S

DATE 9/16/92 SURFACE ELEVATION ______ LOCATION ______

DEPTH, ft.	SAMPLING RESISTANCE	SAMPLE TYPE	DESCRIPTION	STRATUM ELEVATION	HNu HEAD SPACE (ppm)	OVA HEAD SPACE (ppm)
0		SS	Railroad bed shot rock-no sample taken			
	33	SS	Black-brown silty sand and gravel (FILL), little black coal flakes.			2-35
5	20	SS	Brown clay, stiff, with trace silt and subrounded fine gravel.			0.4-1.5
	41	SS	Brown-black silty clay with some fine gravel.			0-4.0
	82	SS	Tan-brown sandy clay			3.0-7.0
10	67	SS	Dark red-brown silty clay, stiff, moist with occassional thin silty sand lenses, wet.			0.2-0.6
	80	SS				0-0.6
15	32	SS				0-0.4
	65	SS				0-0.2

Note : Values under "OVA Head Space Reading" are OVA readings off of freshly broken surfaces in split spoon samples and represent peak readings, not sustained readings.

Completion Depth: 18.5 Ft.

Water Depth: 1.0 ft., After 189 hrs.

Project No.: 90C2139

Project Name: Niagara Transformer

Drilling Method: 8.25" H.S.A.

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LOG of BORING No. NTC-14S

DATE 9/16/92 SURFACE ELEVATION ______ LOCATION ______

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	SAMPLE TYPE	DESCRIPTION	STRATUM ELEVATION	HNu HEAD SPACE (ppm)	OVA HEAD SPACE (ppm)
0				No samples taken from 0' to 10'			
10		88	SS	Red-brown silty clay, stiff, with occassional thin, yellow-tan sandy silt lenses.			0-0.2
		96	SS	Gray silty sand, moist to wet, with trace clay.			0
			SS	No sample taken 14' to 16'.			
		60	SS	Gray silty sand, moist to wet, with trace clay.			0

Note : Values under "OVA Head Space Reading" are OVA readings off of freshly broken surfaces in split spoon samples and represent peak readings, not sustained readings.

Completion Depth: 18.0 Ft.
Project No.: 90C2139
Project Name: Niagara Transformer
Drilling Method: 8.25" H.S.A.

Water Depth: .5 ft., After 185 hrs.
____ ft., After ____ hrs.
____ ft., After ____ hrs.
____ ft., After ____ hrs.

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LOG of Boring No. NTC-15S

DATE 3/1/93 SURFACE ELEVATION ______ LOCATION ______

DEPTH, ft.	SAMPLING RESISTANCE	SAMPLE TYPE	DESCRIPTION	STRATUM ELEVATION	RECOVERY (FEET)	OVA HEAD SPACE (ppm)
0			Augered through top one foot of shot rock and brown sand.			
	100/6"	SS	Shotrock fill and fine brown sand. Frozen.		.4'	
	29	SS	Black/dark brown fine sand, some shotrock fill and silt.		1.7'	
			Tan/brown clay, little small, rounded rock clasts, trace sand and silt.			
5	32	SS	Brown clay, trace silt, no rock clasts. Clay stiff, somewhat moist.		2.0'	
	60	SS	Dark to light brown clay, trace to little silt, trace small, rounded rock clasts. Clay is stiff, somewhat moist to moist lower in spoon. Auger cuttings have slight odor.		1.9'	
10	48	SS	Brown clay, trace to little silt, trace small, rounded rock clasts. Clay is stiff and moist. NAPL/mineral oil throughout spoon, primarily in small voids surrounding rock clasts. Strong odor throughout spoon.		1.7'	
	82	SS	Same as above with increase in silt and moisture.		1.4'	
	61	SS			1.4'	
15	56	SS	Light brown to grey fine sand. Uniform, wet. No visible NAPL/mineral oil or apparent odor throughout spoon.		1.5'	
	45	SS	Light brown clay, some fine sand, little silt and small, rounded rock clasts.		1.1'	
	24	SS	Light brown to grey, fine sand, little to some clay.		1.2'	
20			Grey, fine to medium coarse sand, trace silt. Uniform, wet.			
			Grey to brown clay and fine to medium coarse sand, trace silt. Moist.			

Completion Depth: 21.0 Ft.
Project No.: 90C2139
Project Name: Niagara Transformer
Drilling Method: 6 1/4" ID H.S.A.

Water Depth: ____ ft., After ____ hrs.
____ ft., After ____ hrs.
____ ft., After ____ hrs.
____ ft., After ____ hrs.

LOG of Boring No. NTC-16S

DATE 3/2/93 SURFACE ELEVATION ______ LOCATION ______

DEPTH, ft.	SAMPLING RESISTANCE	SAMPLE TYPE	DESCRIPTION	STRATUM ELEVATION	RECOVERY (FEET)	OVA HEAD SPACE (ppm)
0			Augered through top one foot of shot rock and fine brown sand.			
	N.A.	SS	Shot rock fill and brown sand, some silt and clay. Clay stiff, dry.		.9'	
	16	SS	Dark brown clay, some silt, trace small, rounded rock clasts. Clay stiff, dry to slightly moist in last .2' of spoon. Very slight odor throughout spoon.		.6'	
5	27	SS	Grey clay, some sand. Moist, soft. Odor stronger. Reddish brown clay, trace silt and small, rounded rock clasts. Clay is stiff and dryer. No apparent odor.		1.7'	
	57	SS	Reddish brown clay, occasionally mottled green and dark red in last 1/2 foot of spoon, some to little medium coarse sand (in seams), trace small, rounded rock clasts.		1.4'	
10	45	SS	Same as above but wet with less sand.		1.8'	
	76	.SS.	No recovery in spoon due to basket failure.		0.0	
	33	SS	Grey brown clay, trace silt and small, rounded rock clasts. Clay is firm and moist.		1.8'	
15	35	.SS.	No recovery in spoon due to basket failure.		0.0	
	85	SS	Brown to grey-brown clay, trace silt and small, rounded rock clasts. Clay is firm and moist.		1.9'	
20						

Completion Depth: 19.0 Ft.
Project No.: 90C2139
Project Name: Niagara Transformer
Drilling Method: 6 1/4" ID H.S.A.

Water Depth: ____ft.,After ____hrs.
____ft.,After ____hrs.
____ft.,After ____hrs.
____ft.,After ____hrs.

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LOG of BORING No. DSB-1

DATE 4/19/91 SURFACE ELEVATION ________ LOCATION ________

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	SAMPLE TYPE	DESCRIPTION	STRATUM ELEVATION	POCKET PENETROMETER	WATER CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	OTHER TESTS
0		36	SS	Bituminous asphalt with coarse subgrade						360
				Shot rock fill with brown-tan silty clay matrix, organic odors						
		25	SS							150
				Brown-tan silty clay, moist, firm, some small rock clasts						
5		38	SS	- higher sand content						28
				Tan fine sand, little silt, wet						
		47	SS	Brown-tan clay, some silt with occasional rock clasts, dry, hard, some layers with higher sand content, moist						66
		77	SS							0.24
10				Brown-tan clay, some silt to silty clay, trace to little sand with occasional small rock clasts, dry to wet, hard to soft, occasional to few sand dominated layers						
		27	SS							
		26	SS							
15		19	SS							< 0.2
		15	SS							
20		17	SS							
		17	SS							ND
25		30	SS	- several saturated thin sand lenses, clay has higher sand content adjacent to lenses						
		29	SS							ND
		32	SS							
30		35	SS	- moist, firm						
		23	SS							
		24	SS							ND
35		13	SS	- clay becoming very soft, "gumbo clay"						

CONTINUED ON SHEET 2 OF 2

Completion Depth: 46.7 Ft. Water Depth: ____ ft., After ____ hrs.

Project No.: 90C2139 ____ ft., After ____ hrs.

Project Name: Niagara Transformer RI ____ ft., After ____ hrs.

Drilling Method: Hollow-Stem Auger ____ ft., After ____ hrs.

LOG of BORING No. DSB-1

DATE 4/19/91 SURFACE ELEVATION ______ LOCATION ______

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	SAMPLE TYPE	DESCRIPTION	STRATUM ELEVATION	POCKET PENETROMETER	WATER CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	OTHER TESTS
		36	SS	Alternating / interbedded gray-brown silty sand, gray-brown silt and clay, little to some sand, AND mottled brown-red "gumbo clay", all with abundant to occasional rock clasts, gray portions have higher sand content and are saturated						
40		14	SS							ND
		67	SS							
		129	SS	Gray silt and sand matrix with abundant rock clasts, very hard, compact, "regolith"						ND
45										
50										
55										
60										
65										
70										

NOTES:
(1) Surface casing set at 10 feet
(2) Bedrock (auger refusal) at 46.7 feet
(3) Hole tremie grouted to surface
(4) Values under "OTHER TESTS" are Aroclor-1260 concentration in ppm

Completion Depth: 46.7 Ft.
Project No.: 90C2139
Project Name: Niagara Transformer RI
Drilling Method: Hollow-Stem Auger

Water Depth: ____ ft., After ____ hrs.
____ ft., After ____ hrs.
____ ft., After ____ hrs.
____ ft., After ____ hrs.

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LOG of BORING No. DSB-2

DATE 4/24/91 SURFACE ELEVATION ______ LOCATION ______

DEPTH, ft.	SAMPLING RESISTANCE	SAMPLE TYPE	DESCRIPTION	STRATUM ELEVATION	POCKET PENETROMETER	WATER CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	OTHER TESTS
0			SEE BORING LOGS FOR NTC-4S						
			- surface casing set to 10 feet						
5									
10									
	40	SS	Brown-tan clay and silt, little sand, hard, dry, friable						
	37	SS	Brown-tan fine to medium sand, little to no silt, very wet to saturated occasional thin layers that have a higher silt/clay content, dryer						
15									
	31	SS							ND
	25	SS							
20	24	SS							
	46	SS	Alternating / interbedded brown-tan silty clay, little to trace sand AND tan fine to medium sand, saturated, contacts typically gradational						ND
	57	SS							
25									
	53	SS	- brown-tan silty clay with rock clasts, dry, hard						
	69	SS	- tan fine to medium sand very wet to saturated, soft						ND
30	94	SS							
	56	SS							ND
	47	SS	Brown-tan silty clay, trace sand, dry, hard						
35									
	31	SS	CONTINUED ON SHEET 2 OF 2						

Completion Depth: 46.0 Ft.
Project No.: 90C2139
Project Name: Niagara Transformer RI
Drilling Method: Hollow-Stem Auger

Water Depth: ____ ft., After ____ hrs.
____ ft., After ____ hrs.
____ ft., After ____ hrs.
____ ft., After ____ hrs.

LOG of BORING No. DSB-2

DATE 4/24/91 SURFACE ELEVATION ______ LOCATION ______

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	SAMPLE TYPE	DESCRIPTION	STRATUM ELEVATION	POCKET PENETROMETER	WATER CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	OTHER TESTS
		14	SS	Brown-red-orange clay, very soft "gumbo clay", varves observed						ND
40		12	SS							
		108	SS							
45		86	SS	Gray silt and sand regolith with abundant rock fragments, wet, very hard, compact						ND
50										
55										
60										
65										
70										

NOTES:
(1) Bedrock (auger refusal) at 46'
(2) Hole tremie grouted to surface
(3) Values under "OTHER TESTS" are Aroclor-1260 concentration in ppm

Completion Depth: 46.0 Ft.
Project No.: 90C2139
Project Name: Niagara Transformer RI
Drilling Method: Hollow-Stem Auger

Water Depth: ______ ft., After ______ hrs.
______ ft., After ______ hrs.
______ ft., After ______ hrs.
______ ft., After ______ hrs.

LOG of BORING No. TB-1A

DATE 9/15/92 SURFACE ELEVATION ______ LOCATION ______

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	SAMPLE TYPE	DESCRIPTION	STRATUM ELEVATION	HNu HEAD SPACE (ppm)	OVA HEAD SPACE (ppm)
0		11	SS	Dark brown silt, moist, with some sand and organic debris.			0
		27	SS	Tan-brown silty clay, wet, with some sand.			2.0-4.0
5		69	SS	Tan-brown, fine to medium sand, wet, with some silt, occassionally mottled green.			0
				Note : Values under "OVA Head Spave Reading" are OVA readings off of freshly broken surfaces in split spoon samples and represent peak readings, not sustained readings.			
10							
15							
20							
25							
30							
35							
40							

Completion Depth: 6.0 Ft. Water Depth: ____ft., After ____hrs.

Project No.: 90C2139 ____ft., After ____hrs.

Project Name: Niagara Transformer ____ft., After ____hrs.

Drilling Method: 2.25" H.S.A. ____ft., After ____hrs.

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LOG of BORING No. TB-1B

DATE 9/15/92 SURFACE ELEVATION LOCATION

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	SAMPLE TYPE	DESCRIPTION	STRATUM ELEVATION	HNu HEAD SPACE (ppm)	OVA HEAD SPACE (ppm)
0			SS	Railroad bed shot rock-no sample taken			
		41	SS	Light brown-tan, fine to medium sand, wet, with some silt.			0.5-1.0
5		49	SS				1.0-3.0
		88	SS				0.5-2.0
		104	SS				0
10				Dark red-brown silty clay, stiff, with little sand.			
				Note : Values under "OVA Head Space Reading" are OVA readings off of freshly broken surfaces in split spoon samples and represent peak readings, not sustained readings.			
15							
20							
25							
30							
35							
40							

Completion Depth: 10.0 Ft.
Project No.: 90C2139
Project Name: Niagara Transformer
Drilling Method: 2.25" H.S.A.

Water Depth: ___ ft., After ___ hrs.
___ ft., After ___ hrs.
___ ft., After ___ hrs.
___ ft., After ___ hrs.

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LOG of TEST PIT No. TP-1

DATE 9/15/92 SURFACE ELEVATION ______ LOCATION ______

DEPTH, ft.	SAMPLE No.	DESCRIPTION	STRATUM ELEVATION	HNu HEAD SPACE (ppm)	OVA HEAD SPACE (ppm)
0		Topsoil, organic debris, roots, etc.			
		Red-brown silty clay NAPL seep from drain tile at 3.0'			
5					
10					

Completion Depth: 4.0 Ft.
Project No.: 90C2139
Project Name: Niagara Transformer
Drilling Method: By Backhoe

Water Depth: ____ ft., After ____ hrs.
____ ft., After ____ hrs.
____ ft., After ____ hrs.
____ ft., After ____ hrs.

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LOG of TEST PIT No. TP-2

DATE 9/15/92 SURFACE ELEVATION ______ LOCATION ______

DEPTH, ft.	SAMPLE No.	DESCRIPTION	STRATUM ELEVATION	HNu HEAD SPACE (ppm)	OVA HEAD SPACE (ppm)
0		Topsoil, organic debris, roots, etc.			
		Red-brown silty clay NAPL seep from drain tile at 2.0'			
5					
10					

Completion Depth: 3.0 Ft.
Project No.: 90C2139
Project Name: Niagara Transformer
Drilling Method: By backhoe

Water Depth: ___ft., After ___hrs.
___ft., After ___hrs.
___ft., After ___hrs.
___ft., After ___hrs.

Woodward-Clyde Consultants

LOG of TEST PIT No. TP-3

DATE 9/16/92 SURFACE ELEVATION ______ LOCATION ______

DEPTH, ft.	SAMPLE No.	DESCRIPTION	STRATUM ELEVATION	HNu HEAD SPACE (ppm)	OVA HEAD SPACE (ppm)
0		Topsoil, organic debris			
		Red-brown silty clay, dry.			
		moist			
5					
10					

Completion Depth: 4.0 Ft.
Project No.: 90C2139
Project Name: Niagara Transformer
Drilling Method: By backhoe

Water Depth: ____ ft., After ____ hrs.
____ ft., After ____ hrs.
____ ft., After ____ hrs.
____ ft., After ____ hrs.

Appendix D

APPENDIX D

HYDRAULIC HEAD MEASUREMENTS
NIAGARA TRANSFORMER CORPORATION
REMEDIAL INVESTIGATION

APPENDIX D
SUMMARY OF MONTHLY HYDRAULIC HEAD MONITORING PROGRAM
NIAGARA TRANSFORMER CORPORATION
REMEDIAL INVESTIGATION

		Date of Measurement: 6/10/91		Date of Measurement: 7/15/91		Date of Measurement: 8/22/91	
Well I.D.	Elevation for Top of Casing (ft.)*	Static Water Level (ft.)	Groundwater Elevation (ft)	Static Water Level (ft.)	Groundwater Elevation (ft)	Static Water Level (ft.)	Groundwater Elevation (ft)
NTC-2S	648.12	1.74	646.38	3.19	644.93	4.20	643.92
NTC-3S	647.97	2.88	645.09	5.18	642.79	7.28	640.69
NTC-4S	649.49	6.10	643.39	6.26	643.23	8.41	641.08
NTC-5S	649.50	7.00	642.50	8.17	641.33	11.90	637.60
NTC-6S	647.26	5.54	641.72	6.88	640.38	9.60	637.66
NTC-7S	644.31	4.99	639.32	5.44	638.87	6.49	637.82
NTC-8S	646.14	5.66	640.48	6.15	639.99	7.84	638.30
NTC-9S	642.19	2.52	639.67	3.51	638.68	4.51	637.68
NTC-10	647.52	- -	- -	- -	- -	- -	- -
NTC-11	640.45	- -	- -	- -	- -	- -	- -
NTC-12	640.30	- -	- -	- -	- -	- -	- -
NTC-13	641.10	- -	- -	- -	- -	- -	- -
NTC-14	640.90	- -	- -	- -	- -	- -	- -
NTC-1D	660.88	12.66	648.22	13.80	647.08	14.74	646.14
NTC-8D	646.49	- -	- -	- -	- -	- -	- -
NTC-9D	641.94	6.62	635.32	3.84	638.10	4.08	637.86

*Note: Wells were surveyed using a manhole rim located near Dale Road as the starting benchmark. Elevation listed for rim on plant drawing is not USGS datum. Correction factor of 573.25' was applied to bring all surveyed elevations into USGS range. Correction factor is based upon one spot elevation on Town of Cheektowaga topographic map near manhole rim.

APPENDIX D
SUMMARY OF MONTHLY HYDRAULIC HEAD MONITORING PROGRAM
NIAGARA TRANSFORMER CORPORATION
REMEDIAL INVESTIGATION

		Date of Measurement: 9/10/91		Date of Measurement: 12/21/91		Date of Measurement: 1/29/92	
Well I.D.	Elevation for Top of Casing (ft.)*	Static Water Level (ft.)	Groundwater Elevation (ft)	Static Water Level (ft.)	Groundwater Elevation (ft)	Static Water Level (ft.)	Groundwater Elevation (ft)
NTC-2S	648.12	4.55	643.57	1.23	646.89	1.23	646.89
NTC-3S	647.97	8.10	639.87	2.74	645.23	1.82	646.15
NTC-4S	649.49	Dry	- -	3.35	646.14	3.79	645.70
NTC-5S	649.50	Dry	- -	4.93	644.57	5.18	644.32
NTC-6S	647.26	Dry	- -	3.56	643.70	3.46	643.80
NTC-7S	644.31	8.43	635.88	3.51	640.80	3.47	640.84
NTC-8S	646.14	Dry	- -	4.50	641.64	4.45	641.69
NTC-9S	642.19	5.75	636.44	0.73	641.46	0.81	641.38
NTC-10	647.52	- -	- -	- -	- -	- -	- -
NTC-11	640.45	- -	- -	- -	- -	- -	- -
NTC-12	640.30	- -	- -	- -	- -	- -	- -
NTC-13	641.10	- -	- -	- -	- -	- -	- -
NTC-14	640.90	- -	- -	- -	- -	- -	- -
NTC-1D	660.88	15.30	645.58	10.67	650.21	10.51	650.37
NTC-8D	646.49	- -	- -	- -	- -	- -	- -
NTC-9D	641.94	5.05	636.89	3.57	638.37	3.16	638.78

*Note: Wells were surveyed using a manhole rim located near Dale Road as the starting benchmark. Elevation listed for rim on plant drawing is not USGS datum. Correction factor of 573.25' was applied to bring all surveyed elevations into USGS range. Correction factor is based upon one spot elevation on Town of Cheektowaga topographic map near manhole rim.

APPENDIX D
SUMMARY OF MONTHLY HYDRAULIC HEAD MONITORING PROGRAM
NIAGARA TRANSFORMER CORPORATION
REMEDIAL INVESTIGATION

		Date of Measurement: 2/26/92		Date of Measurement: 3/31/92		Date of Measurement: 4/29/92	
Well I.D.	Elevation for Top of Casing (ft.)*	Static Water Level (ft.)	Groundwater Elevation (ft)	Static Water Level (ft.)	Groundwater Elevation (ft)	Static Water Level (ft.)	Groundwater Elevation (ft)
NTC-2S	648.12	0.08	648.04	0.03	648.09	0.19	647.93
NTC-3S	647.97	0.76	647.21	1.01	646.96	1.12	646.85
NTC-4S	649.49	2.70	646.79	2.69	646.80	3.21	646.28
NTC-5S	649.50	4.39	645.11	4.24	645.26	4.88	644.62
NTC-6S	647.26	2.93	644.33	2.80	644.46	3.18	644.08
NTC-7S	644.31	2.72	641.59	2.83	641.48	3.35	640.96
NTC-8S	646.14	3.98	642.16	3.86	642.28	4.06	642.08
NTC-9S	642.19	0.42	641.77	0.43	641.76	0.73	641.46
NTC-10	647.52	- -	- -	- -	- -	- -	- -
NTC-11	640.45	- -	- -	- -	- -	- -	- -
NTC-12	640.30	- -	- -	- -	- -	- -	- -
NTC-13	641.10	- -	- -	- -	- -	- -	- -
NTC-14	640.90	- -	- -	- -	- -	- -	- -
NTC-1D	660.88	9.67	651.21	9.65	651.23	9.78	651.10
NTC-8D	646.49	- -	- -	- -	- -	- -	- -
NTC-9D	641.94	3.27	638.67	2.80	639.14	2.73	639.21

*Note: Wells were surveyed using a manhole rim located near Dale Road as the starting benchmark. Elevation listed for rim on plant drawing is not USGS datum. Correction factor of 573.25' was applied to bring all surveyed elevations into USGS range. Correction factor is based upon one spot elevation on Town of Cheektowaga topographic map near manhole rim.

APPENDIX D
SUMMARY OF MONTHLY HYDRAULIC HEAD MONITORING PROGRAM
NIAGARA TRANSFORMER CORPORATION
REMEDIAL INVESTIGATION

		Date of Measurement: 5/28/92		Date of Measurement: 6/29/92		Date of Measurement: 7/31/92	
Well I.D.	Elevation for Top of Casing (ft.)*	Static Water Level (ft.)	Groundwater Elevation (ft.)	Static Water Level (ft.)	Groundwater Elevation (ft)	Static Water Level (ft.)	Groundwater Elevation (ft)
NTC-2S	648.12	1.46	646.66	1.95	646.17	0.04	648.08
NTC-3S	647.97	2.11	645.86	2.66	645.31	1.83	646.14
NTC-4S	649.49	4.35	645.14	5.13	644.36	3.63	645.86
NTC-5S	649.50	6.34	643.16	6.66	642.84	4.01	645.49
NTC-6S	647.26	5.14	642.12	5.99	641.27	3.60	643.66
NTC-7S	644.31	4.37	639.94	5.04	639.27	2.68	641.63
NTC-8S	646.14	4.88	641.26	5.45	640.69	2.78	643.36
NTC-9S	642.19	1.82	640.37	2.66	639.53	0.09	642.10
NTC-10	647.52	- -	- -	3.43	644.86	1.50	646.02
NTC-11	640.45	- -	- -	1.05	637.02	0.16	640.29
NTC-12	640.30	- -	- -	- -	- -	- -	- -
NTC-13	641.10	- -	- -	- -	- -	- -	- -
NTC-14	640.90	- -	- -	- -	- -	- -	- -
NTC-1D	660.88	10.32	650.56	11.31	649.57	10.75	650.13
NTC-8D	646.49	- -	- -	- -	- -	7.09	639.40
NTC-9D	641.94	2.73	639.21	2.81	639.13	2.65	639.29

*Note: Wells were surveyed using a manhole rim located near Dale Road as the starting benchmark. Elevation listed for rim on plant drawing is not USGS datum. Correction factor of 573.25' was applied to bring all surveyed elevations into USGS range. Correction factor is based upon one spot elevation on Town of Cheektowaga topographic map near manhole rim.

APPENDIX D
SUMMARY OF MONTHLY HYDRAULIC HEAD MONITORING PROGRAM
NIAGARA TRANSFORMER CORPORATION
REMEDIAL INVESTIGATION

Well I.D.	Elevation for Top of Casing (ft.)*	Date of Measurement: 8/25/92		Date of Measurement: 9/24/92		Date of Measurement: 10/28/92	
		Static Water Level (ft.)	Groundwater Elevation (ft)	Static Water Level (ft.)	Groundwater Elevation (ft)	Static Water Level (ft.)	Groundwater Elevation (ft.)
NTC-2S	648.12	0.68	647.44	0.82	647.30	1.23	646.07
NTC-3S	647.97	2.33	645.64	2.58	645.39	2.35	643.04
NTC-4S	649.49	4.63	644.86	3.32	646.17	3.58	642.59
NTC-5S	649.50	5.95	643.55	4.80	644.70	5.57	639.13
NTC-6S	647.26	5.22	642.04	3.05	644.21	3.32	640.89
NTC-7S	644.31	3.84	640.47	2.92	641.39	2.94	638.45
NTC-8S	646.14	5.01	641.13	4.01	642.13	4.53	637.60
NTC-9S	642.19	0.75	641.44	0.28	641.91	0.48	641.43
NTC-10	647.52	2.83	644.69	1.48	646.04	2.53	643.51
NTC-11	640.45	0.62	639.83	0.15	640.30	0.28	640.02
NTC-12	640.30	- -	- -	0.04	640.26	0.57	639.69
NTC-13	641.10	- -	- -	1.02	640.08	1.66	638.42
NTC-14	640.90	- -	- -	0.52	640.38	1.26	639.12
NTC-1D	660.88	10.93	649.95	10.09	650.79	10.27	640.52
NTC-8D	646.49	7.06	639.43	6.72	639.77	6.80	632.97
NTC-9D	641.94	2.58	639.36	2.40	639.54	2.31	637.23

*Note: Wells were surveyed using a manhole rim located near Dale Road as the starting benchmark. Elevation listed for rim on plant drawing is not USGS datum. Correction factor of 573.25' was applied to bring all surveyed elevations into USGS range. Correction factor is based upon one spot elevation on Town of Cheektowaga topographic map near manhole rim.

APPENDIX D
SUMMARY OF MONTHLY HYDRAULIC HEAD MONITORING PROGRAM
NIAGARA TRANSFORMER CORPORATION
REMEDIAL INVESTIGATION

Well I.D.	Elevation for Top of Casing (ft.)*	Date of Measurement: 11/30/92 Static Water Level (ft.)	Groundwater Elevation (ft.)
NTC-2S	648.12	0.32	647.80
NTC-3S	647.97	1.31	646.66
NTC-4S	649.49	3.01	646.48
NTC-5S	649.50	5.25	644.25
NTC-6S	647.26	3.15	644.11
NTC-7S	644.31	2.62	641.69
NTC-8S	646.14	4.22	641.92
NTC-9S	642.19	0.35	641.84
NTC-10	647.52	1.63	645.89
NTC-11	640.45	0.12	640.33
NTC-12	640.30	0.30	640.00
NTC-13	641.10	1.50	639.60
NTC-14	640.90	1.05	639.85
NTC-1D	660.88	9.90	650.98
NTC-8D	646.49	6.21	640.28
NTC-9D	641.94	2.15	639.79

*Note: Wells were surveyed using a manhole rim located near Dale Road as the starting benchmark. Elevation listed for rim on plant drawing is not USGS datum. Correction factor of 573.25' was applied to bring all surveyed elevations into USGS range. Correction factor is based upon one spot elevation on Town of Cheektowaga topographic map near manhole rim.

APPENDIX D
BEDROCK SURFACE ELEVATIONS
NIAGARA TRANSFORMER CORPORATION
REMEDIAL INVESTIGATION

Well/Boring	Depth to Bedrock from Ground Surface (ft.)	Ground Surface Elevation (ft.)*	Bedrock Surface Elevation (ft)
NTC-1D	54	658.19	604.19
NTC-8D	43.6	643.91	600.31
NTC-9D	44	642.10	598.10
DSB-1	46.7	648.43	601.73
DSB-2	46	647.40	601.40

*Note: Wells were surveyed using a manhole rim located near Dale Road as the starting benchmark. Elevation listed for rim on plant drawing is not USGS datum. Correction factor of 573.25' was applied to bring all surveyed elevations into USGS range. Correction factor is based upon one spot elevation on Town of Cheektowaga topographic map near manhole rim.

Appendix E

APPENDIX E

DATA VALIDATION REPORTS
SUPPLEMENTAL RI ANALYSES

MEMORANDUM

To:	File: 90C2139-1	From:	Anthony J. Misercola
		Office:	Western New York
		Date:	October 15, 1992

Subject: Analytical Data Validation
Supplemental Soil/Sediment Analyses
Remedial Investigation (RI)
Niagara Transformer Corporation (NTC) Site
Cheektowaga, New York

1. OVERVIEW

The following memo presents an assessment and validation of analytical results reported by General Testing Corporation (GTC) for soil/sediment sample analyses in support of the above-captioned program. Samples submitted for analyses consisted of the following:

Matrix	Investigative Samples	Field Duplicate Samples	Rinsate Blanks	MS/MSDs(1)
Soil/sediment	102	9	1	8

(1) Matrix spike/matrix spike duplicate samples

All soil/sediment samples were analyzed for polychlorinated biphenyls (PCBs) using either "New York State Department of Environmental Conservation (NYSDEC) Analytical Service Protocols (ASP)" 1989/1991 or Method 8080 from "Test Methods for Evaluating Solid Wastes", USEPA SW-846", dated September 1986.

The QA/QC criteria by which these data have been assessed are outlined in the aforementioned methods and the following documents:

1. Remedial Investigation Work Plan
   Niagara Transformer Corporation
   Cheektowaga, New York. February 14, 1991.
   Prepared by Woodward-Clyde Consultants (WCC)

2. CLP Organics Data Review and Preliminary Review.
   SOP Number HW-6, Revision #8.
   January 1992. Prepared by USEPA Region II.

Results of the analytical data validation are presented in the following sections.

2. SAMPLE HOLDING TIMES

Sample holding times as required by the NYSDEC for PCB analyses are as follows:

Analyses

PCBs (soil)	5 days from VTSR[(1)] to extraction 40 days from extraction to analysis
PCBs (water)	5 days from VTSR[(1)] to extraction 40 days from extraction to analysis

(1) Verified time of sample receipt

Examination of VTSR dates, extraction and analyses dates, showed that the following samples were extracted outside their holding time criterion:

GTC Project Number	Sample	Number of Days From VTSR to Extraction
R92-2857	NTC-S-4	42
	NTC-S-5	42
	NTC-S-6	42
R92-2340	NTC-8D 20'-22'	33
	NTC-8D 40'-42'	33
	NTC-8D 42'-44'	33
R92-2649	061992-PS-1-A	108
	061992-PS-1-B	108
	061992-PS-1-C	108
	061992-PS-2-A	108
	061992-PS-2-B	108
	061992-PS-2-C	108
	061992-PS-3-A	108
	061992-PS-3-B	108
	061992-PS-4-G	108
	061992-1	108
	061992-2	108
	061992-3	108
	061992-4	108
	061992-5	108
	061992-6	108
	QA-1 (dup. of 061992-PS-2-B)	108
R92-04062	NTC-13S 2'-4'	7
	NTC-13S 4'-6'	7
	NTC-13S 6'-8'	7
	NTC-13S 8'-10'	7
	NTC-13S 10'-12'	7
	NTC-13S 12'-14'	7
	NTC-13S 14'-16'	7

GTC Project Number	Sample	Number of Days From VTSR to Extraction
R92-04062 (Cont.)	NTC-13S 16'-18'	7
	NTC-14S 10'-12'	7
	NTC-14S 12'-14'	7
	NTC-QC (dup. of NTC-14S 10'-12')	7
	NTC-14S 16'-18'	7

Holding times were exceeded for samples in GTC Project Number R92-2857 because the samples were originally put on hold and were requested not to be extracted/analyzed unless other samples collected from the same property had detections of PCBs. There were no apparent reason for the excessive holding time exceedances for samples analyzed under GTC Project Number R92-2340. GTC used SW-846 holding times (14 days from collection to extraction) for samples reported under GTC Project Number R92-04062. Following review of sample results from GTC Project Number R92-2649 WCC requested samples be re-extracted and re-analyzed due to an elevated PCB result for a laboratory method blank analysis.

The holding time exceedences for R92-2857 and R92-2649 were discussed with the NYSDEC prior to the analyses, and holding time exemptions were granted. Due to the stability and low volatility of PCBs, exceeding holding time criterion has no significant effect on the data quality. Therefore, the PCB data were not qualified.

3. INSTRUMENT CALIBRATION

Calibration for PCB analyses for samples analyzed by the NYSDEC ASP is based on the analysis of several different pesticide calibration standards and only one PCB standard. In accordance with the ASP, if resolution, linearity and calibration criteria are adhered to for pesticides, the one PCB standard may be used for quantification purposes. Failure to meet certain ASP criteria for pesticides requires repeating the calibration sequence since per the method, samples should not be analyzed until calibration criteria are met. However, since only PCB analyses were performed, outlying calibration standard results were evaluated and an assessment of their effects on the PCB data was conducted. Pesticide resolution acceptance criteria was not met for two GTC Project Numbers as shown below:

GTC Project Number	Standard	GC(1)	% Resolution	Acceptance Criteria
Resolution Check Mixture				
R92-2164	Endosulfan I 4,4-DDE	DB-608	40	≥ 60 percent
	4,4-DDE Dieldrin	DB-608	40	≥ 60 percent
	Endosulfan sulfate Methoxychlor	DB-1701	45	60 percent
	Methoxychlor Endrin ketone	DB-1701	45	≥ 60 percent
Initial Calibration Individual B Mixture				
R92-2459	gamma-chlordane alpha-chlordane	DB-1701	~80	≥ 90 percent

(1) Gas chromatograph identification

Failure of pesticide resolution criteria has minimal effect on the identification of PCBs. Therefore, associated samples were not qualified on this basis.

Some pesticide calibration standards showed retention times outside established windows as presented below:

GTC Project Number	Standard	Analyte	Rt	Rt Window
R92-2857	Resolution check mixture	TCX	11.41	11.26±0.05
	Ind B Med.	TCX	11.34	11.26±0.05
		beta-BHC	19.65	19.58±0.05
		delta-BHC	22.32	22.26±0.05
		aldrin	23.67	23.61±0.05

Per the ASP, the above calibrations should have been redone; however, they were not. Since PCB identification is primarily a function of pattern recognition and not individual peak retention time matches, associated sample data are not qualified on the basis of outlying surrogate or pesticide compound retention times.

Percent relative standard deviations (RSDs) and percent differences (%Ds) between pesticide calibration factors were greater than 20 percent and 25 percent (maximum allowed per method) for both initial and continuing pesticide calibrations, respectively, for the following GTC Project Numbers:

	Column	Pesticide	Percent RSD	%D
1.	R92-2340			
	DB-608	alpha-BHC	33.7	---
		delta-BHC	33.2	---
		gamma-BHC	28.9	---
		4,4'-DDT	25.1	---
		endrin ketone	27.0	---
	DB-1701	alpha-BHC	38	---
		delta-BHC	36.7	---
		gamma-BHC	34.4	---
		aldrin	22.1	---
		4,4'-DDE	22.7	---
		4,4'-DDD	25.7	---
		4,4'-DDT	29.3	---
2.	R92-2164			
	DB-608	4,4'-DDD	---	31.2
		4,4'-DDE	---	31.2
	DB-1701	alpha-BHC	---	37.5
		gamma-BHC	---	37.5
		4,4'-DDD	---	31.2
		4,4'-DDT	---	56.2

	Column	Pesticide	Percent RSD	%D
3.	R92-2459			
	DB-1701	alpha-BHC	38.0	---
		delta-BHC	36.7	---
		gamma-BHC	34.4	---
		aldrin	22.1	---
		4,4'-DDD	22.7	---
		4,4'-DDE	25.7	---
		4,4'-DDT	29.3	---
		endrin ketone	22.0	---
	DB-608	alpha-BHC	33.7	---
		delta-BHC	32.2	---
		gamma-BHC	28.9	---
		4,4'-DDT	25.1	---
		endrin ketone	22.0	---
4.	R92-2857			
	DB-608	alpha-BHC	34.4	---
		delta-BHC	33.2	---
		gamma-BHC	29.8	---
		4,4'-DDT	34.9	---
		methoxychlor	27.0	---
		endrin ketone	22.4	---
	DB-1701	alpha-BHC	37.4	---
		delta-BHC	37.6	---
		gamma-BHC	33.7	---
		heptachlor epoxide	21.8	---
		4,4'-DDE	21.4	---
		4,4'-DDD	26.3	---
		4,4'-DDT	32.9	---

--- Percent RSD or %D is acceptable

ASP allows two pesticide compounds to exceed the 20 percent RSD criteria and none to exceed the 25 %D criteria. As shown, GTC failed to meet these criteria for many packages analyzed by ASP, but re-calibration was not performed. Therefore, acceptable linearity for the above-calibrations was not met. The quantitation of PCBs by ASP is based on a single point standard assuming a linear detector response. Since, for the above GTC Project Numbers, linearity was not achieved for pesticides, it is assumed the same would be true for PCBs. Therefore, detected PCB results for the affected GTC Project Numbers are required to be qualified as estimated (data qualifier J).

Following are the affected GTC Project Numbers and associated samples for which PCBs were detected and require qualification as estimated.

GTC Project Number	Affected Samples	
R92-2340	NTC-10S 0'-2'	NTC-8D 14'-16'
	NTC-10S 2'-4'	NTC-8D 20-'22'
	NTC-10S 8'-10'	NTC-8D 26'-28'
	NTC-11S 0'-2'	NTC-8D 32'-34'
	NTC-11S 0'-2'DL	NTC-8D 40'-42'
	NTC-11S 10'-12'	NTC-8D 42'-44'
	NTC-11S 2'-4'	QA-1 (dup. of NTC 10S 8'-10')
	NTC-11S 4'-6'	
	NTC-11S 4'-6'DL	
	NTC-11S 6'-8'	
	NTC-11S 8'-10'	
R92-2164	NTC-S-1DL	
	NTC-S-3	
	NTC-S-9	
	NTC-S-9DL	
	NTC-S-12 0"-6"	
	NTC-S-13	
	NTC-S-13DL	
	NTC-S-14	
	NTC-S-15 (dup. of NTC-S-2)	
	NTC-S-16 (dup. of NTC-S-11 0"-6")	

GTC Project Number	Affected Samples
R92-2459	NTC-11S 12'-13.5' QA-2 (dup of NTC-11S 8'-10')
R92-2857	NTC-S-4 NTC-S-5 NTC-S-6 NTC-S-6DL

For samples analyzed via SW-846 protocols, calibrations were performed using 5-point PCB curves and checked every tenth sample with mid level PCB standards. All PCB curves used for quantitation met SW-846 criteria (RSDs in calibration factors less than 20 percent) as did all continuing calibration PCB check standards (%Ds less than 15 percent).

4. SURROGATE SPIKE RECOVERIES

Samples analyzed for PCBs are spiked with surrogate compounds prior to extraction. Surrogate compounds are used to check laboratory performance on an individual sample basis.

Samples analyzed by SW-846 protocols were spiked with surrogate compounds dibutylchlorendate (DBC) and/or tetrachloro-meta-xylene (TCMX). Samples analyzed by ASP were spiked with surrogate compounds TCMX and decachlorobiphenyl (DCB).

Due to the necessity for sample dilution, many surrogate recoveries could not be recovered or were outside control limits. No qualification is required per EPA Region II guidelines when outlying or no surrogate recoveries are caused by dilutions. Only one sample had an outlying surrogate spike recovery which was not directly caused by subsequent dilutions.

Sample	TCX(1) (%)	Surrogate Compound TCX(2) (%)	DCB1 (%)	DCB2 (%)	Control Limits
NTC-10S 10'-12'	51	--	--	--	60-150

(1) Recovery for DB-608 column
(2) Recovery for DB-1701 column
--- Recovery is acceptable

Since the PCB result for the above sample is below the Contract Required Quantitation Limit (CRQL), the result was qualified as estimated (data qualifier J) by GTC. Therefore, further qualification based on surrogate recoveries is not required.

5. FLORISIL CARTRIDGE AND GPC CLEANUP VERIFICATION

Florisil cartridge and GPC column cleanups are utilized on PCB sample extracts to minimize matrix interferences resulting from other materials that may be present in the samples. Results for these analyses were reported for all samples analyzed by the NYSDEC ASP 1991 protocols. Solutions of known pesticide concentrations are run through florisil cartridge and GPC column cleanups and analyzed to monitor for potential loss of analytes during the respective cleanup procedures. All florisil cartridge cleanup and most GPC column cleanup analyses had percent recoveries within control limits.

One GPC column cleanup (GTC Project Number R92-2164) reported a recovery of 117 percent for 4,4-DDT with control limits, of 80-110 percent. Since the recovery was only moderately above control limits, and most samples in this package were previously estimated because of calibration problems, no further qualification was required.

6. METHOD BLANK SAMPLES

Method blank samples are used to assess potential contamination problems from laboratory conditions and/or procedures.

Three of the eight GTC data packages showed contaminated method blank samples. As noted in Section 2, samples under GTC Project Number R92-2649 were re-extracted/re-analyzed because the corresponding method yielded a concentration above the CRQL.

The re-extracted/re-analyzed method blank for this package was non-detected for all subject PCBs. Two other data packages, R92-2857 and R92-2340 yielded the following detections of PCB 1260:

GTC Project Number	PCB	Concentration ug/kg	CRQL ug/kg
R92-2857	1260	14	33
R92-2340	1260	16	33
	1260	40	33

Most samples in these two data packages yielded PCB concentrations in excess of five times (assuming dilution factors) the method blank concentration and therefore did not require qualification, with the exception of sample NTC-11S 2'-4' (R92-2340). This sample's corresponding method blank yielded a concentration of Aroclor 1260 above the CRQL but neither the sample nor the method blank were re-extracted or re-analyzed. The concentration for 1260 in NTC-11S 2'-4' is therefore qualified as non-detected (data qualifier U).

7. RINSATE BLANK SAMPLES

Rinsate blank samples are used to assess the potential for cross-contamination during sampling activities. Since most soil and sediment samples were collected using dedicated sampling equipment, the collection of rinsate blank samples was limited to one on June 3, 1992. As this rinsate blank sample was PCB-free, the potential for sample contamination was minimal.

8. FIELD DUPLICATE RESULTS

Field duplicate samples are collected to assess the aggregate analytical and sampling protocol precision. The Work Plan required the collection of one field duplicate sample per 10 investigative samples. A total of 9 field duplicate samples out of 102 investigative samples were collected; thereby falling one short of meeting the requirement of 10 percent field duplicate sample collection. Field duplicate samples were submitted "blind" to GTC and are identified as follows:

Investigation Sample	Corresponding Field Duplicate Sample
NTC-S-2	NTC-S-15
NTC-S11 0"-6"	NTC-S-16
NTC-10S 8'-10'	QA-1 (6/2/92)
NTC-11S 8'-10'	QA-2
NTC-12S 12'-14'	NTC-12S
NTC-14S 10'-12'	NTC-QC
061992 PS-2-B	QA-1 (6/19/92)
NT071592-S-7	NTC-071592-S-D
NTC-91892-S-1	NTC-91892-S-2

For comparative purposes, field duplicate sample results were considered reproducible if both results were greater than 5 times the CRQL (ASP) or method detection limit (SW-846) and the RPDs were less than or equal to 50 percent.

Based on this criteria, only three field duplicate results were not reproducible. These are:

Aroclor	Concentration (ug/kg)		RPD
1260	NTC-91892-S-1 380	NTC-91892-S-2 180	71.4
1260	NTC-11S 8'-10' 1,400,000	QA-2 7,400,000(1)	136

Aroclor	Concentration (ug/kg)		RPD
1260	NTC-S11 0"-6" 4,600	NTC-S-16 2,100	74.6

(1) Previously estimated due to calibration outliers

Results for the above sample are qualified as estimated (data qualifier J) due to the low precision achieved.

It should be noted that the discrepancies for the above sample results were most likely caused by sample heterogeneity. Small changes in the sample matrix can have a substantial effect on the reproducibility of the data.

9. MATRIX SPIKE/MATRIX SPIKE DUPLICATES (MS/MSD) ANALYSES

MS/MSD samples are analyzed to assess method accuracy and precision on an individual sample basis. MS/MSD analyses are required on a 1 in 20 sample basis. Based on the total number submitted (see Section 1), the frequency of MS/MSD analyses was more than sufficient. Samples analyzed for PCBs by SW-846 protocols were spiked directly with standard PCBs. Samples analyzed for PCBs by ASP were spiked with pesticide compounds per the method protocol. The following samples were submitted for MS/MSD analyses by WCC:

MS/MSD SAMPLES

NTC-S-3
NTC-8D 26'-28'
NTC-11S 10'-12'
NTC-12S 6'-8'
NTC-14S 12'-14'
061992-PS-4G
NT071592-S-1
NTC91892-S-3

Pesticide MS/MSD results were compared to ASP control limits whereas PCB MS/MSD results were compared to laboratory generated accuracy and precision control limits.

Due to the necessity for sample dilution, MS/MSD recoveries could not be reported for samples NTC-11S 10'-12', NTC-91892-S-3, NT071592-S-1, and NTC-S-3. Remaining MS/MSD spike recoveries and RPDs indicated satisfactory analytical accuracy and precision with the exception of the following:

Sample	Spike Compound	MS Recovery (%)	MSD Recovery (%)	Control Limits
061992-PS-4G	1260	138	132	8-127

Since the above spike recoveries do not indicate a substantially high bias, qualification is not recommended.

10. CONCLUSION AND RECOMMENDATION

Based on the criteria outlined, it is recommended that the results reported for the provided data packages be accepted for use. However, many of the results required estimation (data qualifier J) due primarily to calibration problems associated with meeting ASP criteria for pesticides. It is also noted that although NYSDEC ASP protocols require substantially more QC documentation, most of it is not relevant to PCB analyses. SW-846 protocols require three to five point calibration curves for PCBs to demonstrate linearity and for quantification purposes whereas quantification under ASP uses a single point PCB standard assuming linear response if the pesticide calibration standards meet acceptance criteria. It is therefore recommended that, subject to NYSDEC approval, any future PCB analyses for this project employ SW-846 Method 8080 to alleviate unnecessary data qualification based on outlying pesticide calibration results and to generate results which are quantitatively more reliable.

AJM:jee

MEMORANDUM

To: File: 90C2139-1

From: Anthony J. Misercola

Office: Western New York

Date: October 15, 1992

Subject: Data Validation
Surface Water Samples and NAPL Sample
Niagara Transformer Corporation (NTC) Site
Cheektowaga, New York
May, June, July, September 1992

1. OVERVIEW

This memorandum presents an assessment and validation of analytical results for nine surface water samples and one non-aqueous phase liquid (NAPL) sample collected at the Niagara Transformer Site (NTC) located in Cheektowaga, New York. The samples were collected on May 26, June 26, July 15, and September 24, 1992. Analytical services were provided by General Testing Corporation (GTC) of Rochester, New York.

A summary of samples collected and analyses performed is presented below:

Sample ID	Matrix	Analyses
NTC-W1	water	Select BNs(1)
NTC-10S	water	Select BNs, PCBs, Total petroleum hydrocarbons (TPH)
NTC-8D	water	Select BNs, PCBs, TPH

Sample ID	Matrix	Analyses
NTC-7S-2	water	Target Analyte List (TAL) metals
NTC-11S	water	Select BNs, PCBs, TPH
NTC-Dup (Dup of NTC-11S)	water	Select BNs, PCBs, TPH
NTC-NAPL (from NTC-11S)	NAPL	Select BNs, PCBs
W-1	water	Select BNs, PCBs
NTC-Sept	water	Select BNs, PCBs
NTC-8D(R)	water	PCBs

(1) Select BNs - 1,2-dichlorobenzene, 1,3-dichlorobenzene, 1,4-dichlorobenzene, and 1,2,4-trichlorobenzene
(R) Resampled

BN analyses were performed by New York State Department of Environmental Conservation (NYSDEC) Analytical Services Protocol (ASP) Method 91-2. PCB analysis for sample W-1 was performed by NYSDEC ASP Method 91-3. TAL metals were also analyzed by NYSDEC ASP methods. PCBs for all other samples were analyzed using Method 608, from 40 CFR part 136 (July 1, 1990). TPH analyses were performed according to Method 418.1, from "Methods for Chemical Analysis of Water and Wastes", USEPA July 1983.

In addition to the analytical methods, the following documents were used as guidance for the data validation:

1. "CLP Organics Data Review and Preliminary Review", SOP number HW-6, Revision #8. January 1992. Prepared by USEPA Region II.

2. "Evaluation of Metals Data for the Contract Laboratory Program (CLP) based on SOW 3/90", SOP Revision XI. January 1992. Prepared by USEPA Region II.

These documents will be referred to as the "Region II Guidelines".

Assessment of the data included the following: laboratory conformance to analytical methods; adherence to accuracy and precision criteria; checks for data consistency based on field duplicate sample analyses; transmittal errors; and anomalously high or low parameter values. Data were also checked for legibility, completeness, correctness, and the presence of requisite dates, initials and signatures.

During the initial analyses of some samples, several compounds exceeded instrument linear ranges and subsequently required dilutions. Results which exceeded instrument linear ranges in the initial analyses were flagged by the laboratory with the qualifier "E". For these compounds, only the diluted results are valid for use. In this report, sample identifications followed by the suffix DL refer to the diluted sample results.

The following sections present the results of the data assessment and validation.

2. SAMPLE HOLDING TIMES

Sample holding times as presented in the analytical methods are listed below:

Analysis	Sample Holding Time
BNs, PCBs (Method 91-3)	5 days from VTSR[1] to extraction 40 days from extraction to analysis
PCBs (Method 608)	7 days from collection to extraction 40 days from extraction to analysis
TAL Metals	6 months from VTSR to analysis
Mercury	26 days from VTSR to analysis
TPH	28 days from collection to analysis

VTSR[1] - Verified time of sample receipt

Review of the chain-of-custody forms, date of sample receipt, extraction, and analysis dates indicated that all samples were analyzed within their requisite holding times.

3. INSTRUMENT PERFORMANCE AND CALIBRATION

Prior to BN analyses, the gas chromatograph/mass spectrometer (GC/MS) performance was assessed using decafluorotriphenylphosphine (DFTPP). The relative ion abundances were within the method specified limits. Therefore, the GC/MS was in proper working order prior to sample analyses.

One initial calibration (August 4, 1992) had a relative percent difference (RPD) of 26.5 percent, for 1,2-dichlorobenzene, above the upper control limit of 20.5 percent. Per ASP, up to four compounds are allowed to exceed the 20.5 percent RSD criteria, as long as the RSD is below 40 percent. No action is required, as the method requirements were met. All remaining RSD values were below 20.5 percent.

Calibration for PCB analysis of sample W-1 followed the ASP sequence for which acceptance criteria are based on analyses of pesticide calibration standards. Failure to meet certain ASP calibration criteria requires repeating the calibration sequence since per the method requirements, samples may not be analyzed until the calibration criteria are met. The laboratory did not meet the ASP calibration criteria. However, since only PCB analyses were performed, outlying pesticide calibration standard results were evaluated and an assessment of their effects on the PCB data quality was conducted for sample W-1.

RT shifts of surrogate compounds are used to evaluate the stability of the GC system during standard and sample analyses. Retention times for the surrogate compound tetrachloro-meta-xylene were outside the specified retention time window of 0.05 minutes for several standards on column DB-608. The laboratory stated that this retention time (RT) shift was due to unknown circumstances. Since retention times were outside the retention time window by only 0.02 minutes, the RT shift has no effect on the quantitation or identification of PCBs, therefore, no qualification is required. Percent relative standard deviations (%RSDs) between calibration factors were greater than 20 percent (maximum allowed per method) for the following pesticide compounds:

Column	**Analyte**	**Percent RSD**
DB-608	alpha-BHC	30.0
	gamma-BHC (lindane)	28.6
	dieldrin	21.4
	methoxychlor	21.8
DB-1701	alpha-BHC	38.8
	gamma-BHC	35.3
	4,4'-DDT	21.0
	methoxychlor	34.1

ASP allows two pesticide compounds to exceed the 20 percent RSD criteria as long as the values do not exceed 30 percent. The laboratory failed to meet this criteria, but recalibration was not performed. Therefore, acceptable linearity for this initial calibration was not achieved. The quantitation of PCBs is based on a single calibration point, assuming a linear detector response. Since a linear detector response was not initially established for pesticides, a three-point calibration curve should have been performed to establish acceptable linearity for PCBs but was not detected. PCB data for sample W-1 are therefore qualified as estimated (J for detects) based on failure to meet linearity criteria.

The instrument blank samples analyzed with the initial and continuing calibration standards were not spiked with the surrogate compounds tetrachloro-meta-xylene or decachlorobiphenyl as required by ASP. Retention time shifts could therefore not be evaluated. As PCBs are identified by pattern recognition, not retention time, the absence of retention time data for instrument blank samples has no effect upon the PCB data.

The resolution criterion of 60 percent was not met for 4,4'-DDE (40 percent) and dieldrin (40 percent) on column DB-608 and endosulfan sulfate (55 percent) and methoxychlor (55 percent) on column DB-1701. Review of the sample and standard chromatograms for PCBs indicated that compound identification was acceptable. Therefore, the low resolution achieved for the pesticide compounds did not affect the identification of Aroclor 1260 in sample W-1.

The surrogate compound decachlorobiphenyl had RPD values above 25 percent in individual standard mixture B on both columns. Individual standard mixture A had alpha-BHC and gamma-BHC outside retention time windows on column DB-608. The outlying RPD values and outlying pesticide retention times indicate that a functional problem existed with the instrument calibrations and subsequent sample analysis. Since the PCB data for sample W-1 was previously qualified as estimated, no further qualification was performed.

Examination of the metals data showed acceptable correlation coefficients and initial calibration verification (ICV) percent recoveries. Two continuing calibration verification (CCV) percent recoveries (arsenic and selenium) were outside the 90 to 110 percent ASP control limits. However, these recoveries were not associated with the Niagara Transformer sample. Therefore, qualification was not required.

Six contract required detection limit (CRDL) percent recoveries were outside the "Region II Guidelines" control limits of 80 to 120 percent as listed as follows:

Analyte	CRDL Percent Recovery	Percent Control Limits
arsenic	27.4	80-120
lead	79.4	80-120
mercury	0	80-120
selenium	44.6	80-120
antimony	137.5	80-120
vanadium	126.2	80-120

Per the "Region II Guidelines", the following qualification of sample NTC-7S-2 was performed:

Sample ID	Analyte	Sample Concentration (mg/l)	Qualifier
NTC-7S-2	arsenic	3.0U	R
	antimony	19.6B	J

Sample ID	Analyte	Sample Concentration (mg/l)	Qualifier
NTC-7S-2	lead	2.3B	J
(continued)	mercury	0.10U	R
	selenium	2.8U	R

J - value is estimated
B - analyte is detected above the instrument detection limit (IDL) but below the CRDL
R - value is unusable
U - non-detected at the stated detection limit

Vanadium did not require qualification, since the CRDL standard recovery was above control limits, and the sample result was non-detected. "Region II Guidelines" require qualification of only detected data when the CRDL standard recovery exceeds 120 percent.

All remaining metals calibration and performance data were acceptable.

4. SURROGATE SPIKE RECOVERIES

Samples analyzed for BNs and PCBs are spiked with surrogate compounds prior to extraction. Surrogate compounds are used to check laboratory performance on an individual sample basis.

Due to the necessity for sample dilution, surrogate compounds could not be recovered for the following samples:

Fraction	Samples
BNs	NTC-11S DL NTC-Dup DL NTC-NAPL DL
PCBs	NTC-11S NTC-Dup (dup. of NTC-11S)

Therefore, laboratory performance could not be evaluated for the above samples. The following investigative samples had outlying surrogate spike recoveries:

Sample ID	Analysis	Surrogate Compound	Percent Recovery	Percent Control Limits
NTC-11S	BN	nitrobenzene-d_5	0	35-114
		2-fluorobiphenyl	282	43-116
		terphenyl-d_{14}	0	33-141
		1,2-dichlorobenzene-d_4	7	16-110
NTC-Dup (Dup of NTC-11S)	BN	nitrobenzene-d_5	0	35-114
		2-fluorobiphenyl	640	43-116
		1,2-dichlorobenzene-d_4	114	16-110
NTC-NAPL	BN	nitrobenzene-d_5	166	23-120
		2-fluorobiphenyl	203	30-115
		1,2-dichlorobenzene-d_4	258	20-130

The above samples were reanalyzed at a dilution, however all reanalyses had the surrogates diluted out of solution.

Qualification of sample data on the basis of outlying surrogate spike recoveries per the "Region II Guidelines" is described below:

1. If any BN surrogate recovery is less than 10 percent

   detected data - J (estimated)
   non-detected data - R (unusable)

2. If more than one BN surrogate recovery is outside control limits but greater than 10 percent

   detected data - J (estimated)
   non-detected data - UJ (estimated quantitation limit)

The affected sample data is qualified below:

Sample ID	Analysis	Compound	Concentration	Qualifier
NTC-11S	BN	1,3-dichlorobenzene	520E µg/l	Note(1)
		1,4-dichlorobenzene	530E µg/l	Note(1)
		1,2-dichlorobenzene	Note(2)	-----
		1,2,4-trichlorobenzene	Note(2)	-----
NTC-Dup	BN	1,3-dichlorobenzene	380E µg/l	Note(1)
		1,4-dichlorobenzene	210E µg/l	Note(1)
		1,2-dichlorobenzene	420E µg/l	Note(1)
		1,2,4-trichlorobenzene	Note(2)	-----
NTC-NAPL	BN	1,3-dichlorobenzene	1,000,000 µg/kg	J
		1,4-dichlorobenzene	1,000,000 µg/kg	J
		1,2-dichlorobenzene	2,400,000E µg/kg	Note(1)
		1,2,4-trichlorobenzene	650,000 µg/kg	J

E, Note(1) - Value exceeded instrument's linear calibration range and is considered an estimated value. Further qualification is not required.
Note(2) - Compound could not be quantified due to severe matrix interference
J - Estimated value

5. METHOD BLANK SAMPLES

Method blank samples are used to assess contamination from laboratory conditions and/or procedures. All method blank samples were non-detected for PCBs and TPH. A tentatively identified compound (TIC) was detected in one BN method blank sample (5/29/92) as shown below:

Extraction Date	Retention Time (Minutes)	TIC	Estimated Concentration μg/l
5/29/92	4.12	Unknown	370

This TIC was also present in sample NTC-W1 at a concentration of 400 μg/l. Per the "Region II Guidelines", this datum requires rejection (data qualifier R) on the basis of method blank sample contamination.

All initial calibration blanks, continuing calibration blanks, and preparation blanks analyzed for TAL metals were non-detected.

6. FIELD DUPLICATE SAMPLES

Field duplicate sample results are used to assess overall precision achieved in the field. A field duplicate of sample NTC-11S was collected and submitted as sample NTC-Dup. to the laboratory.

Organic field duplicate results greater than five times the laboratory detection limit (accounting for dilution factors) are considered reproducible if the RPD between the original result and field duplicate result is less than 50 percent. All field duplicate results were reproducible, with the exception of those reported for 1,2,4-trichlor which had an RPD of 158.5 percent. Results for 1,2,4-trichlorobenzene in NTC and NTC-11S DL are therefore qualified as estimated (data qualifier J).

7. MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD) AND MATRI BLANK (MSB) ANALYSES

To evaluate potential matrix effects upon the data, MS/MSD and MSB samp analyzed. This requirement was waived for the sample batch containing onl NTC-W1 by NYSDEC. Samples NTC-10S (BNs, PCBs), NTC-NAPL (BNs), N (BNs, PCBs), and W-1 (BNs, pesticides) were analyzed as MS/MSD samples. samples yielded recoveries within the method control limits for BNs and pesti

Spike recoveries for the BN MS/MSD of NTC-NAPL could not be recovere elevated concentrations of the compounds of interest. Sample NTC-10S acceptable BN MS/MSD recoveries and RPD values. MS/MSD sample W-1 following outlying recoveries and/or RPD values:

Sample ID	Analyte	% Recovery MS/MSD	% Control Limits	RPD	RI Co Li
W-1	gamma-BHC (lindane)	--/50	56-123	21	15
	dieldrin	--/38	52-126	38	18
	4,4′-DDT	--/--	38-127	41	27

-- Recovery within control limits

As this sample has been previously qualified due to outlying pesticide calibrati further qualification of sample data is not required.

An MS analysis is required by ASP for metals analyses. Sample NTC-7S-2 was a as an MS sample. Calcium had an outlying MS recovery of 168.7 percent, al control limits of 75 to 125 percent. However, as the sample concentration was greater than four times the spike concentration, the control limits do not apply. Silver had an outlying MS recovery at 32.0 percent. Since the MS recovery indicated a low bias in results and the sample result was non-detected, the silver datum for NTC-7S-2 was qualified as estimated (data qualifier J).

8. INTERNAL STANDARDS

Internal standard area counts and retention times are used to ensure that GC/MS sensitivity and response are stable during analysis of BNs. Only those internal standards associated with the selected BNs analyzed were evaluated against control limits. Samples NTC-Dup and NTC-11S showed outlying internal standard area counts as shown below:

Sample ID	Internal Standard	Area	Area Limits
NTC-Dup	1,2-dichlorobenzene-d_4	13951	21778-87110
(Dup of NTC-11-S)	naphthalene-d_8	0	87469-349876
NTC-11-S	1,2-dichlorobenzene-d_4	5077	21778-87110
	naphthalene-d_8	0	87469-349876

Naphthalene-d_8 was not detected in both samples due to matrix interference. Qualification of the 1,2,4-trichlorobenzene data was not performed, as it could not be quantitated in either sample. The 1,2-dichlorobenzene, 1,3-dichlorobenzene and 1,4-dichlorobenzene data for both samples are already estimated as the results exceeded the instrument's linear calibration range. Further qualification is not required.

Both samples were re-analyzed at a dilution and yielded acceptable internal standard area counts and retention times.

9. ICP SERIAL DILUTION

For metals analyzed by Inductively Coupled Plasma (ICP), analytes detected at concentration 50 times (or greater) the instrument detection limit in an undiluted extract are required to have an ICP serial dilution performed. An ICP serial dilution was performed on sample NTC-7S-2. All diluted results except iron (13.7 percent) and sodium (12.2 percent) agreed within 10 percent of their corresponding undiluted results. Both iron and sodium required qualification as estimated (J) due to potential interferences inhibiting their quantitation.

10. INTERFERENCE CHECK SAMPLE

For ICP analyses, the interference check sample analysis is used to check the laboratory's interelement and background correction factors. all percent recoveries were within the established control limits of 80 to 120 percent.

11. LABORATORY CONTROL SAMPLE (LCS)

The LCS serves as a monitor of the efficiency of the metals digestion procedure. All LCS recoveries were within the established control limits of 80 to 120 percent. This indicates that sample digestion was efficiently performed by the laboratory.

12. DETECTION LIMITS

Samples analyzed by Method 608 generally did not attain the required detection limit of 0.065 μg/l for PCBs. For some samples, the laboratory did not meet this detection limit due to elevated PCB concentrations in the samples.

13. COMPOUND QUANTITATION

Samples NTC-10S and NTC-11S could not have 1,2,4-trichlorobenzene quantitated, because corresponding internal standards could not be identified due to matrix interferences. Matrix interferences also prevented the quantitation of 1,2-dichlorobenzene in sample NTC-11S. Both samples were re-analyzed at a dilution.

14. CONCLUSION AND RECOMMENDATIONS

Based on the criteria outlined, it is recommended that the results reported for the provided data packages be accepted for use with the qualifications noted herein.

Failure to meet certain ASP criteria for Method 91-3 (PCBs) indicates problems with the laboratory's ability to accurately perform the required analyses. It is recommended that, subject to NYSDEC approval, any future PCB analyses for this project employ SW-846 Method 8080 to alleviate unnecessary data qualification based on outlying pesticide calibration results (ASP Method 91-3) and to generate results which are quantitatively more reliable.

AJM:jee